SECTION ACC
ACCELERATOR CONTROL SYSTEM

CONTENTS

PRECAUTION 2

PRECAUTIONS 2
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 2

ON-VEHICLE REPAIR 3

ACCELERATOR CONTROL SYSTEM 3
Exploded View 3
Removal and Installation 3
Inspection 3

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001094798

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

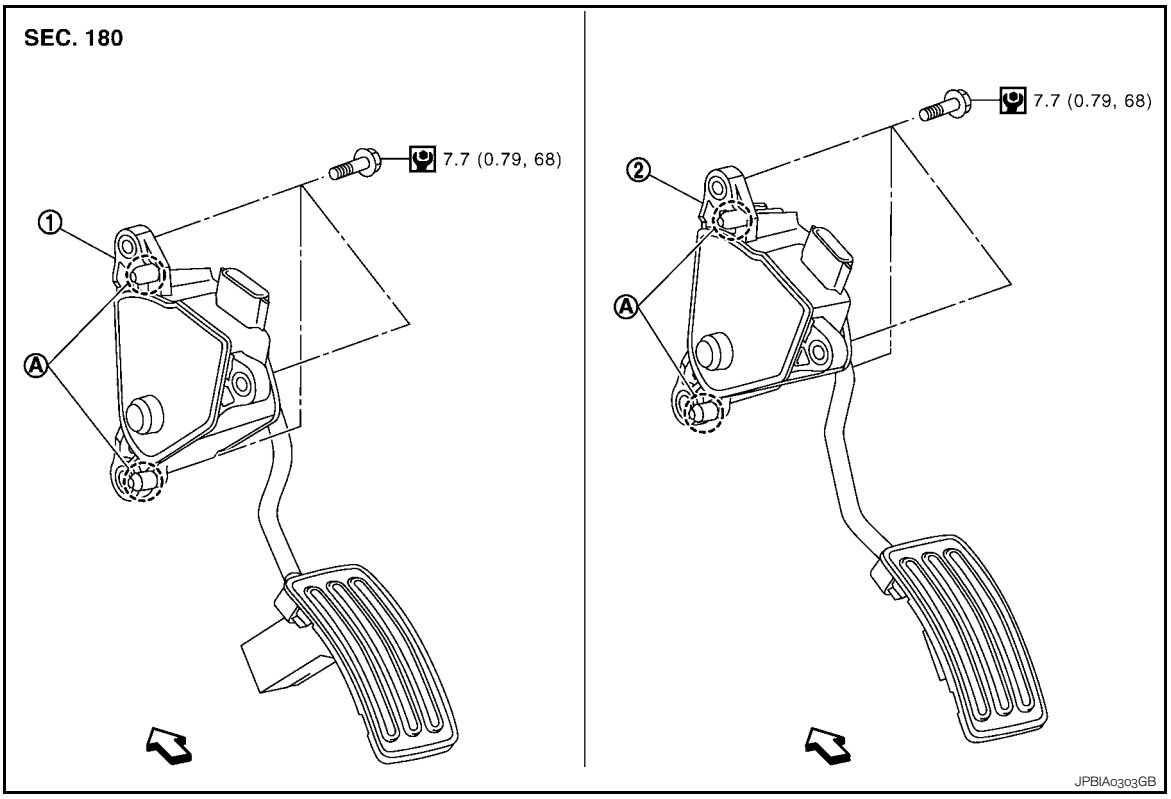
cardiagn.com

ON-VEHICLE REPAIR

ACCELERATOR CONTROL SYSTEM

Exploded View

INFOID:0000000000905754



1. Accelerator pedal assembly (LHD models) 2. Accelerator pedal assembly (RHD models)
A. Locating pin
⇦ : Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000905755

REMOVAL

1. Loosen mounting bolts, and remove accelerator pedal assembly.
   CAUTION:
   - **Never disassemble accelerator lever. Never remove accelerator pedal position sensor from accelerator lever.**
   - **Avoid impact from dropping etc. during handling.**
   - **Be careful to keep accelerator lever away from water.**
2. Disconnect accelerator pedal position sensor harness connector.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Insert locating pin into vehicle side to position accelerator pedal assembly. Install mounting bolt to accelerator pedal assembly.

Inspection

INFOID:0000000000905756

INSPECTION AFTER INSTALLATION

- Make sure accelerator pedal moves smoothly within the whole operation range when it is fully depressed and released. (CVT models)

cardiagn.com

- Make sure accelerator pedal securely returns to the fully released position.
- For the electrical inspection of accelerator pedal position sensor. Refer to EC-280, "Description" (HR16DE), EC-1158, "Description" (MR20DE) or EC-1358, "Description" (K9K).

cardiagn.com

SECTION AV
AUDIO, VISUAL & NAVIGATION SYSTEM

CONTENTS

AUDIO WITHOUT NAVIGATION

BASIC INSPECTION 5

DIAGNOSIS AND REPAIR WORKFLOW 5
Work Flow 5

FUNCTION DIAGNOSIS 6

AUDIO SYSTEM 6
System Diagram 6
System Description 6
Component Parts Location 8
Component Description 8

COMPONENT DIAGNOSIS 9

POWER SUPPLY AND GROUND CIRCUIT 9

AUDIO UNIT 9
AUDIO UNIT : Diagnosis Procedure 9

MICROPHONE SIGNAL CIRCUIT 10
Description 10
Diagnosis Procedure 10

STEERING SWITCH SIGNAL A CIRCUIT 11
Description 11
Diagnosis Procedure 11
Component Inspection 11

STEERING SWITCH SIGNAL B CIRCUIT 13
Description 13
Diagnosis Procedure 13
Component Inspection 13

STEERING SWITCH SIGNAL GND CIRCUIT.... 15
Description 15
Diagnosis Procedure 15
Component Inspection 15

ECU DIAGNOSIS 16

AUDIO UNIT 16
Reference Value 16
Wiring Diagram - AUDIO WITHOUT NAVIGATION SYSTEM (LHD MODELS) - 18
Wiring Diagram - AUDIO WITHOUT NAVIGATION SYSTEM (RHD MODELS) - 24

SYMPTOM DIAGNOSIS 30

MULTI AV SYSTEM SYMPTOMS 30
Symptom Table 30

NORMAL OPERATING CONDITION 31
Description 31

PRECAUTION 32

PRECAUTIONS 32
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 32

ON-VEHICLE REPAIR 33

AUDIO UNIT 33
Exploded View 33
Removal and Installation 33

FRONT DOOR SPEAKER 34
Exploded View 34
Removal and Installation 34

REAR DOOR SPEAKER 35
Exploded View 35
Removal and Installation 35

TWEETER 36
Exploded View 36
Removal and Installation 36

STEERING SWITCH 37
Exploded View 37
Removal and Installation 37

cardiagn.com

MICROPHONE 38
Exploded View 38
Removal and Installation 38

RADIO ANTENNA 39
Exploded View 39
Removal and Installation 39

ANTENNA FEEDER (RADIO) 40
Harness Layout 40

AUDIO WITH NAVIGATION

BASIC INSPECTION 41

DIAGNOSIS AND REPAIR WORKFLOW 41
Work Flow 41

FUNCTION DIAGNOSIS 43

MULTI AV SYSTEM 43
System Diagram 43
System Description 43
Component Parts Location 44
Component Description 45

NAVIGATION SYSTEM 47
System Diagram 47
System Description 47
Component Parts Location 49
Component Description 50

REAR VIEW MONITOR SYSTEM 51
System Diagram 51
System Description 51
Component Parts Location 51
Component Description 52

AUDIO SYSTEM 53
System Diagram 53
System Description 53
Component Parts Location 53
Component Description 54

DIAGNOSIS SYSTEM (NAVI CONTROL UNIT) 55
Diagnosis Description 55
CONSULT - III Function (MULTI AV) 65

DIAGNOSIS SYSTEM (CAMERA CONTROL UNIT) 70
CONSULT-III Function (REAR VIEW CAMERA) ... 70

COMPONENT DIAGNOSIS 71

U1000 CAN COMM CIRCUIT 71
Description 71
DTC Logic 71
Diagnosis Procedure 71

U1010 CONTROL UNIT (CAN) 72
Description 72
DTC Logic 72
Diagnosis Procedure 72

U1310 NAVI CONTROL UNIT 73
Description 73
DTC Logic 73

U1200 NAVI CONTROL UNIT 74
Description 74
DTC Logic 74

U1201 NAVI CONTROL UNIT 75
Description 75
DTC Logic 75

U1216 NAVI CONTROL UNIT 76
Description 76
DTC Logic 76

U1217 NAVI CONTROL UNIT 77
Description 77
DTC Logic 77

U1204 GPS 78
Description 78
DTC Logic 78
Diagnosis Procedure 78

U1205 GPS 79
Description 79
DTC Logic 79
Diagnosis Procedure 79

U1206 GPS 80
Description 80
DTC Logic 80
Diagnosis Procedure 80

U1207 GPS 81
Description 81
DTC Logic 81
Diagnosis Procedure 81

U1208 NAVI CONTROL UNIT 82
Description 82
DTC Logic 82
Diagnosis Procedure 82

U1209 NAVI CONTROL UNIT 83
Description 83
DTC Logic 83
Diagnosis Procedure 83

U120A NAVI CONTROL UNIT 84
Description 84
DTC Logic 84
Diagnosis Procedure 84

U120C NAVI CONTROL UNIT 85
Description 85
DTC Logic 85
Diagnosis Procedure 85

cardiagn.com

U120D NAVI CONTROL UNIT 86
Description 86
DTC Logic 86
Diagnosis Procedure 86

U120E NAVI CONTROL UNIT 87
Description 87
DTC Logic 87
Diagnosis Procedure 87

U120F NAVI CONTROL UNIT 88
Description 88
DTC Logic 88
Diagnosis Procedure 88

U1210 NAVI CONTROL UNIT 89
Description 89
DTC Logic 89
Diagnosis Procedure 89

U1211 NAVI CONTROL UNIT 90
Description 90
DTC Logic 90
Diagnosis Procedure 90

U1212 NAVI CONTROL UNIT 91
Description 91
DTC Logic 91
Diagnosis Procedure 91

U1213 NAVI CONTROL UNIT 92
Description 92
DTC Logic 92
Diagnosis Procedure 92

U1214 NAVI CONTROL UNIT 93
Description 93
DTC Logic 93
Diagnosis Procedure 93

U1215 NAVI CONTROL UNIT 94
Description 94
DTC Logic 94
Diagnosis Procedure 94

U1243 DISPLAY UNIT 95
Description 95
DTC Logic 95
Diagnosis Procedure 95

U1244 GPS ANTENNA 97
Description 97
DTC Logic 97
Diagnosis Procedure 97

U1250 CAMERA CONTROL UNIT 98
Description 98
DTC Logic 98
Diagnosis Procedure 98

U1300 AV COMM CIRCUIT 99
Description 99

POWER SUPPLY AND GROUND CIRCUIT .. 100

NAVI CONTROL UNIT 100
NAVI CONTROL UNIT : Diagnosis Procedure 100

AUDIO UNIT 100
AUDIO UNIT : Diagnosis Procedure 100

DISPLAY UNIT 101
DISPLAY UNIT : Diagnosis Procedure 101

CAMERA CONTROL UNIT 101
CAMERA CONTROL UNIT : Diagnosis Procedure ..102

RGB (R: RED) SIGNAL CIRCUIT 103
Description 103
Diagnosis Procedure 103

RGB (G: GREEN) SIGNAL CIRCUIT 104
Description 104
Diagnosis Procedure 104

RGB (B: BLUE) SIGNAL CIRCUIT 105
Description 105
Diagnosis Procedure 105

RGB SYNCHRONIZING SIGNAL CIRCUIT ... 106
Description 106
Diagnosis Procedure 106

RGB AREA (YS) SIGNAL CIRCUIT 107
Description 107
Diagnosis Procedure 107

HORIZONTAL SYNCHRONIZING (HP) SIGNAL CIRCUIT 108
Description 108
Diagnosis Procedure 108

VERTICAL SYNCHRONIZING (VP) SIGNAL CIRCUIT 109
Description 109
Diagnosis Procedure 109

MICROPHONE SIGNAL CIRCUIT 110
Description 110
Diagnosis Procedure 110

CAMERA IMAGE SIGNAL CIRCUIT (REAR VIEW CAMERA TO CAMERA CONTROL UNIT) 111
Description 111
Diagnosis Procedure 111

CAMERA IMAGE SIGNAL CIRCUIT (CAMERA CONTROL UNIT TO DISPLAY UNIT) 112
Description 112
Diagnosis Procedure 112

CAMERA ON SIGNAL CIRCUIT 113
Description 113

cardiagn.com

Diagnosis Procedure 113

STEERING SWITCH SIGNAL A CIRCUIT 114
Description 114
Diagnosis Procedure 114
Component Inspection 114

STEERING SWITCH SIGNAL B CIRCUIT 116
Description 116
Diagnosis Procedure 116
Component Inspection 116

STEERING SWITCH SIGNAL GND CIRCUIT. 118
Description 118
Diagnosis Procedure 118
Component Inspection 118

ECU DIAGNOSIS 120

NAVI CONTROL UNIT 120
Reference Value 120
Wiring Diagram - AUDIO WITH NAVIGATION SYSTEM - 124
DTC Index 137

AUDIO UNIT 139
Reference Value 139
Wiring Diagram - AUDIO WITH NAVIGATION SYSTEM - 142

DISPLAY UNIT 156
Reference Value 156
Wiring Diagram - AUDIO WITH NAVIGATION SYSTEM - 159

CAMERA CONTROL UNIT 173
Reference Value 173
Wiring Diagram - AUDIO WITH NAVIGATION SYSTEM - 175

SYMPTOM DIAGNOSIS 189

MULTI AV SYSTEM SYMPTOMS 189
Symptom Table 189

NORMAL OPERATING CONDITION 192
Description 192

PRECAUTION 200

PRECAUTIONS 200
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 200
Precaution for Trouble Diagnosis 200
Precaution for Harness Repair 200

ON-VEHICLE REPAIR 201

NAVI CONTROL UNIT 201
Exploded View 201
Removal and Installation 201

AUDIO UNIT 202
Exploded View 202
Removal and Installation 202

DISPLAY UNIT 203
Exploded View 203
Removal and Installation 203

FRONT DOOR SPEAKER 204
Exploded View 204
Removal and Installation 204

REAR DOOR SPEAKER 205
Exploded View 205
Removal and Installation 205

TWEETER 206
Exploded View 206
Removal and Installation 206

STEERING SWITCH 207
Exploded View 207
Removal and Installation 207

MICROPHONE 208
Exploded View 208
Removal and Installation 208

RADIO ANTENNA 209
Exploded View 209
Removal and Installation 209

GPS ANTENNA 210
Harness Layout 210
Removal and Installation 210

CAMERA CONTROL UNIT 212
Exploded View 212
Removal and Installation 212

REAR VIEW CAMERA 213
Exploded View 213
Removal and Installation 213
Adjustment 213

ANTENNA FEEDER (RADIO) 216
Harness Layout 216

ANTENNA FEEDER (GPS) 217
Harness Layout 217

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000996219

DETAILED FLOW

1.CHECK SYMPTOM

Check the malfunction symptoms by performing the following items.
- Interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred).
- Check the symptom.

>> GO TO 2.

2.PERFORM DIAGNOSIS BY SYMPTOM

Perform the relevant diagnosis referring to the diagnosis chart by symptom. Refer to AV-30, "Symptom Table".

>> GO TO 3.

3.REPAIR OR REPLACE MALFUNCTIONING PARTS

Repair or replace the malfunctioning parts.

>> GO TO 4.

4.FINAL CHECK

Perform the operation to check that the malfunction symptom is solved or any other symptoms are present.

Is there any symptom?

YES >> GO TO 2.
NO >> INSPECTION END

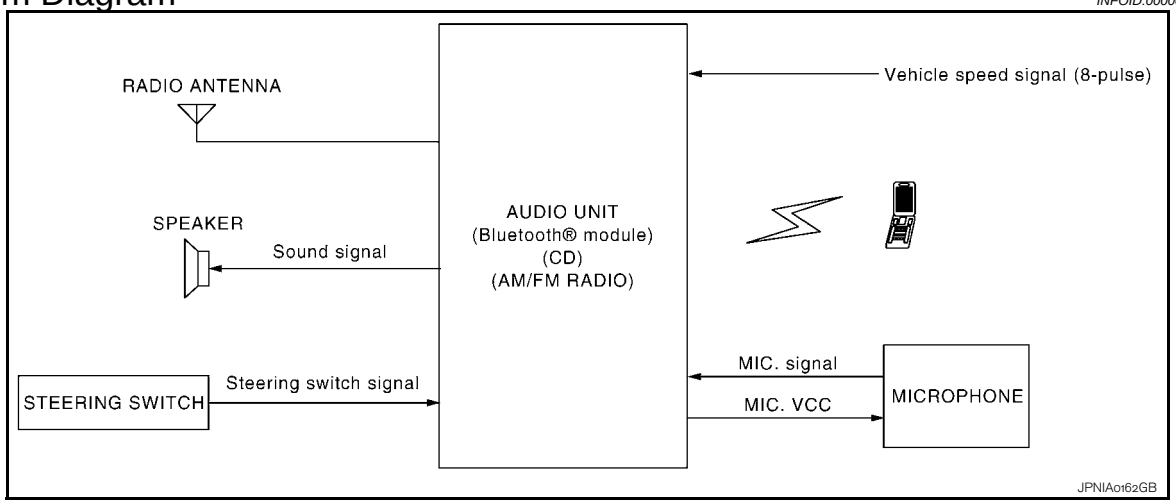
cardiagn.com

FUNCTION DIAGNOSIS

AUDIO SYSTEM

System Diagram

INFOID:0000000000996244



System Description

INFOID:0000000000996245

The audio system is equipped with following function. Each function is operated with audio switch or steering switch.

Function
AM/FM radio
CD
HANDS-FREE PHONE

FUNCTION DESCRIPTION

Operating signal

Audio system operation can be performed with audio switch or steering switch.

AM/FM Radio Mode

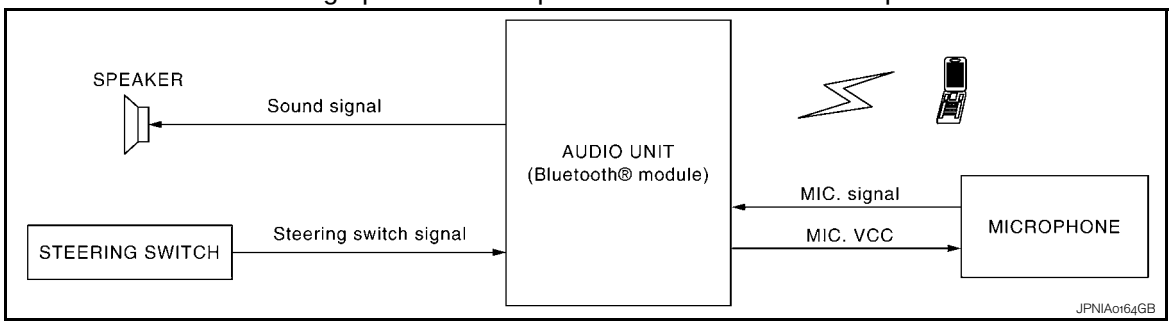
- AM/FM radio tuner is built into audio unit.
- Audio signal is received by antenna, next it is input to audio unit. Audio unit outputs the audio signal to each speaker.

CD Mode

- CD function is built into audio unit.
- Audio unit outputs audio signal to each speaker when CD is inserted to audio unit.

Hands-free phone system

- Hands-free communication can be operated by connecting using Bluetooth® with cellular phone.
- Operation is performed by steering switch.
- Guide sound that is heard during operation is output from audio unit to front speaker.



cardiagn.com

When a call is originated
- Spoken voice sound output from the microphone (Mic. Signal) is input to audio unit. Audio unit outputs to cellular phone with Bluetooth® communication as a TEL voice signal. Voice sound is then heard at the other party.

When receiving a call
- Voice sound is input to own cellular phone from the other party. TEL voice signal is output to front speaker, and the signal is input to audio unit by establishing Bluetooth® communication from cellular phone.

NATS AUDIO LINK

Description

The link with the NATS IMMU implies that the audio unit can basically only be operated if connected to the matching NATS IMMU to which the audio unit was initially fitted on the production line.
Since radio operation is impossible after the link with the NATS is disrupted, theft of the audio unit is basically useless since special equipment is required to reset the audio unit.

Initialization Process for Audio Units That Are Linked to the NATS IMMU

New audio units will be delivered to the factories in the “NEW” state, i.e. ready to be linked with the vehicle's NATS. When the audio unit in “NEW” state is first switched on at the factory, it will start up communication with the vehicle's immobilizer control unit (IMMU) and send a code (the “Audio Unit Code”) to the IMMU. The IMMU will then store this code, which is unique to each audio unit, in its (permanent) memory.
Upon receipt of the code by the IMMU, the NATS will confirm correct receipt of the audio unit code to the audio unit. Hereafter, the audio unit will operate as normal.
During the initialization process, “NEW” is displayed on the audio unit display. Normally though, communication between audio unit and IMMU takes such a short time (300 ms) that the audio unit seems to switch on directly without showing “NEW” on its display.

Normal Operation

Each time the audio unit is switched on afterwards, the audio unit code will be verified between the audio unit and the NATS before the audio unit becomes operational. During the code verification process, “WAIT” is shown on the audio unit display. Again, the communication takes such a short time (300 ms) that the audio unit seems to switch on directly without showing “WAIT” on its display.

When The Radio Is Locked

In case of the audio unit being linked with the vehicle's NATS (immobilizer system), disconnection of the link between the audio unit and the IMMU will cause the audio unit to switch into the lock (“SECURE”) mode in which the audio unit is fully inoperative. Hence, repair of the audio unit is basically impossible, unless the audio unit is reset to the “NEW” state for which special decoding equipment is required.
Clarion has provided their authorized service representatives with so called “decoder boxes” which can bring the audio unit back to the “NEW” state, enabling the audio unit to be switched on after which repair can be performed. Subsequently, when the repaired audio unit is delivered to the final user again, it will be in the “NEW” state to enable re-linking the audio unit to the vehicle's immobilizer system. As a result of the above, repair of the audio unit can only be done by an authorized Clarion representative (when the owner of the vehicle requests repair and can show personal identification).

Service Procedure

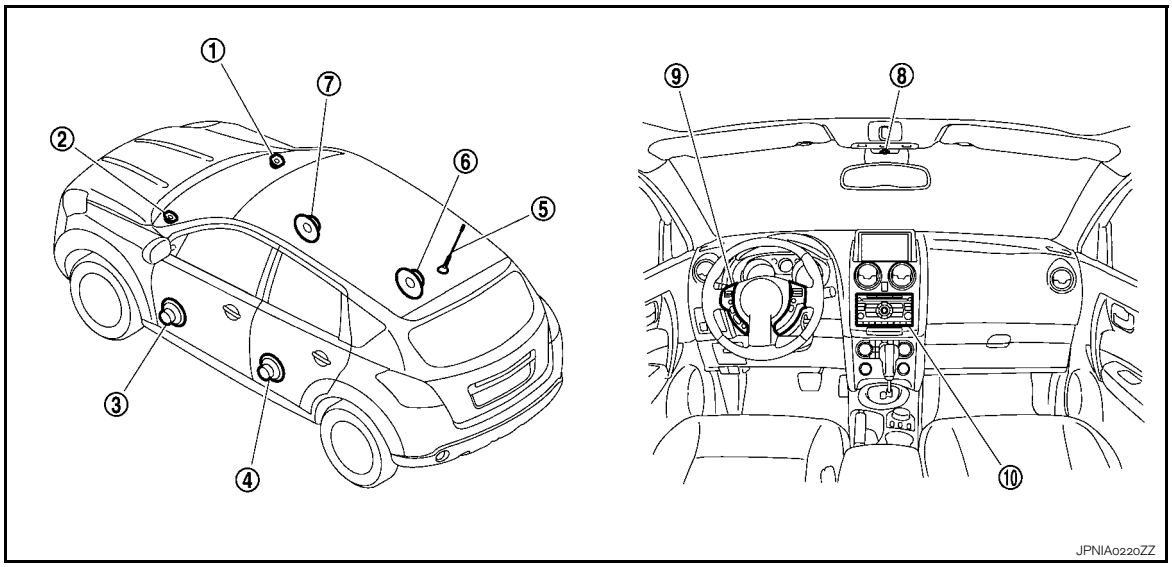
Item	Service procedure	Description
Battery disconnection	No additional action required.	–
Radio needs repair	Repair needs to be done by authorized representative of radio manufacturer since radio cannot be operated unless it is reset to NEW state, using special decoding equipment.	–
Replacement of radio by new part	No additional action required.	Radio is delivered in “NEW” state.
Transferring radio to another vehicle/replacement of radio by an old part	Radio needs to be reset to NEW state by authorized representative of radio manufacturer.	–
Replacement of IMMU	Radio needs to be reset to NEW state by authorized representative of Clarion.	After switching on the radio, it will display “SECURE” after 1 minute.

cardiagn.com

Item	Service procedure	Description
No communication from IMMU to radio	1. Check NATS system if NATS is malfunctioning. 2. Reset radio to “NEW” state by authorized representative of Clarion after NATS is repaired.	The radio will display “SECURE” after 1 minute after switching on the radio. Further use of radio is impossible until communication is established again, or after radio is reset by authorized representative of Clarion.
When initialized between ECM and IMMU.	Radio needs to be reset to “NEW” status by authorized representative of Clarion.	It will display “SECURE” after 1 minute after switching on the radio.

Component Parts Location

INFOID:0000000000996248



1. Tweeter RH
2. Tweeter LH
3. Front door speaker LH
4. Rear door speaker LH
5. Radio antenna
6. Rear door speaker RH
7. Front door speaker RH
8. Microphone
9. Steering switch
10. Audio unit

Component Description

INFOID:0000000000996249

Part name	Description
AUDIO UNIT	• Operational switch of audio system is integrated. • Receiving function of AM/FM radio, replaying function of CD and hands-free phone function are integrated. • Audio signals are output to each speaker.
FRONT DOOR SPEAKER	• Outputs sound signal from audio unit. • Outputs high, mid and low range sounds.
REAR DOOR SPEAKER	• Outputs sound signal from audio unit. • Outputs high, mid and low range sounds.
TWEETER	• Outputs sound signal from audio unit. • Outputs high range sound.
STEERING SWITCH	• Operations for audio and hands-free phone are possible. • Steering switch signal (operation signal) is output to audio unit.
MICROPHONE	• Used for hands-free phone operation. • Mic. signal is sent to audio unit. • Power (Mic. VCC) is supplied from audio unit.
RADIO ANTENNA	Radio signal received by antenna is sent to audio unit.

cardiagn.com

COMPONENT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

AUDIO UNIT

AUDIO UNIT : Diagnosis Procedure

INFOID:0000000000996400

1.CHECK FUSE

Check for blown fuses.

Power source	Fuse No.
Battery	38
Ignition switch ACC or ON	5

Is inspection result OK?

YES >> GO TO 2.
NO >> Be sure to eliminate cause of malfunction before installing new fuse.

2.CHECK POWER SUPPLY CIRCUIT

Check voltage between audio unit harness connector and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Value (Approx.)
Battery power supply	M46	19	OFF	12 V
ACC power supply	M46	7	ACC	12 V

Is inspection result OK?

YES >> GO TO 3.
NO >> Check harness between audio unit and fuse.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect audio unit connector.
3. Check continuity between audio unit harness connector and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Continuity
Ground	M48	31	OFF	Continuity should exist.

Is inspection result OK?

YES >> INSPECTION END
NO >> Repair harness or connector.

cardiagn.com

MICROPHONE SIGNAL CIRCUIT

Description

INFOID:0000000000996424

Supply power from audio unit to microphone. The microphone transmits the sound voice to the audio unit.

Diagnosis Procedure

INFOID:0000000000996425

1.CHECK CONTINUITY BETWEEN AUDIO UNIT AND MICROPHONE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect audio unit connector and microphone connector.
3. Check continuity between audio unit harness connector terminals 35, 36, 37 and microphone harness connector terminals 1, 2, 4.

35 - 1	**: Continuity should exist.**
36 - 2	**: Continuity should exist.**
37 - 4	**: Continuity should exist.**

4. Check continuity between audio unit harness connector terminals 35, 37 and ground.

35, 37 - Ground	**: Continuity should not exist.**

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK VOLTAGE MICROPHONE VCC

1. Connect audio unit connector.
2. Turn ignition switch ON.
3. Check voltage between audio unit harness connector terminal 37 and ground.

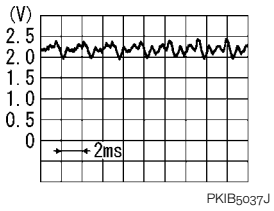
37 - ground	**: Approx. 5 V**

Is inspection result OK?

YES >> GO TO 3.
NO >> Replace audio unit.

3.CHECK MICROPHONE SIGNAL

1. Connect microphone connector.
2. Check signal between audio unit harness connector terminals 35 and 36.

35 - 36	 PKIB5037J

Is inspection result OK?

YES >> Replace audio unit.
NO >> Replace microphone.

cardiagn.com

STEERING SWITCH SIGNAL A CIRCUIT

Description

INFOID:0000000000996436

Transmits the steering switch signal to audio unit.

Diagnosis Procedure

INFOID:0000000000996437

1.CHECK STEERING SWITCH SIGNAL A CIRCUIT

1. Disconnect audio unit connector and spiral cable connector.
2. Check continuity between audio unit harness connector terminal 6 and spiral cable harness connector terminal 24.

6 - 24 : Continuity should exist.

3. Check continuity between audio unit harness connector terminal 6 and ground.

6 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK SPIRAL CABLE

Check spiral cable.

Is inspection result OK?

YES >> GO TO 3.
NO >> Replace spiral cable.

3.CHECK AUDIO UNIT VOLTAGE

1. Connect audio unit connector and spiral cable connector.
2. Turn ignition switch ON.
3. Check voltage between audio unit harness connector terminals 6 and 15.

6 - 15 : Approx. 5 V

Is inspection result OK?

YES >> GO TO 4.
NO >> Replace audio unit.

4.CHECK STEERING SWITCH

1. Turn ignition switch OFF.
2. Check steering switch. Refer to AV-11, "Component Inspection".

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace steering switch.

Component Inspection

INFOID:0000000000996438

Measure the resistance between the steering switch connector terminals 20 to 17 and 16 to 17.

cardiagn.com

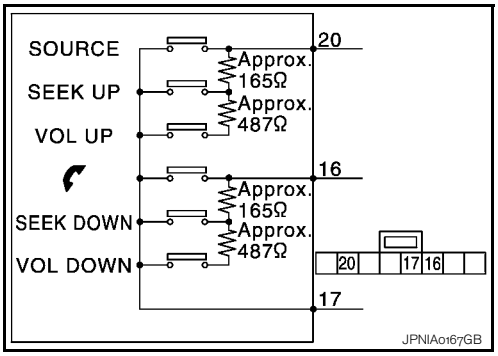
Standard

Between terminals 20 and 17

VOL UP switch ON	**: 634 – 665 Ω**
SEEK UP switch ON	**: 162 – 168 Ω**
SOURCE switch ON	**: 0 Ω**

Between terminals 16 and 17

VOL DOWN switch ON	**: 634 – 665 Ω**
SEEK DOWN switch ON	**: 162 – 168 Ω**
switch ON	**: 0 Ω**



cardiagn.com

STEERING SWITCH SIGNAL B CIRCUIT

Description

INFOID:0000000000999575

Transmits the steering switch signal to audio unit.

Diagnosis Procedure

INFOID:0000000000996441

1.CHECK STEERING SWITCH SIGNAL B CIRCUIT

1. Disconnect audio unit connector and spiral cable connector.
2. Check continuity between audio unit harness connector terminal 16 and spiral cable harness connector terminals 32.

16 - 32 : Continuity should exist.

3. Check continuity between audio unit harness connector terminal 16 and ground.

16 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK SPIRAL CABLE

Check spiral cable.

Is inspection result OK?

YES >> GO TO 3.
NO >> Replace spiral cable.

3.CHECK AUDIO UNIT VOLTAGE

1. Connect audio unit connector and spiral cable connector.
2. Turn ignition switch ON.
3. Check voltage between audio unit harness connector terminals 16 and 15.

16 - 15 : Approx. 5 V

Is inspection result OK?

YES >> GO TO 4.
NO >> Replace audio unit.

4.CHECK STEERING SWITCH

1. Turn ignition switch OFF.
2. Check steering switch. Refer to AV-13, "Component Inspection".

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace steering switch.

Component Inspection

INFOID:0000000000999577

Measure the resistance between the steering switch connector terminals 20 to 17 and 16 to 17.

cardiagn.com

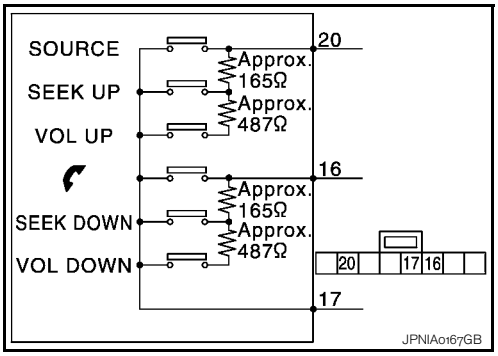
Standard

Between terminals 20 and 17

VOL UP switch ON	**: 634 – 665 Ω**
SEEK UP switch ON	**: 162 – 168 Ω**
SOURCE switch ON	**: 0 Ω**

Between terminals 16 and 17

VOL DOWN switch ON	**: 634 – 665 Ω**
SEEK DOWN switch ON	**: 162 – 168 Ω**
switch ON	**: 0 Ω**



cardiagn.com

STEERING SWITCH SIGNAL GND CIRCUIT

Description

INFOID:0000000000999576

Transmits the steering switch signal to audio unit.

Diagnosis Procedure

INFOID:0000000000996446

1.CHECK STEERING SWITCH SIGNAL GND CIRCUIT

1. Disconnect audio unit connector and spiral cable connector.
2. Check continuity between audio unit harness connector terminal 15 and spiral cable harness connector terminal 31.

15 - 31 : Continuity should exist.

3. Connect audio unit connector.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK SPIRAL CABLE

Check spiral cable.

Is inspection result OK?

YES >> GO TO 3.
NO >> Replace spiral cable.

3.CHECK GROUND CIRCUIT

1. Connect audio unit connector.
2. Check continuity between audio unit harness connector terminal 15 and ground.

15 - Ground : Continuity should exist.

Is inspection result OK?

YES >> GO TO 4.
NO >> Replace audio unit.

4.CHECK STEERING SWITCH

1. Turn ignition switch OFF.
2. Check steering switch. Refer to AV-15, "Component Inspection".

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace steering switch.

Component Inspection

INFOID:0000000000999578

Measure the resistance between the steering switch connector terminals 20 to 17 and 16 to 17.

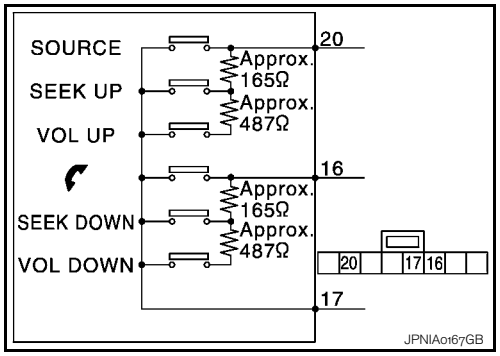
Standard

Between terminals 20 and 17

VOL UP switch ON	**: 634 – 665 Ω**
SEEK UP switch ON	**: 162 – 168 Ω**
SOURCE switch ON	**: 0 Ω**

Between terminals 16 and 17

VOL DOWN switch ON	**: 634 – 665 Ω**
SEEK DOWN switch ON	**: 162 – 168 Ω**
switch ON	**: 0 Ω**



cardiagn.com

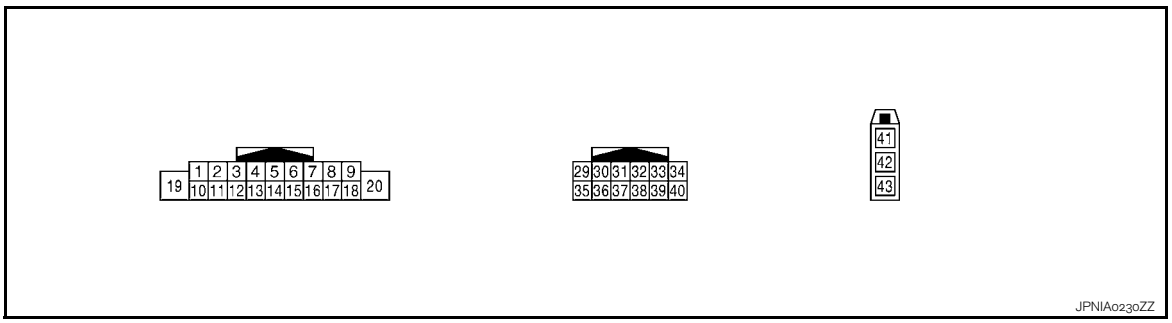
ECU DIAGNOSIS

AUDIO UNIT

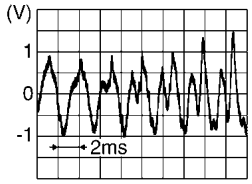
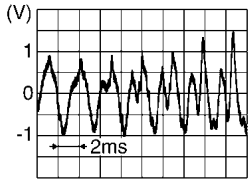
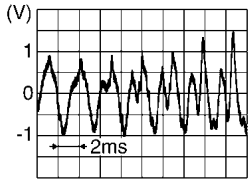
Reference Value

INFOID:0000000000996452

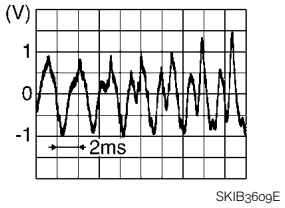
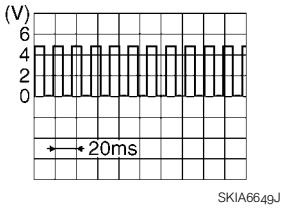
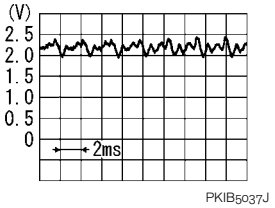
TERMINAL LAYOUT



PHYSICAL VALUES

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
2 (L)	3 (G)	Sound signal front LH	Output	Ignition switch ON	Voice output	 SKIB3609E
4 (LG)	5 (Y)	Sound signal rear LH	Output	Ignition switch ON	Voice output	 SKIB3609E
6 (R)	15 (B)	Steering switch signal A	Input	Ignition switch ON	Keep pressing SOURCE switch.	0 V
					Keep pressing SEEK UP switch.	1.7 V
					Keep pressing VOL UP switch.	3.3 V
					Except for above.	5 V
7 (R)	Ground	ACC power supply	Input	Ignition switch ACC	–	Battery voltage
11 (BR)	12 (P)	Sound signal front RH	Output	Ignition switch ON	Voice output	 SKIB3609E

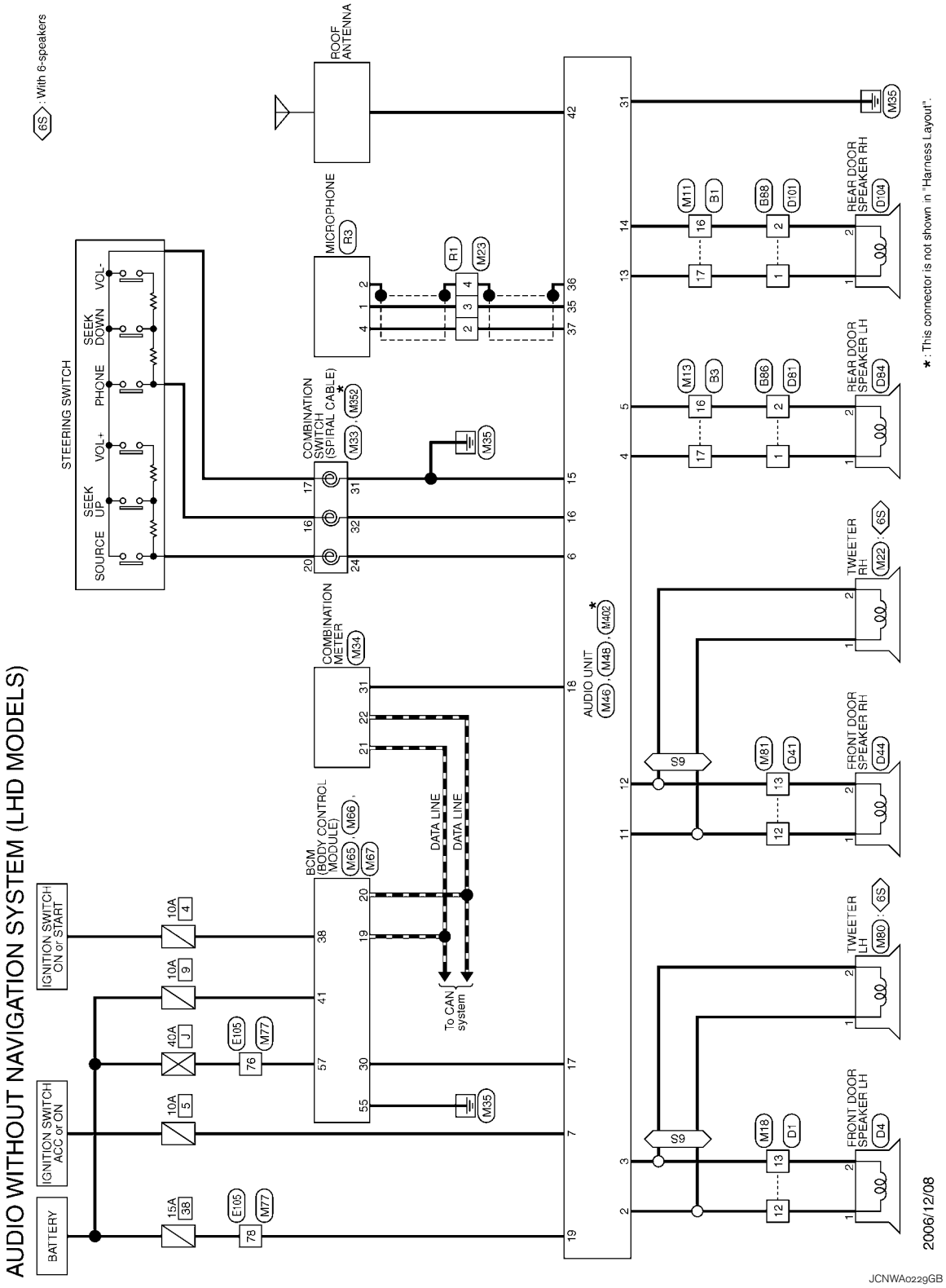
cardiagn.com

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
13 (O)	14 (V)	Sound signal rear RH	Output	Ignition switch ON	Voice output	 SKIB3609E
15 (B)	Ground	Steering switch signal GND	—	Ignition switch ON	—	0 V
16 (Y)	15 (B)	Steering switch signal B	Input	Ignition switch ON	Keep pressing switch.	0 V
					Keep pressing SEEK DOWN switch.	1.7 V
					Keep pressing VOL DOWN switch.	3.3 V
					Except for above.	5 V
17 (SB)	—	Immobilizer	—	—	—	—
18 (Y)	Ground	Vehicle speed signal (8-pulse)	Input	Ignition switch ON	When vehicle speed is approx. 40 km/h (25MPH)	 SKIA6649J
19 (LG)	Ground	Battery power supply	Input	Ignition switch OFF	—	Battery voltage
31 (B)	Ground	GND	—	Ignition switch ON	—	0 V
35 (B/W)	36	Microphone signal	Input	Ignition switch ON	Sounds	 PKIB5037J
36	Ground	Microphone GND	—	Ignition switch ON	—	0 V
37 (L)	36	Microphone VCC	Output	Ignition switch ON	—	5 V
42	—	Antenna signal	Input	—	—	—

cardiagn.com

Wiring Diagram - AUDIO WITHOUT NAVIGATION SYSTEM (LHD MODELS) -

INFOID:0000000000996454



cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (LHD MODELS)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
16	V	-
17	O	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	-
17	LG	-

Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

7	6	5	4	3	2	1
16	15	14	13	12	11	10	9	8

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	D4
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

7	6	5	4	3	2	1
16	15	14	13	12	11	10	9	8

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	D44
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

JCNWA0230GB

cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (LHD MODELS)

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D84
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D104
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–
78	LG	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
16	V	–
17	O	–

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	–
17	LG	–

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	–
13	G	–

JCNWA0231GB

cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (LHD MODELS)

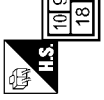
Connector No.	M22
Connector Name	TWEETER RH
Connector Type	FCI 211FC023S9017

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	P	–

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	W	–
3	B	–
4	SHIELD	–

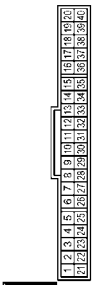
Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
24	R	–
31	B	–
32	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
31	Y	VEHICLE SPEED (8-PULSE)

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	SOUND SIGNAL FRONT LH (+)
3	G	SOUND SIGNAL FRONT LH (–)
4	LG	SOUND SIGNAL REAR LH (+)
5	Y	SOUND SIGNAL REAR RH (–)
6	R	STRG SW A
7	R	ACC
11	BR	SOUND SIGNAL FRONT RH (+)
12	P	SOUND SIGNAL FRONT RH (–)
13	O	SOUND SIGNAL REAR RH (+)
14	V	SOUND SIGNAL REAR RH (–)
15	B	STRG SW GND
16	Y	STRG SW B
17	SB	IMMOBILIZER
18	Y	VEHICLE SPEED (8-PULSE)
19	LG	BATTERY

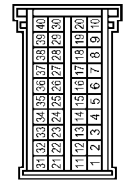
Connector No.	M48
Connector Name	AUDIO UNIT
Connector Type	TH12FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
31	B	CONTROL SIGNAL [Without navigation system]
35	B/W	MICROPHONE SIGNAL
36	SHIELD	MICROPHONE GND
37	L	MICROPHONE VCC[Without navigation system]

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L
30	SB	AUDIO LINK
38	W/L	IGN SW

JCNWA0232GB

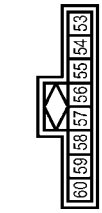
cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (LHD MODELS)

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

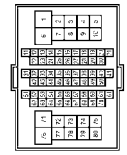
Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–
78	LG	–

Connector No.	M80
Connector Name	TWEETER LH
Connector Type	FCI 211PC023S9017

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	G	–

Connector No.	M81
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	P	–

Connector No.	M352
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08MGY-X

Terminal No.	Color of Wire	Signal Name [Specification]
16	–	–
17	–	–
20	–	–

Connector No.	M402
Connector Name	AUDIO UNIT
Connector Type	G13 SH-2 SIS-HU

Terminal No.	Color of Wire	Signal Name [Specification]
42	–	ANTENNA

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS6

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	–
3	W	–
4	SHIELD	–

JCNWA0233GB

cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (LHD MODELS)

Connector No.	R3
Connector Name	MICROPHONE
Connector Type	TK04FW

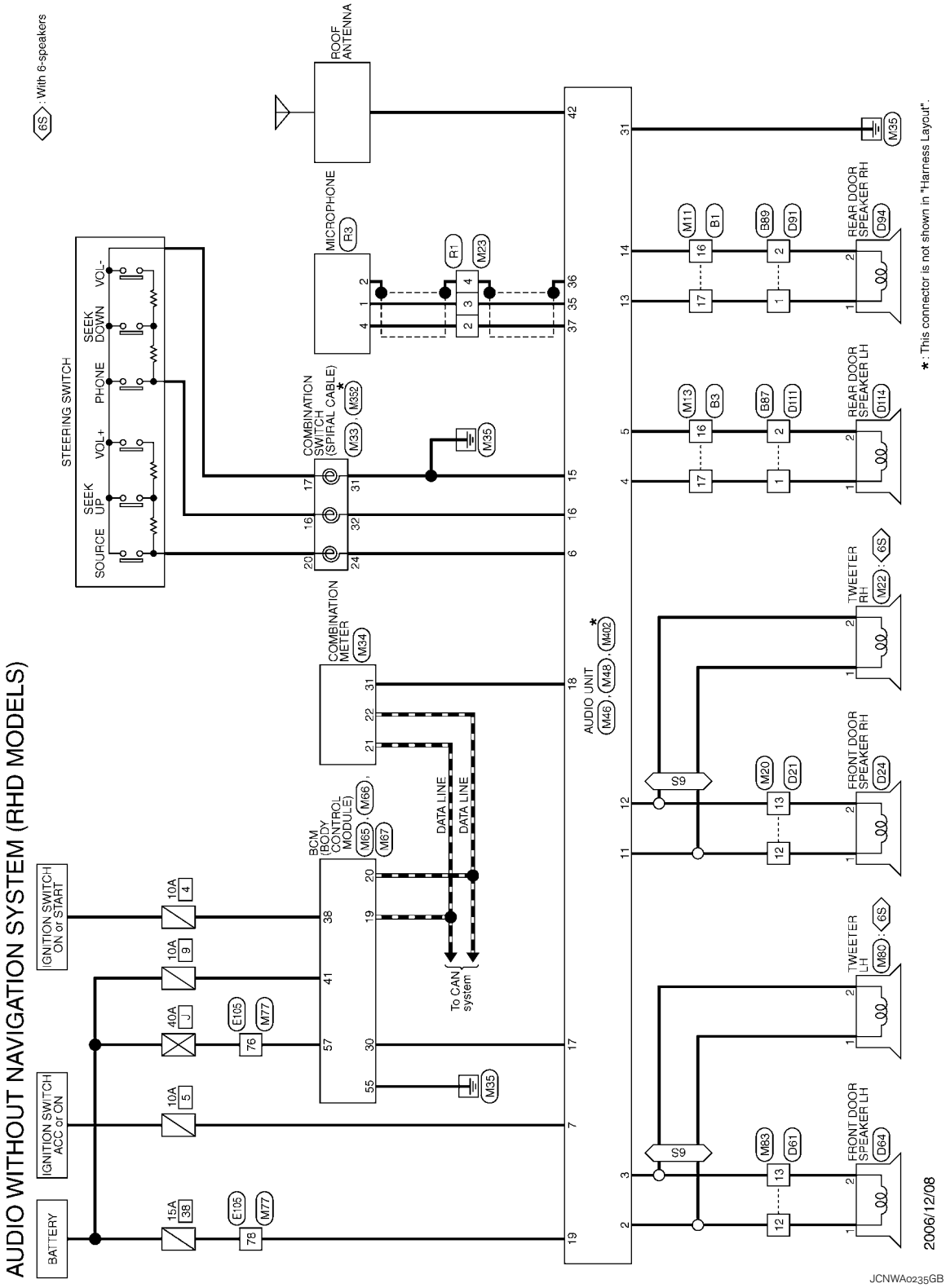
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	MICROPHONE SIGNAL
2	SHIELD	MICROPHONE GND
4	B	MICROPHONE VCC

JCNWA0234GB

cardiagn.com

Wiring Diagram - AUDIO WITHOUT NAVIGATION SYSTEM (RHD MODELS) -

INFOID:0000000001111175



cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (RHD MODELS)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
16	V	-
17	O	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	-
17	LG	-

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

7	6	5	4	3	2	1
16	15	14	13	12	11	10	9	8

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	D24
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

7	6	5	4	3	2	1
16	15	14	13	12	11	10	9	8

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	D64
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

JCNWA0236GB

cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (RHD MODELS)

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D94
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D114
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–
78	LG	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
16	V	–
17	O	–

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	–
17	LG	–

Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	P	–

JCNWA0237GB

cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (RHD MODELS)

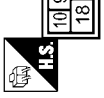
Connector No.	M22
Connector Name	TWEETER RH
Connector Type	FCI 211PC023S9017

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	P	–

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	W	–
3	B	–
4	SHIELD	–

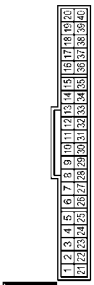
Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
24	R	–
31	B	–
32	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
31	Y	VEHICLE SPEED (8-PULSE)

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	SOUND SIGNAL FRONT LH (+)
3	G	SOUND SIGNAL FRONT LH (–)
4	LG	SOUND SIGNAL REAR LH (+)
5	Y	SOUND SIGNAL REAR RH (–)
6	R	STRG SW A
7	R	ACC
11	BR	SOUND SIGNAL FRONT RH (+)
12	P	SOUND SIGNAL FRONT RH (–)
13	O	SOUND SIGNAL REAR RH (+)
14	V	SOUND SIGNAL REAR RH (–)
15	B	STRG SW GND
16	Y	STRG SW B
17	SB	IMMOBILIZER
18	Y	VEHICLE SPEED (8-PULSE)
19	LG	BATTERY

Connector No.	M48
Connector Name	AUDIO UNIT
Connector Type	TH12FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
31	B	CONTROL SIGNAL [Without navigation system]
35	B/W	MICROPHONE SIGNAL
36	SHIELD	MICROPHONE GND
37	L	MICROPHONE VCC[Without navigation system]

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L
30	SB	AUDIO LINK
38	W/L	IGN SW

JCNWA0238GB

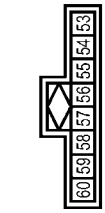
cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (RHD MODELS)

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

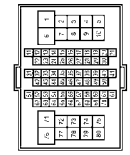
Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–
78	LG	–

Connector No.	M80
Connector Name	TWEETER LH
Connector Type	FCI 211PC023S9017

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	G	–

Connector No.	M83
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	–
13	G	–

Connector No.	M352
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08MGY-X

Terminal No.	Color of Wire	Signal Name [Specification]
16	–	–
17	–	–
20	–	–

Connector No.	M402
Connector Name	AUDIO UNIT
Connector Type	G13 SH-2 SIS-HU

Terminal No.	Color of Wire	Signal Name [Specification]
42	–	ANTENNA

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	–
3	W	–
4	SHIELD	–

JCNWA0239GB

cardiagn.com

AUDIO WITHOUT NAVIGATION SYSTEM (RHD MODELS)

Connector No.	R3
Connector Name	MICROPHONE
Connector Type	TK04FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	MICROPHONE SIGNAL
2	SHIELD	MICROPHONE GND
4	B	MICROPHONE VCC

JCNWA0240GB

cardiagn.com

SYMPTOM DIAGNOSIS

MULTI AV SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000000996467

RELATED TO AUDIO

Symptom	Check items	Possible malfunction location / Action to take
Audio sound is not heard.	No sound from all speakers	Audio unit (AV-33, "Exploded View")
	Sound is not heard only from the specific places (Front RH, rear RH, front LH and rear LH).	Sound signal circuit of suspect system

RELATED TO HANDS FREE PHONE

- Check that the cellular phone is corresponding type (Bluetooth® enabled) when the hands free related malfunction vehicle is in service before performing a diagnosis.
- There is a case that malfunction occurs due to the version change of the phone type, etc. even though it is a corresponding type. Therefore, confirm it by changing the cellular phone to another corresponding type phone, and check that it operates normally. It is necessary to distinguish whether the cause is the vehicle or cellular phone. Check to ensure the customers phone is supported by checking the phone compatibility for the hands free system.

Trouble diagnosis chart by symptom

Symptoms	Check items	Possible malfunction location / Action to take
Does not recognize cellular phone connection.	Repeat the registration of cellular phone.	Audio unit (AV-33, "Exploded View")
Hands free phone cannot be established.	• Hands free phone operation can be made, but the communication cannot be established. • Hands free phone operation can be performed, however, voice between each other cannot be heard during the conversation.	Audio unit (AV-33, "Exploded View")
The other party's voice cannot be heard by hands free phone.	No sound from all speakers	Audio unit (AV-33, "Exploded View")
	Sound is not heard only from the specific places (Front RH or front LH).	Sound signal circuit (TEL voice)
Originating sound is not heard by the other party with hands free phone communication.	Sound operation function is normal.	Audio unit (AV-33, "Exploded View")
	Sound operation function does not work.	Microphone signal circuit (AV-10, "Diagnosis Procedure")

RELATED TO STEERING SWITCH

Symptoms	Possible malfunction location / Action to take
All steering switches are not operated.	Steering switch signal ground circuit (AV-15, "Diagnosis Procedure")
Only specified switch cannot be operated.	Steering switch (AV-37, "Exploded View")
“MENU UP”, “VOL UP” and “SOURCE” switches are not operated.	Steering switch signal A circuit (AV-11, "Diagnosis Procedure")
“ ”, “MENU DOWN” and “VOL DOWN” switches are not operated.	Steering switch signal B circuit (AV-13, "Diagnosis Procedure")

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000001000509

RELATED TO AUDIO

- The majority of the audio malfunctions are the result of outside causes (bad CD, electromagnetic interference, etc.). Check the symptoms below to diagnose the malfunction.
- The vehicle itself can be a source of noise if noise prevention parts or electrical equipment is malfunctioning. Check that noise is caused and/or changed by engine speed, ignition switch turned to each position, and operation of each piece of electrical equipment. Then determine the cause.

NOTE:

- CD-R is not guaranteed to play because they can contain compressed audio (MP3, WMA) or could be incorrectly mastered by the customer on a computer.
- Check that the CDs carry the Compact Disc Logo. If not, the disc is not mastered to the red book Compact Disc Standard and may not play.

Symptoms	Cause and Counter measure
Cannot play	Check that the CD was inserted correctly.
	Check that the CD is scratched or dirty.
	Check that there is condensation inside the player, and if there is, wait until the condensation is gone (about 1 hour) before using the player.
	The player will play correctly after it returns to the normal temperature if there is a temperature increase error.
	Only the music CD files (CD-DA data) will be played if there is a mixture of music CD files (CD-DA data) and MP3/WMA files on a CD.
	Files with extensions other than ".MP3", ".WMA", ".mp3", or ".wma" cannot be played.
	Check that the finalization process, such as session close and disc close, is done for the disc.
	Check that the CD is protected by copyright.
Poor sound quality	Check that the CD is scratched or dirty.
It takes a relatively long time before the music starts playing.	If there are many folder or file levels on the MP3/WMA CD, or if it is a multisession disc, some time may be required before the music starts playing.
The songs do not play back in the desired order.	The playback order is the order in which the files were written by the software, so the files might not play in the desired order.

Noise resulting from variations in field strength, such as fading noise and multi-path noise, or external noise from trains and other sources, is not a malfunction.

NOTE:

- Fading noise: This noise occurs because of variations in the field strength in a narrow range due to mountains or buildings blocking the signal.
- Multi-path noise: This noise results from a time difference between the broadcast waves directly from the station arriving at the antenna and the waves reflected by mountains or buildings.

RELATED TO TELEPHONE

Symptom	Possible cause	Possible solution
The system does not recognize the command. The system recognizes the command incorrectly.	The interior of the vehicle is too noisy.	Close the windows or have other occupants be quiet.
	The volume of the voice is too low.	Speak louder.
	Pronunciation is unclear.	Speak clearly.
	Voice recognition mode is not yet ready to speak.	Push the release "✆" on the steering switch, and speak a command after the tone sounds.
	5 seconds or more have passed after pushed and released "✆" on the steering switch.	Make sure to speak a command within 5seconds after push and release "✆" on the steering switch.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001091326

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

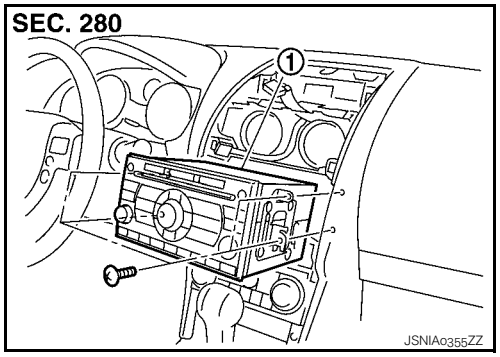
cardiagn.com

ON-VEHICLE REPAIR

AUDIO UNIT

Exploded View

INFOID:0000000000996482



1. Audio unit

Removal and Installation

INFOID:0000000000996483

REMOVAL

1. Remove cluster lid C. Refer to IP-11, "Exploded View".
2. Remove audio unit with bracket.

INSTALLATION

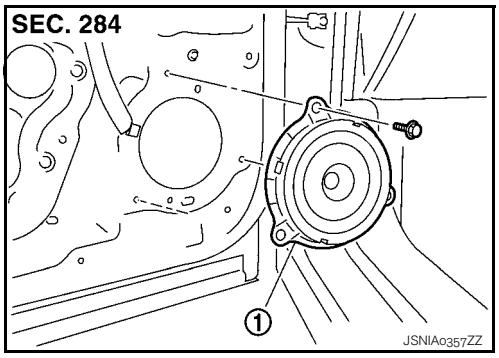
Install in the reverse order of removal.

cardiagn.com

FRONT DOOR SPEAKER

Exploded View

INFOID:0000000000996488



1. Front door speaker

Removal and Installation

INFOID:0000000000996489

REMOVAL

1. Remove front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Exploded View".
2. Remove front door speaker.

INSTALLATION

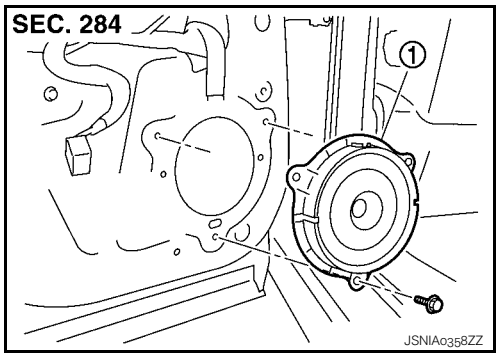
Install in the reverse order of removal.

cardiagn.com

REAR DOOR SPEAKER

Exploded View

INFOID:0000000000996490



1. Rear door speaker

Removal and Installation

INFOID:0000000000996491

REMOVAL

1. Remove rear door finisher. Refer to INT-12, "REAR DOOR FINISHER : Exploded View".
2. Remove rear door speaker.

INSTALLATION

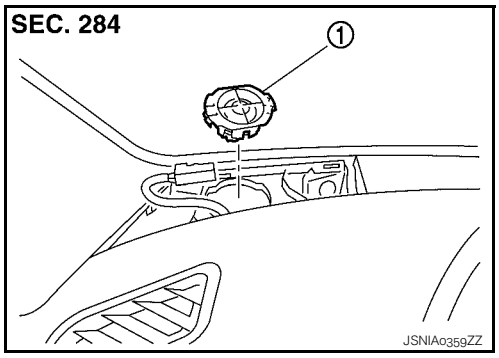
Install in the reverse order of removal.

cardiagn.com

TWEETER

Exploded View

INFOID:0000000000996492



1. Tweeter

Removal and Installation

INFOID:0000000000996493

REMOVAL

1. Remove tweeter grill. Refer to IP-11, "Exploded View".
2. Remove tweeter.

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

STEERING SWITCH

Exploded View

INFOID:0000000000996508

Refer to ST-9, "Exploded View".

Removal and Installation

INFOID:0000000000996509

REMOVAL

Refer to ST-9, "Removal and Installation".

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

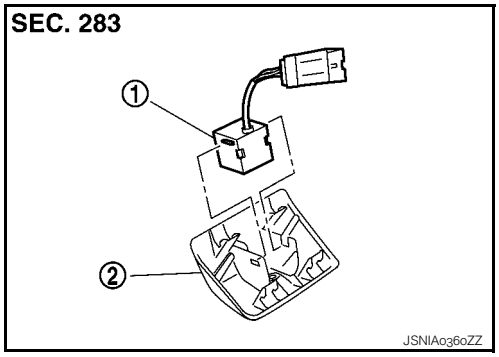
MICROPHONE

Exploded View

INFOID:0000000000996514

REMOVAL
Refer to INT-20, "Exploded View".

DISASSEMBLY



1. Microphone
2. Microphone cover

Removal and Installation

INFOID:0000000000996515

REMOVAL

1. Remove microphone cover. Refer to INT-20, "Exploded View".
2. Remove microphone.

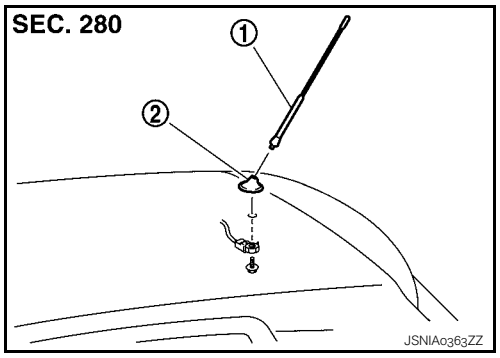
INSTALLATION
Install in the reverse order of removal.

cardiagn.com

RADIO ANTENNA

Exploded View

INFOID:0000000000996516



1. Antenna rod
2. Antenna base

Removal and Installation

INFOID:0000000000996517

REMOVAL

1. Remove headlining. Refer to INT-20, "Exploded View".
2. Remove antenna base and antenna rod.

INSTALLATION

Install in the reverse order of removal.

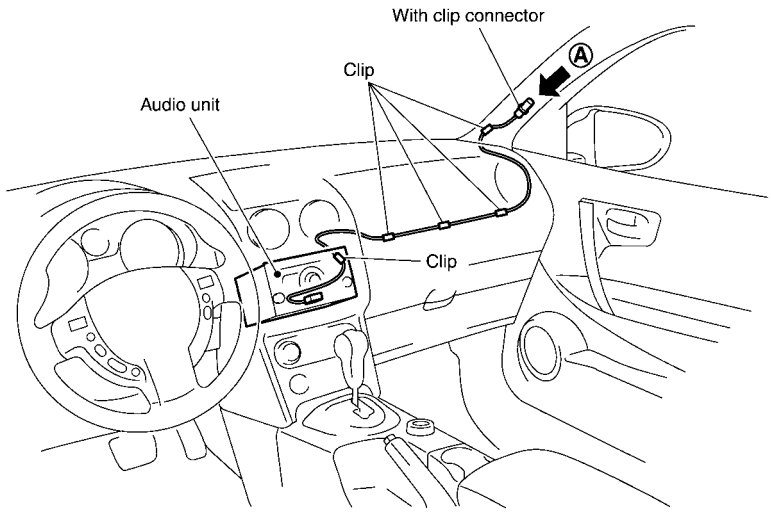
cardiagn.com

ANTENNA FEEDER (RADIO)

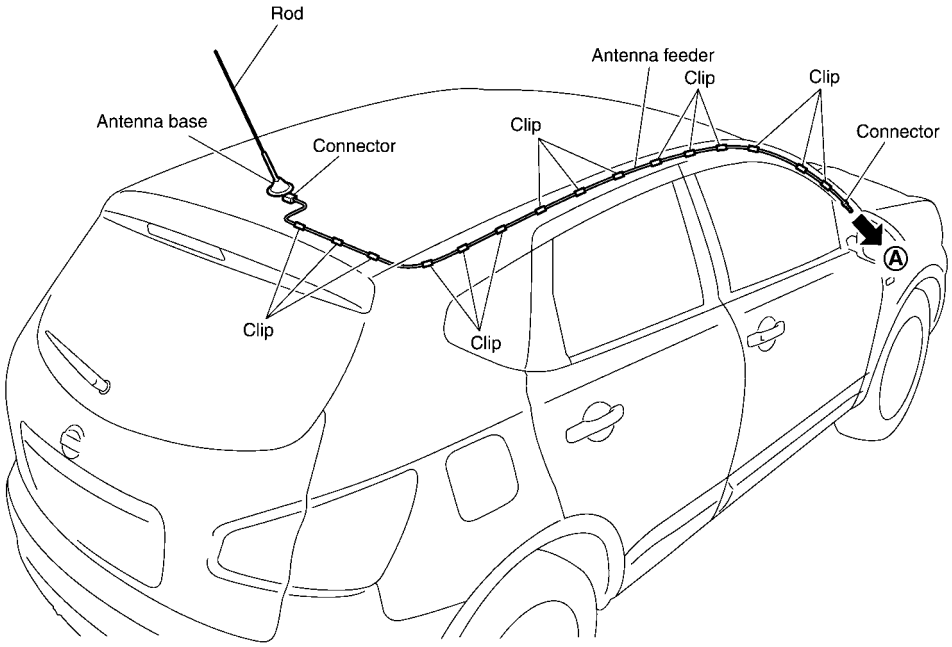
Harness Layout

INFOID:0000000000996531

SEC. 280



Instrument panel driver side



Rear view of vehicle

JPNIA0225GB

cardiagn.com

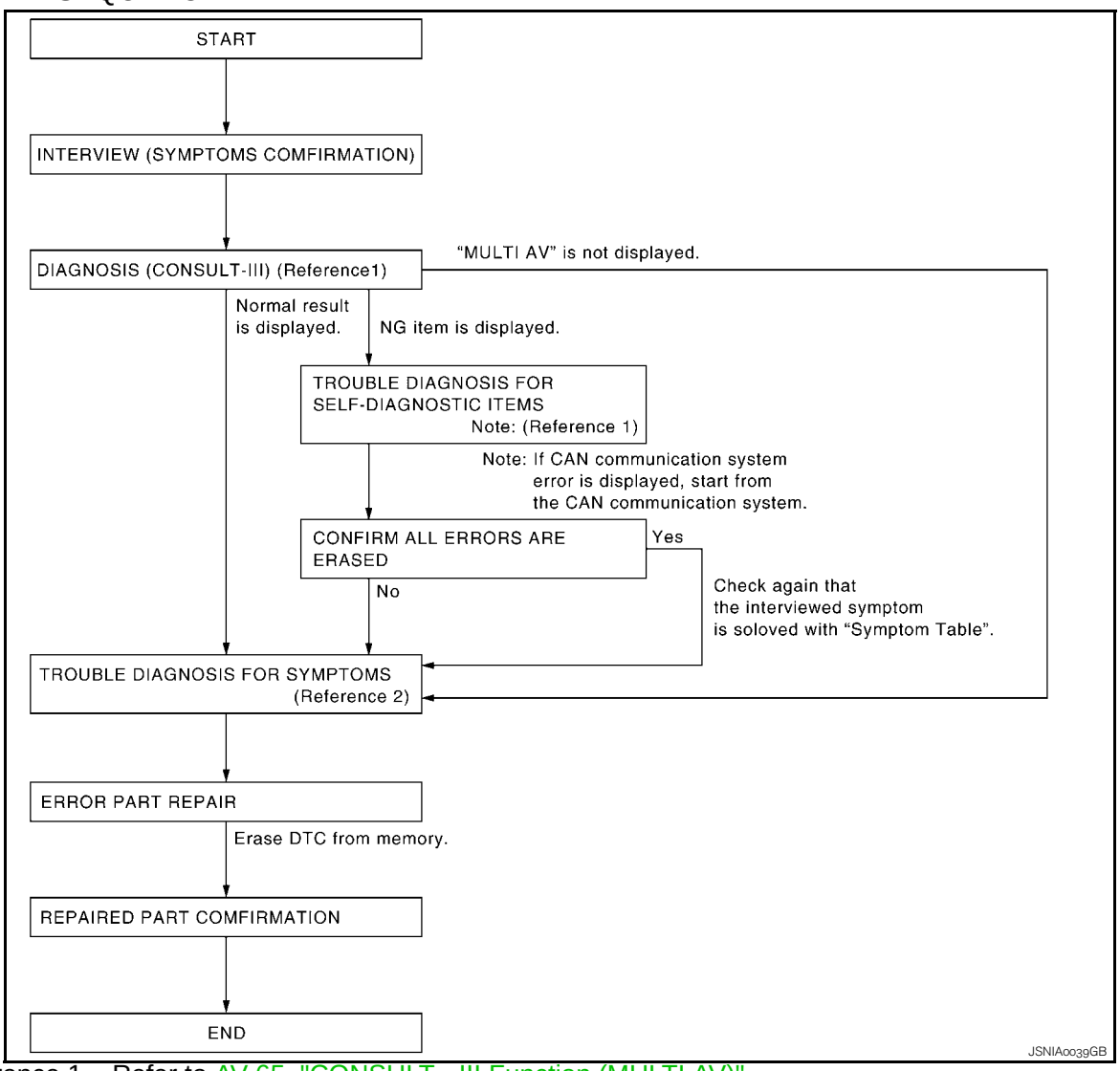
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000946996

OVERALL SEQUENCE



- Reference 1··· Refer to AV-65, "CONSULT - III Function (MULTI AV)".
- Reference 2··· Refer to AV-189, "Symptom Table".

DETAILED FLOW

1.CHECK SYMPTOM

Check the malfunction symptoms by performing the following items.
- Interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred).
- Check the symptom.

>> GO TO 2.

2.SELF-DIAGNOSIS (CONSULT-III)

1. Connect CONSULT-III and perform a self-diagnosis for "MULTI AV".
   NOTE:
   Skip to step 4 of the diagnosis procedure if "MULTI AV" is not displayed.
2. Check that any DTC No. is displayed in the self-diagnosis results.

cardiagn.com

Is any DTC No. displayed?

YES >> GO TO 3.
NO >> GO TO 4.

3. CHECK SELF-DIAGNOSIS RESULTS (CONSULT-III)

1. Check the DTC No. indicated in the self-diagnosis results.
2. Perform the relevant diagnosis referring to the DTC Index. Refer to AV-137, "DTC Index".

NOTE:
Start with the diagnosis for the CAN communication system if “CAN COMM CIRCUIT [U1000] and CONTROL UNIT CAN [U1010]” is displayed.

>> GO TO 5.

4. PERFORM DIAGNOSIS BY SYMPTOM

Perform the relevant diagnosis referring to the diagnosis chart by symptom. Refer to AV-189, "Symptom Table".

>> GO TO 5.

5. REPAIR OR REPLACE MALFUNCTIONING PARTS

Repair or replace the identified malfunctioning parts.

NOTE:
Erase the stored self-diagnosis results after repairing or replacing the relevant components if any DTC No. has been indicated in the self-diagnosis results.

>> GO TO 6.

6. CHECK AFTER REPAIR

1. Perform a self-diagnosis for “MULTI AV” with CONSULT-III after repairing or replacing the malfunctioning parts.
2. Check that any DTC No. is displayed in the self-diagnosis results.

Is any DTC No. displayed?

YES >> GO TO 3.
NO >> GO TO 7.

7. FINAL CHECK

Perform the operation to check that the malfunction symptom is solved or any other symptoms are present.

Is there any symptom?

YES >> GO TO 4.
NO >> INSPECTION END

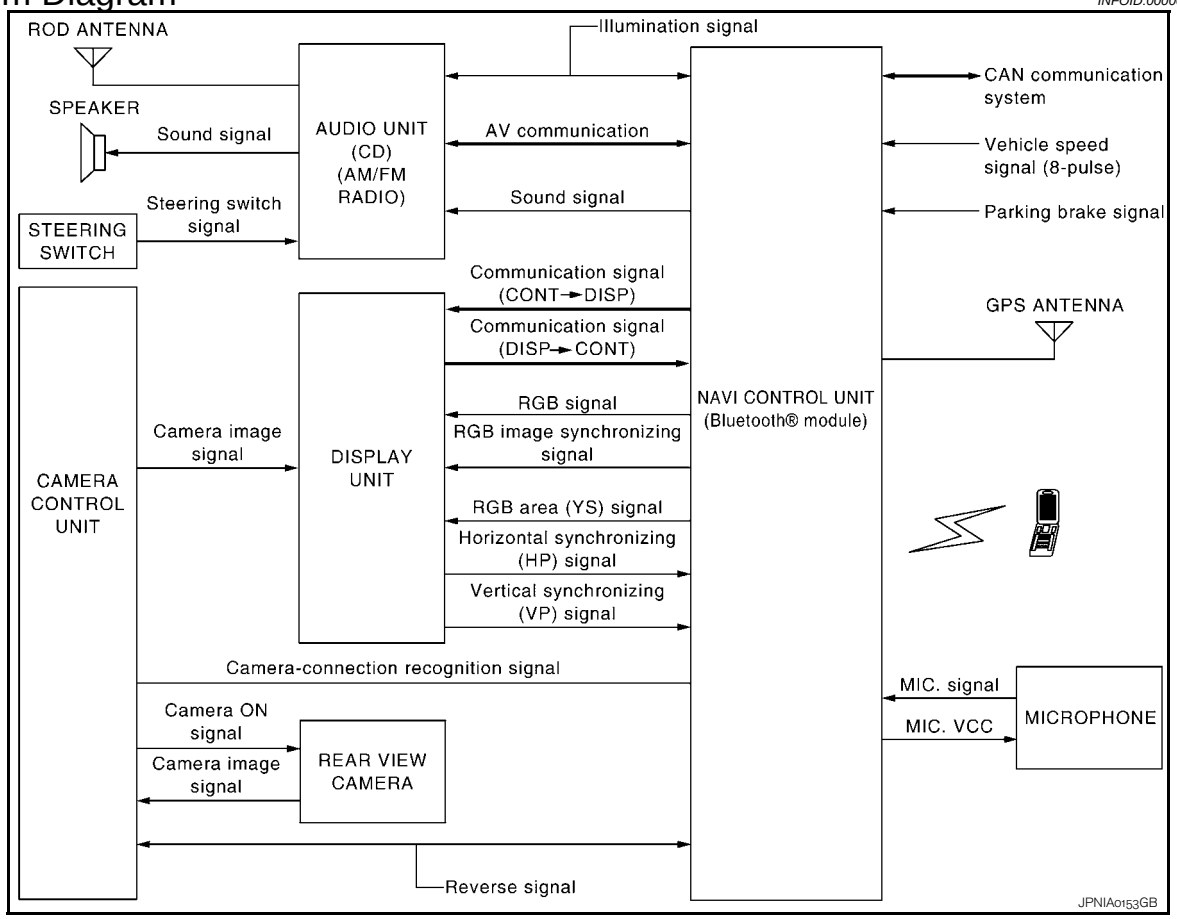
cardiagn.com

FUNCTION DIAGNOSIS

MULTI AV SYSTEM

System Diagram

INFOID:0000000000947003



System Description

INFOID:0000000000947004

Multi AV system means that the following systems are integrated.

System name	System explanation
NAVIGATION SYSTEM	AV-47, "System Description"
AUDIO SYSTEM	AV-53, "System Description"
REAR VIEW MONITOR SYSTEM	AV-51, "System Description"
VEHICLE INFORMATION SYSTEM	• Status of audio, fuel economy, maintenance and navigation is displayed. • NAVI control unit displays the fuel consumption status and trip computer status while receiving data signal through CAN communication from ECM, combination meter and BCM.
HANDS-FREE PHONE SYSTEM	Refer to the following “HANDS-FREE PHONE SYSTEM”.

- Two AV communication lines (H, L) connect between units that configure MULTI AV system. NAVI control unit controls by sending/receiving data one by one with each unit (slave unit) that configures them completely as a master unit.
- Two AV communication lines (H, L) adopt a twisted pair line that is resistant to noise.
- NAVI control unit is connected by CAN communication, and it receives data signal from ECM, combination meter. It computes and displays fuel economy information value with the obtained information. Sending/receiving of data signal is performed by BCM. Also, it sends the required signal of vehicle setting and receives the response signal.

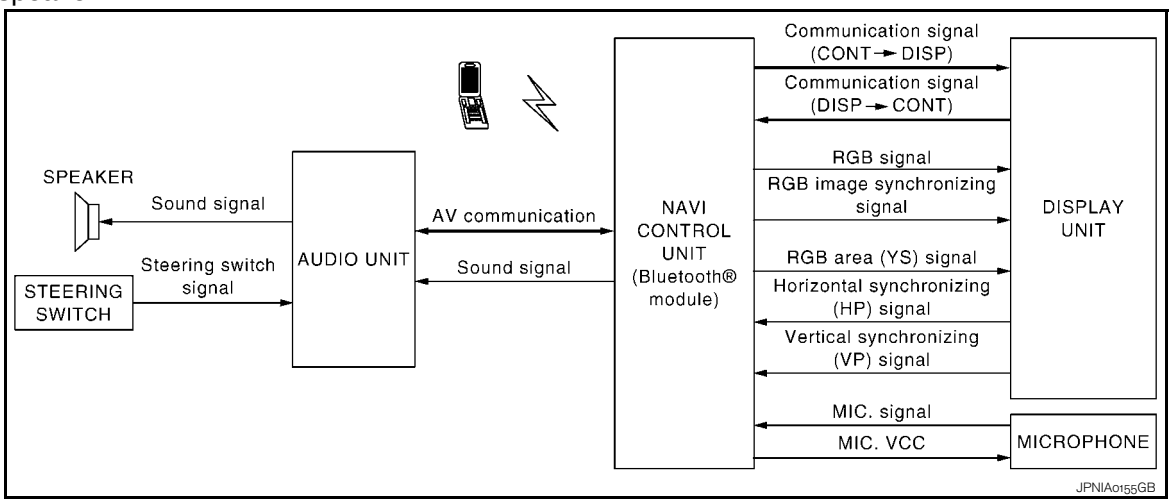
cardiagn.com

- NAVI control unit is connected with display and serial communication, and it sends the required signal of display and display control and receives the response signal from front display. Also, it is connected with satellite radio by serial communication, and it sends the operating signal and receives the display signal.

NOTE:
NAVI control unit can perform CONSULT-III self-operating function and on board self-diagnosis.
- CONSULT-III self diagnosis: Refer to AV-65, "CONSULT - III Function (MULTI AV)".
- On board self diagnosis: Refer to AV-55, "Diagnosis Description".

HANDS-FREE PHONE SYSTEM

- Hands-free communication can be operated by connecting using Bluetooth® with cellular phone.
- Operation is performed by steering switch, and operating condition is indicated on display.
- Guide sound that is heard during operation is input from NAVI control unit to audio unit and is output from front speaker.



When a call is originated
Spoken voice sound output from the microphone (Mic. Signal) is input to NAVI control unit. NAVI control unit outputs to cellular phone with Bluetooth® communication as a TEL voice signal. Voice sound is then heard at the other party.

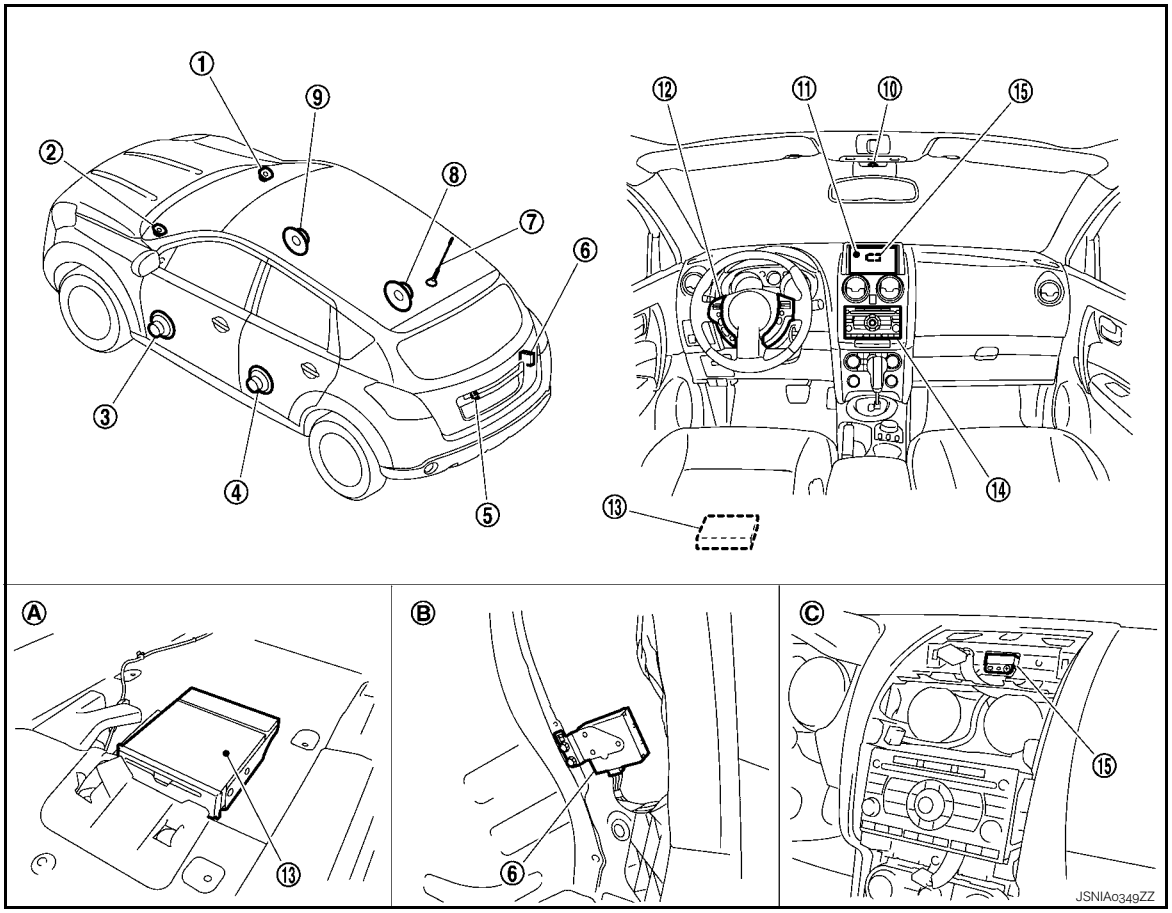
When receiving a call
Voice sound is input to own cellular phone from the other party. TEL voice signal is output to front speaker, and the signal is input to audio unit via NAVI control unit by establishing Bluetooth® communication from cellular phone.

Component Parts Location

INFOID:0000000000947005

NOTE:
As for right-hand drive vehicles, install GPS antenna feeder between the center console and the instrument panel in the reverse of left-handle drive vehicles.

cardiagn.com



1. Tweeter RH
2. Tweeter LH
3. Front door speaker LH
4. Rear door speaker LH
5. Rear view camera
6. Camera control unit
7. Radio antenna
8. Rear door speaker RH
9. Front door speaker RH
10. Microphone
11. Display unit
12. Steering switch
13. NAVI control unit
14. Audio unit
15. GPS antenna
A. A bottom of a front seat LH
B. Luggage side RH
C. Back of a display unit

Component Description

INFOID:0000000000947006

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the Map DVD-ROM by installing Map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of Map data.
DISPLAY UNIT	• Display image is controlled by the serial communication from NAVI control unit. • RGB image signal is input from NAVI control unit (RGB, RGB area and RGB synchronizing). Camera image signal is input from camera control unit. • Synchronize signal (HP, VP) is output to NAVI control unit.

cardiagn.com

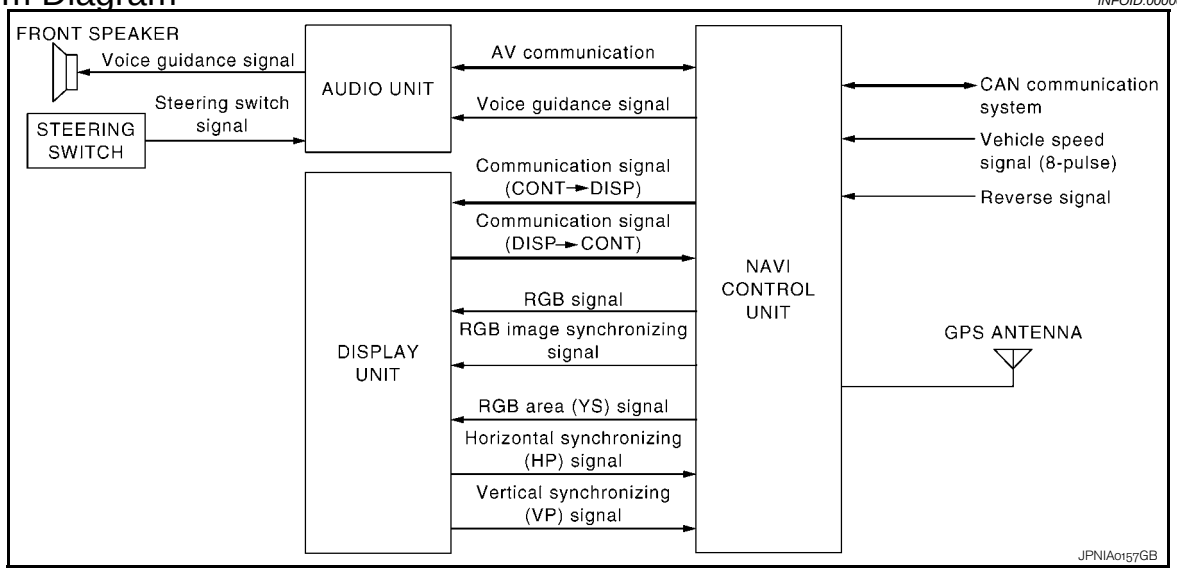
Part name	Description
AUDIO UNIT	• Operational switch of MULTI AV system is integrated. • NAVI control unit and AV communication are connected with Audio unit. Operating signals of the switch are sent to the NAVI control unit.
FRONT DOOR SPEAKER	• Outputs sound signal from audio unit. • Outputs high, mid and low range sounds.
REAR DOOR SPEAKER	• Outputs sound signal from audio unit. • Outputs high, mid and low range sounds.
TWEETER	• Outputs sound signal from audio unit. • Outputs high range sound.
CAMERA CONTROL UNIT	• Camera image signal is input from rear view camera, and camera image is indicated on the display. • Power (camera ON signal) is sent to rear view camera. • Controlled by AV communication sent from NAVI control unit. • NAVI control unit recognizes the presence of camera system with camera connection recognition signal.
REAR VIEW CAMERA	The image of vehicle rear view is sent to camera control unit.
STEERING SWITCH	• Operations for audio, hands-free phone, voice recognition and navigation, etc. are possible. • Steering switch signal (operation signal) is output to audio unit.
MICROPHONE	• Used for hands-free phone operation and voice recognition. • Mic. signal is sent to NAVI control unit. • Power (Mic. VCC) is supplied from NAVI control unit.
GPS ANTENNA	GPS signal is received and sent to NAVI control unit.
RADIO ANTENNA	Radio signal received by antenna is sent to audio unit.

cardiagn.com

NAVIGATION SYSTEM

System Diagram

INFOID:0000000000947007



System Description

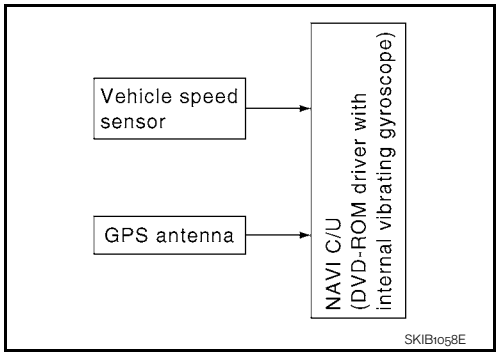
INFOID:0000000000947008

NAVIGATION SYSTEM

Location Detection Principle

The navigation system periodically calculates the vehicle's current position according to the following three signals:

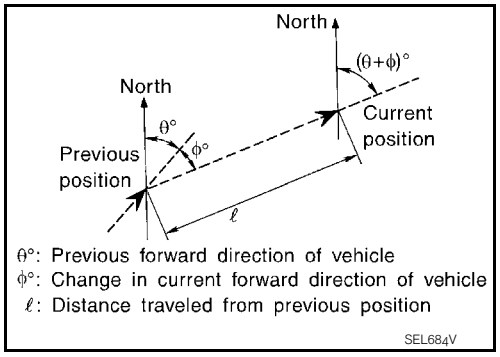
- Travel distance of the vehicle as determined by the vehicle speed sensor
- Turning angle of the vehicle as determined by the gyroscope (angular velocity sensor)
- Direction of vehicle travel as determined by the GPS antenna (GPS information)



The current position of the vehicle is then identified by comparing the calculated vehicle position with map data read from the map DVD-ROM, which is stored in the DVD-ROM drive (map-matching), and indicated on the screen as a vehicle mark. More accurate data is judged and used by comparing vehicle position detection results found by the GPS with the result by map-matching.

The current vehicle position will be calculated by detecting the distance the vehicle moved from the previous calculation point and its direction.

- Travel distance
  Travel distance calculations are based on the vehicle speed sensor input signal. Therefore, the calculation may become incorrect as the tires wear down. To prevent this, an automatic distance correction function has been adopted.
- Travel direction
  Change in the travel direction of the vehicle is calculated by a gyroscope (angular velocity sensor) and a GPS antenna (GPS information). They have both advantages and disadvantages.



Type	Advantage	Disadvantage
Gyroscope (angular velocity sensor)	Can detect the vehicle's turning angle quite accurately.	Direction errors may accumulate when vehicle is driven for long distances without stopping.
GPS antenna (GPS information)	Can detect the vehicle's travel direction (North/South/East/West).	Correct direction cannot be detected when vehicle speed is low.

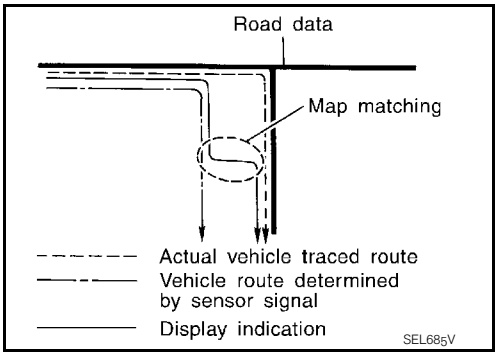
More accurate traveling direction is detected because priorities are set for the signals from these two devices according to the situation.

Map-Matching

Map-matching compares a current location detected by the method in the “Location Detection Principle” with a road map data from Map DVD-ROM stored in DVD-ROM drive.

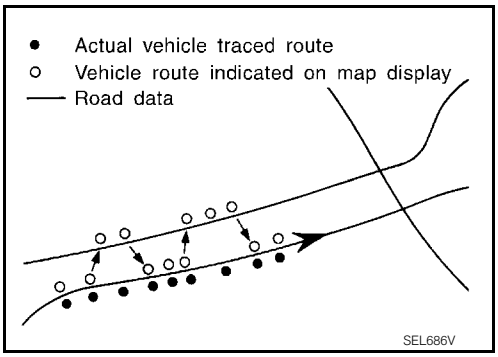
NOTE:

The road map data is based on data stored in the map DVD-ROM.

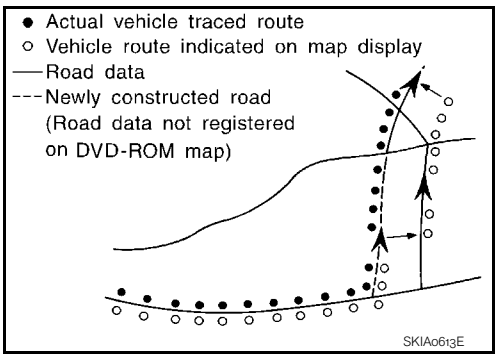


The vehicle position may not be corrected under the following circumstances and after driving for a certain time when GPS information is difficult to receive. In this case, the vehicle mark on the display must be corrected manually.

- In map-matching, alternative routes to reach the destination will be shown and prioritized, after the road on which the vehicle is currently driven has been judged and the vehicle mark has been repositioned.
  Alternative routes will be shown in different order of priority, and the incorrect road can be avoided if there is an error in distance and/or direction.
  They are of the same priority if two roads are running in parallel. Therefore, the vehicle mark may appear on either of them alternately, depending on maneuvering of the steering wheel and configuration of the road.

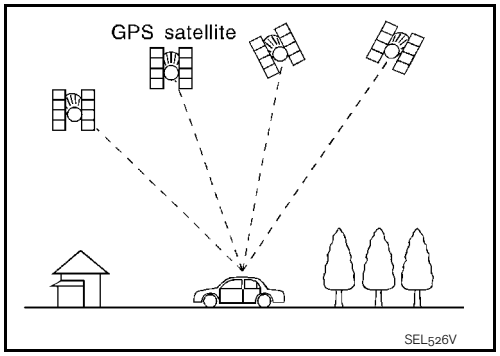


- Map-matching does not function correctly when a road on which the vehicle is driving is new and not recorded in the map DVD-ROM, or when road pattern stored in the map data and the actual road pattern are different due to repair.
  The map-matching function may find another road and position the vehicle mark on it when driving on a road not present in the map. Then, the vehicle mark may change to it when the correct road is detected.
- Effective range for comparing the vehicle position and travel direction calculated by the distance and direction with the road data read from the map DVD-ROM is limited. Therefore, correction by map-matching is not possible when there is an excessive gap between current vehicle position and the position on the map.



GPS (Global Positioning System)

cardiagn.com



GPS (Global Positioning System) was developed for and is controlled by the US Department of Defense. The system utilizes GPS satellites (NAVSTAR), sending out radio waves while flying on an orbit around the earth at an altitude of approximately 21,000 km (13,100miles).
The GPS receiver calculates the vehicle's position in three dimensions (latitude/longitude/altitude) according to the time lag of the radio waves received from four or more GPS satellites (three-dimensional positioning). The GPS receiver calculates the vehicle's position in two dimensions (latitude/longitude), utilizing the altitude data calculated previously with radio waves from four or more GPS satellites (two-dimensional positioning) if radio waves were received only from three GPS satellites.
Position correction by GPS is not available while the vehicle is stopped.
Accuracy of GPS will deteriorate under the following conditions:

- In two-dimensional positioning, GPS accuracy will deteriorate when altitude of the vehicle position changes.
- The accuracy can be even lower depending on the arrangement of the GPS satellites utilized for the positioning.
- Position detection is not possible when vehicle is in an area where radio waves from the GPS satellite do not reach, such as in a tunnel, parking lot in a building, and under an elevated highway. Radio waves from the GPS satellites may not be received when some object is located over the GPS antenna.

NOTE:

- Even a high-precision three dimensional positioning, the detection result has an error about 10 m (30ft).
- Because the signals of GPS satellite is controlled by the Tracking and Control Center in the United States, the accuracy may be degraded lower intentionally or the radio waves may stop.

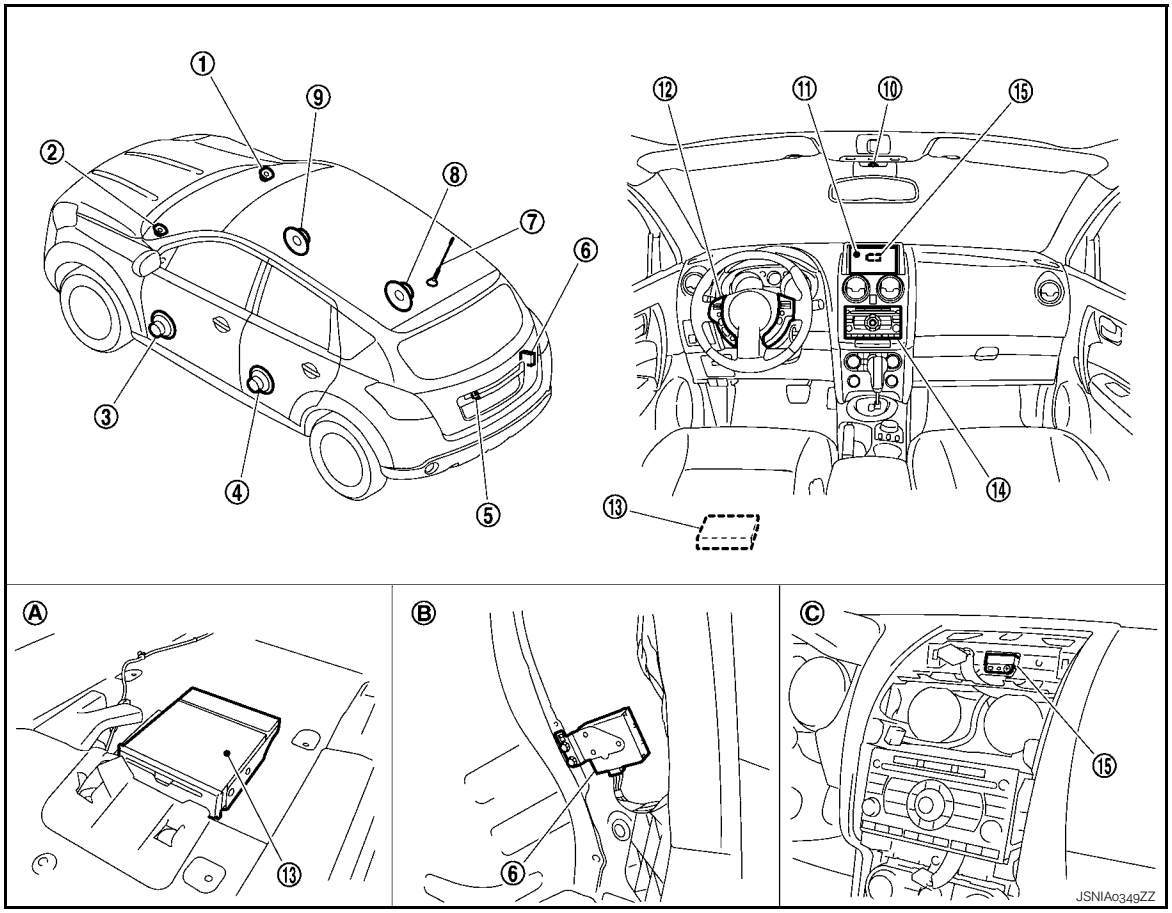
Traffic Information (RDS-TMC)
NOTE: This system is built-in NAVI control unit.
The traffic information broadcast allows to you to avoid delays due to traffic incidents.
Traffic jams, roadwork, closed roads around your current location, etc. are represented graphically on the map by icons depicting the nature of the event.
Incidents on the route are automatically brought to your attention when they are approached.
The Traffic Information feature gives you the opportunity to forecast traffic incidents, determine how serious they are, via the guidance mode, and allows you to detour around traffic incidents.
The navigation system receives traffic information from best available sources and enables the RDS-TMC (Radio Data System-Traffic Information Channel) to inform and guide you.
The RDS-TMC broadcast is fed by a dedicated FM tuner so that you can still tune your radio station while Traffic Information is being broadcasted.

Component Parts Location

INFOID:0000000000984502

NOTE:
As for right-hand drive vehicles, install GPS antenna feeder between the center console and the instrument panel in the reverse of left-handle drive vehicles.

cardiagn.com



1. Tweeter RH
2. Tweeter LH
3. Front door speaker LH
4. Rear door speaker LH
5. Rear view camera
6. Camera control unit
7. Radio antenna
8. Rear door speaker RH
9. Front door speaker RH
10. Microphone
11. Display unit
12. Steering switch
13. NAVI control unit
14. Audio unit
15. GPS antenna
A. A bottom of a front seat LH
B. Luggage side RH
C. Back of a display unit

Component Description

INFOID:0000000000947010

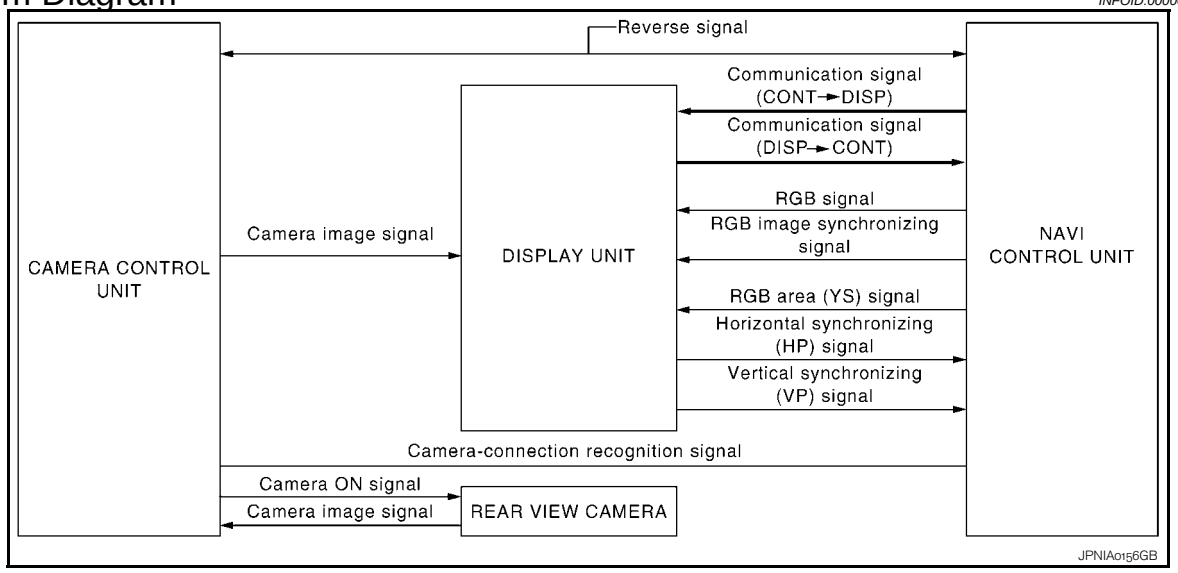
Part name	Description
NAVI CONTORL UNIT	• The master unit controls each operation of the Navigation system. • Map data can be read from the Map DVD-ROM by installing Map DVD-ROM. • The RGB signal (map information) is output to the display. • The voice guidance signal is output to the audio unit.
MAP DVD-ROM	A collection of Map data
DISPLAY UNIT	Map image signal is input from NAVI control unit, and it map image indicated on the display.
AUDIO UNIT	• Voice guidance signal is input from NAVI control unit, and it is output to front LH/RH speakers. • Each operation of navigation can be performed.
FRONT DOOR SPEAKER	Voice guidance signal from audio unit is output.
TWEETER	
STEERING SWITCH	• Each operation of navigation, etc. can be performed. • Switch operating signal is output to NAVI control unit via audio unit with AV communication.
GPS ANTENNA	GPS signal is received and is output to NAVI control unit.

cardiagn.com

REAR VIEW MONITOR SYSTEM

System Diagram

INFOID:0000000000947011



System Description

INFOID:0000000000947012

Camera image operation principle

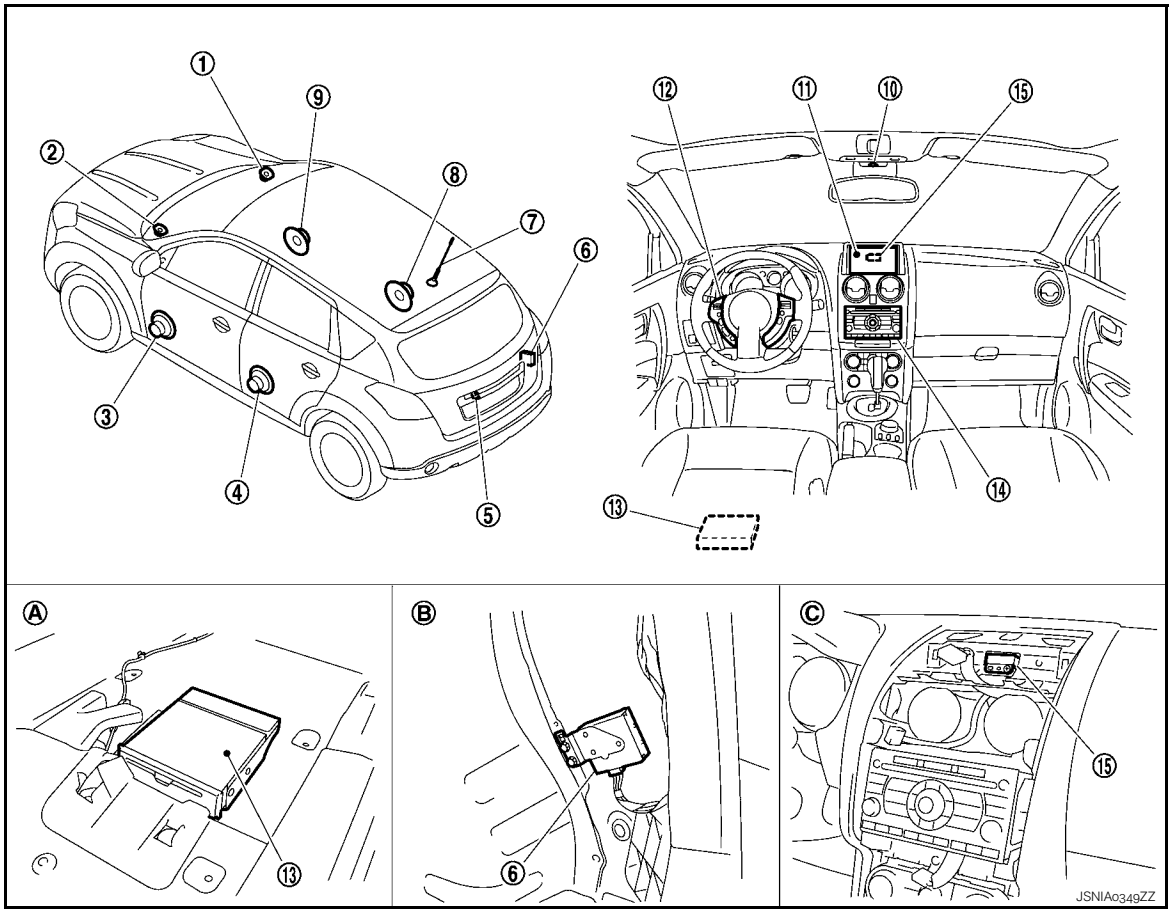
- Power is supplied to rear view camera from camera control unit and outputs camera image signal to camera control unit when selector lever is set to R position and the reverse signal on camera control unit is input.
- Camera control unit synthesizes guide lines with camera image signal from rear view camera, and transmits camera image signal to the display. In this case, since the reverse signal is also input to NAVI control unit, the NAVI control unit recognizes the selector lever as in R position, and it switches communication signal between NAVI control unit and display unit, and image that is displayed on the display unit by RGB signal with rear view monitor image.
- The NAVI control unit determines whether rear view camera is equipped or not, based on the presence of camera connection recognition signal. It switches to rear view monitor image at the time of reverse signal input when it is not equipped.
- Warning message under the rear view monitor display is described by NAVI control unit.
- NAVI control unit is connected in communication with display unit, and it controls operation of rear view monitor system.

Component Parts Location

INFOID:0000000000984503

NOTE:
As for right-hand drive vehicles, install GPS antenna feeder between the center console and the instrument panel in the reverse of left-handle drive vehicles.

cardiagn.com



1. Tweeter RH
2. Tweeter LH
3. Front door speaker LH
4. Rear door speaker LH
5. Rear view camera
6. Camera control unit
7. Radio antenna
8. Rear door speaker RH
9. Front door speaker RH
10. Microphone
11. Display unit
12. Steering switch
13. NAVI control unit
14. Audio unit
15. GPS antenna
A. A bottom of a front seat LH
B. Luggage side RH
C. Back of a display unit

Component Description

INFOID:0000000000947014

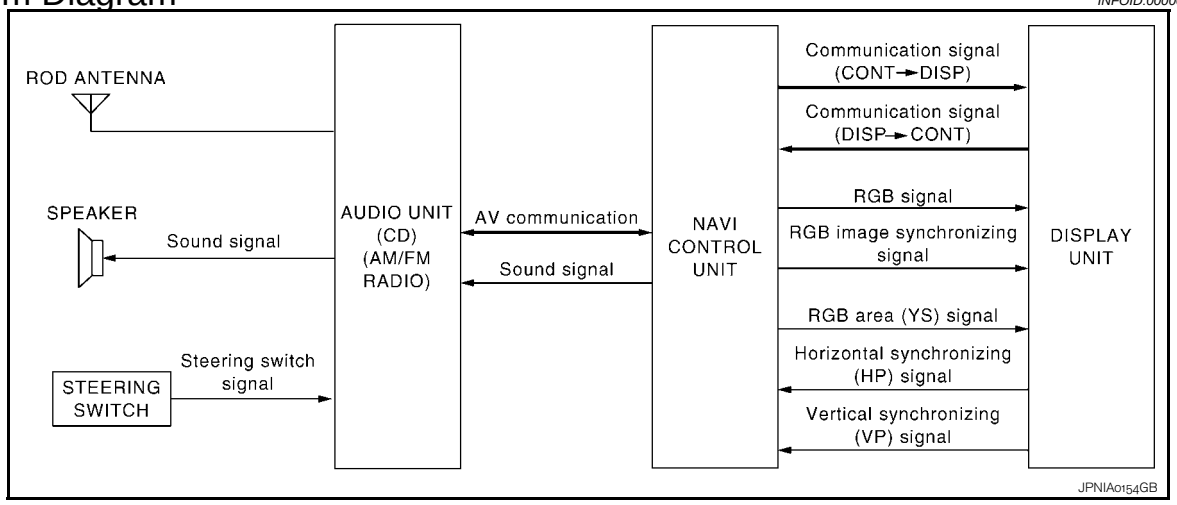
Part name	Description
NAVI CONTORL UNIT	• Image on display is changed to rear view monitor with the communication for display unit. • Warning displayed in rear view monitor image is illustrated.
DISPLAY UNIT	• Camera image signal is sent from camera control unit, and RGB signal for warning display is sent from NAVI control unit. • Rear view monitor image is changed with the communication for NAVI control unit.
CAMERA CONTROL UNIT	• Camera image signal is input from rear view camera, and camera image is indicated on the display. • Power (camera ON signal) is sent to rear view camera. • NAVI control unit recognizes the presence of camera system with camera connection recognition signal.
REAR VIEW CAMERA	The image of vehicle rear view is sent to camera control unit.
STEERING ANGLE SENSOR	Steering signal necessary for possible route line control is sent to camera control unit.

cardiagn.com

AUDIO SYSTEM

System Diagram

INFOID:0000000000947015



System Description

INFOID:0000000000947016

The audio system is equipped with following function. Each function is operated with audio switch or steering switch. Operation status of AUDIO is indicated at display.

Function
AM/FM radio
CD

Function description

Operating signal

Audio system operation can be performed with audio switch or steering switch.

Screen display

- Switching of display is performed with serial communication between display unit and NAVI control unit.
- The image signal to display operating condition is performed with RGB signal, RGB area signal and RGB image synchronizing signal.

AM/FM Radio Mode

- AM/FM radio tuner is built into audio unit.
- Audio signal is received by antenna, next it is amplified by antenna amp., and finally it is input to audio unit. Audio unit outputs the audio signal to each speaker.

CD Mode

- CD function is built into audio unit.
- Audio unit outputs audio signal to each speaker when CD is inserted to audio unit.

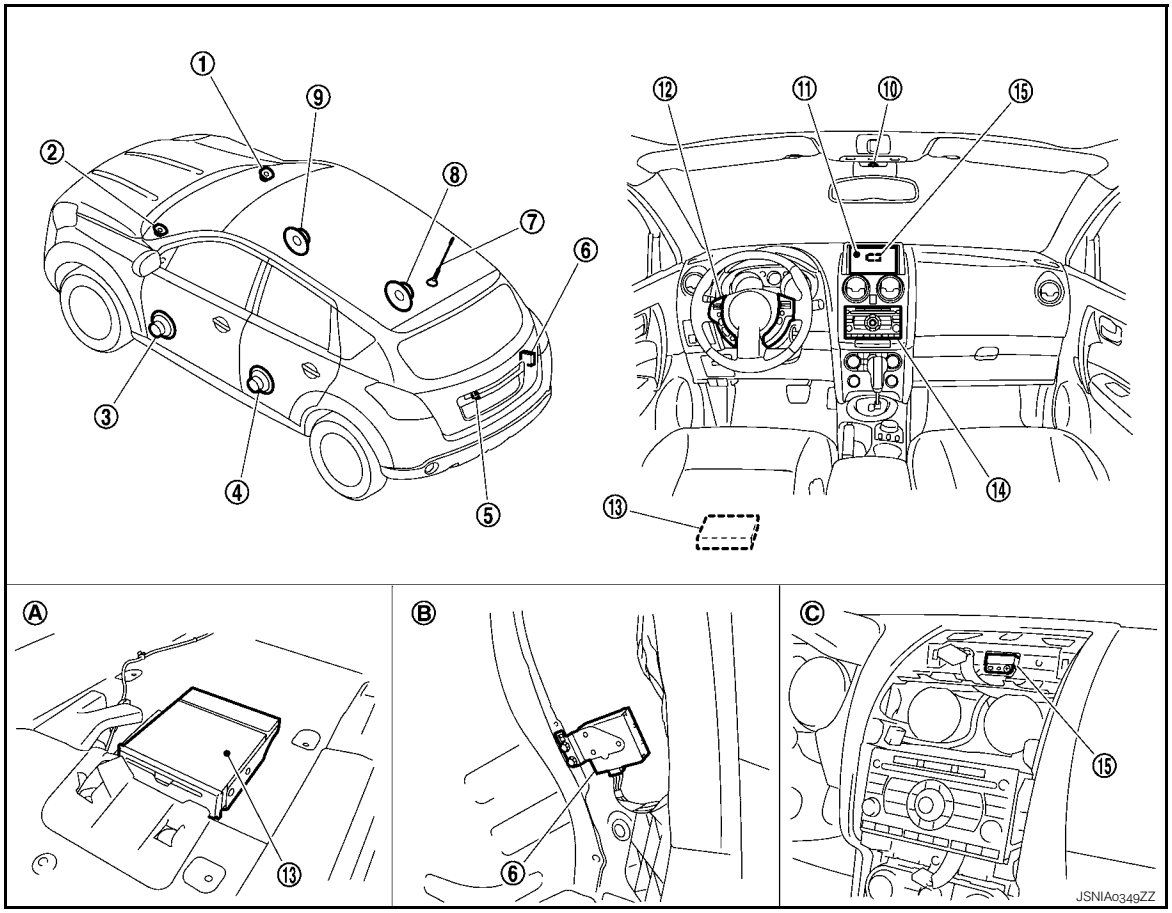
Component Parts Location

INFOID:0000000000984504

NOTE:

As for right-hand drive vehicles, install GPS antenna feeder between the center console and the instrument panel in the reverse of left-handle drive vehicles.

cardiagn.com



1. Tweeter RH
2. Tweeter LH
3. Front door speaker LH
4. Rear door speaker LH
5. Rear view camera
6. Camera control unit
7. Radio antenna
8. Rear door speaker RH
9. Front door speaker RH
10. Microphone
11. Display unit
12. Steering switch
13. NAVI control unit
14. Audio unit
15. GPS antenna
A. A bottom of a front seat LH
B. Luggage side RH
C. Back of a display unit

Component Description

INFOID:0000000000947018

Part name	Description
AUDIO UNIT	• Operational switch of audio system is integrated. • Receiving function of AM/FM radio, replaying function of CD are integrated. • Audio signals are output to each speaker.
DISPLAY UNIT	• Display image is controlled by the serial communication from NAVI control unit. • RGB image signal (audio operation condition) is input from NAVI control unit.
FRONT DOOR SPEAKER	• Outputs sound signal from audio unit. • Outputs high, mid and low range sounds.
REAR DOOR SPEAKER	• Outputs sound signal from audio unit. • Outputs high, mid and low range sounds.
TWEETER	• Outputs sound signal from audio unit. • Outputs high range sound.
STEERING SWITCH	• Each audio operation can be operated. • Steering switch signal (operation signal) is output to audio unit.
RADIO ANTENNA	Radio signal received by antenna is sent to audio unit.

cardiagn.com

DIAGNOSIS SYSTEM (NAVI CONTROL UNIT)

Diagnosis Description

INFOID:0000000000947019

MULTI AV SYSTEM on board diagnosis function

- The NAVI control unit diagnosis function starts up with audio switch operation and the NAVI control unit performs a diagnosis for each unit in the system during the on board diagnosis.
- Perform a CONSULT-III diagnosis if the on board diagnosis does not start, e.g., the screen does not display anything, the multifunction switch does not function. etc.

On board diagnosis

Description

- The trouble diagnosis function has a self-diagnosis mode for conducting trouble diagnosis automatically and a confirmation/adjustment mode for operating manually.
- The self-diagnosis mode performs diagnoses on the NAVI control unit, connections between system components as well as connections between NAVI control unit and GPS antenna. Then it displays the diagnosis results on the display.
- The confirmation/adjustment mode allows the technician to check, modify or adjust the vehicle signals and set values, as well as to monitor the system error records and system communication status. The check, modify or adjust actions generally require human intervention and judgment (the system cannot make judgment automatically).

On board diagnosis item

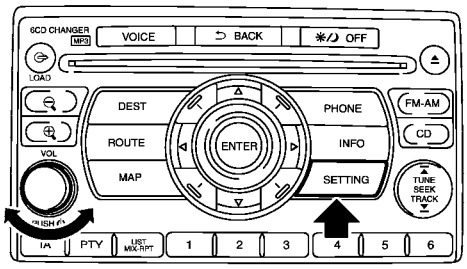
Mode			Description
Self Diagnosis			• NAVI control unit diagnosis • Diagnoses the connections across system components, between NAVI control unit and GPS antenna.
Confirmation/ Adjustment	Display Diagnosis		The following check functions are available: color tone check by color bar display, light and shade check by gray scale display.
	Vehicle Signals		Diagnosis of signals can be performed for vehicle speed, parking brake, lights, ignition switch, and reverse.
	Speaker Test		The connection of a speaker can be confirmed by test tone.
	Navigation	Steering Angle Adjustment	A difference can be adjusted between the actual turning angle and the vehicle mark turning angle.
		Speed Calibration	A difference can be adjusted between the current location mark and the actual location.
	Error History		The system malfunction and the frequency when occurred in the past are displayed. The time and place that the selected malfunction last occurred are displayed when the malfunctioning item is selected.
	Vehicle CAN Diagnosis		The transmitting/receiving of CAN communication can be monitored.
	AV COMM Diagnosis		The communication condition of each unit of Multi AV system can be monitored.
	Handsfree Phone		The received volume adjustment of hands-free phone, microphone speaker check, and erase memory can be performed.
	Bluetooth		The passkey and the device name can be checked and changed.
	Delete Unit Connection Log		Erase the connection history of unit and error history.
	Feature Restriction Setting		Operations of navigation system while driving can be restricted by using this function.

STARTING PROCEDURE

1. Start the engine.
2. Turn the audio system OFF.

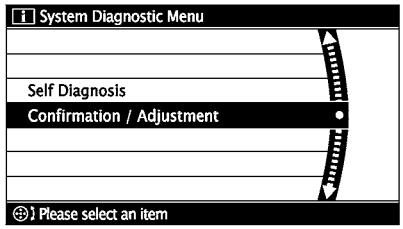
cardiagn.com

3. Turn the volume control dial clockwise or counterclockwise for 40 clicks or more while pushing the “SETTING” button. (A short beep will be heard when the self-diagnosis mode is started.)
   • Shifting from current screen to previous screen is performed by pushing “BACK” button.



JPNIA0173GB

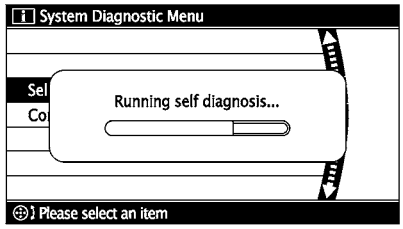
4. The trouble diagnosis initial screen is displayed, and then the items of “Self Diagnosis” and “Confirmation / Adjustment” can be selected.



SKIB3961E

Self-diagnosis mode

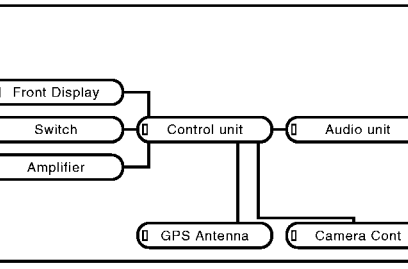
1. Start the self-diagnosis function. Then select “Self Diagnosis”.
- Self-diagnosis subdivision screen is displayed, and the self-diagnosis mode starts.
- The bar graph visible on the center of the self-diagnosis subdivision screen indicates progress of the trouble diagnosis.



SKIB3657E

2. Diagnosis results are displayed after the self-diagnosis is completed. The unit names and the connection lines are color-coded according to the diagnostic results.

Diagnosis results	Unit	Connection line
Normal	Green	Green
Connection malfunction	Gray	Yellow
DVD drive undiagnosed	Gray	Green
DVD-ROM and DVD-ROM drive malfunction	Yellow	Green
Unit malfunction Note	Red	Green



SKIB9021E

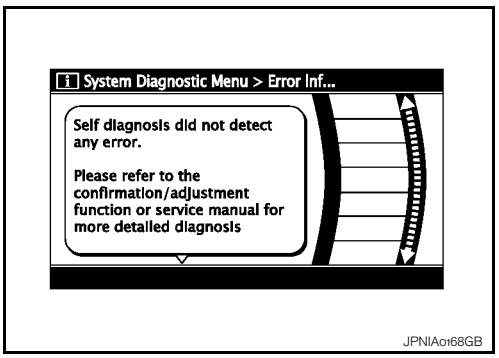
NOTE:

• Only the control unit (NAVI control unit) is displayed in red.

- The screen switch colors are determined according to the following order of priority: red > yellow > gray if multiple errors occur at the same time for a single unit.

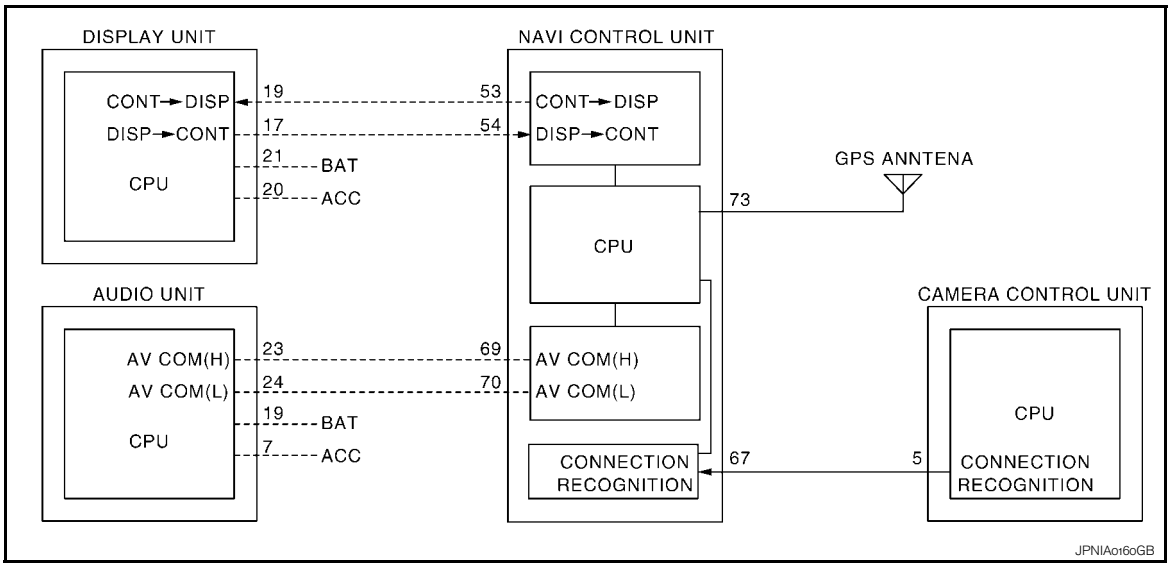
cardiagn.com

- The comments of the self-diagnosis results can be viewed with a component in the diagnosis result screen.



Detection range of self-diagnosis mode

- The self-diagnosis mode allows the technician to diagnose the connection in the communication line between NAVI control unit and each unit and the internal operation of the NAVI control unit.
- Because the start condition of diagnosis function is a switch operation, the on board diagnosis function cannot be started up if any malfunction is detected in a switch.

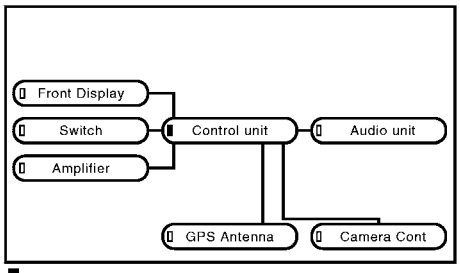
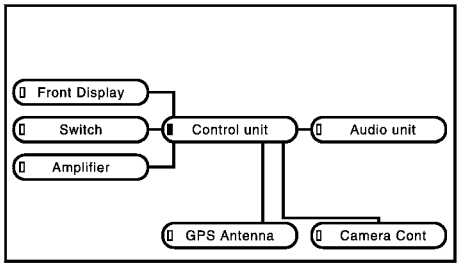
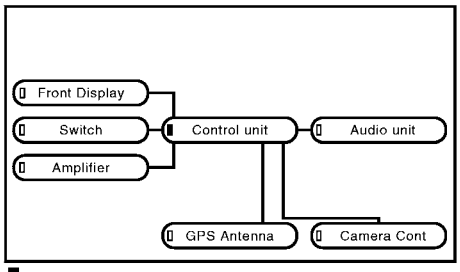
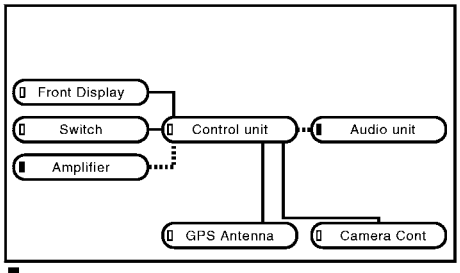


Self-diagnosis results

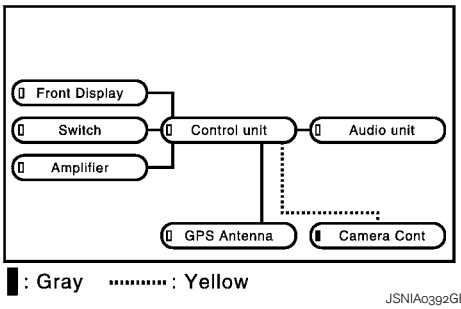
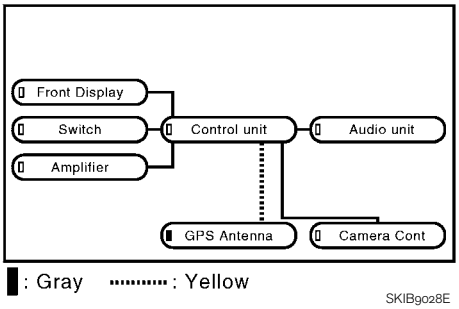
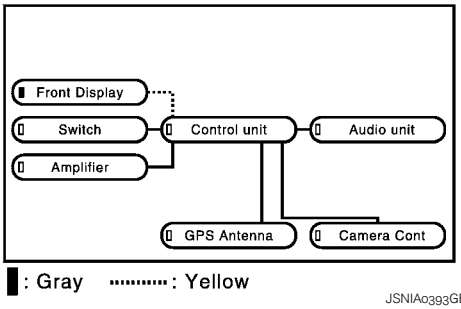
Check the applicable display at the following table, and then repair the malfunctioning parts.

Self-diagnosis result chart

cardiagn.com

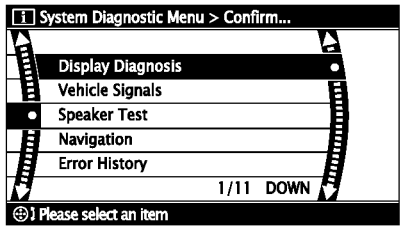
Area with yellow connection lines	Description	Possible malfunction location / Action to take
 : Red SKIB9022E	NAVI control unit malfunction is detected.	NAVI control unit
 : Yellow JSNIA0391GB	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Clean the DVD-ROM drive pickup lens in NAVI control unit using the specified cleaning disc. • Map disc • NAVI control unit
 : Gray SKIB9024E	DVD-ROM not inserted is detected.	Insert map disc
 : Gray ····· : Yellow SKIB9025E	Malfunction is detected on communication signal between NAVI control unit and audio unit.	• NAVI control unit • Audio unit

cardiagn.com

Area with yellow connection lines	Description	Possible malfunction location / Action to take
 JSNIA0392GB	A malfunction is detected in Camera-connection recognition signal circuit.	Camera connection recognition signal circuit
 SKIB9028E	GPS antenna connection malfunction is detected.	• GPS antenna • GPS antenna feeder
 JSNIA0393GB	Malfunction is detected on communication signal between NAVI control unit and display unit.	• NAVI control unit • Display unit

COMFIRMATON/ADJUSTMENT MODE

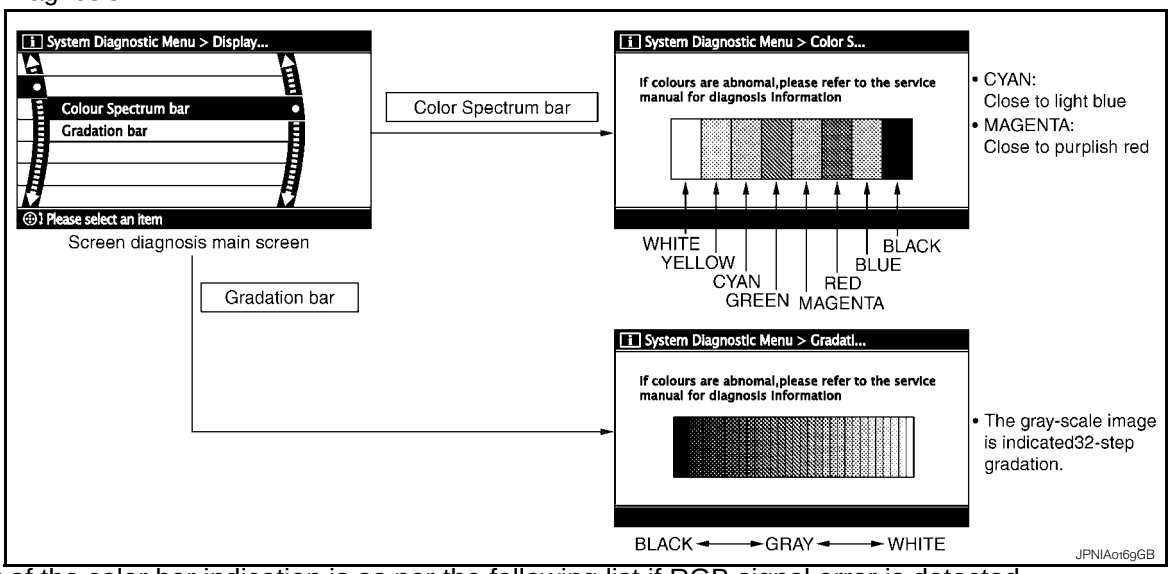
1. Start the diagnosis function and select “Confirmation / Adjustment”. The confirmation/adjustment mode indicates where each item can be checked or adjusted.
2. Select each switch on the “Confirmation / Adjustment Mode” screen to display the relevant trouble diagnosis screen. Press the “BACK” switch to return to the initial “Confirmation / Adjustment Mode” screen.



SKIB4658E

cardiagn.com

Display Diagnosis

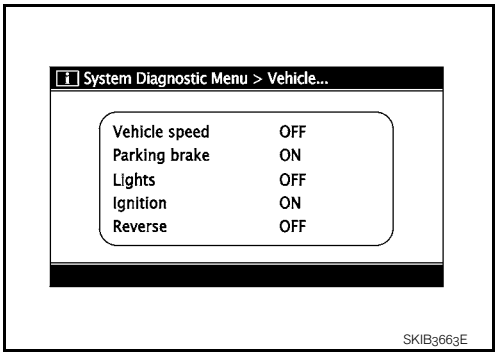


The tint of the color bar indication is as per the following list if RGB signal error is detected.

R (red) signal error : Light blue (Cyan) tint
G (green) signal error : Purple (Magenta) tint
B (blue) signal error : Yellow tint

Vehicle Signals

A comparison check can be made of each actual vehicle signal and the signals recognized by the system.



Diagnosis item	Display	Vehicle status	Remarks
Vehicle speed	ON	Vehicle speed > 0 km/h (0 MPH)	Changes in indication may be delayed by approximately 1.5 seconds. This is normal.
	OFF	Vehicle speed = 0 km/h (0 MPH)	
	—	Ignition switch ACC	
Parking brake	ON	Parking brake is applied.	
	OFF	Parking brake is released.	
Lights	ON	Light switch ON	—
	OFF	Light switch OFF	
Ignition	ON	Ignition switch ON	—
	OFF	Ignition switch in ACC position	
Reverse	ON	Selector lever in R position	Changes in indication may be delayed by approximately 1.5 seconds. This is normal.
	OFF	Selector lever in any position other than R	
	—	Ignition switch ACC	

Speaker Test

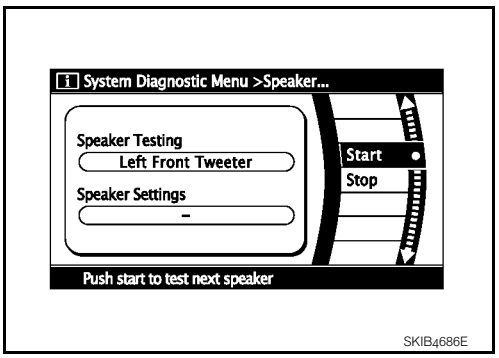
cardiagn.com

Select “SPEAKER TEST” to display the Speaker Diagnosis screen. Press “START and NEXT” to generate a test tone in a speaker. Press “Start” to generate a test tone in the next speaker. Press “Stop” to stop the test tones.

NOTE:

The frequency of test tone emitted from each speaker is as follows.

Tweeter	**: 3 kHz**
Front door speaker	**: 300 Hz**
Rear door speaker	**: 1 kHz**

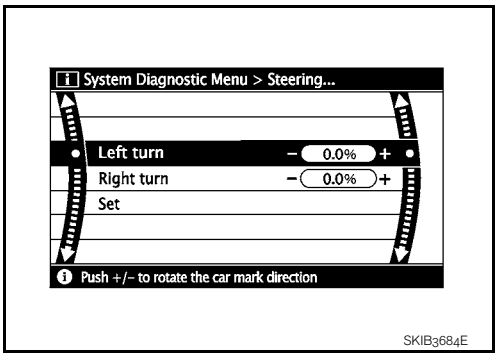


SKIB4686E

Navigation

STEERING ANGLE ADJUSTMENT

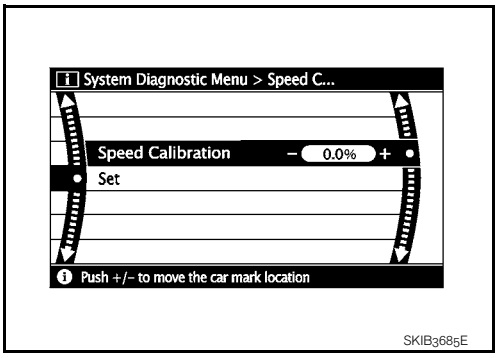
The steering angle output value detected with the gyroscope is adjusted.



SKIB3684E

SPEED CALIBRATION

During normal driving, distance error caused by tire wear and tire pressure change is automatically adjusted for by the automatic distance correction function. This function, on the other hand, is for immediate adjustment, in cases such as driving with tire chain fitted on tires.



SKIB3685E

ERROR HISTORY

The diagnostic results of “Self-diagnosis” determine if any malfunction occurred between selecting “Self-diagnosis” and displaying “Self-diagnostic Results”.

The trouble diagnosis result will be judged normal if an error occurred before the ignition switch was turned ON and does not occur again until “Self-diagnosis” is completed. Therefore, errors in the past which cannot be found by “Self-diagnosis”, must be found by checking the “Error record”.

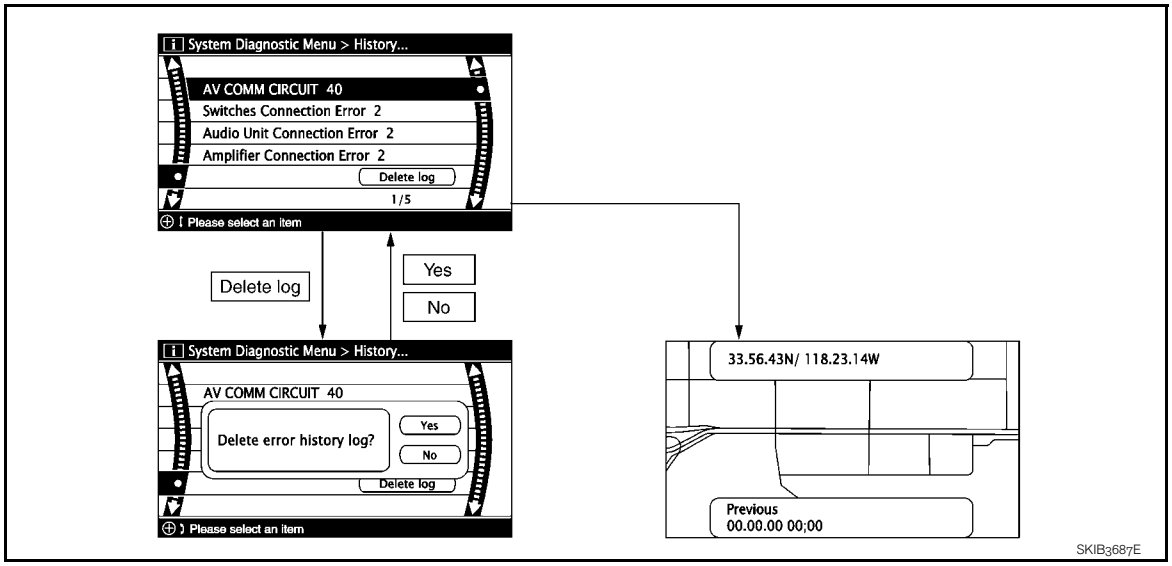
The error history shows the error occurrence frequency in past. The frequency of occurrence is displayed by 2 types: the count down type and the count up type. Select either type according to the error item.

In “Error History” of models with NAVI, time and place that the selected error last occurred are displayed. Be careful about the following.

- The correct date of occurrence may not be able to be displayed if there is a malfunction with the GPS antenna circuit board in the NAVI control unit.
- Place of the error occurrence is represented by the position of the current location mark at the time an error occurred. If current location mark has deviated from the correct position, then the place of the error occurrence cannot be located correctly.

cardiagn.com

Transition Screen



Count Down Type
- Set the counter to 40 when the error is detected. The counter decreases by 1 if the system is normal when turning the ignition switch ON.
- The lower limit of the counter is 1. It can be reset to 0 by “Delete log” switch or CONSULT-III.

Count Up Type
- The counter increases 1 when the ignition switch is turned ON and the error is detected. The counter does not decrease even if it is normal when the ignition switch is turned ON the next time.
- The upper limit of the counter is 50. 51 or more is displayed as 50. It can be reset to 0 by “Delete log” switch or CONSULT-III.

Display type of occurrence frequency	Error history display item
Count down type	CAN_COMM_CIRCUIT, CONTROL UNIT (CAN), AV COMM CIRCUIT, CONTROL UNIT (AV)
Count up type	Other than the above

Error Item
- Some error items may be displayed simultaneously according to the cause. The detection of the cause can be performed by the combination of display items if some error items are displayed simultaneously.

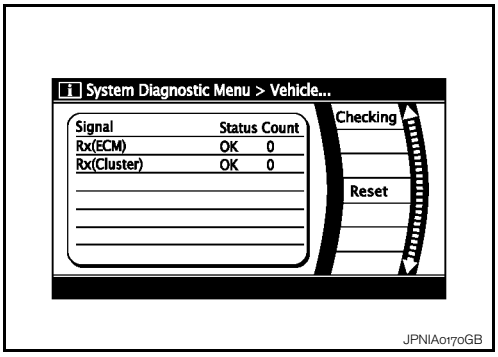
Error item	Description	Possible cause/Action to take
CAN_COMM_CIRCUIT	CAN communication malfunction is detected.	Perform the diagnosis using CONSULT-III, and then repair the malfunctioning parts based on diagnostic results. Refer to AV-65, "CONSULT - III Function (MULTI AV)".
CONTROL UNIT (CAN)	CAN initial diagnosis malfunction is detected.	NAVI control unit
CONTROL UNIT (AV)	AV communication circuit initial diagnosis malfunction is detected.	NAVI control unit
• AV COMM CIRCUIT • Switches Connection Error • Audio Unit Connection Error • Amplifier Connection Error • RDS-TMC Error	• Audio unit power supply and ground circuit malfunction is detected. • Malfunction is detected on communication circuit between Audio unit and NAVI control unit. • Malfunction is detected on communication signal between audio unit and NAVI control unit.	• Audio unit power supply and ground circuit • Communication circuit between audio unit and NAVI control unit

cardiagn.com

Error item	Description	Possible cause/Action to take
Front Display Connection Error	• Display unit power supply and ground circuit malfunction is detected. • Malfunction is detected on communication circuit between display unit and NAVI control unit. • Malfunction is detected on communication signal between display unit and NAVI control unit.	• Display unit power supply and ground circuit • Communication circuit between display unit and NAVI control unit
GPS Antenna Error	GPS antenna connection malfunction is detected.	• GPS antenna feeder • GPS antenna
Camera Control Unit Connection Error	Camera and connection recognition signal circuit malfunction is detected.	Camera-connection recognition signal circuit
FLASH-ROM Error Of Control Unit	NAVI control unit malfunction is detected.	NAVI control unit
Connection Of Gyro	NAVI control unit malfunction is detected.	NAVI control unit
GPS Communication Error	GPS malfunction is detected.	Intermittent malfunction caused by strong radio interference may be detected if the symptoms such as the GPS receipt malfunction occur. Replace NAVI control unit if the malfunction always occurs.
GPS ROM Error		
GPS RAM Error		
GPS RTC Error		
DVD-ROM Communication Error	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit
DVD-ROM Read Error		
DVD-ROM Disc Error		
DVD-ROM Mechanism not Detected		
DVD-ROM Mechanism Error		
DVD-ROM Focus Error		
DVD-ROM TOC Error		
DVD-ROM Seek Error		
DVD-ROM Error Correction Error		
DVD-ROM Data Transfer Error		
DVD-ROM Data Error		
DVD-ROM Time-out		
DVD-ROM Loading / Eject Error		
CAN Controller Memory Error	NAVI control unit malfunction is detected.	NAVI control unit
Bluetooth Module Connection Error		

Vehicle CAN Diagnosis

- CAN communication status and error counter is displayed.
- Error counter displays 0 if any malfunction is not detected in the past. It displays 40 if the malfunction is detected. It displays 39 when turning the ignition switch ON and it is normal. The lower limit of the counter is 1.
- The error counter displays 0 if it resets.



JPNIA0170GB

Items	Display (Current)	Malfunction counter (Past)
Rx (ECM)	OK / ???	0 – 40
Rx (Cluster)	OK / ???	0 – 40

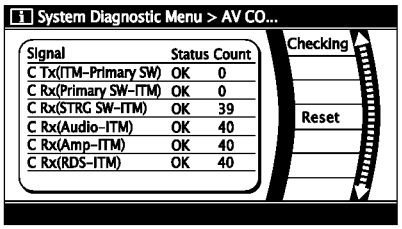
NOTE:

"???" indicates UNKWN.

cardiagn.com

AV COMM Diagnosis

- Displays the communication status between NAVI control unit (master unit) and each unit.
- The error counter displays 0 if any malfunction was not detected in the past. It displays 40 if the malfunction is detected. It displays 39 when turning the ignition switch ON and it is normal. The lower limit of the counter is 1.
- The error counter is erased if it resets.



SKIB4668E

Items	Status (Current)	Counter (Past)
C Tx(ITM–PrimarySW)	OK / ???	0 – 40
C Rx(PrimarySW–ITM)	OK / ???	0 – 40
C Rx(STRG SW–ITM)	OK / ???	0 – 40
C Rx (Audio–ITM)	OK / ???	0 – 40
C Rx(Amp–ITM)	OK / ???	0 – 40
C Rx(RearCamera–ITM)	OK / ???	0 – 40
C Rx(XM–ITM)	OK / ???	0 – 40
C Rx(Amp–Audio)	OK / ???	0 – 40
C Tx(Audio–ITM)	OK / ???	0 – 40

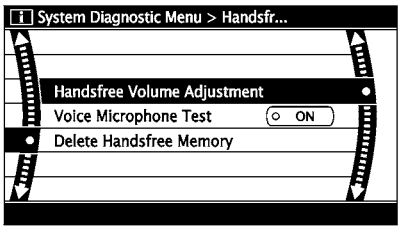
ITM: NAVI control unit

NOTE:

"???" indicates UNKWN.

Handsfree Phone

The hands-free phone reception volume adjustment, microphone and speaker test, and memory erase functions are also available.

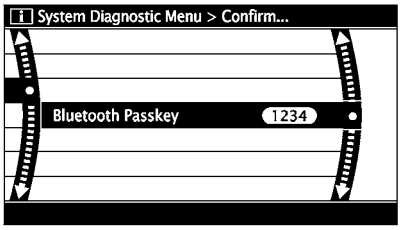


SKIB3668E

Bluetooth

Confirmation/Change Passkey

- The passkey of Bluetooth can be confirmed and changed.
- The passkey can be changed by four digits within 0 to 9.

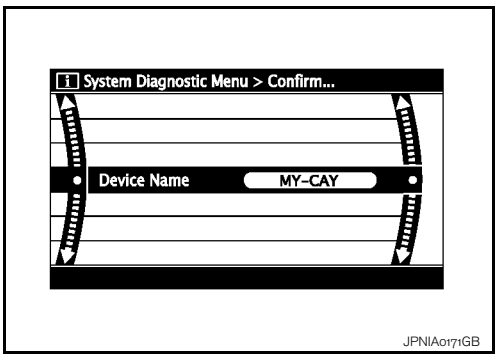


SKIB3669E

Confirmation/Change Device Name

cardiagn.com

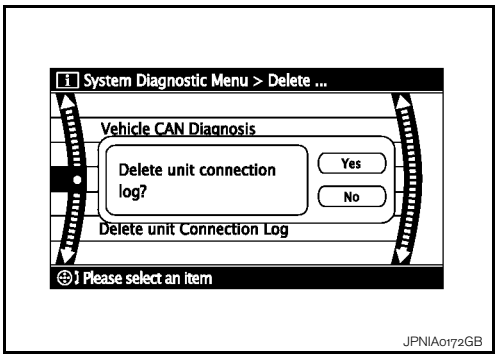
- The device name of Bluetooth can be confirmed and changed.
- The device name can be changed by sixteen digits within A to Z (small character can be used) and - (hyphen).



JPNIA0171GB

Delete Unit Connection Log

Deletes any unit connection records and error records from the NAVI control unit memory. (Clear the records of the unit that has been removed.)



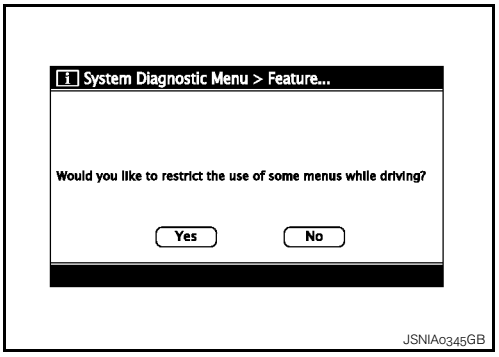
JPNIA0172GB

Feature Restriction Setting

Operations of navigation system that are performed while driving can be restricted by using this function.

CAUTION:

Once operational restrictions are imposed, they can not be cancelled even when the software is updated or the language-switching program is loaded.



JSNIA0345GB

CONSULT - III Function (MULTI AV)

INFOID:0000000000947020

CONSULT-III functions

CONSULT-III performs the following functions via the communication with the NAVI control unit.

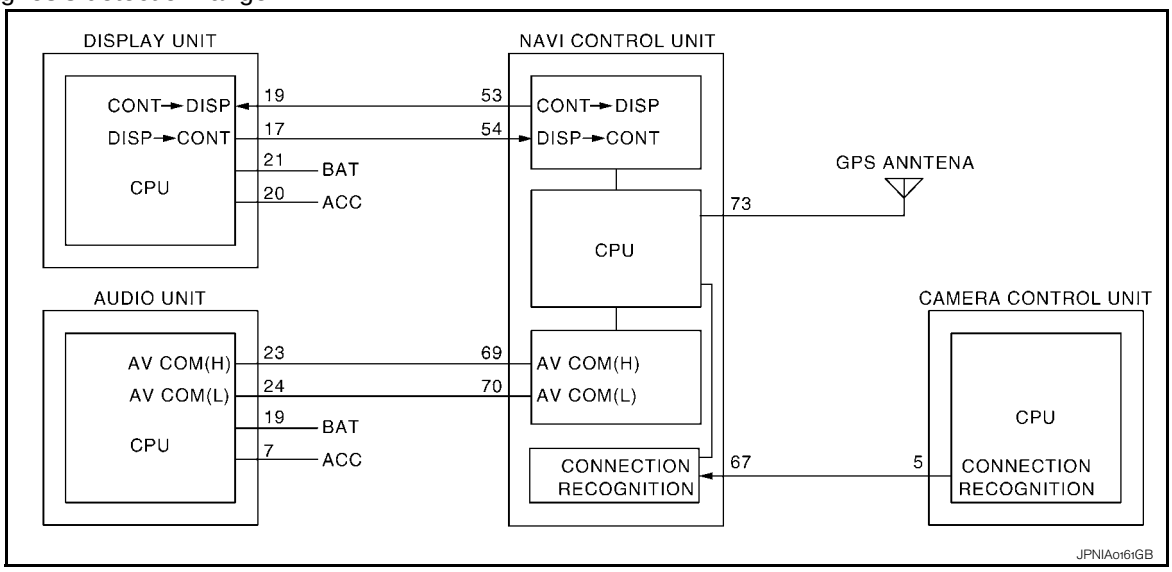
Diagnosis mode	Description
SELF-DIAG RESULTS	Performs a diagnosis on the NAVI control unit and a connection diagnosis for the communication circuit of the Multi AV system, and displays the current and past malfunctions collectively.
DATA MONITOR	The diagnosis of vehicle signal that is input to the NAVI control unit can be performed.
AV COMM MONITOR	Allows the technician to monitor the status of the Multi AV system communication signals.
ECU PART NUMBER	The part number of NAVI control unit can be checked.

Self-diagnosis results

- In CONSULT-III self-diagnosis, self-diagnosis results and error history are displayed collectively.
- The current malfunction indicates “CRNT”. The past malfunction indicates “PAST”.
- The timing is displayed as “0” if any of the error codes [U1000], [U1010], [U1300] and [U1310] is detected. The counter increases by 1 if the condition is normal at the next ignition switch ON cycle.

cardiagn.com

Self-diagnosis detection range



Self-diagnosis results display item

Error item	Description	Possible cause/Action to take
CAN COMM CIRCUIT[U1000]	CAN communication malfunction is detected.	Perform the diagnosis using CONSULT-III, and then repair the malfunctioning parts based on diagnostic results. Refer to AV-71, "Diagnosis Procedure".
CONTROL UNIT (CAN) [U1010]	CAN initial diagnosis malfunction is detected.	NAVI control unit
CONTROL UNIT (AV) [U1310]	AV communication circuit initial diagnosis malfunction is detected.	NAVI control unit
• AV COMM CIRCUIT [U1300] • SWITCH CONN [U1240] • AUDIO H/U CONN [U1249] • AMP CONN [U124E] • RDS CONN [U124F]	• Audio unit power supply and ground circuit malfunction is detected. • Malfunction is detected on communication circuit between audio unit and NAVI control unit. • Malfunction is detected on communication signal between audio unit and NAVI control unit.	• Audio unit power supply and ground circuit • Communication circuit between audio unit and NAVI control unit
FRONT DISP CONN [U1243]	• Display unit power supply and ground circuit malfunction is detected. • Malfunction is detected on communication circuit between display unit and NAVI control unit. • Malfunction is detected on communication signal between display unit and NAVI control unit.	• Display unit power supply and ground circuit • Communication circuit between display unit and NAVI control unit
GPS ANTENNA CONN [U1244]	GPS antenna connection malfunction is detected.	• GPS antenna feeder • GPS antenna
CAMERA CONT. CONN [U1250]	Camera and connection recognition signal circuit malfunction is detected.	Camera-connection recognition signal circuit
Control Unit FLASH-ROM [U1200]	NAVI control unit malfunction is detected.	NAVI control unit
Gyro NO CONN [U1201]	NAVI control unit malfunction is detected.	NAVI control unit

cardiagn.com

Error item	Description	Possible cause/Action to take
GPS COMM [U1204]	GPS malfunction is detected.	Intermittent malfunction caused by strong radio interference may be detected if the symptoms such as the GPS receipt malfunction occur. Replace NAVI control unit if the malfunction always occurs.
GPS ROM [U1205]		
GPS RAM [U1206]		
GPS RTC [U1207]		
DVD-ROM COMM [U1208]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit
DVD-ROM READ [U1209]		
DVD-ROM DISC [U120A]		
DVD-ROM MECHA DETECT [U120C]		
DVD-ROM DRIVE MECHA [U120D]		
DVD-ROM FOCUS [U120E]		
DVD-ROM TOC [U120F]		
DVD-ROM SEEK [U1210]		
DVD-ROM ERR CORRECTION [U1211]		
DVD-ROM DATA FORWARD [U1212]		
DVD-ROM DATA [U1213]		
DVD-ROM TIMEOUT [U1214]		
DVD-ROM LOAD [U1215]		
CAN CONT [U1216]	NAVI control unit malfunction is detected.	NAVI control unit
BLUETOOTH CONN [U1217]		

DATA MONITOR

ALL SIGNALS
- Displays the status of the following vehicle signals inputted to the NAVI control unit.
- For each signal, actual signal can be compared with the condition recognized on the system.

Display Item	Display	Vehicle status	Remarks
VHCL SPD SIG	ON	Vehicle speed >0 km/h (0 MPH)	Changes in indication may be delayed. This is normal.
	OFF	Vehicle speed =0 km/h (0 MPH)	
PKB SIG	ON	Parking brake is applied.	Changes in indication may be delayed. This is normal.
	OFF	Parking brake is released.	
ILLUM SIG	ON	Lighting switch ON	—
	OFF	Lighting switch OFF	
IGN SIG	ON	Ignition switch ON	—
	OFF	Ignition switch in ACC position	
REV SIG	ON	Selector lever in R position	Changes in indication may be delayed. This is normal.
	OFF	Selector lever in any position other than R	

SELECTION FROM MENU
Allows the technician to select which vehicle signals should be displayed and displays the status of the selected vehicle signals.

cardiagn.com

Item to be selected	Description
VHCL SPD SIG	The same as when “ALL SIGNALS” is selected.
PKB SIG	
ILLUM SIG	
IGN SIG	
REV SIG	

AV communication monitor

AV&NAVI C/U

- Displays the communication status from NAVI control unit to each unit as well as the error counter.
- The error counter displays “OK” if no malfunction was detected in the past and displays “0” if a malfunction is detected. It increases by 1 if the condition is normal at the next ignition switch ON cycle. The upper limit of the counter is 39.

Items	Display (Current)	Malfunction counter (Past)
TRANSMIT DIAG	OK / UNKWN	OK / 0 – 39
PANEL SWITCH	OK/ UNKWN	OK / 0 – 39
SW SECONDARY	—	—
RR CONTROL SW	—	—
STEERING SW	OK / UNKWN	OK / 0 – 39
AUDIO	OK / UNKWN	OK / 0 – 39
SPEAKER AMP	OK / UNKWN	OK / 0 – 39
SIDE CAMERA	—	—
REAR CAMERA	—	—
TV TUNER	—	—
DVD PLAYER	—	—
VIDEO DIST	—	—
ETC	—	—
FM MULTI	OK / UNKWN	OK / 0 – 39
REMOTE CONT	—	—

AUDIO

- Displays the NAVI control unit communication status and the error counter.
- The error counter displays “OK” if no malfunction was detected in the past and displays “0” if a malfunction is detected. It increases by 1 if the condition is normal at the next ignition switch ON cycle. The upper limit of the counter is 39.

Items	Display (Current)	Malfunction counter (Past)
TRANSMIT DG	OK / UNKWN	OK / 0 – 39
SPEAKER AMP	—	—
TV TUNER	—	—
DVD PLAYER	—	—
MD DECK	—	—
CD CHANGER	—	—
MD CHANGER	—	—

cardiagn.com

ECU PART NUMBER

The part number of NAVI control unit is displayed.

cardiagn.com

DIAGNOSIS SYSTEM (CAMERA CONTROL UNIT)

CONSULT-III Function (REAR VIEW CAMERA)

INFOID:0000000001096711

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

Diagnosis part	Check Item, Diagnosis Mode	Description
REAR VIEW CAMERA	WORK SUPPORT	Adjusts the vehicle width and distance guiding lines that overlap camera image.
	DATA MONITOR	Displays input data for rear view camera control unit in real-time.
	ECU PART NUMBER	Displays rear view camera control unit part number.

WORK SUPPORT

Work item	Description
SELECT GUIDELINE PATTERN	The opening of the vehicle width and distance guiding lines can be selected from 2 patterns.
ADJ GUIDELINE POSITION	Adjusts the vehicle width and distance guiding lines upper/lower/left/right.

For details, refer to Refer to Service Manual.

DATA MONITOR

Monitor item	Content
R POSI SIG [ON/OFF]	“ON (selector lever R position)/OFF (other than R position)” status as judged from the reverse signal is displayed.

cardiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000000947021

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart. Refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000000947022

DTC DETECTION LOGIC

DTC	Display contents of CONSULT-III	Diagnostic item is detected when...	Probable malfunction location
U1000	CAN COMM CIRCUIT [U1000]	NAVI control unit does not transmit or receive CAN communication signal for 2 seconds or more.	CAN communication system

Diagnosis Procedure

INFOID:0000000000947023

1. PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 second or more.
2. Check “Self Diagnostic Result” of “MULTI AV”.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to “LAN system”. Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI section. Refer to GI-39, "Intermittent Incident".

cardiagn.com

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000000947024

Initial diagnosis of NAVI control unit.

DTC Logic

INFOID:0000000000947025

DTC DETECTION LOGIC

DTC	Display contents of CONSULT-III	Diagnostic item is detected when...	Probable malfunction location
U1010	CONTROL UNIT (CAN) [U1010]	CAN initial diagnosis malfunction is detected.	NAVI control unit

Diagnosis Procedure

INFOID:0000000000947026

1.REPLACE NAVI CONTROL UNIT

Replace NAVI control unit when DTC U1010 is detected.

>> INSPECTION END

cardiagn.com

U1310 NAVI CONTROL UNIT

Description

INFOID:0000000000947027

Replace the NAVI control unit if this DTC is displayed. Refer to AV-201, "Exploded View".

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).

DTC Logic

INFOID:0000000000947028

DTC	Display contents of CONSULT-III	DTC Detection Condition	Action to take
U1310	CONTROL UNIT (AV) [U1310]	An initial diagnosis error is detected in AV communication circuit.	Replace NAVI control unit.

cardiagn.com

U1200 NAVI CONTROL UNIT

Description

INFOID:0000000000954873

Replace the NAVI control unit if this DTC is displayed. Refer to AV-201, "Exploded View".

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).

DTC Logic

INFOID:0000000000947030

DTC	Display contents of CONSULT-III	DTC Detection Condition	Action to take
U1200	Cont Unit FLASH- ROM [U1200]	An internal malfunction is detected in NAVI control unit (FLASH-ROM).	Replace NAVI control unit.

cardiagn.com

U1201 NAVI CONTROL UNIT

Description

INFOID:0000000000954874

Replace the NAVI control unit if this DTC is displayed. Refer to AV-201, "Exploded View".

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).

DTC Logic

INFOID:0000000000947032

DTC	Display contents of CONSULT-III	DTC Detection Condition	Action to take
U1201	GYRO NO CONN [U1201]	Internal malfunction of NAVI control unit (gyrocompass disconnection) is detected.	Replace NAVI control unit.

cardiagn.com

U1216 NAVI CONTROL UNIT

Description

INFOID:0000000000954875

Replace the NAVI control unit if this DTC is displayed. Refer to AV-201, "Exploded View".

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).

DTC Logic

INFOID:0000000000947034

DTC	Display contents of CONSULT-III	DTC Detection Condition	Action to take
U1216	CAN CONT [U1216]	Internal malfunction of NAVI control unit (CAN controller) is detected.	Replace NAVI control unit.

cardiagn.com

U1217 NAVI CONTROL UNIT

Description

INFOID:0000000000954876

Replace the NAVI control unit if this DTC is displayed. Refer to AV-201, "Exploded View".

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).

DTC Logic

INFOID:0000000000947036

DTC	Display contents of CONSULT-III	DTC Detection Condition	Action to take
U1217	BLUETOOTH MODULE CONN [U1217]	Internal malfunction of NAVI control unit (Bluetooth module connection malfunction) is detected.	Replace NAVI control unit.

cardiagn.com

U1204 GPS

Description

INFOID:0000000000947056

An intermittent error caused by strong radio interference may be detected unless any symptoms (GPS reception error, etc.) occur. Replace the NAVI control unit if the malfunction occurs constantly. Refer to AV-201, "Exploded View".

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).

DTC Logic

INFOID:0000000000947057

DTC	Display contents of CONSULT-III	DTC Detection Condition	Action to take
U1204	GPS CONN [U1204]	Internal malfunction of NAVI control unit (GPS malfunction) is detected.	Replace NAVI control unit.

Diagnosis Procedure

INFOID:0000000000947058

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Perform the self-diagnosis again.
3. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> The intermittent malfunction caused by strong radio interference can be detected.

cardiagn.com

U1205 GPS

Description

INFOID:0000000000954891

An intermittent error caused by strong radio interference may be detected unless any symptoms (GPS reception error, etc.) occur. Replace the NAVI control unit if the malfunction occurs constantly. Refer to AV-201, "Exploded View".

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).

DTC Logic

INFOID:0000000000947060

DTC	Display contents of CONSULT-III	DTC Detection Condition	Action to take
U1205	GPS ROM [U1205]	Internal malfunction of NAVI control unit (GPS malfunction) is detected.	Replace NAVI control unit.

Diagnosis Procedure

INFOID:0000000000954892

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Perform the self-diagnosis again.
3. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> The intermittent malfunction caused by strong radio interference can be detected.

cardiagn.com

U1206 GPS

Description

INFOID:0000000000954893

An intermittent error caused by strong radio interference may be detected unless any symptoms (GPS reception error, etc.) occur. Replace the NAVI control unit if the malfunction occurs constantly. Refer to AV-201, "Exploded View".

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).

DTC Logic

INFOID:0000000000947063

DTC	Display contents of CONSULT-III	DTC Detection Condition	Action to take
U1206	GPS RAM [U1206]	Internal malfunction of NAVI control unit (GPS malfunction) is detected.	Replace NAVI control unit.

Diagnosis Procedure

INFOID:0000000000954894

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Perform the self-diagnosis again.
3. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> The intermittent malfunction caused by strong radio interference can be detected.

cardiagn.com

U1207 GPS

Description

INFOID:0000000000954897

An intermittent error caused by strong radio interference may be detected unless any symptoms (GPS reception error, etc.) occur. Replace the NAVI control unit if the malfunction occurs constantly. Refer to AV-201, "Exploded View".

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).

DTC Logic

INFOID:0000000000947066

DTC	Display contents of CONSULT-III	DTC Detection Condition	Action to take
U1207	GPS RTC [U1207]	Internal malfunction of NAVI control unit (GPS malfunction) is detected.	Replace NAVI control unit.

Diagnosis Procedure

INFOID:0000000000954898

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Perform the self-diagnosis again.
3. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> The intermittent malfunction caused by strong radio interference can be detected.

cardiagn.com

U1208 NAVI CONTROL UNIT

Description

INFOID:0000000000954914

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954915

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U1208	DVD-ROM COMM [U1208]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954916

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U1209 NAVI CONTROL UNIT

Description

INFOID:0000000000954923

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954924

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U1209	DVD-ROM READ [U1209]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954925

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U120A NAVI CONTROL UNIT

Description

INFOID:0000000000954926

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954927

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U120A	DVD-ROM DISC [U120A]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954928

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U120C NAVI CONTROL UNIT

Description

INFOID:0000000000954929

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954930

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U120C	DVD-ROM MECHA DETECT [U120C]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954931

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U120D NAVI CONTROL UNIT

Description

INFOID:0000000000954932

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954933

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U120D	DVD-ROM DRIVE MECHA [U120D]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954934

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U120E NAVI CONTROL UNIT

Description

INFOID:0000000000954935

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954936

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U120E	DVD-ROM FOCUS [U120E]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954937

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U120F NAVI CONTROL UNIT

Description

INFOID:0000000000954938

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954939

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U120F	DVD-ROM TOC [U120F]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954940

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U1210 NAVI CONTROL UNIT

Description

INFOID:0000000000954941

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954942

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U1210	DVD-ROM SEEK [U1210]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954943

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U1211 NAVI CONTROL UNIT

Description

INFOID:0000000000954944

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954945

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U1211	DVD-ROM ERR CORRECTION [U1211]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954946

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U1212 NAVI CONTROL UNIT

Description

INFOID:0000000000954947

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954948

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U1212	DVD-ROM DATA FORWARD [U1212]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954949

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U1213 NAVI CONTROL UNIT

Description

INFOID:0000000000954950

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954951

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U1213	DVD-ROM DATA [U1213]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954952

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U1214 NAVI CONTROL UNIT

Description

INFOID:0000000000954954

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954955

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U1214	DVD-ROM TIMEOUT [U1214]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954956

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U1215 NAVI CONTROL UNIT

Description

INFOID:0000000000954957

Part name	Description
NAVI CONTORL UNIT	• Map data can be read from the map DVD-ROM by installing map DVD-ROM. • It is the master unit of the MULTI AV system, and it is connected to each control unit by means of communication. It operates each system according to communication signals from the NAVI control unit. • The NAVI control unit includes the audio, hands-free phone, navigation, and vehicle information functions. • It is connected to ECM and combination meter via CAN communication to obtain necessary information for the vehicle information function. • It inputs the illumination signals that are required for the display dimming control. • It inputs the signals for driving status recognition (vehicle speed, reverse and parking brake).
MAP DVD-ROM	A collection of map data

DTC Logic

INFOID:0000000000954958

DTC	Display contents of CONSULT-III	DTC Detection Condition	Probable malfunction location
U1215	DVD-ROM LOAD [U1215]	• Malfunction is detected on DVD-ROM drive pickup lens in NAVI control unit. • There is dirt and damage on the map disc.	• Map disc • NAVI control unit

Diagnosis Procedure

INFOID:0000000000954959

1.PERFORM THE SELF-DIAGNOSIS

1. Delete the self-diagnosis results. Turn ignition switch OFF.
2. Turn ignition switch ON. Replace map DVD-ROM with a normal one.
3. Perform the self-diagnosis again.
4. Check that the DTC is detected again.

Is any DTC detected?

YES >> Replace NAVI control unit.
NO >> Replace Map disc.

cardiagn.com

U1243 DISPLAY UNIT

Description

INFOID:0000000000947068

Part name	Description
DISPLAY UNIT	• Display image is controlled by the serial communication from NAVI control unit. • RGB image signal is input from NAVI control unit (RGB, RGB area and RGB synchronizing). Camera image signal is input from camera control unit. • Synchronize signal (HP, VP) is output to NAVI control unit.

DTC Logic

INFOID:0000000000947069

DTC	Display contents of CONSULT-III	DTC Detection Condition	Possible causes
U1243	FRONT DISP CONN [U1243]	• Display unit power supply and ground circuit malfunction is detected. • Malfunction is detected on communication circuit between display unit and NAVI control unit. • Malfunction is detected on communication signal between display unit and NAVI control unit.	• Display unit power supply and ground circuit • Communication circuit between display unit and NAVI control unit

Diagnosis Procedure

INFOID:0000000000947070

1.CHECK DISPLAY UNIT POWER SUPPLY AND GROUND CIRCUIT

Check display unit power supply and ground circuit. Refer to AV-101, "DISPLAY UNIT : Diagnosis Procedure".

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair malfunctioning parts.

2.CHECK CONTINUITY COMMUNICATION CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display unit connector and NAVI control unit connector.
3. Check continuity between display unit harness connector terminals 17, 19 and NAVI control unit harness connector terminals 54, 53.

17 - 54 : Continuity should exist.
19 - 53 : Continuity should exist.

4. Check continuity between display unit harness connector terminals 17, 19 and ground.

17, 19 - Ground : Continuity should not exist.

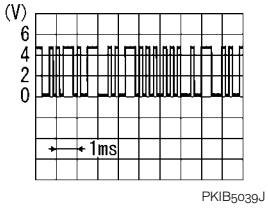
Is inspection result OK?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK COMMUNICATION SIGNAL

1. Connect display unit connector and NAVI control unit connector.
2. Turn ignition switch ON.
3. Check signal between display unit harness connector terminal 17 and ground.

cardiagn.com

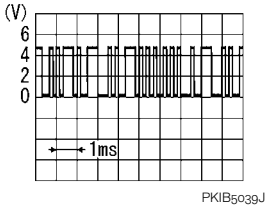
17 - Ground	 PKIB5039J

Is inspection result OK?

YES >> GO TO 4.
NO >> Replace NAVI control unit.

4.CHECK COMMUNICATION SIGNAL

Check signal between display unit harness connector terminal 19 and ground.

19 - Ground	 PKIB5039J

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace display unit.

cardiagn.com

U1244 GPS ANTENNA

Description

INFOID:0000000000947071

Part name	Description
GPS ANTENNA	GPS signal is received and sent to NAVI control unit.

DTC Logic

INFOID:0000000000947072

DTC	Display contents of CONSULT-III	DTC Detection Condition	Possible causes
U1244	GPS ANTENNA CONN [U1244]	GPS antenna connection malfunction is detected.	GPS antenna disconnection

Diagnosis Procedure

INFOID:0000000000947073

1.CHECK GPS ANTENNA

Visually check GPS antenna and antenna feeder.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair malfunctioning parts.

2.CHECK NAVI CONTROL UNIT VOLTAGE

1. Disconnect GPS antenna connector.
2. Turn ignition switch ON.
3. Check voltage between NAVI control unit terminal 73 and ground.

73 - Ground : Approx. 5 V

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace NAVI control unit.

cardiagn.com

U1250 CAMERA CONTROL UNIT

Description

INFOID:0000000000947077

Part name	Description
CAMERA CONTROL UNIT	• Camera image signal is input from rear view camera, and camera image is indicated on the display. • Power (camera ON signal) is sent to rear view camera. • It is controlled by AV communication sent from NAVI control unit. • NAVI control unit recognizes the presence of camera system with camera connection recognition signal.

DTC Logic

INFOID:0000000000947078

DTC	Display contents of CONSULT-III	DTC Detection Condition	Possible causes
U1250	CAMERA CONT. CONN [U1250]	A malfunction is detected in camera-connection recognition signal circuit.	Camera-connection recognition signal circuit

Diagnosis Procedure

INFOID:0000000000947079

1.CHECK CAMERA-CONNECTION RECOGNITION SIGNAL CIRCUIT

1. Disconnect NAVI control unit connector and camera control unit connector.
2. Check continuity between NAVI control unit harness connector terminal 67 and camera control unit harness connector terminal 5.

67 - 5 : Continuity should exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK NAVI CONTROL UNIT VOLTAGE

1. Connect NAVI control unit connector.
2. Turn ignition switch ON.
3. Check voltage between NAVI control unit harness connector terminal 67 and ground.

67 - Ground : Approx. 5 V

Is inspection result OK?

YES >> Replace camera control unit.
NO >> Replace NAVI control unit.

cardiagn.com

U1300 AV COMM CIRCUIT

Description

INFOID:0000000000955002

U1300 is indicated when malfunction occurs in communication signal of multi AV system. It is indicated simultaneously, without fail, with the malfunction of control units connected to NAVI control unit with communication line. It determines the possible malfunction cause from the table below.

SELF-DIAGNOSIS RESULTS DISPLAY ITEM

DTC	Display contents of CONSULT-III	Description	Possible malfunction factor/Action to take
U1300 U1240 U1249 U124E U124F	• AV COMM CIRCUIT [U1300] • SWITCH CONN [U1240] • AUDIO H/U CONN [U1249] • AMP CONN [U124E] • RDS CONN [U124F]	• Audio unit power supply and ground circuit malfunction is detected. • Malfunction occurs in AV communication circuit between NAVI control unit and audio unit. • Malfunction is detected in AV communication signal between NAVI control unit and audio unit.	• Audio unit power supply and ground circuits Refer to AV-100, "AUDIO UNIT : Diagnosis Procedure". • AV communication circuit between NAVI control unit and audio unit

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT
NAVI CONTROL UNIT

NAVI CONTROL UNIT : Diagnosis Procedure

INFOID:0000000000947084

1.CHECK FUSE

Check for blown fuses.

Power source	Fuse No.
Battery	38
Ignition switch ACC or ON	5
Ignition switch ON or START	4

Is inspection result OK?

YES >> GO TO 2.
NO >> Be sure to eliminate cause of malfunction before installing new fuse.

2.CHECK POWER SUPPLY CIRCUIT

Check voltage between NAVI control unit harness connectors and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Value (Approx.)
Battery power supply	B95	2	OFF	12 V
ACC power supply	B95	5	ACC	12 V
Ignition signal	B96	63	ON	12 V

Is inspection result OK?

YES >> GO TO 3.
NO >> Check harness between NAVI control unit and fuse.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect NAVI control unit connectors.
3. Check continuity between NAVI control unit harness connector and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Continuity
Ground	B95	1	OFF	Continuity should exist.

Is inspection result OK?

YES >> INSPECTION END
NO >> Repair harness or connector.

AUDIO UNIT

AUDIO UNIT : Diagnosis Procedure

INFOID:0000000000954530

1.CHECK FUSE

Check for blown fuses.

Power source	Fuse No.
Battery	38
Ignition switch ACC or ON	5

Is inspection result OK?

YES >> GO TO 2.
NO >> Be sure to eliminate cause of malfunction before installing new fuse.

2.CHECK POWER SUPPLY CIRCUIT

Check voltage between audio unit harness connectors and ground.

cardiagn.com

Signal name	Connector No.	Terminal No.	Ignition switch position	Value (Approx.)
Battery power supply	M46	19	OFF	12 V
ACC power supply	M46	7	ACC	12 V

Is inspection result OK?

YES >> GO TO 3.
NO >> Check harness between audio unit and fuse.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect audio unit connectors.
3. Check continuity between audio unit harness connector and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Continuity
Ground	M46	8, 20	OFF	Continuity should exist.

Is inspection result OK?

YES >> INSPECTION END
NO >> Repair harness or connector.

DISPLAY UNIT

DISPLAY UNIT : Diagnosis Procedure

INFOID:0000000000947085

1.CHECK FUSE

Check for blown fuses.

Power source	Fuse No.
Battery	38
Ignition switch ACC or ON	5

Is inspection result OK?

YES >> GO TO 2.
NO >> Be sure to eliminate cause of malfunction before installing new fuse.

2.CHECK POWER SUPPLY CIRCUIT

Check voltage between display unit harness connectors and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Value (Approx.)
Battery power supply	M49	21	OFF	12 V
ACC power supply	M49	20	ACC	12 V

Is inspection result OK?

YES >> GO TO 3.
NO >> Check harness between display unit and fuse.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display unit connector.
3. Check continuity between display unit harness connector and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Continuity
Ground	M49	23	OFF	Continuity should exist.

Is inspection result OK?

YES >> INSPECTION END
NO >> Repair harness or connector.

CAMERA CONTROL UNIT

cardiagn.com

CAMERA CONTROL UNIT : Diagnosis Procedure

INFOID:0000000000947087

1.CHECK FUSE

Check for blown fuses.

Power source	Fuse No.
Battery	38
Ignition switch ACC or ON	5

Is inspection result OK?

YES >> GO TO 2.
NO >> Be sure to eliminate cause of malfunction before installing new fuse.

2.CHECK POWER SUPPLY CIRCUIT

Check voltage between camera control unit harness connectors and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Value (Approx.)
Battery power supply	B60	1	OFF	12 V
ACC power supply	B60	2	ACC	12 V

Is inspection result OK?

YES >> GO TO 3.
NO >> Check harness between camera control unit and fuse.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect camera control unit connector.
3. Check continuity between camera control unit harness connector and ground.

Signal name	Connector No.	Terminal No.	Ignition switch position	Continuity
Ground	B60	3	OFF	Continuity should exist.

Is inspection result OK?

YES >> INSPECTION END
NO >> Repair harness or connector.

cardiagn.com

RGB (R: RED) SIGNAL CIRCUIT

Description

INFOID:0000000000947090

Transmits the image displayed with NAVI control unit with RGB signal to the display unit.

Diagnosis Procedure

INFOID:0000000000947091

1.CHECK CONTINUITY RGB (R: RED) SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display unit connector and NAVI control unit connector.
3. Check continuity between display unit harness connector terminal 1 and NAVI control unit harness connector terminal 44.

1 - 44 : Continuity should exist.

4. Check continuity between display unit harness connector terminal 1 and ground.

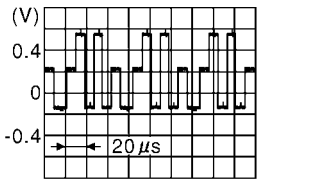
1 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK RGB (R: RED) SIGNAL

1. Connect display unit connector and NAVI control unit connector.
2. Turn ignition switch ON.
3. Start “Confirmation / Adjustment Mode”, and then display color bar by selecting“Color Spectrum Bar” on DISPLAY DIAGNOSIS screen.
4. Check signal between display unit harness connector terminal 1 and 8.

1 - 8	 JPNIA0221ZZ

Is inspection result OK?

YES >> Replace display unit.
NO >> Replace NAVI control unit.

cardiagn.com

RGB (G: GREEN) SIGNAL CIRCUIT

Description

INFOID:0000000000947092

Transmits the image displayed with NAVI control unit with RGB signal to the display unit.

Diagnosis Procedure

INFOID:0000000000947093

1.CHECK CONTINUITY RGB (G: GREEN) SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display unit connector and NAVI control unit connector.
3. Check continuity between display unit harness connector terminal 3 and NAVI control unit harness connector terminal 45.

3 - 45 : Continuity should exist.

4. Check continuity between display unit harness connector terminal 3 and ground.

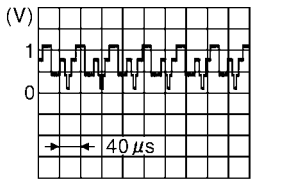
3 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK RGB (G: GREEN) SIGNAL

1. Connect display unit connector and NAVI control unit connector.
2. Turn ignition switch ON.
3. Start “Confirmation / Adjustment Mode”, and then display color bar by selecting“Color Spectrum Bar” on DISPLAY DIAGNOSIS screen.
4. Check signal between display unit harness connector terminal 3 and 8.

3 - 8	 JPNIA0222ZZ

Is inspection result OK?

YES >> Replace display unit.
NO >> Replace NAVI control unit.

cardiagn.com

RGB (B: BLUE) SIGNAL CIRCUIT

Description

INFOID:0000000000947094

Transmits the image displayed with NAVI control unit with RGB signal to the display unit.

Diagnosis Procedure

INFOID:0000000000947095

1.CHECK CONTINUITY RGB (B: BLUE) SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display unit connector and NAVI control unit connector.
3. Check continuity between display unit harness connector terminal 5 and NAVI control unit harness connector terminal 46.

5 - 46 : Continuity should exist.

4. Check continuity between display unit harness connector terminal 5 and ground.

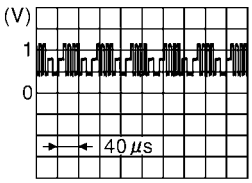
5 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK RGB (B: BLUE) SIGNAL

1. Connect display unit connector and NAVI control unit connector.
2. Turn ignition switch ON.
3. Start “Confirmation / Adjustment Mode”, and then display color bar by selecting“Color Spectrum Bar” on DISPLAY DIAGNOSIS screen.
4. Check signal between display unit harness connector terminal 5 and 8.

5 - 8	 JPNIA0223ZZ

Is inspection result OK?

YES >> Replace display unit.
NO >> Replace NAVI control unit.

cardiagn.com

RGB SYNCHRONIZING SIGNAL CIRCUIT

Description

INFOID:0000000000947096

Transmits the RGB synchronizing signal to the display unit so as to synchronize the RGB image displayed with NAVI control unit.

Diagnosis Procedure

INFOID:0000000000947097

1.CHECK CONTINUITY RGB SYNCHRONIZING SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display unit connector and NAVI control unit connector.
3. Check continuity between display unit harness connector terminal 7 and NAVI control unit harness connector terminal 48.

7 - 48 : Continuity should exist.

4. Check continuity between display unit harness connector terminal 7 and ground.

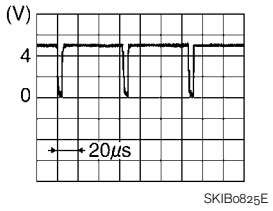
7 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK RGB SYNCHRONIZING SIGNAL

1. Connect display unit connector and NAVI control unit connector.
2. Turn ignition switch ON.
3. Check signal between display unit harness connector terminal 7 and ground.

7 - Ground	 SKIB0825E

Is inspection result OK?

YES >> Replace display unit.
NO >> Replace NAVI control unit.

cardiagn.com

RGB AREA (YS) SIGNAL CIRCUIT

Description

INFOID:0000000000947098

Transmits the display area of RGB image displayed by NAVI control unit with RGB area (YS) signal to display unit.

Diagnosis Procedure

INFOID:0000000000947099

1.CHECK CONTINUITY RGB AREA (YS) SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display unit connector and NAVI control unit connector.
3. Check continuity between display unit harness connector terminal 2 and NAVI control unit harness connector terminal 50.

2 - 50 : Continuity should exist.

4. Check continuity between display unit harness connector terminal 2 and ground.

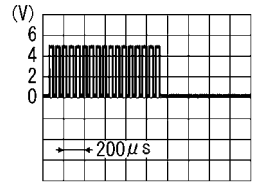
2 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK RGB SYNCHRONIZING SIGNAL

1. Connect display unit connector and NAVI control unit connector.
2. Turn ignition switch ON.
3. Check signal between display unit harness connector terminal 2 and ground.

2 - Ground	At RGB image displayed	: Approx. 5 V
	At rear view camera image displayed	 PKIB4948J

Is inspection result OK?

YES >> Replace display unit.
NO >> Replace NAVI control unit.

cardiagn.com

HORIZONTAL SYNCHRONIZING (HP) SIGNAL CIRCUIT

Description

INFOID:0000000000947100

In composite image (camera image), it transmits the vertical synchronizing (VP) signal and horizontal synchronizing (HP) signal from display unit to NAVI control unit so as to synchronize the RGB images displayed with NAVI control unit such as the image quality adjusting menu, etc.

Diagnosis Procedure

INFOID:0000000000947101

1.CHECK CONTINUITY HORIZONTAL SYNCHRONIZING (HP) SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display unit connector and NAVI control unit connector.
3. Check continuity between display unit harness connector terminal 4 and NAVI control unit harness connector terminal 51.

4 - 51 : Continuity should exist.

4. Check continuity between display unit harness connector terminal 4 and ground.

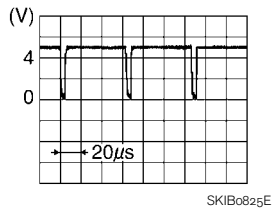
4 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK HORIZONTAL SYNCHRONIZING (HP) SIGNAL

1. Connect display unit connector and NAVI control unit connector.
2. Turn ignition switch ON.
3. Check signal between display unit harness connector terminal 4 and ground.

4 - Ground	 SKIB0825E

Is inspection result OK?

YES >> Replace NAVI control unit.
NO >> Replace display unit.

cardiagn.com

VERTICAL SYNCHRONIZING (VP) SIGNAL CIRCUIT

Description

INFOID:0000000000947102

In composite image (camera image), it is transmits the vertical synchronizing (VP) signal and horizontal synchronizing (HP) signal from display unit to NAVI control unit so as to synchronize the RGB images displayed with NAVI control unit such as the image quality adjusting menu, etc.

Diagnosis Procedure

INFOID:0000000000947103

1. CHECK CONTINUITY VERTICAL SYNCHRONIZING (VP) SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display unit connector and NAVI control unit connector.
3. Check continuity between display unit harness connector terminal 6 and NAVI control unit harness connector terminal 52.

6 - 52 : Continuity should exist.

4. Check continuity between display unit harness connector terminal 6 and ground.

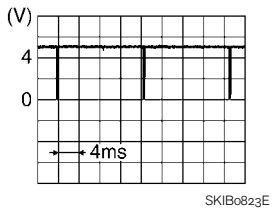
6 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2. CHECK VERTICAL SYNCHRONIZING (VP) SIGNAL

1. Connect display unit connector and NAVI control unit connector.
2. Turn ignition switch ON.
3. Check signal between display unit harness connector terminal 6 and ground.

6 - Ground	 SKIB0823E

Is inspection result OK?

YES >> Replace NAVI control unit.
NO >> Replace display unit.

cardiagn.com

MICROPHONE SIGNAL CIRCUIT

Description

INFOID:0000000000947108

Supplies power from NAVI control unit to microphone. The microphone transmits the sound voice to the NAVI control unit.

Diagnosis Procedure

INFOID:0000000000947109

1.CHECK CONTINUITY BETWEEN NAVI CONTROL UNIT AND MICROPHONE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect NAVI control unit connector and microphone connector.
3. Check continuity between NAVI control unit harness connector terminals 6, 7, 8 and microphone harness connector terminals 4, 2, 1.

6 - 4	**: Continuity should exist.**
7 - 2	**: Continuity should exist.**
8 - 1	**: Continuity should exist.**

4. Check continuity between NAVI control unit harness connector terminals 6, 8 and ground.

6, 8 - Ground	**: Continuity should not exist.**

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK VOLTAGE MICROPHONE VCC

1. Connect NAVI control unit connector.
2. Turn ignition switch ON.
3. Check voltage between NAVI control unit harness connector terminals 6 and 7.

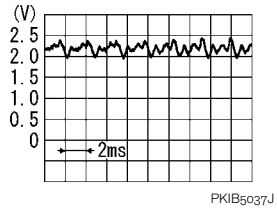
6 - 7	**: Approx. 5 V**

Is inspection result OK?

YES >> GO TO 3.
NO >> Replace NAVI control unit.

3.CHECK MICROPHONE SIGNAL

1. Connect microphone connector.
2. Check signal between NAVI control unit harness connector terminals 8 and 7.

8 - 7	 PKIB5037J

Is inspection result OK?

YES >> Replace NAVI control unit.
NO >> Replace microphone.

cardiagn.com

CAMERA IMAGE SIGNAL CIRCUIT (REAR VIEW CAMERA TO CAMERA CONTROL UNIT)

Description

INFOID:0000000000947110

- Camera control unit outputs camera ON signal to rear view camera and inputs rear view camera image signal from rear view camera when the reverse signal is input.
- The camera control unit that inputs the camera image signal transmits the camera image signal to the display unit.

Diagnosis Procedure

INFOID:0000000000947111

1.CHECK CONTINUITY CAMERA IMAGE SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect camera control unit connector and rear view camera connector.
3. Check continuity between camera control unit harness connector terminal 10 and rear view camera harness connector terminal 3.

10 - 3 : Continuity should exist.

4. Check continuity between camera control unit harness connector terminal 10 and ground.

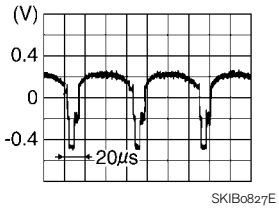
10 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK CAMERA IMAGE SIGNAL

1. Connect camera control unit connector and rear view camera connector.
2. Turn ignition switch ON.
3. Check signal between camera control unit harness connector terminal 10 and ground.

10 - Ground	At rear view camera image displayed	 SKIB0827E

Is inspection result OK?

YES >> Replace camera control unit.
NO >> Replace rear view camera.

cardiagn.com

CAMERA IMAGE SIGNAL CIRCUIT (CAMERA CONTROL UNIT TO DISPLAY UNIT)

Description

INFOID:0000000000947114

- Camera control unit outputs camera ON signal to rear view camera and inputs rear view camera image signal from rear view camera when the reverse signal is input.
- The camera control unit that inputs the camera image signal transmits the camera image signal to the display unit.

Diagnosis Procedure

INFOID:0000000000947115

1.CHECK CONTINUITY CAMERA IMAGE SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect camera control unit connector and display unit connector.
3. Check continuity between camera control unit harness connector terminal 12, 11 and display unit harness connector terminal 11, 12.

12 - 11	**: Continuity should exist.**
11 - 12	**: Continuity should exist.**

4. Check continuity between camera control unit harness connector terminal 12 and ground.

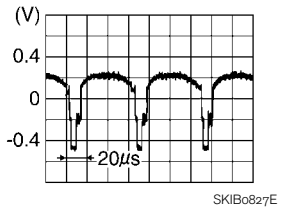
12 - Ground	**: Continuity should not exist.**

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK CAMERA IMAGE SIGNAL

1. Connect camera control unit connector and display unit connector.
2. Turn ignition switch ON.
3. Check signal between camera control unit harness connector terminal 12 and ground.

12 - Ground	At rear view camera image displayed	 SKIB0827E

Is inspection result OK?

YES >> Replace display unit.
NO >> Replace camera control unit.

cardiagn.com

CAMERA ON SIGNAL CIRCUIT

Description

INFOID:0000000000947112

- Camera control unit outputs camera ON signal to rear view camera and inputs rear view camera image signal from rear view camera when the reverse signal is input.
- The camera control unit that inputs the camera image signal transmits the camera image signal to the display unit.

Diagnosis Procedure

INFOID:0000000000947113

1. CHECK CONTINUITY CAMERA ON SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect camera control unit connector and rear view camera connector.
3. Check continuity between camera control unit harness connector terminal 8 and rear view camera harness connector terminal 1.

8 - 1 : Continuity should exist.

4. Check continuity between camera control unit harness connector terminal 8 and ground.

8 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2. CHECK VOLTAGE CAMERA ON SIGNAL

1. Connect camera control unit connector and rear view camera connector.
2. Turn ignition switch ON.
3. Shift the selector lever to “R” position.
4. Check signal between camera control unit harness connector terminal 8 and ground.

8 - Ground : Approx. 6 V

Is inspection result OK?

YES >> Replace rear view camera.
NO >> Replace camera control unit.

cardiagn.com

STEERING SWITCH SIGNAL A CIRCUIT

Description

INFOID:0000000000947120

Transmits the steering switch signal to audio unit.

Diagnosis Procedure

INFOID:0000000000947121

1.CHECK STEERING SWITCH SIGNAL A CIRCUIT

1. Disconnect audio unit connector and spiral cable connector.
2. Check continuity between audio unit harness connector terminal 6 and spiral cable harness connector terminal 24.

6 - 24 : Continuity should exist.

3. Check continuity between audio unit harness connector terminals 6 and ground.

6 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK SPIRAL CABLE

Check spiral cable.

Is inspection result OK?

YES >> GO TO 3.
NO >> Replace spiral cable.

3.CHECK AUDIO UNIT VOLTAGE

1. Connect audio unit connector and spiral cable connector.
2. Turn ignition switch ON.
3. Check voltage between audio unit harness connector terminals 6 and 15.

6 - 15 : Approx. 5 V

Is inspection result OK?

YES >> GO TO 4.
NO >> Replace audio unit.

4.CHECK STEERING SWITCH

1. Turn ignition switch OFF.
2. Check steering switch. Refer to AV-114, "Component Inspection".

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace steering switch.

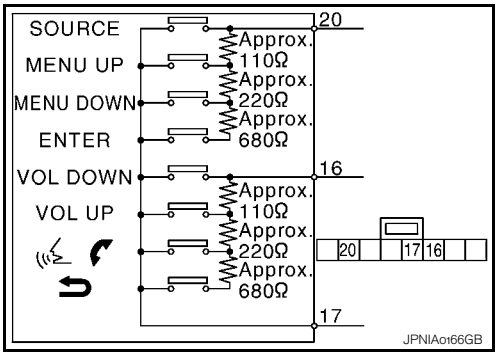
Component Inspection

INFOID:0000000000947122

Measure the resistance between the steering switch connector terminals 20 to 17 and 16 to 17.

cardiagn.com

Standard



Between terminals 20 and 17

ENTER switch ON	**: 990 – 1030 Ω**
MENU DOWN switch ON	**: 324 – 336 Ω**
MENU UP switch ON	**: 108 – 112 Ω**
SOURCE switch ON	**: 0 Ω**

Between terminals 16 and 17

↩ switch ON	**: 990 – 1030 Ω**
switch ON	**: 324 – 336 Ω**
VOL UP switch ON	**: 108 – 112 Ω**
VOL DOWN switch ON	**: 0 Ω**

cardiagn.com

STEERING SWITCH SIGNAL B CIRCUIT

Description

INFOID:0000000000955225

Transmits the steering switch signal to audio unit.

Diagnosis Procedure

INFOID:0000000000947124

1.CHECK STEERING SWITCH SIGNAL B CIRCUIT

1. Disconnect audio unit connector and spiral cable connector.
2. Check continuity between audio unit harness connector terminal 16 and spiral cable harness connector terminal 32.

16 - 32 : Continuity should exist.

3. Check continuity between audio unit harness connector terminal 16 and ground.

16 - Ground : Continuity should not exist.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK SPIRAL CABLE

Check spiral cable.

Is inspection result OK?

YES >> GO TO 3.
NO >> Replace spiral cable.

3.CHECK AUDIO UNIT VOLTAGE

1. Connect audio unit connector and spiral cable connector.
2. Turn ignition switch ON.
3. Check voltage between audio unit harness connector terminals 16 and 15.

16 - 15 : Approx. 5 V

Is inspection result OK?

YES >> GO TO 4.
NO >> Replace audio unit.

4.CHECK STEERING SWITCH

1. Turn ignition switch OFF.
2. Check steering switch. Refer to AV-116, "Component Inspection".

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace steering switch.

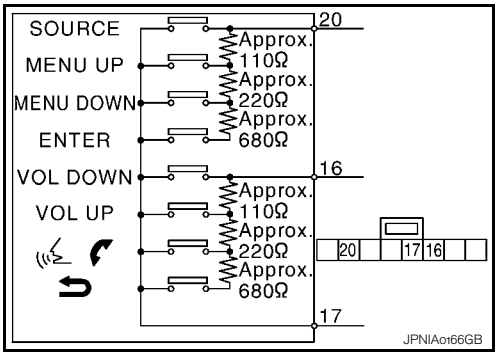
Component Inspection

INFOID:0000000000955226

Measure the resistance between the steering switch connector terminals 20 to 17 and 16 to 17.

cardiagn.com

Standard



Between terminals 20 and 17

ENTER switch ON	**: 990 – 1030 Ω**
MENU DOWN switch ON	**: 324 – 336 Ω**
MENU UP switch ON	**: 108 – 112 Ω**
SOURCE switch ON	**: 0 Ω**

Between terminals 16 and 17

↩ switch ON	**: 990 – 1030 Ω**
switch ON	**: 324 – 336 Ω**
VOL UP switch ON	**: 108 – 112 Ω**
VOL DOWN switch ON	**: 0 Ω**

cardiagn.com

STEERING SWITCH SIGNAL GND CIRCUIT

Description

INFOID:0000000000955227

Transmits the steering switch signal to audio unit.

Diagnosis Procedure

INFOID:0000000000947127

1.CHECK STEERING SWITCH SIGNAL GND CIRCUIT

1. Disconnect audio unit connector and spiral cable connector.
2. Check continuity between audio unit harness connector terminal 15 and spiral cable harness connector terminal 31.

15 - 31 : Continuity should exist.

3. Connect audio unit connector.

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK SPIRAL CABLE

Check spiral cable.

Is inspection result OK?

YES >> GO TO 3.
NO >> Replace spiral cable.

3.CHECK GROUND CIRCUIT

1. Connect audio unit connector.
2. Check continuity between audio unit harness connector terminal 15 and ground.

15 - Ground : Continuity should exist.

Is inspection result OK?

YES >> GO TO 4.
NO >> Replace audio unit.

4.CHECK STEERING SWITCH

1. Turn ignition switch OFF.
2. Check steering switch. Refer to AV-118, "Component Inspection".

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace steering switch.

Component Inspection

INFOID:0000000000955228

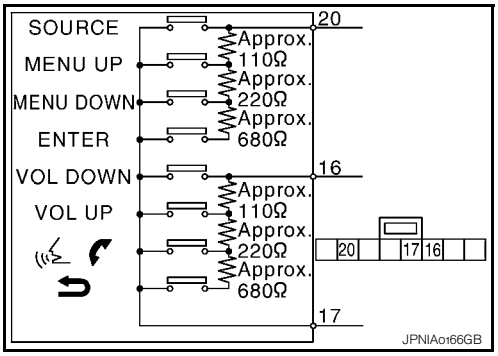
Measure the resistance between the steering switch connector terminals 20 to 17 and 16 to 17.

Standard

Between terminals 20 and 17

ENTER switch ON : 990 – 1030 Ω
MENU DOWN switch ON : 324 – 336 Ω
MENU UP switch ON : 108 – 112 Ω
SOURCE switch ON : 0 Ω

Between terminals 16 and 17



cardiagn.com

switch ON	: 990 – 1030 Ω
switch ON	: 324 – 336 Ω
VOL UP switch ON	: 108 – 112 Ω
VOL DOWN switch ON	: 0 Ω

cardiagn.com

ECU DIAGNOSIS

NAVI CONTROL UNIT

Reference Value

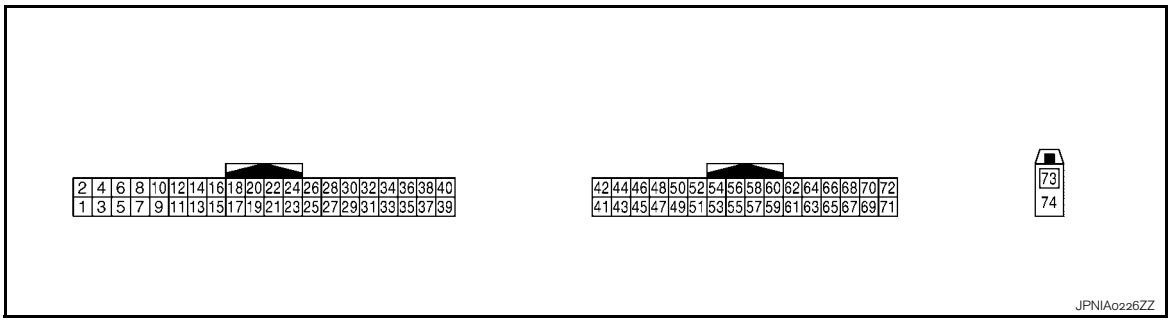
INFOID:0000000000947129

VALUES ON THE DIAGNOSIS TOOL

CONSULT-III data monitor item

Display Item	Display	Vehicle status	Remarks
VHCL SPD SIG	ON	Vehicle speed >0 km/h (0 MPH)	Changes in indication may be delayed. This is normal.
	OFF	Vehicle speed =0 km/h (0 MPH)	
PKB SIG	ON	Parking brake is applied.	Changes in indication may be delayed. This is normal.
	OFF	Parking brake is released.	
ILLUM SIG	ON	Lighting switch ON	—
	OFF	Lighting switch OFF	
IGN SIG	ON	Ignition switch ON	—
	OFF	Ignition switch in ACC position	
REV SIG	ON	Selector lever in R position	Changes in indication may be delayed. This is normal.
	OFF	Selector lever in any position other than R	

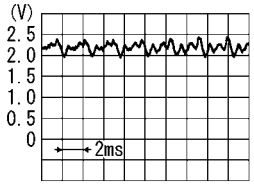
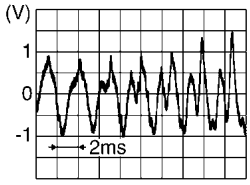
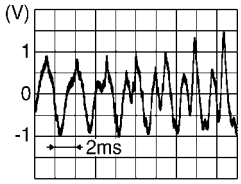
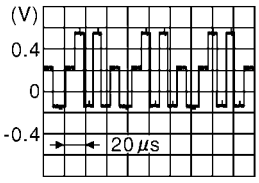
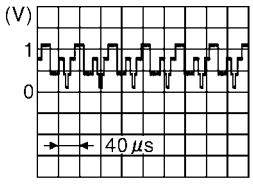
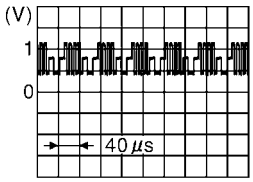
TERMINAL LAYOUT



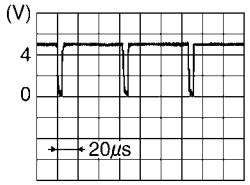
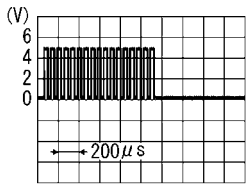
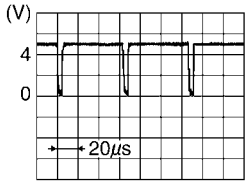
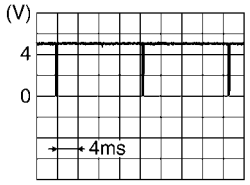
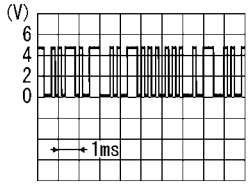
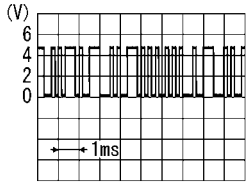
PHYSICAL VALUES

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
1 (B)	Ground	GND	—	Ignition switch ON	—	0 V
2 (LG)	Ground	Battery power supply	Input	Ignition switch OFF	—	Battery voltage
5 (R)	Ground	ACC power supply	Input	Ignition switch ACC	—	Battery voltage
6 (B)	7	Microphone VCC	Output	Ignition switch ON	—	5 V
7	Ground	Microphone GND	—	Ignition switch ON	—	0 V

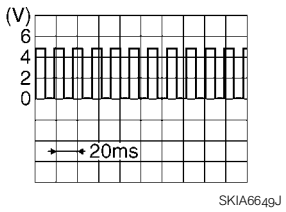
cardiagn.com

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
8 (W)	7	Microphone signal	Input	Ignition switch ON	Sounds	 PKIB5037J
9	—	Shield	—	—	—	—
10 (W)	11 (O)	TEL voice signal	Output	Ignition switch ON	TEL voice output	 SKIB3609E
12 (O)	14 (W)	Voice guidance signal	Output	Ignition switch ON	Voice guidance output	 SKIB3609E
13	—	Shield	—	—	—	—
44 (G)	47 (B)	RGB signal (R: red)	Output	Ignition switch ON	Start “Confirmation / Adjustment Mode”, and then display color bar by selecting “Color Spectrum Bar” on DISPLAY DIAGNOSIS screen.	 JPNIA0221ZZ
45 (R)	47 (B)	RGB signal (G: green)	Output	Ignition switch ON	Start “Confirmation / Adjustment Mode”, and then display color bar by selecting“Color Spectrum Bar” on DISPLAY DIAGNOSIS screen.	 JPNIA0222ZZ
46 (W)	47 (B)	RGB signal (B: blue)	Output	Ignition switch ON	Start “Confirmation / Adjustment Mode”, and then display color bar by selecting“Color Spectrum Bar” on DISPLAY DIAGNOSIS screen.	 JPNIA0223ZZ
47 (B)	Ground	RGB ground	—	Ignition switch ON	—	0 V

cardiagn.com

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
48 (B)	Ground	RGB synchronizing signal	Output	Ignition switch ON	—	 SKIB0825E
49	Ground	Shield	—	—	—	—
50 (G)	Ground	RGB area (YS) signal	Output	Ignition switch ON	At RGB image displayed	5 V
					At rear view camera image displayed	 PKIB4948J
51 (R)	Ground	Horizontal synchronizing (HP) signal	Input	Ignition switch ON	—	 SKIB0825E
52 (W)	Ground	Vertical synchronizing (VP) signal	Input	Ignition switch ON	—	 SKIB0823E
53 (W)	Ground	Communication signal (CONT→DISP)	Output	Ignition switch ON	When adjusting display-brightness.	 PKIB5039J
54 (O)	Ground	Communication signal (DISP→CONT)	Input	Ignition switch ON	When adjusting display-brightness.	 PKIB5039J
55	—	Shield	—	—	—	—
61 (R/L)	Ground	Illumination signal	Input	OFF	Lighting switch is OFF.	0 V
					Lighting switch is ON.	12 V

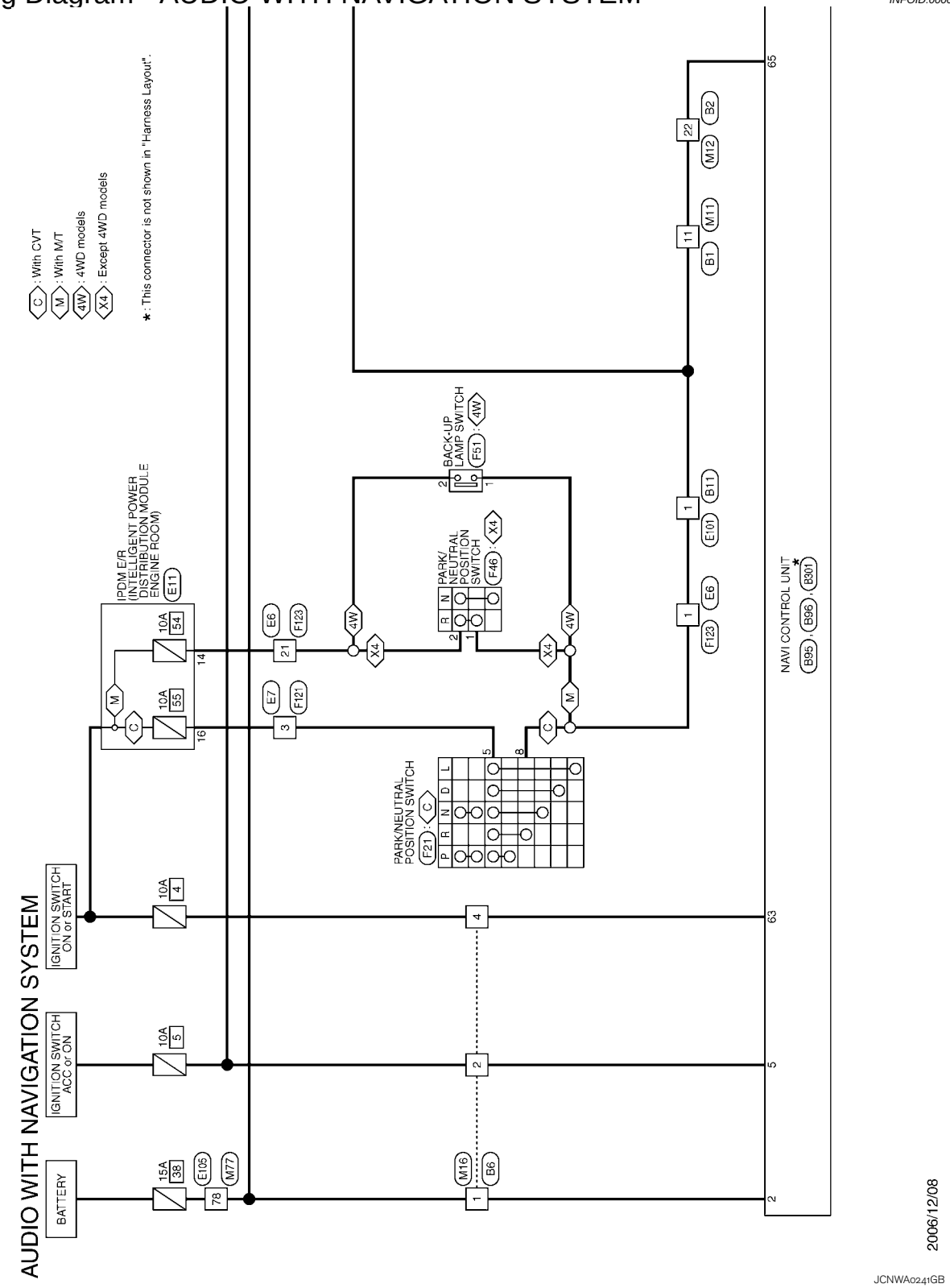
cardiagn.com

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
63 (W)	Ground	Ignition signal	Input	Ignition switch ON	—	Battery voltage
64 (V)	Ground	Parking brake signal	Input	Ignition switch ON	Parking brake ON	0 V
					Parking brake OFF	12 V
65 (Y/G)	Ground	Reverse signal	Input	Ignition switch ON	R position	12 V
					Other than R position	0 V
66 (Y)	Ground	Vehicle speed signal (8-pulse)	Input	Ignition switch ON	When vehicle speed is approx. 40 km/h (25MPH)	 SKIA6649J
67 (Y)	Ground	Camera-connection recognition signal	Input	Ignition switch ON	Connected to camera control unit connector	0 V
					Not connected to camera control unit connector	5 V
69 (L)	—	AV communication signal (H)	Input/ Output	—	—	—
70 (P)	—	AV communication signal (L)	Input/ Output	—	—	—
71 (L)	—	CAN–H	Input/ Output	—	—	—
72 (P)	—	CAN–L	Input/ Output	—	—	—
73	Ground	GPS antenna signal	Input	Ignition switch ACC	Not connected to GPS antenna connector	5 V
74	—	Shield	—	—	—	—

cardiagn.com

Wiring Diagram - AUDIO WITH NAVIGATION SYSTEM -

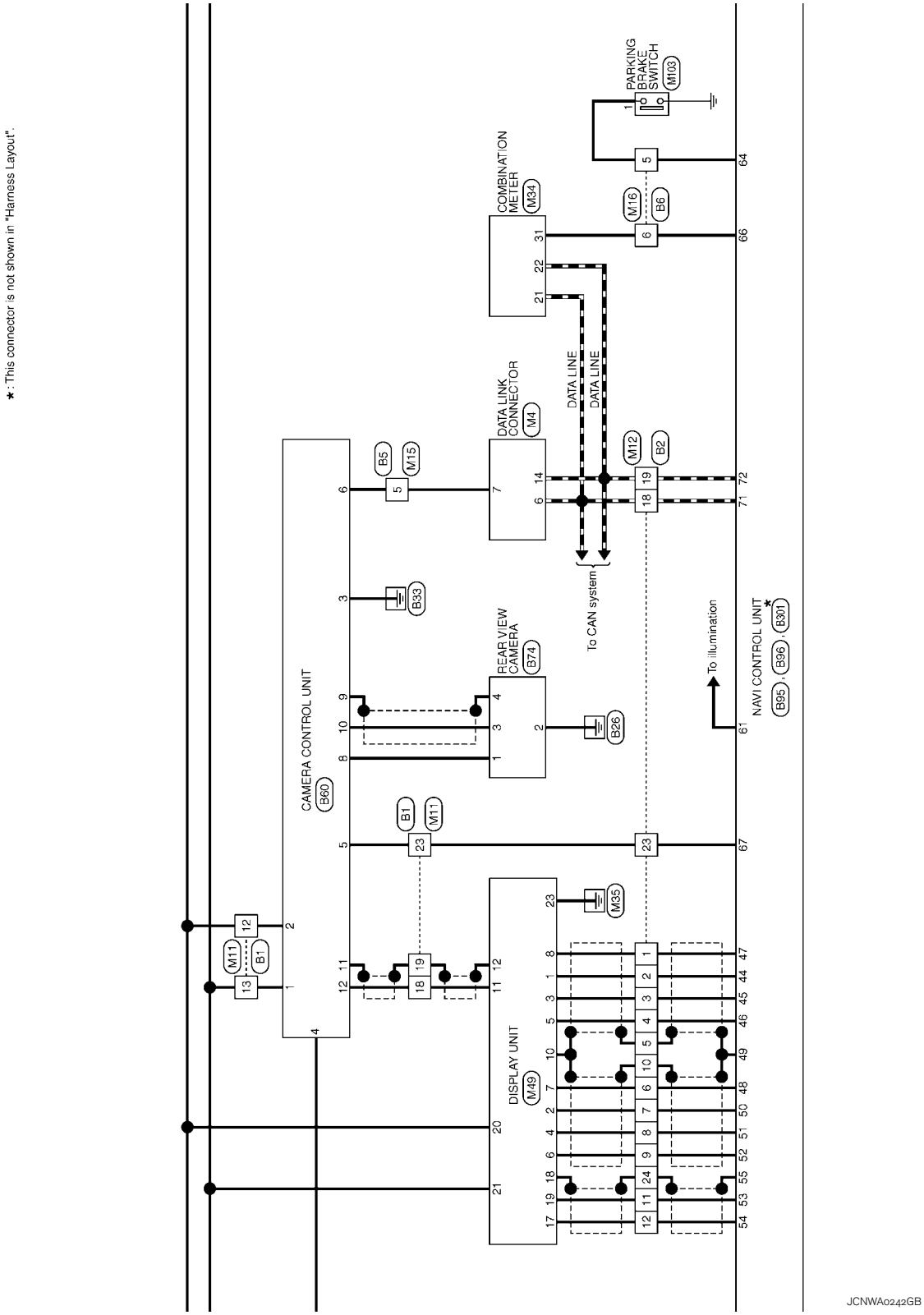
INFOID:0000000000947130



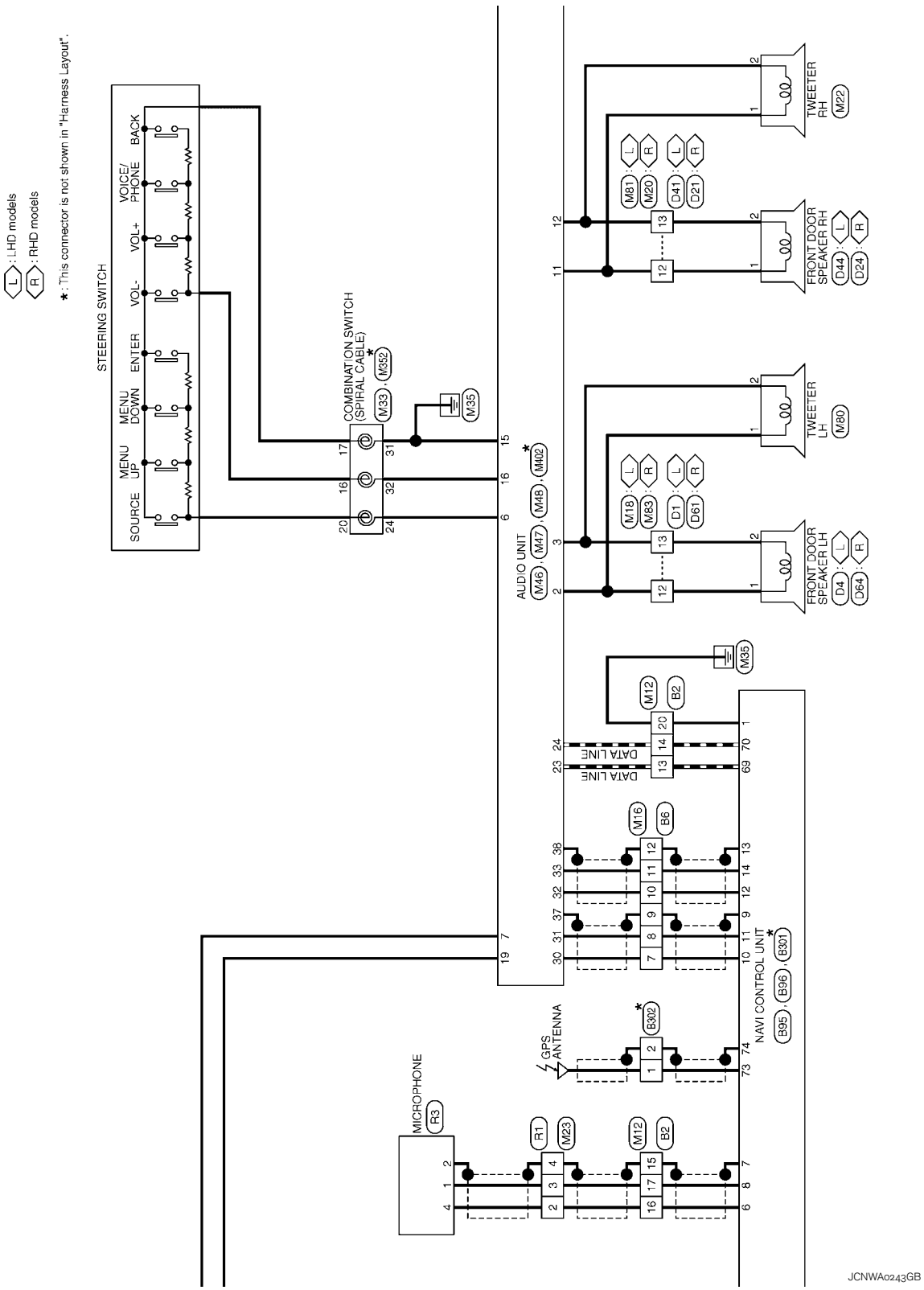
2006/12/08

JCNWA0241GB

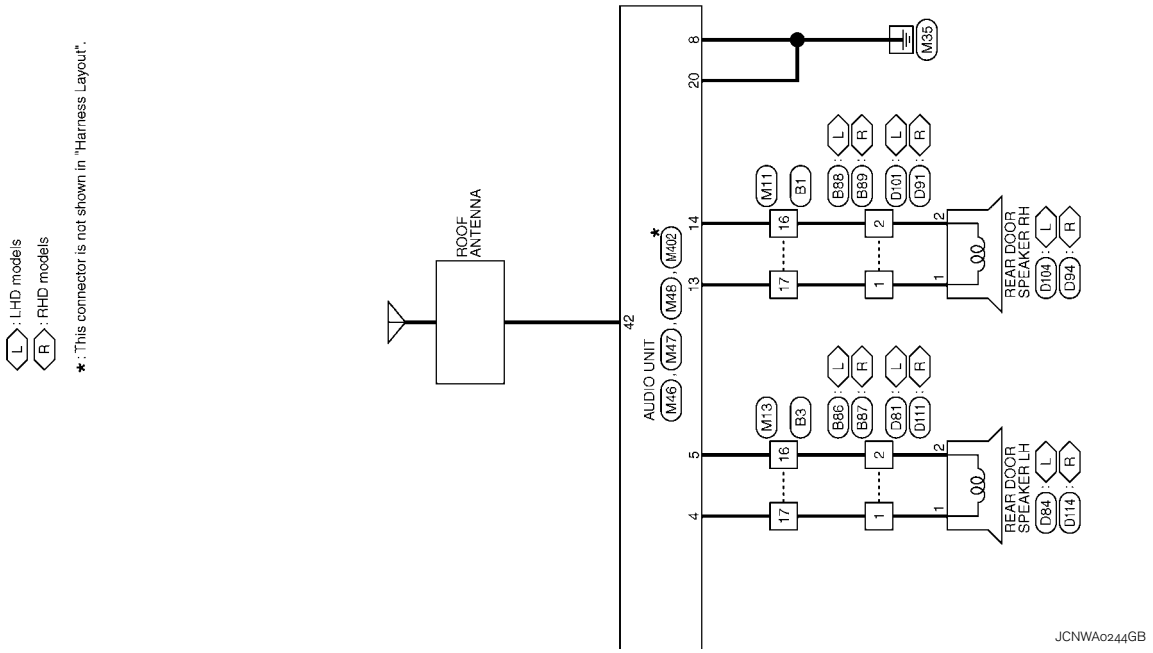
cardiagn.com



cardiagn.com



cardiagn.com



cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
11	Y/G	–
12	R	–
13	LG	–
16	V	–
17	O	–
18	R	–
19	SHIELD	–
23	Y	–

Connector No.	B2
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	G	–
3	R	–
4	W	–
5	SHIELD	–
6	B	–
7	G	–
8	R	–
9	W	–
10	SHIELD	–
11	W	–
12	O	–
13	L	–
14	P	–
15	SHIELD	–
16	B	–
17	W	–
18	L	–
19	P	–
20	B	–
22	Y/G	–
23	Y	–
24	SHIELD	–

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	–
17	LG	–

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
5	O	–

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Type	TH12MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	R	–
4	W	–
5	V	–
6	Y	–
7	W	–
8	O	–
9	SHIELD	–
10	O	–
11	W	–
12	SHIELD	–

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

Connector No.	B60
Connector Name	CAMERA CONTROL UNIT
Connector Type	TH16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	BATTERY
2	R	ACC
3	B	GND
4	Y/G	REVERSE SIGNAL
5	Y	CONNECTION RECOGNITION
6	O	DDL
8	V	CAMERA ON SIGNAL
9	SHIELD	SHIELD
10	W	CAMERA IMAGE SIGNAL
11	SHIELD	SHIELD
12	R	CAMERA IMAGE SIGNAL

JCNWA0245GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M402
Connector Name	AUDIO UNIT
Connector Type	G13 SH-2 SYS-HU

H.S.

41 42 43

Terminal No.	Color of Wire	Signal Name [Specification]
42	–	ANTENNA

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	–
3	W	–
4	SHIELD	–

Connector No.	R3
Connector Name	MICROPHONE
Connector Type	TK04FW

H.S.

1 2 3 4

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	MICROPHONE SIGNAL
2	SHIELD	MICROPHONE GND
4	B	MICROPHONE VCC

JCNWA0246GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B74
Connector Name	REAR VIEW CAMERA
Connector Type	TH04MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	CAMERA ON SIGNAL
2	B	GND
3	W	CAMERA IMAGE SIGNAL
4	SHIELD	SHIELD

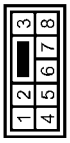
Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS06MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

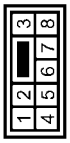
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

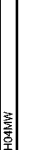


Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

14	W	VOICE GUIDANCE SIGNAL (-)

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

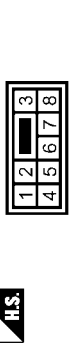
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	B95
Connector Name	NAVI CONTROL UNIT
Connector Type	TH40FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND
2	LG	BATTERY
5	R	ACC
6	B	MICROPHONE VCC
7	SHIELD	MICROPHONE GND
8	W	MICROPHONE SIGNAL
9	SHIELD	SHIELD
10	W	TEL VOICE SIGNAL (+)
11	O	TEL VOIVE SIGNAL (-)
12	O	VOICE GUIDANCE SIGNAL (+)
13	SHIELD	SHIELD

JCNWA0247GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B96
Connector Name	NAVI CONTROL UNIT
Connector Type	TH32FW

Terminal No.	Color of Wire	Signal Name [Specification]
44	G	RGB (R/RED) SIGNAL
45	R	RGB (G/GREEN) SIGNAL
46	W	RGB (B/BLUE) SIGNAL
47	B	RGB GND
48	B	RGB SYNC
49	SHIELD	SHIELD
50	G	RGB AREA (YS) SIGNAL
51	R	HP
52	W	VP
53	W	COMM (CONT->DISP)
54	O	COMM (DISP->CONT)

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

55	SHIELD	SHIELD
61	R/L	ILLUMINATION
63	W	IGNITION
64	V	PARKING BRAKE
65	Y/G	REVERSE SIGNAL
66	Y	VEHICLE SPEED (8-PULSE)
67	Y	CONNECTION RECOGNITION
69	L	AV COMM (H)
70	P	AV COMM (L)
71	L	CAN-H
72	P	CAN-L

Connector No.	D4
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

Connector No.	B301
Connector Name	NAVI CONTROL UNIT
Connector Type	GT5S-PP-HU

Terminal No.	Color of Wire	Signal Name [Specification]
73	-	GPS ANTENNA
74	SHIELD	SHIELD

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	B302
Connector Name	GPS ANTENNA
Connector Type	GT5S-PP-HU

Terminal No.	Color of Wire	Signal Name [Specification]
1	-	-
2	SHIELD	-

Connector No.	D24
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

JCNWA0248GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	D44
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	D64
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-

Connector No.	D84
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-

Connector No.	D94
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-

JCNWA0249GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D104
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D114
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1Y

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	–
16	Y/R	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

JCNWA0250GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
78	LG	–

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
5	Y/R	–
8	Y/G	–

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
2	R/B	–

Connector No.	F51
Connector Name	BACK-UP LAMP SWITCH
Connector Type	RK02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
2	R/B	–

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
7	O	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
11	Y	–
12	R	–
13	LG	–
16	V	–
17	O	–
18	W	–
19	SHIELD	–
23	Y	–

JCNWA0251GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M12
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-
3	R	-
4	W	-
5	SHIELD	-
6	B	-
7	G	-
8	R	-
9	W	-
10	SHIELD	-
11	W	-
12	O	-
13	L	-
14	P	-
15	SHIELD	-
16	W	-
17	B	-
18	L	-
19	P	-
20	B	-
22	Y	-
23	Y	-
24	SHIELD	-

Connector No.	M16
Connector Name	WIRE TO WIRE
Connector Type	TH12FW

H.S.

6	5	4	3	2	1
12	11	10	9	8	7

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-
4	O	-
5	V	-
6	Y	-
7	W	-
8	O	-
9	SHIELD	-
10	O	-
11	W	-
12	SHIELD	-

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	-
17	LG	-

Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3		2	1
8	7	6	5	4

Terminal No.	Color of Wire	Signal Name [Specification]
5	O	-

Connector No.	M22
Connector Name	TWEETER RH
Connector Type	FCI 211PC023S0017

H.S.

1
2

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

JCNWA0252GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

10	9	8	7	6	5	4	3	2	1
18	17	16	15	14	13	12	11		

Terminal No.	Color of Wire	Signal Name [Specification]
2	W	–
3	B	–
4	SHIELD	–

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

H.S.

24	25	26	27
31	32	33	34

Terminal No.	Color of Wire	Signal Name [Specification]
24	R	–
31	B	–
32	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
31	Y	VEHICLE SPEED (8-PULSE)

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

H.S.

19	10	11	12	13	14	15	16	17	18	1	2	3	4	5	6	7	8	9	20

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	SOUND SIGNAL FRONT LH (+)
3	G	SOUND SIGNAL FRONT LH (–)
4	LG	SOUND SIGNAL REAR LH (+)
5	Y	SOUND SIGNAL REAR RH (–)
6	R	STRG SW A
7	R	ACC
8	B	GND
11	BR	SOUND SIGNAL FRONT RH (+)
12	P	SOUND SIGNAL FRONT RH (–)
13	O	SOUND SIGNAL REAR RH (+)
14	V	SOUND SIGNAL REAR RH (–)

15	B	STRG SW GND
16	Y	STRG SW B
19	LG	BATTERY
20	B	GND

Connector No.	M47
Connector Name	AUDIO UNIT
Connector Type	TH08FW

H.S.

21	22	23	24
25	26	27	28

Terminal No.	Color of Wire	Signal Name [Specification]
23	L	AV COMM (H)
24	P	AV COMM (L)

Connector No.	M48
Connector Name	AUDIO UNIT
Connector Type	TH12FW

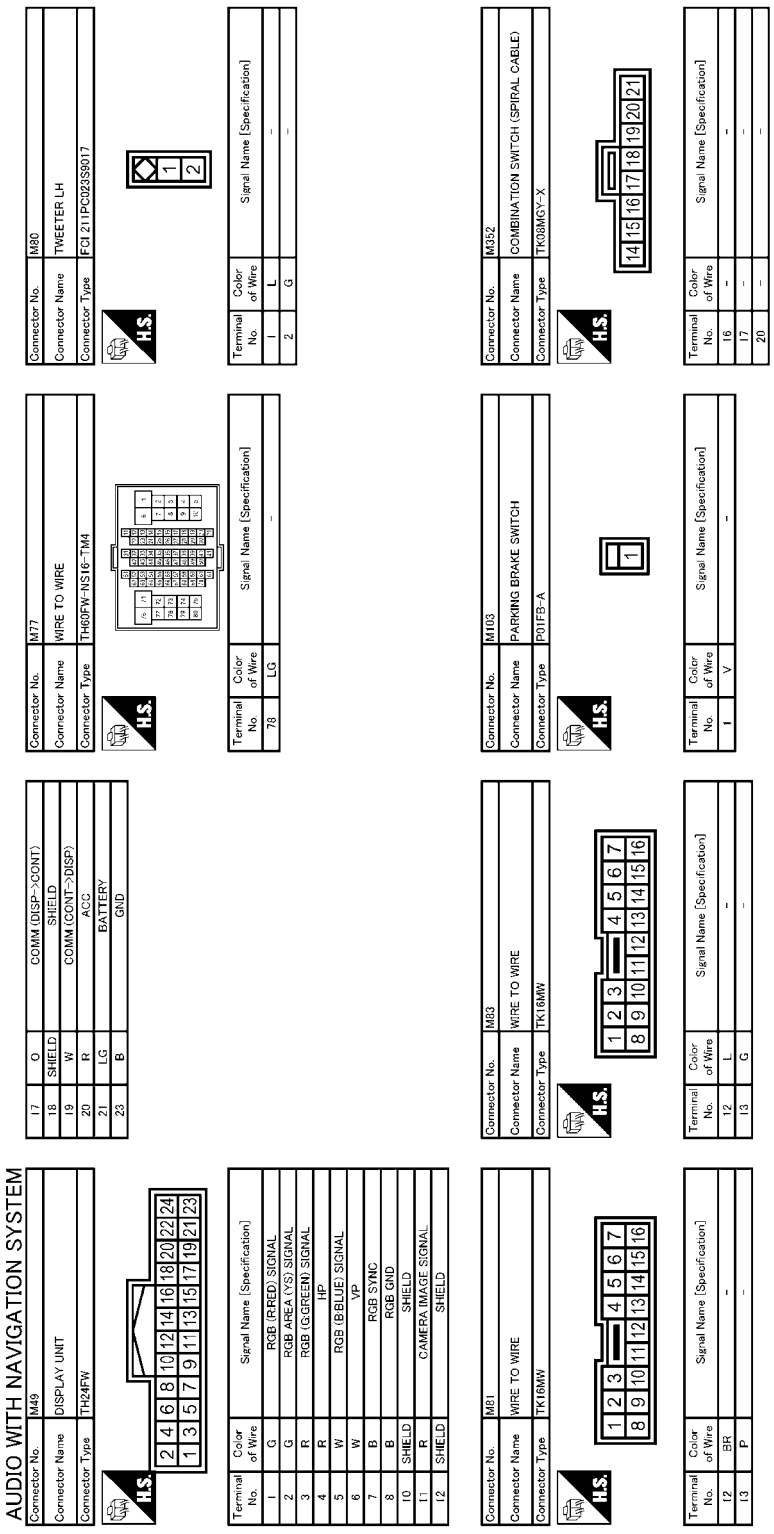
H.S.

29	30	31	32	33	34
35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
30	W	TEL VOICE SIGNAL (+)
31	O	TEL VOICE SIGNAL (–)[With navigation system]
32	O	VOICE GUIDANCE (+)
33	W	VOICE GUIDANCE (–)
37	SHIELD	SHIELD[With navigation system]
38	SHIELD	SHIELD

JCNWA0253GB

cardiagn.com



JCNWA0254GB

DTC Index

INFOID:0000000000947131

Self-diagnosis results display item

DTC	Error item	Refer to
U1000	CAN COMM CIRCUIT [U1000]	AV-71, "Diagnosis Procedure"
U1010	CONTROL UNIT (CAN) [U1010]	AV-72, "Diagnosis Procedure"

cardiagn.com

DTC	Error item	Refer to
U1310	CONTROL UNIT (AV) [U1310]	AV-73, "DTC Logic"
U1300 U1240 U1249 U124E U124F	AV COMM CIRCUIT [U1300] SWITCH CONN [U1240] AUDIO H/U CONN [U1249] AMP CONN [U124E] RDS CONN [U124F]	AV-99, "Description"
U1243	FRONT DISP CONN [U1243]	AV-95, "Diagnosis Procedure"
U1244	GPS ANTENNA CONN [U1244]	AV-97, "Diagnosis Procedure"
U1250	CAMERA CONT. CONN [U1250]	AV-98, "Diagnosis Procedure"
U1200	Control Unit FLASH-ROM [U1200]	AV-74, "DTC Logic"
U1201	Gyro NO CONN [U1201]	AV-75, "DTC Logic"
U1204	GPS COMM [U1204]	AV-78, "Diagnosis Procedure"
U1205	GPS ROM [U1205]	AV-79, "Diagnosis Procedure"
U1206	GPS RAM [U1206]	AV-80, "Diagnosis Procedure"
U1207	GPS RTC [U1207]	AV-81, "Diagnosis Procedure"
U1208	DVD-ROM COMM [U1208]	AV-82, "Diagnosis Procedure"
U1209	DVD-ROM READ [U1209]	AV-83, "Diagnosis Procedure"
U120A	DVD-ROM DISC [U120A]	AV-84, "Diagnosis Procedure"
U120C	DVD-ROM MECHA DETECT [U120C]	AV-85, "Diagnosis Procedure"
U120D	DVD-ROM DRIVE MECHA [U120D]	AV-86, "Diagnosis Procedure"
U120E	DVD-ROM FOCUS [U120E]	AV-87, "Diagnosis Procedure"
U120F	DVD-ROM TOC [U120F]	AV-88, "Diagnosis Procedure"
U1210	DVD-ROM SEEK [U1210]	AV-89, "Diagnosis Procedure"
U1211	DVD-ROM ERR CORRECTION [U1211]	AV-90, "Diagnosis Procedure"
U1212	DVD-ROM DATA FORWARD [U1212]	AV-91, "Diagnosis Procedure"
U1213	DVD-ROM DATA [U1213]	AV-92, "Diagnosis Procedure"
U1214	DVD-ROM TIMEOUT [U1214]	AV-93, "Diagnosis Procedure"
U1215	DVD-ROM LOAD [U1215]	AV-94, "Diagnosis Procedure"
U1216	CAN CONT [U1216]	AV-76, "DTC Logic"
U1217	BLUETOOTH CONN [U1217]	AV-77, "DTC Logic"

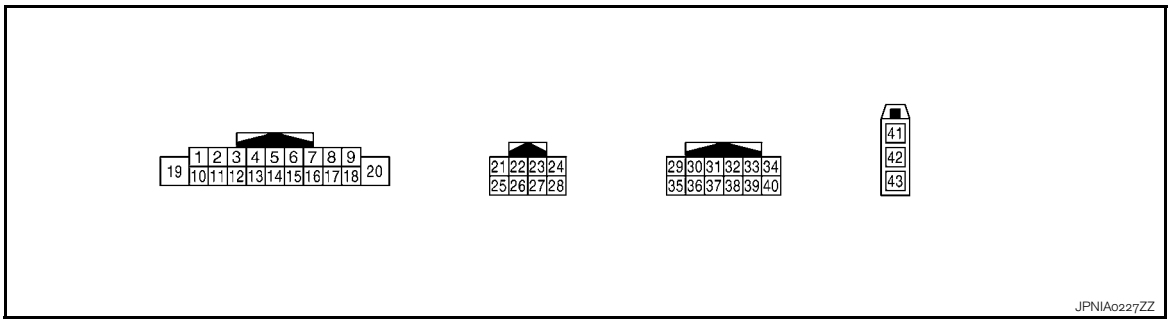
cardiagn.com

AUDIO UNIT

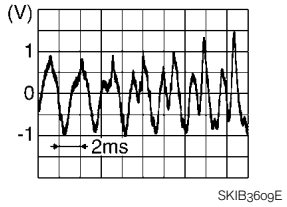
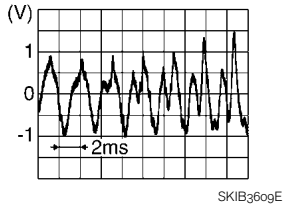
Reference Value

INFOID:0000000000955824

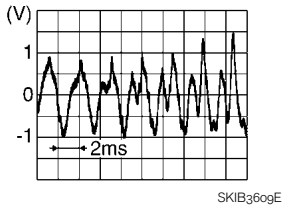
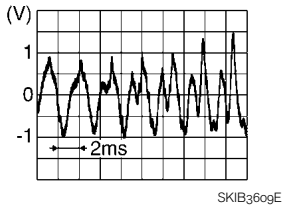
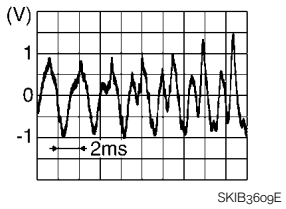
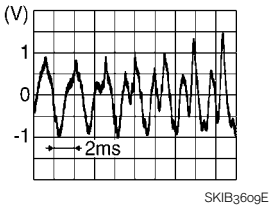
TERMINAL LAYOUT



PHYSICAL VALUES

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
2 (L)	3 (G)	Sound signal front LH	Output	Ignition switch ON	Voice output	 SKIB3609E
4 (LG)	5 (Y)	Sound signal rear LH	Output	Ignition switch ON	Voice output	 SKIB3609E
6 (R)	15 (B)	Steering switch signal A	Input	Ignition switch ON	Keep pressing SOURCE switch.	0 V
					Keep pressing MENU UP switch.	1.2 V
					Keep pressing MENU DOWN switch.	2.5 V
					Keep pressing ENTER switch.	3.7 V
					Except for above.	5 V
7 (R)	Ground	ACC power supply	Input	Ignition switch ACC	–	Battery voltage
8 (B)	Ground	GND	—	Ignition switch ON	—	0 V
9 (R)	Ground	Illumination signal	Input	OFF	Lighting switch is OFF.	0 V
					Lighting switch is ON.	12 V

cardiagn.com

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
11 (BR)	12 (P)	Sound signal front RH	Output	Ignition switch ON	Voice output	 SKIB3609E
13 (O)	14 (V)	Sound signal rear RH	Output	Ignition switch ON	Voice output	 SKIB3609E
15 (B)	Ground	Steering switch signal GND	—	Ignition switch ON	—	0 V
16 (Y)	15 (B)	Steering switch signal B	Input	Ignition switch ON	Keep pressing VOL DOWN switch.	0 V
					Keep pressing VOL UP switch.	1.2 V
					Keep pressing switch.	2.5 V
					Keep pressing switch.	3.7 V
					Except for above.	5 V
19 (LG)	Ground	Battery power supply	Input	Ignition switch OFF	—	Battery voltage
20 (B)	Ground	GND	—	Ignition switch ON	—	0 V
23 (L)	—	AV communication signal (H)	Input/ Output	—	—	—
24 (P)	—	AV communication signal (L)	Input/ Output	—	—	—
30 (W)	31 (O)	TEL voice signal	Input	Ignition switch ON	TEL voice output	 SKIB3609E
32 (O)	33 (W)	Voice guidance signal	Input	Ignition switch ON	Voice guidance output	 SKIB3609E

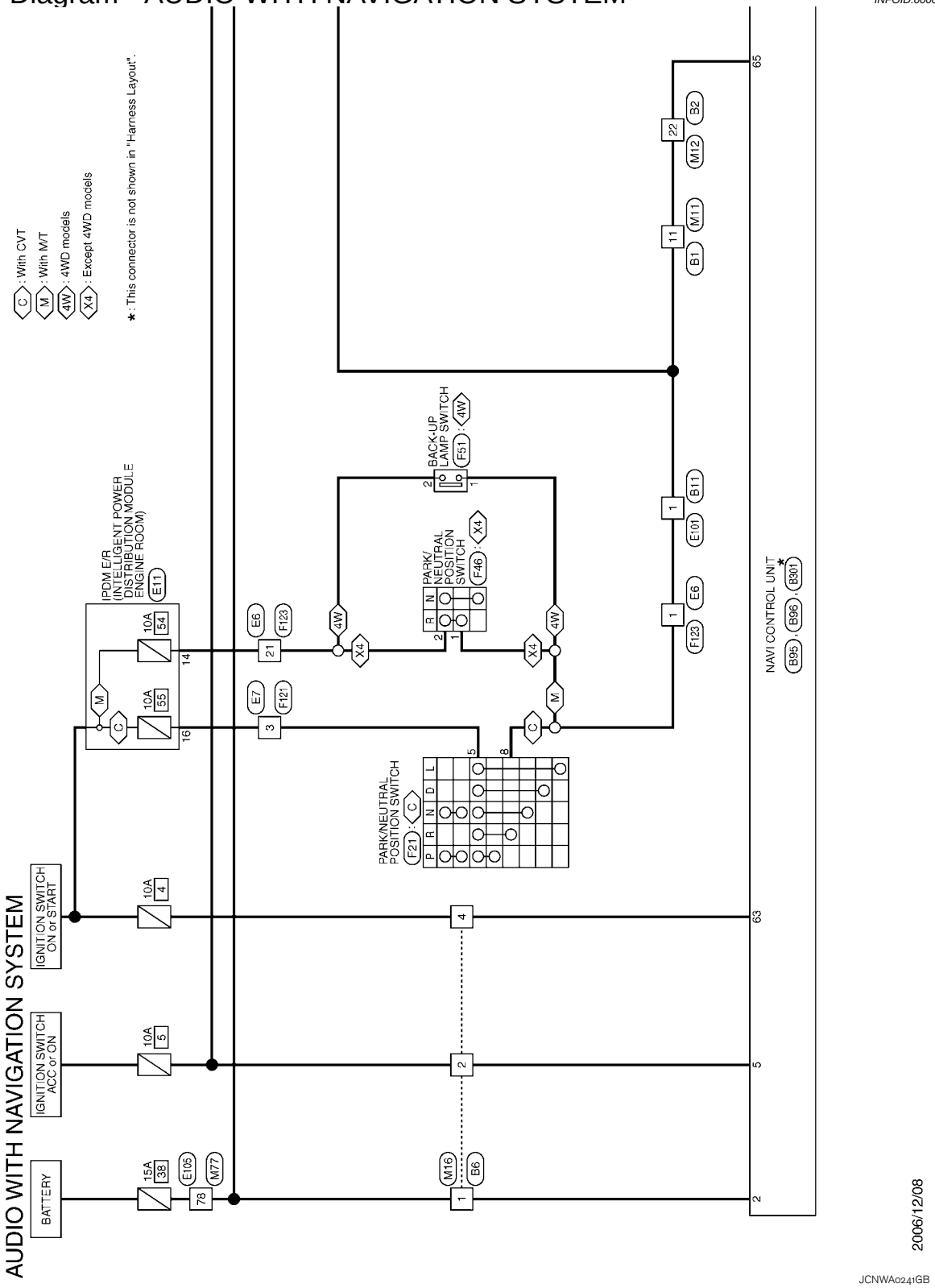
cardiagn.com

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
37	—	Shield	—	—	—	—
38	—	Shield	—	—	—	—
42	—	Antenna signal	Input	—	—	—

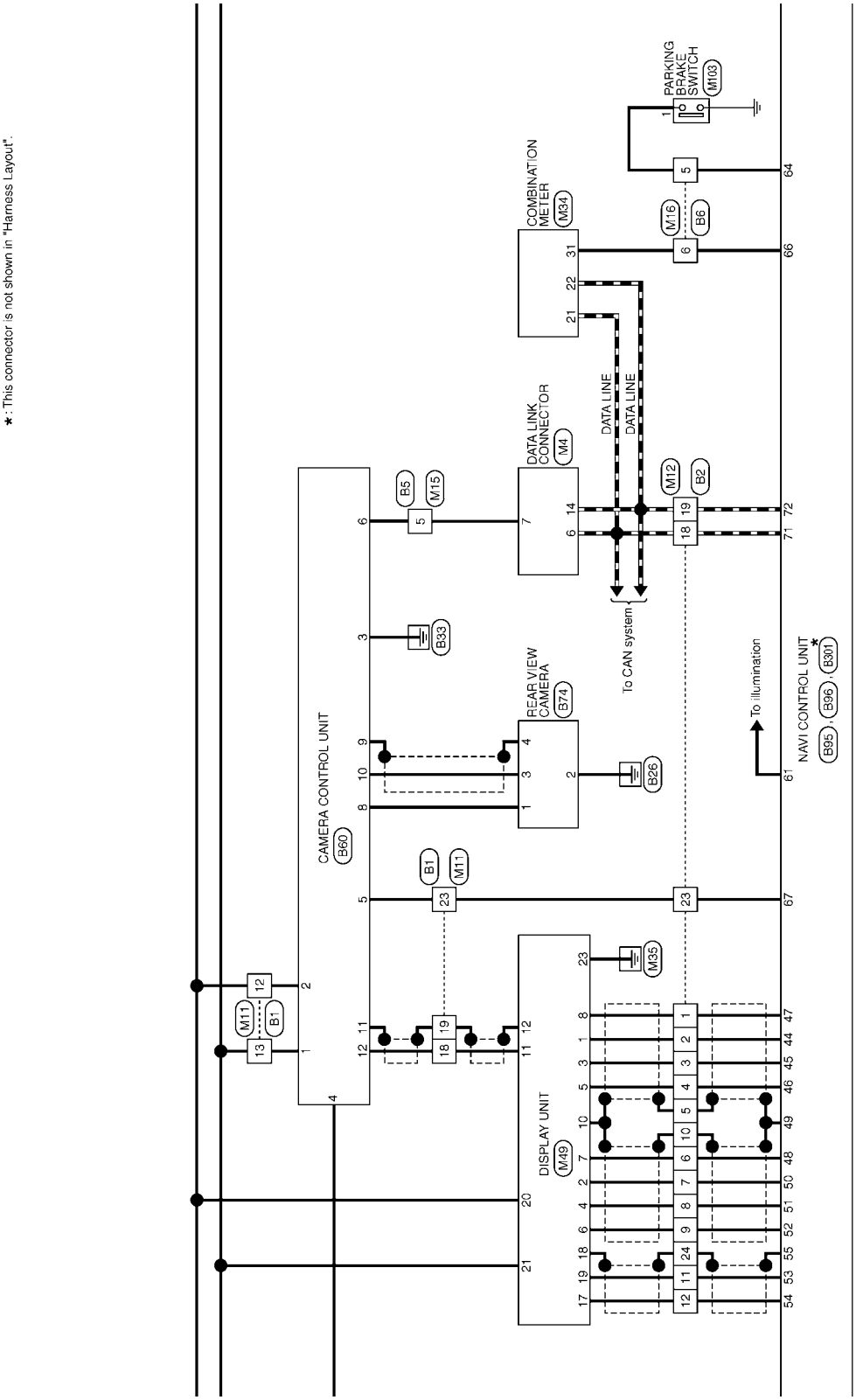
cardiagn.com

Wiring Diagram - AUDIO WITH NAVIGATION SYSTEM -

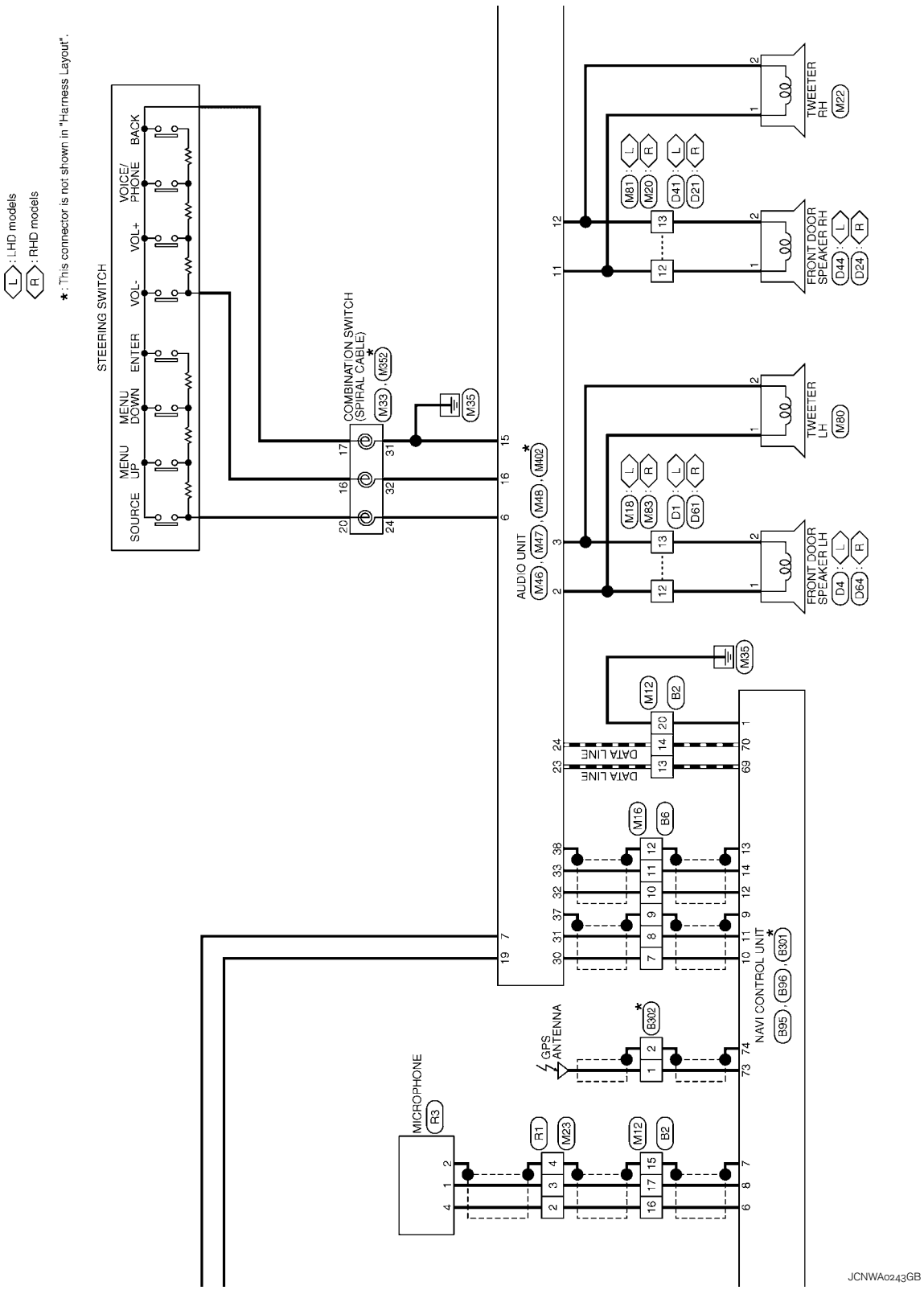
INFOID:0000000000955707



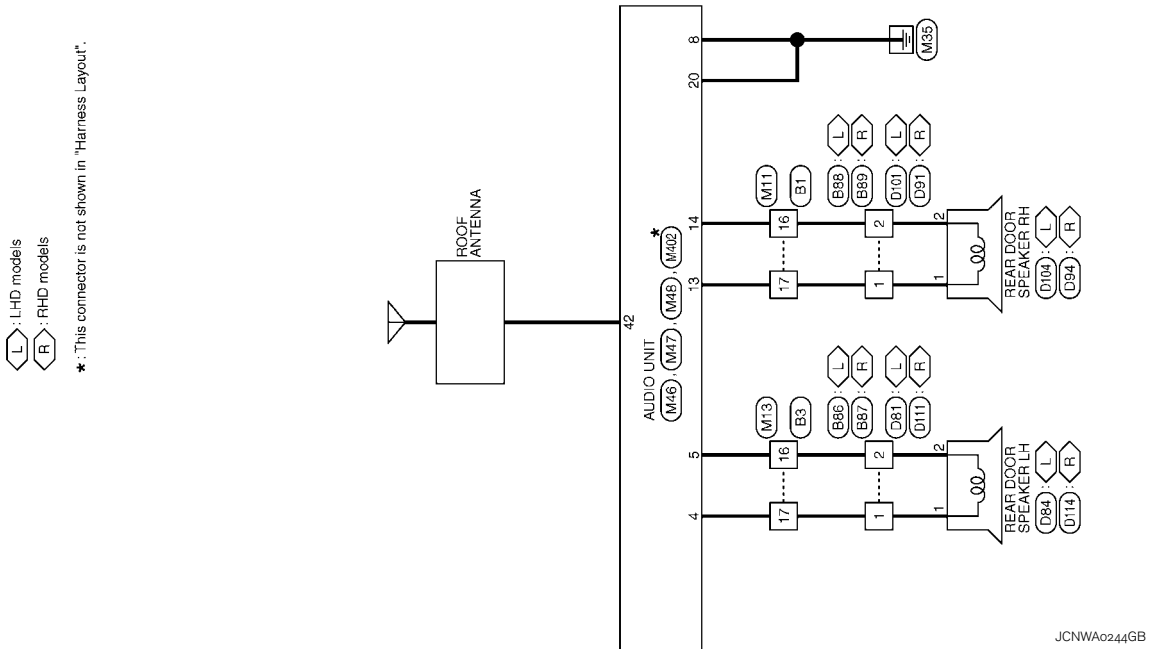
cardiagn.com



cardiagn.com



cardiagn.com



cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
11	Y/G	–
12	R	–
13	LG	–
16	V	–
17	O	–
18	R	–
19	SHIELD	–
23	Y	–

Connector No.	B2
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	G	–
3	R	–
4	W	–
5	SHIELD	–
6	B	–
7	G	–
8	R	–
9	W	–
10	SHIELD	–
11	W	–

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	–
17	LG	–

12	O	–
13	L	–
14	P	–
15	SHIELD	–
16	B	–
17	W	–
18	L	–
19	P	–
20	B	–
22	Y/G	–
23	Y	–
24	SHIELD	–

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
5	O	–

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Type	TH12MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	R	–
4	W	–
5	V	–
6	Y	–
7	W	–
8	O	–
9	SHIELD	–
10	O	–
11	W	–
12	SHIELD	–

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

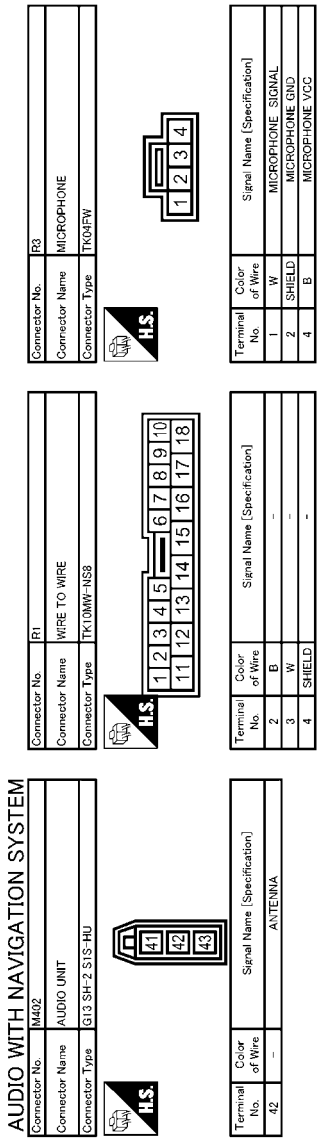
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

Connector No.	B60
Connector Name	CAMERA CONTROL UNIT
Connector Type	TH16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	BATTERY
2	R	ACC
3	B	GND
4	Y/G	REVERSE SIGNAL
5	Y	CONNECTION RECOGNITION
6	O	DDL
8	V	CAMERA ON SIGNAL
9	SHIELD	SHIELD
10	W	CAMERA IMAGE SIGNAL
11	SHIELD	SHIELD
12	R	CAMERA IMAGE SIGNAL

JCNWA0245GB

cardiagn.com



JCNWA0246GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B74
Connector Name	REAR VIEW CAMERA
Connector Type	TH04MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	CAMERA ON SIGNAL
2	B	GND
3	W	CAMERA IMAGE SIGNAL
4	SHIELD	SHIELD

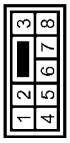
Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS06MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

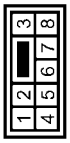
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	B95
Connector Name	NAVI CONTROL UNIT
Connector Type	TH40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND
2	LG	BATTERY
5	R	ACC
6	B	MICROPHONE VCC
7	SHIELD	MICROPHONE GND
8	W	MICROPHONE SIGNAL
9	SHIELD	SHIELD
10	W	TEL VOICE SIGNAL (+)
11	O	TEL VOIVE SIGNAL (-)
12	O	VOICE GUIDANCE SIGNAL (+)
13	SHIELD	SHIELD
14	W	VOICE GUIDANCE SIGNAL (-)

JCNWA0247GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B96
Connector Name	NAVI CONTROL UNIT
Connector Type	TH32FW

Terminal No.	Color of Wire	Signal Name [Specification]
44	G	RGB (R/RED) SIGNAL
45	R	RGB (G/GREEN) SIGNAL
46	W	RGB (B/BLUE) SIGNAL
47	B	RGB GND
48	B	RGB SYNC
49	SHIELD	SHIELD
50	G	RGB AREA (YS) SIGNAL
51	R	HP
52	W	VP
53	W	COMM (CONT->DISP)
54	O	COMM (DISP->CONT)

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

55	SHIELD	SHIELD
61	R/L	ILLUMINATION
63	W	IGNITION
64	V	PARKING BRAKE
65	Y/G	REVERSE SIGNAL
66	Y	VEHICLE SPEED (8-PULSE)
67	Y	CONNECTION RECOGNITION
69	L	AV COMM (H)
70	P	AV COMM (L)
71	L	CAN-H
72	P	CAN-L

Connector No.	D4
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

Connector No.	B301
Connector Name	NAVI CONTROL UNIT
Connector Type	GT5S-PP-HU

Terminal No.	Color of Wire	Signal Name [Specification]
73	-	GPS ANTENNA
74	SHIELD	SHIELD

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	B302
Connector Name	GPS ANTENNA
Connector Type	GT5S-PP-HU

Terminal No.	Color of Wire	Signal Name [Specification]
1	-	-
2	SHIELD	-

Connector No.	D24
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

JCNWA0248GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	P	–

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D44
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	P	–

Connector No.	D84
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	–
13	G	–

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D64
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	G	–

Connector No.	D94
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

JCNWA0249GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D104
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D114
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	–
16	Y/R	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

JCNWA0250GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

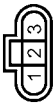
Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
78	LG	–

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
5	Y/R	–
8	Y/G	–

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

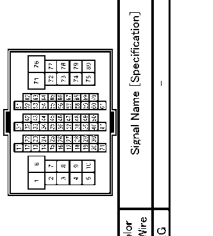


Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
2	R/B	–

Connector No.	F51
Connector Name	BACK-UP LAMP SWITCH
Connector Type	RK02FB

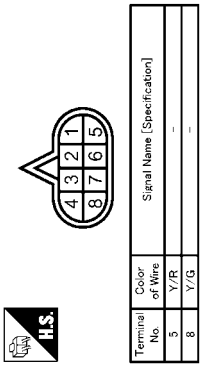
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
2	R/B	–

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS



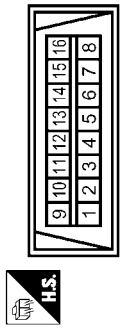
Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V



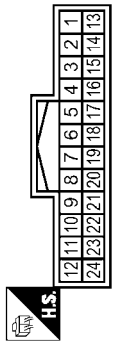
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
7	O	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
11	Y	–
12	R	–
13	LG	–
16	V	–
17	O	–
18	W	–
19	SHIELD	–
23	Y	–

JCNWA0251GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M12
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-
3	R	-
4	W	-
5	SHIELD	-
6	B	-
7	G	-
8	R	-
9	W	-
10	SHIELD	-
11	W	-
12	SHIELD	-
13	O	-
14	L	-
15	SHIELD	-
16	W	-
17	B	-
18	L	-
19	P	-
20	B	-
22	Y	-
23	Y	-
24	SHIELD	-

Connector No.	M16
Connector Name	WIRE TO WIRE
Connector Type	TH12FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-
4	O	-
5	V	-
6	Y	-
7	W	-
8	O	-
9	SHIELD	-
10	O	-
11	W	-
12	SHIELD	-

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	-
17	LG	-

Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
5	O	-

Connector No.	M22
Connector Name	TWEETER RH
Connector Type	FCI 211PC02S9017

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

JCNWA0252GB

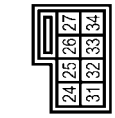
cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

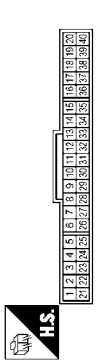
Terminal No.	Color of Wire	Signal Name [Specification]
2	W	-
3	B	-
4	SHIELD	-

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V



Terminal No.	Color of Wire	Signal Name [Specification]
24	R	-
31	B	-
32	Y	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
31	Y	VEHICLE SPEED (8-PULSE)

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	SOUND SIGNAL FRONT LH (+)
3	G	SOUND SIGNAL FRONT LH (-)
4	LG	SOUND SIGNAL REAR LH (+)
5	Y	SOUND SIGNAL REAR RH (-)
6	R	STRG SW A
7	R	ACC
8	B	GND
11	BR	SOUND SIGNAL FRONT RH (+)
12	P	SOUND SIGNAL FRONT RH (-)
13	O	SOUND SIGNAL REAR RH (+)
14	V	SOUND SIGNAL REAR RH (-)

I5	B	STRG SW GND
I6	Y	STRG SW B
I9	LG	BATTERY
20	B	GND

Connector No.	M47
Connector Name	AUDIO UNIT
Connector Type	TH08FW

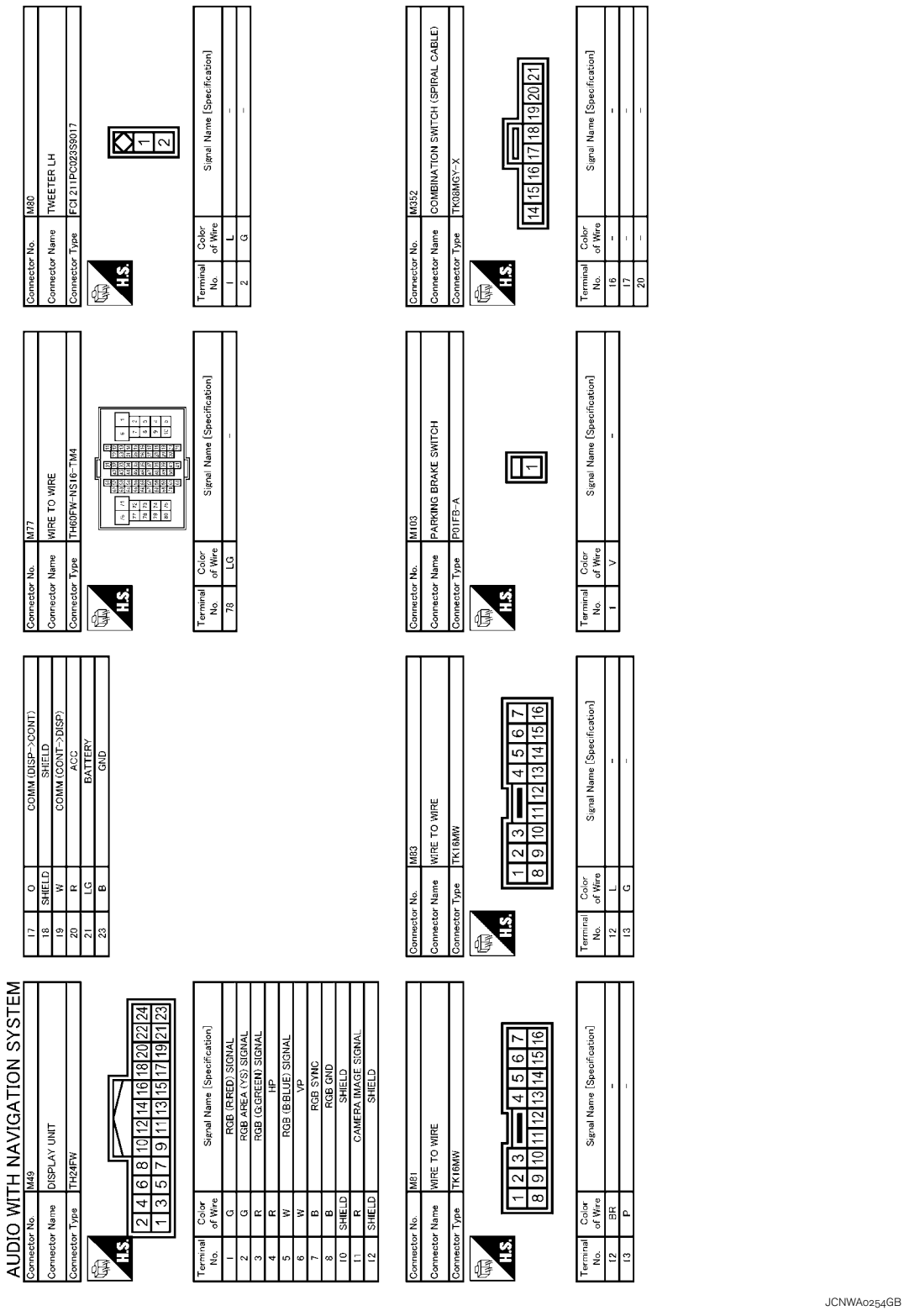
Terminal No.	Color of Wire	Signal Name [Specification]
23	L	AV COMM (H)
24	P	AV COMM (L)

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH12FW

Terminal No.	Color of Wire	Signal Name [Specification]
30	W	TEL VOICE SIGNAL (+)
31	O	TEL VOICE SIGNAL (-)[With navigation system]
32	O	VOICE GUIDANCE (+)
33	W	VOICE GUIDANCE (-)
37	SHIELD	SHIELD[With navigation system]
38	SHIELD	SHIELD

JCNWA0253GB

cardiagn.com



JCNWA0254GB

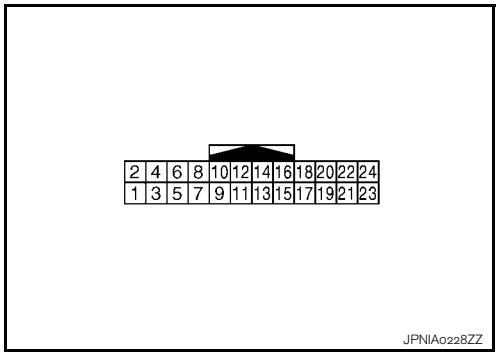
cardiagn.com

DISPLAY UNIT

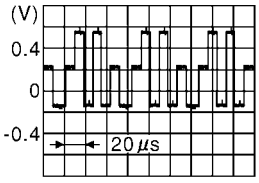
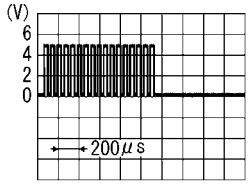
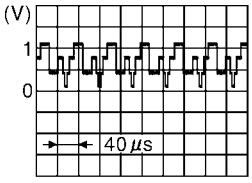
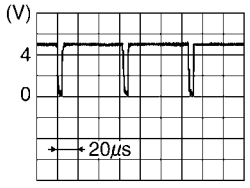
Reference Value

INFOID:0000000000947132

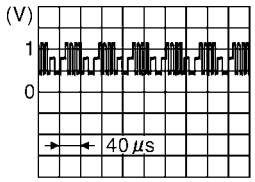
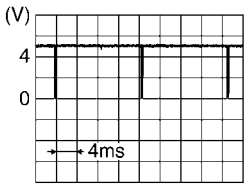
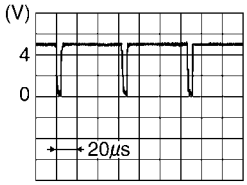
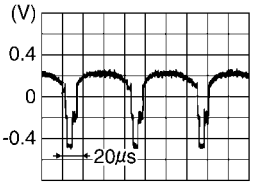
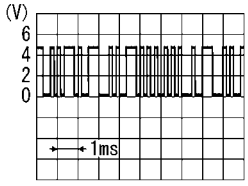
TERMINAL LAYOUT



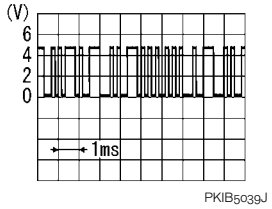
PHYSICAL VALUES

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
1 (G)	8 (B)	RGB signal (R: red)	Input	Ignition switch ON	Start “Confirmation / Adjustment Mode”, and then display color bar by selecting“Color Spectrum Bar” on DISPLAY DIAGNOSIS screen.	 JPNIA0221ZZ
2 (G)	Ground	RGB area (YS) signal	Input	Ignition switch ON	At RGB image displayed	5 V
					At rear view camera image displayed	 PKIB4948J
3 (R)	8 (B)	RGB signal (G: green)	Input	Ignition switch ON	Start “Confirmation / Adjustment Mode”, and then display color bar by selecting“Color Spectrum Bar” on DISPLAY DIAGNOSIS screen.	 JPNIA0222ZZ
4 (R)	Ground	Horizontal synchronizing (HP) signal	Output	Ignition switch ON	—	 SKIB0825E

cardiagn.com

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	8 (B)	RGB signal (B: blue)	Input	Ignition switch ON	Start “Confirmation / Adjustment Mode”, and then display color bar by selecting“Color Spectrum Bar” on DISPLAY DIAGNOSIS screen.	 JPNIA0223ZZ
6 (W)	Ground	Vertical synchronizing (VP) signal	Output	Ignition switch ON	—	 SKIB0823E
7 (B)	Ground	RGB synchronizing signal	Input	Ignition switch ON	—	 SKIB0825E
8 (B)	Ground	RGB ground	—	Ignition switch ON	—	0 V
10	Ground	Shield	—	Ignition switch ON	—	0 V
11 (R)	Ground	Camera image signal	Input	Ignition switch ON	At rear view camera image displayed	 SKIB0827E
12	—	Shield	—	—	—	—
17 (O)	Ground	Communication signal (DISP→CONT)	Output	Ignition switch ON	When adjusting display-brightness.	 PKIB5039J
18	—	Shield	—	—	—	—

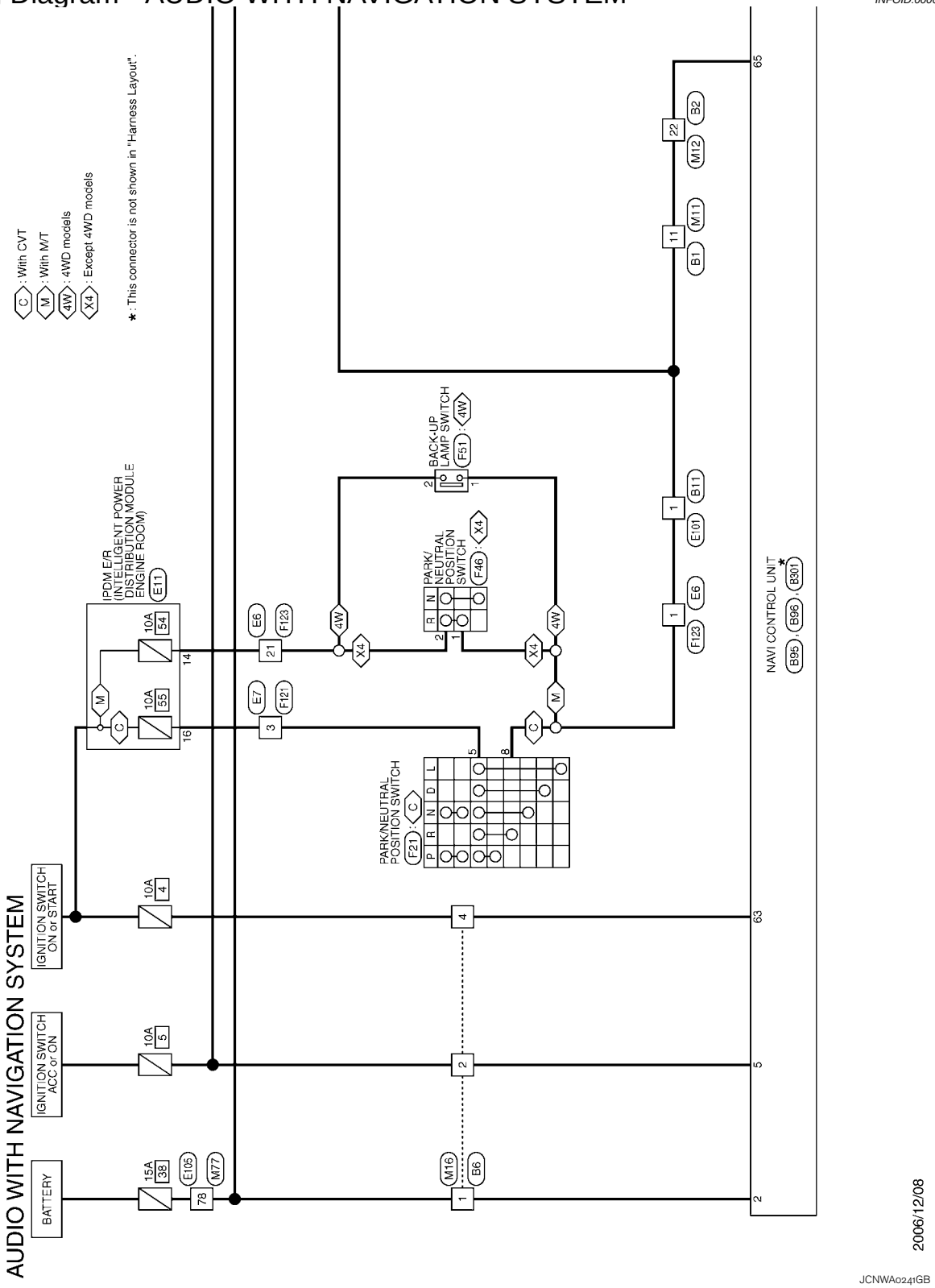
cardiagn.com

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
19 (W)	Ground	Communication signal (CONT→DISP)	Input	Ignition switch ON	When adjusting display-brightness.	 PKIB5039J
20 (R)	Ground	ACC power supply	Input	Ignition switch ACC	—	Battery voltage
21 (LG)	Ground	Battery power supply	Input	Ignition switch OFF	—	Battery voltage
23 (B)	Ground	GND	—	Ignition switch ON	—	0 V

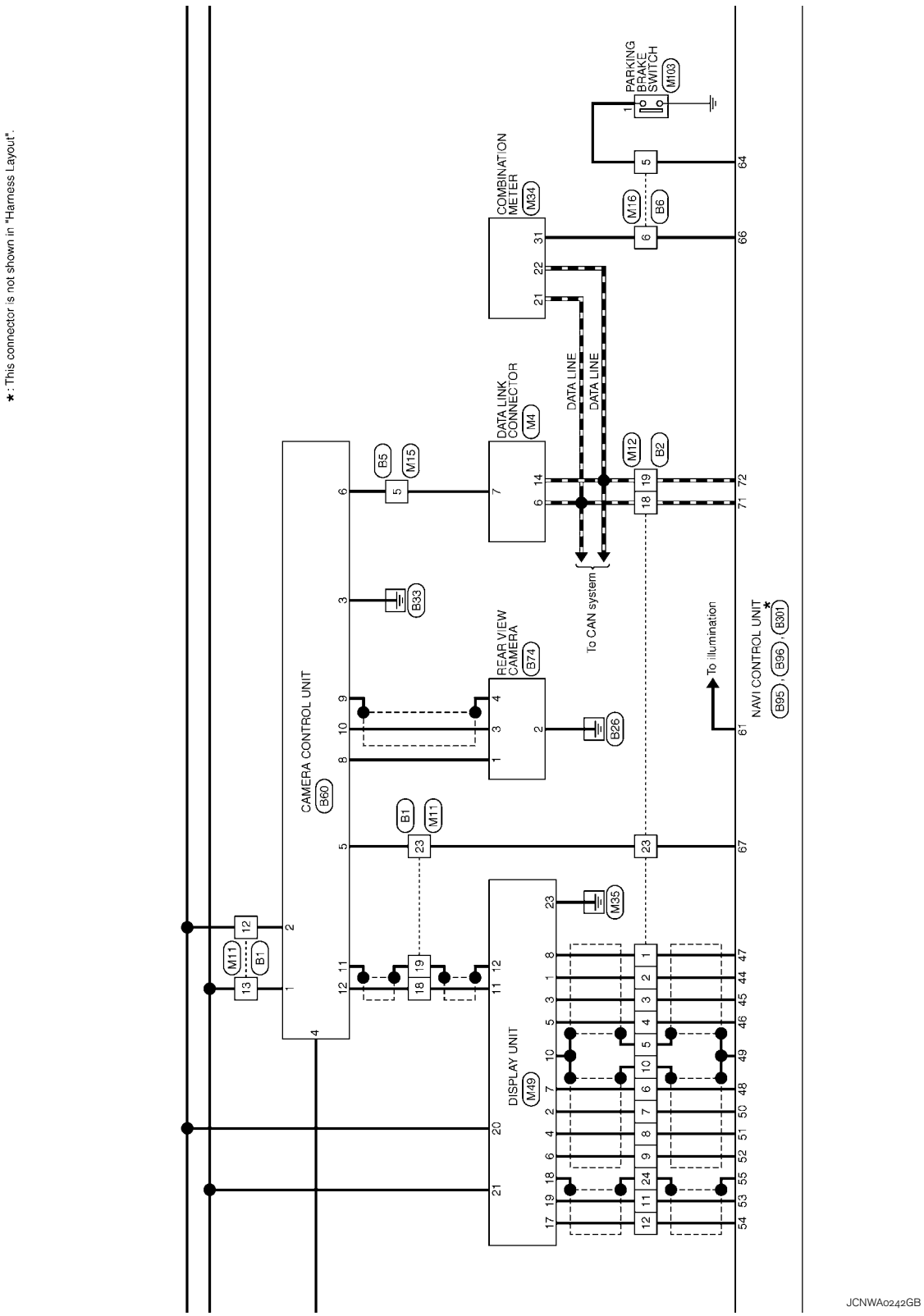
cardiagn.com

Wiring Diagram - AUDIO WITH NAVIGATION SYSTEM -

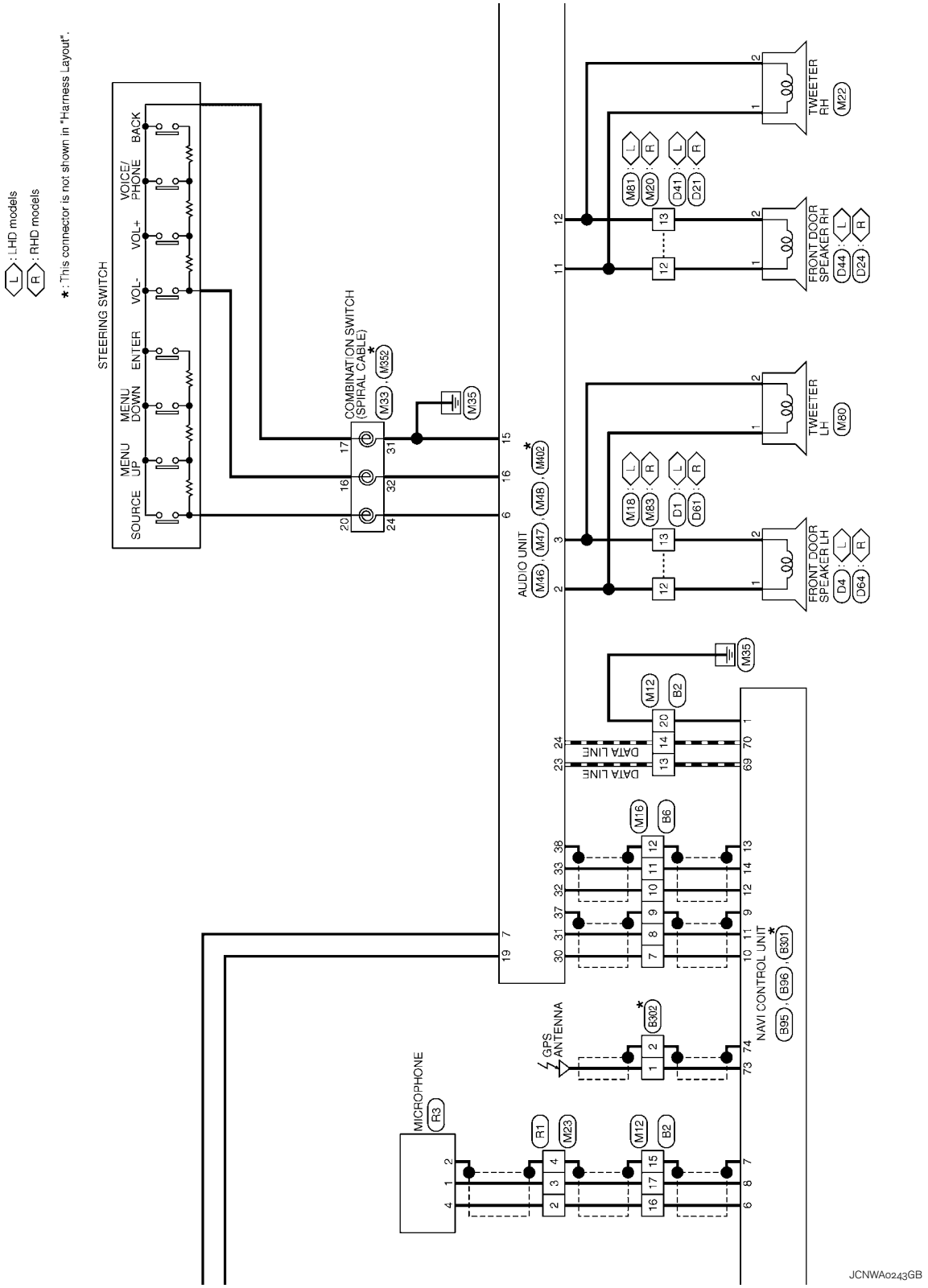
INFOID:0000000000955708



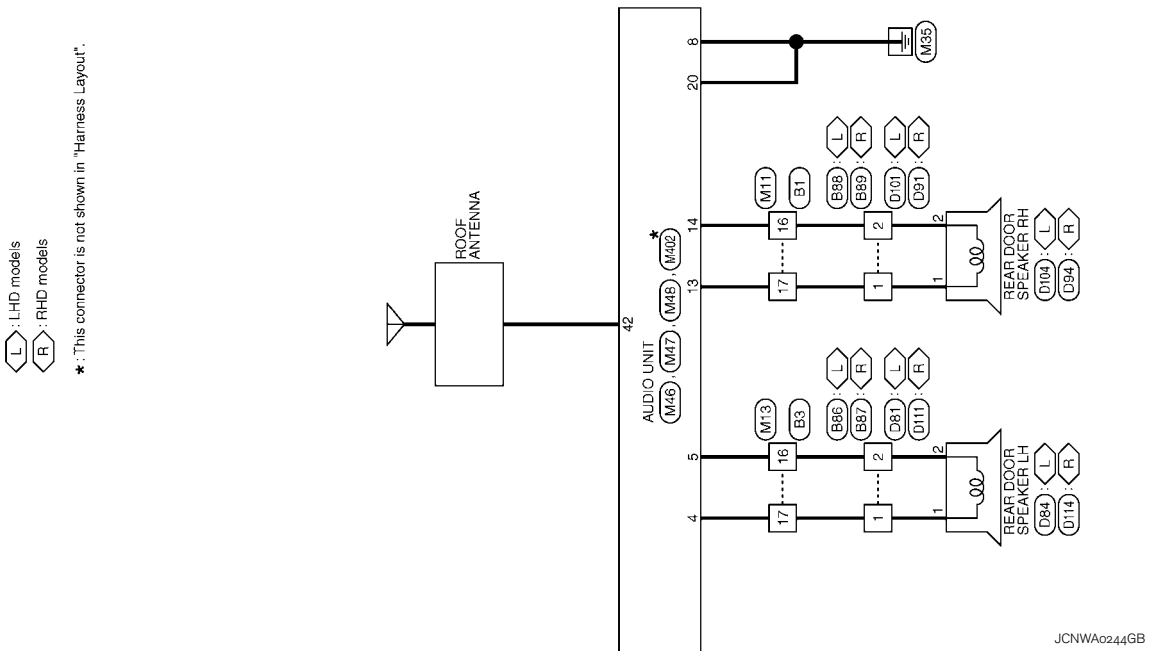
cardiagn.com



cardiagn.com



cardiagn.com



cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
11	Y/G	-
12	R	-
13	LG	-
16	V	-
17	O	-
18	R	-
19	SHIELD	-
23	Y	-

Connector No.	B2
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-
3	R	-
4	W	-
5	SHIELD	-
6	B	-
7	G	-
8	R	-
9	W	-
10	SHIELD	-
11	W	-
12	O	-
13	L	-
14	P	-
15	SHIELD	-
16	B	-
17	W	-
18	L	-
19	P	-
20	B	-
22	Y/G	-
23	Y	-
24	SHIELD	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	-
17	LG	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
5	O	-

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Type	TH12MW

H.S.

1	2	3	4	5	6
7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-
4	W	-
5	V	-
6	Y	-
7	W	-
8	O	-
9	SHIELD	-
10	O	-
11	W	-
12	SHIELD	-

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18		

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-

Connector No.	B60
Connector Name	CAMERA CONTROL UNIT
Connector Type	TH16FW

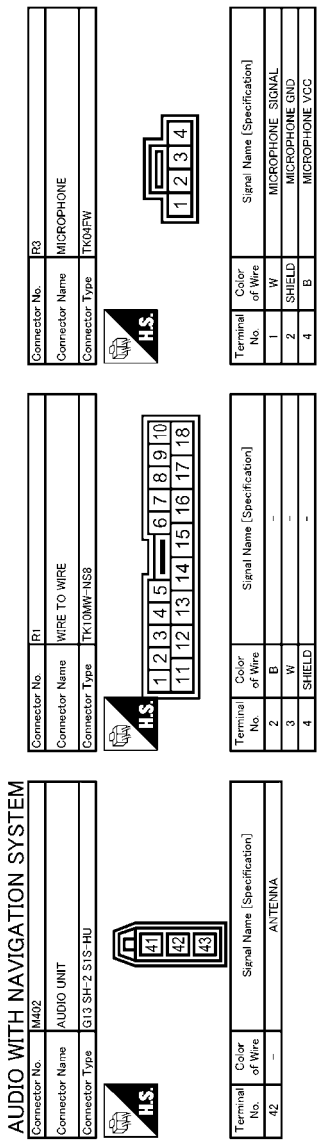
H.S.

2	4	6	8	10	12	14	16
1	3	5	7	9	11	13	15

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	BATTERY
2	R	ACC
3	B	GND
4	Y/G	REVERSE SIGNAL
5	Y	CONNECTION RECOGNITION
6	O	DDL
8	V	CAMERA ON SIGNAL
9	SHIELD	SHIELD
10	W	CAMERA IMAGE SIGNAL
11	SHIELD	SHIELD
12	R	CAMERA IMAGE SIGNAL

JCNWA0245GB

cardiagn.com



JCNWA0246GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B74
Connector Name	REAR VIEW CAMERA
Connector Type	TH04MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	CAMERA ON SIGNAL
2	B	GND
3	W	CAMERA IMAGE SIGNAL
4	SHIELD	SHIELD

Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS06MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-

14	W	VOICE GUIDANCE SIGNAL (-)

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-

Connector No.	B95
Connector Name	NAVI CONTROL UNIT
Connector Type	TH40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND
2	LG	BATTERY
5	R	ACC
6	B	MICROPHONE VCC
7	SHIELD	MICROPHONE GND
8	W	MICROPHONE SIGNAL
9	SHIELD	SHIELD
10	W	TEL VOICE SIGNAL (+)
11	O	TEL VOIVE SIGNAL (-)
12	O	VOICE GUIDANCE SIGNAL (+)
13	SHIELD	SHIELD

JCNWA0247GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B96
Connector Name	NAVI CONTROL UNIT
Connector Type	TH32FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
44	G	RGB (R:RED) SIGNAL
45	R	RGB (G:GREEN) SIGNAL
46	W	RGB (B:BLUE) SIGNAL
47	B	RGB GND
48	B	RGB SYNC
49	SHIELD	SHIELD
50	G	RGB AREA (YS) SIGNAL
51	R	HP
52	W	VP
53	W	COMM (CONT->DISP)
54	O	COMM (DISP->CONT)

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

Connector No.	D4
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
55	SHIELD	SHIELD
61	R/L	ILLUMINATION
63	W	IGNITION
64	V	PARKING BRAKE
65	Y/G	REVERSE SIGNAL
66	Y	VEHICLE SPEED (8-PULSE)
67	Y	CONNECTION RECOGNITION
69	L	AV COMM (H)
70	P	AV COMM (L)
71	L	CAN-H
72	P	CAN-L

Connector No.	B301
Connector Name	NAVI CONTROL UNIT
Connector Type	GT5S-PP-HU

Terminal No.	Color of Wire	Signal Name [Specification]
73	-	GPS ANTENNA
74	SHIELD	SHIELD

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	B302
Connector Name	GPS ANTENNA
Connector Type	GT5S-PP-HU

Terminal No.	Color of Wire	Signal Name [Specification]
1	-	-
2	SHIELD	-

Connector No.	D24
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

JCNWA0248GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	P	–

Connector No.	D44
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	P	–

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	–
13	G	–

Connector No.	D64
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	G	–

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D84
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D94
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

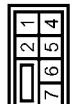
JCNWA0249GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D104
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D114
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1Y

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	–
16	Y/R	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

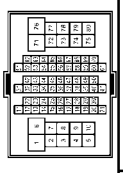
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

JCNWA0250GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
78	LG	-

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
5	Y/R	-
8	Y/G	-

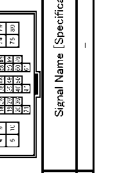
Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
2	R/B	-

Connector No.	F51
Connector Name	BACK-UP LAMP SWITCH
Connector Type	RK02FB

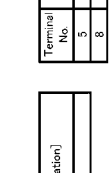
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
2	R/B	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS



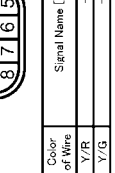
Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V



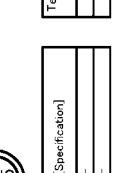
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
21	R/B	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
7	O	-
14	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
11	Y	-
12	R	-
13	LG	-
16	V	-
17	O	-
18	W	-
19	SHIELD	-
23	Y	-

JCNWA0251GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M12
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-
3	R	-
4	W	-
5	SHIELD	-
6	B	-
7	G	-
8	R	-
9	W	-
10	SHIELD	-
11	W	-
12	SHIELD	-
13	L	-
14	P	-
15	SHIELD	-
16	W	-
17	B	-
18	L	-
19	P	-
20	B	-
22	Y	-
23	Y	-
24	SHIELD	-

Connector No.	M16
Connector Name	WIRE TO WIRE
Connector Type	TH12FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-
4	O	-
5	V	-
6	Y	-
7	W	-
8	O	-
9	SHIELD	-
10	O	-
11	W	-
12	SHIELD	-

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	-
17	LG	-

Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	O	-

Connector No.	M22
Connector Name	TWEETER RH
Connector Type	FCI 211PC023S9017

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

JCNWA0252GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

10 9 8 7 6 5 4 3 2 1
18 17 16 15 14 13 12 11

Terminal No.	Color of Wire	Signal Name [Specification]
2	W	-
3	B	-
4	SHIELD	-

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

H.S.

24 25 26 27
31 32 33 34

Terminal No.	Color of Wire	Signal Name [Specification]
24	R	-
31	B	-
32	Y	-

15	B	STRG SW GND
16	Y	STRG SW B
19	LG	BATTERY
20	B	GND

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
31	Y	VEHICLE SPEED (8-PULSE)

Connector No.	M47
Connector Name	AUDIO UNIT
Connector Type	TH08FW

H.S.

21 22 23 24
25 26 27 28

Terminal No.	Color of Wire	Signal Name [Specification]
23	L	AV COMM (H)
24	P	AV COMM (L)

Connector No.	M48
Connector Name	AUDIO UNIT
Connector Type	TH12FW

H.S.

29 30 31 32 33 34
35 36 37 38 39 40

Terminal No.	Color of Wire	Signal Name [Specification]
30	W	TEL VOICE SIGNAL (+)
31	O	TEL VOICE SIGNAL (-)[With navigation system]
32	O	VOICE GUIDANCE (+)
33	W	VOICE GUIDANCE (-)
37	SHIELD	SHIELD[With navigation system]
38	SHIELD	SHIELD

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

H.S.

1 2 3 4 5 6 7 8 9
19 10 11 12 13 14 15 16 17 18 20

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	SOUND SIGNAL FRONT LH (+)
3	G	SOUND SIGNAL FRONT LH (-)
4	LG	SOUND SIGNAL REAR LH (+)
5	Y	SOUND SIGNAL REAR RH (-)
6	R	STRG SW A
7	R	ACC
8	B	GND
11	BR	SOUND SIGNAL FRONT RH (+)
12	P	SOUND SIGNAL FRONT RH (-)
13	O	SOUND SIGNAL REAR RH (+)
14	V	SOUND SIGNAL REAR RH (-)

JCNWA0253GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M49
Connector Name	DISPLAY UNIT
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	RGB (R:RED) SIGNAL
2	G	RGB AREA (YS) SIGNAL
3	R	RGB (G:GREEN) SIGNAL
4	R	HP
5	W	RGB (B:BLUE) SIGNAL
6	W	VP
7	B	RGB SYNC
8	B	RGB GND
10	SHIELD	SHIELD
11	R	CAMERA IMAGE SIGNAL
12	SHIELD	SHIELD

Connector No.	M81
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

I7	O	COMM (DISP->CONT)
I8	SHIELD	SHIELD
I9	W	COMM (CONT->DISP)
20	R	ACC
21	LG	BATTERY
23	B	GND

Connector No.	M83
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
78	LG	-

Connector No.	M103
Connector Name	PARKING BRAKE SWITCH
Connector Type	P01FB-A

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-

Connector No.	M80
Connector Name	TWEETER LH
Connector Type	FCI 211PC023S9017

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

Connector No.	M352
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08MGY-X

Terminal No.	Color of Wire	Signal Name [Specification]
16	-	-
17	-	-
20	-	-

JCNWA0254GB

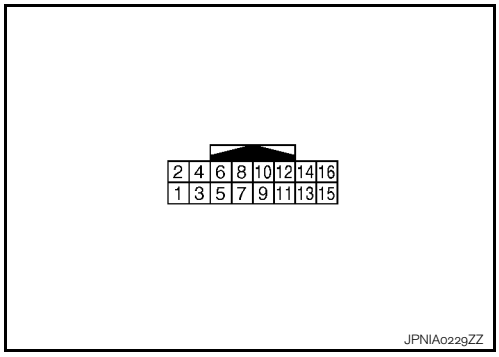
cardiagn.com

CAMERA CONTROL UNIT

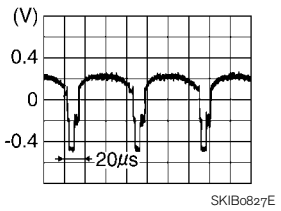
Reference Value

INFOID:0000000000947136

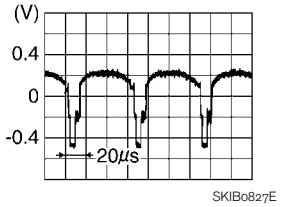
TERMINAL LAYOUT



PHYSICAL VALUES

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
1 (LG)	Ground	Battery power supply	Input	Ignition switch OFF	—	Battery voltage
2 (R)	Ground	ACC power supply	Input	Ignition switch ACC	—	Battery voltage
3 (B)	Ground	GND	—	Ignition switch ON	—	0 V
4 (Y/G)	Ground	Reverse signal	Input	Ignition switch ON	R position	12 V
					Other than R position	0 V
5 (Y)	Ground	Camera-connection recognition signal	—	Ignition switch ON	Connected to camera control unit connector	0 V
					Not connected to camera control unit connector	5 V
6 (O)	—	Data transmit/receive signal	—	—	—	—
8 (V)	Ground	Camera ON signal	Output	Ignition switch ON	R position	6 V
					Other than R position	0 V
9	—	Shield	—	—	—	—
10 (W)	Ground	Camera image signal	Input	Ignition switch ON	At rear view camera image displayed	

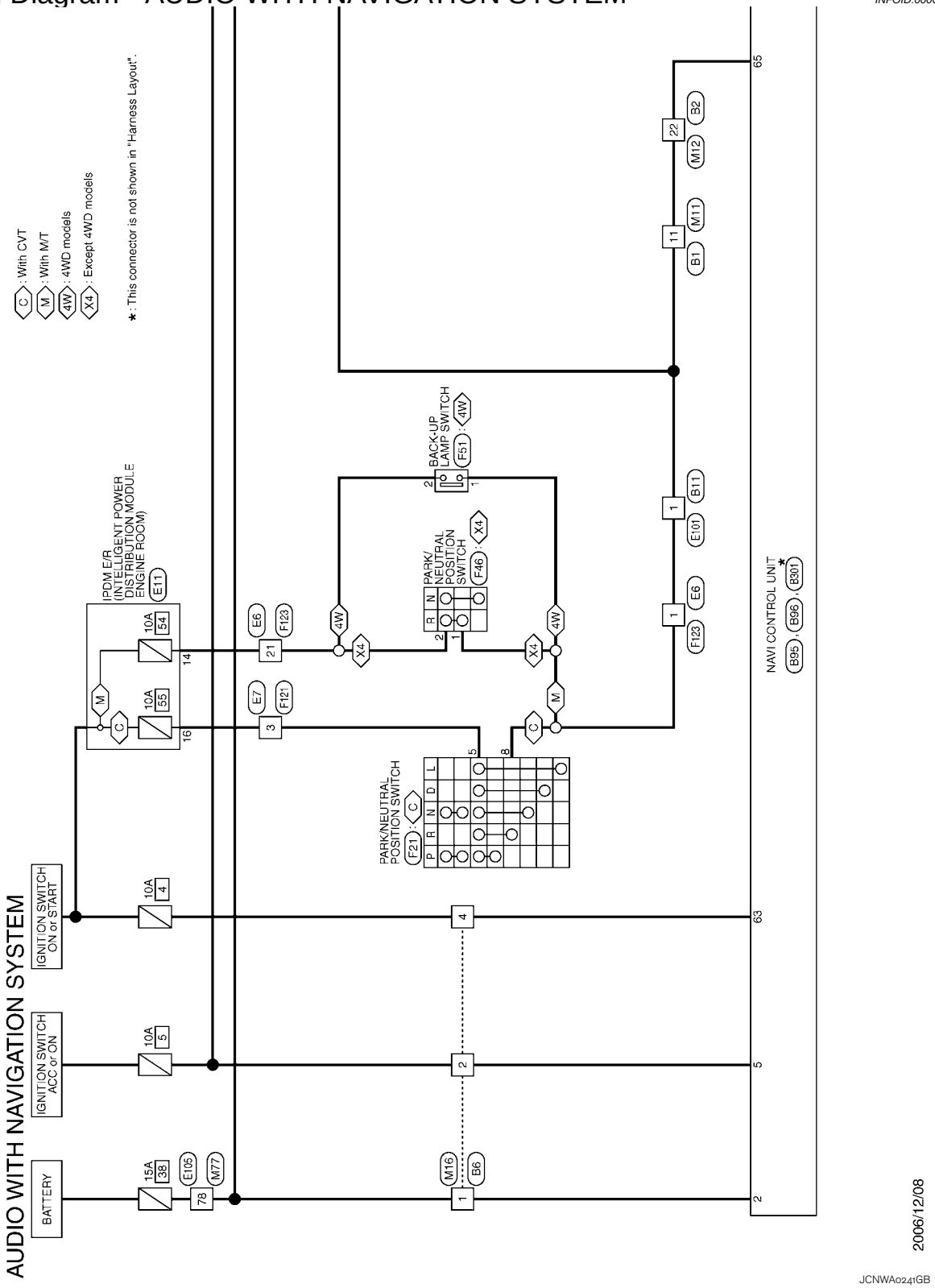
cardiagn.com

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
11	—	Shield	—	—	—	—
12 (R)	Ground	Camera image signal	Output	Ignition switch ON	At rear view camera image displayed	 SKIB0827E

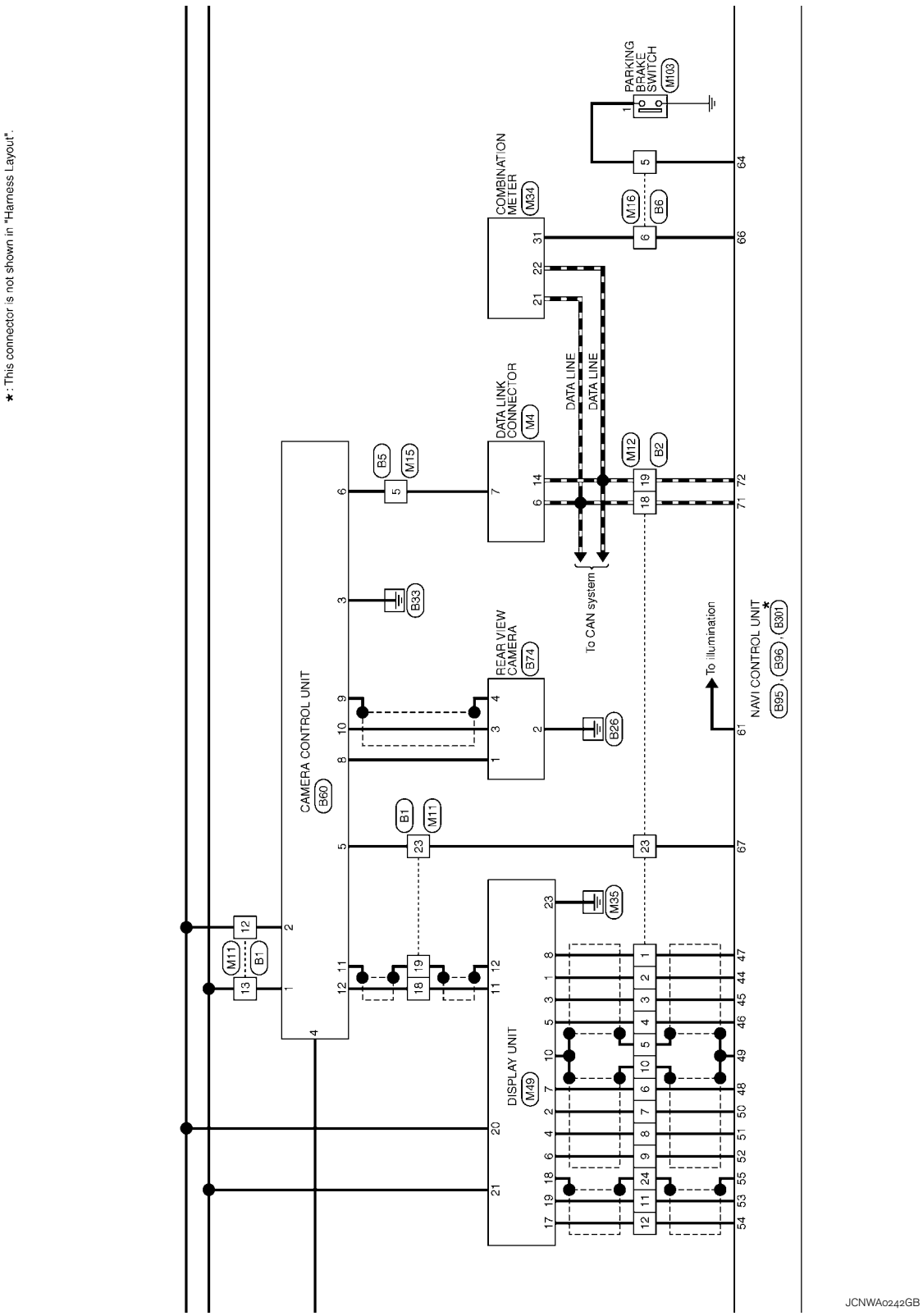
cardiagn.com

Wiring Diagram - AUDIO WITH NAVIGATION SYSTEM -

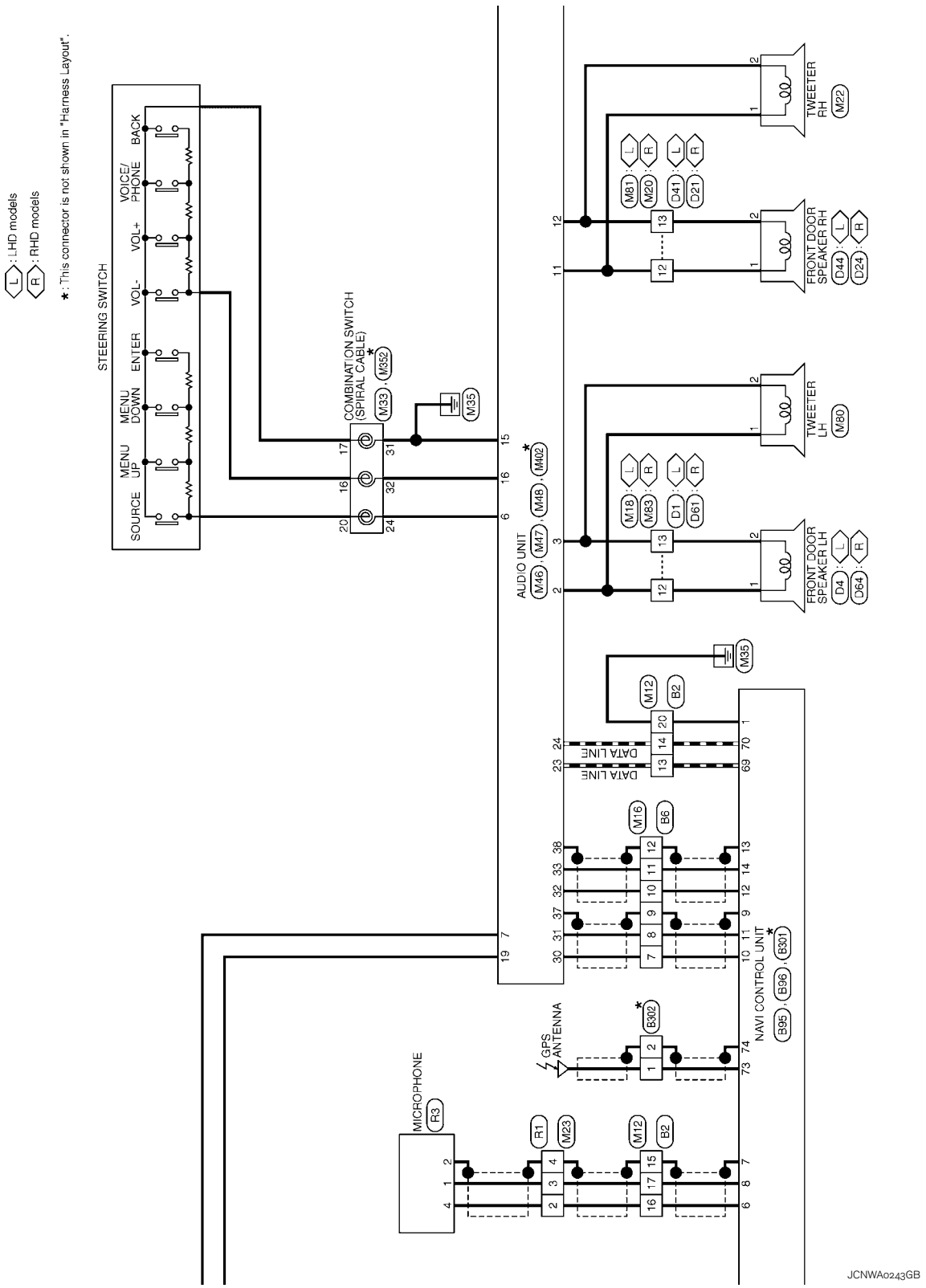
INFOID:0000000000955709



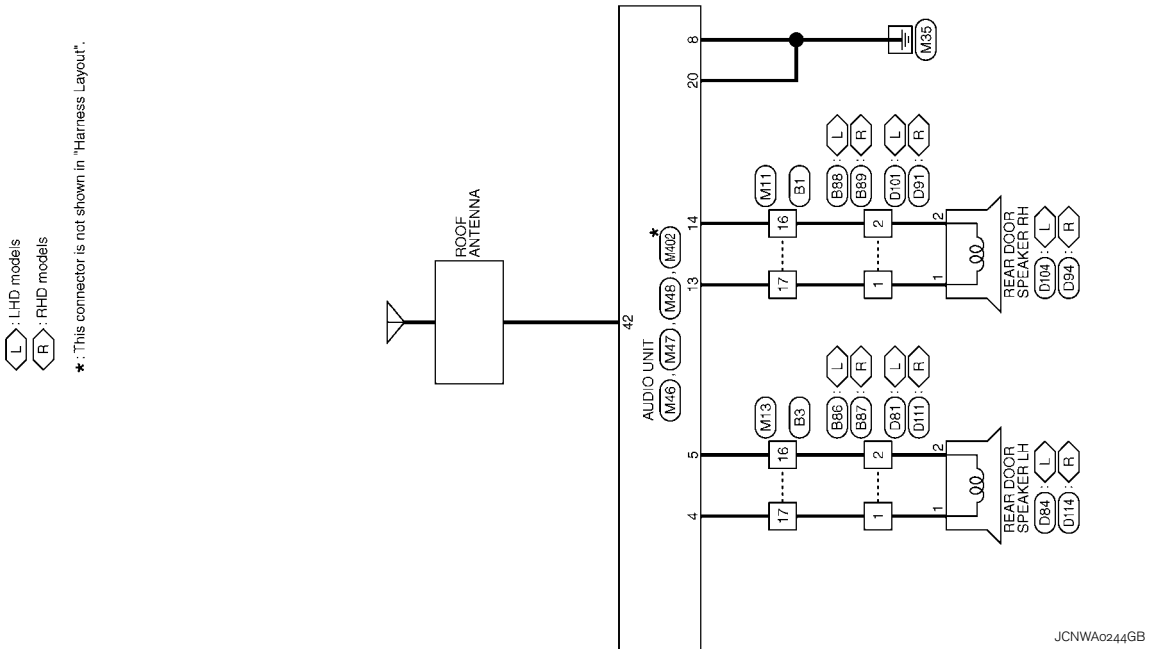
cardiagn.com



cardiagn.com



cardiagn.com



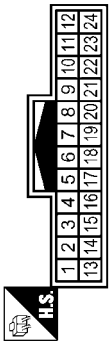
cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

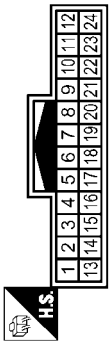
Terminal No.	Color of Wire	Signal Name [Specification]
11	Y/G	–
12	R	–
13	LG	–
16	V	–
17	O	–
18	R	–
19	SHIELD	–
23	Y	–

Connector No.	B2
Connector Name	WIRE TO WIRE
Connector Type	TH24MW



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	G	–
3	R	–
4	W	–
5	SHIELD	–
6	B	–
7	G	–
8	R	–
9	W	–
10	SHIELD	–
11	W	–

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW



Terminal No.	Color of Wire	Signal Name [Specification]
12	O	–
13	L	–
14	P	–
15	SHIELD	–
16	B	–
17	W	–
18	L	–
19	P	–
20	B	–
22	Y/G	–
23	Y	–
24	SHIELD	–

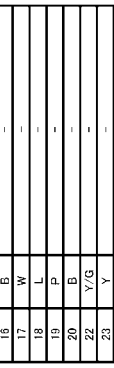
Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS06MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
5	O	–

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Type	TH12MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	R	–
4	W	–
5	V	–
6	Y	–
7	W	–
8	O	–
9	SHIELD	–
10	O	–
11	W	–
12	SHIELD	–

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

Connector No.	B60
Connector Name	CAMERA CONTROL UNIT
Connector Type	TH16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	BATTERY
2	R	ACC
3	B	GND
4	Y/G	REVERSE SIGNAL
5	Y	CONNECTION RECOGNITION
6	O	DDL
8	V	CAMERA ON SIGNAL
9	SHIELD	SHIELD
10	W	CAMERA IMAGE SIGNAL
11	SHIELD	SHIELD
12	R	CAMERA IMAGE SIGNAL

JCNWA0245GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M402
Connector Name	AUDIO UNIT
Connector Type	G13 SH-2 S1S-HU

H.S.

41 42 43

Terminal No.	Color of Wire	Signal Name [Specification]
42	–	ANTENNA

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	–
3	W	–
4	SHIELD	–

Connector No.	R3
Connector Name	MICROPHONE
Connector Type	TK04FW

H.S.

1 2 3 4

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	MICROPHONE SIGNAL
2	SHIELD	MICROPHONE GND
4	B	MICROPHONE VCC

JCNWA0246GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B74
Connector Name	REAR VIEW CAMERA
Connector Type	TH04MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	CAMERA ON SIGNAL
2	B	GND
3	W	CAMERA IMAGE SIGNAL
4	SHIELD	SHIELD

Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS06MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-

Connector No.	B95
Connector Name	NAVI CONTROL UNIT
Connector Type	TH40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND
2	LG	BATTERY
5	R	ACC
6	B	MICROPHONE VCC
7	SHIELD	MICROPHONE GND
8	W	MICROPHONE SIGNAL
9	SHIELD	SHIELD
10	W	TEL VOICE SIGNAL (+)
11	O	TEL VOIVE SIGNAL (-)
12	O	VOICE GUIDANCE SIGNAL (+)
13	SHIELD	SHIELD
14	W	VOICE GUIDANCE SIGNAL (-)

JCNWA0247GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	B96
Connector Name	NAVI CONTROL UNIT
Connector Type	TH32FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
44	G	RGB (R:RED) SIGNAL
45	R	RGB (G:GREEN) SIGNAL
46	W	RGB (B:BLUE) SIGNAL
47	B	RGB GND
48	B	RGB SYNC
49	SHIELD	SHIELD
50	G	RGB AREA (YS) SIGNAL
51	R	HP
52	W	VP
53	W	COMM (CONT->DISP)
54	O	COMM (DISP->CONT)

55	SHIELD	SHIELD
61	R/L	ILLUMINATION
63	W	IGNITION
64	V	PARKING BRAKE
65	Y/G	REVERSE SIGNAL
66	Y	VEHICLE SPEED (8-PULSE)
67	Y	CONNECTION RECOGNITION
69	L	AV COMM (H)
70	P	AV COMM (L)
71	L	CAN-H
72	P	CAN-L

Connector No.	D4
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

Connector No.	B301
Connector Name	NAVI CONTROL UNIT
Connector Type	GT5S-PP-HU

Terminal No.	Color of Wire	Signal Name [Specification]
73	-	GPS ANTENNA
74	SHIELD	SHIELD

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	B302
Connector Name	GPS ANTENNA
Connector Type	GT5S-PP-HU

Terminal No.	Color of Wire	Signal Name [Specification]
1	-	-
2	SHIELD	-

Connector No.	D24
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

JCNWA0248GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	P	–

Connector No.	D44
Connector Name	FRONT DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	P	–

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	–
13	G	–

Connector No.	D64
Connector Name	FRONT DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	G	–

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D84
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D94
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

JCNWA0249GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D104
Connector Name	REAR DOOR SPEAKER RH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

Connector No.	D114
Connector Name	REAR DOOR SPEAKER LH
Connector Type	NS02FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–

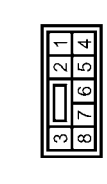
Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1Y

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS



Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	–
16	Y/R	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

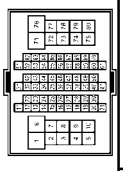
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

JCNWA0250GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
78	LG	-

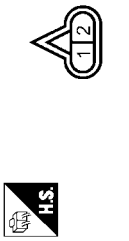
Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
5	Y/R	-
8	Y/G	-

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
2	R/B	-

Connector No.	F51
Connector Name	BACK-UP LAMP SWITCH
Connector Type	RK02FB

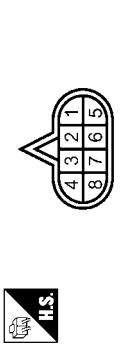


Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
2	R/B	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

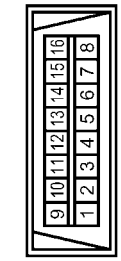
Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V



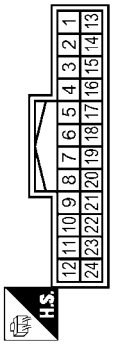
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
21	R/B	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
7	O	-
14	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
11	Y	-
12	R	-
13	LG	-
16	V	-
17	O	-
18	W	-
19	SHIELD	-
23	Y	-

JCNWA0251GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M12
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-
3	R	-
4	W	-
5	SHIELD	-
6	B	-
7	G	-
8	R	-
9	W	-
10	SHIELD	-
11	W	-
12	O	-
13	L	-
14	P	-
15	SHIELD	-
16	W	-
17	B	-
18	L	-
19	P	-
20	B	-
22	Y	-
23	Y	-
24	SHIELD	-

Connector No.	M16
Connector Name	WIRE TO WIRE
Connector Type	TH12FW

H.S.

6	5	4	3	2	1
12	11	10	9	8	7

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-
4	O	-
5	V	-
6	Y	-
7	W	-
8	O	-
9	SHIELD	-
10	O	-
11	W	-
12	SHIELD	-

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
12	L	-
13	G	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	-
17	LG	-

Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	-
13	P	-

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3		2	1
8	7	6	5	4

Terminal No.	Color of Wire	Signal Name [Specification]
5	O	-

Connector No.	M22
Connector Name	TWEETER RH
Connector Type	FCI 211PC02S9017

H.S.

1
2

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	P	-

JCNWA0252GB

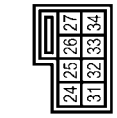
cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
2	W	-
3	B	-
4	SHIELD	-

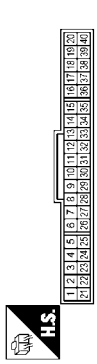
Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V



Terminal No.	Color of Wire	Signal Name [Specification]
24	R	-
31	B	-
32	Y	-

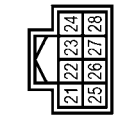
15	B	STRG SW GND
16	Y	STRG SW B
19	LG	BATTERY
20	B	GND

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



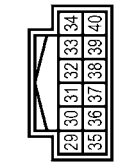
Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
31	Y	VEHICLE SPEED (8-PULSE)

Connector No.	M47
Connector Name	AUDIO UNIT
Connector Type	TH08FW



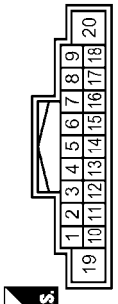
Terminal No.	Color of Wire	Signal Name [Specification]
23	L	AV COMM (H)
24	P	AV COMM (L)

Connector No.	M48
Connector Name	AUDIO UNIT
Connector Type	TH12FW



Terminal No.	Color of Wire	Signal Name [Specification]
30	W	TEL VOICE SIGNAL (+)
31	O	TEL VOICE SIGNAL (-)[With navigation system]
32	O	VOICE GUIDANCE (+)
33	W	VOICE GUIDANCE (-)
37	SHIELD	SHIELD[With navigation system]
38	SHIELD	SHIELD

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2



Terminal No.	Color of Wire	Signal Name [Specification]
2	L	SOUND SIGNAL FRONT LH (+)
3	G	SOUND SIGNAL FRONT LH (-)
4	LG	SOUND SIGNAL REAR LH (+)
5	Y	SOUND SIGNAL REAR RH (-)
6	R	STRG SW A
7	R	ACC
8	B	GND
11	BR	SOUND SIGNAL FRONT RH (+)
12	P	SOUND SIGNAL FRONT RH (-)
13	O	SOUND SIGNAL REAR RH (+)
14	V	SOUND SIGNAL REAR RH (-)

JCNWA0253GB

cardiagn.com

AUDIO WITH NAVIGATION SYSTEM

Connector No.	M49
Connector Name	DISPLAY UNIT
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	RGB (R/RED) SIGNAL
2	G	RGB AREA (YS) SIGNAL
3	R	RGB (G/GREEN) SIGNAL
4	R	HP
5	W	RGB (B/BLUE) SIGNAL
6	W	VP
7	B	RGB SYNC
8	B	RGB GND
10	SHIELD	SHIELD
11	R	CAMERA IMAGE SIGNAL
12	SHIELD	SHIELD

I7	O	COMM (DISP->CONT)
I8	SHIELD	SHIELD
I9	W	COMM (CONT->DISP)
20	R	ACC
21	LG	BATTERY
23	B	GND

Connector No.	M81
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
I2	BR	-
I3	P	-

Connector No.	M83
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
I2	L	-
I3	G	-

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
78	LG	-

Connector No.	M103
Connector Name	PARKING BRAKE SWITCH
Connector Type	P01FB-A

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-

Connector No.	M80
Connector Name	TWEETER LH
Connector Type	FCI 211PC023S9017

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

Connector No.	M352
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08MGY-X

Terminal No.	Color of Wire	Signal Name [Specification]
16	-	-
17	-	-
20	-	-

JCNWA0254GB

cardiagn.com

SYMPTOM DIAGNOSIS

MULTI AV SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000000947140

RELATED TO NAVIGATION

NOTE:
Combined part of AV switch and audio unit.

Symptoms	Check items	Possible malfunction location/Action to take
AV switch cannot be operated. (All switches cannot be operated.)	"MULTI AV" is displayed on "SELECT SYSTEM" screen of CONSULT-III.	Perform the self-diagnosis using CONSULT-III. (AV-65, "CONSULT - III Function (MULTI AV)")
	"MULTI AV" is not displayed on "SELECT SYSTEM" screen of CONSULT-III.	• NAVI control unit power supply and ground circuit (AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure") • Perform CAN diagnosis when "Please wait" is indicated on the screen for approximately 120 seconds after ignition switch ON.
AV switch cannot be operated. (Only specified switch cannot be operated.)	CONSULT-III self-diagnosis detects a malfunction.	Perform the self-diagnosis using CONSULT-III. (AV-65, "CONSULT - III Function (MULTI AV)")
	CONSULT-III self-diagnosis does not detect a malfunction.	Audio unit (AV-202, "Exploded View")
Map screen is not displayed. (RGB image other than map is normal.)	–	Perform the self-diagnosis using CONSULT-III. (AV-65, "CONSULT - III Function (MULTI AV)")
Fuel economy information display is malfunctioning.	–	NAVI control unit power supply and ground circuit (Ignition signal) (AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure")
Voice guidance is not heard.	–	Voice guidance signal circuit
Traffic information (RDS-TMC) is not received.	Radio broadcasts are received.	Audio unit (AV-202, "Exploded View")
	Radio broadcasts are not received.	• Radio antenna (AV-209, "Exploded View") • Antenna feeder (AV-216, "Harness Layout")

RELATED TO REAR VIEW MONITOR

Symptoms	Check items	Possible malfunction location/Action to take
Warning message under the display is not displayed at rear view monitor image.	–	• Horizontal synchronizing (HP) signal circuit (AV-108, "Diagnosis Procedure") • Vertical synchronizing (VP) signal circuit (AV-109, "Diagnosis Procedure") • RGB area (YS) signal circuit (AV-107, "Diagnosis Procedure")
Camera image is not shown. (Only warning message under the display is displayed.)	"REAR VIEW CAMERA" is displayed on "SELECT SYSTEM" screen of CONSULT-III.	• Camera image signal circuit (positive circuit) (Between camera control unit and display unit) (AV-112, "Diagnosis Procedure") • Camera ON signal circuit (AV-113, "Diagnosis Procedure") • Camera image signal circuit (Between rear view camera and camera control unit) (AV-111, "Diagnosis Procedure")
	"REAR VIEW CAMERA" is not displayed on "SELECT SYSTEM" screen of CONSULT-III.	Camera control unit power supply and ground circuit (AV-102, "CAMERA CONTROL UNIT : Diagnosis Procedure")
Camera image is rolling.	–	Camera image signal circuit (negative circuit) (Between camera control unit and display unit) (AV-112, "Diagnosis Procedure")

cardiagn.com

Symptoms	Check items	Possible malfunction location/Action to take
It cannot be switched to rear view monitor.	CONSULT-III self-diagnosis detects a malfunction.	Perform the self-diagnosis using CONSULT-III (MULTI AV) (AV-65, "CONSULT - III Function (MULTI AV)").
	CONSULT-III self-diagnosis does not detect a malfunction.	NAVI control unit reverse signal circuit

RELATED TO AUDIO

Symptom	Check items	Possible malfunction location / Action to take
Audio sound is not heard.	No sound from all speakers	Audio unit (AV-202, "Exploded View")
	Sound is not heard only from the specific places (Front RH, rear RH, front LH and rear LH).	Sound signal circuit of suspect system

RELATED TO RGB IMAGE

Symptoms	Check items	Possible malfunction location/Action to take
Color of RGB image is not proper.	Light blue (Cyan) tint	RGB signal (R: red) circuit (AV-103, "Diagnosis Procedure")
	Purple (Magenta) tint and image is rolling.	RGB signal (G: green) circuit (AV-104, "Diagnosis Procedure")
	Screen looks yellowish.	RGB signal (B: blue) circuit (AV-105, "Diagnosis Procedure")
• RGB image is too dark. • RGB image is too fuzzy.	–	RGB ground circuit
RGB image is not displayed. (Nothing is displayed on the screen.)	"MULTI AV" is displayed on "SELECT SYSTEM" screen of CONSULT-III.	Perform the self-diagnosis using CONSULT-III (AV-65, "CONSULT - III Function (MULTI AV)").
	"MULTI AV" is not displayed on "SELECT SYSTEM" screen of CONSULT-III.	NAVI control unit power supply and ground circuit (AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure")

RELATED TO VOICE ACTIVATED CONTROL

Symptoms	Check items	Possible malfunction location/Action to take
The voice cannot be controlled even if the voice control screen is displayed.	Voice sounds at "Speaker Test" and "Voice Microphone Test" of "Confirmation / Adjustment Mode".	NAVI control unit (AV-201, "Exploded View")
	Voice does not sound at "Speaker Test" and "Voice Microphone Test" of "Confirmation / Adjustment Mode".	• MIC. power supply circuit (AV-110, "Diagnosis Procedure") • Shield (MIC.) circuit (AV-110, "Diagnosis Procedure") • MIC. signal circuit (AV-110, "Diagnosis Procedure")
The voice cannot be controlled. (Voice control screen is not displayed.)	TEL operation screen is displayed by pressing and holding "" switch of steering wheel switch.	NAVI control unit (AV-201, "Exploded View")
	• TEL operation screen is not displayed by pressing and holding "" switch of steering wheel switch. • Other steering wheel switches are normal.	Steering switch (AV-207, "Exploded View")
	"BACK", "VOL UP", "VOL DOWN" and "" switches of steering wheel switch are not operated.	Steering switch signal B circuit AV-116, "Diagnosis Procedure"(AV-201, "Exploded View")
	All steering switches are not operated.	Steering switch signal ground circuit (AV-118, "Diagnosis Procedure")

RELATED TO HANDS FREE PHONE

cardiagn.com

- Check that the cellular phone is corresponding type (Bluetooth® enabled) when the hands free related malfunction vehicle is in service before performing a diagnosis.
- There is a case that malfunction occurs due to the version change of the phone type, etc. even though it is a corresponding type. Therefore, confirm it by changing the cellular phone to another corresponding type phone, and check that it operates normally. It is necessary to distinguish whether the cause is the vehicle or cellular phone. Check to ensure the customers phone is supported by checking the phone compatibility for the hands free system.

Trouble diagnosis chart by symptom

Symptoms	Check items	Possible malfunction location/Action to take
Does not recognize cellular phone connection.	Repeat the registration of cellular phone.	NAVI control unit (AV-201, "Exploded View")
Hands free phone cannot be established.	• Hands free phone operation can be made, but the communication cannot be established. • Hands free phone operation can be performed, however, voice between each other cannot be heard during the conversation.	NAVI control unit (AV-201, "Exploded View")
The other party's voice cannot be heard by hands free phone.	Check the “microphone speaker ”in Inspection & Adjustment Mode if sound is heard.	NAVI control unit (AV-65, "CONSULT - III Function (MULTI AV)")
	Check the “microphone speaker ”in Inspection & Adjustment Mode if sound is not heard.	TEL voice signal circuit
Originating sound is not heard by the other party with hands free phone communication.	Sound operation function is normal.	NAVI control unit (AV-201, "Exploded View")
	Sound operation function does not work.	Microphone signal circuit (AV-110, "Diagnosis Procedure")

RELATED TO STEERING WHEEL SWITCH

Symptoms	Possible malfunction location/Action to take
All steering switches are not operated.	Steering switch signal ground circuit (AV-118, "Diagnosis Procedure")
Only specified switch cannot be operated.	Steering switch (AV-207, "Exploded View")
“ENTER”, “MENU UP”, “MENU DOWN” and “SOURCE” switches are not operated.	Steering switch signal A circuit (AV-114, "Diagnosis Procedure")
“BACK”, “ ”, “VOL UP” and “VOL DOWN” switches are not operated.	Steering switch signal B circuit (AV-116, "Diagnosis Procedure")

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000000972595

BASIC OPERATION

Symptoms	Possible cause	Possible solution
No image is displayed.	The brightness is at the lowest setting.	Adjust the brightness of the display.
	The display is turned off.	Push and hold ☀/☽ to turn on the display.
No voice guidance is available. The volume is too high or too low.	The volume is not set correctly, or it is turned off.	Adjust the volume of voice guidance.
	Volume guidance is not provided for narrow streets (roads displayed in gray).	This is not a malfunction.
No map is displayed on the screen.	The map DVD-ROM is not inserted, or it is inserted upside down.	Insert the map DVD-ROM correctly.
	A screen other than map screen is displayed.	Push “MAP”.
The screen is too dim. The movement is slow.	The temperature in the interior of the vehicle is low.	Wait until the interior of the vehicle has warmed up.
Some pixels in the display are darker or brighter than others.	This condition is an inherent characteristic of liquid crystal displays.	This is not a malfunction.
Some menu items cannot be selected.	Some menu items become unavailable while the vehicle is driven.	Park the vehicle in a safe location, and then operate the navigation system.

NOTE:

Locations stored in the Address Book and other memory functions may be lost if the vehicle's battery is disconnected or becomes discharged. Service the vehicle's battery as necessary and re-enter the information in the Address Book If this occurs.

VEHICLE ICON

Symptoms	Possible cause	Possible solution
Names of roads and locations differ between Plan view and Birdview™.	This is because the quantity of the displayed information is reduced so that the screen does not become too crowded. There is also a chance that names of the roads or locations may be displayed multiple times, and the names appearing on the screen may be different because of a processing procedure.	This is not a malfunction.
The vehicle icon is not displayed in the correct position.	The vehicle was transported after the ignition switch was turned off, for example, by a ferry or car transporter.	Drive the vehicle for a while on a road where GPS can be received.
	The position and direction of the vehicle may be incorrect depending on the driving environments and the levels of positioning accuracy of the navigation system.	This is not a malfunction. Drive the vehicle for a while to automatically correct the position and direction of the vehicle icon.
When the vehicle is traveling on a new road, the vehicle icon is located on another road nearby.	Because the new road is not stored in the map data, the system automatically places the vehicle ion on the nearest road available.	Updated road information will be included in the next version of the map DVD-ROM.
The screen does not switch to the night screen even after turning on the headlights.	The daytime screen was set the last time the headlights were turned on.	Set the screen to the night screen mode using when turning on the headlights.
The map does not scroll even when the vehicle is moving.	The current location map screen is not displayed.	Push “MAP”.
The vehicle icon is not displayed.	The current location map screen is not displayed.	Push “MAP”.

cardiagn.com

Symptoms	Possible cause	Possible solution
The GPS indicator on the screen remains gray.	GPS signals cannot be received depending on the vehicle location, such as in a parking garage, on a road that has numerous tall buildings, etc.	Drive on an open, straight road for a while.
	GPS signals cannot be received because objects are placed on top of the display.	Remove the objects from top of the display.
	A sufficient amount of GPS satellites are not available.	Wait for the satellites to move locations available for navigation system.
The location of vehicle icon is misaligned from the actual position.	Speed calculations based on the speed sensor may be incorrect when using tire chains or replacing the tires.	Drive the vehicle for a while (at approximately 30 km/h (19 MPH) for about 30 minutes) to automatically correct the vehicle icon position. Contact an NISSAN / INFINITI dealer if this does not correct the vehicle icon position.
	The map data has mistake or is incomplete (the vehicle icon position is always misaligned in the same area).	Updated road information will be included in the next version of the map DVD-ROM.

MAP DVD-ROM

Symptom	Possible cause	Possible solution
The message “Error” appears.	Map DVD-ROM is dirty or partially damaged.	Check the DVD-ROM and wipe it clean with a soft cloth.
		Replace the DVD-ROM if there is any damage.

ROUTE CALCULATION AND VISUAL GUIDANCE

Symptoms	Possible cause	Possible solution
In the auto reroute calculation, waypoints are not included.	Waypoints already passed are not included in the auto reroute calculation.	In case of going to that waypoints again, edit the route.
Route information is not displayed.	Route calculation has not yet been performed.	Set the destination and perform route calculation.
	The vehicle is not driven on the suggested route.	Drive on the suggested route.
	Route guidance is set to off.	Turn on route guidance.
	Route information is not provided for narrow streets (roads displayed in gray).	This is not a malfunction.
The auto reroute calculation (or detour calculation) suggests the same route as the one previously suggested.	Route calculation took priority conditions into consideration, but the same route was calculated.	This is not a malfunction.
A waypoint cannot be added.	Five waypoints are already set on the route, including ones that already passed.	A maximum of 5 waypoints can be set on the route. In case of going to 6 or more waypoints, perform route calculations multiple times as necessary.
The suggested route is not displayed.	Roads near the destination cannot be calculated.	Reset the destination to a main or ordinary road, and recalculate the route.
	The starting point and destination are too close.	Set a more distant destination.
	The starting point and destination are too far away.	Divide the way by selecting one or two intermediate destinations, and perform route calculations multiple times.
	There are time restricted roads (by day of week, by time) near the current vehicle location or destination.	Set Use Time Restricted Roads to off.
A part of the route is not displayed.	The suggested route includes narrow streets (roads displayed in gray).	This is not a malfunction.

cardiagn.com

Symptoms	Possible cause	Possible solution
The part of the route already passed is deleted.	A route is managed by sections between waypoints. The section between the starting point and the waypoint is deleted if you passed the first waypoint. (It may not be deleted depending on the area.)	This is not a malfunction.
An indirect route is suggested.	The system may suggest an indirect route if there are restrictions (such as one way streets) on roads close to the starting point or destination.	Adjust the location of the starting point or destination.
	The system may suggest an indirect route because route calculation does not take into consideration some areas such as narrow streets (gray roads).	Reset the destination to a main or ordinary road, and recalculate the route.
The landmark information does not correspond to the actual information.	This may be caused by insufficient or incorrect data on the DVD-ROM.	This is not a malfunction.
The suggested route does not exactly connect to the starting point, waypoints, or destination.	There is no data for route calculation closer to these locations.	Set the starting point, waypoints and destination on main road, and perform route calculation.

VOICE GUIDANCE

Symptoms	Possible cause	Possible solution
The voice guidance is not available.	Voice guidance is only available at certain intersections. In some cases, voice guidance is not available even when the vehicle should make a turn.	This is not a malfunction.
	The vehicle has deviated from the suggested route.	Go back to the suggested route or request route calculation again.
	Voice guidance is set to off.	Turn on the voice guidance.
	Route guidance is set to off.	Turn on the voice guidance.
The guidance content does not correspond to the actual condition.	The content of the voice guidance may vary, depending on the types of intersections at which turns are made.	Follow all traffic rules and regulations.

VOICE RECOGNITION

Symptom	Possible cause	Possible solution
The system does not recognize the command. The system recognizes the command incorrectly.	The interior of the vehicle is too noisy.	Close the windows or have other occupants be quiet.
	The volume of the voice is too low.	Speak louder.
	Pronunciation is unclear.	Speak clearly.
	Voice recognition mode is not yet ready to speak.	Push the release " " on the steering switch, and speak a command after the tone sounds.
	5 seconds or more have passed after pushed and released " " on the steering switch.	Make sure to speak a command within 5 seconds after push and release " " on the steering switch.
	Only a limited range of voice commands is usable for each screen.	Use a correct voice command appropriate for the current screen.

REAR VIEW MONITOR

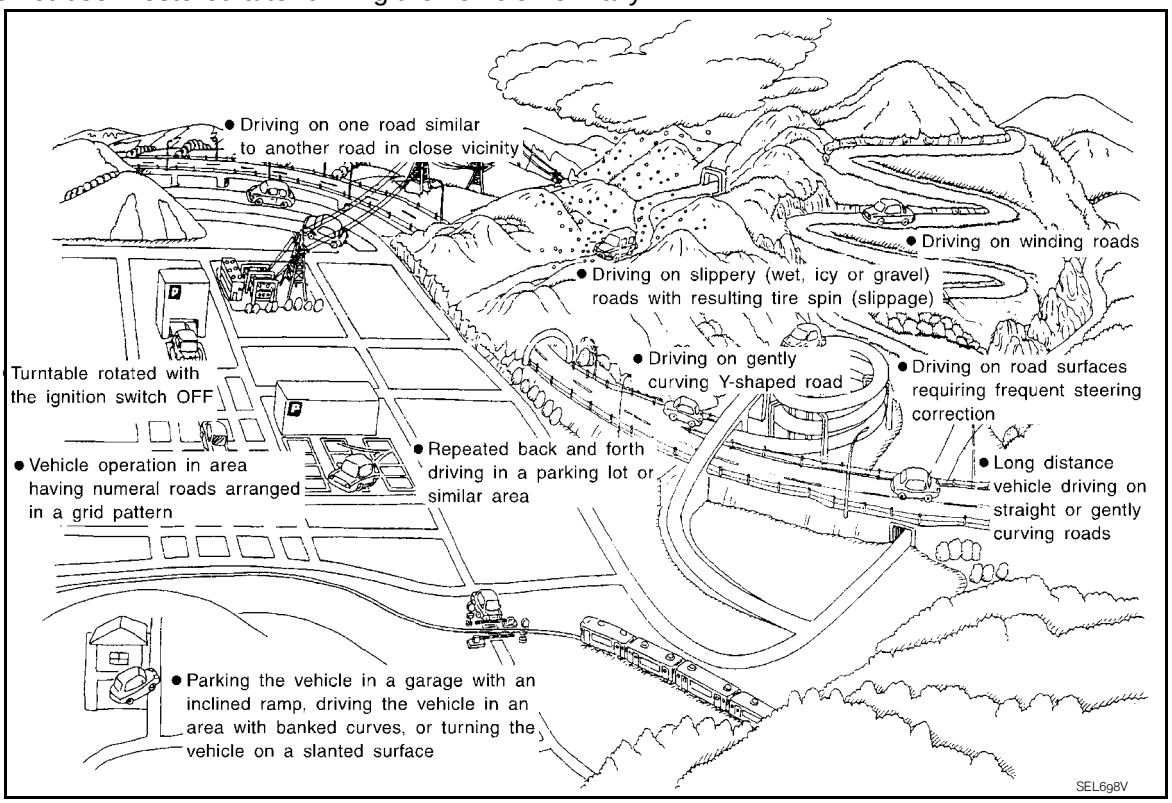
Symptoms	Possible cause	Possible solution
Rear view monitor image is not displayed	Shift lever (M/T models) or selector lever (CVT models) is not in R position.	Shift lever (M/T models) or selector lever (CVT models) is in R position.

cardiagn.com

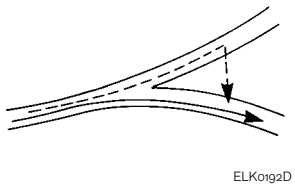
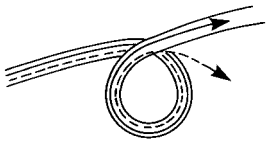
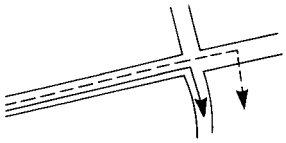
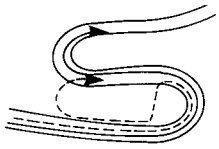
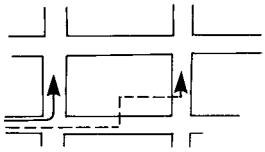
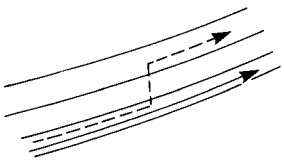
Symptoms	Possible cause	Possible solution
Rear view monitor image is not clear	Front glass of camera lens is dirty.	Dip a soft cloth into water and wipe the glass softly.
	There are raindrops, snow, etc.	Wipe it with a soft cloth softly.
	The sunlight or the headlight of following vehicle is shining directly to the camera lens.	It returns to the original condition if the light applied to the lens disappears.

EXAMPLES OF CURRENT LOCATION MARK DISPLACEMENT

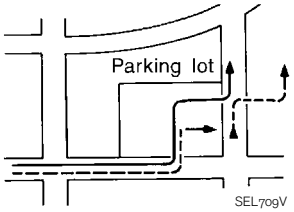
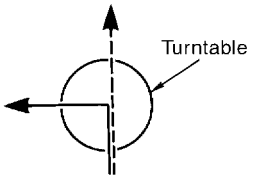
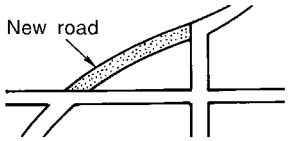
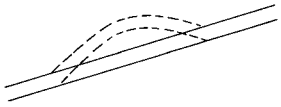
It calculates vehicle travel by reading travel distance and turn angle. Therefore, a mistake will occur in the current location display if the vehicle is driven in the following manner. Perform location correction if correct location has not been restored after driving the vehicle normally.



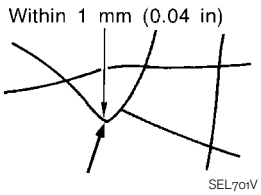
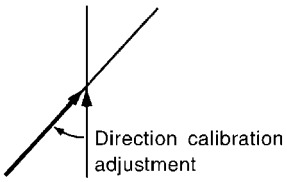
cardiagn.com

Cause (condition)		Driving condition	Remarks (correction, etc.)
Road pattern	Y-intersections  ELKo192D	At a Y intersection or similar gradual division of roads, errors in the direction of travel deduced by the sensor may result in the current location mark appearing on the wrong road.	Perform location correction and, if necessary, direction correction if the correct location has not been restored after traveling about 10 km/h (6 MPH).
	Spiral roads  ELKo193D	Turning angle errors accumulate and vehicle mark may deviate from the correct location when driving on a large, continuous spiral road (such as loop bridge).	
	Straight roads  ELKo194D	Map-matching does not work effectively enough and distance errors may accumulate when driving on a long, straight, slowly curving road without stopping. As a result, the vehicle mark may deviate from the correct location when the vehicle turns at a corner.	
	Switchback turns  ELKo195D	The map may be matched to other roads in a similar direction nearby at every turn, and the vehicle mark may deviate from the correct location when driving on a zigzag road.	
	Grid pattern roads  ELKo196D	The map may be matched to them by mistake and the vehicle mark may deviate from the correct location when driving in a location where roads are laid out in a grid pattern, where many roads are running in the similar direction nearby.	
	Parallel roads  ELKo197D	The map may be matched to the other road by mistake and the vehicle mark may deviate from the correct location when two roads are running in parallel (such as highway and sideway).	

cardiagn.com

Cause (condition)		Driving condition	Remarks (correction, etc.)
Place	In a parking lot  SEL709V	Matching may place the vehicle mark on a nearby road when driving in a parking lot, or other locations where there are no roads on the map. The vehicle mark may have deviated from the correct location when the vehicle returns to the road. Direction errors accumulate, and the vehicle mark may deviate from the correct location when driving in circle or turning the steering wheel repeatedly.	Perform location correction and, if necessary, direction correction if the correct location has not been restored after traveling about 10 km/h (6 MPH).
	Turntable  SEL710V	The navigation system cannot receive the signal from the gyroscope (angular speed sensor) when the ignition switch is OFF. Therefore, the displayed direction may be incorrect and the correct road may not be easily returned to after rotating the vehicle on a turntable with the ignition OFF.	
	Slippery roads	On snow, wet roads, gravel, or other roads where tires may slip easily, accumulated mileage errors may cause the vehicle mark to deviate from the correct road.	
	Slopes	An error in the turning angle will occur, and the vehicle mark may deviate from the road when parking in sloped garages, when traveling on banked roads, or in other cases where the vehicle turns when tilted.	
Map data	Roads not displayed on the map screen  SEL699V	Map matching does not function correctly and matches the location to a nearby road when driving on new roads or other roads not displayed on the map screen. The vehicle mark may deviate from the correct road when the vehicle returns to a road which is on the map.	
	Different road pattern (Changed due to repair)  ELK0201D	Map matching does not function correctly and matches the location to a nearby road if the road pattern stored in the map data and the actual road pattern are different. The vehicle mark may deviate from the correct road.	

cardiagn.com

Cause (condition)		Driving condition	Remarks (correction, etc.)
Vehicle	Use of tire chains	The vehicle mark may deviate from the correct road.	Drive the vehicle for a while. Adjust it with the distance adjustment function if distance still deviates. (Recover the original value if tire chains are removed.)
	Use of tires other than the specified size		Replace all tires with the specified size tire.
	Malfunctioning air pressure of tire		Adjust all tires to the specified air pressure.
	Replace tire		Drive the vehicle for a while. It adjusts with the distance adjustment function if the distance is still not in the correct location.
Driving manner	Just after the engine is started	The vehicle can be shown in the incorrect direction and may deviate from the correct location if vehicle is driven off just after the engine is started when gyroscope (angular speed sensor) correction is not completed.	Wait for a short while before driving after starting the engine.
	Continuous driving without stopping	Direction errors may accumulate, and the current location mark may deviate from the correct road when driving long distances without stopping.	Stop and adjust orientation.
	Abusive driving	Spinning the wheels or engaging in other kinds of abusive driving may result in the system being unable perform correct detection, and may cause the vehicle mark to deviate from the correct road.	Perform location correction and, if necessary, direction correction if after traveling about 10 km/h (6 MPH) the correct location has not been restored.
Position correction method	Position correction accuracy  SEL701V	Accuracy may be reduced when correct road cannot be found, particularly in places where there are many roads if accuracy of location settings is poor.	From the roads displayed on the screen, input a position within an accuracy of 1mm (0.04 in). **CAUTION:** **When correcting, use the most detailed map possible.**
	Direction when location is corrected  SEL702V	Accuracy may be reduced afterwards if accuracy of location settings during correction is poor.	Perform direction correction.

THE CURRENT POSITION MARK SHOWS A POSITION THAT IS COMPLETELY INCORRECT.

In the following cases, the current location mark may be displayed in a completely incorrect location. If so, perform position/direction correction.

- When location correction has not been done
- It may shift to a completely unexpected location and not return unless location correction is performed if GPS satellite reception is poor and the current location mark slips out of place. The position will be corrected if a GPS signal can be received.
- When vehicle is traveled by ferry, or when vehicle is towed.
- Because calculation of the current location cannot be done when traveling with the ignition OFF, for example when traveling by ferry or when being towed, the location before travel is displayed. The location will be corrected if the precise location can be detected with GPS.

cardiagn.com

THE CURRENT POSITION MARK JUMPS.

In the following cases, the current location mark may appear to jump as a result of automatic correction of the current location.

- When map matching has been done
- The current location mark may seem to jump if current location and the current location mark are different when map matching is done. At this time, the location may be “corrected” to the incorrect road or to a location which is not on a road.
- When GPS location correction has been done
- The current location mark may seem to jump if current location and the current location mark are different when location is corrected using GPS measurements. At this time, the location may be “corrected” to a location which is not on a road.

THE CURRENT LOCATION MARK IS IN A RIVER OR THE SEA.

The navigation system moves the current location mark with no distinction between land and rivers or sea. It may appear that the vehicle is driving in a river or the sea if the location mark is somehow out of place.

CURRENT LOCATION MARK ROTATES WITHOUT OPERATION

The rotating condition is recorded as the stop condition if the ignition switch is turned ON with the turntable rotating. Therefore, the current location mark might rotate when actually stopping.

WHEN DRIVING ON THE SAME ROAD, SOMETIMES THE CURRENT LOCATION MARK IS IN THE CORRECT PLACE AND SOMETIMES IT IS IN THE INCORRECT PLACE.

The conditions of the GPS antenna (GPS data) and gyroscope (angular speed sensor) change gradually. Depending on the road traveled and operation of the steering wheel, the location detection results will be different. Therefore, even on a road on which the location has never been incorrect, conditions may cause the vehicle mark to deviate.

LOCATION CORRECTION BY MAP MATCHING IS SLOW.

- The map matching function needs to refer to the data of the surrounding area. It is necessary to drive some distance for the function to work.
- Because of the way map matching operates, when there are many roads running in similar directions in the surrounding area a matching determination may be impossible. The location will remain uncorrected until some special feature is found.

ALTHOUGH THE GPS RECEIVING DISPLAY IS GREEN, THE VEHICLE MARK DOES NOT RETURN TO THE CORRECT LOCATION.

- GPS accuracy has a malfunction range of about 10 m (30 ft). In some cases the current location mark may not be on the correct street, even when GPS location correction is done.
- The navigation system compares the results of GPS location detection with the results from map-matching location detection. The one that is determined to have higher accuracy is used.
- Position correction by GPS is not available while the vehicle is stopped.

THE NAME OF THE CURRENT PLACE IS NOT DISPLAYED.

The current place name might not be displayed when there is no name of place information in the map screen.

THE DISPLAY IS DIFFERENT BETWEEN BIRDVIEW® AND (FLAT) MAP DISPLAY.

The following is different at Birdview®.

- The current place name displays names that are primarily in the direction of vehicle travel.
- The amount of time before the vehicle travel or turn angle is updated on the screen is longer than for the (flat) map display.
- The conditions for display of place names, roads, and other data are different for nearby areas and for more distant areas.
- Some trimming of the character data is done to prevent the display from becoming too complex. In some cases and in some locations, the display contents may differ.
- The same place name, street name, etc. may be displayed multiple times.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001091324

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Trouble Diagnosis

INFOID:0000000000947143

AV COMMUNICATION SYSTEM

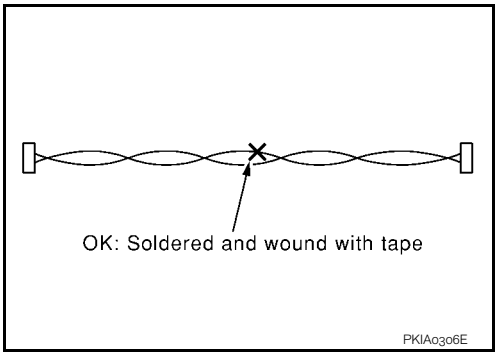
- Do not apply voltage of 7.0 V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0 V or less.
- Be sure to turn ignition switch OFF and disconnect the battery cable from the negative terminal before checking the circuit.

Precaution for Harness Repair

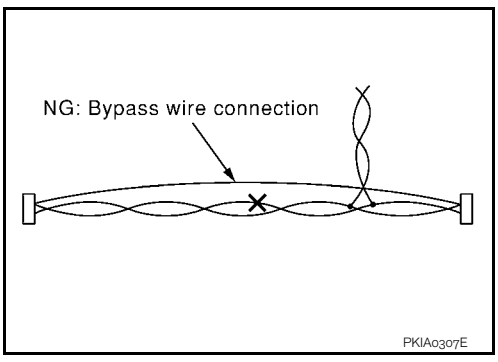
INFOID:0000000000947144

AV COMMUNICATION SYSTEM

- Solder the repaired parts, and wrap with tape. [Frays of twisted line must be within 110 mm (4.33 in).]



- Do not perform bypass wire connections for the repair parts. (The spliced wire will become separated and the characteristics of twisted line will be lost.)



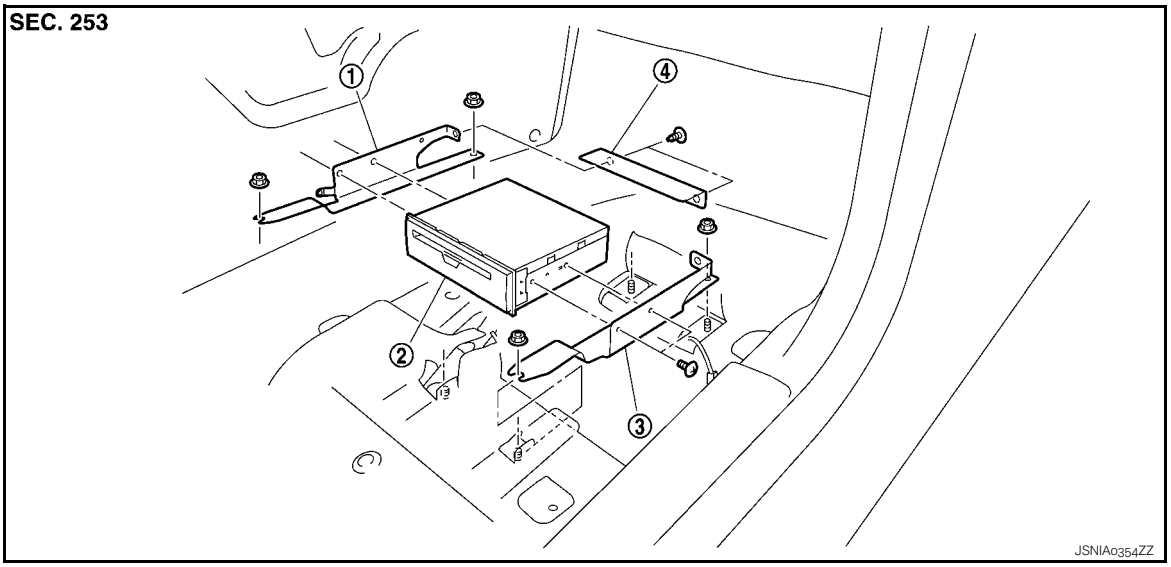
cardiagn.com

ON-VEHICLE REPAIR

NAVI CONTROL UNIT

Exploded View

INFOID:0000000000947146



1. Bracket RH
2. NAVI control unit
3. Bracket LH
4. Bracket rear

Removal and Installation

INFOID:0000000000947147

REMOVAL

1. Remove bracket nuts, and then remove NAVI control unit with bracket.
2. Remove bracket screws and clips, and then remove NAVI control unit.

INSTALLATION

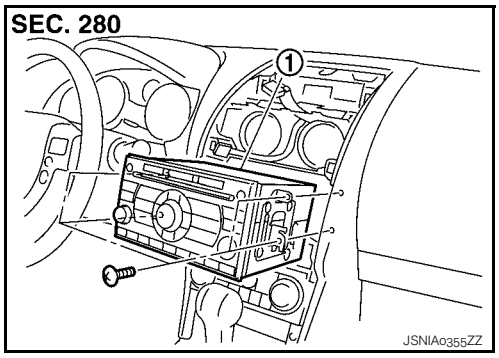
Install in the reverse order of removal.

cardiagn.com

AUDIO UNIT

Exploded View

INFOID:0000000000954534



1. Audio unit

Removal and Installation

INFOID:0000000000954535

REMOVAL

1. Remove cluster lid C. Refer to IP-11, "Exploded View".
2. Remove audio unit with bracket.

INSTALLATION

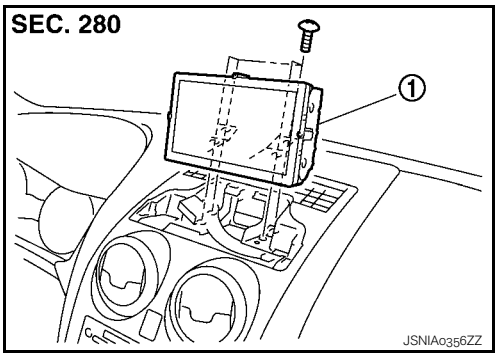
Install in the reverse order of removal.

cardiagn.com

DISPLAY UNIT

Exploded View

INFOID:0000000000947148



1. Display unit

Removal and Installation

INFOID:0000000000947149

REMOVAL

1. Remove display unit cover. Refer to IP-11, "Exploded View".
2. Remove display unit with bracket.

INSTALLATION

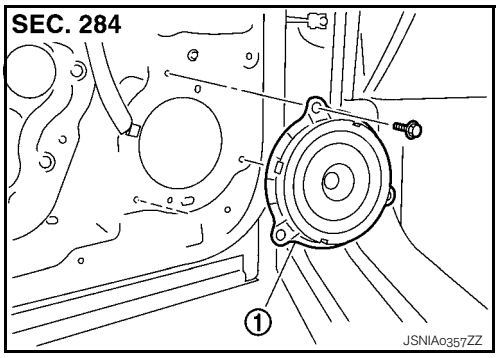
Install in the reverse order of removal.

cardiagn.com

FRONT DOOR SPEAKER

Exploded View

INFOID:0000000000947152



1. Front door speaker

Removal and Installation

INFOID:0000000000947153

REMOVAL

1. Remove front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Exploded View".
2. Remove front door speaker.

INSTALLATION

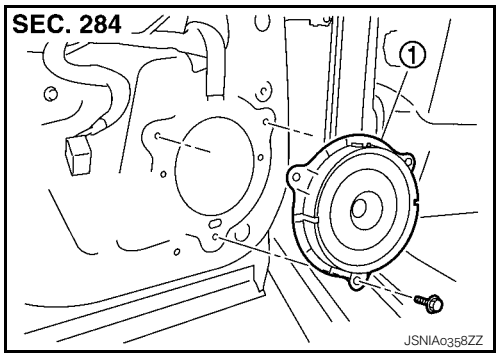
Install in the reverse order of removal.

cardiagn.com

REAR DOOR SPEAKER

Exploded View

INFOID:0000000000947154



1. Rear door speaker

Removal and Installation

INFOID:0000000000947155

REMOVAL

1. Remove rear door finisher. Refer to INT-12, "REAR DOOR FINISHER : Exploded View".
2. Remove rear door speaker.

INSTALLATION

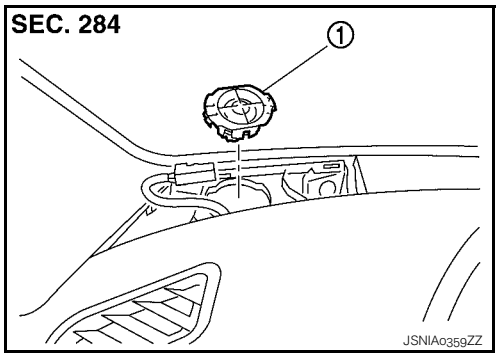
Install in the reverse order of removal.

cardiagn.com

TWEETER

Exploded View

INFOID:0000000000947156



1. Tweeter

Removal and Installation

INFOID:0000000000947157

REMOVAL

1. Remove tweeter grill. Refer to IP-11, "Exploded View".
2. Remove tweeter.

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

STEERING SWITCH

Exploded View

INFOID:0000000000947172

Refer to ST-9, "Exploded View".

Removal and Installation

INFOID:0000000000947173

REMOVAL

Refer to ST-9, "Removal and Installation".

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

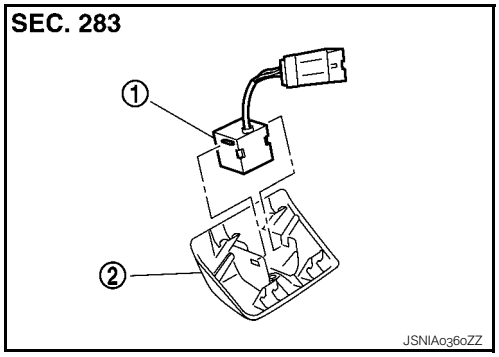
MICROPHONE

Exploded View

INFOID:0000000000947178

REMOVAL
Refer to INT-20, "Exploded View".

DISASSEMBLY



1. Microphone
2. Microphone cover

Removal and Installation

INFOID:0000000000947179

REMOVAL

1. Remove microphone cover. Refer to INT-20, "Exploded View".
2. Remove microphone.

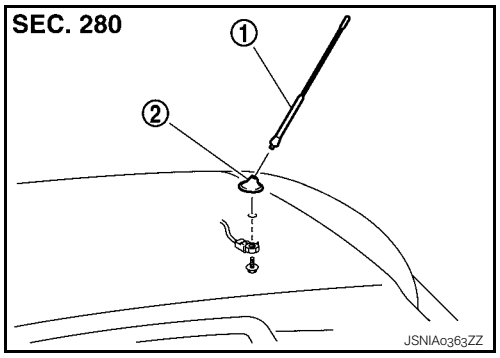
INSTALLATION
Install in the reverse order of removal.

cardiagn.com

RADIO ANTENNA

Exploded View

INFOID:0000000000967694



1. Rod antenna
2. Antenna base

Removal and Installation

INFOID:0000000000967695

REMOVAL

1. Remove headlining. Refer to INT-20, "Exploded View".
2. Remove antenna base and antenna rod.

INSTALLATION

Install in the reverse order of removal.

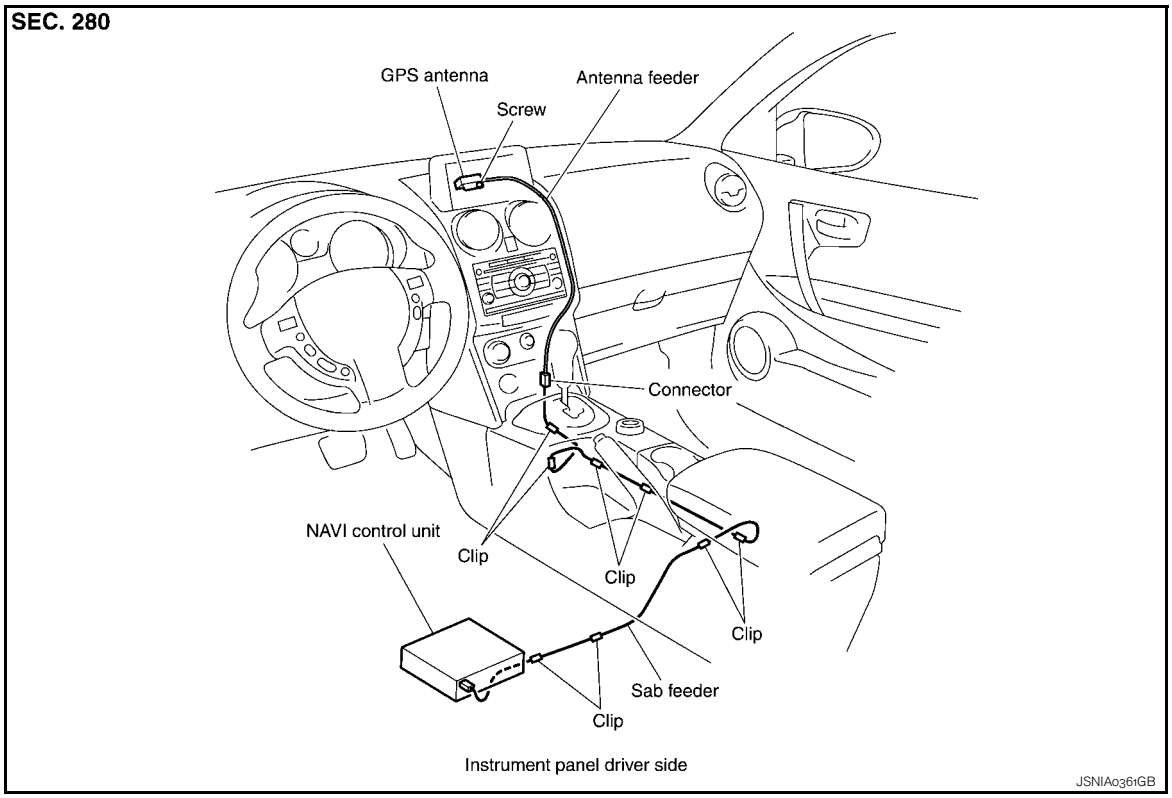
cardiagn.com

GPS ANTENNA

Harness Layout

INFOID:0000000000947181

NOTE:
As for right-hand drive vehicles, install GPS antenna feeder between the center console and the instrument panel in the reverse of left-handle drive vehicles.



Removal and Installation

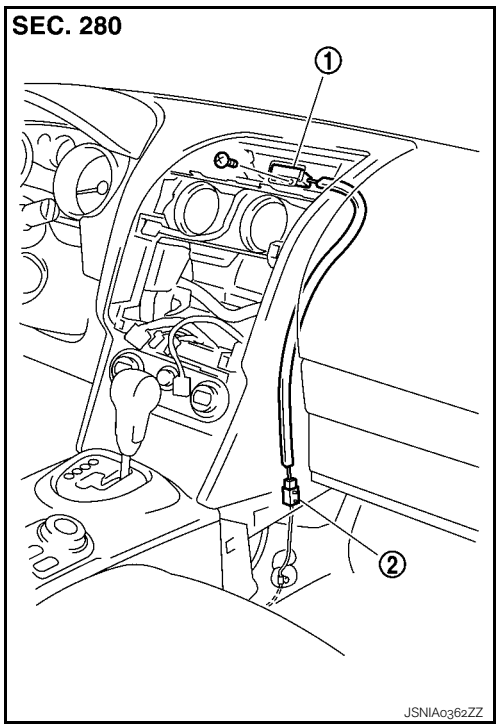
INFOID:0000000000947182

REMOVAL

1. Remove display unit. Refer to AV-203, "Exploded View".
2. Remove audio unit. Refer to AV-202, "Exploded View".

cardiagn.com

3. Remove instrument lower panel RH. Then remove GPS antenna connector (2). Refer to IP-11, "Exploded View".
4. Remove GPS antenna (1).



INSTALLATION

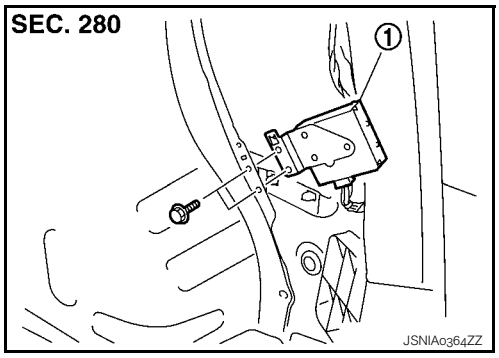
Install in the reverse order of removal.

cardiagn.com

CAMERA CONTROL UNIT

Exploded View

INFOID:0000000000947183



1. Camera control unit

Removal and Installation

INFOID:0000000000947184

REMOVAL

1. Remove luggage side lower finisher (RH). Refer to INT-24, "Exploded View".
2. Remove camera control unit.

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

REAR VIEW CAMERA

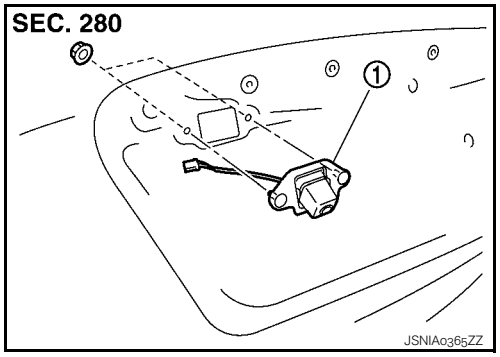
Exploded View

INFOID:0000000000947186

REMOVAL

Refer to EXT-31, "Exploded View".

DISASSEMBLY



1. Rear view camera

Removal and Installation

INFOID:0000000000947187

REMOVAL

1. Remove back door finisher. Refer to EXT-31, "Exploded View".
2. Remove back door trim finisher lower. Refer to INT-26, "Exploded View".
3. Remove rear view camera.

INSTALLATION

Install in the reverse order of removal.

Adjustment

INFOID:0000000000970728

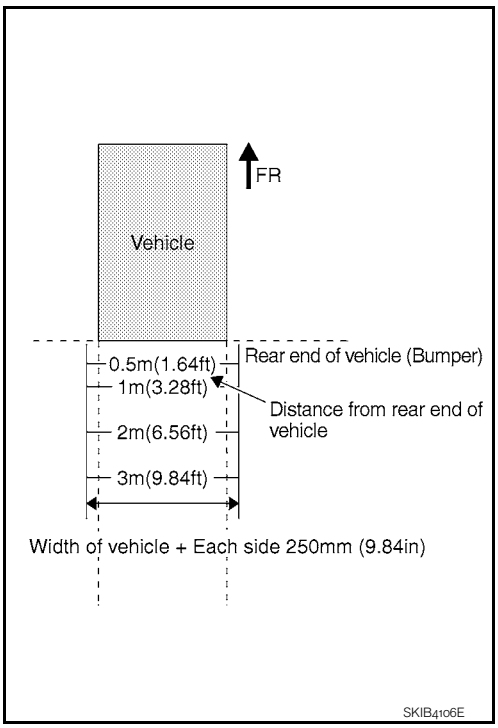
DESCRIPTION

CONSULT-III is used to modify the guideline position that shows the width of vehicle and the distance from rear end of vehicle on the rear view monitor. These can be caused by condition variations of body assembly and camera installation.

VEHICLE WIDTH AND DISTANCE GUIDING LINE CORRECTION PROCEDURE

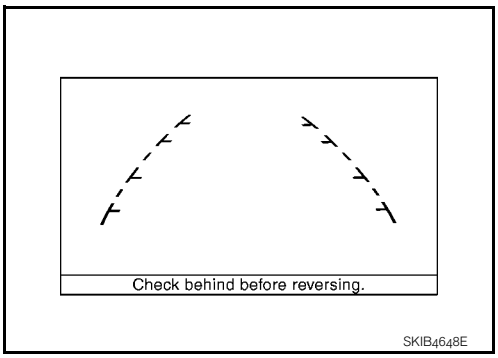
cardiagn.com

1. Create a correction line to modify the guiding lines inside monitors. Draw lines on the rearward area of the vehicle passing through the following points: 250 mm (9.84 in) from both sides of the vehicle, and 0.5 m (1.64 ft), 1 m (3.28 ft), 2 m (6.56 ft), and 3 m (9.84 ft) from the rear end of the bumper.



2. Connect CONSULT-III. Then touch “REAR VIEW CAMERA” on “SELECT SYSTEM” screen.
   CAUTION:
   Correct the guiding line with the engine stopped for safety.

3. Shift selector lever to R position.



4. Touch “ADJ GUIDELINE POSITION” on “SELECT WORK ITEM” screen.
   CAUTION:
   Vehicle width guiding lines may move horizontally when starting “ADJ GUIDELINE POSITION” mode. It is normal.

5. Touch “X UP”, “X DOWN”, “Y UP”, and “Y DOWN” so as to align with a correction line created, and then adjust the guiding lines.

Adjustment direction	ADJUST MONITOR	
LEFT/RIGHT	X VALUE ADJ	– 8 - 8
UP/DOWN	Y VALUE ADJ	– 8 - 8

6. Touch “SAVE” so as to fix the lines if the guiding lines align with the correction lines. Then end the correction by touching “END”. GO TO 7 if the guiding lines do not align with the correction lines.

7. Touch “SELECT GUIDELINE PATTERN” on “SELECT WORK ITEM” screen.

8. Change the pattern of the guiding lines by touching “UP” or “DOWN”. [Select from among 2 patterns (“PATTERN NO. 0” or “1”) of the guiding lines.]
9. Fix the pattern of the guiding lines by touching “SAVE”.

cardiagn.com

10. End the correction by touching “END”.

CAUTION:

The change is not reflected at the next starting if “SAVE” is not touched if the setting value is changed on “SELECT GUIDELINE PATTERN” and “ADJ GUIDELINE POSITION”.

cardiagn.com

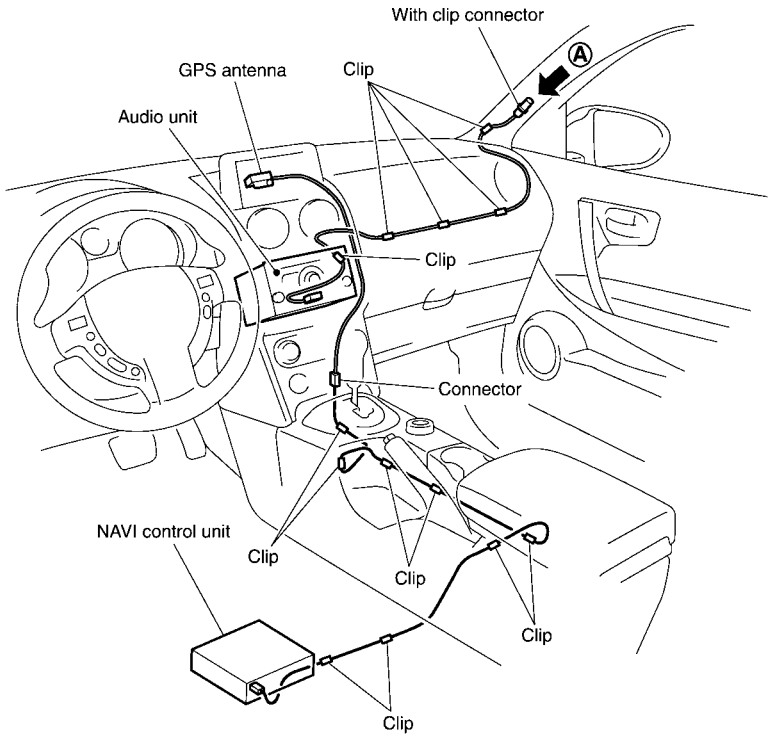
ANTENNA FEEDER (RADIO)

Harness Layout

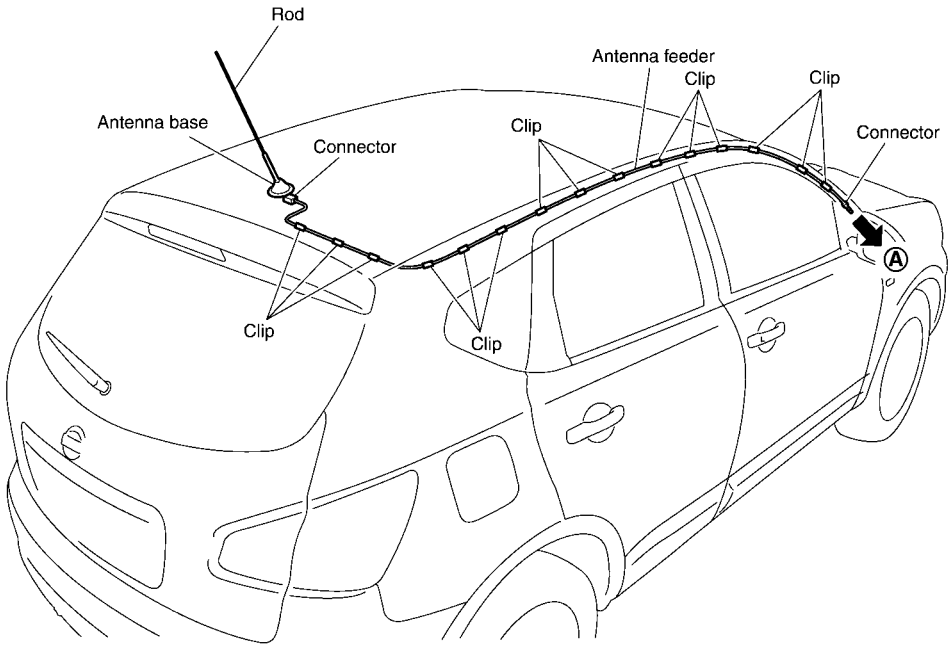
INFOID:0000000000947192

NOTE:
As for right-hand drive vehicles, install GPS antenna feeder between the center console and the instrument panel in the reverse of left-handle drive vehicles.

SEC. 280



Instrument panel driver side



Rear view of vehicle

JSNIA0366GB

cardiagn.com

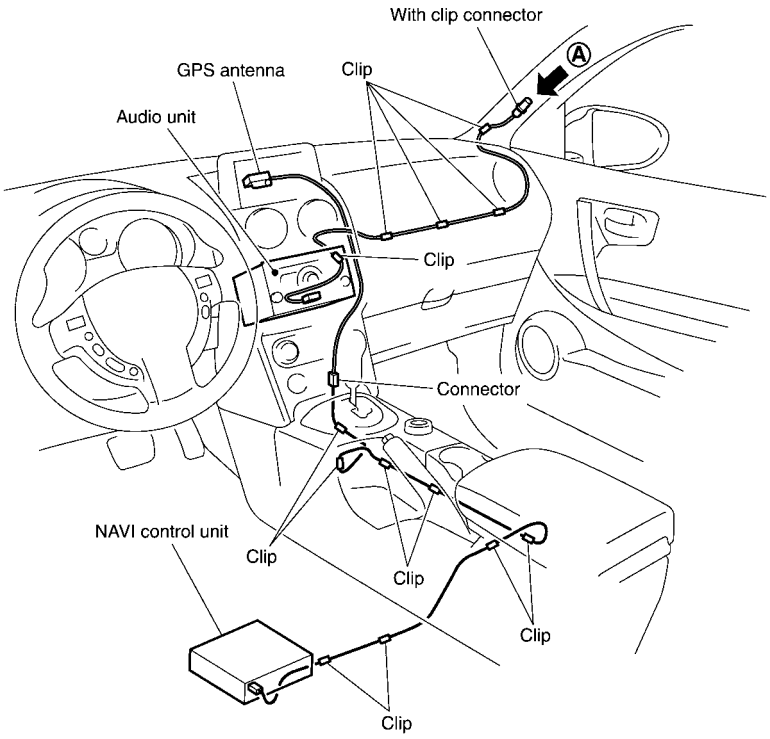
ANTENNA FEEDER (GPS)

Harness Layout

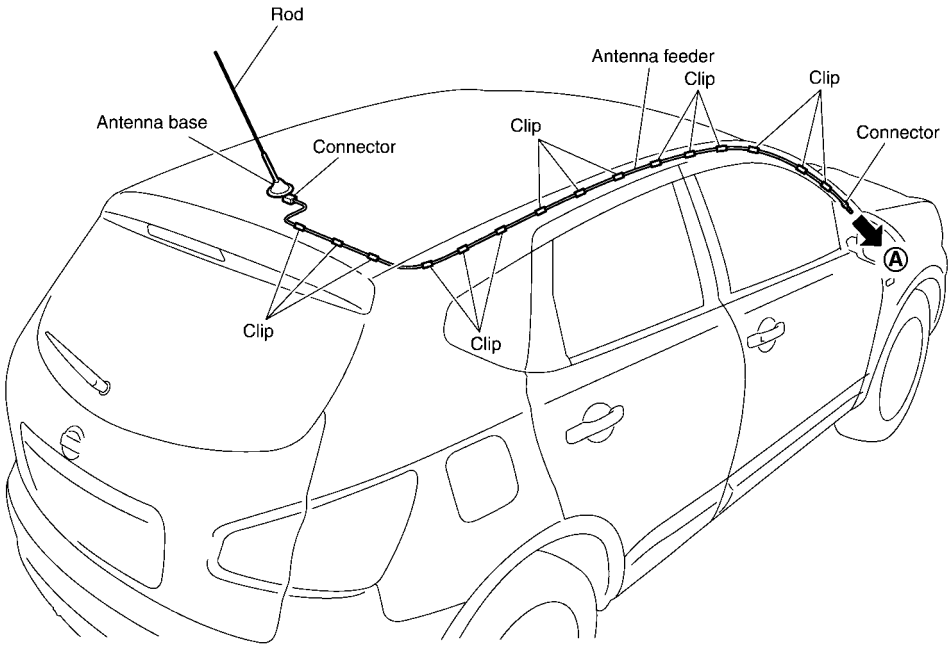
INFOID:0000000000971220

NOTE:
As for right-hand drive vehicles, install GPS antenna feeder between the center console and the instrument panel in the reverse of left-handle drive vehicles.

SEC. 280



Instrument panel driver side



Rear view of vehicle

JSNIA0366GB

cardiagn.com

SECTION BCS
BODY CONTROL SYSTEM

CONTENTS

BASIC INSPECTION 3

INSPECTION AND ADJUSTMENT 3

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 3
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 3
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement 3

CONFIGURATION 3
CONFIGURATION : Description 3
CONFIGURATION : Special Repair Requirement 4

FUNCTION DIAGNOSIS 7

BODY CONTROL SYSTEM 7
System Description 7
Component Parts Location 8

COMBINATION SWITCH READING SYSTEM 9
System Diagram 9
System Description 9
Component Parts Location 12

SIGNAL BUFFER SYSTEM 13
System Diagram 13
System Description 13

POWER CONSUMPTION CONTROL SYSTEM 14
System Diagram 14
System Description 14
Component Parts Location 15

DIAGNOSIS SYSTEM (BCM) 17

COMMON ITEM 17
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 17

BCM 17
BCM : CONSULT-III Function (BCM - BCM) 17

DOOR LOCK 18
DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK) 18

REAR WINDOW DEFOGGER 19
REAR WINDOW DEFOGGER : CONSULT-III Function (BCM - REAR DEFOGGER) 19

BUZZER 19
BUZZER : CONSULT-III Function (BCM - BUZZER) 19

INT LAMP 20
INT LAMP : CONSULT-III Function (BCM - INT LAMP) 20

MULTIREMOTE ENT 22
MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT) 22

HEADLAMP 23
HEADLAMP : CONSULT-III Function (BCM - HEAD LAMP) 23

WIPER 24
WIPER : CONSULT-III Function (BCM - WIPER) 24

FLASHER 25
FLASHER : CONSULT-III Function (BCM - FLASHER) 25

AIR CONDITIONER 26
AIR CONDITIONER : CONSULT-III Function (BCM - AUTO AIR CONDITIONER) 26

INTELLIGENT KEY 26
INTELLIGENT KEY : CONSULT-III Function (BCM - INTELLIGENT KEY) 26

COMB SW 26

cardiagn.com

COMB SW : CONSULT-III Function (BCM - COMB SW) 26

IMMU 27
IMMU : CONSULT-III Function (BCM - IMMU) 27

BATTERY SAVER 28
BATTERY SAVER : CONSULT-III Function (BCM - BATTERY SAVER) 28

TRUNK 29
TRUNK : CONSULT-III Function (BCM - TRUNK) 29

THEFT ALM 29
THEFT ALM : CONSULT-III Function (BCM - THEFT ALM) 29

SIGNAL BUFFER 30
SIGNAL BUFFER : CONSULT-III Function (BCM - SIGNAL BUFFER) 30

PTC HEATER 31
PTC HEATER : CONSULT-III Function (BCM - PTC HEATER) 31

COMPONENT DIAGNOSIS 32

U1000 CAN COMM CIRCUIT 32
Description 32
DTC Logic 32
Diagnosis Procedure 32

U1010 CONTROL UNIT (CAN) 33
DTC Logic 33
Diagnosis Procedure 33
Special Repair Requirement 33

POWER SUPPLY AND GROUND CIRCUIT 34
Diagnosis Procedure 34

COMBINATION SWITCH INPUT CIRCUIT 35
Diagnosis Procedure 35
Special Repair Requirement 36

COMBINATION SWITCH OUTPUT CIRCUIT 37
Diagnosis Procedure 37
Special Repair Requirement 37

COMBINATION SWITCH 38
Description 38
Diagnosis Procedure 38

ECU DIAGNOSIS 39

BCM (BODY CONTROL MODULE) 39
Reference Value 39
Wiring Diagram - BCM - 55
Fail Safe 59
DTC Inspection Priority Chart 60
DTC Index 61

PRECAUTION 62

PRECAUTIONS 62
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 62

SYMPTOM DIAGNOSIS 63

COMBINATION SWITCH SYSTEM SYMPTOMS 63
Symptom Table 63

ON-VEHICLE REPAIR 64

BCM (BODY CONTROL MODULE) 64
Exploded View 64
Removal and Installation 64

COMBINATION SWITCH 65
Exploded View 65
Removal and Installation 65

cardiagn.com

BASIC INSPECTION

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000000892455

When replacing BCM, save or print current vehicle specification with CONSULT-III configuration before replacement.
Configuration has three functions as follows

- READ CONFIGURATION is the function to read (extract) vehicle configuration of current BCM.
- WRITE CONFIGURATION - Manual selection is the function to select and write vehicle configuration on BCM manually.
- WRITE CONFIGURATION - Config file is the function to write vehicle configuration with the data extracted from current BCM.

CAUTION:

- **When replacing BCM, you must perform WRITE CONFIGURATION with CONSULT-III.**
- **Complete the procedure of WRITE CONFIGURATION in order.**
- **If you set incorrect WRITE CONFIGURATION, incidents will occur.**
- **Configuration is different for each vehicle model. Confirm configuration of each vehicle model.**

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000000892456

1.SAVING VEHICLE SPECIFICATION

Perform “READ CONFIGURATION” with CONSULT-III to save or print current vehicle specification.

>> GO TO 2.

2.REPLACE BCM

Replace BCM. Refer to BCS-64, "Exploded View".

>> GO TO 3.

3.WRITING VEHICLE SPECIFICATION

Perform “WRITE CONFIGURATION - Config file” or “WRITE CONFIGURATION - Manual selection” with CONSULT-III to write vehicle specification. Refer to BCS-4, "CONFIGURATION : Special Repair Requirement".

>> GO TO 4.

4.INITIALIZE BCM (NATS)

Perform BCM initialization. (NATS)

>> WORK END

CONFIGURATION

CONFIGURATION : Description

INFOID:0000000000892457

Vehicle specification needs to be written with CONSULT-III because it is not written after replacing BCM.
Configuration has three functions as follows

- READ CONFIGURATION is the function to read (extract) vehicle configuration of current BCM.
- WRITE CONFIGURATION - Manual selection is the function to select and write vehicle configuration on BCM manually.
- WRITE CONFIGURATION - Config file is the function to write vehicle configuration with the data extracted from current BCM.

CAUTION:

cardiagn.com

- **When replacing BCM, you must perform WRITE CONFIGURATION with CONSULT-III.**
- **Complete the procedure of WRITE CONFIGURATION in order.**
- **If you set incorrect WRITE CONFIGURATION, incidents will occur.**
- **Configuration is different for each vehicle model. Confirm configuration of each vehicle model.**

CONFIGURATION : Special Repair Requirement

INFOID:0000000000892458

1.WRITING VEHICLE SPECIFICATION

Perform “WRITE CONFIGURATION” with CONSULT-III.

When writing saved data>>GO TO 2.
When writing manually>>GO TO 3.

2.PERFORM “WRITE CONFIGURATION - CONFIG FILE”

Perform “WRITE CONFIGURATION - Config file” with CONSULT-III.

>> WORK END

3.PERFORM “WRITE CONFIGURATION - MANUAL SELECTION”

For “WRITE CONFIGURATION - Manual selection”, using the following flow chart, identify the correct model and configuration list.
Confirm and/or change setting value for each item according to the configuration list.
Depending on CONSULT-III software version being used, some or all of the write configuration items shown in the following configuration lists may be displayed. If an item does not display on the CONSULT-III “WRITE CONFIGURATION - Manual selection” screen, then it is an auto setting item and it cannot be manually set or changed.

- Gasoline engine models (RHD)

MANUAL SETTING ITEM	
Items	Setting value
HANDLE	RHD
PTC HEATER	WITHOUT
AUTO LIGHT	WITH⇔WITHOUT
KEYLESS ENTRY	WITH⇔WITHOUT
DTRL	WITHOUT
THEFT ALARM	WITH⇔WITHOUT
AUTO SETTING ITEM	
RAIN SENSOR	WITH or WITHOUT
H/L WSR SWTRG	FR WSR SW
H/L_BULB	H4 HALOGEN or DEFAULT
FR FOG LAMP	WITH or WITHOUT
DONGLE	WITH
SUPER LOCK	WITH
I-KEY	WITH or WITHOUT
DOOR/L SPEED	WITH
H/L BAT SAVER	WITHOUT
KEY WARNING	MODE1
R LAMP LOGIC	MODE2

- Gasoline engine models (LHD)

cardiagn.com

MANUAL SETTING ITEM	
Items	Setting value
HANDLE	LHD
PTC HEATER	WITHOUT
AUTO LIGHT	WITH⇔WITHOUT
KEYLESS ENTRY	WITH⇔WITHOUT
DTRL	WITH⇔WITHOUT
THEFT ALARM	WITHOUT
AUTO SETTING ITEM	
RAIN SENSOR	WITH or WITHOUT
H/L WSR SWTRG	FR WSR SW
H/L_BULB	H4 HALOGEN or DEFAULT
FR FOG LAMP	WITH or WITHOUT
DONGLE	WITHOUT
SUPER LOCK	WITHOUT
I-KEY	WITH or WITHOUT
DOOR/L SPEED	WITH
H/L BAT SAVER	WITHOUT
KEY WARNING	MODE1
R LAMP LOGIC	MODE2

- Diesel engine models (RHD)

MANUAL SETTING ITEM	
Items	Setting value
HANDLE	RHD
PTC HEATER	2 PTC
AUTO LIGHT	WITH⇔WITHOUT
KEYLESS ENTRY	WITH⇔WITHOUT
DTRL	WITHOUT
THEFT ALARM	WITH⇔WITHOUT
AUTO SETTING ITEM	
RAIN SENSOR	WITH or WITHOUT
H/L WSR SWTRG	FR WSR SW
H/L_BULB	H4 HALOGEN or DEFAULT
FR FOG LAMP	WITH or WITHOUT
DONGLE	WITH
SUPER LOCK	WITH
I-KEY	WITH or WITHOUT
DOOR/L SPEED	WITH
H/L BAT SAVER	WITHOUT
KEY WARNING	MODE1
R LAMP LOGIC	MODE2

- Diesel engine models (LHD)

cardiagn.com

MANUAL SETTING ITEM	
Items	Setting value
HANDLE	LHD
PTC HEATER	2 PTC
AUTO LIGHT	WITH⇔WITHOUT
KEYLESS ENTRY	WITH⇔WITHOUT
DTRL	WITH⇔WITHOUT
THEFT ALARM	WITHOUT
AUTO SETTING ITEM	
RAIN SENSOR	WITH or WITHOUT
H/L WSR SWTRG	FR WSR SW
H/L_BULB	H4 HALOGEN or DEFAULT
FR FOG LAMP	WITH or WITHOUT
DONGLE	WITHOUT
SUPER LOCK	WITHOUT
I-KEY	WITH or WITHOUT
DOOR/L SPEED	WITH
H/L BAT SAVER	WITHOUT
KEY WARNING	MODE1
R LAMP LOGIC	MODE2

>> WORK END

cardiagn.com

FUNCTION DIAGNOSIS

BODY CONTROL SYSTEM

System Description

INFOID:0000000000924591

OUTLINE

- BCM (Body Control Module) controls the various electrical components. It inputs the information required to the control from CAN communication and the signal received from each switch and sensor.
- BCM has combination switch reading function for reading the operation status of combination switches (light, turn signal, wiper and washer) in addition to a function for controlling the operation of various electrical components. It also has the signal transmission function as the passed point of signal and the power consumption control function that reduces the power consumption with the ignition switch OFF.
- BCM is equipped with the diagnosis function that performs the diagnosis with CONSULT-III and various settings.

BCM control function list

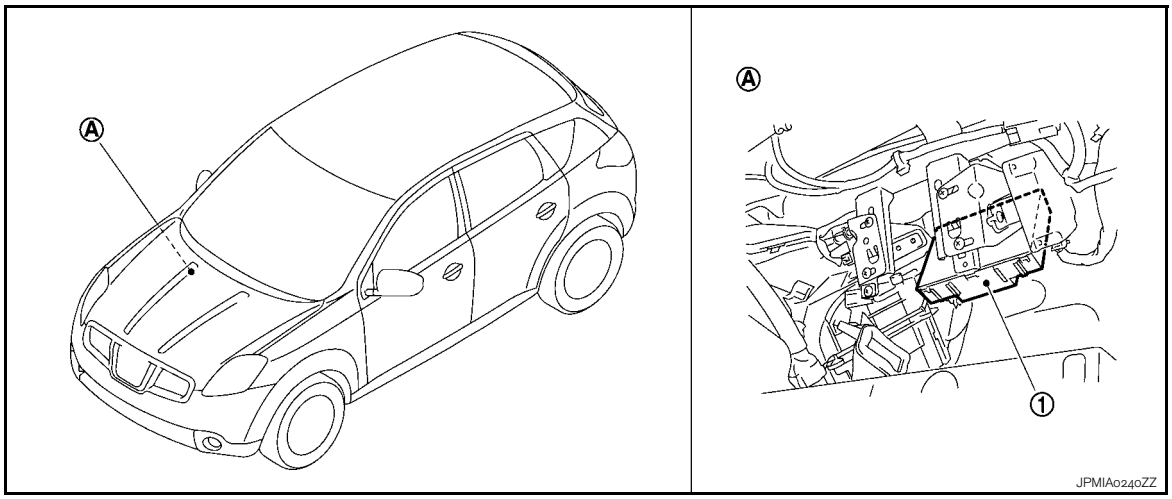
System	Refer to
Combination switch reading system	BCS-9, "System Diagram"
Signal buffer system	BCS-13, "System Diagram"
Power consumption control system	BCS-14, "System Diagram"
Auto light system	EXL-15, "System Diagram"
Turn signal and hazard warning lamp system	EXL-21, "System Diagram"
Headlamp system	EXL-11, "System Diagram"
Front fog lamp system	EXL-17, "System Diagram"
Rear fog lamp system	EXL-25, "System Diagram"
Daytime running light system	EXL-13, "System Diagram"
Interior room lamp control system	INL-6, "System Diagram"
Interior room lamp battery saver system	INL-10, "System Diagram"
Front wiper and washer system	WW-6, "System Diagram"
Rear wiper and washer system	WW-11, "System Diagram"
Headlamp washer system	WW-15, "System Diagram"
Warning chime system	WCS-4, "WARNING CHIME SYSTEM : System Diagram"
Door lock system	• WITH I-KEY, WITHOUT SUPER LOCK: DLK-24, "DOOR LOCK AND UNLOCK SWITCH : System Diagram" • WITH I-KEY & SUPER LOCK: DLK-287, "DOOR LOCK AND UNLOCK SWITCH : System Diagram" • WITHOUT I-KEY & SUPER LOCK: DLK-557, "DOOR LOCK AND UNLOCK SWITCH : System Diagram" • WITHOUT I-KEY, WITH SUPER LOCK: DLK-717, "DOOR LOCK AND UNLOCK SWITCH : System Diagram"
Nissan anti-theft system	• WITH INTELLIGENT KEY SYSTEM: SEC-14, "System Diagram" • WITHOUT INTELLIGENT KEY SYSTEM: SEC-161, "System Diagram"
Vehicle security system	• WITH INTELLIGENT KEY SYSTEM: SEC-19, "System Diagram" • WITHOUT INTELLIGENT KEY SYSTEM: SEC-165, "System Diagram"
Rear window defogger system	DEF-4, "System Diagram"
Multi-remote control system	• WITHOUT I-KEY & SUPER LOCK: DLK-559, "KEYFOB : System Diagram" • WITHOUT I-KEY, WITHOUT SUPER LOCK: DLK-719, "KEYFOB : System Diagram"
Intelligent Key system	• WITH I-KEY, WITHOUT SUPER LOCK: DLK-28, "INTELLIGENT KEY : System Diagram" • WITH I-KEY & SUPER LOCK: DLK-291, "INTELLIGENT KEY : System Diagram"

cardiagn.com

System	Refer to
Power window system	PWC-6, "System Diagram"
PTC heater control system	HAC-46, "Description"

Component Parts Location

INFOID:0000000000924592



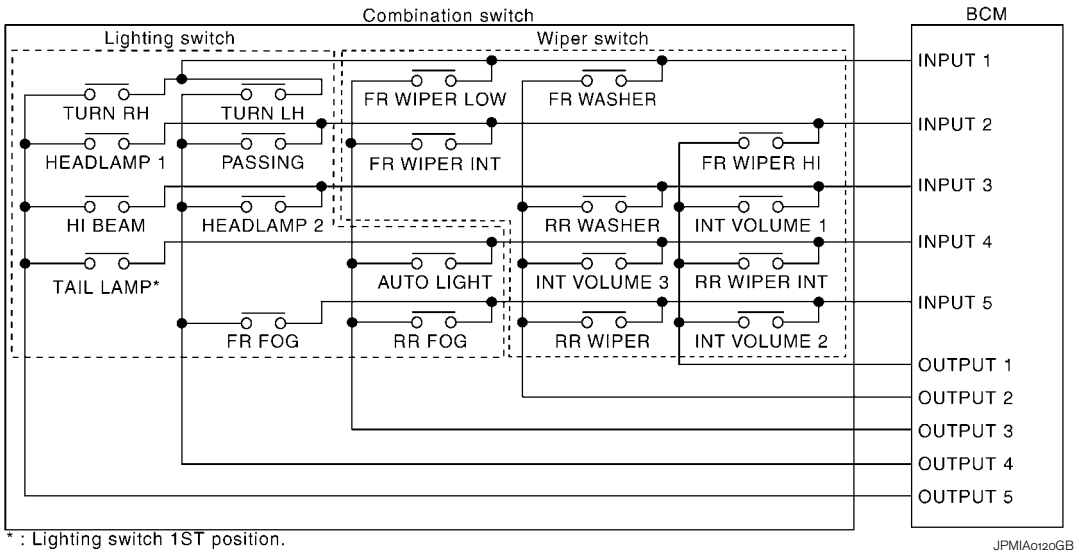
1. BCM
A. Over the glove box

cardiagn.com

COMBINATION SWITCH READING SYSTEM

System Diagram

INFOID:0000000000924593



* : Lighting switch 1ST position.

JPMIA0120GB

System Description

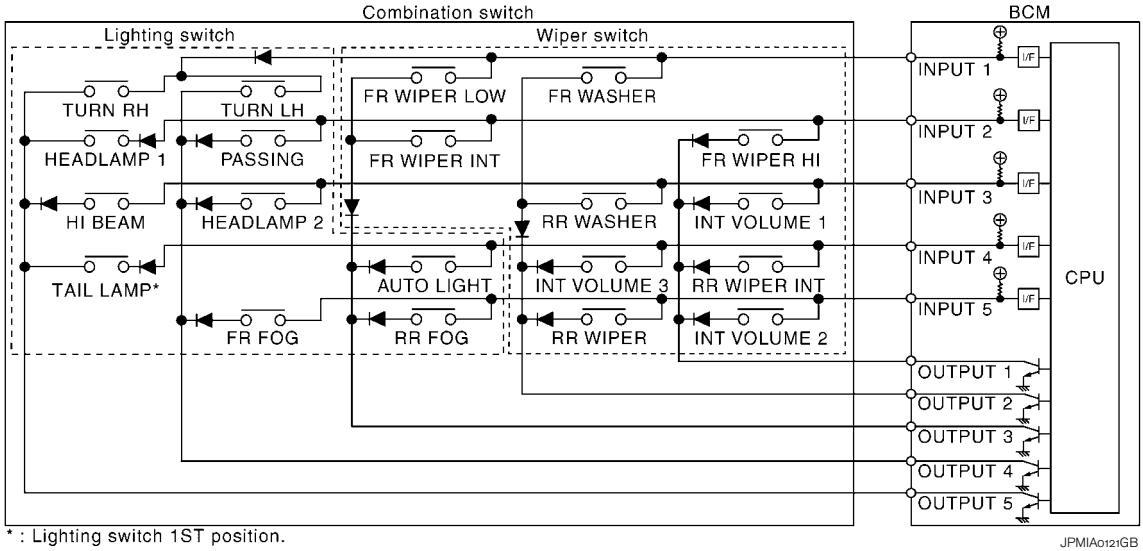
INFOID:0000000000924594

OUTLINE

- BCM reads the status of the combination switch (light, turn signal, wiper and washer) and recognizes the status of each switch.
- BCM is a combination of 5 output terminals (OUTPUT 1 - 5) and 5 input terminals (INPUT 1 - 5). It reads a maximum of 20 switch status.

COMBINATION SWITCH MATRIX

Combination switch circuit



* : Lighting switch 1ST position.

JPMIA0121GB

Combination switch INPUT-OUTPUT system list

System	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5
INPUT 1	—	FR WASHER	FR WIPER LOW	TURN LH	TURN RH
INPUT 2	FR WIPER HI	—	FR WIPER INT	PASSING	HEADLAMP 1
INPUT 3	INT VOLUME 1	RR WASHER	—	HEADLAMP 2	HI BEAM

cardiagn.com

System	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5
INPUT 4	RR WIPER INT	INT VOLUME 3	AUTO LIGHT	—	TAIL LAMP
INPUT 5	INT VOLUME 2	RR WIPER	RR FOG	FR FOG	—

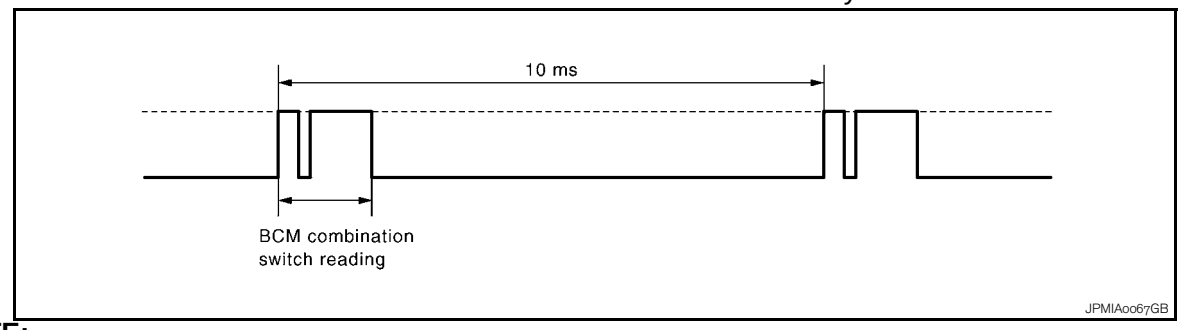
NOTE:

Headlamp has a dual system switch.

COMBINATION SWITCH READING FUNCTION

Description

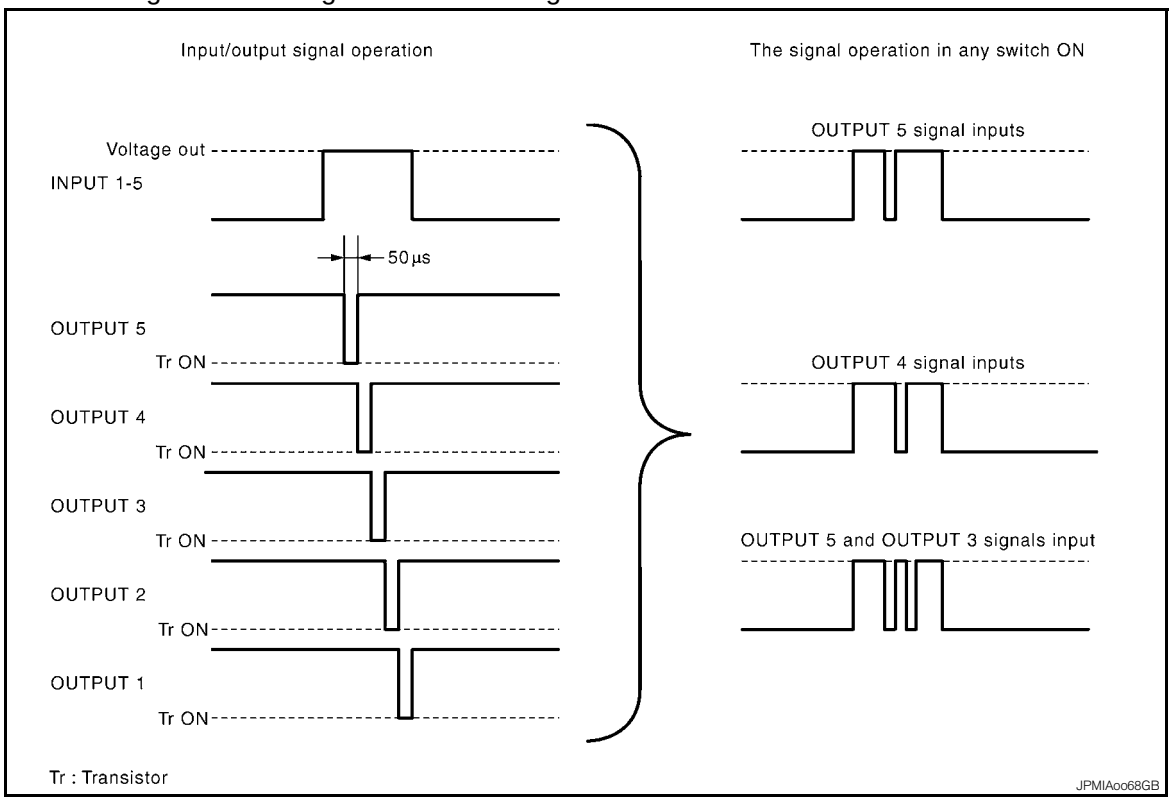
- BCM reads the status of the combination switch at 10 ms interval normally.



NOTE:

BCM reads the status of the combination switch at 20 ms interval when BCM is controlled at low power consumption control mode.

- BCM operates as follows and judges the status of the combination switch.
- INPUT 1 - 5 outputs the voltage waveforms of 5 systems simultaneously.
- It operates the transistor on OUTPUT side in the following order: OUTPUT 5 → 4 → 3 → 2 → 1.
- The voltage waveform of INPUT corresponding to the formed circuit changes according to the operation of the transistor on OUTPUT side if any (1 or more) switches are ON.
- It reads this change of the voltage as the status signal of the combination switch.



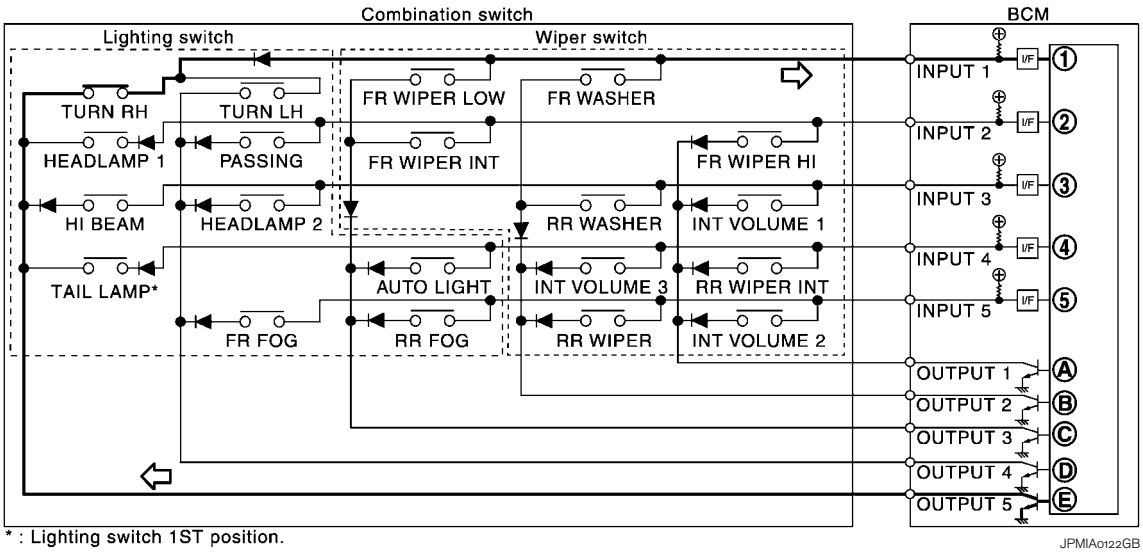
Operation Example

In the following operation example, the combination of the status signals of the combination switch is replaced as follows: INPUT 1 - 5 to “1 - 5” and OUTPUT 1 - 5 to “A - E”.

Example 1: When a switch (TURN RH switch) is turned ON

cardiagn.com

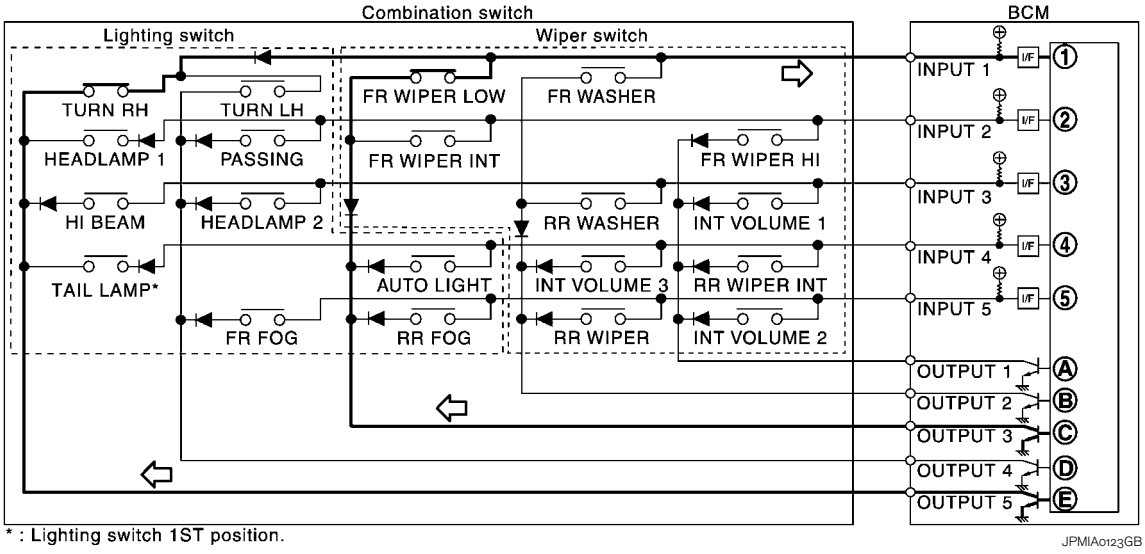
- The circuit between INPUT 1 and OUTPUT 5 is formed when the TURN RH switch is turned ON.



- BCM detects the combination switch status signal “1E” when the signal of OUTPUT 5 is input to INPUT 1.
- BCM judges that the TURN RH switch is ON when the signal “1E” is detected.

Example 2: When some switches (turn RH switch, front wiper LO switch) are turned ON

- The circuits between INPUT 1 and OUTPUT 5 and between INPUT 1 and OUTPUT 3 are formed when the TURN RH switch and FR WIPER LOW switch are turned ON.



- BCM detects the combination switch status signal “1CE” when the signals of OUTPUT 3 and OUTPUT 5 are input to INPUT 1.
- BCM judges that the TURN RH switch and FR WIPER LOW switch are ON when the signal “1CE” is detected.

WIPER INTERMITTENT DIAL POSITION SETTING (FRONT WIPER INTERMITTENT OPERATION)

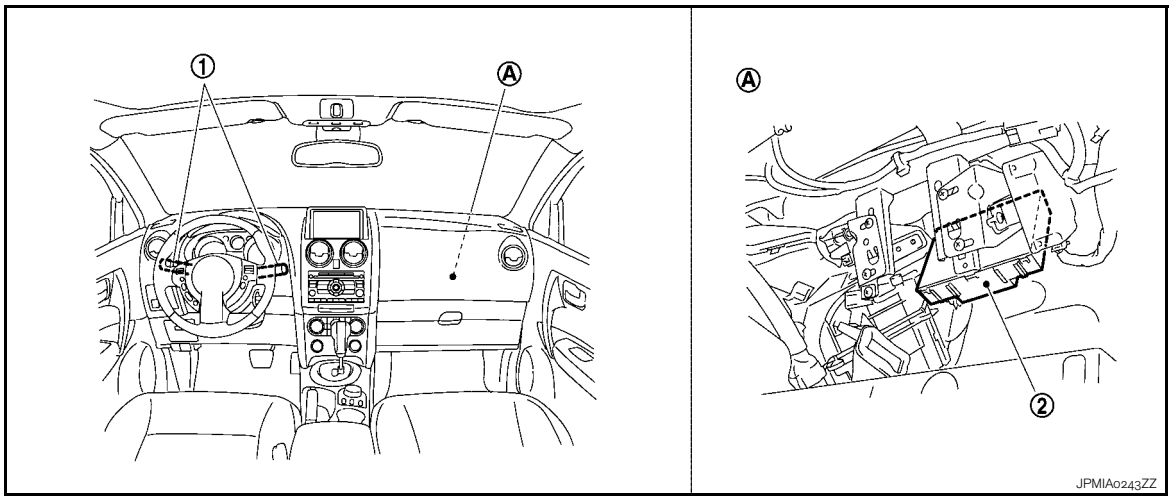
BCM judges the wiper intermittent dial 1 - 7 by the status of INT VOLUME 1, 2 and 3 switches.

cardiagn.com

Wiper intermittent dial position	Intermittent operation delay interval	INT VOLUME switch ON/OFF status		
		INT VOLUME 1 switch	INT VOLUME 2 switch	INT VOLUME 3 switch
1	Short	ON	ON	ON
2		ON	ON	OFF
3	↑	ON	OFF	OFF
4	↓	OFF	OFF	OFF
5		OFF	OFF	ON
6	Long	OFF	ON	ON
7		OFF	ON	OFF

Component Parts Location

INFOID:0000000000924595



1. Combination switch
2. BCM

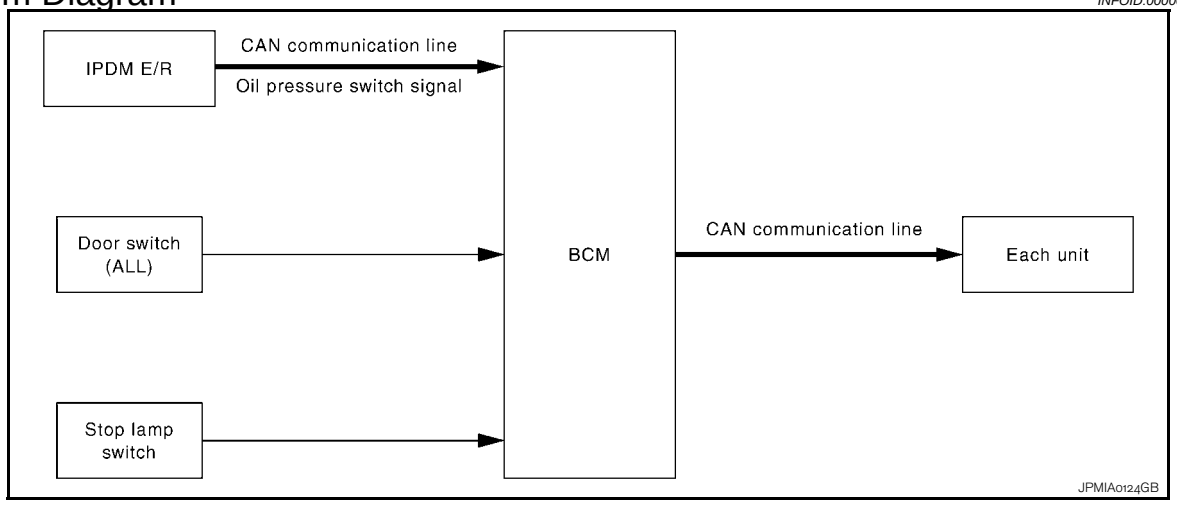
A. Over the glove box

cardiagn.com

SIGNAL BUFFER SYSTEM

System Diagram

INFOID:0000000000924596



System Description

INFOID:0000000000924597

OUTLINE

BCM has the signal transmission function that outputs/transmits each input/received signal to each unit.

Signal transmission function list

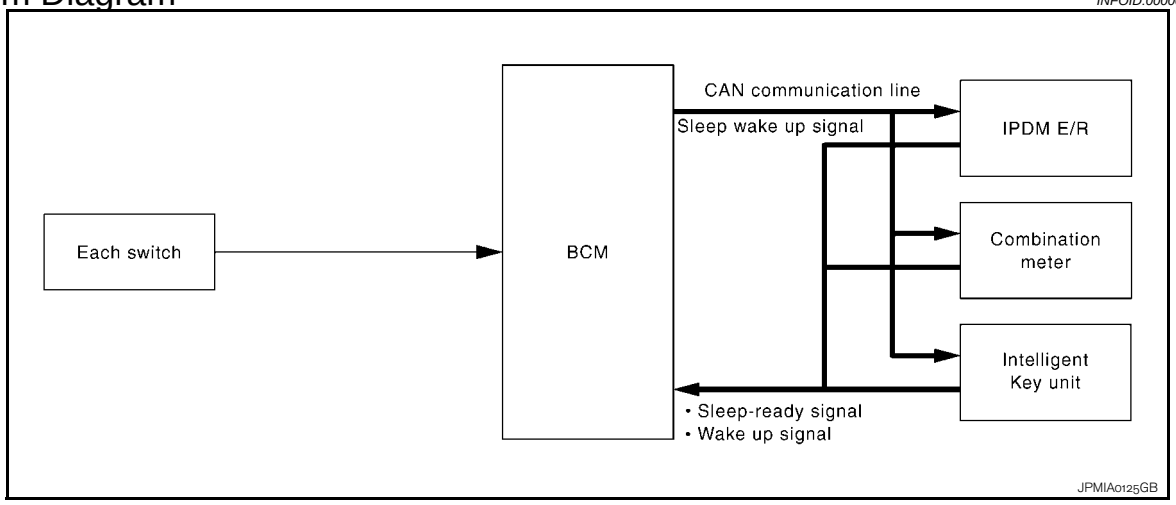
Signal name	Input	Output	Description
Door switch signal	Any door switch	• Combination meter (CAN) • IPDM E/R (CAN) • Intelligent Key unit (CAN) • NAVI control unit (CAN)	Inputs the door switch signal and transmits it via CAN communication.
Stop lamp switch signal	Stop lamp switch	TCM (CAN)	Inputs the stop lamp switch signal and transmits the stop lamp switch signal via CAN communication.
Oil pressure switch signal	IPDM E/R (CAN)	Combination meter (CAN)	Transmits the received oil pressure switch signal via CAN communication.

cardiagn.com

POWER CONSUMPTION CONTROL SYSTEM

System Diagram

INFOID:0000000000924598



System Description

INFOID:0000000000924599

OUTLINE

- BCM incorporates a power consumption control function that reduces the power consumption according to the vehicle status.
- BCM switches the status (control mode) by itself with the power saving control function. It performs the sleep request to each unit (IPDM E/R, combination meter and Intelligent Key unit) that operates with the ignition switch OFF.

Normal mode (wake-up)
- CAN communication is normally performed with other units
- Each control with BCM is operating properly

CAN communication sleep mode (CAN sleep)
- CAN transmission is stopped
- Control with BCM only is operating

Low power consumption mode (BCM sleep)
- Low power consumption control is active
- CAN transmission is stopped

LOW POWER CONSUMPTION CONTROL WITH BCM

BCM reduces the power consumption with the following operation in the low power consumption mode.
- The reading interval of the each switches changes from 10 ms interval to 20 ms interval.

Sleep mode activation

- BCM receives the sleep-ready signal (ready) from IPDM E/R, combination meter and Intelligent Key unit via CAN communication.
- BCM transmits the sleep wake up signal (sleep) to each unit when all of the CAN sleep conditions are fulfilled.
- Each unit stops the transmission of CAN communication with the sleep wake up signal. BCM is in CAN communication sleep mode.
- BCM is in the low power consumption mode and perform the low power consumption control when all of the BCM sleep conditions are fulfilled with CAN sleep condition.

cardiagn.com

Sleep condition

CAN sleep condition	BCM sleep condition
• Receiving the sleep-ready signal (ready) from all units • Ignition switch: OFF • Vehicle security system alarm: Not operation • Warning lamp: Not operation • Warning chime: Not operation • Stop lamp switch: OFF • Key switch status: No change for 2seconds • Hazard warning lamp: Not operation • Exterior lamp: OFF • Door lock status: No change for 2seconds • CONSULT-III communication status: Not communication • Door switch status: No change for 2seconds	The controls only BCM are completed. (Interior room lamp battery saver: Time out etc.)

Wake-up operation

- BCM transmits sleep wake up signal (wake up) to each unit when any condition listed below is established, and then goes into normal mode from low power consumption mode.
- Each unit starts transmissions with CAN communication by receiving sleep wake up signals. Each unit transmits wake up signals to BCM with CAN communication to convey the start of CAN communication.

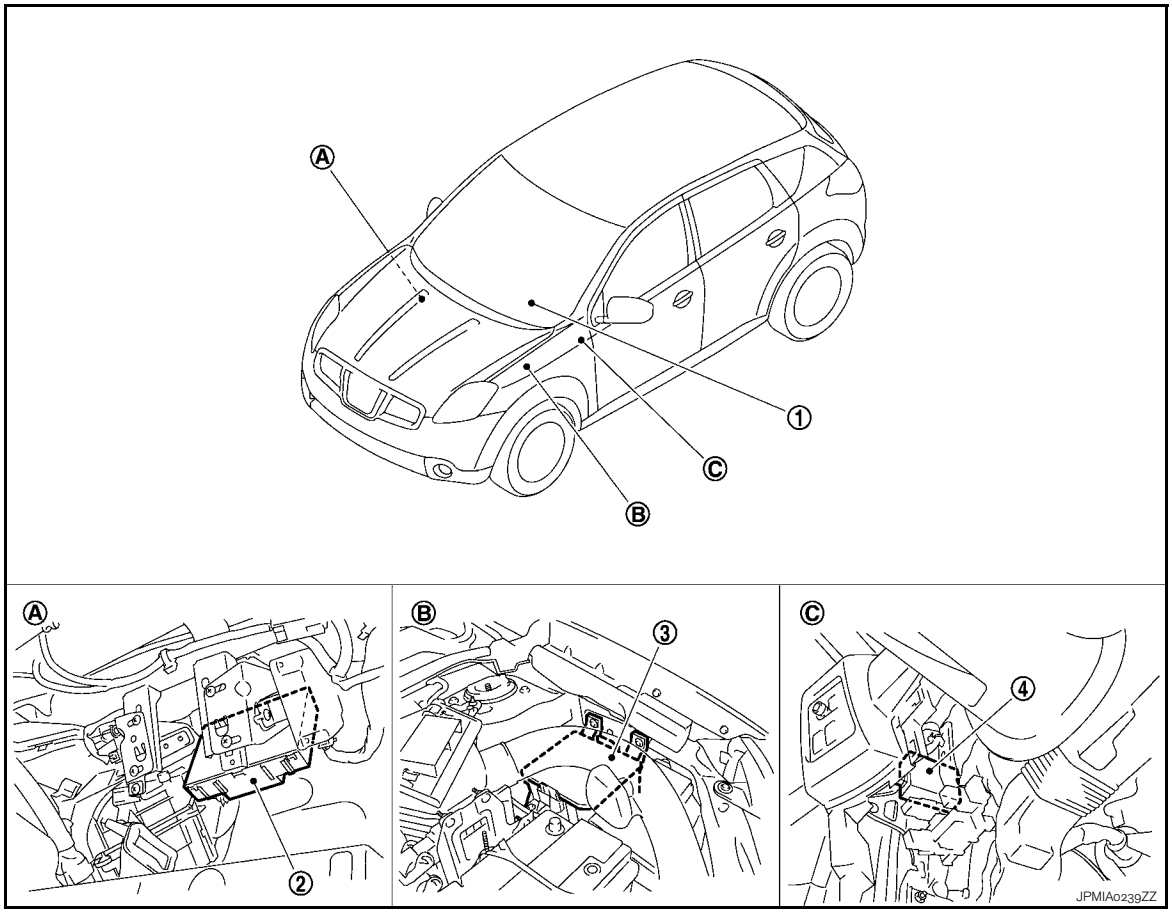
Wake-up condition

BCM wake-up condition
• Ignition switch: OFF → ACC or ON • Stop lamp switch: ON (Depress brake pedal) • Any door switch: OFF → ON • Lighting switch: OFF → 1ST or PASS • Hazard switch: OFF → ON • Back door opener switch OFF → ON • Remote keyless entry receiver: Receiving

Component Parts Location

INFOID:0000000000924600

cardiagn.com



1. Combination meter
2. BCM
3. IPDM E/R
4. Intelligent Key unit
A. Over the glove box
B. Engine room (left side)
C. Over the instrument lower panel (driver side)

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000000924601

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

BCM

BCM : CONSULT-III Function (BCM - BCM)

INFOID:0000000000924608

WORK SUPPORT

cardiagn.com

Item	Description
RESET SETTING VALUE	Return a value set with WORK SUPPORT of each system to a default value in factory shipment.

DOOR LOCK

DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)

INFOID:0000000001097013

BCM CONSULT-III FUNCTION

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
KEYLESS LOCK*2	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK*2	Indicates [ON/OFF] condition of unlock signal from key fob.
I-KEY LOCK*1	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK*1	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.
UNLOCK WITH DR	This item is indicated, but not monitored.
UNLOCK SHOCK	Indicates [ON/OFF] condition of signal from air bag diagnosis unit. • ON: During the unlock operation interlock with air bag. • OFF: Other than above.
SHOCK SENSOR	Indicates [NOMAL/ON/OFF] condition of circuit between BCM and air bag diagnosis sensor unit. • NORMAL: Ignition switch ON. (BCM is receiving normal condition signal from air bag diagnosis sensor unit.) • ON: During the receiving of air bag deployment signal from air bag diagnosis sensor unit. • OFF: After the receiving of air bag deployment signal from air bag diagnosis sensor unit.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the multi remote control system equipped vehicle.

ACTIVE TEST

cardiagn.com

Test item	Description
SUPER LOCK*1	This test is able to check super lock operation [LOCK (SET)/UNLOCK (RELEASE)].
DOOR LOCK IND	This test is able to check door lock indicator (built in door lock and unlock switch on center console) operation [ON/OFF].
DOOR LOCK	This test is able to check door lock operation [ALL LOCK/ALL UNLOCK/DR UNLOCK/ OTHER UNLOCK].

:*1 For the super lock equipped vehicle.

WORK SUPPORT

Test item	Description
SECURITY DOOR LOCK SET	Anti hijack function mode can be changed in this mode. • ON: Anti hijack mode is active. • OFF: Anti hijack mode is inactive.

REAR WINDOW DEFOGGER

REAR WINDOW DEFOGGER : CONSULT-III Function (BCM - REAR DEFOGGER)

INFOID:0000000001097014

Data monitor

Monitor Item	Description
REAR DEF SW	Displays “Press (ON)/other (OFF)” status determined with the rear window defogger switch.
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.

ACTIVE TEST

Test Item	Description
REAR DEFOGGER	Give a drive signal to the rear window defogger relay to activate it.

BUZZER

BUZZER : CONSULT-III Function (BCM - BUZZER)

INFOID:0000000001097015

CONSULT-III FUNCTION (BCM – BUZZER)

Test item	Diagnosis mode	Description
Buzzer	Data Monitor	Displays BCM input data in real time.
	Active Test	Operation of electrical loads can be checked by sending driving signal to them.

DATA MONITOR

Display item [Unit]	Description
IGN ON SW [On/Off]	Ignition switch (ON) status judged by ignition power supply input.
KEY ON SW [On/Off]	Key switch status.
DOOR SW -DR [On/Off]	Front door switch (driver side) status judged by BCM.
TAIL LAMP SW [On/Off]	Lighting switch status judged by the lighting switch signal read with combination switch reading function.

cardiagn.com

Display item [Unit]	Description
BUCKLE SW [On/Off]	Seat belt buckle switch status judged by the seat belt buckle switch signal received from combination meter via CAN communication.
DOOR SW -AS	Front door switch (passenger side) status judged by BCM.
DOOR SW -RR	Rear door switch RH status judged by BCM.
DOOR SW -RL	Rear door switch LH status judged by BCM.
BACK DOOR SW	Back door switch status judged by BCM.
VEHICLE SPEED [km/h]	Vehicle speed signal value received from combination meter via CAN communication.

ACTIVE TEST

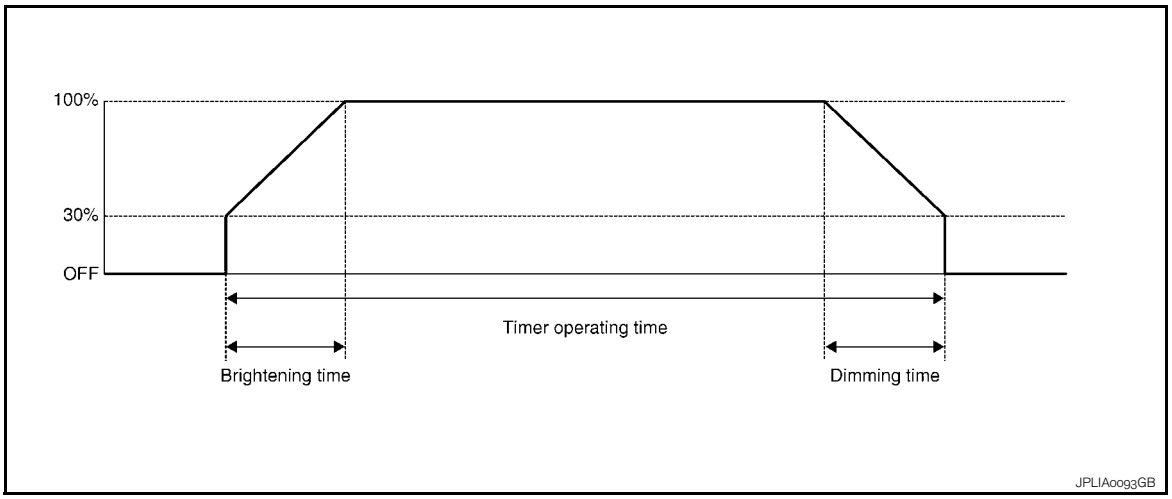
Display item	Description
LIGHT WARN ALM	The light reminder warning operation can be checked by operating the relevant function (On/Off).
IGN KEY WARN ALM	The key warning operation can be checked by operating the relevant function (On/Off).
KEY REMINDER WARN	The key reminder warning operation can be checked by operating the relevant function (On/Off).

INT LAMP

INT LAMP : CONSULT-III Function (BCM - INT LAMP)

INFOID:0000000001097016

WORK SUPPORT



Service item	Setting item	Setting	
ROOM LAMP TIMER SET	MODE 1	0 sec.	Sets the interior room lamp ON time. (Timer operating time)
	MODE 2	7.5 sec.	
	MODE 3*	15 sec.	
	MODE 4	30 sec.	
SET I/L D-UNLCK INTCON	ON*	With the interior room lamp timer function	
	OFF	Without the interior room lamp timer function	
ROOM LAMP ON TIME SET	MODE 1	0.5 sec.	Sets the interior room lamp gradual brightening time.
	MODE 2*	1 sec.	
	MODE 3	2 sec.	
	MODE 4	3 sec.	
	MODE 5	4 sec.	
	MODE 6	5 sec.	
	MODE 7	0 sec.	

cardiagn.com

Service item	Setting item	Setting	
ROOM LAMP OFF TIME SET	MODE 1	0.5 sec.	Sets the interior room lamp gradual dimming time.
	MODE 2*	1 sec.	
	MODE 3	2 sec.	
	MODE 4	3 sec.	
	MODE 5	4 sec.	
	MODE 6	5 sec.	
	MODE 7	0 sec.	
R LAMP TIMER LOGIC SET	MODE 1*	Interior room lamp timer activates with synchronizing all doors.	
	MODE 2	Interior room lamp timer activates with synchronizing the driver door only.	

*: Initial setting

DATA MONITOR

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judges from IGN signal (ignition power supply)
ACC SW [ON/OFF]	Ignition switch (ACC) status judges from ACC signal (ACC power supply)
KEY ON SW [ON/OFF]	The switch status input from key switch
PUSH SW [ON/OFF]	Push switch status received from Intelligent Key unit by CAN communication
DOOR SW-DR [ON/OFF]	The switch status input from front door switch (driver side)
DOOR SW-AS [ON/OFF]	The switch status input from front door switch (passenger side)
DOOR SW-RR [ON/OFF]	The switch status input from rear door switch RH
DOOR SW- RL [ON/OFF]	The switch status input from rear door switch LH
BACK DOOR SW [ON/OFF]	The switch status input from back door switch
CDL LOCK SW [ON/OFF]	Lock switch status input from door lock and unlock switch
CDL UNLOCK SW [ON/OFF]	Unlock switch status input from door lock and unlock switch
I-KEY LOCK [ON/OFF]	Lock signal status received from Intelligent Key unit by CAN communication
I-KEY UNLOCK [ON/OFF]	Unlock signal status received from Intelligent Key unit by CAN communication
KEYLESS LOCK [ON/OFF]	Lock signal status received from remote keyless entry receiver (integrated in the BCM)
KEYLESS UNLOCK [ON/OFF]	Unlock signal status received from remote keyless entry receiver (integrated in the BCM)

ACTIVE TEST

cardiagn.com

Test item	Operation	Description
INT LAMP	ON	Outputs the interior room lamp control signal to turn the interior room lamps ON. [Map lamp, personal lamp, room lamp, luggage room lamp (when applicable lamps switch is in DOOR position.)]
	OFF	Stops the interior room lamp control signal to turn the interior room lamps.

MULTIREMOTE ENT

MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT)

INFOID:0000000001097017

BCM CONSULT-III FUNCTION

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
KEYKESS LOCK	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK	Indicates [ON/OFF] condition of unlock signal from key fob.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
RKE LOCK AND UNLOCK	This item is indicated, but not monitored.

ACTIVE TEST

Test item	Description
DOOR LOCK	This test is able to check warning chime in combination meter operation. [ALL LOCK/ALL UNLOCK/DR UNLOCK/OTHER UNLOCK]
INT LAMP	This test is able to check interior lamp operation [ON/OFF].
FLASHER	This test is able to check flasher operation [LH/RH/OFF].

WORK SUPPORT

cardiagn.com

Test item	Description
HAZARD LAMP SET	Answer back function (hazard) mode can be changed in this mode. For the detail of the setting, refer to DLK-575, "System Description".
AUTO LOCK SET	Auto door lock time can be changed in this mode. • MODE 1: 1 minute • MODE 2: 2 minutes • MODE 3: 3 minutes • MODE 4: 4 minutes • MODE 5: 5 minutes

HEADLAMP

HEADLAMP : CONSULT-III Function (BCM - HEAD LAMP)

INFOID:0000000001097018

WORK SUPPORT

Service item	Setting item	Setting	
HEAD LIGHT TIMER	MODE 1	10 sec.	Sets follow me home function activating time.
	MODE 2*	30 sec.	

*: Initial setting

DATA MONITOR

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judged from IGN signal (ignition power supply)
ACC SW [ON/OFF]	Ignition switch (ACC) status judged from ACC signal (ACC power supply)
HI BEAM SW [ON/OFF]	Each switch status that BCM judges from the combination switch reading function
HEAD LAMP SW1 [ON/OFF]	
HEAD LAMP SW2 [ON/OFF]	
TAIL LAMP SW [ON/OFF]	
AUTO LIGHT SW [ON/OFF]	
PASSING SW [ON/OFF]	
FR FOG SW [ON/OFF]	
RR FOG SW [ON/OFF]	
DOOR SW-DR [ON/OFF]	The switch status input from front door switch (driver side)
DOOR SW-AS [ON/OFF]	The switch status input from front door switch (passenger side)
DOOR SW-RR [ON/OFF]	The switch status input from rear door switch RH
DOOR SW- RL [ON/OFF]	The switch status input from rear door switch LH
BACK DOOR SW [ON/OFF]	The switch status input from back door switch

cardiagn.com

Monitor item [Unit]	Description
TURN SIGNAL R [ON/OFF]	Each switch status that BCM judges from the combination switch reading function
TURN SIGNAL L [ON/OFF]	
ENGINE RUNNING [ON/OFF]	The engine status received from ECM with CAN communication
PUSH SW [ON/OFF]	Push switch status received from Intelligent Key unit by CAN communication
LIT-SEN FAIL [OK/NOTOK]	• The sensor status received from light & rain sensor with serial link • The serial link condition that BCM judges
AUT LIGHT SYS [ON/OFF]	Auto light system status that BCM judges from the vehicle condition

ACTIVE TEST

Test item	Operation	Description
TAIL LAMP	ON	Transmits the position light request signal to IPDM E/R with CAN communication to turn the tail lamp ON.
	OFF	Stops the tail lamp request signal transmission.
HEAD LAMP	HI	Transmits the high beam request signal with CAN communication to turn the headlamp (HI).
	LO	Transmits the low beam request signal with CAN communication to turn the headlamp (LO).
	OFF	Stops the high & low beam request signal transmission.
FR FOG LAMP	ON	Transmits the front fog lights request signal to IPDM E/R with CAN communication to turn the front fog lamp ON.
	OFF	Stops the front fog lights request signal transmission.
RR FOG LAMP	ON	• Outputs the voltage to turn the rear fog lamp ON. • Transmits the rear fog lamp status signal to the combination meter with CAN communication to turn the rear fog lamp indicator lamp ON.
	OFF	• Stops the voltage to turn the rear fog lamp OFF. • Stops the rear fog lamp status signal transmission.
DAYTIME RUNNING LIGHT	ON	Transmits the day time running light request signal to IPDM E/R with CAN communication to turn the each lamps ON.
	OFF	Stops the day time running light request signal transmission.

WIPER

WIPER : CONSULT-III Function (BCM - WIPER)

INFOID:0000000001097019

WORK SUPPORT

Service item	Setting item	Description
WIPER SPEED SETTING	ON*	With vehicle speed (Front wiper intermittent time linked with the vehicle speed and wiper intermittent dial position)
	OFF	Without vehicle speed (Front wiper intermittent time linked with the wiper intermittent dial position)

*:Factory setting

DATA MONITOR

cardiagn.com

Monitor Item [Unit]	Description
IGN ON SW	Ignition switch ON status judged from ignition power supply.
IGN SW CAN	Ignition switch ON status received from IPDM E/R with CAN communication.
FR WIPER HI [OFF/ON]	Each switch status that BCM judges from the combination switch reading function.
FR WIPER LOW [OFF/ON]	
FR WIPER INT [OFF/ON]	
FR WASHER SW [OFF/ON]	
H/L WASH SW [OFF/ON]	**NOTE:** The item is indicated, but not monitored.
INT VOLUME [1 – 7]	Each switch status that BCM judges from the combination switch reading function.
FR WIPER STOP [OFF/ON]	Front wiper motor (stop position) status received from IPDM E/R with CAN communication.
VEHICLE SPEED [km/h]	The value of the vehicle speed signal received from combination meter with CAN communication.
RR WIPER ON [OFF/ON]	Each switch status that BCM judges from the combination switch reading function.
RR WIPER INT [OFF/ON]	
RR WASHER SW [OFF/ON]	
RR WIPER STOP [OFF/ON]	Rear wiper motor (stop position) status input from the rear wiper motor.

ACTIVE TEST

Test item	Operation	Description
FR WIPER	HI	Transmits the front wiper request signal (HI) to IPDM E/R with CAN communication to operate the front wiper HI operation.
	LO	Transmits the front wiper request signal (LO) to IPDM E/R with CAN communication to operate the front wiper LO operation.
	INT	Transmits the front wiper request signal (INT) to IPDM E/R with CAN communication to operate the front wiper INT operation.
	OFF	Stops transmitting the front wiper request signal to stop the front wiper operation.
RR WIPER	ON	Outputs the voltage to operate the rear wiper motor.
	OFF	Stops the voltage to stop.
HEADLAMP WASHER	ON	Transmits the headlamp washer request signal to IPDM E/R with CAN communication to operate the headlamp washer operation.

FLASHER

FLASHER : CONSULT-III Function (BCM - FLASHER)

INFOID:0000000001097020

DATA MONITOR

cardiagn.com

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judged from IGN signal (ignition power supply)
HAZARD SW [ON/OFF]	The switch status input from the hazard switch
TURN SIGNAL R [ON/OFF]	Each switch condition that BCM judges from the combination switch reading function
TURN SIGNAL L [ON/OFF]	

ACTIVE TEST

Test item	Operation	Description
FLASHER	RH	Outputs the voltage to turn the right side turn signal lamps ON.
	LH	Outputs the voltage to turn the left side turn signal lamps ON.
	OFF	Stops the voltage to turn the turn signal lamps OFF.

AIR CONDITIONER

AIR CONDITIONER : CONSULT-III Function (BCM - AUTO AIR CONDITIONER)

INFOID:0000000001098003

DATA MONITOR

Display Item List

Monitor Item [Unit]		Contents
IGN SW	[On/Off]	Display [ignition switch position (On)/(Off), ACC position (Off)] status as judged form ignition switch signal.
FAN ON SIG	[On/Off]	Display [FAN (On)/FAN (Off)] status as judged form blower fan motor switch signal.
AIR COND SW	[On/Off]	Display [COMP (On)/COMP (Off)] status as judged form air conditioner switch signal.

INTELLIGENT KEY

INTELLIGENT KEY : CONSULT-III Function (BCM - INTELLIGENT KEY)

INFOID:0000000001097021

BCM CONSULT-III FUNCTION

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW	Indicates [ON/OFF] condition of ignition knob switch.
I-KEY LOCK	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.

COMB SW

COMB SW : CONSULT-III Function (BCM - COMB SW)

INFOID:0000000000924607

cardiagn.com

DATA MONITOR

Monitor item [UNIT]	Description
TURN SIGNAL R [OFF/ON]	Displays the status of the TURN RH switch in combination switch judged by BCM with the combination switch reading function.
TURN SIGNAL L [OFF/ON]	Displays the status of the TURN LH switch in combination switch judged by BCM with the combination switch reading function.
HI BEAM SW [OFF/ON]	Displays the status of the HI BEAM switch in combination switch judged by BCM with the combination switch reading function.
HEAD LAMP SW 1 [OFF/ON]	Displays the status of the HEADLAMP 1 switch in combination switch judged by BCM with the combination switch reading function.
HEAD LAMP SW 2 [OFF/ON]	Displays the status of the HEADLAMP 2 switch in combination switch judged by BCM with the combination switch reading function.
TAIL LAMP SW [OFF/ON]	Displays the status of the TAIL LAMP switch in combination switch judged by BCM with the combination switch reading function.
PASSING SW [OFF/ON]	Displays the status of the PASSING switch in combination switch judged by BCM with the combination switch reading function.
AUTO LIGHT SW [OFF/ON]	Displays the status of the AUTO LIGHT switch in combination switch judged by BCM with the combination switch reading function.
FR FOG SW [OFF/ON]	Displays the status of the FR FOG switch in combination switch judged by BCM with the combination switch reading function.
RR FOG SW [OFF/ON]	Displays the status of the RR FOG switch in combination switch judged by BCM with the combination switch reading function.
FR WIPER HI [OFF/ON]	Displays the status of the FR WIPER HI switch in combination switch judged by BCM with the combination switch reading function.
FR WIPER LOW [OFF/ON]	Displays the status of the FR WIPER LOW switch in combination switch judged by BCM with the combination switch reading function.
FR WIPER INT [OFF/ON]	Displays the status of the FR WIPER INT switch in combination switch judged by BCM with the combination switch reading function.
FR WASHER SW [OFF/ON]	Displays the status of the FR WASHER switch in combination switch judged by BCM with the combination switch reading function.
INT VOLUME [1 - 7]	Displays the status of wiper intermittent dial position judged by BCM with the combination switch reading function.
RR WIPER ON [OFF/ON]	Displays the status of the RR WIPER switch in combination switch judged by BCM with the combination switch reading function.
RR WIPER INT [OFF/ON]	Displays the status of the RR WIPER INT switch in combination switch judged by BCM with the combination switch reading function.
RR WASHER SW [OFF/ON]	Displays the status of the RR WASHER switch in combination switch judged by BCM with the combination switch reading function.

IMMU

IMMU : CONSULT-III Function (BCM - IMMU)

INFOID:0000000001097022

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.

DATA MONITOR

cardiagn.com

Monitor item	Content
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.

*1: For the vehicle Intelligent key is equipped.

ACTIVE TEST

Test item	Description
THEFT IND	This test is able to check security indicator operation [ON/OFF].

BATTERY SAVER

BATTERY SAVER : CONSULT-III Function (BCM - BATTERY SAVER)

INFOID:0000000001097023

WORK SUPPORT

Service item	Setting item	Setting	
ROOM LAMP TIMER SET	MODE 1*	30 min.	Sets the interior room lamp battery saver timer operating time.
	MODE 2	60 min.	

*: Initial setting

DATA MONITOR

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judges from IGN signal (ignition power supply)
ACC SW [ON/OFF]	Ignition switch (ACC) status judges from ACC signal (ACC power supply)
KEY ON SW [ON/OFF]	The switch status input from key switch
PUSH SW [ON/OFF]	Push switch status received from Intelligent Key unit by CAN communication
DOOR SW-DR [ON/OFF]	The switch status input from front door switch (driver side)
DOOR SW-AS [ON/OFF]	The switch status input from front door switch (passenger side)
DOOR SW-RR [ON/OFF]	The switch status input from rear door switch RH
DOOR SW- RL [ON/OFF]	The switch status input from rear door switch LH
BACK DOOR SW [ON/OFF]	The switch status input from back door switch
CDL LOCK SW [ON/OFF]	Lock switch status input from door lock and unlock switch
CDL UNLOCK SW [ON/OFF]	Unlock switch status input from door lock and unlock switch
I-KEY LOCK [ON/OFF]	Lock signal status received from Intelligent Key unit by CAN communication
I-KEY UNLOCK [ON/OFF]	Unlock signal status received from Intelligent Key unit by CAN communication

cardiagn.com

Monitor item [Unit]	Description
KEYLESS LOCK [ON/OFF]	Lock signal status received from remote keyless entry receiver (integrated in the BCM)
KEYLESS UNLOCK [ON/OFF]	Unlock signal status received from remote keyless entry receiver (integrated in the BCM)

ACTIVE TEST

Test item	Operation	Description
BATTERY SAVER	OFF	Cuts the interior room lamp power supply to turn interior room lamps OFF.
	ON	Outputs the interior room lamp power supply to turn interior room lamps ON.*

*: Each lamp switch is in ON position.

TRUNK

TRUNK : CONSULT-III Function (BCM - TRUNK)

INFOID:0000000001097025

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
TRNK OPNR SW	Indicates [ON/OFF] condition of back door opener switch.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the remote keyless entry system equipped vehicle.

ACTIVE TEST

Test item	Description
TRUNK/GLASS HATCH	This test is able to check back door opener operation [ON/OFF].

THEFT ALM

THEFT ALM : CONSULT-III Function (BCM - THEFT ALM)

INFOID:0000000001097026

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

cardiagn.com

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
KEYKESS LOCK*2	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK*2	Indicates [ON/OFF] condition of unlock signal from key fob.
I-KEY LOCK*1	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK*1	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.
HOOD SW	Indicates [ON/OFF] condition of hood switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.

*1: For vehicle equipped with Intelligent Key.

*2: For the vehicle equipped with remote key less entry system.

ACTIVE TEST

Test item	Description
THEFT IND	This test is able to check security indicator operation [ON/OFF].
VEHICLE SECURITY HORN	This test is able to check horn operation [ON].
FLASHER	This test is able to check flasher operation [LH/RH/OFF].

WORK SUPPORT

Test item	Description
SECURITY ALARM SET	Vehicle security function mode can be changed in this mode. • ON: Vehicle security function is ON. • OFF: Vehicle security function is OFF.
THEFT ALM TRG	The switch which triggered vehicle security system is recorded. This mode can be able to confirm and erase the record of vehicle security system.

SIGNAL BUFFER

SIGNAL BUFFER : CONSULT-III Function (BCM - SIGNAL BUFFER)

INFOID:0000000000924610

DATA MONITOR

Monitor item [UNIT]	Description
OIL PRESS SW [OFF/ON]	Displays the status of oil pressure switch received from IPDM E/R via CAN communication.

ACTIVE TEST

cardiagn.com

Test item	Operation	Description
OIL PRESSURE SW	OFF	OFF
	ON	BCM transmits the oil pressure switch signal to the combination meter via CAN communication, which illuminates the oil pressure warning lamp in the combination meter.

PTC HEATER

PTC HEATER : CONSULT-III Function (BCM - PTC HEATER)

INFOID:0000000001098004

DATA MONITOR

Display Item List

Monitor Item [Unit]	Description
ELEC PWR CUT [OFF/FREEZ/INHBT]	Indicate [OFF/FREEZ/INHBT] condition of the PTC heater states.
FAN ON SIG [On/Off]	Displays [FAN (ON)/FAN (OFF)] status as judged from blower fan motor signal.
ENGINE STATUS [STOP/STAL/RUN/CRA]	Indicate [STOP/STALL/RUN/CRA] condition of the engine states.
ENG COOLNT T [°C]	The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.
BATTERY VOLT [V]	The power supply voltage of BCM is displayed.
ENGINE RPM [rpm]	Indicates the engine speed computed from the signal of the crankshaft position sensor.
OUTSIDE TEMP [°C]	The outside air temperature (determined by the signal voltage of the OAT sensor) is displayed.

ACTIVE TEST

Test item

Test Item	Operation	Description
PTC HEATER	OFF PTC 1 PTC 2 PTC 3	This test is able to check PTC heater operation.

cardiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000000924613

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart. Refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000000924614

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1000	CAN COMM CIRCUIT	When BCM cannot communicate CAN communication signal continuously for 2 seconds or more.	Any item (or items) of the following listed below is malfunctioning in CAN communication system. • Transmission • Receiving (ECM) • Receiving (METER/M&A) • Receiving (TCM) • Receiving (MULTI AV) • Receiving (IPDM E/R) • Receiving (I-KEY)

Diagnosis Procedure

INFOID:0000000000943712

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check “Self Diagnostic Result” of BCM.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

U1010 CONTROL UNIT (CAN)

DTC Logic

INFOID:0000000000924616

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of BCM.	BCM

Diagnosis Procedure

INFOID:0000000000924617

1.REPLACE BCM

When “DTC:U1010” is detected, replace BCM.

>> Replace BCM. Refer to BCS-64, "Exploded View".

Special Repair Requirement

INFOID:0000000000927249

1.ADDITIONAL SERVICE WHEN REPLACING BCM

>> Refer to BCS-3, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000000924627

1.CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not fusing.

Terminal No.	Signal name	Fuses and fusible link No.
41	Battery power supply	9
57		J
37	ACC power supply	5
38	Ignition power supply	4

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)			
BCM			OFF	ACC	ON
Connector	Terminal				
M65	37	Ground	Approx. 0 V	Battery voltage	Battery voltage
	38		Approx. 0 V	Approx. 0 V	Battery voltage
M66	41		Battery voltage	Battery voltage	Battery voltage
M67	57				

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

cardiagn.com

COMBINATION SWITCH INPUT CIRCUIT

Diagnosis Procedure

INFOID:0000000000924629

1.CHECK INPUT 1 - 5 SYSTEM CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect BCM and combination switch connectors.
3. Check continuity between BCM harness connector and combination switch harness connector.

System	BCM		Combination switch		Continuity
	Connector	Terminal	Connector	Terminal	
INPUT 1	M65	33	M27	1	Existed
INPUT 2		32		2	
INPUT 3		35		3	
INPUT 4		34		4	
INPUT 5		31		5	

Does continuity exist?

YES >> GO TO 2.
NO >> Repair harnesses or connectors.

2.CHECK INPUT 1 - 5 SYSTEM CIRCUIT FOR SHORT

Check for continuity between BCM harness connector and ground.

System	BCM		Ground	Continuity
	Connector	Terminal		
INPUT 1	M65	33	Ground	Not existed
INPUT 2		32		
INPUT 3		35		
INPUT 4		34		
INPUT 5		31		

Does continuity exist?

YES >> Repair harnesses or connectors.
NO >> GO TO 3.

3.CHECK BCM OUTPUT VOLTAGE

1. Connect BCM connector.
2. Check voltage between BCM harness connector and ground.

System	Terminals			Voltage (Approx.)
	(+)		(–)	
	BCM			
	Connector	Terminal		
INPUT 1	M65	33	Ground	Refer to BCS-39, "Reference Value".
INPUT 2		32		
INPUT 3		35		
INPUT 4		34		
INPUT 5		31		

Is the measurement value normal?

YES >> GO TO 4.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

cardiagn.com

4.CHECK COMBINATION SWITCH

Check combination switch. Refer to BCS-38, "Description".

Is the check result normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> Replace the combination switch (applicable parts).

Special Repair Requirement

INFOID:0000000000927429

1.ADDITIONAL SERVICE WHEN REPLACING BCM

>> Refer to BCS-3, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".

cardiagn.com

COMBINATION SWITCH OUTPUT CIRCUIT

Diagnosis Procedure

INFOID:0000000000924631

1.CHECK OUTPUT 1 - 5 SYSTEM CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect BCM and combination switch connectors.
3. Check continuity between BCM harness connector and combination switch harness connector.

System	BCM		Combination switch		Continuity
	Connector	Terminal	Connector	Terminal	
OUTPUT 1	M65	1	M27	6	Existed
OUTPUT 2		4		7	
OUTPUT 3		3		10	
OUTPUT 4		2		9	
OUTPUT 5		5		8	

Does continuity exist?

YES >> GO TO 2.
NO >> Repair harnesses or connectors.

2.CHECK OUTPUT 1 - 5 SYSTEM CIRCUIT FOR SHORT

Check for continuity between BCM harness connector and ground.

System	BCM			Continuity
	Connector	Terminal		
OUTPUT 1	M65	1	Ground	Not existed
OUTPUT 2		4		
OUTPUT 3		3		
OUTPUT 4		2		
OUTPUT 5		5		

Does continuity exist?

YES >> Repair harnesses or connectors.
NO >> GO TO 3.

3.CHECK COMBINATION SWITCH

Check combination switch. Refer to BCS-38, "Description".

Is the check result normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> Replace combination switch (applicable parts).

Special Repair Requirement

INFOID:0000000000927430

1.ADDITIONAL SERVICE WHEN REPLACING BCM

>> Refer to BCS-3, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".

cardiagn.com

COMBINATION SWITCH

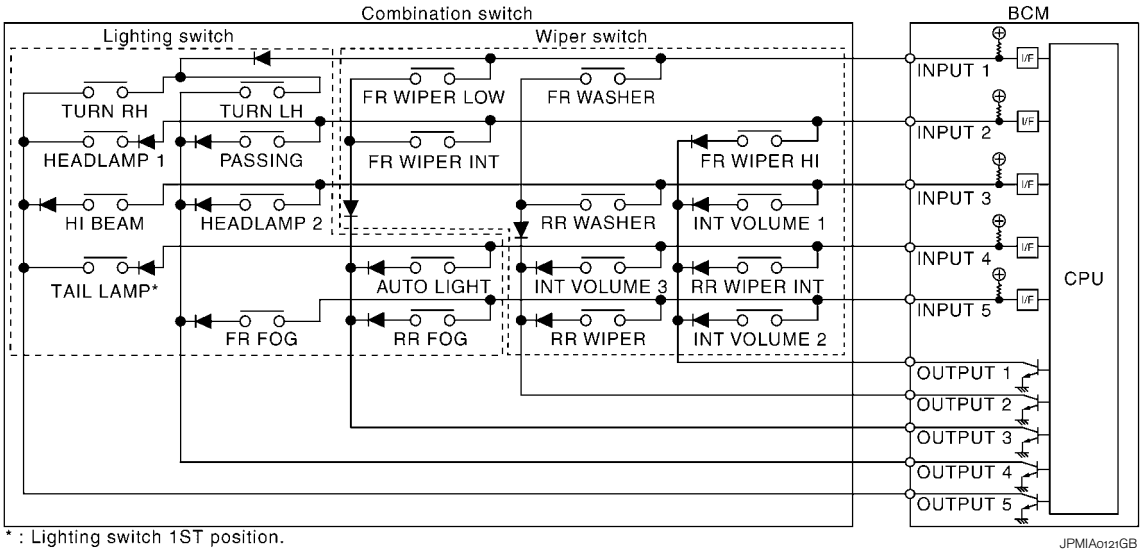
Description

INFOID:0000000001026782

COMBINATION SWITCH MATRIX

Combination switch consists of INPUT circuit and OUTPUT circuit.

Combination switch circuit



Combination switch INPUT-OUTPUT system list

System	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5
INPUT 1	—	FR WASHER	FR WIPER LOW	TURN LH	TURN RH
INPUT 2	FR WIPER HI	—	FR WIPER INT	PASSING	HEADLAMP 1
INPUT 3	INT VOLUME 1	RR WASHER	—	HEADLAMP 2	HI BEAM
INPUT 4	RR WIPER INT	INT VOLUME 3	AUTO LIGHT	—	TAIL LAMP
INPUT 5	INT VOLUME 2	RR WIPER	RR FOG	FR FOG	—

NOTE:

Headlamp has a dual system switch.

Diagnosis Procedure

INFOID:0000000001026783

1.CHECK LIGHT & TURN SIGNAL SWITCH

Check operation with normal light & turn signal switch installed.

Does it operate normally?

YES >> Replace light & turn signal switch.
NO >> GO TO 2.

2.CHECK WIPER & WASHER SWITCH

Check operation with normal wiper & washer switch installed.

Does it operate normally?

YES >> Replace wiper & washer switch.
NO >> GO TO 3.

3.CHECK SWITCH BASE (SPIRAL CABLE)

Check operation with normal switch base (spiral cable) installed.

Does it operate normally?

YES >> Replace switch base (spiral cable).
NO >> Combination switch is normal.

cardiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000000924644

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

cardiagn.com

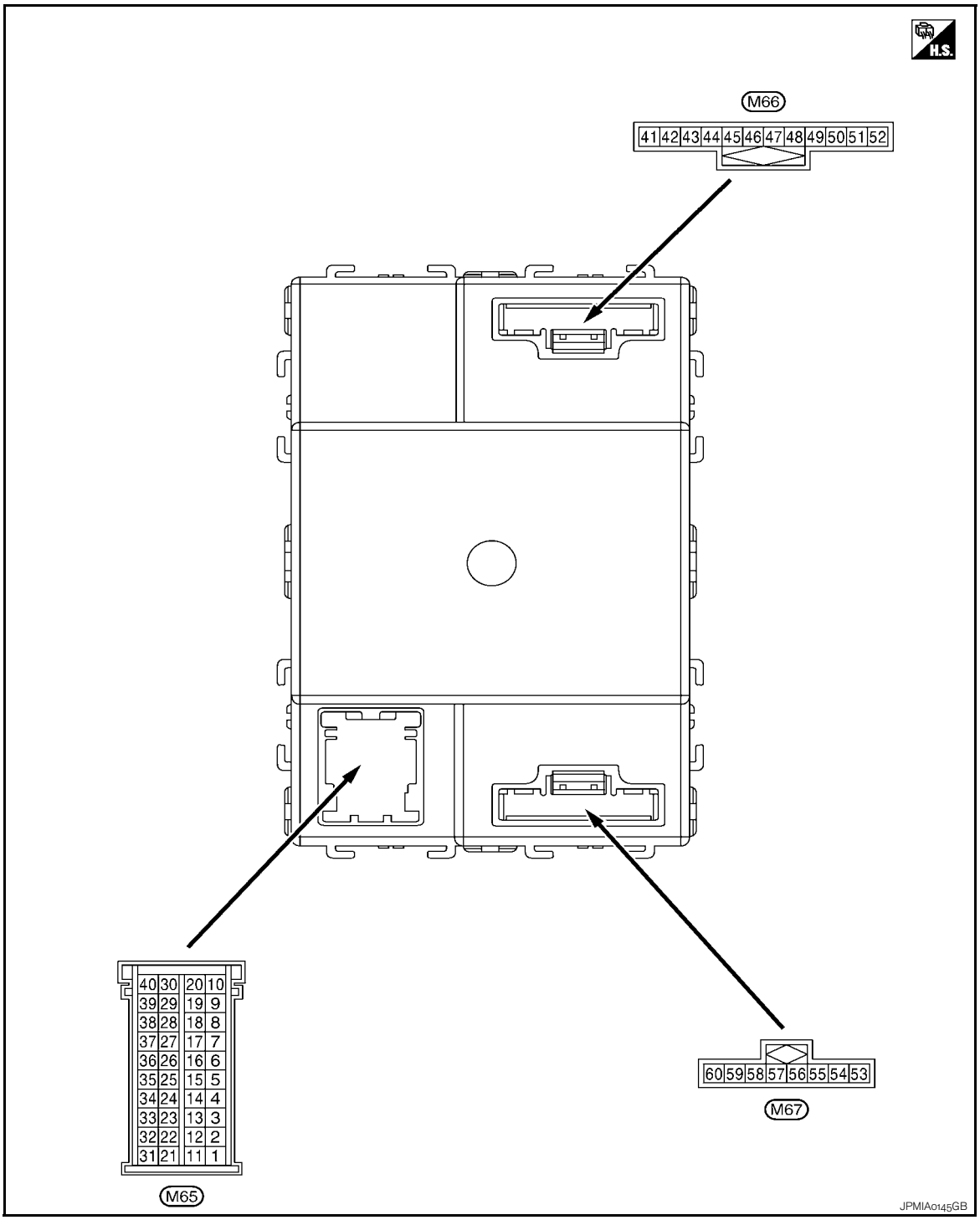
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

cardiagn.com

TERMINAL LAYOUT

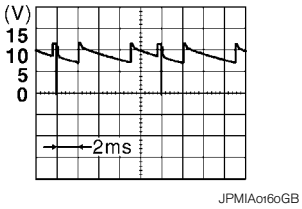
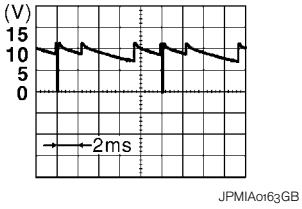
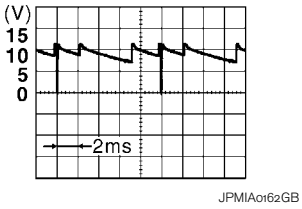
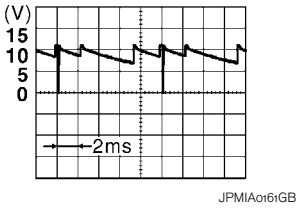


PHYSICAL VALUES

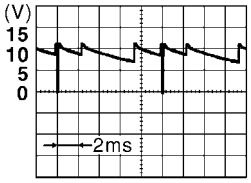
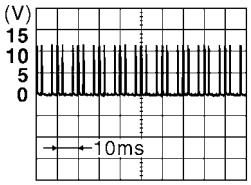
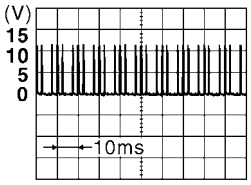
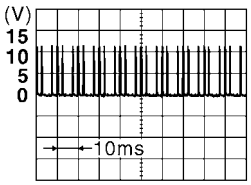
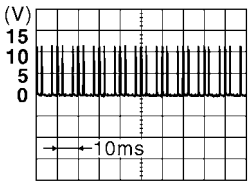
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

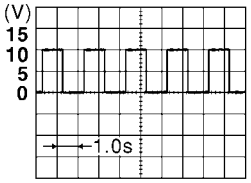
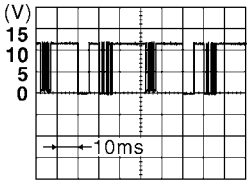
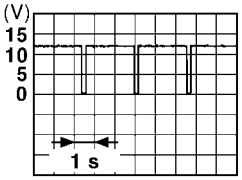
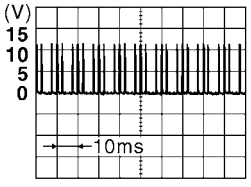
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

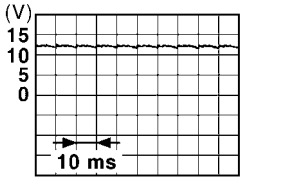
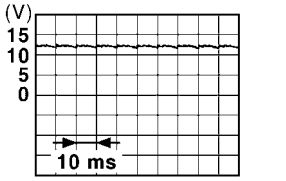
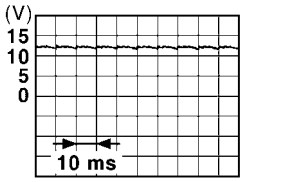
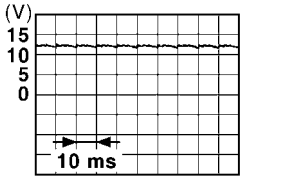
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

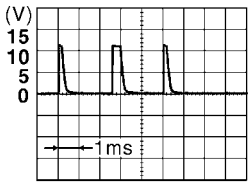
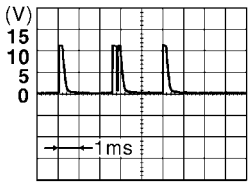
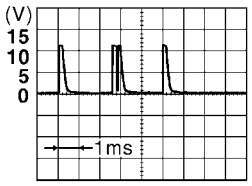
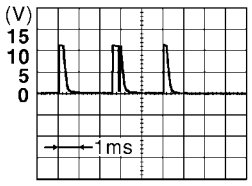
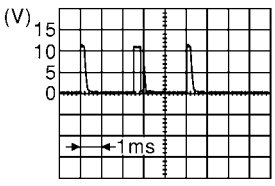
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

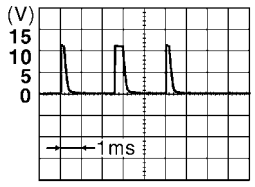
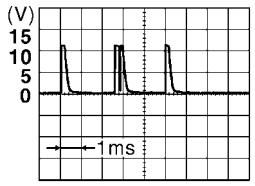
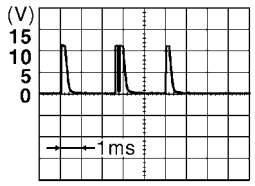
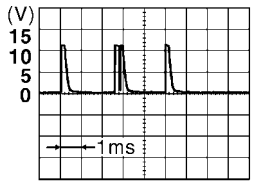
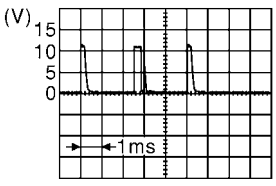
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIB0924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIB0924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIB0924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIB0924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

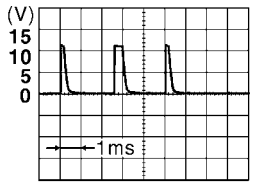
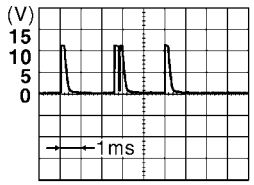
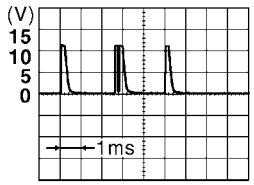
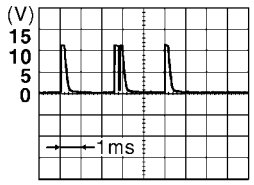
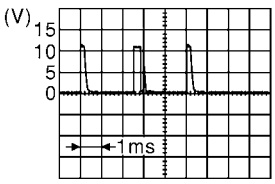
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

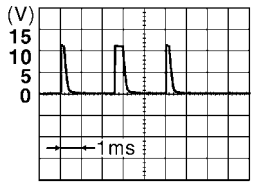
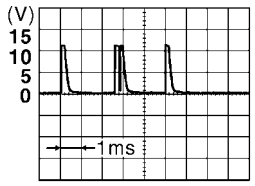
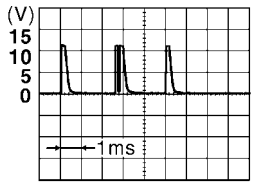
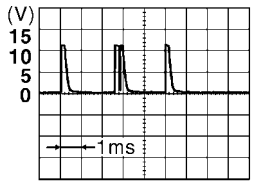
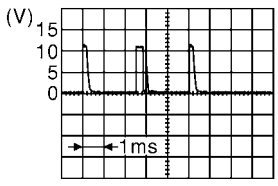
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

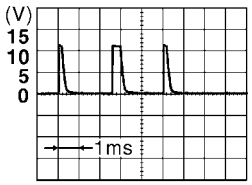
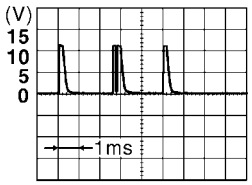
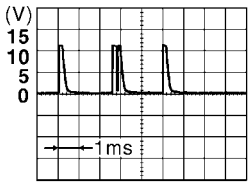
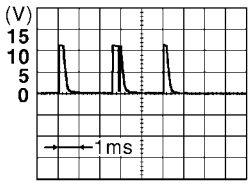
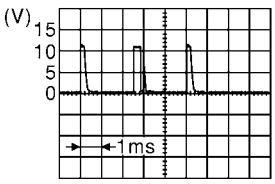
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

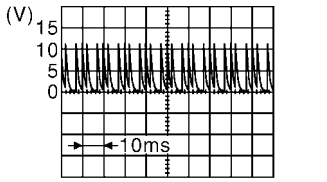
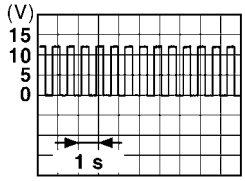
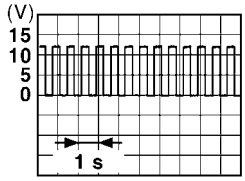
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

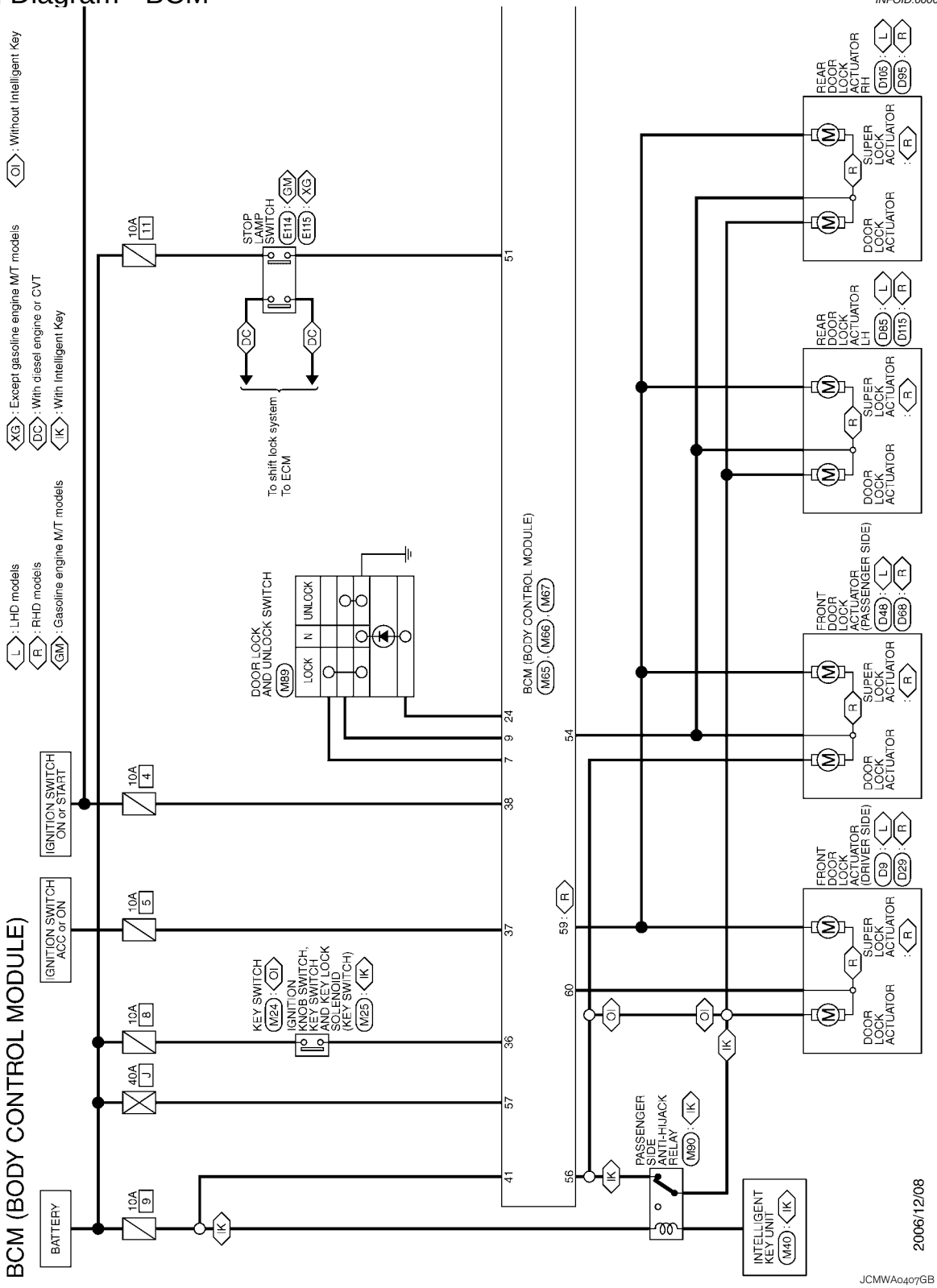
*1: With Intelligent Key system

*2: Without Intelligent Key system

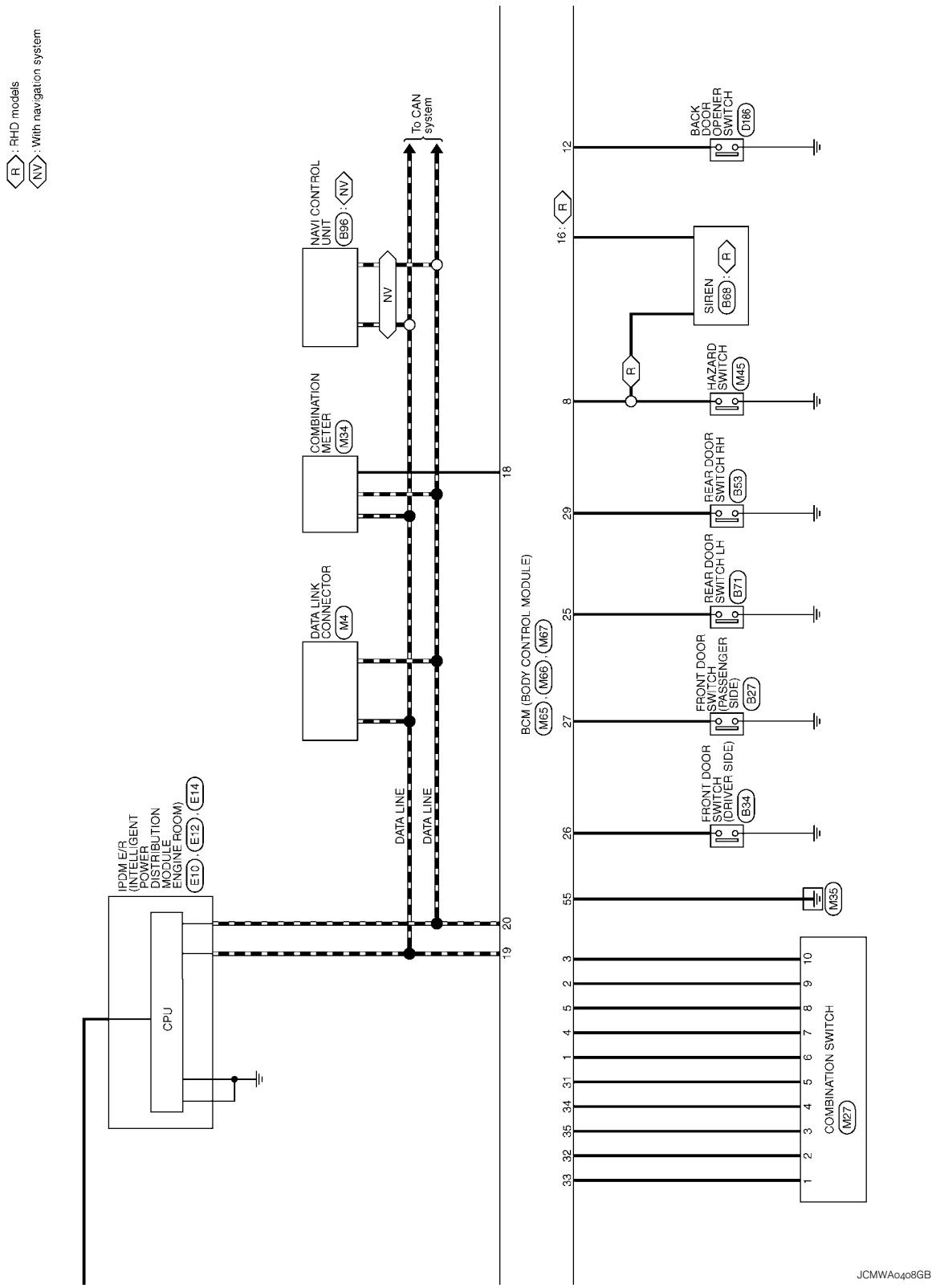
cardiagn.com

Wiring Diagram - BCM -

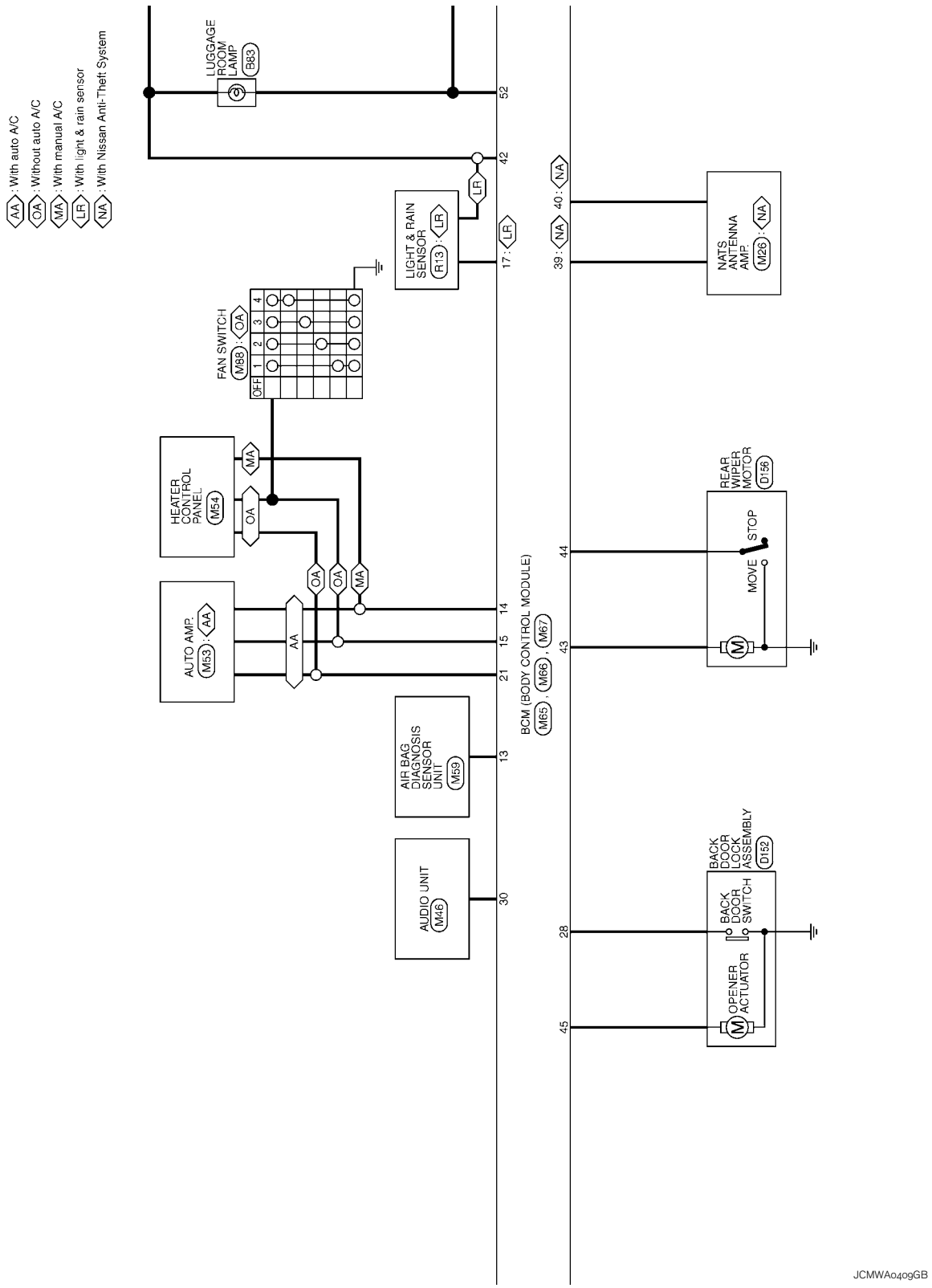
INFOID:0000000000924645



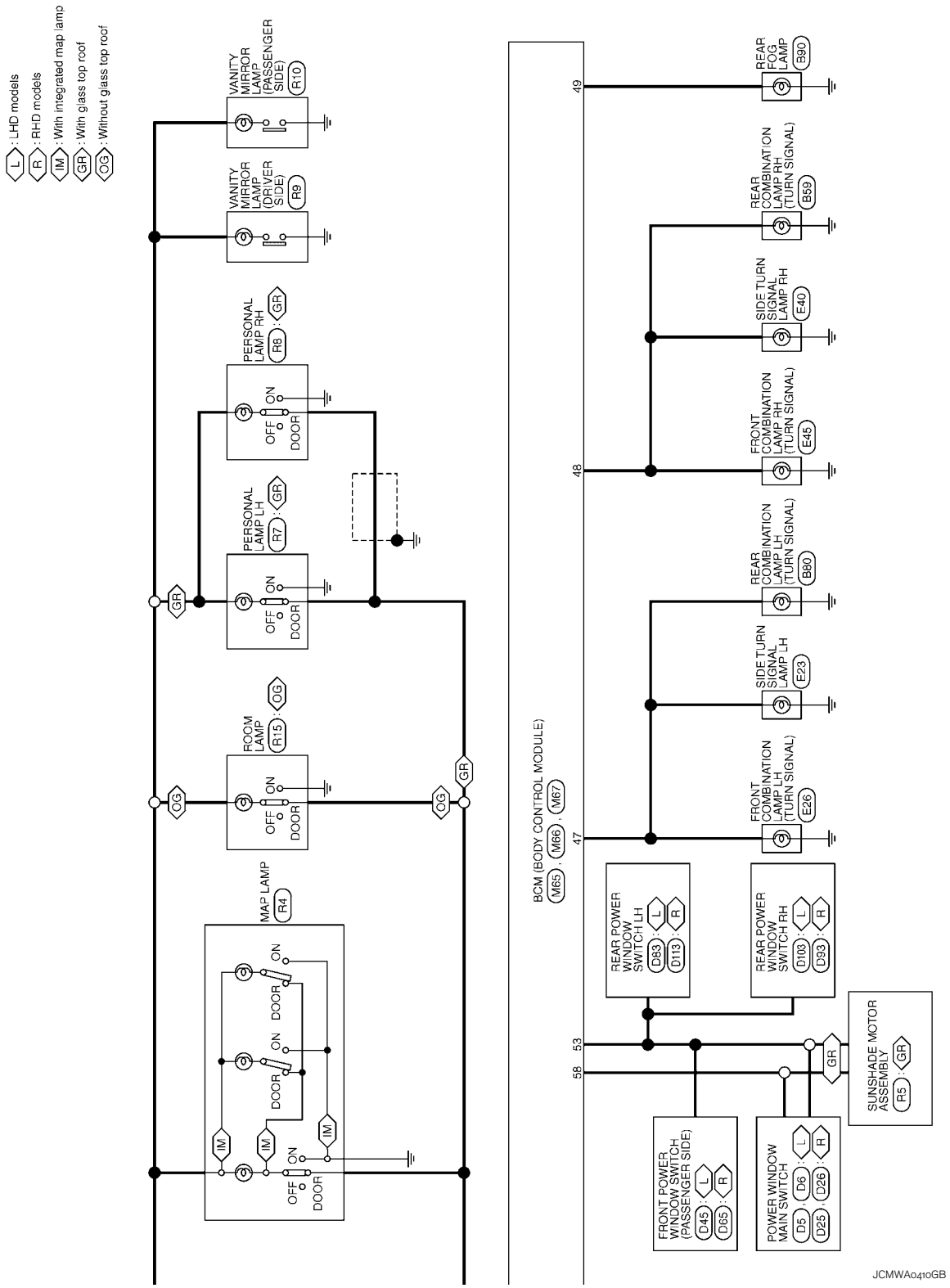
cardiagn.com



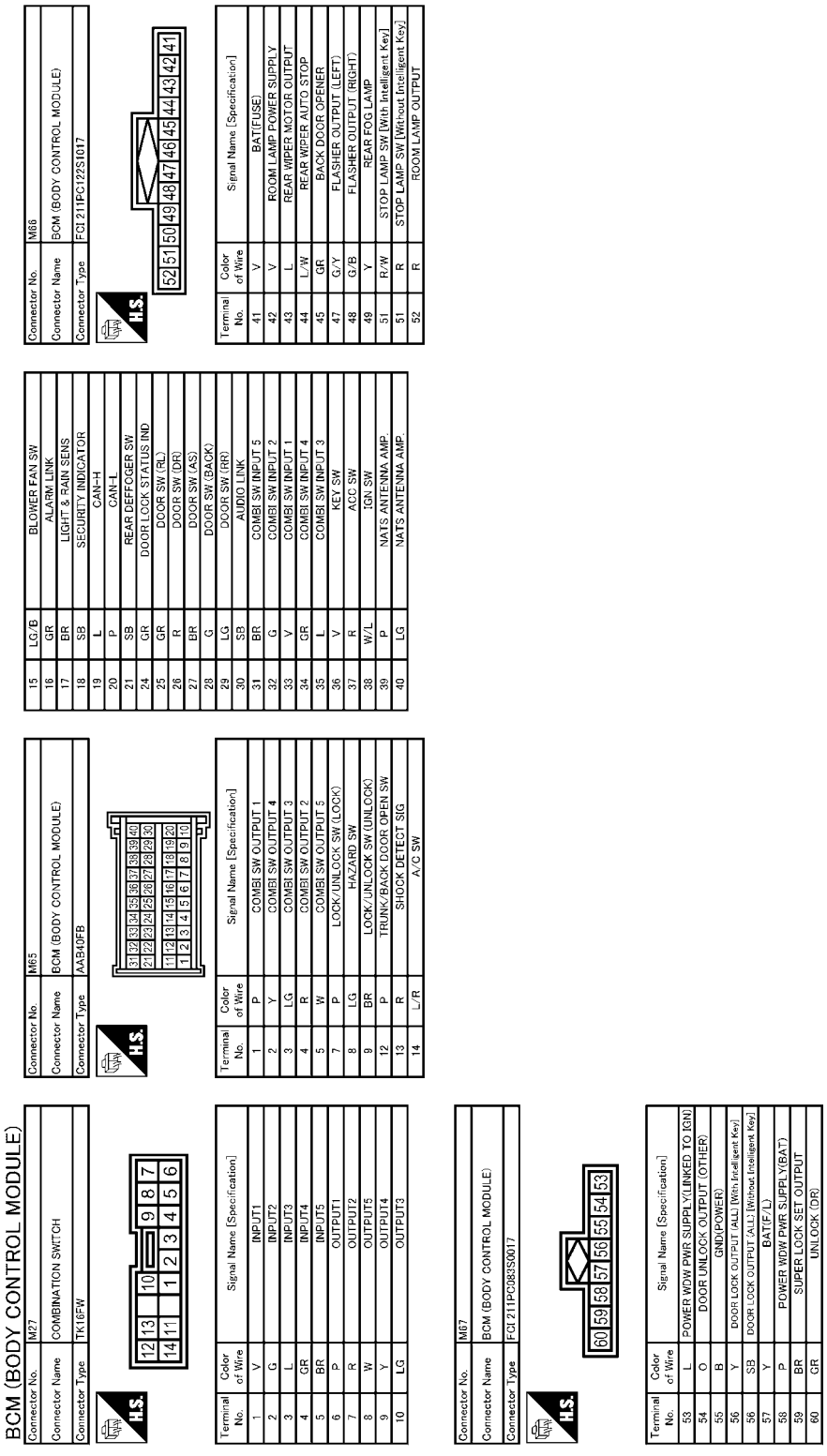
cardiagn.com



cardiagn.com



cardiagn.com



JCMWA0411GB

Fail Safe

INFOID:0000000000924646

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000000924647

cardiagn.com

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000000925732

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001097632

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

cardiagn.com

SYMPTOM DIAGNOSIS

COMBINATION SWITCH SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000000936046

1. Perform “Data Monitor” of CONSULT-III to check for any malfunctioning item.
2. Check the malfunction combinations.

Malfunction item: ×

Data monitor item																	Malfunction combination
TURN SIGNAL R	TURN SIGNAL L	HI BEAM SW	HEAD LAMP SW 1	HEAD LAMP SW 2	TAIL LAMP SW	PASSING SW	AUTO LIGHT SW	FR FOG SW	RR FOG SW	FR WIPER HI	FR WIPER LOW	FR WIPER INT	FR WASHER SW	INT VOLUME	RR WIPER ON	RR WIPER INT	RR WASHER SW	
×	×										×		×					A
			×			×				×		×						B
		×		×										×			×	C
					×		×							×		×		D
								×	×					×	×			E
										×				×		×	×	F
													×	×	×			G
							×		×		×	×						H
	×			×		×		×										I
×		×	×		×													J
Combinations other than those above																		K
All Items																		L
If only one item is detected or the item is not applicable to the combinations A to L																		M

3. Identify the malfunctioning part from the agreed combination and repair or replace the part.

Malfunction combination	Malfunctioning part	Repair or replace
A	Combination switch INPUT 1 circuit	Inspect the combination switch input circuit applicable to the malfunctioning part. Refer to BCS-35, "Diagnosis Procedure".
B	Combination switch INPUT 2 circuit	
C	Combination switch INPUT 3 circuit	
D	Combination switch INPUT 4 circuit	
E	Combination switch INPUT 5 circuit	
F	Combination switch OUTPUT 1 circuit	Inspect the combination switch output circuit applicable to the malfunctioning part. Refer to BCS-37, "Diagnosis Procedure".
G	Combination switch OUTPUT 2 circuit	
H	Combination switch OUTPUT 3 circuit	
I	Combination switch OUTPUT 4 circuit	
J	Combination switch OUTPUT 5 circuit	
K	Light and turn signal switch or front wiper and washer switch	Refer to BCS-38, "Description".
L	BCM	Replace BCM.
M	Light and turn signal switch or front wiper and washer switch	Replace the switch that cannot be operated.

cardiagn.com

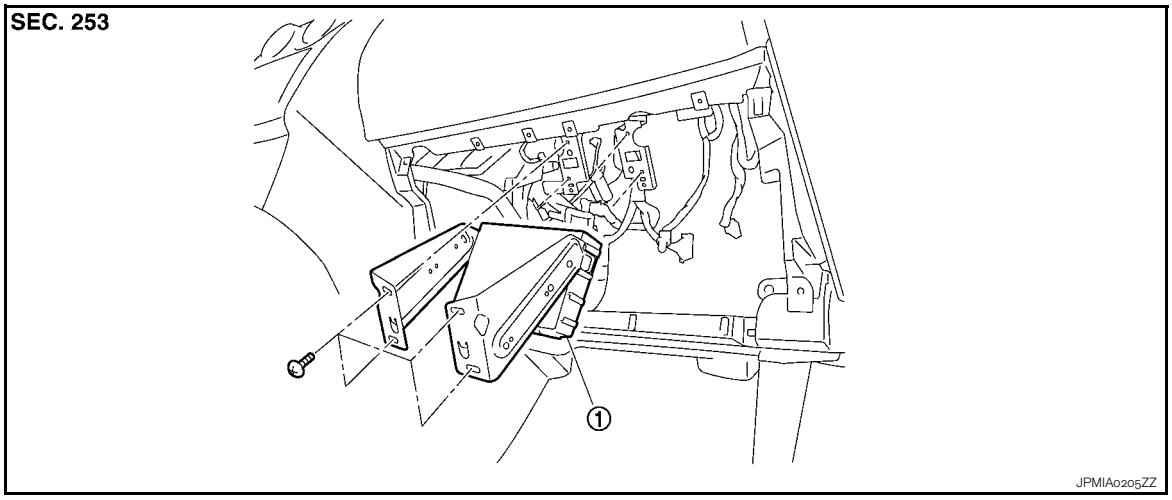
ON-VEHICLE REPAIR

BCM (BODY CONTROL MODULE)

Exploded View

INFOID:0000000000924640

CAUTION:
Before replacing BCM, perform configuration. Refer to BCS-3, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".



1. BCM

Removal and Installation

INFOID:0000000000924641

CAUTION:
Before replacing BCM, perform configuration. Refer to BCS-3, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".

REMOVAL

1. Remove glove box assembly. Refer to IP-11, "Exploded View".
2. Disconnect 4WD control unit connector.
3. Remove intake heater duct.
4. Remove mounting screws.
5. Remove BCM and disconnect the connector.

INSTALLATION

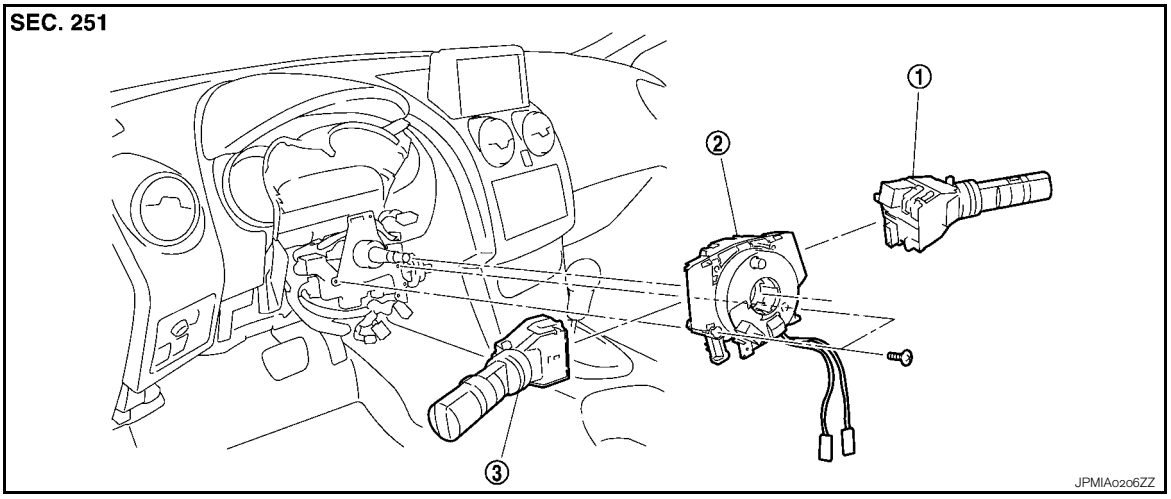
Install in the reverse order of removal.

cardiagn.com

COMBINATION SWITCH

Exploded View

INFOID:0000000000924642



1. Wiper and washer switch
2. Switch base (Spiral cable)
3. Light and turn signal switch

Removal and Installation

INFOID:0000000000924643

Refer to SR-6, "Exploded View".

cardiagn.com

SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

ABS

BASIC INSPECTION 6

DIAGNOSIS AND REPAIR WORKFLOW 6
Work Flow 6
Diagnostic Work Sheet 8

FUNCTION DIAGNOSIS 9

ABS 9
System Diagram 9
System Description 9
Component Parts Location 9
Component Description 11

EBD 13
System Diagram 13
System Description 13
Component Parts Location 13
Component Description 15

DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)] 17
CONSULT-III Function (ABS) 17

COMPONENT DIAGNOSIS 20

C1101, C1102, C1103, C1104 WHEEL SENSOR-1 20
Description 20
DTC Logic 20
Diagnosis Procedure 20
Component Inspection 22

C1105, C1106, C1107, C1108 WHEEL SENSOR-2 23
Description 23
DTC Logic 23
Diagnosis Procedure 23
Component Inspection 24

C1109 POWER AND GROUND SYSTEM 26
Description 26
DTC Logic 26
Diagnosis Procedure 26

C1110, C1153 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 28
Description 28
DTC Logic 28
Diagnosis Procedure 28

C1111 ABS MOTOR, MOTOR RELAY SYSTEM 29
Description 29
DTC Logic 29
Diagnosis Procedure 29
Component Inspection 30

C1113 G SENSOR 31
Description 31
DTC Logic 31
Diagnosis Procedure 31
Component Inspection 32

C1114 ACTUATOR RELAY SYSTEM 33
Description 33
DTC Logic 33
Diagnosis Procedure 33
Component Inspection 34

C1115 WHEEL SENSOR 35
Description 35
DTC Logic 35
Diagnosis Procedure 35
Component Inspection 36

C1116 STOP LAMP SWITCH 38
Description 38
DTC Logic 38
Diagnosis Procedure 38
Component Inspection 39

cardiagn.com

C1120, C1122, C1124, C1126 IN ABS SOL 40
Description 40
DTC Logic 40
Diagnosis Procedure 40
Component Inspection 41

C1121, C1123, C1125, C1127 OUT ABS SOL.. 42
Description 42
DTC Logic 42
Diagnosis Procedure 42
Component Inspection 43

U1000 CAN COMM CIRCUIT 44
Description 44
DTC Logic 44
Diagnosis Procedure 44

BRAKE FLUID LEVEL SWITCH 45
Description 45
Component Function Check 45
Diagnosis Procedure 45
Component Inspection 46

PARKING BRAKE SWITCH 47
Description 47
Diagnosis Procedure 47
Component Function Check 47
Component Inspection 47

ABS WARNING LAMP 49
Description 49
Component Function Check 49
Diagnosis Procedure 49

BRAKE WARNING LAMP 50
Description 50
Component Function Check 50
Diagnosis Procedure 50

ECU DIAGNOSIS 51

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 51
Reference Value 51
Wiring Diagram - BRAKE CONTROL SYSTEM - ... 52
Fail-Safe 56
DTC No. Index 57

SYMPTOM DIAGNOSIS 58

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY 58
Diagnosis Procedure 58

UNEXPECTED PEDAL REACTION 59
Diagnosis Procedure 59

THE BRAKING DISTANCE IS LONG 60
Diagnosis Procedure 60

ABS FUNCTION DOES NOT OPERATE 61
Diagnosis Procedure 61

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS 62
Diagnosis Procedure 62

NORMAL OPERATING CONDITION 63
Description 63

PRECAUTION 64

PRECAUTIONS 64
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" Service 64
Precaution for Brake System 64
Precaution for Brake Control 64

PREPARATION 66

PREPARATION 66
Special Service Tool 66

ON-VEHICLE REPAIR 67

WHEEL SENSOR 67

FRONT WHEEL SENSOR 67
FRONT WHEEL SENSOR : Exploded View 67
FRONT WHEEL SENSOR : Removal and Installation 67

REAR WHEEL SENSOR 67
REAR WHEEL SENSOR : Exploded View 67
REAR WHEEL SENSOR : Removal and Installation 68

SENSOR ROTOR 69

FRONT SENSOR ROTOR 69
FRONT SENSOR ROTOR : Exploded View 69
FRONT SENSOR ROTOR : Removal and Installation 69

REAR SENSOR ROTOR 69
REAR SENSOR ROTOR : Exploded View 69
REAR SENSOR ROTOR : Removal and Installation 69

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 70
Exploded View 70
Removal and Installation 71

G SENSOR 73
Exploded View 73
Removal and Installation 73

ESP/TCS/ABS

BASIC INSPECTION 74

DIAGNOSIS AND REPAIR WORKFLOW 74
Work Flow 74
Diagnostic Work Sheet 77

cardiagn.com

INSPECTION AND ADJUSTMENT 78

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 78
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 78
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement 78

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION 78
ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description 78
ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement 78

FUNCTION DIAGNOSIS 80

ESP 80
System Diagram 80
System Description 80
Component Parts Location 80
Component Description 83

TCS 84
System Diagram 84
System Description 84
Component Parts Location 84
Component Description 87

ABS 88
System Diagram 88
System Description 88
Component Parts Location 88
Component Description 91

EBD 92
System Diagram 92
System Description 92
Component Parts Location 92
Component Description 95

DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)] 96
CONSULT-III Function (ABS) 96

COMPONENT DIAGNOSIS 100

C1101, C1102, C1103, C1104 WHEEL SENSOR-1 100
Description 100
DTC Logic 100
Diagnosis Procedure 100
Component Inspection 102
Special Repair Requirement 102

C1105, C1106, C1107, C1108 WHEEL SENSOR-2 103
Description 103
DTC Logic 103
Diagnosis Procedure 103
Component Inspection 105
Special Repair Requirement 105

C1109 POWER AND GROUND SYSTEM 106
Description 106
DTC Logic 106
Diagnosis Procedure 106
Special Repair Requirement 107

C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 108
Description 108
DTC Logic 108
Diagnosis Procedure 108
Special Repair Requirement 108

C1111 ABS MOTOR, MOTOR RELAY SYSTEM 110
Description 110
DTC Logic 110
Diagnosis Procedure 110
Component Inspection 111
Special Repair Requirement 111

C1114 ACTUATOR RELAY SYSTEM 113
Description 113
DTC Logic 113
Diagnosis Procedure 113
Component Inspection 114
Special Repair Requirement 114

C1115 WHEEL SENSOR 115
Description 115
DTC Logic 115
Diagnosis Procedure 115
Component Inspection 116
Special Repair Requirement 117

C1116 STOP LAMP SWITCH 118
Description 118
DTC Logic 118
Diagnosis Procedure 118
Component Inspection 119
Special Repair Requirement 120

C1120, C1122, C1124, C1126 IN ABS SOL ... 121
Description 121
DTC Logic 121
Diagnosis Procedure 121
Component Inspection 122
Special Repair Requirement 123

C1121, C1123, C1125, C1127 OUT ABS SOL. 124
Description 124
DTC Logic 124
Diagnosis Procedure 124
Component Inspection 125
Special Repair Requirement 126

C1130, C1131, C1132 ENGINE SIGNAL 127

cardiagn.com

Description 127
DTC Logic 127
Diagnosis Procedure 127
Special Repair Requirement 127

C1142 PRESS SENSOR 128
Description 128
DTC Logic 128
Diagnosis Procedure 128
Component Inspection 129
Special Repair Requirement 129

C1143, C1144 STEERING ANGLE SENSOR . 130
Description 130
DTC Logic 130
Diagnosis Procedure 130
Component Inspection 131
Special Repair Requirement 131

C1145 YAW RATE SENSOR 133
Description 133
DTC Logic 133
Diagnosis Procedure 133
Component Inspection 134
Special Repair Requirement 135

C1146 G SENSOR 136
Description 136
DTC Logic 136
Diagnosis Procedure 136
Component Inspection 137
Special Repair Requirement 137

C1147, C1148, C1149, C1150 USV/HSV LINE 138
Description 138
DTC Logic 138
Diagnosis Procedure 138
Component Inspection 139
Special Repair Requirement 140

C1155 BRAKE FLUID LEVEL SWITCH 141
Description 141
DTC Logic 141
Diagnosis Procedure 141
Component Inspection 142
Special Repair Requirement 143

U1000, U1002 CAN COMM CIRCUIT 144
Description 144
DTC Logic 144
Diagnosis Procedure 144
Special Repair Requirement 144

PARKING BRAKE SWITCH 145
Description 145
Diagnosis Procedure 145
Component Function Check 145
Component Inspection 145

ESP OFF SWITCH 147
Description 147
Component Function Check 147
Diagnosis Procedure 147
Component Inspection 148

ABS WARNING LAMP 149
Description 149
Component Function Check 149
Diagnosis Procedure 149

BRAKE WARNING LAMP 150
Description 150
Component Function Check 150
Diagnosis Procedure 150

ESP OFF INDICATOR LAMP 151
Description 151
Component Function Check 151
Diagnosis Procedure 151

SLIP INDICATOR LAMP 152
Description 152
Component Function Check 152
Diagnosis Procedure 152

ECU DIAGNOSIS 153

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 153
Reference Value 153
Wiring Diagram - BRAKE CONTROL SYSTEM - . 155
Fail-Safe 159
DTC No. Index 160

SYMPTOM DIAGNOSIS 162

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY 162
Diagnosis Procedure 162

UNEXPECTED PEDAL REACTION 163
Diagnosis Procedure 163

THE BRAKING DISTANCE IS LONG 164
Diagnosis Procedure 164

ABS FUNCTION DOES NOT OPERATE 165
Diagnosis Procedure 165

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS 166
Diagnosis Procedure 166

VEHICLE JERKS DURING ESP/TCS/ABS CONTROL 167
Diagnosis Procedure 167

NORMAL OPERATING CONDITION 168
Description 168

PRECAUTION 169

PRECAUTIONS 169

cardiagn.com

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" Service 169
Precaution for Brake System 169
Precaution for Brake Control 169

PREPARATION 171

PREPARATION 171
Special Service Tool 171

ON-VEHICLE REPAIR 172

WHEEL SENSOR 172

FRONT WHEEL SENSOR 172
FRONT WHEEL SENSOR : Exploded View 172
FRONT WHEEL SENSOR : Removal and Installation 172

REAR WHEEL SENSOR 172
REAR WHEEL SENSOR : Exploded View 172
REAR WHEEL SENSOR : Removal and Installation 173

SENSOR ROTOR 174

FRONT SENSOR ROTOR 174
FRONT SENSOR ROTOR : Exploded View 174
FRONT SENSOR ROTOR : Removal and Installation 174

REAR SENSOR ROTOR 174
REAR SENSOR ROTOR : Exploded View 174
REAR SENSOR ROTOR : Removal and Installation 174

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 175
Exploded View 175
Removal and Installation 176

YAW RATE/SIDE G SENSOR 178
Exploded View 178
Removal and Installation 178

STEERING ANGLE SENSOR 179
Exploded View 179
Removal and Installation 179

cardiagn.com

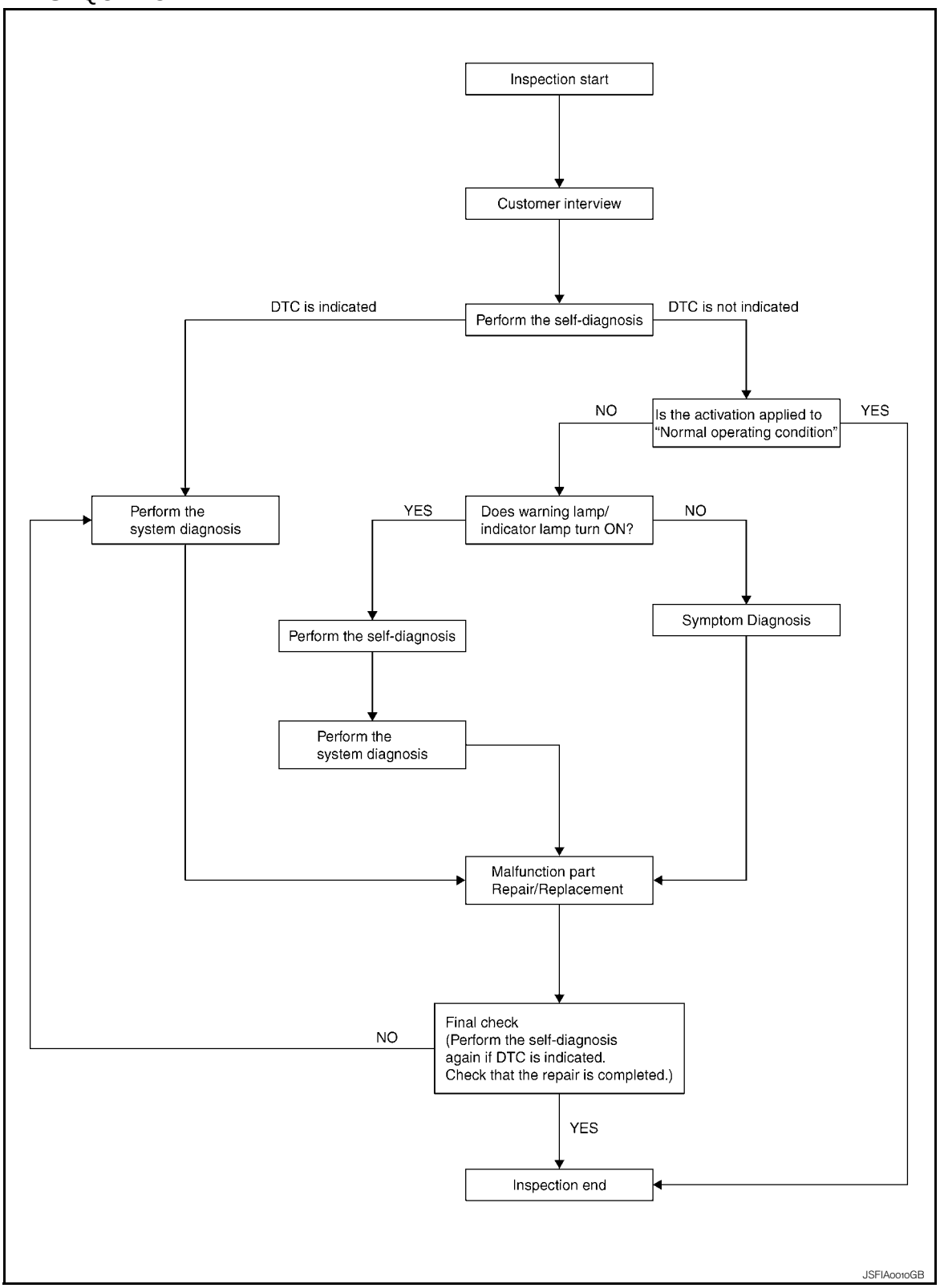
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000924945

OVERALL SEQUENCE



DETAIED FLOW

cardiagn.com

1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-8, "Diagnostic Work Sheet".

>> GO TO 2.

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is there any DTC displayed?

YES >> GO TO 3.
NO >> GO TO 4.

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-57, "DTC No. Index".

>> GO TO 7.

4.CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-63, "Description".

Is the symptom is a normal operation?

YES >> INSPECTION END
NO >> GO TO 5.

5.CHECK THE WARNING LAMP FOR ILLUMINATION

Check that the warning lamp illuminate.
- ABS warning lamp: Refer to BRC-49, "Description".
- Brake warning lamp: Refer to BRC-50, "Description".

Is ON/OFF timing normal?

YES >> GO TO 6.
NO >> GO TO 2.

6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7.

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any DTC indicated?

YES >> GO TO 3.
NO >> INSPECTION END

cardiagn.com

Diagnostic Work Sheet

INFOID:0000000000924946

Customer name MR/MS	Model & Year		VIN
Engine #	Trans.		Mileage
Incident Date	Manuf. Date		In Service Date
Symptoms	☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle)	☐ Warning / Indicator activate	☐ Firm pedal operation Large stroke pedal operation
	☐ ABS does not work (Wheels lock when braking)	☐ Lack of sense of acceleration	
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐Snow ☐Gravel ☐Other) ☐ Bumps / potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

SFIA3264E

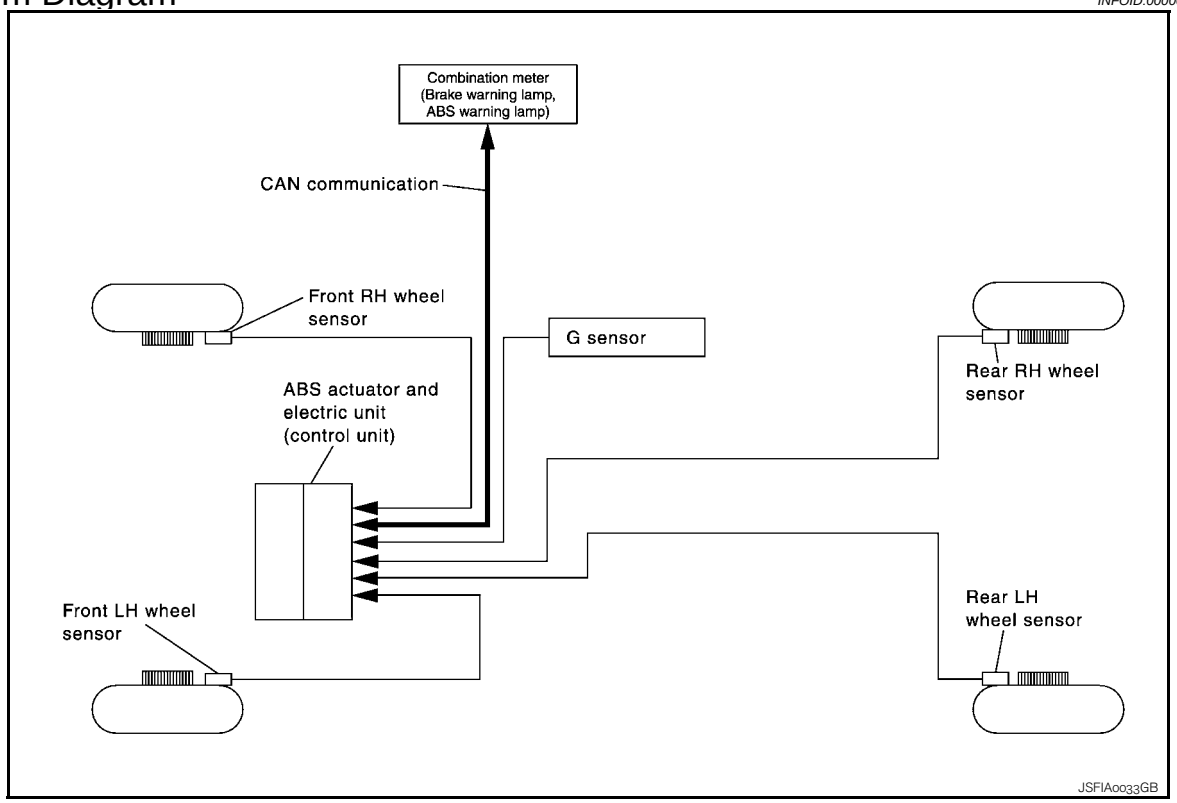
cardiagn.com

FUNCTION DIAGNOSIS

ABS

System Diagram

INFOID:0000000000924959



System Description

INFOID:0000000000924960

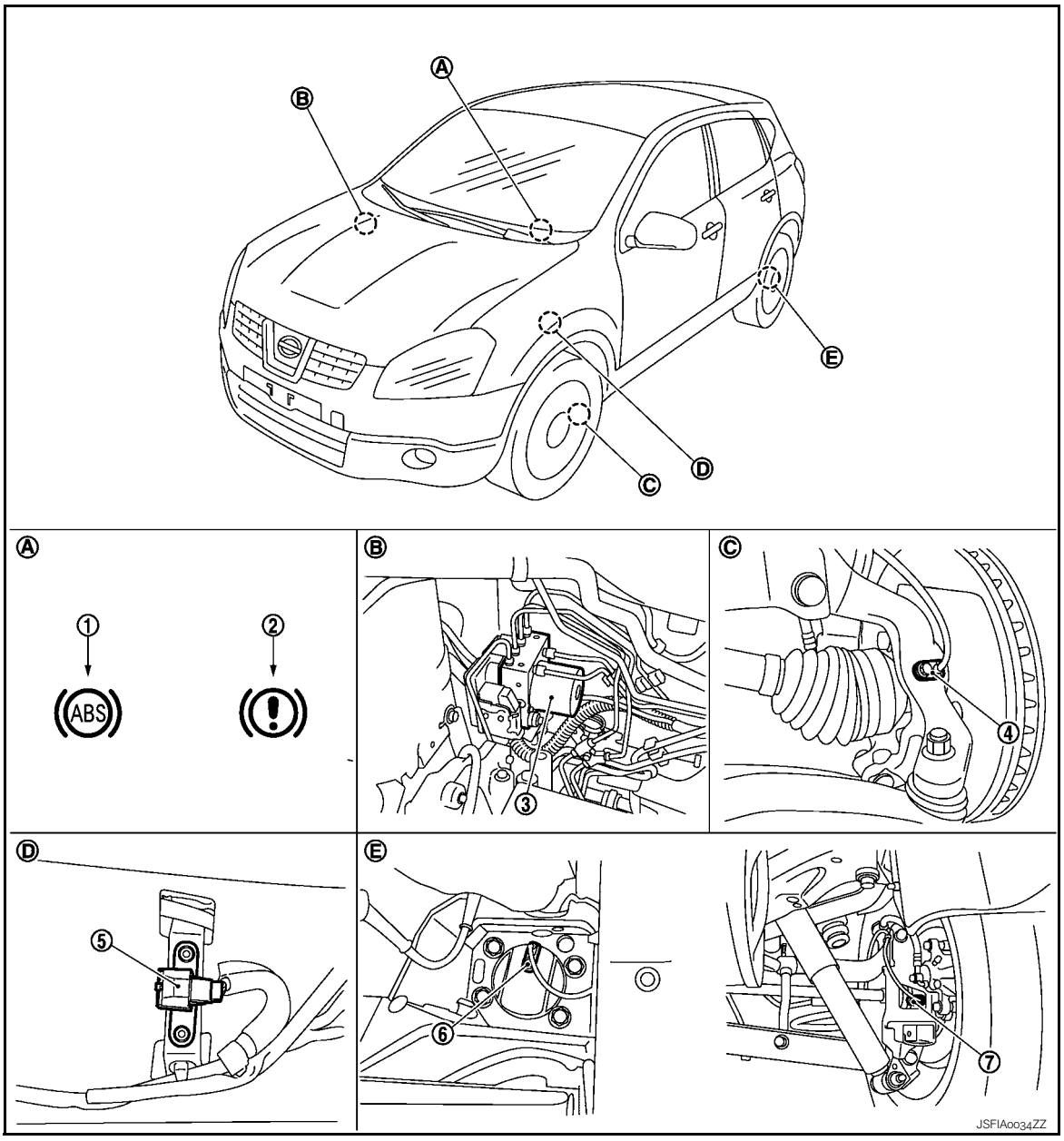
- Anti-Lock Braking System is a function that detects wheel revolution while braking, electronically controls braking force, and prevents wheel locking during sudden braking. It improves handling stability and maneuverability for avoiding obstacles.
- Electrical system diagnosis by CONSULT-III is available.

Component Parts Location

INFOID:0000000000924961

cardiagn.com

LHD models

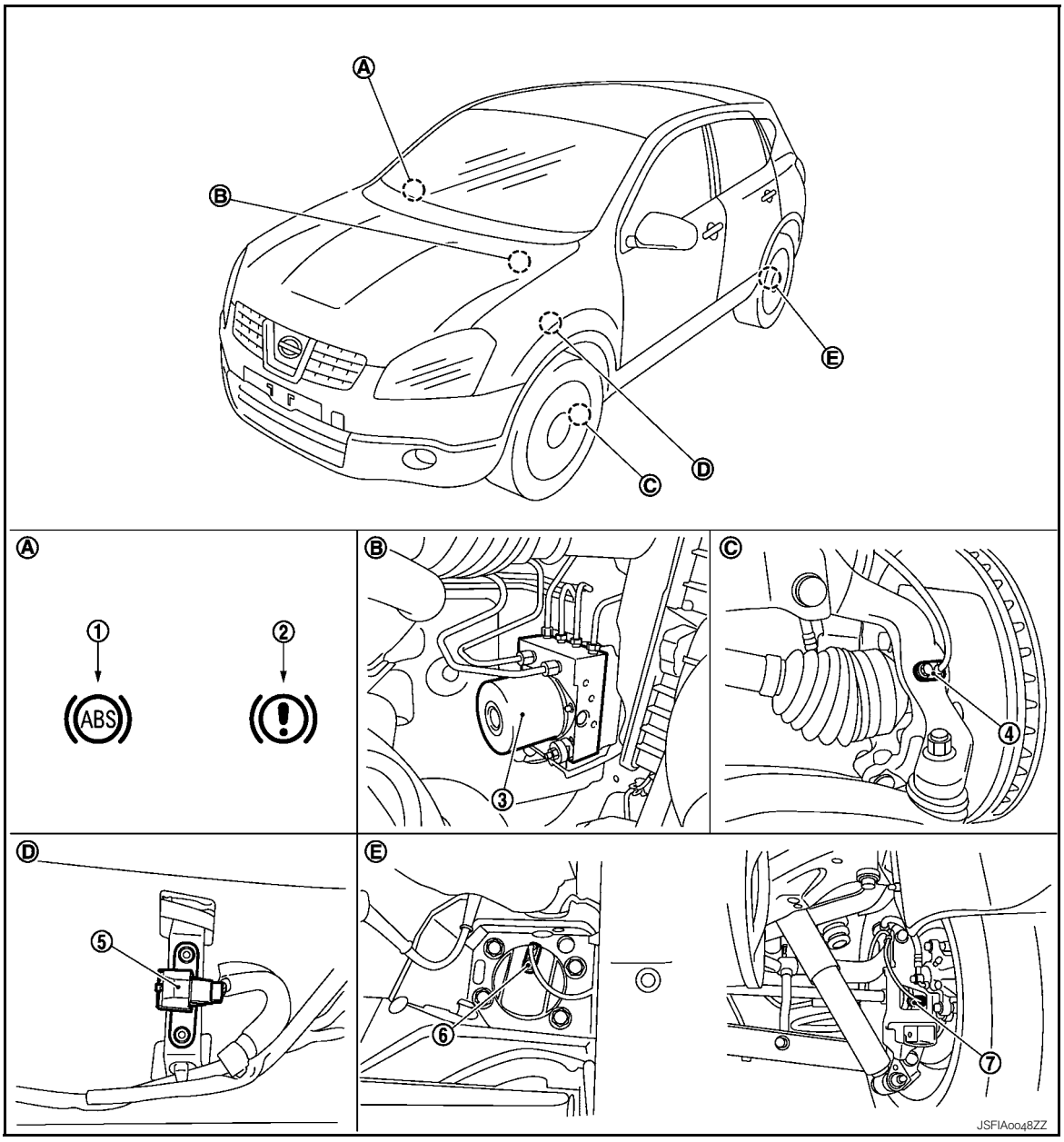


1. ABS warning lamp
2. Brake warning lamp
3. ABS actuator and electric unit (control unit)
4. Front wheel sensor
5. G sensor
6. Rear wheel sensor (2WD models)
7. Rear wheel sensor (4WD models)

A. Combination meter
B. Engine room (right side)
C. Steering knuckle
D. Lower instrument cover RH
E. Rear axle

cardiagn.com

RHD models



1. ABS warning lamp
2. Brake warning lamp
3. ABS actuator and electric unit (control unit)
4. Front wheel sensor
5. G sensor
6. Rear wheel sensor (2WD models)
7. Rear wheel sensor (4WD models)

A. Combination meter
B. Engine room (left side)
C. Steering knuckle
D. Lower instrument cover RH
E. Rear axle

Component Description

INFOID:0000000000924962

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-29, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-33, "Description"
	Solenoid valve	BRC-40, "Description"
Wheel sensor		BRC-20, "Description"

cardiagn.com

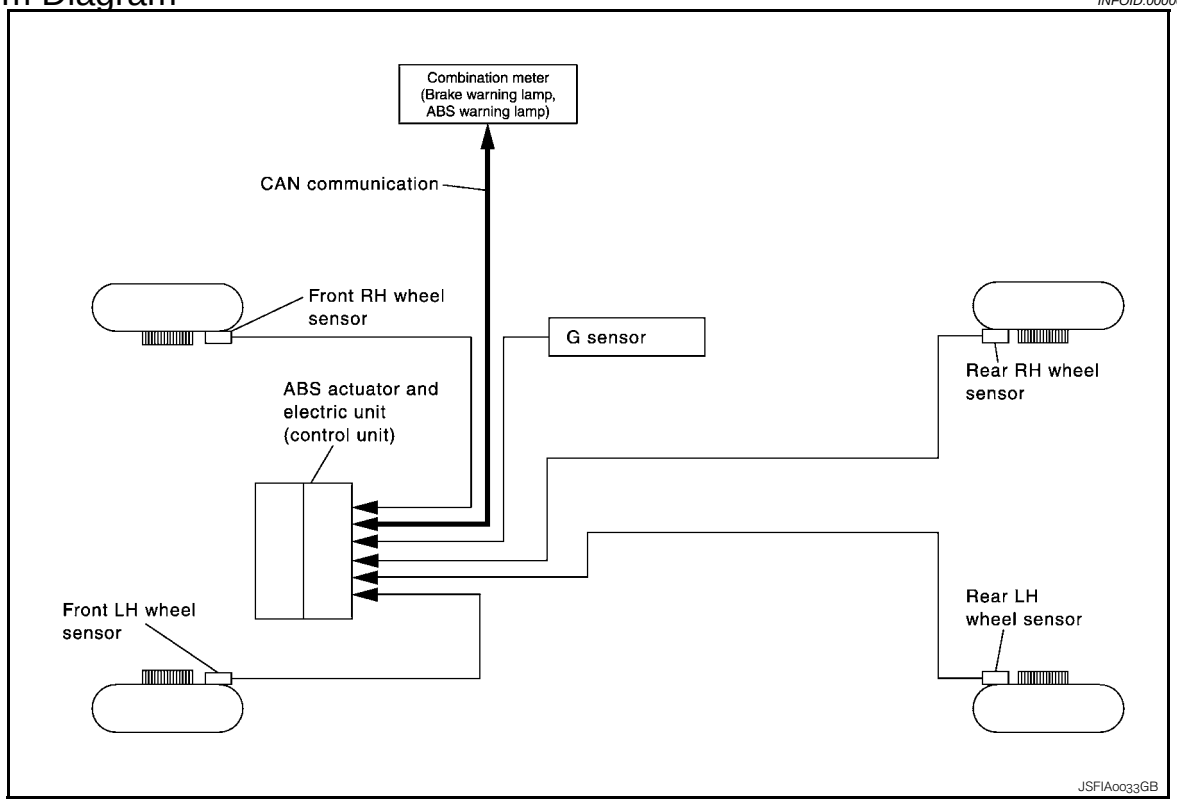
Component parts	Reference
ABS warning lamp	BRC-49, "Description"
Brake warning lamp	BRC-50, "Description"

cardiagn.com

EBD

System Diagram

INFOID:0000000000977414



System Description

INFOID:0000000000924964

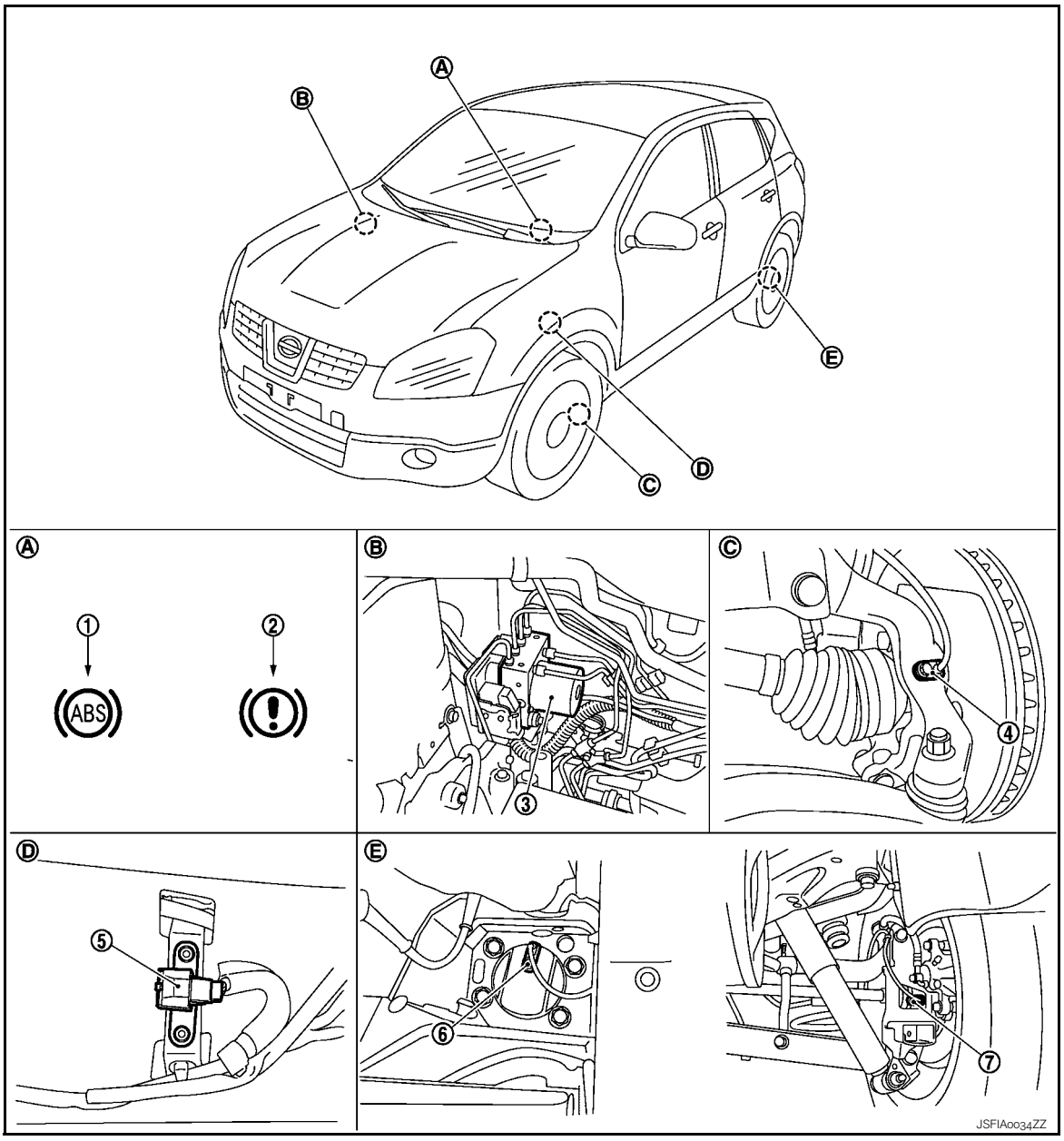
- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then is electronically controls the rear braking force (brake fluid pressure) to reducing and reduces rear wheel slippage. Accordingly it improves vehicle stability.
- Electrical system diagnosis by CONSULT-III is available.

Component Parts Location

INFOID:0000000000977415

cardiagn.com

LHD models

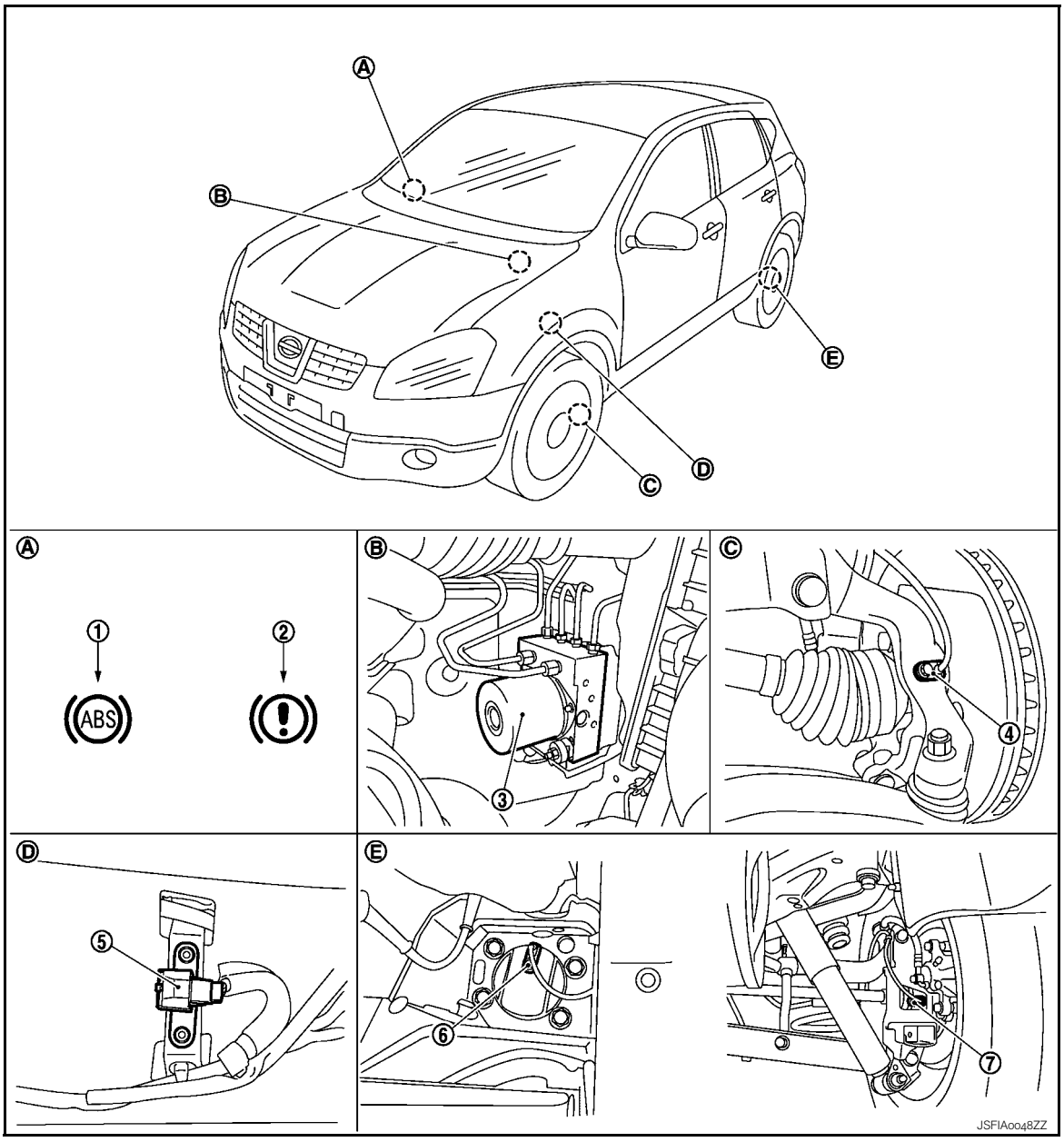


1. ABS warning lamp
2. Brake warning lamp
3. ABS actuator and electric unit (control unit)
4. Front wheel sensor
5. G sensor
6. Rear wheel sensor (2WD models)
7. Rear wheel sensor (4WD models)

A. Combination meter
B. Engine room (right side)
C. Steering knuckle
D. Lower instrument cover RH
E. Rear axle

cardiagn.com

RHD models



1. ABS warning lamp
2. Brake warning lamp
3. ABS actuator and electric unit (control unit)
4. Front wheel sensor
5. G sensor
6. Rear wheel sensor (2WD models)
7. Rear wheel sensor (4WD models)

A. Combination meter
B. Engine room (left side)
C. Steering knuckle
D. Lower instrument cover RH
E. Rear axle

Component Description

INFOID:0000000000977416

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-29, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-33, "Description"
	Solenoid valve	BRC-40, "Description"
Wheel sensor		BRC-20, "Description"

cardiagn.com

Component parts	Reference
ABS warning lamp	BRC-49, "Description"
Brake warning lamp	BRC-50, "Description"

cardiagn.com

DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

CONSULT-III Function (ABS)

INFOID:0000000000924967

FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic test mode	Function
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active test	Diagnostic test mode is which CONSULT-III drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
ECU part number	ABS actuator and electric unit (control unit) part number can be read.
Function test	Performed by CONSULT-III instead of a technician to determine whether each system is “OK” or “NG”.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF-DIAG RESULTS MODE

Operation Procedure

1. Before performing the self-diagnosis, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

How to Erase Self-diagnosis Results

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp and brake warning lamp turn OFF.
   CAUTION:
   If memory cannot be erased, perform applicably diagnosis.
   NOTE:
   - When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
   - Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

Display Item List

Refer to BRC-57, "DTC No. Index".

DATA MONITOR MODE

Display Item List

×: Applicable o: Optional item

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNLAS	
FR LH SENSOR [km/h (MPH)]	×	×	Wheel speed
FR RH SENSOR [km/h (MPH)]	×	×	
RR LH SENSOR [km/h (MPH)]	×	×	
RR RH SENSOR [km/h (MPH)]	×	×	
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal status

cardiagn.com

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNLAS	
BATTERY VOLT (V)	×	×	Battery voltage supplied to the ABS actuator and electric unit (control unit)
DECEL G SENSOR (G) NOTE 1	×	×	Vehicle on level surface or on slope
FR RH IN SOL (On/Off)	o	×	Operation status of each solenoid valve
FR RH OUT SOL (On/Off)	o	×	
FR LH IN SOL (On/Off)	o	×	
FR LH OUT SOL (On/Off)	o	×	
RR RH IN SOL (On/Off)	o	×	
RR RH OUT SOL (On/Off)	o	×	
RR LH IN SOL (On/Off)	o	×	
RR LH OUT SOL (On/Off)	o	×	
MOTOR RELAY (On/Off)	o	×	Motor and motor relay operation
ACTUATOR RLY (On/Off) NOTE 2	o	×	Actuator relay operation
ABS WARN LAMP (On/Off)	o	×	ABS warning lamp
G SENSOR (On/Off)	o	o	G sensor signal status
EBD SIGNAL (On/Off)	o	o	EBD operation
ABS SIGNAL (On/Off)	o	o	ABS operation
EBD FAIL SIG (On/Off)	o	o	EBD fail-safe signal
ABS FAIL SIG (On/Off)	o	o	ABS fail-safe signal

NOTE:

1: Only 4WD models

2: Every 20 seconds momentary switch to OFF.

ACTIVE TEST MODE

CAUTION:

- **Do not perform active test while driving vehicle.**
- **Make sure to completely bleed air from brake system.**
- **The active test cannot be performed with the ABS warning lamp and brake warning lamp are ON.**
- **ABS warning lamp and brake warning lamp are ON during active test.**

NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- “TEST IS STOPPED” is displayed 10 seconds after operation start.
- After “TEST IS STOPPED” is displayed, to perform test again.

Test Item

cardiagn.com

ABS SOLENOID VALVE

- For ABS solenoid valve, touch “UP”, “KEEP”, and “DOWN”. Then use screen monitor to check that solenoid valve operates as shown in solenoid valve operation chart.

Solenoid valve operation chart

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*

*: ON for 1 to 2 seconds after the touch, and then OFF.

ABS MOTOR

- Touch “ON” and “OFF” on screen. Make sure motor relay and actuator relay operates as shown in table below.

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY NOTE	ON	ON

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

cardiagn.com

COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

INFOID:0000000000924968

When the sensor rotor rotates, the magnetic field changes. The sensor converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924969

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1101	RR RH SENSOR-1	Circuit of rear RH wheel circuit is open or short circuit. Current signal from sensor is outside limits.	• Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit)
C1102	RR LH SENSOR-1	Circuit of rear LH wheel circuit is open or short circuit. Current signal from sensor is outside limits.	
C1103	FR RH SENSOR-1	Circuit of front RH wheel circuit is open or short circuit. Current signal from sensor is outside limits.	
C1104	FR LH SENSOR-1	Circuit of front LH wheel circuit is open or short circuit. Current signal from sensor is outside limits.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
RR RH SENSOR-1
RR LH SENSOR-1
FR RH SENSOR-1
FR LH SENSOR-1

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-20, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924970

CAUTION:
Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

cardiagn.com

5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	9	E39 (Front RH)	2	Existed
	16	E22 (Front LH)		
	8	B41 (Rear RH)		
	6	B44 (Rear LH)		

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	10	E39 (Front RH)	1	Existed
	5	E22 (Front LH)		
	19	B41 (Rear RH)		
	17	B44 (Rear LH)		

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E34	9, 10	E34	1, 4	Not existed
	16, 5			
	8, 19			
	6, 17			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	2	Ground	8 V or more
E22 (Front LH)			
B41 (Rear RH)			
B44 (Rear LH)			

Is the inspection result normal?

cardiagn.com

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000000924971

1. CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	Nearly matches the speedometer display (±10% or less)
FR RH SENSOR	
RR LH SENSOR	
RR RH SENSOR	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-20, "Diagnosis Procedure".

cardiagn.com

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

INFOID:0000000000977429

ABS unit continually monitors wheel speed sensors to detect abnormal signals.

DTC Logic

INFOID:0000000000924974

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	Signal from rear RH wheel sensor does not match other 3 wheel speed signals.	• Sensor not installed correctly • Sensor rotor or encoder damaged • Sensor rotor loose on axle • Electrical interference • Wheel not turning - e.g. vehicle driven on 2WD dyno • Sensor damaged • ABS unit damaged
C1106	RR LH SENSOR-2	Signal from rear LH wheel sensor does not match other 3 wheel speed signals.	
C1107	FR RH SENSOR-2	Signal from front RH wheel sensor does not match other 3 wheel speed signals.	
C1108	FR LH SENSOR-2	Signal from front LH wheel sensor does not match other 3 wheel speed signals.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
RR RH SENSOR-2
RR LH SENSOR-2
FR RH SENSOR-2
FR LH SENSOR-2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-23, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001090894

CAUTION:
Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

cardiagn.com

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	9	E39 (Front RH)	2	Existed
	16	E22 (Front LH)		
	8	B41 (Rear RH)		
	6	B44 (Rear LH)		

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	10	E39 (Front RH)	1	Existed
	5	E22 (Front LH)		
	19	B41 (Rear RH)		
	17	B44 (Rear LH)		

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E34	9, 10	E34	1, 4	Not existed
	16, 5			
	8, 19			
	6, 17			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	2	Ground	8 V or more
E22 (Front LH)			
B41 (Rear RH)			
B44 (Rear LH)			

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000001090895

cardiagn.com

1.CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	Nearly matches the speedometer display (±10% or less)
FR RH SENSOR	
RR LH SENSOR	
RR RH SENSOR	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".

cardiagn.com

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000000924978

Power is supply from the battery to ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924979

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1109	BATTERY VOLTAGE [ABNORMAL]	When the ABS actuator and electric unit (control unit) power supply is lower than normal and vehicle speed is greater than 6 km/h (4 MPH). Power supply is greater than normal limits.	• Harness or connector • ABS actuator and electric unit (control unit) • Fuse • Vehicle electrical power system

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-26, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924980

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Repair or replace connector.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Turn ignition switch ON or OFF and check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E34	18	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0 V

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.

cardiagn.com

NO >> Repair or replace malfunctioning components.

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

1. Use 12V lamp (normal rating 10 to 20W) connected between E34 terminals 18 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E34 terminals 1 and 2).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Check battery for terminal looseness, low voltage, etc. if any malfunction is found, repair malfunctioning parts.
NO >> Repair or replace malfunctioning components (check ABS earth bolt for tightness and corrosion).

cardiagn.com

C1110, C1153 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000001091113

ABS unit is continuously monitoring ECU hardware and software for correct operation.

DTC Logic

INFOID:0000000000924982

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	Possible internal failure of control unit components.	• Internal failure of control unit components • ABS solenoid valve or motor power supply/ground abnormality
C1153	EMERGENCY BRAKE	Continuous ABS/EBD control for more than 60 seconds.	• ABS control unit software failure • Wheel speed sensor input abnormality

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

1. Check both ABS solenoid valve and motor supply and ground circuits using a suitable electrical load.
2. Check wheel speed sensor inputs.
3. Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE
EMERGENCY BRAKE

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-28, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924983

INSPECTION PROCEDURE

1.REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

CAUTION:
Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than those applicable.

>> Replace ABS actuator and electric unit (control unit).

cardiagn.com

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000000924985

PUMP

The pump returns the brake fluid stored in the reservoir to the master cylinder by reducing the pressure.

MOTOR

The motor drives the pump according to the signals transmitted by the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924986

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1111	PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	• Harness or connector • ABS actuator and electric unit (control unit)
		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-29, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924987

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between the ABS actuator and electric unit (control unit) harness connector terminal and ground.

cardiagn.com

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E34	2	Ground	Battery voltage

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

Use 12V lamp (normal rating 10 to 20W) connected between E34 terminals 1 and 2. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

4.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion).

Component Inspection

INFOID:0000000000924988

1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch “ON” and “OFF” on screen. Make sure motor relay and actuator relay operates as shown in table below.

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY NOTE	ON	ON

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-29, "Diagnosis Procedure".

cardiagn.com

C1113 G SENSOR

Description

INFOID:0000000000936456

G sensor detects G affecting the vehicle, and transmits the data to the ABS actuator and electric unit (control unit) as an analog voltage signal.

DTC Logic

INFOID:0000000000936457

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1113	G SENSOR	G sensor is malfunctioning, or signal line of G sensor is open or shorted.	• Harness or connector • ABS actuator and electric unit (control unit) • G sensor • Electrical interference • Vehicle driven on 4WD rolling road

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
G SENSOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-31, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000936458

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect G sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK G SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect G sensor connector.
3. Turn ignition switch ON or OFF and check voltage between G sensor harness connector terminal and ground.

G sensor		—	Condition	Voltage
Connector	Terminal			
M71	3	Ground	Ignition switch: ON	Battery voltage
		Ground	Ignition switch: OFF	Approx. 0 V

cardiagn.com

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK G SENSOR GROUND CIRCUIT

Check continuity between G sensor harness connector terminal and ground.

G sensor		—	Continuity
Connector	Terminal		
M71	1	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK G SENSOR HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between G sensor harness connector terminals and ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit)		G sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	14	M71	1	Existed
	21		2	
	24		3	

Is the inspection result normal?

YES >> Replace G sensor.
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000936459

1.CHECK DATA MONITOR

Select “G SENSOR”, in “DATA MONITOR” and check G sensor signal.

Monitor item	DATA MONITOR
G SENSOR	ON/OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-17, "CONSULT-III Function (ABS)".

cardiagn.com

C1114 ACTUATOR RELAY SYSTEM

Description

INFOID:0000000000924990

Activates or deactivates each solenoid valve according to the signals transmitted by the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924991

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1114	MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	• Harness or connector • ABS actuator and electric unit (control unit)
		During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
MAIN RELAY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-33, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924992

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E34	3	Ground	Battery voltage

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

cardiagn.com

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

Use 12V lamp (normal rating 10 to 20W) connected between E34 terminals 1 and 3. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

4.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion).

Component Inspection

INFOID:0000000000924993

1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch “ON” and “OFF” on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY NOTE	ON	ON

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-33, "Diagnosis Procedure".

cardiagn.com

C1115 WHEEL SENSOR

Description

INFOID:0000000000977433

When the sensor rotor rotates, the magnetic field changes. The sensor converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924996

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1115	ABS SENSOR [ABNORMAL SIGNAL]	Miss-match between the 4 wheel speed sensor signals.	• Harness or connector not a possible cause. • Other possible causes - Tire radius (due to wrong size or pressure) interference.

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001090896

CAUTION:
Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.

cardiagn.com

4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	9	E39 (Front RH)	2	Existed
	16	E22 (Front LH)		
	8	B41 (Rear RH)		
	6	B44 (Rear LH)		

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	10	E39 (Front RH)	1	Existed
	5	E22 (Front LH)		
	19	B41 (Rear RH)		
	17	B44 (Rear LH)		

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E34	9, 10	E34	1, 4	Not existed
	16, 5			
	8, 19			
	6, 17			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	2	Ground	8 V or more
E22 (Front LH)			
B41 (Rear RH)			
B44 (Rear LH)			

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000001090897

1. CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

cardiagn.com

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	Nearly matches the speedometer display (±10% or less)
FR RH SENSOR	
RR LH SENSOR	
RR RH SENSOR	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".

cardiagn.com

C1116 STOP LAMP SWITCH

Description

INFOID:0000000000925000

The stop lamp switch transmits the stop lamp switch signal (ON/OFF) to the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000925001

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	• Harness or connector • Stop lamp switch • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-38, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000925002

INSPECTION PROCEDURE

1.CHECK STOP LAMP ILLUMINATE

Press brake pedal and check stop lamp illuminate.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning components.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect stop lamp switch connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors securely.
6. Start engine.
7. Repeat pumping brake pedal carefully several times, and perform self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

3.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch connector terminals.

cardiagn.com

Stop lamp switch Terminal	Condition	Continuity
1 – 2	Release stop lamp switch (When brake pedal is depressed.)	Existed
	Push stop lamp switch (When brake pedal is released.)	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace stop lamp switch.

4.CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Connect stop lamp switch connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)		Condition	Voltage
Connector	Terminal		
E34	20	Brake pedal is depressed	Battery voltage
		Brake pedal is released	Approx. 0 V

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000925003

1.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch connector terminals.

Stop lamp switch Terminal	Condition	Continuity
1 – 2	Release stop lamp switch (When brake pedal is depressed.)	Existed
	Push stop lamp switch (When brake pedal is released.)	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

cardiagn.com

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000000925005

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000925006

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1120	FR LH IN ABS SOL	When the control unit detects a malfunction in the front LH inlet solenoid circuit.	ABS actuator and electric unit (control unit)
C1122	FR RH IN ABS SOL	When the control unit detects a malfunction in the front RH inlet solenoid circuit.	
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	
C1126	RR RH IN ABS SOL	When the control unit detects a malfunction in the rear RH inlet solenoid circuit.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
FR LH IN ABS SOL
FR RH IN ABS SOL
RR LH IN ABS SOL
RR RH IN ABS SOL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000925007

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

cardiagn.com

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E34	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000925008

1.CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “KEEP”, and “DOWN”, and check that the system operates as shown in the table below.

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*

*: ON for 1 to 2 seconds after the touch, and then OFF.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure".

cardiagn.com

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000000977437

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000925011

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1121	FR LH OUT ABS SOL	When the control unit detects a malfunction in the front LH outlet solenoid circuit.	ABS actuator and electric unit (control unit)
C1123	FR RH OUT ABS SOL	When the control unit detects a malfunction in the front RH outlet solenoid circuit.	
C1125	RR LH OUT ABS SOL	When the control unit detects a malfunction in the rear LH outlet solenoid circuit.	
C1127	RR RH OUT ABS SOL	When the control unit detects a malfunction in the rear RH outlet solenoid circuit.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
FR LH OUT ABS SOL
FR RH OUT ABS SOL
RR LH OUT ABS SOL
RR RH OUT ABS SOL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-42, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001090898

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

cardiagn.com

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E34	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000001090899

1.CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “KEEP”, and “DOWN”, and check that the system operates as shown in the table below.

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*

*: ON for 1 to 2 seconds after the touch, and then OFF.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-42, "Diagnosis Procedure".

cardiagn.com

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000000925048

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000000925049

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more.	• CAN communication line • ABS actuator and electric unit (control unit)

Diagnosis Procedure

INFOID:0000000000925050

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and perform self-diagnosis.

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

cardiagn.com

BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000000925043

The brake fluid level switch converts the brake fluid level to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

Component Function Check

INFOID:0000000000925730

1.CHECK BRAKE FLUID LEVEL SWITCH OPERATION

Operate the brake fluid level switch. Then check that the brake warning lamp in the combination meter turns ON/OFF correctly.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-45, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000925045

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector and combination meter connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform component function check. Refer to BRC-45, "Component Function Check".

Is the inspection result normal?

YES >> Poor connection of connector terminal. Replace or repair connector.
NO >> GO TO 2.

2.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector.
3. Check continuity between brake fluid level switch connector terminals.

Brake fluid level switch		Condition	Continuity
Connector	Terminal		
E37	1 – 2	When brake fluid is full in the reservoir tank.	Not existed
		When brake fluid is empty in the reservoir tank.	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Brake fluid level switch is malfunction. Replace reservoir tank.

3.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

1. Disconnect combination meter connector.
2. Check continuity between brake fluid level switch harness connector terminals and combination meter harness connector terminal and/or ground.

Combination meter		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
M34	27	E37	1	Existed

cardiagn.com

Combination meter		—	Continuity
Connector	Terminal		
M34	27	Ground	Not existed

Brake fluid level switch		—	Continuity
Connector	Terminal		
E37	2	Ground	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000925046

1. CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector.
3. Check continuity between brake fluid level switch connector terminals.

Brake fluid level switch		Condition	Continuity
Connector	Terminal		
E37	1 – 2	When brake fluid is full in the reservoir tank.	Not existed
		When brake fluid is empty in the reservoir tank.	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace reservoir tank.

cardiagn.com

PARKING BRAKE SWITCH

Description

INFOID:0000000000925052

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

Diagnosis Procedure

INFOID:0000000001125317

1.CHECK COMBINATION METER INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between combination meter harness connector terminal 26 and ground.

26 – Ground	
Parking brake ON	: Approx. 0 V
Parking brake OFF	: Approx. 5 V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK PARKING BRAKE SWITCH SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and parking brake switch connector.
3. Check continuity between combination meter harness connector terminal 26 and parking brake switch harness connector terminal 1.

26 – 1	: Continuity should exist.

4. Check continuity between combination meter harness connector terminal 26 and ground.

26 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

Component Function Check

INFOID:0000000000925053

1.CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. Then check that the brake warning lamp in the combination meter turns on/off correctly.

Condition	Brake warning lamp illumination status
When the parking brake switch is operation	ON
When the parking brake switch is not operation.	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-47, "Diagnosis Procedure".

Component Inspection

INFOID:0000000000925055

INSPECTION PROCEDURE

1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.

cardiagn.com

3. Check continuity between parking brake switch terminal and ground.

Parking brake switch		—	Condition	Continuity
Connector	Terminal			
M103	1	Ground	When the parking brake switch is operated.	Existed
			When the parking brake switch is not operated.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace parking brake switch.

cardiagn.com

ABS WARNING LAMP

Description

INFOID:0000000000925060

×: ON –: OFF

Condition	ABS warning lamp
Ignition switch OFF	–
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	–
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

Component Function Check

INFOID:0000000000925061

1.CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-49, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000925062

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-21, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

cardiagn.com

BRAKE WARNING LAMP

Description

INFOID:0000000000925063

×: ON –: OFF

Condition	Brake warning lamp NOTE 1
Ignition switch OFF	–
For 1 second after turning ON ignition switch	× NOTE 2
1 second later after turning ON ignition switch	× NOTE 2
EBD function is malfunctioning.	×

NOTE:

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:0000000000925064

1. BRAKE WARNING LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to diagnosis procedure. Refer to BRC-50, "Diagnosis Procedure".

2. BRAKE WARNING LAMP OPERATION CHECK 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check parking brake switch. Refer to BRC-47, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000925065

1. CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check parking brake switch. Refer to BRC-47, "Diagnosis Procedure".

2. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check items displayed by self-diagnosis.

3. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-21, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

cardiagn.com

ECU DIAGNOSIS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000000925072

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

Monitor item	Condition		Value/Status
FR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running NOTE 1	Nearly matches the speed meter display (± 10% or less)
FR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running NOTE 1	Nearly matches the speed meter display (± 10% or less)
RR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running NOTE 1	Nearly matches the speed meter display (± 10% or less)
RR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running NOTE 1	Nearly matches the speed meter display (± 10% or less)
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
DECEL G SENSOR NOTE 2	Decel G detected by decel G sensor	Vehicle on level surface or on slope	According to gradient of slope
FR RH IN SOL	Operation status of front RH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR RH OUT SOL	Operation status of front RH outlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH IN SOL	Operation status of front LH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off

cardiagn.com

Monitor item	Condition		Value/Status
FR LH OUT SOL	Operation status of front LH outlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH IN SOL	Operation status of rear RH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of rear RH outlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH IN SOL	Operation status of rear LH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of rear LH outlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	On
		When the motor relay and motor are not operating	Off
ACTUATOR RLY NOTE 3	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
ABS WARN LAMP	ABS warning lamp NOTE 4	When ABS warning lamp is ON	On
		When ABS warning lamp is OFF	Off
EBD SIGNAL	EBD operation	EBD is active	On
		EBD is inactive	Off
ABS SIGNAL	ABS operation	ABS is active	On
		ABS is inactive	Off
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	On
		EBD is normal	Off
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	On
		ABS is normal	Off

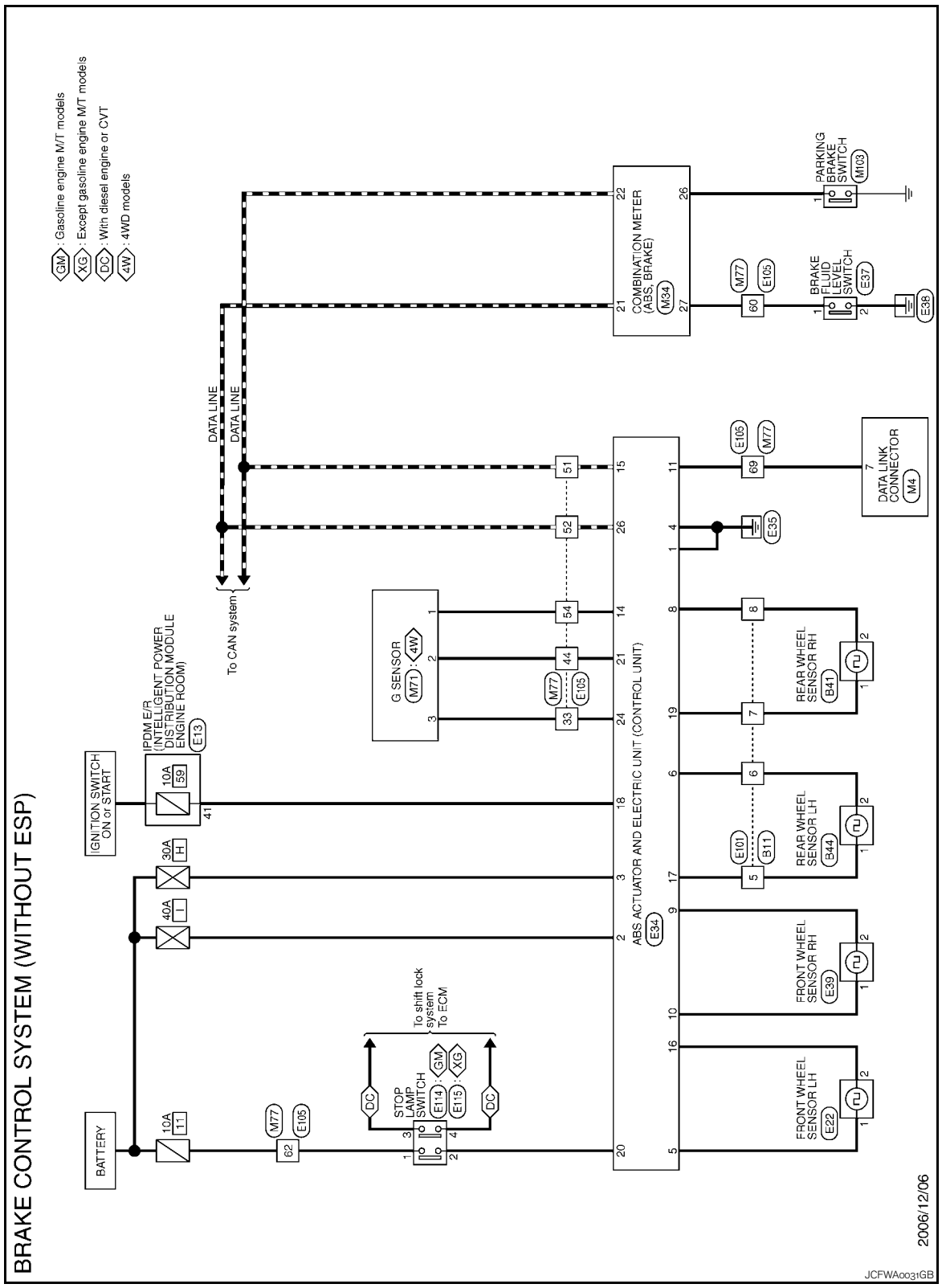
NOTE:

- 1: Confirm tire pressure is normal.
- 2: Only 4WD models.
- 3: Every 20 seconds momentary switch to OFF.
- 4: On and off timing for warning lamp and indicator lamp. Refer to BRC-49, "Description".

Wiring Diagram - BRAKE CONTROL SYSTEM -

INFOID:0000000000925073

cardiagn.com



cardiagn.com

BRAKE CONTROL SYSTEM (WITHOUT ESP)

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
5	G/O	–
6	G/Y	–
7	LG	–
8	P	– [2WD models without ESP]

Connector No.	B41
Connector Name	REAR WHEEL SENSOR RH
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	P	– [2WD models without ESP]

Connector No.	B44
Connector Name	REAR WHEEL SENSOR LH
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	G/O	–
2	G/Y	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
41	P	–

Connector No.	E22
Connector Name	FRONT WHEEL SENSOR LH
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	– [Without ESP]
2	Y	–

Connector No.	E34
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AH24-LH

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND(MTR)
2	Y	+B(MTR)
3	W/R	+B(SOL)
4	B	GND(SOL)
5	R/L	DS FL
6	G/Y	DP RL
8	P	DP RR[2WD models]
8	V	DP RR[4WD models]
9	W	DP FR
10	B	DS FR
11	O	DIAG-K

I4	L	AGND
I5	P	CAN-L
I6	Y	DP FL
I7	G/O	DS RL
I8	P	IGN
I9	LG	DS RR
20	R/W	STOP L SIG
21	W	AX
24	BR	UST
26	L	CAN-H

Connector No.	E37
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Type	YV02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/B	–
2	B	–

JCFWA0032GB

cardiagn.com

BRAKE CONTROL SYSTEM (WITHOUT ESP)

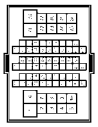
Connector No.	E39
Connector Name	FRONT WHEEL SENSOR RH
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	W	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
5	G/O	–
6	G/Y	–
7	LG	–
8	P	–[2WD models without ESP]

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
33	BR	–
44	W	–[4WD models without ESP]
51	P	–
52	L	–[4WD models without ESP]
54	L	–[4WD models without ESP]
60	R/B	–
62	V	–
69	O	–

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–

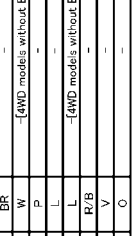
Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–
3	G	–[With CVT]
3	O	–[With diesel engine]
4	B	–[With CVT]
4	W/L	–[With diesel engine]

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



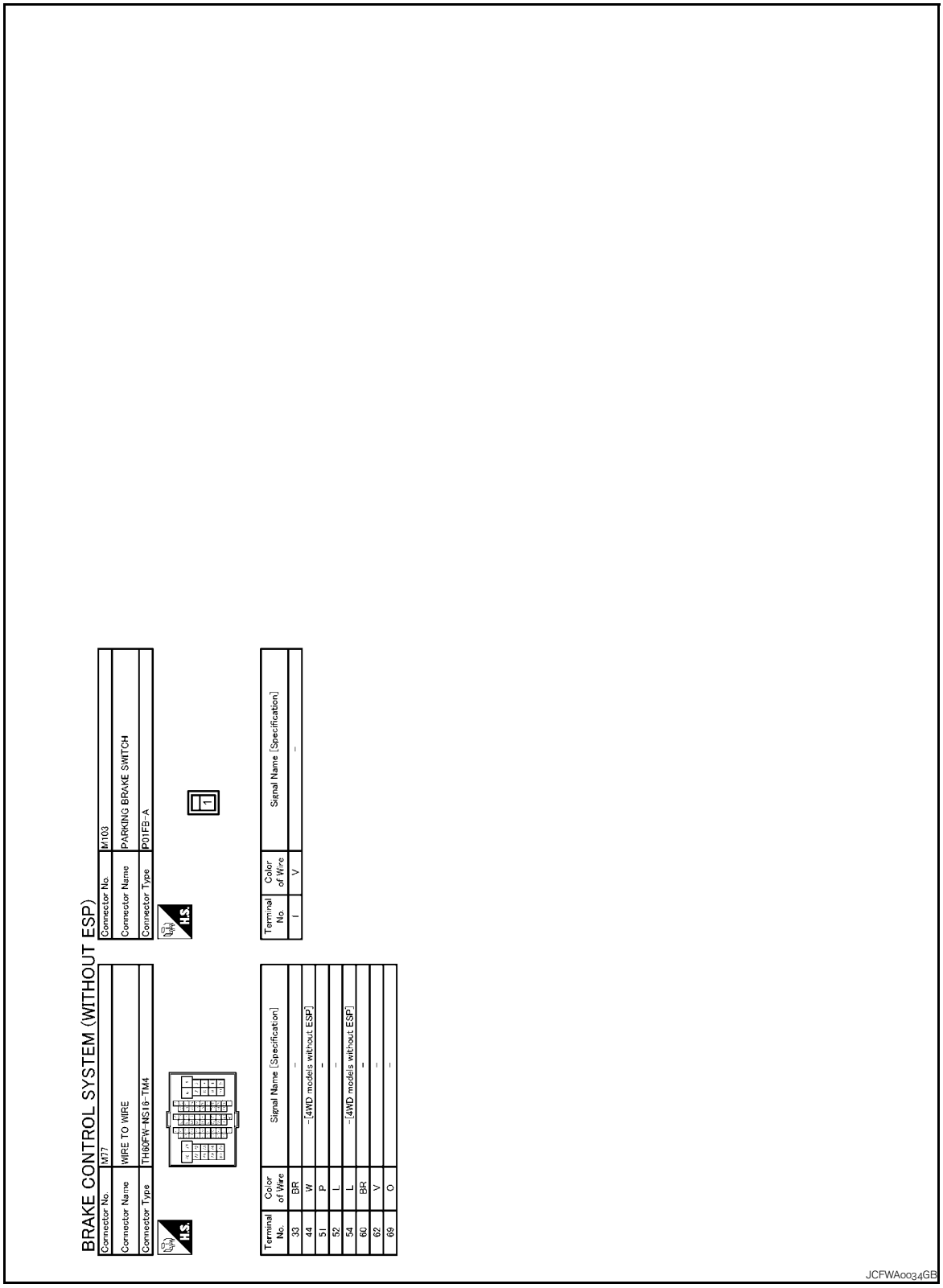
Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN–H
22	P	CAN–L
26	V	PARKING BRAKE SW
27	BR	BRAKE FLUID LEVEL SW

Connector No.	M71
Connector Name	G SENSOR
Connector Type	A03FBR

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	GND
2	W	OUTPUT
3	BR	B

JCFWA0033GB

cardiagn.com



Fail-Safe

INFOID:0000000000925074

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp will turn ON. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp will turn ON. Simultaneously, the ABS become one of the following conditions of the fail-safe function.

cardiagn.com

- For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without ABS system.
  NOTE:
  ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for “Ignition switch ON” and “The first starting” are being performed.
- For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without ABS, EBD system.

DTC No. Index

INFOID:0000000000925075

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-20, "Description"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-23, "Description"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-26, "Description"
C1110	CONTROLLER FAILURE	BRC-28, "Description"
C1111	PUMP MOTOR	BRC-29, "Description"
C1113	G SENSOR	BRC-31, "Description"
C1114	MAIN RELAY	BRC-33, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-35, "Description"
C1116	STOP LAMP SW	BRC-38, "Description"
C1120	FR LH IN ABS SOL	BRC-40, "Description"
C1121	FR LH OUT ABS SOL	BRC-42, "Description"
C1122	FR RH IN ABS SOL	BRC-40, "Description"
C1123	FR RH OUT ABS SOL	BRC-42, "Description"
C1124	RR LH IN ABS SOL	BRC-40, "Description"
C1125	RR LH OUT ABS SOL	BRC-42, "Description"
C1126	RR RH IN ABS SOL	BRC-40, "Description"
C1127	RR RH OUT ABS SOL	BRC-42, "Description"
C1153	EMERGENCY BRAKE	BRC-28, "Description"
U1000	CAN COMM CIRCUIT	BRC-44, "Description"

cardiagn.com

SYMPTOM DIAGNOSIS

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000000925077

1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-46, "General Specifications" (LHD models), BR-90, "General Specifications" (RHD models).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check brake system.

2.CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles.
- Front: FAX-7, "Inspection" (2WD models), FAX-47, "Inspection" (4WD models)
- Rear: RAX-3, "Inspection" (2WD models), RAX-9, "Inspection" (4WD models)

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.
- Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4.
NO >>
- Replace wheel sensor or sensor rotor.
- Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving.

Is the ABS warning lamp illuminated?

YES >> Perform self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".
NO >> INSPECTION END

cardiagn.com

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000000925078

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment" (LHD models), BR-52, "Inspection and Adjustment" (RHD models).

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
- Brake pedal: BR-8, "Exploded View" (LHD models), BR-52, "Exploded View" (RHD models).
- Brake booster: BR-14, "Exploded View" (LHD models), BR-58, "Exploded View" (RHD models).
- Brake master cylinder: BR-13, "Exploded View" (LHD models), BR-57, "Exploded View" (RHD models).
- Brake fluid: BR-11, "Inspection" (LHD models), BR-55, "Inspection" (RHD models).

NO >> GO TO 2.

2.CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is normal in this condition. Connect connector after inspection.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check brake system.

cardiagn.com

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000000925079

CAUTION:

The stopping distance on slippery road surfaces might be longer with the ABS operating than when the ABS is not operating.

1. CHECK FUNCTION

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check brake system.

cardiagn.com

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000925080

CAUTION:
ABS does not operate when speed is 10 km/h (6 MPH) or lower.

1. CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Perform self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

cardiagn.com

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000000925081

CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.

- **When shifting gears**
- **When driving on slippery road**
- **During cornering at high speed**
- **When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]**
- **When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]**

1. SYMPTOM CHECK 1

Check that there are pedal vibrations when the engine is started.

Do vibrations occur?

YES >> GO TO 2.
NO >> Inspect the brake pedal.

2. SYMPTOM CHECK 2

Check that there are ABS operation noises when the engine is started.

Do the operation noises occur?

YES >> GO TO 3.
NO >> Perform self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

3. SYMPTOM CHECK 3

Check symptoms when electrical component (headlamps, etc.) switches are operated.

Do symptoms occur?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
NO >> INSPECTION END

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000000925083

Symptom	Result
Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS is activated.	This is a normal condition due to the ABS activation.
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is a normal, and it is caused by the ABS operation check.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" Service

INFOID:0000000000925084

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

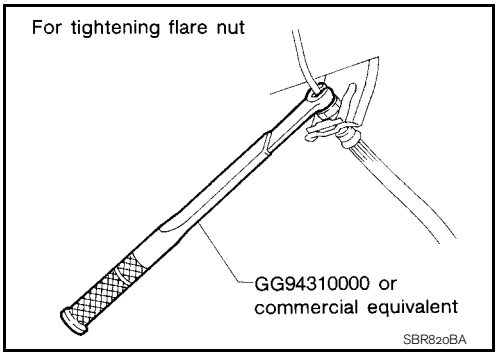
Precaution for Brake System

INFOID:0000000000925085

WARNING:

Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.

- Only use DOT 4 brake fluid. Refer to MA-21, "Fluids and Lubricants".
- Never to reuse drained brake fluid.
- Never to spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Never to use mineral oils such as gasoline or light oil. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with a flare nut torque wrench.
- Always conform the specified tightening torque when installing the brake pipes.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.



Precaution for Brake Control

INFOID:0000000000925086

- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.

cardiagn.com

- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.

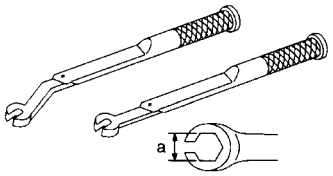
cardiagn.com

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000000925087

Tool number Tool name		Description
GG94310000 Flare nut torque wrench a: 10 mm (0.39 in)/ 12 mm (0.47 in)	 S-NT406	Installing each brake piping

cardiagn.com

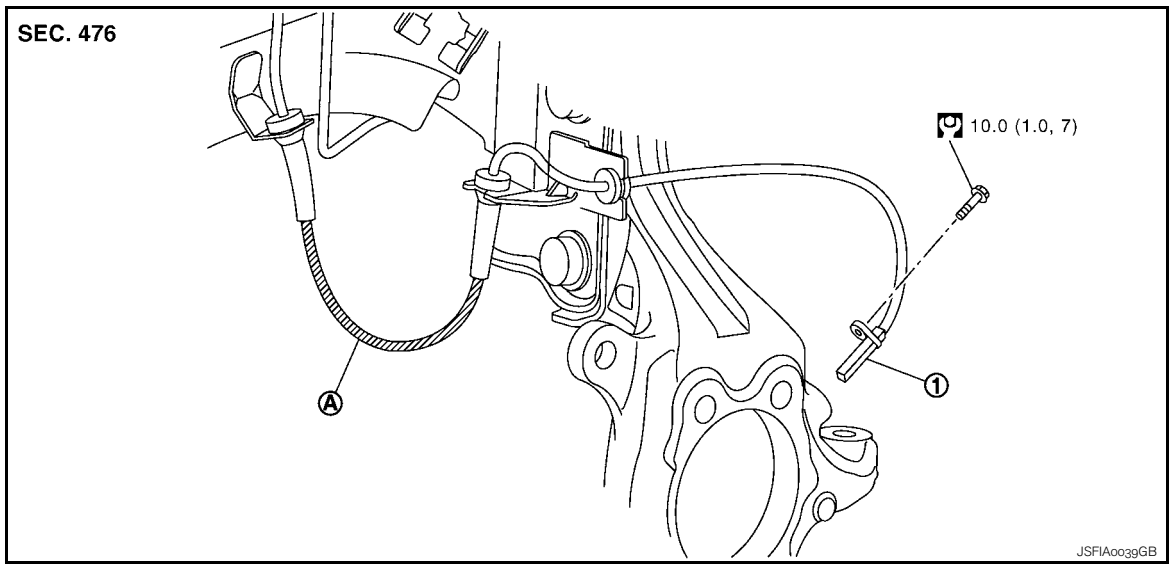
ON-VEHICLE REPAIR

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000001115319



1. Front LH wheel sensor

A. White line (slant line)

Refer to GI section GI-4, "Components" for symbols in the figure.

NOTE:
The above figure (front side) shows left side. Right side is the mirror image.

FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000001115320

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**
- **When you see the harness of the wheel sensor from the front side of the vehicle ensure that the white lines (A) are not twisted.**

INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View".

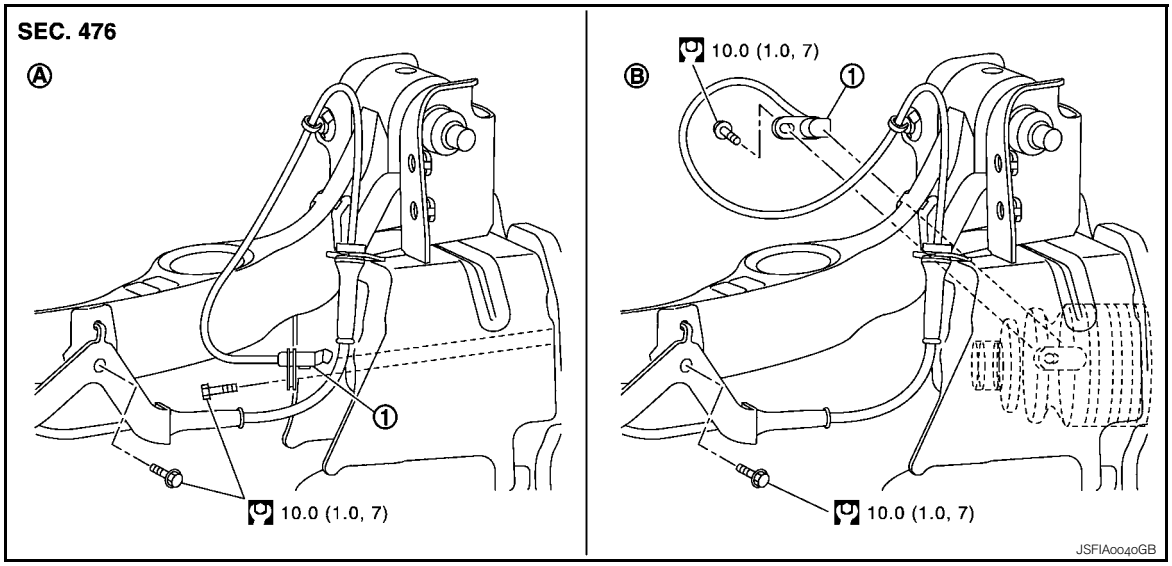
- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

INFOID:0000000001115321

cardiagn.com



1. Rear LH wheel sensor

A. 2WD models B. 4WD models

Refer to GI section GI-4, "Components" for symbols in the figure.

NOTE:
The above figure (front side) shows left side. Right side is the mirror image.

REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000001115322

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:
- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**

INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".
- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

cardiagn.com

SENSOR ROTOR

FRONT SENSOR ROTOR

FRONT SENSOR ROTOR : Exploded View

INFOID:0000000001115323

Refer to FAX-9, "Exploded View" (2WD models), FAX-49, "Exploded View" (4WD models).

FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000001115324

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with wheel hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-49, "Removal and Installation" (4WD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with wheel hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-49, "Removal and Installation" (4WD models).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Exploded View

INFOID:0000000001115325

Refer to RAX-4, "Exploded View" (2WD models), RAX-13, "Exploded View" (4WD models).

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000001115326

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with wheel hub and bearing assembly. Refer to RAX-4, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with wheel hub and bearing assembly. Refer to RAX-4, "Removal and Installation".

4WD MODELS

For removal and installation of sensor rotor, refer to RAX-14, "Disassembly and Assembly".

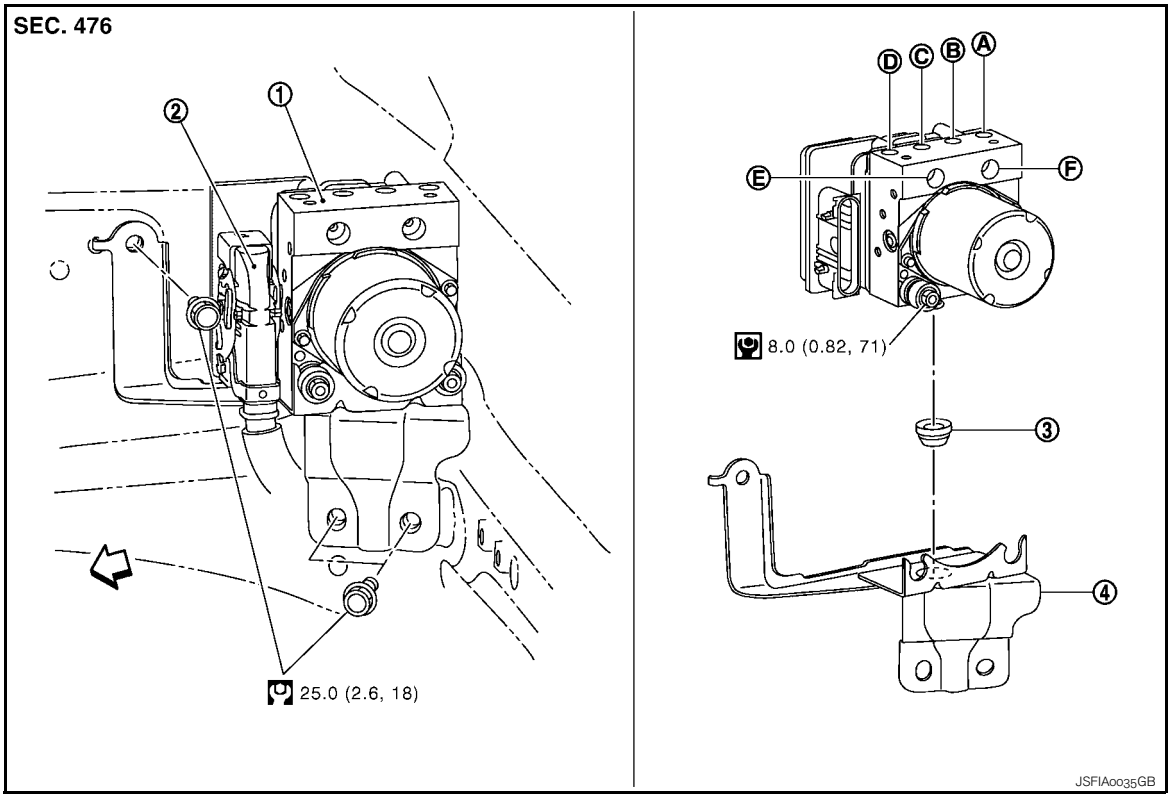
cardiagn.com

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000000925095

LHD models



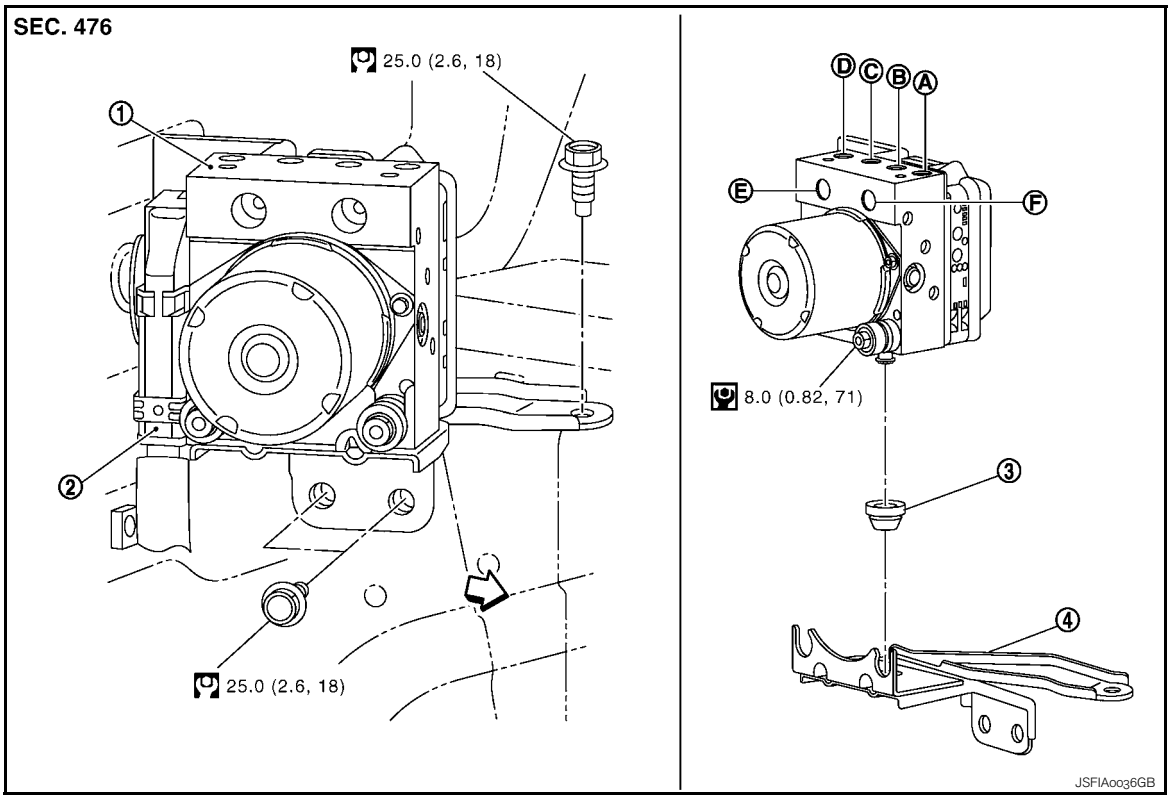
1.	ABS actuator and electric unit (control unit)	2.	Connector	3.	Bushing
4.	Bracket				
A.	To front LH brake caliper	B.	To rear RH brake caliper	C.	To Rear LH brake caliper
D.	To front RH brake caliper	E.	From master cylinder secondary side	F.	From master cylinder primary side

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

cardiagn.com

RHD models



1.	ABS actuator and electric unit (control unit)	2.	Connector	3.	Bushing
4.	Bracket				
A.	To front LH brake caliper	B.	To rear RH brake caliper	C.	To Rear LH brake caliper
D.	To front RH brake caliper	E.	From master cylinder secondary side	F.	From master cylinder primary side

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000925096

LHD MODELS

Removal

CAUTION:

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).**

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove exhaust manifold.
   - HR16DE: EX-5, "Exploded View"
   - MR20DE: EX-10, "Exploded View"
   - K9K: EX-15, "Exploded View"
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
5. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
6. Remove ABS actuator and electric unit (control unit) from vehicle.

cardiagn.com

Installation

Note the following, and install in the reverse order of removal.

CAUTION:

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**

RHD MODELS

Removal

CAUTION:

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).**

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove air cleaner and air duct.
   - HR16DE: EM-27, "Exploded View"
   - MR20DE: EM-144, "Exploded View"
   - K9K: EM-265, "Exploded View"
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
5. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
6. Remove ABS actuator and electric unit (control unit) from vehicle.

Installation

Note the following, and install in the reverse order of removal.

CAUTION:

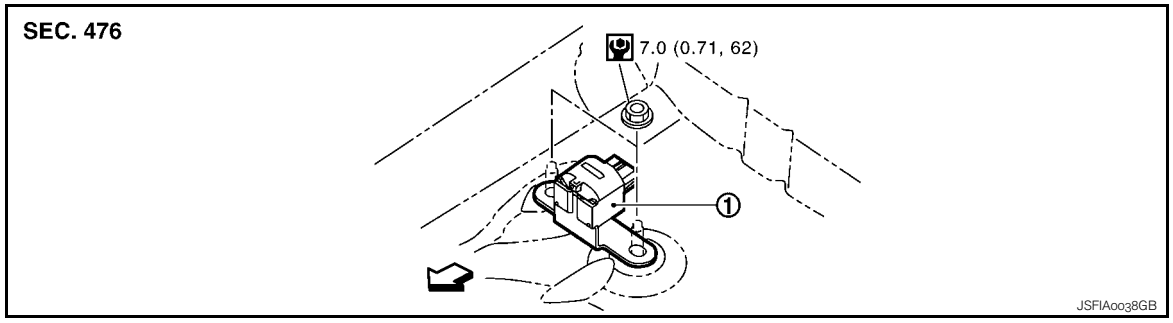
- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**

cardiagn.com

G SENSOR

Exploded View

INFOID:0000000000925097



1. G sensor

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000925098

REMOVAL

CAUTION:

- **Do not drop or strike G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because G sensor is sensitive for the impact.**

1. Remove lower instrument cover RH. Refer to IP-11, "Exploded View".
2. Disconnect G sensor harness connector.
3. Remove mounting nuts. Remove G sensor.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

- **Do not drop or strike G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because G sensor is sensitive for the impact.**

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

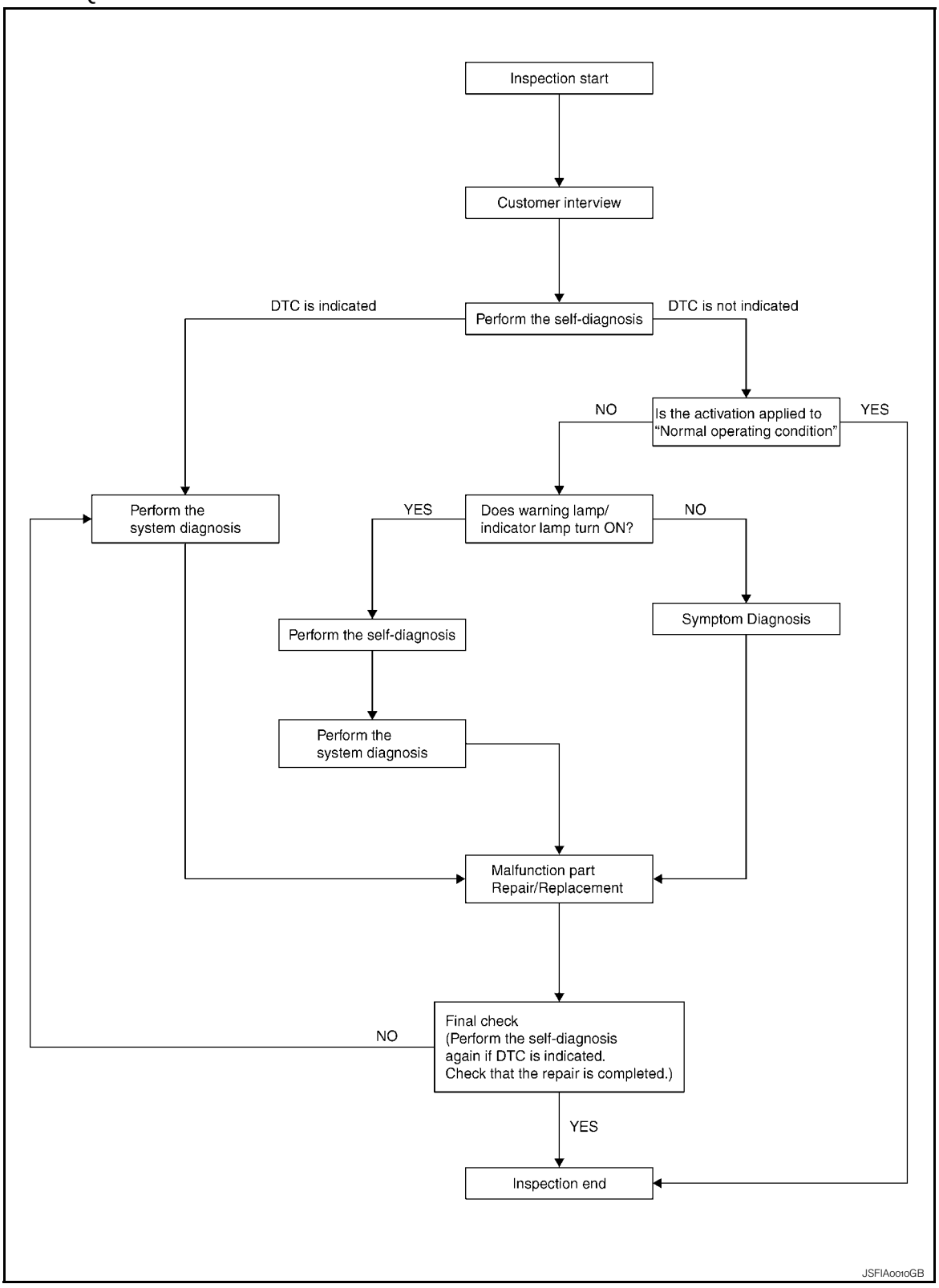
INFOID:0000000000924789

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

cardiagn.com

OVERALL SEQUENCE



DETAIED FLOW

1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-77, "Diagnostic Work Sheet".

>> GO TO 2.

cardiagn.com

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is there any DTC displayed?

YES >> GO TO 3.
NO >> GO TO 4.

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-160, "DTC No. Index".

>> GO TO 7.

4.CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-168, "Description".

Is the symptom is a normal operation?

YES >> INSPECTION END
NO >> GO TO 5.

5.CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.
- ABS warning lamp: Refer to BRC-149, "Description".
- Brake warning lamp: Refer to BRC-150, "Description".
- ESP OFF indicator lamp: Refer to BRC-151, "Description".
- SLIP indicator lamp: Refer to BRC-152, "Description".

Is ON/OFF timing normal?

YES >> GO TO 6.
NO >> GO TO 2.

6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7.

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any DTC indicated?

YES >> GO TO 3.
NO >> INSPECTION END

cardiagn.com

Diagnostic Work Sheet

INFOID:0000000000924790

Customer name MR/MS	Model & Year		VIN
Engine #	Trans.		Mileage
Incident Date	Manuf. Date		In Service Date
Symptoms	☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle)	☐ Warning / Indicator activate	☐ Firm pedal operation Large stroke pedal operation
	☐ TCS does not work (Rear wheels slip when accelerating)	☐ ABS does not work (Wheels lock when braking)	☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐Snow ☐Gravel ☐Other) ☐ Bumps / potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

SFIA3265E

cardiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000000924791

After replacing the ABS actuator and electric unit (control unit), perform the neutral position adjustment for the steering angle sensor.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000000924792

1.PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description

INFOID:0000000000924793

In case of doing work that applies to the list below, make sure to adjust neutral position of steering angle sensor before running vehicle.

×: Required –: Not required

Situation	Adjustment of steering angle sensor neutral position
Removing/Installing ABS actuator and electric unit (control unit)	—
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering angle sensor	×
Replacing steering angle sensor	×
Removing/Installing steering components	×
Replacing steering components	×
Removing/Installing suspension components	×
Replacing suspension components	×
Change tires to new ones	—
Tire rotation	—
Adjusting wheel alignment	×

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement

INFOID:0000000000924794

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

CAUTION:

To adjust neutral position of steering angle sensor, make sure to use CONSULT-III.
(Adjustment cannot be done without CONSULT-III).

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

2.PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

1. On the CONSULT-III screen, touch "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT" in order.
2. Touch “START”.

cardiagn.com

CAUTION:
Do not touch steering wheel while adjusting steering angle sensor.

3. After approximately 10 seconds, touch “END”.
NOTE:
After approximately 60 seconds, it ends automatically.
4. Turn ignition switch OFF, then turn it ON again.
CAUTION:
Be sure to perform above operation.

>> GO TO 3.

3. CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.
2. Select “DATA MONITOR”. Then make sure “STR ANGLE SIG” is within 0±2.5°.

Is the steering angle within the specified range?

YES >> GO TO 4.
NO >> Perform the neutral position adjustment for the steering angle sensor again, GO TO 1.

4. ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memories of the ABS actuator and electric unit (control unit) and ECM.
- ABS actuator and electric unit (control unit): Refer to BRC-96, "CONSULT-III Function (ABS)".
- ECM
- HR16DE (With EURO-OBD): EC-100, "CONSULT-III Function".
- HR16DE (Without EURO-OBD): EC-430, "CONSULT-III Function".
- MR20DE (With EURO-OBD): EC-719, "CONSULT-III Function".
- MR20DE (Without EURO-OBD): EC-1054, "CONSULT-III Function".
- K9K: EC-1315, "Diagnosis Description".

Are the memories erased?

YES >> INSPECTION END
NO >> Check the items indicated by the self-diagnosis.

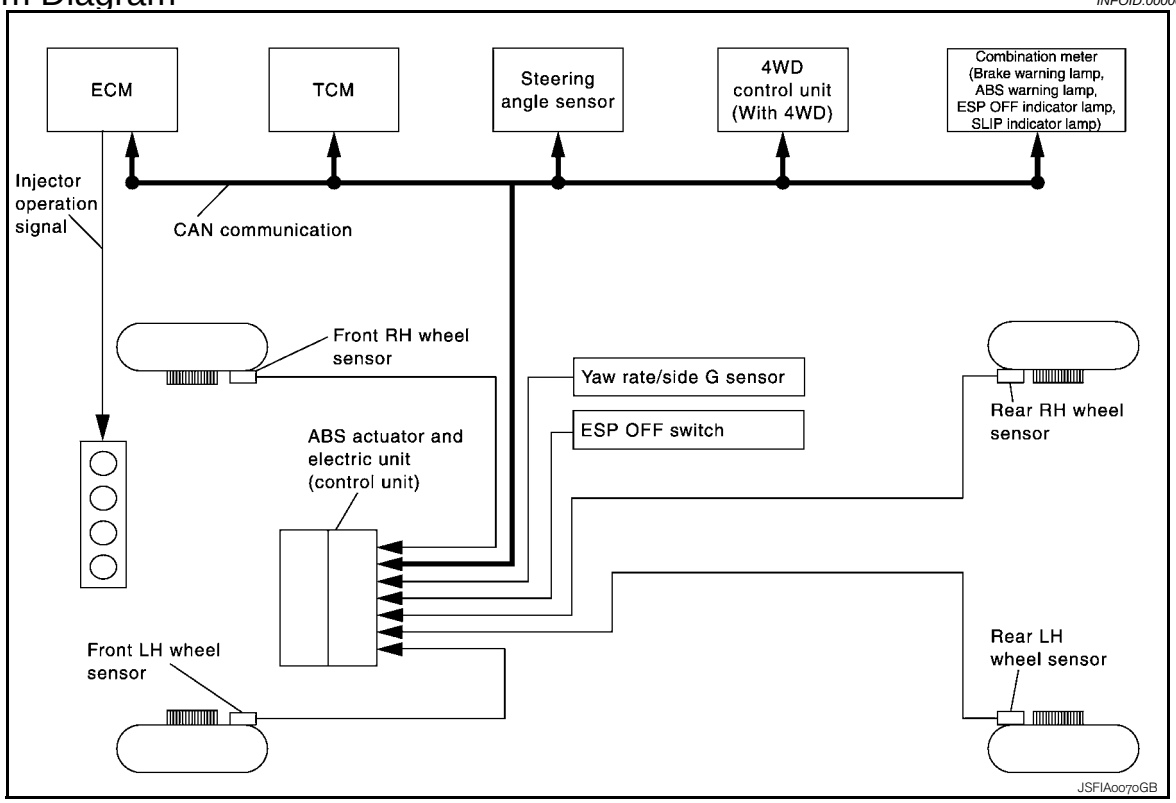
cardiagn.com

FUNCTION DIAGNOSIS

ESP

System Diagram

INFOID:0000000000924795



System Description

INFOID:0000000000924796

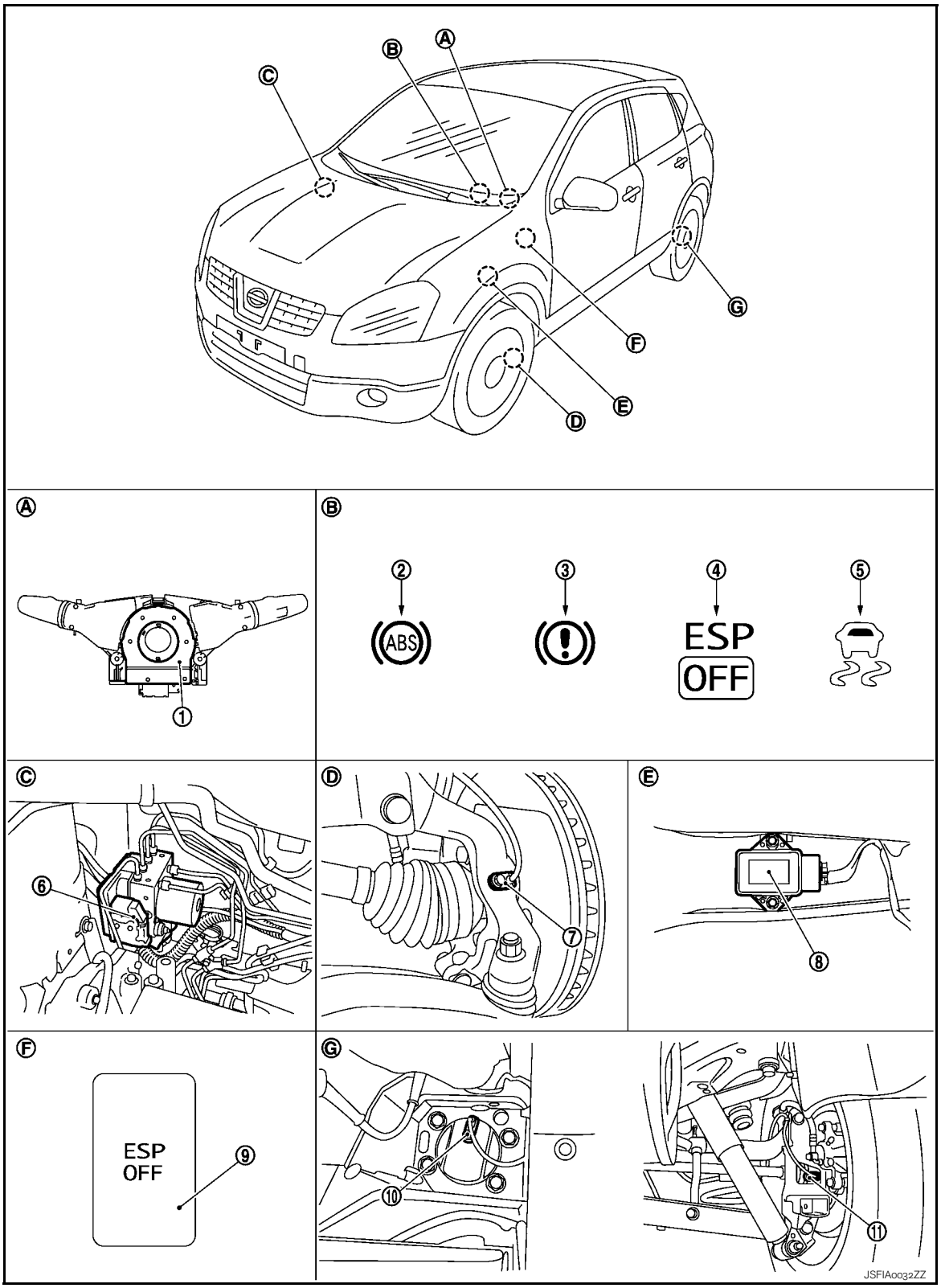
- Electronic Stability Program system detects driver's steering operation amount and brake pedal travel from steering angle sensor and pressure sensor. Using information from yaw rate sensor, G sensor and wheel sensor, ESP judges driving condition (conditions of under steer and over steer) to improve vehicle driving stability by controlling brake application to 4 wheels and engine output.
- During ESP operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

Component Parts Location

INFOID:0000000000924797

cardiagn.com

LHD models



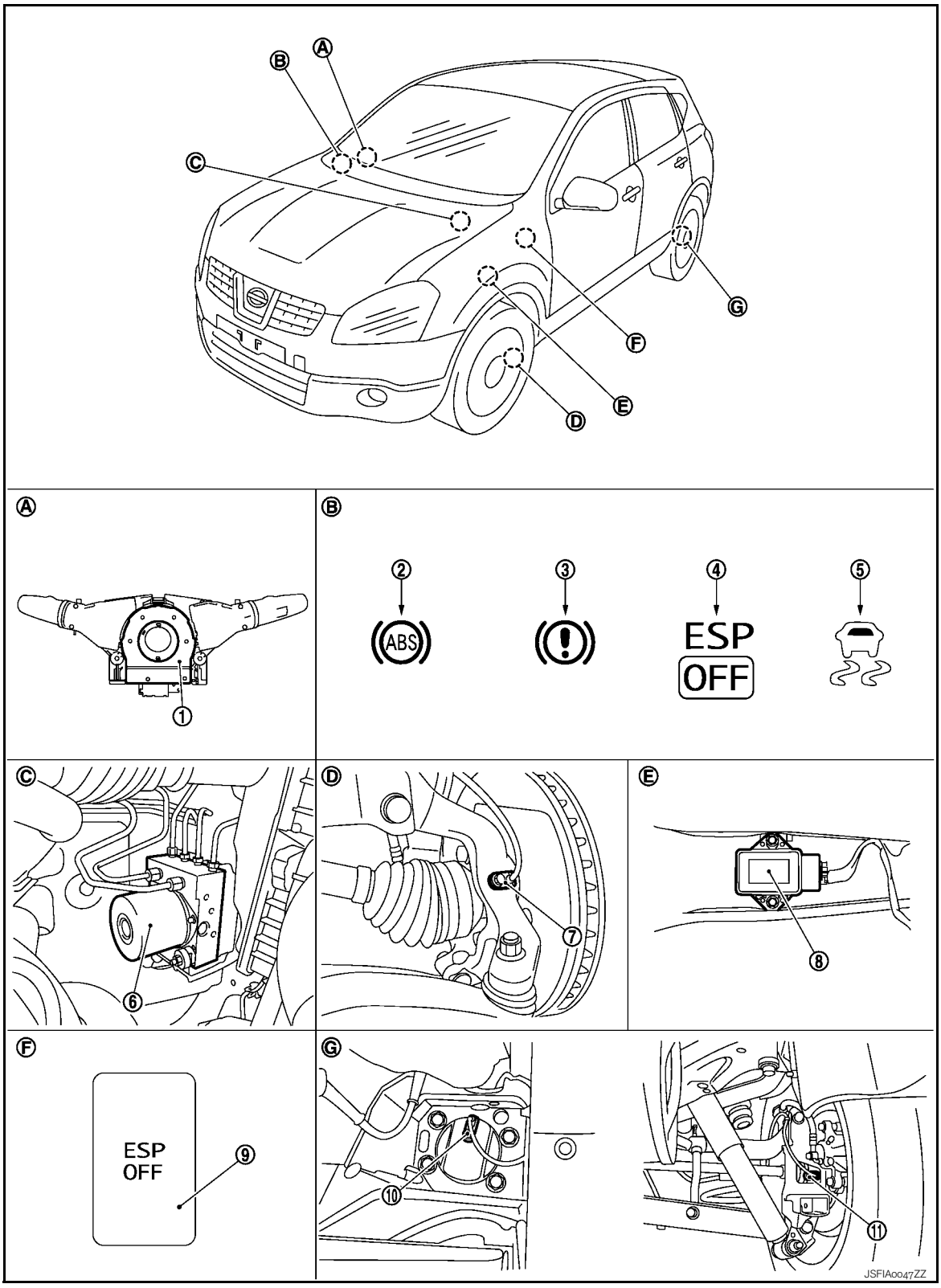
1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)

A. Back of spiral cable assembly
B. Combination meter
C. Right side in engine room

cardiagn.com

D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

RHD models



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch

cardiagn.com

10. Rear wheel sensor (2WD models) 11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly B. Combination meter C. Left side in engine room
D. Steering knuckle E. Lower instrument cover RH F. Instrument driver lower panel
G. Rear suspension arm

Component Description

INFOID:0000000000924798

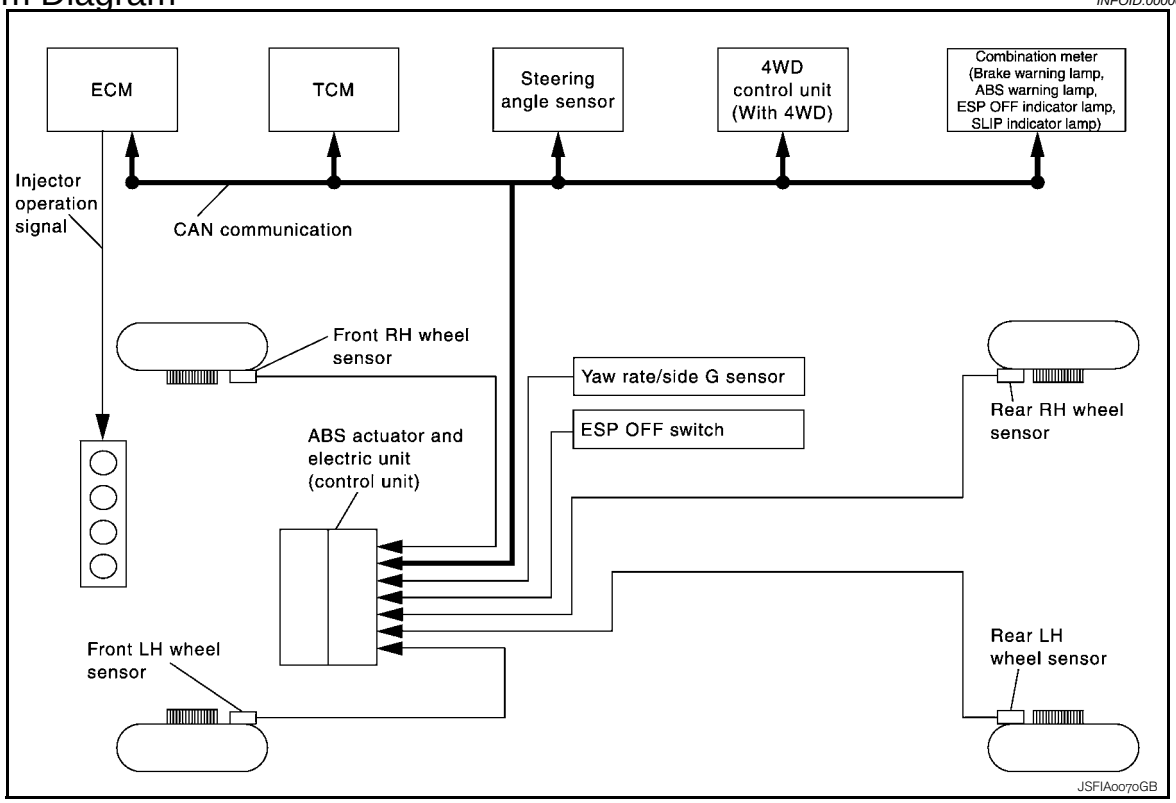
Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-110, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-113, "Description"
	Solenoid valve	BRC-121, "Description"
	Pressure sensor	BRC-128, "Description"
	ESP switch-over valve (USV1, USV2, HSV1, HSV2)	BRC-138, "Description"
Wheel sensor		BRC-100, "Description"
Yaw rate sensor		BRC-133, "Description"
G sensor		BRC-136, "Description"
Steering angle sensor		BRC-130, "Description"
ESP OFF switch		BRC-147, "Description"
ABS warning lamp		BRC-149, "Description"
Brake warning lamp		BRC-150, "Description"
ESP OFF indicator lamp		BRC-151, "Description"
SLIP indicator lamp		BRC-152, "Description"

cardiagn.com

TCS

System Diagram

INFOID:0000000000977394



System Description

INFOID:0000000000924800

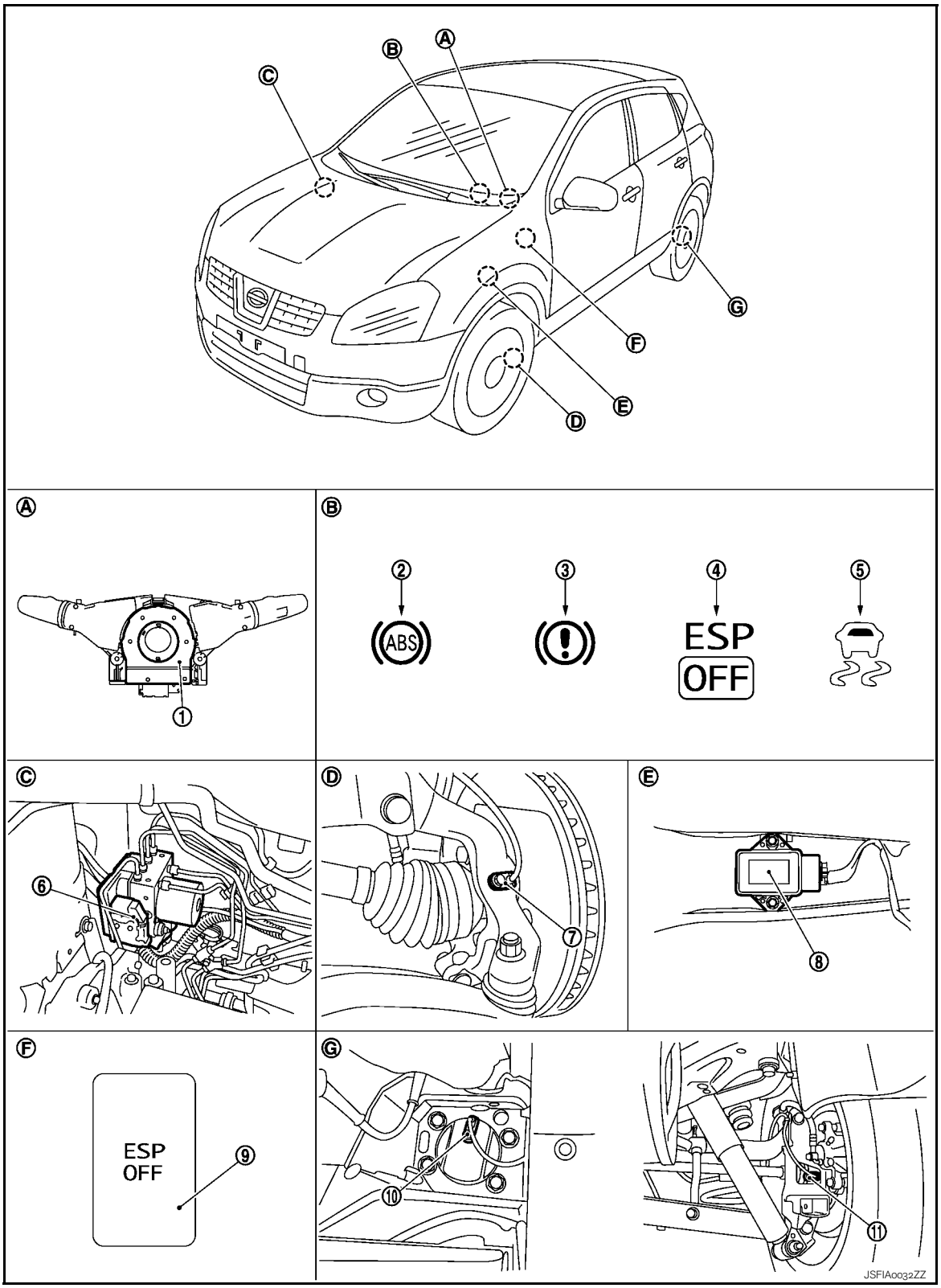
- Traction Control System is a function that electronically controls engine torque, brake fluid pressure and gear ratio (except M/T) to ensure the optimum slippage ratio at drive wheels by computing wheel speed signals from 4 wheel sensors. When ABS actuator and electric unit (control unit) detects a spin at drive wheels (rear wheels), it compares wheel speed signals from all 4 wheels. At this time, LH and RH rear brake fluid pressure are controlled, while fuel being cut to engine and throttle valve being closed to reduce engine torque by the control unit. Further more, throttle position is continuously controlled to ensure the optimum engine torque at all times.
- During TCS operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

Component Parts Location

INFOID:0000000000977395

cardiagn.com

LHD models



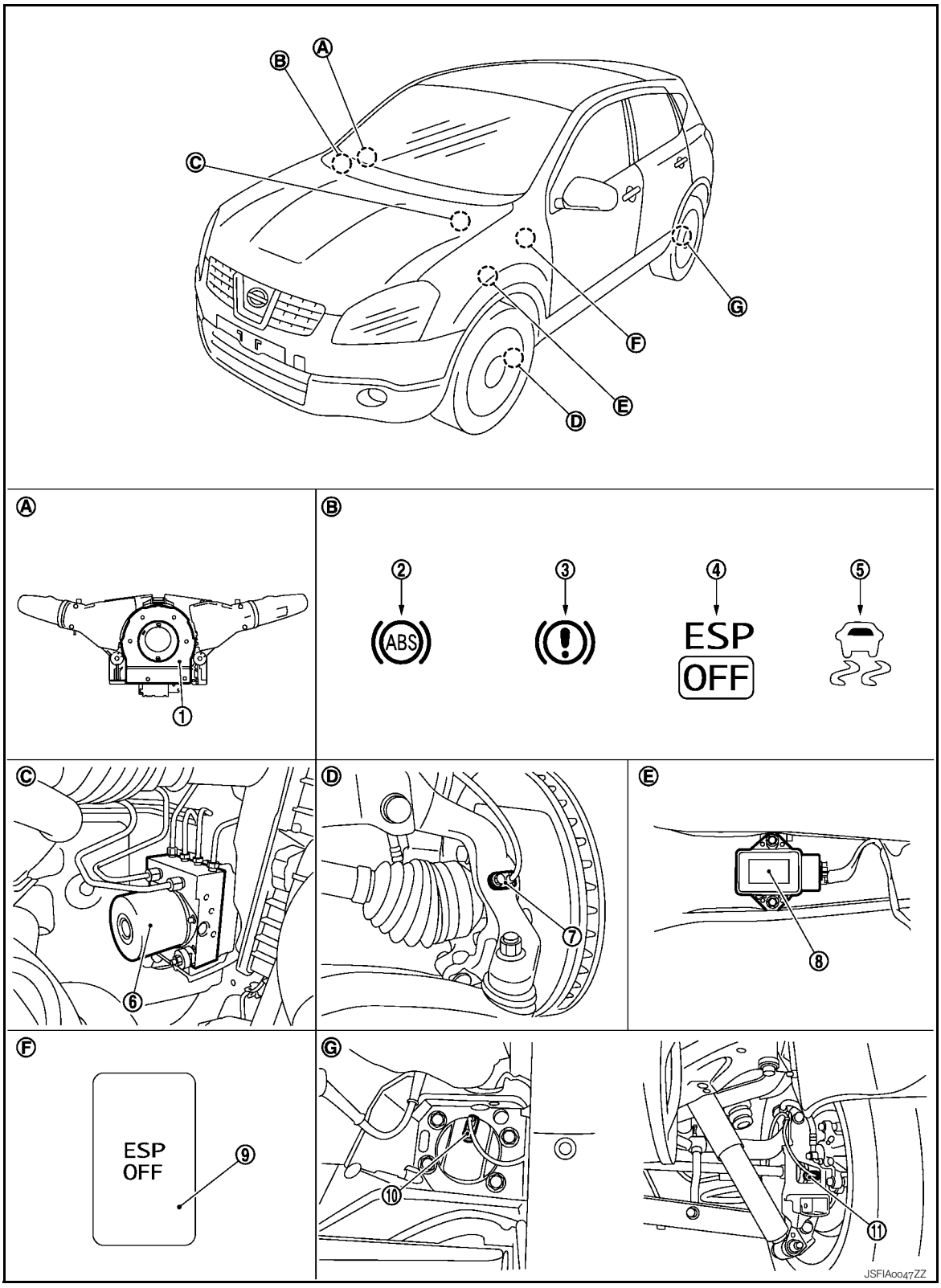
1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)

A. Back of spiral cable assembly
B. Combination meter
C. Right side in engine room

cardiagn.com

D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

RHD models



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch

cardiagn.com

10. Rear wheel sensor (2WD models) 11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly B. Combination meter C. Left side in engine room
D. Steering knuckle E. Lower instrument cover RH F. Instrument driver lower panel
G. Rear suspension arm

Component Description

INFOID:0000000000977396

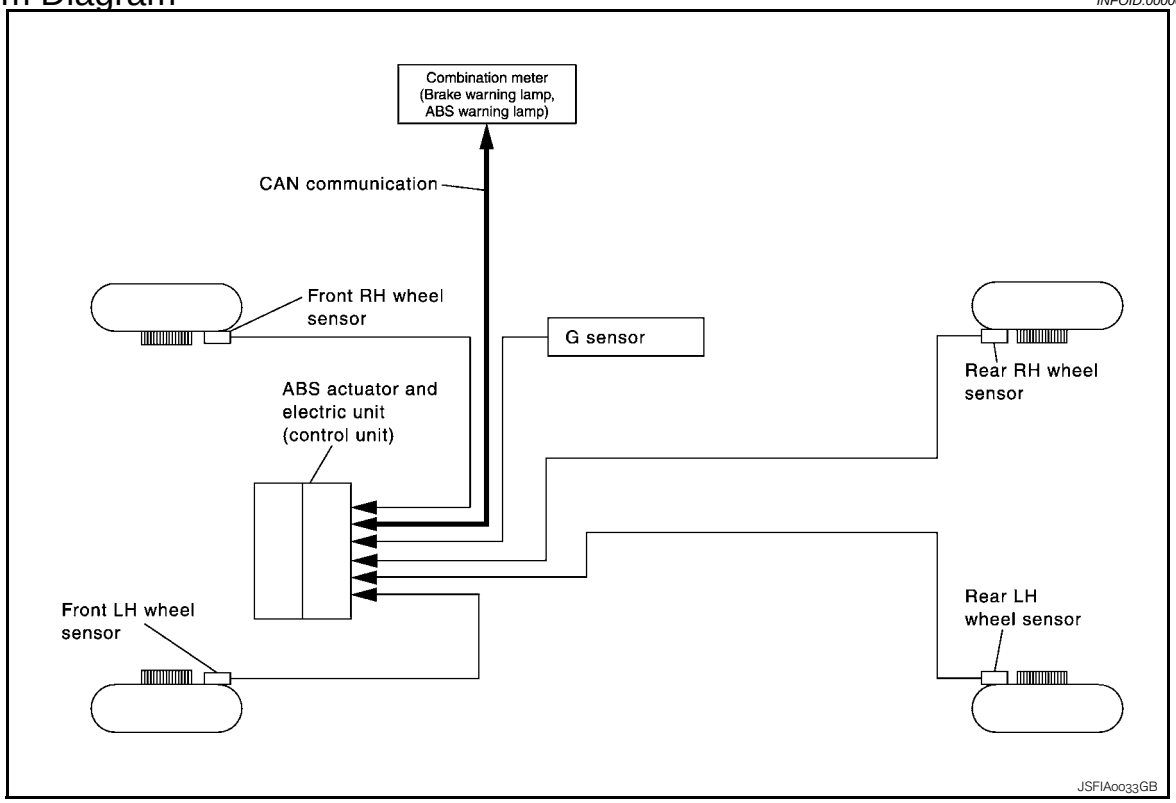
Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-110, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-113, "Description"
	Solenoid valve	BRC-121, "Description"
	Pressure sensor	BRC-128, "Description"
	ESP switch-over valve (USV1, USV2, HSV1, HSV2)	BRC-138, "Description"
Wheel sensor		BRC-100, "Description"
Yaw rate sensor		BRC-133, "Description"
G sensor		BRC-136, "Description"
Steering angle sensor		BRC-130, "Description"
ESP OFF switch		BRC-147, "Description"
ABS warning lamp		BRC-149, "Description"
Brake warning lamp		BRC-150, "Description"
ESP OFF indicator lamp		BRC-151, "Description"
SLIP indicator lamp		BRC-152, "Description"

cardiagn.com

ABS

System Diagram

INFOID:0000000000924803



System Description

INFOID:0000000000924804

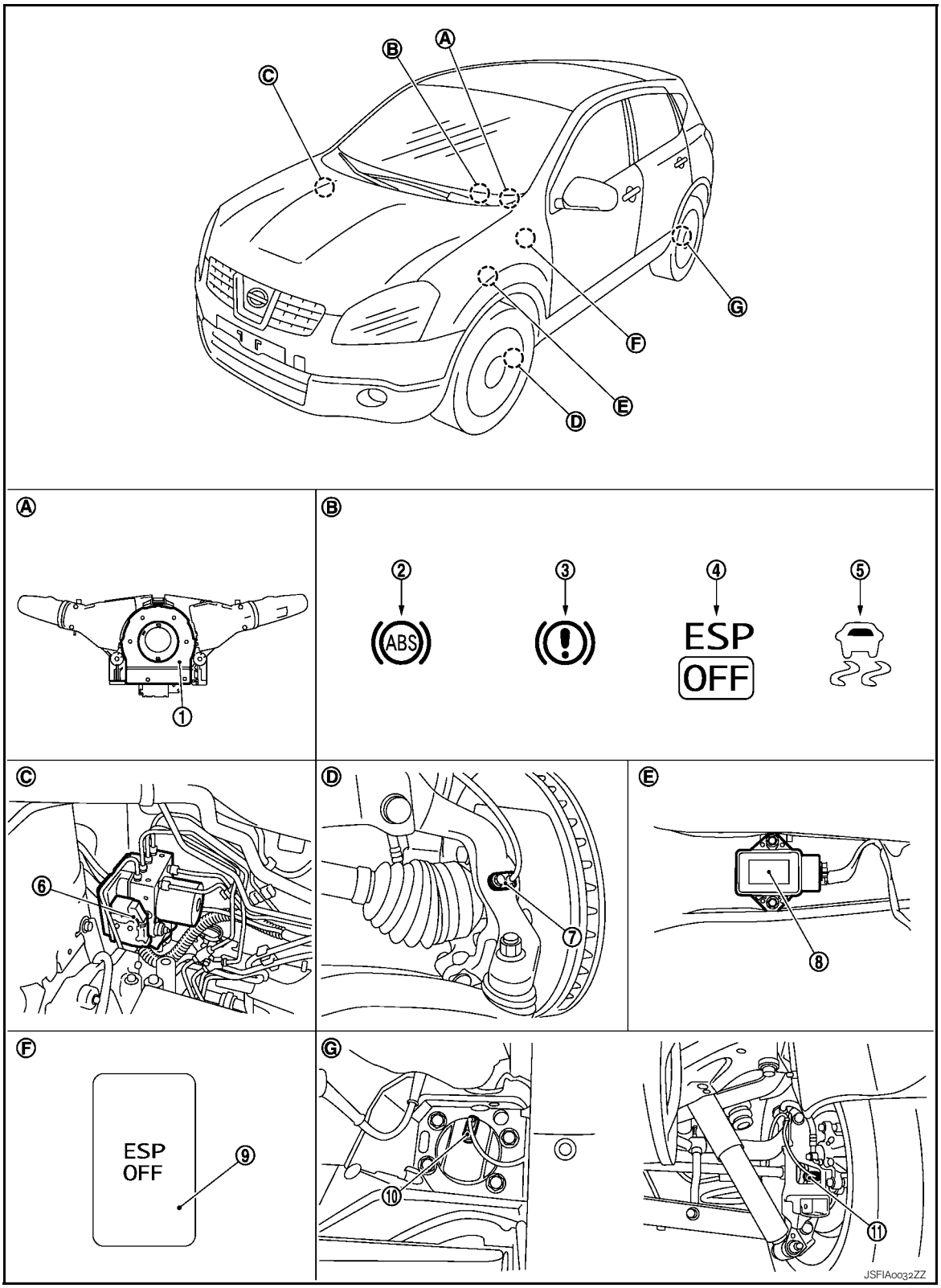
- Anti-Lock Braking System is a function that detects wheel revolution while braking, electronically controls braking force, and prevents wheel locking during sudden braking. It improves handling stability and maneuverability for avoiding obstacles.
- Electrical system diagnosis by CONSULT-III is available.

Component Parts Location

INFOID:0000000000977397

cardiagn.com

LHD models



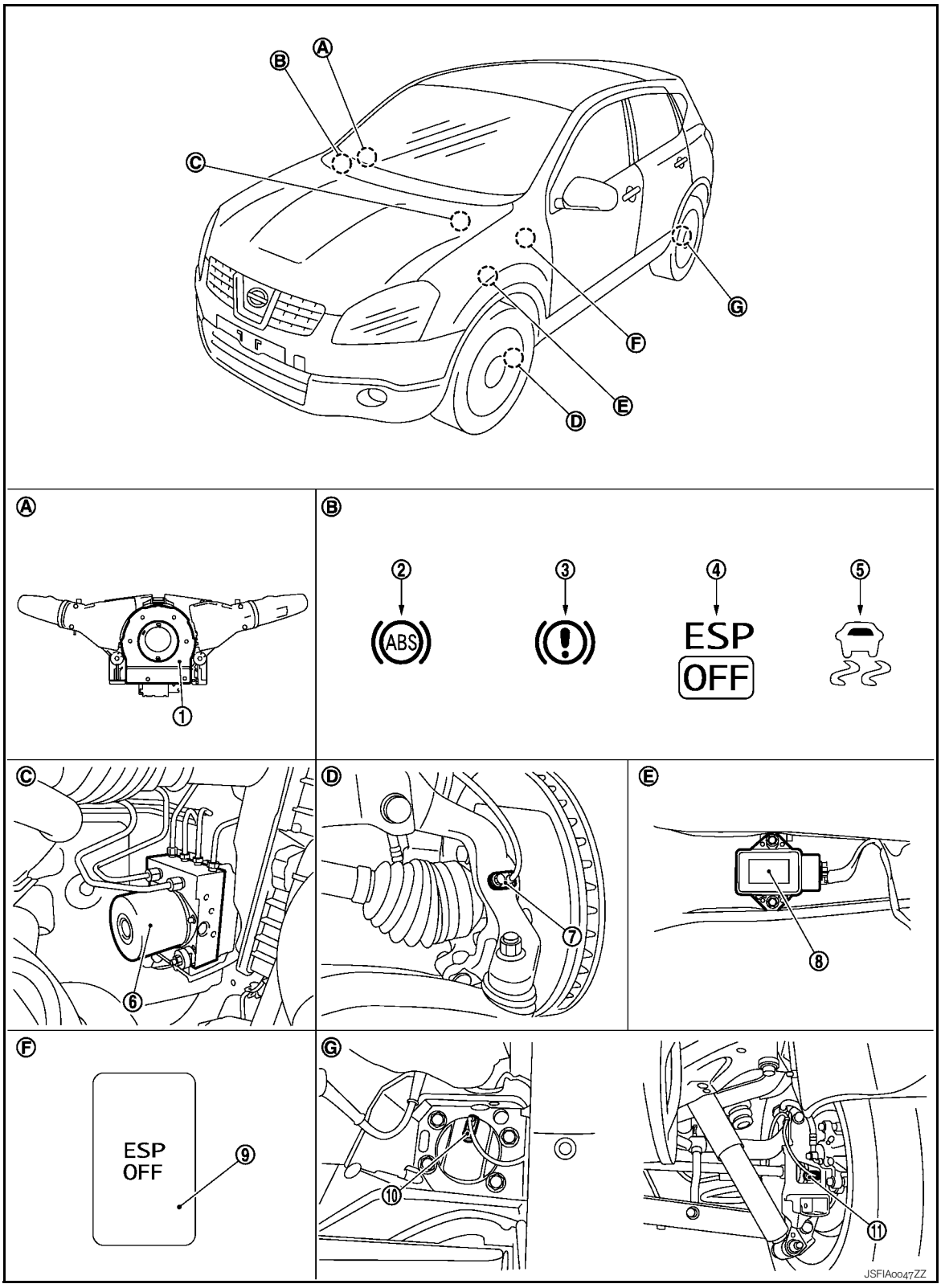
1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)

A. Back of spiral cable assembly
B. Combination meter
C. Right side in engine room

cardiagn.com

D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

RHD models



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch

cardiagn.com

10. Rear wheel sensor (2WD models) 11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly B. Combination meter C. Left side in engine room
D. Steering knuckle E. Lower instrument cover RH F. Instrument driver lower panel
G. Rear suspension arm

Component Description

INFOID:0000000000924806

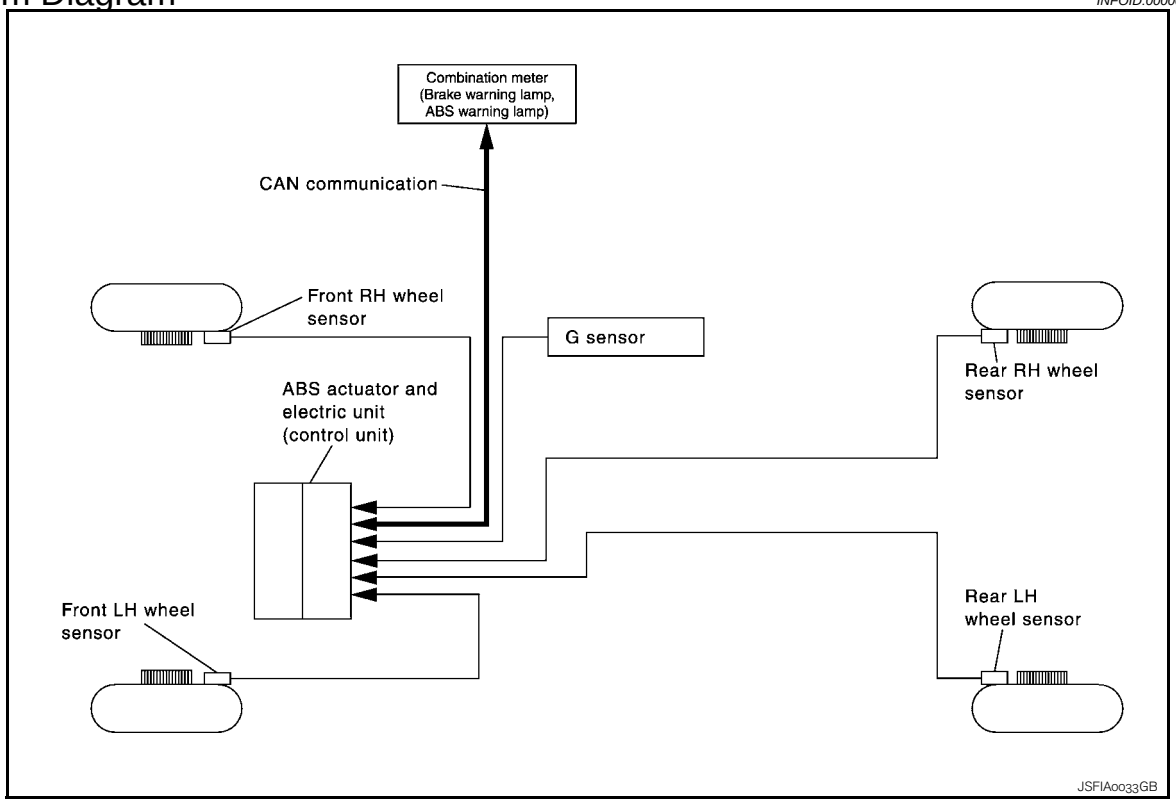
Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-110, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-113, "Description"
	Solenoid valve	BRC-121, "Description"
Wheel sensor		BRC-100, "Description"
ABS warning lamp		BRC-149, "Description"
Brake warning lamp		BRC-150, "Description"

cardiagn.com

EBD

System Diagram

INFOID:0000000000977399



System Description

INFOID:0000000000924808

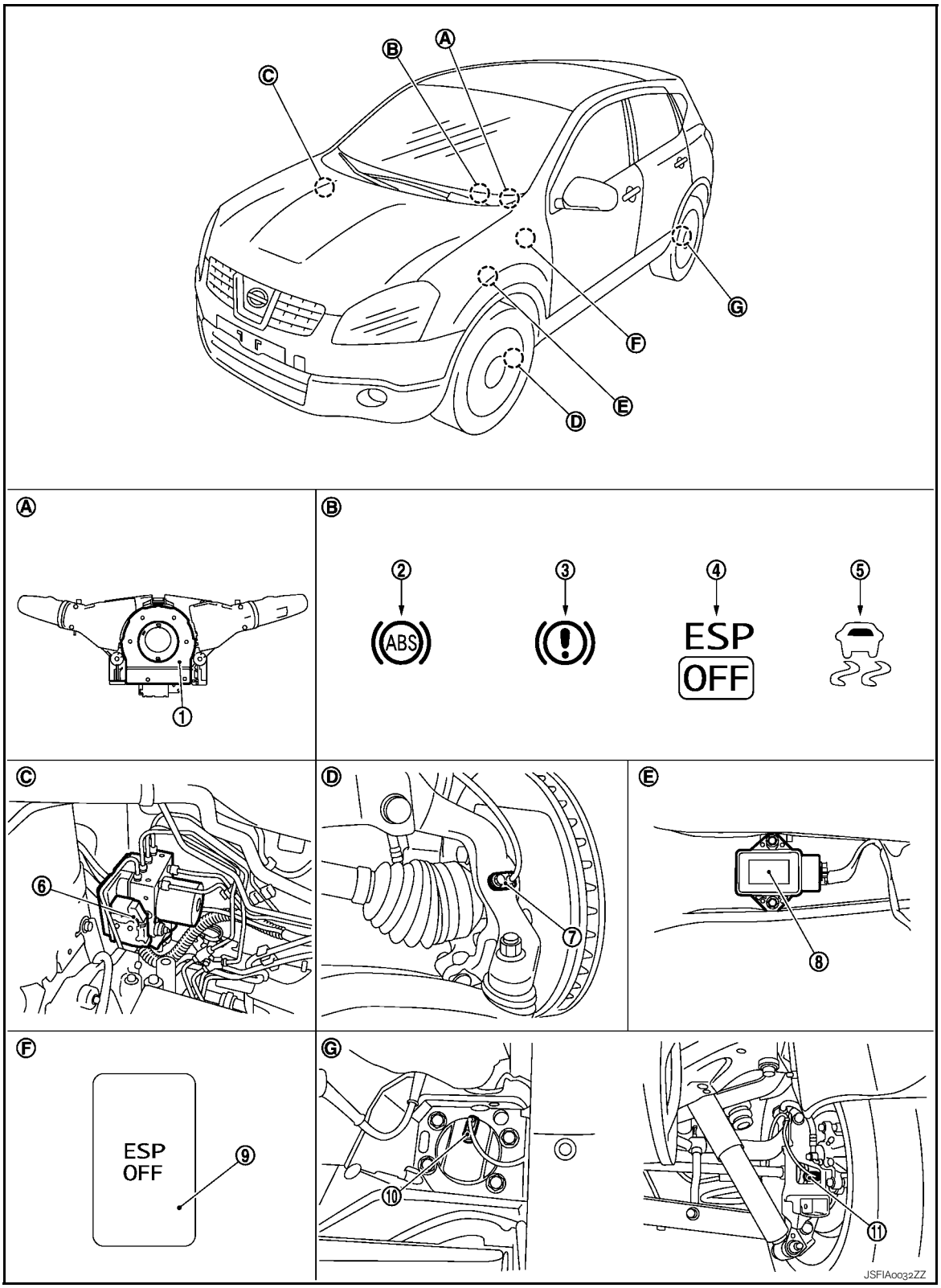
- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then is electronically controls the rear braking force (brake fluid pressure) to reducing and reduces rear wheel slippage. Accordingly it improves vehicle stability.
- Electrical system diagnosis by CONSULT-III is available.

Component Parts Location

INFOID:0000000000977398

cardiagn.com

LHD models



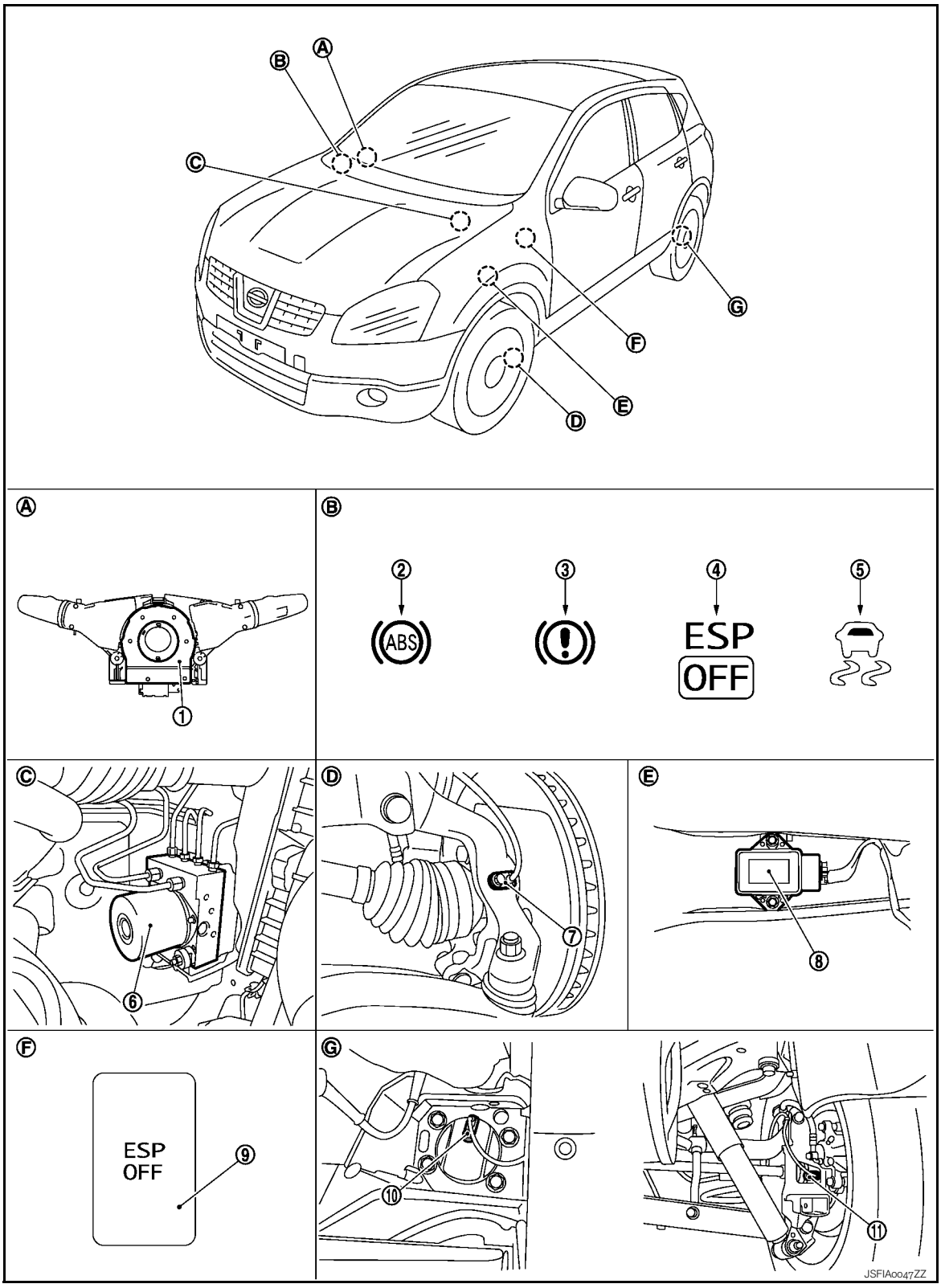
1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)

A. Back of spiral cable assembly
B. Combination meter
C. Right side in engine room

cardiagn.com

D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

RHD models



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch

cardiagn.com

10. Rear wheel sensor (2WD models) 11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly B. Combination meter C. Left side in engine room
D. Steering knuckle E. Lower instrument cover RH F. Instrument driver lower panel
G. Rear suspension arm

Component Description

INFOID:0000000000977400

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-110, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-113, "Description"
	Solenoid valve	BRC-121, "Description"
Wheel sensor		BRC-100, "Description"
ABS warning lamp		BRC-149, "Description"
Brake warning lamp		BRC-150, "Description"

cardiagn.com

DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

CONSULT-III Function (ABS)

INFOID:0000000000924811

FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-III.
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active test	Diagnostic test mode is which CONSULT-III drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
ECU part number	ABS actuator and electric unit (control unit) part number can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF-DIAG RESULTS MODE

Operation Procedure

1. Before performing the self-diagnosis, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

How to Erase Self-diagnosis Results

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn OFF.
   CAUTION:
   If memory cannot be erased, perform applicably diagnosis.
   NOTE:
   - When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
   - Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
   - ESP OFF switch should not stay “ON” position.

Display Item List

Refer to BRC-160, "DTC No. Index".

DATA MONITOR MODE

Display Item List

×: Applicable o: Optional item

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNLAS	
FR LH SENSOR [km/h (MPH)]	×	×	Wheel speed
FR RH SENSOR [km/h (MPH)]	×	×	
RR LH SENSOR [km/h (MPH)]	×	×	
RR RH SENSOR [km/h (MPH)]	×	×	

cardiagn.com

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNLAS	
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal status
BATTERY VOLT (V)	×	×	Battery voltage supplied to the ABS actuator and electric unit (control unit)
GEAR	×	×	Gear position determined by TCM
SLCT LVR POSI	×	×	Selector lever position (except M/T)
OFF SW (On/Off)	o	×	ESP OFF switch
YAW RATE SEN (°/s)	×	×	Yaw rate detected by yaw rate/side G sensor
ACCEL POS SIG (%)	×	o	Throttle actuator opening/closing is displayed (Linked with accelerator pedal)
SIDE G-SENSOR (m/s^2)	×	o	Transverse G detected by yaw rate/side G sensor
STR ANGLE SIG (°)	×	o	Steering angle detected by steering angle sensor
PRESS SENSOR (bar)	×	o	Brake fluid pressure detected by pressure sensor
ENGINE RPM [tr/min (rpm)]	×	o	Engine speed
FLUID LEV SW (On/Off)	×	o	Brake fluid level switch signal status
PARK BRAKE SW (On/Off)	×	o	Parking brake switch signal status
FR RH IN SOL (On/Off)	o	×	Operation status of each solenoid valve
FR RH OUT SOL (On/Off)	o	×	
FR LH IN SOL (On/Off)	o	×	
FR LH OUT SOL (On/Off)	o	×	
RR RH IN SOL (On/Off)	o	×	
RR RH OUT SOL (On/Off)	o	×	
RR LH IN SOL (On/Off)	o	×	
RR LH OUT SOL (On/Off)	o	×	
MOTOR RELAY (On/Off)	o	×	Motor and motor relay operation
ACTUATOR RLY NOTE (On/Off)	o	×	Actuator relay operation
ABS WARN LAMP (On/Off)	o	×	ABS warning lamp
OFF LAMP (On/Off)	o	×	ESP OFF indicator lamp
SLIP LAMP (On/Off)	o	×	SLIP indicator lamp

cardiagn.com

NOTE:

Every 20 seconds momentary switch to OFF.

ACTIVE TEST MODE

CAUTION:

- **Do not perform active test while driving vehicle.**
- **Make sure to completely bleed air from brake system.**
- **The active test cannot be performed with the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on.**
- **ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.**
- **Erase memory of ICC system after implementing active test.**

NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- “TEST IS STOPPED” is displayed 10 seconds after operation start.
- After “TEST IS STOPPED” is displayed, to perform test again.

Test Item

ABS SOLENOID VALVE

- For ABS solenoid valve, touch “UP”, “KEEP” and “DOWN”. Then use screen monitor to check that solenoid valve operates as shown in the table below.

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
	USV [FR-RL]	OFF	OFF	OFF
	HSV [FR-RL]	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
	USV [FL-RR]	OFF	OFF	OFF
	HSV [FL-RR]	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
	USV [FL-RR]	OFF	OFF	OFF
	HSV [FL-RR]	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*
	USV [FR-RL]	OFF	OFF	OFF
	HSV [FR-RL]	OFF	OFF	OFF

*: ON for 1 to 2 seconds after the touch, and then OFF.

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is malfunction because it is an operation for checking.

ABS SOLENOID VALVE (ACT)

- For ABS solenoid valve (ACT), touch “UP”, “ACT UP” and “ACT KEEP”. Then use screen monitor to check that solenoid valve operates as shown in the table below.

cardiagn.com

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	OFF	OFF
	FR RH OUT SOL	OFF	OFF	OFF
	USV [FR-RL]	OFF	ON	ON
	HSV [FR-RL]	OFF	ON*	OFF
FR LH SOL	FR LH IN SOL	OFF	OFF	OFF
	FR LH OUT SOL	OFF	OFF	OFF
	USV [FL-RR]	OFF	ON	ON
	HSV [FL-RR]	OFF	ON*	OFF
RR RH SOL	RR RH IN SOL	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	OFF
	USV [FL-RR]	OFF	ON	ON
	HSV [FL-RR]	OFF	ON*	OFF
RR LH SOL	RR LH IN SOL	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	OFF
	USV [FR-RL]	OFF	ON	ON
	HSV [FR-RL]	OFF	ON*	OFF

*: ON for 1 to 2 seconds after the touch, and then OFF.

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is malfunction because it is an operation for checking.

ABS MOTOR

- Touch “ON” and “OFF” on screen. Make sure motor relay and actuator relay operates as shown in table below.

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY NOTE	ON	ON

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

cardiagn.com

COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

INFOID:0000000000924812

When the sensor rotor rotates, the magnetic field changes. The sensor converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924813

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1101	RR RH SENSOR-1	Circuit of rear RH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	• Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit)
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
RR RH SENSOR-1
RR LH SENSOR-1
FR RH SENSOR-1
FR LH SENSOR-1

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-100, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924814

CAUTION:
Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

cardiagn.com

5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	9	E39 (Front RH)	2	Existed
	16	E22 (Front LH)		
	8	B41 (Rear RH)		
	6	B44 (Rear LH)		

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	10	E39 (Front RH)	1	Existed
	5	E22 (Front LH)		
	19	B41 (Rear RH)		
	17	B44 (Rear LH)		

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E36	10, 9	E36	1, 4	Not existed
	5, 16			
	19, 8			
	17, 6			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	2	Ground	8 V or more
E22 (Front LH)			
B41 (Rear RH)			
B44 (Rear LH)			

Is the inspection result normal?

cardiagn.com

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000000924815

1.CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	Nearly matches the speedometer display (±10% or less)
FR RH SENSOR	
RR LH SENSOR	
RR RH SENSOR	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-100, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000924816

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

INFOID:0000000000977401

ABS unit continually monitors wheel speed sensors to detect abnormal signals.

DTC Logic

INFOID:0000000000924818

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	Signal from rear RH wheel sensor does not match other 3 wheel speed signal.	• Sensor not installed corretly • Sensor rotor or encoder damaged • Sensor rotor loose on axle • Electrical interference • Wheel not turning - e.g. vehicle driven on 2WD dyno • Sensor damaged • ABS unit damaged
C1106	RR LH SENSOR-2	Signal from rear LH wheel sensor does not match other 3 wheel speed signal.	
C1107	FR RH SENSOR-2	Signal from front RH wheel sensor does not match other 3 wheel speed signal.	
C1108	FR LH SENSOR-2	Signal from front LH wheel sensor does not match other 3 wheel speed signal.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
RR RH SENSOR-2
RR LH SENSOR-2
FR RH SENSOR-2
FR LH SENSOR-2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-103, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000977403

CAUTION:
Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

cardiagn.com

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	9	E39 (Front RH)	2	Existed
	16	E22 (Front LH)		
	8	B41 (Rear RH)		
	6	B44 (Rear LH)		

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	10	E39 (Front RH)	1	Existed
	5	E22 (Front LH)		
	19	B41 (Rear RH)		
	17	B44 (Rear LH)		

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E36	10, 9	E36	1, 4	Not existed
	5, 16			
	19, 8			
	17, 6			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	2	Ground	8 V or more
E22 (Front LH)			
B41 (Rear RH)			
B44 (Rear LH)			

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

cardiagn.com

Component Inspection

INFOID:0000000000977404

1.CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	Nearly matches the speedometer display (±10% or less)
FR RH SENSOR	
RR LH SENSOR	
RR RH SENSOR	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-103, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000977405

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000000924822

Power is supplied from the battery to ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924823

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1109	BATTERY VOLTAGE [ABNORMAL]	When the ABS actuator and electric unit (control unit) power supply is lower than normal and vehicle speed is greater than 6 km/h (4 MPH). Power supply is greater than normal limits.	• Harness or connector • ABS unit • Fuse • Vehicle electrical power system

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-106, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924824

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Repair or replace connector.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Turn ignition switch ON or OFF and check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E36	18	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0 V

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.

cardiagn.com

NO >> Repair or replace malfunctioning components.

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

1. Use 12V lamp (normal rating 10 to 20W) connected between E36 terminals 18 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E36 terminals 1 and 2).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Check battery for terminal looseness, low voltage, etc. if any malfunction is found, repair malfunctioning parts.
NO >> Repair or replace malfunctioning components. (Check ABS earth bolt for tightness and corrosion.)

Special Repair Requirement

INFOID:0000000000924825

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000001091114

ABS unit is continuously monitoring ECU hardware and software for correct operation.

DTC Logic

INFOID:0000000000924826

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	Possible internal failure of control unit components.	• Internal failure of control unit components. • ABS solenoid valve or motor power supply / ground abnormal.
C1153	EMERGENCY BRAKE	Continuous ABS/EBD control for more than 60 seconds.	• ABS control unit software failure • Wheel speed sensor input abnormality.
C1170	VARIANT CODING	In a case where VARIANT CODING is different.	ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

1. Check both ABS solenoid valve and motor supply and ground circuits using a suitable electrical load.
2. Check wheel speed sensor inputs.
3. Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE
EMERGENCY BRAKE
VARIANT CODING

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-108, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924827

INSPECTION PROCEDURE

1.REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

CAUTION:
Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than those applicable.

>> Replace ABS actuator and electric unit (control unit).

Special Repair Requirement

INFOID:0000000000924828

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

cardiagn.com

>> END

cardiagn.com

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000000924829

PUMP

The pump returns the brake fluid stored in the reservoir to the master cylinder by reducing the pressure.

MOTOR

The motor drives the pump according to the signals transmitted by the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924830

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1111	PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	• Harness or connector • ABS actuator and electric unit (control unit)
		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-110, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924831

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between the ABS actuator and electric unit (control unit) harness connector terminal and ground.

cardiagn.com

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	2	Ground	Battery voltage

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITION)

Use 12V lamp (normal rating 10 to 20W) connected between E36 terminals 1 and 2. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

4.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion.)

Component Inspection

INFOID:0000000000924832

1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY NOTE	ON	ON

NOTE:
A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-110, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000924833

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

cardiagn.com

>> END

cardiagn.com

C1114 ACTUATOR RELAY SYSTEM

Description

INFOID:0000000000924834

Activates or deactivates each solenoid valve according to the signals transmitted by the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924835

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1114	MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	• Harness or connector • ABS actuator and electric unit (control unit)
		During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
MAIN RELAY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-113, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924836

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	3	Ground	Battery voltage

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

cardiagn.com

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITION)

Use 12V lamp (normal rating 10 to 20W) connected between E36 terminals 1 and 3. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion.)

Component Inspection

INFOID:0000000000924837

1. CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY NOTE	ON	ON

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-33, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000924838

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1115 WHEEL SENSOR

Description

INFOID:0000000000977406

When the sensor rotor rotates, the magnetic field changes. The sensor converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924840

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1115	ABS SENSOR [ABNORMAL SIGNAL]	Miss-match between the 4 wheel speed sensor signals.	• Harness or connector is not a possible cause • Other possible causes - Tire radius (due to wrong size or pressure) interference.

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-115, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000977407

CAUTION:
Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.

cardiagn.com

4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	9	E39 (Front RH)	2	Existed
	16	E22 (Front LH)		
	8	B41 (Rear RH)		
	6	B44 (Rear LH)		

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	10	E39 (Front RH)	1	Existed
	5	E22 (Front LH)		
	19	B41 (Rear RH)		
	17	B44 (Rear LH)		

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E36	10, 9	E36	1, 4	Not existed
	5, 16			
	19, 8			
	17, 6			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	2	Ground	8 V or more
E22 (Front LH)			
B41 (Rear RH)			
B44 (Rear LH)			

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000000977408

1. CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

cardiagn.com

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	Nearly matches the speedometer display (±10% or less)
FR RH SENSOR	
RR LH SENSOR	
RR RH SENSOR	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-115, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000977409

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1116 STOP LAMP SWITCH

Description

INFOID:0000000000924844

The stop lamp switch transmits the stop lamp switch signal (ON/OFF) to the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924845

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	• Harness or connector • Stop lamp switch • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-118, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924846

INSPECTION PROCEDURE

1.CHECK STOP LAMPS ILLUMINATE

Check stop lamps illuminate when brake pedal is pressed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check stop lamp circuit.

2.CHECK DATA MONITOR

Using data monitor check both pressure sensor signal and brake lamp switch signal.

Pressure sensor

Condition	PRESS SEN (DATA MONITOR)
Brake pedal released	Approx. 3 bar
Brake pedal pressed	0 to 200 bar

Stop lamp switch

Condition	STOP LAMP SW (DATA MONITOR)
Brake pedal released	OFF
Brake pedal pressed	ON

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning parts.

3.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.

cardiagn.com

3. Disconnect stop lamp switch connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors securely.
6. Start engine.
7. Repeat pumping brake pedal carefully several times, and perform self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)"

Is any item indicated in the self-diagnosis display?

YES >> GO TO 4.
NO >> Poor connection of connector terminal. Replace or repair connector.

4. CHECK STOP LAMP SWITCH

1. Disconnect stop lamp switch connector.
2. Check continuity between stop lamp switch connector terminals.

Stop lamp switch Terminal	Condition	Continuity
1 – 2	Release stop lamp switch (When brake pedal is depressed.)	Existed
	Push stop lamp switch (When brake pedal is released.)	Not existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace stop lamp switch.

5. CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Connect stop lamp switch connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)		Condition	Voltage
Connector	Terminal		
E36	20	Brake pedal is depressed	Battery voltage
		Brake pedal is released	Approx. 0 V

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000924847

1. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch connector terminals.

Stop lamp switch Terminal	Condition	Continuity
1 – 2	Release stop lamp switch (When brake pedal is depressed.)	Existed
	Push stop lamp switch (When brake pedal is released.)	Not existed

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> Replace stop lamp switch.

Special Repair Requirement

INFOID:0000000000924848

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000000924849

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924850

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1120	FR LH IN ABS SOL	When the control unit detects a malfunction in the front LH inlet solenoid circuit.	ABS actuator and electric unit (control unit)
C1122	FR RH IN ABS SOL	When the control unit detects a malfunction in the front RH inlet solenoid circuit.	
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	
C1126	RR RH IN ABS SOL	When the control unit detects a malfunction in the rear RH inlet solenoid circuit.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
FR LH IN ABS SOL
FR RH IN ABS SOL
RR LH IN ABS SOL
RR RH IN ABS SOL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-121, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924851

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

cardiagn.com

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000924852

1.CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “KEEP”, and “DOWN”, and check that the system operates as shown in the table below.

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
	USV [FR-RL]	OFF	OFF	OFF
	HSV [FR-RL]	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
	USV [FL-RR]	OFF	OFF	OFF
	HSV [FL-RR]	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
	USV [FL-RR]	OFF	OFF	OFF
	HSV [FL-RR]	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*
	USV [FR-RL]	OFF	OFF	OFF
	HSV [FR-RL]	OFF	OFF	OFF

*: ON for 1 to 2 seconds after the touch, and then OFF.

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> Go to diagnosis procedure. Refer to BRC-121, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000924853

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000000977410

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000000924855

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1121	FR LH OUT ABS SOL	When the control unit detects a malfunction in the front LH outlet solenoid circuit.	ABS actuator and electric unit (control unit)
C1123	FR RH OUT ABS SOL	When the control unit detects a malfunction in the front RH outlet solenoid circuit.	
C1125	RR LH OUT ABS SOL	When the control unit detects a malfunction in the rear LH outlet solenoid circuit.	
C1127	RR RH OUT ABS SOL	When the control unit detects a malfunction in the rear RH outlet solenoid circuit.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
FR LH OUT ABS SOL
FR RH OUT ABS SOL
RR LH OUT ABS SOL
RR RH OUT ABS SOL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-124, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000977411

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

cardiagn.com

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000977412

1.CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “KEEP”, and “DOWN”, and check that the system operates as shown in the table below.

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
	USV [FR-RL]	OFF	OFF	OFF
	HSV [FR-RL]	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
	USV [FL-RR]	OFF	OFF	OFF
	HSV [FL-RR]	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
	USV [FL-RR]	OFF	OFF	OFF
	HSV [FL-RR]	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*
	USV [FR-RL]	OFF	OFF	OFF
	HSV [FR-RL]	OFF	OFF	OFF

*: ON for 1 to 2 seconds after the touch, and then OFF.

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> Go to diagnosis procedure. Refer to BRC-124, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000977413

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1130, C1131, C1132 ENGINE SIGNAL

Description

INFOID:0000000000924859

ABS actuator and electric unit (control unit) receives the engine signel from ECM with CAN communication line.

DTC Logic

INFOID:0000000000924860

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1130	ENGINE SIGNAL 1	ECM signals are invalid or ECM self diagnosis indicates a fault that prevents correct TCS operation.	• Harness or connector • ABS actuator and electric unit (control unit) • ECM • CAN communication line
C1131	ENGINE SIGNAL 2		
C1132	ENGINE SIGNAL 3		

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ENGINE SIGNAL 1
ENGINE SIGNAL 2
ENGINE SIGNAL 3

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-127, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924861

INSPECTION PROCEDURE

1.CHECK ENGINE SYSTEM

1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again.
- HR16DE (with EURO-OBD): EC-100, "CONSULT-III Function".
- HR16DE (without EURO-OBD): EC-430, "CONSULT-III Function".
- MR20DE (with EURO-OBD: EC-719, "CONSULT-III Function".
- MR20DE (without EURO-OBD: EC-1054, "CONSULT-III Function".
- K9K: EC-1315, "Diagnosis Description".

2. Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.
NO >> INSPECTION END

Special Repair Requirement

INFOID:0000000000924862

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1142 PRESS SENSOR

Description

INFOID:0000000000924867

The pressure sensor converts the brake fluid pressure to an electric signal and transmits it to the ABS actuator and electric unit (control unit). [The pressure sensor is integrated in the ABS actuator and electric unit (control unit).]

DTC Logic

INFOID:0000000000924868

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1142	PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	• Harness or connector • Stop lamp switch • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PRESS SEN CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-128, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924869

INSPECTION PROCEDURE

1.CHECK STOP LAMP SWITCH CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect stop lamp switch connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors securely.
6. Start engine.
7. Repeat pumping brake pedal carefully several times, and perform self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch connector terminals.

Stop lamp switch Terminal	Condition	Continuity
1 – 2	Release stop lamp switch (When brake pedal is depressed.)	Existed
	Push stop lamp switch (When brake pedal is released.)	Not existed

cardiagn.com

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace stop lamp switch.

3.CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Connect stop lamp switch connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)		Condition	Voltage
Connector	Terminal		
E36	20	Brake pedal is depressed	Battery voltage
		Brake pedal is released	Approx. 0 V

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000924870

1.CHECK DATA MONITOR

On “DATA MONITOR”, select “PRESS SENSOR” and check the brake fluid pressure.

Condition	PRESS SENSOR (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 3 bar
With ignition switch turned ON and brake pedal depressed.	0 to 200 bar

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-128, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000924871

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1143, C1144 STEERING ANGLE SENSOR

Description

INFOID:0000000000924872

The steering angle sensor detects the rotation amount, angular velocity and direction of the steering wheel, and transmits the data to the ABS actuator and electric unit (control unit) via CAN communication.

DTC Logic

INFOID:0000000000924873

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1143	ST ANG SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	• Harness or connector • Steering angle sensor • ABS actuator and electric unit (control unit)
C1144	ST ANG SEN SIGNAL	Neutral position of steering angle sensor is not finished.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANG SEN CIRCUIT
ST ANG SEN SIGNAL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-130, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924874

INSPECTION PROCEDURE

1.CHECK VEHICLE STATE

Check vehicle for any suspension/steering misalignment or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Correct any damage found.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect steering angle sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)"

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

3.CHECK STEERING ANGLE SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect steering angle sensor connector.
3. Check continuity between steering angle sensor harness connector terminal and ground.

cardiagn.com

Steering angle sensor		—	Continuity
Connector	Terminal		
M30	3	Ground	Existed

4. Turn ignition switch ON.
5. Check voltage between steering angle sensor harness connector terminal and ground.

Steering angle sensor		—	Voltage
Connector	Terminal		
M30	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK DATA MONITOR

1. Connect the steering angle sensor connector and ABS actuator and electric unit (control unit) connector.
2. Check steering angle sensor signal.

Steering condition	STR ANGLE SIG (DATA MONITOR)
Driving straight	±2.5 °
Turn 90 ° to right	Approx. +90 °
Turn 90 ° to left	Approx. –90 °

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust neutral position of steering angle sensor.

5.CHECK FOR BACKLASH

1. Check for backlash [turn wheel to left then straight then right then straight (approx. 90)].
2. Check straight position is always similar value.

Is there noticeable backlash?

YES >> Check sensor is correctly fitted to combination witch.
NO >> Check sensor output is correct from lock to lock.

Component Inspection

INFOID:0000000000924875

1.CHECK DATA MONITOR

Select “STR ANGLE SIG” in “DATA MONITOR” and check steering angle sensor signal.

Steering condition	STR ANGLE SIG (DATA MONITOR)
Driving straight	±2.5 °
Turn 90 ° to right	Approx. +90 °
Turn 90 ° to left	Approx. –90 °

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-130, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000924876

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the steering angle sensor or the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

cardiagn.com

>> END

cardiagn.com

C1145 YAW RATE SENSOR

Description

INFOID:0000000000924877

The yaw rate sensor detects the yaw rate affecting the vehicle, and transmits the data to the ABS actuator and electric unit (control unit) as an analog voltage signal.

DTC Logic

INFOID:0000000000924878

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1145	YAW RATE SENSOR	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	• Harness or connector • ABS actuator and electric unit (control unit) • Yaw rate sensor

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
YAW RATE SENSOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-133, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924879

CAUTION:

- **Driving on high speed banked corners can also indicate yaw rate sensor malfunction.**
- **If vehicle is on turn-table at entrance to parking garage, or on other moving surface, VDC OFF indicator lamp may illuminate and CONSULT-III self-diagnosis may indicate yaw rate sensor system malfunction. However, in this case there is no malfunction in yaw rate sensor system. Take vehicle off of turn-table or other moving surface, and start engine. Results will return to normal. And after doing spin turns or acceleration turns with VDC function is being off (VDC OFF switch “ON”), too, the results will return to a normal condition by re-starting vehicle.**

INSPECTION PROCEDURE

1.CHECK INSTALLATION STATE OF YAW RATE SENSOR

Check yaw rate sensor is correctly attached to vehicle. Refer to BRC-178, "Exploded View".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning parts.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect yaw rate sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

cardiagn.com

3.CHECK YAW RATE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect yaw rate sensor connector.
3. Turn ignition switch ON or OFF and check voltage between yaw rate sensor harness connector terminal and ground.

Yaw rate sensor		—	Condition	Voltage
Connector	Terminal			
M72	4	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0 V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK YAW RATE SENSOR GROUND CIRCUIT

Check continuity between yaw rate sensor harness connector terminal and ground.

Yaw rate sensor		—	Continuity
Connector	Terminal		
M72	1	Ground	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace malfunctioning components.

5.CHECK YAW RATE SENSOR HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between yaw rate sensor harness connector terminals and ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit)		Yaw rate sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	14	M72	2	Existed
	25		3	

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace malfunctioning components.

6.CHECK DATA MONITOR

1. Connect the yaw rate sensor connector and ABS actuator and electric unit (control unit) connector.
2. Select “YAW RATE SEN”, “SIDE G-SENSOR” in “DATA MONITOR” and check yaw rate sensor signal.

Vehicle condition	YAW RATE SEN (DATA MONITOR)
Stopped	Approx. 0 d/s
Turning right	Negative value
Turning left	Positive value

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Replace yaw rate sensor.

Component Inspection

INFOID:0000000000924880

cardiagn.com

1.CHECK DATA MONITOR

Select “YAW RATE SEN” in “DATA MONITOR” and check yaw rate sensor signal.

Vehicle condition	YAW RATE SEN (DATA MONITOR)
Stopped	Approx. 0 d/s
Turning right	Negative value
turning left	Positive value

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-133, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000924881

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1146 G SENSOR

Description

INFOID:0000000000972968

G sensor detects G affecting the vehicle, and transmits the data to the ABS actuator and electric unit (control unit) as an analog voltage signal.

DTC Logic

INFOID:0000000000972969

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1146	SIDE G-SEN CIRCUIT	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	• Harness or connector • ABS actuator and electric unit (control unit) • G sensor

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
SIDE G-SEN CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-136, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000972970

CAUTION:
Sudden turns (such as spin turns, acceleration turns), drifting, etc., when VDC function is off (VDC OFF switch “ON”) may cause G sensor system to indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine. Then erase memory of self-diagnosis.

INSPECTION PROCEDURE

1.CHECK INSTALLATION STATE OF G SENSOR

Check G sensor is correctly attached to vehicle. Refer to BRC-178, "Exploded View".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning parts.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect G sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-136, "Diagnosis Procedure".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

3.CHECK G SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect G sensor connector and ABS actuator and electric unit (control unit) connector.

cardiagn.com

3. Check continuity between G sensor harness connector terminals and ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit)		G sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	14	M71	1	Existed
	21		2	
	24		3	

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK DATA MONITOR

1. Connect the G sensor connector and ABS actuator and electric unit (control unit) connector.
2. Select “SIDE G-SENSOR” in “DATA MONITOR” and check G sensor signal.

Vehicle condition	SIDE G-SENOR (DATA MONITOR)
Stopped	Approx. 0 m/s^2
Turning right	Negative value
Turning left	Positive value

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Replace G sensor.

Component Inspection

INFOID:0000000000972971

1.CHECK DATA MONITOR

Select “SIDE G-SENSOR” in “DATA MONITOR” and check G sensor signal.

Vehicle condition	SIDE G-SENSOR (DATA MONITOR)
Stopped	Approx. 0 m/s^2
Turning right	Negative value
Turning left	Positive value

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-136, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000972972

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1147, C1148, C1149, C1150 USV/HSV LINE

Description

INFOID:0000000000924882

USV1, USV2 (CUT VALVE)

The cut valve shuts off the normal brake fluid path from the master cylinder, when ESP/TCS is activated.

HSV1, HSV2 (SUCTION VALVE)

The suction valve supplies the brake fluid from the master cylinder to the pump, when ESP/TCS is activated.

DTC Logic

INFOID:0000000000924883

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1147	USV LINE [FL-RR]	ESP switch-over solenoid valve (USV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	• Harness or connector • ABS actuator and electric unit (control unit)
C1148	USV LINE [FR-RL]	ESP switch-over solenoid valve (USV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
C1149	HSV LINE [FL-RR]	ESP switch-over solenoid valve (HSV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
C1150	HSV LINE [FR-RL]	ESP switch-over solenoid valve (HSV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
USV LINE [FL-RR]
USV LINE [FR-RL]
HSV LINE [FL-RR]
HSV LINE [FR-RL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-138, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924884

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

cardiagn.com

2.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	1, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000924885

1.CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “ACT UP”, and “ACT KEEP”, and check that the system operates as shown in the table below.

Test item	Display item (Note)	Display		
		UP	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	OFF	OFF	OFF
	FR RH OUT SOL	OFF	OFF	OFF
	USV [FR-RL]	OFF	ON	ON
	HSV [FR-RL]	OFF	ON*	OFF
FR LH SOL	FR LH IN SOL	OFF	OFF	OFF
	FR LH OUT SOL	OFF	OFF	OFF
	USV [FL-RR]	OFF	ON	ON
	HSV [FL-RR]	OFF	ON*	OFF
RR RH SOL	RR RH IN SOL	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	OFF
	USV [FL-RR]	OFF	ON	ON
	HSV [FL-RR]	OFF	ON*	OFF
RR LH SOL	RR LH IN SOL	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	OFF
	USV [FR-RL]	OFF	ON	ON
	HSV [FR-RL]	OFF	ON*	OFF

*: ON for 1 to 2 seconds after the touch, and then OFF.

cardiagn.com

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-138, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000000924886

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

C1155 BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000000924887

Brake fluid level switch contacts close when brake fluid level is low. This is detected by the combination meter which sends the status of fluid level to the ABS actuator and electric unit (control unit) via the CAN communication.

DTC Logic

INFOID:0000000000924888

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1155	BR FLUID LEVEL LOW	Ignition switch ON and brake fluid signal low or not available for 10 seconds.	• Brake fluid level is low • Brake fluid level switch • Harness or connector • CAN communication line • Combination meter

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-141, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000924889

INSPECTION PROCEDURE

1.CHECK BRAKE FLUID LEVEL

Check the brake fluid level.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Investigate and fix.

2.CHECK BRAKE WARNING LAMP 1

Check that the brake warning lamp illuminates after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check wiring to brake fluid level switch and combination meter.

3.CHECK BRAKE WARNING LAMP 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check parking brake switch. Refer to BRC-145, "Diagnosis Procedure".

4.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector and combination meter connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

cardiagn.com

4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 5.
NO >> Poor connection of connector terminal. Replace or repair connector.

5.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector.
3. Check continuity between brake fluid level switch connector terminals.

Brake fluid level switch		Condition	Continuity
Connector	Terminal		
E37	1 – 2	When brake fluid is full in the reservoir tank.	Not existed
		When brake fluid is empty in the reservoir tank.	Existed

Is the inspection result normal?

YES >> GO TO 6.
NO >> Brake fluid level switch is malfunction. Replace reservoir tank.

6.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

1. Disconnect combination meter connector.
2. Check continuity between brake fluid level switch harness connector terminals and combination meter harness connector terminal and/or ground.

Combination meter		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
M34	27	E37	1	Existed

Combination meter		—	Continuity
Connector	Terminal		
M34	27	Ground	Not existed

Brake fluid level switch		—	Continuity
Connector	Terminal		
E37	2	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000000924890

1.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector.
3. Check continuity between brake fluid level switch connector terminals.

Brake fluid level switch		—	Condition	Continuity
Connector	Terminal			
E37	1	Ground	When brake fluid is full in the reservoir tank.	Not existed
			When brake fluid is empty in the reservoir tank.	Existed

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> Replace reservoir tank.

Special Repair Requirement

INFOID:0000000000924891

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

U1000, U1002 CAN COMM CIRCUIT

Description

INFOID:0000000001125390

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000000924893

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more.	• CAN communication line • ABS actuator and electric unit (control unit)
U1002	SYSTEM COMM	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.	

Diagnosis Procedure

INFOID:0000000000924894

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and perform self-diagnosis.

Self-diagnosis results
CAN COMM CIRCUIT
SYSTEM COMM

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

Special Repair Requirement

INFOID:0000000000924895

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

cardiagn.com

PARKING BRAKE SWITCH

Description

INFOID:0000000000924896

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

Diagnosis Procedure

INFOID:0000000001125318

1.CHECK COMBINATION METER INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between combination meter harness connector terminal 26 and ground.

26 – Ground	
Parking brake ON	: Approx. 0 V
Parking brake OFF	: Approx. 5 V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK PARKING BRAKE SWITCH SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and parking brake switch connector.
3. Check continuity between combination meter harness connector terminal 26 and parking brake switch harness connector terminal 1.

26 – 1	: Continuity should exist.

4. Check continuity between combination meter harness connector terminal 26 and ground.

26 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

Component Function Check

INFOID:0000000000924897

1.CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. Then check that the brake warning lamp in the combination meter turns on/off correctly.

Condition	Brake warning lamp illumination status
When the parking brake switch is operation	ON
When the parking brake switch is not operation.	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-145, "Diagnosis Procedure".

Component Inspection

INFOID:0000000001125391

INSPECTION PROCEDURE

1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.

cardiagn.com

3. Check continuity between parking brake switch terminal and ground.

Parking brake switch		—	Condition	Continuity
Connector	Terminal			
M103	1	Ground	When the parking brake switch is operated.	Existed
			When the parking brake switch is not operated.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace parking brake switch.

cardiagn.com

ESP OFF SWITCH

Description

INFOID:0000000000924900

ESP OFF switch can deactivate (turn OFF) the ESP/TCS function by pressing the ESP OFF switch.

Component Function Check

INFOID:0000000000924901

1.CHECK ESP OFF SWITCH OPERATION

Turn ON/OFF the ESP OFF switch and check that the ESP OFF indicator lamp in the combination meter turns ON/OFF correctly.

Condition	ESP OFF indicator lamp illumination status
ESP OFF switch: ON	ON
ESP OFF switch: OFF	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-147, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000924902

1.CHECK ESP OFF SWITCH

1. Turn ignition switch OFF.
2. Disconnect ESP OFF switch connector.
3. Check continuity between ESP OFF switch connector terminals.

ESP OFF switch		Condition	Continuity
Connector	Terminal		
M5	1 – 2	When ESP OFF switch is hold pressed.	Existed
		When releasing ESP OFF switch.	Not existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> ESP OFF switch is malfunctioning. Replace ESP OFF switch.

2.CHECK ESP OFF SWITCH HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ESP OFF switch connector terminals and ABS actuator and electric unit (control unit) connector terminal and/or ground.

ABS actuator and electric unit (control unit)		ESP OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E36	21	M5	1	Existed

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	21	Ground	Not existed

ESP OFF switch		—	Continuity
Connector	Terminal		
M5	2	Ground	Existed

Is the inspection result normal?

cardiagn.com

YES >> GO TO 3.
NO >> If the open or short in harness, repair or replace harness.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-21, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

Component Inspection

INFOID:0000000000924903

INSPECTION PROCEDURE

1.CHECK ESP OFF SWITCH

1. Turn ignition switch OFF.
2. Disconnect ESP OFF switch connector.
3. Check continuity between ESP OFF switch connector terminals.

ESP OFF switch		Condition	Continuity
Connector	Terminal		
M5	1 – 2	When ESP OFF switch is hold pressed.	Existed
		When releasing ESP OFF switch.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ESP OFF switch.

cardiagn.com

ABS WARNING LAMP

Description

INFOID:0000000000924904

×: ON –: OFF

Condition	ABS warning lamp
Ignition switch OFF	–
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	–
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

Component Function Check

INFOID:0000000000924905

1.CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-149, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000924906

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-21, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

cardiagn.com

BRAKE WARNING LAMP

Description

INFOID:0000000000924907

×: ON –: OFF

Condition	Brake warning lamp NOTE 1
Ignition switch OFF	–
For 1 second after turning ON ignition switch	× NOTE 2
1 second later after turning ON ignition switch	× NOTE 2
EBD function is malfunctioning.	×

NOTE:

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:0000000000924908

1. BRAKE WARNING LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to diagnosis procedure. Refer to BRC-150, "Diagnosis Procedure".

2. BRAKE WARNING LAMP OPERATION CHECK 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check parking brake switch. Refer to BRC-145, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000924909

1. CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check parking brake switch. Refer to BRC-145, "Diagnosis Procedure".

2. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check items displayed by self-diagnosis.

3. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-21, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

cardiagn.com

ESP OFF INDICATOR LAMP

Description

INFOID:0000000000924910

×: ON –: OFF

Condition	ESP OFF indicator lamp
Ignition switch OFF	–
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	–
ESP OFF switch turned ON. (ESP function is OFF.)	×
ESP/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

Component Function Check

INFOID:0000000000924911

1.ESP OFF INDICATOR LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to diagnosis procedure. Refer to BRC-151, "Diagnosis Procedure".

2.ESP OFF INDICATOR LAMP OPERATION CHECK 2

Check that the ESP OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the ESP OFF switch.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check ESP OFF switch. Refer to BRC-147, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000924912

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

2.CHECK ESP OFF SWITCH

Check that the ESP OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the ESP OFF switch.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check ESP OFF switch. Refer to BRC-147, "Diagnosis Procedure".

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-21, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

cardiagn.com

SLIP INDICATOR LAMP

Description

INFOID:0000000000924913

×: ON –: OFF

Condition	SLIP indicator lamp
Ignition switch OFF	–
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	–
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

Component Function Check

INFOID:0000000000924914

1.CHECK SLIP INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-152, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000924915

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-21, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

cardiagn.com

ECU DIAGNOSIS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000000924916

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

Monitor item	Condition		Value/Status
FR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running NOTE 1	Nearly matches the speed meter display (± 10% or less)
FR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running NOTE 1	Nearly matches the speed meter display (± 10% or less)
RR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running NOTE 1	Nearly matches the speed meter display (± 10% or less)
RR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running NOTE 1	Nearly matches the speed meter display (± 10% or less)
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	ON
		When brake pedal is not depressed	OFF
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear 6th gear	1 2 3 4 5 6
SLCT LVR POSI	Selector lever position	P position R position N position D position	P R N D
OFF SW	ESP OFF switch ON/OFF	ESP OFF switch ON (When ESP OFF indicator lamp is ON)	ON
		ESP OFF switch OFF (When ESP OFF indicator lamp is OFF)	OFF
YAW RATE SEN	Yaw rate detected by yaw rate/side G sensor	When vehicle stop	Approx. 0 °/s
		When vehicle turning	–75 to 75 °/s
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0 %
		Depress accelerator pedal (ignition switch is ON)	0 - 100 %

cardiagn.com

Monitor item	Condition		Value/Status
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s^2
		Vehicle turning right	Negative value (m/s^2)
		Vehicle turning left	Positive value (m/s^2)
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0°
		Steering wheel turned	–720 to 720°
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 3 bar
		With ignition switch turned ON and brake pedal depressed	0 to 200 bar
ENGINE RPM	With engine running	With engine stopped	0 tr/min
		Engine running	Almost in accordance with tachometer display
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	ON
		When brake fluid level switch OFF	OFF
PARK BRAKE SW	Parking brake switch signal status	Parking brake switch is active	ON
		Parking brake switch is inactive	OFF
FR RH IN SOL	Operation status of front RH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
FR RH OUT SOL	Operation status of front RH outlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
FR LH IN SOL	Operation status of front LH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
FR LH OUT SOL	Operation status of front RH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
RR RH IN SOL	Operation status of rear RH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF

cardiagn.com

Monitor item	Condition		Value/Status
RR RH OUT SOL	Operation status of rear RH outlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
RR LH IN SOL	Operation status of rear LH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
RR LH OUT SOL	Operation status of rear RH inlet solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	ON
		When the motor relay and motor are not operating	OFF
ACTUATOR RLY NOTE 2	Actuator relay operation	When the actuator relay is operating	ON
		When the actuator relay is not operating	OFF
ABS WARN LAMP	ABS warning lamp NOTE 3	When ABS warning lamp is ON	ON
		When ABS warning lamp is OFF	OFF
OFF LAMP	ESP OFF indicator lamp NOTE 3	When ESP OFF indicator lamp is ON	ON
		When ESP OFF indicator lamp is OFF	OFF
SLIP LAMP	SLIP indicator lamp NOTE 3	When SLIP indicator lamp is ON	ON
		When SLIP indicator lamp is OFF	OFF

NOTE:

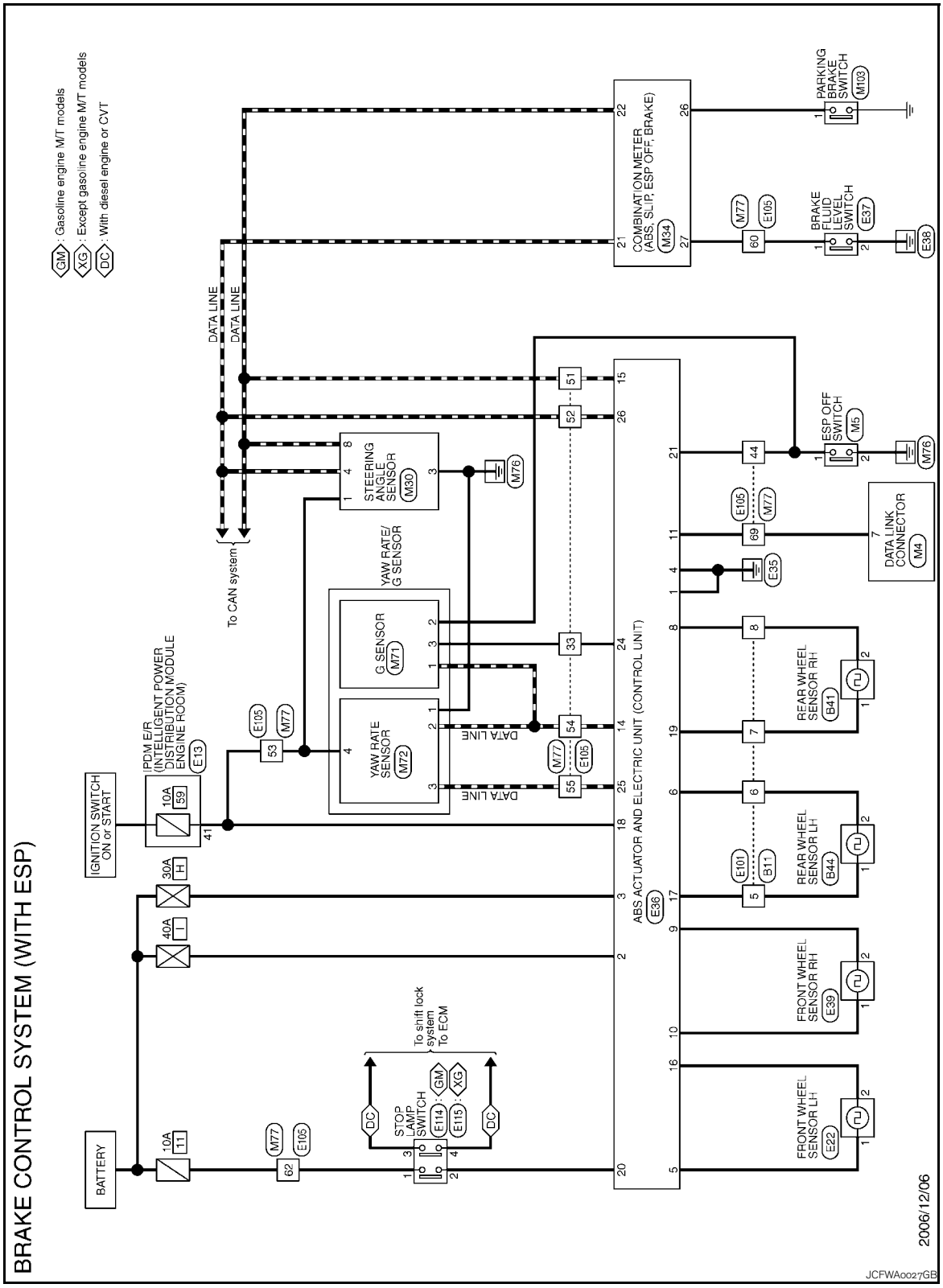
- 1: Confirm tire pressure is normal.
- 2: Every 20 seconds momentary switch to OFF.
- 3: On and off timing for warning lamp and indicator lamp.

- ABS warning lamp: BRC-149, "Description".
- ESP OFF indicator lamp: BRC-151, "Description".
- SLIP indicator lamp: BRC-152, "Description".

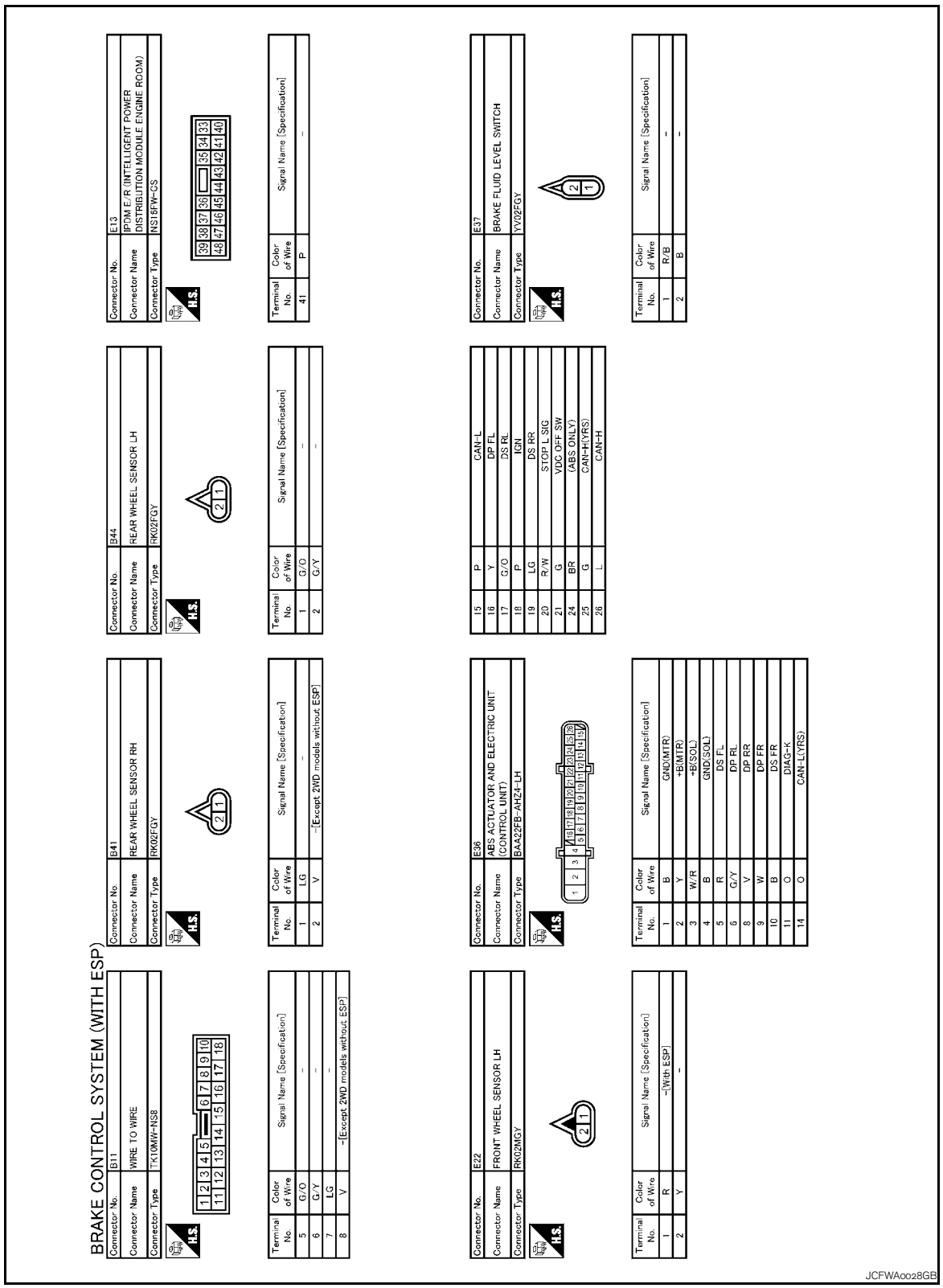
Wiring Diagram - BRAKE CONTROL SYSTEM -

INFOID:0000000000924917

cardiagn.com



cardiagn.com



cardiagn.com

BRAKE CONTROL SYSTEM (WITH ESP)

Connector No.	E39
Connector Name	FRONT WHEEL SENSOR RH
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	W	–

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–
3	G	–[With CVT]
3	O	–[With diesel engine]
4	B	–[With CVT]
4	W/L	–[With diesel engine]

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
5	G/O	–
6	G/Y	–
7	LG	–
8	V	–[Except 2WD models without ESP]

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
33	BR	–
44	G	–[With ESP]
51	P	–
52	L	–
53	P	–
54	O	–[With ESP]
55	G	–
60	R/B	–
62	V	–
69	O	–

Connector No.	M5
Connector Name	ESP OFF SWITCH
Connector Type	TK06FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	B	–

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

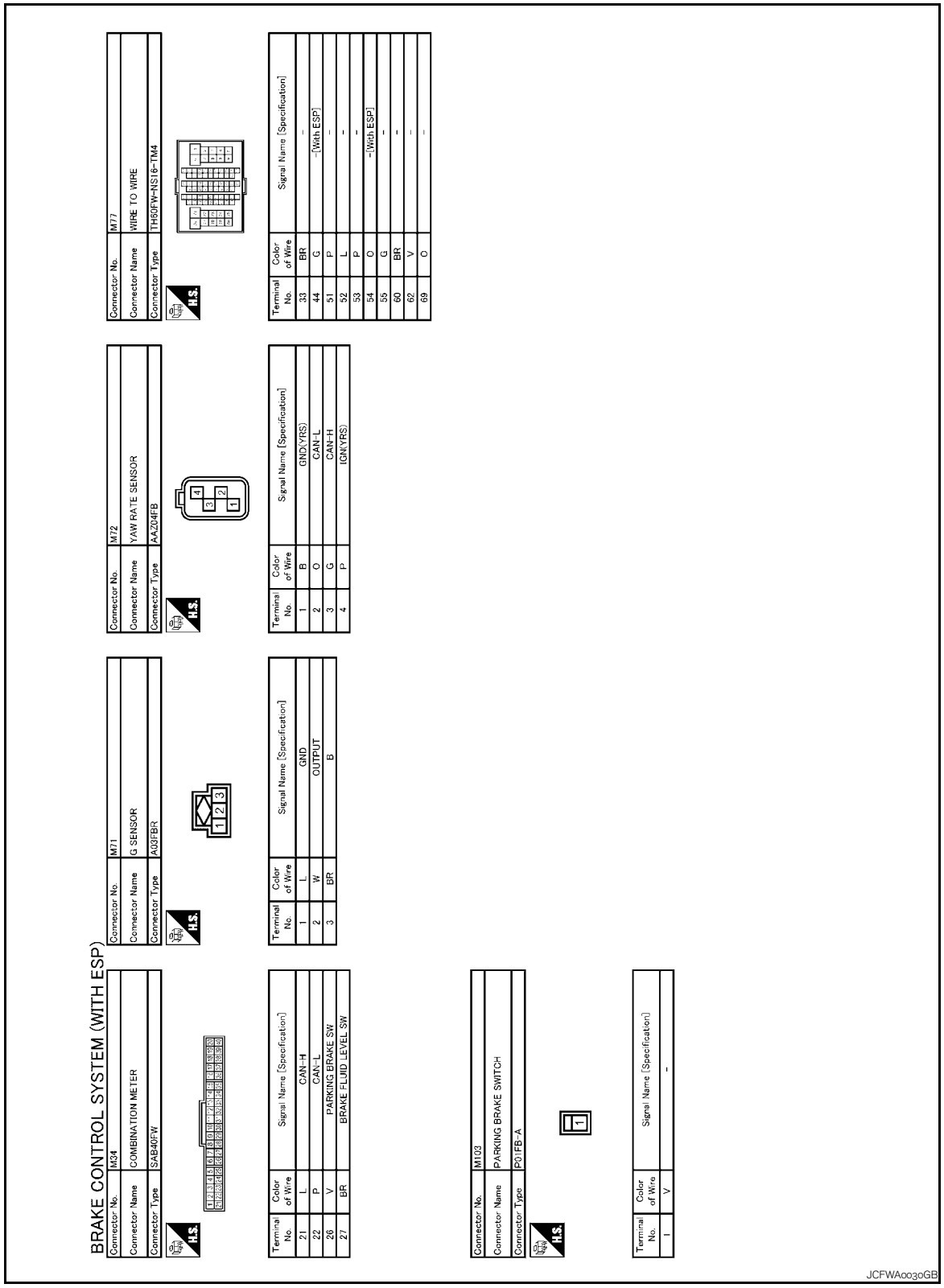
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–

Connector No.	M30
Connector Name	STEERING ANGLE SENSOR
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/L	IGN SAS
3	B	GND SAS
4	L	CAN-H
8	P	CAN-L

JCFWA0029GB

cardiagn.com



Fail-Safe

INFOID:0000000000924918

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the ESP/TCS/ABS become one of the following conditions of the fail-safe function.

cardiagn.com

- For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.
  NOTE:
  ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for “Ignition switch ON” and “The first starting” are being performed.
- For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

ESP/TCS SYSTEM

In case of malfunction in the ESP/TCS/ABS system, ESP OFF indicator lamp, SLIP indicator lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without ESP/TCS control.

CAUTION:

If the Fail-Safe function is activated, then perform self-diagnosis for ESP/TCS/ABS control system.

DTC No. Index

INFOID:0000000000924919

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-100, "Description"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-103, "Description"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-106, "Description"
C1110	CONTROLLER FAILURE	BRC-108, "Description"
C1111	PUMP MOTOR	BRC-110, "Description"
C1114	MAIN RELAY	BRC-113, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-115, "Description"
C1116	STOP LAMP SW	BRC-118, "Description"
C1120	FR LH IN ABS SOL	BRC-121, "Description"
C1121	FR LH OUT ABS SOL	BRC-124, "Description"
C1122	FR RH IN ABS SOL	BRC-121, "Description"
C1123	FR RH OUT ABS SOL	BRC-124, "Description"
C1124	RR LH IN ABS SOL	BRC-121, "Description"
C1125	RR LH OUT ABS SOL	BRC-124, "Description"
C1126	RR RH IN ABS SOL	BRC-121, "Description"
C1127	RR RH OUT ABS SOL	BRC-124, "Description"
C1130	ENGINE SIGNAL 1	BRC-127, "Description"
C1131	ENGINE SIGNAL 2	
C1132	ENGINE SIGNAL 3	
C1142	PRESS SEN CIRCUIT	BRC-128, "Description"
C1143	ST ANG SEN CIRCUIT	BRC-130, "Description"
C1144	ST ANG SEN SIGNAL	
C1145	YAW RATE SENSOR	BRC-133, "Description"
C1146	SIDE G-SEN CIRCUIT	BRC-136, "Description"

cardiagn.com

DTC	Items (CONSULT screen terms)	Reference
C1147	USV LINE [FL-RR]	BRC-138, "Description"
C1148	USV LINE [FR-RL]	
C1149	HSV LINE [FL-RR]	
C1150	HSV LINE [FR-RL]	
C1153	EMERGENCY BRAKE	BRC-108, "Description"
C1155	BR FLUID LEVEL LOW	BRC-141, "Description"
C1170	VARIANT CORDING	BRC-108, "Description"
U1000	CAN COMM CIRCUIT	BRC-144, "Description"
U1002	SYSTEM COMM	BRC-144, "Description"

cardiagn.com

SYMPTOM DIAGNOSIS

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000000924921

1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-46, "General Specifications" (LHD models), BR-90, "General Specifications" (RHD models).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check brake system.

2.CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles.
- Front: FAX-7, "Inspection" (2WD models), FAX-47, "Inspection" (4WD models)
- Rear: RAX-3, "Inspection" (2WD models), RAX-9, "Inspection" (4WD models)

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.
- Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4.
NO >>
- Replace wheel sensor or sensor rotor.
- Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving.

Is the ABS warning lamp illuminated?

YES >> Perform self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".
NO >> INSPECTION END

cardiagn.com

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000000924922

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment" (LHD models), BR-52, "Inspection and Adjustment" (RHD models).

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
- Brake pedal: BR-8, "Exploded View" (LHD models), BR-52, "Exploded View" (RHD models).
- Brake booster: BR-14, "Exploded View" (LHD models), BR-58, "Exploded View" (RHD models).
- Brake master cylinder: BR-13, "Exploded View" (LHD models), BR-57, "Exploded View" (RHD models).
- Brake fluid: BR-11, "Inspection" (LHD models), BR-55, "Inspection" (RHD models).

NO >> GO TO 2.

2.CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is normal in this condition. Connect connector after inspection.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check brake system.

cardiagn.com

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000000924923

CAUTION:

The stopping distance on slippery road surfaces might be longer with the ABS operating than when the ABS is not operating.

1.CHECK FUNCTION

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check brake system.

cardiagn.com

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000924924

CAUTION:
ABS does not operate when speed is 10 km/h (6 MPH) or lower.

1. CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Perform self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

cardiagn.com

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000000924925

CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.

- **When shifting gears**
- **When driving on slippery road**
- **During cornering at high speed**
- **When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]**
- **When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]**

1.SYMPTOM CHECK 1

Check that there are pedal vibrations when the engine is started.

Do vibrations occur?

YES >> GO TO 2.
NO >> Inspect the brake pedal.

2.SYMPTOM CHECK 2

Check that there are ABS operation noises when the engine is started.

Do the operation noises occur?

YES >> GO TO 3.
NO >> Perform self-diagnosis. Refer to BRC-96, "CONSULT-III Function (ABS)".

3.SYMPTOM CHECK 3

Check symptoms when electrical component (headlamps, etc.) switches are operated.

Do symptoms occur?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
NO >> INSPECTION END

cardiagn.com

VEHICLE JERKS DURING ESP/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:0000000000924926

1.SYMPTOM CHECK

Check if the vehicle jerks during ESP/TCS/ABS control.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnostic of ABS actuator and electric unit (control unit). Refer to BRC-96, "CONSULT-III Function (ABS)".

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis.
NO >> GO TO 3.

3.CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc.
- Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis.

Are self-diagnosis results indicated?

YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.
NO >> GO TO 4.

4.CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS

Perform ECM and TCM self-diagnosis.

Are self-diagnosis results indicated?

YES >> Check the corresponding items.
- ECM:
  - HR16DE (with EURO-OBD): EC-100, "CONSULT-III Function".
  - HR16DE (without EURO-OBD): EC-430, "CONSULT-III Function".
  - MR20DE (with EURO-OBD): EC-719, "CONSULT-III Function".
  - MR20DE (without EURO-OBD): EC-1054, "CONSULT-III Function".
  - K9K: EC-1315, "Diagnosis Description".
- TCM: Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

NO >> Replace ABS actuator and electric unit (control unit).

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000000924927

Symptom	Result
Slight vibrations are felt on the brake pedal and the operation noises occur, when ESP, TCS or ABS is activated.	This is a normal condition due to the ESP, TCS or ABS activation.
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	
The brake pedal moves and generates noises, when TCS or ESP is activated due to rapid acceleration or sharp turn.	
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is a normal, and it is caused by the ABS operation check.
Depending on the road conditions, the driver may experience a sluggish feel.	This is normal, because TCS places the highest priority on the optimum traction (stability).
TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	
The ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal road. If the normal condition is restored, there is no malfunction. At that time, erase the self-diagnosis memory.
ESP may not operate normally or the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course).	
A malfunction may occur in the yaw rate/side G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the ESP function is off (ESP OFF indicator lamp illuminated).	
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the ESP/TCS function before performing an inspection on a chassis dynamometer.)

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" Service

INFOID:0000000000924928

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

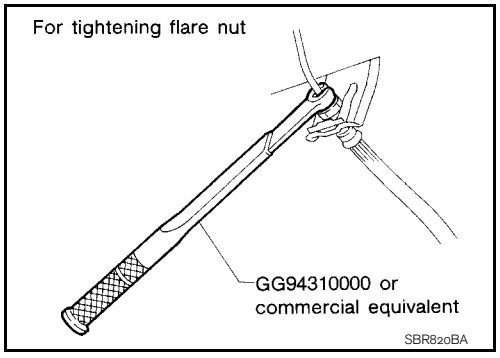
Precaution for Brake System

INFOID:0000000000924929

WARNING:

Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.

- Only use DOT 4 brake fluid. Refer to MA-21, "Fluids and Lubricants".
- Never to reuse drained brake fluid.
- Never to spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Never to use mineral oils such as gasoline or light oil. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with a flare nut torque wrench.
- Always conform the specified tightening torque when installing the brake pipes.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.



Precaution for Brake Control

INFOID:0000000000924930

- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.

cardiagn.com

- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- ESP system may not operate normally or a ESP OFF indicator lamp or SLIP indicator lamp may light.

- When replacing the following parts with parts other than genuine parts or making modifications: Suspension-related parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).
- When driving with worn or deteriorated suspension, tires and brake-related parts.

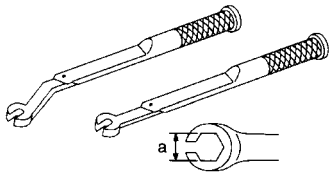
cardiagn.com

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000000936578

Tool number Tool name		Description
GG94310000 Flare nut torque wrench a: 10 mm (0.39 in)/ 12 mm (0.47 in)	 S-NT406	Installing each brake piping

cardiagn.com

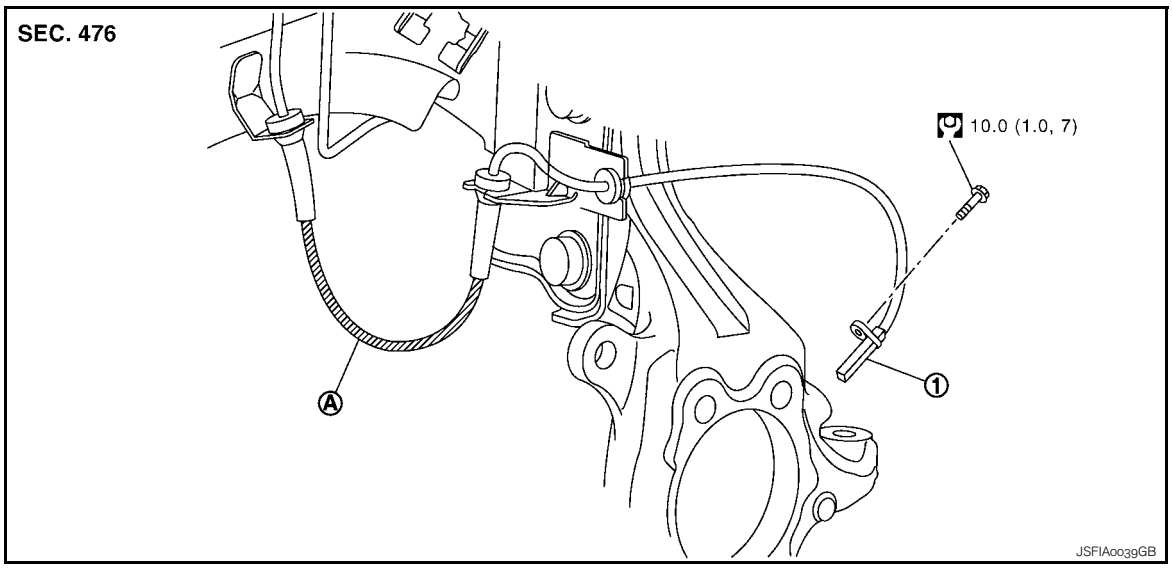
ON-VEHICLE REPAIR

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000001115340



1. Front LH wheel sensor

A. White line (slant line)

Refer to GI section GI-4, "Components" for symbols in the figure.

NOTE:
The above figure (front side) shows left side. Right side is the mirror image.

FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000001115341

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**
- **When you see the harness of the wheel sensor from the front side of the vehicle ensure that the white lines (A) are not twisted.**

INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View".

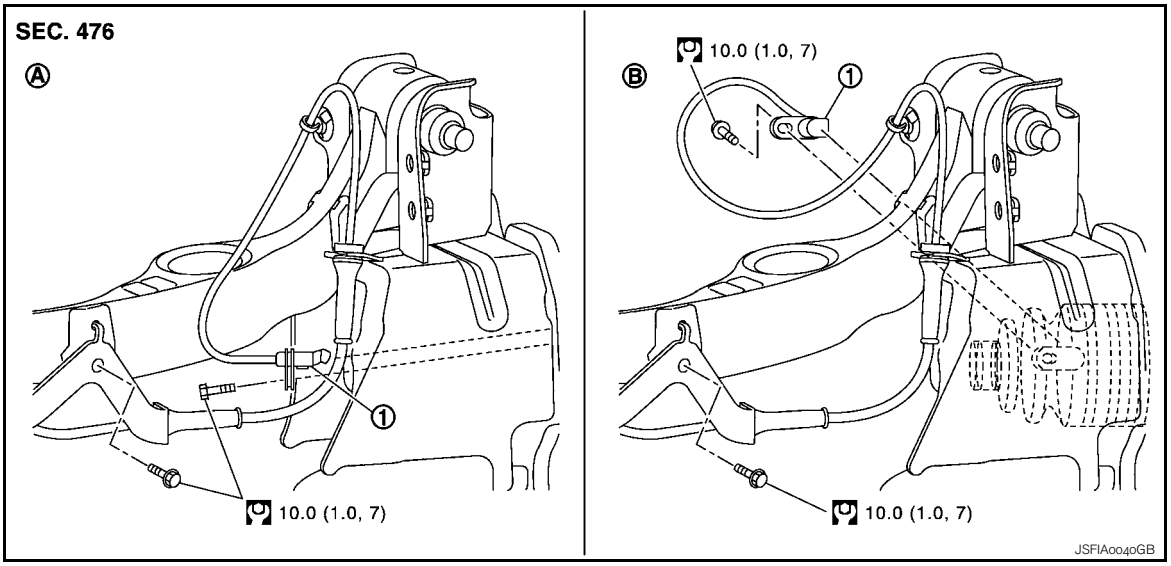
- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

INFOID:0000000001115342

cardiagn.com



1. Rear LH wheel sensor

A. 2WD models B. 4WD models

Refer to GI section GI-4, "Components" for symbols in the figure.

NOTE:
The above figure (front side) shows left side. Right side is the mirror image.

REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000001115343

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**

INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

cardiagn.com

SENSOR ROTOR

FRONT SENSOR ROTOR

FRONT SENSOR ROTOR : Exploded View

INFOID:0000000001115344

Refer to FAX-9, "Exploded View" (2WD models), FAX-49, "Exploded View" (4WD models).

FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000001115345

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with wheel hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-49, "Removal and Installation" (4WD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with wheel hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-49, "Removal and Installation" (4WD models).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Exploded View

INFOID:0000000001115346

Refer to RAX-4, "Exploded View" (2WD models), RAX-13, "Exploded View" (4WD models).

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000001115347

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with wheel hub and bearing assembly. Refer to RAX-4, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with wheel hub and bearing assembly. Refer to RAX-4, "Removal and Installation".

4WD MODELS

For removal and installation of sensor rotor, refer to RAX-14, "Disassembly and Assembly".

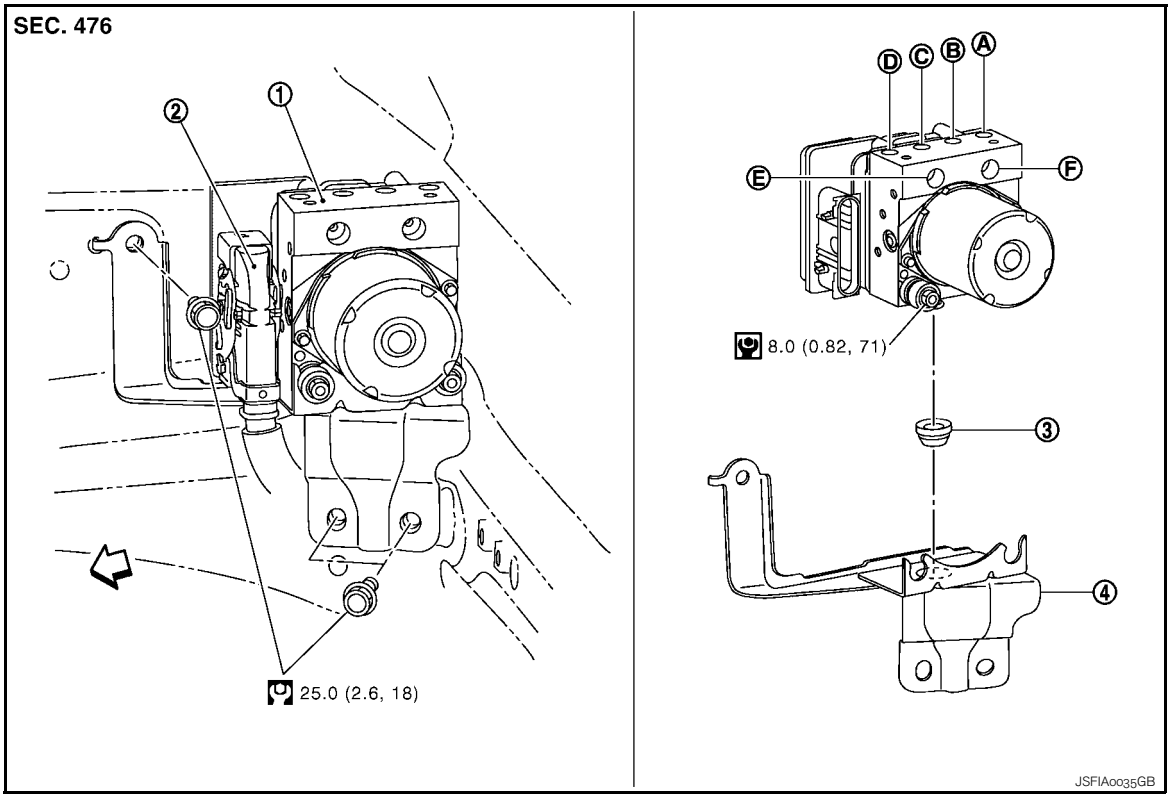
cardiagn.com

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000001115348

LHD models



1.	ABS actuator and electric unit (control unit)	2.	Connector	3.	Bushing
4.	Bracket				

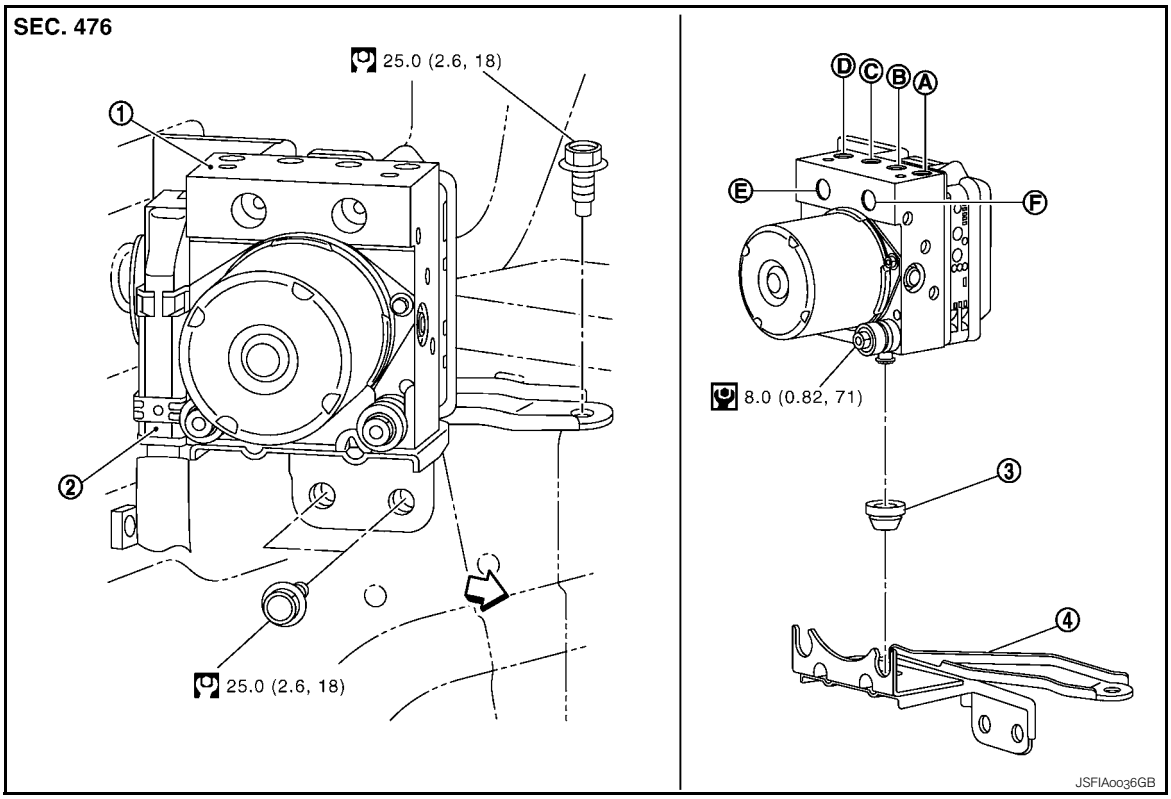
A.	To front LH brake caliper	B.	To rear RH brake caliper	C.	To Rear LH brake caliper
D.	To front RH brake caliper	E.	From master cylinder secondary side	F.	From master cylinder primary side

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

cardiagn.com

RHD models



1.	ABS actuator and electric unit (control unit)	2.	Connector	3.	Bushing
4.	Bracket				
A.	To front LH brake caliper	B.	To rear RH brake caliper	C.	To Rear LH brake caliper
D.	To front RH brake caliper	E.	From master cylinder secondary side	F.	From master cylinder primary side

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001116482

LHD MODELS

Removal

CAUTION:

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).**

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove exhaust manifold.
   - HR16DE: EX-5, "Exploded View"
   - MR20DE: EX-10, "Exploded View"
   - K9K: EX-15, "Exploded View"
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
5. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
6. Remove ABS actuator and electric unit (control unit) from vehicle.

cardiagn.com

Installation

Note the following, and install in the reverse order of removal.

CAUTION:

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**
- **When replacing ABS actuator and electric unit (control unit), make sure to adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".**

RHD MODELS

Removal

CAUTION:

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).**

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove air cleaner and air duct.
   - HR16DE: EM-27, "Exploded View"
   - MR20DE: EM-144, "Exploded View"
   - K9K: EM-265, "Exploded View"
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
5. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
6. Remove ABS actuator and electric unit (control unit) from vehicle.

Installation

Note the following, and install in the reverse order of removal.

CAUTION:

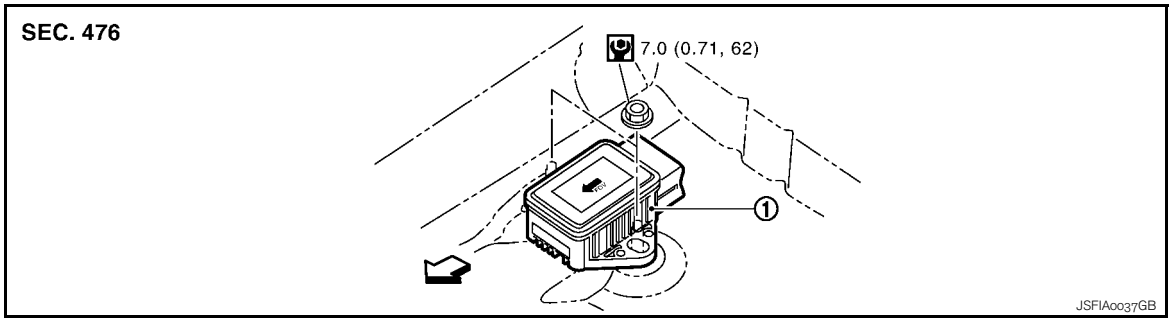
- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-56, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**
- **When replacing ABS actuator and electric unit (control unit), make sure to adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".**

cardiagn.com

YAW RATE/SIDE G SENSOR

Exploded View

INFOID:0000000000924941



1. Yaw rate/side G sensor

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbol makes in the figure.

Removal and Installation

INFOID:0000000000924942

REMOVAL

CAUTION:

- **Do not drop or strike yaw rate/side G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because yaw rate/side G sensor is sensitive for the impact.**

1. Remove lower instrument cover RH. Refer to IP-11, "Exploded View".
2. Disconnect yaw rate/side G sensor harness connector.
3. Remove mounting nuts. Remove yaw rate/side G sensor.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

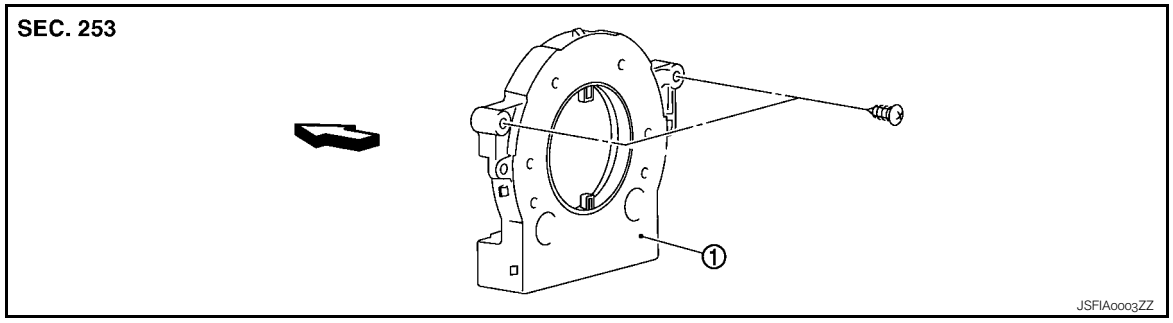
- **Do not drop or strike yaw rate/side G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because yaw rate/side G sensor is sensitive for the impact.**

cardiagn.com

STEERING ANGLE SENSOR

Exploded View

INFOID:0000000000924943



1. Steering angle sensor

⇦: Vehicle front

Removal and Installation

INFOID:0000000000924944

REMOVAL

1. Remove spiral cable assembly. Refer to SR-6, "Exploded View".
2. Remove steering angle sensor from spiral cable assembly.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

After work, make sure to adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

cardiagn.com

SECTION BR
BRAKE SYSTEM

CONTENTS

LHD

SYMPTOM DIAGNOSIS 4

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 4
NVH Troubleshooting Chart 4

PRECAUTION 5

PRECAUTIONS 5
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 5
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 5
Precaution for Brake System 5

PREPARATION 7

PREPARATION 7
Commercial Service Tool 7

ON-VEHICLE MAINTENANCE 8

BRAKE PEDAL 8
Exploded View 8
Inspection and Adjustment 8

BRAKE FLUID 11
Inspection 11
Draining 11
Refilling 11
Bleeding Brake System 12

BRAKE MASTER CYLINDER 13
Exploded View 13
Inspection 13

BRAKE BOOSTER 14
Exploded View 14
Inspection 14

FRONT DISC BRAKE 15

BRAKE PAD 15
BRAKE PAD : Exploded View 15
BRAKE PAD : Inspection 15

DISC ROTOR 15
DISC ROTOR : Inspection 15

REAR DISC BRAKE 16

BRAKE PAD 16
BRAKE PAD : Exploded View 16
BRAKE PAD : Inspection 16

DISC ROTOR 16
DISC ROTOR : Inspection 16

ON-VEHICLE REPAIR 17

BRAKE PEDAL 17
Exploded View 17
Removal and Installation 17
Inspection and Adjustment 18

BRAKE PIPING 19

FRONT BRAKE (WITH ABS) 19
FRONT BRAKE (WITH ABS) : Exploded View 19
FRONT BRAKE (WITH ABS) : Hydraulic Piping 19
FRONT BRAKE (WITH ABS) : Removal and Installation 20
FRONT BRAKE (WITH ABS) : Inspection 21

FRONT BRAKE (WITH ESP) 21
FRONT BRAKE (WITH ESP) : Exploded View 21
FRONT BRAKE (WITH ESP) : Hydraulic Piping 22
FRONT BRAKE (WITH ESP) : Removal and Installation 23
FRONT BRAKE (WITH ESP) : Inspection 23

REAR BRAKE 24
REAR BRAKE : Exploded View 24
REAR BRAKE : Hydraulic Piping 24

cardiagn.com

REAR BRAKE : Removal and Installation 25
REAR BRAKE : Inspection 26

BRAKE MASTER CYLINDER 27
Exploded View 27
Removal and Installation 27
Disassembly and Assembly 28
Inspection 29

BRAKE BOOSTER 30
Exploded View 30
Removal and installation 30
Inspection and Adjustment 31

VACUUM LINES 33

HR16DE/MR20DE MODELS 33
HR16DE/MR20DE MODELS : Exploded View 33
HR16DE/MR20DE MODELS : Removal and Installation 33
HR16DE/MR20DE MODELS : Inspection 33

K9K MODELS 34
K9K MODELS : Exploded View 34
K9K MODELS : Removal and Installation 34
K9K MODELS : Inspection 35

FRONT DISC BRAKE 36

BRAKE PAD 36
BRAKE PAD : Exploded View 36
BRAKE PAD : Removal and Installation 36
BRAKE PAD : Inspection and Adjustment 36

BRAKE CALIPER ASSEMBLY 37
BRAKE CALIPER ASSEMBLY : Exploded View 37
BRAKE CALIPER ASSEMBLY : Removal and Installation 37
BRAKE CALIPER ASSEMBLY : Disassembly and Assembly 38
BRAKE CALIPER ASSEMBLY : Inspection and Adjustment 40

REAR DISC BRAKE 41

BRAKE PAD 41
BRAKE PAD : Exploded View 41
BRAKE PAD : Removal and Installation 41
BRAKE PAD : Inspection and Adjustment 41

BRAKE CALIPER ASSEMBLY 42
BRAKE CALIPER ASSEMBLY : Exploded View 42
BRAKE CALIPER ASSEMBLY : Removal and Installation 43
BRAKE CALIPER ASSEMBLY : Disassembly and Assembly 43
BRAKE CALIPER ASSEMBLY : Inspection and Adjustment 45

SERVICE DATA AND SPECIFICATIONS (SDS) 46

SERVICE DATA AND SPECIFICATIONS (SDS) 46
General Specifications 46
Brake Pedal 46
Brake Booster 46
Front Disc Brake 46
Rear Disc Brake 46

RHD

SYMPTOM DIAGNOSIS 48

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 48
NVH Troubleshooting Chart 48

PRECAUTION 49

PRECAUTIONS 49
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 49
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 49
Precaution for Brake System 49

PREPARATION 51

PREPARATION 51
Commercial Service Tool 51

ON-VEHICLE MAINTENANCE 52

BRAKE PEDAL 52
Exploded View 52
Inspection and Adjustment 52

BRAKE FLUID 55
Inspection 55
Draining 55
Refilling 55
Bleeding Brake System 56

BRAKE MASTER CYLINDER 57
Exploded View 57
Inspection 57

BRAKE BOOSTER 58
Exploded View 58
Inspection 58

FRONT DISC BRAKE 59

BRAKE PAD 59
BRAKE PAD : Exploded View 59
BRAKE PAD : Inspection 59

DISC ROTOR 59
DISC ROTOR : Inspection 59

REAR DISC BRAKE 60

BRAKE PAD 60

cardiagn.com

BRAKE PAD : Exploded View 60
BRAKE PAD : Inspection 60

DISC ROTOR 60
DISC ROTOR : Inspection 60

ON-VEHICLE REPAIR 61

BRAKE PEDAL 61
Exploded View 61
Removal and Installation 61
Inspection and Adjustment 62

BRAKE PIPING 63

FRONT BRAKE (WITH ABS) 63
FRONT BRAKE (WITH ABS) : Exploded View 63
FRONT BRAKE (WITH ABS) : Hydraulic Piping 63
FRONT BRAKE (WITH ABS) : Removal and Installation 64
FRONT BRAKE (WITH ABS) : Inspection 65

FRONT BRAKE (WITH ESP) 65
FRONT BRAKE (WITH ESP) : Exploded View 65
FRONT BRAKE (WITH ESP) : Hydraulic Piping 66
FRONT BRAKE (WITH ESP) : Removal and Installation 67
FRONT BRAKE (WITH ESP) : Inspection 67

REAR BRAKE 68
REAR BRAKE : Exploded View 68
REAR BRAKE : Hydraulic Piping 68
REAR BRAKE : Removal and Installation 69
REAR BRAKE : Inspection 70

BRAKE MASTER CYLINDER 71
Exploded View 71
Removal and Installation 71
Disassembly and Assembly 72
Inspection 73

BRAKE BOOSTER 74
Exploded View 74
Removal and installation 74
Inspection and Adjustment 75

VACUUM LINES 77

HR16DE/MR20DE MODELS 77
HR16DE/MR20DE MODELS : Exploded View 77
HR16DE/MR20DE MODELS : Removal and Installation 77
HR16DE/MR20DE MODELS : Inspection 77

K9K MODELS 78
K9K MODELS : Exploded View 78
K9K MODELS : Removal and Installation 78
K9K MODELS : Inspection 79

FRONT DISC BRAKE 80

BRAKE PAD 80
BRAKE PAD : Exploded View 80
BRAKE PAD : Removal and Installation 80
BRAKE PAD : Inspection and Adjustment 80

BRAKE CALIPER ASSEMBLY 81
BRAKE CALIPER ASSEMBLY : Exploded View 81
BRAKE CALIPER ASSEMBLY : Removal and Installation 81
BRAKE CALIPER ASSEMBLY : Disassembly and Assembly 82
BRAKE CALIPER ASSEMBLY : Inspection and Adjustment 84

REAR DISC BRAKE 85

BRAKE PAD 85
BRAKE PAD : Exploded View 85
BRAKE PAD : Removal and Installation 85
BRAKE PAD : Inspection and Adjustment 85

BRAKE CALIPER ASSEMBLY 86
BRAKE CALIPER ASSEMBLY : Exploded View 86
BRAKE CALIPER ASSEMBLY : Removal and Installation 87
BRAKE CALIPER ASSEMBLY : Disassembly and Assembly 87
BRAKE CALIPER ASSEMBLY : Inspection and Adjustment 89

SERVICE DATA AND SPECIFICATIONS (SDS) 90

SERVICE DATA AND SPECIFICATIONS (SDS) 90
General Specifications 90
Brake Pedal 90
Brake Booster 90
Front Disc Brake 90
Rear Disc Brake 90

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000925763

Use the chart below to find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			BR-15, BR-16	BR-15, BR-16	BR-36, BR-41	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	NVH in DLN section	NHV in DLN section	NVH in FAX, RAX, FSU and RSU section	NVH in WT section	NVH in WT section	NVH in FAX and/or RAX section	NVH in ST section
Possible cause and SUSPECTED PARTS			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	PROPELLER SHAFT	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise	×	×	×								×	×	×	×	×	×	×
		Shake				×							×		×	×	×	×	×
		Shimmy, Judder				×	×	×	×	×	×	×			×	×	×		×

×: Applicable

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001116836

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001095720

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Brake System

INFOID:0000000000925765

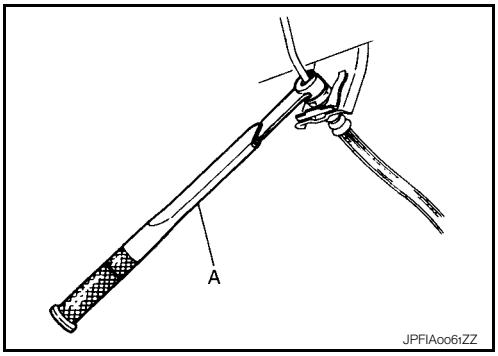
WARNING:

Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.

cardiagn.com

CAUTION:

- **Only use “DOT 4” brake fluid. Refer to MA-21, "Fluids and Lubricants".**
- **Never reuse drained brake fluid.**
- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.**
- **Always clean with new brake fluid when cleaning the master cylinder, brake caliper and other components.**
- **Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.**
- **Always loosen the brake tube flare nut with a flare nut wrench.**
- **Tighten the brake tube flare nut to the specified torque with flare nut torque wrench (A).**
- **Always confirm the specified tightening torque when installing the brake pipes.**
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.**
- **Check that no brake fluid leakage is present after replacing the parts.**
- **Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-36, "BRAKE PAD : Inspection and Adjustment" (front brake pad), BR-40, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment" (front disc rotor), BR-41, "BRAKE PAD : Inspection and Adjustment" (rear brake pad), BR-45, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment" (rear disc rotor).**



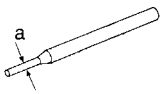
cardiagn.com

PREPARATION

PREPARATION

Commercial Service Tool

INFOID:0000000000925766

Tool name	Description
Pin punch a: 4 mm (0.16 in) dia.  NT410	Removing and installing reservoir tank pin

cardiagn.com

ON-VEHICLE MAINTENANCE

BRAKE PEDAL

Exploded View

INFOID:0000000000925771

Refer to BR-17, "Exploded View".

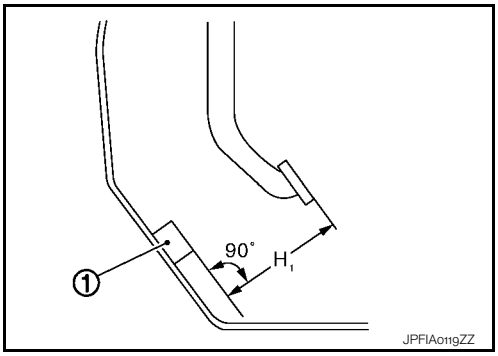
Inspection and Adjustment

INFOID:0000000000925772

INSPECTION

Brake Pedal Height

Check the height (H_1) between the accelerator pedal stopper (1) and the brake pedal upper surface.



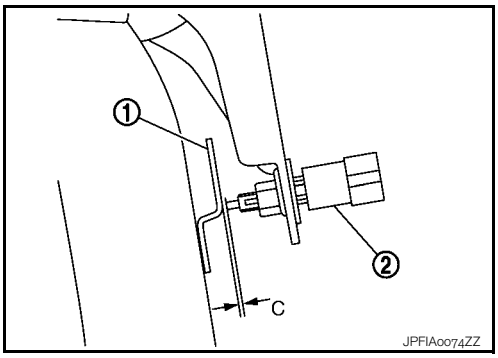
Standard

Brake pedal height (H_1)	**: Refer to BR-46, "Brake Pedal".**

CAUTION:
Remove the floor trim.

ASCD Cancel Switch and Stop Lamp Switch

Check the clearance (C) among bracket (1) and ASCD cancel switch/stop lamp switch (2) threaded end.



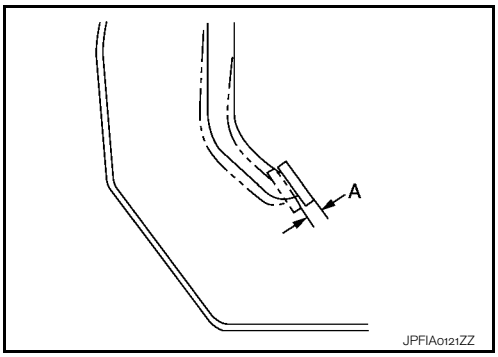
Standard

Clearance (C) between bracket and ASCD cancel switch/stop lamp switch threaded end	**: Refer to BR-46, "Brake Pedal".**

CAUTION:
The stop lamp must be turned off when the brake pedal is released.
NOTE:
Pull the brake pedal pad to make the clearance between bracket and ASCD cancel switch/stop lamp switch threaded end.

Brake Pedal Play

Press the brake pedal. Check the brake pedal play (A).



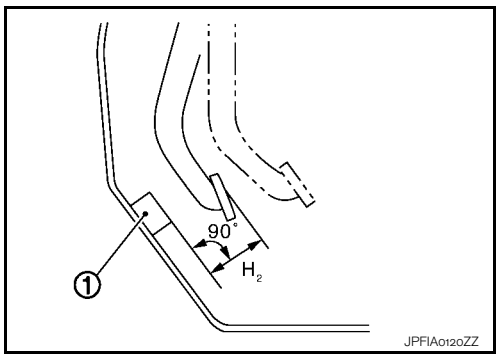
Standard

Pedal play (A)	**: Refer to BR-46, "Brake Pedal".**

Depressed Brake Pedal Height

cardiagn.com

Check the height between the accelerator pedal stopper (1) and the brake pedal upper surface (H_2) when depressing the brake pedal at 490 N (50 kg, 110 lb) while turning engine ON.



Standard

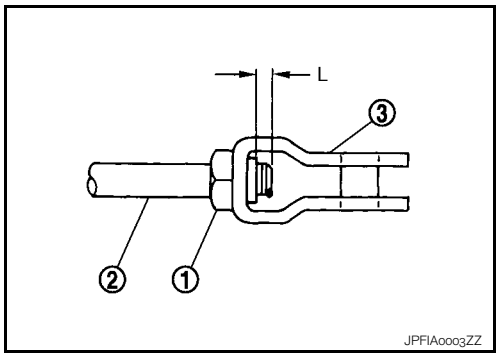
Depressed brake pedal height (H_2) **: Refer to BR-46, "Brake Pedal".**

CAUTION:
Remove the floor trim.

ADJUSTMENT

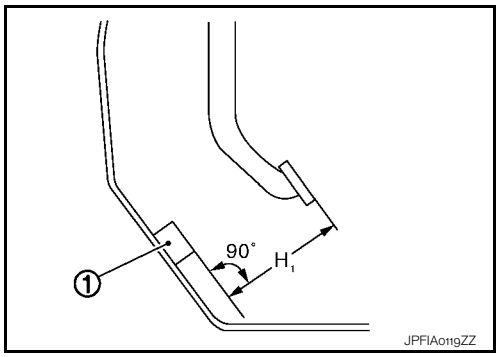
Brake Pedal Height

1. Disconnect the harness connector from ASCD cancel switch and stop lamp switch.
2. Turn the ASCD cancel switch and stop lamp switch 45° counterclockwise.
3. Loosen the input rod lock nut (1). Adjust the brake pedal to the specification. Tighten the input rod lock nut to the specification. Refer to BR-30, "Exploded View".
   CAUTION:
   The threaded end of the input rod (2) must project to the inner side (L) of the clevis (3).



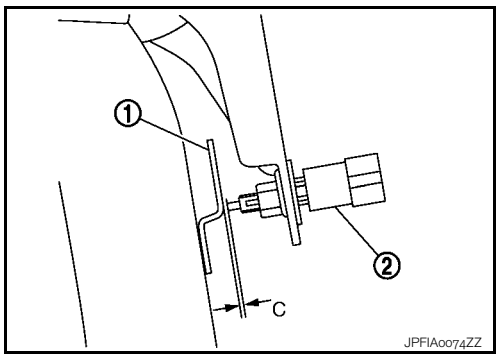
Standard

Brake pedal height (H_1) **: Refer to BR-46, "Brake Pedal".**



ASCD Cancel Switch and Stop Lamp Switch

1. Disconnect the harness connector from ASCD cancel switch and stop lamp switch.
2. Turn the ASCD cancel switch and stop lamp switch 45° counterclockwise.
3. Press-fit ASCD cancel switch/stop lamp switch (2) until ASCD cancel switch/stop lamp switch hits the bracket (1) 45° clockwise.
   CAUTION:
   - **The clearance (C) between the bracket and ASCD cancel switch/stop lamp switch threaded end must be the specified value. Refer to BR-46, "Brake Pedal".**
   - **The stop lamp must be turned off when the brake pedal is released.**



Brake Pedal Play

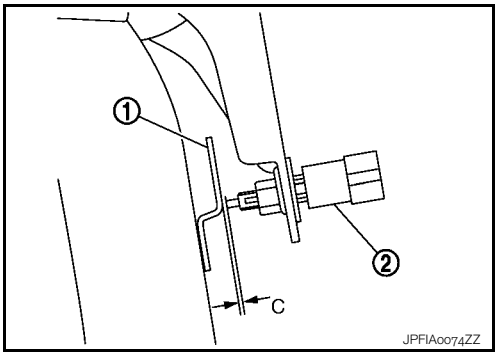
1. Disconnect the harness connector from ASCD cancel switch and stop lamp switch.
2. Turn the ASCD cancel switch and stop lamp switch 45° counterclockwise.

cardiagn.com

3. Press-fit ASCD cancel switch/stop lamp switch (2) until ASCD cancel switch/stop lamp switch hits the bracket (1) 45° clockwise.

CAUTION:

- **The clearance (C) between the bracket and ASCD cancel switch/stop lamp switch threaded end must be the specified value. Refer to BR-46, "Brake Pedal".**
- **The stop lamp must be turned off when the brake pedal is released.**



cardiagn.com

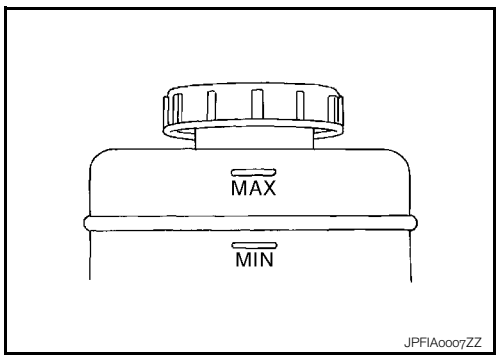
BRAKE FLUID

Inspection

INFOID:0000000000925773

BRAKE FLUID LEVEL

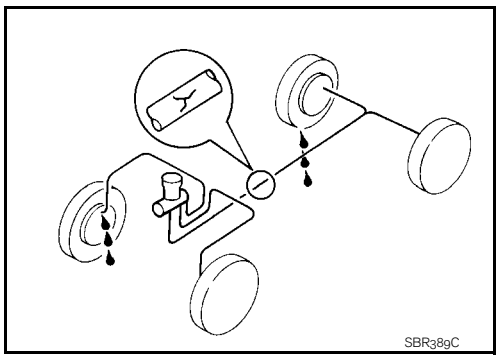
- Check that the fluid level in the reservoir tank is within the specified range (MAX – MIN lines).
- Visually check for any brake fluid leakage around the reservoir tank.
- Check the brake system for any leakage if the fluid level is extremely low (lower than MIN).
- Check the brake system for fluid leakage if the warning lamp remains illuminated even after the parking brake is released.



JPFIA0007ZZ

BRAKE LINE

1. Check brake line (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.
2. Check for fluid leakage by fully depressing brake pedal while engine is running.
   CAUTION:
   If leakage occurs around joints, retighten or, if necessary, replace damaged parts.


SBR389C

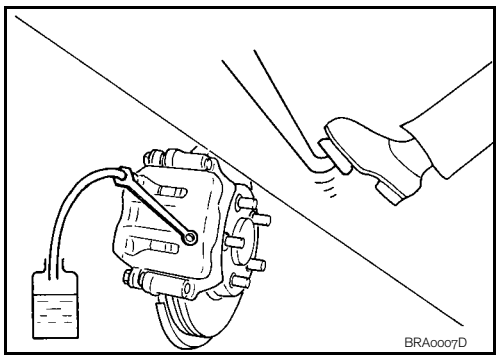
Draining

INFOID:0000000000925774

CAUTION:

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.**
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before draining.**

1. Connect a vinyl tube to the bleed valve.
2. Depress the brake pedal and loosen the bleeder valve to gradually discharge brake fluid.


BRA0007D

Refilling

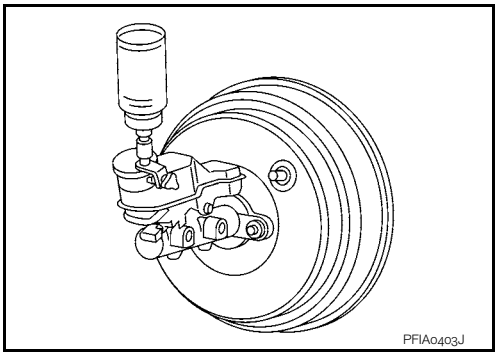
INFOID:0000000000925775

CAUTION:

Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before refilling.

cardiagn.com

1. Check that there is no foreign material in the reservoir tank, and refill with new brake fluid.
   CAUTION:
   Never reuse drained brake fluid.
2. Loosen the bleeder valve, slowly depress the brake pedal to the full stroke, and then release the pedal. Repeat this operation at intervals of 2 or 3 seconds until all brake fluid is discharged. Then close the bleeder valve with the brake pedal depressed. Repeat the same work on each wheel.
3. Perform the air bleeding. Refer to BR-12, "Bleeding Brake System".



Bleeding Brake System

INFOID:0000000000925776

CAUTION:
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.**
- **Monitor the fluid level in the reservoir tank during the air bleeding.**
- **Always use new brake fluid for refilling. Never reuse the drained brake fluid.**

1. Connect a vinyl tube to the bleeder valve of the rear right brake.
2. Fully depress the brake pedal 4 to 5 times.
3. Loosen the bleeder valve and bleed air with the brake pedal depressed, and then quickly tighten the bleeder valve.
4. Repeat steps 2 and 3 until all of the air is out of the brake line.
5. Tighten the bleeder valve to the specified torque. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View" (front disc brake), BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View" (rear disc brake).
6. Perform steps 1 to 5 for the rear right brake → front left brake → rear left brake → and front right brake in order.
7. Check that the fluid level in the reservoir tank is within the specified range after air bleeding. Refer to BR-11, "Inspection".

cardiagn.com

BRAKE MASTER CYLINDER

Exploded View

INFOID:0000000000925777

Refer to BR-27, "Exploded View".

Inspection

INFOID:0000000000925778

FLUID LEAK

Check for brake fluid leakage from the master cylinder mounting face, reservoir tank mounting face and brake tube connections.

cardiagn.com

BRAKE BOOSTER

Exploded View

INFOID:0000000000925779

Refer to BR-30, "Exploded View".

Inspection

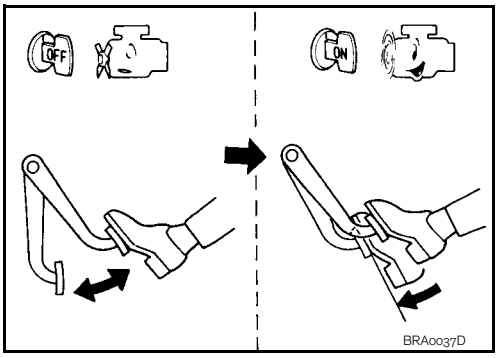
INFOID:0000000000925780

OPERATION

Depress the brake pedal several times at 5-second intervals with the engine stopped. Start the engine with the brake pedal fully depressed. Check that the clearance between brake pedal and dash lower panel decreases.

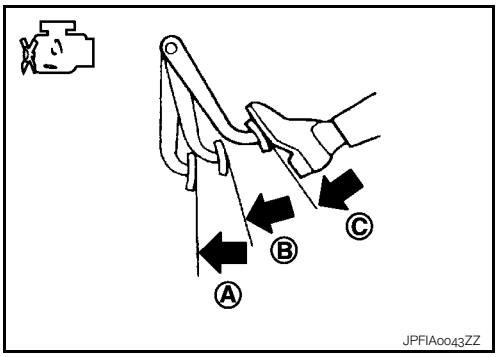
NOTE:

A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



AIR TIGHT

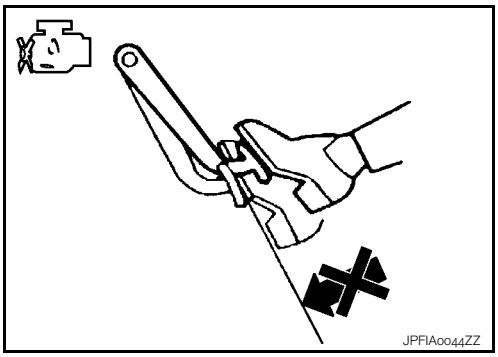
- Idle the engine for 1 minute to apply vacuum to the brake booster, and stop the engine. Then depress the brake pedal several times at 5-second intervals until the accumulated vacuum is released to atmospheric pressure. Check that the clearance between brake pedal and dash lower panel gradually increases (A → B → C) each time the brake pedal is depressed during this operation.



- Depress the brake pedal with the engine running. Then stop the engine while holding down the brake pedal. Check that the brake pedal stroke does not change after holding down the brake pedal for 30 seconds or more.

  NOTE:

  A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



cardiagn.com

FRONT DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000000925781

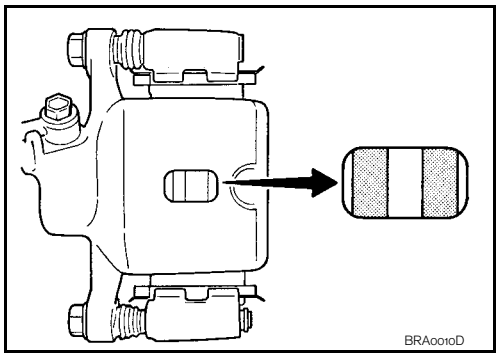
Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View".

BRAKE PAD : Inspection

INFOID:0000000000925782

PAD WEAR

Check pad thickness from an inspection hole on cylinder body. Check using a scale if necessary.



Standard thickness : Refer to **BR-46, "Front Disc Brake"**.

Wear limit thickness : Refer to **BR-46, "Front Disc Brake"**.

DISC ROTOR

DISC ROTOR : Inspection

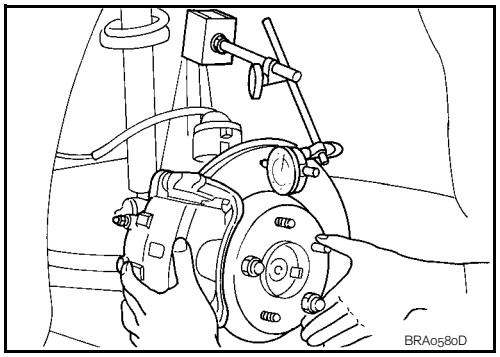
INFOID:0000000000925783

APPEARANCE

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

RUNOUT

1. Fix the disc rotor to the wheel hub and bearing assembly with wheel nuts (2 points at least).
2. Inspect the runout with a dial gauge. [Measured at 10 mm (0.39 in) inside the disc edge.]



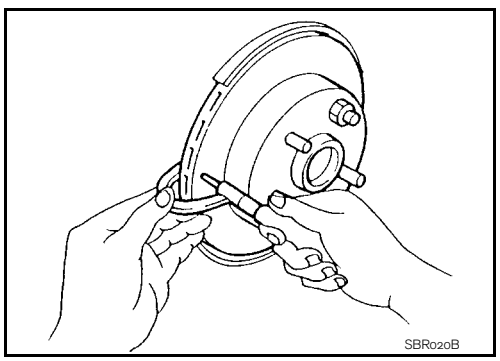
Runout limit : Refer to **BR-46, "Front Disc Brake"**.

NOTE:
Check the wheel bearing axial end play before the inspection. Refer to FAX-7, "Inspection" (2WD), FAX-47, "Inspection" (4WD).

3. Find the installation position with a minimum runout by shifting the disc rotor-to-wheel hub and bearing assembly installation position by one hole at a time if the runout exceeds the limit value.
4. Replace or lathe the disc rotor if the runout exceeds the limit even after the above operation.

THICKNESS

Check the thickness of the disc rotor using a micrometer. Replace the disc rotor if the thickness is below the wear limit.



Wear limit thickness : Refer to **BR-46, "Front Disc Brake"**.

cardiagn.com

REAR DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000000925784

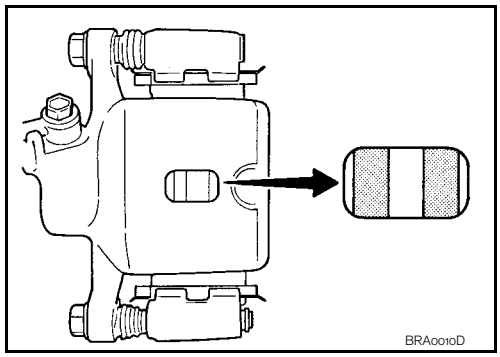
Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View".

BRAKE PAD : Inspection

INFOID:0000000000925785

PAD WEAR

Check pad thickness from an inspection hole on cylinder body. Check using a scale if necessary.



Standard thickness : Refer to BR-46, "Rear Disc Brake".

Wear limit thickness : Refer to BR-46, "Rear Disc Brake".

DISC ROTOR

DISC ROTOR : Inspection

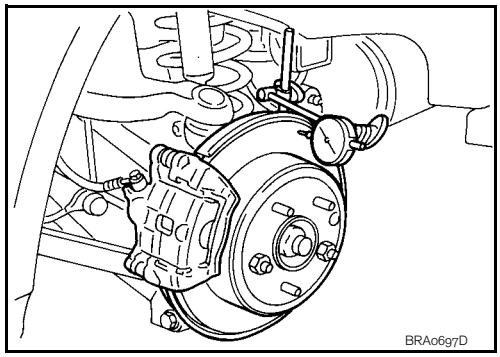
INFOID:0000000000925786

APPEARANCE

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

RUNOUT

1. Fix the disc rotor to the wheel hub and bearing assembly with wheel nuts (2 points at least).
2. Inspect the runout with a dial gauge. [Measured at 10 mm (0.39 in) inside disc edge.]



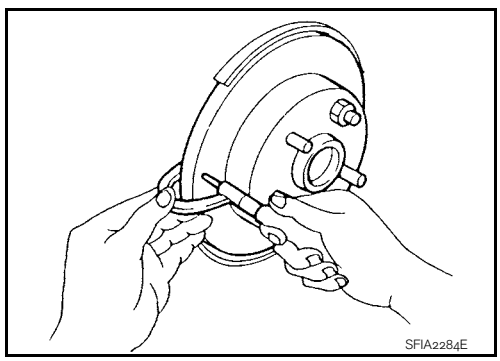
Runout limit : Refer to BR-46, "Rear Disc Brake".

NOTE:
Check the wheel bearing axial end play before the inspection. Refer to RAX-3, "Inspection" (2WD), RAX-9, "Inspection" (4WD).

3. Find the installation position with a minimum runout by shifting the disc rotor-to-wheel hub and bearing assembly installation position by one hole at a time if the runout exceeds the limit value.
4. Replace or lathe the disc rotor if the runout exceeds the limit even after the above operation.

THICKNESS

Check the thickness of the disc rotor using a micrometer. Replace the disc rotor if the thickness is below the wear limit.



Wear limit thickness : Refer to BR-46, "Rear Disc Brake".

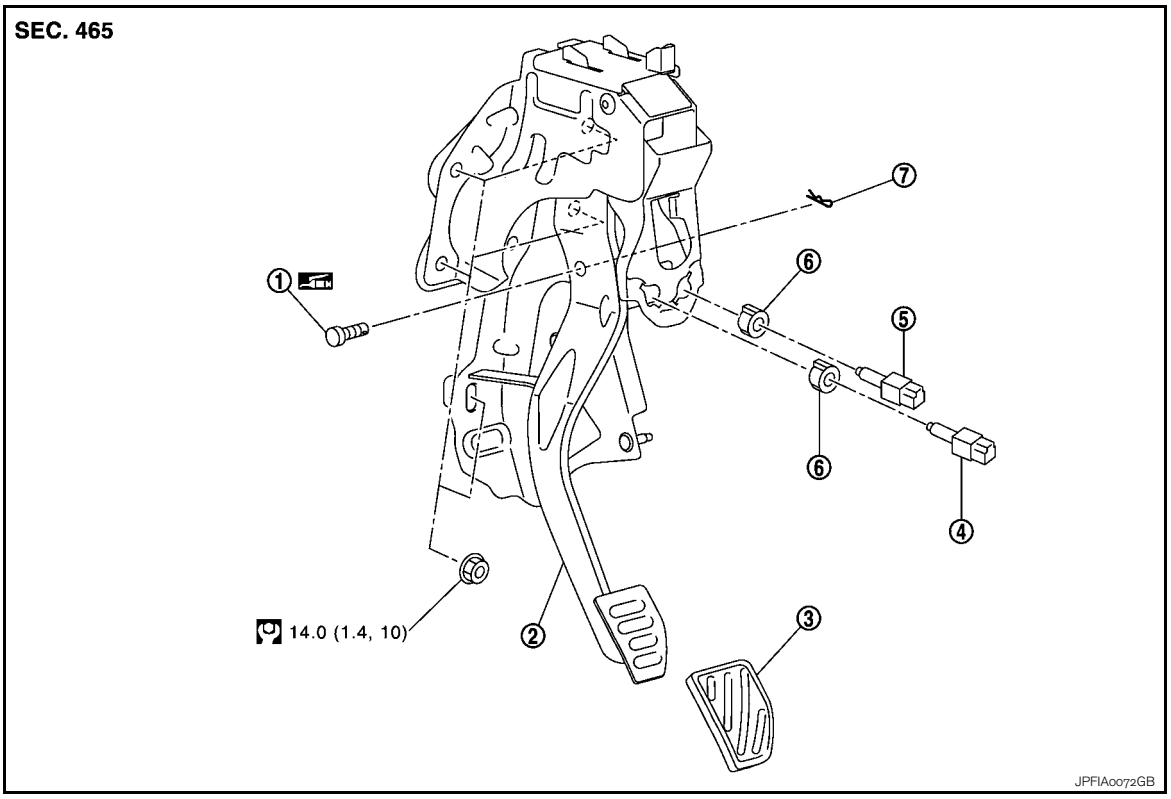
cardiagn.com

ON-VEHICLE REPAIR

BRAKE PEDAL

Exploded View

INFOID:0000000000925787



1. Clevis pin
2. Brake pedal assembly
3. Brake pedal pad
4. ASCD cancel switch
5. Stop lamp switch
6. Clip
7. Snap pin

: Apply multi-purpose grease.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000925788

REMOVAL

1. Remove front kicking plate inner. Refer to INT-14, "Exploded View".
2. Remove dash side finisher. Refer to INT-14, "Exploded View".
3. Remove instrument driver lower panel. Refer to IP-11, "Exploded View".
4. Remove foot duct. Refer to VTL-47, "FOOT DUCTS : Exploded View" (automatic air conditioner), VTL-93, "FOOT DUCTS : Exploded View" (manual air conditioner)
5. Remove mode door motor. Refer to VTL-35, "Exploded View" (automatic air conditioner).
6. Disconnect ASCD cancel switch and the stop lamp switch harness connectors.
7. Disconnect accelerator pedal position sensor harness connector.
8. Remove steering member stay.
9. Remove snap pin and clevis pin from clevis of brake booster.
10. Remove the brake pedal assembly and the accelerator pedal.
11. Remove the accelerator pedal from brake pedal assembly. Refer to ACC-3, "Exploded View".

INSTALLATION

Note the following, and installation is the reverse order of removal.

cardiagn.com

- Apply the multi-purpose grease to the clevis pin and the mating faces. (Not necessary if grease has been already applied.)

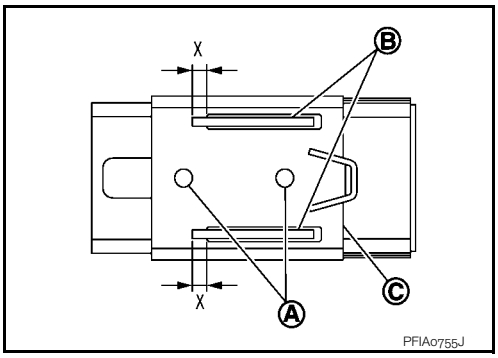
NOTE:
The clevis pin may be inserted in either direction.

Inspection and Adjustment

INFOID:0000000000925789

INSPECTION AFTER REMOVAL

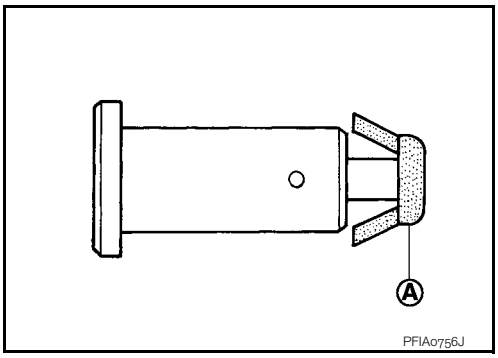
- Check the following items and replace the brake pedal assembly if necessary.
- Check the brake pedal upper rivet (A) for deformation.
- Check the brake pedal for bend, damage, and cracks on the welded parts.
- Check the lapping length (X) of sub-bracket (B) and slide plate (C).



Limit

Lapping length	**: 5.0 mm (0.197 in)**

- Check clevis pin and plastic stopper (A) for damage and deformation. If any is found, replace clevis pin.



ADJUSTMENT AFTER INSTALLATION

- Perform the brake pedal adjustment after installing the brake pedal assembly. Refer to BR-8, "Inspection and Adjustment".
- Perform the accelerator pedal check after installing the accelerator pedal. Refer to ACC-3, "Inspection".

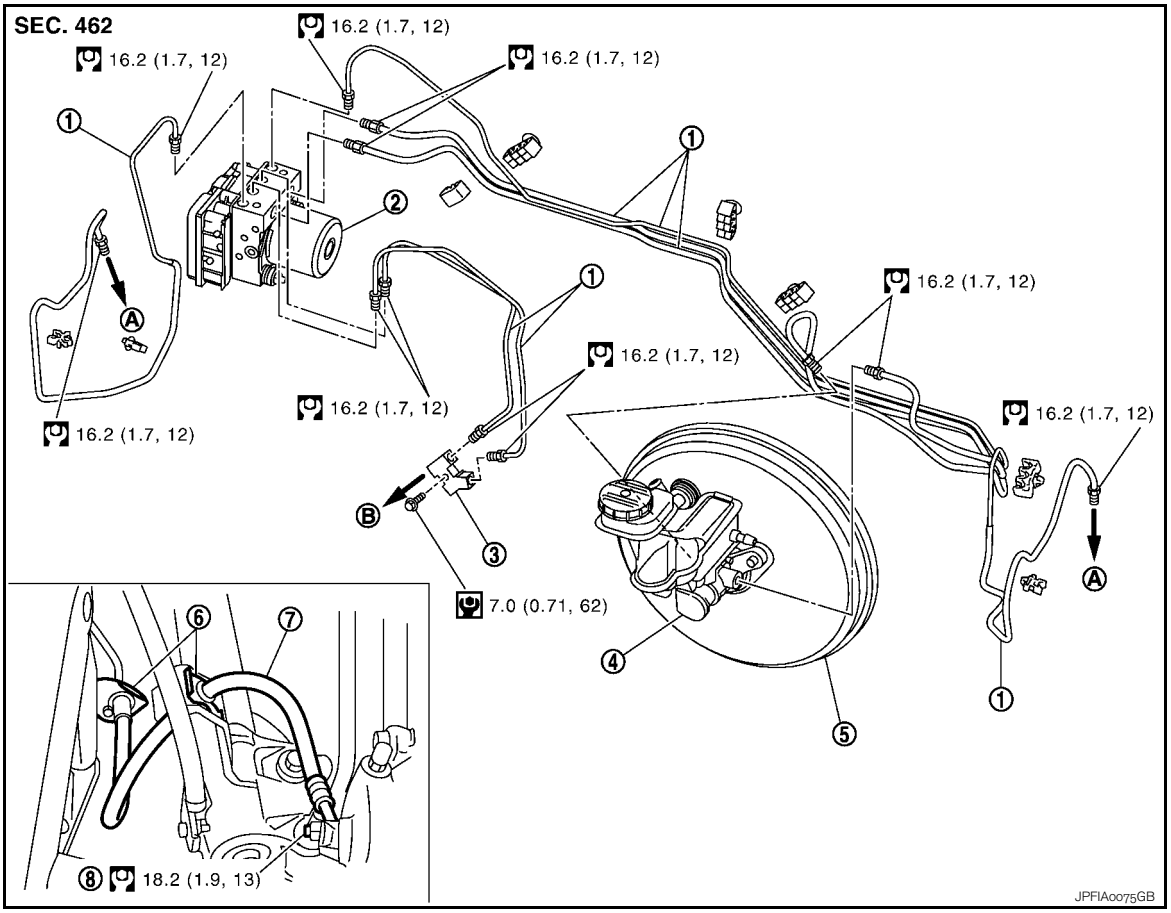
cardiagn.com

BRAKE PIPING

FRONT BRAKE (WITH ABS)

FRONT BRAKE (WITH ABS) : Exploded View

INFOID:0000000000925790

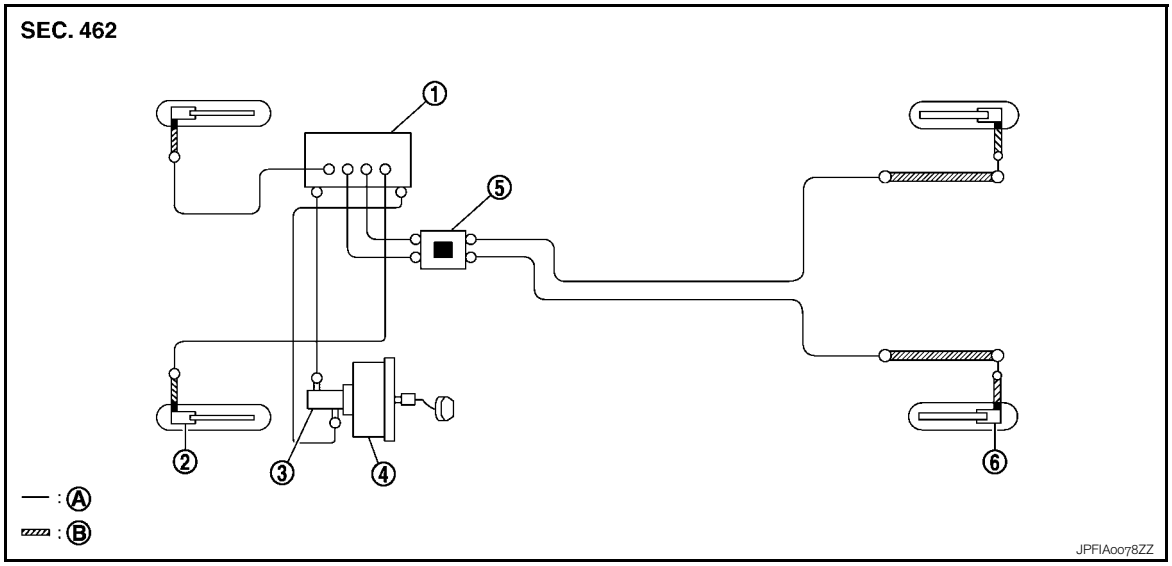


1. Brake tube
2. ABS actuator and electric unit (control unit)
3. Connector
4. Master cylinder assembly
5. Brake booster
6. Lock plate
7. Brake hose
8. Union bolt
A. To front brake hose
B. To rear brake tube

Refer to GI-4, "Components" for symbols in the figure.

FRONT BRAKE (WITH ABS) : Hydraulic Piping

INFOID:0000000000925791



1. ABS actuator and electric unit (control unit)
2. Front disc brake
3. Master cylinder assembly
4. Brake booster
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut

■ : Union bolt

▣ : Connector

FRONT BRAKE (WITH ABS) : Removal and Installation

INFOID:0000000000925792

REMOVAL

CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Remove tires.
2. Drain brake fluid. Refer to BR-11, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tubes.**
   - **Cover open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose.

INSTALLATION

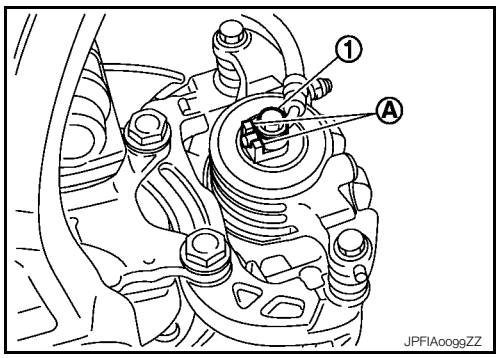
CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse the copper washer.

cardiagn.com

2. Align the brake hose pin to the projection (A) of the brake caliper assembly and tighten the union bolt (1) to the specified torque.
3. Install the brake tube to the brake hose, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that all brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

FRONT BRAKE (WITH ABS) : Inspection

INFOID:0000000000925793

INSPECTION AFTER INSTALLATOIN

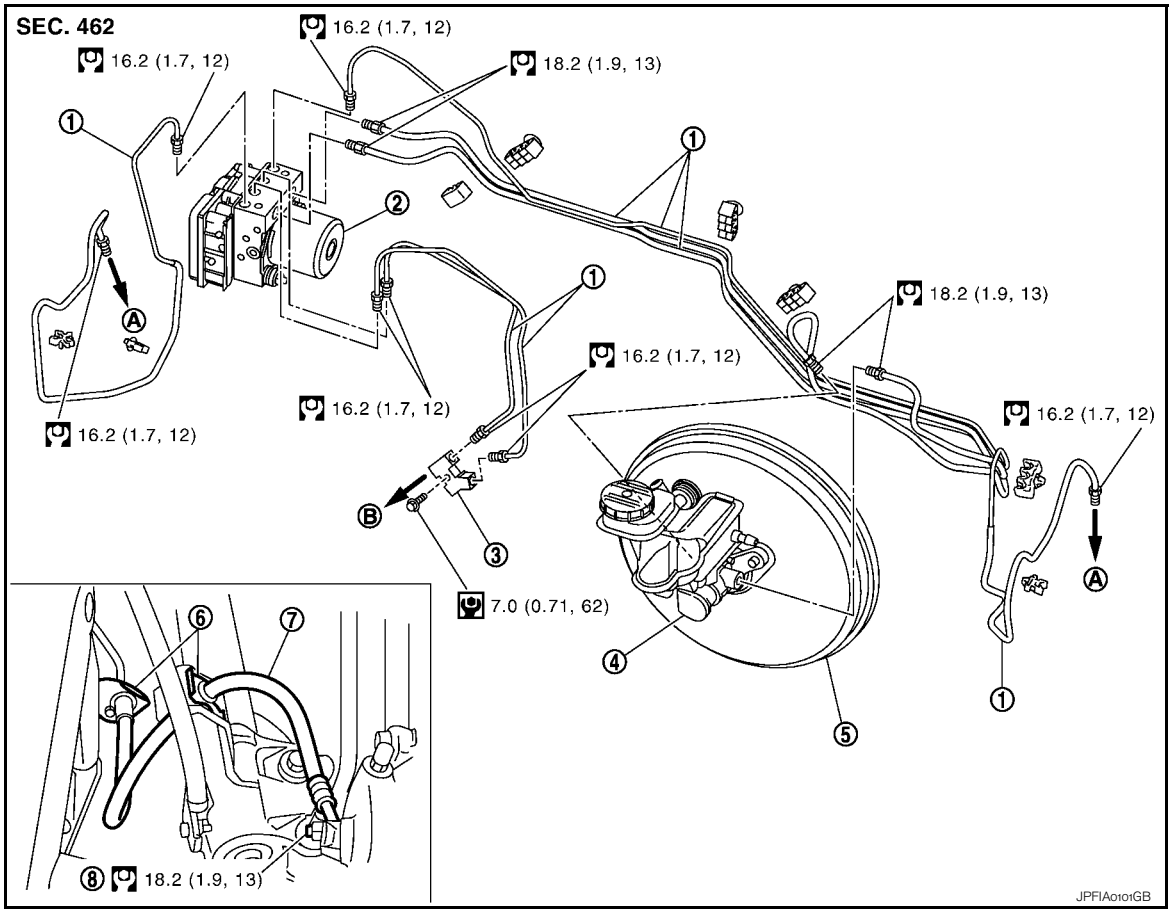
1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds with the engine running. Check for any fluid leakage.
   CAUTION:
   Retighten the applicable connection to the specified torque and repair any abnormal (damaged, worn or deformed) part if any brake fluid leakage is present.

FRONT BRAKE (WITH ESP)

FRONT BRAKE (WITH ESP) : Exploded View

INFOID:0000000000938013

cardiagn.com

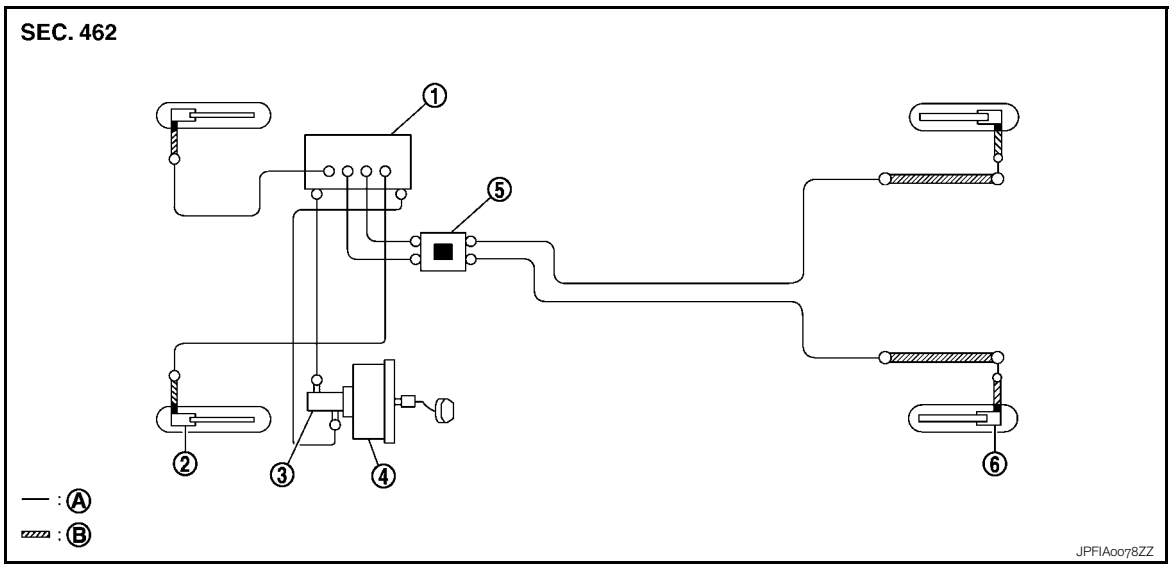


1.	Brake tube	2.	ABS actuator and electric unit (control unit)	3.	Connector
4.	Master cylinder assembly	5.	Brake booster	6.	Lock plate
7.	Brake hose	8.	Union bolt		
A.	To front brake hose	B.	To rear brake tube		

Refer to GI-4, "Components" for symbols in the figure.

FRONT BRAKE (WITH ESP) : Hydraulic Piping

INFOID:0000000000938014



cardiagn.com

1. ABS actuator and electric unit (control unit)
2. Front disc brake
3. Master cylinder assembly
4. Brake booster
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut
■ : Union bolt
▣ : Connector

FRONT BRAKE (WITH ESP) : Removal and Installation

INFOID:0000000000938015

REMOVAL

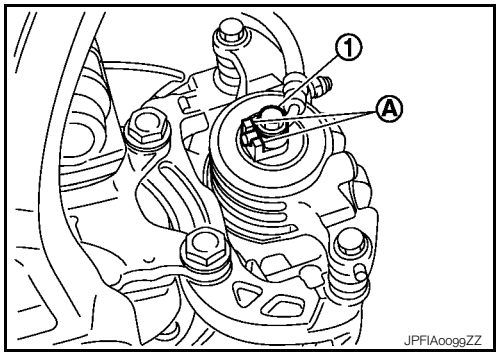
CAUTION:
Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Remove tires.
2. Drain brake fluid. Refer to BR-11, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tubes.**
   - **Cover open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose.

INSTALLATION

CAUTION:
Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse the copper washer.
2. Align the brake hose pin to the projection (A) of the brake caliper assembly and tighten the union bolt (1) to the specified torque.
3. Install the brake tube to the brake hose, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that all brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

FRONT BRAKE (WITH ESP) : Inspection

INFOID:0000000000938016

INSPECTION AFTER INSTALLATOIN

1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds with the engine running. Check for any fluid leakage.

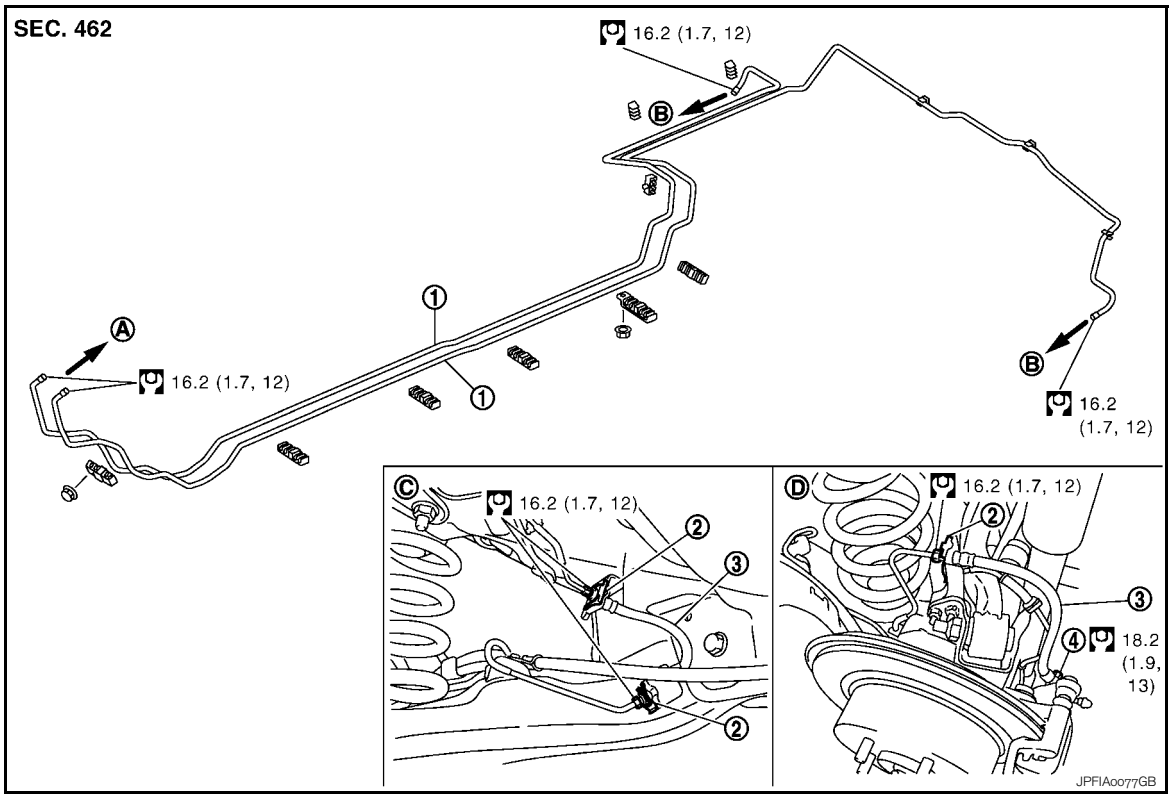
cardiagn.com

CAUTION:
Retighten the applicable connection to the specified torque and repair any abnormal (damaged, worn or deformed) part if any brake fluid leakage is present.

REAR BRAKE

REAR BRAKE : Exploded View

INFOID:0000000000925794



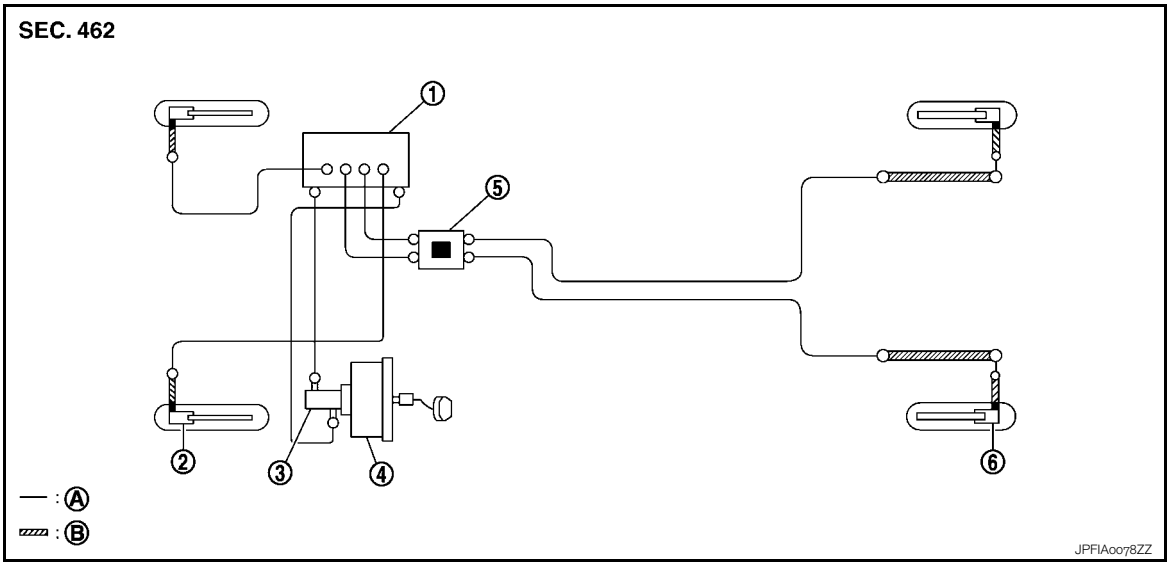
1. Brake tube
2. Lock plate
3. Brake hose
4. Union bolt
A. To front brake tube
B. To rear brake hose
C. Floor side
D. Caliper side

Refer to GI-4, "Components" for symbols in the figure.

REAR BRAKE : Hydraulic Piping

INFOID:0000000000925795

cardiagn.com



1. ABS actuator and electric unit (control unit)
2. Front disc brake
3. Master cylinder
4. Brake booster
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut
■ : Union bolt
▣ : Connector

REAR BRAKE : Removal and Installation

INFOID:0000000000925796

REMOVAL

CAUTION:
Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Remove tires.
2. Drain brake fluid. Refer to BR-11, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never sharply bend, twist or strongly pull the brake hoses and tubes.**
   - **Cover the open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose from the vehicle.

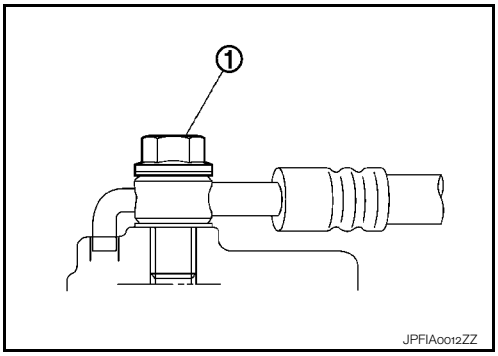
INSTALLATION

CAUTION:
Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse copper washer.

cardiagn.com

2. Install the brake hose L-pin by aligning it with the brake caliper assembly positioning hole, and tighten the union bolt (1) to the specified torque.
3. Connect the hose to the brake tube, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that the brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.
5. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.



REAR BRAKE : Inspection

INFOID:0000000000925797

INSPECTION AFTER REMOVAL

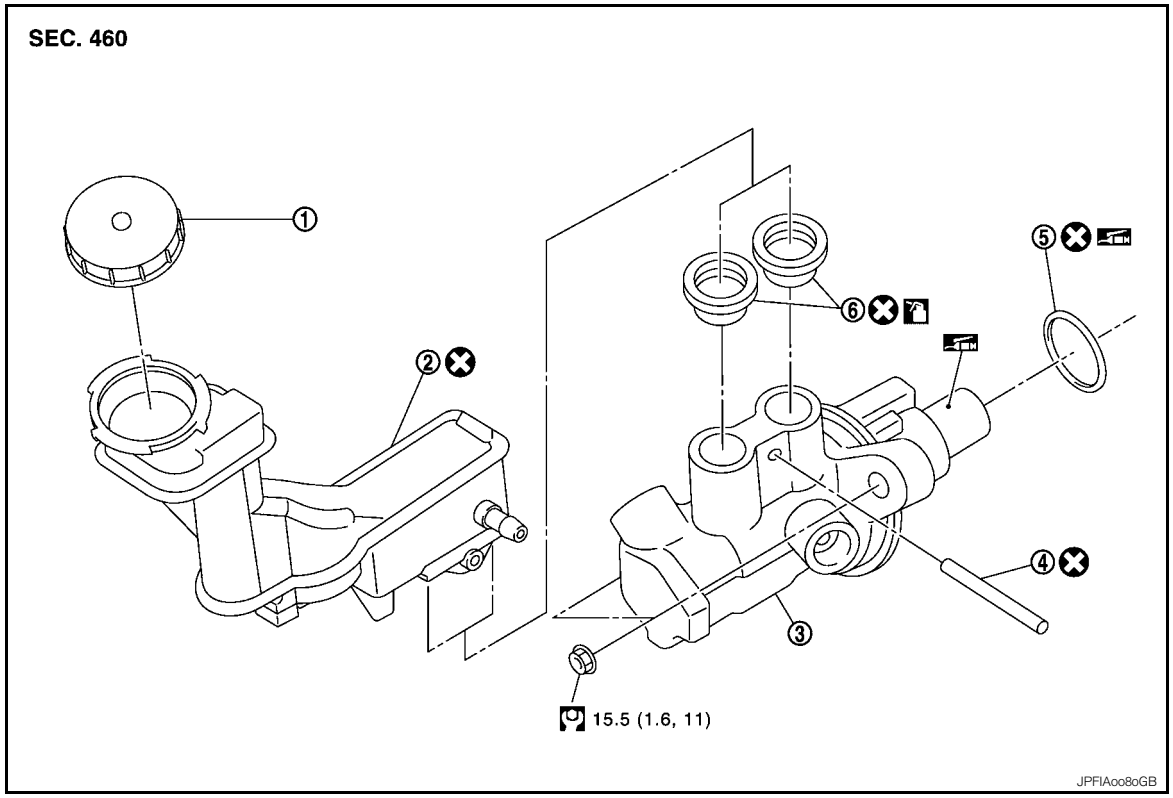
1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds with the engine running. Check for any fluid leakage.
   CAUTION:
   Retighten the applicable connection to the specified torque and repair any abnormal (damaged, worn or deformed) part if any brake fluid leakage is present.

cardiagn.com

BRAKE MASTER CYLINDER

Exploded View

INFOID:0000000000925798



1. Reservoir cap
2. Reservoir tank
3. Cylinder body
4. Pin
5. O-ring
6. Grommet

: Apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000925799

REMOVAL

CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Remove battery and bracket.
2. Remove air duct and air cleaner case. Refer to EM-27, "Exploded View" (HR16DE engine models), EM-144, "Exploded View" (HR20DE engine models), EM-265, "Exploded View" (K9K engine models).
3. Drain brake fluid. Refer to BR-11, "Draining".
4. Separate the brake fluid level switch harness connector.
5. Separate the brake tubes from the master cylinder assembly with a flare nut wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.
6. Remove the master cylinder assembly.
   CAUTION:
   - **Depress the brake pedal several times to release the vacuum pressure from the brake booster. Then remove the master cylinder assembly.**
   - **Never depress the brake pedal after the master cylinder assembly is removed.**

cardiagn.com

- **The piston of the master cylinder assembly is exposed. Never damage it when removing the master cylinder.**
- **The piston may drop off when pulled out strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**

INSTALLATION

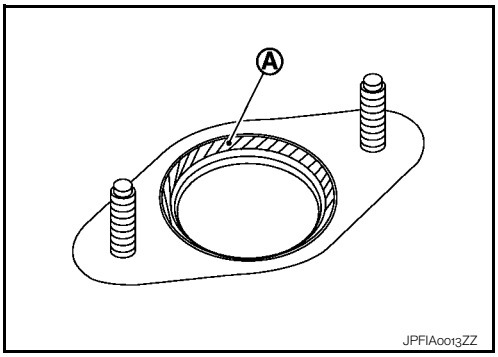
CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

- Note the following, and installation is the reverse order of removal.

CAUTION:

- **Never depress the brake pedal after the master cylinder assembly is removed.**
- **Apply PBC (Poly Butyl Cuprysil) silicone-based grease to the brake booster [see (A) in the figure] when installing the master cylinder assembly to the brake booster.**
- **The piston of the master cylinder assembly is exposed. Never damage it when handling the master cylinder and check that no dirt and dust are present on the piston before installation. Clean it with new brake fluid if necessary.**
- **The piston may drop off when pulled strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**



- Temporarily tighten the brake tube flare nut to the master cylinder assembly by hand. Then tighten it to the specified torque with a flare nut torque wrench. Refer to BR-19, "FRONT BRAKE (WITH ABS) : Exploded View" (with ABS), BR-21, "FRONT BRAKE (WITH ESP) : Exploded View" (with ESP).

CAUTION:

Never scratch the flare nut and the brake tube.

- After installation, perform the air bleeding. Refer to BR-12, "Bleeding Brake System".

CAUTION:

Never reuse drained brake fluid.

Disassembly and Assembly

INFOID:0000000000925800

DISASSEMBLY

CAUTION:

- **Never disassemble the cylinder body.**
- **Remove the reservoir tank if necessary.**

1. Fix the master cylinder assembly to a vise.

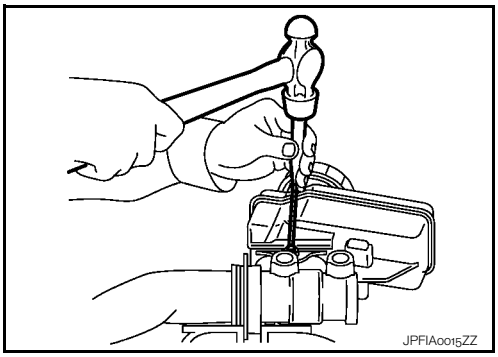
   CAUTION:

   Always set copper plates or cloth between vise when fixing the cylinder body to a vise. Never overtighten the vise.

2. Remove the reservoir tank mounting pin with a pin punch.
3. Remove the reservoir tank and grommet from the cylinder body.

   CAUTION:

   Never drop the removed parts. The parts must not be reused if they are dropped.



ASSEMBLY

1. Apply new brake fluid to the grommet and install it to the cylinder body.

   CAUTION:

   - **Never use mineral oil such as gasoline or light oil.**
   - **Never reuse the grommets.**

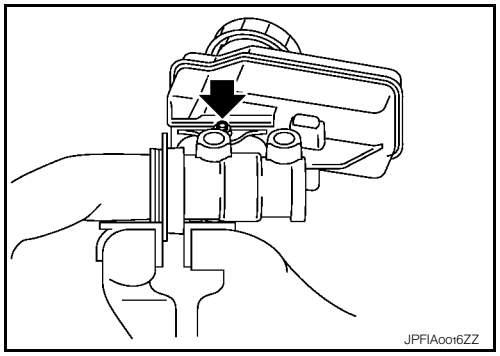
2. Install the reservoir tank to the cylinder body.

cardiagn.com

CAUTION:
- **Never drop the parts when installing. The parts must not be reused if they are dropped.**
- **Never reuse reservoir tank.**

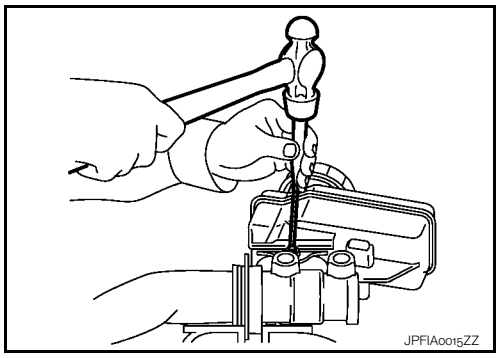
3. Fix the cylinder body to a vise.

CAUTION:
- **Place the reservoir tank with the chamfered pin hole (⬅) facing up.**
- **Always set copper plates or cloth between vise when fixing the cylinder body to a vise. Never overtighten the vise.**



4. Tilt the reservoir tank so that a mounting pin can be inserted. Insert a mounting pin. Return the reservoir tank to the horizontal position. Insert another mounting pin into the pin hole on the opposite side in the same manner after the mounting pin passes through the cylinder body pin hole.

CAUTION:
Never reuse the mounting pin.



Inspection

INFOID:0000000000925801

INSPECTION AFTER INSTALLATION

Fluid Leak

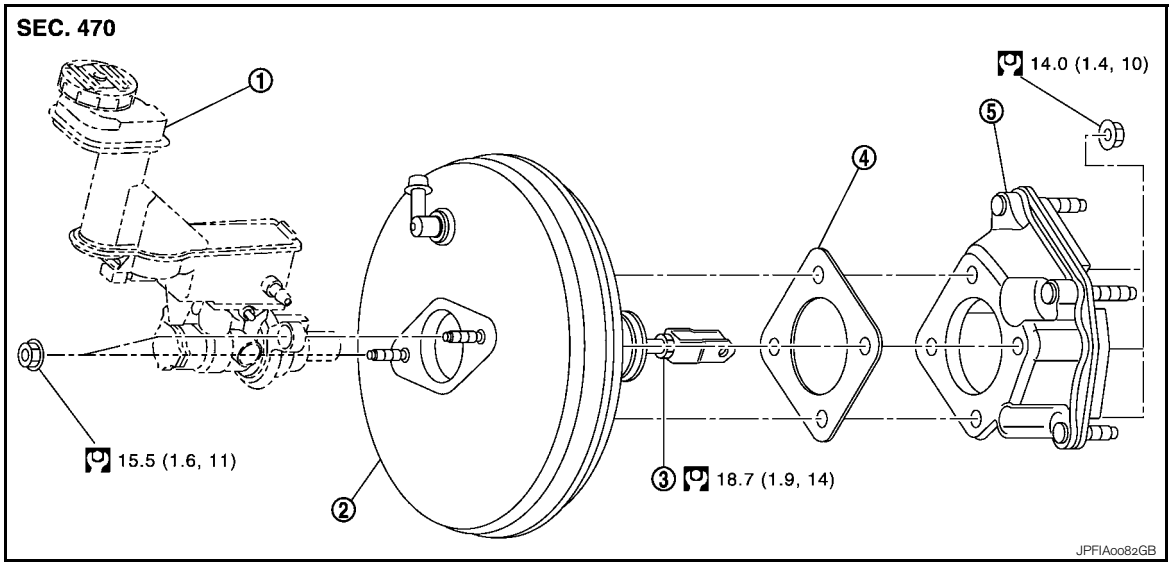
Check for brake fluid leakage from the cylinder body-to-brake booster mounting face, reservoir tank mounting face and brake tube connections.

cardiagn.com

BRAKE BOOSTER

Exploded View

INFOID:0000000000925806



1. Master cylinder assembly
2. Brake booster
3. Lock nut
4. Gasket
5. Spacer

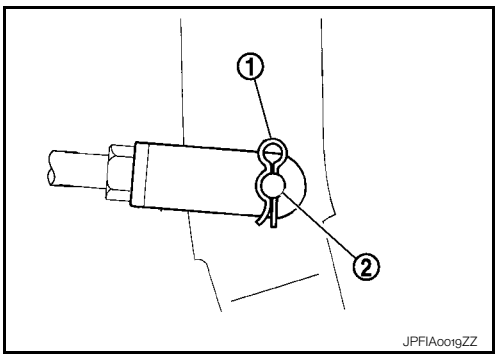
Refer to GI-4, "Components" for symbols in the figure.

Removal and installation

INFOID:0000000000925807

REMOVAL

1. Remove battery and bracket.
2. Remove air duct and air cleaner case. Refer to EM-27, "Exploded View" (HR16DE engine models), EM-144, "Exploded View" (MR20DE engine models), EM-265, "Exploded View" (K9K engine models).
3. Remove brake master cylinder assembly. Refer to BR-27, "Removal and Installation".
   CAUTION:
   - **Depress the brake pedal several times to release the vacuum pressure from the brake booster. Then remove the master cylinder assembly.**
   - **Never depress the brake pedal after the master cylinder assembly is removed.**
   - **The piston of the master cylinder assembly is exposed. Never damage it when removing the master cylinder.**
   - **The piston may drop off when pulled out strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**
4. Remove vacuum hose from brake booster. Refer to BR-33, "HR16DE/MR20DE MODELS : Removal and Installation" (HR16DE, MR20DE engine models), BR-34, "K9K MODELS : Removal and Installation" (K9K engine models).
5. Remove snap pin (1) and clevis pin (2) from inside vehicle.
6. Remove nuts on brake booster and brake pedal assembly. Refer to BR-17, "Exploded View".
7. Remove brake booster from dash panel in engine room side.
   CAUTION:
   Never deform or bend the brake tubes.
8. Remove the spacer from brake booster.



INSTALLATION

cardiagn.com

Note the following, and installation is the reverse order of removal.

CAUTION:

- **Be careful not to damage brake booster stud bolt threads. If brake booster is tilted during installation, the dash panel may damage the threads.**
- **Never deform or bend the brake tubes when installing the brake booster.**
- **Always use a new gasket between the brake booster and the spacer.**
- **Replace the clevis pin if it is damaged. Refer to BR-18, "Inspection and Adjustment".**
- After installation, perform the air bleeding. Refer to BR-12, "Bleeding Brake System".

CAUTION:

Never reuse drained brake fluid.

Inspection and Adjustment

INFOID:0000000000925808

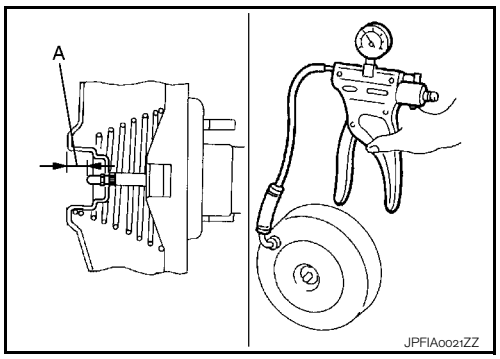
INSPECTION AFTER REMOVAL

Output Rod Length Inspection

1. With a handy vacuum pomp, apply vacuum pressure of –66.7 kPa (–500 mmHg, –19.70 inHg, –0.667 bar) to the brake booster.
2. Check the output rod length (A).

Standard

Output rod length (A) **: Refer to BR-46, "Brake Booster".**



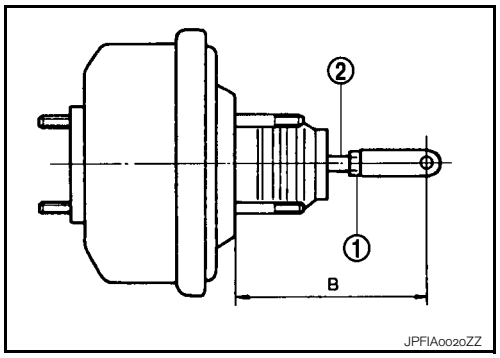
Input Rod Length Inspection

1. Loosen the lock nut (1) and adjust the input rod (2) to the specified length (B).

Standard

Input rod length (B) **: Refer to BR-46, "Brake Booster".**

2. Tighten the lock nut to the specified torque.



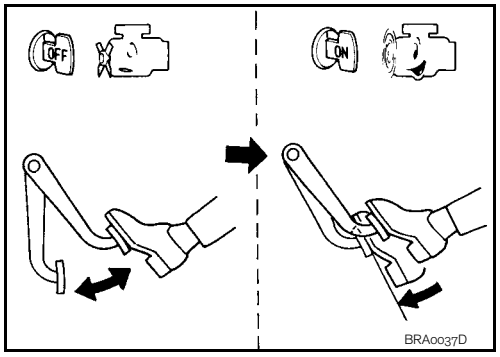
INSPECTION AFTER INSTALLATION

Operation

Depress the brake pedal several times at 5-second intervals with the engine stopped. Start the engine with the brake pedal fully depressed. Check that the clearance between brake pedal and dash lower pane decreases.

NOTE:

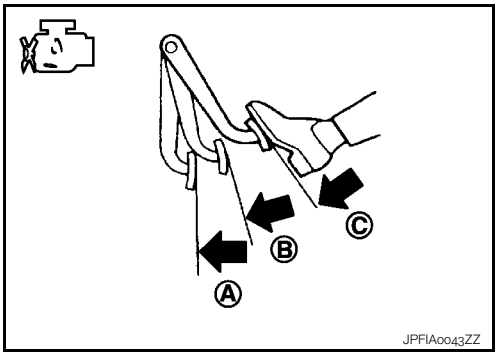
A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



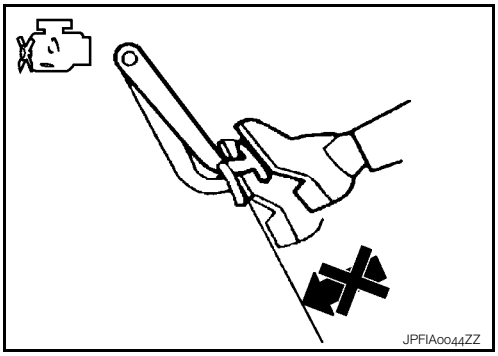
Air Tight

cardiagn.com

- Idle the engine for 1 minute to apply vacuum to the brake booster, and stop the engine. Then depress the brake pedal several times at 5-second intervals until the accumulated vacuum is released to atmospheric pressure. Check that the clearance between brake pedal and dash lower panel gradually increases (A → B → C) each time the brake pedal is depressed during this operation.



- Depress the brake pedal with the engine running. Then stop the engine while holding down the brake pedal. Check that the brake pedal stroke does not change after holding down the brake pedal for 30 seconds or more.
  NOTE:
  A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



ADJUSTMENT AFTER INSTALLTION

Perform the brake pedal adjustment after installing the brake pedal assembly. Refer to BR-8, "Inspection and Adjustment".

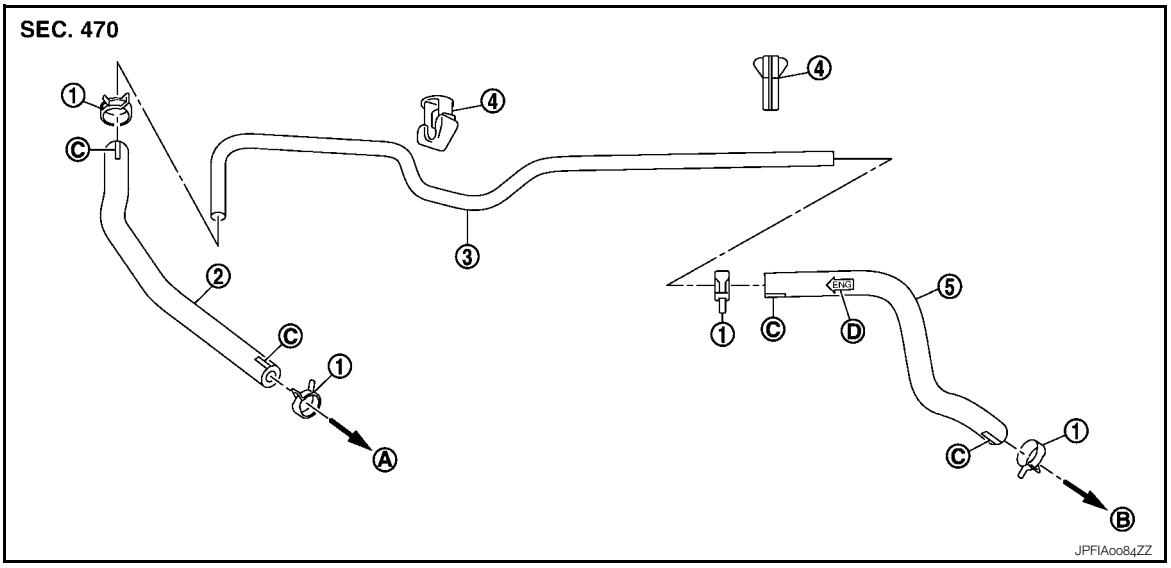
cardiagn.com

VACUUM LINES

HR16DE/MR20DE MODELS

HR16DE/MR20DE MODELS : Exploded View

INFOID:0000000000925812



1. Clamp
2. Vacuum hose
3. Vacuum tube
4. Grommet
5. Vacuum hose (built in check valve)
A. To intake manifold
B. To brake booster
C. Paint mark
D. Stamp indicating engine direction

HR16DE/MR20DE MODELS : Removal and Installation

INFOID:0000000000925813

REMOVAL

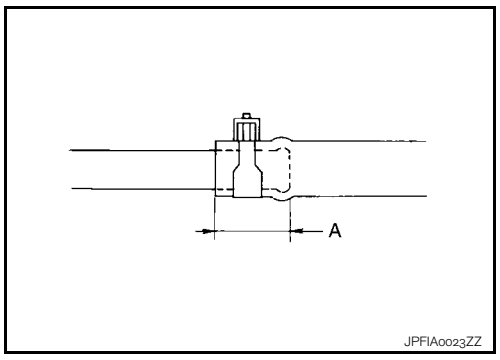
Remove the vacuum hose and tube.

INSTALLATION

Install the vacuum hose and tube.

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling of vacuum hose.**
- **Face the marking side vehicle front when assembling of vacuum hose (built in check valve).**



HR16DE/MR20DE MODELS : Inspection

INFOID:0000000000925814

INSPECTION AFTER REMOVAL

Appearance

Check for correct assembly, damage and deterioration.

Check Valve Airtightness

cardiagn.com

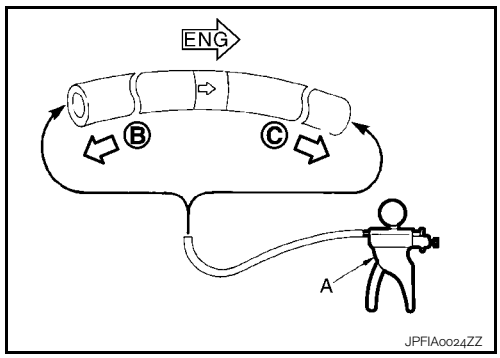
- Use a handy vacuum pump (A) to check.

When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mmHg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of −66.7 kPa (−500 mmHg, −19.70 inHg, −0.667 bar).

When connected to the engine side (C):

Vacuum should not exist.

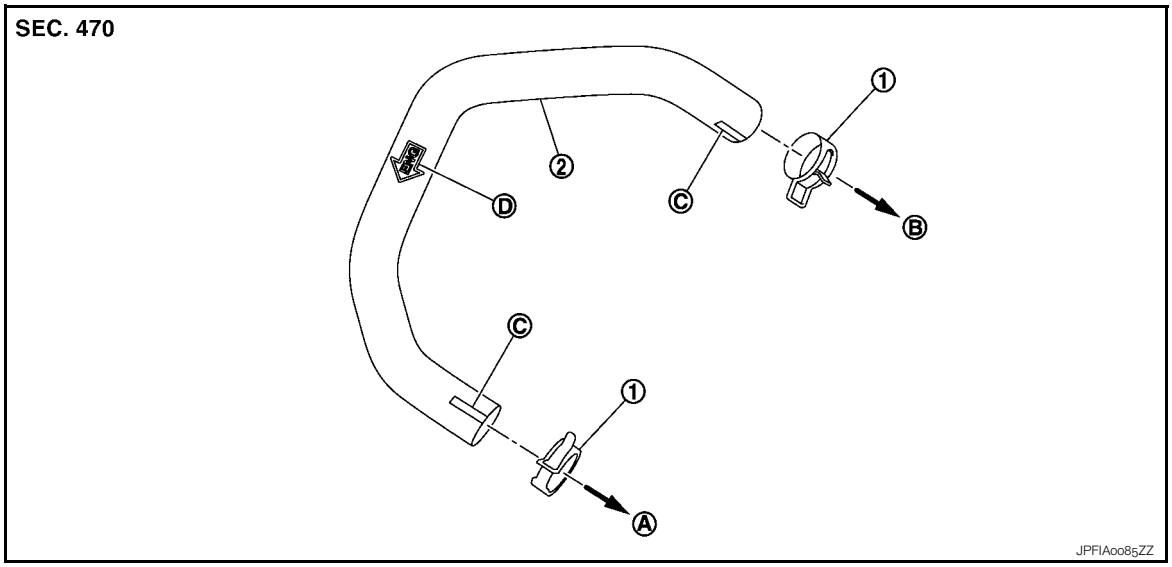


- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

K9K MODELS

K9K MODELS : Exploded View

INFOID:0000000000938026



1. Clamp
2. Vacuum hose (built in check valve)
A. To vacuum pomp
B. To brake booster
C. Paint mark
D. Stamp indicating engine direction

K9K MODELS : Removal and Installation

INFOID:0000000000938027

REMOVAL

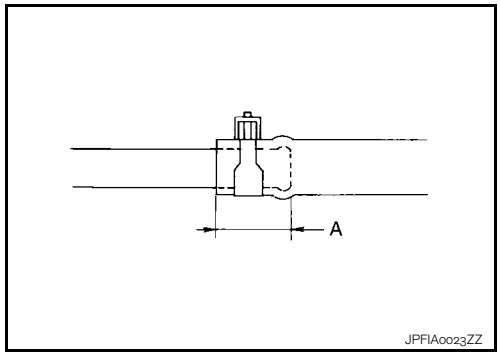
Remove the vacuum hose.

INSTALLATION

Install the vacuum hose.

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling (vacuum pomp side).**
- **Face the marking side vehicle front when assembling (brake booster side).**



cardiagn.com

K9K MODELS : Inspection

INFOID:0000000000938028

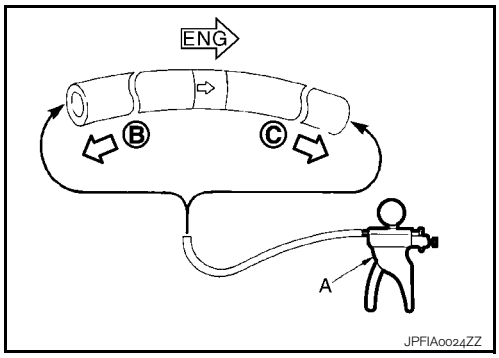
INSPECTION AFTER REMOVAL

Appearance

Check for correct assembly, damage and deterioration.

Check Valve Airtightness

- Use a handy vacuum pump (A) to check.



When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mmHg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of −66.7 kPa (−500 mmHg, −19.70 inHg, −0.667 bar).

When connected to the engine side (C):

Vacuum should not exist.

- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

cardiagn.com

FRONT DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000000925818

Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View".

BRAKE PAD : Removal and Installation

INFOID:0000000000925819

REMOVAL

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Remove tires.
2. Remove lower sliding pin bolt.
3. Suspend the cylinder body with suitable wire so that the brake hose will not stretch. Then remove the brake pad from the torque member.
   CAUTION:
   - **Never deform the pad retainer when removing the pad retainer from the torque member.**
   - **Never damage the piston boot.**
   - **Never drop the brake pads, shims, and the shim covers.**

INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Install the pad retainer to the torque member if the pad retainers has been removed.
   CAUTION:
   - **Securely assemble the pad retainers so that it will not be lifted up from the torque member.**
   - **Never deform the pad retainers.**
2. Apply copper based brake grease to the mating faces between the pads, shims and shim covers, and install them to the brake pad.
   CAUTION:
   Always replace the shims together with the shim covers when replacing the brake pad.
3. Install the cylinder body and brake pads to the torque member.
   CAUTION:
   - **Never damage the piston boot.**
   - **When replacing a pad with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.**

   NOTE:
   Use a disc brake piston tool to easily press piston.
4. Install the lower sliding pin bolt and tighten it to the specified torque.
5. Depress the brake pedal several times to check that no drag feel is present for the front disc brake.
6. Install tires.

BRAKE PAD : Inspection and Adjustment

INFOID:0000000000925820

INSPECTION AFTER REMOVAL

Replace the shims and the shim covers if rust is excessively attached.

ADJUSTMENT AFTER INSTALLATION

cardiagn.com

Brake Burnishing Procedure

Burnish contact surfaces between pads according to following procedure after refinishing or replacing pads, or if a soft pedal occurs at very low mileage.

CAUTION:

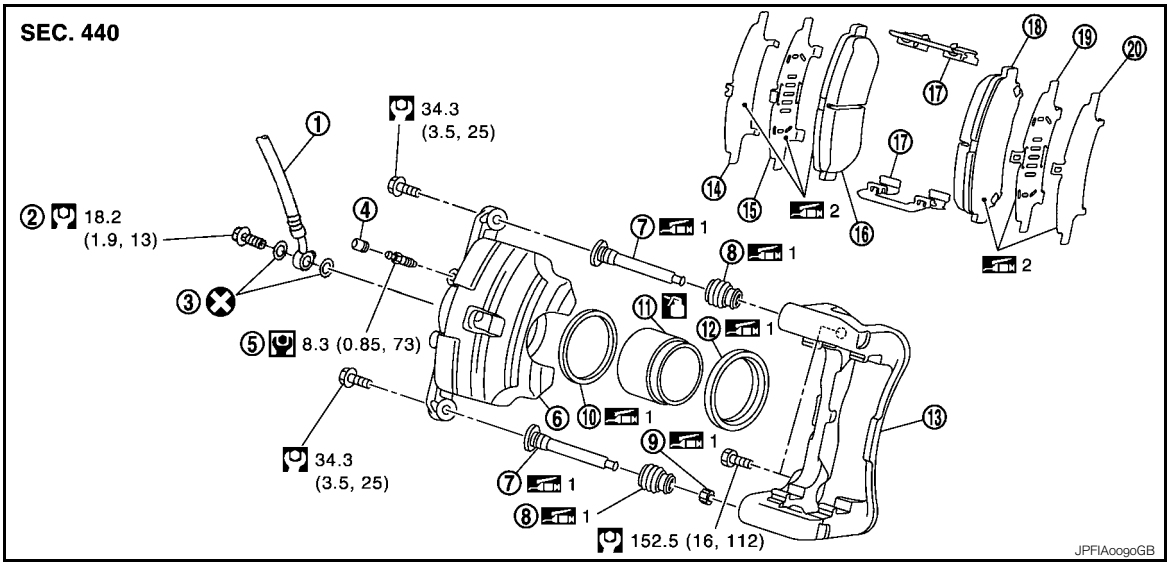
- **Be careful of vehicle speed because the brake does not operate easily until pads and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000000925825



1. Brake hose	2. Union bolt	3. Copper washer
4. Cap	5. Bleeder valve	6. Cylinder body
7. Sliding pin	8. Sliding pin boot	9. Bushing
10. Piston seal	11. Piston	12. Piston boot
13. Torque member	14. Inner shim cover	15. Inner shim
16. Inner pad	17. Pad retainer	18. Outer pad
19. Outer shim	20. Outer shim cover	

: 1: Apply rubber grease.

: 2: Apply copper based brake grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE CALIPER ASSEMBLY : Removal and Installation

INFOID:0000000000925826

REMOVAL

WARNING:

Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.

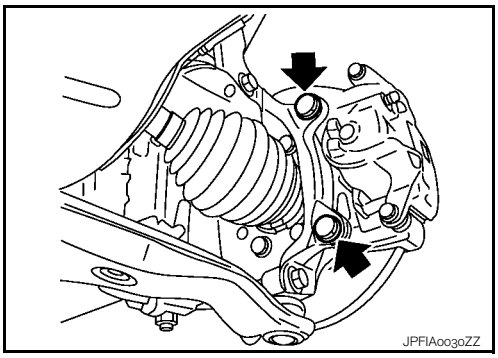
CAUTION:

Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Remove tires.

cardiagn.com

2. Fix the disc rotor using wheel nuts.
3. Drain brake fluid. Refer to BR-11, "Draining".
   CAUTION:
   Never spill or splash brake fluid on the disc rotor.
4. Remove union bolt, and then disconnect brake hose from caliper assembly.
5. Remove torque member mounting bolts, and remove brake caliper assembly.
   CAUTION:
   Never drop brake pads and caliper assembly.
6. Remove disc rotor.
   CAUTION:
   - **Put matching marks on the wheel hub and bearing assembly and the disc rotor before removing the disc rotor.**
   - **Never drop disc rotor.**



INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Install disc rotor.
   CAUTION:
   Align the matching marks made during removal when reusing the disc rotor.
2. Install the brake caliper assembly to the vehicle and tighten the torque member mounting bolts to the specified torque.
   CAUTION:
   Never spill or splash any grease and moisture on the brake caliper assembly mounting face, threads, mounting bolts and washers. Wipe out any grease and moisture.
3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque.
4. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   - **Never reuse drained brake fluid.**
   - **Never spill or splash brake fluid on the disc rotor.**
5. Check that no drag feel is present for the front disc brake.
6. Install tires.

BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

INFOID:0000000000925827

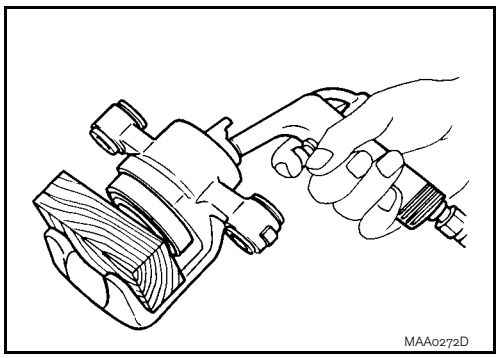
DISASSEMBLY

NOTE:
Never remove the torque member, brake pads, shims, shim covers and pad retainers when disassembling and assembling the cylinder body.

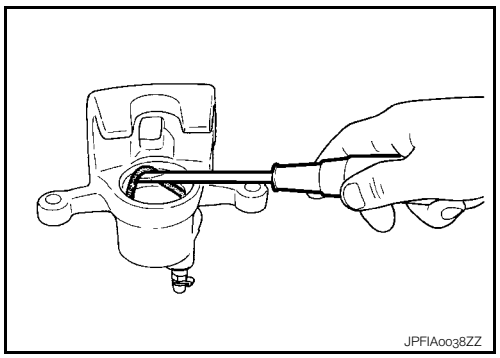
1. Remove the sliding pin bolts, and remove the cylinder body from the torque member.
   CAUTION:
   Never drop pads, shims, shim covers and pad retainers from torque member.
2. Remove sliding pins and sliding pin boots from torque member.
3. Remove bushing from sliding pin.

cardiagn.com

4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.
CAUTION:
Never get fingers caught in the piston.

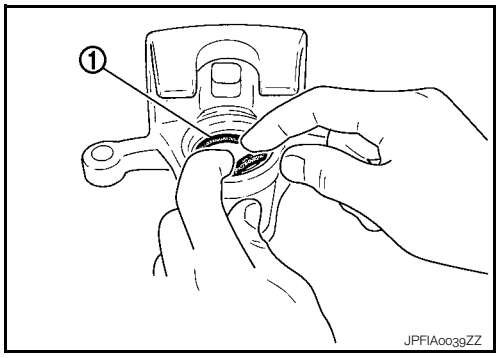


5. Remove piston seal from cylinder body using suitable tool.
CAUTION:
Be careful not to damage a cylinder inner wall.

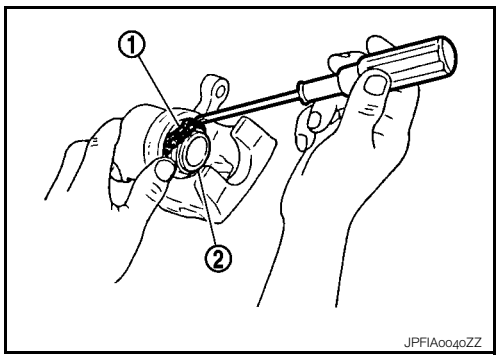


ASSEMBLY

1. Apply rubber grease to piston seal (1), and install to cylinder body.
CAUTION:
Never reuse piston seal.

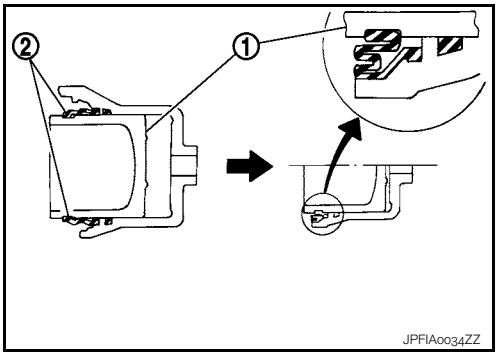


2. Apply rubber grease to piston boot (1). Cover the piston (2) end with piston boot, and then install cylinder side lip on piston boot securely into a groove on cylinder body.
CAUTION:
Never reuse piston boot.



cardiagn.com

3. Apply brake fluid to piston (1). Push piston into cylinder body by hand and push piston boot (2) piston-side lip into the piston groove.
   CAUTION:
   Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.
4. Apply rubber grease to bushing, install bushing to sliding pin.
5. Apply rubber grease to sliding pins and sliding pin boots, install sliding pins and sliding pin boots to torque member.
6. Install the cylinder body to the torque member and tighten the sliding pin bolts to the specified torque.



BRAKE CALIPER ASSEMBLY : Inspection and Adjustment

INFOID:0000000000925828

INSPECTION AFTER DISASSEMBLY

Cylinder Body

Check the inner wall of the cylinder for rust, wear, cracks or damage. Replace the cylinder if any abnormal condition is detected.

CAUTION:
Always clean with new brake fluid. Never clean with mineral oil such as gasoline and light oil.

Torque Member

Check the torque member for rust, wear, cracks or damage. Replace the member if any abnormal condition is detected.

Piston

Check the surface of the piston for rust, wear, cracks or damage. Replace the piston if any abnormal condition is detected.

CAUTION:
A piston sliding surface is plated. Never polish with sandpaper.

Sliding Pin and Sliding Pin Boot

Check the sliding pins and sliding boots for rust, wear, cracks or damage. Replace the parts if any abnormal condition is detected.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between disc rotors and pads according to following procedure after refinishing or replacing disc rotor, or if a soft pedal occurs at very low mileage.

CAUTION:
- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

cardiagn.com

REAR DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000000925832

Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View".

BRAKE PAD : Removal and Installation

INFOID:0000000000925833

REMOVAL

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Remove tires.
2. Remove the lower sliding pin bolt.
3. Suspend the cylinder body with suitable wire so that the brake hose will not stretch. Remove the brake pads from the torque member.
   CAUTION:
   - **Never deform the pad retainers if removing the pad retainers.**
   - **Never damage the piston boot.**
   - **Never drop the brake pad, shims, and the shim cover.**

INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Install the pad retainers to the torque member if the pad retainers has been removed.
   CAUTION:
   - **Securely assemble the pad retainers not to be lifted up from the torque member.**
   - **Never deform the pad retainers.**
2. Apply copper based brake grease to the mating faces between the brake pads and the shims and install them to the brake pad.
   CAUTION:
   Always replace the shims together with the shim cover when replacing the brake pad.
3. Install cylinder body and brake pads to torque member.
   CAUTION:
   - **Never damage the piston boot.**
   - **When replacing a pads with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.**

   NOTE:
   Use a disc brake piston tool to easily press piston.
4. Install the lower sliding pin bolt and tighten it to the specified torque.
5. Depress the brake pedal several times to check that no drag feel is present for the rear disc brake.
6. Install tires.

BRAKE PAD : Inspection and Adjustment

INFOID:0000000000925834

INSPECTION AFTER REMOVAL

Replace the shims and the shim cover if rust is excessively attached.

cardiagn.com

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between pads according to following procedure after refinishing or replacing pads, or if a soft pedal occurs at very low mileage.

CAUTION:

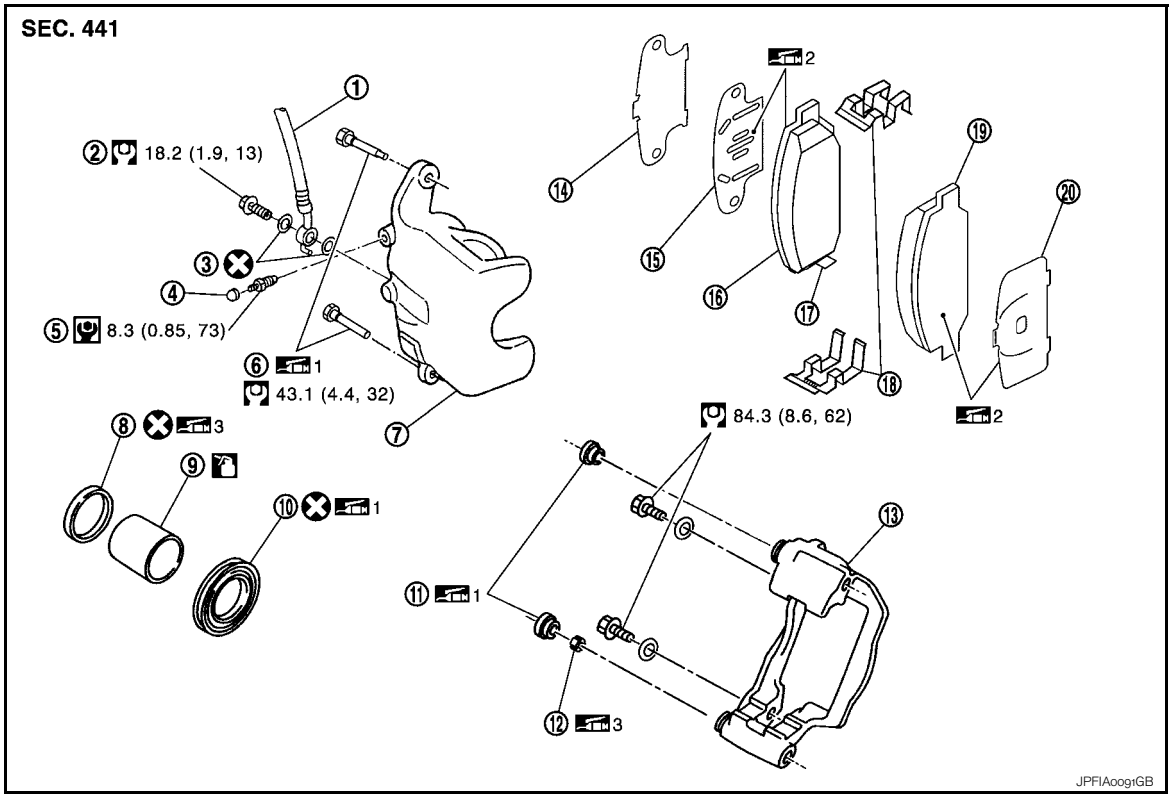
- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000000925839



1. Brake hose
2. Union bolt
3. Copper washer
4. Cap
5. Bleeder valve
6. Sliding pin bolt
7. Cylinder body
8. Piston seal
9. Piston
10. Piston boot
11. Sliding pin boot
12. Bushing
13. Torque member
14. Inner shim cover
15. Inner shim
16. Inner pad
17. Pad wear sensor (RH inner side only)
18. Pad retainer
19. Outer pad
20. Outer shim

1: Apply rubber grease.

2: Apply copper based brake grease.

3: Apply polyglycol ether based lubricant.

cardiagn.com

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

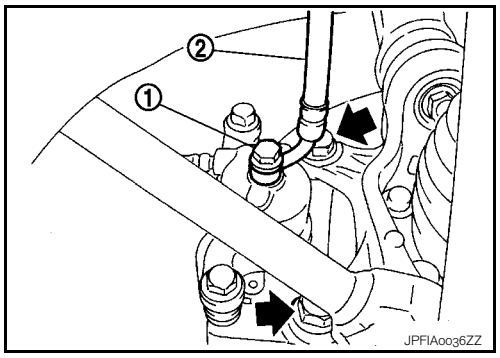
BRAKE CALIPER ASSEMBLY : Removal and Installation

INFOID:0000000000925840

REMOVAL

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Remove tires.
2. Fix the disc rotor using wheel nuts.
3. Drain brake fluid. Refer to BR-11, "Draining".
   CAUTION:
   Never spill or splash brake fluid on the disc rotor.
4. Remove union bolt (1) and then disconnect brake hose (2) from caliper assembly.
5. Remove torque member mounting bolts, and remove brake caliper assembly.
   CAUTION:
   Never drop brake pads and caliper assembly.
6. Remove disc rotor.
   CAUTION:
   - **Put matching marks on the wheel hub and bearing assembly and the disc rotor before removing the disc rotor.**
   - **Never drop disc rotor.**



INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Install disc rotor.
   CAUTION:
   Align the matching marks made during removal when reusing the disc rotor.
2. Install the brake caliper assembly to the vehicle and tighten the torque member mounting bolts to the specified torque.
   CAUTION:
   Never spill or splash any grease and moisture on the brake caliper assembly mounting face, threads, mounting bolts, and washers. Wipe out any grease and moisture.
3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque.
4. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   - **Never reuse drained brake fluid.**
   - **Never spill or splash brake fluid on the disc rotor.**
5. Check that no drag feel is present for the rear disc brake.
6. Install tires.

BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

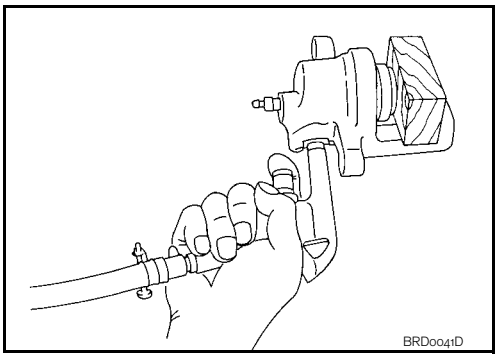
INFOID:0000000000925841

DISASSEMBLY

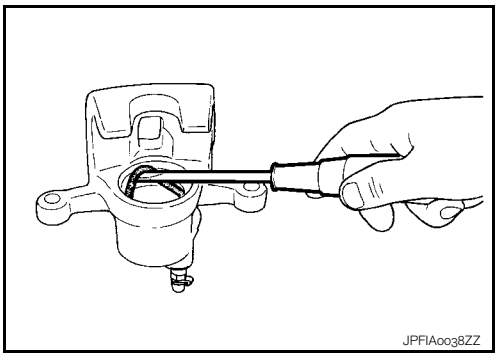
NOTE:
Never remove the torque member, brake pads, shims, shim cover and pad retainers disassembling and assembling the cylinder body.

cardiagn.com

1. Remove the sliding pin bolts and remove the cylinder body from the torque member.
   CAUTION:
   Never drop pads, shims, shim cover and pad retainers from torque member.
2. Remove sliding pin boots from torque member.
3. Remove bushing from sliding pin bolt.
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.
   CAUTION:
   Never get fingers caught in the piston.

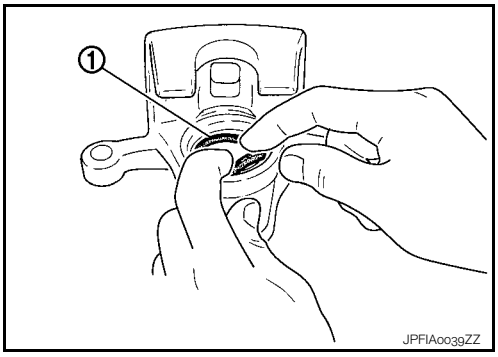


5. Remove piston seal from cylinder body using suitable tool.
   CAUTION:
   Be careful not to damage a cylinder inner wall.

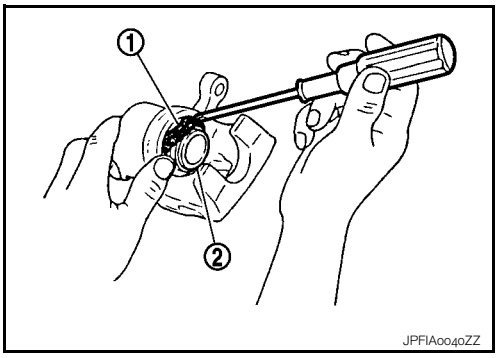


ASSEMBLY

1. Apply polyglycol ether based lubricant to piston seal (1), and install to cylinder body.
   CAUTION:
   Never reuse piston seal.

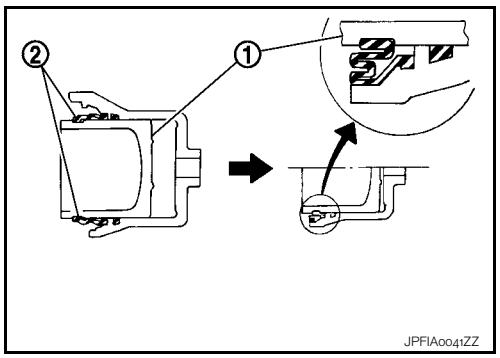


2. Apply rubber grease to piston boot (1). Cover the piston (2) end with the piston boot, and then install cylinder side lip on the piston boot securely into the groove on cylinder body.
   CAUTION:
   Never reuse piston boot.



cardiagn.com

3. Apply brake fluid to piston (1). Push piston into cylinder body by hand and push piston boot (2) piston side lip into the piston groove.
CAUTION:
Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.
4. Apply polyglycol ether based lubricant to bushing, install bushing to sliding pin bolt.
5. Apply rubber grease to the sliding pin bolts and the sliding pin boots, install sliding pin boot to torque member.
6. Install the cylinder body to the torque member and tighten the sliding pin bolts to the specified torque.



BRAKE CALIPER ASSEMBLY : Inspection and Adjustment

INFOID:0000000000925842

INSPECTION AFTER DISASSEMBLY

Cylinder Body

Check the inner wall of the cylinder for rust, wear, cracks or damage. Replace the cylinder if any abnormal condition is detected.

CAUTION:
Always clean with new brake fluid. Never clean with mineral oil such as gasoline and light oil.

Torque Member

Check the torque member for rust, wear, cracks or damage. Replace the member if any abnormal condition is detected.

Piston

Check the piston for rust, wear, cracks or damage. Replace the piston if any abnormal condition is detected.

CAUTION:
A piston sliding surface is plated. Never polish with sandpaper.

Sliding Pin Bolt and Sliding Pin Boot

Check the sliding pin bolts and sliding pin boots for rust, wear, cracks or damage. Replace the parts if any abnormal condition is detected.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between disc rotors and pads according to the following procedure after refinishing or replacing disc rotor, or if a soft pedal occurs at very low mileage.

CAUTION:
- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000000925843

Unit: mm (in.)

Front brake	Cylinder bore diameter	60.33 (2.375)
	Pad length × width × thickness	123.6 × 47.5 × 11.0 (4.87 × 1.870 × 0.433)
	Rotor outer diameter × thickness	296 × 26.0 (11.65 × 1.024)
Rear brake	Cylinder bore diameter	34.93 (1.375)
	Pad length × width × thickness	83.0 × 31.9 × 8.5 (3.268 × 1.256 × 0.335)
	Rotor outer diameter × thickness	292 × 9.0 (11.50 × 0.354)
Master cylinder	Cylinder bore diameter	23.8 (15/16)
Control valve	Valve type	Electric brake force distribution
Brake booster	Diaphragm diameter	275 (10.8)
Recommended brake fluid		DOT 4

Brake Pedal

INFOID:0000000000925844

Unit: mm (in.)

Brake pedal height (H_1)	183.7 – 193.7 (7.23 – 7.63)
Clearance (C) between bracket and ASCD cancel switch/stop lamp switch threaded end	0.74 – 1.96 (0.0291 – 0.0772)
Brake pedal play (A)	—
Depressed brake pedal height (H_2) [Depressing 490 N (50 kg, 110 lb) while turning the engine ON]	—

Brake Booster

INFOID:0000000000925845

Vacuum type

Unit: mm (in.)

Output rod length (A)	30.5 (1.201)
Input rod length (B)	150.7 – 157.7 (5.93 – 6.21)

Front Disc Brake

INFOID:0000000000925846

Unit: mm (in.)

Brake pad	Standard thickness	11.0 (0.433)
	Wear limit thickness	2.0 (0.079)
Disc rotor	Standard thickness	26.0 (1.024)
	Wear limit thickness	24.0 (0.945)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	0.035 (0.0014)

Rear Disc Brake

INFOID:0000000000925847

Unit: mm (in.)

Brake pad	Standard thickness	8.5 (0.335)
	Wear limit thickness	2.0 (0.079)

cardiagn.com

Disc rotor	Standard thickness	9.0 (0.354)
	Wear limit thickness	8.0 (0.315)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	—

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000938036

Use the chart below to find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			BR-59, BR-60	BR-59, BR-60	BR-80, BR-85	BR-59, BR-60	BR-59, BR-60	BR-59, BR-60	BR-59, BR-60	BR-59, BR-60	BR-59, BR-60	BR-59, BR-60	NVH in DLN section	NHV in DLN section	NVH in FAX, RAX, FSU and RSU section	NVH in WT section	NVH in WT section	NVH in FAX and/or RAX section	NVH in ST section
Possible cause and SUSPECTED PARTS			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	PROPELLER SHAFT	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise	×	×	×								×	×	×	×	×	×	×
		Shake				×							×		×	×	×	×	×
		Shimmy, Judder				×	×	×	×	×	×	×			×	×	×		×

×: Applicable

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001116848

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001102254

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Brake System

INFOID:0000000000938038

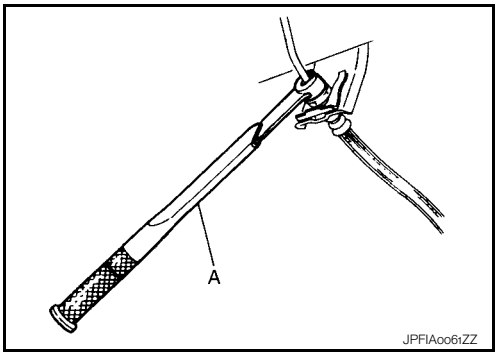
WARNING:

Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.

cardiagn.com

CAUTION:

- **Only use “DOT 4” brake fluid. Refer to MA-21, "Fluids and Lubricants".**
- **Never reuse drained brake fluid.**
- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.**
- **Always clean with new brake fluid when cleaning the master cylinder, brake caliper and other components.**
- **Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.**
- **Always loosen the brake tube flare nut with a flare nut wrench.**
- **Tighten the brake tube flare nut to the specified torque with flare nut torque wrench (A).**
- **Always confirm the specified tightening torque when installing the brake pipes.**
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.**
- **Check that no brake fluid leakage is present after replacing the parts.**
- **Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-80, "BRAKE PAD : Inspection and Adjustment" (front brake pad), BR-84, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment" (front disc rotor), BR-85, "BRAKE PAD : Inspection and Adjustment" (rear brake pad), BR-89, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment" (rear disc rotor).**



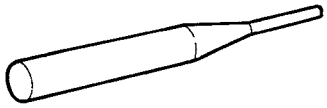
cardiagn.com

PREPARATION

PREPARATION

Commercial Service Tool

INFOID:0000000000938102

Tool name	Description
Pin punch a: 4 mm (0.16 in) dia.  ZZA0515D	Removing and installing reservoir tank pin

cardiagn.com

ON-VEHICLE MAINTENANCE

BRAKE PEDAL

Exploded View

INFOID:0000000000938039

Refer to BR-61, "Exploded View".

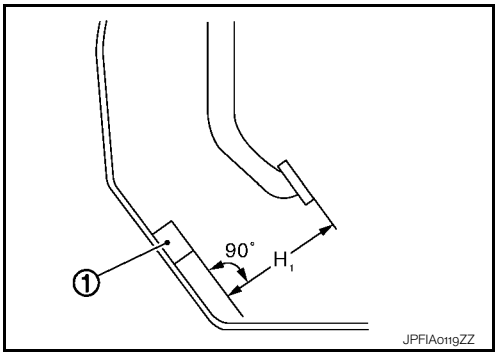
Inspection and Adjustment

INFOID:0000000000938040

INSPECTION

Brake Pedal Height

Check the height (H_1) between the accelerator pedal stopper (1) and the brake pedal upper surface.



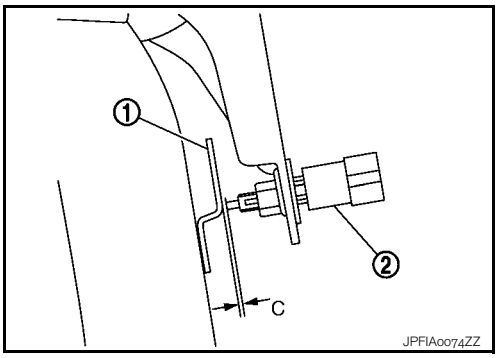
Standard

Brake pedal height (H_1)	**: Refer to BR-90, "Brake Pedal".**

CAUTION:
Remove the floor trim.

ASCD Cancel Switch and Stop Lamp Switch

Check the clearance (C) among bracket (1) and ASCD cancel switch/stop lamp switch (2) threaded end.



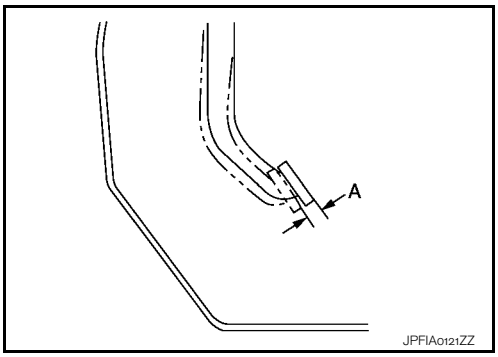
Standard

Clearance (C) between bracket and ASCD cancel switch/stop lamp switch threaded end	**: Refer to BR-90, "Brake Pedal".**

CAUTION:
The stop lamp must be turned off when the brake pedal is released.
NOTE:
Pull the brake pedal pad to make the clearance between bracket and ASCD cancel switch/stop lamp switch threaded end.

Brake Pedal Play

Press the brake pedal. Check the brake pedal play (A).



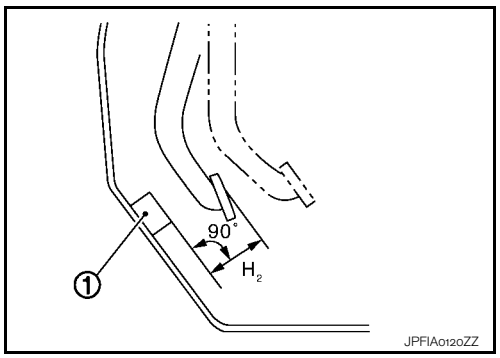
Standard

Pedal play (A)	**: Refer to BR-90, "Brake Pedal".**

Depressed Brake Pedal Height

cardiagn.com

Check the height between the accelerator pedal stopper (1) and the brake pedal upper surface (H_2) when depressing the brake pedal at 490 N (50 kg, 110 lb) while turning engine ON.



Standard

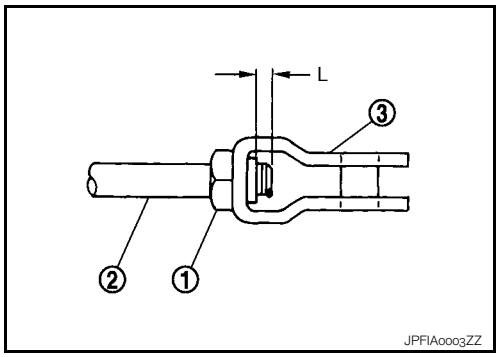
Depressed brake pedal height (H_2)	**: Refer to BR-90, "Brake Pedal".**

CAUTION:
Remove the floor trim.

ADJUSTMENT

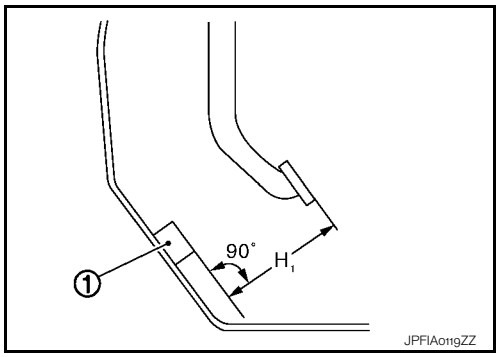
Brake Pedal Height

1. Disconnect the harness connector from ASCD cancel switch and stop lamp switch.
2. Turn the ASCD cancel switch and stop lamp switch 45° counterclockwise.
3. Loosen the input rod lock nut (1). Adjust the brake pedal to the specification. Tighten the input rod lock nut to the specification. Refer to BR-74, "Exploded View".
   CAUTION:
   The threaded end of the input rod (2) must project to the inner side (L) of the clevis (3).



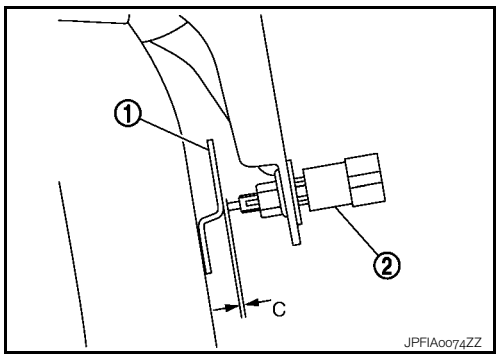
Standard

Brake pedal height (H_1)	**: Refer to BR-90, "Brake Pedal".**



ASCD Cancel Switch and Stop Lamp Switch

1. Disconnect the harness connector from ASCD cancel switch and stop lamp switch.
2. Turn the ASCD cancel switch and stop lamp switch 45° counterclockwise.
3. Press-fit ASCD cancel switch/stop lamp switch (2) until ASCD cancel switch/stop lamp switch hits the bracket (1) 45° clockwise.
   CAUTION:
   - **The clearance (C) between the bracket and ASCD cancel switch/stop lamp switch threaded end must be the specified value. Refer to BR-90, "Brake Pedal".**
   - **The stop lamp must be turned off when the brake pedal is released.**



Brake Pedal Play

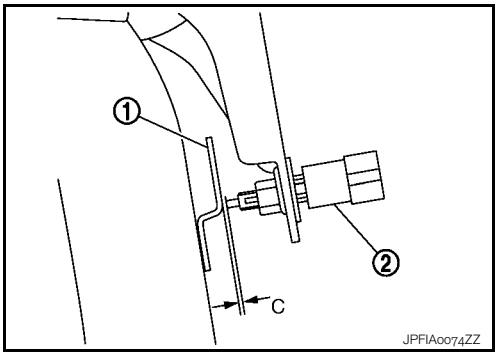
1. Disconnect the harness connector from ASCD cancel switch and stop lamp switch.
2. Turn the ASCD cancel switch and stop lamp switch 45° counterclockwise.

cardiagn.com

3. Press-fit ASCD cancel switch/stop lamp switch (2) until ASCD cancel switch/stop lamp switch hits the bracket (1) 45° clockwise.

CAUTION:

- **The clearance (C) between the bracket and ASCD cancel switch/stop lamp switch threaded end must be the specified value. Refer to BR-90, "Brake Pedal".**
- **The stop lamp must be turned off when the brake pedal is released.**



cardiagn.com

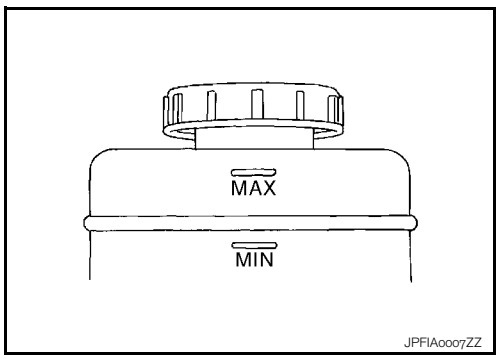
BRAKE FLUID

Inspection

INFOID:0000000000938041

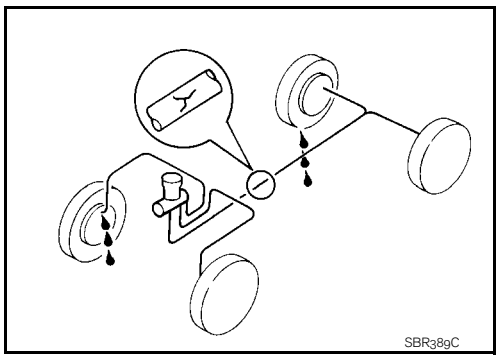
BRAKE FLUID LEVEL

- Check that the fluid level in the reservoir tank is within the specified range (MAX – MIN lines).
- Visually check for any brake fluid leakage around the reservoir tank.
- Check the brake system for any leakage if the fluid level is extremely low (lower than MIN).
- Check the brake system for fluid leakage if the warning lamp remains illuminated even after the parking brake is released.



BRAKE LINE

1. Check brake line (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.
2. Check for fluid leakage by fully depressing brake pedal while engine is running.
   CAUTION:
   If leakage occurs around joints, retighten or, if necessary, replace damaged parts.



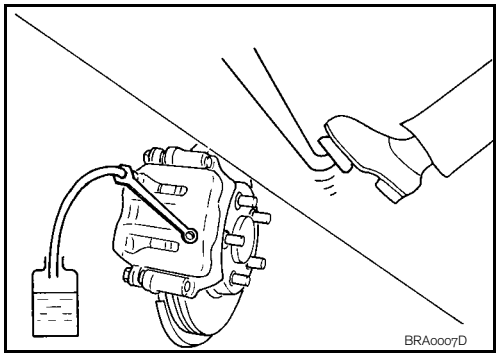
Draining

INFOID:0000000000938042

CAUTION:

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.**
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before draining.**

1. Connect a vinyl tube to the bleed valve.
2. Depress the brake pedal and loosen the bleeder valve to gradually discharge brake fluid.



Refilling

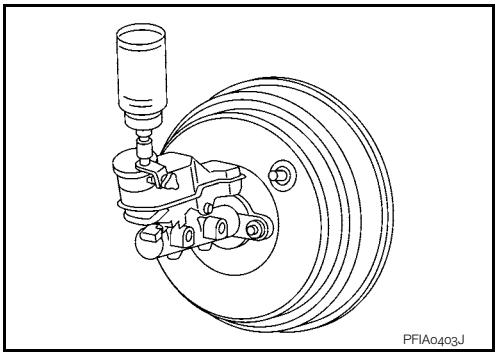
INFOID:0000000000938043

CAUTION:

Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before refilling.

cardiagn.com

1. Check that there is no foreign material in the reservoir tank, and refill with new brake fluid.
   CAUTION:
   Never reuse drained brake fluid.
2. Loosen the bleeder valve, slowly depress the brake pedal to the full stroke, and then release the pedal. Repeat this operation at intervals of 2 or 3 seconds until all brake fluid is discharged. Then close the bleeder valve with the brake pedal depressed. Repeat the same work on each wheel.
3. Perform the air bleeding. Refer to BR-56, "Bleeding Brake System".



Bleeding Brake System

INFOID:0000000000938044

CAUTION:
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.**
- **Monitor the fluid level in the reservoir tank during the air bleeding.**
- **Always use new brake fluid for refilling. Never reuse the drained brake fluid.**

1. Connect a vinyl tube to the bleeder valve of the rear left brake.
2. Fully depress the brake pedal 4 to 5 times.
3. Loosen the bleeder valve and bleed air with the brake pedal depressed, and then quickly tighten the bleeder valve.
4. Repeat steps 2 and 3 until all of the air is out of the brake line.
5. Tighten the bleeder valve to the specified torque. Refer to BR-81, "BRAKE CALIPER ASSEMBLY : Exploded View" (front disc brake), BR-86, "BRAKE CALIPER ASSEMBLY : Exploded View" (rear disc brake).
6. Perform steps 1 to 5 for the rear left brake →front right brake → rear right brake → and front left brake in order.
7. Check that the fluid level in the reservoir tank is within the specified range after air bleeding. Refer to BR-55, "Inspection".

cardiagn.com

BRAKE MASTER CYLINDER

Exploded View

INFOID:0000000000938045

Refer to BR-71, "Exploded View".

Inspection

INFOID:0000000000938046

FLUID LEAK

Check for brake fluid leakage from the master cylinder mounting face, reservoir tank mounting face and brake tube connections.

cardiagn.com

BRAKE BOOSTER

Exploded View

INFOID:0000000000938047

Refer to BR-74, "Exploded View".

Inspection

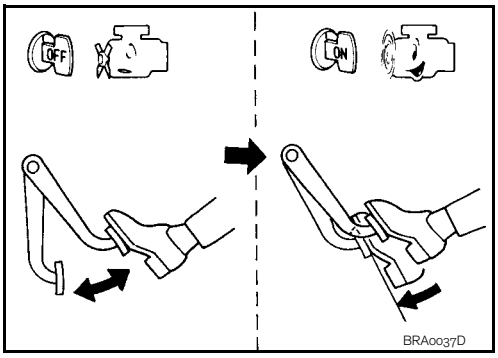
INFOID:0000000000938048

OPERATION

Depress the brake pedal several times at 5-second intervals with the engine stopped. Start the engine with the brake pedal fully depressed. Check that the clearance between brake pedal and dash lower panel decreases.

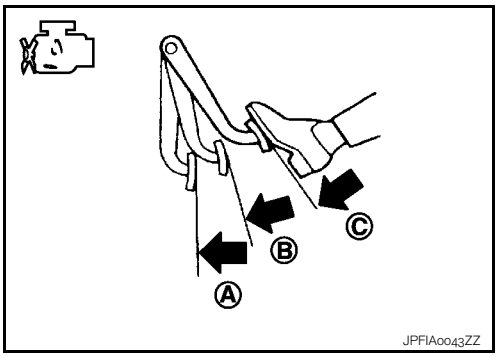
NOTE:

A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



AIR TIGHT

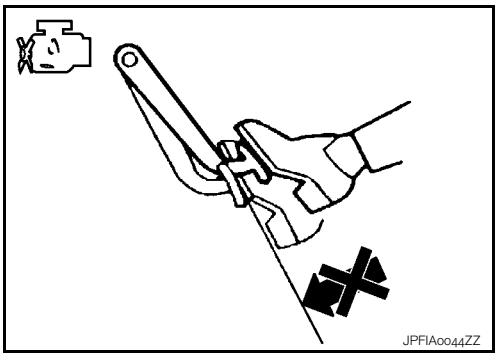
- Idle the engine for 1 minute to apply vacuum to the brake booster, and stop the engine. Then depress the brake pedal several times at 5-second intervals until the accumulated vacuum is released to atmospheric pressure. Check that the clearance between brake pedal and dash lower panel gradually increases (A → B → C) each time the brake pedal is depressed during this operation.



- Depress the brake pedal with the engine running. Then stop the engine while holding down the brake pedal. Check that the brake pedal stroke does not change after holding down the brake pedal for 30 seconds or more.

  NOTE:

  A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



cardiagn.com

FRONT DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000000938049

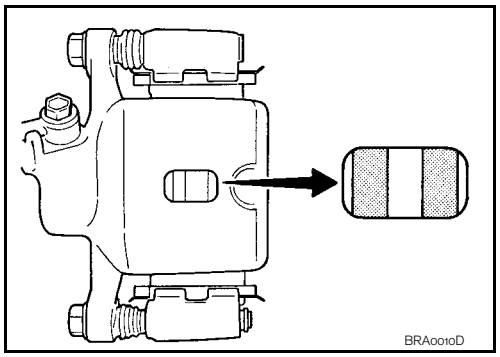
Refer to BR-81, "BRAKE CALIPER ASSEMBLY : Exploded View".

BRAKE PAD : Inspection

INFOID:0000000000938050

PAD WEAR

Check pad thickness from an inspection hole on cylinder body. Check using a scale if necessary.



Standard thickness : Refer to **BR-90, "Front Disc Brake"**.

Wear limit thickness : Refer to **BR-90, "Front Disc Brake"**.

DISC ROTOR

DISC ROTOR : Inspection

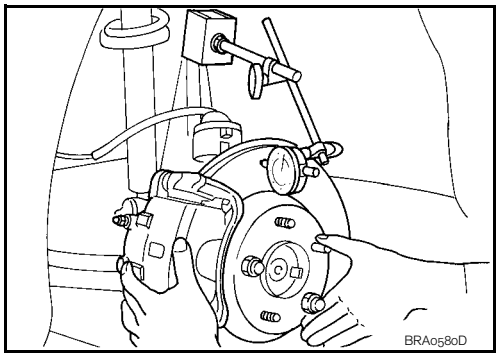
INFOID:0000000000938051

APPEARANCE

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

RUNOUT

1. Fix the disc rotor to the wheel hub and bearing assembly with wheel nuts (2 points at least).
2. Inspect the runout with a dial gauge. [Measured at 10 mm (0.39 in) inside the disc edge.]



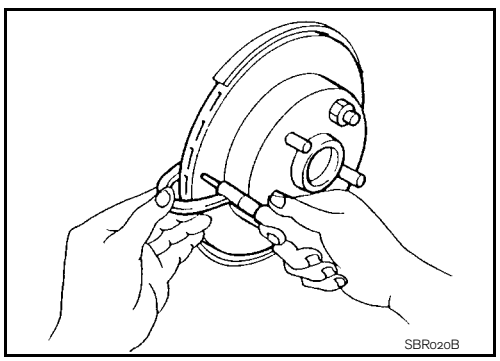
Runout limit : Refer to **BR-90, "Front Disc Brake"**.

NOTE:
Check the wheel bearing axial end play before the inspection. Refer to FAX-7, "Inspection" (2WD), FAX-47, "Inspection" (4WD).

3. Find the installation position with a minimum runout by shifting the disc rotor-to-wheel hub and bearing assembly installation position by one hole at a time if the runout exceeds the limit value.
4. Replace or lathe the disc rotor if the runout exceeds the limit even after the above operation.

THICKNESS

Check the thickness of the disc rotor using a micrometer. Replace the disc rotor if the thickness is below the wear limit.



Wear limit thickness : Refer to **BR-90, "Front Disc Brake"**.

cardiagn.com

REAR DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000000938052

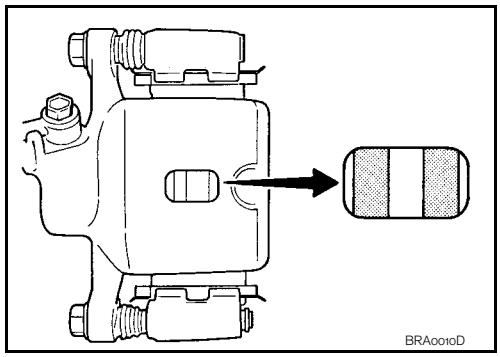
Refer to BR-86, "BRAKE CALIPER ASSEMBLY : Exploded View".

BRAKE PAD : Inspection

INFOID:0000000000938053

PAD WEAR

Check pad thickness from an inspection hole on cylinder body. Check using a scale if necessary.



Standard thickness **: Refer to BR-90, "Rear Disc Brake".**

Wear limit thickness **: Refer to BR-90, "Rear Disc Brake".**

DISC ROTOR

DISC ROTOR : Inspection

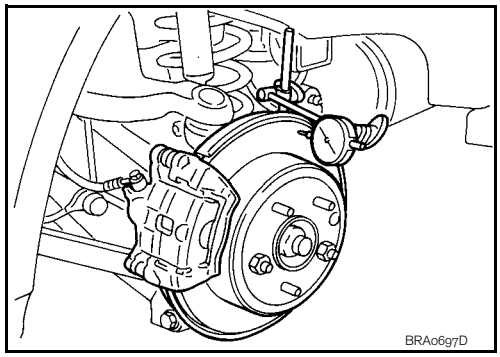
INFOID:0000000000938054

APPEARANCE

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

RUNOUT

1. Fix the disc rotor to the wheel hub and bearing assembly with wheel nuts (2 points at least).
2. Inspect the runout with a dial gauge. [Measured at 10 mm (0.39 in) inside disc edge.]



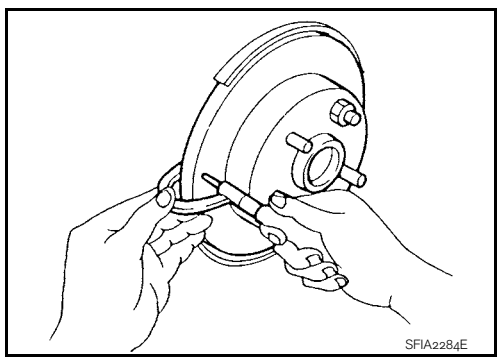
Runout limit **: Refer to BR-90, "Rear Disc Brake".**

NOTE:
Check the wheel bearing axial end play before the inspection. Refer to RAX-3, "Inspection" (2WD), RAX-9, "Inspection" (4WD).

3. Find the installation position with a minimum runout by shifting the disc rotor-to-wheel hub and bearing assembly installation position by one hole at a time if the runout exceeds the limit value.
4. Replace or lathe the disc rotor if the runout exceeds the limit even after the above operation.

THICKNESS

Check the thickness of the disc rotor using a micrometer. Replace the disc rotor if the thickness is below the wear limit.



Wear limit thickness **: Refer to BR-90, "Rear Disc Brake".**

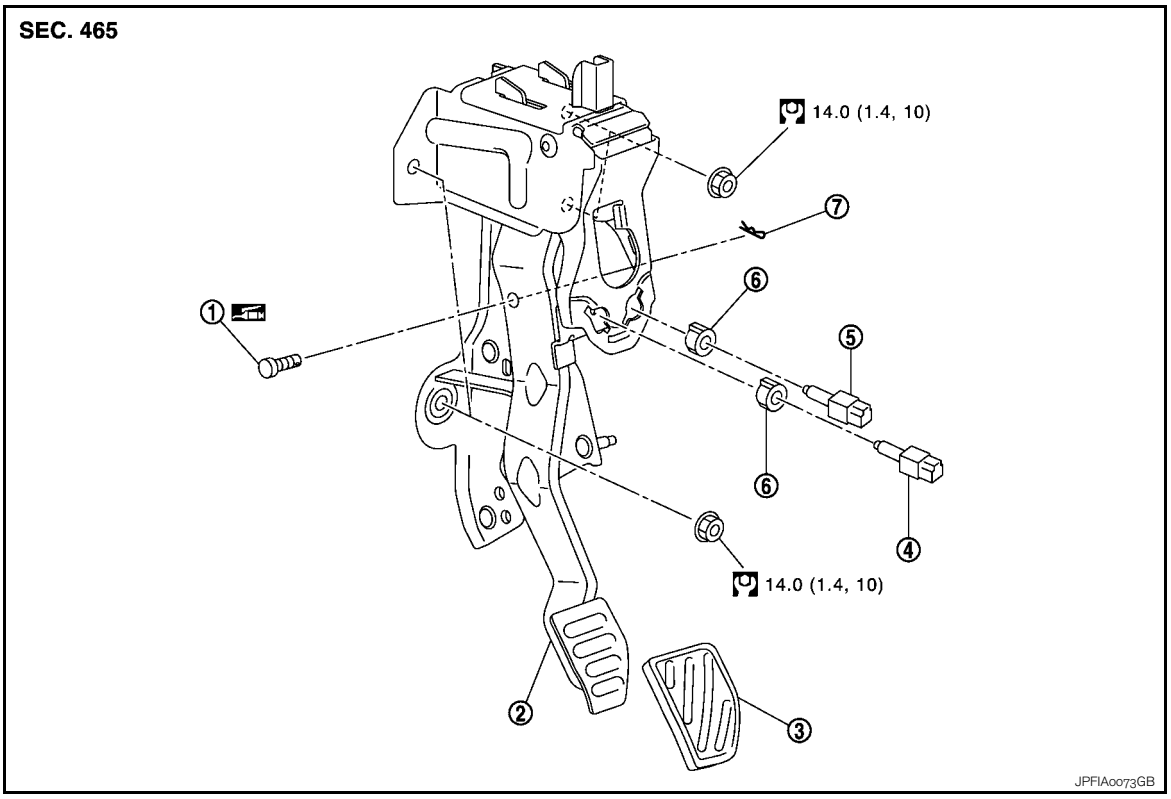
cardiagn.com

ON-VEHICLE REPAIR

BRAKE PEDAL

Exploded View

INFOID:0000000000938055



1. Clevis pin
2. Brake pedal assembly
3. Brake pedal pad
4. ASCD cancel switch
5. Stop lamp switch
6. Clip
7. Snap pin

: Apply multi-purpose grease.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000938056

REMOVAL

1. Remove front kicking plate inner. Refer to INT-14, "Exploded View".
2. Remove dash side finisher. Refer to INT-14, "Exploded View".
3. Remove instrument driver lower panel. Refer to IP-11, "Exploded View".
4. Remove foot duct. Refer to IP-11, "Exploded View" (automatic air conditioner), VTL-93, "FOOT DUCTS : Exploded View" (manual air conditioner).
5. Disconnect ASCD cancel switch and the stop lamp switch harness connectors.
6. Disconnect accelerator pedal position sensor harness connector.
7. Remove steering member stay.
8. Remove snap pin and clevis pin from clevis of brake booster.
9. Remove the brake pedal assembly and the accelerator pedal.
10. Remove the accelerator pedal from brake pedal assembly. Refer to ACC-3, "Exploded View".

INSTALLATION

Note the following, and installation is the reverse order of removal.

cardiagn.com

- Apply the multi-purpose grease to the clevis pin and the mating faces. (Not necessary if grease has been already applied.)

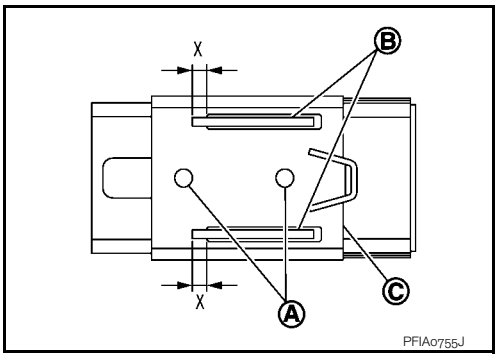
NOTE:
The clevis pin may be inserted in either direction.

Inspection and Adjustment

INFOID:0000000000938057

INSPECTION AFTER REMOVAL

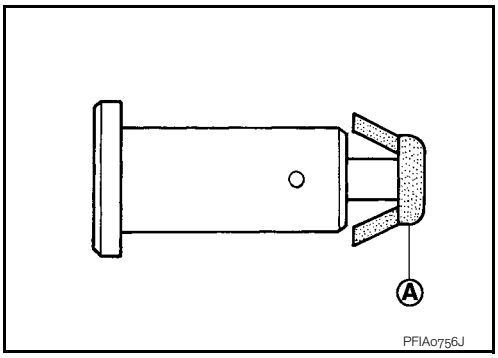
- Check the following items and replace the brake pedal assembly if necessary.
- Check the brake pedal upper rivet (A) for deformation.
- Check the brake pedal for bend, damage, and cracks on the welded parts.
- Check the lapping length (X) of sub-bracket (B) and slide plate (C).



Limit

Lapping length	**: 5.0 mm (0.197 in)**

- Check clevis pin and plastic stopper (A) for damage and deformation. If any is found, replace clevis pin.



ADJUSTMENT AFTER INSTALLATION

- Perform the brake pedal adjustment after installing the brake pedal assembly. Refer to BR-52, "Inspection and Adjustment".
- Perform the accelerator pedal check after installing the accelerator pedal. Refer to ACC-3, "Inspection".

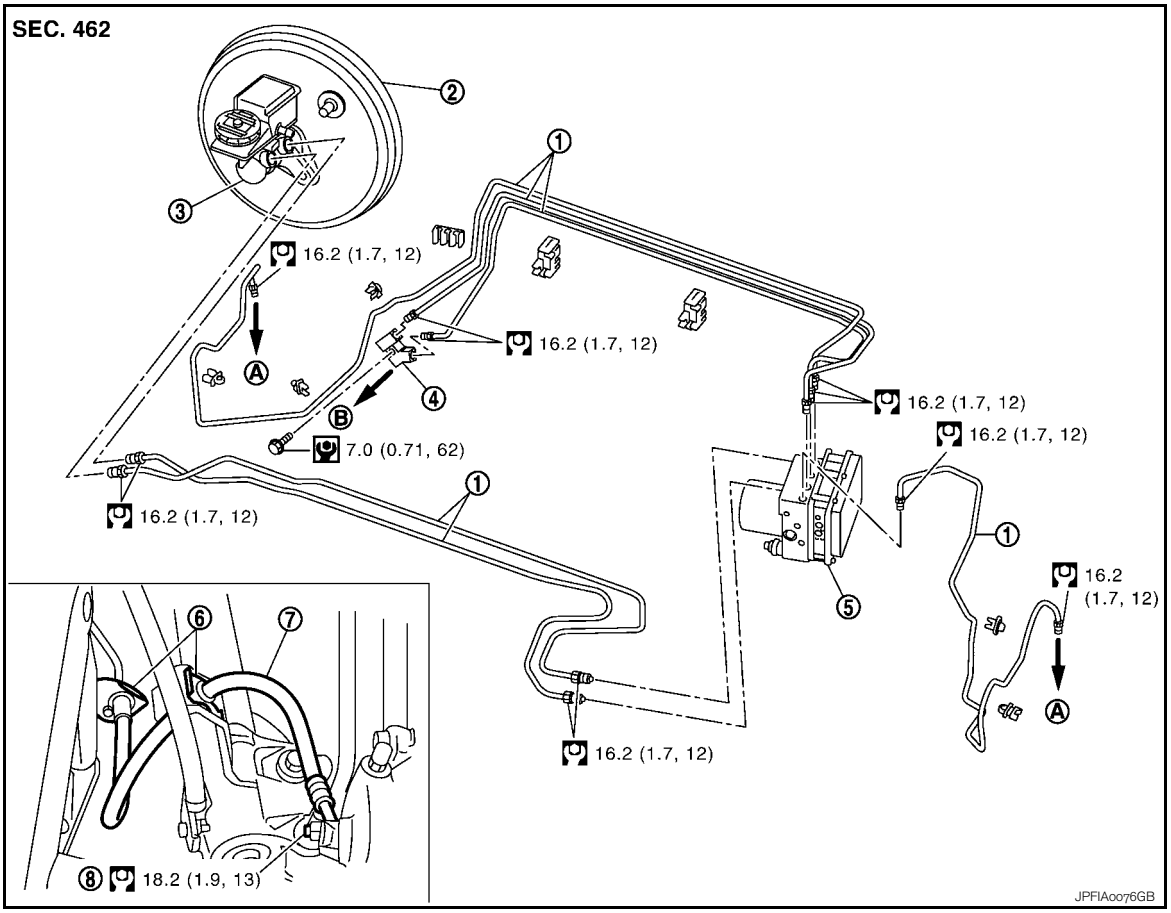
cardiagn.com

BRAKE PIPING

FRONT BRAKE (WITH ABS)

FRONT BRAKE (WITH ABS) : Exploded View

INFOID:0000000000938058



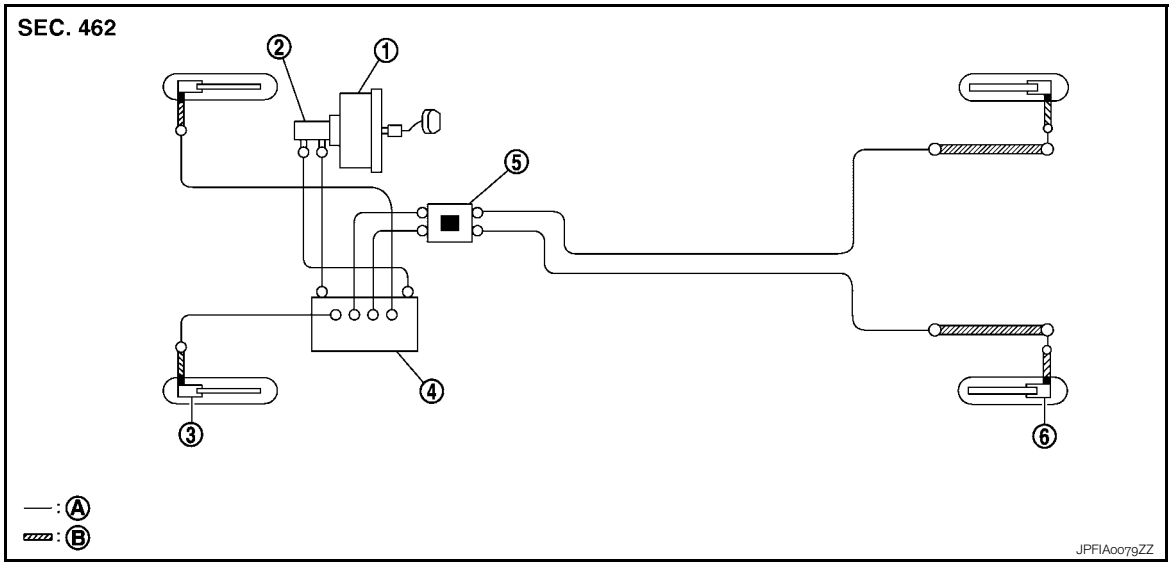
1. Brake tube
2. Brake booster
3. Master cylinder assembly
4. Connector
5. ABS actuator and electric unit (control unit)
6. Lock plate
7. Brake hose
8. Union bolt
A. To front brake hose
B. To rear brake tube

Refer to GI-4, "Components" for symbols in the figure.

FRONT BRAKE (WITH ABS) : Hydraulic Piping

INFOID:0000000000938059

cardiagn.com



1. Brake booster
2. Master cylinder assembly
3. Front disc brake
4. ABS actuator and electric unit (control unit)
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut

■ : Union bolt

▣ : Connector

FRONT BRAKE (WITH ABS) : Removal and Installation

INFOID:0000000000938060

REMOVAL

CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Remove tires.
2. Drain brake fluid. Refer to BR-55, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tubes.**
   - **Cover open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose.

INSTALLATION

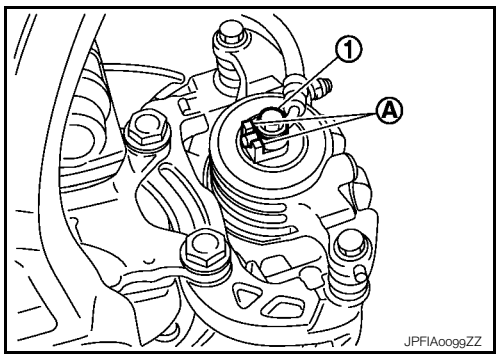
CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse the copper washer.

cardiagn.com

2. Align the brake hose pin to the projection (A) of the brake caliper assembly and tighten the union bolt (1) to the specified torque.
3. Install the brake tube to the brake hose, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that all brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-56, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

FRONT BRAKE (WITH ABS) : Inspection

INFOID:0000000000938061

INSPECTION AFTER INSTALLATOIN

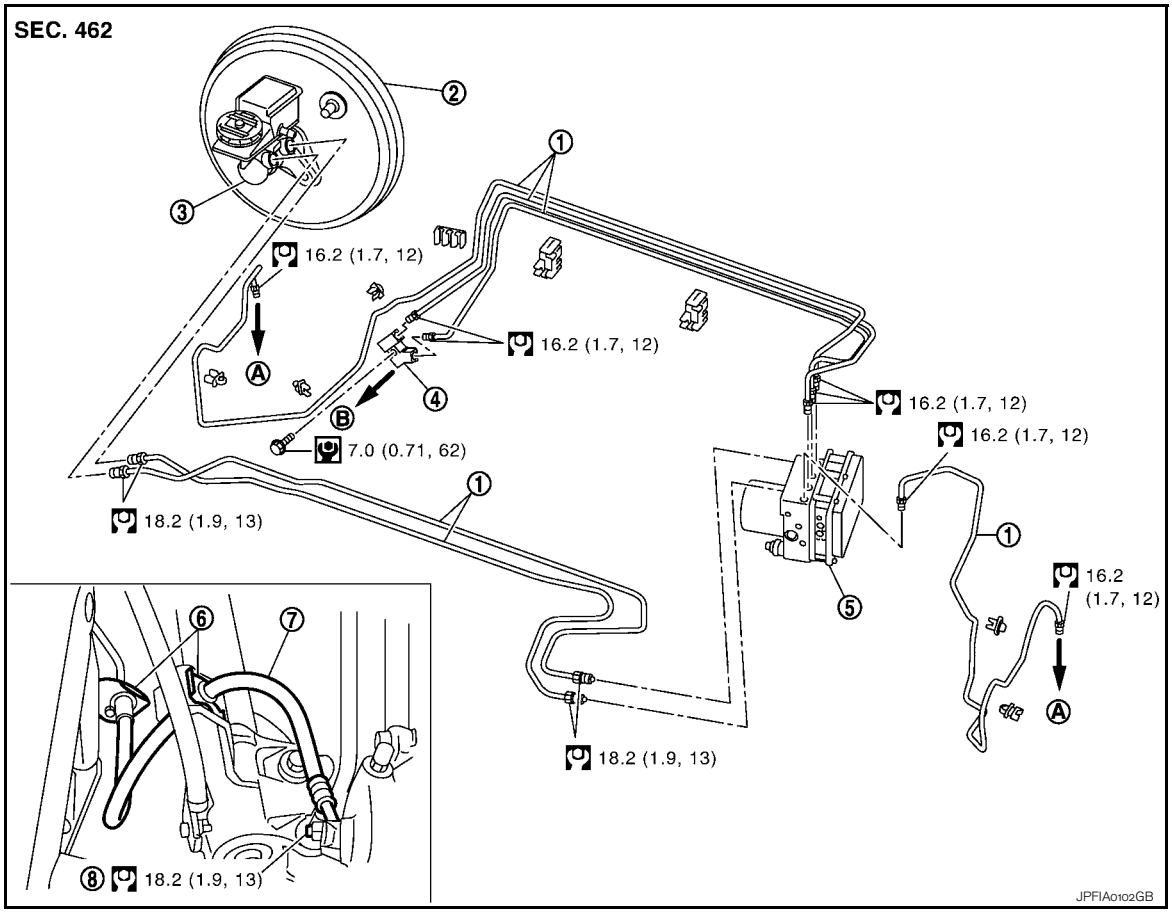
1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds with the engine running. Check for any fluid leakage.
   CAUTION:
   Retighten the applicable connection to the specified torque and repair any abnormal (damaged, worn or deformed) part if any brake fluid leakage is present.

FRONT BRAKE (WITH ESP)

FRONT BRAKE (WITH ESP) : Exploded View

INFOID:0000000000953029

cardiagn.com

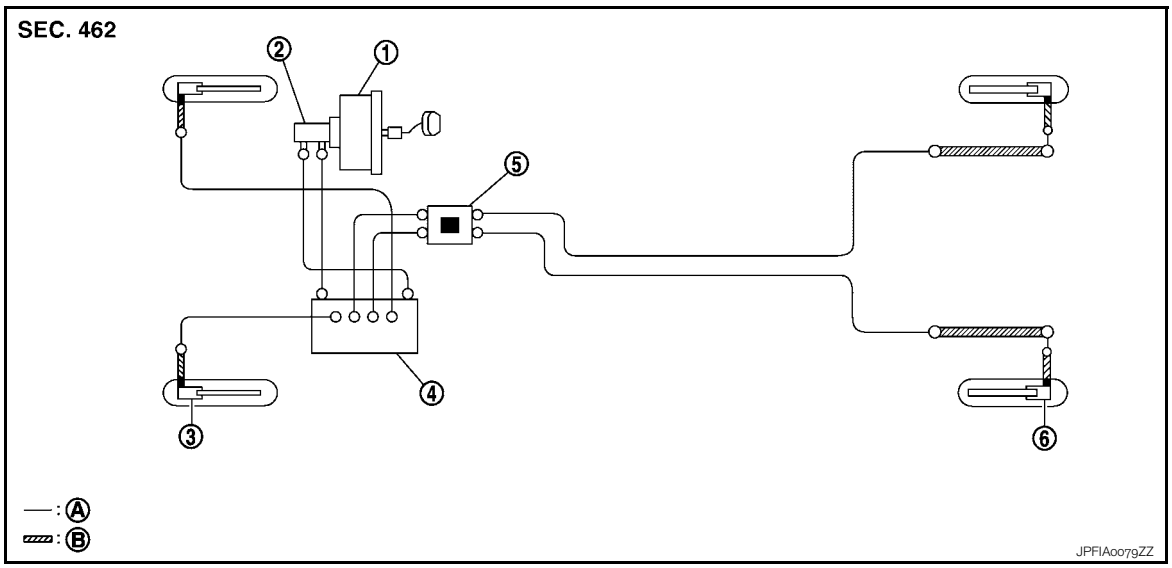


1. Brake tube
2. Brake booster
3. Master cylinder assembly
4. Connector
5. ABS actuator and electric unit (control unit)
6. Lock plate
7. Brake hose
8. Union bolt
A. To front brake hose
B. To rear brake tube

Refer to GI-4, "Components" for symbols in the figure.

FRONT BRAKE (WITH ESP) : Hydraulic Piping

INFOID:0000000001102265



cardiagn.com

1. Brake booster
2. Master cylinder assembly
3. Front disc brake
4. ABS actuator and electric unit (control unit)
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut
■ : Union bolt
▣ : Connector

FRONT BRAKE (WITH ESP) : Removal and Installation

INFOID:0000000000938064

REMOVAL

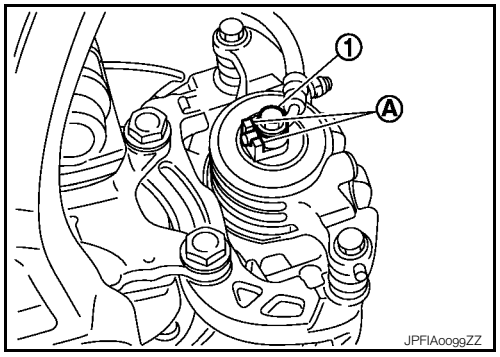
CAUTION:
Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Remove tires.
2. Drain brake fluid. Refer to BR-55, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tubes.**
   - **Cover open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose.

INSTALLATION

CAUTION:
Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse the copper washer.
2. Align the brake hose pin to the projection (A) of the brake caliper assembly and tighten the union bolt (1) to the specified torque.
3. Install the brake tube to the brake hose, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that all brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-56, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

FRONT BRAKE (WITH ESP) : Inspection

INFOID:0000000000938065

INSPECTION AFTER INSTALLATOIN

1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds with the engine running. Check for any fluid leakage.

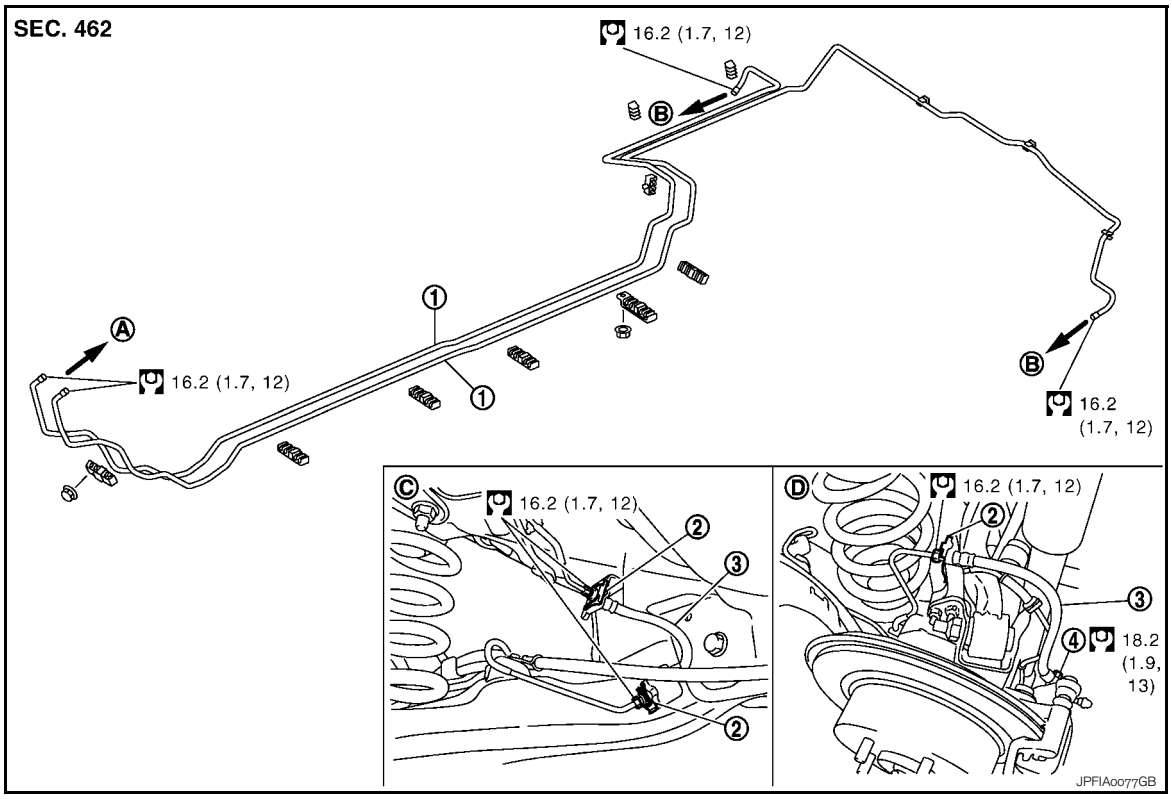
cardiagn.com

CAUTION:
Retighten the applicable connection to the specified torque and repair any abnormal (damaged, worn or deformed) part if any brake fluid leakage is present.

REAR BRAKE

REAR BRAKE : Exploded View

INFOID:0000000000938066



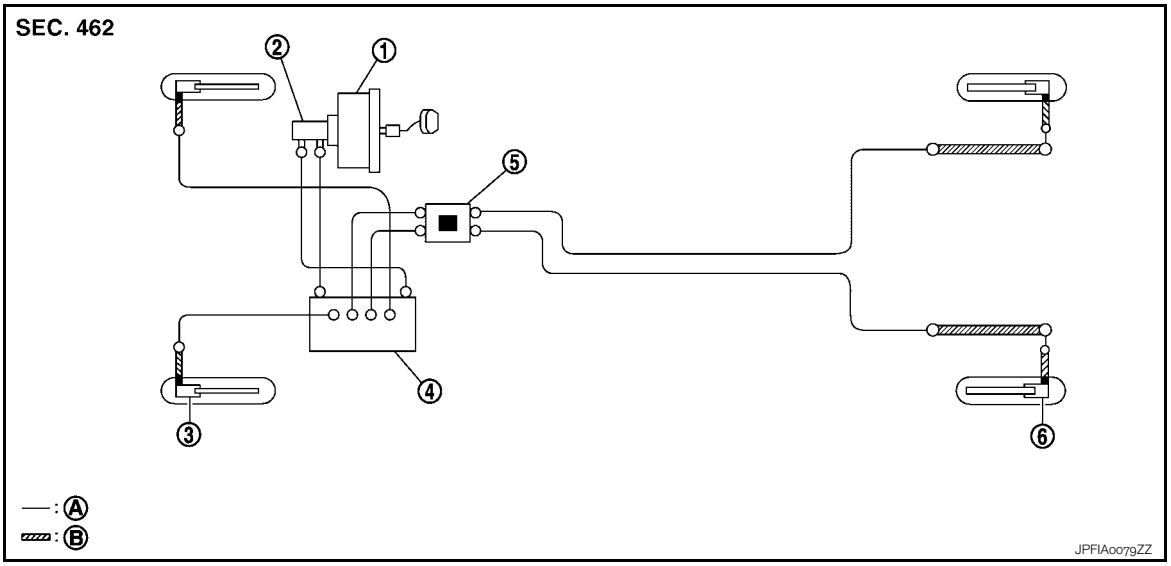
1. Brake tube
2. Lock plate
3. Brake hose
4. Union bolt
A. To front brake tube
B. To rear brake hose
C. Floor side
D. Caliper side

Refer to GI-4, "Components" for symbols in the figure.

REAR BRAKE : Hydraulic Piping

INFOID:0000000001102266

cardiagn.com



1. Brake booster
2. Master cylinder assembly
3. Front disc brake
4. ABS actuator and electric unit (control unit)
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut

■ : Union bolt

▣ : Connector

REAR BRAKE : Removal and Installation

INFOID:0000000000938068

REMOVAL

CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Remove tires.
2. Drain brake fluid. Refer to BR-55, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never sharply bend, twist or strongly pull the brake hoses and tubes.**
   - **Cover the open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose from the vehicle.

INSTALLATION

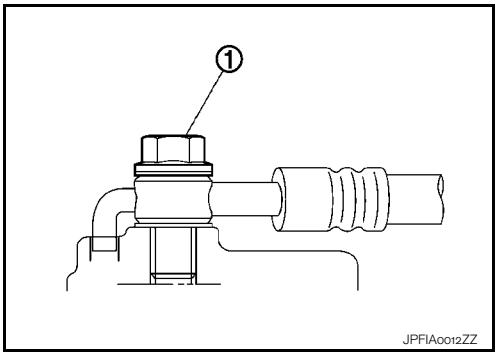
CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse copper washer.

cardiagn.com

2. Install the brake hose L-pin by aligning it with the brake caliper assembly positioning hole, and tighten the union bolt (1) to the specified torque.
3. Connect the hose to the brake tube, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that the brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.
5. Refill with new brake fluid and perform the air bleeding. Refer to BR-56, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.



REAR BRAKE : Inspection

INFOID:0000000000938069

INSPECTION AFTER REMOVAL

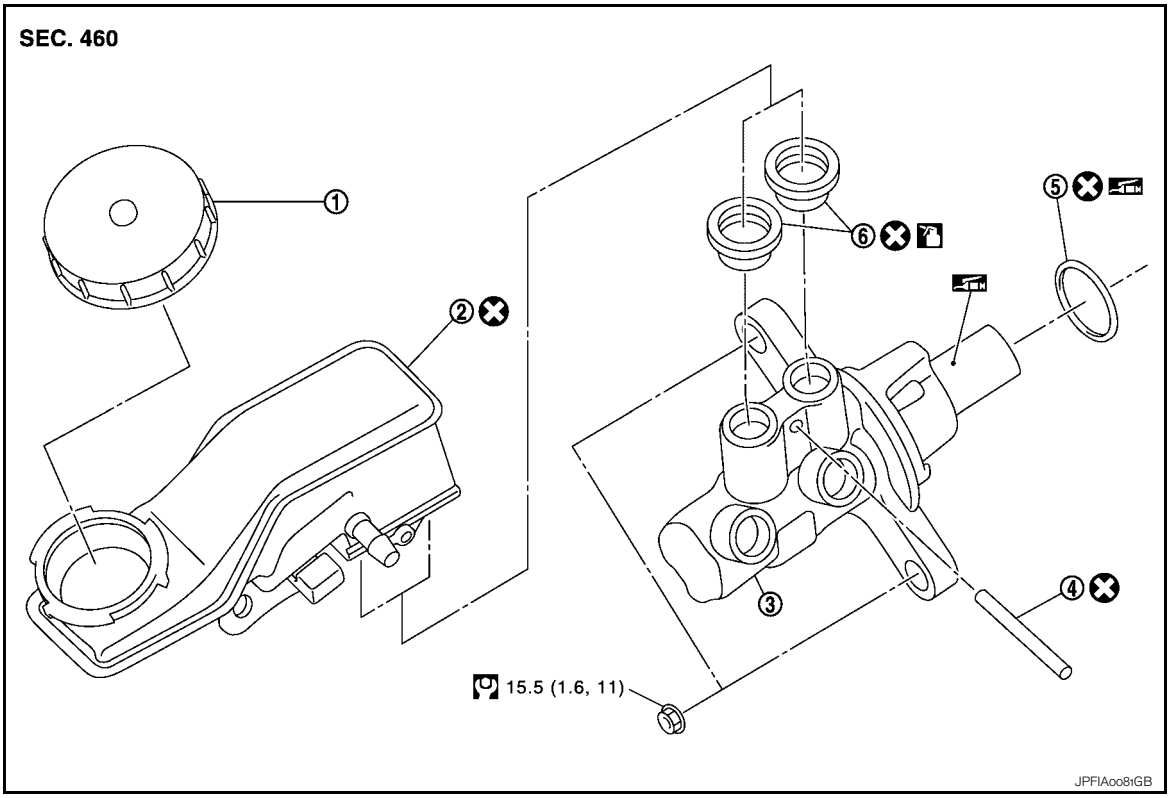
1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds with the engine running. Check for any fluid leakage.
   CAUTION:
   Retighten the applicable connection to the specified torque and repair any abnormal (damaged, worn or deformed) part if any brake fluid leakage is present.

cardiagn.com

BRAKE MASTER CYLINDER

Exploded View

INFOID:0000000000938070



1. Reservoir cap
2. Reservoir tank
3. Cylinder body
4. Pin
5. O-ring
6. Grommet

: Apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000938071

REMOVAL

CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

1. Drain brake fluid. Refer to BR-55, "Draining".
2. Separate the brake fluid level switch harness connector.
3. Separate the brake tubes from the master cylinder assembly with a flare nut wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.
4. Remove the master cylinder assembly.
   CAUTION:
   - **Depress the brake pedal several times to release the vacuum pressure from the brake booster. Then remove the master cylinder assembly.**
   - **Never depress the brake pedal after the master cylinder assembly is removed.**
   - **The piston of the master cylinder assembly is exposed. Never damage it when removing the master cylinder.**
   - **The piston may drop off when pulled out strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**

cardiagn.com

INSTALLATION

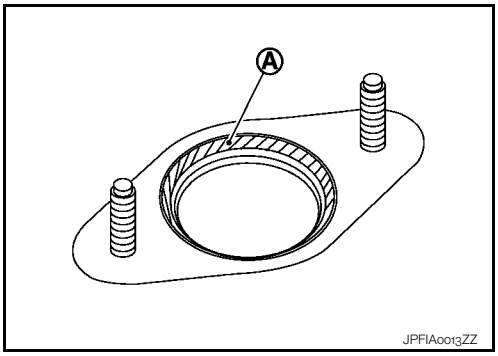
CAUTION:

Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

- Note the following, and installation is the reverse order of removal.

CAUTION:

- **Never depress the brake pedal after the master cylinder assembly is removed.**
- **Apply PBC (Poly Butyl Cuprysil) silicone-based grease to the brake booster [see (A) in the figure] when installing the master cylinder assembly to the brake booster.**
- **The piston of the master cylinder assembly is exposed. Never damage it when handling the master cylinder and check that no dirt and dust are present on the piston before installation. Clean it with new brake fluid if necessary.**
- **The piston may drop off when pulled strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**



- Temporarily tighten the brake tube flare nut to the master cylinder assembly by hand. Then tighten it to the specified torque with a flare nut torque wrench. Refer to BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (with ABS), BR-65, "FRONT BRAKE (WITH ESP) : Exploded View" (with ESP).

CAUTION:

Never scratch the flare nut and the brake tube.

- After installation, perform the air bleeding. Refer to BR-56, "Bleeding Brake System".

CAUTION:

Never reuse drained brake fluid.

Disassembly and Assembly

INFOID:0000000000938072

DISASSEMBLY

CAUTION:

- **Never disassemble the cylinder body.**
- **Remove the reservoir tank if necessary.**

1. Fix the master cylinder assembly to a vise.

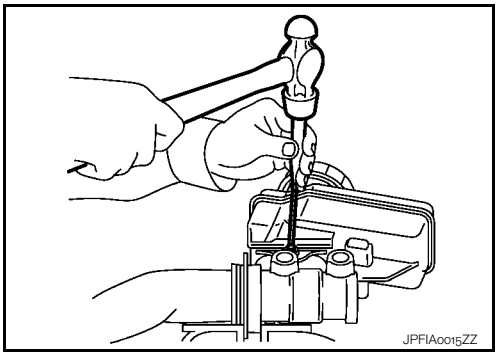
   CAUTION:

   Always set copper plates or cloth between vise when fixing the cylinder body to a vise. Never overtighten the vise.

2. Remove the reservoir tank mounting pin with a pin punch.
3. Remove the reservoir tank and grommet from the cylinder body.

   CAUTION:

   Never drop the removed parts. The parts must not be reused if they are dropped.



ASSEMBLY

1. Apply new brake fluid to the grommet and install it to the cylinder body.

   CAUTION:

   - **Never use mineral oil such as gasoline or light oil.**
   - **Never reuse the grommets.**

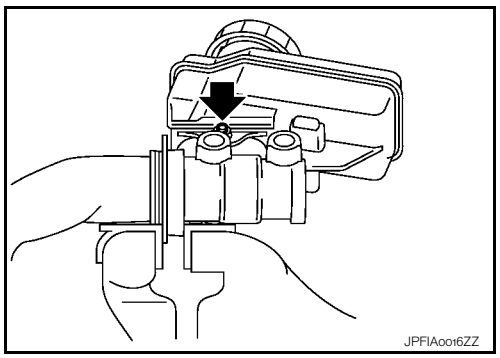
2. Install the reservoir tank to the cylinder body.

   CAUTION:

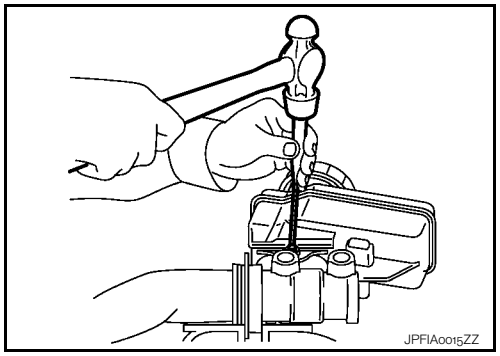
   - **Never drop the parts when installing. The parts must not be reused if they are dropped.**
   - **Never reuse reservoir tank.**

cardiagn.com

3. Fix the cylinder body to a vise.
CAUTION:
- **Place the reservoir tank with the chamfered pin hole (⬅) facing up.**
- **Always set copper plates or cloth between vise when fixing the cylinder body to a vise. Never overtighten the vise.**



4. Tilt the reservoir tank so that a mounting pin can be inserted. Insert a mounting pin. Return the reservoir tank to the horizontal position. Insert another mounting pin into the pin hole on the opposite side in the same manner after the mounting pin passes through the cylinder body pin hole.
CAUTION:
Never reuse the mounting pin.



Inspection

INFOID:0000000000938073

INSPECTION AFTER INSTALLATION

Fluid Leak

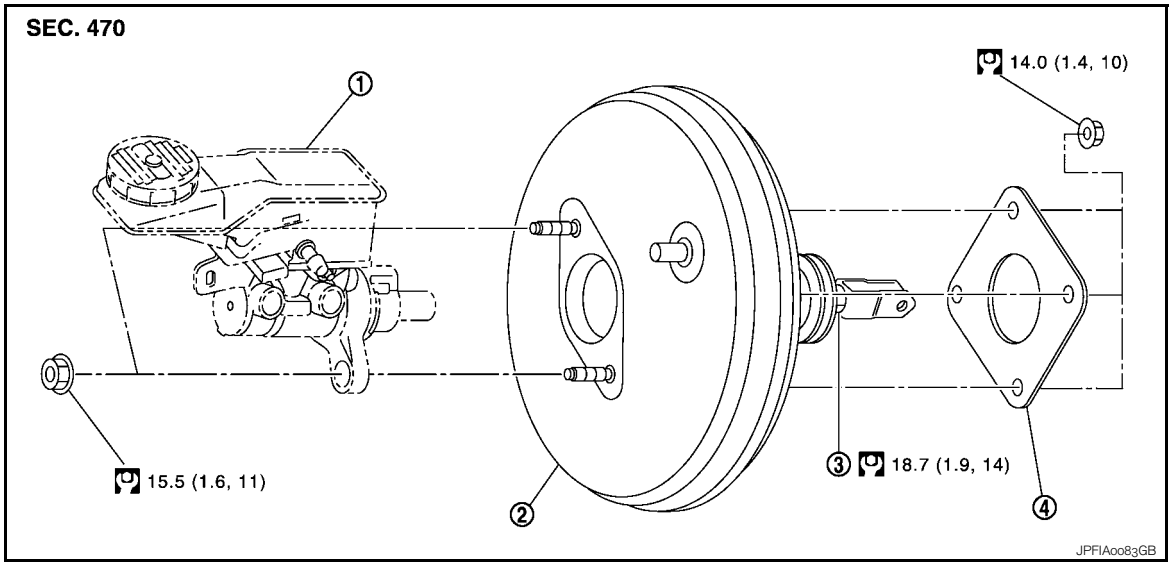
Check for brake fluid leakage from the cylinder body-to-brake booster mounting face, reservoir tank mounting face and brake tube connections.

cardiagn.com

BRAKE BOOSTER

Exploded View

INFOID:0000000000938074



1. Master cylinder assembly
2. Brake booster
3. Lock nut
4. Gasket

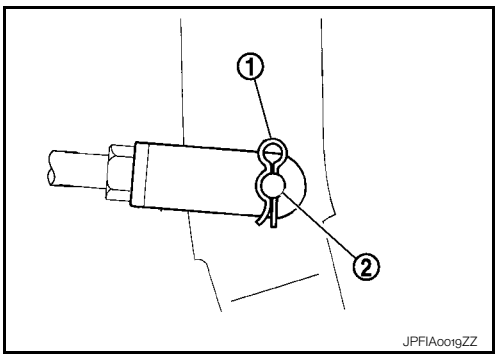
Refer to GI-4, "Components" for symbols in the figure.

Removal and installation

INFOID:0000000000938075

REMOVAL

1. Remove brake master cylinder assembly. Refer to BR-71, "Removal and Installation".
   CAUTION:
   - **Depress the brake pedal several times to release the vacuum pressure from the brake booster. Then remove the master cylinder assembly.**
   - **Never depress the brake pedal after the master cylinder assembly is removed.**
   - **The piston of the master cylinder assembly is exposed. Never damage it when removing the master cylinder.**
   - **The piston may drop off when pulled out strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**
2. Remove vacuum hose from brake booster. Refer to BR-77, "HR16DE/MR20DE MODELS : Removal and Installation" (HR16DE, MR20DE engine models), BR-78, "K9K MODELS : Removal and Installation" (K9K engine models).
3. Remove snap pin (1) and clevis pin (2) from inside vehicle.
4. Remove nuts on brake booster and brake pedal assembly. Refer to BR-61, "Exploded View".
5. Remove brake booster from dash panel in engine room side.
   CAUTION:
   Never deform or bend the brake tubes.
6. Remove the spacer from brake booster.



INSTALLATION

Note the following, and installation is the reverse order of removal.

CAUTION:

cardiagn.com

- **Be careful not to damage brake booster stud bolt threads. If brake booster is tilted during installation, the dash panel may damage the threads.**
- **Never deform or bend the brake tubes when installing the brake booster.**
- **Always use a new gasket between the brake booster and the spacer.**
- **Replace the clevis pin if it is damaged. Refer to BR-62, "Inspection and Adjustment".**
- After installation, perform the air bleeding. Refer to BR-56, "Bleeding Brake System".

CAUTION:
Never reuse drained brake fluid.

Inspection and Adjustment

INFOID:0000000000938076

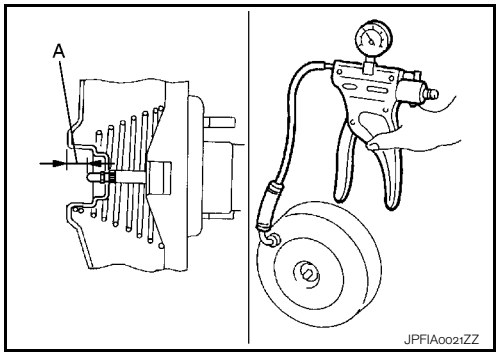
INSPECTION AFTER REMOVAL

Output Rod Length Inspection

1. With a handy vacuum pomp, apply vacuum pressure of –66.7 kPa (–500 mmHg, –19.70 inHg, –0.667 bar) to the brake booster.
2. Check the output rod length (A).

Standard

Output rod length (A) **: Refer to BR-90, "Brake Booster".**



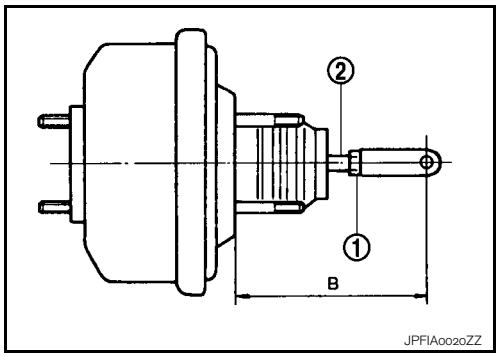
Input Rod Length Inspection

1. Loosen the lock nut (1) and adjust the input rod (2) to the specified length (B).

Standard

Input rod length (B) **: Refer to BR-90, "Brake Booster".**

2. Tighten the lock nut to the specified torque.

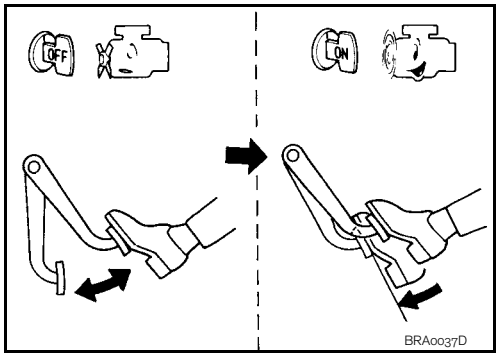


INSPECTION AFTER INSTALLATION

Operation

Depress the brake pedal several times at 5-second intervals with the engine stopped. Start the engine with the brake pedal fully depressed. Check that the clearance between brake pedal and dash lower pane decreases.

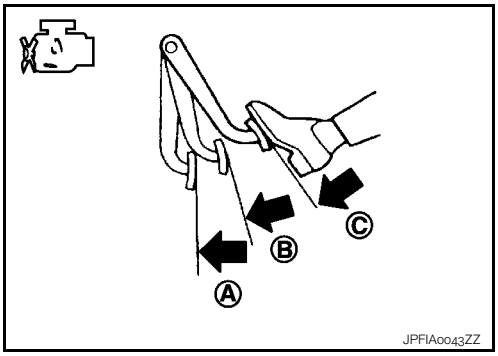
NOTE:
A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



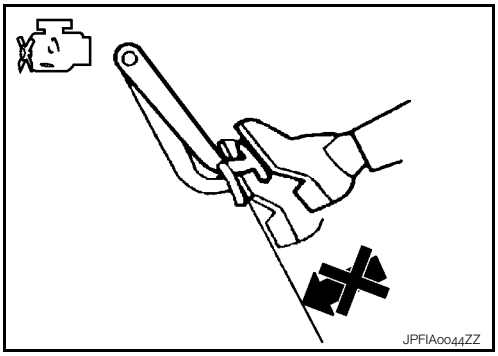
Air Tight

cardiagn.com

- Idle the engine for 1 minute to apply vacuum to the brake booster, and stop the engine. Then depress the brake pedal several times at 5-second intervals until the accumulated vacuum is released to atmospheric pressure. Check that the clearance between brake pedal and dash lower panel gradually increases (A → B → C) each time the brake pedal is depressed during this operation.



- Depress the brake pedal with the engine running. Then stop the engine while holding down the brake pedal. Check that the brake pedal stroke does not change after holding down the brake pedal for 30 seconds or more.
  NOTE:
  A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



ADJUSTMENT AFTER INSTALLTION

Perform the brake pedal adjustment after installing the brake pedal assembly. Refer to BR-52, "Inspection and Adjustment".

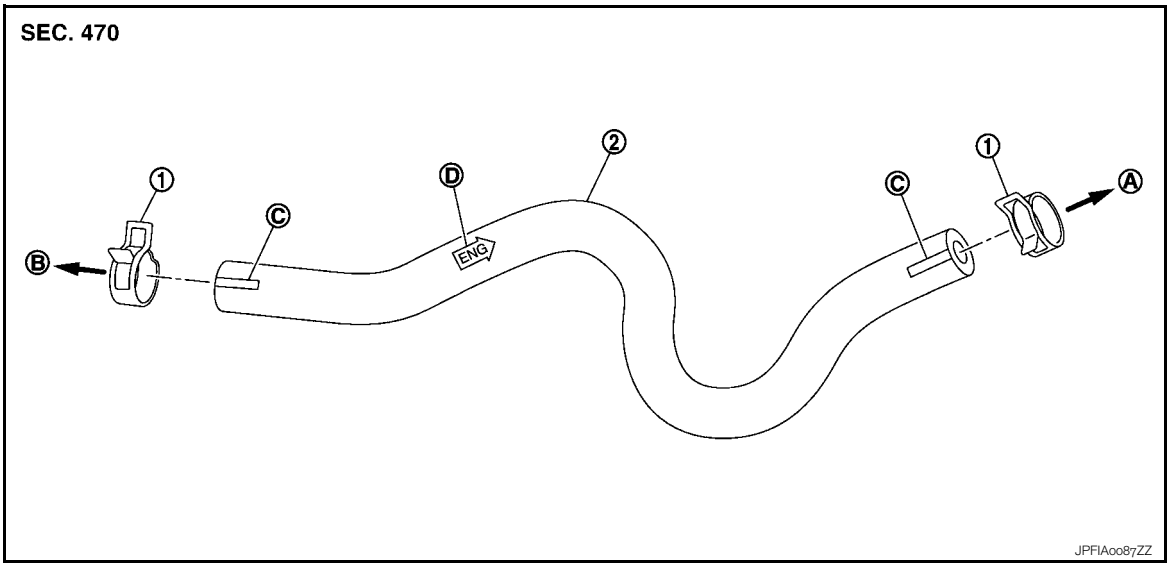
cardiagn.com

VACUUM LINES

HR16DE/MR20DE MODELS

HR16DE/MR20DE MODELS : Exploded View

INFOID:0000000000938077



1. Clamp
2. Vacuum hose (built in check valve)
A. To intake manifold
B. To brake booster
C. Paint mark
D. Stamp indicating engine direction

HR16DE/MR20DE MODELS : Removal and Installation

INFOID:0000000000938078

REMOVAL

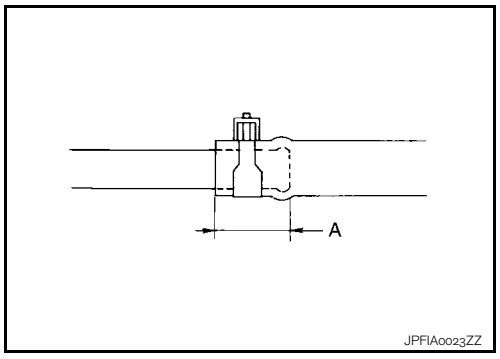
Remove the vacuum hose.

INSTALLATION

Install the vacuum hose.

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling of vacuum hose.**



HR16DE/MR20DE MODELS : Inspection

INFOID:0000000000938079

INSPECTION AFTER REMOVAL

Appearance

Check for correct assembly, damage and deterioration.

Check Valve Airtightness

cardiagn.com

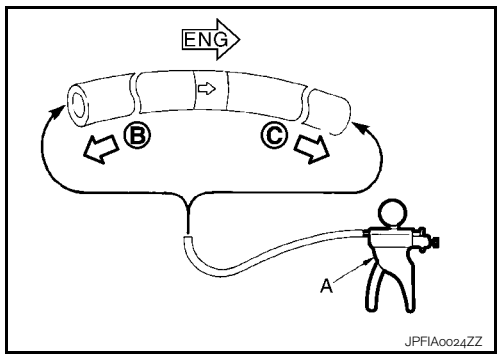
- Use a handy vacuum pump (A) to check.

When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mm-Hg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of −66.7 kPa (−500 mmHg, −19.70 inHg, −0.667 bar).

When connected to the engine side (C):

Vacuum should not exist.

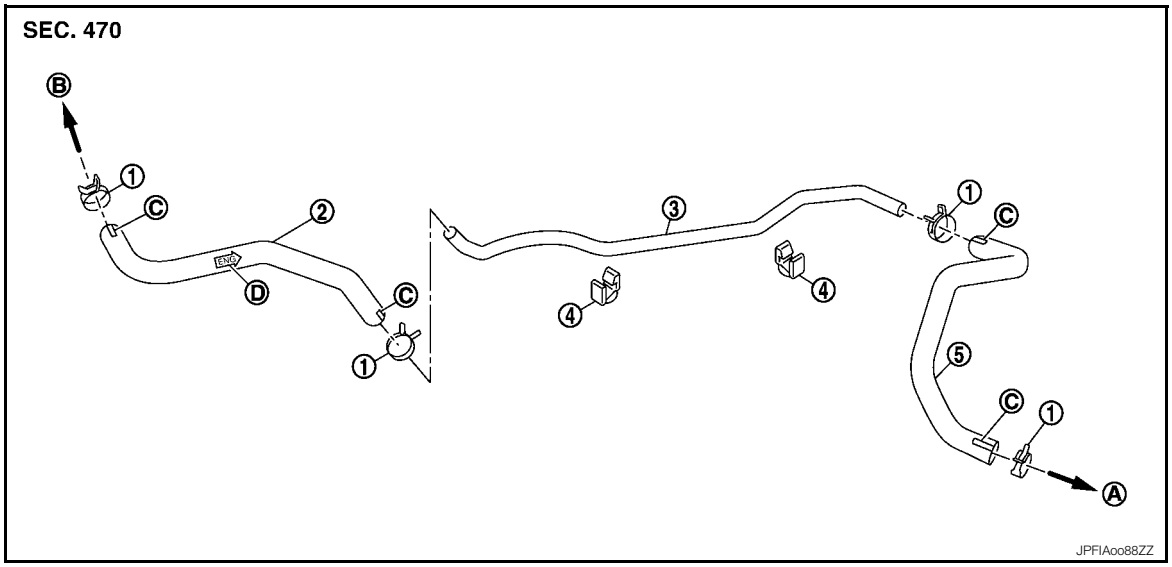


- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

K9K MODELS

K9K MODELS : Exploded View

INFOID:0000000000938080



1.	Clamp	2.	Vacuum hose (built in check valve)	3.	vacuum tube
4.	Clip	5.	Vacuum hose		
A.	To vacuum pomp	B.	To brake booster	C.	Paint mark
D.	Stamp indicating engine direction				

K9K MODELS : Removal and Installation

INFOID:0000000000938081

REMOVAL

Remove the vacuum hose and tube.

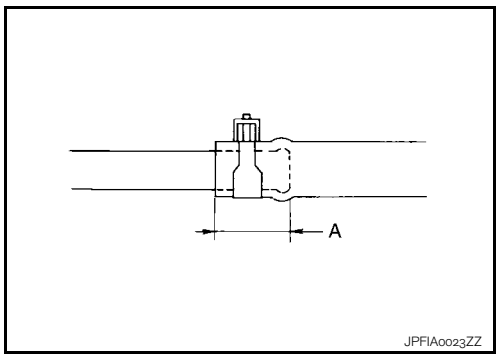
INSTALLATION

Install the vacuum hose and tube.

CAUTION:

cardiagn.com

- **Because vacuum hose contains a check valve, it must be installed the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling.**



K9K MODELS : Inspection

INFOID:0000000000938082

INSPECTION AFTER REMOVAL

Appearance

Check for correct assembly, damage and deterioration.

Check Valve Airtightness

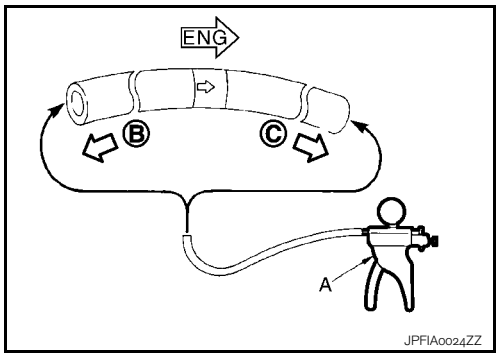
- Use a handy vacuum pump (A) to check.

When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mm-Hg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of −66.7 kPa (−500 mmHg, −19.70 inHg, −0.667 bar).

When connected to the engine side (C):

Vacuum should not exist.



- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

cardiagn.com

FRONT DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000000938083

Refer to BR-81, "BRAKE CALIPER ASSEMBLY : Exploded View".

BRAKE PAD : Removal and Installation

INFOID:0000000000938084

REMOVAL

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Remove tires.
2. Remove lower sliding pin bolt.
3. Suspend the cylinder body with suitable wire so that the brake hose will not stretch. Then remove the brake pad from the torque member.
   CAUTION:
   - **Never deform the pad retainer when removing the pad retainer from the torque member.**
   - **Never damage the piston boot.**
   - **Never drop the brake pads, shims, and the shim covers.**

INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Install the pad retainer to the torque member if the pad retainers has been removed.
   CAUTION:
   - **Securely assemble the pad retainers so that it will not be lifted up from the torque member.**
   - **Never deform the pad retainers.**
2. Apply copper based brake grease to the mating faces between the pads, shims and shim covers, and install them to the brake pad.
   CAUTION:
   Always replace the shims together with the shim covers when replacing the brake pad.
3. Install the cylinder body and brake pads to the torque member.
   CAUTION:
   - **Never damage the piston boot.**
   - **When replacing a pad with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.**

   NOTE:
   Use a disc brake piston tool to easily press piston.
4. Install the lower sliding pin bolt and tighten it to the specified torque.
5. Depress the brake pedal several times to check that no drag feel is present for the front disc brake.
6. Install tires.

BRAKE PAD : Inspection and Adjustment

INFOID:0000000000938085

INSPECTION AFTER REMOVAL

Replace the shims and the shim covers if rust is excessively attached.

ADJUSTMENT AFTER INSTALLATION

cardiagn.com

Brake Burnishing Procedure

Burnish contact surfaces between pads according to following procedure after refinishing or replacing pads, or if a soft pedal occurs at very low mileage.

CAUTION:

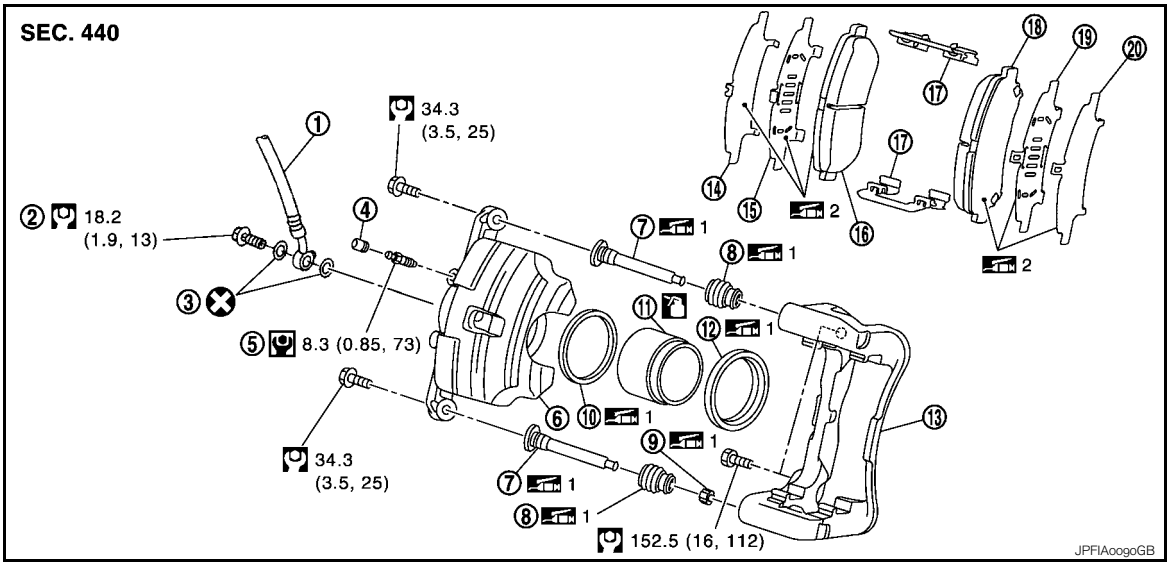
- **Be careful of vehicle speed because the brake does not operate easily until pads and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000000938086



1. Brake hose	2. Union bolt	3. Copper washer
4. Cap	5. Bleeder valve	6. Cylinder body
7. Sliding pin	8. Sliding pin boot	9. Bushing
10. Piston seal	11. Piston	12. Piston boot
13. Torque member	14. Inner shim cover	15. Inner shim
16. Inner pad	17. Pad retainer	18. Outer pad
19. Outer shim	20. Outer shim cover	

: 1: Apply rubber grease.

: 2: Apply copper based brake grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE CALIPER ASSEMBLY : Removal and Installation

INFOID:0000000000938087

REMOVAL

WARNING:

Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.

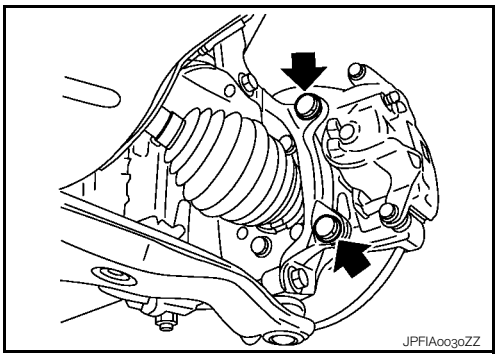
CAUTION:

Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Remove tires.

cardiagn.com

2. Fix the disc rotor using wheel nuts.
3. Drain brake fluid. Refer to BR-11, "Draining".
   CAUTION:
   Never spill or splash brake fluid on the disc rotor.
4. Remove union bolt, and then disconnect brake hose from caliper assembly.
5. Remove torque member mounting bolts, and remove brake caliper assembly.
   CAUTION:
   Never drop brake pads and caliper assembly.
6. Remove disc rotor.
   CAUTION:
   - **Put matching marks on the wheel hub and bearing assembly and the disc rotor before removing the disc rotor.**
   - **Never drop disc rotor.**



INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Install disc rotor.
   CAUTION:
   Align the matching marks made during removal when reusing the disc rotor.
2. Install the brake caliper assembly to the vehicle and tighten the torque member mounting bolts to the specified torque.
   CAUTION:
   Never spill or splash any grease and moisture on the brake caliper assembly mounting face, threads, mounting bolts and washers. Wipe out any grease and moisture.
3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque.
4. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   - **Never reuse drained brake fluid.**
   - **Never spill or splash brake fluid on the disc rotor.**
5. Check that no drag feel is present for the front disc brake.
6. Install tires.

BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

INFOID:0000000000938088

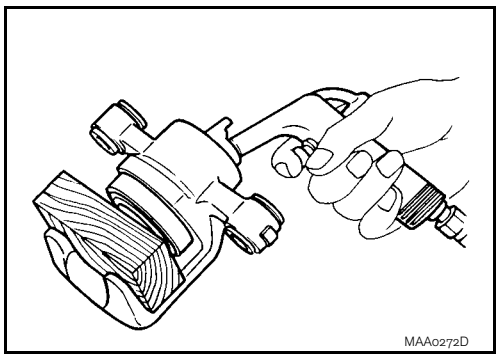
DISASSEMBLY

NOTE:
Never remove the torque member, brake pads, shims, shim covers and pad retainers when disassembling and assembling the cylinder body.

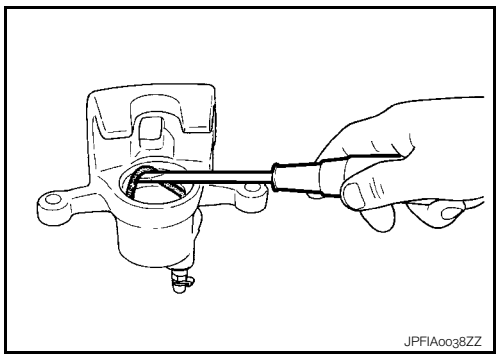
1. Remove the sliding pin bolts, and remove the cylinder body from the torque member.
   CAUTION:
   Never drop pads, shims, shim covers and pad retainers from torque member.
2. Remove sliding pins and sliding pin boots from torque member.
3. Remove bushing from sliding pin.

cardiagn.com

4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.
CAUTION:
Never get fingers caught in the piston.

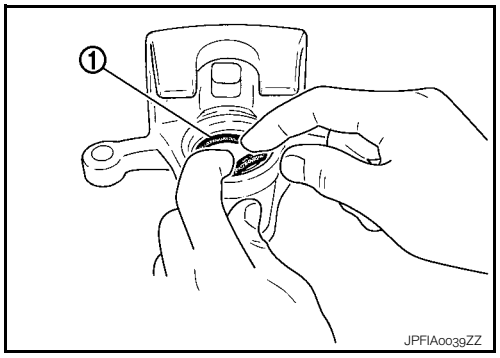


5. Remove piston seal from cylinder body using suitable tool.
CAUTION:
Be careful not to damage a cylinder inner wall.

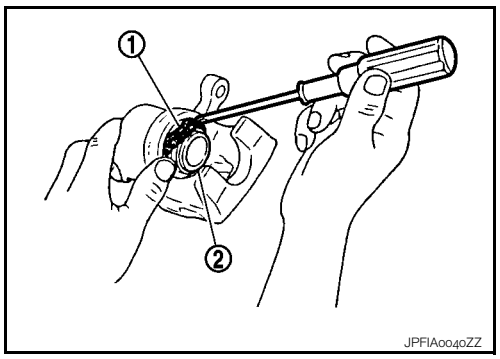


ASSEMBLY

1. Apply rubber grease to piston seal (1), and install to cylinder body.
CAUTION:
Never reuse piston seal.

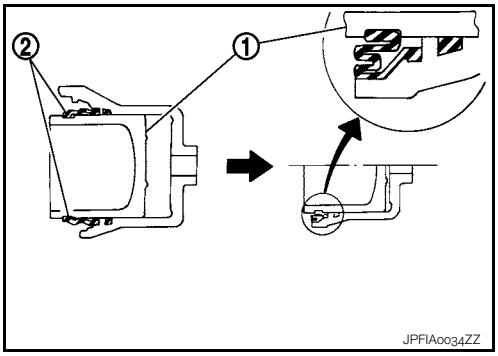


2. Apply rubber grease to piston boot (1). Cover the piston (2) end with piston boot, and then install cylinder side lip on piston boot securely into a groove on cylinder body.
CAUTION:
Never reuse piston boot.



cardiagn.com

3. Apply brake fluid to piston (1). Push piston into cylinder body by hand and push piston boot (2) piston-side lip into the piston groove.
   CAUTION:
   Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.
4. Apply rubber grease to bushing, install bushing to sliding pin.
5. Apply rubber grease to sliding pins and sliding pin boots, install sliding pins and sliding pin boots to torque member.
6. Install the cylinder body to the torque member and tighten the sliding pin bolts to the specified torque.



BRAKE CALIPER ASSEMBLY : Inspection and Adjustment

INFOID:0000000000938089

INSPECTION AFTER DISASSEMBLY

Cylinder Body

Check the inner wall of the cylinder for rust, wear, cracks or damage. Replace the cylinder if any abnormal condition is detected.

CAUTION:
Always clean with new brake fluid. Never clean with mineral oil such as gasoline and light oil.

Torque Member

Check the torque member for rust, wear, cracks or damage. Replace the member if any abnormal condition is detected.

Piston

Check the surface of the piston for rust, wear, cracks or damage. Replace the piston if any abnormal condition is detected.

CAUTION:
A piston sliding surface is plated. Never polish with sandpaper.

Sliding Pin and Sliding Pin Boot

Check the sliding pins and sliding boots for rust, wear, cracks or damage. Replace the parts if any abnormal condition is detected.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between disc rotors and pads according to following procedure after refinishing or replacing disc rotor, or if a soft pedal occurs at very low mileage.

CAUTION:
- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

cardiagn.com

REAR DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000000938090

Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View".

BRAKE PAD : Removal and Installation

INFOID:0000000000938091

REMOVAL

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Remove tires.
2. Remove the lower sliding pin bolt.
3. Suspend the cylinder body with suitable wire so that the brake hose will not stretch. Remove the brake pads from the torque member.
   CAUTION:
   - **Never deform the pad retainers if removing the pad retainers.**
   - **Never damage the piston boot.**
   - **Never drop the brake pad, shims, and the shim cover.**

INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Install the pad retainers to the torque member if the pad retainers has been removed.
   CAUTION:
   - **Securely assemble the pad retainers not to be lifted up from the torque member.**
   - **Never deform the pad retainers.**
2. Apply copper based brake grease to the mating faces between the brake pads and the shims and install them to the brake pad.
   CAUTION:
   Always replace the shims together with the shim cover when replacing the brake pad.
3. Install cylinder body and brake pads to torque member.
   CAUTION:
   - **Never damage the piston boot.**
   - **When replacing a pads with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.**

   NOTE:
   Use a disc brake piston tool to easily press piston.
4. Install the lower sliding pin bolt and tighten it to the specified torque.
5. Depress the brake pedal several times to check that no drag feel is present for the rear disc brake.
6. Install tires.

BRAKE PAD : Inspection and Adjustment

INFOID:0000000000938092

INSPECTION AFTER REMOVAL

Replace the shims and the shim cover if rust is excessively attached.

cardiagn.com

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between pads according to following procedure after refinishing or replacing pads, or if a soft pedal occurs at very low mileage.

CAUTION:

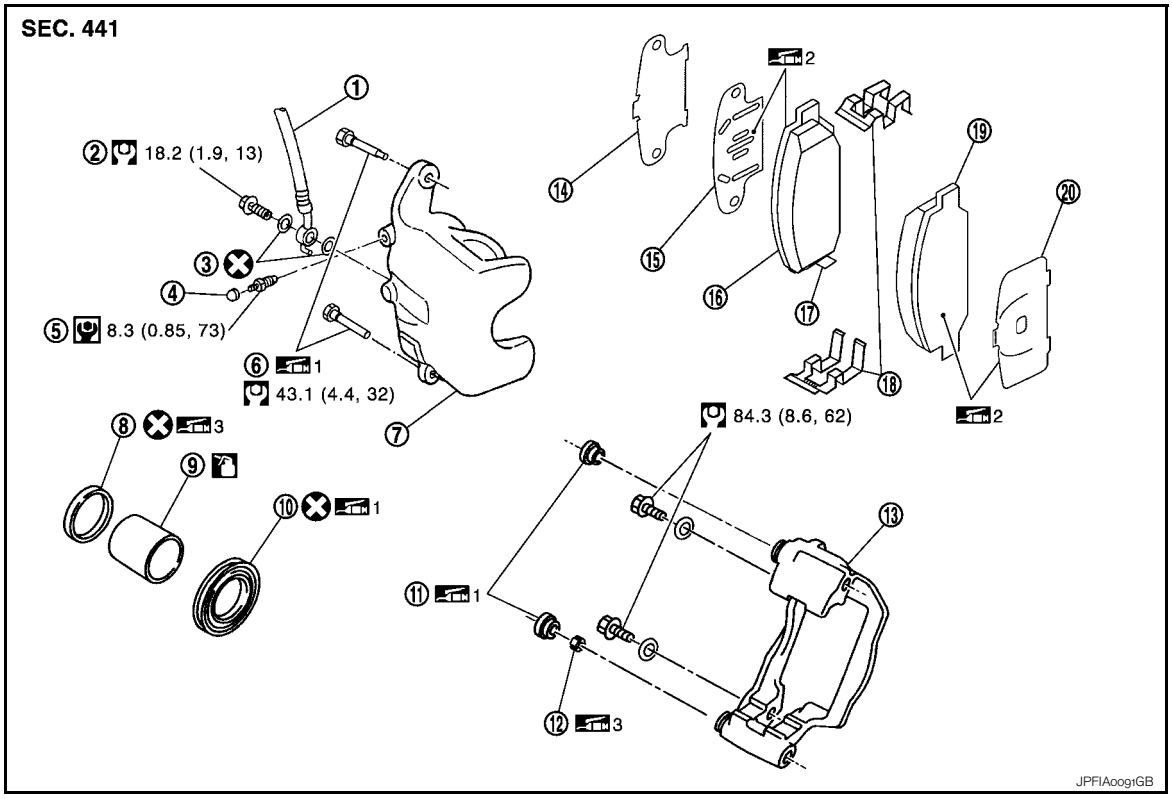
- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000000938093



1. Brake hose
2. Union bolt
3. Copper washer
4. Cap
5. Bleeder valve
6. Sliding pin bolt
7. Cylinder body
8. Piston seal
9. Piston
10. Piston boot
11. Sliding pin boot
12. Bushing
13. Torque member
14. Inner shim cover
15. Inner shim
16. Inner pad
17. Pad wear sensor (RH inner side only)
18. Pad retainer
19. Outer pad
20. Outer shim

1: Apply rubber grease.

2: Apply copper based brake grease.

3: Apply polyglycol ether based lubricant.

cardiagn.com

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

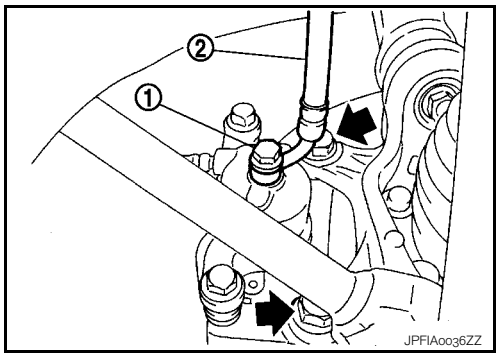
BRAKE CALIPER ASSEMBLY : Removal and Installation

INFOID:0000000000938094

REMOVAL

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Remove tires.
2. Fix the disc rotor using wheel nuts.
3. Drain brake fluid. Refer to BR-11, "Draining".
   CAUTION:
   Never spill or splash brake fluid on the disc rotor.
4. Remove union bolt (1) and then disconnect brake hose (2) from caliper assembly.
5. Remove torque member mounting bolts, and remove brake caliper assembly.
   CAUTION:
   Never drop brake pads and caliper assembly.
6. Remove disc rotor.
   CAUTION:
   - **Put matching marks on the wheel hub and bearing assembly and the disc rotor before removing the disc rotor.**
   - **Never drop disc rotor.**



INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Install disc rotor.
   CAUTION:
   Align the matching marks made during removal when reusing the disc rotor.
2. Install the brake caliper assembly to the vehicle and tighten the torque member mounting bolts to the specified torque.
   CAUTION:
   Never spill or splash any grease and moisture on the brake caliper assembly mounting face, threads, mounting bolts, and washers. Wipe out any grease and moisture.
3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque.
4. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   - **Never reuse drained brake fluid.**
   - **Never spill or splash brake fluid on the disc rotor.**
5. Check that no drag feel is present for the rear disc brake.
6. Install tires.

BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

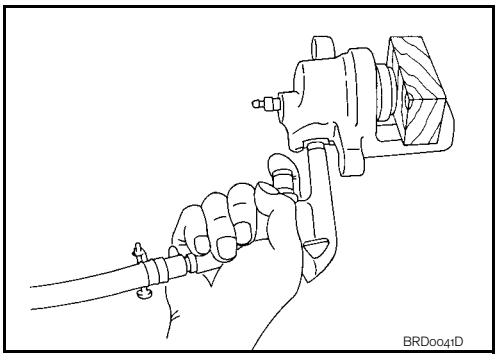
INFOID:0000000000938095

DISASSEMBLY

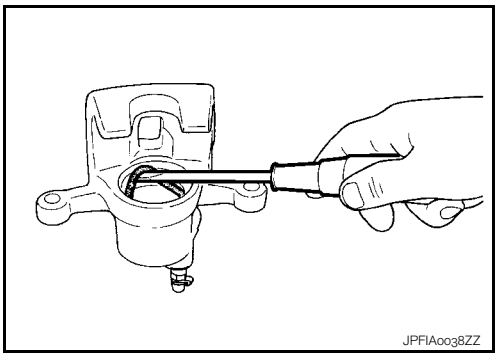
NOTE:
Never remove the torque member, brake pads, shims, shim cover and pad retainers disassembling and assembling the cylinder body.

cardiagn.com

1. Remove the sliding pin bolts and remove the cylinder body from the torque member.
   CAUTION:
   Never drop pads, shims, shim cover and pad retainers from torque member.
2. Remove sliding pin boots from torque member.
3. Remove bushing from sliding pin bolt.
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.
   CAUTION:
   Never get fingers caught in the piston.

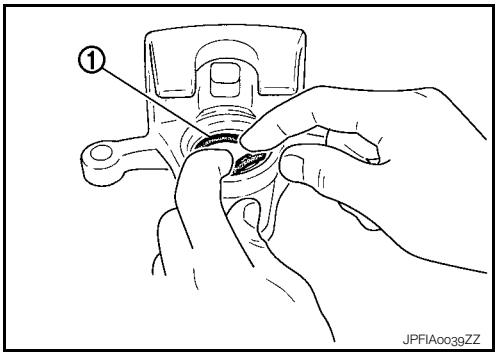


5. Remove piston seal from cylinder body using suitable tool.
   CAUTION:
   Be careful not to damage a cylinder inner wall.

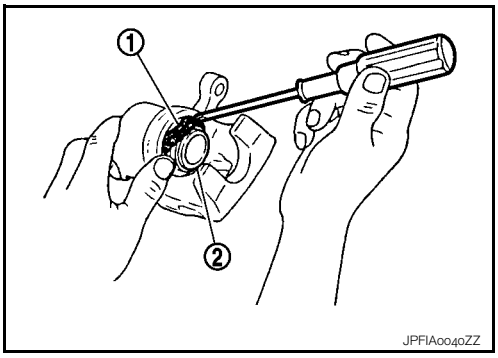


ASSEMBLY

1. Apply polyglycol ether based lubricant to piston seal (1), and install to cylinder body.
   CAUTION:
   Never reuse piston seal.

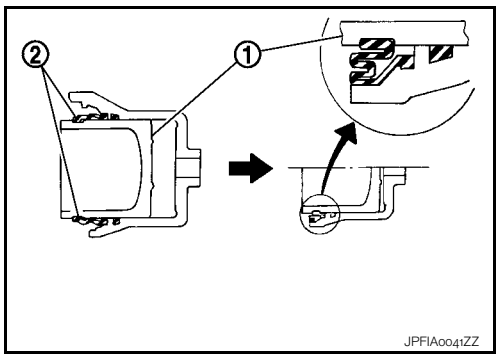


2. Apply rubber grease to piston boot (1). Cover the piston (2) end with the piston boot, and then install cylinder side lip on the piston boot securely into the groove on cylinder body.
   CAUTION:
   Never reuse piston boot.



cardiagn.com

3. Apply brake fluid to piston (1). Push piston into cylinder body by hand and push piston boot (2) piston side lip into the piston groove.
CAUTION:
Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.
4. Apply polyglycol ether based lubricant to bushing, install bushing to sliding pin bolt.
5. Apply rubber grease to the sliding pin bolts and the sliding pin boots, install sliding pin boot to torque member.
6. Install the cylinder body to the torque member and tighten the sliding pin bolts to the specified torque.



BRAKE CALIPER ASSEMBLY : Inspection and Adjustment

INFOID:0000000000938096

INSPECTION AFTER DISASSEMBLY

Cylinder Body

Check the inner wall of the cylinder for rust, wear, cracks or damage. Replace the cylinder if any abnormal condition is detected.

CAUTION:
Always clean with new brake fluid. Never clean with mineral oil such as gasoline and light oil.

Torque Member

Check the torque member for rust, wear, cracks or damage. Replace the member if any abnormal condition is detected.

Piston

Check the piston for rust, wear, cracks or damage. Replace the piston if any abnormal condition is detected.

CAUTION:
A piston sliding surface is plated. Never polish with sandpaper.

Sliding Pin Bolt and Sliding Pin Boot

Check the sliding pin bolts and sliding pin boots for rust, wear, cracks or damage. Replace the parts if any abnormal condition is detected.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between disc rotors and pads according to the following procedure after refinishing or replacing disc rotor, or if a soft pedal occurs at very low mileage.

CAUTION:
- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000000938097

Unit: mm (in.)

Front brake	Cylinder bore diameter	60.33 (2.375)
	Pad length × width × thickness	123.6 × 47.5 × 11.0 (4.87 × 1.870 × 0.433)
	Rotor outer diameter × thickness	296 × 26.0 (11.65 × 1.024)
Rear brake	Cylinder bore diameter	34.93 (1.375)
	Pad length × width × thickness	83.0 × 31.9 × 8.5 (3.268 × 1.256 × 0.335)
	Rotor outer diameter × thickness	292 × 9.0 (11.50 × 0.354)
Master cylinder	Cylinder bore diameter	23.8 (15/16)
Control valve	Valve type	Electric brake force distribution
Brake booster	Diaphragm diameter	250 (9.8)
Recommended brake fluid		DOT 4

Brake Pedal

INFOID:0000000000938098

Unit: mm (in.)

Brake pedal height (H_1)	130.2 – 140.2 (5.13 – 5.52)
Clearance (C) between bracket and ASCD cancel switch/stop lamp switch threaded end	0.74 – 1.96 (0.0291 – 0.0772)
Brake pedal play (A)	—
Depressed brake pedal height (H_2) [Depressing 490 N (50 kg, 110 lb) while turning the engine ON]	—

Brake Booster

INFOID:0000000000938099

Vacuum type

Unit: mm (in.)

Output rod length (A)	30.5 (1.201)
Input rod length (B)	124.5 – 125.5 (4.90 – 4.94)

Front Disc Brake

INFOID:0000000000938100

Unit: mm (in.)

Brake pad	Standard thickness	11.0 (0.433)
	Wear limit thickness	2.0 (0.079)
Disc rotor	Standard thickness	26.0 (1.024)
	Wear limit thickness	24.0 (0.945)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	0.035 (0.0014)

Rear Disc Brake

INFOID:0000000000938101

Unit: mm (in.)

Brake pad	Standard thickness	8.5 (0.335)
	Wear limit thickness	2.0 (0.079)

cardiagn.com

Disc rotor	Standard thickness	9.0 (0.354)
	Wear limit thickness	8.0 (0.315)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	—

cardiagn.com

SECTION CHG
CHARGING SYSTEM

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3

K9K MODELS 3
K9K MODELS : Work Flow 3

HR16DE/MR20DE MODELS 4
HR16DE/MR20DE MODELS : Work Flow 4

FUNCTION DIAGNOSIS 8

CHARGING SYSTEM 8
System Diagram 8
System Description 9
Component Parts Location 9
Component Description 9

COMPONENT DIAGNOSIS 10

B TERMINAL CIRCUIT 10
Description 10
Diagnosis Procedure 10

L TERMINAL CIRCUIT (OPEN) 11
Description 11
Diagnosis Procedure 11

L TERMINAL CIRCUIT (SHORT) 13
Description 13
Diagnosis Procedure 13

S TERMINAL CIRCUIT 14
Description 14
Diagnosis Procedure 14

CHARGING SYSTEM 15
Wiring Diagram - CHARGING SYSTEM (GASOLINE ENGINE MODELS) - 15
Wiring Diagram - CHARGING SYSTEM (DIESEL ENGINE MODELS) - 18

SYMPTOM DIAGNOSIS 21

CHARGING SYSTEM 21
Symptom Table 21

PRECAUTION 22

PRECAUTIONS 22
Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 22

PREPARATION 23

PREPARATION 23
Special Service Tool 23

ON-VEHICLE MAINTENANCE 24

CHARGING SYSTEM PRELIMINARY INSPECTION 24
Inspection Procedure 24

ON-VEHICLE REPAIR 25

ALTERNATOR 25

K9K MODELS 25
K9K MODELS : Exploded View 25
K9K MODELS : Removal and Installation 25

HR16DE MODELS 25
HR16DE MODELS : Exploded View 25
HR16DE MODELS : Removal and Installation 27
HR16DE MODELS : Disassembly and Assembly 27
HR16DE MODELS : Inspection 28

MR20DE MODELS 29
MR20DE MODELS : Exploded View 29
MR20DE MODELS : Removal and Installation 30
MR20DE MODELS : Disassembly and Assembly 31
MR20DE MODELS : Inspection 32

SERVICE DATA AND SPECIFICATIONS (SDS) 34

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS) 34

Alternator 34

cardiagn.com

BASIC INSPECTION

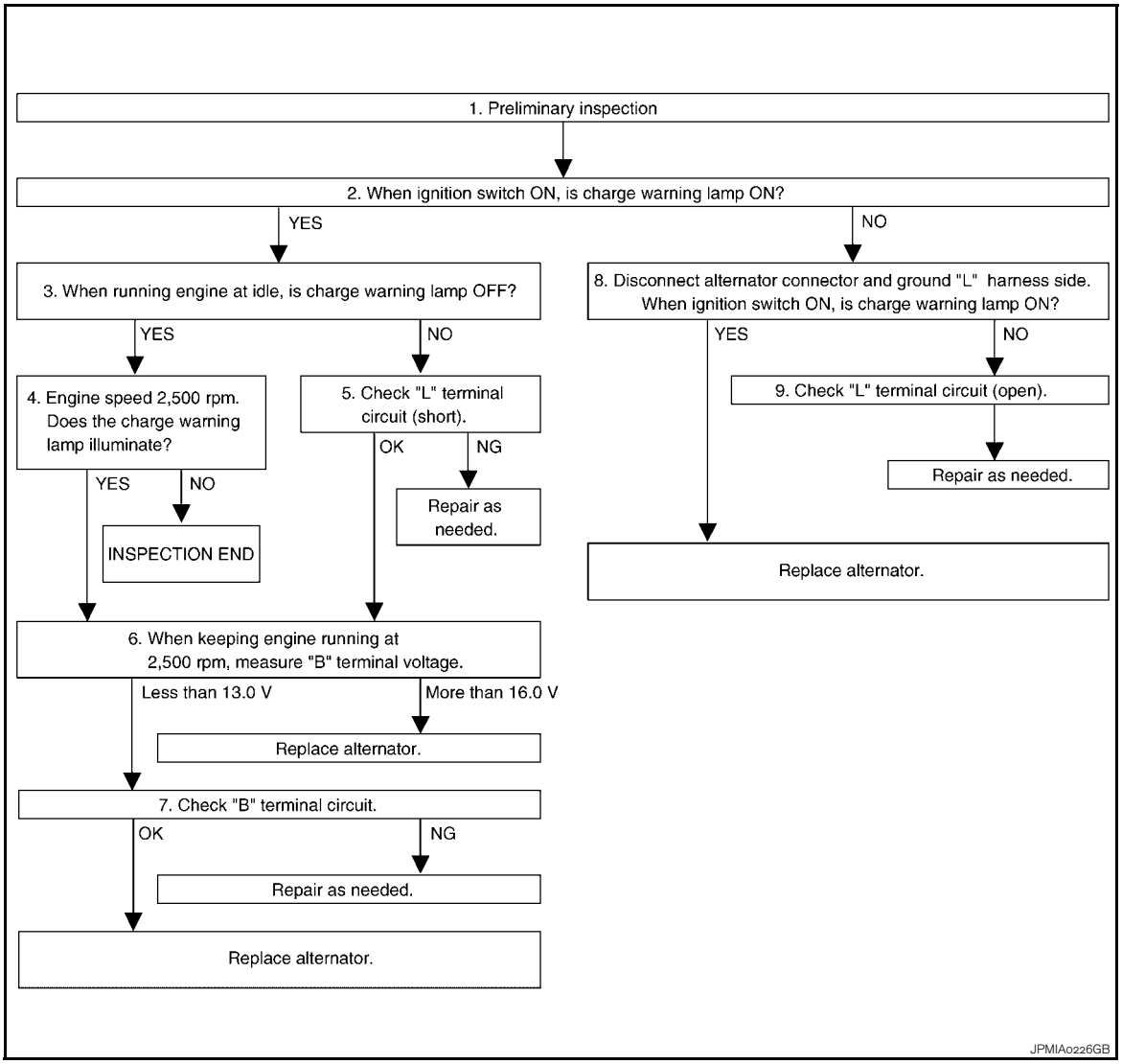
DIAGNOSIS AND REPAIR WORKFLOW

K9K MODELS

K9K MODELS : Work Flow

INFOID:0000000000955234

OVERALL SEQUENCE



DETAILED FLOW

1.PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to CHG-24, "Inspection Procedure" .

>> GO TO 2.

2.INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 3.
NO >> GO TO 8.

3.INSPECTION WITH CHARGE WARNING LAMP (IDLING)

cardiagn.com

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 4.
NO >> GO TO 5.

4. INSPECTION WITH CHARGE WARNING LAMP (ENGINE AT 2,500 RPM)

Increase and maintain the engine speed at 2,500 rpm.

Does the charge warning lamp illuminate?

YES >> GO TO 6.
NO >> INSPECTION END

5. "L" TERMINAL CIRCUIT (SHORT) INSPECTION

Check "L" terminal circuit (short). Refer to CHG-13, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair as needed.

6. MEASURE "B" TERMINAL VOLTAGE

Engine start. When keeping engine running at 2,500 rpm, measure "B" terminal voltage.

What voltage does the measurement result show?

Less than 13.0 V>>GO TO 7.
More than 16.0 V>>Replace alternator.

7. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-10, "Diagnosis Procedure" .

Is the inspection result normal?

YES >> Replace alternator.
NO >> Repair as needed.

8. INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

1. Disconnect alternator connector and ground "L" harness side.
2. Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> Replace alternator.
NO >> GO TO 9.

9. CHECK "L" TERMINAL CIRCUIT (OPEN)

Check "L" terminal circuit (open). Refer to CHG-11, "Diagnosis Procedure".

>> Repair as needed.

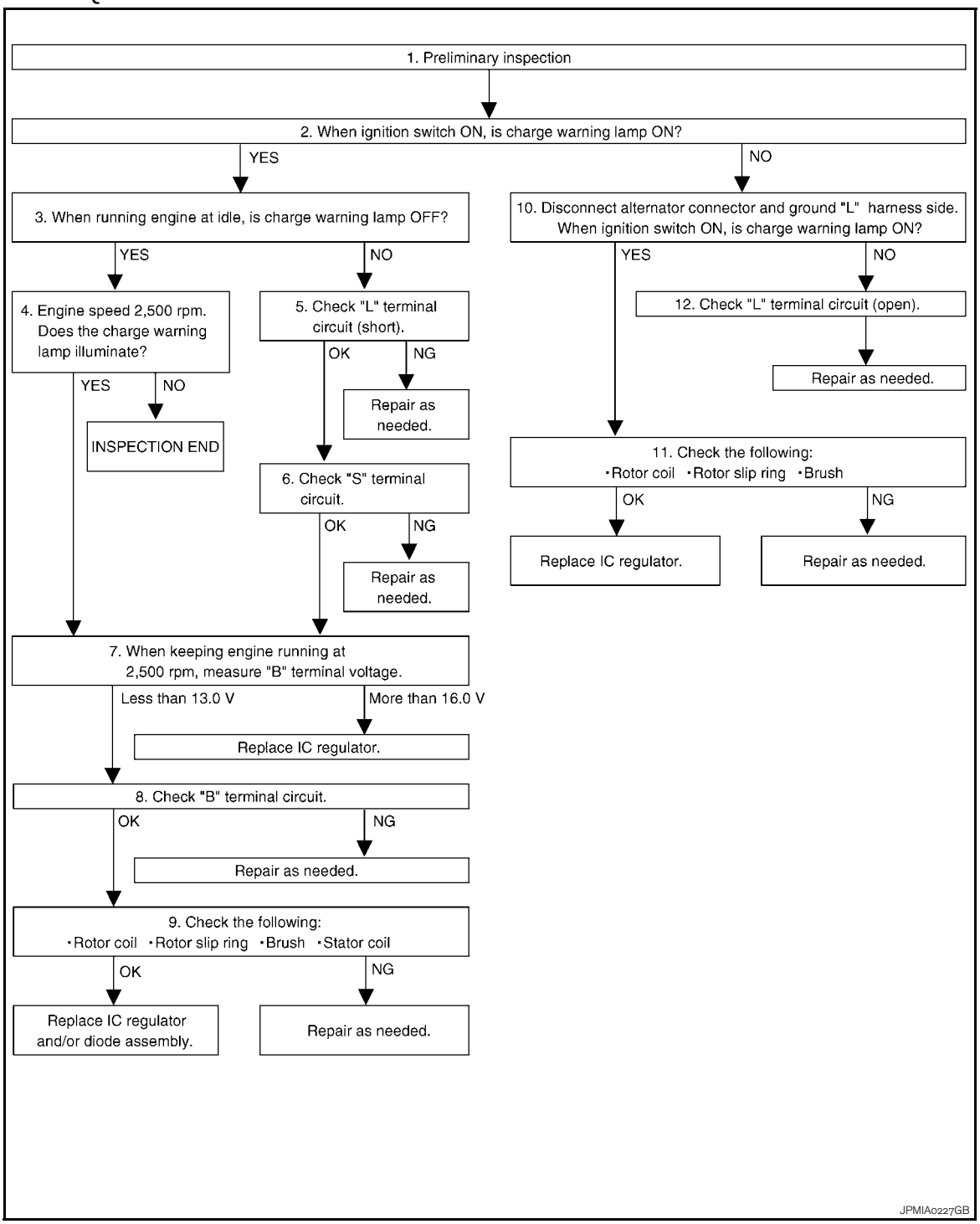
HR16DE/MR20DE MODELS

HR16DE/MR20DE MODELS : Work Flow

INFOID:0000000000987910

cardiagn.com

OVERALL SEQUENCE



DETAILED FLOW

1.PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to CHG-24, "Inspection Procedure" .

>> GO TO 2.

2.INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 3.

cardiagn.com

NO >> GO TO 10.

3. INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 4.
NO >> GO TO 5.

4. INSPECTION WITH CHARGE WARNING LAMP (ENGINE AT 2,500 RPM)

Increase and maintain the engine speed at 2,500 rpm.

Does the charge warning lamp illuminate?

YES >> GO TO 7.
NO >> INSPECTION END

5. "L" TERMINAL CIRCUIT (SHORT) INSPECTION

Check "L" terminal circuit (short). Refer to CHG-13, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair as needed.

6. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to CHG-14, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair as needed.

7. MEASURE "B" TERMINAL VOLTAGE

Start engine. When keeping engine running at 2,500 rpm, measure "B" terminal voltage.

What voltage does the measurement result show?

Less than 13.0 V>>GO TO 8.
More than 16.0 V>>Replace IC regulator.

8. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-10, "Diagnosis Procedure" .

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair as needed.

9. DISASSEMBLE AND CHECK ALTERNATOR

Check the following conditions. Refer to CHG-28, "HR16DE MODELS : Inspection" (HR engine models) or CHG-32, "MR20DE MODELS : Inspection" (MR engine models)

- Rotor coil
- Rotor slip ring
- Brush
- Stator coil

Are these normal?

YES >> Replace IC regulator and/or diode assembly.
NO >> Repair as needed.

10. INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

1. Disconnect alternator connector and ground "L" harness side.
2. Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 11.
NO >> GO TO 12.

11. DISASSEMBLE AND CHECK ALTERNATOR

cardiagn.com

Check the following conditions. Refer to CHG-28, "HR16DE MODELS : Inspection" (HR engine models) or CHG-32, "MR20DE MODELS : Inspection" (MR engine models)

- Rotor coil
- Rotor slip ring
- Brush

Are these normal?

YES >> Replace IC regulator.
NO >> Repair as needed.

12. CHECK “L” TERMINAL CIRCUIT (OPEN)

Check “L” terminal circuit (open). Refer to CHG-11, "Diagnosis Procedure".

>> Repair as needed.

cardiagn.com

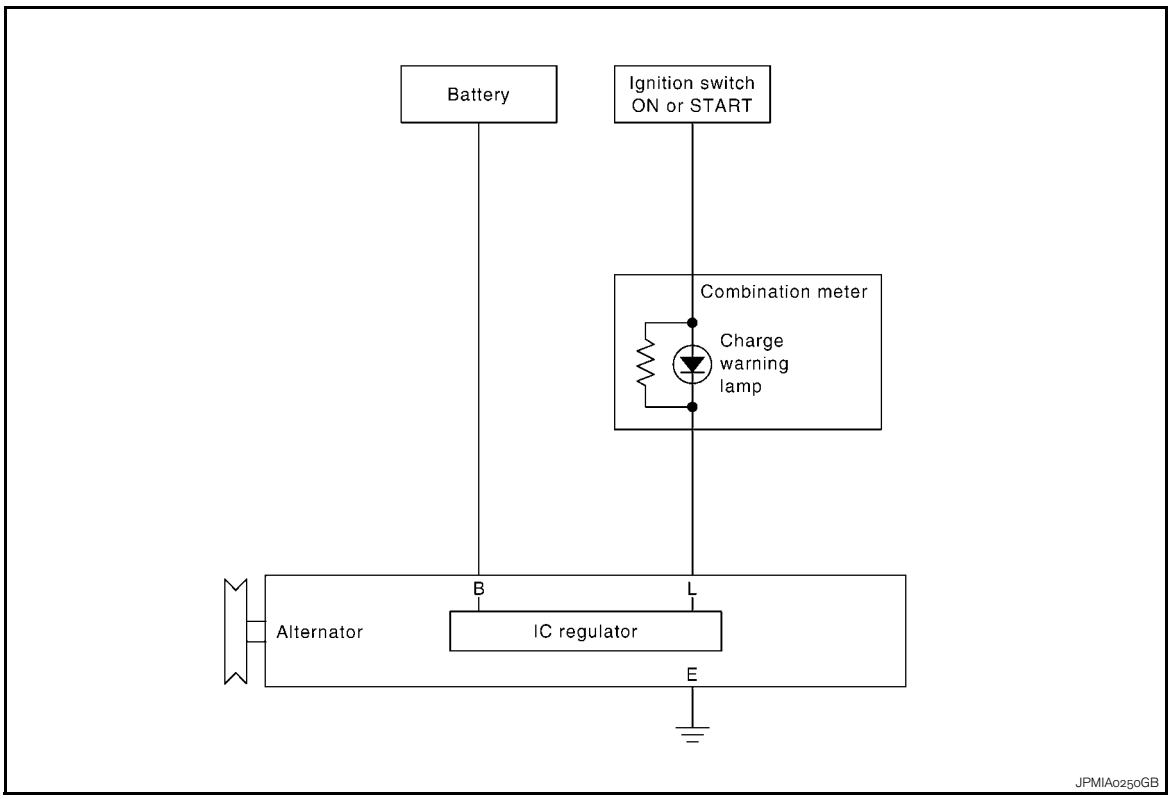
FUNCTION DIAGNOSIS

CHARGING SYSTEM

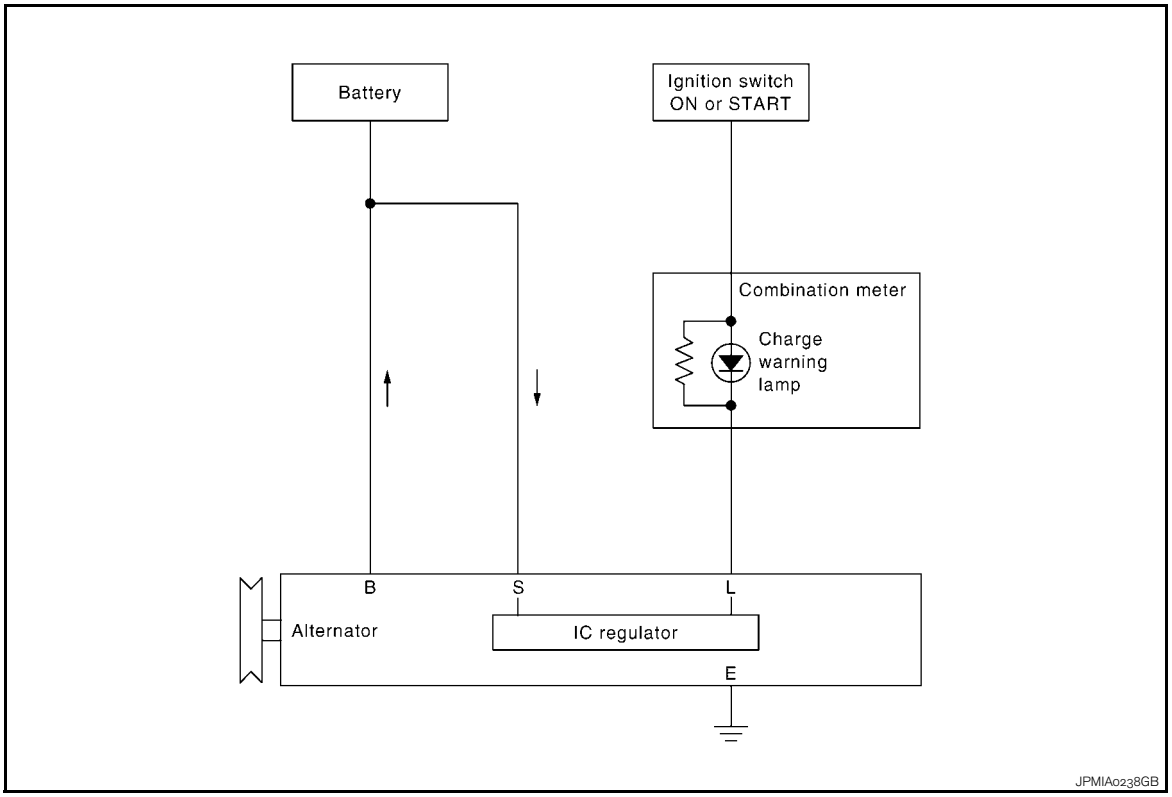
System Diagram

INFOID:0000000000955235

K9K models



HR16DE/MR20DE models



cardiagn.com

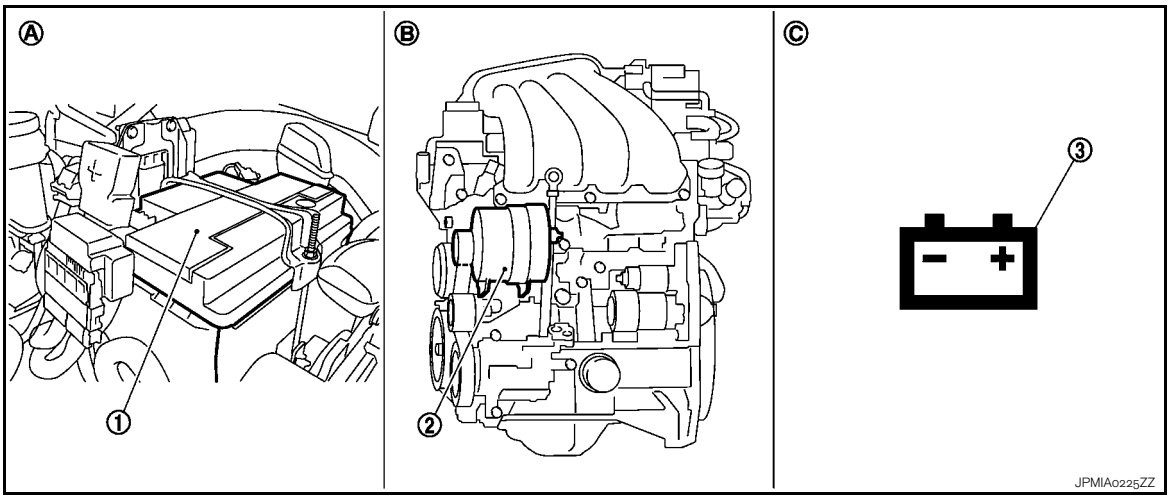
System Description

INFOID:0000000000955236

The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC regulator.

Component Parts Location

INFOID:0000000000955237



1. Battery
2. Alternator
3. Charge warning lamp
A. Engine room (left side)
B. Engine
C. Combination meter

Component Description

INFOID:0000000000955238

Component part		Description
Alternator	“B” terminal	Refer to CHG-10, "Description".
	“S” terminal (HR16DE/MR20DE models only)	Refer to CHG-14, "Description".
	“L” terminal	Refer to CHG-11, "Description".
Combination meter (Charge warning lamp)		The IC regulator warning function activates to illuminate the charge warning lamp, if any of the following symptoms occur while alternator is operating: • Excessive voltage is produced. • No voltage is produced.

cardiagn.com

COMPONENT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:0000000000955243

"B" terminal circuit supplies power to charge the battery and to operate the vehicle's electrical system.

Diagnosis Procedure

INFOID:0000000000955244

1.CHECK "B" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if "B" terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair "B" terminal connection.

2.CHECK "B" TERMINAL CIRCUIT

Check voltage between alternator "B" terminal and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Alternator "B" terminal	Terminal		
F59 (K9K) F14 (HR16DE/MR20DE)	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness for open between alternator and fusible link.

3.CHECK "B" TERMINAL CONNECTION (VOLTAGE DROP TEST)

1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and alternator "B" terminal.

Terminals			Voltage (Approx.)
(+)	(–)		
	Alternator "B" terminal	Terminal	
Battery positive terminal	F59 (K9K) F14 (HR16DE/MR20DE)	1	Less than 0.2 V

Is the inspection result normal?

YES >> "B" terminal circuit is normal. Refer to CHG-3, "K9K MODELS : Work Flow" (K9K models) or CHG-4, "HR16DE/MR20DE MODELS : Work Flow" (HR16DE/MR20DE models).
NO >> Check harness between battery and alternator for poor continuity.

cardiagn.com

L TERMINAL CIRCUIT (OPEN)

Description

INFOID:0000000000955245

The “L” terminal circuit controls the charge warning lamp. The charge warning lamp illuminates when the ignition switch is set to ON or START. When the alternator is providing sufficient voltage with the engine running, the charge warning lamp will go off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:0000000000955246

1.CHECK “L” TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if “L” terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair “L” terminal connection.

2.CHECK “L” TERMINAL CIRCUIT (OPEN)

1. Disconnect alternator connector.
2. Apply ground to alternator connector harness connector terminal.
3. Check condition of the charge warning lamp with the ignition switch in the ON position.

- K9K models

Alternator harness connector	Terminal	Ground	Condition	
			Ignition switch position	Charge warning lamp
F60	4		ON	Illuminate

- HR16DE/MR20DE models

Alternator harness connector	Terminal	Ground	Condition	
			Ignition switch position	Charge warning lamp
F15	3		ON	Illuminate

Does it illuminate?

YES >> “L” terminal circuit is normal. Refer to CHG-3, "K9K MODELS : Work Flow" (K9K models) or CHG-4, "HR16DE/MR20DE MODELS : Work Flow" (HR16DE/MR20DE models).
NO >> GO TO 3.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the battery cable from the negative terminal.
2. Disconnect the combination meter connector.
3. Check continuity between alternator harness connector and combination meter harness connector.

- K9K engine models

Alternator harness connector		Combination meter harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
F60	4	M34	25	Existed

- HR engine/MR engine models

Alternator harness connector		Combination meter harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
F15	3	M34	25	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair the harness or connector.

cardiagn.com

4. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check continuity between combination meter harness connector M34 terminal 2 and 10A fuse [No.4, located in the fuse block(J/B)].

Does continuity exist?

YES >> GO TO 5.
NO >> Repair the harness.

5. CHECK POWER SUPPLY CIRCUIT

1. Connect the battery cable to the negative terminal.
2. Check voltage between combination meter harness connector and ground.

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Combination meter harness connector	Terminal			
M34	2	Ground	When the ignition switch is in ON position	Battery voltage

Is the inspection result normal?

YES >> Replace combination meter.
NO >> Inspect the power supply circuit. Refer to PG-47, "Wiring Diagram - IGNITION POWER SUPPLY - ".

cardiagn.com

L TERMINAL CIRCUIT (SHORT)

Description

INFOID:0000000000955247

The “L” terminal circuit controls the charge warning lamp. The charge warning lamp illuminates when the ignition switch is set to ON or START. When the alternator is providing sufficient voltage with the engine running, the charge warning lamp will go off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:0000000000955248

1.CHECK “L” TERMINAL CIRCUIT (SHORT)

1. Turn ignition switch OFF.
2. Disconnect alternator harness connector.
3. Turn ignition switch ON.

Does charge warning lamp illuminate?

YES >> GO TO 2.
NO >> Refer to CHG-3, "K9K MODELS : Work Flow" (K9K models) or CHG-4, "HR16DE/MR20DE MODELS : Work Flow" (HR16DE/MR20DE models).

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect combination meter connector.
4. Check continuity between combination meter harness connector and ground.

Combination meter harness connector		Ground	Continuity
Connector No.	Terminal No.		
M34	25		Not existed

Is the inspection result normal?

YES >> Replace combination meter.
NO >> Repair the harness.

cardiagn.com

S TERMINAL CIRCUIT

Description

INFOID:0000000000955249

The output voltage of the alternator is controlled by the IC regulator at the “S” terminal detecting the input voltage.
The “S” terminal circuit detects the battery voltage to adjust the alternator output voltage with the IC regulator.

Diagnosis Procedure

INFOID:0000000000955250

1.CHECK “S” TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if “S” terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair “S” terminal connection.

2.CHECK “S” TERMINAL CIRCUIT

Check voltage between alternator harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Alternator harness connector	Terminal		
F15	4	Ground	Battery voltage

Is the inspection result normal?

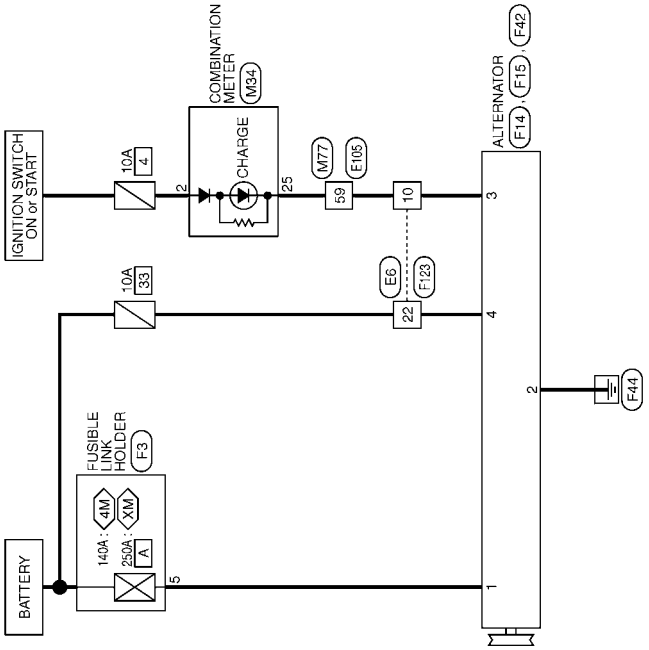
YES >> Refer to CHG-4, "HR16DE/MR20DE MODELS : Work Flow" .
NO >> Check harness for open between alternator and fuse.

cardiagn.com

CHARGING SYSTEM

Wiring Diagram - CHARGING SYSTEM (GASOLINE ENGINE MODELS) - INFOID:0000000000955251

4M : With HR engine and 4WD models with M/T
XM : Except HR engine and 4WD models with M/T



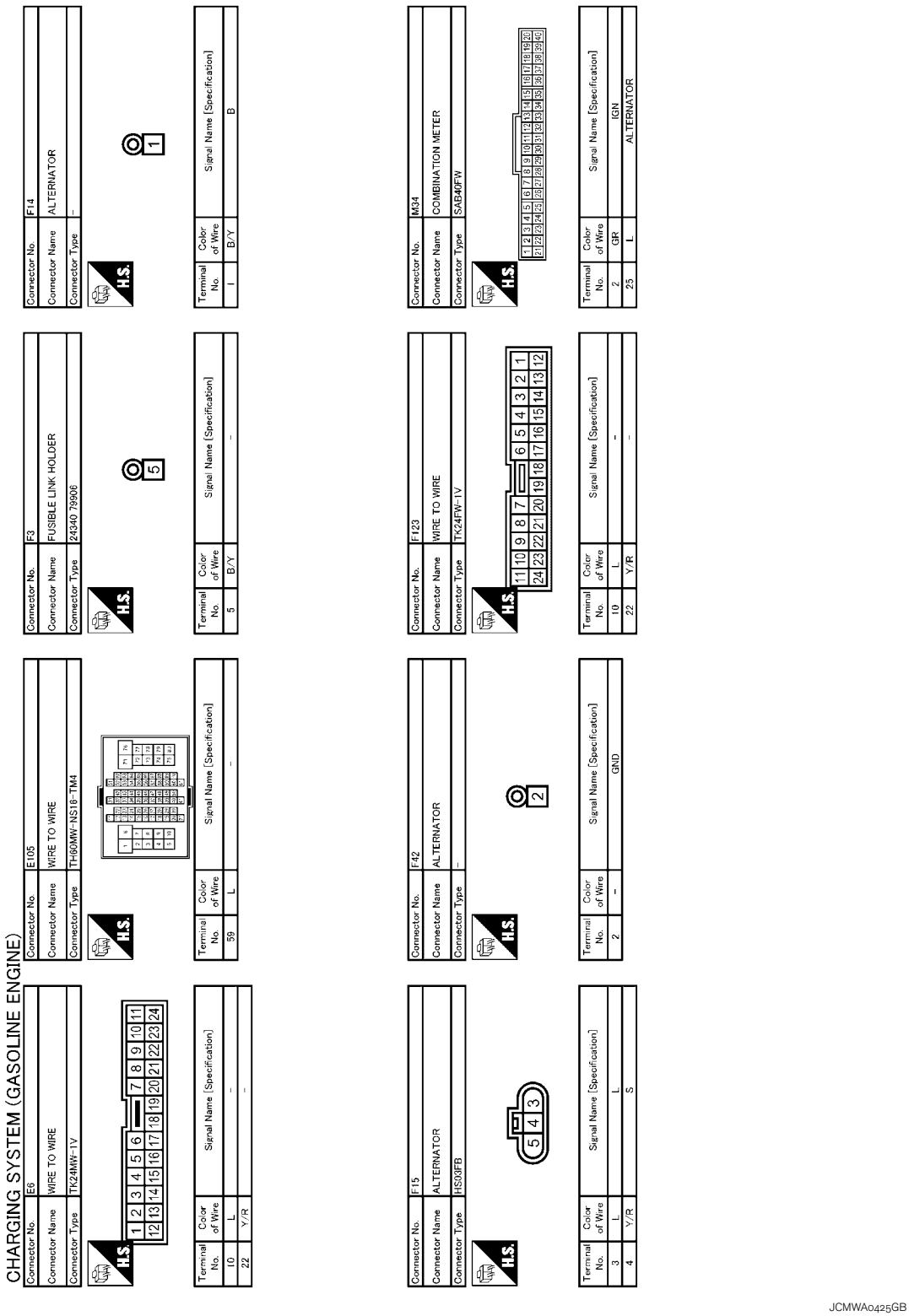
CHARGING SYSTEM (GASOLINE ENGINE)

2006/12/08

JCMWA0424GB

cardiagn.com

CHARGING SYSTEM (GASOLINE ENGINE)

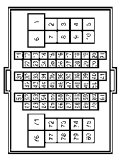


JCMWA0425GB

cardiagn.com

CHARGING SYSTEM (GASOLINE ENGINE)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



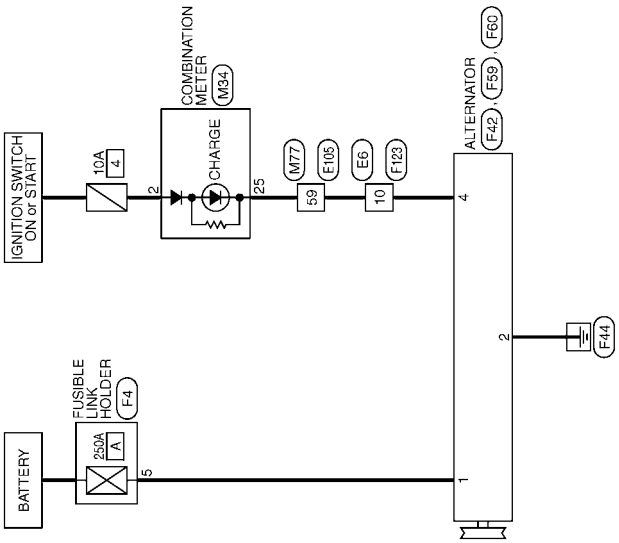
Terminal No.	Color of Wire	Signal Name [Specification]
39	L	-

JCMWA0426GB

cardiagn.com

Wiring Diagram - CHARGING SYSTEM (DIESEL ENGINE MODELS) -

INFOID:0000000001125401



CHARGING SYSTEM (DIESEL ENGINE)

2006/12/08

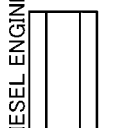
JCMWA0427GB

cardiagn.com

CHARGING SYSTEM (DIESEL ENGINE)

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1Y

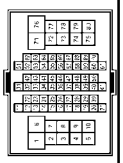
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
10	L	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
59	L	–

Connector No.	F4
Connector Name	FUSIBLE LINK HOLDER
Connector Type	24348 51E09

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B/Y	–

Connector No.	F42
Connector Name	ALTERNATOR
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	–	GND

Connector No.	F59
Connector Name	ALTERNATOR
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	L

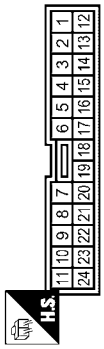
Connector No.	F60
Connector Name	ALTERNATOR
Connector Type	FEA02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	L	S

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1Y

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
10	L	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

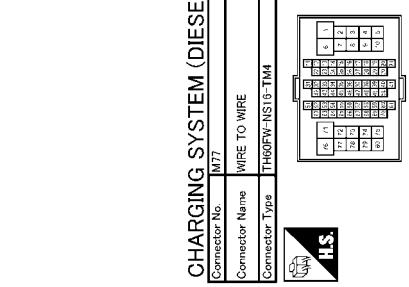
Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	IGN
25	L	ALTERNATOR

JCMWA0428GB

cardiagn.com

CHARGING SYSTEM (DIESEL ENGINE)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
59	L	–

JCMWA0429GB

cardiagn.com

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:0000000000955252

Symptom	Reference
Discharged battery	Refer to CHG-3, "K9K MODELS : Work Flow" (K9K models) or CHG-4, "HR16DE/MR20DE MODELS : Work Flow" (HR16DE/MR20DE models).
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charge warning lamp turns ON when increasing the engine speed.	

cardiagn.com

PRECAUTION

PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000955253

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

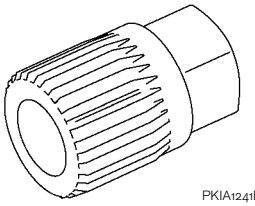
cardiagn.com

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000000984722

Tool number Tool name	Description
KV10118200 Alternator pulley adapter  PKIA1241E	Removing and installing alternator pulley

cardiagn.com

ON-VEHICLE MAINTENANCE

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:0000000000955256

1.CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals are clean and tight.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair battery terminals connection.

2.CHECK FUSE

Check for blown fuse and fusible link.

- K9K engine models

Unit	Power source (Power supply terminals)	Fuse No.
Combination meter	Ignition switch ON (“L” terminal)	4

- HR engine/MR engine models

Unit	Power source (Power supply terminals)	Fuse No.
Alternator	Battery (“S” terminal)	33
Combination meter	Ignition switch ON (“L” terminal)	4

Is the inspection result normal?

YES >> GO TO 3.
NO >> Be sure to eliminate the cause of malfunction before installing new fuse.

3.CHECK “E” TERMINAL CONNECTION

Check if “E” terminal (alternator ground harness) is clean and tight.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair “E” terminal connection.

4.CHECK DRIVE BELT TENSION

Check drive belt tension. Refer to EM-259, "Inspection and Adjustment"(K9K), EM-15, "Checking"(HR16DE) or EM-134, "Checking"(MR20DE).

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair as needed.

cardiagn.com

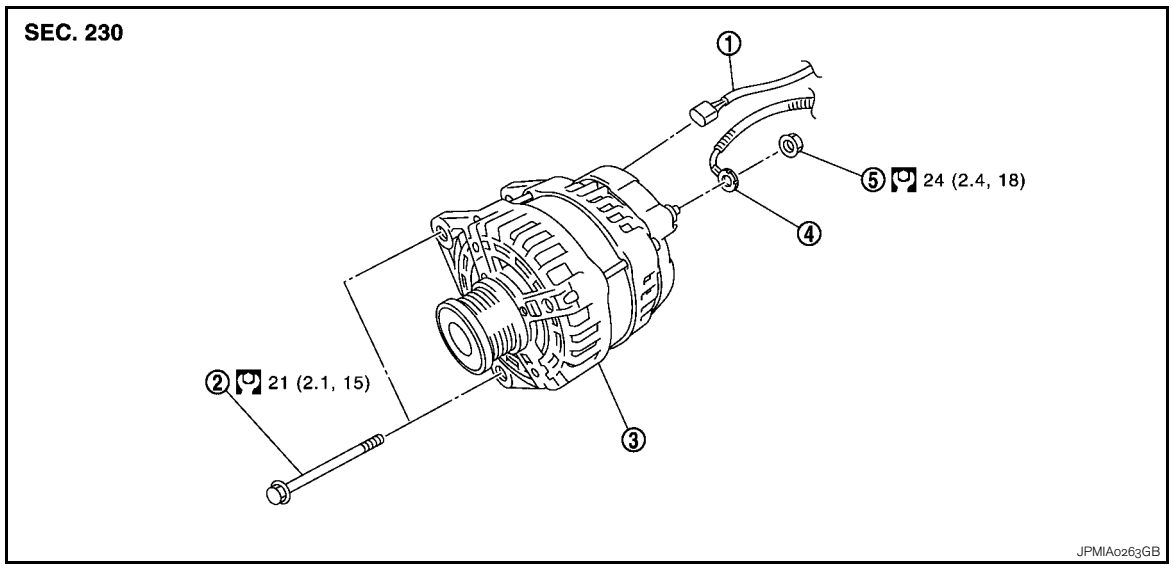
ON-VEHICLE REPAIR

ALTERNATOR

K9K MODELS

K9K MODELS : Exploded View

INFOID:0000000000955258



1. Alternator connector
2. Alternator mounting bolt
3. Alternator
4. “B” terminal harness
5. “B” terminal nut

Refer to GI-4, "Components" for symbols in the figure.

K9K MODELS : Removal and Installation

INFOID:0000000000955259

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove RH fender protector partially.
3. Remove fuel injection pipe protector.
4. Remove drive belt. Refer to EM-259, "Removal and Installation".
5. Disconnect alternator connector.
6. Remove “B” terminal nut and “B” terminal harness.
7. Remove upper alternator mounting bolt.
8. Release lower alternator mounting bolt, then push it aside.
9. Remove alternator with lower mounting bolt.
   NOTE:
   Pull alternator to the front side from upside. Turn, then pull lower side of alternator with lower mounting bolt.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Be sure to tighten “B” terminal nut carefully.

- Install alternator, and check tension of belt. Refer to EM-259, "Inspection and Adjustment".

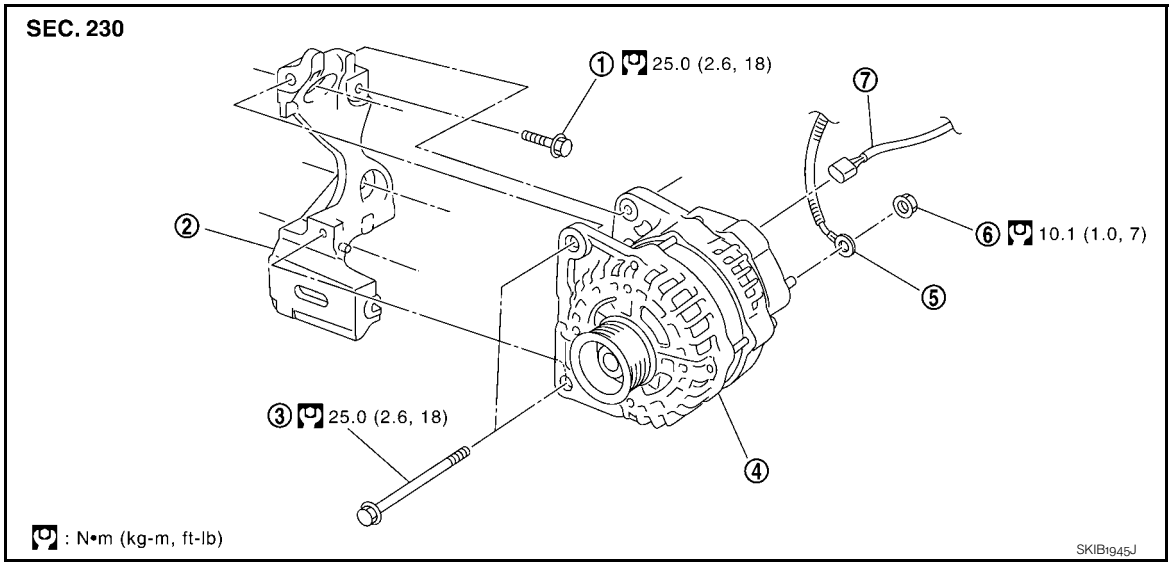
HR16DE MODELS

HR16DE MODELS : Exploded View

INFOID:0000000000955726

REMOVAL

cardiagn.com

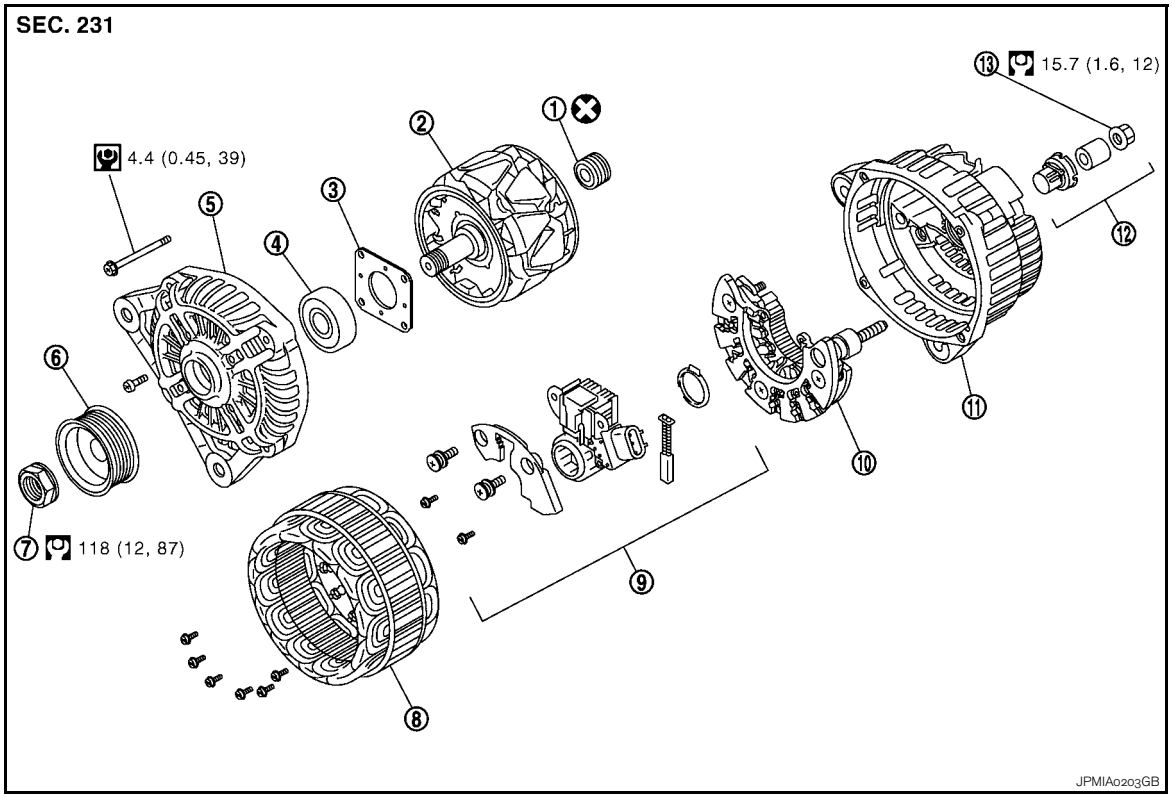


1. Alternator bracket mounting bolt
2. Alternator bracket
3. Alternator mounting bolt
4. Alternator
5. “B” terminal harness
6. “B” terminal nut
7. Alternator connector

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY

Type: A2TJ0291ZE



1. Rear bearing
2. Rotor assembly
3. Retainer
4. Front bearing
5. Front bracket assembly
6. Pulley
7. Pulley nut
8. Stator assembly
9. IC voltage regulator assembly
10. Diode assembly
11. Rear bracket assembly
12. Terminal set

cardiagn.com

13. “B” terminal nut

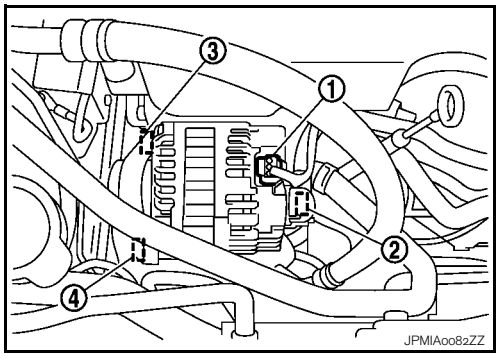
Refer to GI-4, "Components" for symbols in the figure.

HR16DE MODELS : Removal and Installation

INFOID:0000000000955727

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove drive belt. Refer to EM-16, "Removal and Installation".
3. Disconnect alternator connector (1).
4. Remove “B” terminal nut (2) and “B” terminal harness.
5. Remove upper alternator mounting bolt (3) and alternator lower mounting bolt (4).
6. Remove alternator upward from the vehicle.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

Be sure to tighten “B” terminal nut carefully.

- Temporarily tighten the alternator bolts in order from the lower to the upper, and then tighten them in order from the upper to the lower.

  CAUTION:

  For the alternator, the front side (pulley side) surface is the reference surface. Fit the reference surface to the alternator mounting part, and then tighten the bolts.
- Install alternator, and check tension of belt. Refer to EM-15, "Checking".

HR16DE MODELS : Disassembly and Assembly

INFOID:0000000000967571

DISASSEMBLY

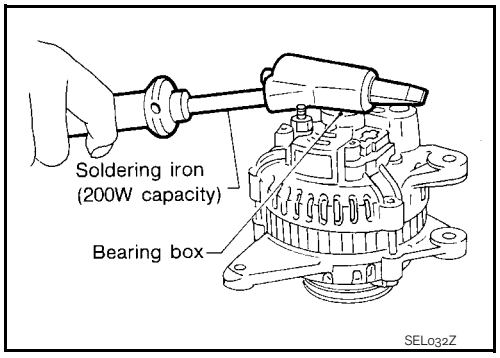
Rear Cover

NOTE:

Rear cover may be hard to remove because a ring is used to lock outer race of rear bearing. To facilitate removal of rear cover, heat only the bearing box section until the temperature increases to approximately 30°C (86°F) with a soldering iron (200W capacity).

CAUTION:

Never use a heat gun, as if can damage diode assembly.



ASSEMBLY

Rear Bearing

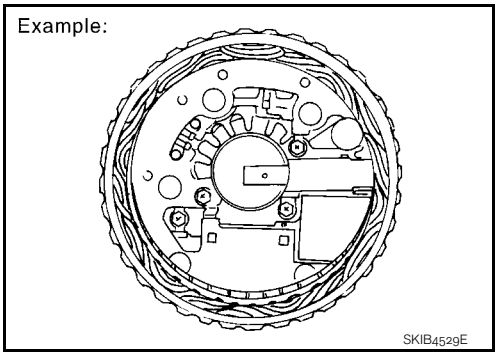
CAUTION:

- **Never reuse rear bearing. Replace with a new one.**
- **Never lubricate rear bearing outer race.**

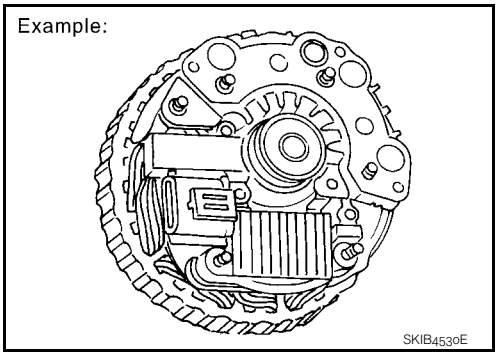
Rear Cover Installation

cardiagn.com

1. Fit brush assembly, diode assembly, regulator assembly and stator.



2. Push brushed up with fingers and install them to rotor.
NOTE:
Take care not damage slip ring sliding surface.



HR16DE MODELS : Inspection

INFOID:0000000000955729

INSPECTION AFTER DISASSEMBLY

Rotor Check

1. Resistance test

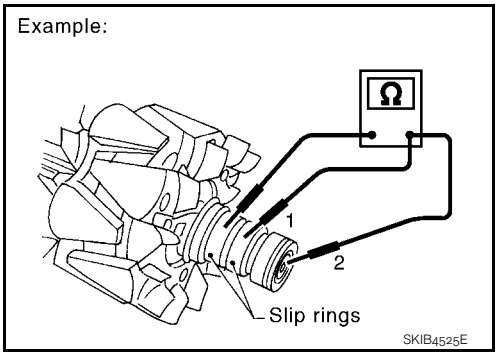
Resistance	**Refer to SDS CHG-34, "Alternator".**

- Replace the rotor if the measurement value is outside of the specified range.

2. Insulator test
   - Replace the rotor if continuity exists.
3. Check slip ring for wear.

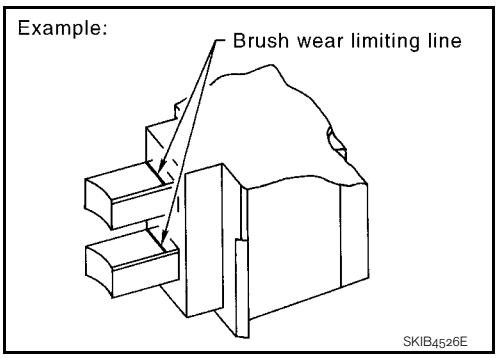
Slip ring minimum outer diameter	**: Refer to SDS CHG-34, "Alternator".**

- Replace the rotor if the measurement value is outside of the specified range.



Brush Check

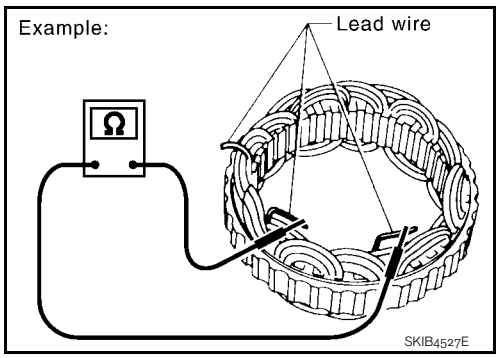
1. Check smooth movement of brush.
   - Check brush holder and clean if it is not smooth.
2. Check brush for wear.
   - Replace brush if it is worn down to the limit line.



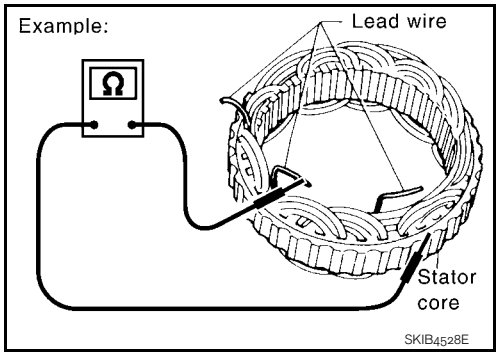
Stator Check

cardiagn.com

1. Continuity test
   - Replace the stator if continuity does not exist.



2. Ground test
   - Replace the stator if continuity exists.

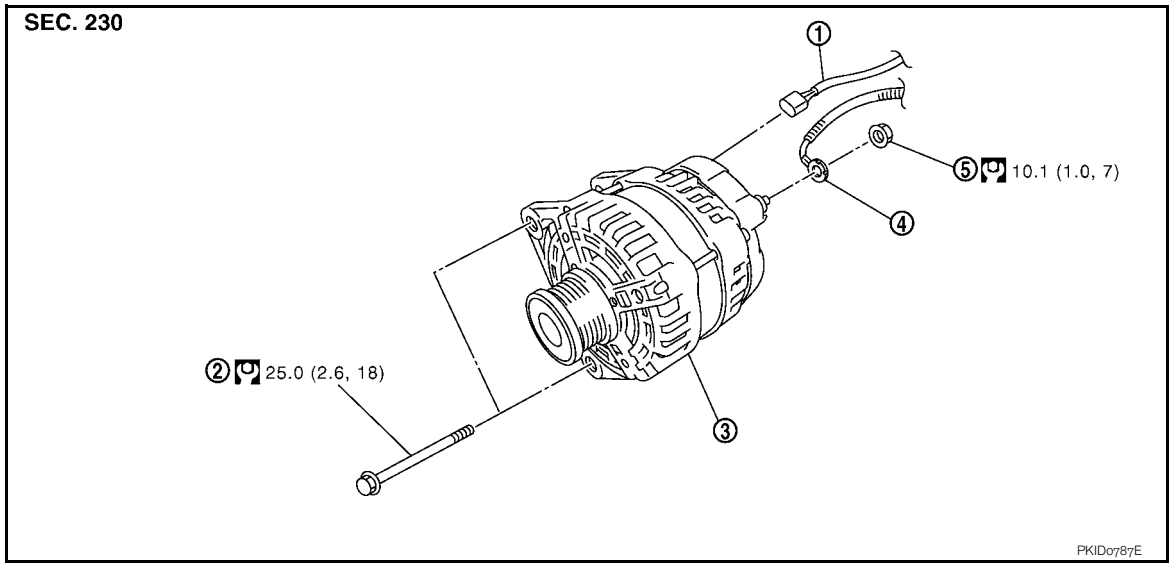


MR20DE MODELS

MR20DE MODELS : Exploded View

INFOID:0000000000955730

REMOVAL



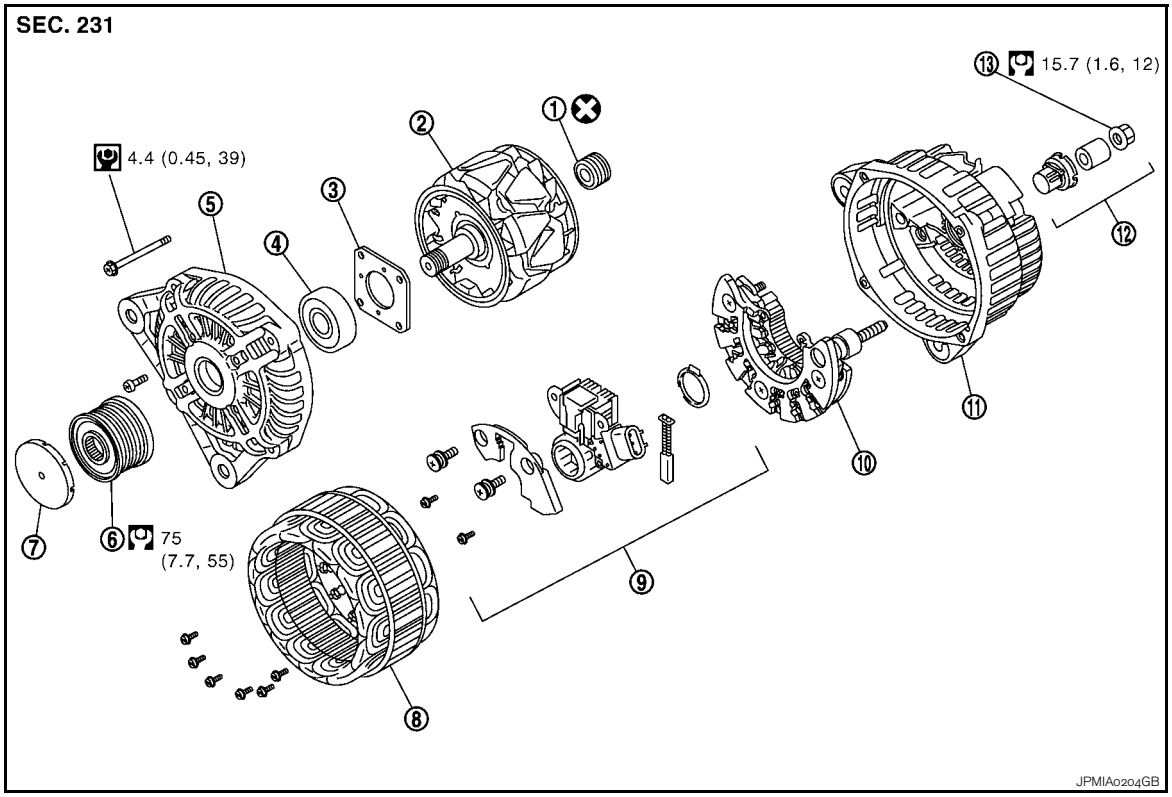
1. Alternator connector
2. Alternator mounting bolt
3. Alternator
4. “B” terminal harness
5. “B” terminal nut

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY

Type: A2TJ0281ZE

cardiagn.com



1. Rear bearing
2. Rotor assembly
3. Retainer
4. Front bearing
5. Front bracket assembly
6. Pulley
7. Pulley cap
8. Stator assembly
9. IC voltage regulator assembly
10. Diode assembly
11. Rear bracket assembly
12. Terminal set
13. “B” terminal nut

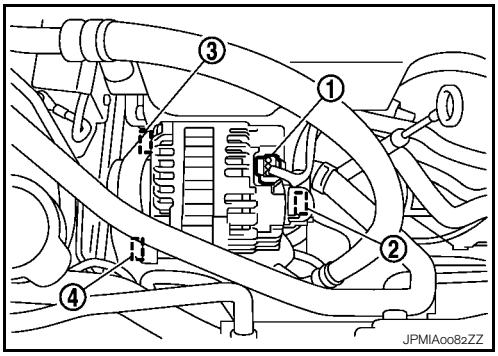
Refer to GI-4, "Components" for symbols in the figure.

MR20DE MODELS : Removal and Installation

INFOID:0000000000955731

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove drive belt. Refer to EM-134, "Removal and Installation".
3. Disconnect alternator connector (1).
4. Remove “B” terminal nut (2) and “B” terminal harness.
5. Remove upper alternator mounting bolt (3).
6. Completely loosen lower alternator mounting bolt (4), and pull it out until the bolt head is in contact with the side member. And then, remove the alternator by pulling it forward.
   NOTE:
   The alternator can be removed together with the bolts by pulling it forward and using the alternator bracket bolt hole cutout.
7. Remove alternator upward from the vehicle.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

Be sure to tighten “B” terminal nut carefully.

- Temporarily tighten the alternator bolts in order from the lower to the upper, and then tighten them in order from the upper to the lower.

  CAUTION:

cardiagn.com

For the alternator, the front side (pulley side) surface is the reference surface. Fit the reference surface to the alternator mounting part, and then tighten the bolts.

- Install alternator, and check tension of belt. Refer to EM-134, "Checking".

MR20DE MODELS : Disassembly and Assembly

INFOID:0000000000955732

DISASSEMBLY

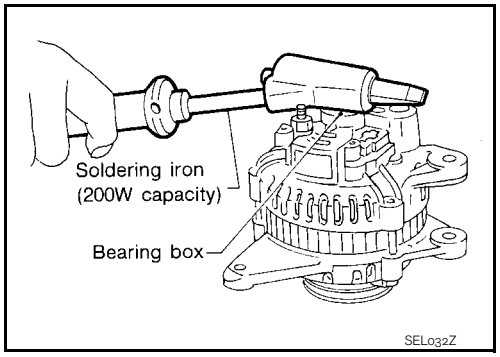
Rear Cover

NOTE:

Rear cover may be hard to remove because a ring is used to lock outer race of rear bearing. To facilitate removal of rear cover, heat only the bearing box section until the temperature increases to approximately 30°C (86°F) with a soldering iron (200W capacity).

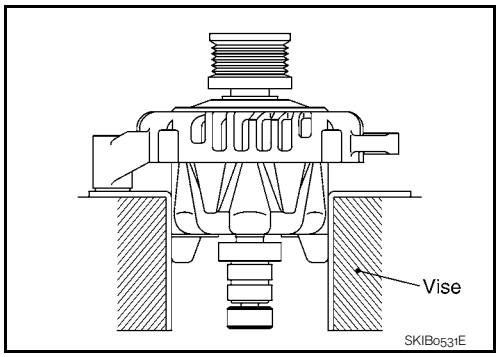
CAUTION:

Never use a heat gun, as if can damage diode assembly.

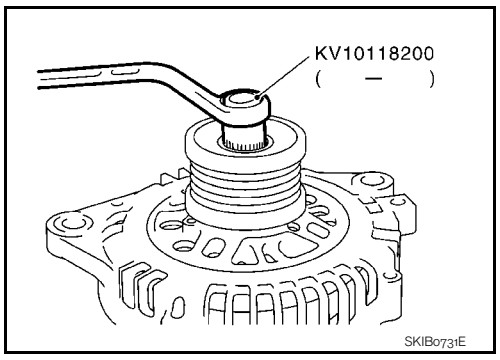


Front Cover

1. Set rotor to the vise.
   CAUTION:
   - **Be careful not to damage the rotor.**
   - **Use copper plate or thick cloth for rotor in the vise.**
2. Remove pulley cap, using suitable tool.



3. Remove alternator pulley, using alternator pulley adaptor [SST].



ASSEMBLY

Rear Bearing

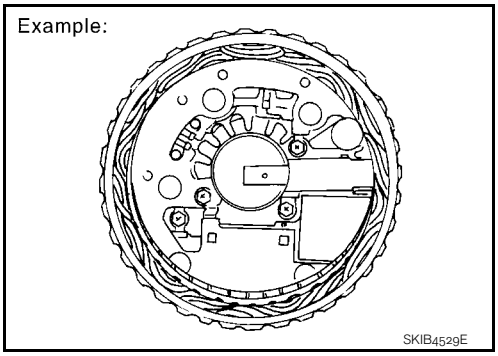
CAUTION:

- **Never reuse rear bearing. Replace with a new one.**
- **Never lubricate rear bearing outer race.**

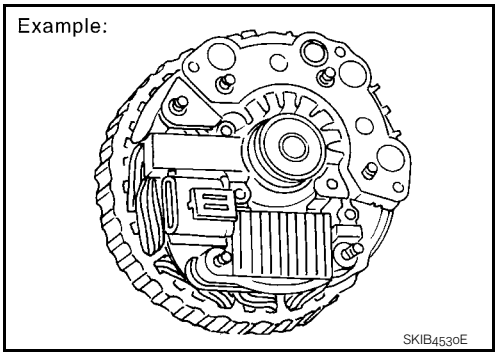
Rear Cover Installation

cardiagn.com

1. Fit brush assembly, diode assembly, regulator assembly and stator.



2. Push brushed up with fingers and install them to rotor.
NOTE:
Take care not damage slip ring sliding surface.



MR20DE MODELS : Inspection

INFOID:0000000000955733

INSPECTION AFTER DISASSEMBLY

Rotor Check

1. Resistance test

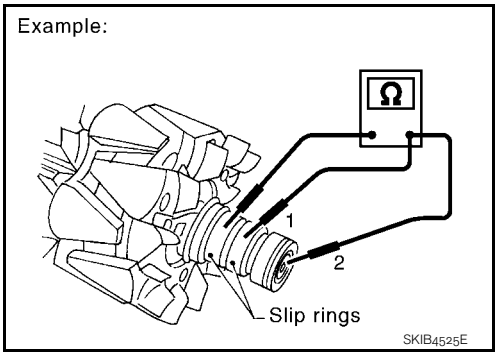
Resistance	**Refer to SDS CHG-34, "Alternator".**

- Replace the rotor if the measurement value is outside of the specified range.

2. Insulator test
   - Replace the rotor if continuity exists.
3. Check slip ring for wear.

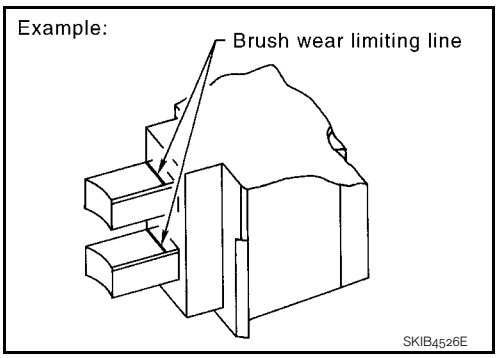
Slip ring minimum outer diameter	**: Refer to SDS CHG-34, "Alternator".**

- Replace the rotor if the measurement value is outside of the specified range.



Brush Check

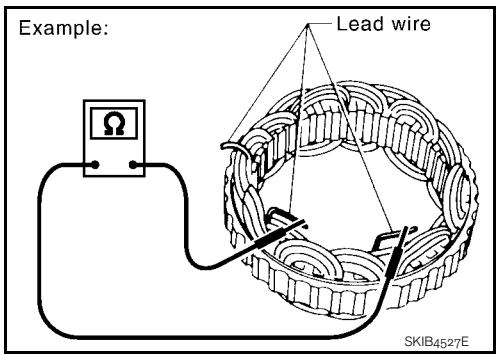
1. Check smooth movement of brush.
   - Check brush holder and clean if it is not smooth.
2. Check brush for wear.
   - Replace brush if it is worn down to the limit line.



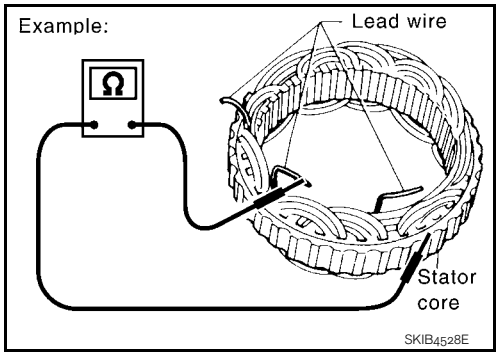
Stator Check

cardiagn.com

1. Continuity test
   - Replace the stator if continuity does not exist.



2. Ground test
   - Replace the stator if continuity exists.



cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Alternator

INFOID:0000000000955262

Applied model		HR16DE	MR20DE	K9K
Type		A2TJ0291ZE	A2TJ0281ZE	0 124 525 082
		MITSUBISHI make	MITSUBISHI make	BOSCH make
Nominal rating	[V - A]	12 - 120		—
Ground polarity		Negative		—
Minimum revolution under no-load (When 13.5 V is applied)	[rpm]	Less than 1,300		—
Hot output current (When 13.5 V is applied)	[A/rpm]	More than 27/1,300 More than 95/2,500 More than 116/5,000		—
Regulated output voltage	[V]	14.1 - 14.7		—
Minimum length of brush	[mm (in)]	More than 5.00 (0.197)		—
Brush spring pressure	[N (g, oz)]	4.1 - 5.3 (418 - 541, 14.7 - 19.1)		—
Slip ring minimum outer diameter	[mm (in)]	More than 22.1 (0.870)		—
Rotor (Field coil) resistance	[Ω]	1.7 - 2.2		—

cardiagn.com

SECTION CL
CLUTCH

CONTENTS

SYMPTOM DIAGNOSIS 2

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 2
NVH Troubleshooting Chart 2

PRECAUTION 3

PRECAUTIONS 3
Service Notice or Precautions for Clutch 3

PREPARATION 4

PREPARATION 4
Special Service Tools 4
Commercial Service Tools 4

ON-VEHICLE MAINTENANCE 5

CLUTCH PEDAL 5
Inspection and Adjustment 5

CLUTCH FLUID 6
Inspection 6
Air Bleeding Procedure 6

ON-VEHICLE REPAIR 8

CLUTCH PEDAL 8
Exploded View 8
Removal and Installation 8
Inspection 8

CLUTCH MASTER CYLINDER 10
Exploded View 10
Removal and Installation 10

CLUTCH PIPING 13
Exploded View 13
Hydraulic Layout 13
Removal and Installation 14

REMOVAL AND INSTALLATION 15

CSC (CONCENTRIC SLAVE CYLINDER) 15
Exploded View 15
Removal and Installation 15

CLUTCH DISC AND CLUTCH COVER 16

HR16DE, MR20DE 16
HR16DE, MR20DE : Exploded View 16
HR16DE, MR20DE : Removal and Installation 16
HR16DE, MR20DE : Inspection 17

K9K 18
K9K : Exploded View 18
K9K : Removal and Installation 18
K9K : Inspection 19

SERVICE DATA AND SPECIFICATIONS (SDS) 20

SERVICE DATA AND SPECIFICATIONS (SDS) 20
Clutch Control System 20
Clutch Pedal 20
Clutch Disc 20
Clutch Cover 20

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001043505

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference		CL-5	CL-6	EM-83 (HR16DE), EM-194 (MR20DE),EM-298 (K9K)	CL-15	CL-16										EM-101 (HR16DE), EM-219 (MR20DE),EM-326 (K9K)
SUSPECTED PARTS (Possible cause)		CLUTCH PEDAL (Inspection and adjustment)	CLUTCH LINE (Air in line)	ENGINE MOUNTING (Loose)	CSC (Concentric Slave Cylinder) (Worn, dirty or damaged)	CLUTCH DISC (Out of true)	CLUTCH DISC (Runout is excessive)	CLUTCH DISC (Lining broken)	CLUTCH DISC (Dirty or burned)	CLUTCH DISC (Oily)	CLUTCH DISC (Worn out)	CLUTCH DISC (Hardened)	CLUTCH DISC (Lack of spline grease)	DIAPHRAGM SPRING (Damaged)	DIAPHRAGM SPRING (Out of tip alignment)	PRESSURE PLATE (Distortion)	FLYWHEEL (Distortion)
Symptom	Clutch grabs/chatters			1			2			2	2	2			2		
	Clutch pedal spongy		1		2												
	Clutch noisy				1												
	Clutch slips	1								2	2			3		4	5
	Clutch does not disengage	1	2		3	3	3	3	3	3			3	4	4	5	

cardiagn.com

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Clutch

INFOID:0000000001043506

CAUTION:

- **Recommended clutch fluid is brake fluid “DOT 4”. Refer to MA-21, "Fluids and Lubricants".**
- **Never reuse drained clutch fluid.**
- **Never splash clutch fluid on painted areas.**
- **Never use mineral oils such as gasoline or kerosene. It will ruin the rubber parts of the hydraulic system.**
- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never disassemble master cylinder and CSC.**

WARNING:

After cleaning clutch disc, wipe it with a dust collector. Never use compressed air.

cardiagn.com

PREPARATION

PREPARATION

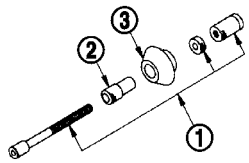
Special Service Tools

INFOID:0000000001043507

Tool number Tool name	Description
ST20050240 Diaphragm adjusting wrench ZZA0508D	Adjusting unevenness of diaphragm spring of clutch cover

Commercial Service Tools

INFOID:0000000001043508

Tool name	Description
Clutch aligner 1: Center shaft 2: Attachment 3: Guide  PCIB0017E	Installing clutch disc

cardiagn.com

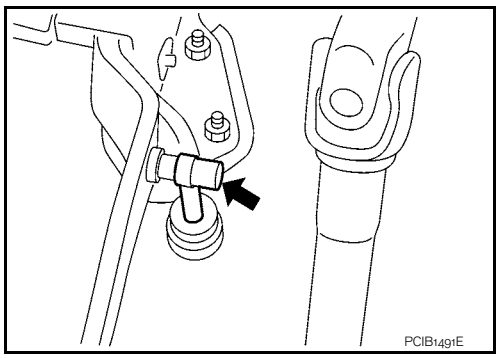
ON-VEHICLE MAINTENANCE

CLUTCH PEDAL

Inspection and Adjustment

INFOID:0000000001043509

INSPECTION



1. Check to see if the master cylinder rod end moves freely. It should not be bound by the clutch pedal.
   - If the rod end does not move freely, remove the rod end and check for deformation or damage on the rod end. Leave the rod end removed for step 2.
2. Check the clutch pedal stroke for free range of movement.

a. With the master cylinder rod end removed, manually move the clutch pedal up and down to determine if it moves freely.

b. If any sticking is noted, replace the clutch pedal assembly. Reverify that the master cylinder rod end moves freely.

3. Inspect the ASCD clutch switch position.

a. If the rod end does not move freely, check that the ASCD clutch switch is not applying pressure to the clutch pedal causing the rod end to bind. To adjust, disconnect the ASCD clutch switch electrical connector and turn the ASCD clutch switch.

b. Connect the ASCD clutch switch electrical connector.

4. Check the clutch hydraulic system components (master cylinder assembly, CSC) for sticking or binding.

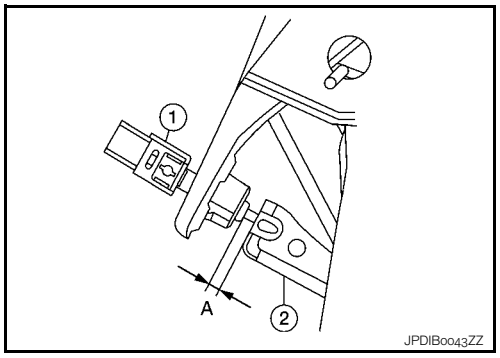
a. If any sticking or binding is noted, repair or replace the related parts as necessary.

b. If any hydraulic system repair was necessary, bleed the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".

NOTE:
Do not use a vacuum assist or any other type of power bleeder on this system. Use of a vacuum assist or power bleeder will not purge all of the air from the system.

ADJUSTMENT

Adjust ASCD clutch switch (1) position so that clearance between clutch pedal (2) and thread end of ASCD clutch switch, with clutch pedal fully released, is within specification “A”.



Clearance “A” : Refer to CL-20, "Clutch Pedal".

cardiagn.com

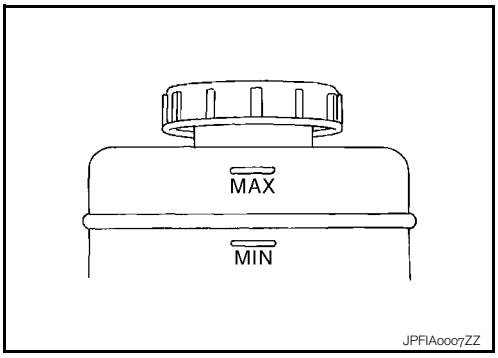
CLUTCH FLUID

Inspection

INFOID:0000000001092869

CLUTCH FLUID LEVEL

- Check that the fluid level in the reservoir tank is within the specified range (MAX – MIN lines).
- Visually check for any clutch fluid leakage around the reservoir tank.
- Check the clutch system for any leakage if the fluid level is extremely low (lower than MIN).



Air Bleeding Procedure

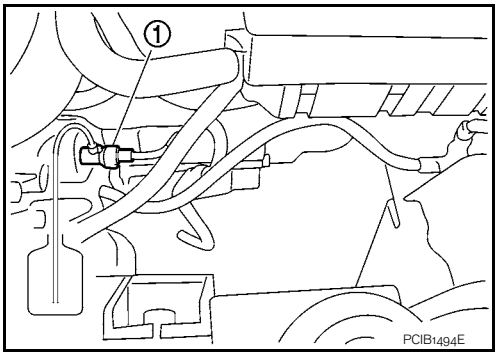
INFOID:0000000001043510

NOTE:
Do not use a vacuum assist or any other type of power bleeder on this system. Use of a vacuum assist or power bleeder will not purge all the air from the system.

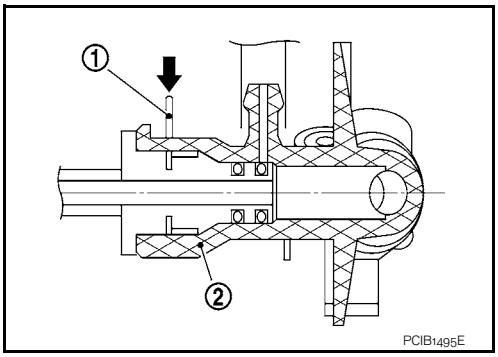
CAUTION:

- **Monitor clutch fluid level in reservoir tank to make sure it does not empty.**
- **Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.**
- Bleed the air of bleeding connector (1).

1. Fill reservoir tank with new clutch fluid.
2. Connect a transparent vinyl hose to air bleeder of bleeding connector.
3. “Depress” and “release” the clutch pedal slowly and fully 15 times at an interval of 2 to 3 seconds and release the clutch pedal.



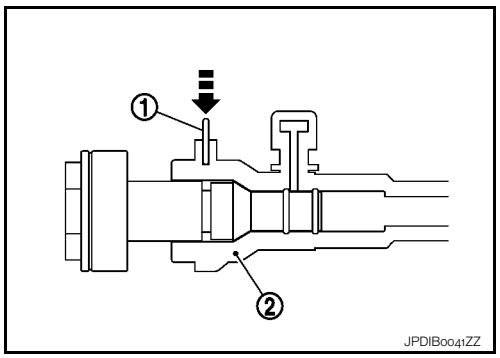
4. Push the lock pin (1) of the bleeding connector (2), and maintain the position.
   - RS5F92R



cardiagn.com

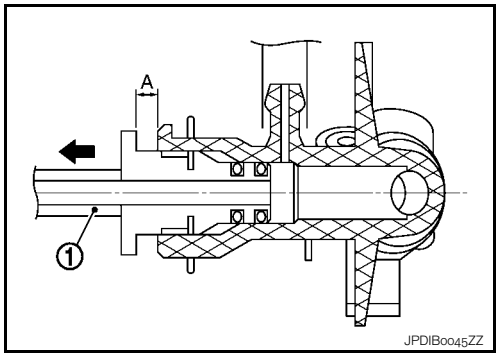
- RS6F94R and RS6F52A

CAUTION:
Hold it to prevent releasing clutch tube from bleeding connector when fluid pressure is applied in the tube.



5. Slide clutch tube (1) in the direction of the arrow as shown in the figure.
   - RS5F92R

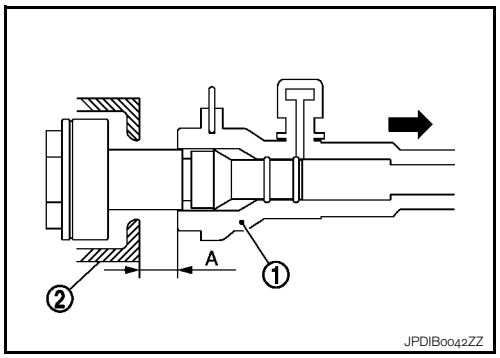
Dimension “A” : 5 mm (0.20 in)



- RS6F94R and RS6F52A

2 : Clutch housing

Dimension “A” : 10 mm (0.39 in)



6. Depress the clutch pedal soon and hold it, and then bleed the air from the piping.
   CAUTION:
   Hold it to prevent releasing clutch tube from bleeding connector when fluid pressure is applied in the tube.
7. Return clutch tube (1) and lock pin to their original positions.
8. Release clutch pedal and wait for 5 seconds.
9. Repeat steps 3 to 8 until no bubbles are observed in the clutch fluid.

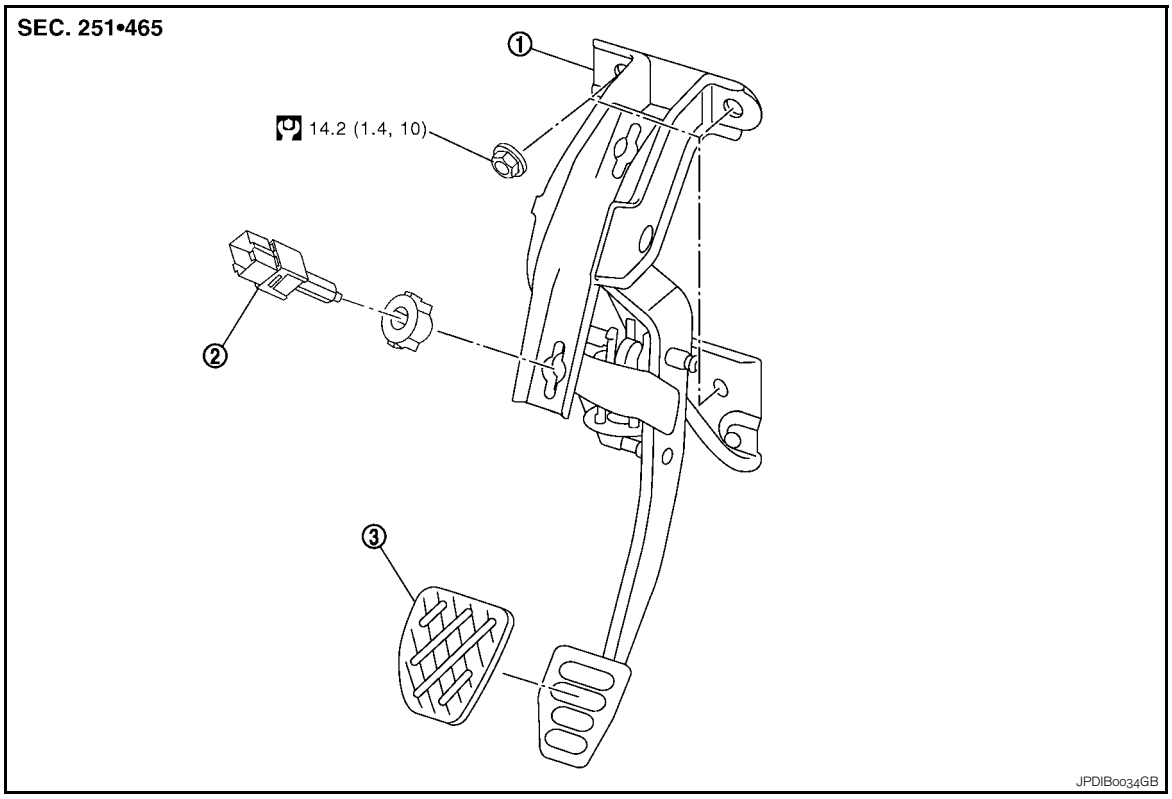
cardiagn.com

ON-VEHICLE REPAIR

CLUTCH PEDAL

Exploded View

INFOID:0000000001043511



1. Clutch pedal assembly
2. ASCD clutch switch
3. Pedal pad

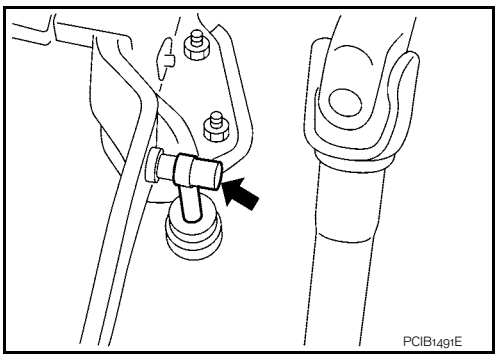
Refer to GI-4, "Components" for the symbols in the figure.

Removal and Installation

INFOID:0000000001043512

REMOVAL

1. Remove front kicking plate inner and dash side finisher. Refer to INT-14, "Removal and Installation".
2. Remove lower instrument panel, driver side. Refer to IP-12, "Removal and Installation".
3. Disconnect ASCD clutch switch harness connector and then disconnect clip of harness from clutch pedal assembly.
4. Remove master cylinder rod end from clutch pedal assembly.
5. Remove clutch pedal assembly.



INSTALLATION

Install in the reverse order of removal.

Inspection

INFOID:0000000001043513

cardiagn.com

INSPECTION AFTER REMOVAL

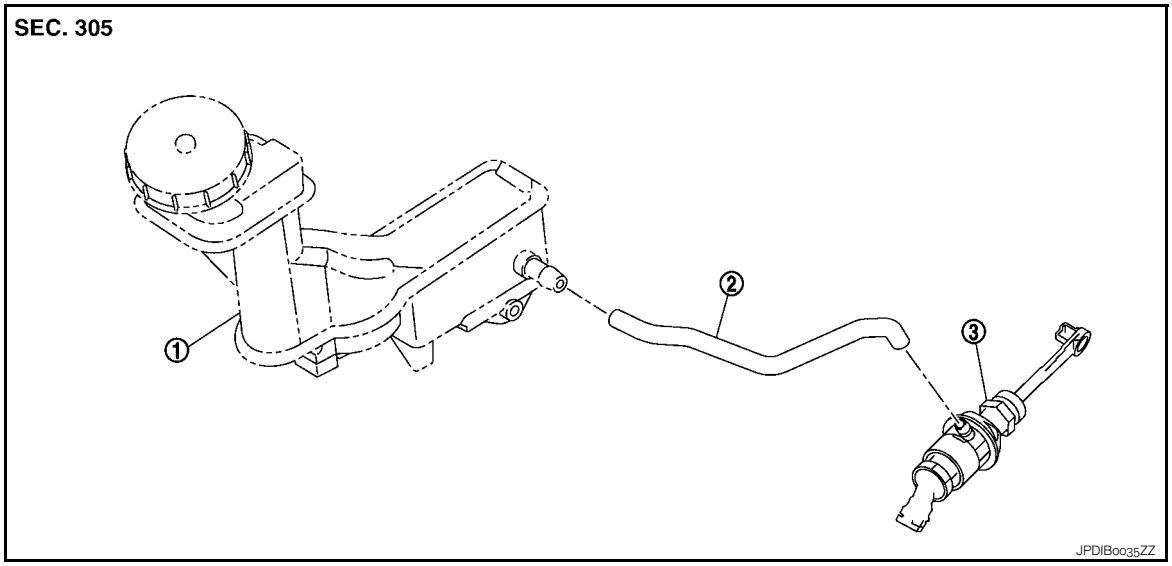
Check clutch pedal for bend, damage, or a cracked weld. If bend, damage, or a cracked weld is found, replace clutch pedal assembly.

cardiagn.com

CLUTCH MASTER CYLINDER

Exploded View

INFOID:0000000001043514



1. Reservoir tank assembly
2. Hose
3. Master cylinder assembly

Removal and Installation

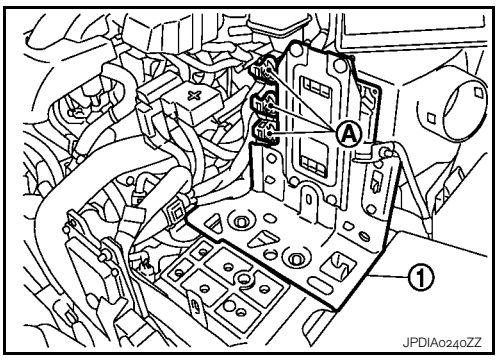
INFOID:0000000001043515

REMOVAL

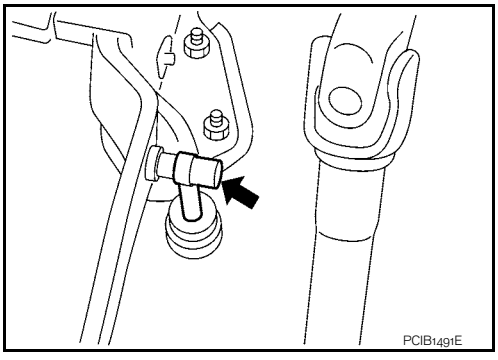
CAUTION:

- **Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.**
- **Never disassemble master cylinder.**

1. Remove the air cleaner case and air duct (inlet) or air ducts. Refer to EM-27, "Removal and Installation" (HR16DE), EM-144, "Removal and Installation" (MR20DE), or EM-265, "Removal and Installation" (K9K).
2. Remove the battery. Refer to PG-118, "Removal and Installation".
3. Disconnect the connectors (A) and then remove the bracket (1).
4. Drain clutch fluid in reservoir tank assembly and then remove hose.

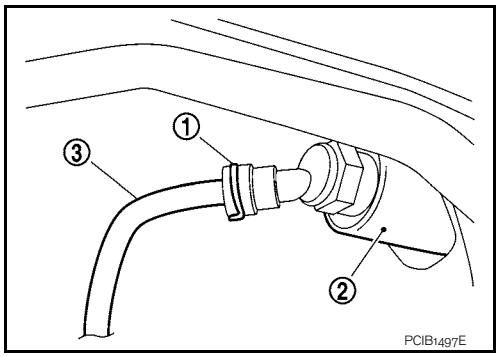


5. Remove master cylinder rod end from clutch pedal assembly.



cardiagn.com

6. Remove lock pin (1) from connector of master cylinder (2) and separate clutch tube (3).
7. Rotate master cylinder assembly clockwise by 45° and then remove master cylinder assembly from the vehicle.



INSTALLATION

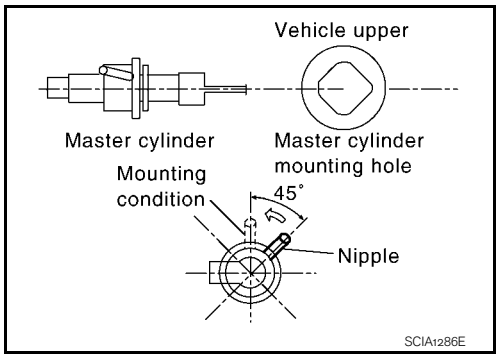
CAUTION:

Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.

1. Tilt master cylinder assembly clockwise by 45° and insert it to the mounting hole. Rotate counterclockwise and secure it. At this time, nipple is upward of the vehicle.
2. Install master cylinder rod end to clutch pedal assembly.
3. Install hose to reservoir tank assembly and master cylinder assembly.

   CAUTION:

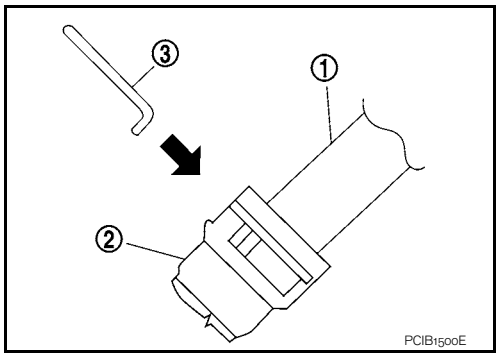
   Set hose with painted mark facing upward.



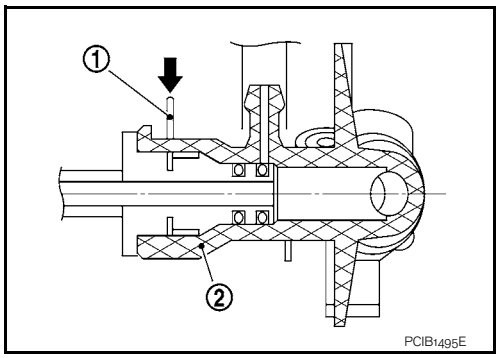
4. Install clutch tube (1) into connector of master cylinder assembly (2) until it stops.
5. Install lock pin (3) into connector of master cylinder assembly until it stops.
6. Fill new clutch fluid according to the following.

a. Fill reservoir tank assembly with new clutch fluid.

b. Connect a transparent vinyl hose to air bleeder of bleeding connector.

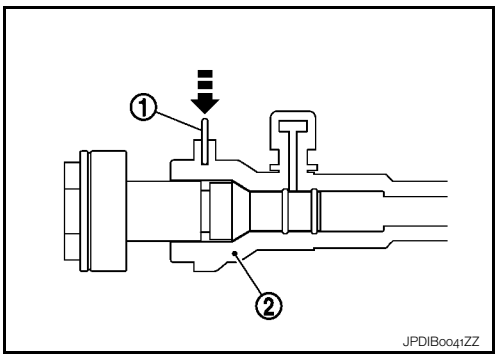


c. Push the lock pin (1) of the bleeding connector (2).
   - RS5F92R



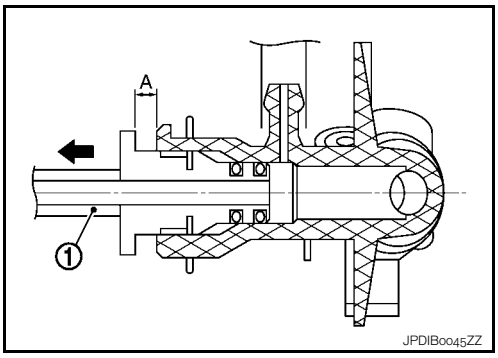
cardiagn.com

- RS6F94R and RS6F52A



d. Slide clutch tube (1) in the direction of the arrow as shown in the figure.
- RS5F92R

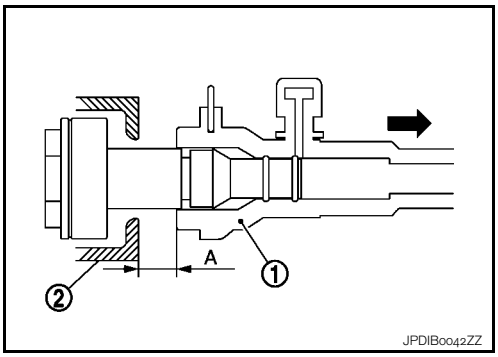
Dimension "A" : 5 mm (0.20 in)



- RS6F94R and RS6F52A

2 : Clutch housing

Dimension "A" : 10 mm (0.39 in)



e. Depress clutch pedal slowly to full stroke and then release it. Repeat this until new clutch fluid comes out.

CAUTION:
- **Hold it to prevent releasing clutch tube from bleeding connector when fluid pressure is applied in the tube.**
- **Monitor clutch fluid level in reservoir tank to make sure it does not empty.**

f. Place clutch tube (1) and lock pin back into position with clutch pedal depressed.

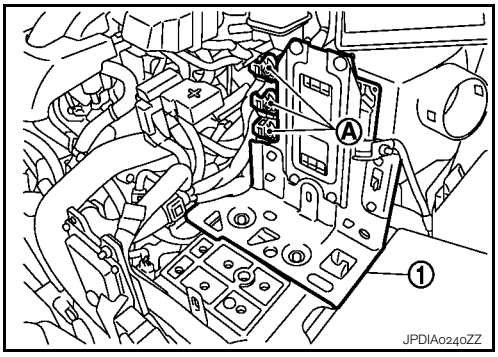
g. Bleed the air from the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".

7. After completing this procedure, inspect for clutch pedal. Refer to CL-5, "Inspection and Adjustment".

8. Install the bracket (1) and then connect the connectors (A).

9. Install the battery. Refer to PG-118, "Removal and Installation".

10. Install the air cleaner case and air duct (inlet) or air ducts. Refer to EM-27, "Removal and Installation" (HR16DE), EM-144, "Removal and Installation" (MR20DE), or EM-265, "Removal and Installation" (K9K).



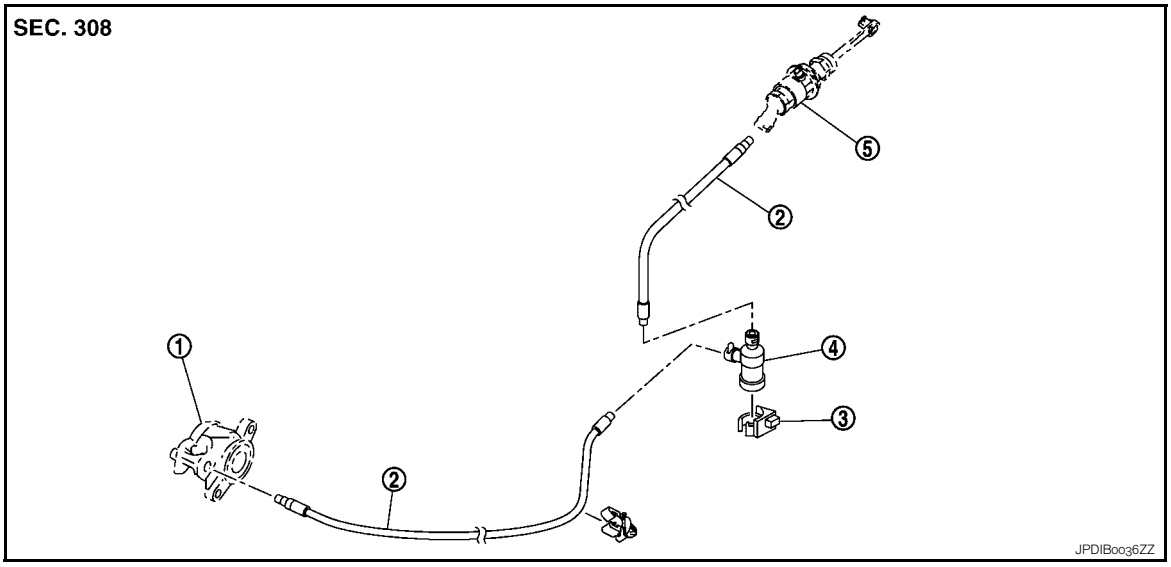
cardiagn.com

CLUTCH PIPING

Exploded View

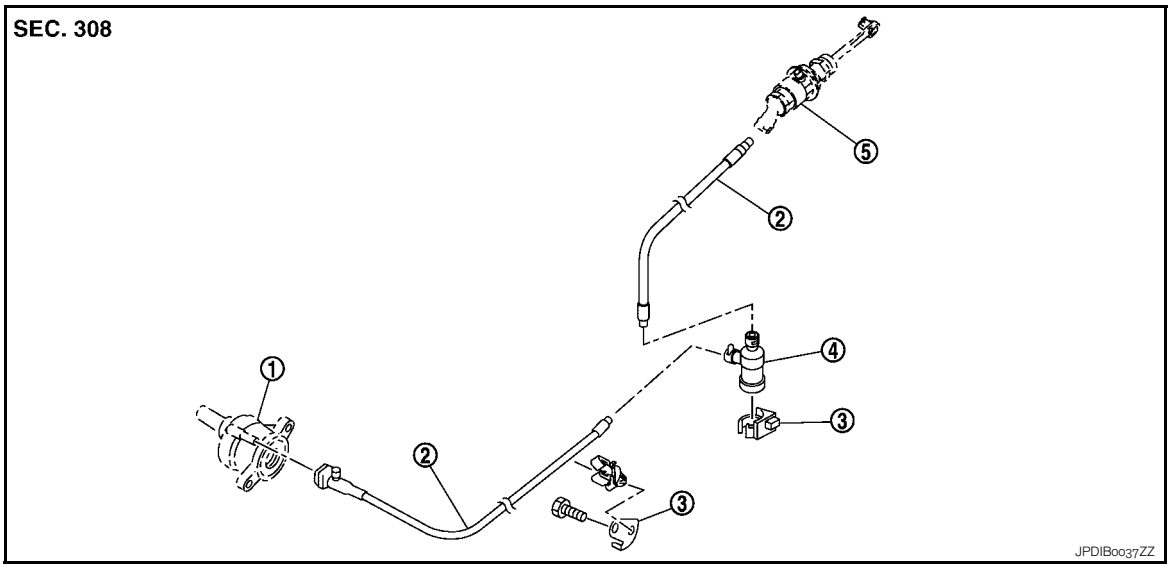
INFOID:0000000001043518

RS5F92R



1. CSC (Concentric Slave Cylinder)
2. Clutch tube
3. Bracket
4. Clutch damper
5. Master cylinder assembly

RS6F94R and RS6F52A

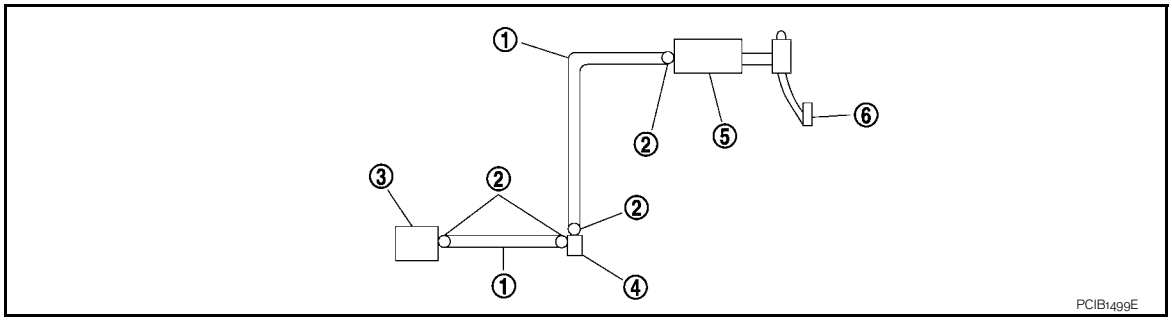


1. CSC (Concentric Slave Cylinder)
2. Clutch tube
3. Bracket
4. Clutch damper
5. Master cylinder assembly

Hydraulic Layout

INFOID:0000000001043519

cardiagn.com



1. Clutch tube
2. Lock pin
3. CSC (Concentric Slave Cylinder)
4. Clutch damper
5. Master cylinder assembly
6. Clutch pedal assembly

Removal and Installation

INFOID:0000000001043520

CAUTION:
Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.

REMOVAL

Refer to the figure for removal procedure.

INSTALLATION

Refer to the figure for installation procedure.

- When installing clutch tube to connector of CSC, connector of clutch damper and connector of master cylinder, push it as far as it goes.
- When installing lock pin to connector of CSC, connector of clutch damper and connector of master cylinder, push it as far as it goes.
- After installation, bleed the air from the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".

CAUTION:
Never scratch or damage clutch hose.

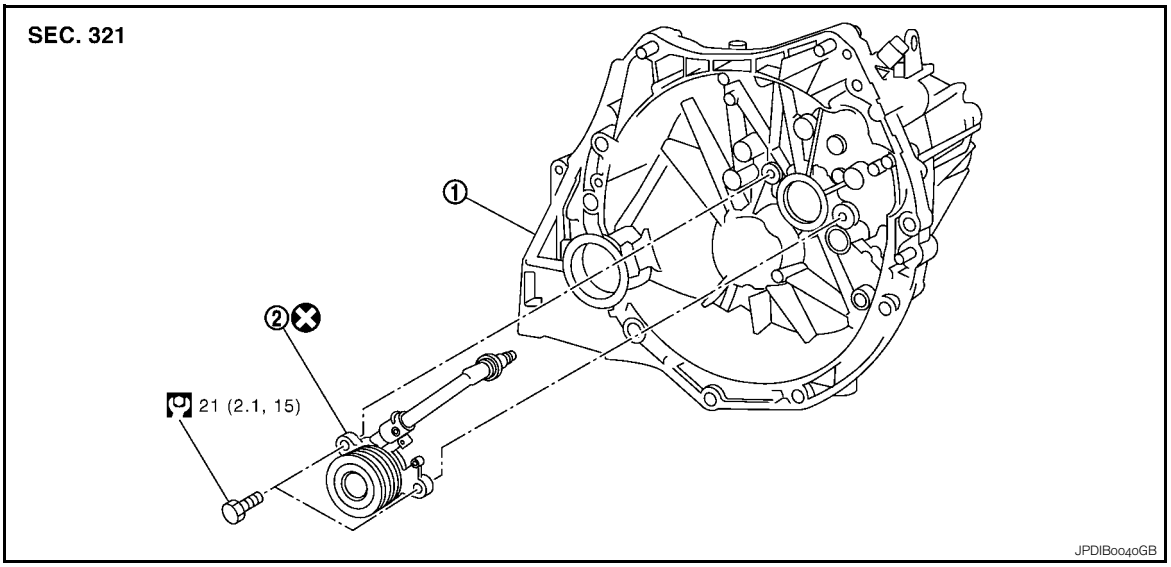
cardiagn.com

REMOVAL AND INSTALLATION

CSC (CONCENTRIC SLAVE CYLINDER)

Exploded View

INFOID:0000000001043521



1. Transaxle assembly
2. CSC (Concentric Slave Cylinder)

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001043522

CAUTION:

- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never disassemble CSC.**
- **Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.**

REMOVAL

1. Remove transaxle assembly from the vehicle. Refer to TM-23, "Removal and Installation" (RS5F92R), TM-69, "Removal and Installation" (RS6F94R), or TM-123, "Removal and Installation" (RS6F52A).
2. Remove mounting bolts and then remove CSC from clutch housing.

INSTALLATION

1. Install CSC to clutch housing and then tighten bolts to the specified torque.
   CAUTION:
   - **Never reuse CSC.**
   - **Never insert and operate CSC because piston and stopper of CSC components may fall off.**
2. Install transaxle assembly. Refer to TM-23, "Removal and Installation" (RS5F92R), TM-69, "Removal and Installation" (RS6F94R), or TM-123, "Removal and Installation" (RS6F52A).
3. Bleed the air from the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".

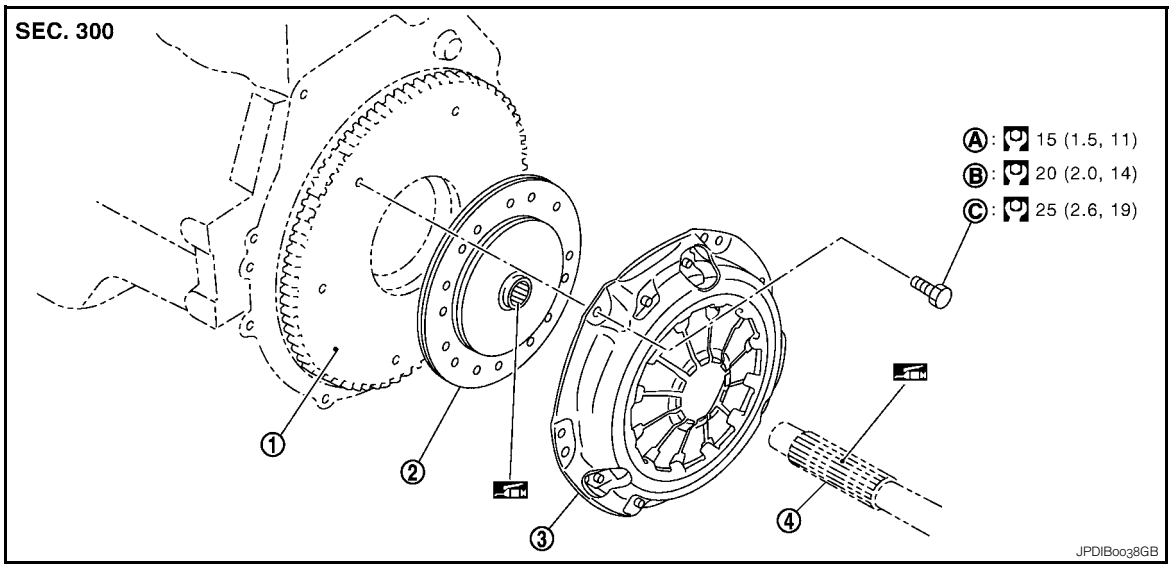
cardiagn.com

CLUTCH DISC AND CLUTCH COVER

HR16DE, MR20DE

HR16DE, MR20DE : Exploded View

INFOID:0000000001043523



1. Flywheel
2. Clutch disc
3. Clutch cover
4. Input shaft

A. First step (MR20DE)
B. First step (HR16DE)
C. Final step

: Apply lithium-based grease including molybdenum disulphide.

Refer to GI-4, "Components" for symbols not described on the above.

CAUTION:

- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never bring any grease to the clutch disc facing, pressure plate surface and flywheel surface.**
- **When installing, be careful that grease applied to input shaft does not adhere to clutch disc.**
- **Never clean in solvent on clutch disc.**

HR16DE, MR20DE : Removal and Installation

INFOID:0000000001043524

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

REMOVAL

1. Remove transaxle assembly from the vehicle. Refer to TM-23, "Removal and Installation" (RS5F92R), TM-69, "Removal and Installation" (RS6F94R), or TM-123, "Removal and Installation" (RS6F52A).
2. Loosen clutch cover mounting bolts.
3. Remove clutch cover and clutch disc.
   CAUTION:
   Never drop clutch disc.

INSTALLATION

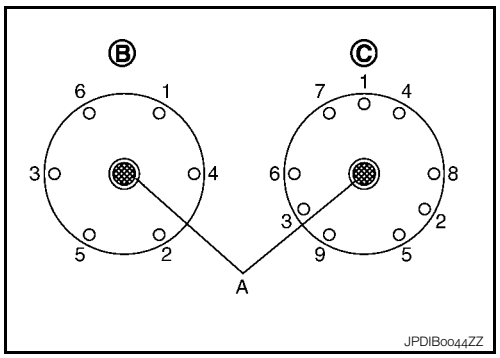
1. Clean clutch disc and input shaft splines to remove grease and powder arisen from abrasion.
2. Apply recommended grease to clutch disc and input shaft splines.
   CAUTION:

cardiagn.com

Be sure to apply grease to the points specified. Otherwise, noise, poor disengagement, or damage to the clutch may result. Excessive grease may cause slip or judder. And if it adheres to seal of CSC, it cause clutch fluid leakage. Wipe off excess grease. Wipe off any grease oozing from the parts.

3. Install clutch disc using a suitable clutch aligner (A).

   B : HR16DE
   C : MR20DE



4. Install clutch cover. Pre-tighten clutch cover mounting bolts.
5. Tighten clutch cover mounting bolts evenly to the specified torque in two steps in the order shown in the figure.
6. Install transaxle assembly to the vehicle. Refer to TM-23, "Removal and Installation" (RS5F92R), TM-69, "Removal and Installation" (RS6F94R), or TM-123, "Removal and Installation" (RS6F52A).

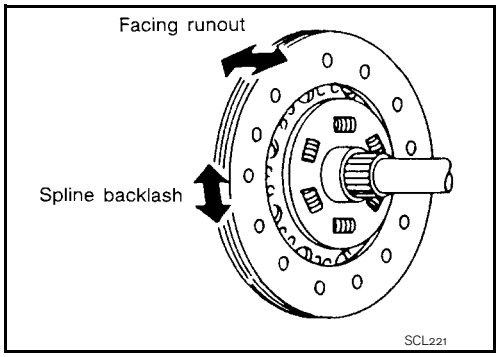
HR16DE, MR20DE : Inspection

INFOID:0000000001043525

INSPECTION AFTER REMOVAL

CLUTCH DISC

- Measure circumferential runout relative to clutch disc center spline. If it is outside the specification, replace clutch disc.

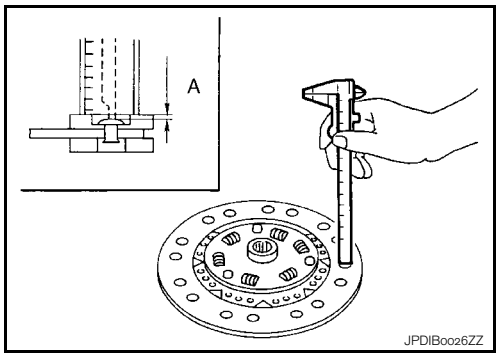


Runout limit/diameter of the area to be measured	**: Refer to CL-20, "Clutch Disc".**

- Measure backlash to clutch disc spline and main drive gear spline at the circumference of clutch disc. If outside the specification, replace clutch disc.

Maximum allowable spline backlash (at outer edge of disc)	**: Refer to CL-20, "Clutch Disc".**

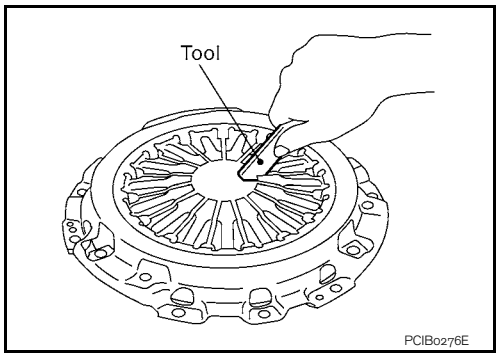
- Measure the depth “A” to clutch disc facing rivet heads using calipers. If it exceeds the allowable facing wear limit, replace clutch disc.



Facing wear limit (depth to the rivet head)	**: Refer to CL-20, "Clutch Disc".**

CLUTCH COVER

Check diaphragm spring lever claws for unevenness with the lever still on the vehicle. If they exceed the tolerance, adjust lever height using the diaphragm adjusting wrench [SST: ST20050240].



Tolerance for diaphragm spring lever unevenness	**: Refer to CL-20, "Clutch Cover".**

- Check clutch cover thrust ring for wear or breakage. If wear or breakage is found, replace clutch cover.
  NOTE:
  - Worn thrust ring will generate a beating noise when tapped at the rivet with a hammer.
  - Broken thrust ring will make a clinking sound when cover is shaken up and down.

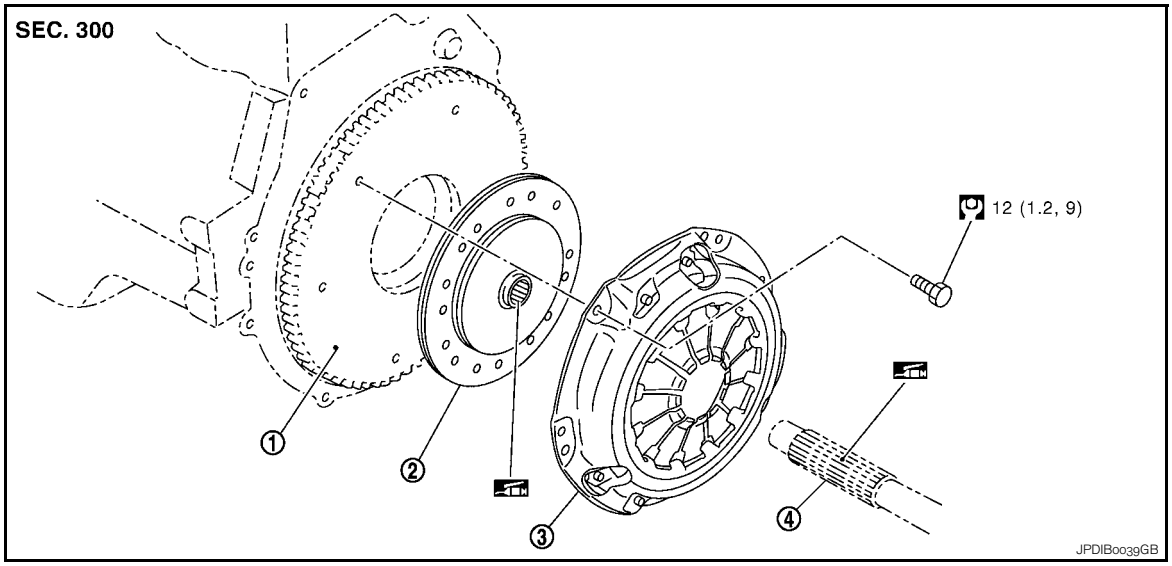
cardiagn.com

- If a trace of burn or discoloration is found on the clutch cover pressure plate to clutch disc contact surface, repair the surface with sandpaper. If surface is damaged or distorted, replace clutch cover.

K9K

K9K : Exploded View

INFOID:0000000001043557



1. Flywheel
2. Clutch disc
3. Clutch cover
4. Input shaft

: Apply lithium-based grease including molybdenum disulphide.

Refer to GI-4, "Components" for symbols not described on the above.

CAUTION:

- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never bring any grease to the clutch disc facing, pressure plate surface and flywheel surface.**
- **When installing, be careful that grease applied to input shaft does not adhere to clutch disc.**
- **Never clean in solvent on clutch disc.**

K9K : Removal and Installation

INFOID:0000000001043558

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

REMOVAL

1. Remove transaxle assembly from the vehicle. Refer to TM-69, "Removal and Installation".
2. Loosen clutch cover mounting bolts.
3. Remove clutch cover and clutch disc.
   CAUTION:
   Never drop clutch disc.

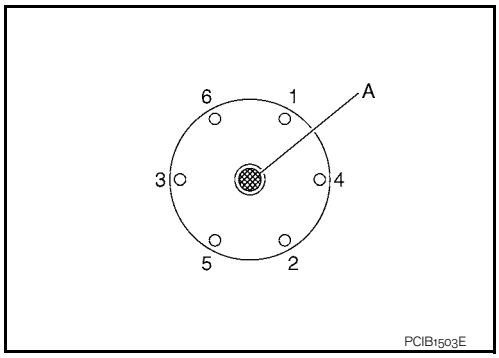
INSTALLATION

1. Clean clutch disc and input shaft splines to remove grease and powder arisen from abrasion.
2. Apply recommended grease to clutch disc and input shaft splines.
   CAUTION:
   Be sure to apply grease to the points specified. Otherwise, noise, poor disengagement, or damage to the clutch may result. Excessive grease may cause slip or judder. And if it adheres to seal of

cardiagn.com

CSC, it cause clutch fluid leakage. Wipe off excess grease. Wipe off any grease oozing from the parts.

3. Install clutch disc using a suitable clutch aligner (A).
4. Install clutch cover. Pre-tighten clutch cover mounting bolts.
5. Tighten clutch cover mounting bolts evenly to the specified torque in the order shown in the figure.
6. Install transaxle assembly to the vehicle. Refer to TM-69, "Removal and Installation".



K9K : Inspection

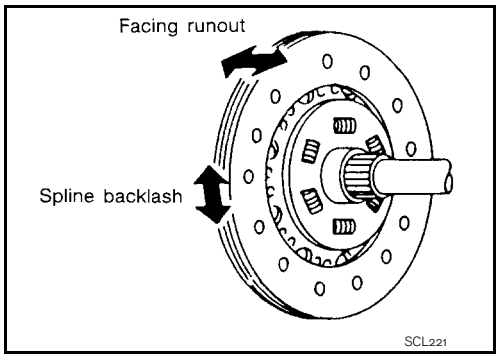
INFOID:0000000001043559

INSPECTION AFTER REMOVAL

CLUTCH DISC

- Measure circumferential runout relative to clutch disc center spline. If it is outside the specification, replace clutch disc.

Runout limit/diameter of the area to be measured : Refer to CL-20, "Clutch Disc".

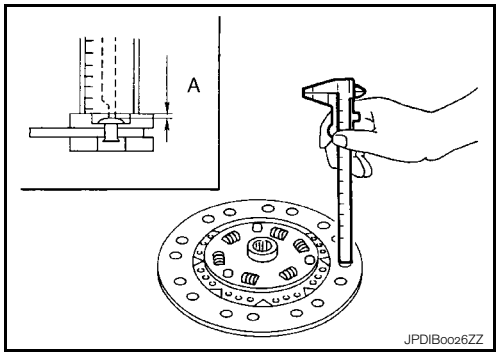


- Measure backlash to clutch disc spline and main drive gear spline at the circumference of clutch disc. If outside the specification, replace clutch disc.

Maximum allowable spline backlash (at outer edge of disc) : Refer to CL-20, "Clutch Disc".

- Measure the depth “A” to clutch disc facing rivet heads using calipers. If it exceeds the allowable facing wear limit, replace clutch disc.

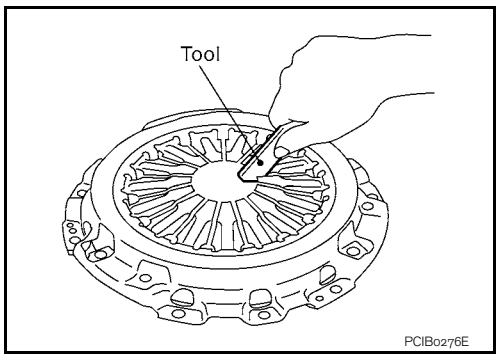
Facing wear limit (depth to the rivet head) : Refer to CL-20, "Clutch Disc".



CLUTCH COVER

Check diaphragm spring lever claws for unevenness with the lever still on the vehicle. If they exceed the tolerance, adjust lever height using the diaphragm adjusting wrench [SST: ST20050240].

Tolerance for diaphragm spring lever unevenness : Refer to CL-20, "Clutch Cover".



- Check clutch cover thrust ring for wear or breakage. If wear or breakage is found, replace clutch cover.

NOTE:

- Worn thrust ring will generate a beating noise when tapped at the rivet with a hammer.
- Broken thrust ring will make a clinking sound when cover is shaken up and down.

- If a trace of burn or discoloration is found on the clutch cover pressure plate to clutch disc contact surface, repair the surface with sandpaper. If surface is damaged or distorted, replace clutch cover.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Clutch Control System

INFOID:0000000001043459

Type of clutch control	Hydraulic

Clutch Pedal

INFOID:0000000001043460

Unit: mm (in)

Clearance “A” between clutch pedal and ASCD switch threaded end while clutch pedal is fully released.	0.74 - 1.96 (0.0291 - 0.0772)

Clutch Disc

INFOID:0000000001043462

Unit: mm (in)

Engine type	HR16DE	MR20DE	K9K
Model	200	225	
Facing size (Outer dia. × Inner dia. × Thickness)	200 × 140 × 3.5 (7.87 × 5.51 × 0.138)	225 × 160 × 3.2 (8.86 × 6.30 × 0.126)	225 × 150 × 3.1 (8.86 × 5.91 × 0.122)
Runout limit/diameter of the area to be measured	1.0 (0.039) /200 (7.87) dia.	1.0 (0.039) /215 (8.46) dia.	
Maximum allowable spline backlash (at outer edge of disc)	0.8 (0.031)	1.0 (0.039)	0.507 (0.0200)
Facing wear limit (depth to the rivet head)	0.3 (0.012)		1.0 (0.039)

Clutch Cover

INFOID:0000000001043463

Engine type	HR16DE	MR20DE		K9K
Transaxle type	RS5F92R	RS6F94R	RS6F52A	RS6F94R
Set-load	4,658 N (475.1 kg, 1,047.1 lb)	5,390 N (549.8 kg, 1,211.7 lb)		6,300 N (642.6 kg, 1416.2 lb)
Tolerance for diaphragm spring lever unevenness	0.7 mm (0.028 in) or less			1.2 mm (0.047 in) or less
Diaphragm spring lever height	29 - 31 mm (1.14 - 1.22 in)	21 - 23 mm (0.83 -0.91 in)	31.8 - 33.8 mm (1.252 - 1.331 in)	—

cardiagn.com

CCS

CRUISE CONTROL SYSTEM

cardiagn.com

MEMO

cardiagn.com

SECTION DEF
DEFOGGER

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
Work Flow 3

FUNCTION DIAGNOSIS 4

REAR WINDOW DEFOGGER SYSTEM 4
System Diagram 4
System Description 4
Component Parts Location 4
Component Description 5

DIAGNOSIS SYSTEM (BCM) 6

COMMON ITEM 6
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 6

REAR WINDOW DEFOGGER 6
REAR WINDOW DEFOGGER : CONSULT-III Function (BCM - REAR DEFOGGER) 6

DIAGNOSIS SYSTEM (IPDM E/R) 8
Diagnosis Description 8
CONSULT - III Function (IPDM E/R) 10

COMPONENT DIAGNOSIS 13

REAR WINDOW DEFOGGER SWITCH 13

WITH AUTO A/C 13
WITH AUTO A/C : Description 13
WITH AUTO A/C : Component Function Check 13
WITH AUTO A/C : Diagnosis Procedure 13

WITHOUT AUTO A/C 14
WITHOUT AUTO A/C : Description 14
WITHOUT AUTO A/C : Component Function Check 14
WITHOUT AUTO A/C : Diagnosis Procedure 15
WITHOUT AUTO A/C : Component Inspection 16

REAR WINDOW DEFOGGER POWER SUPPLY AND GROUND CIRCUIT 17
Description 17
Component Function Check 17
Diagnosis Procedure 17
Component Inspection 18

DRIVER SIDE DOOR MIRROR DEFOGGER 19
Description 19
Component Function Check 19
Diagnosis Procedure 19
Component Inspection 20

PASSENGER SIDE DOOR MIRROR DEFOGGER 21
Description 21
Component Function Check 21
Diagnosis Procedure 21
Component Inspection 22

REAR WINDOW DEFOGGER ON SIGNAL 23

WITH AUTO A/C 23
WITH AUTO A/C : Description 23
WITH AUTO A/C : Component Function Check 23
WITH AUTO A/C : Diagnosis Procedure 23

WITHOUT AUTO A/C 23
WITHOUT AUTO A/C : Description 23
WITHOUT AUTO A/C : Component Function Check 24
WITHOUT AUTO A/C : Diagnosis Procedure 24

ECU DIAGNOSIS 25

BCM (BODY CONTROL MODULE) 25
Reference Value 25
Wiring Diagram - DEFOGGER CONTROL SYSTEM (LHD MODELS) - 41
Wiring Diagram - DEFOGGER CONTROL SYSTEM (RHD MODELS) - 45
Fail Safe 48

carDiag.com

DTC Inspection Priority Chart 49
DTC Index 50

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 51
Reference Value 51
Wiring Diagram - DEFOGGER CONTROL SYSTEM (LHD MODELS) - 57
Wiring Diagram - DEFOGGER CONTROL SYSTEM (RHD MODELS) - 61
Fail Safe 64
DTC Index 66

SYMPTOM DIAGNOSIS 67

REAR WINDOW DEFOGGER DOES NOT OPERATE 67
Diagnosis Procedure 67

REAR WINDOW DEFOGGER AND DOOR MIRROR DEFOGGER DO NOT OPERATE. 68
Diagnosis Procedure 68

REAR WINDOW DEFOGGER DOES NOT OPERATE BUT BOTH OF DOOR MIRROR DEFOGGER OPERATE. 69
Diagnosis Procedure 69

DRIVER SIDE DOOR MIRROR DEFOGGER DOES NOT OPERATE. 70
Diagnosis Procedure 70

PASSENGER SIDE DOOR MIRROR DEFOGGER DOES NOT OPERATE. 71
Diagnosis Procedure 71

REAR WINDOW DEFOGGER SWITCH DOES NOT LIGHT, BUT REAR WINDOW DEFOGGER OPERATES 72
Diagnosis Procedure 72

PRECAUTION 73

PRECAUTIONS 73
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 73

ON-VEHICLE MAINTENANCE 74

PRE-INSPECTION FOR DIAGNOSTIC 74
Basic Inspection 74

ON-VEHICLE REPAIR 75

FILAMENT 75
Inspection and Repair 75

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000951256

DETAILED FLOW

1.OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings the vehicle in.

>> GO TO 2.

2.CHECK DTC

Perform self diagnosis with CONSULT-III

Is any DTC detected?

YES >> Refer to BCS-61, "DTC Index".
NO >> GO TO 3.

3.REPRODUCE THE MALFUNCTION INFORMATION

Check the malfunction on the vehicle that the customer describes.
Inspect the relation of the symptoms and the condition when the symptoms occur.

>> GO TO 4.

4.PERFORM “BASIC INSPECTION”

Perform the basic inspection.Refer to DEF-74, "Basic Inspection".

>> GO TO 5.

5.IDENTIFY THE MALFUNCTIONING SYSTEM WITH “SYMPTOM DIAGNOSIS”

Use “Symptom diagnosis” from the symptom inspection result in step 3. Then identify where to start performing the diagnosis based on possible causes and symptoms.

>> GO TO 6.

6.IDENTIFY MALFUNCTIONING PARTS WITH “COMPONENT DIAGNOSIS”

Perform the diagnosis with “Component diagnosis” of the applicable system.

>> GO TO 7.

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

8.FINAL CHECK

Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 3.

Is the malfunctioning part repaired or replaced?

YES >> Trouble diagnosis is completed.
NO >> GO TO 4.

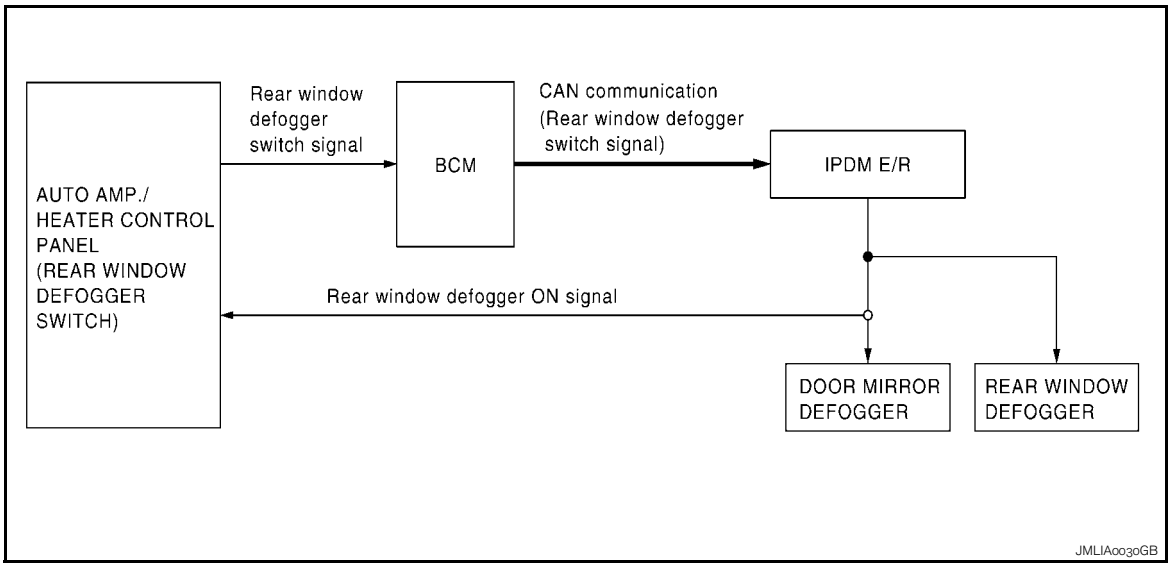
cardiagn.com

FUNCTION DIAGNOSIS

REAR WINDOW DEFOGGER SYSTEM

System Diagram

INFOID:0000000000951258



System Description

INFOID:0000000000951259

OPERATION DESCRIPTION

- BCM detects that the rear window defogger switch is turned ON when the ignition switch is ON, and then transmits the rear window defogger switch signal to IPDM E/R via CAN communication for approximately 15 minutes.
- IPDM E/R turns rear window defogger relay ON when it receives the rear window defogger switch signal. Then, it transmits the rear window defogger ON signal to ECM via CAN communication.
- The power is supplied to the rear window defogger and door mirror defogger (with mirror defogger) when the rear window defogger relay is turned ON.

TIMER FUNCTION

- BCM transmits the rear window defogger switch signal to IPDM E/R for approximately 15 minutes when the rear window defogger switch is turned ON with the ignition switch ON. Then, IPDM E/R operates the rear window defogger and door mirror defogger (with mirror defogger).
- The timer is cancelled if the rear window defogger switch is pressed again during timer operation. BCM stops the output of rear window defogger switch signal. The same reaction also occurs during timer operation if the ignition switch is turned OFF.

INPUT/OUTPUT SIGNAL CHART

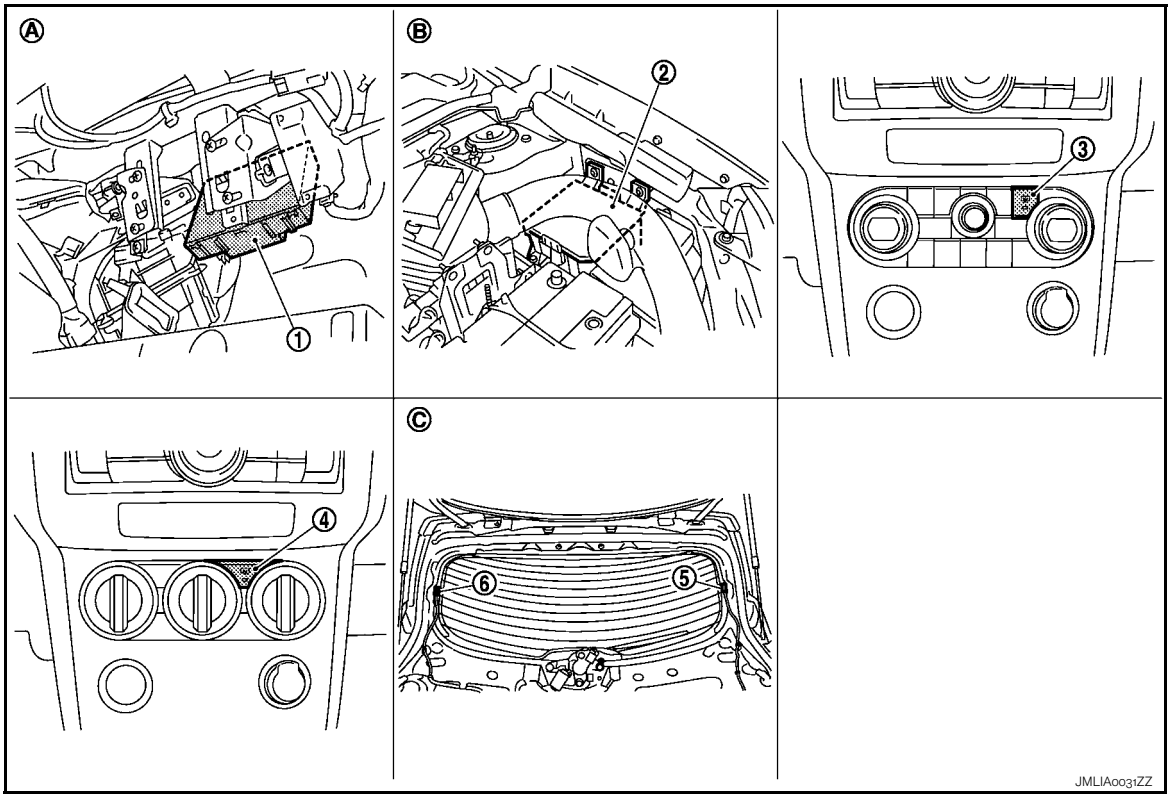
Switch	Input signal to BCM	BCM function	Acutuator
Rear window defogger switch	Defogger switch signal	Rear window defogger & Door mirror defogger* control	Rear window defogger Door mirror defogger *
Ignition switch	Ignition signal		

*: With mirror defogger

Component Parts Location

INFOID:0000000000951260

cardiagn.com



1.	BCM M65,M66,M67	2.	IPDM E/R E10,E12,E14	3.	Rear window defogger switch (built in AUTO AMP. M53)
4.	Rear window defogger switch (built in heater control panel M54)	5.	Rear window defogger B58	6.	Rear window defogger D155
A.	Behind glove box	B.	Engine room dash panel (LH)	C.	Behind back door trim finisher

Component Description

INFOID:0000000000951261

BCM	• Operates the rear window defogger with the operation of rear window defogger switch. • Performs the timer control of rear window defogger.
Rear window defogger relay	• Operates the rear window defogger and the door mirror defogger* with the control signal from IPDM E/R.
Auto amp. / Heter control panel (Rear window defogger switch)	• The rear window defogger switch is installed. • Turns the indicator lamp ON when detecting the operation of rear window defogger.
Rear window defogger	• Heats the heating wire with the power supply from the rear window defogger relay to prevent the rear window from fogging up.
Door mirror defogger*	• Heats the heating wire with the power supply from the rear window defogger relay to prevent the door mirror from fogging up.

*With mirror defogger

carDiag.com

DIAGNOSIS SYSTEM (BCM)
COMMON ITEM
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001114950

APPLICATION ITEM
CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION
BCM can perform the following functions for each system.
NOTE:
It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

REAR WINDOW DEFOGGER
REAR WINDOW DEFOGGER : CONSULT-III Function (BCM - REAR DEFOGGER)

INFOID:0000000000951263

Data monitor

cardiagn.com

Monitor Item	Description
REAR DEF SW	Displays “Press (ON)/other (OFF)” status determined with the rear window defogger switch.
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.

ACTIVE TEST

Test Item	Description
REAR DEFOGGER	Give a drive signal to the rear window defogger relay to activate it.

carDiagn.com

DIAGNOSIS SYSTEM (IPDM E/R)

Diagnosis Description

INFOID:0000000001114954

Auto active test

Description

In auto active test mode, the IPDM E/R sends a drive signal to the following systems to check their operation.

- Oil pressure warning lamp
- Rear window defogger
- Front wiper (LO, HI)
- Parking lamps
- License plate lamps
- Tail lamps
- Front fog lamps
- Headlamps (LO, HI)
- A/C compressor (magnet clutch)
- Cooling fan (LO, HI)

Operation procedure

1. Close the hood and lift the wiper arms from the windshield. (Prevent windshield damage due to wiper operation)
   NOTE:
   When auto active test is performed with hood opened, sprinkle water on windshield beforehand.
2. Turn ignition switch OFF.
3. Turn the ignition switch ON, and within 20 seconds, press the driver door switch 10 times. Then turn the ignition switch OFF.
   CAUTION:
   Close passenger door.
4. Turn the ignition switch ON within 10 seconds. Then the horn sounds once and the auto active test starts.
5. The oil pressure warning lamp starts blinking when the auto active test starts.
6. After a series of the following operations is repeated 3 times, auto active test is completed.

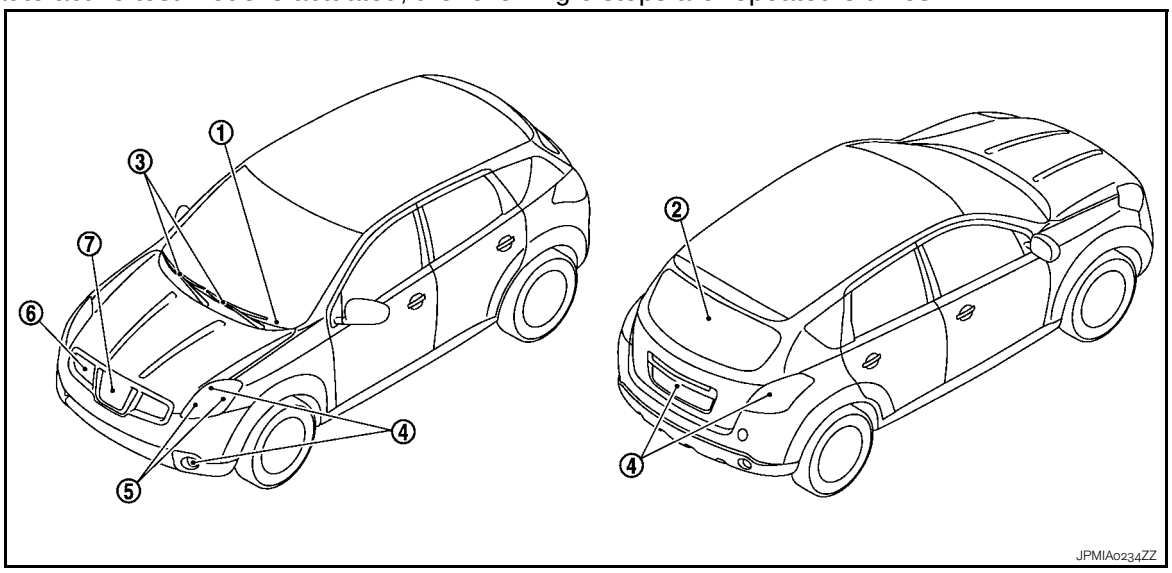
NOTE:
When auto active test mode has to be cancelled halfway through test, turn ignition switch OFF.

CAUTION:

- **If auto active test mode cannot be actuated, check door switch system.**
- **Never start the engine.**

Inspection in auto active test mode

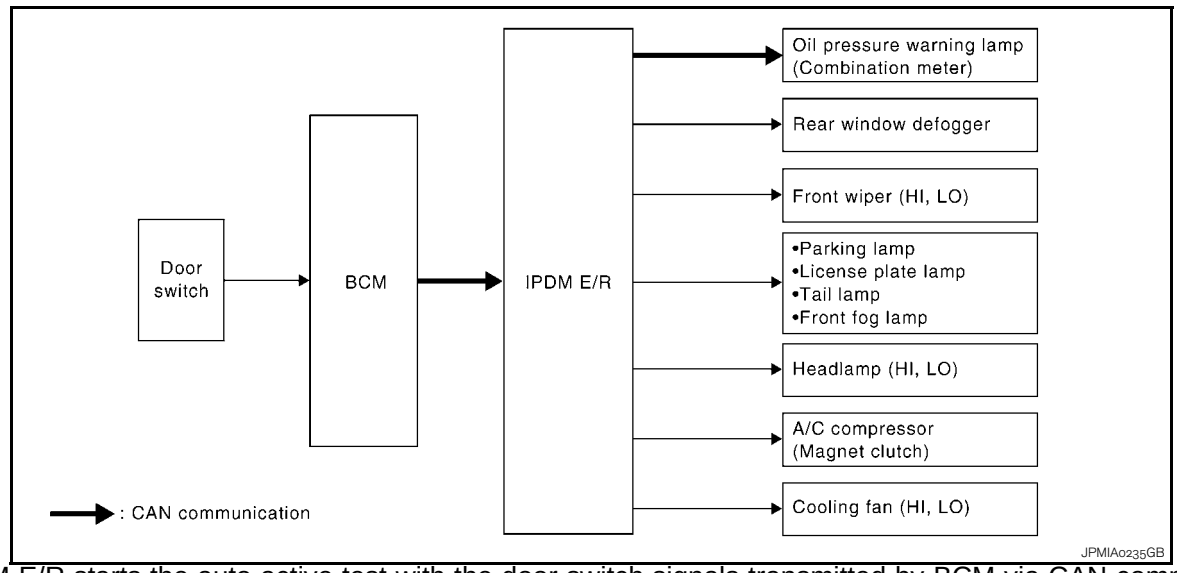
When auto active test mode is actuated, the following 6 steps are repeated 3 times.



cardiagn.com

Operation sequence	Inspection location	Operation
1	Oil pressure warning lamp	Blinks continuously during operation of auto active test.
2	Rear window defogger	10 seconds
3	Front wiper	LO for 5 seconds → HI for 5 seconds
4	• Parking lamps • License plate lamps • Tail lamps • Front fog lamps	10 seconds
5	Headlamps	LO ⇔ HI 5 times
6	A/C compressor (magnet clutch)	ON ⇔ OFF 5 times
7	Cooling fan	LO for 5 seconds → HI for 5 seconds

Concept of auto active test



- IPDM E/R starts the auto active test with the door switch signals transmitted by BCM via CAN communication. Therefore, the CAN communication line between IPDM E/R and BCM is considered normal if the auto active test starts successfully.
- The auto active test facilitates troubleshooting if any systems controlled by IPDM E/R cannot be operated.

Diagnosis chart in auto active test mode

Symptom	Inspection contents		Possible cause
Rear window defogger does not operate	Perform auto active test. Does the rear window defogger operate?	YES	BCM signal input circuit
		NO	• Rear window defogger • Rear window defogger ground circuit • Harness or connector between IPDM E/R and rear window defogger • IPDM E/R
Any of the following components do not operate • Parking lamps • License plate lamps • Tail lamps • Front fog lamps • Headlamp (HI, LO) • Front wiper (HI, LO)	Perform auto active test. Does the applicable system operate?	YES	BCM signal input circuit
		NO	• Lamp or motor • Lamp or motor ground circuit • Harness or connector between IPDM E/R and applicable system • IPDM E/R

Symptom	Inspection contents		Possible cause
A/C compressor does not operate	Perform auto active test. Does the magnet clutch operate?	YES	• Communication signal between BCM and auto amp. (with auto A/C) • Communication signal between BCM and heater control panel (without auto A/C, with manual A/C) • BCM • CAN communication signal between BCM and ECM • CAN communication signal between ECM and IPDM E/R
		NO	• Magnet clutch • Harness or connector between IPDM E/R and magnet clutch • IPDM E/R
Oil pressure warning lamp does not operate	Perform auto active test. Does the oil pressure warning lamp blink?	YES	• Harness or connector between IPDM E/R and oil pressure switch • Oil pressure switch • IPDM E/R
		NO	• CAN communication signal between IPDM E/R and BCM • CAN communication signal between BCM and combination meter • Combination meter
Cooling fan does not operate	Perform auto active test. Does the cooling fan operate?	YES	• ECM signal input circuit • CAN communication signal between ECM and IPDM E/R
		NO	• Cooling fan • Cooling fan ground circuit • Harness or connector between IPDM E/R and cooling fan • IPDM E/R • Cooling fan relay-3* • Harness or connector between IPDM E/R and cooling fan relay-3* • Harness or connector between cooling fan and cooling fan relay-3*

NOTE:

*: MR engine and K9K engine models

CONSULT - III Function (IPDM E/R)

INFOID:0000000001114955

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with IPDM E/R.

Diagnosis mode	Description
Ecu Identification	Allows confirmation of IPDM E/R part number.
Self Diagnostic Result	Displays the diagnosis results judged by IPDM E/R.
Data Monitor	Displays the real-time input/output data from IPDM E/R input/output data.
Active Test	IPDM E/R can provide a drive signal to electronic components to check their operations.
CAN Diag Support Monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF DIAGNOSTIC

Refer to PCS-30, "DTC Index".

DATA MONITOR

Monitor item

cardiagn.com

Monitor Item [Unit]	MAIN SIGNALS	Description
MOTOR FAN REQ [1 - 4]	×	Displays the value of the cooling fan speed signal received from ECM via CAN communication.
AC COMP REQ [Off/On]	×	Displays the status of the A/C compressor request signal received from ECM via CAN communication.
TAIL&CLR REQ [Off/On]	×	Displays the status of the position light request signal received from BCM via CAN communication.
HL LO REQ [Off/On]	×	Displays the status of the low beam request signal received from BCM via CAN communication.
HL HI REQ [Off/On]	×	Displays the status of the high beam request signal received from BCM via CAN communication.
FR FOG REQ [Off/On]	×	Displays the status of the front fog light request signal received from BCM via CAN communication.
HL WASHER REQ [Off/On]		Displays the status of the headlamp washer request signal received from BCM via CAN communication.
FR WIP REQ [Stop/1LOW/Low/Hi]	×	Displays the status of the front wiper request signal received from BCM via CAN communication.
WIP AUTO STOP [STOP P/ACT P]	×	Displays the status of the front wiper auto stop signal judged by IPDM E/R.
WIP PROT [Off/BLOCK]	×	Displays the status of the front wiper fail-safe operation judged by IPDM E/R.
ST RLY REQ [Off/On]		Displays the status of the ignition and starter request signal received from BCM via CAN communication.
IGN RLY [Off/On]	×	Displays the status of the ignition relay judged by IPDM E/R.
RR DEF REQ [Off/On]	×	Displays the status of the rear defogger request signal received from BCM via CAN communication.
OIL P SW [Open/Close]		Displays the status of the oil pressure switch judged by IPDM E/R.
REV SW [Off/On]		Displays the status of the reverse switch judged by IPDM E/R.
HOOD SW [Off/On]		Displays the status of the hood switch judged by IPDM E/R. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
THFT HRN REQ [Off/On]		Displays the status of the theft warning horn request signal received from BCM via CAN communication. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
HORN CHIRP [Off/On]		**NOTE:** This item is indicated, but not monitored.
IGN ON SW [Off/On]		Displays the status of the ignition switch judged by IPDM E/R.

ACTIVE TEST

Test item

Test item	Operation	Description
REAR DEFOGGER	Off	OFF
	On	Operates the rear window defogger relay.
FRONT WIPER	Off	OFF
	Lo	Operates the front wiper relay.
	Hi	Operates the front wiper relay and front wiper high relay.

carDiag.com

Test item	Operation	Description
MOTOR FAN	1	OFF
	2	Operates the cooling fan relay (low operation).
	3	Operates the cooling fan relay (high operation).
	4	
HEAD LAMP WASHER	On	Operates the headlamp washer relay for 1 second.
EXTERNAL LAMPS	Off	OFF
	TAIL	Operates the tail lamp relay.
	Lo	Operates the headlamp low relay.
	Hi	Operates the headlamp low relay and ON/OFF the headlamp high relay at 1 second intervals.
	Fog	Operates the front fog lamp relay.
HORN	On	Operates horn relay for 20 ms.

cardiagn.com

COMPONENT DIAGNOSIS

REAR WINDOW DEFOGGER SWITCH WITH AUTO A/C

WITH AUTO A/C : Description

INFOID:0000000000951265

The rear window defogger is operated by turning the rear window defogger switch ON.

WITH AUTO A/C : Component Function Check

INFOID:0000000000951266

1.CHECK REAR WINDOW DEFOGGER SWITCH OPERATION

Check (“REAR DEF SW”, “IGN ON SW”) in DATA MONITOR mode with CONSULT-III. Refer to DEF-6, "REAR WINDOW DEFOGGER : CONSULT-III Function (BCM - REAR DEFOGGER)".

When rear defogger switch is turned to ON

REAR DEF SW :ON

OK or NG

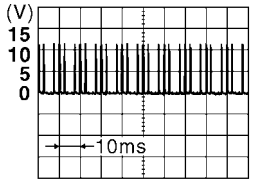
OK >> Rear window defogger switch is OK.
NG >> Refer to DEF-13, "WITH AUTO A/C : Diagnosis Procedure".

WITH AUTO A/C : Diagnosis Procedure

INFOID:0000000000951267

1.CHECK REAR WINDOW DEFOGGER SWITCH OPERATION

1. Turn ignition switch ON.
2. Check voltage between BCM connector ground.

Connector	Terminal (+)	Terminal (–)	Condition	Voltage (V) (Approx.)
M65	21	Ground	Rear window defogger switch is pressed.	0
			Rear window defogger switch is OFF.	

JPMIA0154GB

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK REAR WINDOW DEFOGGER SWITCH CIRCUIT HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and auto amp. connector.
3. Check continuity between BCM connector and auto amp. connector.

BCM connector	Terminal	Auto amp. connector	Terminal	Continuity
M65	21	M53	23	Yes

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	21		No

Is the inspection result normal?

YES >> GO TO 3.

carDiagn.com

NO >> Repair or replace harness between BCM and auto amp.

3.CHECK REAR WINDOW DEFOGGER SWITCH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect auto amp,connector.
3. Check continuity between auto amp. connector and ground.

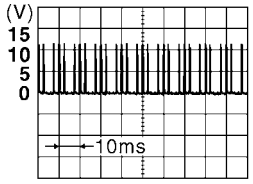
Auto amp. connector	Terminal	Ground	Continuity
M53	17		Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness between auto amp.and ground.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Turn ignition switch ON.
3. Check voltage between BCM connector and ground.

Connector	Terminal		Voltage (V) (Approx.)
	(+)	(–)	
M65	21	Ground	

JPMIA0154GB

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 6.

5.CHECK IINTERMITTENT INCDENT

Check intermittent incident.
Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace auto amp. Refer to VTL-21, "Removal and Installation".
NO >> Repair or replace the malfunctioning parts.

6.CHECK IINTERMITTENT INCDENT

Check intermittent incident.
Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> Repair or replace the malfunctioning parts.

WITHOUT AUTO A/C

WITHOUT AUTO A/C : Description

INFOID:0000000000978700

The rear window defogger is operated by turning the rear window defogger switch ON.

WITHOUT AUTO A/C : Component Function Check

INFOID:0000000000978756

1.CHECK REAR WINDOW DEFOGGER SWITCH OPERATION

Check (“REAR DEF SW”, “IGN ON SW”) in DATA MONITOR mode with CONSULT-III. Refer to DEF-6, "REAR WINDOW DEFOGGER : CONSULT-III Function (BCM - REAR DEFOGGER)".

cardiagn.com

When rear defogger switch is turned to ON

REAR DEF SW :ON

OK or NG

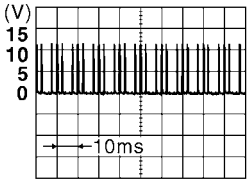
OK >> Rear window defogger switch is OK.
NG >> Refer to DEF-13, "WITH AUTO A/C : Diagnosis Procedure".

WITHOUT AUTO A/C : Diagnosis Procedure

INFOID:0000000000978757

1.CHECK REAR WINDOW DEFOGGER SWITCH OPERATION

1. Turn ignition switch ON.
2. Check voltage between BCM connector ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(–)		
M65	21	Ground	Rear window defogger switch is pressed.	0
			Rear window defogger switch is OFF.	

JPMIA0154GB

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK REAR WINDOW DEFOGGER SWITCH CIRCUIT HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and heater control panel connector.
3. Check continuity between BCM connector and heater control panel connector.

BCM connector	Terminal	Heater control panel connector	Terminal	Continuity
M65	21	M54	18	Yes

4. Check continuity between BCM connector and ground

BCM connector	Terminal	Ground	Continuity
M65	21		No

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and heater control panel.

3.CHECK REAR WINDOW DEFOGGER SWITCH

Check rear window defogger switch.
Refer to DEF-16, "WITHOUT AUTO A/C : Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace heater control panel (rear window defogger switch). Refer to VTL-72, "Removal and Installation".

4.CHECK REAR WINDOW DEFOGGER SWITCH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector.
3. Check continuity between heater control panel connector and ground.

carDiagn.com

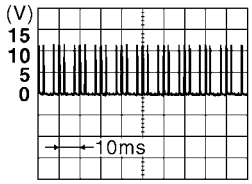
Heater control panel connector	Terminal	Ground	Continuity
M54	20		Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness between heater control panel and ground.

5.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Turn ignition switch ON.
3. Check voltage between BCM connector and ground.

Connector	Terminal (+)	Terminal (–)	Voltage (V) (Approx.)
M65	21	Ground	

JPMIA0154GB

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> GO TO 6.

6.CHECK INTERMITTENT INCDENT

Check intermittent incident.
Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> Repair or replace the malfunctioning parts.

WITHOUT AUTO A/C : Component Inspection

INFOID:0000000000997885

1.CHECK HEATER CONTROL PANEL (REAR WINDOW DEFOGGER SWITCH)

Check heter control panel (rear window defogger switch).

Terminal (Heater control panel)		Condition	Continuity
18	20	Rear window defogger switch is pressed	Existed
		Rear window defogger switch: OFF	Not existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace heter control panel (rear window defogger switch). Refer to VTL-72, "Removal and Installation".

cardiagn.com

REAR WINDOW DEFOGGER POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000000951272

Heats the heating wire with the power supply from the rear window defogger relay to prevent the rear window from fogging up.

Component Function Check

INFOID:0000000000951273

1.CHECK REAR WINDOW DEFOGGER

Check that the heating wire of rear window defogger is heated when turning the rear window defogger switch ON.

Is the inspection result normal?

YES >> Rear window defogger is OK.
NO >> Refer to DEF-17, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000951274

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between rear window defogger connector and ground.

Terminals			Condition of rear window defogger switch	Voltage (V) (Approx.)
(+)		(–)		
Rear window defogger connector	Terminal			
B58	1	Ground	ON	Battery voltage
			OFF	0

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect rear window defogger connector.
3. Check continuity between rear window defogger connector and ground.

Rear window defogger connector	Terminal	Ground	Continuity
D155	2		Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness between rear window defogger and ground.

3.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R and rear window defogger connectors.
3. Check continuity between IPDM E/R and rear window defogger connector.

IPDM E/R connector	Terminal	Rear window defogger connector	Terminal	Continuity
E14	49	B58	1	Existed

4. Check continuity between IPDM E/R connector and ground.

IPDM E/R connector	Terminal	Ground	Continuity
E14	49		Not existed

cardiagn.com

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness between IPDM E/R and rear window defogger .

4.CHECK FILAMENT

Check filament.
Refer to DEF-18, "Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair filament.

5.CHECK IPDM E/R OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between IPDM E/R connector and ground.

Terminal		Condition	Voltage (V) (Approx.)
(+)	(–)		
49	Ground	Rear window defogger switch : ON	Battery voltage
		Rear window defogger switch : OFF	0

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".

Component Inspection

INFOID:0000000000951275

1.CHECK FILAMENT

Check the filament for damage or blown.
Refer to DEF-75, "Inspection and Repair".

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Repair filament.

cardiagn.com

DRIVER SIDE DOOR MIRROR DEFOGGER

Description

INFOID:0000000000951276

Heats the heating wire with the power supply from the rear window defogger relay to prevent the door mirror from fogging up.

Component Function Check

INFOID:0000000000951277

1.CHECK DRIVER SIDE DOOR MIRROR DEFOGGER

Check that heating wire of driver side door mirror defogger is heated when turning the rear window defogger switch ON.

Is the inspection result normal?

YES >> Driver side door mirror defogger is OK.
NO >> Refer to DEF-19, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000951278

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door mirror (driver side) connector.
3. Turn ignition switch ON.
4. Check voltage between door mirror (driver side) connector and ground.

Terminals			Condition of rear window defogger switch	Voltage (V) (Approx.)
(+)		(–)		
Door mirror (driver side) connector	Terminal			
D3(LHD) D23(RHD)	7	Ground	ON	Battery voltage
			OFF	0

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between door mirror (driver side) connector and ground.

Door mirror (driver side) connector	Terminal	Ground	Continuity
D3(LHD) D23(RHD)	8		Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness between door mirror (driver side) and ground.

3.CHECK DOOR MIRROR HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between door mirror (driver side) connector and IPDM E/R.

Door mirror (driver side) connector	Terminal	IPDM E/R connector	Terminal	Continuity
D3(LHD) D23(RHD)	7	E14	49	Existed

4. Check continuity between door mirror (driver side) connector and ground.

A B C D E F G H I J K DEF M N O P
cardiagn.com

Door mirror (driver side) connector	Terminal	Ground	Continuity
D3(LHD) D23(RHD)	7		Not existed

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident"
NO >> Repair or replace harness between door mirror (driver side) and IPDM E/R.

4. CHECK DRIVER SIDE DOOR MIRROR DEFOGGER

Check driver side door mirror defogger.
Refer to DEF-20, "Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Replace door mirror (driver side). Refer to MIR-39, "Removal and Installation".

Component Inspection

INFOID:0000000000951279

1. CHECK DRIVER SIDE DOOR MIRROR DEFOGGER

1. Turn ignition switch OFF.
2. Disconnect door mirror (driver side) connector.
3. Check continuity between door mirror terminals.

Door mirror (diver side) connector	Terminal		Continuity
D3(LHD) D23(RHD)	7	8	Existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace door mirror (driver side). Refer to MIR-39, "Removal and Installation".

cardiagn.com

PASSENGER SIDE DOOR MIRROR DEFOGGER

Description

INFOID:0000000000951280

Heats the heating wire with the power supply from the rear window defogger relay to prevent the door mirror from fogging up.

Component Function Check

INFOID:0000000000951281

1.CHECK PASSENGER SIDE DOOR MIRROR DEFOGGER

Check that the heating wire of passenger side door mirror defogger is heated when turning the rear window defogger switch ON.

Is the inspection result normal?

YES >> Passenger side door mirror defogger is OK.
NO >> Refer to DEF-21, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000998568

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door mirror (passenger side) connector.
3. Turn ignition switch ON.
4. Check voltage between door mirror (passenger side) connector and ground.

Terminals			Condition of rear window defogger switch	Voltage (V) (Approx.)
(+)		(–)		
Door mirror (passenger side) connector	Terminal			
D43(LHD) D63(RHD)	7	Ground	ON	Battery voltage
			OFF	0

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between door mirror (passenger side) connector and ground.

Door mirror (passenger side) connector	Terminal	Ground	Continuity
D43(LHD) D63(RHD)	8		Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness between door mirror (passenger side) and ground.

3.CHECK DOOR MIRROR HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between door mirror (passenger side) connector and IPDM E/R.

Door mirror (passenger side) connector	Terminal	IPDM E/R connector	Terminal	Continuity
D43(LHD) D63(RHD)	7	E14	49	Existed

4. Check continuity between door mirror (passenger side) connector and ground.

A B C D E F G H I J K DEF M N O P
cardiagn.com

Door mirror (passenger side) connector	Terminal		Continuity
D43(LHD) D63(RHD)	7	Ground	Not existed

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness between door mirror (passenger side) and IPDM E/R.

4. CHECK PASSENGER SIDE DOOR MIRROR DEFOGGER

Check passenger side door mirror defogger.
Refer to DEF-20, "Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Replace door mirror (passenger side). Refer to MIR-39, "Removal and Installation".

Component Inspection

INFOID:0000000000951283

1. CHECK PASSENGER DOOR MIRROR DEFOGGER

1. Turn ignition switch OFF.
2. Disconnect door mirror (passenger side) connector.
3. Check continuity between door mirror terminals.

Door mirror (passenger side) connector	Terminal		Continuity
D43(LHD) D63(RHD)	7	8	Existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace door mirror (passenger side). Refer to MIR-39, "Removal and Installation".

cardiagn.com

REAR WINDOW DEFOGGER ON SIGNAL WITH AUTO A/C

WITH AUTO A/C : Description

INFOID:0000000001025363

Turns the indicator lamp in the rear window defogger switch ON when operating the rear window defogger.

WITH AUTO A/C : Component Function Check

INFOID:0000000001025364

1.CHECK REAR WINDOW DEFOGGER ON SIGNAL

Check that the indicator lamps of rear window defogger switch are illuminated when turning the rear window defogger switch ON.

Is the inspection result normal?

OK >> Rear window defogger ON signal is OK.
NG >> Refer to DEF-23, "WITH AUTO A/C : Diagnosis Procedure".

WITH AUTO A/C : Diagnosis Procedure

INFOID:0000000001025365

1.CHECK REAR WINDOW DEFOGGER ON SIGNAL

1. Turn ignition switch ON.
2. Check voltage between auto amp. connector ground.

Auto amp. connector	Terminal		Condition	Voltage (V) (Approx.)
	(+)	(–)		
M53	22	Ground	Rear window defogger switch is pressed.	Battery voltage
			Rear window defogger switch is OFF.	0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R and auto amp. connector.
3. Check continuity between IPDM E/R connector and auto amp. connector.

IPDM E/R connector	Terminal	Auto amp. connector	Terminal	Continuity
E14	49	M53	22	Existed

4. Check continuity between BCM connector and ground.

IPDM E/R connector	Terminal	Ground	Continuity
E14	49		Not existed

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness between IPDM E/R and auto amp.

3.CHECK IINTERMITTENT INCDENT

Check intermittent incident.
Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace auto amp. Refer to VTL-21, "Removal and Installation".
NO >> Repair or replace the malfunctioning parts.

WITHOUT AUTO A/C

WITHOUT AUTO A/C : Description

INFOID:0000000001025367

cardiagn.com

Turns the indicator lamp in the rear window defogger switch ON when operating the rear window defogger.

WITHOUT AUTO A/C : Component Function Check

INFOID:0000000001025368

1.CHECK REAR WINDOW DEFOGGER ON SIGNAL

Check that the indicator lamps of rear window defogger switch are illuminated when turning the rear window defogger switch ON.

Is the inspection result normal?

OK >> Rear window defogger ON signal is OK.
NG >> Refer to DEF-23, "WITH AUTO A/C : Diagnosis Procedure".

WITHOUT AUTO A/C : Diagnosis Procedure

INFOID:0000000001025369

1.CHECK REAR WINDOW DEFOGGER ON SIGNAL

1. Turn ignition switch ON.
2. Check voltage between heater control panel connector ground.

Heater control panel connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(–)		
M54	19	Ground	Rear window defogger switch is ON.	Battery voltage
			Rear window defogger switch is OFF.	0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R and heater control panel connector.
3. Check continuity between IPDM E/R connector and heater control panel connector.

IPDM E/R connector	Terminal	Heater control panel connector	Terminal	Continuity
E14	49	M54	19	Existed

4. Check continuity between BCM connector and ground

IPDM E/R connector	Terminal	Ground	Continuity
E14	49		Not existed

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness between IPDM E/R and heater control panel.

3.CHECK IINTERMITTENT INCDENT

Check intermittent incident.
Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace heater control panel. Refer to VTL-72, "Removal and Installation".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001114994

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

cardiagn.com

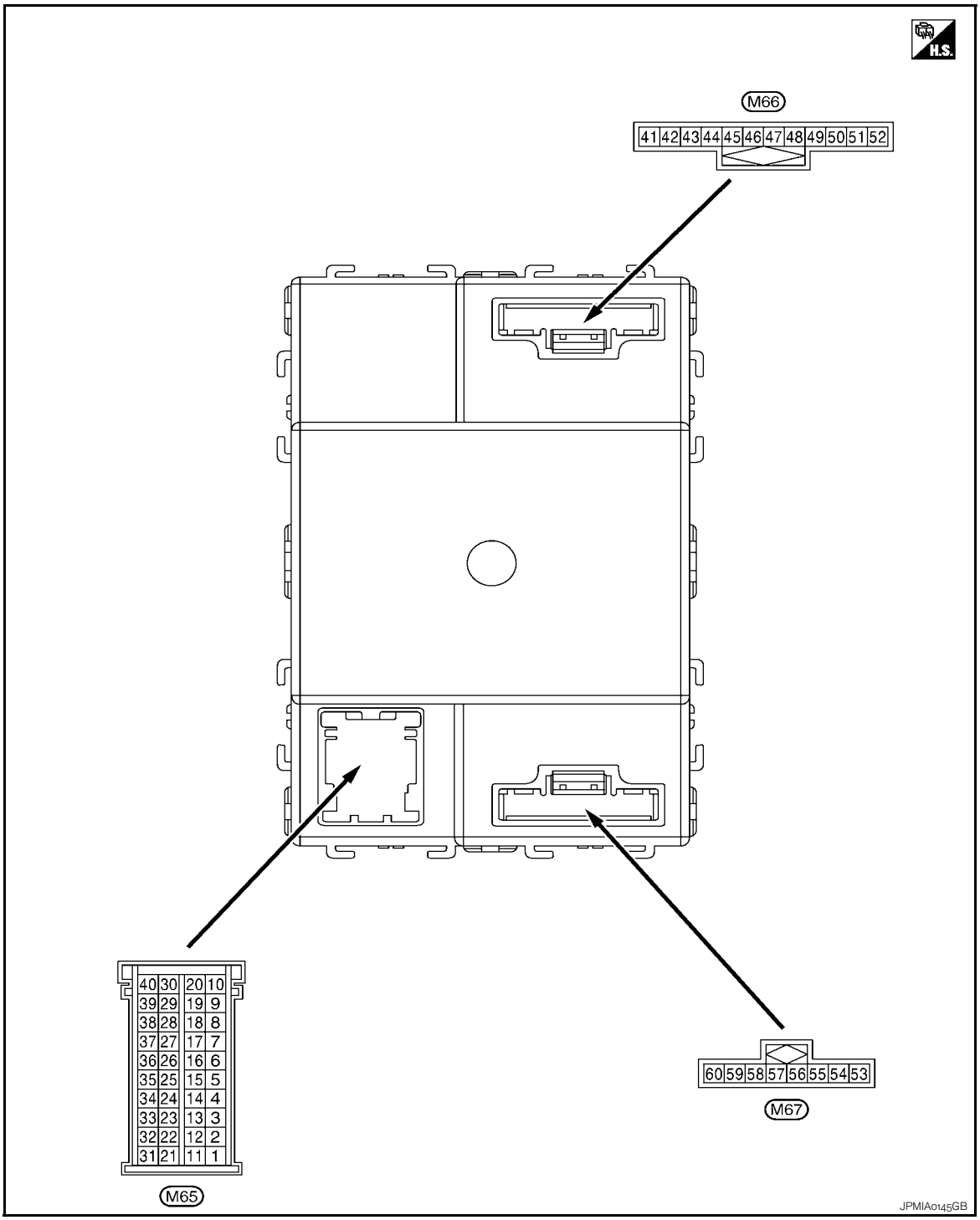
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

carDiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

cardiagn.com

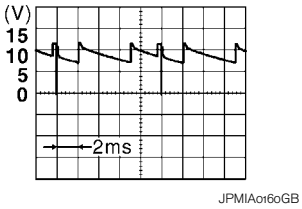
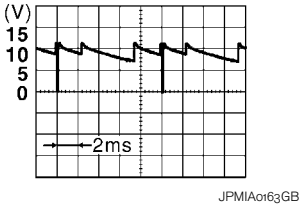
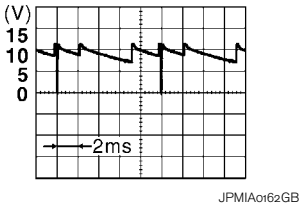
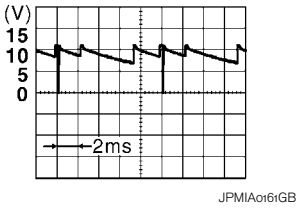
TERMINAL LAYOUT



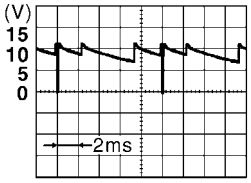
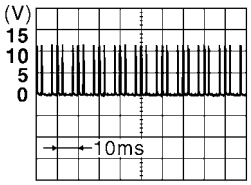
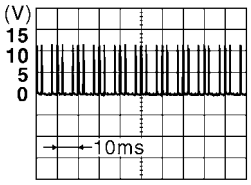
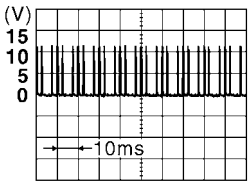
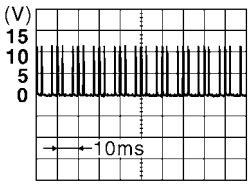
PHYSICAL VALUES

CAUTION:

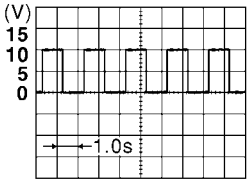
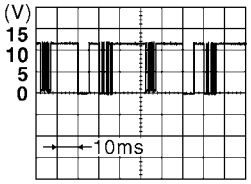
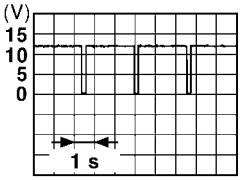
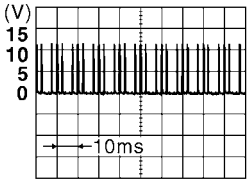
- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

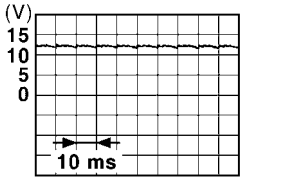
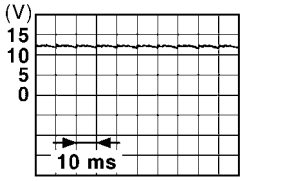
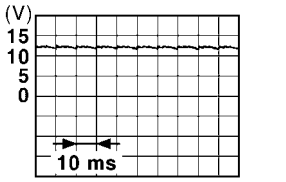
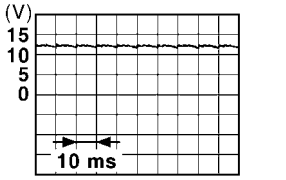
cardiagn.com

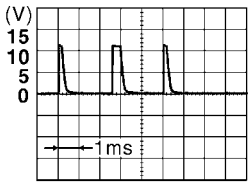
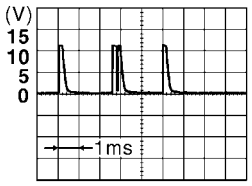
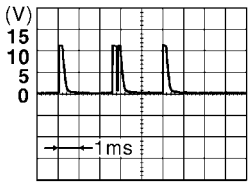
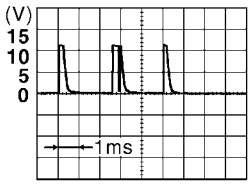
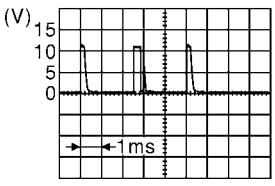
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

carDiagn.com

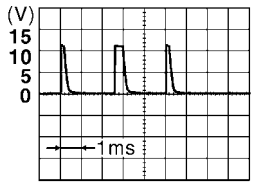
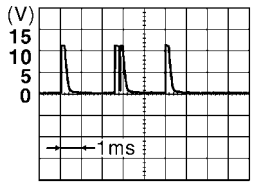
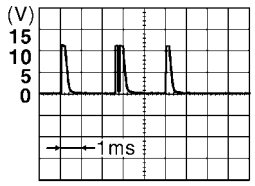
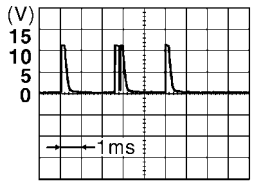
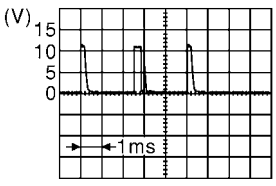
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

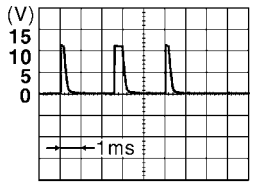
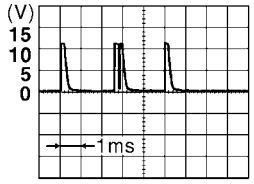
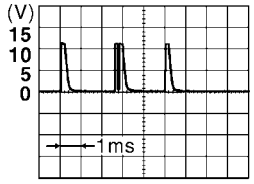
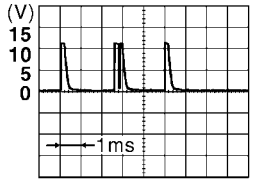
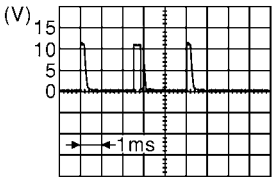
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIB0924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIB0924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIB0924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIB0924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

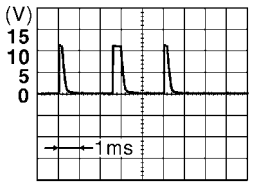
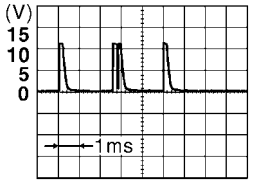
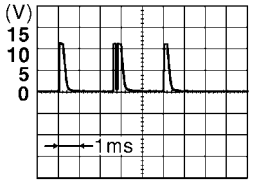
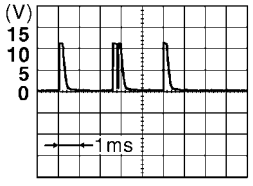
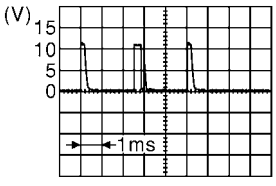
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

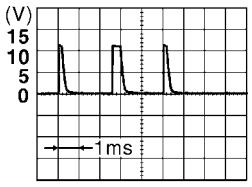
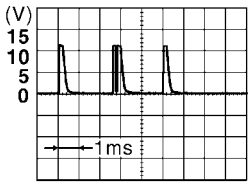
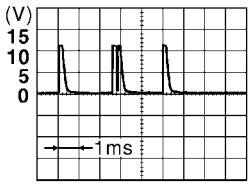
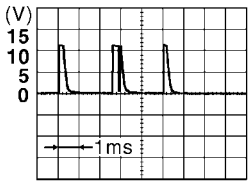
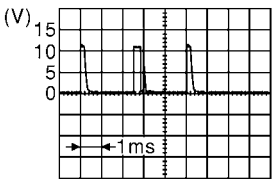
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

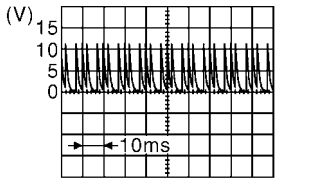
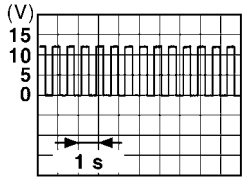
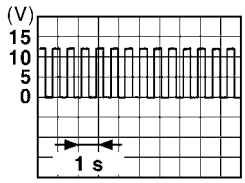
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

carDiag.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

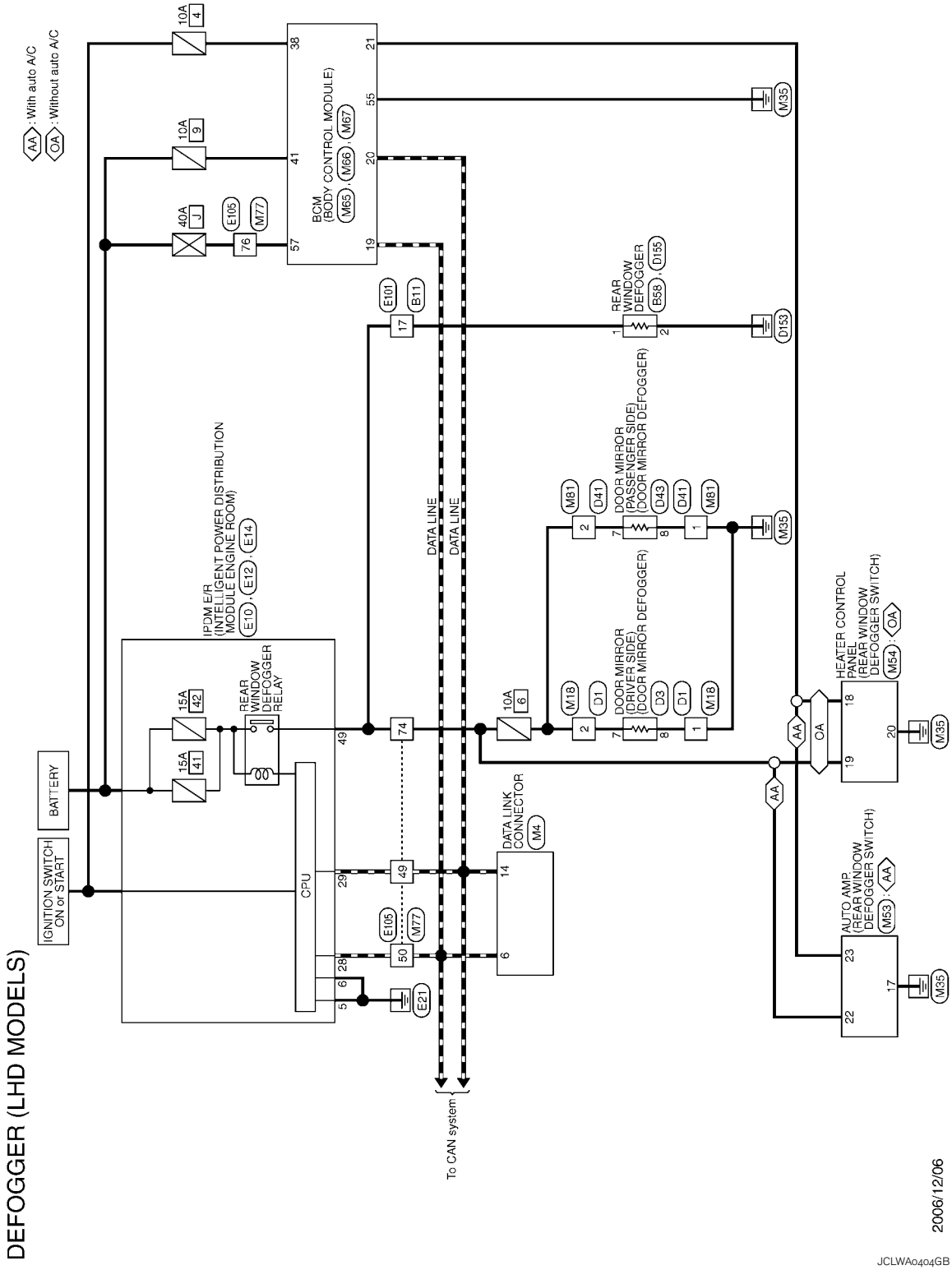
*1: With Intelligent Key system

*2: Without Intelligent Key system

cardiagn.com

Wiring Diagram - DEFOGGER CONTROL SYSTEM (LHD MODELS) -

INFOID:0000000001114995

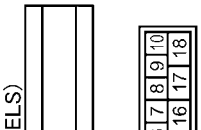


carsdiagn.com

DEFOGGER (LHD MODELS)

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
17	B	-

Connector No.	B58
Connector Name	REAR WINDOW DEFOGGER
Connector Type	P01FB-A

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

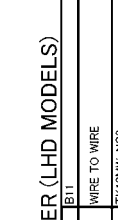
Connector No.	D3
Connector Name	DOOR MIRROR (DRIVER SIDE)
Connector Type	TK08MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	B	-

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	P	-

Connector No.	D43
Connector Name	DOOR MIRROR (PASSENGER SIDE)
Connector Type	TK08MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	B	-

Connector No.	D153
Connector Name	BODY GROUND
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	-	-

Connector No.	D155
Connector Name	REAR WINDOW DEFOGGER
Connector Type	P01FB-A

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-

JCLWA0405GB

cardiagn.com

DEFOGGER (LHD MODELS)

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
74	G	-
76	Y	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
26	L	-
29	P	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	YZK-7283-5591-40-F

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	-

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
17	G	-

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
17	B	GND
22	R	RR DEF F/B
23	SB	RR DEF ON

JCLWA0406GB

carDiagn.com

DEFOGGER (LHD MODELS)

Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY

H.S.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Terminal No.	Color of Wire	Signal Name [Specification]
18	SB	RR DEF
19	R	RR DEF F/B
20	B	GND

Connector No.	M55
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L
21	SB	REAR DEFFOGER SW
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

52	51	50	49	48	47	46	45	44	43	42	41

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

H.S.

60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
74	R	-
76	Y	-

Connector No.	M81
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	16

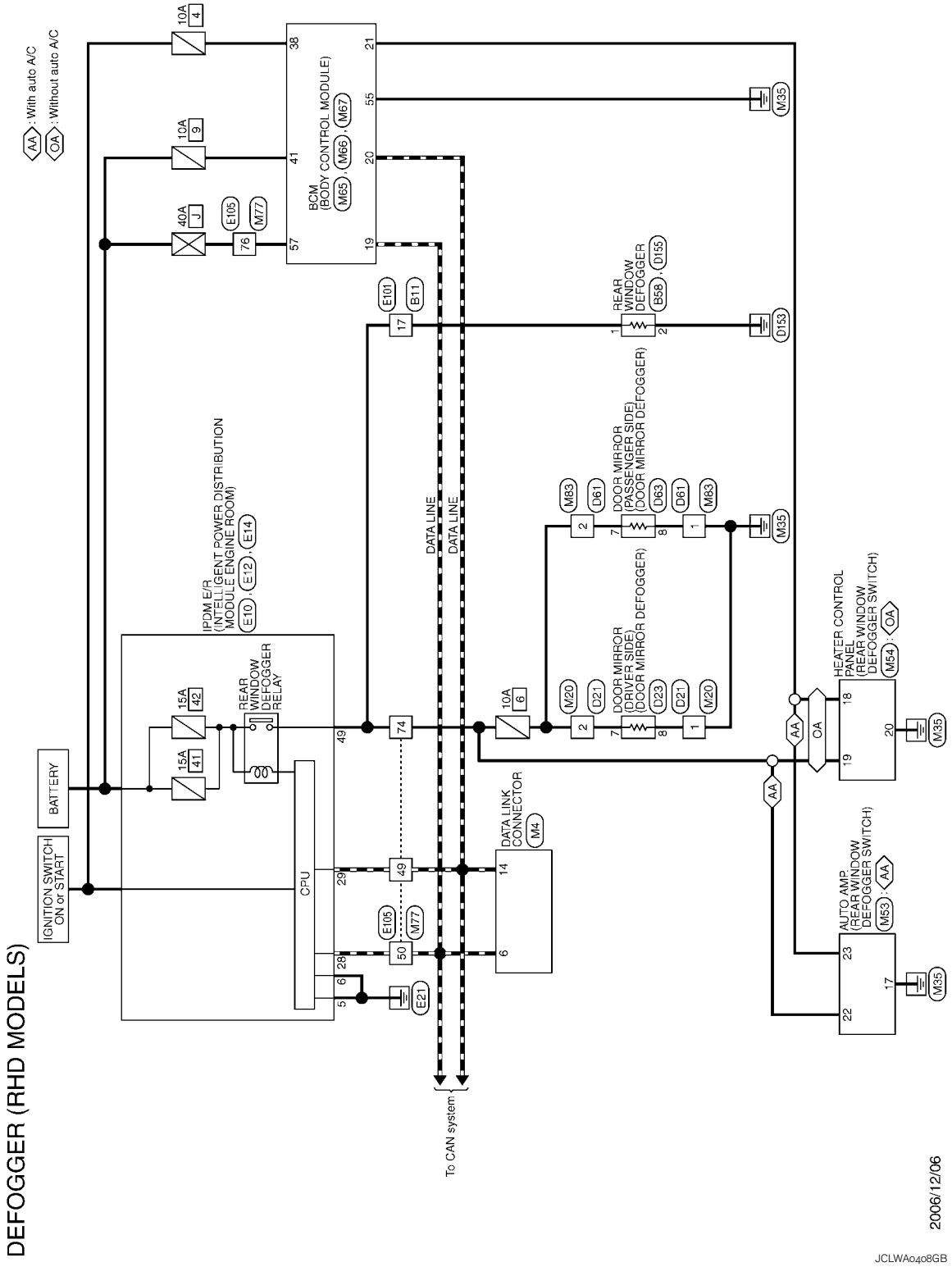
Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

JCLWA0407GB

cardiagn.com

Wiring Diagram - DEFOGGER CONTROL SYSTEM (RHD MODELS) -

INFOID:0000000001125403



carDiagn.com

DEFOGGER (RHD MODELS)

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
17	B	-

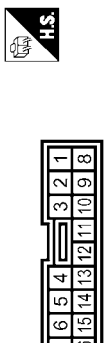
Connector No.	B58
Connector Name	REAR WINDOW DEFOGGER
Connector Type	P01FB-A

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	P	-

Connector No.	D23
Connector Name	DOOR MIRROR (DRIVER SIDE)
Connector Type	TK08MGY



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	B	-

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

Connector No.	D63
Connector Name	DOOR MIRROR (PASSENGER SIDE)
Connector Type	TK08MGY

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	B	-

Connector No.	D155
Connector Name	REAR WINDOW DEFOGGER
Connector Type	P01FB-A

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

JCLWA0409GB

cardiagn.com

DEFOGGER (RHD MODELS)

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

25 24 23 22 21
32 31 30 29 28 27 26

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	–
29	P	–

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

H.S.

51 50 49
54 53 52

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

10 9 8 7 6 5 4 3 2 1
18 17 16 15 14 13 12 11

Terminal No.	Color of Wire	Signal Name [Specification]
17	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
74	G	–
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

9 10 11 12 13 14 15 16
1 2 3 4 5 6 7 8

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

1 2 3 4 5 6 7
8 9 10 11 12 13 14 15 16

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	G	–

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
17	B	GND
22	R	RR DEF F/B
23	SB	RR DEF ON

Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY

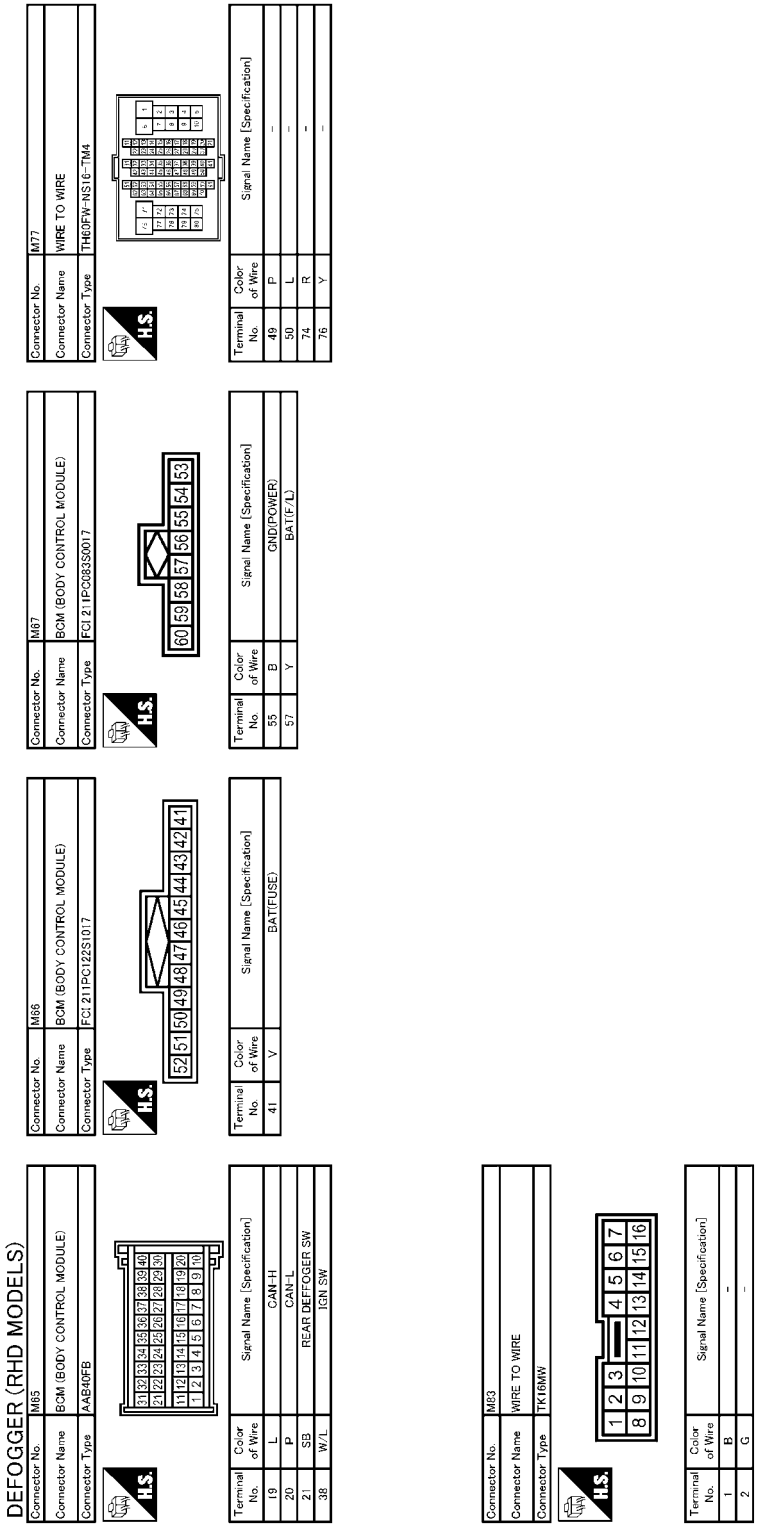
H.S.

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20

Terminal No.	Color of Wire	Signal Name [Specification]
18	SB	RR DEF
19	R	RR DEF F/B
20	B	GND

JCLWA0410GB

carsdiagn.com



JCLWA0411GB

Fail Safe

INFOID:0000000001114996

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001114997

carDiagn.com

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001114998

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Reference Value

INFOID:0000000001035893

VALUES ON THE DIAGNOSIS TOOL

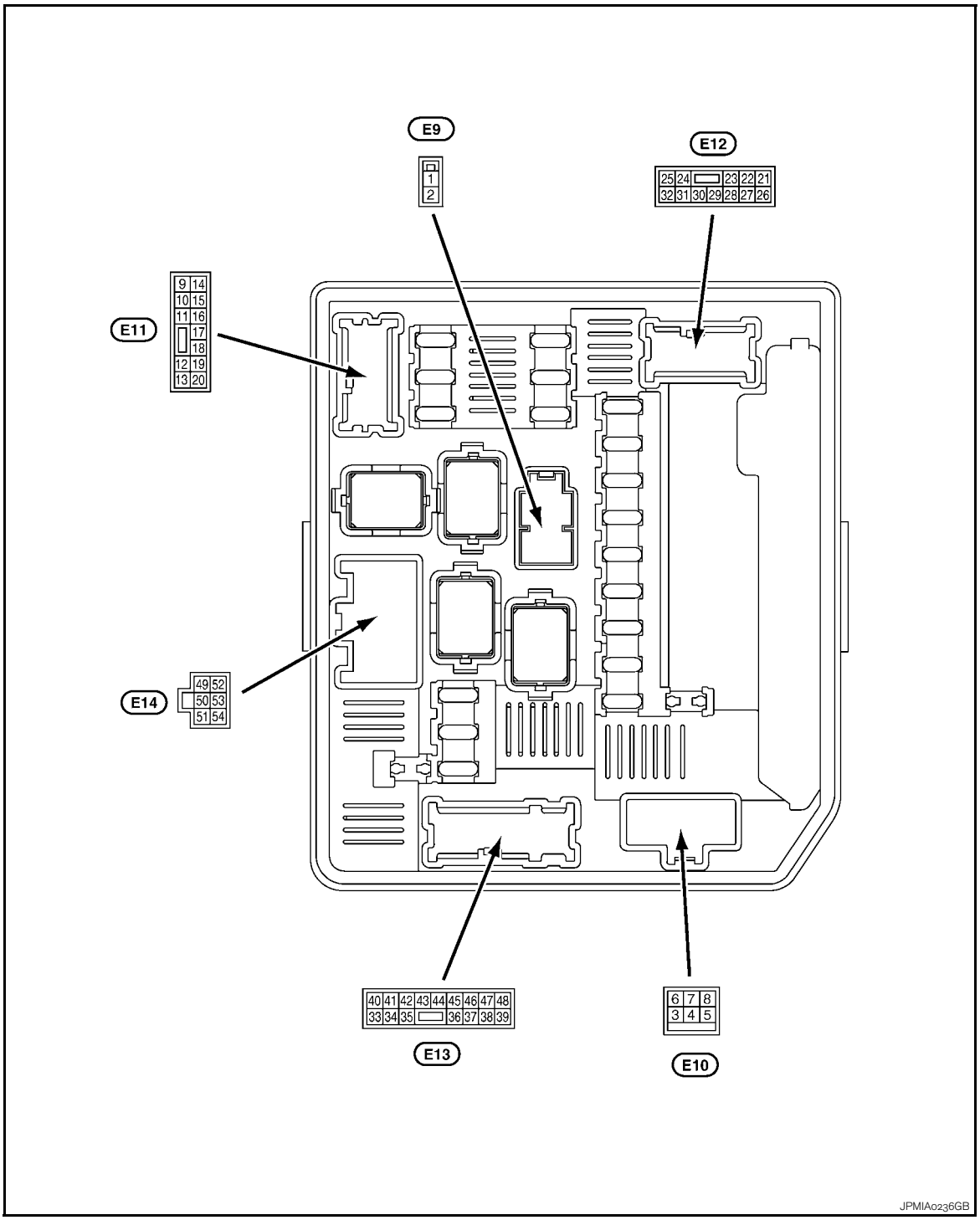
Monitor Item	Condition		Value/Status
MOTOR FAN REQ	Engine idle speed	Changes depending on engine coolant temperature, air conditioner operation status, vehicle speed, etc.	1 - 3
AC COMP REQ	Engine running	A/C switch OFF	Off
		A/C switch ON (Compressor is operating)	On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI (Light is illuminated)		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		Front fog lamp switch ON	On
HL WASHER REQ	Ignition switch ON, and low beam headlamp is ON	Front washer switch OFF	Off
		Front washer switch ON (When headlamp washer is operating)	On
FR WIP REQ	Ignition switch ON	Front wiper switch OFF	STOP
		Front wiper switch INT	1LOW
		Front wiper switch LO	Low
		Front wiper switch HI	Hi
WIP AUTO STOP	Ignition switch ON	Front wiper stop position	STOP P
		Any position other than front wiper stop position	ACT P
WIP PROT	Ignition switch ON	Front wiper operates normally	Off
		Front wiper stops at fail-safe operation	BLOCK
ST RLY REQ **NOTE:** Vehicle without Intelligent Key system indicates only “ON”, and it does not change.	When Intelligent Key is outside the vehicle, and the push switch is pushed		Off
	When Intelligent Key is inside the vehicle, and the push switch is pushed		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Ignition switch ON	Rear window defogger switch OFF	Off
		Rear window defogger switch ON (Rear window defogger is operating)	On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close

carDiagn.com

Monitor Item	Condition	Value/Status
REV SW	Except selector lever R position	Off
	Selector lever R position	On
HOOD SW **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Close the hood	Off
	Open the hood	On
THFT HRN REQ **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Not operation	Off
	Horn is activated with Vehicle Security (Theft Warning) system.	On
HORN CHIRP	**NOTE:** This item is indicated, but not monitored.	Off
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

cardiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
		Signal name	Input/ Output		
+	–				
1 (G)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
2 (R)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
5 (B)	Ground	Ground	—	Ignition switch ON	0 V

carDiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
6 (B)	Ground	Ground	—	Ignition switch ON		0 V
7 (Y)	Ground	Front wiper LO	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch LO	Battery voltage
8 (Y/R)	Ground	Front wiper HI	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch HI	Battery voltage
9 (G)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
10*1 (L/R)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
11*2 (O)	Ground	PTC heater 1 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
12*2 (G/Y)	Ground	PTC heater 2 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
14 (R/B)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
15 (Y/L)*1 (B/R)*2	Ground	ECM relay control	Input	• Engine running • Ignition switch OFF (For a few seconds after turning ignition switch OFF)		0 - 1.0 V*1
						0.6 V*2
				Ignition switch OFF or ACC (More than a few seconds after turning ignition switch OFF)		Battery voltage
16*3 (Y/R)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
19*1 (R/O)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
21*4 (GR)	Ground	Hood switch	Input	Close the hood		Battery voltage
				Open the hood		0 V
22 (Y/G)	Ground	Reverse switch	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON	• Selector lever “R” (Except M/T models) • M/T control lever “R” (M/T models)	Battery voltage
					• Selector lever in any position other than “R” (Except M/T models) • M/T control lever in any position other than “R” (M/T models)	0 V
23 (Y/B)	Ground	A/C relay power supply	Output	Engine stopped		0 V
				Engine running	A/C switch OFF	0 V
					A/C switch ON (A/C compressor is operating)	Battery voltage
24 (R/Y)	Ground	Headlamp LO (RH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
25*1 (G/L)	Ground	ETC relay control	Input	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		0 - 1.0 V
26 (O)	Ground	Front wiper auto stop	Input	Ignition switch ON	Front wiper stop position	0 V
					Any position other than front wiper stop position	Battery voltage
27 (W)	Ground	Oil pressure switch	Input	Engine stopped		0 V
				Engine running		Battery voltage
28 (L)	—	CAN-H	Input/ Output	—		—
29 (P)	—	CAN-L	Input/ Output	—		—
30*4 (L)	Ground	Horn relay control	Output	The horn is not activated		Battery voltage
				The horn is activated		0 V
31 (R)	Ground	Headlamp LO (sensor)	Output	Ignition switch ON	Lighting switch OFF	0 V
					Lighting switch 2ND	Battery voltage
32*1 (R/Y)	Ground	ETC relay power supply	Output	Ignition switch ON		Battery voltage
33*1 (B/O)	Ground	Fuel pump relay control	Input	• Engine running • Ignition switch ON (For 1 second after turning ignition switch ON)		0 - 1.0 V
				Ignition switch ON (More than 1 second after turning ignition switch ON)		Battery voltage
34 (R/B)	Ground	Starter relay power supply	Input	Ignition switch ON (Except M/T models)	Selector lever “P” or “N”	0 V
					Selector lever in any position other than “P” or “N”	Battery voltage
				Ignition switch ON (M/T models)		
35 (W/L)	Ground	Ignition switch ON	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
36 (W)	Ground	Front fog lamp (RH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
37 (R/W)	Ground	Parking lamp (RH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
38 (R/L)	Ground	Tail, license plate lamps and illuminations	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
39 (GR)	Ground	Headlamp washer relay control	Output	Ignition switch ON	When headlamp washer is operating	0 V
					When headlamp washer is not operating	Battery voltage
40*1 (BR/Y)*5 (SB)*6	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
41 (P)	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

carDiag.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
42*1 (B/Y)	Ground	Fuel pump relay power supply	Output	• Ignition switch OFF or ACC • Approximately 1 second or more after turning the ignition switch ON		0 V
				• Approximately 1 second after turning the ignition switch ON • Engine running		Battery voltage
43 (W/B)	Ground	Front fog lamp (LH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
44 (L)	Ground	Headlamp LO (LH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
45 (L/W)	Ground	Headlamp HI (RH)	Output	• Lighting switch 2ND and HI • lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
46 (G)	Ground	Headlamp HI (LH)	Output	• Lighting switch 2ND and HI • Lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
47 (R/L)	Ground	Parking lamp (LH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
48*7 (Y)	Ground	Cooling fan relay-3 control	Output	When cooling fan does HI operation		0 V
				When cooling fan does OFF or LO operation		Battery voltage
49 (B)	Ground	Rear window defogger relay power supply	Output	Ignition switch ON	Rear window defogger switch ON	Battery voltage
					Rear window defogger switch OFF	0 V
50 (B/R)	Ground	Starter relay power supply	Output	When engine is clanking		Battery voltage
				When engine is not clanking		0 V
51 (P)	Ground	Ignition switch START	Input	Ignition switch START		Battery voltage
				Ignition switch OFF, ACC or ON		0 V
52 (W)	Ground	Cooling fan relay-1 power supply	Output	When cooling fan does LO or HI operation		Battery voltage
				When cooling fan does OFF operation		0 V
53 (W/B)	Ground	Battery power supply (Cooling fan relay)	Input	Ignition switch OFF		Battery voltage
54*5 (R)	Ground	Cooling fan relay-2 power supply	Input	When cooling fan does HI operation		Battery voltage
				When cooling fan does OFF or LO operation		0 V

*1: HR engine and MR engine models

*2: K9K engine models

*3: Except M/T models only

*4: With vehicle security (theft warning) system

*5: HR engine models

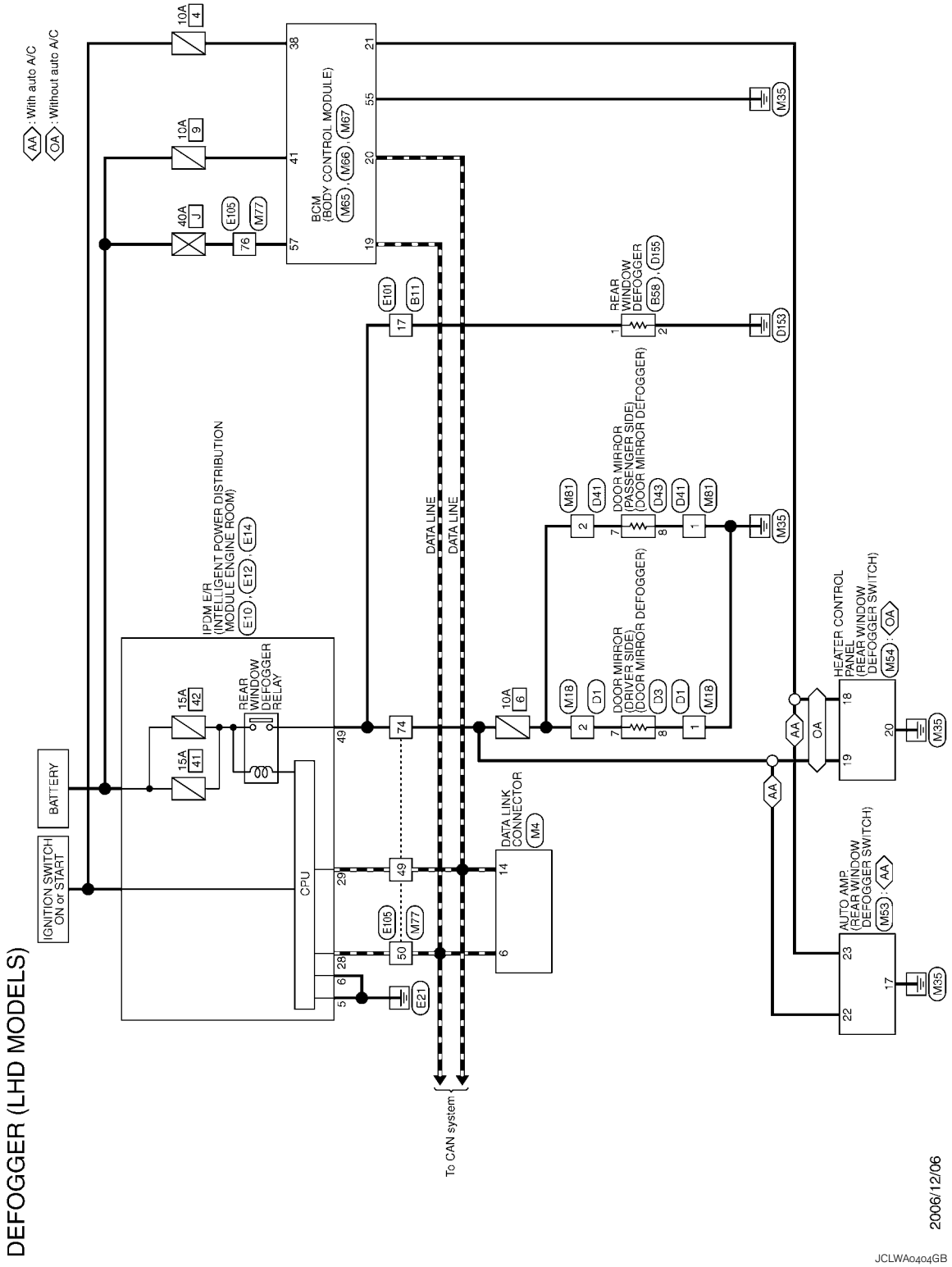
*6: MR engine models

*7: MR engine and K9K engine models

cardiagn.com

Wiring Diagram - DEFOGGER CONTROL SYSTEM (LHD MODELS) -

INFOID:0000000001125404

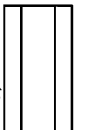


carDiagn.com

DEFOGGER (LHD MODELS)

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
17	B	-

Connector No.	B58
Connector Name	REAR WINDOW DEFOGGER
Connector Type	P01FB-A

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

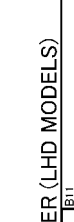
Connector No.	D3
Connector Name	DOOR MIRROR (DRIVER SIDE)
Connector Type	TK08MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	B	-

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	P	-

Connector No.	D43
Connector Name	DOOR MIRROR (PASSENGER SIDE)
Connector Type	TK08MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	B	-

Connector No.	D153
Connector Name	BODY GROUND
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	-	-

Connector No.	D155
Connector Name	REAR WINDOW DEFOGGER
Connector Type	P01FB-A

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-

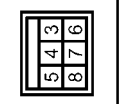
JCLWA0405GB

cardiagn.com

DEFOGGER (LHD MODELS)

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
26	L	-
29	P	-

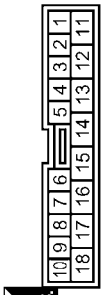
Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	-

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
17	G	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
74	G	-
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW

H.S.

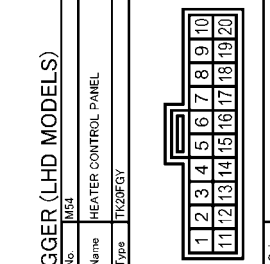
Terminal No.	Color of Wire	Signal Name [Specification]
17	B	GND
22	R	RR DEF F/B
23	SB	RR DEF ON

JCLWA0406GB

carsdiagn.com

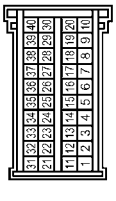
DEFOGGER (LHD MODELS)

Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY



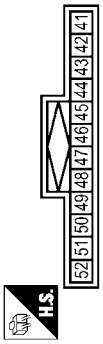
Terminal No.	Color of Wire	Signal Name [Specification]
18	SB	RR DEF
19	R	RR DEF F/B
20	B	GND

Connector No.	M55
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



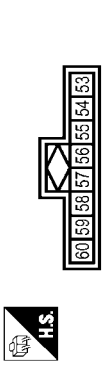
Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L
21	SB	REAR DEFFOGER SW
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
74	R	-
76	Y	-

Connector No.	M81
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

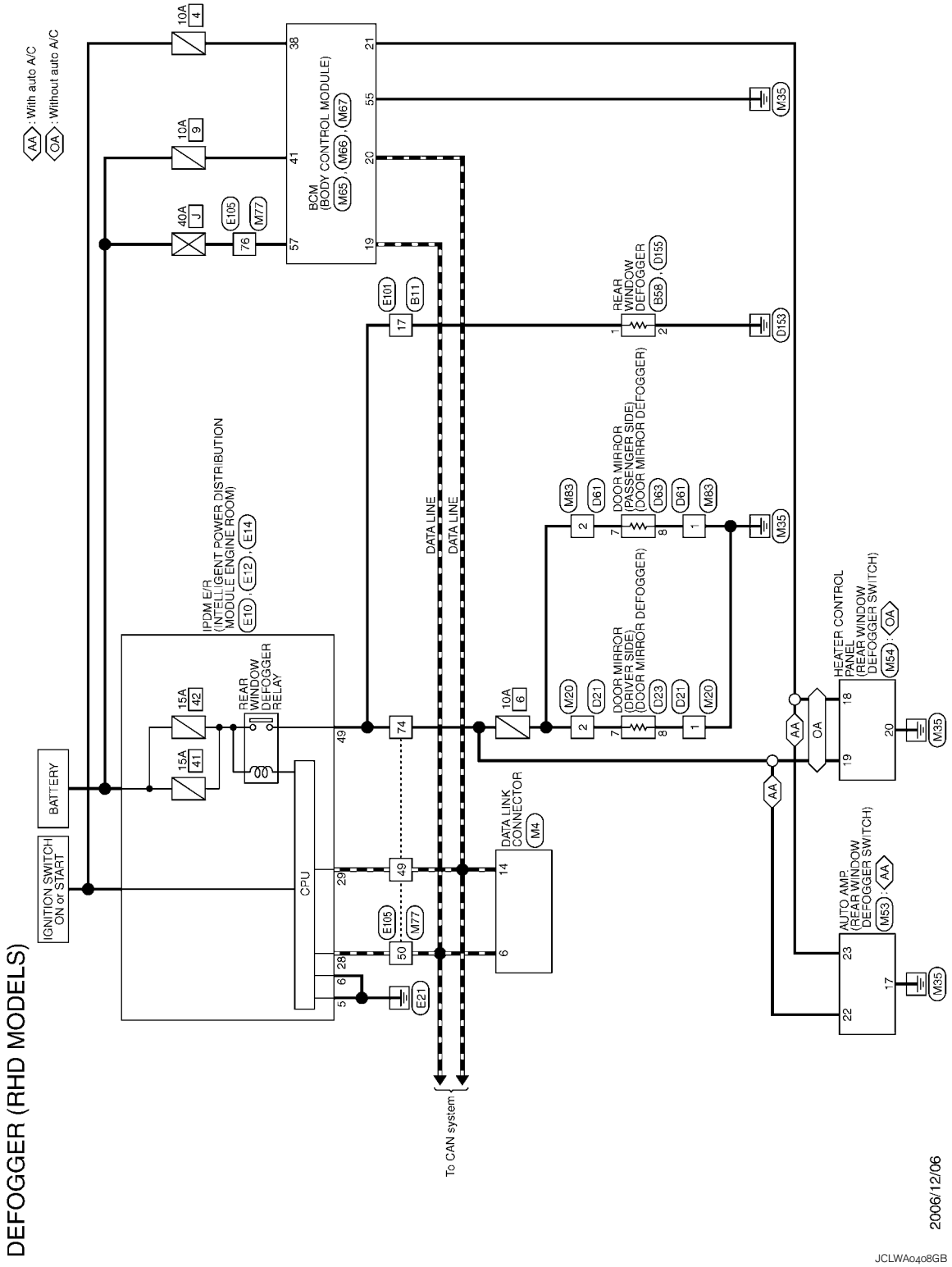
Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

JCLWA0407GB

cardiagn.com

Wiring Diagram - DEFOGGER CONTROL SYSTEM (RHD MODELS) -

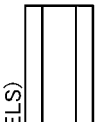
INFOID:0000000001125405



DEFOGGER (RHD MODELS)

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
17	B	-

Connector No.	B58
Connector Name	REAR WINDOW DEFOGGER
Connector Type	P01FB-A

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	P	-

Connector No.	D23
Connector Name	DOOR MIRROR (DRIVER SIDE)
Connector Type	TK08MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	B	-

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

Connector No.	D63
Connector Name	DOOR MIRROR (PASSENGER SIDE)
Connector Type	TK08MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	B	-

Connector No.	D155
Connector Name	REAR WINDOW DEFOGGER
Connector Type	P01FB-A

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

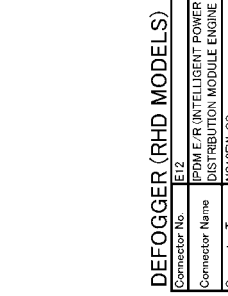
Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

JCLWA0409GB

cardiagn.com

DEFOGGER (RHD MODELS)

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

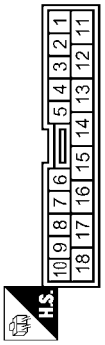


Terminal No.	Color of Wire	Signal Name [Specification]
28	L	–
29	P	–

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

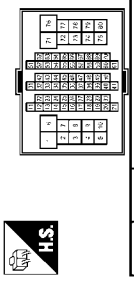
Terminal No.	Color of Wire	Signal Name [Specification]
49	B	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
17	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
74	G	–
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	G	–

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW

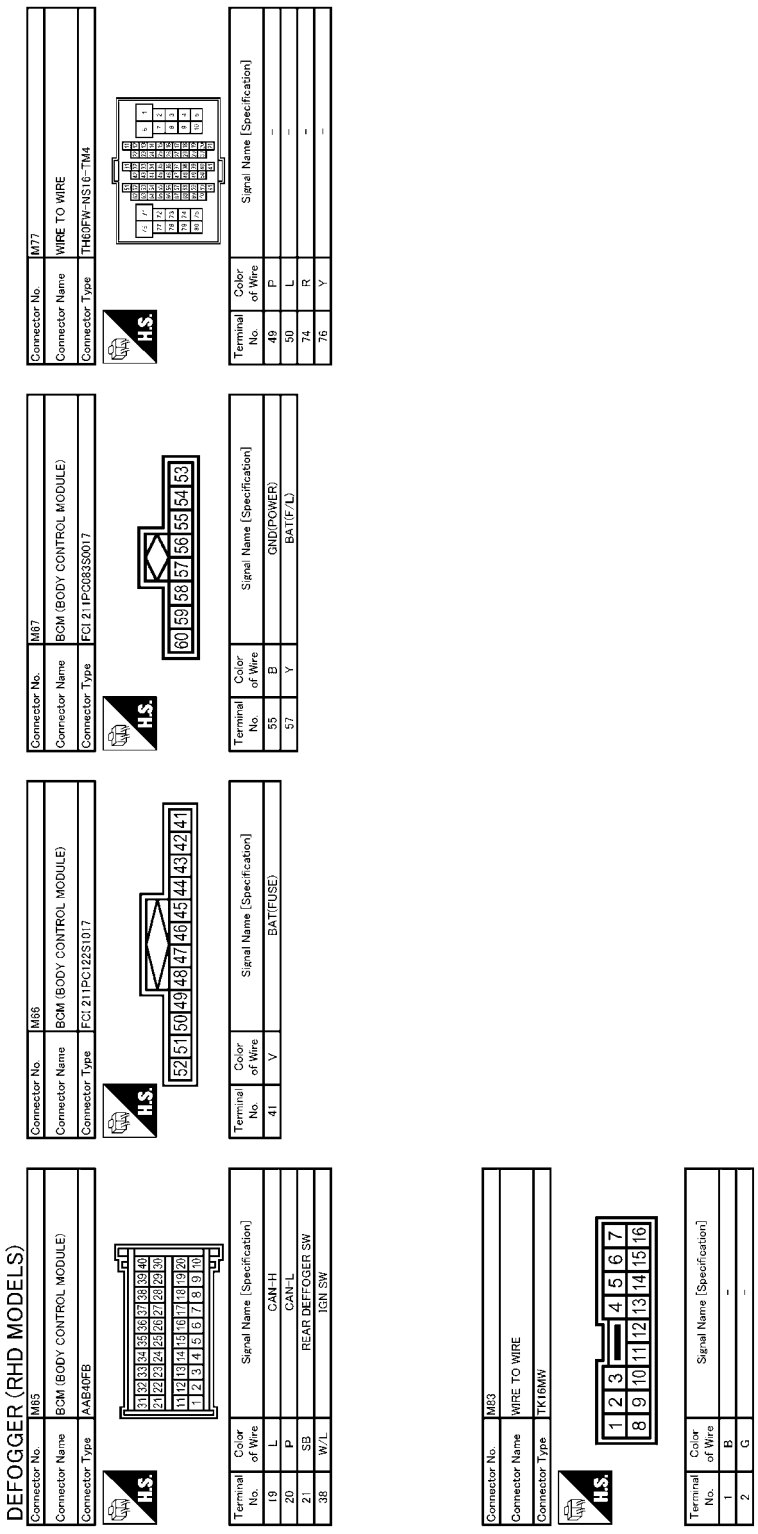
Terminal No.	Color of Wire	Signal Name [Specification]
17	B	GND
22	R	RR DEF F/B
23	SB	RR DEF ON

Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY

Terminal No.	Color of Wire	Signal Name [Specification]
18	SB	RR DEF
19	R	RR DEF F/B
20	B	GND

JCLWA0410GB

carsdiagn.com



JCLWA0411GB

Fail Safe

INFOID:0000000001035895

CAN communication control

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If no CAN communication is available with ECM

cardiagn.com

Control part	Fail-safe in operation
Cooling fan	• The cooling fan relay-2*1 or the cooling fan relay-3*2 turns ON when the ignition switch is turned ON • Turns off the fan motor low relay when the ignition switch is turned OFF
A/C compressor	A/C relay OFF

*1: HR engine models

*2: MR engine and K9K engine models

If no CAN communication is available with BCM

Control part	Fail-safe in operation
Headlamp	• The headlamp low relay turns ON when the ignition switch is turned ON • The headlamp low relay turns OFF when the ignition switch is turned OFF • Headlamp high relay OFF
• Parking lamps • License plate lamps • Tail lamps • Illuminations	• The tail lamp relay turns ON when the ignition switch is turned ON • The tail lamp relay turns OFF when the ignition switch is turned OFF
Front wiper	• The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. • The front wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Front fog lamps	Front fog lamp relay OFF
Starter motor	Inhibit relay OFF
Rear window defogger	Rear window defogger relay OFF
Headlamp washer	Headlamp washer relay OFF
PTC heater	PTC heater relay OFF

Ignition relay malfunction detection function

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

DTC	Ignition switch	Ignition relay	Tail lamp relay
—	ON	ON	—
—	OFF	OFF	—
B2098: IGN RLY ON	OFF	ON	ON (10 minutes)
B2099: IGN RLY OFF	ON	OFF	—

NOTE:

The tail lamp relay is turned OFF when the ignition switch is turned ON.

Front wiper control

IPDM E/R detects the front wiper stop position with the front wiper auto stop signal.
When the front wiper auto stop signal is in the conditions listed below, IPDM E/R repeats a front wiper 10 seconds operation and 20 seconds stop five times.

Ignition switch	Front wiper switch	Front wiper auto stop signal
ON	OFF	The front wiper auto stop signal (stop position) cannot be input for 10 seconds.
	ON	The front wiper auto stop signal does not change for 10 seconds.

NOTE:

carDiagn.com

This operation status can be confirmed on the IPDM E/R “Data Monitor” that displays “BLOCK” for the item “WIP PROT” while the wiper is stopped.

DTC Index

INFOID:0000000001035896

CONSULT display	Fail-safe	Timing[NOTE]		Reference page
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	PAST	PCS-14
B2098: IGN RELAY ON	×	CRNT	PAST	PCS-15
B2099: IGN RELAY OFF	—	CRNT	PAST	PCS-16
B2100: EEPROM	—	CRNT	PAST	PCS-17

NOTE:

The details of time display are as follows.

- CRNT: The malfunctions that are detected now.
- PAST: The number is indicated when it is normal at present and a malfunction was detected in the past.

cardiagn.com

SYMPTOM DIAGNOSIS

REAR WINDOW DEFOGGER DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000998574

1. IPDM E/R AUTO ACTIVE TEST

Check IPDM E/R active test.
Refer to PCS-9, "Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2. CHECK REAR WINDOW DEFOGGER SWITCH

Check rear window defogger switch.
With auto A/C. Refer to DEF-13, "WITH AUTO A/C : Component Function Check".
Without auto A/C. Refer to DEF-14, "WITHOUT AUTO A/C : Component Function Check"

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning parts.

3. CHECK REAR WINDOW DEFOGGER POWER SUPPLY AND GROUND CIRCUIT

Check rear window defogger power supply and ground circuit.
Refer to DEF-17, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

REAR WINDOW DEFOGGER AND DOOR MIRROR DEFOGGER DO NOT OPERATE.

Diagnosis Procedure

INFOID:0000000000951289

1. IPDM E/R AUTO ACTIVE TEST

Check IPDM E/R active test.
Refer to PCS-9, "Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2. CHECK REAR WINDOW DEFOGGER SWITCH

Check rear window defogger switch.
With auto A/C. Refer to DEF-13, "WITH AUTO A/C : Component Function Check".
Without auto A/C. Refer to DEF-14, "WITHOUT AUTO A/C : Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

REAR WINDOW DEFOGGER DOES NOT OPERATE BUT BOTH OF DOOR MIRROR DEFOGGER OPERATE.

Diagnosis Procedure

INFOID:0000000000951290

1. CHECK REAR WINDOW DEFOGGER POWER SUPPLY AND GROUND CIRCUIT

Check rear window defogger power supply and ground circuit.
Refer to DEF-17, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

DRIVER SIDE DOOR MIRROR DEFOGGER DOES NOT OPERATE.

Diagnosis Procedure

INFOID:0000000000951292

1.CHECK DRIVER SIDE DOOR MIRROR DEFOGGER

Check driver side door mirror defogger.
Refer to DEF-19, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

PASSENGER SIDE DOOR MIRROR DEFOGGER DOES NOT OPERATE.

Diagnosis Procedure

INFOID:0000000000951293

1.CHECK PASSENGER SIDE DOOR MIRROR DEFOGGER

Check passenger side door mirror defogger.
Refer to DEF-21, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

REAR WINDOW DEFOGGER SWITCH DOES NOT LIGHT, BUT REAR WINDOW DEFOGGER OPERATES

Diagnosis Procedure

INFOID:0000000000951295

1. CHECK REAR WINDOW DEFOGGER ON SIGNAL

Check rear window defogger ON signal.
With auto A/C. Refer to DEF-23, "WITH AUTO A/C : Component Function Check".
Without auto A/C. Refer to DEF-24, "WITHOUT AUTO A/C : Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000951296

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

cardiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000000977986

BASIC INSPECTION

1. INSPECTION START

1. Check the service history.
2. Check the following parts.

- Fuse/circuit breaker blown.
- Poor connection, open or short circuit of harness connector.
- Battery voltage.

Is the inspection result normal?

YES >> Inspection end.
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

ON-VEHICLE REPAIR

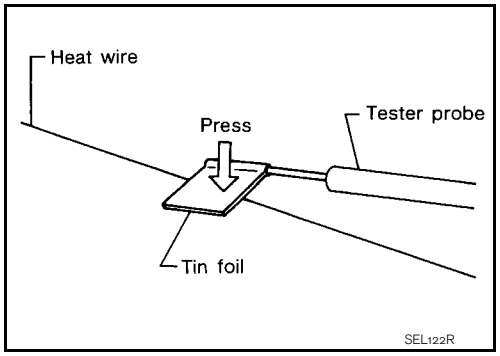
FILAMENT

Inspection and Repair

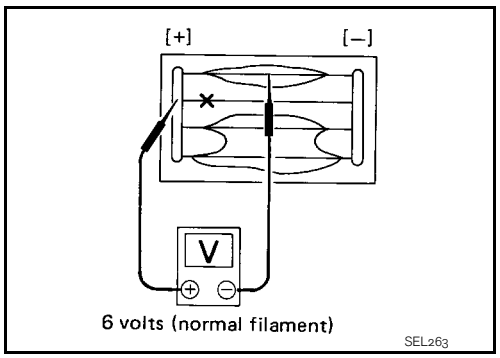
INFOID:0000000000951297

INSPECTION

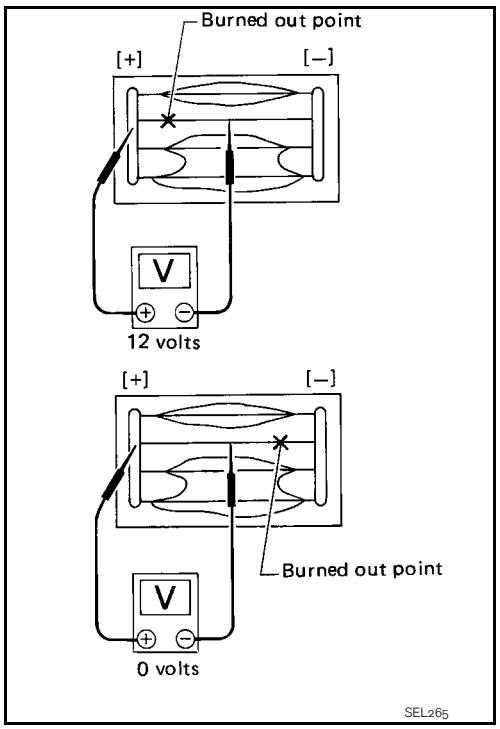
1. When measuring voltage, wrap tin foil around the top of the negative probe. Then press the foil against the wire with your finger.



2. Attach probe circuit tester (in Volt range) to middle portion of each filament.



3. If a filament is burned out, circuit tester registers 0 or battery voltage.
4. To locate burned out point, move probe to left and right along filament. Test needle will swing abruptly when probe passes the point.



REPAIR

REPAIR EQUIPMENT

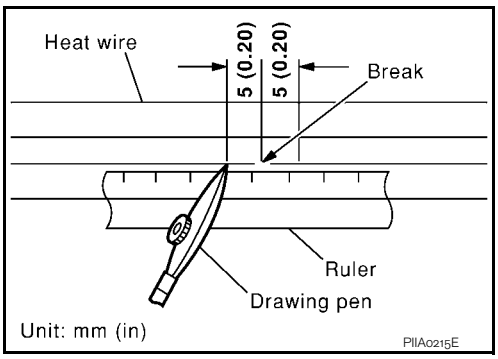
- Conductive silver composition (Dupont No. 4817 or equivalent)

cardiagn.com

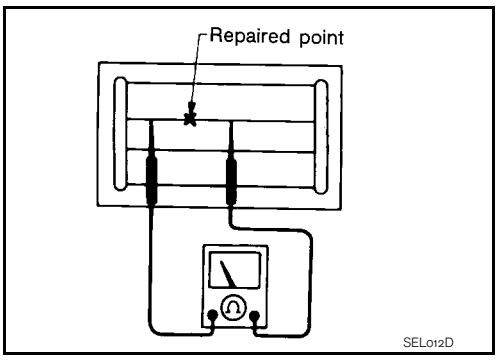
- Ruler 30 cm (11.8 in) long
- Drawing pen
- Heat gun
- Alcohol
- Cloth

REPAIRING PROCEDURE

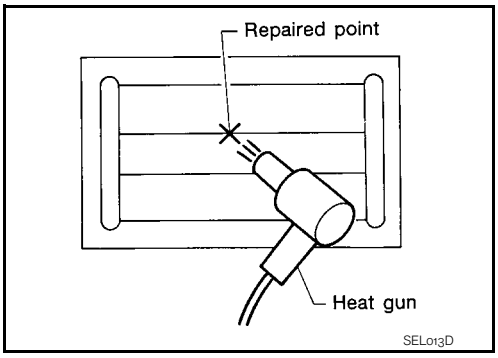
1. Wipe broken heat wire and its surrounding area clean with a cloth dampened in alcohol.
2. Apply a small amount of conductive silver composition to tip of drawing pen.
   Shake silver composition container before use.
3. Place ruler on glass along broken line. Deposit conductive silver composition on break with drawing pen. Slightly overlap existing heat wire on both sides [preferably 5 mm (0.20 in)] of the break.



4. After repair has been completed, check repaired wire for continuity. This check should be conducted 10 minutes after silver composition is deposited.
   Do not touch repaired area while test is being conducted.



5. Apply a constant stream of hot air directly to the repaired area for approximately 20 minutes with a heat gun. A minimum distance of 3 cm (1.2 in) should be kept between repaired area and hot air outlet.
   If a heat gun is not available, let the repaired area dry for 24 hours.



cardiagn.com

SECTION DLK
DOOR & LOCK

CONTENTS

WITH I-KEY, WITHOUT SUPER LOCK

BASIC INSPECTION 20

DIAGNOSIS AND REPAIR WORKFLOW 20
Work Flow 20

INSPECTION AND ADJUSTMENT 23

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 23
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 23
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement 23

FUNCTION DIAGNOSIS 24

DOOR LOCK FUNCTION 24

DOOR LOCK AND UNLOCK SWITCH 24
DOOR LOCK AND UNLOCK SWITCH : System Diagram 24
DOOR LOCK AND UNLOCK SWITCH : System Description 24
DOOR LOCK AND UNLOCK SWITCH : Component Parts Location 25
DOOR LOCK AND UNLOCK SWITCH : Component Description 27

INTELLIGENT KEY 28
INTELLIGENT KEY : System Diagram 28
INTELLIGENT KEY : System Description 28
INTELLIGENT KEY : Component Parts Location 29
INTELLIGENT KEY : Component Description 31

DOOR REQUEST SWITCH 31
DOOR REQUEST SWITCH : System Diagram 31
DOOR REQUEST SWITCH : System Description 31
DOOR REQUEST SWITCH : Component Parts Location 32
DOOR REQUEST SWITCH : Component Description 34

KEY REMINDER 35
KEY REMINDER : System Diagram 35
KEY REMINDER : System Description 35
KEY REMINDER : Component Parts Location 36
KEY REMINDER : Component Description 37

AUTO DOOR LOCK 38
AUTO DOOR LOCK : System Diagram 38
AUTO DOOR LOCK : System Description 38
AUTO DOOR LOCK : Component Parts Location 38
AUTO DOOR LOCK : Component Description 40

VEHICLE SPEED SENSING AUTO DOOR LOCK....41
VEHICLE SPEED SENSING AUTO DOOR LOCK : System Diagram 41
VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description 41
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Parts Location 41
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Description 43

AIR BAG INTERLOCK UNLOCK 44
AIR BAG INTERLOCK UNLOCK : System Diagram 44
AIR BAG INTERLOCK UNLOCK : System Description 44
AIR BAG INTERLOCK UNLOCK : Component Parts Location 44
AIR BAG INTERLOCK UNLOCK : Component Description 46

BACK DOOR OPENER FUNCTION 48

BACK DOOR OPENER SWITCH 48
BACK DOOR OPENER SWITCH : System Diagram 48
BACK DOOR OPENER SWITCH : System Description 48
BACK DOOR OPENER SWITCH : Component Parts Location 48

BACK DOOR OPENER SWITCH :
Component Description 50

WARNING FUNCTION 52
System Diagram 52
System Description 52
Component Parts Location 54
Component Description 56

HAZARD AND BUZZER REMINDER FUNCTION 58
System Diagram 58
System Description 58
Component Parts Location 59
Component Description 61

DIAGNOSIS SYSTEM (BCM) 62

COMMON ITEM 62
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 62

DOOR LOCK 62
DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK) 62

INTELLIGENT KEY 64
INTELLIGENT KEY : CONSULT-III Function (BCM - INTELLIGENT KEY) 64

TRUNK 64
TRUNK : CONSULT-III Function (BCM - TRUNK) 64

DIAGNOSIS SYSTEM (INTELLIGENT KEY UNIT) 65
CONSULT-III Function (INTELLIGENT KEY) 65

COMPONENT DIAGNOSIS 68

U1000 CAN COMM CIRCUIT 68
Description 68
DTC Logic 68
Diagnosis Procedure 68

U1010 CONTROL UNIT (CAN) 69
Description 69
DTC Logic 69
Diagnosis Procedure 69
Special Repair Requirement 69

B2552 INTELLIGENT KEY 70
Description 70
DTC Logic 70
Diagnosis Procedure 70
Special Repair Requirement 70

POWER SUPPLY AND GROUND CIRCUIT 71

INTELLIGENT KEY UNIT 71
INTELLIGENT KEY UNIT : Diagnosis Procedure 71

BCM 71
BCM : Diagnosis Procedure 71

DOOR LOCK AND UNLOCK SWITCH 73
Description 73
Component Function Check 73
Diagnosis Procedure 73
Component Inspection 74

DOOR LOCK AND UNLOCK SWITCH INDICATOR 75
Description 75
Component Function Check 75
Diagnosis Procedure 75
Component Inspection 76

DOOR REQUEST SWITCH 77

DRIVER SIDE 77
DRIVER SIDE : Description 77
DRIVER SIDE : Component Function Check 77
DRIVER SIDE : Diagnosis Procedure 77
DRIVER SIDE : Component Inspection 78

PASSENGER SIDE 78
PASSENGER SIDE : Description 78
PASSENGER SIDE :
Component Function Check 79
PASSENGER SIDE : Diagnosis Procedure 79
PASSENGER SIDE : Component Inspection 80

BACK DOOR 80
BACK DOOR : Description 80
BACK DOOR : Component Function Check 80
BACK DOOR : Diagnosis Procedure 81
BACK DOOR : Component Inspection 82

DOOR SWITCH 83

DRIVER SIDE 83
DRIVER SIDE : Description 83
DRIVER SIDE : Component Function Check 83
DRIVER SIDE : Diagnosis Procedure 83
DRIVER SIDE : Component Inspection 84

PASSENGER SIDE 84
PASSENGER SIDE : Description 84
PASSENGER SIDE :
Component Function Check 84
PASSENGER SIDE : Diagnosis Procedure 84
PASSENGER SIDE : Component Inspection 85

REAR LH 86
REAR LH : Description 86
REAR LH : Component Function Check 86
REAR LH : Diagnosis Procedure 86
REAR LH : Component Inspection 87

REAR RH 87
REAR RH : Description 87
REAR RH : Component Function Check 87
REAR RH : Diagnosis Procedure 87
REAR RH : Component Inspection 88

BACK DOOR 89

cardiagn.com

BACK DOOR : Description 89
BACK DOOR : Component Function Check 89
BACK DOOR : Diagnosis Procedure 89
BACK DOOR : Component Inspection 90

KEY SWITCH 91
Description 91
Component Function Check 91
Diagnosis Procedure 91
Component Inspection 92

IGNITION KNOB SWITCH 93
Description 93
Component Function Check 93
Diagnosis Procedure 93
Component Inspection 94

DOOR LOCK ACTUATOR 95

DRIVER SIDE 95
DRIVER SIDE : Description 95
DRIVER SIDE : Component Function Check 95
DRIVER SIDE : Diagnosis Procedure 95
DRIVER SIDE : Component Inspection 96
DRIVER SIDE : Special Repair Requirement 97

PASSENGER SIDE 97
PASSENGER SIDE : Description 97
PASSENGER SIDE :
Component Function Check 97
PASSENGER SIDE : Diagnosis Procedure 97
PASSENGER SIDE : Component Inspection 98

REAR LH 98
REAR LH : Description 98
REAR LH : Component Function Check 98
REAR LH : Diagnosis Procedure 99
REAR LH : Component Inspection 100

REAR RH 100
REAR RH : Description 100
REAR RH : Component Function Check 100
REAR RH : Diagnosis Procedure 101
REAR RH : Component Inspection 102

BACK DOOR OPENER ACTUATOR 103
Description 103
Component Function Check 103
Diagnosis Procedure 103
Component Inspection 104

BACK DOOR OPENER SWITCH 105
Description 105
Component Function Check 105
Diagnosis Procedure 105
Component Inspection 106

OUTSIDE KEY ANTENNA 107

DRIVER SIDE 107
DRIVER SIDE : Description 107
DRIVER SIDE : Component Function Check 107
DRIVER SIDE : Diagnosis Procedure 107

PASSENGER SIDE 109
PASSENGER SIDE : Description 110
PASSENGER SIDE :
Component Function Check 110
PASSENGER SIDE : Diagnosis Procedure 110

REAR BUMPER 113
REAR BUMPER : Description 113
REAR BUMPER : Component Function Check 113
REAR BUMPER : Diagnosis Procedure 113

INSIDE KEY ANTENNA 116

INSTRUMENT CENTER 116
INSTRUMENT CENTER : Description 116
INSTRUMENT CENTER :
Component Function Check 116
INSTRUMENT CENTER : Diagnosis Procedure 116

CONSOLE 119
CONSOLE : Description 119
CONSOLE : Component Function Check 119
CONSOLE : Diagnosis Procedure 119

REAR SEAT 121
REAR SEAT : Description 122
REAR SEAT : Component Function Check 122
REAR SEAT : Diagnosis Procedure 122

ANTI-HIJACK RELAY 125

PASSENGER SIDE 125
PASSENGER SIDE : Description 125
PASSENGER SIDE :
Component Function Check 125
PASSENGER SIDE : Diagnosis Procedure 125
PASSENGER SIDE : Component Inspection 126

INTELLIGENT KEY WARNING BUZZER 127
Description 127
Component Function Check 127
Diagnosis Procedure 127
Component Inspection 128

BUZZER (COMBINATION METER) 129
Description 129
Component Function Check 129
Diagnosis Procedure 129

KEY WARNING LAMP 130
Description 130
Component Function Check 130
Diagnosis Procedure 130

LOCK WARNING LAMP 131
Description 131
Component Function Check 131
Diagnosis Procedure 131

HAZARD WARNING LAMPS 132

carsdiagn.com

Description 132
Component Function Check 132
Diagnosis Procedure 132

VEHICLE SPEED SIGNAL CIRCUIT 133
Description 133
Component Function Check 133
Diagnosis Procedure 133

INTELLIGENT KEY BATTERY 134
Description 134
Component Function Check 134
Diagnosis Procedure 134

ECU DIAGNOSIS 135

INTELLIGENT KEY UNIT 135
Reference Value 135
Wiring Diagram - POWER DOOR LOCK CONTROL SYSTEM - 142
Wiring Diagram - INTELLIGENT KEY CONTROL SYSTEM - 149
Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM - 158
Fail Safe 162
DTC Inspection Priority Chart 163
DTC Index 163

BCM (BODY CONTROL MODULE) 164
Reference Value 164
Wiring Diagram - POWER DOOR LOCK CONTROL SYSTEM - 180
Wiring Diagram - INTELLIGENT KEY CONTROL SYSTEM - 187
Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM - 196
Fail Safe 200
DTC Inspection Priority Chart 201
DTC Index 202

SYMPTOM DIAGNOSIS 203

DOOR LOCK FUNCTION SYMPTOMS 203

DOOR LOCK AND UNLOCK SWITCH 203
DOOR LOCK AND UNLOCK SWITCH : Symptom Table 203

INTELLIGENT KEY 203
INTELLIGENT KEY : Symptom Table 203

DOOR REQUEST SWITCH 204
DOOR REQUEST SWITCH : Symptom Table 204

KEY REMINDER 205
KEY REMINDER : Symptom Table 205

AUTO DOOR LOCK 205
AUTO DOOR LOCK : Symptom Table 205

VEHICLE SPEED SENSING AUTO DOOR LOCK..206
VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table 206

BACK DOOR OPEN FUNCTION SYMPTOMS ..207

BACK DOOR OPENER SWITCH 207
BACK DOOR OPENER SWITCH : Symptom Table 207

WARNING FUNCTION SYMPTOMS 208

BUZZER (COMBINATION METER) 208
BUZZER (COMBINATION METER) : Symptom Table 208

INTELLIGENT KEY WARNING BUZZER 208
INTELLIGENT KEY WARNING BUZZER : Symptom Table 208

WARNING LAMP 209
WARNING LAMP : Symptom Table 209

BACK DOOR 209
BACK DOOR : Symptom Table 209

HAZARD AND BUZZER REMINDER FUNCTION SYMPTOMS 211

HAZARD WARNING LAMP 211
HAZARD WARNING LAMP : Symptom Table 211

INTELLIGENT KEY WARNING BUZZER 211
INTELLIGENT KEY WARNING BUZZER : Symptom Table 211

SQUEAK AND RATTLE TROUBLE DIAGNOSES 212
Work Flow 212
Inspection Procedure 214
Diagnostic Worksheet 216

PRECAUTION 218

PRECAUTIONS 218
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 218
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 218
Precaution for Procedure without Cowl Top Cover. 218
Work 219

PREPARATION 220

PREPARATION 220
Commercial Service Tools 220

ON-VEHICLE MAINTENANCE 221

PRE-INSPECTION FOR DIAGNOSTIC 221
Basic Inspection 221

cardiagn.com

ON-VEHICLE REPAIR 223

HOOD 223

HOOD ASSEMBLY 223
HOOD ASSEMBLY : Exploded View 223
HOOD ASSEMBLY : Removal and Installation 224
HOOD ASSEMBLY : Adjustment 225

HOOD HINGE 225
HOOD HINGE : Exploded View 226
HOOD HINGE : Removal and Installation 226

HOOD SUPPORT ROD 226
HOOD SUPPORT ROD : Exploded View 226
HOOD SUPPORT ROD : Removal and Installation 227

HOOD LOCK CONTROL 227
HOOD LOCK CONTROL : Exploded View 227
HOOD LOCK CONTROL : Removal and Installation 228
HOOD LOCK CONTROL : Inspection 229

RADIATOR CORE SUPPORT 230
Exploded View 230
Removal and Installation 231

FRONT FENDER 233
Exploded View 233
Removal and Installation 233

FRONT DOOR 235

DOOR ASSEMBLY 235
DOOR ASSEMBLY : Exploded View 235
DOOR ASSEMBLY : Removal and Installation 236
DOOR ASSEMBLY : Adjustment 237

DOOR STRIKER 238
DOOR STRIKER : Exploded View 238
DOOR STRIKER : Removal and Installation 238

DOOR HINGE 238
DOOR HINGE : Exploded View 239
DOOR HINGE : Removal and Installation 239

DOOR CHECK LINK 239
DOOR CHECK LINK : Exploded View 239
DOOR CHECK LINK : Removal and Installation .. 240

REAR DOOR 241

DOOR ASSEMBLY 241
DOOR ASSEMBLY : Exploded View 241
DOOR ASSEMBLY : Removal and Installation 242
DOOR ASSEMBLY : Adjustment 243

DOOR STRIKER 244
DOOR STRIKER : Exploded View 244
DOOR STRIKER : Removal and Installation 244

DOOR HINGE 244
DOOR HINGE : Exploded View 244
DOOR HINGE : Removal and Installation 245

DOOR CHECK LINK 245
DOOR CHECK LINK : Exploded View 245
DOOR CHECK LINK : Removal and Installation .. 246

BACK DOOR 247

BACK DOOR ASSEMBLY 247
BACK DOOR ASSEMBLY : Exploded View 247
BACK DOOR ASSEMBLY : Removal and Installation 248
BACK DOOR ASSEMBLY : Adjustment 250

BACK DOOR STRIKER 250
BACK DOOR STRIKER : Exploded View 250
BACK DOOR STRIKER : Removal and Installation 251

BACK DOOR HINGE 251
BACK DOOR HINGE : Exploded View 251
BACK DOOR HINGE : Removal and Installation .. 252

BACK DOOR STAY 252
BACK DOOR STAY : Exploded View 253
BACK DOOR STAY : Removal and Installation ... 253

BACK DOOR WEATHER-STRIP 253
BACK DOOR WEATHER-STRIP : Exploded View. 253
BACK DOOR WEATHER-STRIP : Removal and Installation 254

FRONT DOOR LOCK 255

DOOR LOCK 255
DOOR LOCK : Exploded View 255
DOOR LOCK : Removal and Installation 255

INSIDE HANDLE 257
INSIDE HANDLE : Exploded View 257
INSIDE HANDLE : Removal and Installation 258

OUTSIDE HANDLE 258
OUTSIDE HANDLE : Exploded View 258
OUTSIDE HANDLE : Removal and Installation 259

REAR DOOR LOCK 262

DOOR LOCK 262
DOOR LOCK : Exploded View 262
DOOR LOCK : Removal and Installation 262

INSIDE HANDLE 264
INSIDE HANDLE : Exploded View 264
INSIDE HANDLE : Removal and Installation 264

OUTSIDE HANDLE 265
OUTSIDE HANDLE : Exploded View 265
OUTSIDE HANDLE : Removal and Installation 265

BACK DOOR LOCK 268

DOOR LOCK 268

carsdiagn.com

DOOR LOCK : Exploded View 268
DOOR LOCK : Removal and Installation 268

FUEL FILLER LID OPENER 269

FUEL FILLER LID 269
FUEL FILLER LID : Exploded View 269
FUEL FILLER LID : Removal and Installation 269

FUEL FILLER OPENER CABLE 269
FUEL FILLER OPENER CABLE : Exploded View..270
FUEL FILLER OPENER CABLE : Removal and Installation 270

DOOR SWITCH 272
Exploded View 272
Removal and Installation 272

INSIDE KEY ANTENNA 273

INSTRUMENT CENTER 273
INSTRUMENT CENTER : Exploded View 273
INSTRUMENT CENTER : Removal and Installation 273

CONSOLE 273
CONSOLE : Exploded View 273
CONSOLE : Removal and Installation 273

REAR 274
REAR : Exploded View 274
REAR : Removal and Installation 274

OUTSIDE KEY ANTENNA 275

DRIVER SIDE 275
DRIVER SIDE : Exploded View 275
DRIVER SIDE : Removal and Installation 275

PASSENGER SIDE 275
PASSENGER SIDE : Exploded View 275
PASSENGER SIDE : Removal and Installation ...275

REAR BUMPER 276
REAR BUMPER : Exploded View 276
REAR BUMPER : Removal and Installation 276

INTELLIGENT KEY WARNING BUZZER 277
Exploded View 277
Removal and Installation 277

BACK DOOR REQUEST SWITCH 278
Exploded View 278
Removal and Installation 278

BACK DOOR OPENER SWITCH 279
Exploded View 279
Removal and Installation 279

DOOR LOCK AND UNLOCK SWITCH 280
Exploded View 280
Removal and Installation 280

INTELLIGENT KEY BATTERY 281
Exploded View 281
Removal and Installation 281

INTELLIGENT KEY UNIT 282
Exploded View 282
Removal and Installation 282

WITH I-KEY & SUPER LOCK

BASIC INSPECTION 283

DIAGNOSIS AND REPAIR WORKFLOW 283
Work Flow 283

INSPECTION AND ADJUSTMENT 286

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 286
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 286
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement .. 286

FUNCTION DIAGNOSIS 287

DOOR LOCK FUNCTION 287

DOOR LOCK AND UNLOCK SWITCH 287
DOOR LOCK AND UNLOCK SWITCH : System Diagram 287
DOOR LOCK AND UNLOCK SWITCH : System Description 287
DOOR LOCK AND UNLOCK SWITCH : Component Parts Location 288
DOOR LOCK AND UNLOCK SWITCH : Component Description 290

INTELLIGENT KEY 291
INTELLIGENT KEY : System Diagram 291
INTELLIGENT KEY : System Description 291
INTELLIGENT KEY : Component Parts Location.. 292
INTELLIGENT KEY : Component Description 294

DOOR REQUEST SWITCH 295
DOOR REQUEST SWITCH : System Diagram ... 295
DOOR REQUEST SWITCH : System Description.. 295
DOOR REQUEST SWITCH : Component Parts Location 297
DOOR REQUEST SWITCH : Component Description 298

KEY REMINDER 299
KEY REMINDER : System Diagram 299
KEY REMINDER : System Description 299
KEY REMINDER : Component Parts Location .. 300
KEY REMINDER : Component Description 302

AUTO DOOR LOCK 302
AUTO DOOR LOCK : System Diagram 302
AUTO DOOR LOCK : System Description 302
AUTO DOOR LOCK : Component Parts Location 302
AUTO DOOR LOCK : Component Description ... 304

cardiagn.com

VEHICLE SPEED SENSING AUTO DOOR LOCK.. 305
VEHICLE SPEED SENSING AUTO DOOR LOCK : System Diagram 305
VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description 305
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Parts Location 305
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Description 307

AIR BAG INTERLOCK UNLOCK 308
AIR BAG INTERLOCK UNLOCK : System Diagram 308
AIR BAG INTERLOCK UNLOCK : System Description 308
AIR BAG INTERLOCK UNLOCK : Component Parts Location 308
AIR BAG INTERLOCK UNLOCK : Component Description 310

BACK DOOR OPENER FUNCTION 312

BACK DOOR OPENER SWITCH 312
BACK DOOR OPENER SWITCH : System Diagram 312
BACK DOOR OPENER SWITCH : System Description 312
BACK DOOR OPENER SWITCH : Component Parts Location 312
BACK DOOR OPENER SWITCH : Component Description 314

WARNING FUNCTION 316
System Diagram 316
System Description 316
Component Parts Location 318
Component Description 320

HAZARD AND BUZZER REMINDER FUNCTION 322
System Diagram 322
System Description 322
Component Parts Location 323
Component Description 325

DIAGNOSIS SYSTEM (BCM) 326

COMMON ITEM 326
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 326

DOOR LOCK 326
DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK) 326

INTELLIGENT KEY 328
INTELLIGENT KEY : CONSULT-III Function (BCM - INTELLIGENT KEY) 328

TRUNK 328
TRUNK : CONSULT-III Function (BCM - TRUNK). 328

DIAGNOSIS SYSTEM (INTELLIGENT KEY UNIT) 329
CONSULT-III Function (INTELLIGENT KEY) 329

COMPONENT DIAGNOSIS 332

U1000 CAN COMM CIRCUIT 332
Description 332
DTC Logic 332
Diagnosis Procedure 332

U1010 CONTROL UNIT (CAN) 333
Description 333
DTC Logic 333
Diagnosis Procedure 333
Special Repair Requirement 333

B2552 INTELLIGENT KEY 334
Description 334
DTC Logic 334
Diagnosis Procedure 334
Special Repair Requirement 334

POWER SUPPLY AND GROUND CIRCUIT .. 335

INTELLIGENT KEY UNIT 335
INTELLIGENT KEY UNIT : Diagnosis Procedure.. 335

BCM 335
BCM : Diagnosis Procedure 335

DOOR LOCK AND UNLOCK SWITCH 337
Description 337
Component Function Check 337
Diagnosis Procedure 337
Component Inspection 338

DOOR LOCK AND UNLOCK SWITCH INDICATOR 339
Description 339
Component Function Check 339
Diagnosis Procedure 339
Component Inspection 340

DOOR REQUEST SWITCH 341

DRIVER SIDE 341
DRIVER SIDE : Description 341
DRIVER SIDE : Component Function Check 341
DRIVER SIDE : Diagnosis Procedure 341
DRIVER SIDE : Component Inspection 342

PASSENGER SIDE 342
PASSENGER SIDE : Description 342
PASSENGER SIDE : Component Function Check 343
PASSENGER SIDE : Diagnosis Procedure 343
PASSENGER SIDE : Component Inspection 344

BACK DOOR 344
BACK DOOR : Description 344
BACK DOOR : Component Function Check 344

carDiagn.com

BACK DOOR : Diagnosis Procedure 345
BACK DOOR : Component Inspection 346

DOOR SWITCH 347

DRIVER SIDE 347
DRIVER SIDE : Description 347
DRIVER SIDE : Component Function Check 347
DRIVER SIDE : Diagnosis Procedure 347
DRIVER SIDE : Component Inspection 348

PASSENGER SIDE 348
PASSENGER SIDE : Description 348
PASSENGER SIDE :
Component Function Check 348
PASSENGER SIDE : Diagnosis Procedure 348
PASSENGER SIDE : Component Inspection 349

REAR LH 350
REAR LH : Description 350
REAR LH : Component Function Check 350
REAR LH : Diagnosis Procedure 350
REAR LH : Component Inspection 351

REAR RH 351
REAR RH : Description 351
REAR RH : Component Function Check 351
REAR RH : Diagnosis Procedure 351
REAR RH : Component Inspection 352

BACK DOOR 353
BACK DOOR : Description 353
BACK DOOR : Component Function Check 353
BACK DOOR : Diagnosis Procedure 353
BACK DOOR : Component Inspection 354

KEY SWITCH 355
Description 355
Component Function Check 355
Diagnosis Procedure 355
Component Inspection 356

IGNITION KNOB SWITCH 357
Description 357
Component Function Check 357
Diagnosis Procedure 357
Component Inspection 358

DOOR LOCK ACTUATOR 359

DRIVER SIDE 359
DRIVER SIDE : Description 359
DRIVER SIDE : Component Function Check 359
DRIVER SIDE : Diagnosis Procedure 359
DRIVER SIDE : Component Inspection 360
DRIVER SIDE : Special Repair Requirement 361

PASSENGER SIDE 361
PASSENGER SIDE : Description 361
PASSENGER SIDE :
Component Function Check 361
PASSENGER SIDE : Diagnosis Procedure 361
PASSENGER SIDE : Component Inspection 362

REAR LH 362
REAR LH : Description 362
REAR LH : Component Function Check 362
REAR LH : Diagnosis Procedure 363
REAR LH : Component Inspection 364

REAR RH 364
REAR RH : Description 364
REAR RH : Component Function Check 364
REAR RH : Diagnosis Procedure 365
REAR RH : Component Inspection 366

SUPER LOCK ACTUATOR 367

DRIVER SIDE 367
DRIVER SIDE : Description 367
DRIVER SIDE : Component Function Check 367
DRIVER SIDE : Diagnosis Procedure 367
DRIVER SIDE : Component Inspection 368
DRIVER SIDE : Special Repair Requirement 368

PASSENGER SIDE 368
PASSENGER SIDE : Description 368
PASSENGER SIDE :
Component Function Check 368
PASSENGER SIDE : Diagnosis Procedure 368
PASSENGER SIDE : Component Inspection 369

REAR LH 369
REAR LH : Description 369
REAR LH : Component Function Check 370
REAR LH : Diagnosis Procedure 370
REAR LH : Component Inspection 370

REAR RH 371
REAR RH : Description 371
REAR RH : Component Function Check 371
REAR RH : Diagnosis Procedure 371
REAR RH : Component Inspection 372

BACK DOOR OPENER ACTUATOR 373
Description 373
Component Function Check 373
Diagnosis Procedure 373
Component Inspection 374

BACK DOOR OPENER SWITCH 375
Description 375
Component Function Check 375
Diagnosis Procedure 375
Component Inspection 376

OUTSIDE KEY ANTENNA 377

DRIVER SIDE 377
DRIVER SIDE : Description 377
DRIVER SIDE : Component Function Check 377
DRIVER SIDE : Diagnosis Procedure 377

PASSENGER SIDE 379

cardiagn.com

PASSENGER SIDE : Description 380
PASSENGER SIDE : Component Function Check 380
PASSENGER SIDE : Diagnosis Procedure 380

REAR BUMPER 382
REAR BUMPER : Description 383
REAR BUMPER : Component Function Check 383
REAR BUMPER : Diagnosis Procedure 383

INSIDE KEY ANTENNA 386

INSTRUMENT CENTER 386
INSTRUMENT CENTER : Description 386
INSTRUMENT CENTER : Component Function Check 386
INSTRUMENT CENTER : Diagnosis Procedure 386

CONSOLE 389
CONSOLE : Description 389
CONSOLE : Component Function Check 389
CONSOLE : Diagnosis Procedure 389

REAR SEAT 391
REAR SEAT : Description 392
REAR SEAT : Component Function Check 392
REAR SEAT : Diagnosis Procedure 392

ANTI-HIJACK RELAY 395

PASSENGER SIDE 395
PASSENGER SIDE : Description 395
PASSENGER SIDE : Component Function Check 395
PASSENGER SIDE : Diagnosis Procedure 395
PASSENGER SIDE : Component Inspection 396

INTELLIGENT KEY WARNING BUZZER 397
Description 397
Component Function Check 397
Diagnosis Procedure 397
Component Inspection 398

BUZZER (COMBINATION METER) 399
Description 399
Component Function Check 399
Diagnosis Procedure 399

KEY WARNING LAMP 400
Description 400
Component Function Check 400
Diagnosis Procedure 400

LOCK WARNING LAMP 401
Description 401
Component Function Check 401
Diagnosis Procedure 401

HAZARD WARNING LAMPS 402
Description 402
Component Function Check 402
Diagnosis Procedure 402

VEHICLE SPEED SIGNAL CIRCUIT 403
Description 403
Component Function Check 403
Diagnosis Procedure 403

INTELLIGENT KEY BATTERY 404
Description 404
Component Function Check 404
Diagnosis Procedure 404

ECU DIAGNOSIS 405

INTELLIGENT KEY UNIT 405
Reference Value 405
Wiring Diagram - SUPER LOCK CONTROL SYSTEM - 411
Wiring Diagram - INTELLIGENT KEY CONTROL SYSTEM - 418
Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM - 428
Fail Safe 432
DTC Inspection Priority Chart 433
DTC Index 433

BCM (BODY CONTROL MODULE) 434
Reference Value 434
Wiring Diagram - SUPER LOCK CONTROL SYSTEM - 449
Wiring Diagram - INTELLIGENT KEY CONTROL SYSTEM - 456
Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM - 466
Fail Safe 470
DTC Inspection Priority Chart 471
DTC Index 472

SYMPTOM DIAGNOSIS 473

DOOR LOCK FUNCTION SYMPTOMS 473

DOOR LOCK AND UNLOCK SWITCH 473
DOOR LOCK AND UNLOCK SWITCH : Symptom Table 473

INTELLIGENT KEY 473
INTELLIGENT KEY : Symptom Table 473

DOOR REQUEST SWITCH 474
DOOR REQUEST SWITCH : Symptom Table 474

KEY REMINDER 475
KEY REMINDER : Symptom Table 475

AUTO DOOR LOCK 475
AUTO DOOR LOCK : Symptom Table 475

VEHICLE SPEED SENSING AUTO DOOR LOCK 476
VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table 476

BACK DOOR OPEN FUNCTION SYMPTOMS 477

carDiagn.com

BACK DOOR OPENER SWITCH 477
BACK DOOR OPENER SWITCH : Symptom Table 477

WARNING FUNCTION SYMPTOMS 478

BUZZER (COMBINATION METER) 478
BUZZER (COMBINATION METER) : Symptom Table 478

INTELLIGENT KEY WARNING BUZZER 478
INTELLIGENT KEY WARNING BUZZER : Symptom Table 478

WARNING LAMP 479
WARNING LAMP : Symptom Table 479

BACK DOOR 479
BACK DOOR : Symptom Table 479

HAZARD AND BUZZER REMINDER FUNCTION SYMPTOMS 481

HAZARD WARNING LAMP 481
HAZARD WARNING LAMP : Symptom Table 481

INTELLIGENT KEY WARNING BUZZER 481
INTELLIGENT KEY WARNING BUZZER : Symptom Table 481

SQUEAK AND RATTLE TROUBLE DIAGNOSES 482
Work Flow 482
Inspection Procedure 484
Diagnostic Worksheet 486

PRECAUTION 488

PRECAUTIONS 488
Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 488
Procedure without Cowl Top Cover 488
Steering Wheel Rotation after Battery Disconnect 488
Work 489

PREPARATION 490

PREPARATION 490
Commercial Service Tools 490

ON-VEHICLE MAINTENANCE 491

PRE-INSPECTION FOR DIAGNOSTIC 491
Basic Inspection 491

ON-VEHICLE REPAIR 493

HOOD 493

HOOD ASSEMBLY 493
HOOD ASSEMBLY : Exploded View 493
HOOD ASSEMBLY : Removal and Installation 494
HOOD ASSEMBLY : Adjustment 495

HOOD HINGE 495
HOOD HINGE : Exploded View 496
HOOD HINGE : Removal and Installation 496

HOOD SUPPORT ROD 496
HOOD SUPPORT ROD : Exploded View 496
HOOD SUPPORT ROD : Removal and Installation 497

HOOD LOCK CONTROL 497
HOOD LOCK CONTROL : Exploded View 497
HOOD LOCK CONTROL : Removal and Installation 498
HOOD LOCK CONTROL : Inspection 499

RADIATOR CORE SUPPORT 500
Exploded View 500
Removal and Installation 501

FRONT FENDER 503
Exploded View 503
Removal and Installation 503

FRONT DOOR 505

DOOR ASSEMBLY 505
DOOR ASSEMBLY : Exploded View 505
DOOR ASSEMBLY : Removal and Installation ... 506
DOOR ASSEMBLY : Adjustment 507

DOOR STRIKER 508
DOOR STRIKER : Exploded View 508
DOOR STRIKER : Removal and Installation 508

DOOR HINGE 508
DOOR HINGE : Exploded View 509
DOOR HINGE : Removal and Installation 509

DOOR CHECK LINK 509
DOOR CHECK LINK : Exploded View 509
DOOR CHECK LINK : Removal and Installation . 510

REAR DOOR 511

DOOR ASSEMBLY 511
DOOR ASSEMBLY : Exploded View 511
DOOR ASSEMBLY : Removal and Installation ... 512
DOOR ASSEMBLY : Adjustment 513

DOOR STRIKER 514
DOOR STRIKER : Exploded View 514
DOOR STRIKER : Removal and Installation 514

DOOR HINGE 514
DOOR HINGE : Exploded View 514
DOOR HINGE : Removal and Installation 515

DOOR CHECK LINK 515
DOOR CHECK LINK : Exploded View 515
DOOR CHECK LINK : Removal and Installation . 516
DOOR CHECK LINK : Removal and Installation . 516

cardiagn.com

BACK DOOR **247**

BACK DOOR ASSEMBLY **518**
BACK DOOR ASSEMBLY : Exploded View 518
BACK DOOR ASSEMBLY : Removal and Installation 519
BACK DOOR ASSEMBLY : Adjustment 521

BACK DOOR STRIKER **521**
BACK DOOR STRIKER : Exploded View 521
BACK DOOR STRIKER : Removal and Installation 522

BACK DOOR HINGE **522**
BACK DOOR HINGE : Exploded View 522
BACK DOOR HINGE : Removal and Installation .. 523

BACK DOOR STAY **523**
BACK DOOR STAY : Exploded View 524
BACK DOOR STAY : Removal and Installation ... 524

BACK DOOR WEATHER-STRIP **524**
BACK DOOR WEATHER-STRIP : Exploded View. 524
BACK DOOR WEATHER-STRIP : Removal and Installation 525

FRONT DOOR LOCK **526**

DOOR LOCK **526**
DOOR LOCK : Exploded View 526
DOOR LOCK : Removal and Installation 526

INSIDE HANDLE **528**
INSIDE HANDLE : Exploded View 528
INSIDE HANDLE : Removal and Installation 529

OUTSIDE HANDLE **529**
OUTSIDE HANDLE : Exploded View 529
OUTSIDE HANDLE : Removal and Installation ... 530

REAR DOOR LOCK **533**

DOOR LOCK **533**
DOOR LOCK : Exploded View 533
DOOR LOCK : Removal and Installation 533

INSIDE HANDLE **535**
INSIDE HANDLE : Exploded View 535
INSIDE HANDLE : Removal and Installation 535

OUTSIDE HANDLE **536**
OUTSIDE HANDLE : Exploded View 536
OUTSIDE HANDLE : Removal and Installation ... 536

BACK DOOR LOCK **539**

DOOR LOCK **539**
DOOR LOCK : Exploded View 539
DOOR LOCK : Removal and Installation 539

FUEL FILLER LID OPENER **269**

FUEL FILLER LID **540**
FUEL FILLER LID : Exploded View 540
FUEL FILLER LID : Removal and Installation 540

FUEL FILLER OPENER CABLE **540**
FUEL FILLER OPENER CABLE : Exploded View. 541
FUEL FILLER OPENER CABLE : Removal and Installation 541

DOOR SWITCH **543**
Exploded View 543
Removal and Installation 543

INSIDE KEY ANTENNA **544**

INSTRUMENT CENTER **544**
INSTRUMENT CENTER : Exploded View 544
INSTRUMENT CENTER : Removal and Installation 544

CONSOLE **544**
CONSOLE : Exploded View 544
CONSOLE : Removal and Installation 544

REAR **545**
REAR : Exploded View 545
REAR : Removal and Installation 545

OUTSIDE KEY ANTENNA **546**

DRIVER SIDE **546**
DRIVER SIDE : Exploded View 546
DRIVER SIDE : Removal and Installation 546

PASSENGER SIDE **546**
PASSENGER SIDE : Exploded View 546
PASSENGER SIDE : Removal and Installation ... 546

REAR BUMPER **546**
REAR BUMPER : Exploded View 547
REAR BUMPER : Removal and Installation 547

INTELLIGENT KEY WARNING BUZZER **548**
Exploded View 548
Removal and Installation 548

BACK DOOR REQUEST SWITCH **549**
Exploded View 549
Removal and Installation 549

BACK DOOR OPENER SWITCH **550**
Exploded View 550
Removal and Installation 550

INTELLIGENT KEY BATTERY **551**
Exploded View 551
Removal and Installation 551

INTELLIGENT KEY UNIT **552**
Exploded View 552
Removal and Installation 552

WITHOUT I-KEY & SUPER LOCK

BASIC INSPECTION **553**

carsdiagn.com

DIAGNOSIS AND REPAIR WORKFLOW 553
Work Flow 553

INSPECTION AND ADJUSTMENT 556

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 556
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 556
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement ...556

FUNCTION DIAGNOSIS 557

DOOR LOCK FUNCTION 557

DOOR LOCK AND UNLOCK SWITCH 557
DOOR LOCK AND UNLOCK SWITCH : System Diagram 557
DOOR LOCK AND UNLOCK SWITCH : System Description 557
DOOR LOCK AND UNLOCK SWITCH : Component Parts Location 558
DOOR LOCK AND UNLOCK SWITCH : Component Description 559

KEYFOB 559
KEYFOB : System Diagram 559
KEYFOB : System Description 560
KEYFOB : Component Parts Location 560
KEYFOB : Component Description 562

AUTO DOOR LOCK 562
AUTO DOOR LOCK : System Diagram 562
AUTO DOOR LOCK : System Description 563
AUTO DOOR LOCK : Component Parts Location 563
AUTO DOOR LOCK : Component Description 564

VEHICLE SPEED SENSING AUTO DOOR LOCK..564
VEHICLE SPEED SENSING AUTO DOOR LOCK : System Diagram 564
VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description 565
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Parts Location 565
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Description 566

AIR BAG INTERLOCK UNLOCK 566
AIR BAG INTERLOCK UNLOCK : System Diagram 566
AIR BAG INTERLOCK UNLOCK : System Description 567
AIR BAG INTERLOCK UNLOCK : Component Parts Location 567
AIR BAG INTERLOCK UNLOCK : Component Description 568

BACK DOOR OPENER FUNCTION 569

BACK DOOR OPENER SWITCH 569
BACK DOOR OPENER SWITCH : System Diagram 569
BACK DOOR OPENER SWITCH : System Description 569
BACK DOOR OPENER SWITCH : Component Parts Location 569
BACK DOOR OPENER SWITCH : Component Description 571

WARNING FUNCTION 572
System Diagram 572
System Description 572
Component Parts Location 572
Component Description 574

HAZARD REMINDER FUNCTION 575
System Diagram 575
System Description 575
Component Parts Location 575
Component Description 577

DIAGNOSIS SYSTEM (BCM) 578

COMMON ITEM 578
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 578

DOOR LOCK 578
DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK) 578

MULTIREMOTE ENT 580
MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT) 580

TRUNK 581
TRUNK : CONSULT-III Function (BCM - TRUNK). 581

COMPONENT DIAGNOSIS 582

U1000 CAN COMM CIRCUIT 582
Description 582
DTC Logic 582
Diagnosis Procedure 582

U1010 CONTROL UNIT (CAN) 583
DTC Logic 583
Diagnosis Procedure 583
Special Repair Requirement 583

POWER SUPPLY AND GROUND CIRCUIT ...584

BCM 584
BCM : Diagnosis Procedure 584

DOOR LOCK AND UNLOCK SWITCH 585
Description 585
Component Function Check 585
Diagnosis Procedure 585
Component Inspection 586

cardiagn.com

DOOR LOCK AND UNLOCK SWITCH INDICATOR 587
Description 587
Component Function Check 587
Diagnosis Procedure 587
Component Inspection 588

DOOR SWITCH 589

DRIVER SIDE 589
DRIVER SIDE : Description 589
DRIVER SIDE : Component Function Check 589
DRIVER SIDE : Diagnosis Procedure 589
DRIVER SIDE : Component Inspection 590

PASSENGER SIDE 590
PASSENGER SIDE : Description 590
PASSENGER SIDE : Component Function Check 590
PASSENGER SIDE : Diagnosis Procedure 590
PASSENGER SIDE : Component Inspection 591

REAR LH 592
REAR LH : Description 592
REAR LH : Component Function Check 592
REAR LH : Diagnosis Procedure 592
REAR LH : Component Inspection 593

REAR RH 593
REAR RH : Description 593
REAR RH : Component Function Check 593
REAR RH : Diagnosis Procedure 593
REAR RH : Component Inspection 594

BACK DOOR 595
BACK DOOR : Description 595
BACK DOOR : Component Function Check 595
BACK DOOR : Diagnosis Procedure 595
BACK DOOR : Component Inspection 596

KEY SWITCH 597
Description 597
Component Function Check 597
Diagnosis Procedure 597
Component Inspection 598

DOOR LOCK ACTUATOR 599

DRIVER SIDE 599
DRIVER SIDE : Description 599
DRIVER SIDE : Component Function Check 599
DRIVER SIDE : Diagnosis Procedure 599
DRIVER SIDE : Component Inspection 600
DRIVER SIDE : Special Repair Requirement 600

PASSENGER SIDE 600
PASSENGER SIDE : Description 600
PASSENGER SIDE : Component Function Check 600
PASSENGER SIDE : Diagnosis Procedure 600
PASSENGER SIDE : Component Inspection 601

REAR LH 601
REAR LH : Description 601
REAR LH : Component Function Check 602
REAR LH : Diagnosis Procedure 602
REAR LH : Component Inspection 603

REAR RH 603
REAR RH : Description 603
REAR RH : Component Function Check 603
REAR RH : Diagnosis Procedure 603
REAR RH : Component Inspection 604

BACK DOOR OPENER ACTUATOR 605
Description 605
Component Function Check 605
Diagnosis Procedure 605
Component Inspection 606

BACK DOOR OPENER SWITCH 607
Description 607
Component Function Check 607
Diagnosis Procedure 607
Component Inspection 608

BUZZER (COMBINATION METER) 609
Description 609
Component Function Check 609
Diagnosis Procedure 609

HAZARD WARNING LAMPS 610
Description 610
Component Function Check 610
Diagnosis Procedure 610

VEHICLE SPEED SIGNAL CIRCUIT 611
Description 611
Component Function Check 611
Diagnosis Procedure 611

KEYFOB BATTERY 612
Description 612
Component Function Check 612
Diagnosis Procedure 612

ECU DIAGNOSIS 613

BCM (BODY CONTROL MODULE) 613
Reference Value 613
Wiring Diagram - POWER DOOR LOCK CONTROL SYSTEM - 629
Wiring Diagram - REMOTE KEYLESS ENTRY CONTROL SYSTEM - 635
Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM - 638
Fail Safe 642
DTC Inspection Priority Chart 643
DTC Index 644

SYMPTOM DIAGNOSIS 645

DOOR LOCK FUNCTION SYMPTOMS 645

carDiagn.com

DOOR LOCK AND UNLOCK SWITCH 645
DOOR LOCK AND UNLOCK SWITCH : Symptom Table 645

KEYFOB 645
KEYFOB : Symptom Table 645

AUTO DOOR LOCK 646
AUTO DOOR LOCK : Symptom Table 646

VEHICLE SPEED SENSING AUTO DOOR LOCK..646
VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table 646

BACK DOOR OPEN FUNCTION SYMPTOMS . 648

BACK DOOR OPENER SWITCH 648
BACK DOOR OPENER SWITCH : Symptom Table 648

WARNING FUNCTION SYMPTOMS 649

BACK DOOR 649
BACK DOOR : Symptom Table 649

HAZARD REMINDER FUNCTION 650

HAZARD WARNING LAMP 650
HAZARD WARNING LAMP : Symptom Table 650

SQUEAK AND RATTLE TROUBLE DIAGNOSES 651
Work Flow 651
Inspection Procedure 653
Diagnostic Worksheet 655

PRECAUTION 657

PRECAUTIONS 657
Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 657
Procedure without Cowl Top Cover 657
Steering Wheel Rotation after Battery Disconnect 657
Work 658

PREPARATION 659

PREPARATION 659
Commercial Service Tools 659

ON-VEHICLE MAINTENANCE 660

PRE-INSPECTION FOR DIAGNOSTIC 660
Basic Inspection 660

ON-VEHICLE REPAIR 661

HOOD 661

HOOD ASSEMBLY 661
HOOD ASSEMBLY : Exploded View 661
HOOD ASSEMBLY : Removal and Installation 662
HOOD ASSEMBLY : Adjustment 663

HOOD HINGE 663
HOOD HINGE : Exploded View 664
HOOD HINGE : Removal and Installation 664

HOOD SUPPORT ROD 664
HOOD SUPPORT ROD : Exploded View 664
HOOD SUPPORT ROD : Removal and Installation 665

HOOD LOCK CONTROL 665
HOOD LOCK CONTROL : Exploded View 665
HOOD LOCK CONTROL : Removal and Installation 666
HOOD LOCK CONTROL : Inspection 667

RADIATOR CORE SUPPORT 668
Exploded View 668
Removal and Installation 669

FRONT FENDER 671
Exploded View 671
Removal and Installation 671

FRONT DOOR 673

DOOR ASSEMBLY 673
DOOR ASSEMBLY : Exploded View 673
DOOR ASSEMBLY : Removal and Installation ... 674
DOOR ASSEMBLY : Adjustment 675

DOOR STRIKER 676
DOOR STRIKER : Exploded View 676
DOOR STRIKER : Removal and Installation 676

DOOR HINGE 676
DOOR HINGE : Exploded View 677
DOOR HINGE : Removal and Installation 677

DOOR CHECK LINK 677
DOOR CHECK LINK : Exploded View 677
DOOR CHECK LINK : Removal and Installation . 678

REAR DOOR 679

DOOR ASSEMBLY 679
DOOR ASSEMBLY : Exploded View 679
DOOR ASSEMBLY : Removal and Installation ... 680
DOOR ASSEMBLY : Adjustment 681

DOOR STRIKER 682
DOOR STRIKER : Exploded View 682
DOOR STRIKER : Removal and Installation 682

DOOR HINGE 682
DOOR HINGE : Exploded View 682
DOOR HINGE : Removal and Installation 683

DOOR CHECK LINK 683
DOOR CHECK LINK : Exploded View 683
DOOR CHECK LINK : Removal and Installation . 684

BACK DOOR 247

cardiagn.com

BACK DOOR ASSEMBLY 685
BACK DOOR ASSEMBLY : Exploded View 685
BACK DOOR ASSEMBLY : Removal and Installation 686
BACK DOOR ASSEMBLY : Adjustment 688

BACK DOOR STRIKER 688
BACK DOOR STRIKER : Exploded View 688
BACK DOOR STRIKER : Removal and Installation 689

BACK DOOR HINGE 689
BACK DOOR HINGE : Exploded View 689
BACK DOOR HINGE : Removal and Installation .. 690

BACK DOOR STAY 690
BACK DOOR STAY : Exploded View 691
BACK DOOR STAY : Removal and Installation ... 691

BACK DOOR WEATHER-STRIP 691
BACK DOOR WEATHER-STRIP : Exploded View. 691
BACK DOOR WEATHER-STRIP : Removal and Installation 692

FRONT DOOR LOCK 693

DOOR LOCK 693
DOOR LOCK : Exploded View 693
DOOR LOCK : Removal and Installation 693

INSIDE HANDLE 695
INSIDE HANDLE : Exploded View 695
INSIDE HANDLE : Removal and Installation 696

OUTSIDE HANDLE 696
OUTSIDE HANDLE : Exploded View 696
OUTSIDE HANDLE : Removal and Installation ... 697

REAR DOOR LOCK 700

DOOR LOCK 700
DOOR LOCK : Exploded View 700
DOOR LOCK : Removal and Installation 700

INSIDE HANDLE 702
INSIDE HANDLE : Exploded View 702
INSIDE HANDLE : Removal and Installation 702

OUTSIDE HANDLE 703
OUTSIDE HANDLE : Exploded View 703
OUTSIDE HANDLE : Removal and Installation ... 703

BACK DOOR LOCK 706

DOOR LOCK 706
DOOR LOCK : Exploded View 706
DOOR LOCK : Removal and Installation 706

FUEL FILLER LID OPENER 269

FUEL FILLER LID 707
FUEL FILLER LID : Exploded View 707
FUEL FILLER LID : Removal and Installation 707

FUEL FILLER OPENER CABLE 707
FUEL FILLER OPENER CABLE : Exploded View. 708
FUEL FILLER OPENER CABLE : Removal and Installation 708

DOOR SWITCH 710
Exploded View 710
Removal and Installation 710

BACK DOOR OPENER SWITCH 711
Exploded View 711
Removal and Installation 711

KEYFOB 712
Exploded View 712
Removal and Installation 712

WITHOUT I-KEY, WITH SUPER LOCK

BASIC INSPECTION 713

DIAGNOSIS AND REPAIR WORKFLOW 713
Work Flow 713

INSPECTION AND ADJUSTMENT 716

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 716
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 716
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement ... 716

FUNCTION DIAGNOSIS 717

DOOR LOCK FUNCTION 717

DOOR LOCK AND UNLOCK SWITCH 717
DOOR LOCK AND UNLOCK SWITCH : System Diagram 717
DOOR LOCK AND UNLOCK SWITCH : System Description 717
DOOR LOCK AND UNLOCK SWITCH : Component Parts Location 718
DOOR LOCK AND UNLOCK SWITCH : Component Description 719

KEYFOB 719
KEYFOB : System Diagram 719
KEYFOB : System Description 720
KEYFOB : Component Parts Location 720
KEYFOB : Component Description 722

AUTO DOOR LOCK 722
AUTO DOOR LOCK : System Diagram 722
AUTO DOOR LOCK : System Description 723
AUTO DOOR LOCK : Component Parts Location 723
AUTO DOOR LOCK : Component Description 724

VEHICLE SPEED SENSING AUTO DOOR LOCK.. 724
VEHICLE SPEED SENSING AUTO DOOR LOCK : System Diagram 724

carsdiagn.com

VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description 725
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Parts Location 725
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Description 726

AIR BAG INTERLOCK UNLOCK 726
AIR BAG INTERLOCK UNLOCK : System Diagram 726
AIR BAG INTERLOCK UNLOCK : System Description 727
AIR BAG INTERLOCK UNLOCK : Component Parts Location 727
AIR BAG INTERLOCK UNLOCK : Component Description 728

BACK DOOR OPENER FUNCTION 729

BACK DOOR OPENER SWITCH 729
BACK DOOR OPENER SWITCH : System Diagram 729
BACK DOOR OPENER SWITCH : System Description 729
BACK DOOR OPENER SWITCH : Component Parts Location 729
BACK DOOR OPENER SWITCH : Component Description 731

WARNING FUNCTION 732
System Diagram 732
System Description 732
Component Parts Location 732
Component Description 734

HAZARD REMINDER FUNCTION 735
System Diagram 735
System Description 735
Component Parts Location 735
Component Description 737

DIAGNOSIS SYSTEM (BCM) 738

COMMON ITEM 738
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 738

DOOR LOCK 738
DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK) 738

MULTIREMOTE ENT 740
MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT) 740

TRUNK 741
TRUNK : CONSULT-III Function (BCM - TRUNK) ..741

COMPONENT DIAGNOSIS 742

U1000 CAN COMM CIRCUIT 742
Description 742
DTC Logic 742
Diagnosis Procedure 742

U1010 CONTROL UNIT (CAN) 743
DTC Logic 743
Diagnosis Procedure 743
Special Repair Requirement 743

POWER SUPPLY AND GROUND CIRCUIT ...744

BCM 744
BCM : Diagnosis Procedure 744

DOOR LOCK AND UNLOCK SWITCH 745
Description 745
Component Function Check 745
Diagnosis Procedure 745
Component Inspection 746

DOOR LOCK AND UNLOCK SWITCH INDICATOR 747
Description 747
Component Function Check 747
Diagnosis Procedure 747
Component Inspection 748

DOOR SWITCH 749

DRIVER SIDE 749
DRIVER SIDE : Description 749
DRIVER SIDE : Component Function Check 749
DRIVER SIDE : Diagnosis Procedure 749
DRIVER SIDE : Component Inspection 750

PASSENGER SIDE 750
PASSENGER SIDE : Description 750
PASSENGER SIDE : Component Function Check 750
PASSENGER SIDE : Diagnosis Procedure 750
PASSENGER SIDE : Component Inspection 751

REAR LH 752
REAR LH : Description 752
REAR LH : Component Function Check 752
REAR LH : Diagnosis Procedure 752
REAR LH : Component Inspection 753

REAR RH 753
REAR RH : Description 753
REAR RH : Component Function Check 753
REAR RH : Diagnosis Procedure 753
REAR RH : Component Inspection 754

BACK DOOR 755
BACK DOOR : Description 755
BACK DOOR : Component Function Check 755
BACK DOOR : Diagnosis Procedure 755
BACK DOOR : Component Inspection 756

KEY SWITCH 757
Description 757
Component Function Check 757

cardiagn.com

Diagnosis Procedure 757
Component Inspection 758

DOOR LOCK ACTUATOR 759

DRIVER SIDE 759
DRIVER SIDE : Description 759
DRIVER SIDE : Component Function Check 759
DRIVER SIDE : Diagnosis Procedure 759
DRIVER SIDE : Component Inspection 760
DRIVER SIDE : Special Repair Requirement 760

PASSENGER SIDE 760
PASSENGER SIDE : Description 760
PASSENGER SIDE :
Component Function Check 760
PASSENGER SIDE : Diagnosis Procedure 760
PASSENGER SIDE : Component Inspection 761

REAR LH 761
REAR LH : Description 761
REAR LH : Component Function Check 762
REAR LH : Diagnosis Procedure 762
REAR LH : Component Inspection 763

REAR RH 763
REAR RH : Description 763
REAR RH : Component Function Check 763
REAR RH : Diagnosis Procedure 763
REAR RH : Component Inspection 764

SUPER LOCK ACTUATOR 765

DRIVER SIDE 765
DRIVER SIDE : Description 765
DRIVER SIDE : Component Function Check 765
DRIVER SIDE : Diagnosis Procedure 765
DRIVER SIDE : Component Inspection 766
DRIVER SIDE : Special Repair Requirement 766

PASSENGER SIDE 766
PASSENGER SIDE : Description 766
PASSENGER SIDE :
Component Function Check 766
PASSENGER SIDE : Diagnosis Procedure 766
PASSENGER SIDE : Component Inspection 767

REAR LH 767
REAR LH : Description 767
REAR LH : Component Function Check 768
REAR LH : Diagnosis Procedure 768
REAR LH : Component Inspection 768

REAR RH 769
REAR RH : Description 769
REAR RH : Component Function Check 769
REAR RH : Diagnosis Procedure 769
REAR RH : Component Inspection 770

BACK DOOR OPENER ACTUATOR 771
Description 771
Component Function Check 771
Diagnosis Procedure 771
Component Inspection 772

BACK DOOR OPENER SWITCH 773
Description 773
Component Function Check 773
Diagnosis Procedure 773
Component Inspection 774

BUZZER (COMBINATION METER) 775
Description 775
Component Function Check 775
Diagnosis Procedure 775

HAZARD WARNING LAMPS 776
Description 776
Component Function Check 776
Diagnosis Procedure 776

VEHICLE SPEED SIGNAL CIRCUIT 777
Description 777
Component Function Check 777
Diagnosis Procedure 777

KEYFOB BATTERY 778
Description 778
Component Function Check 778
Diagnosis Procedure 778

ECU DIAGNOSIS 779

BCM (BODY CONTROL MODULE) 779
Reference Value 779
Wiring Diagram - SUPER LOCK CONTROL SYSTEM - 794
Wiring Diagram - REMOTE KEYLESS ENTRY CONTROL SYSTEM - 802
Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM - 805
Fail Safe 809
DTC Inspection Priority Chart 810
DTC Index 811

SYMPTOM DIAGNOSIS 812

DOOR LOCK FUNCTION SYMPTOMS 812

DOOR LOCK AND UNLOCK SWITCH 812
DOOR LOCK AND UNLOCK SWITCH : Symptom Table 812

KEYFOB 812
KEYFOB : Symptom Table 812

AUTO DOOR LOCK 813
AUTO DOOR LOCK : Symptom Table 813

VEHICLE SPEED SENSING AUTO DOOR LOCK.. 813
VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table 813

carDiagn.com

BACK DOOR OPEN FUNCTION SYMPTOMS . 815

BACK DOOR OPENER SWITCH 815
BACK DOOR OPENER SWITCH : Symptom Table 815

WARNING FUNCTION SYMPTOMS 816

BACK DOOR 816
BACK DOOR : Symptom Table 816

HAZARD REMINDER FUNCTION 817

HAZARD WARNING LAMP 817
HAZARD WARNING LAMP : Symptom Table 817

SQUEAK AND RATTLE TROUBLE DIAGNOSES 818
Work Flow 818
Inspection Procedure 820
Diagnostic Worksheet 822

PRECAUTION 824

PRECAUTIONS 824
Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 824
Procedure without Cowl Top Cover 824
Steering Wheel Rotation after Battery Disconnect 824
Work 825

PREPARATION 826

PREPARATION 826
Commercial Service Tools 826

ON-VEHICLE MAINTENANCE 827

PRE-INSPECTION FOR DIAGNOSTIC 827
Basic Inspection 827

ON-VEHICLE REPAIR 828

HOOD 828

HOOD ASSEMBLY 828
HOOD ASSEMBLY : Exploded View 828
HOOD ASSEMBLY : Removal and Installation 829
HOOD ASSEMBLY : Adjustment 830

HOOD HINGE 830
HOOD HINGE : Exploded View 831
HOOD HINGE : Removal and Installation 831

HOOD SUPPORT ROD 831
HOOD SUPPORT ROD : Exploded View 831
HOOD SUPPORT ROD : Removal and Installation 832

HOOD LOCK CONTROL 832
HOOD LOCK CONTROL : Exploded View 832
HOOD LOCK CONTROL : Removal and Installation 833
HOOD LOCK CONTROL : Inspection 834

RADIATOR CORE SUPPORT 835
Exploded View 835
Removal and Installation 836

FRONT FENDER 838
Exploded View 838
Removal and Installation 838

FRONT DOOR 840

DOOR ASSEMBLY 840
DOOR ASSEMBLY : Exploded View 840
DOOR ASSEMBLY : Removal and Installation ... 841
DOOR ASSEMBLY : Adjustment 842

DOOR STRIKER 843
DOOR STRIKER : Exploded View 843
DOOR STRIKER : Removal and Installation 843

DOOR HINGE 843
DOOR HINGE : Exploded View 844
DOOR HINGE : Removal and Installation 844

DOOR CHECK LINK 844
DOOR CHECK LINK : Exploded View 844
DOOR CHECK LINK : Removal and Installation . 845

REAR DOOR 846

DOOR ASSEMBLY 846
DOOR ASSEMBLY : Exploded View 846
DOOR ASSEMBLY : Removal and Installation ... 847
DOOR ASSEMBLY : Adjustment 848

DOOR STRIKER 849
DOOR STRIKER : Exploded View 849
DOOR STRIKER : Removal and Installation 849

DOOR HINGE 849
DOOR HINGE : Exploded View 849
DOOR HINGE : Removal and Installation 850

DOOR CHECK LINK 850
DOOR CHECK LINK : Exploded View 850
DOOR CHECK LINK : Removal and Installation . 851

BACK DOOR 247

BACK DOOR ASSEMBLY 852
BACK DOOR ASSEMBLY : Exploded View 852
BACK DOOR ASSEMBLY : Removal and Installation 853
BACK DOOR ASSEMBLY : Adjustment 855

BACK DOOR STRIKER 855
BACK DOOR STRIKER : Exploded View 855
BACK DOOR STRIKER : Removal and Installation 856

BACK DOOR HINGE 856

cardiagn.com

BACK DOOR HINGE : Exploded View 856
BACK DOOR HINGE : Removal and Installation .. 857

BACK DOOR STAY 857
BACK DOOR STAY : Exploded View 858
BACK DOOR STAY : Removal and Installation ... 858

BACK DOOR WEATHER-STRIP 858
BACK DOOR WEATHER-STRIP : Exploded View. 858
BACK DOOR WEATHER-STRIP : Removal and Installation 859

FRONT DOOR LOCK 860

DOOR LOCK 860
DOOR LOCK : Exploded View 860
DOOR LOCK : Removal and Installation 860

INSIDE HANDLE 862
INSIDE HANDLE : Exploded View 862
INSIDE HANDLE : Removal and Installation 863

OUTSIDE HANDLE 863
OUTSIDE HANDLE : Exploded View 863
OUTSIDE HANDLE : Removal and Installation ... 864

REAR DOOR LOCK 867

DOOR LOCK 867
DOOR LOCK : Exploded View 867
DOOR LOCK : Removal and Installation 867

INSIDE HANDLE 869
INSIDE HANDLE : Exploded View 869
INSIDE HANDLE : Removal and Installation 869

OUTSIDE HANDLE 870
OUTSIDE HANDLE : Exploded View 870
OUTSIDE HANDLE : Removal and Installation 870

BACK DOOR LOCK 873

DOOR LOCK 873
DOOR LOCK : Exploded View 873
DOOR LOCK : Removal and Installation 873

FUEL FILLER LID OPENER 269

FUEL FILLER LID 874
FUEL FILLER LID : Exploded View 874
FUEL FILLER LID : Removal and Installation 874

FUEL FILLER OPENER CABLE 874
FUEL FILLER OPENER CABLE : Exploded View. 875
FUEL FILLER OPENER CABLE : Removal and Installation 875

DOOR SWITCH 877
Exploded View 877
Removal and Installation 877

BACK DOOR OPENER SWITCH 878
Exploded View 878
Removal and Installation 878

KEYFOB BATTERY 879
Exploded View 879
Removal and Installation 879

q-diagn.com

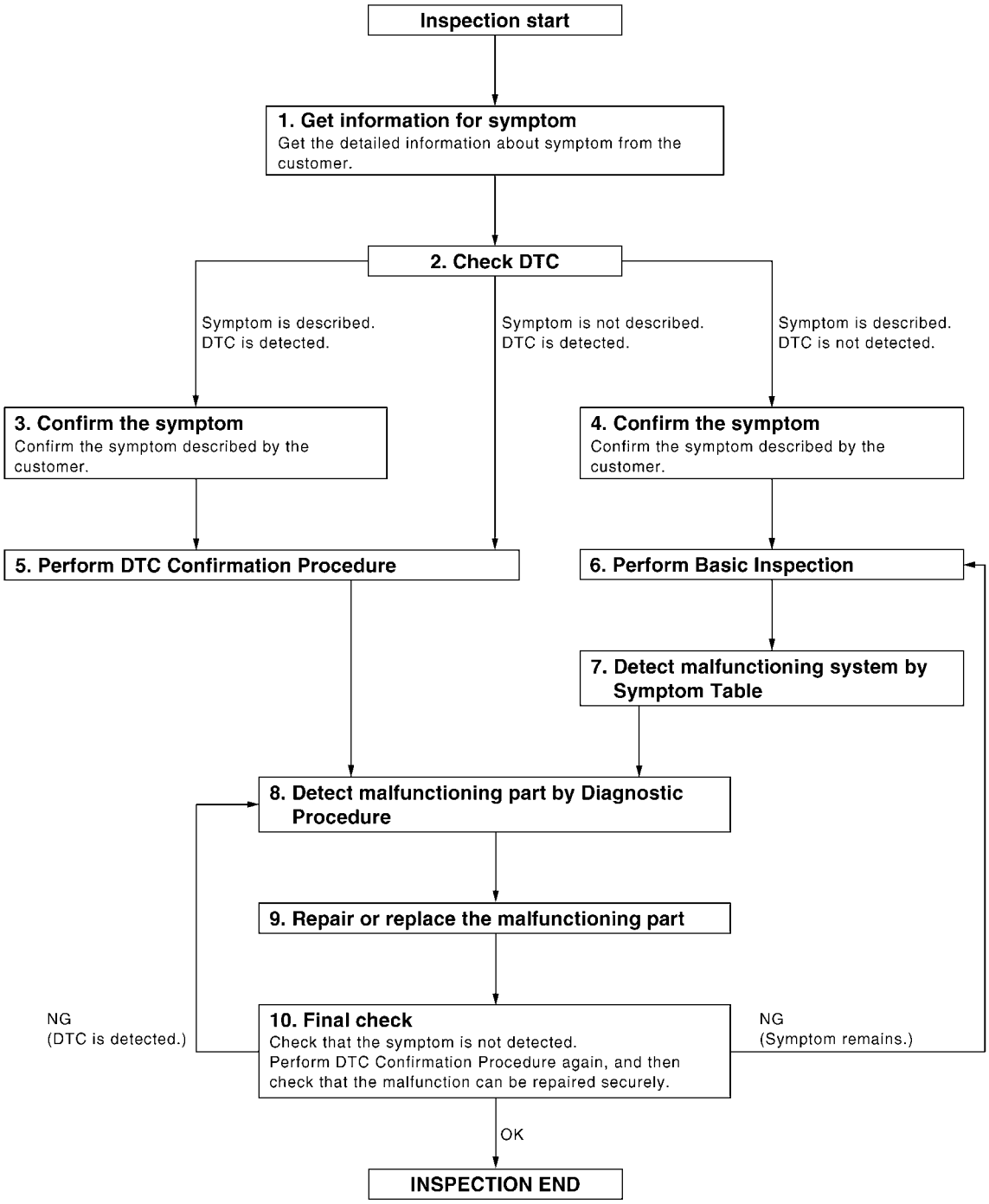
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000939032

OVERALL SEQUENCE



JMKIA0101GB

DETAILED FLOW

cardiagn.com

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred).

>> GO TO 2.

2.CHECK DTC

1. Check DTC for Intelligent Key unit and BCM.
2. Perform the following procedure if DTC is displayed.

- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.

3. Check related service bulletins for information.

Is any symptom described and any DTC detected?

Symptom is described, DTC is displayed>>GO TO 3.
Symptom is described, DTC is not displayed>>GO TO 4.
Symptom is not described, DTC is displayed>>GO TO 5.

3.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR” mode and check real-time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR ” mode and check real-time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC Confirmation Procedure for the displayed DTC, and then check that DTC is detected again.
If two or more DTCs are detected, refer to DLK-163, "DTC Inspection Priority Chart" (Intelligent Key unit), DLK-201, "DTC Inspection Priority Chart" (BCM) and determine trouble diagnosis order.

Is DTC detected?

YES >> GO TO 8.
NO >> Refer to GI-39, "Intermittent Incident".

6.PERFORM BASIC INSPECTION

Perform Basic Inspection. Refer to DLK-221, "Basic Inspection".

>> GO TO 7.

7.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to Symptom Table based on the confirmed symptom in step 4.

>> GO TO 8.

8.DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Inspect according to Diagnostic Procedure of the system.
NOTE:
The Diagnostic Procedure is described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure.

>> GO TO 9.

9.REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it.

>> GO TO 10.

10.FINAL CHECK

When DTC was detected in step 9, perform DTC Confirmation Procedure or Component Function Check again, and then check that the malfunctions have been fully repaired.
When symptom was described by the customer, refer to the confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Does the symptom reappear?

YES (DTC is detected)>>GO TO 8.
YES (Symptom remains)>>GO TO 6.
NO >> **INSPECTION END**

cardiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000000939034

Perform the system initialization when replacing Intelligent Key unit, replacing Intelligent Key or registering an additional Intelligent Key.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000000939035

Refer to the CONSULT-III Operation Manual-NATS.

cardiagn.com

FUNCTION DIAGNOSIS

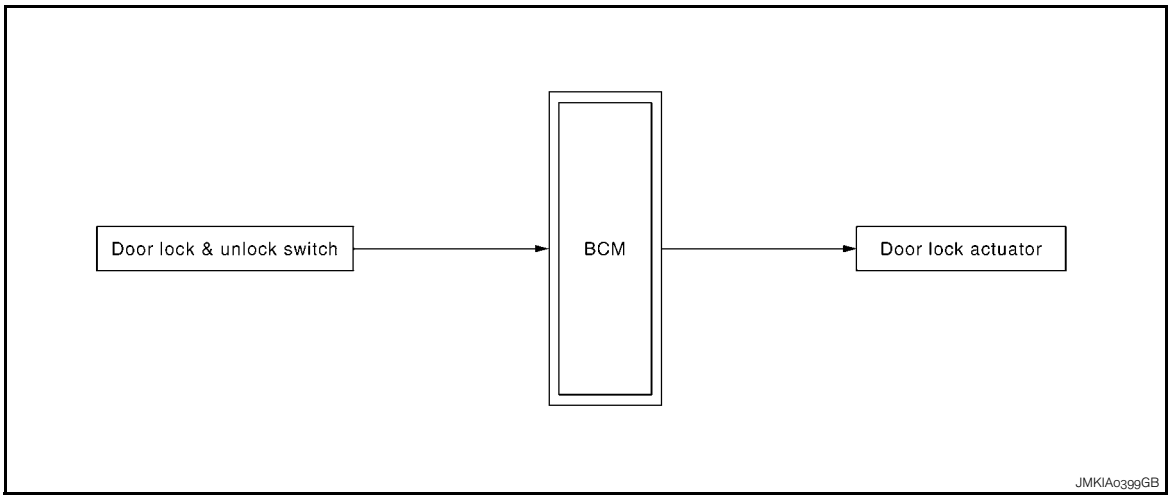
DOOR LOCK FUNCTION

DOOR LOCK AND UNLOCK SWITCH

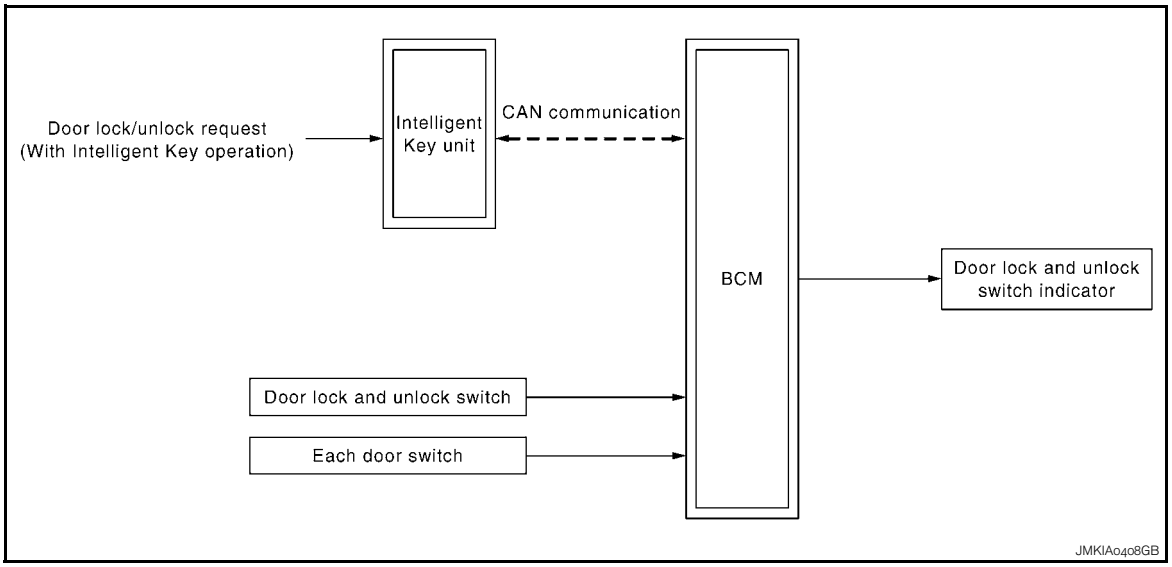
DOOR LOCK AND UNLOCK SWITCH : System Diagram

INFOID:0000000000939036

DOOR LOCK AND UNLOCK SWITCH OPERATION



DOOR LOCK AND UNLOCK SWITCH INDICATOR OPERATION



DOOR LOCK AND UNLOCK SWITCH : System Description

INFOID:0000000000939037

DOOR LOCK AND UNLOCK SWITCH OPERATION

Functions are available by operating the door lock and unlock switch on center console. Interlocked with the lock/unlock operation of door lock and unlock switch, door lock actuators of all doors are locked/unlocked.

Operation Condition

If the following conditions are not satisfied, door lock/unlock operation is not performed even if the door lock and unlock switch is operated.

cardiagn.com

Door lock and unlock switch	Operation condition
Lock operation	All of the following conditions are satisfied. • Except driver side doors are closed. • Doors are not locked with Intelligent Key or door request switch.
Unlock operation	All of the following conditions are satisfied. • Doors are not locked with Intelligent Key or door request switch.

NOTE:
When the door lock is locked with Intelligent Key or door request switch, door lock and unlock switch operation will be invalid until either of the following conditions is satisfied.
- Turn ignition switch ON.
- Unlock with Intelligent Key or door request switch.

DOOR LOCK AND UNLOCK SWITCH INDICATOR OPERATION

Door lock and unlock switch indicator indicates door lock status. The indicator turns ON while ignition switch is ON and each door lock is locked. If any door is opened, the indicator will turn OFF.

1 Minute Timer

A timer must be running to turn OFF the indicator. The timer will run for 1 minute after locking with Intelligent Key, door request switch or auto door lock.

30 Minutes Timer

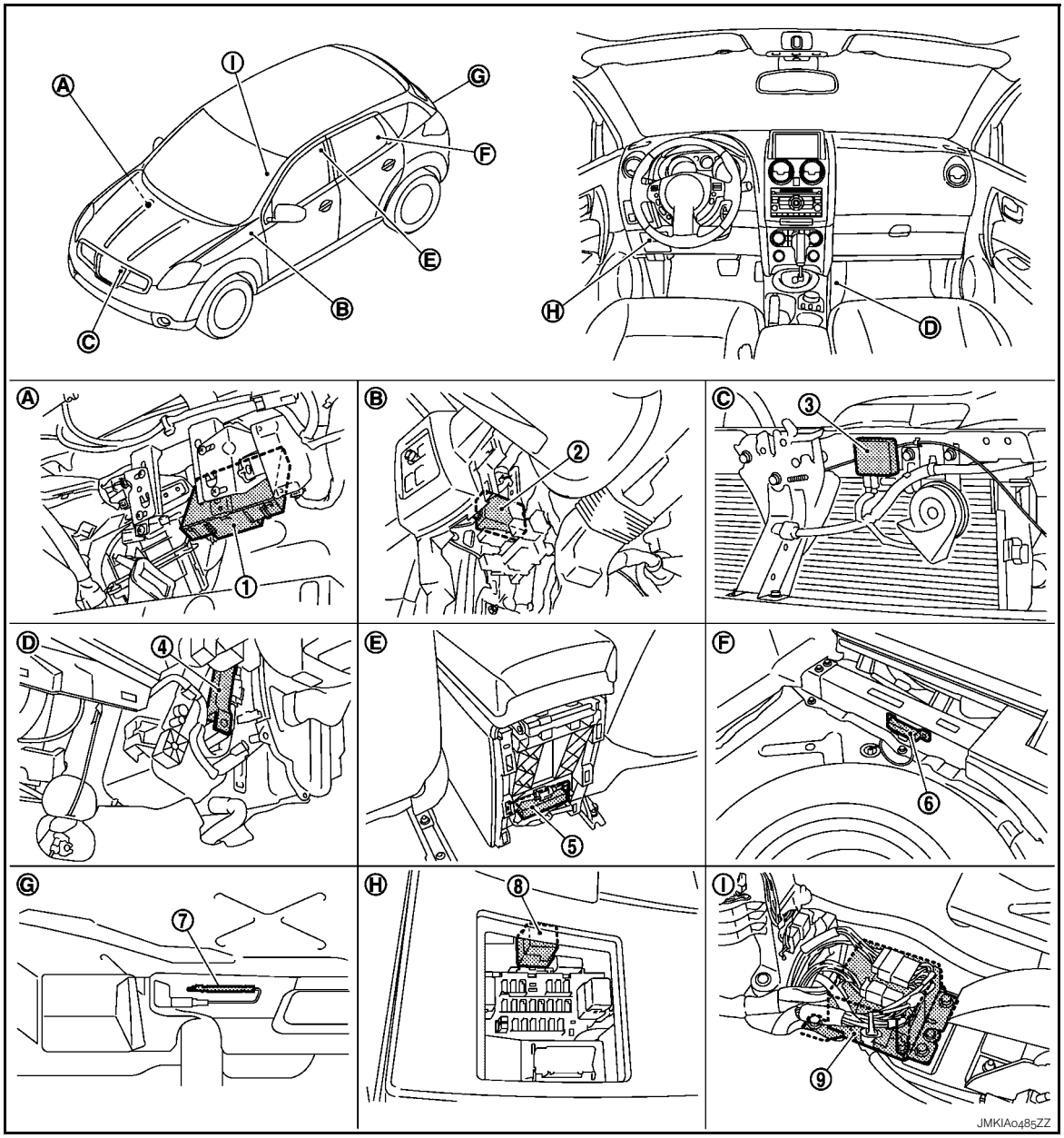
A timer must be running to turn OFF the indicator. The timer will run for 30 minutes after locking with door lock and unlock switch.

NOTE:
1minute timer condition is satisfied while the 30 minutes timer is active, however the 30 minutes timer does not change to 1 minute timer condition.

DOOR LOCK AND UNLOCK SWITCH : Component Parts Location

INFOID:0000000000939038

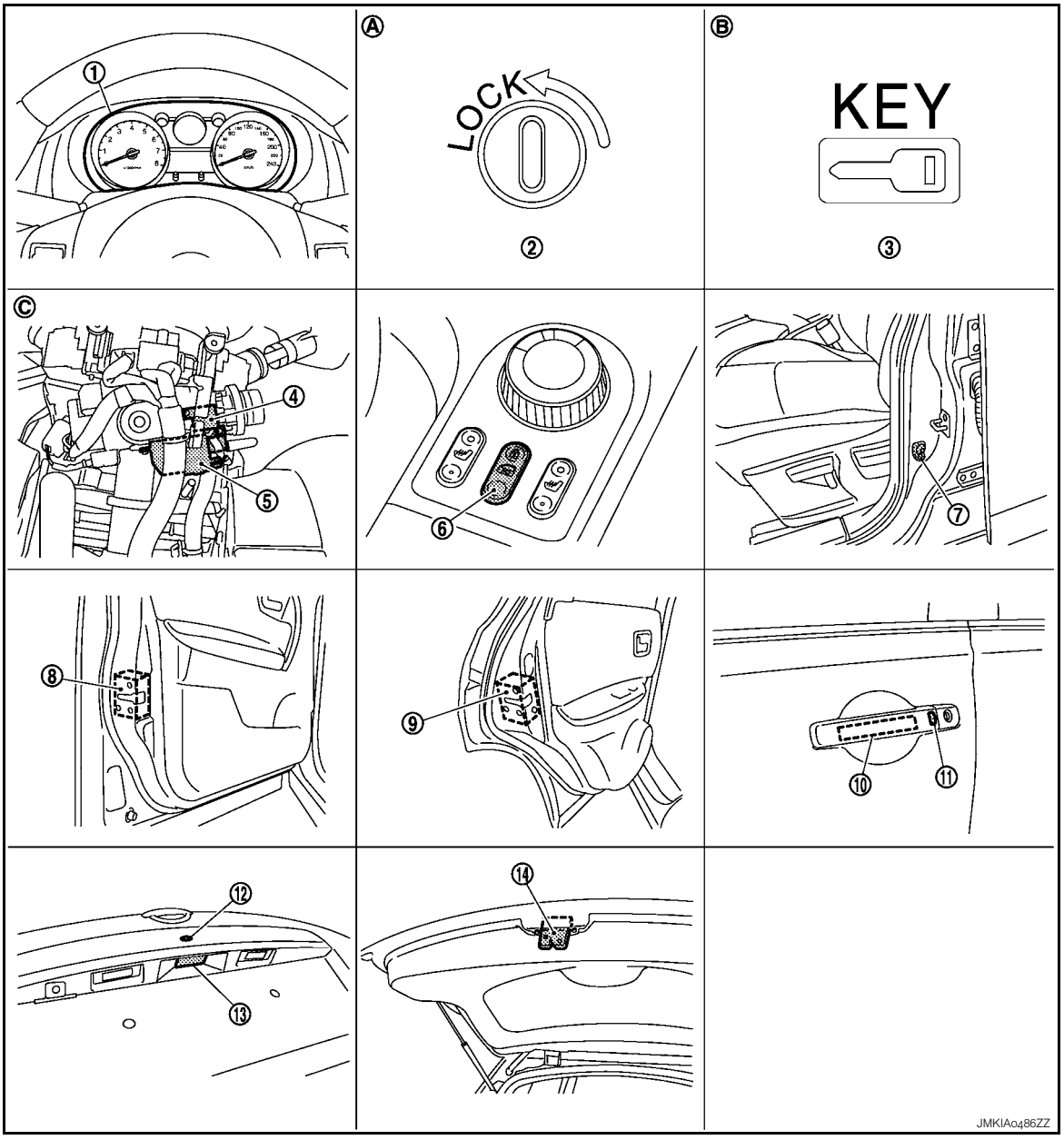
carsdiagn.com



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed

cardiagn.com



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

DOOR LOCK AND UNLOCK SWITCH : Component Description

INFOID:0000000000939039

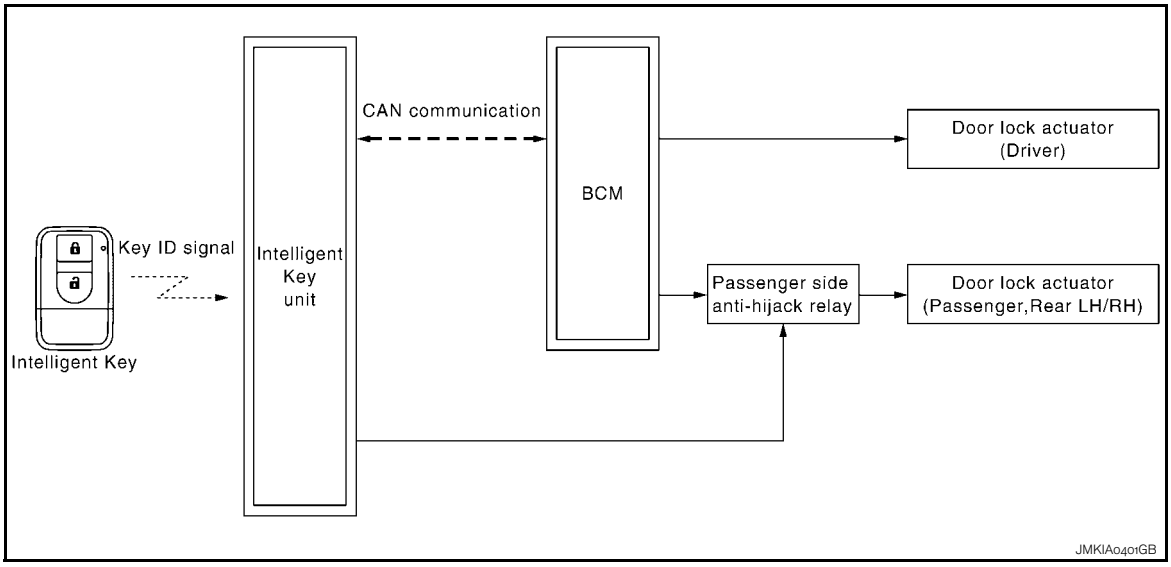
Item	Function
BCM	Controls the door lock function.
Door switch	Detects door state (open or close).
Door lock and unlock switch	Transmits door lock/unlock signal to BCM. Door lock/unlock switch indicator is built-in door lock and unlock switch.
Door lock actuator	Receives door lock/unlock signal from BCM and locks/unlocks each door.

INTELLIGENT KEY

INTELLIGENT KEY : System Diagram

INFOID:0000000000939040

INTELLIGENT KEY OPERATION



INTELLIGENT KEY : System Description

INFOID:0000000000939041

INTELLIGENT KEY OPERATION

The Intelligent Key has the same functions as the multi remote control system. Therefore, it can be used in the same manner as the keyfob by operating the door lock/unlock button.
This function can be set to OFF with CONSULT-III. For the setting information, refer to DLK-65, "CONSULT-III Function (INTELLIGENT KEY)".

OPERATION CONDITION

Remote controller operation	Operation condition
Lock	• All doors are closed • Key switch is OFF (key is removed from ignition key cylinder) • Ignition knob switch is OFF (Ignition switch is not pressed)
Unlock	• Key switch is OFF (key is removed from ignition key cylinder) • Ignition knob switch is OFF (Ignition switch is not pressed)

OPERATION AREA

To ensure that the Intelligent Key works effectively, use within a 100 cm range of each door, however the operable range may differ according to surroundings.

DOOR LOCK AND UNLOCK CONTROL

When door lock and unlock button of the Intelligent Key are pressed, lock signal or unlock signal is transmitted from Intelligent Key to Intelligent Key unit.
When Intelligent Key unit receives the door lock and unlock signal, it operates door lock actuator.

ANTI-HIJACK MODE

cardiagn.com

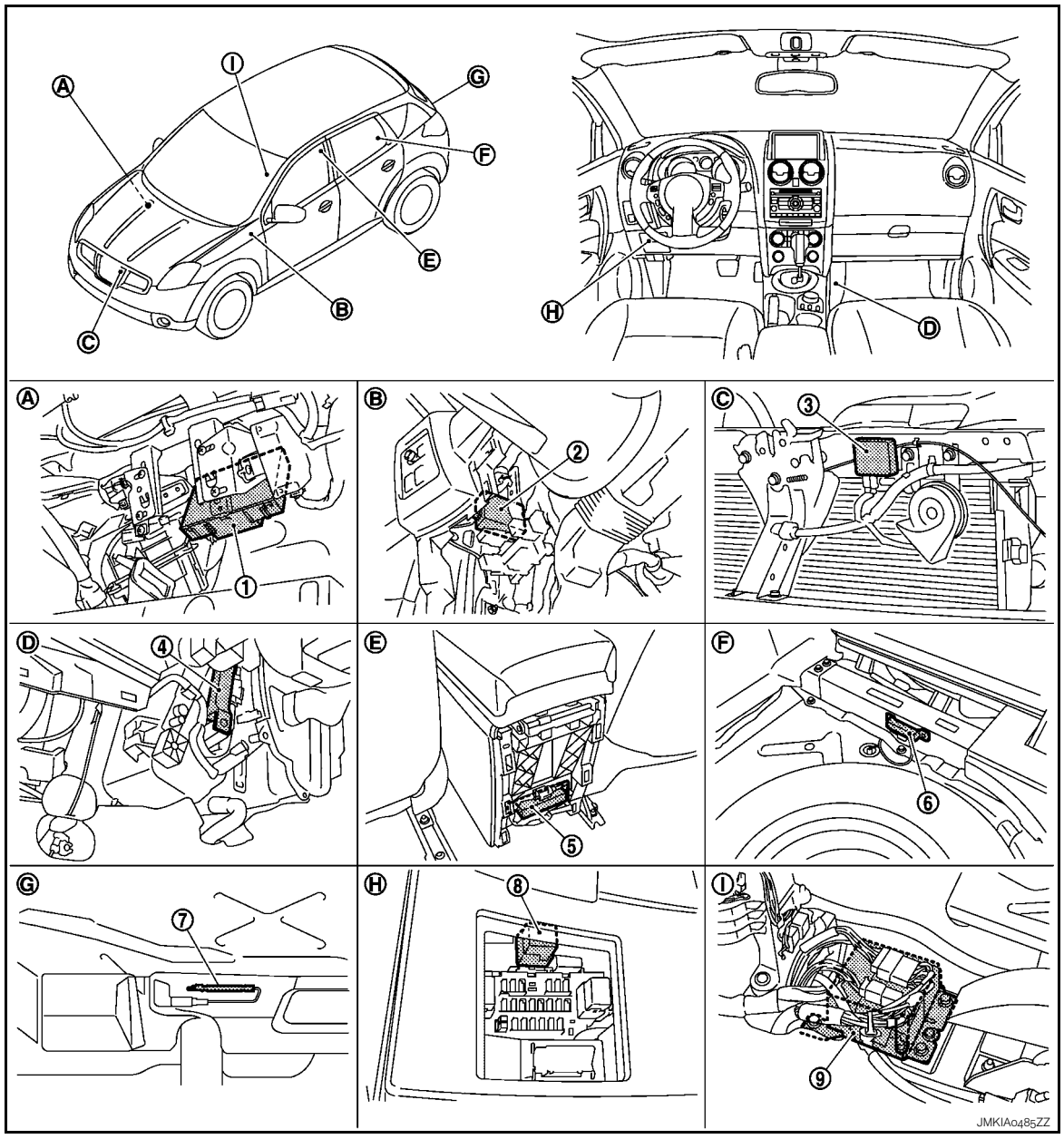
When door lock is unlocked, pressing LOCK button on Intelligent Key once will lock all doors. When door lock is locked, pressing UNLOCK button on Intelligent Key door will unlock driver side door. Pressing UNLOCK button on Intelligent Key a second time within 5 seconds from the first time will unlock all doors and back door can be opened with back door opener switch.

NOTE:

Anti-hijack mode can be set to ON or OFF with CONSULT-III. For the setting information, refer to DLK-65, "CONSULT-III Function (INTELLIGENT KEY)".

INTELLIGENT KEY : Component Parts Location

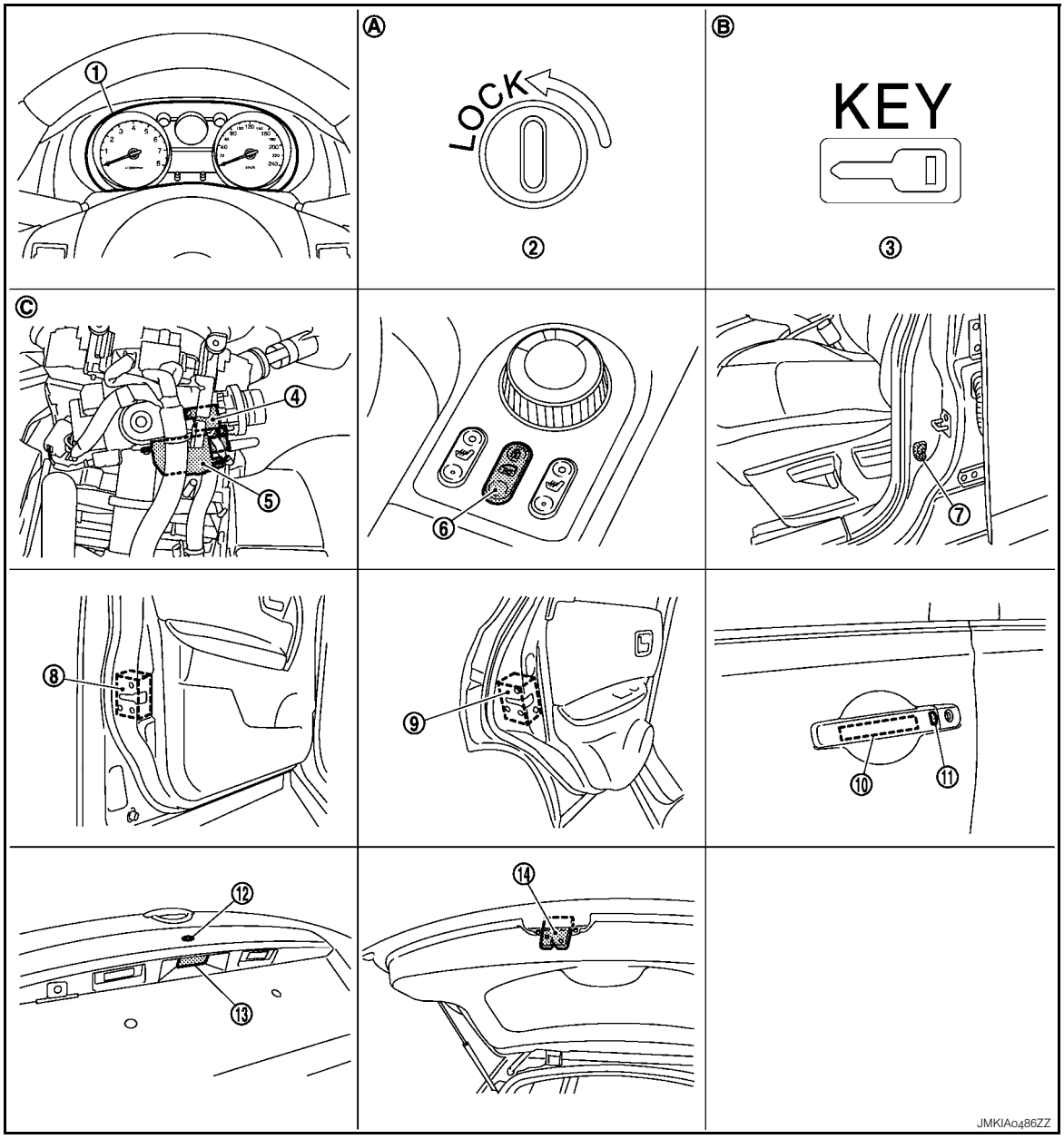
INFOID:0000000001116982



1. BCM M65, M66, M67
2. Intelligent Key unit M40
3. Intelligent Key warning buzzer E25
4. Inside key antenna (instrument center) M70
5. Inside key antenna (center console) M61
6. Inside key antenna (rear seat) B45
7. Inside key antenna (rear bumper) B81
8. Passenger side anti-hijack relay M90
9. Air bag diagnosis sensor unit M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed

D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

cardiagn.com

INTELLIGENT KEY : Component Description

INFOID:0000000000939043

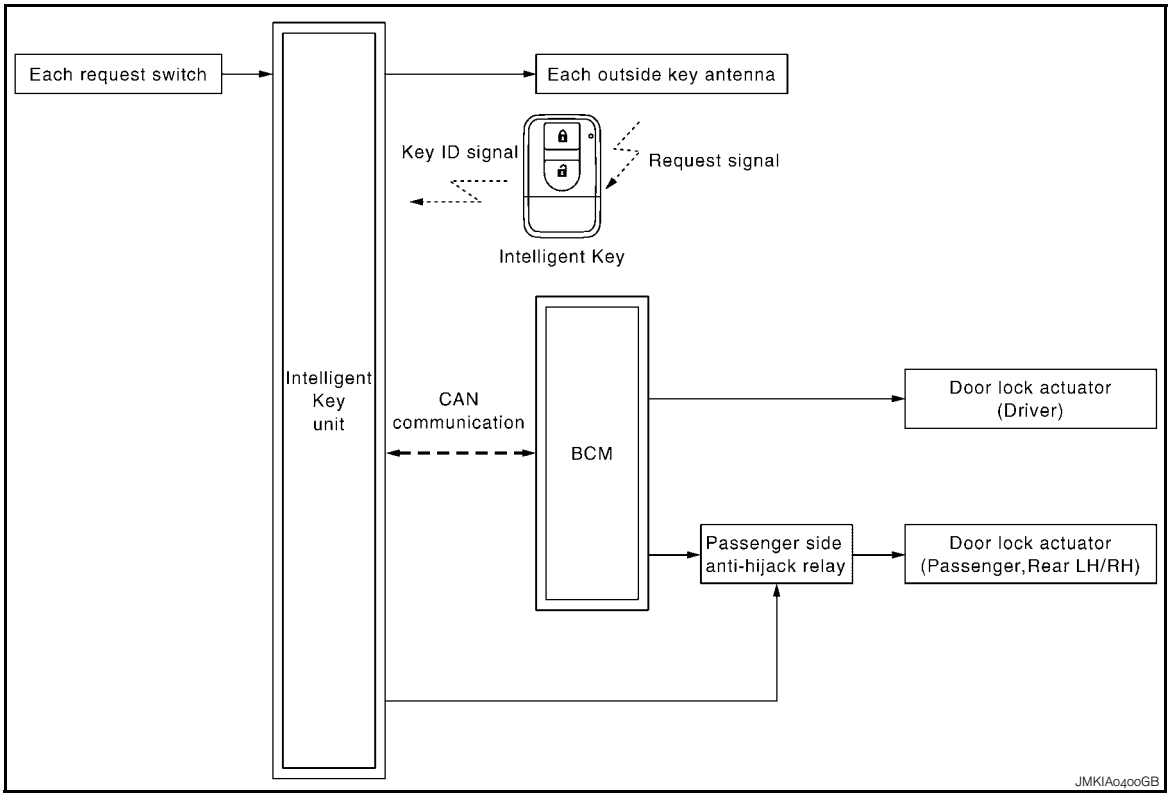
Item	Function
Intelligent Key unit	Controls the door lock/unlock operation with BCM.
BCM	Controls the door lock/unlock operation with Intelligent Key unit.
Door switch	Detects door state (open or closed).
Key switch	Detects that mechanical key is inserted into ignition key cylinder.
Ignition knob switch	Detects ignition knob state (push or release).
Outside key antenna	Detects that Intelligent Key is in detection area of outside key antenna.
Intelligent Key	Transmits key ID to Intelligent Key unit when lock/unlock button is pressed.
Passenger side anti-hijack relay	Controls the circuit of door lock actuator (passenger side, rear LH/RH).
Door lock actuator	Receives lock/unlock signal from BCM and locks and unlocks each door.

DOOR REQUEST SWITCH

DOOR REQUEST SWITCH : System Diagram

INFOID:0000000001078856

DOOR REQUEST SWITCH OPERATION



DOOR REQUEST SWITCH : System Description

INFOID:0000000001078857

DOOR REQUEST SWITCH OPERATION

Only when pressing the request switch, it is possible to lock and unlock the door by carrying the Intelligent Key. The Intelligent Key system is a system that makes it possible to lock and unlock the door by carrying the Intelligent Key, which operates based on the results of electronic ID verification using two-way communications between the Intelligent Key and the vehicle (Intelligent Key unit).

This function can be set to OFF with CONSULT-III. For the setting information, refer to DLK-65, "CONSULT-III Function (INTELLIGENT KEY)".

CAUTION:

The driver should always carry the Intelligent Key

OPERATION CONDITION

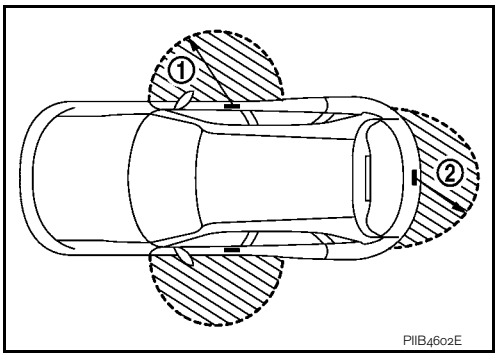
If the following conditions are not satisfied, door lock and unlock operation is not performed even if the request switch is operated.

Each request switch operation	Operation condition
Lock operation	• All doors are closed. • Key switch is OFF. (Key is removed from ignition key cylinder.) • Ignition knob switch is OFF. (Ignition switch is not pushed.) • Any Intelligent Key is not inside the vehicle • Intelligent Key is within outside key antenna detection area
Unlock Operation	• Key switch is OFF. (Key is removed from ignition key cylinder.) • Ignition knob switch is OFF. (Ignition switch is not pushed.) • Intelligent Key is not inside the vehicle.* • Intelligent Key is within outside key antenna detection area.

*: Even with a registered Intelligent Key remaining inside the vehicle, door locks can be unlocked from outside of the vehicle with a spare Intelligent Key as long as key IDs are different.

OUTSIDE KEY ANTENNA DETECTION AREA

The outside key antenna detection area of door lock and unlock function is in the range of approximately 80 cm (31.50 in) surrounding the driver and passenger door handles (1) and the back door request switch (2). However, this operating range depends on the ambient conditions.



DOOR LOCK AND UNLOCK CONTROL

When the Intelligent Key detects that door request switch is pressed, it starts corresponding with outside key antenna (door of request switch pressed side). Then, the Intelligent Key is checked to be near the door.
If the Intelligent Key is within the outside key antenna detection area, it receives the request signal and transmits the key ID signal to the Intelligent Key unit. Intelligent Key unit receives the key ID signal and compares it with the registered key ID. Intelligent Key unit sends the door lock and unlock signal to BCM via CAN communication.

ANTI-HIJACK MODE

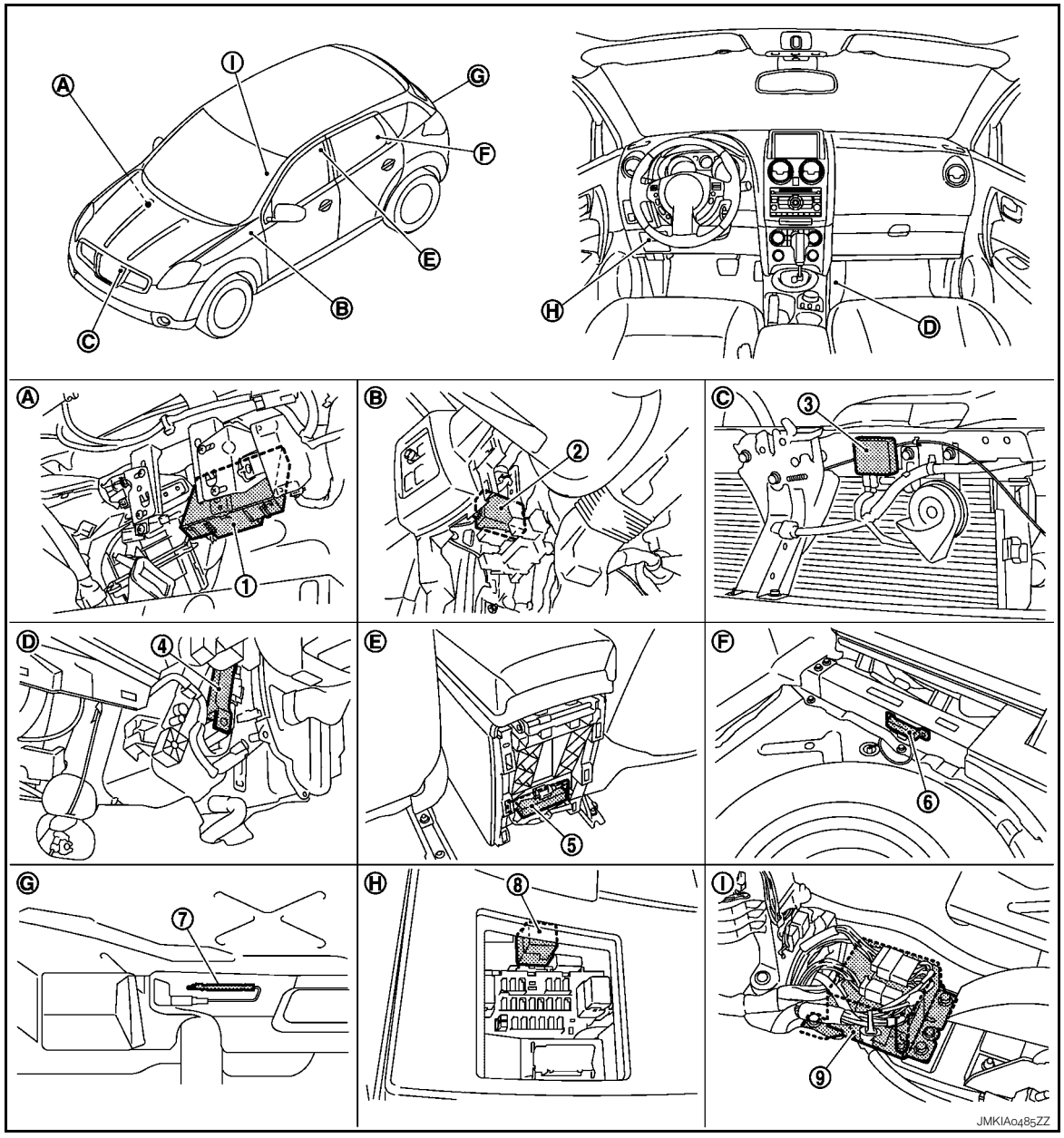
- When door is unlocked, pressing door request switch (driver or passenger) once will lock all doors. When door is locked, pressing door request switch (driver or passenger) once will unlock operated door. Pressing the door request switch door a second time within 5 seconds from the first time will unlock all doors and back door can be opened with back door opener switch.
- When door is unlocked, pressing door request switch (back door) will lock all doors. When door lock is locked, pressing door request switch (back door) will unlock all doors and back door can be opened with back door opener switch.

NOTE:
Anti-hijack mode can be set to OFF with CONSULT-III and Intelligent Key. For the setting information, refer to DLK-65, "CONSULT-III Function (INTELLIGENT KEY)".

DOOR REQUEST SWITCH : Component Parts Location

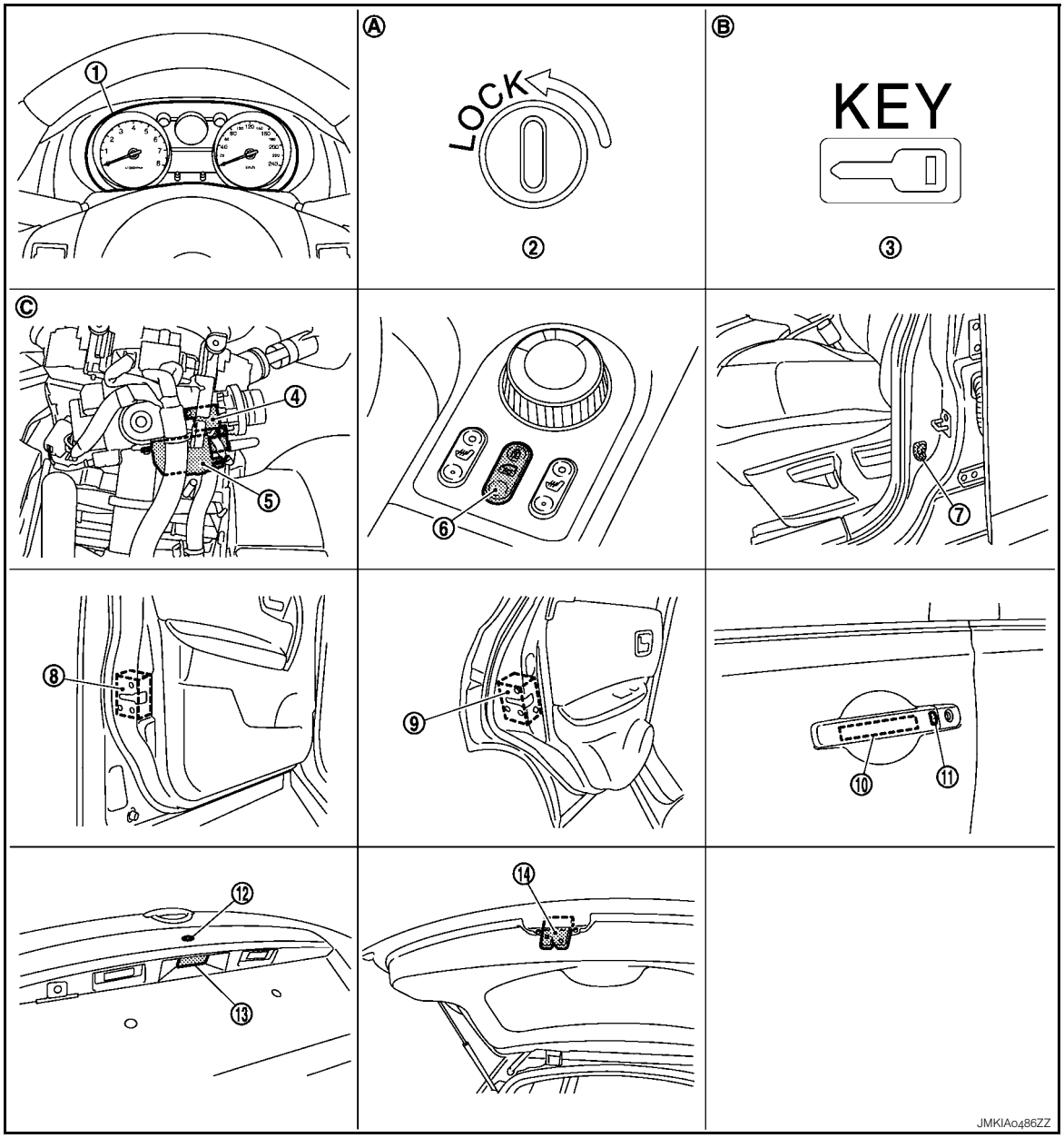
INFOID:0000000001116983

cardiagn.com



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

DOOR REQUEST SWITCH : Component Description

INFOID:0000000001078859

cardiagn.com

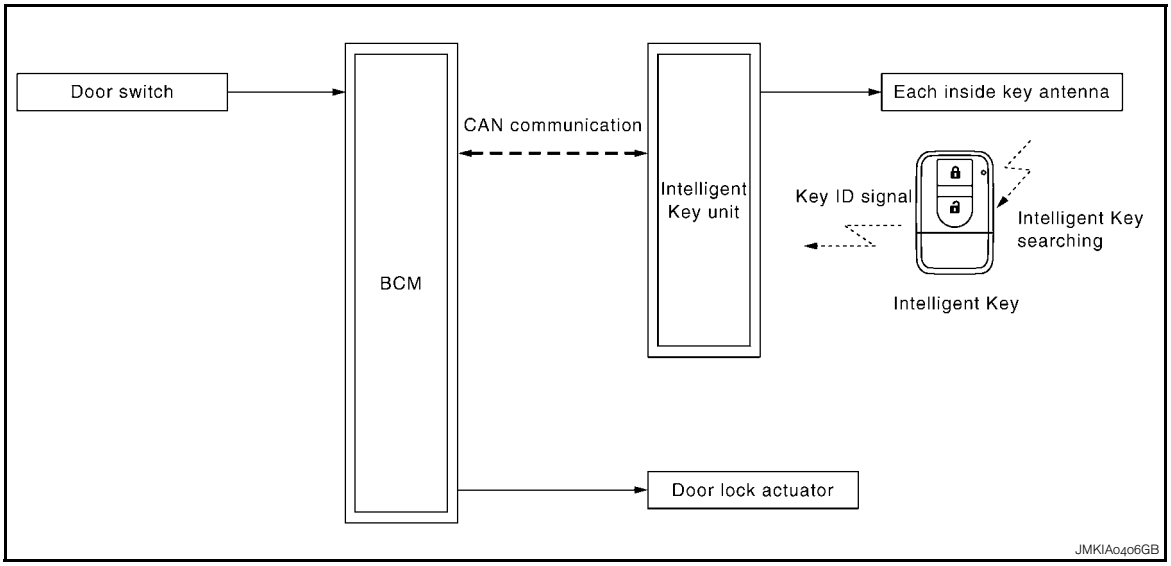
Item	Function
Intelligent Key unit	Controls the door lock function with BCM.
BCM	Controls the door lock/unlock function with Intelligent Key unit.
Door request switch	Transmits opertion signal (lock and unlock) to Intelligent Key unit.
Door switch	Detects door state (open or closed).
Key switch	Detects that mechanical key is inserted into ignition key cylinder.
Ignition knob switch	Detects ignition knob state (push or release).
Outside key antenna	Detects that Intelligent Key is in detection area of outside key antenna.
Inside key antenna	Detects that Intelligent Key is in detection area of inside key antenna.
Intelligent Key	Transmits key ID to Intelligent Key unit when request signal is received from outside key antenna.
Passenger side anti-hijack relay	Controls the circuit of door lock actuator (passenger side, rear LH/RH).
Door lock actuator	Receives lock/unlock signal from BCM and locks/unlocks each door.

KEY REMINDER

KEY REMINDER : System Diagram

INFOID:0000000001080230

KEY REMINDER OPERATION



KEY REMINDER : System Description

INFOID:0000000001080231

KEY REMINDER OPERATION

Key reminder have the following 2 functions.

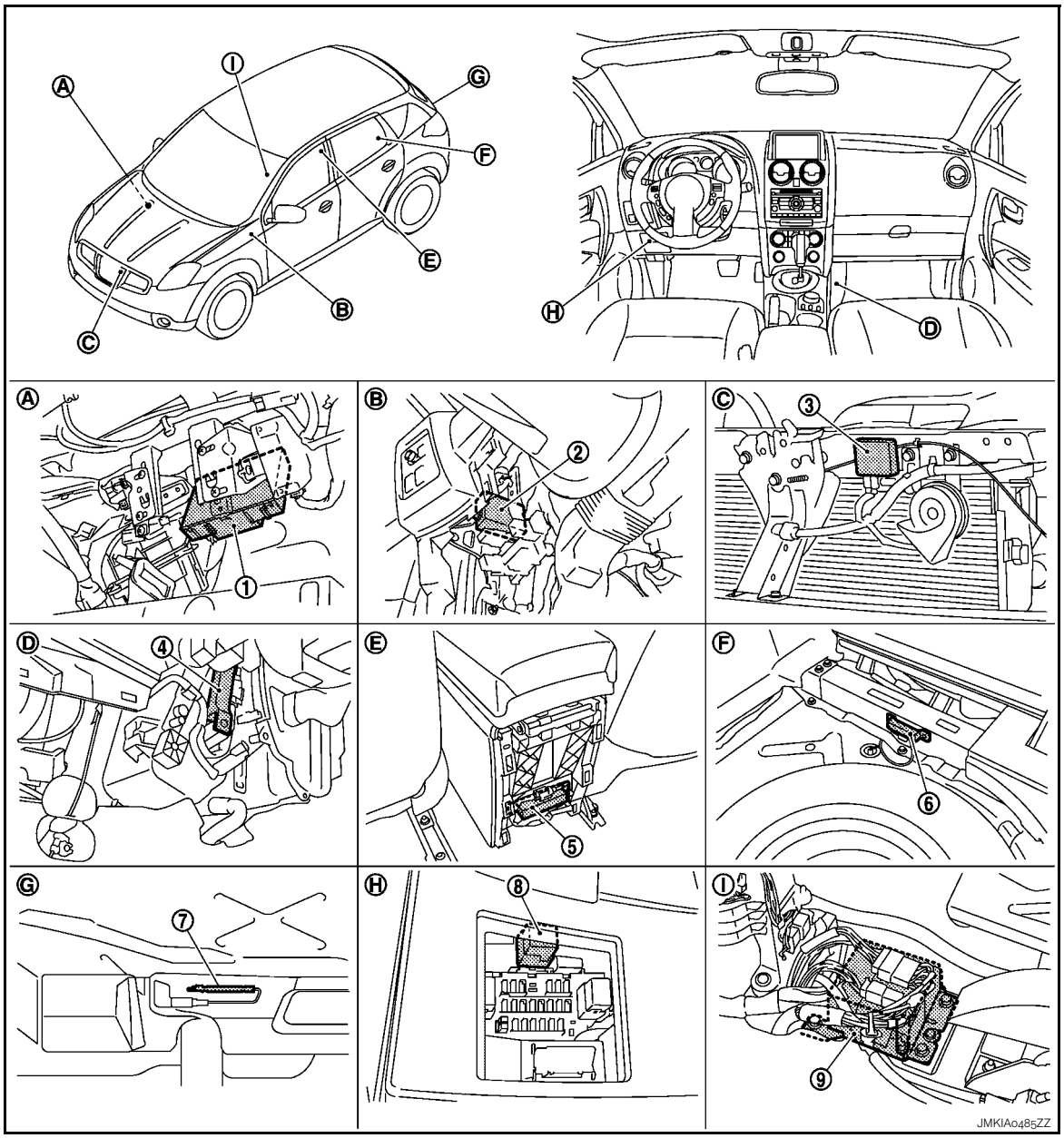
Operation	Operation condition	Operation
Driver door close	Right after driver side door is closed under the following conditions. • Door lock operation. • Driver side door is opened. • Driver side door is in unlock state.	All doors unlock
Any door open to all doors close	Right after all doors are closed under the following conditions. • Intelligent Key is inside the vehicle. • Any door is opened. • All doors are locked by door lock and unlock switch.	• All doors unlock • Active Intelligent Key warning buzzer

CAUTION:

The above function operates when the Intelligent Key is inside the vehicle. However, there may be times when the Intelligent Key cannot be detected, and this function will not operate when the Intelligent Key is on the instrument panel, rear parcel shelf or in the glove box. Also, this system sometimes does not operate if the Intelligent Key is in the door pocket of an open door.

KEY REMINDER : Component Parts Location

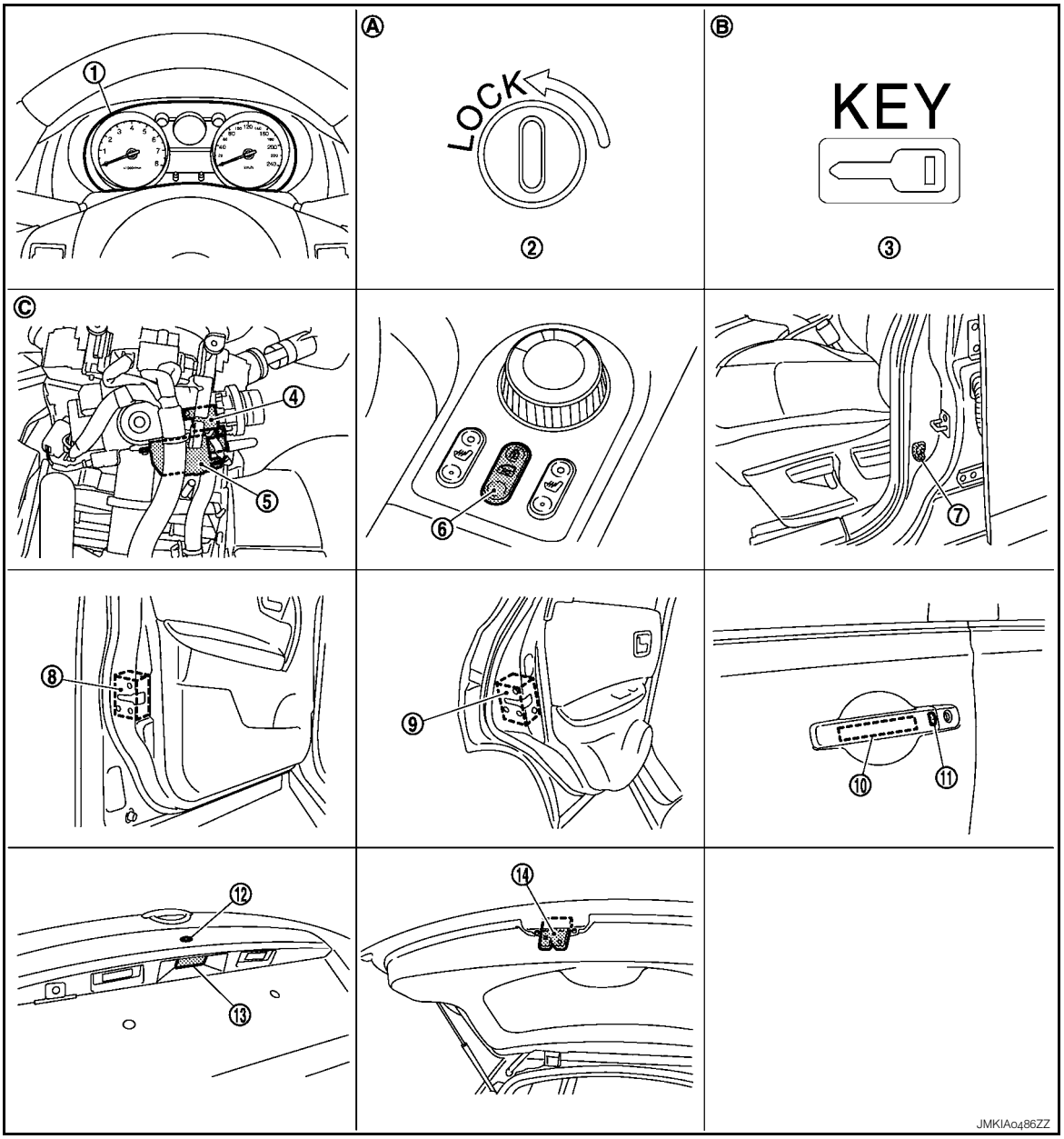
INFOID:0000000001116984



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed

cardiagn.com



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

KEY REMINDER : Component Description

INFOID:0000000001080233

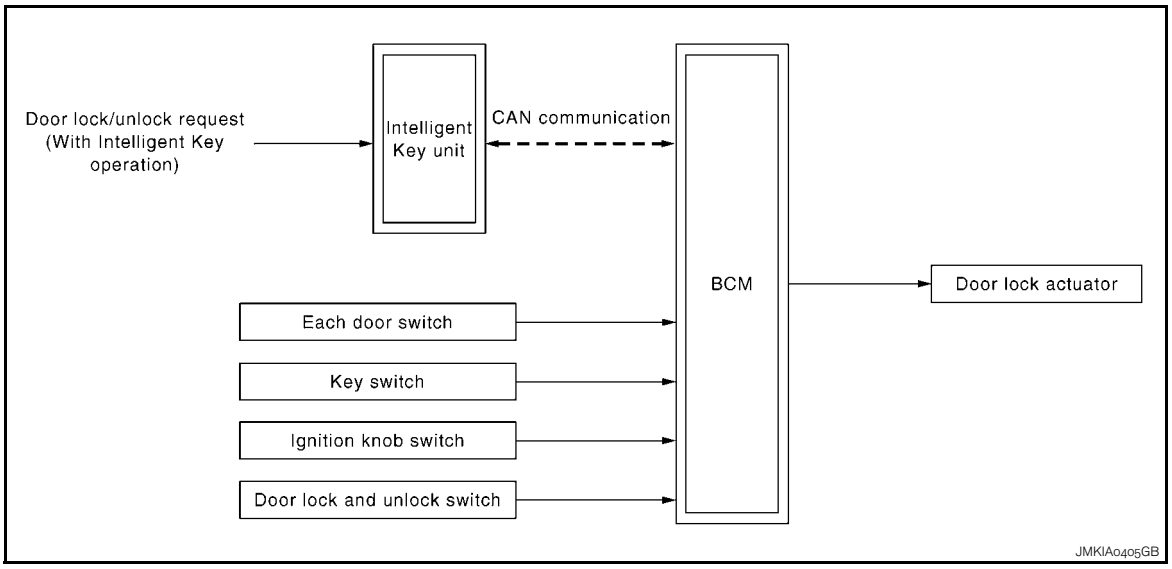
Item	Function
Intelligent Key unit	Controls the door lock function with BCM.
BCM	Controls the door lock and unlock operation with Intelligent Key unit.
Door switch	Detects door state (open or closed).
Inside key antenna	Detects that Intelligent Key is in detection area of inside key antenna.
Intelligent Key	Transmits key ID to Intelligent Key unit when Intelligent Key is searching.
Door lock actuator	Receives lock and unlock signal from BCM and locks/unlocks each door.

AUTO DOOR LOCK

AUTO DOOR LOCK : System Diagram

INFOID:0000000001080185

AUTO DOOR LOCK OPERATION



AUTO DOOR LOCK : System Description

INFOID:0000000001080186

AUTO DOOR LOCK OPERATION

When all doors are locked and then doors are unlocked with Intelligent Key or door request switch, BCM does not receive the following signals within 2 minutes*1, and all doors are automatically locked.

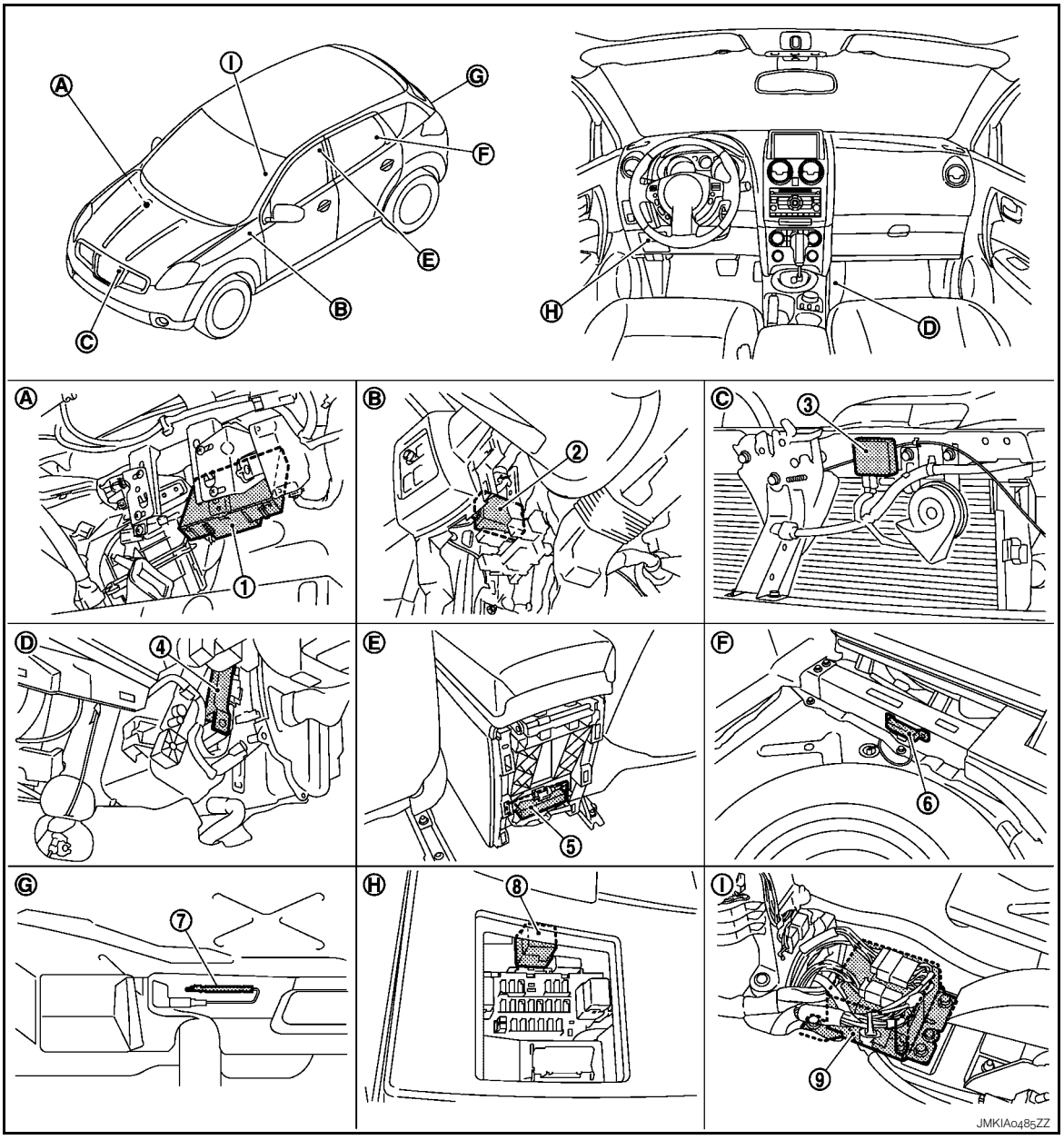
- Any door is opened.
- Ignition knob is pressed.
- Ignition key is inserted into ignition key cylinder.
- Door is locked with Intelligent Key.
- Door is locked/unlocked with door lock and unlock switch.

*1: Auto door lock operation mode can be changed with CONSULT-III. Refer to DLK-65, "CONSULT-III Function (INTELLIGENT KEY)".

AUTO DOOR LOCK : Component Parts Location

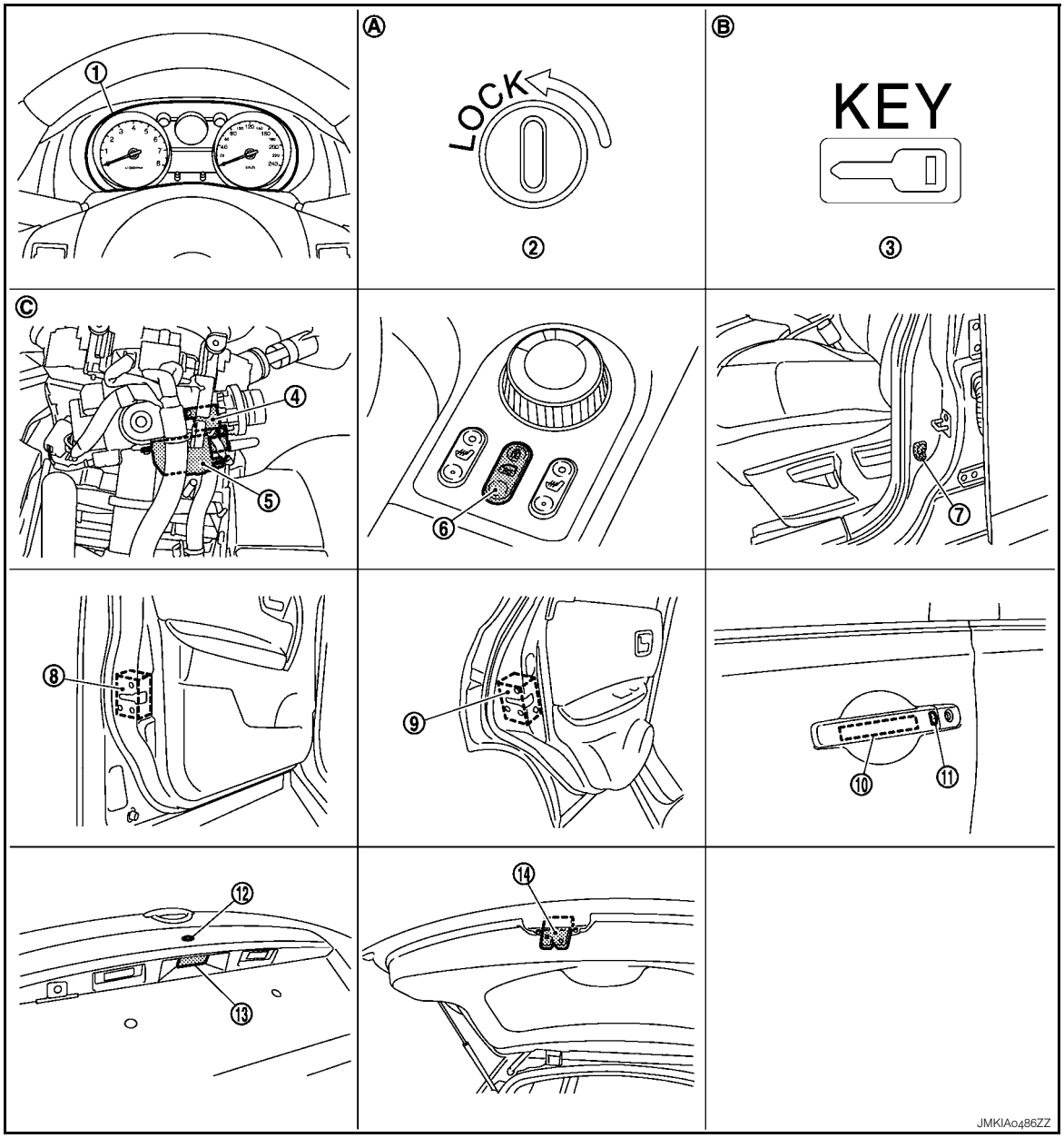
INFOID:0000000001116985

cardiagn.com



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

AUTO DOOR LOCK : Component Description

INFOID:0000000001080188

cardiagn.com

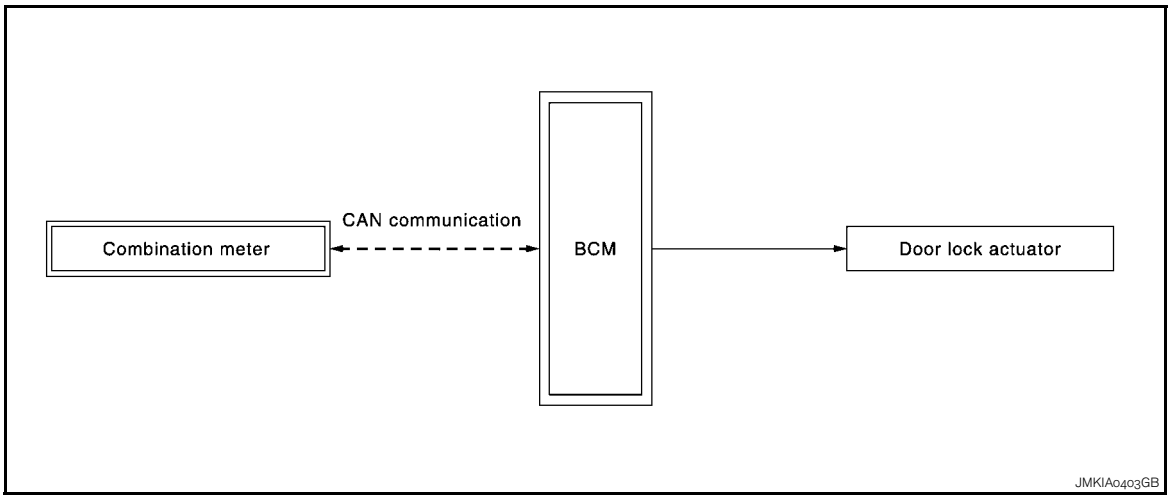
Item	Function
Intelligent Key unit	Controls the door lock function with BCM.
BCM	Controls the door lock function with Intelligent Key unit.
Door switch	Detects door state (open or closed).
Key switch	Detects that mechanical key is inserted into ignition key cylinder.
Ignition knob switch	Detects ignition knob state (push or release).
Door lock and unlock switch	Transmits door lock and unlock signal to BCM.
Door lock actuator	Receives lock and unlock signal from BCM and locks and unlocks each door.

VEHICLE SPEED SENSING AUTO DOOR LOCK

VEHICLE SPEED SENSING AUTO DOOR LOCK : System Diagram

INFOID:0000000001078860

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION



VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description

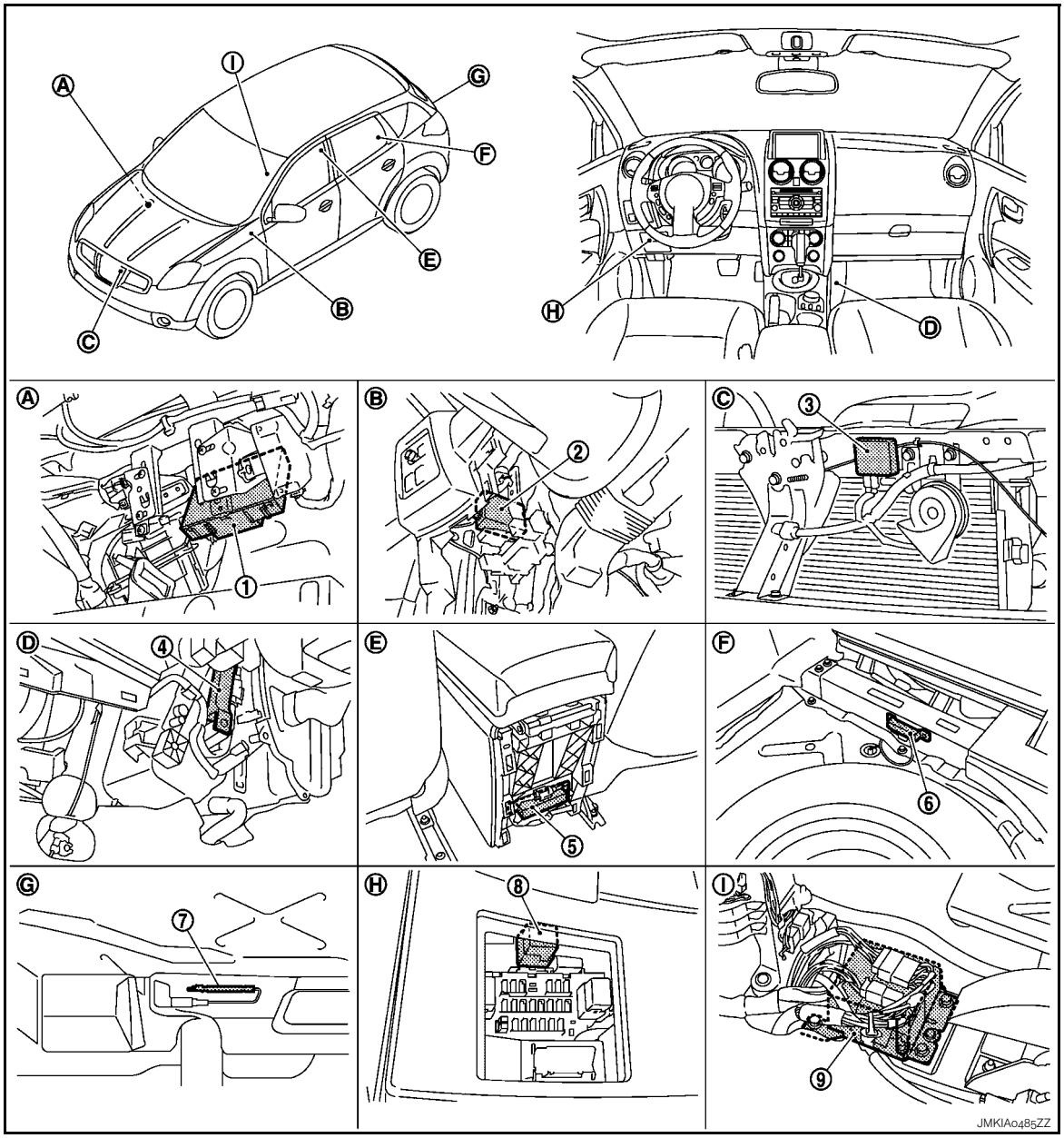
INFOID:0000000001078861

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION

When the vehicle speed exceeds 12 km/h (7 MPH), all doors are automatically locked. BCM receives vehicle speed signal from combination meter via CAN communication.

VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Parts Location

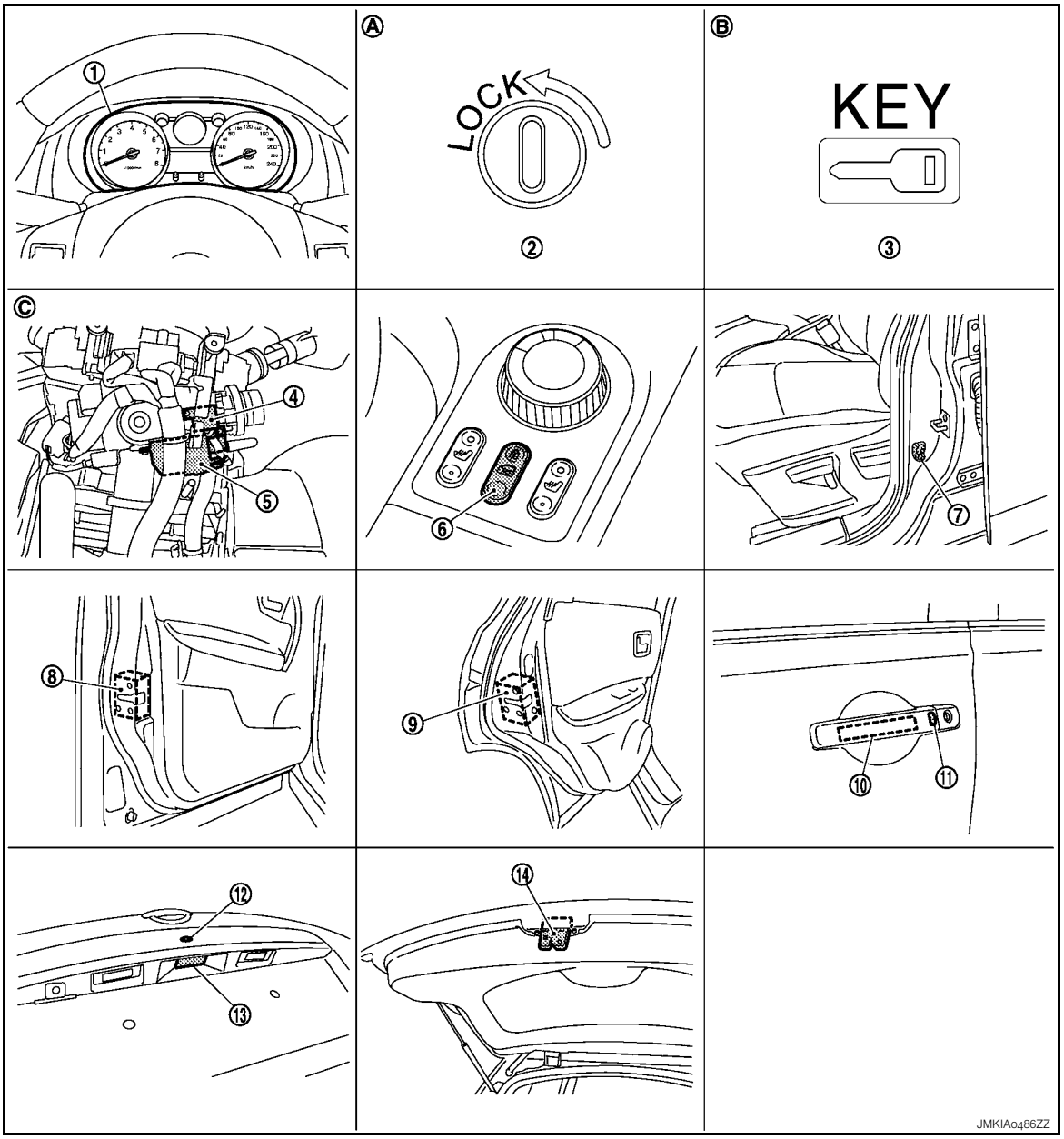
INFOID:0000000001116986



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed

cardiagn.com



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Description

INFOID:0000000001078863

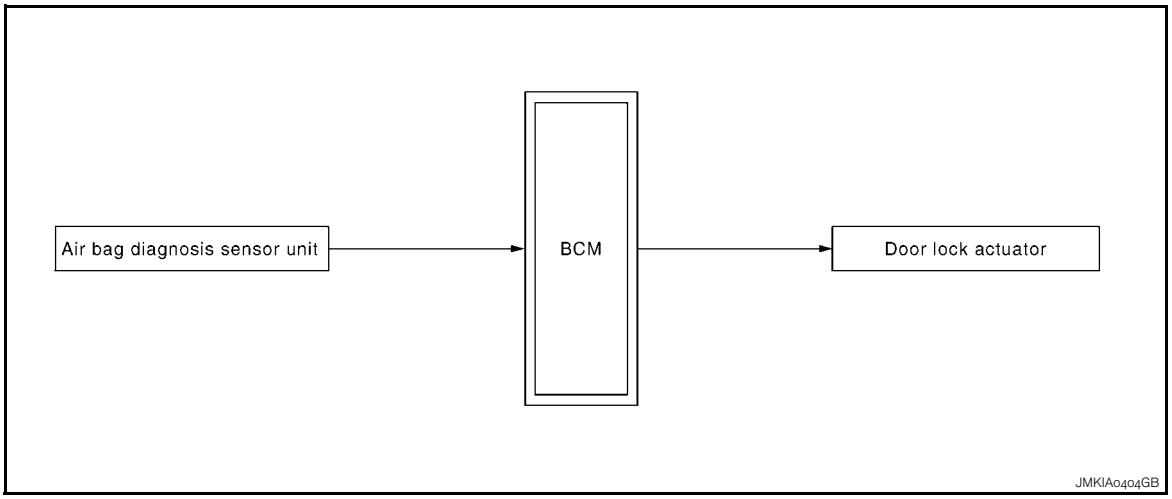
Item	Function
BCM	Controls the door lock/unlock function.
Combination meter	Transmits vehicle speed signal to BCM via CAN communication.
Door lock actuator	Receives door lock and unlock signal from BCM and locks and unlocks each door.

AIR BAG INTERLOCK UNLOCK

AIR BAG INTERLOCK UNLOCK : System Diagram

INFOID:0000000001078864

AIR BAG INTERLOCK UNLOCK OPERATION



AIR BAG INTERLOCK UNLOCK : System Description

INFOID:0000000001078865

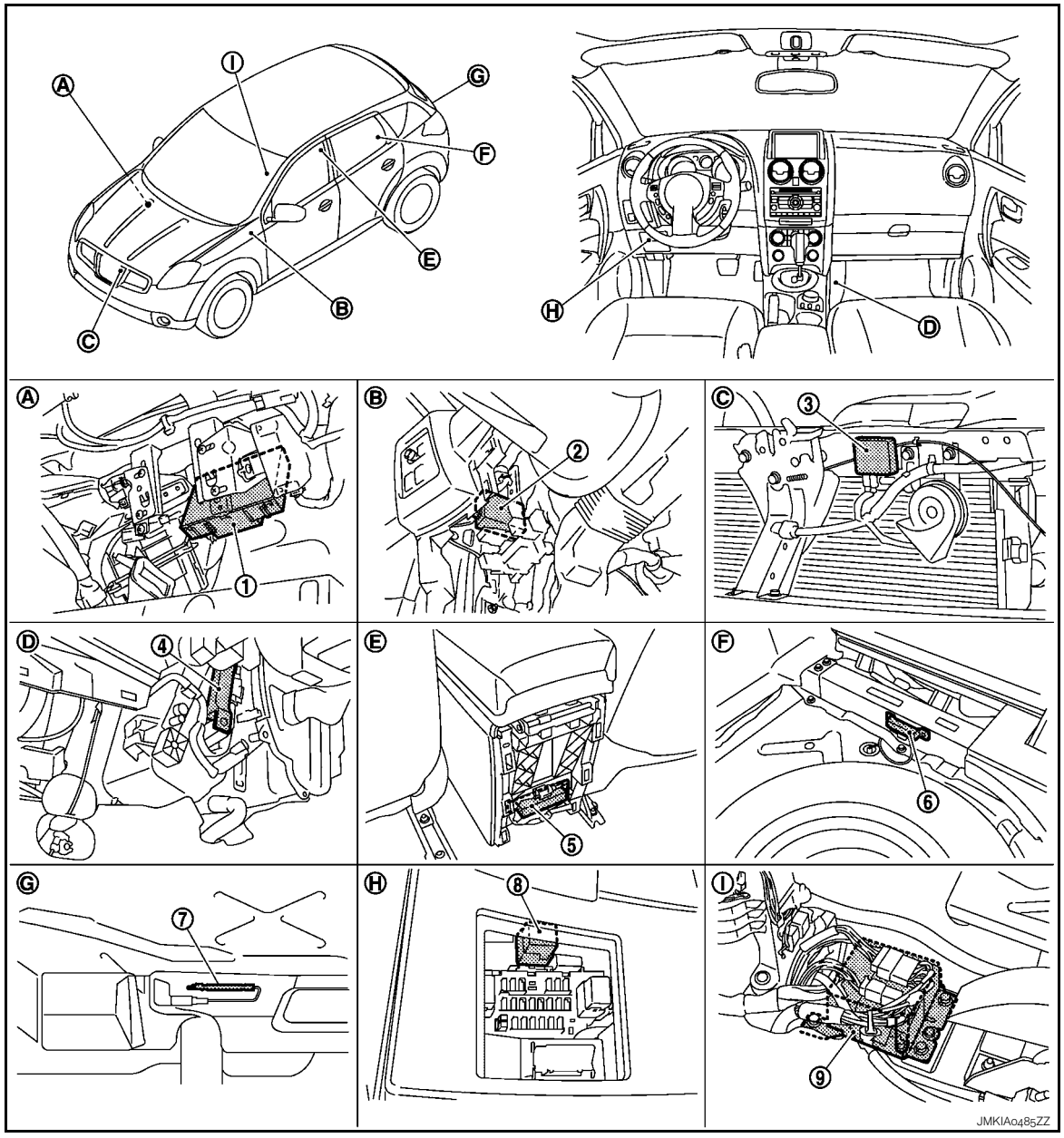
AIR BAG INTERLOCK UNLOCK OPERATION

When ignition switch is ON and BCM receives air bag deployment signal, it operates automatically to unlock all doors. Air bag diagnosis sensor unit sends the air bag deployment signal to BCM.

AIR BAG INTERLOCK UNLOCK : Component Parts Location

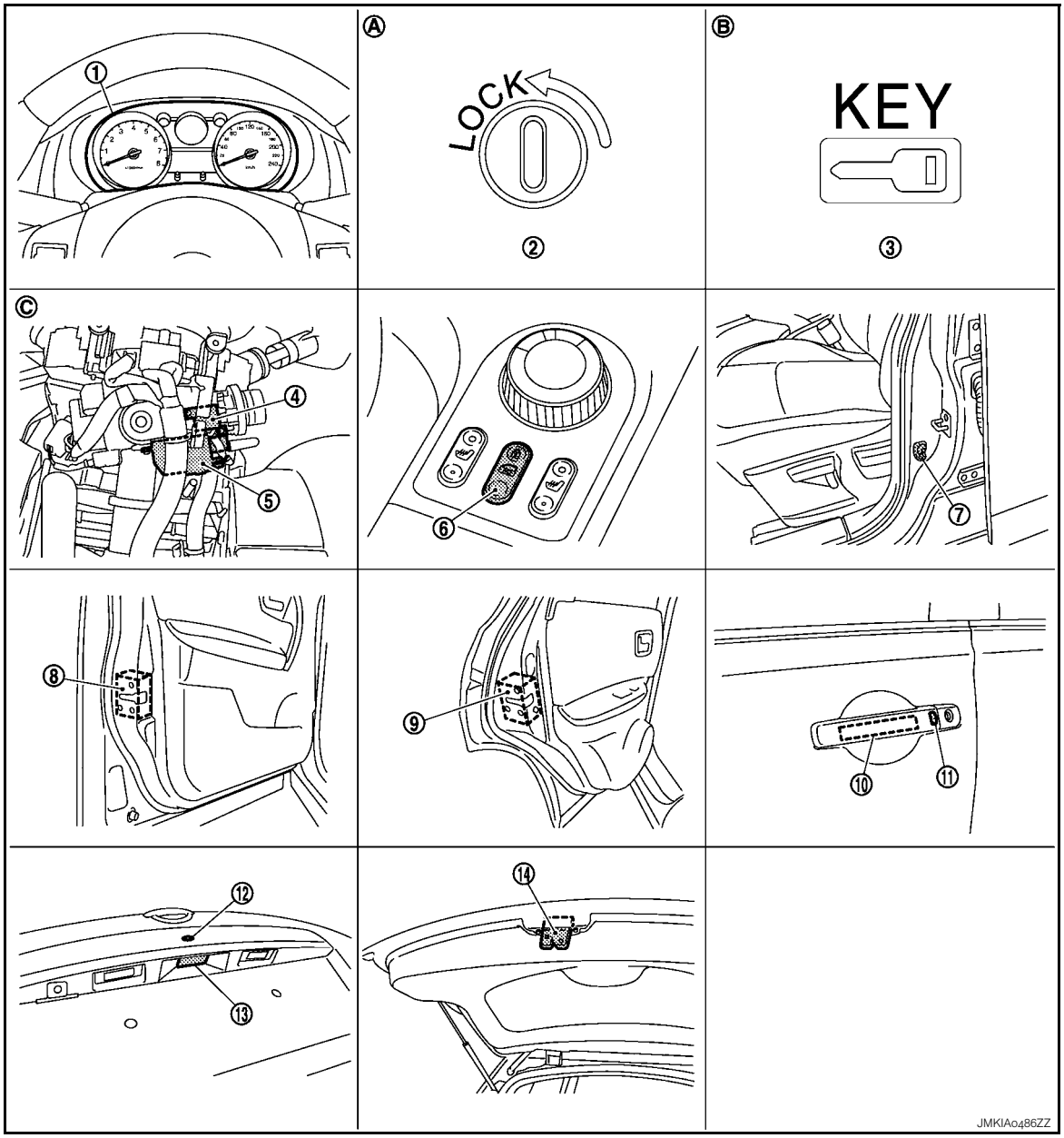
INFOID:0000000001116987

cardiagn.com



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

AIR BAG INTERLOCK UNLOCK : Component Description

INFOID:0000000001078867

cardiagn.com

Item	Function
BCM	Controls the door lock function.
Air bag diagnosis sensor unit	Transmits air bag deployment signal to BCM for shock sensing auto unlock.
Door lock actuator	Receives unlock signal from BCM and unlocks each door.

carsdiagn.com

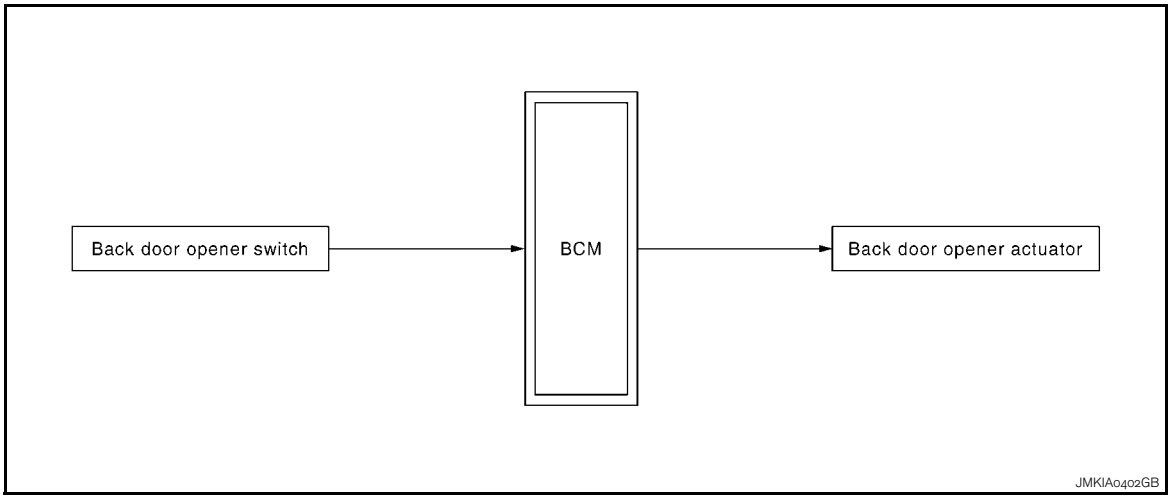
BACK DOOR OPENER FUNCTION

BACK DOOR OPENER SWITCH

BACK DOOR OPENER SWITCH : System Diagram

INFOID:0000000000939048

BACK DOOR OPENER OPERATION



BACK DOOR OPENER SWITCH : System Description

INFOID:0000000000939049

BACK DOOR OPENER OPERATION

When back door opener switch is pressed, BCM opens back door opener actuator.

NOTE:

Back door opener actuator is not for locking the back door. The function is only to open the back door.

OPERATION CONDITION

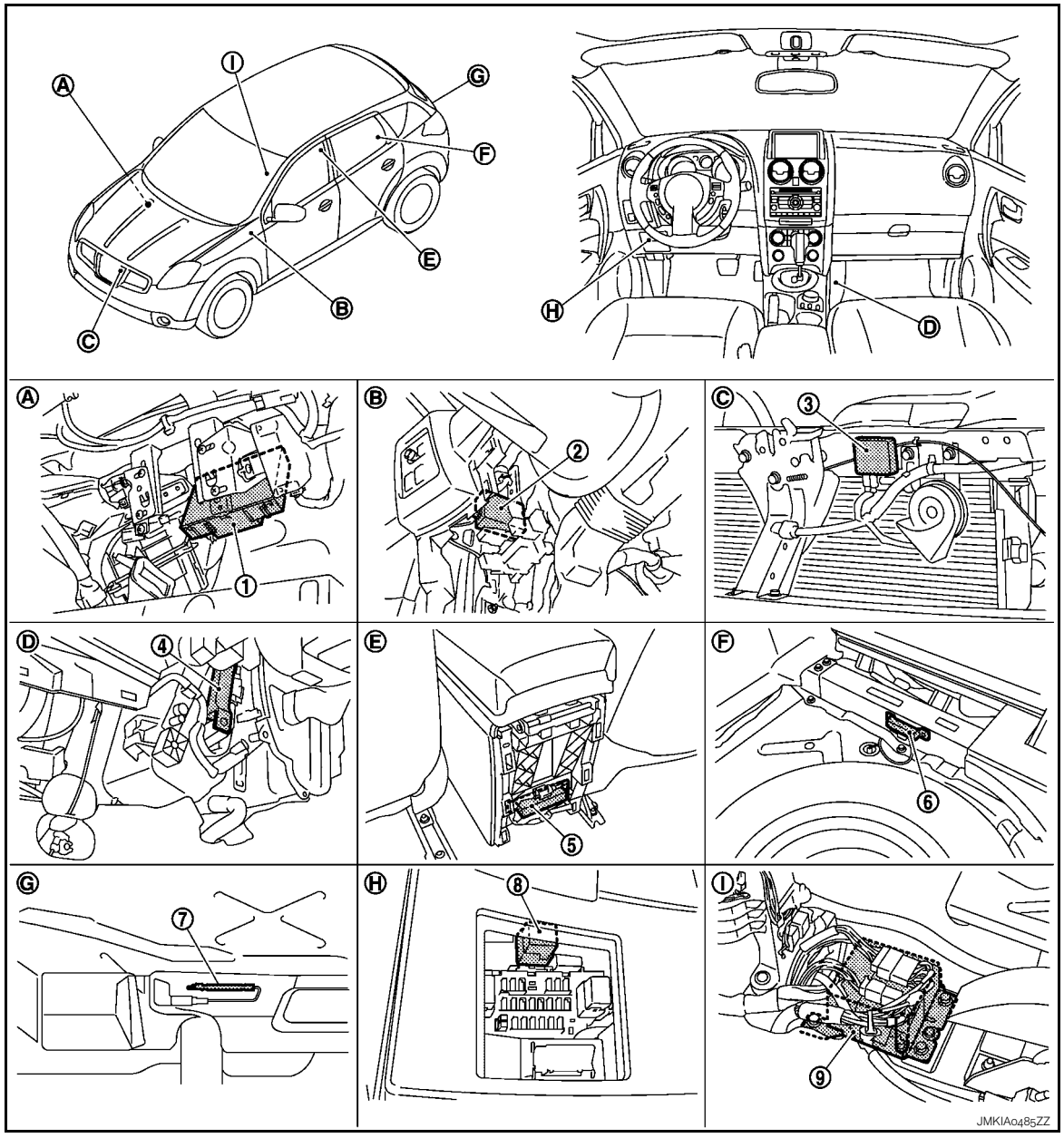
If the following conditions are not satisfied, back door opener operation is not performed.

Back door opener switch operation	Operation condition
Back door open	• Vehicle speed is less than 5 km/h (3 MPH). • All doors are unlocked.

BACK DOOR OPENER SWITCH : Component Parts Location

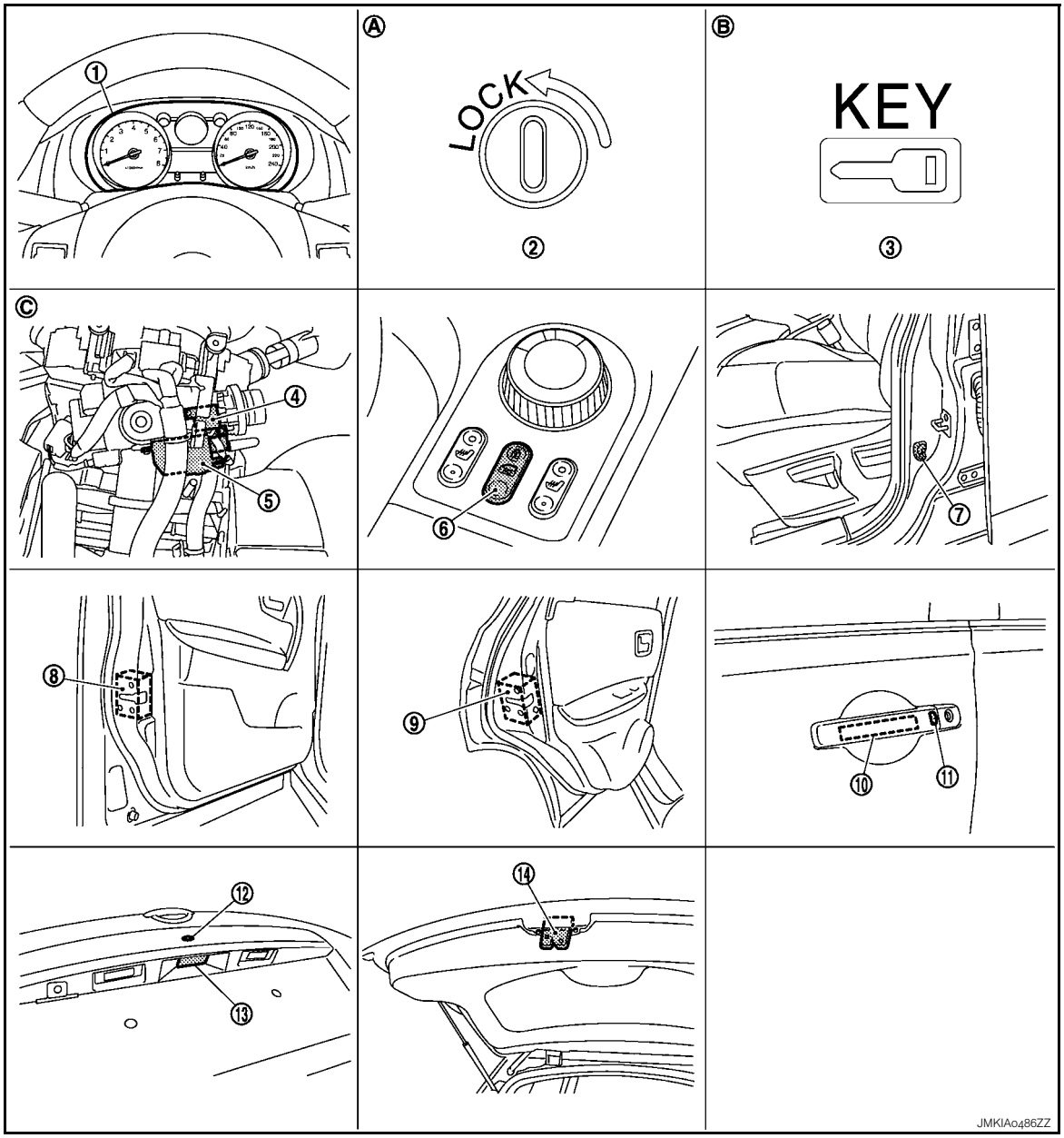
INFOID:0000000001117047

cardiagn.com



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

BACK DOOR OPENER SWITCH : Component Description

INFOID:0000000000939051

cardiagn.com

Item	Function
BCM	Controls the back door opener function.
Back door opener switch	Transmits back door opener switch operation signal to BCM.
Back door opener actuator	Opens the back door with the back door open signal from BCM.
Combination meter	Transmits vehicle speed signal to BCM via CAN communication.

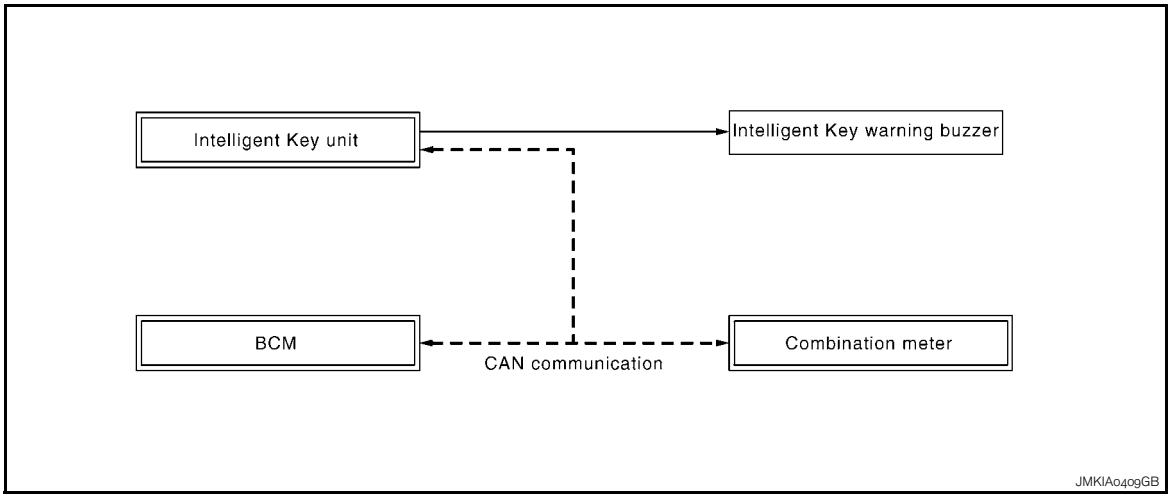
carsdiagn.com

WARNING FUNCTION

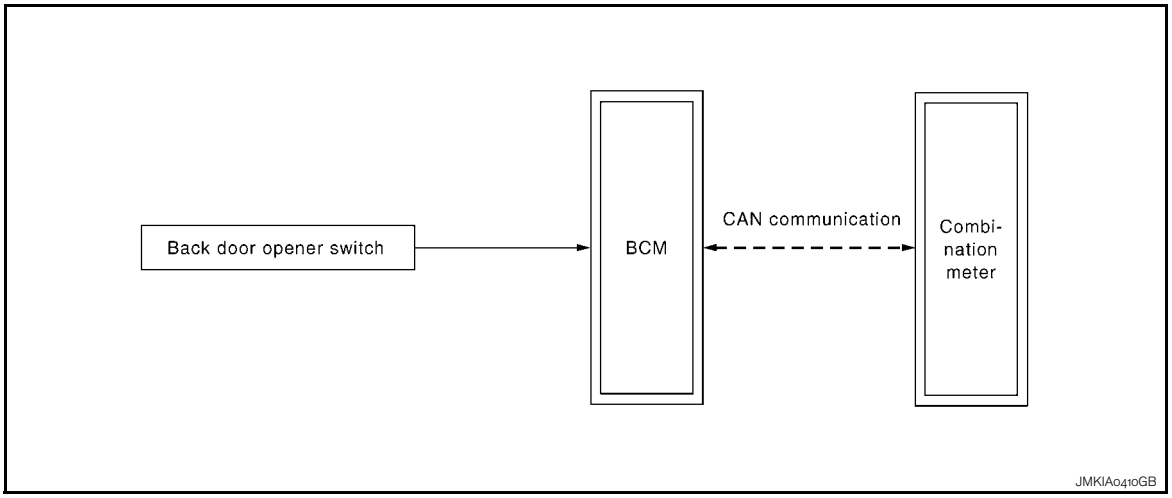
System Diagram

INFOID:0000000001078629

INTELLIGENT KEY WARNING OPERATION



BACK DOOR OPEN WARNING OPERATION



System Description

INFOID:0000000001078630

DESCRIPTION

The warning functions are as follows and are given to the user as warning information and warnings using combinations of Intelligent Key warning buzzer, key warning lamps and buzzer (built in combination meter).

INTELLIGENT KEY WARNING OPERATION

Once one of the following conditions below is established, alert or warning will be executed.

cardiagn.com

Warning/Information functions		Operation conditions	Warning lamp	Warning chime	
				Combination meter buzzer	Intelligent Key warning buzzer
Ignition knob return forgotten warning		When all the conditions below are met. • Ignition knob: OFF or LOCK (knob is pressed). • Door switch (driver side): ON (Door is open).	—	Active for 5 seconds (pipipipi, pipipipi···)	—
Ignition key warning (when mechanical key is used)		When all the conditions below are met. • Ignition switch: OFF position. • Key switch: ON (inserted) • Door switch (driver side): ON (Door is open).	—	Active for 5 seconds (pipipipi, pipipipi···)	—
OFF position warning		When all the conditions below are met. • Ignition switch is between ACC and OFF position or ignition knob is pressed in while ignition switch is in LOCK position. • 3 seconds in the above state have pressed.	"LOCK" (RED blinking)	Active for 1 second (pipi, pipi···)	—
Take away warning	Any door open to all doors closed	When all the conditions below are met. • Ignition switch: Except LOCK position. • Door switch: ON to OFF (Door is open to closed). • Intelligent Key cannot be detected inside the vehicle.	"LOCK" (RED blinking)	—	Active (pi, pi, pi)
	Door is open	When all the conditions below are met. • Door switch: ON (Door is open) • Key ID verification every 5 seconds when registered Intelligent Key can not be detected inside the vehicle.	"LOCK" (RED blinking)	—	—
	Take away through window	When all the conditions below are met. • Key ID verification: OK • Every 30 seconds when registered Intelligent Key cannot be detected inside the vehicle or result of vehicle speed verification is NG. (The registered Intelligent Key cannot be detected inside the vehicle when ignition switch is ON.) • Key switch: OFF (Key is removed from ignition key cylinder.)	"LOCK" (RED blinking)	Active for 3 seconds (pipipi···	—

carsdiagn.com

Warning/Information functions		Operation conditions	Warning lamp	Warning chime	
				Combination meter buzzer	Intelligent Key warning buzzer
Door lock operation warning	Request switch operation	When request switch is pushed (lock operation) under the following conditions. • Door switch: ON (Any door is open). • Ignition switch is in ACC or OFF position or ignition knob is pressed in LOCK position or mechanical key is inserted into ignition key cylinder. • Intelligent Key is inside vehicle.	—	—	Active for 2 seconds (pipipi···)
	Intelligent Key button operation	When Intelligent Key button is pushed (lock operation) under the following conditions. • Door switch: ON (Any door is open). • Ignition switch is in ACC or OFF position or ignition knob is pressed in LOCK position or mechanical key is inserted into ignition key cylinder.	—	—	Active for 2 seconds (pipipi···)
Intelligent Key low battery warning		When Intelligent Key battery voltage is low, Intelligent Key unit is detected after ignition switch is turned ON.	"KEY" (GREEN blinking for 30 seconds)	—	—

KEY WARNING LAMP & LOCK WARNING LAMP

The key indicator and lock indicator indicates Intelligent Key system status.

Operation Condition

Behavior of lamps			Operation condition
KEY	GREEN	Lighting	All the following conditions are satisfied. • Ignition knob is pushed in LOCK position. (Ignition knob switch is ON) • Ignition key is removed from ignition key cylinder. (Key switch is OFF) • Intelligent Key is detected inside of the vehicle. • KEY RED lighting/blinking conditions are not satisfied.
		Blinking	while Intelligent Key low battery warning is operating.
	RED	Lighting	All the following conditions are satisfied. • Ignition knob is pushed. (Ignition knob switch is ON) • Ignition key is removed from ignition key cylinder. (Key switch is OFF) • Intelligent Key is not detected inside of the vehicle.
		Blinking	All the following conditions are satisfied. • Take away warning is operating. • KEY RED lighting condition is not satisfied.
LOCK		Blinking	while OFF position warning is operating.
KEY(RED) and LOCK lighting			All the following conditions are satisfied. • Ignition switch is ON. • Steering lock ID is NG.

BACK DOOR OPEN WARNING OPERATION

When back door opener switch is operated, when door lock is locked with door lock and unlock switch, speed sensing lock or only driver side is unlocked with anti-hijack function, the buzzer (built in combination meter) will sound.

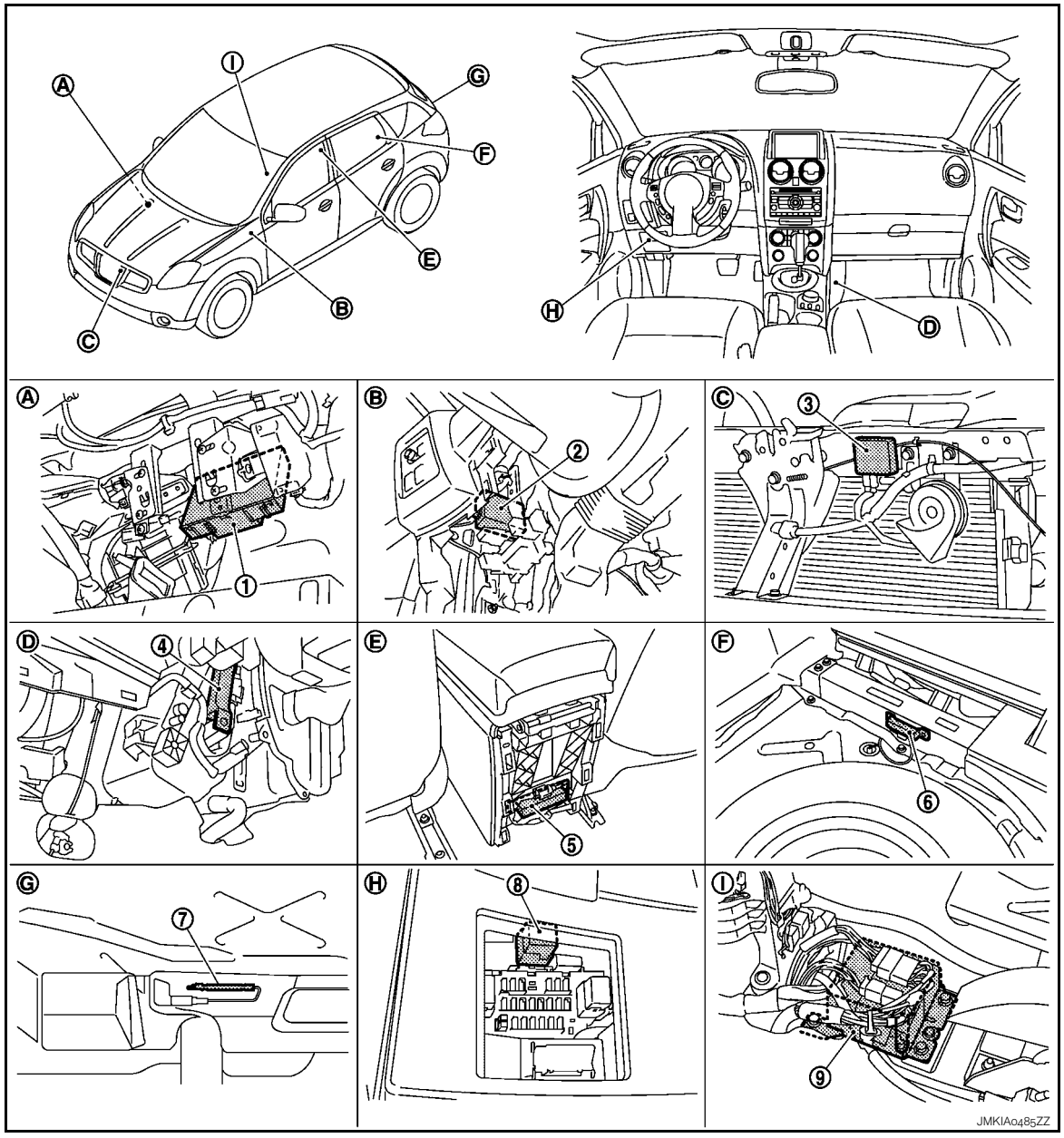
KEY REMINDER OPERATION

- The buzzer (combination meter) will sound and the doors will not lock if the door lock and unlock switch is pressed while the driver door is open and mechanical key is inserted ignition key cylinder.
- The buzzer (combination meter) will sound and the doors will not lock if the door lock and unlock switch is pressed while any door other than the driver door is open.

Component Parts Location

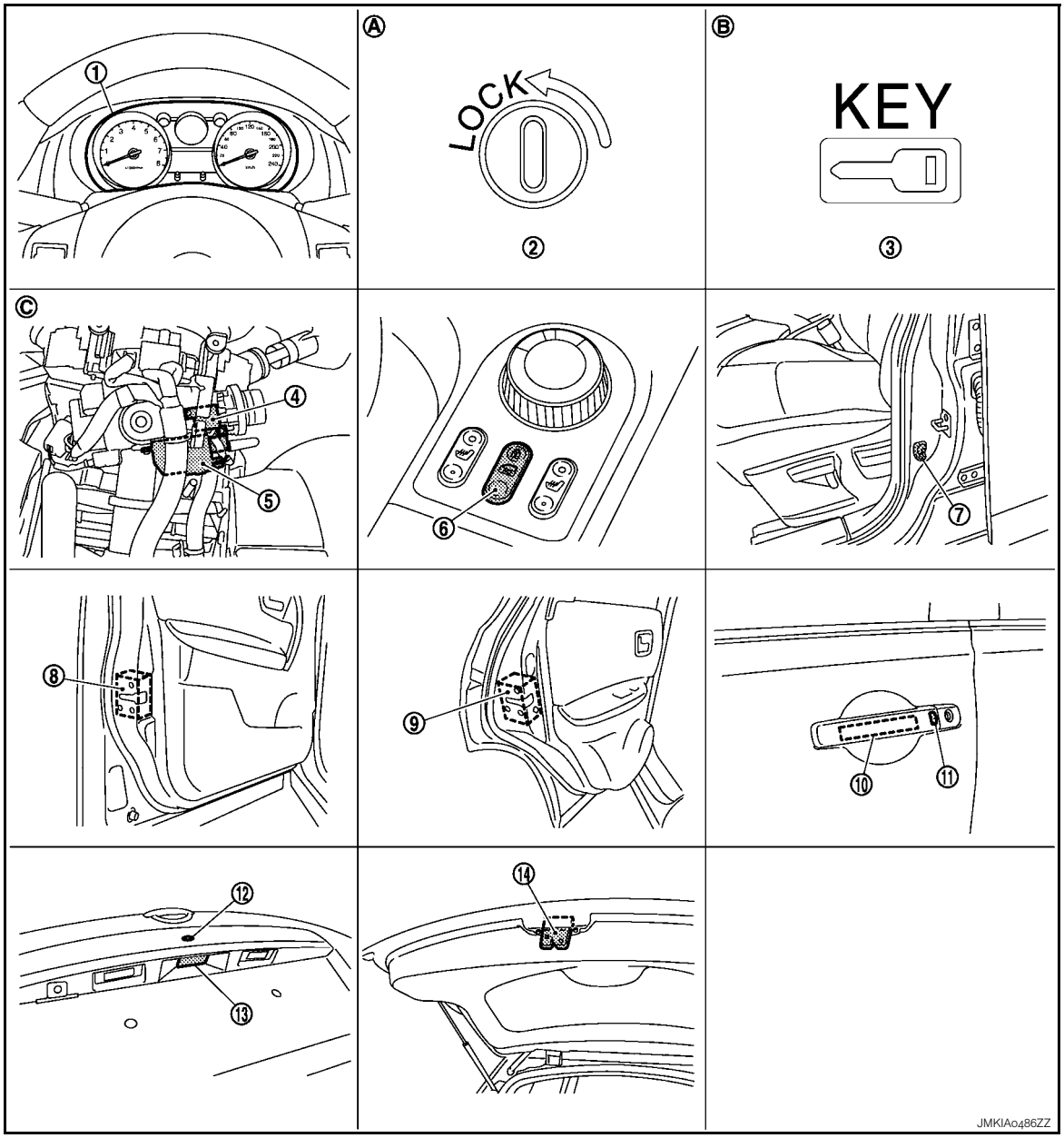
INFOID:0000000001117048

cardiagn.com



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

Component Description

INFOID:0000000001078632

cardiagn.com

Item	Function
BCM	Controls the warning function with Intelligent Key unit.
Intelligent Key unit	Controls the warning function with BCM.
Key switch	Detects that mechanical key is inserted into ignition key cylinder.
Door switch	Detects door state (open or closed).
Door lock and unlock switch	Transmits door lock and unlock signal to BCM.
Intelligent Key unit	Requests to turn ON hazard warning lamp to BCM and turn signal indicator to combination meter.
Combination meter	Turns ON the LOCK indicator, KEY indicator, turn signal indicator and buzzer (built in combination meter) by the request from Intelligent Key unit via CAN communication.
Intelligent Key warning buzzer	Sounds by the request from Intelligent Key unit.
Back door opener switch	Transmits back door open signal to BCM

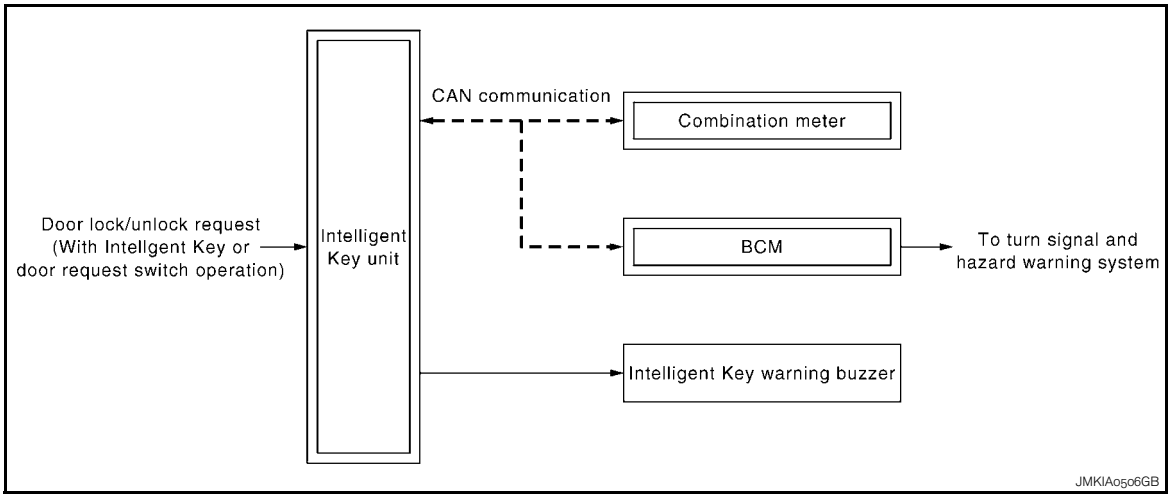
carsdiagn.com

HAZARD AND BUZZER REMINDER FUNCTION

System Diagram

INFOID:0000000001078875

HAZARD & BUZZER REMINDER FUNCTION



System Description

INFOID:0000000001078876

HAZARD AND BUZZER REMINDER FUNCTION

When door is locked or unlocked by Intelligent Key or door request switch, Intelligent Key unit sounds buzzer and sends hazard request signal to BCM via CAN communication. Then BCM flashes hazard warning lamps as a reminder.

NOTE:

Hazard and buzzer reminder function mode can be changed with CONSULT-III. Refer to DLK-65, "CONSULT-III Function (INTELLIGENT KEY)".

Hazard Operation

Hazard reminder setting (With CONSULT-III)		Door lock operation (with Intelligent Key or door request switch)	Hazard warning lamp flash
HAZARD ANSWER BACK	OFF	Any	—
	LOCK ONLY	Lock	Once
		Unlock	—
		Unlock (Anti-hijack)	—
	UNLK ONLY	Lock	—
		Unlock	Twice
		Unlock (Anti-hijack)	Twice (quick)
	LOCK/UNLK	Lock	Once
		Unlock	Twice
		Unlock (Anti-hijack)	Twice (quick)

Buzzer Operation

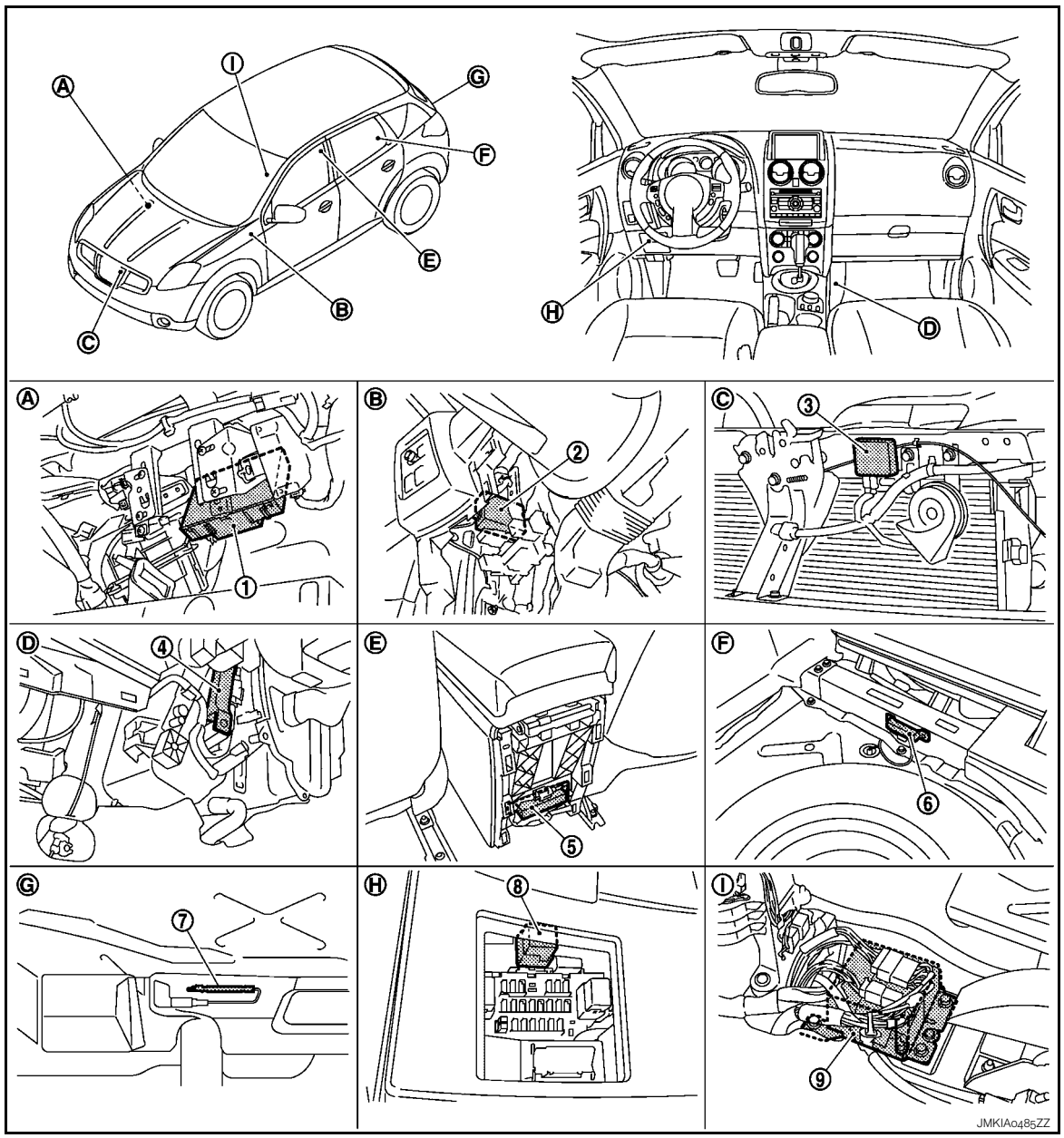
Buzzer reminder setting (With CONSULT-III)		Door lock operation (with Intelligent Key or door request switch)	Buzzer warning sounds
ANSWER BACK WITH I-KEY LOCK	BUZZER	Lock	Once
		Unlock	Depends on other setting
		Unlock (Anti-hijack)	Depends on other setting
	OFF	Any	—

cardiagn.com

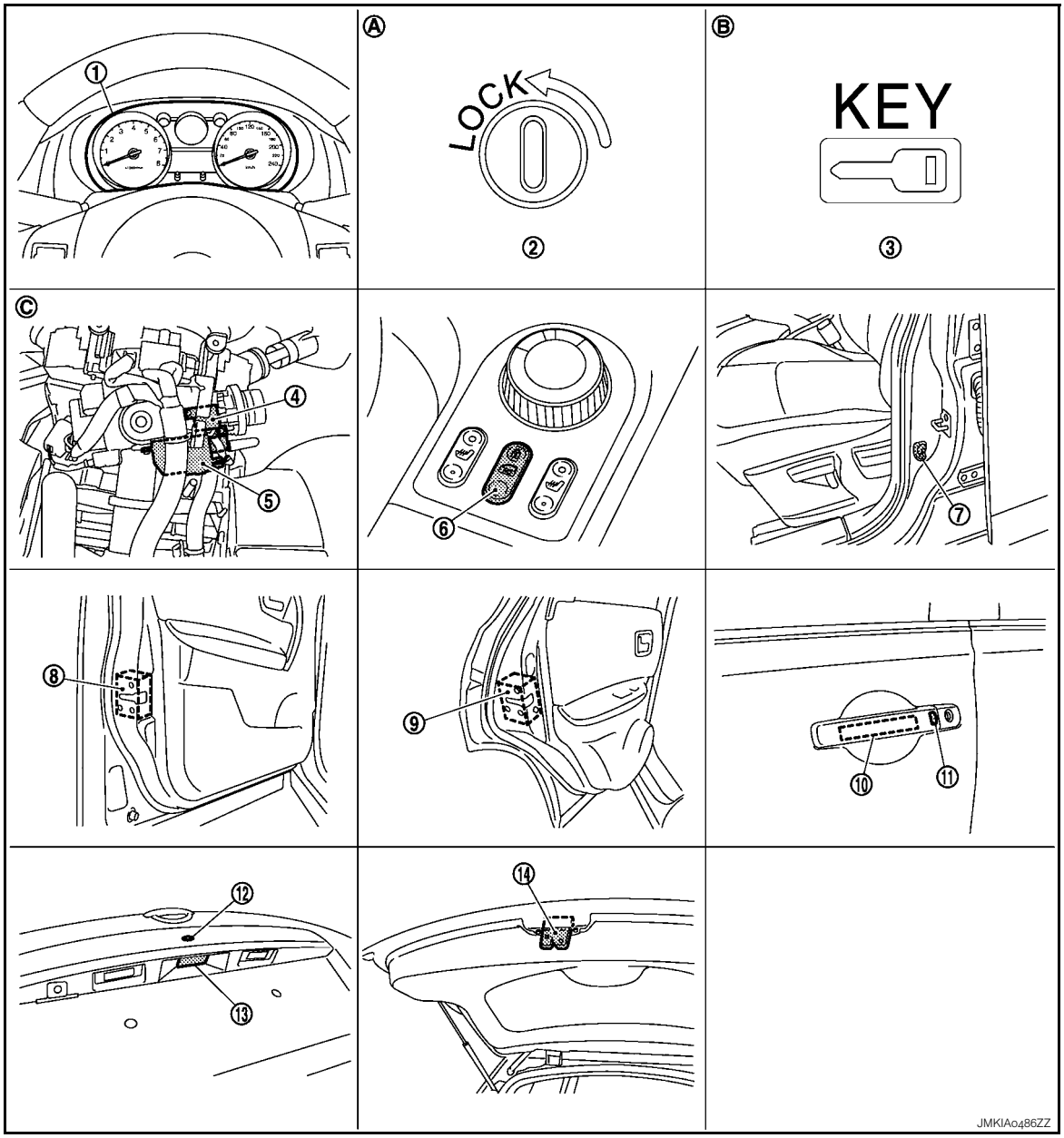
Buzzer reminder setting (With CONSULT-III)		Door lock operation (with Intelligent Key or door request switch)	Buzzer warning sounds
ANSWER BACK WITH I-KEY UNLOCK	BUZZER	Lock	Depends on other setting
		Unlock	Twice
		Unlock (Anti-hijack)	Twice
	OFF	Any	—
ANSWER BACK FUNCTION	ON	Lock	Once
		Unlock	Twice
		Unlock (Anti-hijack)	Twice
	OFF	Any	—

Component Parts Location

INFOID:0000000001117049



1. BCM M65, M66, M67
2. Intelligent Key unit M40
3. Intelligent Key warning buzzer E25
4. Inside key antenna (instrument center) M70
5. Inside key antenna (center console) M61
6. Inside key antenna (rear seat) B45
7. Inside key antenna (rear bumper) B81
8. Passenger side anti-hijack relay M90
9. Air bag diagnosis sensor unit M59
- A. Over the glove box
- B. Over the instrument lower panel (driver side)
- C. View with front bumper removed
- D. View with lower instrument cover removed
- E. View with center console rear finisher removed
- F. View with luggage floor spacer (LH) removed
- G. View with rear bumper fascia removed
- H. View with fuse box lid removed
- I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89

cardiagn.com

7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D9
9. Rear door lock actuator LH D85
10. Front door request switch (driver side) D10
11. Outside key antenna (driver side) D11
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

Component Description

INFOID:0000000001078878

Item	Function
BCM	Controls the hazard and buzzer reminder function with Intelligent Key unit.
Intelligent Key unit	Controls the hazard and buzzer reminder function with BCM.
Combination meter	Turns ON the LOCK indicator, KEY indicator, turn signal indicator and buzzer (built in combination meter) by the request from Intelligent Key unit via CAN communication.
Intelligent Key warning buzzer	Sounds by the request signal from Intelligent Key unit via CAN communication.

carsdiagn.com

DIAGNOSIS SYSTEM (BCM)
COMMON ITEM
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001096696

APPLICATION ITEM
CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION
BCM can perform the following functions for each system.
NOTE:
It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

DOOR LOCK
DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)

INFOID:0000000001034253

BCM CONSULT-III FUNCTION
CONSULT-III performs the following functions via CAN communication with BCM.

cardiagn.com

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
KEYLESS LOCK*2	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK*2	Indicates [ON/OFF] condition of unlock signal from key fob.
I-KEY LOCK*1	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK*1	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.
UNLOCK WITH DR	This item is indicated, but not monitored.
UNLOCK SHOCK	Indicates [ON/OFF] condition of signal from air bag diagnosis unit. • ON: During the unlock operation interlock with air bag. • OFF: Other than above.
SHOCK SENSOR	Indicates [NOMAL/ON/OFF] condition of circuit between BCM and air bag diagnosis sensor unit. • NORMAL: Ignition switch ON. (BCM is receiving normal condition signal from air bag diagnosis sensor unit.) • ON: During the receiving of air bag deployment signal from air bag diagnosis sensor unit. • OFF: After the receiving of air bag deployment signal from air bag diagnosis sensor unit.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the multi remote control system equipped vehicle.

ACTIVE TEST

Test item	Description
SUPER LOCK*1	This test is able to check super lock operation [LOCK (SET)/UNLOCK (RELEASE)].
DOOR LOCK IND	This test is able to check door lock indicator (built in door lock and unlock switch on center console) operation [ON/OFF].
DOOR LOCK	This test is able to check door lock operation [ALL LOCK/ALL UNLOCK/DR UNLOCK/ OTHER UNLOCK].

:*1 For the super lock equipped vehicle.

WORK SUPPORT

A B C D E F G H I J DLK L M N O P
carsdiagn.com

Test item	Description
SECURITY DOOR LOCK SET	Anti hijack function mode can be changed in this mode. • ON: Anti hijack mode is active. • OFF: Anti hijack mode is inactive.

INTELLIGENT KEY

INTELLIGENT KEY : CONSULT-III Function (BCM - INTELLIGENT KEY)

INFOID:0000000001034255

BCM CONSULT-III FUNCTION

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW	Indicates [ON/OFF] condition of ignition knob switch.
I-KEY LOCK	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.

TRUNK

TRUNK : CONSULT-III Function (BCM - TRUNK)

INFOID:0000000001034257

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
TRNK OPNR SW	Indicates [ON/OFF] condition of back door opener switch.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the remote keyless entry system equipped vehicle.

ACTIVE TEST

Test item	Description
TRUNK/GLASS HATCH	This test is able to check back door opener operation [ON/OFF].

cardiagn.com

DIAGNOSIS SYSTEM (INTELLIGENT KEY UNIT)

CONSULT-III Function (INTELLIGENT KEY)

INFOID:0000000001034251

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with Intelligent Key unit.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by Intelligent Key unit.
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from Intelligent Key unit.
DATA MONITOR	The Intelligent Key unit input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.
ECU IDENTIFICATION	The Intelligent Key unit part number is displayed.

WORK SUPPORT

Support item	Description	Selection item	Condition
CONFIRM KEY FOB ID	It can check whether Intelligent Key ID code is registered or not.	—	—
TAKE OUT FROM WINDOW WARN	Take away warning chime (from window) mode can be changed.	ON	Active
		OFF	Inactive
LOW BATT OF KEY FOB WARN	Intelligent Key low battery warning mode can be changed.	ON	Active
		OFF	Inactive
KEYLESS FUNCTION	Door lock function with Intelligent Key can be changed.	ON	Active
		OFF	Inactive
ANSWER BACK FUNCTION	Buzzer reminder operation can be changed.	ON	Active
		OFF	Inactive
SELECTIVE UNLOCK FUNCTION	Anti-hijack mode can be changed.	ON	Active
		OFF	Inactive
HAZARD ANSWER BACK	Hazard reminder operation mode can be changed.	Refer to DLK-58.	
ANSWER BACK WITH I-KEY LOCK	Buzzer reminder operation (lock operation) mode by each door request switch can be changed.	BUZZER	Active
		OFF	Inactive
ANSWER BACK WITH I-KEY UNLOCK	Buzzer reminder operation (unlock operation) mode by each door request switch can be changed.	BUZZER	Active
		OFF	Inactive
AUTO RELOCK TIMER	Auto door lock operation mode can be changed.	OFF	Inactive
		2 min	Active
ENGINE START BY I-KEY	Engine start function (by Intelligent Key) mode can be changed.	ON	Active
		OFF	Inactive
LOCK/UNLOCK BY I-KEY	Door lock function by door request switch can be changed.	ON	Active
		OFF	Inactive

SELF-DIAG RESULT

Refer to DLK-163, "DTC Index".

DATA MONITOR

Monitor Item	Condition
PUSH SW	Indicates [ON (pressed)/OFF (released)] condition of ignition knob switch.
KEY SW	Indicates [ON (inserted)/OFF (removed)] condition of key switch.
DR REQ SW	Indicates [ON (pressed)/OFF (released)] condition of door request switch (driver side).
AS REQ SW	Indicates [ON (pressed)/OFF (released)] condition of door request switch (passenger side).
BD/TR REQ SW	Indicates [ON (pressed)/OFF (released)] condition of door request switch (back door).
IGN SW	Indicates [ON (ON or START position)/OFF (other than ON and START position)] condition of ignition switch ON position.
ACC SW	Indicates [ON/OFF] condition of ignition switch ACC position.
STOP LAMP SW	Indicates [ON/OFF] condition of stop lamp switch.
DOOR LOCK SIG	Indicates [ON/OFF] condition of LOCK signal from Intelligent Key.
DOOR UNLOCK SIG	Indicates [ON/OFF] condition of UNLOCK signal from Intelligent Key.
DOOR SW DR	Indicates [OPEN/CLOSE] condition of front door switch (driver side) from BCM via CAN communication.
DOOR SW AS	Indicates [OPEN/CLOSE] condition of front door switch (passenger side) from BCM via CAN communication.
DOOR SW RR	Indicates [OPEN/CLOSE] condition of rear door switch (RH) from BCM via CAN communication.
DOOR SW RL	Indicates [OPEN/CLOSE] condition of rear door switch (LH) from BCM via CAN communication.
DOOR BK SW	Indicates [OPEN/CLOSE] condition of back door switch from BCM via CAN communication.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

ACTIVE TEST

Test item	Description
DOOR LOCK/UNLOCK	This test is able to check door lock/unlock operation. • ALL UNLK: All door lock actuators are unlocked. • DR UNLK: Door lock actuator (driver side) is unlocked. • AS UNLK: Door lock actuator (passenger side) is unlocked. • BK UNLK: This item is indicated, but inactive. • LOCK: All door lock actuator is locked.
ANTENNA	This test is able to check Intelligent Key antenna operation. When the following condition are met, hazard warning lamps flash. • ROOM ANT1: Inside key antenna (console) detects Intelligent Key, when “ROOM ANT1” is selected. • ROOM ANT2: Inside key antenna (instrument center/rear seat) detects Intelligent Key, when “ROOM ANT2”is selected. • DRIVER ANT: Outside key antenna (driver side) detects Intelligent Key, when “DRIVER ANT” is selected. • ASSIST ANT: Outside key antenna (passenger side) detects Intelligent Key, when “ASSIST ANT” is selected. • BK DOOR ANT: Outside key antenna (rear bumper) detects Intelligent Key, when “BK DOOR ANT” is selected.
OUTSIDE BUZZER	This test is able to check Intelligent Key warning buzzer operation. • ON • OFF
INSIDE BUZZER	This test is able to check warning chime in combination meter operation. • TAKE OUT: Take away warning chime sounds. • KNOB: Ignition knob switch warning chime sounds. • KEY: Key warning chime sounds. • OFF

cardiagn.com

Test item	Description
INDICATOR	This test is able to check warning lamp operation. • BLUE ON: Key warning lamp (green) illuminates. • RED ON: Key warning lamp (red) illuminates. • KNOB ON: Lock warning lamp illuminates. • BLUE IND: Key warning lamp (green) flashes. • RED IND: Key warning lamp (red) flashes. • KNOB IND: Lock warning lamp flashes. • OFF
KEY LOCK SOLENOID*1	This test is able to check key interlock operation. • LOCK: Key interlock is active. • UNLOCK: Key interlock is inactive.

*1: The item is only for MT model.

carsdiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001078091

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart, refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000000939071

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1000	CAN COMM CIRCUIT	When Intelligent Key unit cannot communicate CAN communication signal continuously for 2 seconds or more.	In CAN communication system, any item (or items) of the following listed below is malfunctioning. • Transmission • Receiving (BCM) • Receiving (IPDM E/R) • Receiving (ECM) • Receiving (METER/M&A) • Receiving (MULTI AV)

Diagnosis Procedure

INFOID:0000000000939072

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check “Self Diagnostic Result”.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000001078092

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart, refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000000939073

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of Intelligent Key unit.	Intelligent Key unit

Diagnosis Procedure

INFOID:0000000000939074

1.REPLACE INTELLIGENT KEY UNIT

When DTC [U1010] is detected, replace Intelligent Key unit.

>> Replace Intelligent Key unit.

Special Repair Requirement

INFOID:0000000000939075

1.REQUIRED WORK WHEN REPLACING INTELLIGENT KEY UNIT

Initialize control unit. Refer to CONSULT-III operation manual NATS-IVIS/NVIS.

>> Work end.

B2552 INTELLIGENT KEY

Description

INFOID:0000000001115364

Intelligent key unit performs engine start operation and steering lock control by crosschecking ID with the Intelligent key.

DTC Logic

INFOID:0000000001115365

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2552	INTELLIGENT KEY UNIT	Malfunction is detected inside Intelligent key unit.	• Intelligent Key unit

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to DLK-70, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001115366

1.REPLACE INTELLIGENT KEY UNIT

1. Replace Intelligent Key unit.
2. Perform initialization with CONSULT-III. Re-register all mechanical keys. Refer to “CONSULT-III Operation Manual NATS”.
3. Start the engine.

Does the engine start?

YES >> INSPECTION END
NO >> Perform “DTC confirmation procedure”. Refer to DLK-70, "DTC Logic".

Special Repair Requirement

INFOID:0000000001115367

1.REQUIRED WORK WHEN REPLACING INTELLIGENT KEY UNIT

Initialize control unit. Refer to CONSULT-III operation manual NATS-IVIS/NVIS.

>> Work end.

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT
INTELLIGENT KEY UNIT

INTELLIGENT KEY UNIT : Diagnosis Procedure

INFOID:0000000000939085

1.CHECK FUSE AND FUSIBLE LINK

Check that the following fuse is not blown.

Terminal No.	Signal name	Fuse No.
11	Battery power supply	9 (10A)
6	Ignition power supply	4 (10A)

Is the fuse blown?

YES >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Turn ignition switch ON.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminal			Voltage (V) (Approx.)
(+)		(–)	
Intelligent Key unit		Ground	
Connector	Terminal		
M40	11		Battery voltage
	6		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between Intelligent Key unit harness connector and ground.

Intelligent Key unit		Ground	Continuity
Connector	Terminal		
M40	12		Exists

Does continuity exist?

YES >> Intelligent Key unit power supply and ground circuit are OK.
NO >> Repair harness or connector.

BCM

BCM : Diagnosis Procedure

INFOID:0000000001034129

1.CHECK FUSE AND FUSIBLE LINK

Check that the following fuse and fusible link are not blown.

Terminal No.	Signal name	Fuse and fusible link No.
41	Battery power supply	9 (10A)
57		J (40A)

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.

carsdiagn.com

NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
BCM		Ground	
Connector	Terminal		
M66	41		Battery voltage
M67	57		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> BCM power supply and ground circuit are OK.
NO >> Repair harness or connector.

cardiagn.com

DOOR LOCK AND UNLOCK SWITCH

Description

INFOID:0000000000939090

Transmits door lock/unlock operation to BCM.

Component Function Check

INFOID:0000000000939091

1.CHECK FUNCTION

With CONSULT-III

Check “CDL LOCK SW ”and “CDL UNLOCK SW” in Data monitor mode with CONSULT-III.

Monitor item	Condition	
CDL LOCK SW	LOCK	: ON
	UNLOCK	: OFF
CDL UNLOCK SW	LOCK	: OFF
	UNLOCK	: ON

Is the inspection result normal?

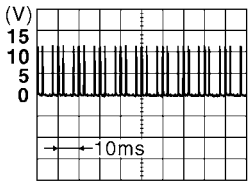
YES >> Door lock and unlock switch is OK.
NO >> Refer to DLK-73, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000939092

1.CHECK DOOR LOCK AND UNLOCK INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect door lock and unlock switch connector.
3. Check voltage between door lock and unlock switch and ground.

Terminal			Signal (Reference value)
(+)		(–)	
Door lock and unlock switch connector	Terminal		
M89	1	Ground	
	6		

JPMIA0154GB

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK AND UNLOCK SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector and door lock and unlock switch connector.

BCM connector	Terminal	Door lock and unlock switch connector	Terminal	Continuity
M65	7	M89	6	Exists
	9		1	

4. Check continuity between BCM connector and ground.

carsdiagn.com

BCM connector	Terminal		Continuity
M65	7	Ground	Does not exist
	9		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

3.CHECK DOOR LOCK AND UNLOCK SWITCH GROUND

Check continuity between door lock and unlock switch connector and ground.

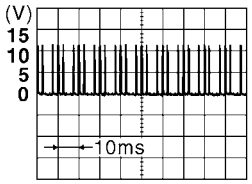
Door lock and unlock switch connector	Terminal	Ground	Continuity
M89	5		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminal			Signal (Reference value)
(+)		(–)	
BCM connector	Terminal		
M65	7	Ground	
	9		

JPMIA0154GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK DOOR LOCK AND UNLOCK SWITCH

Check door lock and unlock switch
Refer to DLK-74, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

Component Inspection

INFOID:0000000001098047

1.CHECK DOOR LOCK AND UNLOCK SWITCH

Check door lock and unlock switch.

Door lock and unlock switch	Terminal		Condition	Continuity
M89	6	5	LOCK	Exists
	1		UNLOCK	

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

cardiagn.com

DOOR LOCK AND UNLOCK SWITCH INDICATOR

Description

INFOID:0000000001102255

The door lock and unlock switch indicates door lock status. The indicator will illuminate when a lock operation is accomplished, and during this status, if any door is opened, the indicator will turn OFF.

Component Function Check

INFOID:0000000001102256

1.CHECK FUNCTION

With CONSULT-III

Check “DOOR LOCK IND” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK IND	:ON	Illuminated
	:OFF	Not illuminated

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Refer to DLK-75, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102257

1.CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between door lock and unlock switch and ground.

Terminal			Condition	Voltage (Approx.)
(+)		(–)		
Door lock and unlock switch connector	Terminal			
M89	4	Ground	Door lock operation is accomplished	Battery voltage
			Any door is OPEN	0

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK DOOR LOCK AND UNLOCK SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and door lock and unlock switch connector.
3. Check continuity between BCM connector and door lock and unlock switch connector.

BCM connector	Terminal	Door lock and unlock switch connector	Terminal	Continuity
M65	24	M89	4	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	24		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK DOOR LOCK AND UNLOCK SWITCH GROUND

Check continuity between door lock and unlock switch connector and ground.

Door lock and unlock switch connector	Terminal	Ground	Continuity
M89	5		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminal			Condition	Voltage (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	24	Ground	Door lock operation is accomplished	Battery voltage
			Any door is OPEN	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5. CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR

Check door lock and unlock switch
Refer to DLK-76, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

Component Inspection

INFOID:0000000001102258

1. CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR

Check continuity door lock and unlock switch.

Door lock and unlock switch	Terminal		Continuity
	(+)	(-)	
M89	5	4	Exists
	4	5	Does not exist

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

cardiagn.com

DOOR REQUEST SWITCH
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001109368

Transmits lock/unlock operation to Intelligent Key unit.

DRIVER SIDE : Component Function Check

INFOID:0000000001109369

1.CHECK FUNCTION

With CONSULT-III

Check door request switch “DR REQ SW” in Data monitor mode.

Monitor item	Condition	
DR REQ SW	Door request switch is pressed	:ON
	Door request switch is released	:OFF

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Refer to DLK-77, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001109370

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between Intelligent Key unit harness connector and ground.

Terminal			Door request switch condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	5	Ground	Pressed	0
			Released	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK FRONT DOOR REQUEST SWITCH CIRCUIT

1. Disconnect Intelligent Key unit.
2. Check continuity between Intelligent Key unit connector and door request switch connector.

Intelligent Key unit connector	Terminal	Door request switch connector	Terminal	Continuity
M40	5	D10	1	Exists

3. Check continuity between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Continuity
M40	5		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and front outside handle.

3.CHECK DOOR REQUEST SWITCH GROUND CIRCUIT

Check continuity between door request switch connector and ground.

Door request switch connector	Terminal	Ground	Continuity
D10	2		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace front outside handle ground circuit.

4.CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit connector.
2. Check voltage between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Voltage (V) (Approx.)
M40	5		5

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 6.

5.CHECK DOOR REQUEST SWITCH

Check door request switch.
Refer to DLK-78, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning front outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".

6.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-282, "Exploded View".
NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

DRIVER SIDE : Component Inspection

INFOID:0000000001109371

1.CHECK DOOR REQUEST SWITCH

Check door request switch.

Terminal		Door request switch condition	Continuity
Door request switch			
1	2	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Replace malfunctioning front outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001109372

Transmits lock/unlock operation to Intelligent Key unit.

cardiagn.com

PASSENGER SIDE : Component Function Check

INFOID:0000000001109373

1.CHECK FUNCTION

With CONSULT-III

Check door request switch “AS REQ SW” in Data monitor mode.

Monitor item	Condition	
AS REQ SW	Door request switch is pressed	:ON
	Door request switch is released	:OFF

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Refer to DLK-81, "BACK DOOR : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001109374

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between Intelligent Key unit harness connector and ground.

Terminal			Door request switch condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	25	Ground	Pressed	0
			Released	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK DOOR REQUEST SWITCH CIRCUIT

1. Disconnect Intelligent Key unit.
2. Check continuity between Intelligent Key unit connector and door request switch connector.

Intelligent Key unit connector	Terminal	Door request switch connector	Terminal	Continuity
M40	25	D49	1	Exists

3. Check continuity between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Continuity
M40	25		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and front outside handle.

3.CHECK DOOR REQUEST SWITCH GROUND CIRCUIT

Check continuity between front door request switch connector and ground.

Door request switch connector	Terminal	Ground	Continuity
D49	2		Exists

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace front outside handle ground circuit.

4.CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit connector.
2. Check voltage between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Voltage (V) (Approx.)
M40	25		5

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 6.

5.CHECK DOOR REQUEST SWITCH

Check door request switch.
Refer to DLK-82, "BACK DOOR : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning front outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".

6.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-282, "Exploded View".
NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

PASSENGER SIDE : Component Inspection

INFOID:0000000001109375

1.CHECK DOOR REQUEST SWITCH

Check door request switch.

Terminal		Door request switch condition	Continuity
Door request switch			
1	2	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Replace malfunctioning front outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".

BACK DOOR

BACK DOOR : Description

INFOID:0000000001109376

Transmits lock/unlock operation to Intelligent Key unit.

BACK DOOR : Component Function Check

INFOID:0000000001109377

1.CHECK FUNCTION

With CONSULT-III
Check door request switch “BD/TR REQ SW” in Data monitor mode.

cardiagn.com

Monitor item	Condition	
BD/TR REQ SW	Door request switch is pressed	:ON
	Door request switch is released	:OFF

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Refer to DLK-81, "BACK DOOR : Diagnosis Procedure".

BACK DOOR : Diagnosis Procedure

INFOID:0000000001109378

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between Intelligent Key unit harness connector and ground.

Terminal			Door request switch condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	29	Ground	Pressed	0
			Released	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK DOOR REQUEST SWITCH CIRCUIT

1. Disconnect Intelligent Key unit.
2. Check continuity between Intelligent Key unit connector and door request switch connector.

Intelligent Key unit connector	Terminal	Door request switch connector	Terminal	Continuity
M40	29	D187	1	Exists

3. Check continuity between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Continuity
M40	29		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and back door request switch.

3.CHECK DOOR REQUEST SWITCH GROUND CIRCUIT

Check continuity between front door request switch connector and ground.

Door request switch connector	Terminal	Ground	Continuity
D187	2		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace back door request switch ground circuit.

4.CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit connector.
2. Check voltage between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Voltage (V) (Approx.)
M40	29		5

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 6.

5.CHECK DOOR REQUEST SWITCH

Check door request switch.
Refer to DLK-82, "BACK DOOR : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door request switch. Refer to DLK-278, "Exploded View".

6.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-282, "Exploded View".
NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

BACK DOOR : Component Inspection

INFOID:0000000001109379

1.CHECK DOOR REQUEST SWITCH

Check door request switch.

Terminal		Door request switch condition	Continuity
Door request switch			
1	2	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Replace back door request switch. Refer to DLK-278, "Exploded View".

cardiagn.com

DOOR SWITCH
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000000939086

Detects door open/closed condition.

DRIVER SIDE : Component Function Check

INFOID:0000000000939087

1.CHECK FUNCTION

With CONSULT-III

Check door switches “DOOR SW-DR” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-DR	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

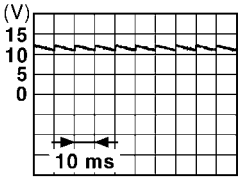
YES >> Door switch is OK.
NO >> Refer to DLK-83, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000000939088

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals (+) BCM connector	Terminals (+) Terminal	Terminals (–)	Door condition	Voltage (V) (Approx.)
M65	26	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	26	B34	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	26		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-84, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

DRIVER SIDE : Component Inspection

INFOID:0000000000939089

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001035849

Detects door open/closed condition.

PASSENGER SIDE : Component Function Check

INFOID:0000000001035850

1.CHECK FUNCTION

With CONSULT-III

Check door switches “DOOR SW-AS” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-AS	OPEN	: ON
	CLOSE	: OFF

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Refer to DLK-84, "PASSENGER SIDE : Diagnosis Procedure".

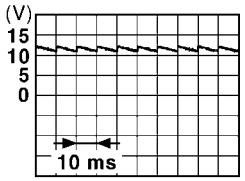
PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001098048

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

cardiagn.com

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	27	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	27	B27	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	27		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-85, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

PASSENGER SIDE : Component Inspection

INFOID:0000000001098049

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR LH

REAR LH : Description

INFOID:0000000001035853

Detects door open/closed condition.

REAR LH : Component Function Check

INFOID:0000000001035854

1.CHECK FUNCTION

With CONSULT-III

Check door switches “DOOR SW-RL” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-RL	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

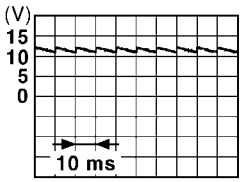
YES >> Door switch is OK.
NO >> Refer to DLK-86, "REAR LH : Diagnosis Procedure".

REAR LH : Diagnosis Procedure

INFOID:0000000001098050

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	25	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	25	B71	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	25		Does not exist

Is the inspection result normal?

cardiagn.com

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3. CHECK DOOR SWITCH

Check door switch.
Refer to DLK-87, "REAR LH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR LH : Component Inspection

INFOID:0000000001098051

1. CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR RH

REAR RH : Description

INFOID:0000000001035857

Detects door open/close condition.

REAR RH : Component Function Check

INFOID:0000000001035858

1. CHECK FUNCTION

With CONSULT-III
Check door switches “DOOR SW-RR” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-RR	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

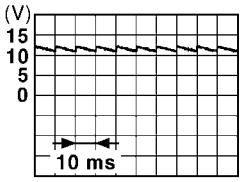
YES >> Door switch is OK.
NO >> Refer to DLK-87, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001098052

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	29	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	29	B53	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	29		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-88, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR RH : Component Inspection

INFOID:0000000001098053

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

cardiagn.com

BACK DOOR

BACK DOOR : Description

INFOID:0000000000939119

Detects back door open condition.

BACK DOOR : Component Function Check

INFOID:0000000000939120

1.CHECK FUNCTION

With CONSULT-III

Check “BACK DOOR SW” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
BACK DOOR SW	OPEN	: ON
	CLOSE	: OFF

Is the inspection result normal?

YES >> Back door lock assembly (door switch) is OK.
NO >> Refer to DLK-89, "BACK DOOR : Diagnosis Procedure".

BACK DOOR : Diagnosis Procedure

INFOID:0000000000939121

1.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH) INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Back door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	28	Ground	OPEN	0
			CLOSE	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH) CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and back door lock assembly (door switch) connector.

BCM connector	Terminal	Back door lock assembly (door switch) connector	Terminal	Continuity
M65	28	D152	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	28		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and trunk room lamp switch.

3.CHECK BACK DOOR LOCK ASSEMBLY GROUND CIRCUIT

Check continuity between back door lock assembly connector and ground.

Back door lock assembly (door switch) connector	Terminal	Ground	Continuity
D152	3		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace back door lock assembly ground circuit.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M65	28	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH)

Check back door lock assembly (door switch).
Refer to DLK-90, "BACK DOOR : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door lock assembly (door switch). Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

BACK DOOR : Component Inspection

INFOID:0000000000939122

1.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH)

1. Turn ignition switch OFF.
2. Disconnect back door lock assembly (door switch) connector.
3. Check back door lock assembly (door switch).

Terminal		Trunk condition	Continuity
Back door lock assembly (door switch)			
4	3	OPEN	Exists
		CLOSE	Does not exist

Is the inspection result normal?

YES >> Back door lock assembly (door switch) is OK.
NO >> Replace back door lock assembly (door switch). Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

cardiagn.com

KEY SWITCH

Description

INFOID:0000000001116292

Key switch detects that mechanical key is inserted into the key cylinder, and then transmits the signal to BCM and Intelligent Key unit.

Component Function Check

INFOID:0000000001116293

1.CHECK KEY SWITCH INPUT SIGNAL

Check key switch (“KEY SW”) in “DATA MONITOR” mode with CONSULT-III. Refer to DLK-62, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Monitor item	Condition	
KEY SW	Insert mechanical key into key cylinder	: ON
	Remove mechanical key from key cylinder	: OFF

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Refer to DLK-91, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116294

1.CHECK KEY SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and BCM connector.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	7	Ground	Insert mechanical key into key cylinder	Battery voltage
			Remove mechanical key from key cylinder	0

4. Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	36	Ground	Insert mechanical key into key cylinder	Battery voltage
			Remove mechanical key from key cylinder	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Remove mechanical key from key cylinder.
2. Disconnect key switch connector.
3. Check voltage between key switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Key switch connector	Terminal		
M25	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK KEY SWITCH SIGNAL CIRCUIT

1. Check continuity between Intelligent Key unit harness connector and key switch connector.

Intelligent Key unit connector	Terminal	Key switch connector	Terminal	Continuity
M40	7	M25	1	Exists

2. Check continuity between BCM harness connector and key switch connector.

BCM connector	Terminal	Key switch connector	Terminal	Continuity
M65	36	M25	1	Exists

3. Check continuity between key switch connector and ground.

Key switch connector	Terminal	Ground	Continuity
M25	1	Ground	Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK KEY SWITCH

Check key switch function.
Refer to DLK-92, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace key switch.

Component Inspection

INFOID:0000000001116295

COMPONENT INSPECTION

1.CHECK KEY SWITCH

Check continuity between key switch terminals.

Terminal		Condition	Continuity
key switch connector			
1	2	Insert mechanical key into key cylinder	Exists
		Remove mechanical key from key cylinder	Does not exist

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Replace key switch.

cardiagn.com

IGNITION KNOB SWITCH

Description

INFOID:0000000001116319

Ignition knob switch detects that ignition knob is pressed, and then transmits the signal to Intelligent Key unit.

Component Function Check

INFOID:0000000001116320

1.CHECK IGNITION KNOB SWITCH INPUT SIGNAL

Check ignition knob switch (“PUSH SW”) in “DATA MONITOR” mode with CONSULT-III. Refer to DLK-62, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Monitor item	Condition	
PUSH SW	Ignition knob switch is pressed	: ON
	Ignition knob switch is released	: OFF

Is the inspection result normal?

YES >> Ignition knob switch is OK.
NO >> Refer to SEC-48, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116321

1.CHECK IGNITION KNOB SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and BCM connector.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	27	Ground	Ignition knob switch is pressed	Battery voltage
			Ignition knob switch is released	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK IGNITION KNOB SWITCH POWER SUPPLY CIRCUIT

1. Disconnect ignition knob switch connector.
2. Check voltage between ignition knob switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Ignition knob switch connector	Terminal		
M25	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK IGNITION KNOB SWITCH SIGNAL CIRCUIT

1. Check continuity between Intelligent Key unit harness connector and ignition knob switch connector.

Intelligent Key unit connector	Terminal	Ignition knob switch connector	Terminal	Continuity
M40	27	M25	3	Exists

A B C D E F G H I J DLK L M N O P
carsdiagn.com

2. Check continuity between ignition knob switch connector and ground.

Ignition knob switch connector	Terminal	Ground	Continuity
M25	3		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK IGNITION KNOB SWITCH

Check ignition knob switch function.
Refer to SEC-49, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace ignition knob switch.

Component Inspection

INFOID:0000000001116322

1. CHECK IGNITION KNOB SWITCH

1. Turn ignition switch OFF.
2. Disconnect ignition knob switch harness connector.
3. Check continuity between ignition knob switch terminals under the following conditions.

Ignition knob switch			Condition	Continuity
Connector	Terminal			
M25	3	4	Ignition knob switch is pressed	Exists
			Ignition knob switch is released	Does not exist

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace ignition knob switch.

cardiagn.com

DOOR LOCK ACTUATOR
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000000939131

Locks/unlocks the door with the signal from BCM.

DRIVER SIDE : Component Function Check

INFOID:0000000000939132

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK/UNLOCK” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK/UNLOCK	:ALL UNLK	The all door lock actuators are unlocked
	:DR UNLK	The door lock actuator (driver side) is unlocked
	:LOCK	The all door lock actuators are locked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-95, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000000939133

1.CHECK OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	60		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect BCM and front door lock actuator (driver side) connector.
2. Check continuity between BCM connector and front door lock actuator (driver side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D9	3	Exists
	60		2	

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	60		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK DOOR LOCK ACTUATOR CIRCUIT 1

1. Disconnect anti-hijack relay connector.
2. Check continuity between BCM connector and anti-hijack relay connector.

BCM connector	Terminal	Anti-hijack relay connector	Terminal	Continuity
M67	56	M90	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK DOOR LOCK ACTUATOR CIRCUIT 2

Check continuity of anti-hijack relay.

Anti-hijack relay connector	Terminal		Continuity
M90	4	3	Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK DOOR LOCK ACTUATOR CIRCUIT 3

1. Check continuity between anti-hijack relay connector and front door lock actuator (driver side) connector.

Anti-hijack relay connector	Terminal	Door lock actuator connector	Terminal	Continuity
M90	3	D9	3	Exists

2. Check continuity between anti-hijack relay connector and ground.

Anti-hijack relay connector	Terminal	Ground	Continuity
M90	3		Does not exist

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

6.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-96, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation". After that, DLK-97, "DRIVER SIDE : Special Repair Requirement"

DRIVER SIDE : Component Inspection

INFOID:0000000001098100

1.CHECK FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)

Check the actuator operation by connecting the battery voltage to front door lock actuator (driver side).

cardiagn.com

Front door lock actuator (driver side)	Terminal		Door lock actuator condition
	(+)	(-)	
D9	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Front door lock actuator (driver side) is OK.
NO >> Replace front door lock actuator (driver side). Refer to DLK-255, "DOOR LOCK : Removal and Installation". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

DRIVER SIDE : Special Repair Requirement

INFOID:0000000001098101

Refer to PWC-4, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001097240

Locks/unlocks the door with the signal from BCM.

PASSENGER SIDE : Component Function Check

INFOID:0000000001102056

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK/UNLOCK” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK/UNLOCK	:ALL UNLK	The all door lock actuators are unlocked
	:AS UNLK	The door lock actuator (passenger side) is locked
	:LOCK	The all door lock actuators are locked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-97, "PASSENGER SIDE : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001097242

1.CHECK OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect BCM and front door lock actuator (passenger side) connector.
2. Check continuity between BCM connector and front door lock actuator (passenger side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D48	3	Exists
	54		2	

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-98, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

PASSENGER SIDE : Component Inspection

INFOID:0000000001098102

1.CHECK FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)

Check the actuator operation by connecting the battery voltage directly to front door lock actuator (passenger side).

Front door lock actuator (passenger side) connector	Terminal		Door lock actuator condition
	(+)	(-)	
D48	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Front door lock actuator (passenger side) is OK.
NO >> Replace front door lock actuator (passenger side). Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR LH

REAR LH : Description

INFOID:0000000001097243

Locks/unlocks the door with the signal from BCM.

REAR LH : Component Function Check

INFOID:0000000001102057

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK/UNLOCK” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK/UNLOCK	:ALL UNLK	The all door lock actuators are unlocked
	:LOCK	The all door lock actuators are locked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-99, "REAR LH : Diagnosis Procedure".

cardiagn.com

REAR LH : Diagnosis Procedure

INFOID:0000000001097245

1.CHECK OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect BCM and rear door lock actuator (LH) connector.
2. Check continuity between BCM connector and rear door lock actuator (LH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D85	3	Exists
	54		2	

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK DOOR LOCK ACTUATOR CIRCUIT 1

1. Disconnect anti-hijack relay connector.
2. Check continuity between BCM connector and anti-hijack relay connector.

BCM connector	Terminal	Anti-hijack relay connector	Terminal	Continuity
M67	56	M90	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK DOOR LOCK ACTUATOR CIRCUIT 2

Check continuity anti-hijack relay.

Anti-hijack relay connector	Terminal		Continuity
M90	4	3	Exists

Is the inspection result normal?

A B C D E F G H I J DLK L M N O P
carsdiagn.com

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK DOOR LOCK ACTUATOR CIRCUIT 3

1. Check continuity between anti-hijack relay connector and rear door lock actuator (LH) connector.

Anti-hijack relay connector	Terminal	Door lock actuator connector	Terminal	Continuity
M90	3	D85	3	Exists

2. Check continuity between anti-hijack relay connector and ground.

Anti-hijack relay connector	Terminal	Ground	Continuity
M90	3		Does not exist

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

6.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-100, "REAR LH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR LH : Component Inspection

INFOID:0000000001098103

1.CHECK REAR DOOR LOCK ACTUATOR (LH)

Check the actuator operation by connecting the battery voltage directly to rear door lock actuator (LH).

Rear door lock actuator (LH)	Terminal		Door lock actuator condition
	(+)	(-)	
D85	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Rear door lock actuator (LH) is OK.
NO >> Replace rear door lock actuator (LH). Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH

REAR RH : Description

INFOID:0000000001097246

Locks/unlocks the door with the signal from BCM.

REAR RH : Component Function Check

INFOID:0000000001102058

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK/UNLOCK” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK/UNLOCK	:ALL UNLK	The all door lock actuators are unlocked
	:LOCK	The all door lock actuators are locked

Is the inspection result normal?

cardiagn.com

YES >> Door lock actuator is OK.
NO >> Refer to DLK-101, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001097248

1.CHECK OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (RH) connector.
3. Check continuity between BCM connector and rear door lock actuator (RH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D105	3	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect anti-hijack relay.
2. Check continuity between BCM connector and anti-hijack relay connector.

BCM connector	Terminal	Anti-hijack relay connector	Terminal	Continuity
M67	56	M90	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK DOOR LOCK ACTUATOR CIRCUIT

Check continuity anti-hijack relay.

Anti-hijack relay connector	Terminal		Continuity
M90	4	3	Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Check continuity between anti-hijack relay connector and rear door lock actuator (RH) connector.

Anti-hijack relay connector	Terminal	Door lock actuator connector	Terminal	Continuity
M90	3	D105	3	Exists

2. Check continuity between anti-hijack relay connector and ground.

Anti-hijack relay connector	Terminal	Ground	Continuity
M90	3		Does not exist

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

6.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-102, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH : Component Inspection

INFOID:0000000001098104

1.CHECK REAR DOOR LOCK ACTUATOR (RH)

Check the actuator operation by connecting the battery voltage directly to rear door lock actuator (RH).

Rear door lock actuator (RH)	Terminal		Door lock actuator condition
	(+)	(-)	
D105	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Rear door lock actuator (RH) is OK.
NO >> Replace rear door lock actuator (RH). Refer to DLK-255, "DOOR LOCK : Removal and Installation".

cardiagn.com

BACK DOOR OPENER ACTUATOR

Description

INFOID:0000000001097224

Opens the back door with the signal from BCM.

Component Function Check

INFOID:0000000001097225

1.CHECK FUNCTION

With CONSULT-III

Check “TRUNK/GLASS HATCH” in Active test mode with CONSULT-III.

Test item		Condition
TRUNK/GLASS HATCH	:OPEN	Back door lock opener actuator operation

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-103, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001097226

1.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of back door opener switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M66	45	Ground	Pressed	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK BACK DOOR LOCK ASSEMBLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and back door lock assembly connector.
3. Check continuity between BCM connector and back door lock assembly connector.

BCM connector	Terminal	Back door lock assembly connector	Terminal	Continuity
M66	45	D152	2	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M66	45		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK BACK DOOR LOCK ASSEMBLY GROUND CIRCUIT

Check continuity between back door lock assembly connector and ground.

Back door lock assembly connector	Terminal	Ground	Continuity
D152	1		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK BACK DOOR LOCK ASSEMBLY

Check back door lock assembly connector and ground.
Refer to DLK-104, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door lock assembly. Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

Component Inspection

INFOID:0000000001098113

1.CHECK BACK DOOR LOCK ASSEMBLY

Check the actuator operation by connecting battery voltage to back door lock assembly.

Back door lock assembly connector	Terminal		Back door actuator condition
D152	(+)	(-)	OPEN
	2	1	

Is the inspection result normal?

YES >> Back door lock assembly (back door lock actuator) is OK.
NO >> Replace back door lock assembly (back door lock actuator). Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

cardiagn.com

BACK DOOR OPENER SWITCH

Description

INFOID:0000000001078347

Sends the back door opening signal to BCM.

Component Function Check

INFOID:0000000001078348

1.CHECK FUNCTION

With CONSULT-III

Check “TRNK OPNR SW” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
TRNK OPNR SW	Back door opener switch is pressed	:ON
	Back door opener switch is released	:OFF

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-105, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001078349

1.CHECK BCM INPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of back door opener switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	12	Ground	Pressed	0
			Released	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK BACK DOOR OPENER SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and back door opener switch connector.
3. Check continuity between BCM connector and back door opener switch connector.

BCM connector	Terminal	Back door opener switch connector	Terminal	Continuity
M65	12	D186	1	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	12		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M65	12	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

4.CHECK BACK DOOR OPENER SWITCH GROUND CIRCUIT

Check continuity between back door opener switch connector and ground.

Back door opener switch connector	Terminal	Ground	Continuity
D186	2		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK BACK DOOR OPENER SWITCH

Check back door opener switch.
Refer to DLK-106, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door opener switch. Refer to DLK-279, "Exploded View".

Component Inspection

INFOID:0000000001098114

1.CHECK BACK DOOR OPENER SWITCH

Check back door opener switch.

Back door opener switch connector	Terminal		Back door opener switch condition	Continuity
D186	1	2	Pressed	Exists
			Released	Does not exist

Is the inspection result normal?

YES >> Back door opener switch is OK.
NO >> Replace back door opener switch. Refer to DLK-279, "Exploded View".

cardiagn.com

OUTSIDE KEY ANTENNA
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001109329

Detects whether Intelligent Key is outside the vehicle.
Integrated in front outside handle (driver side).

DRIVER SIDE : Component Function Check

INFOID:0000000001109330

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III
1. Check “ANTENNA” in “Active Test” mode with CONSULT-III.
2. Touch “DRIVER ANT”.
3. When Intelligent Key is in outside key antenna (driver side) detection area, hazard lamp flashes.

Test Item		Outside Antenna
ANTENNA	:DRIVER ANT	Outside key antenna (driver side)

Is the inspection result normal?

YES >> Outside key antenna is OK.
NO >> Refer to DLK-113, "REAR BUMPER : Diagnosis Procedure".

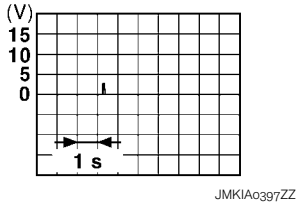
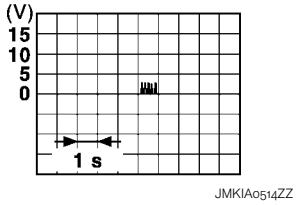
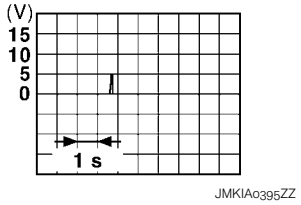
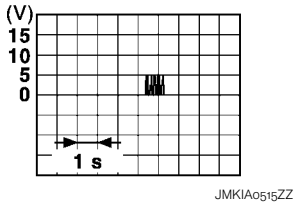
DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001109331

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

carsdiagn.com

Terminals				Condition		Signal (Reference value)
(+)			(–)			
Intelligent Key unit connector		Terminal				
M40	Driver side (+)	19	Ground	Request switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0397ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Driver side (-)	20			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK OUTSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and front outside handle connector.
2. Check continuity between Intelligent Key unit connector and outside key antenna connector.

Intelligent Key unit connector	Terminal	Outside key antenna connector	Terminal	Continuity
M40	19	D11	1	Exists
	20		2	

3. Check continuity between Intelligent Key unit connector and ground.

cardiagn.com

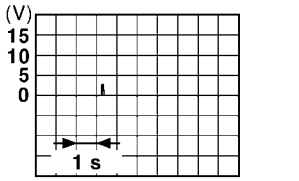
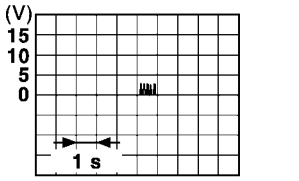
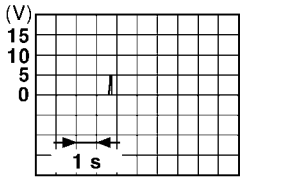
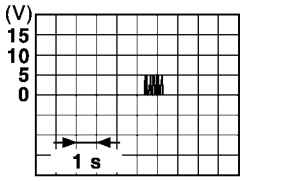
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	19		Does not exist
	20		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and outside key antenna.

3. CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace outside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and outside key antenna connector.
3. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminals (+) Intelligent Key unit connector	Terminals (+) Terminal	Terminals (–)	Condition		Signal (Reference value)
M40	Driver side (+) 19	Ground	Door request switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0397ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Driver side (-) 20		Door request switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Replace outside key antenna (driver side). Refer to DLK-275, "DRIVER SIDE : Exploded View".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001109332

Detects whether Intelligent Key is outside the vehicle.
Integrated in front outside handle (passenger side).

PASSENGER SIDE : Component Function Check

INFOID:0000000001109333

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in “Active Test” mode with CONSULT-III.
2. Touch “ASSIST ANT”.
3. When Intelligent Key is in outside key antenna (passenger side) detection area, hazard lamp is flashes.

Test Item		Outside Antenna
ANTENNA	:ASSIST ANT	Outside key antenna (passenger side)

Is the inspection result normal?

YES >> Outside key antenna is OK.
NO >> Refer to DLK-110, "PASSENGER SIDE : Diagnosis Procedure".

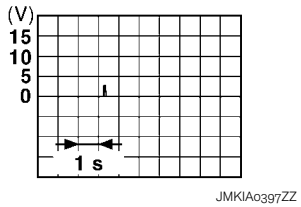
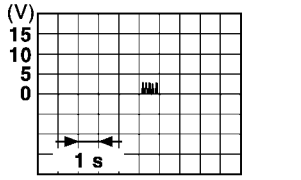
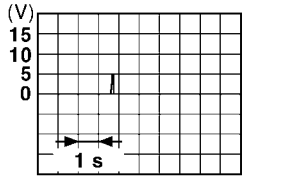
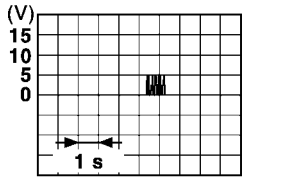
PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001109334

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

cardiagn.com

Terminals				Condition		Signal (Reference value)
(+)			(–)			
Intelligent Key unit connector		Terminal				
M40	Passenger side (+)	37	Ground	Request switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0397ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Passenger side (-)	38			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK OUTSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and front outside handle connector.
2. Check continuity between Intelligent Key unit connector and outside key antenna connector.

Intelligent Key unit connector	Terminal	Outside key antenna connector	Terminal	Continuity
M40	37	D50	1	Exists
	38		2	

3. Check continuity between Intelligent Key unit connector and ground.

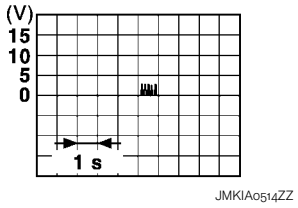
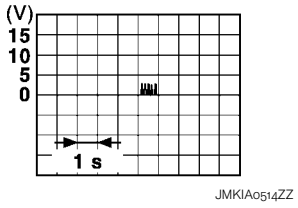
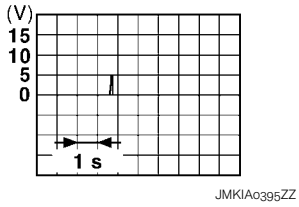
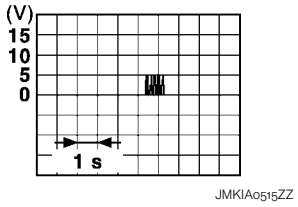
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	37		Does not exist
	38		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and outside key antenna.

3.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace outside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and outside key antenna connector.
3. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminal (+)			Terminal (–)	Condition		Signal (Reference value)
Intelligent Key unit connector		Terminal				
M40	Passenger side (+)	37	Ground	Door request switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0514ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Passenger side (-)	38			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Replace outside key antenna. Refer to DLK-275, "PASSENGER SIDE : Exploded View" (passenger side).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

REAR BUMPER

REAR BUMPER : Description

INFOID:0000000001109335

Detects whether Intelligent Key is outside the vehicle.
Installed in rear bumper.

REAR BUMPER : Component Function Check

INFOID:0000000001109336

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in “Active Test” mode with CONSULT-III.
2. Touch “BK DOOR ANT”.
3. When Intelligent Key is in outside key antenna (rear bumper) detection area, hazard lamp is flashes.

Test Item		Outside Antenna
ANTENNA	:BK DOOR ANT	Outside key antenna (rear bumper)

Is the inspection result normal?

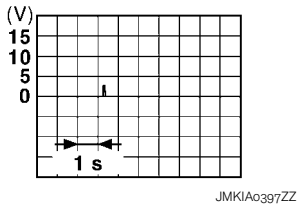
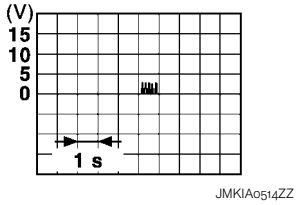
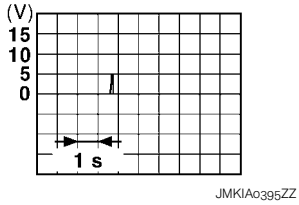
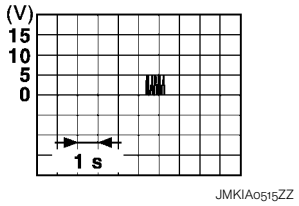
YES >> Outside key antenna is OK.
NO >> Refer to DLK-113, "REAR BUMPER : Diagnosis Procedure".

REAR BUMPER : Diagnosis Procedure

INFOID:0000000001109337

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminal				Condition		Signal (Reference value)
(+)			(–)			
Intelligent Key unit connector		Terminal				
M40	Rear bumper (+)	17	Ground	Request switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0397ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Rear bumper (-)	18			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK OUTSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and front outside handle connector.
2. Check continuity between Intelligent Key unit connector and outside key antenna connector.

Intelligent Key unit connector	Terminal	Outside key antenna connector	Terminal	Continuity
M40	17	B81 (rear bumper)	1	Exists
	18		2	

3. Check continuity between Intelligent Key unit connector and ground.

cardiagn.com

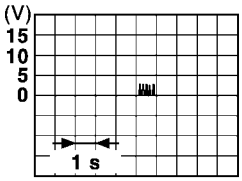
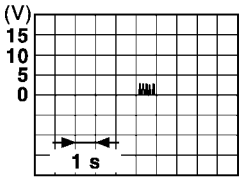
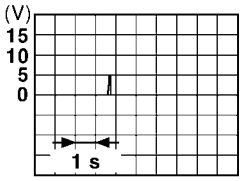
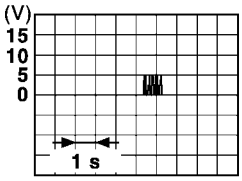
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	17		Does not exist
	18		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and outside key antenna.

3. CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace outside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and outside key antenna connector.
3. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminal (+) Intelligent Key unit connector		Terminal (+) Terminal	Terminal (–)	Condition		Signal (Reference value)
M40	Rear bumper (+)	17	Ground	Door request switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0514ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Rear bumper (-)	18			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Replace outside key antenna. Refer to DLK-276, "REAR BUMPER : Exploded View" (Rear bumper).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

INSIDE KEY ANTENNA
INSTRUMENT CENTER

INSTRUMENT CENTER : Description

INFOID:0000000001109338

Detects whether Intelligent Key is inside the vehicle.

INSTRUMENT CENTER : Component Function Check

INFOID:0000000001109339

1.CHECK INSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in Active test mode with CONSULT-III.
2. Touch “ROOM ANT 2”.
3. When Intelligent Key is in inside key antenna (instrument center) detection area, hazard lamp flashes.

Test Item		Inside Antenna
ANTENNA	:ROOM ANT 2	Inside key antenna (instrument center)

Is the inspection result normal?

YES >> Inside key antenna is OK.
NO >> Refer to DLK-116, "INSTRUMENT CENTER : Diagnosis Procedure".

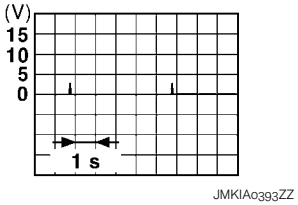
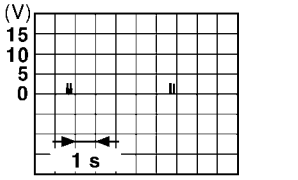
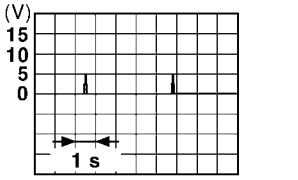
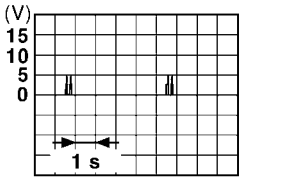
INSTRUMENT CENTER : Diagnosis Procedure

INFOID:0000000001109340

1.CHECK INSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

cardiagn.com

Terminals				Condition		Signal (Reference value)
(+)			(–)			
Intelligent Key unit connector		Terminal				
M40	Instrument center (+)	33	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Instrument center (-)	34			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK INSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and inside key antenna connector.
2. Check continuity between Intelligent Key unit connector and inside key antenna connector.

Intelligent Key unit connector	Terminal	Inside key antenna connector	Terminal	Continuity
M40	33	M70 (instrument center)	1	Exists
	34		2	

3. Check continuity between Intelligent Key unit connector and ground.

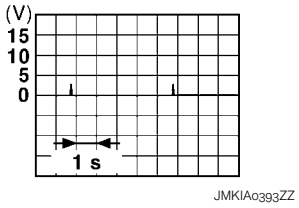
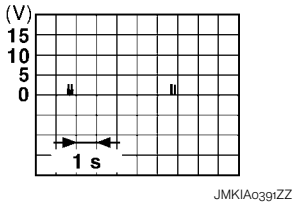
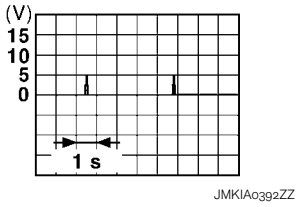
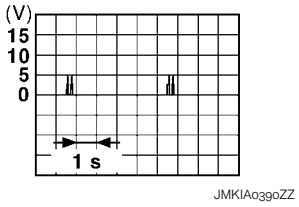
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	33		Does not exist
	34		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and inside key antenna.

3.CHECK INSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace inside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and inside key antenna connector.
3. Check signal between Intelligent Key connector and ground with oscilloscope.

Terminals (+) Intelligent Key unit connector		Terminals (+) Terminal	Terminals (–)	Condition		Signal (Reference value)
M40	Instrument center (+)	33	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Instrument center (-)	34			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Replace inside key antenna. Refer to DLK-273, "INSTRUMENT CENTER : Exploded View" (instrument center).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

CONSOLE

CONSOLE : Description

INFOID:0000000001109341

Detects whether Intelligent Key is inside the vehicle.

CONSOLE : Component Function Check

INFOID:0000000001109342

1. CHECK INSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in Active test mode with CONSULT-III.
2. Touch “ROOM ANT 1”.
3. When Intelligent Key is in inside key antenna (console) detection area, hazard lamp flashes.

Test Item		Inside Antenna
ANTENNA	:ROOM ANT 1	Inside key antenna (console)

Is the inspection result normal?

YES >> Inside key antenna is OK.
NO >> Refer to DLK-119, "CONSOLE : Diagnosis Procedure".

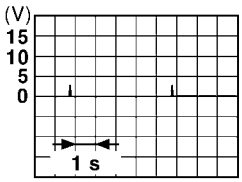
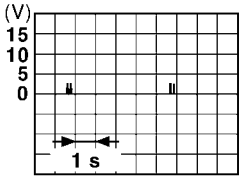
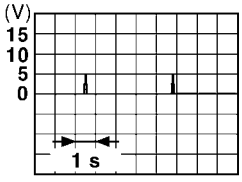
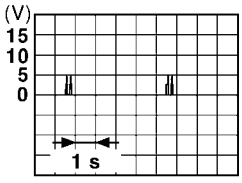
CONSOLE : Diagnosis Procedure

INFOID:0000000001109343

1. CHECK INSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

carsdiagn.com

Terminal (+) Intelligent Key unit connector	Terminal (+) Terminal	Terminal (–)	Condition		Signal (Reference value)
M40	Console (+) 15	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Console (-) 16			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK INSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and inside key antenna connector.
2. Check continuity between Intelligent Key unit connector and inside key antenna connector.

Intelligent Key unit connector	Terminal	Inside key antenna connector	Terminal	Continuity
M40	15	M61 (console)	1	Exists
	16		2	

3. Check continuity between Intelligent Key unit connector and ground.

cardiagn.com

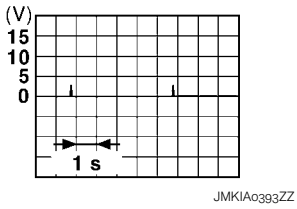
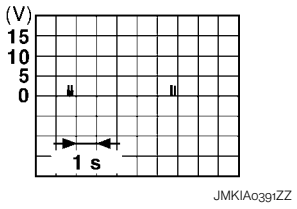
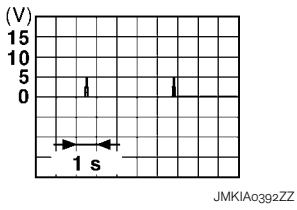
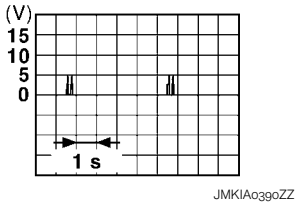
Intelligent Key unit connector	Terminal		Continuity
M40	15	Ground	Does not exist
	16		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and inside key antenna.

3. CHECK INSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace inside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and inside key antenna connector.
3. Check signal between Intelligent Key connector and ground with oscilloscope.

Terminal (+)		Terminal (+)	Terminal (–)	Condition		Signal (Reference value)
Intelligent Key unit connector						
M40	Console (+)	15	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Console (-)	16			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Replace inside key antenna. Refer to DLK-273, "CONSOLE : Exploded View" (console).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

REAR SEAT

carsdiagn.com

REAR SEAT : Description

INFOID:0000000001109344

Detects whether Intelligent Key is inside the vehicle.

REAR SEAT : Component Function Check

INFOID:0000000001109345

1.CHECK INSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in “Active Test” mode with CONSULT-III.
2. Touch “ROOM ANT 2”.
3. When Intelligent Key is in inside key antenna (rear seat) detection area, hazard lamp flases.

Test Item		Inside Antenna
ANTENNA	:ROOM ANT 2	Inside key antenna (rear seat)

Is the inspection result normal?

YES >> Inside key antenna is OK.
NO >> Refer to DLK-122, "REAR SEAT : Diagnosis Procedure".

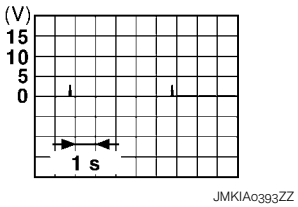
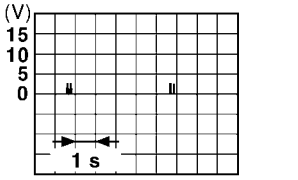
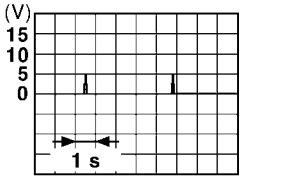
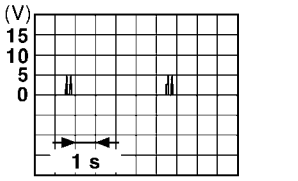
REAR SEAT : Diagnosis Procedure

INFOID:0000000001109346

1.CHECK INSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

cardiagn.com

Terminal (+)		Terminal (+)	Terminal (–)	Condition		Signal (Reference value)
Intelligent Key unit connector		Terminal				
M40	Rear seat (+)	13	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Rear seat (-)	14			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK INSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and inside key antenna connector.
2. Check continuity between Intelligent Key unit connector and inside key antenna connector.

Intelligent Key unit connector	Terminal	Inside key antenna connector	Terminal	Continuity
M40	13	B45 (rear seat)	1	Exists
	14		2	

3. Check continuity between Intelligent Key unit connector and ground.

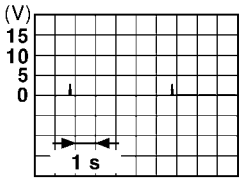
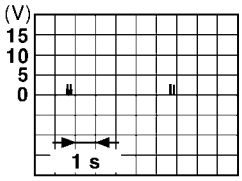
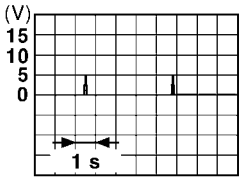
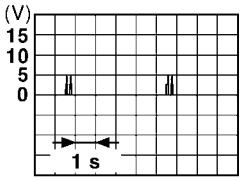
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	13		Does not exist
	14		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and inside key antenna.

3.CHECK INSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace inside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and inside key antenna connector.
3. Check signal between Intelligent Key connector and ground with oscilloscope.

Terminal (+) Intelligent Key unit connector	Terminal (+) Terminal	Terminal (–)	Condition		Signal (Reference value)
M40	Rear seat (+) 13	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Rear seat (-) 14			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Replace inside key antenna. Refer to DLK-274, "REAR : Exploded View" (rear seat).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

ANTI-HIJACK RELAY
PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001034191

Receives anti-hijack signal from Intelligent Key unit.

PASSENGER SIDE : Component Function Check

INFOID:0000000001034192

1.CHECK FUNCTION

1. All doors are locked using Intelligent Key or door request switch. (Super lock system condition: Set)
2. Press door request switch (passenger side), only passenger side door is UNLOCK.

Is the inspection result normal?

YES >> Anti-hijack relay is OK.
NO >> Refer to DLK-125, "PASSENGER SIDE : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001034193

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL 1

1. Check voltage between Intelligent Key unit connector and ground.

Terminal			Condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	11	Ground	Ignition switch OFF	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check condition of harness and connector. If OK, repair or replace harness.

2.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL 2

1. Check voltage between Intelligent Key unit connector and ground.

Terminal			Condition		Voltage (V) (Approx.)
(+)		(–)			
Intelligent Key unit connector	Terminal				
M40	40	Ground	Press front door request switch (passenger side)	Anti-hijack operation	Battery voltage → 0 → Battery voltage
				Other than above	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK INTELLIGENT KEY UNIT GROUND CIRCUIT

Check continuity between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Continuity
M40	12		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

4. CHECK PASSENGER SIDE ANTI-HIJACK RELAY GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect passenger side anti-hijack relay connector and Intelligent Key unit connector.
3. Check voltage between passenger side anti-hijack relay connector and ground.

Terminal			Condition	Voltage (V) (Approx.)
(+)		(–)		
Passenger side anti-hijack relay connector	Terminal			
M90	2	Ground	Ignition switch OFF	Battery voltage

4. Check continuity between passenger side anti-hijack relay connector and Intelligent Key unit connector.

Passenger side anti-hijack relay connector	Terminal	Intelligent Key unit connector	Terminal	Continuity
M90	1	M40	40	Exists

5. Check continuity between passenger side anti-hijack relay connector and ground.

Passenger side anti-hijack relay connector	Terminal	Ground	Continuity
M90	1		Does not exist

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check condition of harness and connector. If OK, repair or replace harness.

5. CHECK ANTI-HIJACK RELAY

Check anti-hijack relay.
Refer to DLK-126, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace anti-hijack relay. Refer to DLK-25, "DOOR LOCK AND UNLOCK SWITCH : Component Parts Location".

PASSENGER SIDE : Component Inspection

INFOID:0000000001034194

1. CHECK ANTI-HIJACK RELAY

1. Turn ignition switch OFF.
2. Disconnect passenger side anti-hijack relay harness connector.
3. Check continuity passenger side anti-hijack relay terminals 3 and 4.

Passenger side anti-hijack relay connector	Terminal		Condition	Continuity
M90	3	4	Battery voltage direct current supply between terminals 1 and 2	Does not exist
			Other than above	Exists

Is the inspection result normal?

YES >> Passenger side anti-hijack relay is OK.
NO >> Replace passenger side anti-hijack relay. Refer to DLK-25, "DOOR LOCK AND UNLOCK SWITCH : Component Parts Location".

cardiagn.com

INTELLIGENT KEY WARNING BUZZER

Description

INFOID:0000000000939149

Answers back and warns about an inappropriate operation.

Component Function Check

INFOID:0000000000939150

1.CHECK FUNCTION

With CONSULT-III

Check Intelligent Key warning buzzer “OUTSIDE BUZZER” in “Active Test” mode.

Is the inspection result normal?

YES >> Intelligent Key warning buzzer is OK.
NO >> Refer to DLK-127, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000939151

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL 1

Check voltage between Intelligent Key unit connector and ground.

Terminal			Warning buzzer operation condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	4	Ground	Sounding	0
			Not sounding	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK INTELLIGENT KEY WARNING BUZZER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key warning buzzer connector.
3. Check voltage between Intelligent Key warning buzzer connector and ground.

Terminal			Voltage (V) (Approx.)
(+)		(–)	
Intelligent Key warning buzzer connector	Terminal		
E25	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace Intelligent Key warning buzzer power supply circuit.

3.CHECK HARNESS CONTINUITY

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key warning buzzer connector and Intelligent Key unit connector.

Intelligent Key warning buzzer connector	Terminal	Intelligent Key unit connector	Terminal	Continuity
E25	3	M40	4	Exists

3. Check continuity between Intelligent Key warning buzzer connector and ground.

Intelligent Key warning buzzer connector	Terminal	Ground	Continuity
E25	3		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness between Intelligent Key warning buzzer and Intelligent Key unit.

4.CHECK INTELLIGENT KEY WARNING BUZZER

Check Intelligent Key warning buzzer.
Refer to DLK-128, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace Intelligent Key warning buzzer. Refer to DLK-277, "Exploded View".

5.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-282, "Exploded View".
NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000000939152

1.CHECK INTELLIGENT KEY WARNING BUZZER

Connect battery power supply to Intelligent Key warning buzzer terminals 1 and 3, and check the operation.

Intelligent Key warning buzzer connector	Terminal		Operation
	(+)	(-)	Buzzer sounds
E25	1	3	

Is the inspection result normal?

YES >> Intelligent Key warning buzzer is OK. GO TO 2.
NO >> Replace Intelligent Key warning buzzer. Refer to DLK-277, "Exploded View".

2.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-282, "Exploded View".
NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

cardiagn.com

BUZZER (COMBINATION METER)

Description

INFOID:0000000000939172

Performs operation method guide and warning with buzzer.

Component Function Check

INFOID:0000000000939173

1.CHECK FUNCTION

With CONSULT-III

Check the operation with “INSIDE BUZZER” in the Active test.

Test item	Condition	
INSIDE BUZZER	:TAKE OUT	Take away warning chime sounds
	:KNOB	Ignition knob switch warning chime sounds
	:KEY	Key warning chime sounds

Is the inspection result normal?

Yes >> Warning buzzer in combination meter is OK.
No >> Refer to DLK-129, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000939174

1.CHECK BUZZER (COMBINATION METER) CIRCUIT

Refer to WCS-20, "Component Function Check".

Is the inspection result normal?

Yes >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
No >> Repair or replace buzzer (combination meter) circuit.

KEY WARNING LAMP

Description

INFOID:0000000001034140

Performs operation method guide and warning together with buzzer.

Component Function Check

INFOID:0000000001034141

1.CHECK FUNCTION

With CONSULT-III

Check the operation with “INDICATOR” in “Active Test”.

Test item	Condition	
INDICATOR	:BLUE ON	Key warning lamp (green) illuminates
	:RED ON	Key warning lamp (red) illuminates
	:BLUE IND	Key warning lamp (green) flashes
	:RED IND	Key warning lamp (red) flashes

Is the inspection result normal?

Yes >> Key warning lamp in combination meter is OK.
No >> Refer to DLK-130, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001034142

1.CHECK KEY WARNING LAMP CIRCUIT

Refer to WCS-20, "Component Function Check".

Is the inspection result normal?

Yes >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
No >> Repair or replace key warning lamp circuit.

cardiagn.com

LOCK WARNING LAMP

Description

INFOID:0000000001097590

Performs operation method guide and warning together with buzzer.

Component Function Check

INFOID:0000000001097591

1.CHECK FUNCTION

With CONSULT-III

Check the operation with “INDICATOR” in “Active Test”.

Test item	Condition	
INDICATOR	:KNOB ON	Lock warning lamp illuminates
	:KNOB IND	Lock warning lamp flashes

Is the inspection result normal?

Yes >> Lock warning lamp in combination meter is OK.
No >> Refer to DLK-131, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001097592

1.CHECK LOCK WARNING LAMP CIRCUIT

Refer to WCS-20, "Component Function Check".

Is the inspection result normal?

Yes >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
No >> Repair or replace lock warning lamp circuit.

HAZARD WARNING LAMPS

Description

INFOID:0000000000939175

Performs answer-back for each operation with the number of blinks.

Component Function Check

INFOID:0000000000939176

1.CHECK FUNCTION

With CONSULT-III

Check hazard warning lamp “FLASHER” in “Active test”.

Is the inspection result normal?

YES >> Hazard warning lamp circuit is OK.
NO >> Refer to DLK-132, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000939177

1.CHECK HAZARD SWITCH CIRCUIT

Check hazard switch circuit.
Refer to EXL-72, "Component Function Check".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace hazard warning switch circuit.

cardiagn.com

VEHICLE SPEED SIGNAL CIRCUIT

Description

INFOID:0000000001078356

Displays the vehicle speed signal received from combination meter as a numerical value (km/h).

Component Function Check

INFOID:0000000001078357

1.CHECK FUNCTION

Check that all doors are automatically locked at the vehicle speed of more than 12 km/h (7 MPH).

Is the inspection result normal?

YES >> Vehicle speed signal circuit is OK.
NO >> Refer to DLK-133, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001078358

1.CHECK VEHICLE SPEED SIGNAL CIRCUIT

Check vehicle speed signal “VEHICLE SPEED” in “Data Monitor”.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace vehicle speed signal circuit.

carsdiagn.com

INTELLIGENT KEY BATTERY

Description

INFOID:0000000000939159

The following functions are available when having and carrying electronic ID.
- Door lock and unlock
- Engine start

Remote control entry function and panic alarm function are available when operating the button.

Component Function Check

INFOID:0000000000939160

1.CHECK INTELLIGENT KEY FUNCTION

Does door lock and unlock operate when operating Intelligent Key switch?

Is the inspection result normal?

YES >> Intelligent Key is OK.
NO >> Refer to DLK-134, "Diagnosis Procedure".

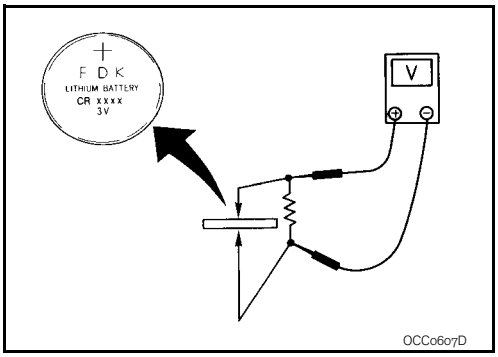
Diagnosis Procedure

INFOID:0000000000939161

1.CHECK INTELLIGENT KEY BATTERY

Check by connecting a resistance (approximately 300Ω) so that the current value becomes about 10 mA.

Standard : Approx. 2.5 - 3.0V



Is the measurement value within the specification?

YES >> Replace Intelligent Key.
NO >> Replace Intelligent Key battery. Refer to DLK-281, "Exploded View".

cardiagn.com

ECU DIAGNOSIS

INTELLIGENT KEY UNIT

Reference Value

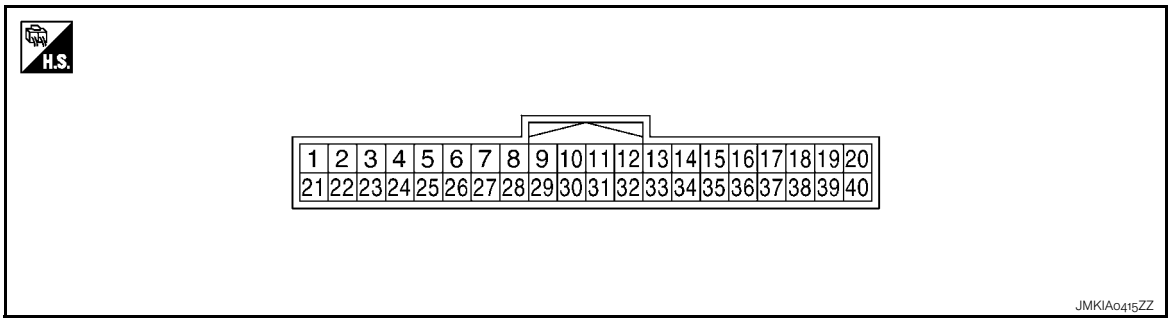
INFOID:0000000001070414

VALUES ON THE DIAGNOSIS TOOL

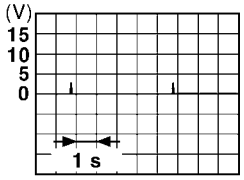
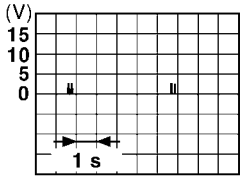
CONSULT-III MONITOR ITEM

Monitor Item	Condition		Value/Status
PUSH SW	Ignition knob	Release	OFF
		Press	ON
KEY ON SW	Mechanical key	Removed	OFF
		Inserted	ON
DR REQ SW	Door request switch (driver)	Release	OFF
		Press	ON
AS REQ SW	Door request switch (passenger)	Release	OFF
		Press	ON
BD/TR REQ SW	Door request switch (back door)	Release	OFF
		Press	ON
IGN SW	Ignition switch	Other than ON position	OFF
		ON position	ON
ACC SW	Ignition switch	Other than ACC or ON position	OFF
		ACC or ON position	ON
STOP LAMP SW	Brake pedal	Press	OFF
		Release	ON
DOOR LOCK SIG	Lock button of Intelligent Key	Release	OFF
		Press	ON
DOOR UNLOCK SIG	Unlock button of Intelligent Key	Release	OFF
		Press	ON
DOOR SW DR	Door (driver side)	Close	OFF
		Open	ON
DOOR SW AS	Door (passenger side)	Close	OFF
		Open	ON
DOOR SW RR	Door (rear RH)	Close	OFF
		Open	ON
DOOR SW RL	Door (rear LH)	Close	OFF
		Open	ON
BACK DOOR SW	Back door	Close	OFF
		Open	ON
VEHICLE SPEED	While driving		Equivalent to speedometer reading

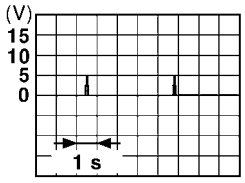
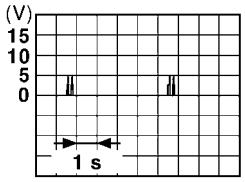
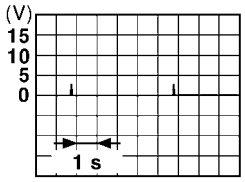
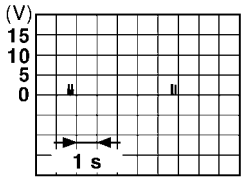
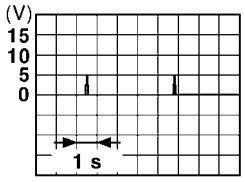
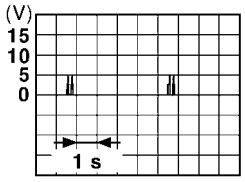
TERMINAL LAYOUT

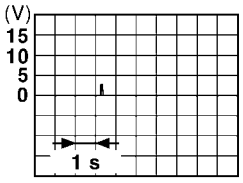
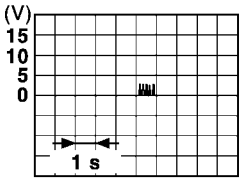
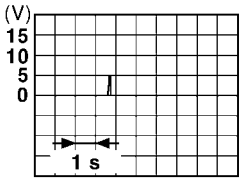
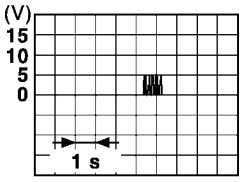
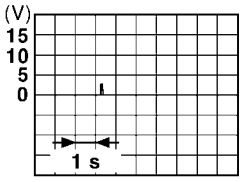
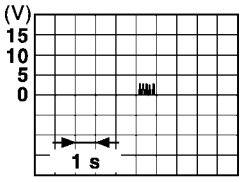


PHYSICAL VALUES

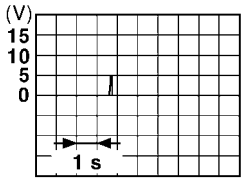
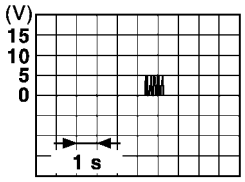
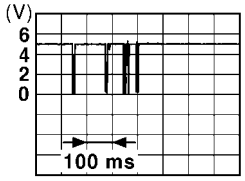
Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
1	Ground	LG	Steering lock unit power supply	Output	Ignition switch	OFF or ACC	5
						ON	0
2	Ground	L	CAN - H	Input/ Output	—		—
3	Ground	P	CAN - L	Input/ Output	—		—
4	Ground	LG	Intelligent Key warning buzzer	Output	Intelligent Key warning buzzer	Sounding	0
						Not sounding	Battery voltage
5	Ground	P	Front door request switch (driver side)	Input	Front door request switch (driver side)	ON (Pressed)	0
						OFF (Released)	5
6	Ground	W	Ignition switch power supply	Input	Ignition switch	OFF or ACC	0
						ON or START	Battery voltage
7	Ground	V	Key switch	Input	When ignition key is inserted into ignition key cylinder		Battery voltage
					When ignition key is not inserted into ignition key cylinder		0
11	Ground	V	Battery power supply	Input	Ignition switch OFF		Battery voltage
12	Ground	B	Ground	—	Ignition switch ON		0
13	Ground	Y	Inside key antenna (+) (rear seat)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0393ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0391ZZ

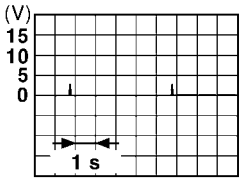
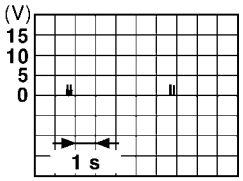
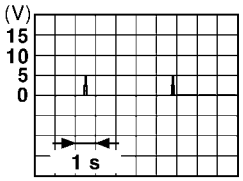
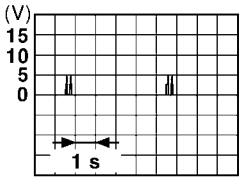
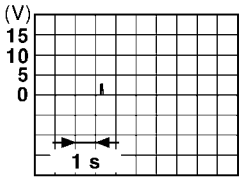
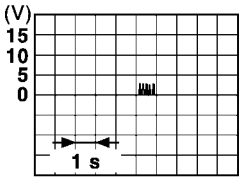
cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition		Value [V] (Approx.)
14	Ground	W	Inside key antenna (-) (rear seat)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0392ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0390ZZ
15	Ground	SB	Inside key antenna (+) (console)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0393ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0391ZZ
16	Ground	BR	Inside key antenna (-) (console)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0392ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0390ZZ

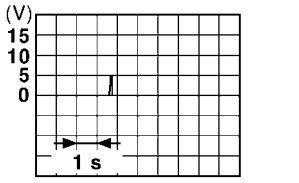
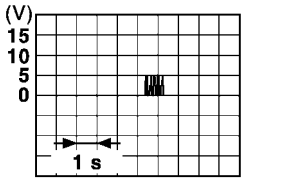
Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
17	Ground	SB	Outside key antenna (+) (rear bumper)	Output	When the back door request switch is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0397ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0514ZZ
18	Ground	V	Outside key antenna (-) (rear bumper)	Output	When the back door request switch is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0395ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0515ZZ
19	Ground	L	Outside key antenna (+) (driver side)	Output	When the front door request switch (driver side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0397ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0514ZZ

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition		Value [V] (Approx.)
20	Ground	BR	Outside key antenna (-) (driver side)	Output	When the front door request switch (driver side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0395ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0515ZZ
22*1	Ground	W	Key lock solenoid	Output	Key lock solenoid	LOCK*2	Battery voltage
						UNLOCK*2	0
25	Ground	BR	Front door request switch (passenger side)	Input	Front door request switch (passenger side)	ON (Pressed)	0
						OFF (Released)	5
27	Ground	L	Ignition knob switch	Input	Ignition switch OFF	When ignition knob switch is pressed	Battery voltage
						When ignition knob switch is released	0
29	Ground	GR	Back door request switch	Input	Back door request switch	ON (Pressed)	0
						OFF (Released)	5
31	Ground	GR	Steering lock unit ground	—	—	—	0
32	Ground	P	Steering lock unit communication	Input/ Output	Steering lock	LOCK status	5
						LOCK or UNLOCK	 JMKIA0433ZZ

Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
33	Ground	O	Inside key antenna (+) (instrument center)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0393ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0391ZZ
34	Ground	G	Inside key antenna (-) (instrument center)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0392ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0390ZZ
37	Ground	L	Outside key antenna (+) (passenger side)	Output	When the front door request switch (passenger side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0397ZZ
						When Intelligent Key is in the antenna detection area	 JMKIA0514ZZ

cardiagn.com

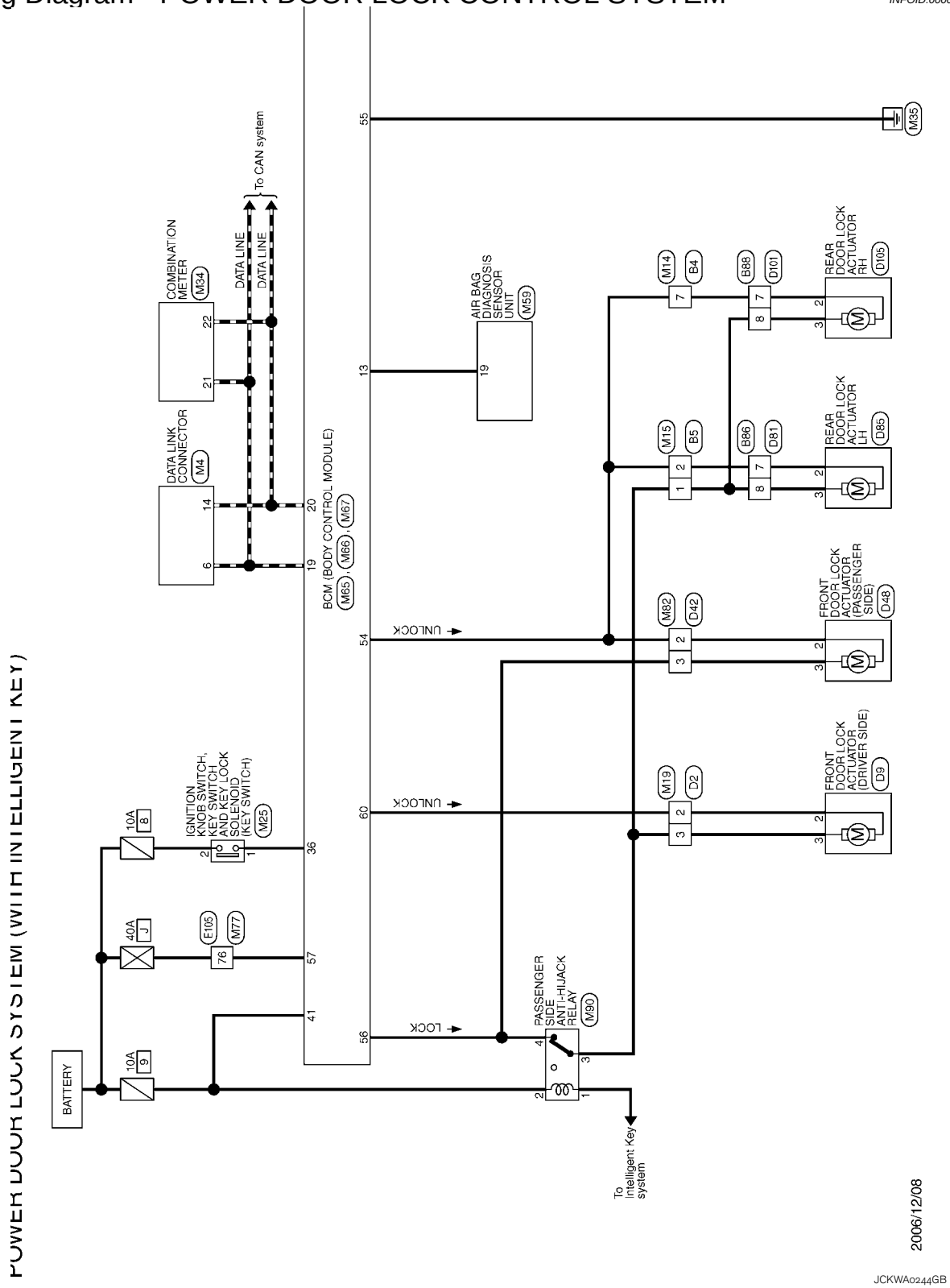
Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition		Value [V] (Approx.)
38	Ground	O	Outside key antenna (-) (passenger side)	Output	When the front door request switch (passenger side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0395ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0515ZZ
40	Ground	Y	Passenger side anti-hijack relay	Input	Press front door request switch (passenger side)	Anti-hijack operation	Battery voltage → 0 → Battery voltage
						Other than above	Battery voltage

*1: Only for MT model.

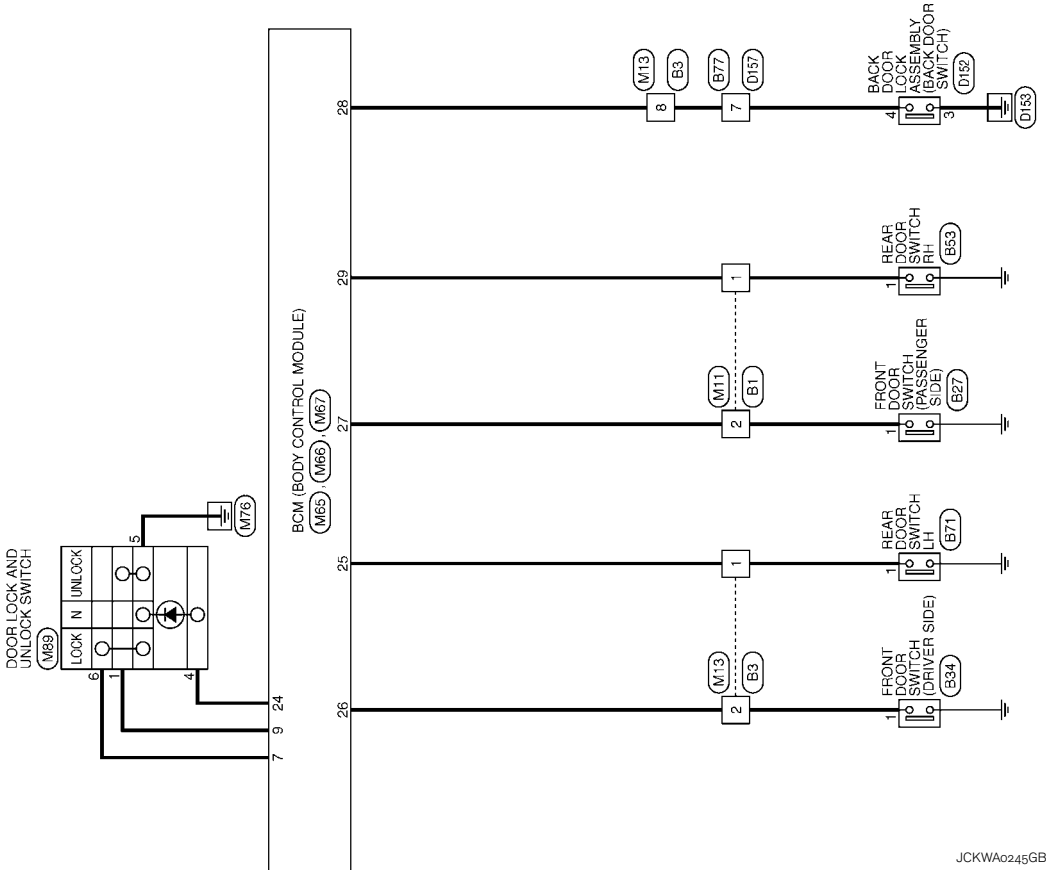
*2: Key interlock operation is only for M/T model for operation condition, refer to SEC-9, "System Description".

Wiring Diagram - POWER DOOR LOCK CONTROL SYSTEM -

INFOID:0000000001097042



cardiagn.com


DOOR LOCK AND UNLOCK SWITCH
M89
LOCK
N
UNLOCK
M76
BCM (BODY CONTROL MODULE)
M65, M66, M67
24
9
7
28
29
27
25
26
M13
B3
B77
D157
BACK DOOR LOCK ASSEMBLY (BACK DOOR SWITCH)
D152
D153
REAR DOOR SWITCH RH
B53
M11
B1
FRONT DOOR SWITCH (PASSENGER SIDE)
B27
REAR DOOR SWITCH LH
B71
FRONT DOOR SWITCH (DRIVER SIDE)
B34
JCKWA0245GB

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	BR	-[LHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R/W	-[LHD models]
8	G	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0246GB

cardiagn.com

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

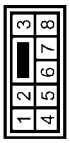
Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS06MW-CS

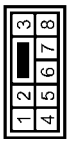
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

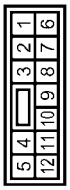
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	D2
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	–[With Intelligent Key]
3	SB	–

Connector No.	D9
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	–[With Intelligent Key]
3	R/Y	–[With Intelligent Key]

Connector No.	D42
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–[With Intelligent Key]
3	Y	–[With Intelligent Key]

Connector No.	D48
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–[With Intelligent Key]
3	Y	–[With Intelligent Key]

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

JCKWA0247GB

carsdiagn.com

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	D85
Connector Name	REAR DOOR LOCK ACTUATOR LH
Connector Type	FEA04FB-FHA2

H.S.

1 2 3 4 5 6

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–
3	SB	–

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

H.S.

3 2 1
8 7 6 5 4

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	D105
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

H.S.

6 5 4 3 2 1

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–
3	SB	–

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

H.S.

1 2 3 4

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	–
4	G	–

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

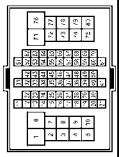
H.S.

1 2 3 4
5 6 7 8

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

9 10 11 12 13 14 15 16
1 2 3 4 5 6 7 8

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12 11 10 9 8 7 6 5 4 3 2 1
24 23 22 21 20 19 18 17 16 15 14 13

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]

JCKWA0248GB

cardiagn.com

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R	-[LHD models]
8	G	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

H.S.

3		2	1
8	7	6	5	4

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3		2	1
8	7	6	5	4

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-

Connector No.	M19
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.

1	2	3		4	5
6	7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	-
3	SB	-

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

H.S.

1	2	3	4	5	6

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	Y	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

H.S.

20	21	17									24	49	1
22	11	46	48	47	45	13	3	4	6	5
16	12	19	15	14	51	23	50	18	52	2

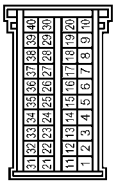
Terminal No.	Color of Wire	Signal Name [Specification]
19	R	UNLOCK

JCKWA0249GB

carsdiagn.com

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



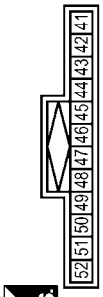
Terminal No.	Color of Wire	Signal Name [Specification]
7	P	LOCK/UNLOCK SW (LOCK)
9	BR	LOCK/UNLOCK SW (UNLOCK)
13	R	SHOCK DETECT SIG
19	L	CAN-H
20	P	CAN-L
24	GR	DOOR LOCK STATUS IND
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

36	V	KEY SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

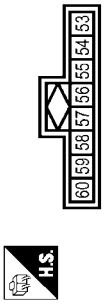


Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M82
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	M87
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
54	O	DOOR UNLOCK OUTPUT (OTHER)
55	B	GND(POWER)
56	Y	DOOR LOCK OUTPUT (ALL)[With Intelligent Key]
57	Y	BAT(F/L)
60	GR	UNLOCK (DR)

Connector No.	M89
Connector Name	DOOR LOCK AND UNLOCK SWITCH
Connector Type	7703197674

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
4	GR	-
5	B	-
6	P	-

Connector No.	M90
Connector Name	PASSENGER SIDE ANTI-HIJACK RELAY
Connector Type	MS03FB-M2

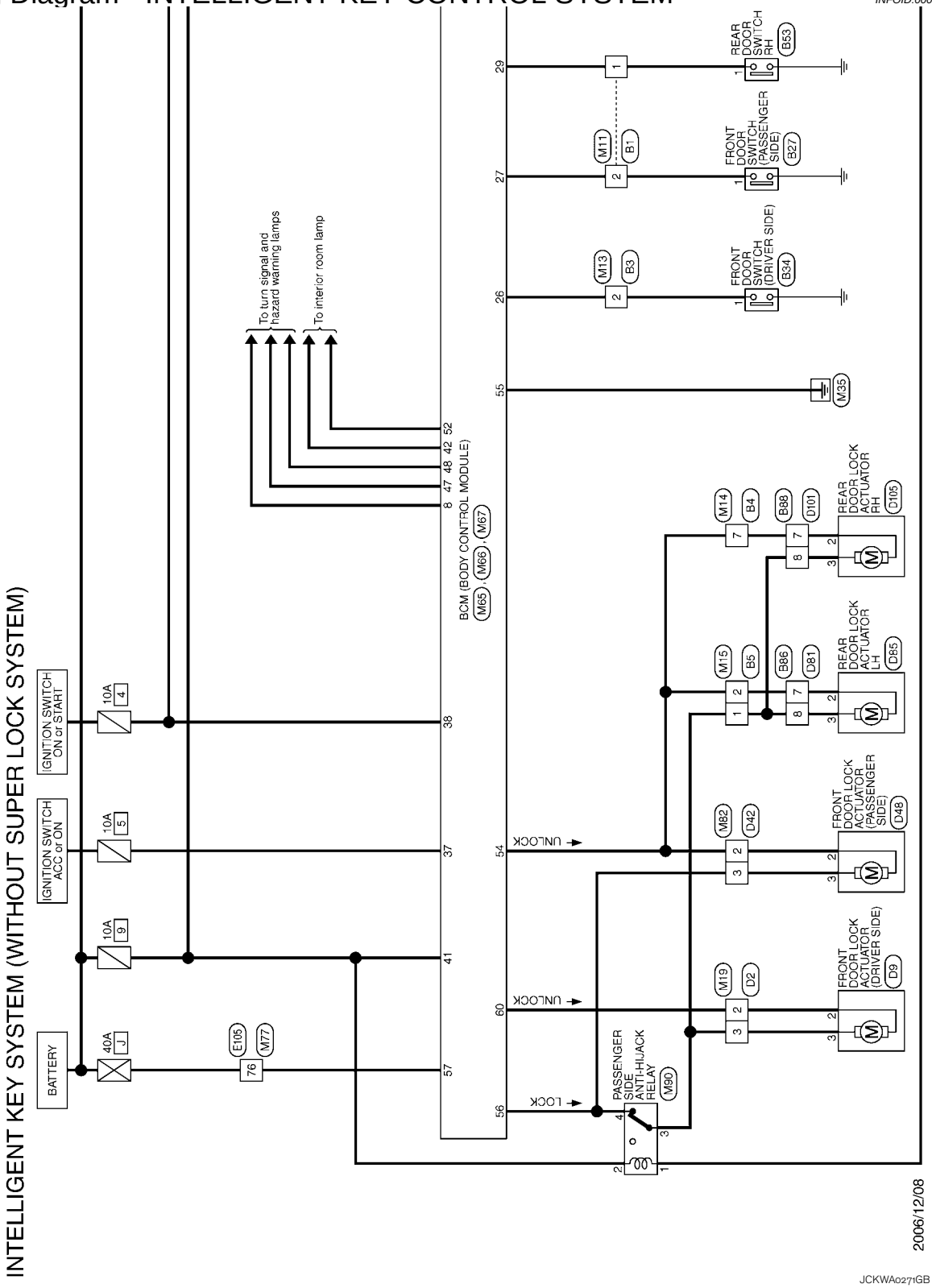
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	V	-
3	SB	-
4	Y	-

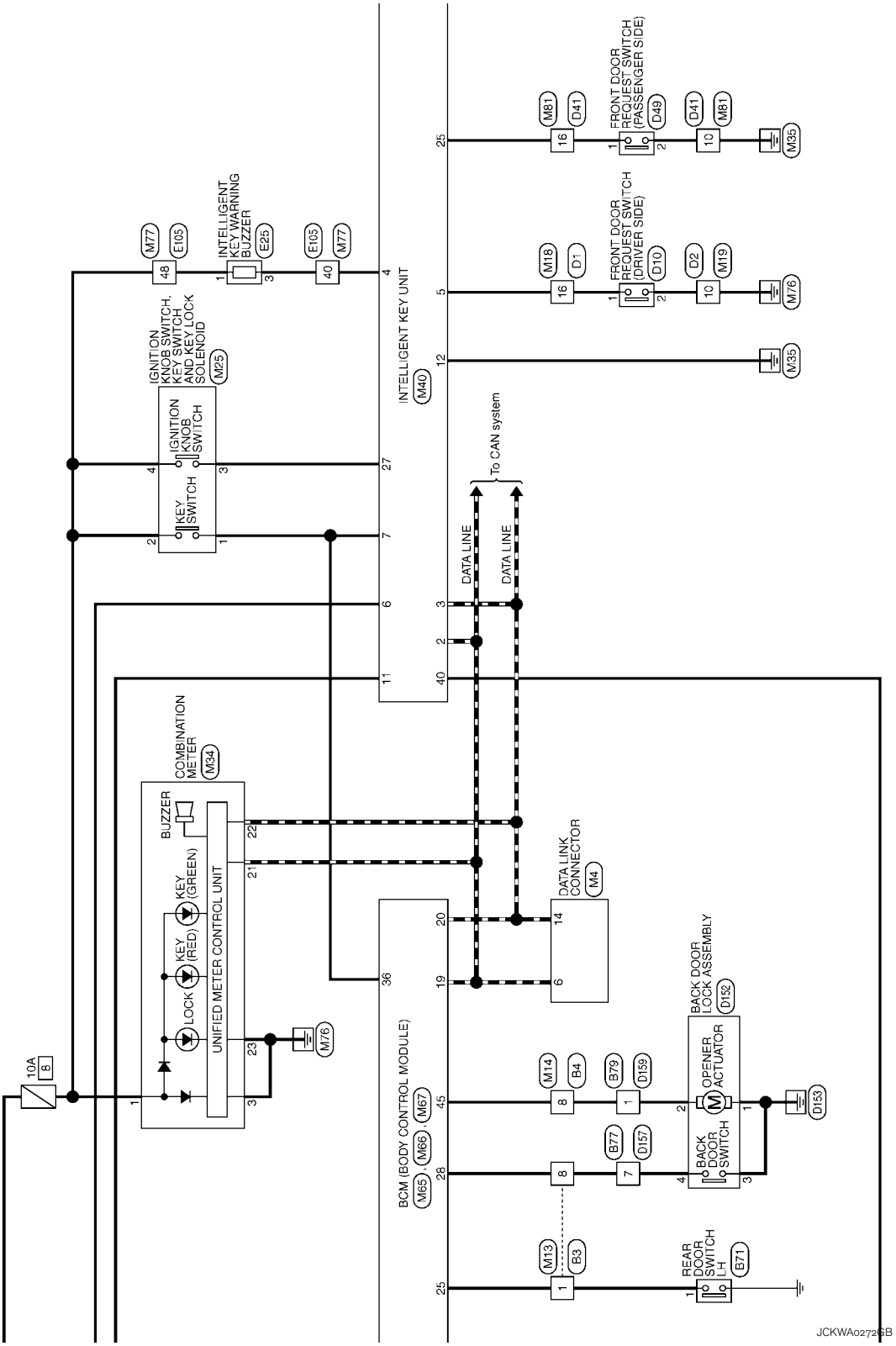
JCKWA0250GB

cardiagn.com

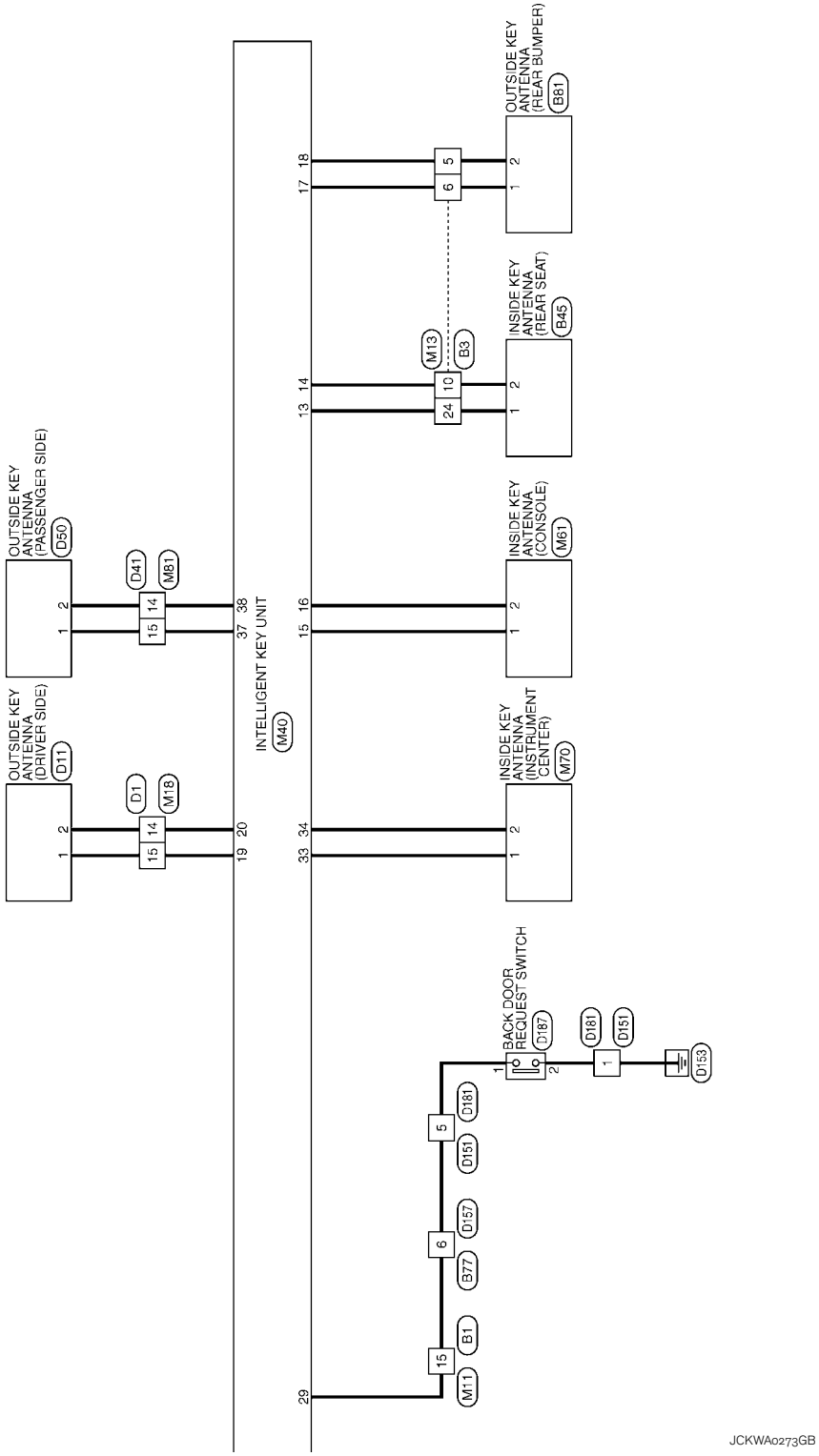
Wiring Diagram - INTELLIGENT KEY CONTROL SYSTEM -

INFOID:0000000001097043





cardiagn.com


OUTSIDE KEY ANTENNA (REAR BUMPER)
B81
INSIDE KEY ANTENNA (REAR SEAT)
B45
INSIDE KEY ANTENNA (CONSOLE)
M61
INSIDE KEY ANTENNA (INSTRUMENT CENTER)
M70
OUTSIDE KEY ANTENNA (PASSENGER SIDE)
D50
OUTSIDE KEY ANTENNA (DRIVER SIDE)
D11
INTELLIGENT KEY UNIT
M40
BACK DOOR REQUEST SWITCH
D187
M13
B3
D41
M81
D1
M18
D181
D151
D157
B77
B1
M11
D153
JCKWA0273GB

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	-[RHD models]
15	GR	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
5	V	-
6	SB	-
8	G	-
10	W/R	-
24	Y	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-
8	GR	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B45
Connector Name	INSIDE KEY ANTENNA (REAR SEAT)
Connector Type	RK02FGY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	W/R	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

JCKWA0274GB

cardiagn.com

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

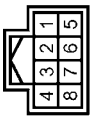
Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2		
3		

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	GR	-
7	G	-
8		

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2		

Connector No.	B81
Connector Name	OUTSIDE KEY ANTENNA (REAR BUMPER)
Connector Type	RK02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	V	-

Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-
8	SB	-

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-
8	SB	-

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	BR/W	-
15	L/Y	-
16	P	-

Connector No.	D2
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	-[With Intelligent Key]
3	SB	-
10	B	-

JCKWA0275GB

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

Connector No.	D9
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	–[With Intelligent Key]
3	R/Y	–[With Intelligent Key]

Connector No.	D10
Connector Name	FRONT DOOR REQUEST SWITCH (DRIVER SIDE)
Connector Type	RK02ML-B

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	B	–

Connector No.	D11
Connector Name	OUTSIDE KEY ANTENNA (DRIVER SIDE)
Connector Type	RK02MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/Y	–
2	BR/W	–

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
10	B	–
14	O	–
15	L	–
16	BR	–

Connector No.	D42
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–[With Intelligent Key]
3	Y	–[With Intelligent Key]

Connector No.	D48
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–[With Intelligent Key]
3	Y	–[With Intelligent Key]

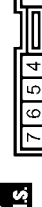
Connector No.	D49
Connector Name	FRONT DOOR REQUEST SWITCH (PASSENGER SIDE)
Connector Type	RK02ML-B

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	B	–

Connector No.	D50
Connector Name	OUTSIDE KEY ANTENNA (PASSENGER SIDE)
Connector Type	RK02MGY

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	O	–

JCKWA0276GB

cardiagn.com

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	D85
Connector Name	REAR DOOR LOCK ACTUATOR LH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–
3	SB	–

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	D105
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–
3	SB	–

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
5	GR	–

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	GR	–
3	B	–
4	G	–

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	GR	–
7	G	–

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–

JCKWA0277GB

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
5	GR	–

Connector No.	D187
Connector Name	BACK DOOR REQUEST SWITCH
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	B	–

Connector No.	E25
Connector Name	INTELLIGENT KEY WARNING BUZZER
Connector Type	RK03FBR-DGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	–	–
3	LG/B	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
40	LG/B	–
48	Y	–
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	R	–[RHD models]
15	GR	–

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	BR	–[RHD models]
5	V	–
6	SB	–
8	G	–
10	W	–
24	Y	–

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	GR	–

JCKWA0278GB

cardiagn.com

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

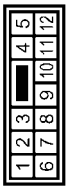
Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	–

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

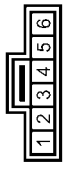
Terminal No.	Color of Wire	Signal Name [Specification]
14	BR	–
15	L	–
16	P	–

Connector No.	M19
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	–
3	SB	–
10	B	–

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–
3	L	–
4	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
3	B	GND
21	L	CAN-H
22	P	CAN-L
23	B	GND

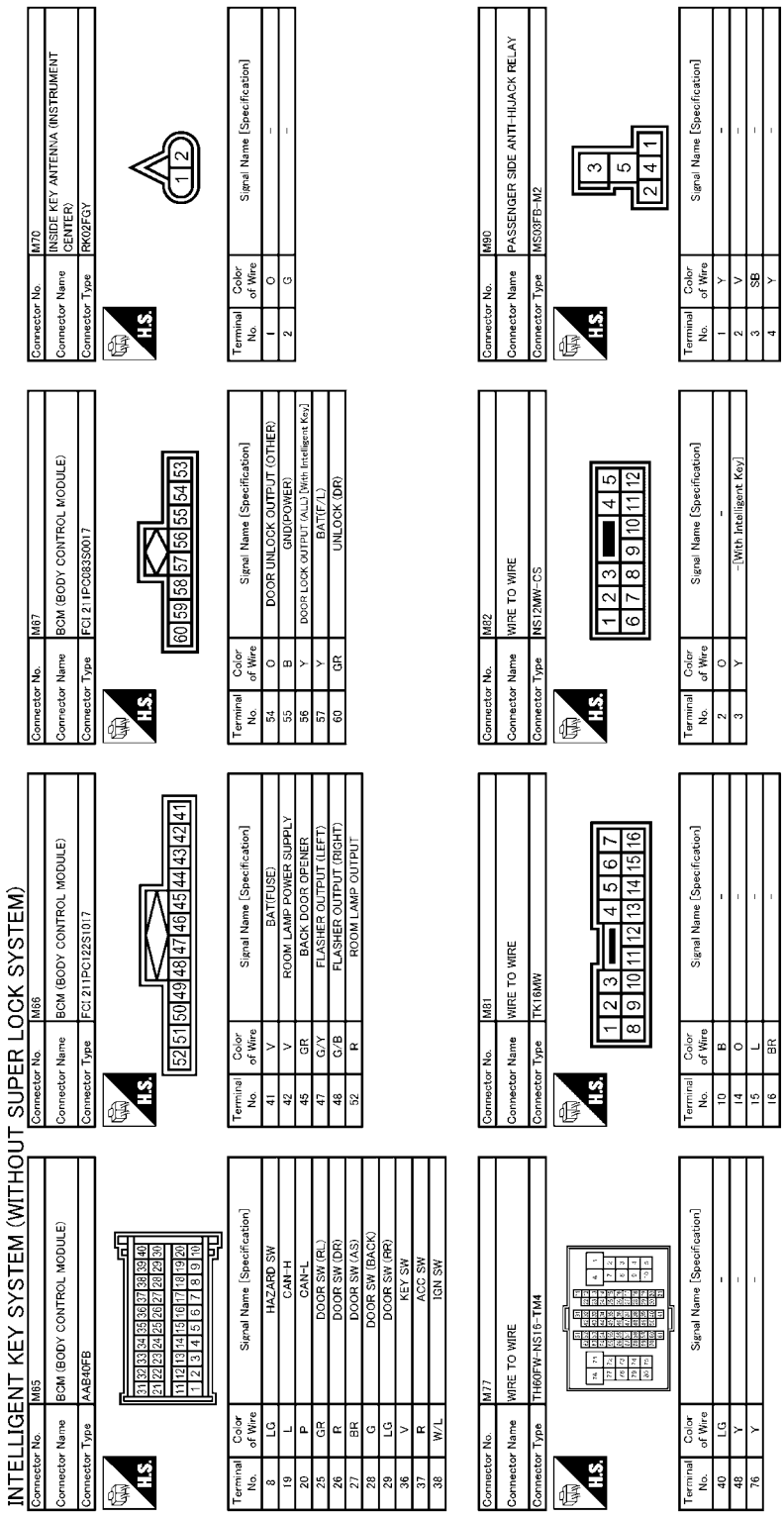
Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L
4	LG	BUZZER
5	P	REQUEST SW (DR)
6	W	IGN SW
7	V	KEY SW
11	V	BATT+
12	B	GND
13	Y	REAR SEAT (+)
14	W	REAR SEAT (–)
15	SB	CONSOLE (+)
16	BR	CONSOLE (–)
17	SB	REAR BUMPER (+)
18	V	REAR BUMPER (–)
19	L	DRIVER DOOR (+)
20	BR	DRIVER DOOR (–)
25	BR	REQUEST SW (AS)
27	L	KNOB SW
29	GR	REQUEST SW (BD)
33	O	INSTRUMENT (+)
34	G	INSTRUMENT (–)
37	L	PASSENGER DOOR (+)
38	O	PASSENGER DOOR (–)
40	Y	AS ANTI-HIJACK

Connector No.	M61
Connector Name	INSIDE KEY ANTENNA (CONSOLE)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	BR	–

JCKWA0279GB



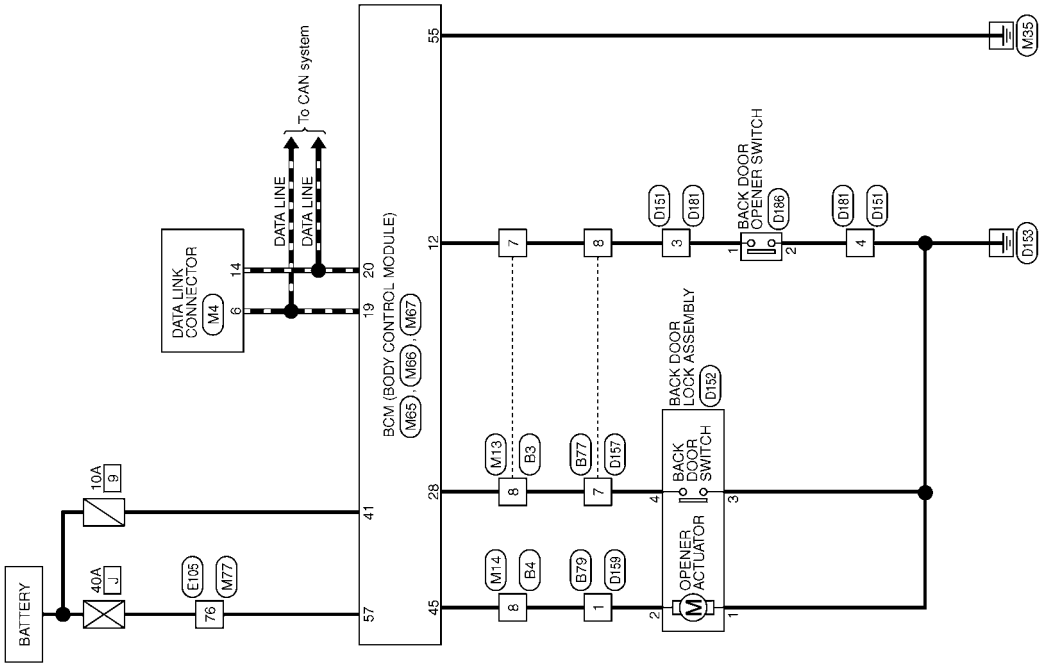
JCKWA0280GB

Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM -

INFOID:0000000001097044

cardiagn.com

BACK DOOR OPENER SYSTEM



2006/12/08

JCKWA0295GB

BACK DOOR OPENER SYSTEM

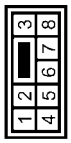
Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

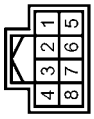
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

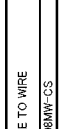
Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 48309 EV 4M9

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0296GB

cardiagn.com

BACK DOOR OPENER SYSTEM

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

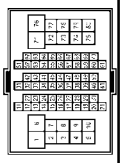
Connector No.	D186
Connector Name	BACK DOOR OPENER SWITCH
Connector Type	RK02MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

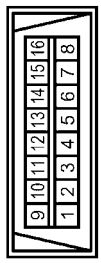
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

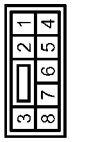
Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

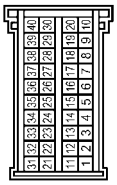
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

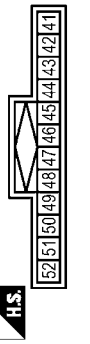
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
12	P	TRUNK/BACK DOOR OPEN SW
19	L	CAN-H
20	P	CAN-L
28	G	DOOR SW (BACK)

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.



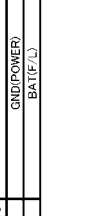
Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
45	GR	BACK DOOR OPENER

JCKWA0297GB

BACK DOOR OPENER SYSTEM

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

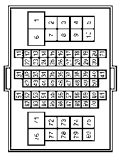
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

JCKWA0298GB

Fail Safe

INFOID:0000000001070418

cardiagn.com

Display contents of CONSULT-III	Fail-safe	Cancellation
B2013: STRG COMM 1	• Inhibits steering look unlocking	Erase DTC
B2552: INTELLIGENT KEY	• Inhibits steering look unlocking • Inhibits engine cranking (BCM) • Fuel cut (ECM)	Erase DTC
B2590: NATS MALFUNCTION	• Inhibits steering look unlocking • Inhibits engine cranking (BCM) • Fuel cut (ECM)	Erase DTC

DTC Inspection Priority Chart

INFOID:0000000001070419

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN) • B2552: INTELIGENT KEY
2	• B2013: STRG COMM 1 • B2590: NATS MALFUNCTION

DTC Index

INFOID:0000000001070420

NOTE:
Details of time display
- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	Detection condition	Fail-safe	Diagnosis
No DTC is detected. further testing may be required.	—	—	—
U1000: CAN COMM CIRCUIT	Intelligent Key unit cannot receive CAN communication signal continuously for 2 seconds or more.	—	Check CAN communication system. Refer to DLK-68
U1010: CONTROL UNIT (CAN)	Intelligent Key unit detects internal CAN communication circuit malfunction.	—	Replace Intelligent Key unit.
B2013: STRG COMM 1	The ID verification result between Intelligent key unit and steering lock unit are NG. Or Intelligent Key unit cannot communicate with steering lock unit.	×	Perform steering lock unit ID registration with CONSULT-III
B2552: INTELLIGENT KEY	Intelligent Key unit internal malfunction.	×	Replace Intelligent Key unit.
B2590: NATS MALFUNCTION	The ID verification result between Intelligent key unit and BCM are NG. Or Intelligent Key unit cannot communicate with BCM.	×	Check NATS Refer to SEC-43

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001097037

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

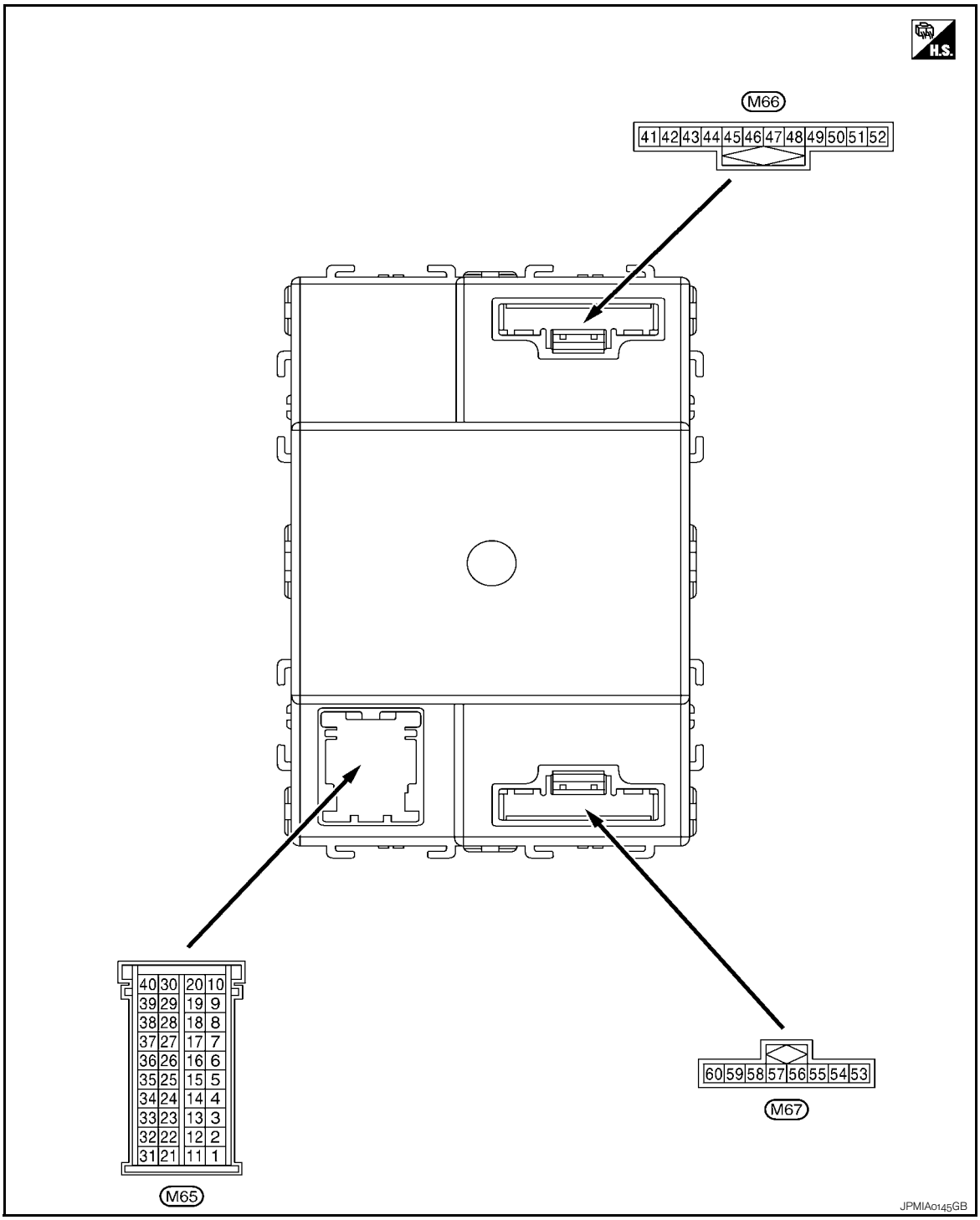
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

carsdiagn.com

TERMINAL LAYOUT

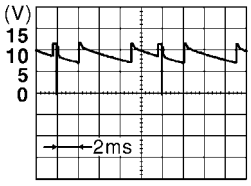
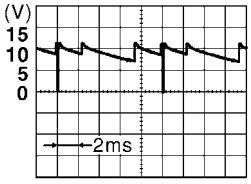
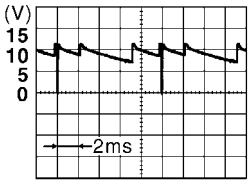
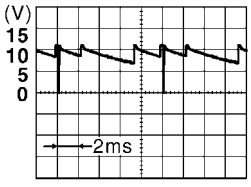


PHYSICAL VALUES

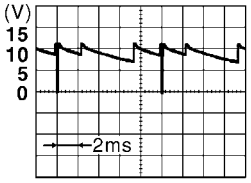
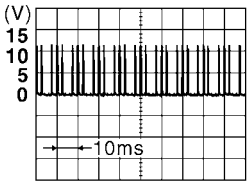
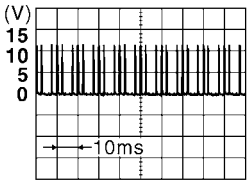
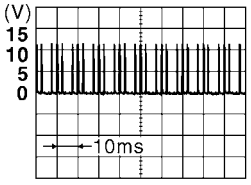
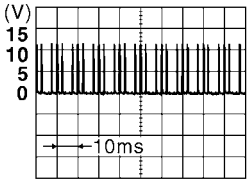
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

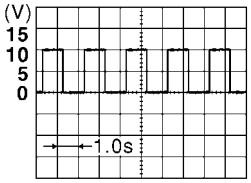
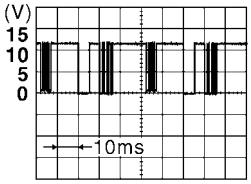
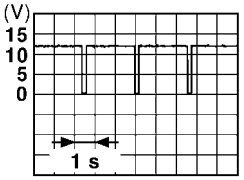
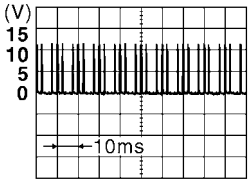
cardiagn.com

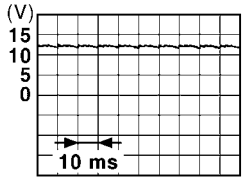
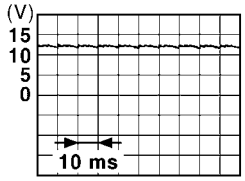
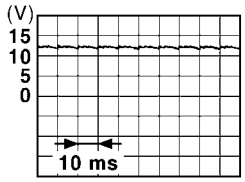
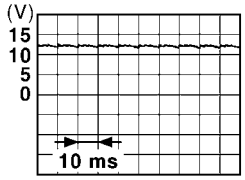
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

carsdiagn.com

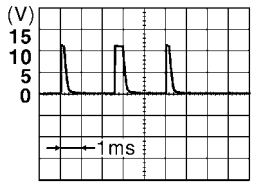
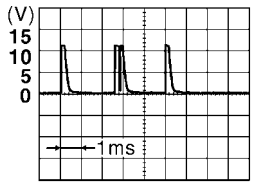
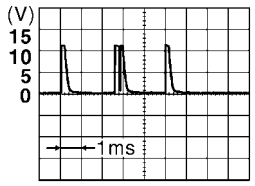
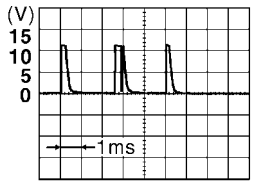
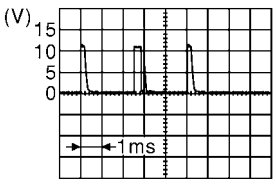
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

cardiagn.com

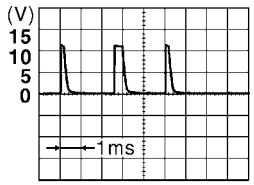
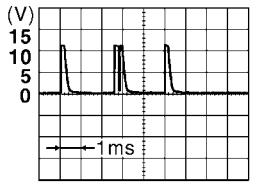
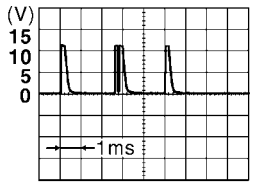
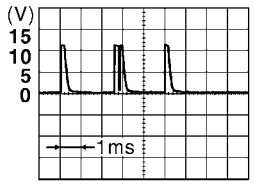
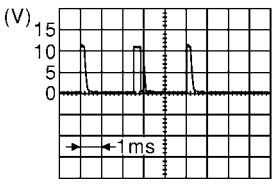
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIB0924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIB0924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIB0924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIB0924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

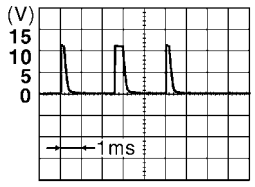
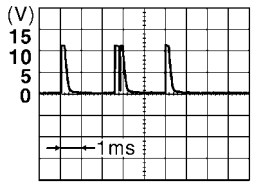
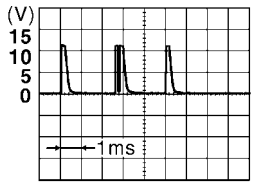
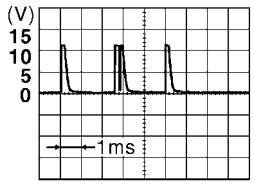
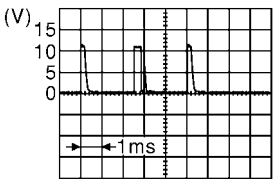
cardiagn.com

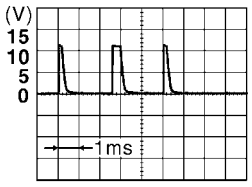
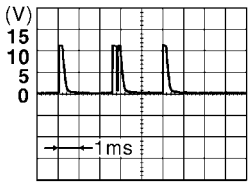
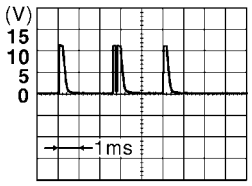
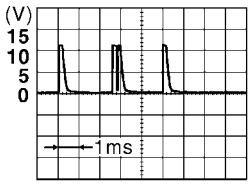
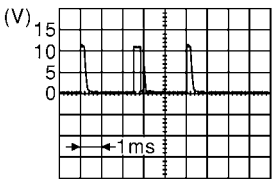
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

carsdiagn.com

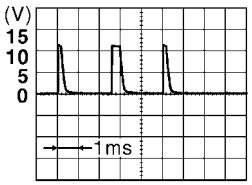
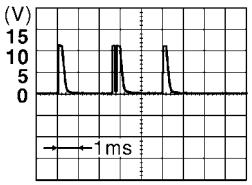
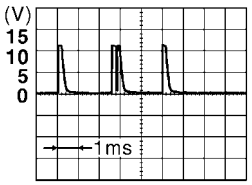
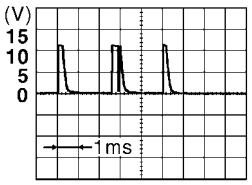
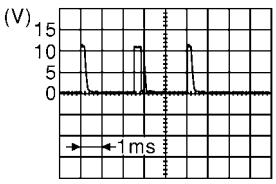
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

cardiagn.com

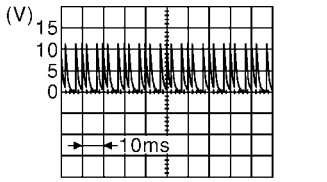
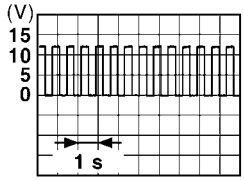
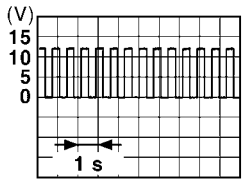
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

carsdiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

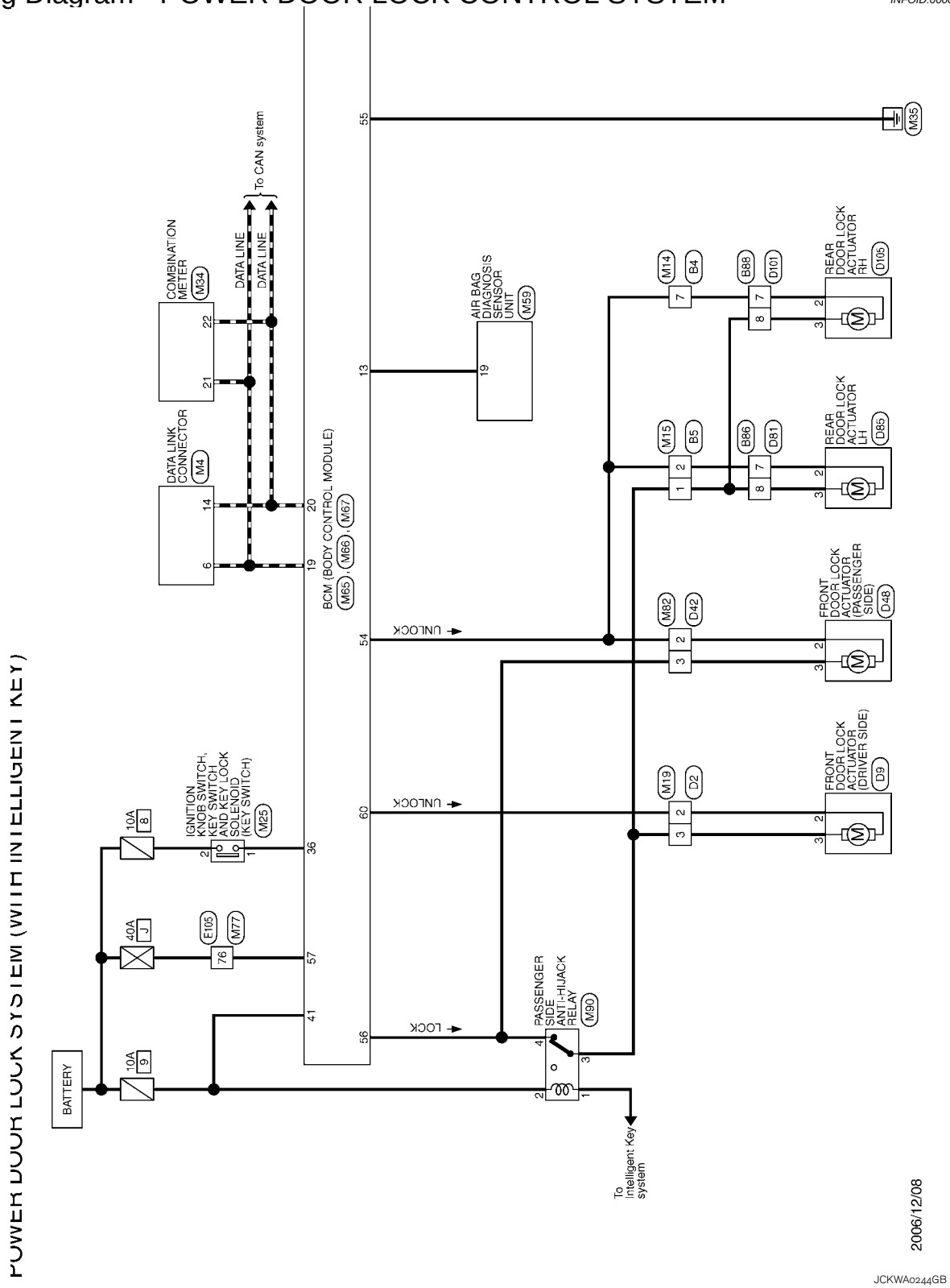
*1: With Intelligent Key system

*2: Without Intelligent Key system

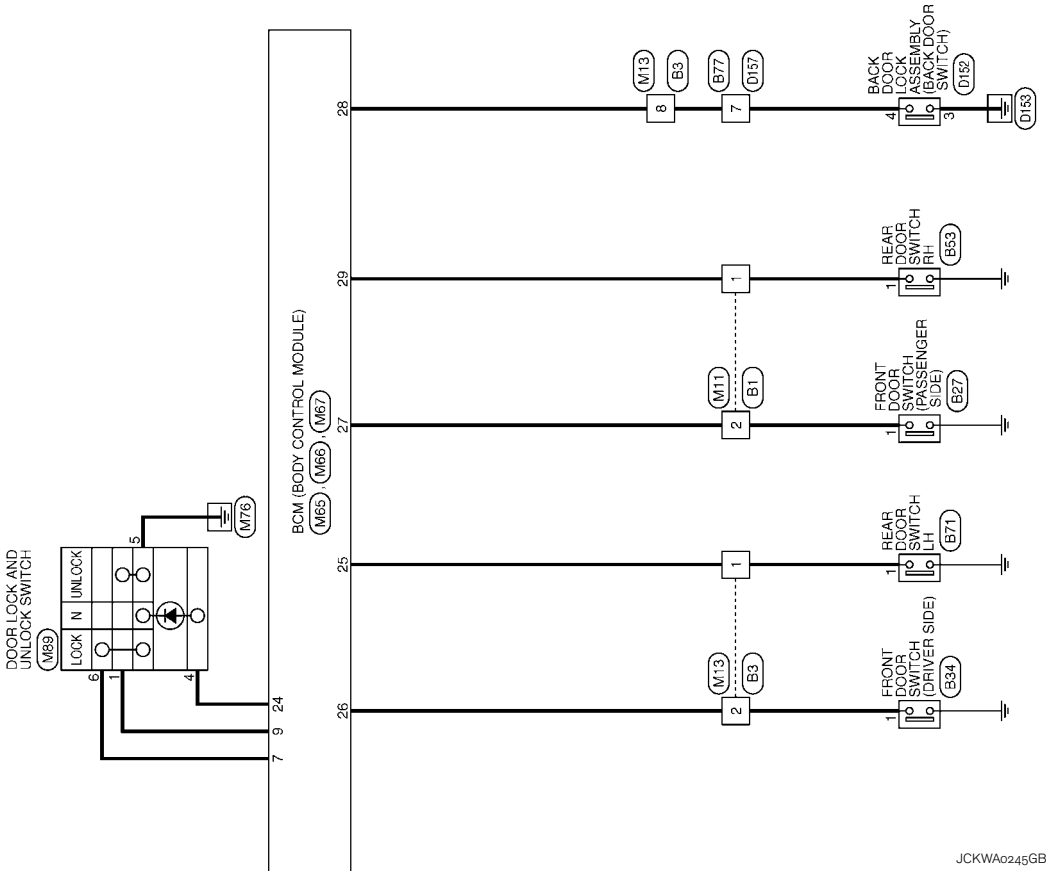
carsdiagn.com

Wiring Diagram - POWER DOOR LOCK CONTROL SYSTEM -

INFOID:0000000001125422



cardiagn.com



carsdiagn.com

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	BR	-[LHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R/W	-[LHD models]
8	G	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0246GB

cardiagn.com

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS06MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	D2
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	–[With Intelligent Key]
3	SB	–

Connector No.	D9
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	–[With Intelligent Key]
3	R/Y	–[With Intelligent Key]

Connector No.	D42
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–[With Intelligent Key]
3	Y	–[With Intelligent Key]

Connector No.	D48
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–[With Intelligent Key]
3	Y	–[With Intelligent Key]

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

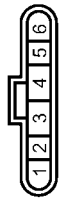
JCKWA0247GB

carsdiagn.com

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	D85
Connector Name	REAR DOOR LOCK ACTUATOR LH
Connector Type	FEA04FB-FHA2

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–
3	SB	–

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	D105
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–
3	SB	–

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	–
4	G	–

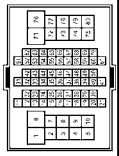
Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

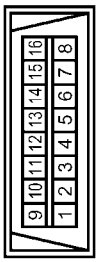
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

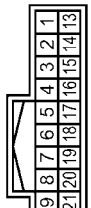
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]

JCKWA0248GB

cardiagn.com

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R	-[LHD models]
8	G	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

H.S.

3		2	1
8	7	6	5	4

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3		2	1
8	7	6	5	4

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-

Connector No.	M19
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.

1	2	3		4	5
6	7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	-
3	SB	-

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

H.S.

1	2	3	4	5	6

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	Y	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

H.S.

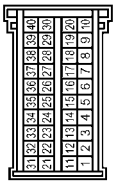
20	21	17									24	49	1
22	11	46	48	47	45	13	3	4	6	5
16	12	19	15	14	51	23	50	18	52	2

Terminal No.	Color of Wire	Signal Name [Specification]
19	R	UNLOCK

JCKWA0249GB

POWER DOOR LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



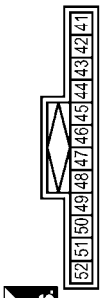
Terminal No.	Color of Wire	Signal Name [Specification]
7	P	LOCK/UNLOCK SW (LOCK)
9	BR	LOCK/UNLOCK SW (UNLOCK)
13	R	SHOCK DETECT SIG
19	L	CAN-H
20	P	CAN-L
24	GR	DOOR LOCK STATUS IND
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

36	V	KEY SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
54	O	DOOR UNLOCK OUTPUT (OTHER)
55	B	GND(POWER)
56	Y	DOOR LOCK OUTPUT (ALL)[With Intelligent Key]
57	Y	BAT(F/L)
60	GR	UNLOCK (DR)

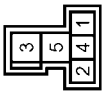
Connector No.	M82
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	M89
Connector Name	DOOR LOCK AND UNLOCK SWITCH
Connector Type	7703197674

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
4	GR	-
5	B	-
6	P	-

Connector No.	M90
Connector Name	PASSENGER SIDE ANTI-HIJACK RELAY
Connector Type	MS03FB-M2



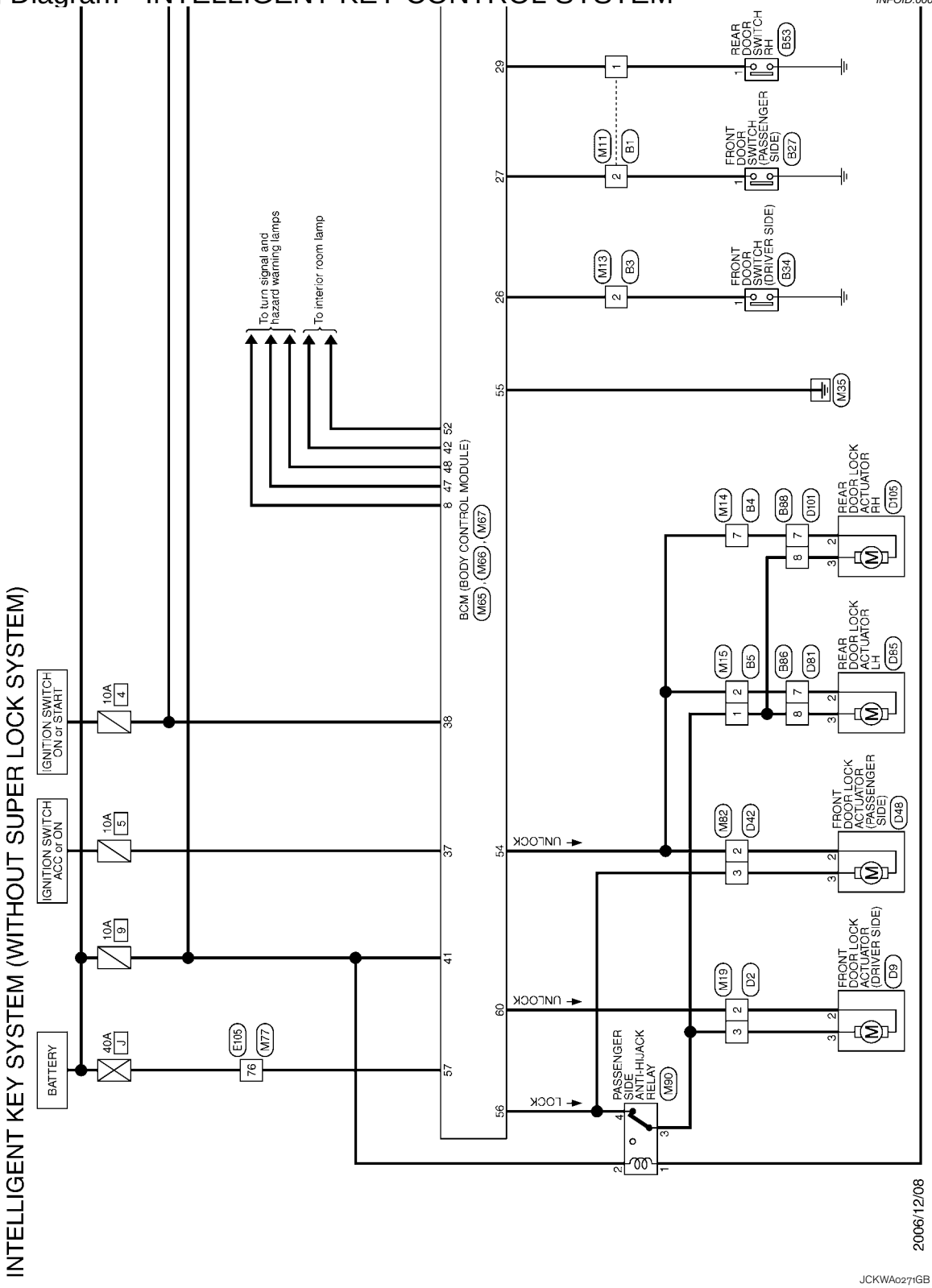
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	V	-
3	SB	-
4	Y	-

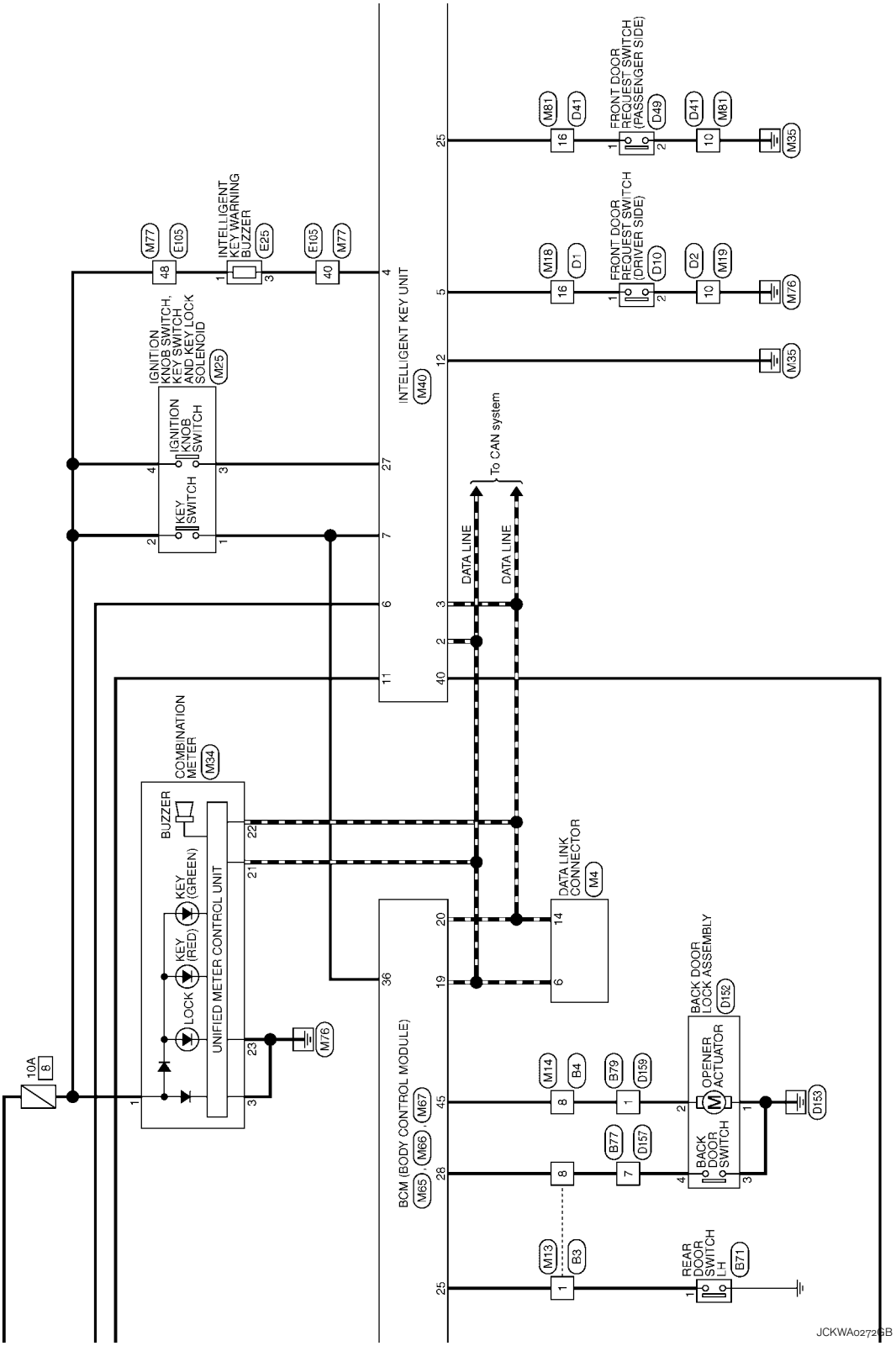
JCKWA0250GB

cardiagn.com

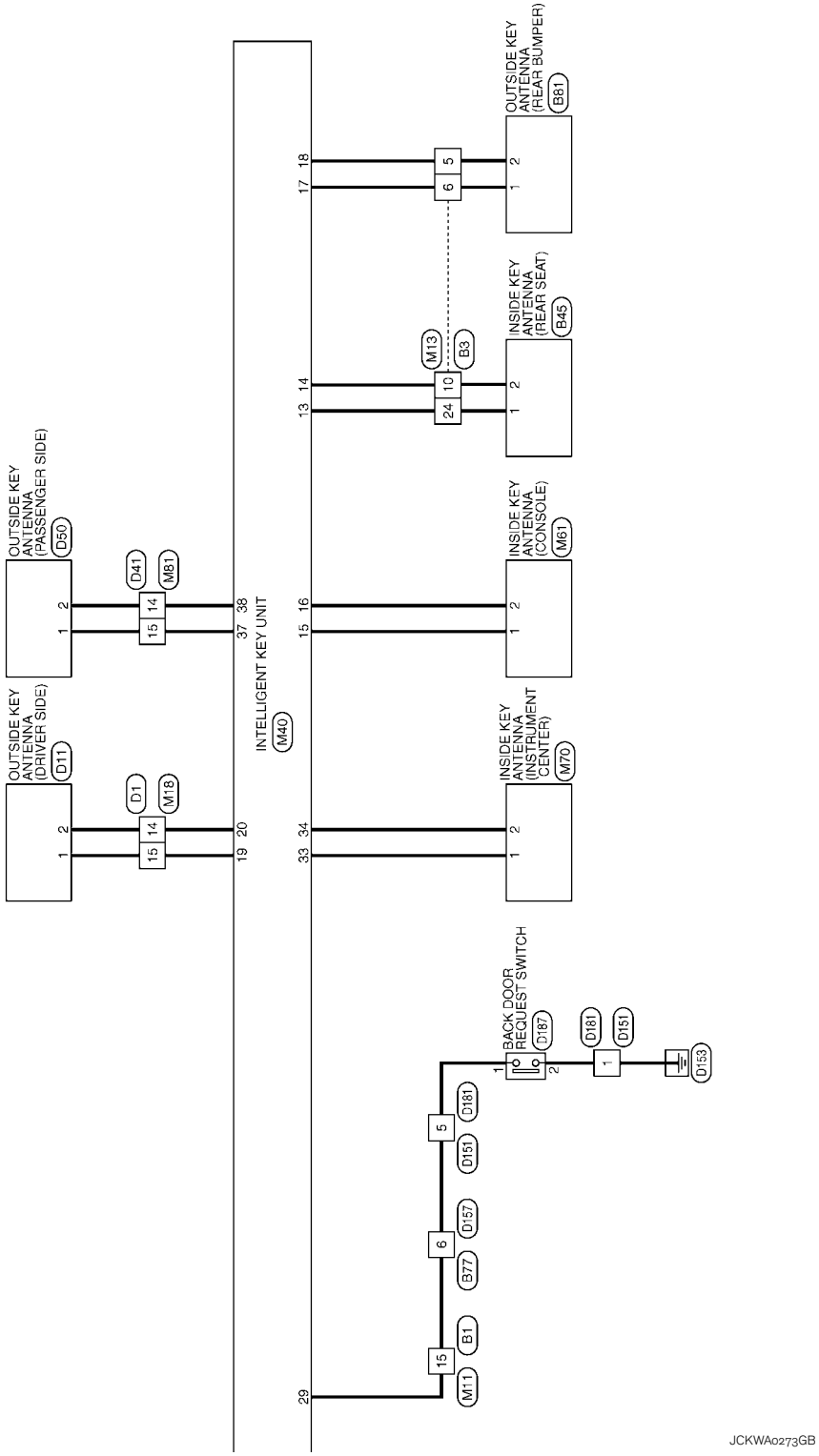
Wiring Diagram - INTELLIGENT KEY CONTROL SYSTEM -

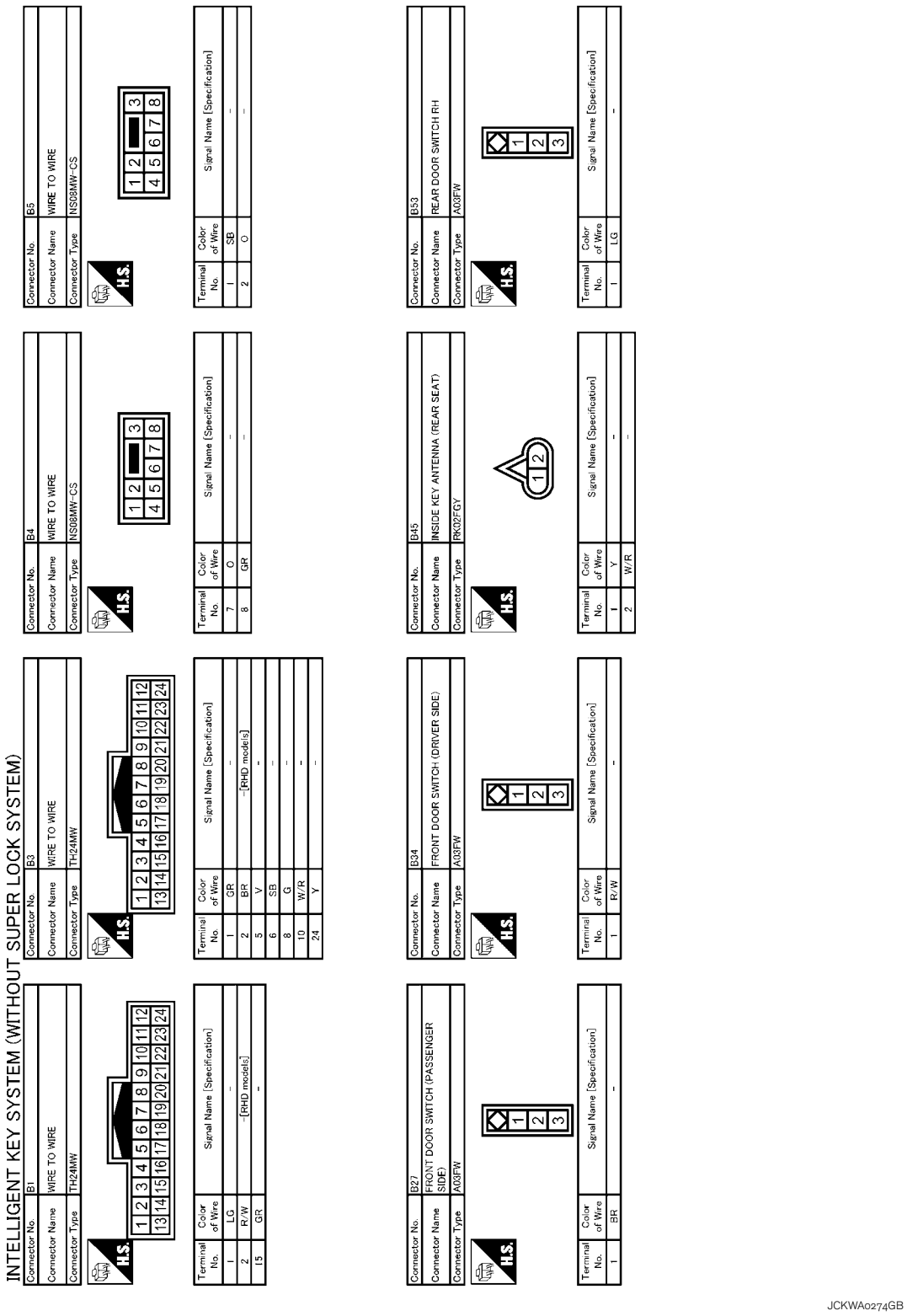
INFOID:0000000001125423





cardiagn.com


OUTSIDE KEY ANTENNA (REAR BUMPER)
B81
INSIDE KEY ANTENNA (REAR SEAT)
B45
INSIDE KEY ANTENNA (CONSOLE)
M61
INSIDE KEY ANTENNA (INSTRUMENT CENTER)
M70
OUTSIDE KEY ANTENNA (PASSENGER SIDE)
D50
OUTSIDE KEY ANTENNA (DRIVER SIDE)
D11
INTELLIGENT KEY UNIT
M40
BACK DOOR REQUEST SWITCH
D187
M13
B3
D41
M81
D1
M18
M11
B1
B77
D157
D151
D181
D153
JCKWA0273GB



JCKWA0274GB

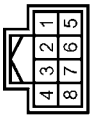
cardiagn.com

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2		
3		

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	GR	–
7	G	–
8		

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2		

Connector No.	B81
Connector Name	OUTSIDE KEY ANTENNA (REAR BUMPER)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	V	–

Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
14	BR/W	–
15	L/Y	–
16	P	–

Connector No.	D2
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	–[With Intelligent Key]
3	SB	–
10	B	–

JCKWA0275GB

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

Connector No.	D9
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	–[With Intelligent Key]
3	R/Y	–[With Intelligent Key]

Connector No.	D10
Connector Name	FRONT DOOR REQUEST SWITCH (DRIVER SIDE)
Connector Type	RK02ML-B

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	B	–

Connector No.	D11
Connector Name	OUTSIDE KEY ANTENNA (DRIVER SIDE)
Connector Type	RK02MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/Y	–
2	BR/W	–

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
10	B	–
14	O	–
15	L	–
16	BR	–

Connector No.	D42
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–[With Intelligent Key]
3	Y	–[With Intelligent Key]

Connector No.	D48
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–[With Intelligent Key]
3	Y	–[With Intelligent Key]

Connector No.	D49
Connector Name	FRONT DOOR REQUEST SWITCH (PASSENGER SIDE)
Connector Type	RK02ML-B

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	B	–

Connector No.	D50
Connector Name	OUTSIDE KEY ANTENNA (PASSENGER SIDE)
Connector Type	RK02MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	O	–

JCKWA0276GB

cardiagn.com

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-
8	SB	-

Connector No.	D85
Connector Name	REAR DOOR LOCK ACTUATOR LH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	-
3	SB	-

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-
8	SB	-

Connector No.	D105
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	-
3	SB	-

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
5	GR	-

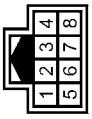
Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M8

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	GR	-
7	G	-

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0277GB

carsdiagn.com

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
5	GR	-

Connector No.	D187
Connector Name	BACK DOOR REQUEST SWITCH
Connector Type	RK02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	B	-

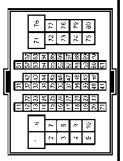
Connector No.	E25
Connector Name	INTELLIGENT KEY WARNING BUZZER
Connector Type	RK03FBR-DGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	-	-
3	LG/B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

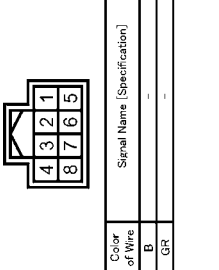
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
40	LG/B	-
48	Y	-
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

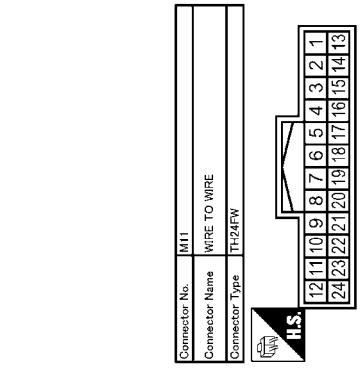
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

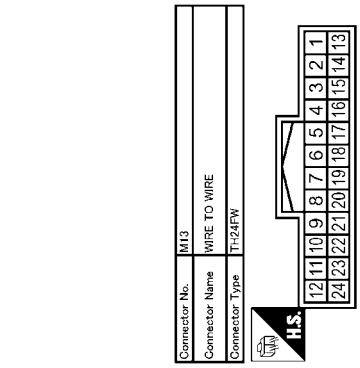
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-[RHD models]
15	GR	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
5	V	-
6	SB	-
8	G	-
10	W	-
24	Y	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-
8	GR	-

JCKWA0278GB

cardiagn.com

INTELLIGENT KEY SYSTEM (WITHOUT SUPER LOCK SYSTEM)

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	–

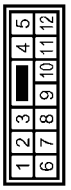
Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	BR	–
15	L	–
16	P	–

Connector No.	M19
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	–
3	SB	–
10	B	–

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–
3	L	–
4	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
3	B	GND
21	L	CAN-H
22	P	CAN-L
23	B	GND

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

H.S.

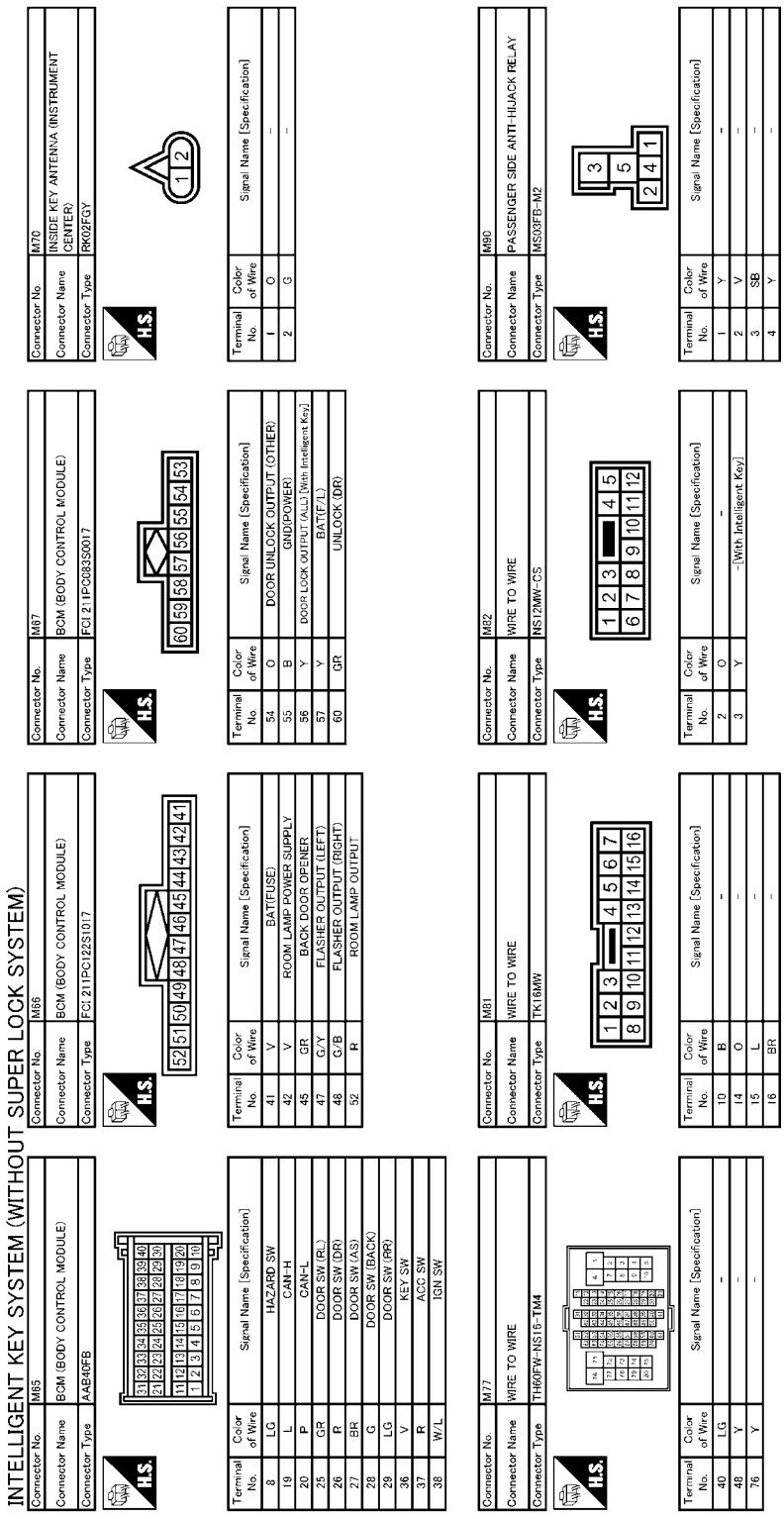
Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L
4	LG	BUZZER
5	P	REQUEST SW (DR)
6	W	IGN SW
7	V	KEY SW
11	V	BATT+
12	B	GND
13	Y	REAR SEAT (+)
14	W	REAR SEAT (–)
15	SB	CONSOLE (+)
16	BR	CONSOLE (–)
17	SB	REAR BUMPER (+)
18	V	REAR BUMPER (–)
19	L	DRIVER DOOR (+)
20	BR	DRIVER DOOR (–)
25	BR	REQUEST SW (AS)
27	L	KNOB SW
29	GR	REQUEST SW (BD)
33	O	INSTRUMENT (+)
34	G	INSTRUMENT (–)
37	L	PASSENGER DOOR (+)
38	O	PASSENGER DOOR (–)
40	Y	AS ANTI-HIJACK

Connector No.	M61
Connector Name	INSIDE KEY ANTENNA (CONSOLE)
Connector Type	RK02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	BR	–

JCKWA0279GB



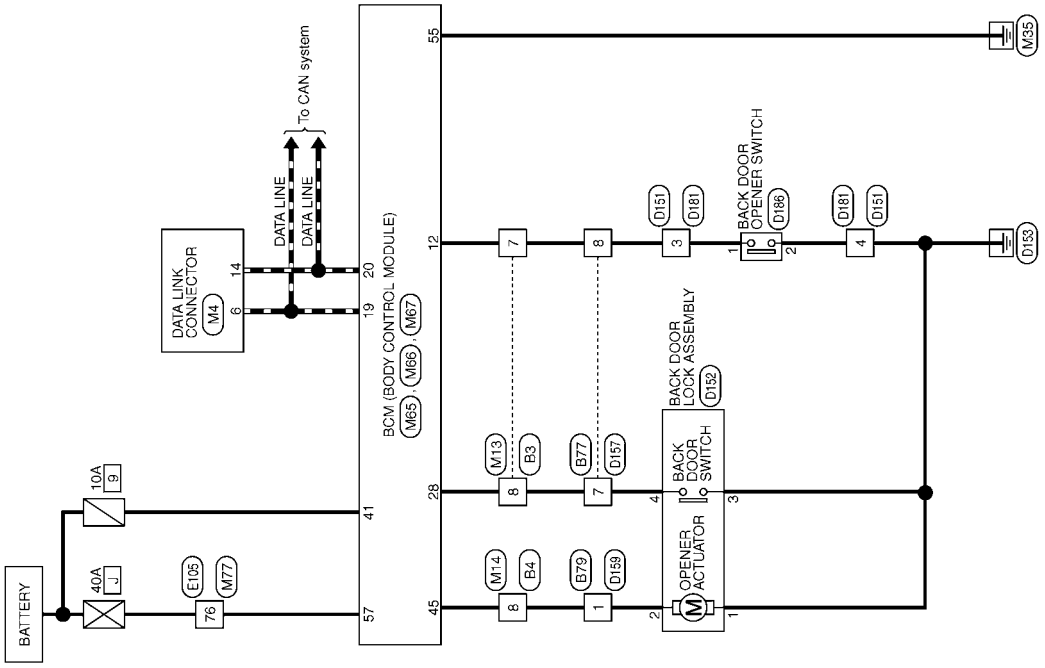
JCKWA0280GB

Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM -

INFOID:0000000001125424

cardiagn.com

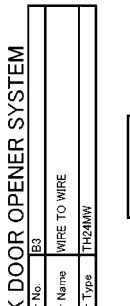
BACK DOOR OPENER SYSTEM



BACK DOOR OPENER SYSTEM

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

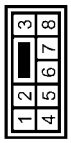
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

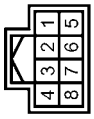
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

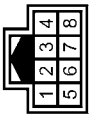
Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 48309 EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0296GB

cardiagn.com

BACK DOOR OPENER SYSTEM

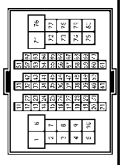
Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

Connector No.	D186
Connector Name	BACK DOOR OPENER SWITCH
Connector Type	RK02MGY

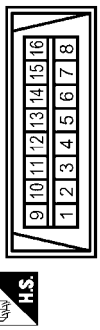
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH-60MW-NS16-TM4



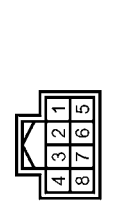
Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



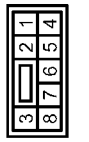
Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



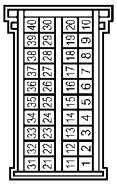
Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS



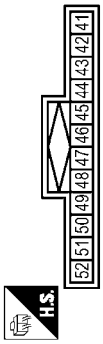
Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
12	P	TRUNK/BACK DOOR OPEN SW
19	L	CAN-H
20	P	CAN-L
28	G	DOOR SW (BACK)

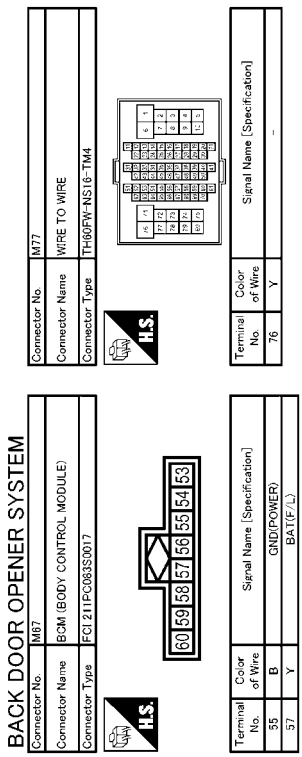
Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
45	GR	BACK DOOR OPENER

JCKWA0297GB

carsdiagn.com



JCKWA0298GB

Fail Safe

INFOID:0000000001097039

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001097040

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001097041

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

SYMPTOM DIAGNOSIS

DOOR LOCK FUNCTION SYMPTOMS

DOOR LOCK AND UNLOCK SWITCH

DOOR LOCK AND UNLOCK SWITCH : Symptom Table

INFOID:0000000000939191

DOOR LOCK AND UNLOCK SWITCH OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Except driver side, doors are closed.
- Passenger side door is not in anti-hijack state.
- Doors are not locked by Intelligent Key or door request switch.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
Door lock and unlock function does not operate with door lock and unlock switch.	1. Check BCM power supply and ground circuit.		DLK-71
	2. Check door lock and unlock switch.		DLK-73
	3. Check door switch.	Passenger side	DLK-84
		Rear LH	DLK-86
		Rear RH	DLK-87
		Back door	DLK-89
	4. Check intermittent incident.		GI-39
Specific door lock actuator does not operate.	1. Check door lock actuator.	Driver side	DLK-95
		Passenger side	DLK-97
		Rear LH	DLK-98
		Rear RH	DLK-100
	2. Check intermittent incident.		GI-39
Rear LH and RH door lock actuator does not operate.	1. Check anti-hijack relay.		DLK-125
	2. Check intermittent incident.		GI-39

INTELLIGENT KEY

INTELLIGENT KEY : Symptom Table

INFOID:0000000000939193

INTELLIGENT KEY OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock and unlock operation are normal.
- Emergency key is removed from ignition key cylinder.
- All doors are closed.
- Ignition knob is not pressed.

- No Intelligent Keys are inside the vehicle.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
All of the Intelligent Key functions do not operate.	1. Check Intelligent Key power supply and ground circuit.	DLK-71
	2. Check driver side door switch.	DLK-83
	3. Check key switch.	DLK-91
	4. Check ignition knob switch.	DLK-93
	5. Check Intelligent Key battery.	DLK-134
	6. Check intermittent incident.	GI-39
Anti-hijack function does not operate by Intelligent Key.	1. Check “SELECTIVE UNLOCK FUNCTION” setting in “WORK SUPPORT”.	DLK-65
	2. Check intermittent incident.	GI-39

DOOR REQUEST SWITCH

DOOR REQUEST SWITCH : Symptom Table

INFOID:0000000000939192

DOOR REQUEST SWITCH OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Intelligent Key operation is normal.
- “LOCK/UNLOCK BY I-KEY” is ON when setting on CONSULT-III.
- Emergency key is removed from ignition key cylinder.
- Ignition switch is in OFF position.
- No Intelligent Keys are not inside the vehicle.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Door lock and unlock do not operate by door request switch.	1. Check “LOCK/UNLOCK BY I-KEY” setting in “WORK SUPPORT”.	DLK-65
	2. Check intermittent incident.	GI-39
Door lock/unlock does not operate by request switch (driver side).	1. Check door request switch (driver side).	DLK-77
	2. Check outside key antenna (driver side).	DLK-107
	3. Check intermittent incident.	GI-39
Door lock/unlock does not operate by request switch (passenger side).	1. Check door request switch (passenger side).	DLK-79
	2. Check outside key antenna (passenger side).	DLK-110
	3. Check intermittent incident.	GI-39
Door lock/unlock does not operate by request switch (back door).	1. Check door request switch (back door).	DLK-80
	2. Check outside key antenna (rear bumper).	DLK-113
	3. Check intermittent incident.	GI-39
Anti-hijack function does not operate by driver side door request switch (other door lock functions operate).	1. Check “SELECTIVE UNLOCK FUNCTION” setting in “WORK SUPPORT”.	DLK-65
	2. Check intermittent incident.	GI-39

cardiagn.com

Symptom	Diagnosis/service procedure	Reference page
Passenger side anti-hijack function does not operate by passenger side door request switch (other door lock functions operate).	1. Check passenger side anti-hijack relay.	DLK-125
	2. Check intermittent incident.	GI-39

KEY REMINDER

KEY REMINDER : Symptom Table

INFOID:0000000001091244

KEY REMINDER OPERATION MALFUNCTION

NOTE:
- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- To understand the operation when it does work, refer to DLK-35, "KEY REMINDER : System Description".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)
- Request switch operation and door lock and unlock switch operation are normal.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
Key reminder operation does not operate.	1. Check door switch (driver side).		DLK-83
	2. Check inside key antenna.	Instrument center	DLK-116
		Console	DLK-119
		Rear seat	DLK-122
	3. Check intermittent incident.		GI-38

AUTO DOOR LOCK

AUTO DOOR LOCK : Symptom Table

INFOID:0000000001091243

AUTO DOOR LOCK OPERATION MALFUNCTION

NOTE:
- “AUTO RELOCK TIMER” is not OFF when setting on CONSULT-III.
- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- To understand the operation when it does work, refer to DLK-38, "AUTO DOOR LOCK : System Description"“
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)
- Request switch operation and door lock and unlock switch operation are normal.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
Auto door lock operation does not operate.	1. Check “AUTO RELOCK TIMER” setting in “WORK SUPPORT”.		DLK-65
	2. Check door switch.	Driver side	DLK-83
		Passenger side	DLK-84
		Rear LH	DLK-86
		Rear RH	DLK-87
		Back door	DLK-89
	3. Check ignition knob switch.		DLK-93
	4. Check key switch.		DLK-91
	5. Check intermittent incident.		GI-39

VEHICLE SPEED SENSING AUTO DOOR LOCK

VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table

INFOID:0000000001091126

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- To understand the operation when it does work, refer to DLK-41, "VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Request switch operation and door lock and unlock switch operation are normal.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Vehicle speed sensing auto door lock operation does not operate.	1. Check vehicle speed signal.	DLK-133
	2. Check intermittent incident.	GI-39

cardiagn.com

BACK DOOR OPEN FUNCTION SYMPTOMS

BACK DOOR OPENER SWITCH

BACK DOOR OPENER SWITCH : Symptom Table

INFOID:0000000000939194

BACK DOOR OPENER FUNCTION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock function is normal.
- Vehicle speed is less than 5 km/h (3 MPH).
- All doors are unlocked.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Back door opener function does not operate by back door opener switch.	1. Check back door opener switch.	DLK-105
	2. Check vehicle speed signal.	DLK-133
	3. Check back door opener actuator.	DLK-103
	4. Check intermittent incident.	GI-39

carsdiagn.com

WARNING FUNCTION SYMPTOMS

BUZZER (COMBINATION METER)

BUZZER (COMBINATION METER) : Symptom Table

INFOID:0000000000939197

BUZZER (COMBINATION METER) OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Warning chime functions operating conditions are extremely complicated. During operation confirmations, reconfirm the list above twice in order to ensure proper operation. Refer to DLK-52, "System Description".
- Door lock function is normal.

Symptom Table

Symptom		Diagnosis/service procedure	Reference page
Ignition knob return forgotten warning does not operate properly.		1. Check buzzer (combination meter).	DLK-129
		2. Check intermittent incident.	GI-39
Ignition key warning does not operate properly.		1. Check buzzer (combination meter).	DLK-129
		2. Check intermittent incident.	GI-39
OFF position warning does not operate properly.		1. Check buzzer (combination meter).	DLK-129
		2. Check intermittent incident.	GI-39
Take away warning does not operate properly.	Take away through window	1. Check buzzer (combination meter).	DLK-129
		2. Check intermittent incident.	GI-39

INTELLIGENT KEY WARNING BUZZER

INTELLIGENT KEY WARNING BUZZER : Symptom Table

INFOID:0000000001091534

INTELLIGENT KEY WARNING BUZZER OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

Warning chime functions operating conditions are extremely complicated. During operation confirmations, reconfirm the list above twice in order to ensure proper operation. Refer to DLK-52, "System Description".

Symptom Table

Symptom		Diagnosis/service procedure	Reference page
Take away warning does not operate properly.	Any door open to all doors closed.	1. Check “TAKE OUT FROM WINDOW WARN” setting in “WORK SUPPORT”.	DLK-65
		2. Check Intelligent Key warning buzzer.	DLK-127
		3. Check intermittent incident.	GI-39

cardiagn.com

Symptom		Diagnosis/service procedure	Reference page
Door lock operation warning chime does not operate properly.	Request switch operation	1. Check Intelligent Key warning buzzer.	DLK-127
		2. Check intermittent incident.	GI-39
	Intelligent Key button operation	1. Check Intelligent Key warning buzzer.	DLK-127
		2. Check intermittent incident.	GI-39

WARNING LAMP

WARNING LAMP : Symptom Table

INFOID:0000000001091535

WARNING LAMP OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Warning chime functions operating conditions are extremely complicated. During operation confirmations, reconfirm the list above twice in order to ensure proper operation. Refer to DLK-52, "System Description".
- Door lock function is normal.

Symptom Table

Symptom		Diagnosis/service procedure	Reference page
OFF position warning does not operate properly.		1. Check LOCK warning lamp. (RED blinking)	DLK-131
		2. Check intermittent incident.	GI-39
Take away warning does not operate properly.	Any door open to all doors closed.	1. Check LOCK warning lamp. (RED blinking)	DLK-131
		2. Check intermittent incident.	GI-39
	Door is open	1. Check LOCK warning lamp. (RED blinking)	DLK-131
		2. Check intermittent incident.	GI-39
	Take away through window	1. Check LOCK warning lamp. (RED blinking)	DLK-131
		2. Check intermittent incident.	GI-39
Intelligent Key low battery warning does not operate properly.		1. Check “LOW BAT OF KEY FOB WARN” setting in “WORK SUPPORT”.	DLK-65
		2. Check Intelligent Key battery.	DLK-134
		3. Check KEY warning lamp. (GREEN blinking)	DLK-130
		4. Check intermittent incident.	GI-39

BACK DOOR

BACK DOOR : Symptom Table

INFOID:0000000001093277

BACK DOOR OPEN WARNING OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock function and back door opener function is normal.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Back door open warning does not operate properly.	1. Check back door opener switch.	DLK-105
	2. Check intermittent incident.	GI-39

cardiagn.com

HAZARD AND BUZZER REMINDER FUNCTION SYMPTOMS

HAZARD WARNING LAMP

HAZARD WARNING LAMP : Symptom Table

INFOID:0000000000939198

BUZZER REMINDER OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- “LOCK/UNLOCK BY I-KEY” is ON when setting on CONSULT-III.
- “ANSWER BACK WITH I-KEY LOCK”, “ANSWER BACK WITH I-KEY UNLOCK” and “ANSWER BACK FUNCTION” are ON when setting on CONSULT-III.
- Door lock function is normal.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Buzzer reminder operation does not operate properly.	1. Check setting of buzzer reminder with CONSULT-III.	DLK-65
	2. Check intermittent incident.	GI-39

INTELLIGENT KEY WARNING BUZZER

INTELLIGENT KEY WARNING BUZZER : Symptom Table

INFOID:0000000001091545

HAZARD REMINDER OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-20, "Work Flow".
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- “HAZARD ANSWER BACK” is ON when setting on CONSULT-III.
- Door lock function is normal.

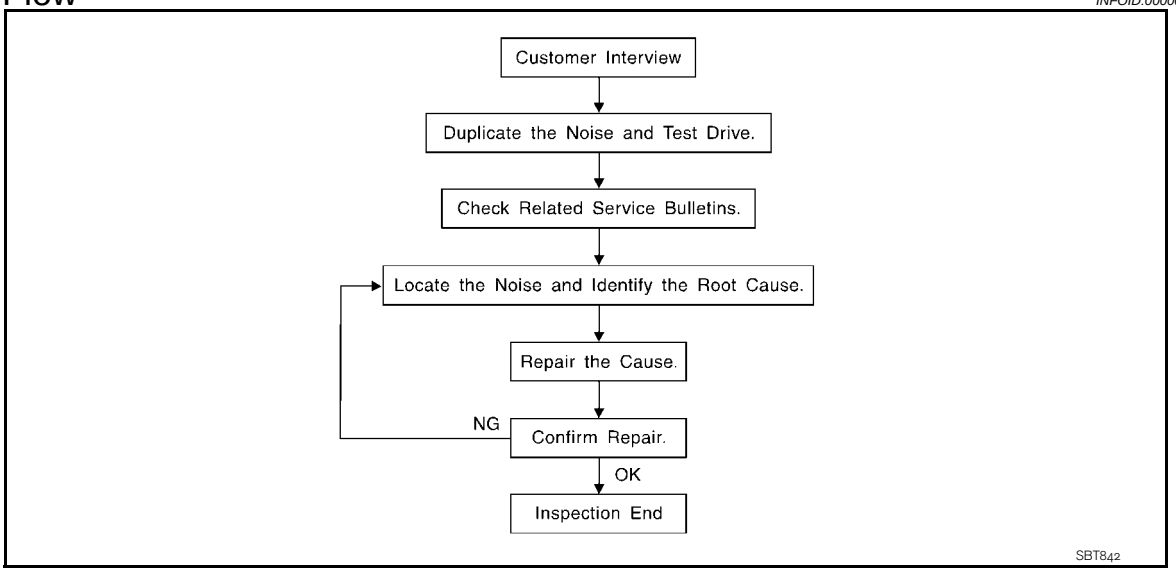
Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Hazard reminder operation does not operate properly.	1. Check setting of hazard reminder with CONSULT-III.	DLK-65
	2. Check intermittent incident.	GI-39

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000001098110



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to DLK-216, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

cardiagn.com

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to DLK-214, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.
- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

carsdiagn.com

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001098111

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

cardiagn.com

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.

Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.

Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

c-diagn.com

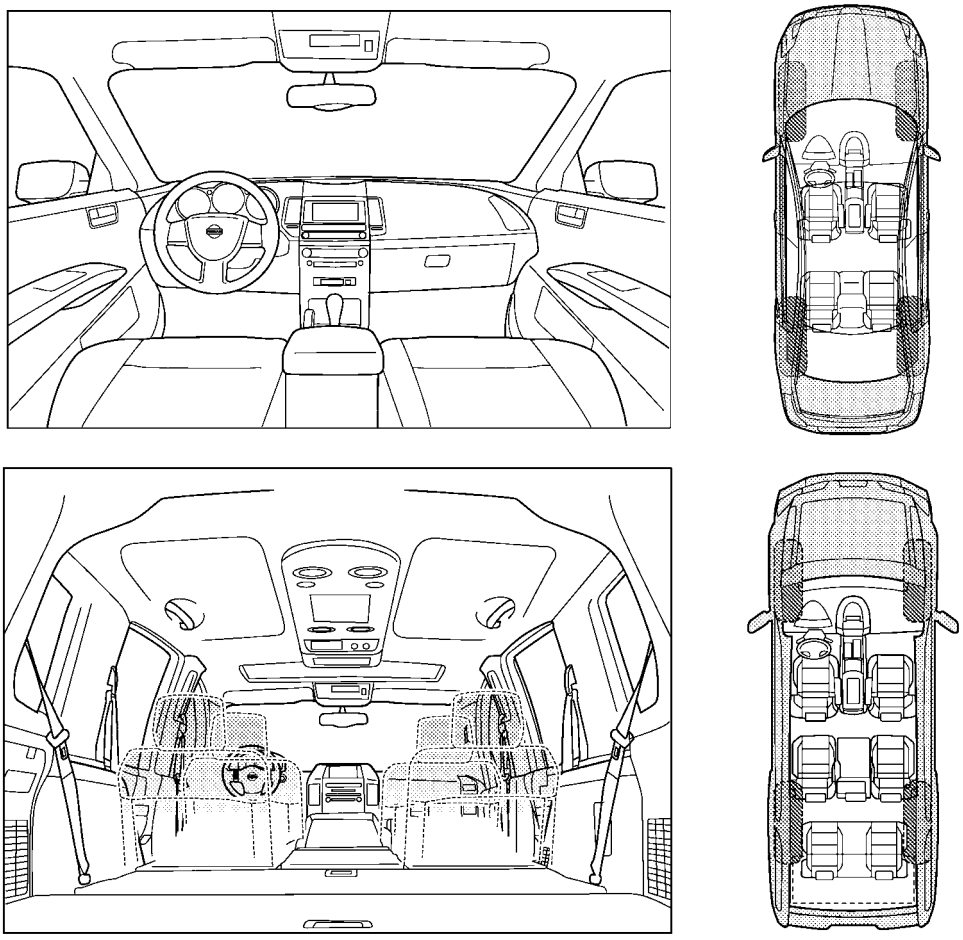
Diagnostic Worksheet

INFOID:0000000001098112

SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

cardiagn.com

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001096525

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001096526

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

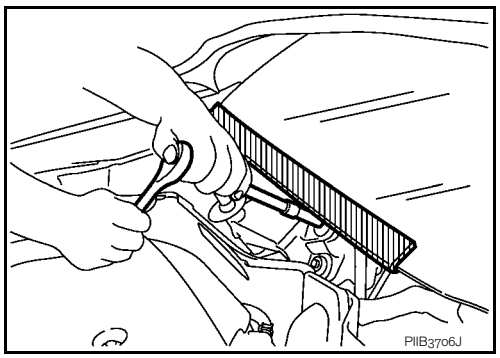
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001096527

cardiagn.com

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Work

INFOID:0000000000939205

- After removing and installing the opening/closing parts, be sure to carry out fitting adjustments to check their operational.
- Check the lubrication level, damage, and wear of each part. If necessary, grease or replace it.

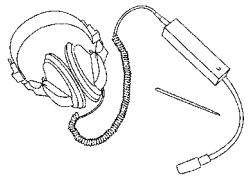
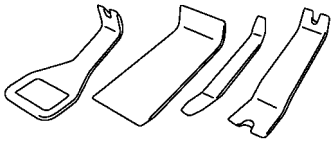
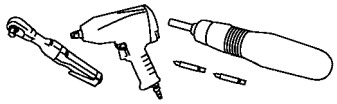
carsdiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000001116408

Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Remover tool  PIIB7923J	Remove the clips, pawls, and metal clips
Power tool  PIIB1407E	

cardiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000001035832

BASIC INSPECTION

1. CHECK POWER DOOR LOCK AND UNLOCK SWITCH OPERATION

Check door lock and unlock operation by operating door lock and unlock switch.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refer to DLK-203, "DOOR LOCK AND UNLOCK SWITCH : Symptom Table".

2. CHECK INTELLIGENT KEY OPERATION

Check door lock and unlock operation by operating the Intelligent Key remote control button.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refer to DLK-203, "INTELLIGENT KEY : Symptom Table".

3. CHECK DOOR REQUEST SWITCH OPERATION

Check door lock and unlock operation by operating door request switch.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Refer to DLK-204, "DOOR REQUEST SWITCH : Symptom Table".

4. CHECK KEY REMINDER OPERATION

Check key reminder operation. Refer to DLK-35, "KEY REMINDER : System Description".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Refer to DLK-205, "KEY REMINDER : Symptom Table".

5. CHECK AUTO DOOR LOCK OPERATION

Check auto door lock operation. Refer to DLK-38, "AUTO DOOR LOCK : System Description".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Refer to DLK-205, "AUTO DOOR LOCK : Symptom Table".

6. CHECK VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION

Check vehicle speed sensing auto door lock operation. Refer to DLK-41, "VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Refer to DLK-206, "VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table".

7. CHECK BACK DOOR OPENER OPERATION

Check back door opener operation by operating the back door opener switch.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Refer to DLK-207, "BACK DOOR OPENER SWITCH : Symptom Table".

8. CHECK WARNING FUNCTION

Check warning function. Refer to DLK-52, "System Description".

Is the inspection result normal?

YES >> GO TO 9.

NO [Buzzer (combination meter)]>> Refer to DLK-208, "BUZZER (COMBINATION METER) : Symptom Table".
NO (Intelligent Key warning buzzer)>> Refer to DLK-208, "INTELLIGENT KEY WARNING BUZZER : Symptom Table".
NO (Warning lamp)>> Refer to DLK-209, "WARNING LAMP : Symptom Table".
NO (Back door open warning)>> Refer to DLK-209, "BACK DOOR : Symptom Table".

9. CHECK HAZARD AND BUZZER REMINDER FUNCTION

Check hazard and buzzer reminder function by Intelligent Key or request switch. Refer to DLK-322, "System Description".

Is the inspection result normal?

YES >> GO TO 10.
NO (Hazard warning lamp)>> Refer to DLK-211, "HAZARD WARNING LAMP : Symptom Table".
NO (Intelligent Key warning buzzer)>> Refer to DLK-211, "INTELLIGENT KEY WARNING BUZZER : Symptom Table".

10. CHECK OUT

CHECK OUT.

>> INSPECTION END

cardiagn.com

ON-VEHICLE REPAIR

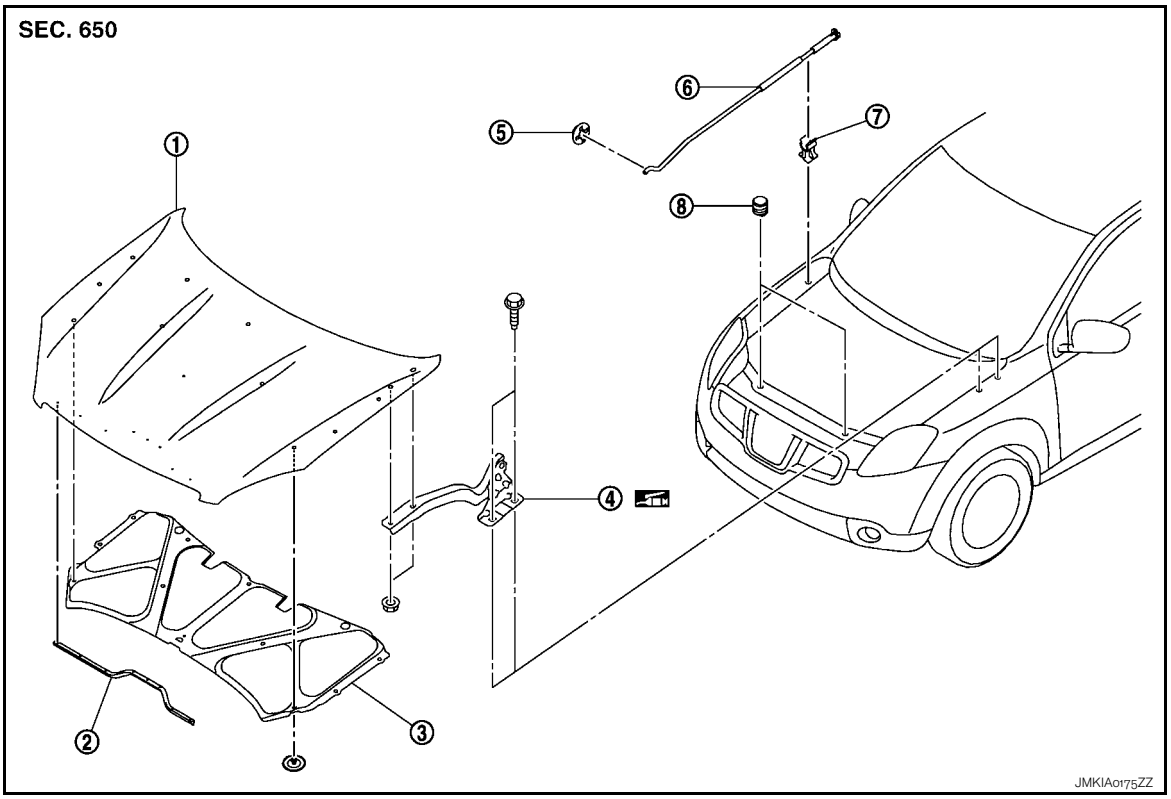
HOOD

HOOD ASSEMBLY

HOOD ASSEMBLY : Exploded View

INFOID:0000000000939208

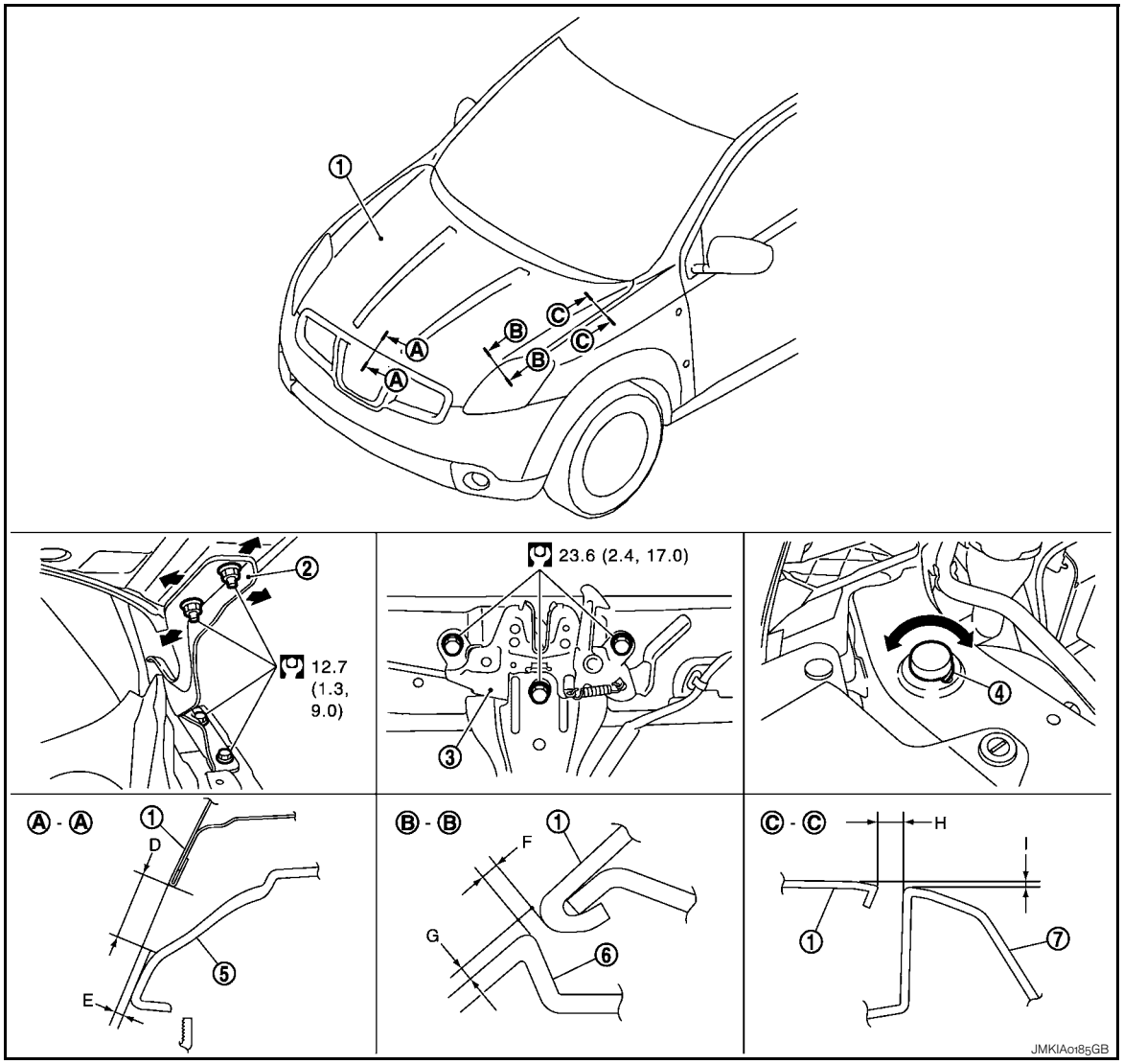
REMOVAL



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Hood assembly
2. Hood hinge
3. Hood lock assembly
4. Hood bumper rubber
5. Front grille
6. Front combination lamp
7. Front fender

Refer to GI-4, "Components" for symbols in the figure.

HOOD ASSEMBLY : Removal and Installation

INFOID:0000000000939209

REMOVAL

1. Support the hood lock assembly with the proper material to prevent it from falling.
   WARNING:
   Bodily injury may occur if no supporting rod is holding the hood open when removing the hood stay.
2. Remove the hood hinge mounting nuts on the hood to remove the hood assembly.
   CAUTION:
   Perform work with 2 workers, because of its heavy weight.
3. Remove the following parts after removing the hood assembly.
   - Hood insulator
   - Hood sealing rubber

INSTALLATION

Install in the reverse order of removal.

CAUTION:

cardiagn.com

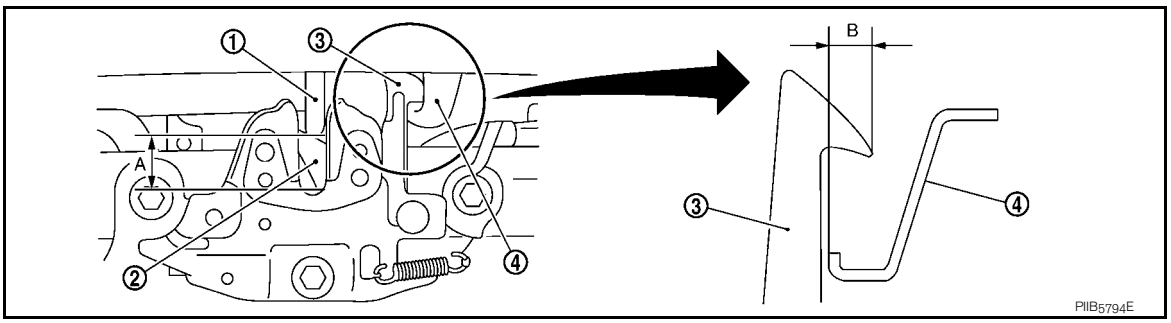
- **Perform work with 2 workers, because of its heavy weight.**
- **Before installing the hood hinge, apply anticorrosive agent onto the mounting surface of the vehicle body.**
- **After installing, perform hood fitting adjustment. Refer to DLK-225, "HOOD ASSEMBLY : Adjustment".**

HOOD ASSEMBLY : Adjustment

INFOID:0000000000939210

Portion				Standard	Right/left Clearance (MAX)
Hood – Front bumper	A – A	D	Clearance	5.2 – 9.2 mm (0.205 – 0.362 in)	2.0 mm (0.079 in)
		E	Surface height	- 0.2 – 3.8 mm (- 0.008 – 0.150 in)	2.0 mm (0.079 in)
Hood – Front combination lamp	B – B	F	Clearance	3.7 – 7.7 mm (0.140 – 0.303 in)	2.0 mm (0.079 in)
		G	Surface height	- 2.3 – 2.3 mm (- 0.091 – 0.091 in)	2.3 mm (0.091 in)
Hood – Front fender	C – C	H	Clearance	3.9 – 5.9 mm (0.154 – 0.232 in)	1.5 mm (0.059 in)
		I	Surface height	- 1.0 – 1.0 mm (- 0.039 – 0.039 in)	1.5 mm (0.059 in)

1. Check the clearance and the surface height between the hood and each part by visualy and touching. (Fitting standard dimension in the table below should be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the hood lock and adjust the height by rotating the bumper rubber until the hood becomes 1 to1.5 mm (0.04 to 0.059 in) lower than the fender.
4. Temporarily tighten the hood lock, and position by engaging it with the hood striker. Check the lock and striker for looseness and adjust the clearance and evenness with the striker to satisfy the specification.
5. Adjust A and B shown in the figure to the following value with hood's own weight by dropping it from approximately. 200 mm (7.87 in) height or by pressing the hood lightly [approximately. 29 N (3 kg)].



1. Hood striker
2. Primary latch
3. Secondary striker
4. Secondary latch

A : 20.0 mm (0.787 in)
B : 6.8 mm (0.268 in)

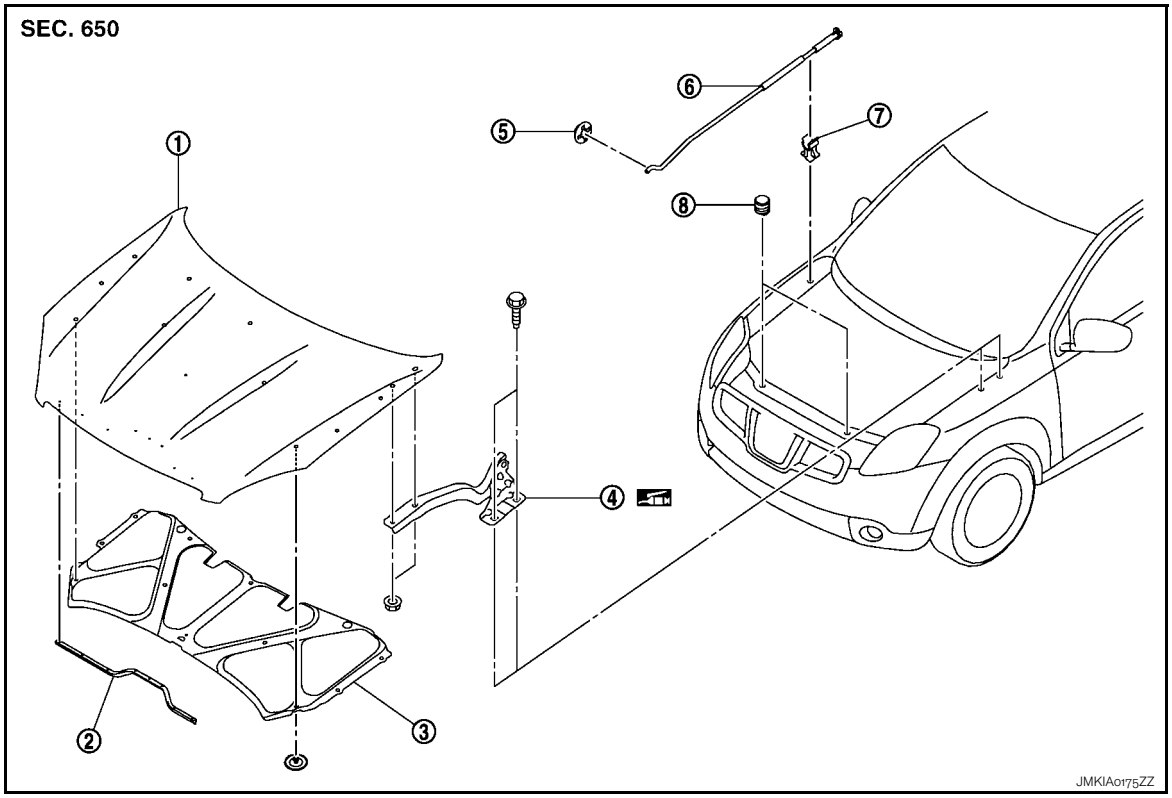
6. After adjustment tighten lock bolts to the specified torque.

HOOD HINGE

carsdiagn.com

HOOD HINGE : Exploded View

INFOID:0000000001091261



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

HOOD HINGE : Removal and Installation

INFOID:0000000001091262

REMOVAL

1. Remove the hood assembly. Refer to DLK-224, "HOOD ASSEMBLY : Removal and Installation".
2. Remove the front fender. Refer to DLK-233, "Removal and Installation".
3. Remove the hood hinge mounting bolts, and then remove the hood hinge.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

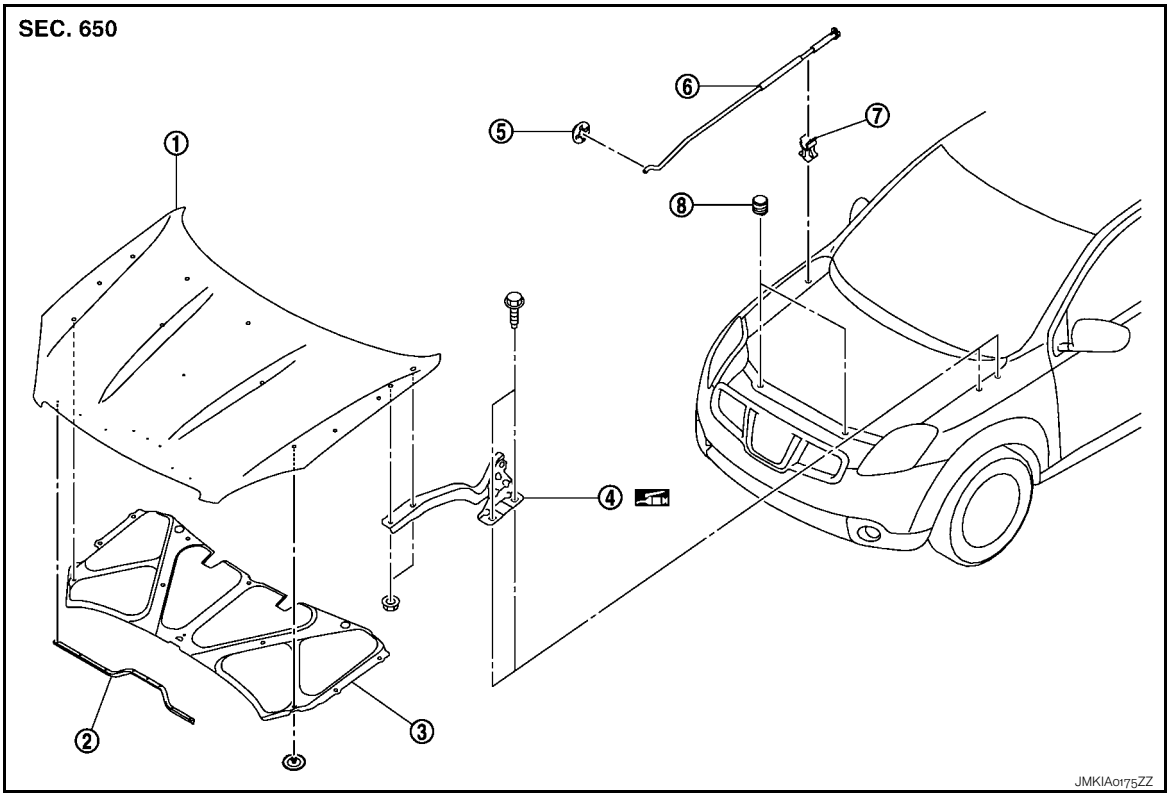
- **After installation, apply touch-up paint (the body color) onto the head of the hinge mounting bolts and nuts.**
- **Before installation of hood hinge, apply anticorrosive agent onto the mounting surface of the vehicle body.**
- **After installation, perform hood fitting adjustment. Refer to DLK-225, "HOOD ASSEMBLY : Adjustment".**

HOOD SUPPORT ROD

HOOD SUPPORT ROD : Exploded View

INFOID:0000000001095093

cardiagn.com



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

HOOD SUPPORT ROD : Removal and Installation

INFOID:0000000001091264

REMOVAL

1. Support the hood lock assembly with the proper material to prevent it from falling.

   WARNING:
   Bodily injury may occur if no supporting rod is holding the hood open when removing the hood stay.
2. Remove the hood support rod from the grommet.

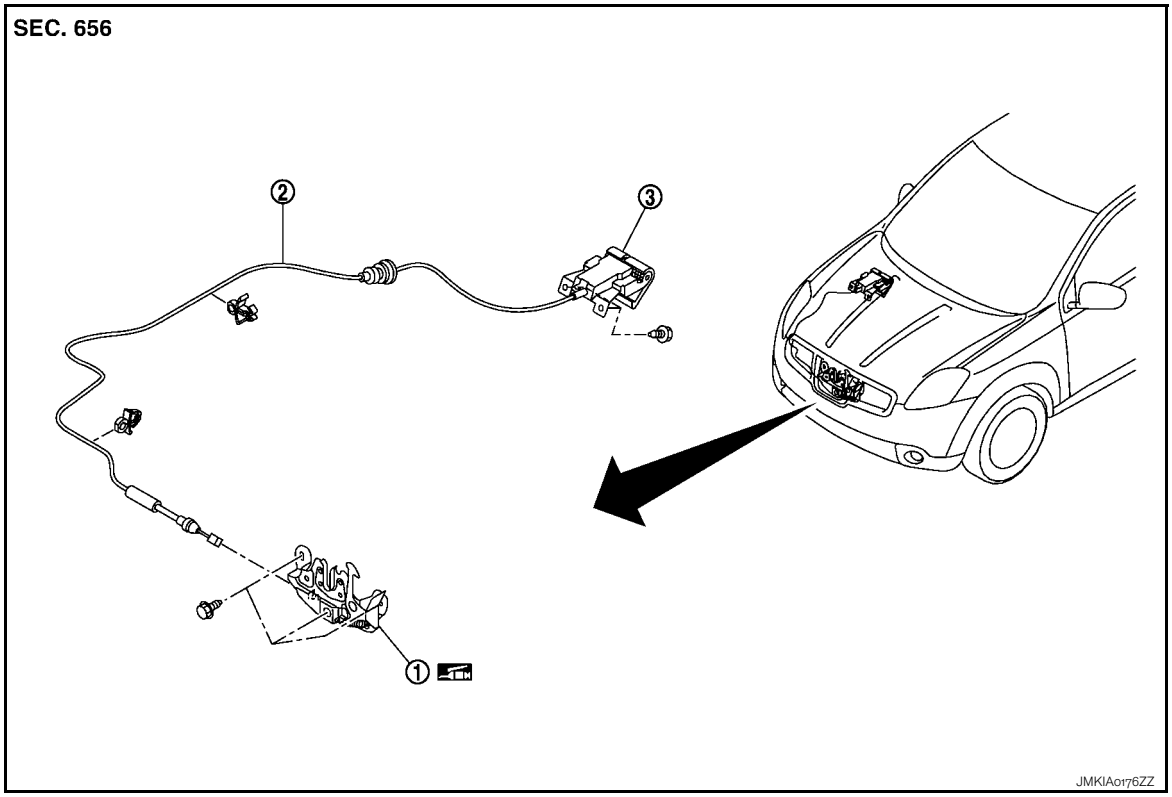
INSTALLATION

Install in the reverse order of removal.

HOOD LOCK CONTROL

HOOD LOCK CONTROL : Exploded View

INFOID:0000000000939211



1. Hood lock assembly
2. Hood lock control cable
3. Hood lock opener

Refer to GI-4, "Components" for symbols in the figure.

HOOD LOCK CONTROL : Removal and Installation

INFOID:0000000000939212

REMOVAL

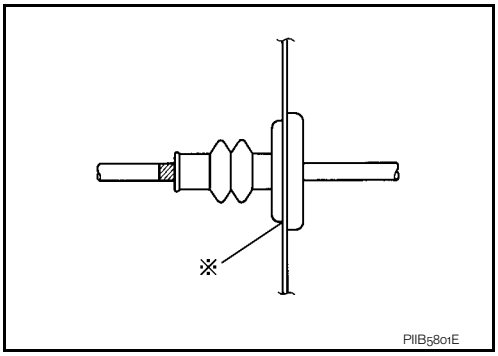
1. Remove the hood lock opener mounting bolts, and then remove the hood lock opener.
2. Remove the front bumper fascia. Refer to EXT-11, "Removal and Installation".
3. Remove the hood lock mounting bolts, and then remove the hood lock.
4. Remove the fender protector. Refer to EXT-22, "Removal and Installation".
5. Disconnect the hood lock cable from hood lock, and clip it from the hoodledge.
6. Remove the grommet on the dash lower panel, and pull the hood lock control cable toward the passenger compartment.
   CAUTION:
   While pulling, do not to damage (peeling) the outside of the hood lock control cable.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Do not to bend the cable too much, keeping the radius 100 mm (3.94 in) or more.**
- **Check that the cable is not offset from the positioning grommet, and apply the sealant to the grommet (at *mark) properly.**



cardiagn.com

- **Check that the hood lock control cable is properly engaged with the hood lock.**
- **After installation, perform hood fitting adjustment. Refer to DLK-225, "HOOD ASSEMBLY : Adjustment".**
- **After installation, perform the hood lock control inspection. Refer to DLK-229, "HOOD LOCK CONTROL : Inspection".**

HOOD LOCK CONTROL : Inspection

INFOID:0000000000939213

NOTE:
If the hood lock cable is bent or deformed, replace it.

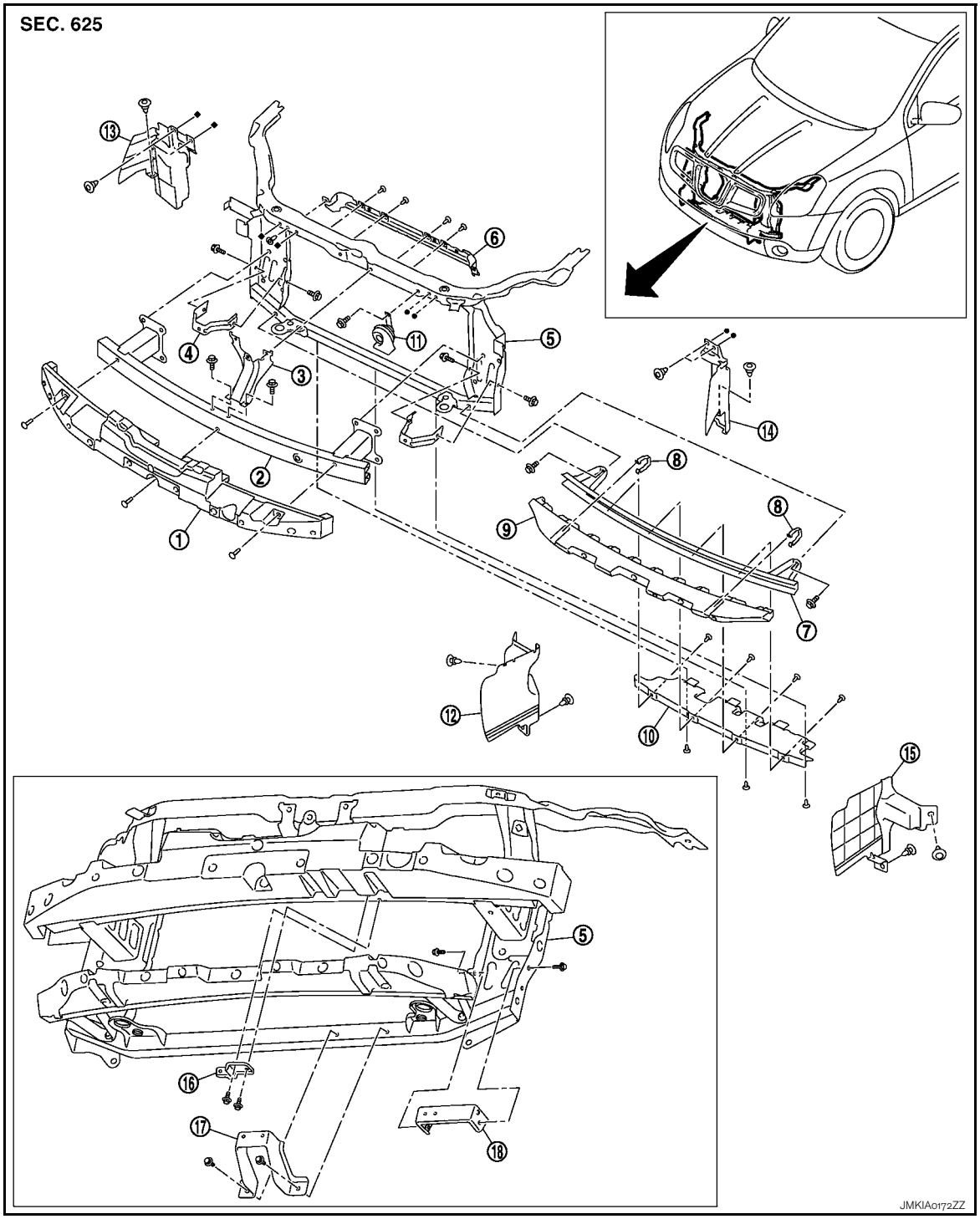
1. Check that the secondary latch is properly engaged with the secondary striker [6.8 mm (0.268 in) shown in the figure] by hood weight.
2. While operating the hood opener, carefully check that the front end of the hood is raised by approximately 20.0 mm (0.787 in). Also check that the hood opener returns to the original position.
3. Check that the hood opener operating is condition 49 N (5.0 kg) or below.
4. Install so that static closing face of hood is 94 – 490 N·m (9.6 – 50.0 kg-m).
   NOTE:
   - Exert vertical force on right side and left side of hood lock.
   - Do not press simultaneously both sides.
5. Check the hood lock lubrication condition. If necessary, apply body grease to the hood lock.

carsdiagn.com

RADIATOR CORE SUPPORT

Exploded View

INFOID:0000000000939214



1. Energy absorber
2. Bumper reinforcement
3. Hood lock support stay
4. Intercooler bracket (with K9K engine models)
5. Radiator core support assembly
6. Upper air dam
7. Apron bracket assembly
8. Fastener
9. Energy absorber lower
10. Front air guide lower
11. Horn assembly
12. Front air guide side lower RH
13. Front air guide side RH
14. Front air guide side LH
15. Front air guide side lower LH
16. Oil cooler bracket upper
17. Oil cooler bracket lower
18. Oil cooler bracket side

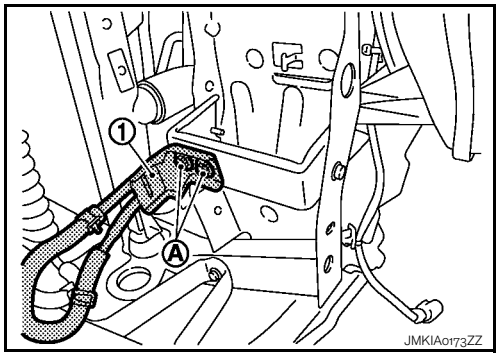
cardiagn.com

Removal and Installation

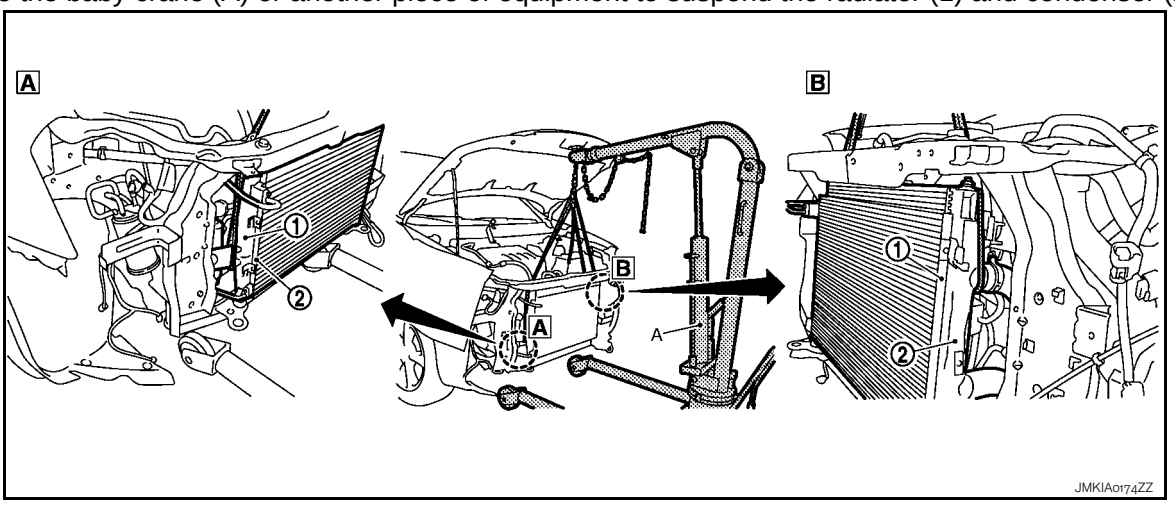
INFOID:0000000000939215

REMOVAL

1. Remove the front fillet molding. Refer to EXT-23, "Removal and Installation".
2. Remove the front bumper fascia and the energy absorber. Refer to EXT-11, "Removal and Installation".
3. Remove the energy absorber (upper and lower). Refer to EXT-11, "Removal and Installation".
4. Remove the air cleaner duct. Refer to EM-27, "Removal and Installation".
5. Remove the front combination lamp (LH/RH). Refer to EXL-171, "Removal and Installation".
6. Remove the bumper reinforcement. Refer to EXT-11, "Removal and Installation".
7. Disconnect the hood lock control cable clamp, and then remove the hood lock assembly. Refer to DLK-228, "HOOD LOCK CONTROL : Removal and Installation".
8. Remove the air guide mounting clips, and then remove the air guide (LH/RH).
9. Remove the hood lock stay mounting bolts, and then remove the hood lock stay.
10. Remove the hood switch (with theft warning systems). Refer to SEC-SEC-156, "Removal and Installation".
11. Remove the crush zone sensor. Refer to SR-14, "Removal and Installation".
12. Remove the horn. Refer to HRN-5, "Removal and Installation".
13. Remove the ambient sensor. Refer to VTL-22, "Removal and Installation".
14. Remove the radiator mounting bracket (LH/RH). Refer to CO-13, "Removal and Installation".
15. Remove the Intelligent Key warning buzzer (with Intelligent Key systems). Refer to DLK-277, "Removal and Installation".
16. Remove the charge air cooler assembly (with K9K engine models). Refer to EM-266, "Removal and Installation".
17. Remove the A/T fluid cooler assembly and the A/T fluid cooler bracket (with A/T models only). Refer to TM-348, "FLUID COOLER : Removal and Installation".
18. Remove the A/T fluid cooler pipe bracket (1) mounting bolts (A) (with A/T models only).



19. Remove the washer tank. Refer to WW-99, "Removal and Installation".
20. Use the baby crane (A) or another piece of equipment to suspend the radiator (1) and condenser (2).



21. Remove the radiator core support assembly mounting bolts, and draw out the radiator core support assembly to the front of the vehicle.
22. Remove the radiator core support assembly.
23. Remove the following parts after removing the radiator core support assembly.
    - Inlet tube bracket (with K9K engine models)
    - Intercooler bracket (with K9K engine models)
    - Apron reinforcement bracket

INSTALLATION

Install in the reverse order of removal.

CAUTION:

After installation, refill the following parts.

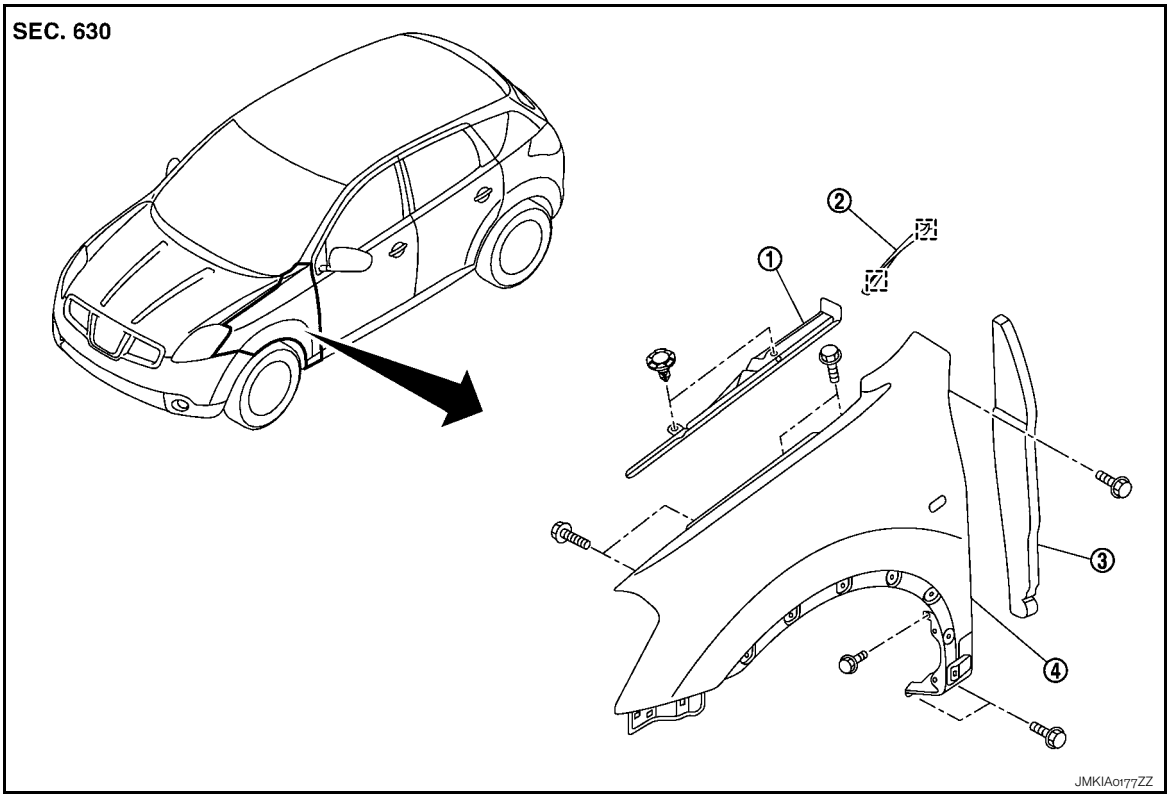
- **A/T fluid. Refer to TM-315, "Changing".**
- **Engine coolant. Refer to CO-9, "Refilling".**

cardiagn.com

FRONT FENDER

Exploded View

INFOID:0000000000939216



1. Hood seal assembly (side)
2. Front fender finisher
3. Front fender seal
4. Front fender

: Metal clip

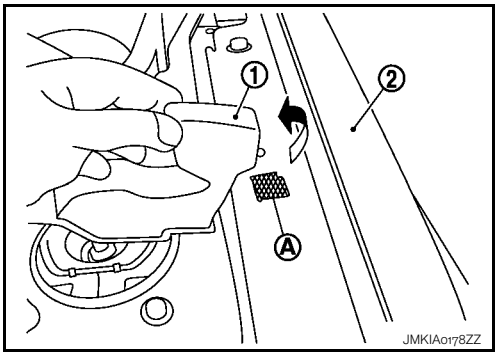
Removal and Installation

INFOID:0000000000939217

REMOVAL

1. Remove the outer fender protector. Refer to EXT-22, "Removal and Installation".
2. Remove the inner fender protector. Refer to EXT-22, "Removal and Installation".
3. Remove the side turn signal lamp. Refer to EXL-178, "Removal and Installation".
4. Remove the front bumper fascia. Refer to EXT-11, "Removal and Installation".
5. Remove the front combination lamp.
   - XENON TYPE: EXL-171, "Removal and Installation".
   - HALOGEN TYPE: EXL-327, "Removal and Installation".
6. Remove the mounting clips and remove hoodledge cover.
7. Remove the center mudguard. Refer to EXT-28, "Removal and Installation".

8. Peel away the double-faced adhesive tape (A) of the front fender seal (1) from the front fender (2).



9. Remove the mounting bolts and remove the front fender.
   CAUTION:
   Use a shop cloth to protect the body from being damaged during removal.
10. Remove the following parts after removing the front fender.
    - Front fender seal.
    - Bumper side bracket. Refer to EXT-11, "Exploded View".

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace the double-faced adhesive tape on the back of the cowl top cover seal with new tape.**
- **Do not wash the vehicle within 24 hours after installation so as to keep adhesive.**
- **After installation, apply the touch-up paint (the body color) onto the head of the front fender mounting bolts.**
- **After installation, check the front fender adjustment. Refer to DLK-225, "HOOD ASSEMBLY : Adjustment" and DLK-237, "DOOR ASSEMBLY : Adjustment".**

cardiagn.com

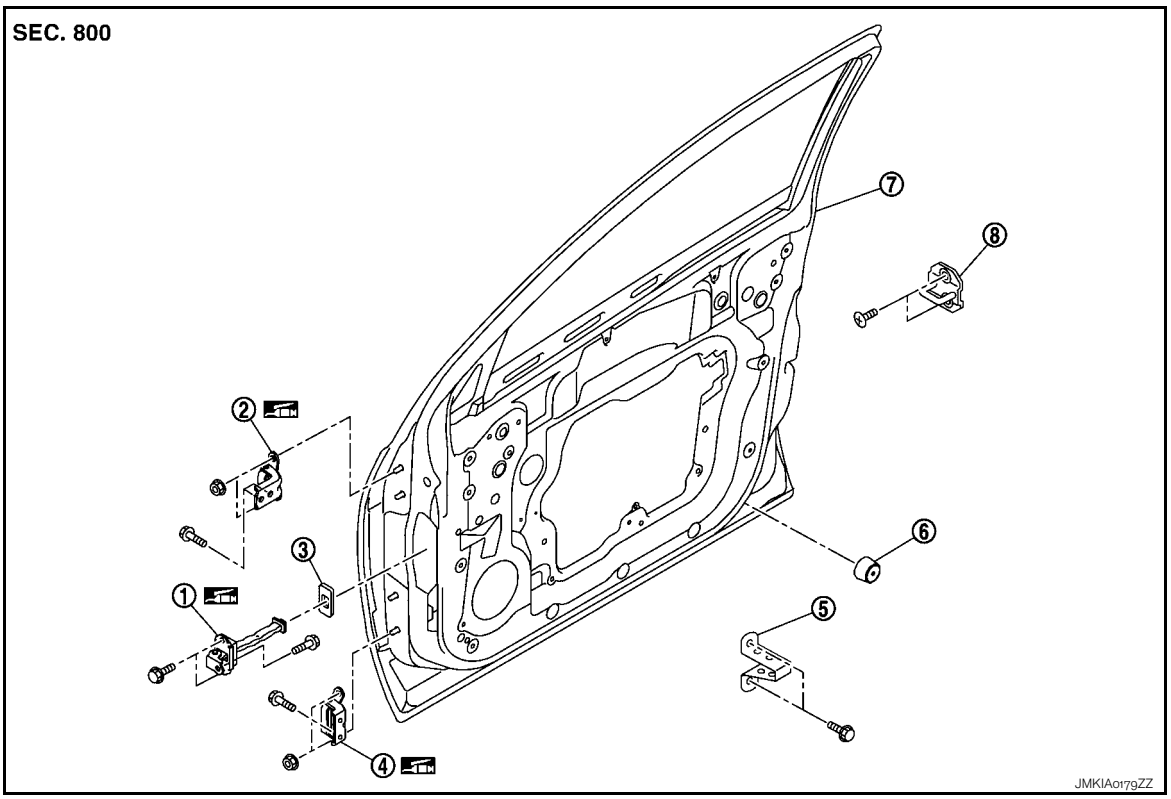
FRONT DOOR

DOOR ASSEMBLY

DOOR ASSEMBLY : Exploded View

INFOID:0000000000939218

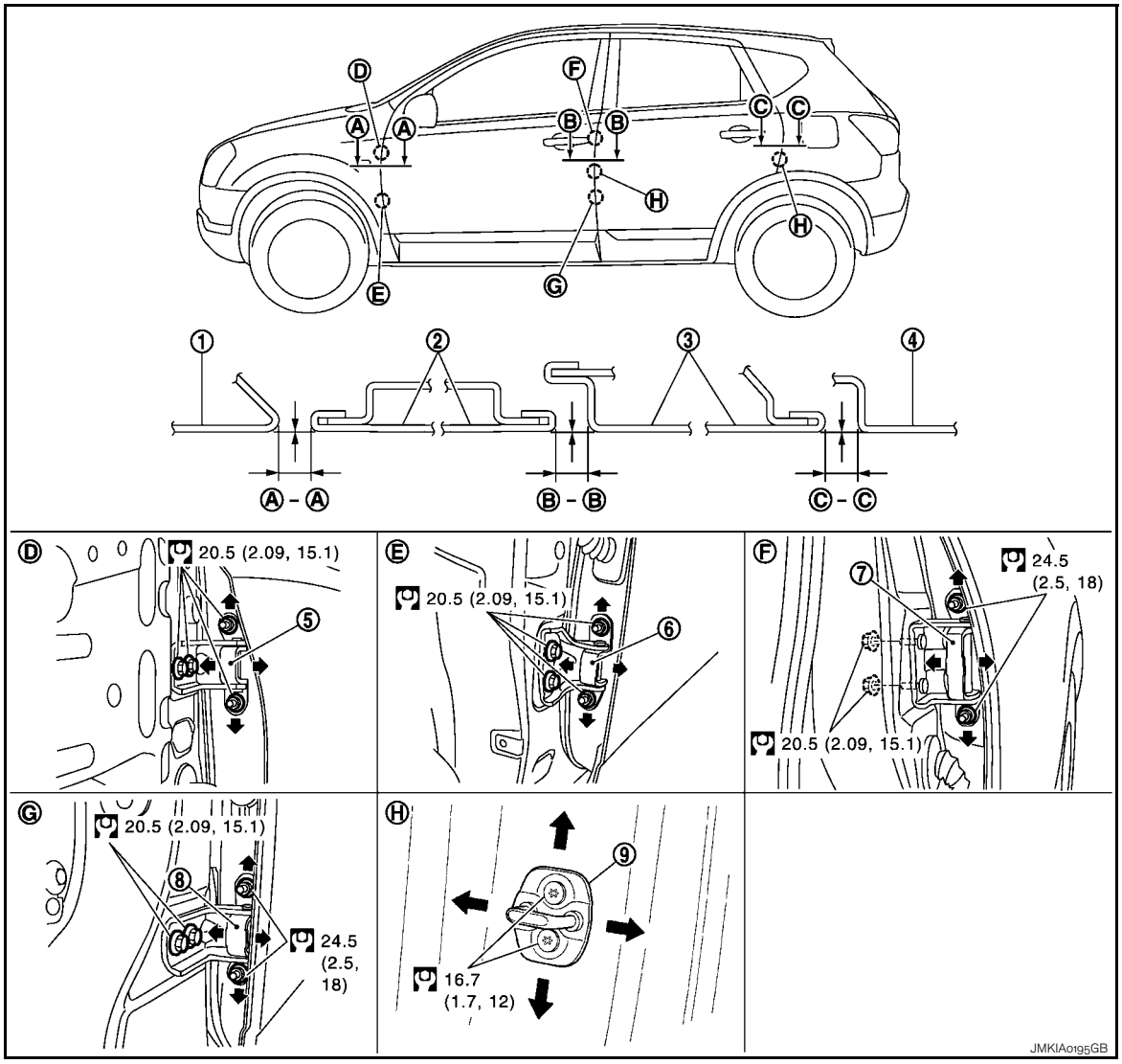
REMOVAL



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Front fender
2. Front door outer
3. Rear door outer
4. Rear fender
5. Front door hinge (upper)
6. Front door hinge (lower)
7. Rear door hinge (upper)
8. Rear door hinge (lower)
9. Door striker

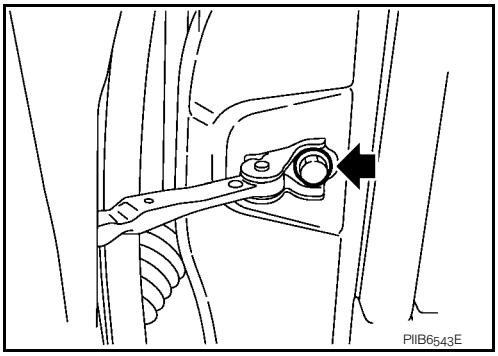
Refer to GI-4, "Components" for symbols in the figure.

DOOR ASSEMBLY : Removal and Installation

INFOID:0000000000939219

REMOVAL

1. Remove the mounting bolts of the door check link on the vehicle.



2. Remove the front door harness grommet, and then pull out the harness from the vehicle.

cardiagn.com

3. Disconnect the front door harness connector.
4. Remove the door hinge mounting nuts (door side), and then remove the door assembly.
   CAUTION:
   - **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
   - **Perform work with 2 workers, because of its heavy weight.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **When removing and installing the front door assembly, perform the fitting adjustment. Refer to DLK-237, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the front door open/close operation after installation.**

DOOR ASSEMBLY : Adjustment

INFOID:0000000000939220

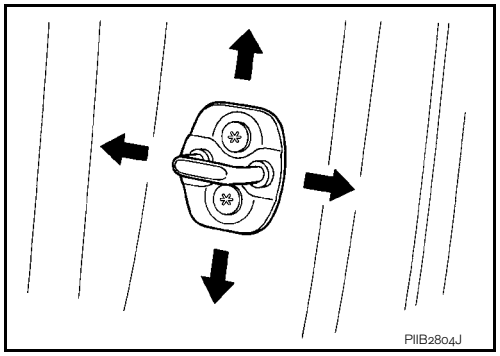
CLEARANCE, SURFACE HEIGHT AND SURFACE MISMATCH ADJUSTMENT

Portion		Clearance	Surface height
Front fender – Front door	A – A	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)
Front door – Rear door	B – B	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)

1. Check the clearance and surface height and surface mismatch between the front door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the front fender. Refer to refer to DLK-233, "Removal and Installation".
4. Loosen the door hinge mounting nuts on door side.
5. Adjust the surface height and surface mismatch of the front door according to the fitting standard dimension.
6. Temporarily tighten the hinge mounting nuts on door side.
7. Loosen the door hinge mounting bolts on body side.
8. Raise the front door at rear end to adjust clearance of the front door according to the fitting standard dimension.
9. After adjustment tighten bolts and nuts to the specified torque.
10. Install the front fender. Refer to refer to DLK-233, "Removal and Installation".
    CAUTION:
    After installation, check the front fender adjustment. Refer to DLK-225, "HOOD ASSEMBLY : Adjustment".

DOOR STRIKER ADJUSTMENT

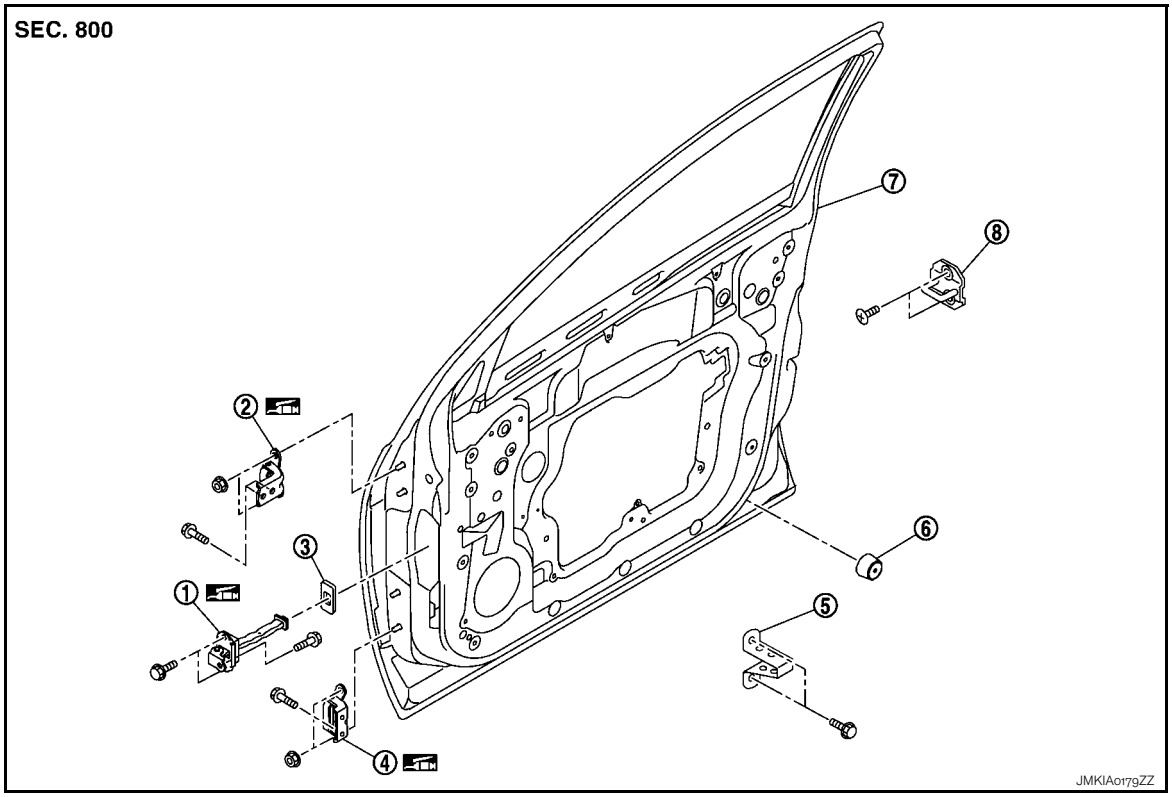
Adjust the door striker so that it becomes parallel with the lock insertion direction.



DOOR STRIKER

DOOR STRIKER : Exploded View

INFOID:0000000001091274



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

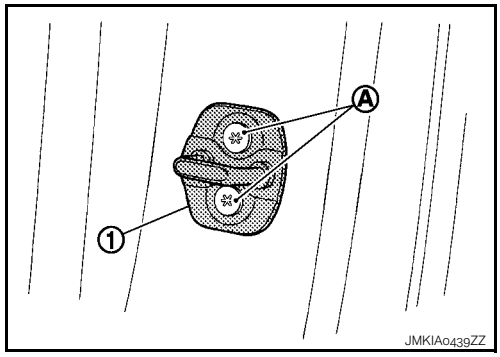
Refer to GI-4, "Components" for symbols in the figure.

DOOR STRIKER : Removal and Installation

INFOID:0000000001096546

REMOVAL

Remove the mounting bolts (A), and then remove the door striker (1).



INSTALLATION

Install in the reverse order of removal.

CAUTION:

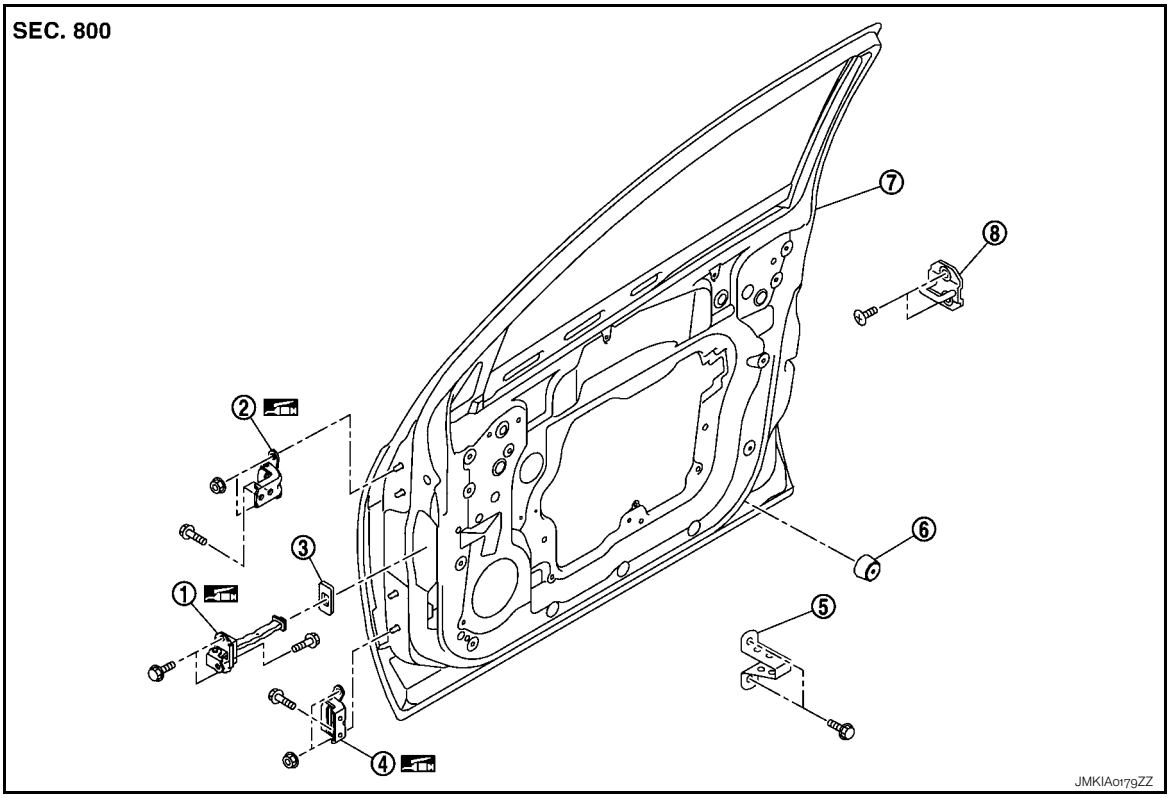
- **Check the front door open/close operation after installation.**
- **When removing and installing the door striker, be sure to perform the fitting adjustment. Refer to DLK-237, "DOOR ASSEMBLY : Adjustment".**

DOOR HINGE

cardiagn.com

DOOR HINGE : Exploded View

INFOID:0000000001095186



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR HINGE : Removal and Installation

INFOID:0000000001091290

REMOVAL

1. Remove the front door assembly. Refer to DLK-236, "DOOR ASSEMBLY : Removal and Installation".
2. Remove the door hinge mounting bolts, and then remove the front door hinge.

INSTALLATION

Install in the reverse order of removal.

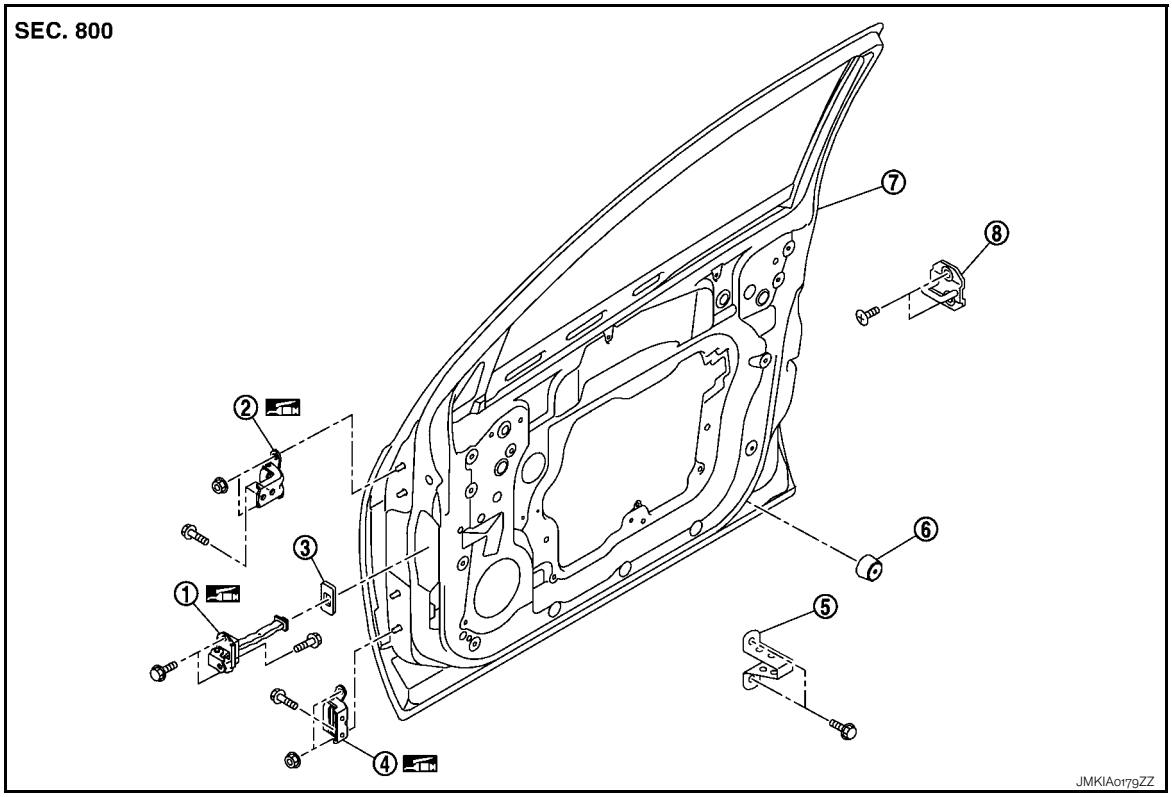
CAUTION:

- **When removing and installing the front door assembly, perform the fitting adjustment. Refer to DLK-237, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the front door open/close operation after installation.**

DOOR CHECK LINK

DOOR CHECK LINK : Exploded View

INFOID:0000000001095191



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

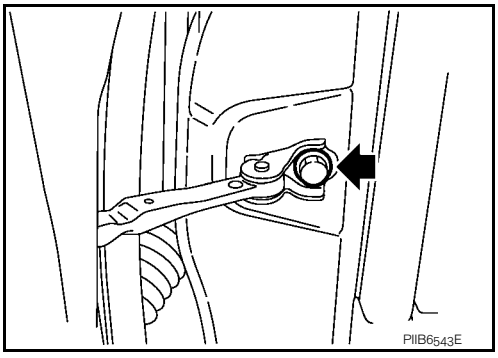
Refer to GI-4, "Components" for symbols in the figure.

DOOR CHECK LINK : Removal and Installation

INFOID:0000000001096548

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the front door speaker. Refer to AV-34, "Removal and Installation".
3. Remove the mounting bolts of the door check link on the vehicle.



4. Remove the door check link cover, and then remove the door check link mounting bolts.
5. Remove the door check link.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check the front door open/close operation after installation.

cardiagn.com

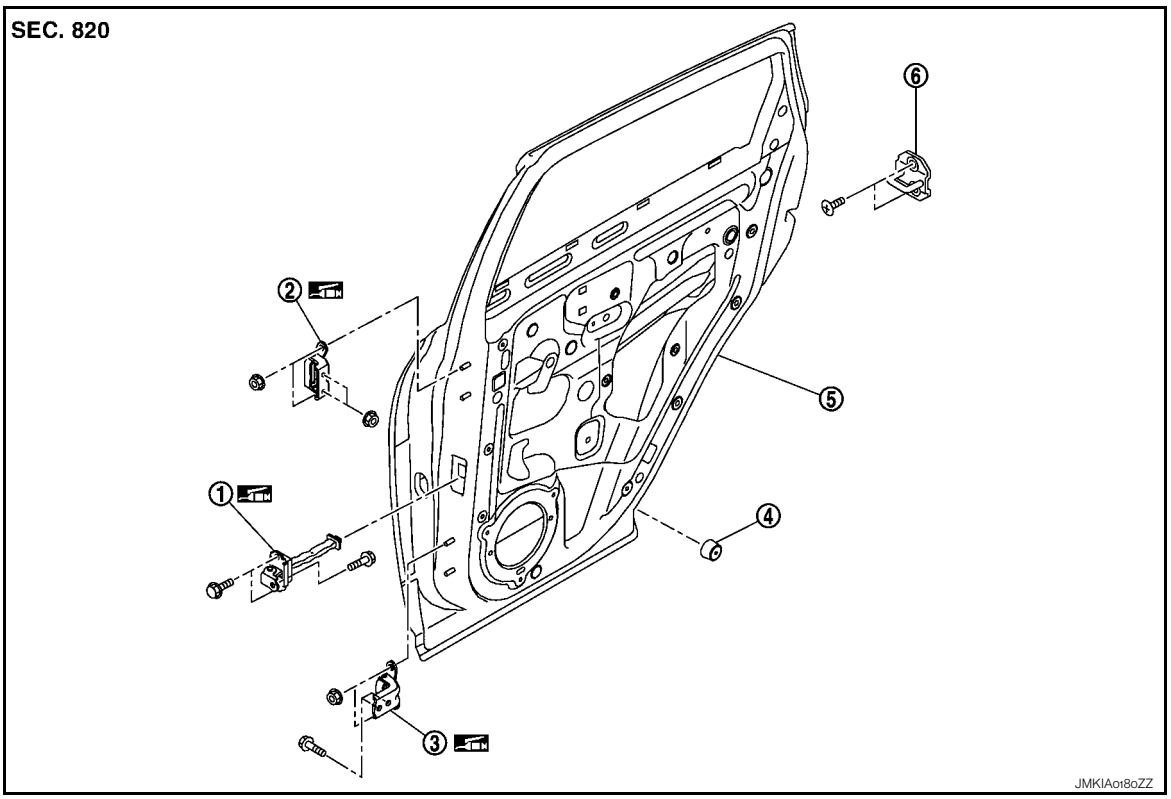
REAR DOOR

DOOR ASSEMBLY

DOOR ASSEMBLY : Exploded View

INFOID:0000000000939221

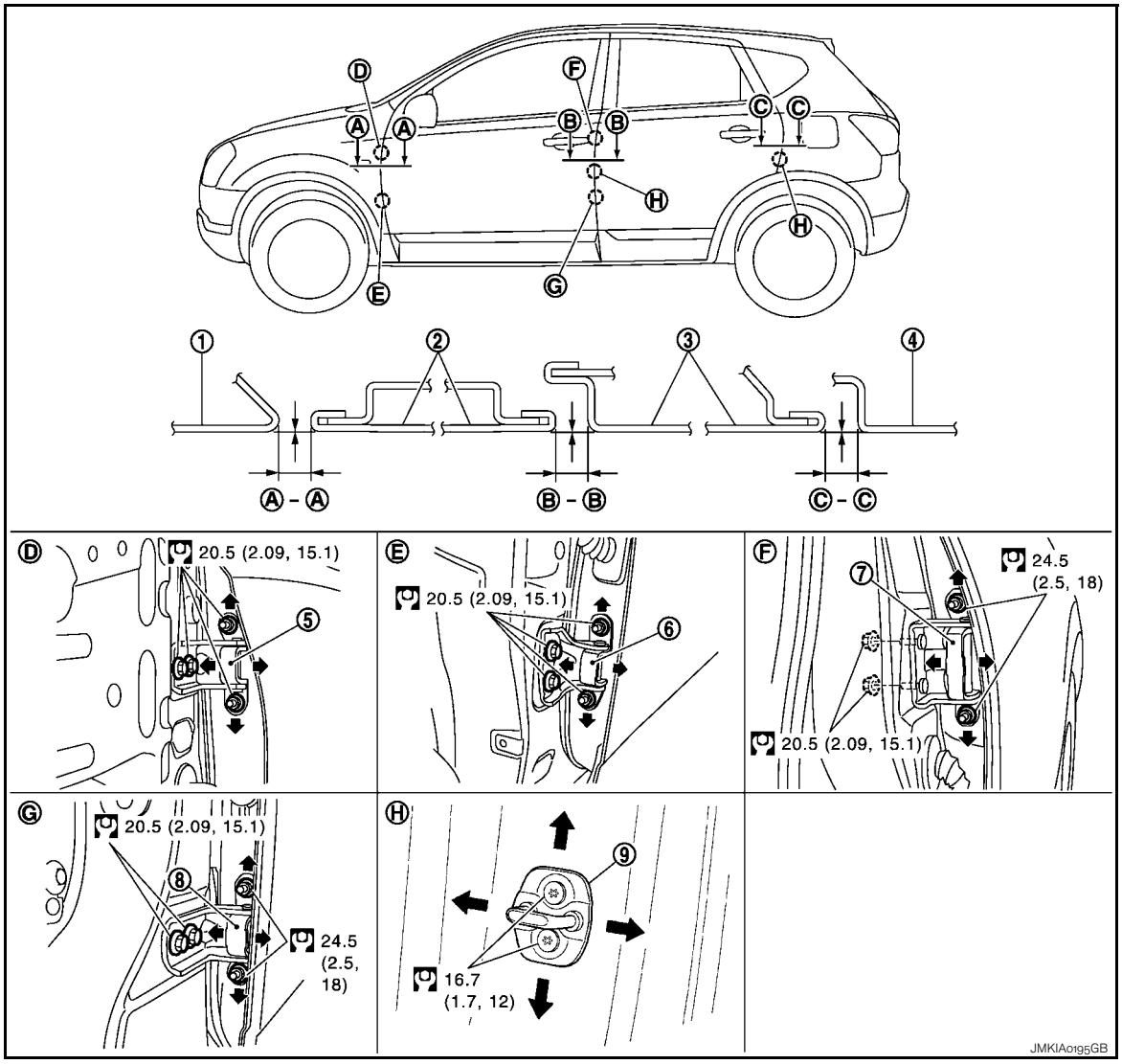
REMOVAL



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Front fender
2. Front door outer
3. Rear door outer
4. Rear fender
5. Front door hinge (upper)
6. Front door hinge (lower)
7. Rear door hinge (upper)
8. Rear door hinge (lower)
9. Striker

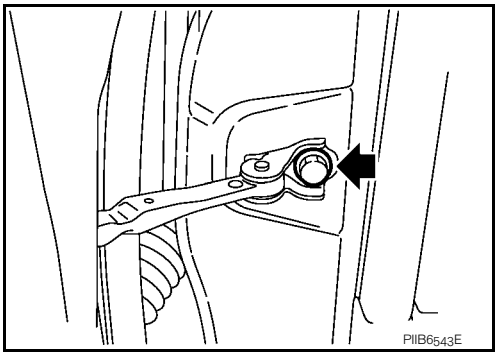
Refer to GI-4, "Components" for symbols in the figure.

DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001097301

REMOVAL

1. Remove the mounting bolts of the door check link on the vehicle.



2. Remove the rear door harness grommet, and then pull out the door harness from the vehicle.

cardiagn.com

3. Disconnect the rear door harness connector.
4. Remove the door hinge mounting nuts (door side), and then remove the rear door assembly.

CAUTION:
- **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
- **Perform work with 2 workers, because of it's heavy weight.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:
- **When removing and installing the rear door assembly, perform the fitting adjustment. Refer to DLK-243, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the rear door open/close operation after installation.**
- **Check the rear door lock/unlock operation after installation.**

DOOR ASSEMBLY : Adjustment

INFOID:0000000000939223

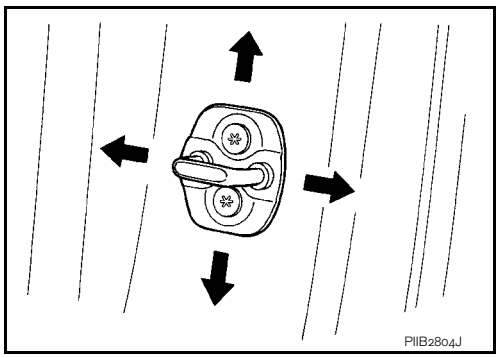
CLEARANCE, SURFACE HEIGHT AND SURFACE MISMATCH ADJUSTMENT

Portion		Clearance	Surface height
Front door – Rear door	B – B	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)
Rear door – Rear fender	C – C	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)

1. Check the clearance and surface height and surface mismatch between the rear door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the center pillar upper garnish and center pillar lower garnish. Refer to INT-14, "Removal and Installation".
4. Loosen the door hinge mounting nuts on door side.
5. Adjust the surface height and surface mismatch of the rear door according to the fitting standard dimension.
6. Temporarily tighten the hinge mounting nuts on door side.
7. Loosen the door hinge mounting nuts and bolts on body side.
8. Raise the rear door at rear end to adjust clearance of the rear door according to the fitting standard dimension.
9. After adjustment tighten bolts and nuts to the specified torque.
10. Install the center pillar upper garnish and center pillar lower garnish. Refer to INT-14, "Removal and Installation".

DOOR STRIKER ADJUSTMENT

Adjust the door striker so that it becomes parallel with the lock insertion direction.

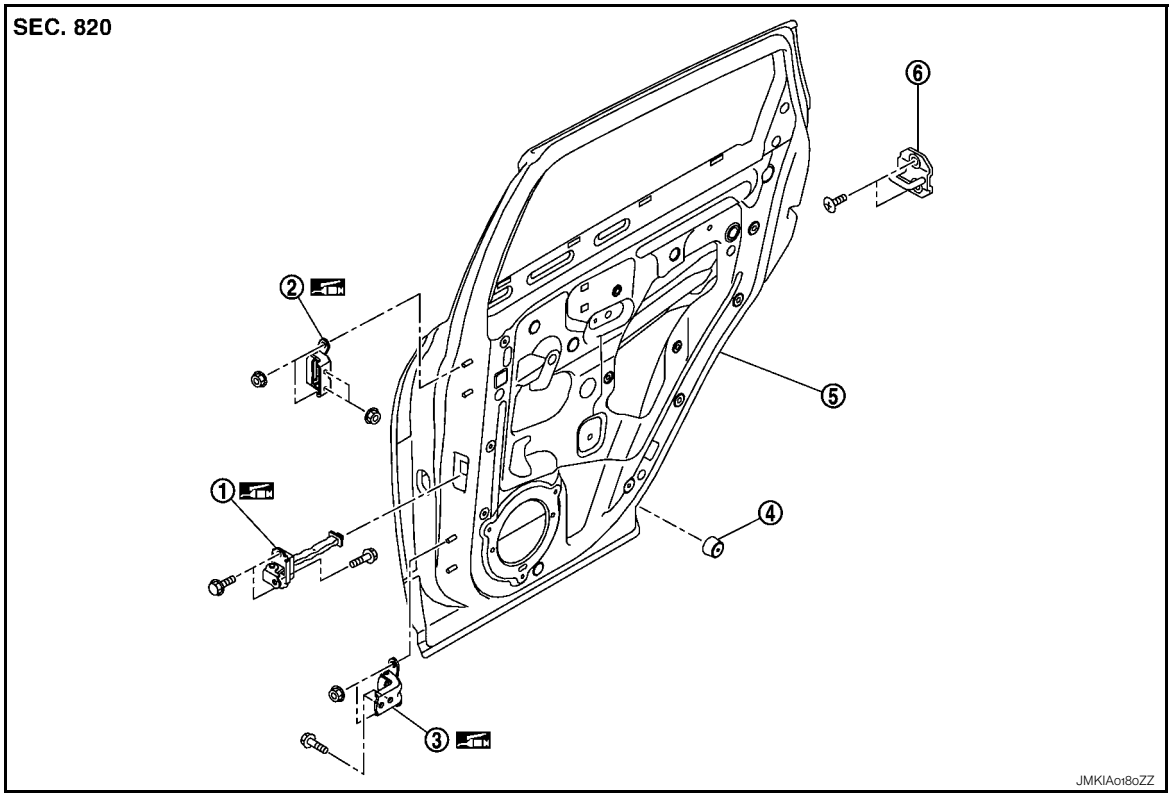


carsdiagn.com

DOOR STRIKER

DOOR STRIKER : Exploded View

INFOID:0000000001091280



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

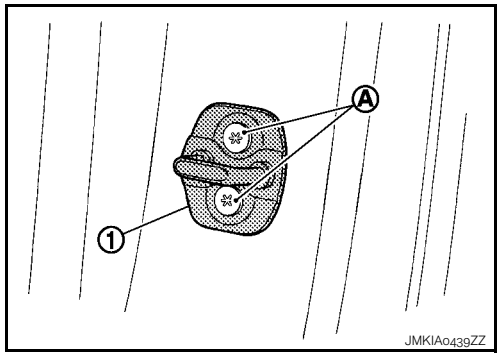
Refer to GI-4, "Components" for symbols in the figure.

DOOR STRIKER : Removal and Installation

INFOID:0000000001096547

REMOVAL

Remove the mounting bolts (A), and then remove the door striker (1).



INSTALLATION

Install in the reverse order of removal.

CAUTION:

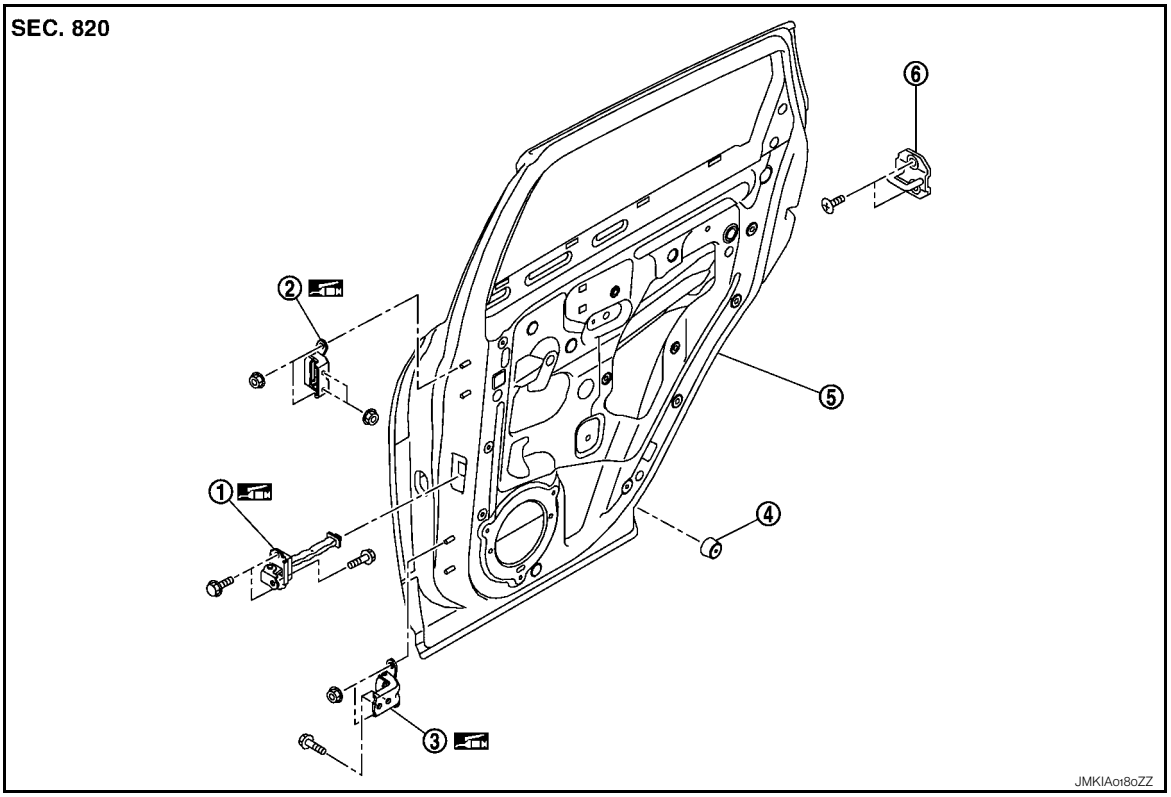
- **Check the rear door open/close operation after installation.**
- **When removing and installing the door striker, be sure to perform the fitting adjustment. Refer to DLK-243, "DOOR ASSEMBLY : Adjustment".**

DOOR HINGE

DOOR HINGE : Exploded View

INFOID:0000000001098045

cardiagn.com



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR HINGE : Removal and Installation

INFOID:0000000001091284

REMOVAL

1. Remove the center pillar lower garnish and the center pillar upper garnish. Refer to INT-14, "Removal and Installation".
2. Remove the rear door assembly. Refer to DLK-242, "DOOR ASSEMBLY : Removal and Installation".
3. Remove the rear door hinge mounting bolts and nuts (body side), and then remove the door hinge.

INSTALLATION

Install in the reverse order of removal.

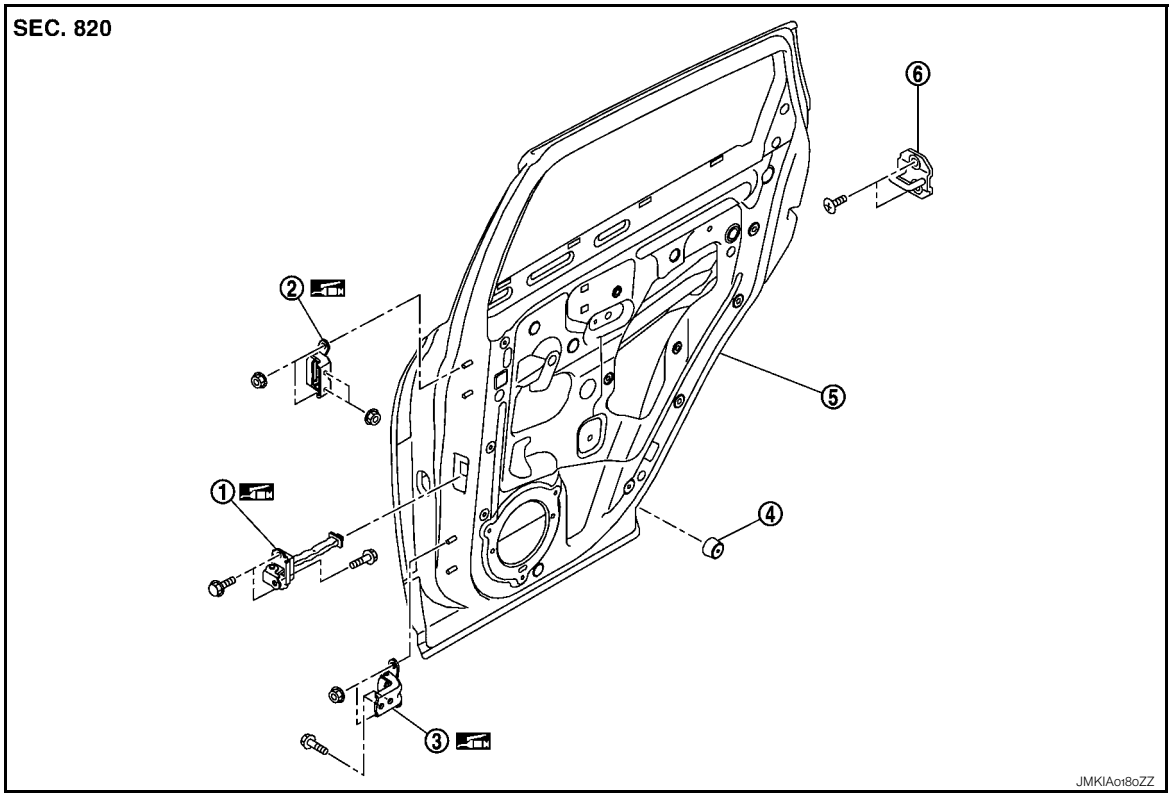
CAUTION:

- **When removing and installing the rear door assembly, perform the fitting adjustment. Refer to DLK-243, "DOOR ASSEMBLY : Adjustment".**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **After installing, apply the touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Check the rear door open/close operation after installation.**

DOOR CHECK LINK

DOOR CHECK LINK : Exploded View

INFOID:0000000001098046



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

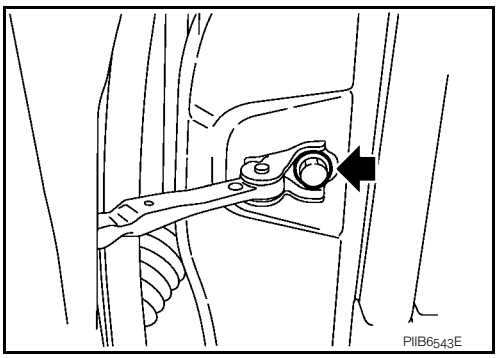
Refer to GI-4, "Components" for symbols in the figure.

DOOR CHECK LINK : Removal and Installation

INFOID:0000000001096661

REMOVAL

1. Remove the rear door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the rear door sealing screen.
3. Remove the mounting bolts of the check link on the vehicle.



4. Remove the door check link cover, and then remove the door check link mounting bolts.
5. Remove the door check link.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check front door open/close operation after installation.

cardiagn.com

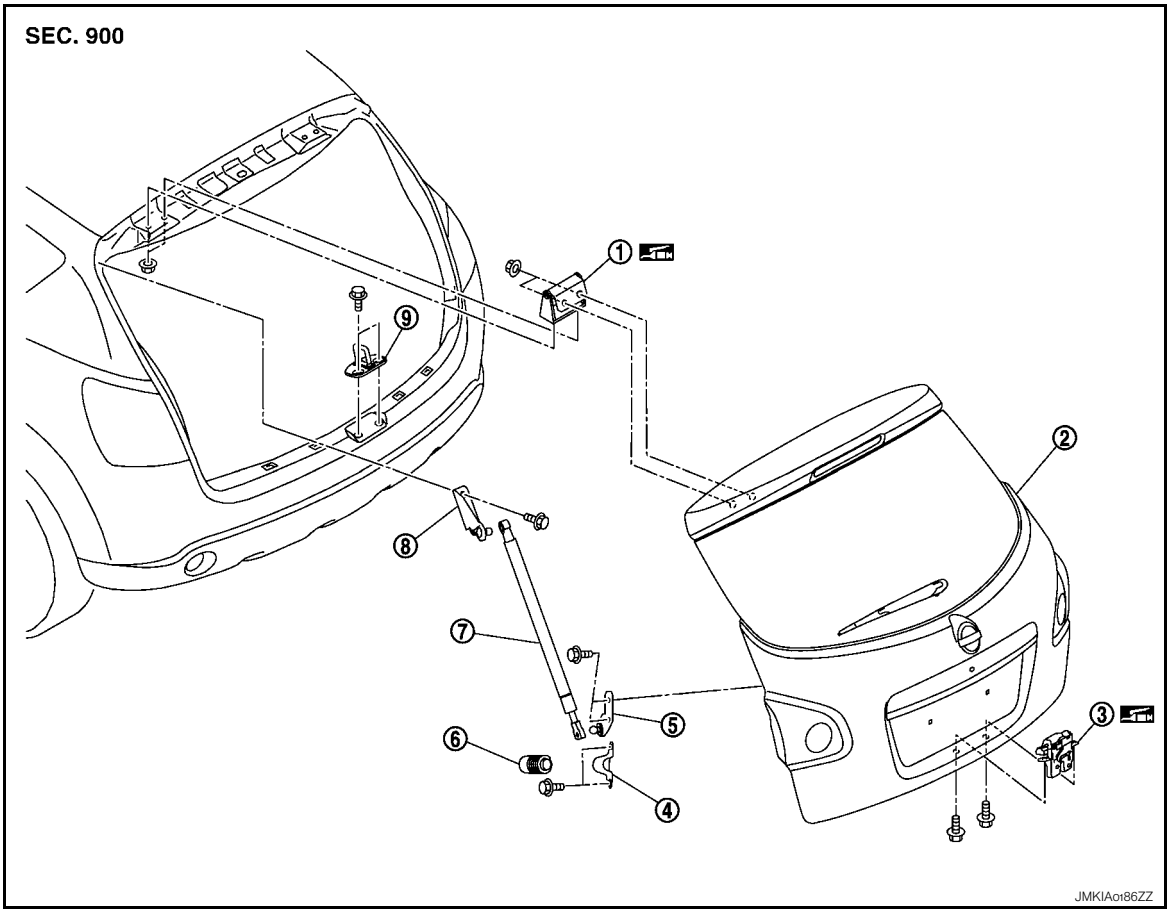
BACK DOOR

BACK DOOR ASSEMBLY

BACK DOOR ASSEMBLY : Exploded View

INFOID:0000000001054832

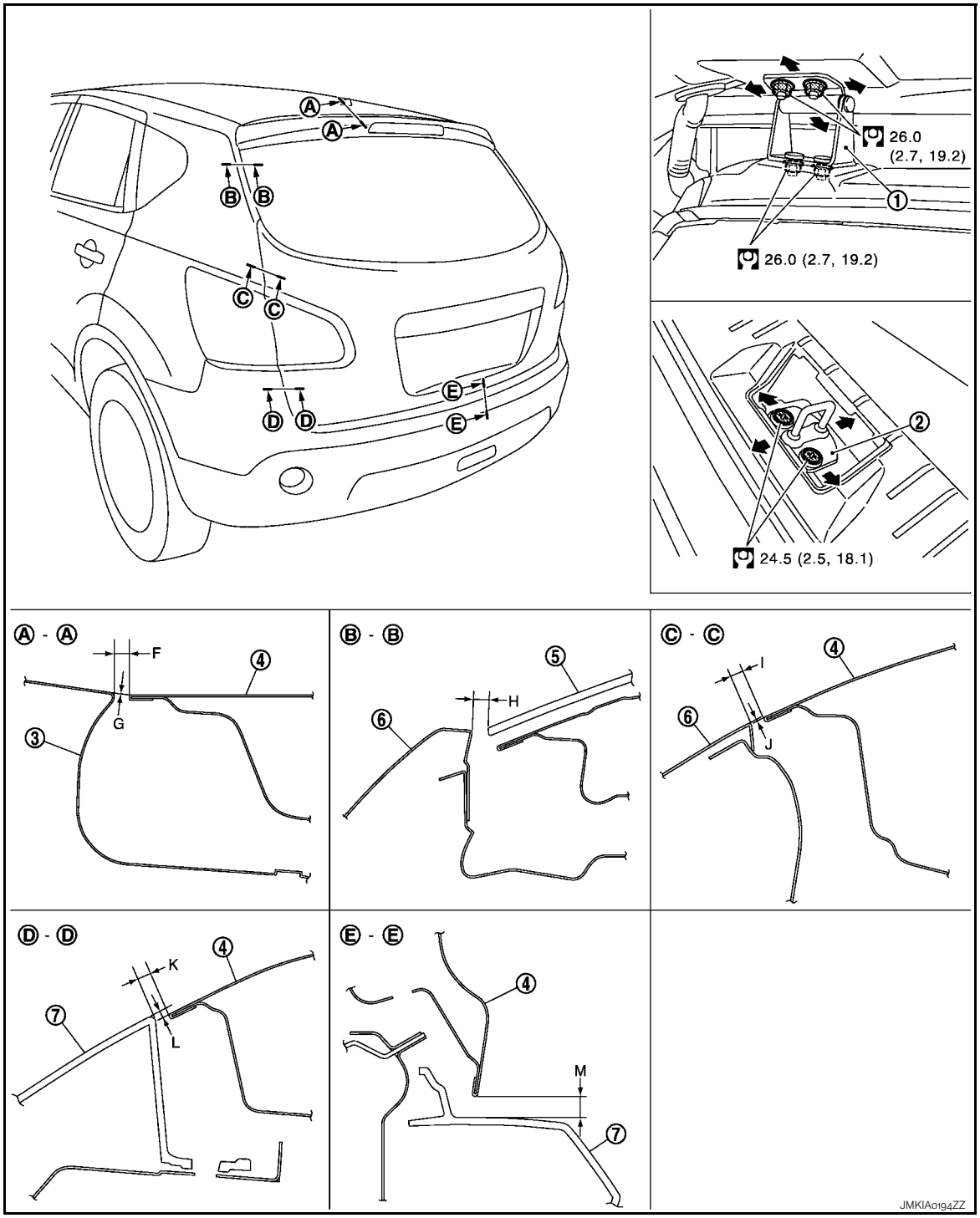
REMOVAL



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Back door hinge
2. Back door striker
3. Roof panel
4. Back door outer
5. Back door glass
6. Body side outer
7. Rear bumper fascia

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001054826

REMOVAL

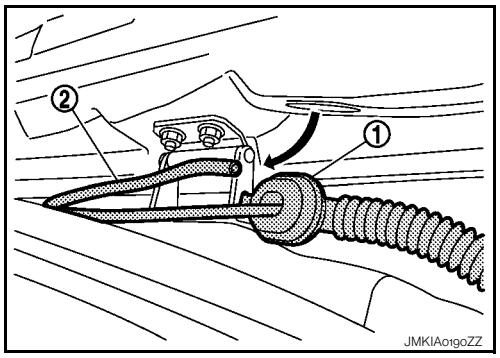
1. Remove the back door finisher inner. Refer to INT-26, "Removal and Installation".
2. Remove the back door window glass. Refer to GW-17, "Removal and Installation".

NOTE:

cardiagn.com

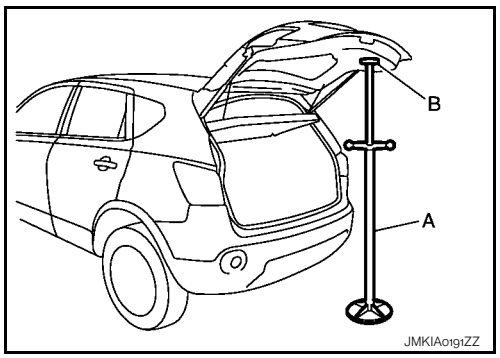
It is necessary to remove back door window glass in order to remove harness, because harness connector interferes with back door window glass pin.

3. Disconnect the connectors in the back door, and then remove the grommet, and pull out hte harness.
4. Remove the parcel shelf. Refer to INT-24, "Removal and Installation".
5. Remove the high-mounted stop lamp. Refer to EXL-183, "Removal and Installation".
6. Remove the grommet (1), and then pull out the washer tube (2) .

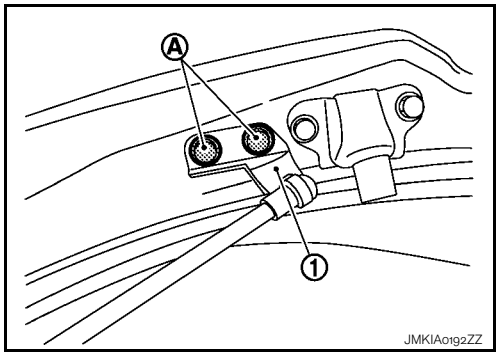


7. Pull the harness out of the back door.
8. Support the back door lock with the proper material to prevent it from falling.

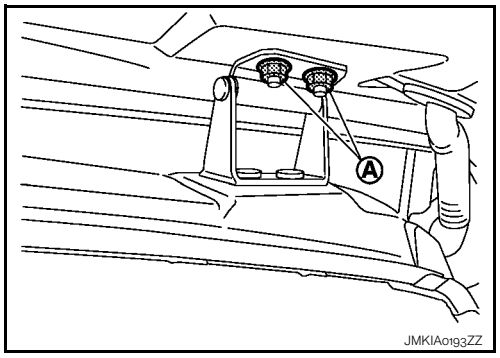
A : Jack
B : Shop cloth



9. Remove the back door stay bracket mounting bolts (A) on the back door.



10. Remove the back door hinge mounting nuts (A) on the back door and remove the back door assembly.
CAUTION:
Perform work with 2 workers, because of its heavy weight.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Perform work with 2 workers, because of its heavy weight.**

carsdiagn.com

- **After installation, perform fitting adjustment. Refer to DLK-250, "BACK DOOR ASSEMBLY : Adjustment".**
- **Check the back door open/close operation after installation.**
- **Check the back door lock/unlock operation after installation.**

BACK DOOR ASSEMBLY : Adjustment

INFOID:0000000001054856

Portion				Standard	Difference(RH/LH)
Back door panel – Roof panel	A – A	F	Clearance	5.0 – 7.0 mm (0.197 – 0.276 in)	—
		G	Surface height	0.0 – 2.0 mm (0.000 – 0.079 in)	—
Back door glass – Body side outer	B – B	H	Clearance	3.9 – 8.1 mm (0.154 – 0.319 in)	2.1 mm (0.083 in)
		I	Surface height	- 1.0 – 3.1 mm (- 0.039 – 0.122 in)	2.0 mm (0.079 in)
Back door panel – Body side outer	C – C	J	Clearance	3.5 – 6.5 mm (0.138 – 0.256 in)	2.0 mm (0.079 in)
		K	Surface height	- 1.0 – 1.0 mm (- 0.039 – 0.039 in)	—
Back door panel – Rear bumper fascia	D – D	L	Clearance	4.0 – 8.0 mm (0.157 – 0.315 in)	2.0 mm (0.079 in)
		M	Surface height	0.1 – 4.1 mm (0.004 – 0.161 in)	2.1 mm (0.083 in)
Back door panel – Rear bumper fascia	E – E	N	Clearance	5.8 – 10.2 mm (0.228 – 0.402 in)	—

FITTING ADJUSTMENT

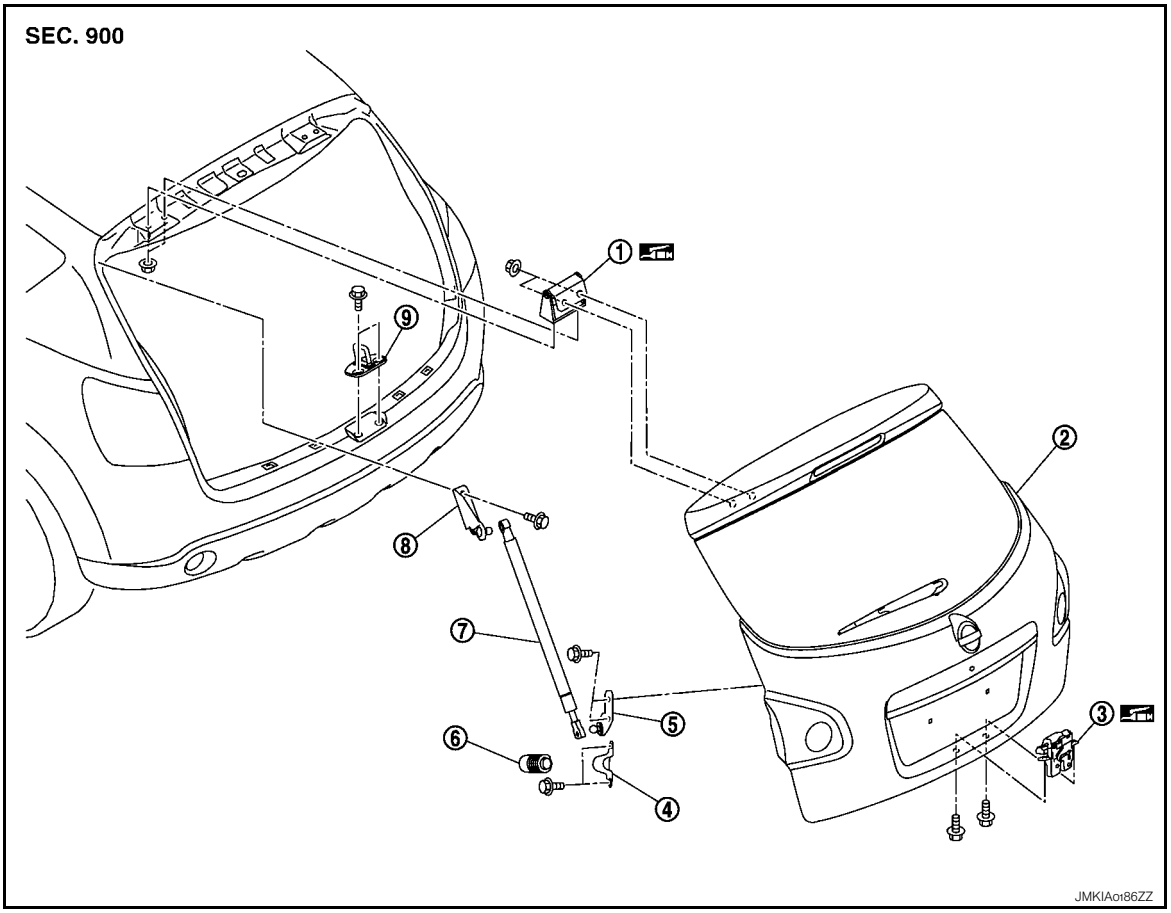
1. Check the clearance and the evenness between the back door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Loosen the bumper rubber.
4. Loosen the back door striker mounting bolts.
5. Lift up the back door approximately 100 – 150 mm (3.937 – 5.906 in) height then close it lightly and check that it is engaged firmly with the back door closed.
6. Check the clearance and evenness.
7. Finally tighten the back door striker.

BACK DOOR STRIKER

BACK DOOR STRIKER : Exploded View

INFOID:0000000001091322

cardiagn.com



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR STRIKER : Removal and Installation

INFOID:0000000001054863

REMOVAL

1. Remove the luggage rear plate cap. Refer to INT-24, "Removal and Installation".
2. Remove the mounting bolts, and then remove the back door striker.

INSTALLATION

Install in the reverse order of removal.

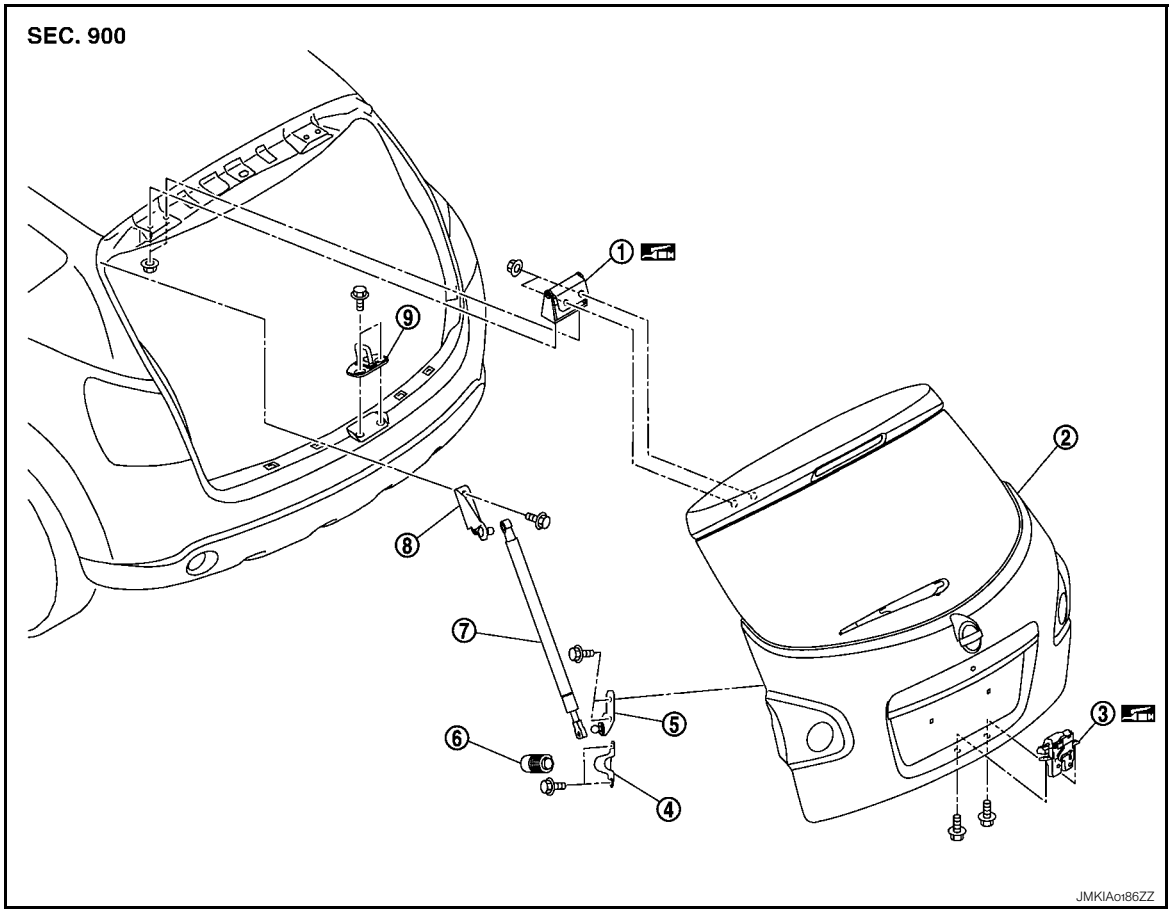
CAUTION:

- **When removing and installing the back door striker, be sure to perform the fitting adjustment. Refer to DLK-250, "BACK DOOR ASSEMBLY : Adjustment".**
- **Check the back door open/close operation after installation.**

BACK DOOR HINGE

BACK DOOR HINGE : Exploded View

INFOID:0000000001116372



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR HINGE : Removal and Installation

INFOID:0000000001102355

REMOVAL

1. Remove the back door assembly. Refer to DLK-248, "BACK DOOR ASSEMBLY : Removal and Installation".
2. Remove upper side of the back door weatherstrip. Refer to DLK-254, "BACK DOOR WEATHER-STRIP : Removal and Installation".
3. Remove rear seat belt cover. Refer to INT-21, "Removal and Installation".
4. Using remover tool, remove the headlining clip at the rear side of the headlining. Refer to INT-20, "Exploded View".
5. Remove the rear side of the headlining.
6. Remove the back door hinge mounting nuts (body side), and then remove the back door hinge.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

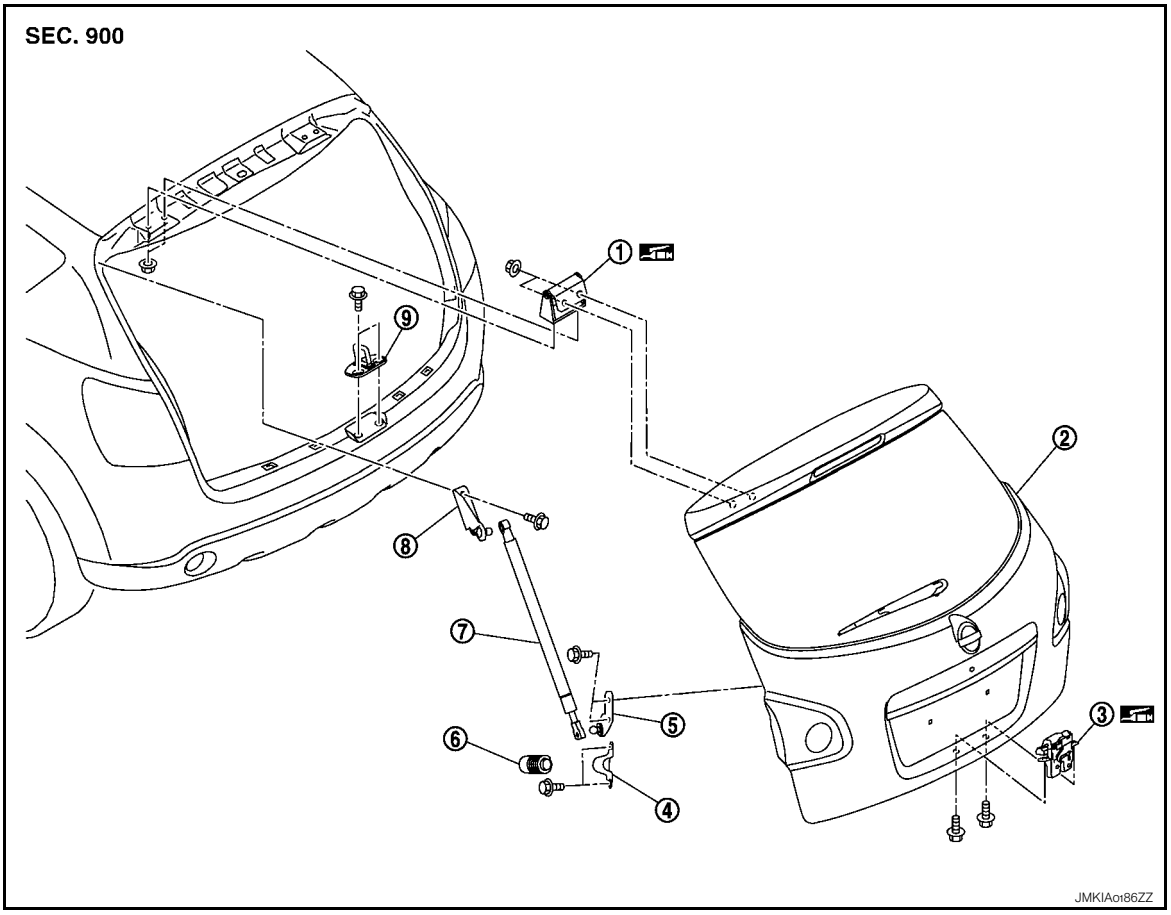
- **When removing and installing the back door assembly, perform the fitting adjustment. Refer to DLK-250, "BACK DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Check the hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the back door open/close operation after installation.**

BACK DOOR STAY

cardiagn.com

BACK DOOR STAY : Exploded View

INFOID:0000000001116373



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR STAY : Removal and Installation

INFOID:0000000001054862

REMOVAL

1. Remove the stud ball (upper/lower), and then remove the back door stay.
2. Remove the mounting bolts, and then remove the back door stay bracket (upper/lower).

INSTALLATION

Install in the reverse order of removal.

CAUTION:

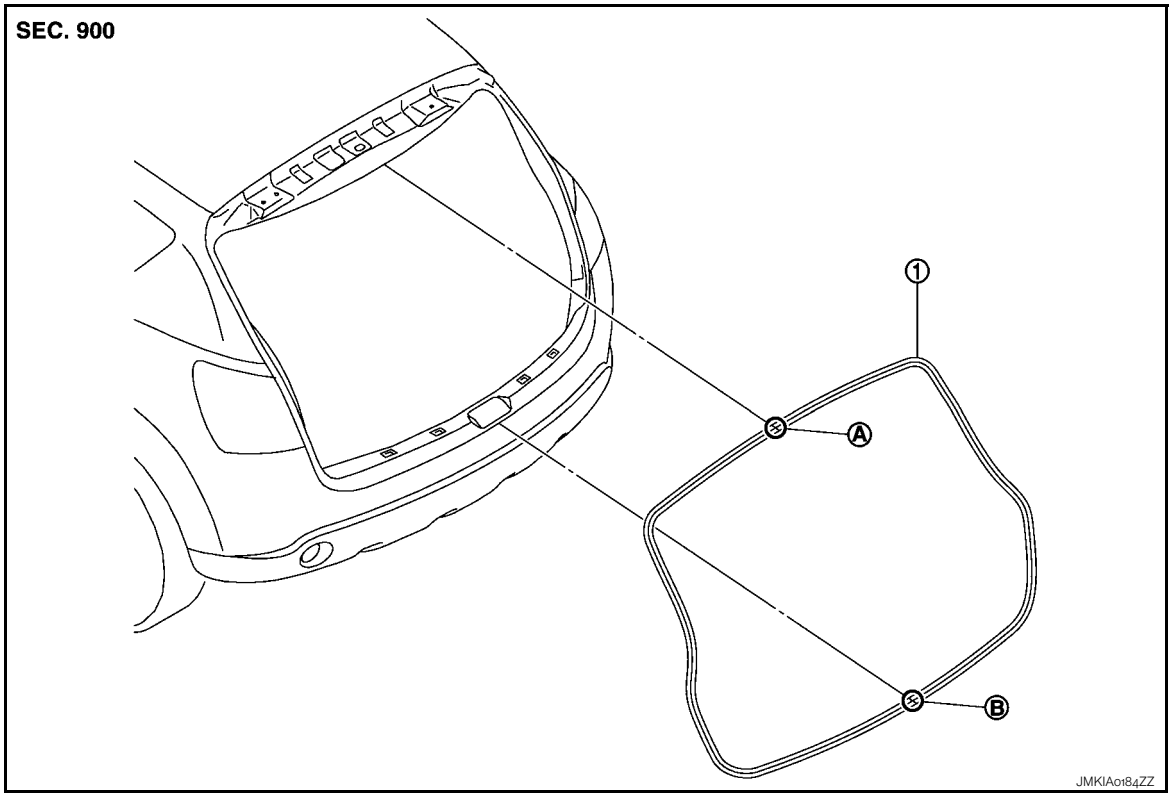
Check the back door open/close operation after installation.

BACK DOOR WEATHER-STRIP

BACK DOOR WEATHER-STRIP : Exploded View

INFOID:0000000001091325

REMOVAL



1. Back door weatherstrip
A. Mark (upper)
B. Mark (lower)

BACK DOOR WEATHER-STRIP : Removal and Installation

INFOID:0000000001054829

REMOVAL

Pull up and remove engagement with body from the weatherstrip joint.

CAUTION:

After removal, do not pull strongly on the weather-strip.

INSTALLATION

1. Working from the upper section, align the weatherstrip mark with vehicle center position mark and install the weatherstrip onto the vehicle.
2. For the lower section, align the weatherstrip seam with center of the back door striker.
3. After installation, pull the weatherstrip gently to ensure that there is no loose section.
   NOTE:
   Make sure that the weatherstrip is fit tlightly at each corner and the luggage rear plate.

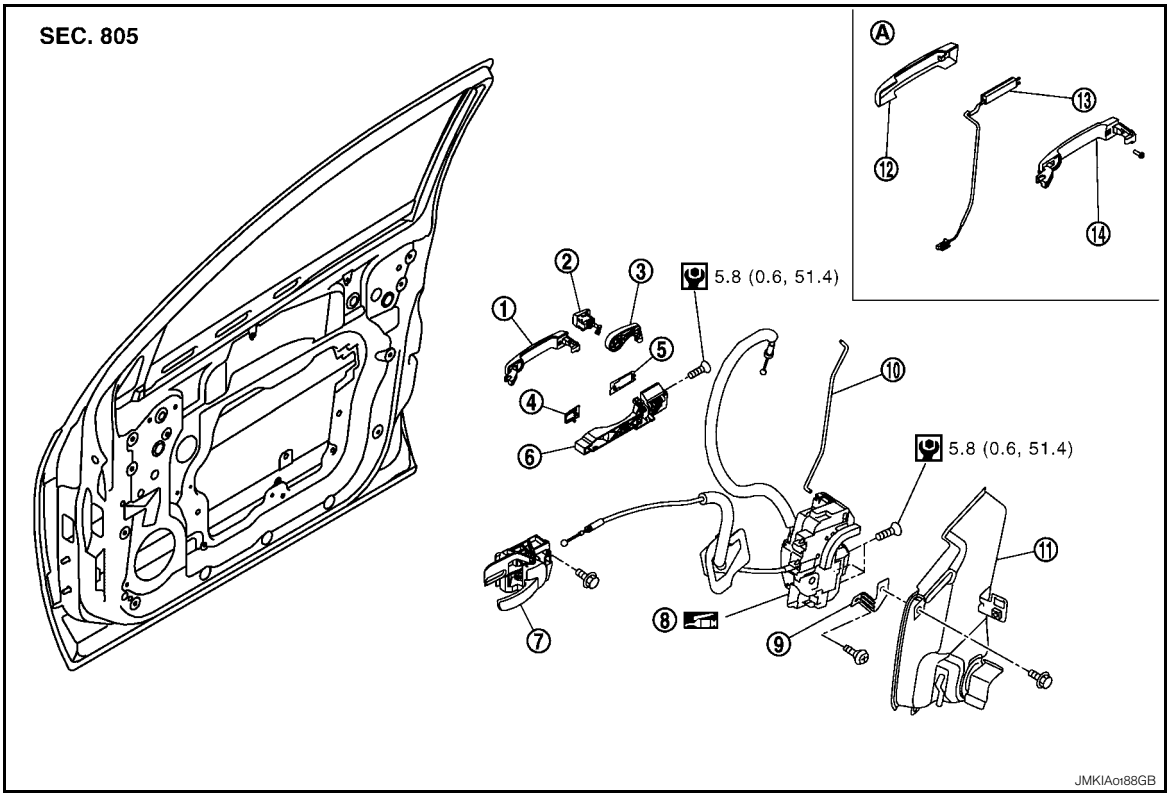
cardiagn.com

FRONT DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000000939224



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

Refer to GI-4, "Components" for symbols in the figure.

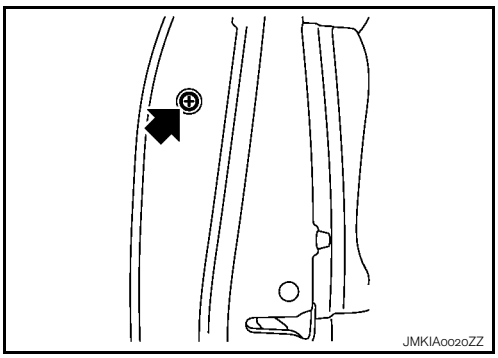
DOOR LOCK : Removal and Installation

INFOID:0000000000939225

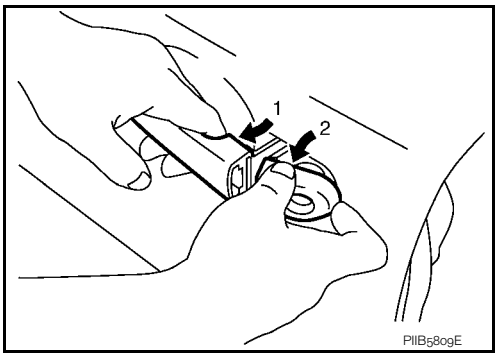
REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
3. Remove the front door glass. Refer to GW-19, "Removal and Installation".
4. Remove the front door module assembly. Refer to GW-22, "Removal and Installation".
5. Disconnect the door antenna and the door request switch connector and remove the harness clamp (models with Intelligent Key system).

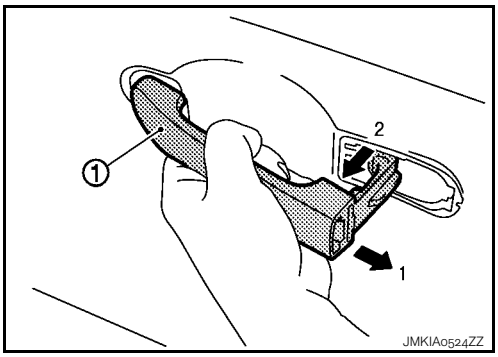
6. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and outside handle escutcheon (passenger side) mounting bolts from grommet hole.
CAUTION:
Do not forcibly remove the bolts (TORX: T10).



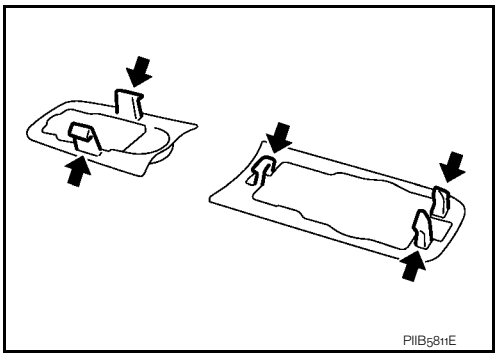
7. Reach in to separate the key cylinder rod connection (on the handle).
8. Disconnect the door key cylinder switch harness connector.
9. Remove the key cylinder lever from the door key cylinder.
10. While pulling the outside handle, remove door key cylinder assembly.



11. Disconnect front door request switch harness connector (models with Intelligent Key system).
12. While pulling outside handle, slide toward rear of vehicle to remove outside handle.

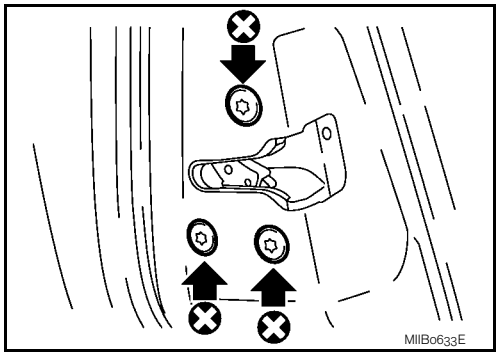


13. Remove the front gasket and the rear gasket.

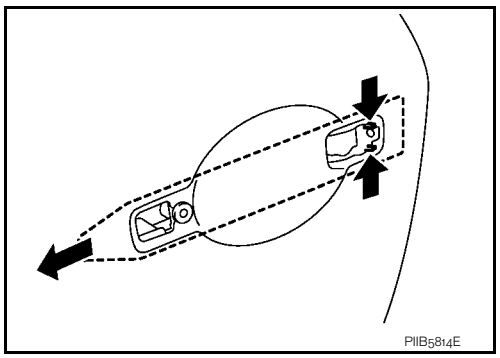


cardiagn.com

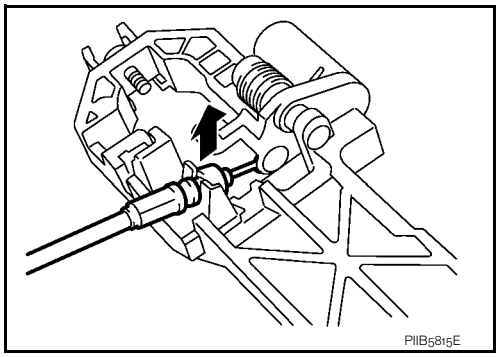
14. Remove the door lock assembly mounting bolts (TORX: T30).
15. Disconnect the door lock actuator connector, and then remove the door lock assembly.



16. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



17. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

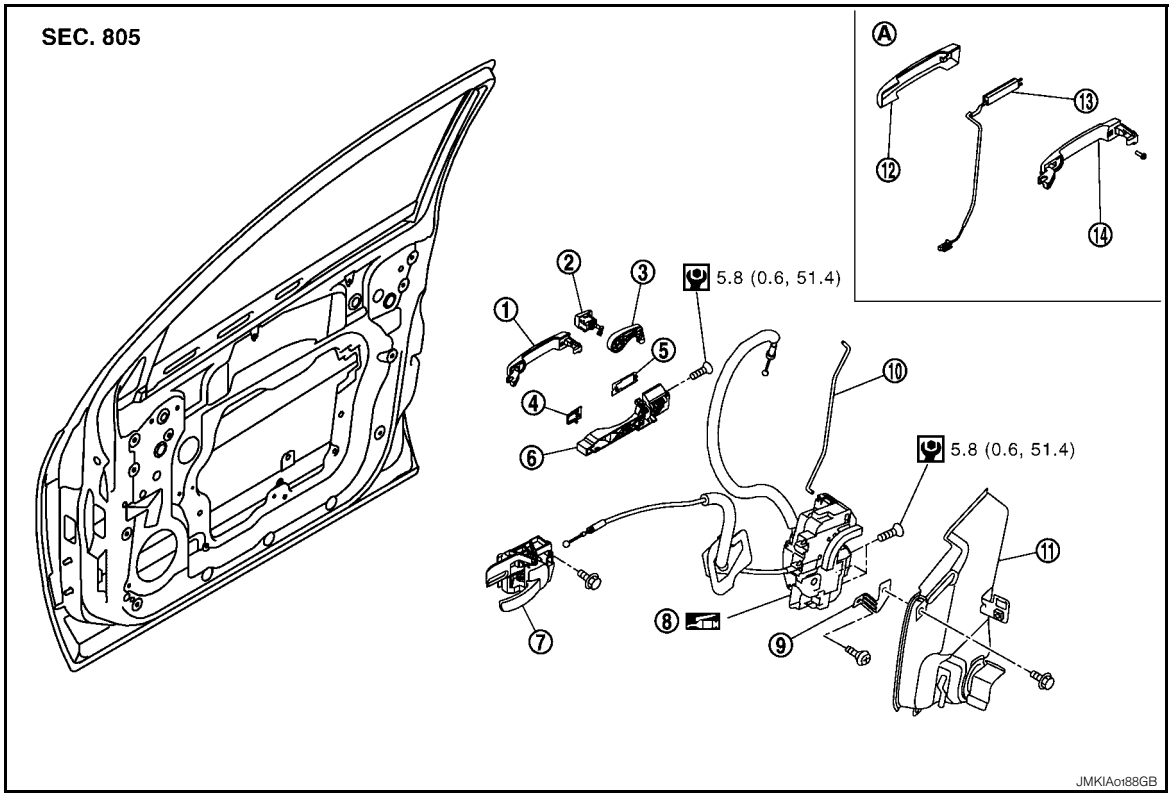
CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

INSIDE HANDLE

INSIDE HANDLE : Exploded View

INFOID:0000000001091307



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

Refer to GI-4, "Components" for symbols in the figure.

INSIDE HANDLE : Removal and Installation

INFOID:0000000001091308

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt.
3. Disconnect the inside handle knob cable and the lock knob cable, and then remove the inside handle.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

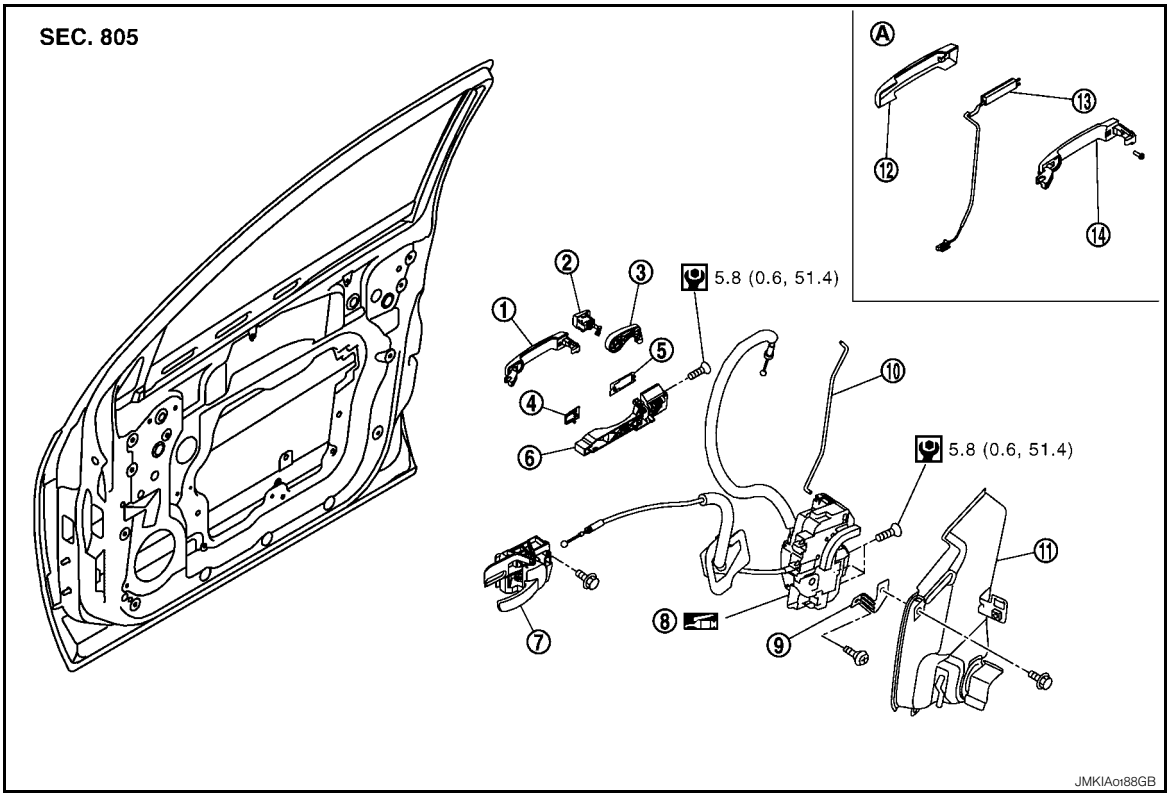
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

OUTSIDE HANDLE

OUTSIDE HANDLE : Exploded View

INFOID:0000000001091309

cardiagn.com



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

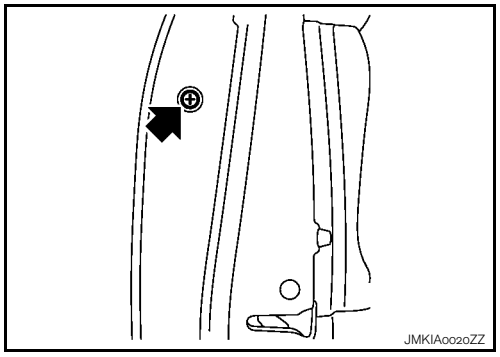
Refer to GI-4, "Components" for symbols in the figure.

OUTSIDE HANDLE : Removal and Installation

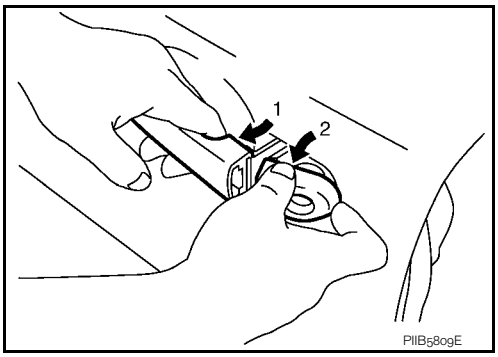
INFOID:0000000001091310

REMOVAL

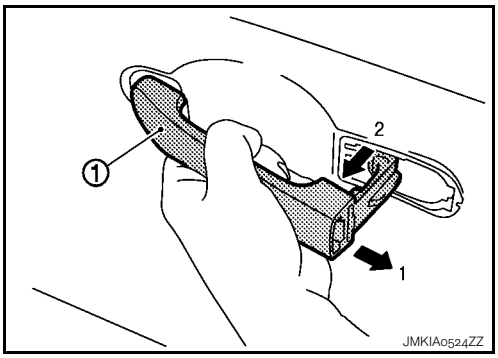
1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt, and disconnect the inside handle knob cable and the lock knob cable.
3. Remove the front door glass. Refer to GW-19, "Removal and Installation".
4. Remove the front door module assembly. Refer to GW-22, "Removal and Installation".
5. Disconnect the door antenna and the door request switch connector and remove the harness clamp (models with Intelligent Key system).
6. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
   CAUTION:
   Do not forcibly remove the bolts (TORX: T10).



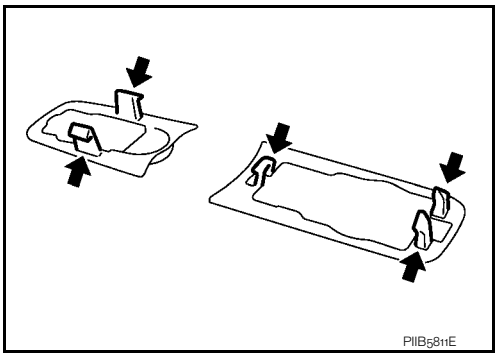
7. Reach in to separate the key cylinder rod connection (on the handle).
8. Disconnect the door key cylinder switch harness connector.
9. Remove the key cylinder lever from the door key cylinder.
10. While pulling the outside handle, remove the door key cylinder assembly.



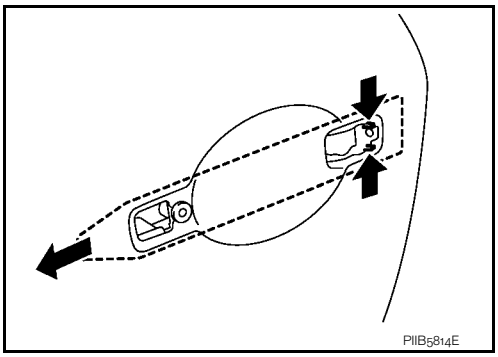
11. Disconnect the front door request switch harness connector (models with Intelligent Key system).
12. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



13. Remove the front gasket and rear gasket.

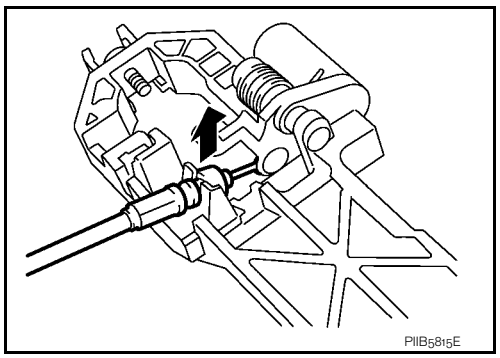


14. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



cardiagn.com

15. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

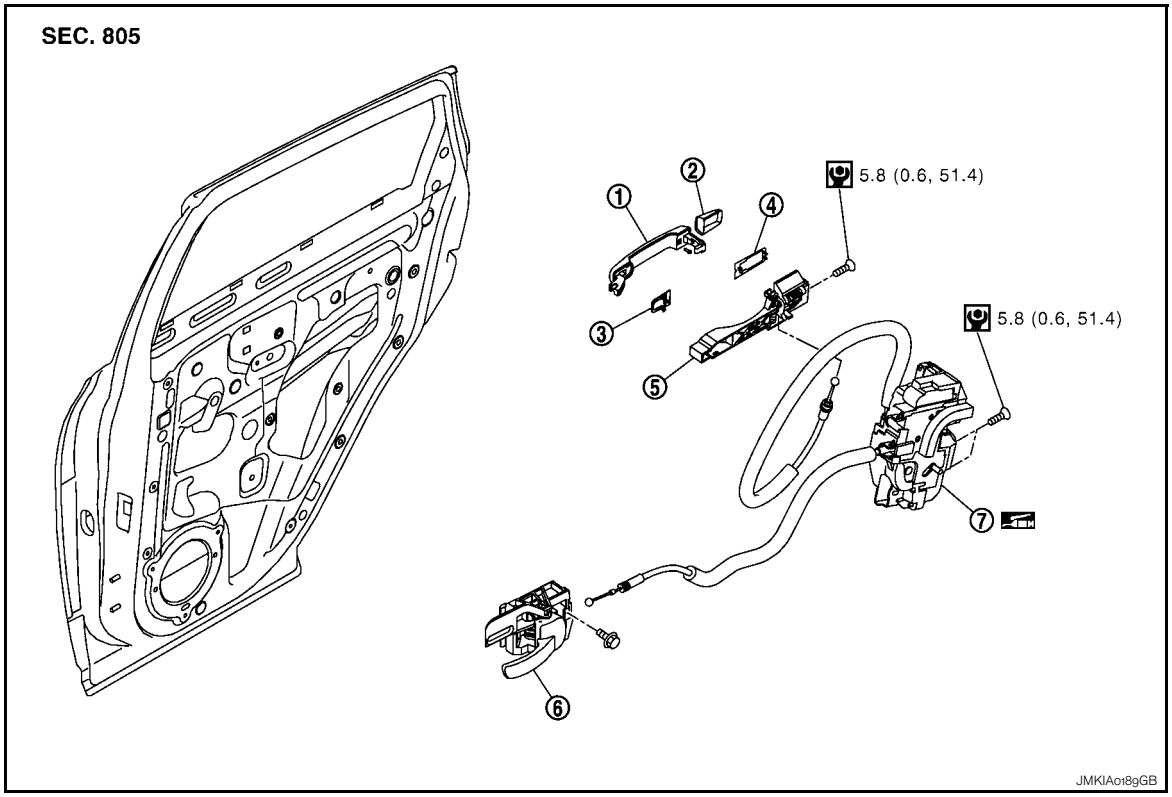
carsdiagn.com

REAR DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001091297



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

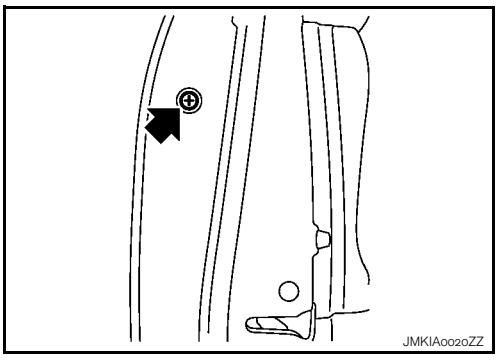
Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

INFOID:0000000001091298

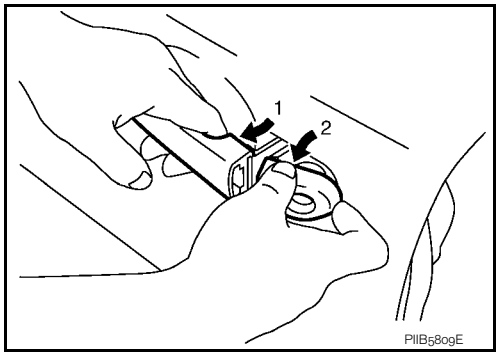
REMOVAL

1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Fully close the front door window.
3. Remove the door sealing screen.
4. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
5. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
   CAUTION:
   Do not forcibly remove the bolts (TORX: T10).

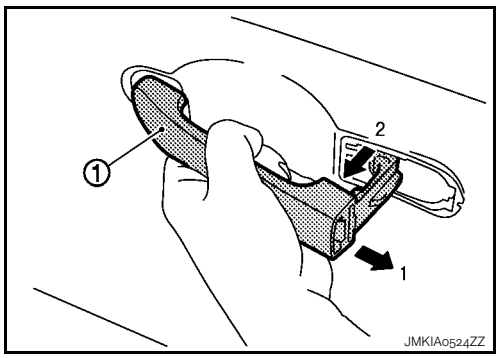


cardiagn.com

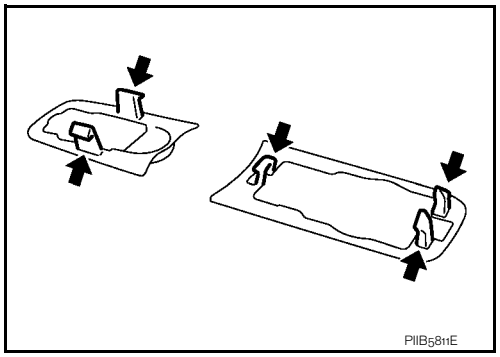
6. While pulling the outside handle, remove the door key cylinder assembly.



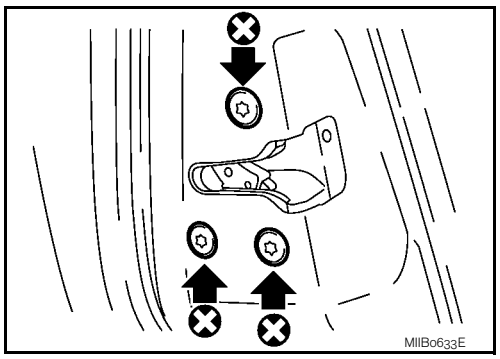
7. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



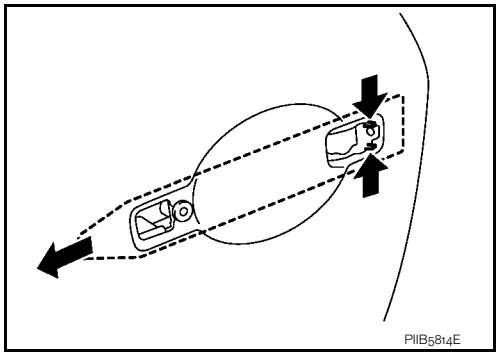
8. Remove the front gasket and the rear gasket.



9. Remove the door lock assembly mounting bolts (TORX: T30).
10. Disconnect the door lock actuator connector, and then remove the door lock assembly.

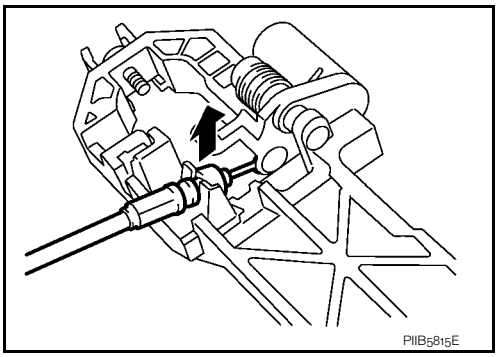


11. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



carsdiagn.com

12. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

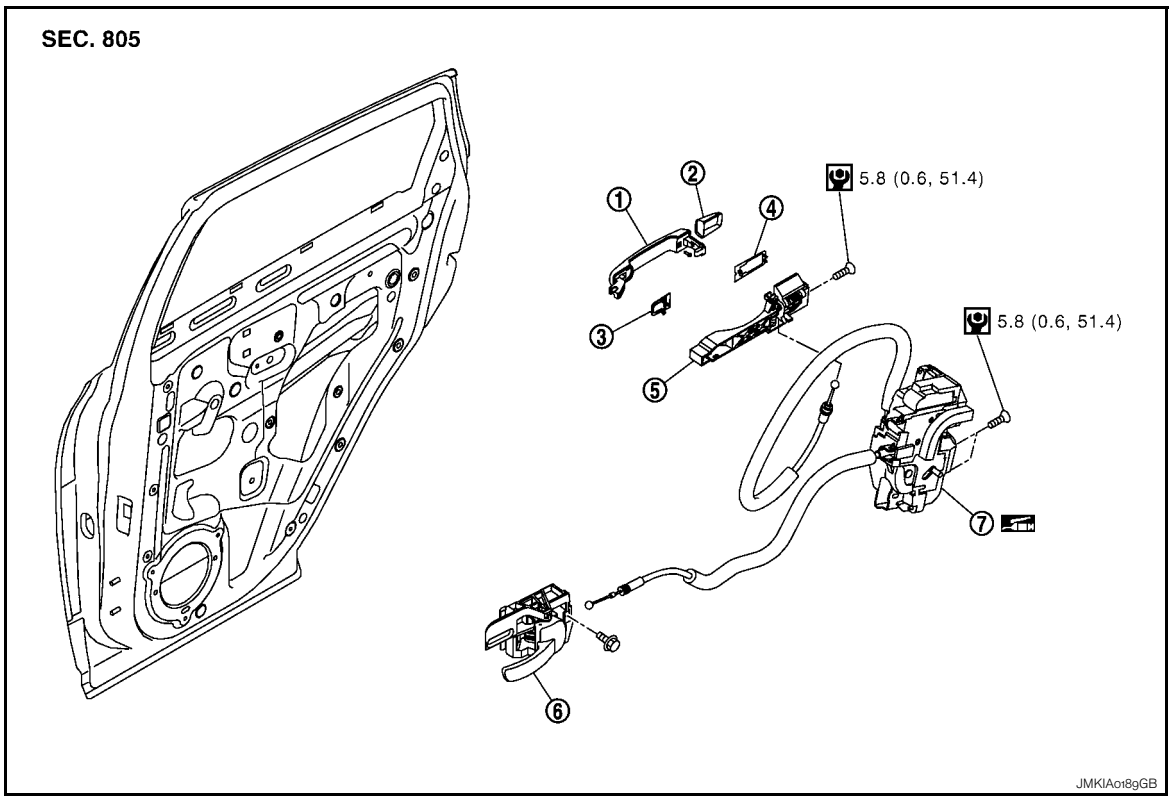
CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

INSIDE HANDLE

INSIDE HANDLE : Exploded View

INFOID:0000000001091311



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

Refer to GI-4, "Components" for symbols in the figure.

INSIDE HANDLE : Removal and Installation

INFOID:0000000001091312

REMOVAL

1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Remove the door sealing screen.

cardiagn.com

3. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
4. Remove the inside handle.

INSTALLATION

Install in the reverse order of removal.

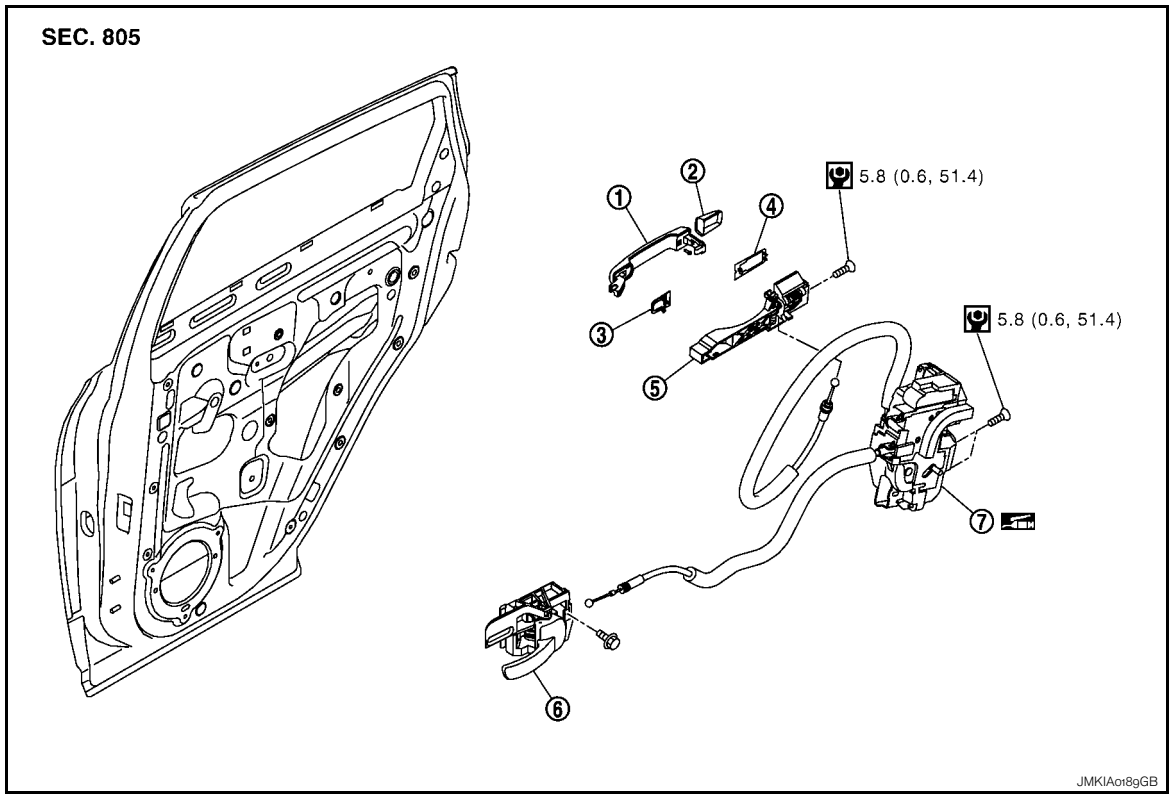
CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

OUTSIDE HANDLE

OUTSIDE HANDLE : Exploded View

INFOID:0000000001091313



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

Refer to GI-4, "Components" for symbols in the figure.

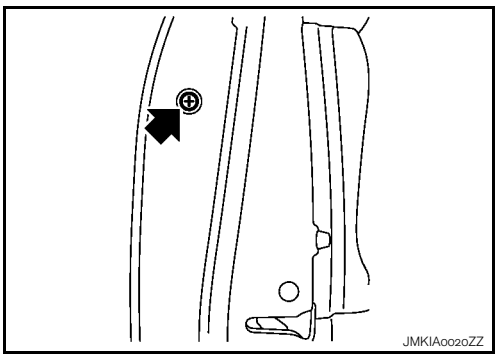
OUTSIDE HANDLE : Removal and Installation

INFOID:0000000001091314

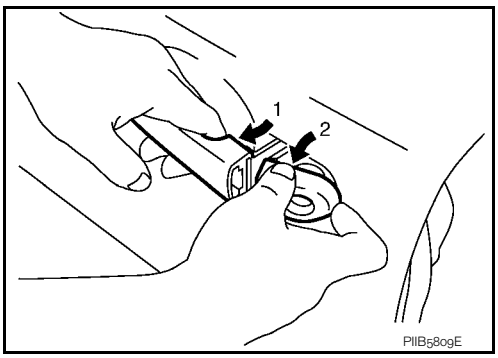
REMOVAL

1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Fully close the front door window.
3. Remove the door sealing screen.
4. Remove the inside handle mounting bolt, disconnect the inside handle knob cable and the lock knob cable.

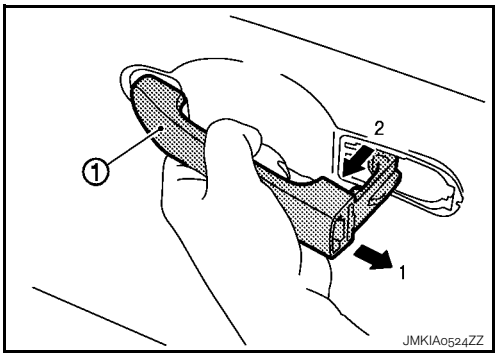
5. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
CAUTION:
Do not forcibly remove the bolts (TORX: T10).



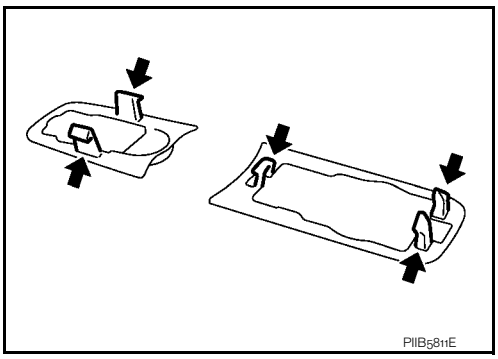
6. While pulling the outside handle, and then remove the door key cylinder assembly.



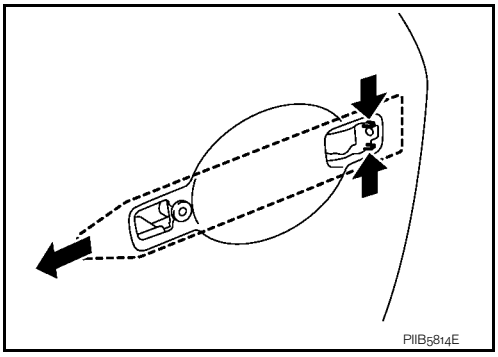
7. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



8. Remove the front gasket and the rear gasket.

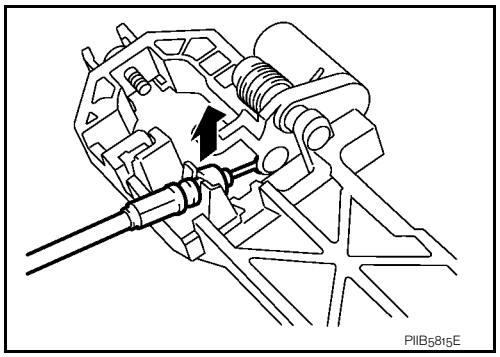


9. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



cardiagn.com

10. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

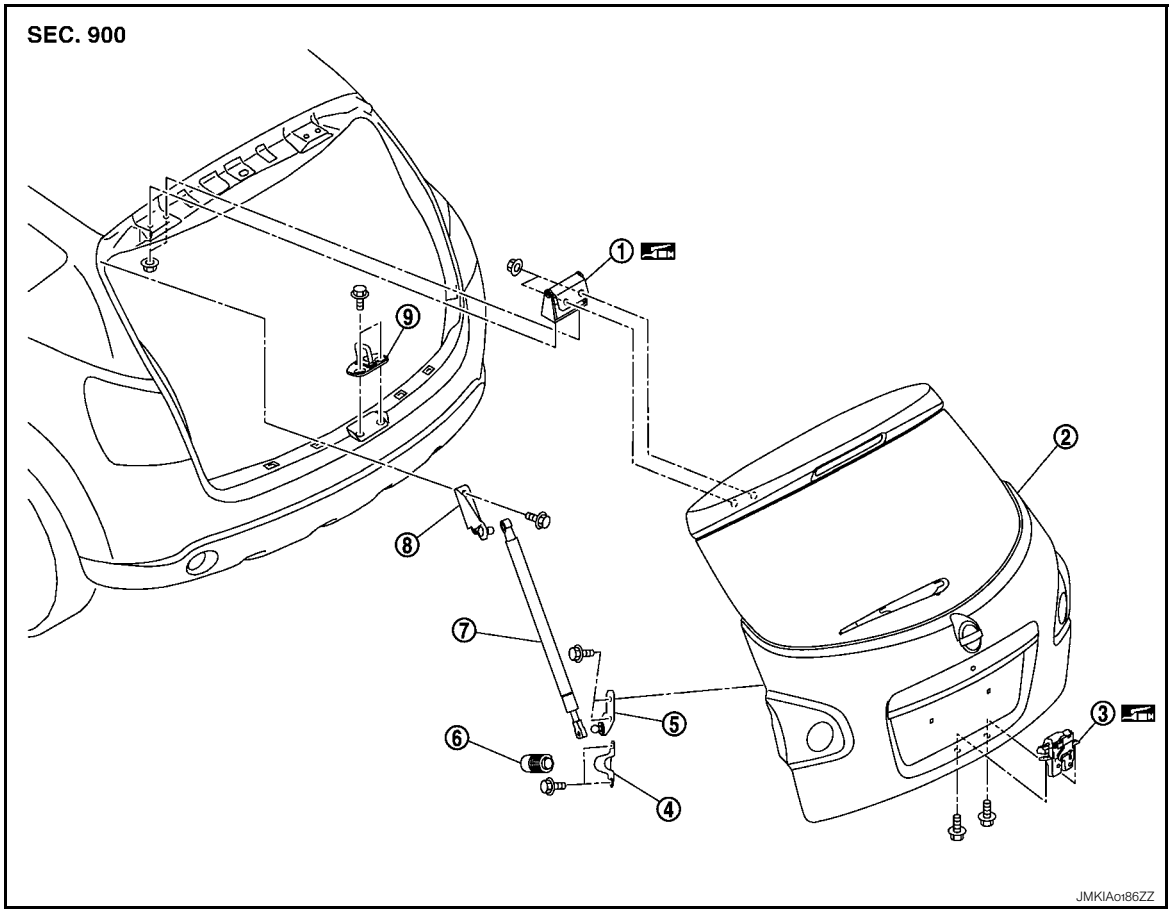
carjdiagn.com

BACK DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001091305



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

INFOID:0000000001091306

REMOVAL

1. Remove the back door trim finisher lower. Refer to INT-26, "Removal and Installation".
2. Disconnect the back door lock assembly and back door opener switch connectors.
3. Remove the back door lock mounting bolts, and then remove the back door lock and actuator.

INSTALLTION

Install in the reverse order of removal.

CAUTION:

Check the back door lock/unlock operation after installation.

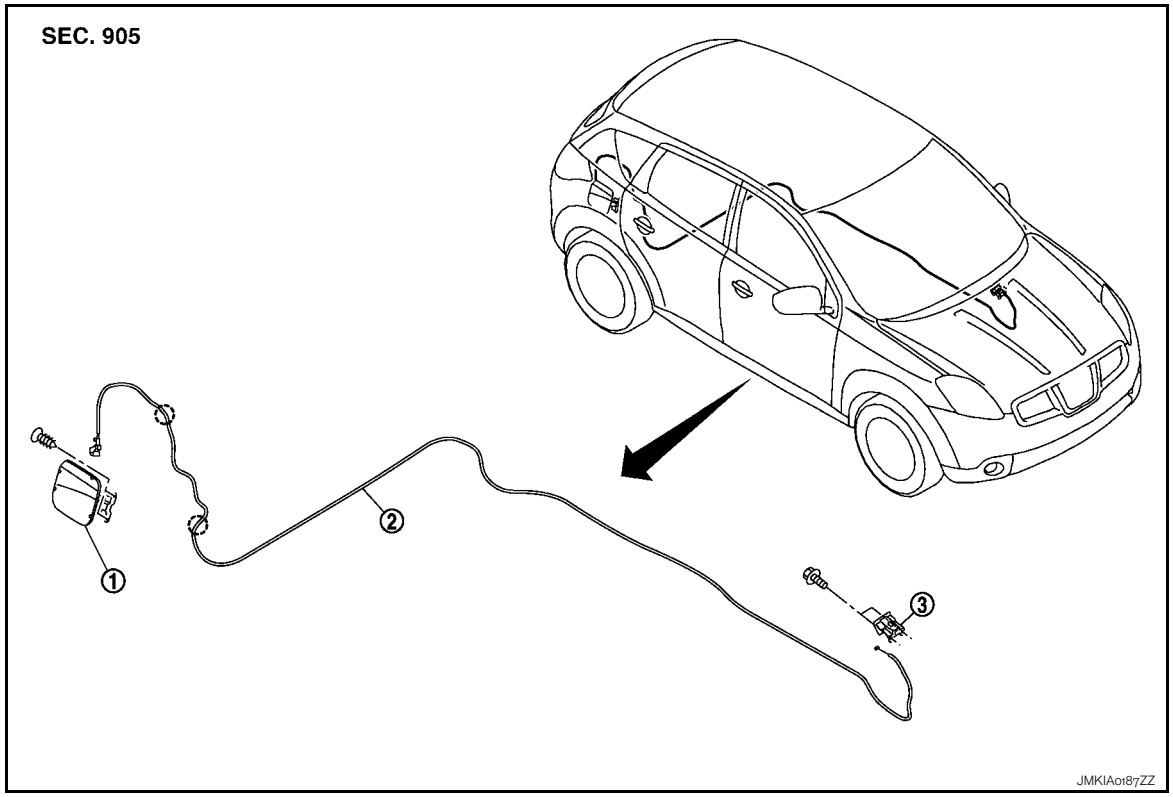
cardiagn.com

FUEL FILLER LID OPENER

FUEL FILLER LID

FUEL FILLER LID : Exploded View

INFOID:0000000001054835



1. Fuel filler lid assembly
2. Fuel filler opener cable
3. Fuel opener lever

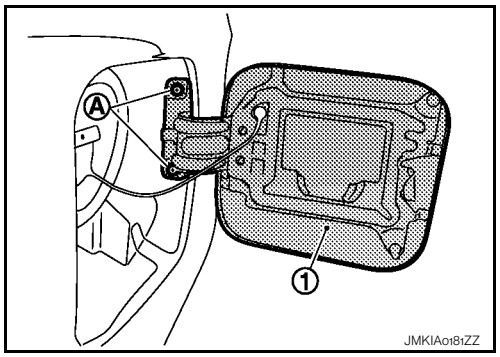
: Clip

FUEL FILLER LID : Removal and Installation

INFOID:0000000001054830

REMOVAL

1. Fully open the fuel filler lid.
2. Remove the filler cap.
3. Remove the mounting screws (A), and then remove the fuel filler lid (1).



INSTALLATION

Install in the reverse order of removal.

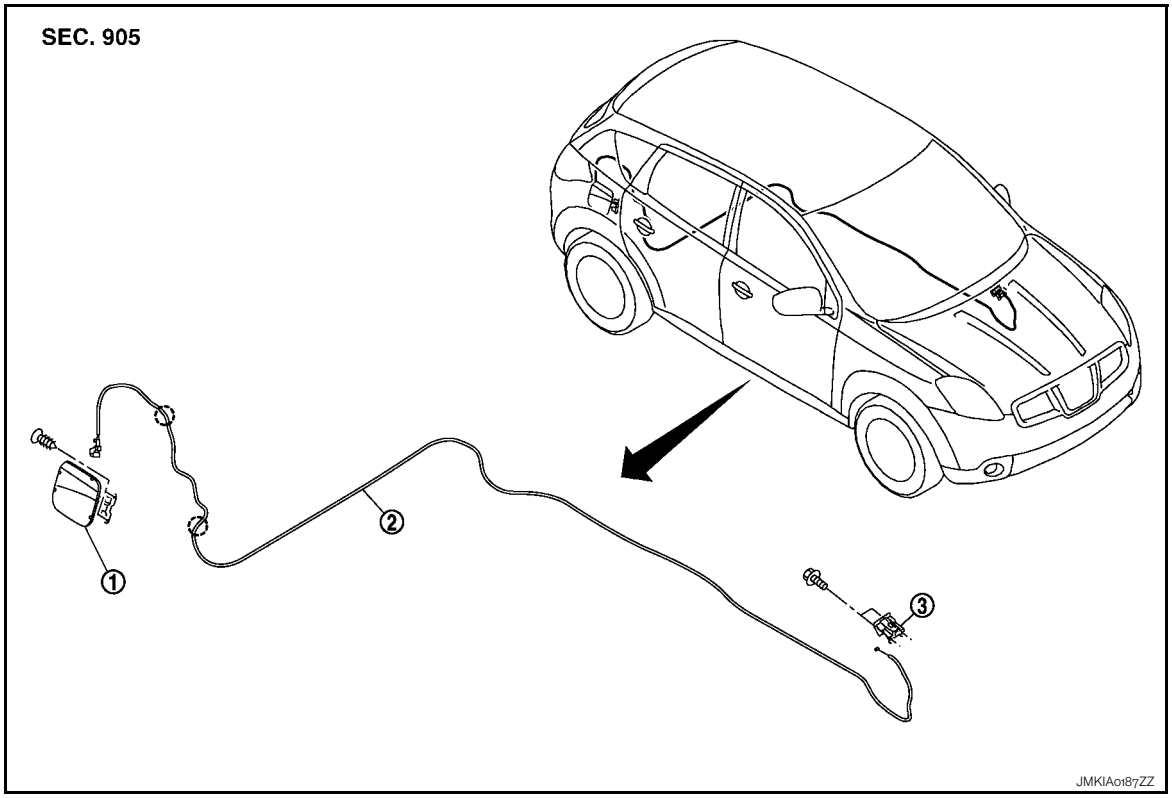
CAUTION:

After installation, apply the touch-up paint (the body color) onto the head of the mounting screws.

FUEL FILLER OPENER CABLE

FUEL FILLER OPENER CABLE : Exploded View

INFOID:0000000001091319



1. Fuel filler lid assembly
2. Fuel filler opener cable
3. Fuel opener lever

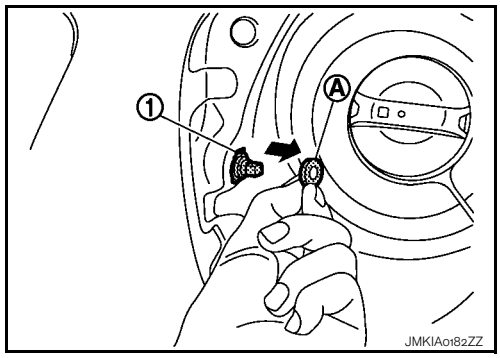
: Clip

FUEL FILLER OPENER CABLE : Removal and Installation

INFOID:0000000001091923

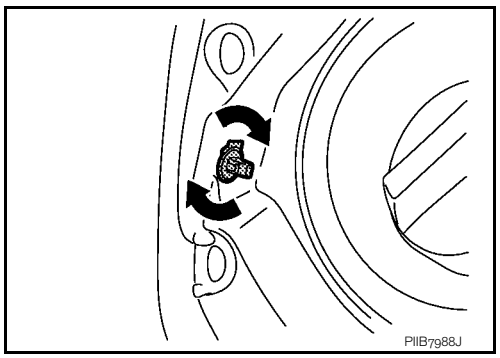
REMOVAL

1. Remove the rear seat cushion, rear seatback, seatback lower support, and seatback mounting outer bracket. Refer to SE-31, "Removal and Installation".
2. Remove the dash side finisher, front kicking plate inner, rear kicking plate inner, center pillar lower garnish, and luggage side lower finisher (front). Refer to INT-14, "Removal and Installation".
3. Remove the parcel shelf, luggage floor carpet, luggage floor spacer, luggage rear plate, luggage side lower finisher, and rear pillar finisher. Refer to INT-24, "Removal and Installation".
4. Remove the fuel filler lock seal (1).

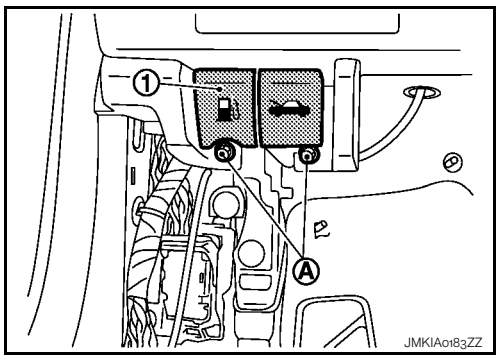


cardiagn.com

5. Rotate the fuel filler lock, and then remove the fuel filler lock.



6. Remove the fuel filler opener cable mounting clips and the clamps.
7. Remove the mounting bolts, and then remove the fuel filler lid opener lever.



8. Remove the fuel filler opener cable.

INSTALLATION

Install in the reverse order of removal.

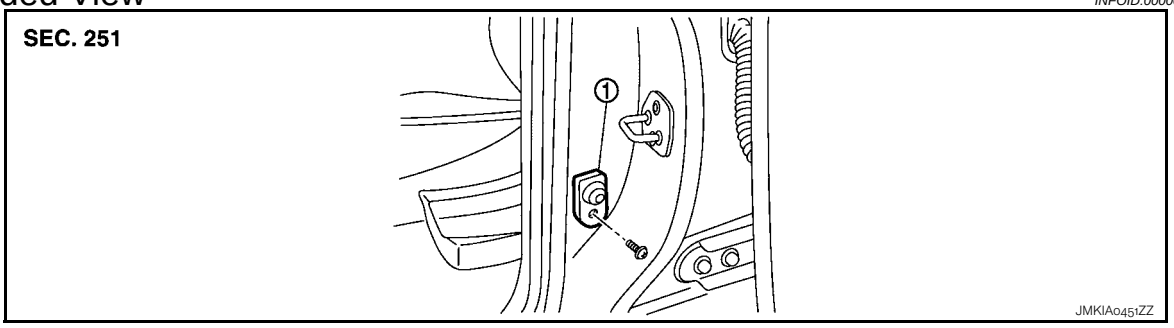
CAUTION:

Check the fuel filler lid open/close operation after installation.

DOOR SWITCH

Exploded View

INFOID:0000000001091512



1. Door switch (driver side)

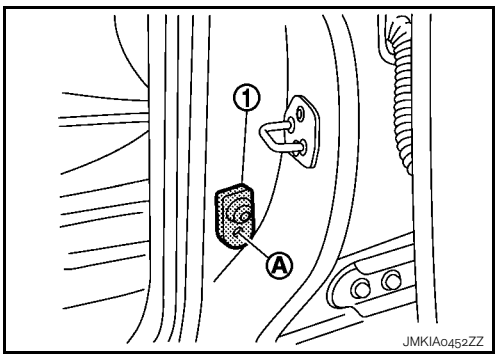
Refer to DLK-272, "Removal and Installation".

Removal and Installation

INFOID:0000000000939235

REMOVAL

1. Remove the door switch mounting bolt (A), and then remove door switch (1).
   NOTE:
   The same procedure is also performed for door switch (passenger side, rear LH and rear RH).



INSTALLATION

Install in the reverse order of removal.

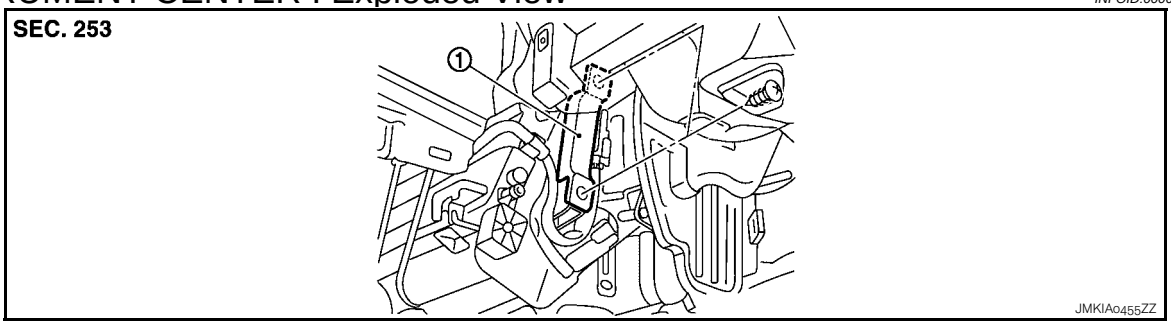
cardiagn.com

INSIDE KEY ANTENNA

INSTRUMENT CENTER

INSTRUMENT CENTER : Exploded View

INFOID:0000000000939236



1. Inside key antenna (instrument center)

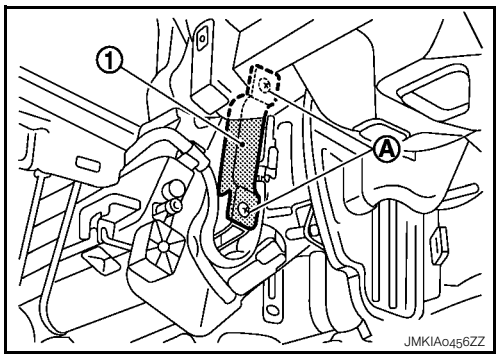
Refer to DLK-273, "INSTRUMENT CENTER : Removal and Installation".

INSTRUMENT CENTER : Removal and Installation

INFOID:0000000000939237

REMOVAL

1. Remove the glove box and instrument lower cover RH. Refer to IP-11, "Exploded View" and IP-12, "Removal and Installation".
2. Remove the key slot mounting screw (A), and then remove inside key antenna (instrument center) (1).



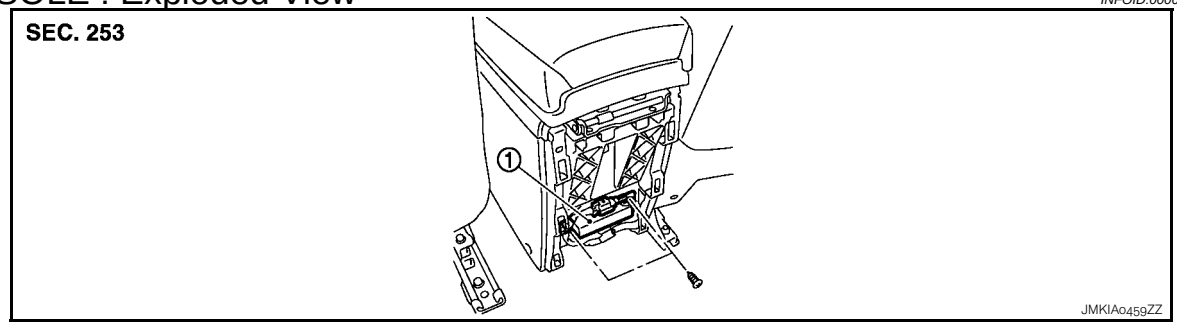
INSTALLATION

Install in the reverse order of removal.

CONSOLE

CONSOLE : Exploded View

INFOID:0000000000939238



1. Inside key antenna (console)

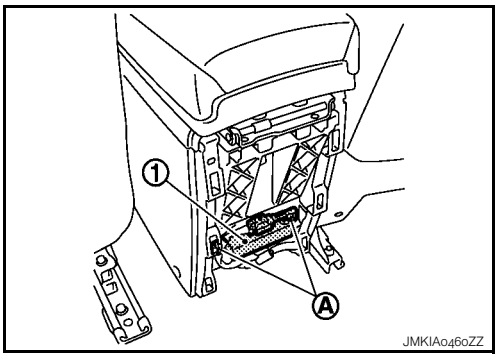
Refer to DLK-273, "CONSOLE : Removal and Installation".

CONSOLE : Removal and Installation

INFOID:0000000000939239

REMOVAL

1. Remove the console rear finisher (2). Refer to IP-18, "Exploded View" and IP-18, "Removal and Installation".
2. Remove the inside key antenna mounting screw (A), and then remove inside key antenna (console) (1).

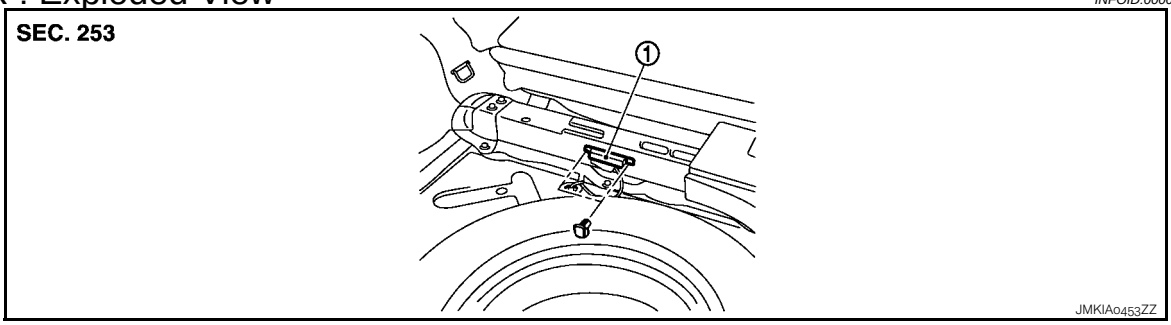


INSTALLATION
Install in the reverse order of removal.

REAR

REAR : Exploded View

INFOID:0000000000939240



1. Inside key antenna (rear seat)

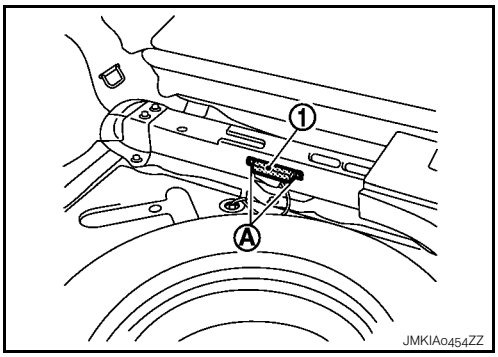
Refer to DLK-274, "REAR : Removal and Installation".

REAR : Removal and Installation

INFOID:0000000000939241

REMOVAL

1. Remove the luggage floor spacer (LH). Refer to INT-24, "Exploded View" and INT-24, "Removal and Installation".
2. Remove the inside key antenna (rear seat) mounting clips (A), and then remove inside key antenna (rear seat) (1).



INSTALLATION
Install in the reverse order of removal.

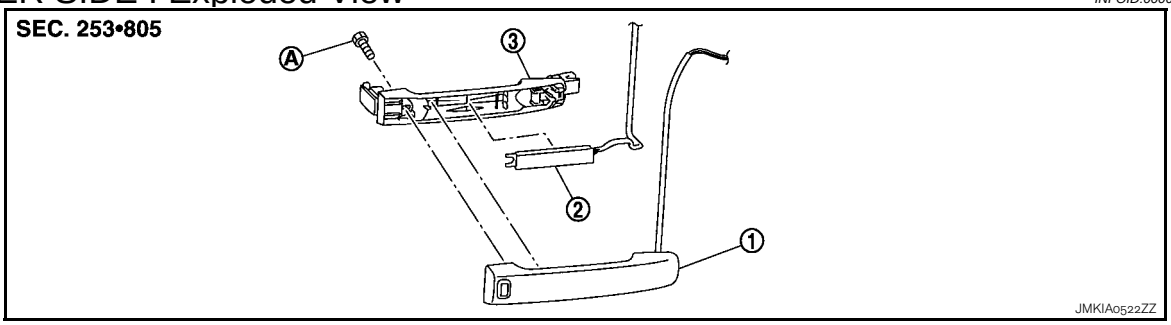
cardiagn.com

OUTSIDE KEY ANTENNA

DRIVER SIDE

DRIVER SIDE : Exploded View

INFOID:0000000000939242



1. Outside handle grip
2. Outside key antenna
3. Outside handle bracket

A. Bolt

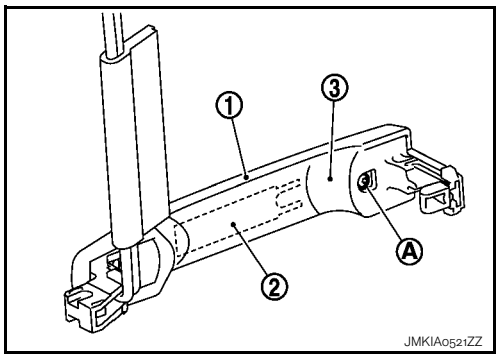
Refer to DLK-275, "DRIVER SIDE : Removal and Installation".

DRIVER SIDE : Removal and Installation

INFOID:0000000000939243

REMOVAL

1. Remove the outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".
2. Remove the bolt (A) from outside handle grip (1).
3. Remove the outside key antenna (2) from outside handle bracket (3).



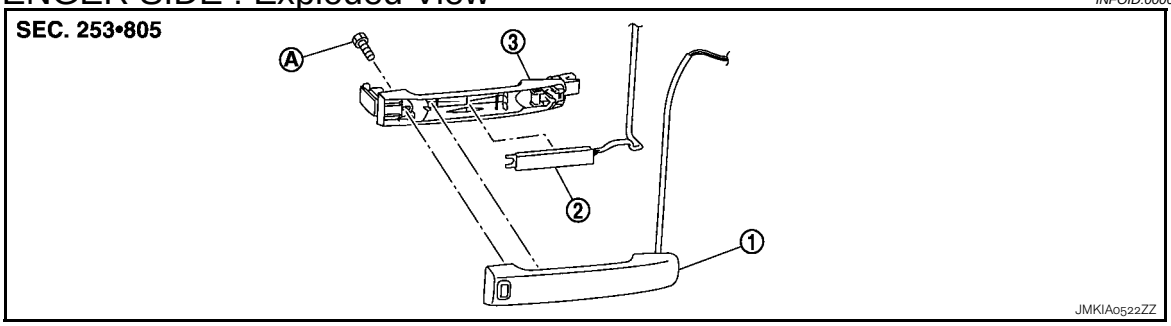
INSTALLATION

Install in the reverse order of removal.

PASSENGER SIDE

PASSENGER SIDE : Exploded View

INFOID:0000000001102421



1. Outside handle grip
2. Outside key antenna
3. Outside handle bracket

A. Bolt

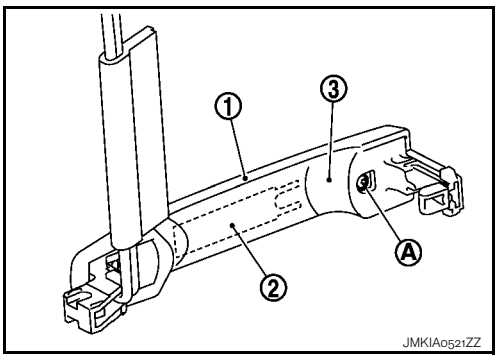
Refer to DLK-275, "PASSENGER SIDE : Removal and Installation".

PASSENGER SIDE : Removal and Installation

INFOID:0000000001102422

REMOVAL

1. Remove the outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".
2. Remove the bolt (A) from outside handle grip (1).
3. Remove the outside key antenna (2) from outside handle bracket (3).



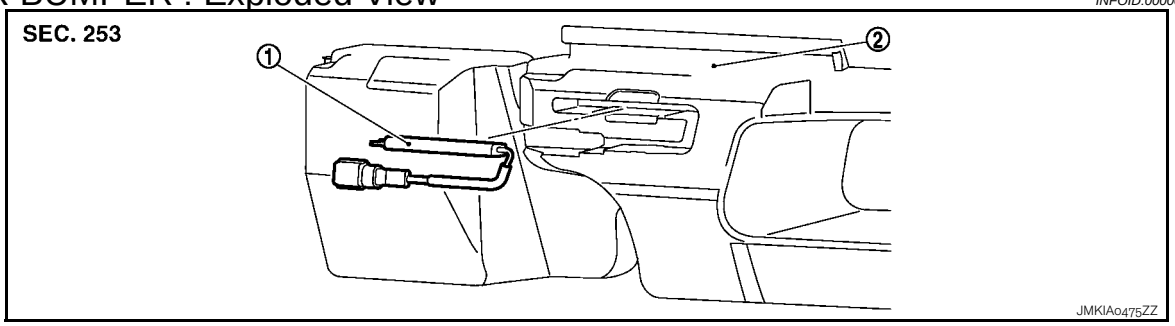
INSTALLATION

Install in the reverse order of removal.

REAR BUMPER

REAR BUMPER : Exploded View

INFOID:0000000000939246



1. Outside key antenna (rear bumper) 2. Rear bumper energy absorber

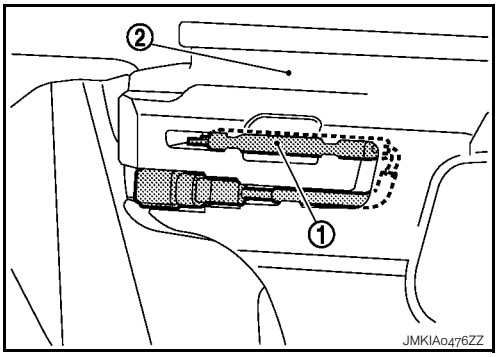
Refer to DLK-276, "REAR BUMPER : Removal and Installation".

REAR BUMPER : Removal and Installation

INFOID:0000000000939247

REMOVAL

1. Remove the rear bumper. Refer to EXT-14, "Exploded View" and EXT-15, "Removal and Installation".
2. Remove the outside key antenna (rear bumper) (1) from rear bumper energy absorber (2).



INSTALLATION

Install in the reverse order of removal.

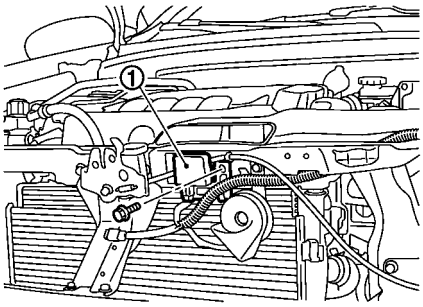
cardiagn.com

INTELLIGENT KEY WARNING BUZZER

Exploded View

INFOID:0000000000939248

SEC. 253



1. Intelligent Key warning buzzer

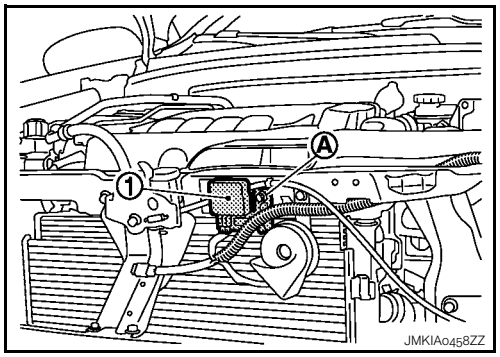
Refer to DLK-277, "Removal and Installation".

Removal and Installation

INFOID:0000000000939249

REMOVAL

1. Remove the front bumper. Refer to EXT-11, "Exploded View" and EXT-11, "Removal and Installation".
2. Remove the Intelligent Key warning buzzer mounting bolt (A), and then remove the Intelligent Key warning buzzer (1).



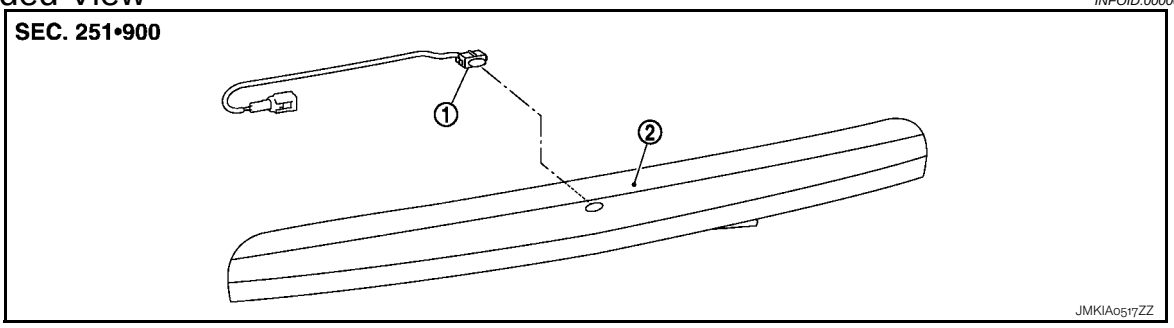
INSTALLATION

Install in the reverse order of removal.

BACK DOOR REQUEST SWITCH

Exploded View

INFOID:0000000000939252



1. Back door request switch
2. Back door finisher

Refer to DLK-278, "Removal and Installation".

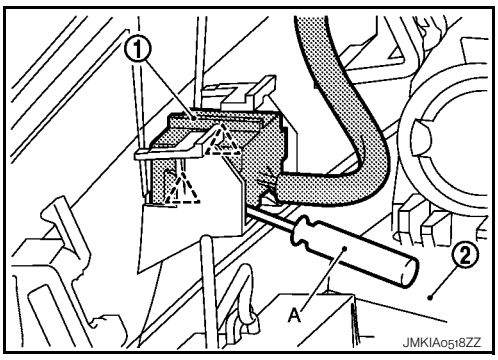
Removal and Installation

INFOID:0000000000939253

REMOVAL

1. Remove the back door finisher.
   Refer to EXT-31, "Exploded View" and EXT-31, "Removal and Installation".
2. Remove the back door request switch (1) from back door finisher (2) using flat-bladed screw driver (A) etc.

   △ : **Pawl**



3. Remove the trunk lid request switch mounting screw (B), and then remove trunk lid request switch (3) from inner bracket (2).

INSTALLATION

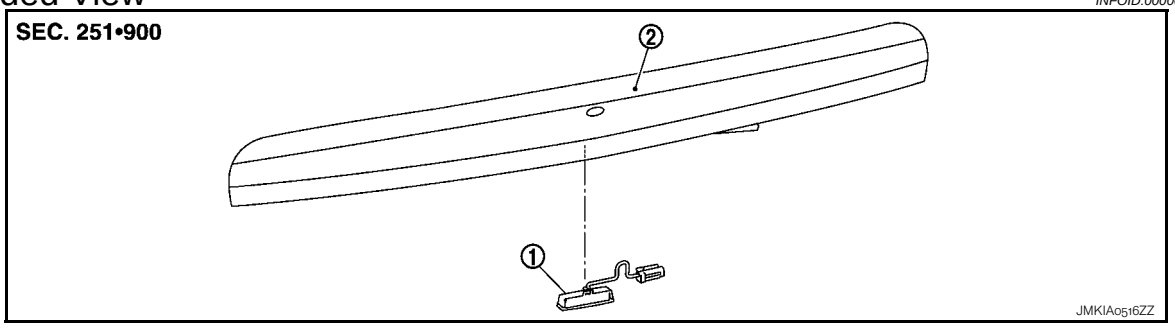
Install in the reverse order of removal.

cardiagn.com

BACK DOOR OPENER SWITCH

Exploded View

INFOID:0000000000939254



1. Back door opener switch
2. Back door finisher

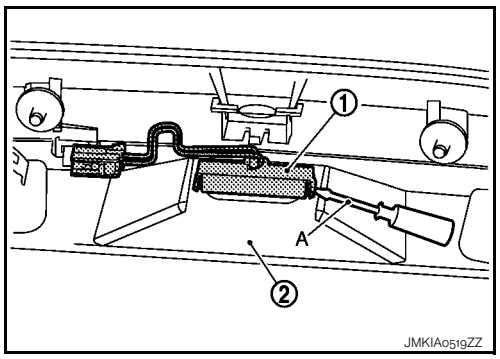
Refer to DLK-279, "Removal and Installation".

Removal and Installation

INFOID:0000000000939255

REMOVAL

1. Remove the back door finisher.
   Refer to EXT-31, "Exploded View" and EXT-31, "Removal and Installation".
2. Remove the back door opener switch (1) from back door finisher (2) using flat-bladed screw driver (A) etc.



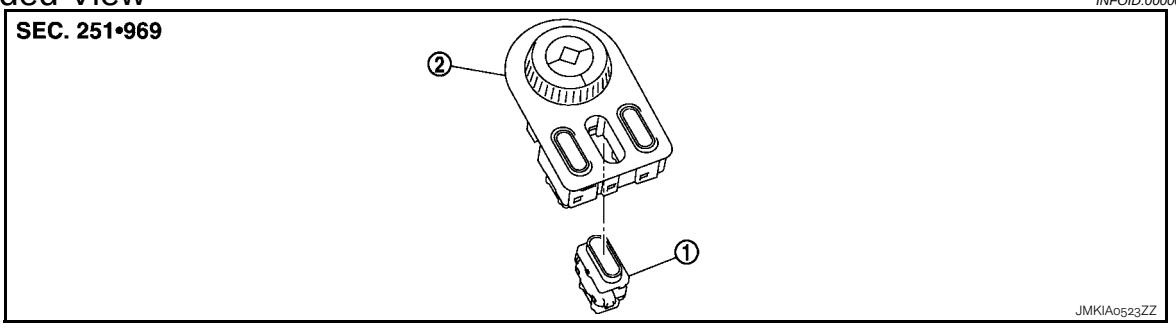
INSTALLATION

Install in the reverse order of removal.

DOOR LOCK AND UNLOCK SWITCH

Exploded View

INFOID:0000000001102429



1. Door lock and unlock switch
2. Center console switch panel

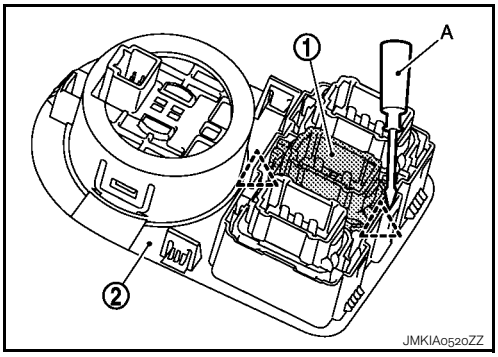
Refer to DLK-280, "Removal and Installation".

Removal and Installation

INFOID:0000000001102430

REMOVAL

1. Remove the center console switch panel. Refer to IP-18, "Exploded View" and IP-18, "Removal and Installation".
2. Remove the door lock and unlock switch (1) from center console switch panel (2) using flat-bladed screwdriver (A), etc.



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

INTELLIGENT KEY BATTERY

Exploded View

INFOID:0000000001109238

Refer to DLK-281, "Removal and Installation".

Removal and Installation

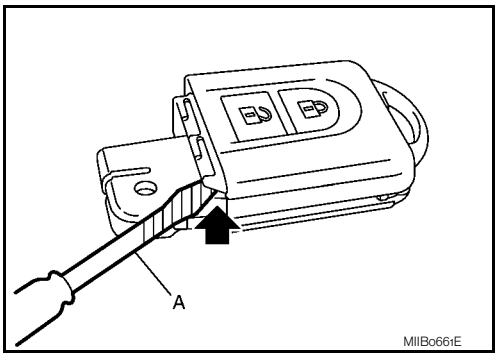
INFOID:0000000001109237

REMOVAL

1. Remove Intelligent Key cover.
2. Insert a flat-bladed screwdriver (A) wrapped with tape as shown in the illustration and then separate lower and upper cases by twisting screwdriver.

CAUTION:

- **Do not touch the circuit board or battery terminal.**
- **The Intelligent Key is water-resistant. However, if it does get wet, immediately wipe it dry.**



3. Remove the circuit board assembly from the upper case (1). [Substrate assembly: circuit board (3) + rubber (2)]
4. Gently press the rubber (2) and remove the circuit board (3).

CAUTION:

Do not touch the printed circuits directly.

5. Remove the battery (4) from the lower case (5) and replace it.

Battery replacement : Coin-type lithium battery (CR2032)

CAUTION:

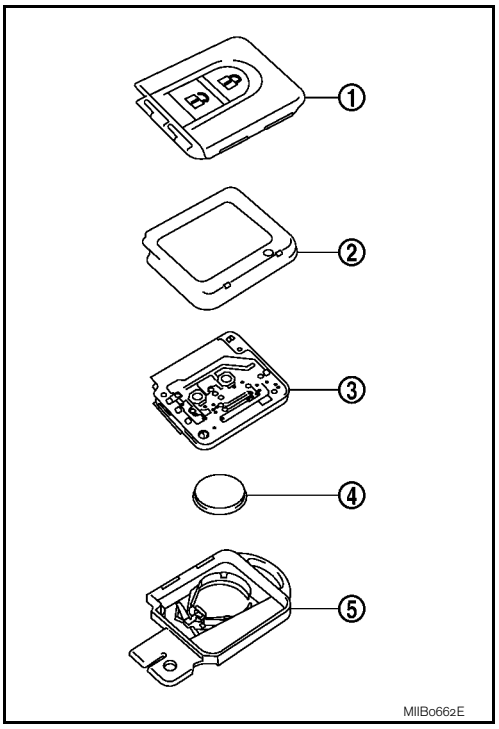
When replacing battery, keep dirt, grease, and other foreign materials off the electrode contact area.

6. After replacement, assemble the upper and lower cases by engaging the hooks on their circumference while being careful not to pinch the rubber, etc.

CAUTION:

After replacing the battery, check that all Intelligent Key functions work normally.

Refer to DLK-134, "Component Function Check".



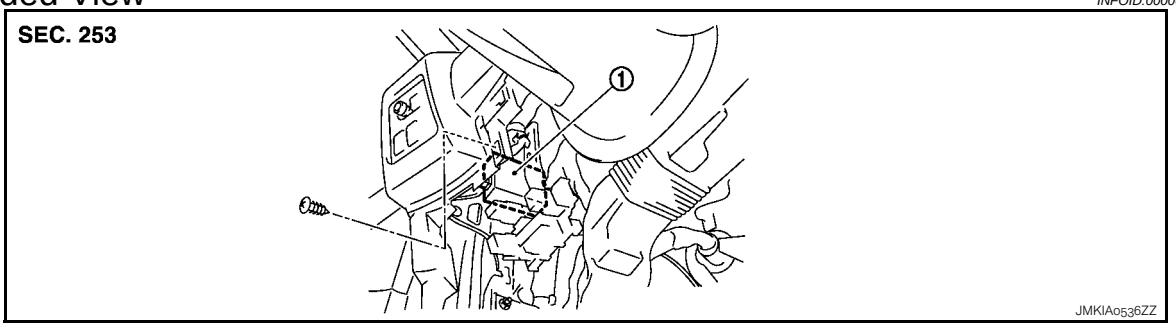
INSTALLATION

Install in the reverse order of removal.

INTELLIGENT KEY UNIT

Exploded View

INFOID:0000000001116299



1. Intelligent Key unit
M40

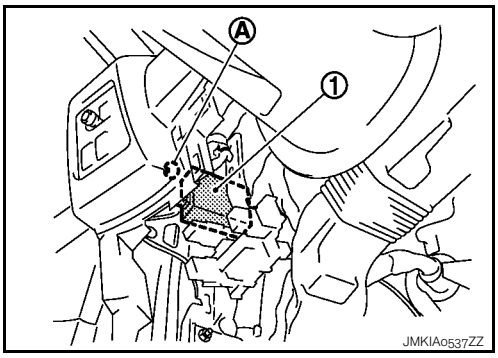
Refer to DLK-282, "Removal and Installation".

Removal and Installation

INFOID:0000000001116300

REMOVAL

1. Remove lower instrument panel (driver side) and mirror switch finisher. Refer to IP-11, "Exploded View" and IP-12, "Removal and Installation".
2. Remove the Intelligent Key unit mounting screw (A), and then remove Intelligent Key unit (1).
NOTE:
Perform the system initialization when replacing Intelligent Key unit. Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

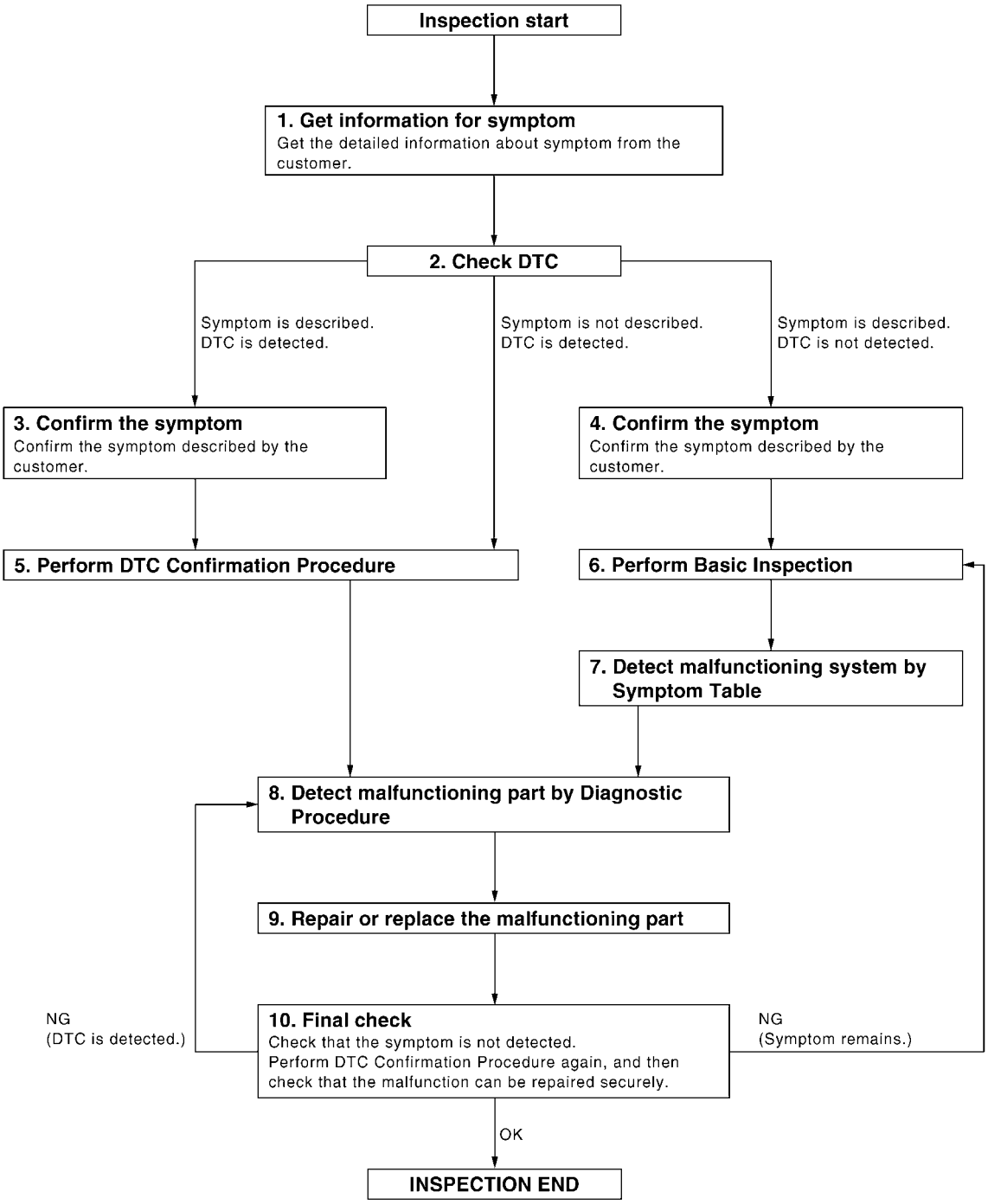
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001102238

OVERALL SEQUENCE



JMKIA0101GB

DETAILED FLOW

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred).

>> GO TO 2.

2.CHECK DTC

1. Check DTC for Intelligent Key unit and BCM.
2. Perform the following procedure if DTC is displayed.

- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.

3. Check related service bulletins for information.

Is any symptom described and any DTC detected?

Symptom is described, DTC is displayed>>GO TO 3.
Symptom is described, DTC is not displayed>>GO TO 4.
Symptom is not described, DTC is displayed>>GO TO 5.

3.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR ” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC Confirmation Procedure for the displayed DTC, and then check that DTC is detected again.
If two or more DTCs are detected, refer to DLK-433, "DTC Inspection Priority Chart" (Intelligent Key unit), DLK-471, "DTC Inspection Priority Chart" (BCM) and determine trouble diagnosis order.

Is DTC detected?

YES >> GO TO 8.
NO >> Refer to GI-39, "Intermittent Incident".

6.PERFORM BASIC INSPECTION

Perform Basic Inspection. Refer to DLK-491, "Basic Inspection".

>> GO TO 7.

7.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to Symptom Table based on the confirmed symptom in step 4.

>> GO TO 8.

8.DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Inspect according to Diagnostic Procedure of the system.
NOTE:
The Diagnostic Procedure described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure.

>> GO TO 9.

cardiagn.com

9.REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it.

>> GO TO 10.

10.FINAL CHECK

When DTC was detected in step 2, perform DTC Confirmation Procedure or Component Function Check again, and then check that the malfunction have been repaired securely.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Does the symptom reappear?

YES (DTC is detected)>>GO TO 8.
YES (Symptom remains)>>GO TO 6.
NO >> **INSPECTION END**

autodiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000001102240

Perform the system initialization when replacing Intelligent Key unit, replacing Intelligent Key or registering an additional Intelligent Key.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000001102241

Refer to the CONSULT-III Operation Manual-NATS.

cardiagn.com

FUNCTION DIAGNOSIS

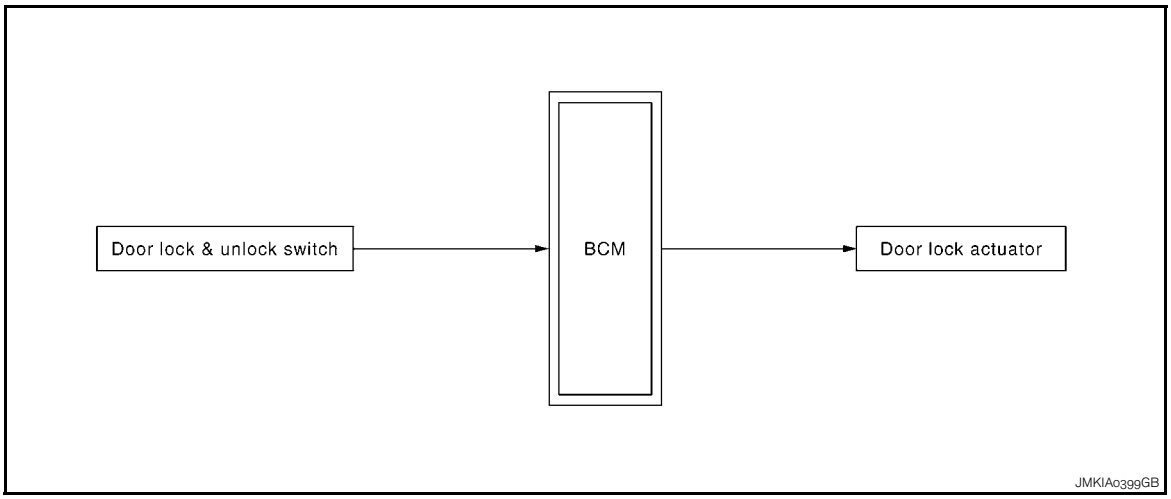
DOOR LOCK FUNCTION

DOOR LOCK AND UNLOCK SWITCH

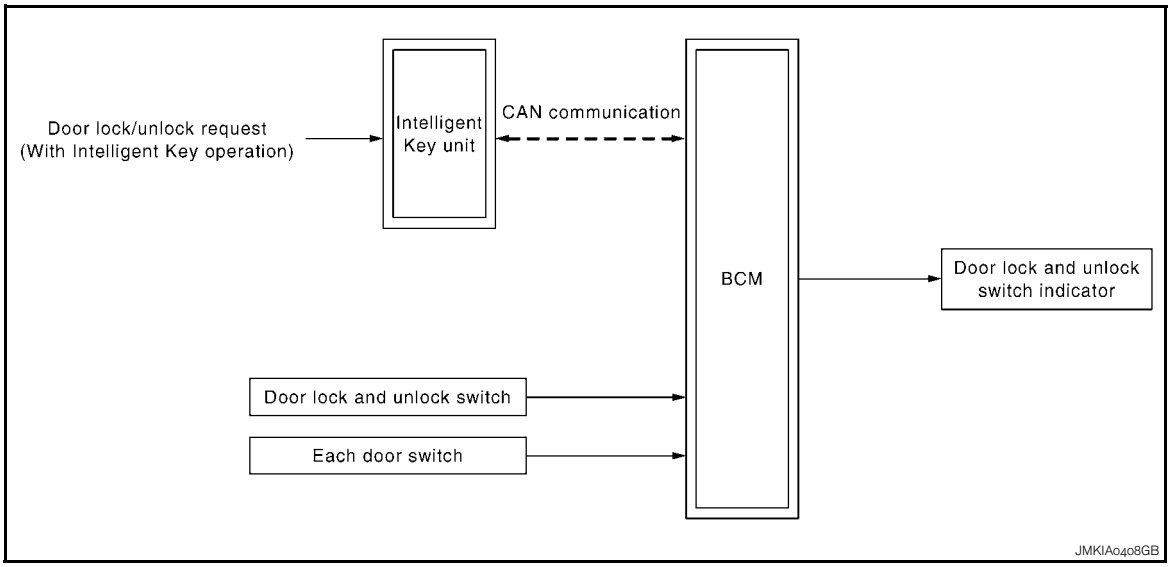
DOOR LOCK AND UNLOCK SWITCH : System Diagram

INFOID:0000000001081194

DOOR LOCK AND UNLOCK SWITCH OPERATION



DOOR LOCK AND UNLOCK SWITCH INDICATOR OPERATION



DOOR LOCK AND UNLOCK SWITCH : System Description

INFOID:0000000001081195

DOOR LOCK AND UNLOCK SWITCH OPERATION

Functions available by operating the door lock and unlock switch on center console. Interlocked with the lock/unlock operation of door lock and unlock switch, door lock actuators of all doors are locked/unlocked.

Operation Condition

If the following conditions are not satisfied, door lock/unlock operation is not performed even if the door lock and unlock switch is operated.

Door lock and unlock switch	Operation condition
Lock operation	Following all conditions are satisfied. • Except driver side doors are closed. • Doors are not locked with Intelligent Key or door request switch.
Unlock operation	Following all conditions are satisfied. • Doors are not locked with Intelligent Key or door request switch.

NOTE:
When the door lock is locked with Intelligent Key or door request switch (in super lock set state), door lock and unlock switch operation will be invalid until either following condition is satisfied.
- Turn ignition switch ON.
- Unlock with Intelligent key or door request switch.

DOOR LOCK AND UNLOCK SWITCH INDICATOR OPERATION

Door lock and unlock switch indicator indicates door lock status. The indicator turn ON while ignition switch is ON and door lock is locked or super lock is set. If any door is opened, the indicator will be turn OFF.

1 Minute Timer

A timer must be running to turn OFF the indicator. The timer will running for 1 minute after super lock set or lock with Intelligent Key, door request switch or auto door lock.

30 Minutes Timer

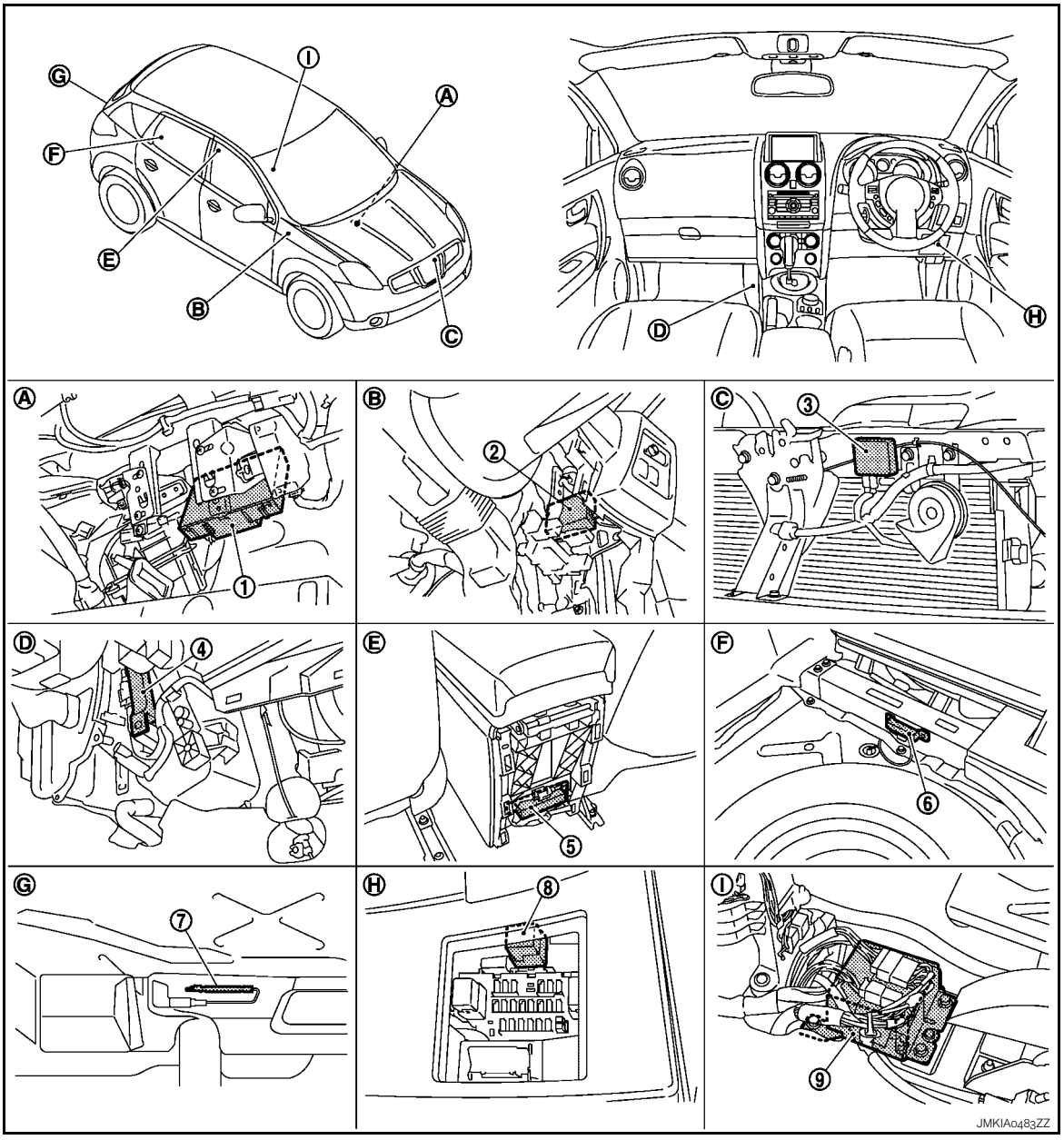
A timer must be running to turn OFF the indicator. The timer will running for 30 minutes after locking with door lock and unlock switch.

NOTE:
1minuite timer condition is satisfied during 30 minutes timer is active, 30 minutes timer is not change to 1 minutes.

DOOR LOCK AND UNLOCK SWITCH : Component Parts Location

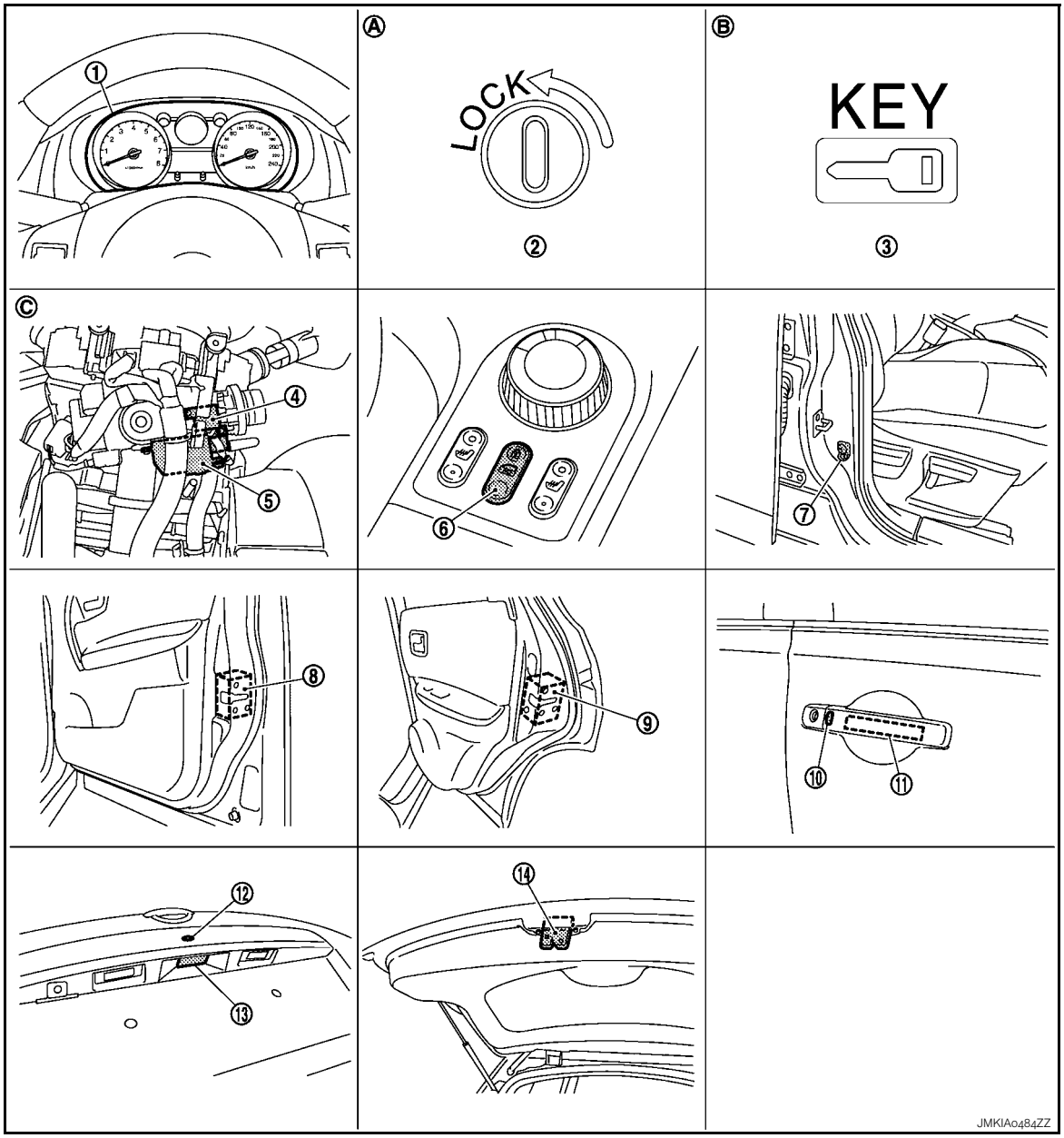
INFOID:0000000001081196

cardiagn.com



1. BCM M65, M66, M67
2. Intelligent Key unit M40
3. Intelligent Key warning buzzer E25
4. Inside key antenna (instrument center) M70
5. Inside key antenna (center console) M61
6. Inside key antenna (rear seat) B45
7. Inside key antenna (rear bumper) B81
8. Passenger side anti-hijack relay M90
9. Air bag diagnosis sensor unit M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

DOOR LOCK AND UNLOCK SWITCH : Component Description

INFOID:0000000001081197

cardiagn.com

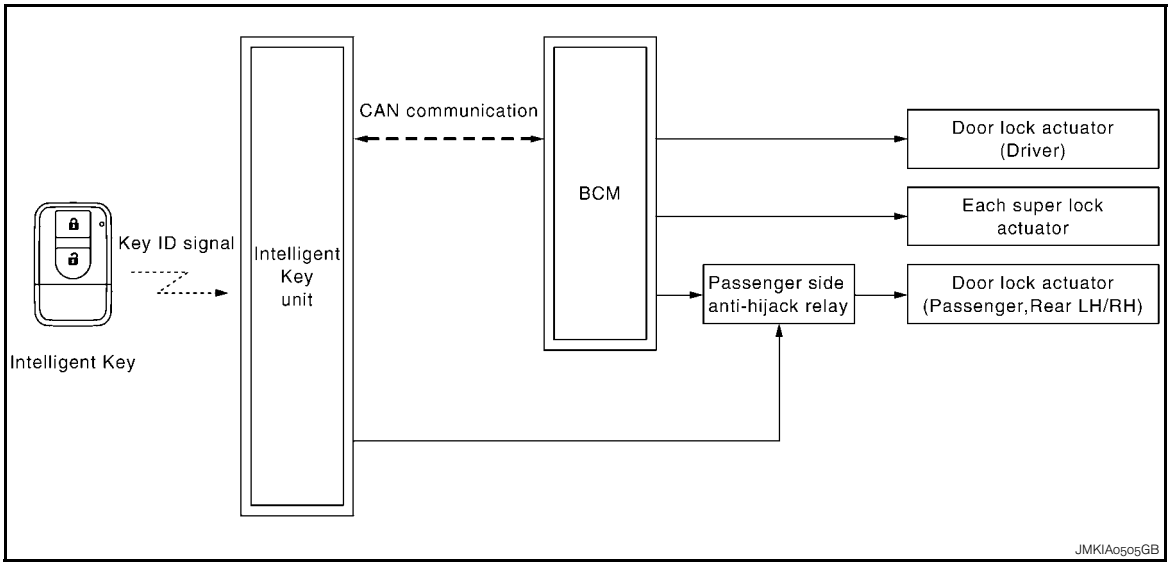
Item	Function
BCM	Controls the door lock function.
Door switch	Detects door state (open or close).
Door lock and unlock switch	Transmits door lock and unlock signal to BCM. Door lock/unlock switch indicator is built-in door lock/unlock switch.
Door lock actuator	Receives door lock/unlock signal from BCM and locks/unlock each door.

INTELLIGENT KEY

INTELLIGENT KEY : System Diagram

INFOID:0000000001081202

INTELLIGENT KEY OPERATION



INTELLIGENT KEY : System Description

INFOID:0000000001081203

INTELLIGENT KEY OPERATION

The Intelligent Key has the same functions as the multi remote control system. Therefore, it can be used in the same manner as the keyfob by operating the door lock/unlock button.
This function can be set to OFF with CONSULT-III. For the setting information, refer to DLK-329, "CONSULT-III Function (INTELLIGENT KEY)".

OPERATION CONDITION

Remote controller operation	Operation condition
Lock	• All doors are closed • Key switch is OFF (key is removed from ignition key cylinder) • Ignition knob switch is OFF (Ignition switch is not pressed) • No Intelligent Keys are inside the vehicle.
Unlock	• Key switch is OFF (key is removed from ignition key cylinder) • Ignition knob switch is OFF (Ignition switch is not pressed)

OPERATION AREA

To ensure that the Intelligent Key works effectively, use within 100 cm range of each door, however the operable range may differ according to surroundings.

LOCK AND UNLOCK CONTROL

When door lock and unlock button of the Intelligent Key is pressed, lock signal or unlock signal is transmitted from Intelligent Key to Intelligent Key unit.
When Intelligent Key unit receives the door lock and unlock signal, it operates door lock actuator.

SUPER LOCK CONTROL WITH ANTI-HIJACK MODE

- Super lock provides a higher anti-theft performance than a conventional power door lock system. The super lock system is controlled by BCM.
- When door lock is unlocked, pressing LOCK button on Intelligent Key once will lock and super lock set all doors. When all doors are set super lock, pressing UNLOCK button on Intelligent Key driver side door will unlock (and super lock release) driver side door and super lock release all other doors. Pressing UNLOCK button on Intelligent Key for a second time within 5 seconds from the first time will unlock all doors and back door can be opened with back door opener switch.

NOTE:
Anti-hijack mode can be set to ON or OFF with CONSULT-III. For the setting information, refer to DLK-329, "CONSULT-III Function (INTELLIGENT KEY)".

SUPER LOCK CONTROL WITHOUT ANTI-HIJACK MODE

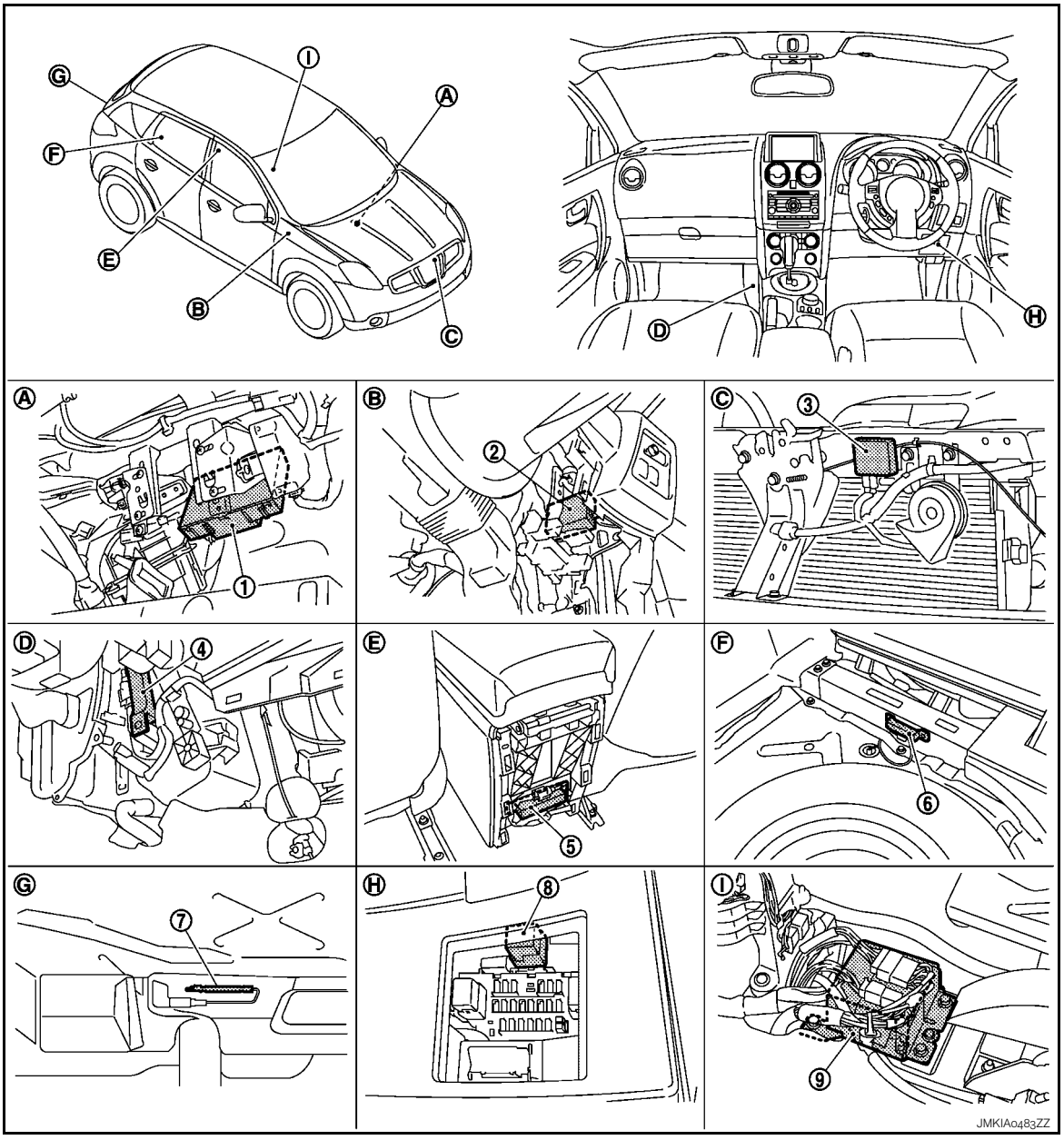
When door lock is unlocked, pressing LOCK button on Intelligent Key once will lock and super lock set all doors. When all doors are set to super lock, pressing UNLOCK button on Intelligent Key will unlock all doors and super lock release all doors and back door can be opened with back door opener switch.

NOTE:
Anti-hijack mode can be set to ON or OFF with CONSULT-III. For the setting information, refer to DLK-329, "CONSULT-III Function (INTELLIGENT KEY)".

INTELLIGENT KEY : Component Parts Location

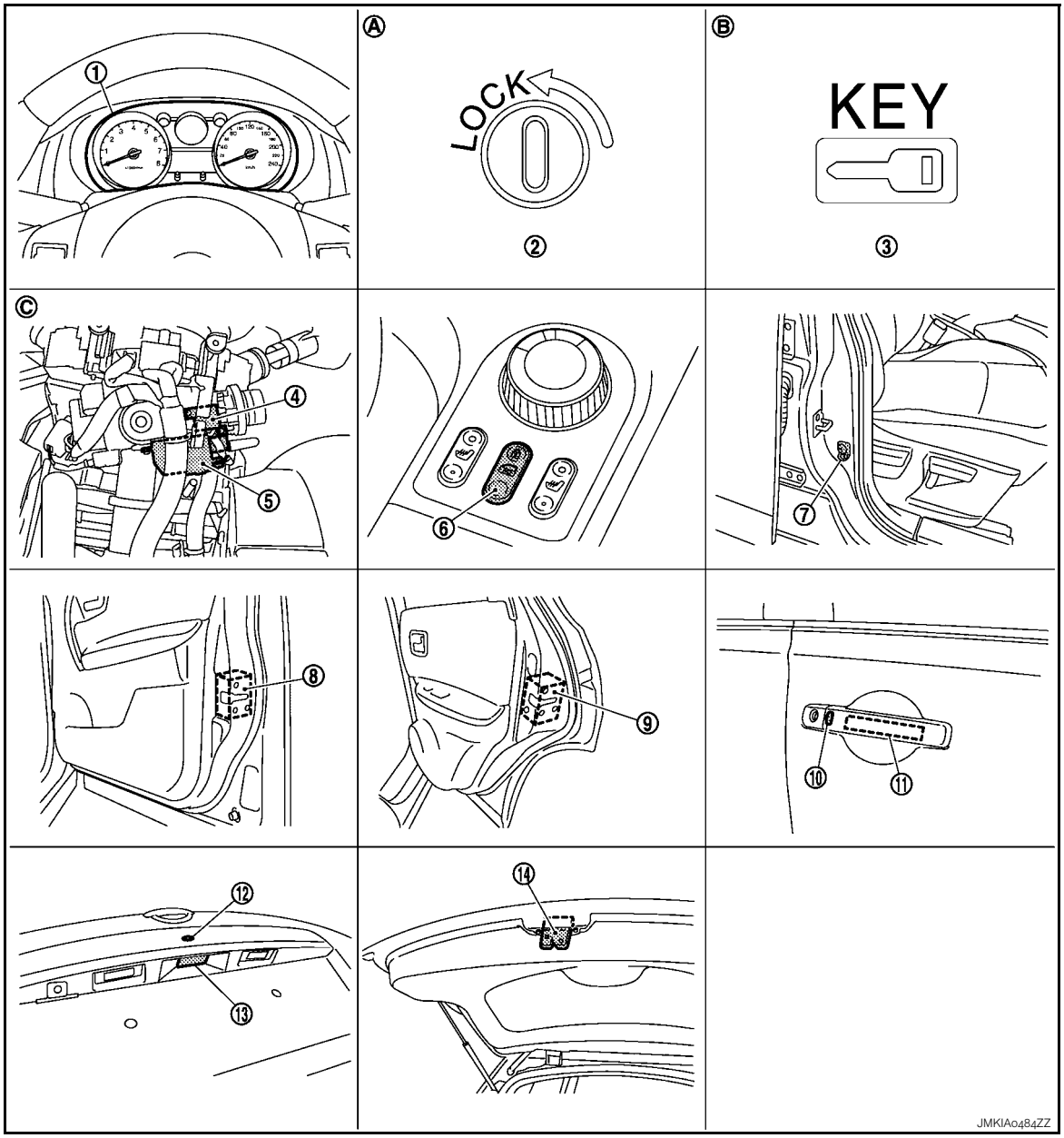
INFOID:0000000001117062

cardiagn.com



1. BCM M65, M66, M67
2. Intelligent Key unit M40
3. Intelligent Key warning buzzer E25
4. Inside key antenna (instrument center) M70
5. Inside key antenna (center console) M61
6. Inside key antenna (rear seat) B45
7. Inside key antenna (rear bumper) B81
8. Passenger side anti-hijack relay M90
9. Air bag diagnosis sensor unit M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

INTELLIGENT KEY : Component Description

INFOID:0000000001081205

cardiagn.com

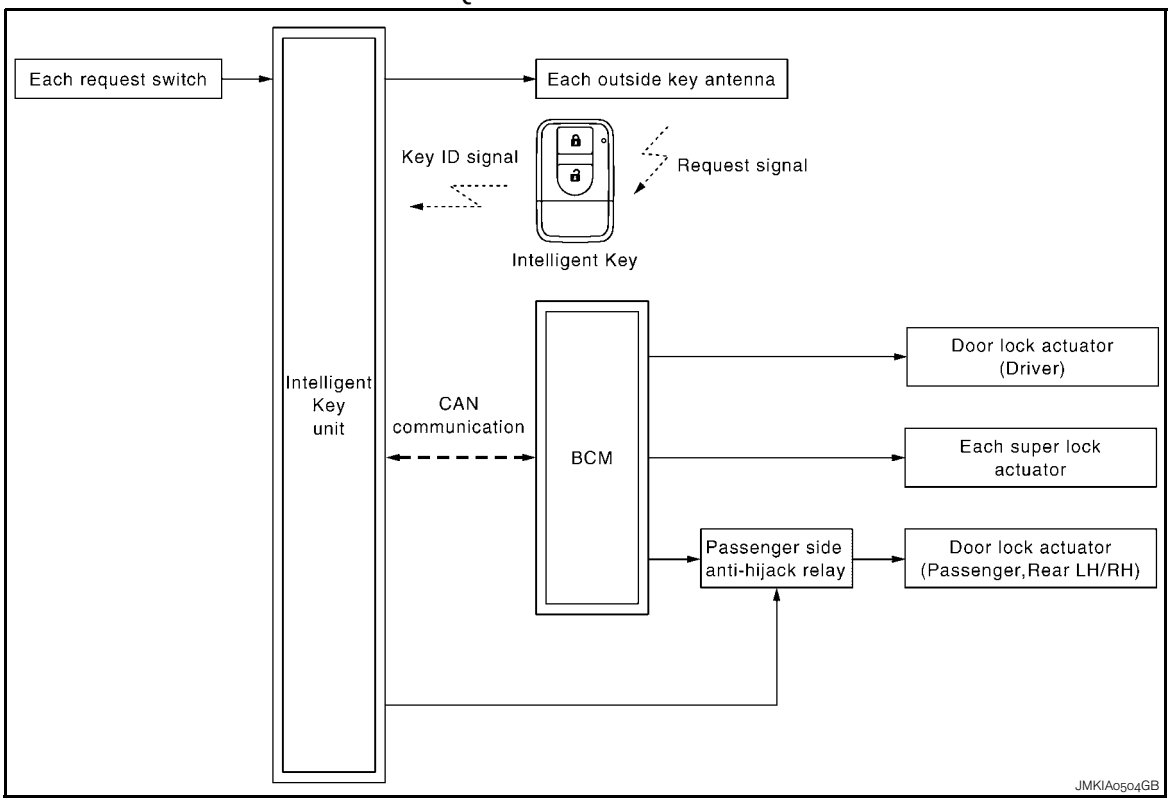
Item	Function
Intelligent Key unit	Controls the door lock/unlock operation with BCM.
BCM	Controls the door lock/unlock operation with Intelligent Key unit.
Door switch	Detects door state (open or close).
Key switch	Detects mechanical key is inserted into ignition key cylinder.
Outside key antenna	Detects Intelligent Key is in detection area of outside key antenna.
Inside key antenna	Detects Intelligent Key is in detection area of inside key antenna.
Intelligent Key	Transmits key ID to Intelligent Key unit when lock/unlock button is pressed.
Passenger side anti-hijack relay	Controls the circuit of door lock actuator (passenger side, rear LH/RH).
Door lock actuator	Receives lock/unlock signal from BCM and lock and unlock each door.
Super lock actuator	Receives super lock set/release signal from BCM and set/release super lock system.

DOOR REQUEST SWITCH

DOOR REQUEST SWITCH : System Diagram

INFOID:0000000001081198

DOOR REQUEST SWITCH OPERATION



DOOR REQUEST SWITCH : System Description

INFOID:0000000001081199

DOOR REQUEST SWITCH OPERATION

Only when pressing the request switch, it is possible to lock and unlock the door by carrying the Intelligent Key. The Intelligent Key system is a system that makes it possible to lock and unlock the door by carrying the Intelligent Key, which operates based on the results of electronic ID verification using two-way communications between the Intelligent Key and the vehicle (Intelligent Key unit).

This function can be set to OFF with CONSULT-III. For the setting information, refer to DLK-329, "CONSULT-III Function (INTELLIGENT KEY)".

CAUTION:

The driver should always carry the Intelligent Key

OPERATION CONDITION

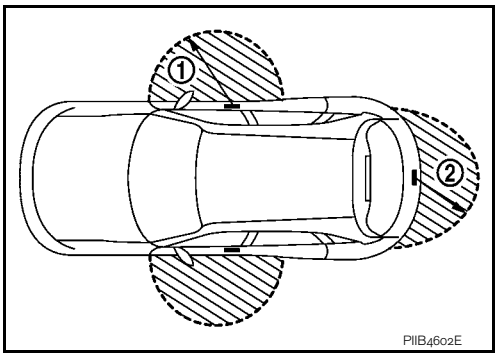
If the following conditions are not satisfied, door lock and unlock operation is not performed even if the request switch is operated.

Each request switch operation	Operation condition
Lock operation	• All doors are closed. • Key switch is OFF. (Key is removed from ignition key cylinder) • Ignition knob switch is OFF. (Ignition switch is not pressed) • No Intelligent Keys are inside the vehicle. • Intelligent Key is within outside key antenna detection area.
Unlock Operation	• Key switch is OFF. (Key is removed from ignition key cylinder) • Ignition knob switch is OFF. (Ignition switch is not pressed) • Intelligent Key is not inside the vehicle.* • Intelligent Key is within outside key antenna detection area.

*: Even with a registered Intelligent Key remaining inside the vehicle, door locks can be unlocked from outside of the vehicle with a spare Intelligent Key as long as key IDs are different.

OUTSIDE KEY ANTENNA DETECTION AREA

The outside key antenna detection area of door lock/unlock function is in the range of approximately 80 cm (31.50 in) surrounding the driver and passenger door handles (1) and the back door request switch (2). However, this operating range depends on the ambient conditions.



DOOR LOCK AND UNLOCK CONTROL

When the Intelligent Key detects that door request switch is pressed, it starts corresponding with outside key antenna (request switch pressed door). Then, the Intelligent Key is checked to be near the door.
If the Intelligent Key is within the outside key antenna detection area, it receives the request signal and transmits the key ID signal to the Intelligent Key unit. Intelligent Key unit receives the key ID signal and compares it with the registered key ID. Intelligent Key unit sends door lock and unlock signal to BCM via CAN communication.

SUPER LOCK CONTROL WITH ANTI-HIJACK MODE

- Super lock provides a higher anti-theft performance than a conventional power door lock system. The super lock system is controlled by BCM and Intelligent Key unit.
- When door is unlocked, pressing door request switch (driver side or passenger side) once will lock all doors and set super lock simultaneously. When super lock is set, all doors cannot be opened from inside.
  When super lock is set, pressing the door request switch once will unlock operated door and super lock is released except operated door. Pressing the door request switch a second time within 5 seconds from the first time will unlock all doors and back door can be opened with back door opener switch.
- When door is unlocked, pressing door request switch (back door) will lock all doors and set super lock simultaneously. When super lock is set, all doors cannot be opened from inside.
  When super lock is set, pressing door request switch (back door) will unlock all doors and release super lock simultaneously and back door can be opened with back door opener switch.

NOTE:
Anti-hijack mode can be set to ON or OFF with CONSULT-III. For the setting information, refer to DLK-329, "CONSULT-III Function (INTELLIGENT KEY)".

SUPER LOCK CONTROL WITHOUT ANTI-HIJACK MODE

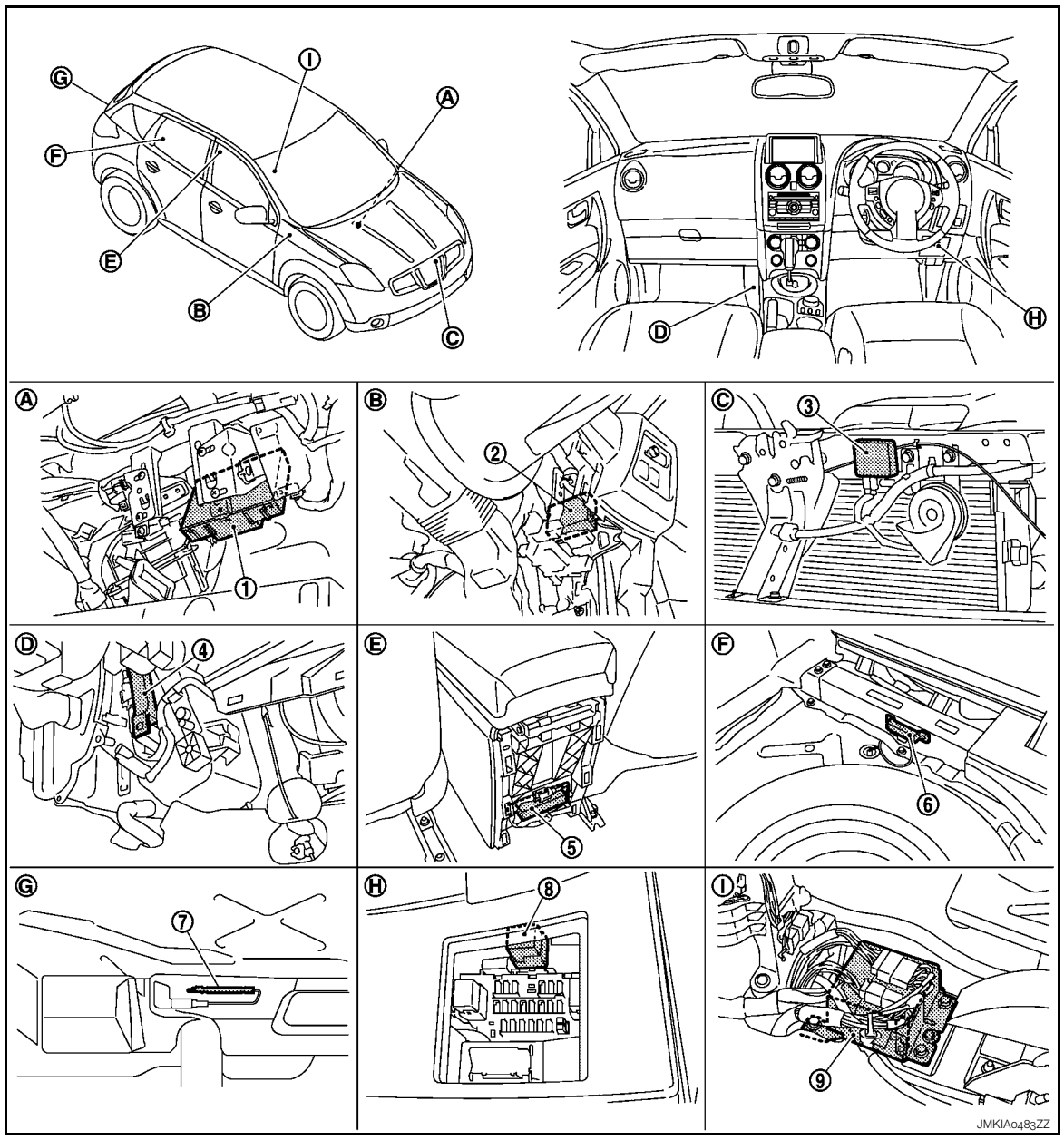
When door is unlocked, pressing door request switch (driver, passenger or back door) will lock all doors and set super lock simultaneously. When super lock is set, all doors can not be opened from inside.
When super lock is set, pressing door request switch (driver side, passenger side or back door) will unlock all doors and release super lock simultaneously and back door is can be opened with back door opener switch.

NOTE:
Anti-hijack mode can be set to ON or OFF with CONSULT-III. For the setting information, refer to DLK-329, "CONSULT-III Function (INTELLIGENT KEY)".

cardiagn.com

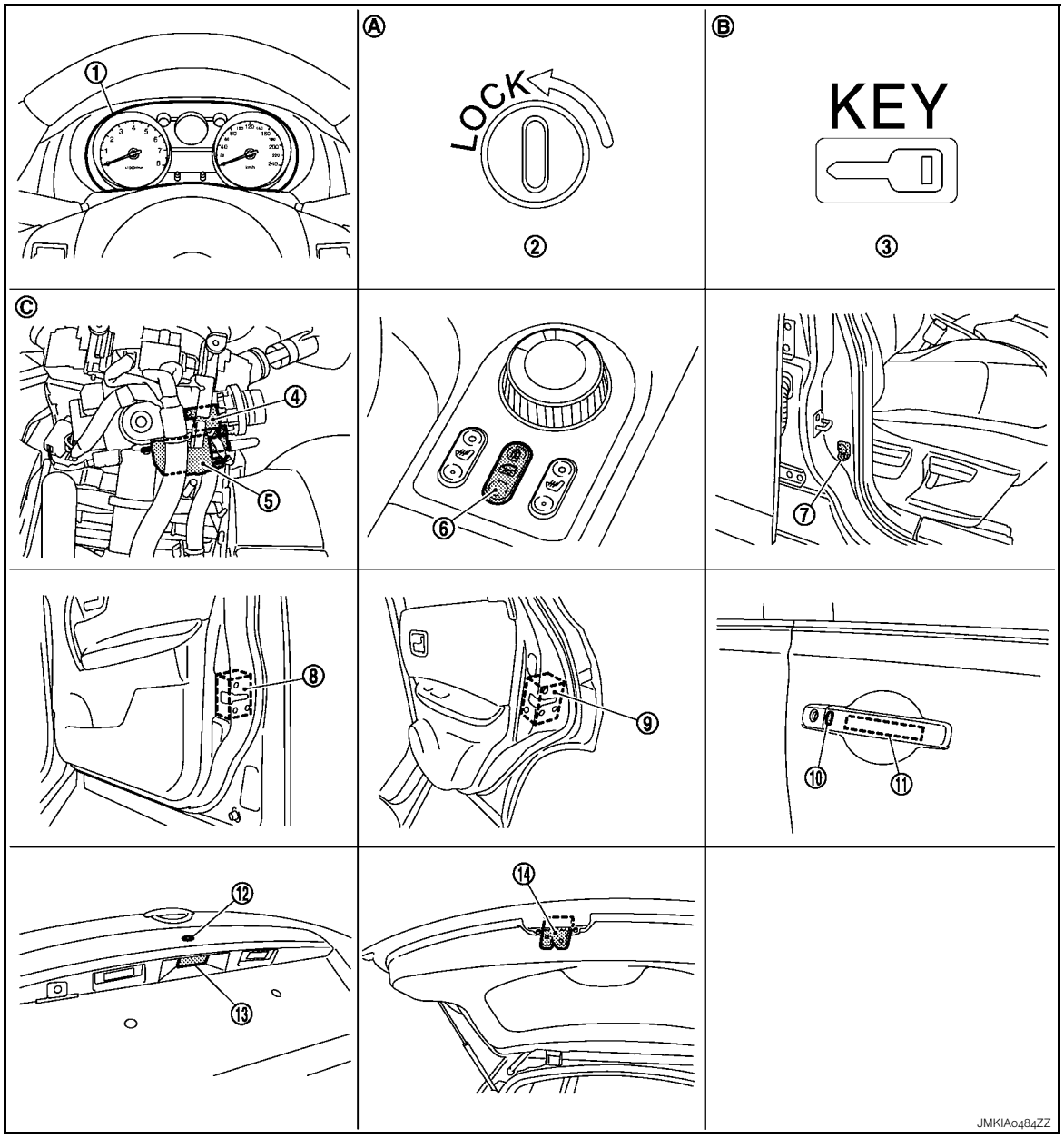
DOOR REQUEST SWITCH : Component Parts Location

INFOID:0000000001117063



1. BCM M65, M66, M67
2. Intelligent Key unit M40
3. Intelligent Key warning buzzer E25
4. Inside key antenna (instrument center) M70
5. Inside key antenna (center console) M61
6. Inside key antenna (rear seat) B45
7. Inside key antenna (rear bumper) B81
8. Passenger side anti-hijack relay M90
9. Air bag diagnosis sensor unit M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

DOOR REQUEST SWITCH : Component Description

INFOID:0000000001081201

cardiagn.com

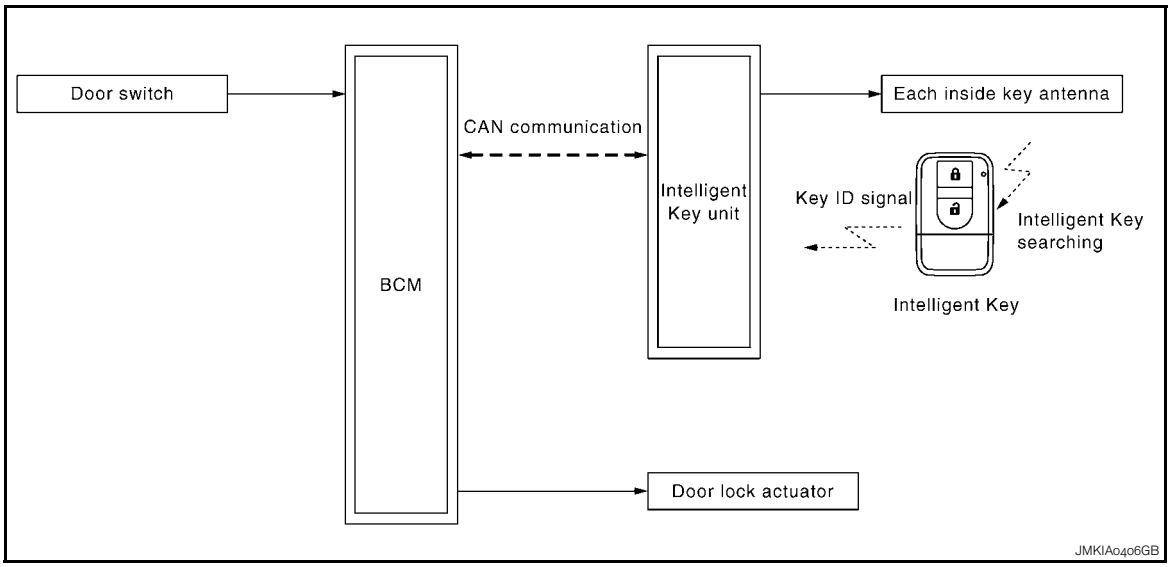
Item	Function
Intelligent Key unit	Controls the door lock function with BCM.
BCM	Controls the door lock function with Intelligent Key unit.
Door request switch	Transmits operation signal (lock and unlock) to Intelligent Key unit.
Door switch	Detects door state (open or close).
Key switch	Detects mechanical key is inserted into ignition key cylinder.
Ignition knob switch	Detects ignition knob state (push or release).
Outside key antenna	Detects Intelligent Key is in detection area of outside key antenna.
Inside key antenna	Detects Intelligent Key is in detection area of inside key antenna.
Intelligent Key	Transmits key ID to Intelligent Key unit when request signal is received from outside key antenna.
Passenger side anti-hijack relay	Controls the circuit of door lock actuator (passenger side, rear LH/RH).
Door lock actuator	Receives lock/unlock signal from BCM and locks/unlocks each door.
Super lock actuator	Receives super lock set/release signal from BCM and sets/releases super lock system.

KEY REMINDER

KEY REMINDER : System Diagram

INFOID:0000000001081222

KEY REMINDER OPERATION



KEY REMINDER : System Description

INFOID:0000000001081223

KEY REMINDER OPERATION

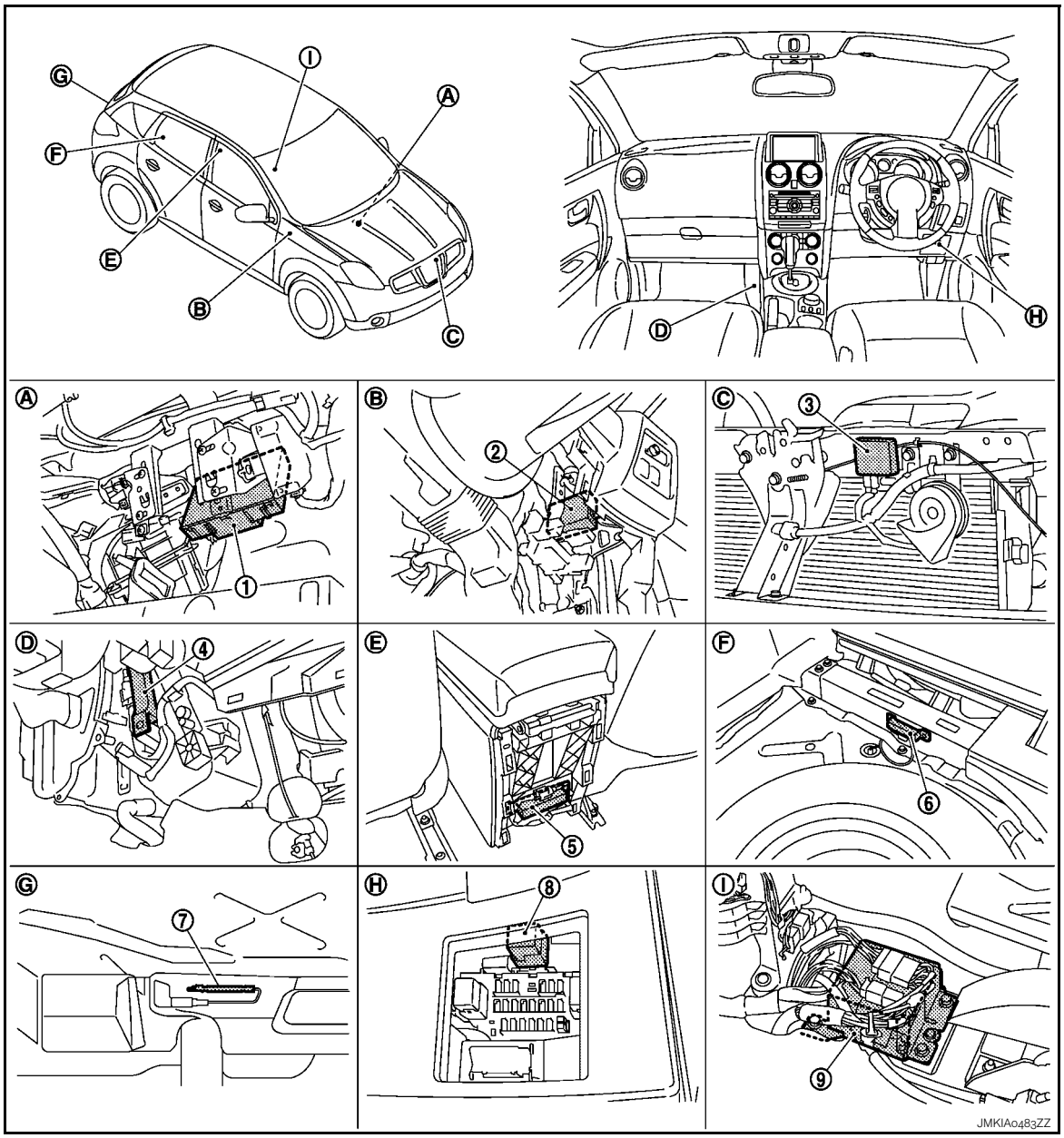
Key reminder have the following 2 functions.

Operation	Operation condition	Operation
Driver door close	Right after driver side door is closed under the following conditions • Door lock operation • Driver side door is opened • Driver side door is in unlock state.	All doors unlock
Any door open to all door close	Right after all doors are closed under the following conditions • Intelligent Key is inside the vehicle • Any door is opened • All doors are locked by door lock and unlock switch.	• All doors unlock • Honk Intelligent Key warning buzzer

CAUTION:
The above function operates when the Intelligent Key is inside the vehicle. However, there may be times when the Intelligent Key can not be detected, and this function will not operate when the Intelligent Key is on the instrument panel, rear parcel shelf or in the glove box. Also, this system some times does not operate if the Intelligent Key is in the door pocket for the open door.

KEY REMINDER : Component Parts Location

INFOID:0000000001117064

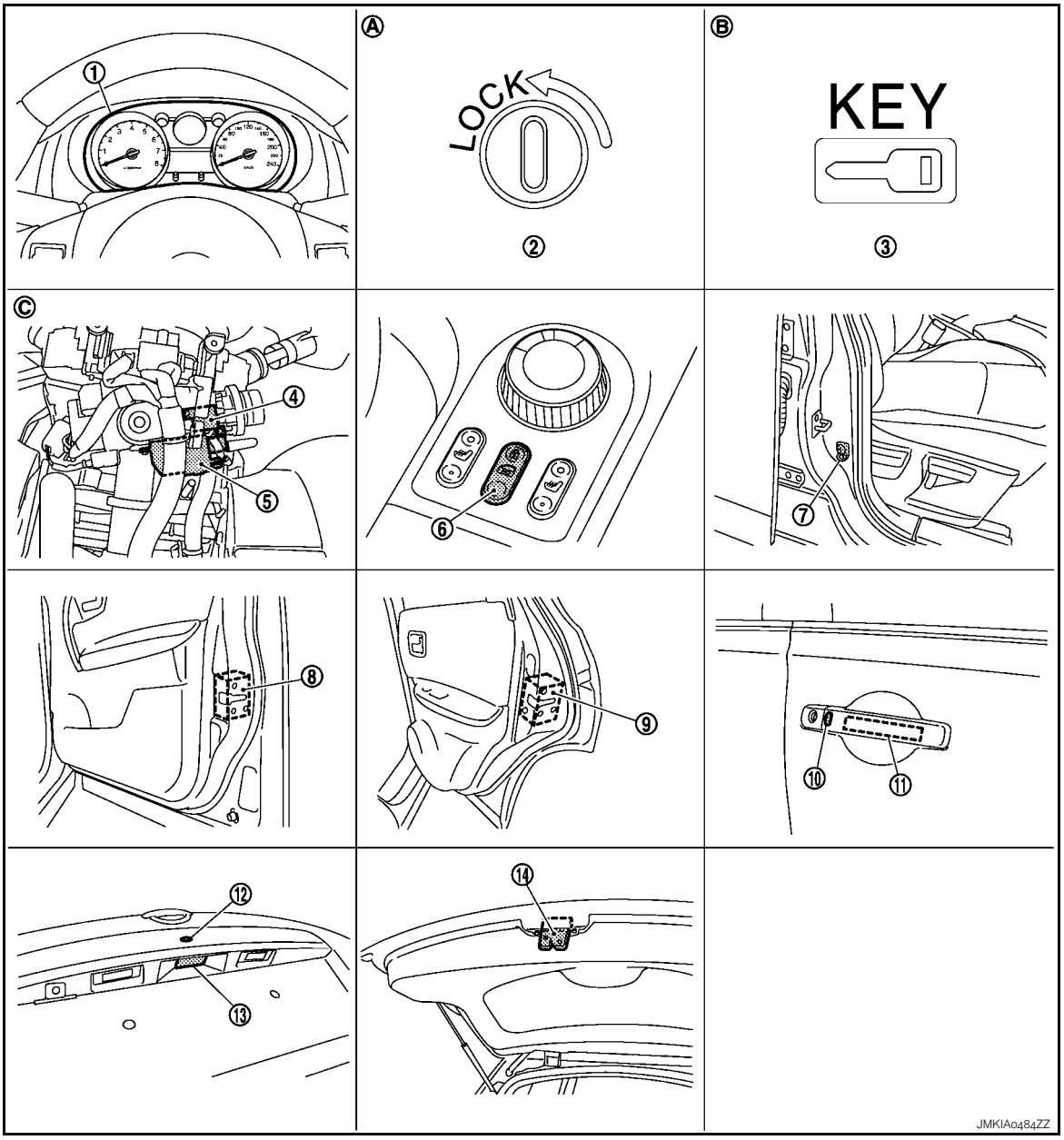


1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed

cardiagn.com

D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

KEY REMINDER : Component Description

INFOID:0000000001081225

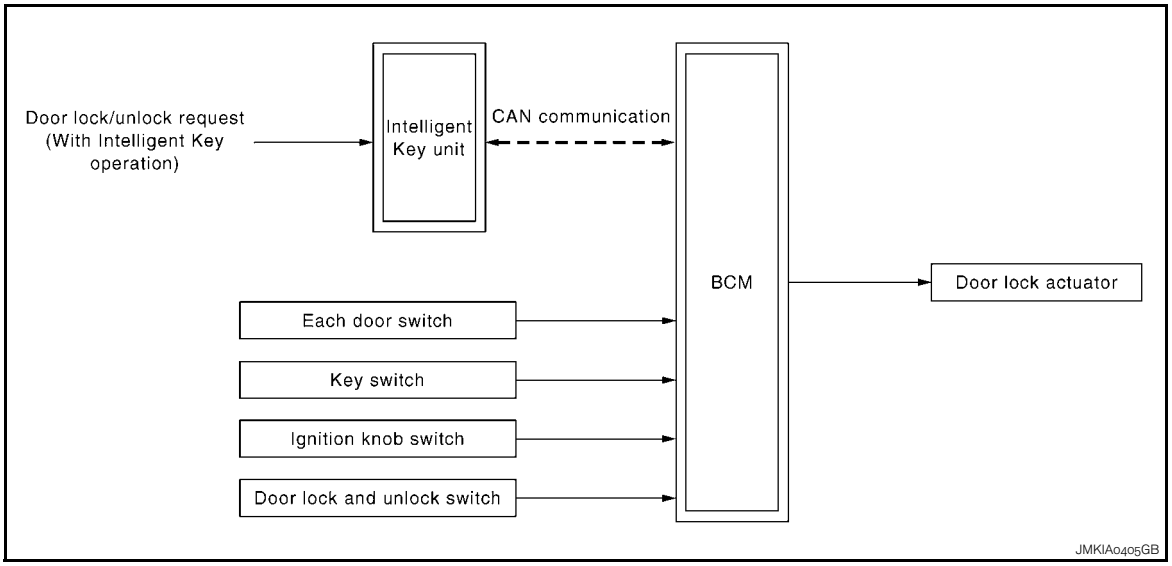
Item	Function
Intelligent Key unit	Controls the door lock function with BCM.
BCM	Controls the door lock and unlock operation with Intelligent Key unit.
Door switch	Detects door state (open or close).
Inside key antenna	Detects Intelligent Key is in detection area of inside key antenna.
Intelligent Key	Transmits key ID to Intelligent Key unit when Intelligent Key searching.
Door lock actuator	Receives lock and unlock signal from BCM and locks/unlocks each door.

AUTO DOOR LOCK

AUTO DOOR LOCK : System Diagram

INFOID:0000000001081226

AUTO DOOR LOCK OPERATION



AUTO DOOR LOCK : System Description

INFOID:0000000001081227

AUTO RELOCK OPERATION

When all door is locked then doors are unlocked with Intelligent Key, door request switch or BCM does not receive the following signal within 2 minutes*1, all doors are automatically locked.

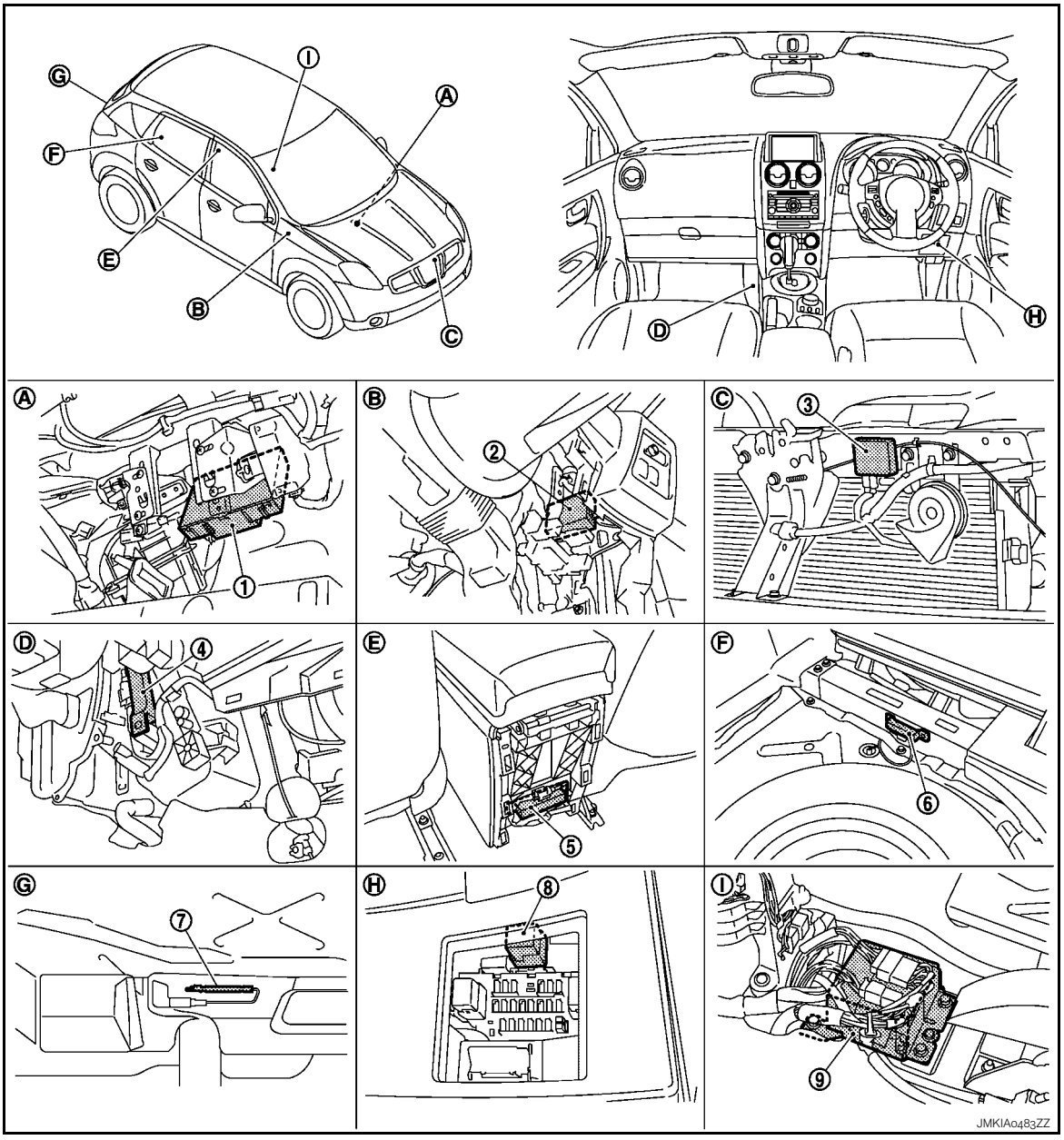
- Any door is opened.
- Ignition knob is pressed.
- Ignition key is inserted into ignition key cylinder.
- Door is locked with Intelligent Key.
- Door is locked/unlocked with door lock and unlock switch.

*1: Auto door lock operation mode can be changed with CONSULT-III. Refer to DLK-329, "CONSULT-III Function (INTELLIGENT KEY)".

AUTO DOOR LOCK : Component Parts Location

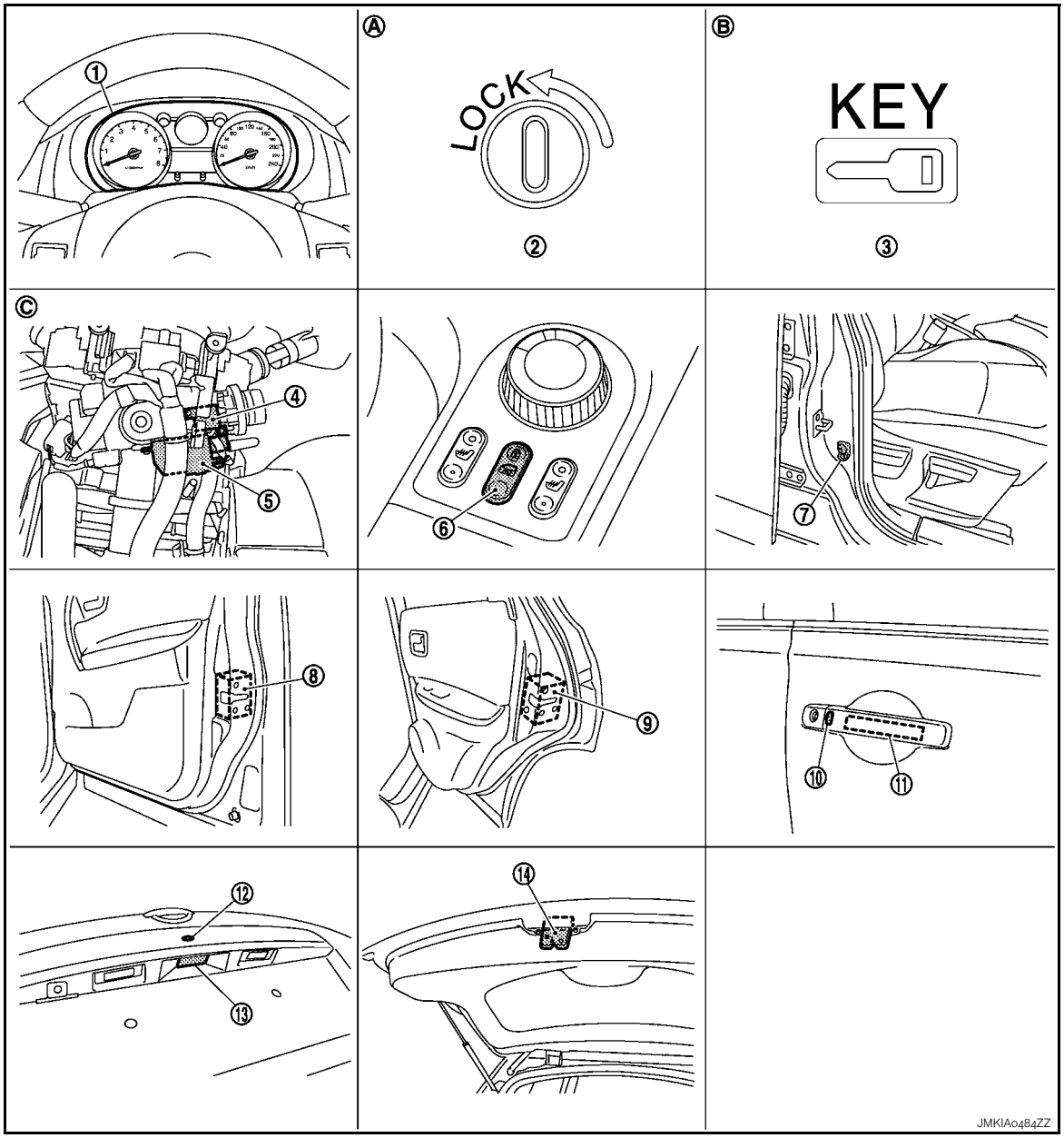
INFOID:0000000001117065

cardiagn.com



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

AUTO DOOR LOCK : Component Description

INFOID:0000000001081229

cardiagn.com

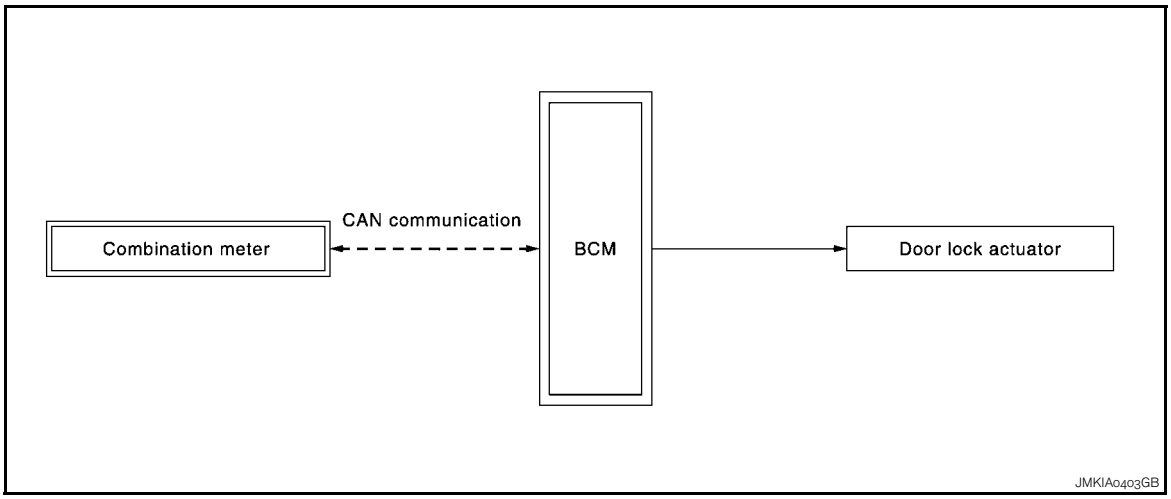
Item	Function
Intelligent Key unit	Controls the door lock function with BCM.
BCM	Controls the door lock function with Intelligent Key unit.
Door switch	Detects door state (open or close).
Key switch	Detects mechanical key is inserted into ignition key cylinder.
Ignition knob switch	Detects ignition knob state (push or release).
Door lock and unlock switch	Transmits door lock and unlock signal to BCM.
Door lock actuator	Receives lock and unlock signal from BCM and lock and unlock each door.

VEHICLE SPEED SENSING AUTO DOOR LOCK

VEHICLE SPEED SENSING AUTO DOOR LOCK : System Diagram

INFOID:0000000001081230

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION



VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description

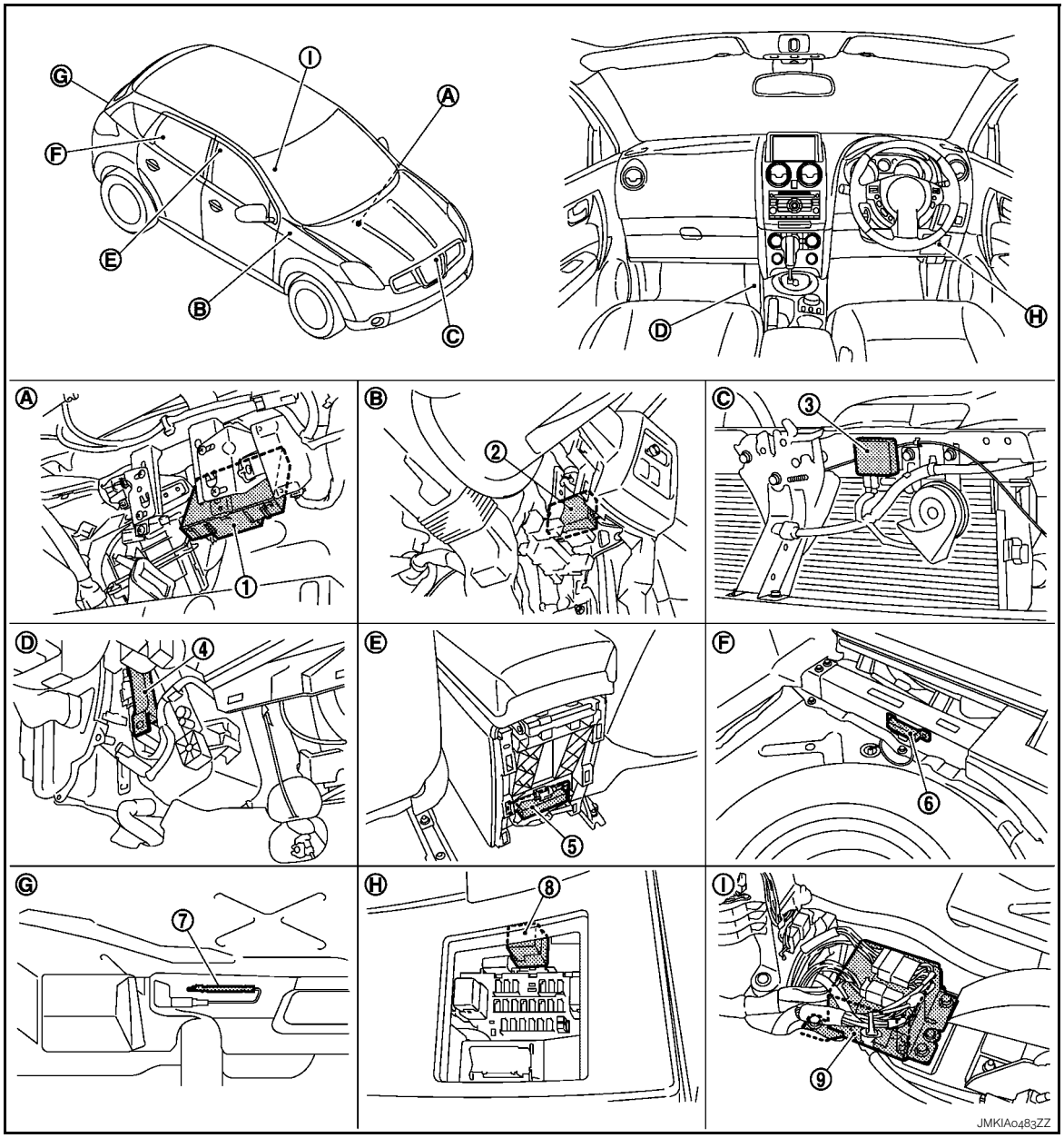
INFOID:0000000001081231

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION

When the vehicle speed exceeds more than 12km/h (7MPH), all doors are automatically locked. BCM receive the vehicle speed signal from combination meter via CAN communication.

VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Parts Location

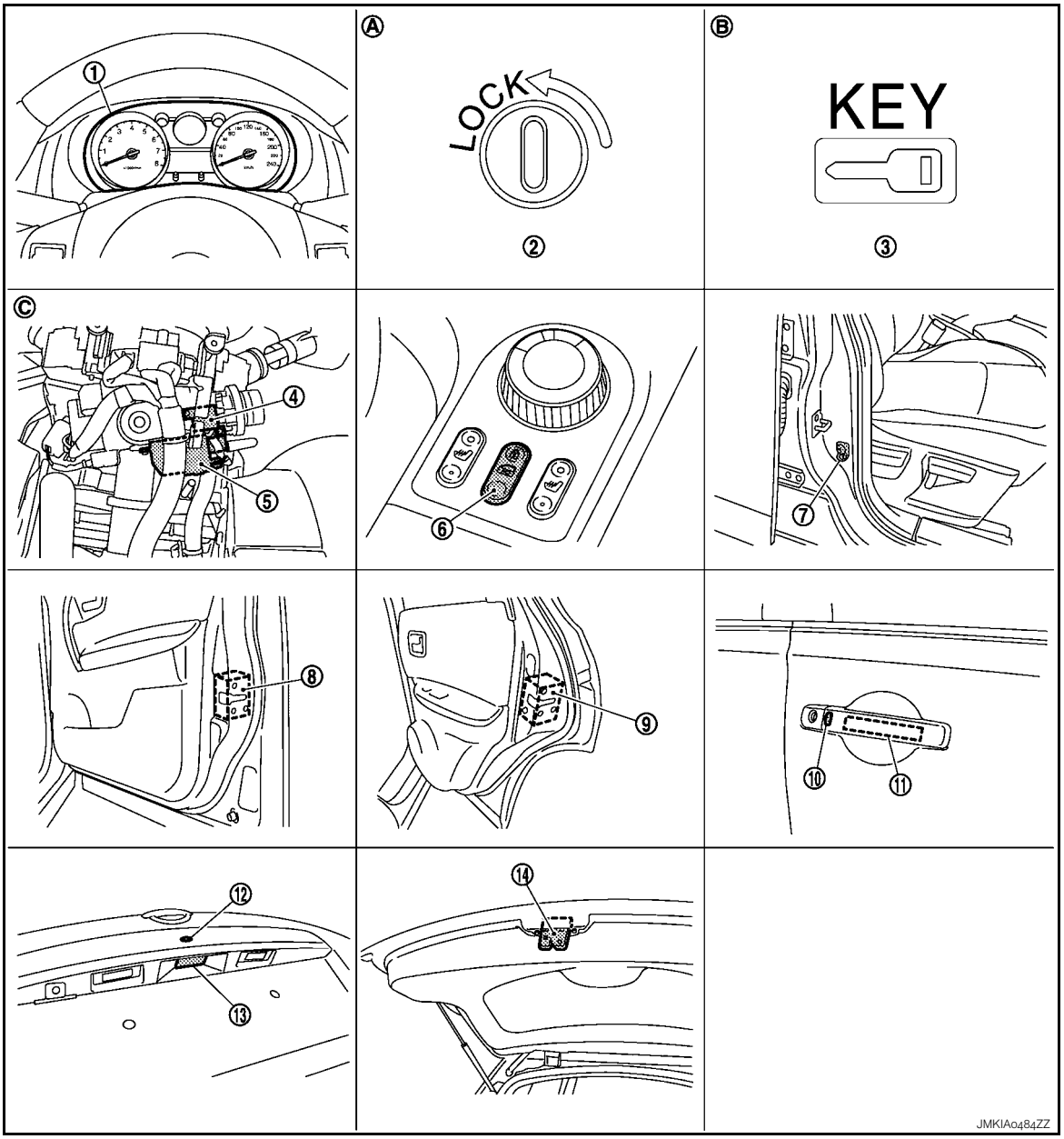
INFOID:0000000001117066



1. BCM
   M65, M66, M67
2. Intelligent Key unit
   M40
3. Intelligent Key warning buzzer
   E25
4. Inside key antenna (instrument center)
   M70
5. Inside key antenna (center console)
   M61
6. Inside key antenna (rear seat)
   B45
7. Inside key antenna (rear bumper)
   B81
8. Passenger side anti-hijack relay
   M90
9. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed

cardiagn.com



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Description

INFOID:0000000001081233

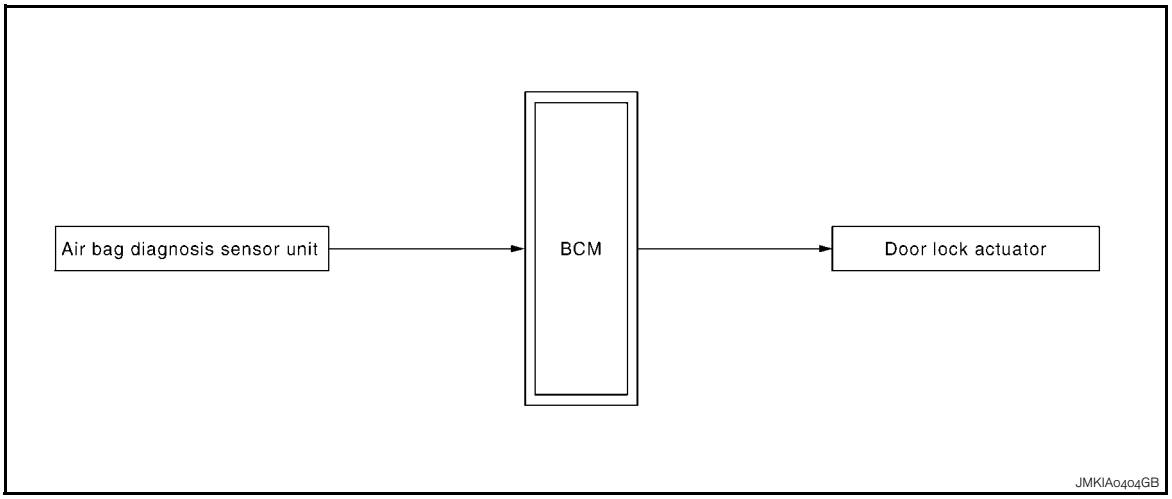
Item	Function
BCM	Controls the door lock function.
Combination meter	Transmits vehicle speed signal to BCM via CAN communication.
Door lock actuator	Receives door lock and unlock signal from BCM and lock and unlock each door.

AIR BAG INTERLOCK UNLOCK

AIR BAG INTERLOCK UNLOCK : System Diagram

INFOID:0000000001081234

AIR BAG INTERLOCK UNLOCK OPERATION



AIR BAG INTERLOCK UNLOCK : System Description

INFOID:0000000001081235

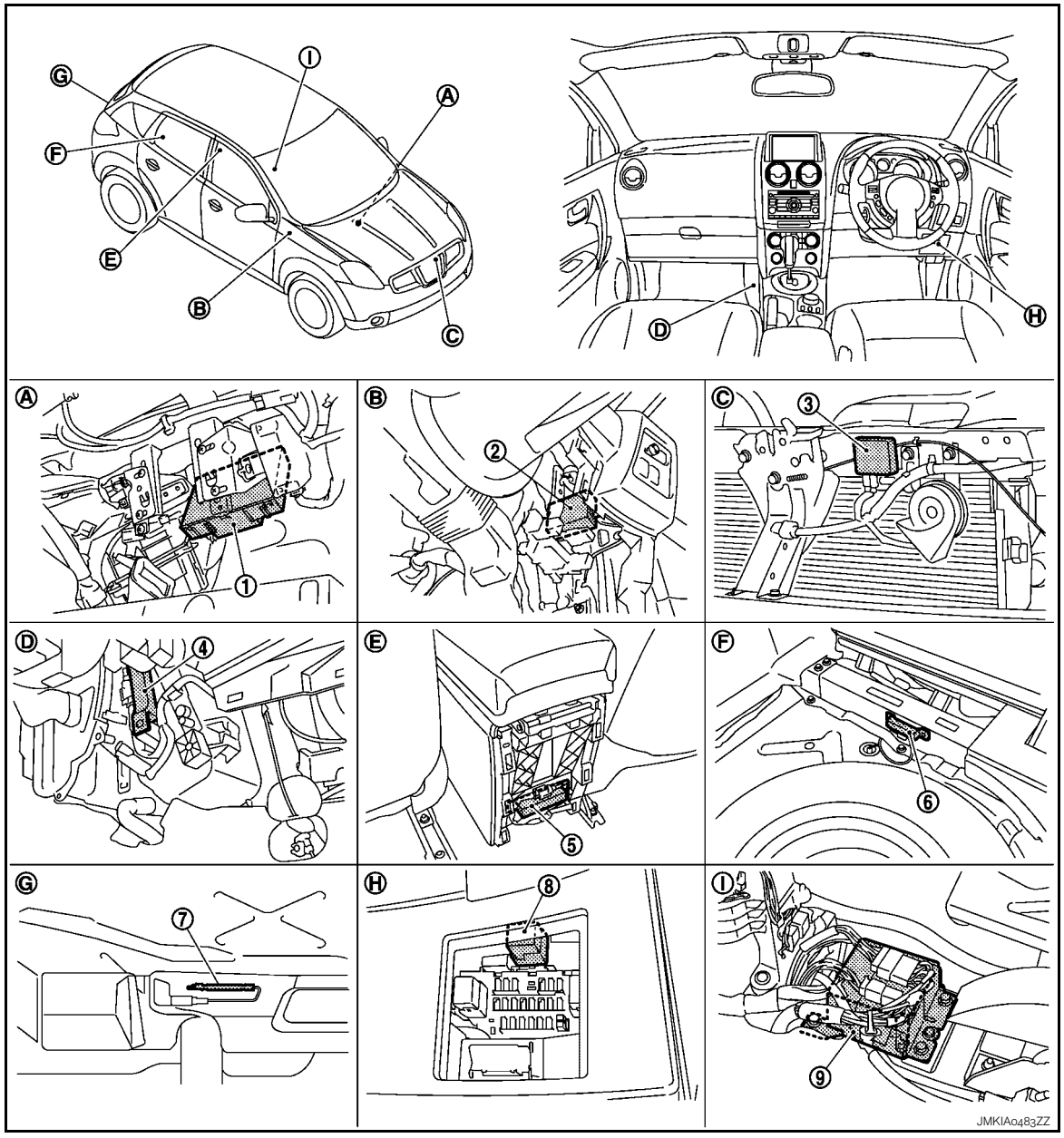
AIR BAG INTERLOCK UNLOCK OPERATION

When ignition switch is ON and BCM receive air bag deployment signal, it operates automatically to unlock all doors. Air bag diagnosis sensor unit sends the air bag deployment signal to BCM.

AIR BAG INTERLOCK UNLOCK : Component Parts Location

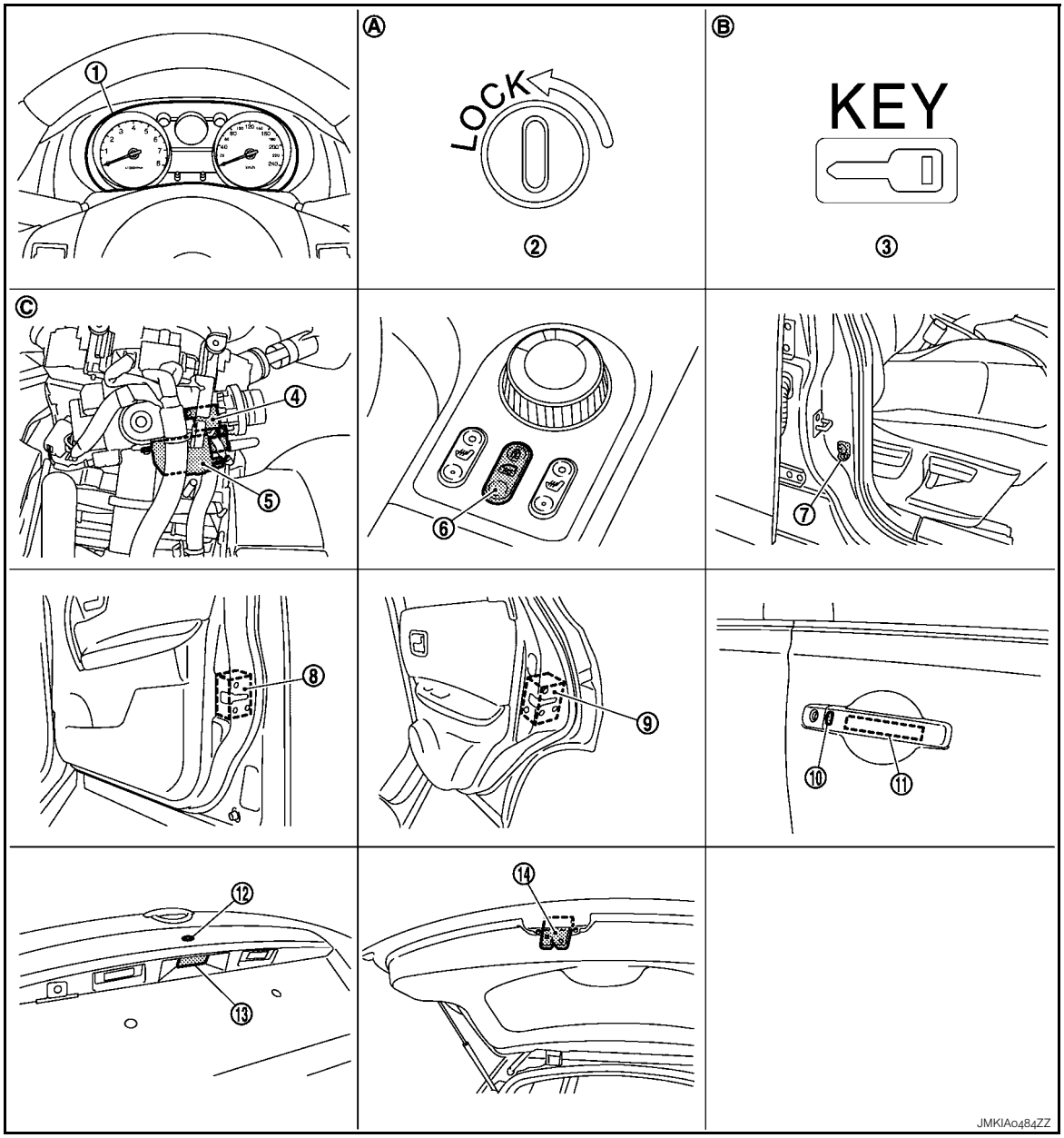
INFOID:0000000001117078

cardiagn.com



1. BCM M65, M66, M67
2. Intelligent Key unit M40
3. Intelligent Key warning buzzer E25
4. Inside key antenna (instrument center) M70
5. Inside key antenna (center console) M61
6. Inside key antenna (rear seat) B45
7. Inside key antenna (rear bumper) B81
8. Passenger side anti-hijack relay M90
9. Air bag diagnosis sensor unit M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

AIR BAG INTERLOCK UNLOCK : Component Description

INFOID:0000000001081237

cardiagn.com

Item	Function
BCM	Controls the door lock function.
Air bag diagnosis sensor unit	Transmits air bag deployment signal to BCM.
Door lock actuator	Receives door lock/unlock signal from BCM and lock and unlock each door.

carsdiagn.com

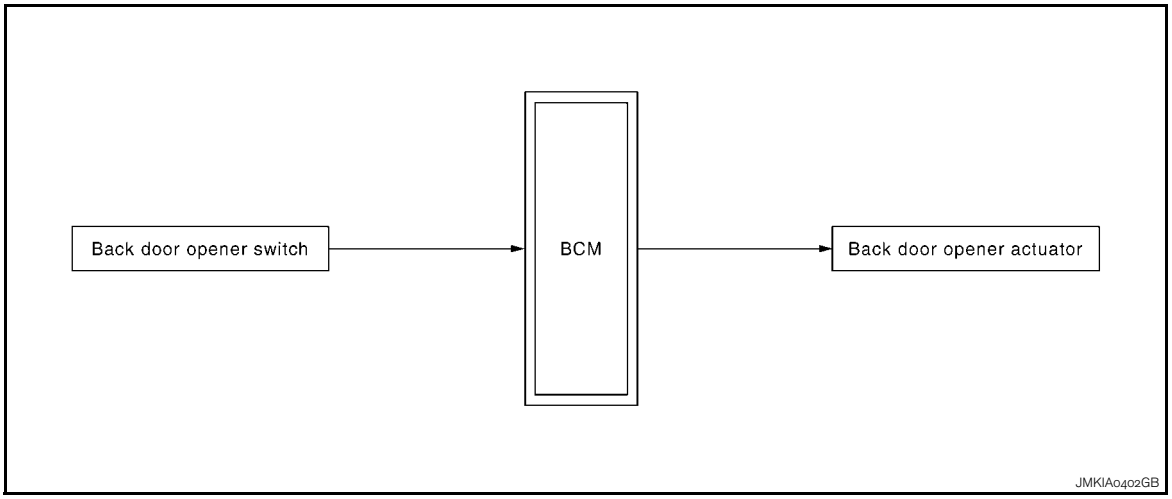
BACK DOOR OPENER FUNCTION

BACK DOOR OPENER SWITCH

BACK DOOR OPENER SWITCH : System Diagram

INFOID:0000000001081238

BACK DOOR OPENER OPERATION



BACK DOOR OPENER SWITCH : System Description

INFOID:0000000001081239

BACK DOOR OPENER OPERATION

When back door opener switch is pressed, BCM opens back door opener actuator.

NOTE:

Back door opener actuator is not for locking the back door. The function is only to open the back door.

OPERATION CONDITION

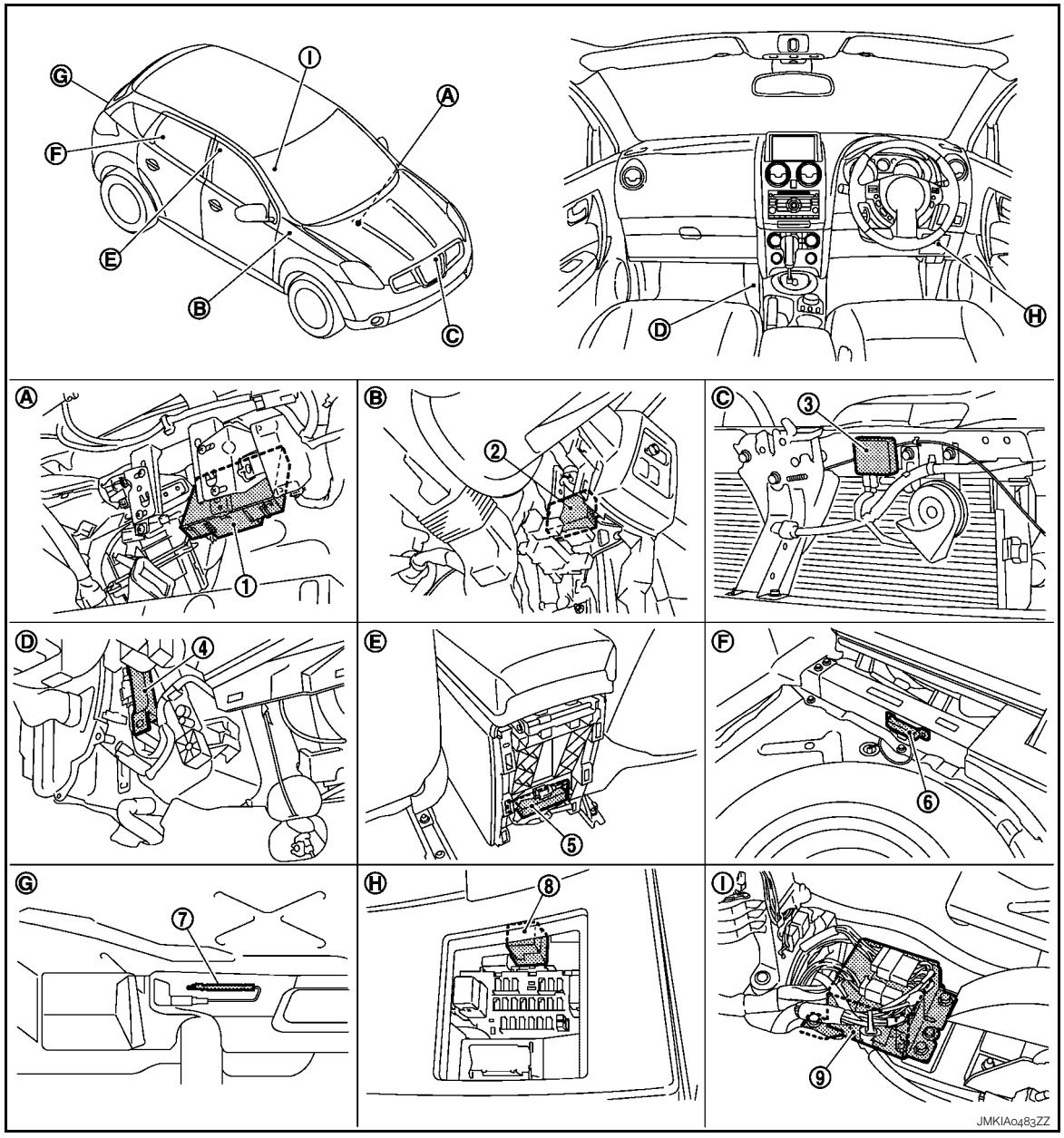
If the following conditions are not satisfied, back door opener operation is not performed.

Back door opener switch operation	Operation condition
Back door open	• Vehicle speed is less than 5 km/h (3 MPH). • All doors are unlocked.

BACK DOOR OPENER SWITCH : Component Parts Location

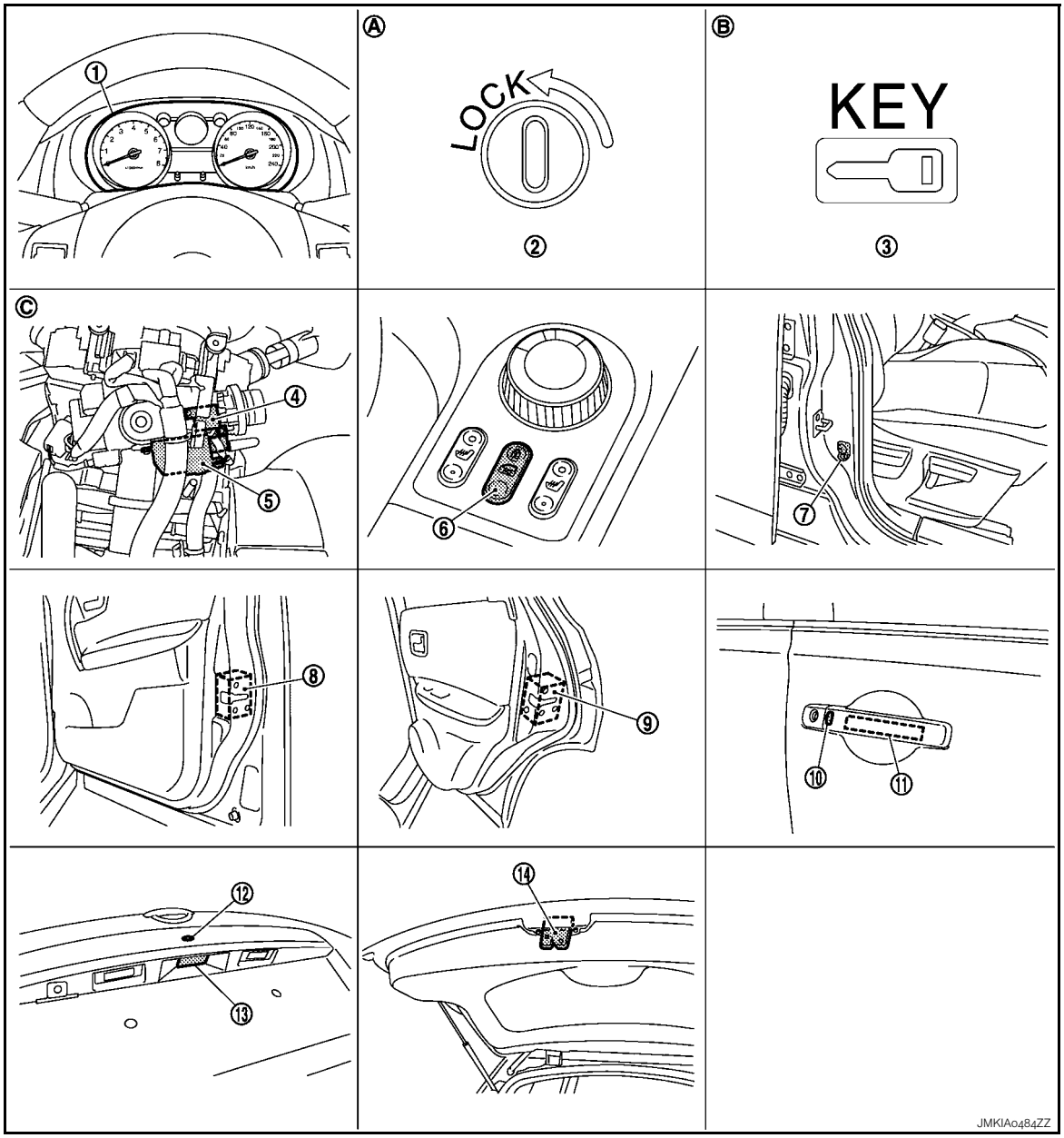
INFOID:0000000001117079

cardiagn.com



1. BCM M65, M66, M67
2. Intelligent Key unit M40
3. Intelligent Key warning buzzer E25
4. Inside key antenna (instrument center) M70
5. Inside key antenna (center console) M61
6. Inside key antenna (rear seat) B45
7. Inside key antenna (rear bumper) B81
8. Passenger side anti-hijack relay M90
9. Air bag diagnosis sensor unit M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

BACK DOOR OPENER SWITCH : Component Description

INFOID:0000000001081241

cardiagn.com

Item	Function
BCM	Controls the back door opener function.
Back door opener switch	Transmits back door opener switch operation signal to BCM.
Back door opener actuator	Opens the back door with the back door open signal from BCM.
Combination meter	Transmits vehicle speed signal to BCM via CAN communication.

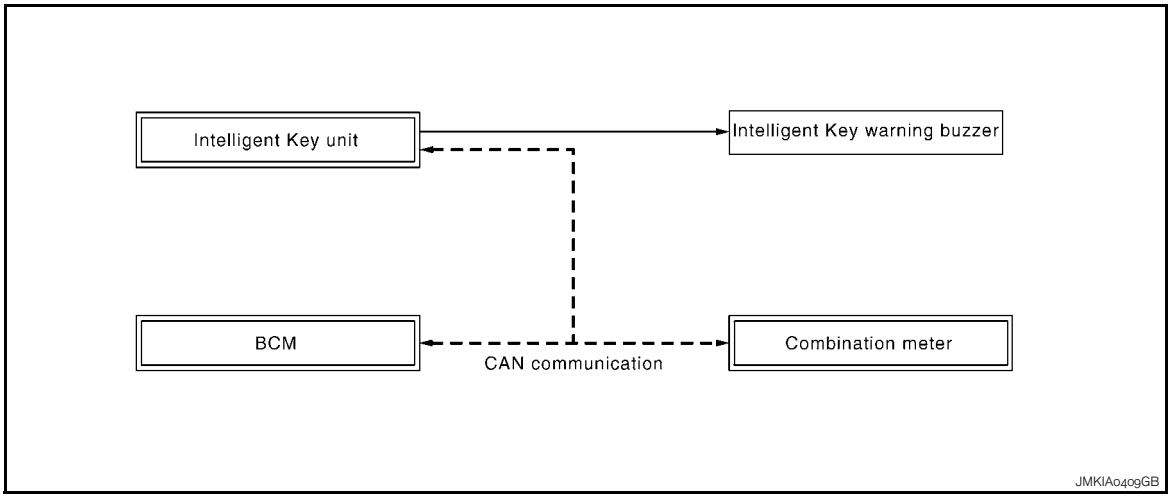
carsdiagn.com

WARNING FUNCTION

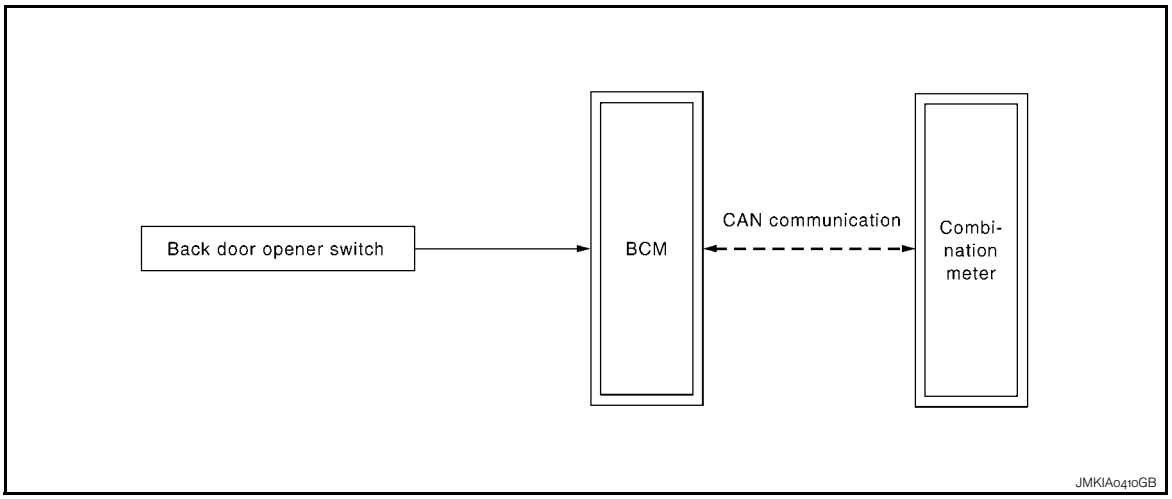
System Diagram

INFOID:0000000001081255

INTELLIGENT KEY WARNING OPERATION



BACK DOOR OPEN WARNING OPERATION



System Description

INFOID:0000000001081256

DESCRIPTION

The warning functions are as follows and are given to the user as warning information and warnings using combinations of Intelligent Key warning buzzer, key warning lamps and buzzer (built in combination meter).

INTELLIGENT KEY WARNING OPERATION

Once one of the following conditions below is established, alert or warning will be executed.

cardiagn.com

Warning/Information functions		Operation conditions	Warning lamp	Warning chime	
				Combination meter buzzer	Intelligent Key warning buzzer
Ignition knob return forgotten warning		When all the conditions below are met. • Ignition knob: OFF or LOCK (knob is pressed). • Door switch (driver side): ON (Door is open).	—	Active for 5 seconds (pipipipi, pipipipi···)	—
Ignition key warning (when mechanical key is used)		When all the conditions below are met. • Ignition switch: OFF position. • Key switch: ON (inserted) • Door switch (driver side): ON (Door is open).	—	Active for 5 seconds (pipipipi, pipipipi···)	—
OFF position warning		When all the conditions below are met. • Ignition switch is between ACC and OFF position or ignition knob is pressed in while ignition switch is in LOCK position. • 3 seconds in the above state have pressed.	"LOCK" (RED blinking)	Active for 1 second (pipi, pipi···)	—
Take away warning	Any door open to all doors closed	When all the conditions below are met. • Ignition switch: Except LOCK position. • Door switch: ON to OFF (Door is open to closed). • Intelligent Key cannot be detected inside the vehicle.	"LOCK" (RED blinking)	—	Active (pi, pi, pi)
	Door is open	When all the conditions below are met. • Door switch: ON (Door is open) • Key ID verification every 5 seconds when registered Intelligent Key can not be detected inside the vehicle.	"LOCK" (RED blinking)	—	—
	Take away through window	When all the conditions below are met. • Key ID verification: OK • Every 30 seconds when registered Intelligent Key cannot be detected inside the vehicle or result of vehicle speed verification is NG. (The registered Intelligent Key cannot be detected inside the vehicle when ignition switch is ON.) • Key switch: OFF (Key is removed from ignition key cylinder.)	"LOCK" (RED blinking)	Active for 3 seconds (pipipi···	—

carsdiagn.com

Warning/Information functions		Operation conditions	Warning lamp	Warning chime	
				Combination meter buzzer	Intelligent Key warning buzzer
Door lock operation warning	Request switch operation	When request switch is pushed (lock operation) under the following conditions. • Door switch: ON (Any door is open). • Ignition switch is in ACC or OFF position or ignition knob is pressed in LOCK position or mechanical key is inserted into ignition key cylinder. • Intelligent Key is inside vehicle.	—	—	Active for 2 seconds (pipipi···)
	Intelligent Key button operation	When Intelligent Key button is pushed (lock operation) under the following conditions. • Door switch: ON (Any door is open). • Ignition switch is in ACC or OFF position or ignition knob is pressed in LOCK position or mechanical key is inserted into ignition key cylinder.	—	—	Active for 2 seconds (pipipi···)
Intelligent Key low battery warning		When Intelligent Key battery voltage is low, Intelligent Key unit is detected after ignition switch is turned ON.	"KEY" (GREEN blinking for 30 seconds)	—	—

KEY WARNING LAMP & LOCK WARNING LAMP

The key indicator and lock indicator indicates Intelligent Key system status.

Operation Condition

Behavior of lamps			Operation condition
KEY	GREEN	Lighting	All the following conditions are satisfied. • Ignition knob is pushed in LOCK position. (Ignition knob switch is ON) • Ignition key is removed from ignition key cylinder. (Key switch is OFF) • Intelligent Key is detected inside of the vehicle. • KEY RED lighting/blinking conditions are not satisfied.
		Blinking	while Intelligent Key low battery warning is operating.
	RED	Lighting	All the following conditions are satisfied. • Ignition knob is pushed. (Ignition knob switch is ON) • Ignition key is removed from ignition key cylinder. (Key switch is OFF) • Intelligent Key is not detected inside of the vehicle.
		Blinking	All the following conditions are satisfied. • Take away warning is operating. • KEY RED lighting condition is not satisfied.
LOCK		Blinking	while OFF position warning is operating.
KEY(RED) and LOCK lighting			All the following conditions are satisfied. • Ignition switch is ON. • Steering lock ID is NG.

BACK DOOR OPEN WARNING OPERATION

When back door opener switch is operated, when door lock is locked with door lock and unlock switch, speed sensing lock or only driver side is unlocked with anti-hijack function, the buzzer (built in combination meter) will sound.

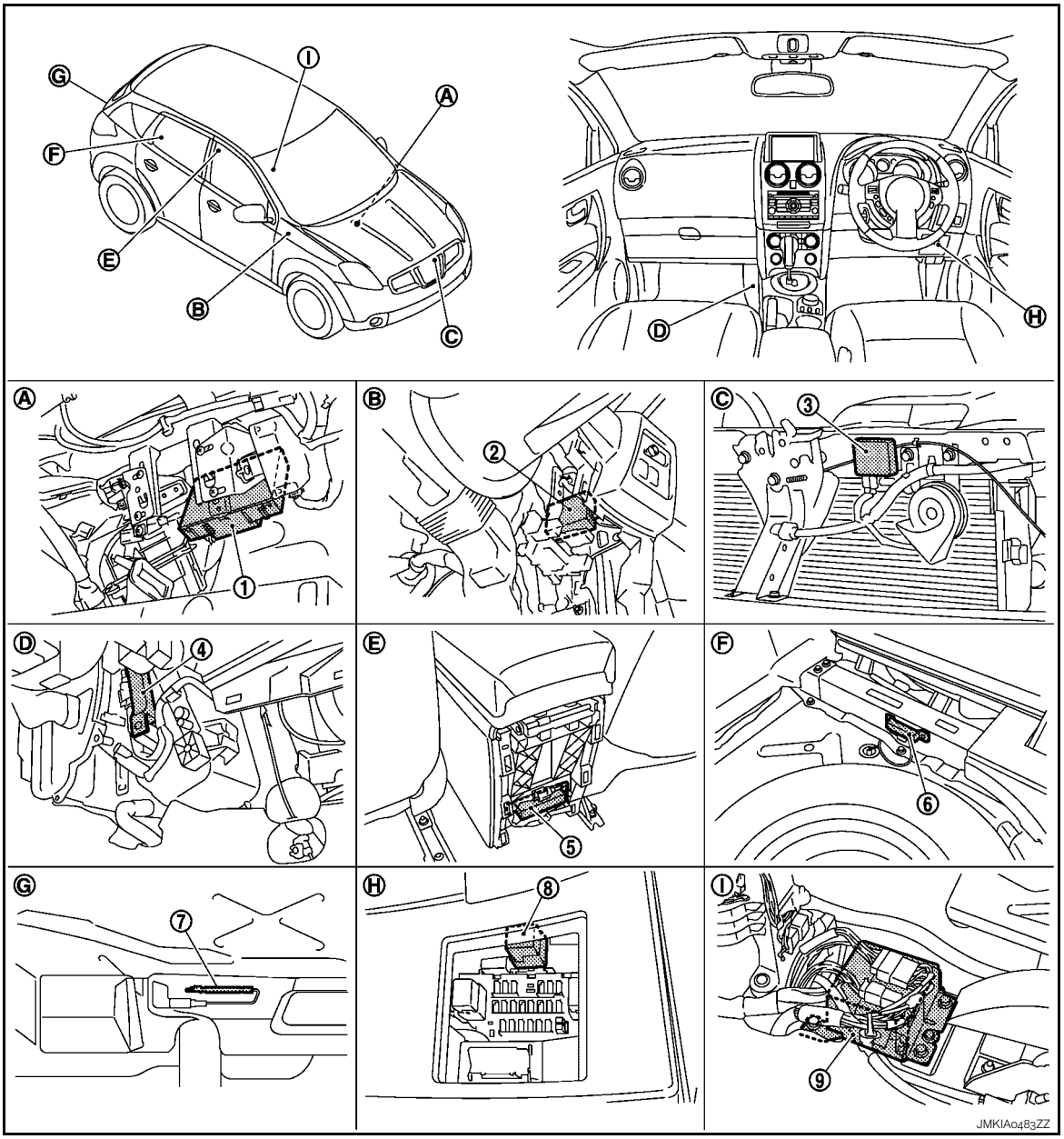
KEY REMINDER OPERATION

- The buzzer (combination meter) will sound and the doors will not lock if the door lock and unlock switch is pressed while the driver door is open and mechanical key is inserted ignition key cylinder.
- The buzzer (combination meter) will sound and the doors will not lock if the door lock and unlock switch is pressed while any door other than the driver door is open.

Component Parts Location

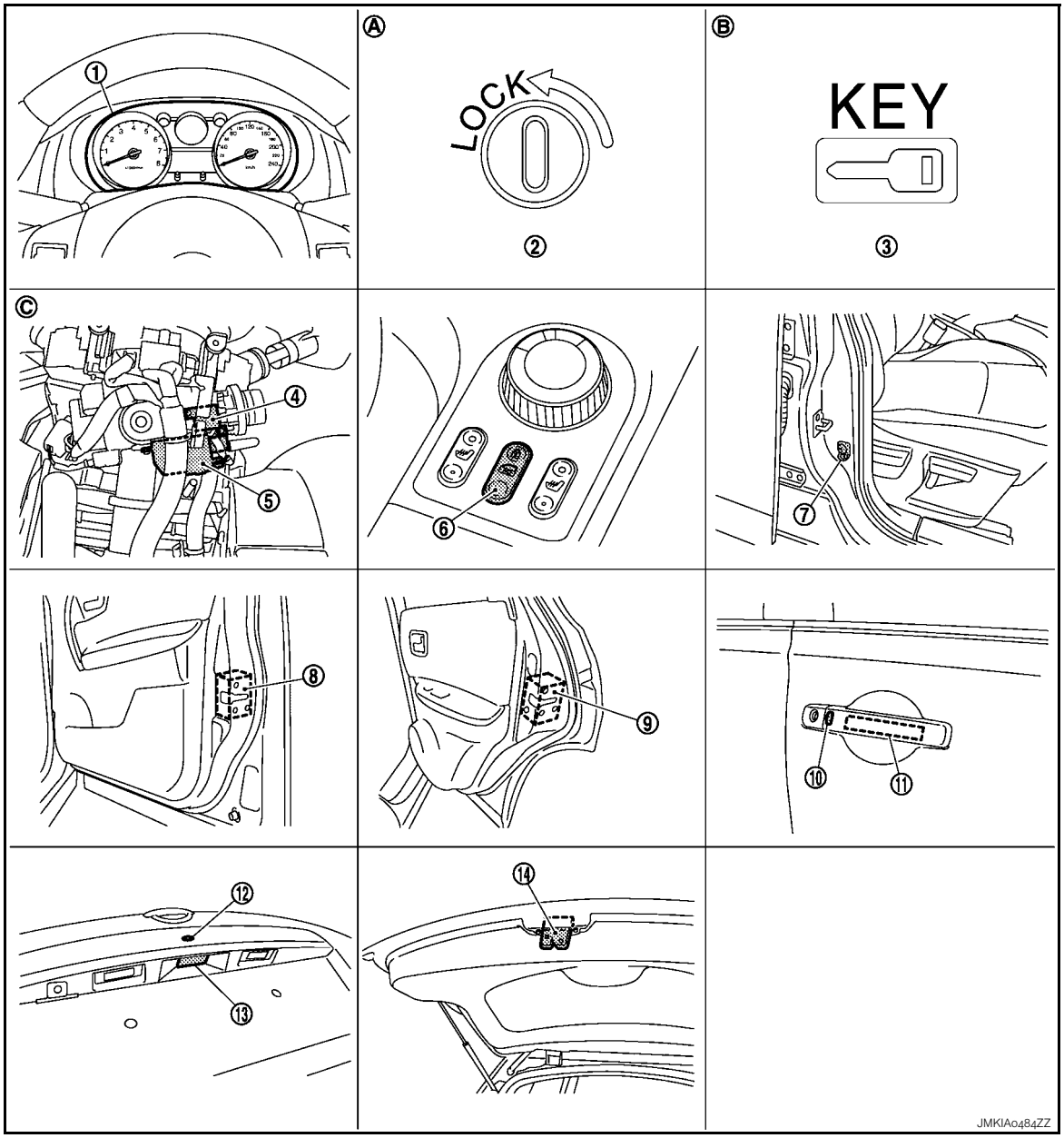
INFOID:0000000001117080

cardiagn.com



1. BCM M65, M66, M67
2. Intelligent Key unit M40
3. Intelligent Key warning buzzer E25
4. Inside key antenna (instrument center) M70
5. Inside key antenna (center console) M61
6. Inside key antenna (rear seat) B45
7. Inside key antenna (rear bumper) B81
8. Passenger side anti-hijack relay M90
9. Air bag diagnosis sensor unit M59

A. Over the glove box
B. Over the instrument lower panel (driver side)
C. View with front bumper removed
D. View with lower instrument cover removed
E. View with center console rear finisher removed
F. View with luggage floor spacer (LH) removed
G. View with rear bumper fascia removed
H. View with fuse box lid removed
I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89
7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

Component Description

INFOID:0000000001081258

cardiagn.com

Item	Function
BCM	Controls the warning function with Intelligent Key unit.
Intelligent Key unit	Controls the warning function with BCM.
Key switch	Detects that mechanical key is inserted into ignition key cylinder.
Door switch	Detects door state (open or closed).
Door lock and unlock switch	Transmits door lock and unlock signal to BCM.
Intelligent Key unit	Requests to turn ON hazard warning lamp to BCM and turn signal indicator to combination meter.
Combination meter	Turns ON the LOCK indicator, KEY indicator, turn signal indicator and buzzer (built in combination meter) by the request from Intelligent Key unit via CAN communication.
Intelligent Key warning buzzer	Sounds by the request from Intelligent Key unit.
Back door opener switch	Transmits back door open signal to BCM

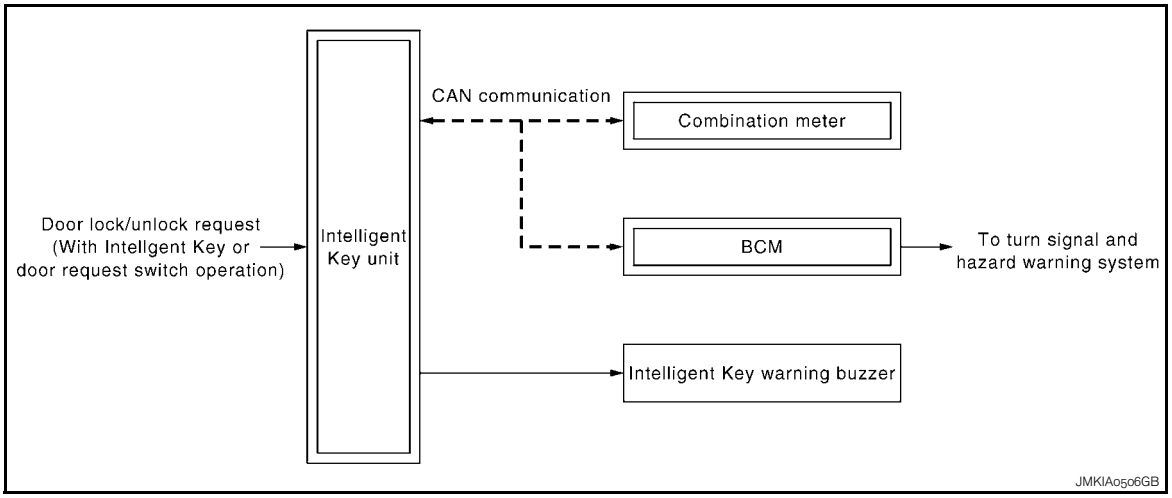
carsdiagn.com

HAZARD AND BUZZER REMINDER FUNCTION

System Diagram

INFOID:0000000001081322

HAZARD & BUZZER REMINDER FUNCTION



System Description

INFOID:0000000001081323

HAZARD AND BUZZER REMINDER FUNCTION

When door is locked or unlocked by Intelligent Key or door request switch, Intelligent Key unit sounds buzzer and sends hazard request signal to BCM via CAN communication. Then BCM flashes hazard warning lamps as a reminder.

NOTE:

Hazard and buzzer reminder function mode can be changed with CONSULT-III. Refer to DLK-329, "CONSULT-III Function (INTELLIGENT KEY)".

Hazard Operation

Hazard reminder setting (With CONSULT-III)		Door lock operation (with Intelligent Key or door request switch)	Hazard warning lamp flash
HAZARD ANSWER BACK	OFF	Any	—
	LOCK ONLY	Lock	Once
		Unlock	—
		Unlock (Anti-hijack)	—
	UNLK ONLY	Lock	—
		Unlock	Twice
		Unlock (Anti-hijack)	Twice (quick)
	LOCK/UNLK	Lock	Once
		Unlock	Twice
		Unlock (Anti-hijack)	Twice (quick)

Buzzer Operation

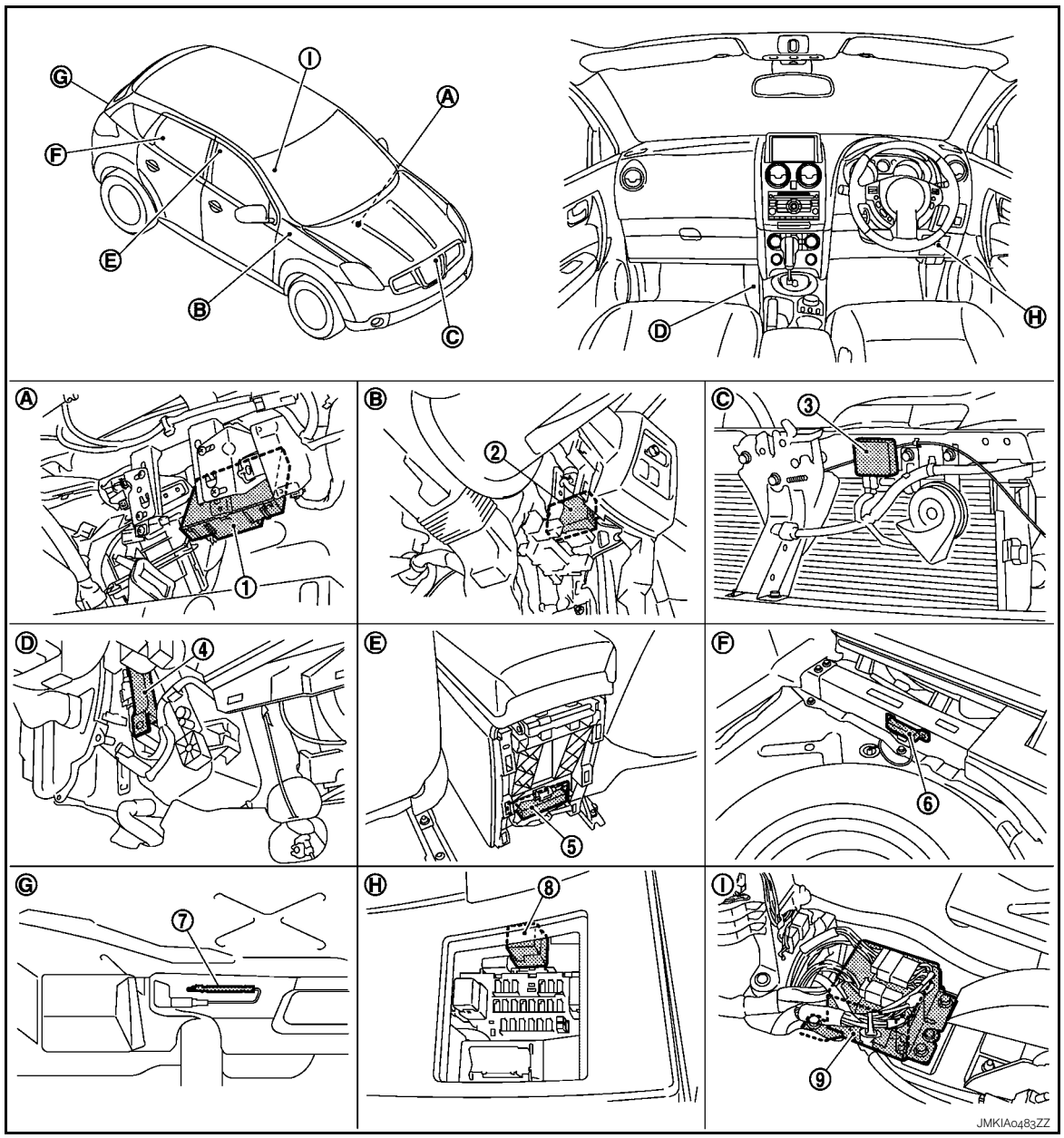
Buzzer reminder setting (With CONSULT-III)		Door lock operation (with Intelligent Key or door request switch)	Buzzer warning sounds
ANSWER BACK WITH I-KEY LOCK	BUZZER	Lock	Once
		Unlock	Depends on other setting
		Unlock (Anti-hijack)	Depends on other setting
	OFF	Any	—

cardiagn.com

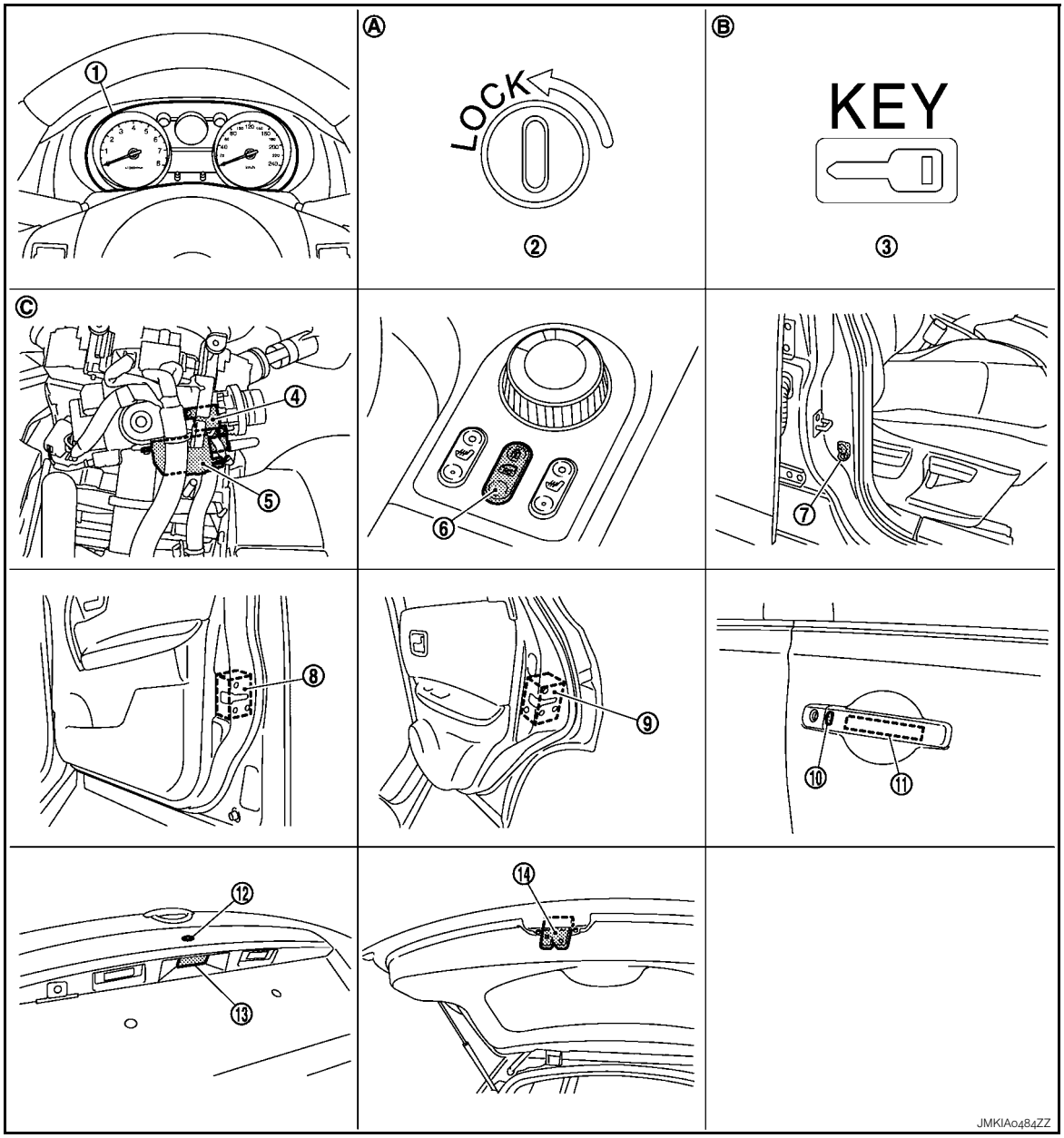
Buzzer reminder setting (With CONSULT-III)		Door lock operation (with Intelligent Key or door request switch)	Buzzer warning sounds
ANSWER BACK WITH I-KEY UNLOCK	BUZZER	Lock	Depends on other setting
		Unlock	Twice
		Unlock (Anti-hijack)	Twice
	OFF	Any	—
ANSWER BACK FUNCTION	ON	Lock	Once
		Unlock	Twice
		Unlock (Anti-hijack)	Twice
	OFF	Any	—

Component Parts Location

INFOID:0000000001117081



1. BCM M65, M66, M67
2. Intelligent Key unit M40
3. Intelligent Key warning buzzer E25
4. Inside key antenna (instrument center) M70
5. Inside key antenna (center console) M61
6. Inside key antenna (rear seat) B45
7. Inside key antenna (rear bumper) B81
8. Passenger side anti-hijack relay M90
9. Air bag diagnosis sensor unit M59
- A. Over the glove box
- B. Over the instrument lower panel (driver side)
- C. View with front bumper removed
- D. View with lower instrument cover removed
- E. View with center console rear finisher removed
- F. View with luggage floor spacer (LH) removed
- G. View with rear bumper fascia removed
- H. View with fuse box lid removed
- I. View with center console removed



1. Combination meter M34
2. Lock warning lamp M34
3. Key warning lamp M34
4. Ignition knob switch, key switch and key lock solenoid (key switch) M25
5. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
6. Door lock and unlock switch M89

cardiagn.com

7. Front door switch (driver side) B34
8. Front door lock actuator (driver side) D29
9. Rear door lock actuator RH D95
10. Front door request switch (driver side) D30
11. Outside key antenna (driver side) D31
12. Back door request switch D187
13. Back door opener switch D186
14. Back door lock assembly D152

A. Inside the combination meter
B. Inside the combination meter
C. View with steering column cover removed

Component Description

INFOID:0000000001081325

Item	Function
BCM	Controls the hazard and buzzer reminder function with Intelligent Key unit.
Intelligent Key unit	Controls the hazard and buzzer reminder function with BCM.
Combination meter	Turns ON the LOCK indicator, KEY indicator, turn signal indicator and buzzer (built in combination meter) by the request from Intelligent Key unit via CAN communication.
Intelligent Key warning buzzer	Sounds by the request signal from Intelligent Key unit via CAN communication.

carsdiagn.com

DIAGNOSIS SYSTEM (BCM)
COMMON ITEM
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001097285

APPLICATION ITEM
CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION
BCM can perform the following functions for each system.
NOTE:
It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

DOOR LOCK
DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)

INFOID:0000000001097286

BCM CONSULT-III FUNCTION
CONSULT-III performs the following functions via CAN communication with BCM.

cardiagn.com

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
KEYLESS LOCK*2	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK*2	Indicates [ON/OFF] condition of unlock signal from key fob.
I-KEY LOCK*1	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK*1	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.
UNLOCK WITH DR	This item is indicated, but not monitored.
UNLOCK SHOCK	Indicates [ON/OFF] condition of signal from air bag diagnosis unit. • ON: During the unlock operation interlock with air bag. • OFF: Other than above.
SHOCK SENSOR	Indicates [NOMAL/ON/OFF] condition of circuit between BCM and air bag diagnosis sensor unit. • NORMAL: Ignition switch ON. (BCM is receiving normal condition signal from air bag diagnosis sensor unit.) • ON: During the receiving of air bag deployment signal from air bag diagnosis sensor unit. • OFF: After the receiving of air bag deployment signal from air bag diagnosis sensor unit.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the multi remote control system equipped vehicle.

ACTIVE TEST

Test item	Description
SUPER LOCK*1	This test is able to check super lock operation [LOCK (SET)/UNLOCK (RELEASE)].
DOOR LOCK IND	This test is able to check door lock indicator (built in door lock and unlock switch on center console) operation [ON/OFF].
DOOR LOCK	This test is able to check door lock operation [ALL LOCK/ALL UNLOCK/DR UNLOCK/ OTHER UNLOCK].

:*1 For the super lock equipped vehicle.

WORK SUPPORT

A B C D E F G H I J DLK L M N O P
carDiagn.com

Test item	Description
SECURITY DOOR LOCK SET	Anti hijack function mode can be changed in this mode. • ON: Anti hijack mode is active. • OFF: Anti hijack mode is inactive.

INTELLIGENT KEY

INTELLIGENT KEY : CONSULT-III Function (BCM - INTELLIGENT KEY)

INFOID:0000000001097287

BCM CONSULT-III FUNCTION

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW	Indicates [ON/OFF] condition of ignition knob switch.
I-KEY LOCK	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.

TRUNK

TRUNK : CONSULT-III Function (BCM - TRUNK)

INFOID:0000000001097288

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
TRNK OPNR SW	Indicates [ON/OFF] condition of back door opener switch.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the remote keyless entry system equipped vehicle.

ACTIVE TEST

Test item	Description
TRUNK/GLASS HATCH	This test is able to check back door opener operation [ON/OFF].

cardiagn.com

DIAGNOSIS SYSTEM (INTELLIGENT KEY UNIT)

CONSULT-III Function (INTELLIGENT KEY)

INFOID:0000000001097289

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with Intelligent Key unit.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by Intelligent Key unit.
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from Intelligent Key unit.
DATA MONITOR	The Intelligent Key unit input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.
ECU IDENTIFICATION	The Intelligent Key unit part number is displayed.

WORK SUPPORT

Support item	Description	Selection item	Condition
CONFIRM KEY FOB ID	It can check whether Intelligent Key ID code is registered or not.	—	—
TAKE OUT FROM WINDOW WARN	Take away warning chime (from window) mode can be changed.	ON	Active
		OFF	Inactive
LOW BATT OF KEY FOB WARN	Intelligent Key low battery warning mode can be changed.	ON	Active
		OFF	Inactive
KEYLESS FUNCTION	Door lock function with Intelligent Key can be changed.	ON	Active
		OFF	Inactive
ANSWER BACK FUNCTION	Buzzer reminder operation can be changed.	ON	Active
		OFF	Inactive
SELECTIVE UNLOCK FUNCTION	Anti-hijack mode can be changed.	ON	Active
		OFF	Inactive
HAZARD ANSWER BACK	Hazard reminder operation mode can be changed.	Refer to DLK-322.	
ANSWER BACK WITH I-KEY LOCK	Buzzer reminder operation (lock operation) mode by each door request switch can be changed.	BUZZER	Active
		OFF	Inactive
ANSWER BACK WITH I-KEY UNLOCK	Buzzer reminder operation (unlock operation) mode by each door request switch can be changed.	BUZZER	Active
		OFF	Inactive
AUTO RELOCK TIMER	Auto door lock operation mode can be changed.	OFF	Inactive
		2 min	Active
ENGINE START BY I-KEY	Engine start function (by Intelligent Key) mode can be changed.	ON	Active
		OFF	Inactive
LOCK/UNLOCK BY I-KEY	Door lock function by door request switch can be changed.	ON	Active
		OFF	Inactive

SELF-DIAG RESULT

Refer to DLK-472, "DTC Index".

DATA MONITOR

Monitor Item	Condition
PUSH SW	Indicates [ON (pressed)/OFF (released)] condition of ignition knob switch.
KEY SW	Indicates [ON (inserted)/OFF (removed)] condition of key switch.
DR REQ SW	Indicates [ON (pressed)/OFF (released)] condition of door request switch (driver side).
AS REQ SW	Indicates [ON (pressed)/OFF (released)] condition of door request switch (passenger side).
BD/TR REQ SW	Indicates [ON (pressed)/OFF (released)] condition of door request switch (back door).
IGN SW	Indicates [ON (ON or START position)/OFF (other than ON and START position)] condition of ignition switch ON position.
ACC SW	Indicates [ON/OFF] condition of ignition switch ACC position.
STOP LAMP SW	Indicates [ON/OFF] condition of stop lamp switch.
DOOR LOCK SIG	Indicates [ON/OFF] condition of LOCK signal from Intelligent Key.
DOOR UNLOCK SIG	Indicates [ON/OFF] condition of UNLOCK signal from Intelligent Key.
DOOR SW DR	Indicates [OPEN/CLOSE] condition of front door switch (driver side) from BCM via CAN communication.
DOOR SW AS	Indicates [OPEN/CLOSE] condition of front door switch (passenger side) from BCM via CAN communication.
DOOR SW RR	Indicates [OPEN/CLOSE] condition of rear door switch (RH) from BCM via CAN communication.
DOOR SW RL	Indicates [OPEN/CLOSE] condition of rear door switch (LH) from BCM via CAN communication.
DOOR BK SW	Indicates [OPEN/CLOSE] condition of back door switch from BCM via CAN communication.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

ACTIVE TEST

Test item	Description
DOOR LOCK/UNLOCK	This test is able to check door lock/unlock operation. • ALL UNLK: All door lock actuators are unlocked. • DR UNLK: Door lock actuator (driver side) is unlocked. • AS UNLK: Door lock actuator (passenger side) is unlocked. • BK UNLK: This item is indicated, but inactive. • LOCK: All door lock actuator is locked.
ANTENNA	This test is able to check Intelligent Key antenna operation. When the following condition are met, hazard warning lamps flash. • ROOM ANT1: Inside key antenna (console) detects Intelligent Key, when “ROOM ANT1” is selected. • ROOM ANT2: Inside key antenna (instrument center/rear seat) detects Intelligent Key, when “ROOM ANT2”is selected. • DRIVER ANT: Outside key antenna (driver side) detects Intelligent Key, when “DRIVER ANT” is selected. • ASSIST ANT: Outside key antenna (passenger side) detects Intelligent Key, when “ASSIST ANT” is selected. • BK DOOR ANT: Outside key antenna (rear bumper) detects Intelligent Key, when “BK DOOR ANT” is selected.
OUTSIDE BUZZER	This test is able to check Intelligent Key warning buzzer operation. • ON • OFF
INSIDE BUZZER	This test is able to check warning chime in combination meter operation. • TAKE OUT: Take away warning chime sounds. • KNOB: Ignition knob switch warning chime sounds. • KEY: Key warning chime sounds. • OFF

cardiagn.com

Test item	Description
INDICATOR	This test is able to check warning lamp operation. • BLUE ON: Key warning lamp (green) illuminates. • RED ON: Key warning lamp (red) illuminates. • KNOB ON: Lock warning lamp illuminates. • BLUE IND: Key warning lamp (green) flashes. • RED IND: Key warning lamp (red) flashes. • KNOB IND: Lock warning lamp flashes. • OFF
KEY LOCK SOLENOID*1	This test is able to check key interlock operation. • LOCK: Key interlock is active. • UNLOCK: Key interlock is inactive.

*1: The item is only for MT model.

carsdiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001097045

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart, refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000001097046

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1000	CAN COMM CIRCUIT	When Intelligent Key unit cannot communicate CAN communication signal continuously for 2 seconds or more.	In CAN communication system, any item (or items) of the following listed below is malfunctioning. • Transmission • Receiving (BCM) • Receiving (IPDM E/R) • Receiving (ECM) • Receiving (METER/M&A) • Receiving (MULTI AV)

Diagnosis Procedure

INFOID:0000000001097047

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check “Self Diagnostic Result”.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000001097048

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart, refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000001097049

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of Intelligent Key unit.	Intelligent Key unit

Diagnosis Procedure

INFOID:0000000001097050

1.REPLACE INTELLIGENT KEY UNIT

When DTC [U1010] is detected, replace Intelligent Key unit.

>> Replace Intelligent Key unit.

Special Repair Requirement

INFOID:0000000001097051

1.REQUIRED WORK WHEN REPLACING INTELLIGENT KEY UNIT

Initialize control unit. Refer to CONSULT-III operation manual NATS-IVIS/NVIS.

>> Work end.

B2552 INTELLIGENT KEY

Description

INFOID:0000000001115370

Intelligent key unit performs engine start operation and steering lock control by crosschecking ID with the Intelligent key.

DTC Logic

INFOID:0000000001115371

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2552	INTELLIGENT KEY UNIT	Malfunction is detected inside Intelligent key unit.	• Intelligent Key unit

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to DLK-334, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001115372

1.REPLACE INTELLIGENT KEY UNIT

1. Replace Intelligent Key unit.
2. Perform initialization with CONSULT-III. Re-register all mechanical keys. Refer to “CONSULT-III Operation Manual NATS”.
3. Start the engine.

Does the engine start?

YES >> INSPECTION END
NO >> Perform “DTC confirmation procedure”. Refer to DLK-334, "DTC Logic".

Special Repair Requirement

INFOID:0000000001115373

1.REQUIRED WORK WHEN REPLACING INTELLIGENT KEY UNIT

Initialize control unit. Refer to CONSULT-III operation manual NATS-IVIS/NVIS.

>> Work end.

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT
INTELLIGENT KEY UNIT

INTELLIGENT KEY UNIT : Diagnosis Procedure

INFOID:0000000001099157

1.CHECK FUSE AND FUSIBLE LINK

Check that the following fuse is not blown.

Terminal No.	Signal name	Fuse No.
11	Battery power supply	9 (10A)
6	Ignition power supply	4 (10A)

Is the fuse blown?

YES >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Turn ignition switch ON.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminal			Voltage (V) (Approx.)
(+)		(–)	
Intelligent Key unit		Ground	
Connector	Terminal		
M40	11		Battery voltage
	6		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between Intelligent Key unit harness connector and ground.

Intelligent Key unit		Ground	Continuity
Connector	Terminal		
M40	12		Exists

Does continuity exist?

YES >> Intelligent Key unit power supply and ground circuit are OK.
NO >> Repair harness or connector.

BCM

BCM : Diagnosis Procedure

INFOID:0000000001115313

1.CHECK FUSE AND FUSIBLE LINK

Check that the following fuse and fusible link are not blown.

Terminal No.	Signal name	Fuse and fusible link No.
41	Battery power supply	9 (10A)
57		J (40A)

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.

carsdiagn.com

NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
BCM		Ground	
Connector	Terminal		
M66	41		Battery voltage
M67	57		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> BCM power supply and ground circuit are OK.
NO >> Repair harness or connector.

cardiagn.com

DOOR LOCK AND UNLOCK SWITCH

Description

INFOID:0000000001099158

Transmits door lock/unlock operation to BCM.

Component Function Check

INFOID:0000000001099159

1.CHECK FUNCTION

With CONSULT-III

Check “CDL LOCK SW ”and “CDL UNLOCK SW” in Data monitor mode with CONSULT-III.

Monitor item	Condition	
CDL LOCK SW	LOCK	: ON
	UNLOCK	: OFF
CDL UNLOCK SW	LOCK	: OFF
	UNLOCK	: ON

Is the inspection result normal?

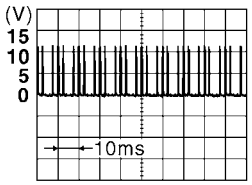
YES >> Door lock and unlock switch is OK.
NO >> Refer to DLK-337, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099160

1.CHECK DOOR LOCK AND UNLOCK INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect door lock and unlock switch connector.
3. Check voltage between door lock and unlock switch and ground.

Terminal			Signal (Reference value)
(+)		(–)	
Door lock and unlock switch connector	Terminal		
M89	1	Ground	
	6		

JPMIA0154GB

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK AND UNLOCK SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector and door lock and unlock switch connector.

BCM connector	Terminal	Door lock and unlock switch connector	Terminal	Continuity
M65	7	M89	6	Exists
	9		1	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal		Continuity
M65	7	Ground	Does not exist
	9		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

3.CHECK DOOR LOCK AND UNLOCK SWITCH GROUND

Check continuity between door lock and unlock switch connector and ground.

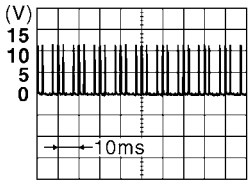
Door lock and unlock switch connector	Terminal	Ground	Continuity
M89	5		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminal			Signal (Reference value)
(+)		(–)	
BCM connector	Terminal		
M65	7	Ground	
	9		

JPMIA0154GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK DOOR LOCK AND UNLOCK SWITCH

Check door lock and unlock switch
Refer to DLK-74, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

Component Inspection

INFOID:0000000001099161

1.CHECK DOOR LOCK AND UNLOCK SWITCH

Check door lock and unlock switch.

Door lock and unlock switch	Terminal		Condition	Continuity
M89	6	5	LOCK	Exists
	1		UNLOCK	

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

cardiagn.com

DOOR LOCK AND UNLOCK SWITCH INDICATOR

Description

INFOID:0000000001102268

The door lock and unlock switch indicates door lock status. The indicator will illuminate when a lock operation is accomplished, and during this status, if any door is opened, the indicator will turn OFF.

Component Function Check

INFOID:0000000001102269

1.CHECK FUNCTION

With CONSULT-III

Check “DOOR LOCK IND” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK IND	:ON	Illuminated
	:OFF	Not illuminated

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Refer to DLK-339, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102270

1.CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between door lock and unlock switch and ground.

Terminal			Condition	Voltage (Approx.)
(+)		(–)		
Door lock and unlock switch connector	Terminal			
M89	4	Ground	Door lock operation is accomplished	Battery voltage
			Any door is OPEN	0

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK DOOR LOCK AND UNLOCK SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and door lock and unlock switch connector.
3. Check continuity between BCM connector and door lock and unlock switch connector.

BCM connector	Terminal	Door lock and unlock switch connector	Terminal	Continuity
M65	24	M89	4	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	24		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK DOOR LOCK AND UNLOCK SWITCH GROUND

Check continuity between door lock and unlock switch connector and ground.

Door lock and unlock switch connector	Terminal	Ground	Continuity
M89	5		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminal			Condition	Voltage (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	24	Ground	Door lock operation is accomplished	Battery voltage
			Any door is OPEN	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR

Check door lock and unlock switch
Refer to DLK-340, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

Component Inspection

INFOID:0000000001102271

1.CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR

Check continuity door lock and unlock switch.

Door lock and unlock switch	Terminal		Continuity
	(+)	(-)	
M89	5	4	Exists
	4	5	Does not exist

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

cardiagn.com

DOOR REQUEST SWITCH
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001109380

Transmits lock/unlock operation to Intelligent Key unit.

DRIVER SIDE : Component Function Check

INFOID:0000000001109381

1.CHECK FUNCTION

With CONSULT-III
Check door request switch “DR REQ SW” in Data monitor mode.

Monitor item	Condition	
DR REQ SW	Door request switch is pressed	:ON
	Door request switch is released	:OFF

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Refer to DLK-345, "BACK DOOR : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001109382

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between Intelligent Key unit harness connector and ground.

Terminal			Door request switch condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	5	Ground	Pressed	0
			Released	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK FRONT DOOR REQUEST SWITCH CIRCUIT

1. Disconnect intelligent key unit.
2. Check continuity between Intelligent Key unit connector and door request switch connector.

Intelligent Key unit connector	Terminal	Door request switch connector	Terminal	Continuity
M40	5	D30	1	Exists

3. Check continuity between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Continuity
M40	5		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and front outside handle.

3.CHECK DOOR REQUEST SWITCH GROUND CIRCUIT

Check continuity between door request switch connector and ground.

Door request switch connector	Terminal	Ground	Continuity
D30	2		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace front outside handle ground circuit.

4.CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit connector.
2. Check voltage between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Voltage (V) (Approx.)
M40	5		5

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 6.

5.CHECK DOOR REQUEST SWITCH

Check door request switch.
Refer to DLK-346, "BACK DOOR : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning front outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".

6.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-552, "Exploded View".
NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

DRIVER SIDE : Component Inspection

INFOID:0000000001109383

1.CHECK DOOR REQUEST SWITCH

Check door request switch.

Terminal		Door request switch condition	Continuity
Door request switch			
1	2	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Replace malfunctioning front outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001109384

Transmits lock/unlock operation to Intelligent Key unit.

cardiagn.com

PASSENGER SIDE : Component Function Check

INFOID:0000000001109385

1.CHECK FUNCTION

With CONSULT-III

Check door request switch “AS REQ SW” in Data monitor mode.

Monitor item	Condition	
AS REQ SW	Door request switch is pressed	:ON
	Door request switch is released	:OFF

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Refer to DLK-345, "BACK DOOR : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001109386

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between Intelligent Key unit harness connector and ground.

Terminal			Door request switch Condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	25	Ground	Pressed	0
			Released	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK DOOR REQUEST SWITCH CIRCUIT

1. Disconnect intelligent key unit.
2. Check continuity between Intelligent Key unit connector and door request switch connector.

Intelligent Key unit connector	Terminal	Door request switch connector	Terminal	Continuity
M40	25	D69	1	Exists

3. Check continuity between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Continuity
M40	25		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and front outside handle.

3.CHECK DOOR REQUEST SWITCH GROUND CIRCUIT

Check continuity between front door request switch connector and ground.

Door request switch connector	Terminal	Ground	Continuity
D69	2		Exists

Is the inspection result normal?

YES >> GO TO 4.

A B C D E F G H I J DLK L M N O P
c-diagn.com

NO >> Repair or replace front outside handle ground circuit.

4.CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit connector.
2. Check voltage between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Voltage (V) (Approx.)
M40	25		5

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 6.

5.CHECK DOOR REQUEST SWITCH

Check door request switch.
Refer to DLK-346, "BACK DOOR : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning front outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".

6.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-552, "Exploded View".
NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

PASSENGER SIDE : Component Inspection

INFOID:0000000001109387

1.CHECK DOOR REQUEST SWITCH

Check door request switch.

Terminal		Door request switch condition	Continuity
Door request switch			
1	2	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Replace malfunctioning front outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".

BACK DOOR

BACK DOOR : Description

INFOID:0000000001109388

Transmits lock/unlock operation to Intelligent Key unit.

BACK DOOR : Component Function Check

INFOID:0000000001109389

1.CHECK FUNCTION

With CONSULT-III
Check door request switch “BD/TR REQ SW” in Data monitor mode.

cardiagn.com

Monitor item	Condition	
BD/TR REQ SW	Door request switch is pressed	:ON
	Door request switch is released	:OFF

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Refer to DLK-345, "BACK DOOR : Diagnosis Procedure".

BACK DOOR : Diagnosis Procedure

INFOID:0000000001109390

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between Intelligent Key unit harness connector and ground.

Terminal			Door request switch condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	29	Ground	Pressed	0
			Released	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK DOOR REQUEST SWITCH CIRCUIT

1. Disconnect Intelligent Key unit.
2. Check continuity between Intelligent Key unit connector and door request switch connector.

Intelligent Key unit connector	Terminal	Door request switch connector	Terminal	Continuity
M40	29	D187	1	Exists

3. Check continuity between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Continuity
M40	29		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and back door request switch.

3.CHECK DOOR REQUEST SWITCH GROUND CIRCUIT

Check continuity between front door request switch connector and ground.

Door request switch connector	Terminal	Ground	Continuity
D187	2		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace back door request switch ground circuit.

4.CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit connector.
2. Check voltage between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Voltage (V) (Approx.)
M40	29		5

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 6.

5.CHECK DOOR REQUEST SWITCH

Check door request switch.
Refer to DLK-346, "BACK DOOR : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door request switch. Refer to DLK-278, "Exploded View".

6.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-552, "Exploded View".

NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

BACK DOOR : Component Inspection

INFOID:0000000001109391

1.CHECK DOOR REQUEST SWITCH

Check door request switch.

Terminal		Door request switch condition	Continuity
Door request switch			
1	2	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door request switch is OK.
NO >> Replace back door request switch. Refer to DLK-278, "Exploded View".

cardiagn.com

DOOR SWITCH
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001099166

Detects door open/closed condition.

DRIVER SIDE : Component Function Check

INFOID:0000000001099167

1.CHECK FUNCTION

With CONSULT-III

Check door switches “DOOR SW-DR” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-DR	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

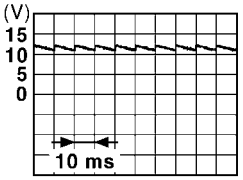
YES >> Door switch is OK.
NO >> Refer to DLK-347, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001099168

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals (+) BCM connector	Terminals (+) Terminal	Terminals (–)	Door condition	Voltage (V) (Approx.)
M65	26	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	26	B34	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	26		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-348, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

DRIVER SIDE : Component Inspection

INFOID:0000000001099169

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001099170

Detects door open/closed condition.

PASSENGER SIDE : Component Function Check

INFOID:0000000001099171

1.CHECK FUNCTION

With CONSULT-III
Check door switches “DOOR SW-AS” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-AS	OPEN	: ON
	CLOSE	: OFF

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Refer to DLK-348, "PASSENGER SIDE : Diagnosis Procedure".

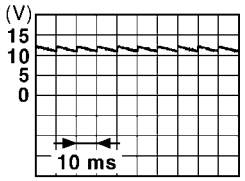
PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001099172

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

cardiagn.com

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	27	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	27	B27	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	27		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-349, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

PASSENGER SIDE : Component Inspection

INFOID:0000000001099173

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR LH

REAR LH : Description

INFOID:0000000001099174

Detects door open/closed condition.

REAR LH : Component Function Check

INFOID:0000000001099175

1.CHECK FUNCTION

With CONSULT-III

Check door switches “DOOR SW-RL” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-RL	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

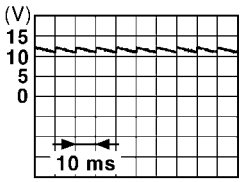
YES >> Door switch is OK.
NO >> Refer to DLK-350, "REAR LH : Diagnosis Procedure".

REAR LH : Diagnosis Procedure

INFOID:0000000001099176

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	25	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	25	B71	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	25		Does not exist

Is the inspection result normal?

cardiagn.com

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-351, "REAR LH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR LH : Component Inspection

INFOID:0000000001099177

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR RH

REAR RH : Description

INFOID:0000000001099178

Detects door open/close condition.

REAR RH : Component Function Check

INFOID:0000000001099179

1.CHECK FUNCTION

With CONSULT-III
Check door switches “DOOR SW-RR” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-RR	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

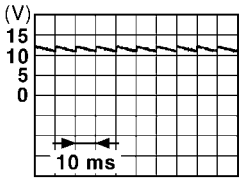
YES >> Door switch is OK.
NO >> Refer to DLK-351, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001099180

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	29	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	29	B53	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	29		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-352, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR RH : Component Inspection

INFOID:0000000001099181

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

cardiagn.com

BACK DOOR

BACK DOOR : Description

INFOID:0000000001099182

Detects back door open condition.

BACK DOOR : Component Function Check

INFOID:0000000001099183

1.CHECK FUNCTION

With CONSULT-III

Check “BACK DOOR SW” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
BACK DOOR SW	OPEN	: ON
	CLOSE	: OFF

Is the inspection result normal?

YES >> Back door lock assembly (door switch) is OK.
NO >> Refer to DLK-353, "BACK DOOR : Diagnosis Procedure".

BACK DOOR : Diagnosis Procedure

INFOID:0000000001099184

1.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH) INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Back door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	28	Ground	OPEN	0
			CLOSE	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH) CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and back door lock assembly (door switch) connector.

BCM connector	Terminal	Back door lock assembly (door switch) connector	Terminal	Continuity
M65	28	D152	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	28		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and trunk room lamp switch.

3.CHECK BACK DOOR LOCK ASSEMBLY GROUND CIRCUIT

Check continuity between back door lock assembly connector and ground.

Back door lock assembly (door switch) connector	Terminal	Ground	Continuity
D152	3		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace back door lock assembly ground circuit.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M65	28	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH)

Check back door lock assembly (door switch).
Refer to DLK-354, "BACK DOOR : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door lock assembly (door switch). Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

BACK DOOR : Component Inspection

INFOID:0000000001099185

1.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH)

1. Turn ignition switch OFF.
2. Disconnect back door lock assembly (door switch) connector.
3. Check back door lock assembly (door switch).

Terminal		Trunk condition	Continuity
Back door lock assembly (door switch)			
4	3	OPEN	Exists
		CLOSE	Does not exist

Is the inspection result normal?

YES >> Back door lock assembly (door switch) is OK.
NO >> Replace back door lock assembly (door switch). Refer to DLK-518, "BACK DOOR ASSEMBLY : Exploded View" and DLK-519, "BACK DOOR ASSEMBLY : Removal and Installation".

cardiagn.com

KEY SWITCH

Description

INFOID:0000000001116374

Key switch detects that mechanical key is inserted into the key cylinder, and then transmits the signal to BCM and Intelligent Key unit.

Component Function Check

INFOID:0000000001116375

1.CHECK KEY SWITCH INPUT SIGNAL

Check key switch (“KEY SW”) in “DATA MONITOR” mode with CONSULT-III. Refer to DLK-62, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Monitor item	Condition	
KEY SW	Insert mechanical key into key cylinder	: ON
	Remove mechanical key from key cylinder	: OFF

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Refer to DLK-355, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116376

1.CHECK KEY SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and BCM connector.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	7	Ground	Insert mechanical key into key cylinder	Battery voltage
			Remove mechanical key from key cylinder	0

4. Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	36	Ground	Insert mechanical key into key cylinder	Battery voltage
			Remove mechanical key from key cylinder	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Remove mechanical key from key cylinder.
2. Disconnect key switch connector.
3. Check voltage between key switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Key switch connector	Terminal		
M25	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK KEY SWITCH SIGNAL CIRCUIT

1. Check continuity between Intelligent Key unit harness connector and key switch connector.

Intelligent Key unit connector	Terminal	Key switch connector	Terminal	Continuity
M40	7	M25	1	Exists

2. Check continuity between BCM harness connector and key switch connector.

BCM connector	Terminal	Key switch connector	Terminal	Continuity
M65	36	M25	1	Exists

3. Check continuity between key switch connector and ground.

Key switch connector	Terminal	Ground	Continuity
M25	1	Ground	Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK KEY SWITCH

Check key switch function.
Refer to DLK-356, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace key switch.

Component Inspection

INFOID:0000000001116377

COMPONENT INSPECTION

1.CHECK KEY SWITCH

Check continuity between key switch terminals.

Terminal		Condition	Continuity
key switch connector			
1	2	Insert mechanical key into key cylinder	Exists
		Remove mechanical key from key cylinder	Does not exist

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Replace key switch.

cardiagn.com

IGNITION KNOB SWITCH

Description

INFOID:0000000001116378

Ignition knob switch detects that ignition knob is pressed, and then transmits the signal to Intelligent Key unit.

Component Function Check

INFOID:0000000001116379

1.CHECK IGNITION KNOB SWITCH INPUT SIGNAL

Check ignition knob switch (“PUSH SW”) in “DATA MONITOR” mode with CONSULT-III. Refer to DLK-62, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Monitor item	Condition	
PUSH SW	Ignition knob switch is pressed	: ON
	Ignition knob switch is released	: OFF

Is the inspection result normal?

YES >> Ignition knob switch is OK.
NO >> Refer to SEC-48, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116380

1.CHECK IGNITION KNOB SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and BCM connector.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	27	Ground	Ignition knob switch is pressed	Battery voltage
			Ignition knob switch is released	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK IGNITION KNOB SWITCH POWER SUPPLY CIRCUIT

1. Disconnect ignition knob switch connector.
2. Check voltage between ignition knob switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Ignition knob switch connector	Terminal		
M25	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK IGNITION KNOB SWITCH SIGNAL CIRCUIT

1. Check continuity between Intelligent Key unit harness connector and ignition knob switch connector.

Intelligent Key unit connector	Terminal	Ignition knob switch connector	Terminal	Continuity
M40	27	M25	3	Exists

A B C D E F G H I J DLK L M N O P
carsdiagn.com

2. Check continuity between ignition knob switch connector and ground.

Ignition knob switch connector	Terminal	Ground	Continuity
M25	3		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK IGNITION KNOB SWITCH

Check ignition knob switch function.
Refer to SEC-49, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace ignition knob switch.

Component Inspection

INFOID:0000000001116381

1. CHECK IGNITION KNOB SWITCH

1. Turn ignition switch OFF.
2. Disconnect ignition knob switch harness connector.
3. Check continuity between ignition knob switch terminals under the following conditions.

Ignition knob switch			Condition	Continuity
Connector	Terminal			
M25	3	4	Ignition knob switch is pressed	Exists
			Ignition knob switch is released	Does not exist

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace ignition knob switch.

cardiagn.com

DOOR LOCK ACTUATOR
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001099187

Locks/unlocks the door with the signal from BCM.

DRIVER SIDE : Component Function Check

INFOID:0000000001099188

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK/UNLOCK” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK/UNLOCK	:ALL UNLK	The all door lock actuators are unlocked
	:DR UNLK	The door lock actuator (driver side) is unlocked
	:LOCK	The all door lock actuators are locked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-359, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001099189

1.CHECK OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	60		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect BCM and front door lock actuator (driver side) connector.
2. Check continuity between BCM connector and front door lock actuator (driver side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D9	3	Exists
	60		2	

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	60		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK DOOR LOCK ACTUATOR CIRCUIT 1

1. Disconnect anti-hijack relay connector.
2. Check continuity between BCM connector and anti-hijack relay connector.

BCM connector	Terminal	Anti-hijack relay connector	Terminal	Continuity
M67	56	M90	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK DOOR LOCK ACTUATOR CIRCUIT 2

Check continuity of anti-hijack relay.

Anti-hijack relay connector	Terminal		Continuity
M90	4	3	Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK DOOR LOCK ACTUATOR CIRCUIT 3

1. Check continuity between anti-hijack relay connector and front door lock actuator (driver side) connector.

Anti-hijack relay connector	Terminal	Door lock actuator connector	Terminal	Continuity
M90	3	D9	3	Exists

2. Check continuity between anti-hijack relay connector and ground.

Anti-hijack relay connector	Terminal	Ground	Continuity
M90	3		Does not exist

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

6.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-96, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement"

DRIVER SIDE : Component Inspection

INFOID:0000000001099190

1.CHECK FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)

Check the actuator operation by connecting the battery voltage to front door lock actuator (driver side).

cardiagn.com

Front door lock actuator (driver side)	Terminal		Door lock actuator condition
	(+)	(-)	
D9	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Front door lock actuator (driver side) is OK.
NO >> Replace front door lock actuator (driver side). Refer to DLK-255, "DOOR LOCK : Removal and Installation". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

DRIVER SIDE : Special Repair Requirement

INFOID:0000000001099191

Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001099192

Locks/unlocks the door with the signal from BCM.

PASSENGER SIDE : Component Function Check

INFOID:0000000001099193

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK/UNLOCK” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK/UNLOCK	:ALL UNLK	The all door lock actuators are unlocked
	:DR UNLK	The door lock actuator (driver side) is unlocked
	:LOCK	The all door lock actuators are locked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-368, "PASSENGER SIDE : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001099194

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock actuator (passenger side) connector.
3. Check continuity between BCM connector and front door lock actuator (passenger side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D48	3	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-98, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

PASSENGER SIDE : Component Inspection

INFOID:0000000001099195

1.CHECK FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)

Check the actuator operation by connecting the battery voltage directly to front door lock actuator (passenger side).

Front door lock actuator (passenger side) connector	Terminal		Door lock actuator condition
	(+)	(-)	
D48	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Front door lock actuator (passenger side) is OK.
NO >> Replace front door lock actuator (passenger side). Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR LH

REAR LH : Description

INFOID:0000000001099196

Locks/unlocks the door with the signal from BCM.

REAR LH : Component Function Check

INFOID:0000000001099197

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK/UNLOCK” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK/UNLOCK	:ALL UNLK	The all door lock actuators are unlocked
	:DR UNLK	The door lock actuator (driver side) is unlocked
	:LOCK	The all door lock actuators are locked

Is the inspection result normal?

YES >> Door lock actuator is OK.

cardiagn.com

NO >> Refer to DLK-363, "REAR LH : Diagnosis Procedure".

REAR LH : Diagnosis Procedure

INFOID:0000000001099198

1.CHECK OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect BCM and rear door lock actuator (LH) connector.
2. Check continuity between BCM connector and rear door lock actuator (LH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D85	3	Exists
	54		2	

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK DOOR LOCK ACTUATOR CIRCUIT 1

1. Disconnect anti-hijack relay connector.
2. Check continuity between BCM connector and anti-hijack relay connector.

BCM connector	Terminal	Anti-hijack relay connector	Terminal	Continuity
M67	56	M90	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK DOOR LOCK ACTUATOR CIRCUIT 2

Check continuity anti-hijack relay.

Anti-hijack relay connector	Terminal		Continuity
M90	4	3	Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK DOOR LOCK ACTUATOR CIRCUIT 3

1. Check continuity between anti-hijack relay connector and rear door lock actuator (LH) connector.

Anti-hijack relay connector	Terminal	Door lock actuator connector	Terminal	Continuity
M90	3	D85	3	Exists

2. Check continuity between anti-hijack relay connector and ground.

Anti-hijack relay connector	Terminal	Ground	Continuity
M90	3		Does not exist

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

6.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-100, "REAR LH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR LH : Component Inspection

INFOID:0000000001099199

1.CHECK REAR DOOR LOCK ACTUATOR (LH)

Check the actuator operation by connecting the battery voltage directly to rear door lock actuator (LH).

Rear door lock actuator (LH)	Terminal		Door lock actuator condition
	(+)	(-)	
D85	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Rear door lock actuator (LH) is OK.
NO >> Replace rear door lock actuator (LH). Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH

REAR RH : Description

INFOID:0000000001099200

Locks/unlocks the door with the signal from BCM.

REAR RH : Component Function Check

INFOID:0000000001099201

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK/UNLOCK” in “Active Test” mode with CONSULT-III.

cardiagn.com

Test item		Condition
DOOR LOCK/UNLOCK	:ALL UNLK	The all door lock actuators are unlocked
	:DR UNLK	The door lock actuator (driver side) is unlocked
	:LOCK	The all door lock actuators are locked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-365, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001099202

1.CHECK OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (RH) connector.
3. Check continuity between BCM connector and rear door lock actuator (RH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D105	3	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect anti-hijack relay.
2. Check continuity between BCM connector and anti-hijack relay connector.

BCM connector	Terminal	Anti-hijack relay connector	Terminal	Continuity
M67	56	M90	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist

A B C D E F G H I J DLK L M N O P
c-diagn.com

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK DOOR LOCK ACTUATOR CIRCUIT

Check continuity anti-hijack relay.

Anti-hijack relay connector	Terminal		Continuity
M90	4	3	Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5. CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Check continuity between anti-hijack relay connector and rear door lock actuator (RH) connector.

Anti-hijack relay connector	Terminal	Door lock actuator connector	Terminal	Continuity
M90	3	D105	3	Exists

2. Check continuity between anti-hijack relay connector and ground.

Anti-hijack relay connector	Terminal	Ground	Continuity
M90	3		Does not exist

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

6. CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-102, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH : Component Inspection

INFOID:0000000001099203

1. CHECK REAR DOOR LOCK ACTUATOR (RH)

Check the actuator operation by connecting the battery voltage directly to rear door lock actuator (RH).

Rear door lock actuator (RH)	Terminal		Door lock actuator condition
	(+)	(-)	
D105	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Rear door lock actuator (RH) is OK.
NO >> Replace rear door lock actuator (RH). Refer to DLK-255, "DOOR LOCK : Removal and Installation".

cardiagn.com

SUPER LOCK ACTUATOR
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001097264

The super lock system is controlled by BCM.

DRIVER SIDE : Component Function Check

INFOID:0000000001097265

1.CHECK FUNCTION

With CONSULT-III
Check “SUPER LOCK” in Active test mode with CONSULT-III.

Test item		Condition
SUPER LOCK	:LOCK (SET)	The super lock actuator is locked (SET)
	:UNLOCK (RELEASE)	The super lock actuator is unlocked (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Refer to DLK-367, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001097266

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	60	Ground	UNLOCK (RELEASE)	0 → Battery voltage → 0
	59		LOCK (SET)	

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SUPER LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock actuator (driver side) connector.
3. Check continuity between BCM connector and front door lock actuator (driver side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	59	D29	1	Exists
	60		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	59		Does not exist
	60		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK SUPER LOCK ACTUATOR

Check super lock actuator.
Refer to DLK-368, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation". After that, DLK-368, "DRIVER SIDE : Special Repair Requirement".

DRIVER SIDE : Component Inspection

INFOID:0000000001099306

1.CHECK SUPER LOCK ACTUATOR

Check the actuator operation by connecting the battery voltage to super lock actuator.

Door lock actuator (super lock actuator) connector	Terminal		Actuator condition
	(+)	(-)	
D29	1	2	LOCK (SET)
	2	1	UNLOCK (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Replace door lock actuator (super lock actuator). Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation". After that, Refer to DLK-368, "DRIVER SIDE : Special Repair Requirement".

DRIVER SIDE : Special Repair Requirement

INFOID:0000000001099307

Perform initialization procedure. Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001099308

The super lock system is controlled by BCM.

PASSENGER SIDE : Component Function Check

INFOID:0000000001099309

1.CHECK FUNCTION

With CONSULT-III
Check “SUPER LOCK” in Active test mode with CONSULT-III.

Test item		Condition
SUPER LOCK	:LOCK (SET)	The super lock actuator is locked (SET)
	:UNLOCK (RELEASE)	The super lock actuator is unlocked (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Refer to DLK-368, "PASSENGER SIDE : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001099317

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

cardiagn.com

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	54	Ground	UNLOCK (RELEASE)	0 → Battery voltage → 0
	59		LOCK (SET)	

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SUPER LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock actuator (passenger side) connector.
3. Check continuity between BCM connector and front door lock actuator (passenger side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	59	D68	1	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	59		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK SUPER LOCK ACTUATOR

Check super lock actuator.
Refer to DLK-369, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

PASSENGER SIDE : Component Inspection

INFOID:0000000001099314

1.CHECK SUPER LOCK ACTUATOR

Check the actuator operation by connecting the battery voltage to super lock actuator.

Door lock actuator (super lock actuator) connector	Terminal		Actuator condition
	(+)	(-)	
D68	1	2	LOCK (SET)
	2	1	UNLOCK (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Replace door lock actuator (super lock actuator). Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation".

REAR LH

REAR LH : Description

INFOID:0000000001099310

The super lock system is controlled by BCM.

REAR LH : Component Function Check

INFOID:0000000001099311

1.CHECK FUNCTION

With CONSULT-III

Check “SUPER LOCK” in Active test mode with CONSULT-III.

Test item		Condition
SUPER LOCK	:LOCK (SET)	The super lock actuator is locked (SET)
	:UNLOCK (RELEASE)	The super lock actuator is unlocked (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Refer to DLK-370, "REAR LH : Diagnosis Procedure".

REAR LH : Diagnosis Procedure

INFOID:0000000001099318

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	54	Ground	UNLOCK (RELEASE)	0 → Battery voltage → 0
	59		LOCK (SET)	

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SUPER LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (LH) connector.
3. Check continuity between BCM connector and rear door lock actuator (LH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	59	D115	1	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	59		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK SUPER LOCK ACTUATOR

Check super lock actuator.
Refer to DLK-370, "REAR LH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR LH : Component Inspection

INFOID:0000000001099315

cardiagn.com

1.CHECK SUPER LOCK ACTUATOR

Check the actuator operation by connecting the battery voltage to super lock actuator.

Door lock actuator (super lock actuator) connector	Terminal		Actuator condition
	(+)	(-)	
D115	1	2	LOCK (SET)
	2	1	UNLOCK (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Replace door lock actuator (super lock actuator). Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH

REAR RH : Description

INFOID:0000000001099312

The super lock system is controlled by BCM.

REAR RH : Component Function Check

INFOID:0000000001099313

1.CHECK FUNCTION

With CONSULT-III
Check “SUPER LOCK” in Active test mode with CONSULT-III.

Test item		Condition
SUPER LOCK	:LOCK (SET)	The super lock actuator is locked (SET)
	:UNLOCK (RELEASE)	The super lock actuator is unlocked (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Refer to DLK-371, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001099319

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	54	Ground	UNLOCK (RELEASE)	0 → Battery voltage → 0
	59		LOCK (SET)	

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SUPER LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (RH) connector.
3. Check continuity between BCM connector and rear door lock actuator (RH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	59	D95	1	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	59		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK SUPER LOCK ACTUATOR

Check super lock actuator.
Refer to DLK-372, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH : Component Inspection

INFOID:0000000001099316

1.CHECK SUPER LOCK ACTUATOR

Check the actuator operate by connecting the battery voltage to super lock actuator.

Door lock actuator (super lock actuator) connector	Terminal		Actuator condition
	(+)	(-)	
D95	1	2	LOCK (SET)
	2	1	UNLOCK (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Replace door lock actuator (super lock actuator). Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation".

cardiagn.com

BACK DOOR OPENER ACTUATOR

Description

INFOID:0000000001099204

Opens the back door with the signal from BCM.

Component Function Check

INFOID:0000000001099205

1.CHECK FUNCTION

With CONSULT-III

Check “TRUNK/GLASS HATCH” in Active test mode with CONSULT-III.

Test item		Condition
TRUNK/GLASS HATCH	:OPEN	Back door lock opener actuator operation

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-373, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099206

1.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of back door opener switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M66	45	Ground	Pressed	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK BACK DOOR LOCK ASSEMBLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and back door lock assembly connector.
3. Check continuity between BCM connector and back door lock assembly connector.

BCM connector	Terminal	Back door lock assembly connector	Terminal	Continuity
M66	45	D152	2	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M66	45		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK BACK DOOR LOCK ASSEMBLY GROUND CIRCUIT

Check continuity between back door lock assembly connector and ground.

Back door lock assembly connector	Terminal	Ground	Continuity
D152	1		Exists

Is the inspection result normal?

carsdiagn.com

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK BACK DOOR LOCK ASSEMBLY

Check back door lock assembly connector and ground.
Refer to DLK-374, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door lock assembly. Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

Component Inspection

INFOID:0000000001099207

1. CHECK BACK DOOR LOCK ASSEMBLY

Check the actuator operation by connecting battery voltage to back door lock assembly.

Back door lock assembly connector	Terminal		Back door actuator condition
D152	(+)	(-)	OPEN
	2	1	

Is the inspection result normal?

YES >> Back door lock assembly (back door lock actuator) is OK.
NO >> Replace back door lock assembly (back door lock actuator). Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

cardiagn.com

BACK DOOR OPENER SWITCH

Description

INFOID:0000000001115816

Sends the back door opening signal to BCM.

Component Function Check

INFOID:0000000001115817

1.CHECK FUNCTION

With CONSULT-III

Check “TRNK OPNR SW” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
TRNK OPNR SW	Back door opener switch is pressed	:ON
	Back door opener switch is released	:OFF

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-375, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115818

1.CHECK BCM INPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of back door opener switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	12	Ground	Pressed	0
			Released	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK BACK DOOR OPENER SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and back door opener switch connector.
3. Check continuity between BCM connector and back door opener switch connector.

BCM connector	Terminal	Back door opener switch connector	Terminal	Continuity
M65	12	D186	1	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	12		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M65	12	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

4. CHECK BACK DOOR OPENER SWITCH GROUND CIRCUIT

Check continuity between back door opener switch connector and ground.

Back door opener switch connector	Terminal	Ground	Continuity
D186	2		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5. CHECK BACK DOOR OPENER SWITCH

Check back door opener switch.
Refer to DLK-376, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door opener switch. Refer to DLK-279, "Exploded View".

Component Inspection

INFOID:0000000001115819

1. CHECK BACK DOOR OPENER SWITCH

Check back door opener switch.

Back door opener switch connector	Terminal		Back door opener switch condition	Continuity
D186	1	2	Pressed	Exists
			Released	Does not exist

Is the inspection result normal?

YES >> Back door opener switch is OK.
NO >> Replace back door opener switch. Refer to DLK-279, "Exploded View".

cardiagn.com

OUTSIDE KEY ANTENNA
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001109347

Detects whether Intelligent Key is outside the vehicle.
Integrated in front outside handle (driver side).

DRIVER SIDE : Component Function Check

INFOID:0000000001109348

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III
1. Check “ANTENNA” in “Active Test” mode with CONSULT-III.
2. Touch “DRIVER ANT”.
3. When Intelligent Key is in outside key antenna (driver side) detection area, hazard lamp flashes.

Test Item		Outside Antenna
ANTENNA	:DRIVER ANT	Outside key antenna (driver side)

Is the inspection result normal?

YES >> Outside key antenna is OK.
NO >> Refer to DLK-383, "REAR BUMPER : Diagnosis Procedure".

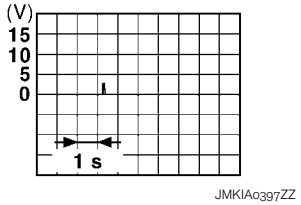
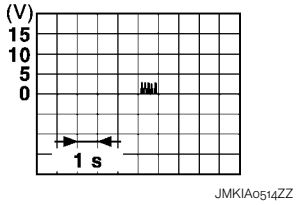
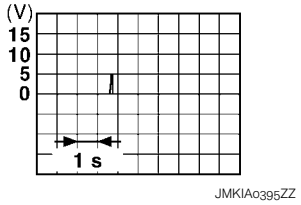
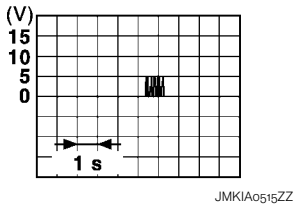
DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001109349

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

carsdiagn.com

Terminals				Condition		Signal (Reference value)
(+)			(–)			
Intelligent Key unit connector		Terminal				
M40	Driver side (+)	19	Ground	Request switch is pushed	When Intelligent Key is in the antenna detection area.	 JMKIA0397ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Driver side (-)	20			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK OUTSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and front outside handle connector.
2. Check continuity between Intelligent Key unit connector and outside key antenna connector.

Intelligent Key unit connector	Terminal	Outside key antenna connector	Terminal	Continuity
M40	19	D31	1	Existed
	20		2	

3. Check continuity between Intelligent Key unit connector and ground.

cardiagn.com

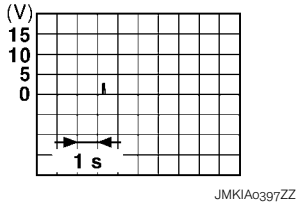
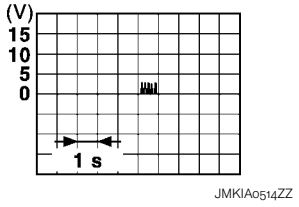
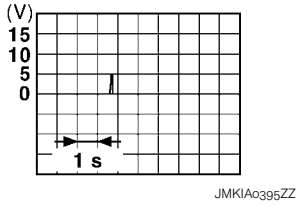
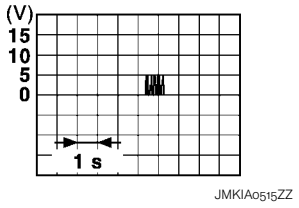
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	19		Not existed
	20		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and outside key antenna.

3. CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace outside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and outside key antenna connector.
3. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminals (+) Intelligent Key unit connector	(+) Terminal	(–)	Condition		Signal (Reference value)
M40	Driver side (+) 19	Ground	Door request switch is pushed	When Intelligent Key is in the antenna detection area.	 JMKIA0397ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Driver side (-) 20		Door request switch is pushed	When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Replace outside key antenna (driver side). Refer to DLK-275, "DRIVER SIDE : Exploded View".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001109350

Detects whether Intelligent Key is outside the vehicle.
Integrated in front outside handle (passenger side).

PASSENGER SIDE : Component Function Check

INFOID:0000000001109351

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in “Active Test” mode with CONSULT-III.
2. Touch “ASSIST ANT”.
3. When Intelligent Key is in outside key antenna (passenger side) detection area, hazard lamp is flashes.

Test Item		Outside Antenna
ANTENNA	:ASSIST ANT	Outside key antenna (passenger side)

Is the inspection result normal?

YES >> Outside key antenna is OK.
NO >> Refer to DLK-383, "REAR BUMPER : Diagnosis Procedure".

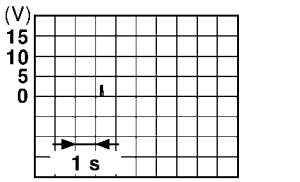
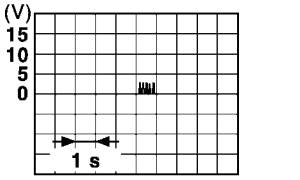
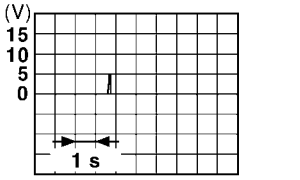
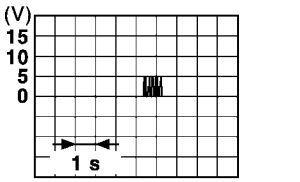
PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001109352

1.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

cardiagn.com

Terminal (+) Intelligent Key unit connector	Terminal (+) Terminal	Terminal (–)	Condition		Signal (Reference value)
M40	Passenger side (+)	37	Ground	Request switch is pushed	When Intelligent Key is in the antenna detection area.	 JMKIA0397ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Passenger side (-)	38			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK OUTSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and front outside handle connector.
2. Check continuity between Intelligent Key unit connector and outside key antenna connector.

Intelligent Key unit connector	Terminal	Outside key antenna connector	Terminal	Continuity
M40	37	D70	1	Existed
	38		2	

3. Check continuity between Intelligent Key unit connector and ground.

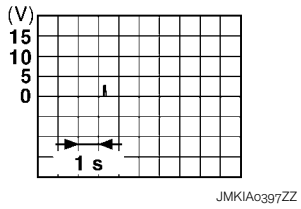
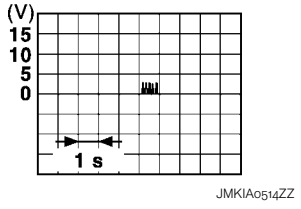
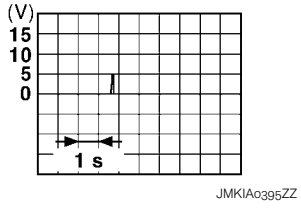
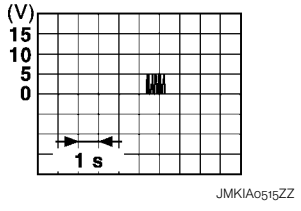
Intelligent Key unit connector	Terminal		Continuity
M40	37	Ground	Not existed
	38		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and outside key antenna.

3. CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace outside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and outside key antenna connector.
3. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminal (+)			Terminal (–)	Condition		Signal (Reference value)
Intelligent Key unit connector		Terminal				
M40	Passenger side (+)	37	Ground	Door request switch is pushed	When Intelligent Key is in the antenna detection area.	 JMKIA0397ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Passenger side (-)	38			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Replace outside key antenna. Refer to DLK-275, "PASSENGER SIDE : Exploded View" (passenger side).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

REAR BUMPER

cardiagn.com

REAR BUMPER : Description

INFOID:0000000001109353

Detects whether Intelligent Key is outside the vehicle.
Installed in rear bumper.

REAR BUMPER : Component Function Check

INFOID:0000000001109354

1. CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in “Active Test” mode with CONSULT-III.
2. Touch “BK DOOR ANT”.
3. When Intelligent Key is in outside key antenna (rear bumper) detection area, hazard lamp is flashes.

Test Item		Outside Antenna
ANTENNA	:BK DOOR ANT	Outside key antenna (rear bumper)

Is the inspection result normal?

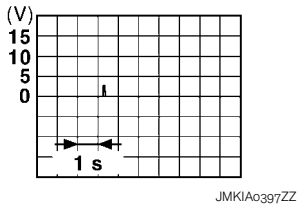
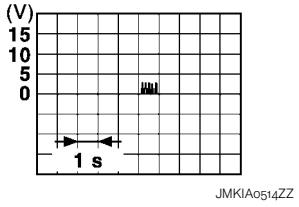
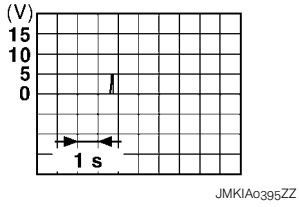
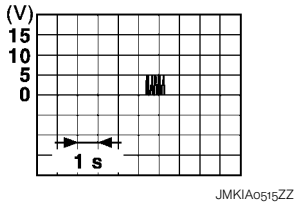
YES >> Outside key antenna is OK.
NO >> Refer to DLK-383, "REAR BUMPER : Diagnosis Procedure".

REAR BUMPER : Diagnosis Procedure

INFOID:0000000001109355

1. CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminal (+) Intelligent Key unit connector	Terminal (+) Terminal	Terminal (–)	Condition		Signal (Reference value)
M40	Rear bumper (+)	17	Ground	Request switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0397ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Rear bumper (-)	18			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK OUTSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and front outside handle connector.
2. Check continuity between Intelligent Key unit connector and outside key antenna connector.

Intelligent Key unit connector	Terminal	Outside key antenna connector	Terminal	Continuity
M40	17	B81 (rear bumper)	1	Exists
	18		2	

3. Check continuity between Intelligent Key unit connector and ground.

cardiagn.com

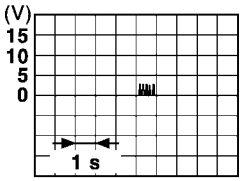
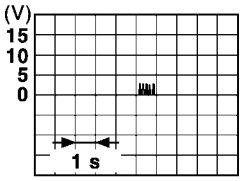
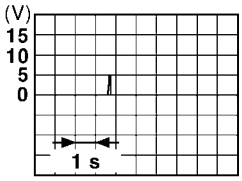
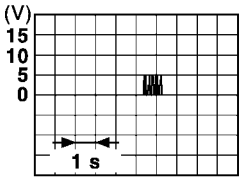
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	17		Does not exist
	18		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and outside key antenna.

3. CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace outside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and outside key antenna connector.
3. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminal (+)		Terminal (+)	Terminal (–)	Condition		Signal (Reference value)
Intelligent Key unit connector		Terminal				
M40	Rear bumper (+)	17	Ground	Door request switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0514ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0514ZZ
	Rear bumper (-)	18			When Intelligent Key is in the antenna detection area.	 JMKIA0395ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0515ZZ

Is the inspection result normal?

YES >> Replace outside key antenna. Refer to DLK-276, "REAR BUMPER : Exploded View" (Rear bumper).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

INSIDE KEY ANTENNA
INSTRUMENT CENTER

INSTRUMENT CENTER : Description

INFOID:0000000001109356

Detects whether Intelligent Key is inside the vehicle.

INSTRUMENT CENTER : Component Function Check

INFOID:0000000001109357

1.CHECK INSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in Active test mode with CONSULT-III.
2. Touch “ROOM ANT 2”.
3. When Intelligent Key is in inside key antenna (instrument center) detection area, hazard lamp flashes.

Test Item		Inside Antenna
ANTENNA	:ROOM ANT 2	Inside key antenna (instrument center)

Is the inspection result normal?

YES >> Inside key antenna is OK.
NO >> Refer to DLK-386, "INSTRUMENT CENTER : Diagnosis Procedure".

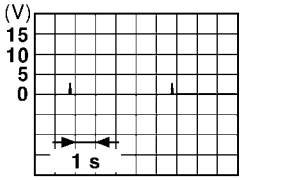
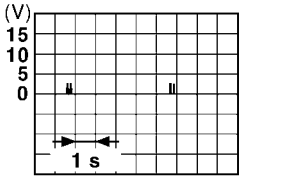
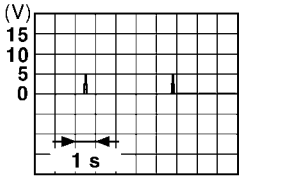
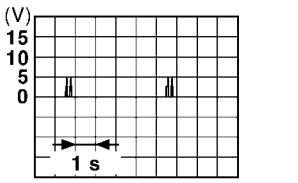
INSTRUMENT CENTER : Diagnosis Procedure

INFOID:0000000001109358

1.CHECK INSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

cardiagn.com

Terminals (+) Intelligent Key unit connector		Terminals (+) Terminal	Terminals (–)	Condition		Signal (Reference value)
M40	Instrument center (+)	33	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Instrument center (-)	34			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK INSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and inside key antenna connector.
2. Check continuity between Intelligent Key unit connector and inside key antenna connector.

Intelligent Key unit connector	Terminal	Inside key antenna connector	Terminal	Continuity
M40	33	M70 (instrument center)	1	Exists
	34		2	

3. Check continuity between Intelligent Key unit connector and ground.

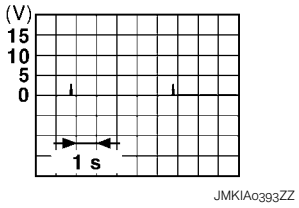
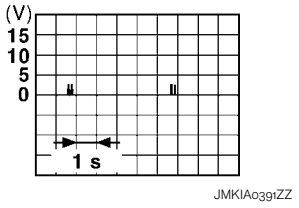
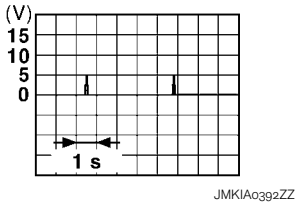
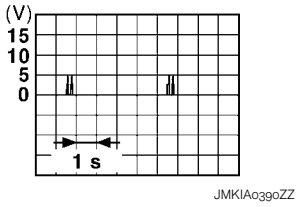
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	33		Does not exist
	34		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and inside key antenna.

3.CHECK INSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace inside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and inside key antenna connector.
3. Check signal between Intelligent Key connector and ground with oscilloscope.

Terminals (+) Intelligent Key unit connector		Terminal	(–)	Condition		Signal (Reference value)
M40	Instrument center (+)	33	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Instrument center (-)	34			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Replace inside key antenna. Refer to DLK-273, "INSTRUMENT CENTER : Exploded View" (instrument center).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

CONSOLE

CONSOLE : Description

INFOID:0000000001109359

Detects whether Intelligent Key is inside the vehicle.

CONSOLE : Component Function Check

INFOID:0000000001109360

1. CHECK INSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in Active test mode with CONSULT-III.
2. Touch “ROOM ANT 1”.
3. When Intelligent Key is in inside key antenna (console) detection area, hazard lamp flashes.

Test Item		Inside Antenna
ANTENNA	:ROOM ANT 1	Inside key antenna (console)

Is the inspection result normal?

YES >> Inside key antenna is OK.
NO >> Refer to DLK-389, "CONSOLE : Diagnosis Procedure".

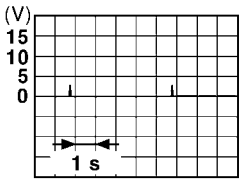
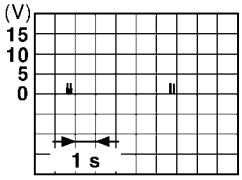
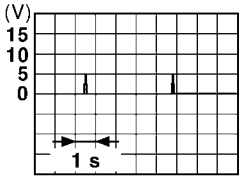
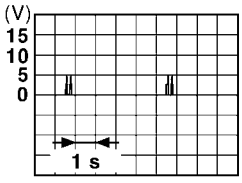
CONSOLE : Diagnosis Procedure

INFOID:0000000001109361

1. CHECK INSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

carsdiagn.com

Terminal (+) Intelligent Key unit connector	Terminal (+) Terminal	Terminal (–)	Condition		Signal (Reference value)
M40	Console (+) 15	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Console (-) 16			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK INSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and inside key antenna connector.
2. Check continuity between Intelligent Key unit connector and inside key antenna connector.

Intelligent Key unit connector	Terminal	Inside key antenna connector	Terminal	Continuity
M40	15	M61 (console)	1	Exists
	16		2	

3. Check continuity between Intelligent Key unit connector and ground.

cardiagn.com

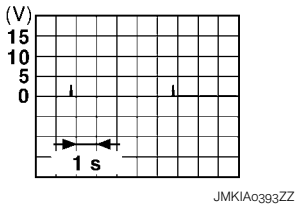
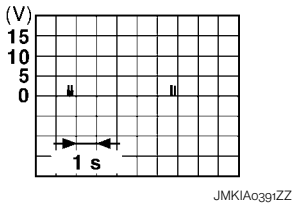
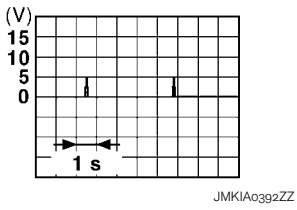
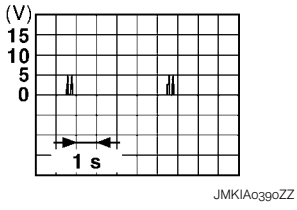
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	15		Does not exist
	16		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and inside key antenna.

3. CHECK INSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace inside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and inside key antenna connector.
3. Check signal between Intelligent Key connector and ground with oscilloscope.

Terminal (+)		Terminal (+)	Terminal (–)	Condition		Signal (Reference value)
Intelligent Key unit connector						
M40	Console (+)	15	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Console (-)	16			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Replace inside key antenna. Refer to DLK-273, "CONSOLE : Exploded View" (console).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

REAR SEAT

carsdiagn.com

REAR SEAT : Description

INFOID:0000000001109362

Detects whether Intelligent Key is inside the vehicle.

REAR SEAT : Component Function Check

INFOID:0000000001109363

1.CHECK INSIDE KEY ANTENNA INPUT SIGNAL

With CONSULT-III

1. Check “ANTENNA” in “Active Test” mode with CONSULT-III.
2. Touch “ROOM ANT 2”.
3. When Intelligent Key is in inside key antenna (rear seat) detection area, hazard lamp flases.

Test Item		Inside Antenna
ANTENNA	:ROOM ANT 2	Inside key antenna (rear seat)

Is the inspection result normal?

YES >> Inside key antenna is OK.
NO >> Refer to DLK-392, "REAR SEAT : Diagnosis Procedure".

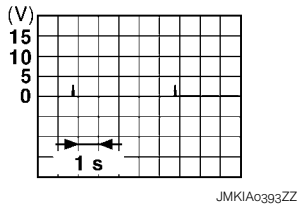
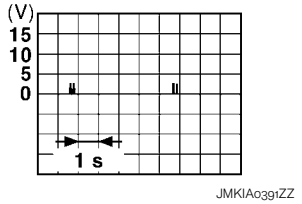
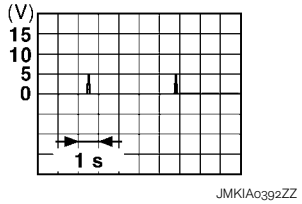
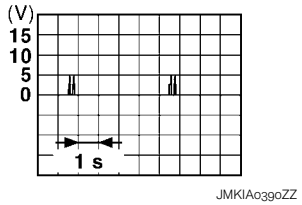
REAR SEAT : Diagnosis Procedure

INFOID:0000000001109364

1.CHECK INSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

cardiagn.com

Terminal (+) Intelligent Key unit connector	Terminal (+) Terminal	Terminal (–)	Condition		Signal (Reference value)
M40	Rear seat (+)	13	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Rear seat (-)	14			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
					When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2. CHECK INSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit connector and inside key antenna connector.
2. Check continuity between Intelligent Key unit connector and inside key antenna connector.

Intelligent Key unit connector	Terminal	Inside key antenna connector	Terminal	Continuity
M40	13	B45 (rear seat)	1	Exists
	14		2	

3. Check continuity between Intelligent Key unit connector and ground.

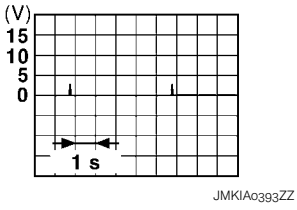
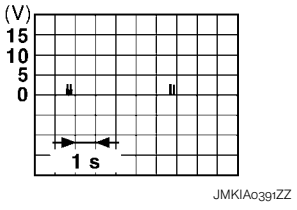
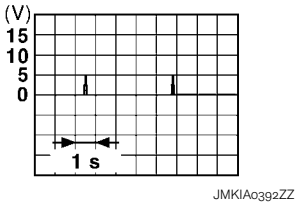
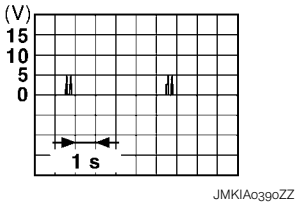
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	13		Does not exist
	14		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between Intelligent Key unit and inside key antenna.

3.CHECK INSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace inside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit connector and inside key antenna connector.
3. Check signal between Intelligent Key connector and ground with oscilloscope.

Terminal (+) Intelligent Key unit connector	Terminal (+) Terminal	Terminal (–)	Condition		Signal (Reference value)
M40	Rear seat (+) 13	Ground	• All doors are closed • Ignition knob switch is pressed	When Intelligent Key is in the antenna detection area.	 JMKIA0393ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0391ZZ
	Rear seat (-) 14			When Intelligent Key is in the antenna detection area.	 JMKIA0392ZZ
				When Intelligent Key is not in the antenna detection area.	 JMKIA0390ZZ

Is the inspection result normal?

YES >> Replace inside key antenna. Refer to DLK-274, "REAR : Exploded View" (rear seat).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

ANTI-HIJACK RELAY
PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001115302

Receives anti-hijack signal from Intelligent Key unit.

PASSENGER SIDE : Component Function Check

INFOID:0000000001115303

1.CHECK FUNCTION

1. All doors are locked using Intelligent Key or door request switch. (Super lock system condition: Set)
2. Press door request switch (passenger side), only passenger side door is UNLOCK.

Is the inspection result normal?

YES >> Anti-hijack relay is OK.
NO >> Refer to DLK-395, "PASSENGER SIDE : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001115304

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL 1

1. Check voltage between Intelligent Key unit connector and ground.

Terminal			Condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	11	Ground	Ignition switch OFF	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check condition of harness and connector. If OK, repair or replace harness.

2.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL 2

1. Check voltage between Intelligent Key unit connector and ground.

Terminal			Condition		Voltage (V) (Approx.)
(+)		(–)			
Intelligent Key unit connector	Terminal				
M40	40	Ground	Press front door request switch (passenger side)	Anti-hijack operation	Battery voltage → 0 → Battery voltage
				Other than above	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK INTELLIGENT KEY UNIT GROUND CIRCUIT

Check continuity between Intelligent Key unit connector and ground.

Intelligent Key unit connector	Terminal	Ground	Continuity
M40	12		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

4. CHECK PASSENGER SIDE ANTI-HIJACK RELAY GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect passenger side anti-hijack relay connector and Intelligent Key unit connector.
3. Check voltage between passenger side anti-hijack relay connector and ground.

Terminal			Condition	Voltage (V) (Approx.)
(+)		(–)		
Passenger side anti-hijack relay connector	Terminal			
M90	2	Ground	Ignition switch OFF	Battery voltage

4. Check continuity between passenger side anti-hijack relay connector and Intelligent Key unit connector.

Passenger side anti-hijack relay connector	Terminal	Intelligent Key unit connector	Terminal	Continuity
M90	1	M40	40	Exists

5. Check continuity between passenger side anti-hijack relay connector and ground.

Passenger side anti-hijack relay connector	Terminal	Ground	Continuity
M90	1		Does not exist

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check condition of harness and connector. If OK, repair or replace harness.

5. CHECK ANTI-HIJACK RELAY

Check anti-hijack relay.
Refer to DLK-396, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace anti-hijack relay. Refer to DLK-288, "DOOR LOCK AND UNLOCK SWITCH : Component Parts Location".

PASSENGER SIDE : Component Inspection

INFOID:0000000001115305

1. CHECK ANTI-HIJACK RELAY

1. Turn ignition switch OFF.
2. Disconnect passenger side anti-hijack relay harness connector.
3. Check continuity passenger side anti-hijack relay terminals 3 and 4.

Passenger side anti-hijack relay connector	Terminal		Condition	Continuity
M90	3	4	Battery voltage direct current supply between terminals 1 and 2	Does not exist
			Other than above	Exists

Is the inspection result normal?

YES >> Passenger side anti-hijack relay is OK.
NO >> Replace passenger side anti-hijack relay. Refer to DLK-288, "DOOR LOCK AND UNLOCK SWITCH : Component Parts Location".

cardiagn.com

INTELLIGENT KEY WARNING BUZZER

Description

INFOID:0000000001116071

Answers back and warns about an inappropriate operation.

Component Function Check

INFOID:0000000001116072

1.CHECK FUNCTION

With CONSULT-III

Check Intelligent Key warning buzzer “OUTSIDE BUZZER” in “Active Test” mode.

Is the inspection result normal?

YES >> Intelligent Key warning buzzer is OK.
NO >> Refer to DLK-397, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116073

1.CHECK INTELLIGENT KEY UNIT INPUT SIGNAL 1

Check voltage between Intelligent Key unit connector and ground.

Terminal			Warning buzzer operation condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	4	Ground	Sounding	0
			Not sounding	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK INTELLIGENT KEY WARNING BUZZER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key warning buzzer connector.
3. Check voltage between Intelligent Key warning buzzer connector and ground.

Terminal			Voltage (V) (Approx.)
(+)		(–)	
Intelligent Key warning buzzer connector	Terminal		
E25	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace Intelligent Key warning buzzer power supply circuit.

3.CHECK HARNESS CONTINUITY

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key warning buzzer connector and Intelligent Key unit connector.

Intelligent Key warning buzzer connector	Terminal	Intelligent Key unit connector	Terminal	Continuity
E25	3	M40	4	Exists

3. Check continuity between Intelligent Key warning buzzer connector and ground.

Intelligent Key warning buzzer connector	Terminal	Ground	Continuity
E25	3		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness between Intelligent Key warning buzzer and Intelligent Key unit.

4.CHECK INTELLIGENT KEY WARNING BUZZER

Check Intelligent Key warning buzzer.
Refer to DLK-398, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace Intelligent Key warning buzzer. Refer to DLK-277, "Exploded View".

5.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-552, "Exploded View".
NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000001116074

1.CHECK INTELLIGENT KEY WARNING BUZZER

Connect battery power supply to Intelligent Key warning buzzer terminals 1 and 3, and check the operation.

Intelligent Key warning buzzer connector	Terminal		Operation
	(+)	(-)	Buzzer sounds
E25	1	3	

Is the inspection result normal?

YES >> Intelligent Key warning buzzer is OK. GO TO 2.
NO >> Replace Intelligent Key warning buzzer. Refer to DLK-277, "Exploded View".

2.REPLACE INTELLIGENT KEY UNIT

Replace Intelligent Key unit.
Refer to DLK-552, "Exploded View".
NOTE:
Perform the system initialization when replacing Intelligent Key unit.
Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

cardiagn.com

BUZZER (COMBINATION METER)

Description

INFOID:0000000001115727

Performs operation method guide and warning with buzzer.

Component Function Check

INFOID:0000000001115728

1.CHECK FUNCTION

With CONSULT-III

Check the operation with “INSIDE BUZZER” in the Active test.

Test item	Condition	
INSIDE BUZZER	:TAKE OUT	Take away warning chime sounds
	:KNOB	Ignition knob switch warning chime sounds
	:KEY	Key warning chime sounds

Is the inspection result normal?

Yes >> Warning buzzer in combination meter is OK.
No >> Refer to DLK-399, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115729

1.CHECK BUZZER (COMBINATION METER) CIRCUIT

Refer to WCS-20, "Component Function Check".

Is the inspection result normal?

Yes >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
No >> Repair or replace buzzer (combination meter) circuit.

KEY WARNING LAMP

Description

INFOID:0000000001115730

Performs operation method guide and warning together with buzzer.

Component Function Check

INFOID:0000000001115731

1.CHECK FUNCTION

With CONSULT-III

Check the operation with “INDICATOR” in “Active Test”.

Test item	Condition	
INDICATOR	:BLUE ON	Key warning lamp (green) illuminates
	:RED ON	Key warning lamp (red) illuminates
	:BLUE IND	Key warning lamp (green) flashes
	:RED IND	Key warning lamp (red) flashes

Is the inspection result normal?

Yes >> Key warning lamp in combination meter is OK.
No >> Refer to DLK-400, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115732

1.CHECK KEY WARNING LAMP CIRCUIT

Refer to WCS-20, "Component Function Check".

Is the inspection result normal?

Yes >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
No >> Repair or replace key warning lamp circuit.

cardiagn.com

LOCK WARNING LAMP

Description

INFOID:0000000001115733

Performs operation method guide and warning together with buzzer.

Component Function Check

INFOID:0000000001115734

1.CHECK FUNCTION

With CONSULT-III

Check the operation with “INDICATOR” in “Active Test”.

Test item	Condition	
INDICATOR	:KNOB ON	Lock warning lamp illuminates
	:KNOB IND	Lock warning lamp flashes

Is the inspection result normal?

Yes >> Lock warning lamp in combination meter is OK.
No >> Refer to DLK-401, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115735

1.CHECK LOCK WARNING LAMP CIRCUIT

Refer to WCS-20, "Component Function Check".

Is the inspection result normal?

Yes >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
No >> Repair or replace lock warning lamp circuit.

HAZARD WARNING LAMPS

Description

INFOID:0000000001115736

Performs answer-back for each operation with the number of blinks.

Component Function Check

INFOID:0000000001115737

1.CHECK FUNCTION

With CONSULT-III

Check hazard warning lamp “FLASHER” in “Active test”.

Is the inspection result normal?

YES >> Hazard warning lamp circuit is OK.
NO >> Refer to DLK-402, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115738

1.CHECK HAZARD SWITCH CIRCUIT

Check hazard switch circuit.
Refer to EXL-72, "Component Function Check".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace hazard warning switch circuit.

cardiagn.com

VEHICLE SPEED SIGNAL CIRCUIT

Description

INFOID:0000000001115718

Displays the vehicle speed signal received from combination meter as a numerical value (km/h).

Component Function Check

INFOID:0000000001115719

1.CHECK FUNCTION

Check that all doors are automatically locked at the vehicle speed of more than 12 km/h (7 MPH).

Is the inspection result normal?

YES >> Vehicle speed signal circuit is OK.
NO >> Refer to DLK-403, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115720

1.CHECK VEHICLE SPEED SIGNAL CIRCUIT

Check vehicle speed signal “VEHICLE SPEED” in “Data Monitor”.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace vehicle speed signal circuit.

carsdiagn.com

INTELLIGENT KEY BATTERY

Description

INFOID:0000000001099239

The following functions are available when having and carrying electronic ID.
- Door lock and unlock
- Engine start

Remote control entry function and panic alarm function are available when operating the button.

Component Function Check

INFOID:0000000001099240

1.CHECK INTELLIGENT KEY FUNCTION

Does door lock and unlock operate when operating Intelligent Key switch?

Is the inspection result normal?

YES >> Intelligent Key is OK.
NO >> Refer to DLK-404, "Diagnosis Procedure".

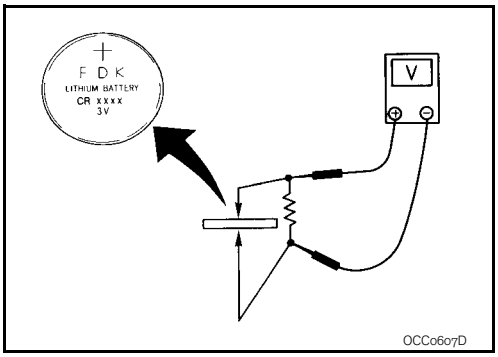
Diagnosis Procedure

INFOID:0000000001099241

1.CHECK INTELLIGENT KEY BATTERY

Check by connecting a resistance (approximately 300Ω) so that the current value becomes about 10 mA.

Standard : Approx. 2.5 - 3.0V



Is the measurement value within the specification?

YES >> Replace Intelligent Key.
NO >> Replace Intelligent Key battery. Refer to DLK-551, "Exploded View".

cardiagn.com

ECU DIAGNOSIS

INTELLIGENT KEY UNIT

Reference Value

INFOID:0000000001081541

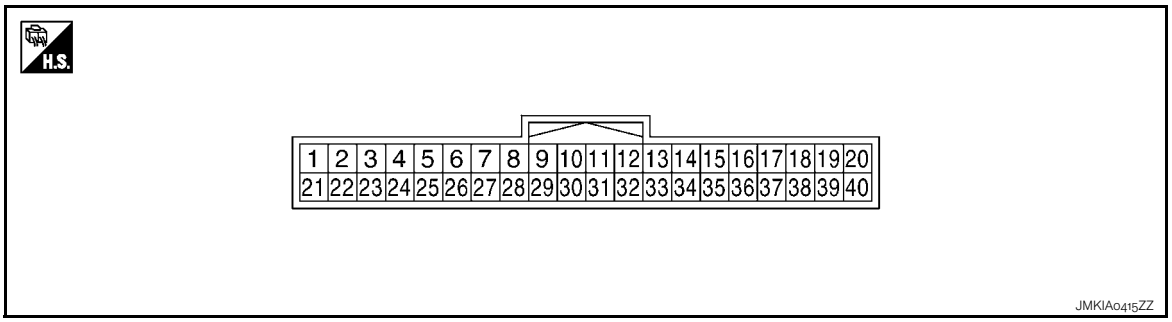
VALUES ON THE DIAGNOSIS TOOL

CONSULT-III MONITOR ITEM

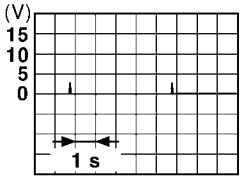
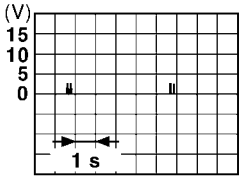
Monitor Item	Condition		Value/Status
PUSH SW	Ignition knob	Release	OFF
		Press	ON
KEY ON SW	Mechanical key	Removed	OFF
		Inserted	ON
DR REQ SW	Door request switch (driver)	Release	OFF
		Press	ON
AS REQ SW	Door request switch (passenger)	Release	OFF
		Press	ON
BD/TR REQ SW	Door request switch (back door)	Release	OFF
		Press	ON
IGN SW	Ignition switch	Other than ON position	OFF
		ON position	ON
ACC SW	Ignition switch	Other than ACC or ON position	OFF
		ACC or ON position	ON
STOP LAMP SW	Brake pedal	Press	OFF
		Release	ON
DOOR LOCK SIG	Lock button of Intelligent Key	Release	OFF
		Press	ON
DOOR UNLOCK SIG	Unlock button of Intelligent Key	Release	OFF
		Press	ON
DOOR SW DR	Door (driver side)	Close	OFF
		Open	ON
DOOR SW AS	Door (passenger side)	Close	OFF
		Open	ON
DOOR SW RR	Door (rear RH)	Close	OFF
		Open	ON
DOOR SW RL	Door (rear LH)	Close	OFF
		Open	ON
BACK DOOR SW	Back door	Close	OFF
		Open	ON
VEHICLE SPEED	While driving		Equivalent to speedometer reading

carsdiagn.com

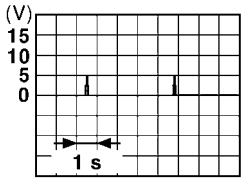
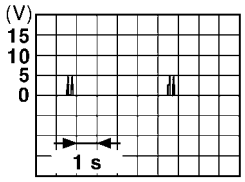
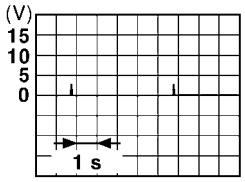
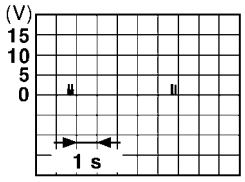
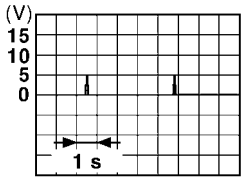
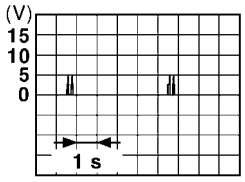
TERMINAL LAYOUT

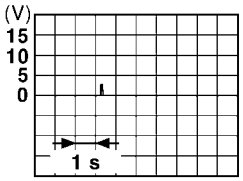
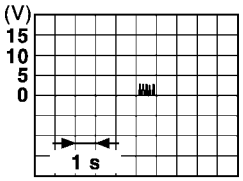
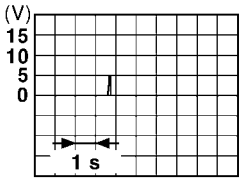
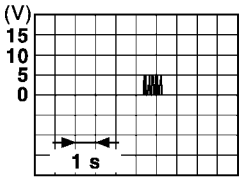
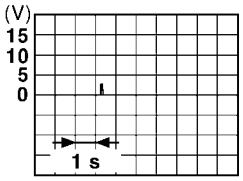
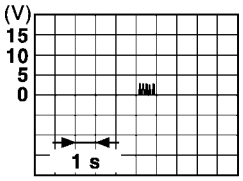


PHYSICAL VALUES

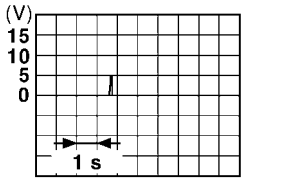
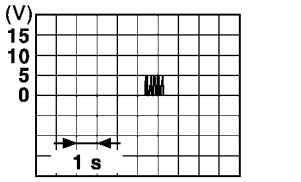
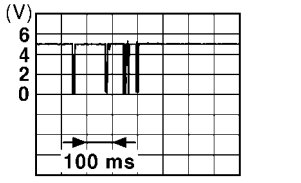
Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/ Output	Condition		Value [V] (Approx.)
1	Ground	LG	Steering lock unit power supply	Output	Ignition switch	OFF or ACC	5
						ON	0
2	Ground	L	CAN - H	Input/ Output	—		—
3	Ground	P	CAN - L	Input/ Output	—		—
4	Ground	LG	Intelligent Key warning buzzer	Output	Intelligent Key warning buzzer	Sounding	0
						Not sounding	Battery voltage
5	Ground	P	Front door request switch (driver side)	Input	Front door request switch (driver side)	ON (Pressed)	0
						OFF (Released)	5
6	Ground	W	Ignition switch power supply	Input	Ignition switch	OFF or ACC	0
						ON or START	Battery voltage
7	Ground	V	Key switch	Input	When ignition key is inserted into ignition key cylinder		Battery voltage
					When ignition key is not inserted into ignition key cylinder		0
11	Ground	V	Battery power supply	Input	Ignition switch OFF		Battery voltage
12	Ground	B	Ground	—	Ignition switch ON		0
13	Ground	Y	Inside key antenna (+) (rear seat)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0393ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0391ZZ

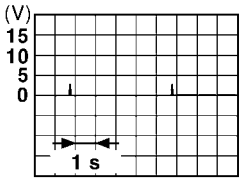
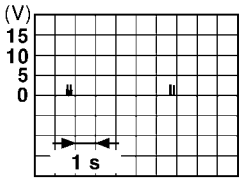
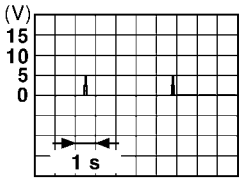
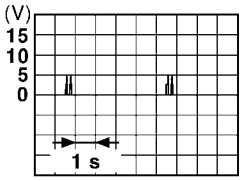
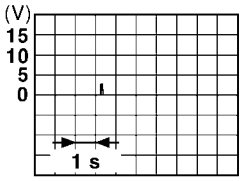
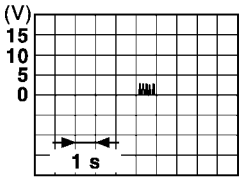
cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition		Value [V] (Approx.)
14	Ground	W	Inside key antenna (-) (rear seat)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0392ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0390ZZ
15	Ground	SB	Inside key antenna (+) (console)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0393ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0391ZZ
16	Ground	BR	Inside key antenna (-) (console)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0392ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0390ZZ

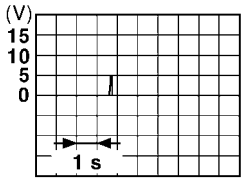
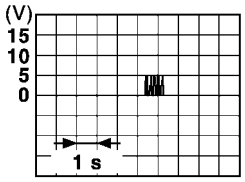
Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition		Value [V] (Approx.)
17	Ground	SB	Outside key antenna (+) (rear bumper)	Output	When the back door request switch is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0397ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0514ZZ
18	Ground	V	Outside key antenna (-) (rear bumper)	Output	When the back door request switch is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0395ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0515ZZ
19	Ground	L	Outside key antenna (+) (driver side)	Output	When the front door request switch (driver side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0397ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0514ZZ

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition		Value [V] (Approx.)
20	Ground	BR	Outside key antenna (-) (driver side)	Output	When the front door request switch (driver side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0395ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0515ZZ
22*1	Ground	W	Key lock solenoid	Output	Key lock solenoid	LOCK*2	Battery voltage
						UNLOCK*2	0
25	Ground	BR	Front door request switch (passenger side)	Input	Front door request switch (passenger side)	ON (Pressed)	0
						OFF (Released)	5
27	Ground	L	Ignition knob switch	Input	Ignition switch OFF	When ignition knob switch is pressed	Battery voltage
						When ignition knob switch is released	0
29	Ground	GR	Back door request switch	Input	Back door request switch	ON (Pressed)	0
						OFF (Released)	5
31	Ground	GR	Steering lock unit ground	—	—	—	0
32	Ground	P	Steering lock unit communication	Input/ Output	Steering lock	LOCK status	5
						LOCK or UNLOCK	 JMKIA0433ZZ

Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
33	Ground	O	Inside key antenna (+) (instrument center)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0393ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0391ZZ
34	Ground	G	Inside key antenna (-) (instrument center)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0392ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0390ZZ
37	Ground	L	Outside key antenna (+) (passenger side)	Output	When the front door request switch (passenger side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0397ZZ
						When Intelligent Key is in the antenna detection area	 JMKIA0514ZZ

cardiagn.com

Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
38	Ground	O	Outside key antenna (-) (passenger side)	Output	When the front door request switch (passenger side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0395ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0515ZZ
40	Ground	Y	Passenger side anti-hijack relay	Input	Press front door request switch (passenger side)	Anti-hijack operation	Battery voltage → 0 → Battery voltage
						Other than above	Battery voltage

*1: Only for MT model.

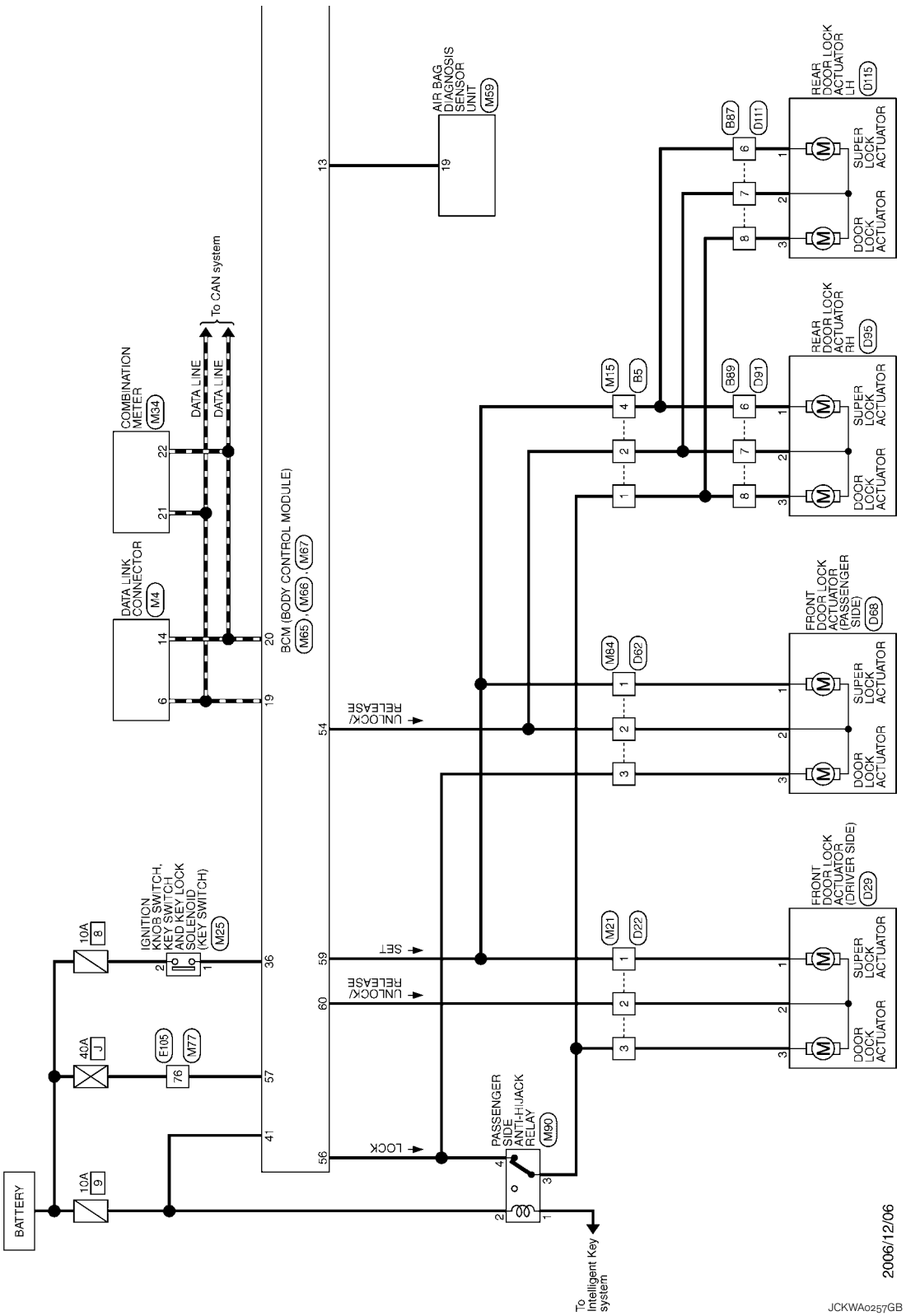
*2: Key interlock operation is only for M/T model for operation condition, refer to SEC-9, "System Description".

Wiring Diagram - SUPER LOCK CONTROL SYSTEM -

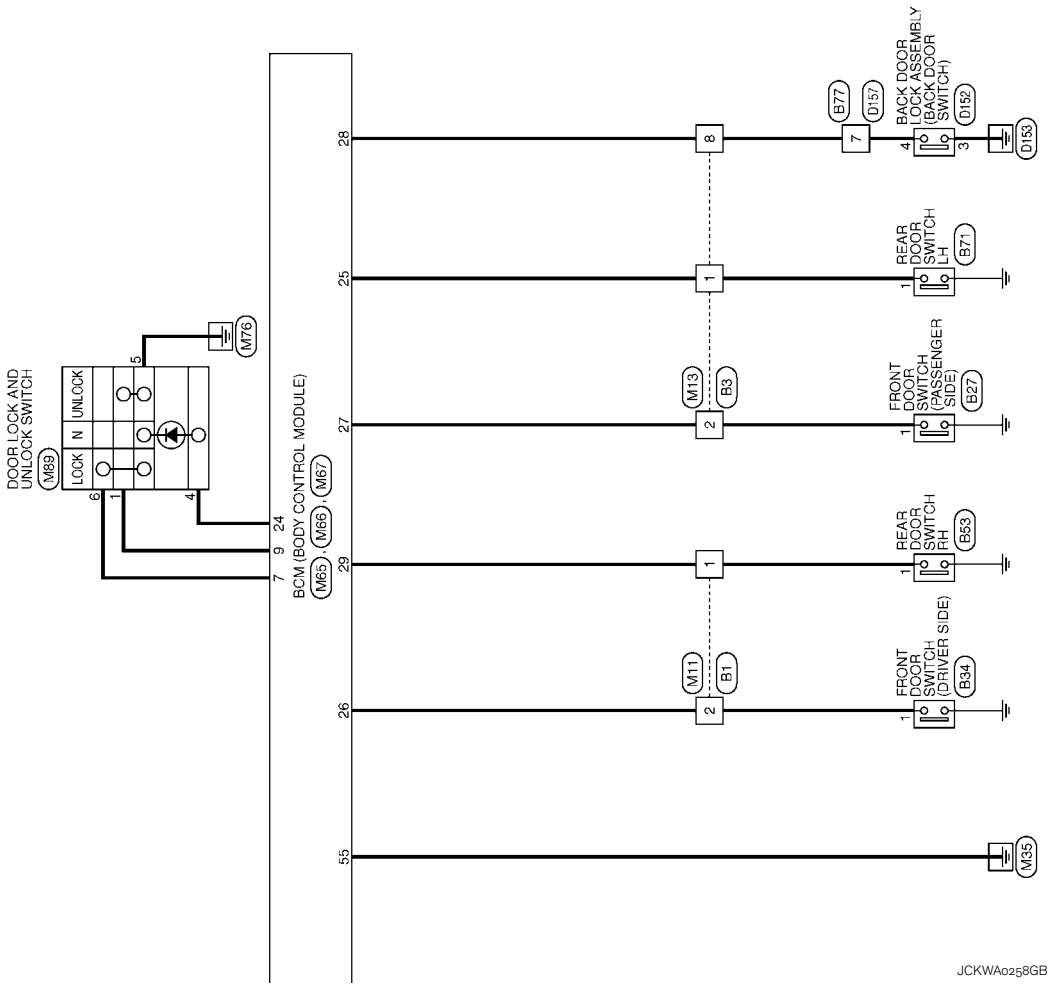
INFOID:0000000001125438

carsdiagn.com

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)



cardiagn.com



carsdiagn.com

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	-[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
8	G	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3	4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-
4	BR	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

JCKWA0259GB

cardiagn.com

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D22
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

Connector No.	D29
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

Connector No.	D62
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	D68
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D95
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

JCKWA0260GB

carsdiagn.com

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D115
Connector Name	REAR DOOR LOCK ACTUATOR LH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

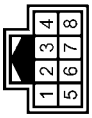
Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	GINCH 4930I EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-[RHD models]

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
8	G	-

JCKWA0261GB

cardiagn.com

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	–
4	BR	–

Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	GR	–
3	SB	–

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

Terminal No.	Color of Wire	Signal Name [Specification]
19	R	UNLOCK

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

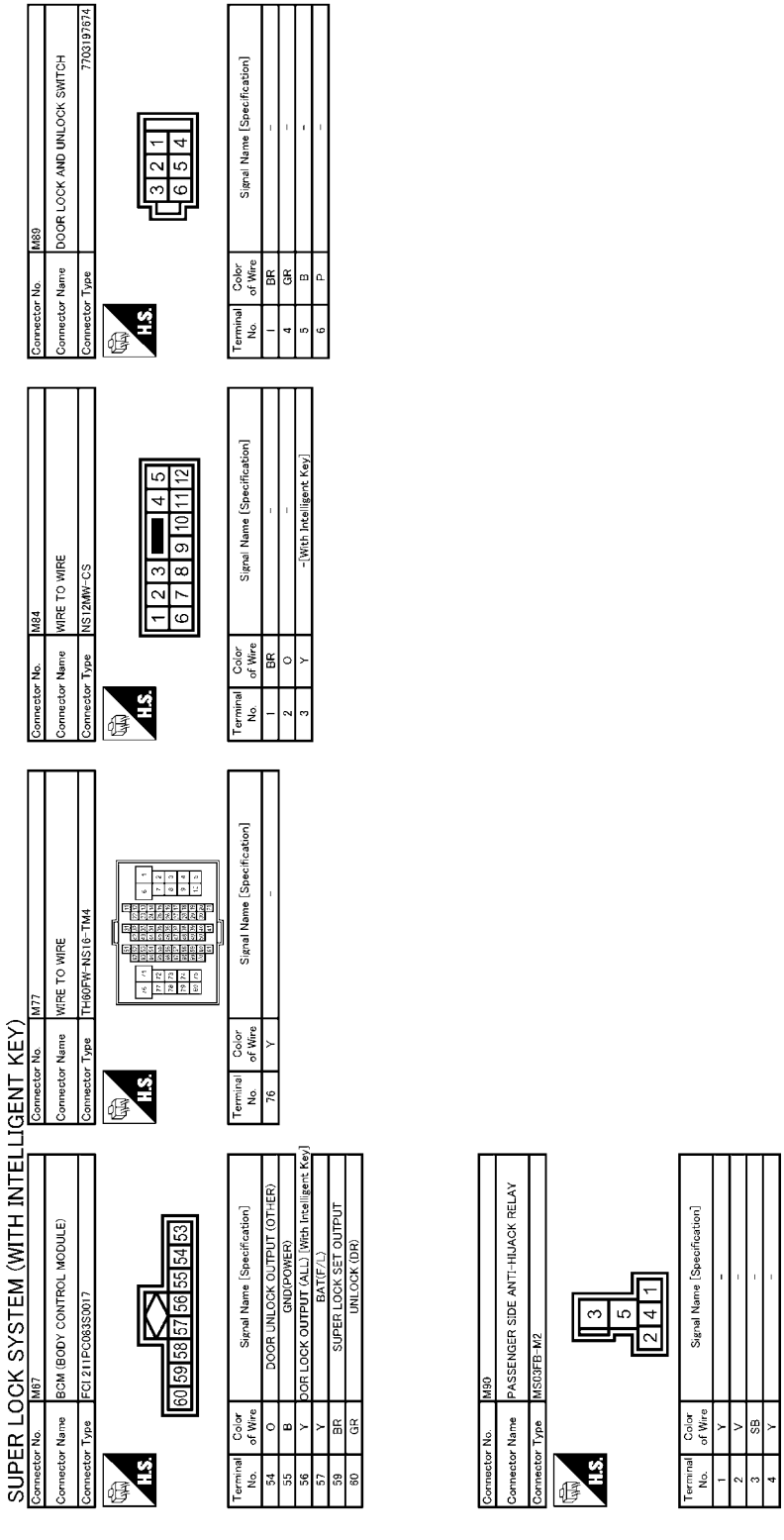
Terminal No.	Color of Wire	Signal Name [Specification]
7	P	LOCK/UNLOCK SW (LOCK)
9	BR	LOCK/UNLOCK SW (UNLOCK)
13	R	SHOCK DETECT SIG
19	L	CAN-H
20	P	CAN-L
24	GR	DOOR LOCK STATUS IND
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)

36	V	KEY SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BATTFUSE)

JCKWA0262GB

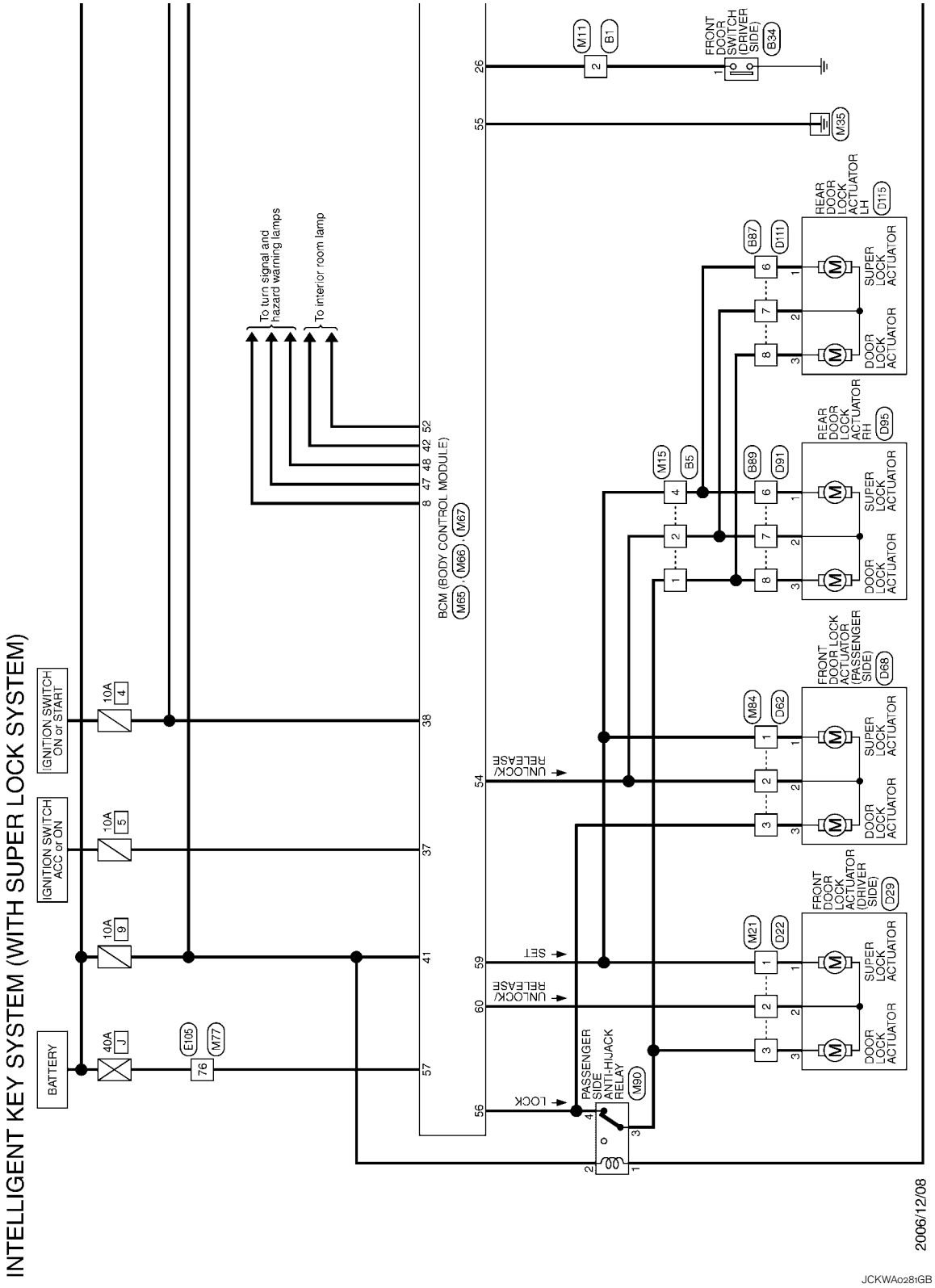


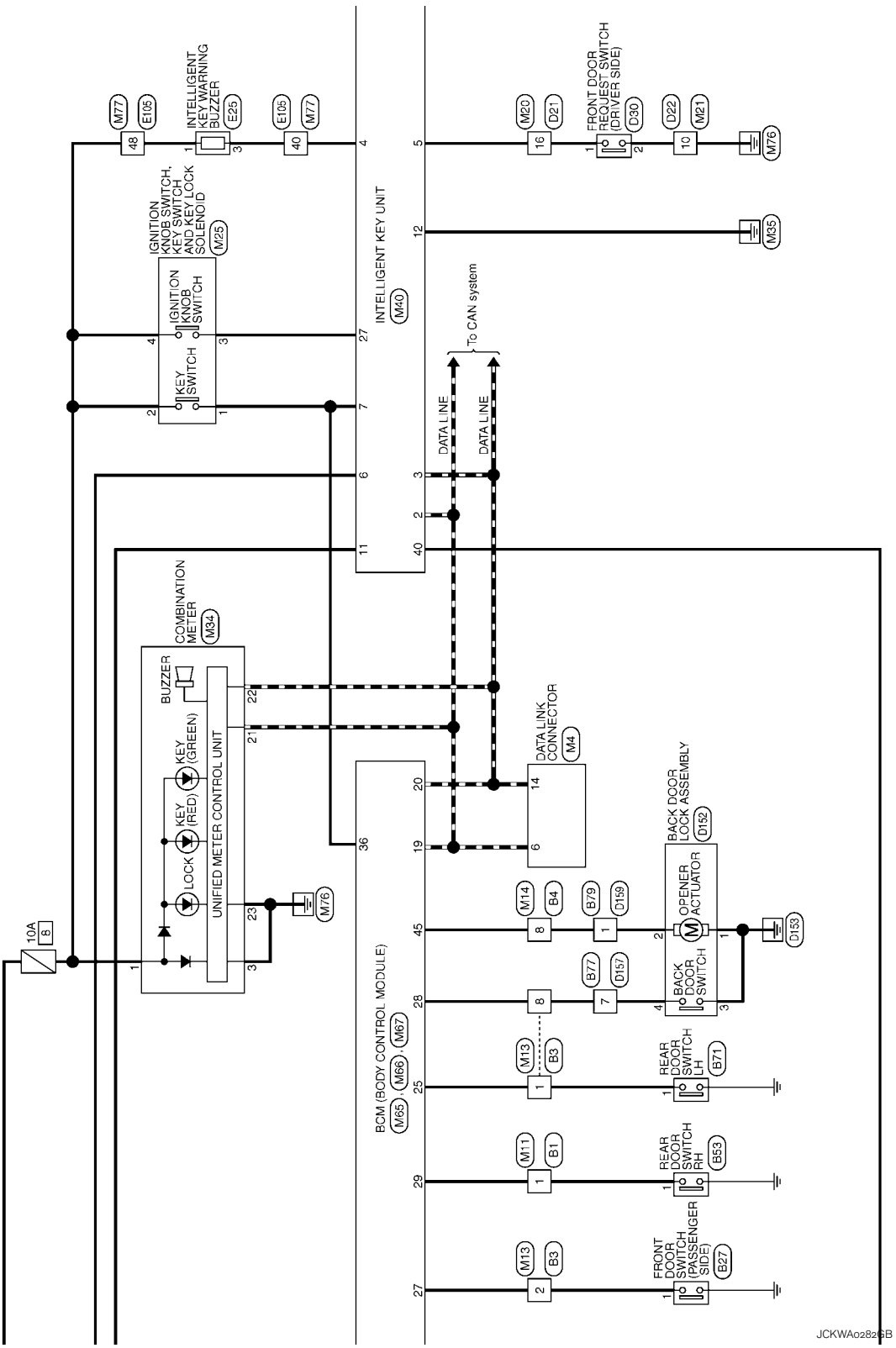
JCKWA0263GB

Wiring Diagram - INTELLIGENT KEY CONTROL SYSTEM -

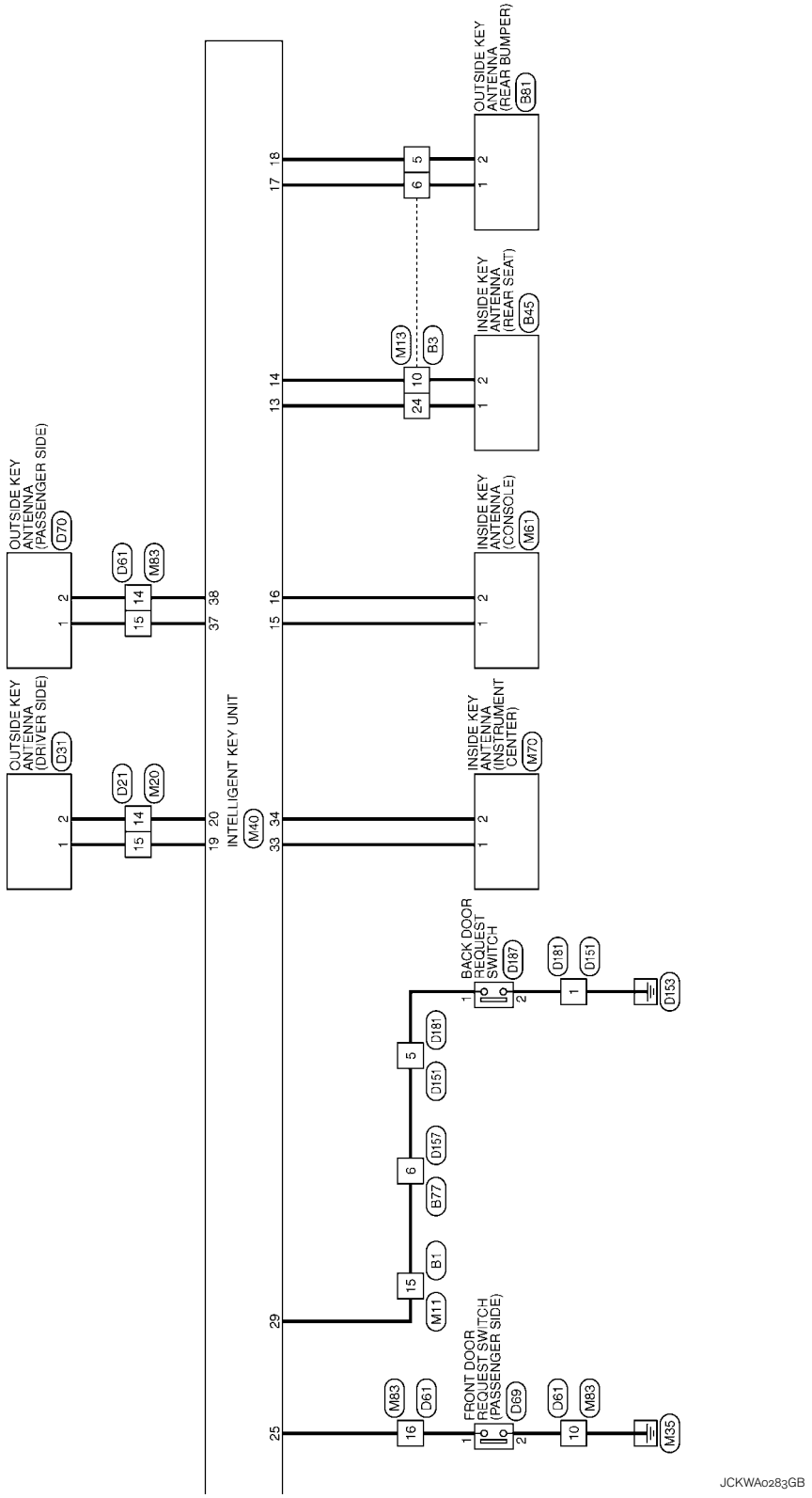
INFOID:0000000001081543

cardiagn.com


INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)
BATTERY
IGNITION SWITCH ON or START
IGNITION SWITCH ACC or ON
40A J
10A 4
10A 5
10A 9
E105
M77
76
BCM (BODY CONTROL MODULE)
M65 M66 M67
To turn signal and hazard warning lamps
To interior room lamp
PASSENGER SIDE ANTI-HIJACK RELAY M90
LOCK
UNLOCK RELEASE
SET
UNLOCK RELEASE
FRONT DOOR SWITCH (DRIVER SIDE) B34
FRONT DOOR LOCK ACTUATOR (DRIVER SIDE) D29
FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE) D68
REAR DOOR LOCK ACTUATOR RH D95
REAR DOOR LOCK ACTUATOR LH D115
DOOR LOCK ACTUATOR
SUPER LOCK ACTUATOR
2006/12/08
JCKWA0281GB



cardiagn.com


OUTSIDE KEY ANTENNA (REAR BUMPER)
B81
INSIDE KEY ANTENNA (REAR SEAT)
B45
INSIDE KEY ANTENNA (CONSOLE)
M61
INSIDE KEY ANTENNA (INSTRUMENT CENTER)
M70
OUTSIDE KEY ANTENNA (PASSENGER SIDE)
D70
OUTSIDE KEY ANTENNA (DRIVER SIDE)
D31
INTELLIGENT KEY UNIT
M40
BACK DOOR REQUEST SWITCH
D187
FRONT DOOR REQUEST SWITCH (PASSENGER SIDE)
D69
JCKWA0283GB

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	-[RHD models]
15	GR	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R/W	-[LHD models]
2	BR	-[RHD models]
5	V	-
6	SB	-
8	G	-
10	W/R	-
24	Y	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-
4	BR	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B45
Connector Name	INSIDE KEY ANTENNA (REAR SEAT)
Connector Type	RK02FGY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	W/R	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

JCKWA0284GB

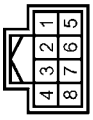
cardiagn.com

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2		
3		

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	GR	-
7	G	-
8		

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2		

Connector No.	B81
Connector Name	OUTSIDE KEY ANTENNA (REAR BUMPER)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	V	-

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
14	BR/W	-
15	L/Y	-
16	P	-

Connector No.	D22
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-
10	B	-

JCKWA0285GB

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	D29
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

Connector No.	D30
Connector Name	FRONT DOOR REQUEST SWITCH (DRIVER SIDE)
Connector Type	RK02ML-B

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	B	-

Connector No.	D31
Connector Name	OUTSIDE KEY ANTENNA (DRIVER SIDE)
Connector Type	RK02MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/Y	-
2	BR/W	-

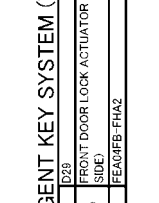
Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
10	B	-
14	O	-
15	L	-
16	B/R	-

Connector No.	D62
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	D68
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	D69
Connector Name	FRONT DOOR REQUEST SWITCH (PASSENGER SIDE)
Connector Type	RK02ML-B

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/R	-
2	B	-

Connector No.	D70
Connector Name	OUTSIDE KEY ANTENNA (PASSENGER SIDE)
Connector Type	RK02MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	O	-

JCKWA0286GB

cardiagn.com

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	–
7	O	–
8	SB	–

Connector No.	D95
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	O	–
3	SB	–

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	–
7	O	–
8	SB	–

Connector No.	D115
Connector Name	REAR DOOR LOCK ACTUATOR LH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	O	–
3	SB	–

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
5	GR	–

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309-EV-4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	GR	–
3	B	–
4	G	–

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	GR	–
7	G	–

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–

JCKWA0287GB

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
5	GR	-

Connector No.	D187
Connector Name	BACK DOOR REQUEST SWITCH
Connector Type	RK02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	B	-

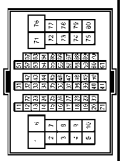
Connector No.	E25
Connector Name	INTELLIGENT KEY WARNING BUZZER
Connector Type	RK03FBR-DGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	-	-
3	LG/B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

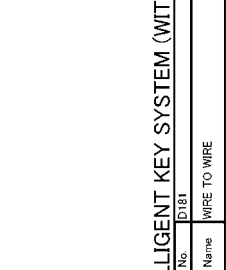
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
40	LG/B	-
48	Y	-
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

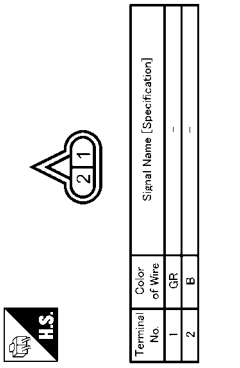
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

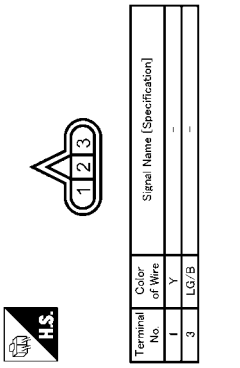
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-[RHD models]
15	GR	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

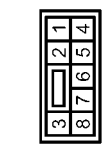
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
5	V	-
6	SB	-
8	G	-
10	W	-
24	Y	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

JCKWA0288GB

cardiagn.com

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	–
4	BR	–

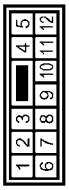
Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	BR	–
15	L	–
16	P	–

Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	GR	–
3	SB	–
10	B	–

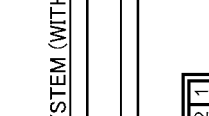
Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–
3	L	–
4	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

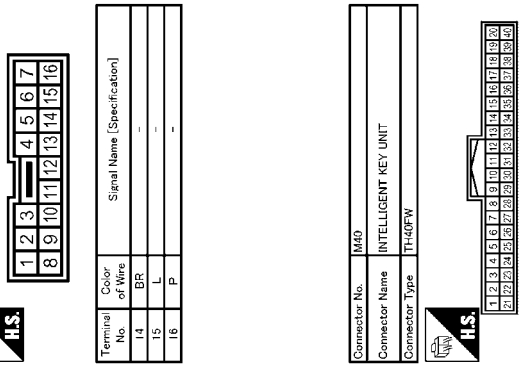
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
3	B	GND
21	L	CAN-H
22	P	CAN-L
23	B	GND

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L
4	LG	BUZZER
5	P	REQUEST SW (DR)
6	W	IGN SW
7	V	KEY SW
11	V	BATT+
12	B	GND
13	Y	REAR SEAT (+)
14	W	REAR SEAT (–)
15	SB	CONSOLE (+)
16	BR	CONSOLE (–)
17	SB	REAR BUMPER (+)
18	V	REAR BUMPER (–)
19	L	DRIVER DOOR (+)
20	BR	DRIVER DOOR (–)
25	BR	REQUEST SW (AS)
27	L	KNOB SW
29	GR	REQUEST SW (BD)
33	O	INSTRUMENT (+)
34	G	INSTRUMENT (–)
37	L	PASSENGER DOOR (+)
38	O	PASSENGER DOOR (–)
40	Y	AS ANTI-HIJACK

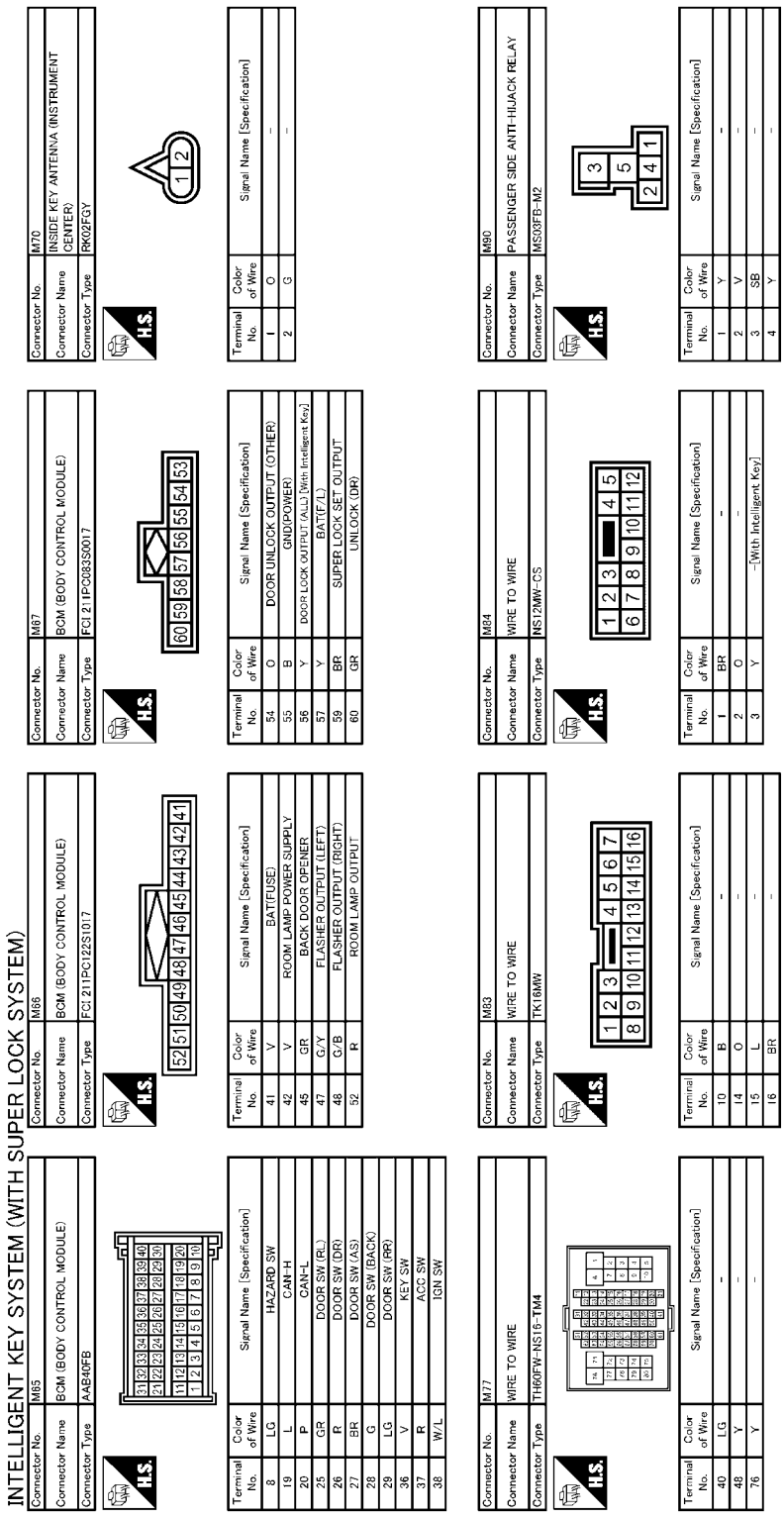
Connector No.	M61
Connector Name	INSIDE KEY ANTENNA (CONSOLE)
Connector Type	RK02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	BR	–

JCKWA0289GB

cardiagn.com



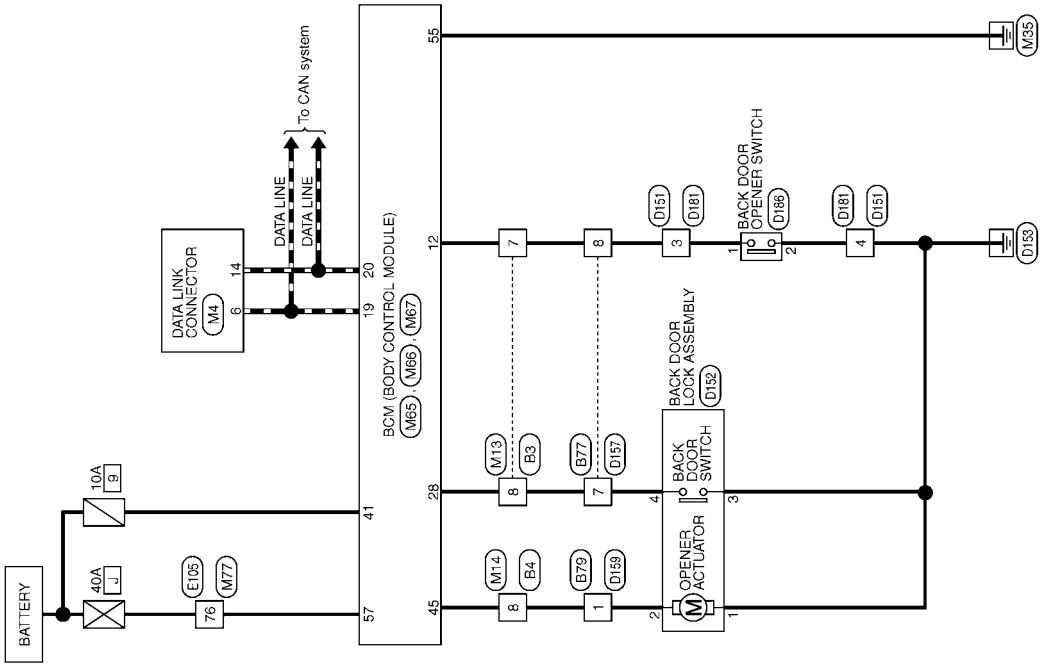
JCKWA0290GB

Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM -

INFOID:0000000001125426

cardiagn.com

BACK DOOR OPENER SYSTEM



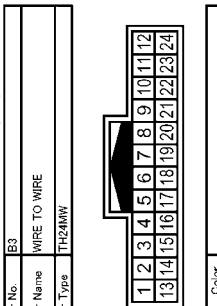
2006/12/08

JCKWA0295GB

BACK DOOR OPENER SYSTEM

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

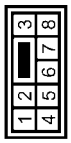
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

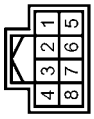
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

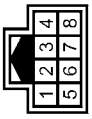
Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 48309 EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0296GB

cardiagn.com

BACK DOOR OPENER SYSTEM

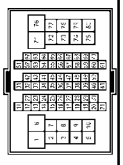
Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	–
4	B	–

Connector No.	D186
Connector Name	BACK DOOR OPENER SWITCH
Connector Type	RK02MGY

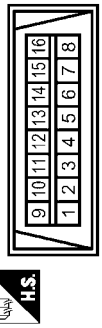
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	B	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



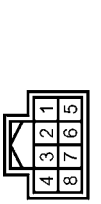
Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



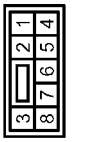
Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



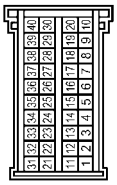
Terminal No.	Color of Wire	Signal Name [Specification]
7	P	–
8	G	–

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS



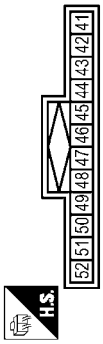
Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
12	P	TRUNK/BACK DOOR OPEN SW
19	L	CAN-H
20	P	CAN-L
28	G	DOOR SW (BACK)

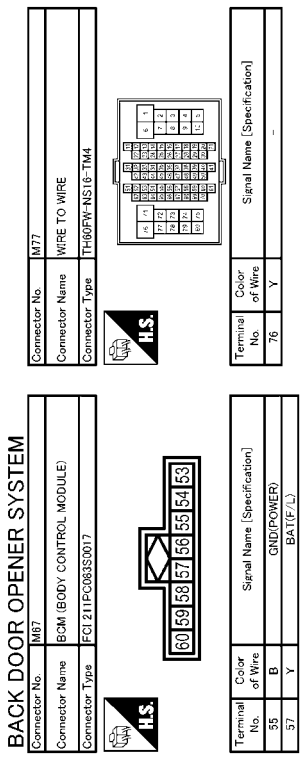
Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
45	GR	BACK DOOR OPENER

JCKWA0297GB

carsdiagn.com



JCKWA0298GB

Fail Safe

INFOID:0000000001081545

cardiagn.com

Display contents of CONSULT-III	Fail-safe	Cancellation
B2013: STRG COMM 1	• Inhibits steering look unlocking	Erase DTC
B2552: INTELLIGENT KEY	• Inhibits steering look unlocking • Inhibits engine cranking (BCM) • Fuel cut (ECM)	Erase DTC
B2590: NATS MALFUNCTION	• Inhibits steering look unlocking • Inhibits engine cranking (BCM) • Fuel cut (ECM)	Erase DTC

DTC Inspection Priority Chart

INFOID:0000000001081546

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN) • B2552: INTELIGENT KEY
2	• B2013: STRG COMM 1 • B2590: NATS MALFUNCTION

DTC Index

INFOID:0000000001081547

NOTE:
Details of time display
- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	Detection condition	Fail-safe	Diagnosis
No DTC is detected. further testing may be required.	—	—	—
U1000: CAN COMM CIRCUIT	Intelligent Key unit cannot receive CAN communication signal continuously for 2 seconds or more.	—	Check CAN communication system. Refer to DLK-68
U1010: CONTROL UNIT (CAN)	Intelligent Key unit detects internal CAN communication circuit malfunction.	—	Replace Intelligent Key unit.
B2013: STRG COMM 1	The ID verification result between Intelligent key unit and steering lock unit are NG. Or Intelligent Key unit cannot communicate with steering lock unit.	×	Perform steering lock unit ID registration with CONSULT-III
B2552: INTELLIGENT KEY	Intelligent Key unit internal malfunction.	×	Replace Intelligent Key unit.
B2590: NATS MALFUNCTION	The ID verification result between Intelligent key unit and BCM are NG. Or Intelligent Key unit cannot communicate with BCM.	×	Check NATS Refer to SEC-43

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001097293

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

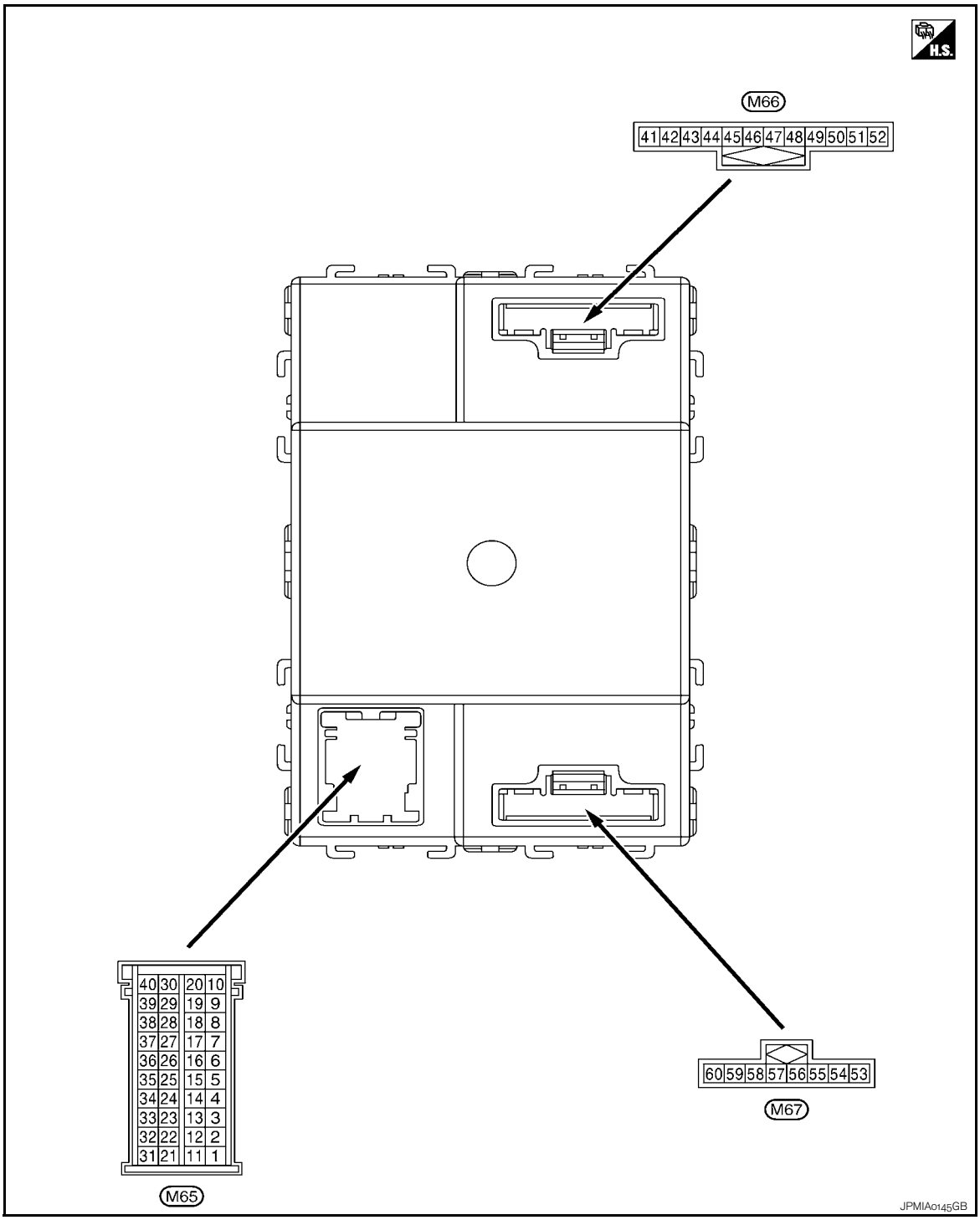
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

carsdiagn.com

TERMINAL LAYOUT

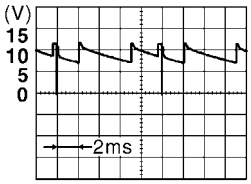
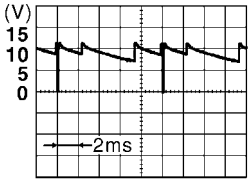
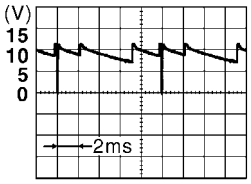
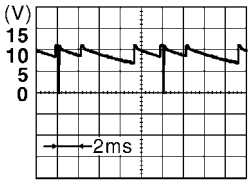


PHYSICAL VALUES

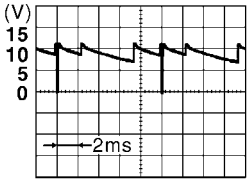
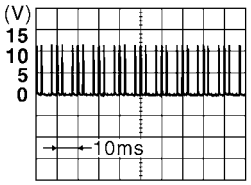
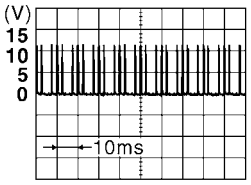
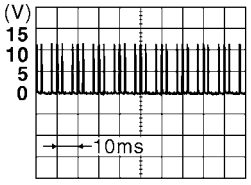
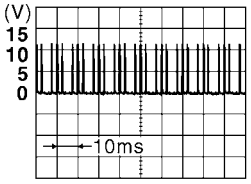
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

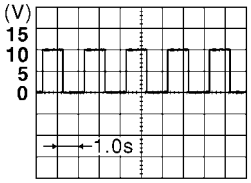
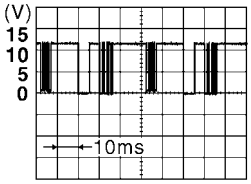
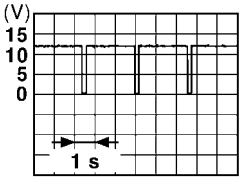
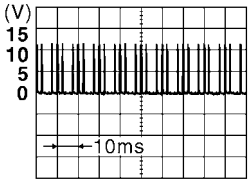
cardiagn.com

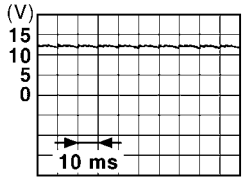
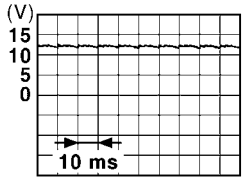
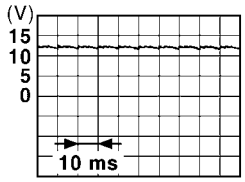
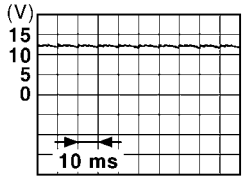
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

carsdiagn.com

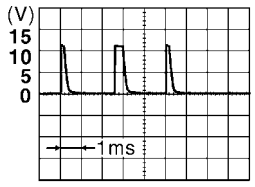
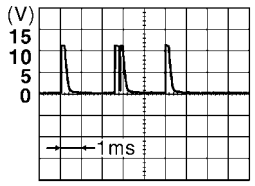
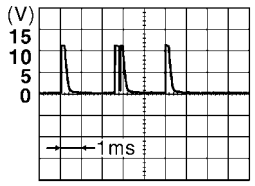
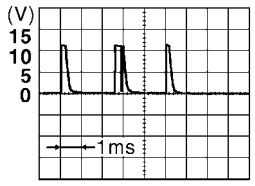
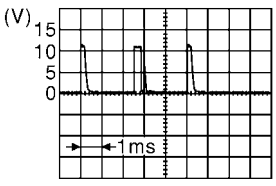
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

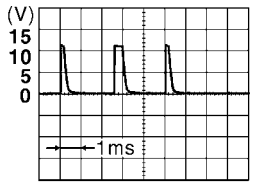
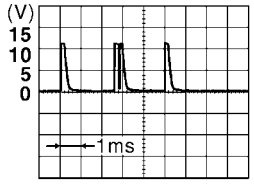
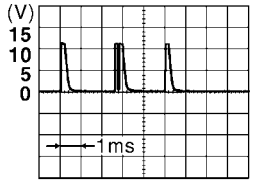
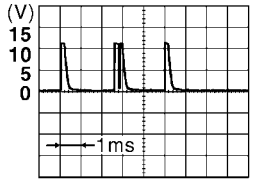
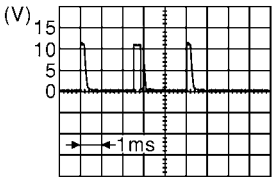
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

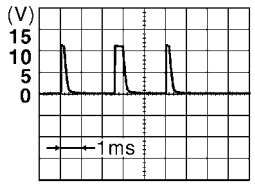
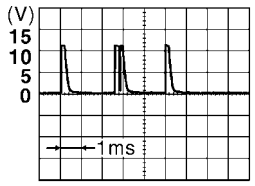
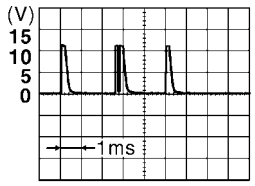
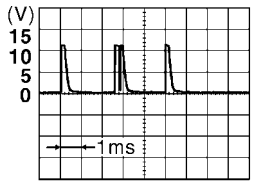
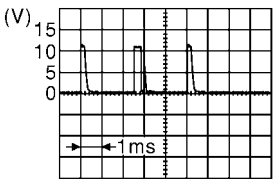
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIDo924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIDo924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIDo924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIDo924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

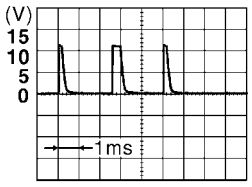
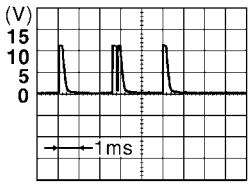
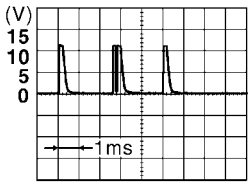
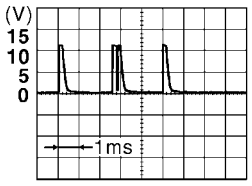
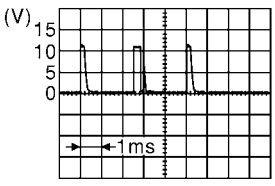
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

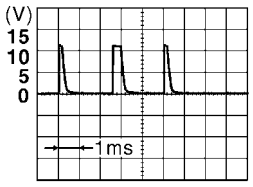
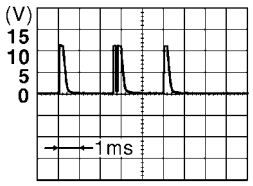
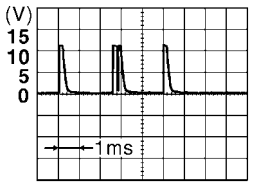
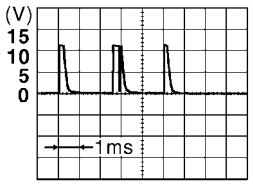
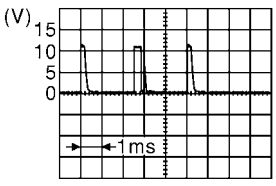
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

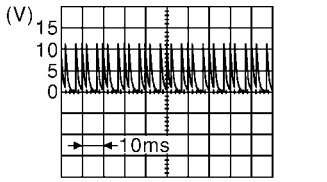
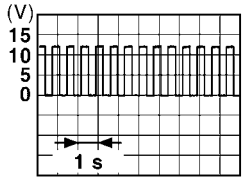
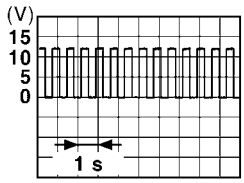
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

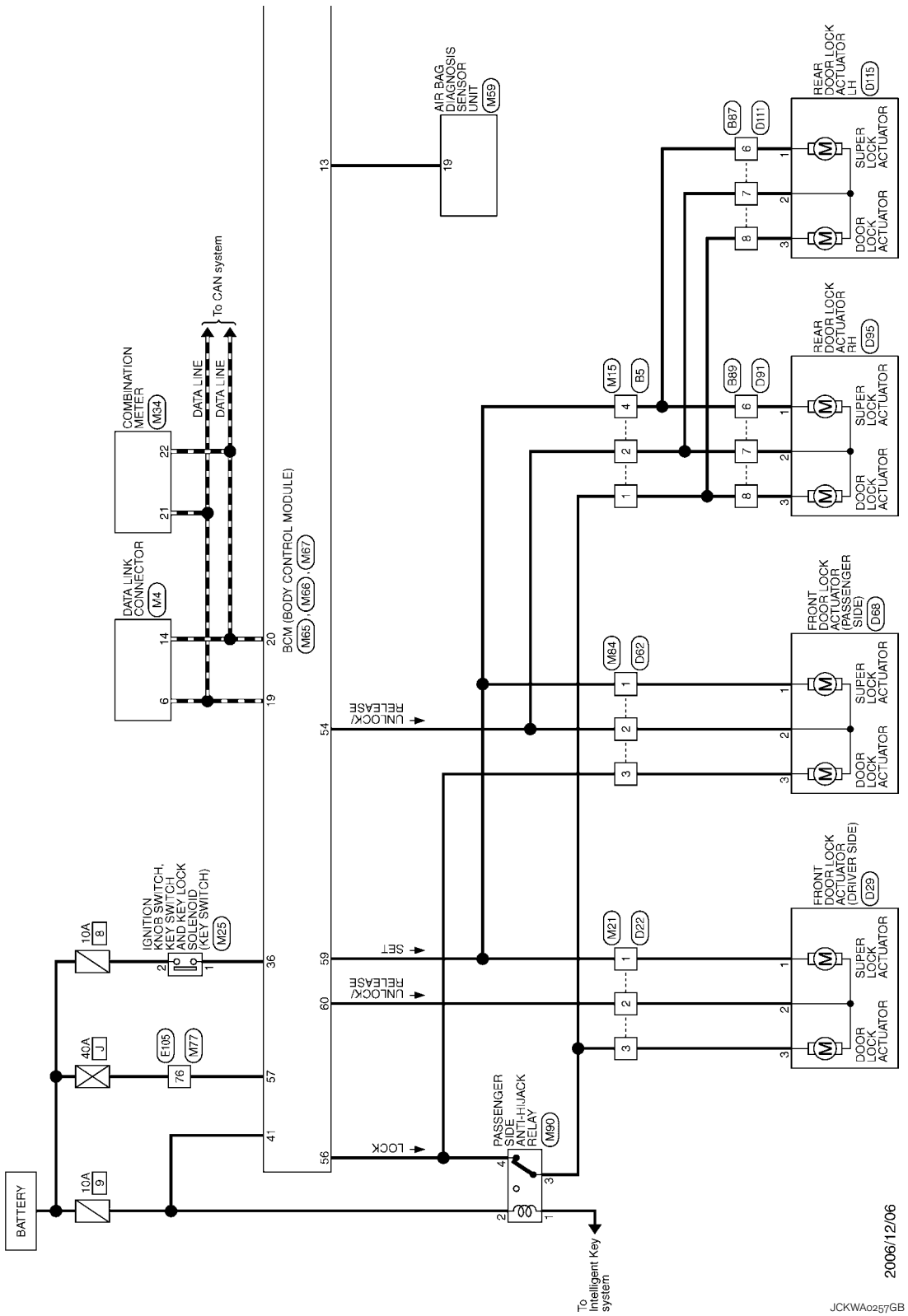
*1: With Intelligent Key system

*2: Without Intelligent Key system

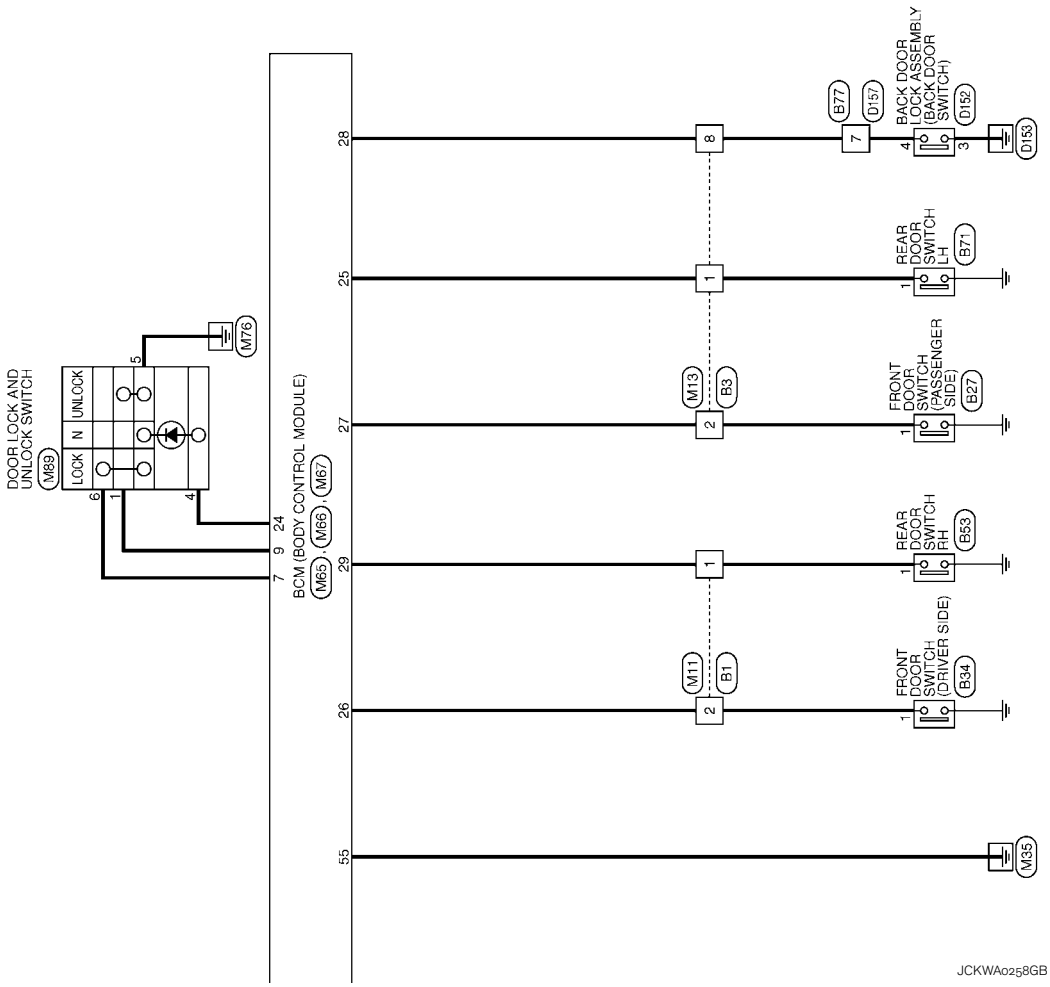
Wiring Diagram - SUPER LOCK CONTROL SYSTEM -

INFOID:0000000001125439

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)



cardiagn.com


DOOR LOCK AND UNLOCK SWITCH
M69
LOCK
N
UNLOCK
6
1
4
5
M76
BCM (BODY CONTROL MODULE)
M65, M66, M67
24
9
7
28
25
27
29
26
55
8
1
2
1
2
M13
B3
M11
B1
B77
7
D157
BACK DOOR LOCK ASSEMBLY (BACK DOOR SWITCH)
4
3
D152
D153
REAR DOOR SWITCH LH
B71
FRONT DOOR SWITCH (PASSENGER SIDE)
B27
REAR DOOR SWITCH RH
B53
FRONT DOOR SWITCH (DRIVER SIDE)
B34
M35
JCKWA0258GB

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	-[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
8	G	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-
4	BR	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

JCKWA0259GB

cardiagn.com

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

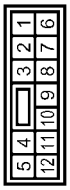
Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D22
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

Connector No.	D29
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

Connector No.	D62
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	D68
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D95
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

JCKWA0260GB

carsdiagn.com

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D115
Connector Name	REAR DOOR LOCK ACTUATOR LH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

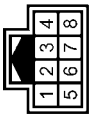
Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	GINCH 49309 EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-[RHD models]

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
8	G	-

JCKWA0261GB

cardiagn.com

SUPER LOCK SYSTEM (WITH INTELLIGENT KEY)

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3		2	1
8	7	6	5	4

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	–
4	BR	–

Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.

1	2	3		4	5
6	7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	GR	–
3	SB	–

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

H.S.

1	2	3	4	5	6

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

H.S.

20	21	17						24	49	1
22	11	46	48	47	45	13	3	4	6	5
16	12	19	15	14	51	23	50	18	52	2

Terminal No.	Color of Wire	Signal Name [Specification]
19	R	UNLOCK

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Terminal No.	Color of Wire	Signal Name [Specification]
7	P	LOCK/UNLOCK SW (LOCK)
9	BR	LOCK/UNLOCK SW (UNLOCK)
13	R	SHOCK DETECT SIG
19	L	CAN-H
20	P	CAN-L
24	GR	DOOR LOCK STATUS IND
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)

36	V	KEY SW

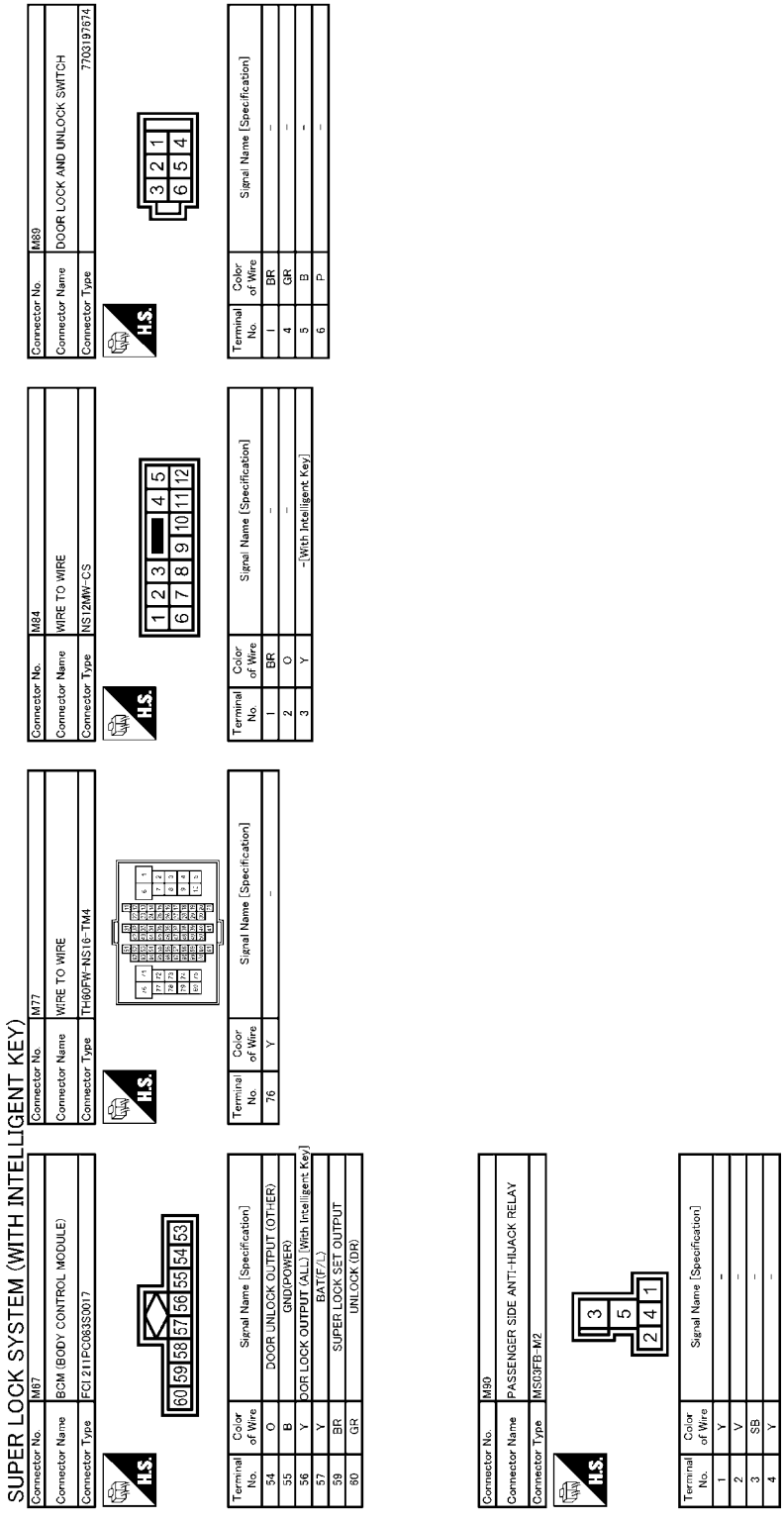
Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

52	51	50	49	48	47	46	45	44	43	42	41

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BATTFUSE)

JCKWA0262GB

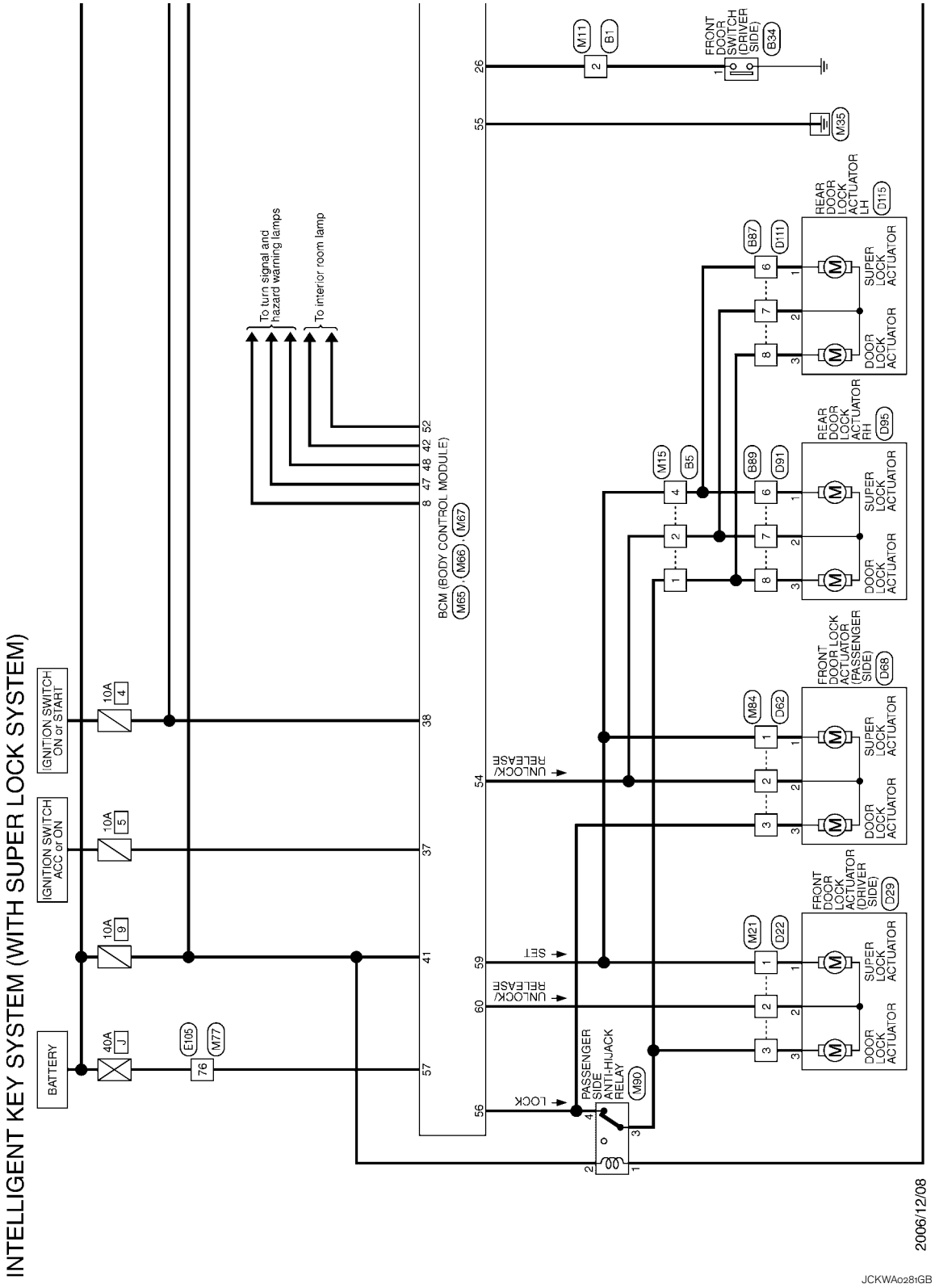


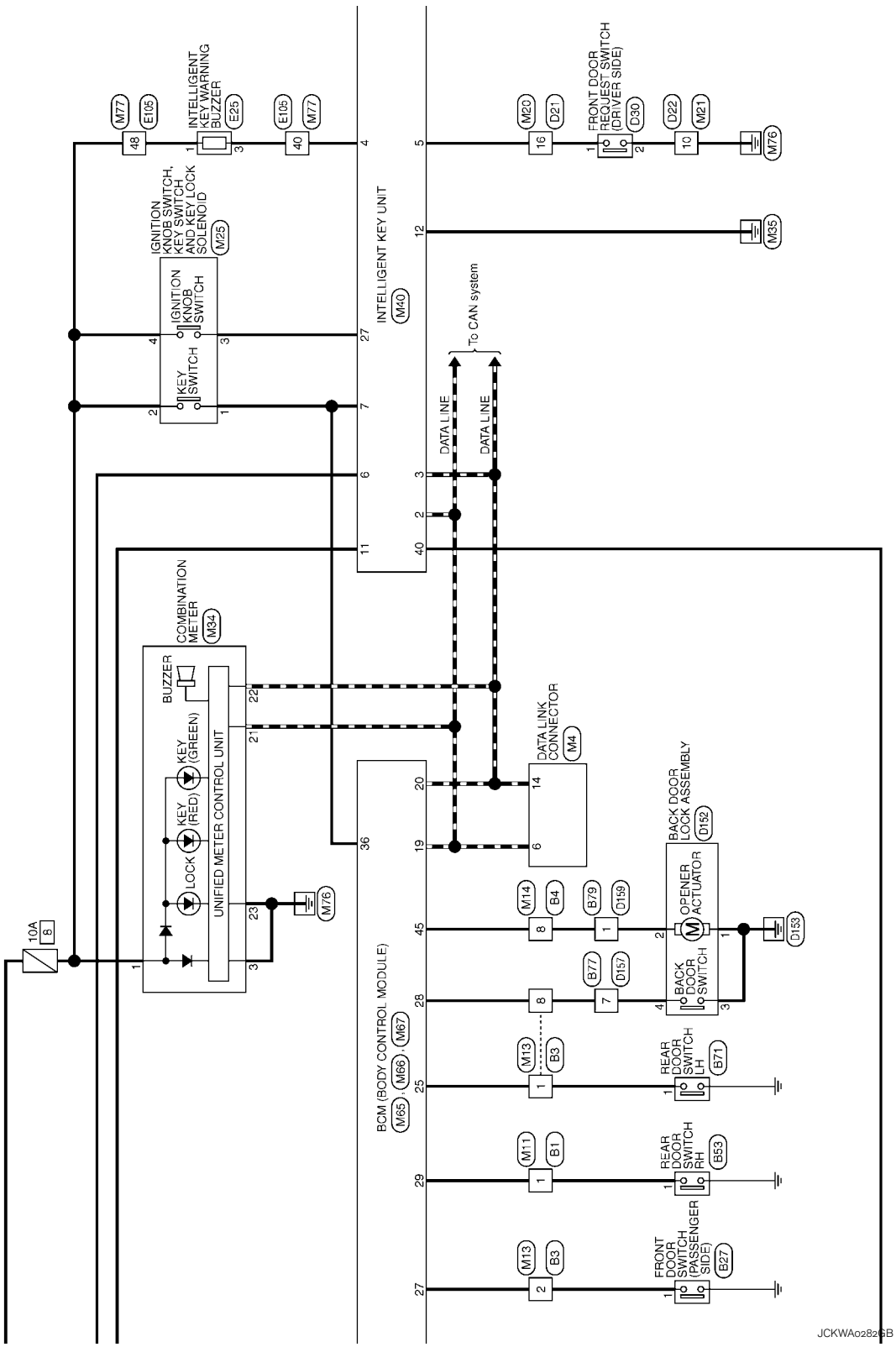
JCKWA0263GB

Wiring Diagram - INTELLIGENT KEY CONTROL SYSTEM -

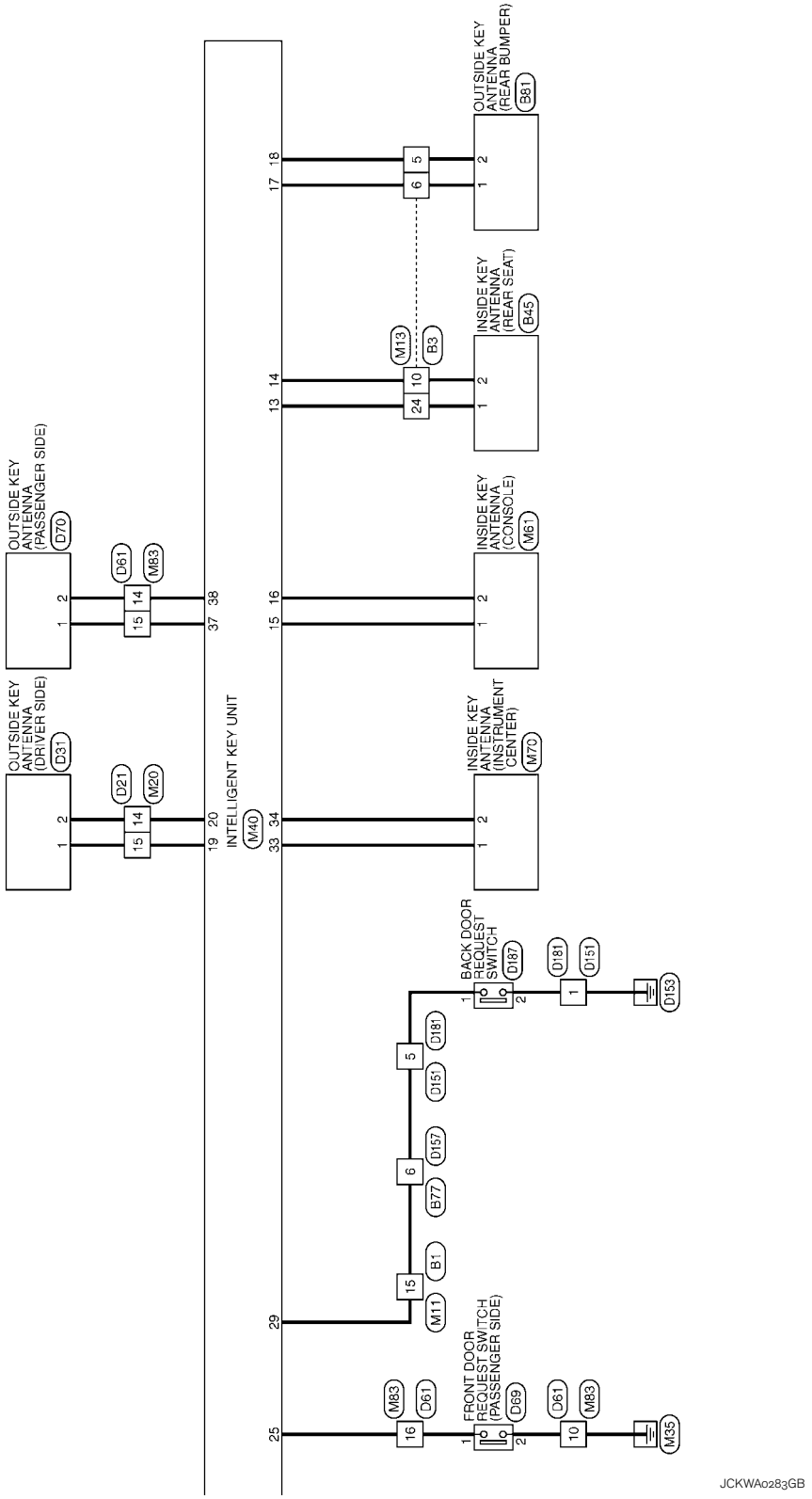
INFOID:0000000001125431

cardiagn.com


INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)
BATTERY
IGNITION SWITCH ON or START
IGNITION SWITCH ACC or ON
40A J
10A 4
10A 5
10A 9
E105
M77
76
BCM (BODY CONTROL MODULE)
M65 M66 M67
To turn signal and hazard warning lamps
To interior room lamp
UNLOCK RELEASE
SET
LOCK
PASSENGER SIDE ANTI-HIJACK RELAY
M90
FRONT DOOR SWITCH (DRIVER SIDE)
B34
M11
B1
M35
REAR DOOR LOCK ACTUATOR LH
D115
REAR DOOR LOCK ACTUATOR RH
D95
FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
D68
FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
D29
SUPER LOCK ACTUATOR
DOOR LOCK ACTUATOR
2006/12/08
JCKWA0281GB



cardiagn.com


OUTSIDE KEY ANTENNA (REAR BUMPER)
B81
INSIDE KEY ANTENNA (REAR SEAT)
B45
INSIDE KEY ANTENNA (CONSOLE)
M61
INSIDE KEY ANTENNA (INSTRUMENT CENTER)
M70
OUTSIDE KEY ANTENNA (PASSENGER SIDE)
D70
OUTSIDE KEY ANTENNA (DRIVER SIDE)
D31
INTELLIGENT KEY UNIT
M40
BACK DOOR REQUEST SWITCH
D187
FRONT DOOR REQUEST SWITCH (PASSENGER SIDE)
D69
JCKWA0283GB

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	-[RHD models]
15	GR	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R/W	-[LHD models]
2	BR	-[RHD models]
5	V	-
6	SB	-
8	G	-
10	W/R	-
24	Y	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-
4	BR	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B45
Connector Name	INSIDE KEY ANTENNA (REAR SEAT)
Connector Type	RK02FGY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	W/R	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

JCKWA0284GB

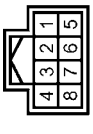
cardiagn.com

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2		
3		

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	GR	-
7	G	-
8		

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2		

Connector No.	B81
Connector Name	OUTSIDE KEY ANTENNA (REAR BUMPER)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	V	-

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
14	BR/W	-
15	L/Y	-
16	P	-

Connector No.	D22
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-
10	B	-

JCKWA0285GB

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	D29
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

Connector No.	D30
Connector Name	FRONT DOOR REQUEST SWITCH (DRIVER SIDE)
Connector Type	RK02ML-B

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	B	-

Connector No.	D31
Connector Name	OUTSIDE KEY ANTENNA (DRIVER SIDE)
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/Y	-
2	BR/W	-

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
10	B	-
14	O	-
15	L	-
16	B/R	-

Connector No.	D62
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	D68
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	D69
Connector Name	FRONT DOOR REQUEST SWITCH (PASSENGER SIDE)
Connector Type	RK02ML-B

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/R	-
2	B	-

Connector No.	D70
Connector Name	OUTSIDE KEY ANTENNA (PASSENGER SIDE)
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	O	-

JCKWA0286GB

cardiagn.com

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D95
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	-
7	O	-
8	SB	-

Connector No.	D115
Connector Name	REAR DOOR LOCK ACTUATOR LH
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
5	GR	-

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309-EV-4M8

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	GR	-
7	G	-

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0287GB

carsdiagn.com

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
5	GR	-

Connector No.	D187
Connector Name	BACK DOOR REQUEST SWITCH
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	B	-

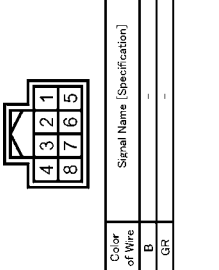
Connector No.	E25
Connector Name	INTELLIGENT KEY WARNING BUZZER
Connector Type	RK03FBR-DGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	-	-
3	LG/B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

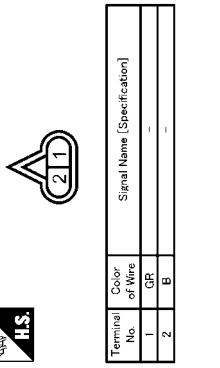
Terminal No.	Color of Wire	Signal Name [Specification]
40	LG/B	-
48	Y	-
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



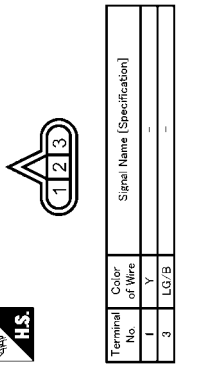
Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-[RHD models]
15	GR	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
5	V	-
6	SB	-
8	G	-
10	W	-
24	Y	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

JCKWA0288GB

cardiagn.com

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	–
4	BR	–

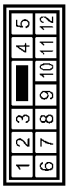
Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	BR	–
15	L	–
16	P	–

Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	GR	–
3	SB	–
10	B	–

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–
3	L	–
4	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
3	B	GND
21	L	CAN-H
22	P	CAN-L
23	B	GND

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L
4	LG	BUZZER
5	P	REQUEST SW (DR)
6	W	IGN SW
7	V	KEY SW
11	V	BATT+
12	B	GND
13	Y	REAR SEAT (+)
14	W	REAR SEAT (–)
15	SB	CONSOLE (+)
16	BR	CONSOLE (–)
17	SB	REAR BUMPER (+)
18	V	REAR BUMPER (–)
19	L	DRIVER DOOR (+)
20	BR	DRIVER DOOR (–)
25	BR	REQUEST SW (AS)
27	L	KNOB SW
29	GR	REQUEST SW (BD)
33	O	INSTRUMENT (+)
34	G	INSTRUMENT (–)
37	L	PASSENGER DOOR (+)
38	O	PASSENGER DOOR (–)
40	Y	AS ANTI-HIJACK

Connector No.	M61
Connector Name	INSIDE KEY ANTENNA (CONSOLE)
Connector Type	RK02FGY

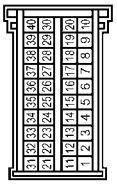
H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	BR	–

JCKWA0289GB

INTELLIGENT KEY SYSTEM (WITH SUPER LOCK SYSTEM)

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
8	LG	HAZARD SW
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)
36	V	KEY SW
37	R	ACC SW
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
42	V	ROOM LAMP POWER SUPPLY
45	GR	BACK DOOR OPENER
47	G/Y	FLASHER OUTPUT (LEFT)
48	G/B	FLASHER OUTPUT (RIGHT)
52	R	ROOM LAMP OUTPUT

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
54	O	DOOR UNLOCK OUTPUT (OTHER)
55	B	GND(POWER)
56	Y	DOOR LOCK OUTPUT (ALL) [With Intelligent Key]
57	V	BAT(F/L)
59	BR	SUPER LOCK SET OUTPUT
60	GR	UNLOCK (DR)

Connector No.	M70
Connector Name	INSIDE KEY ANTENNA (INSTRUMENT CENTER)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	G	-

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
40	LG	-
48	Y	-
76	Y	-

Connector No.	M83
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
10	B	-
14	O	-
15	L	-
16	BR	-

Connector No.	M84
Connector Name	WIRE TO WIRE
Connector Type	MS12MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	Y	-[With Intelligent Key]

Connector No.	M90
Connector Name	PASSENGER SIDE ANTI-HIJACK RELAY
Connector Type	MS03FB-M2

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	V	-
3	SB	-
4	Y	-

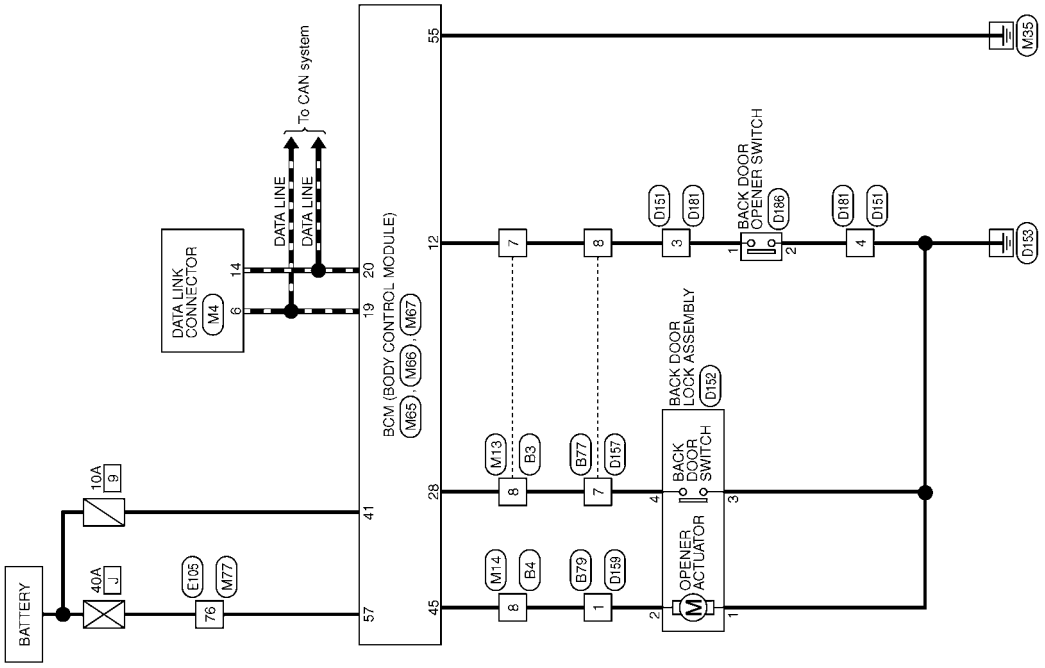
JCKWA0290GB

Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM -

INFOID:0000000001125427

cardiagn.com

BACK DOOR OPENER SYSTEM



2006/12/08

JCKWA0295GB

BACK DOOR OPENER SYSTEM

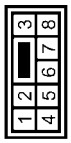
Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

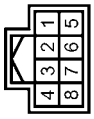
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

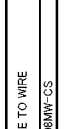
Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 48309 EV 4M9

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0296GB

cardiagn.com

BACK DOOR OPENER SYSTEM

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

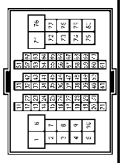
Connector No.	D186
Connector Name	BACK DOOR OPENER SWITCH
Connector Type	RK02MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

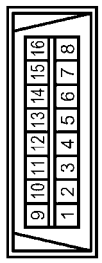
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

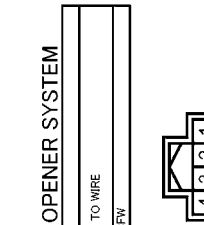
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
12	P	TRUNK/BACK DOOR OPEN SW
19	L	CAN-H
20	P	CAN-L
28	G	DOOR SW (BACK)

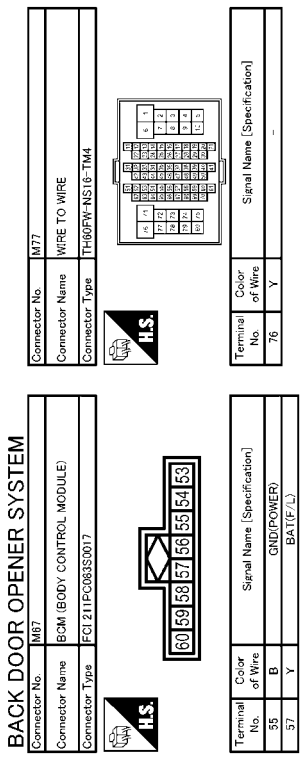
Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
45	GR	BACK DOOR OPENER

JCKWA0297GB

carsdiagn.com



JCKWA0298GB

Fail Safe

INFOID:0000000001097295

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001097296

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001097297

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

SYMPTOM DIAGNOSIS

DOOR LOCK FUNCTION SYMPTOMS

DOOR LOCK AND UNLOCK SWITCH

DOOR LOCK AND UNLOCK SWITCH : Symptom Table

INFOID:0000000001109309

DOOR LOCK AND UNLOCK SWITCH OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-283, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Except driver side, doors are closed.
- Super lock is not in set state.
- Passenger side door is not in anti-hijack state.
- Doors are not locked by Intelligent Key or door request switch.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
Door lock and unlock function does not operate with door lock and unlock switch.	1. Check BCM power supply and ground circuit.		DLK-335
	2. Check door lock and unlock switch.		DLK-337
	3. Check door switch.	Passenger side	DLK-348
		Rear LH	DLK-350
		Rear RH	DLK-351
		Back door	DLK-353
	4. Check intermittent incident.		GI-39
Specific door lock does not operate properly.	1. Check door lock actuator.	Driver side	DLK-359
		Passenger side	DLK-361
		Rear LH	DLK-362
		Rear RH	DLK-364
	2. Check intermittent incident.		GI-39
Specific door does not open from inside the vehicle.	1. Check super lock actuator.	Driver side	DLK-367
		Passenger side	DLK-368
		Rear LH	DLK-370
		Rear RH	DLK-371
	2. Check intermittent incident.		GI-39
Rear LH and RH door lock actuator does not operate.	1. Check passenger side anti-hijack relay.		DLK-395
	2. Check intermittent incident.		GI-39

INTELLIGENT KEY

INTELLIGENT KEY : Symptom Table

INFOID:0000000001109310

INTELLIGENT KEY OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “WORK FLOW”. Refer to DLK-283, "Work Flow".

- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)
- Door lock and unlock switch operations are normal.
- Emergency key is removed from ignition key cylinder.
- All doors are closed.
- Ignition knob is not pressed.
- No Intelligent keys are inside the vehicle.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
All of the Intelligent Key functions do not operate.	1. Check Intelligent Key unit power supply and ground circuit.		DLK-335
	2. Check driver side door switch.		DLK-353
	3. Check key switch.		DLK-355
	4. Check ignition knob switch.		DLK-357
	5. Check Intelligent Key battery.		DLK-404
	6. Check intermittent incident.		GI-39
Specific door does not operate properly.	1. Check door lock actuator.	Driver side	DLK-359
		Passenger side	DLK-361
		Rear LH	DLK-362
		Rear RH	DLK-364
	2. Check intermittent incident.		GI-39
Anti-hijack function does not operate by Intelligent Key.	1. Check “SELECTIVE UNLOCK FUNCTION” setting in “WORK SUPPORT”.		DLK-329
	2. Check intermittent incident.		GI-39

DOOR REQUEST SWITCH

DOOR REQUEST SWITCH : Symptom Table

INFOID:0000000001109311

DOOR REQUEST SWITCH OPERATION MALFUNCTION

NOTE:
- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-283, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)
- Intelligent Key operation is normal.
- “LOCK/UNLOCK BY I-KEY” is ON when setting on CONSULT-III.
- Emergency key is removed from ignition key cylinder.
- Ignition switch is in OFF position.
- No Intelligent Keys are inside the vehicle.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Door lock and unlock do not operate by door request switch.	1. Check “LOCK/UNLOCK BY I-KEY” setting in “WORK SUPPORT”.	DLK-329
	2. Check intermittent incident.	GI-39

cardiagn.com

Symptom	Diagnosis/service procedure	Reference page
Door lock/unlock does not operate by request switch (driver side).	1. Check door request switch (driver side).	DLK-341
	2. Check outside key antenna (driver side).	DLK-377
	3. Check intermittent incident.	GI-39
Door lock/unlock does not operate by request switch (passenger side).	1. Check door request switch (passenger side).	DLK-343
	2. Check outside key antenna (passenger side).	DLK-380
	3. Check intermittent incident.	GI-39
Door lock/unlock does not operate by request switch (back door).	1. Check door request switch (back door).	DLK-344
	2. Check outside key antenna (rear bumper).	DLK-383
	3. Check intermittent incident.	GI-39
Anti-hijack function does not operate by driver side door request switch (other door lock functions operate).	1. Check “SELECTIVE UNLOCK FUNCTION” setting in “WORK SUPPORT”.	DLK-329
	2. Check intermittent incident.	GI-39
Passenger side anti-hijack function does not operate by passenger side door request switch (other door lock functions operate).	1. Check passenger side anti-hijack relay.	DLK-395
	2. Check intermittent incident.	GI-39

KEY REMINDER

KEY REMINDER : Symptom Table

INFOID:0000000001109312

KEY REMINDER OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “WORK FLOW”. Refer toDLK-283, "Work Flow".
- Understand the operation when does it work, refer to DLK-299, "KEY REMINDER : System Description".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Request switch operation and door lock and unlock switch operation are normal.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
Key reminder operation does not operate properly.	1. Check door switch.	Driver side	DLK-347
		Passenger side	DLK-348
		Rear LH	DLK-350
		Rear RH	DLK-351
		Back door	DLK-353
	2. Check inside key antenna.	Instrument center	DLK-386
		Console	DLK-389
		Rear seat	DLK-392
	3. Check Intermittent Incident.		GI-39

AUTO DOOR LOCK

AUTO DOOR LOCK : Symptom Table

INFOID:0000000001109313

AUTO DOOR LOCK OPERATION MALFUNCTION

NOTE:

- “AUTO RELOCK TIMER” is not OFF when setting on CONSULT-III.
- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-283, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- Understand the operation when does it work, refer to DLK-302, "AUTO DOOR LOCK : System Description".
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Request switch operation and door lock and unlock switch operation are normal.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Auto door lock operation does not operate properly.	1. Check “AUTO RELOCK TIMER” setting in “WORK SUPPORT”.	DLK-329
	2. Check ignition knob switch.	DLK-357
	3. Check key switch.	DLK-355
	4. Check Intermittent Incident.	GI-39

VEHICLE SPEED SENSING AUTO DOOR LOCK

VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table

INFOID:0000000001109314

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “WORK FLOW”. Refer to DLK-283, "Work Flow".
- Understand the operation when does it work, refer to DLK-305, "VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Request switch operation and door lock and unlock switch operation are normal.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Vehicle speed sensing auto door lock operation does not operate.	1. Check vehicle speed signal.	DLK-403
	2. Check Intermittent Incident.	GI-39

cardiagn.com

BACK DOOR OPEN FUNCTION SYMPTOMS
BACK DOOR OPENER SWITCH
BACK DOOR OPENER SWITCH : Symptom Table

INFOID:0000000001109315

BACK DOOR OPENER FUNCTION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “WORK FLOW”. Refer to DLK-283, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock function is normal.
- Vehicle speed is less than 5 km/h (3MPH).
- All doors are unlocked.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Back door opener function does not operate by back door opener switch.	1. Check back door opener switch.	DLK-375
	2. Check vehicle speed signal.	DLK-403
	3. Check back door opener actuator.	DLK-373
	4. Check Intermittent Incident.	GI-39

WARNING FUNCTION SYMPTOMS

BUZZER (COMBINATION METER)

BUZZER (COMBINATION METER) : Symptom Table

INFOID:0000000001109316

BUZZER (COMBINATION METER) OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “WORK FLOW”. Refer to DLK-283, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Warning chime functions operating condition is extremely complicated, during operating confirmations, reconfirm the list above twice in order to ensure proper operation. Refer to DLK-316, "System Description".
- Door lock function is normal.

Symptom Table

Symptom		Diagnosis/service procedure	Reference page
Ignition knob return forgotten warning.does not operate properly.		1. Check buzzer (combination meter).	DLK-399
		2. Check Intermittent Incident.	GI-39
Ignition key warning does not operate properly.		1. Check buzzer (combination meter).	DLK-399
		2. Check Intermittent Incident.	GI-39
OFF position warning does not operate properly.		1. Check buzzer (combination meter).	DLK-399
		2. Check Intermittent Incident.	GI-39
Take away warning does not operate properly.	Take away through window	1. Check buzzer (combination meter).	DLK-399
		2. Check Intermittent Incident.	GI-39

INTELLIGENT KEY WARNING BUZZER

INTELLIGENT KEY WARNING BUZZER : Symptom Table

INFOID:0000000001109317

INTELLIGENT KEY WARNING BUZZER OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “WORK FLOW”. Refer to DLK-283, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Warning chime functions operating condition is extremely complicated, during operating confirmations, reconfirm the list above twice in order to ensure proper operation. Refer to DLK-316, "System Description".
- Door lock function is normal.

Symptom Table

Symptom		Diagnosis/service procedure	Reference page
Take away warning does not operate properly.	Any door open to all door close.	1. Check “TAKE OUT FROM WINDOW WARN” setting in “WORK SUPPORT”.	DLK-329
		2. Check Intelligent Key warning buzzer.	DLK-397
		3. Check Intermittent Incident.	GI-39

cardiagn.com

Symptom		Diagnosis/service procedure	Reference page
Door lock operation warning chime does not operate properly.	Request switch operation	1. Check Intelligent Key warning buzzer.	DLK-397
		2. Check Intermittent Incident.	GI-39
	Intelligent Key button operation	1. Check Intelligent Key warning buzzer.	DLK-397
		2. Check Intermittent Incident.	GI-39

WARNING LAMP

WARNING LAMP : Symptom Table

INFOID:0000000001109318

WARNING LAMP OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “WORK FLOW”. Refer to DLK-283, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Warning chime functions operating condition is extremely complicated, during operating confirmations, reconfirm the list above twice in order to ensure proper operation. Refer to DLK-316, "System Description".
- Door lock function is normal.

Symptom Table

Symptom		Diagnosis/service procedure	Reference page
OFF position warning does not operate properly.		1. Check LOCK warning lamp. (RED blinking)	DLK-401
		2. Check Intermittent Incident.	GI-39
Take away warning does not operate properly.	Any door open to all door close.	1. Check LOCK warning lamp. (RED blinking)	DLK-401
		2. Check Intermittent Incident.	GI-39
	Door is open	1. Check LOCK warning lamp. (RED blinking)	DLK-401
		2. Check Intermittent Incident.	GI-39
	Take away through window	1. Check LOCK warning lamp. (RED blinking)	DLK-401
		2. Check Intermittent Incident.	GI-39
Intelligent Key low battery warning dose not operate properly.		1. Check “LOW BAT OF KEY FOB WARN” setting in “WARK SUPPORT”.	DLK-329
		2. Check Intelligent Key battery.	DLK-404
		3. Check KEY warning lamp. (GREEN blinking)	DLK-400
		4. Check Intermittent Incident.	GI-39

BACK DOOR

BACK DOOR : Symptom Table

INFOID:0000000001109319

BACK DOOR OPEN WARNING OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-283, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock function and back door opener function is normal.

A B C D E F G H I J DLK L M N O P
c-diagn.com

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Back door open warning does not operate properly.	1. Check buzzer (combination meter).	DLK-399
	2. Check intermittent incident.	GI-39

cardiagn.com

HAZARD AND BUZZER REMINDER FUNCTION SYMPTOMS

HAZARD WARNING LAMP

HAZARD WARNING LAMP : Symptom Table

INFOID:0000000001109320

BUZZER REMINDER OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work flow”. Refer to DLK-283, "Work Flow".
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- “LOCK/UNLOCK BY I-KEY” is ON when setting on CONSULT-III.
- “ANSWER BACK WITH I-KEY LOCK”, “ANSWER BACK WITH I-KEY UNLOCK” and “ANSWER BACK FUNCTION” are ON when setting on CONSULT-III.
- Door lock function is normal.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Buzzer reminder operation dose not operate properly.	1. Check setting of buzzer reminder with CONSULT-III.	DLK-329
	2. Check intermittent incident.	GI-39

INTELLIGENT KEY WARNING BUZZER

INTELLIGENT KEY WARNING BUZZER : Symptom Table

INFOID:0000000001109321

HAZARD REMINDER OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work flow”. Refer to DLK-283, "Work Flow".
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- “HAZARD ANSWER BACK” is ON when setting on CONSULT-III.
- Door lock function is normal.

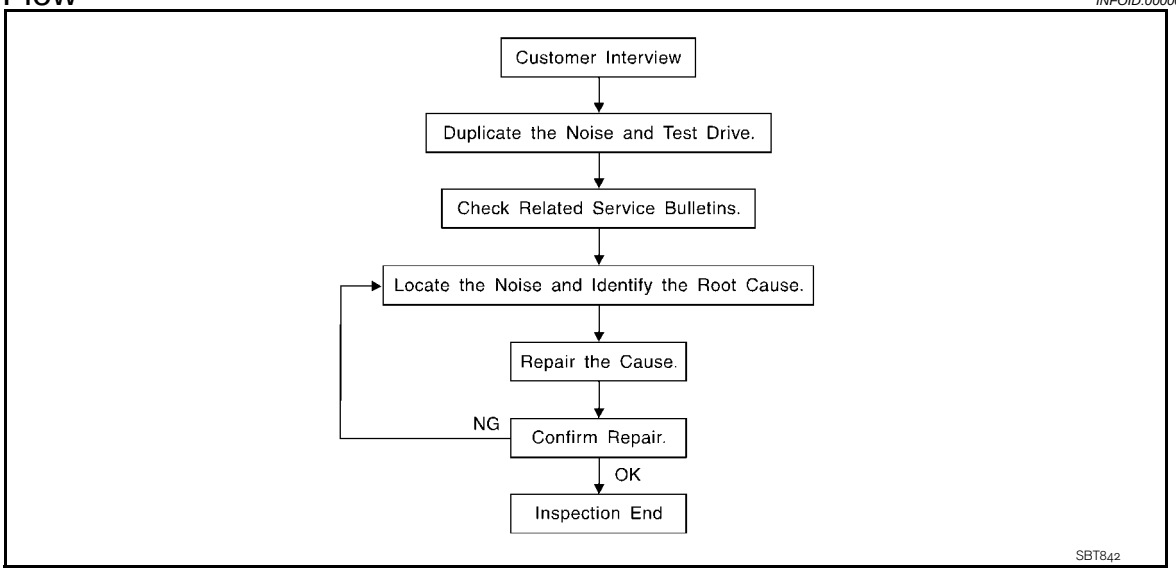
Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Hazard reminder operation does not operate properly.	1. Check setting of hazard reminder with CONSULT-III.	DLK-329
	2. Check intermittent incident.	GI-39

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000001098118



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to DLK-216, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

cardiagn.com

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to DLK-214, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.
- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

carsdiagn.com

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001098119

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

cardiagn.com

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.

Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.

Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

carsdiagn.com

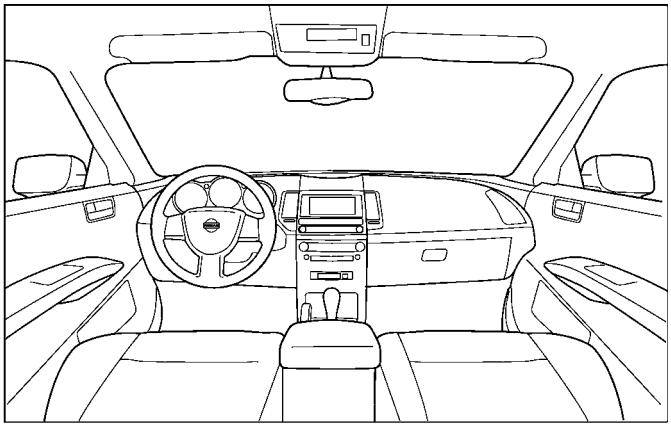
Diagnostic Worksheet

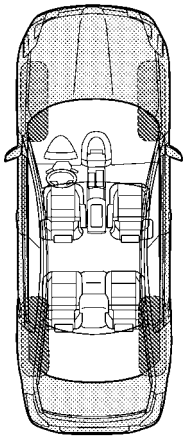
INFOID:0000000001098120

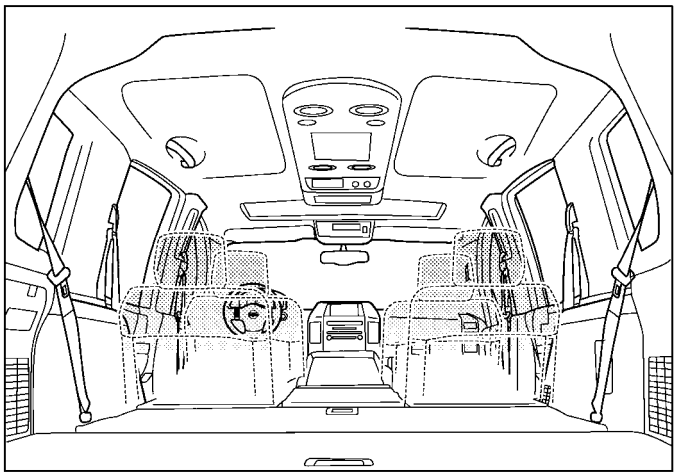
SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

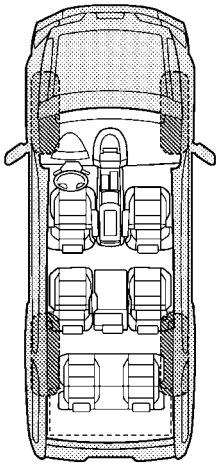
Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.









Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

cardiagn.com

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

PRECAUTION

PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001081560

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

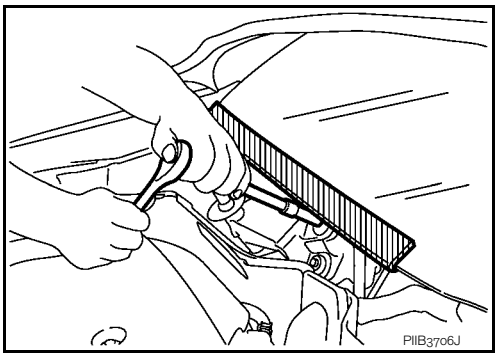
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Procedure without Cowl Top Cover

INFOID:0000000001081561

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Steering Wheel Rotation after Battery Disconnect

INFOID:0000000001081562

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

This vehicle is equipped with a push-button ignition switch and a steering lock unit.
If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the battery disconnected or discharged, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Carry the Intelligent Key or insert it to the key slot and turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)

cardiagn.com

3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

Work

INFOID:0000000001081563

- After removing and installing the opening/closing parts, be sure to carry out fitting adjustments to check their operational.
- Check the lubrication level, damage, and wear of each part. If necessary, grease or replace it.

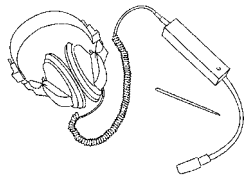
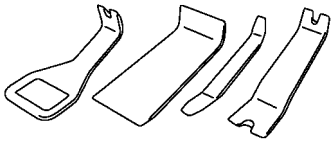
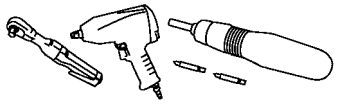
carsdiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000001116409

Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Remover tool  PIIB7923J	Remove the clips, pawls, and metal clips
Power tool  PIIB1407E	

cardiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000001090922

BASIC INSPECTION

1. CHECK POWER DOOR LOCK AND UNLOCK SWITCH OPERATION

Check door lock and unlock operation by operating door lock and unlock switch.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refer to DLK-473, "DOOR LOCK AND UNLOCK SWITCH : Symptom Table".

2. CHECK INTELLIGENT KEY OPERATION

Check door lock and unlock operation by operating the Intelligent Key remote control button.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refer to DLK-473, "INTELLIGENT KEY : Symptom Table".

3. CHECK DOOR REQUEST SWITCH OPERATION

Check door lock and unlock operation by operating door request switch.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Refer to DLK-474, "DOOR REQUEST SWITCH : Symptom Table".

4. CHECK KEY REMINDER OPERATION

Check key reminder operation. Refer to DLK-299, "KEY REMINDER : System Description".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Refer to DLK-475, "KEY REMINDER : Symptom Table".

5. CHECK AUTO DOOR LOCK OPERATION

Check auto door lock operation. Refer to DLK-302, "AUTO DOOR LOCK : System Description".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Refer to DLK-475, "AUTO DOOR LOCK : Symptom Table".

6. CHECK VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION

Check vehicle speed sensing auto door lock operation. Refer to DLK-305, "VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Refer to DLK-476, "VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table".

7. CHECK BACK DOOR OPENER OPERATION

Check back door opener operation by operating the back door opener switch.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Refer to DLK-477, "BACK DOOR OPENER SWITCH : Symptom Table".

8. CHECK WARNING FUNCTION

Check warning function. Refer to DLK-316, "System Description".

Is the inspection result normal?

YES >> GO TO 9.

NO [Buzzer (combination meter)]>> Refer to DLK-478, "BUZZER (COMBINATION METER) : Symptom Table".
NO (Intelligent Key warning buzzer)>> Refer to DLK-478, "INTELLIGENT KEY WARNING BUZZER : Symptom Table".
NO (Warning lamp)>> Refer to DLK-479, "WARNING LAMP : Symptom Table".
NO (Back door open warning)>> Refer to DLK-479, "BACK DOOR : Symptom Table".

9. CHECK HAZARD AND BUZZER REMINDER FUNCTION

Check hazard and buzzer reminder function by Intelligent Key or request switch. Refer to DLK-322, "System Description".

Is the inspection result normal?

YES >> GO TO 10.
NO (Hazard warning lamp)>> Refer to DLK-481, "HAZARD WARNING LAMP : Symptom Table".
NO (Intelligent Key warning buzzer)>> Refer to DLK-481, "INTELLIGENT KEY WARNING BUZZER : Symptom Table".

10. CHECK OUT

CHECK OUT.

>> INSPECTION END

cardiagn.com

ON-VEHICLE REPAIR

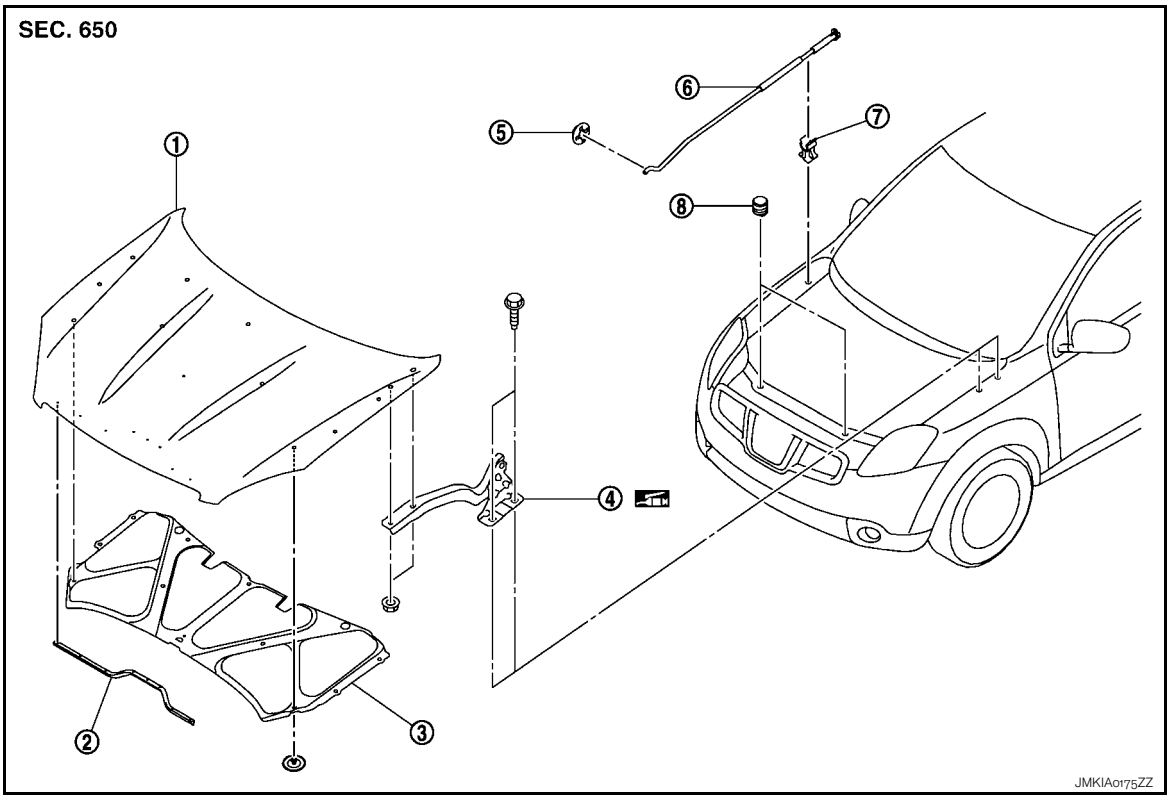
HOOD

HOOD ASSEMBLY

HOOD ASSEMBLY : Exploded View

INFOID:0000000001098453

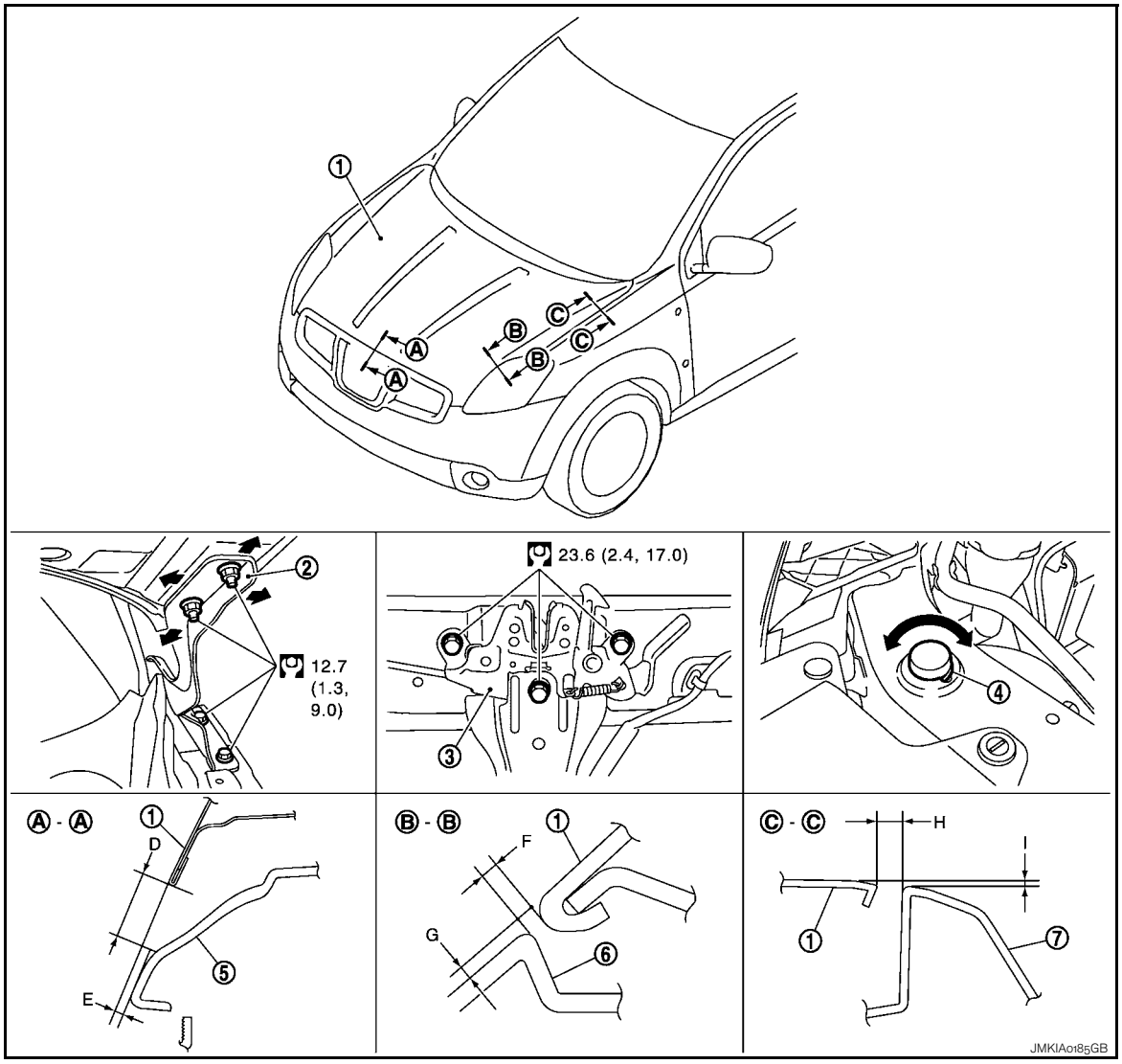
REMOVAL



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Hood assembly
2. Hood hinge
3. Hood lock assembly
4. Hood bumper rubber
5. Front grille
6. Front combination lamp
7. Front fender

Refer to GI-4, "Components" for symbols in the figure.

HOOD ASSEMBLY : Removal and Installation

INFOID:0000000001098454

REMOVAL

1. Support the hood lock assembly with the proper material to prevent it from falling.
   WARNING:
   Bodily injury may occur if no supporting rod is holding the hood open when removing the hood stay.
2. Remove the hood hinge mounting nuts on the hood to remove the hood assembly.
   CAUTION:
   Perform work with 2 workers, because of its heavy weight.
3. Remove the following parts after removing the hood assembly.
   - Hood insulator
   - Hood sealing rubber

INSTALLATION

Install in the reverse order of removal.

CAUTION:

cardiagn.com

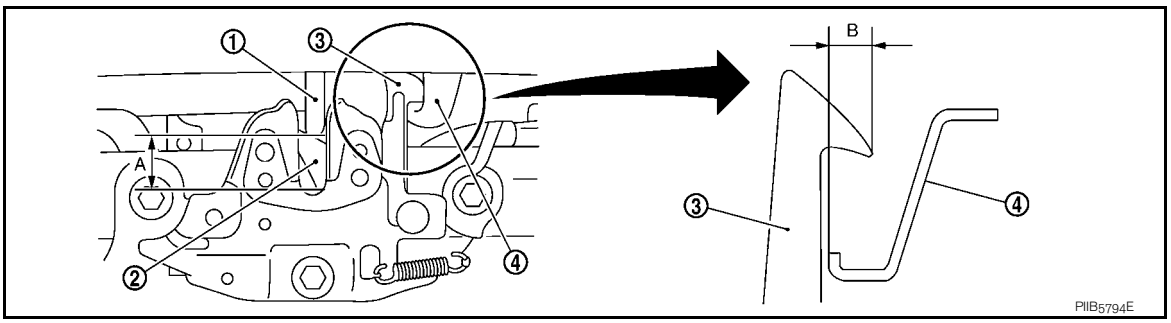
- **Perform work with 2 workers, because of its heavy weight.**
- **Before installing the hood hinge, apply anticorrosive agent onto the mounting surface of the vehicle body.**
- **After installing, perform hood fitting adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment".**

HOOD ASSEMBLY : Adjustment

INFOID:0000000001098455

Portion				Standard	Right/left Clearance (MAX)
Hood – Front bumper	A – A	D	Clearance	5.2 – 9.2 mm (0.205 – 0.362 in)	2.0 mm (0.079 in)
		E	Surface height	- 0.2 – 3.8 mm (- 0.008 – 0.150 in)	2.0 mm (0.079 in)
Hood – Front combination lamp	B – B	F	Clearance	3.7 – 7.7 mm (0.140 – 0.303 in)	2.0 mm (0.079 in)
		G	Surface height	- 2.3 – 2.3 mm (- 0.091 – 0.091 in)	2.3 mm (0.091 in)
Hood – Front fender	C – C	H	Clearance	3.9 – 5.9 mm (0.154 – 0.232 in)	1.5 mm (0.059 in)
		I	Surface height	- 1.0 – 1.0 mm (- 0.039 – 0.039 in)	1.5 mm (0.059 in)

1. Check the clearance and the surface height between the hood and each part by visualy and touching. (Fitting standard dimension in the table below should be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the hood lock and adjust the height by rotating the bumper rubber until the hood becomes 1 to1.5 mm (0.04 to 0.059 in) lower than the fender.
4. Temporarily tighten the hood lock, and position by engaging it with the hood striker. Check the lock and striker for looseness and adjust the clearance and evenness with the striker to satisfy the specification.
5. Adjust A and B shown in the figure to the following value with hood's own weight by dropping it from approximately. 200 mm (7.87 in) height or by pressing the hood lightly [approximately. 29 N (3 kg)].



1. Hood striker
2. Primary latch
3. Secondary striker
4. Secondary latch

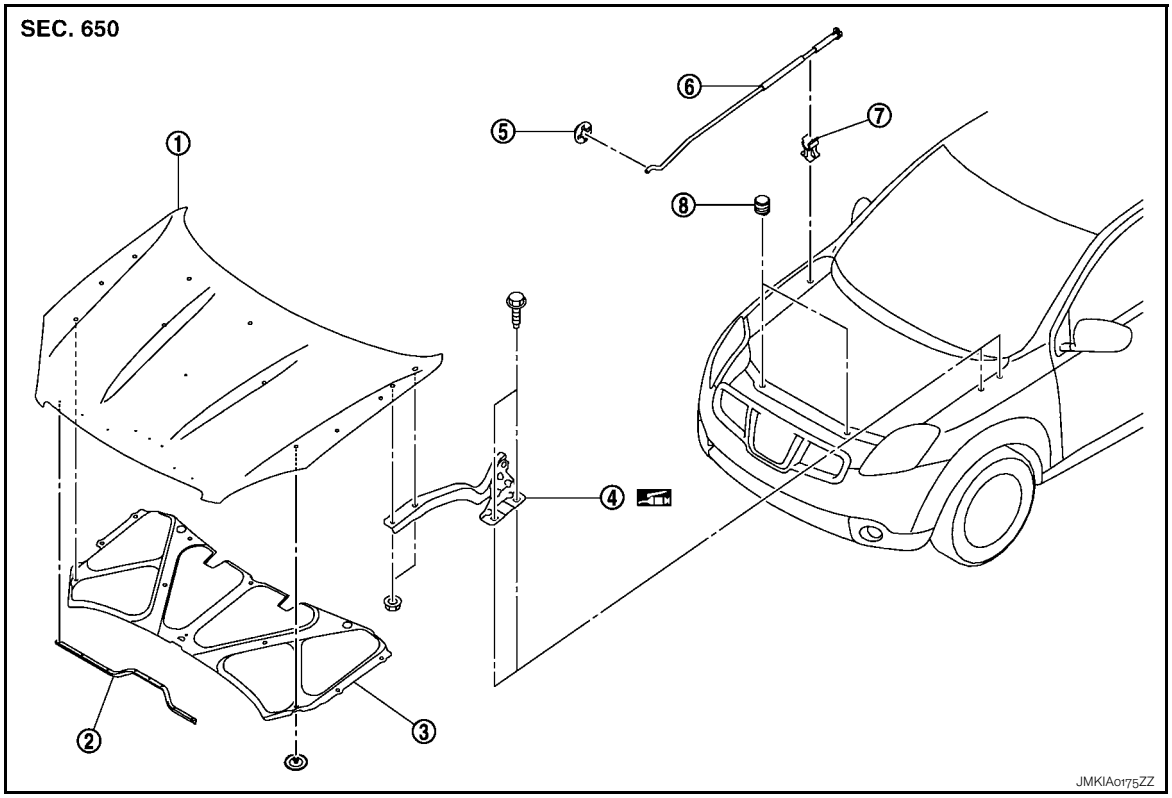
A : 20.0 mm (0.787 in)
B : 6.8 mm (0.268 in)

6. After adjustment tighten lock bolts to the specified torque.

HOOD HINGE

HOOD HINGE : Exploded View

INFOID:0000000001098461



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

HOOD HINGE : Removal and Installation

INFOID:0000000001098462

REMOVAL

1. Remove the hood assembly. Refer to DLK-829, "HOOD ASSEMBLY : Removal and Installation".
2. Remove the front fender. Refer to DLK-838, "Removal and Installation".
3. Remove the hood hinge mounting bolts, and then remove the hood hinge.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

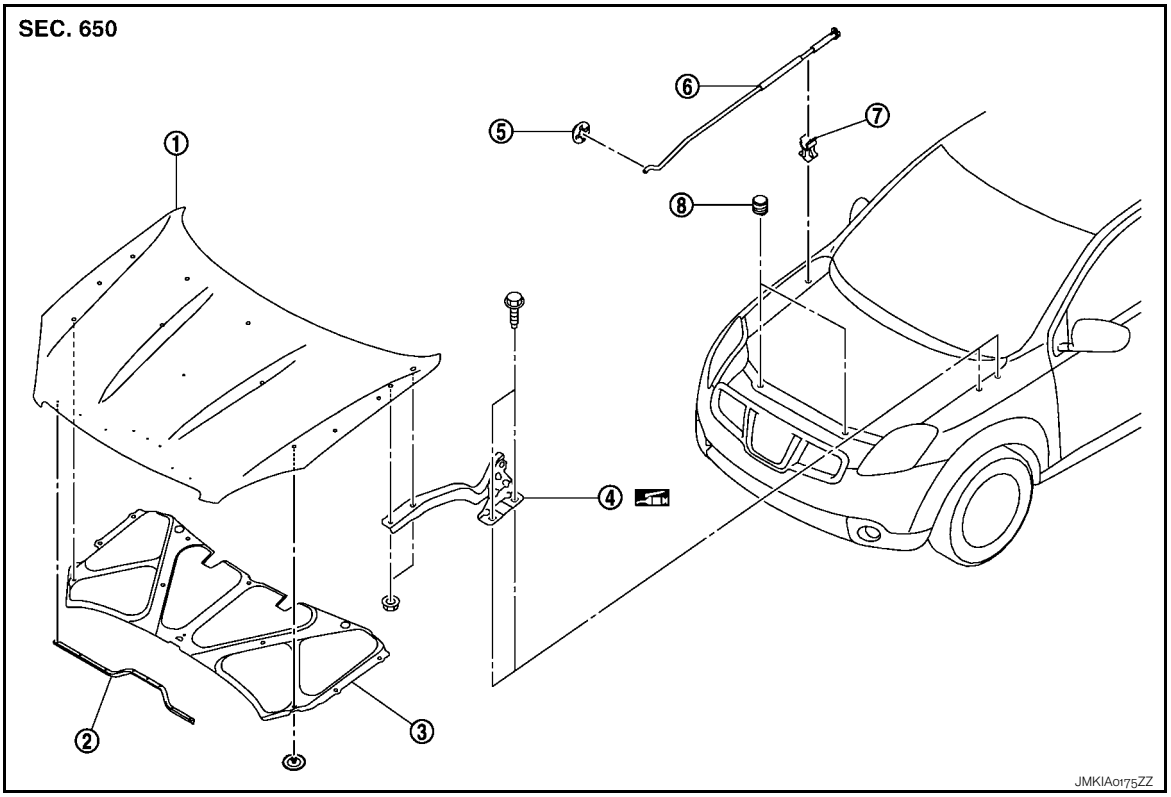
- **After installation, apply touch-up paint (the body color) onto the head of the hinge mounting bolts and nuts.**
- **Before installation of hood hinge, apply anticorrosive agent onto the mounting surface of the vehicle body.**
- **After installation, perform hood fitting adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment".**

HOOD SUPPORT ROD

HOOD SUPPORT ROD : Exploded View

INFOID:0000000001098464

cardiagn.com



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

HOOD SUPPORT ROD : Removal and Installation

INFOID:0000000001098466

REMOVAL

1. Support the hood lock assembly with the proper material to prevent it from falling.

   WARNING:
   Bodily injury may occur if no supporting rod is holding the hood open when removing the hood stay.
2. Remove the hood support rod from the grommet.

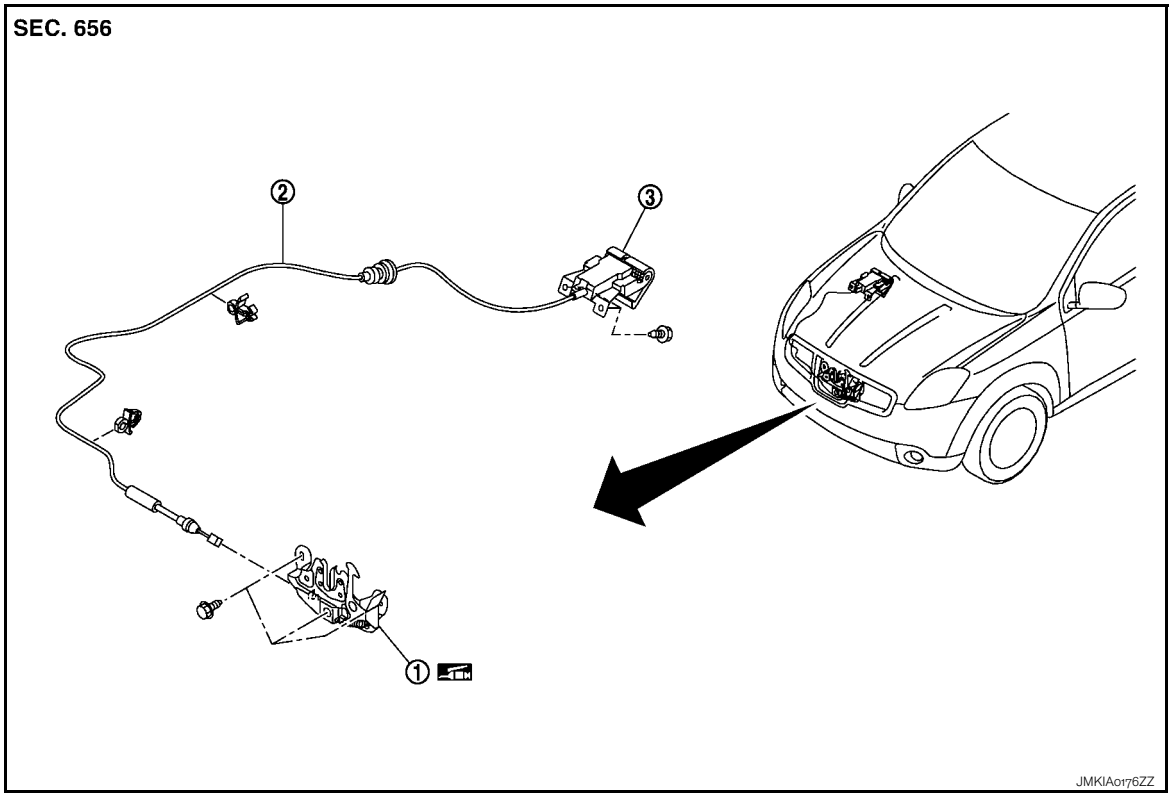
INSTALLATION

Install in the reverse order of removal.

HOOD LOCK CONTROL

HOOD LOCK CONTROL : Exploded View

INFOID:0000000001098468



1. Hood lock assembly
2. Hood lock control cable
3. Hood lock opener

Refer to GI-4, "Components" for symbols in the figure.

HOOD LOCK CONTROL : Removal and Installation

INFOID:0000000001098469

REMOVAL

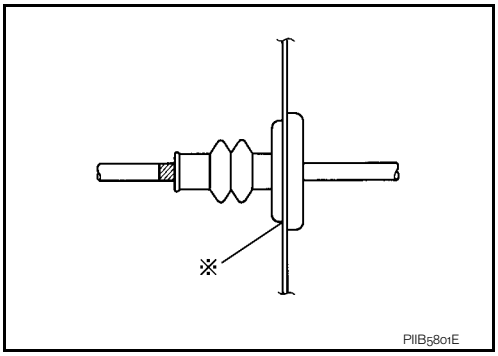
1. Remove the hood lock opener mounting bolts, and then remove the hood lock opener.
2. Remove the front bumper fascia. Refer to EXT-11, "Removal and Installation".
3. Remove the hood lock mounting bolts, and then remove the hood lock.
4. Remove the fender protector. Refer to EXT-22, "Removal and Installation".
5. Disconnect the hood lock cable from hood lock, and clip it from the hoodledge.
6. Remove the grommet on the dash lower panel, and pull the hood lock control cable toward the passenger compartment.
   CAUTION:
   While pulling, do not to damage (peeling) the outside of the hood lock control cable.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Do not to bend the cable too much, keeping the radius 100 mm (3.94 in) or more.**
- **Check that the cable is not offset from the positioning grommet, and apply the sealant to the grommet (at *mark) properly.**



cardiagn.com

- **Check that the hood lock control cable is properly engaged with the hood lock.**
- **After installation, perform hood fitting adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment".**
- **After installation, perform the hood lock control inspection. Refer to DLK-834, "HOOD LOCK CONTROL : Inspection".**

HOOD LOCK CONTROL : Inspection

INFOID:0000000001098470

NOTE:
If the hood lock cable is bent or deformed, replace it.

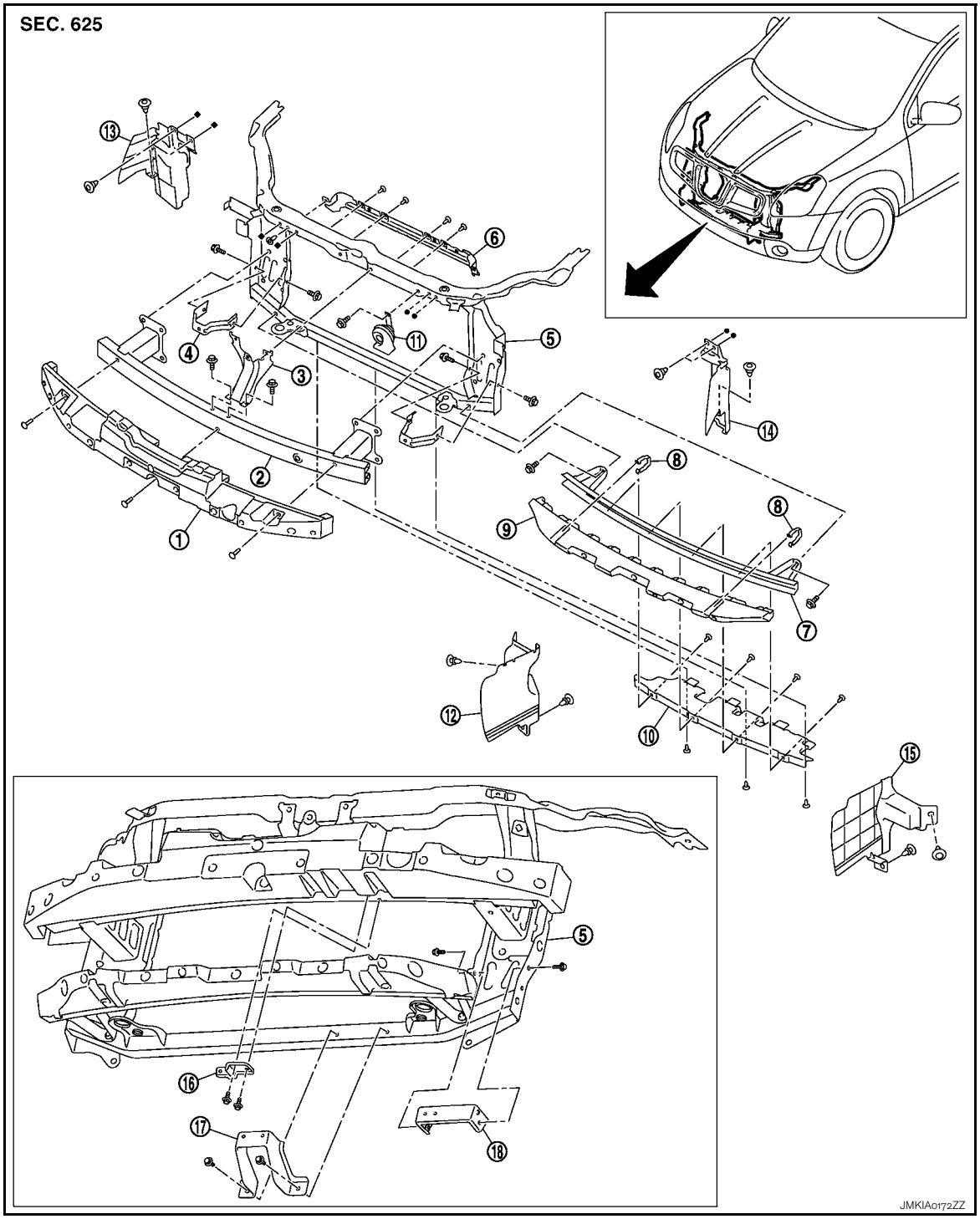
1. Check that the secondary latch is properly engaged with the secondary striker [6.8 mm (0.268 in) shown in the figure] by hood weight.
2. While operating the hood opener, carefully check that the front end of the hood is raised by approximately 20.0 mm (0.787 in). Also check that the hood opener returns to the original position.
3. Check that the hood opener operating is condition 49 N (5.0 kg) or below.
4. Install so that static closing face of hood is 94 – 490 N·m (9.6 – 50.0 kg-m).
   NOTE:
   - Exert vertical force on right side and left side of hood lock.
   - Do not press simultaneously both sides.
5. Check the hood lock lubrication condition. If necessary, apply body grease to the hood lock.

carsdiagn.com

RADIATOR CORE SUPPORT

Exploded View

INFOID:0000000001098475



1. Energy absorber
2. Bumper reinforcement
3. Hood lock support stay
4. Intercooler bracket (with K9K engine models)
5. Radiator core support assembly
6. Upper air dam
7. Apron bracket assembly
8. Fastener
9. Energy absorber lower
10. Front air guide lower
11. Horn assembly
12. Front air guide side lower RH
13. Front air guide side RH
14. Front air guide side LH
15. Front air guide side lower LH
16. Oil cooler bracket upper
17. Oil cooler bracket lower
18. Oil cooler bracket side

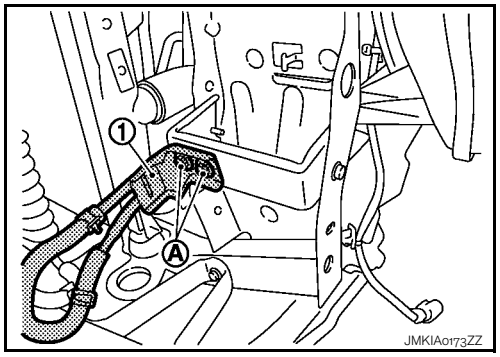
cardiagn.com

Removal and Installation

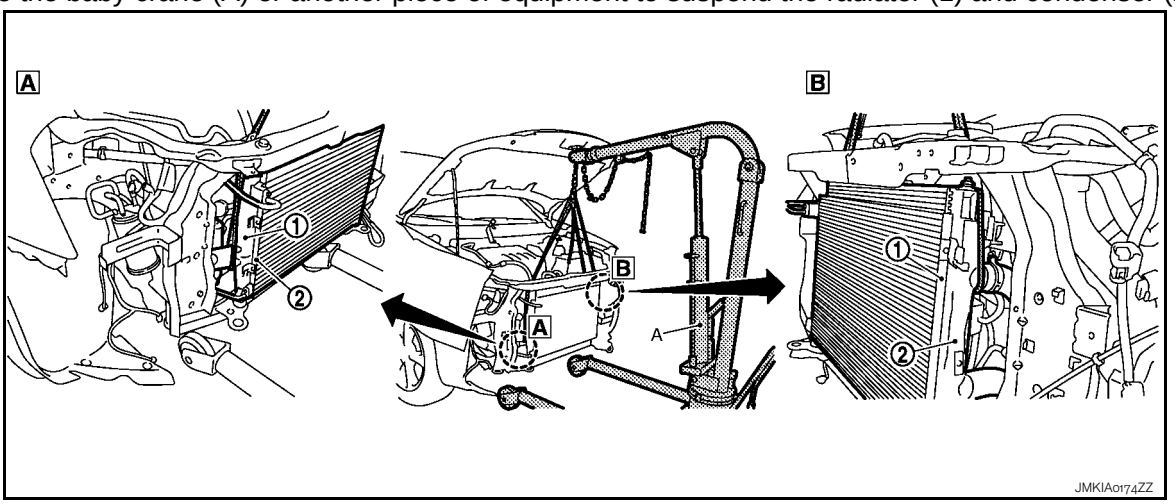
INFOID:0000000001098476

REMOVAL

1. Remove the front fillet molding. Refer to EXT-23, "Removal and Installation".
2. Remove the front bumper fascia and the energy absorber. Refer to EXT-11, "Removal and Installation".
3. Remove the energy absorber (upper and lower). Refer to EXT-11, "Removal and Installation".
4. Remove the air cleaner duct. Refer to EM-27, "Removal and Installation".
5. Remove the front combination lamp (LH/RH). Refer to EXL-171, "Removal and Installation".
6. Remove the bumper reinforcement. Refer to EXT-11, "Removal and Installation".
7. Disconnect the hood lock control cable clamp, and then remove the hood lock assembly. Refer to DLK-833, "HOOD LOCK CONTROL : Removal and Installation".
8. Remove the air guide mounting clips, and then remove the air guide (LH/RH).
9. Remove the hood lock stay mounting bolts, and then remove the hood lock stay.
10. Remove the hood switch (with theft warning systems). Refer to SEC-SEC-156, "Removal and Installation".
11. Remove the crush zone sensor. Refer to SR-14, "Removal and Installation".
12. Remove the horn. Refer to HRN-5, "Removal and Installation".
13. Remove the ambient sensor. Refer to VTL-22, "Removal and Installation".
14. Remove the radiator mounting bracket (LH/RH). Refer to CO-13, "Removal and Installation".
15. Remove the Intelligent Key warning buzzer (with Intelligent Key systems). Refer to DLK-277, "Removal and Installation".
16. Remove the charge air cooler assembly (with K9K engine models). Refer to EM-266, "Removal and Installation".
17. Remove the A/T fluid cooler assembly and the A/T fluid cooler bracket (with A/T models only). Refer to TM-348, "FLUID COOLER : Removal and Installation".
18. Remove the A/T fluid cooler pipe bracket (1) mounting bolts (A) (with A/T models only).



19. Remove the washer tank. Refer to WW-99, "Removal and Installation".
20. Use the baby crane (A) or another piece of equipment to suspend the radiator (1) and condenser (2).



21. Remove the radiator core support assembly mounting bolts, and draw out the radiator core support assembly to the front of the vehicle.
22. Remove the radiator core support assembly.
23. Remove the following parts after removing the radiator core support assembly.
    - Inlet tube bracket (with K9K engine models)
    - Intercooler bracket (with K9K engine models)
    - Apron reinforcement bracket

INSTALLATION

Install in the reverse order of removal.

CAUTION:

After installation, refill the following parts.

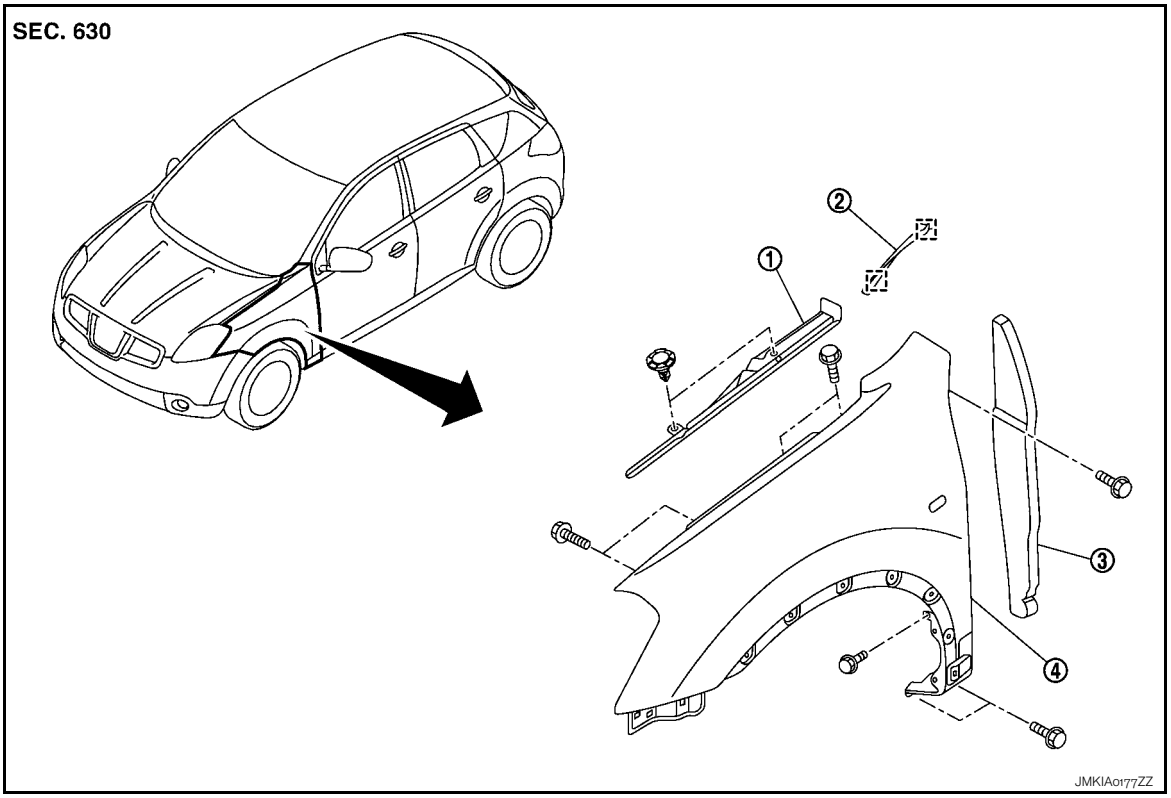
- **A/T fluid. Refer to TM-315, "Changing".**
- **Engine coolant. Refer to CO-9, "Refilling".**

cardiagn.com

FRONT FENDER

Exploded View

INFOID:0000000001098477



1. Hood seal assembly (side)
2. Front fender finisher
3. Front fender seal
4. Front fender

: Metal clip

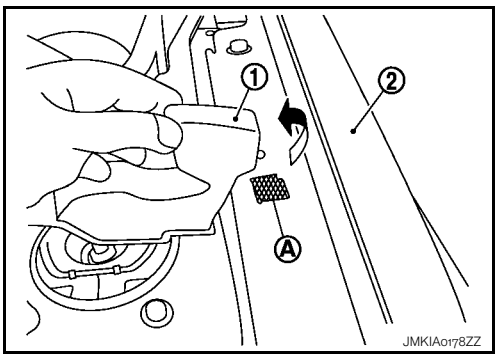
Removal and Installation

INFOID:0000000001098478

REMOVAL

1. Remove the outer fender protector. Refer to EXT-22, "Removal and Installation".
2. Remove the inner fender protector. Refer to EXT-22, "Removal and Installation".
3. Remove the side turn signal lamp. Refer to EXL-178, "Removal and Installation".
4. Remove the front bumper fascia. Refer to EXT-11, "Removal and Installation".
5. Remove the front combination lamp.
   - XENON TYPE: EXL-171, "Removal and Installation".
   - HALOGEN TYPE: EXL-327, "Removal and Installation".
6. Remove the mounting clips and remove hoodledge cover.
7. Remove the center mudguard. Refer to EXT-28, "Removal and Installation".

8. Peel away the double-faced adhesive tape (A) of the front fender seal (1) from the front fender (2).



9. Remove the mounting bolts and remove the front fender.
   CAUTION:
   Use a shop cloth to protect the body from being damaged during removal.
10. Remove the following parts after removing the front fender.
    - Front fender seal.
    - Bumper side bracket. Refer to EXT-11, "Exploded View".

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace the double-faced adhesive tape on the back of the cowl top cover seal with new tape.**
- **Do not wash the vehicle within 24 hours after installation so as to keep adhesive.**
- **After installation, apply the touch-up paint (the body color) onto the head of the front fender mounting bolts.**
- **After installation, check the front fender adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment" and DLK-842, "DOOR ASSEMBLY : Adjustment".**

cardiagn.com

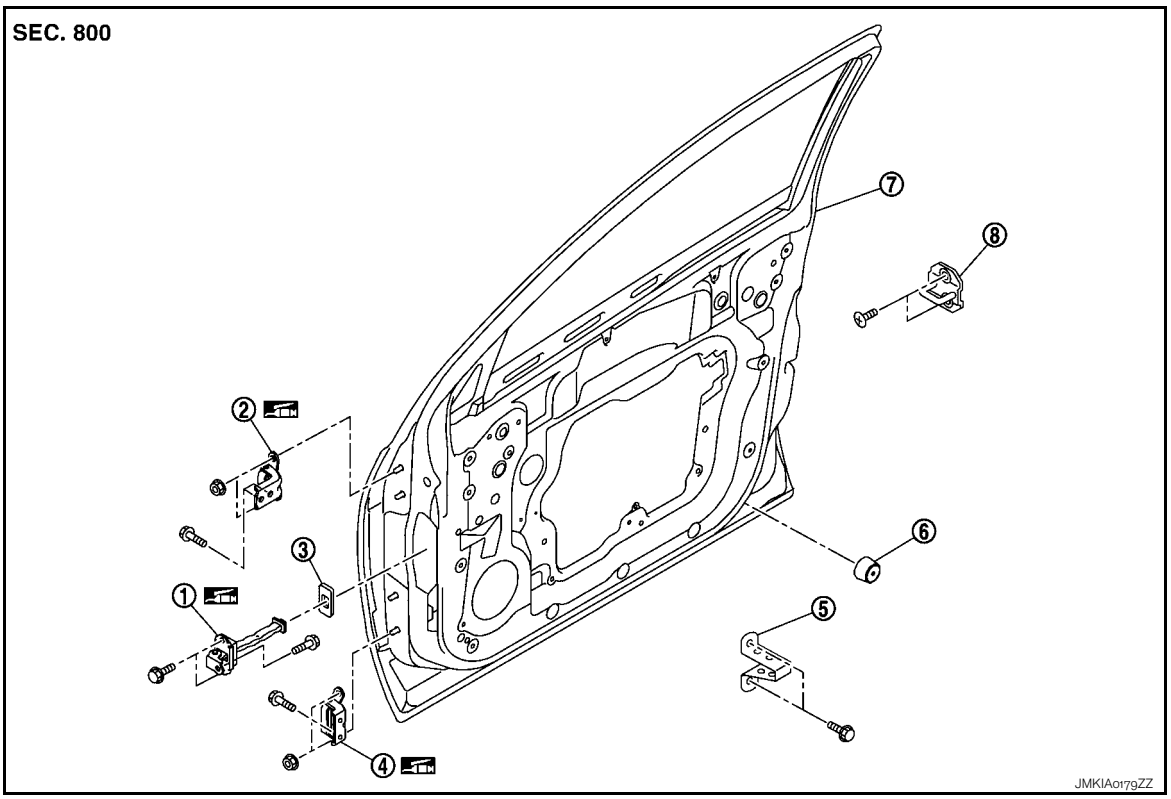
FRONT DOOR

DOOR ASSEMBLY

DOOR ASSEMBLY : Exploded View

INFOID:0000000001098479

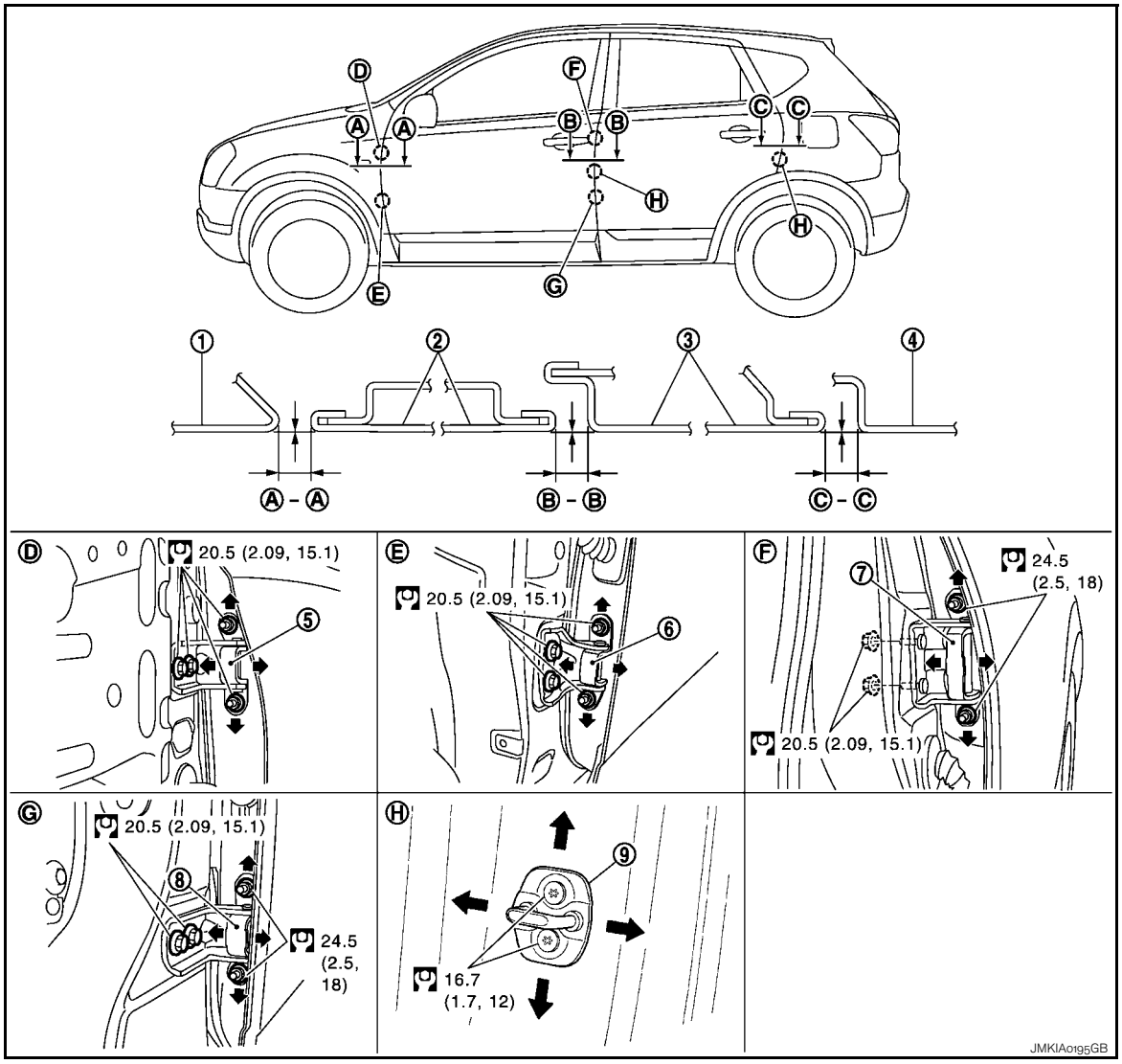
REMOVAL



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Front fender
2. Front door outer
3. Rear door outer
4. Rear fender
5. Front door hinge (upper)
6. Front door hinge (lower)
7. Rear door hinge (upper)
8. Rear door hinge (lower)
9. Door striker

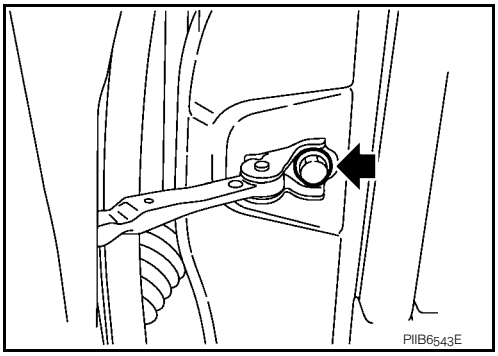
Refer to GI-4, "Components" for symbols in the figure.

DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001098480

REMOVAL

1. Remove the mounting bolts of the door check link on the vehicle.



2. Remove the front door harness grommet, and then pull out the harness from the vehicle.

cardiagn.com

3. Disconnect the front door harness connector.
4. Remove the door hinge mounting nuts (door side), and then remove the door assembly.
   CAUTION:
   - **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
   - **Perform work with 2 workers, because of its heavy weight.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **When removing and installing the front door assembly, perform the fitting adjustment. Refer to DLK-842, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the front door open/close operation after installation.**

DOOR ASSEMBLY : Adjustment

INFOID:0000000001098481

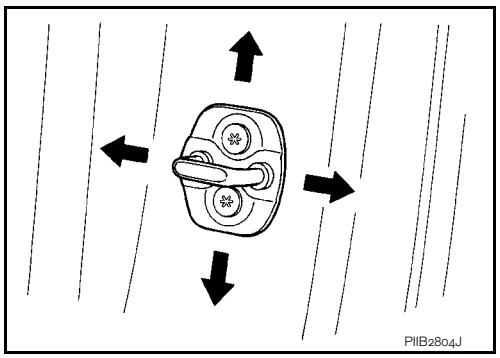
CLEARANCE, SURFACE HEIGHT AND SURFACE MISMATCH ADJUSTMENT

Portion		Clearance	Surface height
Front fender – Front door	A – A	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)
Front door – Rear door	B – B	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)

1. Check the clearance and surface height and surface mismatch between the front door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the front fender. Refer to refer to DLK-838, "Removal and Installation".
4. Loosen the door hinge mounting nuts on door side.
5. Adjust the surface height and surface mismatch of the front door according to the fitting standard dimension.
6. Temporarily tighten the hinge mounting nuts on door side.
7. Loosen the door hinge mounting bolts on body side.
8. Raise the front door at rear end to adjust clearance of the front door according to the fitting standard dimension.
9. After adjustment tighten bolts and nuts to the specified torque.
10. Install the front fender. Refer to refer to DLK-838, "Removal and Installation".
    CAUTION:
    After installation, check the front fender adjustment. Refer to DLK-225, "HOOD ASSEMBLY : Adjustment".

DOOR STRIKER ADJUSTMENT

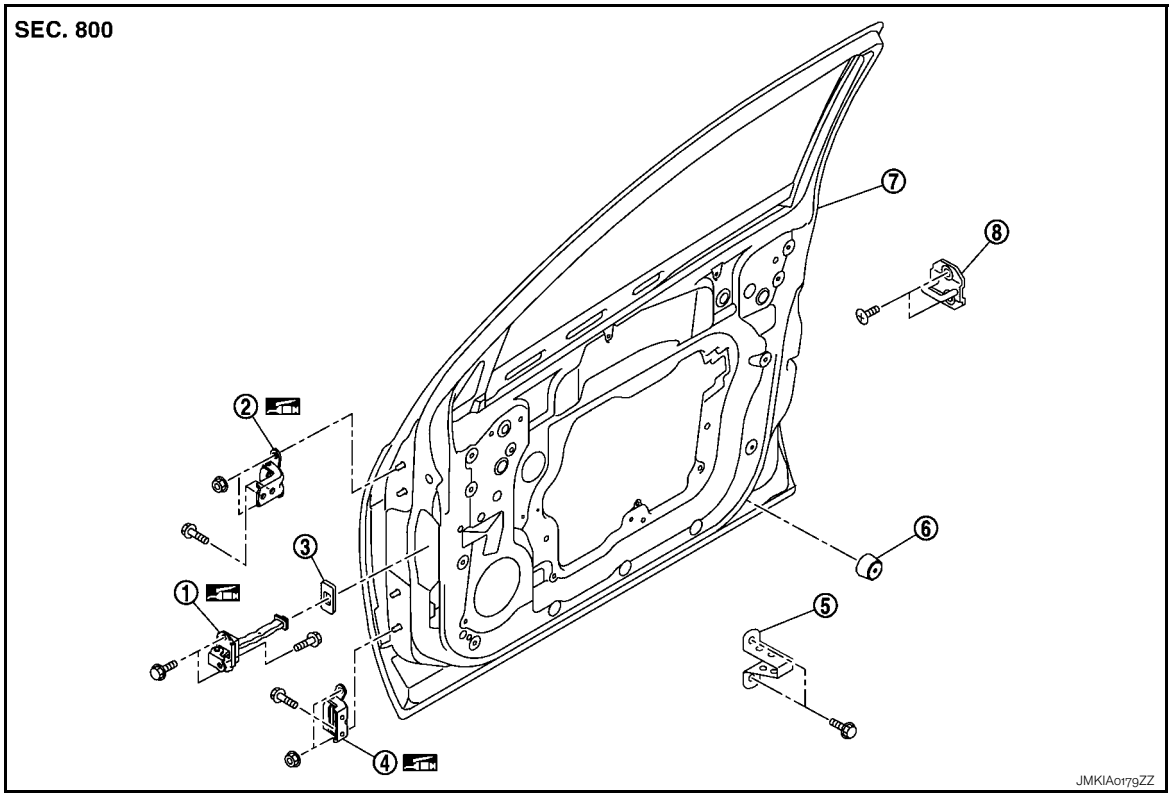
Adjust the door striker so that it becomes parallel with the lock insertion direction.



DOOR STRIKER

DOOR STRIKER : Exploded View

INFOID:0000000001098484



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

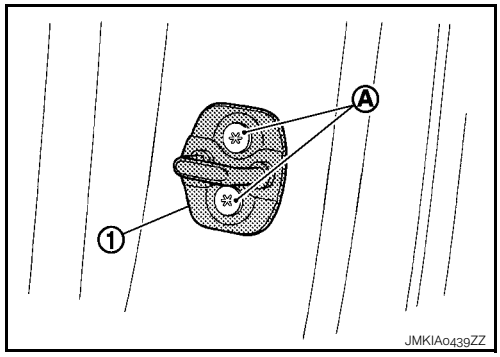
Refer to GI-4, "Components" for symbols in the figure.

DOOR STRIKER : Removal and Installation

INFOID:0000000001098485

REMOVAL

Remove the mounting bolts (A), and then remove the door striker (1).



INSTALLATION

Install in the reverse order of removal.

CAUTION:

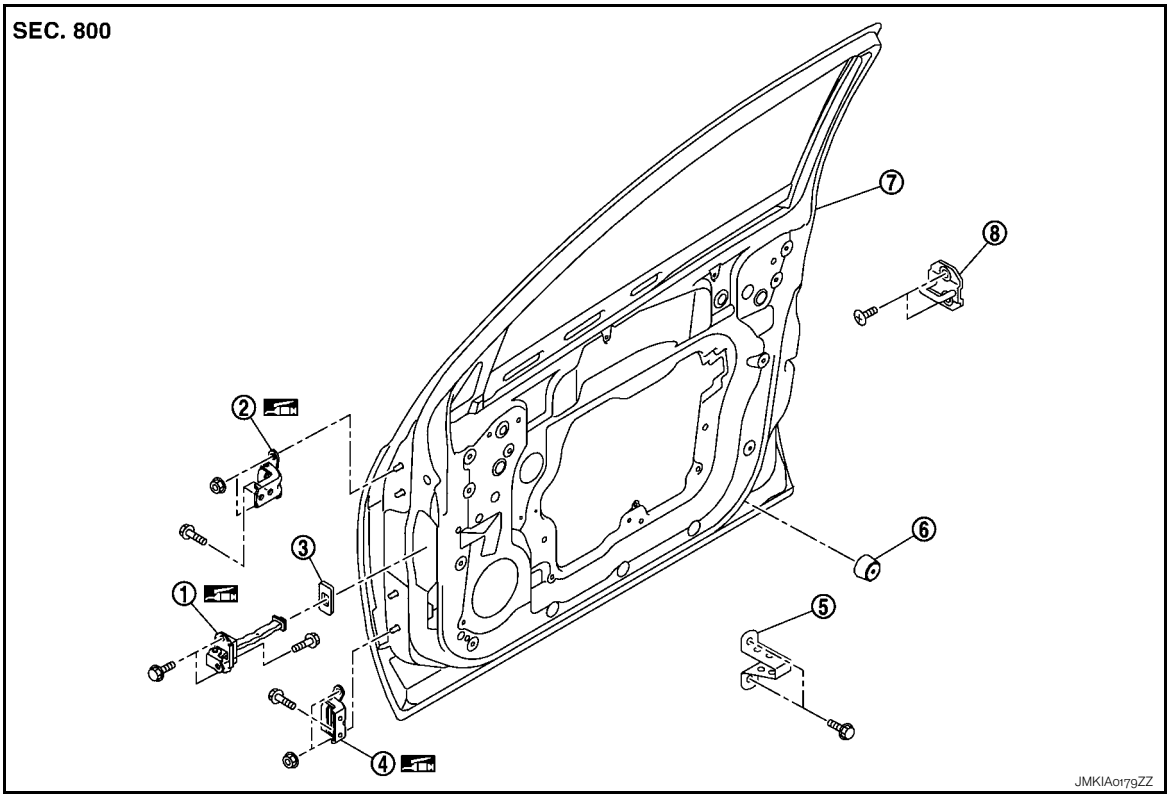
- **Check the front door open/close operation after installation.**
- **When removing and installing the door striker, be sure to perform the fitting adjustment. Refer to DLK-842, "DOOR ASSEMBLY : Adjustment".**

DOOR HINGE

cardiagn.com

DOOR HINGE : Exploded View

INFOID:0000000001098488



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR HINGE : Removal and Installation

INFOID:0000000001098490

REMOVAL

1. Remove the front door assembly. Refer to DLK-841, "DOOR ASSEMBLY : Removal and Installation".
2. Remove the door hinge mounting bolts, and then remove the front door hinge.

INSTALLATION

Install in the reverse order of removal.

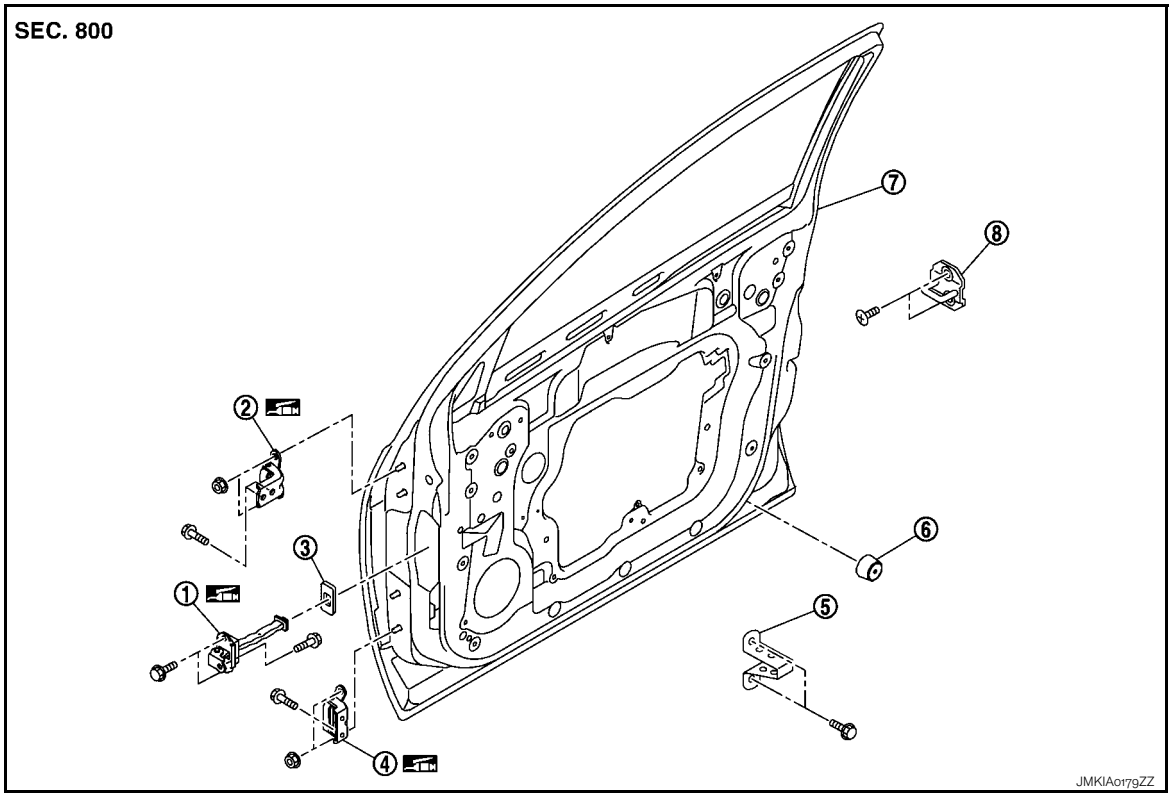
CAUTION:

- **When removing and installing the front door assembly, perform the fitting adjustment. Refer to DLK-842, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the front door open/close operation after installation.**

DOOR CHECK LINK

DOOR CHECK LINK : Exploded View

INFOID:0000000001098493



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

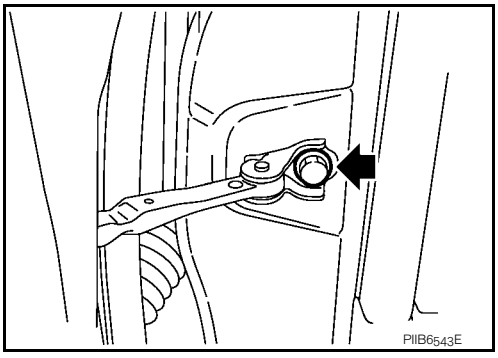
Refer to GI-4, "Components" for symbols in the figure.

DOOR CHECK LINK : Removal and Installation

INFOID:0000000001098495

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the front door speaker. Refer to AV-34, "Removal and Installation".
3. Remove the mounting bolts of the door check link on the vehicle.



4. Remove the door check link cover, and then remove the door check link mounting bolts.
5. Remove the door check link.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check the front door open/close operation after installation.

cardiagn.com

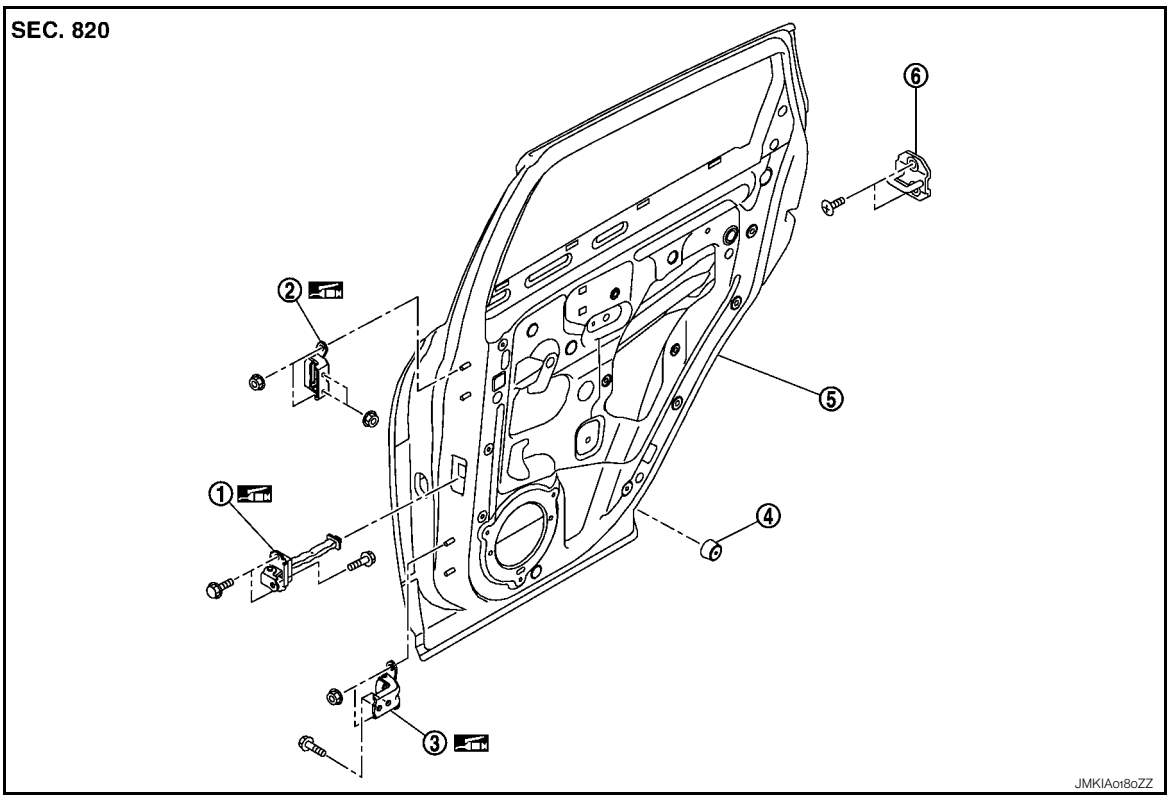
REAR DOOR

DOOR ASSEMBLY

DOOR ASSEMBLY : Exploded View

INFOID:0000000001098497

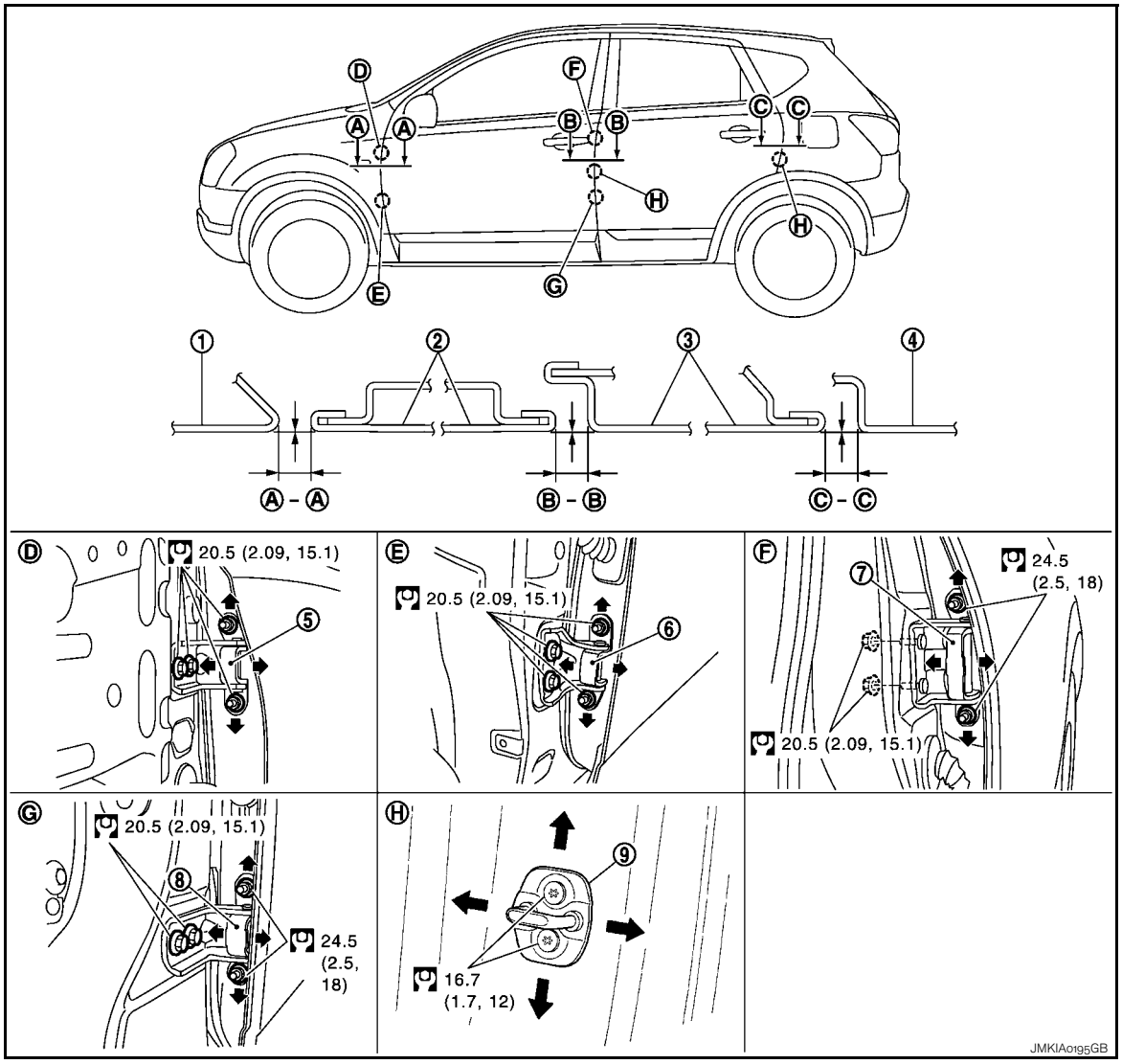
REMOVAL



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Front fender
2. Front door outer
3. Rear door outer
4. Rear fender
5. Front door hinge (upper)
6. Front door hinge (lower)
7. Rear door hinge (upper)
8. Rear door hinge (lower)
9. Striker

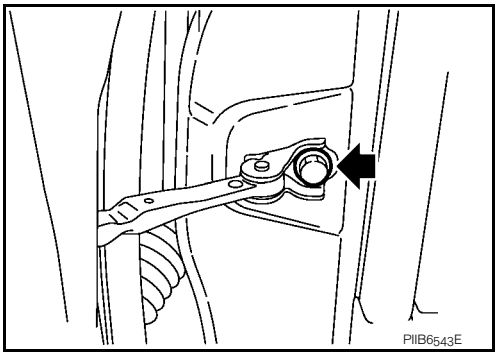
Refer to GI-4, "Components" for symbols in the figure.

DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001098498

REMOVAL

1. Remove the mounting bolts of the door check link on the vehicle.



2. Remove the rear door harness grommet, and then pull out the door harness from the vehicle.

cardiagn.com

3. Disconnect the rear door harness connector.
4. Remove the door hinge mounting nuts (door side), and then remove the rear door assembly.
   CAUTION:
   - **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
   - **Perform work with 2 workers, because of it's heavy weight.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **When removing and installing the rear door assembly, perform the fitting adjustment. Refer to DLK-848, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the rear door open/close operation after installation.**
- **Check the rear door lock/unlock operation after installation.**

DOOR ASSEMBLY : Adjustment

INFOID:0000000001098500

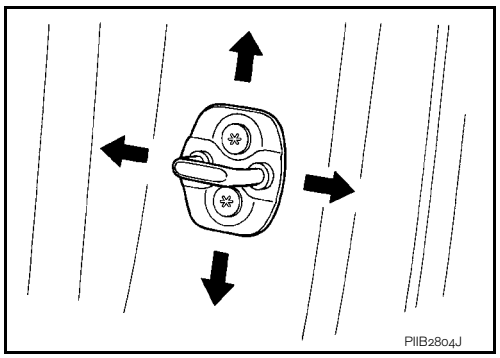
CLEARANCE, SURFACE HEIGHT AND SURFACE MISMATCH ADJUSTMENT

Portion		Clearance	Surface height
Front door – Rear door	B – B	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)
Rear door – Rear fender	C – C	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)

1. Check the clearance and surface height and surface mismatch between the rear door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the center pillar upper garnish and center pillar lower garnish. Refer to INT-14, "Removal and Installation".
4. Loosen the door hinge mounting nuts on door side.
5. Adjust the surface height and surface mismatch of the rear door according to the fitting standard dimension.
6. Temporarily tighten the hinge mounting nuts on door side.
7. Loosen the door hinge mounting nuts and bolts on body side.
8. Raise the rear door at rear end to adjust clearance of the rear door according to the fitting standard dimension.
9. After adjustment tighten bolts and nuts to the specified torque.
10. Install the center pillar upper garnish and center pillar lower garnish. Refer to INT-14, "Removal and Installation".

DOOR STRIKER ADJUSTMENT

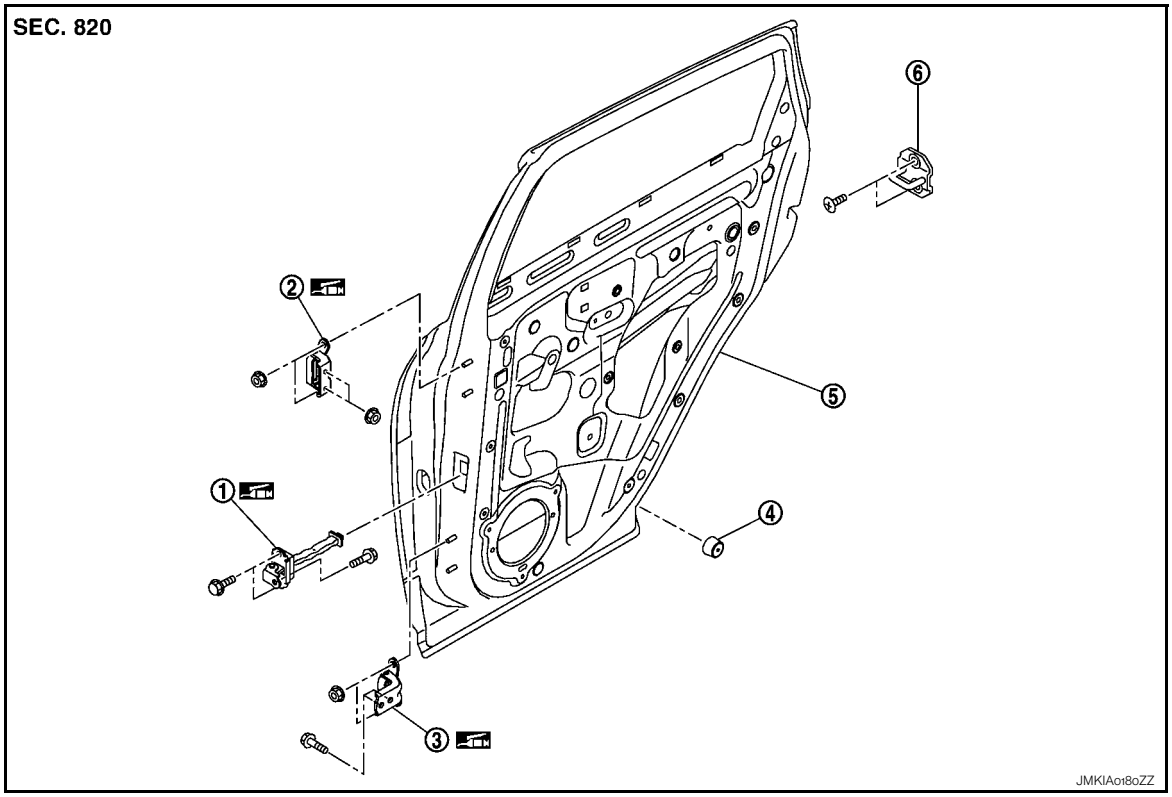
Adjust the door striker so that it becomes parallel with the lock insertion direction.



DOOR STRIKER

DOOR STRIKER : Exploded View

INFOID:0000000001098509



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

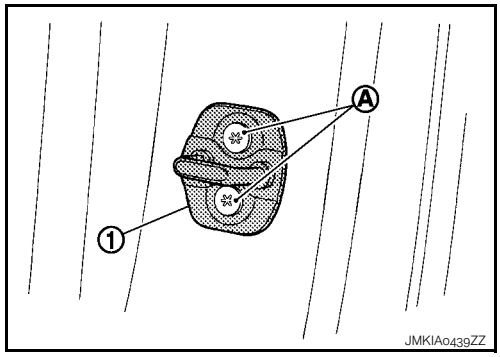
Refer to GI-4, "Components" for symbols in the figure.

DOOR STRIKER : Removal and Installation

INFOID:0000000001098510

REMOVAL

Remove the mounting bolts (A), and then remove the door striker (1).



INSTALLATION

Install in the reverse order of removal.

CAUTION:

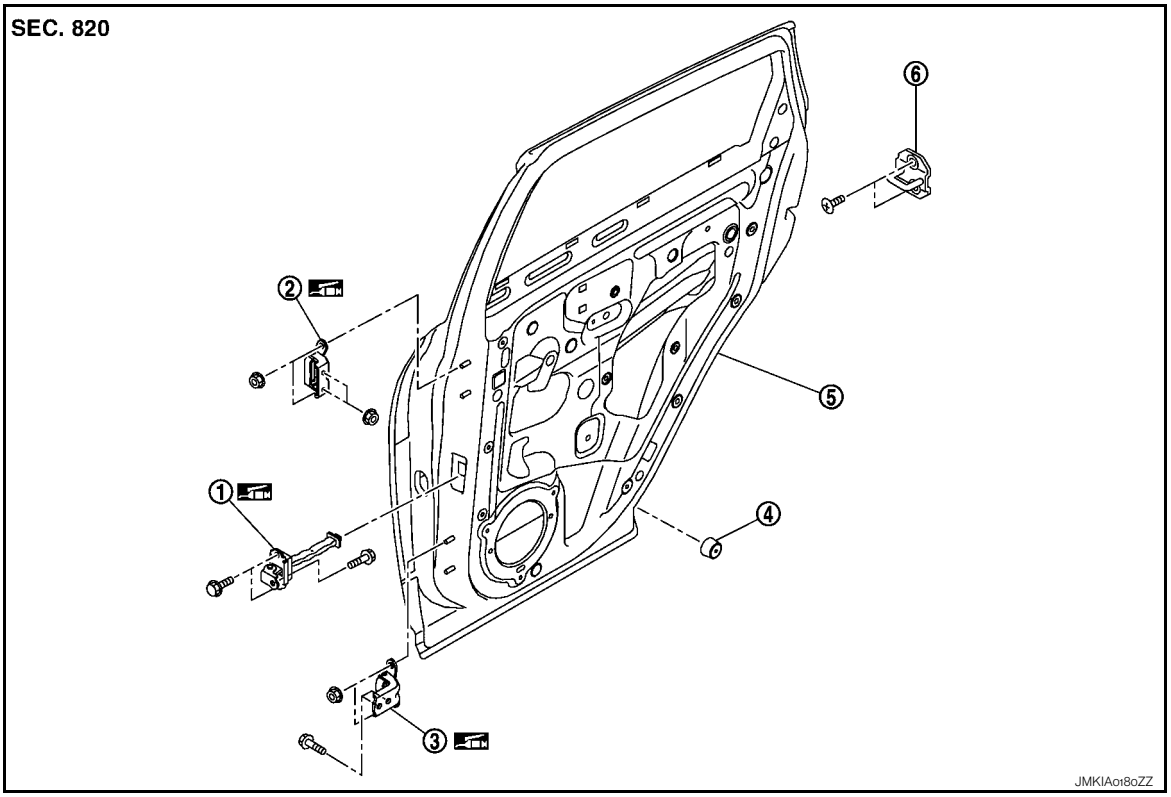
- **Check the rear door open/close operation after installation.**
- **When removing and installing the door striker, be sure to perform the fitting adjustment. Refer to DLK-848, "DOOR ASSEMBLY : Adjustment".**

DOOR HINGE

DOOR HINGE : Exploded View

INFOID:0000000001098513

cardiagn.com



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR HINGE : Removal and Installation

INFOID:0000000001098516

REMOVAL

1. Remove the center pillar lower garnish and the center pillar upper garnish. Refer to INT-14, "Removal and Installation".
2. Remove the rear door assembly. Refer to DLK-242, "DOOR ASSEMBLY : Removal and Installation".
3. Remove the rear door hinge mounting bolts and nuts (body side), and then remove the door hinge.

INSTALLATION

Install in the reverse order of removal.

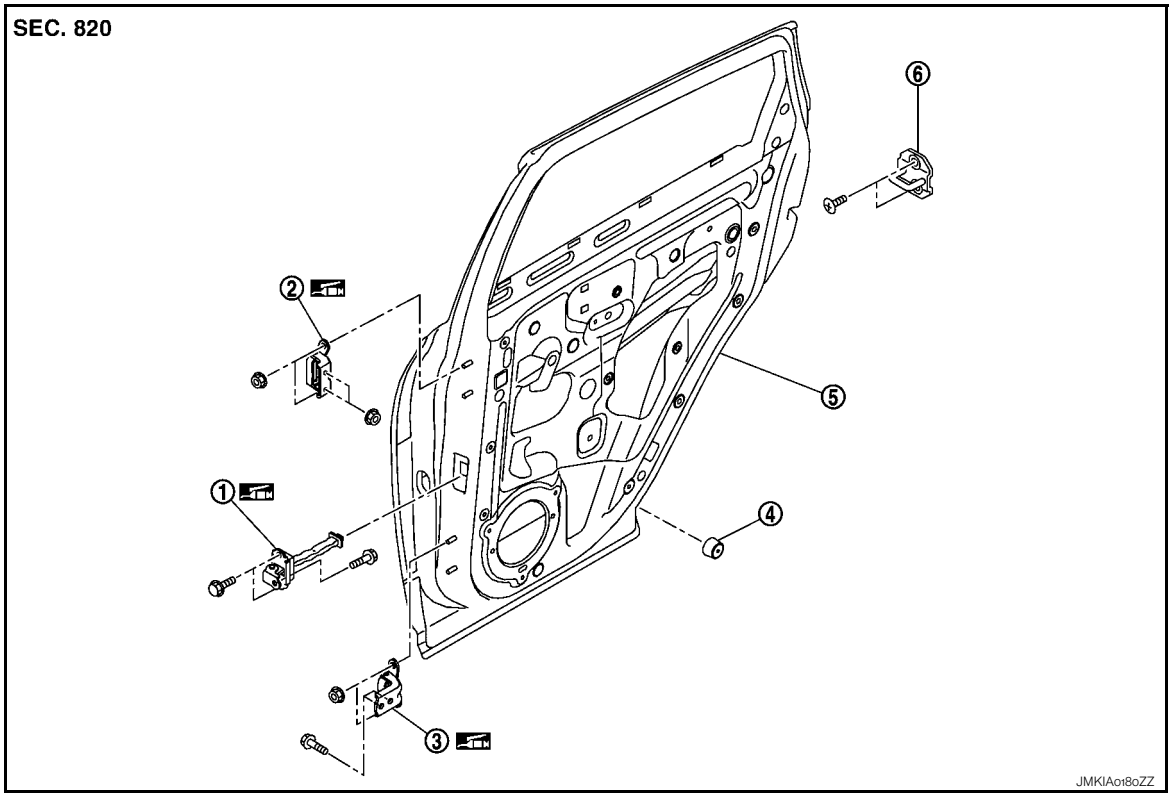
CAUTION:

- **When removing and installing the rear door assembly, perform the fitting adjustment. Refer to DLK-848, "DOOR ASSEMBLY : Adjustment".**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **After installing, apply the touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Check the rear door open/close operation after installation.**

DOOR CHECK LINK

DOOR CHECK LINK : Exploded View

INFOID:0000000001098518



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

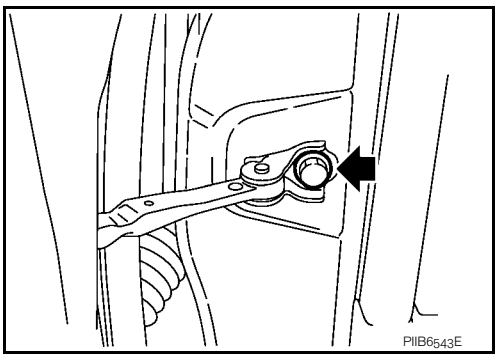
Refer to GI-4, "Components" for symbols in the figure.

DOOR CHECK LINK : Removal and Installation

INFOID:0000000001098520

REMOVAL

1. Remove the rear door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the rear door sealing screen.
3. Remove the mounting bolts of the check link on the vehicle.



4. Remove the door check link cover, and then remove the door check link mounting bolts.
5. Remove the door check link.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check front door open/close operation after installation.

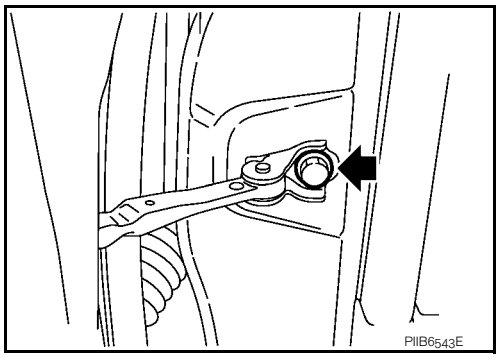
DOOR CHECK LINK : Removal and Installation

INFOID:0000000001098521

REMOVAL

cardiagn.com

1. Remove the rear door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the rear door sealing screen.
3. Remove the mounting bolts of the check link on the vehicle.



4. Remove the door check link cover, and then remove the door check link mounting bolts.
5. Remove the door check link.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check front door open/close operation after installation.

carsdiagn.com

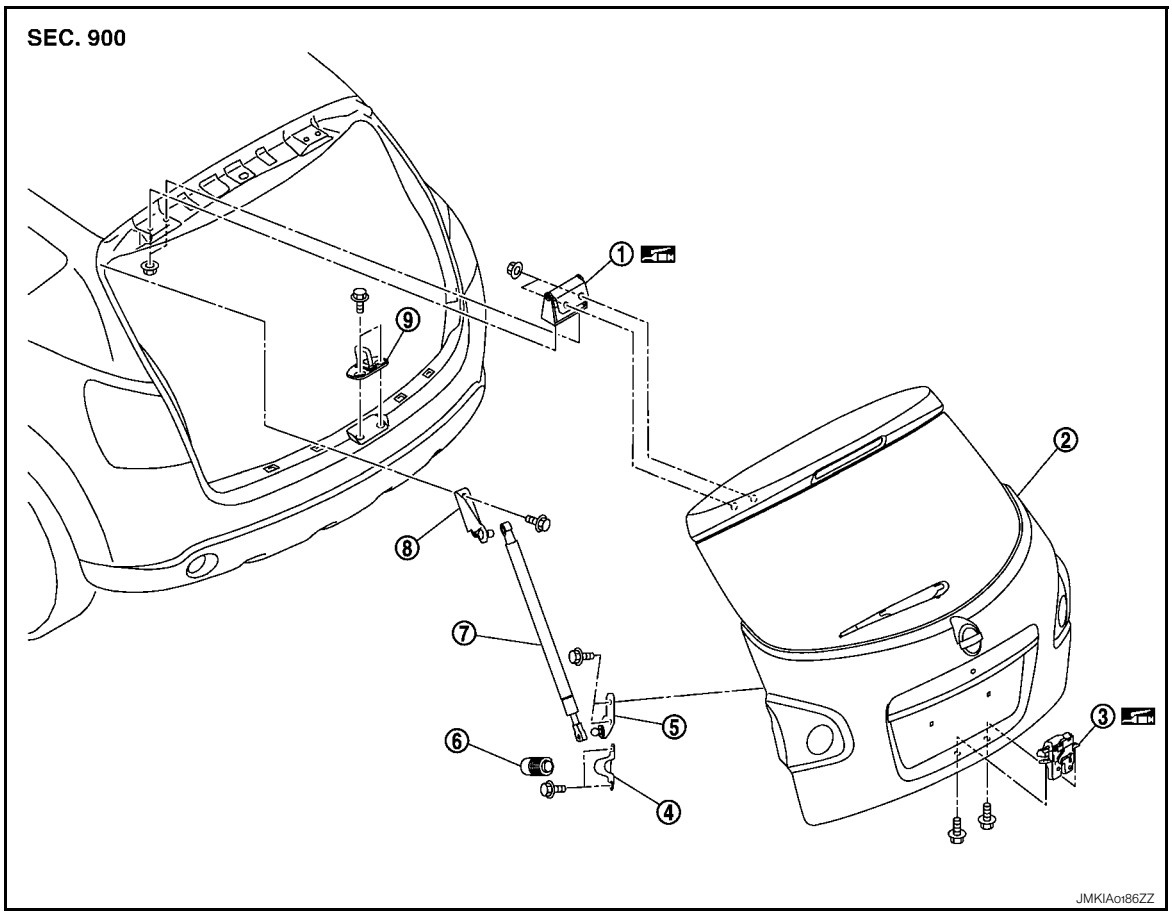
BACK DOOR

BACK DOOR ASSEMBLY

BACK DOOR ASSEMBLY : Exploded View

INFOID:0000000001098525

REMOVAL

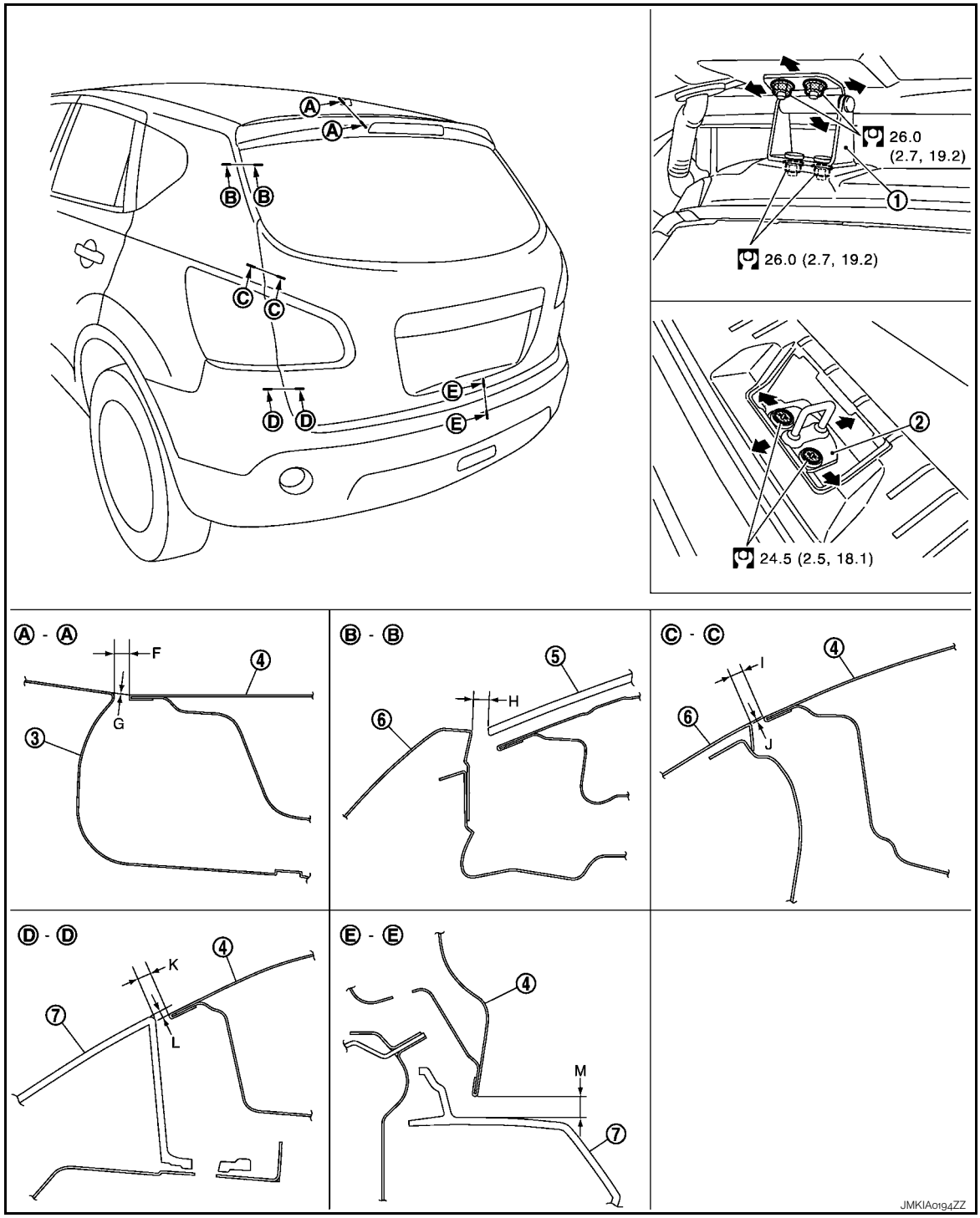


1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT

cardiagn.com



1. Back door hinge
2. Back door striker
3. Roof panel
4. Back door outer
5. Back door glass
6. Body side outer
7. Rear bumper fascia

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001098526

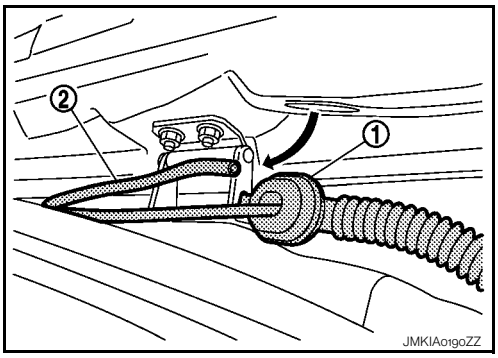
REMOVAL

1. Remove the back door finisher inner. Refer to INT-26, "Removal and Installation".
2. Remove the back door window glass. Refer to GW-17, "Removal and Installation".

NOTE:

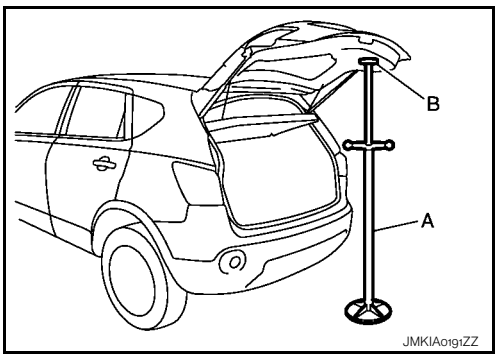
It is necessary to remove back door window glass in order to remove harness, because harness connector interferes with back door window glass pin.

3. Disconnect the connectors in the back door, and then remove the grommet, and pull out hte harness.
4. Remove the parcel shelf. Refer to INT-24, "Removal and Installation".
5. Remove the high-mounted stop lamp. Refer to EXL-183, "Removal and Installation".
6. Remove the grommet (1), and then pull out the washer tube (2) .

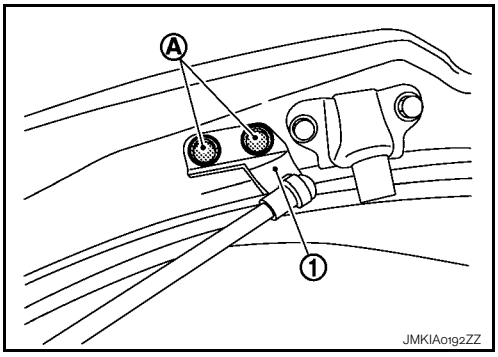


7. Pull the harness out of the back door.
8. Support the back door lock with the proper material to prevent it from falling.

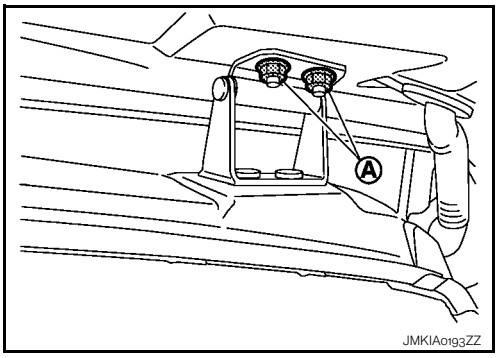
A : Jack
B : Shop cloth



9. Remove the back door stay bracket mounting bolts (A) on the back door.



10. Remove the back door hinge mounting nuts (A) on the back door and remove the back door assembly.
CAUTION:
Perform work with 2 workers, because of its heavy weight.



INSTALLATION
Install in the reverse order of removal.
CAUTION:
- **Perform work with 2 workers, because of its heavy weight.**

cardiagn.com

- **After installation, perform fitting adjustment. Refer to DLK-855, "BACK DOOR ASSEMBLY : Adjustment".**
- **Check the back door open/close operation after installation.**
- **Check the back door lock/unlock operation after installation.**

BACK DOOR ASSEMBLY : Adjustment

INFOID:0000000001098527

Portion				Standard	Difference(RH/LH)
Back door panel – Roof panel	A – A	F	Clearance	5.0 – 7.0 mm (0.197 – 0.276 in)	—
		G	Surface height	0.0 – 2.0 mm (0.000 – 0.079 in)	—
Back door glass – Body side outer	B – B	H	Clearance	3.9 – 8.1 mm (0.154 – 0.319 in)	2.1 mm (0.083 in)
		I	Surface height	- 1.0 – 3.1 mm (- 0.039 – 0.122 in)	2.0 mm (0.079 in)
Back door panel – Body side outer	C – C	J	Clearance	3.5 – 6.5 mm (0.138 – 0.256 in)	2.0 mm (0.079 in)
		K	Surface height	- 1.0 – 1.0 mm (- 0.039 – 0.039 in)	—
Back door panel – Rear bumper fascia	D – D	L	Clearance	4.0 – 8.0 mm (0.157 – 0.315 in)	2.0 mm (0.079 in)
		M	Surface height	0.1 – 4.1 mm (0.004 – 0.161 in)	2.1 mm (0.083 in)
Back door panel – Rear bumper fascia	E – E	N	Clearance	5.8 – 10.2 mm (0.228 – 0.402 in)	—

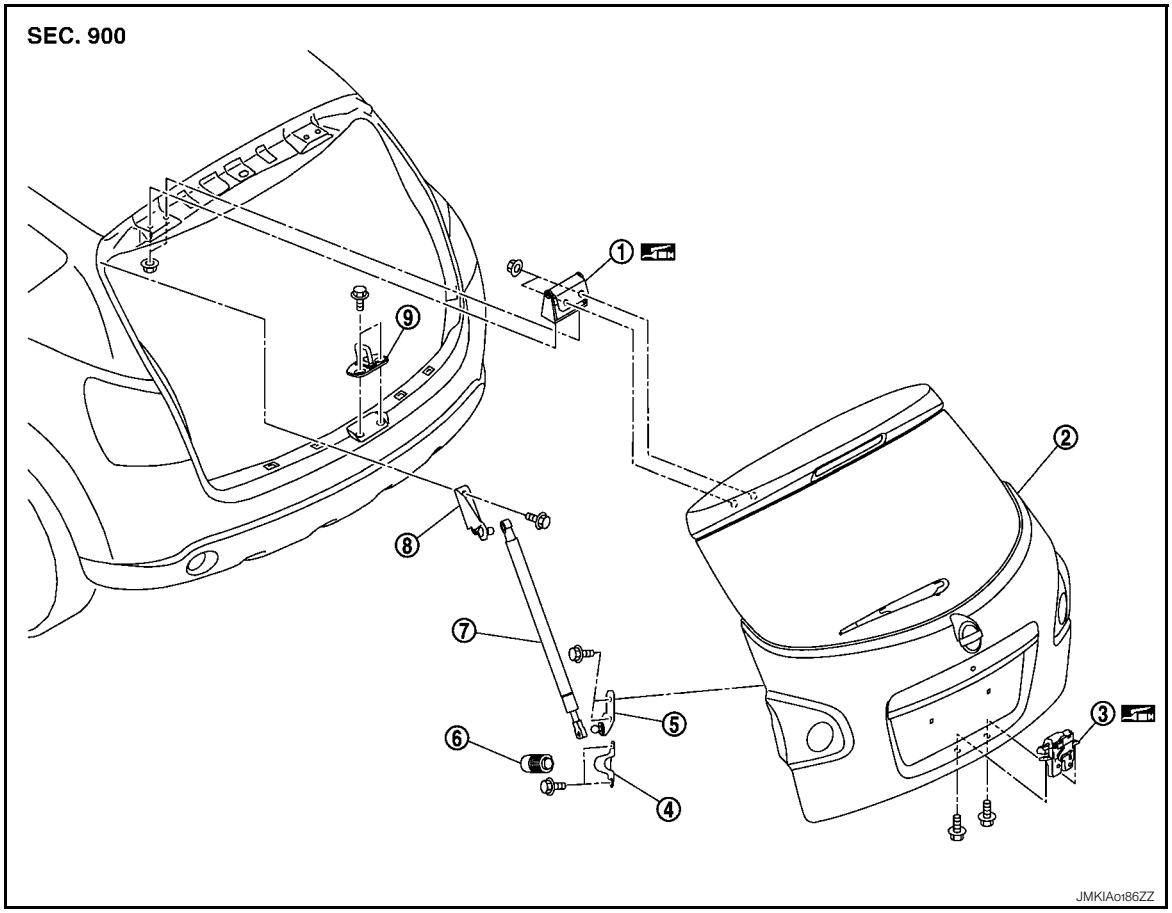
FITTING ADJUSTMENT

1. Check the clearance and the evenness between the back door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Loosen the bumper rubber.
4. Loosen the back door striker mounting bolts.
5. Lift up the back door approximately 100 – 150 mm (3.937 – 5.906 in) height then close it lightly and check that it is engaged firmly with the back door closed.
6. Check the clearance and evenness.
7. Finally tighten the back door striker.

BACK DOOR STRIKER

BACK DOOR STRIKER : Exploded View

INFOID:0000000001098529



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR STRIKER : Removal and Installation

INFOID:0000000001098531

REMOVAL

1. Remove the luggage rear plate cap. Refer to INT-24, "Removal and Installation".
2. Remove the mounting bolts, and then remove the back door striker.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

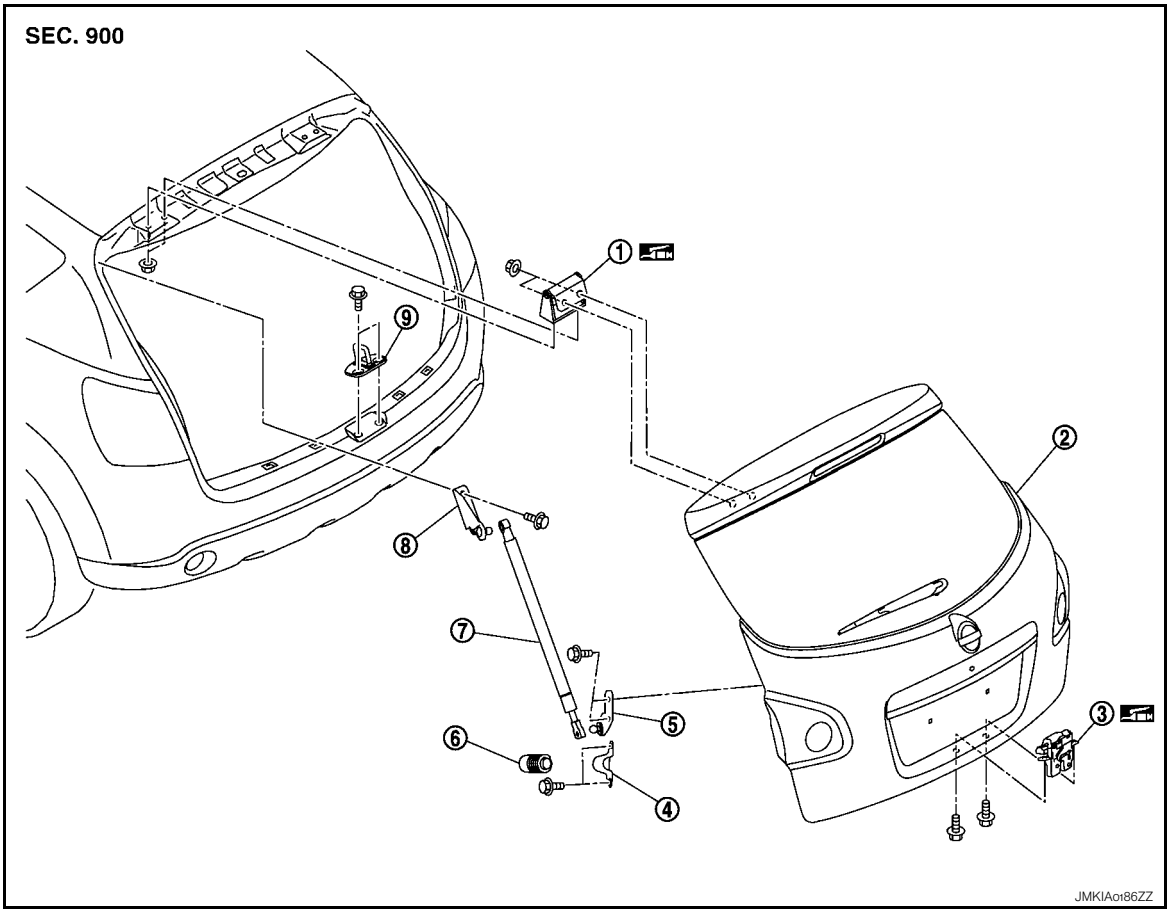
- **When removing and installing the back door striker, be sure to perform the fitting adjustment. Refer to DLK-855, "BACK DOOR ASSEMBLY : Adjustment".**
- **Check the back door open/close operation after installation.**

BACK DOOR HINGE

BACK DOOR HINGE : Exploded View

INFOID:0000000001102423

cardiagn.com



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR HINGE : Removal and Installation

INFOID:0000000001102424

REMOVAL

1. Remove the back door assembly. Refer to DLK-248, "BACK DOOR ASSEMBLY : Removal and Installation".
2. Remove upper side of the back door weatherstrip. Refer to DLK-254, "BACK DOOR WEATHER-STRIP : Removal and Installation".
3. Remove rear seat belt cover. Refer to INT-21, "Removal and Installation".
4. Using remover tool, remove the headlining clip at the rear side of the headlining. Refer to INT-20, "Exploded View".
5. Remove the rear side of the headlining.
6. Remove the back door hinge mounting nuts (body side), and then remove the back door hinge.

INSTALLATION

Install in the reverse order of removal.

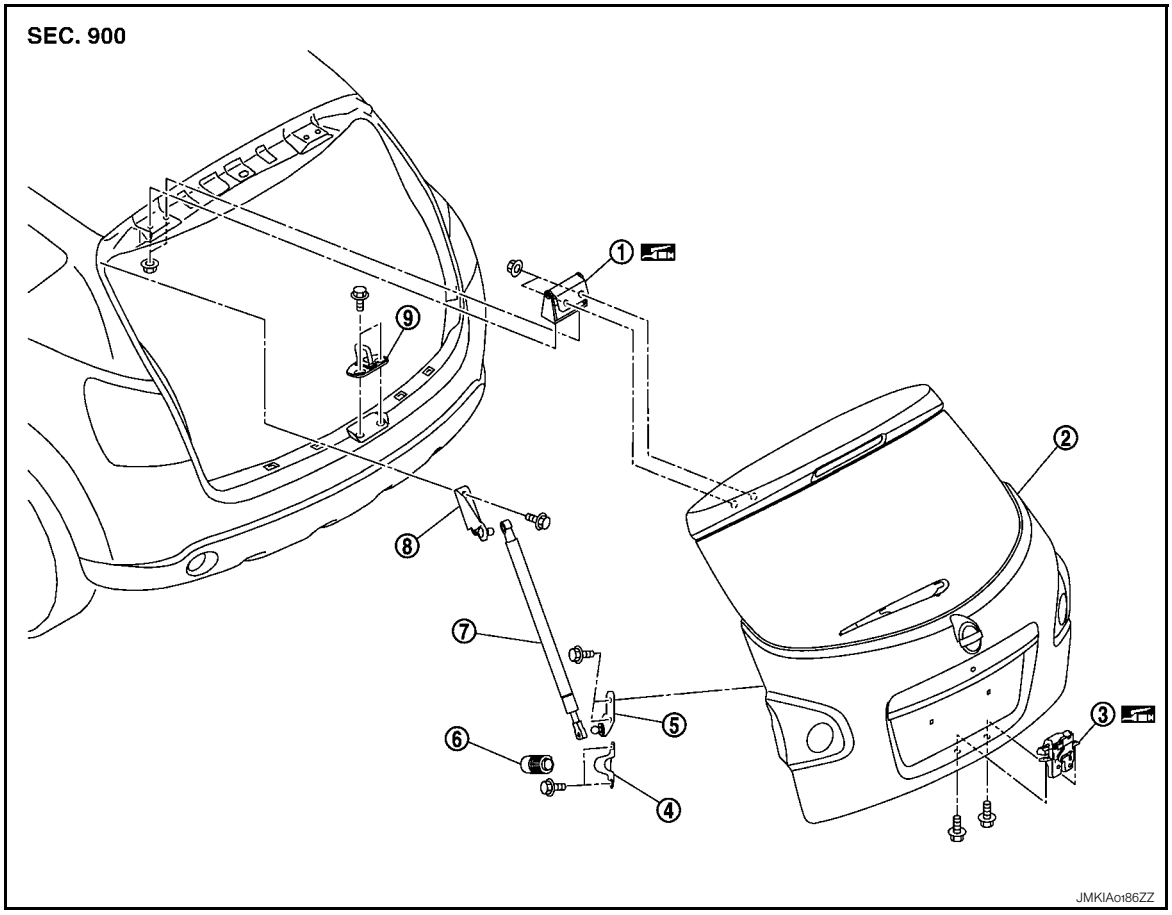
CAUTION:

- **When removing and installing the back door assembly, perform the fitting adjustment. Refer to DLK-250, "BACK DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Check the hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the back door open/close operation after installation.**

BACK DOOR STAY

BACK DOOR STAY : Exploded View

INFOID:0000000001098532



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR STAY : Removal and Installation

INFOID:0000000001098535

REMOVAL

1. Remove the stud ball (upper/lower), and then remove the back door stay.
2. Remove the mounting bolts, and then remove the back door stay bracket (upper/lower).

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check the back door open/close operation after installation.

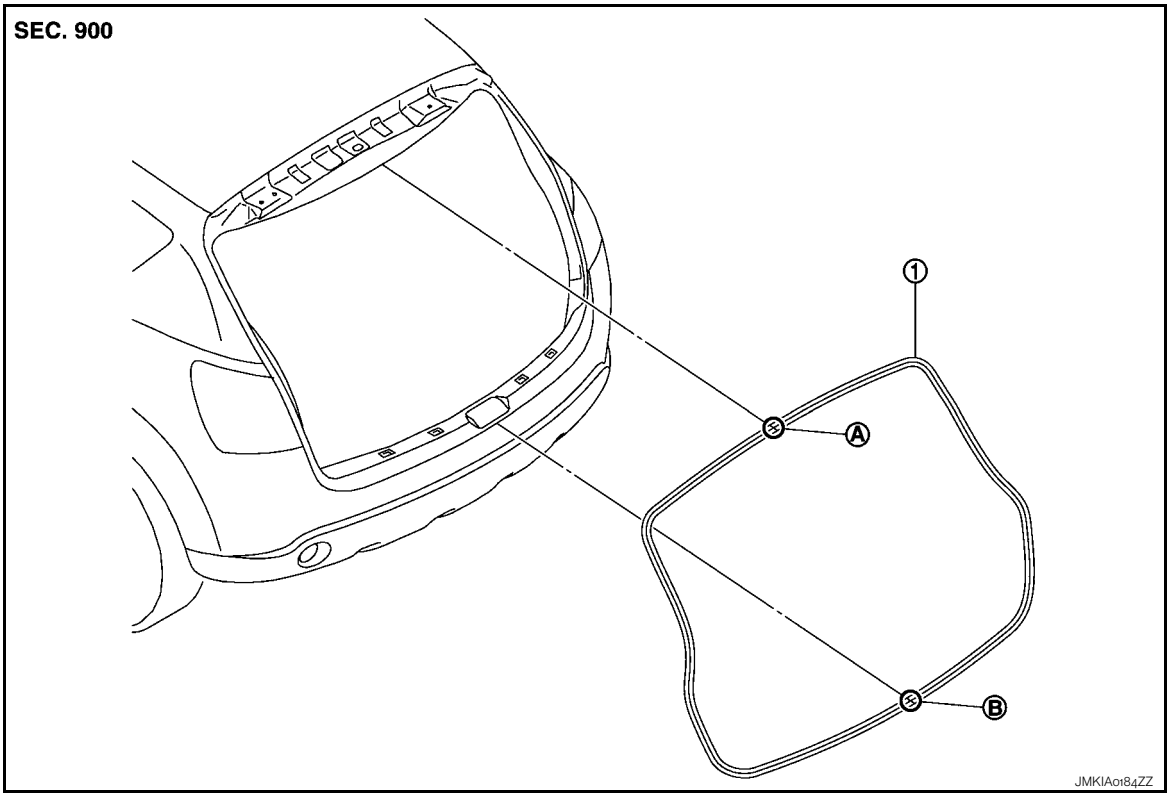
BACK DOOR WEATHER-STRIP

BACK DOOR WEATHER-STRIP : Exploded View

INFOID:0000000001098536

REMOVAL

cardiagn.com



1. Back door weatherstrip
A. Mark (upper)
B. Mark (lower)

BACK DOOR WEATHER-STRIP : Removal and Installation

INFOID:0000000001098538

REMOVAL

Pull up and remove engagement with body from the weatherstrip joint.

CAUTION:

After removal, do not pull strongly on the weather-strip.

INSTALLATION

1. Working from the upper section, align the weatherstrip mark with vehicle center position mark and install the weatherstrip onto the vehicle.
2. For the lower section, align the weatherstrip seam with center of the back door striker.
3. After installation, pull the weatherstrip gently to ensure that there is no loose section.
   NOTE:
   Make sure that the weatherstrip is fit tlightly at each corner and the luggage rear plate.

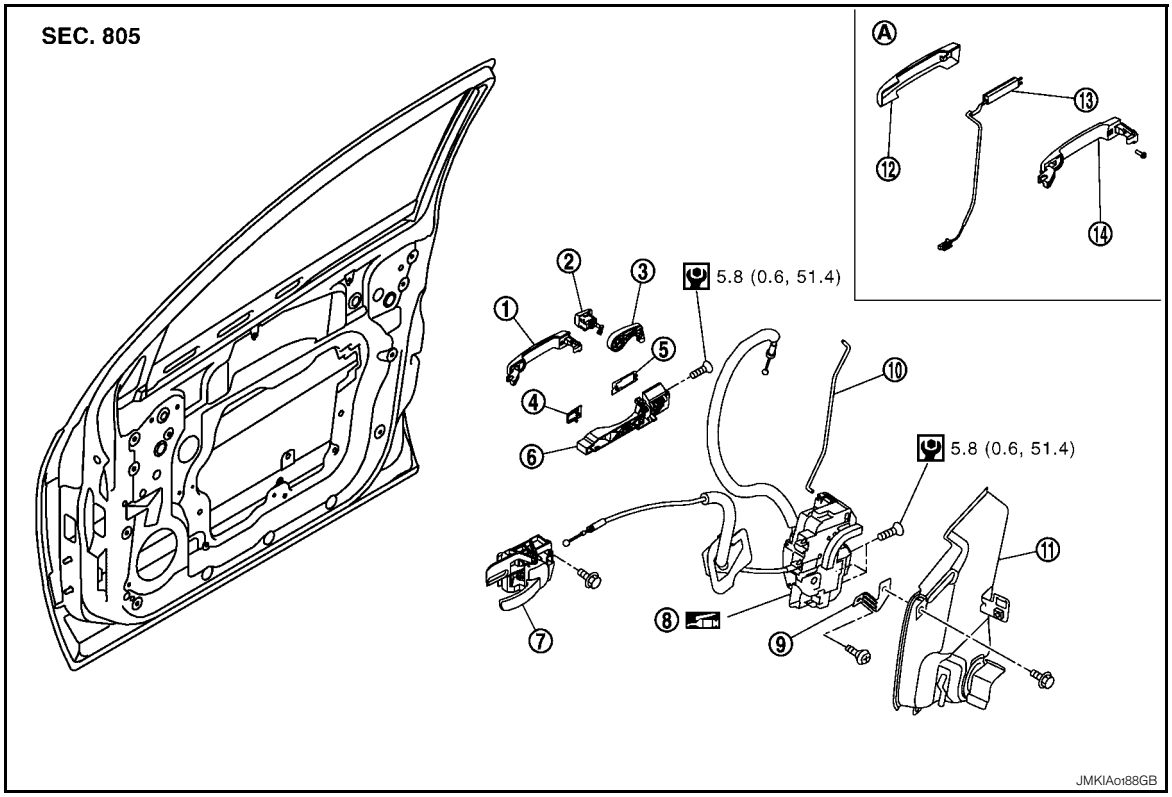
carsdiagn.com

FRONT DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001098539



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

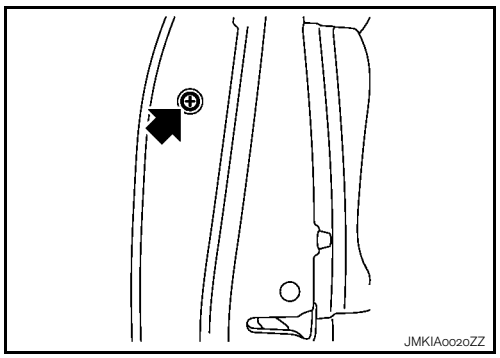
INFOID:0000000001098540

REMOVAL

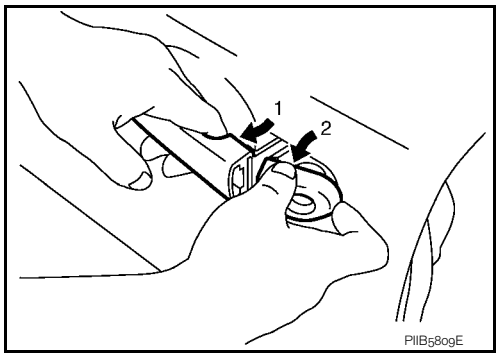
1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
3. Remove the front door glass. Refer to GW-19, "Removal and Installation".
4. Remove the front door module assembly. Refer to GW-22, "Removal and Installation".
5. Disconnect the door antenna and the door request switch connector and remove the harness clamp (models with Intelligent Key system).

cardiagn.com

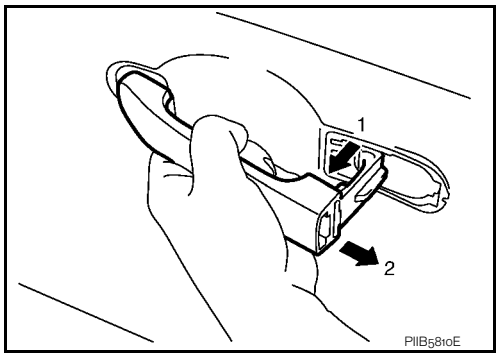
6. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and outside handle escutcheon (passenger side) mounting bolts from grommet hole.
CAUTION:
Do not forcibly remove the bolts (TORX: T10).



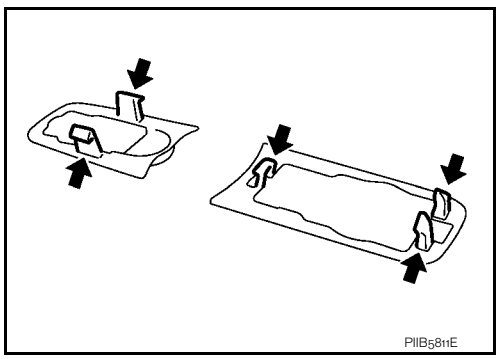
7. Reach in to separate the key cylinder rod connection (on the handle).
8. Disconnect the door key cylinder switch harness connector.
9. Remove the key cylinder lever from the door key cylinder.
10. While pulling the outside handle, remove door key cylinder assembly.



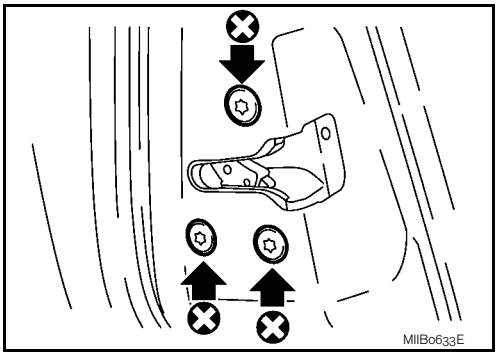
11. Disconnect front door request switch harness connector (models with Intelligent Key system).
12. While pulling outside handle, slide toward rear of vehicle to remove outside handle.



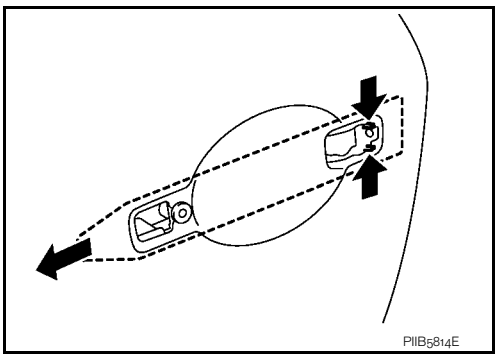
13. Remove the front gasket and the rear gasket.



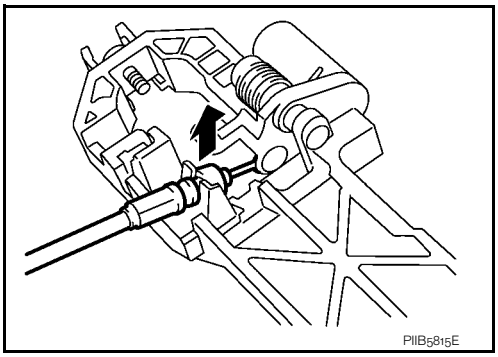
14. Remove the door lock assembly mounting bolts (TORX: T30).
15. Disconnect the door lock actuator connector, and then remove the door lock assembly.



16. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



17. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

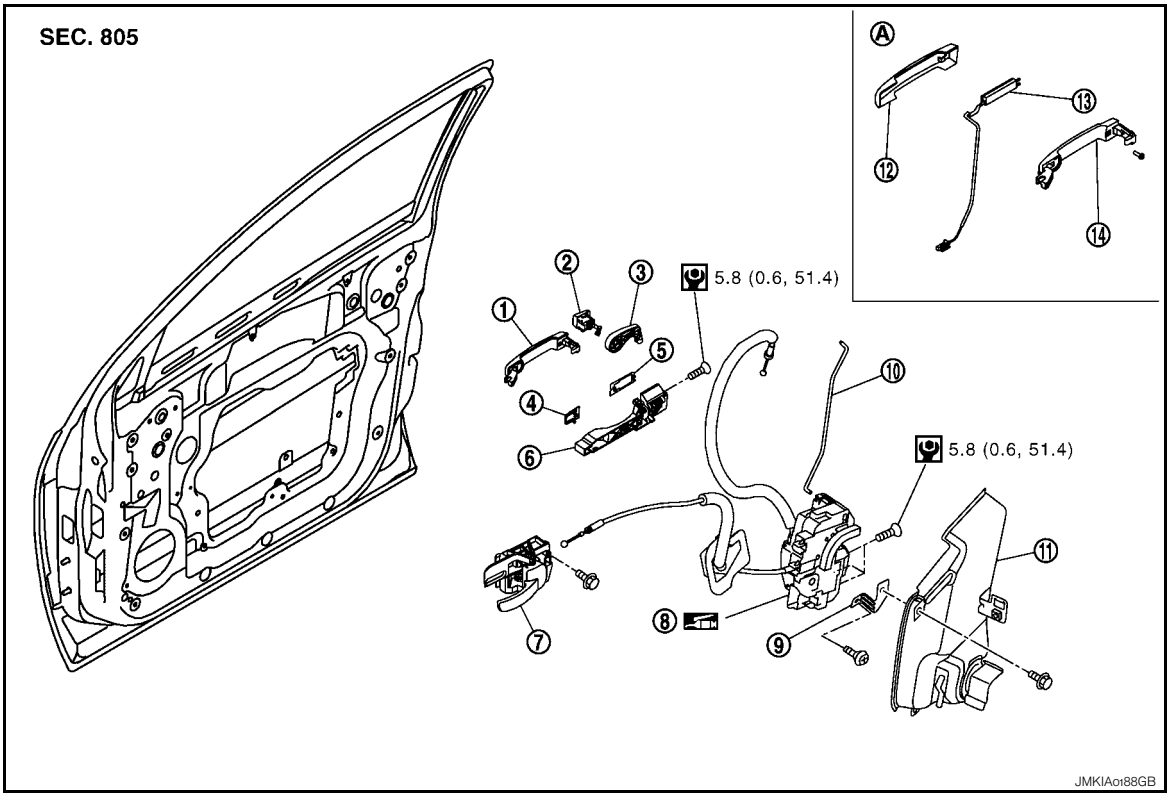
- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

INSIDE HANDLE

INSIDE HANDLE : Exploded View

INFOID:0000000001098545

cardiagn.com



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

Refer to GI-4, "Components" for symbols in the figure.

INSIDE HANDLE : Removal and Installation

INFOID:0000000001098546

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt.
3. Disconnect the inside handle knob cable and the lock knob cable, and then remove the inside handle.

INSTALLATION

Install in the reverse order of removal.

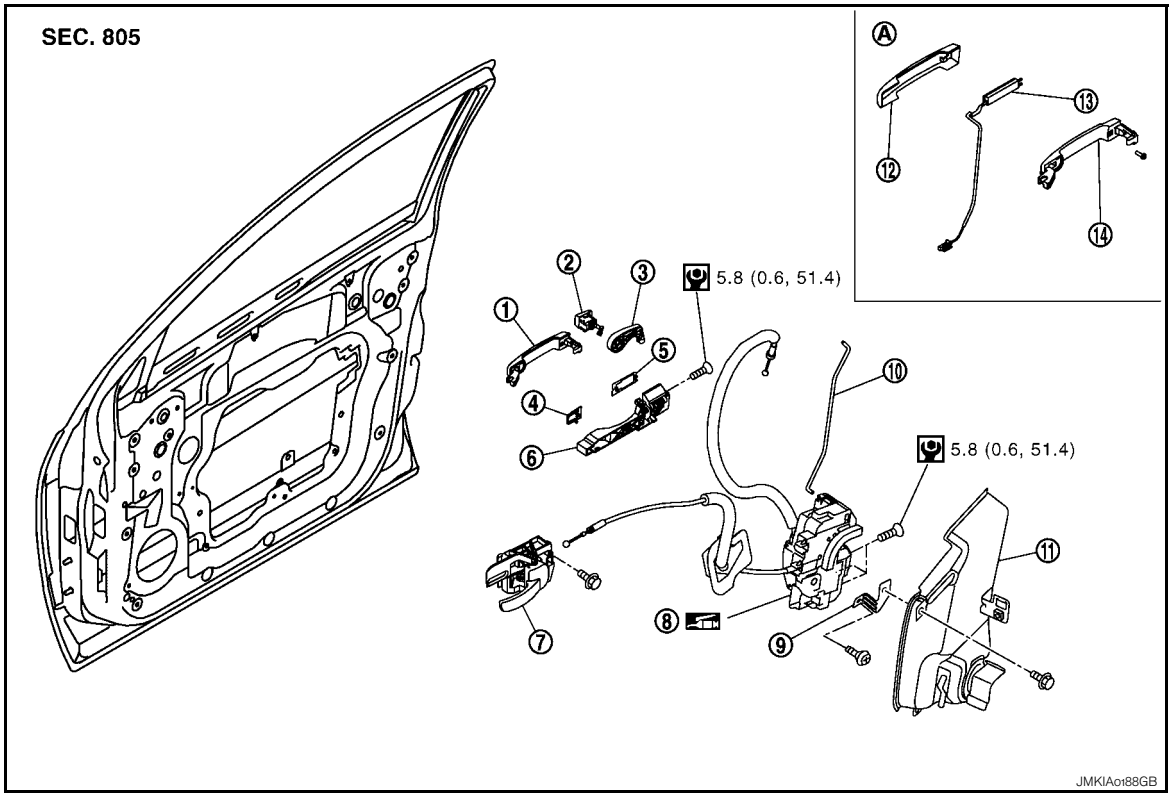
CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

OUTSIDE HANDLE

OUTSIDE HANDLE : Exploded View

INFOID:0000000001098547



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

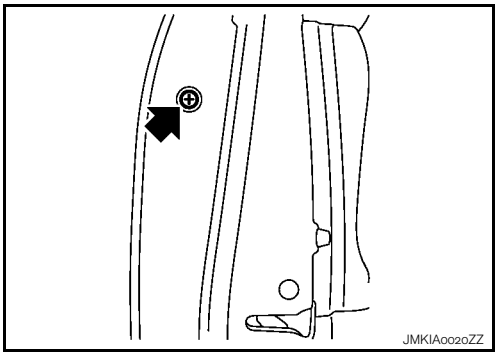
Refer to GI-4, "Components" for symbols in the figure.

OUTSIDE HANDLE : Removal and Installation

INFOID:0000000001098548

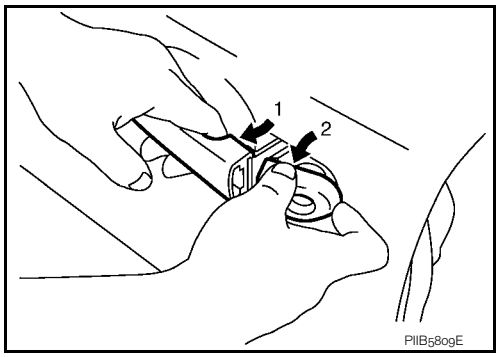
REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt, and disconnect the inside handle knob cable and the lock knob cable.
3. Remove the front door glass. Refer to GW-19, "Removal and Installation".
4. Remove the front door module assembly. Refer to GW-22, "Removal and Installation".
5. Disconnect the door antenna and the door request switch connector and remove the harness clamp (models with Intelligent Key system).
6. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
   CAUTION:
   Do not forcibly remove the bolts (TORX: T10).

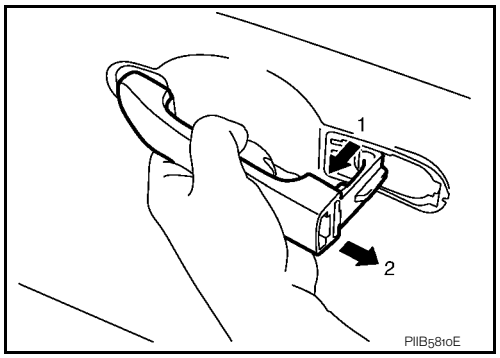


cardiagn.com

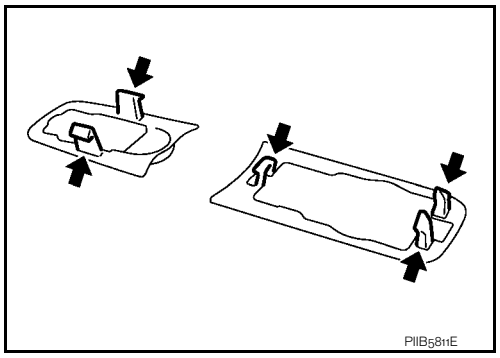
7. Reach in to separate the key cylinder rod connection (on the handle).
8. Disconnect the door key cylinder switch harness connector.
9. Remove the key cylinder lever from the door key cylinder.
10. While pulling the outside handle, remove the door key cylinder assembly.



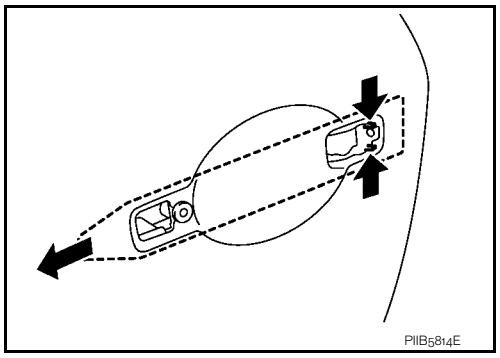
11. Disconnect the front door request switch harness connector (models with Intelligent Key system).
12. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



13. Remove the front gasket and rear gasket.

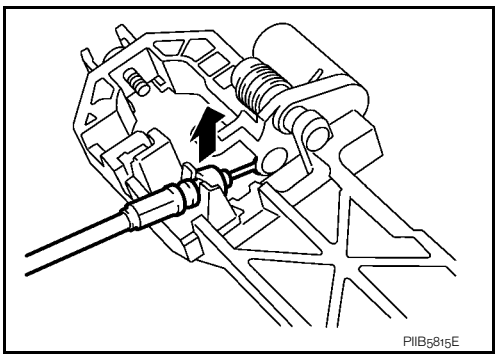


14. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



carsdiagn.com

15. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

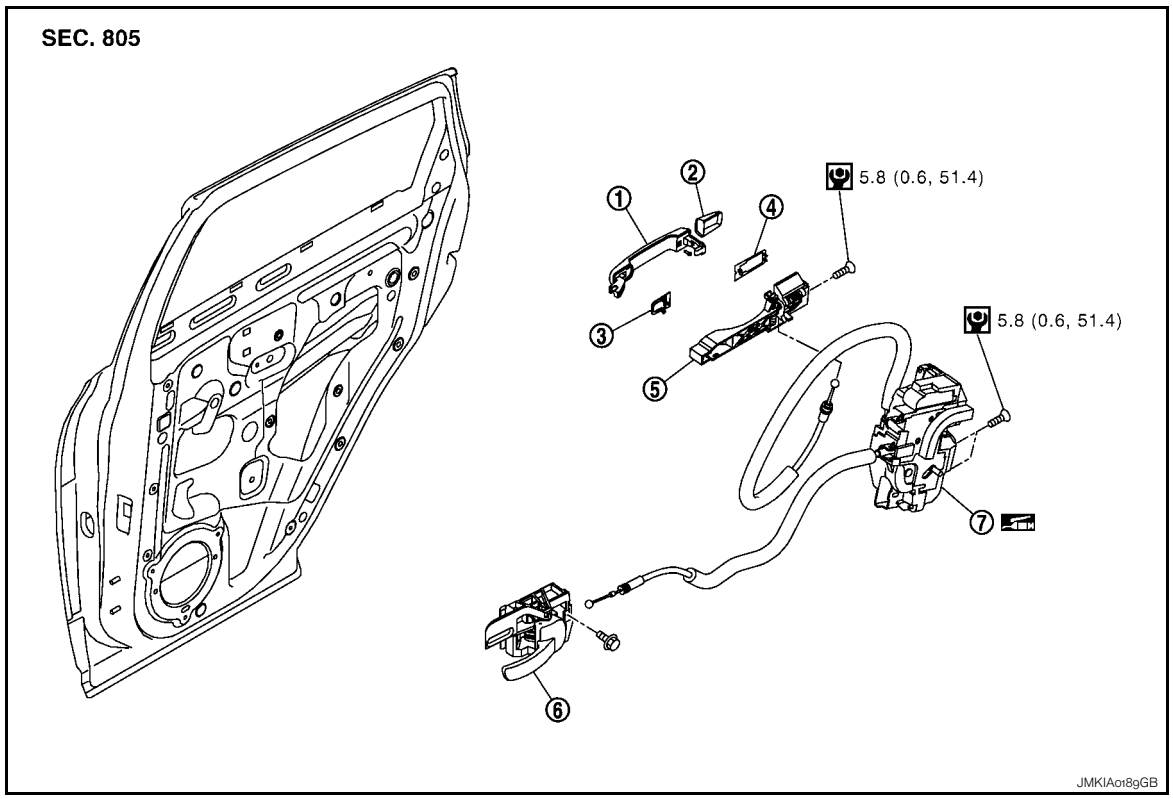
cardiagn.com

REAR DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001098551



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

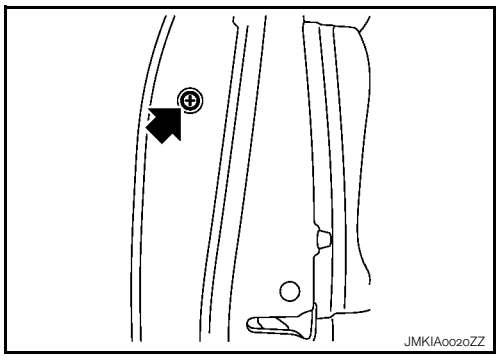
Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

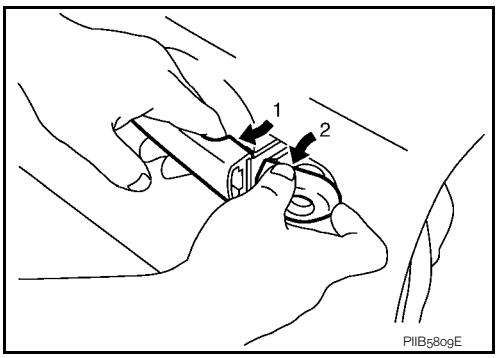
INFOID:0000000001098552

REMOVAL

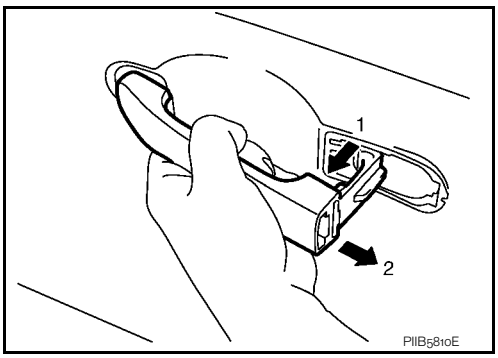
1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Fully close the front door window.
3. Remove the door sealing screen.
4. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
5. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
   CAUTION:
   Do not forcibly remove the bolts (TORX: T10).



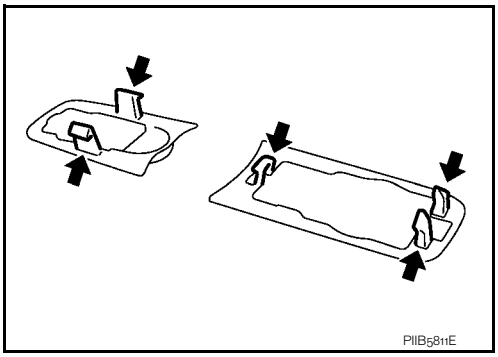
6. While pulling the outside handle, remove the door key cylinder assembly.



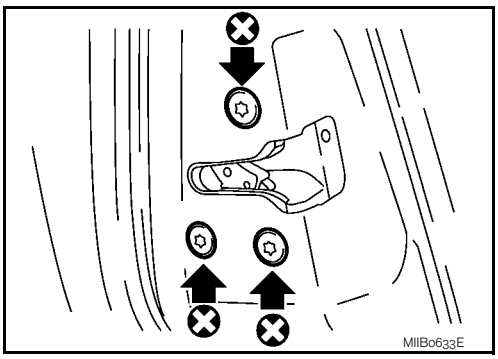
7. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



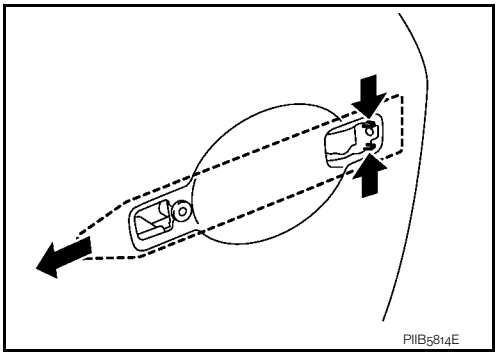
8. Remove the front gasket and the rear gasket.



9. Remove the door lock assembly mounting bolts (TORX: T30).
10. Disconnect the door lock actuator connector, and then remove the door lock assembly.

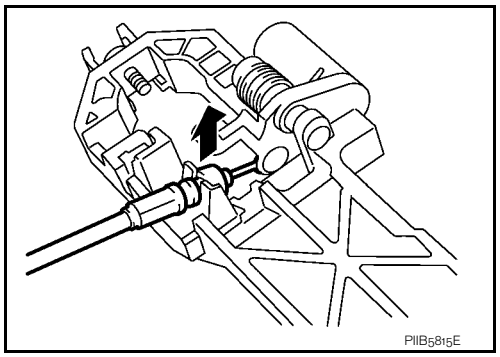


11. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



cardiagn.com

12. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

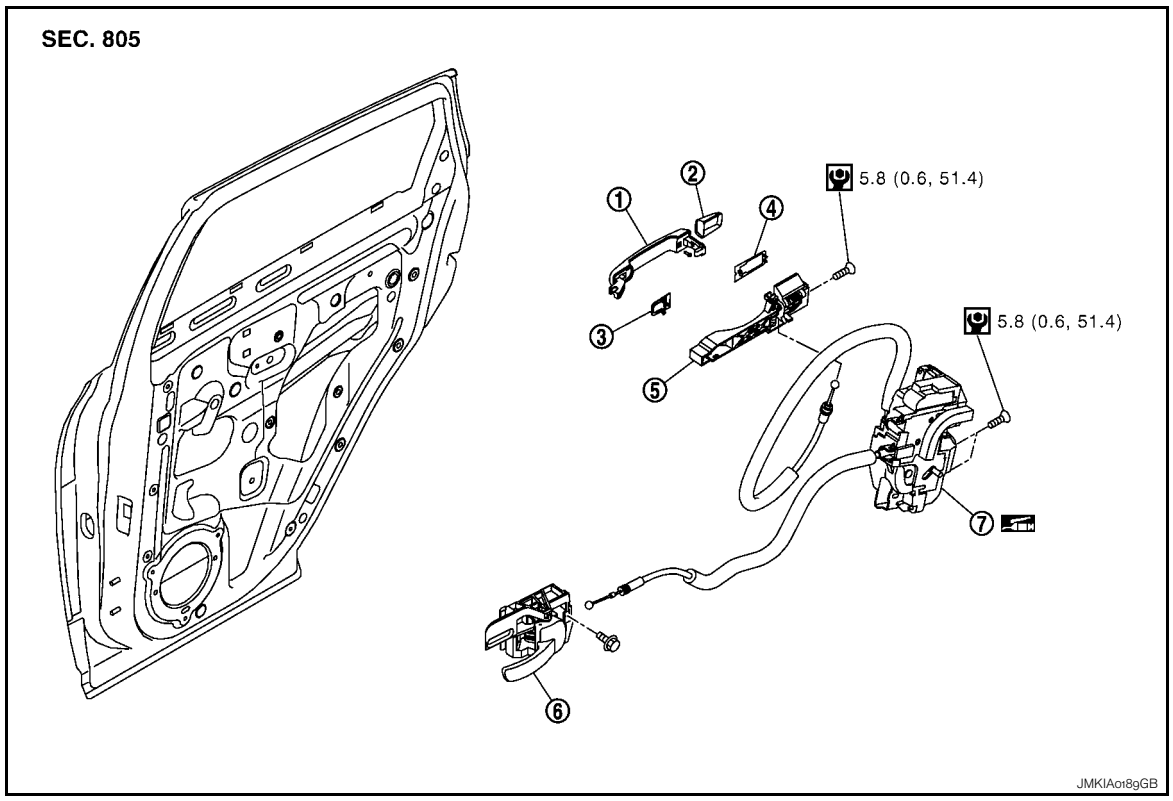
CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

INSIDE HANDLE

INSIDE HANDLE : Exploded View

INFOID:0000000001098555



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

Refer to GI-4, "Components" for symbols in the figure.

INSIDE HANDLE : Removal and Installation

INFOID:0000000001098556

REMOVAL

1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Remove the door sealing screen.

carsdiagn.com

3. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
4. Remove the inside handle.

INSTALLATION

Install in the reverse order of removal.

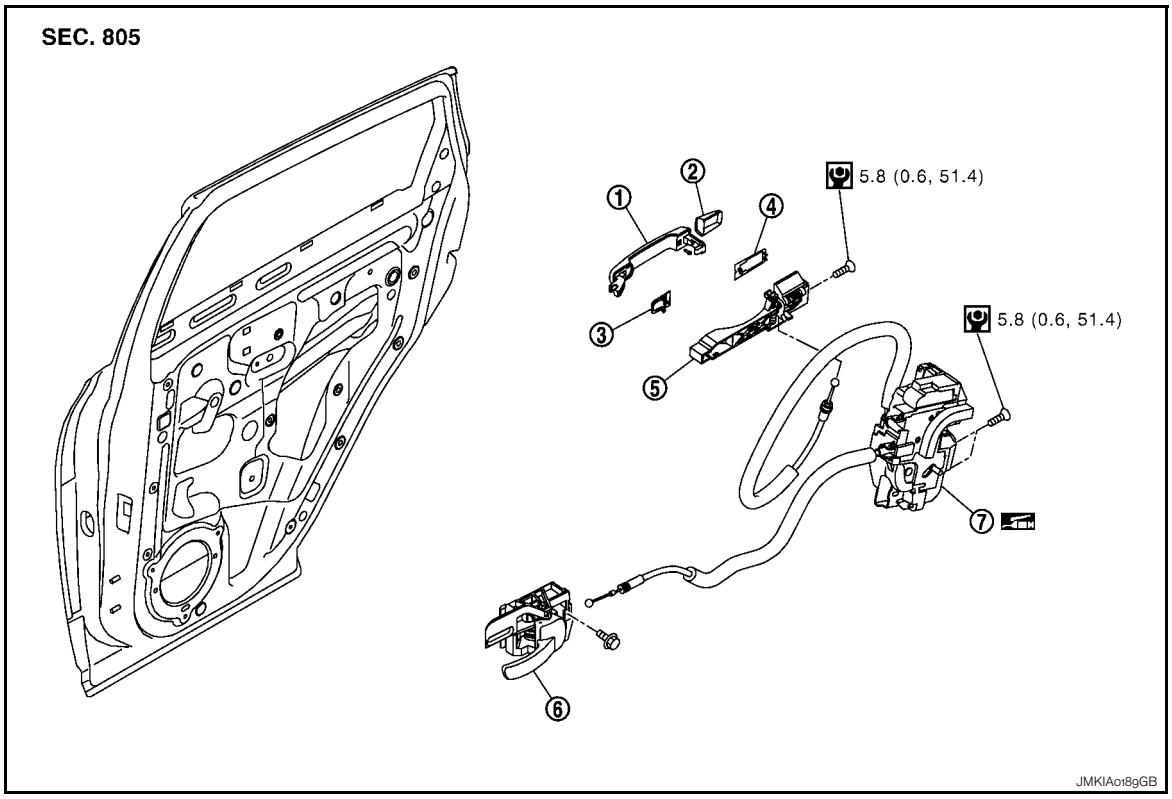
CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

OUTSIDE HANDLE

OUTSIDE HANDLE : Exploded View

INFOID:0000000001098557



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

Refer to GI-4, "Components" for symbols in the figure.

OUTSIDE HANDLE : Removal and Installation

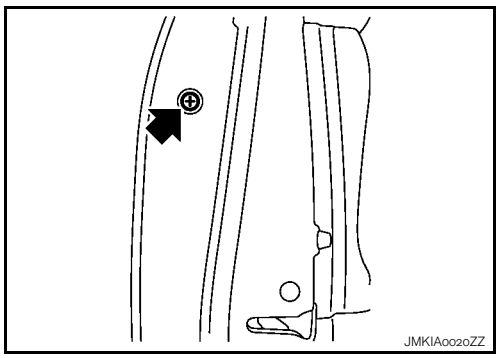
INFOID:0000000001098558

REMOVAL

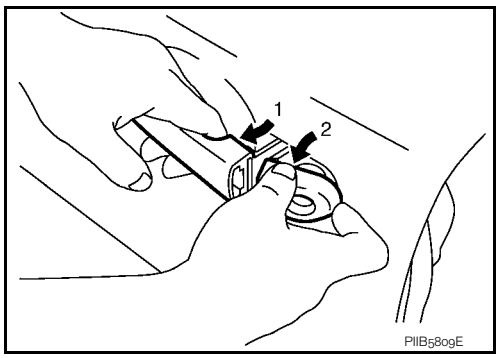
1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Fully close the front door window.
3. Remove the door sealing screen.
4. Remove the inside handle mounting bolt, disconnect the inside handle knob cable and the lock knob cable.

cardiagn.com

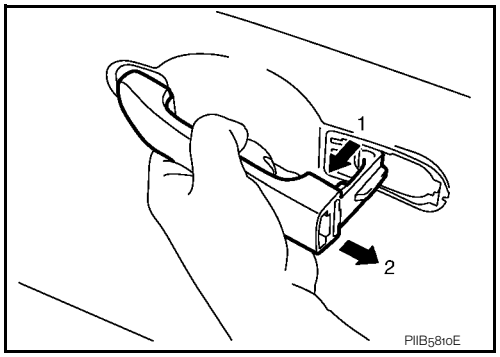
5. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
CAUTION:
Do not forcibly remove the bolts (TORX: T10).



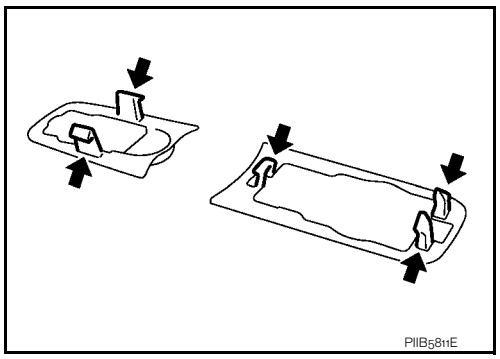
6. While pulling the outside handle, and then remove the door key cylinder assembly.



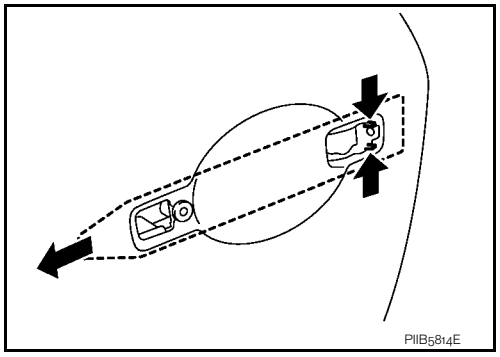
7. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



8. Remove the front gasket and the rear gasket.

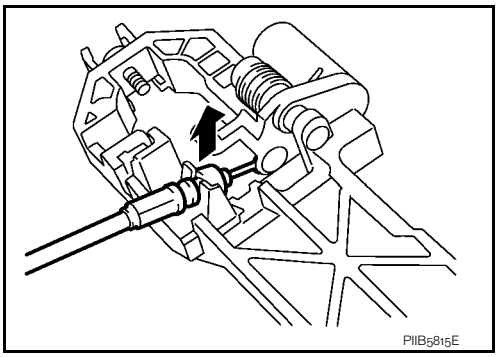


9. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



carsdiagn.com

10. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

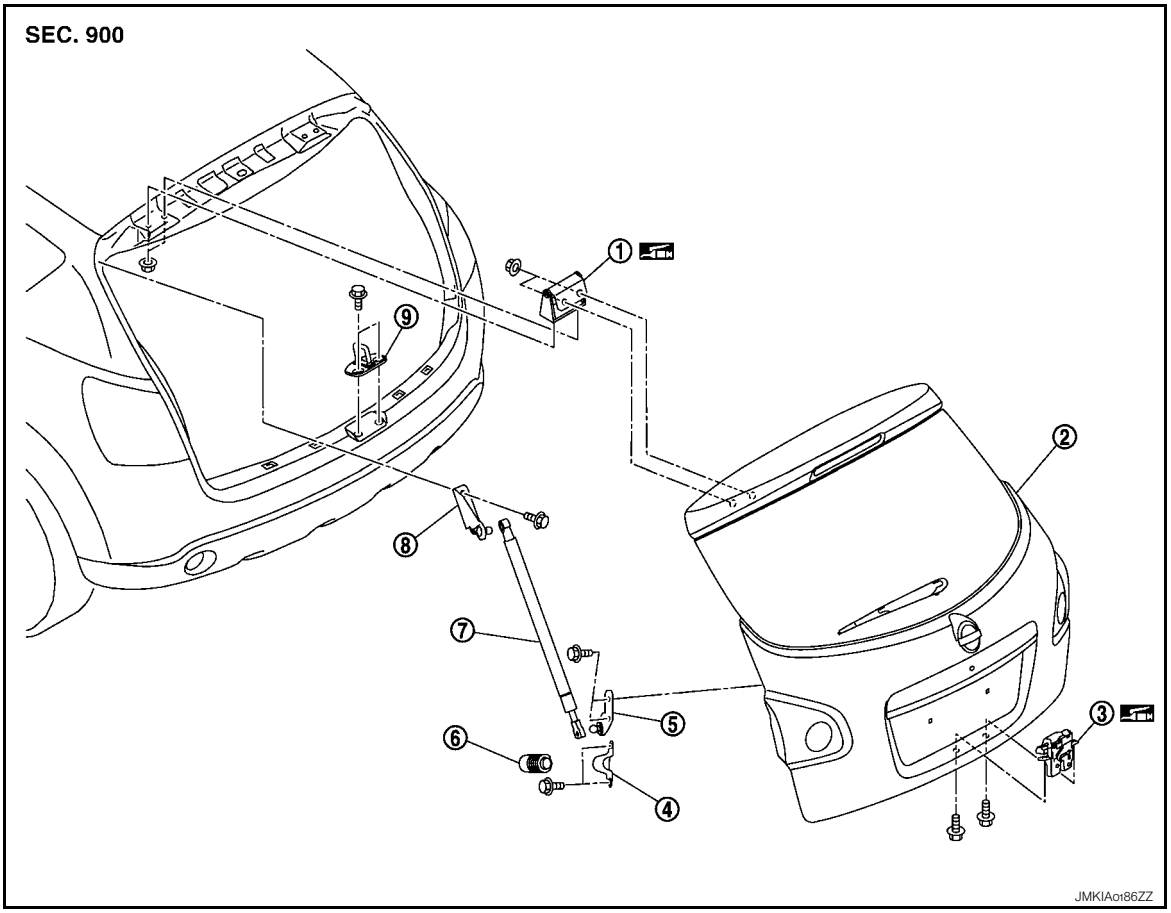
cardiagn.com

BACK DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001098563



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

INFOID:0000000001098564

REMOVAL

1. Remove the back door trim finisher lower. Refer to INT-26, "Removal and Installation".
2. Disconnect the back door lock assembly and back door opener switch connectors.
3. Remove the back door lock mounting bolts, and then remove the back door lock and actuator.

INSTALLTION

Install in the reverse order of removal.

CAUTION:

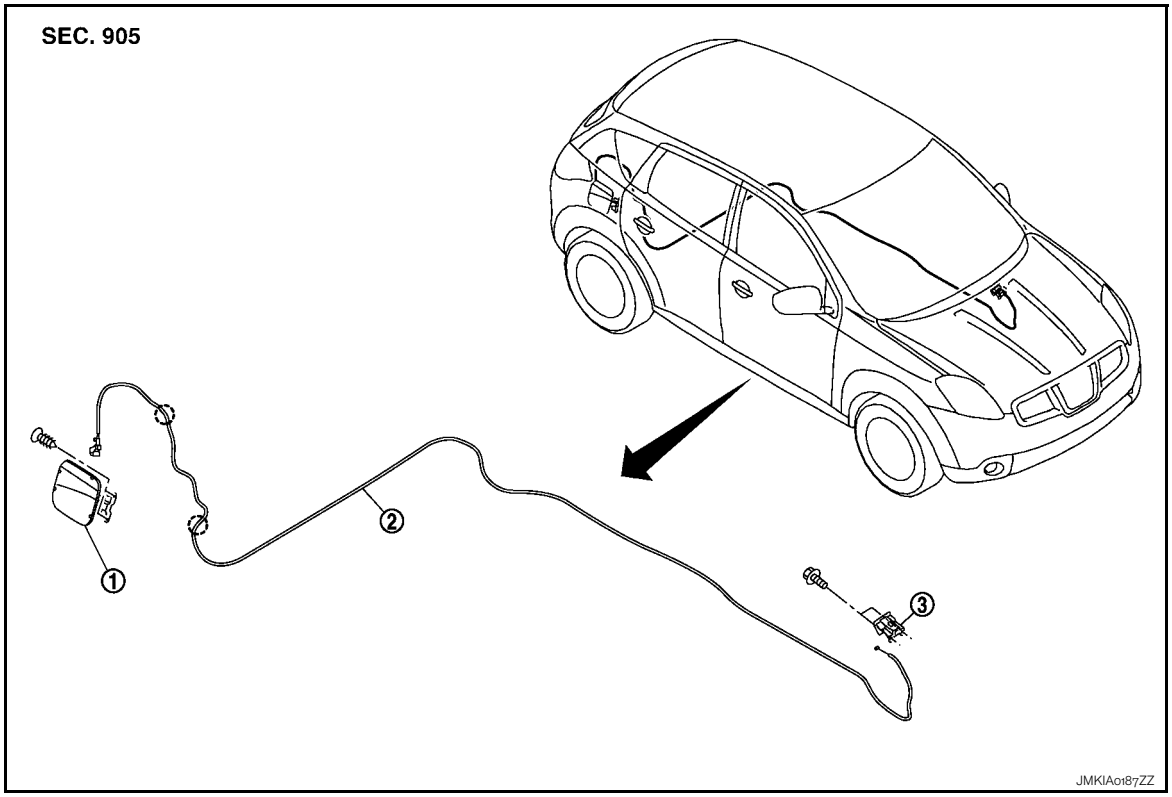
Check the back door lock/unlock operation after installation.

FUEL FILLER LID OPENER

FUEL FILLER LID

FUEL FILLER LID : Exploded View

INFOID:0000000001098569



1. Fuel filler lid assembly
2. Fuel filler opener cable
3. Fuel opener lever

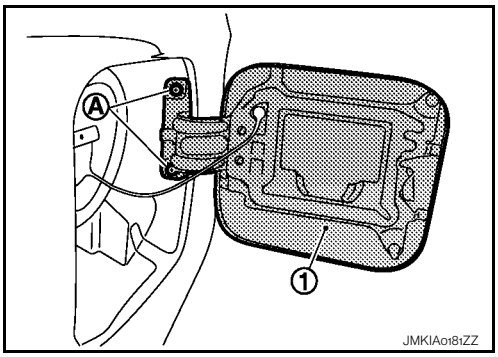
: Clip

FUEL FILLER LID : Removal and Installation

INFOID:0000000001098570

REMOVAL

1. Fully open the fuel filler lid.
2. Remove the filler cap.
3. Remove the mounting screws (A), and then remove the fuel filler lid (1).



INSTALLATION

Install in the reverse order of removal.

CAUTION:

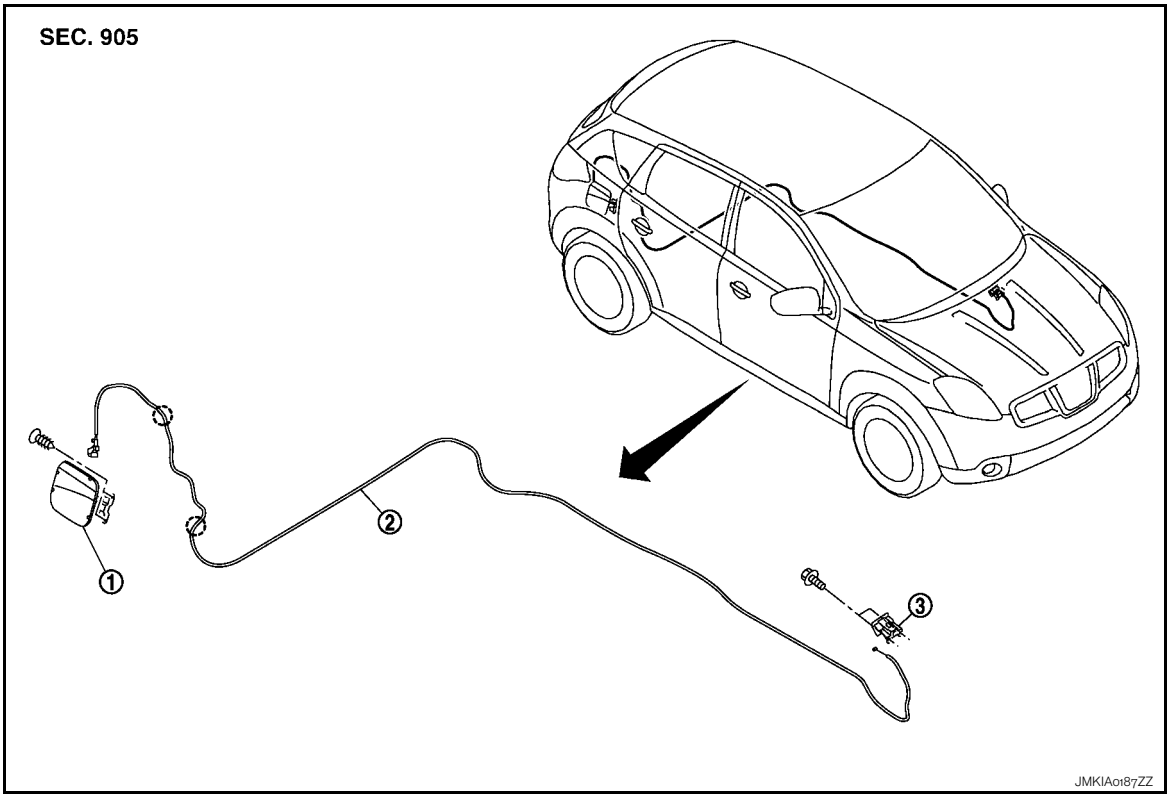
After installation, apply the touch-up paint (the body color) onto the head of the mounting screws.

FUEL FILLER OPENER CABLE

cardiagn.com

FUEL FILLER OPENER CABLE : Exploded View

INFOID:0000000001098571



1. Fuel filler lid assembly
2. Fuel filler opener cable
3. Fuel opener lever

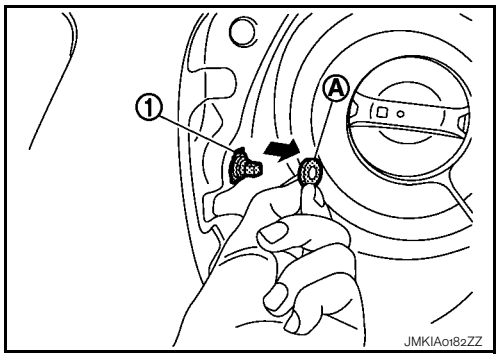
: Clip

FUEL FILLER OPENER CABLE : Removal and Installation

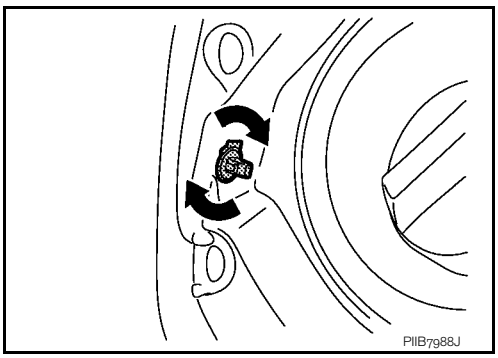
INFOID:0000000001098572

REMOVAL

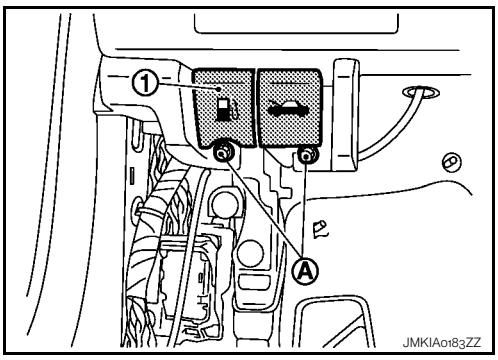
1. Remove the rear seat cushion, rear seatback, seatback lower support, and seatback mounting outer bracket. Refer to SE-31, "Removal and Installation".
2. Remove the dash side finisher, front kicking plate inner, rear kicking plate inner, center pillar lower garnish, and luggage side lower finisher (front). Refer to INT-14, "Removal and Installation".
3. Remove the parcel shelf, luggage floor carpet, luggage floor spacer, luggage rear plate, luggage side lower finisher, and rear pillar finisher. Refer to INT-24, "Removal and Installation".
4. Remove the fuel filler lock seal (1).



5. Rotate the fuel filler lock, and then remove the fuel filler lock.



6. Remove the fuel filler opener cable mounting clips and the clamps.
7. Remove the mounting bolts, and then remove the fuel filler lid opener lever.



8. Remove the fuel filler opener cable.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

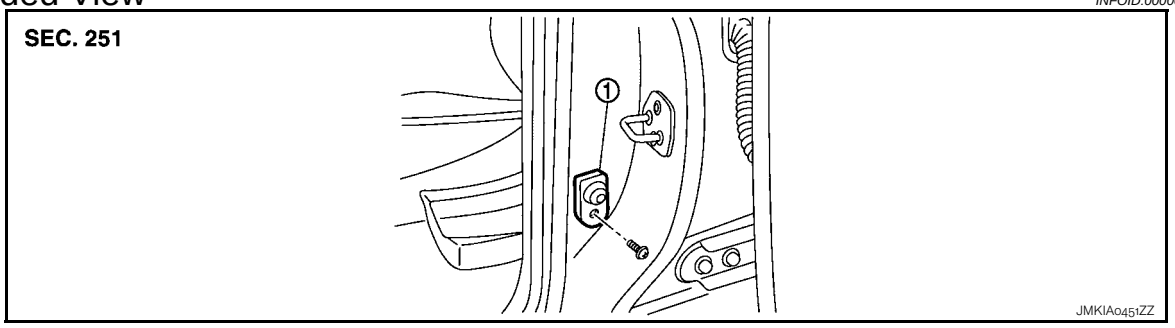
Check the fuel filler lid open/close operation after installation.

cardiagn.com

DOOR SWITCH

Exploded View

INFOID:0000000001095347



1. Door switch (driver side)

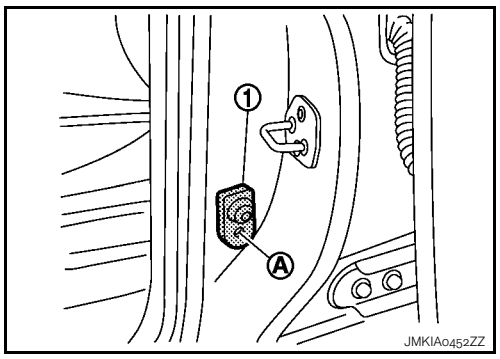
Refer to DLK-877, "Removal and Installation".

Removal and Installation

INFOID:0000000001095348

REMOVAL

1. Remove the door switch mounting bolt (A), and then remove door switch (1).
   NOTE:
   The same procedure is also performed for door switch (passenger side, rear LH and rear RH).



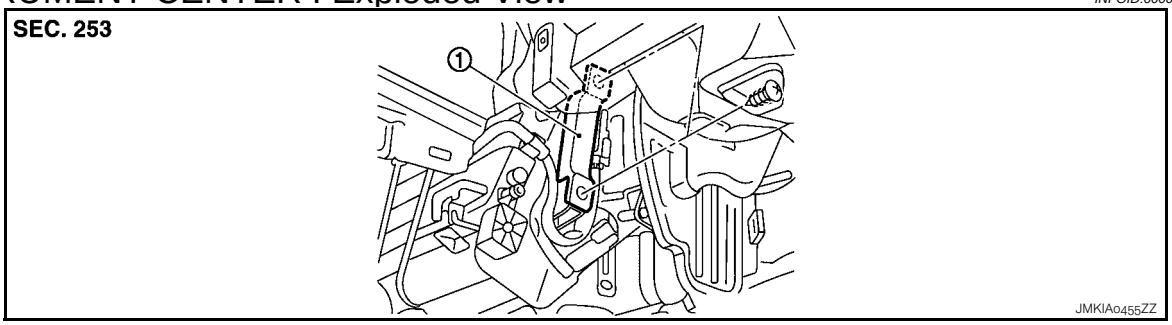
INSTALLATION

Install in the reverse order of removal.

INSIDE KEY ANTENNA
INSTRUMENT CENTER

INSTRUMENT CENTER : Exploded View

INFOID:0000000001095349



1. Inside key antenna (instrument center)

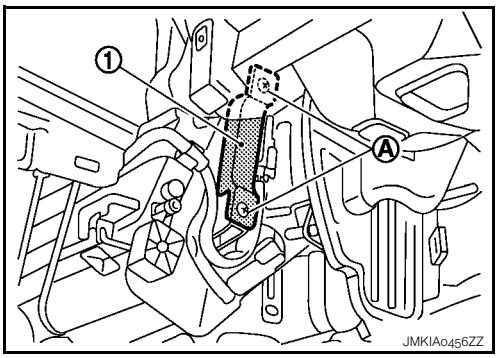
Refer to DLK-544, "INSTRUMENT CENTER : Removal and Installation".

INSTRUMENT CENTER : Removal and Installation

INFOID:0000000001095350

REMOVAL

1. Remove the glove box and instrument lower cover RH. Refer to IP-11, "Exploded View" and IP-12, "Removal and Installation".
2. Remove the key slot mounting screw (A), and then remove inside key antenna (instrument center) (1).



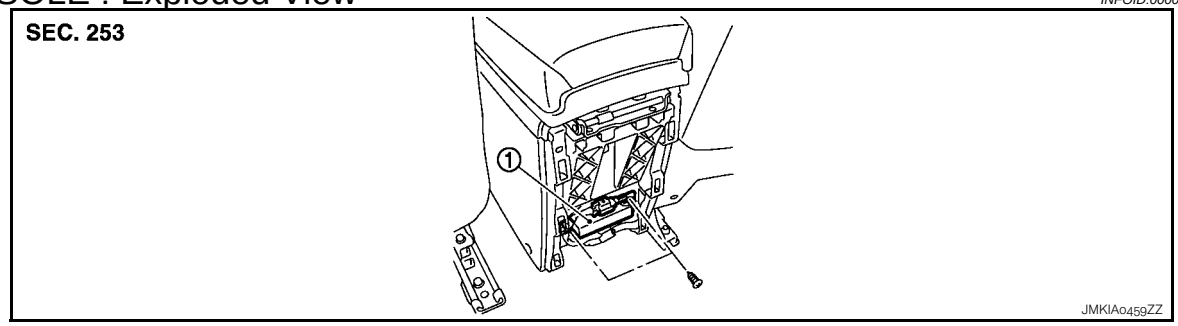
INSTALLATION

Install in the reverse order of removal.

CONSOLE

CONSOLE : Exploded View

INFOID:0000000001095351



1. Inside key antenna (console)

Refer to DLK-544, "CONSOLE : Removal and Installation".

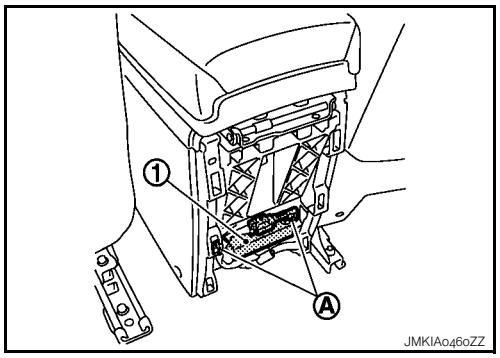
CONSOLE : Removal and Installation

INFOID:0000000001095352

REMOVAL

cardiagn.com

1. Remove the console rear finisher (2). Refer to IP-18, "Exploded View" and IP-18, "Removal and Installation".
2. Remove the inside key antenna mounting screw (A), and then remove inside key antenna (console) (1).

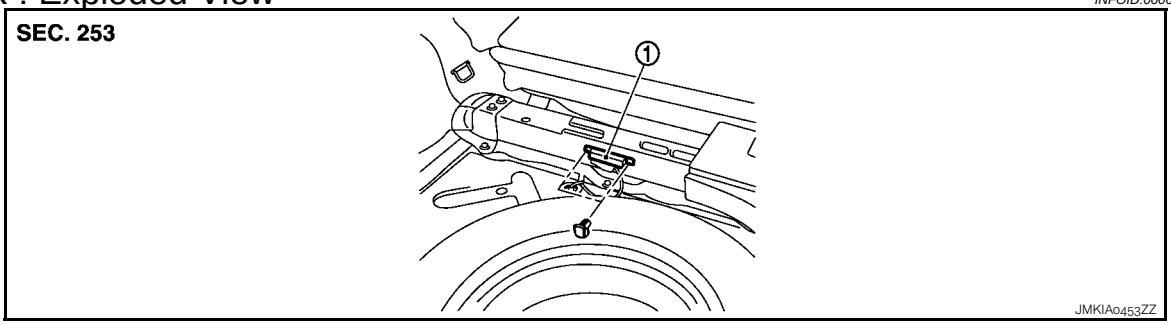


INSTALLATION
Install in the reverse order of removal.

REAR

REAR : Exploded View

INFOID:0000000001095353



1. Inside key antenna (rear seat)

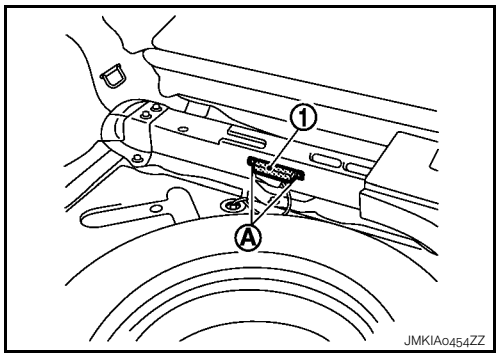
Refer to DLK-545, "REAR : Removal and Installation".

REAR : Removal and Installation

INFOID:0000000001095354

REMOVAL

1. Remove the luggage floor spacer (LH). Refer to INT-24, "Exploded View" and INT-24, "Removal and Installation".
2. Remove the inside key antenna (rear seat) mounting clips (A), and then remove inside key antenna (rear seat) (1).



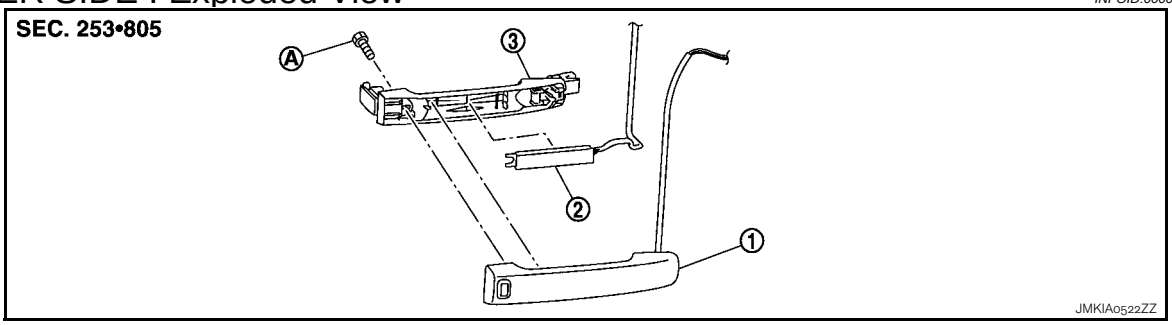
INSTALLATION
Install in the reverse order of removal.

OUTSIDE KEY ANTENNA

DRIVER SIDE

DRIVER SIDE : Exploded View

INFOID:0000000001095355



1. Outside handle grip
2. Outside key antenna
3. Outside handle bracket

A. Bolt

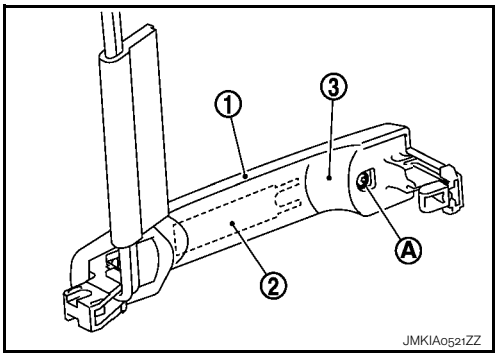
Refer to DLK-275, "DRIVER SIDE : Removal and Installation".

DRIVER SIDE : Removal and Installation

INFOID:0000000001095356

REMOVAL

1. Remove the outside handle. Refer to DLK-258, "OUTSIDE HANDLE : Exploded View" and DLK-259, "OUTSIDE HANDLE : Removal and Installation".
2. Remove the bolt (A) from outside handle grip (1).
3. Remove the outside key antenna (2) from outside handle bracket (3).



INSTALLATION

Install in the reverse order of removal.

PASSENGER SIDE

PASSENGER SIDE : Exploded View

INFOID:0000000001095357

Refer to DLK-275, "DRIVER SIDE : Exploded View".

PASSENGER SIDE : Removal and Installation

INFOID:0000000001095358

REMOVAL

Refer to DLK-275, "DRIVER SIDE : Removal and Installation".

INSTALLATION

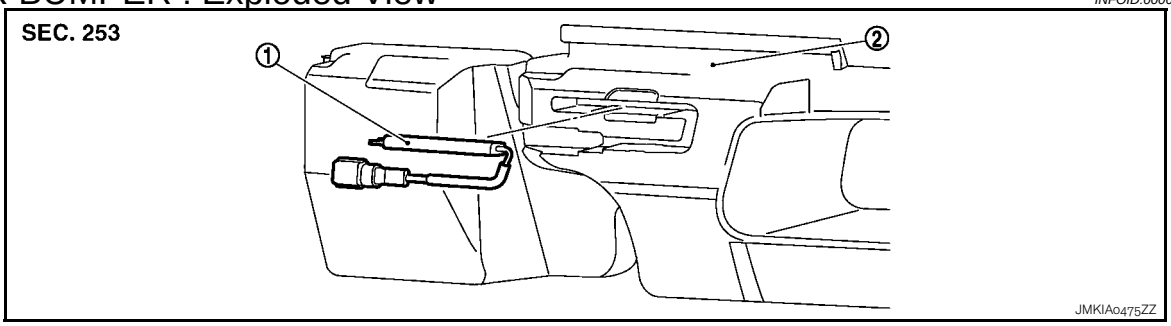
Install in the reverse order of removal.

REAR BUMPER

cardiagn.com

REAR BUMPER : Exploded View

INFOID:0000000001095359



1. Outside key antenna (rear bumper) 2. Rear bumper energy absorber

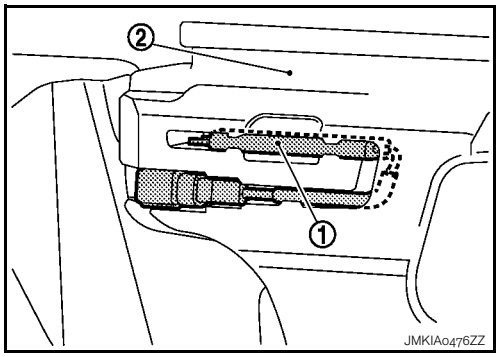
Refer to DLK-547, "REAR BUMPER : Removal and Installation".

REAR BUMPER : Removal and Installation

INFOID:0000000001095360

REMOVAL

1. Remove the rear bumper. Refer to EXT-14, "Exploded View" and EXT-15, "Removal and Installation".
2. Remove the outside key antenna (rear bumper) (1) from rear bumper energy absorber (2).



INSTALLATION

Install in the reverse order of removal.

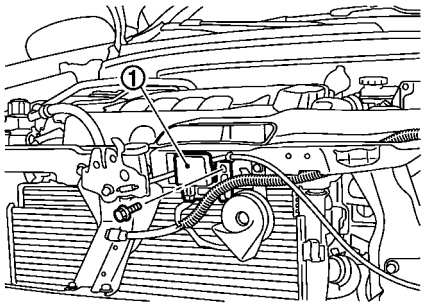
carsdiagn.com

INTELLIGENT KEY WARNING BUZZER

Exploded View

INFOID:0000000001095361

SEC. 253



1. Intelligent Key warning buzzer

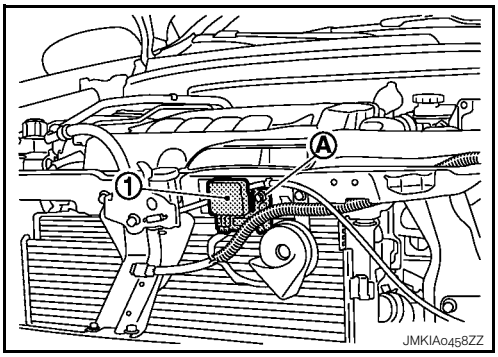
Refer to DLK-548, "Removal and Installation".

Removal and Installation

INFOID:0000000001095362

REMOVAL

1. Remove the front bumper. Refer to EXT-11, "Exploded View" and EXT-11, "Removal and Installation".
2. Remove the Intelligent Key warning buzzer mounting bolt (A), and then remove the Intelligent Key warning buzzer (1).



INSTALLATION

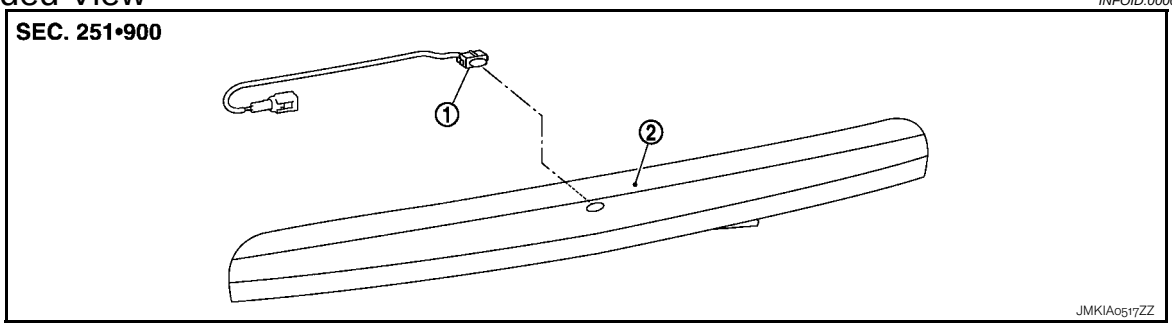
Install in the reverse order of removal.

cardiagn.com

BACK DOOR REQUEST SWITCH

Exploded View

INFOID:0000000001115311



1. Back door request switch
2. Back door finisher

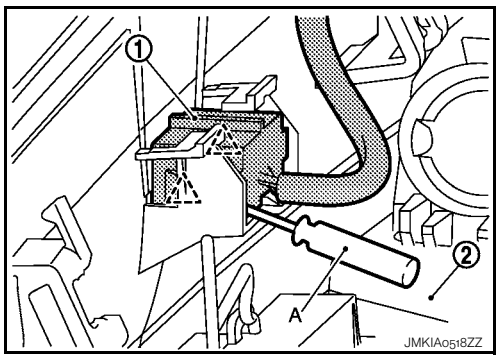
Refer to DLK-549, "Removal and Installation".

Removal and Installation

INFOID:0000000001115312

REMOVAL

1. Remove the back door finisher.
   Refer to EXT-31, "Exploded View" and EXT-31, "Removal and Installation".
2. Remove the back door request switch (1) from back door finisher (2) using flat-bladed screw driver (A) etc.



△ : Pawl

3. Remove the trunk lid request switch mounting screw (B), and then remove trunk lid request switch (3) from inner bracket (2).

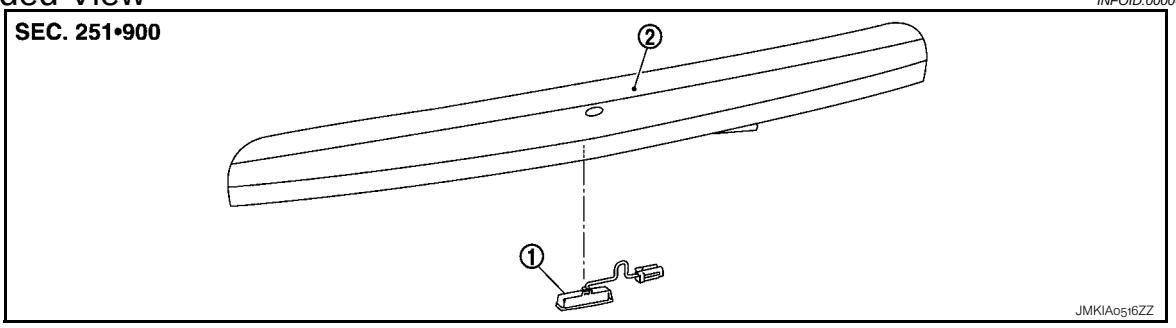
INSTALLATION

Install in the reverse order of removal.

BACK DOOR OPENER SWITCH

Exploded View

INFOID:0000000001116790



1. Back door opener switch
2. Back door finisher

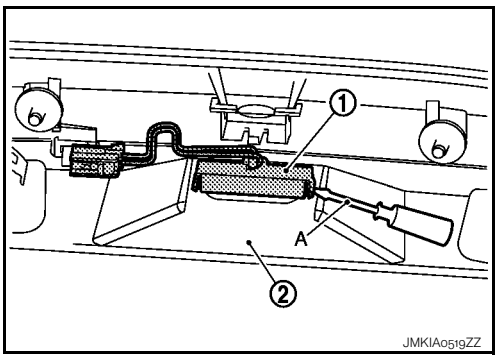
Refer to DLK-550, "Removal and Installation".

Removal and Installation

INFOID:0000000001116791

REMOVAL

1. Remove the back door finisher.
   Refer to EXT-31, "Exploded View" and EXT-31, "Removal and Installation".
2. Remove the back door opener switch (1) from back door finisher (2) using flat-bladed screw driver (A) etc.



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

INTELLIGENT KEY BATTERY

Exploded View

INFOID:0000000001109246

Refer to DLK-281, "Removal and Installation".

Removal and Installation

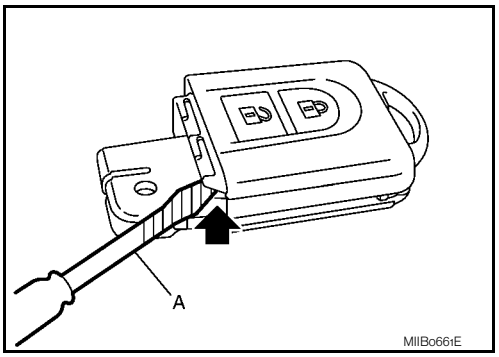
INFOID:0000000001109247

REMOVAL

1. Remove Intelligent Key cover.
2. Insert a flat-bladed screwdriver (A) wrapped with tape as shown in the illustration and then separate lower and upper cases by twisting screwdriver.

CAUTION:

- **Do not touch the circuit board or battery terminal.**
- **The Intelligent Key is water-resistant. However, if it does get wet, immediately wipe it dry.**



3. Remove the circuit board assembly from the upper case (1). [Substrate assembly: circuit board (3) + rubber (2)]
4. Gently press the rubber (2) and remove the circuit board (3).

CAUTION:

Do not touch the printed circuits directly.

5. Remove the battery (4) from the lower case (5) and replace it.

Battery replacement : Coin-type lithium battery (CR2032)

CAUTION:

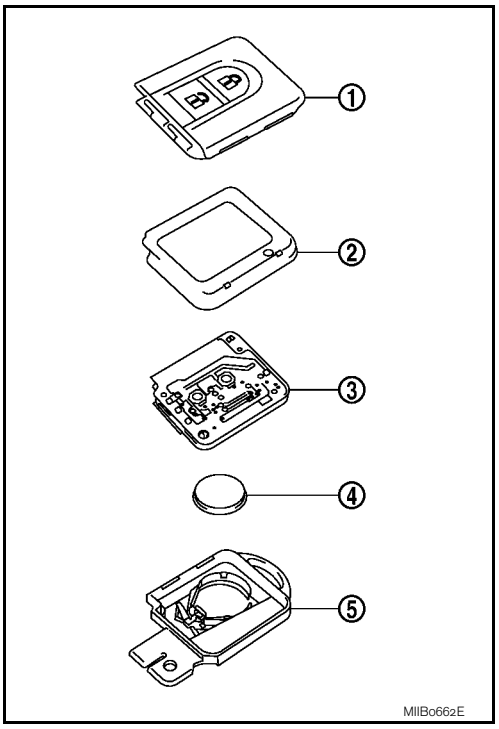
When replacing battery, keep dirt, grease, and other foreign materials off the electrode contact area.

6. After replacement, assemble the upper and lower cases by engaging the hooks on their circumference while being careful not to pinch the rubber, etc.

CAUTION:

After replacing the battery, check that all Intelligent Key functions work normally.

Refer to DLK-134, "Component Function Check".



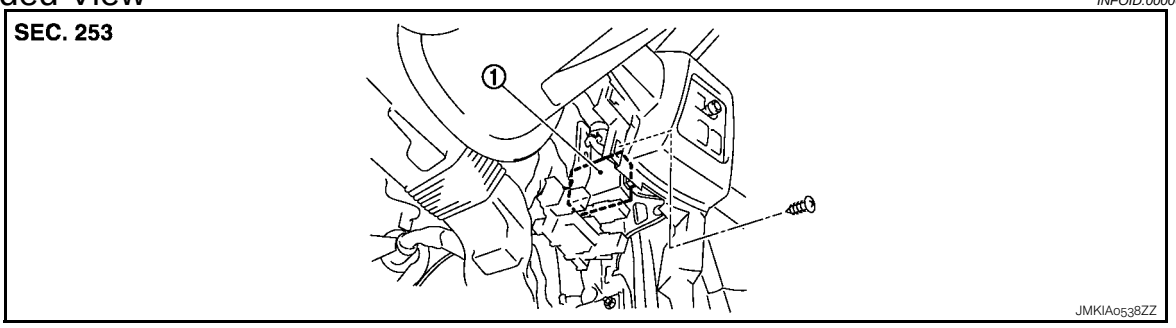
INSTALLATION

Install in the reverse order of removal.

INTELLIGENT KEY UNIT

Exploded View

INFOID:0000000001116437



1. Intelligent Key unit
M40

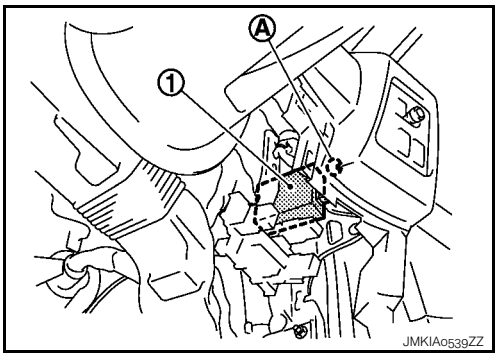
Refer to DLK-551, "Removal and Installation".

Removal and Installation

INFOID:0000000001116438

REMOVAL

1. Remove lower instrument panel (driver side) and mirror switch finisher. Refer to IP-11, "Exploded View" and IP-12, "Removal and Installation".
2. Remove the Intelligent Key unit mounting screw (A), and then remove Intelligent Key unit (1).
NOTE:
Perform the system initialization when replacing Intelligent Key unit. Refer to DLK-23, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

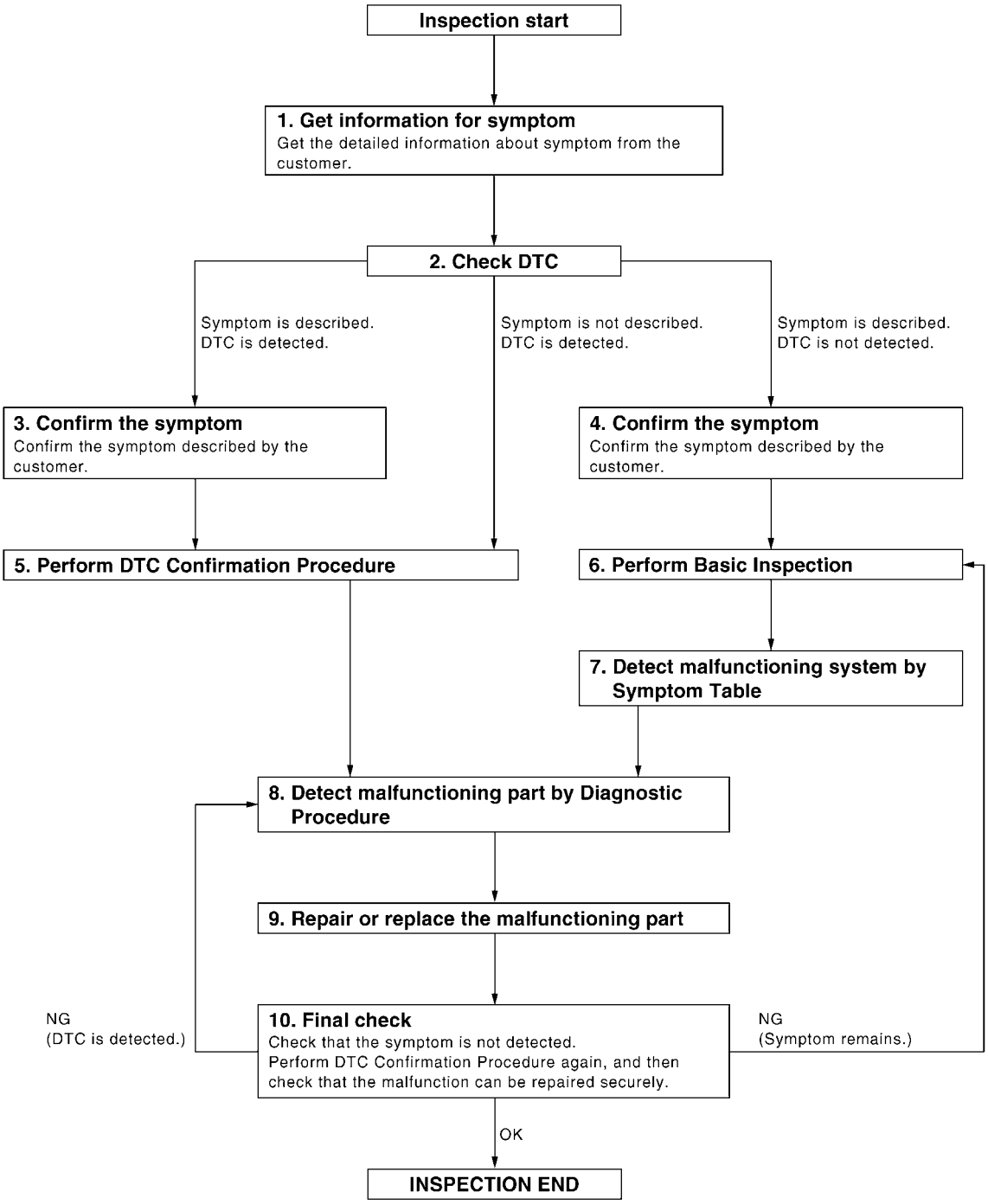
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001102242

OVERALL SEQUENCE



JMKIA0101GB

DETAILED FLOW

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred).

>> GO TO 2.

2.CHECK DTC

1. Check DTC for BCM.
2. Perform the following procedure if DTC is displayed.

- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.

3. Check related service bulletins for information.

Is any symptom described and any DTC detected?

Symptom is described, DTC is displayed>>GO TO 3.
Symptom is described, DTC is not displayed>>GO TO 4.
Symptom is not described, DTC is displayed>>GO TO 5.

3.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR ” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC Confirmation Procedure for the displayed DTC, and then check that DTC is detected again.
If two or more DTCs are detected, refer to DLK-643, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

Is DTC detected?

YES >> GO TO 8.
NO >> Refer to GI-39, "Intermittent Incident".

6.PERFORM BASIC INSPECTION

Perform Basic Inspection, refer to DLK-660, "Basic Inspection".

Inspection End>>GO TO 7.

7.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to Symptom Table based on the confirmed symptom in step 4.

>> GO TO 8.

8.DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Inspect according to Diagnostic Procedure of the system.
NOTE:
The Diagnostic Procedure described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure.

>> GO TO 9.

cardiagn.com

9.REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it.

>> GO TO 10.

10.FINAL CHECK

When DTC was detected in step 2, perform DTC Confirmation Procedure or Component Function Check again, and then check that the malfunction have been repaired securely.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Does the symptom reappear?

YES (DTC is detected)>>GO TO 8.
YES (Symptom remains)>>GO TO 6.
NO >> **INSPECTION END**

carsdiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000001102244

Perform the system initialization when replacing or registering Keyfob and ignition key.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000001102245

Refer to the CONSULT-III Operation Manual-NATS.

cardiagn.com

FUNCTION DIAGNOSIS

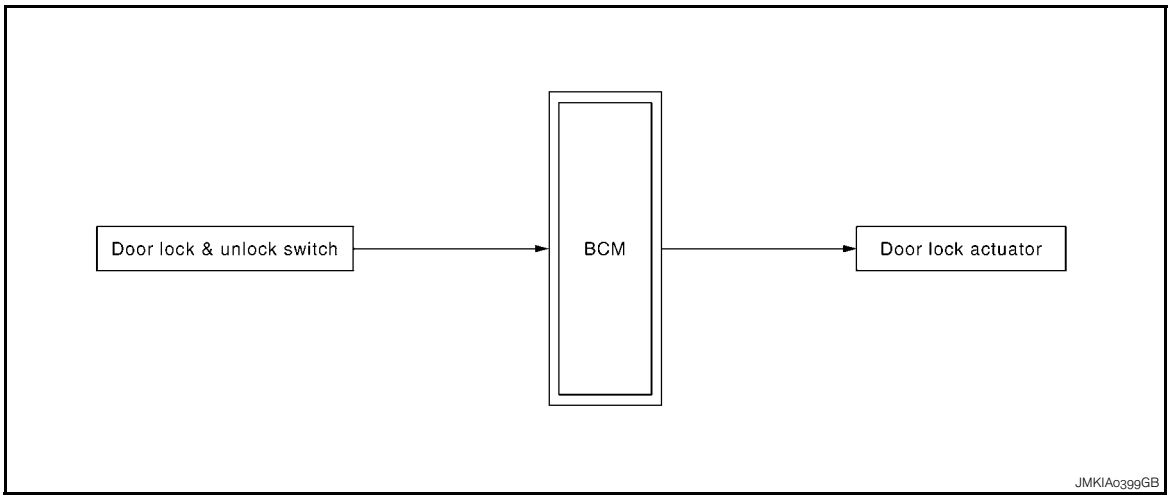
DOOR LOCK FUNCTION

DOOR LOCK AND UNLOCK SWITCH

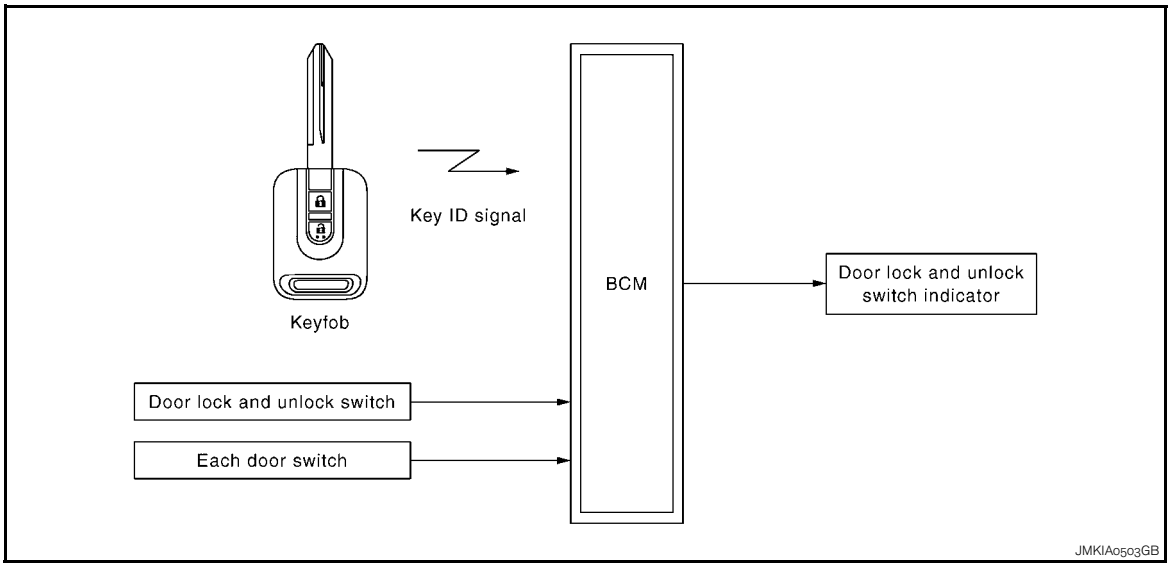
DOOR LOCK AND UNLOCK SWITCH : System Diagram

INFOID:0000000001081575

DOOR LOCK AND UNLOCK SWITCH OPERATION



DOOR LOCK AND UNLOCK SWITCH INDICATOR OPERATION



DOOR LOCK AND UNLOCK SWITCH : System Description

INFOID:0000000001081576

DOOR LOCK AND UNLOCK SWITCH OPERATION

Functions are available by operating the door lock and unlock switch on center console. Interlocked with the lock/unlock operation of door lock and unlock switch, door lock actuators of all doors are locked/unlocked.

Operation Condition

If the following conditions are not satisfied, door lock/unlock operation is not performed even if the door lock and unlock switch is operated.

Door lock and unlock switch	Operation condition
Lock operation	All the following conditions are satisfied. • Except driver side, doors are closed. • Doors are not locked with keyfob.
Unlock operation	All the following all conditions are satisfied. • Doors are not locked with keyfob.

NOTE:
When the door lock is locked with keyfob, door lock and unlock switch operation will be invalid until either of the following conditions is satisfied.
- Turn ignition switch ON.
- Unlock operation by keyfob.

DOOR LOCK AND UNLOCK SWITCH INDICATOR OPERATION

Door lock and unlock switch indicator indicates door lock status. The indicator turn ON while ignition switch is ON and door lock is locked. If any door is opened, the indicator will turn OFF.

1 Minute Timer

A timer must be running to turn OFF the indicator. The timer will run for 1 minute after locking with keyfob or auto door lock.

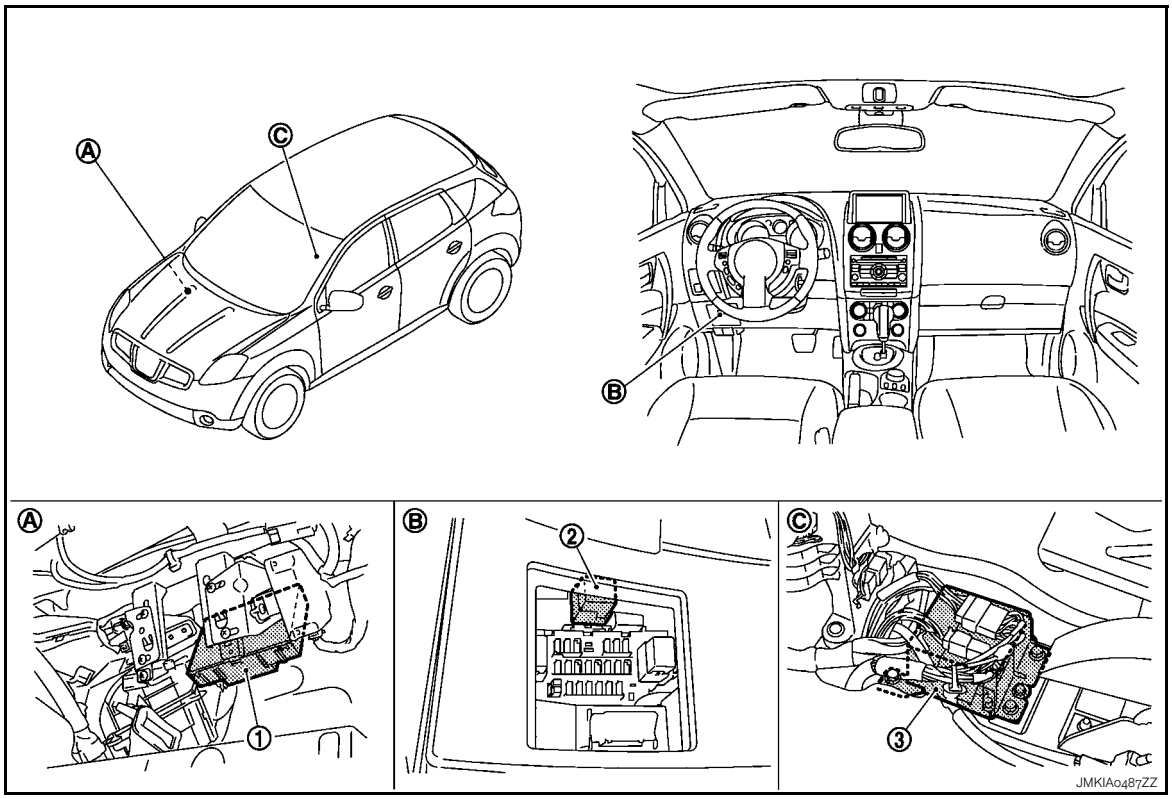
30 Minutes Timer

A timer must be running to turn OFF the indicator. The timer will run for 30 minutes after locking with door lock and unlock switch.

NOTE:
1minute timer condition is satisfied while 30 minutes timer is active, however 30 minutes timer does not change when 1 minutes timer is active.

DOOR LOCK AND UNLOCK SWITCH : Component Parts Location

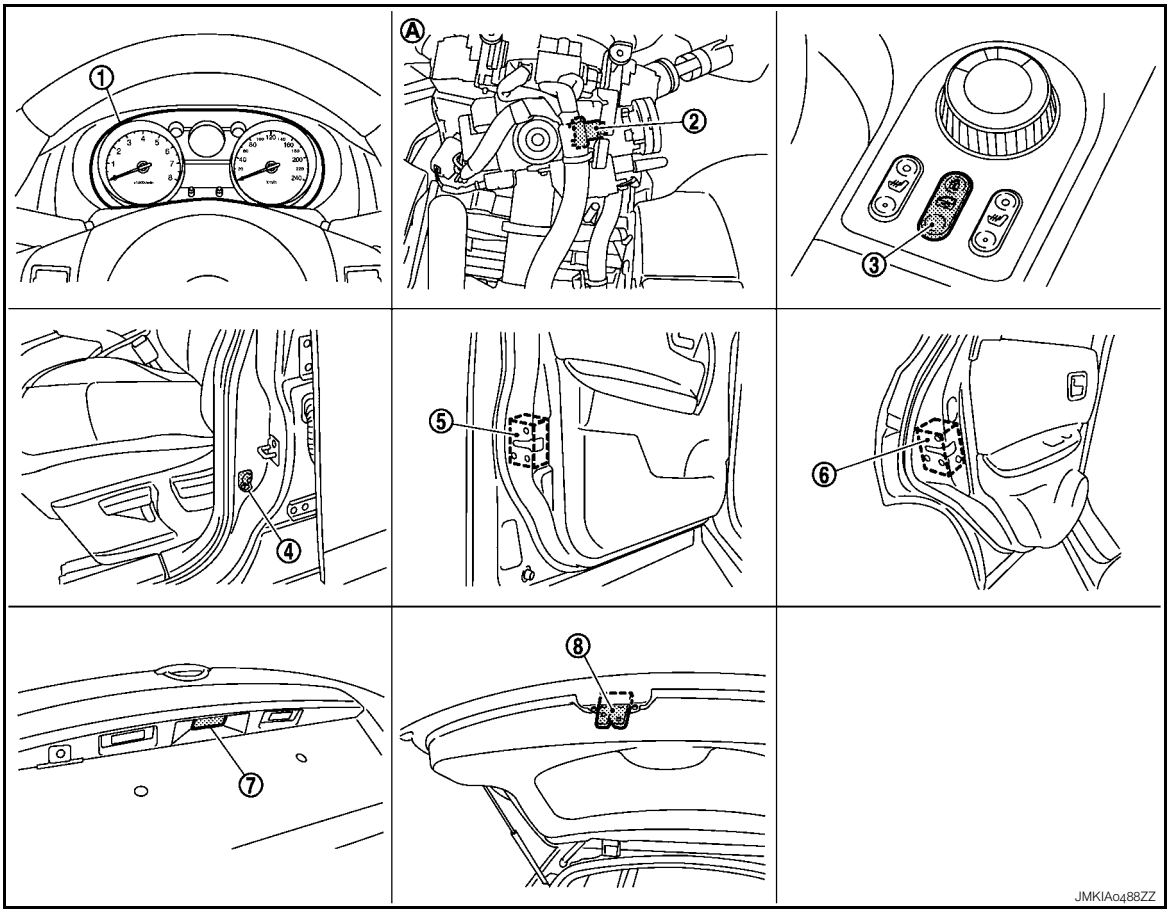
INFOID:0000000001081577



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

cardiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock switch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D9
6. Rear door lock actuator LH D85
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

DOOR LOCK AND UNLOCK SWITCH : Component Description

INFOID:0000000001081578

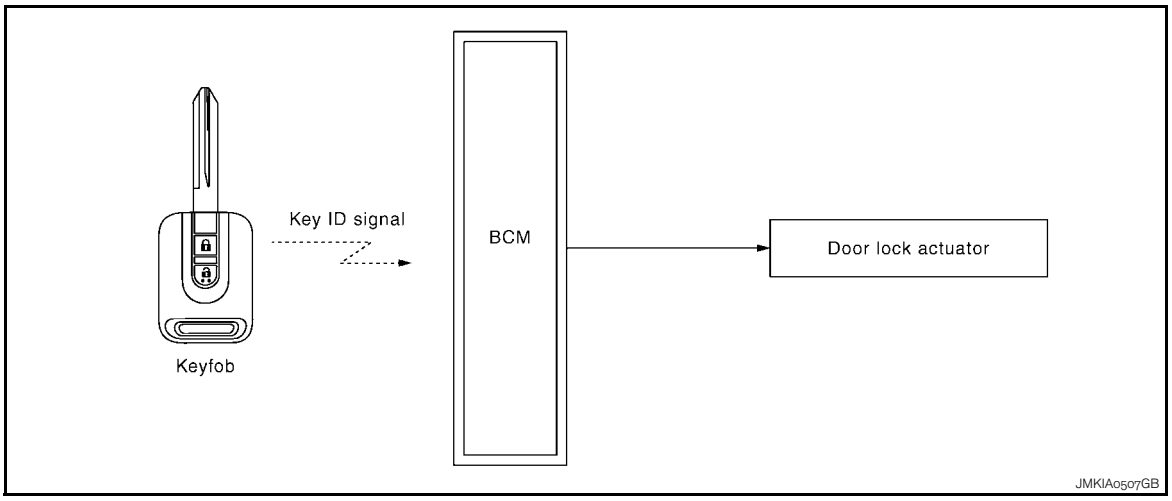
Item	Function
BCM	Controls the door lock and unlock function.
Door switch	Detects door state (open or closed).
Door lock and unlock switch	Transmits door lock and unlock signal to BCM. Door lock and unlock switch indicator is built in door lock and unlock switch.
Door lock actuator	Receives door lock and unlock signal from BCM and locks and unlocks each door.

KEYFOB

KEYFOB : System Diagram

INFOID:0000000001081583

KEYFOB OPERATION



KEYFOB : System Description

INFOID:0000000001081584

KEYFOB OPERATION

The multi remote control system can be locked and unlocked by pressing door lock and unlock button of key-fob.

DOOR LOCK AND UNLOCK OPERATION

When door lock and unlock button of keyfob is pressed, door lock and unlock signal transmits from keyfob to BCM. When BCM receives the door lock and unlock signal, it operates door lock actuator.

OPERATION CONDITION

Remote controller operation	Operation condition
Lock/unlock	Key switch is OFF (key is removed from ignition key cylinder).

OPERATION AREA

To ensure that the keyfob works effectively, use within 100 cm range of each door, however the operable range may differ according to surroundings.

ANTI-HIJACK MODE

When door lock is unlocked, pressing LOCK button on keyfob once will lock all doors. When door lock is locked, pressing UNLOCK button on keyfob will unlock driver side door. Pressing UNLOCK button on keyfob second time within 5 seconds from the first time will unlock all doors and back door can be opened with back door opener switch.

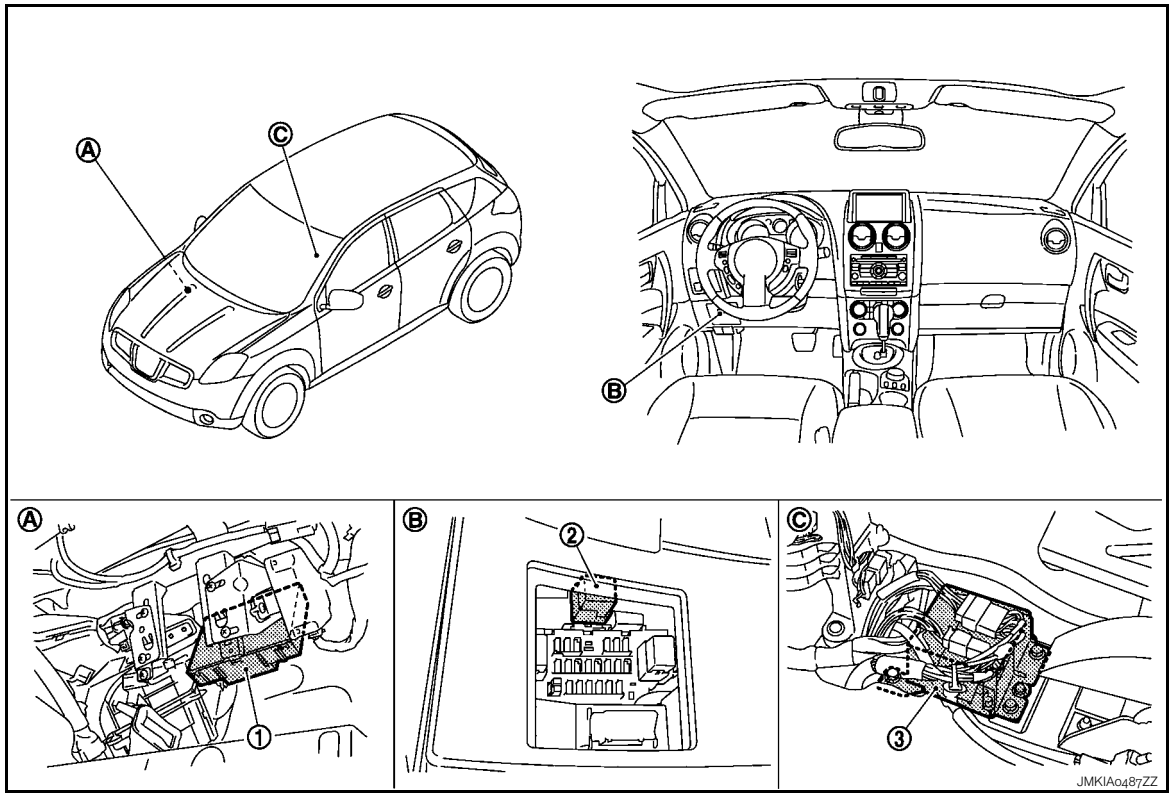
NOTE:

Anti-hijack mode can be set to ON or OFF with CONSULT-III. For the setting information, refer to DLK-580, "MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT)".

KEYFOB : Component Parts Location

INFOID:0000000001117091

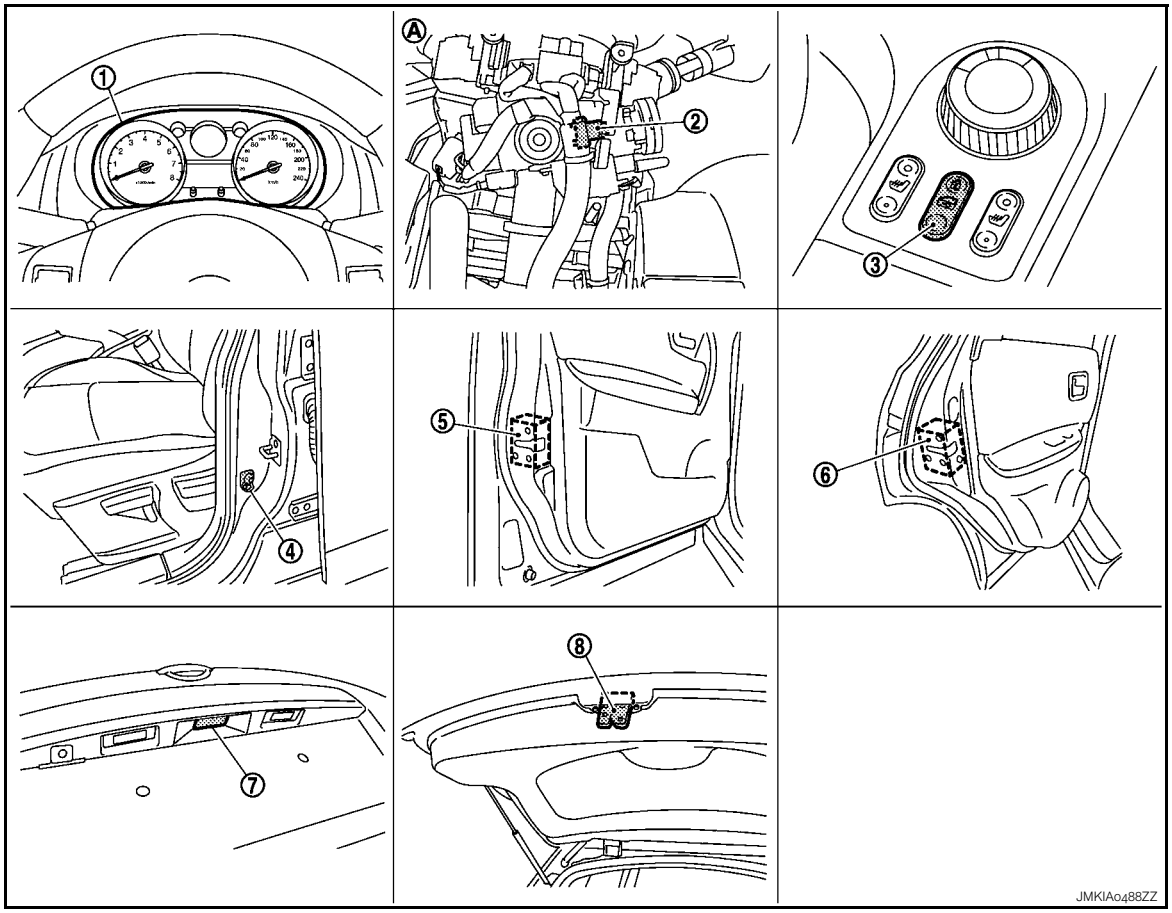
cardiagn.com



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

carsdiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock switch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D9
6. Rear door lock actuator LH D85
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

KEYFOB : Component Description

INFOID:0000000001081586

Item	Function
BCM	Controls the door lock function.
Key switch	Detects that ignition key is inserted into ignition key cylinder.
Door lock actuator	Receives lock and unlock signal from BCM and locks and unlocks each door.

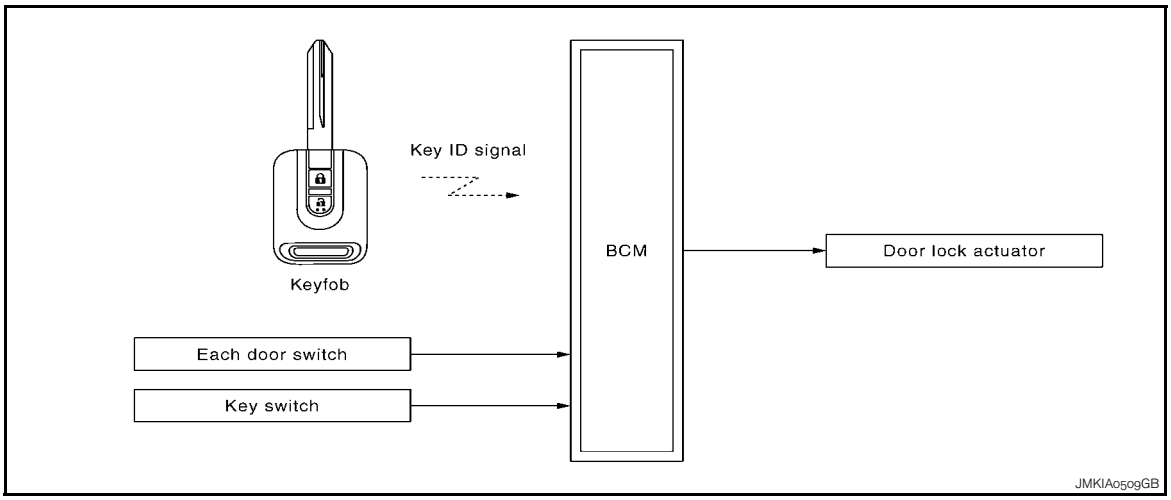
AUTO DOOR LOCK

AUTO DOOR LOCK : System Diagram

INFOID:0000000001081607

cardiagn.com

AUTO DOOR LOCK OPERATION



AUTO DOOR LOCK : System Description

INFOID:0000000001081608

AUTO RELOCK OPERATION

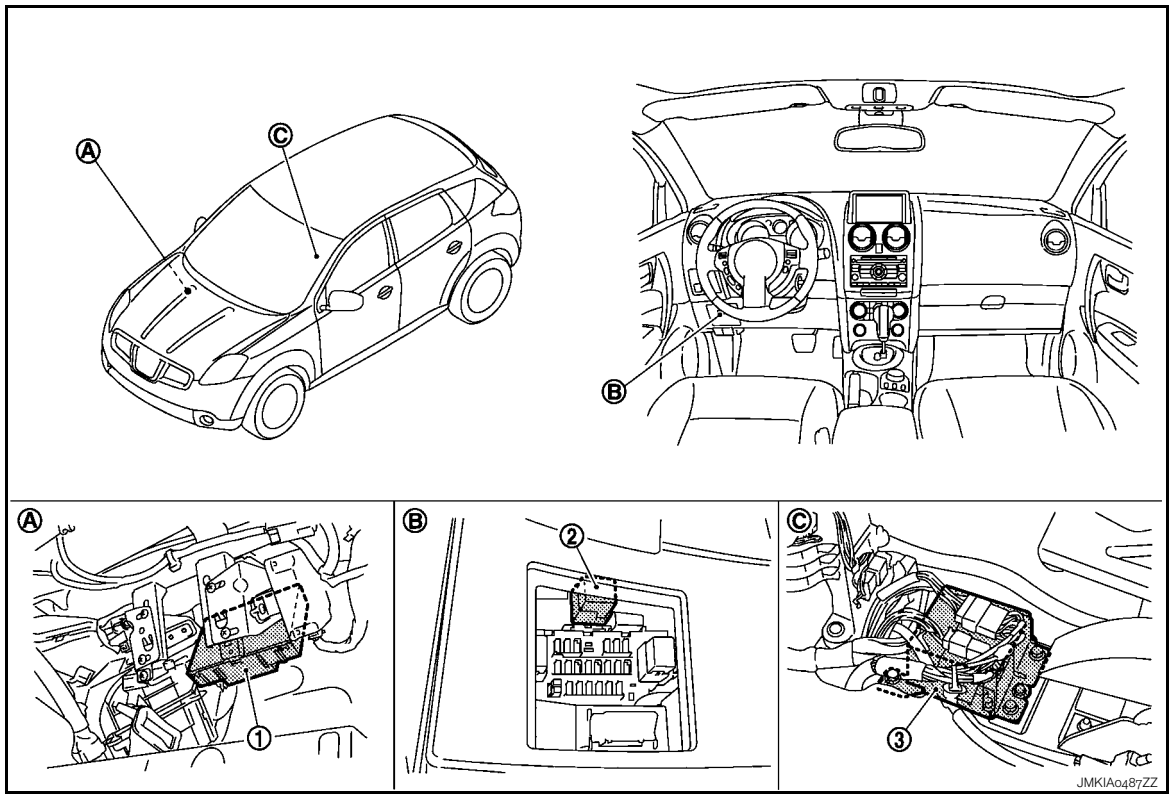
When all doors are locked and then doors are unlocked with keyfob, if BCM does not receive the following signal within 2 minutes*1, all doors are automatically locked.

- Any door is opened.
- Ignition key is inserted into ignition key cylinder.
- Door is locked with keyfob.
- Door is locked/unlocked with door lock and unlock switch.

*1: The time can be changed with CONSULT-III. Refer to DLK-580, "MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT)".

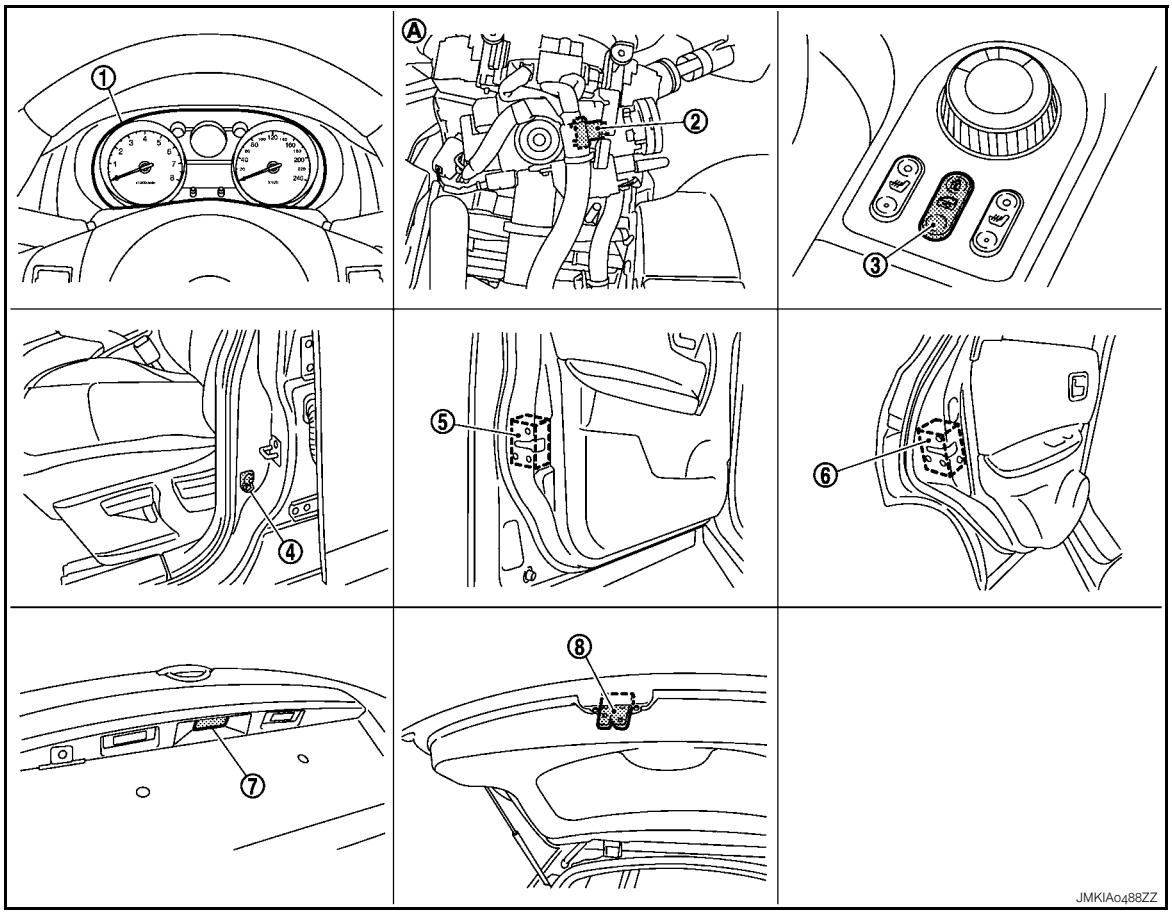
AUTO DOOR LOCK : Component Parts Location

INFOID:0000000001117092



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed



1. Combination meter
   M34
2. Key switch
   M24
3. Door lock and unlock switch
   M89
4. Front door switch (driver side)
   B34
5. Front door lock actuator (driver side)
   D9
6. Rear door lock actuator LH
   D85
7. Back door opener switch
   D186
8. Back door lock assembly
   D152

A. View with steering column cover removed

AUTO DOOR LOCK : Component Description

INFOID:0000000001081610

Item	Function
BCM	Controls the door lock function.
Door switch	Detects door state (open or closed).
Key switch	Detects that ignition key is inserted into ignition key cylinder.
Door lock/unlock switch	Transmits door lock/unlock signal to BCM.
Keyfob	Transmits key ID to BCM when lock and unlock button is pressed.
Door lock actuator	Receives lock/unlock signal from BCM and locks/unlocks each door.

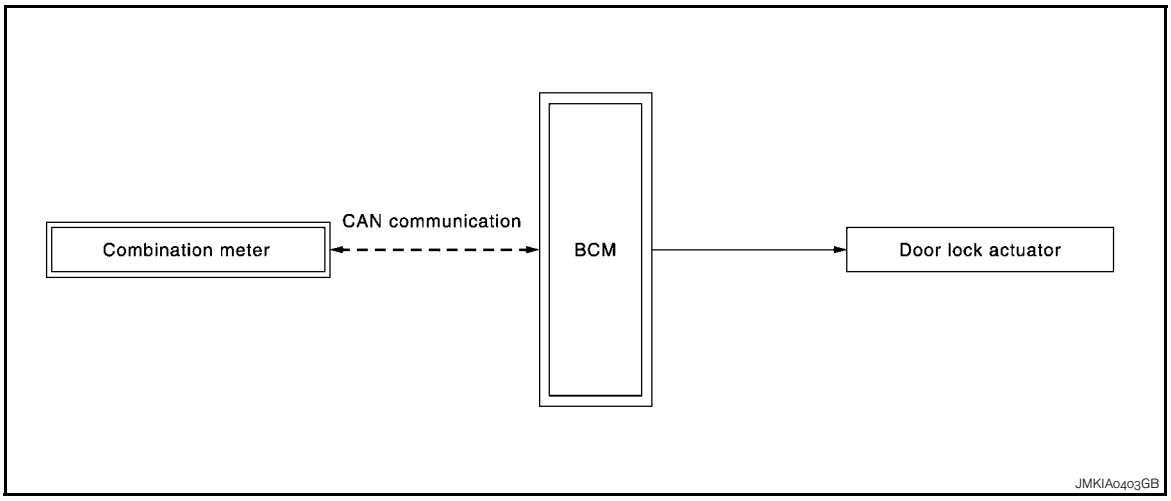
VEHICLE SPEED SENSING AUTO DOOR LOCK

VEHICLE SPEED SENSING AUTO DOOR LOCK : System Diagram

INFOID:0000000001081611

cardiagn.com

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION



VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description

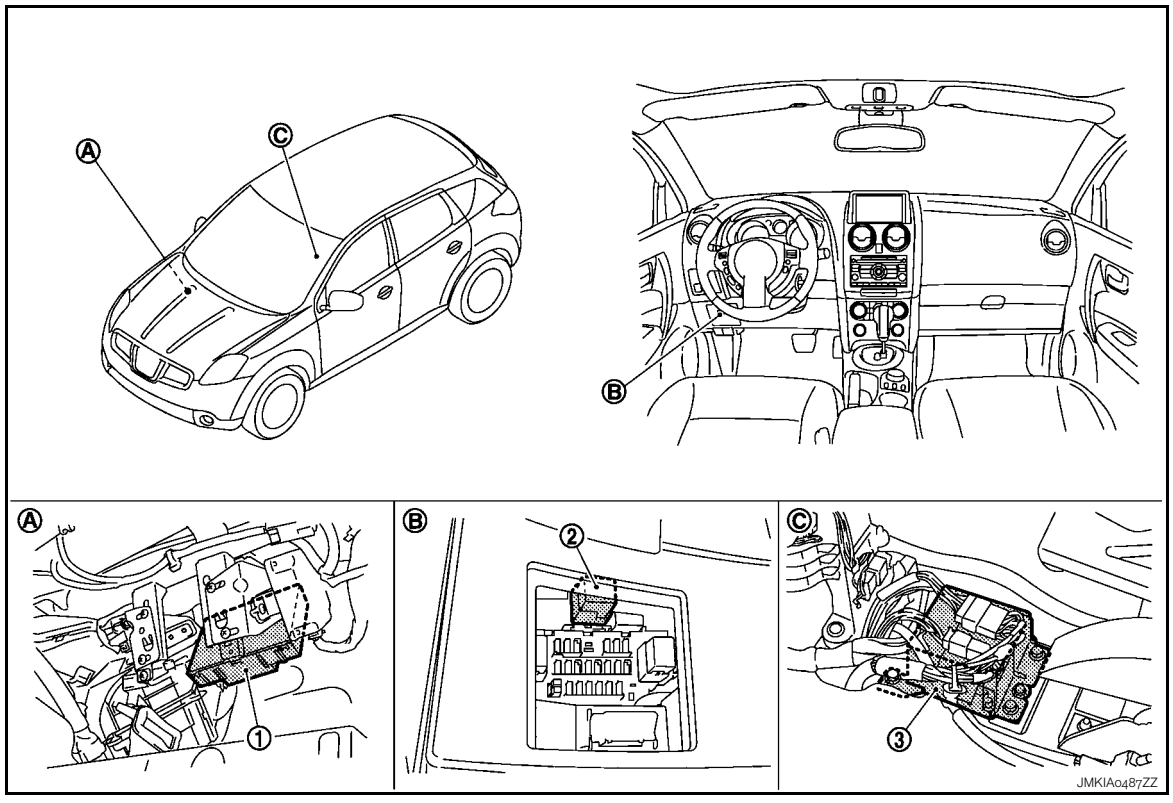
INFOID:0000000001081612

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION

When the vehicle speed exceeds more than 12 km/h (7 MPH), all doors are automatically locked. The vehicle speed signal is received from combination meter via CAN communication.

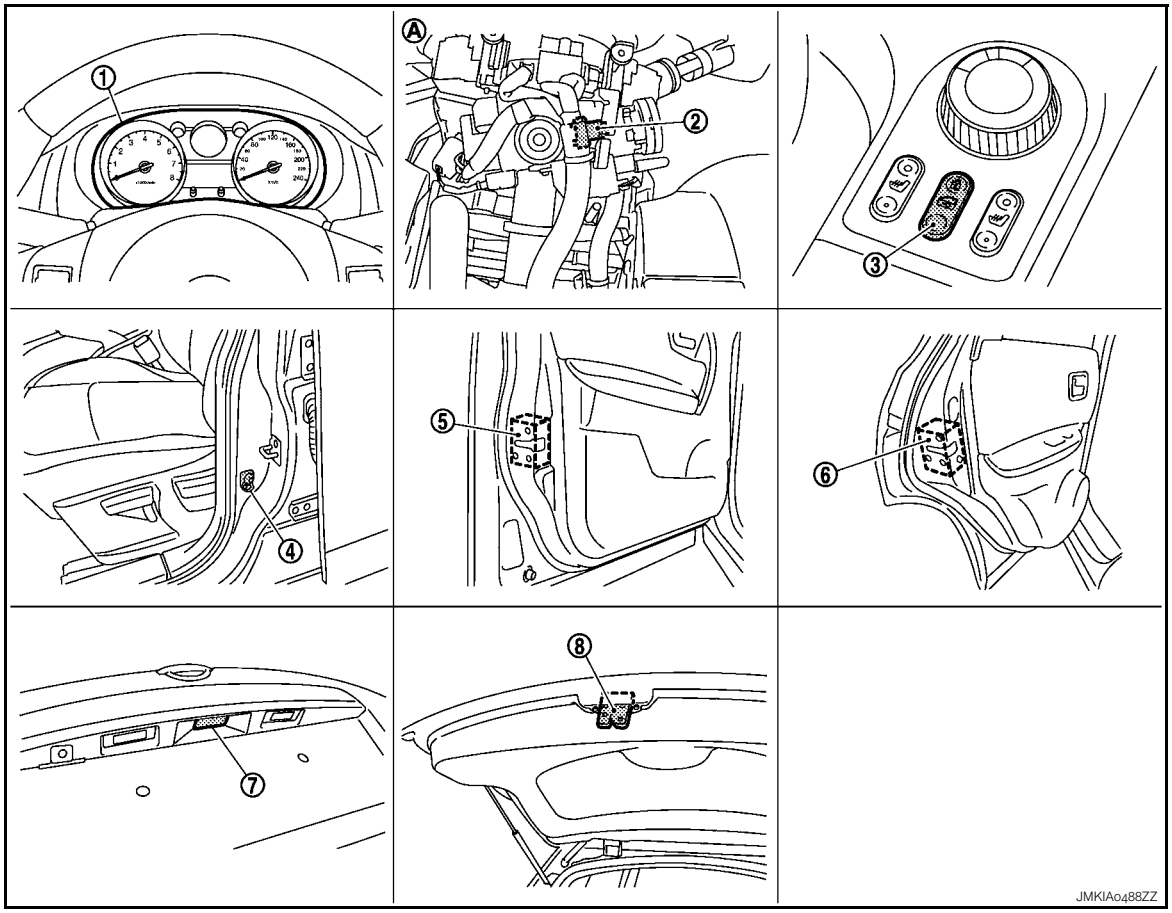
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Parts Location

INFOID:0000000001117093



1. BCM M65, M66, M67
2. Passenger side anti-hijack relay M90
3. Air bag diagnosis sensor unit M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock switch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D9
6. Rear door lock actuator LH D85
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Description

INFOID:0000000001081614

Item	Function
BCM	Controls the door lock function.
Combination meter	Transmits vehicle speed signal to BCM via CAN communication.
Door lock actuator	Receives door lock and unlock signal from BCM and locks and unlocks each door.

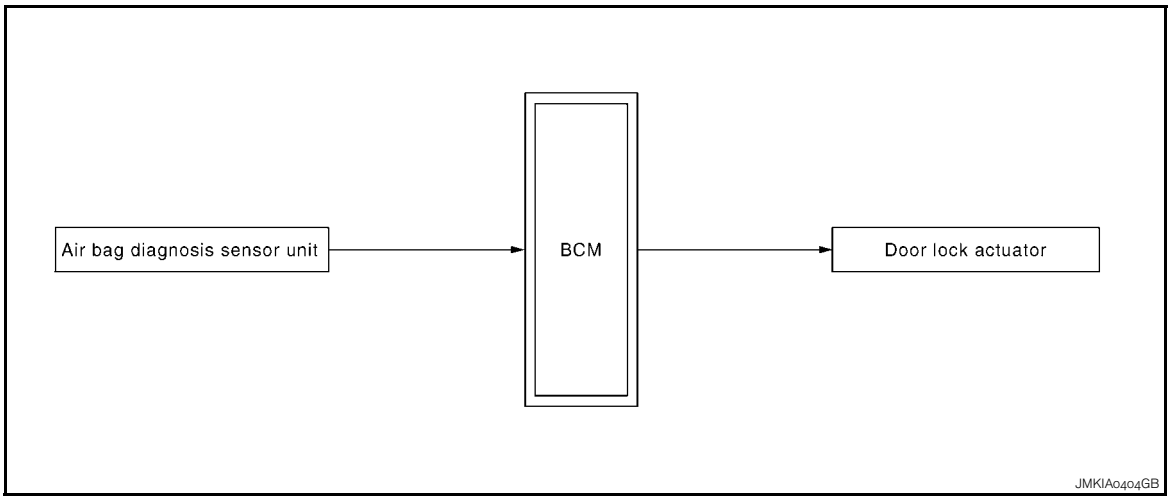
AIR BAG INTERLOCK UNLOCK

AIR BAG INTERLOCK UNLOCK : System Diagram

INFOID:0000000001081615

cardiagn.com

AIR BAG INTERLOCK UNLOCK OPERATION



AIR BAG INTERLOCK UNLOCK : System Description

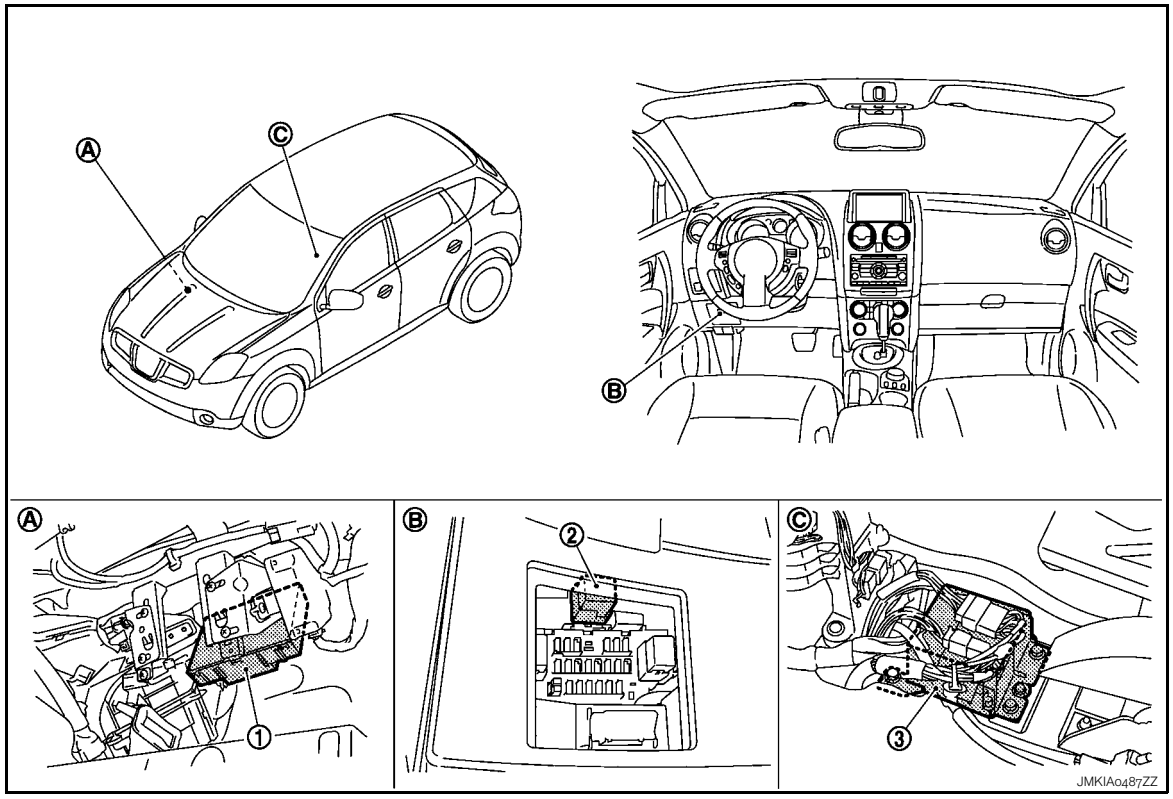
INFOID:0000000001081616

AIR BAG INTERLOCK UNLOCK OPERATION

When ignition switch is ON and BCM receive air bag deployment signal, it operates automatically to unlock all doors. Air bag diagnosis sensor unit sends the air bag deployment signal to BCM.

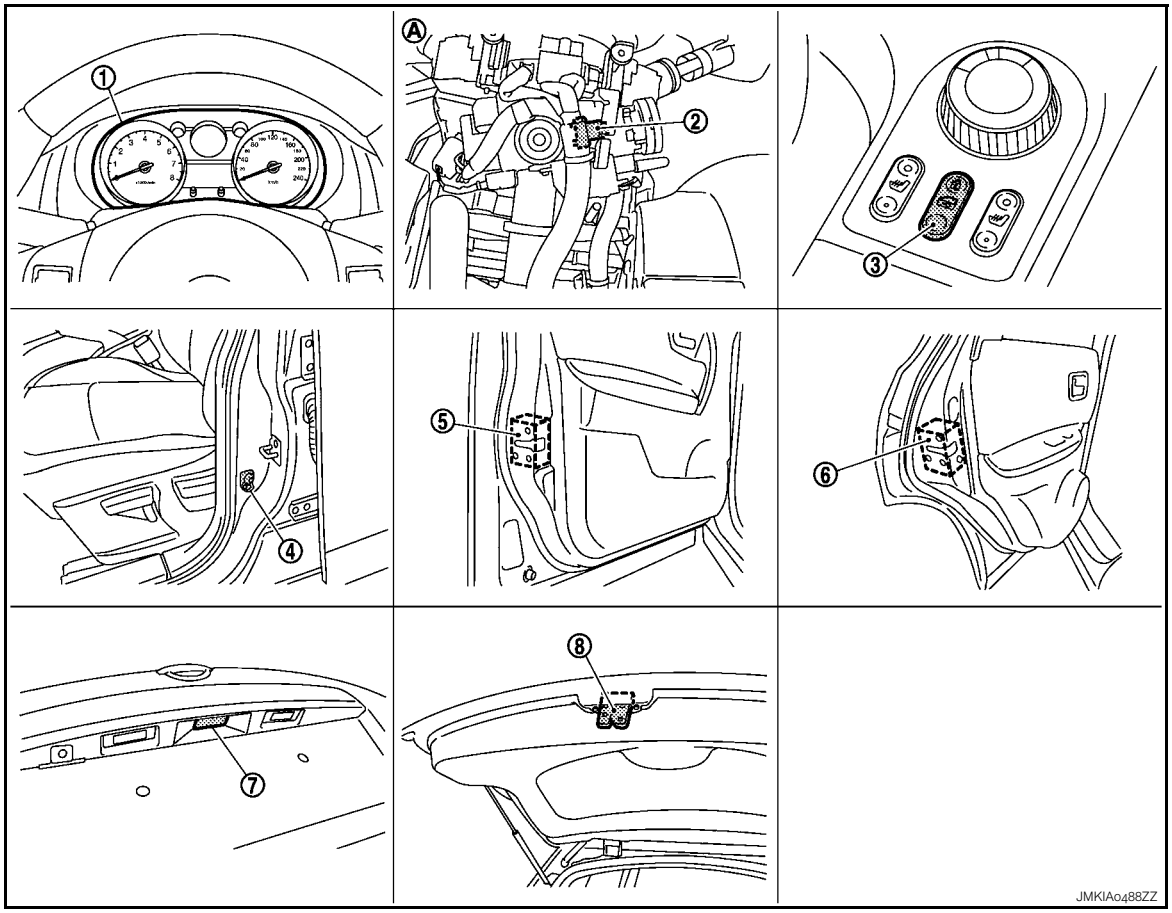
AIR BAG INTERLOCK UNLOCK : Component Parts Location

INFOID:0000000001117094



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock switch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D9
6. Rear door lock actuator LH D85
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

AIR BAG INTERLOCK UNLOCK : Component Description

INFOID:0000000001081618

Item	Function
BCM	Controls the door lock function.
Air bag diagnosis sensor unit	Transmits air bag deployment signal to BCM.
Door lock actuator	Receives door lock and unlock signal from BCM and lock and unlock each door.

cardiagn.com

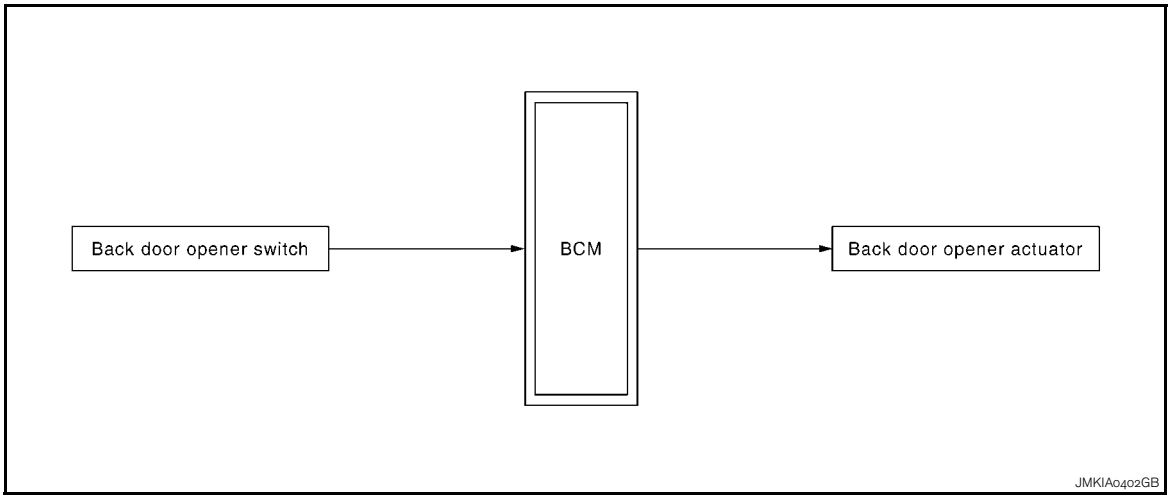
BACK DOOR OPENER FUNCTION

BACK DOOR OPENER SWITCH

BACK DOOR OPENER SWITCH : System Diagram

INFOID:0000000001081619

BACK DOOR OPENER OPERATION



BACK DOOR OPENER SWITCH : System Description

INFOID:0000000001081620

BACK DOOR OPENER OPERATION

When back door opener switch is pressed, BCM opens back door opener actuator.

NOTE:

Back door opener actuator is not for locking the back door. The function is only to open the back door.

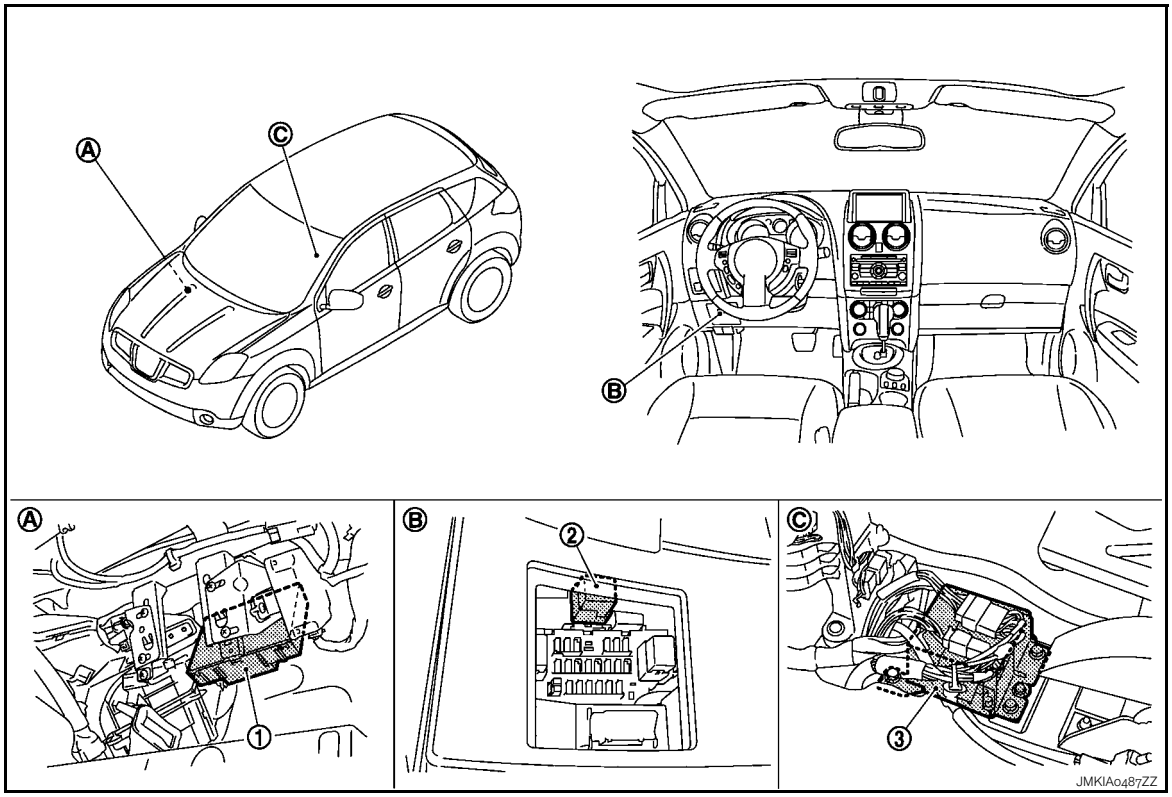
OPERATION CONDITION

If the following conditions are not satisfied, back door opener operation is not performed.

Back door opener switch operation	Operation condition
Back door open	• Vehicle speed is less than 5 km/h (3 MPH). • All doors are unlocked.

BACK DOOR OPENER SWITCH : Component Parts Location

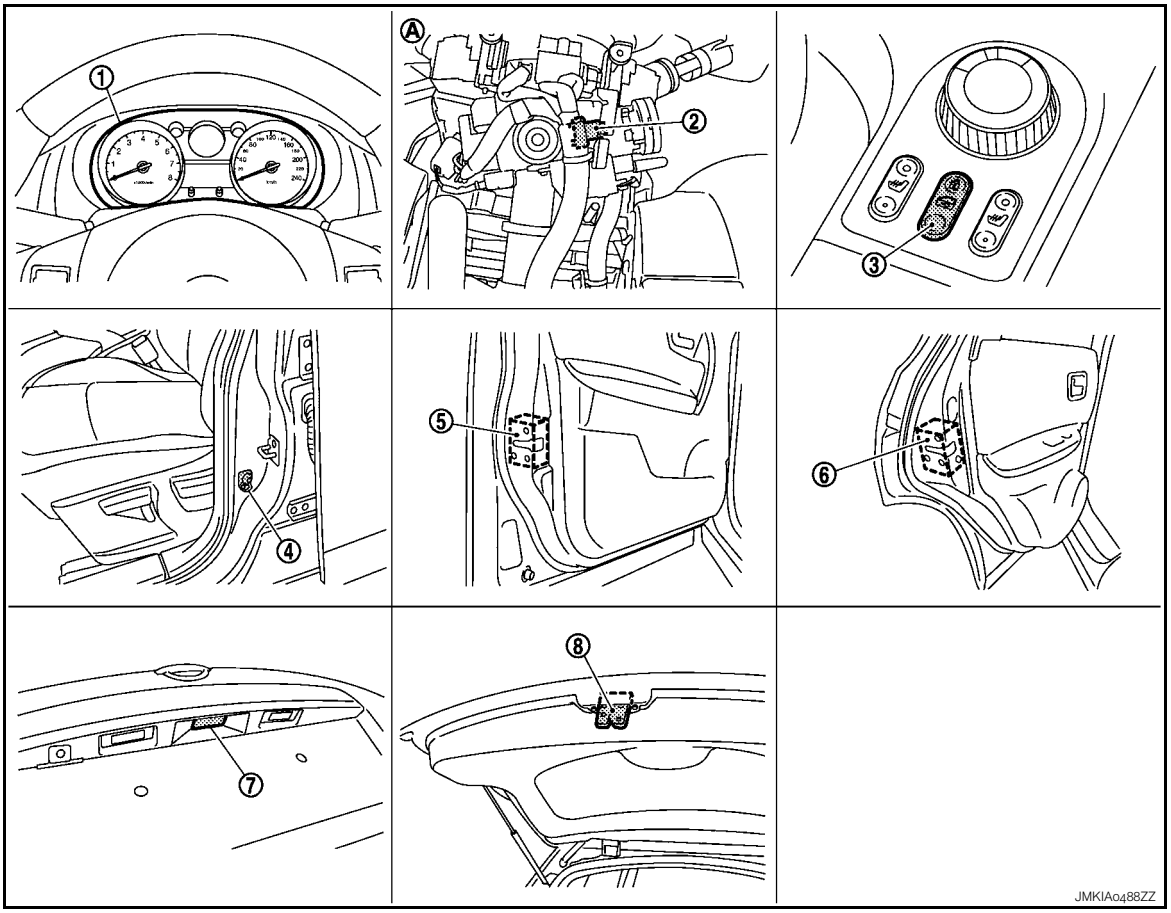
INFOID:0000000001117095



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

cardiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock switch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D9
6. Rear door lock actuator LH D85
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

BACK DOOR OPENER SWITCH : Component Description

INFOID:0000000001081622

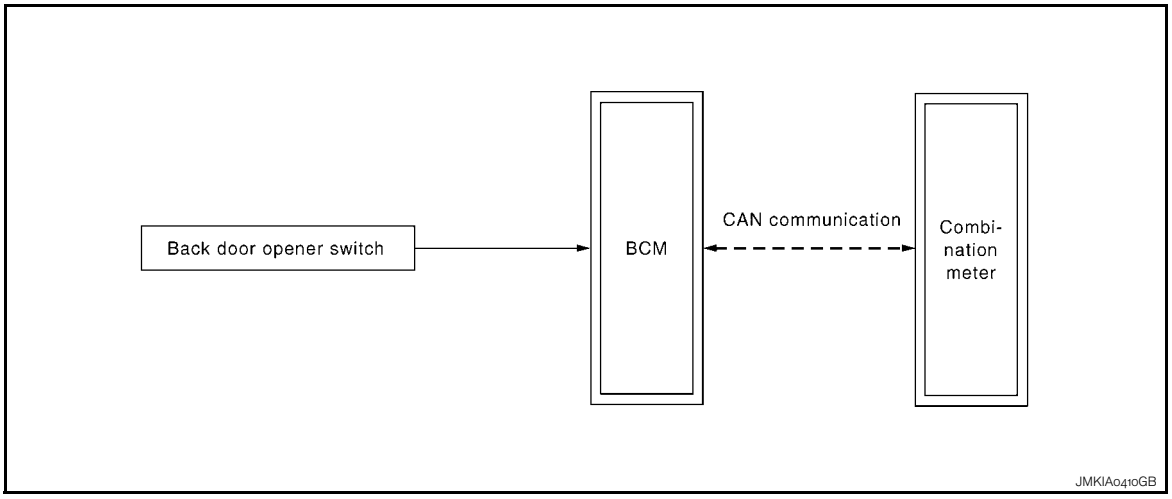
Item	Function
BCM	Controls the back door opener function.
Back door opener switch	Transmits back door opener switch operation signal to BCM.
Back door opener actuator	Opens the back door with the back door open signal from BCM.
Combination meter	Transmits vehicle speed signal to BCM via CAN communication.

WARNING FUNCTION

System Diagram

INFOID:0000000001081636

BACK DOOR OPEN WARNING



System Description

INFOID:0000000001081637

BACK DOOR OPEN WARNING OPERATION

Back door opener switch is operated, when door lock is locked with door lock and unlock switch, by speed sensing lock or when only the driver side is unlocked by the anti-hijack function, the buzzer (built in combination meter) will sound.

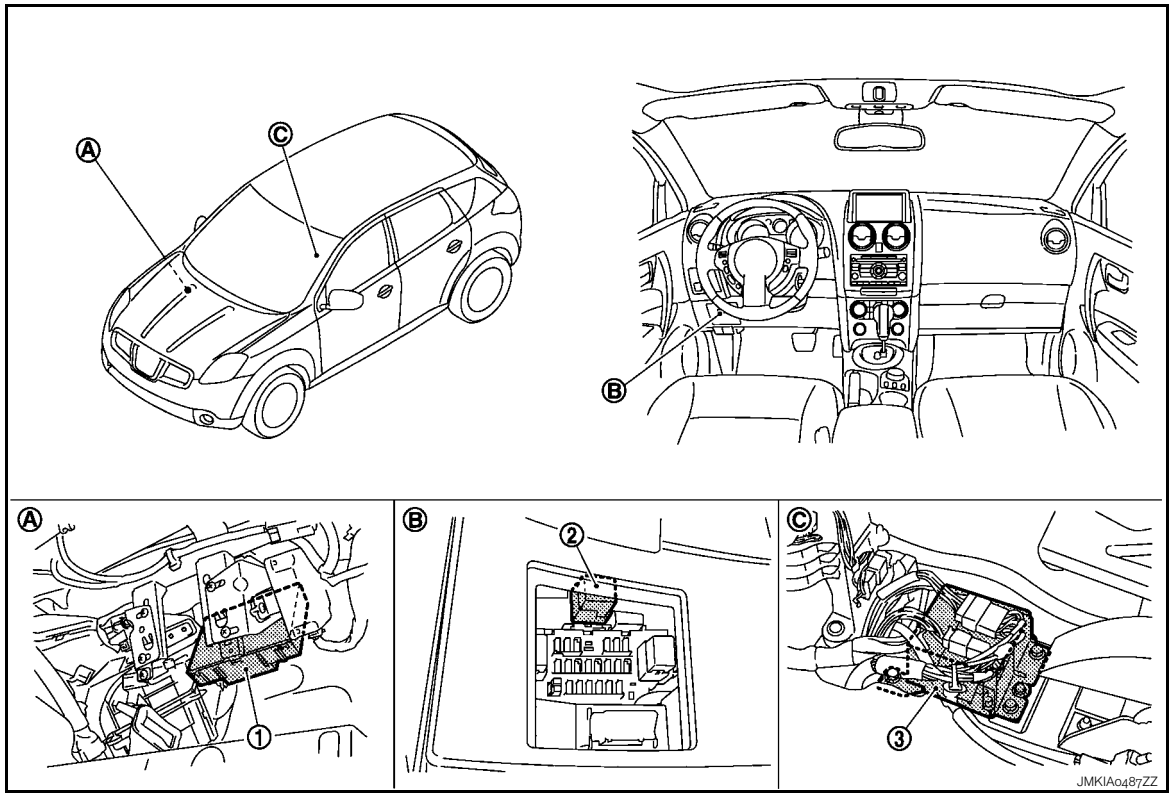
KEY REMINDER OPERATION

- The buzzer (combination meter) will sound and the doors will not lock if the door lock and unlock switch is pressed while the driver door is open and mechanical key is inserted ignition key cylinder.
- The buzzer (combination meter) will sound and the doors will not lock if the door lock and unlock switch is pressed while any door other than the driver door is open.

Component Parts Location

INFOID:0000000001117096

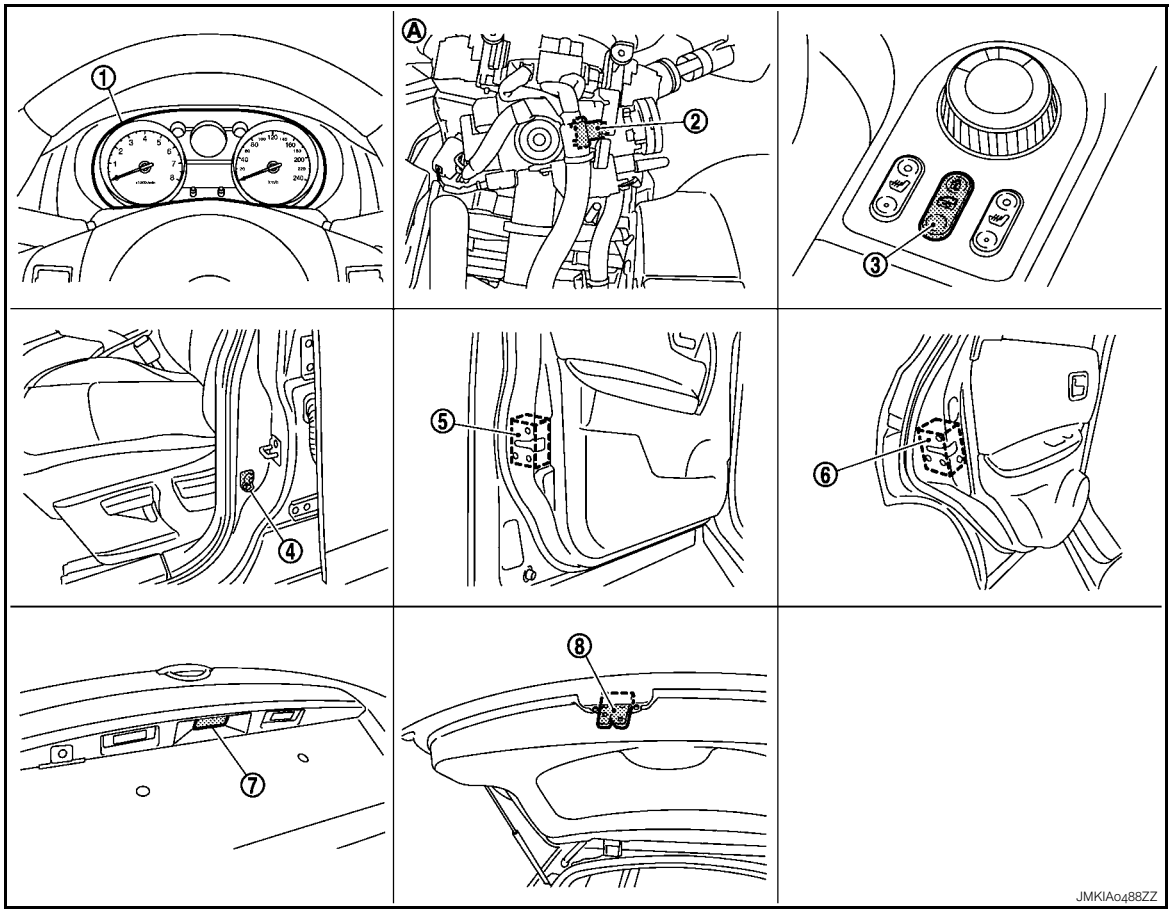
cardiagn.com



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

carsdiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock switch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D9
6. Rear door lock actuator LH D85
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

Component Description

INFOID:0000000001081639

Item	Function
BCM	Controls the warning function.
Combination meter	Sounds the buzzer by the request signal from BCM via CAN communication.
Back door opener switch	Transmit back door open signal to BCM

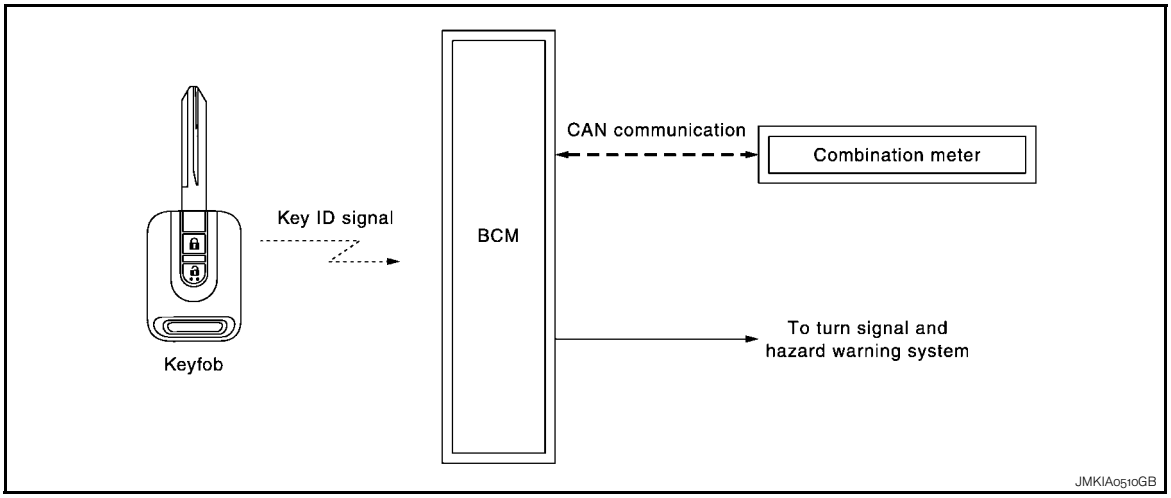
cardiagn.com

HAZARD REMINDER FUNCTION

System Diagram

INFOID:0000000001081703

HAZARD REMINDER FUNCTION



System Description

INFOID:0000000001081704

HAZARD REMINDER OPERATION

When door is locked or unlocked by keyfob, then BCM flashes hazard warning lamp as a reminder.

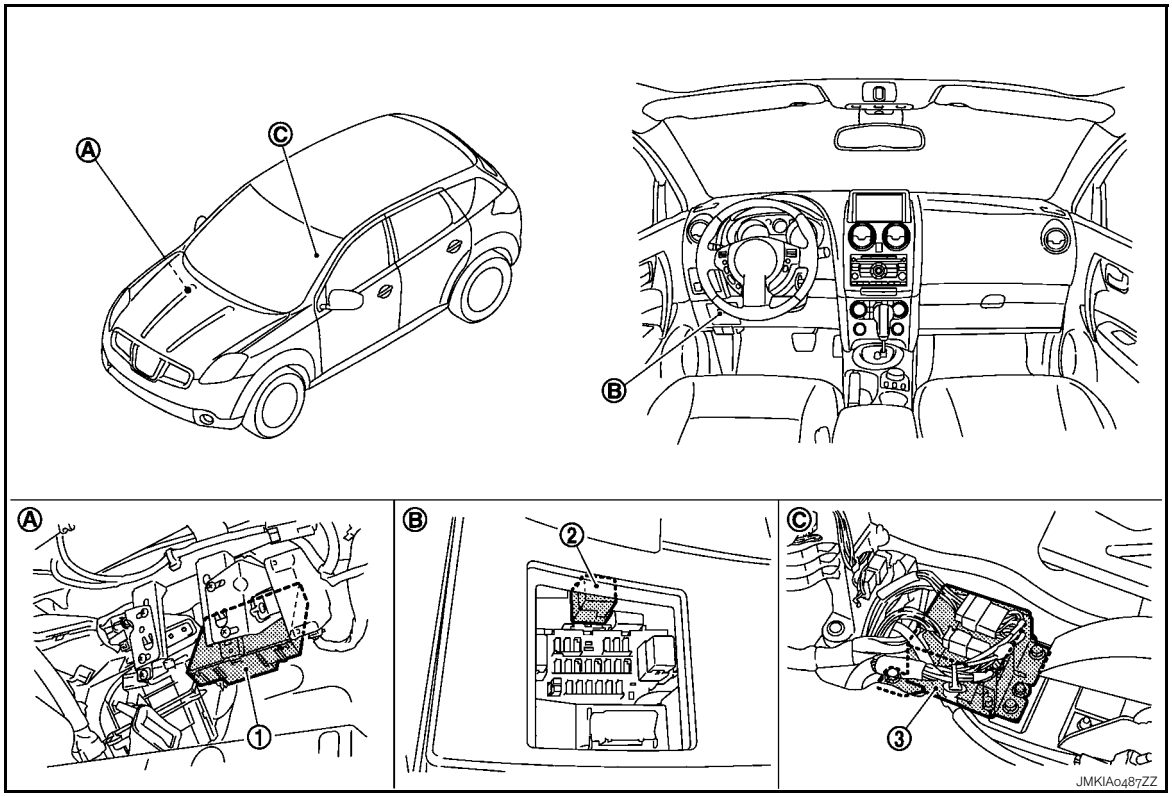
NOTE:

Hazard reminder mode can be changed with CONSULT-III. Refer to DLK-580, "MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT)".

Hazard reminder setting (With CONSULT-III)		Door lock operation (with keyfob)	Hazard warning lamp flash
HAZARD LAMP SET	MODE 1	—	—
	MODE 2	Lock	Once
		Unlock	—
	MODE 3	Lock	—
		Unlock	Twice
	MODE 4	Lock	Once
		Unlock	Twice

Component Parts Location

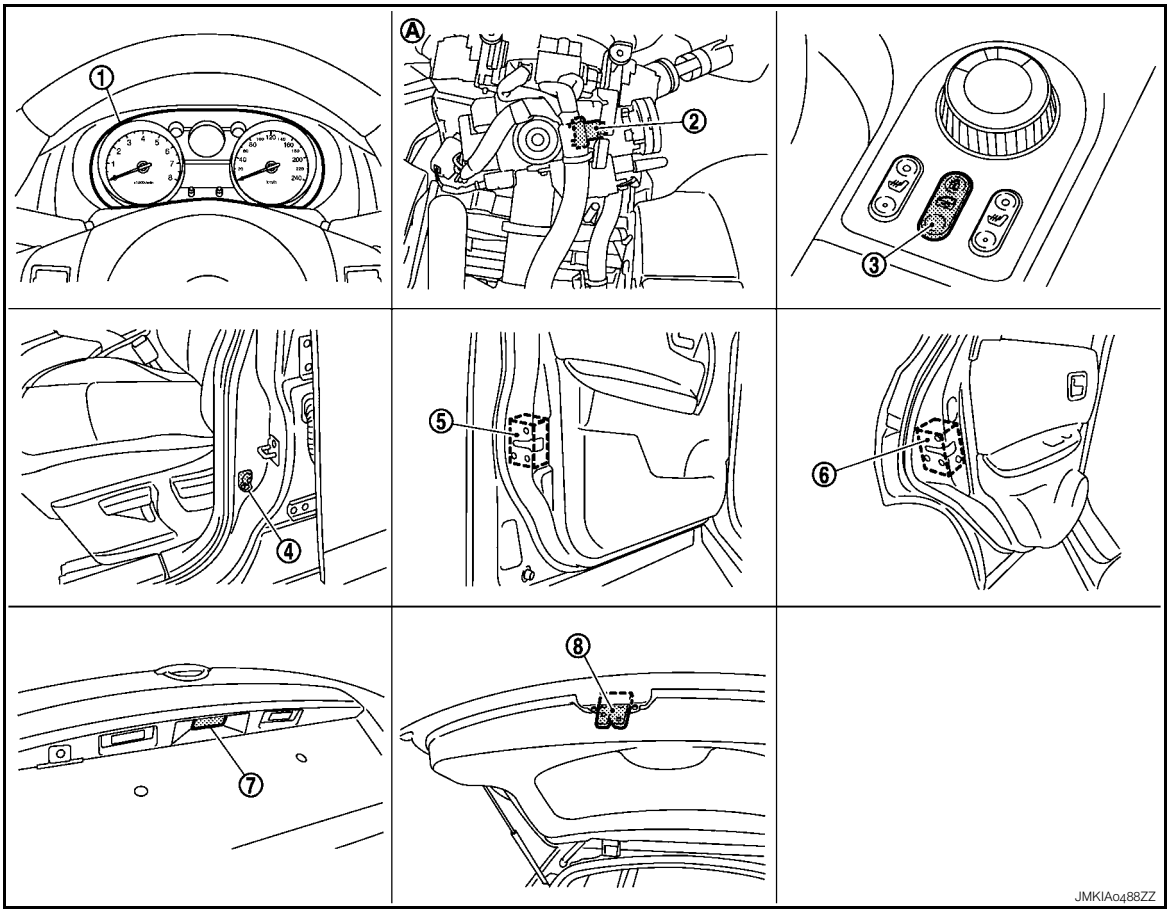
INFOID:0000000001117097



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

cardiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock switch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D9
6. Rear door lock actuator LH D85
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

Component Description

INFOID:0000000001081706

Item	Function
BCM	Controls the hazard reminder system.
Combination meter	Turns ON the turn signal indicator (built in combination meter) by the request from BCM via CAN communication.
Keyfob	Transmits key ID to BCM when lock and unlock button is pressed.

DIAGNOSIS SYSTEM (BCM)
COMMON ITEM
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001096702

APPLICATION ITEM
CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION
BCM can perform the following functions for each system.
NOTE:
It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

DOOR LOCK
DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)

INFOID:0000000001097316

BCM CONSULT-III FUNCTION
CONSULT-III performs the following functions via CAN communication with BCM.

cardiagn.com

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
KEYLESS LOCK*2	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK*2	Indicates [ON/OFF] condition of unlock signal from key fob.
I-KEY LOCK*1	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK*1	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.
UNLOCK WITH DR	This item is indicated, but not monitored.
UNLOCK SHOCK	Indicates [ON/OFF] condition of signal from air bag diagnosis unit. • ON: During the unlock operation interlock with air bag. • OFF: Other than above.
SHOCK SENSOR	Indicates [NOMAL/ON/OFF] condition of circuit between BCM and air bag diagnosis sensor unit. • NORMAL: Ignition switch ON. (BCM is receiving normal condition signal from air bag diagnosis sensor unit.) • ON: During the receiving of air bag deployment signal from air bag diagnosis sensor unit. • OFF: After the receiving of air bag deployment signal from air bag diagnosis sensor unit.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the multi remote control system equipped vehicle.

ACTIVE TEST

Test item	Description
SUPER LOCK*1	This test is able to check super lock operation [LOCK (SET)/UNLOCK (RELEASE)].
DOOR LOCK IND	This test is able to check door lock indicator (built in door lock and unlock switch on center console) operation [ON/OFF].
DOOR LOCK	This test is able to check door lock operation [ALL LOCK/ALL UNLOCK/DR UNLOCK/ OTHER UNLOCK].

:*1 For the super lock equipped vehicle.

WORK SUPPORT

A B C D E F G H I J DLK L M N O P
carDiagn.com

Test item	Description
SECURITY DOOR LOCK SET	Anti hijack function mode can be changed in this mode. • ON: Anti hijack mode is active. • OFF: Anti hijack mode is inactive.

MULTIREMOTE ENT

MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT)

INFOID:0000000001096699

BCM CONSULT-III FUNCTION

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
KEYKESS LOCK	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK	Indicates [ON/OFF] condition of unlock signal from key fob.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
RKE LOCK AND UNLOCK	This item is indicated, but not monitored.

ACTIVE TEST

Test item	Description
DOOR LOCK	This test is able to check warning chime in combination meter operation. [ALL LOCK/ALL UNLOCK/DR UNLOCK/OTHER UNLOCK]
INT LAMP	This test is able to check interior lamp operation [ON/OFF].
FLASHER	This test is able to check flasher operation [LH/RH/OFF].

WORK SUPPORT

cardiagn.com

Test item	Description
HAZARD LAMP SET	Answer back function (hazard) mode can be changed in this mode. For the detail of the setting, refer to DLK-575, "System Description".
AUTO LOCK SET	Auto door lock time can be changed in this mode. • MODE 1: 1 minute • MODE 2: 2 minutes • MODE 3: 3 minutes • MODE 4: 4 minutes • MODE 5: 5 minutes

TRUNK

TRUNK : CONSULT-III Function (BCM - TRUNK)

INFOID:0000000001097315

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
TRNK OPNR SW	Indicates [ON/OFF] condition of back door opener switch.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the remote keyless entry system equipped vehicle.

ACTIVE TEST

Test item	Description
TRUNK/GLASS HATCH	This test is able to check back door opener operation [ON/OFF].

carsdiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001097215

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart. Refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000001097216

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1000	CAN COMM CIRCUIT	When BCM cannot communicate CAN communication signal continuously for 2 seconds or more.	Any item (or items) of the following listed below is malfunctioning in CAN communication system. • Transmission • Receiving (ECM) • Receiving (METER/M&A) • Receiving (TCM) • Receiving (MULTI AV) • Receiving (IPDM E/R) • Receiving (I-KEY)

Diagnosis Procedure

INFOID:0000000001097217

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check “Self Diagnostic Result” of BCM.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

U1010 CONTROL UNIT (CAN)

DTC Logic

INFOID:0000000001097218

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of BCM.	BCM

Diagnosis Procedure

INFOID:0000000001097219

1.REPLACE BCM

When “DTC:U1010” is detected, replace BCM.

>> Replace BCM. Refer to BCS-64, "Exploded View".

Special Repair Requirement

INFOID:0000000001097220

1.ADDITIONAL SERVICE WHEN REPLACING BCM

>> Refer to BCS-3, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".

A B C D E F G H I J DLK L M N O P
ecudiagn.com

POWER SUPPLY AND GROUND CIRCUIT
BCM

BCM : Diagnosis Procedure

INFOID:0000000001115315

1.CHECK FUSE AND FUSIBLE LINK

Check that the following fuse and fusible link are not blown.

Terminal No.	Signal name	Fuse and fusible link No.
41	Battery power supply	9 (10A)
57		J (40A)

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
BCM		Ground	
Connector	Terminal		
M66	41		Battery voltage
M67	57		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> BCM power supply and ground circuit are OK.
NO >> Repair harness or connector.

cardiagn.com

DOOR LOCK AND UNLOCK SWITCH

Description

INFOID:0000000001099004

Transmits door lock/unlock operation to BCM.

Component Function Check

INFOID:0000000001099005

1.CHECK FUNCTION

With CONSULT-III

Check “CDL LOCK SW ”and “CDL UNLOCK SW” in Data monitor mode with CONSULT-III.

Monitor item	Condition	
CDL LOCK SW	LOCK	: ON
	UNLOCK	: OFF
CDL UNLOCK SW	LOCK	: OFF
	UNLOCK	: ON

Is the inspection result normal?

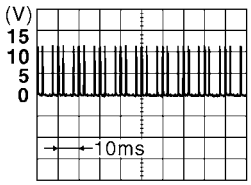
YES >> Door lock and unlock switch is OK.
NO >> Refer to DLK-585, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099006

1.CHECK DOOR LOCK AND UNLOCK INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect door lock and unlock switch connector.
3. Check voltage between door lock and unlock switch and ground.

Terminal			Signal (Reference value)
(+)		(–)	
Door lock and unlock switch connector	Terminal		
M89	1	Ground	
	6		

JPMIA0154GB

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK AND UNLOCK SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector and door lock and unlock switch connector.

BCM connector	Terminal	Door lock and unlock switch connector	Terminal	Continuity
M65	7	M89	6	Exists
	9		1	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal		Continuity
M65	7	Ground	Does not exist
	9		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

3.CHECK DOOR LOCK AND UNLOCK SWITCH GROUND

Check continuity between door lock and unlock switch connector and ground.

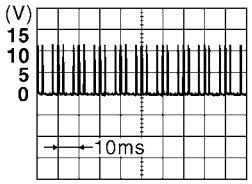
Door lock and unlock switch connector	Terminal	Ground	Continuity
M89	5		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminal			Signal (Reference value)
(+)		(–)	
BCM connector	Terminal		
M65	7	Ground	
	9		

JPMIA0154GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK DOOR LOCK AND UNLOCK SWITCH

Check door lock and unlock switch
Refer to DLK-74, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

Component Inspection

INFOID:0000000001099007

1.CHECK DOOR LOCK AND UNLOCK SWITCH

Check door lock and unlock switch.

Door lock and unlock switch	Terminal		Condition	Continuity
M89	6	5	LOCK	Exists
	1		UNLOCK	

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

cardiagn.com

DOOR LOCK AND UNLOCK SWITCH INDICATOR

Description

INFOID:0000000001102272

The door lock and unlock switch indicates door lock status. The indicator will illuminate when a lock operation is accomplished, and during this status, if any door is opened, the indicator will turn OFF.

Component Function Check

INFOID:0000000001102273

1.CHECK FUNCTION

With CONSULT-III

Check “DOOR LOCK IND” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK IND	:ON	Illuminated
	:OFF	Not illuminated

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Refer to DLK-587, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102274

1.CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between door lock and unlock switch and ground.

Terminal			Condition	Voltage (Approx.)
(+)		(–)		
Door lock and unlock switch connector	Terminal			
M89	4	Ground	Door lock operation is accomplished	Battery voltage
			Any door is OPEN	0

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK DOOR LOCK AND UNLOCK SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and door lock and unlock switch connector.
3. Check continuity between BCM connector and door lock and unlock switch connector.

BCM connector	Terminal	Door lock and unlock switch connector	Terminal	Continuity
M65	24	M89	4	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	24		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK DOOR LOCK AND UNLOCK SWITCH GROUND

Check continuity between door lock and unlock switch connector and ground.

Door lock and unlock switch connector	Terminal	Ground	Continuity
M89	5		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminal			Condition	Voltage (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	24	Ground	Door lock operation is accomplished	Battery voltage
			Any door is OPEN	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR

Check door lock and unlock switch
Refer to DLK-588, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

Component Inspection

INFOID:0000000001102275

1.CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR

Check continuity door lock and unlock switch.

Door lock and unlock switch	Terminal		Continuity
	(+)	(-)	
M89	5	4	Exists
	4	5	Does not exist

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

cardiagn.com

DOOR SWITCH
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001099008

Detects door open/closed condition.

DRIVER SIDE : Component Function Check

INFOID:0000000001099009

1.CHECK FUNCTION

With CONSULT-III

Check door switches “DOOR SW-DR” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-DR	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

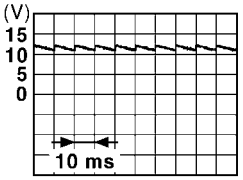
YES >> Door switch is OK.
NO >> Refer to DLK-589, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001099010

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals (+) BCM connector	Terminals (+) Terminal	Terminals (–)	Door condition	Voltage (V) (Approx.)
M65	26	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	26	B34	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	26		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-590, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

DRIVER SIDE : Component Inspection

INFOID:0000000001099011

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001099012

Detects door open/closed condition.

PASSENGER SIDE : Component Function Check

INFOID:0000000001099013

1.CHECK FUNCTION

With CONSULT-III
Check door switches “DOOR SW-AS” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-AS	OPEN	: ON
	CLOSE	: OFF

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Refer to DLK-590, "PASSENGER SIDE : Diagnosis Procedure".

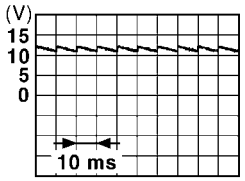
PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001099014

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

cardiagn.com

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	27	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	27	B27	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	27		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-591, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

PASSENGER SIDE : Component Inspection

INFOID:0000000001099015

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR LH

REAR LH : Description

INFOID:0000000001099016

Detects door open/closed condition.

REAR LH : Component Function Check

INFOID:0000000001099017

1.CHECK FUNCTION

With CONSULT-III

Check door switches “DOOR SW-RL” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-RL	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

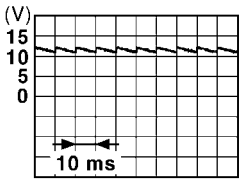
YES >> Door switch is OK.
NO >> Refer to DLK-592, "REAR LH : Diagnosis Procedure".

REAR LH : Diagnosis Procedure

INFOID:0000000001099018

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals (+) BCM connector	Terminals (+) Terminal	Terminals (–)	Door condition	Voltage (V) (Approx.)
M65	25	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	25	B71	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	25		Does not exist

Is the inspection result normal?

cardiagn.com

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3. CHECK DOOR SWITCH

Check door switch.
Refer to DLK-593, "REAR LH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR LH : Component Inspection

INFOID:0000000001099019

1. CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR RH

REAR RH : Description

INFOID:0000000001099020

Detects door open/close condition.

REAR RH : Component Function Check

INFOID:0000000001099021

1. CHECK FUNCTION

With CONSULT-III
Check door switches “DOOR SW-RR” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-RR	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

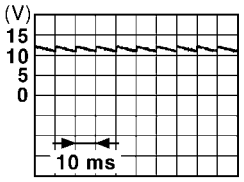
YES >> Door switch is OK.
NO >> Refer to DLK-593, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001099022

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	29	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	29	B53	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	29		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-594, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR RH : Component Inspection

INFOID:0000000001099023

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

cardiagn.com

BACK DOOR

BACK DOOR : Description

INFOID:0000000001099024

Detects back door open condition.

BACK DOOR : Component Function Check

INFOID:0000000001099025

1.CHECK FUNCTION

With CONSULT-III

Check “BACK DOOR SW” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
BACK DOOR SW	OPEN	: ON
	CLOSE	: OFF

Is the inspection result normal?

YES >> Back door lock assembly (door switch) is OK.
NO >> Refer to DLK-595, "BACK DOOR : Diagnosis Procedure".

BACK DOOR : Diagnosis Procedure

INFOID:0000000001099026

1.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH) INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Back door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	28	Ground	OPEN	0
			CLOSE	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH) CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and back door lock assembly (door switch) connector.

BCM connector	Terminal	Back door lock assembly (door switch) connector	Terminal	Continuity
M65	28	D152	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	28		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and trunk room lamp switch.

3.CHECK BACK DOOR LOCK ASSEMBLY GROUND CIRCUIT

Check continuity between back door lock assembly connector and ground.

Back door lock assembly (door switch) connector	Terminal	Ground	Continuity
D152	3		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace back door lock assembly ground circuit.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M65	28	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH)

Check back door lock assembly (door switch).
Refer to DLK-596, "BACK DOOR : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door lock assembly (door switch). Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

BACK DOOR : Component Inspection

INFOID:0000000001099027

1.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH)

1. Turn ignition switch OFF.
2. Disconnect back door lock assembly (door switch) connector.
3. Check back door lock assembly (door switch).

Terminal		Trunk condition	Continuity
Back door lock assembly (door switch)			
4	3	OPEN	Exists
		CLOSE	Does not exist

Is the inspection result normal?

YES >> Back door lock assembly (door switch) is OK.
NO >> Replace back door lock assembly (door switch). Refer to DLK-706, "DOOR LOCK : Exploded View" and DLK-706, "DOOR LOCK : Removal and Installation".

cardiagn.com

KEY SWITCH

Description

INFOID:0000000001116382

Key switch detects that ignition key is inserted into the key cylinder, and then transmits the signal to BCM.

Component Function Check

INFOID:0000000001116383

1.CHECK KEY SWITCH INPUT SIGNAL

Check key switch (“KEY SW”) in “DATA MONITOR” mode with CONSULT-III. Refer to DLK-62, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Monitor item	Condition	
KEY SW	Insert mechanical key into key cylinder	: ON
	Remove mechanical key from key cylinder	: OFF

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Refer to DLK-597, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116384

1.CHECK KEY SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	36	Ground	Insert ignition key into key cylinder	Battery voltage
			Remove ignition key from key cylinder	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Remove ignition key from key cylinder.
2. Disconnect key switch connector.
3. Check voltage between key switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Key switch connector	Terminal		
M25	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK KEY SWITCH SIGNAL CIRCUIT

1. Check continuity between BCM harness connector and key switch connector.

BCM connector	Terminal	Key switch connector	Terminal	Continuity
M65	36	M25	1	Existed

2. Check continuity between key switch connector and ground.

Key switch connector	Terminal	Ground	Continuity
M25	1	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK KEY SWITCH

Check key switch function.
Refer to DLK-598, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace key switch.

Component Inspection

INFOID:0000000001116385

COMPONENT INSPECTION

1.CHECK KEY SWITCH

Check continuity between key switch terminals.

Terminal		Condition	Continuity
key switch connector			
1	2	Insert ignition key into key cylinder	Existed
		Remove ignition key from key cylinder	Not existed

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Replace key switch.

cardiagn.com

DOOR LOCK ACTUATOR
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001099028

Locks/unlocks the door with the signal from BCM.

DRIVER SIDE : Component Function Check

INFOID:0000000001099029

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK” in Active test mode with CONSULT-III.

Test item		Condition
DOOR LOCK	ALL LOCK	The all door lock actuator are locked
	ALL UNLOCK	The all door lock actuator are unlocked
	DR UNLOCK	The door lock actuator (driver side) is unlocked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-599, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001099030

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	60		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock actuator (driver side) connector.
3. Check continuity between BCM connector and front door lock actuator (driver side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D9	3	Exists
	60		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	60		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

carsdiagn.com

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-600, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement"

DRIVER SIDE : Component Inspection

INFOID:0000000001099031

1.CHECK FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)

Check the actuator operation by connecting the battery voltage to front door lock actuator (driver side).

Front door lock actuator (driver side)	Terminal		Door lock actuator condition
	(+)	(-)	
D9	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Front door lock actuator (driver side) is OK.
NO >> Replace front door lock actuator (driver side). Refer to DLK-255, "DOOR LOCK : Removal and Installation". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

DRIVER SIDE : Special Repair Requirement

INFOID:0000000001099032

Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001099033

Locks/unlocks the door with the signal from BCM.

PASSENGER SIDE : Component Function Check

INFOID:0000000001099034

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK” in Active test mode with CONSULT-III.

Test item		Condition
DOOR LOCK	:ALL LOCK	The all door lock actuator are locked
	:ALL UNLOCK	The all door lock actuator are unlocked
	:OTHER UNLOCK	The door lock actuator (front passenger side, rear LH and rear RH) are unlocked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-600, "PASSENGER SIDE : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001099035

1.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

cardiagn.com

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock actuator (passenger side) connector.
3. Check continuity between BCM connector and front door lock actuator (passenger side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D48	3	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-601, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation".

PASSENGER SIDE : Component Inspection

INFOID:0000000001099036

1.CHECK FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)

Check the actuator operation by connecting the battery voltage directly to front door lock actuator (passenger side).

Front door lock actuator (passenger side) connector	Terminal		Door lock actuator condition
	(+)	(-)	
D48	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Front door lock actuator (passenger side) is OK.
NO >> Replace front door lock actuator (passenger side). Refer to DLK-601, "PASSENGER SIDE : Component Inspection".

REAR LH

REAR LH : Description

INFOID:0000000001099037

Locks/unlocks the door with the signal from BCM.

REAR LH : Component Function Check

INFOID:0000000001099038

1.CHECK FUNCTION

With CONSULT-III

Check “DOOR LOCK” in Active test mode with CONSULT-III.

Test item		Condition
DOOR LOCK	:ALL LOCK	The all door lock actuator are locked
	:ALL UNLOCK	The all door lock actuator are unlocked
	:OTHER UNLOCK	The door lock actuator (front passenger side, rear LH and rear RH) are unlocked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-602, "REAR LH : Diagnosis Procedure".

REAR LH : Diagnosis Procedure

INFOID:0000000001099039

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (LH) connector.
3. Check continuity between BCM connector and rear door lock actuator (LH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D85	3	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-603, "REAR LH : Component Inspection".

Is the inspection result normal?

cardiagn.com

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-700, "DOOR LOCK : Exploded View" and DLK-700, "DOOR LOCK : Removal and Installation".

REAR LH : Component Inspection

INFOID:0000000001099040

1.CHECK REAR DOOR LOCK ACTUATOR (LH)

Check the actuator operation by connecting the battery voltage directly to rear door lock actuator (LH).

Rear door lock actuator (LH)	Terminal		Door lock actuator condition
	(+)	(-)	
D85	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Rear door lock actuator (LH) is OK.
NO >> Replace rear door lock actuator (LH). Refer to DLK-262, "DOOR LOCK : Removal and Installation".

REAR RH

REAR RH : Description

INFOID:0000000001099041

Locks/unlocks the door with the signal from BCM.

REAR RH : Component Function Check

INFOID:0000000001099042

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK” in Active test mode with CONSULT-III.

Test item		Condition
DOOR LOCK	:ALL LOCK	The all door lock actuator are locked
	:ALL UNLOCK	The all door lock actuator are unlocked
	:OTHER UNLOCK	The door lock actuator (front passenger side, rear LH and rear RH) are unlocked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-603, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001099043

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (RH) connector.

3. Check continuity between BCM connector and rear door lock actuator (RH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D105	3	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-604, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH : Component Inspection

INFOID:0000000001099044

1.CHECK REAR DOOR LOCK ACTUATOR (RH)

Check the actuator operation by connecting the battery voltage directly to rear door lock actuator (RH).

Rear door lock actuator (RH)	Terminal		Door lock actuator condition
	(+)	(-)	
D105	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Rear door lock actuator (RH) is OK.
NO >> Replace rear door lock actuator (RH). Refer to DLK-255, "DOOR LOCK : Removal and Installation".

cardiagn.com

BACK DOOR OPENER ACTUATOR

Description

INFOID:0000000001116447

Opens the back door with the signal from BCM.

Component Function Check

INFOID:0000000001116448

1.CHECK FUNCTION

With CONSULT-III

Check “TRUNK/GLASS HATCH” in Active test mode with CONSULT-III.

Test item		Condition
TRUNK/GLASS HATCH	:OPEN	Back door lock opener actuator operation

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-605, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116449

1.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of back door opener switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M66	45	Ground	Pressed	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK BACK DOOR LOCK ASSEMBLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and back door lock assembly connector.
3. Check continuity between BCM connector and back door lock assembly connector.

BCM connector	Terminal	Back door lock assembly connector	Terminal	Continuity
M66	45	D152	2	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M66	45		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK BACK DOOR LOCK ASSEMBLY GROUND CIRCUIT

Check continuity between back door lock assembly connector and ground.

Back door lock assembly connector	Terminal	Ground	Continuity
D152	1		Exists

Is the inspection result normal?

A B C D E F G H I J DLK L M N O P
carDiagn.com

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK BACK DOOR LOCK ASSEMBLY

Check back door lock assembly connector and ground.
Refer to DLK-606, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door lock assembly. Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

Component Inspection

INFOID:0000000001116450

1. CHECK BACK DOOR LOCK ASSEMBLY

Check the actuator operation by connecting battery voltage to back door lock assembly.

Back door lock assembly connector	Terminal		Back door actuator condition
D152	(+)	(-)	OPEN
	2	1	

Is the inspection result normal?

YES >> Back door lock assembly (back door lock actuator) is OK.
NO >> Replace back door lock assembly (back door lock actuator). Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

cardiagn.com

BACK DOOR OPENER SWITCH

Description

INFOID:0000000001115824

Sends the back door opening signal to BCM.

Component Function Check

INFOID:0000000001115825

1.CHECK FUNCTION

With CONSULT-III

Check “TRNK OPNR SW” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
TRNK OPNR SW	Back door opener switch is pressed	:ON
	Back door opener switch is released	:OFF

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-607, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115826

1.CHECK BCM INPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of back door opener switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	12	Ground	Pressed	0
			Released	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK BACK DOOR OPENER SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and back door opener switch connector.
3. Check continuity between BCM connector and back door opener switch connector.

BCM connector	Terminal	Back door opener switch connector	Terminal	Continuity
M65	12	D186	1	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	12		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M65	12	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

4. CHECK BACK DOOR OPENER SWITCH GROUND CIRCUIT

Check continuity between back door opener switch connector and ground.

Back door opener switch connector	Terminal	Ground	Continuity
D186	2		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5. CHECK BACK DOOR OPENER SWITCH

Check back door opener switch.
Refer to DLK-608, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door opener switch. Refer to DLK-279, "Exploded View".

Component Inspection

INFOID:0000000001115827

1. CHECK BACK DOOR OPENER SWITCH

Check back door opener switch.

Back door opener switch connector	Terminal		Back door opener switch condition	Continuity
D186	1	2	Pressed	Exists
			Released	Does not exist

Is the inspection result normal?

YES >> Back door opener switch is OK.
NO >> Replace back door opener switch. Refer to DLK-279, "Exploded View".

cardiagn.com

BUZZER (COMBINATION METER)

Description

INFOID:0000000001099053

Performs operation method guide and warning with buzzer.

Component Function Check

INFOID:0000000001099054

1.CHECK FUNCTION

With CONSULT-III

1. Check the operation with “WARNING BUZZER” in the Active Test.
2. Touch “KEY REMINDER WARN” on screen.

Is the inspection result normal?

Yes >> Warning buzzer into combination meter is OK.
No >> Refer to DLK-609, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099055

1.CHECK METER BUZZER CIRCUIT

Refer to WCS-20, "Component Function Check".

Is the inspection result normal?

Yes >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
No >> Repair or replace meter buzzer circuit.

HAZARD WARNING LAMPS

Description

INFOID:0000000001099056

Perform answer-back for each operation with number of blinks.

Component Function Check

INFOID:0000000001099057

1.CHECK FUNCTION

With CONSULT-III

Check hazard warning lamp “FLASHER” in Active test.

Is the inspection result normal?

YES >> Hazard warning lamp circuit is OK.
NO >> Refer to DLK-610, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099058

1.CHECK HAZARD SWITCH CIRCUIT

Check hazard switch circuit.
Refer to EXL-72, "Component Function Check".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace hazard warning switch circuit.

cardiagn.com

VEHICLE SPEED SIGNAL CIRCUIT

Description

INFOID:0000000001115721

Display the vehicle speed signal received from combination meter by numerical value (km/h).

Component Function Check

INFOID:0000000001115722

1.CHECK FUNCTION

Check the vehicle speed more than 12km/h (7MPH), all doors are automatically locked.

Is the inspection result normal?

YES >> Vehicle speed signal circuit is OK.
NO >> Refer to DLK-611, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115723

1.CHECK VEHICLE SPEED SIGNAL CIRCUIT

Check vehicle speed signal “VEHICLE SPEED” in Data monitor.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace hazard warning switch circuit.

KEYFOB BATTERY

Description

INFOID:0000000001099062

Remote door lock and unlock control entry function available when operating on button.
- Door lock and unlock

Component Function Check

INFOID:0000000001099063

1.CHECK KEYFOB FUNCTION

Does door lock and unlock operate with operating keyfob switch?

Is the inspection result normal?

YES >> Keyfob is OK.
NO >> Refer to DLK-612, "Diagnosis Procedure".

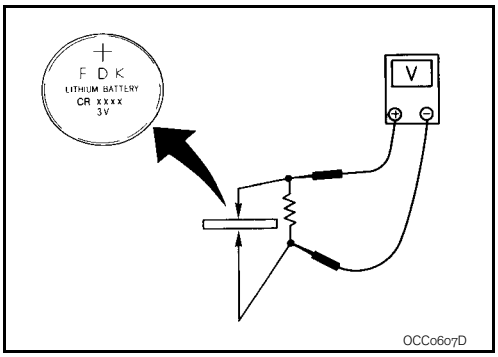
Diagnosis Procedure

INFOID:0000000001099064

1.CHECK KEYFOB BATTERY

Check by connecting a resistance (approximately 300Ω) so that the current value becomes about 10 mA.

Standard : Approx. 2.5 - 3.0V



Is the measurement value within the specification?

YES >> Replace keyfob.
NO >> Replace keyfob battery. Refer to DLK-712, "Exploded View".

cardiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001116443

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

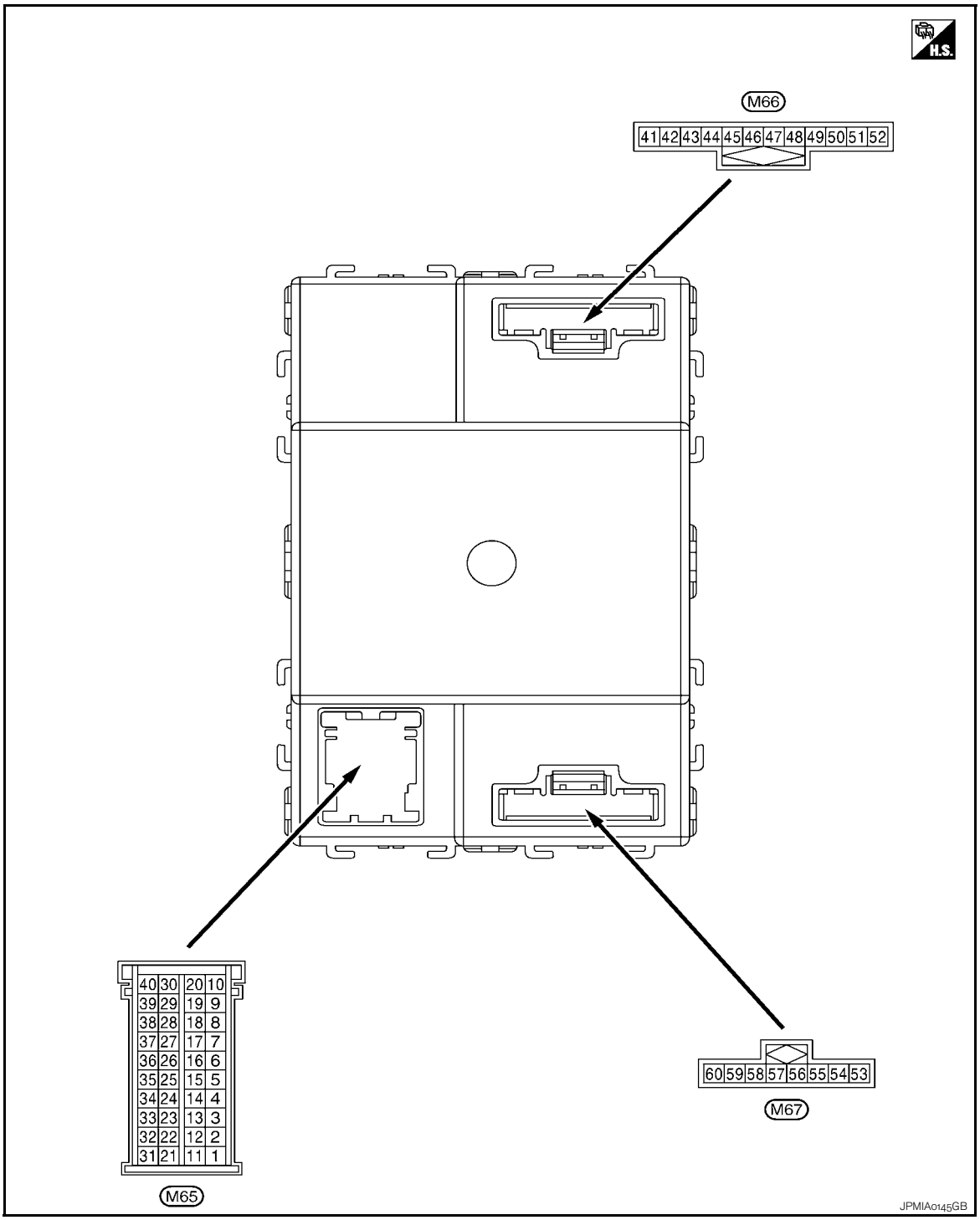
cardiagn.com

Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

cardiagn.com

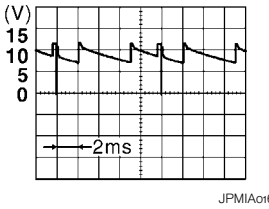
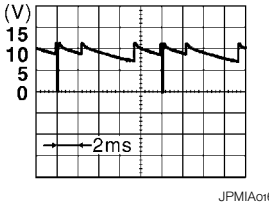
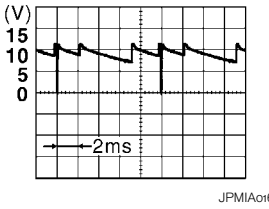
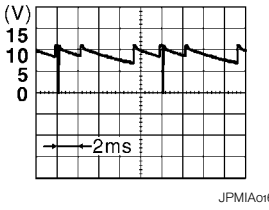
TERMINAL LAYOUT



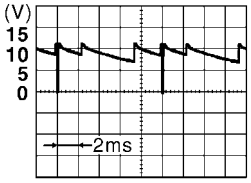
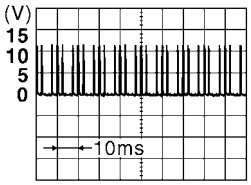
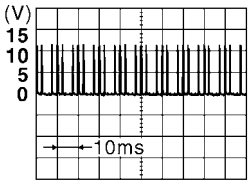
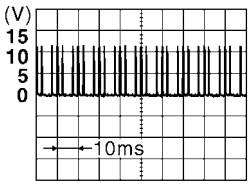
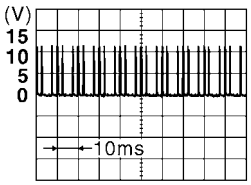
PHYSICAL VALUES

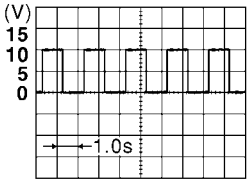
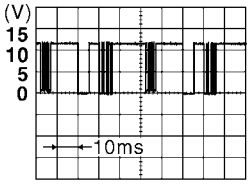
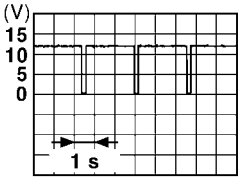
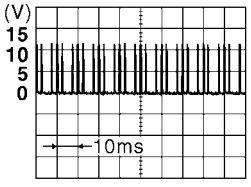
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

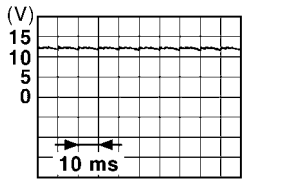
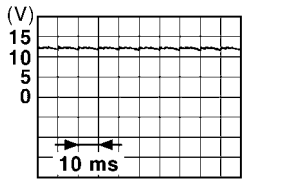
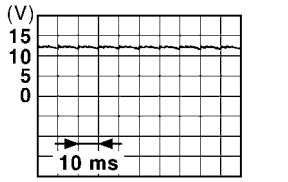
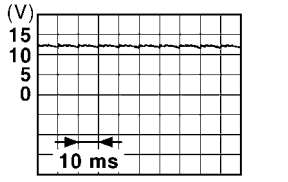
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

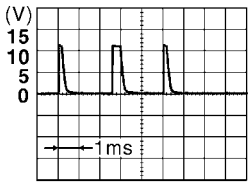
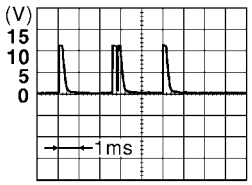
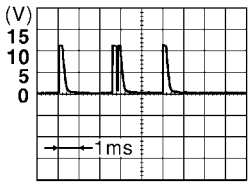
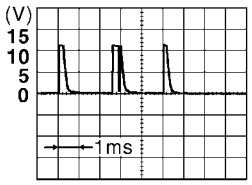
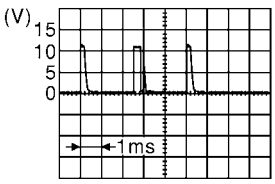
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

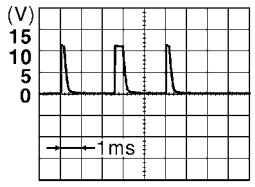
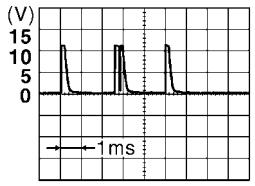
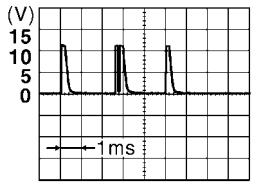
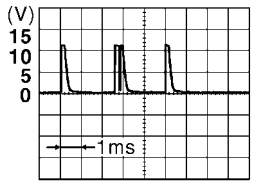
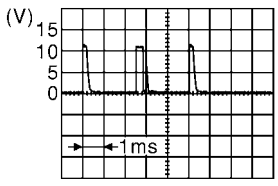
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

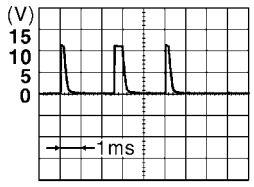
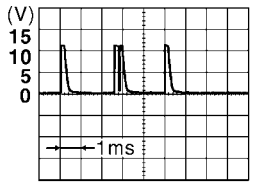
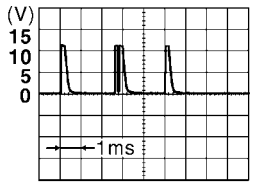
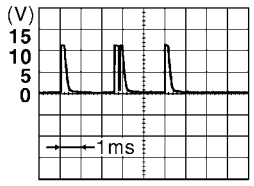
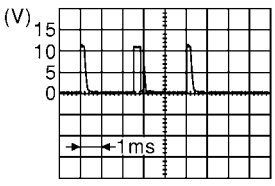
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIDo924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIDo924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIDo924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIDo924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

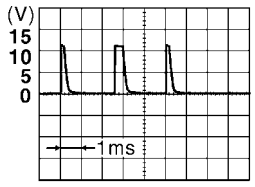
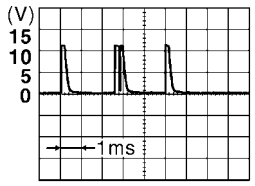
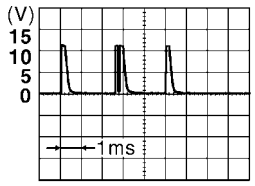
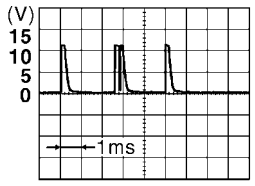
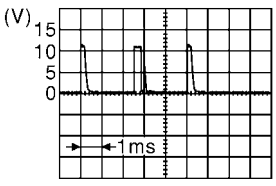
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

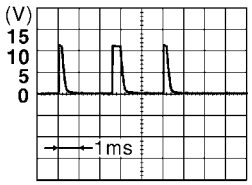
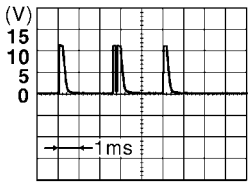
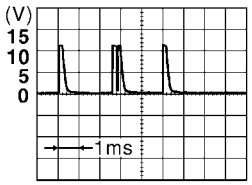
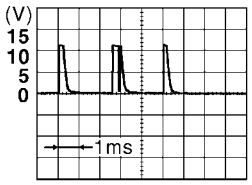
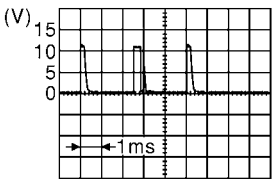
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

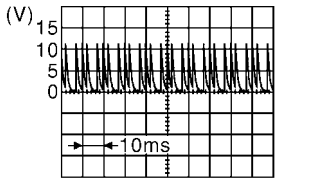
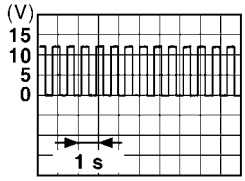
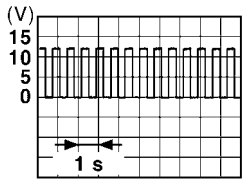
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

*1: With Intelligent Key system

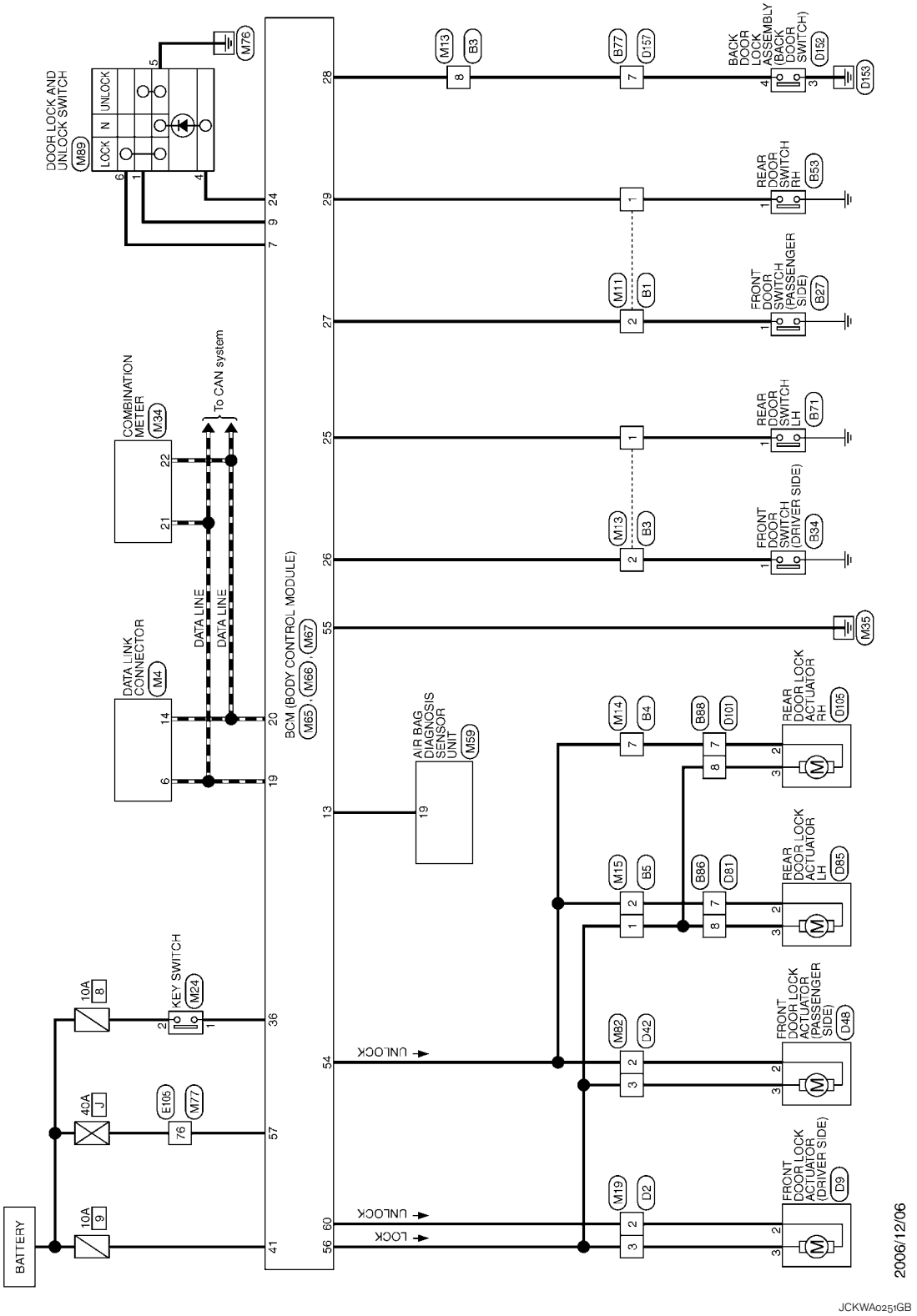
*2: Without Intelligent Key system

cardiagn.com

Wiring Diagram - POWER DOOR LOCK CONTROL SYSTEM -

INFOID:0000000001081923

POWER DOOR LOCK SYSTEM (WITHOUT INTELLIGENT KEY)



POWER DOOR LOCK SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	BR	-[LHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R/W	-[LHD models]
8	G	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0252GB

cardiagn.com

POWER DOOR LOCK SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS06MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	D2
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–[Without Intelligent Key]
3	SB	–

Connector No.	D9
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–[Without Intelligent Key]
3	SB	–[Without Intelligent Key]

Connector No.	D42
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–[Without Intelligent Key]
3	SB	–[Without Intelligent Key]

Connector No.	D48
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–[Without Intelligent Key]
3	SB	–[Without Intelligent Key]

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

JCKWA0253GB

POWER DOOR LOCK SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	D85
Connector Name	REAR DOOR LOCK ACTUATOR LH
Connector Type	FEA04FB-FHA2

H.S.

1 2 3 4 5 6

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–
3	SB	–

Connector No.	D101
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

H.S.

3 2 1
8 7 6 5 4

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	D105
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

H.S.

6 5 4 3 2 1

Terminal No.	Color of Wire	Signal Name [Specification]
2	O	–
3	SB	–

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

H.S.

1 2 3 4

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	–
4	G	–

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

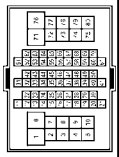
H.S.

1 2 3 4
5 6 7 8

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

9 10 11 12 13 14 15 16
1 2 3 4 5 6 7 8

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12 11 10 9 8 7 6 5 4 3 2 1
24 23 22 21 20 19 18 17 16 15 14 13

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]

JCKWA0254GB

cardiagn.com

POWER DOOR LOCK SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R	-[LHD models]
8	G	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

H.S.

3		2	1
8	7	6	5	4

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	-

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3		2	1
8	7	6	5	4

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-

Connector No.	M19
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.

1	2	3		4	5
6	7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	-
3	SB	-

Connector No.	M24
Connector Name	KEY SWITCH
Connector Type	A02MW

H.S.

2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	Y	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

H.S.

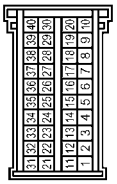
20	21	17									24	49	1
22	11	46	48	47	45	13	3	4	6	5
16	12	19	15	14	51	23	50	18	52	2

Terminal No.	Color of Wire	Signal Name [Specification]
19	R	UNLOCK

JCKWA0255GB

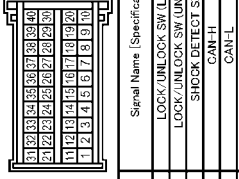
POWER DOOR LOCK SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



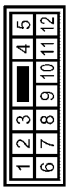
Terminal No.	Color of Wire	Signal Name [Specification]
7	P	LOCK/UNLOCK SW (LOCK)
9	BR	LOCK/UNLOCK SW (UNLOCK)
13	R	SHOCK DETECT SIG
19	L	CAN-H
20	P	CAN-L
24	GR	DOOR LOCK STATUS IND
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



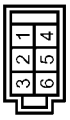
Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M82
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS



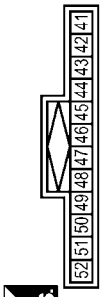
Terminal No.	Color of Wire	Signal Name [Specification]
2	O	-
3	SB	-[Without Intelligent Key]

Connector No.	M89
Connector Name	DOOR LOCK AND UNLOCK SWITCH
Connector Type	7703197674



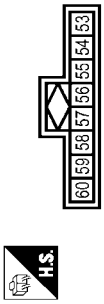
Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
4	GR	-
5	B	-
6	P	-

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



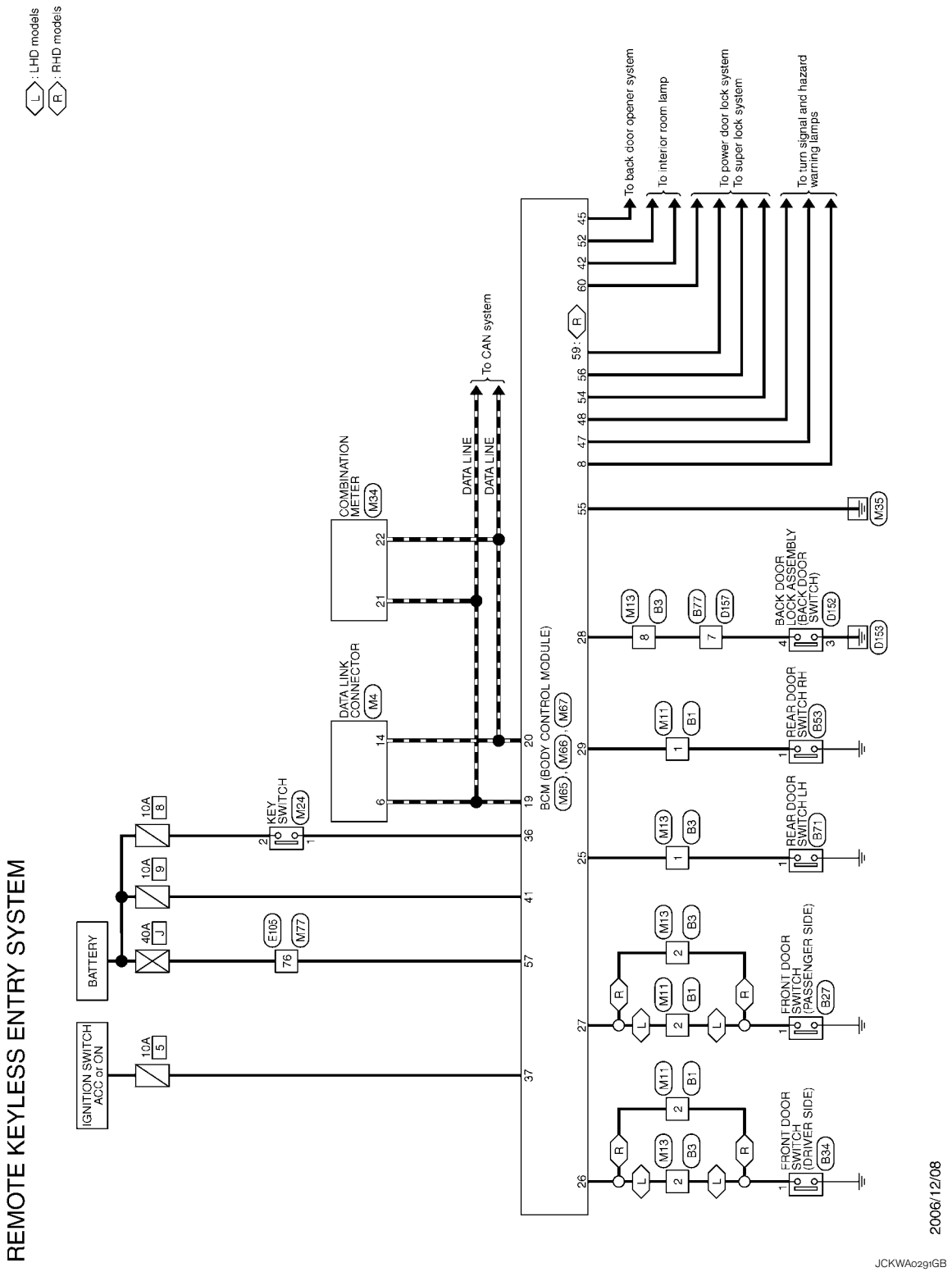
Terminal No.	Color of Wire	Signal Name [Specification]
54	O	DOOR UNLOCK OUTPUT (OTHER)
55	B	GND(POWER)
56	SB	DOOR LOCK OUTPUT (ALL) [Without Intelligent Key]
57	Y	BAT(F/L)
60	GR	UNLOCK (DR)

JCKWA0256GB

cardiagn.com

Wiring Diagram - REMOTE KEYLESS ENTRY CONTROL SYSTEM -

INFOID:0000000001081924



REMOTE KEYLESS ENTRY SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	BR	-[LHD models]
2	R/W	-[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R/W	-[LHD models]
2	BR	-[RHD models]
8	G	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	-
4	G	-

JCKWA0292GB

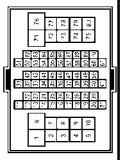
cardiagn.com

REMOTE KEYLESS ENTRY SYSTEM

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

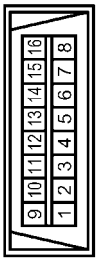


Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M24
Connector Name	KEY SWITCH
Connector Type	A02MW

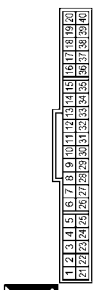
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



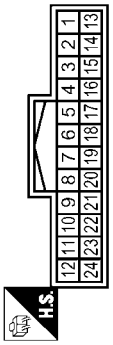
Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



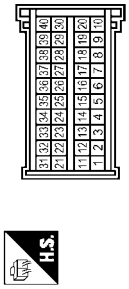
Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



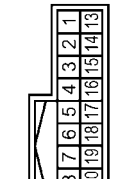
Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]
2	R	–[RHD models]

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
8	LG	HAZARD SW
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)
36	V	KEY SW
37	R	ACC SW

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	R	–[LHD models]
2	BR	–[RHD models]
8	G	–

JCKWA0293GB

REMOTE KEYLESS ENTRY SYSTEM

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

52 51 50 49 48 47 46 45 44 43 42 41

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
42	V	ROOM LAMP POWER SUPPLY
45	GR	BACK DOOR OPENER
47	G/Y	FLASHER OUTPUT (LEFT)
48	G/B	FLASHER OUTPUT (RIGHT)
52	R	ROOM LAMP OUTPUT

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

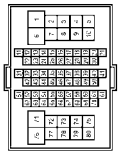
H.S.

60 59 58 57 56 55 54 53

Terminal No.	Color of Wire	Signal Name [Specification]
54	O	DOOR UNLOCK OUTPUT (OTHER)
55	B	GND(POWER)
56	SB	DOOR LOCK OUTPUT (ALL) [Without Intelligent Key]
57	Y	BAT(F/L)
59	BR	SUPER LOCK SET OUTPUT
80	GR	UNLOCK (DR)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

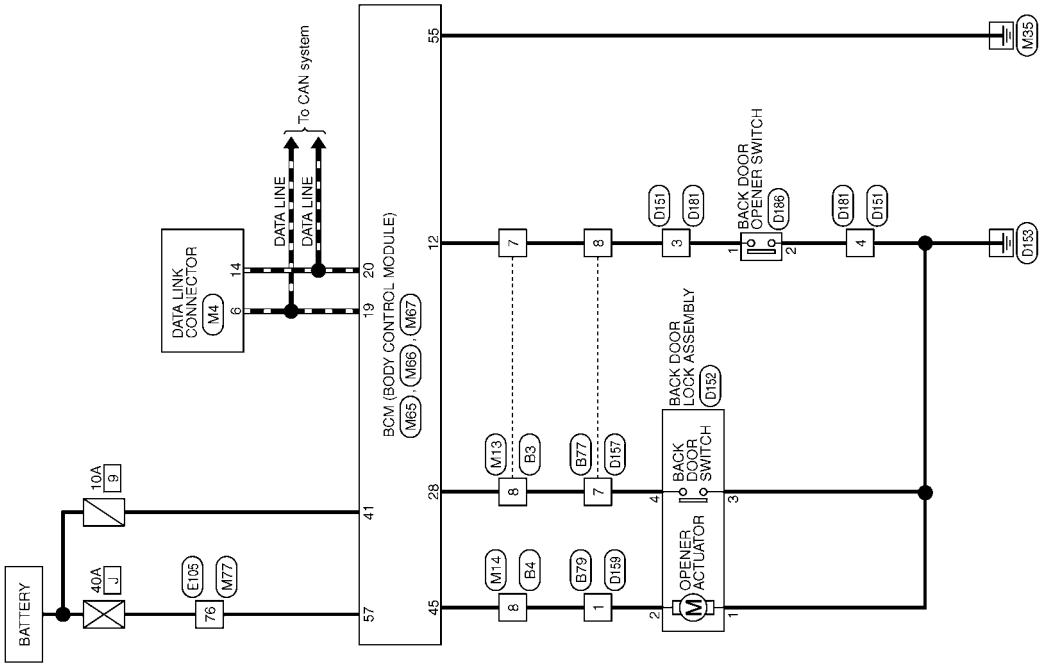
JCKWA0294GB

Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM -

INFOID:0000000001125432

cardiagn.com

BACK DOOR OPENER SYSTEM



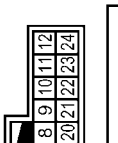
2006/12/08

JCKWA0295GB

BACK DOOR OPENER SYSTEM

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

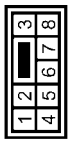
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

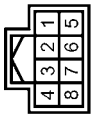
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

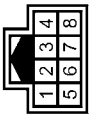
Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 48309 EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0296GB

cardiagn.com

BACK DOOR OPENER SYSTEM

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

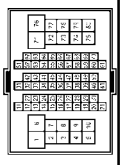
Connector No.	D186
Connector Name	BACK DOOR OPENER SWITCH
Connector Type	RK02MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

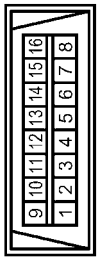
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

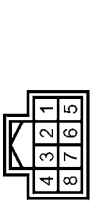
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

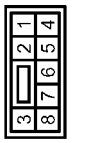
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

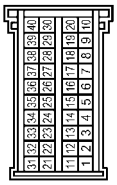
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.



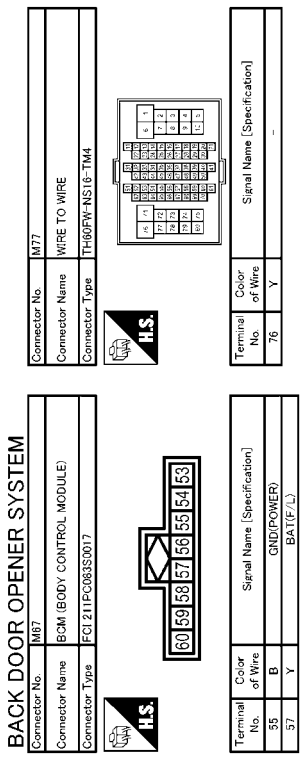
Terminal No.	Color of Wire	Signal Name [Specification]
12	P	TRUNK/BACK DOOR OPEN SW
19	L	CAN-H
20	P	CAN-L
28	G	DOOR SW (BACK)

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
45	GR	BACK DOOR OPENER

JCKWA0297GB



JCKWA0298GB

Fail Safe

INFOID:0000000001116444

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001116445

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001116446

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

SYMPTOM DIAGNOSIS

DOOR LOCK FUNCTION SYMPTOMS

DOOR LOCK AND UNLOCK SWITCH

DOOR LOCK AND UNLOCK SWITCH : Symptom Table

INFOID:0000000001093366

DOOR LOCK AND UNLOCK SWITCH OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-553, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Except driver side, doors are closed.
- Doors are not locked by keyfob.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
Door lock and unlock function does not operate with door lock and unlock switch.	1. Check BCM power supply and ground circuit.		DLK-584
	2. Check door lock and unlock switch.		DLK-585
	3. Check door switch.	Passenger side	DLK-590
		Rear LH	DLK-592
		Rear RH	DLK-593
		Back door	DLK-595
	4. Check intermittent incident.		GI-39
Specific door lock actuator does not operate.	1. Check door lock actuator.	Driver side	DLK-599
		Passenger side	DLK-600
		Rear LH	DLK-602
		Rear RH	DLK-603
	2. Check intermittent incident.		GI-39

KEYFOB

KEYFOB : Symptom Table

INFOID:0000000001093368

KEYFOB OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “WORK FLOW”. Refer to DLK-553, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of Vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Mechanical key is removed from ignition key cylinder.
- Door lock and unlock operation is normal.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
All of the keyfob operations do not operate.	1. Check keyfob battery inspection.	DLK-612
	2. Check key switch	DLK-597
	3. Check intermittent incident.	GI-39
Anti-hijack operation does not operate.	1. Check “SECURITY DOOR LOCK SET” setting in “WORK SUPPORT”.	DLK-578
	2. Check intermittent incident.	GI-39

AUTO DOOR LOCK

AUTO DOOR LOCK : Symptom Table

INFOID:0000000001093370

AUTO DOOR LOCK OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-553, "Work Flow".
- To understand the operation when it does work, refer to DLK-563, "AUTO DOOR LOCK : System Description".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- “AUTO LOCK SET” is ON when setting on CONSULT-III.
- Door lock and unlock function is normal.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
Auto door lock operation does not operate.	1. Check “AUTO LOCK SET” setting in “WORK SUPPORT”.		DLK-580
	2. Check door switch.	Driver side	DLK-589
		Passenger side	DLK-590
		Rear LH	DLK-592
		Rear RH	DLK-593
		Back door	DLK-595
	3. Check key switch.		DLK-597
	4. Check intermittent incident.		GI-39

VEHICLE SPEED SENSING AUTO DOOR LOCK

VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table

INFOID:0000000001093372

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-553, "Work Flow".
- To understand the operation when it does work, refer to DLK-565, "VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock and unlock switch operation is normal.

cardiagn.com

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Vehicle speed sensing auto door lock operation does not operate.	1. Check vehicle speed signal.	DLK-611
	2. Check intermittent incident.	GI-39

carsdiagn.com

BACK DOOR OPEN FUNCTION SYMPTOMS
BACK DOOR OPENER SWITCH
BACK DOOR OPENER SWITCH : Symptom Table

INFOID:0000000001093374

BACK DOOR OPENER FUNCTION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-553, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock function is normal.
- Vehicle speed is less than 5 km/h (3 MPH).
- All doors are unlocked.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Back door opener function does not operate by back door opener switch.	1. Check back door opener switch.	DLK-607
	2. Check vehicle speed signal.	DLK-611
	3. Check back door opener actuator.	DLK-605
	4. Check intermittent incident.	GI-39

cardiagn.com

WARNING FUNCTION SYMPTOMS
BACK DOOR

BACK DOOR : Symptom Table

INFOID:0000000001093380

BACK DOOR OPEN WARNING OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-553, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock function and back door opener function are normal.

Symptom	Diagnosis/service procedure	Reference page
Back door open warning does not operate properly.	1. Check back door opener switch.	DLK-607
	2. Check intermittent incident.	GI-39

carsdiagn.com

HAZARD REMINDER FUNCTION
HAZARD WARNING LAMP
HAZARD WARNING LAMP : Symptom Table

INFOID:0000000001093381

HAZARD REMINDER OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-553, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of Vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock function is normal.
- “HAZARD LAMP SET” is active when setting on CONSULT-III.

Symptom Table

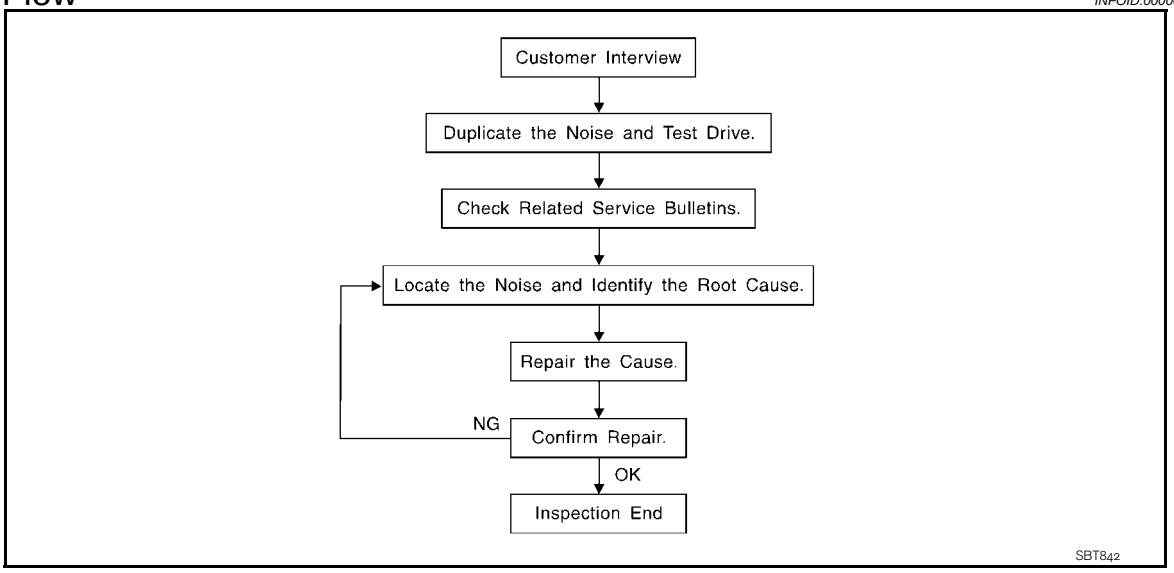
Symptom	Diagnosis/service procedure	Reference page
Hazard reminder operation does not operate properly.	1. Check setting of “HAZARD LAMP SET” with CONSULT-III.	DLK-580
	2. Check intermittent incident.	GI-39

cardiagn.com

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000001098121



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to DLK-216, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to DLK-214, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.
- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

cardiagn.com

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001098122

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

c-diagn.com

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.

Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.

Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

cardiagn.com

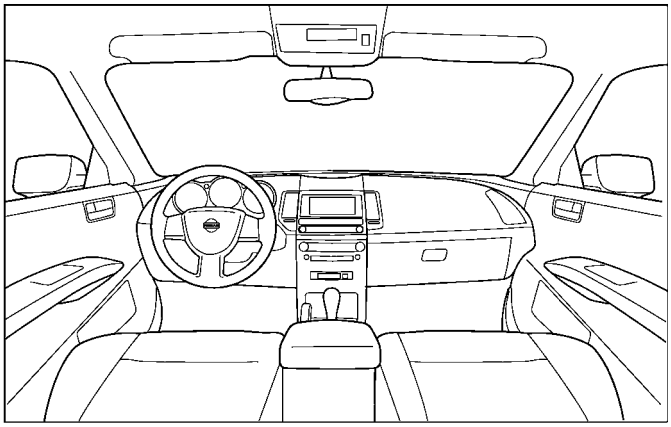
Diagnostic Worksheet

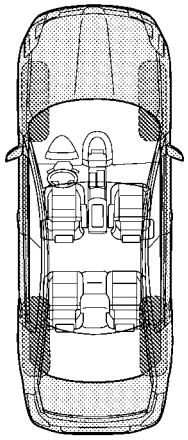
INFOID:0000000001098123

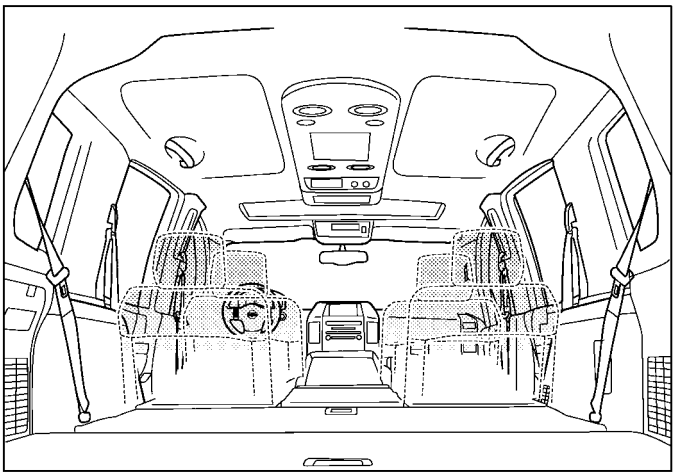
SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

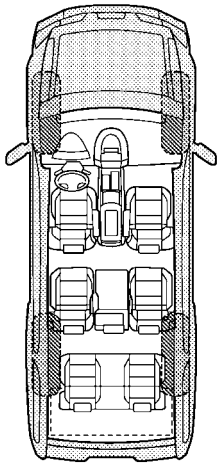
Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.









Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

cardiagn.com

PRECAUTION

PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001081941

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

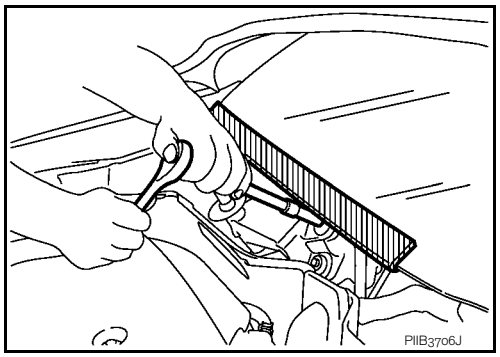
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Procedure without Cowl Top Cover

INFOID:0000000001081942

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Steering Wheel Rotation after Battery Disconnect

INFOID:0000000001081943

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

This vehicle is equipped with a push-button ignition switch and a steering lock unit.
If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the battery disconnected or discharged, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Carry the Intelligent Key or insert it to the key slot and turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)

3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

Work

INFOID:0000000001081944

- After removing and installing the opening/closing parts, be sure to carry out fitting adjustments to check their operational.
- Check the lubrication level, damage, and wear of each part. If necessary, grease or replace it.

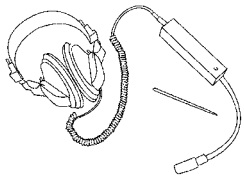
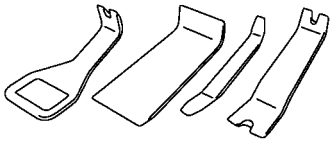
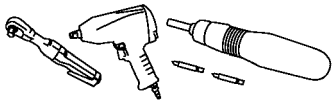
cardiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000001116410

Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Remover tool  PIIB7923J	Remove the clips, pawls, and metal clips
Power tool  PIIB1407E	

carsdiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000001090923

BASIC INSPECTION

1.CHECK DOOR LOCK AND UNLOCK SWITCH OPERATION

Check door lock and unlock operation by operating door lock and unlock switch.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refer to DLK-645, "DOOR LOCK AND UNLOCK SWITCH : Symptom Table".

2.CHECK KEYFOB OPERATION

Check door lock and unlock operation by operationg lock and unlock button of keyfob.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refer to DLK-645, "KEYFOB : Symptom Table".

3.CHECK AUTO DOOR LOCK OPERATION

Check auto door lock operation. Refer to DLK-563, "AUTO DOOR LOCK : System Description".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Refer to DLK-646, "AUTO DOOR LOCK : Symptom Table".

4.CHECK VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION

Check vehicle speed sensing auto door lock. Refer to DLK-565, "VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description"

Is the inspection result normal?

YES >> GO TO 5.
NO >> Refer to DLK-646, "VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table".

5.CHECK BACK DOOR OPENER SWITCH OPERATION

Check back door opener operation by operating back door opener switch.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Refer to DLK-648, "BACK DOOR OPENER SWITCH : Symptom Table".

6.CHECK HAZARD REMINDER FUNCTION

Check hazard reminder function by operating the following switches.
- Lock and unlock button of keyfob.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Refer to DLK-650, "HAZARD WARNING LAMP : Symptom Table".

7.CHECK WARNING FUNCTION

Check that warning function operate properly. Refer to DLK-572, "System Description".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Refer to DLK-649, "BACK DOOR : Symptom Table".

8.CHECK OUT

CHECK OUT.

>> INSPECTION END

cardiagn.com

ON-VEHICLE REPAIR

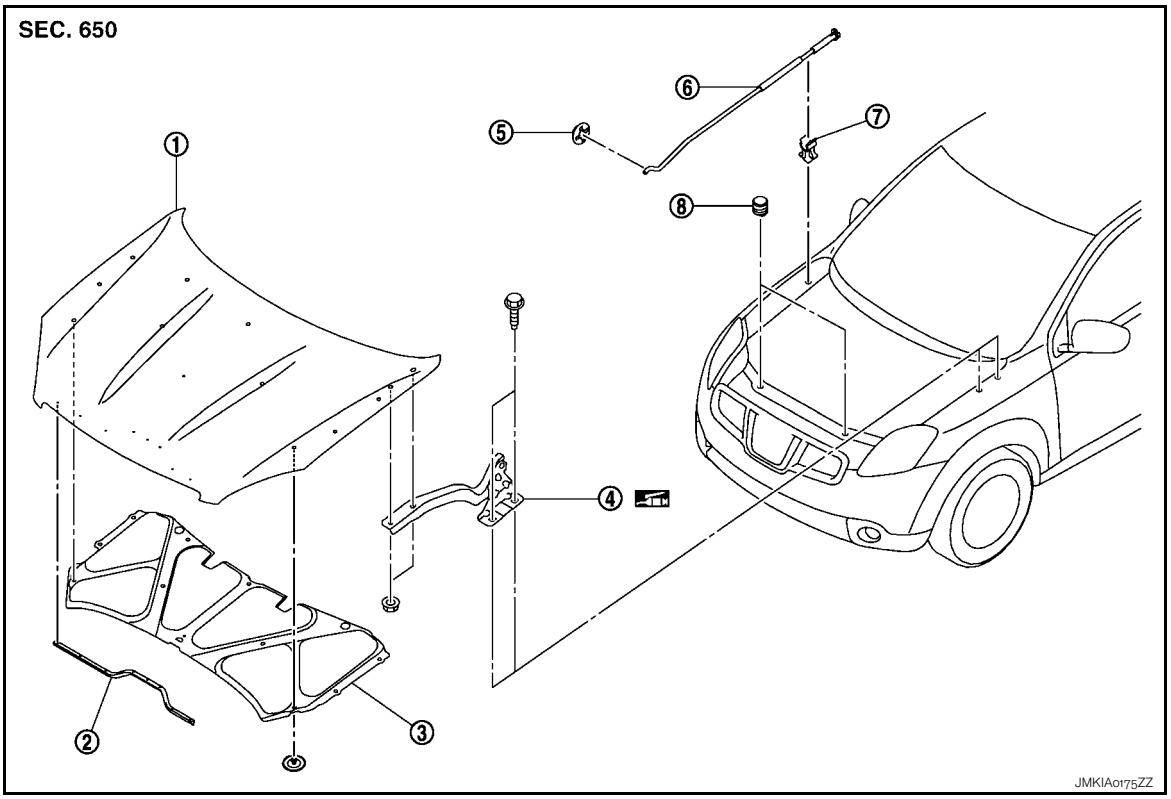
HOOD

HOOD ASSEMBLY

HOOD ASSEMBLY : Exploded View

INFOID:0000000001098574

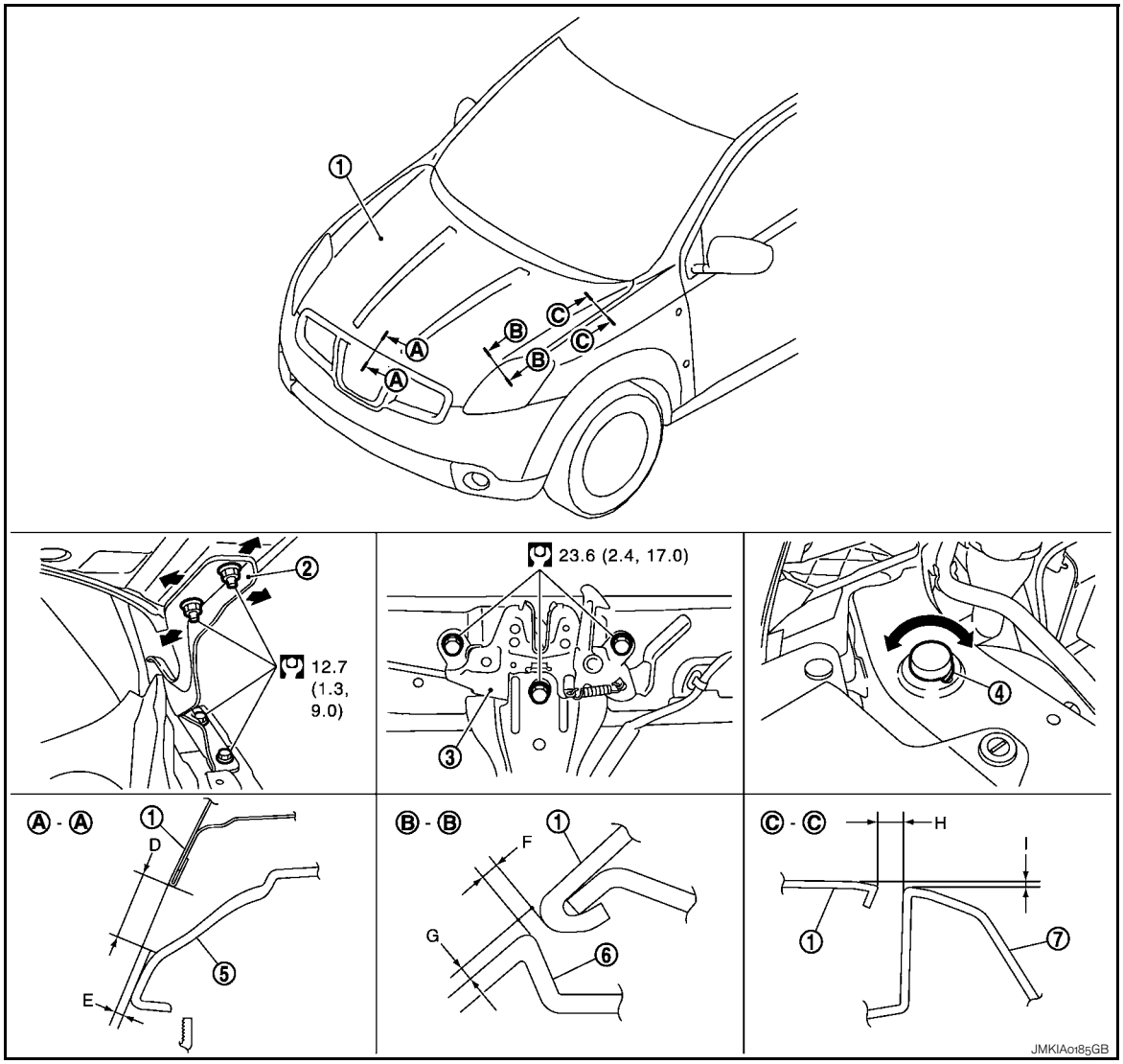
REMOVAL



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Hood assembly
2. Hood hinge
3. Hood lock assembly
4. Hood bumper rubber
5. Front grille
6. Front combination lamp
7. Front fender

Refer to GI-4, "Components" for symbols in the figure.

HOOD ASSEMBLY : Removal and Installation

INFOID:0000000001098575

REMOVAL

1. Support the hood lock assembly with the proper material to prevent it from falling.
   WARNING:
   Bodily injury may occur if no supporting rod is holding the hood open when removing the hood stay.
2. Remove the hood hinge mounting nuts on the hood to remove the hood assembly.
   CAUTION:
   Perform work with 2 workers, because of its heavy weight.
3. Remove the following parts after removing the hood assembly.
   - Hood insulator
   - Hood sealing rubber

INSTALLATION

Install in the reverse order of removal.

CAUTION:

cardiagn.com

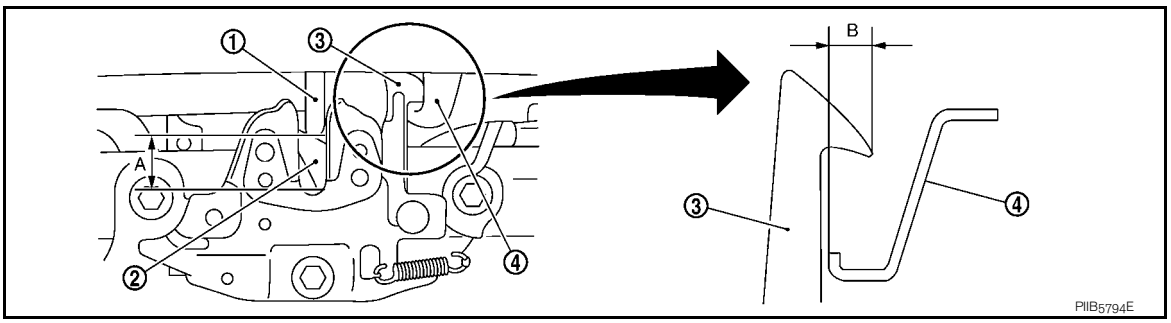
- **Perform work with 2 workers, because of its heavy weight.**
- **Before installing the hood hinge, apply anticorrosive agent onto the mounting surface of the vehicle body.**
- **After installing, perform hood fitting adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment".**

HOOD ASSEMBLY : Adjustment

INFOID:0000000001098576

Portion				Standard	Right/left Clearance (MAX)
Hood – Front bumper	A – A	D	Clearance	5.2 – 9.2 mm (0.205 – 0.362 in)	2.0 mm (0.079 in)
		E	Surface height	- 0.2 – 3.8 mm (- 0.008 – 0.150 in)	2.0 mm (0.079 in)
Hood – Front combination lamp	B – B	F	Clearance	3.7 – 7.7 mm (0.140 – 0.303 in)	2.0 mm (0.079 in)
		G	Surface height	- 2.3 – 2.3 mm (- 0.091 – 0.091 in)	2.3 mm (0.091 in)
Hood – Front fender	C – C	H	Clearance	3.9 – 5.9 mm (0.154 – 0.232 in)	1.5 mm (0.059 in)
		I	Surface height	- 1.0 – 1.0 mm (- 0.039 – 0.039 in)	1.5 mm (0.059 in)

1. Check the clearance and the surface height between the hood and each part by visualy and touching. (Fitting standard dimension in the table below should be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the hood lock and adjust the height by rotating the bumper rubber until the hood becomes 1 to1.5 mm (0.04 to 0.059 in) lower than the fender.
4. Temporarily tighten the hood lock, and position by engaging it with the hood striker. Check the lock and striker for looseness and adjust the clearance and evenness with the striker to satisfy the specification.
5. Adjust A and B shown in the figure to the following value with hood's own weight by dropping it from approximately. 200 mm (7.87 in) height or by pressing the hood lightly [approximately. 29 N (3 kg)].



1. Hood striker
2. Primary latch
3. Secondary striker
4. Secondary latch

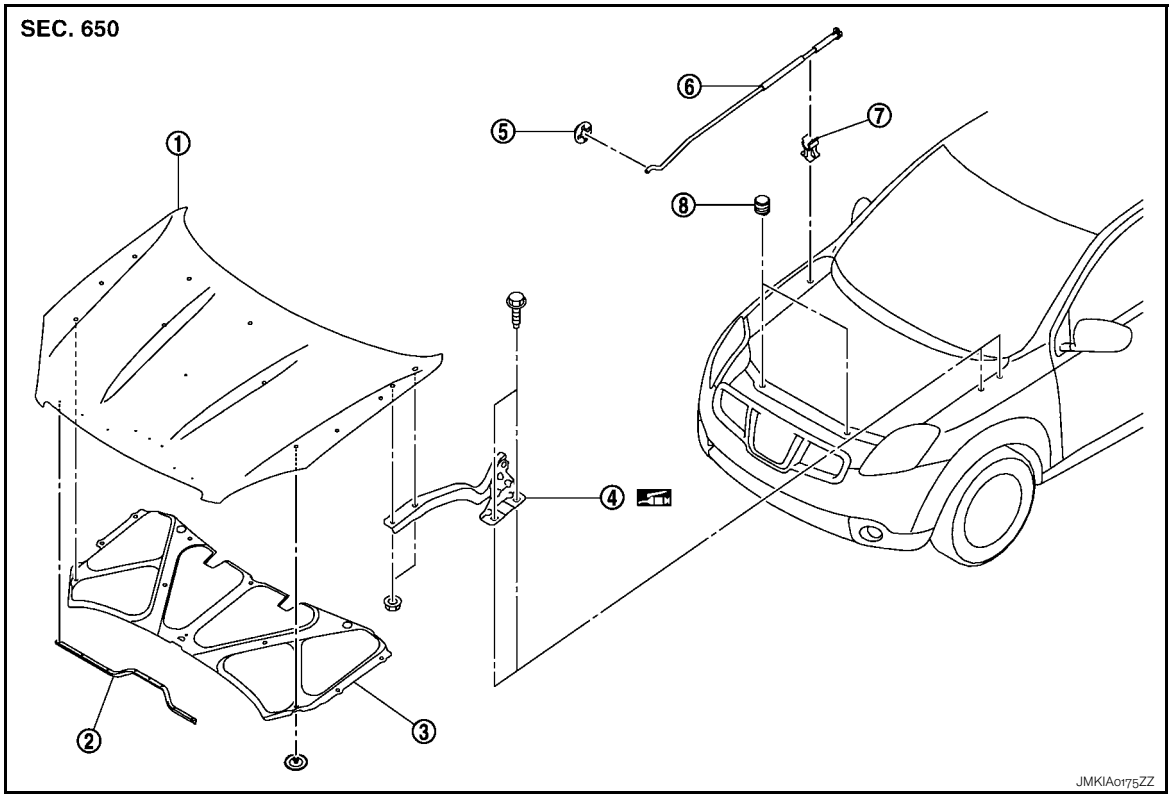
A : 20.0 mm (0.787 in)
B : 6.8 mm (0.268 in)

6. After adjustment tighten lock bolts to the specified torque.

HOOD HINGE

HOOD HINGE : Exploded View

INFOID:0000000001098582



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

HOOD HINGE : Removal and Installation

INFOID:0000000001098583

REMOVAL

1. Remove the hood assembly. Refer to DLK-829, "HOOD ASSEMBLY : Removal and Installation".
2. Remove the front fender. Refer to DLK-838, "Removal and Installation".
3. Remove the hood hinge mounting bolts, and then remove the hood hinge.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

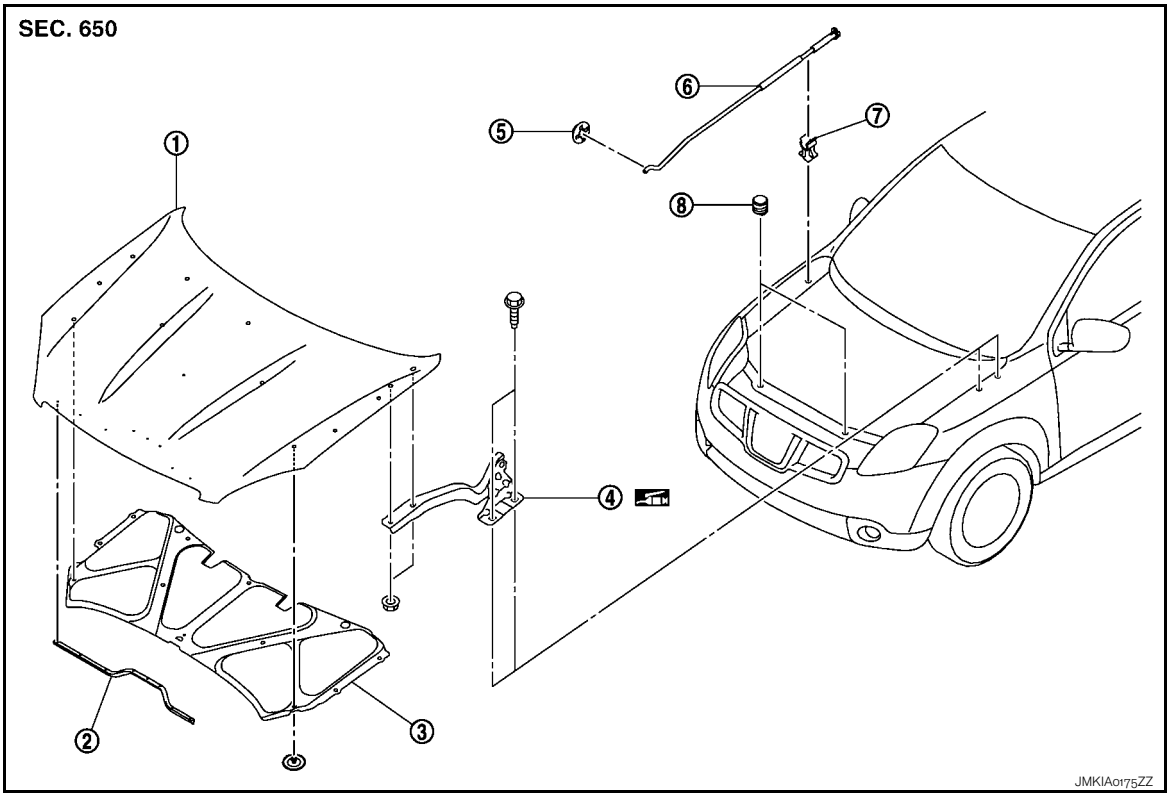
- **After installation, apply touch-up paint (the body color) onto the head of the hinge mounting bolts and nuts.**
- **Before installation of hood hinge, apply anticorrosive agent onto the mounting surface of the vehicle body.**
- **After installation, perform hood fitting adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment".**

HOOD SUPPORT ROD

HOOD SUPPORT ROD : Exploded View

INFOID:0000000001098585

cardiagn.com



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

HOOD SUPPORT ROD : Removal and Installation

INFOID:0000000001098587

REMOVAL

1. Support the hood lock assembly with the proper material to prevent it from falling.

   WARNING:
   Bodily injury may occur if no supporting rod is holding the hood open when removing the hood stay.
2. Remove the hood support rod from the grommet.

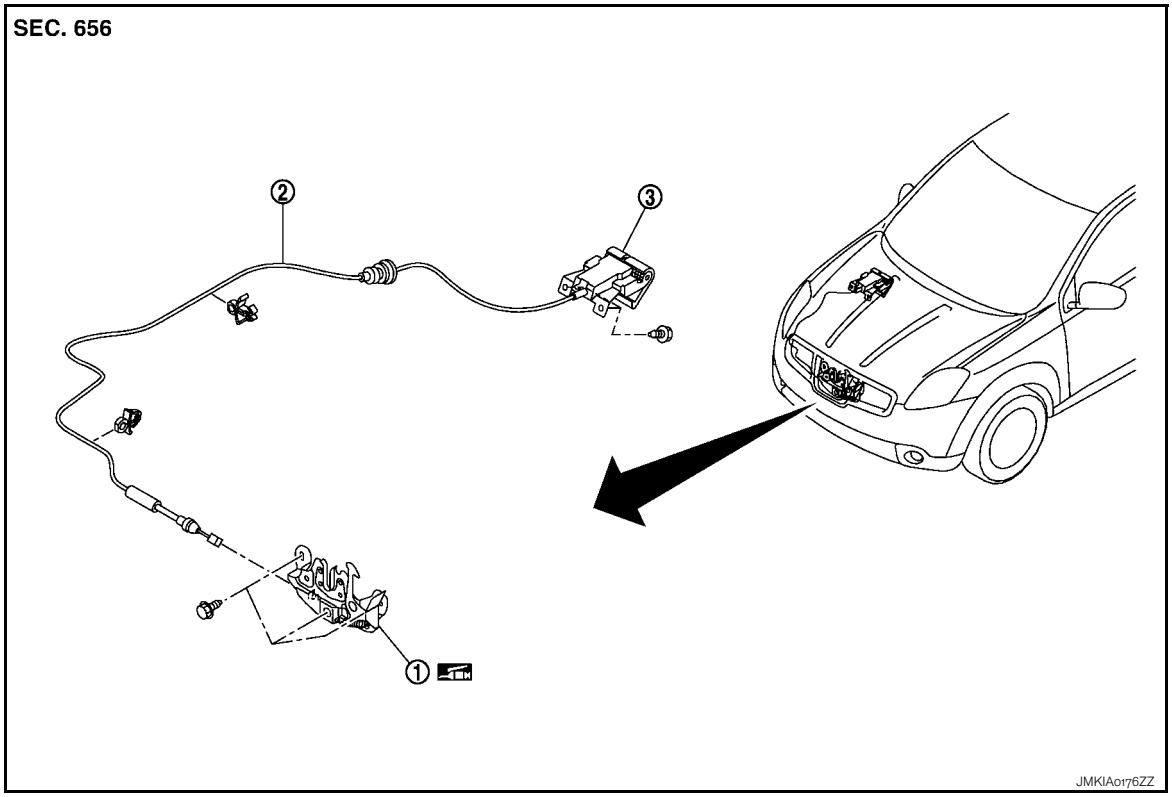
INSTALLATION

Install in the reverse order of removal.

HOOD LOCK CONTROL

HOOD LOCK CONTROL : Exploded View

INFOID:0000000001098589



1. Hood lock assembly
2. Hood lock control cable
3. Hood lock opener

Refer to GI-4, "Components" for symbols in the figure.

HOOD LOCK CONTROL : Removal and Installation

INFOID:0000000001098590

REMOVAL

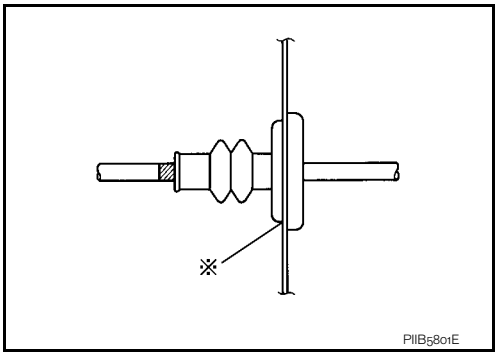
1. Remove the hood lock opener mounting bolts, and then remove the hood lock opener.
2. Remove the front bumper fascia. Refer to EXT-11, "Removal and Installation".
3. Remove the hood lock mounting bolts, and then remove the hood lock.
4. Remove the fender protector. Refer to EXT-22, "Removal and Installation".
5. Disconnect the hood lock cable from hood lock, and clip it from the hoodledge.
6. Remove the grommet on the dash lower panel, and pull the hood lock control cable toward the passenger compartment.
   CAUTION:
   While pulling, do not to damage (peeling) the outside of the hood lock control cable.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Do not to bend the cable too much, keeping the radius 100 mm (3.94 in) or more.**
- **Check that the cable is not offset from the positioning grommet, and apply the sealant to the grommet (at *mark) properly.**



cardiagn.com

- **Check that the hood lock control cable is properly engaged with the hood lock.**
- **After installation, perform hood fitting adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment".**
- **After installation, perform the hood lock control inspection. Refer to DLK-834, "HOOD LOCK CONTROL : Inspection".**

HOOD LOCK CONTROL : Inspection

INFOID:0000000001098591

NOTE:
If the hood lock cable is bent or deformed, replace it.

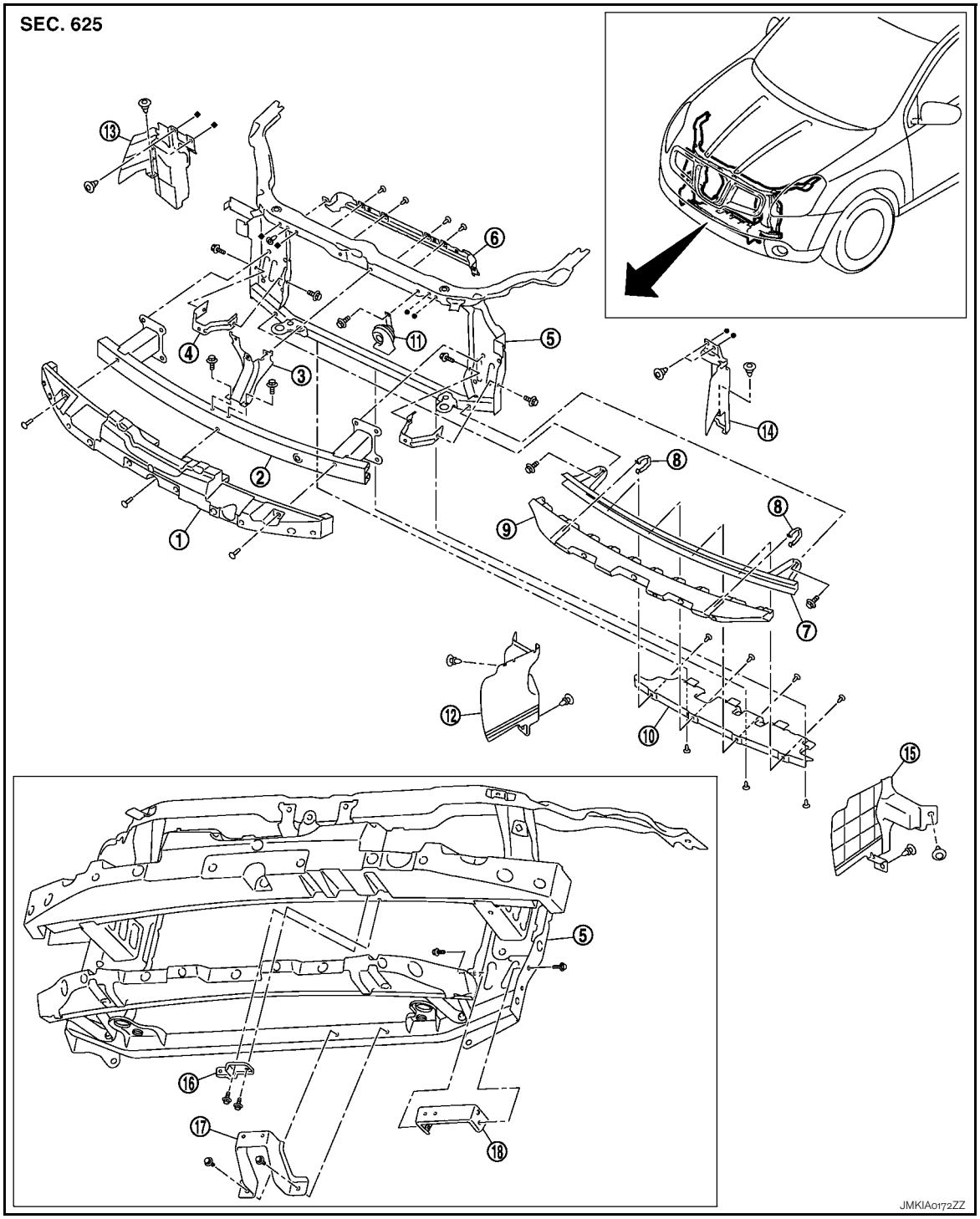
1. Check that the secondary latch is properly engaged with the secondary striker [6.8 mm (0.268 in) shown in the figure] by hood weight.
2. While operating the hood opener, carefully check that the front end of the hood is raised by approximately 20.0 mm (0.787 in). Also check that the hood opener returns to the original position.
3. Check that the hood opener operating is condition 49 N (5.0 kg) or below.
4. Install so that static closing face of hood is 94 – 490 N·m (9.6 – 50.0 kg-m).
   NOTE:
   - Exert vertical force on right side and left side of hood lock.
   - Do not press simultaneously both sides.
5. Check the hood lock lubrication condition. If necessary, apply body grease to the hood lock.

carsdiagn.com

RADIATOR CORE SUPPORT

Exploded View

INFOID:0000000001098596



1. Energy absorber
2. Bumper reinforcement
3. Hood lock support stay
4. Intercooler bracket (with K9K engine models)
5. Radiator core support assembly
6. Upper air dam
7. Apron bracket assembly
8. Fastener
9. Energy absorber lower
10. Front air guide lower
11. Horn assembly
12. Front air guide side lower RH
13. Front air guide side RH
14. Front air guide side LH
15. Front air guide side lower LH
16. Oil cooler bracket upper
17. Oil cooler bracket lower
18. Oil cooler bracket side

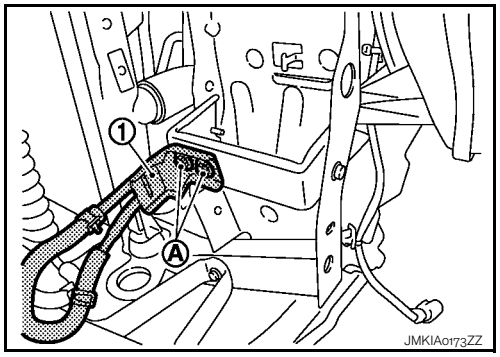
cardiagn.com

Removal and Installation

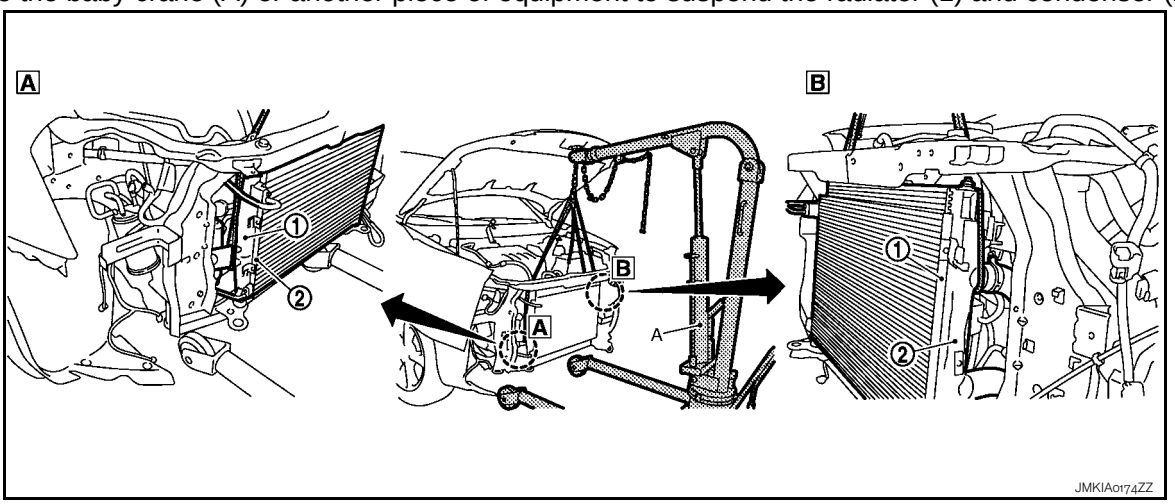
INFOID:0000000001098597

REMOVAL

1. Remove the front fillet molding. Refer to EXT-23, "Removal and Installation".
2. Remove the front bumper fascia and the energy absorber. Refer to EXT-11, "Removal and Installation".
3. Remove the energy absorber (upper and lower). Refer to EXT-11, "Removal and Installation".
4. Remove the air cleaner duct. Refer to EM-27, "Removal and Installation".
5. Remove the front combination lamp (LH/RH). Refer to EXL-171, "Removal and Installation".
6. Remove the bumper reinforcement. Refer to EXT-11, "Removal and Installation".
7. Disconnect the hood lock control cable clamp, and then remove the hood lock assembly. Refer to DLK-833, "HOOD LOCK CONTROL : Removal and Installation".
8. Remove the air guide mounting clips, and then remove the air guide (LH/RH).
9. Remove the hood lock stay mounting bolts, and then remove the hood lock stay.
10. Remove the hood switch (with theft warning systems). Refer to SEC-SEC-156, "Removal and Installation".
11. Remove the crush zone sensor. Refer to SR-14, "Removal and Installation".
12. Remove the horn. Refer to HRN-5, "Removal and Installation".
13. Remove the ambient sensor. Refer to VTL-22, "Removal and Installation".
14. Remove the radiator mounting bracket (LH/RH). Refer to CO-13, "Removal and Installation".
15. Remove the Intelligent Key warning buzzer (with Intelligent Key systems). Refer to DLK-277, "Removal and Installation".
16. Remove the charge air cooler assembly (with K9K engine models). Refer to EM-266, "Removal and Installation".
17. Remove the A/T fluid cooler assembly and the A/T fluid cooler bracket (with A/T models only). Refer to TM-348, "FLUID COOLER : Removal and Installation".
18. Remove the A/T fluid cooler pipe bracket (1) mounting bolts (A) (with A/T models only).



19. Remove the washer tank. Refer to WW-99, "Removal and Installation".
20. Use the baby crane (A) or another piece of equipment to suspend the radiator (1) and condenser (2).



21. Remove the radiator core support assembly mounting bolts, and draw out the radiator core support assembly to the front of the vehicle.
22. Remove the radiator core support assembly.
23. Remove the following parts after removing the radiator core support assembly.
    - Inlet tube bracket (with K9K engine models)
    - Intercooler bracket (with K9K engine models)
    - Apron reinforcement bracket

INSTALLATION

Install in the reverse order of removal.

CAUTION:

After installation, refill the following parts.

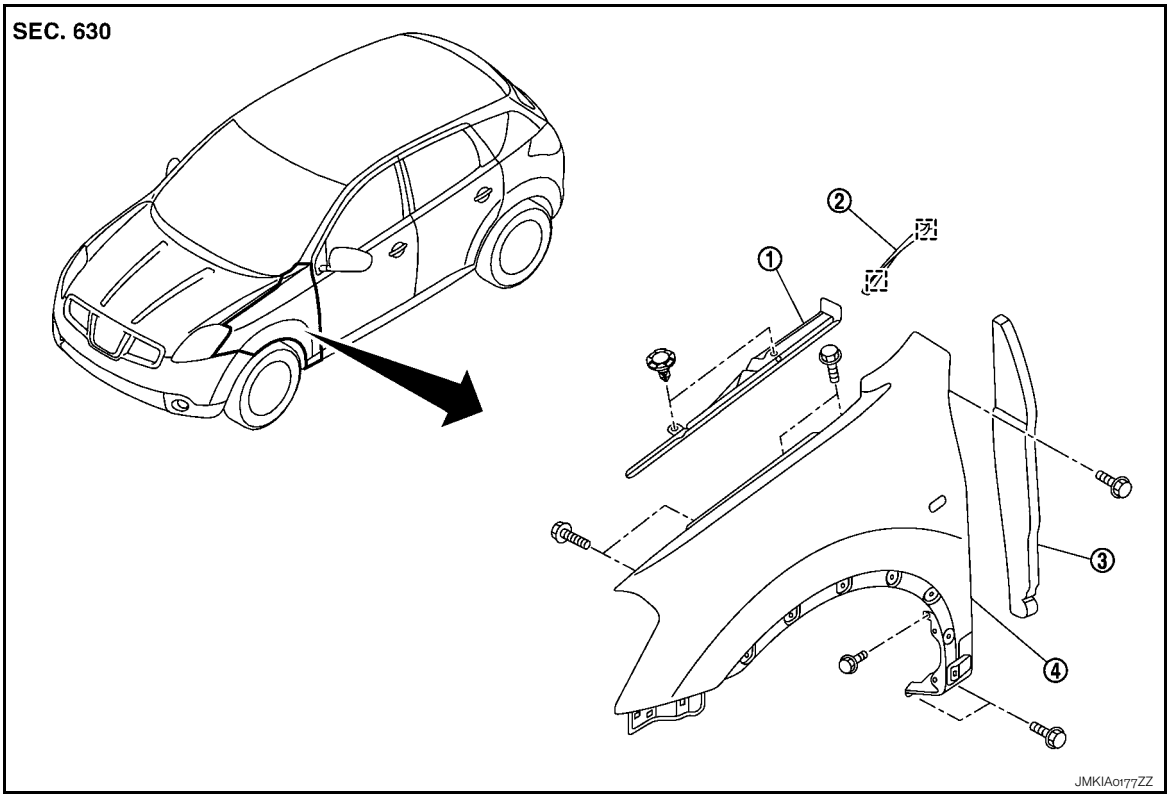
- **A/T fluid. Refer to TM-315, "Changing".**
- **Engine coolant. Refer to CO-9, "Refilling".**

cardiagn.com

FRONT FENDER

Exploded View

INFOID:0000000001098598



1. Hood seal assembly (side)
2. Front fender finisher
3. Front fender seal
4. Front fender

: Metal clip

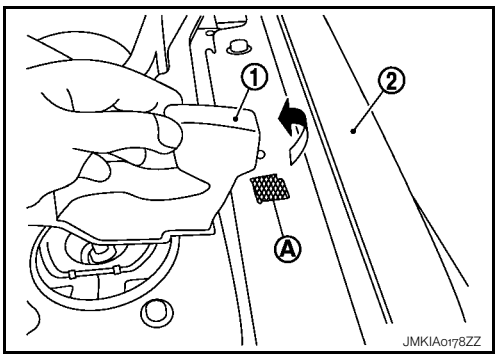
Removal and Installation

INFOID:0000000001098599

REMOVAL

1. Remove the outer fender protector. Refer to EXT-22, "Removal and Installation".
2. Remove the inner fender protector. Refer to EXT-22, "Removal and Installation".
3. Remove the side turn signal lamp. Refer to EXL-178, "Removal and Installation".
4. Remove the front bumper fascia. Refer to EXT-11, "Removal and Installation".
5. Remove the front combination lamp.
   - XENON TYPE: EXL-171, "Removal and Installation".
   - HALOGEN TYPE: EXL-327, "Removal and Installation".
6. Remove the mounting clips and remove hoodledge cover.
7. Remove the center mudguard. Refer to EXT-28, "Removal and Installation".

8. Peel away the double-faced adhesive tape (A) of the front fender seal (1) from the front fender (2).



9. Remove the mounting bolts and remove the front fender.
   CAUTION:
   Use a shop cloth to protect the body from being damaged during removal.
10. Remove the following parts after removing the front fender.
    - Front fender seal.
    - Bumper side bracket. Refer to EXT-11, "Exploded View".

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace the double-faced adhesive tape on the back of the cowl top cover seal with new tape.**
- **Do not wash the vehicle within 24 hours after installation so as to keep adhesive.**
- **After installation, apply the touch-up paint (the body color) onto the head of the front fender mounting bolts.**
- **After installation, check the front fender adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment" and DLK-842, "DOOR ASSEMBLY : Adjustment".**

cardiagn.com

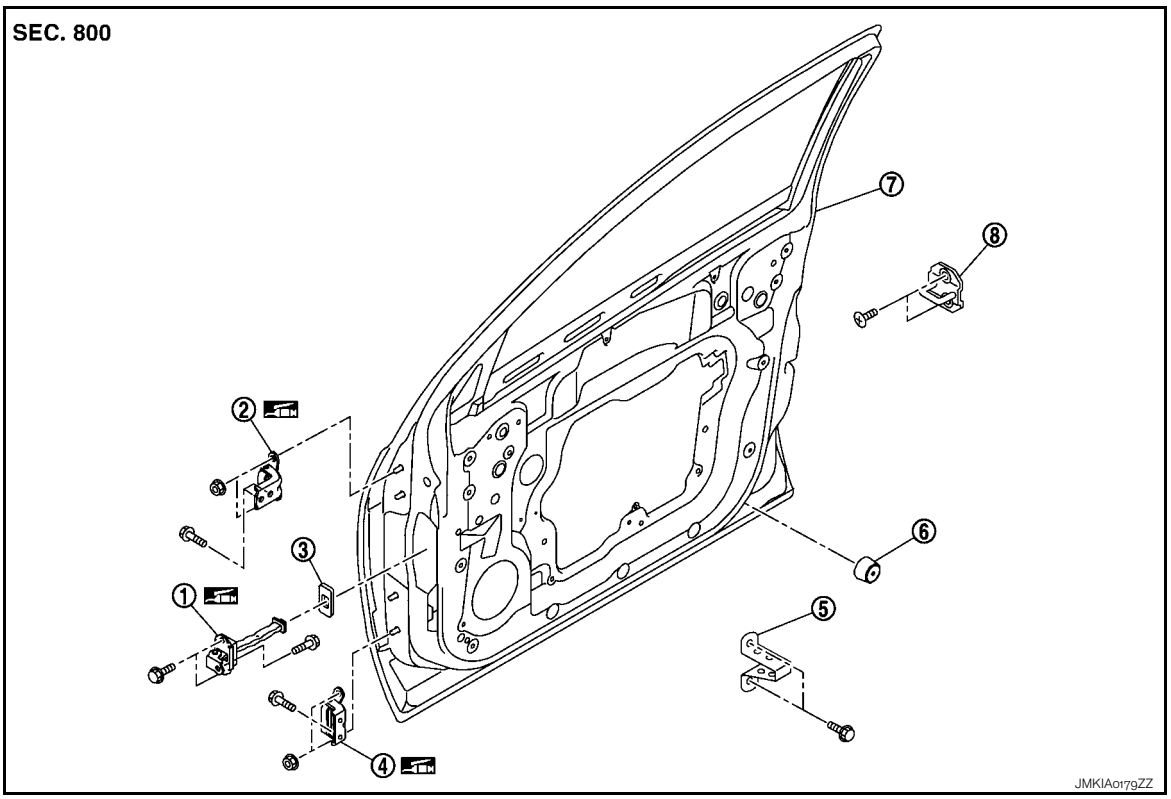
FRONT DOOR

DOOR ASSEMBLY

DOOR ASSEMBLY : Exploded View

INFOID:0000000001098600

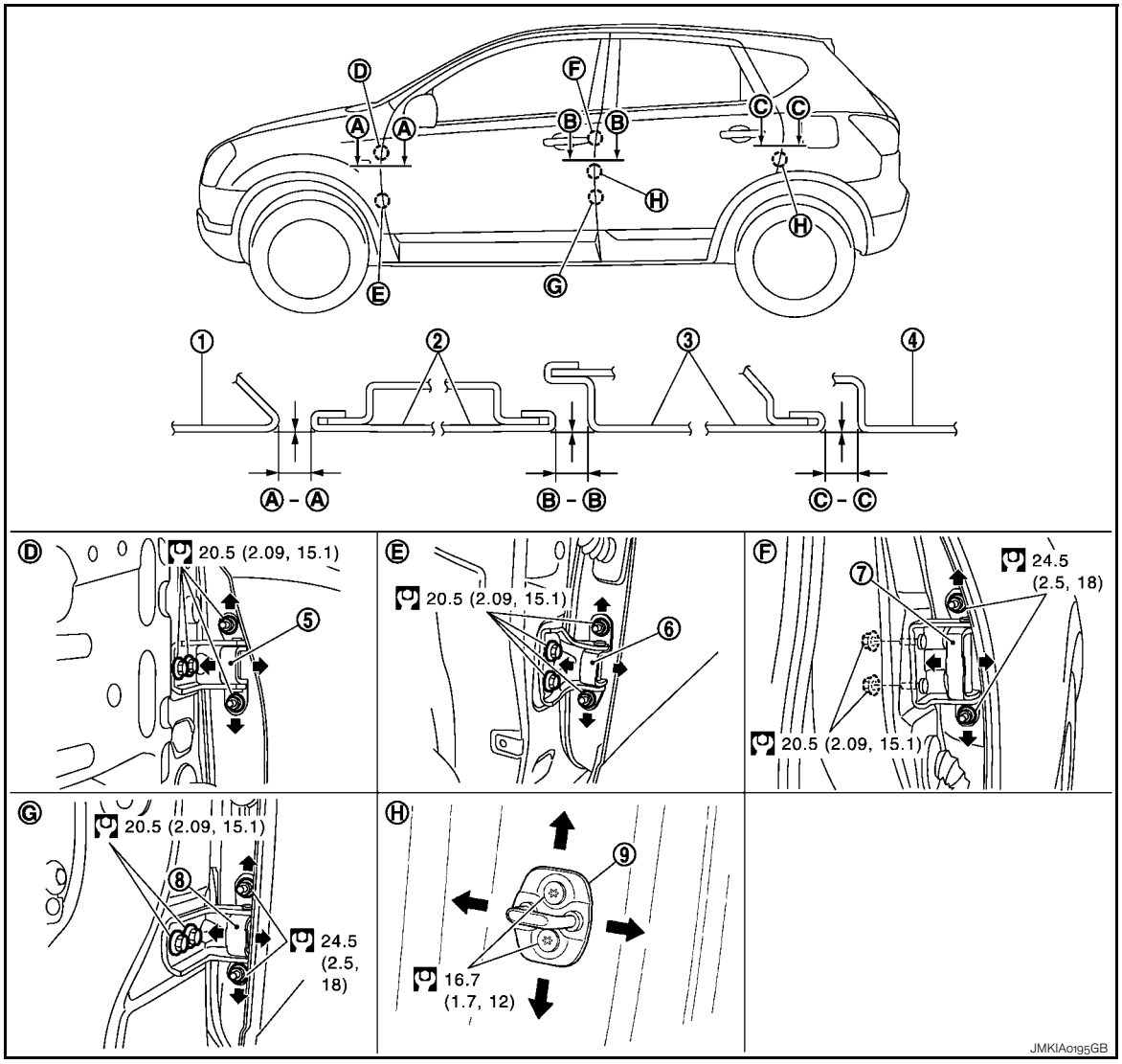
REMOVAL



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Front fender
2. Front door outer
3. Rear door outer
4. Rear fender
5. Front door hinge (upper)
6. Front door hinge (lower)
7. Rear door hinge (upper)
8. Rear door hinge (lower)
9. Door striker

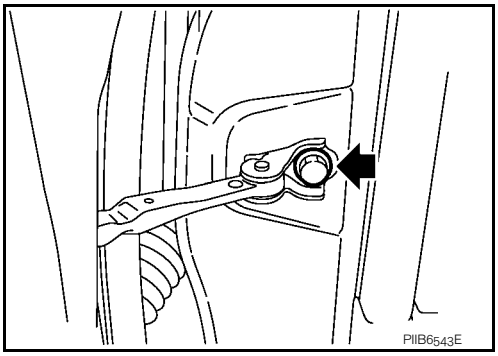
Refer to GI-4, "Components" for symbols in the figure.

DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001098601

REMOVAL

1. Remove the mounting bolts of the door check link on the vehicle.



2. Remove the front door harness grommet, and then pull out the harness from the vehicle.

cardiagn.com

3. Disconnect the front door harness connector.
4. Remove the door hinge mounting nuts (door side), and then remove the door assembly.
   CAUTION:
   - **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
   - **Perform work with 2 workers, because of its heavy weight.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **When removing and installing the front door assembly, perform the fitting adjustment. Refer to DLK-842, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the front door open/close operation after installation.**

DOOR ASSEMBLY : Adjustment

INFOID:0000000001098602

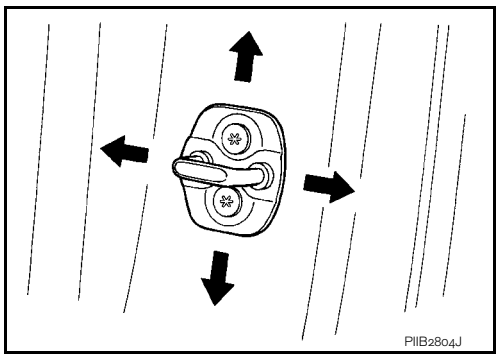
CLEARANCE, SURFACE HEIGHT AND SURFACE MISMATCH ADJUSTMENT

Portion		Clearance	Surface height
Front fender – Front door	A – A	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)
Front door – Rear door	B – B	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)

1. Check the clearance and surface height and surface mismatch between the front door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the front fender. Refer to refer to DLK-838, "Removal and Installation".
4. Loosen the door hinge mounting nuts on door side.
5. Adjust the surface height and surface mismatch of the front door according to the fitting standard dimension.
6. Temporarily tighten the hinge mounting nuts on door side.
7. Loosen the door hinge mounting bolts on body side.
8. Raise the front door at rear end to adjust clearance of the front door according to the fitting standard dimension.
9. After adjustment tighten bolts and nuts to the specified torque.
10. Install the front fender. Refer to refer to DLK-838, "Removal and Installation".
    CAUTION:
    After installation, check the front fender adjustment. Refer to DLK-225, "HOOD ASSEMBLY : Adjustment".

DOOR STRIKER ADJUSTMENT

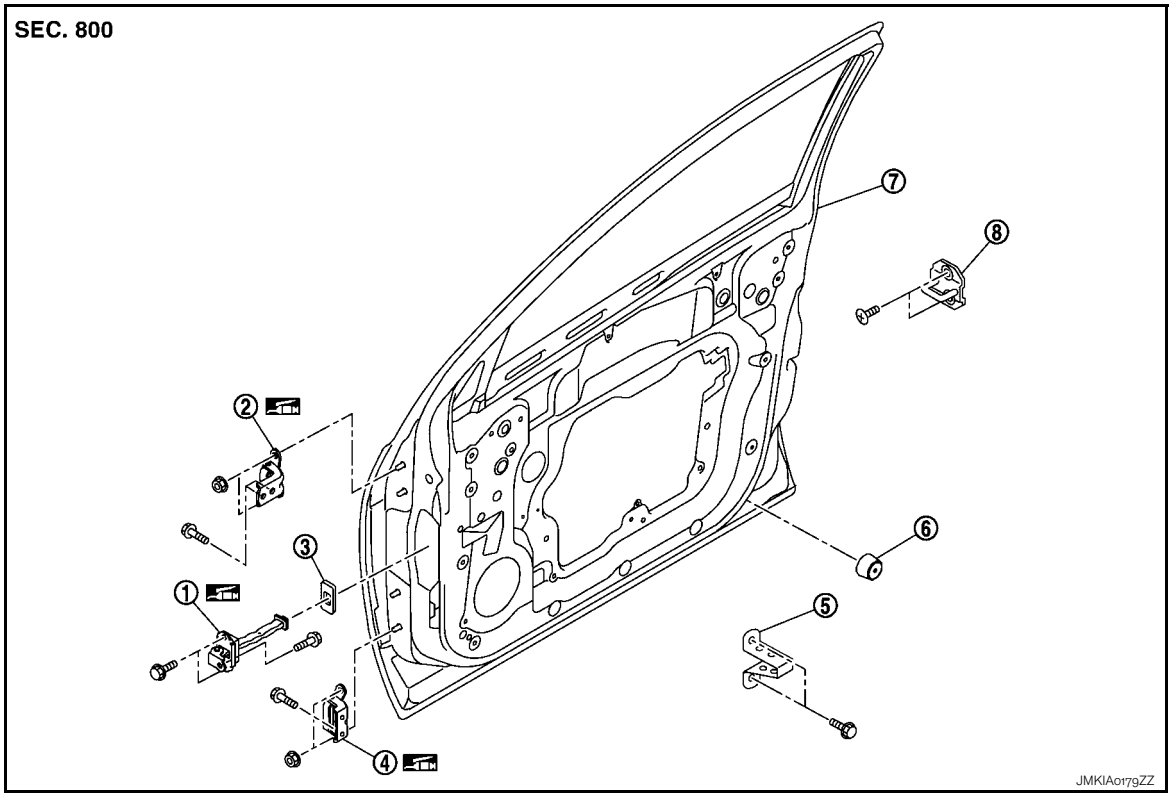
Adjust the door striker so that it becomes parallel with the lock insertion direction.



DOOR STRIKER

DOOR STRIKER : Exploded View

INFOID:0000000001098605



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

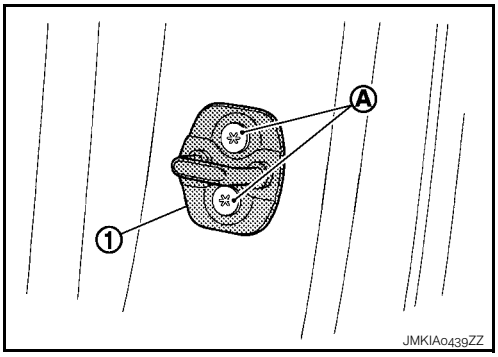
Refer to GI-4, "Components" for symbols in the figure.

DOOR STRIKER : Removal and Installation

INFOID:0000000001098606

REMOVAL

Remove the mounting bolts (A), and then remove the door striker (1).



INSTALLATION

Install in the reverse order of removal.

CAUTION:

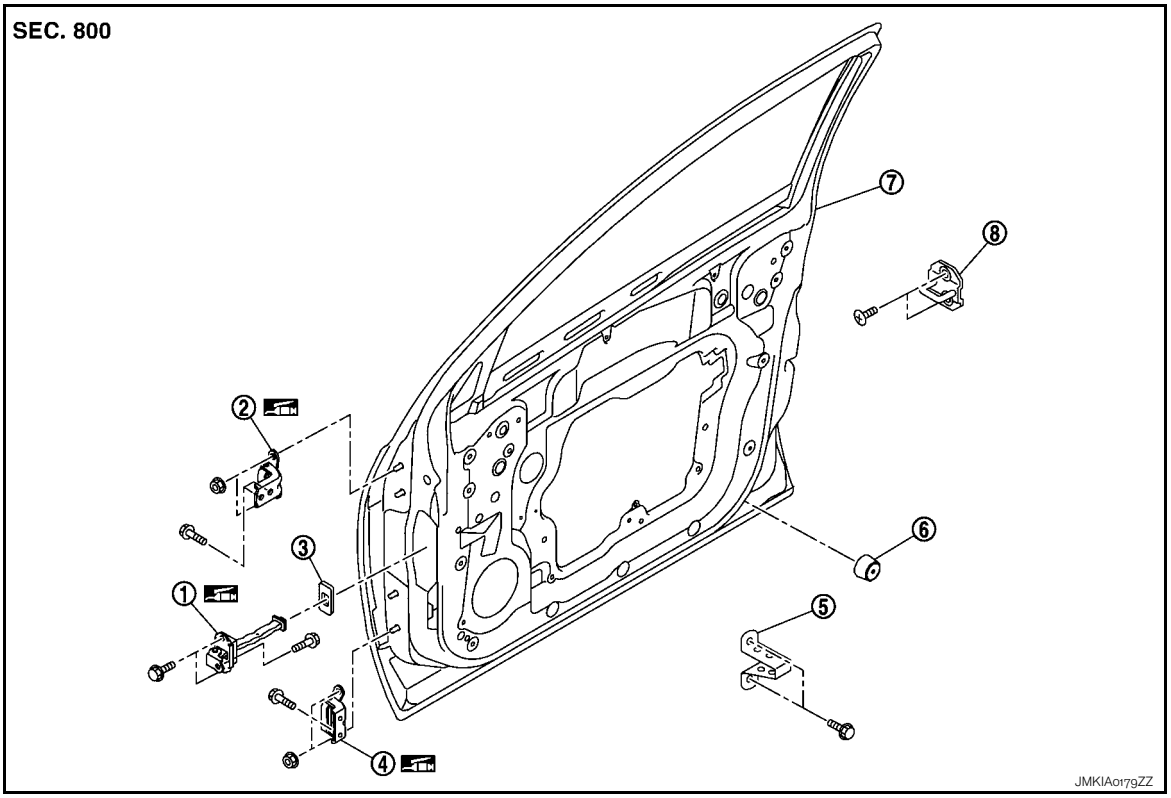
- **Check the front door open/close operation after installation.**
- **When removing and installing the door striker, be sure to perform the fitting adjustment. Refer to DLK-842, "DOOR ASSEMBLY : Adjustment".**

DOOR HINGE

cardiagn.com

DOOR HINGE : Exploded View

INFOID:0000000001098609



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR HINGE : Removal and Installation

INFOID:0000000001098611

REMOVAL

1. Remove the front door assembly. Refer to DLK-841, "DOOR ASSEMBLY : Removal and Installation".
2. Remove the door hinge mounting bolts, and then remove the front door hinge.

INSTALLATION

Install in the reverse order of removal.

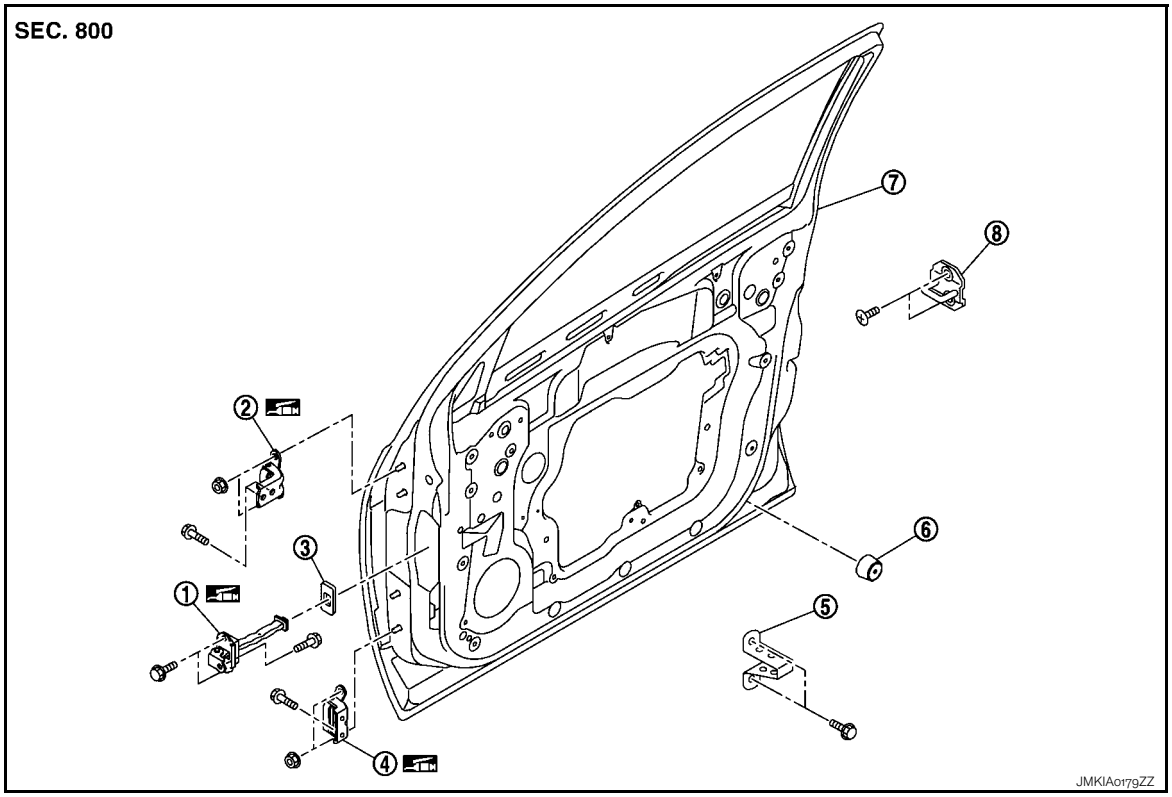
CAUTION:

- **When removing and installing the front door assembly, perform the fitting adjustment. Refer to DLK-842, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the front door open/close operation after installation.**

DOOR CHECK LINK

DOOR CHECK LINK : Exploded View

INFOID:0000000001098614



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

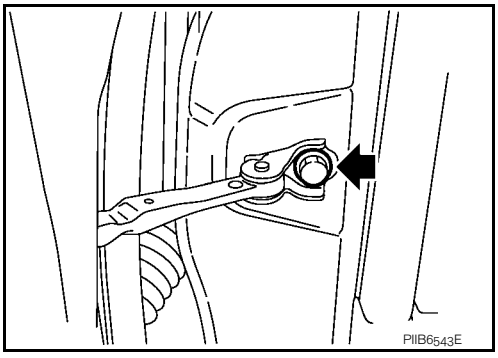
Refer to GI-4, "Components" for symbols in the figure.

DOOR CHECK LINK : Removal and Installation

INFOID:0000000001098616

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the front door speaker. Refer to AV-34, "Removal and Installation".
3. Remove the mounting bolts of the door check link on the vehicle.



4. Remove the door check link cover, and then remove the door check link mounting bolts.
5. Remove the door check link.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check the front door open/close operation after installation.

cardiagn.com

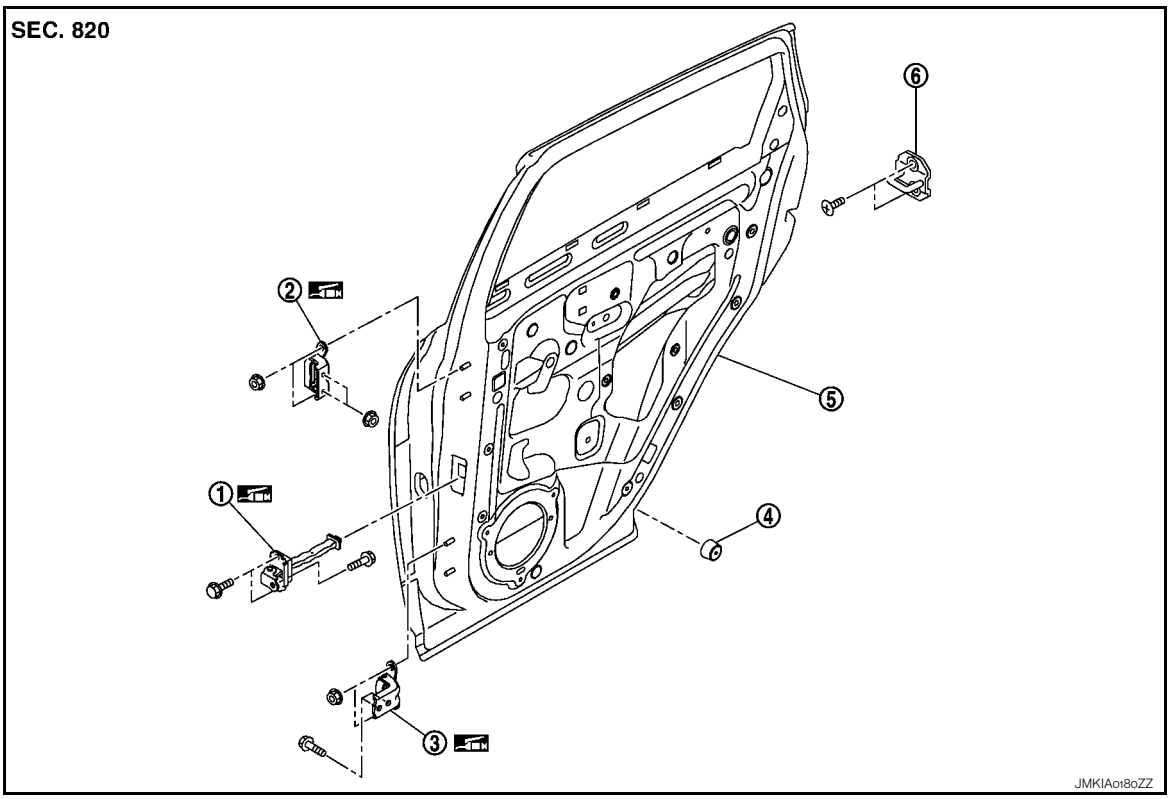
REAR DOOR

DOOR ASSEMBLY

DOOR ASSEMBLY : Exploded View

INFOID:0000000001098618

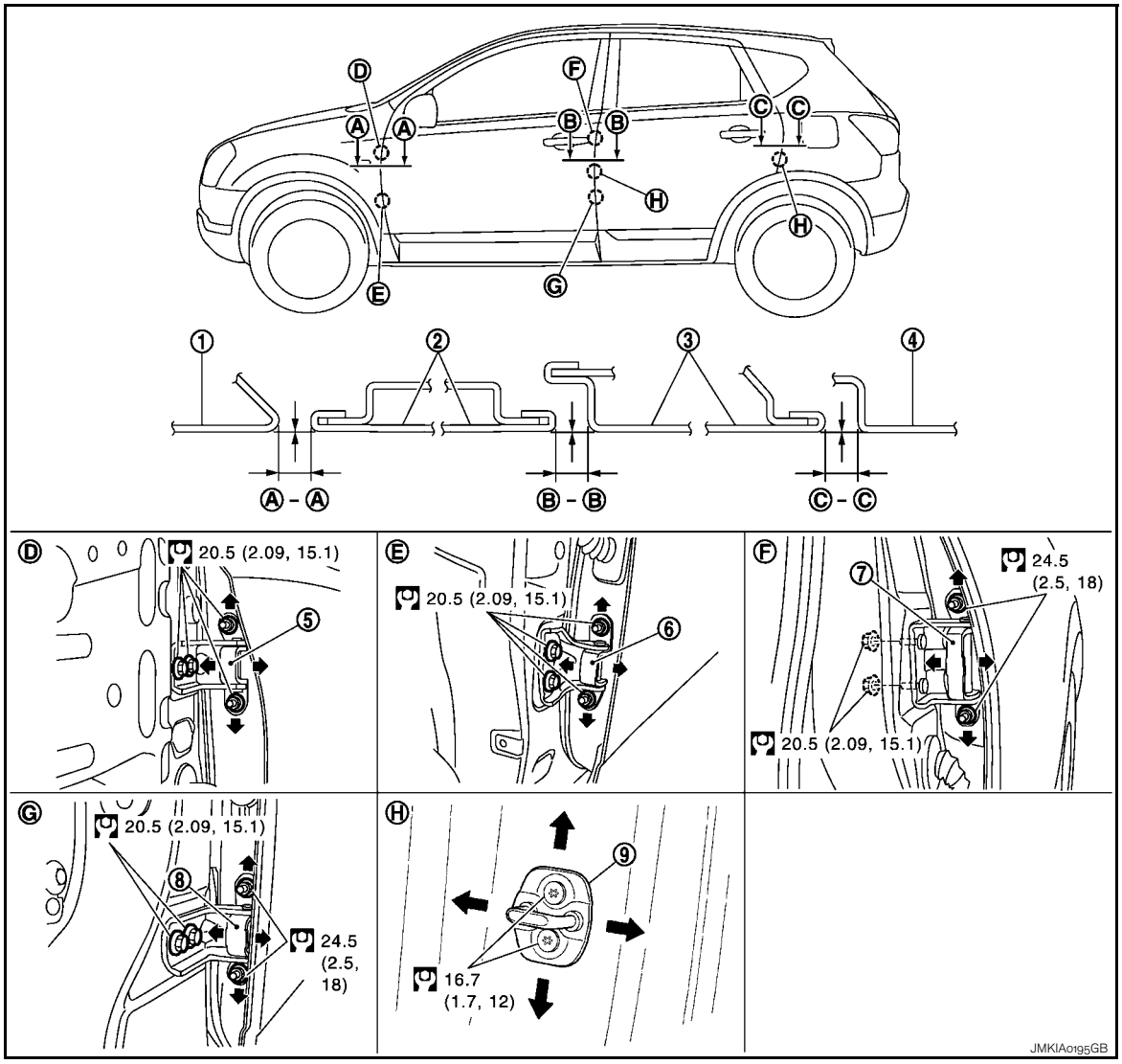
REMOVAL



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Front fender
2. Front door outer
3. Rear door outer
4. Rear fender
5. Front door hinge (upper)
6. Front door hinge (lower)
7. Rear door hinge (upper)
8. Rear door hinge (lower)
9. Striker

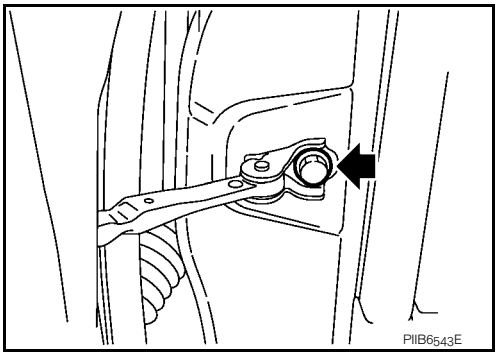
Refer to GI-4, "Components" for symbols in the figure.

DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001098619

REMOVAL

1. Remove the mounting bolts of the door check link on the vehicle.



2. Remove the rear door harness grommet, and then pull out the door harness from the vehicle.

cardiagn.com

3. Disconnect the rear door harness connector.
4. Remove the door hinge mounting nuts (door side), and then remove the rear door assembly.

CAUTION:
- **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
- **Perform work with 2 workers, because of it's heavy weight.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:
- **When removing and installing the rear door assembly, perform the fitting adjustment. Refer to DLK-848, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the rear door open/close operation after installation.**
- **Check the rear door lock/unlock operation after installation.**

DOOR ASSEMBLY : Adjustment

INFOID:0000000001098621

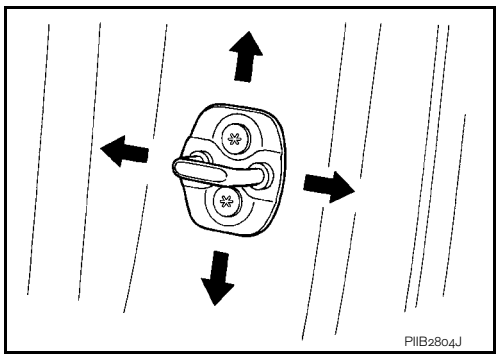
CLEARANCE, SURFACE HEIGHT AND SURFACE MISMATCH ADJUSTMENT

Portion		Clearance	Surface height
Front door – Rear door	B – B	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)
Rear door – Rear fender	C – C	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)

1. Check the clearance and surface height and surface mismatch between the rear door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the center pillar upper garnish and center pillar lower garnish. Refer to INT-14, "Removal and Installation".
4. Loosen the door hinge mounting nuts on door side.
5. Adjust the surface height and surface mismatch of the rear door according to the fitting standard dimension.
6. Temporarily tighten the hinge mounting nuts on door side.
7. Loosen the door hinge mounting nuts and bolts on body side.
8. Raise the rear door at rear end to adjust clearance of the rear door according to the fitting standard dimension.
9. After adjustment tighten bolts and nuts to the specified torque.
10. Install the center pillar upper garnish and center pillar lower garnish. Refer to INT-14, "Removal and Installation".

DOOR STRIKER ADJUSTMENT

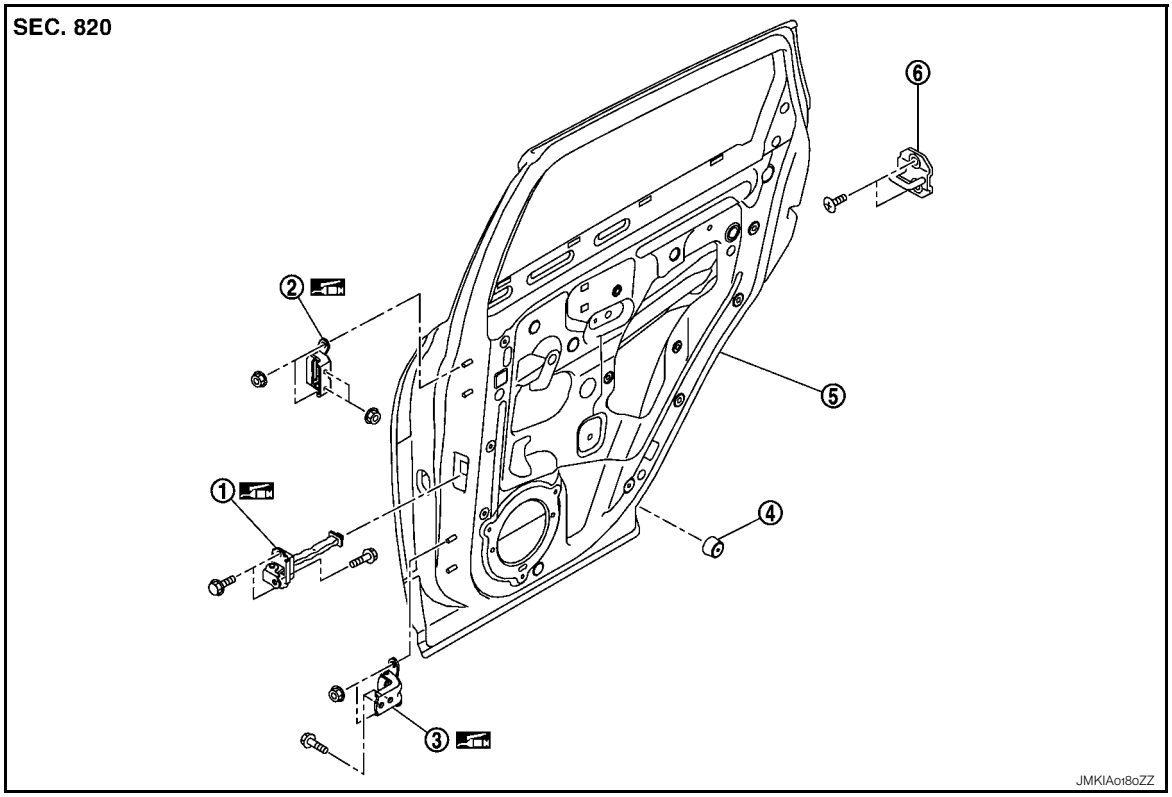
Adjust the door striker so that it becomes parallel with the lock insertion direction.



DOOR STRIKER

DOOR STRIKER : Exploded View

INFOID:0000000001098630



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

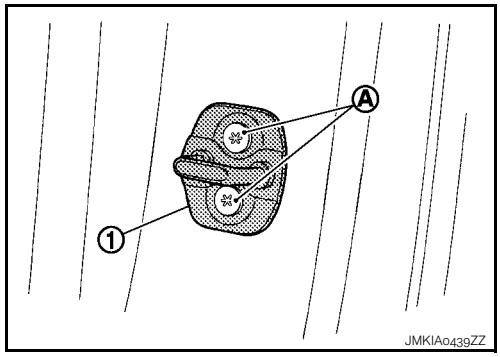
Refer to GI-4, "Components" for symbols in the figure.

DOOR STRIKER : Removal and Installation

INFOID:0000000001098631

REMOVAL

Remove the mounting bolts (A), and then remove the door striker (1).



INSTALLATION

Install in the reverse order of removal.

CAUTION:

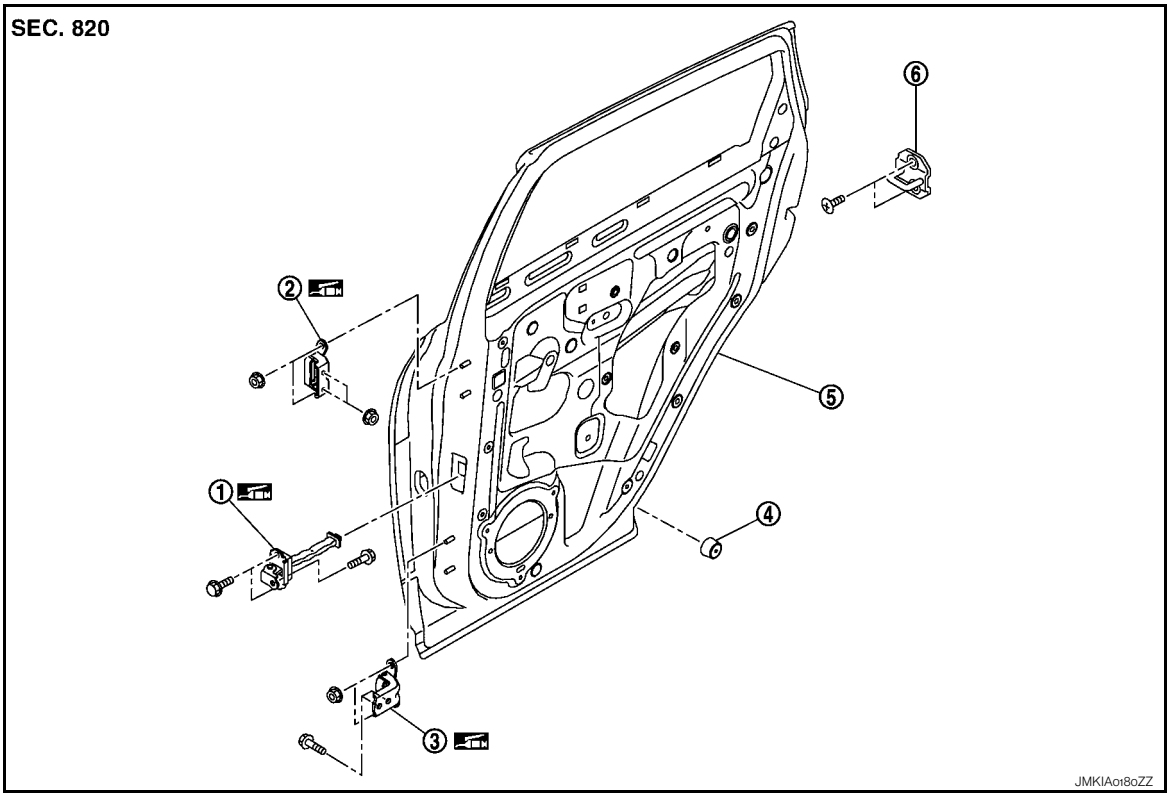
- **Check the rear door open/close operation after installation.**
- **When removing and installing the door striker, be sure to perform the fitting adjustment. Refer to DLK-848, "DOOR ASSEMBLY : Adjustment".**

DOOR HINGE

DOOR HINGE : Exploded View

INFOID:0000000001098634

cardiagn.com



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR HINGE : Removal and Installation

INFOID:0000000001098637

REMOVAL

1. Remove the center pillar lower garnish and the center pillar upper garnish. Refer to INT-14, "Removal and Installation".
2. Remove the rear door assembly. Refer to DLK-242, "DOOR ASSEMBLY : Removal and Installation".
3. Remove the rear door hinge mounting bolts and nuts (body side), and then remove the door hinge.

INSTALLATION

Install in the reverse order of removal.

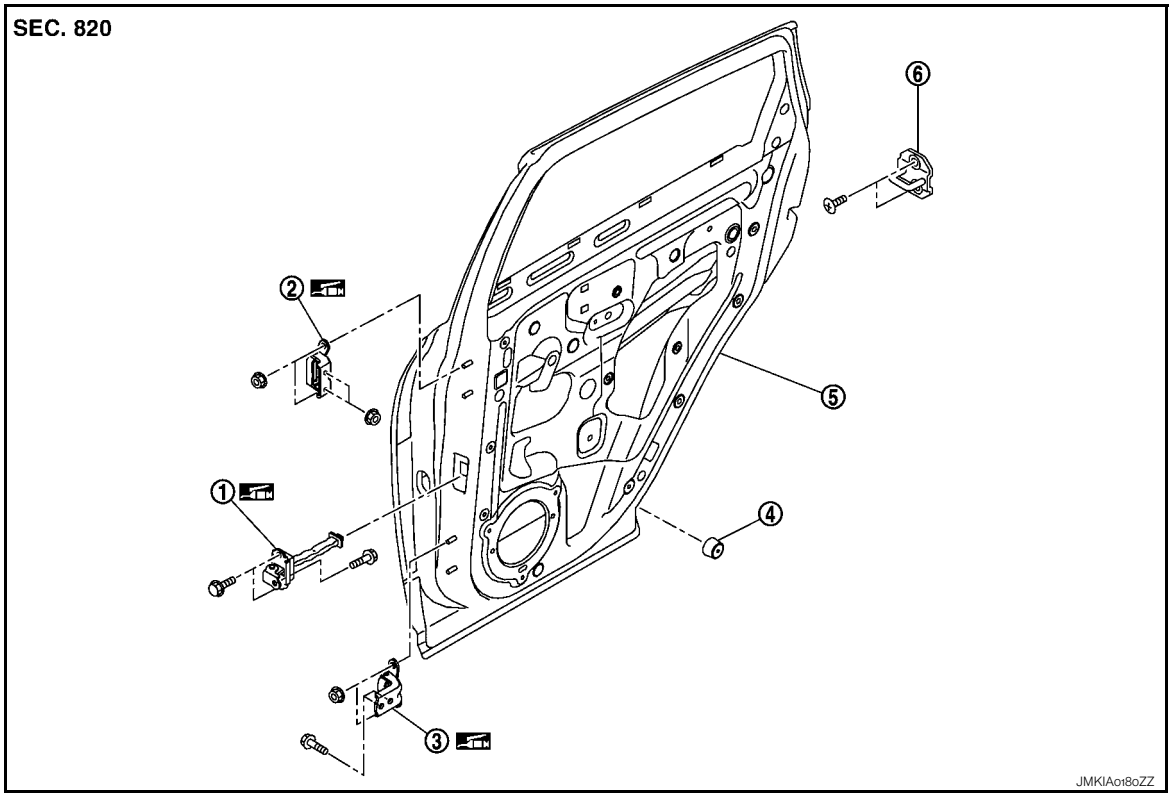
CAUTION:

- **When removing and installing the rear door assembly, perform the fitting adjustment. Refer to DLK-848, "DOOR ASSEMBLY : Adjustment".**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **After installing, apply the touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Check the rear door open/close operation after installation.**

DOOR CHECK LINK

DOOR CHECK LINK : Exploded View

INFOID:0000000001098639



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

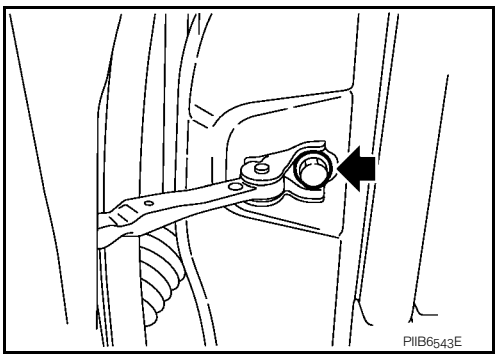
Refer to GI-4, "Components" for symbols in the figure.

DOOR CHECK LINK : Removal and Installation

INFOID:0000000001098641

REMOVAL

1. Remove the rear door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the rear door sealing screen.
3. Remove the mounting bolts of the check link on the vehicle.



4. Remove the door check link cover, and then remove the door check link mounting bolts.
5. Remove the door check link.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check front door open/close operation after installation.

cardiagn.com

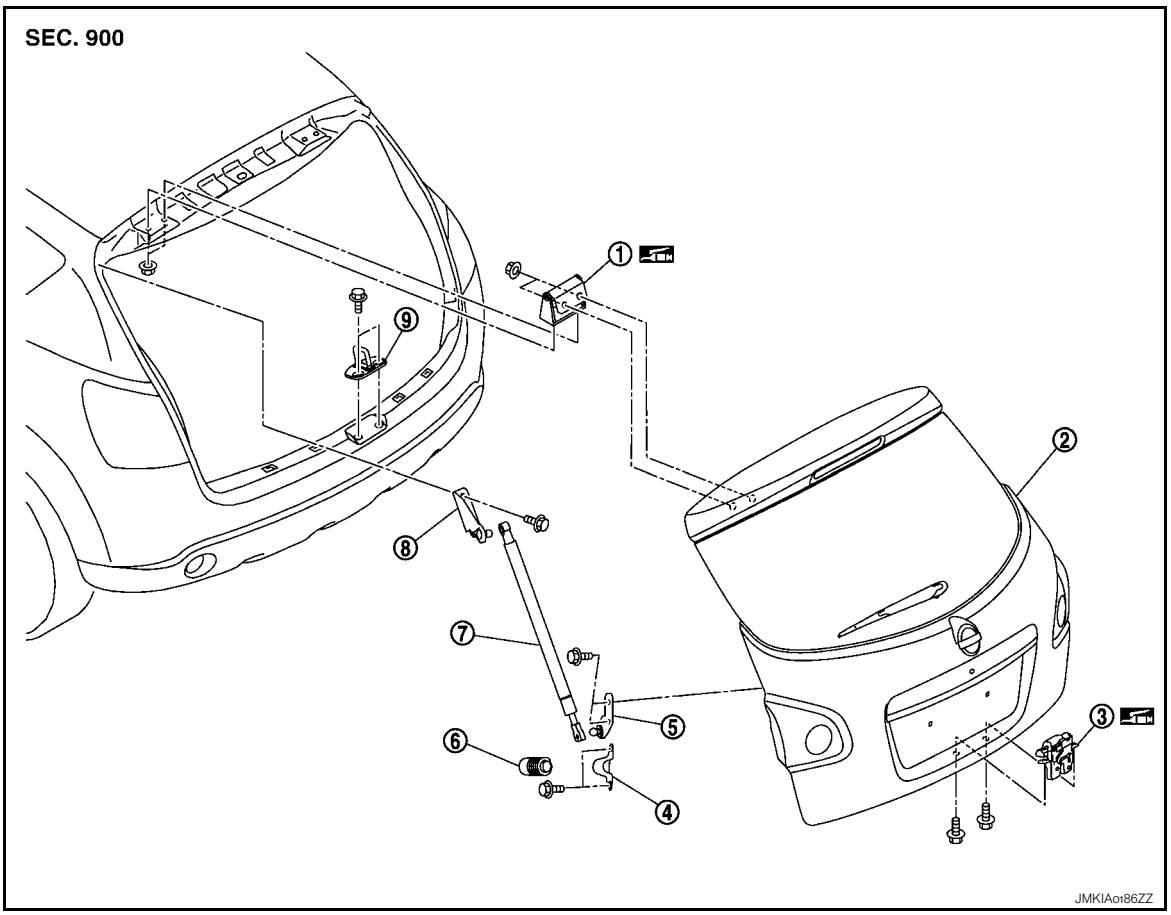
BACK DOOR

BACK DOOR ASSEMBLY

BACK DOOR ASSEMBLY : Exploded View

INFOID:0000000001098646

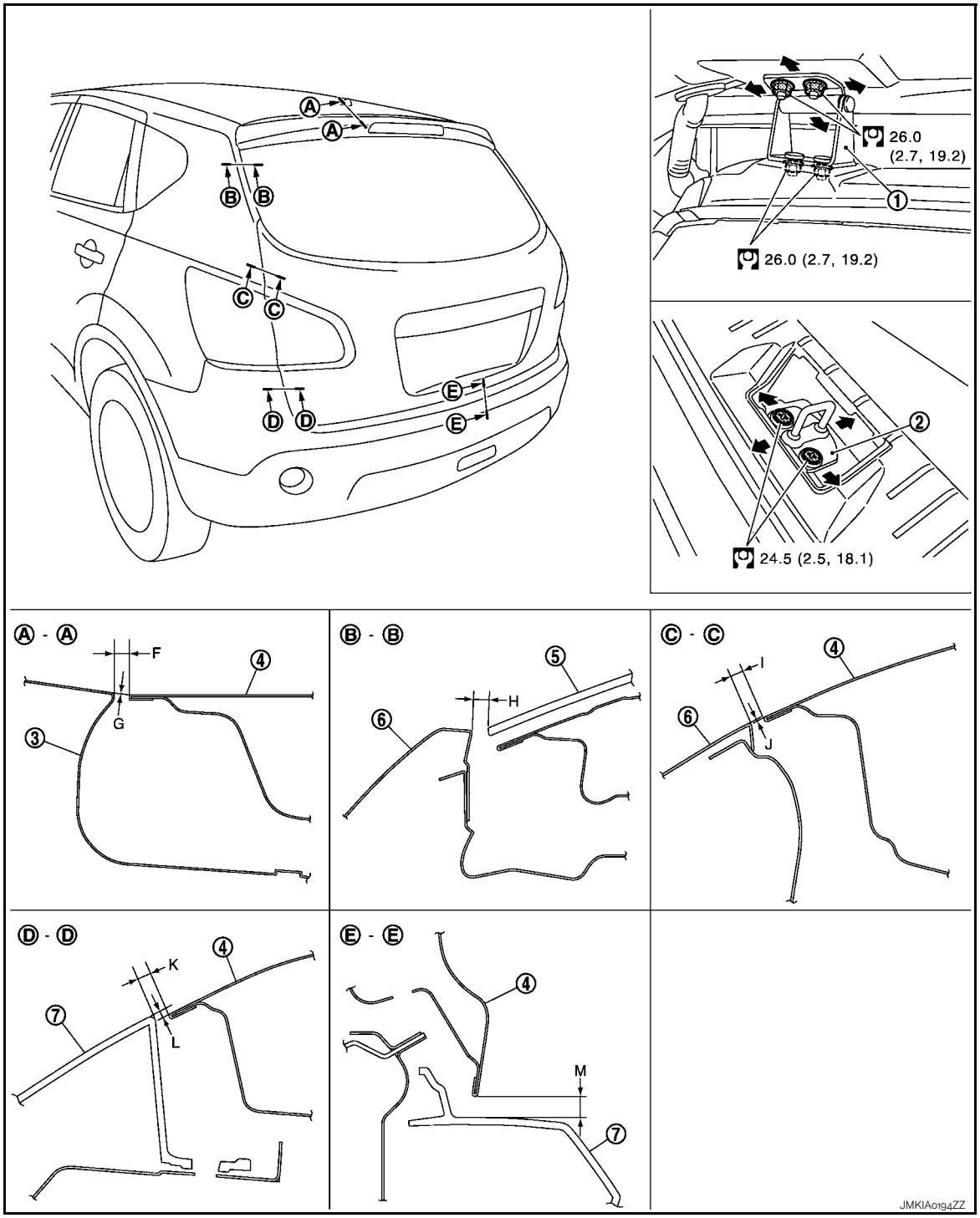
REMOVAL



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT



1. Back door hinge
2. Back door striker
3. Roof panel
4. Back door outer
5. Back door glass
6. Body side outer
7. Rear bumper fascia

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001098647

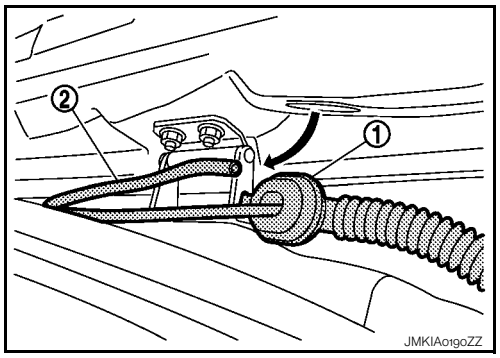
REMOVAL

1. Remove the back door finisher inner. Refer to INT-26, "Removal and Installation".
2. Remove the back door window glass. Refer to GW-17, "Removal and Installation".
   NOTE:

cardiagn.com

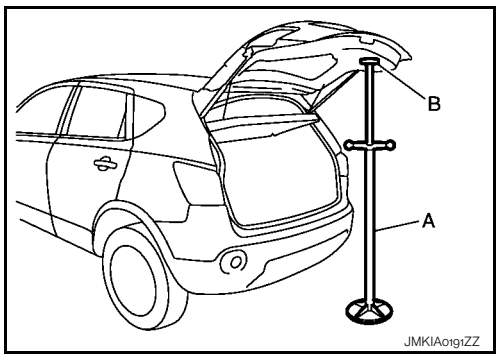
It is necessary to remove back door window glass in order to remove harness, because harness connector interferes with back door window glass pin.

3. Disconnect the connectors in the back door, and then remove the grommet, and pull out hte harness.
4. Remove the parcel shelf. Refer to INT-24, "Removal and Installation".
5. Remove the high-mounted stop lamp. Refer to EXL-183, "Removal and Installation".
6. Remove the grommet (1), and then pull out the washer tube (2) .

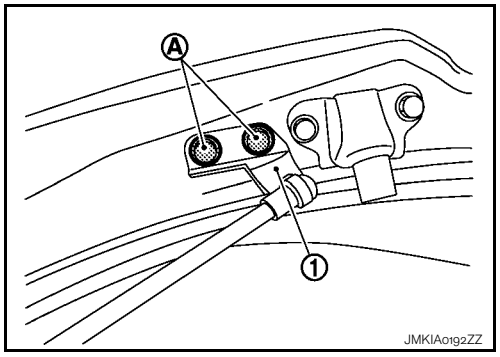


7. Pull the harness out of the back door.
8. Support the back door lock with the proper material to prevent it from falling.

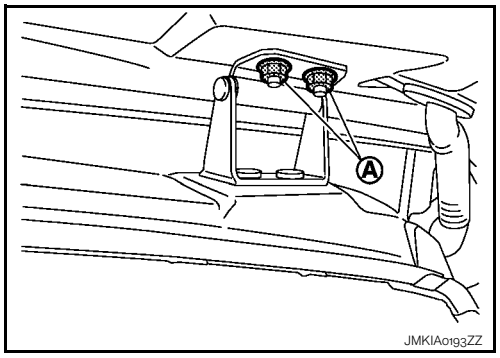
A : Jack
B : Shop cloth



9. Remove the back door stay bracket mounting bolts (A) on the back door.



10. Remove the back door hinge mounting nuts (A) on the back door and remove the back door assembly.
CAUTION:
Perform work with 2 workers, because of its heavy weight.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Perform work with 2 workers, because of its heavy weight.**

carsdiagn.com

- **After installation, perform fitting adjustment. Refer to DLK-855, "BACK DOOR ASSEMBLY : Adjustment".**
- **Check the back door open/close operation after installation.**
- **Check the back door lock/unlock operation after installation.**

BACK DOOR ASSEMBLY : Adjustment

INFOID:0000000001098648

Portion				Standard	Difference(RH/LH)
Back door panel – Roof panel	A – A	F	Clearance	5.0 – 7.0 mm (0.197 – 0.276 in)	—
		G	Surface height	0.0 – 2.0 mm (0.000 – 0.079 in)	—
Back door glass – Body side outer	B – B	H	Clearance	3.9 – 8.1 mm (0.154 – 0.319 in)	2.1 mm (0.083 in)
		I	Surface height	- 1.0 – 3.1 mm (- 0.039 – 0.122 in)	2.0 mm (0.079 in)
Back door panel – Body side outer	C – C	J	Clearance	3.5 – 6.5 mm (0.138 – 0.256 in)	2.0 mm (0.079 in)
		K	Surface height	- 1.0 – 1.0 mm (- 0.039 – 0.039 in)	—
Back door panel – Rear bumper fascia	D – D	L	Clearance	4.0 – 8.0 mm (0.157 – 0.315 in)	2.0 mm (0.079 in)
		M	Surface height	0.1 – 4.1 mm (0.004 – 0.161 in)	2.1 mm (0.083 in)
Back door panel – Rear bumper fascia	E – E	N	Clearance	5.8 – 10.2 mm (0.228 – 0.402 in)	—

FITTING ADJUSTMENT

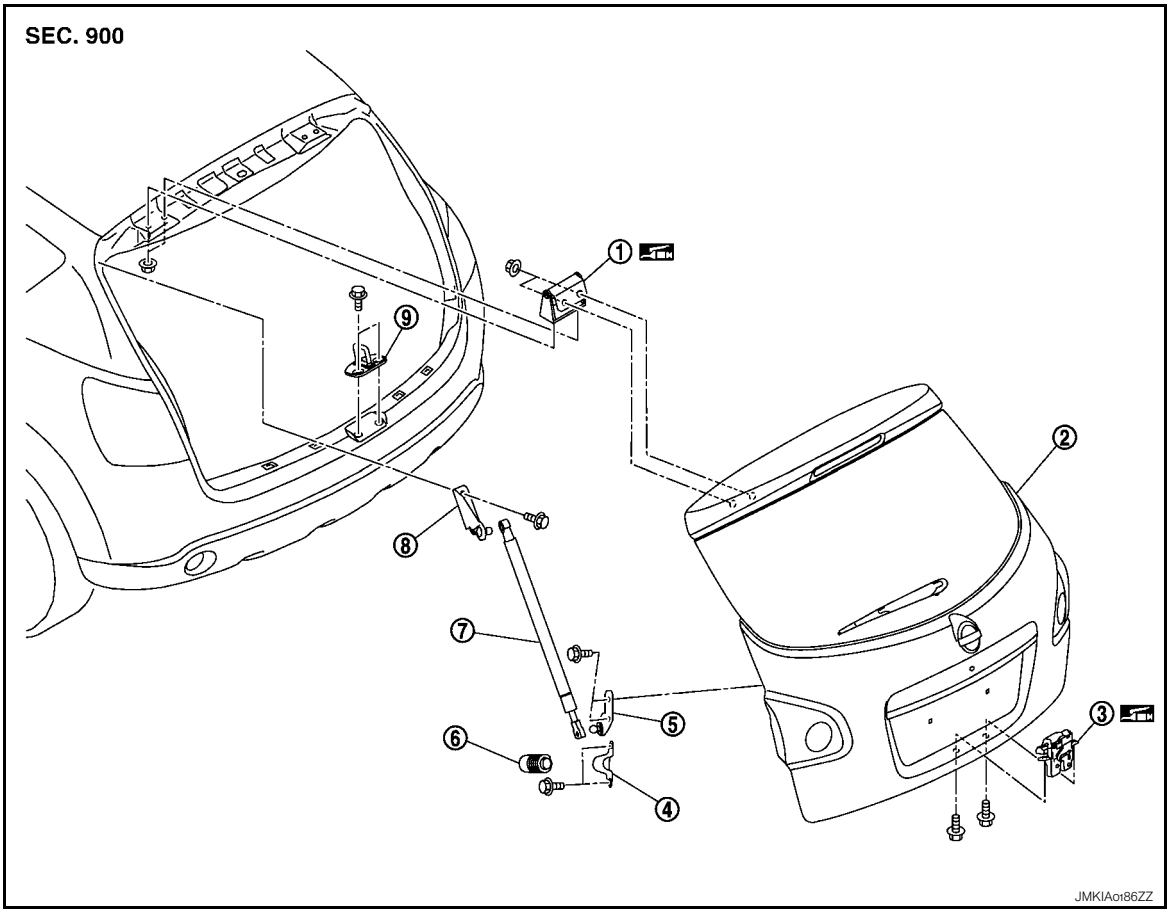
1. Check the clearance and the evenness between the back door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Loosen the bumper rubber.
4. Loosen the back door striker mounting bolts.
5. Lift up the back door approximately 100 – 150 mm (3.937 – 5.906 in) height then close it lightly and check that it is engaged firmly with the back door closed.
6. Check the clearance and evenness.
7. Finally tighten the back door striker.

BACK DOOR STRIKER

BACK DOOR STRIKER : Exploded View

INFOID:0000000001098650

cardiagn.com



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR STRIKER : Removal and Installation

INFOID:0000000001098652

REMOVAL

1. Remove the luggage rear plate cap. Refer to INT-24, "Removal and Installation".
2. Remove the mounting bolts, and then remove the back door striker.

INSTALLATION

Install in the reverse order of removal.

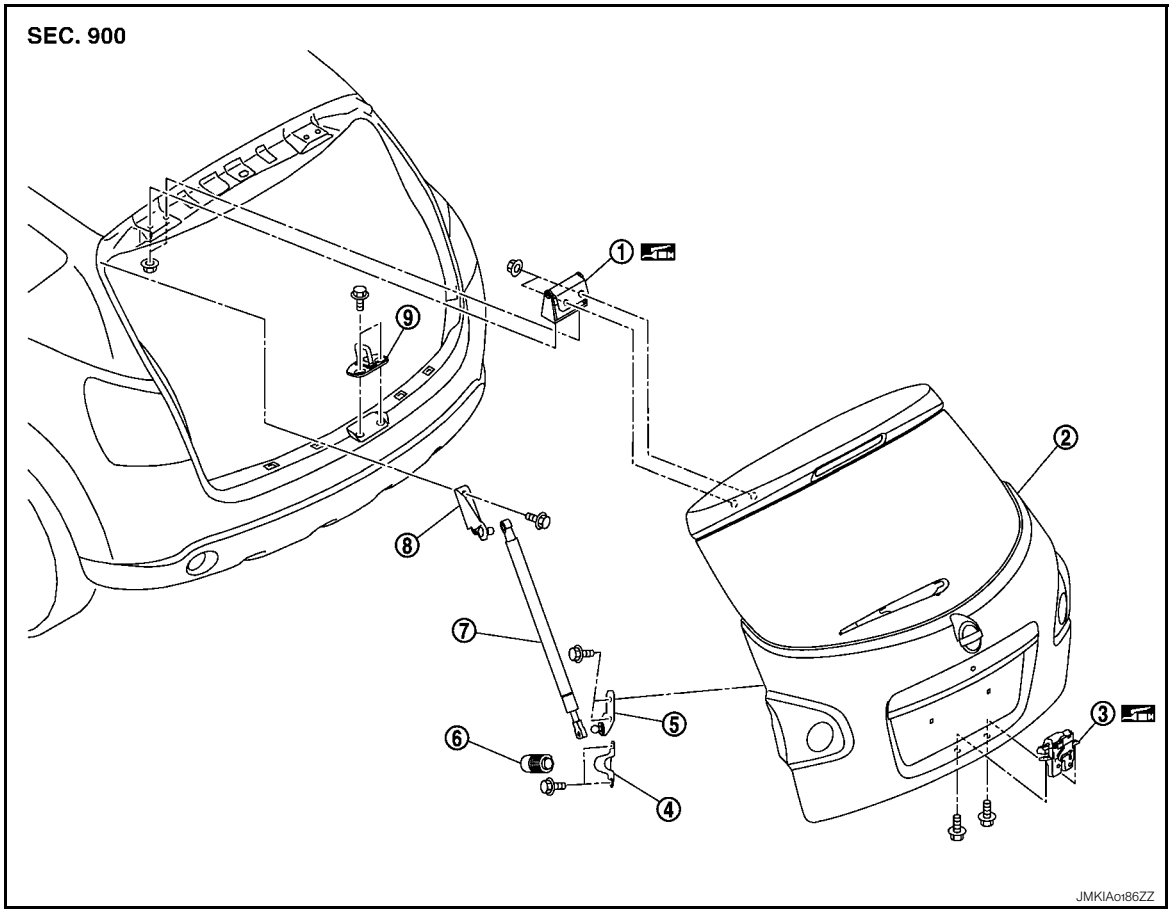
CAUTION:

- **When removing and installing the back door striker, be sure to perform the fitting adjustment. Refer to DLK-855, "BACK DOOR ASSEMBLY : Adjustment".**
- **Check the back door open/close operation after installation.**

BACK DOOR HINGE

BACK DOOR HINGE : Exploded View

INFOID:0000000001102425



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR HINGE : Removal and Installation

INFOID:0000000001102426

REMOVAL

1. Remove the back door assembly. Refer to DLK-248, "BACK DOOR ASSEMBLY : Removal and Installation".
2. Remove upper side of the back door weatherstrip. Refer to DLK-254, "BACK DOOR WEATHER-STRIP : Removal and Installation".
3. Remove rear seat belt cover. Refer to INT-21, "Removal and Installation".
4. Using remover tool, remove the headlining clip at the rear side of the headlining. Refer to INT-20, "Exploded View".
5. Remove the rear side of the headlining.
6. Remove the back door hinge mounting nuts (body side), and then remove the back door hinge.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

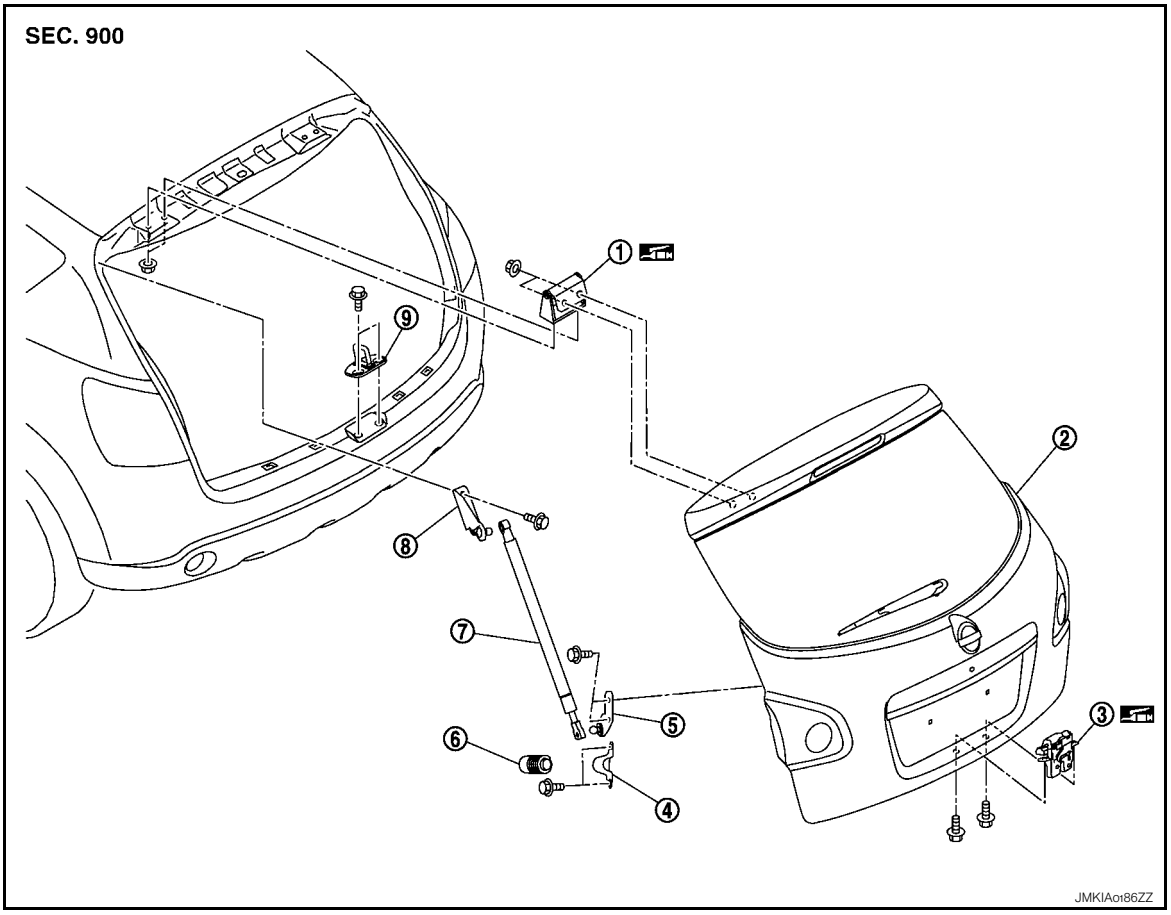
- **When removing and installing the back door assembly, perform the fitting adjustment. Refer to DLK-250, "BACK DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Check the hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the back door open/close operation after installation.**

BACK DOOR STAY

cardiagn.com

BACK DOOR STAY : Exploded View

INFOID:0000000001098653



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR STAY : Removal and Installation

INFOID:0000000001098656

REMOVAL

1. Remove the stud ball (upper/lower), and then remove the back door stay.
2. Remove the mounting bolts, and then remove the back door stay bracket (upper/lower).

INSTALLATION

Install in the reverse order of removal.

CAUTION:

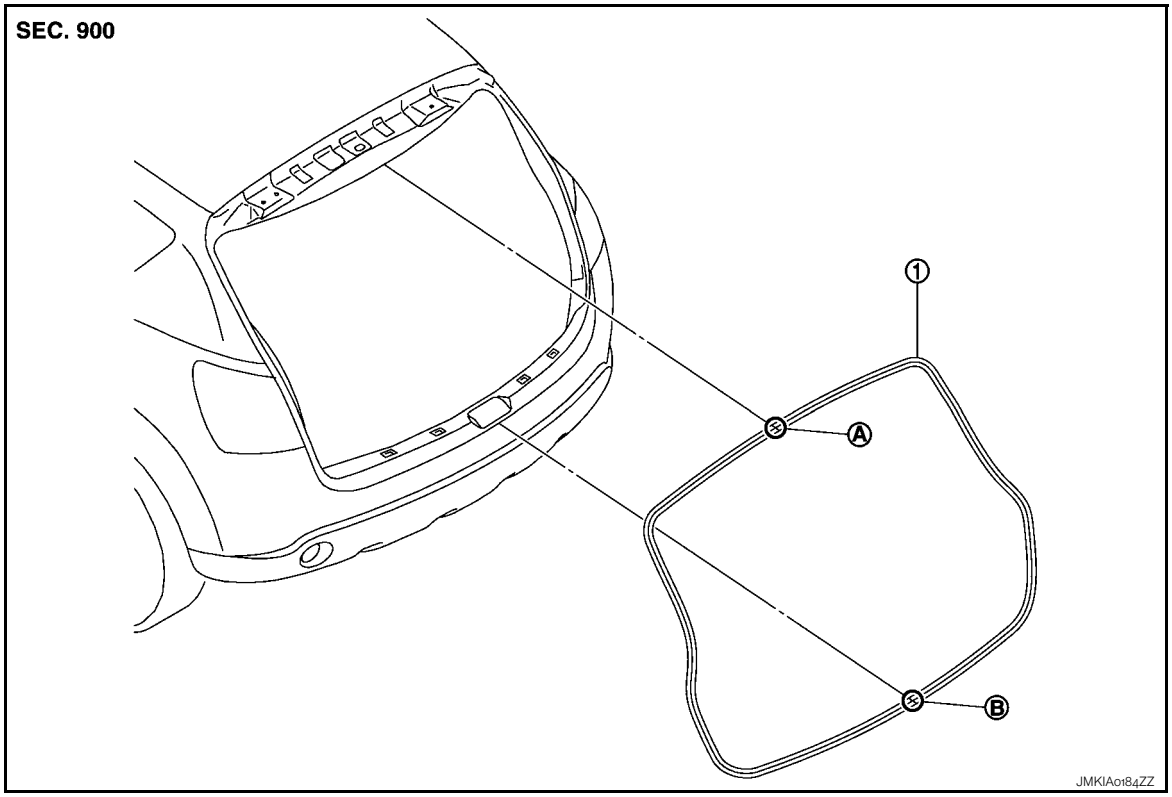
Check the back door open/close operation after installation.

BACK DOOR WEATHER-STRIP

BACK DOOR WEATHER-STRIP : Exploded View

INFOID:0000000001098657

REMOVAL



1. Back door weatherstrip
A. Mark (upper)
B. Mark (lower)

BACK DOOR WEATHER-STRIP : Removal and Installation

INFOID:0000000001098659

REMOVAL

Pull up and remove engagement with body from the weatherstrip joint.

CAUTION:

After removal, do not pull strongly on the weather-strip.

INSTALLATION

1. Working from the upper section, align the weatherstrip mark with vehicle center position mark and install the weatherstrip onto the vehicle.
2. For the lower section, align the weatherstrip seam with center of the back door striker.
3. After installation, pull the weatherstrip gently to ensure that there is no loose section.
   NOTE:
   Make sure that the weatherstrip is fit tlightly at each corner and the luggage rear plate.

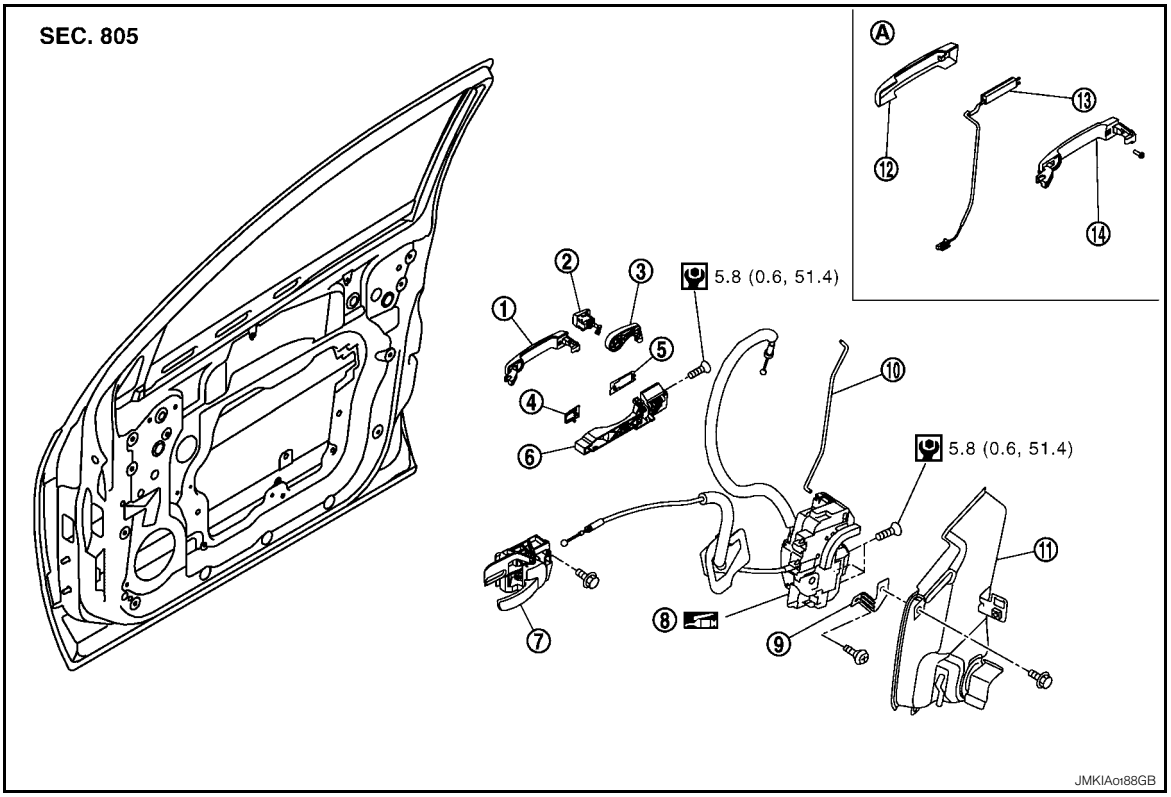
cardiagn.com

FRONT DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001098660



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

Refer to GI-4, "Components" for symbols in the figure.

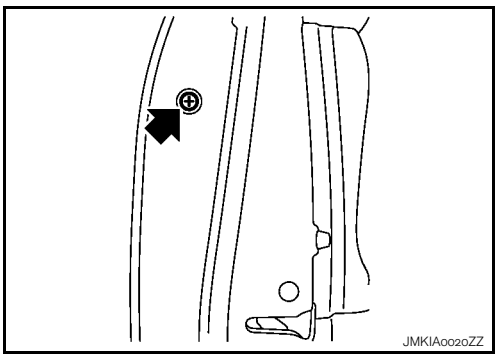
DOOR LOCK : Removal and Installation

INFOID:0000000001098661

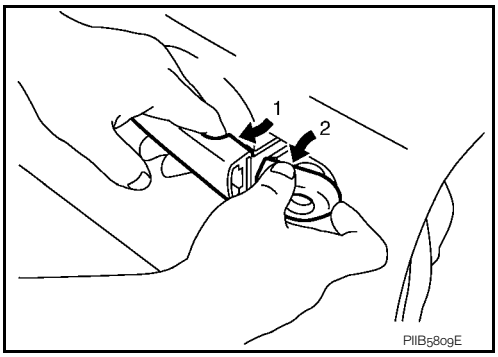
REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
3. Remove the front door glass. Refer to GW-19, "Removal and Installation".
4. Remove the front door module assembly. Refer to GW-22, "Removal and Installation".
5. Disconnect the door antenna and the door request switch connector and remove the harness clamp (models with Intelligent Key system).

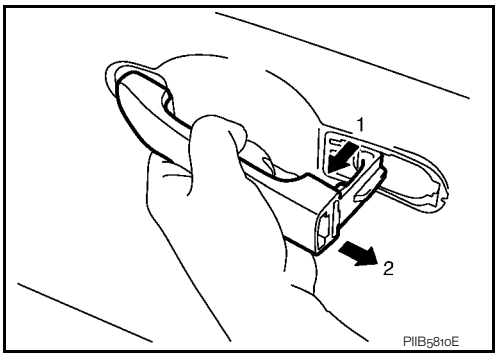
6. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and outside handle escutcheon (passenger side) mounting bolts from grommet hole.
   CAUTION:
   Do not forcibly remove the bolts (TORX: T10).



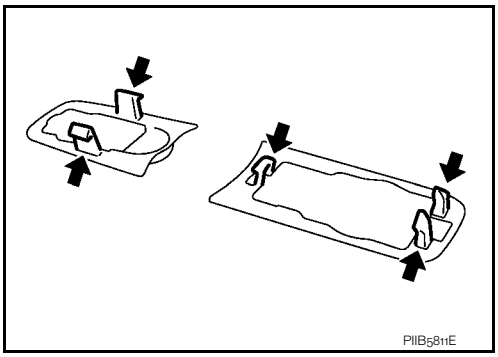
7. Reach in to separate the key cylinder rod connection (on the handle).
8. Disconnect the door key cylinder switch harness connector.
9. Remove the key cylinder lever from the door key cylinder.
10. While pulling the outside handle, remove door key cylinder assembly.



11. Disconnect front door request switch harness connector (models with Intelligent Key system).
12. While pulling outside handle, slide toward rear of vehicle to remove outside handle.

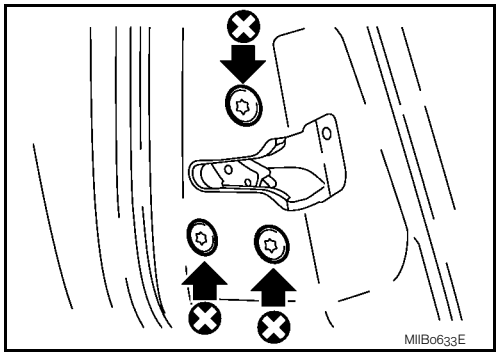


13. Remove the front gasket and the rear gasket.

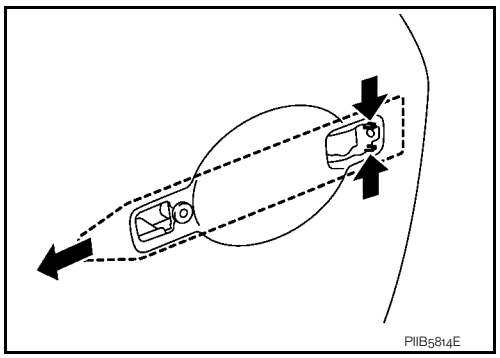


cardiagn.com

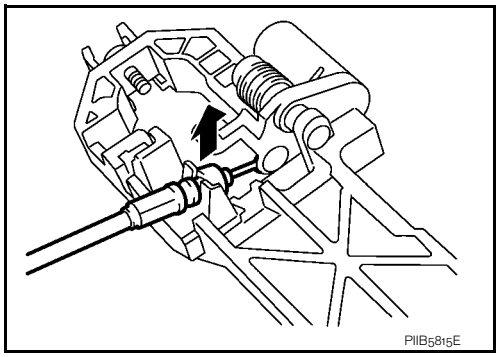
14. Remove the door lock assembly mounting bolts (TORX: T30).
15. Disconnect the door lock actuator connector, and then remove the door lock assembly.



16. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



17. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

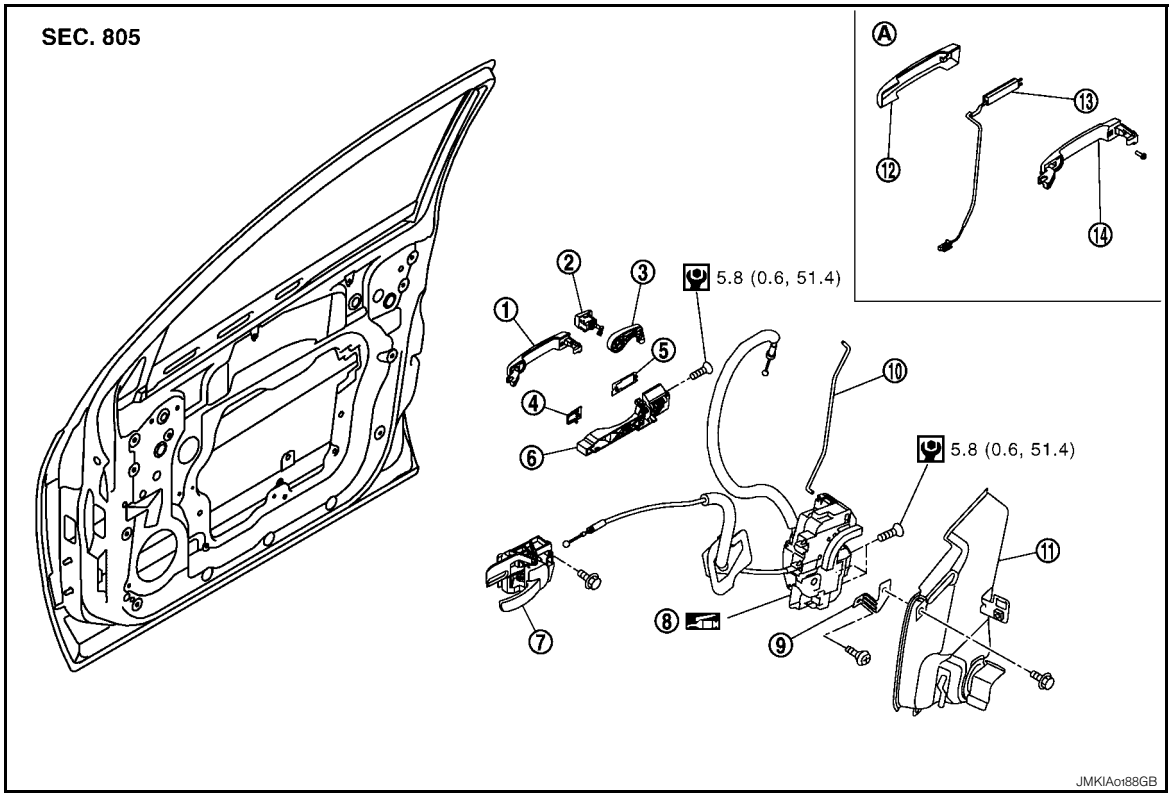
CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

INSIDE HANDLE

INSIDE HANDLE : Exploded View

INFOID:0000000001098666



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

Refer to GI-4, "Components" for symbols in the figure.

INSIDE HANDLE : Removal and Installation

INFOID:0000000001098667

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt.
3. Disconnect the inside handle knob cable and the lock knob cable, and then remove the inside handle.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

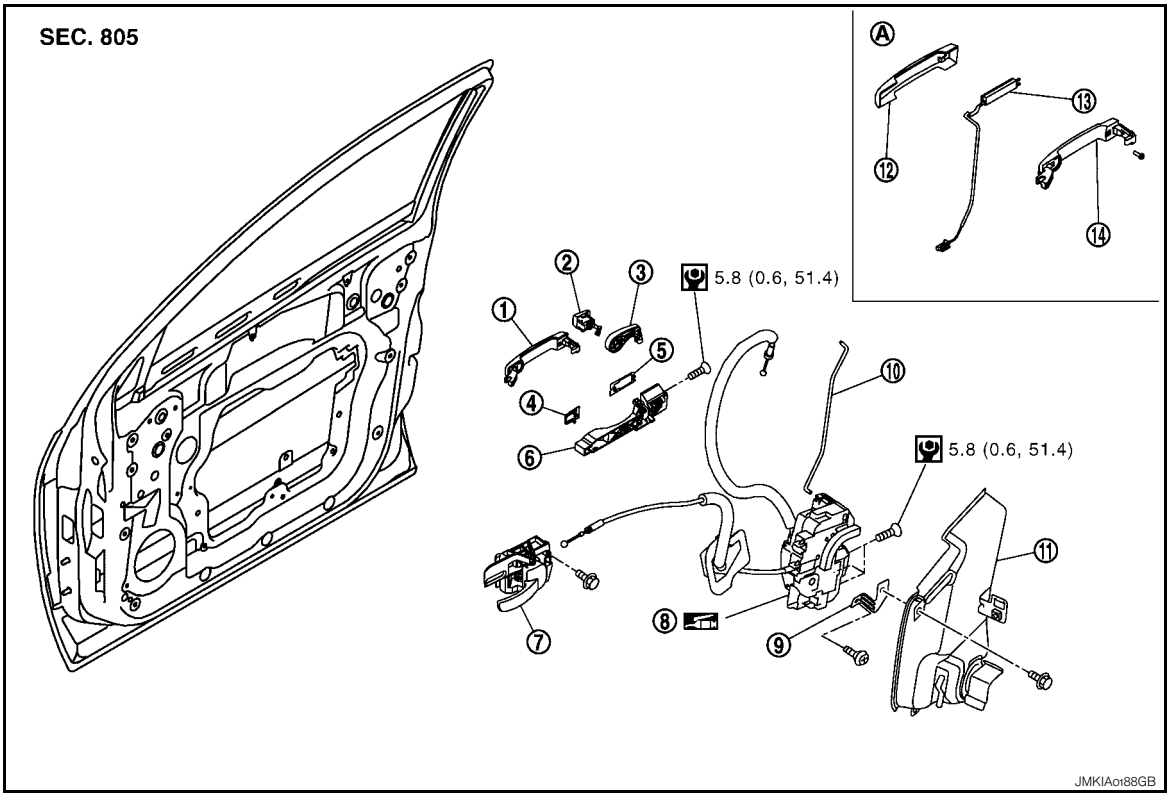
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

OUTSIDE HANDLE

OUTSIDE HANDLE : Exploded View

INFOID:0000000001098668

cardiagn.com



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

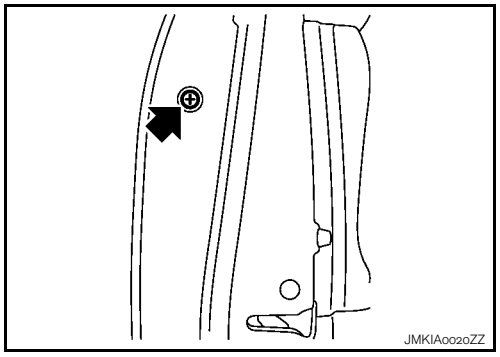
Refer to GI-4, "Components" for symbols in the figure.

OUTSIDE HANDLE : Removal and Installation

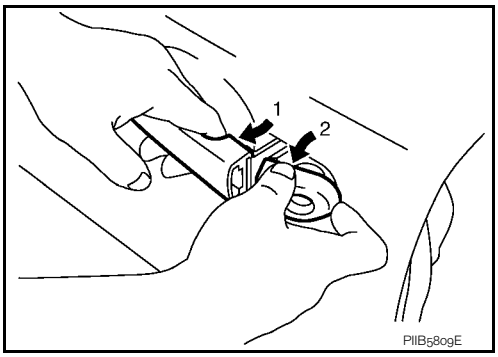
INFOID:0000000001098669

REMOVAL

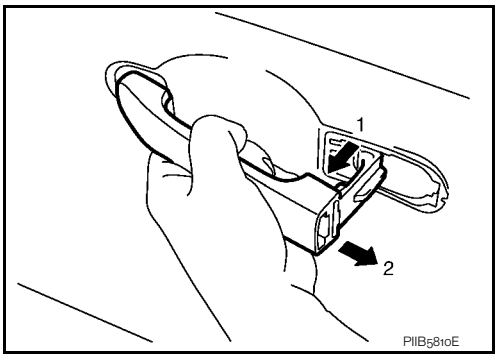
1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt, and disconnect the inside handle knob cable and the lock knob cable.
3. Remove the front door glass. Refer to GW-19, "Removal and Installation".
4. Remove the front door module assembly. Refer to GW-22, "Removal and Installation".
5. Disconnect the door antenna and the door request switch connector and remove the harness clamp (models with Intelligent Key system).
6. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
   CAUTION:
   Do not forcibly remove the bolts (TORX: T10).



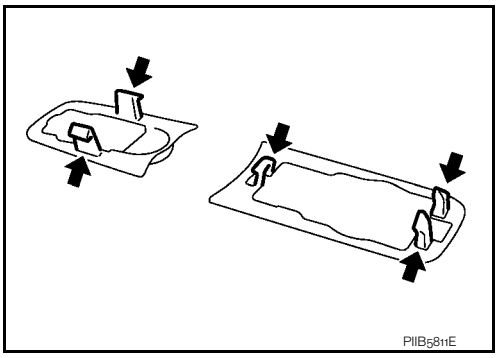
7. Reach in to separate the key cylinder rod connection (on the handle).
8. Disconnect the door key cylinder switch harness connector.
9. Remove the key cylinder lever from the door key cylinder.
10. While pulling the outside handle, remove the door key cylinder assembly.



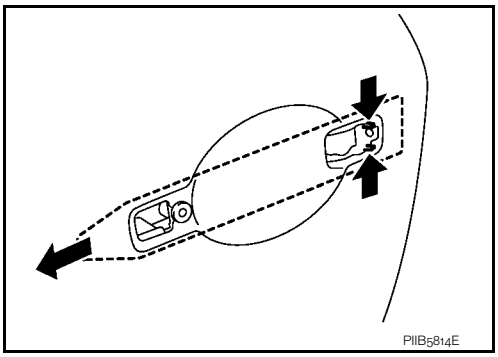
11. Disconnect the front door request switch harness connector (models with Intelligent Key system).
12. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



13. Remove the front gasket and rear gasket.

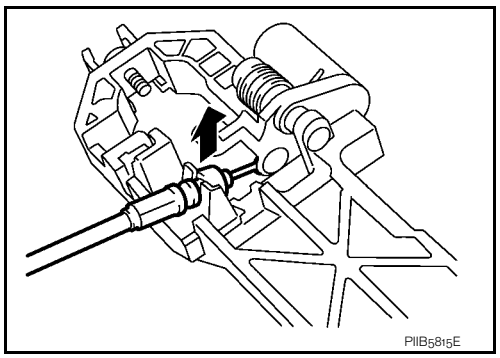


14. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



cardiagn.com

15. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

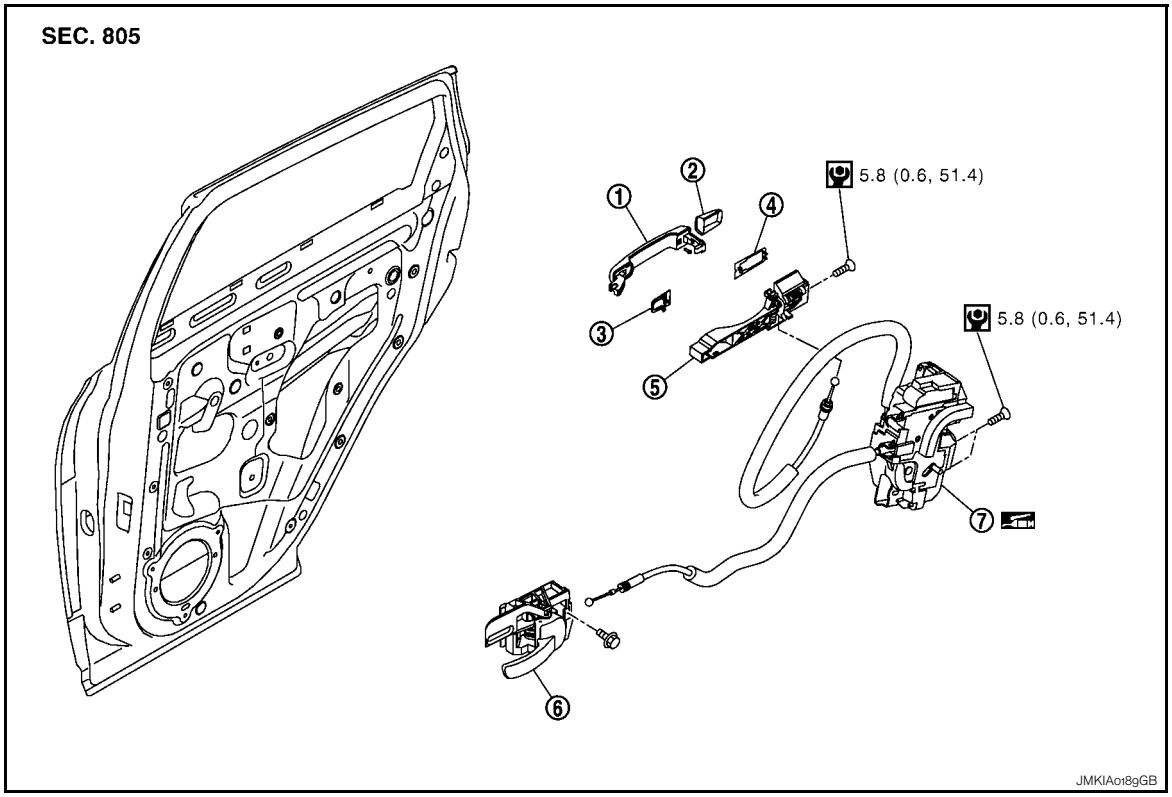
carsdiagn.com

REAR DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001098672



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

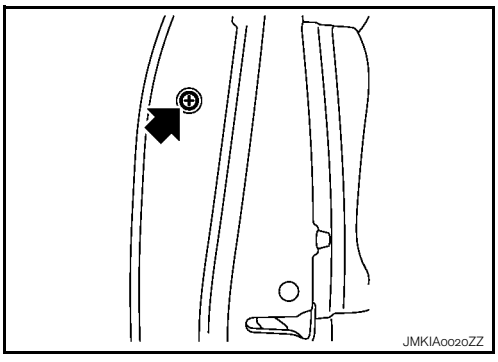
Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

INFOID:0000000001098673

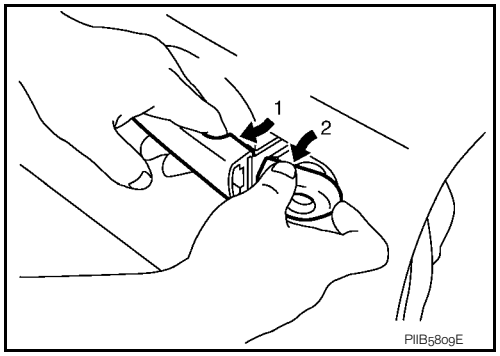
REMOVAL

1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Fully close the front door window.
3. Remove the door sealing screen.
4. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
5. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
   CAUTION:
   Do not forcibly remove the bolts (TORX: T10).

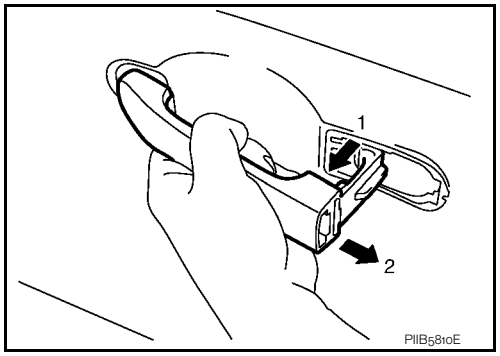


cardiagn.com

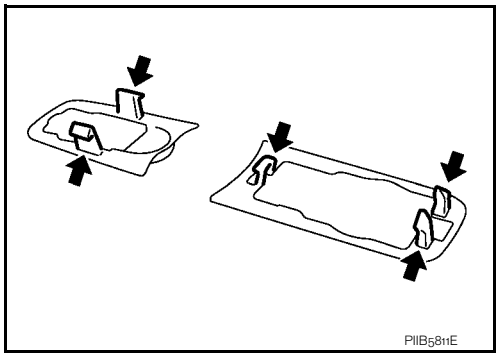
6. While pulling the outside handle, remove the door key cylinder assembly.



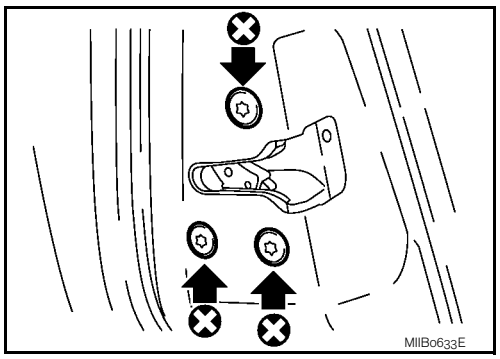
7. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



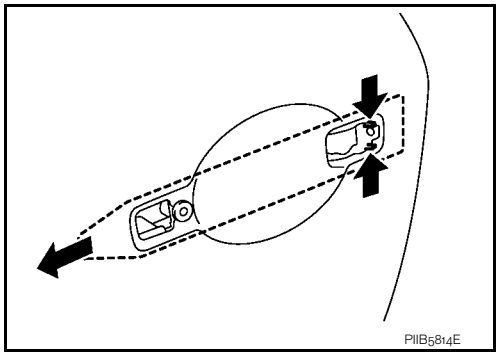
8. Remove the front gasket and the rear gasket.



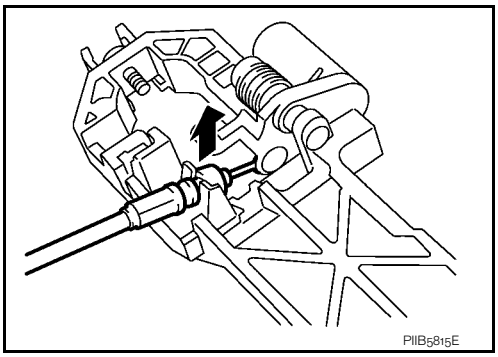
9. Remove the door lock assembly mounting bolts (TORX: T30).
10. Disconnect the door lock actuator connector, and then remove the door lock assembly.



11. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



12. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

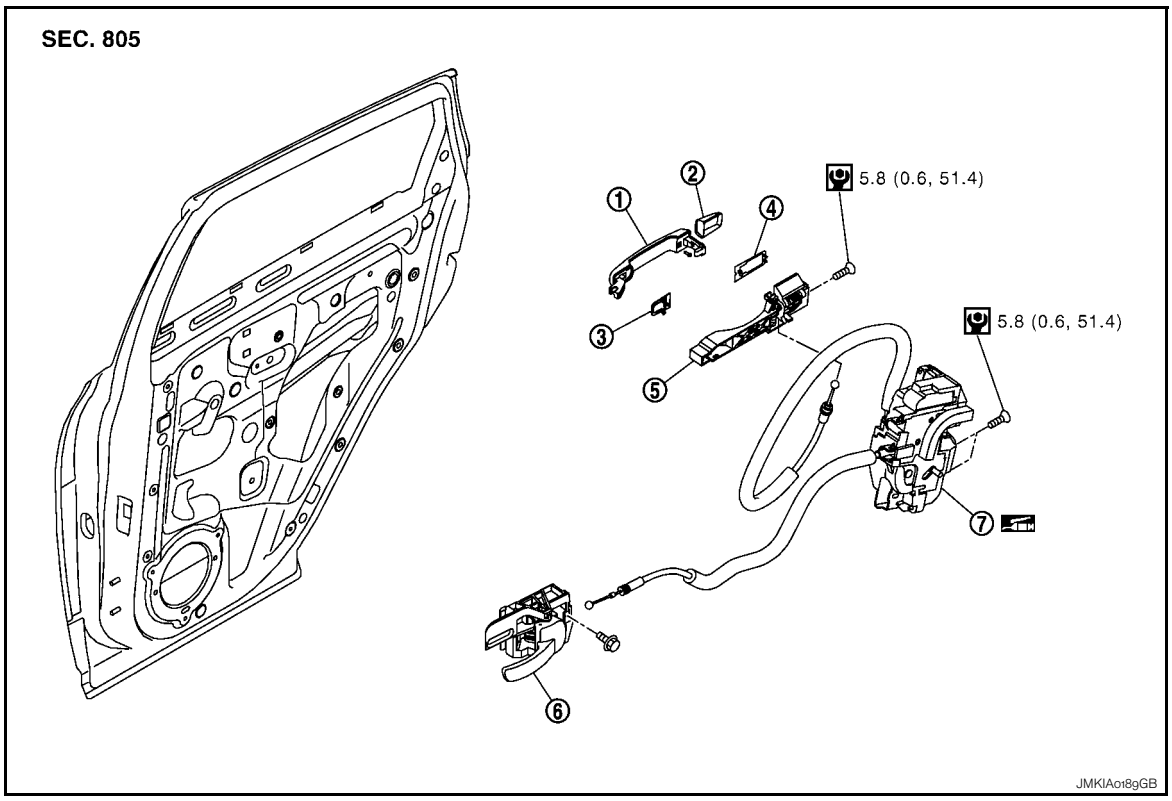
CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

INSIDE HANDLE

INSIDE HANDLE : Exploded View

INFOID:0000000001098676



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

Refer to GI-4, "Components" for symbols in the figure.

INSIDE HANDLE : Removal and Installation

INFOID:0000000001098677

REMOVAL

1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Remove the door sealing screen.

cardiagn.com

3. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
4. Remove the inside handle.

INSTALLATION

Install in the reverse order of removal.

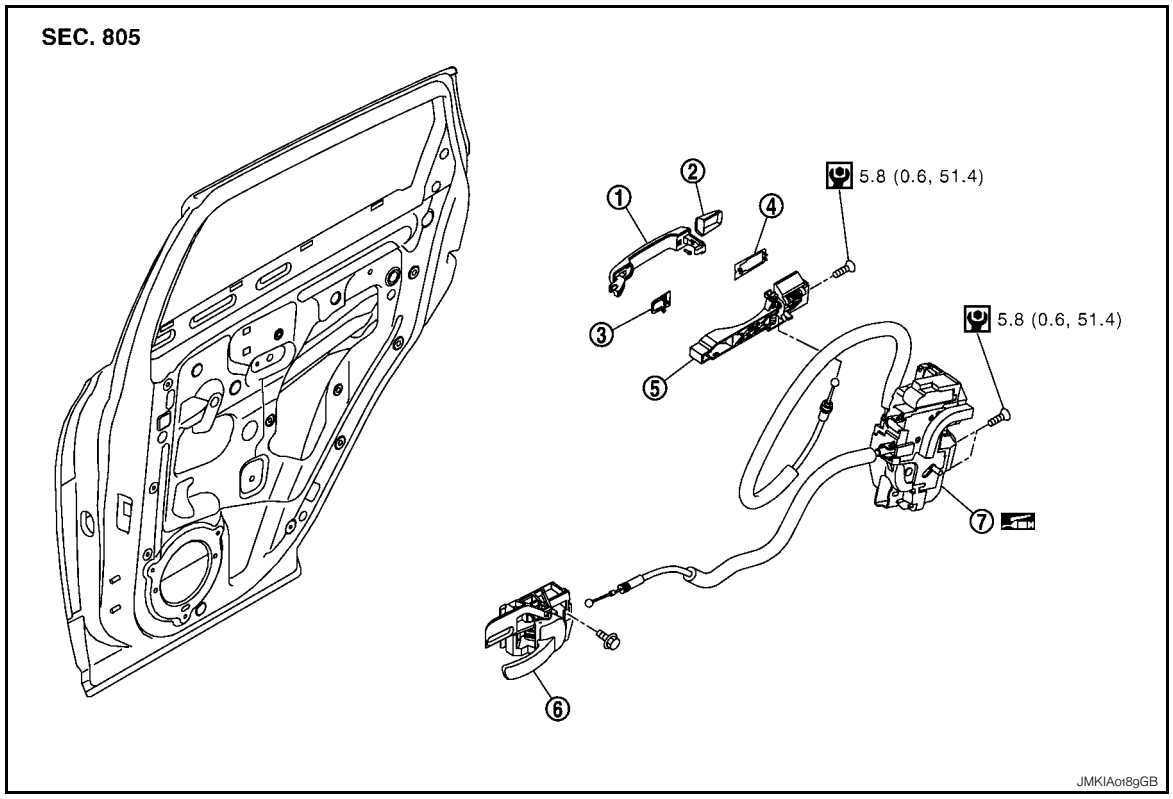
CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

OUTSIDE HANDLE

OUTSIDE HANDLE : Exploded View

INFOID:0000000001098678



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

Refer to GI-4, "Components" for symbols in the figure.

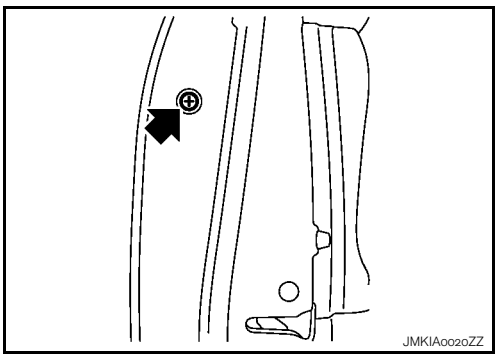
OUTSIDE HANDLE : Removal and Installation

INFOID:0000000001098679

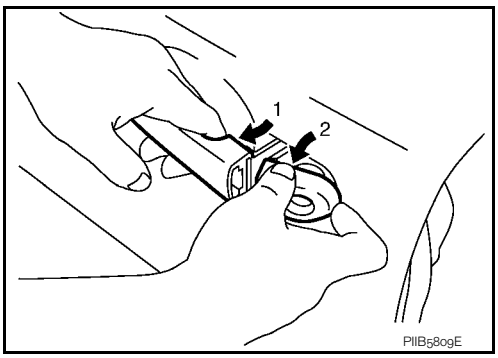
REMOVAL

1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Fully close the front door window.
3. Remove the door sealing screen.
4. Remove the inside handle mounting bolt, disconnect the inside handle knob cable and the lock knob cable.

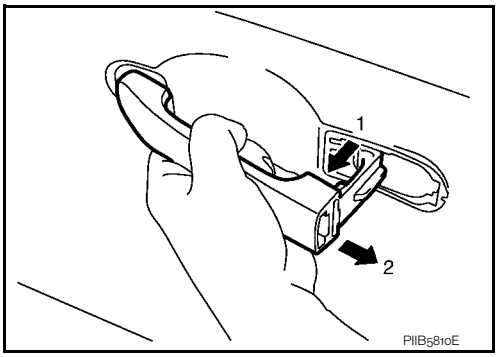
5. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
CAUTION:
Do not forcibly remove the bolts (TORX: T10).



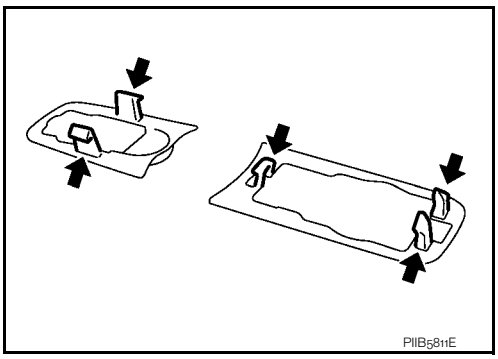
6. While pulling the outside handle, and then remove the door key cylinder assembly.



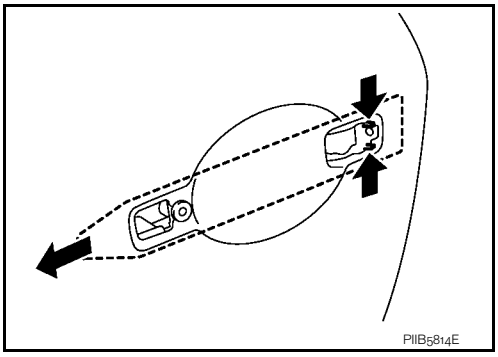
7. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



8. Remove the front gasket and the rear gasket.

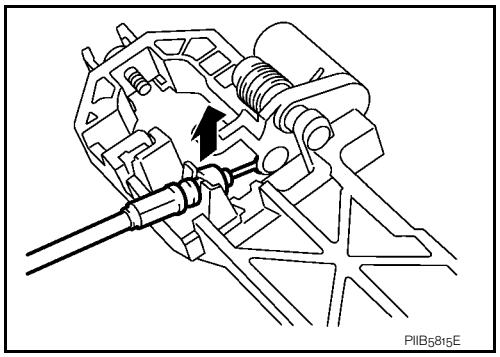


9. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



cardiagn.com

10. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

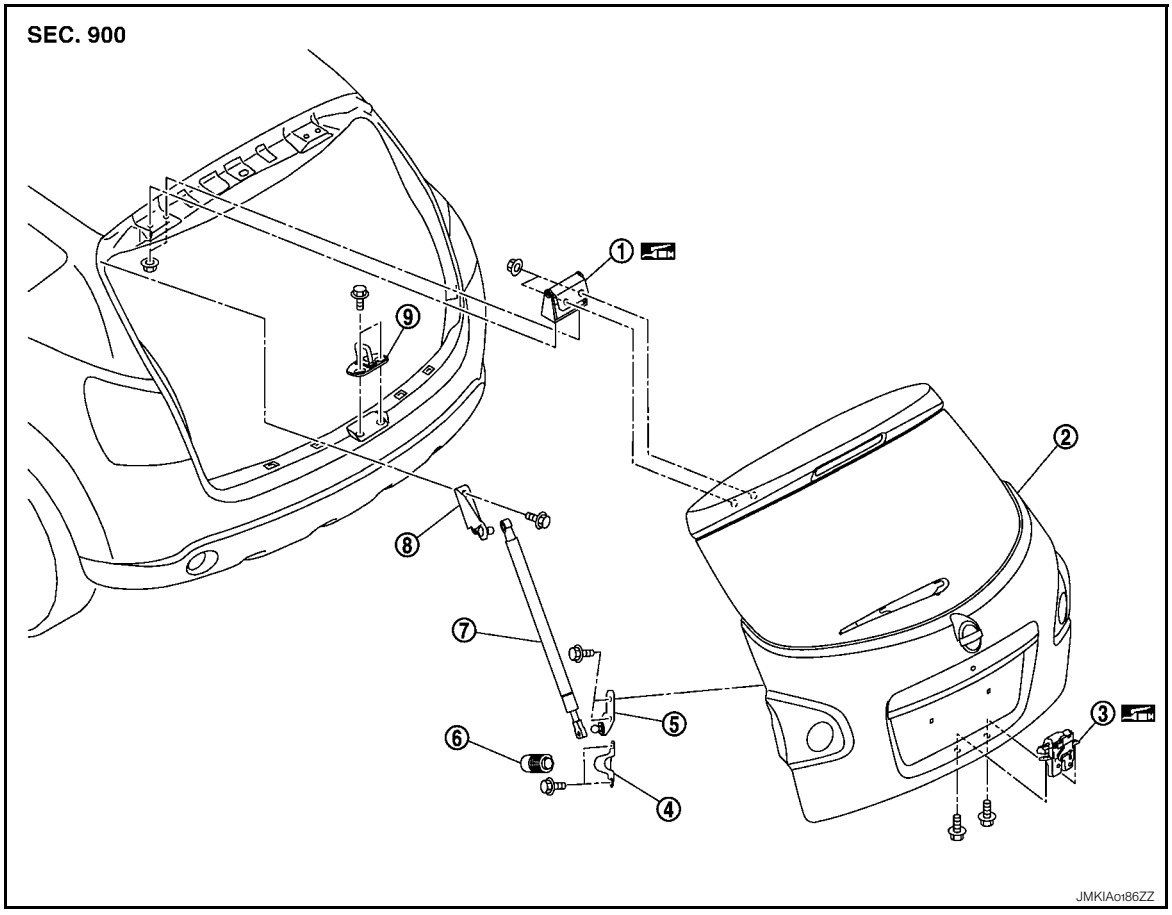
CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

carjdiagn.com

BACK DOOR LOCK
DOOR LOCK
DOOR LOCK : Exploded View

INFOID:0000000001098684



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

INFOID:0000000001098685

REMOVAL

1. Remove the back door trim finisher lower. Refer to INT-26, "Removal and Installation".
2. Disconnect the back door lock assembly and back door opener switch connectors.
3. Remove the back door lock mounting bolts, and then remove the back door lock and actuator.

INSTALLTION

Install in the reverse order of removal.

CAUTION:

Check the back door lock/unlock operation after installation.

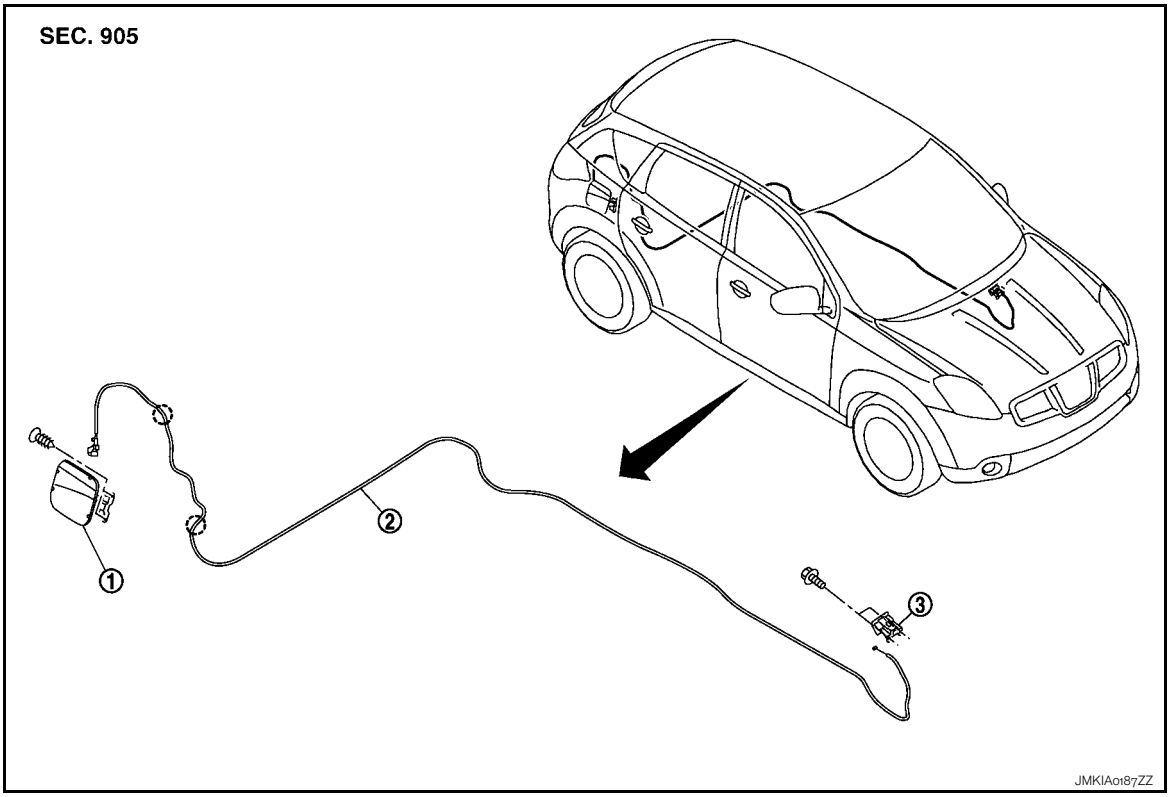
cardiagn.com

FUEL FILLER LID OPENER

FUEL FILLER LID

FUEL FILLER LID : Exploded View

INFOID:0000000001098690



1. Fuel filler lid assembly
2. Fuel filler opener cable
3. Fuel opener lever

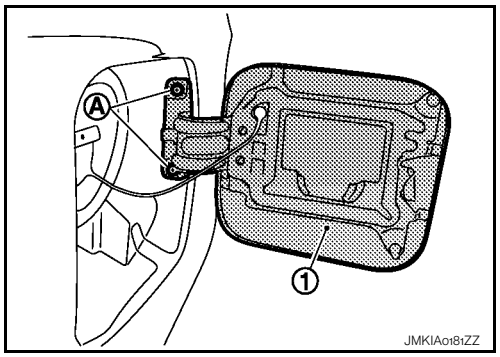
: Clip

FUEL FILLER LID : Removal and Installation

INFOID:0000000001098691

REMOVAL

1. Fully open the fuel filler lid.
2. Remove the filler cap.
3. Remove the mounting screws (A), and then remove the fuel filler lid (1).



INSTALLATION

Install in the reverse order of removal.

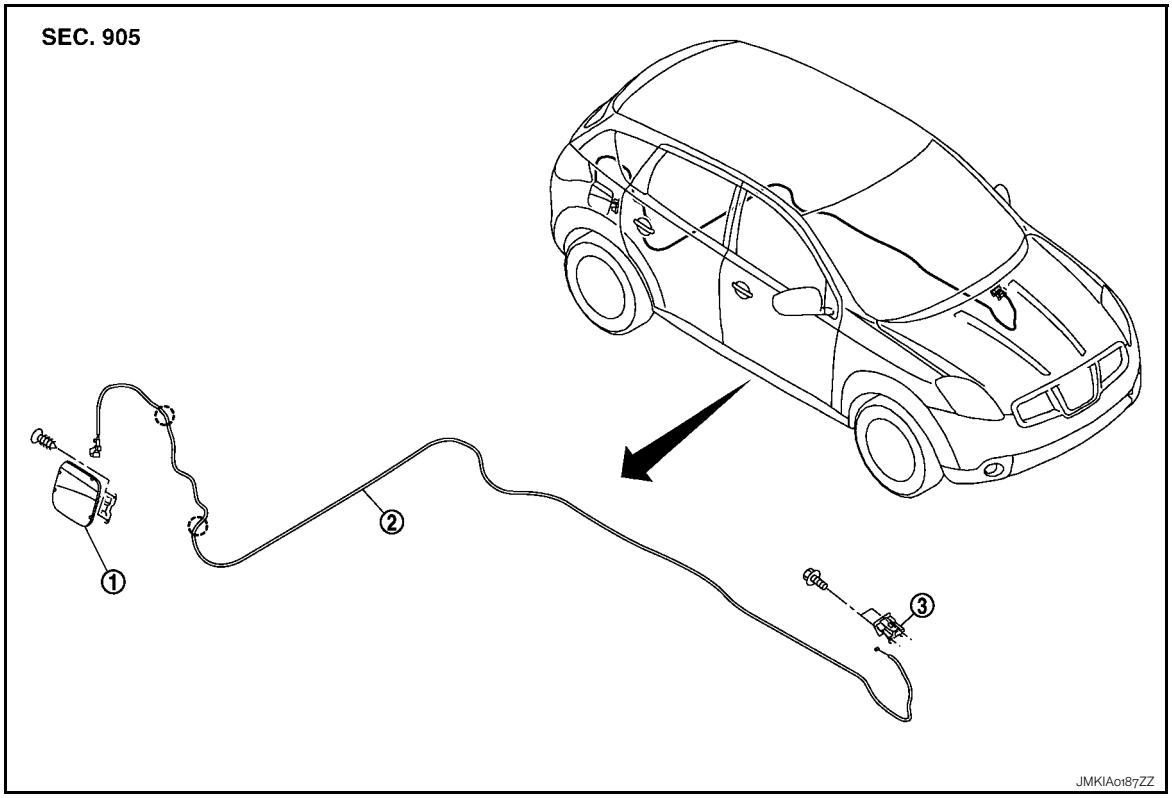
CAUTION:

After installation, apply the touch-up paint (the body color) onto the head of the mounting screws.

FUEL FILLER OPENER CABLE

FUEL FILLER OPENER CABLE : Exploded View

INFOID:0000000001098692



1. Fuel filler lid assembly
2. Fuel filler opener cable
3. Fuel opener lever

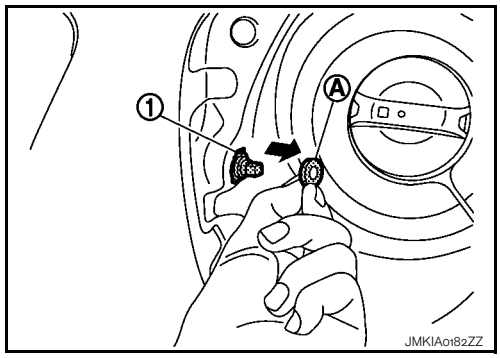
( ) : Clip

FUEL FILLER OPENER CABLE : Removal and Installation

INFOID:0000000001098693

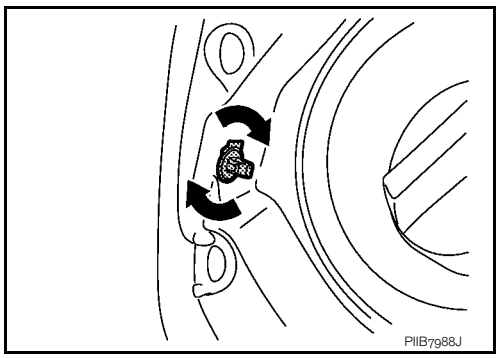
REMOVAL

1. Remove the rear seat cushion, rear seatback, seatback lower support, and seatback mounting outer bracket. Refer to SE-31, "Removal and Installation".
2. Remove the dash side finisher, front kicking plate inner, rear kicking plate inner, center pillar lower garnish, and luggage side lower finisher (front). Refer to INT-14, "Removal and Installation".
3. Remove the parcel shelf, luggage floor carpet, luggage floor spacer, luggage rear plate, luggage side lower finisher, and rear pillar finisher. Refer to INT-24, "Removal and Installation".
4. Remove the fuel filler lock seal (1).

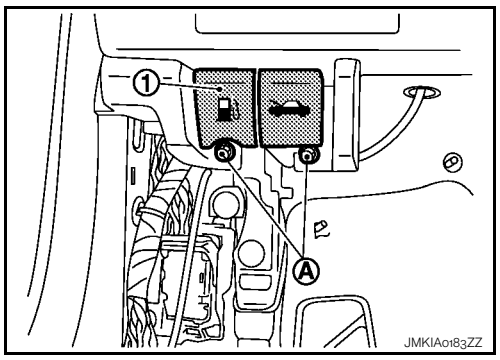


cardiagn.com

5. Rotate the fuel filler lock, and then remove the fuel filler lock.



6. Remove the fuel filler opener cable mounting clips and the clamps.
7. Remove the mounting bolts, and then remove the fuel filler lid opener lever.



8. Remove the fuel filler opener cable.

INSTALLATION

Install in the reverse order of removal.

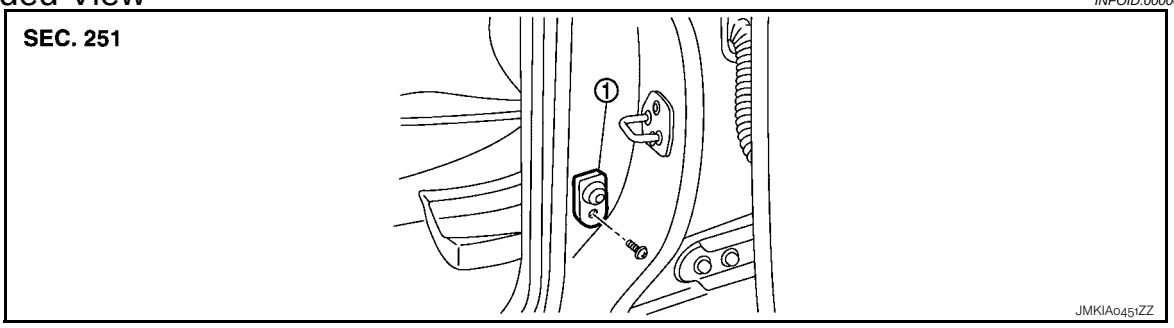
CAUTION:

Check the fuel filler lid open/close operation after installation.

DOOR SWITCH

Exploded View

INFOID:0000000001095473



1. Door switch (driver side)

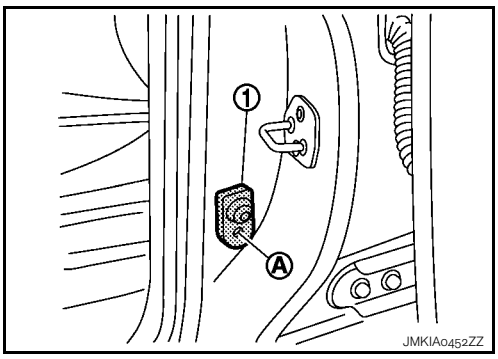
Refer to DLK-877, "Removal and Installation".

Removal and Installation

INFOID:0000000001095474

REMOVAL

1. Remove the door switch mounting bolt (A), and then remove door switch (1).
   NOTE:
   The same procedure is also performed for door switch (passenger side, rear LH and rear RH).



INSTALLATION

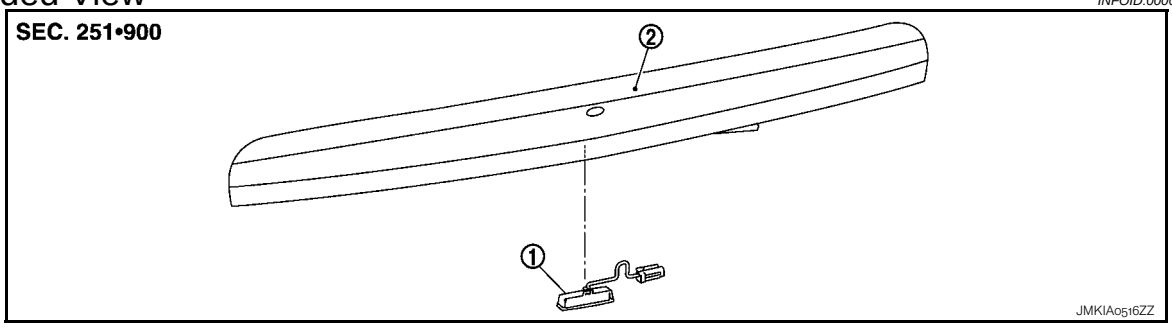
Install in the reverse order of removal.

cardiagn.com

BACK DOOR OPENER SWITCH

Exploded View

INFOID:0000000001116792



1. Back door opener switch
2. Back door finisher

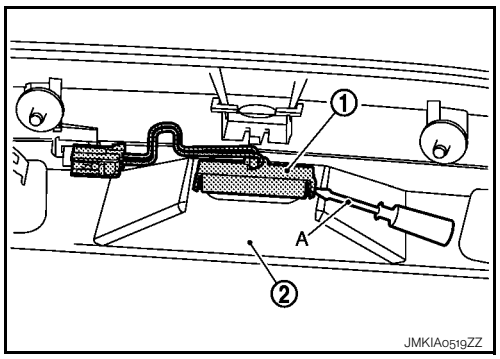
Refer to DLK-711, "Removal and Installation".

Removal and Installation

INFOID:0000000001116793

REMOVAL

1. Remove the back door finisher.
   Refer to EXT-31, "Exploded View" and EXT-31, "Removal and Installation".
2. Remove the back door opener switch (1) from back door finisher (2) using flat-bladed screw driver (A) etc.



INSTALLATION

Install in the reverse order of removal.

KEYFOB

Exploded View

INFOID:0000000001109243

Refer to DLK-712, "Removal and Installation".

Removal and Installation

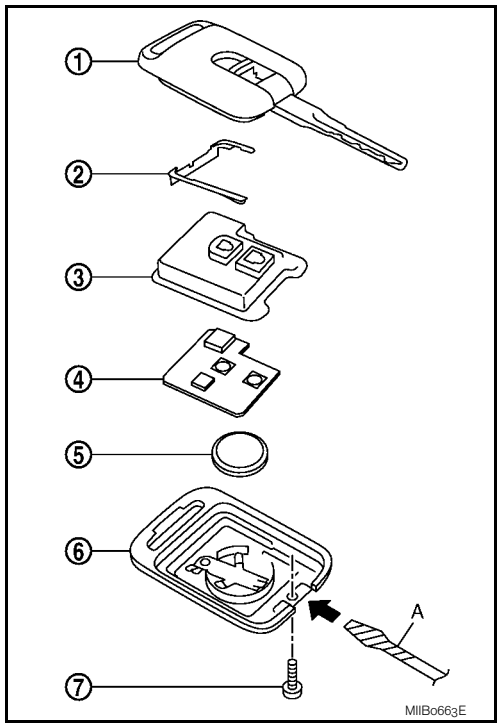
INFOID:0000000001109244

REMOVAL

1. Remove installation screw (7) on the rear of keyfob.
2. Place the key with the lower case (6) facing up. Set a screwdriver (A) wrapped with tape into illustration of the lower case (6) and separate the lower case (6) from the upper case (1).
   CAUTION:
   - **Do not touch the circuit board or battery terminal.**
   - **The keyfob is water-resistant. However, if it does get wet, immediately wipe it dry.**
3. When replacing the circuit board assembly, remove circuit board assembly from the upper case (1).
   [Circuit board assembly: Switch rubber (3) + Board surface (4)]
   CAUTION:
   Do not touch the printed circuits directly.
4. Remove the battery (5) from the lower case (6) and replace it.

   Battery replacement : Coin-type lithium battery (CR2032)

   CAUTION:
   When replacing battery, keep dirt, grease, and other foreign materials off the electrode contact area.
5. After replacement, fit the lower and upper cases together, part (2), (3) and tighten with the screw.
   CAUTION:
   After replacing the battery, Be sure to check that door locking operates normally using the keyfob.
   Refer to DLK-612, "Component Function Check".



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

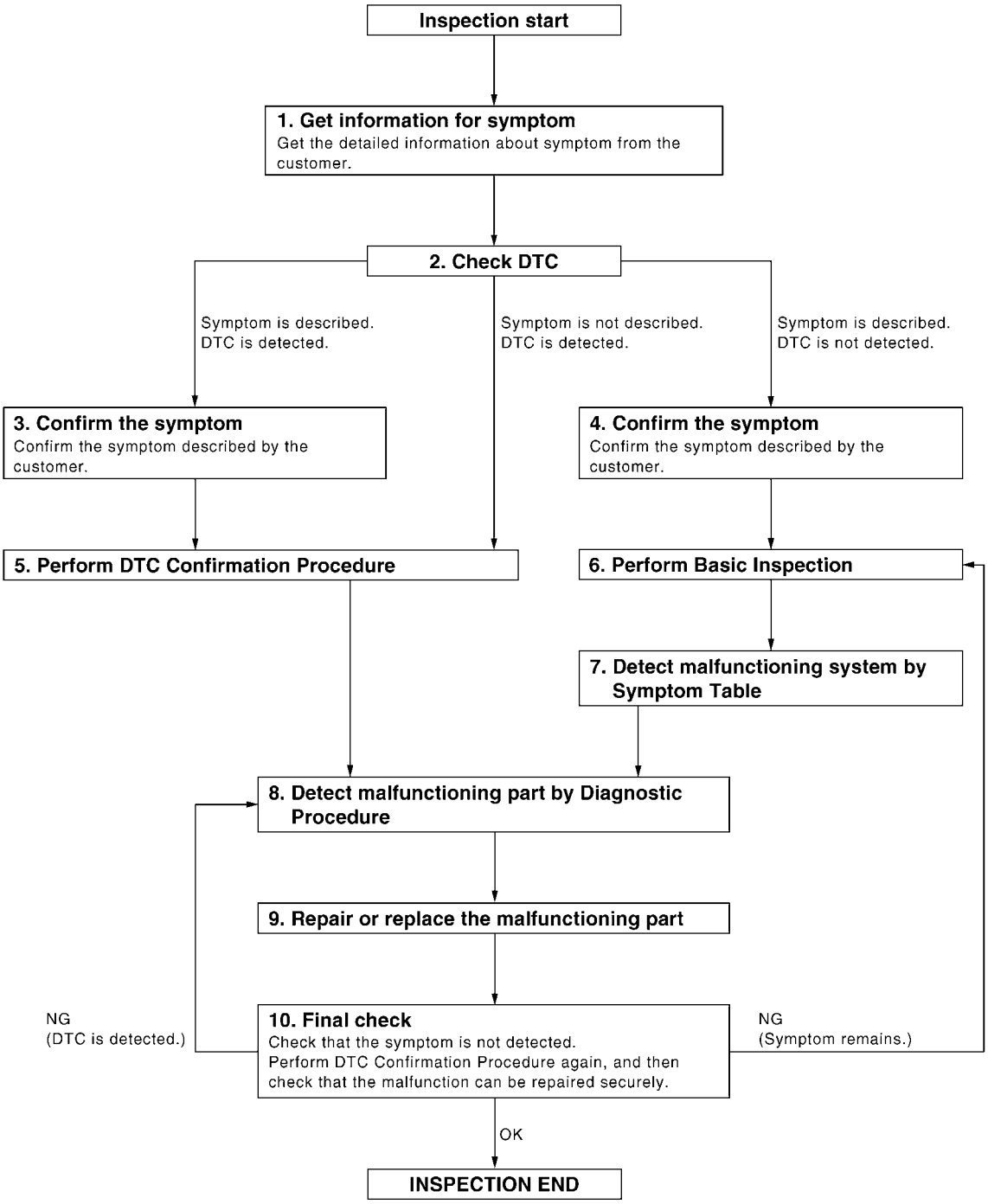
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001102250

OVERALL SEQUENCE



JMKIA0101GB

DETAILED FLOW

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred).

>> GO TO 2.

2.CHECK DTC

1. Check DTC for BCM.
2. Perform the following procedure if DTC is displayed.

- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.

3. Check related service bulletins for information.

Is any symptom described and any DTC detected?

Symptom is described, DTC is displayed>>GO TO 3.
Symptom is described, DTC is not displayed>>GO TO 4.
Symptom is not described, DTC is displayed>>GO TO 5.

3.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR ” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC Confirmation Procedure for the displayed DTC, and then check that DTC is detected again.
If two or more DTCs are detected, refer to DLK-810, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

Is DTC detected?

YES >> GO TO 8.
NO >> Refer to GI-39, "Intermittent Incident".

6.PERFORM BASIC INSPECTION

Perform Basic Inspection, refer to DLK-827, "Basic Inspection".

Inspection End>>GO TO 7.

7.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to Symptom Table based on the confirmed symptom in step 4.

>> GO TO 8.

8.DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Inspect according to Diagnostic Procedure of the system.
NOTE:
The Diagnostic Procedure described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure.

>> GO TO 9.

cardiagn.com

9.REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it.

>> GO TO 10.

10.FINAL CHECK

When DTC was detected in step 2, perform DTC Confirmation Procedure or Component Function Check again, and then check that the malfunction have been repaired securely.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Does the symptom reappear?

YES (DTC is detected)>>GO TO 8.
YES (Symptom remains)>>GO TO 6.
NO >> **INSPECTION END**

carsdiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000001102252

Perform the system initialization when replacing or registering Keyfob and ignition key.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000001102253

Refer to the CONSULT-III Operation Manual-NATS.

cardiagn.com

FUNCTION DIAGNOSIS

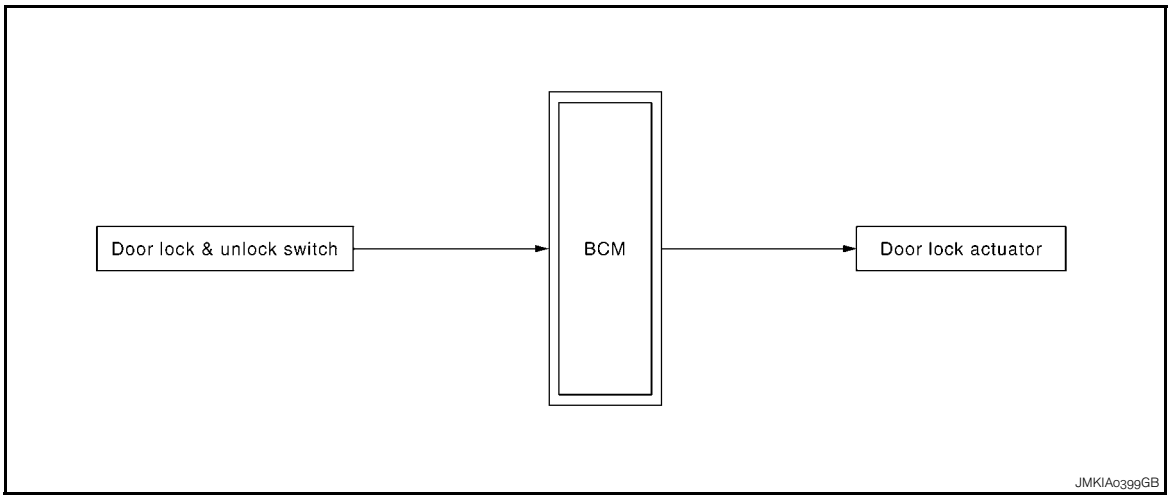
DOOR LOCK FUNCTION

DOOR LOCK AND UNLOCK SWITCH

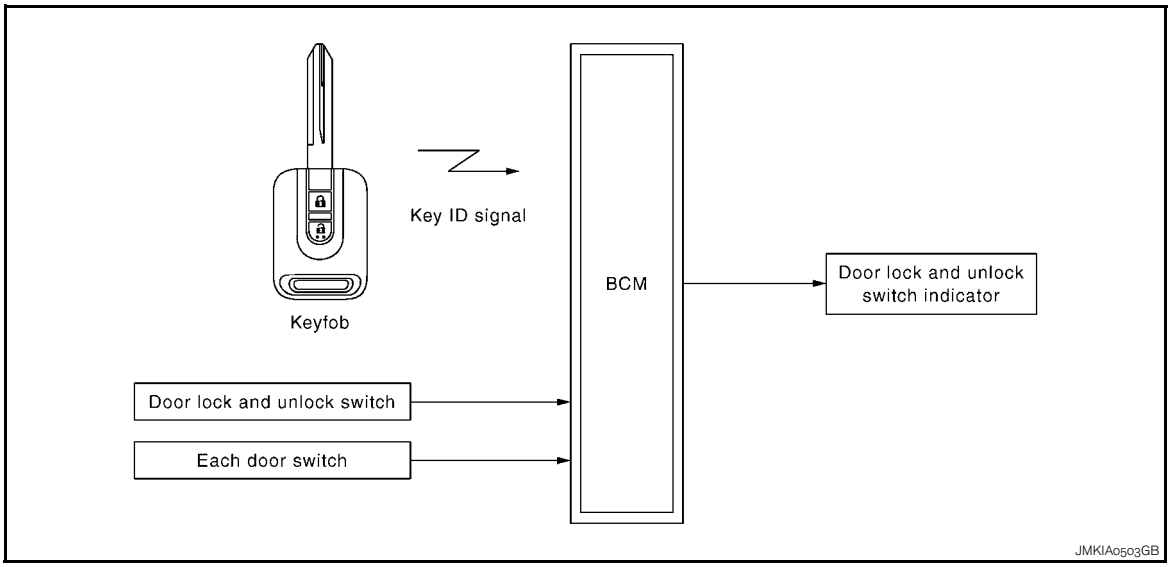
DOOR LOCK AND UNLOCK SWITCH : System Diagram

INFOID:0000000001088464

DOOR LOCK AND UNLOCK SWITCH OPERATION



DOOR LOCK AND UNLOCK SWITCH INDICATOR OPERATION



DOOR LOCK AND UNLOCK SWITCH : System Description

INFOID:0000000001088465

DOOR LOCK AND UNLOCK SWITCH OPERATION

Functions are available by operating the door lock and unlock switch on center console. Interlocked with the lock/unlock operation of door lock and unlock switch, door lock actuators of all doors are locked/unlocked.

Operation Condition

If the following conditions are not satisfied, door lock/unlock operation is not performed even if the door lock and unlock switch is operated.

Door lock and unlock switch	Operation condition
Lock operation	All the following conditions are satisfied. • Except driver side, doors are closed. • Doors are not locked with keyfob.
Unlock operation	All the following all conditions are satisfied. • Doors are not locked with keyfob.

NOTE:
When the door lock is locked with keyfob, door lock and unlock switch operation will be invalid until either of the following conditions is satisfied.
- Turn ignition switch ON.
- Unlock operation by keyfob.

DOOR LOCK AND UNLOCK SWITCH INDICATOR OPERATION

Door lock and unlock switch indicator indicates door lock status. The indicator turn ON while ignition switch is ON and door lock is locked. If any door is opened, the indicator will turn OFF.

1 Minute Timer

A timer must be running to turn OFF the indicator. The timer will run for 1 minute after locking with keyfob or auto door lock.

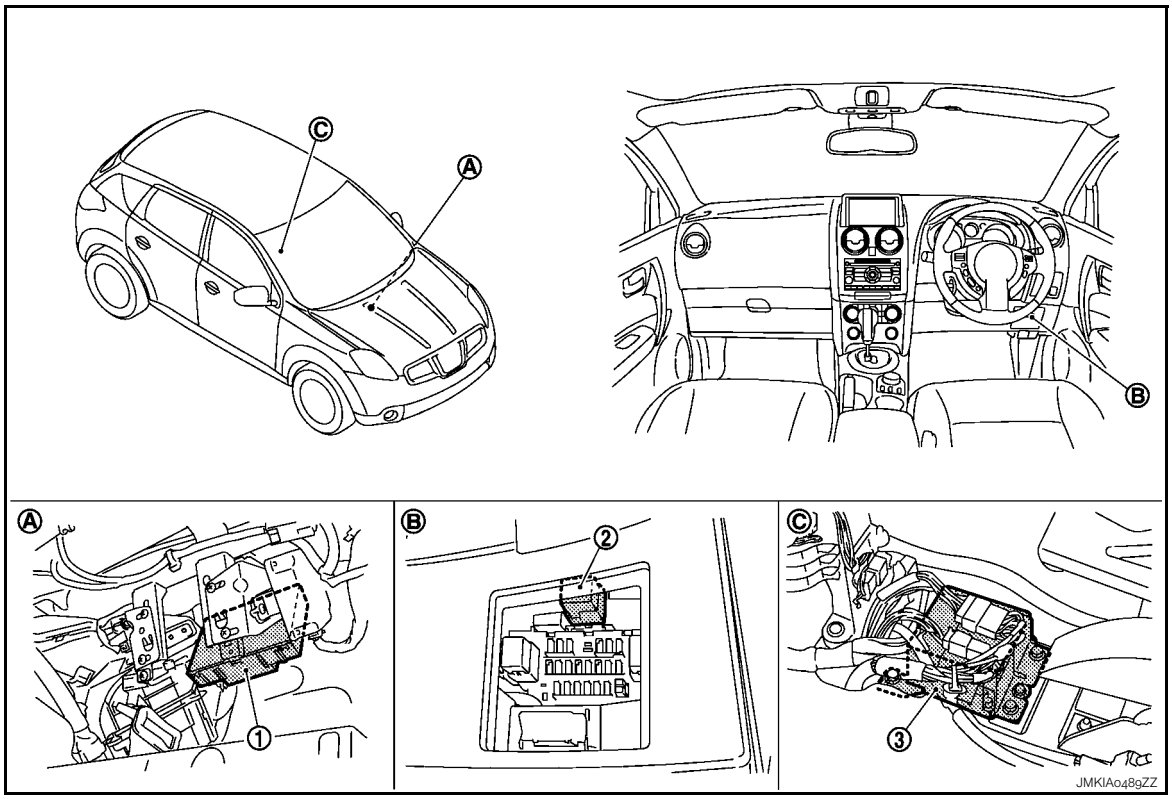
30 Minutes Timer

A timer must be running to turn OFF the indicator. The timer will run for 30 minutes after locking with door lock and unlock switch.

NOTE:
1minute timer condition is satisfied while 30 minutes timer is active, however 30 minutes timer does not change when 1 minutes timer is active.

DOOR LOCK AND UNLOCK SWITCH : Component Parts Location

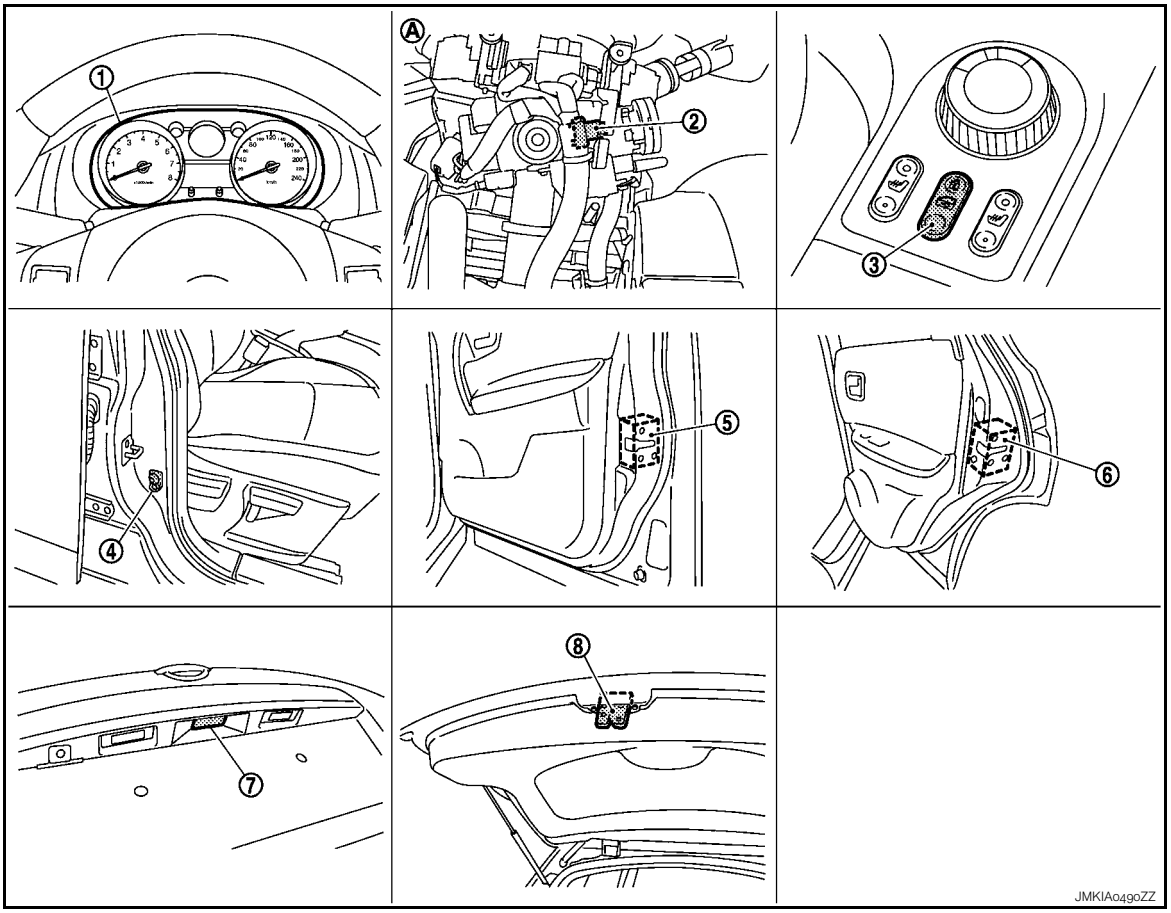
INFOID:0000000001088466



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

cardiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock awitch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D29
6. Rear door lock actuator RH D95
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

DOOR LOCK AND UNLOCK SWITCH : Component Description

INFOID:0000000001088467

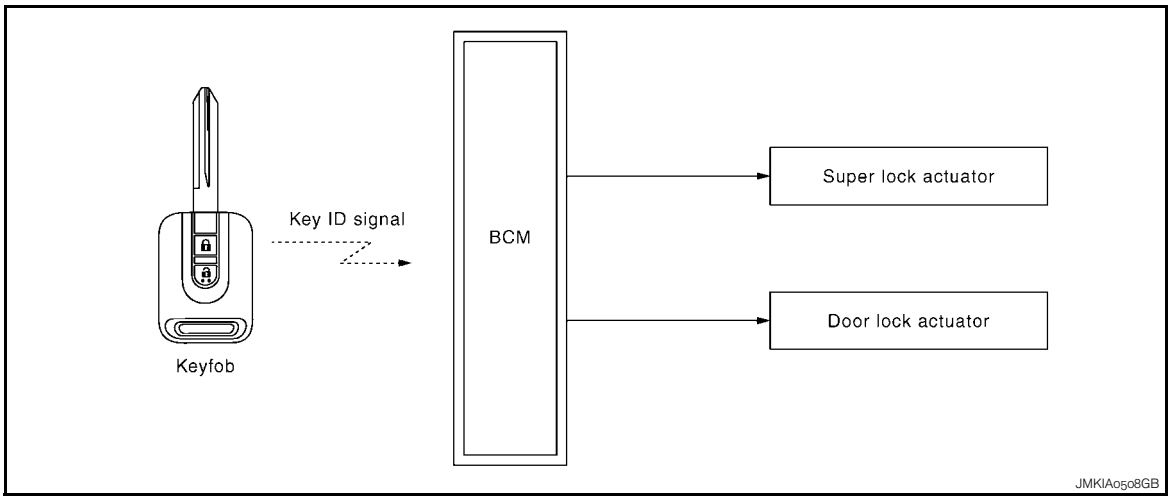
Item	Function
BCM	Controls the door lock and unlock function.
Door switch	Detects door state (open or closed).
Door lock and unlock switch	Transmits door lock and unlock signal to BCM. Door lock and unlock switch indicator is built in door lock and unlock switch.
Door lock actuator	Receives door lock and unlock signal from BCM and locks and unlocks each door.

KEYFOB

KEYFOB : System Diagram

INFOID:0000000001088020

KEYFOB OPERATION



KEYFOB : System Description

INFOID:0000000001088021

KEYFOB OPERATION

The the multi remote control system can be locked and unlocked pressing door lock and unlock button of key-fob.

OPERATION CONDITION

Remote controller operation	Operation condition
Lock/unlock	Key switch is OFF (key is removed from ignition key cylinder).

OPERATION AREA

To ensure that the keyfob works effectively, use within 100 cm range of each door, however the operable range may differ according to surroundings.

DOOR LOCK AND UNLOCK CONTROL

When door lock and unlock button of keyfob is pressed, door lock and unlock signal transmits from keyfob to BCM. When BCM receives the door lock and unlock signal, it operates door lock actuator.

SUPER LOCK CONTROL WITH ANTI-HIJACK MODE

- Super lock provides a higher anti-theft performance than a conventional power door lock system. The super lock system is controlled by BCM.
- When door lock is unlocked, pressing LOCK button on keyfob once will lock and super lock set all doors. When super lock is set, pressing UNLOCK button on keyfob once will unlock (and super lock release) driver side door and super lock release all other doors. Pressing UNLOCK button on keyfob within 5 seconds from the first time will unlock all doors and back door can be opened with back door opener switch.

NOTE:

Anti-hijack mode can be set to ON or OFF with CONSULT-III. For the setting information, refer to DLK-738, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

SUPER LOCK CONTROL WITHOUT ANTI-HIJACK MODE

When door lock is unlocked, pressing LOCK button on keyfob once will lock and super lock set all doors. When all doors are set to super lock, pressing UNLOCK button on keyfob will unlock all doors and super lock release all doors and back door can be opened with back door opener switch.

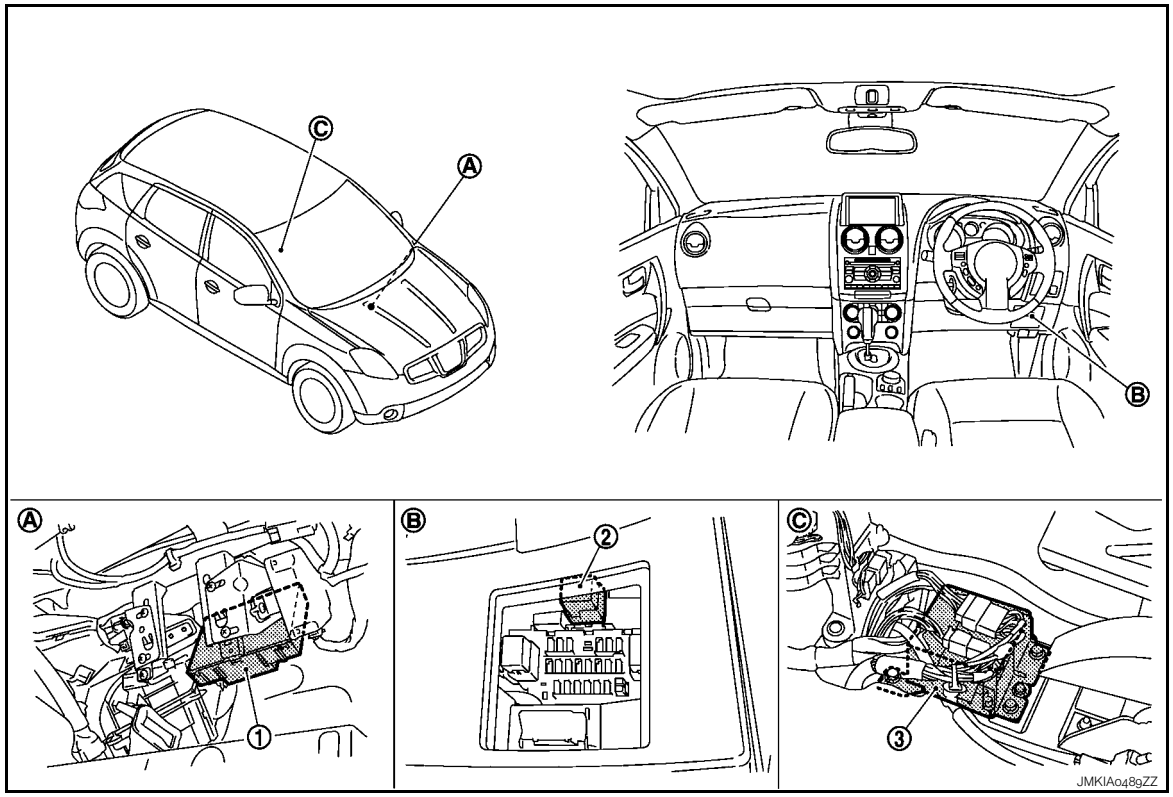
NOTE:

Anti-hijack mode can be set to ON or OFF with CONSULT-III. For the setting information, refer to DLK-738, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

KEYFOB : Component Parts Location

INFOID:0000000001117084

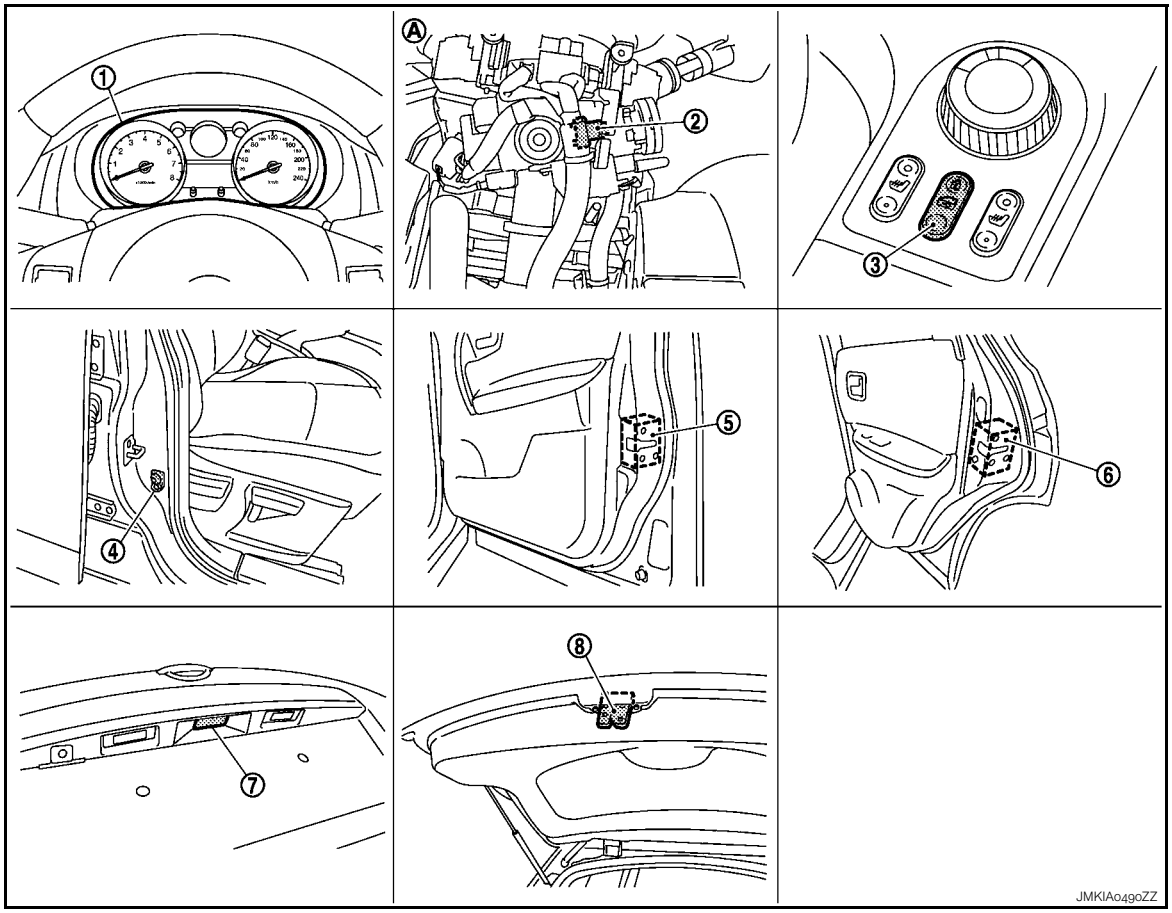
cardiagn.com



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

carsdiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock awitch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D29
6. Rear door lock actuator RH D95
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

KEYFOB : Component Description

INFOID:0000000001088023

Item	Function
BCM	Controls the door lock function.
Key switch	Detect that ignition key is inserted into ignition key cylinder.
Door lock actuator	Receives lock and unlock signal from BCM and locks and unlocks each door.

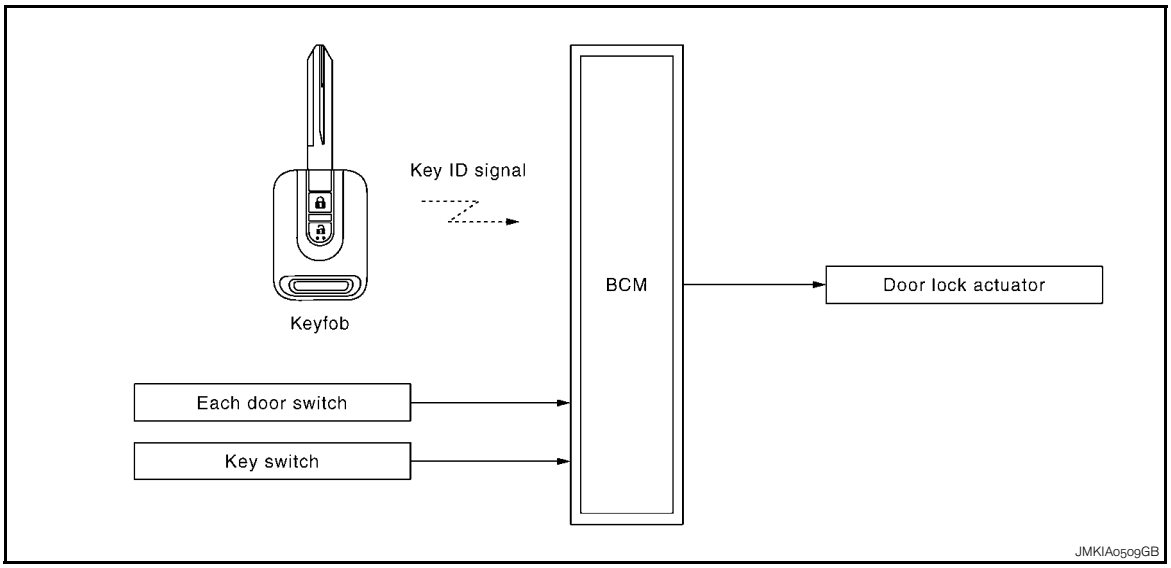
AUTO DOOR LOCK

AUTO DOOR LOCK : System Diagram

INFOID:0000000001088452

cardiagn.com

AUTO RELOCK OPERATION



AUTO DOOR LOCK : System Description

INFOID:0000000001088453

AUTO RELOCK OPERATION

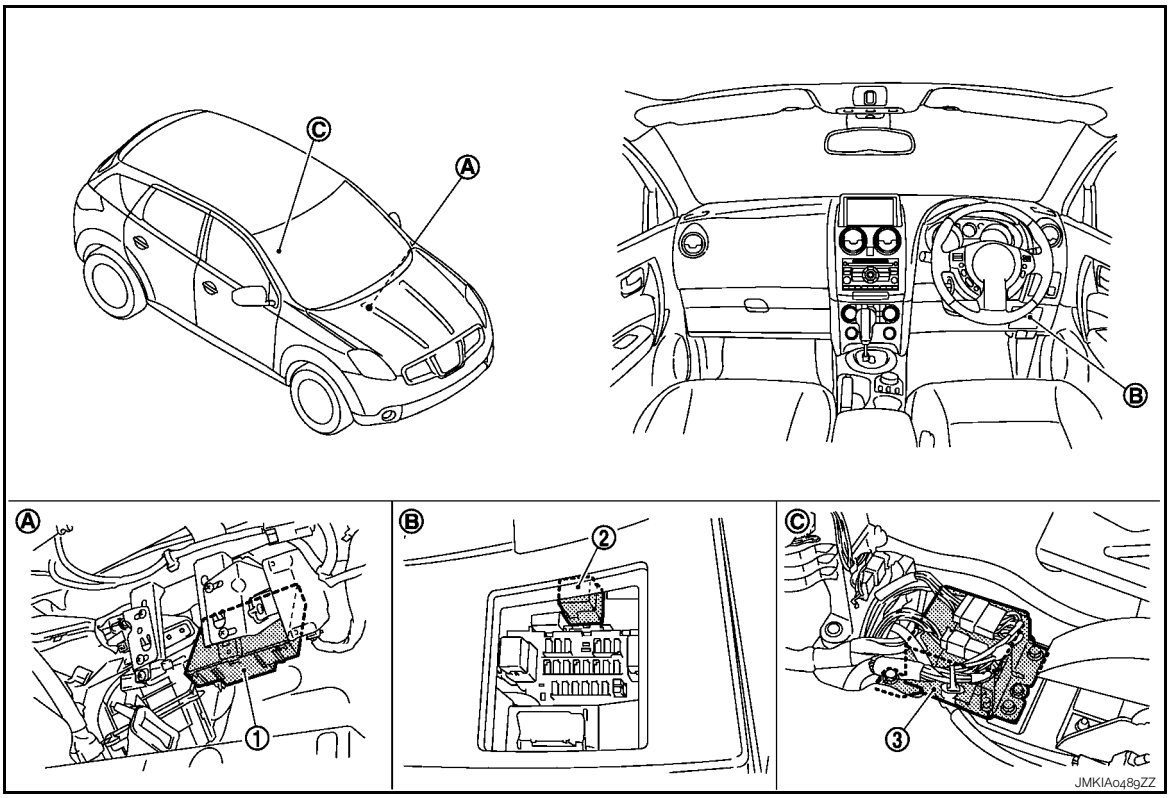
When all doors are locked and then doors are unlocked with keyfob, if BCM does not receive the following signal within 2 minutes[*1], all doors are automatically locked.

- Any door is opened.
- Ignition key is inserted into ignition key cylinder.
- Door is locked with keyfob.
- Door is locked/unlocked with door lock and unlock switch.

[*1]: The time can be changed with CONSULT-III. Refer to DLK-740, "MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT)".

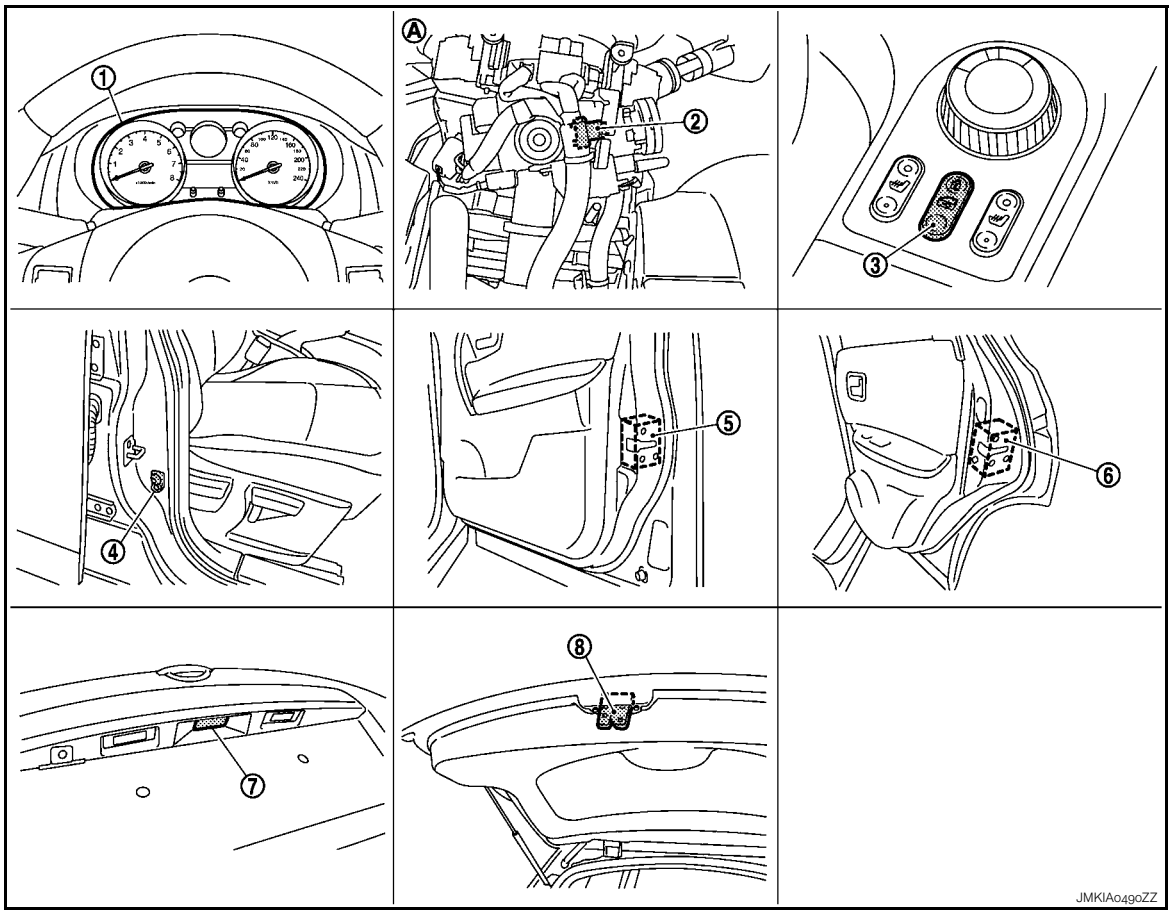
AUTO DOOR LOCK : Component Parts Location

INFOID:0000000001117085



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed



1. Combination meter
   M34
2. Key switch
   M24
3. Door lock and unlock awitch
   M89
4. Front door switch (driver side)
   B34
5. Front door lock actuator (driver side)
   D29
6. Rear door lock actuator RH
   D95
7. Back door opener switch
   D186
8. Back door lock assembly
   D152

A. View with steering column cover removed

AUTO DOOR LOCK : Component Description

INFOID:0000000001088455

Item	Function
BCM	Controls the door lock function.
Door switch	Detects door state (open or closed).
Key switch	Detects that ignition key is inserted into ignition key cylinder.
Door lock/unlock switch	Transmits door lock/unlock signal to BCM.
Keyfob	Transmits key ID to BCM when lock and unlock button is pressed.
Door lock actuator	Receives lock/unlock signal from BCM and locks/unlocks each door.

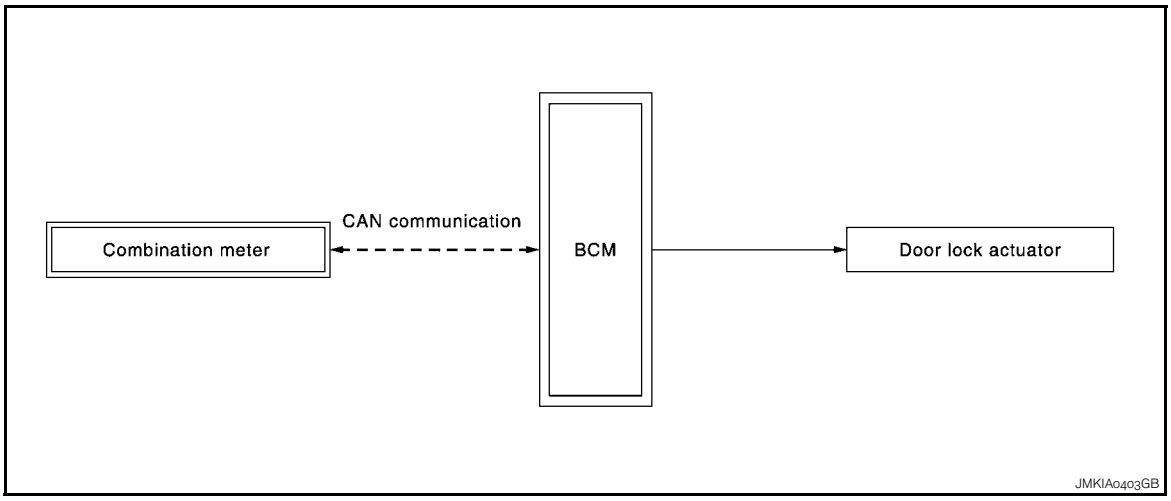
VEHICLE SPEED SENSING AUTO DOOR LOCK

VEHICLE SPEED SENSING AUTO DOOR LOCK : System Diagram

INFOID:0000000001088456

cardiagn.com

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION



VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description

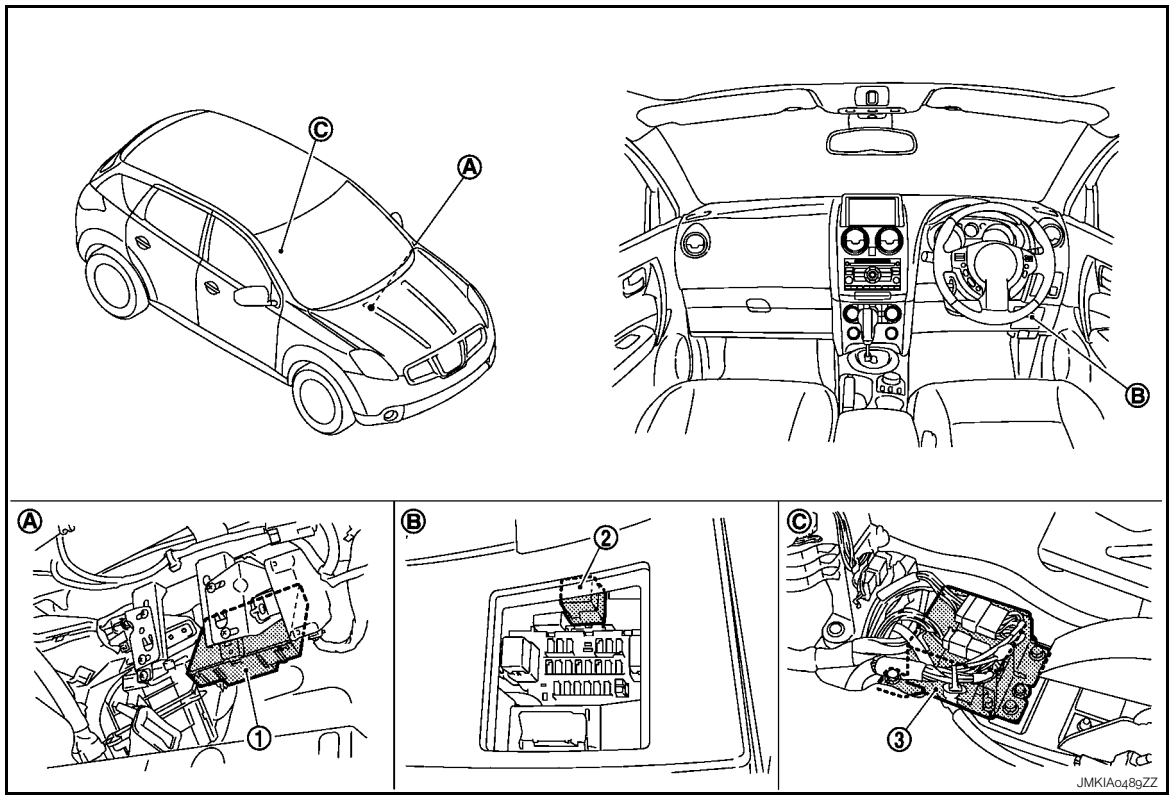
INFOID:0000000001088457

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION

When the vehicle speed exceeds more than 12 km/h (7 MPH), all doors are automatically locked. The vehicle speed signal is received from combination meter via CAN communication.

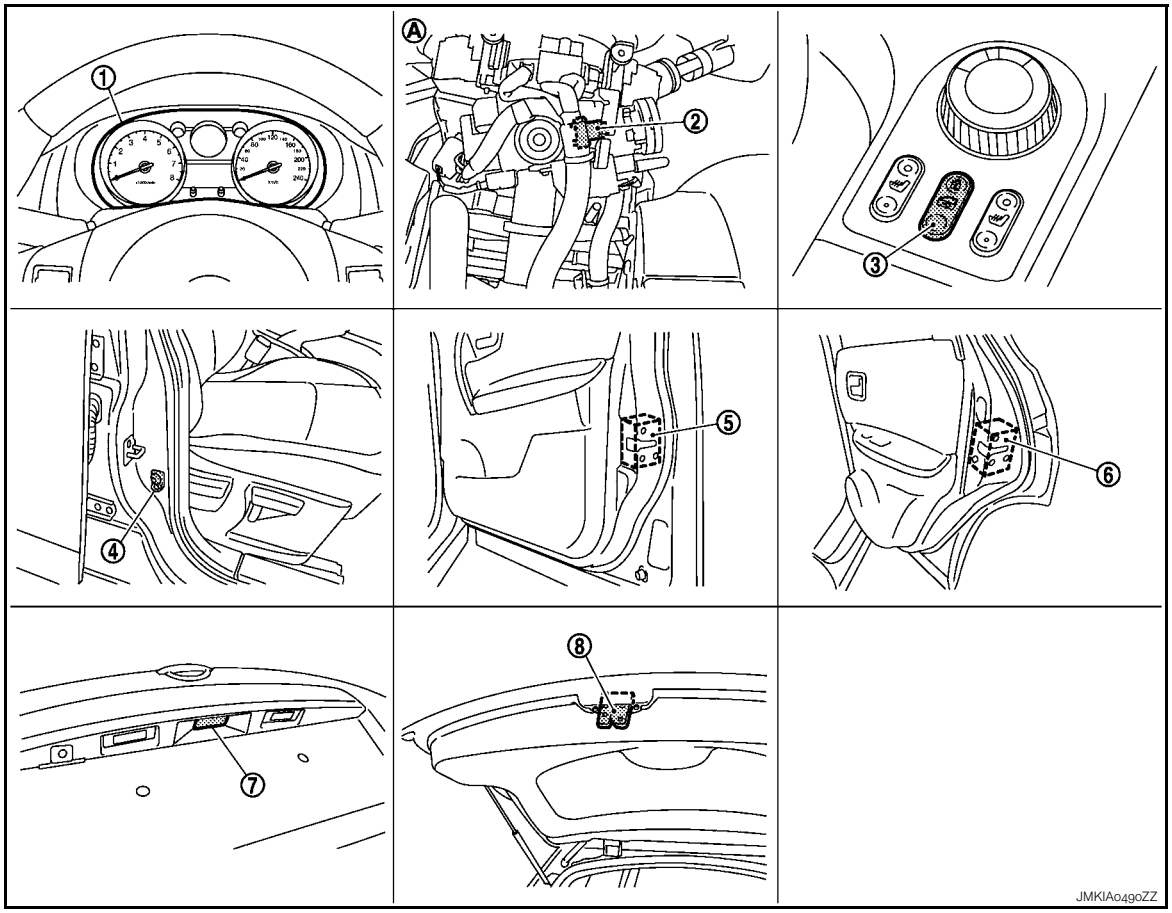
VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Parts Location

INFOID:0000000001117086



1. BCM M65, M66, M67
2. Passenger side anti-hijack relay M90
3. Air bag diagnosis sensor unit M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock awitch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D29
6. Rear door lock actuator RH D95
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

VEHICLE SPEED SENSING AUTO DOOR LOCK : Component Description

INFOID:0000000001088459

Item	Function
BCM	Controls the door lock function.
Combination meter	Transmits vehicle speed signal to BCM via CAN communication.
Door lock actuator	Receives door lock and unlock signal from BCM and locks and unlocks each door.

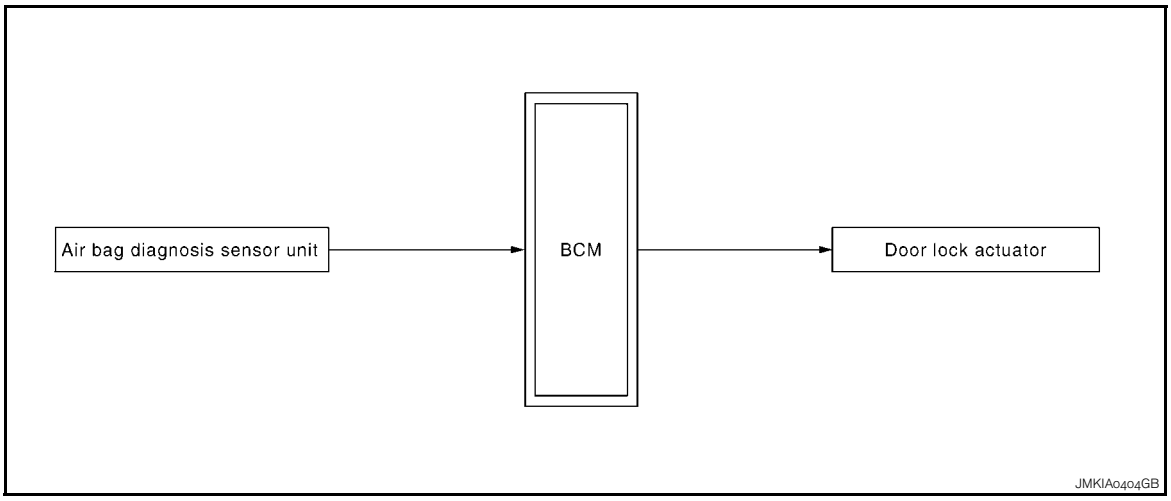
AIR BAG INTERLOCK UNLOCK

AIR BAG INTERLOCK UNLOCK : System Diagram

INFOID:0000000001088460

cardiagn.com

AIR BAG INTERLOCK UNLOCK OPERATION



AIR BAG INTERLOCK UNLOCK : System Description

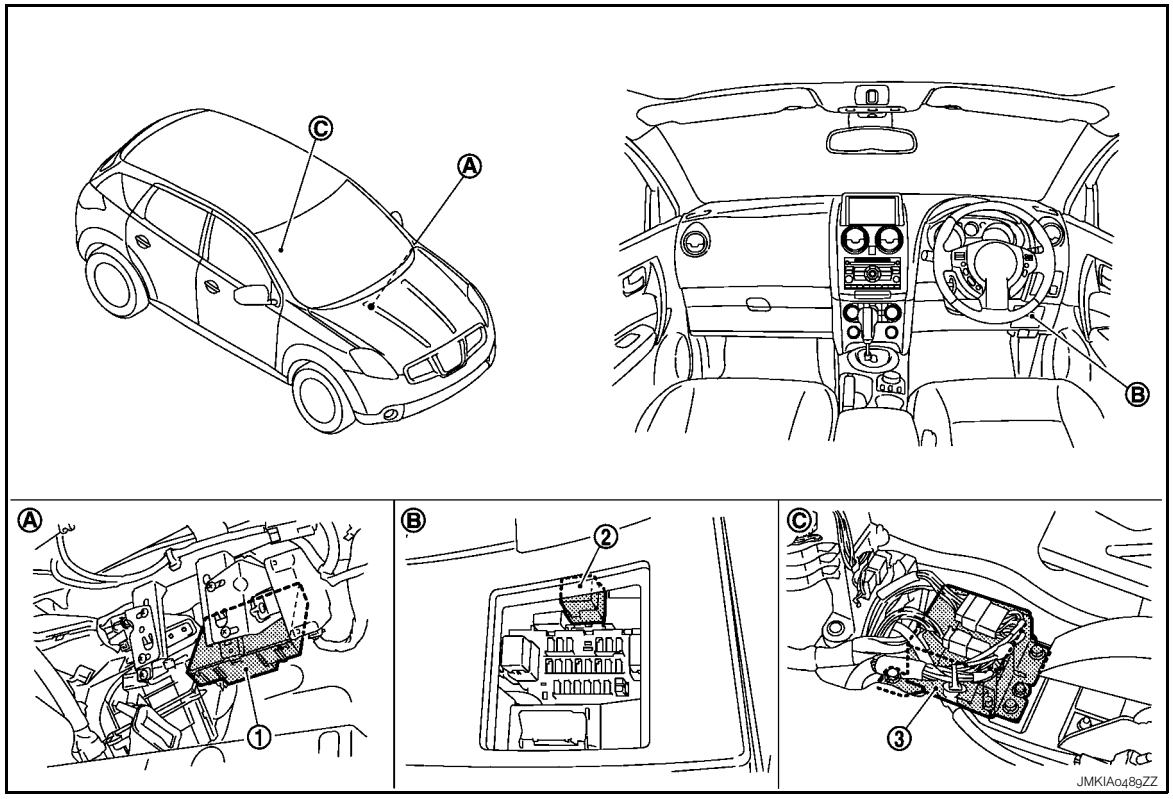
INFOID:0000000001088461

AIR BAG INTERLOCK UNLOCK OPERATION

When ignition switch is ON and BCM receive air bag deployment signal, it operates automatically to unlock all doors. Air bag diagnosis sensor unit sends the air bag deployment signal to BCM.

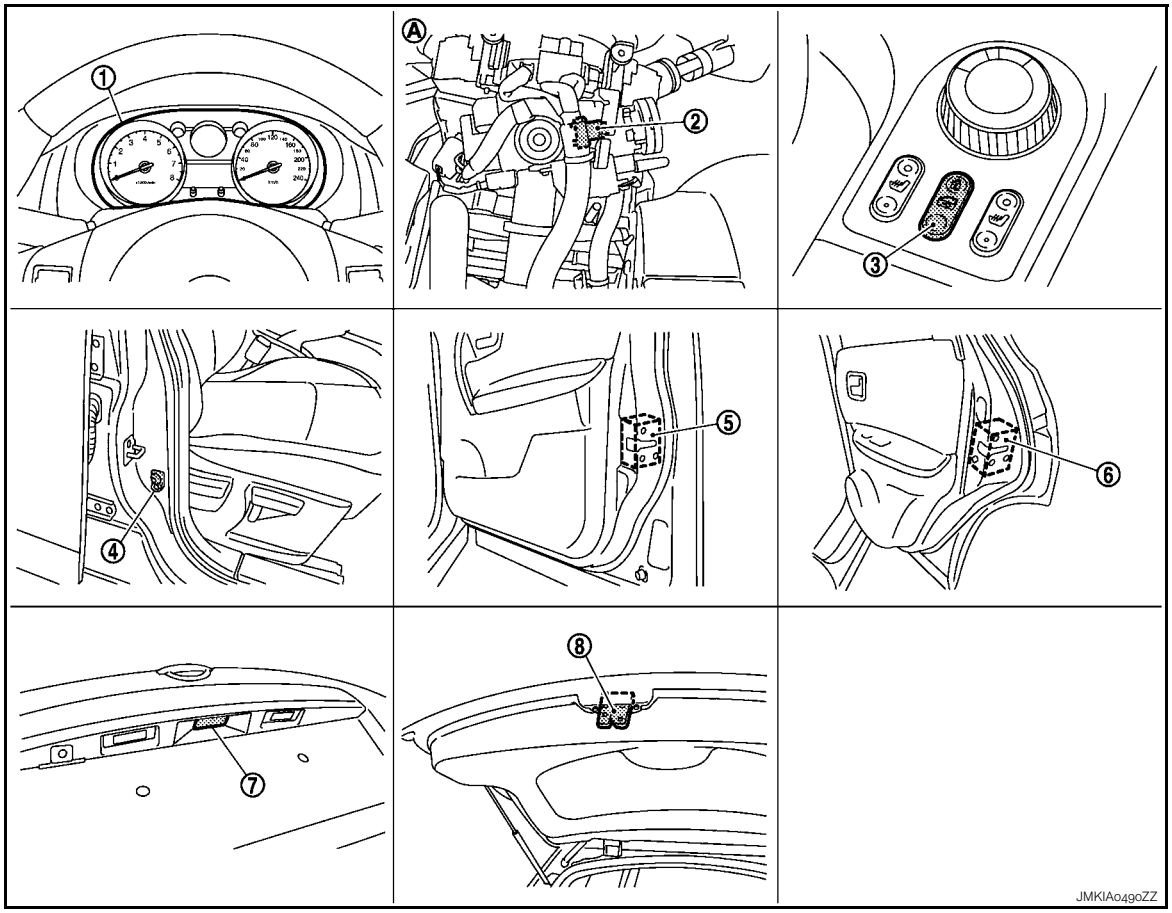
AIR BAG INTERLOCK UNLOCK : Component Parts Location

INFOID:0000000001117087



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock awitch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D29
6. Rear door lock actuator RH D95
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

AIR BAG INTERLOCK UNLOCK : Component Description

INFOID:0000000001088463

Item	Function
BCM	Controls the door lock function.
Air bag diagnosis sensor unit	Transmits air bag deployment signal to BCM.
Door lock actuator	Receives door lock and unlock signal from BCM and lock and unlock each door.

cardiagn.com

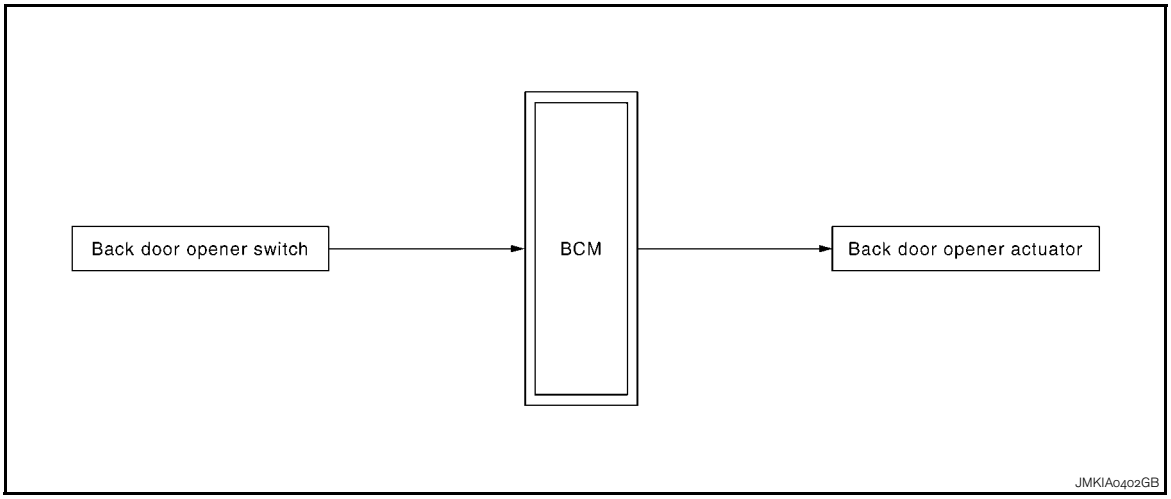
BACK DOOR OPENER FUNCTION

BACK DOOR OPENER SWITCH

BACK DOOR OPENER SWITCH : System Diagram

INFOID:0000000001088056

BACK DOOR OPENER OPERATION



BACK DOOR OPENER SWITCH : System Description

INFOID:0000000001088057

BACK DOOR OPENER OPERATION

When back door opener switch is pressed, BCM opens back door opener actuator.

NOTE:

Back door opener actuator is not for locking the back door. The function is only to open the back door.

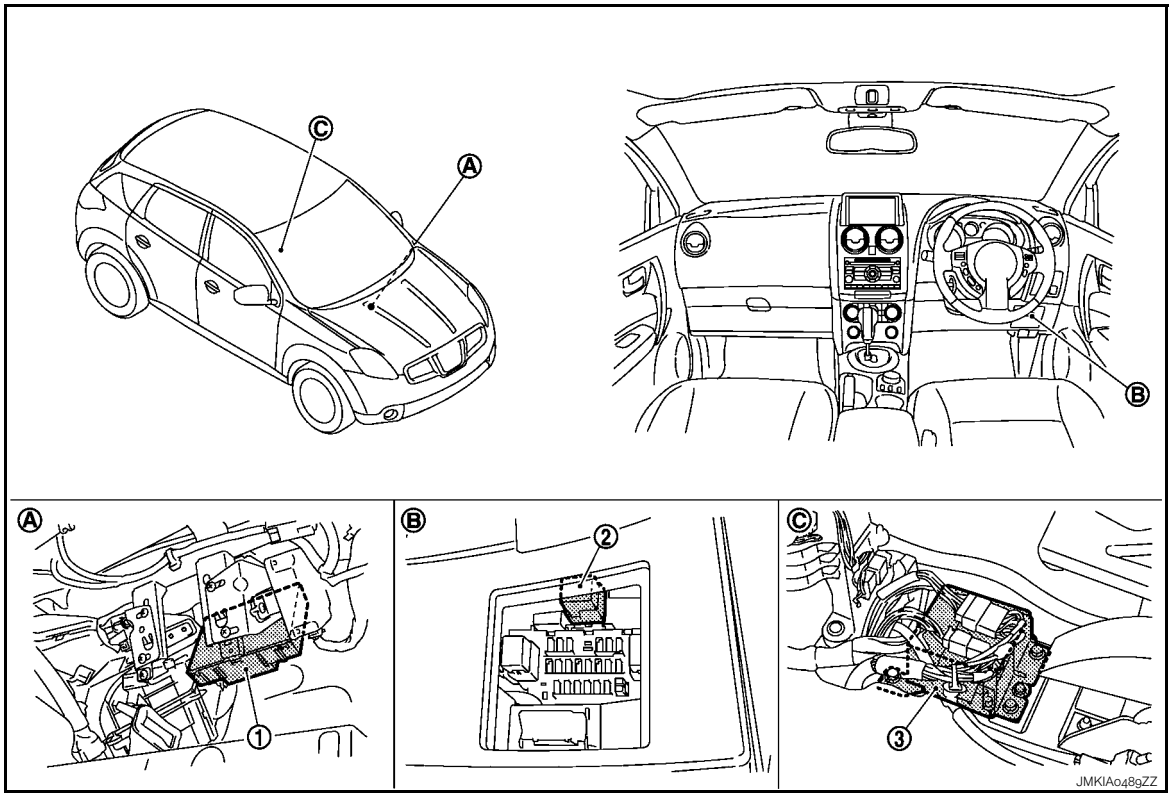
OPERATION CONDITION

If the following conditions are not satisfied, back door opener operation is not performed.

Back door opener switch operation	Operation condition
Back door open	• Vehicle speed is less than 5 km/h (3 MPH). • All doors are unlocked.

BACK DOOR OPENER SWITCH : Component Parts Location

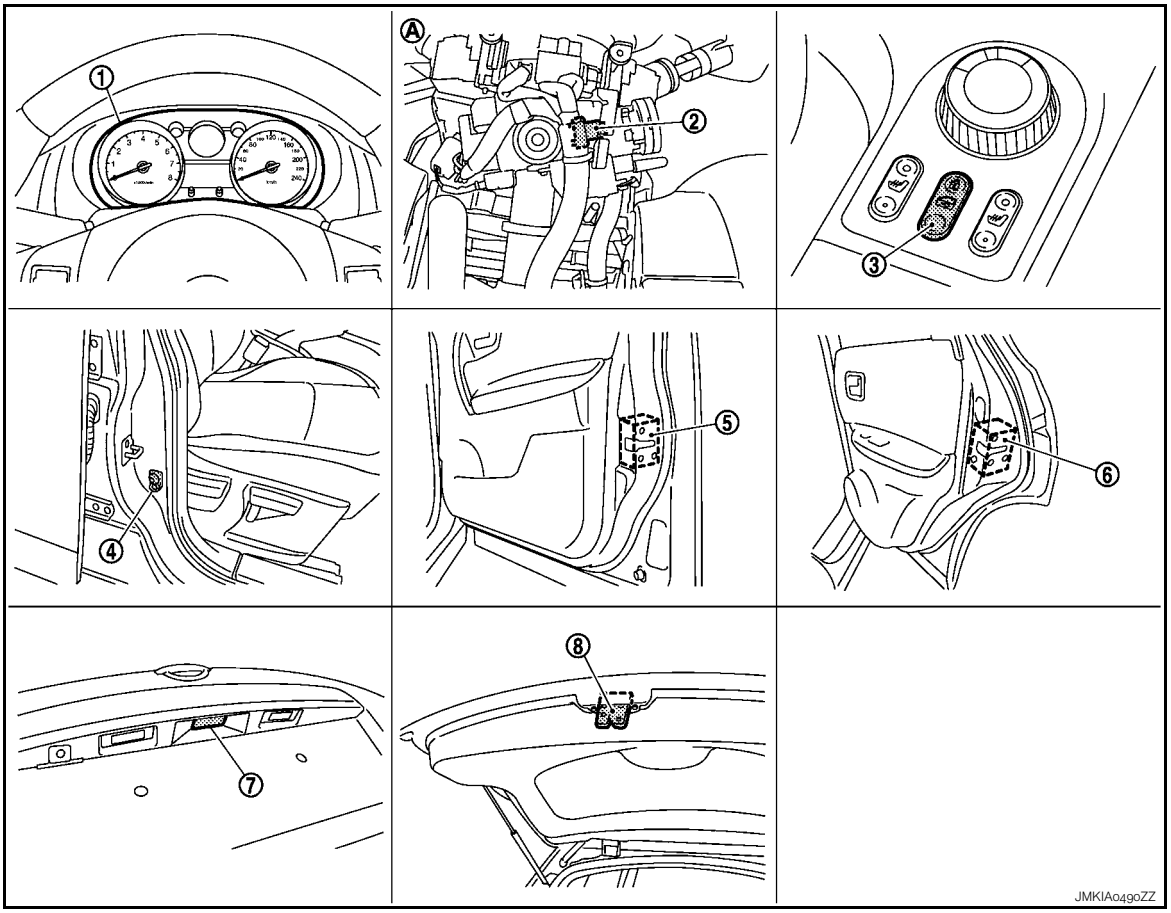
INFOID:0000000001117088



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

cardiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock awitch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D29
6. Rear door lock actuator RH D95
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

BACK DOOR OPENER SWITCH : Component Description

INFOID:0000000001088059

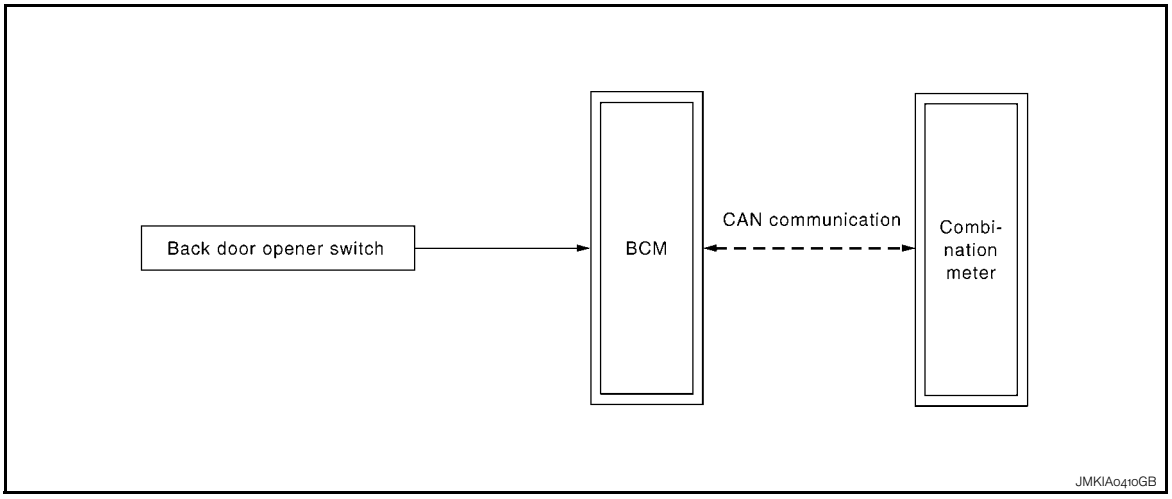
Item	Function
BCM	Controls the back door opener function.
Back door opener switch	Transmits back door opener switch operation signal to BCM.
Back door opener actuator	Opens the back door with the back door open signal from BCM.
Combination meter	Transmits vehicle speed signal to BCM via CAN communication.

WARNING FUNCTION

System Diagram

INFOID:0000000001088073

BACK DOOR OPEN WARNING



System Description

INFOID:0000000001088074

BACK DOOR OPEN WARNING OPERATION

Back door opener switch is operated, when door lock is locked with door lock and unlock switch, by speed sensing lock or when only the driver side is unlocked by the anti-hijack function, the buzzer (built in combination meter) will sound.

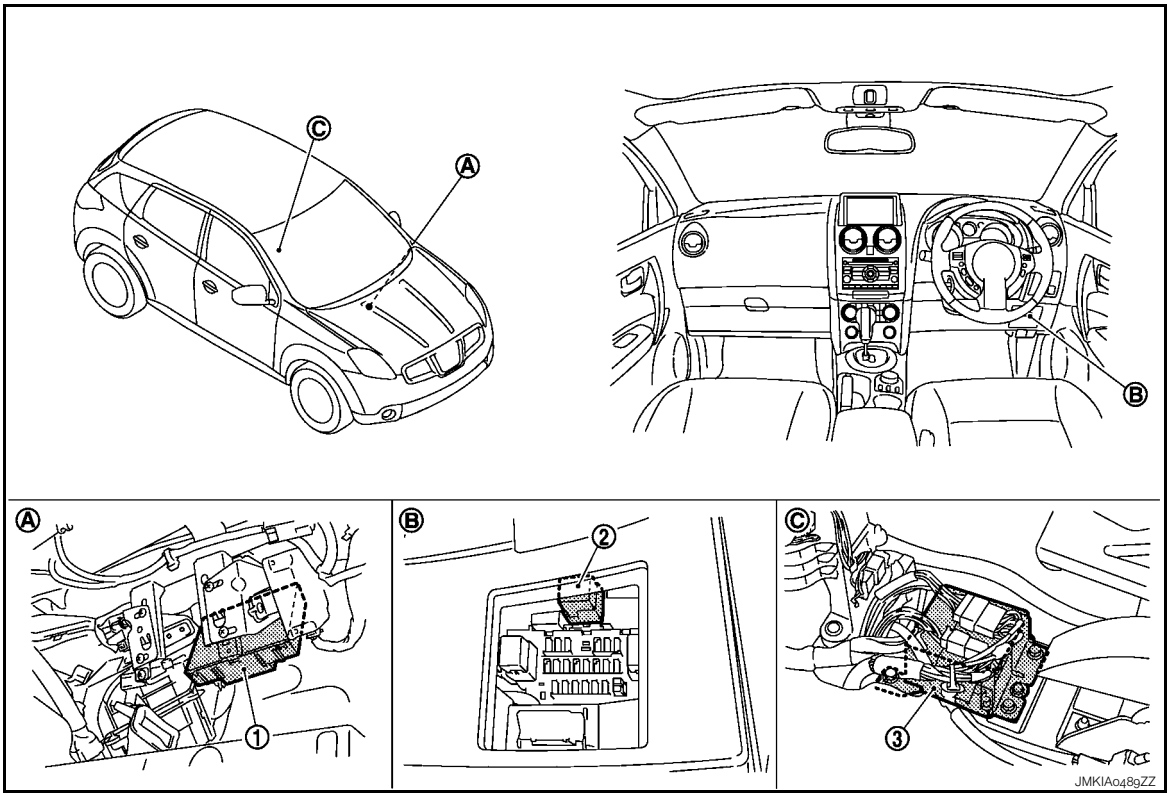
KEY REMINDER OPERATION

- The buzzer (combination meter) will sound and the doors will not lock if the door lock and unlock switch is pressed while the driver door is open and mechanical key is inserted ignition key cylinder.
- The buzzer (combination meter) will sound and the doors will not lock if the door lock and unlock switch is pressed while any door other than the driver door is open.

Component Parts Location

INFOID:0000000001117089

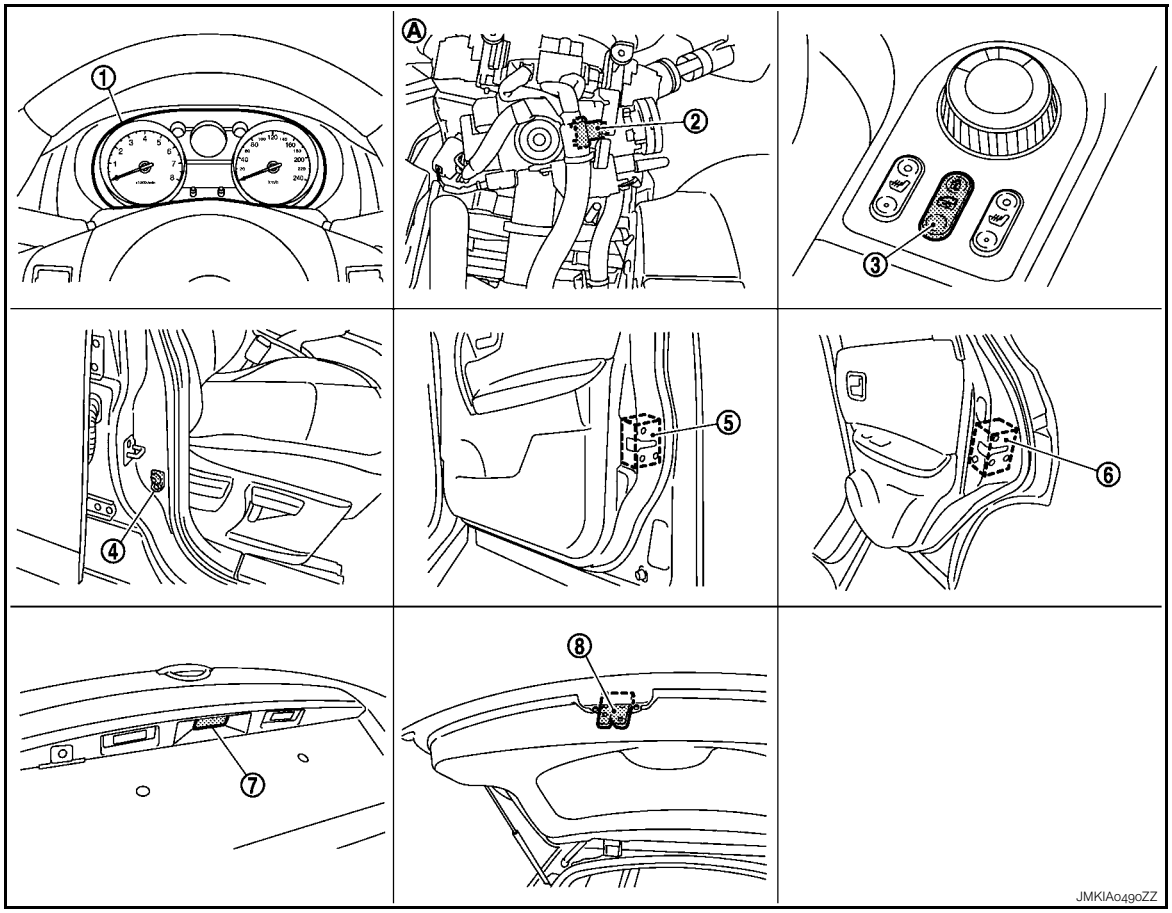
cardiagn.com



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

carsdiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock awitch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D29
6. Rear door lock actuator RH D95
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

Component Description

INFOID:0000000001088076

Item	Function
BCM	Controls the warning function.
Combination meter	Sounds the buzzer by the request signal from BCM via CAN communication.
Back door opener switch	Transmit back door open signal to BCM

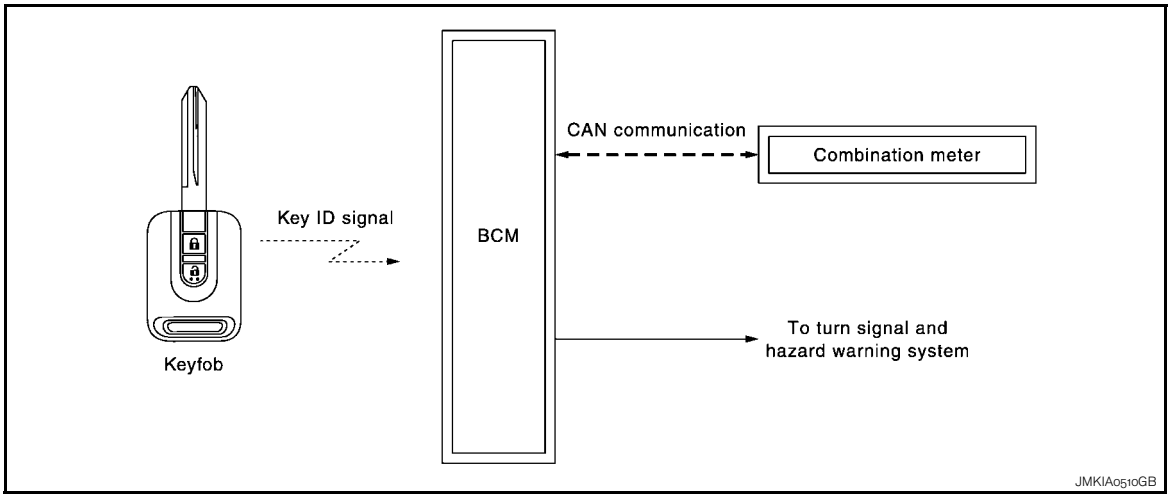
cardiagn.com

HAZARD REMINDER FUNCTION

System Diagram

INFOID:0000000001088140

HAZARD REMINDER FUNCTION



System Description

INFOID:0000000001088141

HAZARD REMINDER OPERATION

When door is locked or unlocked by keyfob, then BCM flashes hazard warning lamp as a reminder.

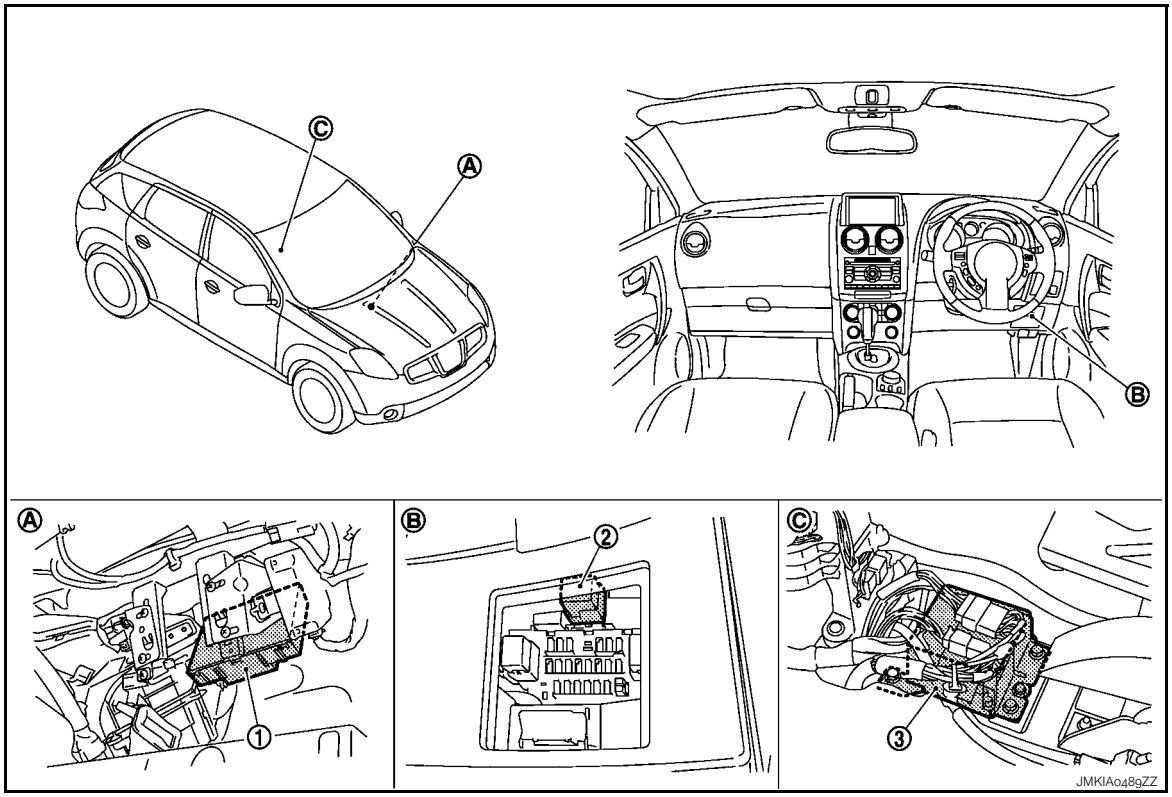
NOTE:

Hazard reminder mode can be changed with CONSULT-III. Refer to DLK-738, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Hazard reminder setting (With CONSULT-III)		Door lock operation (with keyfob)	Hazard warning lamp flash
HAZARD LAMP SET	MODE 1	—	—
	MODE 2	Lock	Once
		Unlock	—
	MODE 3	Lock	—
		Unlock	Twice
	MODE 4	Lock	Once
		Unlock	Twice

Component Parts Location

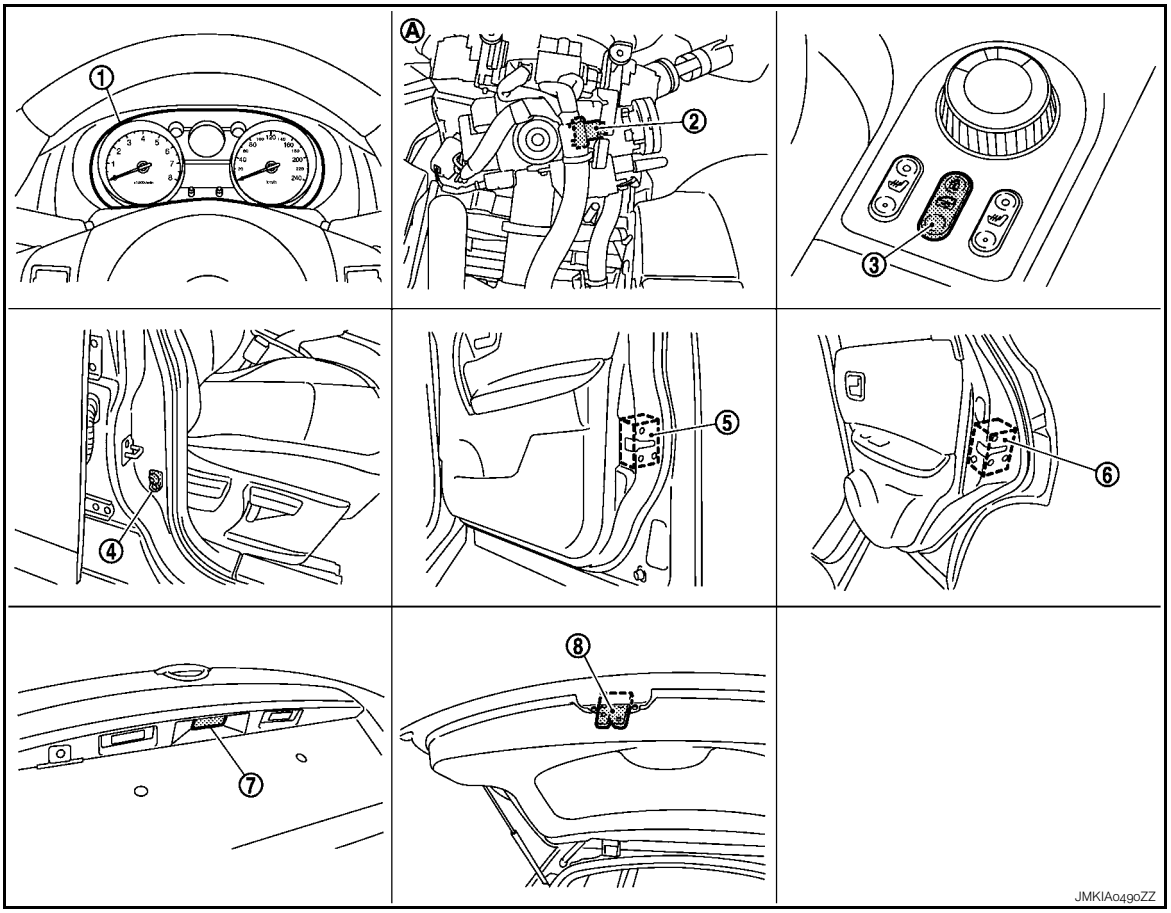
INFOID:0000000001117090



1. BCM
   M65, M66, M67
2. Passenger side anti-hijack relay
   M90
3. Air bag diagnosis sensor unit
   M59

A. Over the glove box
B. View with fuse box lid removed
C. View with center console removed

cardiagn.com



1. Combination meter M34
2. Key switch M24
3. Door lock and unlock awitch M89
4. Front door switch (driver side) B34
5. Front door lock actuator (driver side) D29
6. Rear door lock actuator RH D95
7. Back door opener switch D186
8. Back door lock assembly D152

A. View with steering column cover removed

Component Description

INFOID:0000000001088143

Item	Function
BCM	Controls the hazard reminder system.
Combination meter	Turns ON the turn signal indicator (built in combination meter) by the request from BCM via CAN communication.
Keyfob	Transmits key ID to BCM when lock and unlock button is pressed.

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001097510

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

DOOR LOCK

DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)

INFOID:0000000001097507

BCM CONSULT-III FUNCTION

CONSULT-III performs the following functions via CAN communication with BCM.

cardiagn.com

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
KEYLESS LOCK*2	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK*2	Indicates [ON/OFF] condition of unlock signal from key fob.
I-KEY LOCK*1	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK*1	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.
UNLOCK WITH DR	This item is indicated, but not monitored.
UNLOCK SHOCK	Indicates [ON/OFF] condition of signal from air bag diagnosis unit. • ON: During the unlock operation interlock with air bag. • OFF: Other than above.
SHOCK SENSOR	Indicates [NOMAL/ON/OFF] condition of circuit between BCM and air bag diagnosis sensor unit. • NORMAL: Ignition switch ON. (BCM is receiving normal condition signal from air bag diagnosis sensor unit.) • ON: During the receiving of air bag deployment signal from air bag diagnosis sensor unit. • OFF: After the receiving of air bag deployment signal from air bag diagnosis sensor unit.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the multi remote control system equipped vehicle.

ACTIVE TEST

Test item	Description
SUPER LOCK*1	This test is able to check super lock operation [LOCK (SET)/UNLOCK (RELEASE)].
DOOR LOCK IND	This test is able to check door lock indicator (built in door lock and unlock switch on center console) operation [ON/OFF].
DOOR LOCK	This test is able to check door lock operation [ALL LOCK/ALL UNLOCK/DR UNLOCK/ OTHER UNLOCK].

:*1 For the super lock equipped vehicle.

WORK SUPPORT

A B C D E F G H I J DLK L M N O P
carsdiagn.com

Test item	Description
SECURITY DOOR LOCK SET	Anti hijack function mode can be changed in this mode. • ON: Anti hijack mode is active. • OFF: Anti hijack mode is inactive.

MULTIREMOTE ENT

MULTIREMOTE ENT : CONSULT-III Function (BCM - MULTIREMOTE ENT)

INFOID:0000000001097508

BCM CONSULT-III FUNCTION

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
KEYKESS LOCK	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK	Indicates [ON/OFF] condition of unlock signal from key fob.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
RKE LOCK AND UNLOCK	This item is indicated, but not monitored.

ACTIVE TEST

Test item	Description
DOOR LOCK	This test is able to check warning chime in combination meter operation. [ALL LOCK/ALL UNLOCK/DR UNLOCK/OTHER UNLOCK]
INT LAMP	This test is able to check interior lamp operation [ON/OFF].
FLASHER	This test is able to check flasher operation [LH/RH/OFF].

WORK SUPPORT

cardiagn.com

Test item	Description
HAZARD LAMP SET	Answer back function (hazard) mode can be changed in this mode. For the detail of the setting, refer to DLK-735, "System Description".
AUTO LOCK SET	Auto door lock time can be changed in this mode. • MODE 1: 1 minute • MODE 2: 2 minutes • MODE 3: 3 minutes • MODE 4: 4 minutes • MODE 5: 5 minutes

TRUNK

TRUNK : CONSULT-III Function (BCM - TRUNK)

INFOID:0000000001097509

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
TRNK OPNR SW	Indicates [ON/OFF] condition of back door opener switch.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

*1: For the Intelligent key equipped vehicle.

*2: For the remote keyless entry system equipped vehicle.

ACTIVE TEST

Test item	Description
TRUNK/GLASS HATCH	This test is able to check back door opener operation [ON/OFF].

carsdiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001097495

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart. Refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000001097496

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1000	CAN COMM CIRCUIT	When BCM cannot communicate CAN communication signal continuously for 2 seconds or more.	Any item (or items) of the following listed below is malfunctioning in CAN communication system. • Transmission • Receiving (ECM) • Receiving (METER/M&A) • Receiving (TCM) • Receiving (MULTI AV) • Receiving (IPDM E/R) • Receiving (I-KEY)

Diagnosis Procedure

INFOID:0000000001097497

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check “Self Diagnostic Result” of BCM.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

U1010 CONTROL UNIT (CAN)

DTC Logic

INFOID:0000000001097498

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of BCM.	BCM

Diagnosis Procedure

INFOID:0000000001097499

1.REPLACE BCM

When “DTC:U1010” is detected, replace BCM.

>> Replace BCM. Refer to BCS-64, "Exploded View".

Special Repair Requirement

INFOID:0000000001097500

1.ADDITIONAL SERVICE WHEN REPLACING BCM

>> Refer to BCS-3, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".

carsdiagn.com

POWER SUPPLY AND GROUND CIRCUIT
BCM

BCM : Diagnosis Procedure

INFOID:0000000001115314

1.CHECK FUSE AND FUSIBLE LINK

Check that the following fuse and fusible link are not blown.

Terminal No.	Signal name	Fuse and fusible link No.
41	Battery power supply	9 (10A)
57		J (40A)

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
BCM		Ground	
Connector	Terminal		
M66	41		Battery voltage
M67	57		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> BCM power supply and ground circuit are OK.
NO >> Repair harness or connector.

cardiagn.com

DOOR LOCK AND UNLOCK SWITCH

Description

INFOID:0000000001099066

Transmits door lock/unlock operation to BCM.

Component Function Check

INFOID:0000000001099067

1.CHECK FUNCTION

With CONSULT-III

Check “CDL LOCK SW ”and “CDL UNLOCK SW” in Data monitor mode with CONSULT-III.

Monitor item	Condition	
CDL LOCK SW	LOCK	: ON
	UNLOCK	: OFF
CDL UNLOCK SW	LOCK	: OFF
	UNLOCK	: ON

Is the inspection result normal?

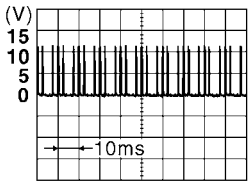
YES >> Door lock and unlock switch is OK.
NO >> Refer to DLK-745, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099068

1.CHECK DOOR LOCK AND UNLOCK INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect door lock and unlock switch connector.
3. Check voltage between door lock and unlock switch and ground.

Terminal			Signal (Reference value)
(+)		(–)	
Door lock and unlock switch connector	Terminal		
M89	1	Ground	
	6		

JPMIA0154GB

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK AND UNLOCK SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector and door lock and unlock switch connector.

BCM connector	Terminal	Door lock and unlock switch connector	Terminal	Continuity
M65	7	M89	6	Exists
	9		1	

4. Check continuity between BCM connector and ground.

carsdiagn.com

BCM connector	Terminal		Continuity
M65	7	Ground	Does not exist
	9		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

3.CHECK DOOR LOCK AND UNLOCK SWITCH GROUND

Check continuity between door lock and unlock switch connector and ground.

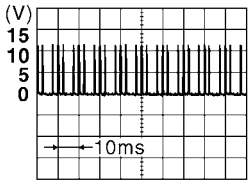
Door lock and unlock switch connector	Terminal	Ground	Continuity
M89	5		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminal			Signal (Reference value)
(+)		(–)	
BCM connector	Terminal		
M65	7	Ground	
	9		

JPMIA0154GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK DOOR LOCK AND UNLOCK SWITCH

Check door lock and unlock switch
Refer to DLK-74, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

Component Inspection

INFOID:0000000001099069

1.CHECK DOOR LOCK AND UNLOCK SWITCH

Check door lock and unlock switch.

Door lock and unlock switch	Terminal		Condition	Continuity
M89	6	5	LOCK	Exists
	1		UNLOCK	

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

cardiagn.com

DOOR LOCK AND UNLOCK SWITCH INDICATOR

Description

INFOID:0000000001102276

The door lock and unlock switch indicates door lock status. The indicator will illuminate when a lock operation is accomplished, and during this status, if any door is opened, the indicator will turn OFF.

Component Function Check

INFOID:0000000001102277

1.CHECK FUNCTION

With CONSULT-III

Check “DOOR LOCK IND” in “Active Test” mode with CONSULT-III.

Test item		Condition
DOOR LOCK IND	:ON	Illuminated
	:OFF	Not illuminated

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Refer to DLK-747, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102278

1.CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between door lock and unlock switch and ground.

Terminal			Condition	Voltage (Approx.)
(+)		(–)		
Door lock and unlock switch connector	Terminal			
M89	4	Ground	Door lock operation is accomplished	Battery voltage
			Any door is OPEN	0

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK DOOR LOCK AND UNLOCK SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and door lock and unlock switch connector.
3. Check continuity between BCM connector and door lock and unlock switch connector.

BCM connector	Terminal	Door lock and unlock switch connector	Terminal	Continuity
M65	24	M89	4	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	24		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK DOOR LOCK AND UNLOCK SWITCH GROUND

Check continuity between door lock and unlock switch connector and ground.

Door lock and unlock switch connector	Terminal	Ground	Continuity
M89	5		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminal			Condition	Voltage (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	24	Ground	Door lock operation is accomplished	Battery voltage
			Any door is OPEN	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5. CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR

Check door lock and unlock switch
Refer to DLK-748, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

Component Inspection

INFOID:0000000001102279

1. CHECK DOOR LOCK AND UNLOCK SWITCH INDICATOR

Check continuity door lock and unlock switch.

Door lock and unlock switch	Terminal		Continuity
	(+)	(-)	
M89	5	4	Exists
	4	5	Does not exist

Is the inspection result normal?

YES >> Door lock and unlock switch is OK.
NO >> Replace door lock and unlock switch. Refer to DLK-280, "Exploded View".

cardiagn.com

DOOR SWITCH
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001099070

Detects door open/closed condition.

DRIVER SIDE : Component Function Check

INFOID:0000000001099071

1.CHECK FUNCTION

With CONSULT-III

Check door switches “DOOR SW-DR” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-DR	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

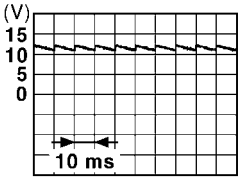
YES >> Door switch is OK.
NO >> Refer to DLK-749, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001099072

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals (+) BCM connector	Terminals (+) Terminal	Terminals (–)	Door condition	Voltage (V) (Approx.)
M65	26	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	26	B34	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	26		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-750, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

DRIVER SIDE : Component Inspection

INFOID:0000000001099073

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001099074

Detects door open/closed condition.

PASSENGER SIDE : Component Function Check

INFOID:0000000001099075

1.CHECK FUNCTION

With CONSULT-III
Check door switches “DOOR SW-AS” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-AS	OPEN	: ON
	CLOSE	: OFF

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Refer to DLK-750, "PASSENGER SIDE : Diagnosis Procedure".

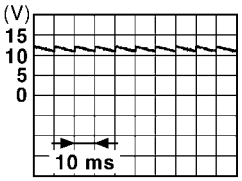
PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001099076

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

cardiagn.com

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	27	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	27	B27	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	27		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-751, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

PASSENGER SIDE : Component Inspection

INFOID:0000000001099077

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR LH

REAR LH : Description

INFOID:0000000001099078

Detects door open/closed condition.

REAR LH : Component Function Check

INFOID:0000000001099079

1.CHECK FUNCTION

With CONSULT-III

Check door switches “DOOR SW-RL” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-RL	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

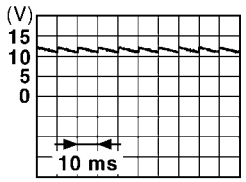
YES >> Door switch is OK.
NO >> Refer to DLK-752, "REAR LH : Diagnosis Procedure".

REAR LH : Diagnosis Procedure

INFOID:0000000001099080

1.CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	25	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	25	B71	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	25		Does not exist

Is the inspection result normal?

cardiagn.com

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3. CHECK DOOR SWITCH

Check door switch.
Refer to DLK-753, "REAR LH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR LH : Component Inspection

INFOID:0000000001099081

1. CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

REAR RH

REAR RH : Description

INFOID:0000000001099082

Detects door open/close condition.

REAR RH : Component Function Check

INFOID:0000000001099083

1. CHECK FUNCTION

With CONSULT-III
Check door switches “DOOR SW-RR” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
DOOR SW-RR	OPEN	:ON
	CLOSE	:OFF

Is the inspection result normal?

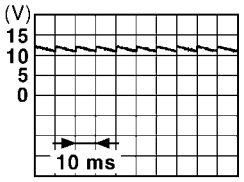
YES >> Door switch is OK.
NO >> Refer to DLK-753, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001099084

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check signal between BCM connector and ground with oscilloscope.

Terminals			Door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	29	Ground	OPEN	0
			CLOSE	

JPMIA0011GB

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and door switch connector.

BCM connector	Terminal	Door switch connector	Terminal	Continuity
M65	29	B53	1	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	29		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and door switch.

3.CHECK DOOR SWITCH

Check door switch.
Refer to DLK-754, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace malfunctioning door switch. Refer to DLK-877, "Exploded View".

REAR RH : Component Inspection

INFOID:0000000001099085

1.CHECK DOOR SWITCH

1. Turn ignition switch OFF.
2. Disconnect door switch connector.
3. Check door switch.

Terminal		Door switch condition	Continuity
Door switch			
1	Ground part of door switch	Pressed	Exists
		Released	Does not exist

Is the inspection result normal?

YES >> Door switch is OK.
NO >> Replace malfunctioning door switch. Refer to DLK-272, "Exploded View".

cardiagn.com

BACK DOOR

BACK DOOR : Description

INFOID:0000000001099086

Detects back door open condition.

BACK DOOR : Component Function Check

INFOID:0000000001099087

1.CHECK FUNCTION

With CONSULT-III

Check “BACK DOOR SW” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
BACK DOOR SW	OPEN	: ON
	CLOSE	: OFF

Is the inspection result normal?

YES >> Back door lock assembly (door switch) is OK.
NO >> Refer to DLK-755, "BACK DOOR : Diagnosis Procedure".

BACK DOOR : Diagnosis Procedure

INFOID:0000000001099088

1.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH) INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector and ground.

Terminals			Back door condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	28	Ground	OPEN	0
			CLOSE	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH) CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector and back door lock assembly (door switch) connector.

BCM connector	Terminal	Back door lock assembly (door switch) connector	Terminal	Continuity
M65	28	D152	4	Exists

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	28		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness between BCM and trunk room lamp switch.

3.CHECK BACK DOOR LOCK ASSEMBLY GROUND CIRCUIT

Check continuity between back door lock assembly connector and ground.

Back door lock assembly (door switch) connector	Terminal	Ground	Continuity
D152	3		Exists

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace back door lock assembly ground circuit.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M65	28	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH)

Check back door lock assembly (door switch).
Refer to DLK-756, "BACK DOOR : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door lock assembly (door switch). Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

BACK DOOR : Component Inspection

INFOID:0000000001099089

1.CHECK BACK DOOR LOCK ASSEMBLY (DOOR SWITCH)

1. Turn ignition switch OFF.
2. Disconnect back door lock assembly (door switch) connector.
3. Check back door lock assembly (door switch).

Terminal		Trunk condition	Continuity
Back door lock assembly (door switch)			
4	3	OPEN	Exists
		CLOSE	Does not exist

Is the inspection result normal?

YES >> Back door lock assembly (door switch) is OK.
NO >> Replace back door lock assembly (door switch). Refer to DLK-873, "DOOR LOCK : Exploded View" and DLK-873, "DOOR LOCK : Removal and Installation".

cardiagn.com

KEY SWITCH

Description

INFOID:0000000001116386

Key switch detects that ignition key is inserted into the key cylinder, and then transmits the signal to BCM.

Component Function Check

INFOID:0000000001116387

1.CHECK KEY SWITCH INPUT SIGNAL

Check key switch (“KEY SW”) in “DATA MONITOR” mode with CONSULT-III. Refer to DLK-62, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Monitor item	Condition	
KEY SW	Insert mechanical key into key cylinder	: ON
	Remove mechanical key from key cylinder	: OFF

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Refer to DLK-757, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116388

1.CHECK KEY SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	36	Ground	Insert ignition key into key cylinder	Battery voltage
			Remove ignition key from key cylinder	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Remove ignition key from key cylinder.
2. Disconnect key switch connector.
3. Check voltage between key switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Key switch connector	Terminal		
M25	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK KEY SWITCH SIGNAL CIRCUIT

1. Check continuity between BCM harness connector and key switch connector.

BCM connector	Terminal	Key switch connector	Terminal	Continuity
M65	36	M25	1	Existed

2. Check continuity between key switch connector and ground.

Key switch connector	Terminal	Ground	Continuity
M25	1	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK KEY SWITCH

Check key switch function.
Refer to DLK-758, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace key switch.

Component Inspection

INFOID:0000000001116389

COMPONENT INSPECTION

1.CHECK KEY SWITCH

Check continuity between key switch terminals.

Terminal		Condition	Continuity
key switch connector			
1	2	Insert ignition key into key cylinder	Existed
		Remove ignition key from key cylinder	Not existed

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Replace key switch.

cardiagn.com

DOOR LOCK ACTUATOR
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001116391

Locks/unlocks the door with the signal from BCM.

DRIVER SIDE : Component Function Check

INFOID:0000000001116392

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK” in Active test mode with CONSULT-III.

Test item		Condition
DOOR LOCK	ALL LOCK	The all door lock actuator are locked
	ALL UNLOCK	The all door lock actuator are unlocked
	DR UNLOCK	The door lock actuator (driver side) is unlocked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-759, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001116393

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	60		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock actuator (driver side) connector.
3. Check continuity between BCM connector and front door lock actuator (driver side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D9	3	Exists
	60		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	60		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

A B C D E F G H I J DLK L M N O P
carsdiagn.com

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-760, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement"

DRIVER SIDE : Component Inspection

INFOID:0000000001116394

1.CHECK FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)

Check the actuator operation by connecting the battery voltage to front door lock actuator (driver side).

Front door lock actuator (driver side)	Terminal		Door lock actuator condition
	(+)	(-)	
D9	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Front door lock actuator (driver side) is OK.
NO >> Replace front door lock actuator (driver side). Refer to DLK-255, "DOOR LOCK : Removal and Installation". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

DRIVER SIDE : Special Repair Requirement

INFOID:0000000001116395

Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001116396

Locks/unlocks the door with the signal from BCM.

PASSENGER SIDE : Component Function Check

INFOID:0000000001116397

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK” in Active test mode with CONSULT-III.

Test item		Condition
DOOR LOCK	:ALL LOCK	The all door lock actuator are locked
	:ALL UNLOCK	The all door lock actuator are unlocked
	:OTHER UNLOCK	The door lock actuator (front passenger side, rear LH and rear RH) are unlocked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-760, "PASSENGER SIDE : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001116398

1.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

cardiagn.com

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock actuator (passenger side) connector.
3. Check continuity between BCM connector and front door lock actuator (passenger side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D48	3	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-761, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation".

PASSENGER SIDE : Component Inspection

INFOID:0000000001116399

1.CHECK FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)

Check the actuator operation by connecting the battery voltage directly to front door lock actuator (passenger side).

Front door lock actuator (passenger side) connector	Terminal		Door lock actuator condition
	(+)	(-)	
D48	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Front door lock actuator (passenger side) is OK.
NO >> Replace front door lock actuator (passenger side). Refer to DLK-761, "PASSENGER SIDE : Component Inspection".

REAR LH

REAR LH : Description

INFOID:0000000001116400

Locks/unlocks the door with the signal from BCM.

REAR LH : Component Function Check

INFOID:0000000001116401

1.CHECK FUNCTION

With CONSULT-III

Check “DOOR LOCK” in Active test mode with CONSULT-III.

Test item		Condition
DOOR LOCK	:ALL LOCK	The all door lock actuator are locked
	:ALL UNLOCK	The all door lock actuator are unlocked
	:OTHER UNLOCK	The door lock actuator (front passenger side, rear LH and rear RH) are unlocked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-762, "REAR LH : Diagnosis Procedure".

REAR LH : Diagnosis Procedure

INFOID:0000000001116402

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (LH) connector.
3. Check continuity between BCM connector and rear door lock actuator (LH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D85	3	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-763, "REAR LH : Component Inspection".

Is the inspection result normal?

cardiagn.com

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-700, "DOOR LOCK : Exploded View" and DLK-700, "DOOR LOCK : Removal and Installation".

REAR LH : Component Inspection

INFOID:0000000001116403

1.CHECK REAR DOOR LOCK ACTUATOR (LH)

Check the actuator operation by connecting the battery voltage directly to rear door lock actuator (LH).

Rear door lock actuator (LH)	Terminal		Door lock actuator condition
	(+)	(-)	
D85	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Rear door lock actuator (LH) is OK.
NO >> Replace rear door lock actuator (LH). Refer to DLK-262, "DOOR LOCK : Removal and Installation".

REAR RH

REAR RH : Description

INFOID:0000000001116404

Locks/unlocks the door with the signal from BCM.

REAR RH : Component Function Check

INFOID:0000000001116405

1.CHECK FUNCTION

With CONSULT-III
Check “DOOR LOCK” in Active test mode with CONSULT-III.

Test item		Condition
DOOR LOCK	:ALL LOCK	The all door lock actuator are locked
	:ALL UNLOCK	The all door lock actuator are unlocked
	:OTHER UNLOCK	The door lock actuator (front passenger side, rear LH and rear RH) are unlocked

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-763, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001116406

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of door lock and unlock switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	56	Ground	Lock	0 → Battery voltage → 0
	54		Unlock	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (RH) connector.

3. Check continuity between BCM connector and rear door lock actuator (RH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	56	D105	3	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	56		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK DOOR LOCK ACTUATOR

Check door lock actuator.
Refer to DLK-764, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH : Component Inspection

INFOID:0000000001116407

1.CHECK REAR DOOR LOCK ACTUATOR (RH)

Check the actuator operation by connecting the battery voltage directly to rear door lock actuator (RH).

Rear door lock actuator (RH)	Terminal		Door lock actuator condition
	(+)	(-)	
D105	3	2	LOCK
	2	3	UNLOCK

Is the inspection result normal?

YES >> Rear door lock actuator (RH) is OK.
NO >> Replace rear door lock actuator (RH). Refer to DLK-255, "DOOR LOCK : Removal and Installation".

cardiagn.com

SUPER LOCK ACTUATOR
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000001102147

The super lock system is controlled by BCM.

DRIVER SIDE : Component Function Check

INFOID:0000000001102148

1.CHECK FUNCTION

With CONSULT-III
Check “SUPER LOCK” in Active test mode with CONSULT-III.

Test item		Condition
SUPER LOCK	:LOCK (SET)	The super lock actuator is locked (SET)
	:UNLOCK (RELEASE)	The super lock actuator is unlocked (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Refer to DLK-367, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000001102149

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	60	Ground	UNLOCK (RELEASE)	0 → Battery voltage → 0
	59		LOCK (SET)	

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SUPER LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock actuator (driver side) connector.
3. Check continuity between BCM connector and front door lock actuator (driver side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	59	D29	1	Exists
	60		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	59		Does not exist
	60		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK SUPER LOCK ACTUATOR

Check super lock actuator.
Refer to DLK-368, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

DRIVER SIDE : Component Inspection

INFOID:0000000001102150

1.CHECK SUPER LOCK ACTUATOR

Check the actuator operation by connecting the battery voltage to super lock actuator.

Door lock actuator (super lock actuator) connector	Terminal		Actuator condition
	(+)	(-)	
D29	1	2	LOCK (SET)
	2	1	UNLOCK (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Replace door lock actuator (super lock actuator). Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation". After that, Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

DRIVER SIDE : Special Repair Requirement

INFOID:0000000001102151

Perform initialization procedure. Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000001102152

The super lock system is controlled by BCM.

PASSENGER SIDE : Component Function Check

INFOID:0000000001102153

1.CHECK FUNCTION

With CONSULT-III
Check “SUPER LOCK” in Active test mode with CONSULT-III.

Test item		Condition
SUPER LOCK	:LOCK (SET)	The super lock actuator is locked (SET)
	:UNLOCK (RELEASE)	The super lock actuator is unlocked (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Refer to DLK-766, "PASSENGER SIDE : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000001102154

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

cardiagn.com

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	54	Ground	UNLOCK (RELEASE)	0 → Battery voltage → 0
	59		LOCK (SET)	

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SUPER LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock actuator (passenger side) connector.
3. Check continuity between BCM connector and front door lock actuator (passenger side) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	59	D68	1	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	59		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK SUPER LOCK ACTUATOR

Check super lock actuator.
Refer to DLK-767, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

PASSENGER SIDE : Component Inspection

INFOID:0000000001102155

1.CHECK SUPER LOCK ACTUATOR

Check the actuator operation by connecting the battery voltage to super lock actuator.

Door lock actuator (super lock actuator) connector	Terminal		Actuator condition
	(+)	(-)	
D68	1	2	LOCK (SET)
	2	1	UNLOCK (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Replace door lock actuator (super lock actuator). Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation".

REAR LH

REAR LH : Description

INFOID:0000000001102156

The super lock system is controlled by BCM.

REAR LH : Component Function Check

INFOID:0000000001102157

1.CHECK FUNCTION

With CONSULT-III

Check “SUPER LOCK” in Active test mode with CONSULT-III.

Test item		Condition
SUPER LOCK	:LOCK (SET)	The super lock actuator is locked (SET)
	:UNLOCK (RELEASE)	The super lock actuator is unlocked (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Refer to DLK-768, "REAR LH : Diagnosis Procedure".

REAR LH : Diagnosis Procedure

INFOID:0000000001102158

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	54	Ground	UNLOCK (RELEASE)	0 → Battery voltage → 0
	59		LOCK (SET)	

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SUPER LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (LH) connector.
3. Check continuity between BCM connector and rear door lock actuator (LH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	59	D115	1	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	59		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK SUPER LOCK ACTUATOR

Check super lock actuator.
Refer to DLK-768, "REAR LH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR LH : Component Inspection

INFOID:0000000001102159

cardiagn.com

1.CHECK SUPER LOCK ACTUATOR

Check the actuator operation by connecting the battery voltage to super lock actuator.

Door lock actuator (super lock actuator) connector	Terminal		Actuator condition
	(+)	(-)	
D115	1	2	LOCK (SET)
	2	1	UNLOCK (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Replace door lock actuator (super lock actuator). Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH

REAR RH : Description

INFOID:0000000001102160

The super lock system is controlled by BCM.

REAR RH : Component Function Check

INFOID:0000000001102161

1.CHECK FUNCTION

With CONSULT-III
Check “SUPER LOCK” in Active test mode with CONSULT-III.

Test item		Condition
SUPER LOCK	:LOCK (SET)	The super lock actuator is locked (SET)
	:UNLOCK (RELEASE)	The super lock actuator is unlocked (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Refer to DLK-769, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000001102162

1.CHECK OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M67	54	Ground	UNLOCK (RELEASE)	0 → Battery voltage → 0
	59		LOCK (SET)	

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SUPER LOCK ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door lock actuator (RH) connector.
3. Check continuity between BCM connector and rear door lock actuator (RH) connector.

BCM connector	Terminal	Door lock actuator connector	Terminal	Continuity
M67	59	D95	1	Exists
	54		2	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	59		Does not exist
	54		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK SUPER LOCK ACTUATOR

Check super lock actuator.
Refer to DLK-770, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace door lock actuator. Refer to DLK-255, "DOOR LOCK : Removal and Installation".

REAR RH : Component Inspection

INFOID:0000000001102163

1.CHECK SUPER LOCK ACTUATOR

Check the actuator operate by connecting the battery voltage to super lock actuator.

Door lock actuator (super lock actuator) connector	Terminal		Actuator condition
	(+)	(-)	
D95	1	2	LOCK (SET)
	2	1	UNLOCK (RELEASE)

Is the inspection result normal?

YES >> Door lock actuator (super lock actuator) is OK.
NO >> Replace door lock actuator (super lock actuator). Refer to DLK-255, "DOOR LOCK : Exploded View" and DLK-255, "DOOR LOCK : Removal and Installation".

cardiagn.com

BACK DOOR OPENER ACTUATOR

Description

INFOID:0000000001099114

Opens the back door with the signal from BCM.

Component Function Check

INFOID:0000000001099115

1.CHECK FUNCTION

With CONSULT-III

Check “TRUNK/GLASS HATCH” in Active test mode with CONSULT-III.

Test item		Condition
TRUNK/GLASS HATCH	:OPEN	Back door lock opener actuator operation

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-771, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099116

1.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of back door opener switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M66	45	Ground	Pressed	0 → Battery voltage → 0

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK BACK DOOR LOCK ASSEMBLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and back door lock assembly connector.
3. Check continuity between BCM connector and back door lock assembly connector.

BCM connector	Terminal	Back door lock assembly connector	Terminal	Continuity
M66	45	D152	2	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M66	45		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK BACK DOOR LOCK ASSEMBLY GROUND CIRCUIT

Check continuity between back door lock assembly connector and ground.

Back door lock assembly connector	Terminal	Ground	Continuity
D152	1		Exists

Is the inspection result normal?

A B C D E F G H I J DLK L M N O P
c-diagn.com

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK BACK DOOR LOCK ASSEMBLY

Check back door lock assembly connector and ground.
Refer to DLK-772, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door lock assembly. Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

Component Inspection

INFOID:0000000001099117

1. CHECK BACK DOOR LOCK ASSEMBLY

Check the actuator operation by connecting battery voltage to back door lock assembly.

Back door lock assembly connector	Terminal		Back door actuator condition
D152	(+)	(-)	OPEN
	2	1	

Is the inspection result normal?

YES >> Back door lock assembly (back door lock actuator) is OK.
NO >> Replace back door lock assembly (back door lock actuator). Refer to DLK-268, "DOOR LOCK : Exploded View" and DLK-268, "DOOR LOCK : Removal and Installation".

cardiagn.com

BACK DOOR OPENER SWITCH

Description

INFOID:0000000001115838

Sends the back door opening signal to BCM.

Component Function Check

INFOID:0000000001115839

1.CHECK FUNCTION

With CONSULT-III

Check “TRNK OPNR SW” in “Data Monitor” mode with CONSULT-III.

Monitor item	Condition	
TRNK OPNR SW	Back door opener switch is pressed	:ON
	Back door opener switch is released	:OFF

Is the inspection result normal?

YES >> Door lock actuator is OK.
NO >> Refer to DLK-773, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115840

1.CHECK BCM INPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Condition of back door opener switch	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	12	Ground	Pressed	0
			Released	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK BACK DOOR OPENER SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and back door opener switch connector.
3. Check continuity between BCM connector and back door opener switch connector.

BCM connector	Terminal	Back door opener switch connector	Terminal	Continuity
M65	12	D186	1	Exists

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M65	12		Does not exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M65	12	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

4.CHECK BACK DOOR OPENER SWITCH GROUND CIRCUIT

Check continuity between back door opener switch connector and ground.

Back door opener switch connector	Terminal	Ground	Continuity
D186	2		Exists

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK BACK DOOR OPENER SWITCH

Check back door opener switch.
Refer to DLK-774, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace back door opener switch. Refer to DLK-279, "Exploded View".

Component Inspection

INFOID:0000000001115841

1.CHECK BACK DOOR OPENER SWITCH

Check back door opener switch.

Back door opener switch connector	Terminal		Back door opener switch condition	Continuity
D186	1	2	Pressed	Exists
			Released	Does not exist

Is the inspection result normal?

YES >> Back door opener switch is OK.
NO >> Replace back door opener switch. Refer to DLK-279, "Exploded View".

cardiagn.com

BUZZER (COMBINATION METER)

Description

INFOID:0000000001116451

Performs operation method guide and warning with buzzer.

Component Function Check

INFOID:0000000001116452

1.CHECK FUNCTION

With CONSULT-III

1. Check the operation with “WARNING BUZZER” in the Active Test.
2. Touch “KEY REMINDER WARN” on screen.

Is the inspection result normal?

Yes >> Warning buzzer into combination meter is OK.
No >> Refer to DLK-775, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116453

1.CHECK METER BUZZER CIRCUIT

Refer to WCS-20, "Component Function Check".

Is the inspection result normal?

Yes >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
No >> Repair or replace meter buzzer circuit.

HAZARD WARNING LAMPS

Description

INFOID:0000000001115760

Perform answer-back for each operation with number of blinks.

Component Function Check

INFOID:0000000001115761

1.CHECK FUNCTION

With CONSULT-III

Check hazard warning lamp “FLASHER” in Active test.

Is the inspection result normal?

YES >> Hazard warning lamp circuit is OK.
NO >> Refer to DLK-776, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115762

1.CHECK HAZARD SWITCH CIRCUIT

Check hazard switch circuit.
Refer to EXL-72, "Component Function Check".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace hazard warning switch circuit.

cardiagn.com

VEHICLE SPEED SIGNAL CIRCUIT

Description

INFOID:0000000001115763

Display the vehicle speed signal received from combination meter by numerical value (km/h).

Component Function Check

INFOID:0000000001115764

1.CHECK FUNCTION

Check the vehicle speed more than 12km/h (7MPH), all doors are automatically locked.

Is the inspection result normal?

YES >> Vehicle speed signal circuit is OK.
NO >> Refer to DLK-778, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115765

1.CHECK VEHICLE SPEED SIGNAL CIRCUIT

Check vehicle speed signal “VEHICLE SPEED” in Data monitor.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace hazard warning switch circuit.

KEYFOB BATTERY

Description

INFOID:0000000001102464

Remote door lock and unlock control entry function available when operating on button.
- Door lock and unlock

Component Function Check

INFOID:0000000001102465

1.CHECK KEYFOB FUNCTION

Does door lock and unlock operate with operating keyfob switch?

Is the inspection result normal?

YES >> Keyfob is OK.
NO >> Refer to DLK-778, "Diagnosis Procedure".

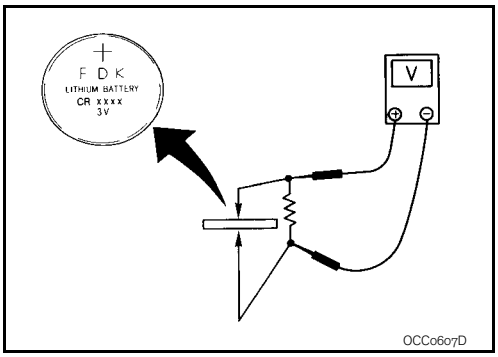
Diagnosis Procedure

INFOID:0000000001102466

1.CHECK KEYFOB BATTERY

Check by connecting a resistance (approximately 300Ω) so that the current value becomes about 10 mA.

Standard : Approx. 2.5 - 3.0V



Is the measurement value within the specification?

YES >> Replace keyfob.
NO >> Replace keyfob battery. Refer to DLK-879, "Exploded View".

cardiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001097501

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

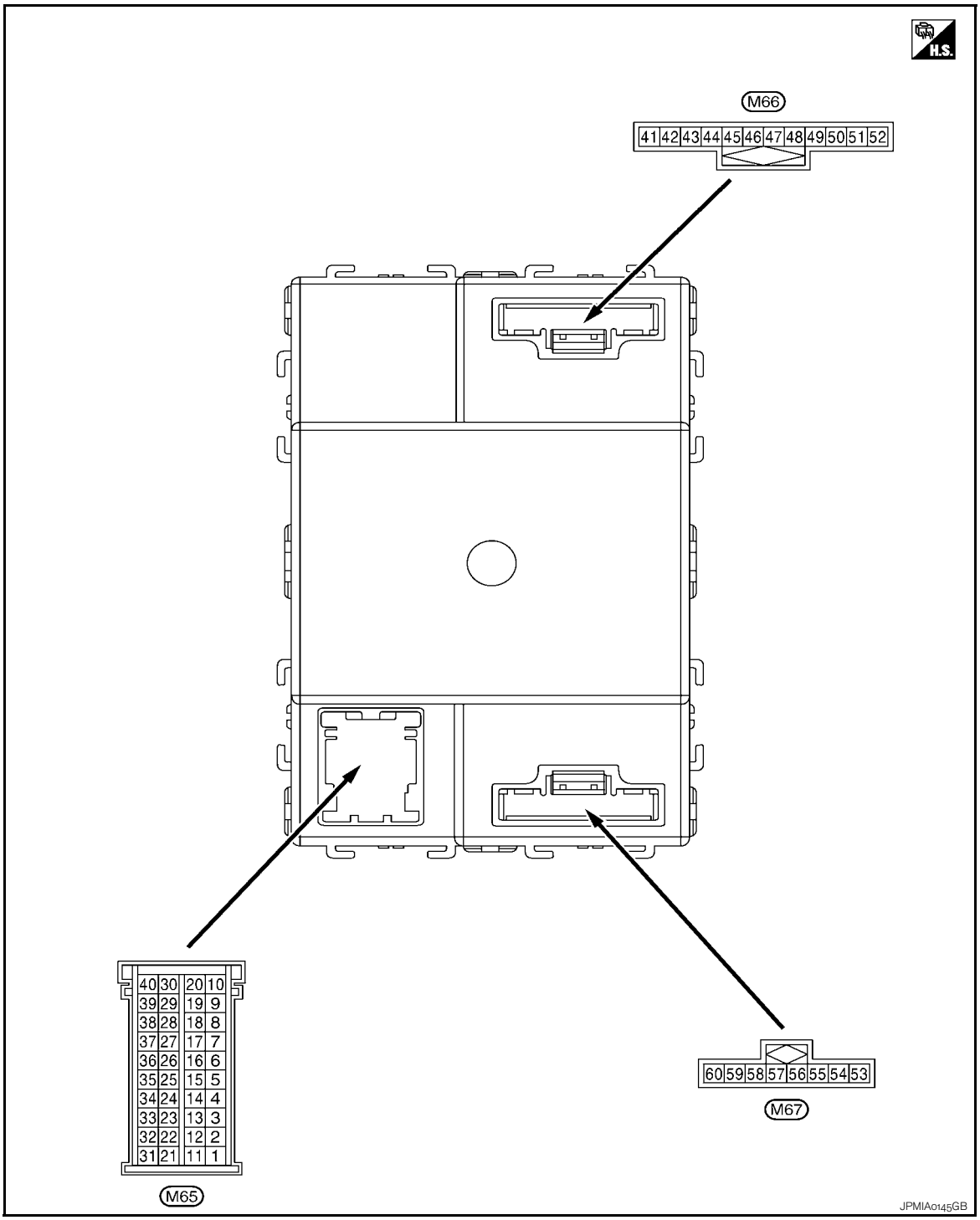
cardiagn.com

Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

cardiagn.com

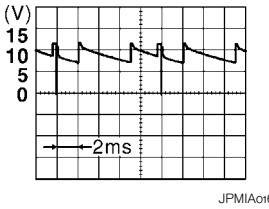
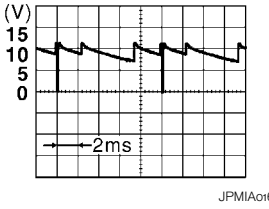
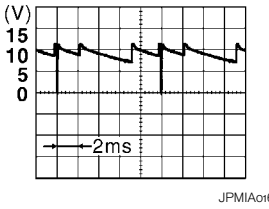
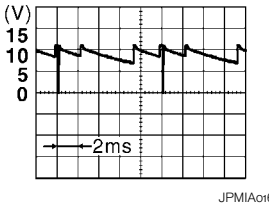
TERMINAL LAYOUT



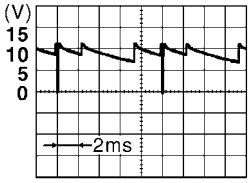
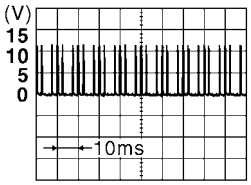
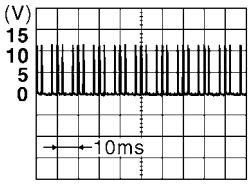
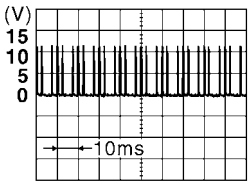
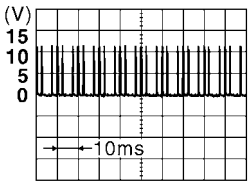
PHYSICAL VALUES

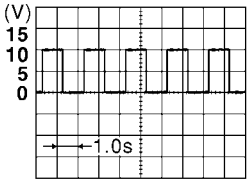
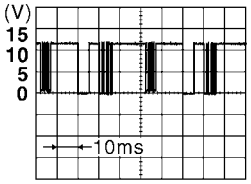
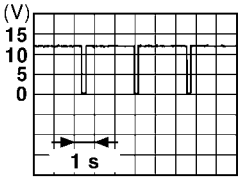
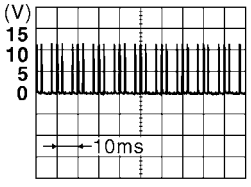
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

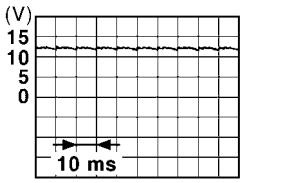
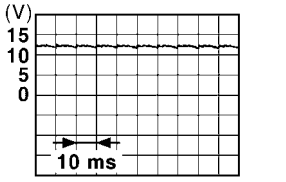
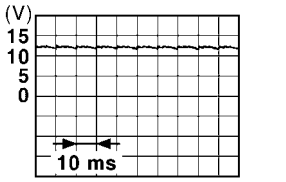
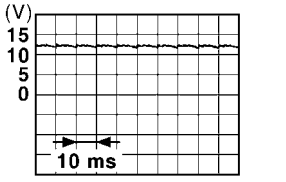
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

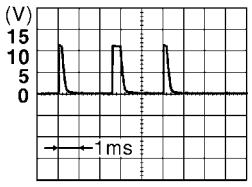
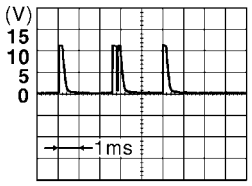
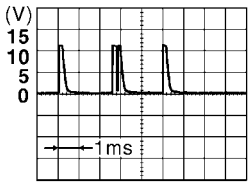
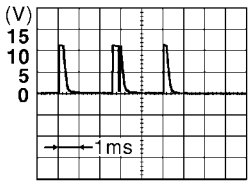
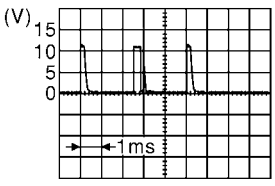
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

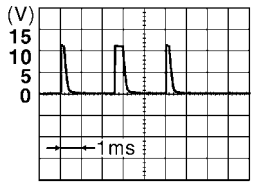
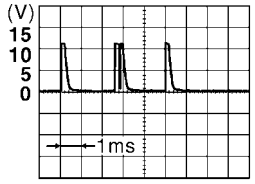
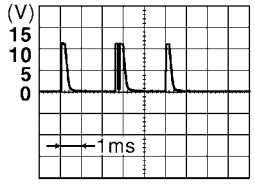
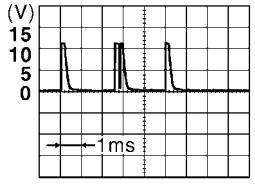
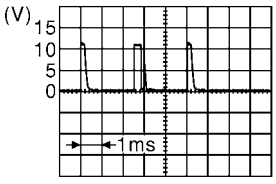
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

cardiagn.com

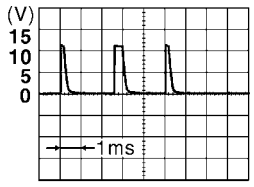
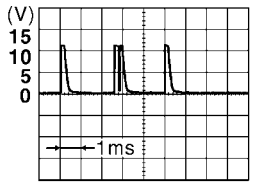
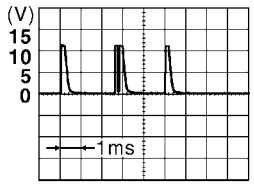
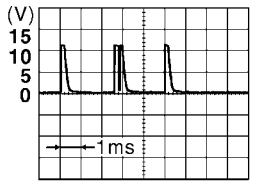
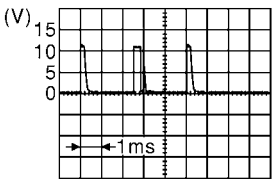
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIDo924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIDo924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIDo924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIDo924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

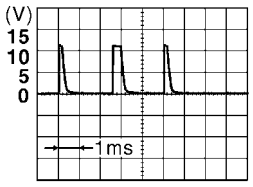
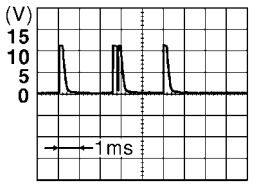
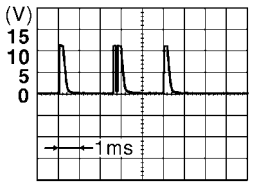
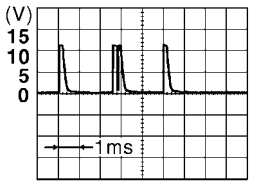
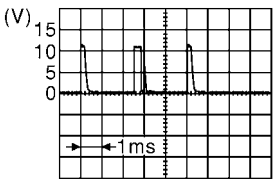
cardiagn.com

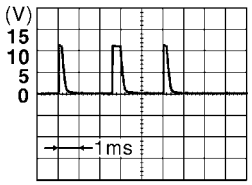
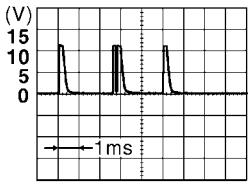
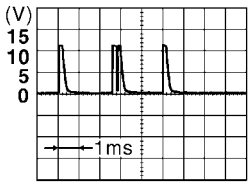
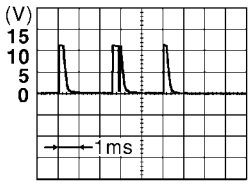
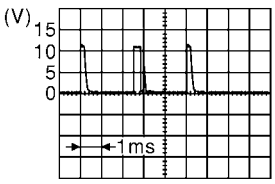
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

carsdiagn.com

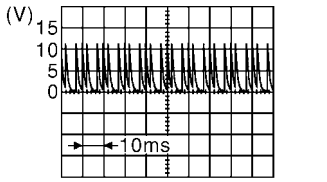
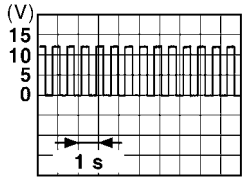
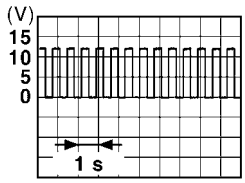
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

*1: With Intelligent Key system

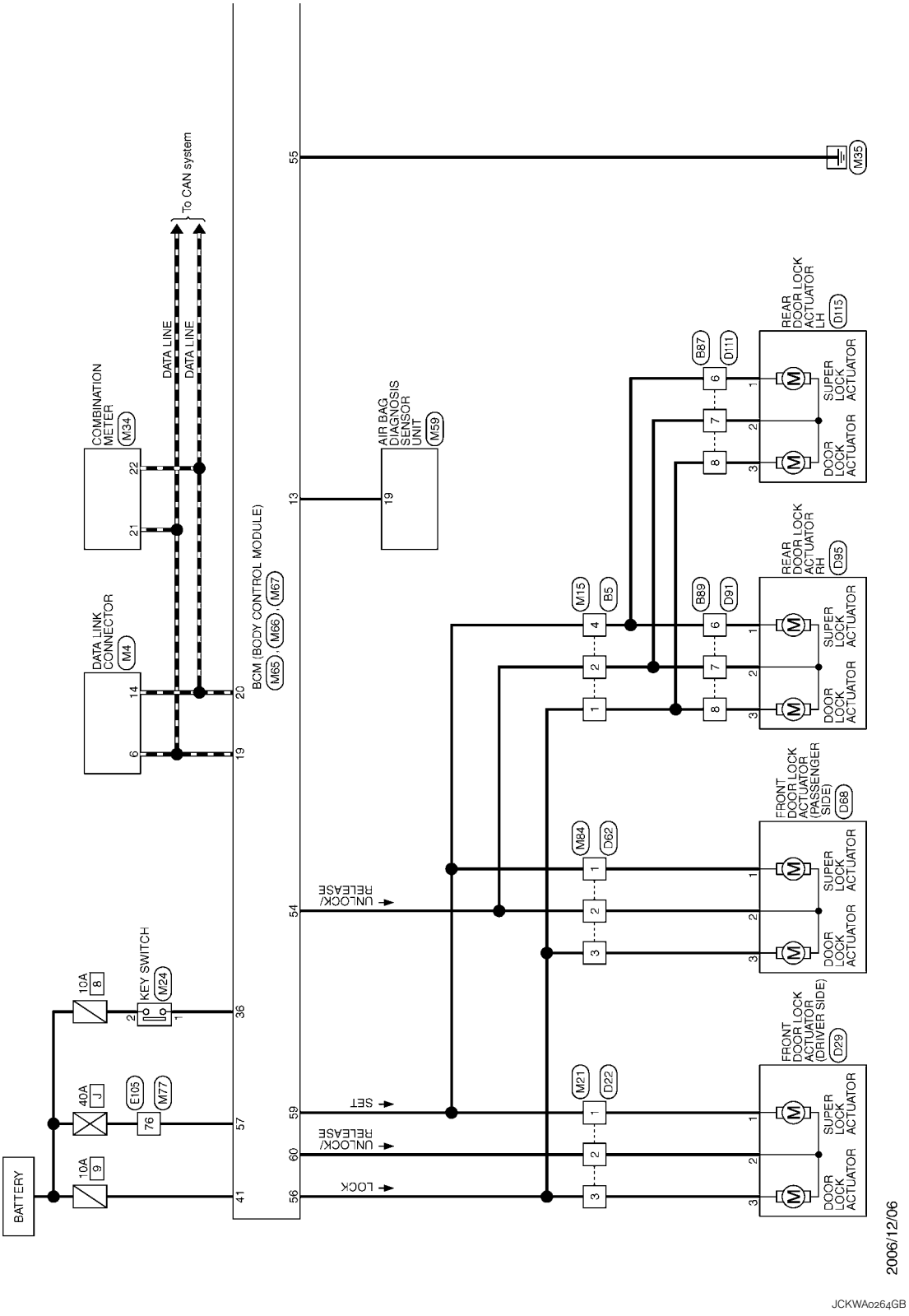
*2: Without Intelligent Key system

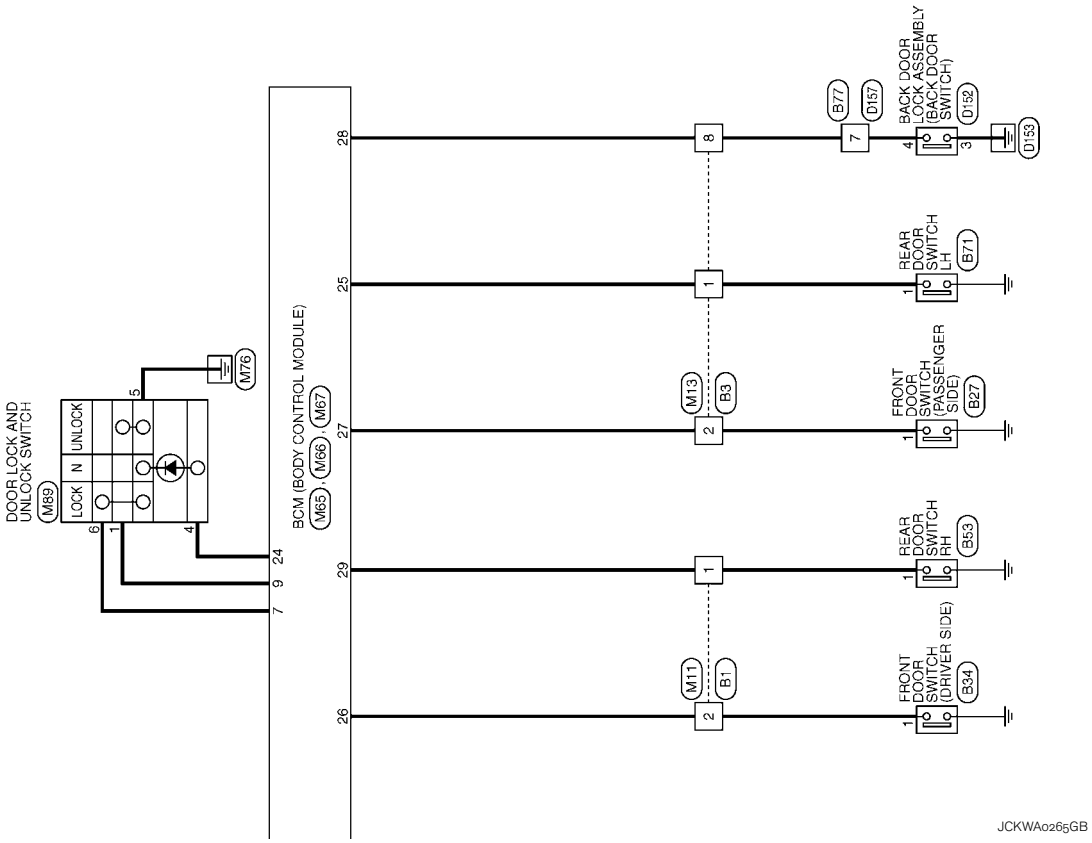
Wiring Diagram - SUPER LOCK CONTROL SYSTEM -

INFOID:0000000001125440

cardiagn.com

SUPER LOCK SYSTEM (WITHOUT INTELLIGENT KEY)





cardiagn.com

SUPER LOCK SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	- [RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	- [RHD models]
8	G	-

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

1	2	3
4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-
4	BR	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

4	3	2	1
8	7	6	5

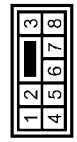
Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

JCKWA0266GB

SUPER LOCK SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

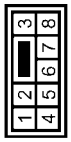
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	–
7	O	–
8	SB	–

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

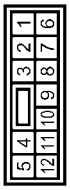
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	–
7	O	–
8	SB	–

Connector No.	D22
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	O	–
3	SB	–

Connector No.	D29
Connector Name	FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	O	–
3	SB	–

Connector No.	D62
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	O	–
3	SB	–[Without Intelligent Key]

Connector No.	D68
Connector Name	FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	O	–
3	SB	–[Without Intelligent Key]

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	–
7	O	–
8	SB	–

Connector No.	D95
Connector Name	REAR DOOR LOCK ACTUATOR RH
Connector Type	FEA04FB-FHA2

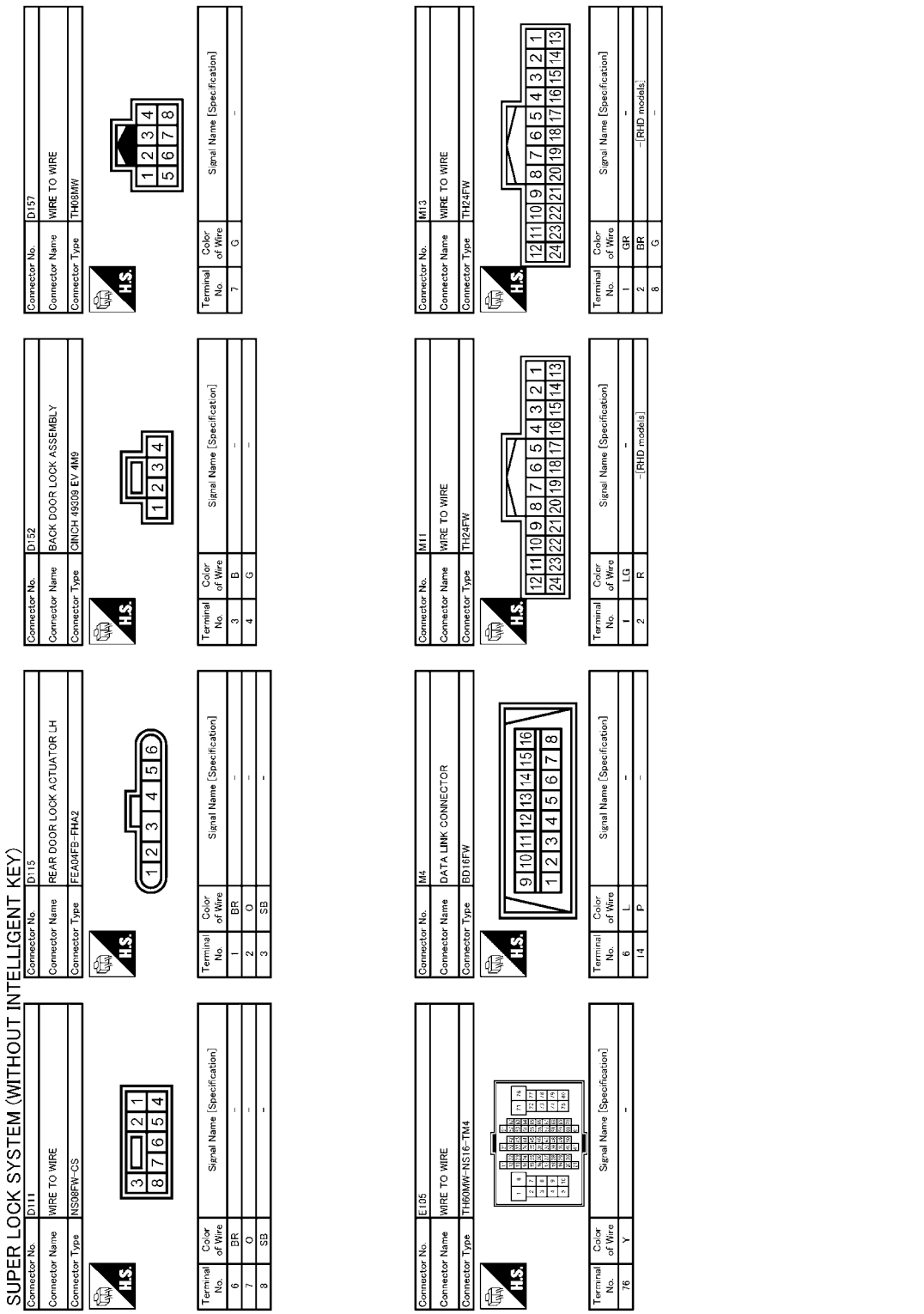
H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	O	–
3	SB	–

JCKWA0267GB

cardiagn.com

SUPER LOCK SYSTEM (WITHOUT INTELLIGENT KEY)



JCKWA0268GB

carsdiagn.com

SUPER LOCK SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-
4	BR	-

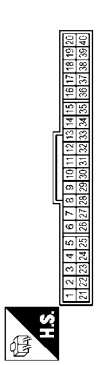
Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	GR	-
3	SB	-

Connector No.	M24
Connector Name	KEY SWITCH
Connector Type	A02MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	V	-

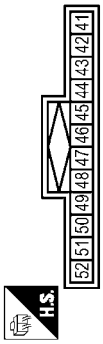
Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

36	V	KEY SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

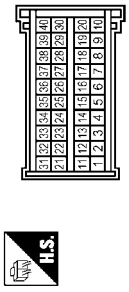


Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

Terminal No.	Color of Wire	Signal Name [Specification]
19	R	UNLOCK

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AABA40FB



Terminal No.	Color of Wire	Signal Name [Specification]
7	P	LOCK/UNLOCK SW (LOCK)
9	BR	LOCK/UNLOCK SW (UNLOCK)
13	R	SHOCK DETECT SIG
19	L	CAN-H
20	P	CAN-L
24	GR	DOOR LOCK STATUS IND
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)

JCKWA026gGB

cardiagn.com

SUPER LOCK SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

H.S.

60 59 58 57 56 55 54 53

Terminal No.	Color of Wire	Signal Name [Specification]
54	O	DOOR UNLOCK OUTPUT (OTHER)
55	B	GND(POWER)
56	SB	DOOR LOCK OUTPUT (ALL) [Without Intelligent Key]
57	Y	BAT(F/L)
59	BR	SUPER LOCK SET OUTPUT
60	GR	UNLOCK (DR)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH160FW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M84
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.

1 2 3 4 5
6 7 8 9 10 11 12

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	O	-
3	SB	-[Without Intelligent Key]

Connector No.	M89
Connector Name	DOOR LOCK AND UNLOCK SWITCH
Connector Type	77003197674

H.S.

3 2 1
6 5 4

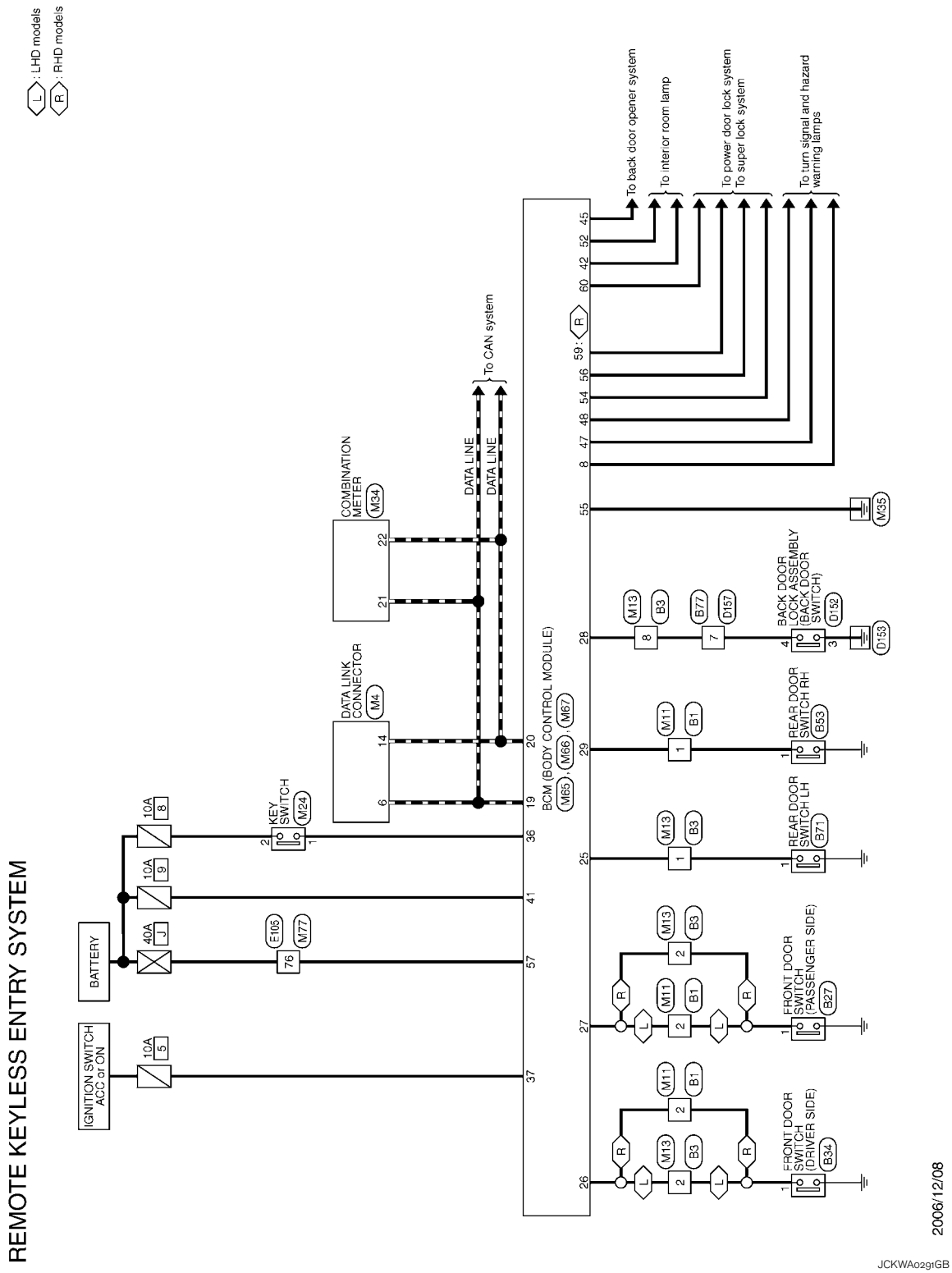
Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
4	GR	-
5	B	-
6	P	-

JCKWA0270GB

carsdiagn.com

Wiring Diagram - REMOTE KEYLESS ENTRY CONTROL SYSTEM -

INFOID:0000000001125435



cardiagn.com

REMOTE KEYLESS ENTRY SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]
2	R/W	–[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	R/W	–[LHD models]
2	BR	–[RHD models]
8	G	–

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	–
4	G	–

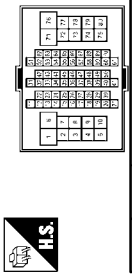
JCKWA0292GB

REMOTE KEYLESS ENTRY SYSTEM

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

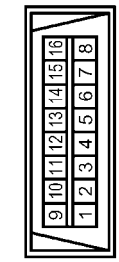
Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



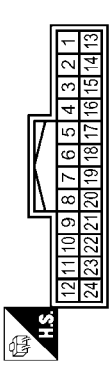
Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]
2	R	–[RHD models]

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	R	–[LHD models]
2	BR	–[RHD models]
8	G	–

Connector No.	M24
Connector Name	KEY SWITCH
Connector Type	A02NW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

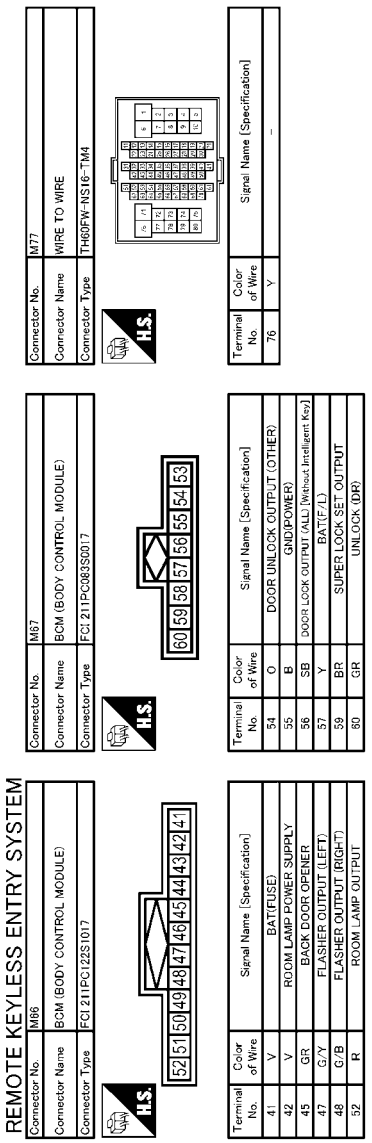
Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
8	LG	HAZARD SW
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)
36	V	KEY SW
37	R	ACC SW

JCKWA0293GB

cardiagn.com

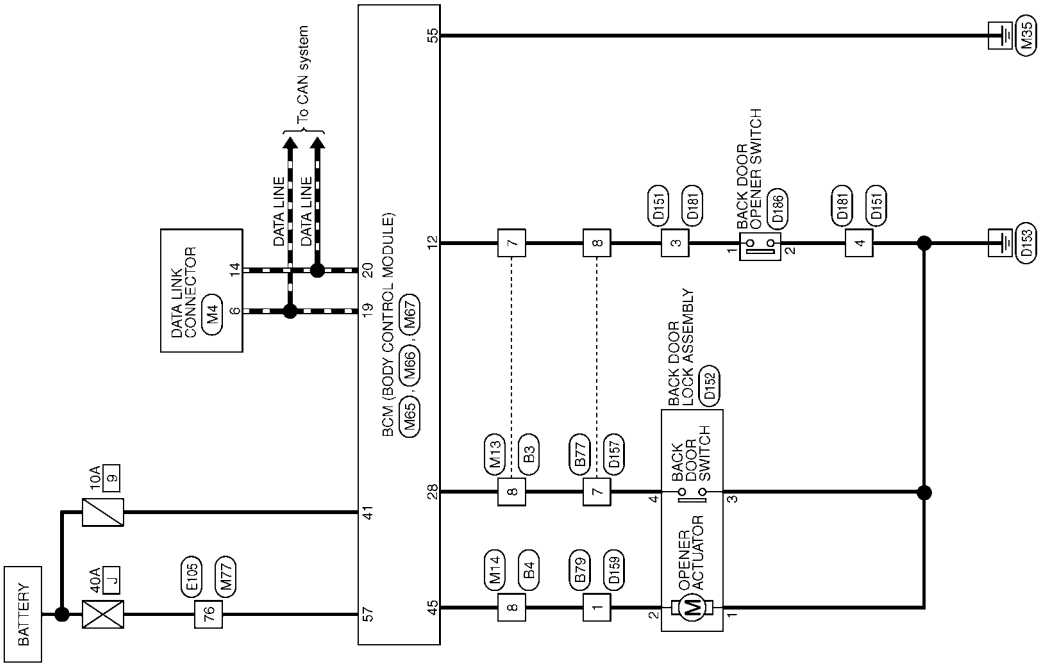


JCKWA0294GB

Wiring Diagram - BACK DOOR OPENER CONTROL SYSTEM -

INFOID:0000000001125433

BACK DOOR OPENER SYSTEM



2006/12/08

JCKWA0295GB

cardiagn.com

BACK DOOR OPENER SYSTEM

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
7	P	-
8	G	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	B79
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	-
4	B	-

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-
8	P	-

Connector No.	D159
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

JCKWA0296GB

BACK DOOR OPENER SYSTEM

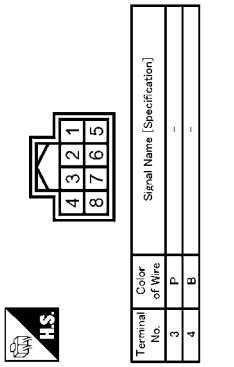
Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	P	–
4	B	–

Connector No.	D186
Connector Name	BACK DOOR OPENER SWITCH
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	B	–

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

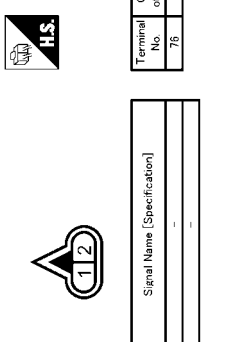


Terminal No.	Color of Wire	Signal Name [Specification]
7	P	–
8	G	–

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

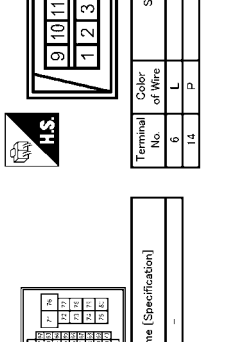
Terminal No.	Color of Wire	Signal Name [Specification]
8	GR	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

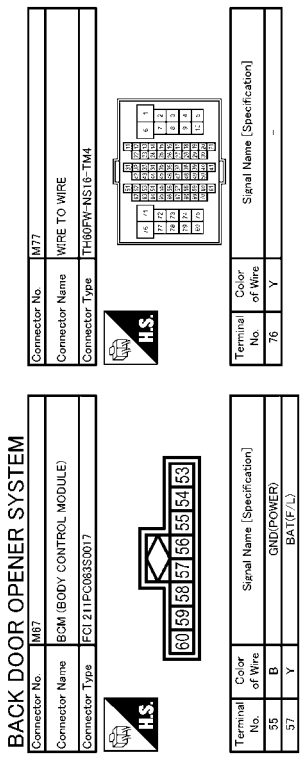
Terminal No.	Color of Wire	Signal Name [Specification]
12	P	TRUNK/BACK DOOR OPEN SW
19	L	CAN-H
20	P	CAN-L
28	G	DOOR SW (BACK)

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
45	GR	BACK DOOR OPENER

JCKWA0297GB

cardiagn.com



JCKWA0298GB

Fail Safe

INFOID:0000000001097503

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001097504

cardiagn.com

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001097505

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

carsdiagn.com

SYMPTOM DIAGNOSIS

DOOR LOCK FUNCTION SYMPTOMS

DOOR LOCK AND UNLOCK SWITCH

DOOR LOCK AND UNLOCK SWITCH : Symptom Table

INFOID:0000000001094360

DOOR LOCK AND UNLOCK SWITCH OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-713, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Except driver side, doors are closed.
- Doors are not locked by keyfob.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
Door lock and unlock function does not operate with door lock and unlock switch.	1. Check BCM power supply and ground circuit.		DLK-744
	2. Check door lock and unlock switch.		DLK-745
	3. Check door switch.	Passenger side	DLK-750
		Rear LH	DLK-752
		Rear RH	DLK-753
		Back door	DLK-755
	4. Check intermittent incident.		GI-39
Specific door lock actuator does not operate.	1. Check door lock actuator.	Driver side	DLK-759
		Passenger side	DLK-760
		Rear LH	DLK-762
		Rear RH	DLK-763
	2. Check intermittent incident.		GI-39

KEYFOB

KEYFOB : Symptom Table

INFOID:0000000001094362

KEYFOB OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-713, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of Vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Mechanical key is removed from ignition key cylinder.
- Door lock and unlock operation is normal.

Symptom Table

cardiagn.com

Symptom	Diagnosis/service procedure	Reference page
All of the keyfob operations do not operate.	1. Check keyfob battery inspection.	DLK-778
	2. Check intermittent incident.	GI-39
Anti-hijack operation does not operate.	1. Check “SECURITY DOOR LOCK SET” setting in “WORK SUPPORT”.	DLK-740
	2. Check Intermittent Incident.	GI-39

AUTO DOOR LOCK

AUTO DOOR LOCK : Symptom Table

INFOID:0000000001094364

AUTO DOOR LOCK OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-713, "Work Flow".
- Understand the operation when does it work, refer to DLK-723, "AUTO DOOR LOCK : System Description".
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- “SECURITY DOOR LOCK SET” is ON when setting on CONSULT-III.
- Door lock and unlock function is normal.

Symptom Table

Symptom	Diagnosis/service procedure		Reference page
Auto door lock operation does not operate.	1. Check “SECURITY DOOR LOCK SET” setting in “WORK SUPPORT”.		DLK-740
	2. Check door switch.	Driver side	DLK-749
		Passenger side	DLK-750
		Rear LH	DLK-752
		Rear RH	DLK-753
		Back door	DLK-755
	3. Check key switch.		DLK-757
	4. Check Intermittent Incident.		GI-39

VEHICLE SPEED SENSING AUTO DOOR LOCK

VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table

INFOID:0000000001094366

VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-713, "Work Flow".
- Understand the operation when does it work, refer to DLK-725, "VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description".
- Check that vehicle is under the condition shown in “Conditions of Vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock and unlock switch operation is normal.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Vehicle speed sensing auto door lock operation does not operate.	1. Check vehicle speed signal.	DLK-777
	2. Check Intermittent Incident.	GI-39

cardiagn.com

BACK DOOR OPEN FUNCTION SYMPTOMS
BACK DOOR OPENER SWITCH
BACK DOOR OPENER SWITCH : Symptom Table

INFOID:0000000001094368

BACK DOOR OPENER FUNCTION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-713, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of Vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock function is normal.
- Vehicle speed is less than 5 km/h (3MPH).
- All doors are unlocked.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Back door opener function does not operate by back door opener switch.	1. Check back door opener switch.	DLK-755
	2. Check vehicle speed signal.	DLK-777
	3. Check back door opener actuator.	DLK-771
	4. Check Intermittent Incident.	GI-39

carsdiagn.com

WARNING FUNCTION SYMPTOMS
BACK DOOR

BACK DOOR : Symptom Table

INFOID:0000000001094374

BACK DOOR OPEN WARNING OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-713, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of Vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Door lock function and back door opener function is normal.

Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Back door open warning does not operate properly.	1. Check back door opener switch.	DLK-773
	2. Check intermittent incident.	GI-39

cardiagn.com

HAZARD REMINDER FUNCTION
HAZARD WARNING LAMP
HAZARD WARNING LAMP : Symptom Table

INFOID:0000000001094375

HAZARD REMINDER OPERATION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Work Flow”. Refer to DLK-713, "Work Flow".
- Check that vehicle is under the condition shown in “Conditions of Vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- “HAZARD LAMP SET” is ON when setting on CONSULT-III.
- Door lock function is normal.

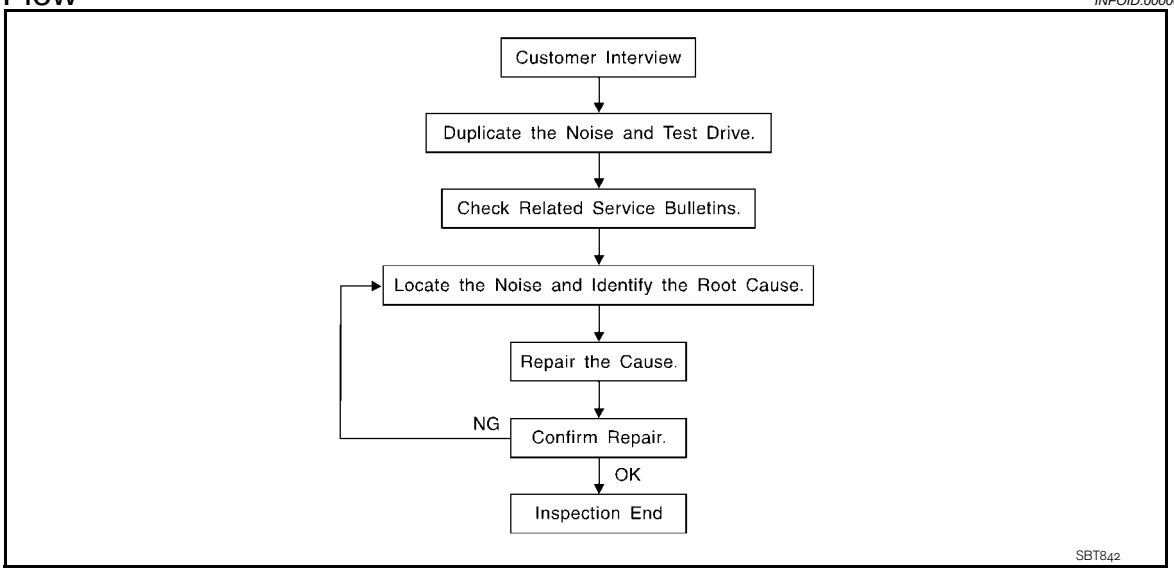
Symptom Table

Symptom	Diagnosis/service procedure	Reference page
Buzzer reminder operation dose not operate properly.	1. Check setting of “HAZARD LAMP SET” with CONSULT-III.	DLK-740
	2. Check intermittent incident.	GI-39

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000001098124



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to DLK-216, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

cardiagn.com

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to DLK-214, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.
- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

carsdiagn.com

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001098125

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

cardiagn.com

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.

Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.

Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

g-diagn.com

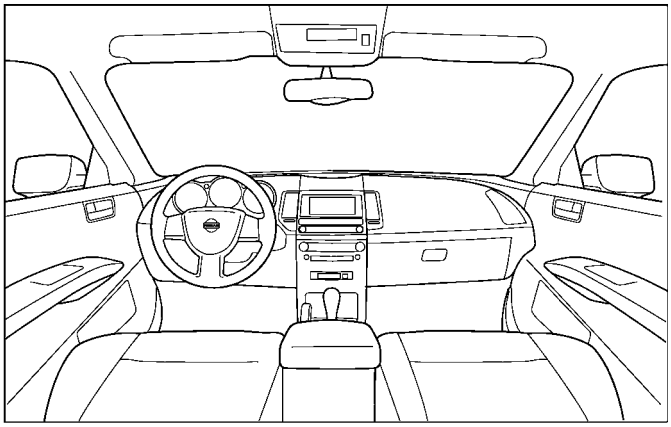
Diagnostic Worksheet

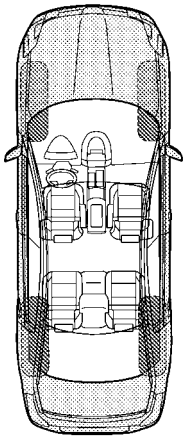
INFOID:0000000001098126

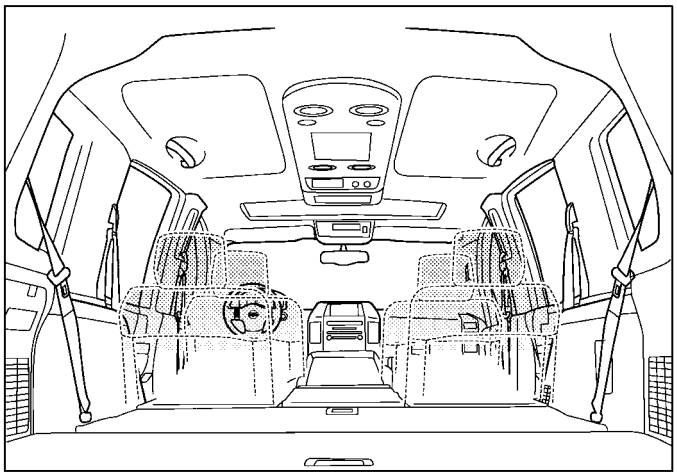
SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

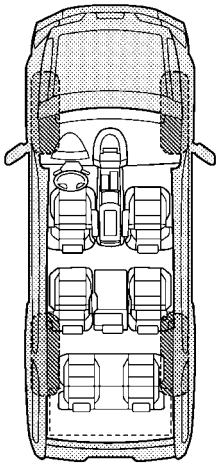
Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.









Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

cardiagn.com

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

PRECAUTION

PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001088378

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

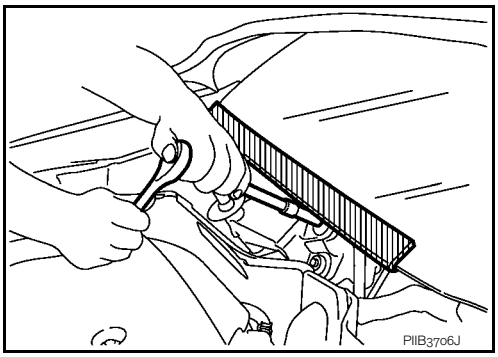
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Procedure without Cowl Top Cover

INFOID:0000000001088379

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Steering Wheel Rotation after Battery Disconnect

INFOID:0000000001088380

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

This vehicle is equipped with a push-button ignition switch and a steering lock unit.
If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the battery disconnected or discharged, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Carry the Intelligent Key or insert it to the key slot and turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)

cardiagn.com

3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

Work

INFOID:0000000001088381

- After removing and installing the opening/closing parts, be sure to carry out fitting adjustments to check their operational.
- Check the lubrication level, damage, and wear of each part. If necessary, grease or replace it.

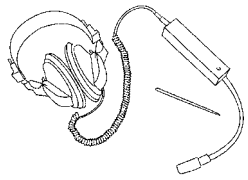
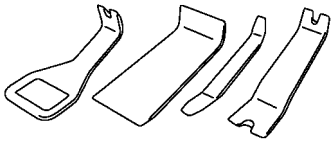
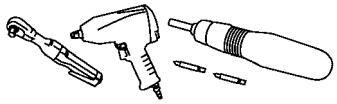
carsdiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000001116411

Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Remover tool  PIIB7923J	Remove the clips, pawls, and metal clips
Power tool  PIIB1407E	

cardiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000001090935

BASIC INSPECTION

1. CHECK DOOR LOCK AND UNLOCK SWITCH OPERATION

Check door lock and unlock operation by operating door lock and unlock switch.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refer to DLK-812, "DOOR LOCK AND UNLOCK SWITCH : Symptom Table".

2. CHECK KEYFOB OPERATION

Check door lock and unlock operation by operationg lock and unlock button of keyfob.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refer to DLK-812, "KEYFOB : Symptom Table".

3. CHECK AUTO DOOR LOCK OPERATION

Check auto door lock operation. Refer to DLK-723, "AUTO DOOR LOCK : System Description".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Refer to DLK-813, "AUTO DOOR LOCK : Symptom Table".

4. CHECK VEHICLE SPEED SENSING AUTO DOOR LOCK OPERATION

Check vehicle speed sensing auto door lock. Refer to DLK-725, "VEHICLE SPEED SENSING AUTO DOOR LOCK : System Description"

Is the inspection result normal?

YES >> GO TO 5.
NO >> Refer to DLK-813, "VEHICLE SPEED SENSING AUTO DOOR LOCK : Symptom Table".

5. CHECK BACK DOOR OPENER SWITCH OPERATION

Check back door opener operation by operating back door opener switch.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Refer to DLK-815, "BACK DOOR OPENER SWITCH : Symptom Table".

6. CHECK HAZARD REMINDER FUNCTION

Check hazard reminder function by operating the following switches.
- Lock and unlock button of keyfob.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Refer to DLK-817, "HAZARD WARNING LAMP : Symptom Table".

7. CHECK WARNING FUNCTION

Check that warning function operate properly. Refer to DLK-732, "System Description".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Refer to DLK-817, "HAZARD WARNING LAMP : Symptom Table".

8. CHECK OUT

CHECK OUT.

>> INSPECTION END

ON-VEHICLE REPAIR

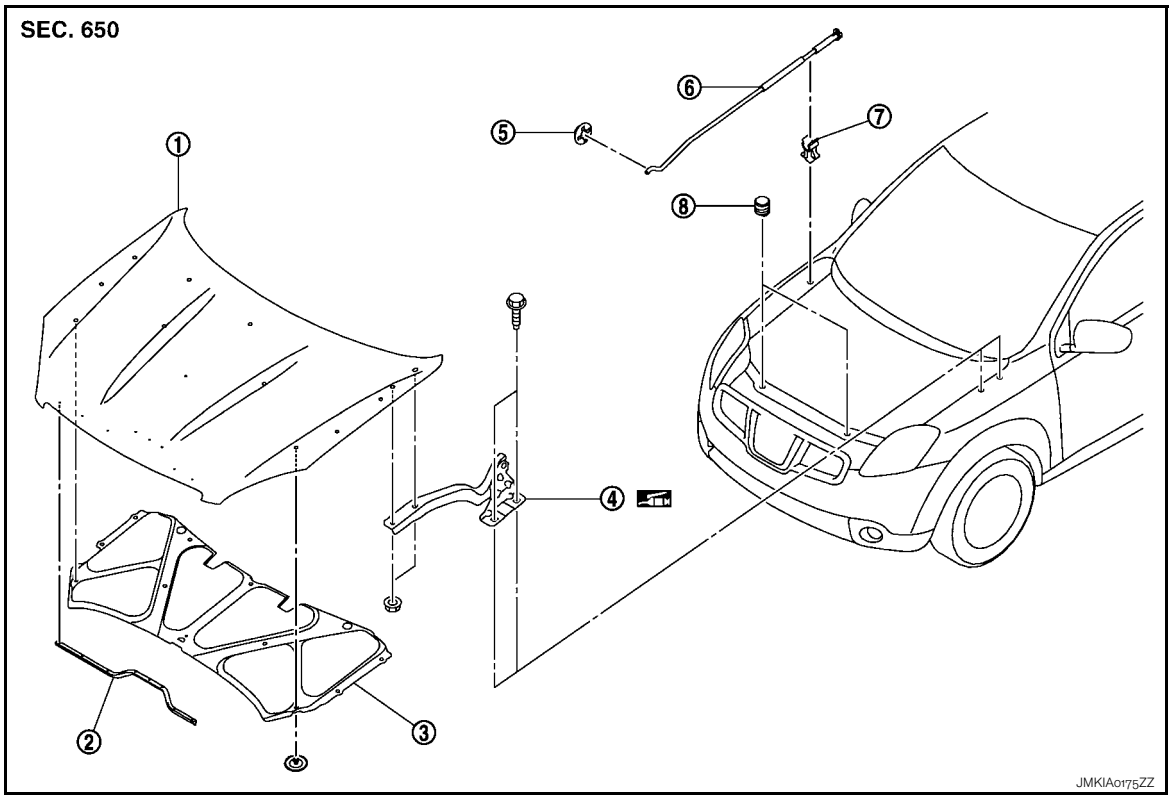
HOOD

HOOD ASSEMBLY

HOOD ASSEMBLY : Exploded View

INFOID:0000000001098695

REMOVAL

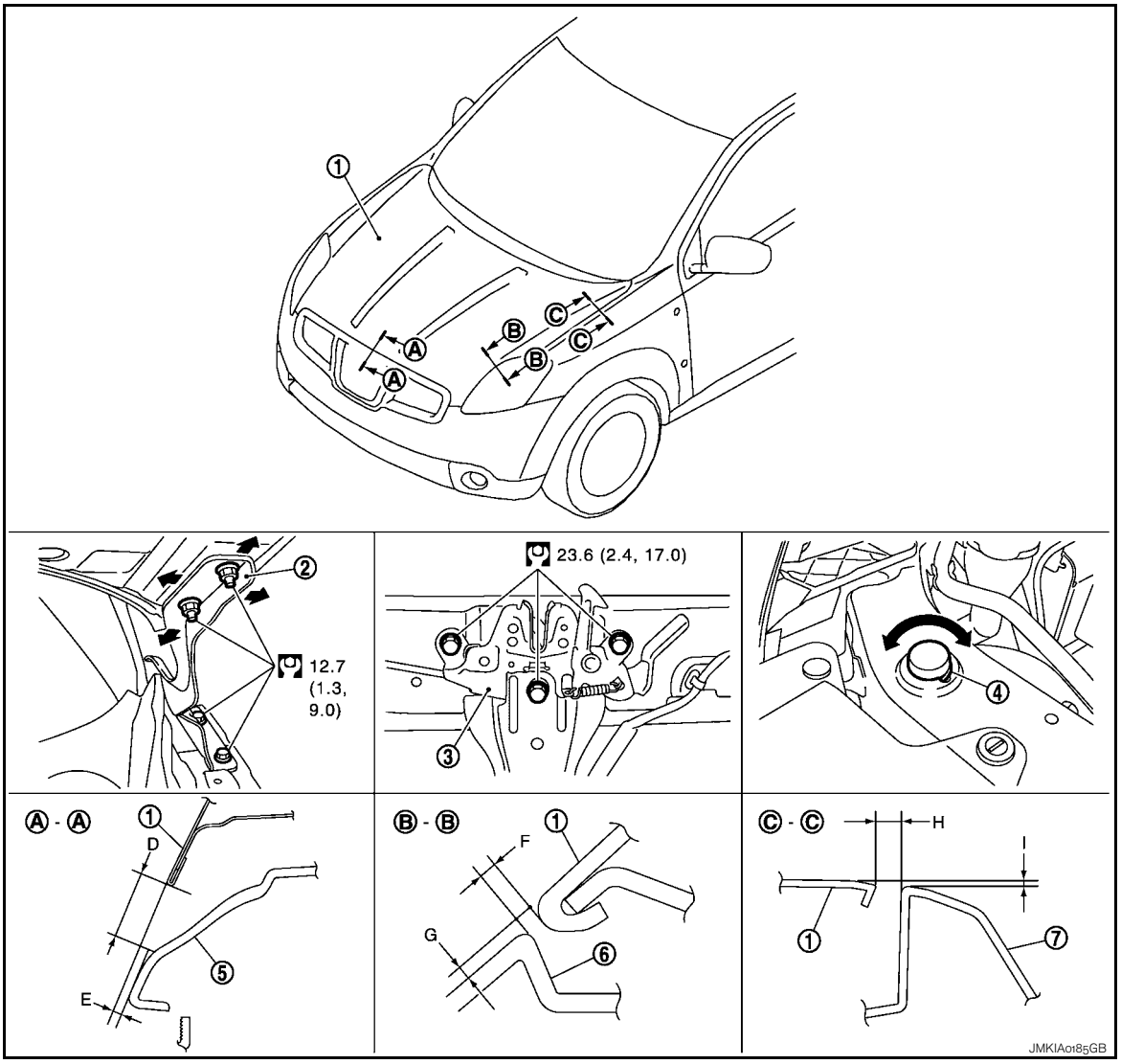


1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT

cardiagn.com



1. Hood assembly
2. Hood hinge
3. Hood lock assembly
4. Hood bumper rubber
5. Front grille
6. Front combination lamp
7. Front fender

Refer to GI-4, "Components" for symbols in the figure.

HOOD ASSEMBLY : Removal and Installation

INFOID:0000000001098696

REMOVAL

1. Support the hood lock assembly with the proper material to prevent it from falling.
   WARNING:
   Bodily injury may occur if no supporting rod is holding the hood open when removing the hood stay.
2. Remove the hood hinge mounting nuts on the hood to remove the hood assembly.
   CAUTION:
   Perform work with 2 workers, because of its heavy weight.
3. Remove the following parts after removing the hood assembly.
   - Hood insulator
   - Hood sealing rubber

INSTALLATION

Install in the reverse order of removal.

CAUTION:

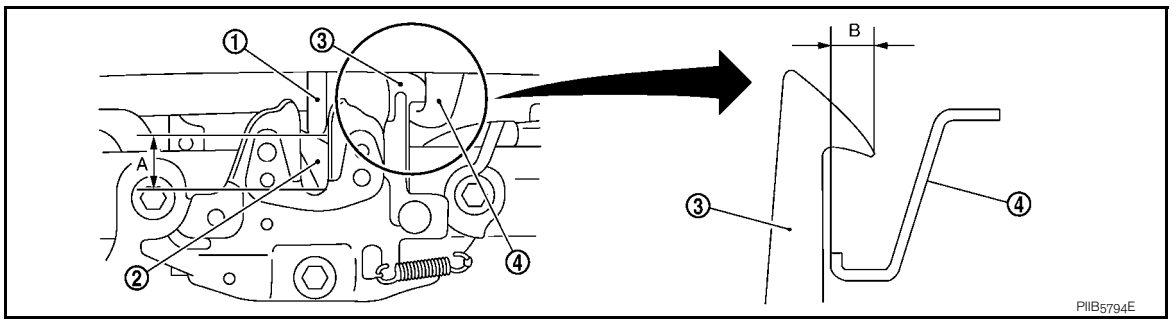
- **Perform work with 2 workers, because of its heavy weight.**
- **Before installing the hood hinge, apply anticorrosive agent onto the mounting surface of the vehicle body.**
- **After installing, perform hood fitting adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment".**

HOOD ASSEMBLY : Adjustment

INFOID:0000000001098697

Portion				Standard	Right/left Clearance (MAX)
Hood – Front bumper	A – A	D	Clearance	5.2 – 9.2 mm (0.205 – 0.362 in)	2.0 mm (0.079 in)
		E	Surface height	- 0.2 – 3.8 mm (- 0.008 – 0.150 in)	2.0 mm (0.079 in)
Hood – Front combination lamp	B – B	F	Clearance	3.7 – 7.7 mm (0.140 – 0.303 in)	2.0 mm (0.079 in)
		G	Surface height	- 2.3 – 2.3 mm (- 0.091 – 0.091 in)	2.3 mm (0.091 in)
Hood – Front fender	C – C	H	Clearance	3.9 – 5.9 mm (0.154 – 0.232 in)	1.5 mm (0.059 in)
		I	Surface height	- 1.0 – 1.0 mm (- 0.039 – 0.039 in)	1.5 mm (0.059 in)

1. Check the clearance and the surface height between the hood and each part by visualy and touching. (Fitting standard dimension in the table below should be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the hood lock and adjust the height by rotating the bumper rubber until the hood becomes 1 to1.5 mm (0.04 to 0.059 in) lower than the fender.
4. Temporarily tighten the hood lock, and position by engaging it with the hood striker. Check the lock and striker for looseness and adjust the clearance and evenness with the striker to satisfy the specification.
5. Adjust A and B shown in the figure to the following value with hood's own weight by dropping it from approximately. 200 mm (7.87 in) height or by pressing the hood lightly [approximately. 29 N (3 kg)].



1. Hood striker
2. Primary latch
3. Secondary striker
4. Secondary latch

A : 20.0 mm (0.787 in)
B : 6.8 mm (0.268 in)

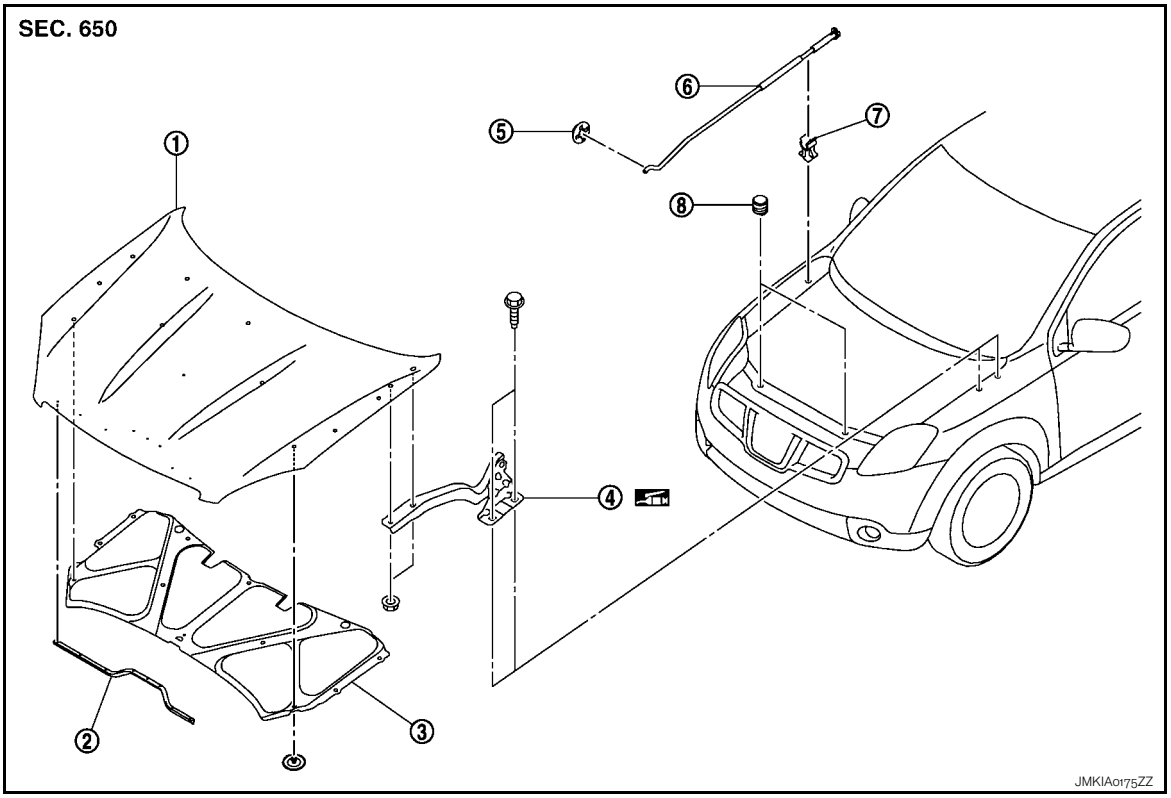
6. After adjustment tighten lock bolts to the specified torque.

HOOD HINGE

cardiagn.com

HOOD HINGE : Exploded View

INFOID:0000000001098703



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

HOOD HINGE : Removal and Installation

INFOID:0000000001098704

REMOVAL

1. Remove the hood assembly. Refer to DLK-829, "HOOD ASSEMBLY : Removal and Installation".
2. Remove the front fender. Refer to DLK-838, "Removal and Installation".
3. Remove the hood hinge mounting bolts, and then remove the hood hinge.

INSTALLATION

Install in the reverse order of removal.

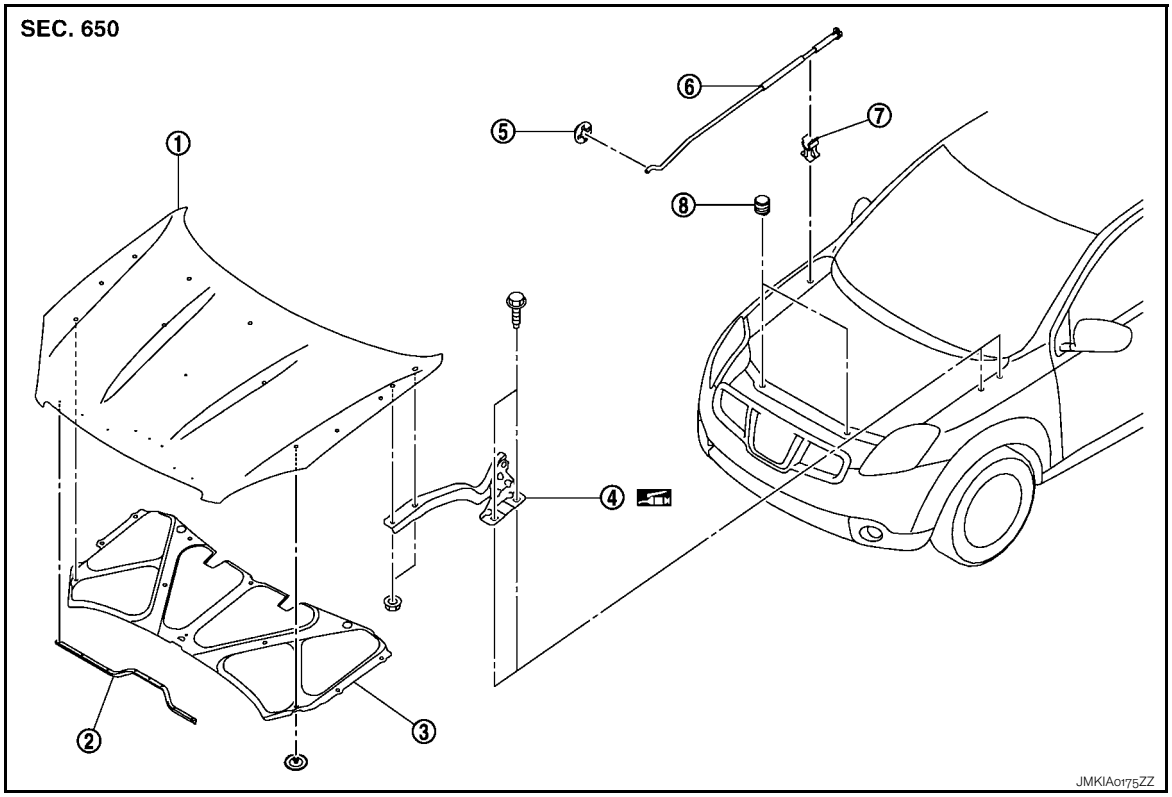
CAUTION:

- **After installation, apply touch-up paint (the body color) onto the head of the hinge mounting bolts and nuts.**
- **Before installation of hood hinge, apply anticorrosive agent onto the mounting surface of the vehicle body.**
- **After installation, perform hood fitting adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment".**

HOOD SUPPORT ROD

HOOD SUPPORT ROD : Exploded View

INFOID:0000000001098706



1. Hood assembly
2. Hood sealing rubber
3. Hood insulator
4. Hood hinge
5. Grommet
6. Hood support rod
7. Clamp
8. Hood bumper rubber

Refer to GI-4, "Components" for symbols in the figure.

HOOD SUPPORT ROD : Removal and Installation

INFOID:0000000001098708

REMOVAL

1. Support the hood lock assembly with the proper material to prevent it from falling.

   WARNING:
   Bodily injury may occur if no supporting rod is holding the hood open when removing the hood stay.

2. Remove the hood support rod from the grommet.

INSTALLATION

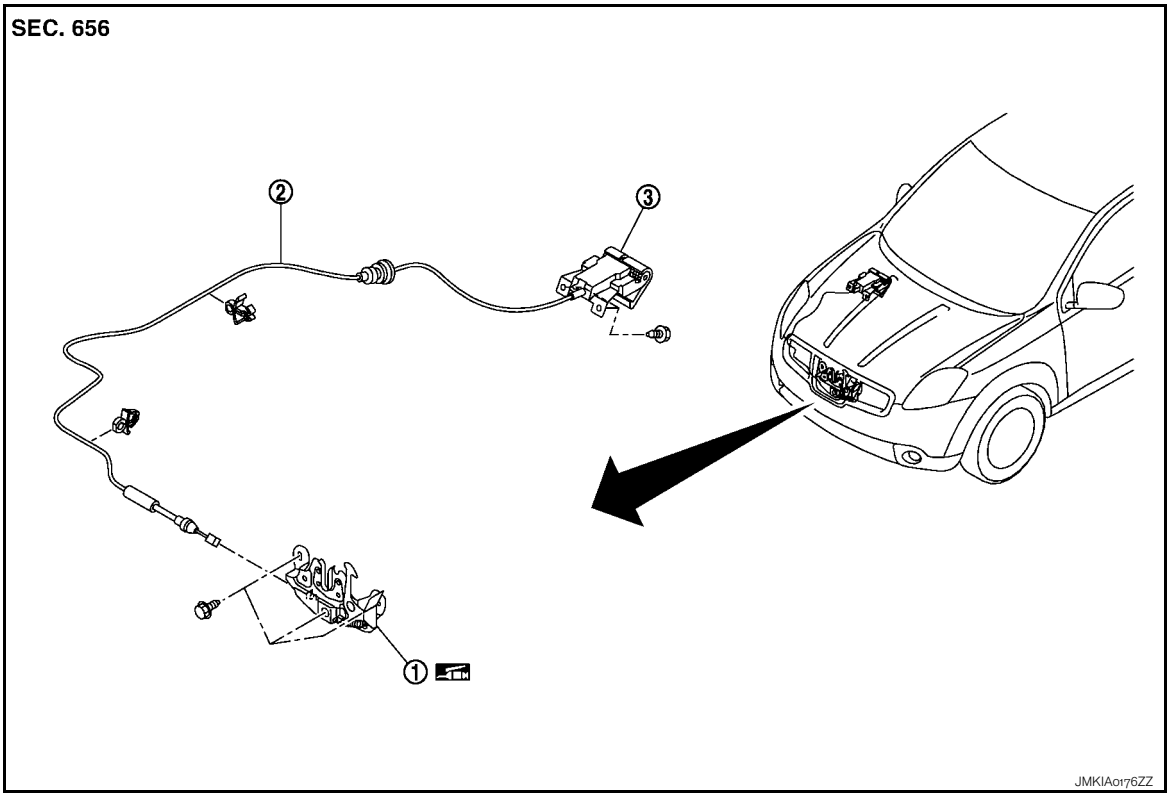
Install in the reverse order of removal.

HOOD LOCK CONTROL

HOOD LOCK CONTROL : Exploded View

INFOID:0000000001098710

cardiagn.com



1. Hood lock assembly
2. Hood lock control cable
3. Hood lock opener

Refer to GI-4, "Components" for symbols in the figure.

HOOD LOCK CONTROL : Removal and Installation

INFOID:0000000001098711

REMOVAL

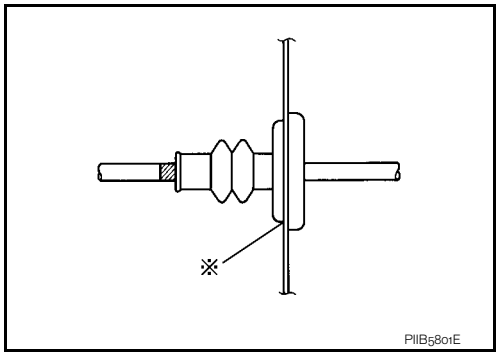
1. Remove the hood lock opener mounting bolts, and then remove the hood lock opener.
2. Remove the front bumper fascia. Refer to EXT-11, "Removal and Installation".
3. Remove the hood lock mounting bolts, and then remove the hood lock.
4. Remove the fender protector. Refer to EXT-22, "Removal and Installation".
5. Disconnect the hood lock cable from hood lock, and clip it from the hoodledge.
6. Remove the grommet on the dash lower panel, and pull the hood lock control cable toward the passenger compartment.
   CAUTION:
   While pulling, do not to damage (peeling) the outside of the hood lock control cable.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Do not to bend the cable too much, keeping the radius 100 mm (3.94 in) or more.**
- **Check that the cable is not offset from the positioning grommet, and apply the sealant to the grommet (at *mark) properly.**



- **Check that the hood lock control cable is properly engaged with the hood lock.**
- **After installation, perform hood fitting adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment".**
- **After installation, perform the hood lock control inspection. Refer to DLK-834, "HOOD LOCK CONTROL : Inspection".**

HOOD LOCK CONTROL : Inspection

INFOID:0000000001098712

NOTE:
If the hood lock cable is bent or deformed, replace it.

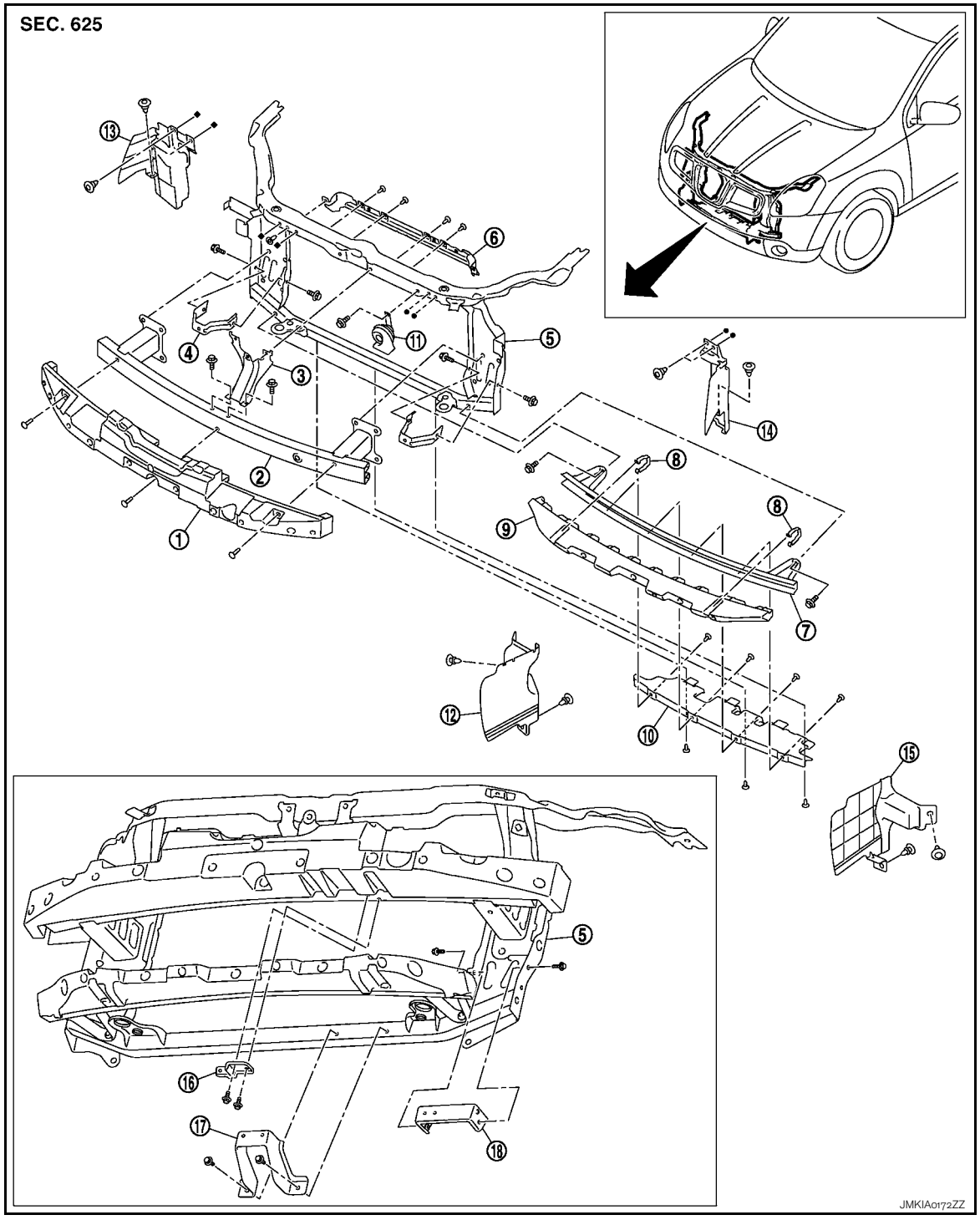
1. Check that the secondary latch is properly engaged with the secondary striker [6.8 mm (0.268 in) shown in the figure] by hood weight.
2. While operating the hood opener, carefully check that the front end of the hood is raised by approximately 20.0 mm (0.787 in). Also check that the hood opener returns to the original position.
3. Check that the hood opener operating is condition 49 N (5.0 kg) or below.
4. Install so that static closing face of hood is 94 – 490 N·m (9.6 – 50.0 kg-m).
   NOTE:
   - Exert vertical force on right side and left side of hood lock.
   - Do not press simultaneously both sides.
5. Check the hood lock lubrication condition. If necessary, apply body grease to the hood lock.

cardiagn.com

RADIATOR CORE SUPPORT

Exploded View

INFOID:0000000001098717



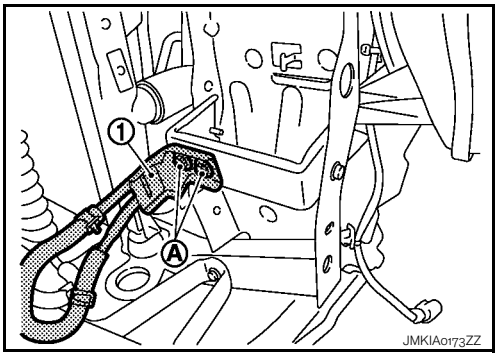
1. Energy absorber
2. Bumper reinforcement
3. Hood lock support stay
4. Intercooler bracket (with K9K engine models)
5. Radiator core support assembly
6. Upper air dam
7. Apron bracket assembly
8. Fastener
9. Energy absorber lower
10. Front air guide lower
11. Horn assembly
12. Front air guide side lower RH
13. Front air guide side RH
14. Front air guide side LH
15. Front air guide side lower LH
16. Oil cooler bracket upper
17. Oil cooler bracket lower
18. Oil cooler bracket side

Removal and Installation

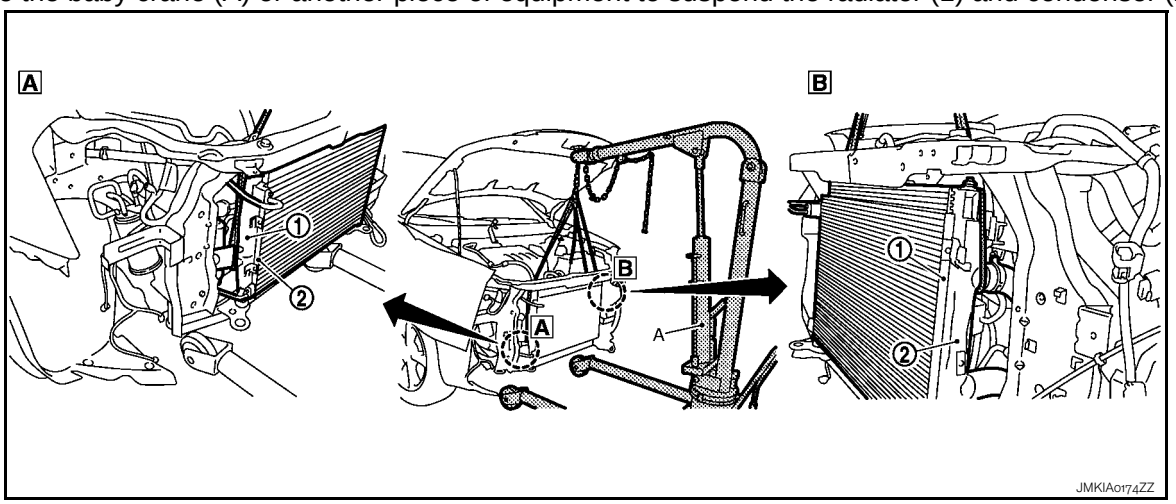
INFOID:0000000001098718

REMOVAL

1. Remove the front fillet molding. Refer to EXT-23, "Removal and Installation".
2. Remove the front bumper fascia and the energy absorber. Refer to EXT-11, "Removal and Installation".
3. Remove the energy absorber (upper and lower). Refer to EXT-11, "Removal and Installation".
4. Remove the air cleaner duct. Refer to EM-27, "Removal and Installation".
5. Remove the front combination lamp (LH/RH). Refer to EXL-171, "Removal and Installation".
6. Remove the bumper reinforcement. Refer to EXT-11, "Removal and Installation".
7. Disconnect the hood lock control cable clamp, and then remove the hood lock assembly. Refer to DLK-833, "HOOD LOCK CONTROL : Removal and Installation".
8. Remove the air guide mounting clips, and then remove the air guide (LH/RH).
9. Remove the hood lock stay mounting bolts, and then remove the hood lock stay.
10. Remove the hood switch (with theft warning systems). Refer to SEC-SEC-156, "Removal and Installation".
11. Remove the crush zone sensor. Refer to SR-14, "Removal and Installation".
12. Remove the horn. Refer to HRN-5, "Removal and Installation".
13. Remove the ambient sensor. Refer to VTL-22, "Removal and Installation".
14. Remove the radiator mounting bracket (LH/RH). Refer to CO-13, "Removal and Installation".
15. Remove the Intelligent Key warning buzzer (with Intelligent Key systems). Refer to DLK-277, "Removal and Installation".
16. Remove the charge air cooler assembly (with K9K engine models). Refer to EM-266, "Removal and Installation".
17. Remove the A/T fluid cooler assembly and the A/T fluid cooler bracket (with A/T models only). Refer to TM-348, "FLUID COOLER : Removal and Installation".
18. Remove the A/T fluid cooler pipe bracket (1) mounting bolts (A) (with A/T models only).



19. Remove the washer tank. Refer to WW-99, "Removal and Installation".
20. Use the baby crane (A) or another piece of equipment to suspend the radiator (1) and condenser (2).



cardiagn.com

21. Remove the radiator core support assembly mounting bolts, and draw out the radiator core support assembly to the front of the vehicle.
22. Remove the radiator core support assembly.
23. Remove the following parts after removing the radiator core support assembly.
    - Inlet tube bracket (with K9K engine models)
    - Intercooler bracket (with K9K engine models)
    - Apron reinforcement bracket

INSTALLATION

Install in the reverse order of removal.

CAUTION:

After installation, refill the following parts.

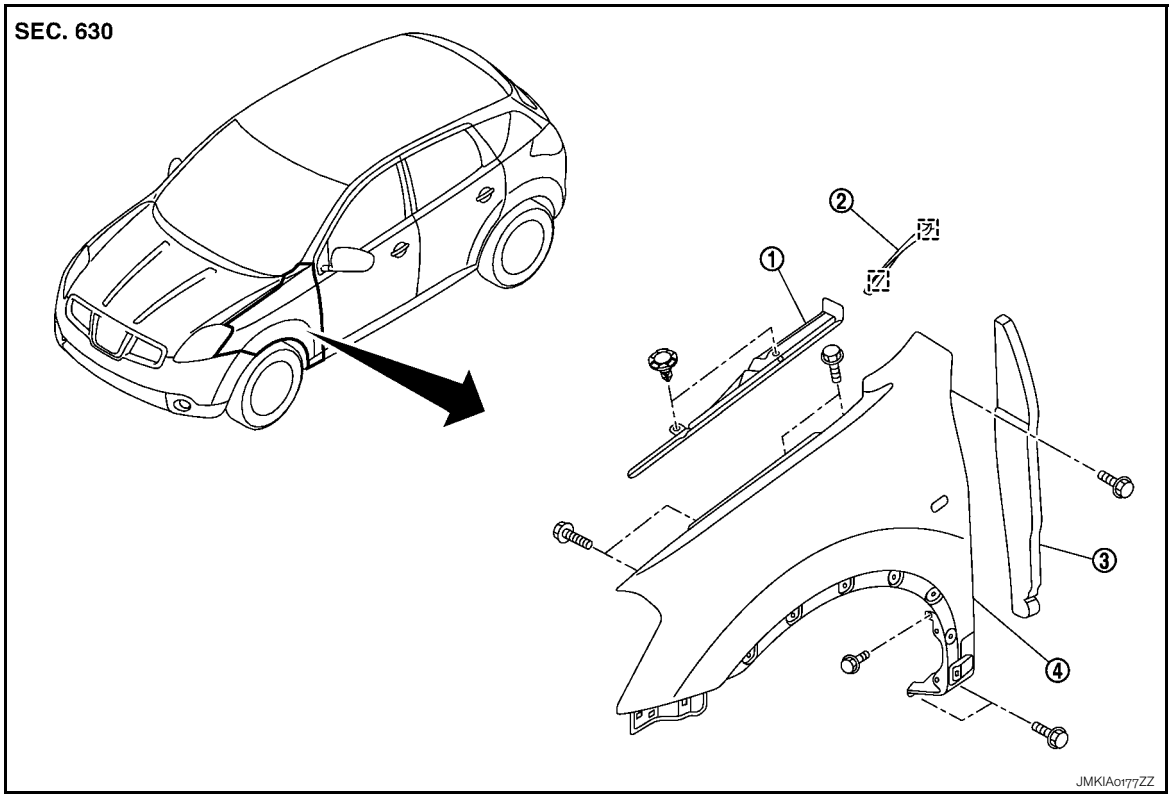
- **A/T fluid. Refer to TM-315, "Changing".**
- **Engine coolant. Refer to CO-9, "Refilling".**

carsdiagn.com

FRONT FENDER

Exploded View

INFOID:0000000001098719



1. Hood seal assembly (side)
2. Front fender finisher
3. Front fender seal
4. Front fender

: Metal clip

Removal and Installation

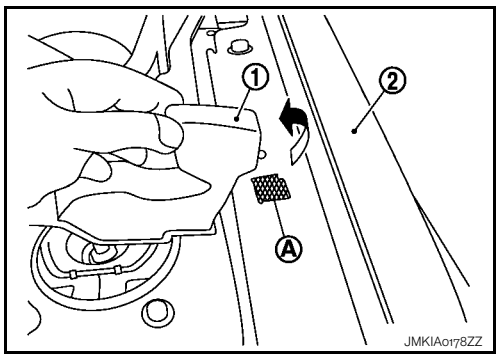
INFOID:0000000001098720

REMOVAL

1. Remove the outer fender protector. Refer to EXT-22, "Removal and Installation".
2. Remove the inner fender protector. Refer to EXT-22, "Removal and Installation".
3. Remove the side turn signal lamp. Refer to EXL-178, "Removal and Installation".
4. Remove the front bumper fascia. Refer to EXT-11, "Removal and Installation".
5. Remove the front combination lamp.
   - XENON TYPE: EXL-171, "Removal and Installation".
   - HALOGEN TYPE: EXL-327, "Removal and Installation".
6. Remove the mounting clips and remove hoodledge cover.
7. Remove the center mudguard. Refer to EXT-28, "Removal and Installation".

cardiagn.com

8. Peel away the double-faced adhesive tape (A) of the front fender seal (1) from the front fender (2).



9. Remove the mounting bolts and remove the front fender.
   CAUTION:
   Use a shop cloth to protect the body from being damaged during removal.
10. Remove the following parts after removing the front fender.
    - Front fender seal.
    - Bumper side bracket. Refer to EXT-11, "Exploded View".

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace the double-faced adhesive tape on the back of the cowl top cover seal with new tape.**
- **Do not wash the vehicle within 24 hours after installation so as to keep adhesive.**
- **After installation, apply the touch-up paint (the body color) onto the head of the front fender mounting bolts.**
- **After installation, check the front fender adjustment. Refer to DLK-830, "HOOD ASSEMBLY : Adjustment" and DLK-842, "DOOR ASSEMBLY : Adjustment".**

carsdiagn.com

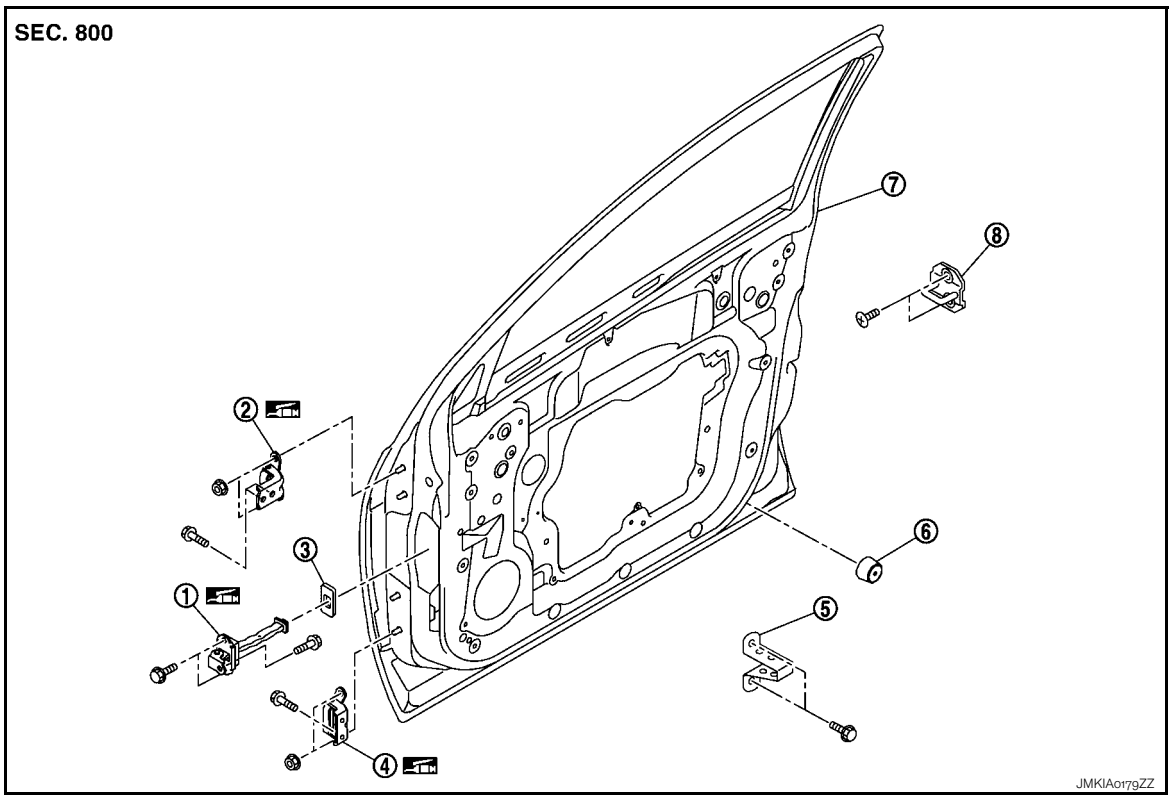
FRONT DOOR

DOOR ASSEMBLY

DOOR ASSEMBLY : Exploded View

INFOID:0000000001098721

REMOVAL

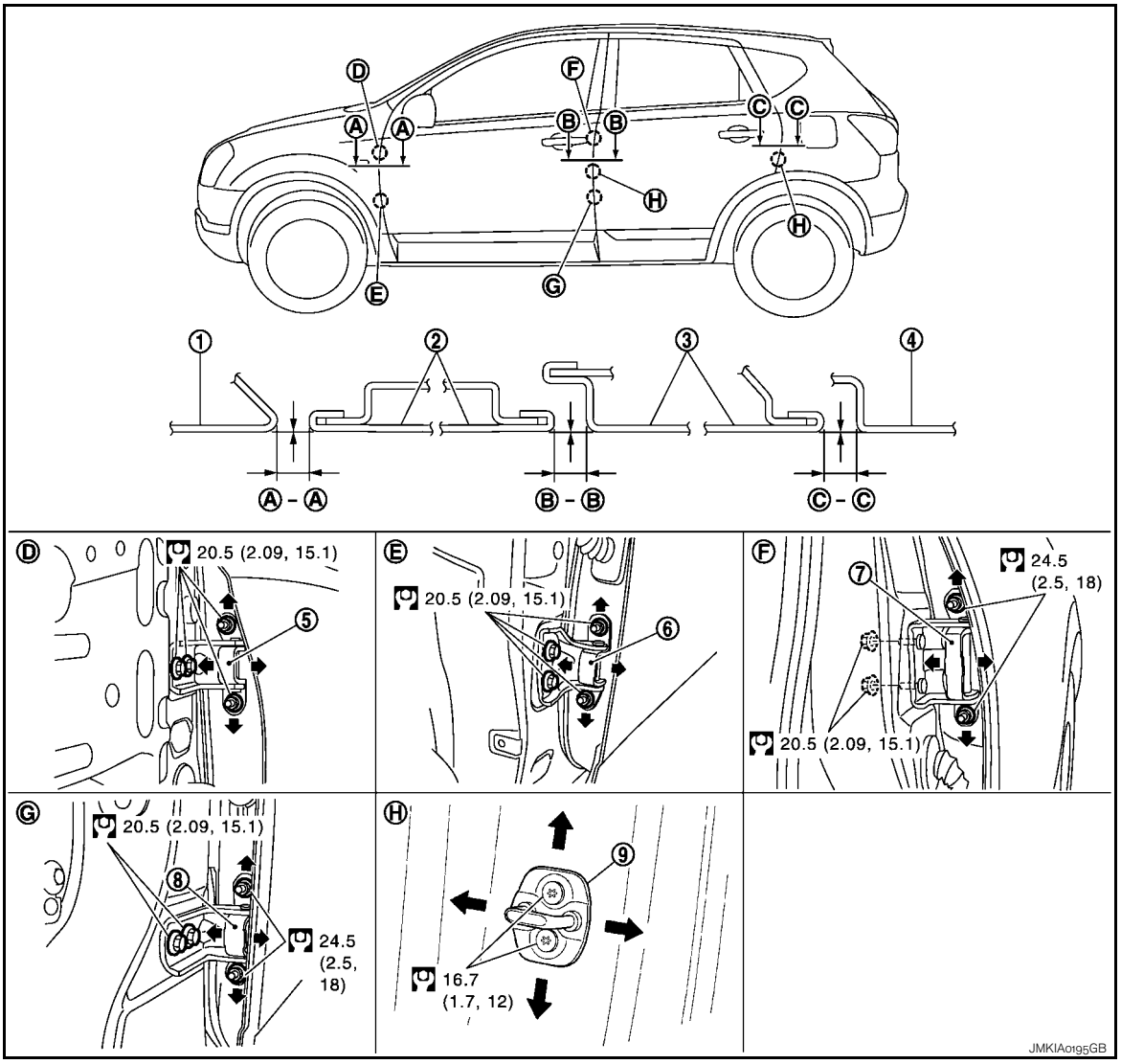


1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT

cardiagn.com



1. Front fender
2. Front door outer
3. Rear door outer
4. Rear fender
5. Front door hinge (upper)
6. Front door hinge (lower)
7. Rear door hinge (upper)
8. Rear door hinge (lower)
9. Door striker

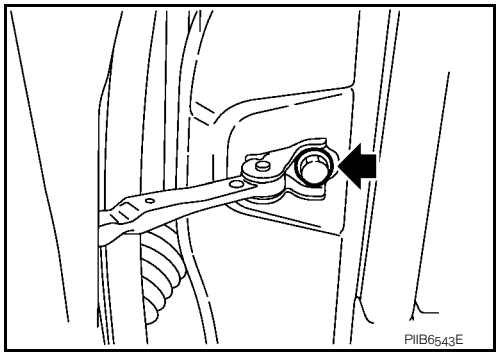
Refer to GI-4, "Components" for symbols in the figure.

DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001098722

REMOVAL

1. Remove the mounting bolts of the door check link on the vehicle.



2. Remove the front door harness grommet, and then pull out the harness from the vehicle.

3. Disconnect the front door harness connector.
4. Remove the door hinge mounting nuts (door side), and then remove the door assembly.
   CAUTION:
   - **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
   - **Perform work with 2 workers, because of its heavy weight.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **When removing and installing the front door assembly, perform the fitting adjustment. Refer to DLK-842, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the front door open/close operation after installation.**

DOOR ASSEMBLY : Adjustment

INFOID:0000000001098723

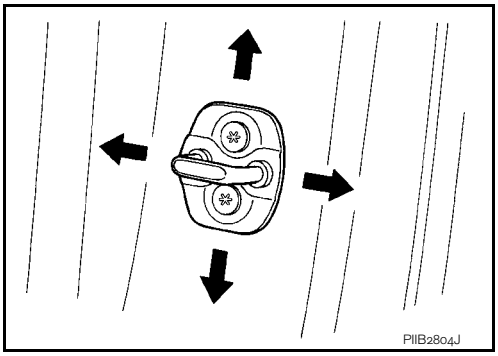
CLEARANCE, SURFACE HEIGHT AND SURFACE MISMATCH ADJUSTMENT

Portion		Clearance	Surface height
Front fender – Front door	A – A	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)
Front door – Rear door	B – B	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)

1. Check the clearance and surface height and surface mismatch between the front door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the front fender. Refer to refer to DLK-838, "Removal and Installation".
4. Loosen the door hinge mounting nuts on door side.
5. Adjust the surface height and surface mismatch of the front door according to the fitting standard dimension.
6. Temporarily tighten the hinge mounting nuts on door side.
7. Loosen the door hinge mounting bolts on body side.
8. Raise the front door at rear end to adjust clearance of the front door according to the fitting standard dimension.
9. After adjustment tighten bolts and nuts to the specified torque.
10. Install the front fender. Refer to refer to DLK-838, "Removal and Installation".
    CAUTION:
    After installation, check the front fender adjustment. Refer to DLK-225, "HOOD ASSEMBLY : Adjustment".

DOOR STRIKER ADJUSTMENT

Adjust the door striker so that it becomes parallel with the lock insertion direction.

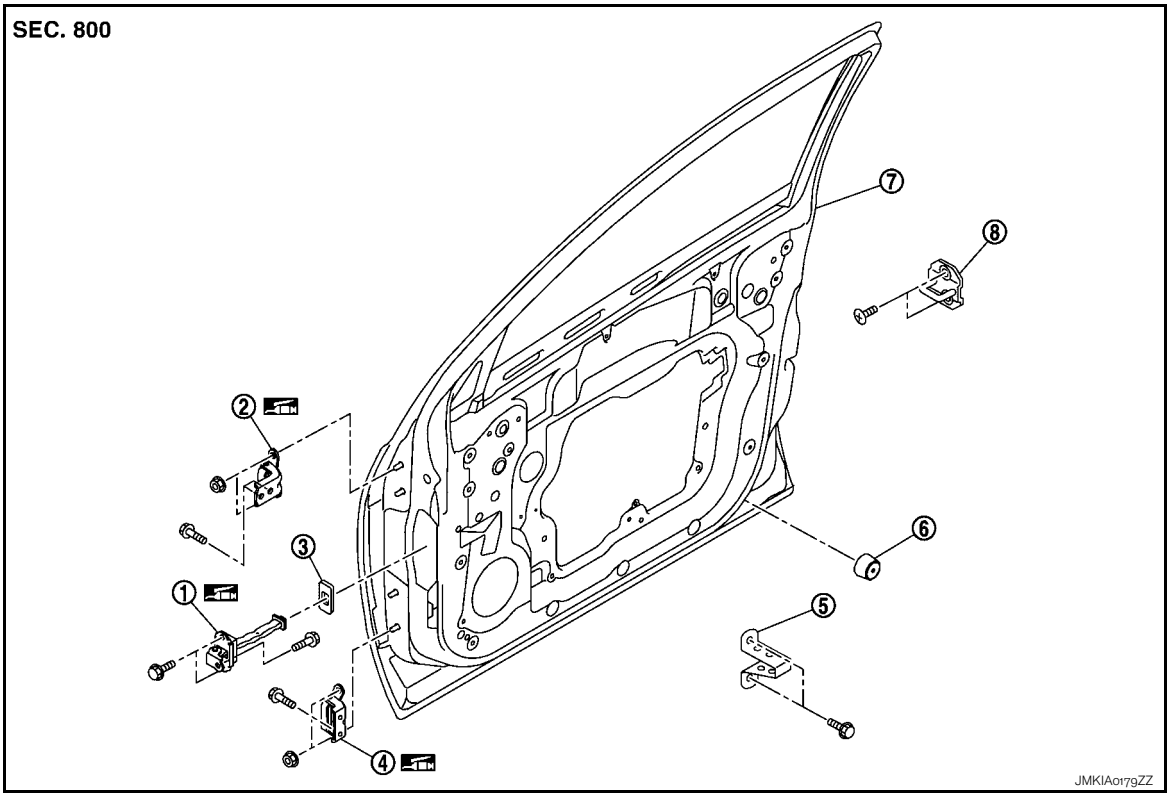


cardiagn.com

DOOR STRIKER

DOOR STRIKER : Exploded View

INFOID:0000000001098726



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

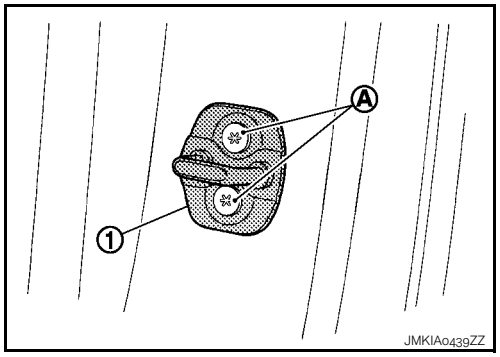
Refer to GI-4, "Components" for symbols in the figure.

DOOR STRIKER : Removal and Installation

INFOID:0000000001098727

REMOVAL

Remove the mounting bolts (A), and then remove the door striker (1).



INSTALLATION

Install in the reverse order of removal.

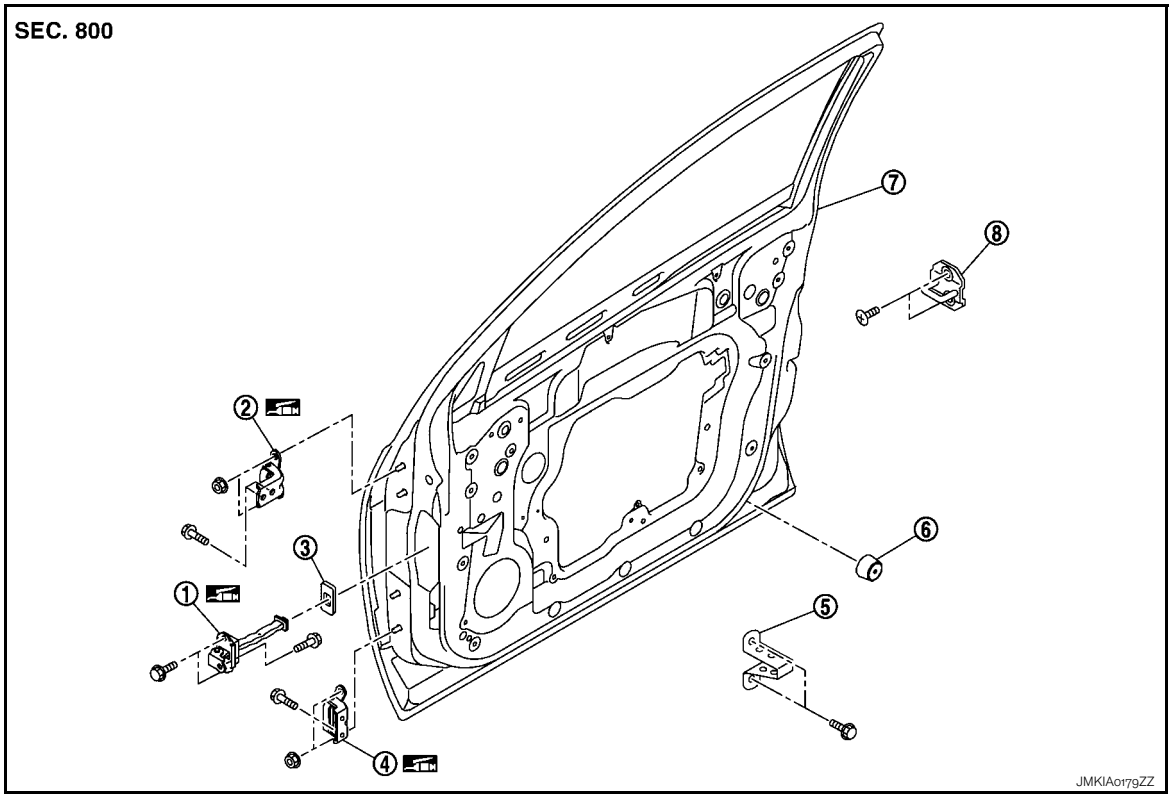
CAUTION:

- **Check the front door open/close operation after installation.**
- **When removing and installing the door striker, be sure to perform the fitting adjustment. Refer to DLK-842, "DOOR ASSEMBLY : Adjustment".**

DOOR HINGE

DOOR HINGE : Exploded View

INFOID:0000000001098730



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR HINGE : Removal and Installation

INFOID:0000000001098732

REMOVAL

1. Remove the front door assembly. Refer to DLK-841, "DOOR ASSEMBLY : Removal and Installation".
2. Remove the door hinge mounting bolts, and then remove the front door hinge.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

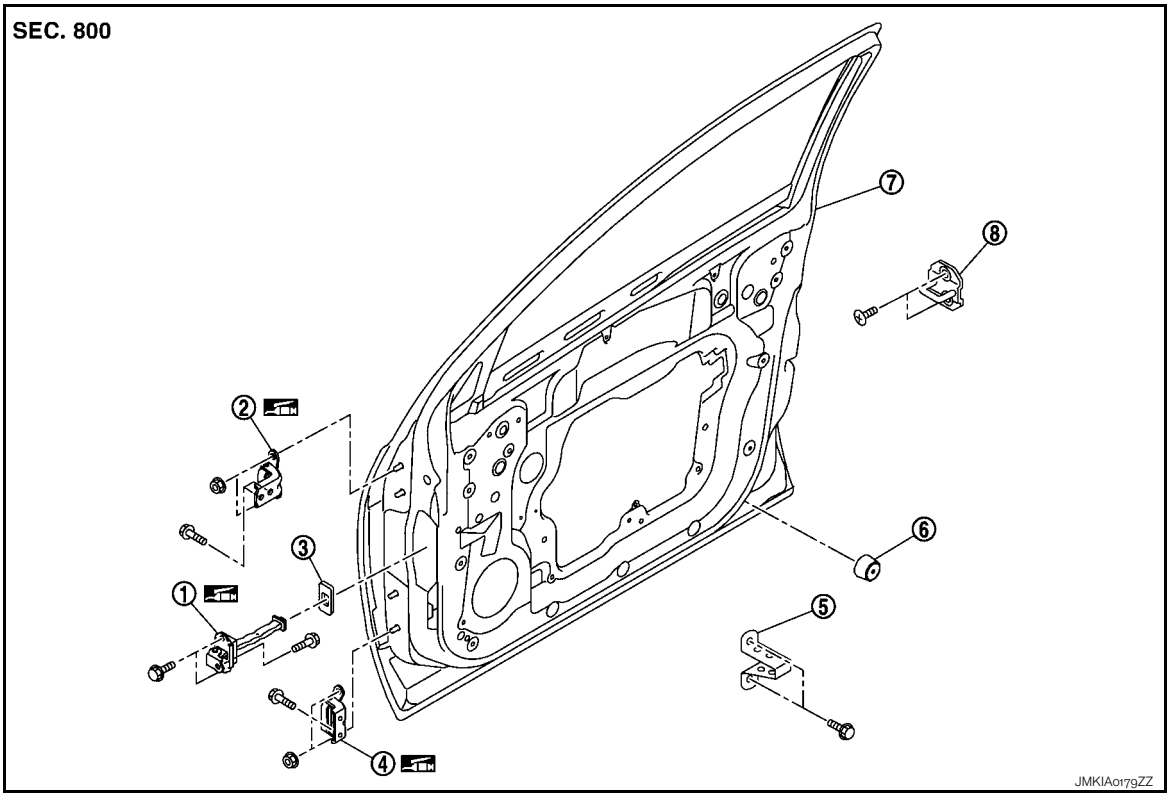
- **When removing and installing the front door assembly, perform the fitting adjustment. Refer to DLK-842, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the front door open/close operation after installation.**

DOOR CHECK LINK

DOOR CHECK LINK : Exploded View

INFOID:0000000001098735

cardiagn.com



1. Door check link
2. Door hinge (upper)
3. Door check link cover
4. Door hinge (lower)
5. Bracket
6. Bumper rubber
7. Front door panel
8. Door striker

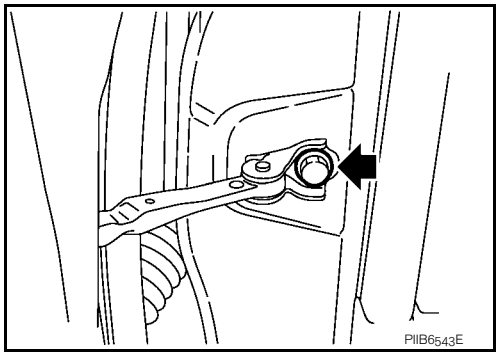
Refer to GI-4, "Components" for symbols in the figure.

DOOR CHECK LINK : Removal and Installation

INFOID:0000000001098737

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the front door speaker. Refer to AV-34, "Removal and Installation".
3. Remove the mounting bolts of the door check link on the vehicle.



4. Remove the door check link cover, and then remove the door check link mounting bolts.
5. Remove the door check link.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check the front door open/close operation after installation.

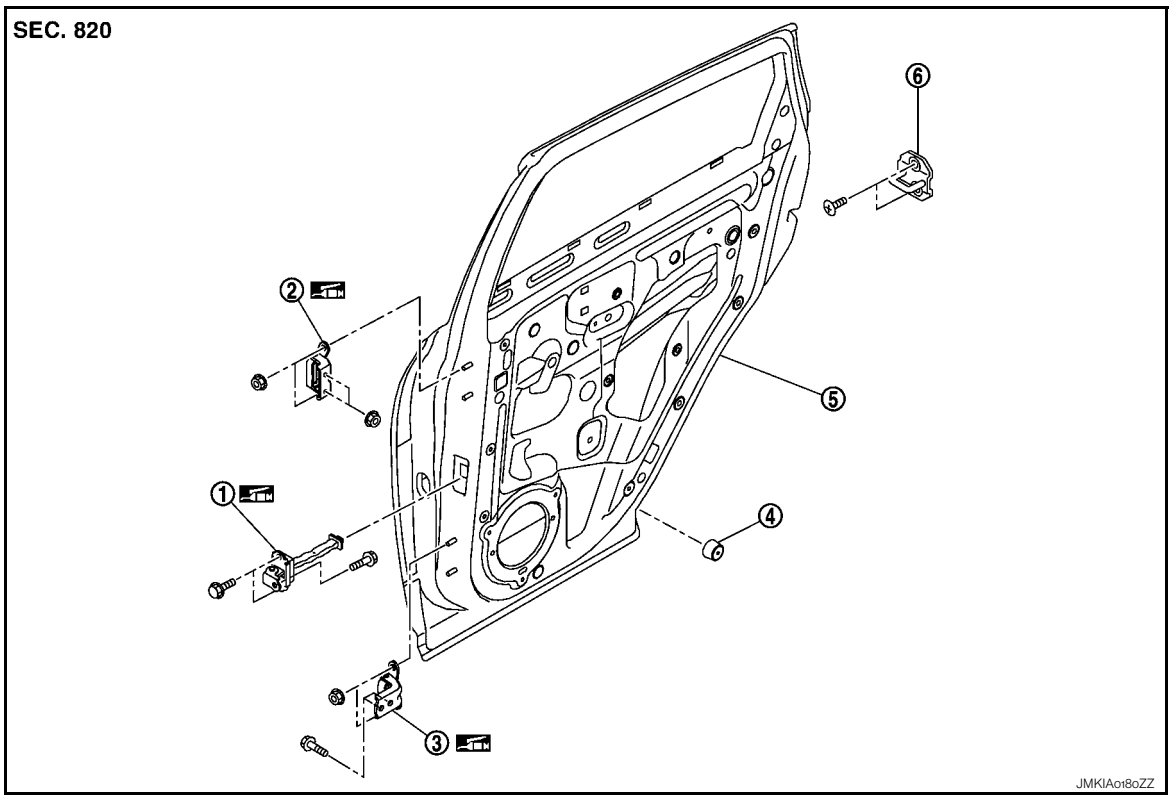
REAR DOOR

DOOR ASSEMBLY

DOOR ASSEMBLY : Exploded View

INFOID:0000000001098739

REMOVAL

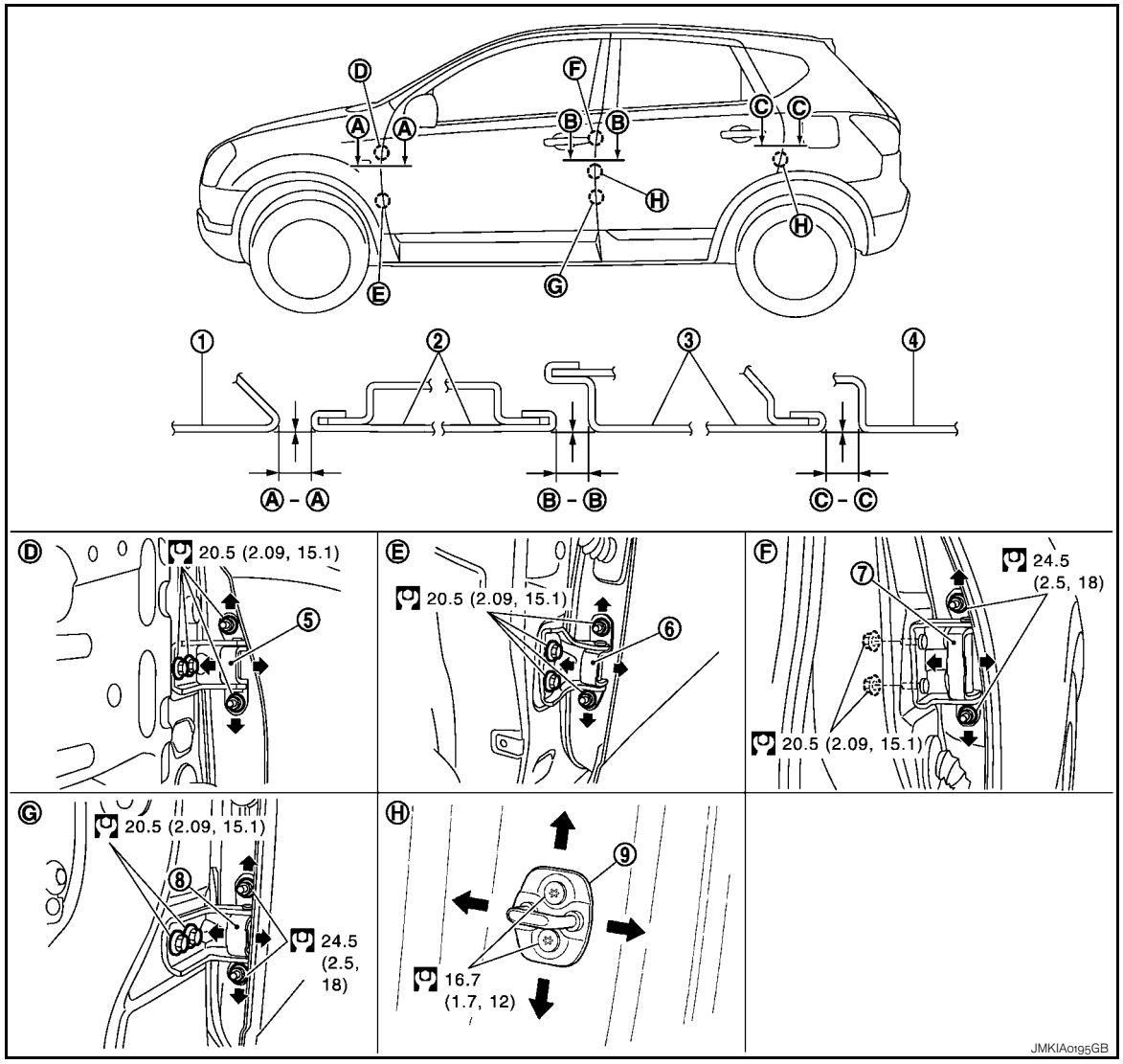


1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT

cardiagn.com



1. Front fender
2. Front door outer
3. Rear door outer
4. Rear fender
5. Front door hinge (upper)
6. Front door hinge (lower)
7. Rear door hinge (upper)
8. Rear door hinge (lower)
9. Striker

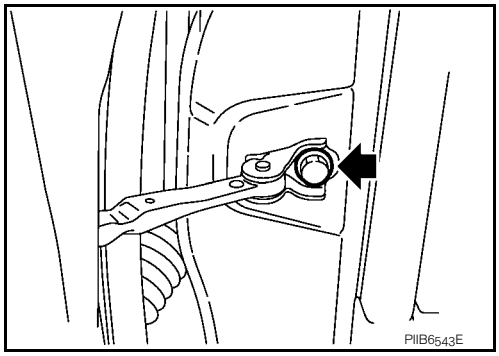
Refer to GI-4, "Components" for symbols in the figure.

DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001098740

REMOVAL

1. Remove the mounting bolts of the door check link on the vehicle.



2. Remove the rear door harness grommet, and then pull out the door harness from the vehicle.

3. Disconnect the rear door harness connector.
4. Remove the door hinge mounting nuts (door side), and then remove the rear door assembly.
   CAUTION:
   - **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
   - **Perform work with 2 workers, because of it's heavy weight.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **When removing and installing the rear door assembly, perform the fitting adjustment. Refer to DLK-848, "DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the door hinge mounting nuts.**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the rear door open/close operation after installation.**
- **Check the rear door lock/unlock operation after installation.**

DOOR ASSEMBLY : Adjustment

INFOID:0000000001098742

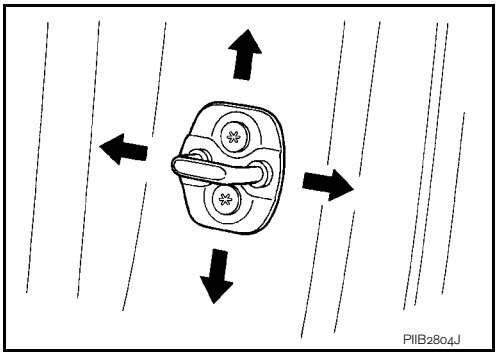
CLEARANCE, SURFACE HEIGHT AND SURFACE MISMATCH ADJUSTMENT

Portion		Clearance	Surface height
Front door – Rear door	B – B	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)
Rear door – Rear fender	C – C	3.5 – 5.0 mm (0.138 – 0.197 in)	- 1.5 – 0.5 mm (- 0.059 – 0.020 in)

1. Check the clearance and surface height and surface mismatch between the rear door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Remove the center pillar upper garnish and center pillar lower garnish. Refer to INT-14, "Removal and Installation".
4. Loosen the door hinge mounting nuts on door side.
5. Adjust the surface height and surface mismatch of the rear door according to the fitting standard dimension.
6. Temporarily tighten the hinge mounting nuts on door side.
7. Loosen the door hinge mounting nuts and bolts on body side.
8. Raise the rear door at rear end to adjust clearance of the rear door according to the fitting standard dimension.
9. After adjustment tighten bolts and nuts to the specified torque.
10. Install the center pillar upper garnish and center pillar lower garnish. Refer to INT-14, "Removal and Installation".

DOOR STRIKER ADJUSTMENT

Adjust the door striker so that it becomes parallel with the lock insertion direction.

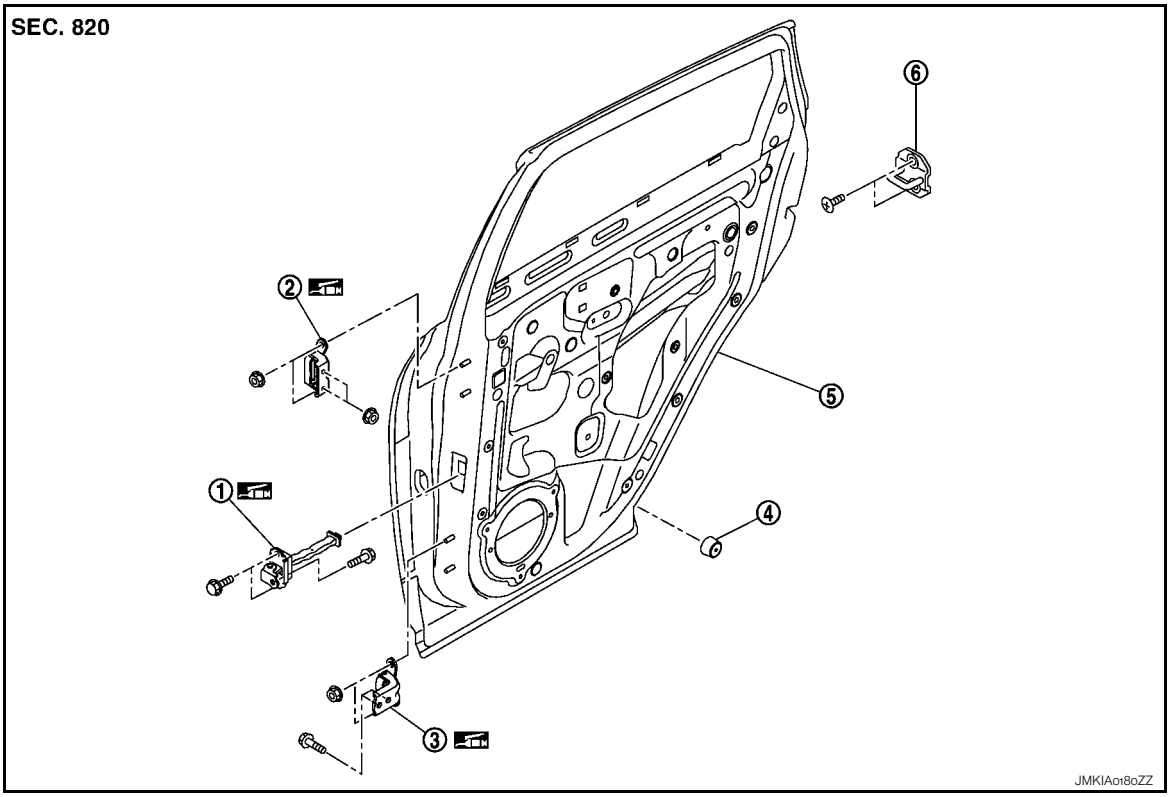


cardiagn.com

DOOR STRIKER

DOOR STRIKER : Exploded View

INFOID:0000000001098751



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

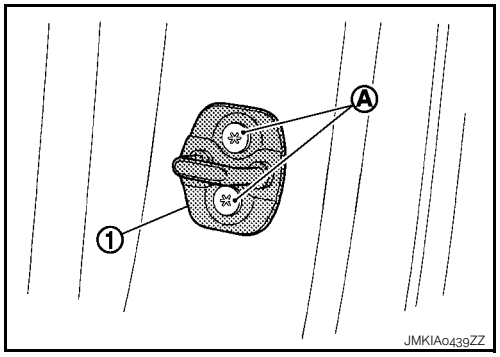
Refer to GI-4, "Components" for symbols in the figure.

DOOR STRIKER : Removal and Installation

INFOID:0000000001098752

REMOVAL

Remove the mounting bolts (A), and then remove the door striker (1).



INSTALLATION

Install in the reverse order of removal.

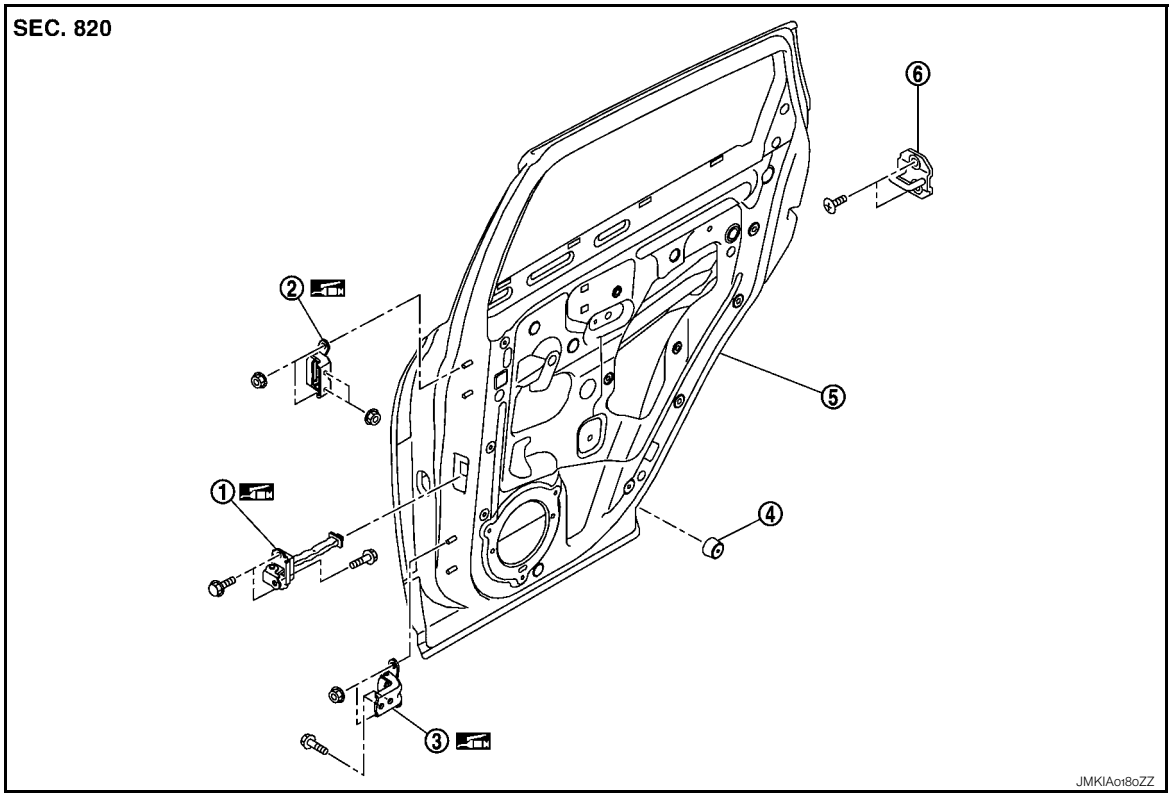
CAUTION:

- **Check the rear door open/close operation after installation.**
- **When removing and installing the door striker, be sure to perform the fitting adjustment. Refer to DLK-848, "DOOR ASSEMBLY : Adjustment".**

DOOR HINGE

DOOR HINGE : Exploded View

INFOID:0000000001098755



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR HINGE : Removal and Installation

INFOID:0000000001098758

REMOVAL

1. Remove the center pillar lower garnish and the center pillar upper garnish. Refer to INT-14, "Removal and Installation".
2. Remove the rear door assembly. Refer to DLK-242, "DOOR ASSEMBLY : Removal and Installation".
3. Remove the rear door hinge mounting bolts and nuts (body side), and then remove the door hinge.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

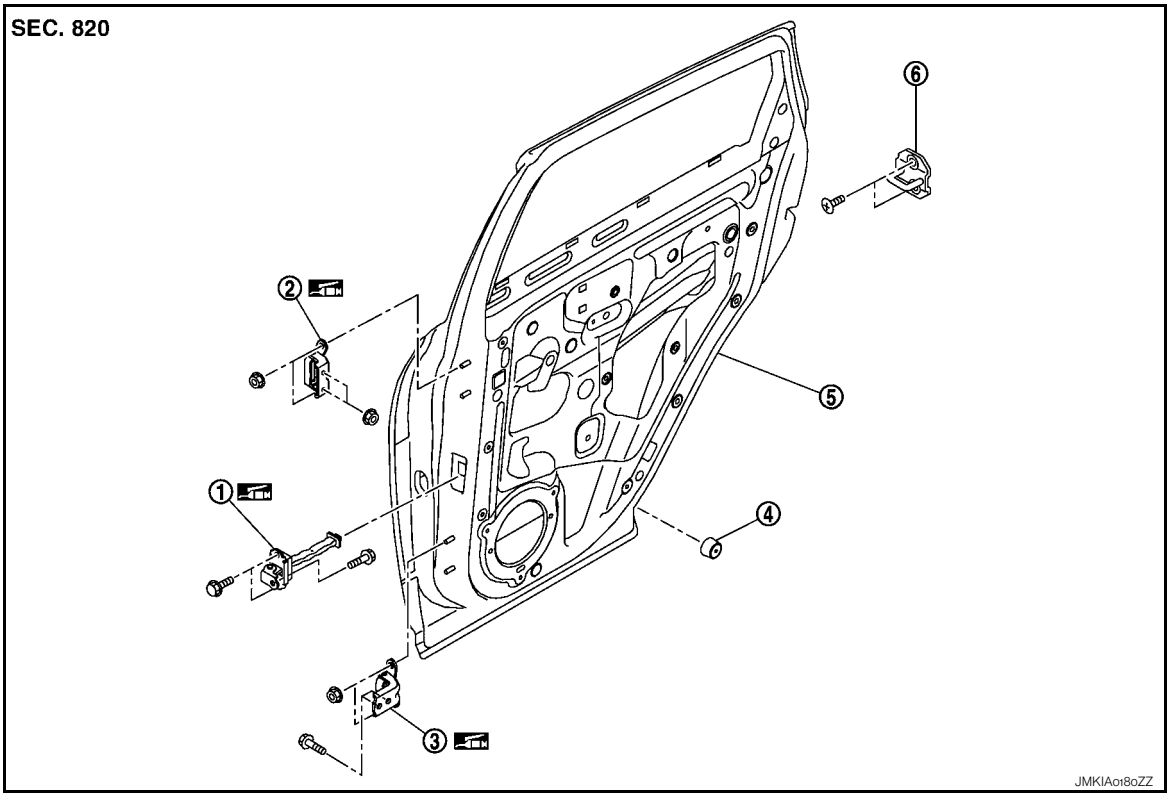
- **When removing and installing the rear door assembly, perform the fitting adjustment. Refer to DLK-848, "DOOR ASSEMBLY : Adjustment".**
- **Check the door hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **After installing, apply the touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Check the rear door open/close operation after installation.**

DOOR CHECK LINK

DOOR CHECK LINK : Exploded View

INFOID:0000000001098760

cardiagn.com



1. Door check link
2. Door hinge (upper)
3. Door hinge (lower)
4. Bumper rubber
5. Rear door panel
6. Door striker

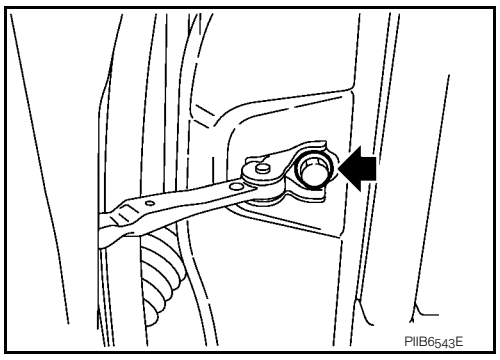
Refer to GI-4, "Components" for symbols in the figure.

DOOR CHECK LINK : Removal and Installation

INFOID:0000000001098762

REMOVAL

1. Remove the rear door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the rear door sealing screen.
3. Remove the mounting bolts of the check link on the vehicle.



4. Remove the door check link cover, and then remove the door check link mounting bolts.
5. Remove the door check link.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check front door open/close operation after installation.

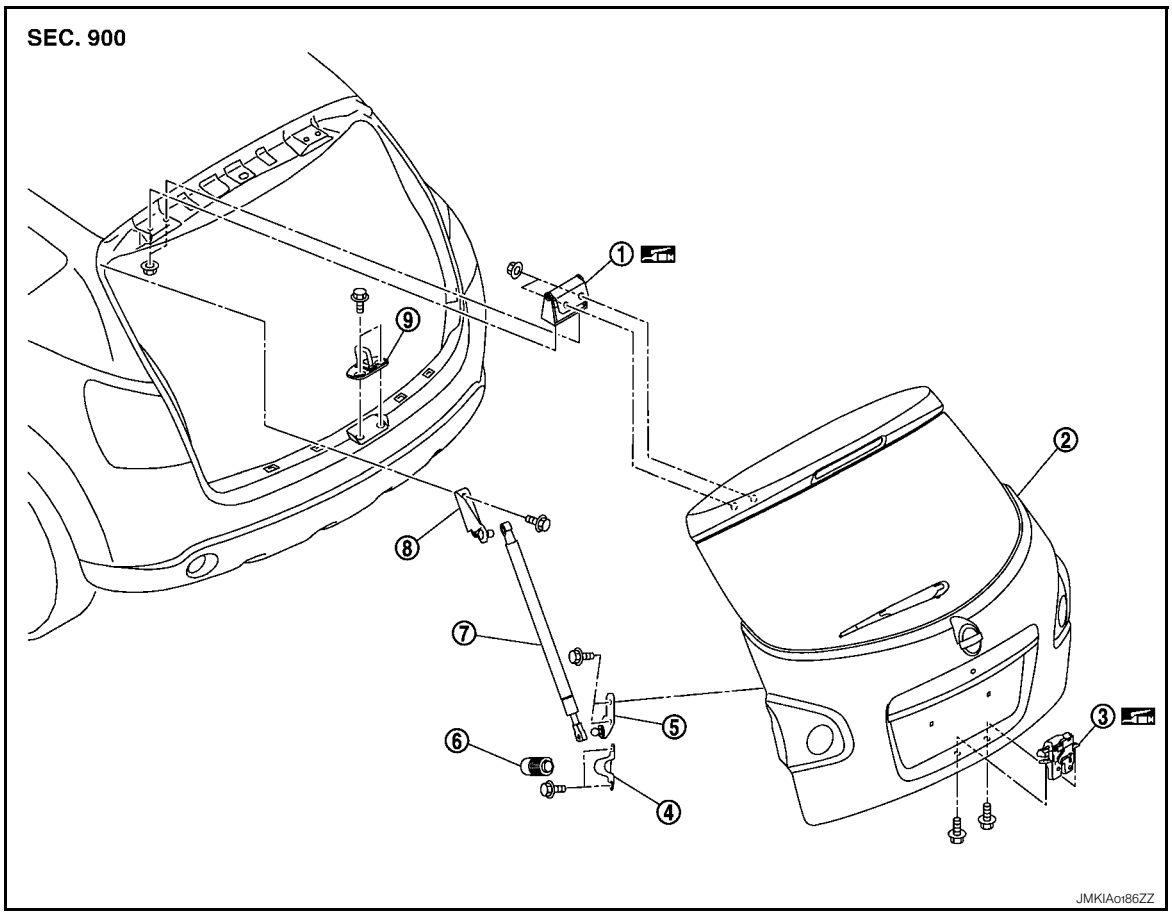
BACK DOOR

BACK DOOR ASSEMBLY

BACK DOOR ASSEMBLY : Exploded View

INFOID:0000000001098767

REMOVAL

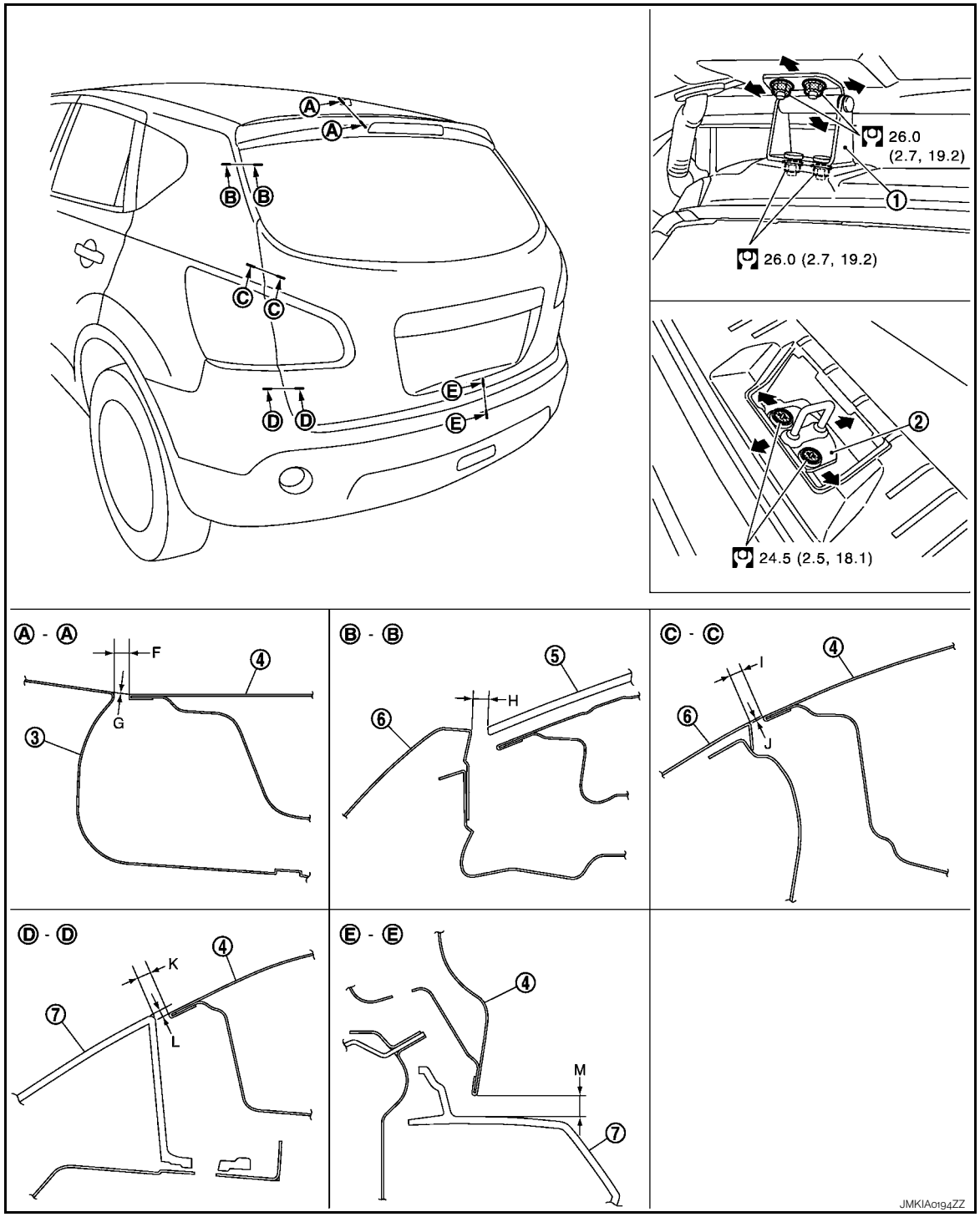


1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

ADJUSTMENT

cardiagn.com



1. Back door hinge
2. Back door striker
3. Roof panel
4. Back door outer
5. Back door glass
6. Body side outer
7. Rear bumper fascia

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR ASSEMBLY : Removal and Installation

INFOID:0000000001098768

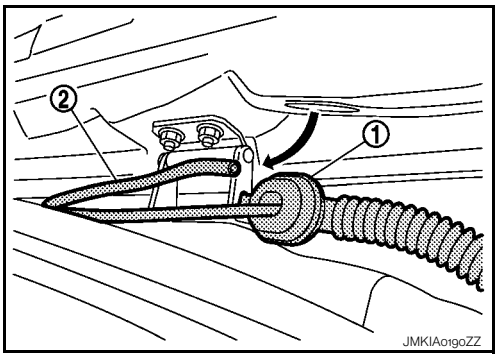
REMOVAL

1. Remove the back door finisher inner. Refer to INT-26, "Removal and Installation".
2. Remove the back door window glass. Refer to GW-17, "Removal and Installation".

NOTE:

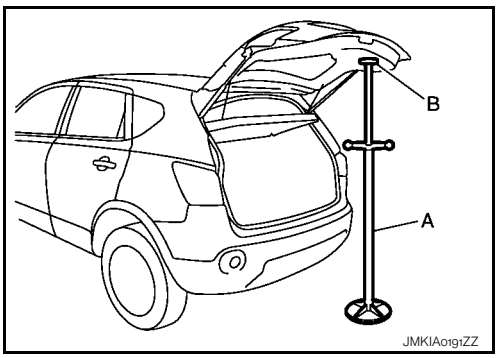
It is necessary to remove back door window glass in order to remove harness, because harness connector interferes with back door window glass pin.

3. Disconnect the connectors in the back door, and then remove the grommet, and pull out hte harness.
4. Remove the parcel shelf. Refer to INT-24, "Removal and Installation".
5. Remove the high-mounted stop lamp. Refer to EXL-183, "Removal and Installation".
6. Remove the grommet (1), and then pull out the washer tube (2) .

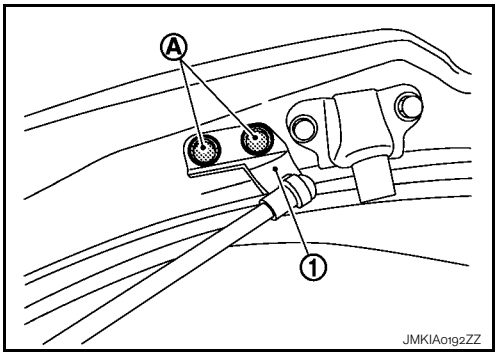


7. Pull the harness out of the back door.
8. Support the back door lock with the proper material to prevent it from falling.

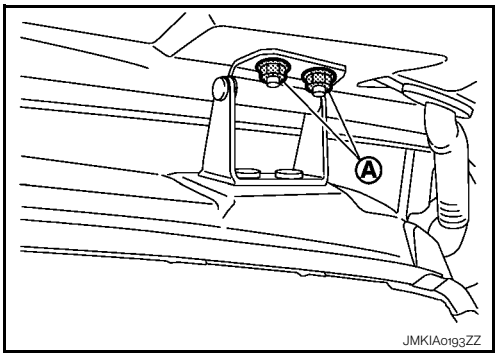
A : Jack
B : Shop cloth



9. Remove the back door stay bracket mounting bolts (A) on the back door.



10. Remove the back door hinge mounting nuts (A) on the back door and remove the back door assembly.
CAUTION:
Perform work with 2 workers, because of its heavy weight.



INSTALLATION
Install in the reverse order of removal.
CAUTION:
- **Perform work with 2 workers, because of its heavy weight.**

cardiagn.com

- **After installation, perform fitting adjustment. Refer to DLK-855, "BACK DOOR ASSEMBLY : Adjustment".**
- **Check the back door open/close operation after installation.**
- **Check the back door lock/unlock operation after installation.**

BACK DOOR ASSEMBLY : Adjustment

INFOID:0000000001098769

Portion				Standard	Difference(RH/LH)
Back door panel – Roof panel	A – A	F	Clearance	5.0 – 7.0 mm (0.197 – 0.276 in)	—
		G	Surface height	0.0 – 2.0 mm (0.000 – 0.079 in)	—
Back door glass – Body side outer	B – B	H	Clearance	3.9 – 8.1 mm (0.154 – 0.319 in)	2.1 mm (0.083 in)
		I	Surface height	- 1.0 – 3.1 mm (- 0.039 – 0.122 in)	2.0 mm (0.079 in)
Back door panel – Body side outer	C – C	J	Clearance	3.5 – 6.5 mm (0.138 – 0.256 in)	2.0 mm (0.079 in)
		K	Surface height	- 1.0 – 1.0 mm (- 0.039 – 0.039 in)	—
Back door panel – Rear bumper fascia	D – D	L	Clearance	4.0 – 8.0 mm (0.157 – 0.315 in)	2.0 mm (0.079 in)
		M	Surface height	0.1 – 4.1 mm (0.004 – 0.161 in)	2.1 mm (0.083 in)
Back door panel – Rear bumper fascia	E – E	N	Clearance	5.8 – 10.2 mm (0.228 – 0.402 in)	—

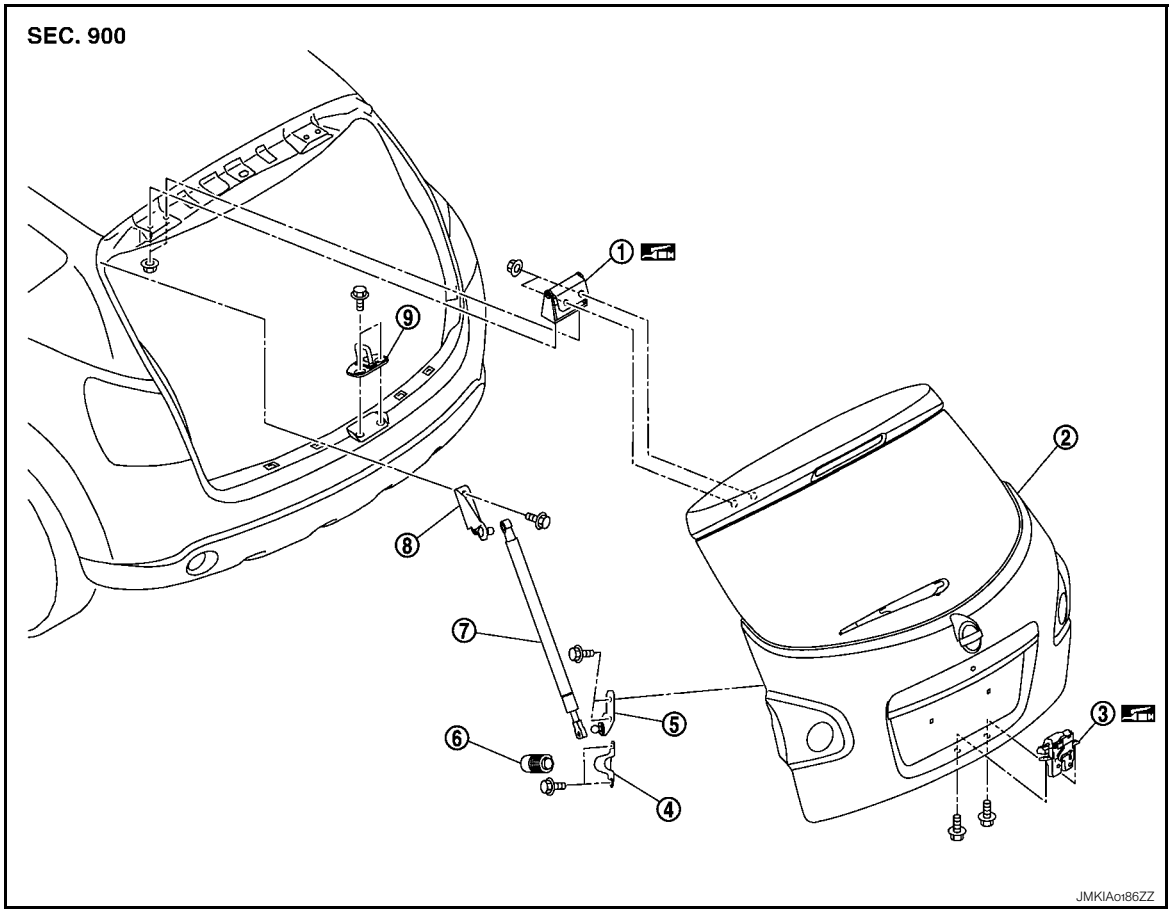
FITTING ADJUSTMENT

1. Check the clearance and the evenness between the back door and each part visually and by touching. (Fitting standard dimension in the table below shall be satisfied.)
2. In case any parts are out of specification, adjust them according to the procedures shown below.
3. Loosen the bumper rubber.
4. Loosen the back door striker mounting bolts.
5. Lift up the back door approximately 100 – 150 mm (3.937 – 5.906 in) height then close it lightly and check that it is engaged firmly with the back door closed.
6. Check the clearance and evenness.
7. Finally tighten the back door striker.

BACK DOOR STRIKER

BACK DOOR STRIKER : Exploded View

INFOID:0000000001098771



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR STRIKER : Removal and Installation

INFOID:0000000001098773

REMOVAL

1. Remove the luggage rear plate cap. Refer to INT-24, "Removal and Installation".
2. Remove the mounting bolts, and then remove the back door striker.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

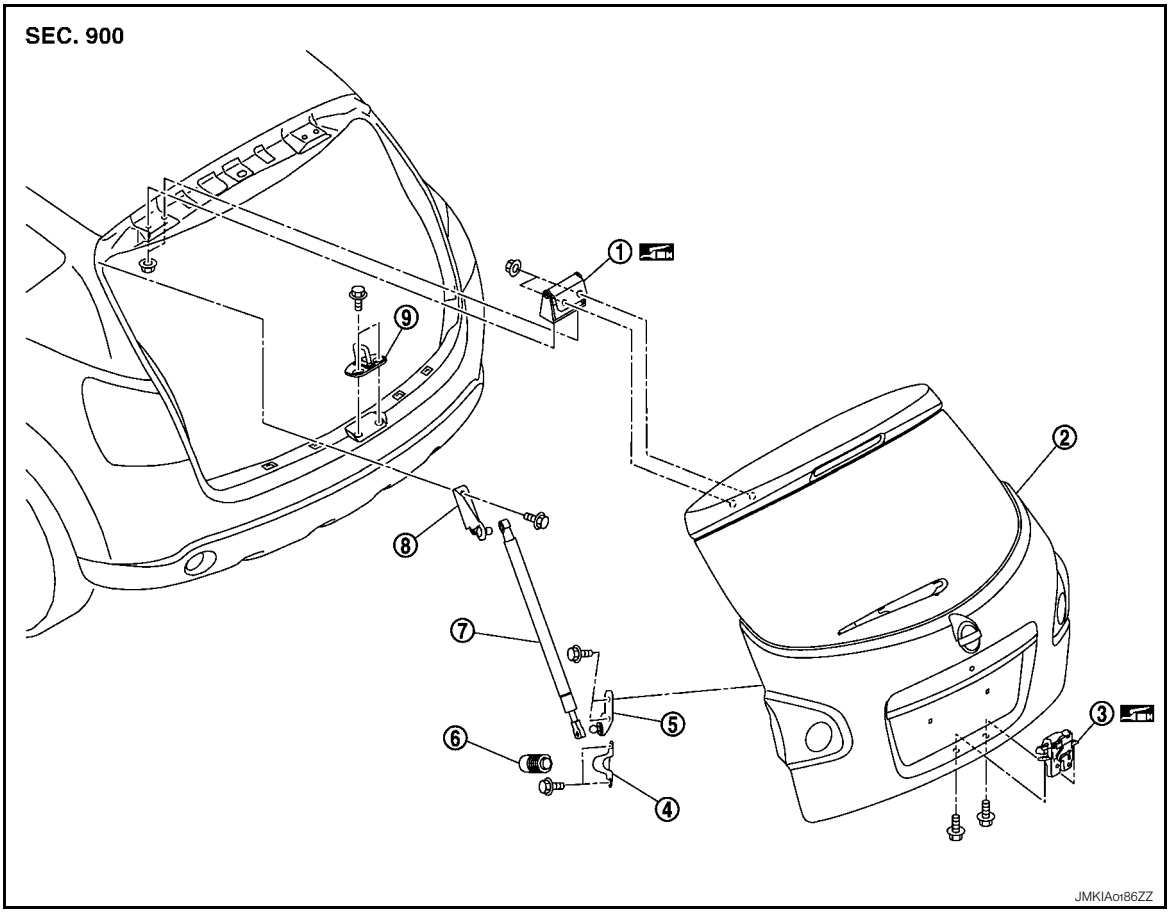
- **When removing and installing the back door striker, be sure to perform the fitting adjustment. Refer to DLK-855, "BACK DOOR ASSEMBLY : Adjustment".**
- **Check the back door open/close operation after installation.**

BACK DOOR HINGE

BACK DOOR HINGE : Exploded View

INFOID:0000000001102427

cardiagn.com



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR HINGE : Removal and Installation

INFOID:0000000001102428

REMOVAL

1. Remove the back door assembly. Refer to DLK-248, "BACK DOOR ASSEMBLY : Removal and Installation".
2. Remove upper side of the back door weatherstrip. Refer to DLK-254, "BACK DOOR WEATHER-STRIP : Removal and Installation".
3. Remove rear seat belt cover. Refer to INT-21, "Removal and Installation".
4. Using remover tool, remove the headlining clip at the rear side of the headlining. Refer to INT-20, "Exploded View".
5. Remove the rear side of the headlining.
6. Remove the back door hinge mounting nuts (body side), and then remove the back door hinge.

INSTALLATION

Install in the reverse order of removal.

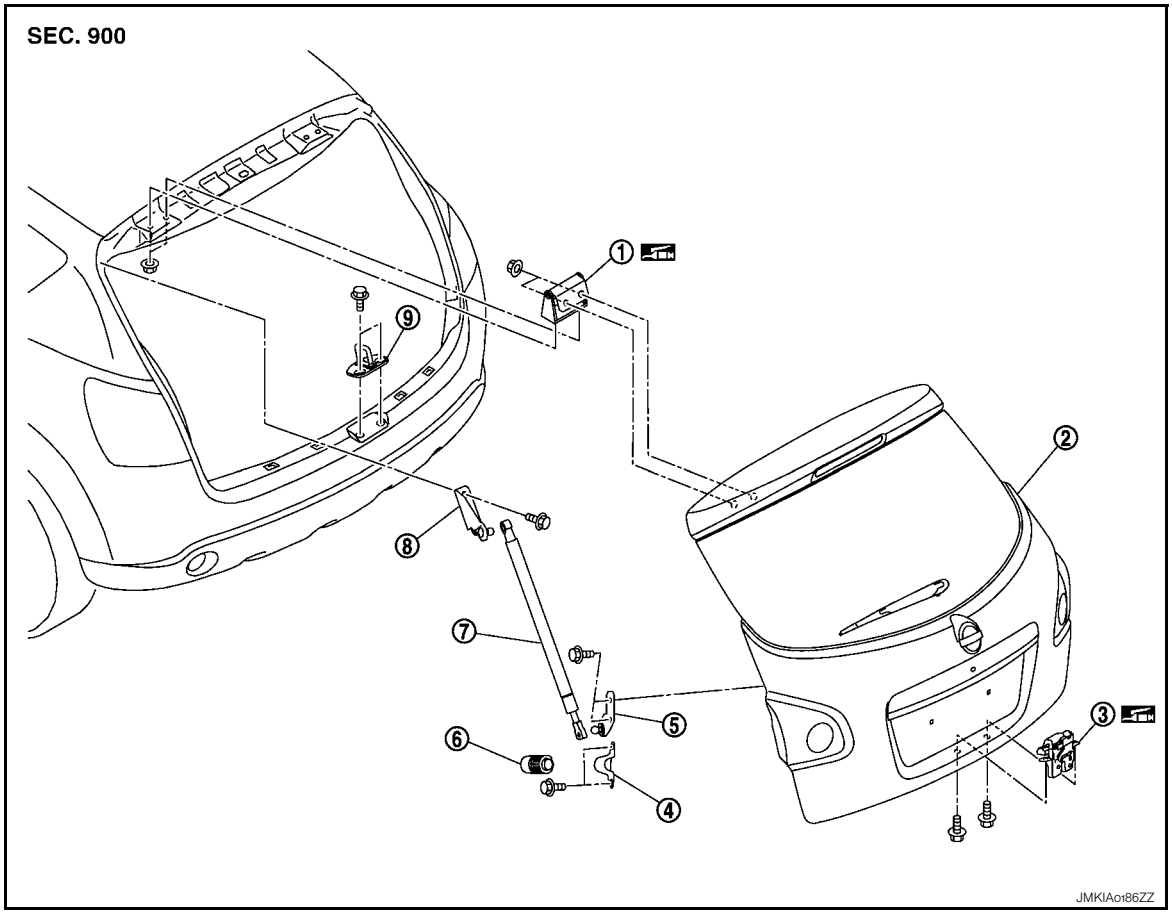
CAUTION:

- **When removing and installing the back door assembly, perform the fitting adjustment. Refer to DLK-250, "BACK DOOR ASSEMBLY : Adjustment".**
- **After installation, apply touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Check the hinge rotating part for poor lubrication. If necessary, apply body grease.**
- **Check the back door open/close operation after installation.**

BACK DOOR STAY

BACK DOOR STAY : Exploded View

INFOID:0000000001098774



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

BACK DOOR STAY : Removal and Installation

INFOID:0000000001098777

REMOVAL

1. Remove the stud ball (upper/lower), and then remove the back door stay.
2. Remove the mounting bolts, and then remove the back door stay bracket (upper/lower).

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Check the back door open/close operation after installation.

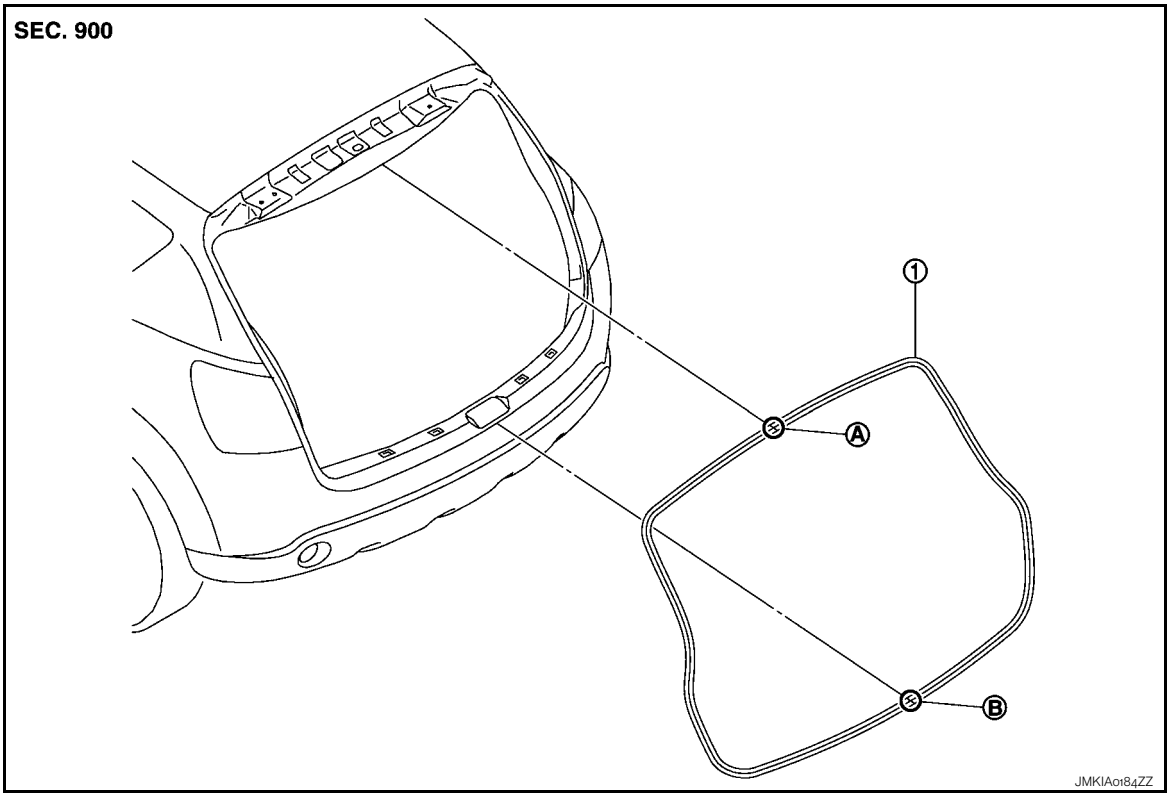
BACK DOOR WEATHER-STRIP

BACK DOOR WEATHER-STRIP : Exploded View

INFOID:0000000001098778

REMOVAL

cardiagn.com



1. Back door weatherstrip
A. Mark (upper)
B. Mark (lower)

BACK DOOR WEATHER-STRIP : Removal and Installation

INFOID:0000000001098780

REMOVAL

Pull up and remove engagement with body from the weatherstrip joint.

CAUTION:

After removal, do not pull strongly on the weather-strip.

INSTALLATION

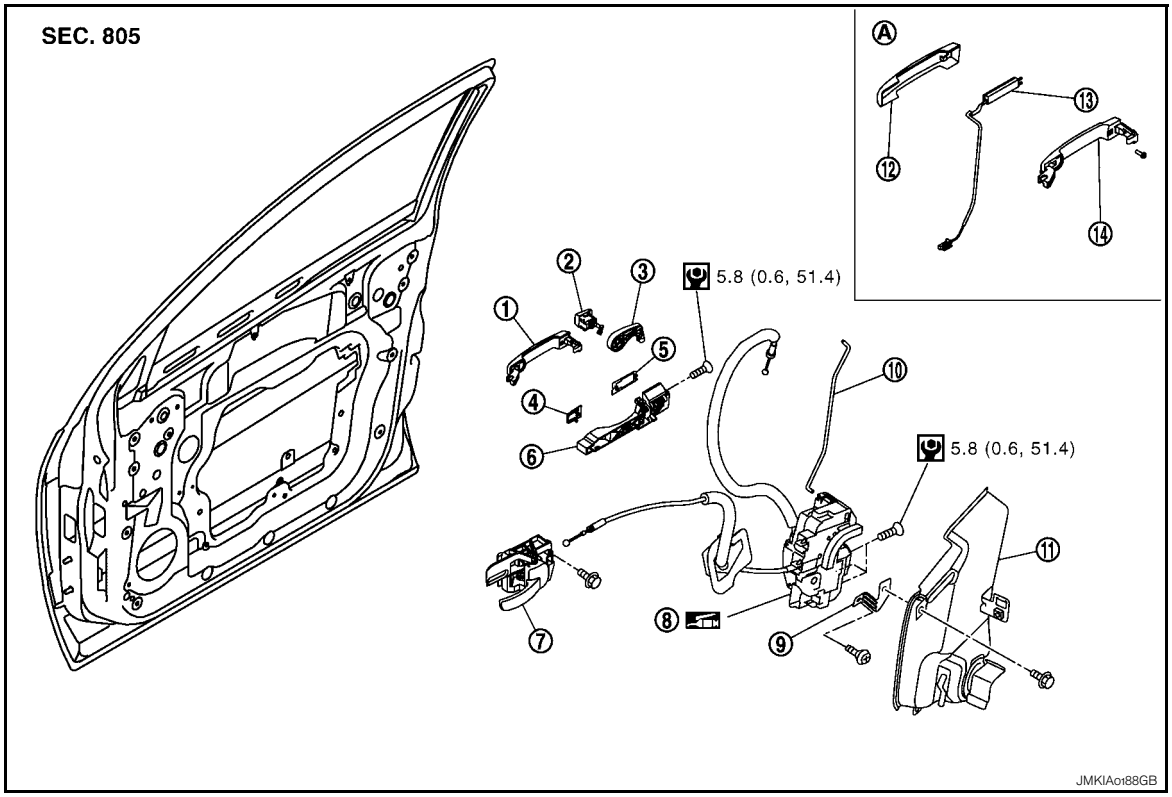
1. Working from the upper section, align the weatherstrip mark with vehicle center position mark and install the weatherstrip onto the vehicle.
2. For the lower section, align the weatherstrip seam with center of the back door striker.
3. After installation, pull the weatherstrip gently to ensure that there is no loose section.
   NOTE:
   Make sure that the weatherstrip is fit tlightly at each corner and the luggage rear plate.

FRONT DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001098781



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

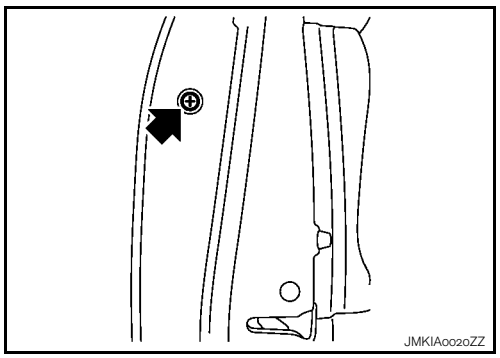
INFOID:0000000001098782

REMOVAL

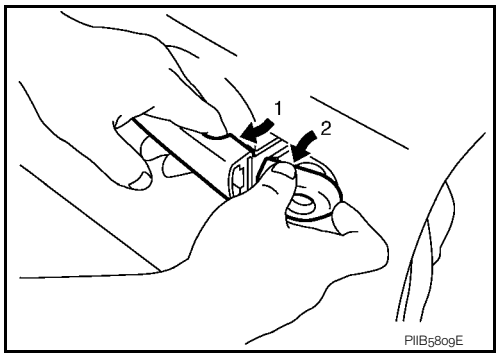
1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
3. Remove the front door glass. Refer to GW-19, "Removal and Installation".
4. Remove the front door module assembly. Refer to GW-22, "Removal and Installation".
5. Disconnect the door antenna and the door request switch connector and remove the harness clamp (models with Intelligent Key system).

cardiagn.com

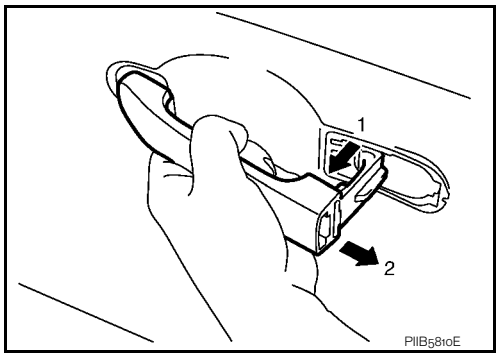
6. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and outside handle escutcheon (passenger side) mounting bolts from grommet hole.
CAUTION:
Do not forcibly remove the bolts (TORX: T10).



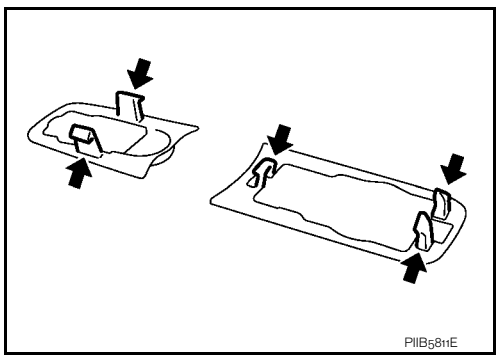
7. Reach in to separate the key cylinder rod connection (on the handle).
8. Disconnect the door key cylinder switch harness connector.
9. Remove the key cylinder lever from the door key cylinder.
10. While pulling the outside handle, remove door key cylinder assembly.



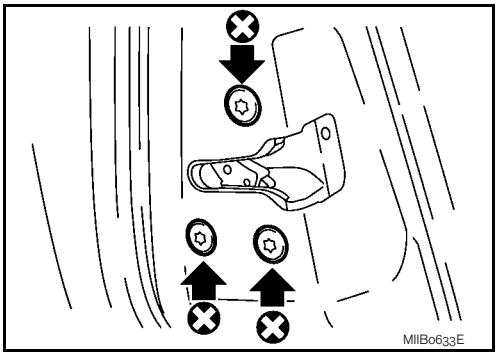
11. Disconnect front door request switch harness connector (models with Intelligent Key system).
12. While pulling outside handle, slide toward rear of vehicle to remove outside handle.



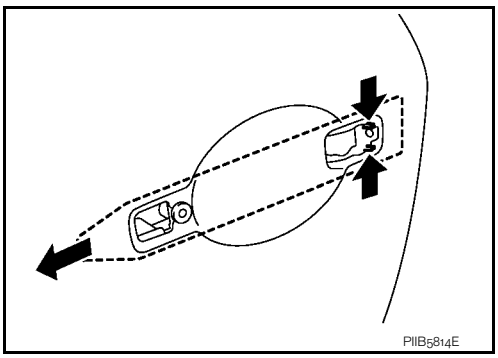
13. Remove the front gasket and the rear gasket.



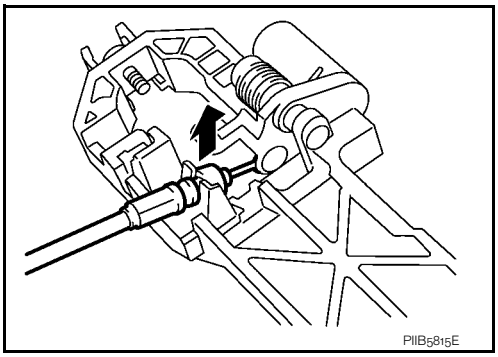
14. Remove the door lock assembly mounting bolts (TORX: T30).
15. Disconnect the door lock actuator connector, and then remove the door lock assembly.



16. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



17. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

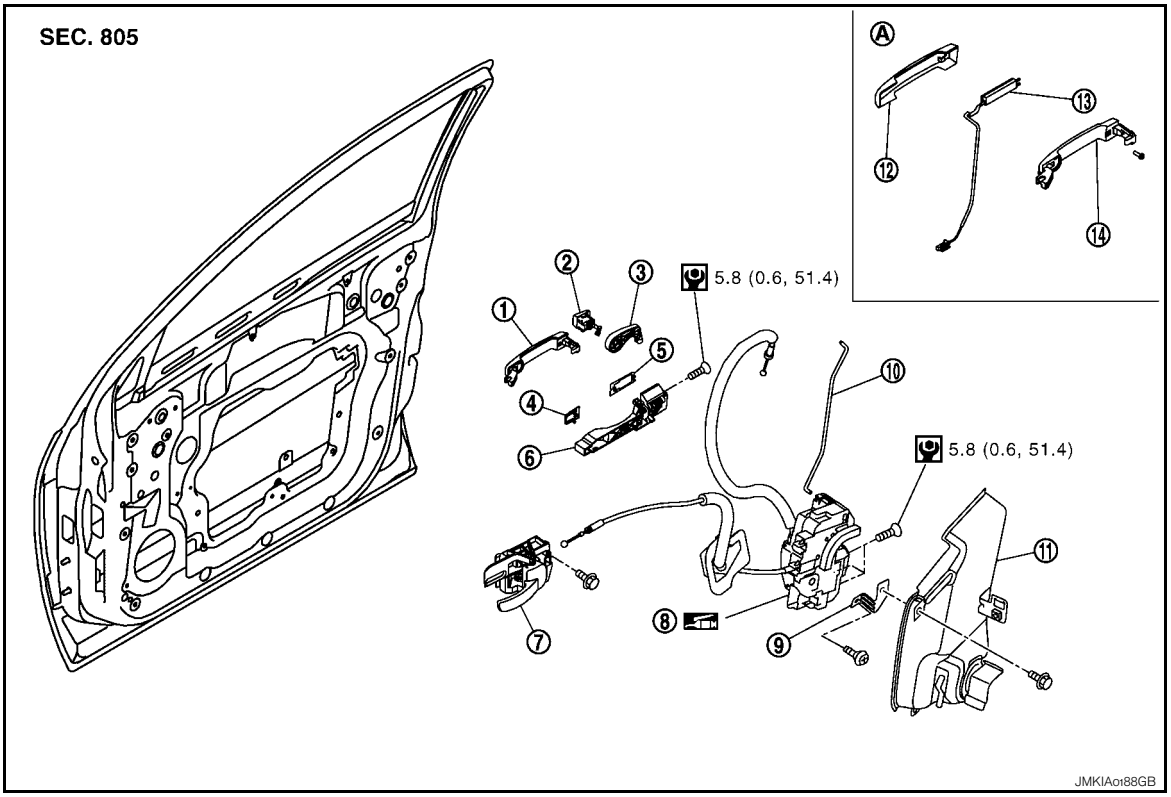
- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

INSIDE HANDLE

INSIDE HANDLE : Exploded View

INFOID:0000000001098787

cardiagn.com



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

Refer to GI-4, "Components" for symbols in the figure.

INSIDE HANDLE : Removal and Installation

INFOID:0000000001098788

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt.
3. Disconnect the inside handle knob cable and the lock knob cable, and then remove the inside handle.

INSTALLATION

Install in the reverse order of removal.

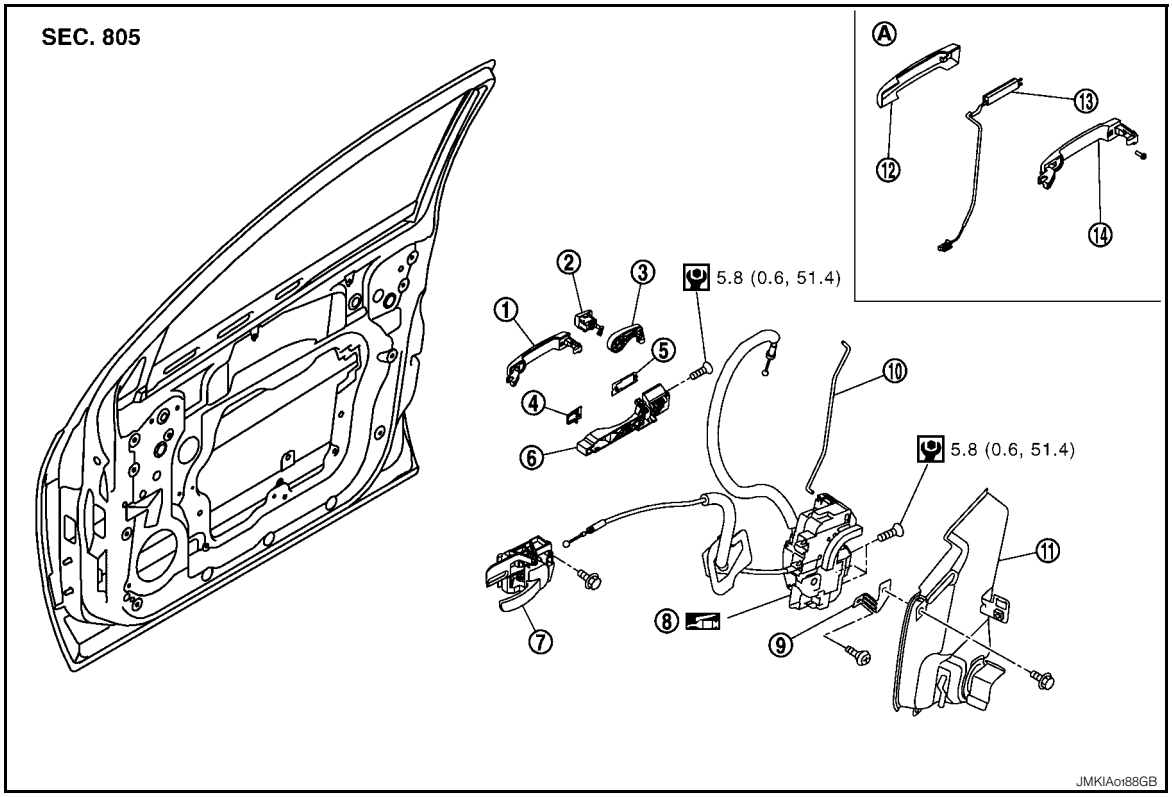
CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

OUTSIDE HANDLE

OUTSIDE HANDLE : Exploded View

INFOID:0000000001098789



1. Outside handle assembly
2. Door key cylinder
3. Key cylinder lever
4. Front gasket
5. Rear gasket
6. Outside handle bracket
7. Inside handle
8. Door lock assembly
9. Key cylinder rod
10. Key rod protector
11. Key rod protector assembly (RH handle only)
12. Outside handle cover
13. Antenna
14. Outside handle base

A: Intelligent Key only

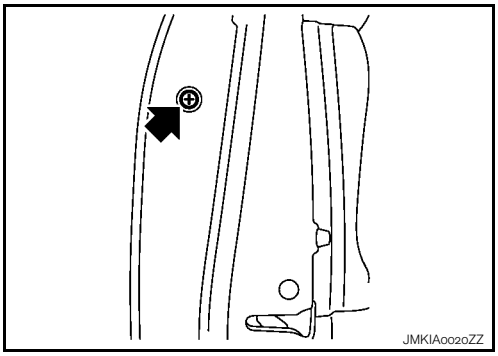
Refer to GI-4, "Components" for symbols in the figure.

OUTSIDE HANDLE : Removal and Installation

INFOID:0000000001098790

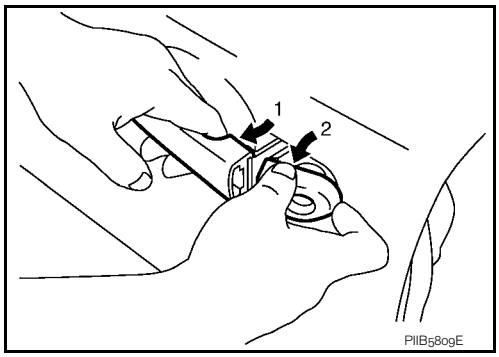
REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the inside handle mounting bolt, and disconnect the inside handle knob cable and the lock knob cable.
3. Remove the front door glass. Refer to GW-19, "Removal and Installation".
4. Remove the front door module assembly. Refer to GW-22, "Removal and Installation".
5. Disconnect the door antenna and the door request switch connector and remove the harness clamp (models with Intelligent Key system).
6. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
   CAUTION:
   Do not forcibly remove the bolts (TORX: T10).

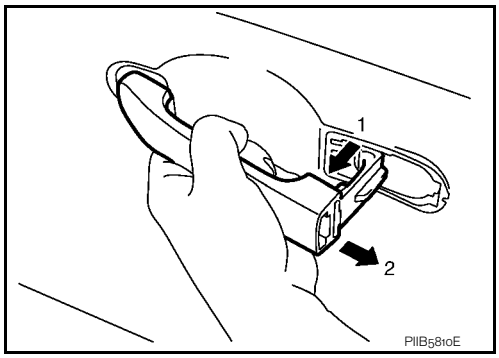


cardiagn.com

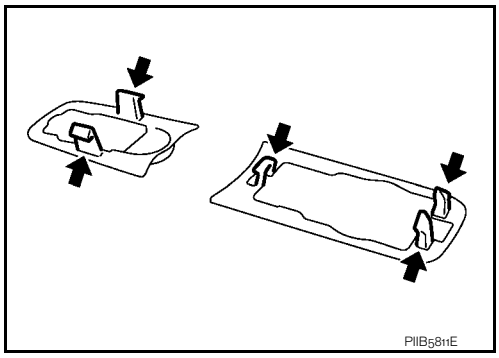
7. Reach in to separate the key cylinder rod connection (on the handle).
8. Disconnect the door key cylinder switch harness connector.
9. Remove the key cylinder lever from the door key cylinder.
10. While pulling the outside handle, remove the door key cylinder assembly.



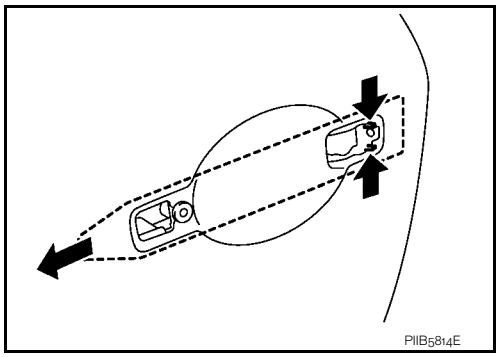
11. Disconnect the front door request switch harness connector (models with Intelligent Key system).
12. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



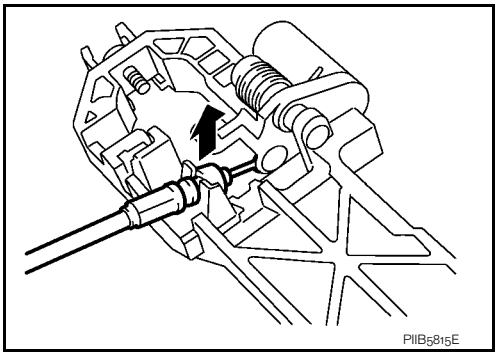
13. Remove the front gasket and rear gasket.



14. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



15. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

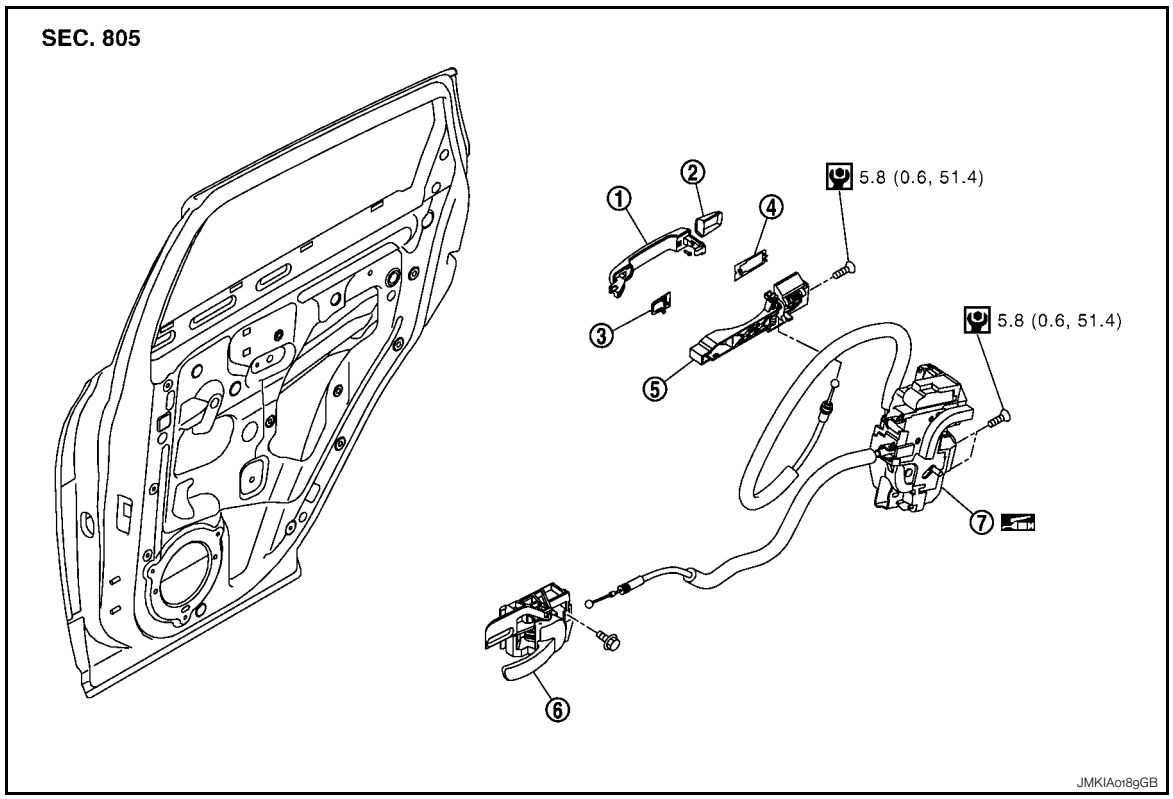
cardiagn.com

REAR DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001098793



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

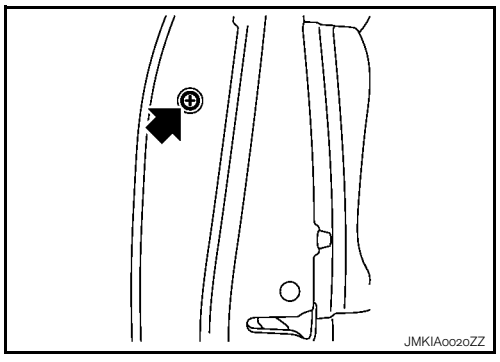
Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

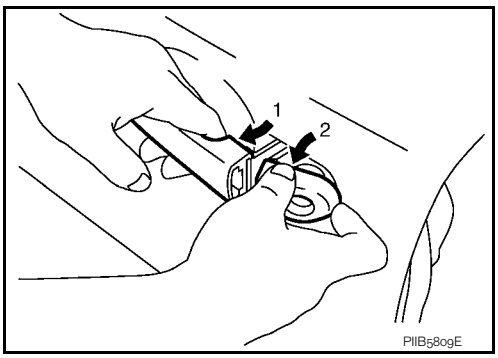
INFOID:0000000001098794

REMOVAL

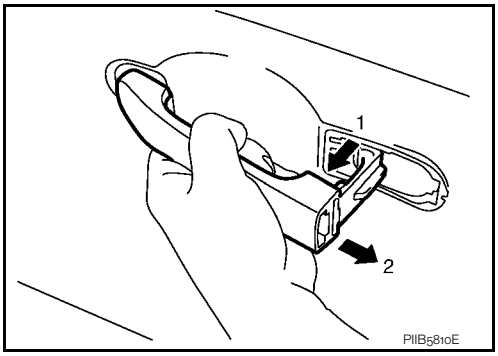
1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Fully close the front door window.
3. Remove the door sealing screen.
4. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
5. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
   CAUTION:
   Do not forcibly remove the bolts (TORX: T10).



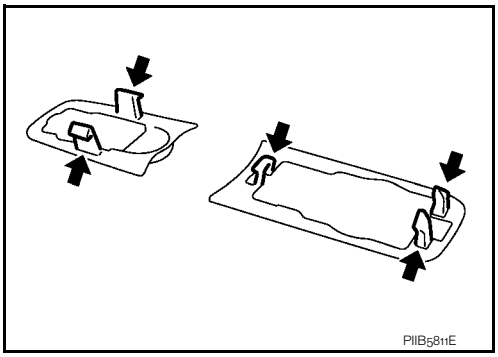
6. While pulling the outside handle, remove the door key cylinder assembly.



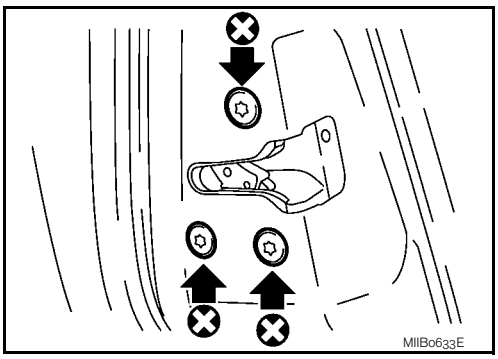
7. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



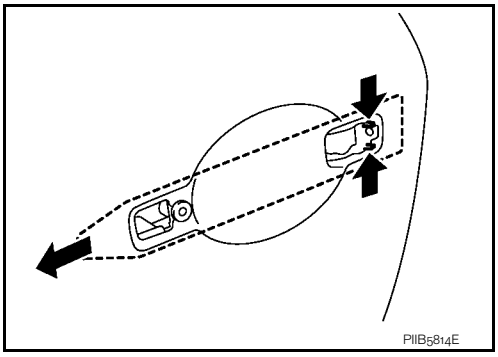
8. Remove the front gasket and the rear gasket.



9. Remove the door lock assembly mounting bolts (TORX: T30).
10. Disconnect the door lock actuator connector, and then remove the door lock assembly.

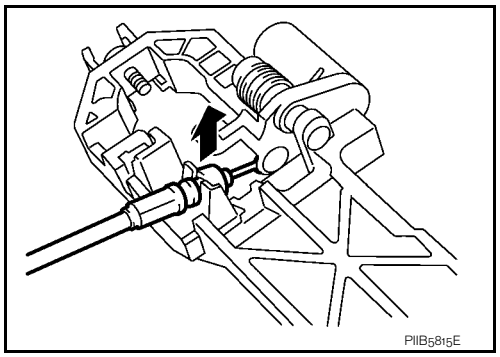


11. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



cardiagn.com

12. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

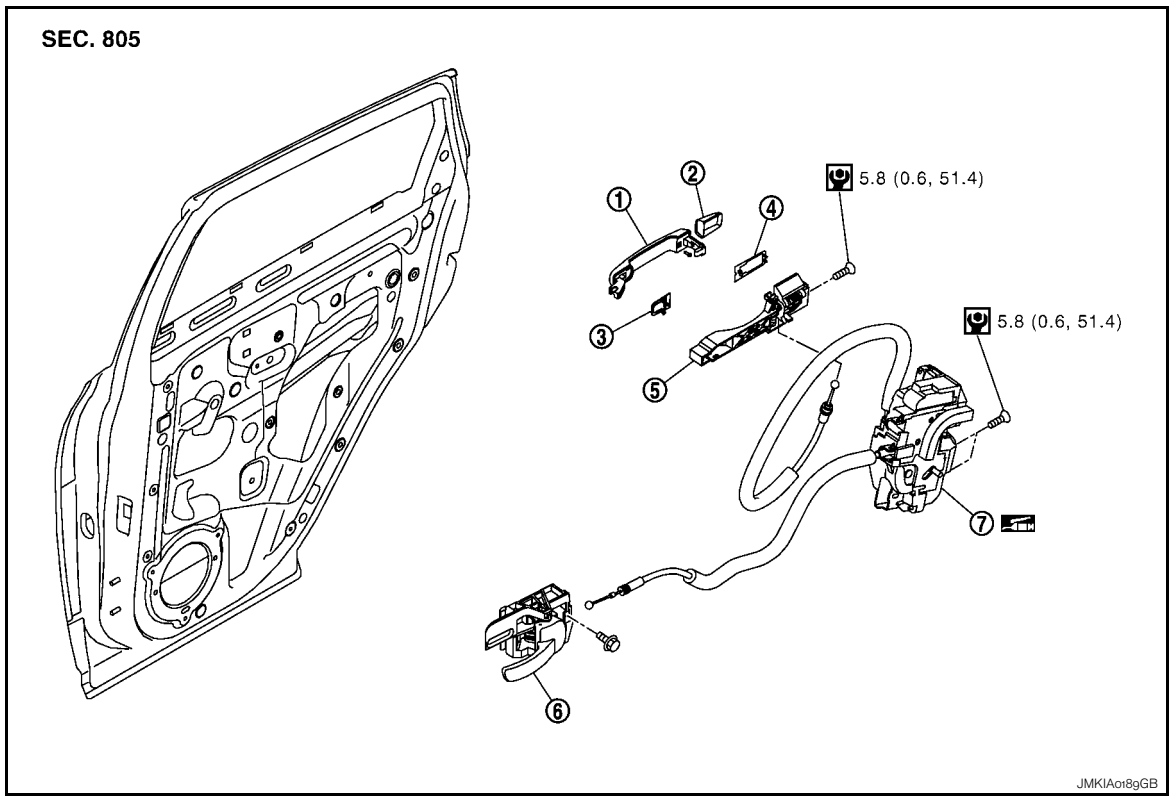
CAUTION:

- **To install each rod, rotate the rod holder until a click is felt.**
- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

INSIDE HANDLE

INSIDE HANDLE : Exploded View

INFOID:0000000001098797



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

Refer to GI-4, "Components" for symbols in the figure.

INSIDE HANDLE : Removal and Installation

INFOID:0000000001098798

REMOVAL

1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Remove the door sealing screen.

carDiagn.com

3. Remove the inside handle mounting bolt, and then disconnect the inside handle knob cable and the lock knob cable.
4. Remove the inside handle.

INSTALLATION

Install in the reverse order of removal.

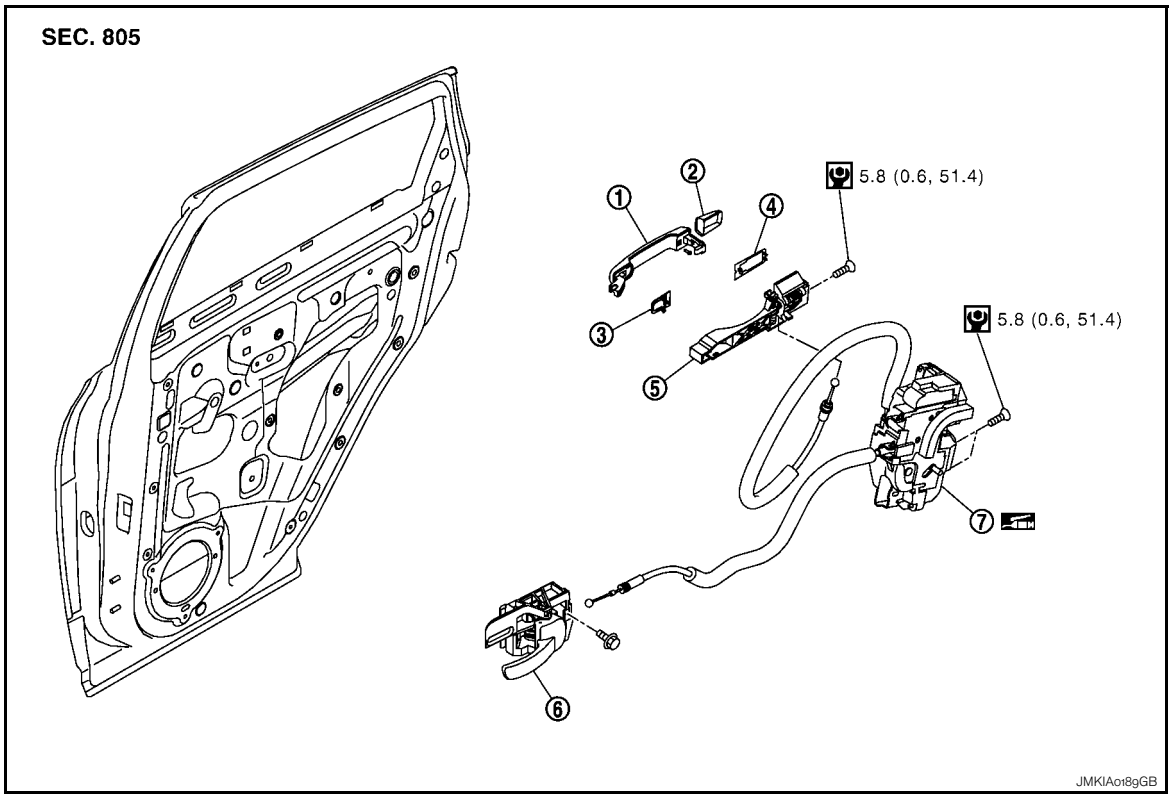
CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

OUTSIDE HANDLE

OUTSIDE HANDLE : Exploded View

INFOID:0000000001098799



1. Outside handle
2. Outside handle escutcheon
3. Front gasket
4. Rear gasket
5. Outside handle bracket
6. Inside handle
7. Door lock assembly

Refer to GI-4, "Components" for symbols in the figure.

OUTSIDE HANDLE : Removal and Installation

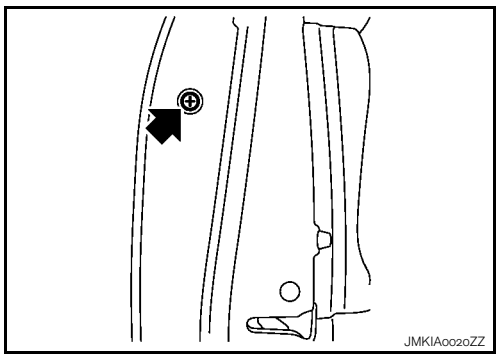
INFOID:0000000001098800

REMOVAL

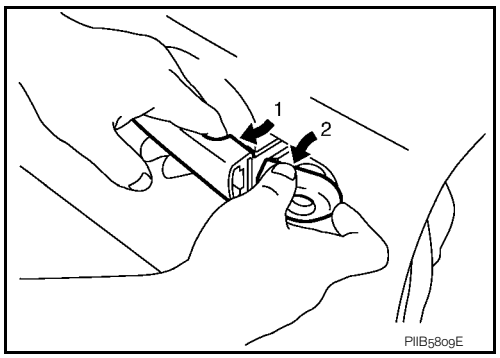
1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Fully close the front door window.
3. Remove the door sealing screen.
4. Remove the inside handle mounting bolt, disconnect the inside handle knob cable and the lock knob cable.

cardiagn.com

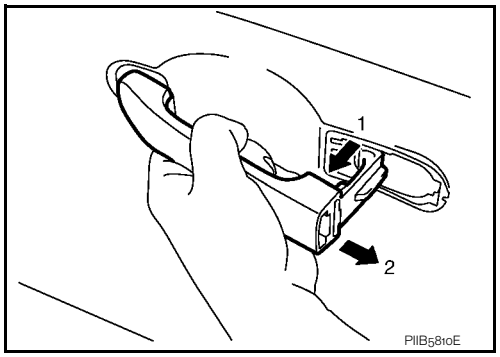
5. Remove the door side grommet, and remove the door key cylinder assembly (driver side) and the outside handle escutcheon (passenger side) mounting bolts from the grommet hole.
CAUTION:
Do not forcibly remove the bolts (TORX: T10).



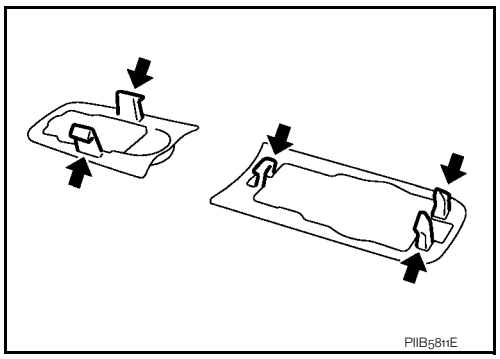
6. While pulling the outside handle, and then remove the door key cylinder assembly.



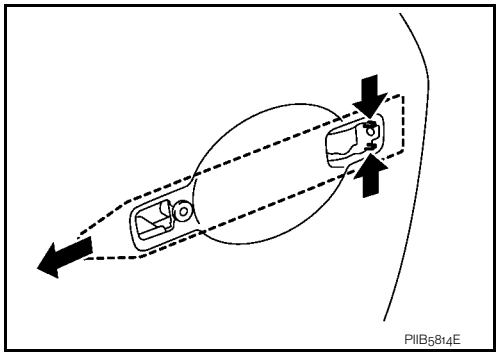
7. While pulling the outside handle, slide toward rear of vehicle to remove the outside handle.



8. Remove the front gasket and the rear gasket.

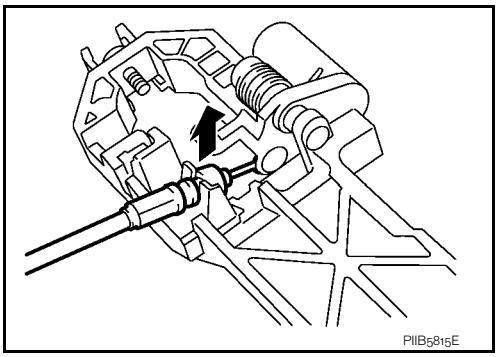


9. While pulling the outside handle bracket, slide toward rear of vehicle to remove the outside handle bracket.



carsdiagn.com

10. Reach in to separate the outside handle cable connection.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Check the door lock/unlock operation after installation.**
- **Check the door open/close operation after installation.**

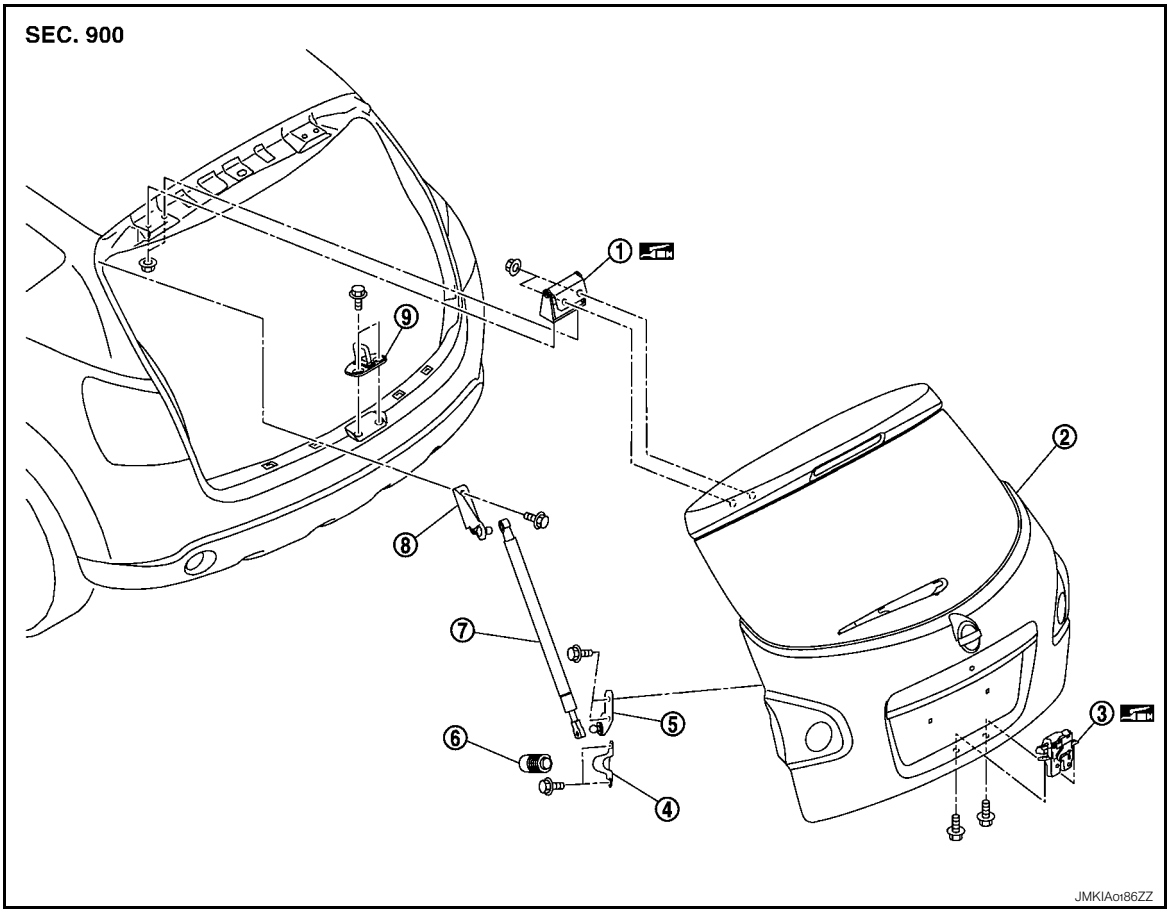
cardiagn.com

BACK DOOR LOCK

DOOR LOCK

DOOR LOCK : Exploded View

INFOID:0000000001098805



1. Back door hinge
2. Back door assembly
3. Back door lock assembly
4. Bumper rubber bracket
5. Back door stay bracket (lower)
6. Bumper rubber
7. Back door stay
8. Back door stay bracket (upper)
9. Back door striker

Refer to GI-4, "Components" for symbols in the figure.

DOOR LOCK : Removal and Installation

INFOID:0000000001098806

REMOVAL

1. Remove the back door trim finisher lower. Refer to INT-26, "Removal and Installation".
2. Disconnect the back door lock assembly and back door opener switch connectors.
3. Remove the back door lock mounting bolts, and then remove the back door lock and actuator.

INSTALLTION

Install in the reverse order of removal.

CAUTION:

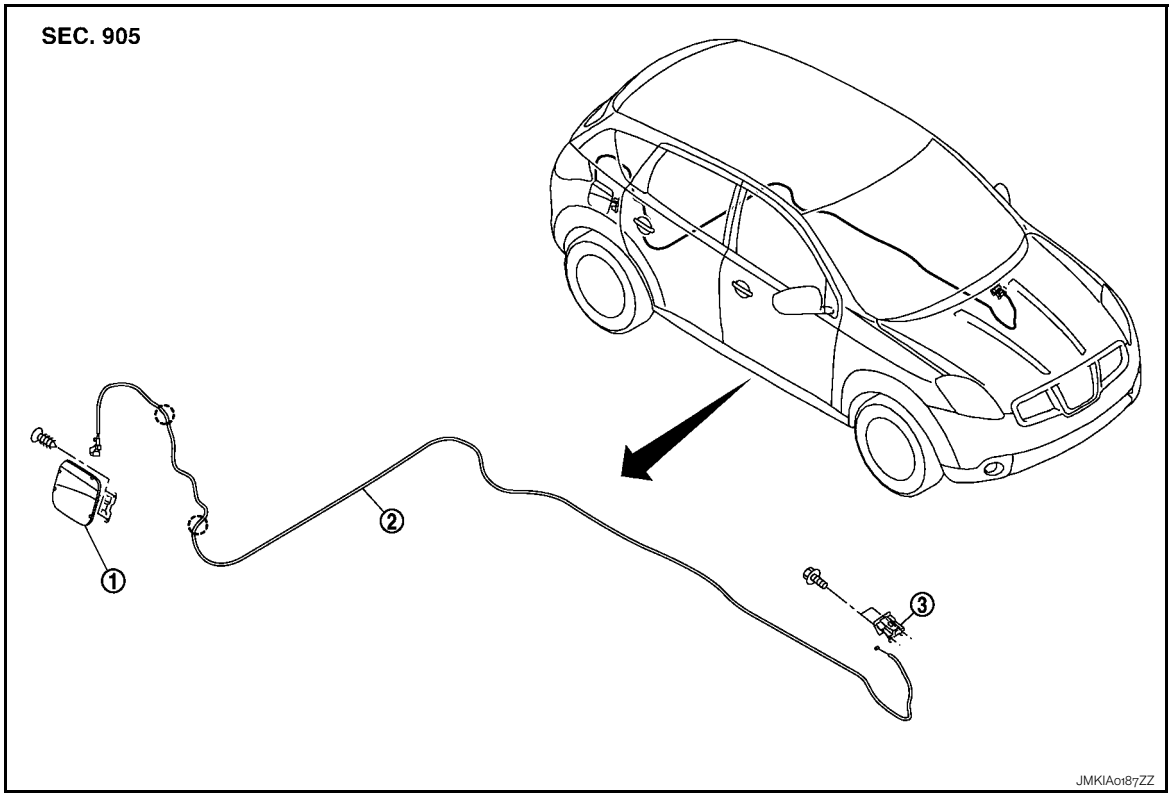
Check the back door lock/unlock operation after installation.

FUEL FILLER LID OPENER

FUEL FILLER LID

FUEL FILLER LID : Exploded View

INFOID:0000000001098811



1. Fuel filler lid assembly
2. Fuel filler opener cable
3. Fuel opener lever

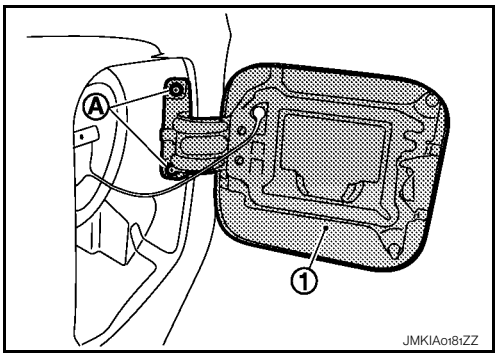
: Clip

FUEL FILLER LID : Removal and Installation

INFOID:0000000001098812

REMOVAL

1. Fully open the fuel filler lid.
2. Remove the filler cap.
3. Remove the mounting screws (A), and then remove the fuel filler lid (1).



INSTALLATION

Install in the reverse order of removal.

CAUTION:

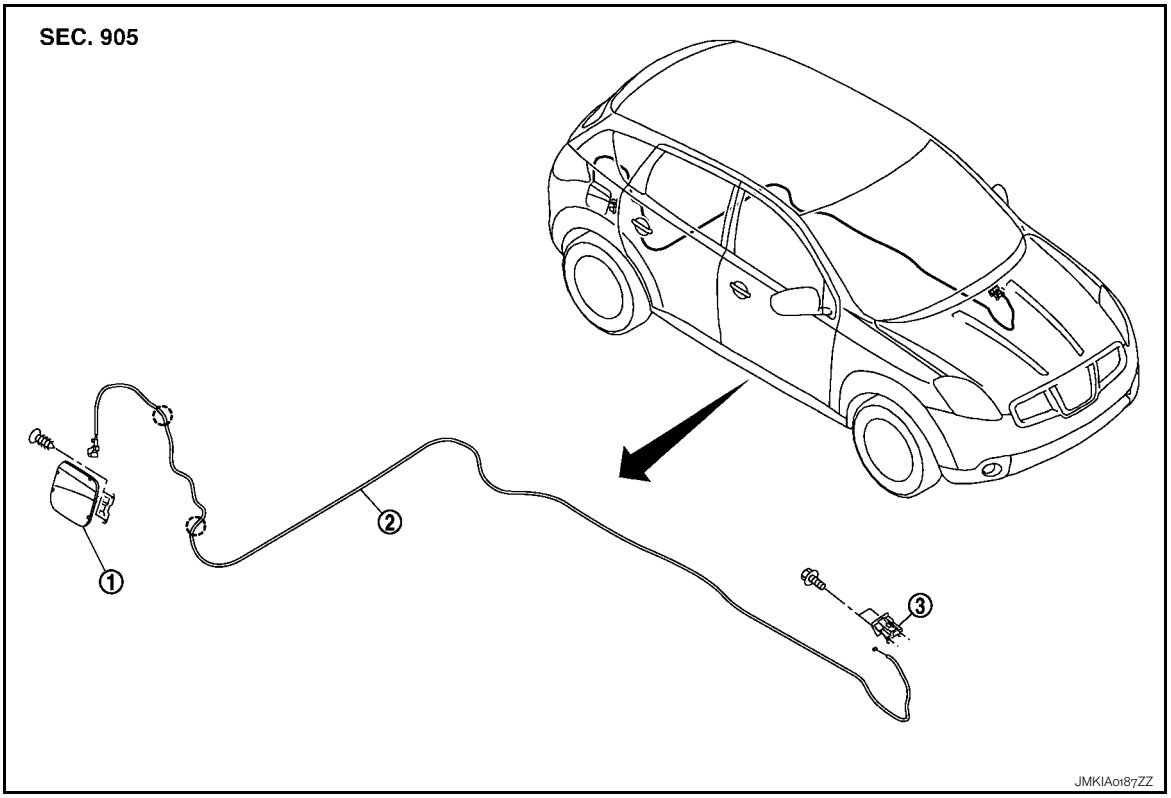
After installation, apply the touch-up paint (the body color) onto the head of the mounting screws.

FUEL FILLER OPENER CABLE

cardiagn.com

FUEL FILLER OPENER CABLE : Exploded View

INFOID:0000000001098813



1. Fuel filler lid assembly
2. Fuel filler opener cable
3. Fuel opener lever

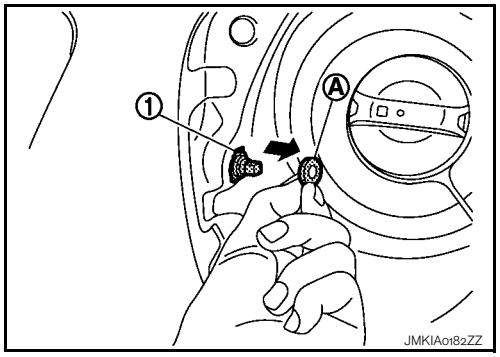
: Clip

FUEL FILLER OPENER CABLE : Removal and Installation

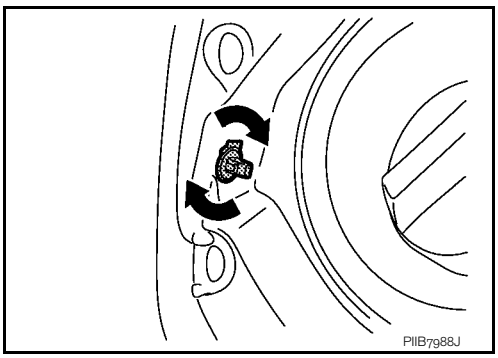
INFOID:0000000001098814

REMOVAL

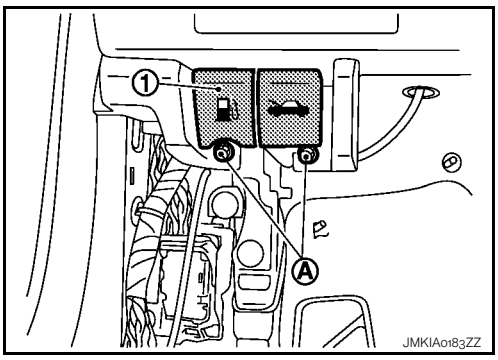
1. Remove the rear seat cushion, rear seatback, seatback lower support, and seatback mounting outer bracket. Refer to SE-31, "Removal and Installation".
2. Remove the dash side finisher, front kicking plate inner, rear kicking plate inner, center pillar lower garnish, and luggage side lower finisher (front). Refer to INT-14, "Removal and Installation".
3. Remove the parcel shelf, luggage floor carpet, luggage floor spacer, luggage rear plate, luggage side lower finisher, and rear pillar finisher. Refer to INT-24, "Removal and Installation".
4. Remove the fuel filler lock seal (1).



5. Rotate the fuel filler lock, and then remove the fuel filler lock.



6. Remove the fuel filler opener cable mounting clips and the clamps.
7. Remove the mounting bolts, and then remove the fuel filler lid opener lever.



8. Remove the fuel filler opener cable.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

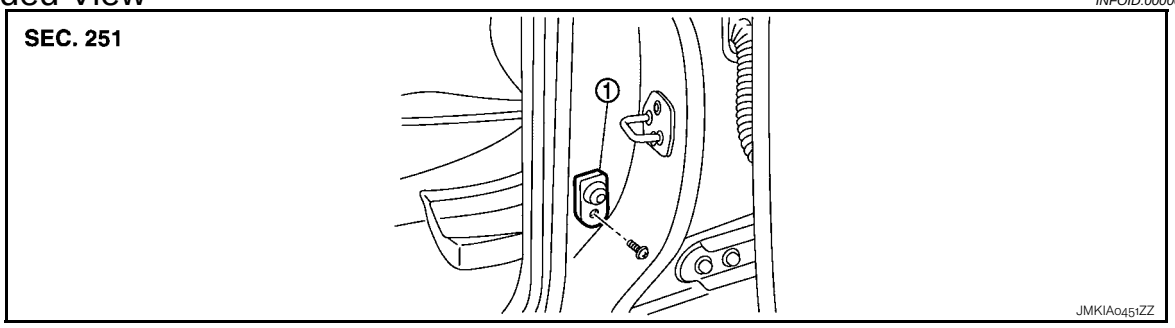
Check the fuel filler lid open/close operation after installation.

cardiagn.com

DOOR SWITCH

Exploded View

INFOID:0000000001095599



1. Door switch (driver side)

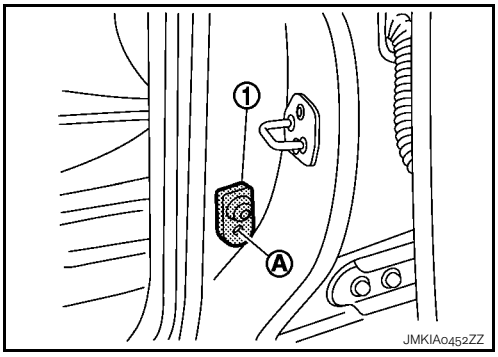
Refer to DLK-877, "Removal and Installation".

Removal and Installation

INFOID:0000000001095600

REMOVAL

1. Remove the door switch mounting bolt (A), and then remove door switch (1).
   NOTE:
   The same procedure is also performed for door switch (passenger side, rear LH and rear RH).



INSTALLATION

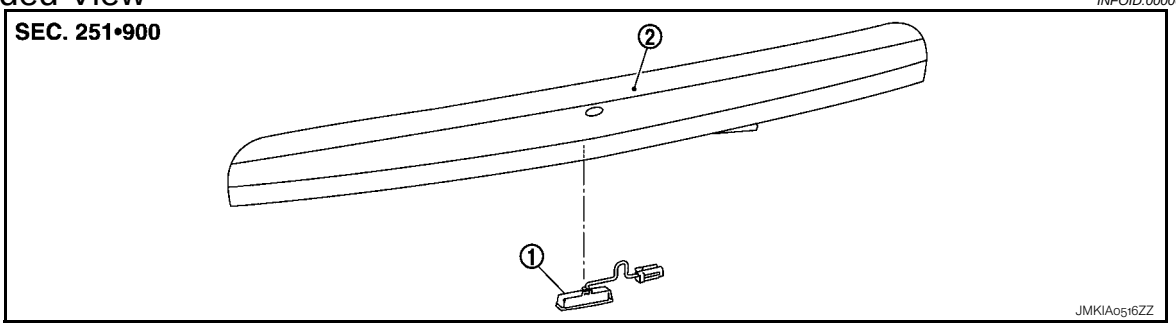
Install in the reverse order of removal.

carsdiagn.com

BACK DOOR OPENER SWITCH

Exploded View

INFOID:0000000001116794



1. Back door opener switch
2. Back door finisher

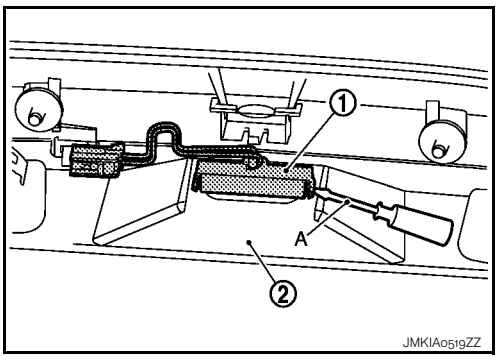
Refer to DLK-878, "Removal and Installation".

Removal and Installation

INFOID:0000000001116795

REMOVAL

1. Remove the back door finisher.
   Refer to EXT-31, "Exploded View" and EXT-31, "Removal and Installation".
2. Remove the back door opener switch (1) from back door finisher (2) using flat-bladed screw driver (A) etc.



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

KEYFOB BATTERY

Exploded View

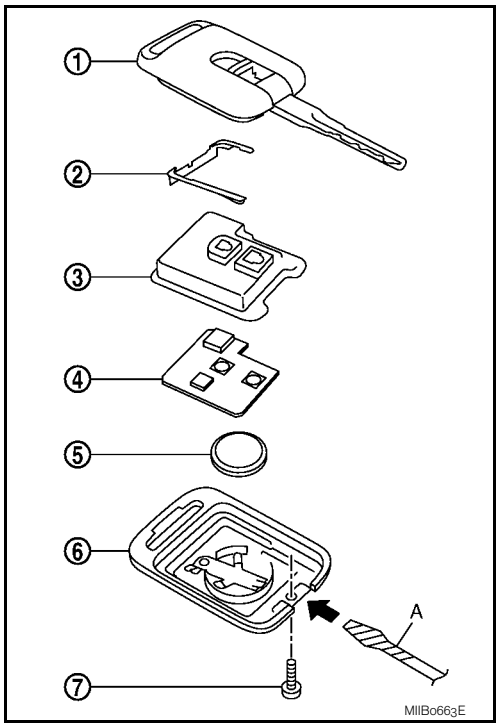
INFOID:0000000001115846

Refer to DLK-879, "Removal and Installation".

Removal and Installation

INFOID:0000000001115847

REMOVAL



1. Remove installation screw (7) on the rear of keyfob.
2. Place the key with the lower case (6) facing up. Set a screwdriver (A) wrapped with tape into illustration of the lower case (6) and separate the lower case (6) from the upper case (1).
   CAUTION:
   - **Do not touch the circuit board or battery terminal.**
   - **The keyfob is water-resistant. However, if it does get wet, immediately wipe it dry.**
3. When replacing the circuit board assembly, remove circuit board assembly from the upper case (1).
   [Circuit board assembly: Switch rubber (3) + Board surface (4)]
   CAUTION:
   Do not touch the printed circuits directly.
4. Remove the battery (5) from the lower case (6) and replace it.

   Battery replacement : Coin-type lithium battery (CR2032)

   CAUTION:
   When replacing battery, keep dirt, grease, and other foreign materials off the electrode contact area.
5. After replacement, fit the lower and upper cases together, part (2), (3) and tighten with the screw.
   CAUTION:
   After replacing the battery, Be sure to check that door locking operates normally using the keyfob.
   Refer to DLK-612, "Component Function Check".

INSTALLATION

Install in the reverse order of removal.

SECTION DLN
DRIVELINE

CONTENTS

TRANSFER: TY30A

BASIC INSPECTION 5

DIAGNOSIS AND REPAIR WORKFLOW 5
Work Flow 5

FUNCTION DIAGNOSIS 6

4WD SYSTEM 6
System Diagram 6
System Description 8
Component Parts Location 9
Component Description 10

DIAGNOSIS SYSTEM (4WD CONTROL UNIT) 12
CONSULT-III Function (ALL MODE AWD/4WD) 12

COMPONENT DIAGNOSIS 14

C1201 4WD CONTROL UNIT 14
Description 14
DTC Logic 14
Diagnosis Procedure 14

C1203 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 15
Description 15
DTC Logic 15
Diagnosis Procedure 15

C1204 4WD SOLENOID 16
Description 16
DTC Logic 16
Diagnosis Procedure 16
Component Inspection 18

C1205 4WD ACTUATOR RELAY 19
Description 19
DTC Logic 19
Diagnosis Procedure 19

C1209 MODE SW 20
Description 20
DTC Logic 20
Diagnosis Procedure 20
Component Inspection 21

C1210 ECM 23
Description 23
DTC Logic 23
Diagnosis Procedure 23

U1000 CAN COMM CIRCUIT 24
Description 24
DTC Logic 24
Diagnosis Procedure 24

U1010 CONTROL UNIT (CAN) 25
Description 25
DTC Logic 25
Diagnosis Procedure 25

POWER SUPPLY AND GROUND CIRCUIT 26
Description 26
Diagnosis Procedure 26

4WD WARNING LAMP 28
Description 28
Diagnosis Procedure 28

4WD INDICATOR LAMP 29
Description 29
Diagnosis Procedure 29

LOCK INDICATOR LAMP 30
Description 30
Diagnosis Procedure 30

ECU DIAGNOSIS 31

4WD CONTROL UNIT 31
Reference Value 31
Wiring Diagram - 4WD SYSTEM - 33

cardiagn.com

Fail Safe 36
DTC Inspection Priority Chart 37
DTC Index 37

SYMPTOM DIAGNOSIS 38

4WD SYSTEM SYMPTOMS 38
Symptom Table 38

4WD WARNING LAMP DOES NOT TURN ON.. 39
Description 39
Diagnosis Procedure 39

4WD WARNING LAMP DOES NOT TURN OFF 40
Description 40
Diagnosis Procedure 40

HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS 41
Description 41
Diagnosis Procedure 41

VEHICLE DOES NOT ENTER 4WD MODE 42
Description 42
Diagnosis Procedure 42

4WD WARNING LAMP BLINKS QUICKLY 43
Description 43

4WD WARNING LAMP BLINKS SLOWLY 44
Description 44
Diagnosis Procedure 44

NORMAL OPERATING CONDITION 45
Description 45

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 46
NVH Troubleshooting Chart 46

PRECAUTION 48

PRECAUTIONS 48
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 48
Service Notice or Precautions for Transfer 48

PREPARATION 49

PREPARATION 49

M/T 49
M/T : Special Service Tools 49
M/T : Commercial Service Tools 50

CVT 51
CVT : Special Service Tools 52
CVT : Commercial Service Tools 54

ON-VEHICLE MAINTENANCE 55

TRANSFER OIL 55
Inspection 55
Draining 55
Refilling 55

ON-VEHICLE REPAIR 56

4WD CONTROL UNIT 56

LHD 56
LHD : Exploded View 56
LHD : Removal and Installation 56

RHD 56
RHD : Exploded View 56
RHD : Removal and Installation 57

REMOVAL AND INSTALLATION 58

TRANSFER ASSEMBLY 58

M/T 58
M/T : Exploded View 58
M/T : Removal and Installation 58

CVT 59
CVT : Exploded View 59
CVT : Removal and Installation 59

DISASSEMBLY AND ASSEMBLY 61

ADAPTER CASE 61

M/T 61
M/T : Exploded View 61
M/T : Disassembly 62
M/T : Assembly 62
M/T : Inspection After Disassembly 63

CVT 63
CVT : Exploded View 63
CVT : Disassembly 64
CVT : Assembly 65
CVT : Inspection After Disassembly 66

RING GEAR SHAFT 67

M/T 67
M/T : Exploded View 67
M/T : Disassembly 68
M/T : Assembly 69
M/T : Inspection After Disassembly 70

CVT 70
CVT : Exploded View 70
CVT : Disassembly 71
CVT : Assembly 73
CVT : Inspection After Disassembly 74

DRIVE PINION 75

M/T 75
M/T : Exploded View 75

cardiagn.com

M/T : Disassembly 76
M/T : Assembly 77
M/T : Adjustment 78
M/T : Inspection After Disassembly 87

CVT 87
CVT : Exploded View 87
CVT : Disassembly 88
CVT : Assembly 90
CVT : Adjustment 91
CVT : Inspection After Disassembly 100

TRANSFER CASE 101

M/T 101
M/T : Exploded View 101
M/T : Disassembly 102
M/T : Assembly 102
M/T : Inspection 103

CVT 103
CVT : Exploded View 103
CVT : Disassembly 104
CVT : Assembly 105
CVT : Inspection 106

SERVICE DATA AND SPECIFICATIONS (SDS) 107

SERVICE DATA AND SPECIFICATIONS (SDS) 107
General Specifications 107
Preload Torque 107
Backlash 107
Companion Flange Runout 107

REAR PROPELLER SHAFT: 3F SPL18-DOJ75

SYMPTOM DIAGNOSIS 108

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 108
NVH Troubleshooting Chart 108

ON-VEHICLE MAINTENANCE 109

REAR PROPELLER SHAFT 109
Inspection 109

ON-VEHICLE REPAIR 110

REAR PROPELLER SHAFT 110
Exploded View 110
Removal and Installation 110
Inspection 112

SERVICE DATA AND SPECIFICATIONS (SDS) 113

SERVICE DATA AND SPECIFICATIONS (SDS) 113
General Specifications 113
Propeller Shaft Runout 113
Journal Axial Play 113

REAR FINAL DRIVE: R145

SYMPTOM DIAGNOSIS 114

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 114
NVH Troubleshooting Chart 114

PRECAUTION 115

PRECAUTIONS 115
Service Notice or Precautions for Rear Final Drive. 115

PREPARATION 116

PREPARATION 116
Special Service Tools 116
Commercial Service Tools 117

FUNCTION DIAGNOSIS 119

REAR FINAL DRIVE ASSEMBLY 119
System Diagram 119

ON-VEHICLE MAINTENANCE 120

REAR DIFFERENTIAL GEAR OIL 120
Inspection 120
Draining 120
Refilling 120

ON-VEHICLE REPAIR 121

FRONT OIL SEAL 121
Exploded View 121
Removal and Installation 121

SIDE OIL SEAL 123
Exploded View 123
Removal and Installation 123

ELECTRIC CONTROLLED COUPLING 124
Exploded View 124
Removal and Installation 124

REMOVAL AND INSTALLATION 128

REAR FINAL DRIVE ASSEMBLY 128
Exploded View 128
Removal and Installation 128

DISASSEMBLY AND ASSEMBLY 130

ELECTRIC CONTROLLED COUPLING 130
Exploded View 130
Disassembly 131
Assembly 131
Adjustment 133
Inspection After Disassembly 133

cardiagn.com

DIFFERENTIAL ASSEMBLY 135
Exploded View 135
Disassembly 135
Assembly 137
Inspection After Disassembly 140

DRIVE PINION 141
Exploded View 141
Disassembly 141
Assembly 142
Adjustment 146
Inspection After Disassembly 149

SERVICE DATA AND SPECIFICATIONS (SDS) 151

SERVICE DATA AND SPECIFICATIONS (SDS) 151
General Specification 151
Drive Gear Runout 151
Differential Side Gear Clearance 151
Preload Torque 151
Backlash 151
Companion Flange Runout 151

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000972071

DETAILED FLOW

1.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, reproduce symptoms, and understand them fully. Ask customer about his/her complaints carefully. Check symptoms by driving vehicle with customer, if necessary.

CAUTION:

Customers are not professional. Never guess easily like “maybe the customer means that...,” or “maybe the customer mentions this symptom”.

>> GO TO 2.

2.CHECK 4WD WARNING LAMP

Start engine and drive at 30 km/h (19 MPH) or more for approx. 1 minute.

Is 4WD warning lamp illuminated?

YES >> GO TO 3.
NO >> GO TO 6.

3.PERFORM SELF-DIAGNOSIS

With CONSULT-III

1. Perform 4WD control unit self-diagnosis.
2. Perform malfunction detected by self-diagnosis.
3. Erase 4WD control unit self-diagnosis results.

>> GO TO 4.

4.CHECK TERMINALS AND HARNESS CONNECTORS

Check pin terminals for damage or loose connection with harness connector.

>> GO TO 5.

5.CHECK SYMPTOM REPRODUCTION

With CONSULT-III

Perform DTC reproduction procedure for the error system.

Is any error detected?

YES >> GO TO 2.
NO >> GO TO 6.

6.PERFORM SYMPTOM DIAGNOSIS

Perform the symptom diagnosis for each system.

Is any malfunction present?

YES >> GO TO 2.
NO >> GO TO 7.

7.FINAL CHECK

With CONSULT-III

Check input/output signal standard of 4WD control unit.

Is the input/output the standard value?

YES >> INSPECTION END
NO >> GO TO 2.

cardiagn.com

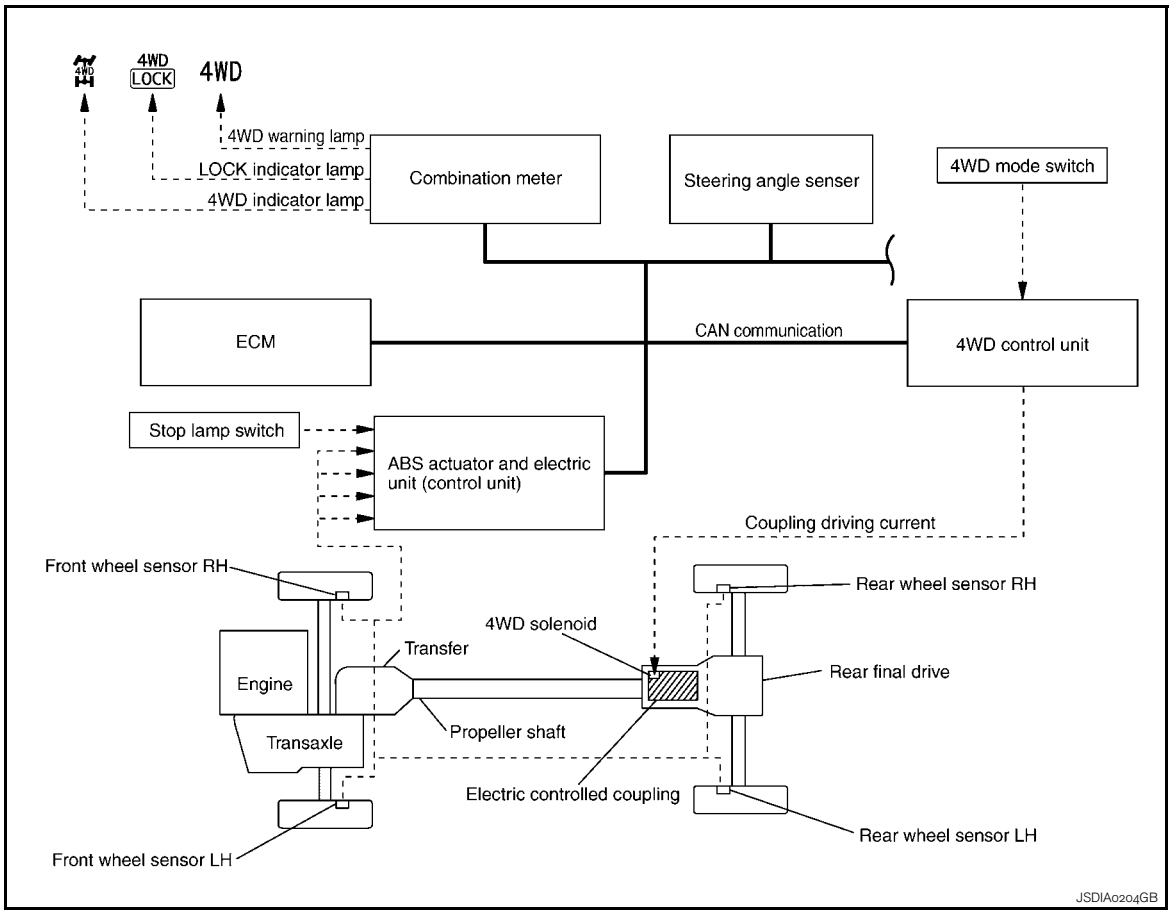
FUNCTION DIAGNOSIS

4WD SYSTEM

System Diagram

INFOID:0000000000972072

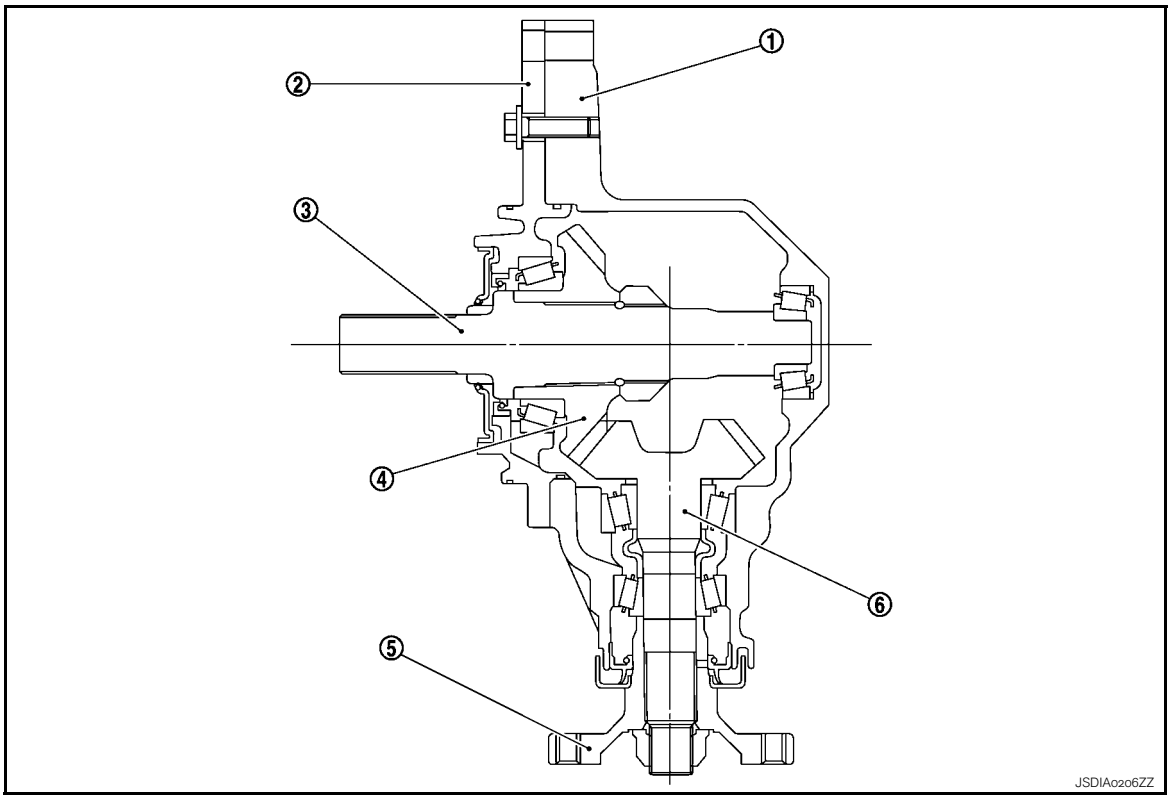
CONTROL DIAGRAM



CROSS-SECTIONAL VIEW

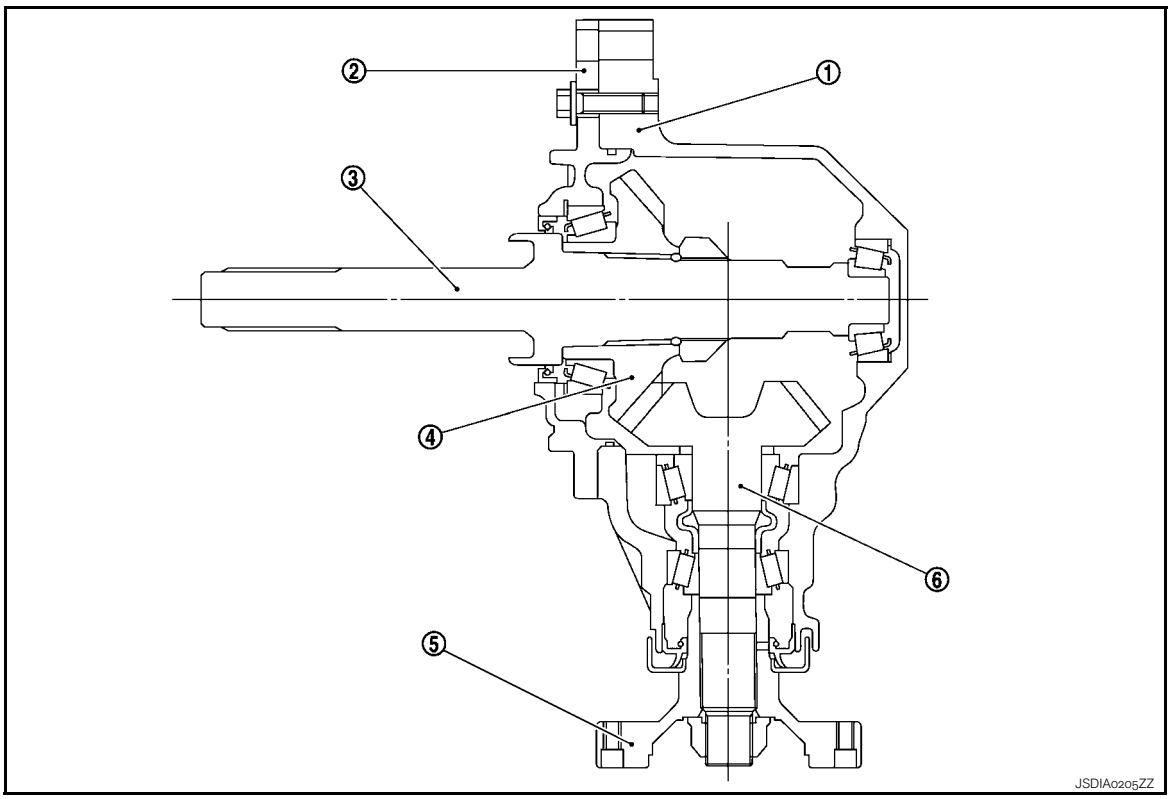
cardiagn.com

M/T models



1. Transfer case
2. Adapter case
3. Ring gear shaft
4. Ring gear
5. Companion flange
6. Drive pinion

CVT models



1. Transfer case
2. Adapter case
3. Ring gear shaft
4. Ring gear
5. Companion flange
6. Drive pinion

cardiagn.com

System Description

INFOID:0000000000972073

DESCRIPTION

- 4WD controls distribution of drive power between front-wheel drive (100:0) and 4WD (50:50) conditions according to signals from sensors.
- It transmits/receives each signal from the following control unit via CAN communication line.

Component parts	Function
ABS actuator and electric unit (control unit)	Transmits the following signals via CAN communication to 4WD control unit. • Vehicle speed signal • Stop lamp switch signal (brake signal)
ECM	Transmits the following signals via CAN communication to 4WD control unit. • Accelerator pedal position signal • Engine speed signal
Combination meter	Transmits conditions of parking brake switch signal via CAN communication to 4WD control unit.
Steering angle sensor	Transmits conditions of steering angle sensor signal via CAN communication to 4WD control unit.

AUTO Mode

- Electronic control allows optimal distribution of torque to front/rear wheels to match road conditions.
- 4WD mode makes possible stable driving, with no wheel spin, on snowy roads or other slippery surfaces.
- On roads which do not require 4WD, AUTO mode contributes to improved fuel economy by driving in conditions close to front-wheel drive.
- Sensor inputs determine the vehicle's turning condition, and tight cornering/braking are controlled by distributing optimum torque to rear wheels.

LOCK Mode

- Front/rear wheel torque distribution is fixed, ensuring stable driving when climbing slopes.
- Vehicle will switch automatically to AUTO mode if vehicle speed increases. If vehicle speed then decreases, the vehicle automatically returns to direct 4-wheel driving conditions.
- LOCK mode will change to AUTO mode automatically, when the vehicle speed exceeds approx. 10 km/h (6 MPH). The LOCK indicator light keeps illuminating.

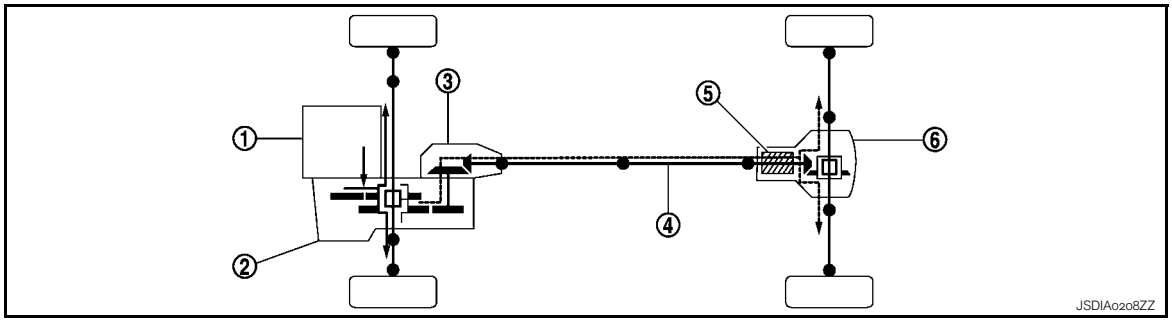
NOTE:
If there is a significant difference in pressure or wear between tires, full vehicle performance is not available. LOCK mode may be prohibited, or speeds at which LOCK mode is enabled may be restricted detecting tire conditions.

2WD Mode

Vehicle is in front-wheel drive.

NOTE:
If front wheels are slipping in 2WD mode, do not switch to AUTO or LOCK. This can cause difficulties for the system.

POWER TRANSFER DIAGRAM



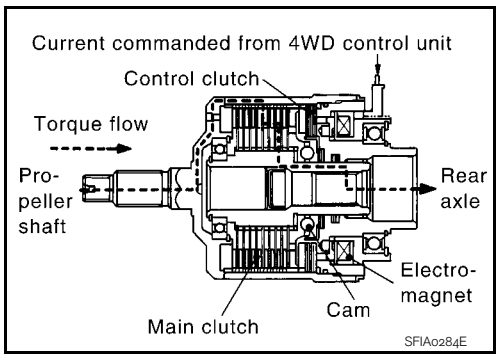
1. Engine
2. Transaxle
3. Transfer
4. Propeller shaft
5. Electric controlled coupling
6. Rear final drive

OPERATION PRINCIPLE

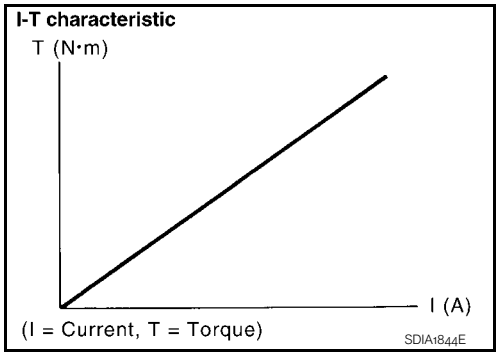
cardiagn.com

Electric Controlled Coupling

1. The 4WD control unit supplies command current to electric controlled coupling (4WD solenoid).
2. The control clutch is engaged by electromagnet and torque is detected in control clutch.
3. The cam operates in response to control clutch torque and applies pressure to main clutch.
4. The main clutch transmits torque to front wheels according to pressing power.



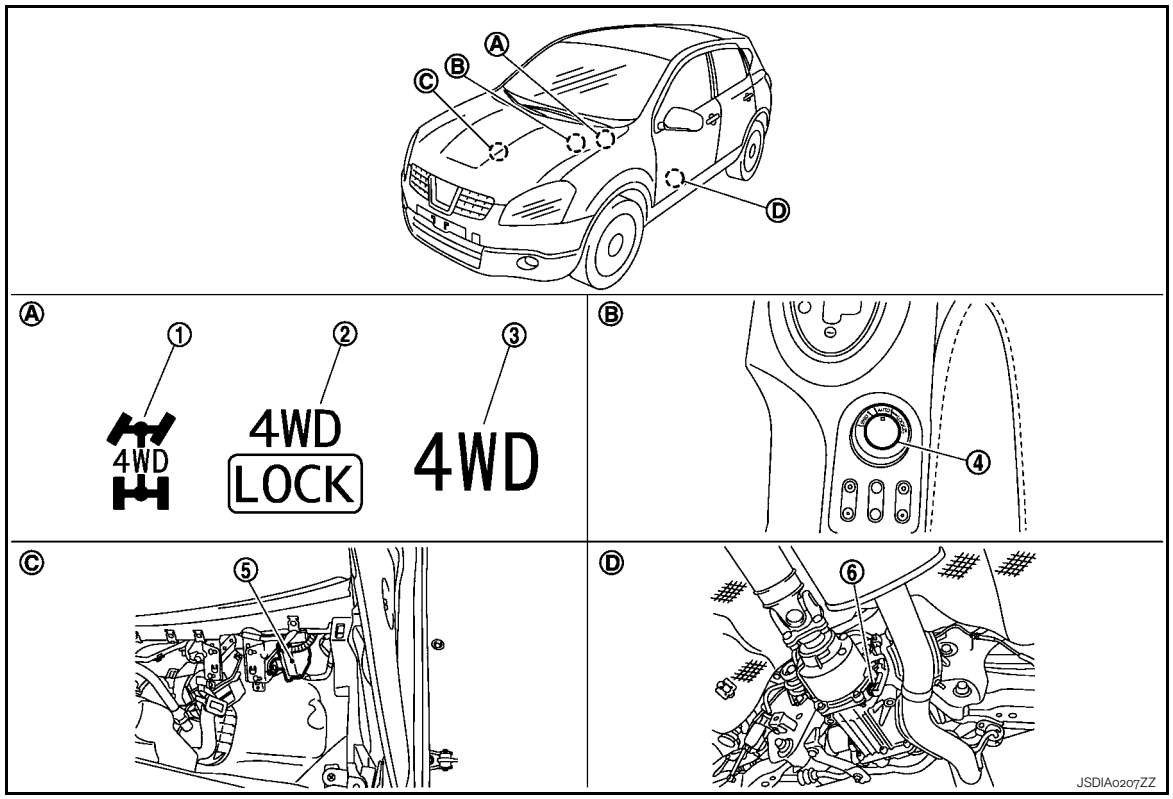
- Transmission torque to the rear wheels is determined according to command current.



Component Parts Location

INFOID:0000000000972074

LHD MODELS



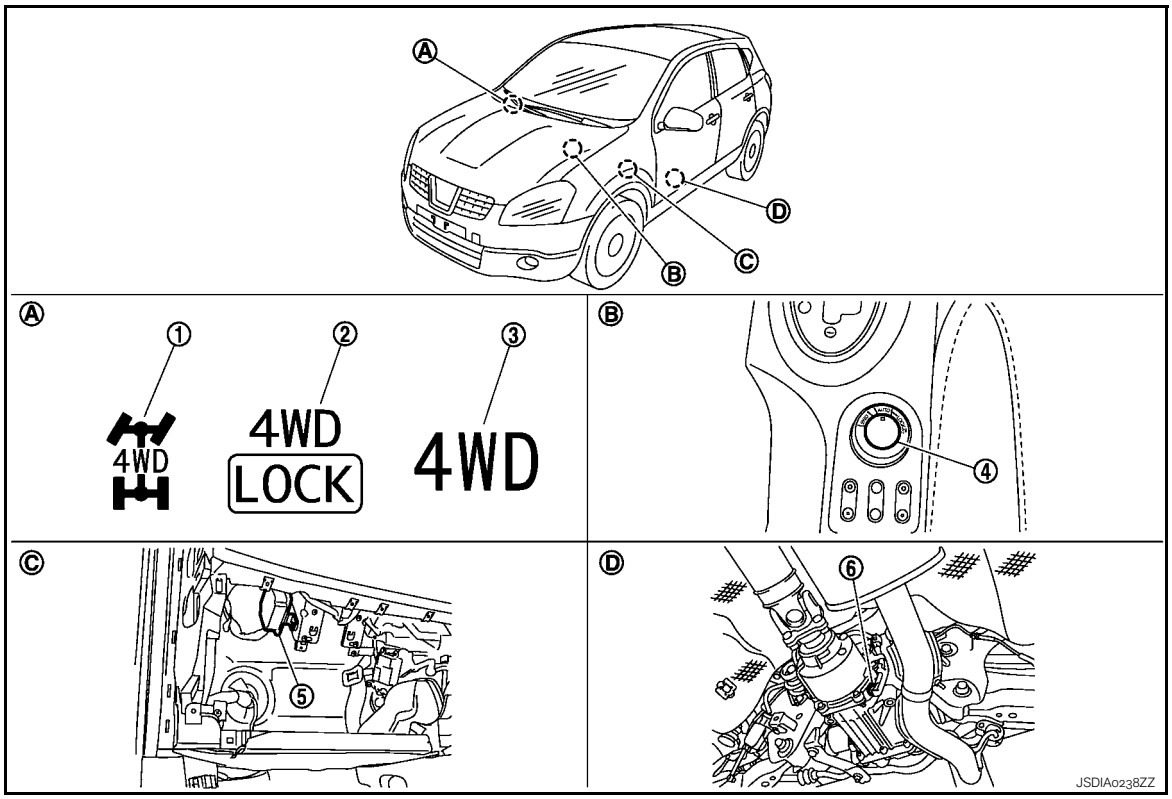
1. 4WD indicator lamp
2. LOCK indicator lamp
3. 4WD warning lamp
4. 4WD mode switch
5. 4WD control unit
6. 4WD solenoid (in rear final drive)

cardiagn.com

A. Combination meter B. Center console assembly C. Instrument assist lower panel removed

D. Rear final drive assembly

RHD MODELS



1. 4WD indicator lamp 2. LOCK indicator lamp 3. 4WD warning lamp
4. 4WD mode switch 5. 4WD control unit 6. 4WD solenoid (in rear final drive)

A. Combination meter B. Center console assembly C. Instrument assist lower panel removed

D. Rear final drive assembly

Component Description

INFOID:0000000000972075

Component parts	Reference/Function
4WD control unit	DLN-14, "Description"
Wheel sensors	Detects wheel speed.
4WD solenoid	DLN-16, "Description"
Electric controlled coupling	Transmits driving force to rear final drive.
4WD warning lamp	DLN-28, "Description"
4WD indicator lamp	DLN-29, "Description"
LOCK indicator lamp	DLN-30, "Description"
4WD mode switch	DLN-20, "Description"
ABS actuator and electric unit (control unit)	DLN-15, "Description"
ECM	DLN-23, "Description"

cardiagn.com

Component parts	Reference/Function
Combination meter	Transmits conditions of parking brake switch signal via CAN communication to 4WD control unit.
Steering angle sensor	Transmits conditions of steering angle sensor signal via CAN communication to 4WD control unit.

cardiagn.com

DIAGNOSIS SYSTEM (4WD CONTROL UNIT)

CONSULT-III Function (ALL MODE AWD/4WD)

INFOID:0000000000972076

FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic test mode	Function
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the 4WD control unit can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Active test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the 4WD control unit and also shifts some parameters in a specified range.
ECU part number	4WD control unit part number can be read.

SELF-DIAG RESULT MODE

Drive at 30 km/h or more for approximately 1 minute before performing the self-diagnosis.

Display Item List

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when...	Possible cause
C1201	CONTROLLER FAILURE	Malfunction has occurred inside 4WD control unit.	Internal malfunction of 4WD control unit
C1203	ABS SYSTEM	Malfunction related to wheel sensor has been detected by ABS actuator and electric unit (control unit).	ABS malfunction • Vehicle speed signal error • Stop lamp switch signal (brake signal) error
C1204	4WD SOLENOID	Malfunction related to 4WD solenoid has been detected.	Internal malfunction of electronic controlled coupling
C1205	4WD ACTUATOR RLY	Malfunction has been detected from 4WD actuator relay integrated with 4WD control unit, or malfunction related to 4WD solenoid has been detected.	Internal malfunction of 4WD control unit
C1209	MODE SW	More than two switch inputs are simultaneously detected due to short circuit of 4WD mode switch.	Malfunction of 4WD mode switch or 4WD mode switch circuit.
C1210	ENGINE SIGNAL 1	Malfunction has been detected from ECM.	Malfunction of engine control system • Accelerator pedal position signal error • Engine speed signal error
U1000	CAN COMM CIRCUIT	When 4WD control unit is not transmitting or receiving CAN communication signal for 2 seconds or more.	CAN communication line error
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of 4WD control unit.	4WD control unit error

How to Erase Self-Diagnostic Results

Before erasing DTC memory, start the engine and drive at 30 km/h or more for approximately 1 minute. Check that ABS warning lamp turns OFF.

NOTE:

Make sure that ABS warning lamp turns OFF by driving for a minute at vehicle speed of 30 km/h (19 MPH) or more after turning ignition switch OFF if 4WD warning lamp turns ON with system malfunction of “ABS SYSTEM [C1203]”. 4WD warning lamp may not turn OFF if it is normal unless ignition switch turns OFF at once and engine restarts after that.

DATA MONITOR MODE

Display Item List

cardiagn.com

×: Standard o: Optional item

Monitor item (Unit)	Monitor Menu		Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	
BATTERY VOLT [V]	o	o	Power supply voltage for 4WD control unit
THRTL POS SEN [%]	o	o	Throttle opening status is displayed.
ETS SOLENOID [A]	o	o	Monitored value of current at 4WD solenoid
FR RH SENSOR [km/h] or [mph]	×	×	Wheel speed calculated by front wheel sensor RH signal is displayed.
FR LH SENSOR [km/h] or [mph]	×	×	Wheel speed calculated by front wheel sensor LH signal is displayed.
RR RH SENSOR [km/h] or [mph]	×	×	Wheel speed calculated by rear wheel sensor RH signal is displayed.
RR LH SENSOR [km/h] or [mph]	×	×	Wheel speed calculated by rear wheel sensor LH signal is displayed.
STOP LAMP SW [On/Off]	o	o	Stop lamp switch signal status via CAN communication line is displayed.
ENG SPEED SIG [Run/Stop]	o	o	Engine status is displayed.
ETS ACTUATOR [On/Off]	o	o	Operating condition of 4WD actuator relay (integrated in 4WD control unit) is displayed.
4WD WARN LAMP [On/Off]	o	o	Control status of 4WD warning lamp is displayed.
4WD MODE SW [2wd/Auto/Lock]	o	o	Mode switch is not equipped, but displayed.
4WD MODE MON [2wd/Auto/Lock]	o	o	Control status of 4WD is displayed.
DIS-TIRE MONI [mm]	o	o	Improper size tire installed condition is displayed.
P BRAKE SW [On/Off]	o	o	Parking switch signal status via CAN communication line is displayed.

ACTIVE TEST MODE

Description

Use this mode to determine and identify the details of a malfunction based on self-diagnostic results or data monitor. 4WD control unit gives drive signal to actuator with receiving command from CONSULT-III to check operation of actuator.

Test Item

Test item	Condition	Description
ETS S/V (Detects 4WD solenoid)	• Vehicle stopped • Engine running • No DTC detected	Change command current value to 4WD solenoid, and then change driving mode. (Monitor value is normal if it is within approximately ±10% of command value.) • Qu: Increase current value in increments of 0.1 A • Qd: Decrease current value in increments of 0.1 A • UP: Increase current value in increments of 0.02 A • DOWN: Decrease current value in increments of 0.02 A

CAUTION:

Never energize continuously for a long time.

cardiagn.com

COMPONENT DIAGNOSIS

C1201 4WD CONTROL UNIT

Description

INFOID:0000000000972077

- Controls driving force distribution by signals from each sensor from rear wheel driving mode (0:100) to 4WD mode (50:50).
- 2WD mode is available by fail-safe function if malfunction is detected in 4WD system.

DTC Logic

INFOID:0000000000972078

DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when...	Possible cause
C1201	CONTROLLER FAILURE	Malfunction has occurred inside 4WD control unit.	Internal malfunction of 4WD control unit

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

Is DTC “C1201” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-14, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000972079

1. PERFORM SELF-DIAGNOSIS

With CONSULT-III

1. Erase 4WD control unit self-diagnosis results.
2. Turn ignition switch OFF, and then wait 10 seconds or more.
3. Perform 4WD control unit self-diagnosis.

Is DTC “C1201” detected?

YES >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).
NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

cardiagn.com

C1203 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000000972080

Transmits the following signals via CAN communication to 4WD control unit.
- Vehicle speed signal
- Stop lamp switch signal (brake signal)

DTC Logic

INFOID:0000000000972081

DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when...	Possible cause
C1203	ABS SYSTEM	Malfunction related to wheel sensor has been detected by ABS actuator and electric unit (control unit).	ABS malfunction • Vehicle speed signal error • Stop lamp switch signal (brake signal) error

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

With CONSULT-III
1. Start engine and drive at 30 km/h (19 MPH) or more for approx. 1 minute.
2. Perform 4WD control unit self-diagnosis.

Is DTC “C1203” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-15, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000972082

1. PERFORM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS

With CONSULT-III
Perform ABS actuator and electric unit (control unit) self-diagnosis.

Is any error system detected?

YES >> Check the error system.
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS

With CONSULT-III
1. Erase 4WD control unit self-diagnosis results.
2. Start engine and drive vehicle at 30 km/h (19 MPH) for at least 1 minute.
3. Make sure that ABS warning lamp turns OFF.
4. Perform 4WD control unit self-diagnosis.

Is DTC “C1203” detected?

YES >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).
NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

cardiagn.com

C1204 4WD SOLENOID

Description

INFOID:0000000000972083

Controls electric controlled coupling by command current from 4WD control unit.

DTC Logic

INFOID:0000000000972084

DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when...	Possible cause
C1204	4WD SOLENOID	Malfunction related to 4WD solenoid has been detected.	Internal malfunction of electronic controlled coupling

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

Is DTC “C1204” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-16, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000972085

1.CHECK 4WD SOLENOID POWER SUPPLY

1. Turn the ignition switch OFF.
2. Disconnect 4WD control unit harness connector.
3. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
4. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		Voltage (Approx.)
Connector	Terminal	
M69	9 – Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check the following. If any items are damaged, repair or replace damaged parts.
- 10A fuse (#32) open
- Short among 10A fuse (#32) connector, 4WD control unit harness connector No. 9 terminal and the ground
- Open between the battery and 4WD control unit harness connector No. 9 terminal

2.CHECK 4WD SOLENOID GROUND

1. Turn the ignition switch OFF.
2. Check the continuity between 4WD control unit harness connector and ground.

4WD control unit		Continuity
Connector	Terminal	
M69	10 – Ground	Existed
	11 – Ground	

Is the inspection result normal?

YES >> GO TO 3.

cardiagn.com

NO >> Repair or replace damaged parts.

3. CHECK 4WD SOLENOID CIRCUIT (1)

Check the resistance between 4WD control unit harness connector terminals.

4WD control unit		Resistance (Approx.)
Connector	Terminal	
M69	1 – 2	2.45 Ω

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. CHECK 4WD SOLENOID CIRCUIT (2)

1. Disconnect 4WD solenoid harness connector.
2. Check the continuity between 4WD control unit harness connector and 4WD solenoid harness connector.

4WD control unit		4WD solenoid		Continuity
Connector	Terminal	Connector	Terminal	
M69	1	B251	1	Existed
	2		2	

3. Check the continuity between 4WD control unit harness connector and the ground.

4WD control unit		Continuity
Connector	Terminal	
M69	1 – Ground	Not existed
	2 – Ground	

4. Check the continuity between 4WD solenoid harness connector and the ground.

4WD solenoid		Continuity
Connector	Terminal	
B251	1 – Ground	Not existed
	2 – Ground	

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5. CHECK 4WD SOLENOID

Check the resistance between 4WD solenoid harness connector terminals.

4WD solenoid		Resistance (Approx.)
Connector	Terminal	
B251	1 – 2	2.45 Ω

Is the inspection result normal?

YES >> GO TO 6.
NO >> 4WD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-130, "Exploded View".

6. CHECK TERMINALS AND HARNESS CONNECTORS

1. Check 4WD control unit pin terminals for damage or loose connection with harness connector.
2. Check 4WD solenoid pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

cardiagn.com

YES >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).
NO >> Repair or replace damaged parts.

Component Inspection

INFOID:0000000000972086

1. CHECK 4WD SOLENOID

1. Turn the ignition switch OFF.
2. Disconnect 4WD solenoid harness connector.
3. Check the resistance between 4WD solenoid harness connector terminals.

4WD solenoid		Resistance (Approx.)
Connector	Terminal	
B251	1 – 2	2.45 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> 4WD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-130, "Exploded View".

cardiagn.com

C1205 4WD ACTUATOR RELAY

Description

INFOID:0000000000972087

4WD solenoid is supplied with voltage by the internal circuit of 4WD control unit.

DTC Logic

INFOID:0000000000972088

DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when...	Possible cause
C1205	4WD ACTUATOR RLY	Malfunction has been detected from 4WD actuator relay integrated with 4WD control unit, or malfunction related to 4WD solenoid has been detected.	Internal malfunction of 4WD control unit

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

Is DTC “C1205” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-19, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000972089

1. PERFORM SELF-DIAGNOSIS

With CONSULT-III

1. Erase 4WD control unit self-diagnosis results.
2. Turn ignition switch OFF, and wait 10 seconds or more.
3. Perform 4WD control unit self-diagnosis.

Is DTC “C1205” detected?

YES >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).
NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

cardiagn.com

C1209 MODE SW

Description

INFOID:0000000001083107

Able to select 2WD, AUTO or LOCK mode.

DTC Logic

INFOID:0000000001083108

DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when...	Possible cause
C1209	MODE SW	More than two switch inputs are simultaneously detected due to short circuit of 4WD mode switch.	Malfunction of 4WD mode switch or 4WD mode switch circuit.

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

Is DTC “C1209” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-20, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001083109

1.CHECK 4WD MODE SWITCH

1. Turn the ignition switch OFF.
2. Remove 4WD mode switch.
3. Check the continuity between 4WD mode switch connector terminals.

4WD mode switch			Continuity
Connector	Terminal	Condition	
M8	2 – 3	4WD mode switch: 2WD	Existed
		Except the above	Not existed
	2 – 6	4WD mode switch: 2WD	Not existed
		4WD mode switch: AUTO	Existed
		4WD mode switch: LOCK (State of hold of LOCK position)	
	2 – 8	4WD mode switch: LOCK (State of hold of LOCK position)	Existed
		Except the above	Not existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace 4WD mode switch.

2.CHECK 4WD MODE SWITCH CIRCUIT (1)

Check the continuity between 4WD mode switch harness connector and ground.

4WD mode switch		Continuity
Connector	Terminal	
M8	2 – Ground	Existed

cardiagn.com

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3. CHECK 4WD MODE SWITCH CIRCUIT (2)

1. Disconnect 4WD control unit harness connector.
2. Check the continuity between 4WD control unit harness connector and 4WD mode switch harness connector.

4WD control unit		4WD mode switch		Continuity
Connector	Terminal	Connector	Terminal	
M69	14	M8	3	Not existed
	14		6	Not existed
	14		8	Existed
	5		3	Not existed
	5		6	Existed
	5		8	Not existed
	12		3	Existed
	12		6	Not existed
	12		8	Not existed

3. Check the continuity between 4WD control unit harness connector and ground.

4WD control unit		Continuity
Connector	Terminal	
M69	14 – Ground	Not existed
	5 – Ground	
	12 – Ground	

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4. CHECK 4WD CONTROL UNIT OUTPUT SIGNAL

1. Connect 4WD control unit harness connector.
2. Turn the ignition switch ON.
3. Check the voltage between 4WD mode switch harness connector and ground.

4WD mode switch		Voltage (Approx.)
Connector	Terminal	
M8	3 – Ground	Battery voltage
	6 – Ground	
	8 – Ground	

Is the inspection result normal?

YES >> Check each harness connector pin terminal for disconnection.
NO >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).

Component Inspection

INFOID:0000000001083110

1. CHECK 4WD MODE SWITCH

1. Turn the ignition switch OFF.
2. Remove 4WD mode switch.

cardiagn.com

3. Check the continuity between 4WD mode switch connector terminals.

4WD mode switch			Continuity
Connector	Terminal	Condition	
M8	2 – 3	4WD mode switch: 2WD	Existed
		Except the above	Not existed
	2 – 6	4WD mode switch: 2WD	Not existed
		4WD mode switch: AUTO	Existed
		4WD mode switch: LOCK (State of hold of LOCK position)	
	2 – 8	4WD mode switch: LOCK (State of hold of LOCK position)	Existed
		Except the above	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace 4WD mode switch.

cardiagn.com

C1210 ECM

Description

INFOID:0000000000972090

Transmits the following signals via CAN communication to 4WD control unit.
- Accelerator pedal position signal
- Engine speed signal

DTC Logic

INFOID:0000000000972091

DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when...	Possible cause
C1210	ENGINE SIGNAL 1	Malfunction has been detected from ECM.	Malfunction of engine control system • Accelerator pedal position signal error • Engine speed signal error

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT-III
1. Start the engine. Drive the vehicle for a while.
2. Perform 4WD control unit self-diagnosis.

Is DTC “C1210” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-23, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000972092

1.PERFORM ECM SELF-DIAGNOSIS

With CONSULT-III
Perform ECM self-diagnosis.

Is any error system detected?

YES >> Check the error system.
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT-III
1. Erase 4WD control unit self-diagnosis results.
2. Turn the ignition switch OFF.
3. Start the engine. Drive the vehicle for a while.
4. Make sure that malfunction indicator (MI) turns OFF.
5. Stop the vehicle. Perform 4WD control unit self-diagnosis.

Is DTC “C1210” detected?

YES >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).
NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

cardiagn.com

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000000972093

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000000972094

DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when...	Possible cause
U1000	CAN COMM CIRCUIT	When 4WD control unit is not transmitting or receiving CAN communication signal for 2 seconds or more.	CAN communication line error

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

Is DTC “U1000” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-24, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000972095

1. PERFORM SELF-DIAGNOSIS

With CONSULT-III

Perform 4WD control unit self-diagnosis.

Is DTC “U1000” detected?

YES >> CAN specification chart. Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

cardiagn.com

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000001088468

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000000972097

DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when...	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of 4WD control unit.	4WD control unit error

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

Is DTC “U1010” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-25, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000972098

1.CHECK 4WD CONTROL UNIT

Check 4WD control unit harness connector for disconnection and deformation.

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).
NO >> Repair or replace damaged parts.

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000000972099

Supplies power to 4WD control unit.

Diagnosis Procedure

INFOID:0000000000972100

1.CHECK 4WD CONTROL UNIT POWER SUPPLY

1. Turn the ignition switch OFF.
2. Disconnect 4WD control unit harness connector.
3. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		Voltage (Approx.)
Connector	Terminal	
M69	7 – Ground	0 V

4. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
5. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		Voltage (Approx.)
Connector	Terminal	
M69	7 – Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check the following. If any items are damaged, repair or replace damaged parts.
- 10A fuse (#45) open
- Short among 10A fuse (#45) connector, 4WD control unit harness connector No. 7 terminal and the ground
- Open between the ignition switch and 4WD control unit harness connector No. 7 terminal
- Ignition switch. Refer to SEC-48, "Diagnosis Procedure" (with Intelligent Key system), SEC-185, "Diagnosis Procedure" (without Intelligent Key system).

2.CHECK 4WD SOLENOID POWER SUPPLY

1. Turn the ignition switch OFF.
2. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		Voltage (Approx.)
Connector	Terminal	
M69	9 – Ground	Battery voltage

3. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
4. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		Voltage (Approx.)
Connector	Terminal	
M69	9 – Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the following. If any items are damaged, repair or replace damaged parts.
- 10A fuse (#32) open

cardiagn.com

- Short among 10A fuse (#32) connector, 4WD control unit harness connector No. 9 terminal and the ground
- Open between the battery and 4WD control unit harness connector No. 9 terminal

3.CHECK 4WD SOLENOID VALVE GROUND

1. Turn the ignition switch OFF.
2. Check the continuity between 4WD control unit harness connector and ground.

4WD control unit		Continuity
Connector	Terminal	
M69	10 – Ground	Existed
	11 – Ground	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace damaged parts.

cardiagn.com

4WD WARNING LAMP

Description

INFOID:0000000000972101

- Turns ON when there is a malfunction in 4WD system. It indicates that fail-safe mode is engaged and vehicle change to front-wheel drive or shifting driving force-4WD (Rear-wheels still have some driving torque).
- Also turns ON when ignition switch is turned ON, for purpose of lamp check. Turns OFF approximately for 1 second after the engine starts if system is normal.

4WD WARNING LAMP INDICATION

Condition	4WD warning lamp
Lamp check	Turns ON when ignition switch is turned ON. Turns OFF approx. 1 second after engine start.
4WD system malfunction	ON
Protection function is activated due to heavy load to electric controlled coupling. (4WD system is not malfunctioning and 4WD system changes to 2WD mode.)	Quick blinking: 2 times/second (Blinking in approx. 1 minute and then turning OFF)
Large difference in diameter of front/rear tires	Slow blinking: 1 time/2 seconds (Continuing to blink until turning ignition switch OFF)
Other than above (system normal)	OFF

CAUTION:
4WD warning lamp also turns ON due to data reception error, CAN communication error etc.

Diagnosis Procedure

INFOID:0000000000972102

1.CHECK POWER SUPPLY AND GROUND CIRCUIT

Perform the trouble diagnosis for power supply and ground circuit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning part.

2.PERFORM SELF-DIAGNOSIS

With CONSULT-III
Perform 4WD control unit self-diagnosis.

Is DTC “U1000” detected?

YES >> CAN specification chart. Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> GO TO 3.

3.PERFORM COMBINATION METER SELF-DIAGNOSIS

With CONSULT-III
Perform combination meter self-diagnosis.

Is any error system detected?

YES >> Check the error system.
NO >> GO TO 4.

4.CHECK 4WD WARNING LAMP SGNAL

With CONSULT-III
1. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
2. Check “4WD WARN LAMP” of 4WD control unit CONSULT-III “DATA MONITOR”.

Does the item on “DATA MONITOR” indicate “On”?

YES >> Replace combination meter. Refer to MWI-72, "Exploded View".
NO >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).

cardiagn.com

4WD INDICATOR LAMP

Description

INFOID:0000000001083116

The following is the indications of indicator lamp after engine start.

4WD INDICATOR LAMP AND LOCK INDICATOR LAMP

Condition	4WD indicator lamp	LOCK indicator lamp
2WD mode	OFF	OFF
AUTO mode	ON	OFF
LOCK mode	ON	ON

Diagnosis Procedure

INFOID:0000000001083117

1.PERFORM SELF-DIAGNOSIS

With CONSULT-III

Perform 4WD control unit self-diagnosis.

Is DTC “U1000” detected?

YES >> CAN specification chart. Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> GO TO 2.

2.CHECK 4WD MODE SWITCH

Perform the trouble diagnosis for 4WD mode switch. Refer to DLN-20, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning part.

3.PERFORM COMBINATION METER SELF-DIAGNOSIS

With CONSULT-III

Perform combination meter self-diagnosis.

Is any error system detected?

YES >> Check the error system.
NO >> GO TO 4.

4.CHECK 4WD INDICATOR LAMP SGNAL

With CONSULT-III

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Change 4WD mode switch in “AUTO” from “2WD”.
3. Check “4WD MODE MON” of 4WD control unit CONSULT-III “DATA MONITOR”.

Does the item on “DATA MONITOR” indicate “Auto”?

YES >> Replace combination meter. Refer to MWI-72, "Exploded View".
NO >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).

cardiagn.com

LOCK INDICATOR LAMP

Description

INFOID:0000000001088449

The following is the indications of indicator lamp after engine start.

4WD INDICATOR LAMP AND LOCK INDICATOR LAMP

Condition	4WD indicator lamp	LOCK indicator lamp
2WD mode	OFF	OFF
AUTO mode	ON	OFF
LOCK mode	ON	ON

Diagnosis Procedure

INFOID:0000000001088450

1.PERFORM SELF-DIAGNOSIS

With CONSULT-III

Perform 4WD control unit self-diagnosis.

Is DTC “U1000” detected?

YES >> CAN specification chart. Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> GO TO 2.

2.CHECK 4WD MODE SWITCH

Perform the trouble diagnosis for 4WD mode switch. Refer to DLN-20, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning part.

3.PERFORM COMBINATION METER SELF-DIAGNOSIS

With CONSULT-III

Perform combination meter self-diagnosis.

Is any error system detected?

YES >> Check the error system.
NO >> GO TO 4.

4.CHECK LOCK INDICATOR LAMP SGNAL

With CONSULT-III

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Change 4WD mode switch in “LOCK” from “AUTO”.
3. Check “4WD MODE MON” of 4WD control unit CONSULT-III “DATA MONITOR”.

Does the item on “DATA MONITOR” indicate “Lock”?

YES >> Replace combination meter. Refer to MWI-72, "Exploded View".
NO >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).

cardiagn.com

ECU DIAGNOSIS

4WD CONTROL UNIT

Reference Value

INFOID:0000000000972103

VALUES ON THE DIAGNOSIS TOOL

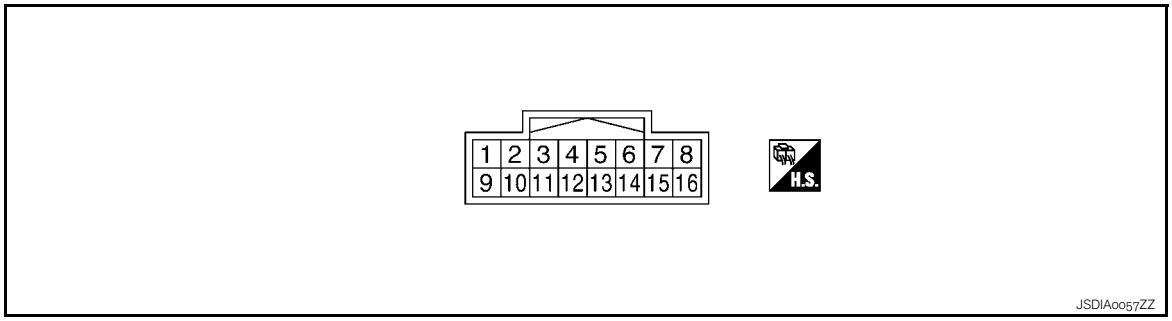
Monitor item	Condition		Value/Status
BATTERY VOLT	Ignition switch: ON		Battery voltage
THRTL POS SEN	When depressing accelerator pedal (Value rises gradually in response to throttle position.)		0 – 100%
ETS SOLENOID	Engine running • At idle speed	4WD mode switch: 2WD	Approx. 0.000 A
		4WD indicator lamp: ON	Approx. 0.000 A
		LOCK indicator lamp: ON	Approx. 0.000 A
	Engine running • When depressing accelerator pedal	4WD mode switch: 2WD	Approx. 0.000 A
		4WD indicator lamp: ON	Approx. 0.000 – 1.500 A*
		LOCK indicator lamp: ON	Approx. 2.800 A
FR RH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
FR LH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
RR RH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
RR LH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
STOP LAMP SW	Brake pedal: Depressed		On
	Brake pedal: Released		Off
ENG SPEED SIG	Engine stopped (Engine speed: Less than 400 rpm)		Stop
	Engine running (Engine speed: 400 rpm or more)		Run
ETS ACTUATOR	Engine stopped (Ignition switch: ON)		Off
	Engine running		On
4WD WARN LAMP	4WD warning lamp: ON		On
	4WD warning lamp: OFF		Off
4WD MODE SW	Ignition switch: ON	4WD mode switch: 2WD	2wd
		4WD mode switch: AUTO	Auto
		4WD mode switch: LOCK (State of hold of LOCK position)	Lock

cardiagn.com

Monitor item	Condition		Value/Status
4WD MODE MON	Ignition switch: ON	4WD mode switch: 2WD	2wd
		4WD mode switch: AUTO	Auto
		4WD mode switch: AUTO ⇒ LOCK (AUTO)	Auto ⇒ Lock
		4WD mode switch: AUTO ⇒ LOCK (LOCK)	Lock ⇒ Auto
DIS-TIRE MONI	Vehicle running with normal size tire installed		0 – 4 mm
	Vehicle running with improper size tire installed (Front/rear tire size difference, wear condition)		4 – 8 mm, 8 – mm
P BRAKE SW	Parking brake operated		On
	Parking brake not operated		Off

*: The values are changed by throttle opening and engine speed.

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
1 (LG)	Ground	4WD solenoid power supply	Output	Engine speed: At idle	4WD mode switch: 2WD	0 V
					4WD indicator lamp: ON	0 V
					LOCK indicator lamp: ON	0 V
				Engine speed: 3,000 rpm or more constant	4WD mode switch: 2WD	0 V
					4WD indicator lamp: ON	2.5 V*
					LOCK indicator lamp: ON	8 V
2 (L)	Ground	4WD solenoid ground	—	Engine speed: At idle		0 V
				Engine speed: 3,000 rpm or more constant		0 V
5 (V)	Ground	4WD mode switch (AUTO)	Output	Ignition switch: ON	4WD mode switch: 2WD	Battery voltage
					4WD mode switch: AUTO	0 V
					4WD mode switch: LOCK	0 V
7 (P)	Ground	Ignition switch	Input	Ignition switch: ON		Battery voltage
				Ignition switch: OFF		0 V
8 (L)	Ground	CAN-H	—	—		—
9 (G)	Ground	Power supply (4WD solenoid)	Input	Ignition switch: ON		Battery voltage
				Ignition switch: OFF		Battery voltage
10 (B)	Ground	Ground	—	Always		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
11 (B)	Ground	Ground	—	Always		0 V
12 (BR)	Ground	4WD mode switch (2WD)	Output	Ignition switch: ON	4WD mode switch: 2WD	0 V
					4WD mode switch: AUTO	Battery voltage
					4WD mode switch: LOCK (State of hold of LOCK position)	Battery voltage
14 (Y)	Ground	4WD mode switch (LOCK)	Output	Ignition switch: ON	4WD mode switch: 2WD	Battery voltage
					4WD mode switch: AUTO	Battery voltage
					4WD mode switch: LOCK (State of hold of LOCK position)	0 V
16 (P)	Ground	CAN-L	—	—		—

*: The values are changed by throttle opening and engine speed.

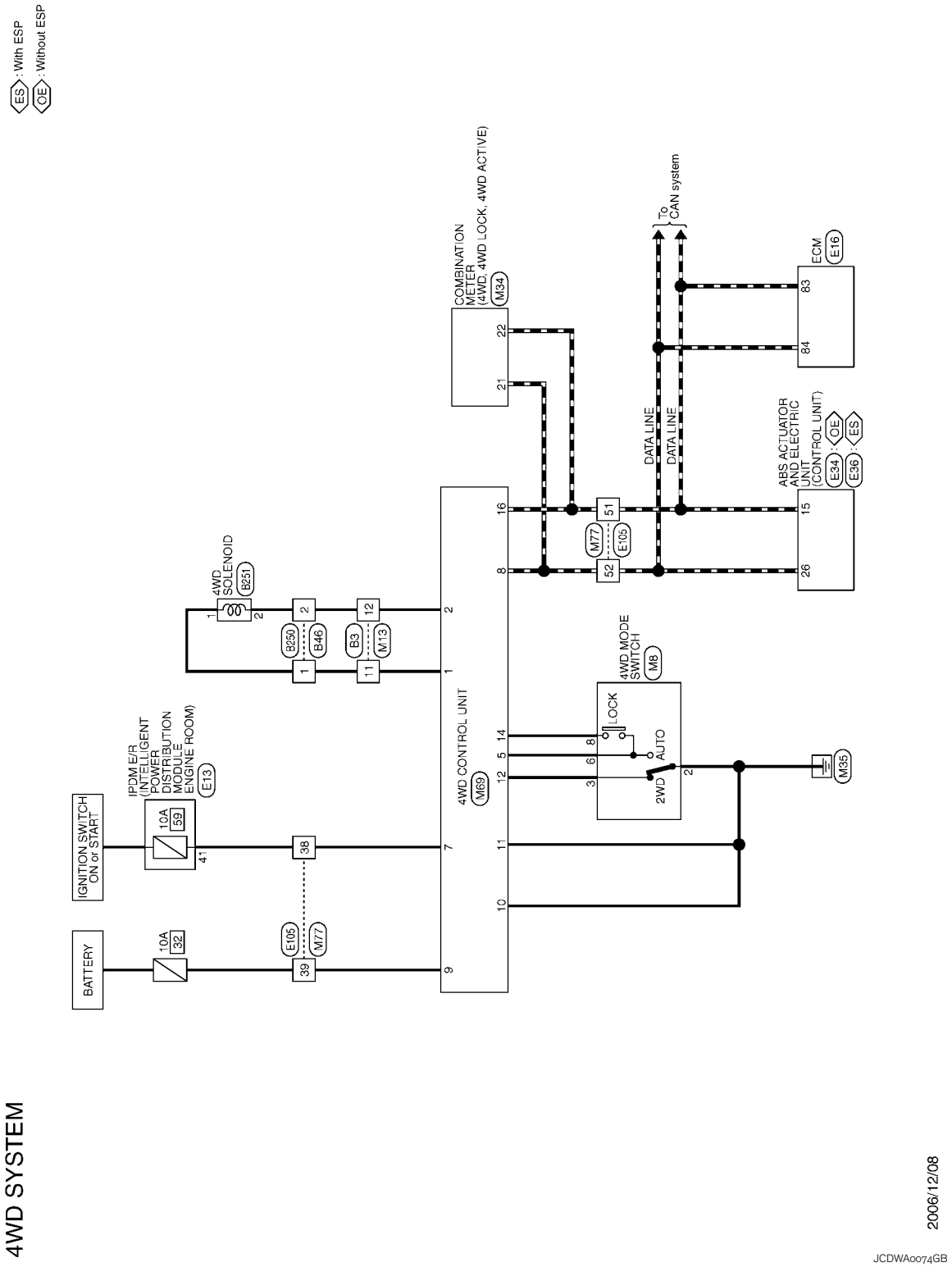
CAUTION:

When using circuit tester to measure voltage for inspection, be sure not to extend forcibly any connector terminals.

Wiring Diagram - 4WD SYSTEM -

INFOID:0000000000972104

cardiagn.com



cardiagn.com

4WD SYSTEM

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
11	LG	–
12	L/W	–

Connector No.	B46
Connector Name	WIRE TO WIRE
Connector Type	RS02FGY

H.S.

2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	L/W	–

Connector No.	B250
Connector Name	WIRE TO WIRE
Connector Type	RS02MGY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	L/W	–

Connector No.	B251
Connector Name	4WD SOLENOID
Connector Type	RS02FGY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	L/W	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

39	38	37	36		35	34	33
48	47	46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name [Specification]
41	P	–

Connector No.	E16
Connector Name	ECM
Connector Type	MA24FB-MEA8-LH

H.S.

81	85	89	93	97	101	105	109
82	86	90	94	98	102	106	110
83	87	91	95	99	103	107	111
84	88	92	96	100	104	108	112

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E34
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH

H.S.

1	2	3	4	16	17	18	19	20	21	22	23	24	25	26
			5	6	7	8	9	10	11	12	13	14	15	

Terminal No.	Color of Wire	Signal Name [Specification]
15	P	CAN-L
26	L	CAN-H

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH

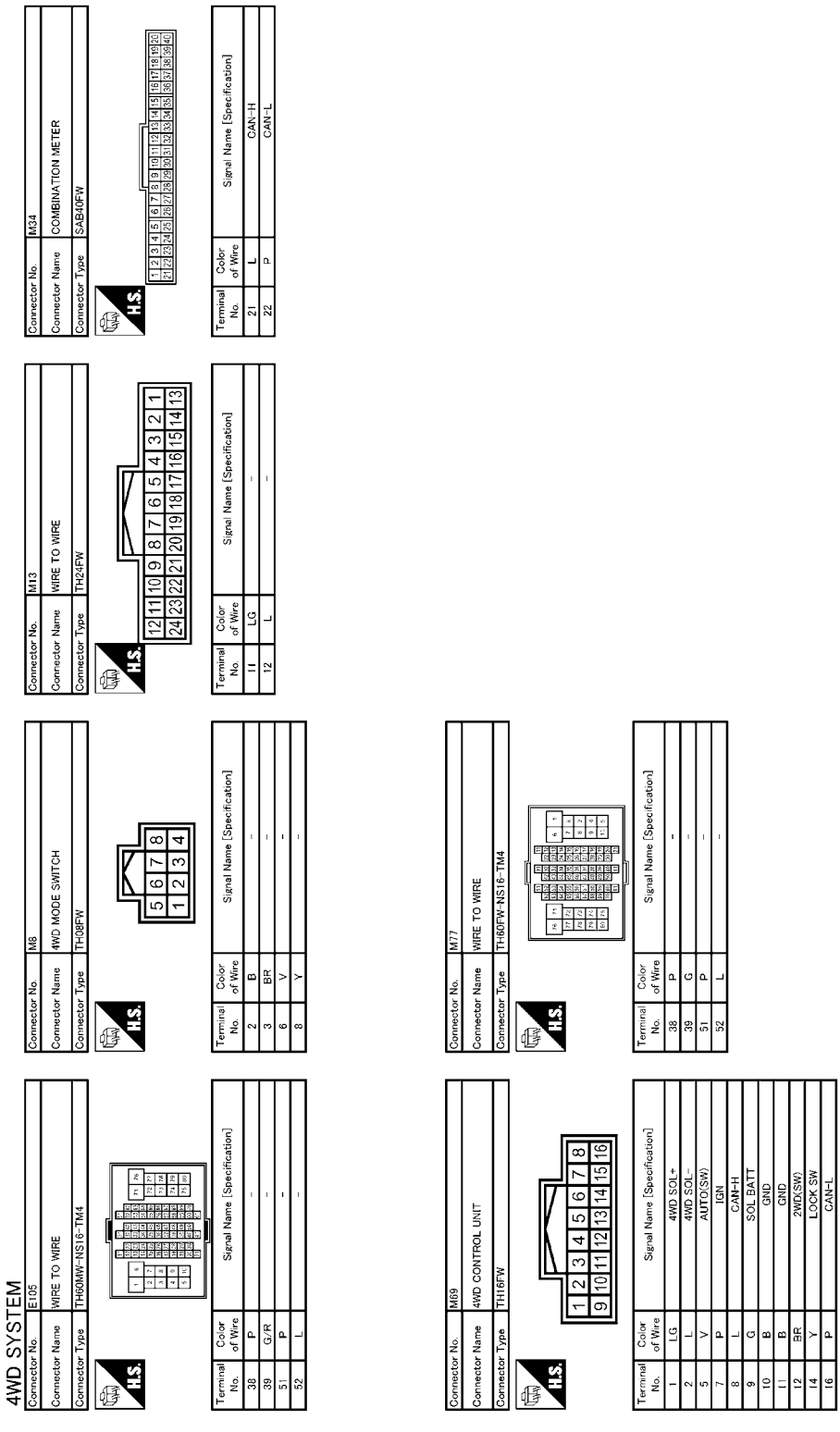
H.S.

1	2	3	4	16	17	18	19	20	21	22	23	24	25	26
			5	6	7	8	9	10	11	12	13	14	15	

Terminal No.	Color of Wire	Signal Name [Specification]
15	P	CAN-L
26	L	CAN-H

JCDWA0075GB

cardiagn.com



JCDWA0076GB

Fail Safe

INFOID:0000000000972105

4WD system

- If any malfunction occurs in 4WD electrical system, and control unit detects the malfunction, 4WD warning lamp on combination meter turns ON to indicate system malfunction.
- When 4WD warning lamp is ON, vehicle changes to front-wheel drive or shifting driving force-4WD (Rear-wheels still have some driving torque).

cardiagn.com

- 4WD system activates its protection function (shuts down 4WD system temporarily) if 4WD system detects high load continuously or the front wheel tire size differs from the rear tire size. (4WD system is automatically restored if 4WD system no longer detects any overload or the tire size difference is eliminated.)

Mode	Warning lamp	DTC	Detected area (Error area)	Error area and root cause
Protection function	Blinking*1	—	4WD control unit	Transfer assembly in protection mode (Internal temperature rise of electronic controlled coupling)
	Blinking*2	—	Outer diameters of front and rear wheel tires	Malfunction in each tire or different tire diameter
Fail-safe	ON	C1201	4WD control unit	Internal malfunction of 4WD control unit
		C1203	ABS actuator and electric unit (control unit)	ABS malfunction • Vehicle speed signal error • Stop lamp switch signal (brake signal) error
		C1204	4WD solenoid	Internal malfunction of electronic controlled coupling
		C1205	4WD control unit	Internal malfunction of 4WD control unit
		C1209	4WD mode switch	Malfunction of 4WD mode switch or 4WD mode switch circuit
		C1210	ECM	Malfunction of engine control system • Accelerator pedal position signal error • Engine speed signal error
		U1000	CAN communication line	CAN communication line error
		U1010	4WD control unit	4WD control unit error

*1: Quick blinking: 2 times/second (blinking for approx. 1 minute and then turned OFF)

*2: Slow blinking: 1 time/2 seconds (Continuing to blink until ignition switch is turned OFF)

DTC Inspection Priority Chart

INFOID:0000000000972106

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	• U1000 CAN COMM CIRCUIT • U1010 CONTROL UNIT (CAN)
2	• C1201 CONTROLLER FAILURE • C1205 4WD ACTUATOR RLY
3	• C1203 ABS SYSTEM • C1210 ENGINE SIGNAL 1
4	• C1204 4WD SOLENOID • C1209 MODE SW

DTC Index

INFOID:0000000000972107

DTC	Items (CONSULT-III screen terms)	Reference
C1201	CONTROLLER FAILURE	DLN-14, "Description"
C1203	ABS SYSTEM	DLN-15, "Description"
C1204	4WD SOLENOID	DLN-16, "Description"
C1205	4WD ACTUATOR RLY	DLN-19, "Description"
C1209	MODE SW	DLN-20, "Description"
C1210	ENGINE SIGNAL 1	DLN-23, "Description"
U1000	CAN COMM CIRCUIT	DLN-24, "Description"
U1010	CONTROL UNIT (CAN)	DLN-25, "Description"

cardiagn.com

SYMPTOM DIAGNOSIS

4WD SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000000972108

If 4WD warning lamp turns ON, perform self-diagnosis.

Symptom	Condition	Check item	Reference
4WD warning lamp does not turn ON when the ignition switch is turned to ON. (4WD warning lamp check)	Ignition switch: ON	Power supply and ground for 4WD control unit	DLN-39, "Description"
		CAN communication line	
		4WD control unit	
		Combination meter	
4WD warning lamp does not turn OFF several seconds after engine started.	Engine running	4WD control unit self-diagnosis	DLN-40, "Description"
		4WD warning lamp	
		Power supply and ground for 4WD control unit	
Heavy tight-corner braking symptom occurs when the vehicle is driven and the steering wheel is turned fully to either side after the engine is started. (See NOTE.)	• While driving • Steering wheel is turned fully to either sides	ECM self-diagnosis	DLN-41, "Description"
		4WD control unit self-diagnosis	
		4WD solenoid	
		Mechanical malfunction of electric controlled coupling (clutch sticking etc.)	
Vehicle does not enter 4WD mode even though 4WD warning lamp turned to OFF.	While driving	CAN communication line	DLN-42, "Description"
		4WD solenoid	
		Mechanical malfunction of electric controlled coupling (Mechanical engagement of clutch is not possible.)	
While driving, 4WD warning lamp blinks quickly. (When blinking in approx. 1 minute and then turning OFF.) Quick blinking: 2 times/second	While driving	Protection function is activated due to heavy load to electric controlled coupling. (4WD system is not malfunctioning. Also, optional distribution of torque sometimes becomes rigid before lamp blinks quickly, but it is not malfunction.)	DLN-43, "Description"
While driving, 4WD warning lamp blinks slowly. (When continuing to blink until turning ignition switch OFF) Slow blinking: 1 time/2 seconds	• While driving • Vehicle speed: 20 km/h (12 MPH) or more	Tire size is different between front and rear of vehicle.	DLN-44, "Description"

NOTE:

Light tight-corner braking symptom may occur depending on driving conditions. This is not malfunction.

cardiagn.com

4WD WARNING LAMP DOES NOT TURN ON

Description

INFOID:0000000000972109

4WD warning lamp does not turn ON when the ignition switch is turned to ON.

Diagnosis Procedure

INFOID:0000000000972110

1.CHECK 4WD WARNING LAMP

Perform the trouble diagnosis for 4WD warning lamp. Refer to DLN-28, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Check each harness connector pin terminal for malfunction or disconnection.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

4WD WARNING LAMP DOES NOT TURN OFF

Description

INFOID:0000000000972111

4WD warning lamp does not turn OFF several seconds after engine started.

Diagnosis Procedure

INFOID:0000000000972112

1.PERFORM SELF-DIAGNOSIS

With CONSULT-III

Perform 4WD control unit self-diagnosis.

Is any error system detected?

YES >> Check the error system.
NO >> GO TO 2.

2.CHECK 4WD WARNING LAMP

Perform the trouble diagnosis of the 4WD warning lamp. Refer to DLN-28, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning part.

3.CHECK 4WD CONTROL UNIT POWER SUPPLY AND GROUND CIRCUIT

Perform the trouble diagnosis of the power supply and ground circuit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Check each harness connector pin terminal for malfunction or disconnection.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS

Description

INFOID:0000000000972113

Heavy tight-corner braking symptom occurs when the vehicle is driven and the steering wheel is turned fully to either side after the engine is started.

NOTE:

Light tight-corner braking symptom may occur depending on driving conditions. This is not malfunction.

Diagnosis Procedure

INFOID:0000000000972114

1. PERFORM ECM SELF-DIAGNOSIS

With CONSULT-III

Perform ECM self-diagnosis.

Is any error system detected?

YES >> Check the error system.
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS

With CONSULT-III

Perform 4WD control unit self-diagnosis.

Is DTC “U1000” detected?

YES >> CAN specification chart. Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> GO TO 3.

3. CHECK 4WD SOLENOID

Perform the trouble diagnosis of the 4WD solenoid. Refer to DLN-16, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace the malfunctioning part.

4. CHECK ELECTRIC CONTROLLED COUPLING

1. Turn the ignition switch OFF.
2. Set the transmission to neutral. Release the parking brake.
3. Lift up the vehicle.
4. Rotate the propeller shaft by hand.
5. Hold rear wheel of right and left lightly.

Does the front propeller shaft rotate?

YES >> Replace electric controlled coupling for mechanical malfunction (clutch sticking etc.). Refer to DLN-124, "Exploded View".
NO >> Check each harness connector pin terminal for disconnection.

cardiagn.com

VEHICLE DOES NOT ENTER 4WD MODE

Description

INFOID:0000000000972115

Vehicle does not enter 4WD mode even though 4WD warning lamp turned to OFF.

Diagnosis Procedure

INFOID:0000000000972116

1.CHECK 4WD WARNING LAMP

Turn the ignition switch ON.

Does 4WD warning lamp turn ON?

YES >> GO TO 2.
NO >> Go to DLN-39, "Diagnosis Procedure".

2.PERFORM SELF-DIAGNOSIS

With CONSULT-III

Perform 4WD control unit self-diagnosis.

Is DTC “U1000” detected?

YES >> CAN specification chart. Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> GO TO 3.

3.CHECK 4WD SOLENOID

Perform the trouble diagnosis of the 4WD solenoid. Refer to DLN-16, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace the malfunctioning part.

4.CRUISE TEST

Drive the vehicle for a period of time.

Does any symptom occur?

YES >> Replace electric controlled coupling for mechanical malfunction (mechanical engagement of clutch is not possible). Refer to DLN-124, "Exploded View".
NO >> Check each harness connector pin terminal for disconnection.

cardiagn.com

4WD WARNING LAMP BLINKS QUICKLY

Description

INFOID:0000000000972117

While driving, 4WD warning lamp blinks 2 times in 1 second and it turns OFF after 1 minute.

- This symptom protects drivetrain parts when a heavy load is applied to the electric controlled coupling and multiple disc clutch temperature increases. Also, optional distribution of torque sometimes becomes rigid before lamp blinks quickly. Both cases are not malfunction.
- When this symptom occurs, stop vehicle and allow it to idle for some times. Blinking will stop and system will be restored.

cardiagn.com

4WD WARNING LAMP BLINKS SLOWLY

Description

INFOID:0000000000972118

4WD warning lamp blinks at approximately 2 seconds intervals while driving.

Diagnosis Procedure

INFOID:0000000000972119

1.CHECK TIRE

Check the following.
- Tire pressure
- Wear condition
- Longitudinal tire size (There is no difference between longitudinal tires.)

Is the inspection result normal?

YES >> GO TO 2.
NO >> Drive at vehicle speed of 20 km/h (12 MPH) or more for 5 seconds or more after repairing or replacing damaged parts. (Initialize improper size tire information.)

2.CHECK INPUT SIGNAL OF TIRE DIAMETER

With CONSULT-III

1. Start engine.
2. Drive at 20 km/h (12 MPH) or more for approx. 200 seconds.
3. Check “DIS-TIRE MONI” of 4WD control unit CONSULT-III “DATA MONITOR”.

Does the item on “DATA MONITOR” indicate “0 - 4 mm”?

YES >> INSPECTION END
NO >> GO TO 3.

3.TERMINAL INSPECTION

Check 4WD control unit harness connector for disconnection.

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-56, "LHD : Exploded View" (LHD models), DLN-56, "RHD : Exploded View" (RHD models).
NO >> Repair or replace the malfunctioning part.

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000001088451

While driving, 4WD warning lamp blinks 2 times in 1 second and it turns OFF after 1 minute.

- This symptom protects drivetrain parts when a heavy load is applied to the electric controlled coupling and multiple disc clutch temperature increases. Also, optional distribution of torque sometimes becomes rigid before lamp blinks quickly. Both cases are not malfunction.
- When this symptom occurs, stop vehicle and allow it to idle for some times. Blinking will stop and system will be restored.

cardiagn.com

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000972121

M/T MODELS

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference		DLN-55, "Inspection"			DLN-61, "M/T : Exploded View"	DLN-61, "M/T : Exploded View"	DLN-61, "M/T : Exploded View"	DLN-70, "M/T : Inspection After Disassembly"	DLN-70, "M/T : Inspection After Disassembly"
SUSPECTED PARTS (Possible cause)		TRANSFER OIL (Level low)	TRANSFER OIL (Wrong)	TRANSFER OIL (Level too high)	LIQUID GASKET (Damaged)	O-RING (Worn or damaged)	OIL SEAL (Worn or damaged)	GEAR (Worn or damaged)	BEARING (Worn or damaged)
Symptom	Noise	1	2				3	3	3
	Transfer oil leakage		3	1	2	2	2		

CVT MODELS

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

cardiagn.com

Reference		DLN-55, "Inspection"			DLN-63, "CVT : Exploded View"	DLN-63, "CVT : Exploded View"	DLN-63, "CVT : Exploded View"	DLN-74, "CVT : Inspection After Disassembly"	DLN-74, "CVT : Inspection After Disassembly"
SUSPECTED PARTS (Possible cause)		TRANSFER OIL (Level low)	TRANSFER OIL (Wrong)	TRANSFER OIL (Level too high)	LIQUID GASKET (Damaged)	O-RING (Worn or damaged)	OIL SEAL (Worn or damaged)	GEAR (Worn or damaged)	BEARING (Worn or damaged)
Symptom	Noise	1	2				3	3	3
	Transfer oil leakage		3	1	2	2	2		

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001070056

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Service Notice or Precautions for Transfer

INFOID:0000000000972123

CAUTION:

- **After overhaul refill the transfer with new transfer oil.**
- **Check the oil level or replace the oil only with the vehicle parked on level surface.**
- **During removal or installation, keep inside of transfer clear of dust or dirt.**
- **Replace all tires at the same time. Always use tires of the proper size and the same brand and pattern. Fitting improper size and unusual wear tires applies excessive force to vehicle mechanism and can cause longitudinal vibration.**
- **Disassembly should be done in a clean work area.**
- **Before proceeding with disassembly, thoroughly clean the transfer. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.**
- **Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts when applied.**
- **All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.**
- **Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new one if necessary.**
- **Gaskets, seals, O-rings and lock nuts should be replaced any time when the transfer is disassembled.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.**
- **Observe the specified torque when assembling.**
- **Clean and flush the parts sufficiently and blow-dry them.**
- **Be careful not to damage sliding surfaces and mating surfaces.**
- **Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transfer.**

cardiagn.com

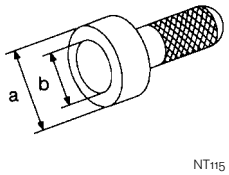
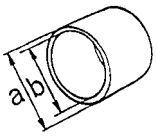
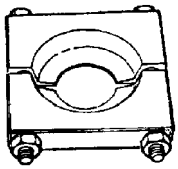
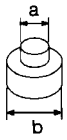
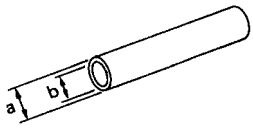
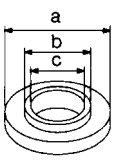
PREPARATION

PREPARATION

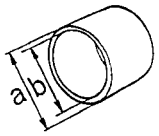
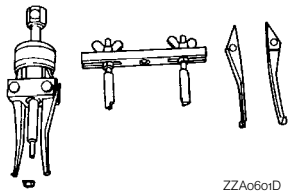
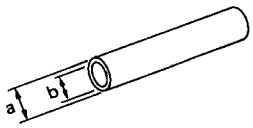
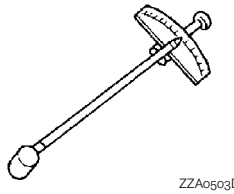
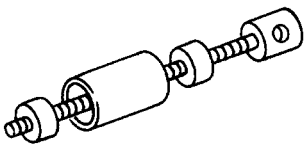
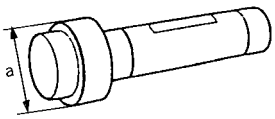
M/T

M/T : Special Service Tools

INFOID:0000000000972124

Tool number Tool name	Description
ST30720000 Drift a: ϕ77 mm (3.03 in) dia. b: ϕ55.5 mm (2.185 in) dia.  NT115	• Installing adapter case oil seal (inner/outer) • Installing drive pinion oil seal
ST27861000 Drift a: ϕ62 mm (2.44 in) dia. b: ϕ52 mm (2.05 in) dia.  ZZA1003D	• Installing adapter case oil seal (inner/outer) • Installing drive pinion oil seal
ST22730000 Replacer  ZZA0700D	• Removing inner race of ring gear shaft bearing (transfer case side) • Removing inner race of drive pinion bearing (front side)
ST33052000 Drift a: ϕ22 mm (0.87 in) dia. b: ϕ28 mm (1.10 in) dia.  NT116	• Removing ring gear • Removing inner race of drive pinion bearing (front side)
ST01530000 Drift a: ϕ48 mm (1.89 in) dia. b: ϕ41 mm (1.61 in) dia.  ZZA0534D	Installing ring gear
ST35272000 Drift a: ϕ72 mm (2.83 in) dia. b: ϕ40 mm (1.57 in) dia. c: ϕ35.5 mm (1.398 in) dia.  NT107	• Installing ring gear • Installing outer race of drive pinion bearing (front side)

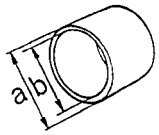
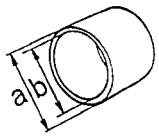
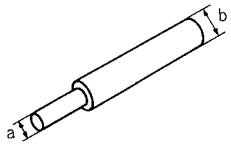
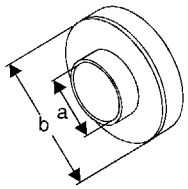
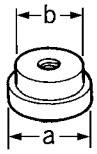
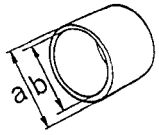
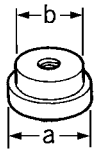
cardiagn.com

Tool number Tool name	Description
KV10111400 Drift a: ϕ25 mm (0.98 in) dia. b: ϕ20.8 mm (0.819 in) dia.  ZZA1003D	Installing inner race of ring gear shaft bearing (transfer case side)
KV381054S0 Puller  ZZA0601D	Removing drive pinion oil seal
ST23860000 Drift a: ϕ38 mm (1.50 in) dia. b: ϕ33 mm (1.30 in) dia.  ZZA0534D	Installing inner race of drive pinion bearing (front side)
ST3127S000 Preload gauge  ZZA0503D	Measuring preload torque
ST38280000 Bushing remover  NT685	Installing outer race of drive pinion bearing (front side)
ST33230000 Drift a: ϕ51 mm (2.01 in) dia.  ZZA0938D	Installing outer race of drive pinion bearing (rear side)

M/T : Commercial Service Tools

INFOID:0000000000972125

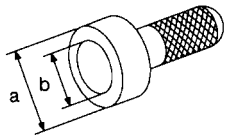
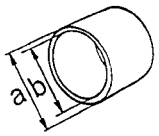
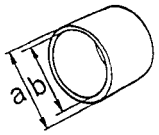
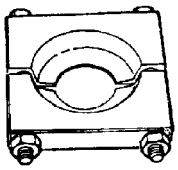
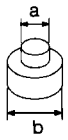
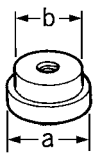
cardiagn.com

Tool name	Description
Drift a: ϕ63 mm (2.48 in) dia. b: ϕ58 mm (2.28 in) dia.  ZZA1003D	Installing adapter case oil seal (inner)
Drift a: ϕ90 mm (3.54 in) dia. b: ϕ88 mm (3.46 in) dia.  ZZA1003D	Installing adapter case oil seal (outer)
Drift a: ϕ12 mm (0.47 in) dia. b: ϕ18 mm (0.71 in) dia.  ZZA1178D	Removing inner race of ring gear shaft bearing (transfer case side)
Drift a: ϕ49 mm (1.93 in) dia. b: ϕ67 mm (2.64 in) dia.  NT660	Removing inner race of ring gear shaft bearing (adapter case side)
Drift a: ϕ80 mm (3.15 in) dia. b: ϕ50 mm (1.97 in) dia.  ZZA1000D	Installing outer race of ring gear shaft bearing (adapter case side)
Drift a: ϕ57 mm (2.24 in) dia. b: ϕ47 mm (1.85 in) dia.  ZZA1003D	Installing inner race of ring gear shaft bearing (adapter case side)
Drift a: ϕ61 mm (2.40 in) dia. b: ϕ48 mm (1.89 in) dia.  ZZA1000D	Installing outer race of drive pinion bearing (front side)

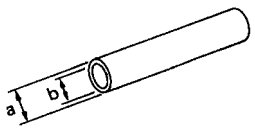
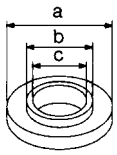
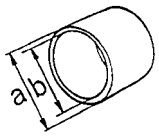
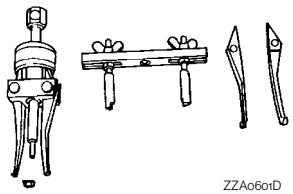
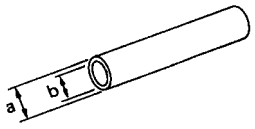
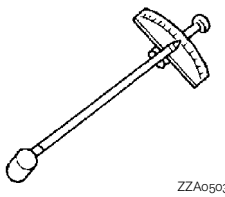
cardiagn.com

CVT : Special Service Tools

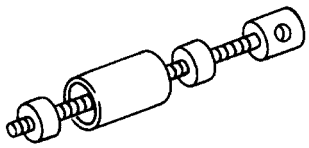
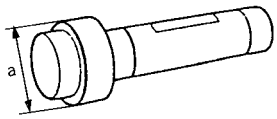
INFOID:0000000001063189

Tool number Tool name	Description
ST30720000 Drift a: ϕ77 mm (3.03 in) dia. b: ϕ55.5 mm (2.185 in) dia.  NT115	• Installing adapter case oil seal • Installing drive pinion oil seal
ST27861000 Drift a: ϕ62 mm (2.44 in) dia. b: ϕ52 mm (2.05 in) dia.  ZZA1003D	• Installing adapter case oil seal • Installing drive pinion oil seal
KV40104830 Drift a: ϕ70 mm (2.76 in) dia. b: ϕ63.5 mm (2.500 in) dia.  ZZA1003D	Installing adapter case oil seal
ST22730000 Replacer  ZZA0700D	• Removing inner race of ring gear shaft bearing (transfer case side) • Removing inner race of drive pinion bearing (front side)
ST33052000 Drift a: ϕ22 mm (0.87 in) dia. b: ϕ28 mm (1.10 in) dia.  NT116	• Removing ring gear • Removing inner race of drive pinion bearing (front side)
ST30621000 Drift a: ϕ72 mm (2.83 in) dia. b: ϕ48 mm (1.89 in) dia.  ZZA1000D	• Installing outer race of ring gear shaft bearing (adapter case side) • Installing outer race of drive pinion bearing (front side)

cardiagn.com

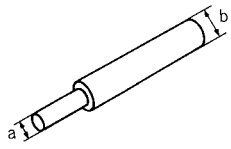
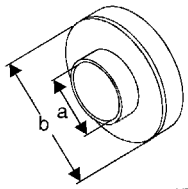
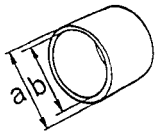
Tool number Tool name	Description
ST01530000 Drift a: ϕ48 mm (1.89 in) dia. b: ϕ41 mm (1.61 in) dia.  ZZA0534D	Installing ring gear
ST35272000 Drift a: ϕ72 mm (2.83 in) dia. b: ϕ40 mm (1.57 in) dia. c: ϕ35.5 mm (1.398 in) dia.  NT107	• Installing ring gear • Installing outer race of drive pinion bearing (front side)
KV10111400 Drift a: ϕ25 mm (0.98 in) dia. b: ϕ20.8 mm (0.819 in) dia.  ZZA1003D	Installing inner race of ring gear shaft bearing (transfer case side)
KV381054S0 Puller  ZZA0601D	Removing drive pinion oil seal
ST23860000 Drift a: ϕ38 mm (1.50 in) dia. b: ϕ33 mm (1.30 in) dia.  ZZA0534D	Installing inner race of drive pinion bearing (front side)
ST3127S000 Preload gauge  ZZA0503D	Measuring preload torque

cardiagn.com

Tool number Tool name	Description
ST38280000 Bushing remover  NT685	Installing outer race of drive pinion bearing (front side)
ST33230000 Drift a: ϕ51 mm (2.01 in) dia.  ZZA0938D	Installing outer race of drive pinion bearing (rear side)

CVT : Commercial Service Tools

INFOID:0000000001115036

Tool name	Description
Drift a: ϕ12 mm (0.47 in) dia. b: ϕ18 mm (0.71 in) dia.  ZZA1178D	Removing inner race of ring gear shaft bearing (transfer case side)
Drift a: ϕ49 mm (1.93 in) dia. b: ϕ67 mm (2.64 in) dia.  NT660	Removing inner race of ring gear shaft bearing (adapter case side)
Drift a: ϕ57 mm (2.24 in) dia. b: ϕ47 mm (1.85 in) dia.  ZZA1003D	Installing inner race of ring gear shaft bearing (adapter case side)

cardiagn.com

ON-VEHICLE MAINTENANCE

TRANSFER OIL

Inspection

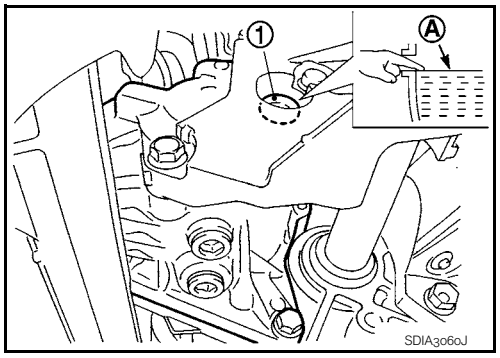
INFOID:0000000000972126

OIL LEAKAGE

Check transfer surrounding area (oil seal, drain plug, filler plug, and transfer case, etc.) for oil leakage.

OIL LEVEL

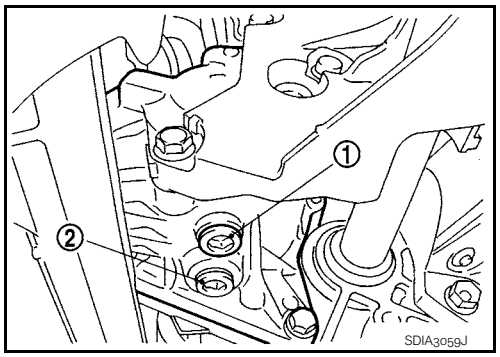
1. Remove filler plug (1) and gasket. Then check that oil is filled up (A) from mounting hole for the filler plug.
2. Before installing filler plug, set a new gasket. Install filler plug on transfer and tighten to the specified torque. Refer to DLN-61, "M/T : Exploded View" (M/T models), DLN-63, "CVT : Exploded View" (CVT models).
   CAUTION:
   Never reuse gaskets.



Draining

INFOID:0000000000972127

1. Run the vehicle to warm up the transfer unit sufficiently.
2. Stop the engine and remove drain plug (1) and gaskets to drain the transfer oil.
   CAUTION:
   Never remove tooth contact test hole plug (2).
3. Before installing drain plug, set a new gasket. Install drain plug on transfer and tighten to the specified torque. Refer to DLN-61, "M/T : Exploded View" (M/T models), DLN-63, "CVT : Exploded View" (CVT models).
   CAUTION:
   Never reuse gaskets.



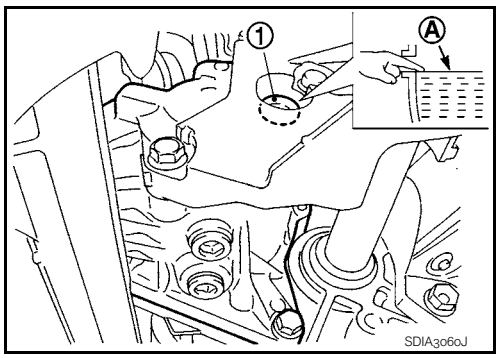
Refilling

INFOID:0000000000972128

1. Remove filler plug (1) and gasket. Then fill oil up to mounting hole (A) for the filler plug.

Oil grade and Viscosity	**: Refer to MA-21, "Fluids and Lubricants".**
Oil capacity	**: Refer to DLN-107, "General Specifications".**

   CAUTION:
   Carefully fill the oil. (Fill up for approximately 3 minutes.)
2. Leave the vehicle for 3 minutes. Then check oil level again.
3. Before installing filler plug, set a new gasket. Install filler plug on transfer and tighten to the specified torque. Refer to DLN-61, "M/T : Exploded View" (M/T models), DLN-63, "CVT : Exploded View" (CVT models).
   CAUTION:
   Never reuse gasket.



cardiagn.com

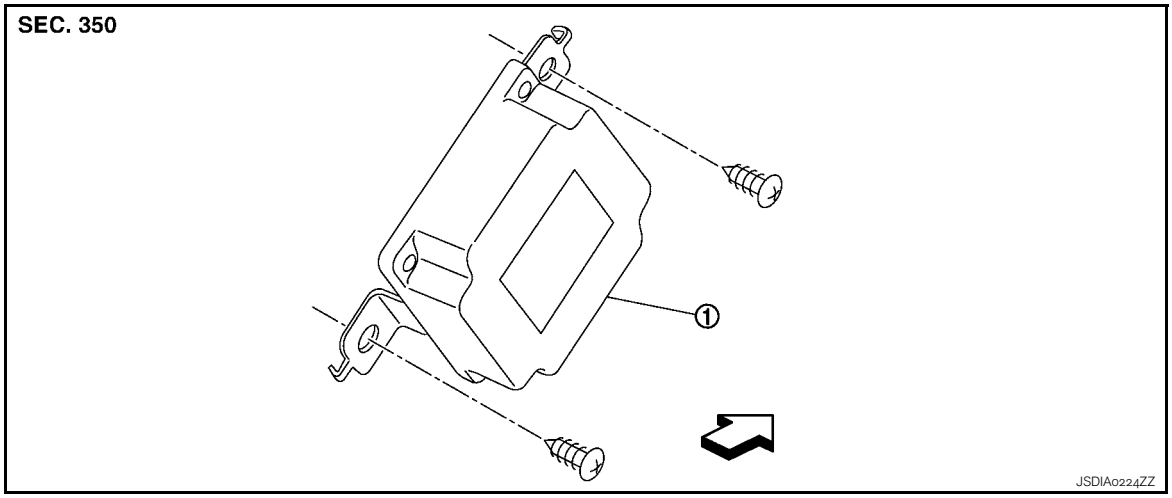
ON-VEHICLE REPAIR

4WD CONTROL UNIT

LHD

LHD : Exploded View

INFOID:0000000001083044



1. 4WD control unit

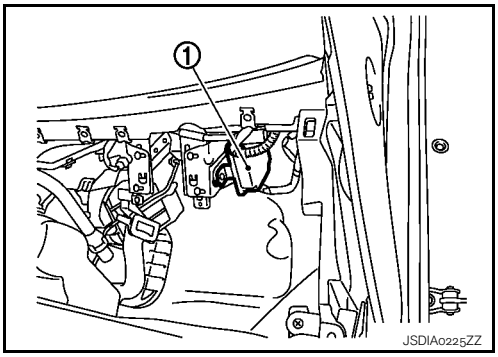
⇦: Vehicle front

LHD : Removal and Installation

INFOID:0000000001083045

REMOVAL

1. Remove the instrument assist lower panel. Refer to IP-11, "Exploded View".
2. Disconnect 4WD control unit harness connector.
3. Remove 4WD control unit (1) mounting screws.
4. Remove 4WD control unit.



INSTALLATION

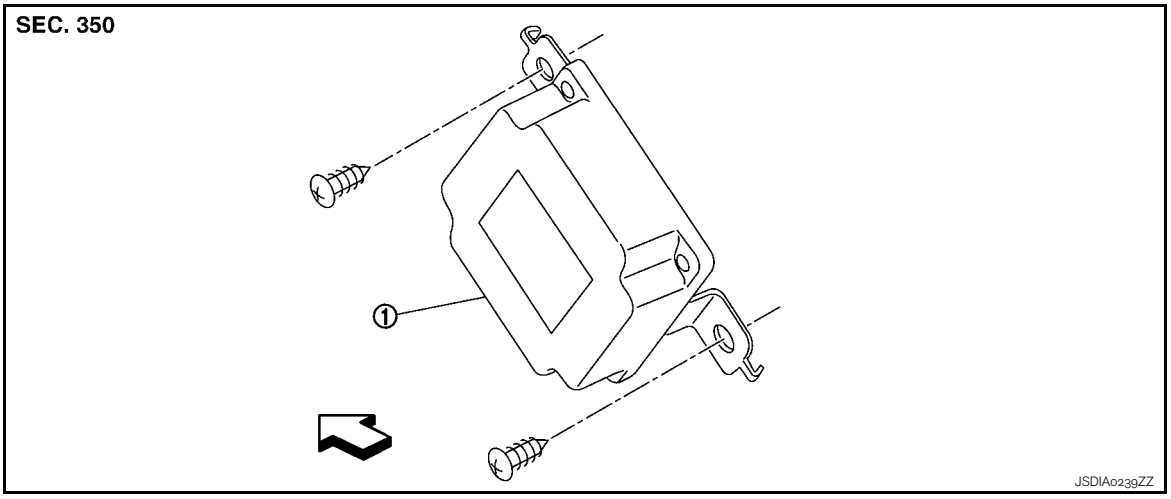
Install is the reverse order of removal.

RHD

RHD : Exploded View

INFOID:0000000000972129

cardiagn.com



1. 4WD control unit

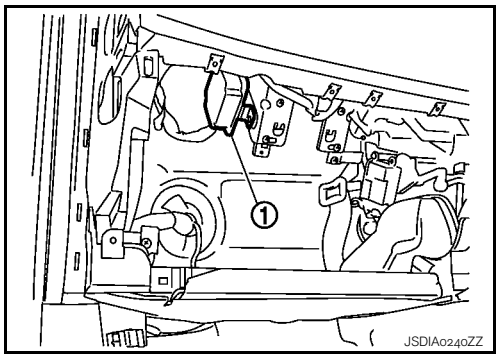
⇦: Vehicle front

RHD : Removal and Installation

INFOID:0000000000972130

REMOVAL

1. Remove the instrument assist lower panel. Refer to IP-11, "Exploded View".
2. Disconnect 4WD control unit harness connector.
3. Remove 4WD control unit (1) mounting screws.
4. Remove 4WD control unit.



INSTALLATION

Install is the reverse order of removal.

cardiagn.com

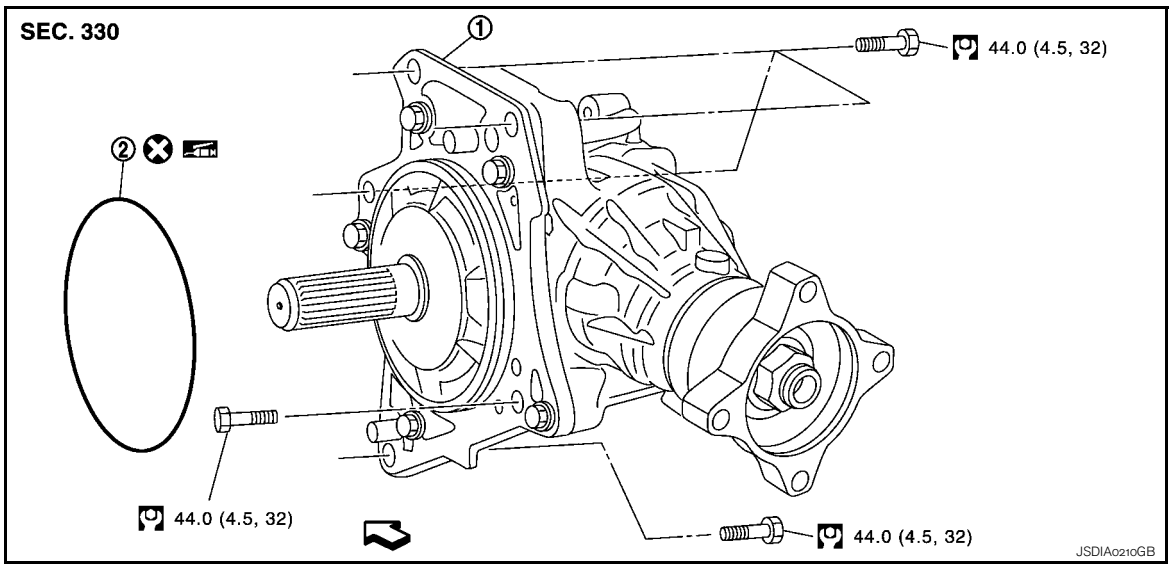
REMOVAL AND INSTALLATION

TRANSFER ASSEMBLY

M/T

M/T : Exploded View

INFOID:0000000001055585



1. Transfer assembly
2. O-ring (outer)

⇦: Vehicle front

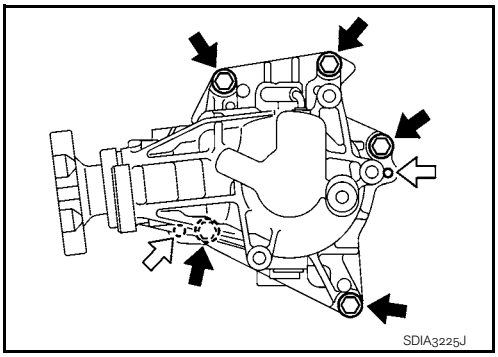
Refer to GI-4, "Components" for symbols in the figure.

M/T : Removal and Installation

INFOID:0000000001055586

REMOVAL

1. Remove the exhaust front tube. Refer to EX-10, "Exploded View".
2. Remove the exhaust manifold. Refer to EM-149, "Exploded View".
3. Separate the rear propeller shaft. Refer to DLN-110, "Exploded View".
4. Remove right side drive shaft and support bearing bracket. Refer to FAX-55, "Exploded View".
5. Remove the mounting bolts (⬅) of transaxle assembly and transfer assembly.
   CAUTION:
   Never remove the mounting bolts (⇦) of adapter case.
6. Remove transfer assembly from the vehicle.
   CAUTION:
   - **Never damage ring gear shaft.**
   - **Never damage air breather hose.**
7. Remove O-ring (outer) from the transfer assembly.



INSTALLATION

Note the following, and install in the reverse order of removal.

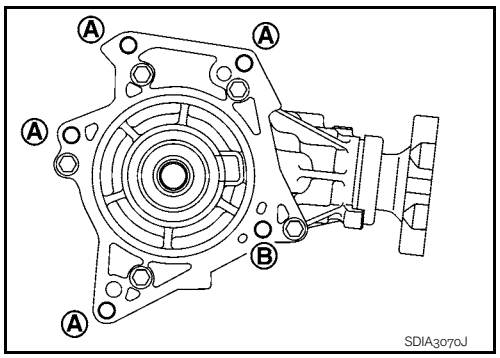
- Apply multi-purpose grease lightly and evenly onto an O-ring (outer), and install it to the transfer assembly.
  CAUTION:
  Never reuse O-ring (outer).

cardiagn.com

- Install mounting bolts according to the standard below when installing transfer assembly to the transaxle assembly.

Bolt symbol	A	B
Installation direction	Transfer ⇒ Transaxle	Transaxle ⇒ Transfer

- Check oil level and check for oil leakage after installation. Refer to DLN-55, "Inspection".

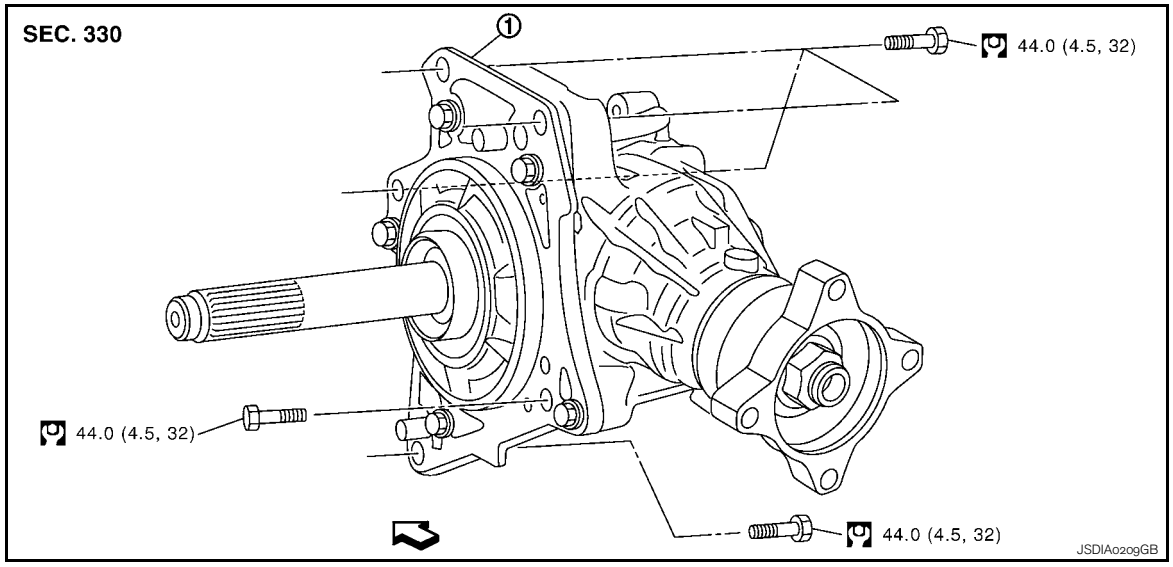


SDIA3070J

CVT

CVT : Exploded View

INFOID:0000000000972135



JSDIA0209GB

1. Transfer assembly

⇦: Vehicle front

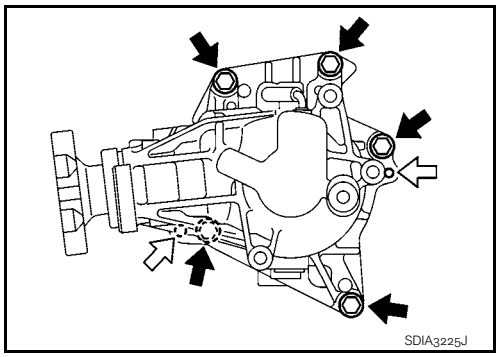
Refer to GI-4, "Components" for symbols in the figure.

CVT : Removal and Installation

INFOID:0000000000972136

REMOVAL

1. Remove the exhaust front tube. Refer to EX-10, "Exploded View".
2. Remove the exhaust manifold. Refer to EM-149, "Exploded View".
3. Separate the rear propeller shaft. Refer to DLN-110, "Exploded View".
4. Remove right side drive shaft and support bearing bracket. Refer to FAX-55, "Exploded View".
5. Remove the mounting bolts (⬅) of transaxle assembly and transfer assembly.
   CAUTION:
   Never remove the mounting bolts (⇦) of adapter case.
6. Remove transfer assembly from the vehicle.
   CAUTION:
   - **Never damage ring gear shaft.**
   - **Never damage air breather hose.**

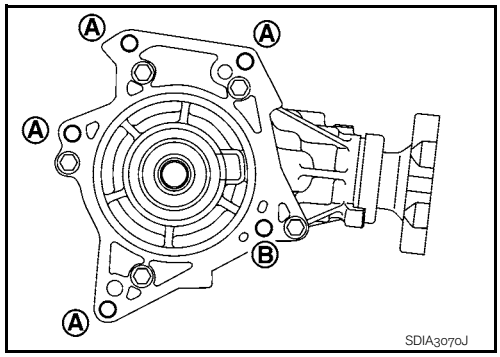

SDIA3225J

cardiagn.com

INSTALLATION

Note the following, and install in the reverse order of removal.

- Install mounting bolts according to the standard below when installing transfer assembly to the transaxle assembly.



Bolt symbol	A	B
Installation direction	Transfer ⇒ Transaxle	Transaxle ⇒ Transfer

CAUTION:

Replace side oil seal (transfer joint) of transaxle assembly when installing transfer assembly to the transaxle assembly. Never damage oil seal. Refer to TM-342, "4WD : Exploded View".

- Check oil level and check for oil leakage after installation. Refer to DLN-55, "Inspection".

cardiagn.com

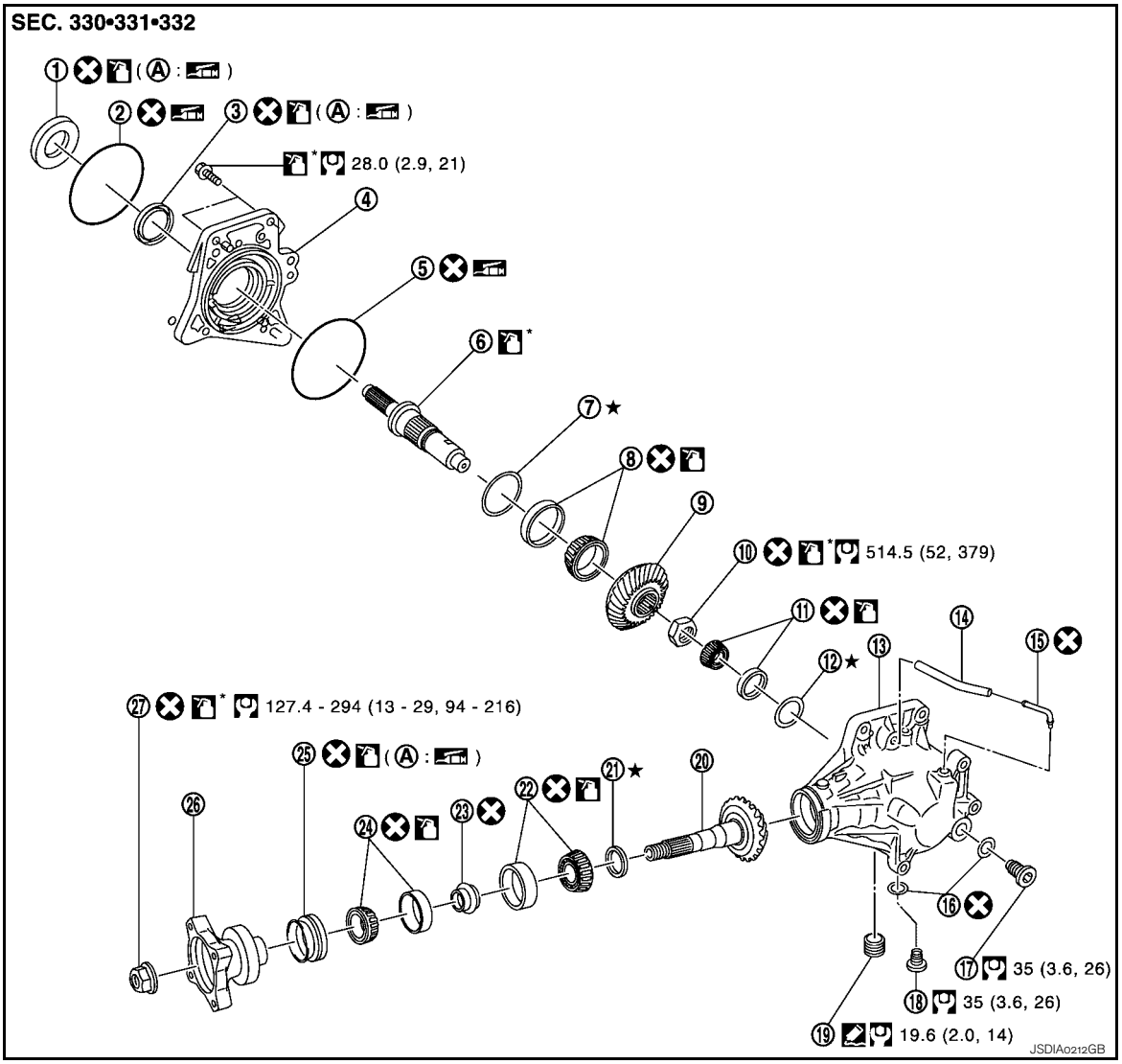
DISASSEMBLY AND ASSEMBLY

ADAPTER CASE

M/T

M/T : Exploded View

INFOID:0000000000972137



1. Adapter case oil seal (outer)
2. O-ring (outer)
3. Adapter case oil seal (inner)
4. Adapter case
5. O-ring (inner)
6. Ring gear shaft
7. Ring gear adjusting shim (adapter case side)
8. Ring gear shaft bearing (adapter case side)
9. Ring gear
10. Ring gear nut
11. Ring gear shaft bearing (transfer case side)
12. Ring gear adjusting shim (transfer case side)
13. Transfer case
14. Air breather hose
15. Air breather tube
16. Gasket
17. Filler plug
18. Drain plug
19. Plug
20. Drive pinion
21. Drive pinion adjusting shim
22. Drive pinion bearing (front side)
23. Collapsible spacer
24. Drive pinion bearing (rear side)
25. Drive pinion oil seal
26. Companion flange
27. Lock nut

A: Oil seal lip

cardiagn.com

: Apply gear oil.

*: Apply anti-corrosive oil.

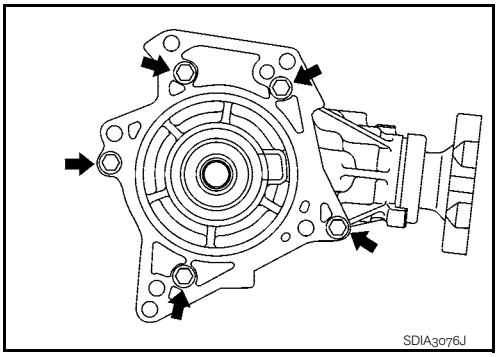
: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

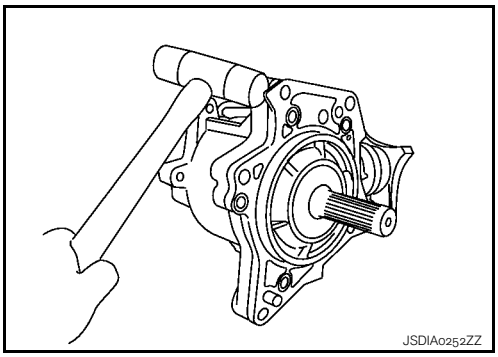
M/T : Disassembly

INFOID:0000000000972138

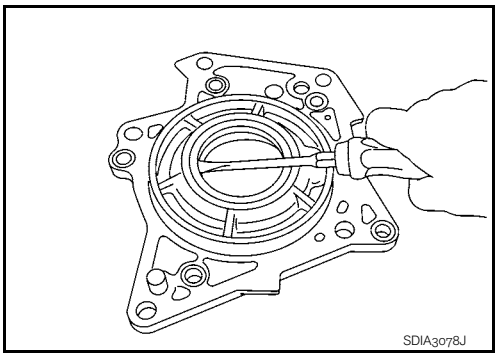
1. Remove O-ring (outer) from adapter case.
2. Remove adapter case mounting bolts (⬅).



3. Lightly tap adapter case with a plastic hammer to remove adapter case.
4. Remove O-ring (inner) from adapter case.



5. Remove adapter case oil seal (outer/inner) with a screwdriver.
   CAUTION:
   Be careful not to damage adapter case.



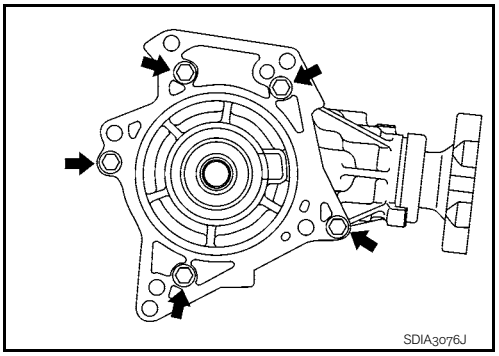
M/T : Assembly

INFOID:0000000000972139

1. Install O-ring (inner) to adapter case.
   CAUTION:
   - **Never reuse O-ring (inner).**
   - **Apply multi-purpose grease to O-ring (inner).**
2. Install adapter case to the transfer case.

cardiagn.com

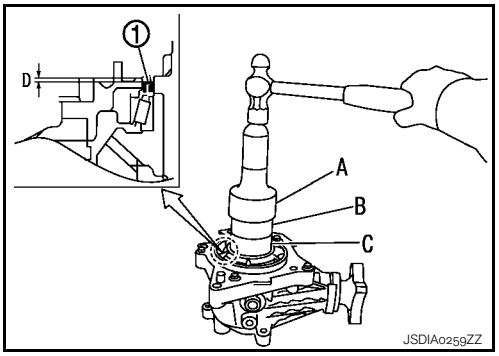
3. Apply anti-corrosive oil onto threads and seats of bolts (⬅), and tighten with the specified torque.
4. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-78, "M/T : Adjustment".
   CAUTION:
   Measure the total preload without the adapter case oil seal (outer/inner).



5. Install adapter case oil seal (inner) (1) to the adapter case with drifts.

   A : Drift (SST: ST30720000)
   B : Drift (SST: ST27861000)
   C : Drift (commercial service tool)

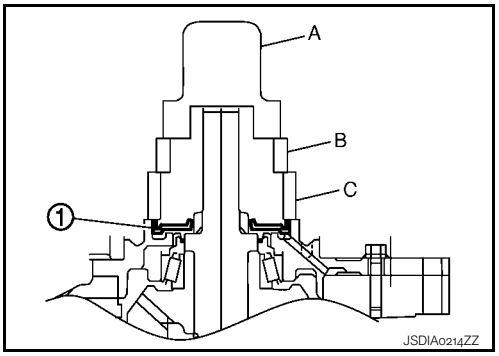
   Dimension “D” : 0 – 1.0 mm



   CAUTION:
   - **Never reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.**
   - **Install adapter case oil seal (inner) in the direction shown in the figure.**

6. Install adapter case oil seal (outer) (1) to the adapter case with drifts so that it becomes flush with adapter case end surface.

   A : Drift (SST: ST30720000)
   B : Drift (SST: ST27861000)
   C : Drift (commercial service tool)



   CAUTION:
   - **Never reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.**
   - **Install adapter case oil seal (outer) in the direction shown in the figure.**

7. Install O-ring (outer) to the adapter case.

M/T : Inspection After Disassembly

INFOID:0000000000972140

Check items below. If necessary, replace them with new ones.

CASE

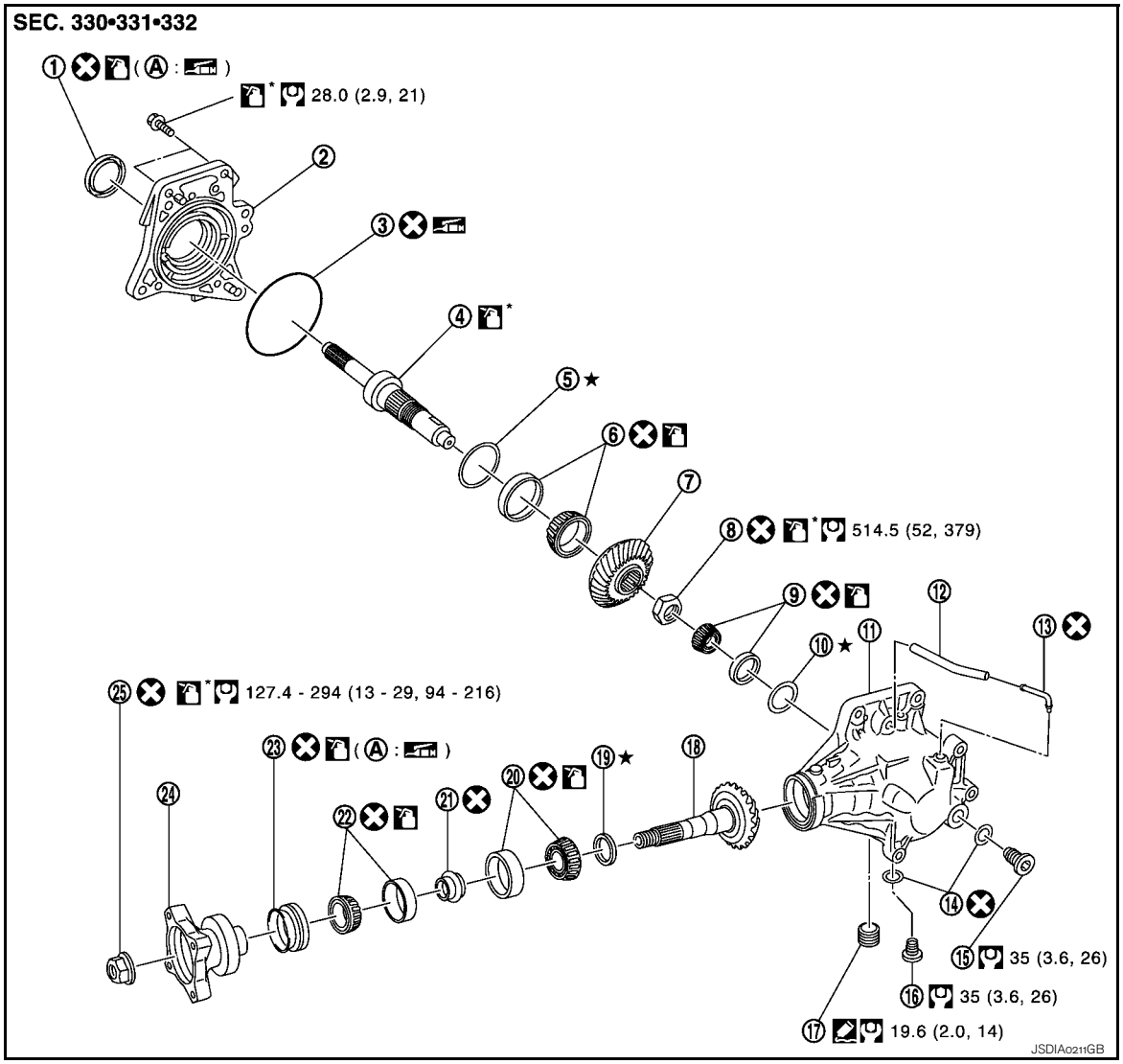
Check the bearing mounting surface for wear, cracks and damages.

CVT

CVT : Exploded View

INFOID:0000000001055630

cardiagn.com



1. Adapter case oil seal
2. Adapter case
3. O-ring
4. Ring gear shaft
5. Ring gear adjusting shim (adapter case side)
6. Ring gear shaft bearing (adapter case side)
7. Ring gear
8. Ring gear nut
9. Ring gear shaft bearing (transfer case side)
10. Ring gear adjusting shim (transfer case side)
11. Transfer case
12. Air breather hose
13. Air breather tube
14. Gasket
15. Filler plug
16. Drain plug
17. Plug
18. Drive pinion
19. Drive pinion adjusting shim
20. Drive pinion bearing (front side)
21. Collapsible spacer
22. Drive pinion bearing (rear side)
23. Drive pinion oil seal
24. Companion flange
25. Lock nut

A: Oil seal lip

: Apply gear oil.

*: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.

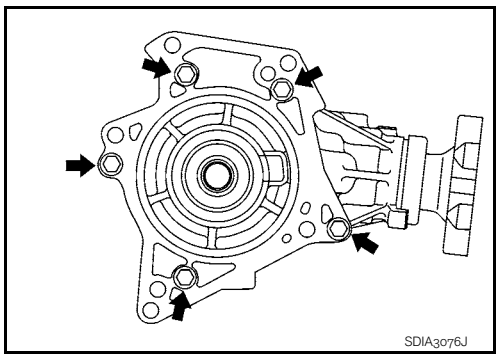
Refer to GI-4, "Components" for symbols not described on the above.

CVT : Disassembly

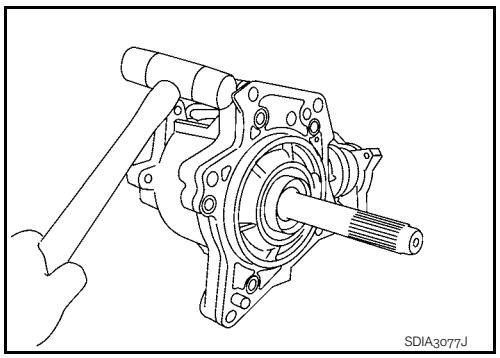
INFOID:0000000001056008

cardiagn.com

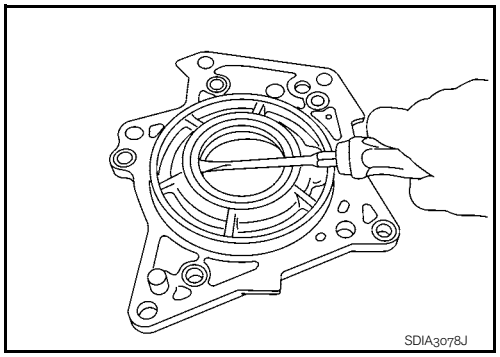
1. Remove adapter case mounting bolts (⬅).



2. Lightly tap adapter case with a plastic hammer to remove adapter case.
3. Remove O-ring from adapter case.



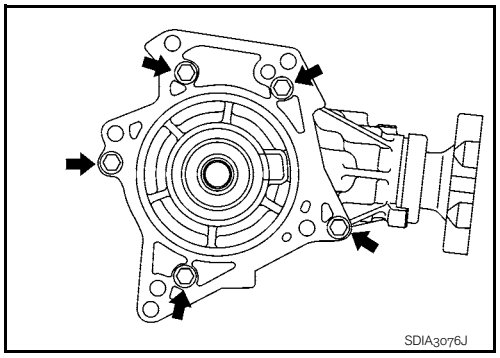
4. Remove adapter case oil seal with a screwdriver.
CAUTION:
Be careful not to damage adapter case.



CVT : Assembly

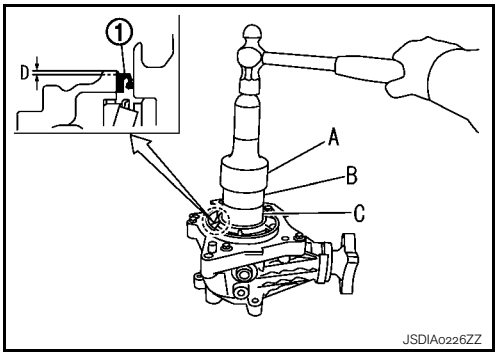
INFOID:0000000001056009

1. Install O-ring to adapter case.
CAUTION:
- **Never reuse O-ring.**
- **Apply multi-purpose grease to O-ring.**
2. Install adapter case to the transfer case.
3. Apply anti-corrosive oil onto threads and seats of bolts (⬅), and tighten with the specified torque.
4. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-91, "CVT : Adjustment".
CAUTION:
Measure the total preload without the adapter case oil seal.



cardiagn.com

5. Install adapter case oil seal (1) to the adapter case with drifts.



A : Drift (SST: ST30720000)
B : Drift (SST: ST27861000)
C : Drift (SST: KV40104830)

Dimension “D” : 0.5 – 1.5 mm

CAUTION:
- **Never reuse adapter case oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.**

CVT : Inspection After Disassembly

INFOID:0000000001056010

Check items below. If necessary, replace them with new ones.

CASE
Check the bearing mounting surface for wear, cracks and damages.

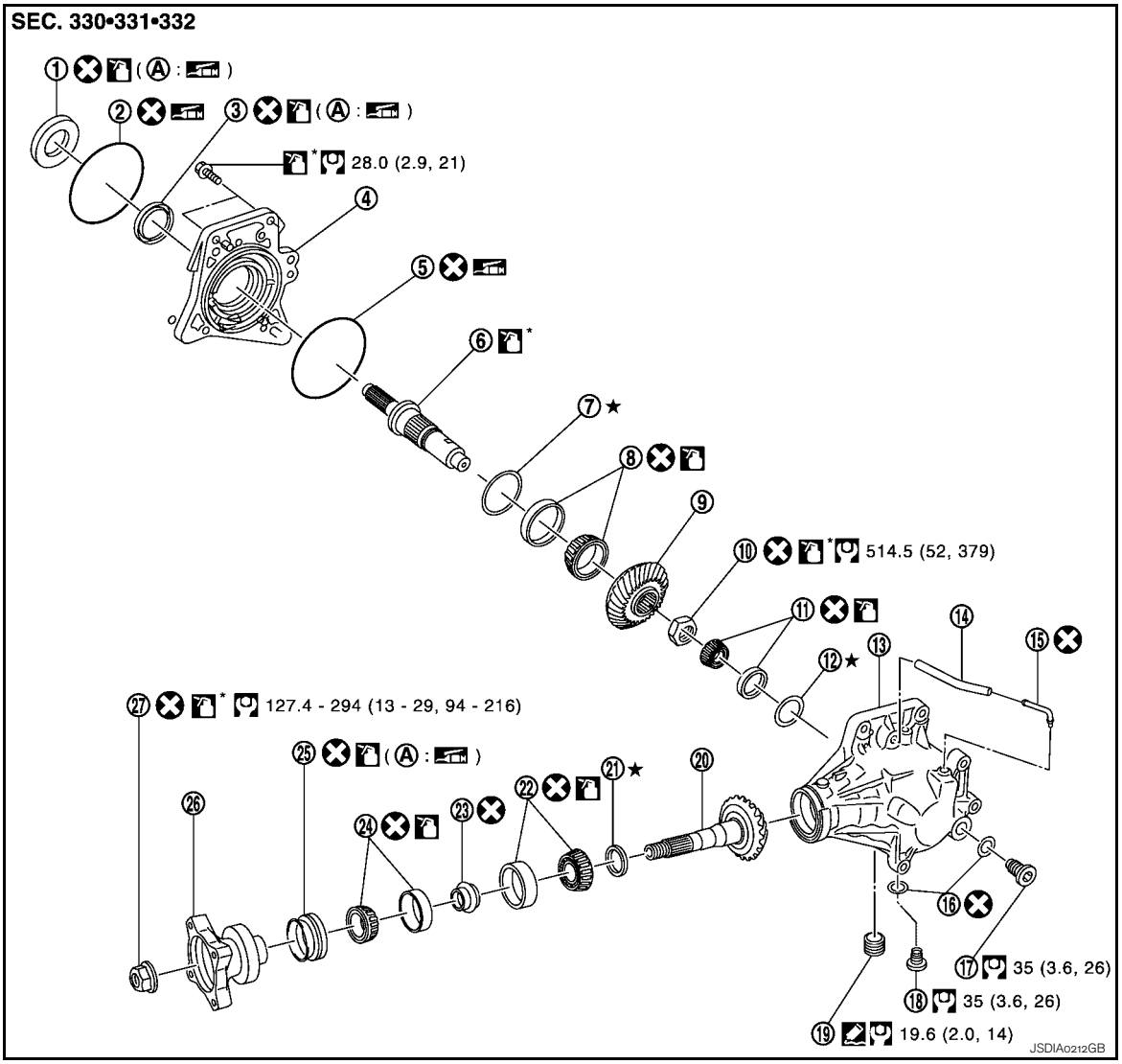
cardiagn.com

RING GEAR SHAFT

M/T

M/T : Exploded View

INFOID:0000000001060134



1. Adapter case oil seal (outer)
2. O-ring (outer)
3. Adapter case oil seal (inner)
4. Adapter case
5. O-ring (inner)
6. Ring gear shaft
7. Ring gear adjusting shim (adapter case side)
8. Ring gear shaft bearing (adapter case side)
9. Ring gear
10. Ring gear nut
11. Ring gear shaft bearing (transfer case side)
12. Ring gear adjusting shim (transfer case side)
13. Transfer case
14. Air breather hose
15. Air breather tube
16. Gasket
17. Filler plug
18. Drain plug
19. Plug
20. Drive pinion
21. Drive pinion adjusting shim
22. Drive pinion bearing (front side)
23. Collapsible spacer
24. Drive pinion bearing (rear side)
25. Drive pinion oil seal
26. Companion flange
27. Lock nut

A: Oil seal lip

: Apply gear oil.

*: Apply anti-corrosive oil.

cardiagn.com

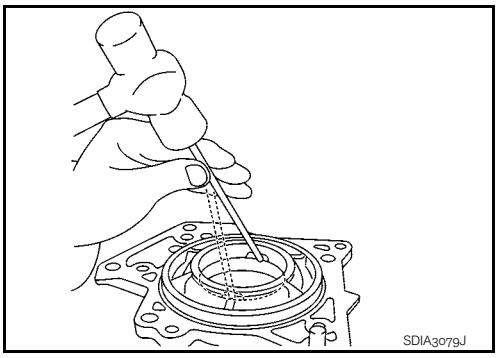
: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

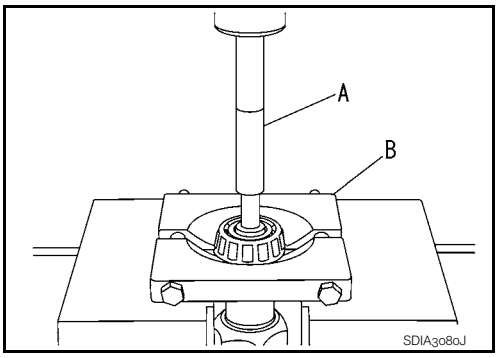
M/T : Disassembly

INFOID:0000000000972142

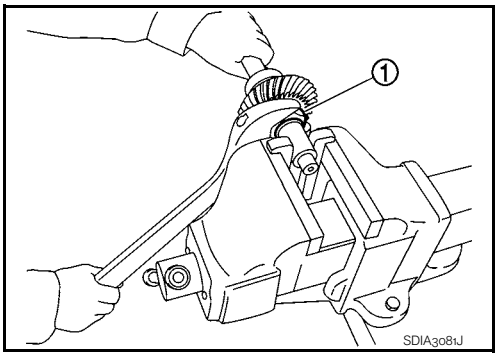
1. Remove adapter case. Refer to DLN-62, "M/T : Disassembly".
2. Remove adapter case oil seal (outer/inner) from the adapter case. Refer to DLN-62, "M/T : Disassembly".
3. Tap the ring gear adjusting shim from the cutout on the adapter case with a brass rod to remove ring gear shaft bearing outer race (adapter case side) and ring gear adjusting shim (adapter case side).
   CAUTION:
   Be careful not to damage adapter case.



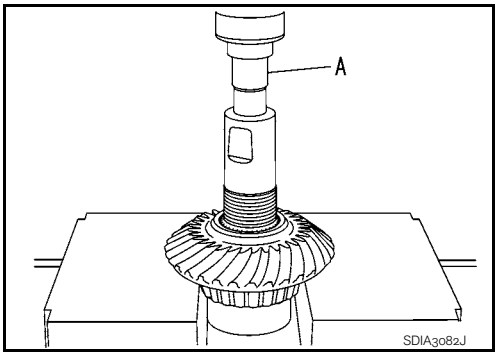
4. Remove ring gear shaft assembly from the transfer case.
5. Remove outer race of ring gear shaft bearing (transfer case side) and ring gear adjusting shim (transfer case side) from the transfer case.
6. Remove inner race of ring gear shaft bearing (transfer case side) from ring gear shaft with drift (A) (commercial service tool) and replacer (B) (SST: ST22730000).



7. Remove ring gear nut (1).
   CAUTION:
   Never damage ring gear shaft.

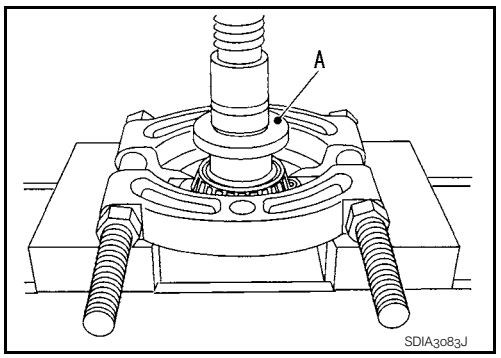


8. Remove ring gear from ring gear shaft with a drift (A) (SST: ST33052000).



cardiagn.com

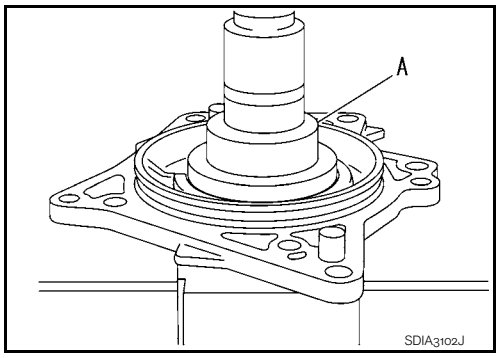
9. Remove inner race of ring gear shaft bearing (adapter case side) from ring gear with a drift (A) (commercial service tool) and replacer.



M/T : Assembly

INFOID:0000000000972143

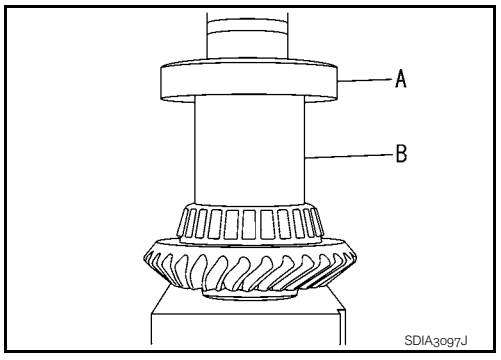
1. Select ring gear adjusting shim (transfer case side). Refer to DLN-78, "M/T : Adjustment".
2. Assemble the selected ring gear adjusting shim (transfer case side) and outer races of ring gear shaft bearing (transfer case side) to the transfer case.
   CAUTION:
   - **Never reuse ring gear shaft bearing (transfer case side).**
   - **Apply gear oil to the ring gear shaft bearing (transfer case side).**
3. Select ring gear adjusting shim (adapter case side). Refer to DLN-78, "M/T : Adjustment".
4. Install the selected ring gear adjusting shim (adapter case side) to the adapter case.
5. Install outer race of ring gear shaft bearing (adapter case side) to the adapter case with a drift (A) (commercial service tool).
   CAUTION:
   - **Never reuse ring gear shaft bearing (adapter case side).**
   - **Apply gear oil to the ring gear shaft bearing (adapter case side).**



6. Install inner race of ring gear shaft bearing (adapter case side) to the ring gear with drifts.

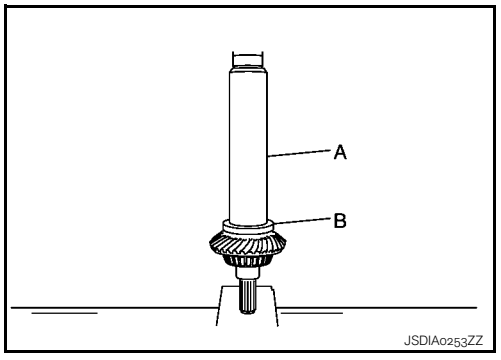
   A : Press adapter (If necessary)
   B : Drift (commercial service tool)

   CAUTION:
   - **Never reuse ring gear shaft bearing (adapter case side).**
   - **Apply gear oil to the ring gear shaft bearing (adapter case side).**



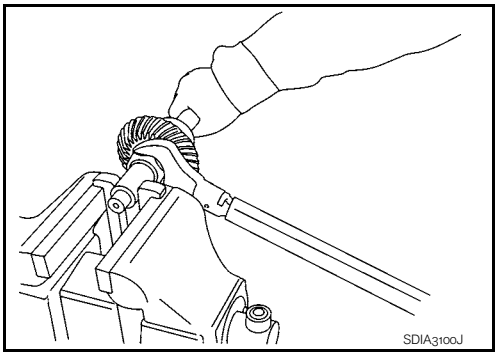
7. Apply anti-corrosive oil to the spline of ring gear shaft. Install the ring gear to ring gear shaft with drifts.

   A : Drift (SST: ST01530000)
   B : Drift (SST: ST35272000)

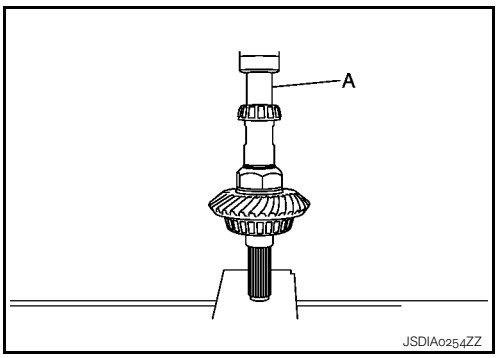


cardiagn.com

8. Apply anti-corrosive oil to threads and seats of ring gear nut. Tighten the ring gear nut with the specified torque by using a torque wrench.
CAUTION:
- **Never reuse ring gear nut.**
- **Never damage ring gear shaft.**



9. Install inner race of ring gear shaft bearing (transfer case side) to the ring gear shaft with a drift (A) (SST: KV10111400).
CAUTION:
- **Never reuse ring gear shaft bearing (transfer case side).**
- **Apply gear oil to the ring gear shaft bearing (transfer race side).**
10. Assemble the ring gear shaft assembly to the transfer case.
11. Install adapter case. Refer to DLN-62, "M/T : Assembly".
12. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-78, "M/T : Adjustment".
CAUTION:
Measure the total preload without the adapter case oil seal.



13. Install adapter case oil seal (outer/inner) to the adapter case. Refer to DLN-62, "M/T : Assembly".

M/T : Inspection After Disassembly

INFOID:0000000000972144

Check items below. If necessary, replace them with new ones.

GEAR AND SHAFT

Check gear face and shaft for wear, cracks, damage, and seizure.
CAUTION:
Replace ring gear and drive pinion as a set (hypoid gear set) if any malfunction is detected on the ring gear or drive pinion.

BEARING

Check for seizure, peeling, wear, corrosion, sticking, unusual noise, roughness in hand turning, and other damage.
CAUTION:
Always replace inner race and outer race as a pair when replacing the bearing.

SHIM

Check for seizure, damage, and unusual wear.

CASE

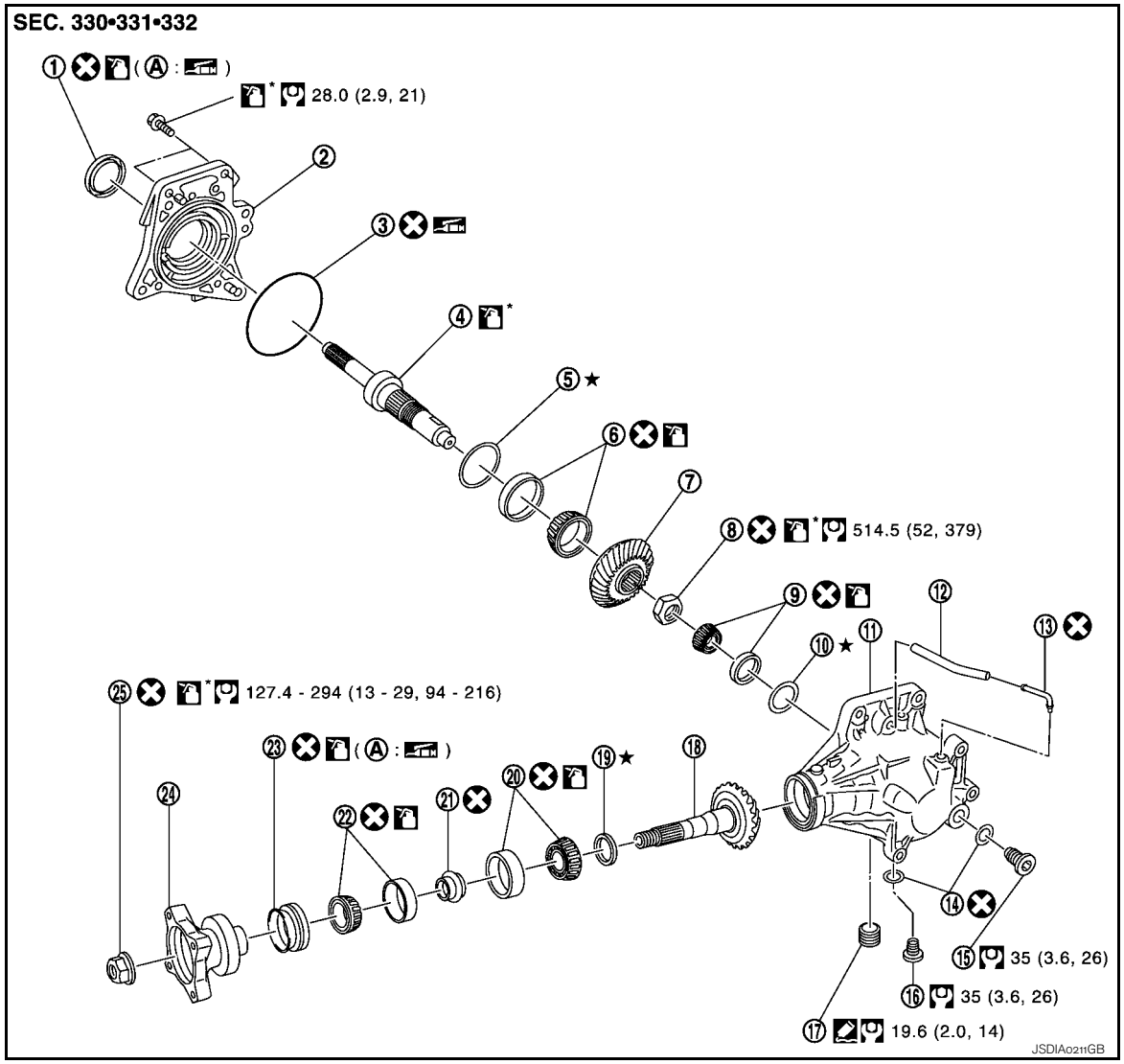
Check the bearing mounting surface for wear, cracks and damages.

CVT

CVT : Exploded View

INFOID:0000000001060135

cardiagn.com



1. Adapter case oil seal
2. Adapter case
3. O-ring
4. Ring gear shaft
5. Ring gear adjusting shim (adapter case side)
6. Ring gear shaft bearing (adapter case side)
7. Ring gear
8. Ring gear nut
9. Ring gear shaft bearing (transfer case side)
10. Ring gear adjusting shim (transfer case side)
11. Transfer case
12. Air breather hose
13. Air breather tube
14. Gasket
15. Filler plug
16. Drain plug
17. Plug
18. Drive pinion
19. Drive pinion adjusting shim
20. Drive pinion bearing (front side)
21. Collapsible spacer
22. Drive pinion bearing (rear side)
23. Drive pinion oil seal
24. Companion flange
25. Lock nut

A: Oil seal lip

: Apply gear oil.

*: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.

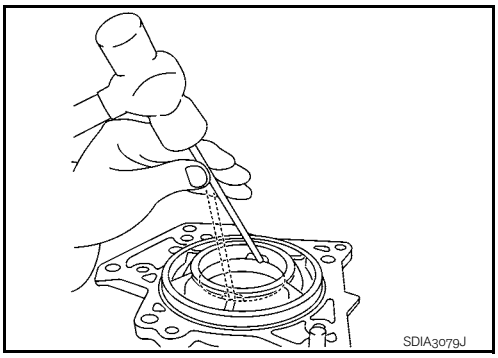
Refer to GI-4, "Components" for symbols not described on the above.

CVT : Disassembly

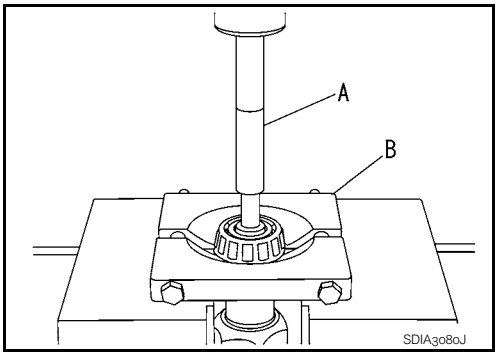
INFOID:0000000001070369

cardiagn.com

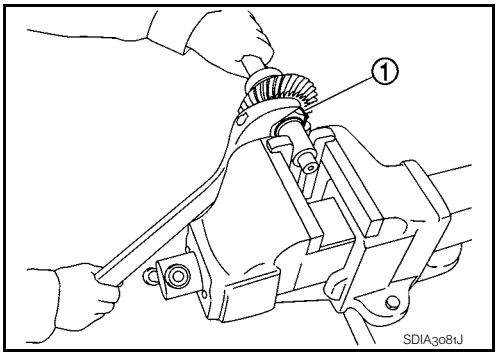
1. Remove adapter case. Refer to DLN-64, "CVT : Disassembly".
2. Remove adapter case oil seal from the adapter case. Refer to DLN-64, "CVT : Disassembly".
3. Tap the ring gear adjusting shim from the cutout on the adapter case with a brass rod to remove ring gear shaft bearing outer race (adapter case side) and ring gear adjusting shim (adapter case side).
   CAUTION:
   Be careful not to damage adapter case.
4. Remove ring gear shaft assembly from the transfer case.
5. Remove outer race of ring gear shaft bearing (transfer case side) and ring gear adjusting shim (transfer case side) from the transfer case.



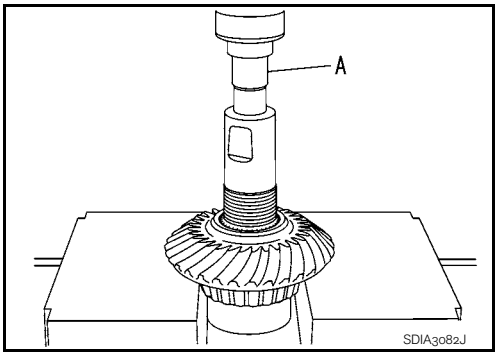
6. Remove inner race of ring gear shaft bearing (transfer case side) from ring gear shaft with drift (A) (commercial service tool) and replacer (B) (SST: ST22730000).



7. Remove ring gear nut (1).
   CAUTION:
   Never damage ring gear shaft.

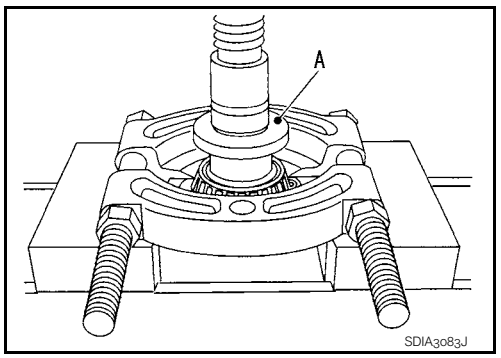


8. Remove ring gear from ring gear shaft with a drift (A) (SST: ST33052000).



cardiagn.com

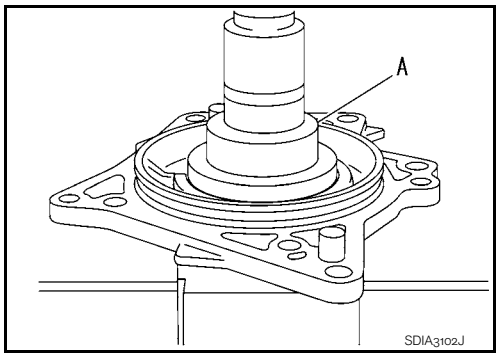
9. Remove inner race of ring gear shaft bearing (adapter case side) from ring gear with a drift (A) (commercial service tool) and replacer.



CVT : Assembly

INFOID:0000000001056106

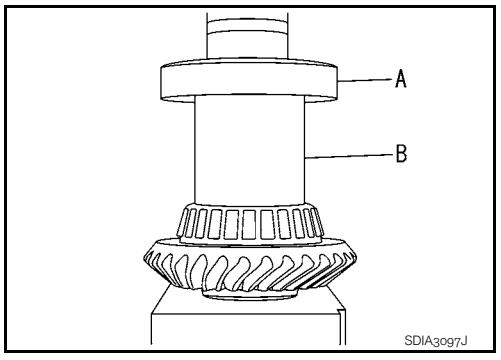
1. Select ring gear adjusting shim (transfer case side). Refer to DLN-91, "CVT : Adjustment".
2. Assemble the selected ring gear adjusting shim (transfer case side) and outer races of ring gear shaft bearing (transfer case side) to the transfer case.
   CAUTION:
   - **Never reuse ring gear shaft bearing (transfer case side).**
   - **Apply gear oil to the ring gear shaft bearing (transfer case side).**
3. Select ring gear adjusting shim (adapter case side). Refer to DLN-91, "CVT : Adjustment".
4. Install the selected ring gear adjusting shim (adapter case side) to the adapter case.
5. Install outer race of ring gear shaft bearing (adapter case side) to the adapter case with a drift (A) (SST: ST30621000).
   CAUTION:
   - **Never reuse ring gear shaft bearing (adapter case side).**
   - **Apply gear oil to the ring gear shaft bearing (adapter case side).**



6. Install inner race of ring gear shaft bearing (adapter case side) to the ring gear with drifts.

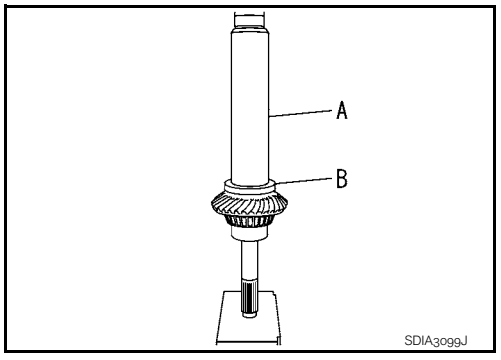
   A : Press adapter (If necessary)
   B : Drift (commercial service tool)

   CAUTION:
   - **Never reuse ring gear shaft bearing (adapter case side).**
   - **Apply gear oil to the ring gear shaft bearing (adapter case side).**



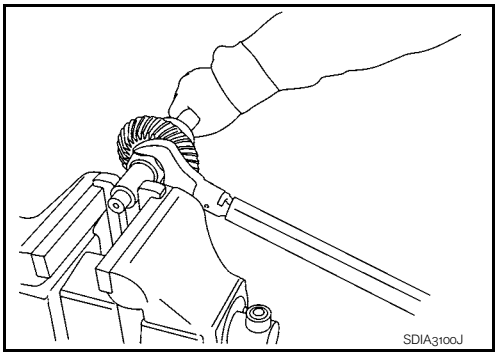
7. Apply anti-corrosive oil to the spline of ring gear shaft. Install the ring gear to ring gear shaft with drifts.

   A : Drift (SST: ST01530000)
   B : Drift (SST: ST35272000)

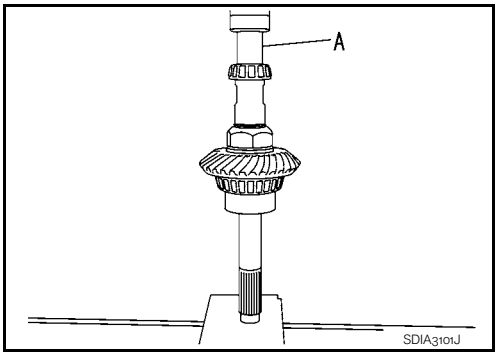


cardiagn.com

8. Apply anti-corrosive oil to threads and seats of ring gear nut. Tighten the ring gear nut with the specified torque by using a torque wrench.
CAUTION:
- **Never reuse ring gear nut.**
- **Never damage ring gear shaft.**



9. Install inner race of ring gear shaft bearing (transfer case side) to the ring gear shaft with a drift (A) (SST: KV10111400).
CAUTION:
- **Never reuse ring gear shaft bearing (transfer case side).**
- **Apply gear oil to the ring gear shaft bearing (transfer race side).**



10. Assemble the ring gear shaft assembly to the transfer case.
11. Install adapter case. Refer to DLN-65, "CVT : Assembly".
12. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-91, "CVT : Adjustment".
CAUTION:
Measure the total preload without the adapter case oil seal.
13. Install adapter case oil seal to the adapter case. Refer to DLN-65, "CVT : Assembly".

CVT : Inspection After Disassembly

INFOID:0000000001056107

Check items below. If necessary, replace them with new ones.

GEAR AND SHAFT

Check gear face and shaft for wear, cracks, damage, and seizure.
CAUTION:
Replace ring gear and drive pinion as a set (hypoid gear set) if any malfunction is detected on the ring gear or drive pinion.

BEARING

Check for seizure, peeling, wear, corrosion, sticking, unusual noise, roughness in hand turning, and other damage.
CAUTION:
Always replace inner race and outer race as a pair when replacing the bearing.

SHIM

Check for seizure, damage, and unusual wear.

CASE

Check the bearing mounting surface for wear, cracks and damages.

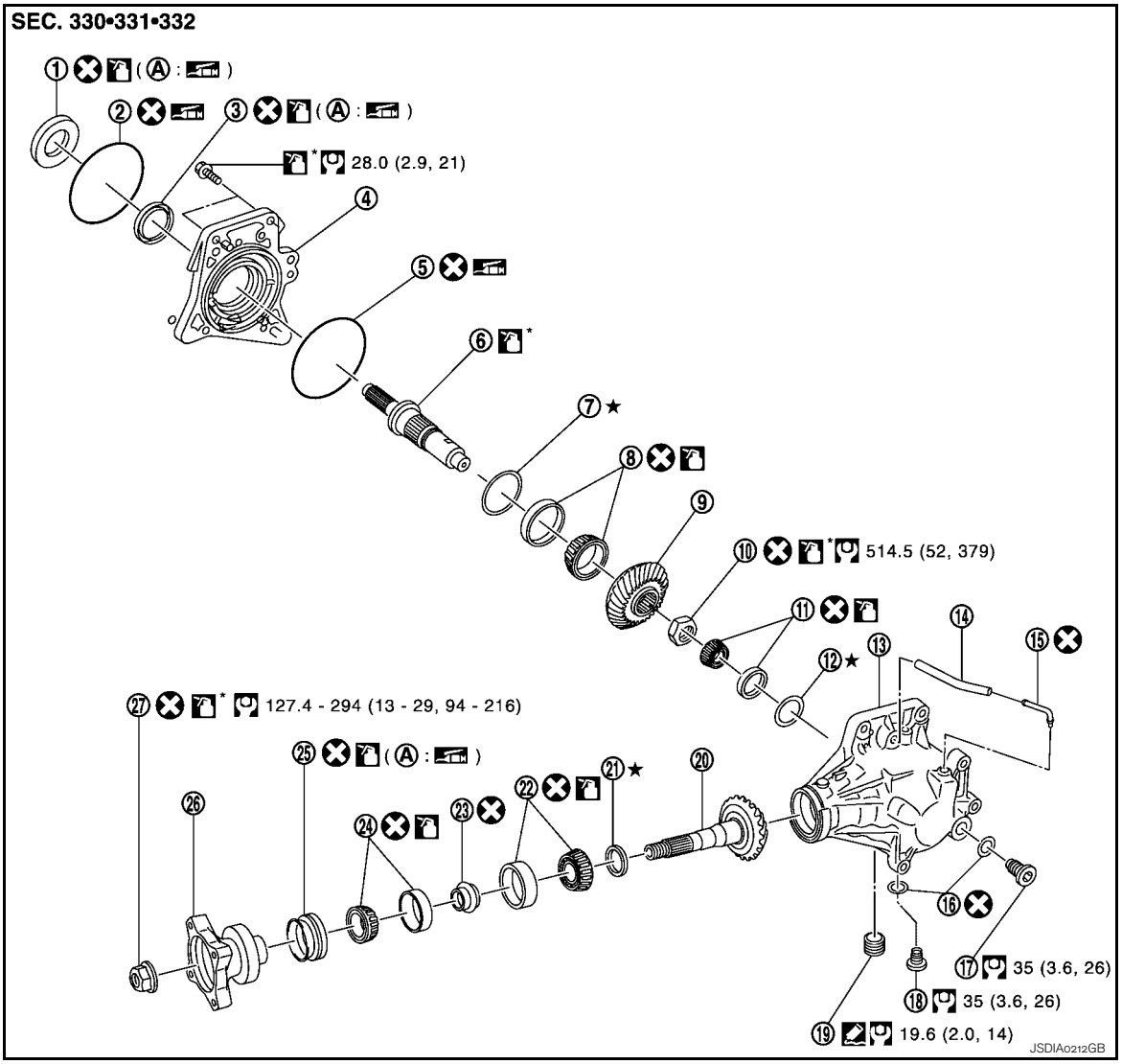
cardiagn.com

DRIVE PINION

M/T

M/T : Exploded View

INFOID:0000000001060137



1. Adapter case oil seal (outer)
2. O-ring (outer)
3. Adapter case oil seal (inner)
4. Adapter case
5. O-ring (inner)
6. Ring gear shaft
7. Ring gear adjusting shim (adapter case side)
8. Ring gear shaft bearing (adapter case side)
9. Ring gear
10. Ring gear nut
11. Ring gear shaft bearing (transfer case side)
12. Ring gear adjusting shim (transfer case side)
13. Transfer case
14. Air breather hose
15. Air breather tube
16. Gasket
17. Filler plug
18. Drain plug
19. Plug
20. Drive pinion
21. Drive pinion adjusting shim
22. Drive pinion bearing (front side)
23. Collapsible spacer
24. Drive pinion bearing (rear side)
25. Drive pinion oil seal
26. Companion flange
27. Lock nut

A: Oil seal lip

: Apply gear oil.

*: Apply anti-corrosive oil.

cardiagn.com

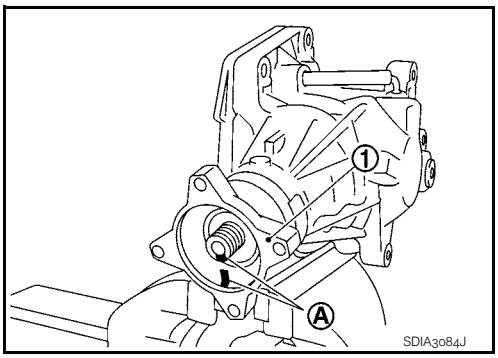
: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

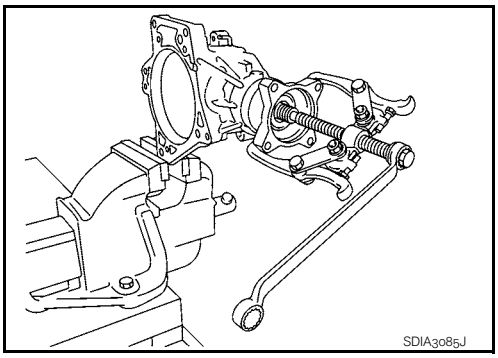
M/T : Disassembly

INFOID:0000000000972146

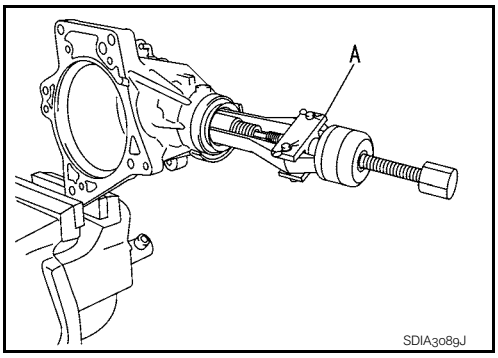
1. Remove adapter case. Refer to DLN-62, "M/T : Disassembly".
2. Remove ring gear shaft assembly. Refer to DLN-68, "M/T : Disassembly".
3. Remove lock nut from the drive pinion.
4. Put matching marks (A) on screw ends of companion flange (1) and drive pinion.
   CAUTION:
   Use paint to avoid scratching the surface.



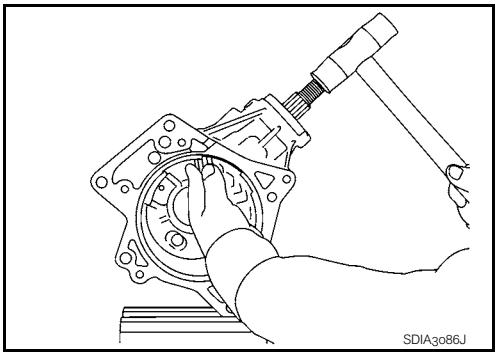
5. Remove companion flange from drive pinion with a puller.



6. Remove drive pinion oil seal from the transfer case with a puller (A) (SST: KV381054S0).
   CAUTION:
   Never damage transfer case.

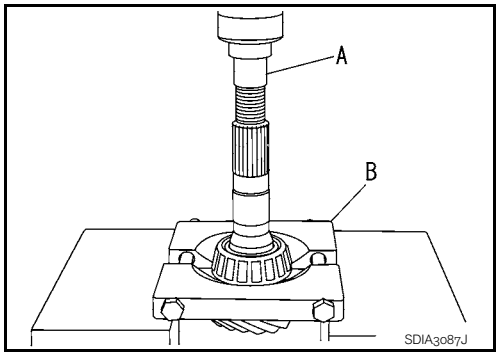


7. Remove drive pinion assembly from transfer case while tapping the drive pinion lightly with a plastic hammer.
   CAUTION:
   Never drop the drive pinion assembly.
8. Remove collapsible spacer from the drive pinion.
9. Remove inner race of drive pinion bearing (rear side) from transfer case.



cardiagn.com

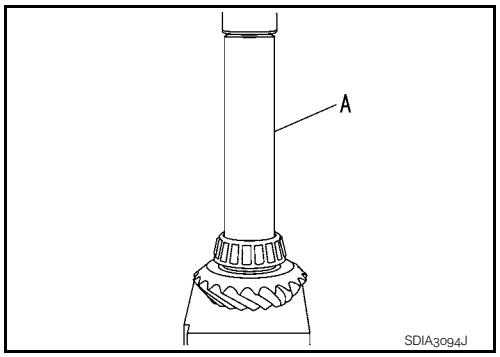
10. Remove inner race of drive pinion bearing (front side) from drive pinion with a drift (A) (SST: ST33052000) and replacer (B) (SST: ST22730000).
11. Remove drive pinion adjusting shim from the drive pinion.



M/T : Assembly

INFOID:0000000000972147

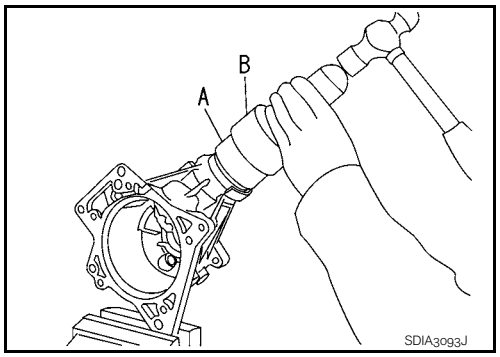
1. Select drive pinion adjusting shim. Refer to DLN-78, "M/T : Adjustment".
2. Install selected drive pinion adjusting shim to drive pinion.
3. Install inner race of drive pinion bearing (front side) to drive pinion with a drift (A) (SST: ST23860000).
   CAUTION:
   - **Never reuse drive pinion bearing (front side).**
   - **Apply gear oil to the drive pinion bearing (front side).**
4. Assemble the inner race of drive pinion bearing (rear side) into the transfer case.
   CAUTION:
   - **Never reuse drive pinion bearing (rear side).**
   - **Apply gear oil to the drive pinion bearing (rear side).**



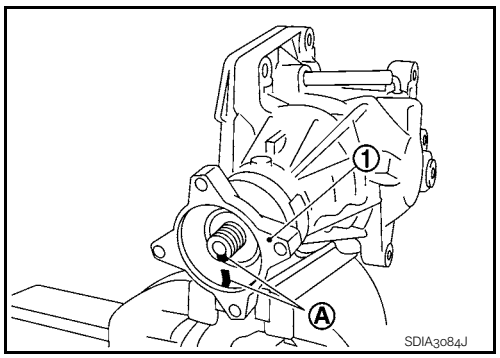
5. Install drive pinion oil seal to transfer case with drifts so that it becomes flush with case end surface.

   A : Drift (SST: ST27861000)
   B : Drift (SST: ST30720000)

   CAUTION:
   - **Never reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.**
6. Assemble a collapsible spacer onto the drive pinion.
   CAUTION:
   Never reuse the collapsible spacer.

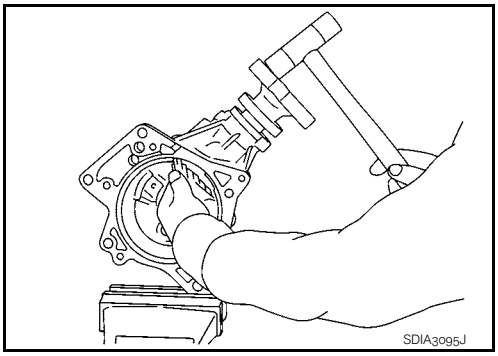


7. Assemble drive pinion assembly into the transfer case, and then install companion flange (1) to drive pinion.
   NOTE:
   Align matching marks (A) on the thread edge of companion flange and drive pinion and install companion flange if drive pinion is reused.



cardiagn.com

8. Tap the companion flange with a plastic hammer as far as the lock nut can be tightened.
   CAUTION:
   Never damage drive pinion oil seal.
9. Apply anti-corrosive oil to the thread and seat of the lock nut, and temporarily tighten lock nut to the drive pinion.
   CAUTION:
   Never reuse lock nut.

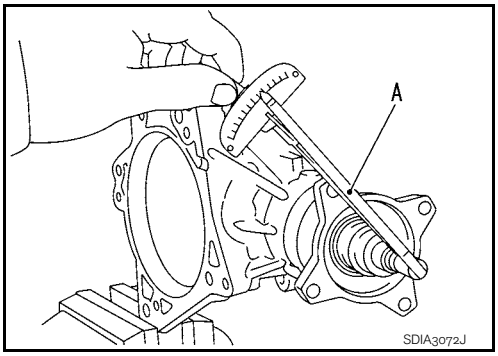


10. Tighten lock nut within the specified torque range with a preload gauge (A) (SST: ST3127S000) so that the drive pinion bearing preload is within standard.

    Standard

    Drive pinion bearing preload : Refer to DLN-107, "Preload Torque".

    CAUTION:
    - **Start the tightening of lock nut from lower limit of the specified torque. Check the preload every 5° to 10° while tightening the lock nut.**
    - **Replace the collapsible spacer and tighten it again to adjust if preload exceeds the specified value. Never loosen lock nut to adjust preload.**
    - **After adjustment, rotate the drive pinion back and forth from 2 to 3 times to check for unusual noise, sticking, binding, and so on.**



11. Install ring gear shaft assembly. Refer to DLN-69, "M/T : Assembly".
12. Install adapter case. Refer to DLN-62, "M/T : Assembly".
13. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-78, "M/T : Adjustment".
    CAUTION:
    Measure the total preload without the adapter case oil seal.

M/T : Adjustment

INFOID:0000000001056555

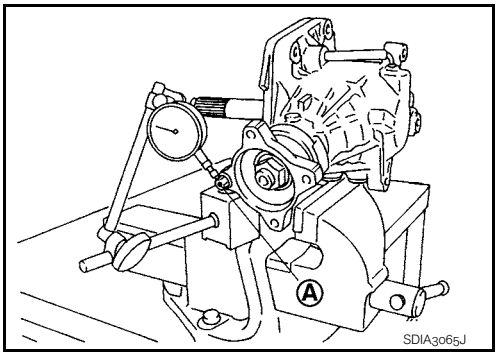
BACKLASH

1. Install the bolt (A) to the companion flange.
2. Fit a dial indicator onto the bolt.
3. Measure the circumference backlash of the companion flange.

   Standard

   Backlash : Refer to DLN-107, "Backlash".

   Disassemble the transfer assembly to check and adjust each part if outside the standard.

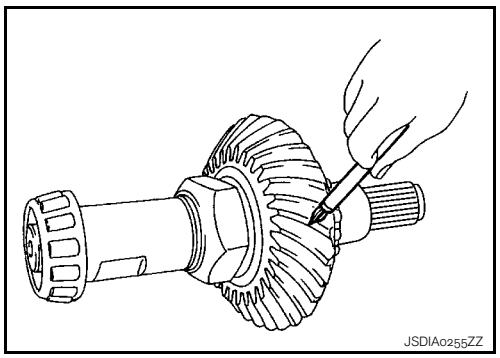


TOOTH CONTACT

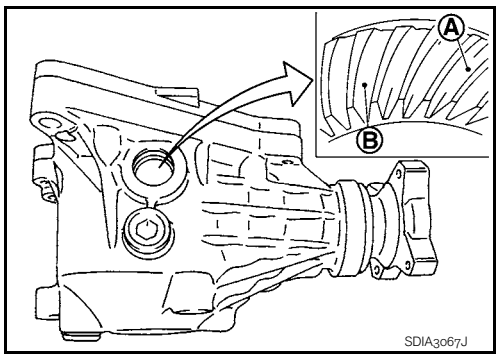
1. Remove adapter case. Refer to DLN-62, "M/T : Disassembly".

cardiagn.com

2. Remove ring gear shaft assembly from transfer case. Then apply red lead onto the ring gear.
   CAUTION:
   Apply red lead to both faces of 3 to 4 gears at 4 locations evenly spaced on the ring gear.
3. Assemble the ring gear shaft assembly to the transfer case.
4. Install adapter case. Refer to DLN-62, "M/T : Assembly".
5. Remove plug on the lower side of the transfer case.



6. Rotate the companion flange back and forth several times. Then check drive pinion to ring gear tooth contact by viewing from the tooth contact test hole. (A: Drive side, B: Reverse side)



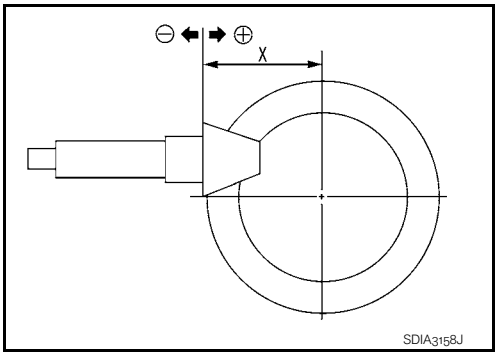
Tooth Contact Judgment Guide

Drive pinion adjusting shim selection value mm (in)		Tooth contact condition		Need for adjustment
		Drive side	Back	
↑ Thicker	+0.12 (+0.0047)	Heel side / Toe side		Yes
	+0.09 (+0.0035)			
	+0.06 (+0.0024)			
	+0.03 (+0.0012)			No
	0 (0.0)			
	−0.03 (−0.0012)			
Thinner ↓	−0.06 (−0.0024)			Yes
	−0.09 (−0.0035)			
	−0.12 (−0.0047)			

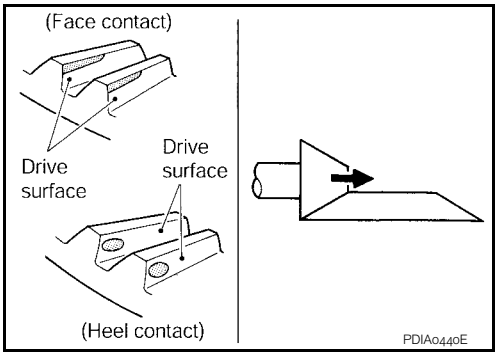
JSDIA0213GB

cardiagn.com

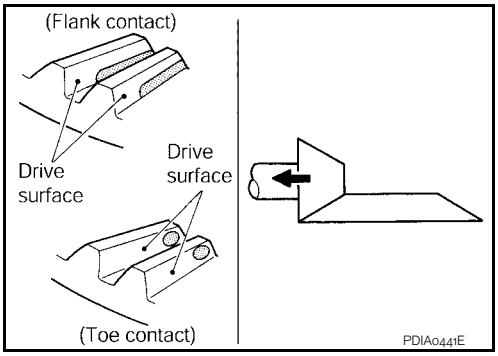
7. Follow the procedure below to adjust pinion height (dimension X) if tooth contact is improper.
CAUTION:
If no adjusting shim with the calculated value is available, select the thicker and closest one.



- Thicken the drive pinion adjusting shim to move the drive pinion closer to the ring gear in case of face contact or heel contact.
CAUTION:
Only one adjusting shim can be selected.



- Thin the drive pinion adjusting shim to move the drive pinion farther from the ring gear in case of flank contact or toe contact.
CAUTION:
Only one adjusting shim can be selected.



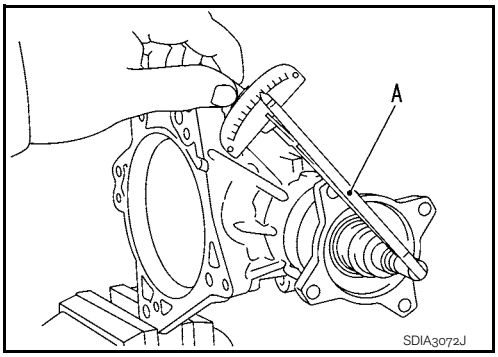
8. Assemble the plug to the transfer case.
CAUTION:
- **Remove old gasket on mounting surface, then remove any moisture, oil, and foreign material on the application and mounting surfaces.**
- **Apply liquid gasket to the thread, and tighten to the specified torque when installing plug.**

DRIVE PINION BEARING PRELOAD

1. Remove adapter case. Refer to DLN-62, "M/T : Disassembly".
2. Remove ring gear shaft assembly from the transfer case.
3. Rotate the companion flange back and forth from 2 to 3 times to check for unusual noise, binding, sticking, and so on.
4. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.
5. Measure the drive pinion bearing preload with a preload gauge (A) (SST: ST3127S000).

Standard

Drive pinion bearing preload : **Refer to DLN-107, "Preload Torque".**



CAUTION:
Each rotational part should rotate smoothly with the specified gear oil.
- Disassemble the drive pinion assembly to check and adjust each part if outside the standard.

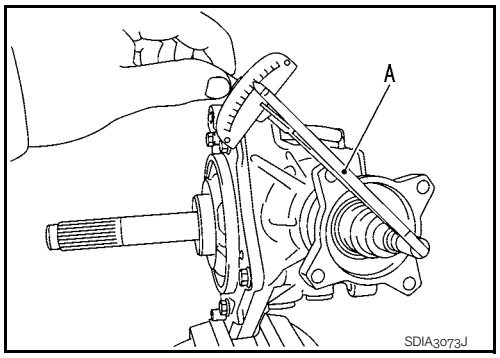
TOTAL PRELOAD

1. Measure drive pinion bearing preload (P_1). Refer to “DRIVE PINION BEARING PRELOAD”.

cardiagn.com

CAUTION:
Check that the drive pinion bearing preload is within the standard.

2. Assemble the ring gear shaft assembly to the transfer case.
3. Install adapter case. Refer to DLN-62, "M/T : Assembly".
4. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.
5. Measure the total preload with a preload gauge (A) (SST: ST3127S000).



Standard

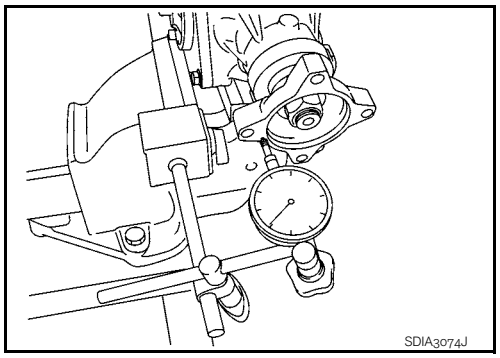
Total preload

All oil seals are installed	**: Refer to DLN-107, "Preload Torque".**
Without adapter case oil seal	**: Refer to DLN-107, "Preload Torque".**

CAUTION:
- **Each rotational part should rotate smoothly with the specified gear oil.**
- **Disassemble the transfer assembly to check and adjust each part if outside the standard. Measure it with the adapter case oil seals removed when measuring total preload after disassembly. Then install adapter case oil seals.**

COMPANION FLANGE RUNOUT

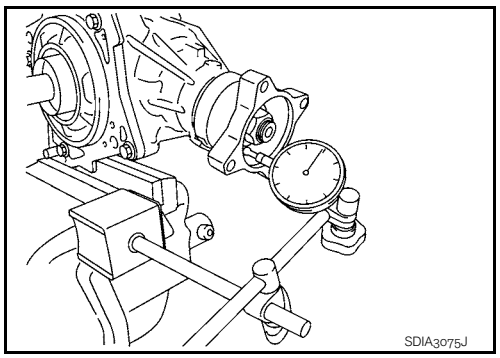
1. Fit a dial indicator onto the companion flange face (inner side of the propeller shaft bolt holes).
2. Rotate the companion flange to check for runout.



Limit

Companion flange runout	**: Refer to DLN-107, "Companion Flange Runout".**

3. Fit a test indicator to the inner side of the companion flange (socket diameter).
4. Rotate the companion flange to check for runout.



Limit

Companion flange runout	**: Refer to DLN-107, "Companion Flange Runout".**

5. Follow the procedure below to adjust if runout value is outside the repair limit.

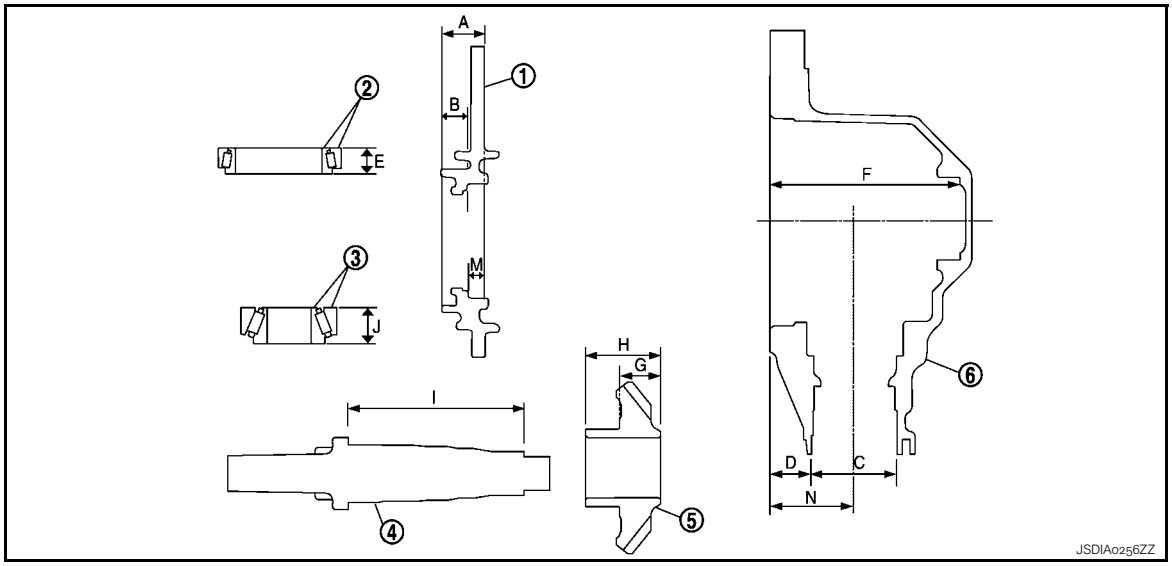
CAUTION:
Replace collapsible spacer to check and adjust each part when companion flange is adjusted or replaced.

a. Check for runout while changing the phase between companion flange and drive pinion in 90° steps. Then search for the minimum point.
b. Replace companion flange if runout value is still outside the limit after the phase has been changed.
c. Adjust assembly status of the drive pinion bearings and drive pinion, or replace drive pinion bearings if runout is outside the standard after the companion flange is replaced.

ADJUSTING SHIM SELECTION

Measuring Point

cardiagn.com



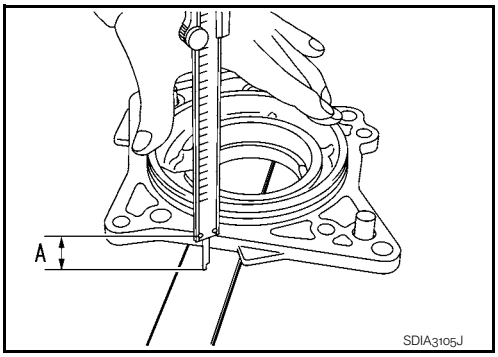
1. Adapter case
2. Ring gear shaft bearing (Adapter case side)
3. Ring gear shaft bearing (Transfer case side)
4. Ring gear shaft
5. Ring gear
6. Transfer case

Ring Gear Adjusting Shim (Adapter Case Side)

1. Measure the dimensions of each measuring point with the following procedure:

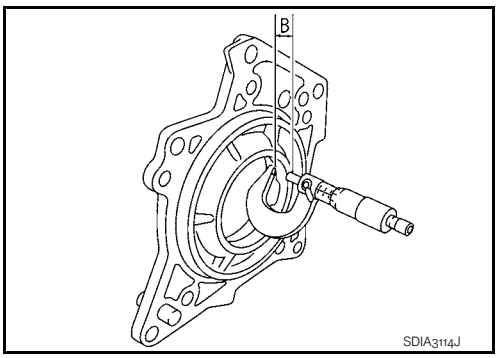
Dimension “A” measurement

- Measure dimension from transfer case mounting surface of adapter case to adapter case edge surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.



Dimension “B” measurement

- Measure dimension from ring gear adjusting shim mounting surface of adapter case to adapter case edge surface with a micrometer. Refer to “Measuring point”.

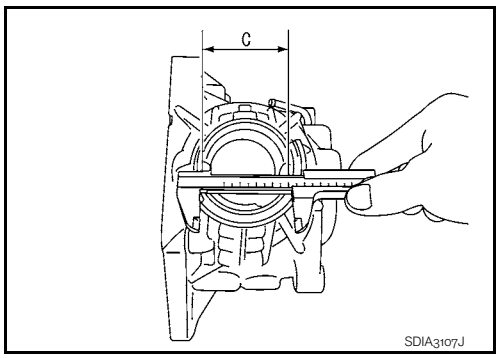


Dimension “C” measurement

cardiagn.com

- Measure the diameter of drive pinion bearing (rear side) mounting area of transfer case with a pair of vernier calipers. Refer to “Measuring point”.

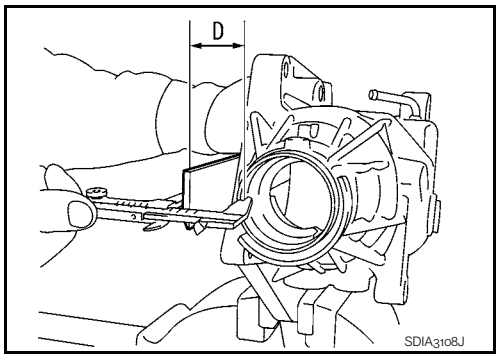
CAUTION:
Never damage transfer case.



Dimension “D” measurement

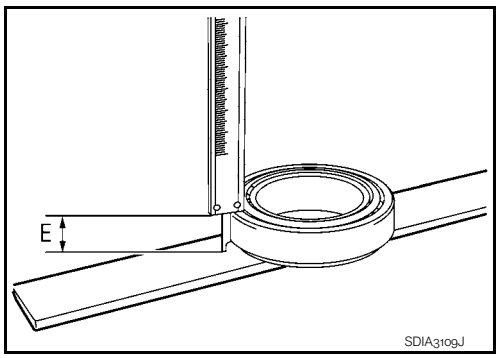
- Measure dimension from adapter case mounting surface of transfer case to drive pinion bearing (rear side) mounting surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.

CAUTION:
- **Never damage transfer case.**
- **Consider the thickness of a straightedge.**



Dimension “E” measurement

- Measure dimension from outer race edge surface of ring gear shaft bearing (adapter case side) to inner race edge surface with a pair of vernier calipers. Refer to “Measuring point”.



2. Calculate dimensions “M” and “N” by the formula below.

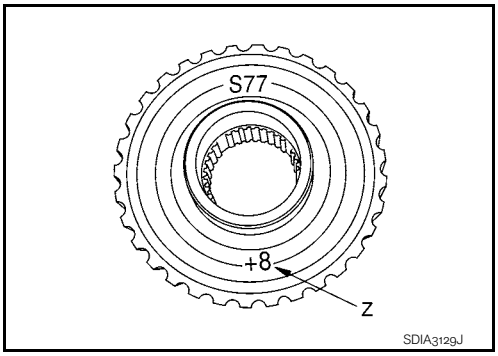
Dimension “M” = “A” – “B”
Dimension “N” = “C” × 0.5 mm (0.020 in) + “D”

3. Convert the dimensions “E”, “M” and “N” according to the standards below.

“E” : Actual value regarding 20.00 mm (0.7874 in) as 0 in increments of 0.01 mm (0.0004 in).
“M” : Actual value regarding 13.90 mm (0.5472 in) as 0 in increments of 0.01 mm (0.0004 in).
“N” : Actual value regarding 55.00 mm (2.1654 in) as 0 in increments of 0.01 mm (0.0004 in).

cardiagn.com

4. Check dimension “Z” (machining difference) on the ring gear back surface.
   NOTE:
   Dimension “Z” indicates difference between optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in) written on the ring gear back surface.



5. Calculate the thickness of the ring gear adjusting shim (adapter case side) “T_1” by the formula below.

   “T_1” = (“M” + “N” – “E” – “Z”) × 0.01 mm (0.0004 in) + 1.40 mm (0.0551 in)

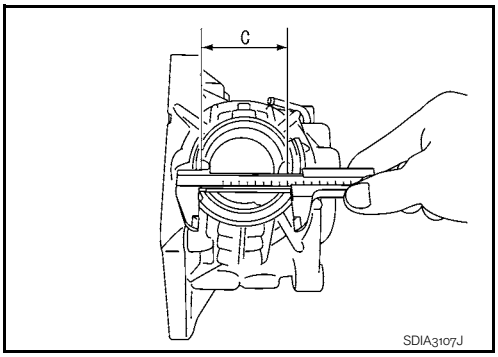
6. Select ring gear adjusting shim (adapter case side).
   CAUTION:
   - **Only one adjusting shim can be selected.**
   - **Select the closest one, favoring thicker over thinner when necessary if no adjusting shim with the calculated value is available.**

Ring Gear Adjusting Shim (Transfer Case Side)

1. Measure the dimensions of each measuring point with the following procedure:

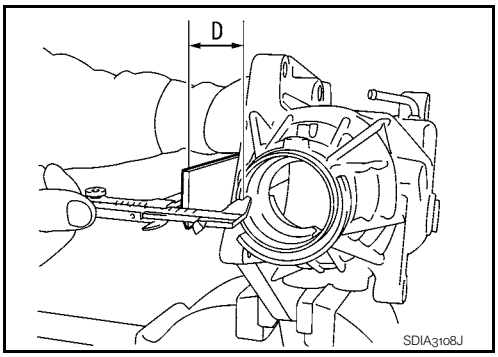
Dimension “C” measurement

- Measure the diameter of drive pinion bearing (rear side) mounting area of transfer case with a pair of vernier calipers. Refer to “Measuring point”.
  CAUTION:
  Never damage transfer case.



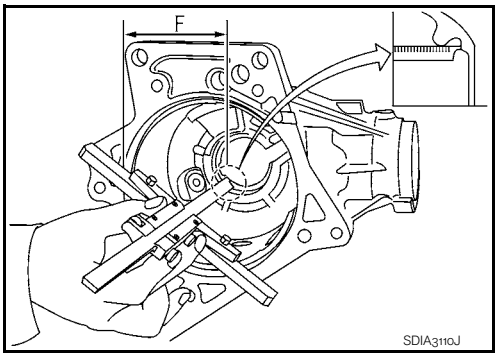
Dimension “D” measurement

- Measure dimension from adapter case mounting surface of transfer case to drive pinion bearing (rear side) mounting surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.
  CAUTION:
  - **Never damage transfer case.**
  - **Consider the thickness of a straightedge.**



Dimension “F” measurement

- Measure dimension from adapter case mounting surface of transfer case to ring gear adjusting shim mounting surface with a depth gauge. Refer to “Measuring point”.
  CAUTION:
  Never damage transfer case.



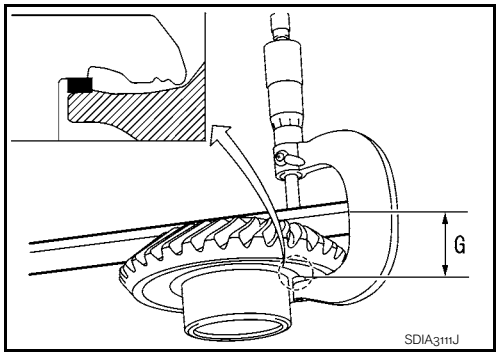
cardiagn.com

Dimension “G” measurement

- Measure dimension from ring gear shaft bearing mounting surface of ring gear to transfer case side edge surface with a micrometer and straightedge. Refer to “Measuring point”.

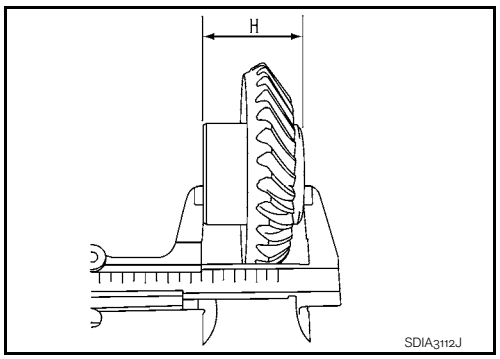
CAUTION:

Consider the thickness of a straightedge.



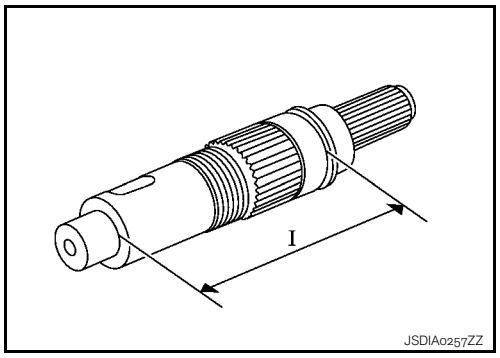
Dimension “H” measurement

- Measure dimension from transfer case side edge surface of ring gear to adapter case side edge surface with a pair of vernier calipers. Refer to “Measuring point”.



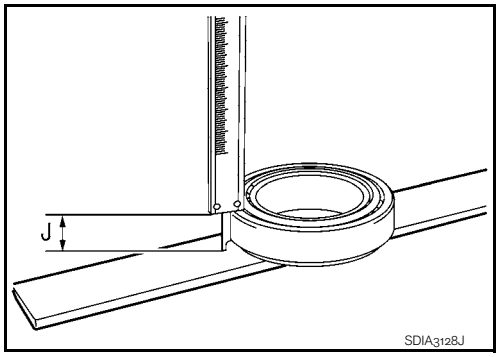
Dimension “I” measurement

- Measure dimension from ring gear mounting surface of ring gear shaft to ring gear shaft bearing (transfer case side) mounting surface with a pair of vernier calipers. Refer to “Measuring point”.



Dimension “J” measurement

- Measure dimension from outer race edge surface of ring gear shaft bearing (transfer case side) to inner race edge surface with a pair of vernier calipers. Refer to “Measuring point”.



2. Calculate dimension “N” by the formula below.

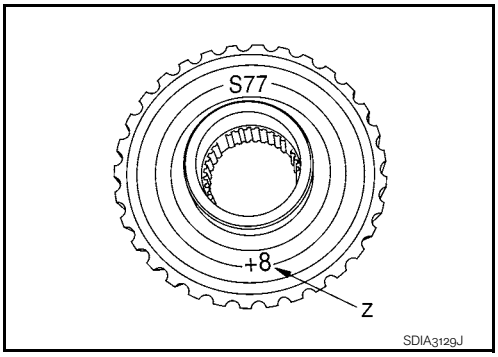
Dimension “N” = “C” × 0.5 mm (0.020 in) + “D”

3. Convert the dimensions “F”, “G”, “H”, “I”, “J” and “N” according to the standards below.

cardiagn.com

"F" : Actual value regarding 122.60 mm (4.83 in) as 0 in increments of 0.01 mm (0.0004 in).
"G" : Actual value regarding 26.60 mm (1.0472 in) as 0 in increments of 0.01 mm (0.0004 in).
"H" : Actual value regarding 48.60 mm (1.9134 in) as 0 in increments of 0.01 mm (0.0004 in).
"I" : Actual value regarding 119.40 mm (4.70 in) as 0 in increments of 0.01 mm (0.0004 in).
"J" : Actual value regarding 16.25 mm (0.6398 in) as 0 in increments of 0.01 mm (0.0004 in).
"N" : Actual value regarding 55.00 mm (2.1654 in) as 0 in increments of 0.01 mm (0.0004 in).

4. Check dimension "Z" (machining difference) on the ring gear back surface.
NOTE:
Dimension "Z" indicates difference between optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in) written on the ring gear back surface.



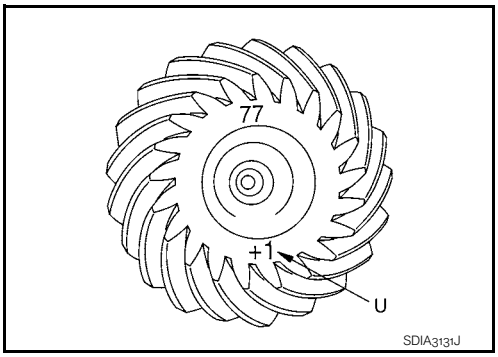
5. Calculate the thickness of the ring gear adjusting shim (transfer case side) "T_2" by the formula below.

"T_2" = ("F" – "G" + "H" – "I" – "J" – "N" + "Z") × 0.01 mm (0.0004 in) + 1.65 mm (0.0650 in)

6. Select ring gear adjusting shim (transfer case side).
CAUTION:
- **Only one adjusting shim can be selected.**
- **Select the closest one, favoring thicker over thinner when necessary if no adjusting shim with the calculated value is available.**

Drive Pinion Adjusting Shim

1. Check the dimension "U" (machining difference) between old and new drive pinions when hypoid gear set (drive pinion and ring gear) has been replaced.
(Assemble new drive pinion adjusting shims with the same thickness as the ones removed prior to disassembly or removed drive pinion adjusting shims when reusing the hypoid gear set.)
NOTE:
Dimension "U" indicates the difference between optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in). It is written on the gear end of the drive pinion for reference.



2. Calculate the thickness of the drive pinion adjusting shim "T" by the formula below.

"T" = T_0 + [(t_1 – t_2) × 0.01 mm (0.0004 in)]
"T" : Thickness of new shim
T_0 : Thickness of old shim
t_1 : Dimension "U" displayed on the gear end of old drive pinion
t_2 : Dimension "U" displayed on the gear end of new drive pinion

[Example]
"T" = 3.21 + [(2 + 1) × 0.01 mm (0.0004 in)]
T_0 : 3.21
t_1 : +2
t_2 : –1

3. Select drive pinion adjusting shim.

cardiagn.com

CAUTION:
- **Only one adjusting shim can be selected.**
- **Select the closest one, if no adjusting shim with the calculated value is available.**

M/T : Inspection After Disassembly

INFOID:0000000000972148

Check items below. If necessary, replace them with new ones.

GEAR AND SHAFT

Check gear face and shaft for wear, cracks, damage, and seizure.

CAUTION:
Replace ring gear and drive pinion as a set (hypoid gear set) if any malfunction is detected on the ring gear or drive pinion.

BEARING

Check for seizure, peeling, wear, corrosion, sticking, unusual noise, roughness in hand turning, and other damage.

CAUTION:
Always replace inner race and outer race as a pair when replacing the bearing.

SHIM

Check for seizure, damage, and unusual wear.

CASE

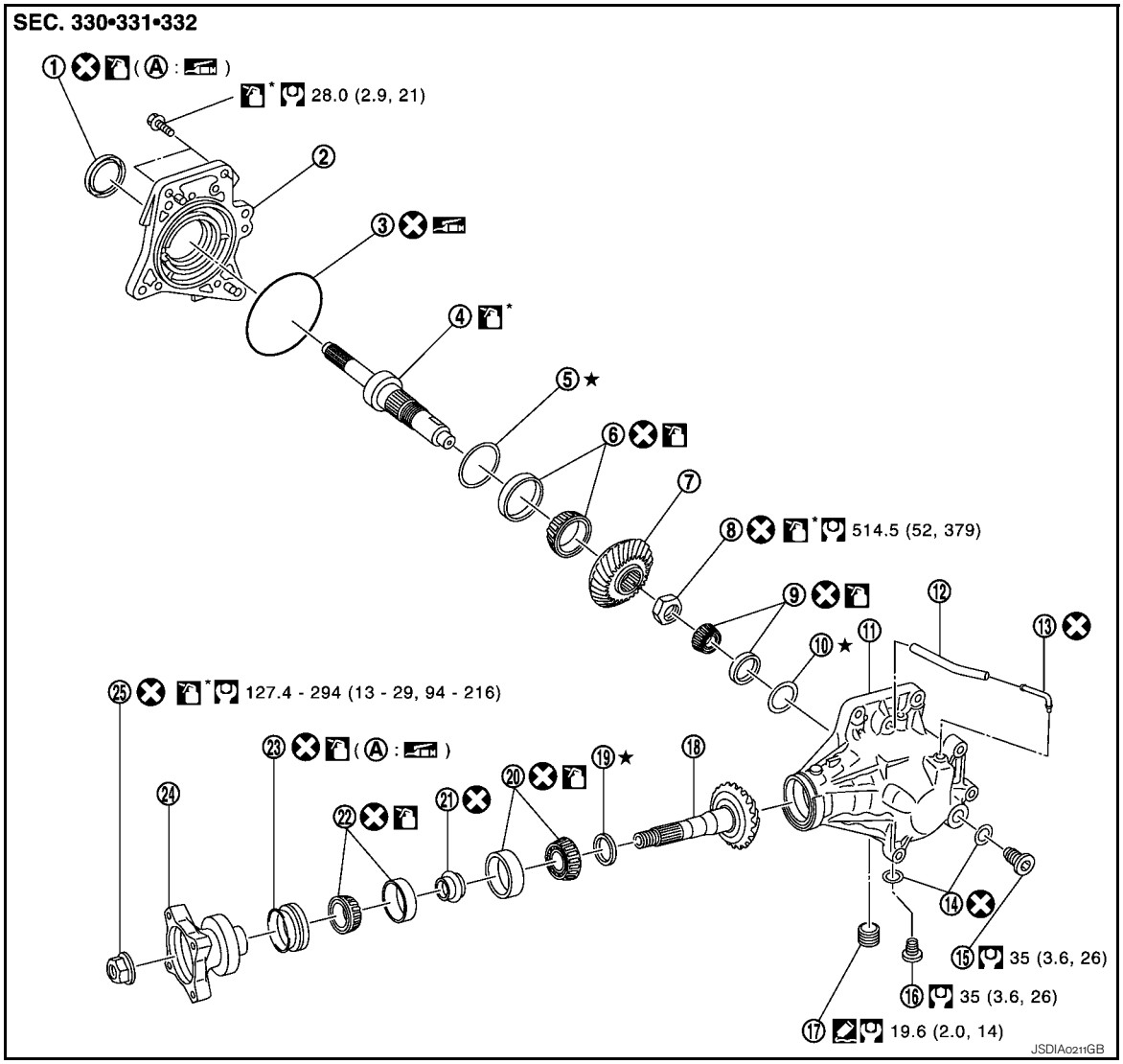
Check the bearing mounting surface for wear, cracks and damages.

CVT

CVT : Exploded View

INFOID:0000000001060138

cardiagn.com



1. Adapter case oil seal	2. Adapter case	3. O-ring
4. Ring gear shaft	5. Ring gear adjusting shim (adapter case side)	6. Ring gear shaft bearing (adapter case side)
7. Ring gear	8. Ring gear nut	9. Ring gear shaft bearing (transfer case side)
10. Ring gear adjusting shim (transfer case side)	11. Transfer case	12. Air breather hose
13. Air breather tube	14. Gasket	15. Filler plug
16. Drain plug	17. Plug	18. Drive pinion
19. Drive pinion adjusting shim	20. Drive pinion bearing (front side)	21. Collapsible spacer
22. Drive pinion bearing (rear side)	23. Drive pinion oil seal	24. Companion flange
25. Lock nut		

A: Oil seal lip

: Apply gear oil.

*: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.

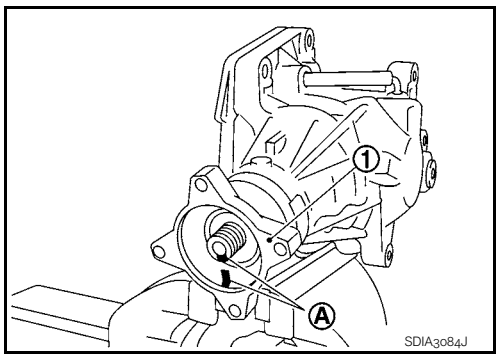
Refer to GI-4, "Components" for symbols not described on the above.

CVT : Disassembly

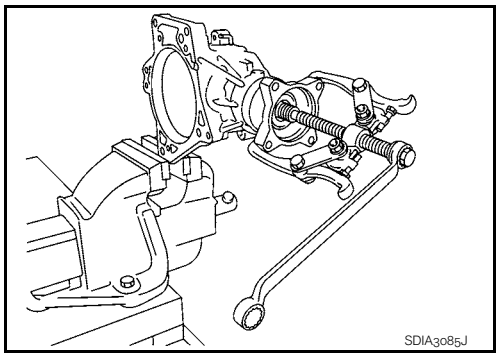
INFOID:0000000001060153

cardiagn.com

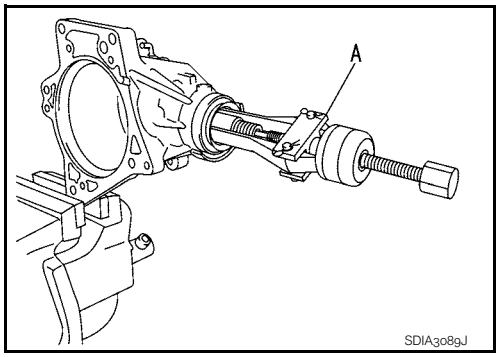
1. Remove adapter case. Refer to DLN-64, "CVT : Disassembly".
2. Remove ring gear shaft assembly. Refer to DLN-71, "CVT : Disassembly".
3. Remove lock nut from the drive pinion.
4. Put matching marks (A) on screw ends of companion flange (1) and drive pinion.
   CAUTION:
   Use paint to avoid scratching the surface.



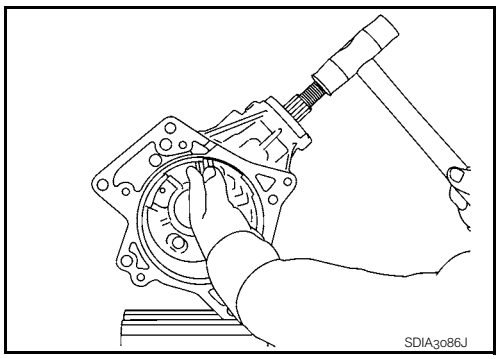
5. Remove companion flange from drive pinion with a puller.



6. Remove drive pinion oil seal from the transfer case with a puller (A) (SST: KV381054S0).
   CAUTION:
   Never damage transfer case.

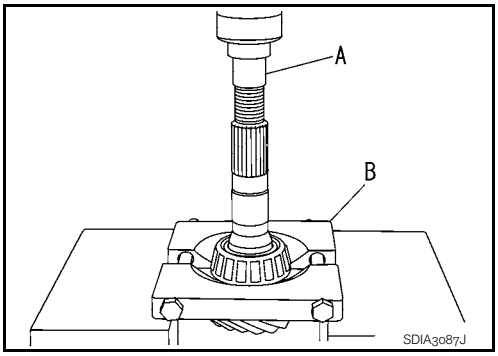


7. Remove drive pinion assembly from transfer case while tapping the drive pinion lightly with a plastic hammer.
   CAUTION:
   Never drop the drive pinion assembly.
8. Remove collapsible spacer from the drive pinion.
9. Remove inner race of drive pinion bearing (rear side) from transfer case.



cardiagn.com

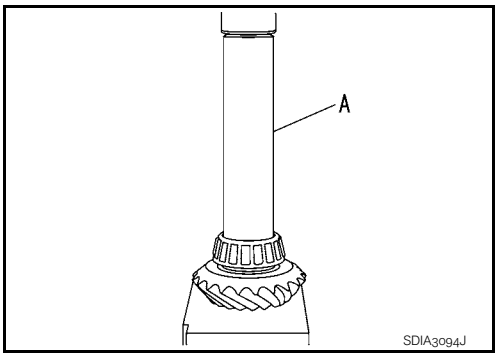
10. Remove inner race of drive pinion bearing (front side) from drive pinion with a drift (A) (SST: ST33052000) and replacer (B) (SST: ST22730000).
11. Remove drive pinion adjusting shim from the drive pinion.



CVT : Assembly

INFOID:0000000001060154

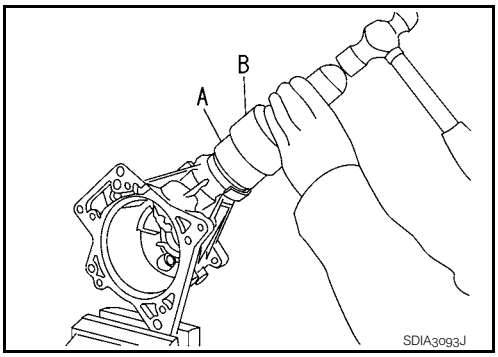
1. Select drive pinion adjusting shim. Refer to DLN-91, "CVT : Adjustment".
2. Install selected drive pinion adjusting shim to drive pinion.
3. Install inner race of drive pinion bearing (front side) to drive pinion with a drift (A) (SST: ST23860000).
   CAUTION:
   - **Never reuse drive pinion bearing (front side).**
   - **Apply gear oil to the drive pinion bearing (front side).**
4. Assemble the inner race of drive pinion bearing (rear side) into the transfer case.
   CAUTION:
   - **Never reuse drive pinion bearing (rear side).**
   - **Apply gear oil to the drive pinion bearing (rear side).**



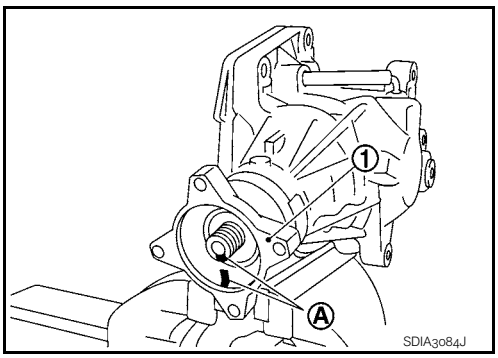
5. Install drive pinion oil seal to transfer case with drifts so that it becomes flush with case end surface.

   A : Drift (SST: ST27861000)
   B : Drift (SST: ST30720000)

   CAUTION:
   - **Never reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.**
6. Assemble a collapsible spacer onto the drive pinion.
   CAUTION:
   Never reuse the collapsible spacer.

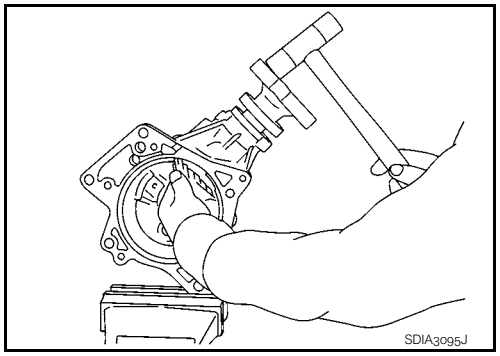


7. Assemble drive pinion assembly into the transfer case, and then install companion flange (1) to drive pinion.
   NOTE:
   Align matching marks (A) on the thread edge of companion flange and drive pinion and install companion flange if drive pinion is reused.



cardiagn.com

8. Tap the companion flange with a plastic hammer as far as the lock nut can be tightened.
   CAUTION:
   Never damage drive pinion oil seal.
9. Apply anti-corrosive oil to the thread and seat of the lock nut, and temporarily tighten lock nut to the drive pinion.
   CAUTION:
   Never reuse lock nut.

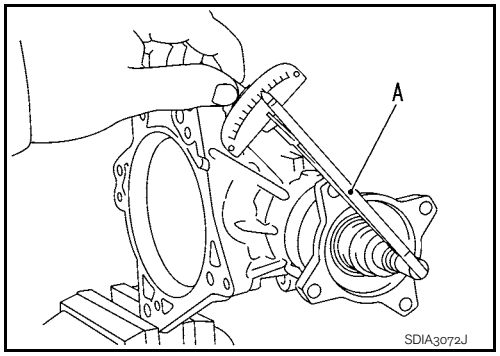


10. Tighten lock nut within the specified torque range with a preload gauge (A) (SST: ST3127S000) so that the drive pinion bearing preload is within standard.

    Standard

    Drive pinion bearing preload : Refer to DLN-107, "Preload Torque".

    CAUTION:
    - **Start the tightening of lock nut from lower limit of the specified torque. Check the preload every 5° to 10° while tightening the lock nut.**
    - **Replace the collapsible spacer and tighten it again to adjust if preload exceeds the specified value. Never loosen lock nut to adjust preload.**
    - **After adjustment, rotate the drive pinion back and forth from 2 to 3 times to check for unusual noise, sticking, binding, and so on.**



11. Install ring gear shaft assembly. Refer to DLN-73, "CVT : Assembly".
12. Install adapter case. Refer to DLN-65, "CVT : Assembly".
13. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-91, "CVT : Adjustment".
    CAUTION:
    Measure the total preload without the adapter case oil seal.

CVT : Adjustment

INFOID:0000000001060155

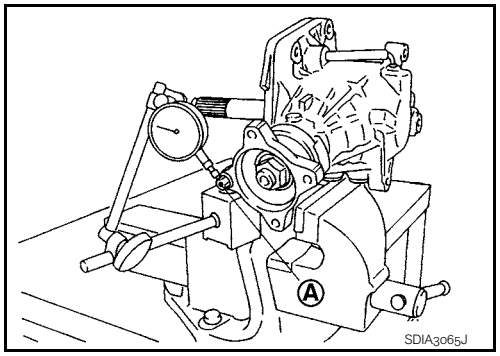
BACKLASH

1. Install the bolt (A) to the companion flange.
2. Fit a dial indicator onto the bolt.
3. Measure the circumference backlash of the companion flange.

   Standard

   Backlash : Refer to DLN-107, "Backlash".

   Disassemble the transfer assembly to check and adjust each part if outside the standard.

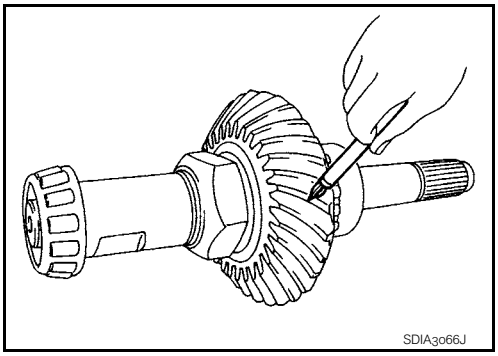


TOOTH CONTACT

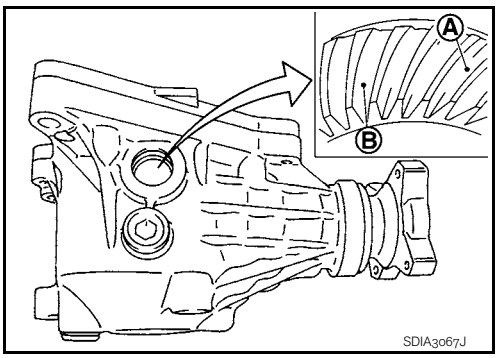
1. Remove adapter case. Refer to DLN-64, "CVT : Disassembly".

cardiagn.com

2. Remove ring gear shaft assembly from transfer case. Then apply red lead onto the ring gear.
   CAUTION:
   Apply red lead to both faces of 3 to 4 gears at 4 locations evenly spaced on the ring gear.
3. Assemble the ring gear shaft assembly to the transfer case.
4. Install adapter case. Refer to DLN-65, "CVT : Assembly".
5. Remove plug on the lower side of the transfer case.


SDIA3066J

6. Rotate the companion flange back and forth several times. Then check drive pinion to ring gear tooth contact by viewing from the tooth contact test hole. (A: Drive side, B: Reverse side)



SDIA3067J

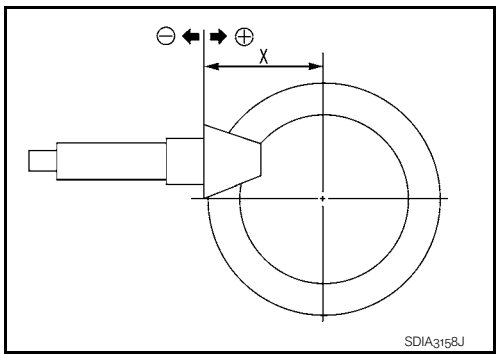
Tooth Contact Judgment Guide

Drive pinion adjusting shim selection value mm (in)		Tooth contact condition		Need for adjustment
		Drive side	Back	
Thicker ↑	+0.12 (+0.0047)	Heel side / Toe side		Yes
	+0.09 (+0.0035)			
	+0.06 (+0.0024)			
	+0.03 (+0.0012)			No
	0 (0.0)			
Thinner ↓	−0.03 (−0.0012)			
	−0.06 (−0.0024)			Yes
	−0.09 (−0.0035)			
	−0.12 (−0.0047)			

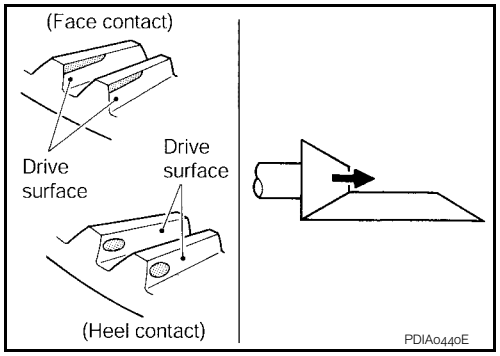
JSDIA0213GB

cardiagn.com

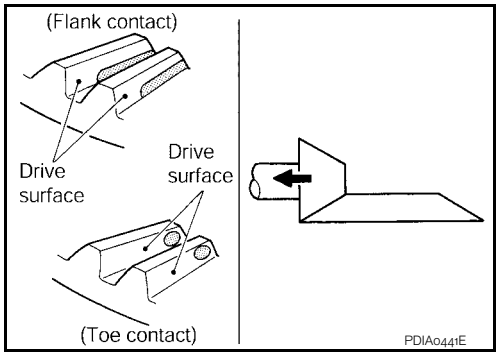
7. Follow the procedure below to adjust pinion height (dimension X) if tooth contact is improper.
CAUTION:
If no adjusting shim with the calculated value is available, select the thicker and closest one.



- Thicken the drive pinion adjusting shim to move the drive pinion closer to the ring gear in case of face contact or heel contact.
CAUTION:
Only one adjusting shim can be selected.



- Thin the drive pinion adjusting shim to move the drive pinion farther from the ring gear in case of flank contact or toe contact.
CAUTION:
Only one adjusting shim can be selected.



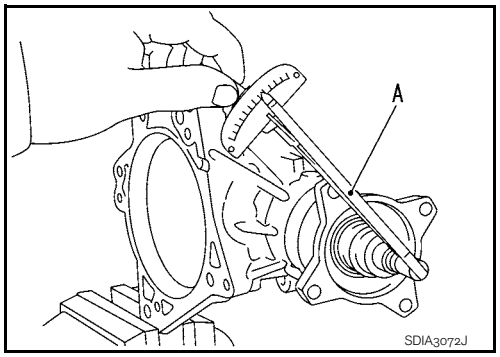
8. Assemble the plug to the transfer case.
CAUTION:
- **Remove old gasket on mounting surface, then remove any moisture, oil, and foreign material on the application and mounting surfaces.**
- **Apply liquid gasket to the thread, and tighten to the specified torque when installing plug.**

DRIVE PINION BEARING PRELOAD

1. Remove adapter case. Refer to DLN-64, "CVT : Disassembly".
2. Remove ring gear shaft assembly from the transfer case.
3. Rotate the companion flange back and forth from 2 to 3 times to check for unusual noise, binding, sticking, and so on.
4. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.
5. Measure the drive pinion bearing preload with a preload gauge (A) (SST: ST3127S000).

Standard

Drive pinion bearing preload **: Refer to DLN-107, "Preload Torque".**



CAUTION:
Each rotational part should rotate smoothly with the specified gear oil.
- Disassemble the drive pinion assembly to check and adjust each part if outside the standard.

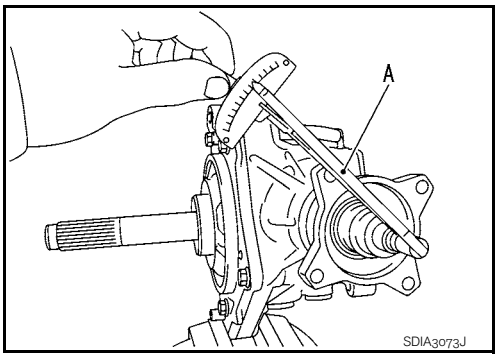
TOTAL PRELOAD

1. Measure drive pinion bearing preload (P_1). Refer to “DRIVE PINION BEARING PRELOAD”.

cardiagn.com

CAUTION:
Check that the drive pinion bearing preload is within the standard.

2. Assemble the ring gear shaft assembly to the transfer case.
3. Install adapter case. Refer to DLN-65, "CVT : Assembly".
4. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.
5. Measure the total preload with a preload gauge (A) (SST: ST3127S000).



Standard

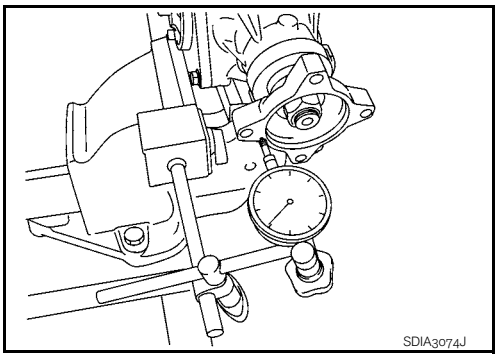
Total preload

All oil seals are installed	**: Refer to DLN-107, "Preload Torque".**
Without adapter case oil seal	**: Refer to DLN-107, "Preload Torque".**

CAUTION:
- **Each rotational part should rotate smoothly with the specified gear oil.**
- **Disassemble the transfer assembly to check and adjust each part if outside the standard. Measure it with the adapter case oil seals removed when measuring total preload after disassembly. Then install adapter case oil seals.**

COMPANION FLANGE RUNOUT

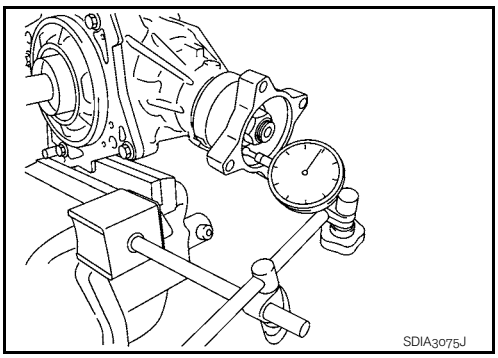
1. Fit a dial indicator onto the companion flange face (inner side of the propeller shaft bolt holes).
2. Rotate the companion flange to check for runout.



Limit

Companion flange runout	**: Refer to DLN-107, "Companion Flange Runout".**

3. Fit a test indicator to the inner side of the companion flange (socket diameter).
4. Rotate the companion flange to check for runout.



Limit

Companion flange runout	**: Refer to DLN-107, "Companion Flange Runout".**

5. Follow the procedure below to adjust if runout value is outside the repair limit.

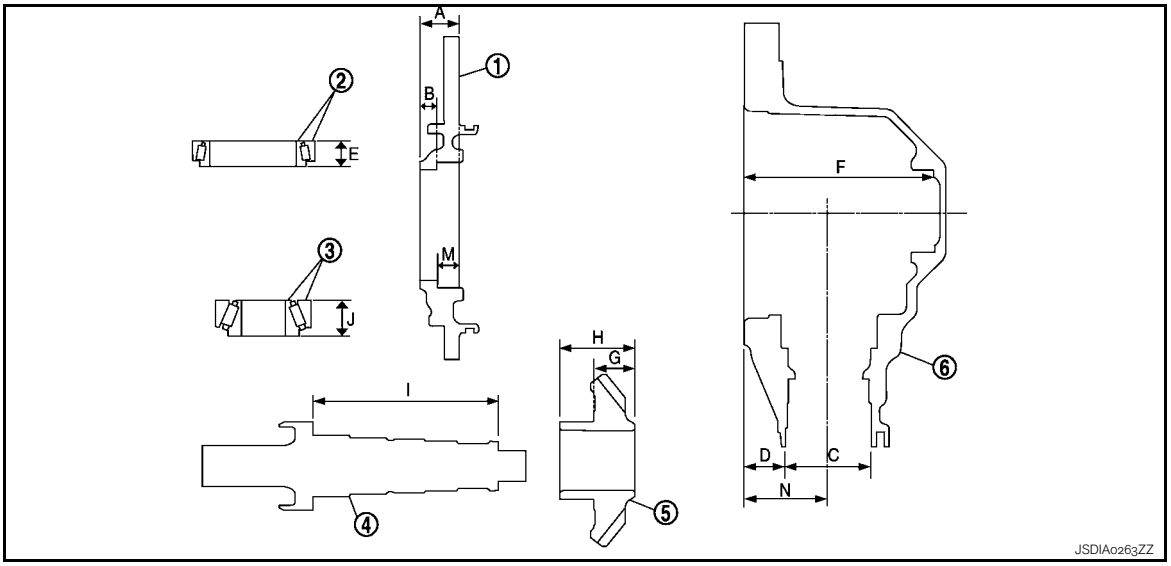
CAUTION:
Replace collapsible spacer to check and adjust each part when companion flange is adjusted or replaced.

a. Check for runout while changing the phase between companion flange and drive pinion in 90° steps. Then search for the minimum point.
b. Replace companion flange if runout value is still outside the limit after the phase has been changed.
c. Adjust assembly status of the drive pinion bearings and drive pinion, or replace drive pinion bearings if runout is outside the standard after the companion flange is replaced.

ADJUSTING SHIM SELECTION

Measuring Point

cardiagn.com



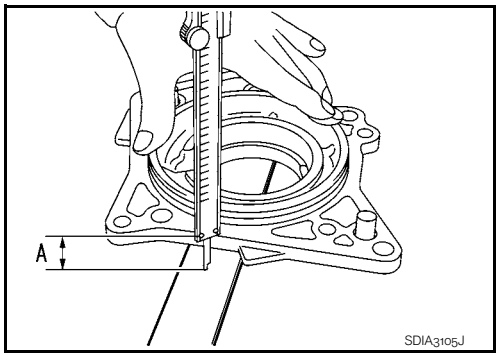
1. Adapter case
2. Ring gear shaft bearing (Adapter case side)
3. Ring gear shaft bearing (Transfer case side)
4. Ring gear shaft
5. Ring gear
6. Transfer case

Ring Gear Adjusting Shim (Adapter Case Side)

1. Measure the dimensions of each measuring point with the following procedure:

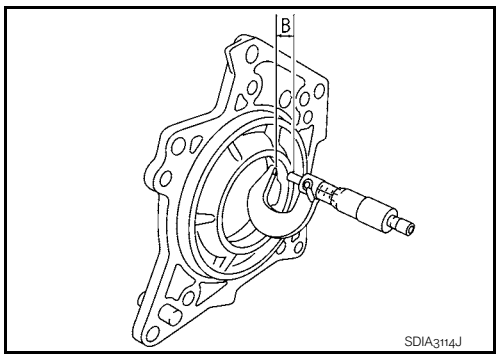
Dimension “A” measurement

- Measure dimension from transfer case mounting surface of adapter case to adapter case edge surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.



Dimension “B” measurement

- Measure dimension from ring gear adjusting shim mounting surface of adapter case to adapter case edge surface with a micrometer. Refer to “Measuring point”.

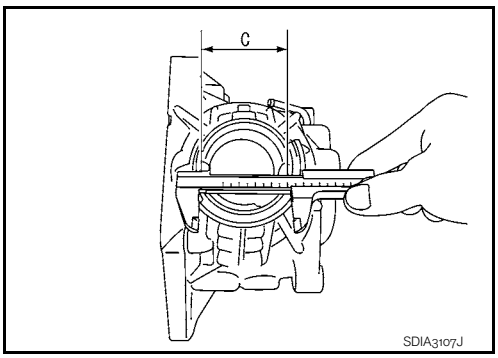


Dimension “C” measurement

cardiagn.com

- Measure the diameter of drive pinion bearing (rear side) mounting area of transfer case with a pair of vernier calipers. Refer to “Measuring point”.

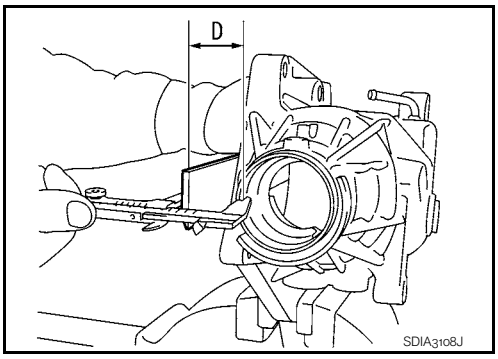
CAUTION:
Never damage transfer case.



Dimension “D” measurement

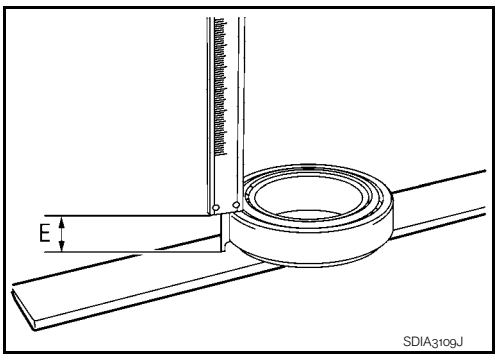
- Measure dimension from adapter case mounting surface of transfer case to drive pinion bearing (rear side) mounting surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.

CAUTION:
- **Never damage transfer case.**
- **Consider the thickness of a straightedge.**



Dimension “E” measurement

- Measure dimension from outer race edge surface of ring gear shaft bearing (adapter case side) to inner race edge surface with a pair of vernier calipers. Refer to “Measuring point”.



2. Calculate dimensions “M” and “N” by the formula below.

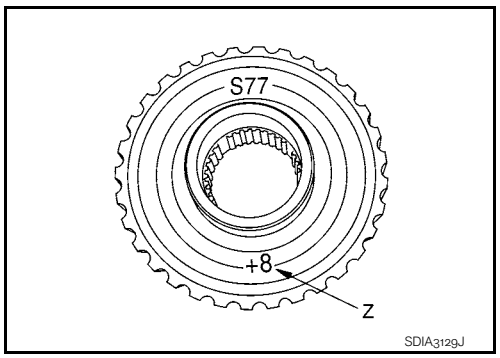
Dimension “M” = “A” – “B”
Dimension “N” = “C” × 0.5 mm (0.020 in) + “D”

3. Convert the dimensions “E”, “M” and “N” according to the standards below.

“E” : Actual value regarding 20.00 mm (0.7874 in) as 0 in increments of 0.01 mm (0.0004 in).
“M” : Actual value regarding 13.90 mm (0.5472 in) as 0 in increments of 0.01 mm (0.0004 in).
“N” : Actual value regarding 55.00 mm (2.1654 in) as 0 in increments of 0.01 mm (0.0004 in).

cardiagn.com

4. Check dimension “Z” (machining difference) on the ring gear back surface.
NOTE:
Dimension “Z” indicates difference between optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in) written on the ring gear back surface.



5. Calculate the thickness of the ring gear adjusting shim (adapter case side) “T_1” by the formula below.

“T_1” = (“M” + “N” – “E” – “Z”) × 0.01 mm (0.0004 in) + 1.40 mm (0.0551 in)

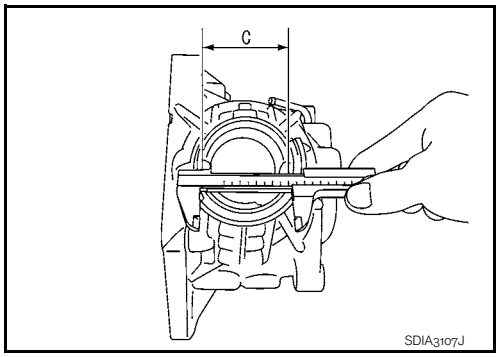
6. Select ring gear adjusting shim (adapter case side).
CAUTION:
- **Only one adjusting shim can be selected.**
- **Select the closest one, favoring thicker over thinner when necessary if no adjusting shim with the calculated value is available.**

Ring Gear Adjusting Shim (Transfer Case Side)

1. Measure the dimensions of each measuring point with the following procedure:

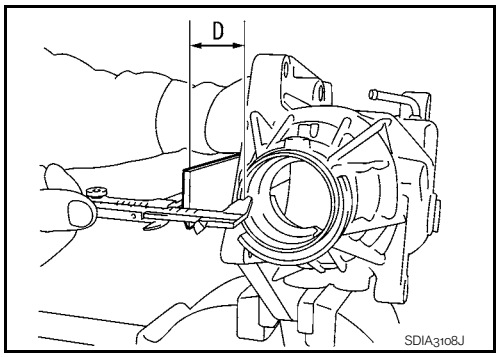
Dimension “C” measurement

- Measure the diameter of drive pinion bearing (rear side) mounting area of transfer case with a pair of vernier calipers. Refer to “Measuring point”.
CAUTION:
Never damage transfer case.



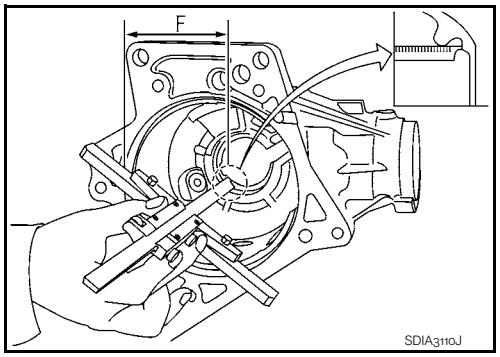
Dimension “D” measurement

- Measure dimension from adapter case mounting surface of transfer case to drive pinion bearing (rear side) mounting surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.
CAUTION:
- **Never damage transfer case.**
- **Consider the thickness of a straightedge.**



Dimension “F” measurement

- Measure dimension from adapter case mounting surface of transfer case to ring gear adjusting shim mounting surface with a depth gauge. Refer to “Measuring point”.
CAUTION:
Never damage transfer case.

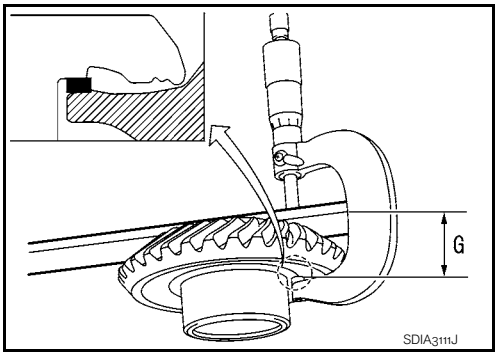


cardiagn.com

Dimension “G” measurement

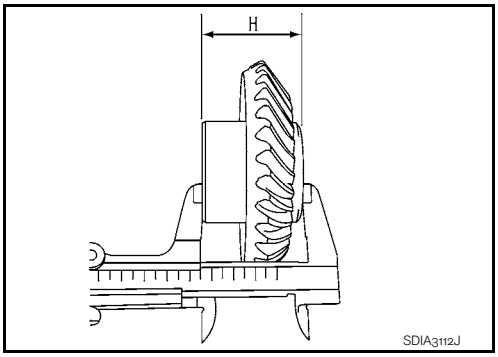
- Measure dimension from ring gear shaft bearing mounting surface of ring gear to transfer case side edge surface with a micrometer and straightedge. Refer to “Measuring point”.

CAUTION:
Consider the thickness of a straightedge.



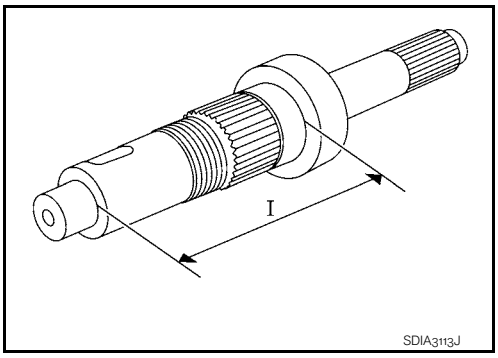
Dimension “H” measurement

- Measure dimension from transfer case side edge surface of ring gear to adapter case side edge surface with a pair of vernier calipers. Refer to “Measuring point”.



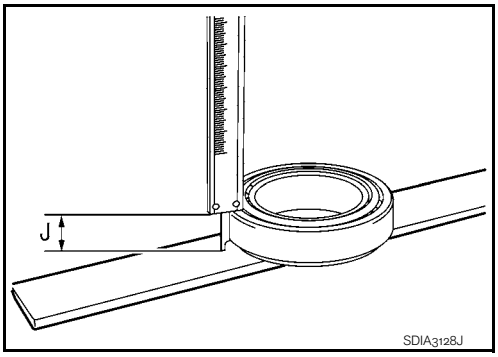
Dimension “I” measurement

- Measure dimension from ring gear mounting surface of ring gear shaft to ring gear shaft bearing (transfer case side) mounting surface with a pair of vernier calipers. Refer to “Measuring point”.



Dimension “J” measurement

- Measure dimension from outer race edge surface of ring gear shaft bearing (transfer case side) to inner race edge surface with a pair of vernier calipers. Refer to “Measuring point”.



2. Calculate dimension “N” by the formula below.

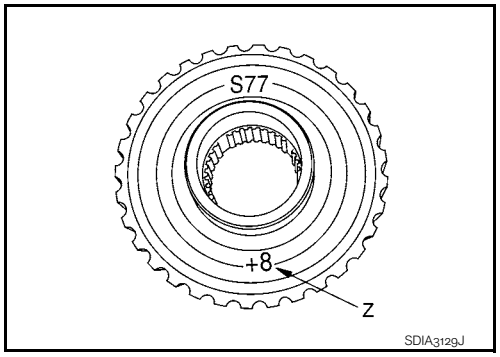
Dimension “N” = “C” × 0.5 mm (0.020 in) + “D”

3. Convert the dimensions “F”, “G”, “H”, “I”, “J” and “N” according to the standards below.

cardiagn.com

"F" : Actual value regarding 122.60 mm (4.83 in) as 0 in increments of 0.01 mm (0.0004 in).
"G" : Actual value regarding 26.60 mm (1.0472 in) as 0 in increments of 0.01 mm (0.0004 in).
"H" : Actual value regarding 48.60 mm (1.9134 in) as 0 in increments of 0.01 mm (0.0004 in).
"I" : Actual value regarding 119.40 mm (4.70 in) as 0 in increments of 0.01 mm (0.0004 in).
"J" : Actual value regarding 16.25 mm (0.6398 in) as 0 in increments of 0.01 mm (0.0004 in).
"N" : Actual value regarding 55.00 mm (2.1654 in) as 0 in increments of 0.01 mm (0.0004 in).

4. Check dimension "Z" (machining difference) on the ring gear back surface.
NOTE:
Dimension "Z" indicates difference between optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in) written on the ring gear back surface.



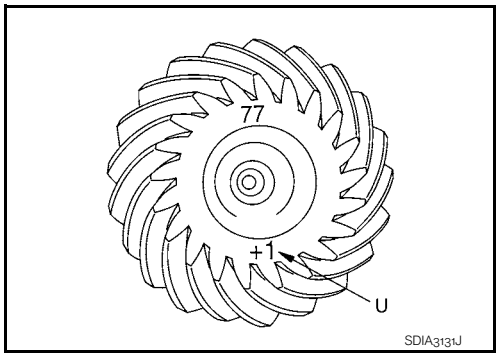
5. Calculate the thickness of the ring gear adjusting shim (transfer case side) "T_2" by the formula below.

"T_2" = ("F" – "G" + "H" – "I" – "J" – "N" + "Z") × 0.01 mm (0.0004 in) + 1.65 mm (0.0650 in)

6. Select ring gear adjusting shim (transfer case side).
CAUTION:
- **Only one adjusting shim can be selected.**
- **Select the closest one, favoring thicker over thinner when necessary if no adjusting shim with the calculated value is available.**

Drive Pinion Adjusting Shim

1. Check the dimension "U" (machining difference) between old and new drive pinions when hypoid gear set (drive pinion and ring gear) has been replaced.
(Assemble new drive pinion adjusting shims with the same thickness as the ones removed prior to disassembly or removed drive pinion adjusting shims when reusing the hypoid gear set.)
NOTE:
Dimension "U" indicates the difference between optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in). It is written on the gear end of the drive pinion for reference.



2. Calculate the thickness of the drive pinion adjusting shim "T" by the formula below.

"T" = T_0 + [(t_1 – t_2) × 0.01 mm (0.0004 in)]
"T" : Thickness of new shim
T_0 : Thickness of old shim
t_1 : Dimension "U" displayed on the gear end of old drive pinion
t_2 : Dimension "U" displayed on the gear end of new drive pinion

[Example]
"T" = 3.21 + [(2 + 1) × 0.01 mm (0.0004 in)]
T_0 : 3.21
t_1 : +2
t_2 : –1

3. Select drive pinion adjusting shim.

cardiagn.com

CAUTION:
- **Only one adjusting shim can be selected.**
- **Select the closest one, if no adjusting shim with the calculated value is available.**

CVT : Inspection After Disassembly

INFOID:0000000001060156

Check items below. If necessary, replace them with new ones.

GEAR AND SHAFT

Check gear face and shaft for wear, cracks, damage, and seizure.

CAUTION:
Replace ring gear and drive pinion as a set (hypoid gear set) if any malfunction is detected on the ring gear or drive pinion.

BEARING

Check for seizure, peeling, wear, corrosion, sticking, unusual noise, roughness in hand turning, and other damage.

CAUTION:
Always replace inner race and outer race as a pair when replacing the bearing.

SHIM

Check for seizure, damage, and unusual wear.

CASE

Check the bearing mounting surface for wear, cracks and damages.

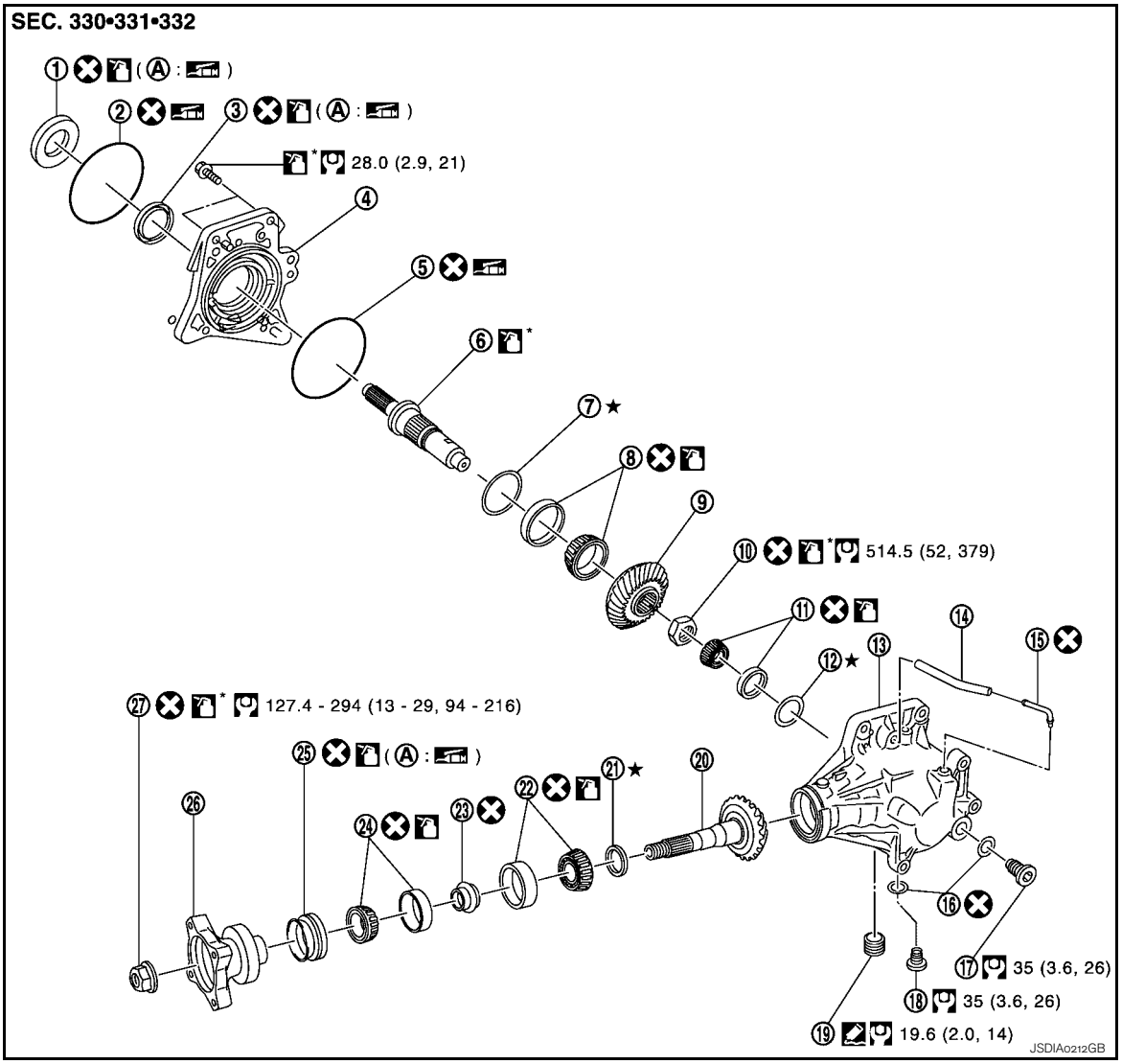
cardiagn.com

TRANSFER CASE

M/T

M/T : Exploded View

INFOID:0000000001060440



1. Adapter case oil seal (outer)
2. O-ring (outer)
3. Adapter case oil seal (inner)
4. Adapter case
5. O-ring (inner)
6. Ring gear shaft
7. Ring gear adjusting shim (adapter case side)
8. Ring gear shaft bearing (adapter case side)
9. Ring gear
10. Ring gear nut
11. Ring gear shaft bearing (transfer case side)
12. Ring gear adjusting shim (transfer case side)
13. Transfer case
14. Air breather hose
15. Air breather tube
16. Gasket
17. Filler plug
18. Drain plug
19. Plug
20. Drive pinion
21. Drive pinion adjusting shim
22. Drive pinion bearing (front side)
23. Collapsible spacer
24. Drive pinion bearing (rear side)
25. Drive pinion oil seal
26. Companion flange
27. Lock nut

A: Oil seal lip

: Apply gear oil.

*: Apply anti-corrosive oil.

cardiagn.com

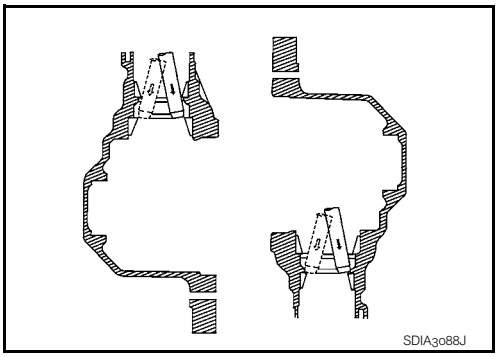
: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

M/T : Disassembly

INFOID:0000000001060433

1. Remove adapter case. Refer to DLN-62, "M/T : Disassembly".
2. Remove ring gear shaft assembly. Refer to DLN-68, "M/T : Disassembly".
3. Remove drive pinion assembly. Refer to DLN-76, "M/T : Disassembly".
4. Tap the outer race of drive pinion bearing from transfer case with a brass rod to remove outer race of drive pinion bearing (front side and rear side).
   CAUTION:
   Never damage transfer case.
5. Remove air breather hose from transfer case.
   CAUTION:
   Never damage air breather hose.
6. Remove air breather tube from transfer case.
7. Remove the filler plug and drain plug from the transfer case, and then remove each gasket.
8. Remove plug from transfer case.



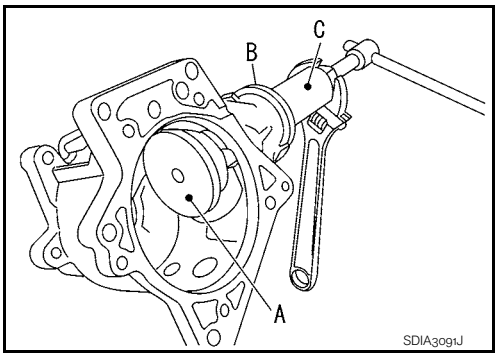
M/T : Assembly

INFOID:0000000001060434

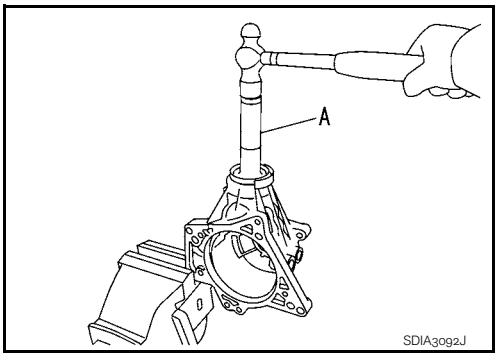
1. Install outer race of drive pinion bearing (front side) to the transfer case with drifts and bushing remover.

   A : Drift (commercial service tool)
   B : Drift (SST: ST35272000)
   C : Bushing remover (SST: ST38280000)

   CAUTION:
   - **Never reuse drive pinion bearing (front side).**
   - **Apply gear oil to the drive pinion bearing (front side)**



2. Install outer race of drive pinion bearing (rear side) to transfer case with a drift (A) (SST: ST33230000).
   CAUTION:
   - **Never reuse drive pinion bearing (rear side).**
   - **Apply gear oil to the drive pinion bearing (rear side).**
3. Install drive pinion assembly. Refer to DLN-77, "M/T : Assembly".
4. Install ring gear shaft assembly. Refer to DLN-69, "M/T : Assembly".
5. Install adapter case. Refer to DLN-62, "M/T : Assembly".

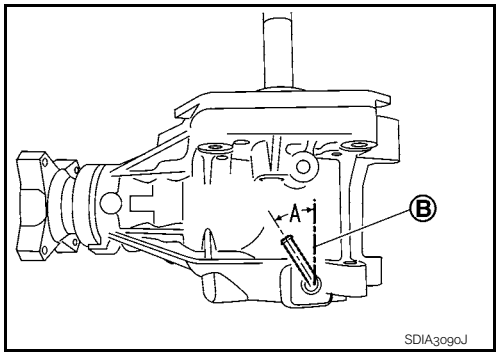


cardiagn.com

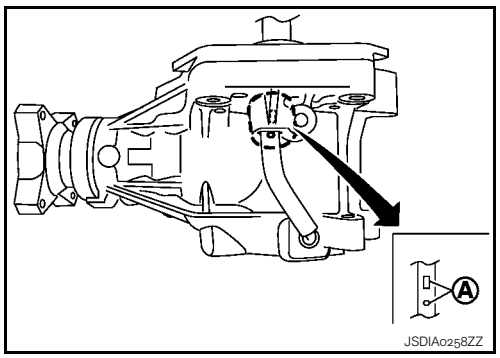
6. Install the air breather tube to the transfer case with its opening facing (A) rearward from transfer input shaft direction (B).

Angle "A" : 25° – 45 °

CAUTION:
Never reuse air breather tube.



7. Install air breather hose.
CAUTION:
- **Never damage air breather hose.**
- **Face the paint area (A) in the direction shown in the figure.**



8. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-78, "M/T : Adjustment".
CAUTION:
Measure the total preload without the adapter case oil seals.
9. Assemble the plug to the transfer case.
CAUTION:
- **Remove old gasket on mounting surface, then remove any moisture, oil, and foreign material on the application and mounting surfaces.**
- **Apply liquid gasket to the threads of plug.**
10. Install gaskets onto filler plug and drain plug and install them into transfer case.
CAUTION:
- **Never reuse gaskets.**
- **Install filler plug after oil is filled.**

M/T : Inspection

INFOID:0000000001060435

Check items below. If necessary, replace them with new ones.

CASE

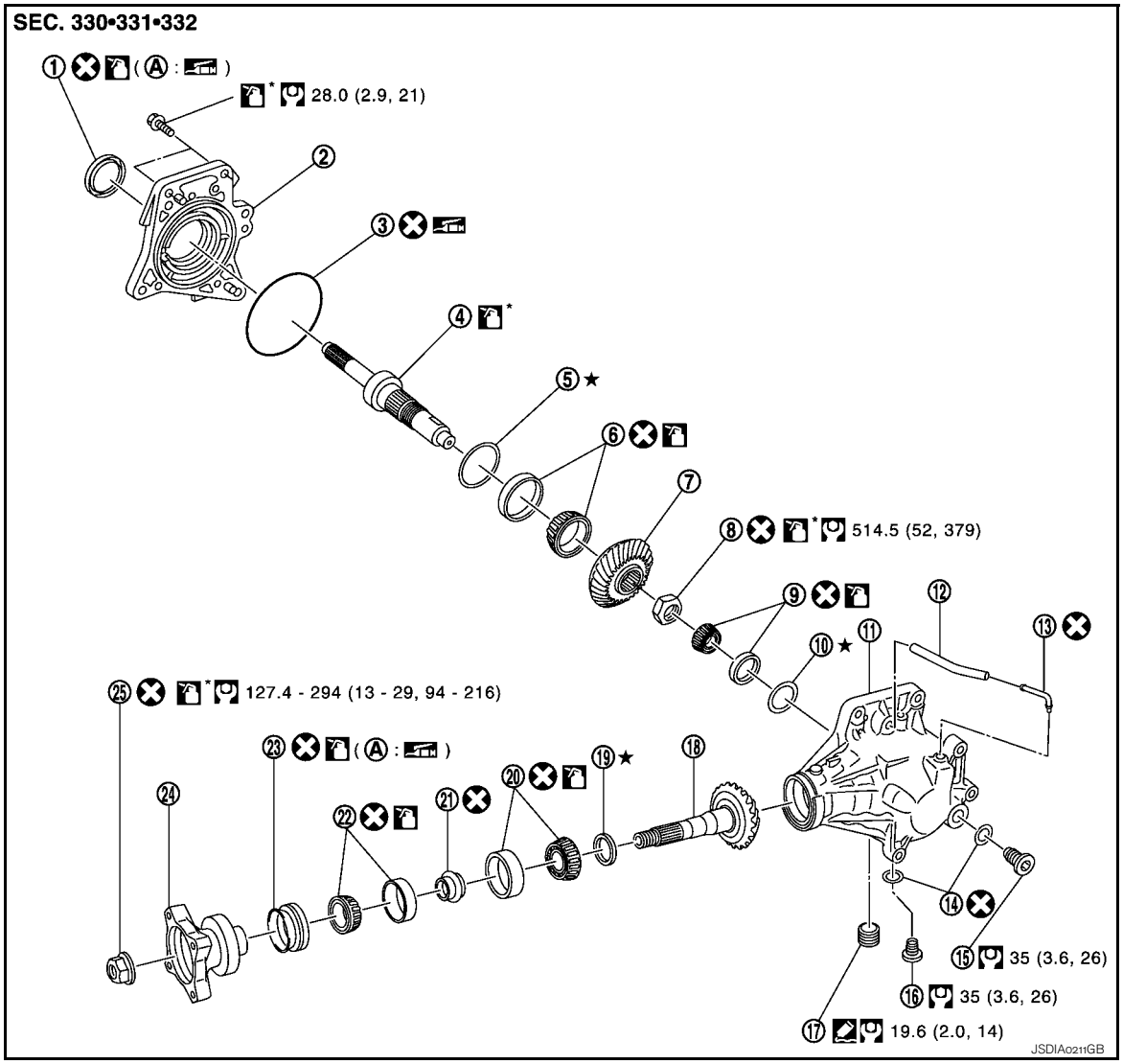
Check the bearing mounting surface for wear, cracks and damages.

CVT

CVT : Exploded View

INFOID:0000000001060441

cardiagn.com



1. Adapter case oil seal
2. Adapter case
3. O-ring
4. Ring gear shaft
5. Ring gear adjusting shim (adapter case side)
6. Ring gear shaft bearing (adapter case side)
7. Ring gear
8. Ring gear nut
9. Ring gear shaft bearing (transfer case side)
10. Ring gear adjusting shim (transfer case side)
11. Transfer case
12. Air breather hose
13. Air breather tube
14. Gasket
15. Filler plug
16. Drain plug
17. Plug
18. Drive pinion
19. Drive pinion adjusting shim
20. Drive pinion bearing (front side)
21. Collapsible spacer
22. Drive pinion bearing (rear side)
23. Drive pinion oil seal
24. Companion flange
25. Lock nut

A: Oil seal lip

: Apply gear oil.

*: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.

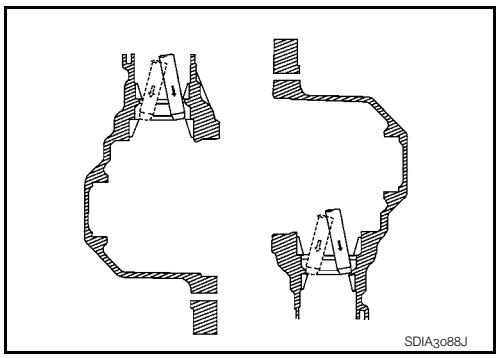
Refer to GI-4, "Components" for symbols not described on the above.

CVT : Disassembly

INFOID:0000000001060456

cardiagn.com

1. Remove adapter case. Refer to DLN-64, "CVT : Disassembly".
2. Remove ring gear shaft assembly. Refer to DLN-71, "CVT : Disassembly".
3. Remove drive pinion assembly. Refer to DLN-88, "CVT : Disassembly".
4. Tap the outer race of drive pinion bearing from transfer case with a brass rod to remove outer race of drive pinion bearing (front side and rear side).
   CAUTION:
   Never damage transfer case.
5. Remove air breather hose from transfer case.
   CAUTION:
   Never damage air breather hose.
6. Remove air breather tube from transfer case.
7. Remove the filler plug and drain plug from the transfer case, and then remove each gasket.
8. Remove plug from transfer case.



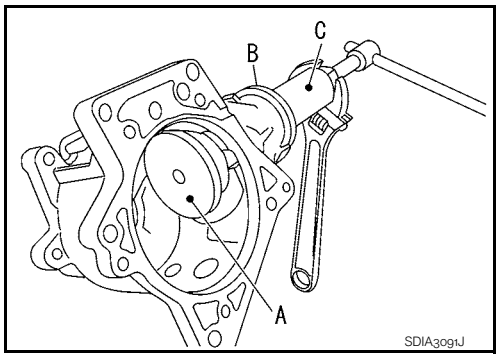
CVT : Assembly

INFOID:0000000001060457

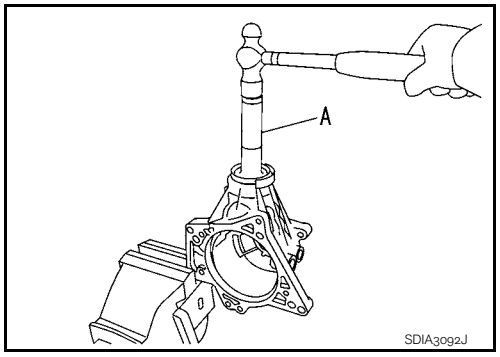
1. Install outer race of drive pinion bearing (front side) to the transfer case with drifts and bushing remover.

   A : Drift (SST: ST30621000)
   B : Drift (SST: ST35272000)
   C : Bushing remover (SST: ST38280000)

   CAUTION:
   - **Never reuse drive pinion bearing (front side).**
   - **Apply gear oil to the drive pinion bearing (front side)**



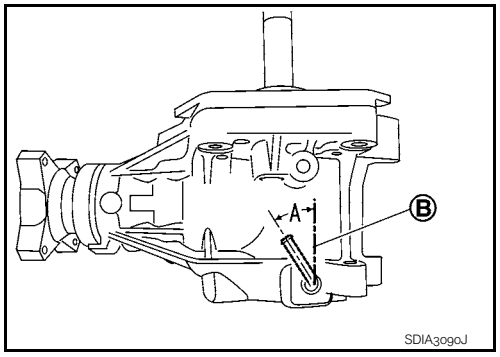
2. Install outer race of drive pinion bearing (rear side) to transfer case with a drift (A) (SST: ST33230000).
   CAUTION:
   - **Never reuse drive pinion bearing (rear side).**
   - **Apply gear oil to the drive pinion bearing (rear side).**
3. Install drive pinion assembly. Refer to DLN-90, "CVT : Assembly".
4. Install ring gear shaft assembly. Refer to DLN-73, "CVT : Assembly".
5. Install adapter case. Refer to DLN-65, "CVT : Assembly".



6. Install the air breather tube to the transfer case with its opening facing (A) rearward from transfer input shaft direction (B).

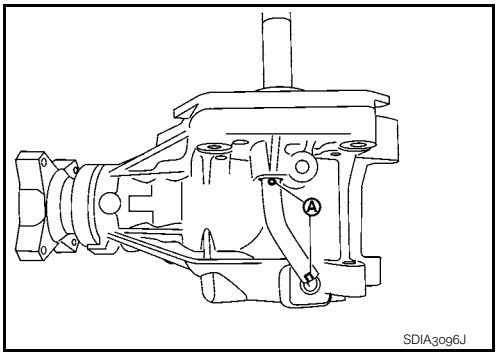
   Angle "A" : 25° – 35 °

   CAUTION:
   Never reuse air breather tube.



cardiagn.com

7. Install air breather hose.
   CAUTION:
   - **Never damage air breather hose.**
   - **Face the paint area (A) in the direction shown in the figure.**



8. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-91, "CVT : Adjustment".
   CAUTION:
   Measure the total preload without the adapter case oil seals.
9. Assemble the plug to the transfer case.
   CAUTION:
   - **Remove old gasket on mounting surface, then remove any moisture, oil, and foreign material on the application and mounting surfaces.**
   - **Apply liquid gasket to the threads of plug.**
10. Install gaskets onto filler plug and drain plug and install them into transfer case.
    CAUTION:
    - **Never reuse gaskets.**
    - **Install filler plug after oil is filled.**

CVT : Inspection

INFOID:0000000001060458

Check items below. If necessary, replace them with new ones.

CASE

Check the bearing mounting surface for wear, cracks and damages.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000000972149

Applied model		4WD	
		MR20DE	
		M/T	CVT
Transfer model		TY30A	
Oil capacity (Approx.) ℓ (Imp pt)		0.38 (5/8)	0.36 (5/8)
Gear ratio		0.656	
Number of teeth	Drive pinion	32	
	Drive gear	21	

Preload Torque

INFOID:0000000001060459

Unit: N·m (kg-m, in-lb)

Item		Standard	
		M/T	CVT
Drive pinion bearing preload (P_1)		0.52 – 1.01 (0.06 – 0.10, 5 – 8)	
Total preload	With all oil seals	P_1 + 0.76 – 0.96 (0.08 – 0.09, 7 – 8)	P_1 + 0.71 – 0.91 (0.08 – 0.09, 7 – 8)
	Without adapter case oil seal	P_1 + 0.55 – 0.75 (0.06 – 0.07, 5 – 6)	

Backlash

INFOID:0000000001060460

Unit: mm (in)

Item	Standard
Ring gear to drive pinion	0.13 – 0.19 (0.0051 – 0.0075)

Companion Flange Runout

INFOID:0000000001060461

Unit: mm (in)

Item	Limit
Companion flange face (inner side of the propeller shaft bolt holes)	0.1 (0.004)
Inside of companion flange (socket diameter)	0.1 (0.004)

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000972150

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference		DLN-109, "Inspection"	DLN-112, "Inspection"	—	DLN-112, "Inspection"	—	DLN-112, "Inspection"	DLN-109, "Inspection"	NVH in DLN section	NVH in FAX, RAX, FSU and RSU section	NVH in WT section	NVH in WT section	NVH in FAX and RAX section	NVH in BR section	NVH in ST section
Possible cause and SUSPECTED PARTS		Uneven rotating torque	Center bearing improper installation	Excessive center bearing axial end play	Center bearing mounting (insulator) cracks, damage or deterioration	Excessive joint angle	Rotation imbalance	Excessive runout	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	Shake		×			×				×	×	×	×	×	×
	Vibration	×	×	×	×	×	×	×		×	×		×		×

×: Applicable

cardiagn.com

ON-VEHICLE MAINTENANCE

REAR PROPELLER SHAFT

Inspection

INFOID:0000000000972152

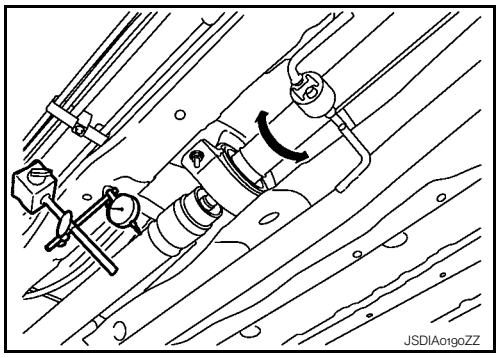
NOISE

- Check the propeller shaft tube surface for dents or cracks. If damaged, replace propeller shaft assembly.
- If center bearing is noisy or damaged, replace propeller shaft assembly.

VIBRATION

If vibration is present at high speed, inspect propeller shaft runout first.

1. Measure propeller shaft runout at runout measuring points by rotating final drive companion flange with hands.



Limit

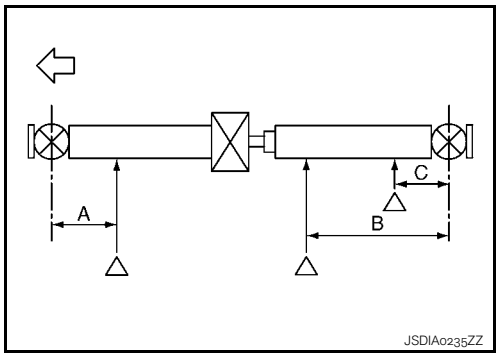
Propeller shaft runout **: Refer to DLN-113, "Propeller Shaft Runout".**

2. If runout still exceeds specifications, separate propeller shaft at final drive companion flange or transfer companion flange; then rotate companion flange 90, 180, 270 degrees and install propeller shaft.
3. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
4. Check the vibration by driving vehicle.

RUNOUT MEASURING POINT

Propeller shaft runout measuring point (Point "△").

⇦ : Vehicle front



Dimension

A: 200 mm (7.87 in)
B: 639 mm (25.16 in)
C: 159 mm (6.26 in)

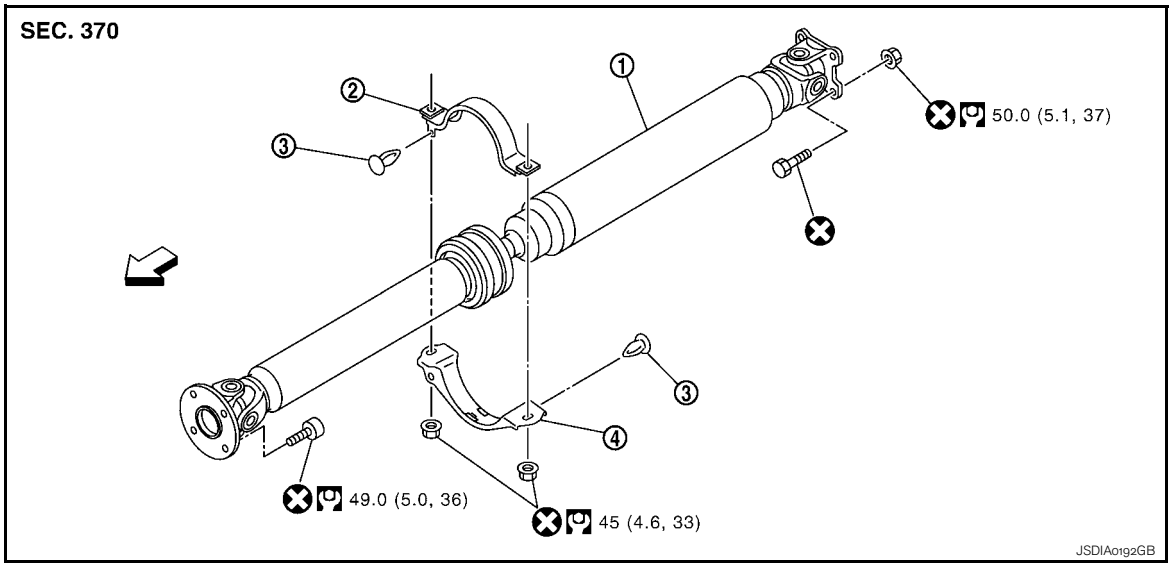
cardiagn.com

ON-VEHICLE REPAIR

REAR PROPELLER SHAFT

Exploded View

INFOID:0000000000972153



1. Propeller shaft assembly
2. Center bearing mounting bracket (upper)
3. Clip
4. Center bearing mounting bracket (lower)

⇦: Vehicle front

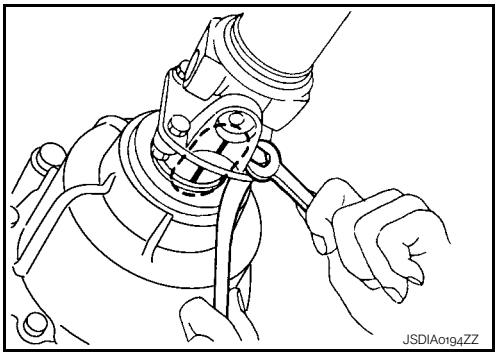
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000972154

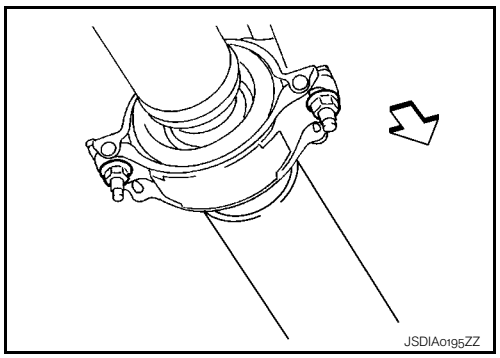
REMOVAL

1. Shift the transaxle to the neutral position, and then release the parking brake.
2. Remove the main muffler and the exhaust front tube. Refer to EX-10, "Exploded View".
3. Put matching marks onto propeller shaft flange yoke and final drive and transfer companion flanges.
   CAUTION:
   For matching marks, use paint. Never damage propeller shaft flange yoke and transfer companion flange.



cardiagn.com

4. Loosen mounting nuts of center bearing mounting brackets.



⇦ : Vehicle front

CAUTION:
Tighten mounting nuts temporarily.

5. Remove propeller shaft assembly fixing bolts and nuts.
6. Remove center bearing mounting bracket fixing nuts.
7. Remove propeller shaft assembly.

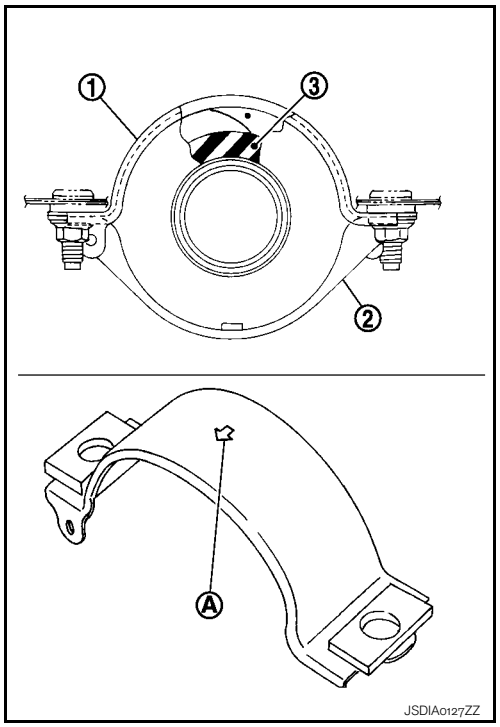
CAUTION:
If constant velocity joint was bent during propeller shaft assembly removal, installation, or transportation, its boot may be damaged. Wrap boot interference area to metal part with shop cloth or rubber to protect boot from breakage.

8. Remove clips and center bearing mounting bracket (upper/lower).

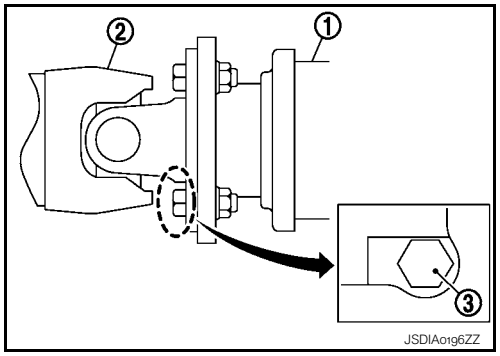
INSTALLATION

Note the following, and install in the reverse order of removal.

- Install center bearing mounting bracket (upper) (1) with its arrow mark (A) facing forward.
- Adjust position of center bearing mounting bracket (1), (2) sliding back and forth to prevent play in thrust direction of center bearing insulator (3). Install center bearing mounting bracket (upper/lower) to vehicle.
- Align matching marks to install propeller shaft assembly to final drive and transfer companion flanges.
- After assembly, perform a driving test to check propeller shaft vibration. If vibration occurred, separate propeller shaft from final drive. Reinstall companion flange after rotating it by 90, 180, 270 degrees. Then perform driving test and check propeller shaft vibration again at each point.



- After tightening the bolts and nuts to the specified torque, make sure that the bolts (3) on the flange side is tightened as shown in the figure.

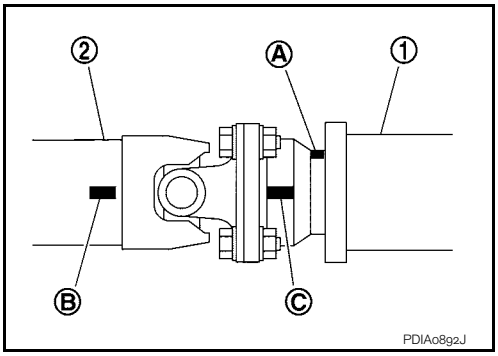


1 : Final drive assembly
2 : Propeller shaft assembly

- If propeller shaft assembly or final drive assembly has been replaced, connect them as follows:

cardiagn.com

- Face the companion flange mark (A) of the final drive (1) upward. With the mark (A) faced upward, couple the propeller shaft and the final drive so that the matching mark (B) of propeller shaft (2) can be positioned as closest as possible with the matching mark (C) of the final drive companion flange.
- Tighten mounting bolts and nuts of propeller shaft and final drive to the specified torque.



Inspection

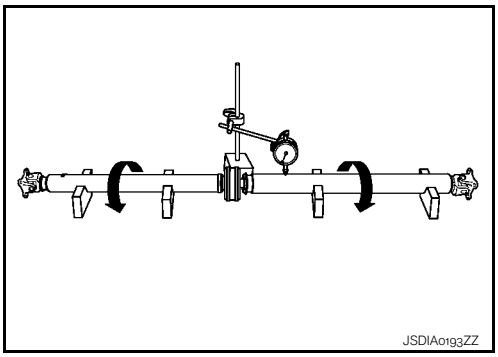
INFOID:0000000000972155

APPEARANCE

Check propeller shaft for bend and damage. If damage is detected, replace propeller shaft assembly.

PROPELLER SHAFT RUNOUT

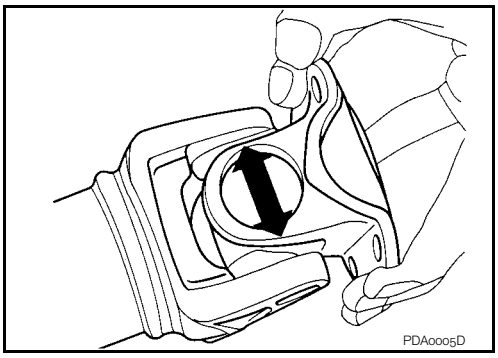
Check propeller shaft runout at measuring points. If runout exceeds specifications, replace propeller shaft assembly. For measuring point, refer to DLN-109, "Inspection".



Limit	
Propeller shaft runout	: Refer to DLN-113, "Propeller Shaft Runout".

JOURNAL AXIAL PLAY

As shown in the figure, while fixing yoke on one side, check axial play of joint. If outside the standard, replace propeller shaft assembly.



Standard	
Journal axial play	: Refer to DLN-113, "Journal Axial Play".

CAUTION:
Never disassemble joints.

CENTER BEARING

Check center bearing for noise and damage. If noise or damage is detected, replace propeller shaft assembly.

CAUTION:
Never disassemble center bearing.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000000972156

Applied model		4WD	
		MR20DE	
		M/T	CVT
Propeller shaft model		3F SPL18-DOJ75	
Number of joints		3	
Type of journal bearings (Non-disassembly type)	1st joint	Shell type	
	2nd joint	Cardan type	
	3rd joint	Shell type	
Coupling method with transfer		Flange type	
Coupling method with rear final drive		Flange type	
Shaft length	1st (Spider to cardan joint center)	1091 mm (42.95 in)	
	2nd (Cardan joint center to spider)	831 mm (32.72 in)	
Shaft outer diameter	1st	57 mm (2.24 in)	
	2nd	70 mm (2.76 in)	

Propeller Shaft Runout

INFOID:0000000000972157

Unit: mm (in)

Item	Limit
Propeller shaft runout	0.6 (0.024)

Journal Axial Play

INFOID:0000000000972158

Unit: mm (in)

Item	Standard
Journal axial play	0 (0)

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000972159

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference		DLN-149, "Inspection After Disassembly"	DLN-146, "Adjustment"	DLN-149, "Inspection After Disassembly"	DLN-146, "Adjustment"	DLN-146, "Adjustment"	DLN-120, "Inspection"	NVH in DLN section	NVH in FAX, RAX, FSU and RSU sections	NVH in WT section	NVH in WT section	NVH in FAX and RAX section	NVH in BR section	NVH in ST section
Possible cause and SUSPECTED PARTS		Gear tooth rough	Gear contact improper	Tooth surfaces worn	Backlash incorrect	Companion flange excessive runout	Gear oil improper	PROPELLER SHAFT	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×

×: Applicable

cardiagn.com

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Rear Final Drive

INFOID:0000000000972160

CAUTION:

- **Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts when applied.**
- **Overhaul should be done in a clean work area, it is preferable to work in dustproof area.**
- **Before disassembly, using steam or white gasoline, completely remove sand and mud from the exterior of the unit, preventing them from entering into the unit during disassembly or assembly.**
- **Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new one if necessary.**
- **Gaskets, seals and O-rings should be replaced any time when the unit is disassembled.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, observe it.**
- **Clean and flush the parts sufficiently and blow-dry them.**
- **Be careful not to damage sliding surfaces and mating surfaces.**
- **When applying sealant, remove the old sealant from the mounting surface; then remove any moisture, oil, and foreign materials from the application and mounting surfaces.**
- **Always use shop paper for cleaning the inside of components.**
- **Avoid using cotton gloves or shop rags to prevent entering of lint.**
- **During assembly, observe the specified tightening torque, and apply new gear oil, petroleum jelly, or multi-purpose grease as specified for each vehicle, if necessary.**

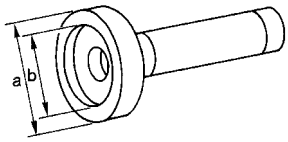
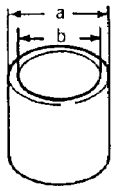
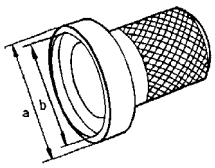
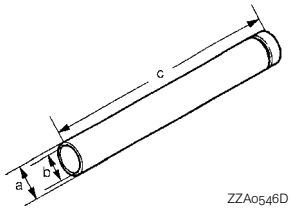
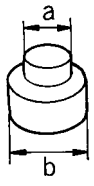
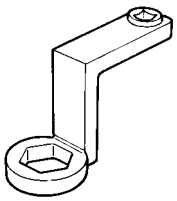
cardiagn.com

PREPARATION

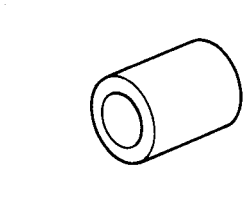
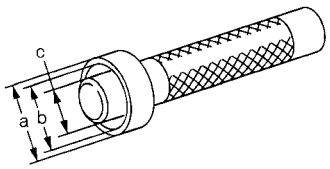
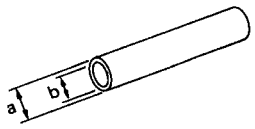
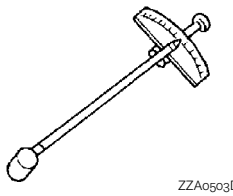
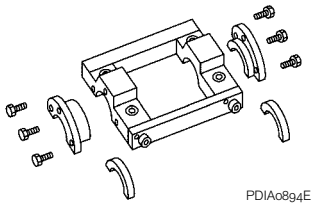
PREPARATION

Special Service Tools

INFOID:0000000000972161

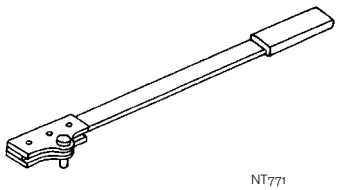
Tool number Tool name	Description
KV38100200 Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.  ZZA1143D	• Installing front oil seal • Installing side oil seal
ST27861000 Drift a: 62 mm (2.44 in) dia. b: 52 mm (2.05 in) dia.  ZZA0832D	Installing front oil seal
ST35271000 Drift a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.  ZZA0814D	Installing center oil seal
ST22360002 Drift a: 29 mm (1.14 in) dia. b: 23 mm (0.91 in) dia. c: 150 mm (5.91 in)  ZZA0546D	Installing coupling front bearing
ST33052000 Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.  ZZA1023D	Removing side bearing inner race
KV38108400 Pinion nut wrench  ZZA1206D	Removing and installing drive pinion nut

cardiagn.com

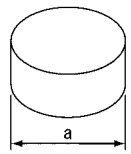
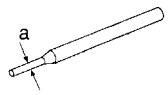
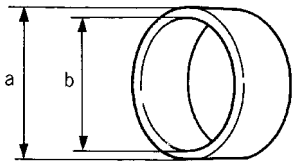
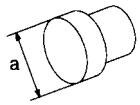
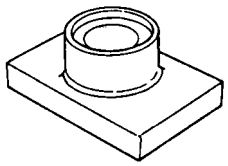
Tool number Tool name	Description
KV38108500 Drive pinion socket  ZZA1205D	• Removing and installing drive pinion nut • Measuring preload torque
ST33230000 Drift a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia.  ZZA1046D	Installing pinion front bearing outer race
ST23860000 Drift a: 38 mm (1.50 in) dia. b: 33 mm (1.30 in) dia.  ZZA0534D	• Installing pinion rear bearing inner race • Installing pinion front bearing inner race
ST3127S000 Preload gauge  ZZA0503D	Measuring preload torque
KV389L0010 Dummy cover set  PDIA0894E	• Checking backlash • Checking drive gear runout • Checking tooth contact

Commercial Service Tools

INFOID:0000000000972162

Tool name	Description
Flange wrench  NT771	Removing and installing companion flange lock nut

cardiagn.com

Drift a: 54.5 mm (2.146 in) dia.  PDIA0893E	Removing and installing gear carrier and rear cover (2 pieces are used)
Pin punch a: 4.5 mm (0.177 in) dia.  NT410	Removing and installing lock pin
Drift a: 39.7 mm (1.563 in) dia. b: 35 mm (1.38 in) dia.  ZZA0936D	Installing side bearing inner race
Drift a: 62 mm (2.44 in) dia.  NT109	Installing pinion front bearing inner race
Stand  ZZA1050D	Installing pinion front bearing inner race

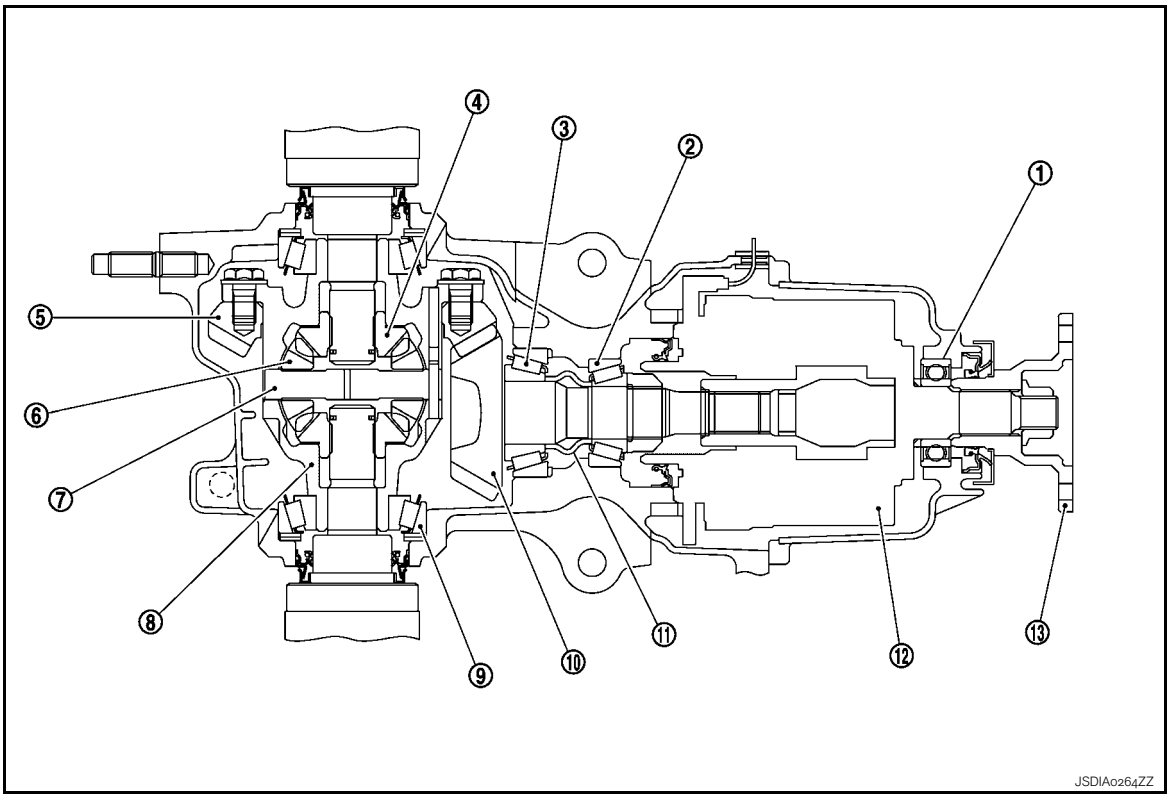
cardiagn.com

FUNCTION DIAGNOSIS

REAR FINAL DRIVE ASSEMBLY

System Diagram

INFOID:0000000000972163



1. Coupling front bearing
2. Pinion front bearing
3. Pinion rear bearing
4. Side gear
5. Drive gear
6. Pinion mate gear
7. Pinion mate shaft
8. Differential case
9. Side bearing
10. Drive pinion
11. Collapsible spacer
12. Electric controlled coupling
13. Companion flange

cardiagn.com

ON-VEHICLE MAINTENANCE

REAR DIFFERENTIAL GEAR OIL

Inspection

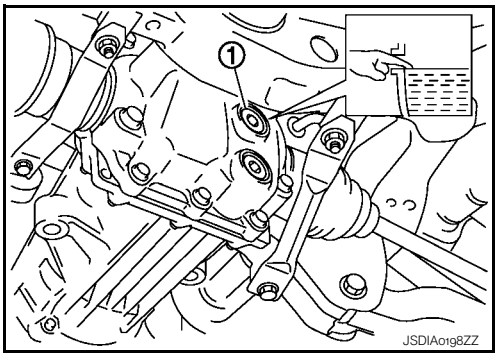
INFOID:0000000000972164

OIL LEAKEGE

Make sure that oil is not leaking from final drive assembly or around it.

OIL LEVEL

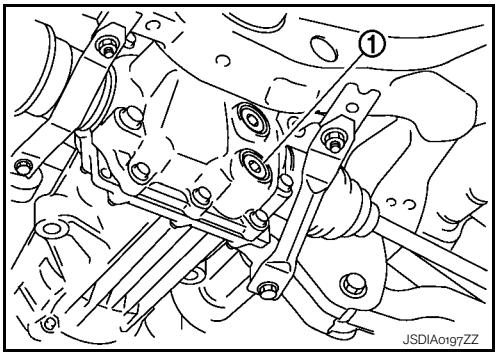
- Remove filler plug (1) and check oil level from filler plug mounting hole as shown in the figure.
  CAUTION:
  Never start engine while checking oil level.
- Set a new gasket on filler plug and install it on final drive assembly. Refer to DLN-130, "Exploded View".
  CAUTION:
  Never reuse gasket.



Draining

INFOID:0000000000972165

1. Stop engine.
2. Remove drain plug (1) and drain gear oil.
3. Set a new gasket on drain plug and install it to final drive assembly and tighten to the specified torque. Refer to DLN-130, "Exploded View".
   CAUTION:
   Never reuse gasket.



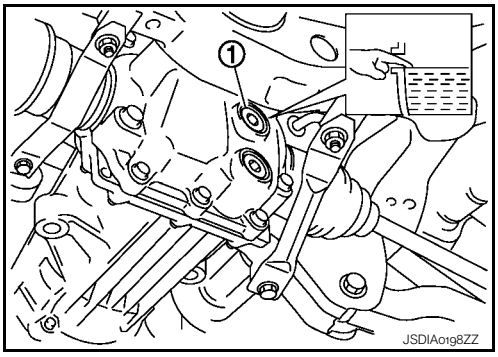
Refilling

INFOID:0000000000972166

1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified level near filler plug mounting hole.

Oil grade and Viscosity	**: Refer to MA-21, "Fluids and Lubricants".**
Oil capacity	**: Refer to DLN-151, "General Specification".**

2. After refilling oil, check oil level. Set a new gasket to filler plug, then install it to final drive assembly. Refer to DLN-130, "Exploded View".
   CAUTION:
   Never reuse gasket.



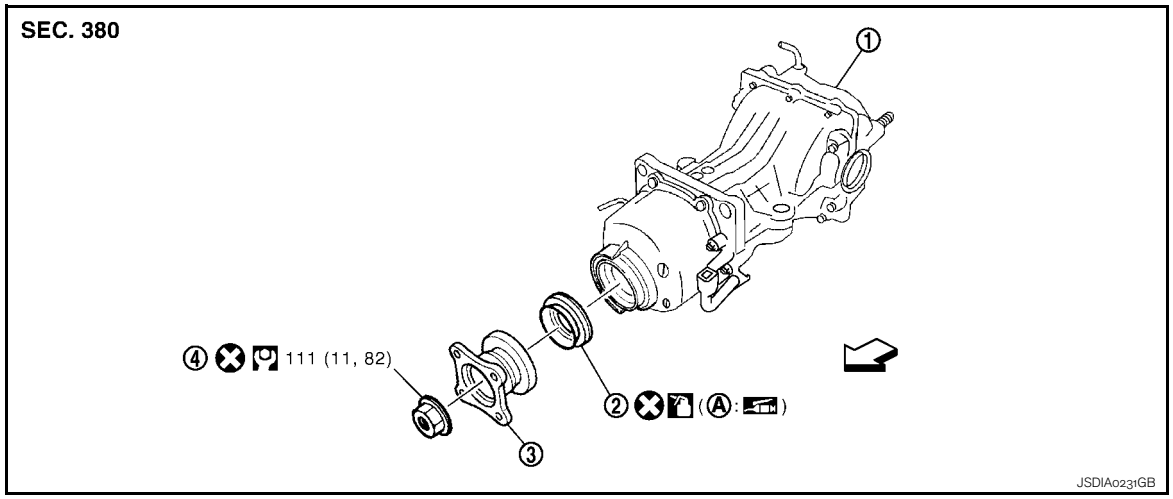
cardiagn.com

ON-VEHICLE REPAIR

FRONT OIL SEAL

Exploded View

INFOID:0000000000972169



1. Final drive assembly
2. Front oil seal
3. Companion flange
4. Companion flange lock nut

A: Oil seal lip

⇦: Vehicle front

: Apply gear oil.

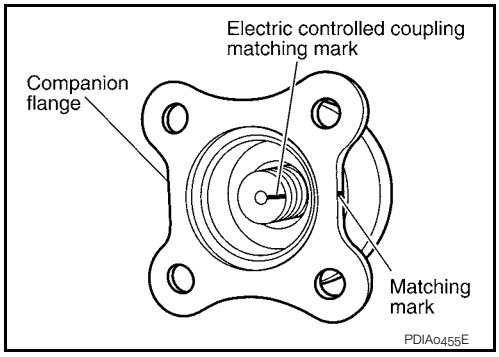
Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000972170

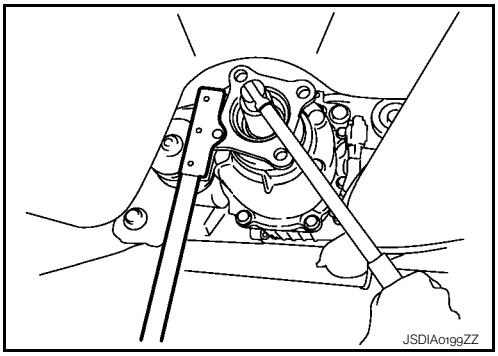
REMOVAL

1. Remove rear propeller shaft. Refer to DLN-110, "Exploded View".
2. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on companion flange.
   CAUTION:
   For matching mark, use paint. Never damage electric controlled coupling.

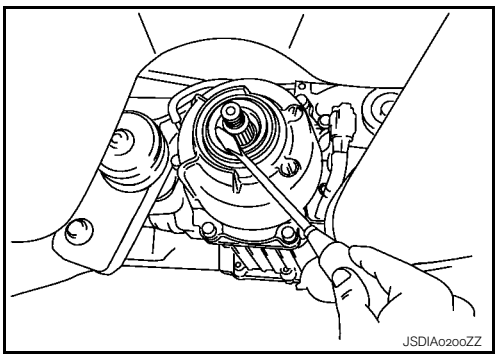


cardiagn.com

3. Remove companion flange lock nut, using a flange wrench (commercial service tool). Then remove companion flange.



4. Remove front oil seal from coupling cover, using a flat-bladed screwdriver.
CAUTION:
Be careful not to damage coupling cover.

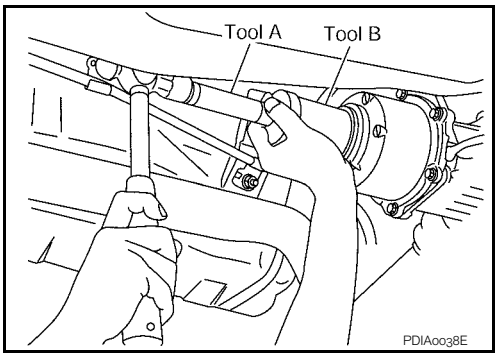


INSTALLATION

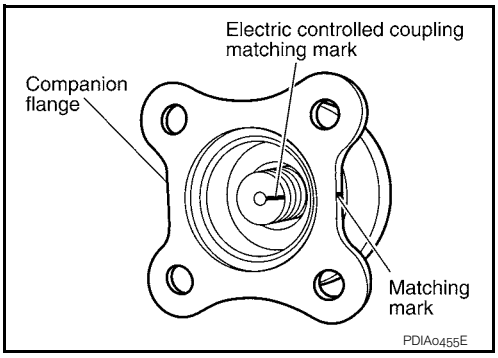
1. Apply multi-purpose grease to front oil seal lips.
2. Install front oil seal until it becomes flush with the coupling cover end, using the drifts.

A : Drift (SST: KV38100200)
B : Drift (SST: ST27861000)

CAUTION:
- **Never reuse oil seal.**
- **When installing, never incline oil seal.**



3. Align the matching mark of electric controlled coupling with the matching mark of companion flange, then install the companion flange.
4. Install companion flange lock nut with a flange wrench (commercial service tool), tighten to the specified torque.
CAUTION:
Never reuse companion flange lock nut.
5. Install rear propeller shaft. Refer to DLN-110, "Exploded View".
6. When oil leaks while removing, check oil level after the installation. Refer to DLN-120, "Inspection".

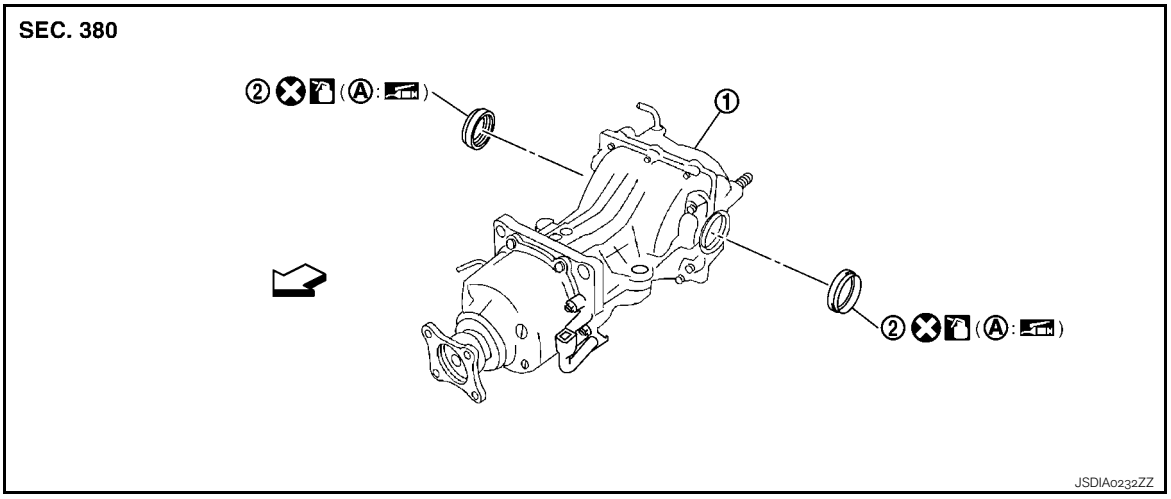


cardiagn.com

SIDE OIL SEAL

Exploded View

INFOID:0000000000972173



1. Final drive assembly
2. Side oil seal

A: Oil seal lip

⇦: Vehicle front

: Apply gear oil.

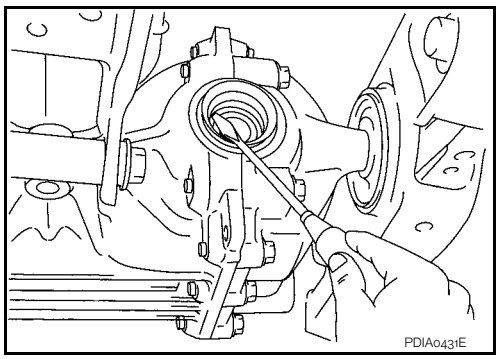
Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000972174

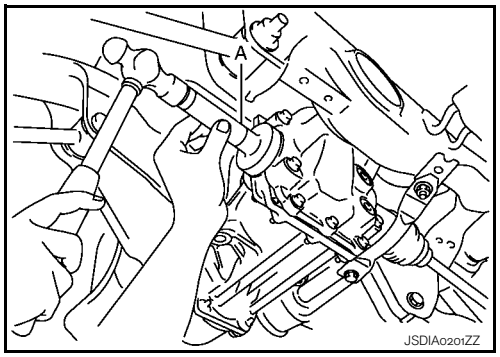
REMOVAL

1. Remove rear drive shafts. Refer to RAX-13, "Exploded View".
2. Remove side oil seals, using a flat-bladed screwdriver.
   CAUTION:
   Be careful not to damage gear carrier and rear cover.



INSTALLATION

1. Apply multi-purpose grease to side oil seal lips.
2. Install side oil seals until it becomes flush with the carrier end, using the drift (A) (SST: KV38100200).
   CAUTION:
   - **Never reuse oil seals.**
   - **When installing, never incline oil seals.**
3. Install rear drive shafts. Refer to RAX-13, "Exploded View".
4. When oil leaks while removing, check oil level after the installation. Refer to DLN-120, "Inspection".

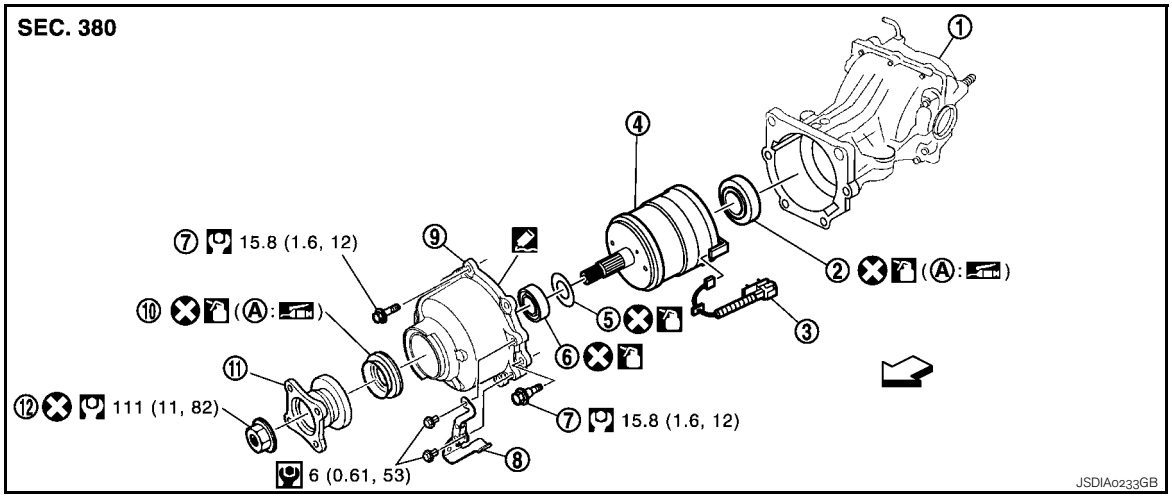


cardiagn.com

ELECTRIC CONTROLLED COUPLING

Exploded View

INFOID:0000000001077013



1. Final drive assembly
2. Center oil seal
3. 4WD solenoid harness
4. Electric controlled coupling
5. Bearing shim
6. Coupling front bearing
7. Reamer bolt
8. Connector bracket
9. Coupling cover
10. Front oil seal
11. Companion flange
12. Companion flange lock nut

A: Oil seal lip

: Vehicle front

: Apply gear oil.

: Apply Genuine Liquid Gasket, Three Bond TB1217 or equivalent.

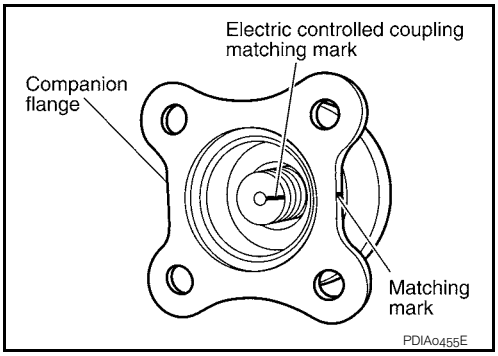
Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001077014

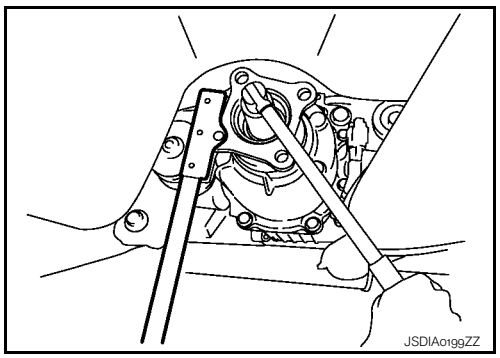
REMOVAL

1. Remove rear propeller shaft. Refer to DLN-110, "Exploded View".
2. Disconnect 4WD solenoid harness connector.
3. Remove connector bracket.
4. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on the companion flange.
   CAUTION:
   For matching mark, use paint. Never damage electric controlled coupling.
   NOTE:
   When replacing electric controlled coupling, matching mark is not necessary.

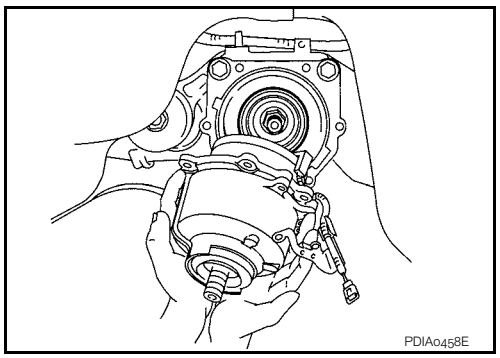


cardiagn.com

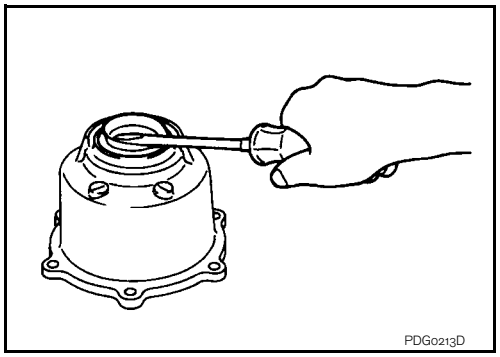
5. Remove companion flange lock nut, using a flange wrench (commercial service tool).
6. Remove companion flange.
7. Remove electric controlled coupling breather hose from coupling cover.



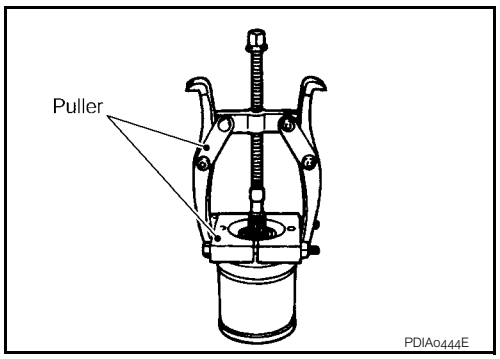
8. Remove coupling cover with electric controlled coupling from final drive assembly.
9. Remove electric controlled coupling from coupling cover.
10. Remove 4WD solenoid harness.



11. Remove front oil seal from coupling cover, using a flat-bladed screwdriver.
CAUTION:
Be careful not to damage coupling cover.



12. Remove coupling front bearing, using pullers and then take off bearing shim from electric controlled coupling.
13. Remove center oil seal from final drive assembly.



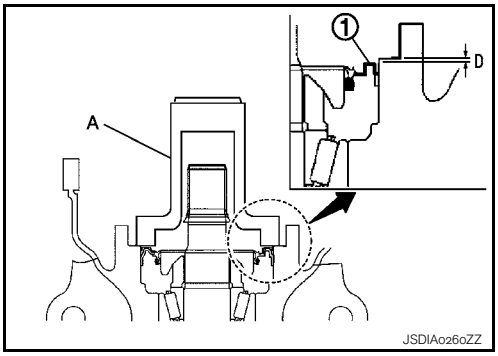
INSTALLATION

cardiagn.com

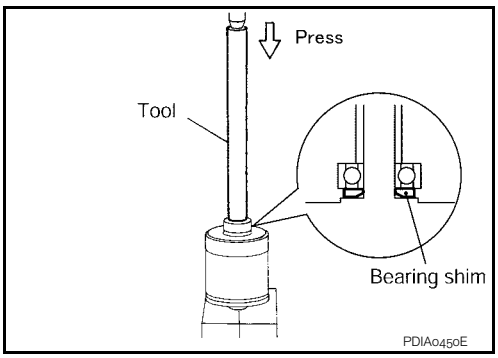
1. Using the drift (A) (SST: ST35271000), install center oil seal (1) as shown in the figure.

   Dimension "D" : 0.8 – 1.2 mm (0.031 – 0.047 in)

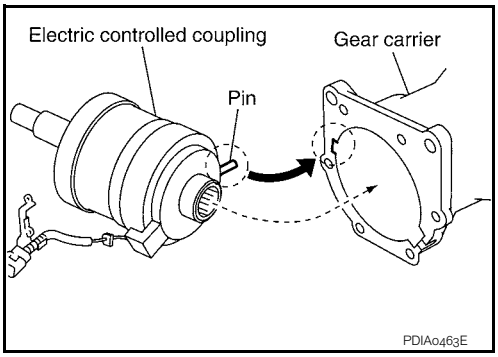
   CAUTION:
   - **Never reuse oil seal.**
   - **When installing, never incline oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



2. Install bearing shim and coupling front bearing to electric controlled coupling, using the drift (SST: 22360002).
   CAUTION:
   - **Never reuse bearing shim and coupling front bearing.**
   - **When assembling bearing shim, shim chamfer side should face electric controlled coupling side.**
   - **Apply gear oil to coupling front bearing and bearing shim.**
3. Connect 4WD solenoid harness to electric controlled coupling.



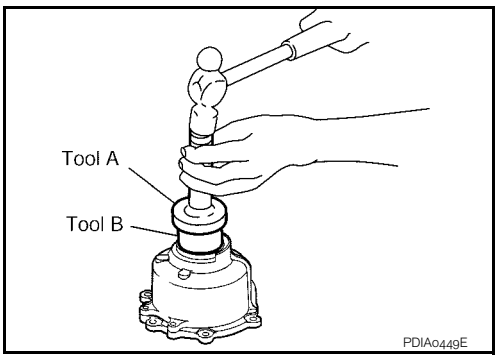
4. Install electric controlled coupling to spline of drive pinion inside gear carrier.
   CAUTION:
   - **Align the pin on electric controlled coupling with the groove of gear carrier.**
   - **Be careful not to damage center oil seal.**
5. Set 4WD solenoid harness guide to gear carrier.



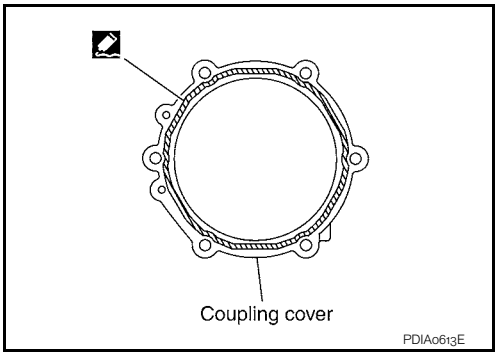
6. Using the drifts, drive front oil seal until it becomes flush with the coupling cover end.

   A : Drift (SST: KV38100200)
   B : Drift (SST: ST27861000)

   CAUTION:
   - **Never reuse oil seal.**
   - **When installing, never incline oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**

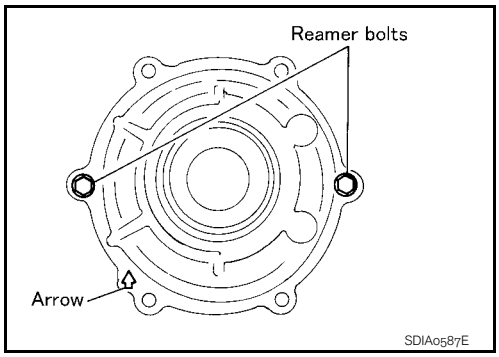


7. Apply liquid gasket to mating surface of coupling cover. Overlap both ends of the bead for at least 3 mm (0.12 in).
   CAUTION:
   Remove old gasket adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.

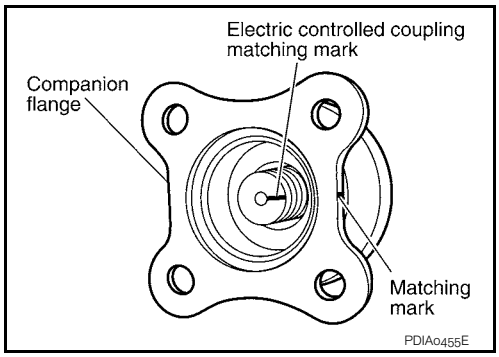


cardiagn.com

8. Install coupling cover to final drive assembly with arrow facing upward, temporarily tighten reamer bolts to the positions shown in the figure.
9. Tighten reamer bolts and coupling cover mounting bolts to the specified torque.
10. Install electric controlled coupling breather hose to coupling cover.
11. Install connector bracket, and tighten bolts to the specified torque.
12. Connect 4WD solenoid harness connector.



13. Install companion flange.
NOTE:
When reusing electric controlled coupling, align the matching mark of electric controlled coupling with the matching mark of companion flange, then install companion flange.
14. Install companion flange lock nut with flange wrench (commercial service tool), tighten to the specified torque.
CAUTION:
Never reuse companion flange lock nut.
15. Check companion flange runout. Refer to DLN-133, "Adjustment".
16. Install rear propeller shaft. Refer to DLN-110, "Exploded View".
17. When oil leaks while removing, check oil level after the installation. Refer to DLN-120, "Inspection".



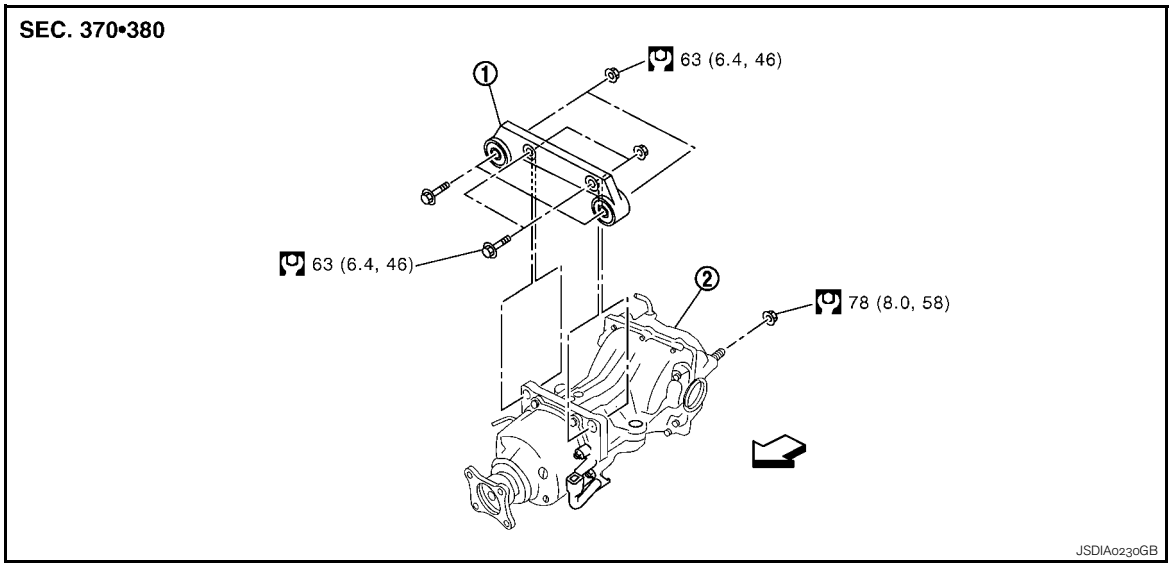
cardiagn.com

REMOVAL AND INSTALLATION

REAR FINAL DRIVE ASSEMBLY

Exploded View

INFOID:0000000000972177



1. Final drive mounting bracket
2. Final drive assembly

⇦: Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000972178

REMOVAL

1. Remove rear propeller shaft. Refer to DLN-110, "Exploded View".
2. Remove rear drive shafts. Refer to RAX-13, "Exploded View".
3. Disconnect 4WD solenoid harness connector.
4. Remove rear final drive breather hose and electric controlled coupling breather hose.
5. Support final drive assembly with a suitable jack.
6. Remove final drive mounting nuts and final drive mounting bolts.
   If necessary, remove final drive mounting bracket.
   CAUTION:
   Secure final drive assembly to a suitable jack while removing it.

INSTALLATION

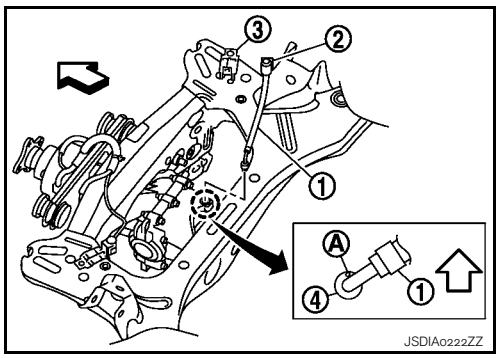
Note the following, and install in the reverse order of removal.

- When installing each breather hoses, refer to the figure and following.
  CAUTION:
  Make sure there are no pinched or restricted areas on the breather hose caused by bending or winding when installing it.

cardiagn.com

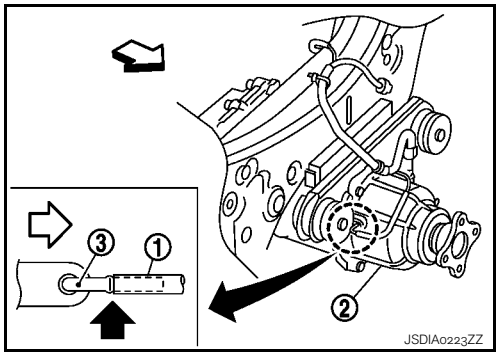
- Install rear final drive breather hose (1) to breather connector (2). Install bracket (3) to the breather connector. Check that the paint mark (A) of metal connector (4) faces forward of the vehicle as shown by the arrow.

⇦ : Vehicle front



- Install electric controlled coupling breather hose (1) to metal tube all way to the point shown by the solid arrow. Check that the coupling cover (2) of metal tube (3) faces forward of the vehicle as shown by the outline arrow (⬅).

⇦ : Vehicle front



- When oil leaks while removing final drive assembly, check oil level after the installation. Refer to DLN-120, "Inspection".

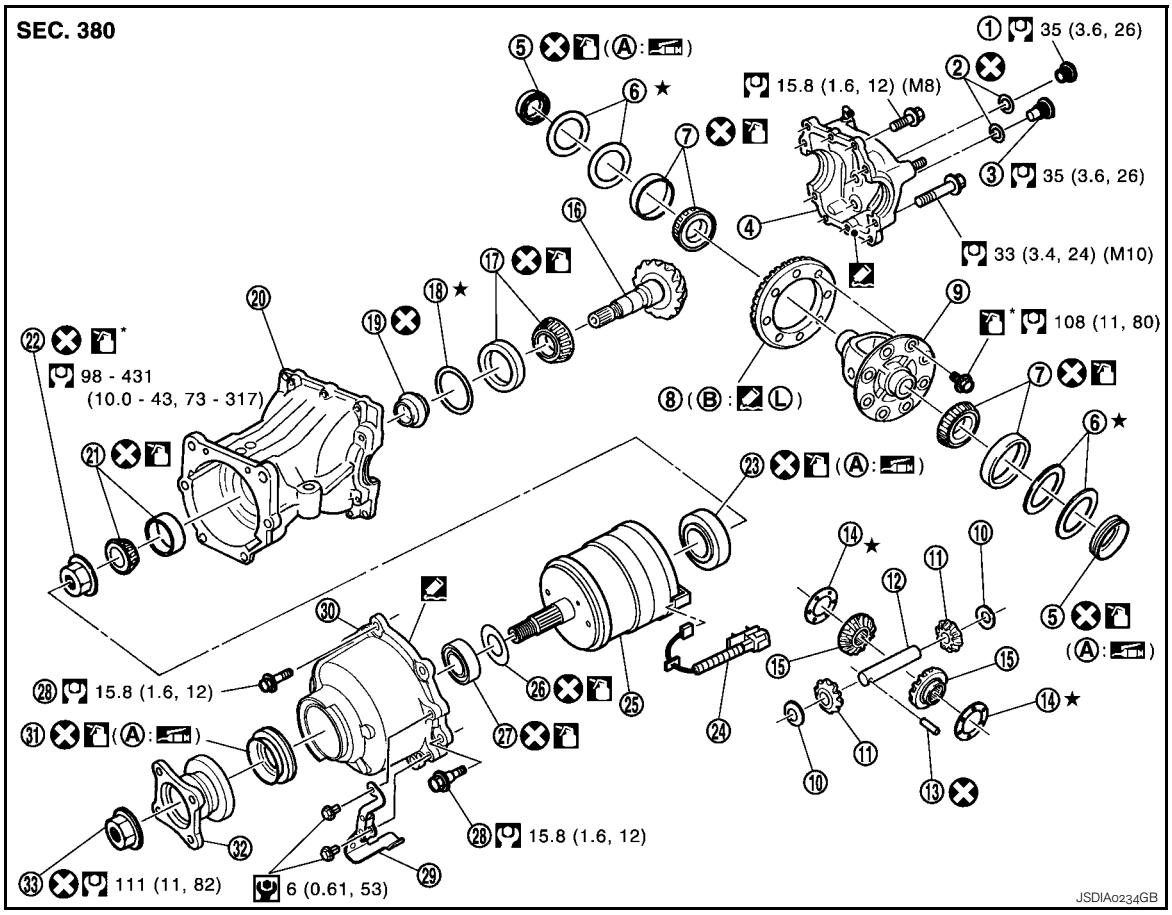
cardiagn.com

DISASSEMBLY AND ASSEMBLY

ELECTRIC CONTROLLED COUPLING

Exploded View

INFOID:0000000001076996



1. Filler plug
2. Gasket
3. Drain plug
4. Rear cover
5. Side oil seal
6. Side bearing adjusting shim
7. Side bearing
8. Drive gear
9. Differential case
10. Pinion mate thrust washer
11. Pinion mate gear
12. Pinion mate shaft
13. Lock pin
14. Side gear thrust washer
15. Side gear
16. Drive pinion
17. Pinion rear bearing
18. Drive pinion adjusting shim
19. Collapsible spacer
20. Gear carrier
21. Pinion front bearing
22. Drive pinion nut
23. Center oil seal
24. 4WD solenoid harness
25. Electric controlled coupling
26. Bearing shim
27. Coupling front bearing
28. Reamer bolt
29. Connector bracket
30. Coupling cover
31. Front oil seal
32. Companion flange
33. Companion flange lock nut

A: Oil seal lip

B: Screw hole

: Apply gear oil.

*: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond TB1217 or equivalent.

L: Apply Genuine Medium Strength Thread Locking Sealant, Three Bond TB1322B or equivalent.

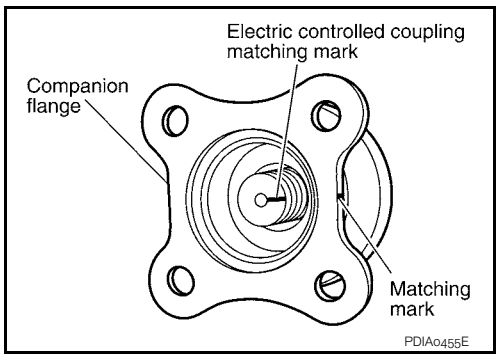
Refer to GI-4, "Components" for symbols not described on the above.

cardiagn.com

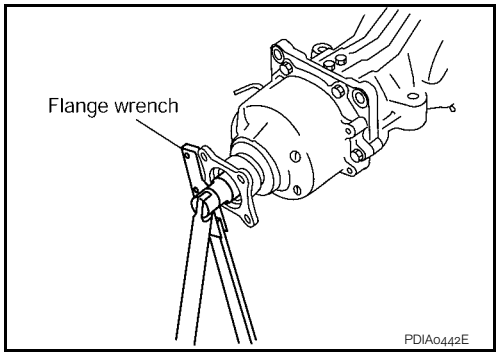
Disassembly

INFOID:0000000001076997

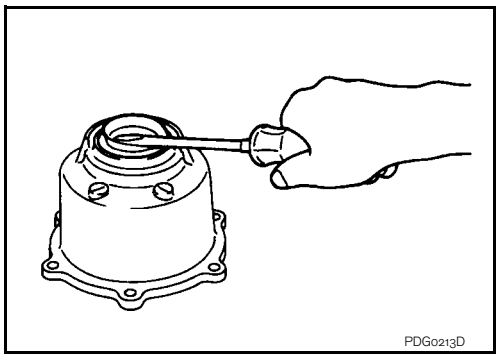
1. Remove connector bracket.
2. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on companion flange.
   CAUTION:
   For matching mark, use paint. Never damage electric controlled coupling.
   NOTE:
   When replacing electric controlled coupling, matching mark is not necessary.



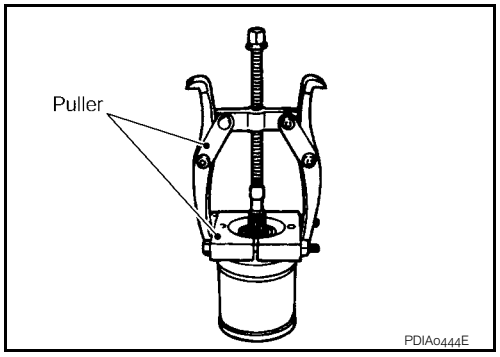
3. Remove companion flange lock nut, using a flange wrench (commercial service tool).
4. Remove companion flange.
5. Remove coupling cover.



6. Remove front oil seal from coupling cover, using flat-bladed screwdriver.
   CAUTION:
   Be careful not to damage coupling cover.
7. Remove electric controlled coupling.
8. Remove 4WD solenoid harness.



9. Remove coupling front bearing, using pullers and then take off bearing shim from electric controlled coupling.
10. Remove center oil seal from gear carrier.



Assembly

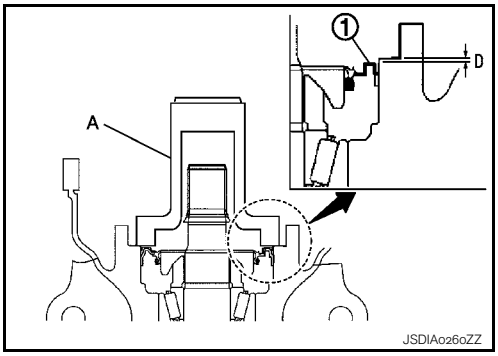
INFOID:0000000001076998

cardiagn.com

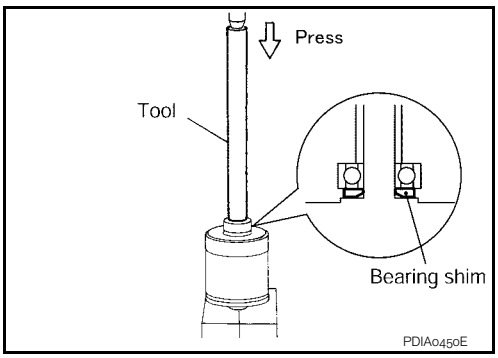
1. Using the drift (A) (SST: ST35271000), install center oil seal (1) as shown in the figure.

   Dimension "D" : 0.8 – 1.2 mm (0.031 – 0.047 in)

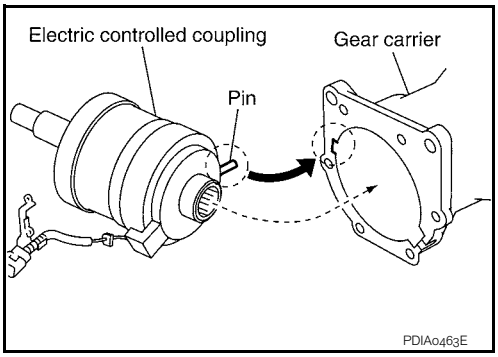
   CAUTION:
   - **Never reuse oil seal.**
   - **When installing, never incline oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



2. Install bearing shim and coupling front bearing to electric controlled coupling, using the drift (SST: 22360002).
   CAUTION:
   - **Never reuse bearing shim and coupling front bearing.**
   - **When assembling bearing shim, shim chamfer side should face electric controlled coupling side.**
   - **Apply gear oil to coupling front bearing and bearing shim.**
3. Connect 4WD solenoid harness to electric controlled coupling.



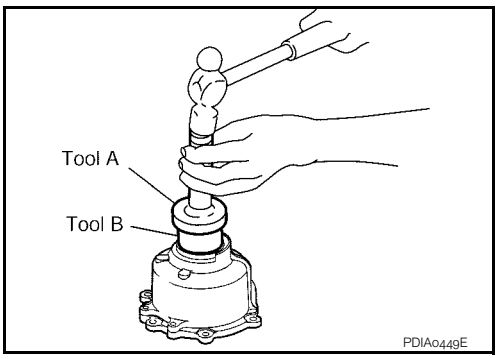
4. Install electric controlled coupling to spline of drive pinion inside gear carrier.
   CAUTION:
   - **Align the pin on electric controlled coupling with the groove of gear carrier.**
   - **Be careful not to damage center oil seal.**
5. Set 4WD solenoid harness guide to gear carrier.



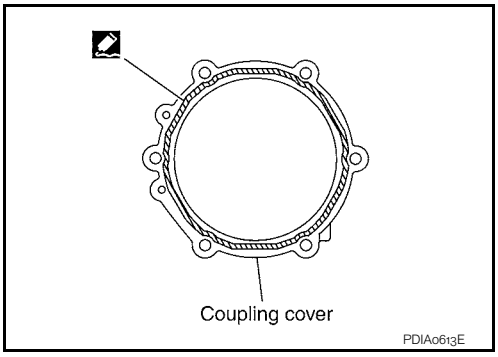
6. Using the drifts, drive front oil seal until it becomes flush with the coupling cover end.

   A : Drift (SST: KV38100200)
   B : Drift (SST: ST27861000)

   CAUTION:
   - **Never reuse oil seal.**
   - **When installing, never incline oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**

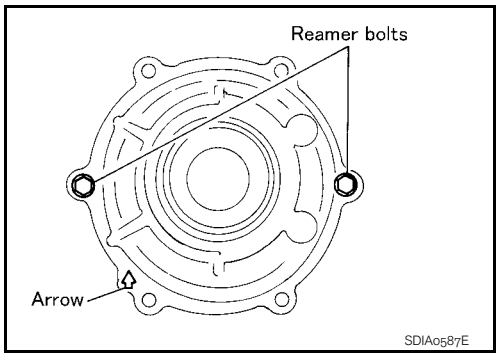


7. Apply liquid gasket to mating surface of coupling cover. Overlap both ends of the bead for at least 3 mm (0.12 in).
   CAUTION:
   Remove old gasket adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.

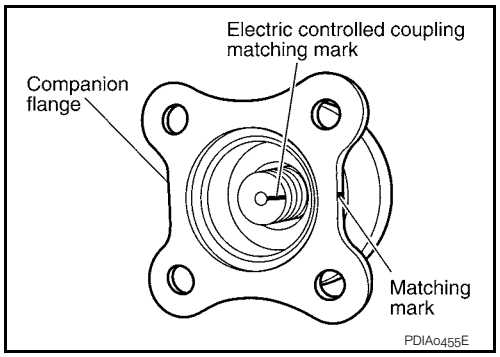


cardiagn.com

8. Install coupling cover to gear carrier with arrow facing upward, temporarily tighten reamer bolts to the positions shown in the figure.
9. Tighten reamer bolts and coupling cover mounting bolts to the specified torque.
10. Install connector bracket, and tighten bolts to the specified torque.



11. Install companion flange.
NOTE:
When reusing electric controlled coupling, align the matching mark of electric controlled coupling with the matching mark of companion flange, then install companion flange.
12. Install companion flange lock nut with flange wrench (commercial service tool), tighten to the specified torque.
CAUTION:
Never reuse companion flange lock nut.
13. Check companion flange runout. Refer to DLN-133, "Adjustment".



Adjustment

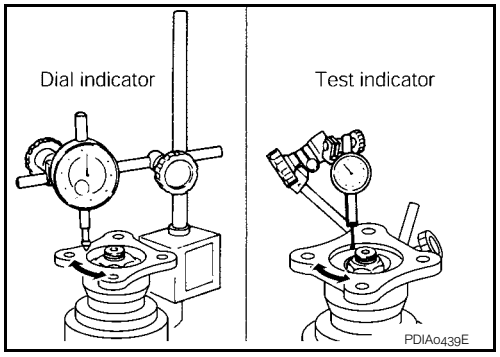
INFOID:0000000000972187

COMPANION FLANGE RUNOUT

1. Fit a dial indicator onto the companion flange face (inner side of the rear propeller shaft mounting bolt holes).
2. Rotate companion flange to check for runout.

Limit

Companion flange runout : Refer to DLN-151, "Companion Flange Runout".



3. Fit a test indicator to the inner side of companion flange (socket diameter).
4. Rotate companion flange to check for runout.

Limit

Companion flange runout : Refer to DLN-151, "Companion Flange Runout".

5. If the runout value is outside the runout limit, follow the procedure below to adjust.

a. Check for runout while changing the phase between companion flange and drive pinion by 90° step, and search for the position where the runout is the minimum.
b. If the runout value is still outside of the limit after the phase has been changed, replace companion flange.
c. If the runout value is still outside of the limit after companion flange has been replaced, possible cause will be an assembly malfunction of drive pinion and electric controlled coupling, malfunctioning coupling bearing, or malfunctioning of electric controlled coupling.

Inspection After Disassembly

INFOID:0000000001077000

Clean up the disassembled parts. Then, inspect if the parts are worn or damaged. If so, follow the measures below.

cardiagn.com

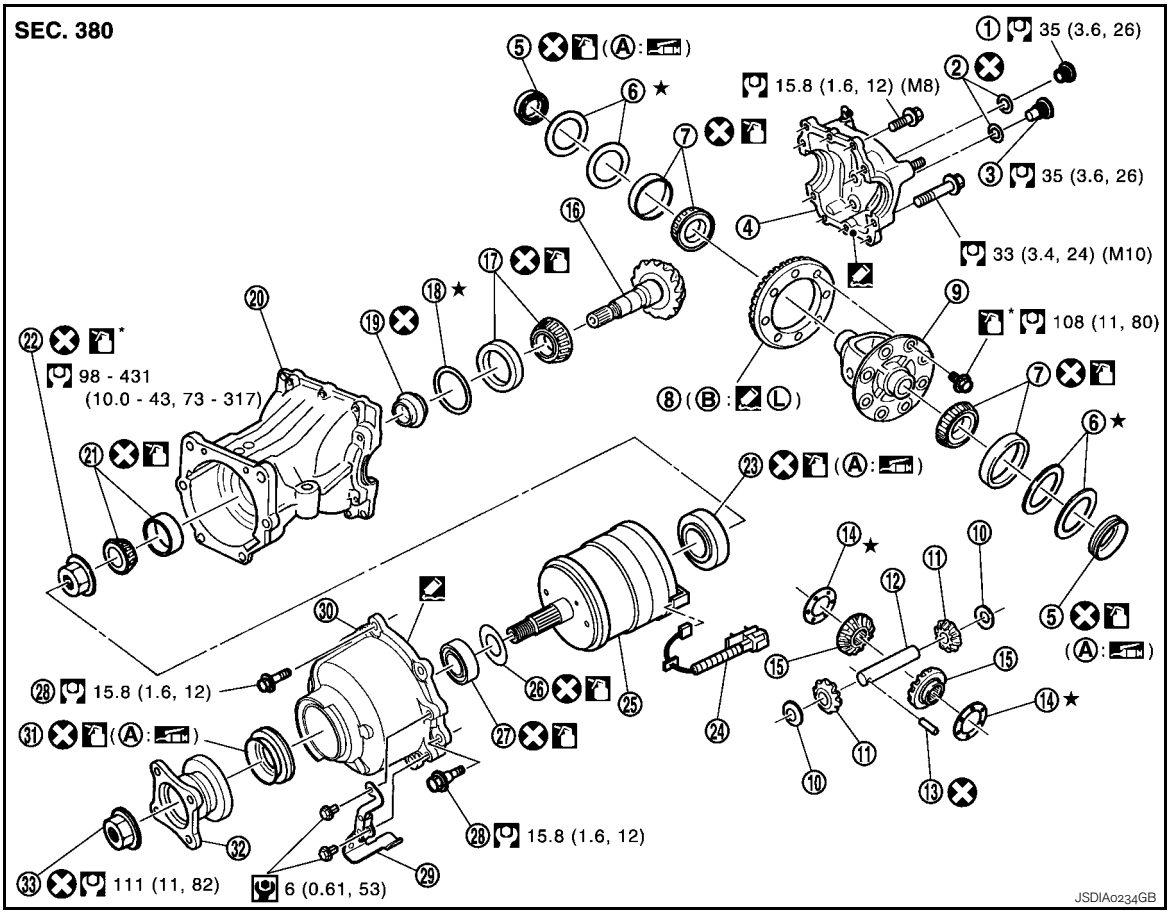
Content	Conditions and Measures
Hypoid gear	• If the gear teeth do not mesh or line-up correctly, determine the cause and adjust or replace as necessary. • If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive gear and drive pinion as a set.
Bearing	If any chipped (by friction), pitted, worn, rusted or scratched mark, or unusual noise from the bearing is observed, replace as a bearing assembly (as a new set).
Side gear and Pinion mate gear	• If any cracks or damage on the surface of the tooth is found, replace. • If any worn or chipped mark on the contact sides of the thrust washer is found, replace.
Side gear thrust washer and pinion mate thrust washer	If it is chipped (by friction), damaged, or unusually worn, replace.
Differential case	If any wear or crack on the contact sides of the differential case is found, replace.
Companion flange	If any chipped mark (about 0.1 mm, 0.004 in) or other damage on the contact sides of the lips of the companion flange is found, replace.

cardiagn.com

DIFFERENTIAL ASSEMBLY

Exploded View

INFOID:0000000001077004



1. Filler plug
2. Gasket
3. Drain plug
4. Rear cover
5. Side oil seal
6. Side bearing adjusting shim
7. Side bearing
8. Drive gear
9. Differential case
10. Pinion mate thrust washer
11. Pinion mate gear
12. Pinion mate shaft
13. Lock pin
14. Side gear thrust washer
15. Side gear
16. Drive pinion
17. Pinion rear bearing
18. Drive pinion adjusting shim
19. Collapsible spacer
20. Gear carrier
21. Pinion front bearing
22. Drive pinion nut
23. Center oil seal
24. 4WD solenoid harness
25. Electric controlled coupling
26. Bearing shim
27. Coupling front bearing
28. Reamer bolt
29. Connector bracket
30. Coupling cover
31. Front oil seal
32. Companion flange
33. Companion flange lock nut

A: Oil seal lip

B: Screw hole

: Apply gear oil.

*: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond TB1217 or equivalent.

L: Apply Genuine Medium Strength Thread Locking Sealant, Three Bond TB1322B or equivalent.

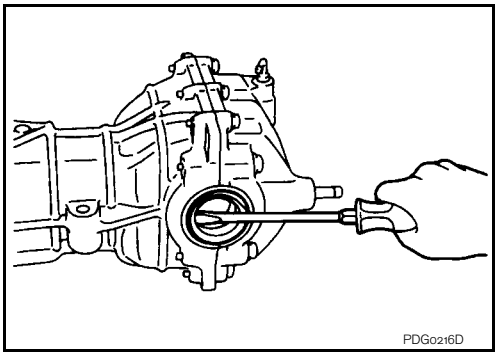
Refer to GI-4, "Components" for symbols not described on the above.

Disassembly

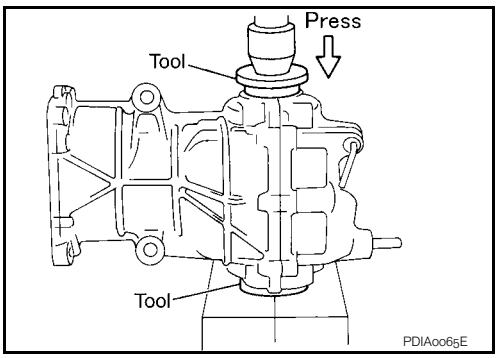
INFOID:0000000000972185

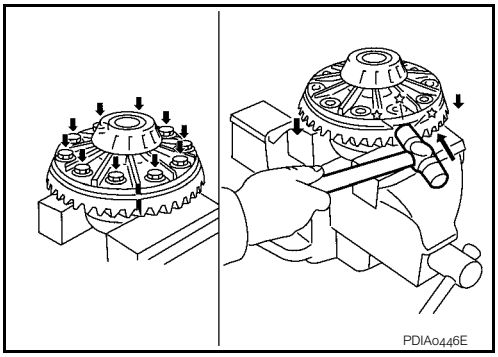
cardiagn.com

1. Remove side oil seals, using flat-bladed screwdriver.
   CAUTION:
   Be careful not to damage gear carrier and rear cover.
2. Remove rear cover mounting bolts.

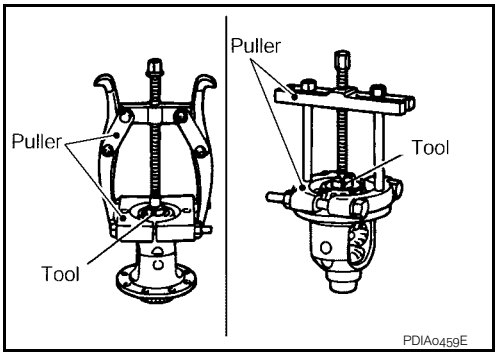


3. Set drifts (commercial service tool) to the right and left side bearing adjusting shims individually. Press differential case assembly with side bearing to remove gear carrier assembly and rear cover assembly.
   CAUTION:
   The pressure shall be as low as possible to remove gear carrier assembly and rear cover assembly. The maximum pressure shall be 10 kN (1 ton, 1.0 Imp ton).
   NOTE:
   Differential case assembly, side bearings, and adjusting shims are compressed and integrated in gear carrier and rear cover.
4. Remove drain plug and filler plug.
5. Remove side bearing adjusting shims and side bearing outer races.
   CAUTION:
   Mark the side bearing adjusting shims so that the original mounting positions (right/left) can be identified later.
6. Remove drive gear mounting bolts and then remove drive gear from differential case.



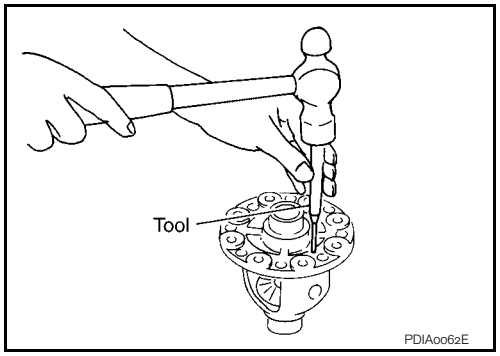


7. Remove side bearing inner races, using pullers and the drift (SST: ST33052000).

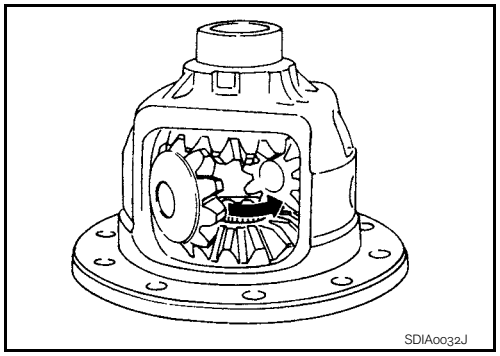


cardiagn.com

8. Pull the lock pin out of pinion mate shaft, using the pin punch (commercial service tool).



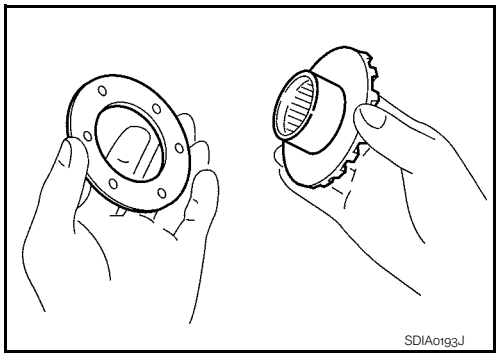
9. Remove pinion mate shaft, pinion mate gears, pinion mate thrust washers, side gears, side gear thrust washers from differential case.



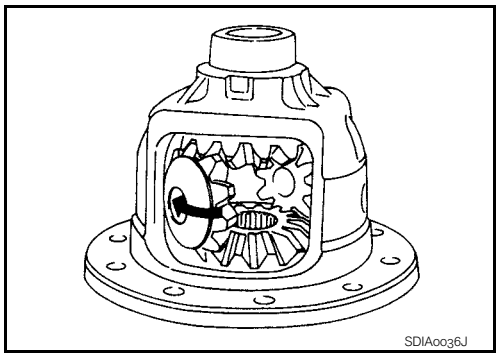
Assembly

INFOID:0000000000972186

1. Install side gear thrust washers with the same thickness as the ones installed prior to disassembly or reinstall the old ones on the side gears.
2. Install side gears and side gear thrust washers into differential case.

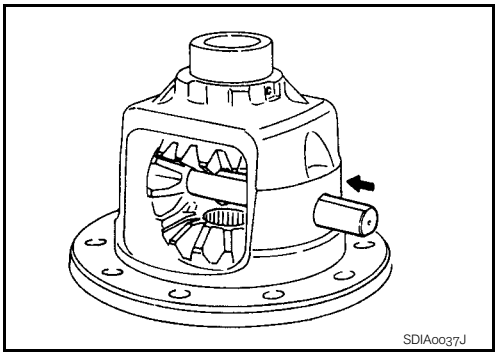


3. Align 2 pinion mate gears in diagonally opposite positions, then rotate and install them into differential case after installing pinion mate thrust washer to pinion mate gear.



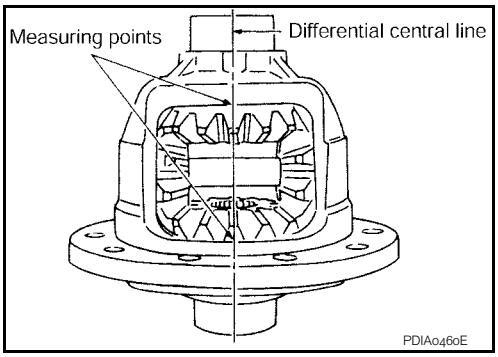
cardiagn.com

4. Align the lock pin holes on differential case with shaft, and install pinion mate shaft.



5. Measure side gear end play following the procedure below, and select the appropriate side gear thrust washers.

a. Place differential case straight up so that side gear to be measured comes upward.

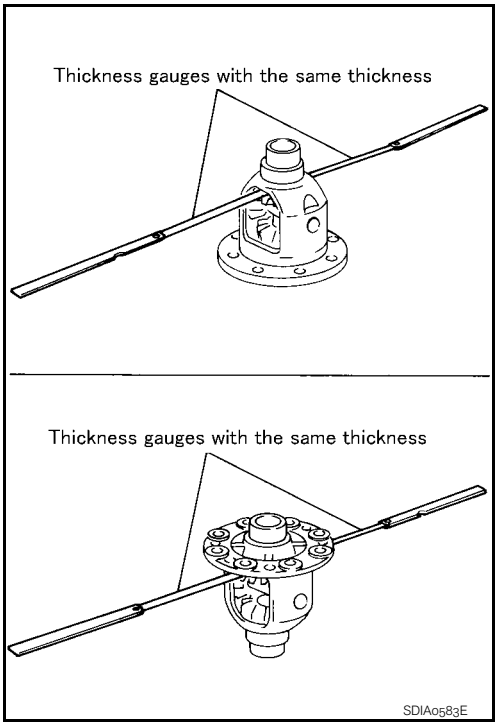


b. Using thickness gauges, measure the clearance between side gear back and differential case at 3 different positions, while rotating side gear. Average the 3 readings, and then measure the clearance. (Measure the clearance of the other side as well.)

Standard

Side gear back clearance **: Refer to DLN-151, "Differential Side Gear Clearance".**

CAUTION:
To prevent side gear from tilting, insert thickness gauges with the same thickness from both sides.



c. If the back clearance is outside the specification, use a thicker/thinner side gear thrust washer to adjust.

When the back clearance is large:

Use a thicker thrust washer.

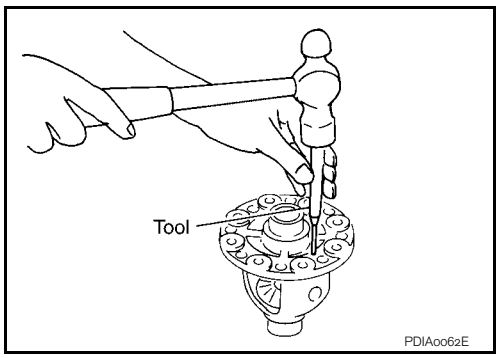
When the back clearance is small:

Use a thinner thrust washer.

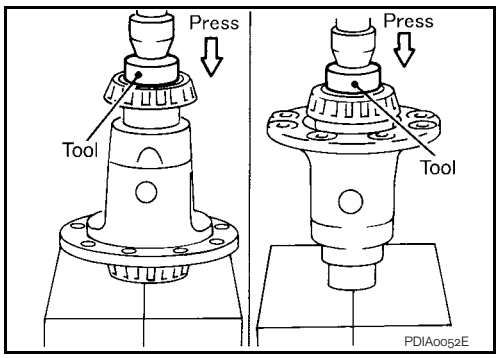
CAUTION:
Select a side gear thrust washer for right and left individually.

cardiagn.com

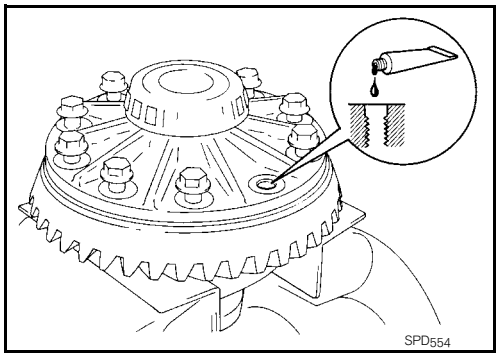
6. Drive a lock pin into pinion mate shaft, using the pin punch (commercial service tool).
CAUTION:
Never reuse lock pin.



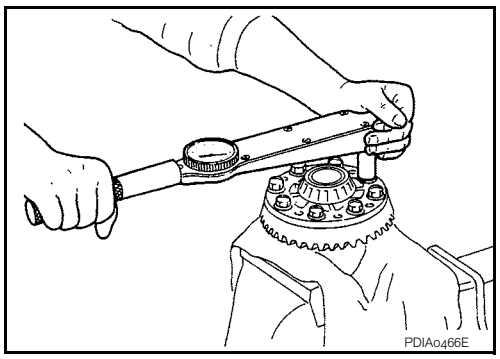
7. Press side bearing inner races to differential case, using the drift (commercial service tool).
CAUTION:
Never reuse side bearing inner races.



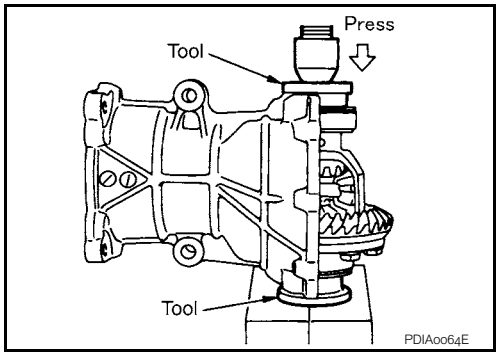
8. Apply locking sealant into the thread hole of drive gear.
CAUTION:
The drive gear back and threaded holes shall be cleaned and decreased sufficiently.



9. Install drive gear to the differential case, and apply anti-corrosive oil onto threads and seats on the mounting bolts, and then tighten to the specified torque.
10. Apply gear oil to side bearings, and install new side bearing adjusting shims (2 pieces for one side) with the same thickness as the ones installed prior to disassembly or re-install the old ones, with side bearing outer race to differential case.
If side bearing adjusting shims have been already selected, use them.
CAUTION:
Never reuse side bearing outer race.

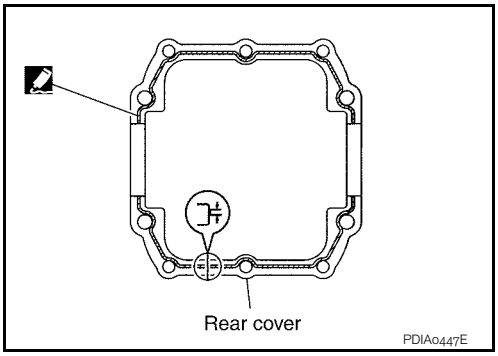


11. Set the drifts (commercial service tool) to the right and left side bearing adjusting shims individually. Compress differential case assembly and side bearing to install gear carrier assembly to differential case assembly.
CAUTION:
- **The drift shall be placed on the center of the adjusting shims.**
- **The pressure shall be as low as possible to install differential assembly into gear carrier assembly. The maximum pressure shall be 10 kN (1 ton, 1.0 Imp ton).**
- **If the adjusting shims are installed by tapping, the gear carrier may be damaged. Avoid tapping.**

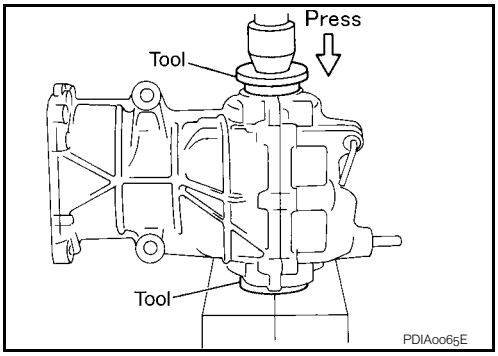


cardiagn.com

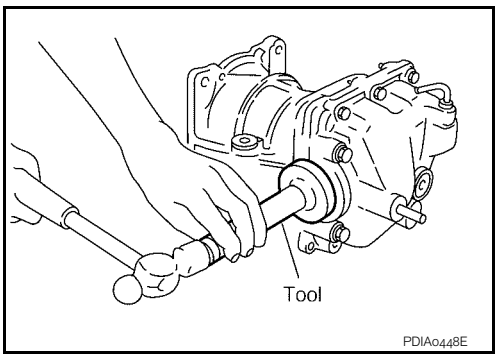
12. Install dummy cover set, check and adjust drive gear runout, tooth contact, backlash, and total preload torque. Refer to DLN-146, "Adjustment".
13. Remove dummy cover set.
14. Apply liquid gasket to mating surface of rear cover. Overlap both ends of the bead for at least 3 mm (0.12 in).
    CAUTION:
    Remove old gasket adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.



15. Set the drifts (commercial service tool) to the right and left side bearing adjusting shims individually. Compress differential case assembly and side bearing to install rear cover.
    CAUTION:
    - **The drift shall be placed on the center of the adjusting shims.**
    - **The pressure shall be as low as possible to install the rear cover. The maximum pressure shall be 10 kN (1 ton, 1.0 lmp ton).**
    - **If rear cover is forced in by tapping, rear cover may be damaged by adjusting shims. Avoid tapping.**



16. Tighten rear cover mounting bolts to the specified torque.
17. Using the drift (SST: KV38100200), drive side oil seals until it becomes flush with the carrier end.
    CAUTION:
    - **Never reuse oil seals.**
    - **When installing, do not incline oil seals.**
    - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**
18. Check total preload torque. Refer to DLN-146, "Adjustment".



Inspection After Disassembly

INFOID:0000000001078623

Clean up the disassembled parts. Then, inspect if the parts are worn or damaged. If so, follow the measures below.

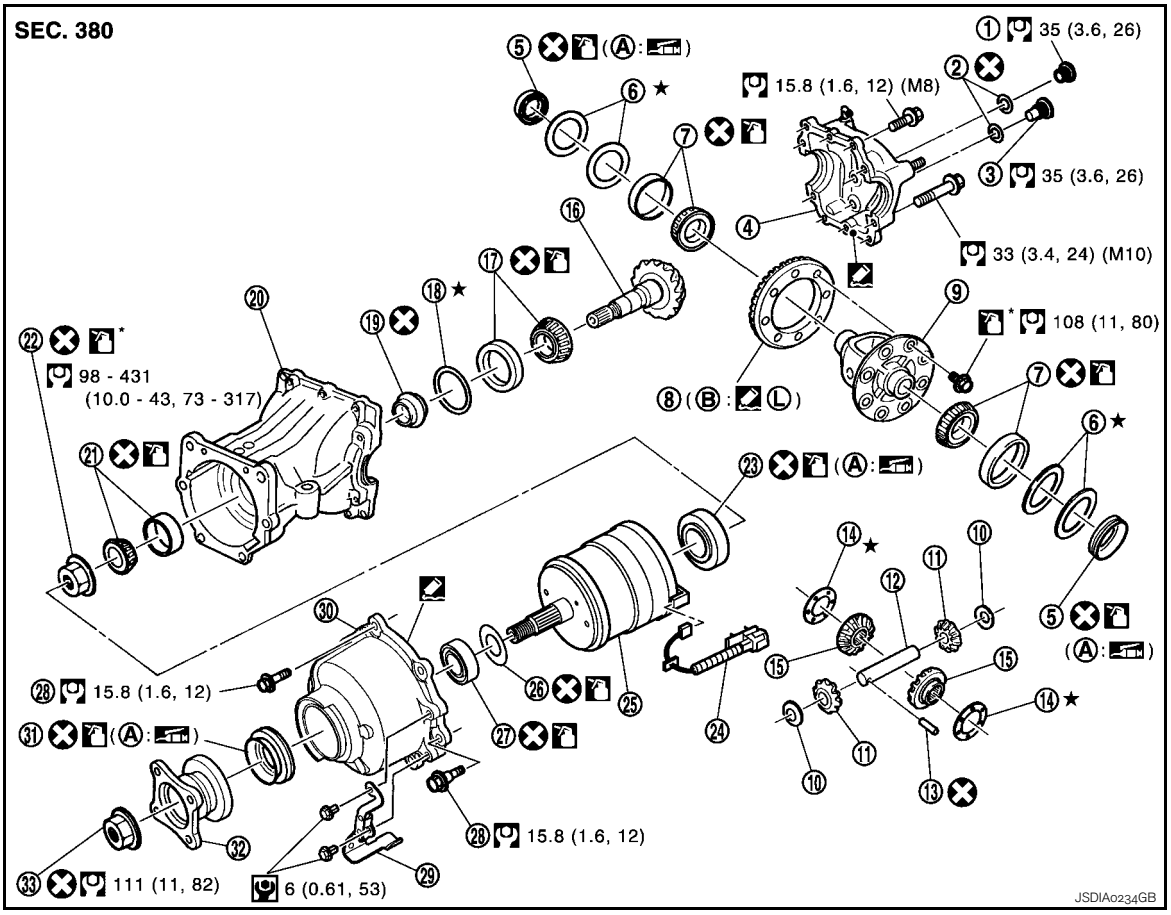
Content	Conditions and Measures
Hypoid gear	• If the gear teeth do not mesh or line-up correctly, determine the cause and adjust or replace as necessary. • If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive gear and drive pinion as a set.
Bearing	If any chipped (by friction), pitted, worn, rusted or scratched mark, or unusual noise from the bearing is observed, replace as a bearing assembly (as a new set).
Side gear and Pinion mate gear	• If any cracks or damage on the surface of the tooth is found, replace. • If any worn or chipped mark on the contact sides of the thrust washer is found, replace.
Side gear thrust washer and pinion mate thrust washer	If it is chipped (by friction), damaged, or unusually worn, replace.
Differential case	If any wear or crack on the contact sides of the differential case is found, replace.
Companion flange	If any chipped mark (about 0.1 mm, 0.004 in) or other damage on the contact sides of the lips of the companion flange is found, replace.

cardiagn.com

DRIVE PINION

Exploded View

INFOID:0000000001077005



1. Filler plug
2. Gasket
3. Drain plug
4. Rear cover
5. Side oil seal
6. Side bearing adjusting shim
7. Side bearing
8. Drive gear
9. Differential case
10. Pinion mate thrust washer
11. Pinion mate gear
12. Pinion mate shaft
13. Lock pin
14. Side gear thrust washer
15. Side gear
16. Drive pinion
17. Pinion rear bearing
18. Drive pinion adjusting shim
19. Collapsible spacer
20. Gear carrier
21. Pinion front bearing
22. Drive pinion nut
23. Center oil seal
24. 4WD solenoid harness
25. Electric controlled coupling
26. Bearing shim
27. Coupling front bearing
28. Reamer bolt
29. Connector bracket
30. Coupling cover
31. Front oil seal
32. Companion flange
33. Companion flange lock nut

A: Oil seal lip

B: Screw hole

: Apply gear oil.

*: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond TB1217 or equivalent.

L: Apply Genuine Medium Strength Thread Locking Sealant, Three Bond TB1322B or equivalent.

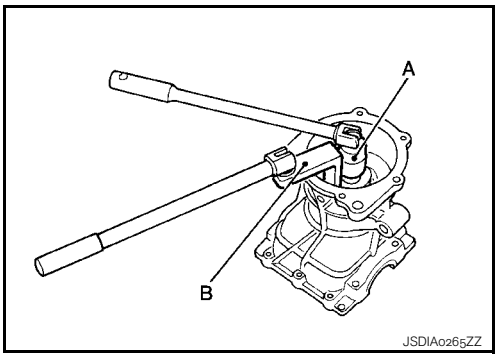
Refer to GI-4, "Components" for symbols not described on the above.

Disassembly

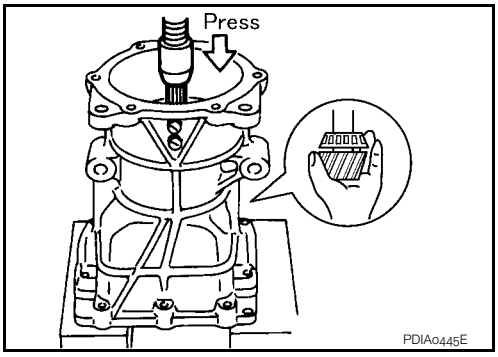
INFOID:0000000000972195

cardiagn.com

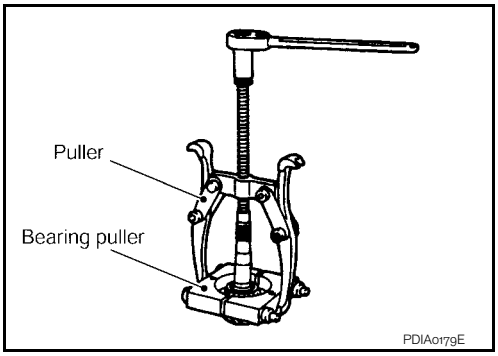
1. Remove electric controlled coupling assembly. Refer to DLN-131, "Disassembly".
2. Remove differential case assembly. Refer to DLN-135, "Disassembly".
3. Fit drive pinion socket (A) (SST: KV38108500) onto drive pinion spline. Remove drive pinion nut, using the pinion nut wrench (B) (SST: KV38108400).



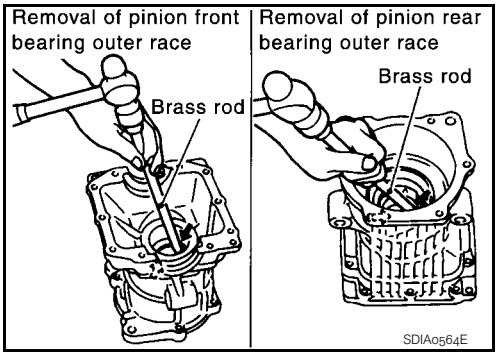
4. Press drive pinion assembly out of gear carrier.
   CAUTION:
   Never drop drive pinion assembly.
5. Remove pinion front bearing inner race.
6. Remove collapsible spacer.



7. Remove pinion rear bearing inner race from drive pinion, using puller and bearing puller.



8. Using a brass rod, tap pinion front bearing outer race evenly from the 2 cutouts on gear carrier and remove pinion front bearing outer race.
   CAUTION:
   Be careful not to damage gear carrier.
9. Using a brass rod, tap drive pinion adjusting shim evenly from the 2 cutouts on gear carrier and remove drive pinion adjusting shim and pinion rear bearing outer race.
   CAUTION:
   Be careful not to damage the gear carrier.



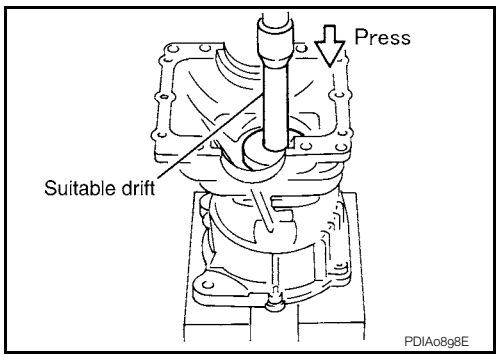
Assembly

INFOID:0000000000972196

cardiagn.com

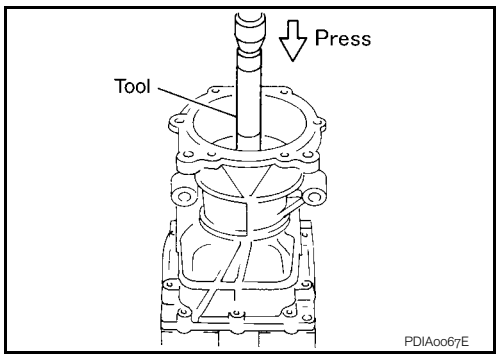
1. Install a drive pinion adjusting shim of the same thickness as was installed prior to disassembly. Press pinion rear bearing outer race into gear carrier, using the suitable drift.

CAUTION:
- **At first, using a hammer, tap bearing outer race until it becomes flush to gear carrier.**
- **Never reuse pinion rear bearing outer race.**



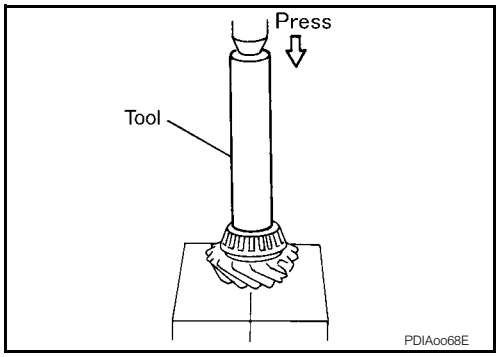
2. Press pinion front bearing outer race into gear carrier, using the drift (SST: 33230000).

CAUTION:
- **At first, using a hammer, tap bearing outer race until it becomes flush to gear carrier.**
- **Never reuse pinion front bearing outer race.**



3. Press pinion rear bearing inner race to drive pinion, using the drift (SST: ST23860000).

CAUTION:
Never reuse pinion rear bearing inner race.



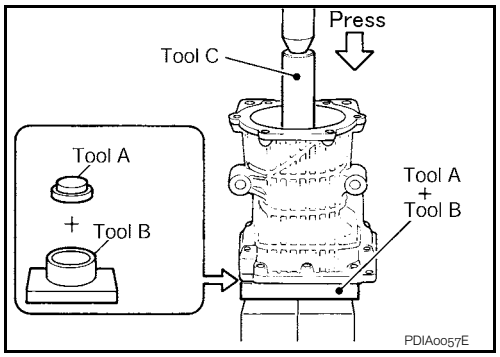
4. After checking and adjusting the tooth contact and backlash of the hypoid gear following the procedure below.

a. Apply gear oil to the pinion rear bearing, and assemble the drive pinion to the gear carrier.

CAUTION:
Never assemble a collapsible spacer.

b. Apply gear oil to pinion front bearing, and assemble pinion front bearing inner race to drive pinion. Using the drifts and stand, press pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.

A : Drift (commercial service tool)
B : Stand (commercial service tool)
C : Drift (SST: ST23860000)



CAUTION:
Never reuse pinion front bearing inner race.

c. Temporarily tighten removed drive pinion nut to drive pinion.

NOTE:
Use removed drive pinion nut only for the preload measurement.

cardiagn.com

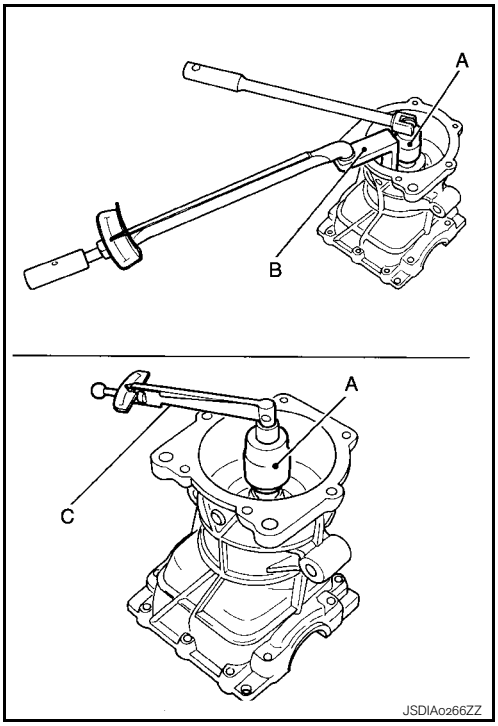
d. Fit the drive pinion socket (A) (SST: KV38108500) onto the drive pinion spline. Using the pinion nut wrench (B) (SST: KV38108400), tighten drive pinion nut to the specified preload torque.

C : Preload gauge (SST: ST3127S000)

Standard

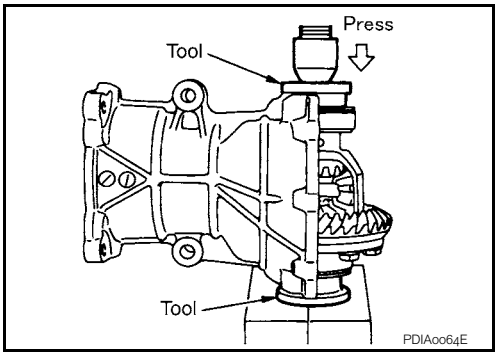
Pinion bearing preload **: Refer to DLN-151, "Preload Torque".**

CAUTION:
Drive pinion nut is tightened with no collapsible spacer. Be careful not to overtighten it. While measuring the preload, tighten it by 5° to 10°.



e. Apply gear oil to side bearings, and install new side bearing adjusting shims with the same thickness or re-install the old ones to the same mounting position they were in prior to disassembly. Set the drifts (commercial service tool) to the right and left. Install differential case assembly to gear carrier.

CAUTION:
- **The drifts shall be placed on the center of the adjusting shims.**
- **The pressure shall be as low as possible to install gear carrier assembly to differential assembly. The maximum pressure shall be 10 kN (1 ton, 1.0 Imp ton).**
- **If adjusting shims are installed by tapping, gear carrier may be damaged. Avoid tapping.**



f. Check and adjust the tooth contact. Refer to DLN-146, "Adjustment".

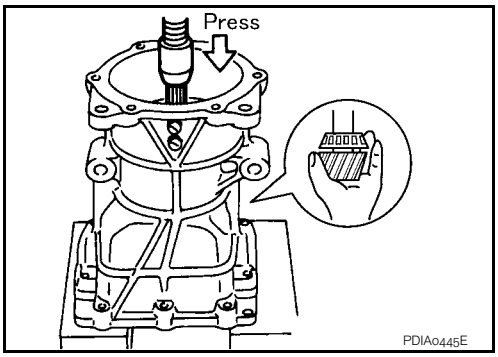
g. Check and adjust the backlash. Refer to DLN-146, "Adjustment".

h. Remove dummy cover set, and remove differential case assembly.

i. Remove drive pinion nut and press drive pinion assembly out of gear carrier.

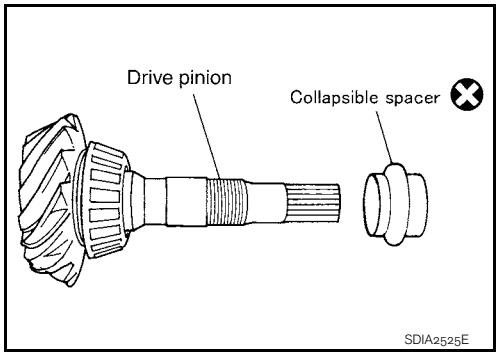
CAUTION:
Never drop drive pinion assembly.

j. Remove pinion front bearing inner race.



cardiagn.com

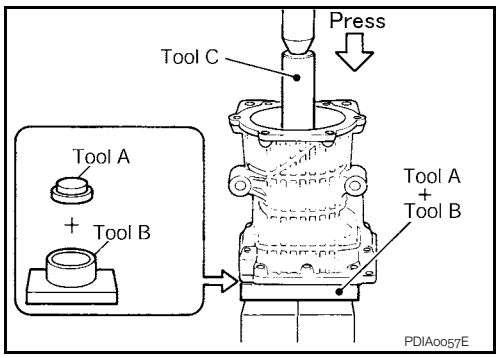
5. Assemble collapsible spacer to drive pinion.
CAUTION:
- **Be careful of the mounting direction of collapsible spacer.**
- **Never reuse collapsible spacer.**



6. Apply gear oil to pinion front bearing, and assemble pinion front bearing inner race to drive pinion. Using the drifts and stand, press pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.

A : Drift (commercial service tool)
B : Stand (commercial service tool)
C : Drift (SST: ST23860000)

CAUTION:
Never reuse pinion front bearing inner race.



7. Apply anti-corrosive oil to the thread and seat of drive pinion nut, and temporarily tighten drive pinion nut to drive pinion.
CAUTION:
Never reuse drive pinion nut.

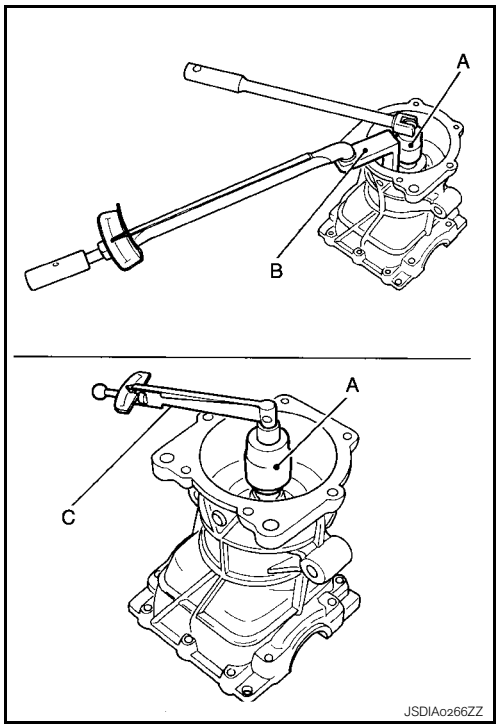
8. Fit the drive pinion socket (A) (SST: KV38108500) onto the drive pinion spline. Using the pinion nut wrench (B) (SST: KV38108400), adjust the drive pinion nut tightening torque and pinion bearing preload torque.

C : Preload gauge (SST: ST3127S000)

Standard

Pinion bearing	**: Refer to DLN-151, "Preload Torque".**

CAUTION:
- **Adjust the lower limit of the drive pinion nut tightening torque first.**
- **If the preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Never loosen drive pinion nut to adjust the preload torque.**
- **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**



9. Install differential case assembly. Refer to DLN-137, "Assembly".
CAUTION:
Never install rear cover.

10. Install dummy cover set, and check drive gear runout, tooth contact, and backlash. Refer to DLN-146, "Adjustment".
11. Remove dummy cover set, then install rear cover, and side oil seal. Refer to DLN-137, "Assembly".
12. Check total preload torque. Refer to DLN-146, "Adjustment".
13. Install electric controlled coupling assembly. Refer to DLN-131, "Assembly".
14. Check companion flange runout. Refer to DLN-133, "Adjustment".

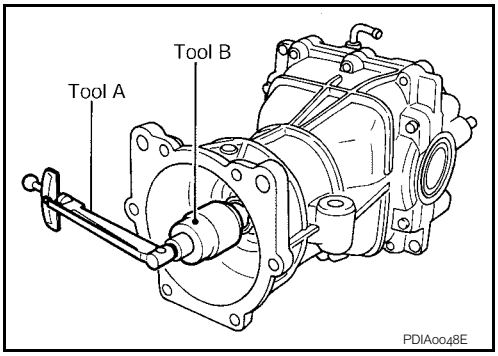
cardiagn.com

Adjustment

INFOID:0000000000972197

TOTAL PRELOAD TORQUE

1. Remove electric controlled coupling assembly. Refer to DLN-131, "Disassembly".
2. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
3. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
4. Fit drive pinion socket onto drive pinion spline. Measure the total preload, using the preload gauge (A) (SST: 3127S000) and drive pinion socket (B) (SST: KV38108500).



Standard

Total preload torque	**: Refer to DLN-151, "Preload Torque".**

NOTE:
Total preload torque = Pinion bearing torque + Side bearing torque

- If measured value is out of the specification, disassemble it to check and adjust each part. Adjust the pinion bearing preload and side bearing preload.
  Adjust the pinion bearing preload first, then adjust the side bearing preload.

When the preload torque is large

On pinion bearings:	**Replace the collapsible spacer.**
On side bearings:	**Use thinner side bearing adjusting shims.**

When the preload is small

On pinion bearings:	**Tighten the drive pinion nut.**
On side bearings:	**Use thicker side bearing adjusting shims.**

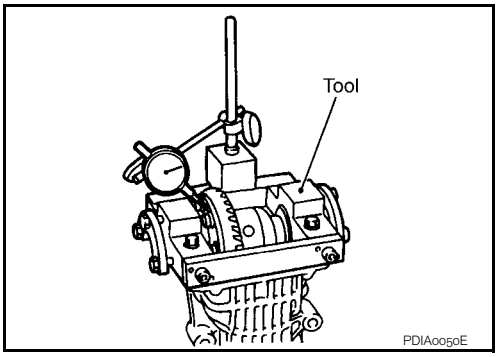
DRIVE GEAR RUNOUT

1. Remove rear cover. Refer to DLN-135, "Disassembly".
2. Following the procedure below, install a dummy cover set (SST: KV389L0010) to gear carrier.

a. Set dummy cover shims to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover to gear carrier.
c. Position dummy cover spacers to dummy cover.
d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-141, "Exploded View".
e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

: 5.9 N·m (0.6 kg-m, 52 in-lb)

3. Fit a dial indicator to the drive gear back face.
4. Rotate the drive gear to measure runout.



Limit

Drive gear back face runout	**: Refer to DLN-151, "Drive Gear Runout".**

- If the runout is outside of the repair limit, check drive gear assembly condition; foreign material may be caught between drive gear and differential case, or differential case or drive gear may be deformed, etc.
  CAUTION:
  Replace drive gear and drive pinion as a set.

cardiagn.com

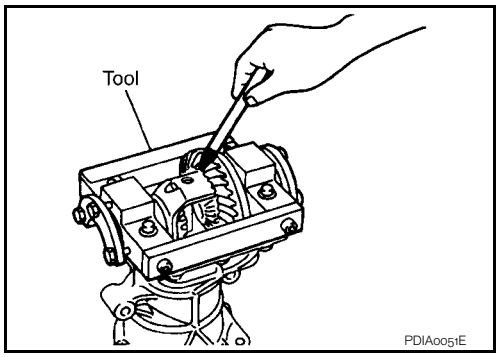
TOOTH CONTACT

1. Remove rear cover. Refer to DLN-135, "Disassembly".
2. Following the procedure below, install a dummy cover set (SST: KV389L0010) to gear carrier.

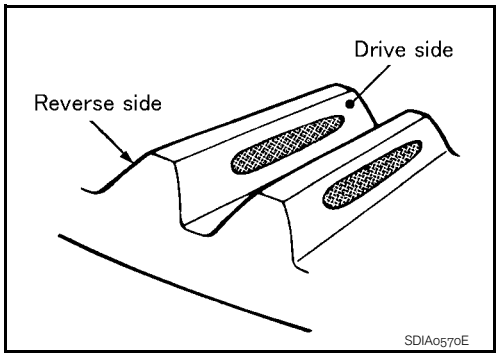
a. Set dummy cover shims to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover to gear carrier.
c. Position dummy cover spacers to dummy cover.
d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-141, "Exploded View".
e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

: 5.9 N·m (0.6 kg-m, 52 in-lb)

3. Apply red lead to drive gear.
CAUTION:
Apply red lead to both the faces of 3 to 4 gears at 4 locations evenly spaced on drive gear.

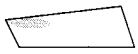
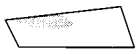
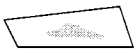


4. Rotate drive gear back and forth several times, check drive pinion gear to drive gear tooth contact.
CAUTION:
Check tooth contact on drive side and reverse side.



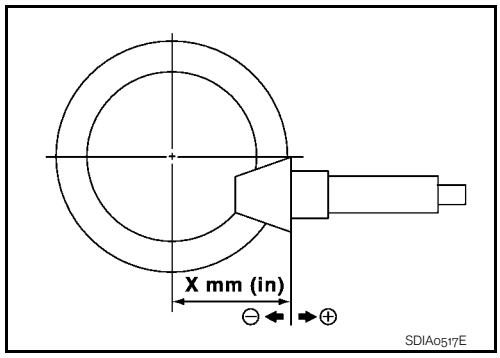
cardiagn.com

Tooth Contact Judgment Guide

Tooth contact condition		Drive pinion adjusting shim selection value [mm (in)]		Adjustment (Yes/No)	Possible cause
Drive side	Back side				
Heel side Toe side	Toe side Heel side 	Thicker ↑	+0.09 (+0.0035)	Yes	Occurrence of noise and scoring sound in all speed ranges.
			+0.06 (+0.0024)		Occurrence of noise when accelerating.
			+0.03 (+0.0012)	No	–
			0		
		Thinner ↓	–0.03 (−0.0012)		
			–0.06 (−0.0024)	Yes	Occurrence of noise at constant speed and decreasing speed.
			–0.09 (−0.0035)		Occurrence of noise and scoring sound in all speed ranges.

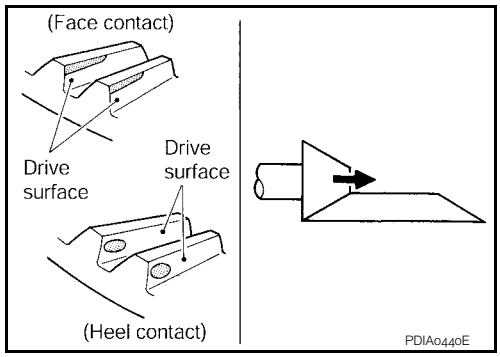
SDIA2549E

5. If tooth contact is improperly adjusted, follow the procedure below to adjust the pinion height (dimension X).



SDIA0517E

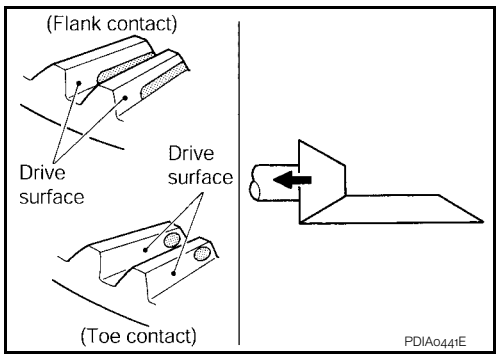
- If the tooth contact is near the face (face contact), or near the heel (heel contact), thicken drive pinion gear adjusting shim to move drive pinion closer to drive gear.



PDIA0440E

cardiagn.com

- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thin drive pinion gear adjusting shim to move drive pinion farther from drive gear.



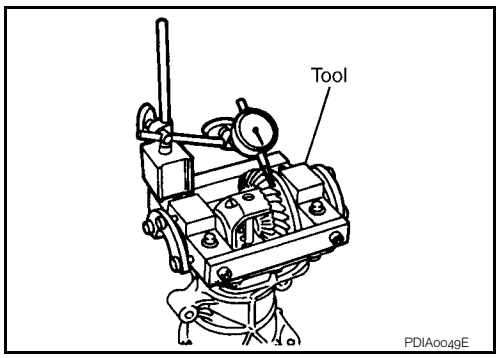
BACKLASH

1. Remove rear cover. Refer to DLN-135, "Disassembly".
2. Following the procedure below, install a dummy cover set (SST: KV389L0010) to gear carrier.

a. Set dummy cover shims to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover to gear carrier.
c. Position dummy cover spacers to dummy cover.
d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-141, "Exploded View".
e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

: 5.9 N·m (0.6 kg-m, 52 in-lb)

3. Fit a dial indicator to the drive gear face to measure the backlash.



Standard

Backlash **: Refer to DLN-151, "Backlash".**

- If the backlash is outside of the specified value, change the thickness of side bearing adjusting shims.

When the backlash is large:

Make drive gear back adjusting shims thicker, and drive gear front adjusting shims thinner.

When the backlash is small:

Make drive gear back adjusting shims thinner, and drive gear front adjusting shims thicker.

Inspection After Disassembly

INFOID:0000000001078624

Clean up the disassembled parts. Then, inspect if the parts are worn or damaged. If so, follow the measures below.

Content	Conditions and Measures
Hypoid gear	• If the gear teeth do not mesh or line-up correctly, determine the cause and adjust or replace as necessary. • If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive gear and drive pinion as a set.
Bearing	If any chipped (by friction), pitted, worn, rusted or scratched mark, or unusual noise from the bearing is observed, replace as a bearing assembly (as a new set).
Side gear and Pinion mate gear	• If any cracks or damage on the surface of the tooth is found, replace. • If any worn or chipped mark on the contact sides of the thrust washer is found, replace.
Side gear thrust washer and pinion mate thrust washer	If it is chipped (by friction), damaged, or unusually worn, replace.

cardiagn.com

Content	Conditions and Measures
Differential case	If any wear or crack on the contact sides of the differential case is found, replace.
Companion flange	If any chipped mark (about 0.1 mm, 0.004 in) or other damage on the contact sides of the lips of the companion flange is found, replace.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000000972199

Applied model	4WD	
	MR20DE	
	M/T	CVT
Final drive model	R145	
Gear ratio	2.466	
Number of teeth (Drive gear/Drive pinion)	37/15	
Oil capacity (Approx.) ℓ (Imp pt)	0.55 (1)	
Number of pinion gears	2	
Drive pinion adjustment spacer type	Collapsible	

Drive Gear Runout

INFOID:0000000000972200

Unit: mm (in)

Item	Limit
Drive gear back face runout	0.05 (0.0020)

Differential Side Gear Clearance

INFOID:0000000000972201

Unit: mm (in)

Item	Standard
Side gear backlash (Clearance between side gear and differential case)	0.2 (0.008) or less (Each gear should rotate smoothly without excessive resistance during differential motion.)

Preload Torque

INFOID:0000000000972202

Unit: N·m (kg-m, in-lb)

Item	Standard
Pinion bearing (P_1)	0.69 – 1.18 (0.07 – 0.12, 7 – 10)
Side bearing (P_2)	0.64 – 0.98 (0.07 – 0.09, 6 – 8)
Side bearing to pinion bearing (Total preload) (Total preload = P_1 + P_2)	1.33 – 2.16 (0.14 – 0.22, 12 – 19)

Backlash

INFOID:0000000000972203

Unit: mm (in)

Item	Standard
Drive gear to drive pinion gear	0.10 – 0.15 (0.0039 – 0.0059)

Companion Flange Runout

INFOID:0000000000972204

Unit: mm (in)

Item	Limit
Companion flange face	0.13 (0.0051)
Inner side of the companion flange	0.19 (0.0075)

cardiagn.com

SECTION EC
ENGINE CONTROL SYSTEM

CONTENTS

HR16DE (WITH EURO-OBD)

BASIC INSPECTION 22

DIAGNOSIS AND REPAIR WORKFLOW 22
Work Flow 22
Diagnostic Work Sheet 24

INSPECTION AND ADJUSTMENT 26

BASIC INSPECTION 26
BASIC INSPECTION : Special Repair Requirement 26

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 29
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 29
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement 29

IDLE SPEED 29
IDLE SPEED : Description 29
IDLE SPEED : Special Repair Requirement 30

IGNITION TIMING 30
IGNITION TIMING : Description 30
IGNITION TIMING : Special Repair Requirement 30

ACCELERATOR PEDAL RELEASED POSITION LEARNING 30
ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description 30
ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement 30

THROTTLE VALVE CLOSED POSITION LEARNING 31
THROTTLE VALVE CLOSED POSITION LEARNING : Description 31
THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement 31

IDLE AIR VOLUME LEARNING 31
IDLE AIR VOLUME LEARNING : Description 31
IDLE AIR VOLUME LEARNING : Special Repair Requirement 31

MIXTURE RATIO SELF-LEARNING VALUE CLEAR 33
MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description 33
MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement 33

FUNCTION DIAGNOSIS 34

ENGINE CONTROL SYSTEM 34
System Diagram 34
System Description 34
Component Parts Location 35
Component Description 39

MULTIPORT FUEL INJECTION SYSTEM 40
System Diagram 40
System Description 40
Component Parts Location 42
Component Description 47

ELECTRIC IGNITION SYSTEM 48
System Diagram 48
System Description 48
Component Parts Location 49
Component Description 53

AIR CONDITIONING CUT CONTROL 54
System Diagram 54
System Description 54
Component Parts Location 55
Component Description 59

AUTOMATIC SPEED CONTROL DEVICE (ASCD) 60
System Diagram 60
System Description 60

cardiagn.com

Component Parts Location 61
Component Description 66

CAN COMMUNICATION 67
System Description 67

COOLING FAN CONTROL 68
System Diagram 68
System Description 68
Component Parts Location 69
Component Description 73

EVAPORATIVE EMISSION SYSTEM 74
System Diagram 74
System Description 75
Component Parts Location 75
Component Description 80

INTAKE VALVE TIMING CONTROL 81
System Diagram 81
System Description 81
Component Parts Location 81
Component Description 86

ON BOARD DIAGNOSTIC (OBD) SYSTEM 87
Diagnosis Description 87
CONSULT-III Function 100
Diagnosis Tool Function 107

COMPONENT DIAGNOSIS 109

TROUBLE DIAGNOSIS - SPECIFICATION VALUE 109
Description 109
Component Function Check 109
Diagnosis Procedure 109

POWER SUPPLY AND GROUND CIRCUIT .. 117
Diagnosis Procedure 117

U1001 CAN COMM CIRCUIT 121
Description 121
DTC Logic 121
Diagnosis Procedure 121

U1010 CONTROL UNIT (CAN) 122
Description 122
DTC Logic 122
Diagnosis Procedure 122

P0011 IVT CONTROL 123
DTC Logic 123
Diagnosis Procedure 124
Component Inspection 125

P0102, P0103 MAF SENSOR 127
Description 127
DTC Logic 127
Diagnosis Procedure 128
Component Inspection 129

P0112, P0113 IAT SENSOR 132
Description 132
DTC Logic 132
Diagnosis Procedure 133
Component Inspection 133

P0117, P0118 ECT SENSOR 135
Description 135
DTC Logic 135
Diagnosis Procedure 136
Component Inspection 136

P0122, P0123 TP SENSOR 138
Description 138
DTC Logic 138
Diagnosis Procedure 138
Component Inspection 139
Special Repair Requirement 140

P0132 HO2S1 141
Description 141
DTC Logic 141
Diagnosis Procedure 142
Component Inspection 143

P0133 HO2S1 145
Description 145
DTC Logic 145
Diagnosis Procedure 146
Component Inspection 148

P0134 HO2S1 151
Description 151
DTC Logic 151
Diagnosis Procedure 152
Component Inspection 153

P0135 HO2S1 HEATER 156
Description 156
DTC Logic 156
Diagnosis Procedure 156
Component Inspection 158

P0138 HO2S2 159
Description 159
DTC Logic 159
Diagnosis Procedure 160
Component Inspection 161

P0139 HO2S2 164
Description 164
DTC Logic 164
Component Function Check 166
Diagnosis Procedure 167
Component Inspection 168

P0141 HO2S2 HEATER 171
Description 171
DTC Logic 171
Diagnosis Procedure 172
Component Inspection 173

cardiagn.com

P0171 FUEL INJECTION SYSTEM FUNCTION 174
DTC Logic 174
Diagnosis Procedure 175

P0172 FUEL INJECTION SYSTEM FUNCTION 178
DTC Logic 178
Diagnosis Procedure 179

P0222, P0223 TP SENSOR 182
Description 182
DTC Logic 182
Diagnosis Procedure 182
Component Inspection 183
Special Repair Requirement 184

P0300, P0301, P0302, P0303, P0304 MISFIRE 185
DTC Logic 185
Diagnosis Procedure 186

P0327, P0328 KS 191
Description 191
DTC Logic 191
Diagnosis Procedure 191
Component Inspection 192

P0335 CKP SENSOR (POS) 193
Description 193
DTC Logic 193
Diagnosis Procedure 194
Component Inspection 196

P0340 CMP SENSOR (PHASE) 197
Description 197
DTC Logic 197
Diagnosis Procedure 198
Component Inspection 199

P0420 THREE WAY CATALYST FUNCTION.. 201
DTC Logic 201
Component Function Check 202
Diagnosis Procedure 203

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE 206
Description 206
DTC Logic 206
Diagnosis Procedure 206
Component Inspection 207

P0500 VSS 209
Description 209
DTC Logic 209
Component Function Check 210
Diagnosis Procedure 210

P0605 ECM 211
Description 211
DTC Logic 211
Diagnosis Procedure 212

P1065 ECM 213
Description 213
DTC Logic 213
Diagnosis Procedure 213

P1111 IVT CONTROL SOLENOID VALVE 215
Description 215
DTC Logic 215
Diagnosis Procedure 215
Component Inspection 216

P1121 ELECTRIC THROTTLE CONTROL ACTUATOR 217
Description 217
DTC Logic 217
Diagnosis Procedure 217
Special Repair Requirement 218

P1122 ELECTRIC THROTTLE CONTROL FUNCTION 219
Description 219
DTC Logic 219
Diagnosis Procedure 219
Component Inspection 221
Special Repair Requirement 222

P1124, P1126 THROTTLE CONTROL MOTOR RELAY 223
Description 223
DTC Logic 223
Diagnosis Procedure 223

P1128 THROTTLE CONTROL MOTOR 226
Description 226
DTC Logic 226
Diagnosis Procedure 226
Component Inspection 227
Special Repair Requirement 227

P1143 HO2S1 228
Description 228
DTC Logic 228
Diagnosis Procedure 229
Component Inspection 230

P1144 HO2S1 233
Description 233
DTC Logic 233
Diagnosis Procedure 234
Component Inspection 235

P1146 HO2S2 238
Description 238
DTC Logic 238
Component Function Check 240
Diagnosis Procedure 241
Component Inspection 242

P1147 HO2S2 245

cardiagn.com

Description 245
DTC Logic 245
Component Function Check 247
Diagnosis Procedure 248
Component Inspection 249

P1212 TCS COMMUNICATION LINE 252
Description 252
DTC Logic 252
Diagnosis Procedure 252

P1217 ENGINE OVER TEMPERATURE 253
DTC Logic 253
Component Function Check 253
Diagnosis Procedure 254

P1225 TP SENSOR 257
Description 257
DTC Logic 257
Diagnosis Procedure 257
Special Repair Requirement 258

P1226 TP SENSOR 259
Description 259
DTC Logic 259
Diagnosis Procedure 259
Special Repair Requirement 260

P1229 SENSOR POWER SUPPLY 261
DTC Logic 261
Diagnosis Procedure 261

P1564 ASCD STEERING SWITCH 263
Description 263
DTC Logic 263
Diagnosis Procedure 263
Component Inspection 265

P1572 ASCD BRAKE SWITCH 266
Description 266
DTC Logic 266
Diagnosis Procedure 267
Component Inspection (ASCD Brake Switch) 270
Component Inspection (ASCD Clutch Switch) 270
Component Inspection (Stop Lamp Switch) 271

P1574 ASCD VEHICLE SPEED SENSOR 272
Description 272
DTC Logic 272
Diagnosis Procedure 272

P1706 PNP SWITCH 274
Description 274
DTC Logic 274
Component Function Check 275
Diagnosis Procedure 275

P1805 BRAKE SWITCH 277
Description 277
DTC Logic 277
Diagnosis Procedure 277
Component Inspection (Stop Lamp Switch) 278

P2122, P2123 APP SENSOR 280
Description 280
DTC Logic 280
Diagnosis Procedure 280
Component Inspection 282
Special Repair Requirement 282

P2127, P2128 APP SENSOR 283
Description 283
DTC Logic 283
Diagnosis Procedure 283
Component Inspection 285
Special Repair Requirement 286

P2135 TP SENSOR 287
Description 287
DTC Logic 287
Diagnosis Procedure 287
Component Inspection 289
Special Repair Requirement 289

P2138 APP SENSOR 290
Description 290
DTC Logic 290
Diagnosis Procedure 290
Component Inspection 292
Special Repair Requirement 293

ASCD BRAKE SWITCH 294
Description 294
Component Function Check 294
Diagnosis Procedure 294
Component Inspection (ASCD Brake Switch) 296
Component Inspection (ASCD Clutch Switch) 296

ASCD INDICATOR 298
Description 298
Component Function Check 298
Diagnosis Procedure 298

COOLING FAN 299
Description 299
Component Function Check 299
Diagnosis Procedure 299
Component Inspection (Cooling Fan Motor) 300

ELECTRICAL LOAD SIGNAL 301
Description 301
Component Function Check 301
Diagnosis Procedure 301

FUEL INJECTOR 303
Description 303
Component Function Check 303
Diagnosis Procedure 303
Component Inspection 304

FUEL PUMP 306
Description 306

cardiagn.com

Component Function Check 306
Diagnosis Procedure 306
Component Inspection (Fuel Pump) 308

IGNITION SIGNAL 309
Description 309
Component Function Check 309
Diagnosis Procedure 309
Component Inspection (Ignition Coil with Power Transistor) 312
Component Inspection (Condenser) 312

MALFUNCTION INDICATOR 314
Description 314
Component Function Check 314
Diagnosis Procedure 314

POSITIVE CRANKCASE VENTILATION 315
Description 315
Component Inspection 315

REFRIGERANT PRESSURE SENSOR 316
Description 316
Component Function Check 316
Diagnosis Procedure 316

ECU DIAGNOSIS 318

ECM 318
Reference Value 318
Wiring Diagram - ENGINE CONTROL SYSTEM - 329
Fail Safe 339
DTC Inspection Priority Chart 341
DTC Index 341
How to Set SRT Code 343
Test Value and Test Limit 345

SYMPTOM DIAGNOSIS 346

ENGINE CONTROL SYSTEM SYMPTOMS ... 346
Symptom Table 346

NORMAL OPERATING CONDITION 350
Description 350

PRECAUTION 351

PRECAUTIONS 351
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 351
Precaution for Procedure without Cowl Top Cover. 351
Precautions For Xenon Headlamp Service 351
On Board Diagnostic (OBD) System of Engine 351
General Precautions 352

PREPARATION 355

PREPARATION 355
Special Service Tools 355
Commercial Service Tools 355

ON-VEHICLE MAINTENANCE 357

FUEL PRESSURE 357
Inspection 357

EVAPORATIVE EMISSION SYSTEM 359
Inspection 359

SERVICE DATA AND SPECIFICATIONS (SDS) 360

SERVICE DATA AND SPECIFICATIONS (SDS) 360
Idle Speed 360
Ignition Timing 360
Calculated Load Value 360
Mass Air Flow Sensor 360

HR16DE (WITHOUT EURO-OBD)

BASIC INSPECTION 361

DIAGNOSIS AND REPAIR WORKFLOW 361
Work Flow 361
Diagnostic Work Sheet 363

INSPECTION AND ADJUSTMENT 365

BASIC INSPECTION 365
BASIC INSPECTION : Special Repair Requirement 365

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 368
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 368
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement ... 368

IDLE SPEED 368
IDLE SPEED : Description 368
IDLE SPEED : Special Repair Requirement 369

IGNITION TIMING 369
IGNITION TIMING : Description 369
IGNITION TIMING : Special Repair Requirement. 369

ACCELERATOR PEDAL RELEASED POSITION LEARNING 369
ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description 369
ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement 369

THROTTLE VALVE CLOSED POSITION LEARNING 370
THROTTLE VALVE CLOSED POSITION LEARNING : Description 370
THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement 370

IDLE AIR VOLUME LEARNING 370
IDLE AIR VOLUME LEARNING : Description 370

cardiagn.com

IDLE AIR VOLUME LEARNING : Special Repair Requirement 370

MIXTURE RATIO SELF-LEARNING VALUE CLEAR 372
MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description 372
MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement 372

FUNCTION DIAGNOSIS 373

ENGINE CONTROL SYSTEM 373
System Diagram 373
System Description 373
Component Parts Location 374
Component Description 378

MULTIPORT FUEL INJECTION SYSTEM 379
System Diagram 379
System Description 379
Component Parts Location 381
Component Description 386

ELECTRIC IGNITION SYSTEM 387
System Diagram 387
System Description 387
Component Parts Location 388
Component Description 392

AIR CONDITIONING CUT CONTROL 393
System Diagram 393
System Description 393
Component Parts Location 394
Component Description 398

AUTOMATIC SPEED CONTROL DEVICE (ASCD) 399
System Diagram 399
System Description 399
Component Parts Location 400
Component Description 405

CAN COMMUNICATION 406
System Description 406

COOLING FAN CONTROL 407
System Diagram 407
System Description 407
Component Parts Location 408
Component Description 412

EVAPORATIVE EMISSION SYSTEM 413
System Diagram 413
System Description 414
Component Parts Location 414
Component Description 419

INTAKE VALVE TIMING CONTROL 420
System Diagram 420
System Description 420
Component Parts Location 420
Component Description 425

ON BOARD DIAGNOSTIC (OBD) SYSTEM ...426
Diagnosis Description 426
CONSULT-III Function 430

COMPONENT DIAGNOSIS 438

TROUBLE DIAGNOSIS - SPECIFICATION VALUE 438
Description 438
Component Function Check 438
Diagnosis Procedure 438

POWER SUPPLY AND GROUND CIRCUIT ...446
Diagnosis Procedure 446

U1001 CAN COMM CIRCUIT 450
Description 450
DTC Logic 450
Diagnosis Procedure 450

U1010 CONTROL UNIT (CAN) 451
Description 451
DTC Logic 451
Diagnosis Procedure 451

P0011 IVT CONTROL 452
DTC Logic 452
Component Function Check 453
Diagnosis Procedure 453
Component Inspection 455

P0102, P0103 MAF SENSOR 456
Description 456
DTC Logic 456
Diagnosis Procedure 457
Component Inspection 458

P0117, P0118 ECT SENSOR 461
Description 461
DTC Logic 461
Diagnosis Procedure 462
Component Inspection 462

P0122, P0123 TP SENSOR 464
Description 464
DTC Logic 464
Diagnosis Procedure 464
Component Inspection 465
Special Repair Requirement 466

P0132 HO2S1 467
Description 467
DTC Logic 467
Diagnosis Procedure 468
Component Inspection 469

P0134 HO2S1 471
Description 471
DTC Logic 471

cardiagn.com

Diagnosis Procedure 472
Component Inspection 473

P0138 HO2S2 475
Description 475
DTC Logic 475
Diagnosis Procedure 476
Component Inspection 477

P0222, P0223 TP SENSOR 480
Description 480
DTC Logic 480
Diagnosis Procedure 480
Component Inspection 481
Special Repair Requirement 482

P0327, P0328 KS 483
Description 483
DTC Logic 483
Diagnosis Procedure 483
Component Inspection 484

P0335 CKP SENSOR (POS) 485
Description 485
DTC Logic 485
Diagnosis Procedure 486
Component Inspection 488

P0340 CMP SENSOR (PHASE) 489
Description 489
DTC Logic 489
Diagnosis Procedure 490
Component Inspection 491

P0605 ECM 493
Description 493
DTC Logic 493
Diagnosis Procedure 494

P1065 ECM 495
Description 495
DTC Logic 495
Diagnosis Procedure 495

P1111 IVT CONTROL SOLENOID VALVE 497
Description 497
DTC Logic 497
Diagnosis Procedure 497
Component Inspection 498

P1121 ELECTRIC THROTTLE CONTROL ACTUATOR 499
Description 499
DTC Logic 499
Diagnosis Procedure 499
Special Repair Requirement 500

P1122 ELECTRIC THROTTLE CONTROL FUNCTION 501
Description 501
DTC Logic 501
Diagnosis Procedure 501
Component Inspection 503
Special Repair Requirement 504

P1124, P1126 THROTTLE CONTROL MOTOR RELAY 505
Description 505
DTC Logic 505
Diagnosis Procedure 505

P1128 THROTTLE CONTROL MOTOR 508
Description 508
DTC Logic 508
Diagnosis Procedure 508
Component Inspection 509
Special Repair Requirement 509

P1212 TCS COMMUNICATION LINE 510
Description 510
DTC Logic 510
Diagnosis Procedure 510

P1217 ENGINE OVER TEMPERATURE 511
DTC Logic 511
Component Function Check 511
Diagnosis Procedure 512

P1225 TP SENSOR 515
Description 515
DTC Logic 515
Diagnosis Procedure 515
Special Repair Requirement 516

P1226 TP SENSOR 517
Description 517
DTC Logic 517
Diagnosis Procedure 517
Special Repair Requirement 518

P1229 SENSOR POWER SUPPLY 519
DTC Logic 519
Diagnosis Procedure 519

P1564 ASCD STEERING SWITCH 521
Description 521
DTC Logic 521
Diagnosis Procedure 521
Component Inspection 523

P1572 ASCD BRAKE SWITCH 524
Description 524
DTC Logic 524
Component Function Check 525
Diagnosis Procedure 526
Component Inspection (ASCD Brake Switch) 529
Component Inspection (ASCD Clutch Switch) 529
Component Inspection (Stop Lamp Switch) 530

P1574 ASCD VEHICLE SPEED SENSOR 531
Description 531
DTC Logic 531

cardiagn.com

Diagnosis Procedure 531

P1706 PNP SWITCH 533
Description 533
DTC Logic 533
Component Function Check 534
Diagnosis Procedure 534

P1805 BRAKE SWITCH 536
Description 536
DTC Logic 536
Diagnosis Procedure 536
Component Inspection (Stop Lamp Switch) 537

P2122, P2123 APP SENSOR 539
Description 539
DTC Logic 539
Diagnosis Procedure 539
Component Inspection 541
Special Repair Requirement 541

P2127, P2128 APP SENSOR 542
Description 542
DTC Logic 542
Diagnosis Procedure 542
Component Inspection 544
Special Repair Requirement 545

P2135 TP SENSOR 546
Description 546
DTC Logic 546
Diagnosis Procedure 546
Component Inspection 548
Special Repair Requirement 548

P2138 APP SENSOR 549
Description 549
DTC Logic 549
Diagnosis Procedure 549
Component Inspection 551
Special Repair Requirement 552

ASCD BRAKE SWITCH 553
Description 553
Component Function Check 553
Diagnosis Procedure 553
Component Inspection (ASCD Brake Switch) 555
Component Inspection (ASCD Clutch Switch) 555

ASCD INDICATOR 557
Description 557
Component Function Check 557
Diagnosis Procedure 557

COOLING FAN 558
Description 558
Component Function Check 558
Diagnosis Procedure 558
Component Inspection (Cooling Fan Motor) 559

ELECTRICAL LOAD SIGNAL 560
Description 560
Component Function Check 560
Diagnosis Procedure 560

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE 562
Description 562
Component Function Check 562
Diagnosis Procedure 562
Component Inspection 564

FUEL INJECTOR 565
Description 565
Component Function Check 565
Diagnosis Procedure 565
Component Inspection 566

FUEL PUMP 568
Description 568
Component Function Check 568
Diagnosis Procedure 568
Component Inspection (Fuel Pump) 570

HO2S1 571
Description 571
Component Function Check 571
Diagnosis Procedure 572
Component Inspection 573

HO2S1 HEATER 576
Description 576
Component Function Check 576
Diagnosis Procedure 576
Component Inspection 578

HO2S2 579
Description 579
Component Function Check 579
Diagnosis Procedure 580
Component Inspection 581

HO2S2 HEATER 583
Description 583
Component Function Check 583
Diagnosis Procedure 583
Component Inspection 585

IAT SENSOR 586
Description 586
Component Function Check 586
Diagnosis Procedure 586
Component Inspection 587

IGNITION SIGNAL 588
Description 588
Component Function Check 588
Diagnosis Procedure 588
Component Inspection (Ignition Coil with Power Transistor) 591
Component Inspection (Condenser) 591

cardiagn.com

MALFUNCTION INDICATOR 593
Description 593
Component Function Check 593
Diagnosis Procedure 593

POSITIVE CRANKCASE VENTILATION 594
Description 594
Component Inspection 594

REFRIGERANT PRESSURE SENSOR 595
Description 595
Component Function Check 595
Diagnosis Procedure 595

VSS 597
Description 597
Diagnosis Procedure 597

ECU DIAGNOSIS 598

ECM 598
Reference Value 598
Wiring Diagram - ENGINE CONTROL SYSTEM ... 608
Fail Safe 618
DTC Inspection Priority Chart 620
DTC Index 620

SYMPTOM DIAGNOSIS 623

ENGINE CONTROL SYSTEM SYMPTOMS ... 623
Symptom Table 623

NORMAL OPERATING CONDITION 627
Description 627

PRECAUTION 628

PRECAUTIONS 628
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 628
Precaution for Procedure without Cowl Top Cover. 628
Precautions For Xenon Headlamp Service 628
On Board Diagnostic (OBD) System of Engine 628
General Precautions 629

PREPARATION 632

PREPARATION 632
Special Service Tools 632
Commercial Service Tools 632

ON-VEHICLE MAINTENANCE 634

FUEL PRESSURE 634
Inspection 634

EVAPORATIVE EMISSION SYSTEM 636
Inspection 636

SERVICE DATA AND SPECIFICATIONS (SDS) 637

SERVICE DATA AND SPECIFICATIONS (SDS) 637
Idle Speed 637
Ignition Timing 637

MR20DE (WITH EURO-OBD)

BASIC INSPECTION 638

DIAGNOSIS AND REPAIR WORKFLOW 638
Work Flow 638
Diagnostic Work Sheet 640

INSPECTION AND ADJUSTMENT 642

BASIC INSPECTION 642
BASIC INSPECTION : Special Repair Requirement 642

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 645
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 645
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement ... 645

IDLE SPEED 646
IDLE SPEED : Description 646
IDLE SPEED : Special Repair Requirement 646

IGNITION TIMING 646
IGNITION TIMING : Description 646
IGNITION TIMING : Special Repair Requirement. 646

VIN REGISTRATION 646
VIN REGISTRATION : Description 646
VIN REGISTRATION : Special Repair Requirement 646

ACCELERATOR PEDAL RELEASED POSITION LEARNING 647
ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description 647
ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement 647

THROTTLE VALVE CLOSED POSITION LEARNING 647
THROTTLE VALVE CLOSED POSITION LEARNING : Description 647
THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement 647

IDLE AIR VOLUME LEARNING 647
IDLE AIR VOLUME LEARNING : Description 647
IDLE AIR VOLUME LEARNING : Special Repair Requirement 647

MIXTURE RATIO SELF-LEARNING VALUE CLEAR 649
MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description 649

cardiagn.com

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement 649

FUNCTION DIAGNOSIS 650

ENGINE CONTROL SYSTEM 650
System Diagram 650
System Description 650
Component Parts Location 651
Component Description 655

MULTIPORT FUEL INJECTION SYSTEM 657
System Diagram 657
System Description 657
Component Parts Location 659
Component Description 664

ELECTRIC IGNITION SYSTEM 665
System Diagram 665
System Description 665
Component Parts Location 666
Component Description 670

AIR CONDITIONING CUT CONTROL 671
System Diagram 671
System Description 671
Component Parts Location 672
Component Description 676

AUTOMATIC SPEED CONTROL DEVICE (ASCD) 677
System Diagram 677
System Description 677
Component Parts Location 678
Component Description 683

CAN COMMUNICATION 684
System Description 684

COOLING FAN CONTROL 685
System Diagram 685
System Description 685
Component Parts Location 686
Component Description 691

EVAPORATIVE EMISSION SYSTEM 692
System Diagram 692
System Description 693
Component Parts Location 694
Component Description 699

INTAKE VALVE TIMING CONTROL 700
System Diagram 700
System Description 700
Component Parts Location 700
Component Description 705

ON BOARD DIAGNOSTIC (OBD) SYSTEM .. 706
Diagnosis Description 706
CONSULT-III Function 719
Diagnosis Tool Function 726

COMPONENT DIAGNOSIS 728

TROUBLE DIAGNOSIS - SPECIFICATION VALUE 728
Description 728
Component Function Check 728
Diagnosis Procedure 728

POWER SUPPLY AND GROUND CIRCUIT ...736
Diagnosis Procedure 736

U1001 CAN COMM CIRCUIT 740
Description 740
DTC Logic 740
Diagnosis Procedure 740

U1010 CONTROL UNIT (CAN) 741
Description 741
DTC Logic 741
Diagnosis Procedure 741

P0011 IVT CONTROL 742
DTC Logic 742
Diagnosis Procedure 743
Component Inspection 744

P0102, P0103 MAF SENSOR 746
Description 746
DTC Logic 746
Diagnosis Procedure 747
Component Inspection 748

P0112, P0113 IAT SENSOR 751
Description 751
DTC Logic 751
Diagnosis Procedure 752
Component Inspection 752

P0117, P0118 ECT SENSOR 754
Description 754
DTC Logic 754
Diagnosis Procedure 755
Component Inspection 755

P0122, P0123 TP SENSOR 757
Description 757
DTC Logic 757
Diagnosis Procedure 757
Component Inspection 758
Special Repair Requirement 759

P0132 HO2S1 760
Description 760
DTC Logic 760
Diagnosis Procedure 761
Component Inspection 762

P0133 HO2S1 764
Description 764
DTC Logic 764
Diagnosis Procedure 765

cardiagn.com

Component Inspection 767

P0134 HO2S1 770
Description 770
DTC Logic 770
Diagnosis Procedure 771
Component Inspection 772

P0135 HO2S1 HEATER 775
Description 775
DTC Logic 775
Diagnosis Procedure 775
Component Inspection 776

P0138 HO2S2 778
Description 778
DTC Logic 778
Diagnosis Procedure 779
Component Inspection 780

P0139 HO2S2 782
Description 782
DTC Logic 782
Component Function Check 784
Diagnosis Procedure 785
Component Inspection 786

P0141 HO2S2 HEATER 788
Description 788
DTC Logic 788
Diagnosis Procedure 788
Component Inspection 790

P0171 FUEL INJECTION SYSTEM FUNCTION 791
DTC Logic 791
Diagnosis Procedure 792

P0172 FUEL INJECTION SYSTEM FUNCTION 795
DTC Logic 795
Diagnosis Procedure 796

P0222, P0223 TP SENSOR 799
Description 799
DTC Logic 799
Diagnosis Procedure 799
Component Inspection 800
Special Repair Requirement 801

P0300, P0301, P0302, P0303, P0304 MISFIRE 802
DTC Logic 802
Diagnosis Procedure 803

P0327, P0328 KS 807
Description 807
DTC Logic 807
Diagnosis Procedure 807
Component Inspection 808

P0335 CKP SENSOR (POS) 809
Description 809
DTC Logic 809
Diagnosis Procedure 810
Component Inspection 812

P0340 CMP SENSOR (PHASE) 813
Description 813
DTC Logic 813
Diagnosis Procedure 814
Component Inspection 815

P0420 THREE WAY CATALYST FUNCTION . 817
DTC Logic 817
Component Function Check 818
Diagnosis Procedure 819

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE 822
Description 822
DTC Logic 822
Diagnosis Procedure 822
Component Inspection 823

P0500 VSS 825
Description 825
DTC Logic 825
Component Function Check 826
Diagnosis Procedure 826

P0605 ECM 827
Description 827
DTC Logic 827
Diagnosis Procedure 828

P1111 IVT CONTROL SOLENOID VALVE 829
Description 829
DTC Logic 829
Diagnosis Procedure 829
Component Inspection 830

P1121 ELECTRIC THROTTLE CONTROL ACTUATOR 832
Description 832
DTC Logic 832
Diagnosis Procedure 832
Special Repair Requirement 833

P1122 ELECTRIC THROTTLE CONTROL FUNCTION 834
Description 834
DTC Logic 834
Diagnosis Procedure 834
Component Inspection 837
Special Repair Requirement 837

P1124, P1126 THROTTLE CONTROL MOTOR RELAY 838
Description 838
DTC Logic 838
Diagnosis Procedure 838

cardiagn.com

P1128 THROTTLE CONTROL MOTOR 841
Description 841
DTC Logic 841
Diagnosis Procedure 841
Component Inspection 842
Special Repair Requirement 842

P1143 HO2S1 844
Description 844
DTC Logic 844
Diagnosis Procedure 845
Component Inspection 846

P1144 HO2S1 849
Description 849
DTC Logic 849
Diagnosis Procedure 850
Component Inspection 851

P1146 HO2S2 854
Description 854
DTC Logic 854
Component Function Check 856
Diagnosis Procedure 857
Component Inspection 858

P1147 HO2S2 861
Description 861
DTC Logic 861
Component Function Check 863
Diagnosis Procedure 864
Component Inspection 865

P1211 TCS CONTROL UNIT 868
Description 868
DTC Logic 868
Diagnosis Procedure 868

P1212 TCS COMMUNICATION LINE 869
Description 869
DTC Logic 869
Diagnosis Procedure 869

P1217 ENGINE OVER TEMPERATURE 870
DTC Logic 870
Component Function Check 870
Diagnosis Procedure 871

P1225 TP SENSOR 874
Description 874
DTC Logic 874
Diagnosis Procedure 874
Special Repair Requirement 875

P1226 TP SENSOR 876
Description 876
DTC Logic 876
Diagnosis Procedure 876
Special Repair Requirement 877

P1229 SENSOR POWER SUPPLY 878
DTC Logic 878
Diagnosis Procedure 878

P1564 ASCD STEERING SWITCH 880
Description 880
DTC Logic 880
Diagnosis Procedure 880
Component Inspection 882

P1572 ASCD BRAKE SWITCH 883
Description 883
DTC Logic 883
Diagnosis Procedure 884
Component Inspection (ASCD Brake Switch) 888
Component Inspection (ASCD Clutch Switch) 888
Component Inspection (Stop Lamp Switch) 889

P1574 ASCD VEHICLE SPEED SENSOR 890
Description 890
DTC Logic 890
Diagnosis Procedure 890

P1706 PNP SWITCH 892
Description 892
DTC Logic 892
Component Function Check 893
Diagnosis Procedure 893

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) 895
Description 895
DTC Logic 895
Diagnosis Procedure 895

P1805 BRAKE SWITCH 896
Description 896
DTC Logic 896
Diagnosis Procedure 896
Component Inspection (Stop Lamp Switch) 897

P2122, P2123 APP SENSOR 899
Description 899
DTC Logic 899
Diagnosis Procedure 899
Component Inspection 901
Special Repair Requirement 901

P2127, P2128 APP SENSOR 902
Description 902
DTC Logic 902
Diagnosis Procedure 902
Component Inspection 904
Special Repair Requirement 905

P2135 TP SENSOR 906
Description 906
DTC Logic 906
Diagnosis Procedure 906
Component Inspection 908
Special Repair Requirement 908

cardiagn.com

P2138 APP SENSOR 909
Description 909
DTC Logic 909
Diagnosis Procedure 909
Component Inspection 911
Special Repair Requirement 912

ASCD BRAKE SWITCH 913
Description 913
Component Function Check 913
Diagnosis Procedure 913
Component Inspection (ASCD Brake Switch) 915
Component Inspection (ASCD Clutch Switch) 916

ASCD INDICATOR 917
Description 917
Component Function Check 917
Diagnosis Procedure 917

COOLING FAN 918
Description 918
Component Function Check 918
Diagnosis Procedure 918
Component Inspection (Cooling Fan Motor) 920
Component Inspection (Cooling Fan Relay) 920

ELECTRICAL LOAD SIGNAL 921
Description 921
Component Function Check 921
Diagnosis Procedure 921

FUEL INJECTOR 923
Description 923
Component Function Check 923
Diagnosis Procedure 923
Component Inspection 924

FUEL PUMP 926
Description 926
Component Function Check 926
Diagnosis Procedure 926
Component Inspection (Fuel Pump) 928

IGNITION SIGNAL 929
Description 929
Component Function Check 929
Diagnosis Procedure 929
Component Inspection (Ignition Coil with Power Transistor) 932
Component Inspection (Condenser) 932

MALFUNCTION INDICATOR 934
Description 934
Component Function Check 934
Diagnosis Procedure 934

POSITIVE CRANKCASE VENTILATION 935
Description 935
Component Inspection 935

REFRIGERANT PRESSURE SENSOR 936
Description 936
Component Function Check 936
Diagnosis Procedure 936

ECU DIAGNOSIS 938

ECM 938
Reference Value 938
Wiring Diagram - ENGINE CONTROL SYSTEM - 949
Fail Safe 959
DTC Inspection Priority Chart 961
DTC Index 962
How to Set SRT Code 964
Test Value and Test Limit 966

SYMPTOM DIAGNOSIS 967

ENGINE CONTROL SYSTEM 967
Symptom Table 967

NORMAL OPERATING CONDITION 971
Description 971

PRECAUTION 972

PRECAUTIONS 972
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 972
Precaution for Procedure without Cowl Top Cover 972
On Board Diagnostic (OBD) System of Engine and CVT 972
General Precautions 972

PREPARATION 976

PREPARATION 976
Special Service Tools 976
Commercial Service Tools 976

ON-VEHICLE REPAIR 978

FUEL PRESSURE 978
Inspection 978

EVAPORATIVE EMISSION SYSTEM 980
Inspection 980

SERVICE DATA AND SPECIFICATIONS (SDS) 981

SERVICE DATA AND SPECIFICATIONS (SDS) 981
Idle Speed 981
Ignition Timing 981
Calculated Load Value 981
Mass Air Flow Sensor 981

MR20DE (WITHOUT EURO-OBD)

BASIC INSPECTION 982

DIAGNOSIS AND REPAIR WORKFLOW 982

cardiagn.com

Work Flow 982
Diagnostic Work Sheet 984

INSPECTION AND ADJUSTMENT 986

BASIC INSPECTION 986
BASIC INSPECTION : Special Repair Requirement 986

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 989
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 989
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement ...989

IDLE SPEED 990
IDLE SPEED : Description 990
IDLE SPEED : Special Repair Requirement 990

IGNITION TIMING 990
IGNITION TIMING : Description 990
IGNITION TIMING : Special Repair Requirement..990

VIN REGISTRATION 990
VIN REGISTRATION : Description 990
VIN REGISTRATION : Special Repair Requirement 990

ACCELERATOR PEDAL RELEASED POSITION LEARNING 991
ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description 991
ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement 991

THROTTLE VALVE CLOSED POSITION LEARNING 991
THROTTLE VALVE CLOSED POSITION LEARNING : Description 991
THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement 991

IDLE AIR VOLUME LEARNING 991
IDLE AIR VOLUME LEARNING : Description 991
IDLE AIR VOLUME LEARNING : Special Repair Requirement 991

MIXTURE RATIO SELF-LEARNING VALUE CLEAR 993
MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description 993
MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement 993

FUNCTION DIAGNOSIS 994

ENGINE CONTROL SYSTEM 994
System Diagram 994
System Description 994
Component Parts Location 995
Component Description 999

MULTIPORT FUEL INJECTION SYSTEM 1001
System Diagram 1001
System Description 1001
Component Parts Location 1003
Component Description 1008

ELECTRIC IGNITION SYSTEM 1009
System Diagram 1009
System Description 1009
Component Parts Location 1010
Component Description 1014

AIR CONDITIONING CUT CONTROL 1015
System Diagram 1015
System Description 1015
Component Parts Location 1016
Component Description 1020

AUTOMATIC SPEED CONTROL DEVICE (ASCD) 1021
System Diagram 1021
System Description 1021
Component Parts Location 1022
Component Description 1027

CAN COMMUNICATION 1028
System Description 1028

COOLING FAN CONTROL 1029
System Diagram 1029
System Description 1029
Component Parts Location 1030
Component Description 1035

EVAPORATIVE EMISSION SYSTEM 1036
System Diagram 1036
System Description 1037
Component Parts Location 1038
Component Description 1043

INTAKE VALVE TIMING CONTROL 1044
System Diagram 1044
System Description 1044
Component Parts Location 1044
Component Description 1049

ON BOARD DIAGNOSTIC (OBD) SYSTEM ..1050
Diagnosis Description 1050
CONSULT-III Function 1054

COMPONENT DIAGNOSIS 1061

TROUBLE DIAGNOSIS - SPECIFICATION VALUE 1061
Description 1061
Component Function Check 1061
Diagnosis Procedure 1061

POWER SUPPLY AND GROUND CIRCUIT ..1069
Diagnosis Procedure 1069

cardiagn.com

U1001 CAN COMM CIRCUIT 1073
Description 1073
DTC Logic 1073
Diagnosis Procedure 1073

U1010 CONTROL UNIT (CAN) 1074
Description 1074
DTC Logic 1074
Diagnosis Procedure 1074

P0011 IVT CONTROL 1075
DTC Logic 1075
Diagnosis Procedure 1076
Component Inspection 1077

P0102, P0103 MAF SENSOR 1079
Description 1079
DTC Logic 1079
Diagnosis Procedure 1080
Component Inspection 1081

P0117, P0118 ECT SENSOR 1084
Description 1084
DTC Logic 1084
Diagnosis Procedure 1085
Component Inspection 1085

P0122, P0123 TP SENSOR 1087
Description 1087
DTC Logic 1087
Diagnosis Procedure 1087
Component Inspection 1088
Special Repair Requirement 1089

P0132 HO2S1 1090
Description 1090
DTC Logic 1090
Diagnosis Procedure 1091
Component Inspection 1092

P0134 HO2S1 1094
Description 1094
DTC Logic 1094
Diagnosis Procedure 1095
Component Inspection 1096

P0222, P0223 TP SENSOR 1098
Description 1098
DTC Logic 1098
Diagnosis Procedure 1098
Component Inspection 1099
Special Repair Requirement 1100

P0327, P0328 KS 1101
Description 1101
DTC Logic 1101
Diagnosis Procedure 1101
Component Inspection 1102

P0335 CKP SENSOR (POS) 1103
Description 1103
DTC Logic 1103
Diagnosis Procedure 1104
Component Inspection 1106

P0340 CMP SENSOR (PHASE) 1107
Description 1107
DTC Logic 1107
Diagnosis Procedure 1108
Component Inspection 1109

P0605 ECM 1111
Description 1111
DTC Logic 1111
Diagnosis Procedure 1112

P1111 IVT CONTROL SOLENOID VALVE ...1113
Description 1113
DTC Logic 1113
Diagnosis Procedure 1113
Component Inspection 1114

P1121 ELECTRIC THROTTLE CONTROL ACTUATOR 1116
Description 1116
DTC Logic 1116
Diagnosis Procedure 1116
Special Repair Requirement 1117

P1122 ELECTRIC THROTTLE CONTROL FUNCTION 1118
Description 1118
DTC Logic 1118
Diagnosis Procedure 1118
Component Inspection 1121
Special Repair Requirement 1121

P1124, P1126 THROTTLE CONTROL MOTOR RELAY 1122
Description 1122
DTC Logic 1122
Diagnosis Procedure 1122

P1128 THROTTLE CONTROL MOTOR 1125
Description 1125
DTC Logic 1125
Diagnosis Procedure 1125
Component Inspection 1126
Special Repair Requirement 1126

P1212 TCS COMMUNICATION LINE 1128
Description 1128
DTC Logic 1128
Diagnosis Procedure 1128

P1217 ENGINE OVER TEMPERATURE 1129
DTC Logic 1129
Component Function Check 1129
Diagnosis Procedure 1130

P1225 TP SENSOR 1133
Description 1133

cardiagn.com

DTC Logic 1133
Diagnosis Procedure 1133
Special Repair Requirement 1134

P1226 TP SENSOR 1135
Description 1135
DTC Logic 1135
Diagnosis Procedure 1135
Special Repair Requirement 1136

P1229 SENSOR POWER SUPPLY 1137
DTC Logic 1137
Diagnosis Procedure 1137

P1564 ASCD STEERING SWITCH 1139
Description 1139
DTC Logic 1139
Diagnosis Procedure 1139
Component Inspection 1141

P1572 ASCD BRAKE SWITCH 1142
Description 1142
DTC Logic 1142
Component Function Check 1143
Diagnosis Procedure 1144
Component Inspection (ASCD Brake Switch) 1148
Component Inspection (ASCD Clutch Switch) 1148
Component Inspection (Stop Lamp Switch) 1149

P1574 ASCD VEHICLE SPEED SENSOR 1150
Description 1150
DTC Logic 1150
Diagnosis Procedure 1150

P1706 PNP SWITCH 1152
Description 1152
DTC Logic 1152
Component Function Check 1153
Diagnosis Procedure 1153

P1805 BRAKE SWITCH 1155
Description 1155
DTC Logic 1155
Diagnosis Procedure 1155
Component Inspection (Stop Lamp Switch) 1156

P2122, P2123 APP SENSOR 1158
Description 1158
DTC Logic 1158
Diagnosis Procedure 1158
Component Inspection 1160
Special Repair Requirement 1160

P2127, P2128 APP SENSOR 1161
Description 1161
DTC Logic 1161
Diagnosis Procedure 1161
Component Inspection 1163
Special Repair Requirement 1164

P2135 TP SENSOR 1165
Description 1165
DTC Logic 1165
Diagnosis Procedure 1165
Component Inspection 1167
Special Repair Requirement 1167

P2138 APP SENSOR 1168
Description 1168
DTC Logic 1168
Diagnosis Procedure 1168
Component Inspection 1170
Special Repair Requirement 1171

ASCD BRAKE SWITCH 1172
Description 1172
Component Function Check 1172
Diagnosis Procedure 1172
Component Inspection (ASCD Brake Switch) 1174
Component Inspection (ASCD Clutch Switch) 1175

ASCD INDICATOR 1176
Description 1176
Component Function Check 1176
Diagnosis Procedure 1176

COOLING FAN 1177
Description 1177
Component Function Check 1177
Diagnosis Procedure 1177
Component Inspection (Cooling Fan Motor) 1179
Component Inspection (Cooling Fan Relay) 1179

ELECTRICAL LOAD SIGNAL 1180
Description 1180
Component Function Check 1180
Diagnosis Procedure 1180

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE 1182
Description 1182
Component Function Check 1182
Diagnosis Procedure 1182
Component Inspection 1184

FUEL INJECTOR 1185
Description 1185
Component Function Check 1185
Diagnosis Procedure 1185
Component Inspection 1186

FUEL PUMP 1188
Description 1188
Component Function Check 1188
Diagnosis Procedure 1188
Component Inspection (Fuel Pump) 1190

HO2S1 1191
Description 1191
Component Function Check 1191
Diagnosis Procedure 1192
Component Inspection 1193

cardiagn.com

HO2S1 HEATER 1196
Description 1196
Component Function Check 1196
Diagnosis Procedure 1196
Component Inspection 1198

HO2S2 1199
Description 1199
Component Function Check 1199
Diagnosis Procedure 1200
Component Inspection 1201

HO2S2 HEATER 1203
Description 1203
Component Function Check 1203
Diagnosis Procedure 1203
Component Inspection 1205

IAT SENSOR 1206
Description 1206
Component Function Check 1206
Diagnosis Procedure 1206
Component Inspection 1207

IGNITION SIGNAL 1208
Description 1208
Component Function Check 1208
Diagnosis Procedure 1208
Component Inspection (Ignition Coil with Power Transistor) 1211
Component Inspection (Condenser) 1211

MALFUNCTION INDICATOR 1213
Description 1213
Component Function Check 1213
Diagnosis Procedure 1213

POSITIVE CRANKCASE VENTILATION 1214
Description 1214
Component Inspection 1214

REFRIGERANT PRESSURE SENSOR 1215
Description 1215
Component Function Check 1215
Diagnosis Procedure 1215

VSS 1217
Description 1217
Diagnosis Procedure 1217

ECU DIAGNOSIS 1218

ECM 1218
Reference Value 1218
Wiring Diagram - ENGINE CONTROL SYSTEM -1229
Fail Safe 1239
DTC Inspection Priority Chart 1241
DTC Index 1241

SYMPTOM DIAGNOSIS 1243

ENGINE CONTROL SYSTEM 1243
Symptom Table 1243

NORMAL OPERATING CONDITION 1247
Description 1247

PRECAUTION 1248

PRECAUTIONS 1248
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 1248
Precaution for Procedure without Cowl Top Cover1248
On Board Diagnostic (OBD) System of Engine and CVT 1248
General Precautions 1248

PREPARATION 1252

PREPARATION 1252
Special Service Tools 1252
Commercial Service Tools 1252

ON-VEHICLE REPAIR 1254

FUEL PRESSURE 1254
Inspection 1254

EVAPORATIVE EMISSION SYSTEM 1256
Inspection 1256

SERVICE DATA AND SPECIFICATIONS (SDS) 1257

SERVICE DATA AND SPECIFICATIONS (SDS) 1257
Idle Speed 1257
Ignition Timing 1257
Mass Air Flow Sensor 1257

K9K

BASIC INSPECTION 1258

DIAGNOSIS AND REPAIR WORKFLOW 1258
Work Flow 1258
Diagnostic Work Sheet 1260

INSPECTION AND ADJUSTMENT 1262

BASIC INSPECTION 1262
BASIC INSPECTION : Description 1262
BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check) 1262
BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check) 1263
BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check] 1263

cardiagn.com

BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check] 1264
BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check) 1267
BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open) 1271
BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity) 1272

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 1273
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 1273
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement .1273

EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING 1274
EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Description 1274
EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement 1274

FUNCTION DIAGNOSIS 1276

ENGINE CONTROL SYSTEM 1276
System Diagram 1276
System Description 1277
Component Parts Location 1277
Component Description 1280

FUEL INJECTION CONTROL 1281
System Description 1281
Component Parts Location 1282

TURBOCHARGER BOOST CONTROL 1287
Vacuum Hose Drawing 1287
System Description 1287
Component Parts Location 1287

EGR SYSTEM 1292
System Description 1292
Component Parts Location 1292

IDLE SPEED CONTROL 1296
System Diagram 1296
System Description 1296
Component Parts Location 1296

ENGINE TORQUE CONTROL 1301
System Description 1301
Component Parts Location 1301

GLOW CONTROL 1305
System Description 1305
Component Parts Location 1305

COOLING FAN CONTROL 1309
System Description 1309
Component Parts Location 1309

CAN COMMUNICATION 1314
System Description 1314

ON BOARD DIAGNOSTIC (OBD) SYSTEM ..1315
Diagnosis Description 1315

COMPONENT DIAGNOSIS 1317

POWER SUPPLY AND GROUND CIRCUIT ..1317
Diagnosis Procedure 1317

P0001 FUEL PUMP 1320
DTC Logic 1320
Diagnosis Procedure 1320
Component Inspection 1321

P0002 FUEL PUMP 1322
DTC Logic 1322
Diagnosis Procedure 1322
Component Inspection 1323

P0016 CKP - CMP CORRELATION 1324
DTC Logic 1324
Diagnosis Procedure 1324
Component Inspection 1325

P0045 TC BOOST CONTROL SOLENOID VALVE 1327
DTC Logic 1327
Diagnosis Procedure 1327
Component Inspection 1328

P0069 TC BOOST SENSOR, BARO SENSOR CORRELATION 1329
DTC Logic 1329
Diagnosis Procedure 1329
Component Inspection 1330

P0087 FUEL PUMP 1331
DTC Logic 1331
Diagnosis Procedure 1331

P0090 FUEL PUMP 1333
DTC Logic 1333
Diagnosis Procedure 1333
Component Inspection 1334

P0100 MAF SENSOR 1335
Description 1335
DTC Logic 1335
Diagnosis Procedure 1335
Component Inspection 1337

P0101 MAF SENSOR 1338
Description 1338
DTC Logic 1338
Diagnosis Procedure 1338
Component Inspection 1340

cardiagn.com

P0110 IAT SENSOR 1341
Description 1341
DTC Logic 1341
Diagnosis Procedure 1341
Component Inspection 1342

P0115 ECT SENSOR 1343
Description 1343
DTC Logic 1343
Diagnosis Procedure 1343
Component Inspection 1344

P0120 ELECTRIC THROTTLE CONTROL ACTUATOR 1345
Description 1345
DTC Logic 1345
Diagnosis Procedure 1345

P0180 FPT SENSOR 1347
Description 1347
DTC Logic 1347
Diagnosis Procedure 1347
Component Inspection 1348

P0190 FRP SENSOR 1349
Description 1349
DTC Logic 1349
Diagnosis Procedure 1349
Component Inspection 1350

P0200 FUEL INJECTOR 1351
DTC Logic 1351
Diagnosis Procedure 1351
Component Inspection 1352

P0201, P0202, P0203, P0204 FUEL INJECTOR 1353
DTC Logic 1353
Diagnosis Procedure 1353
Component Inspection 1354

P0217 ENGINE OVER TEMPERATURE 1355
DTC Logic 1355
Diagnosis Procedure 1355

P0225 APP SENSOR 1358
Description 1358
DTC Logic 1358
Diagnosis Procedure 1358
Component Inspection 1359

P0235 TC BOOST SENSOR 1361
Description 1361
DTC Logic 1361
Diagnosis Procedure 1361
Component Inspection 1362

P0335 CKP SENSOR 1363
DTC Logic 1363
Diagnosis Procedure 1363
Component Inspection 1364

P0340 CMP SENSOR 1365
DTC Logic 1365
Diagnosis Procedure 1365
Component Inspection 1366

P0380 GLOW RELAY 1368
DTC Logic 1368
Diagnosis Procedure 1368

P0381 GLOW CONTROL SYSTEM 1370
DTC Logic 1370
Diagnosis Procedure 1370
Component Inspection 1371

P0409 EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR 1372
DTC Logic 1372
Diagnosis Procedure 1372

P0487 EGR VOLUME CONTROL VALVE 1374
DTC Logic 1374
Diagnosis Procedure 1374
Component Inspection 1375

P0488 EGR SYSTEM 1376
DTC Logic 1376
Diagnosis Procedure 1376
Component Inspection 1378

P0500 VSS 1379
Description 1379
DTC Logic 1379
Diagnosis Procedure 1379

P0530 REFRIGERANT PRESSURE SENSOR 1380
Description 1380
DTC Logic 1380
Diagnosis Procedure 1380

P0560 BATTERY VOLTAGE 1382
DTC Logic 1382
Diagnosis Procedure 1382

P0571 ASCD BRAKE SWITCH 1385
DTC Logic 1385
Diagnosis Procedure 1385
Component Inspection 1386

P0575 ASCD STEERING SWITCH 1388
Description 1388
DTC Logic 1388
Diagnosis Procedure 1388
Component Inspection 1389

P0606 ECM 1391
Description 1391
DTC Logic 1391
Diagnosis Procedure 1391

P0641 SENSOR POWER SUPPLY 1393

cardiagn.com

DTC Logic 1393
Diagnosis Procedure 1393

P0651 SENSOR POWER SUPPLY 1395
DTC Logic 1395
Diagnosis Procedure 1395

P0685 ECM RELAY 1397
DTC Logic 1397
Diagnosis Procedure 1397

P0812 PNP SWITCH 1399
DTC Logic 1399
Diagnosis Procedure 1399

P0830 ASCD CLUTCH SWITCH 1400
Description 1400
DTC Logic 1400
Diagnosis Procedure 1400
Component Inspection 1401

P1089 FUEL PUMP 1402
DTC Logic 1402
Diagnosis Procedure 1402

P2101 ELECTRIC THROTTLE CONTROL FUNCTION 1404
Description 1404
DTC Logic 1404
Diagnosis Procedure 1404
Component Inspection 1405

P2120 APP SENSOR 1407
Description 1407
DTC Logic 1407
Diagnosis Procedure 1407
Component Inspection 1408

P2226 BARO SENSOR 1409
Description 1409
DTC Logic 1409
Diagnosis Procedure 1409

P2263 TC SYSTEM 1410
DTC Logic 1410
Diagnosis Procedure 1410

P2299 ACCELERATOR/BRAKE PEDAL POSITION INCONSISTENCY 1412
DTC Logic 1412
Diagnosis Procedure 1412

P2413 EGR SYSTEM 1415
DTC Logic 1415
Diagnosis Procedure 1415

P2502 BATTERY VOLTAGE 1418
DTC Logic 1418
Diagnosis Procedure 1418

P2610 ENGINE SAFETY STOP 1419
DTC Logic 1419
Diagnosis Procedure 1419

ASCD INDICATOR 1421
Description 1421
Component Function Check 1421
Diagnosis Procedure 1421

COOLING FAN 1422
Description 1422
Component Function Check 1422
Diagnosis Procedure 1422
Component Inspection (Cooling Fan Motor) 1424
Component Inspection (Cooling Fan Relay) 1424

STOP LAMP SWITCH 1425
Description 1425
Component Function Check 1425
Diagnosis Procedure 1425
Component Inspection 1426

ECU DIAGNOSIS 1427

ECM 1427
Wiring Diagram - ENGINE CONTROL SYSTEM -1427
DTC Index 1437

SYMPTOM DIAGNOSIS 1440

ENGINE CONTROL SYSTEM SYMPTOMS ..1440
Symptom Table 1440

NOT COMMUNICATION WITH THE ECM 1441
Description 1441
Diagnosis Procedure 1441

ENGINE DOES NOT START OR STARTS WITH DIFFICULTY 1442
Description 1442
Diagnosis Procedure 1442

STARTING DIFFICULT WITH COLD ENGINE1444
Description 1444
Diagnosis Procedure 1444

IMPOSSIBLE TO SHUT OFF ENGINE 1446
Description 1446
Diagnosis Procedure 1446

ENGINE IDLE SPEED TOO HIGH 1447
Description 1447
Diagnosis Procedure 1447

ENGINE IDLE SPEED TOO LOW OR UNSTABLE 1448
Description 1448
Diagnosis Procedure 1448

ENGINE STALLING 1450
Description 1450
Diagnosis Procedure 1450

cardiagn.com

NO OR VERY LITTLE ACCELERATION, INCREASE IN ENGINE SPEED 1452
Description 1452
Diagnosis Procedure 1452

ENGINE BUCKING 1455
Description 1455
Diagnosis Procedure 1455

ERRATIC ACCELERATION 1457
Description 1457
Diagnosis Procedure 1457

NO ENGINE BRAKING 1459
Description 1459
Diagnosis Procedure 1459

LOSS OF POWER 1460
Description 1460
Diagnosis Procedure 1460

TOO MUCH POWER 1463
Description 1463
Diagnosis Procedure 1463

OVERSPEED AT IDLE SPEED OR ON RELEASING BRAKE 1465
Description 1465
Diagnosis Procedure 1465

EXCESSIVE CONSUMPTION 1466
Description 1466
Diagnosis Procedure 1466

ENGINE KNOCK 1468
Description 1468
Diagnosis Procedure 1468

ENGINE OVERHEATING 1470
Description 1470
Diagnosis Procedure 1470

ENGINE SMOKES WHEN STARTED 1471
Description 1471
Diagnosis Procedure 1471

ENGINE EMITS BLUE SMOKE 1472
Description 1472
Diagnosis Procedure 1472

ENGINE SMOKES WHEN REVVED 1474
Description 1474
Diagnosis Procedure 1474

ENGINE EMITS WHITE SMOKE (ESPECIALLY WHEN STARTING) 1475
Description 1475
Diagnosis Procedure 1475

EMISSION CONTROL NOT SATISFACTORY1476
Description 1476
Diagnosis Procedure 1476

PRECAUTION 1478

PRECAUTIONS 1478
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 1478
Precaution for Procedure without Cowl Top Cover1478
On Board Diagnostic (OBD) System of Engine ..1478
General Precautions 1478
Cleanliness 1481

SERVICE DATA AND SPECIFICATIONS (SDS) 1483

SERVICE DATA AND SPECIFICATIONS (SDS) 1483
Idle Speed 1483

cardiagn.com

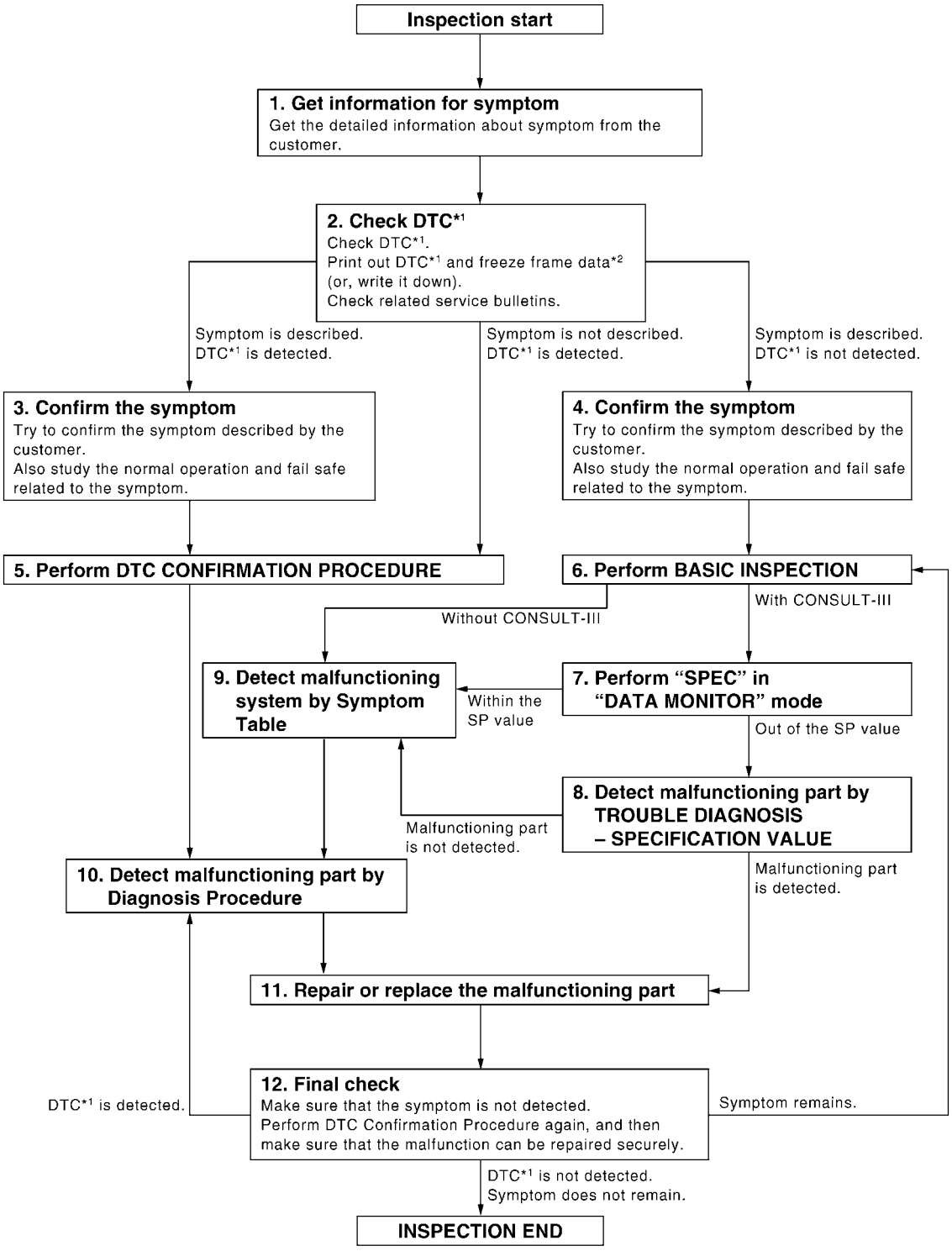
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001056110

OVERALL SEQUENCE



*1: Include 1st trip DTC.
*2: Include 1st trip freeze frame data.

JMBIA0078GB

DETAILED FLOW

cardiagn.com

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the “Diagnostic Work Sheet”. (Refer to EC-24, "Diagnostic Work Sheet".)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.

- Record DTC and freeze frame data. (Print them out with CONSULT-III or GST.)
- Erase DTC. (Refer to EC-87, "Diagnosis Description".)
- Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to EC-346, "Symptom Table".)

3. Check related service bulletins for information.

Is any symptom described and is any DTC detected?

Symptom is described, DTC is detected>>GO TO 3.
Symptom is described, DTC is not detected>>GO TO 4.
Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MI ON).
Also study the normal operation and fail safe related to the symptom. Refer to EC-350, "Description" and EC-339, "Fail Safe".
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail safe related to the symptom. Refer to EC-350, "Description" and EC-339, "Fail Safe".
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.
If two or more DTCs are detected, refer to EC-341, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.
  If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.
NO >> Check according to EC-341, "DTC Index".

6.PERFORM BASIC INSPECTION

Perform EC-26, "BASIC INSPECTION : Special Repair Requirement".

Do you have CONSULT-III?

cardiagn.com

YES >> GO TO 7.
NO >> GO TO 9.

7. PERFORM SPEC IN DATA MONITOR MODE

With CONSULT-III

Make sure that “MAS A/F SE-B1”, “B/FUEL SCHDL” and “A/F ALPHA-B1” are within the SP value using CONSULT-III in “SPEC” of “DATA MONITOR” mode. Refer to EC-109, "Component Function Check".

Is the measurement value within the SP value?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to EC-109, "Diagnosis Procedure".

Is malfunctioning part detected?

YES >> GO TO 11.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to EC-346, "Symptom Table" based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

>> GO TO 10.

10. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

NOTE:

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to Circuit Inspection in GI-41, "Circuit Inspection".

Is malfunctioning part detected?

YES >> GO TO 11.
NO >> Monitor input data from related sensors or check the voltage of related ECM terminals using CONSULT-III. Refer to EC-318, "Reference Value".

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to EC-87, "Diagnosis Description".

>> GO TO 12.

12. FINAL CHECK

When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then make sure that the malfunction have been repaired securely.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 10.
YES-2 >> Symptom remains: GO TO 6.
NO >> Before returning the vehicle to the customer, make sure to erase unnecessary DTC in ECM. (Refer to EC-87, "Diagnosis Description".) If the completion of SRT is needed, drive vehicle under the specific DRIVING PATTERN in EC-343, "How to Set SRT Code".

Diagnostic Work Sheet

INFOID:0000000001056111

DESCRIPTION

cardiagn.com

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.
Some conditions may cause the MI to come on steady or blink and DTC to be detected. Examples:
Vehicle ran out of fuel, which caused the engine to misfire.

KEY POINTS

WHAT ..... Vehicle & engine model
WHEN ..... Date, Frequencies
WHERE..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SEF907L

WORKSHEET SAMPLE

Customer name MR/MS	Model & Year	VIN
Engine #	Trans.	Mileage
Incident Date	Manuf. Date	In Service Date
Fuel and fuel filler cap	☐ Vehicle ran out of fuel causing misfire ☐ Fuel filler cap was left off or incorrectly screwed on.	
Symptoms — ☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]	
Symptoms — ☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
Symptoms — ☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
Symptoms — ☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading	
Incident occurrence	☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime	
Frequency	☐ All the time ☐ Under certain conditions ☐ Sometimes	
Weather conditions	☐ Not affected	
Weather conditions — Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]	
Weather conditions — Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F	
Engine conditions	☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions	☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)	
Driving conditions	☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp	☐ Turned on ☐ Not turned on	

MTBL0017

cardiagn.com

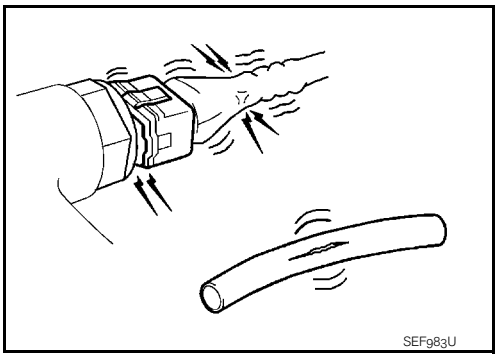
INSPECTION AND ADJUSTMENT
BASIC INSPECTION

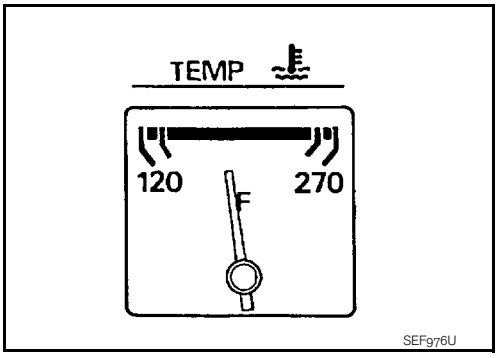
BASIC INSPECTION : Special Repair Requirement

INFOID:0000000001056112

1.INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
- Harness connectors for improper connections
- Wiring harness for improper connections, pinches and cut
- Vacuum hoses for splits, kinks and improper connections
- Hoses and ducts for leaks
- Air cleaner clogging
- Gasket
3. Confirm that electrical or mechanical loads are not applied.
- Headlamp switch is OFF.
- Air conditioner switch is OFF.
- Rear window defogger switch is OFF.
- Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
   Ensure engine stays below 1,000 rpm.


SEF983U

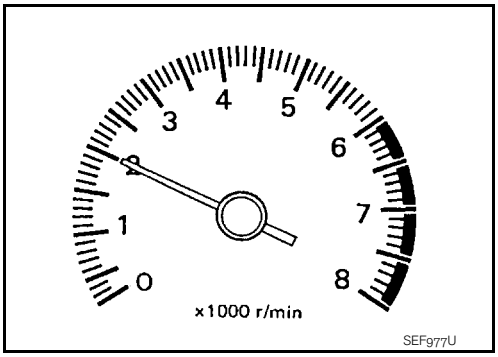


SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-III or GST.

Is any DTC detected?

YES >> GO TO 2.
NO >> GO TO 3.



SEF977U

2.REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding Diagnostic Procedure.

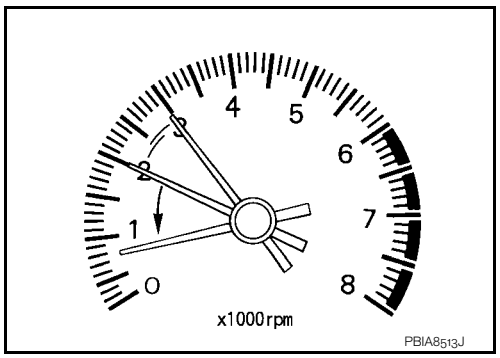
>> GO TO 3

3.CHECK TARGET IDLE SPEED

1. Run engine at about 2,000 rpm for about 2 minutes under no load.

cardiagn.com

2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed.
   For procedure, refer to EC-30, "IDLE SPEED : Special Repair Requirement".
   For specification, refer to EC-360, "Idle Speed".



Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 7.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
   For procedure, refer to EC-30, "IDLE SPEED : Special Repair Requirement".
   For specification, refer to EC-360, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the Following.
- Check camshaft position sensor (PHASE) and circuit. Refer to EC-197, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-193, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace. Then GO TO 4.

9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

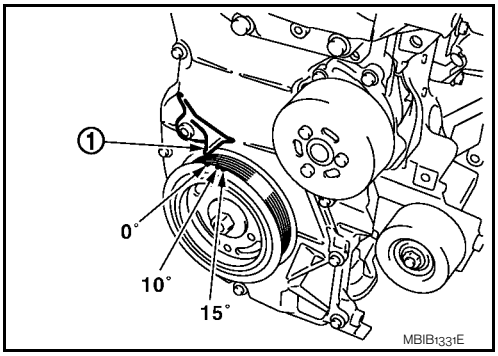
>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.

cardiagn.com

2. Check ignition timing with a timing light.
For procedure, refer to EC-30, "IGNITION TIMING : Special Repair Requirement".
For specification, refer to EC-360, "Ignition Timing".



1 : Timing indicator

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 14.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

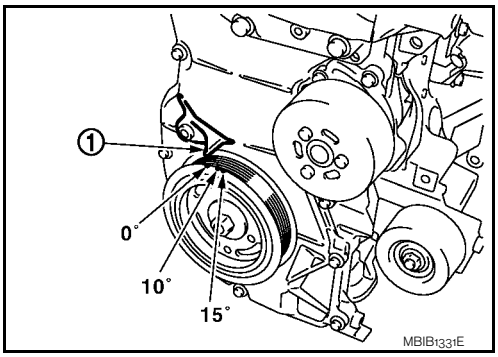
1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
For procedure, refer to EC-30, "IDLE SPEED : Special Repair Requirement".
For specification, refer to EC-360, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 15.
NO >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.
For procedure, refer to EC-30, "IGNITION TIMING : Special Repair Requirement".
For specification, refer to EC-360, "Ignition Timing".



1 : Timing indicator

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-46, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair the timing chain installation. Then GO TO 4.

cardiagn.com

17. DETECT MALFUNCTIONING PART

Check the following.
- Check camshaft position sensor (PHASE) and circuit. Refer to EC-197, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-193, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair or replace. Then GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

>> GO TO 4.

19. INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, go to EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000001056113

When replacing ECM, this procedure must be performed.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000001056114

1. PERFORM INITIALIZATION OF NATS SYSTEM AND REGISTRATION OF ALL NATS IGNITION KEY IDS

Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

>> GO TO 2.

2. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 4.

4. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

IDLE SPEED

IDLE SPEED : Description

INFOID:0000000001056115

This describes how to check the idle speed. For the actual procedure, follow the instructions in “BASIC INSPECTION”.

cardiagn.com

IDLE SPEED : Special Repair Requirement

INFOID:0000000001056116

1.CHECK IDLE SPEED

With CONSULT-III
Check idle speed in “DATA MONITOR” mode with CONSULT-III.
With GST
Check idle speed with Service $01 of GST.

>> INSPECTION END

IGNITION TIMING

IGNITION TIMING : Description

INFOID:0000000001056117

This describes how to check the ignition timing. For the actual procedure, follow the instructions in “BASIC INSPECTION”.

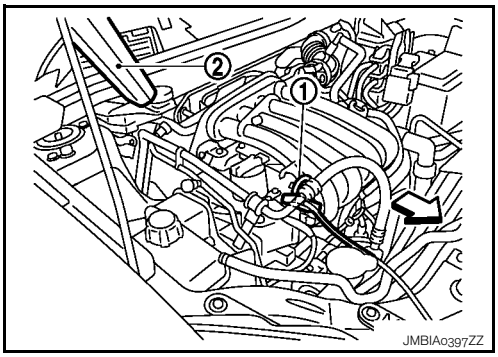
IGNITION TIMING : Special Repair Requirement

INFOID:0000000001056118

1.CHECK IGNITION TIMING

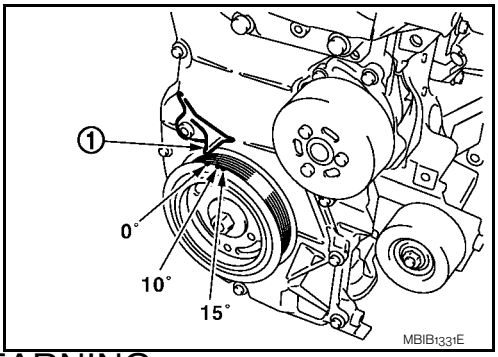
1. Attach timing light to No.1 ignition coil wire harness (1) as shown.

   2 : Timing light
   ⇦ : Vehicle front



2. Check ignition timing.

   1 : Timing indicator



>> INSPECTION END

ACCELERATOR PEDAL RELEASED POSITION LEARNING

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description

INFOID:0000000001056121

Accelerator Pedal Released Position Learning is a function of ECM to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement

INFOID:0000000001056122

1.START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF and wait at least 10 seconds.

cardiagn.com

4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF and wait at least 10 seconds.

>> END

THROTTLE VALVE CLOSED POSITION LEARNING

THROTTLE VALVE CLOSED POSITION LEARNING : Description

INFOID:0000000001056123

Throttle Valve Closed Position Learning is a function of ECM to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

INFOID:0000000001056124

1.START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
   Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

>> END

IDLE AIR VOLUME LEARNING

IDLE AIR VOLUME LEARNING : Description

INFOID:0000000001056125

Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps each engine idle speed within the specific range. It must be performed under any of the following conditions:
- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

IDLE AIR VOLUME LEARNING : Special Repair Requirement

INFOID:0000000001056126

1.PRECONDITIONING

Make sure that all of the following conditions are satisfied.
Learning will be cancelled if any of the following conditions are missed for even a moment.
- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- Park/neutral position switch: ON
- Electric load switch: OFF
  (Air conditioner, headlamp, rear window defogger)
  On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
- Drive vehicle for 10 minutes

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.IDLE AIR VOLUME LEARNING

With CONSULT-III
1. Perform Accelerator Pedal Released Position Learning. Refer to EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
2. Perform Throttle Valve Closed Position Learning. Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
3. Start engine and warm it up to normal operating temperature.
4. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.

cardiagn.com

5. Touch “START” and wait 20 seconds.

Is “CMPLT” displayed on CONSULT-III screen?

YES >> GO TO 4.
NO >> GO TO 5.

3. IDLE AIR VOLUME LEARNING

Without CONSULT-III

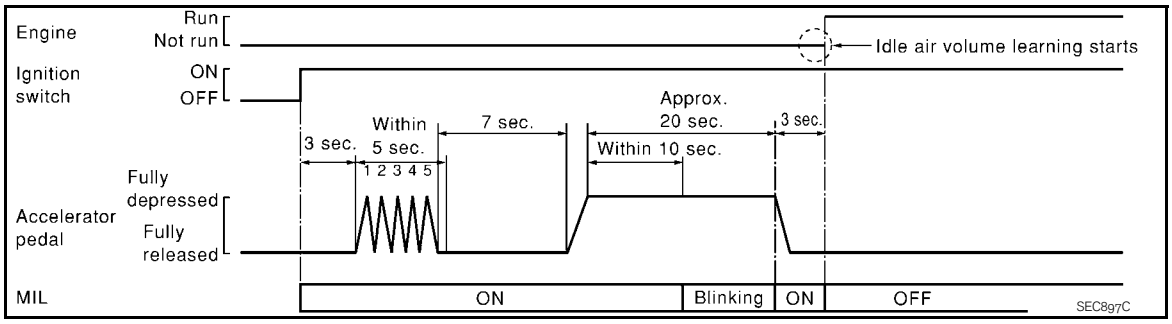
NOTE:

- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**

1. Perform Accelerator Pedal Released Position Learning. Refer to EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
2. Perform Throttle Valve Closed Position Learning. Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
3. Start engine and warm it up to normal operating temperature.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
6. Repeat the following procedure quickly five times within 5 seconds.

- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.

7. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MI stops blinking and turned ON.
8. Fully release the accelerator pedal within 3 seconds after the MI turned ON.
9. Start engine and let it idle.
10. Wait 20 seconds.



>> GO TO 4.

4. CHECK IDLE SPEED AND IGNITION TIMING

Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

For specification, refer to EC-360, "Idle Speed" and EC-360, "Ignition Timing".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following

- Check that throttle valve is fully closed.
- Check PCV valve operation.
- Check that downstream of throttle valve is free from air leakage.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace malfunctioning part.

6. DETECT MALFUNCTIONING PART

Engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.

cardiagn.com

It is useful to perform “TROUBLE DIAGNOSIS - SPECIFICATION VALUE”. Refer to EC-109, "Description".
If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:
- Engine stalls.
- Erroneous idle.

>> INSPECTION END

MIXTURE RATIO SELF-LEARNING VALUE CLEAR

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:0000000001056127

This describes how to erase the mixture ratio self-learning value. For the actual procedure, follow the instructions in “Diagnosis Procedure”.

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:0000000001056128

1.START

With CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-III.
3. Clear mixture ratio self-learning value by touching “CLEAR”.

With GST
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service $03 with GST. Make sure DTC P0102 is detected.
7. Select Service $04 with GST to erase the DTC P0102.

>> END

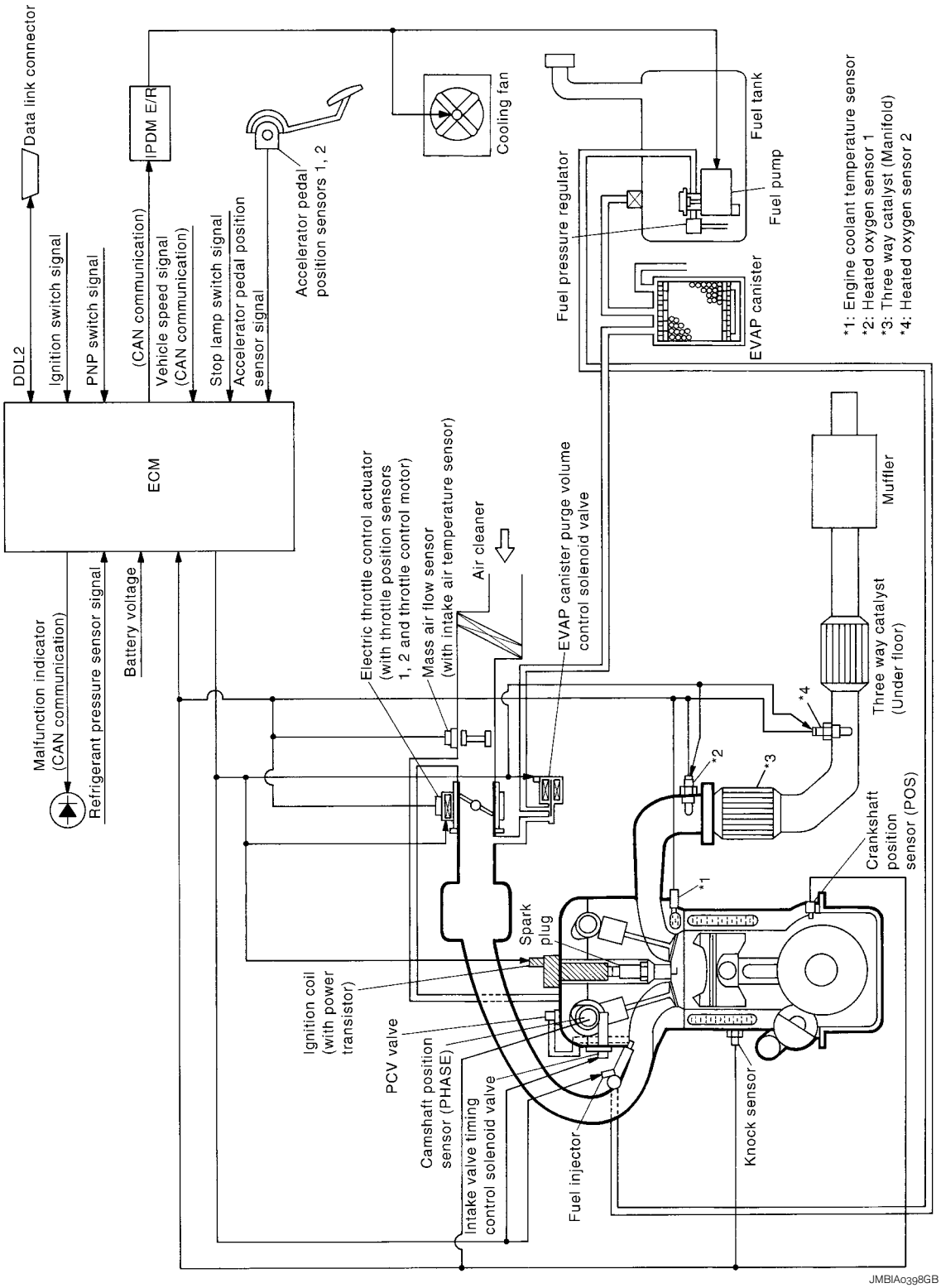
cardiagn.com

FUNCTION DIAGNOSIS

ENGINE CONTROL SYSTEM

System Diagram

INFOID:0000000001056129



System Description

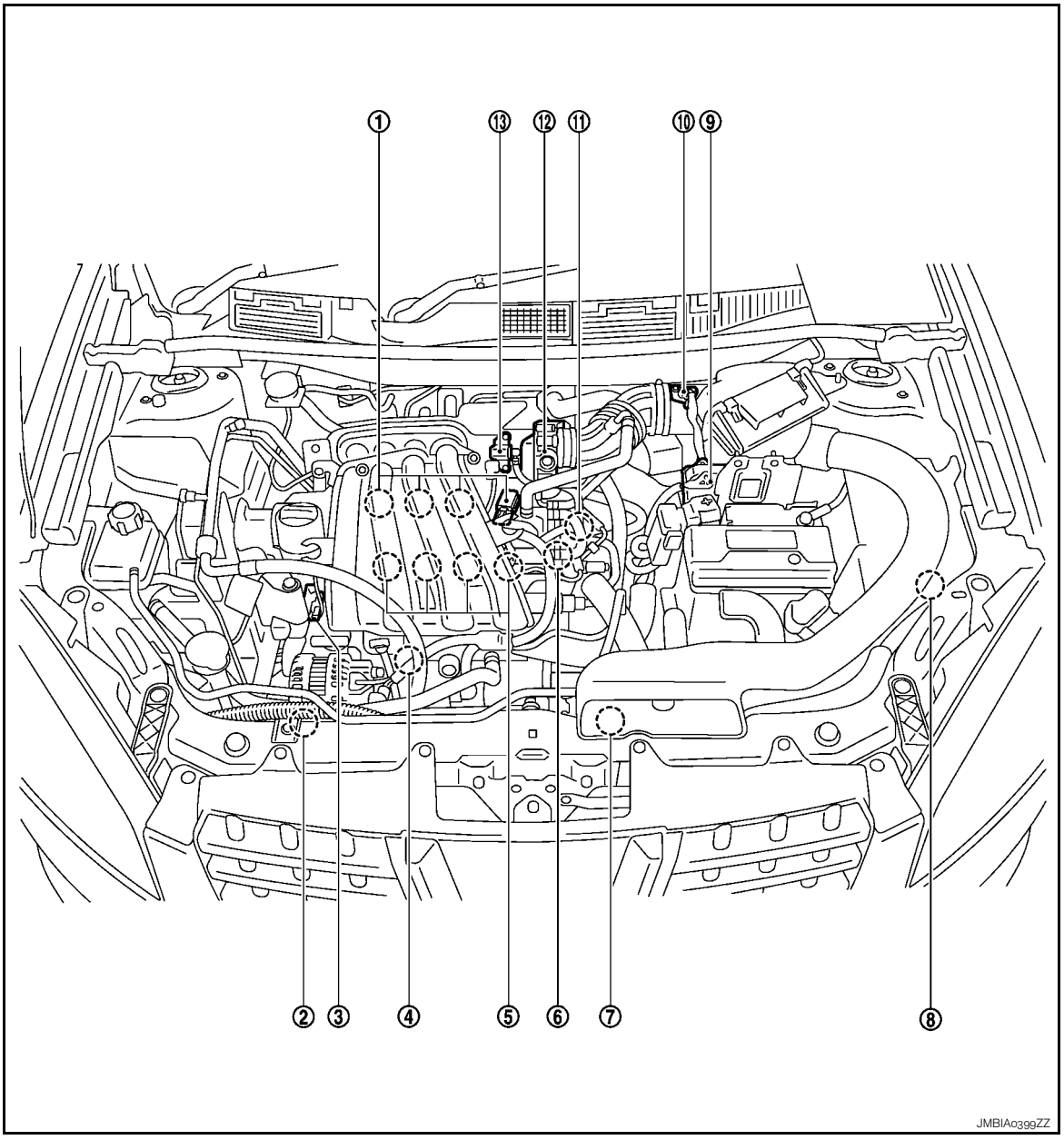
INFOID:0000000001056130

cardiagn.com

ECM performs various controls such as fuel injection control and ignition timing control.

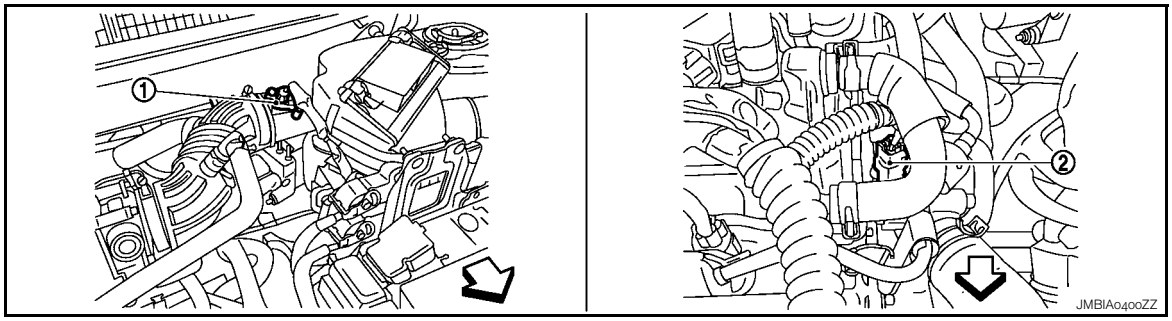
Component Parts Location

INFOID:0000000001056131



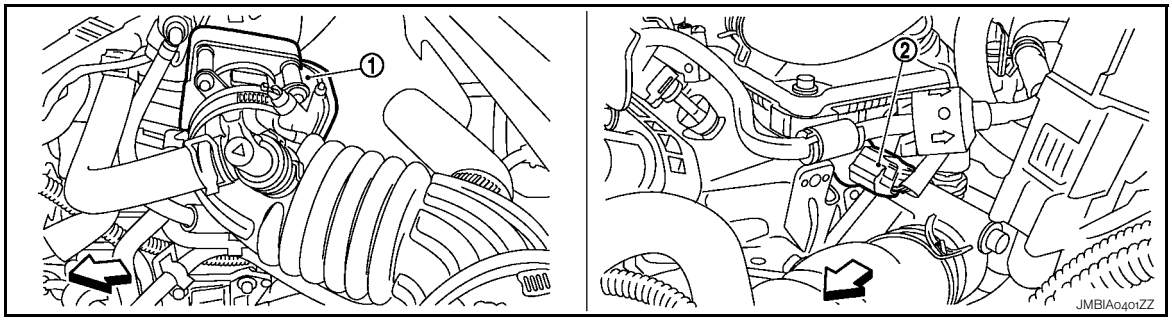
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



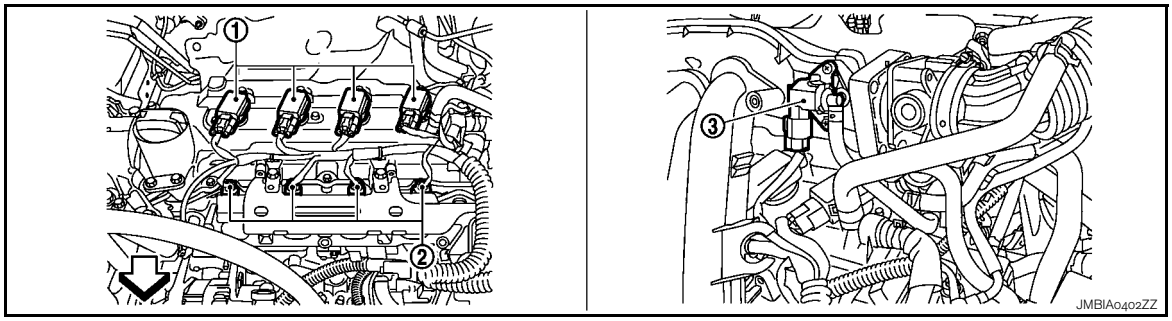
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



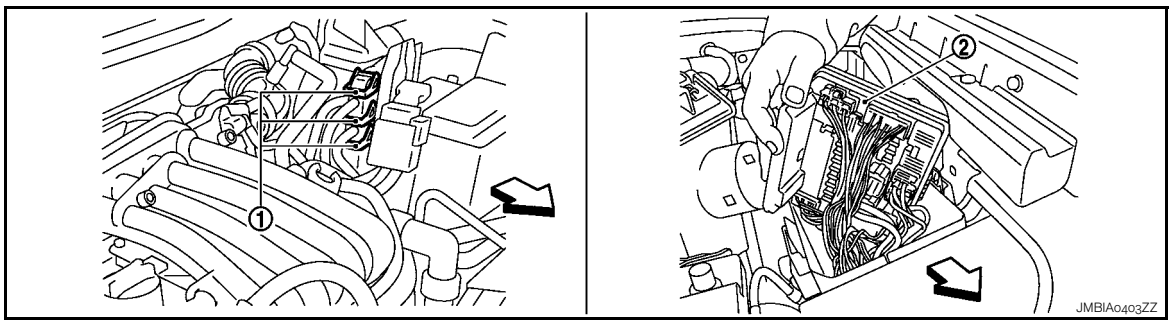
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

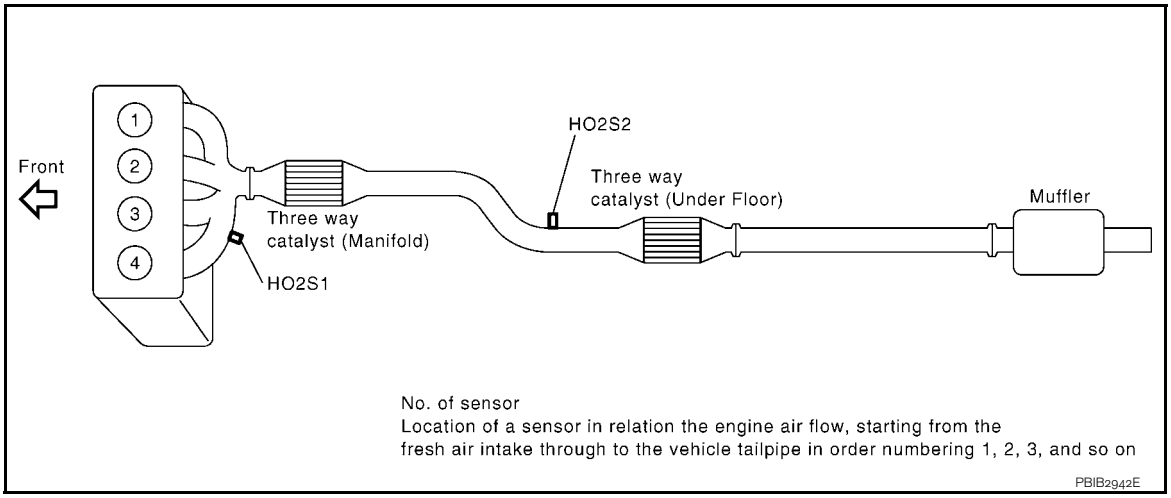
⇦ Vehicle front

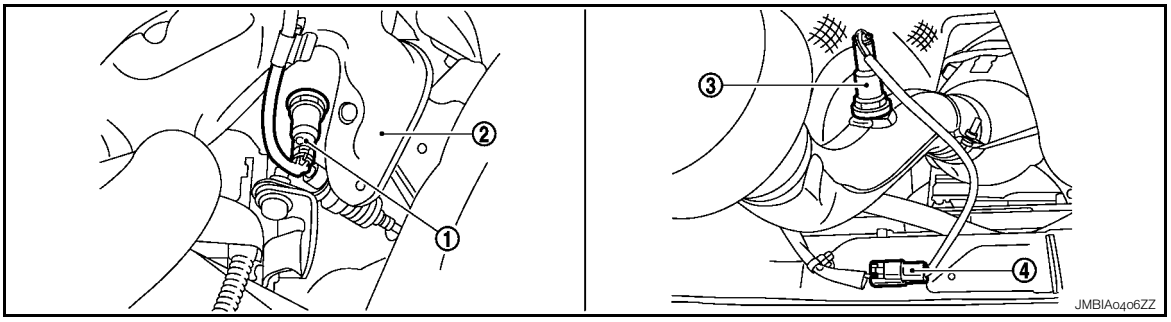


1. ECM harness connector
2. IPDM E/R

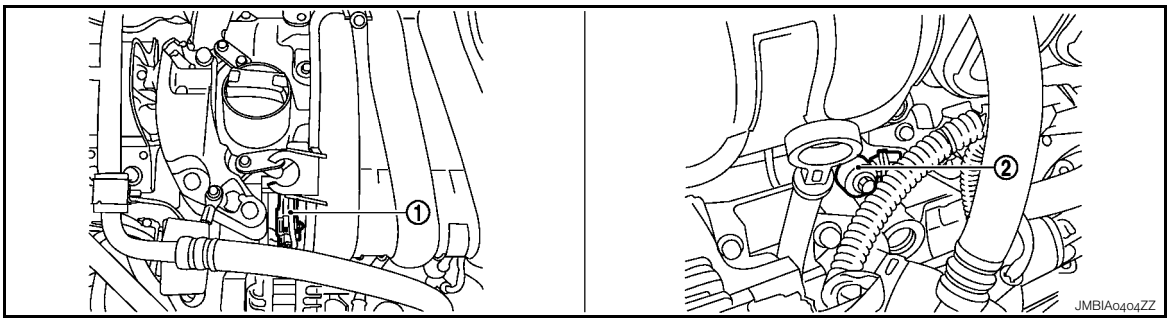
⇦ Vehicle front

cardiagn.com

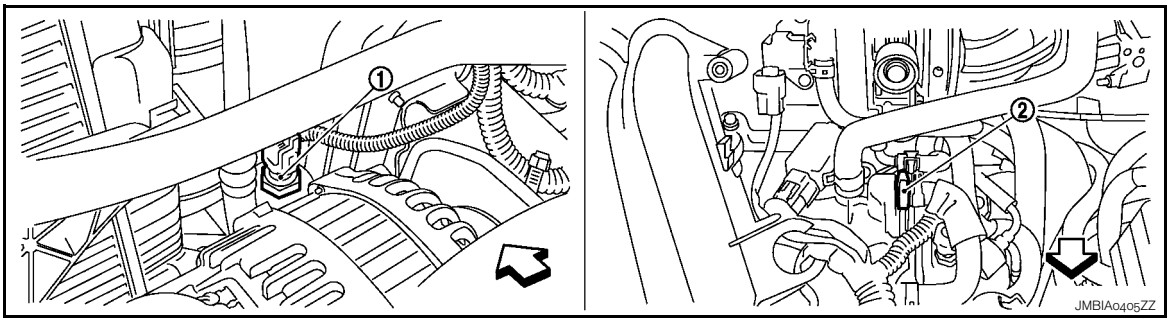




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



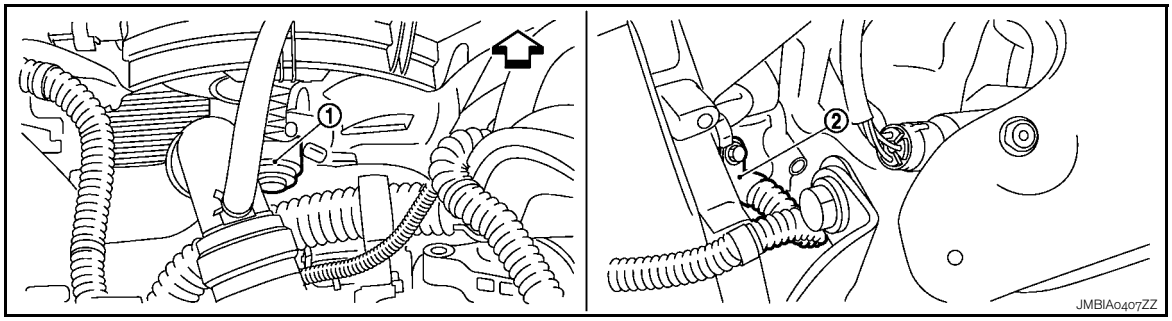
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

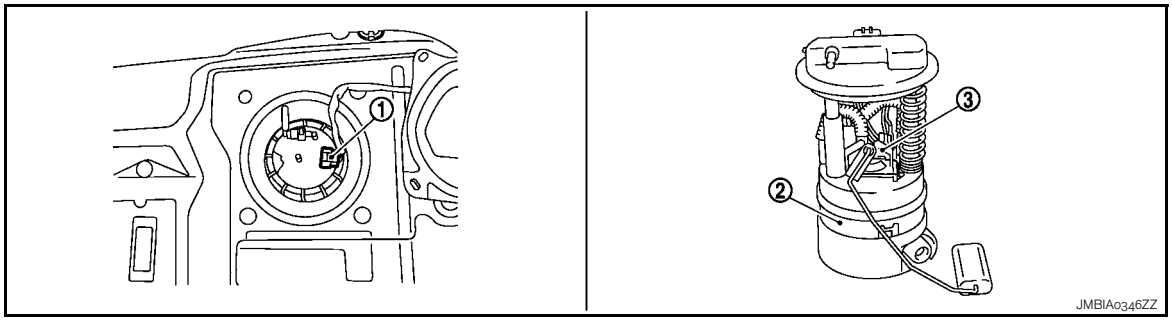
⇦ Vehicle front

cardiagn.com

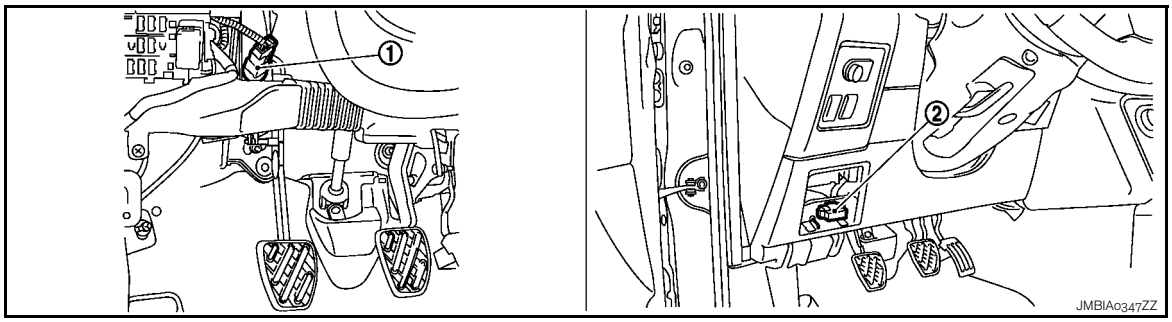


1. Cooling fan motor
2. Crankshaft position sensor (POS)

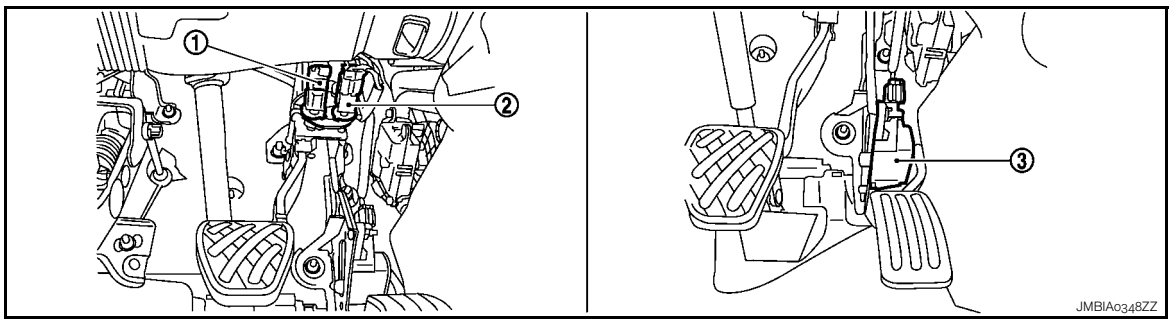
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

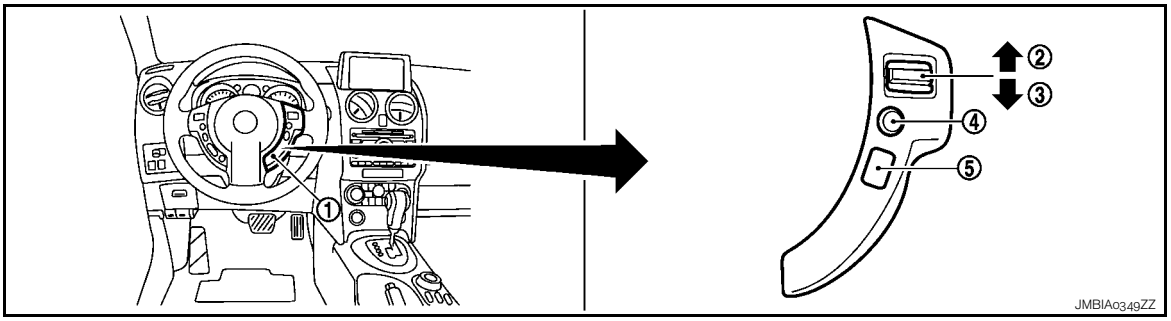


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001056132

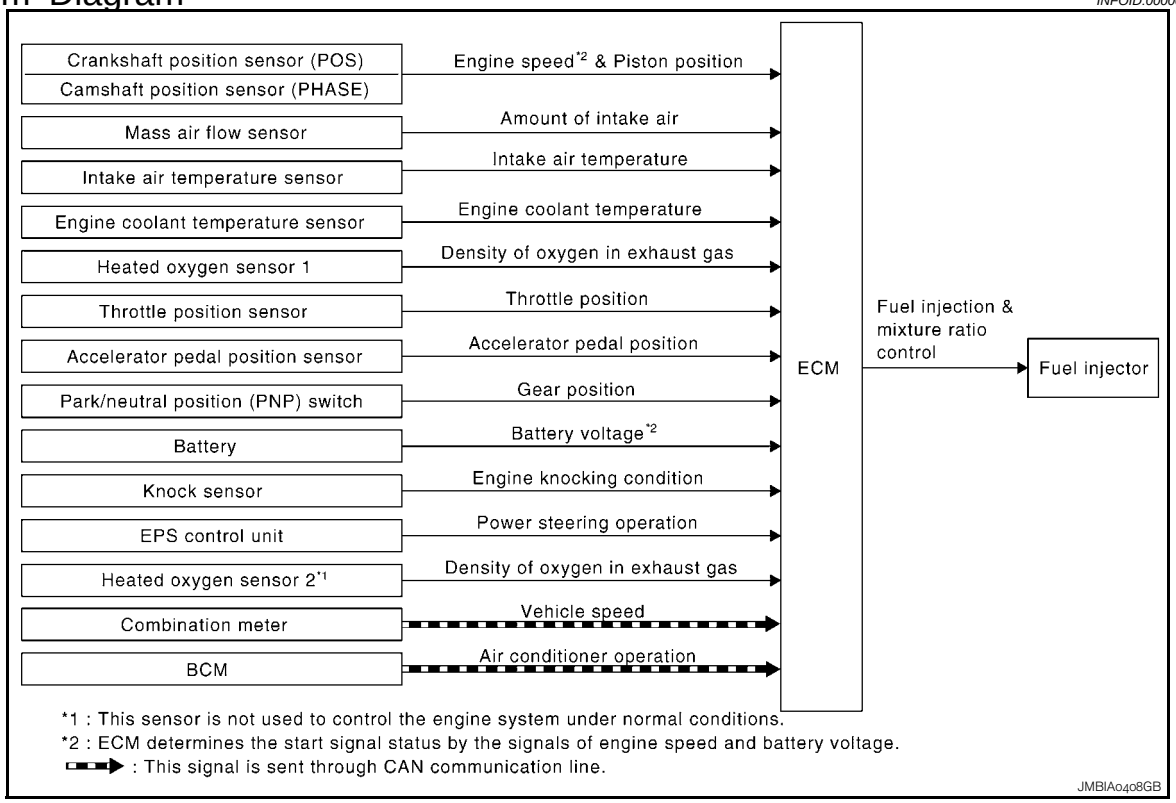
Component	Reference
Accelerator pedal position sensor	EC-280, "Description"
ASCD brake switch	EC-294, "Description"
ASCD steering switch	EC-263, "Description"
ASCD vehicle speed sensor	EC-272, "Description"
Camshaft position sensor (PHASE)	EC-197, "Description"
Crankshaft position sensor (POS)	EC-193, "Description"
Cooling fan motor	EC-299, "Description"
Electric throttle control actuator	EC-217, "Description"
Engine coolant temperature sensor	EC-135, "Description"
Fuel injector	EC-303, "Description"
Fuel pump	EC-306, "Description"
Heated oxygen sensor 1	EC-141, "Description"
Heated oxygen sensor 1 heater	EC-156, "Description"
Heated oxygen sensor 2	EC-159, "Description"
Heated oxygen sensor 2 heater	EC-171, "Description"
Ignition signal	EC-309, "Description"
Intake air temperature sensor	EC-132, "Description"
Intake valve timing control solenoid valve	EC-215, "Description"
Knock sensor	EC-191, "Description"
Mass air flow sensor	EC-127, "Description"
Park/neutral position switch	EC-274, "Description"
PCV valve	EC-315, "Description"
Refrigerant pressure sensor	EC-316, "Description"
Stop lamp switch	EC-277, "Description"
Throttle control motor	EC-226, "Description"
Throttle control motor relay	EC-223, "Description"
Throttle position sensor	EC-138, "Description"
Vehicle speed sensor	EC-209, "Description"

cardiagn.com

MULTIPORT FUEL INJECTION SYSTEM

System Diagram

INFOID:0000000001056133



System Description

INFOID:0000000001056134

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*3 Piston position	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Intake air temperature sensor	Intake air temperature		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage*3		
Knock sensor	Engine knocking condition		
EPS control unit	Power steering operation		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
BCM*2	Air conditioner operation		
Combination meter*2	Vehicle speed		

*1: This sensor is not used to control the engine system under normal conditions.

*2: This signal is sent to the ECM through CAN communication line.

*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

cardiagn.com

SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from the crankshaft position sensor (POS), camshaft position sensor (PHASE) and the mass air flow sensor.

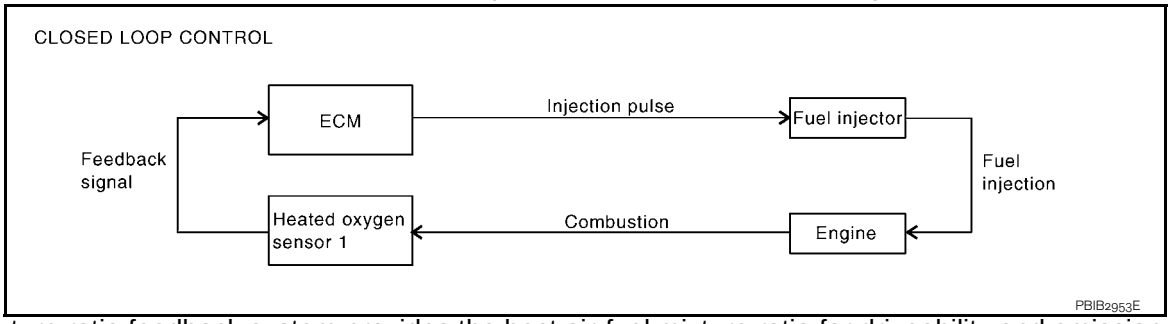
VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- High-load, high-speed operation

<Fuel decrease>
- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to EC-141, "DTC Logic". This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).
This stage is referred to as the closed loop control condition.
heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

- Open Loop Control
  The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 or its circuit
- Insufficient activation of heated sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- When starting the engine

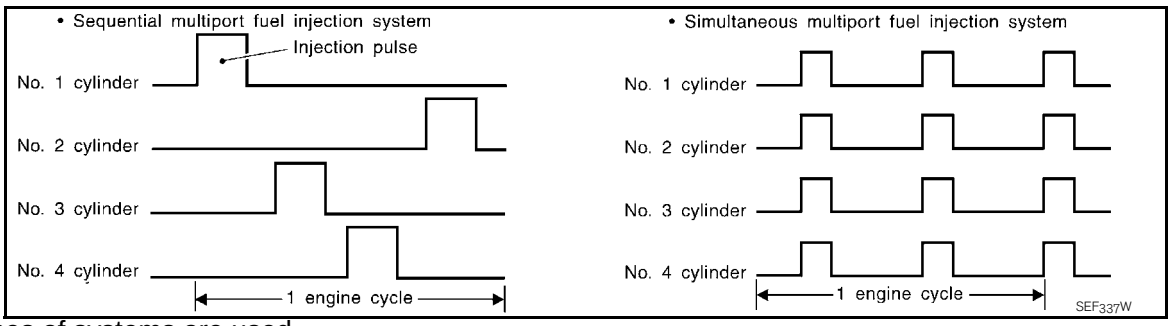
MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) and characteristic changes during operation (i.e., fuel injector clogging) directly affect mixture ratio.
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.

cardiagn.com

"Fuel trim" refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.
"Short term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.
"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

- Sequential Multiport Fuel Injection System
  Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.
- Simultaneous Multiport Fuel Injection System
  Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
  The four injectors will then receive the signals two times for each engine cycle.
  This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

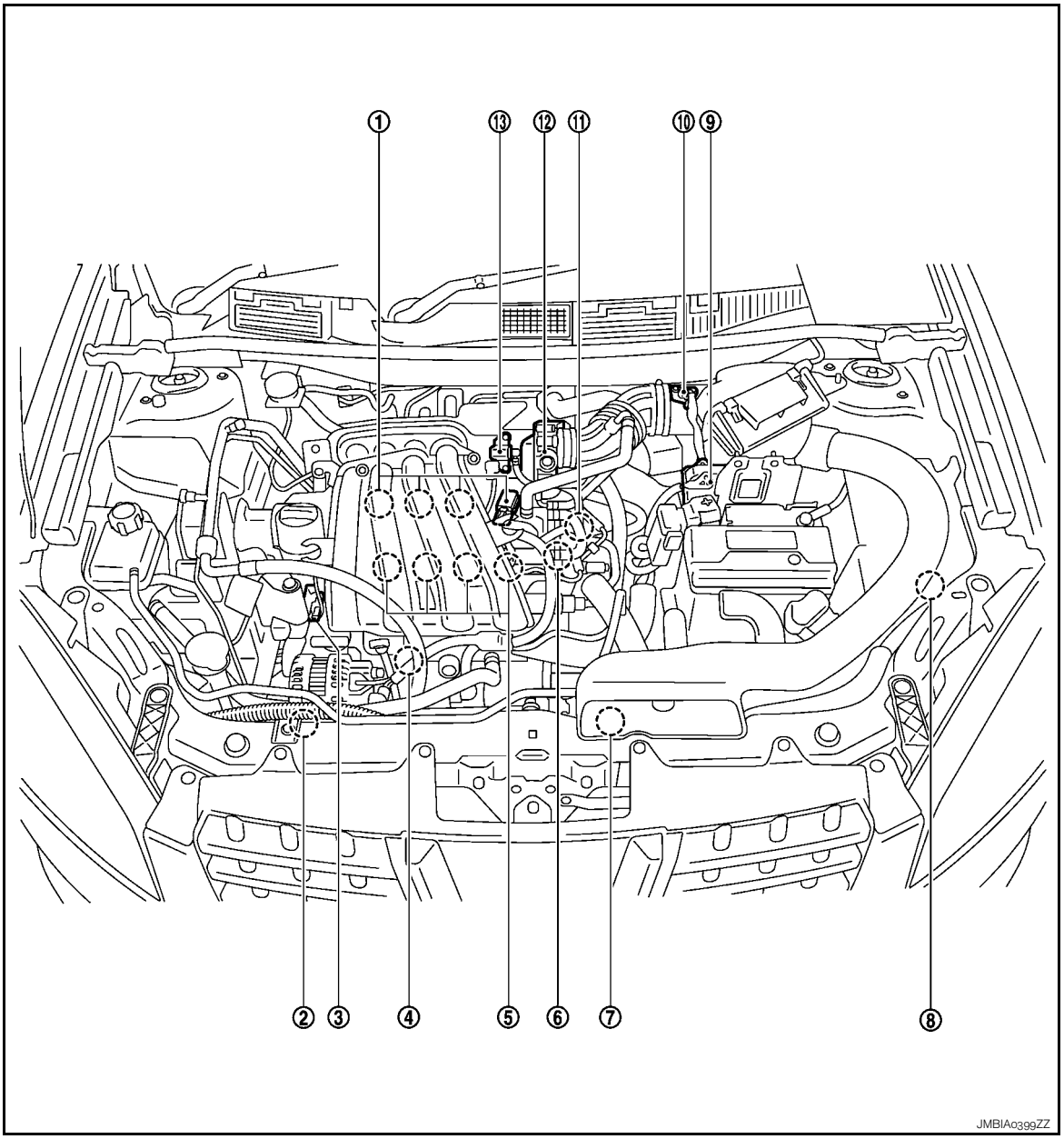
FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration, operation of the engine at excessively high speeds or operation of the vehicle at excessively high speeds.

Component Parts Location

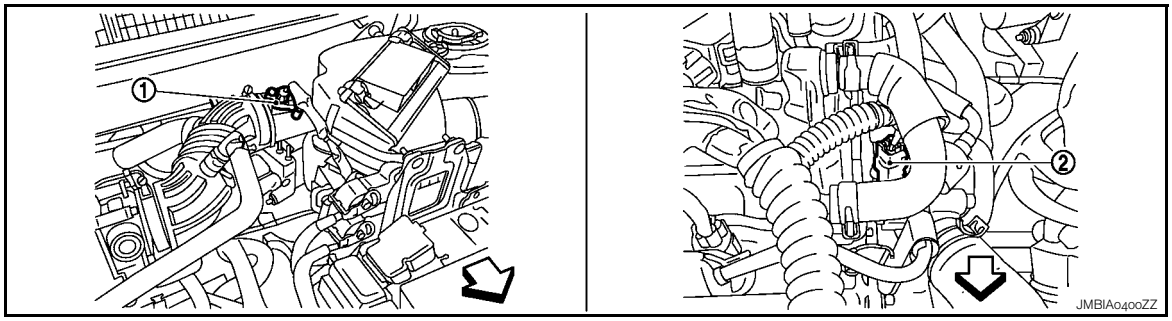
INFOID:0000000001060009

cardiagn.com



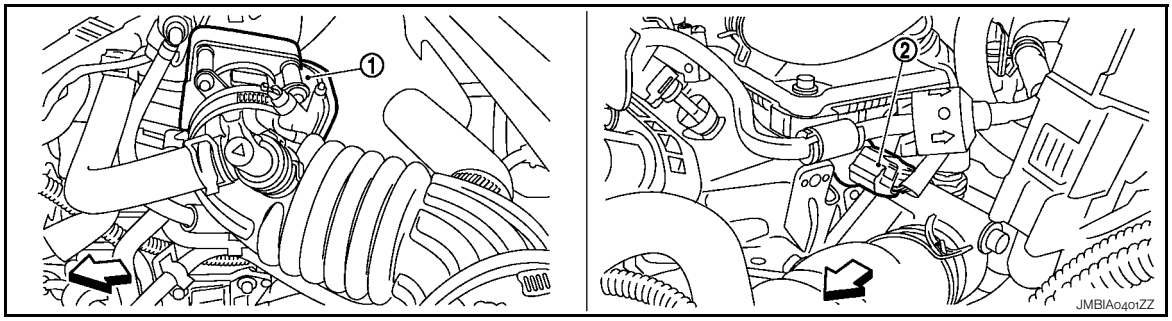
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



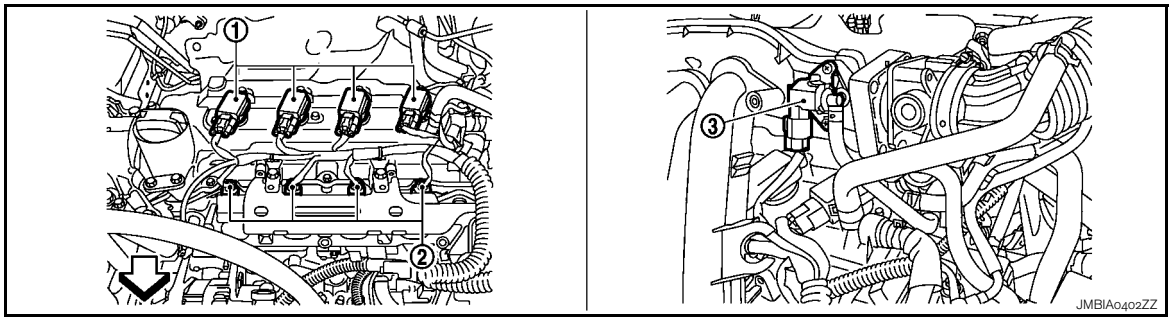
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



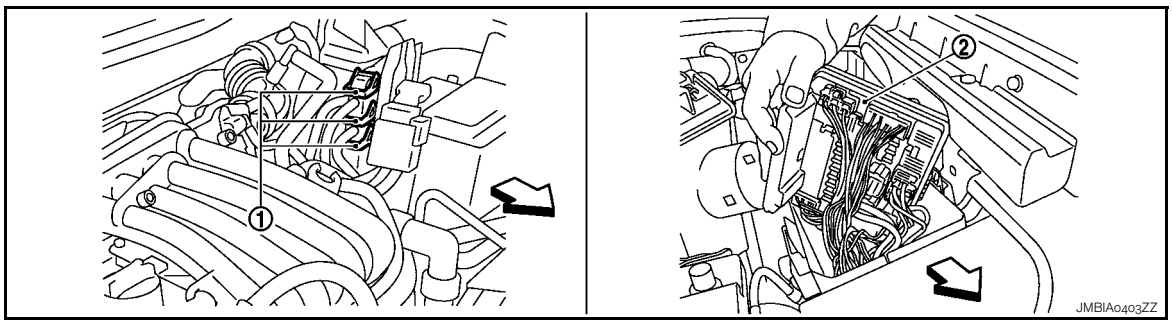
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

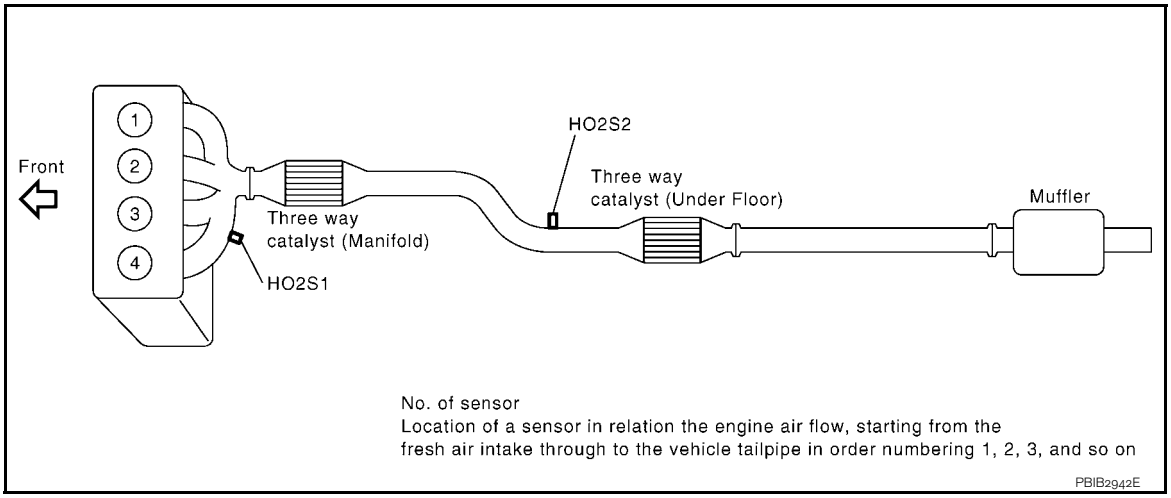
⇦ Vehicle front

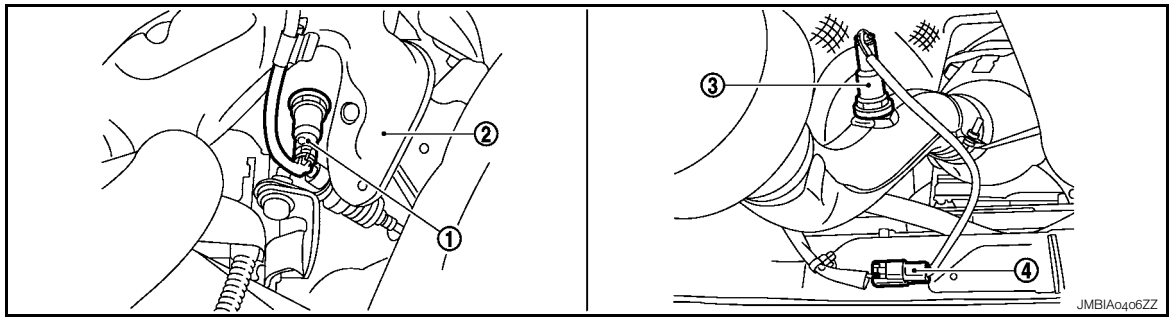


1. ECM harness connector
2. IPDM E/R

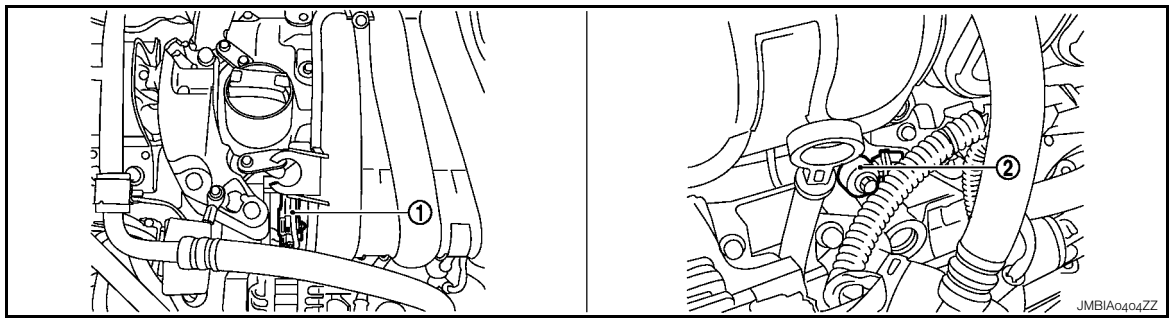
⇦ Vehicle front

cardiagn.com

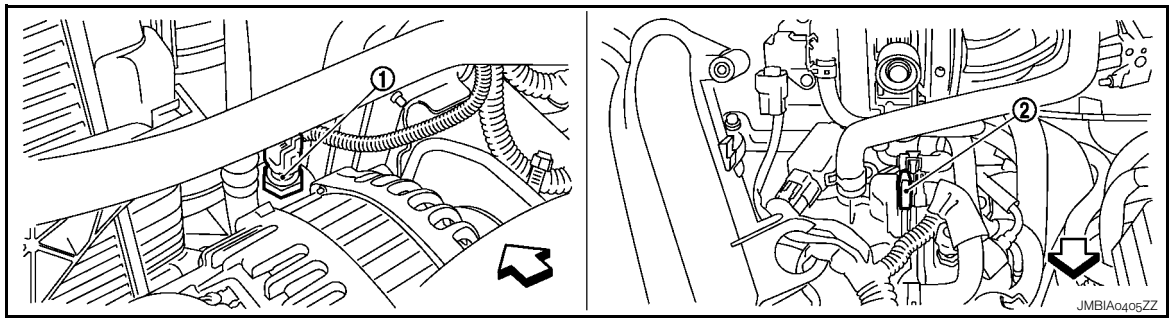




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



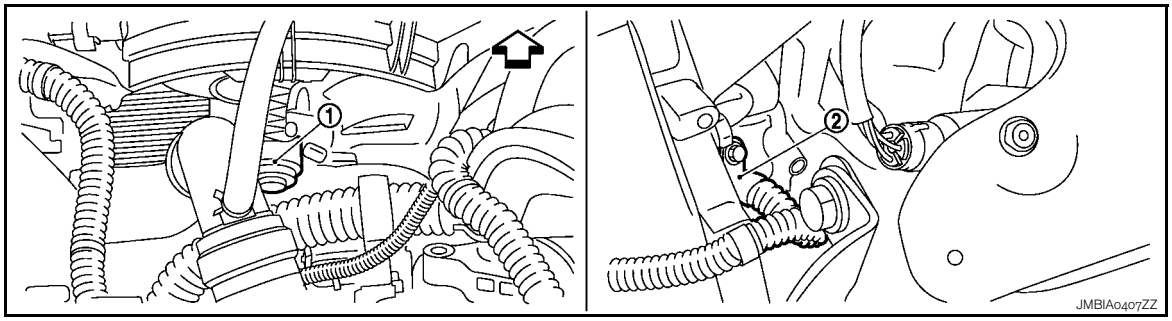
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

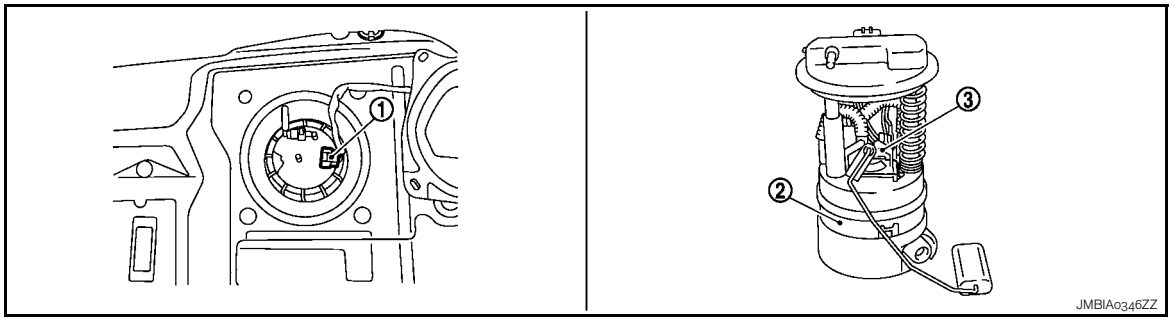
⇦ Vehicle front

cardiagn.com

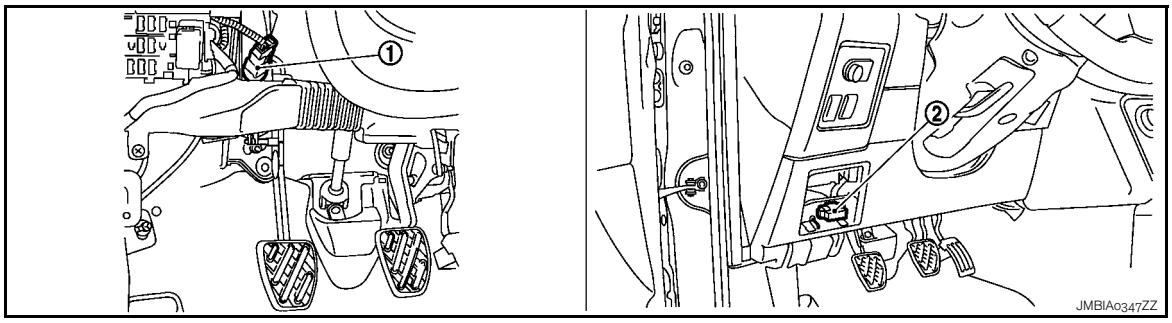


1. Cooling fan motor
2. Crankshaft position sensor (POS)

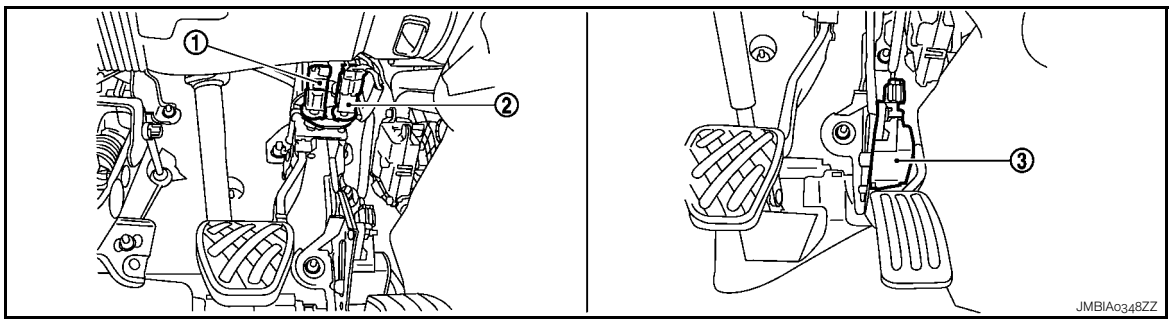
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

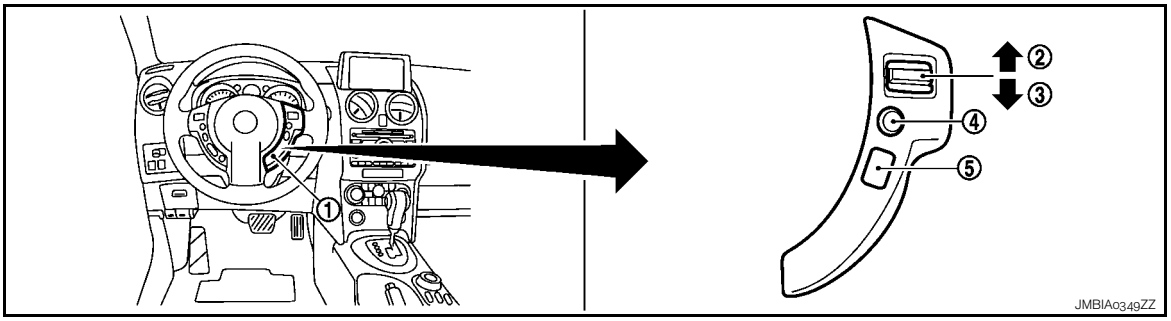


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001056136

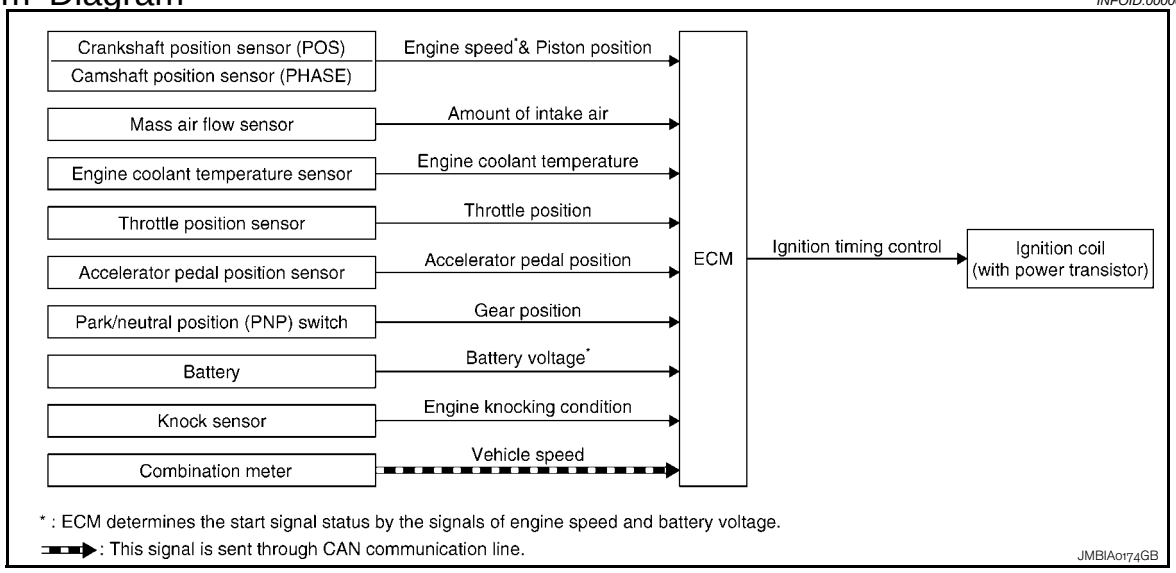
Component	Reference
Accelerator pedal position sensor	EC-280, "Description"
Camshaft position sensor (PHASE)	EC-197, "Description"
Crankshaft position sensor (POS)	EC-193, "Description"
Engine coolant temperature sensor	EC-135, "Description"
Fuel injector	EC-303, "Description"
Heated oxygen sensor 1	EC-141, "Description"
Heated oxygen sensor 2	EC-171, "Description"
Intake air temperature sensor	EC-132, "Description"
Knock sensor	EC-191, "Description"
Mass air flow sensor	EC-127, "Description"
Park/neutral position (PNP) switch	EC-274, "Description"
Throttle position sensor	EC-138, "Description"
Vehicle speed sensor	EC-209, "Description"

cardiagn.com

ELECTRIC IGNITION SYSTEM

System Diagram

INFOID:0000000001056137



System Description

INFOID:0000000001056138

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2 Piston position	Ignition timing control	Ignition coil (with power transistor)
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Combination meter*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM.

The ECM receives information such as the injection pulse width and camshaft position sensor (PHASE) signal. Computing this information, ignition signals are transmitted to the power transistor.

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

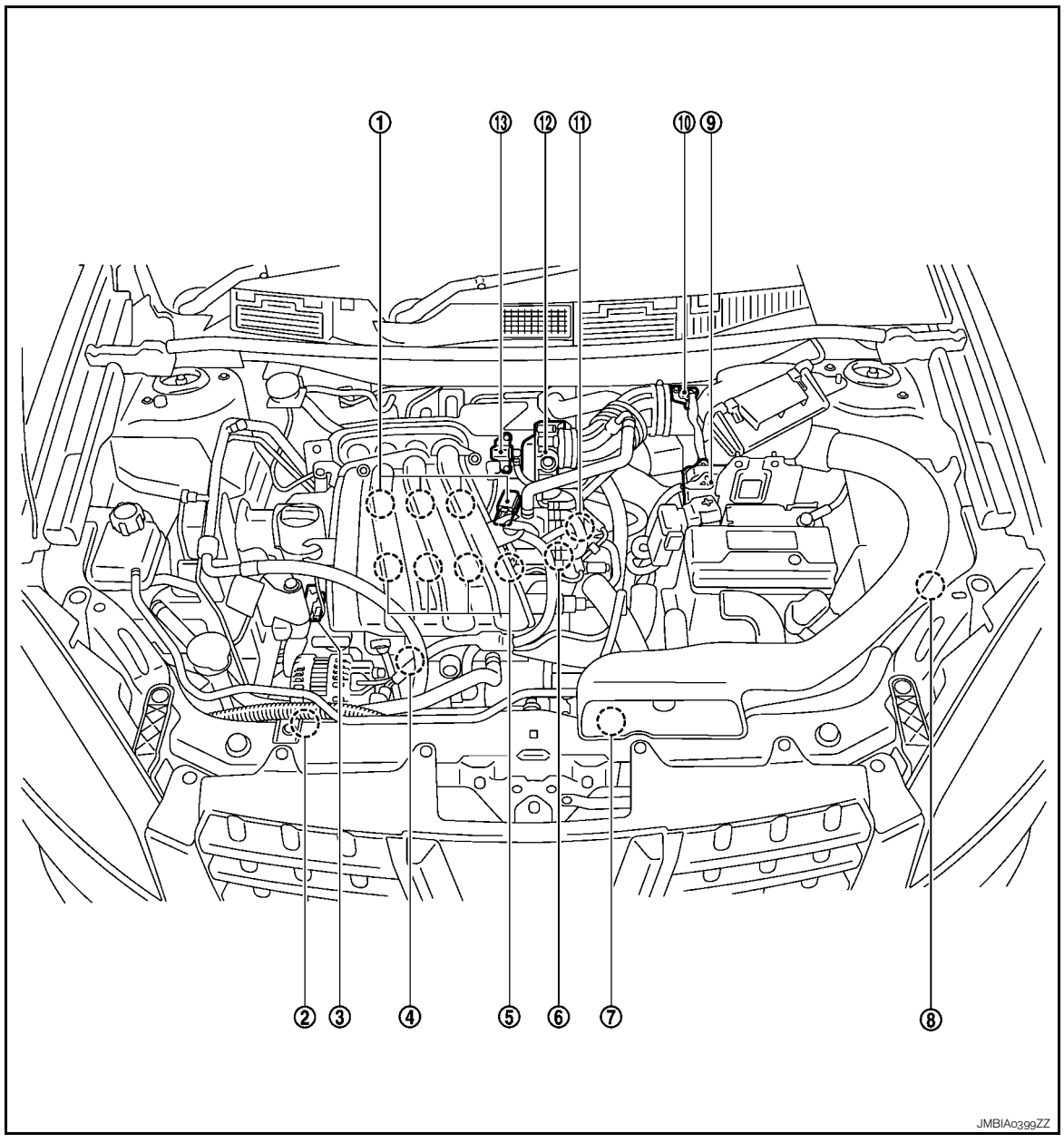
The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not

cardiagn.com

operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

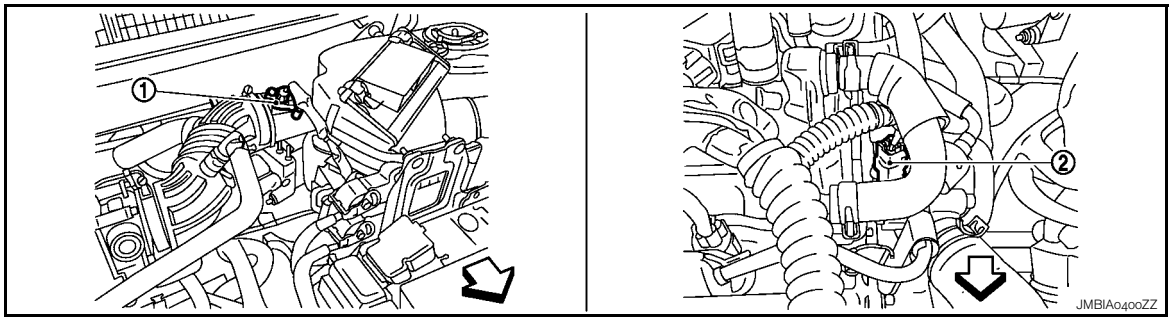
Component Parts Location

INFOID:0000000001060010



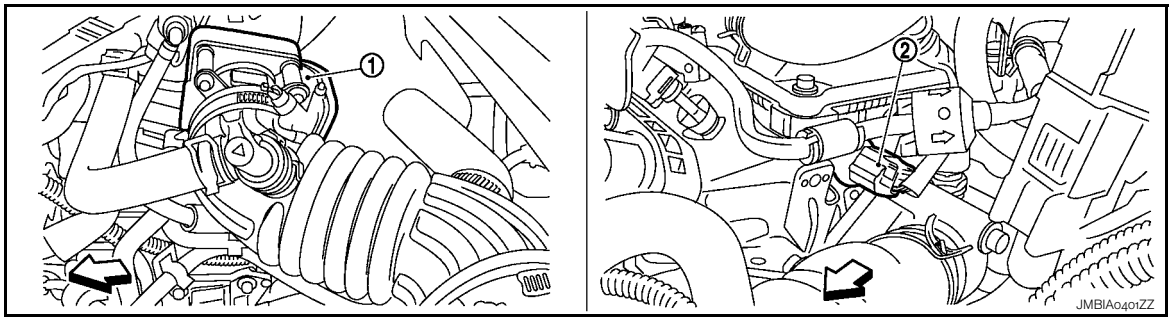
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



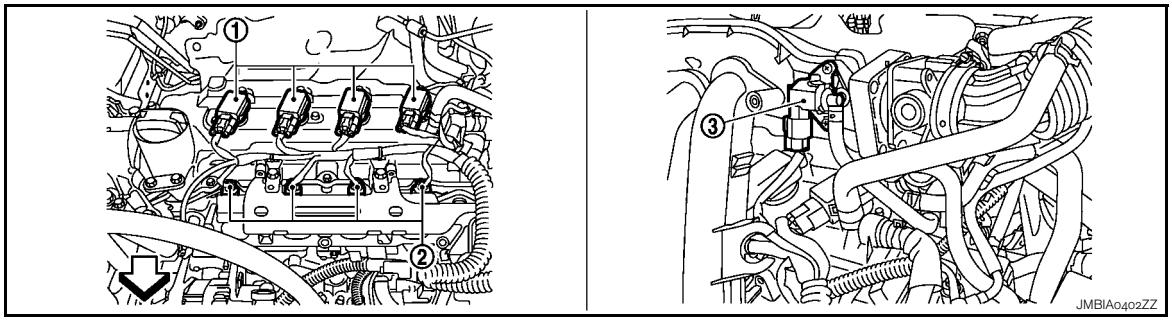
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



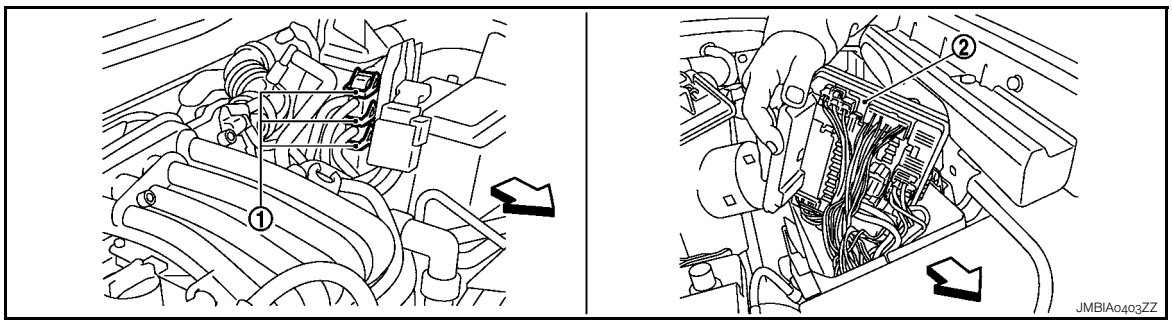
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

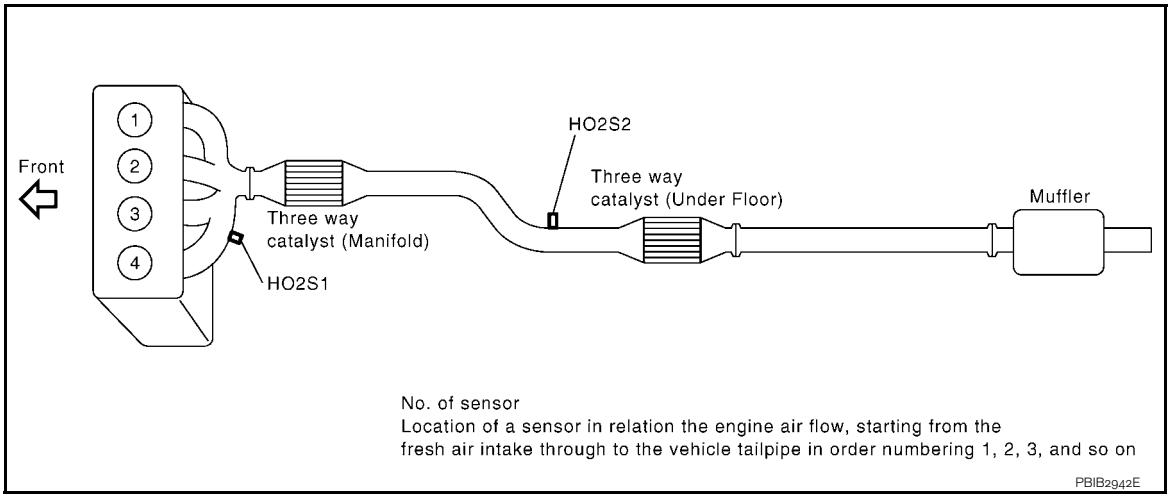
⇦ Vehicle front

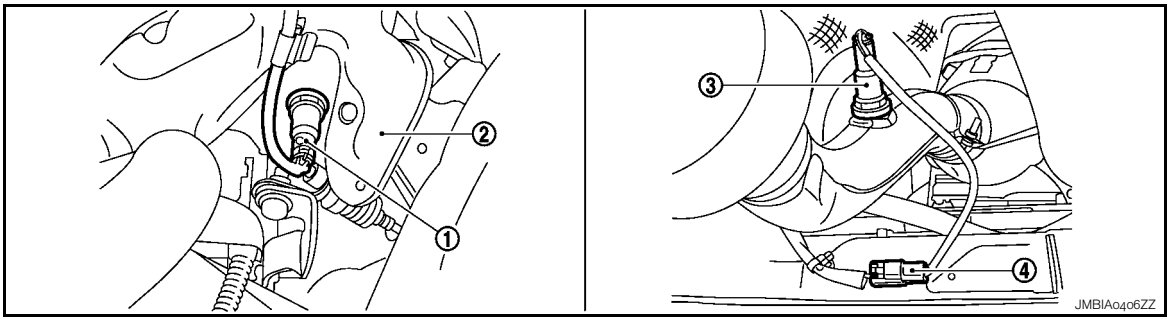


1. ECM harness connector
2. IPDM E/R

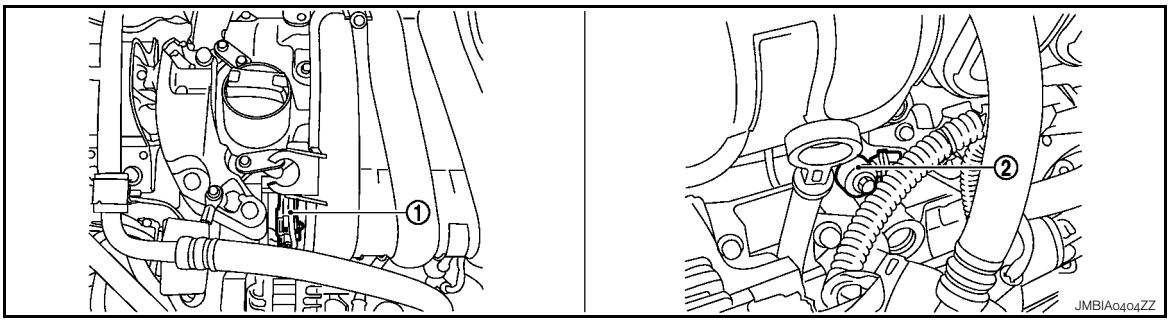
⇦ Vehicle front

cardiagn.com

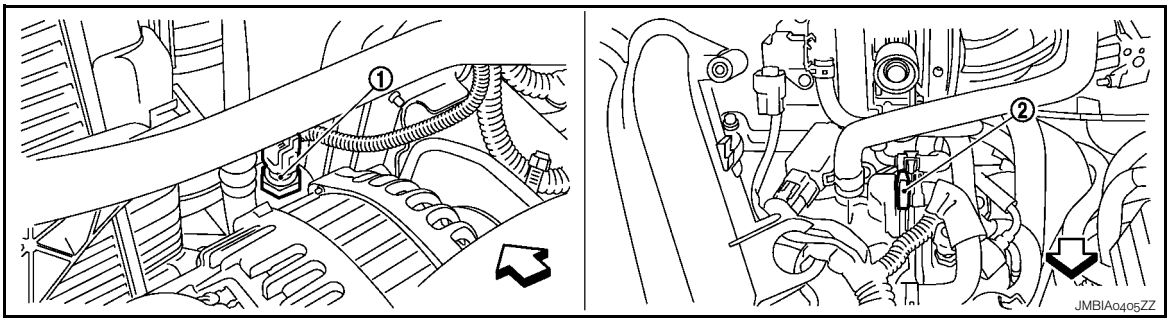




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



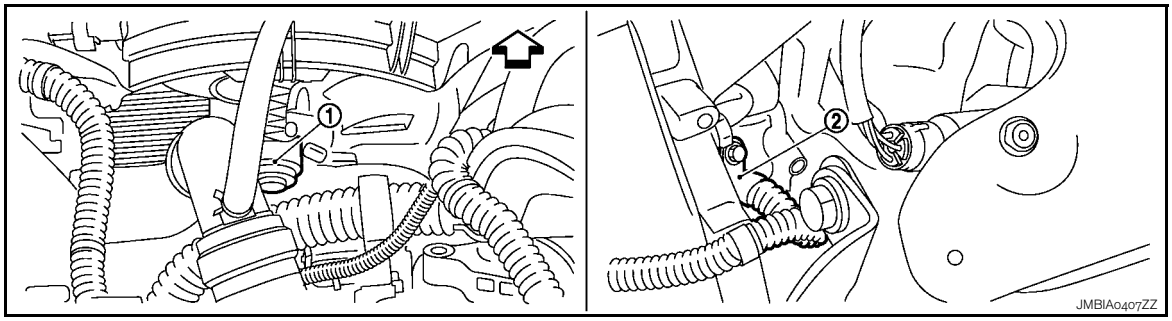
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

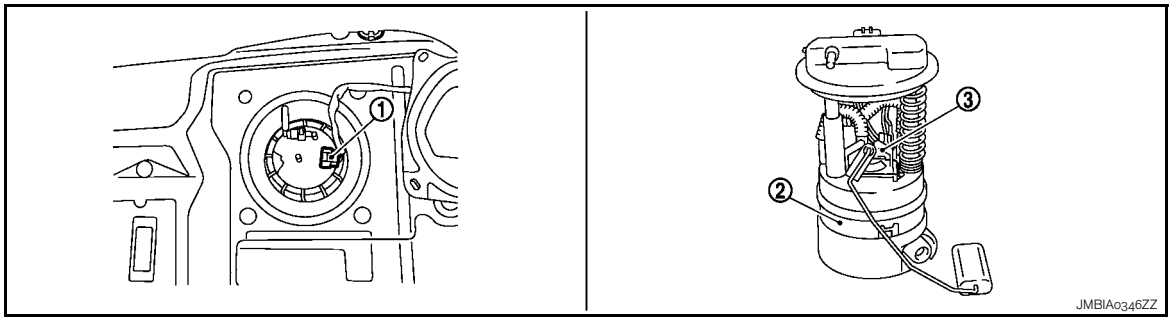
⇦ Vehicle front

cardiagn.com

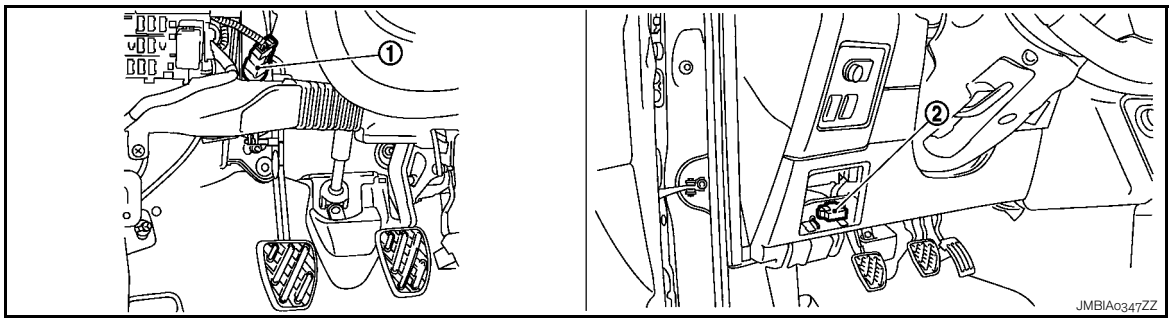


1. Cooling fan motor
2. Crankshaft position sensor (POS)

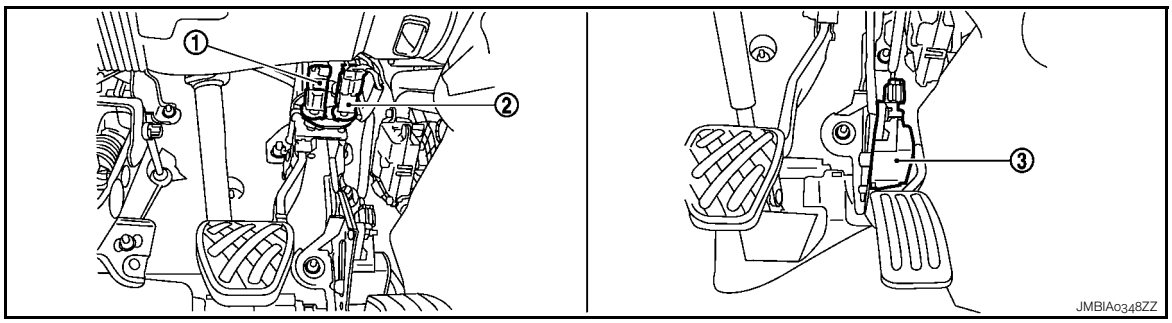
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

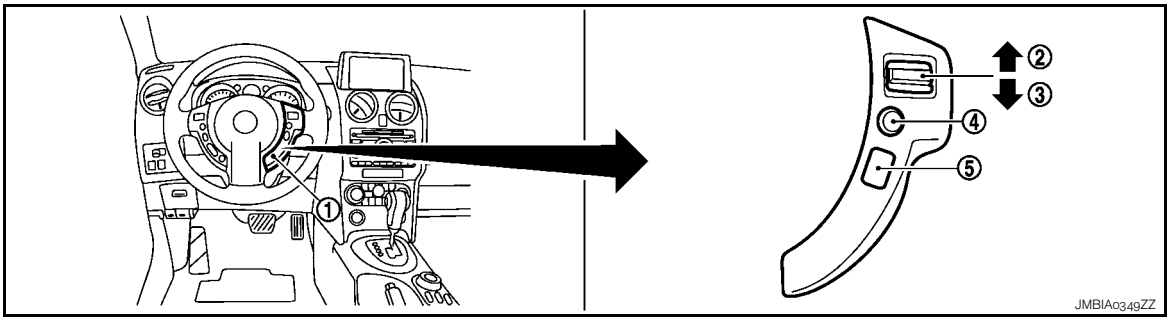


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001056140

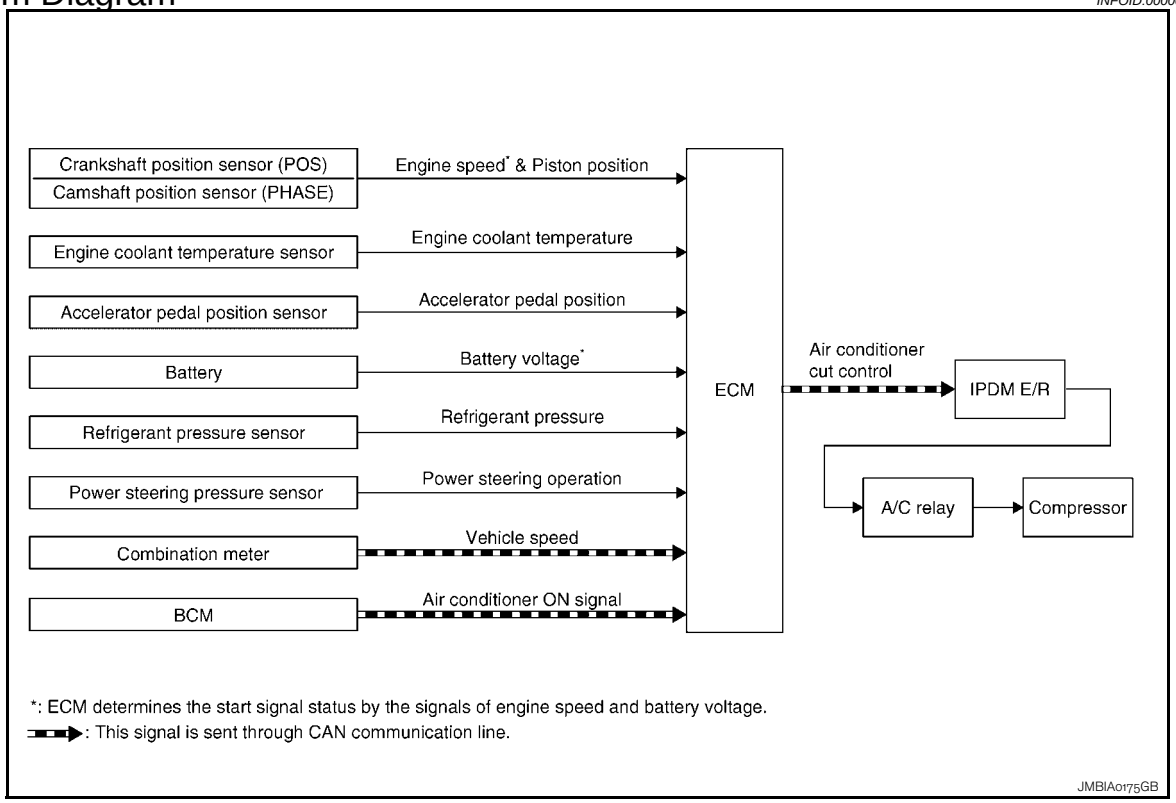
Component	Reference
Accelerator pedal position sensor	EC-280, "Description"
Camshaft position sensor (PHASE)	EC-197, "Description"
Crankshaft position sensor (POS)	EC-193, "Description"
Engine coolant temperature sensor	EC-135, "Description"
Ignition signal	EC-309, "Description"
Knock sensor	EC-191, "Description"
Mass air flow sensor	EC-127, "Description"
Park/neutral position (PNP) switch	EC-274, "Description"
Throttle position sensor	EC-138, "Description"
Vehicle speed sensor	EC-209, "Description"

cardiagn.com

AIR CONDITIONING CUT CONTROL

System Diagram

INFOID:0000000001056141



System Description

INFOID:0000000001056142

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
BCM*1	Air conditioner ON signal	Air conditioner cut control	IPDM E/R ↓ Air conditioner relay ↓ Compressor
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Refrigerant pressure sensor	Refrigerant pressure		
EPS control unit*1	Power steering operation		
Combination meter*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

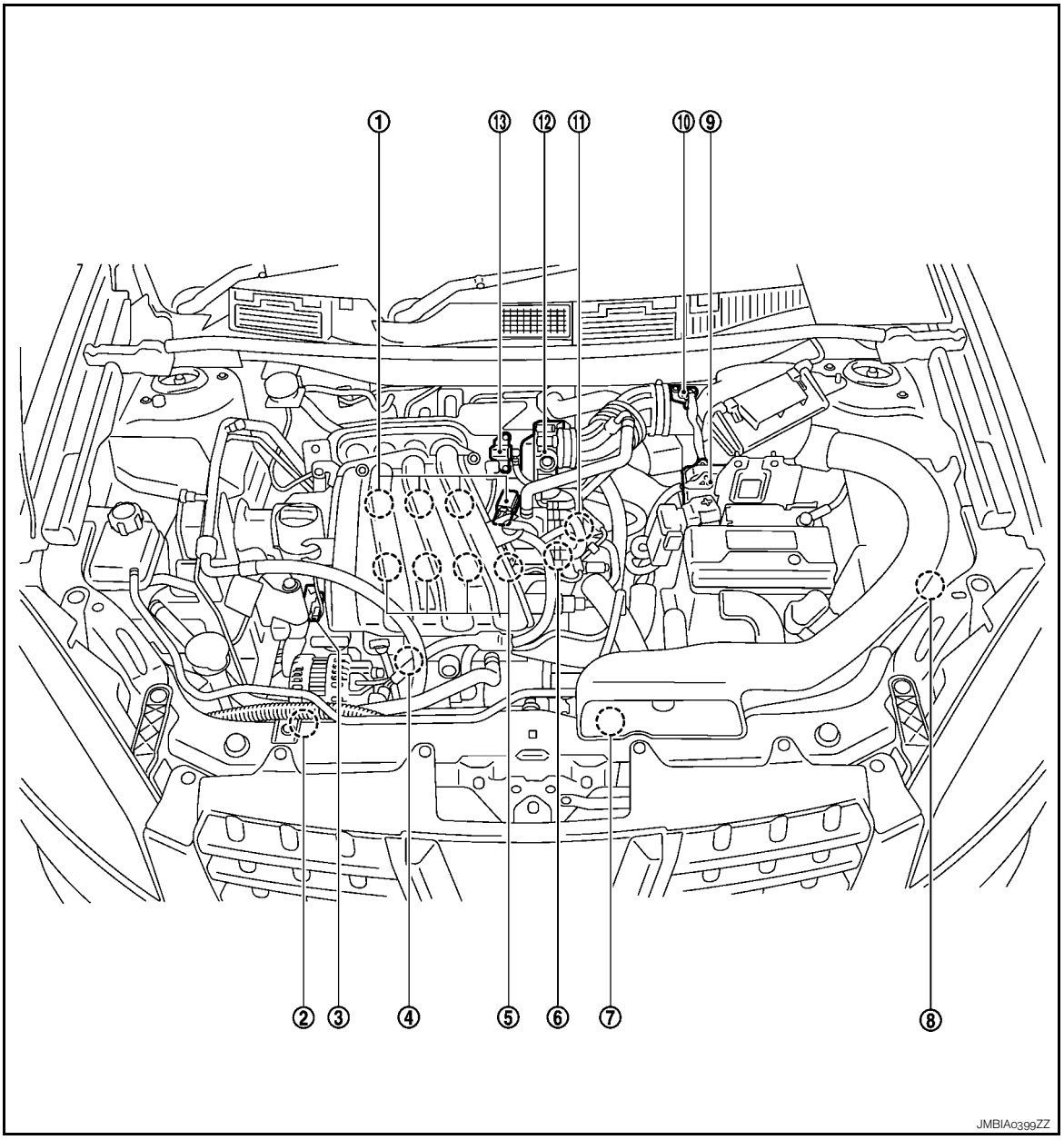
This system improves engine operation when the air conditioner is used.
Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

cardiagn.com

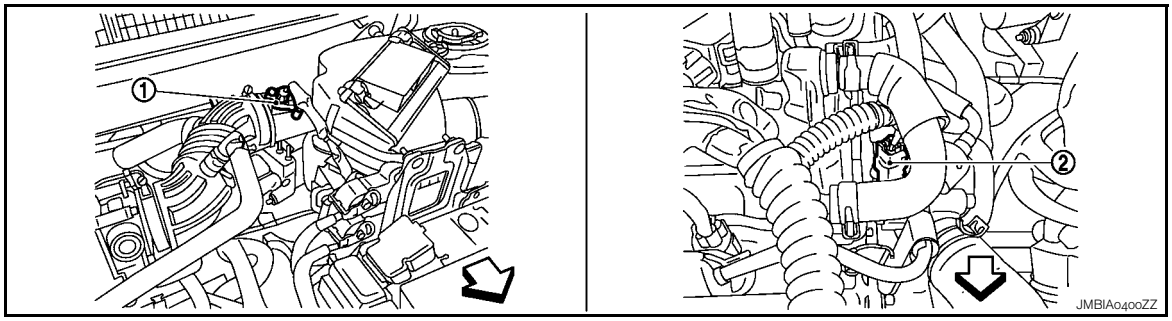
Component Parts Location

INFOID:0000000001060011



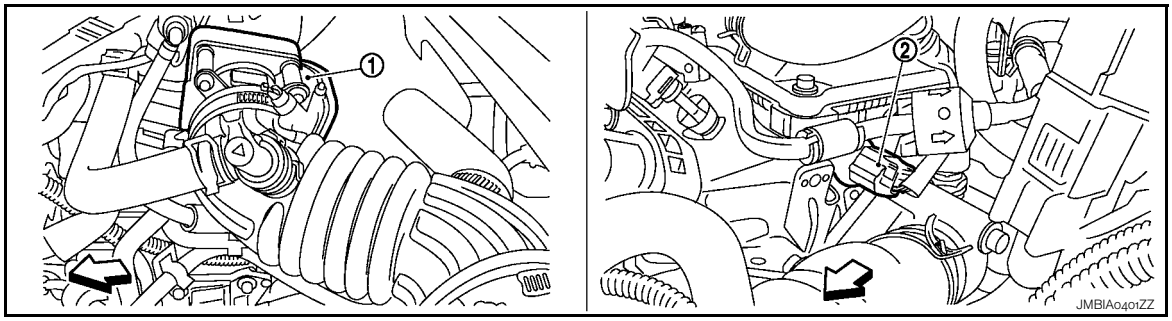
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



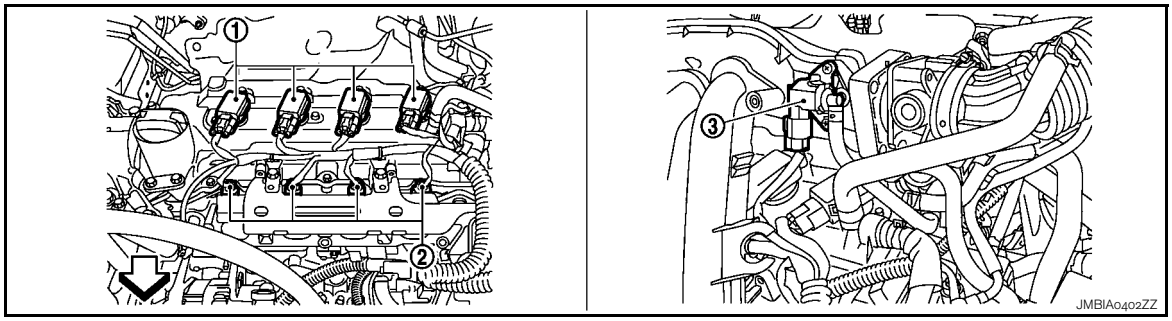
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



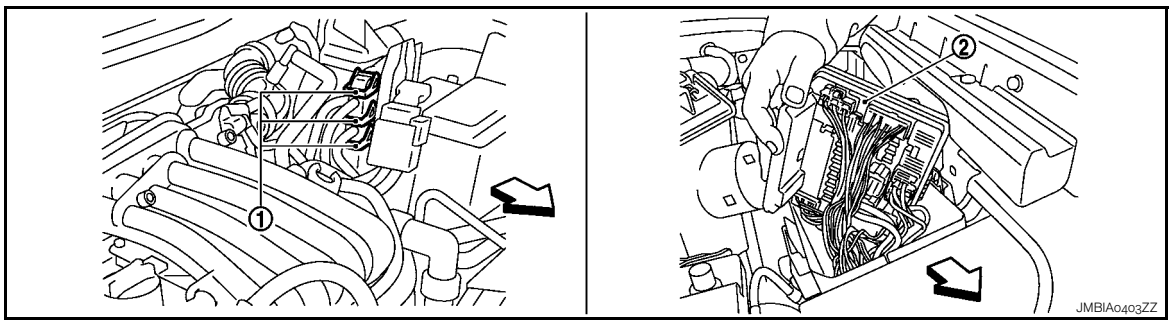
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

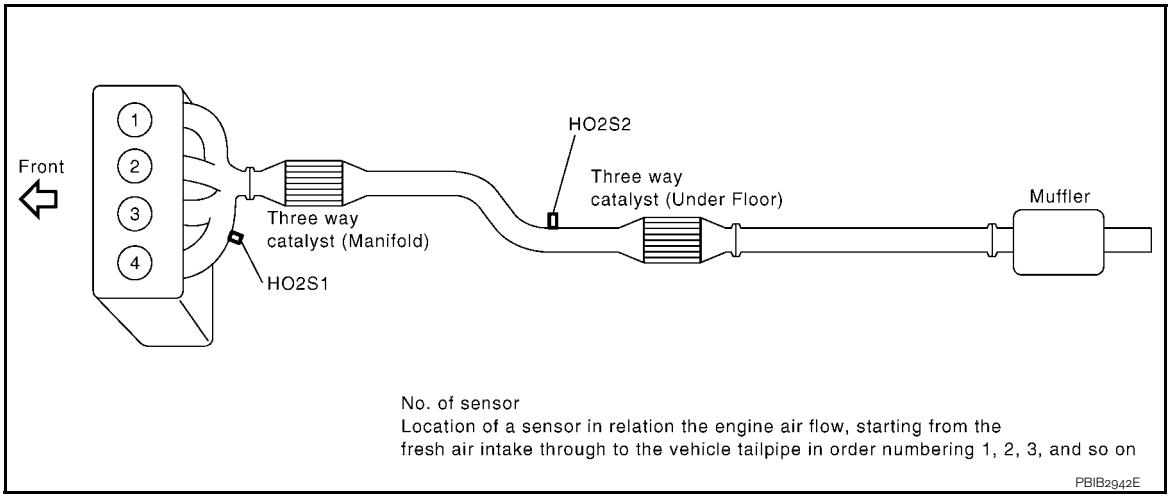
⇦ Vehicle front

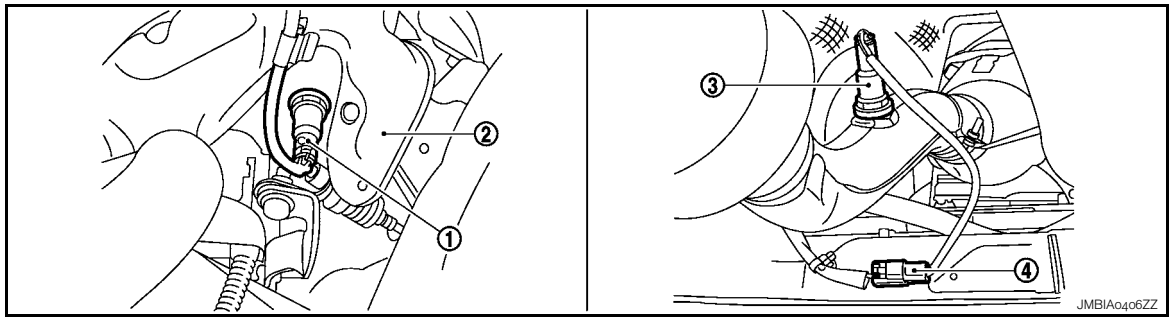


1. ECM harness connector
2. IPDM E/R

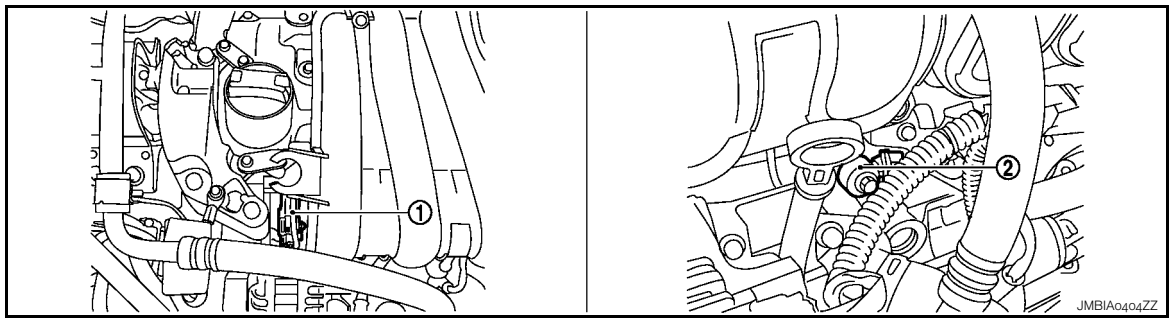
⇦ Vehicle front

cardiagn.com

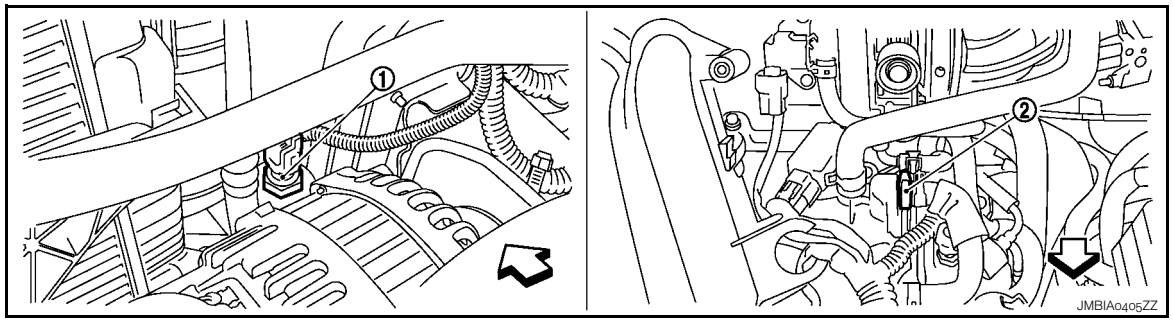




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



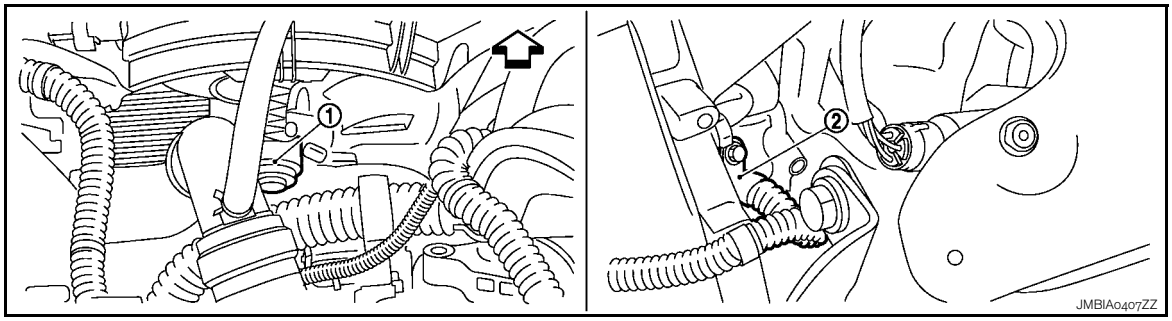
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

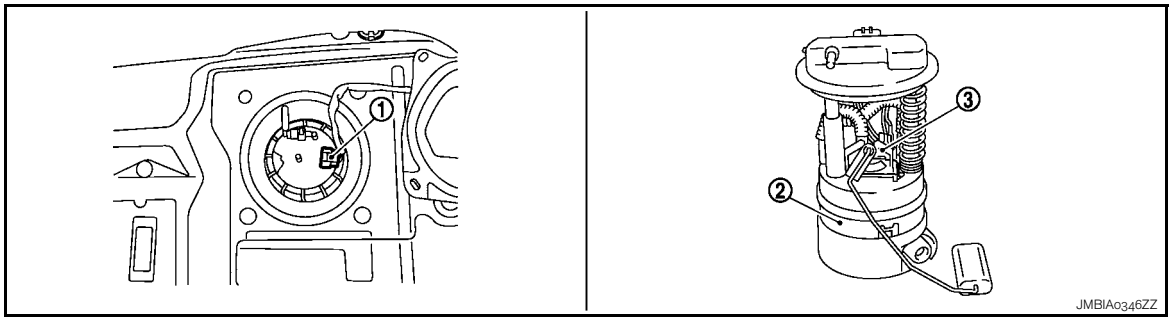
⇦ Vehicle front

cardiagn.com

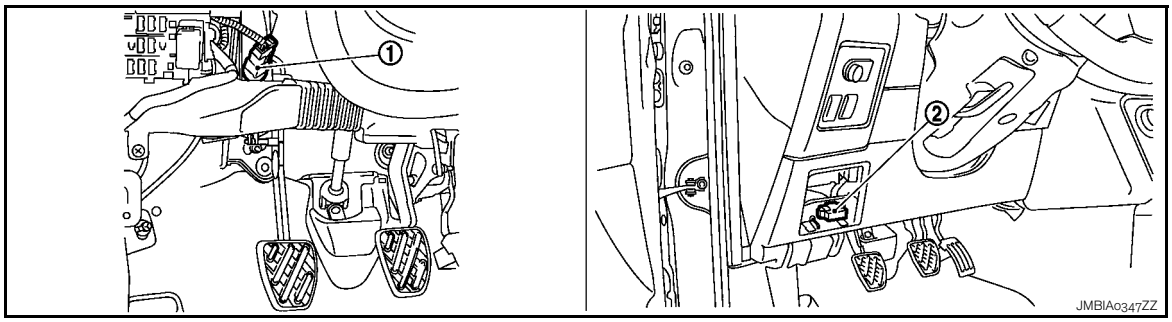


1. Cooling fan motor
2. Crankshaft position sensor (POS)

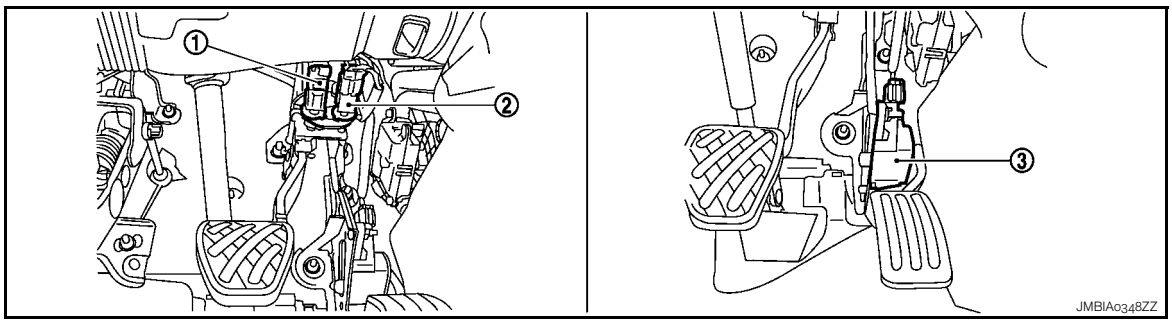
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

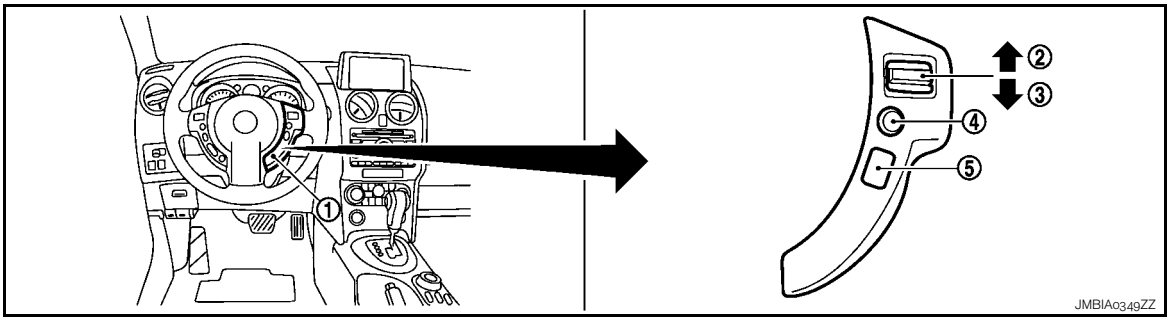


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001056144

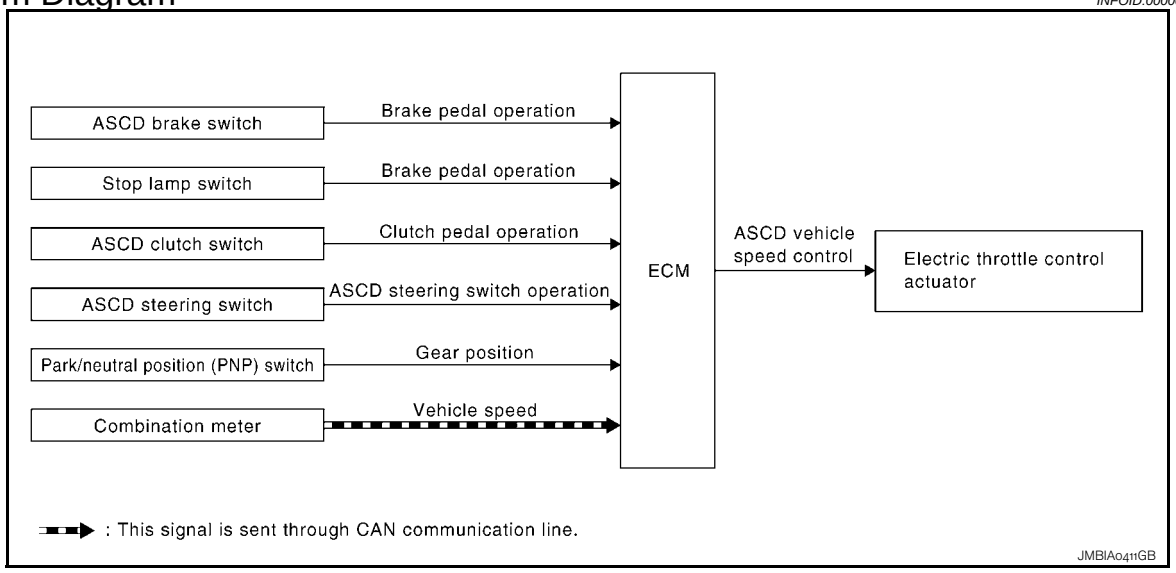
Component	Reference
Accelerator pedal position sensor	EC-280, "Description"
Camshaft position sensor (PHASE)	EC-197, "Description"
Crankshaft position sensor (POS)	EC-193, "Description"
Engine coolant temperature sensor	EC-135, "Description"
EPS contro unit	STC-4, "System Description"
Refrigerant pressure sensor	EC-316, "Description"
Vehicle speed sensor	EC-209, "Description"

cardiagn.com

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Diagram

INFOID:0000000001056145



System Description

INFOID:0000000001056146

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch			
ASCD clutch switch	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/neutral position switch	Gear position		
Combination meter*	Vehicle speed		

*: This signal is sent to the ECM through CAN communication line

BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.
Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 180 km/h (112 MPH).
ECM controls throttle angle of electric throttle control actuator to regulate engine speed.
Operation status of ASCD is indicated by CRUISE lamp and SET lamp in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.
NOTE:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

SET OPERATION

Press MAIN switch. (The CRUISE lamp in combination meter illuminates.)
When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 180 km/h (112 MPH), press SET/COAST switch. (Then SET lamp in combination meter illuminates.)

ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is pressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.
And then ASCD will keep the new set speed.

CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.
- CANCEL switch is pressed

cardiagn.com

- More than 2 switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to neutral position.
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.
  When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ ACCELERATE switch.
- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

COAST OPERATION

When the SET/COAST switch is pressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

RESUME OPERATION

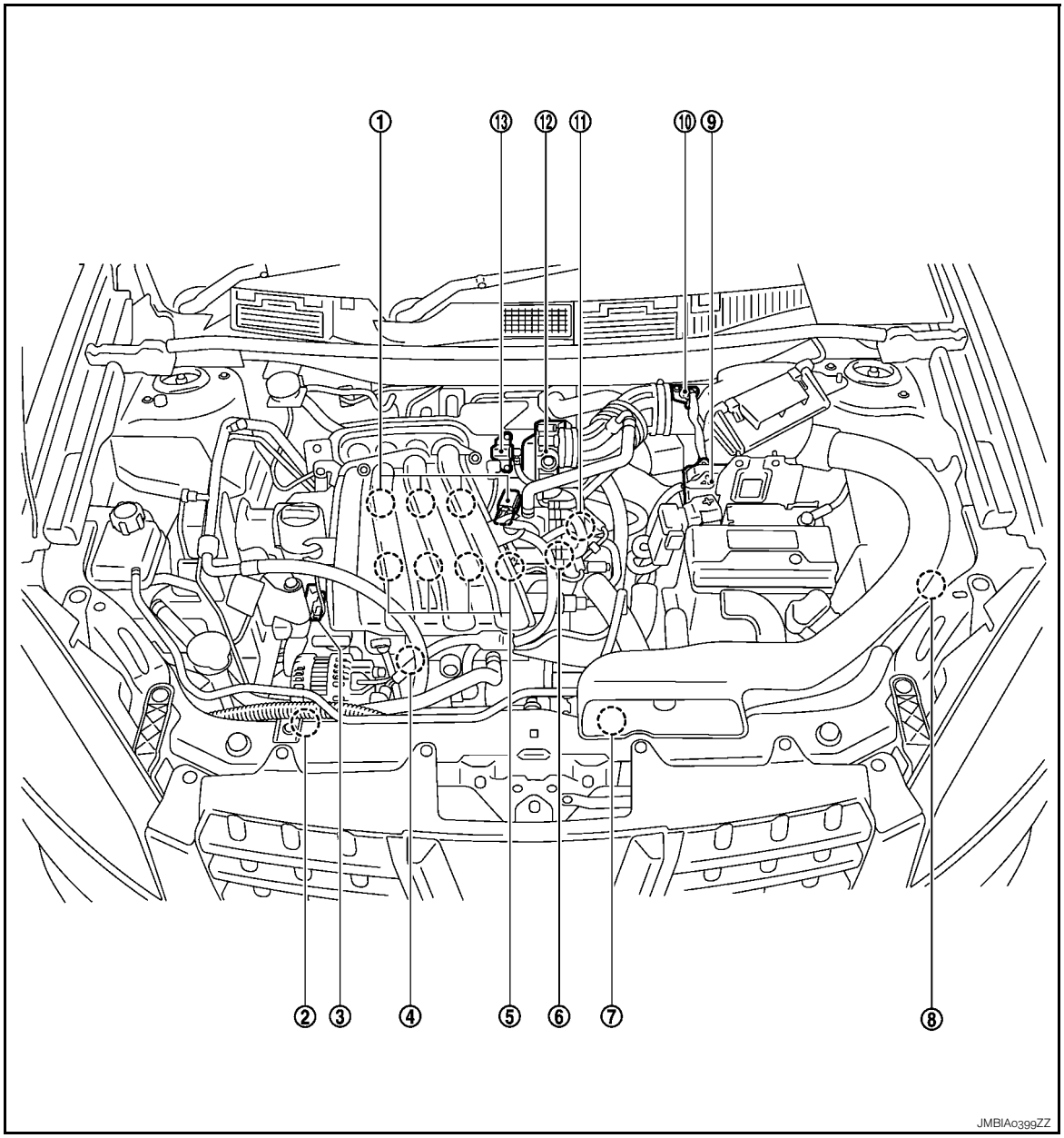
When the RESUME/ACCELERATE switch is pressed after cancel operation other than pressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released
- Clutch pedal is released
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 180km/h (112 MPH)

Component Parts Location

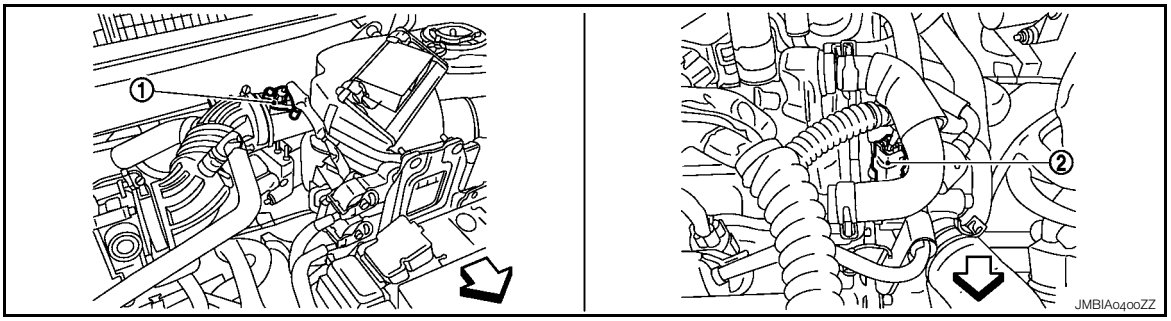
INFOID:0000000001060012

cardiagn.com



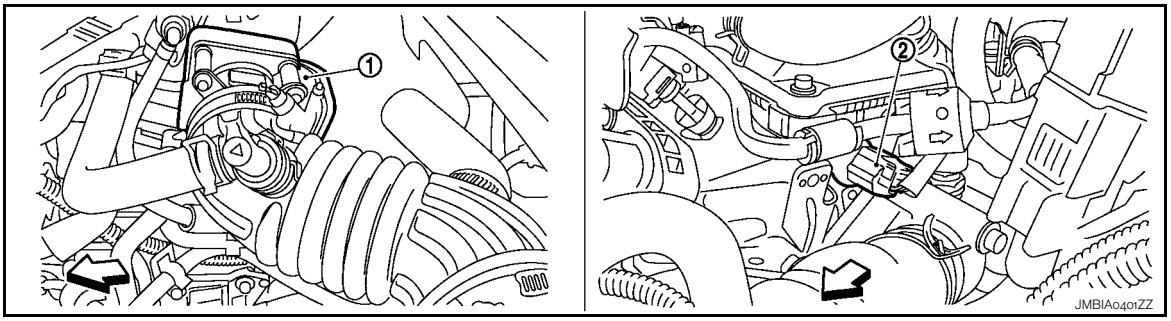
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



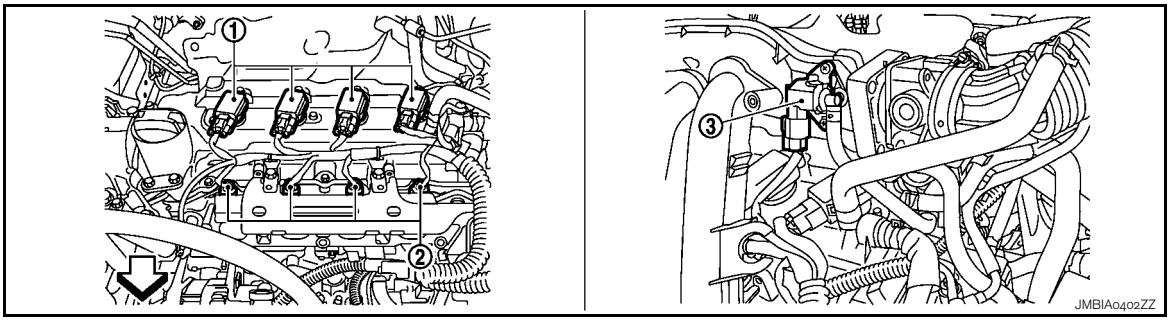
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



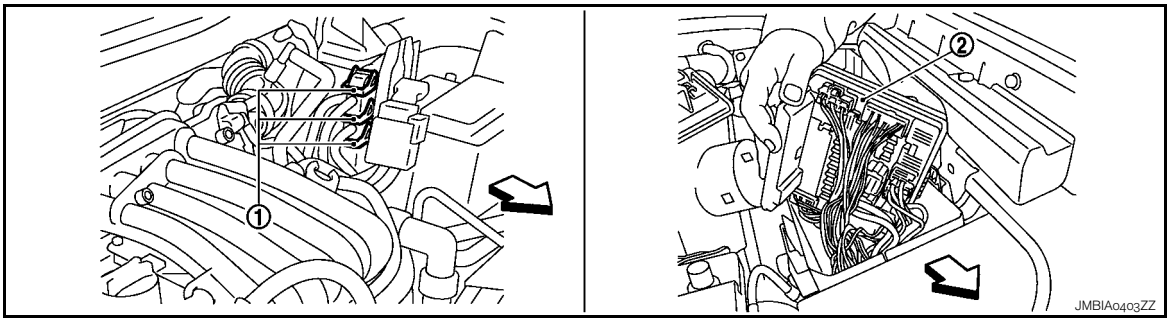
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

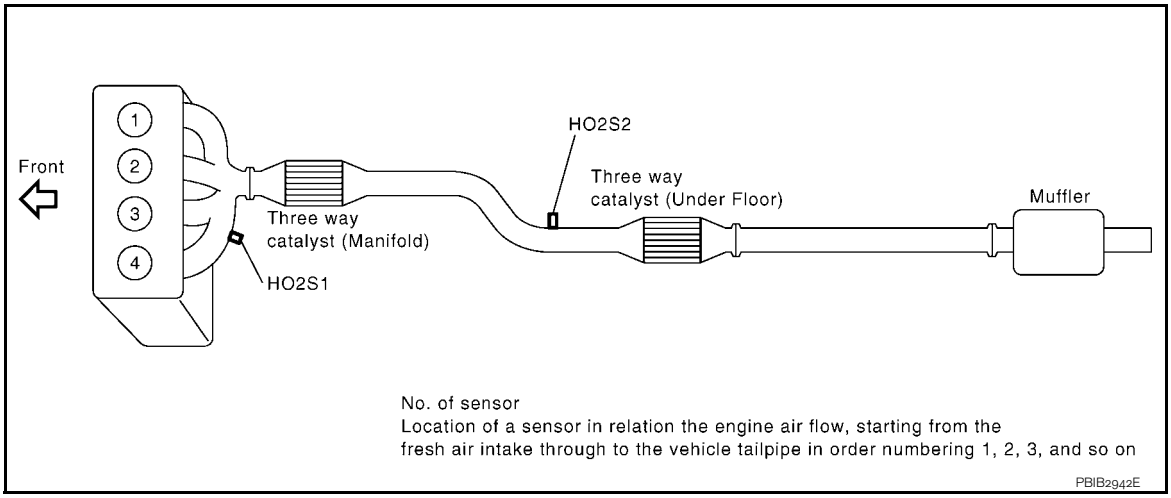
⇦ Vehicle front

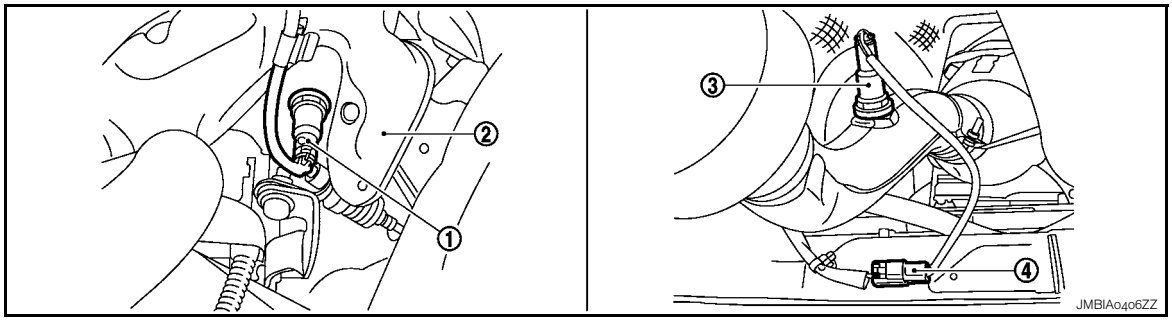


1. ECM harness connector
2. IPDM E/R

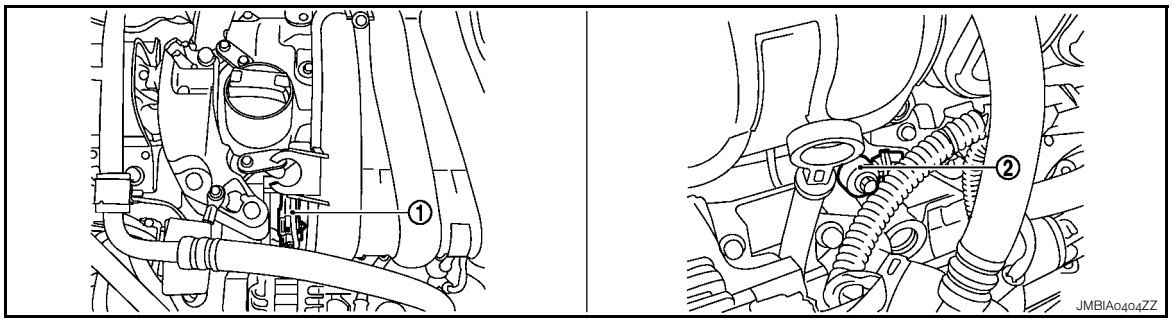
⇦ Vehicle front

cardiagn.com

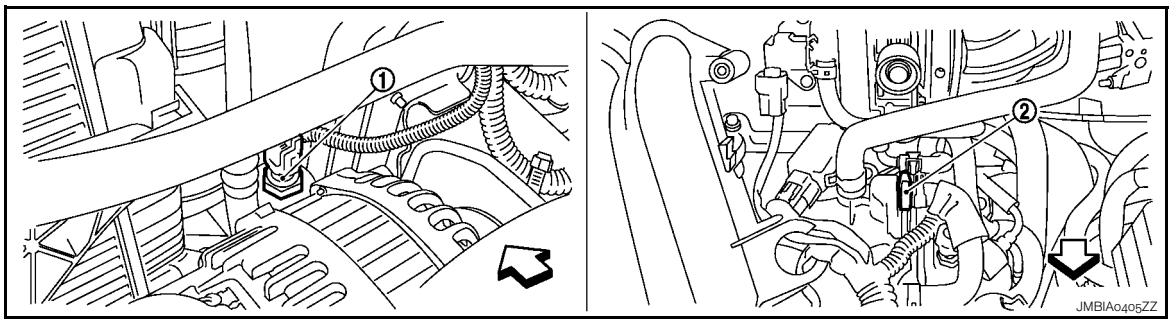




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



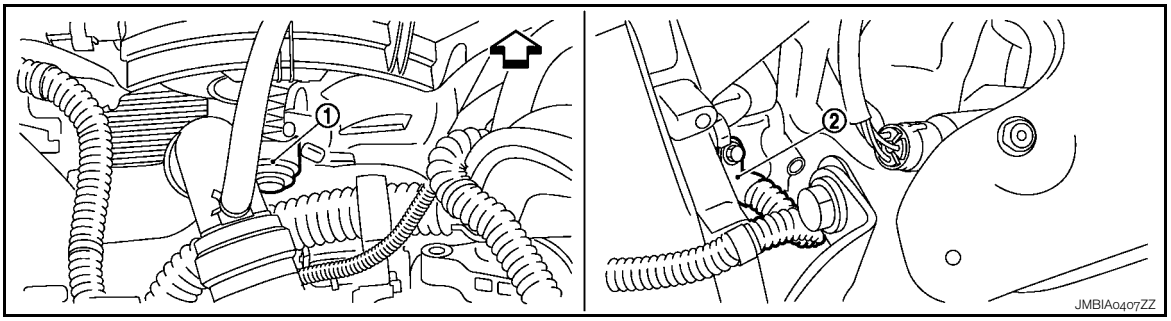
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

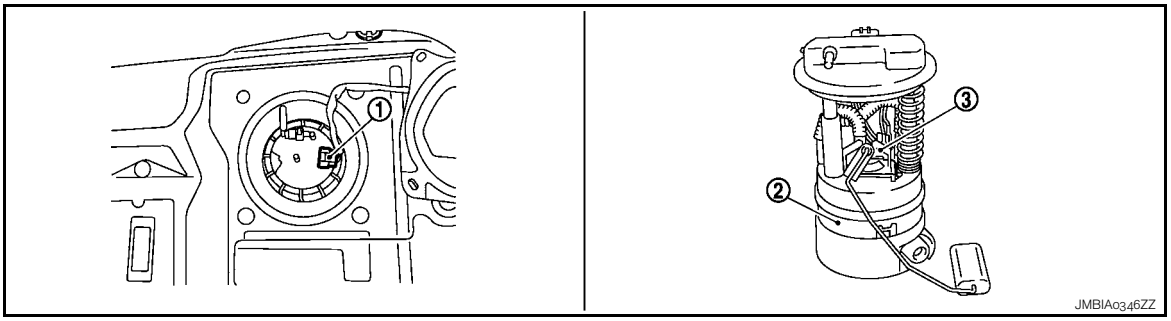
⇦ Vehicle front

cardiagn.com

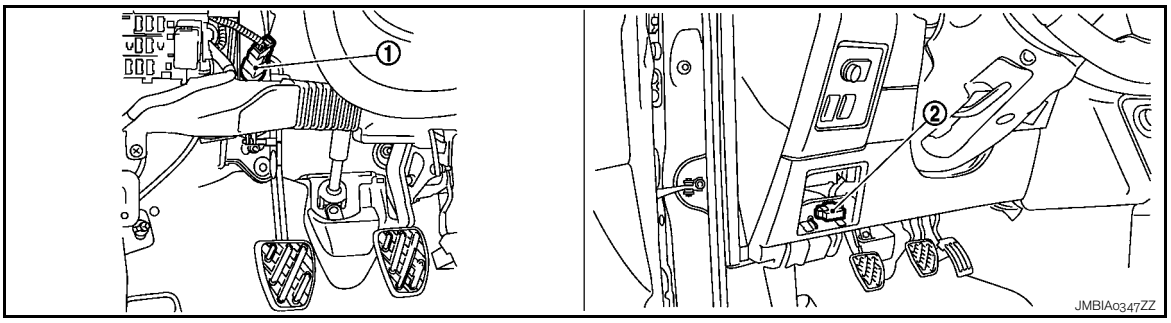


1. Cooling fan motor
2. Crankshaft position sensor (POS)

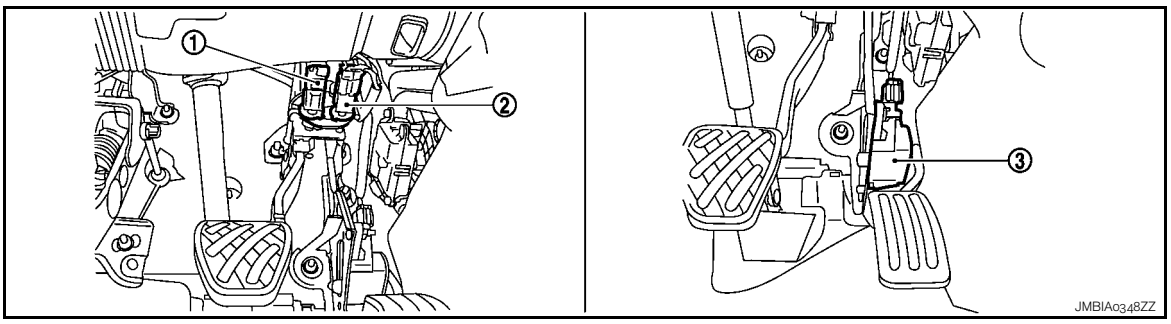
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

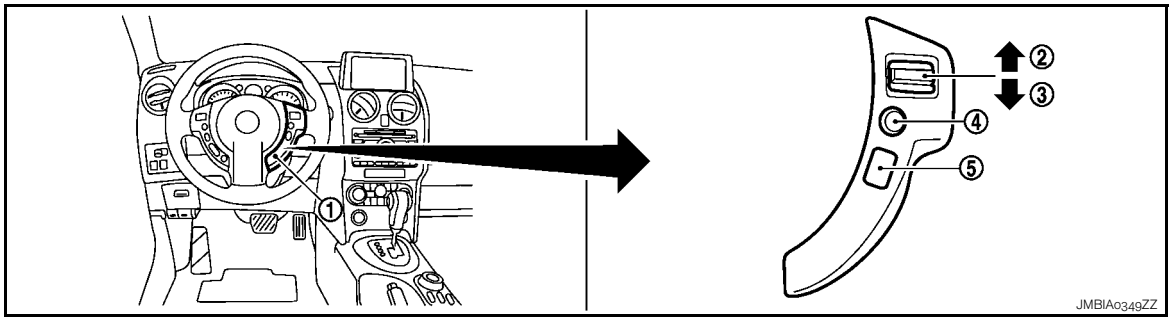


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001056148

Component	Reference
ASCD steering switch	EC-263, "Description"
ASCD clutch switch	EC-294, "Description"
ASCD brake switch	EC-294, "Description"
ASCD indicator	EC-298, "Description"
Stop lamp switch	EC-277, "Description"
Electric throttle control actuator	EC-217, "Description"

cardiagn.com

CAN COMMUNICATION

System Description

INFOID:0000000001056149

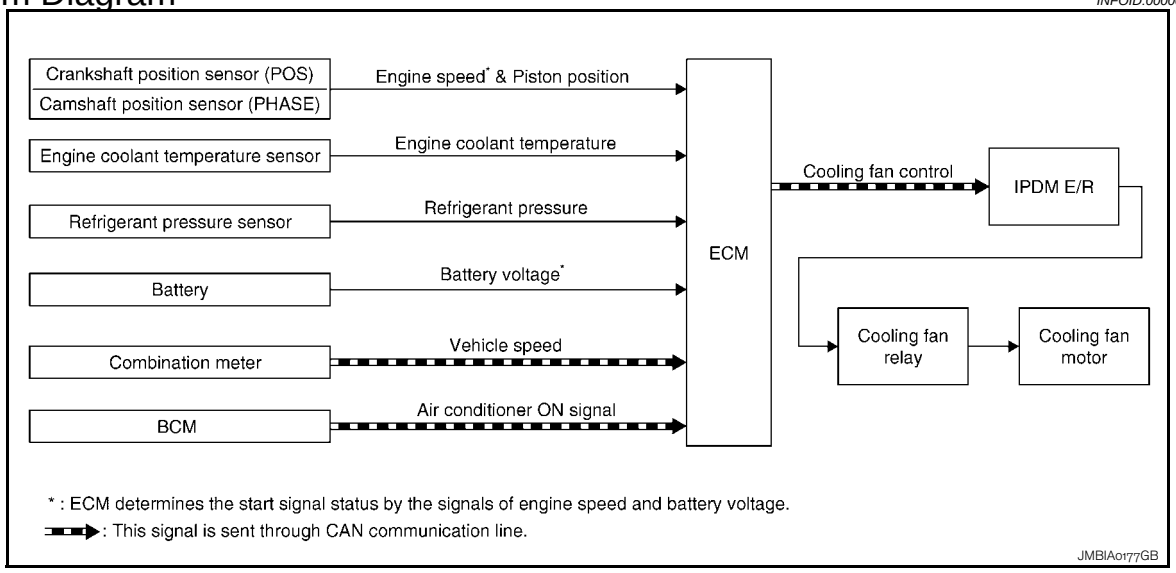
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
Refer to LAN-59, "CAN Communication Signal Chart", about CAN communication for detail.

cardiagn.com

COOLING FAN CONTROL

System Diagram

INFOID:0000000001056150



System Description

INFOID:0000000001056151

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	IPDM E/R ↓ Cooling fan relay ↓ Cooling fan motor
Battery	Battery voltage*1		
Combination meter	Vehicle speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
BCM	Air conditioner ON signal*2		
Refrigerant pressure sensor	Refrigerant pressure		

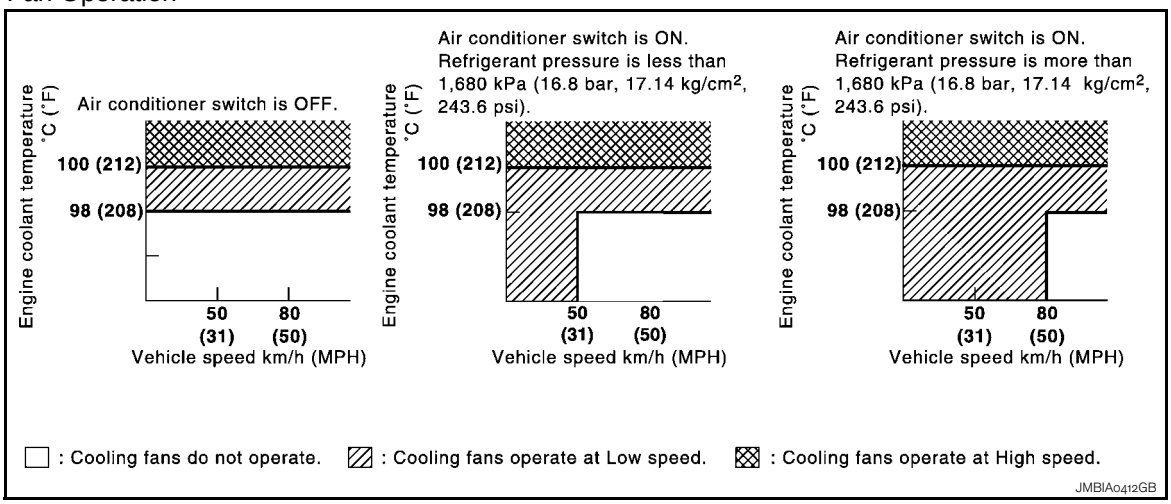
*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to ECM through CAN communication line.

SYSTEM DESCRIPTION

ECM controls cooling fan speed corresponding to vehicle speed, engine coolant temperature, refrigerant pressure, air conditioner ON signal. Then control system has 3-step control [HIGH/LOW/OFF].

Cooling Fan Operation



cardiagn.com

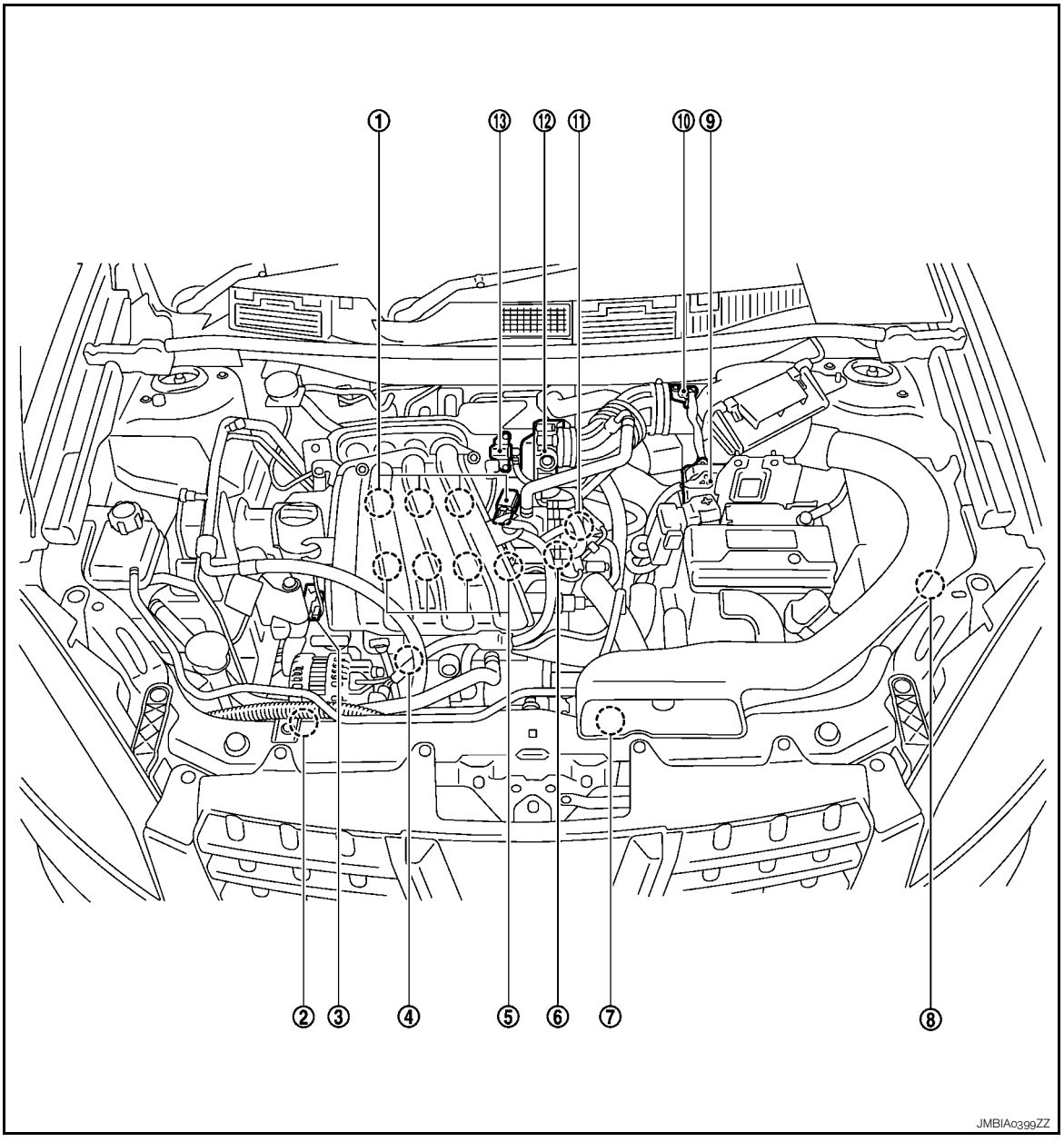
Cooling Fan Relay Operation

The ECM controls cooling fan relays through CAN communication line.

Cooling fan speed	Cooling fan relay	
	1	3
Stop (OFF)	OFF	OFF
Low (LOW)	ON	OFF
High (HI)	OFF	ON

Component Parts Location

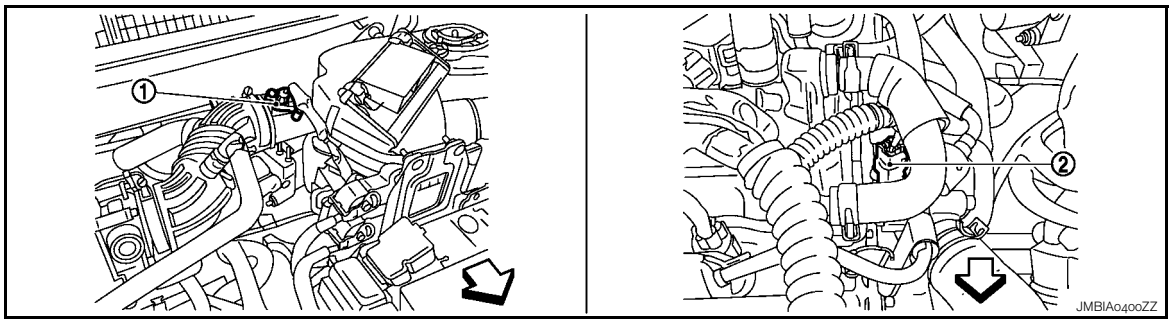
INFOID:0000000001060013



1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM

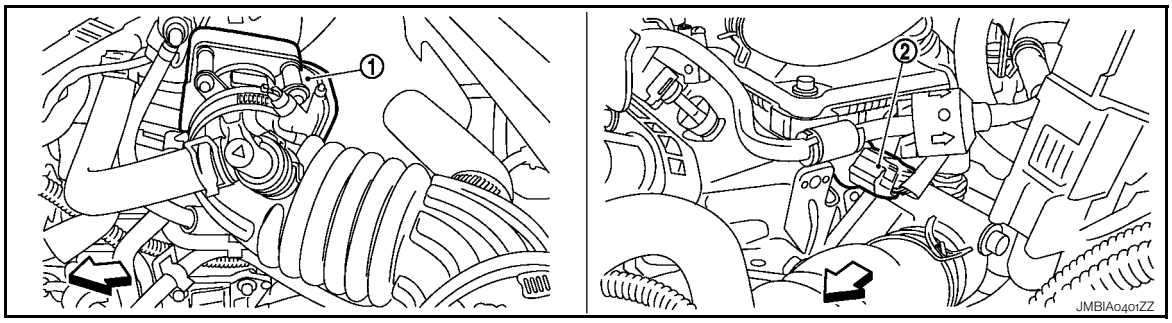
cardiagn.com

10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve



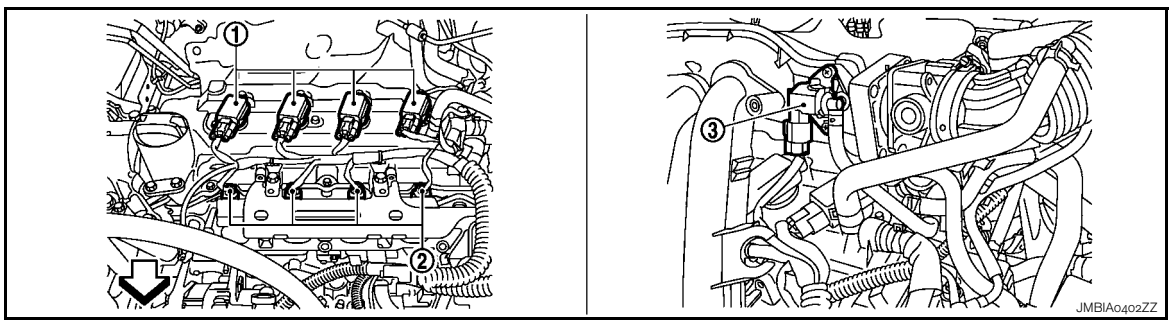
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

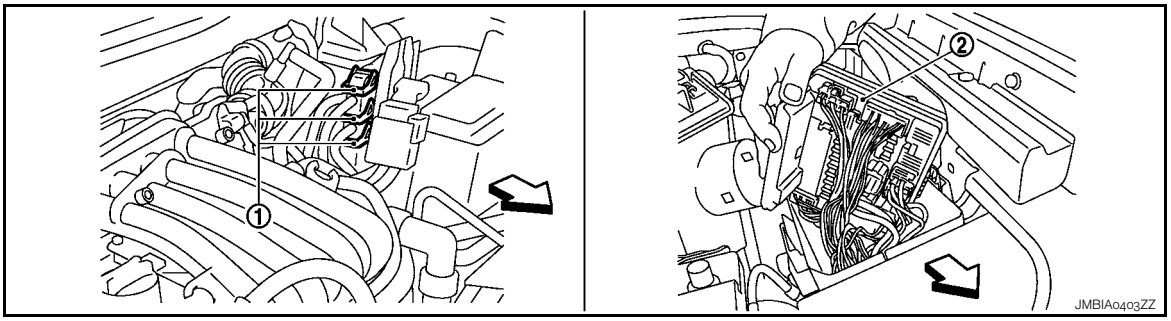
⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

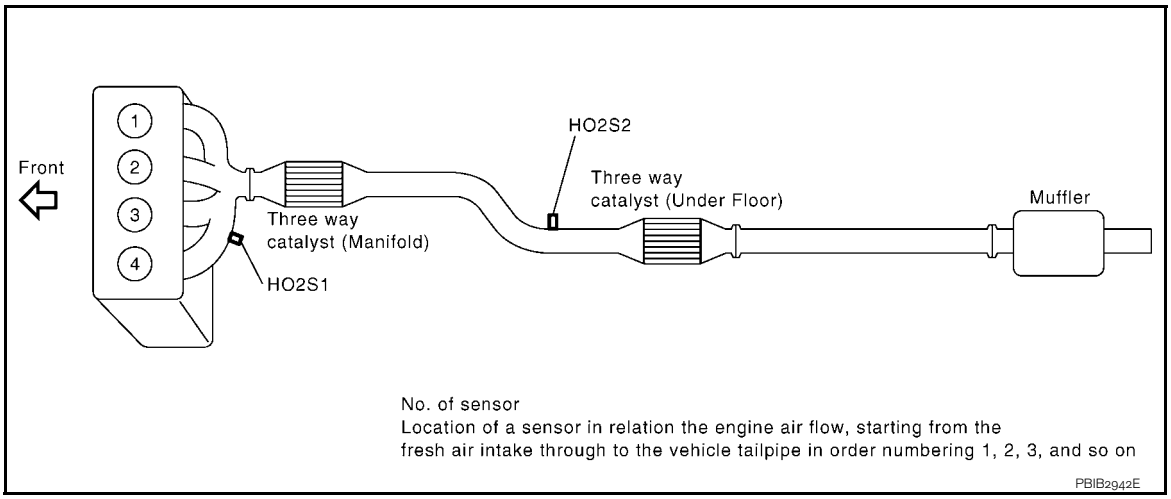
⇦ Vehicle front

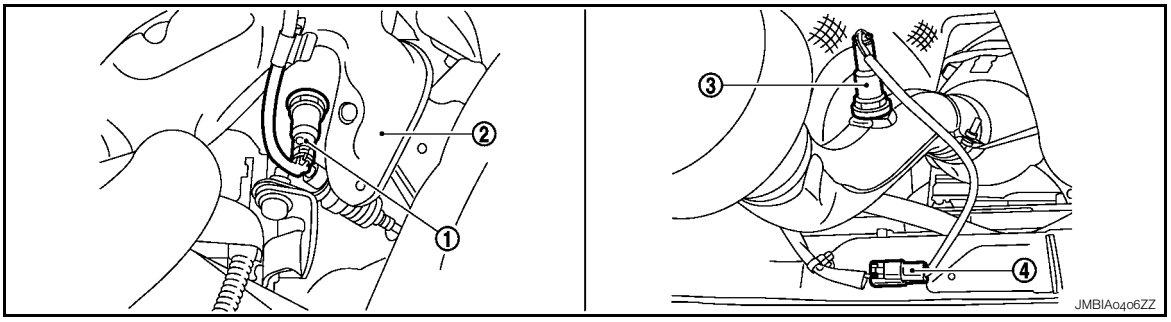
cardiagn.com



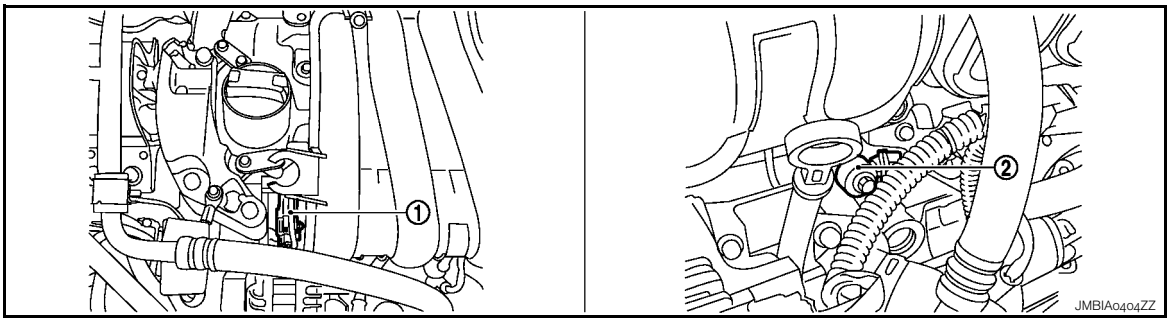
1. ECM harness connector
2. IPDM E/R

⇦ Vehicle front



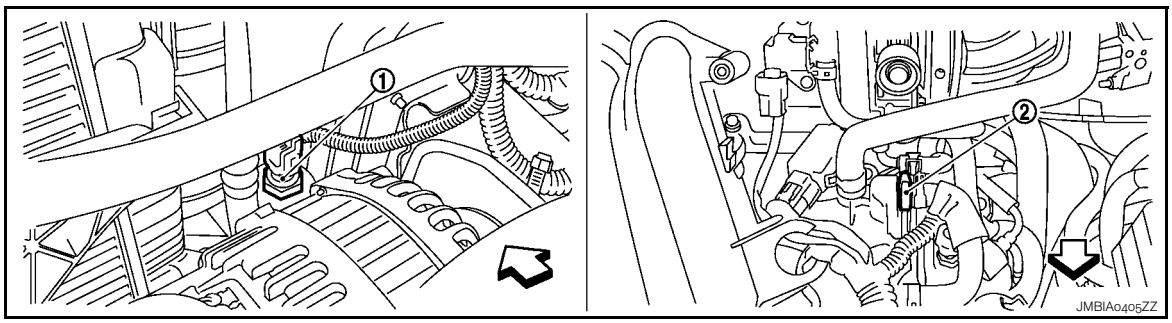


1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



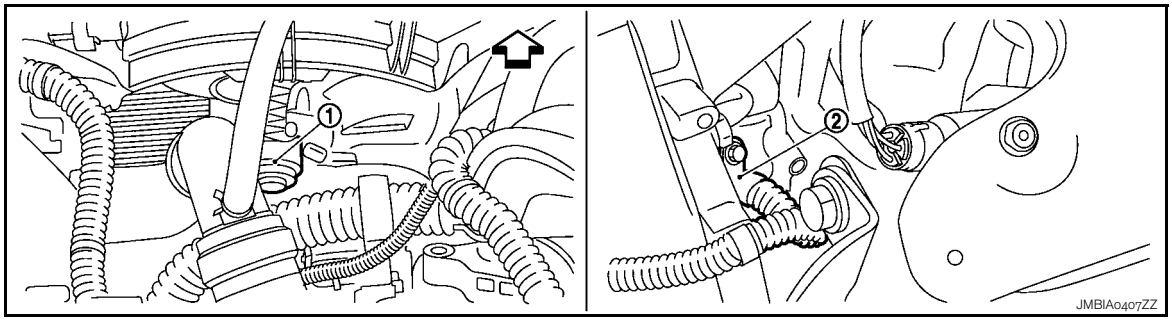
1. Intake valve timing control solenoid valve
2. Knock sensor

cardiagn.com



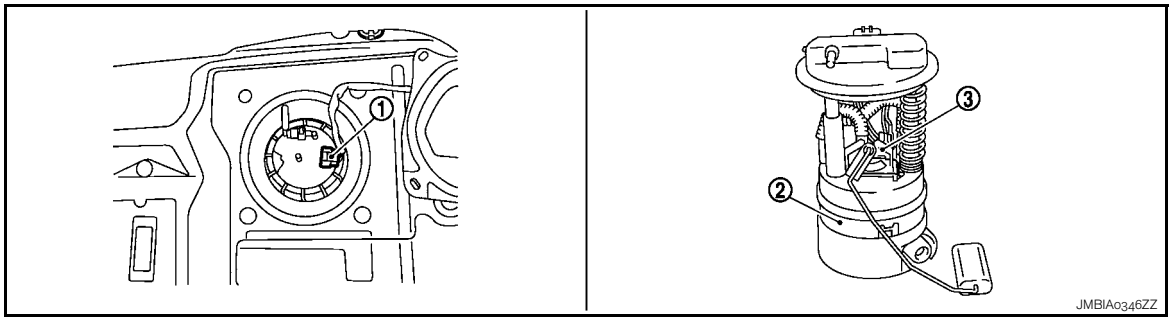
1. Refrigerant pressure sensor
2. PCV valve

⇦ Vehicle front

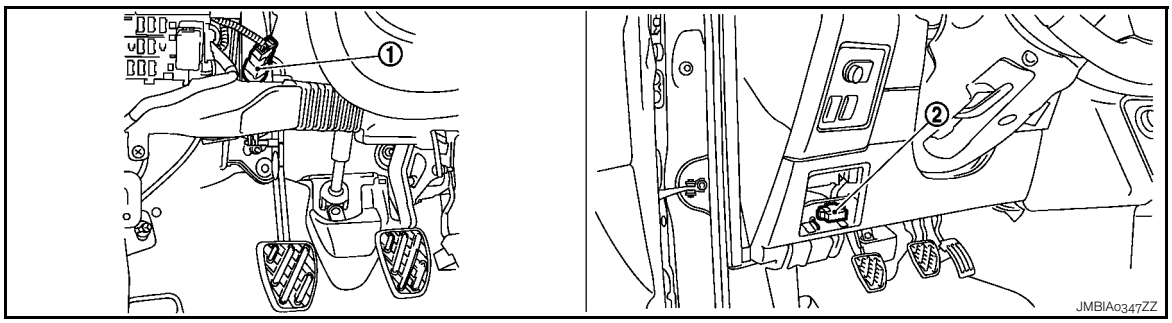


1. Cooling fan motor
2. Crankshaft position sensor (POS)

⇦ Vehicle front

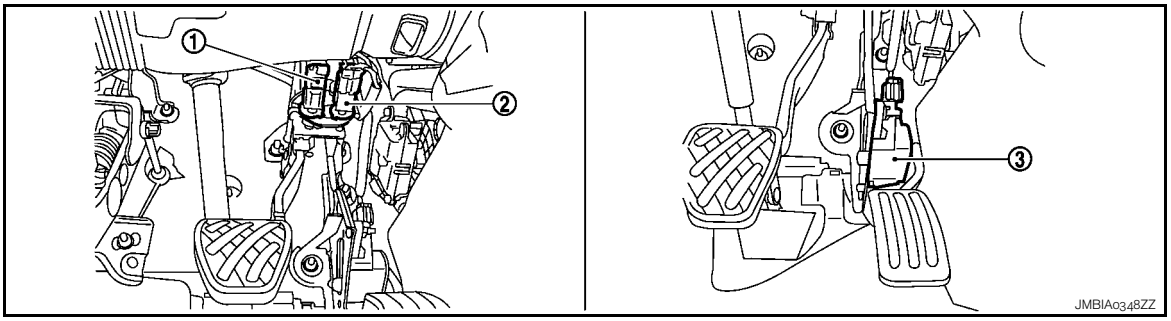


1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

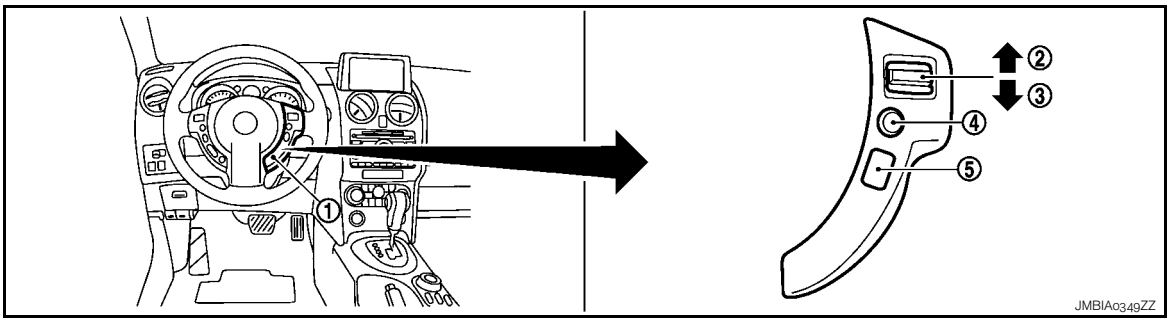


1. ASCD clutch switch
2. Data link connector

cardiagn.com



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001056153

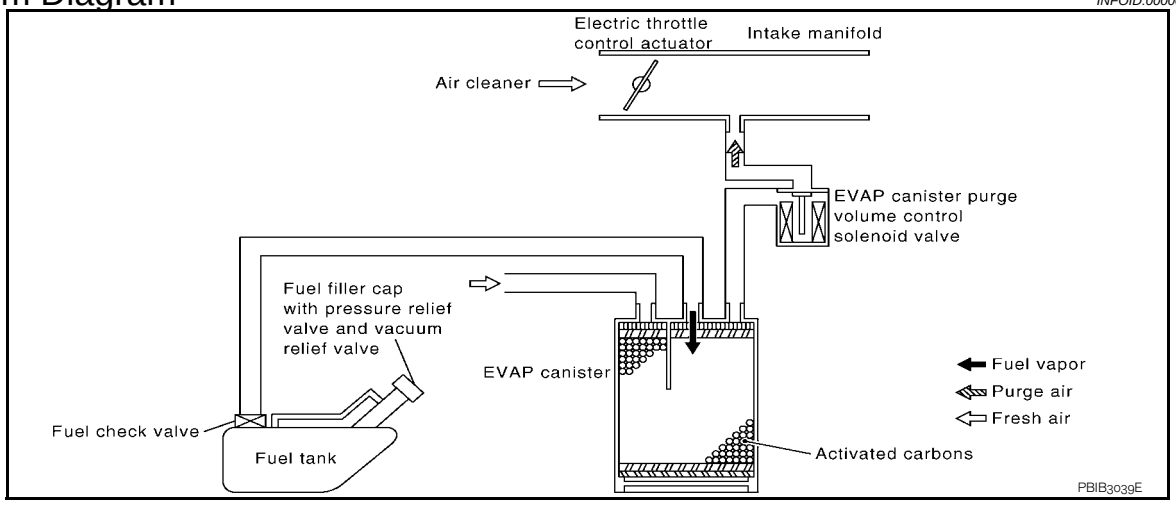
Component	Reference
Camshaft position sensor (PHASE)	EC-197, "Description"
Crankshaft position sensor (POS)	EC-193, "Description"
Cooling fan motor	EC-68, "System Description"
Engine coolant temperature sensor	EC-135, "Description"
Refrigerant pressure sensor	EC-316, "Description"

cardiagn.com

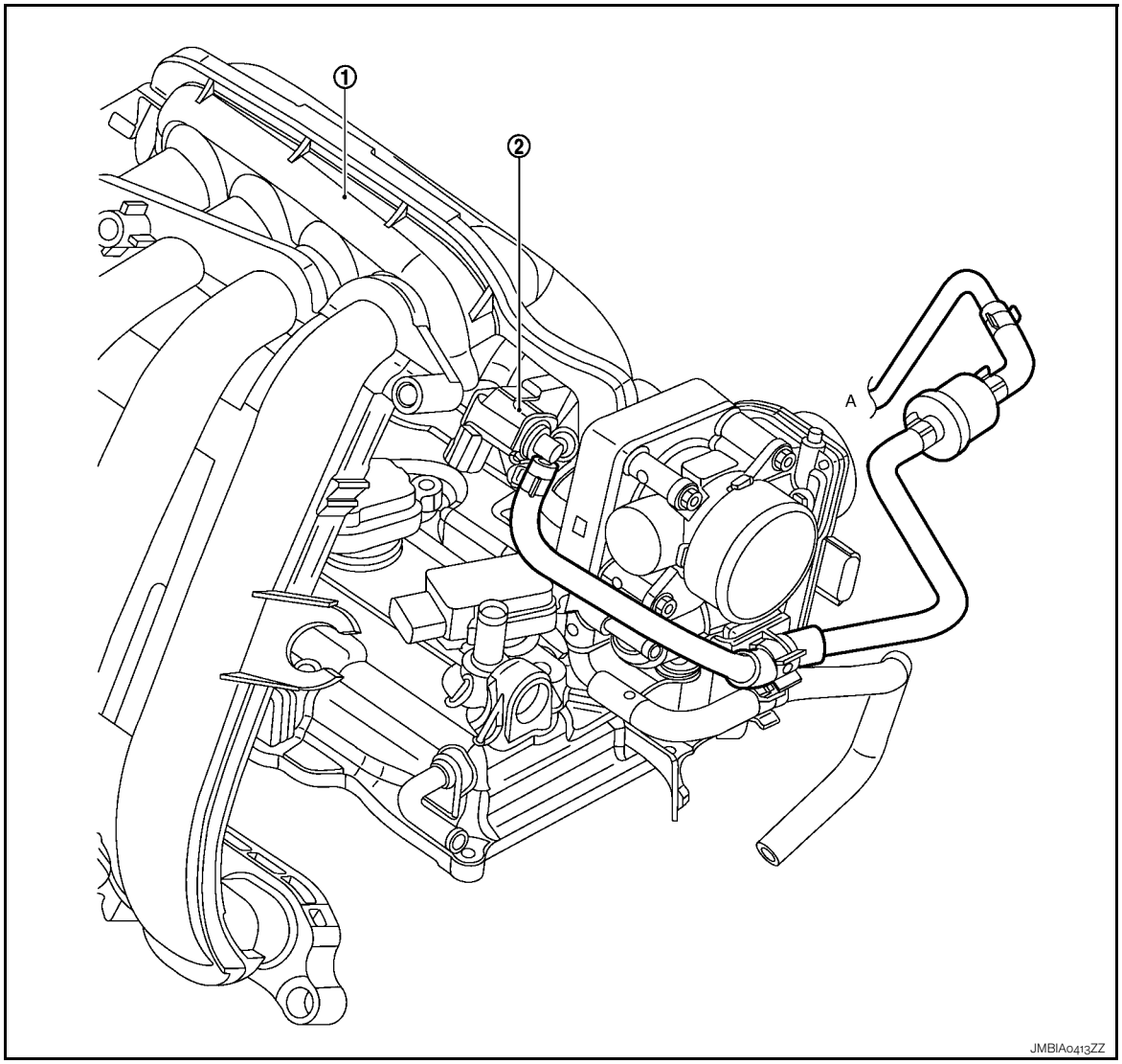
EVAPORATIVE EMISSION SYSTEM

System Diagram

INFOID:0000000001056154



EVAPORATIVE EMISSION LINE DRAWING



cardiagn.com

1. Intake manifold collector
2. EVAP canister purge volume control solenoid valve

A. To EVAP canister

NOTE:
Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

System Description

INFOID:0000000001056155

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Combination meter*2	Vehicle speed		

*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

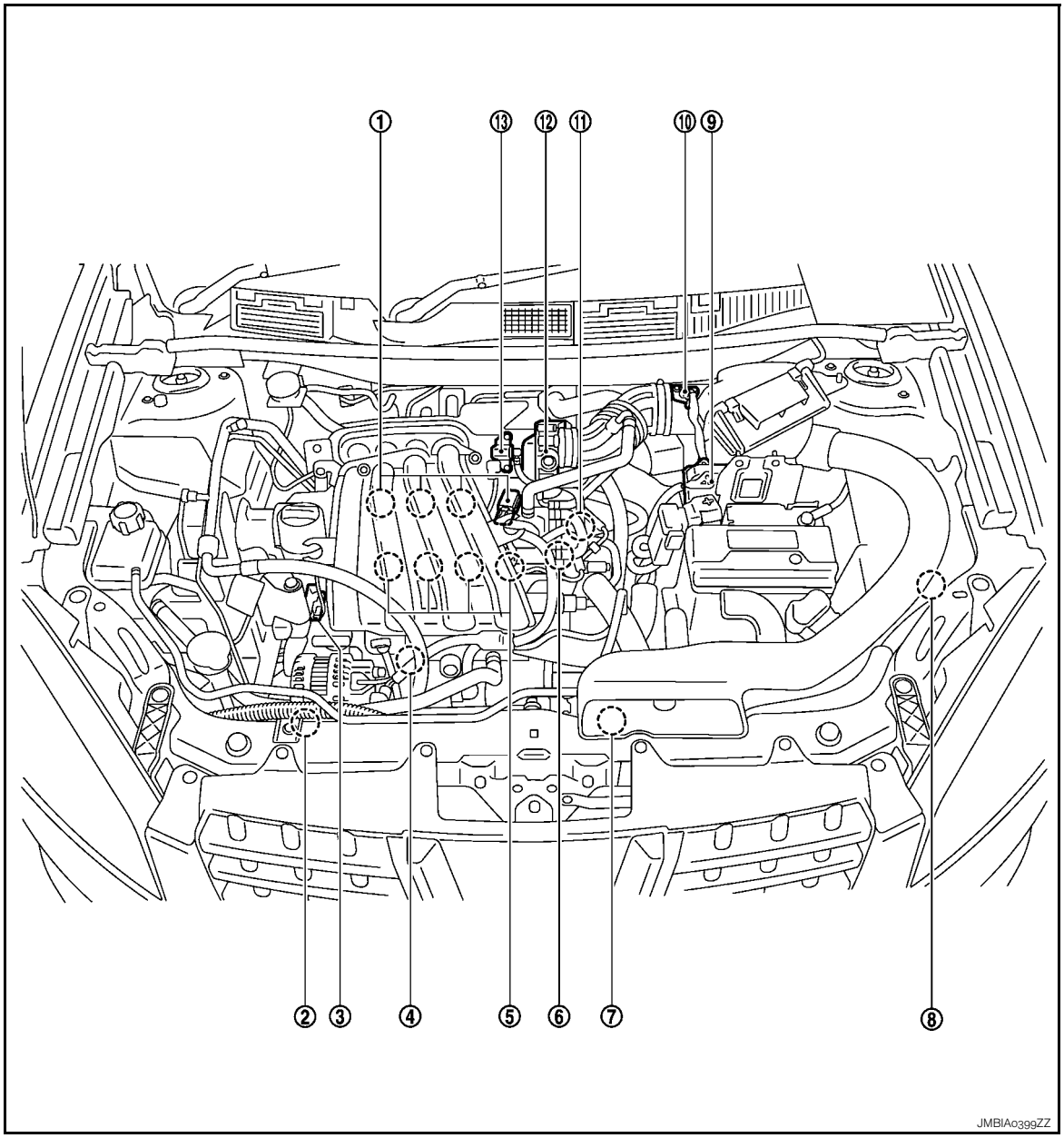
*2: This signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION

The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating.

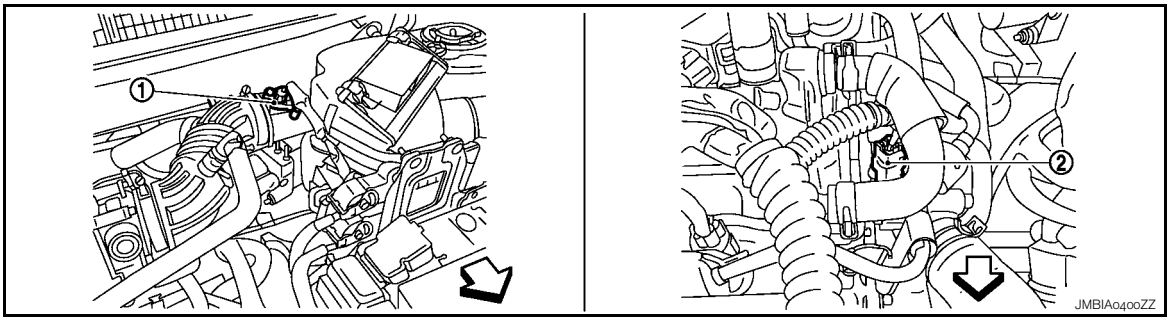
Component Parts Location

INFOID:0000000001060014



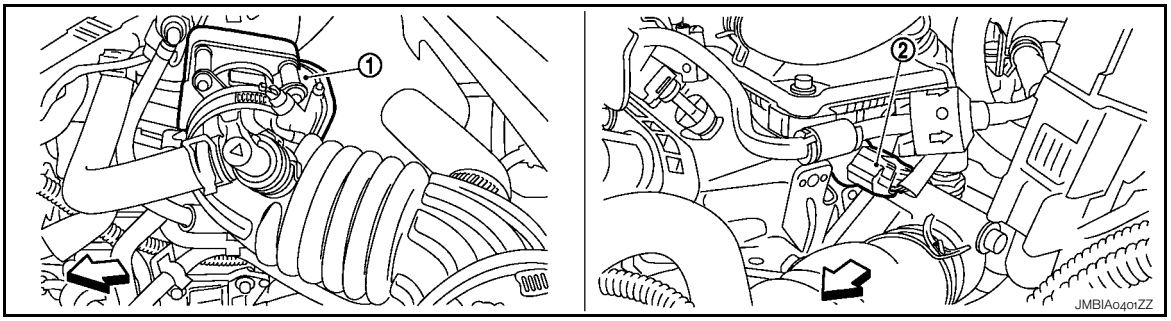
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



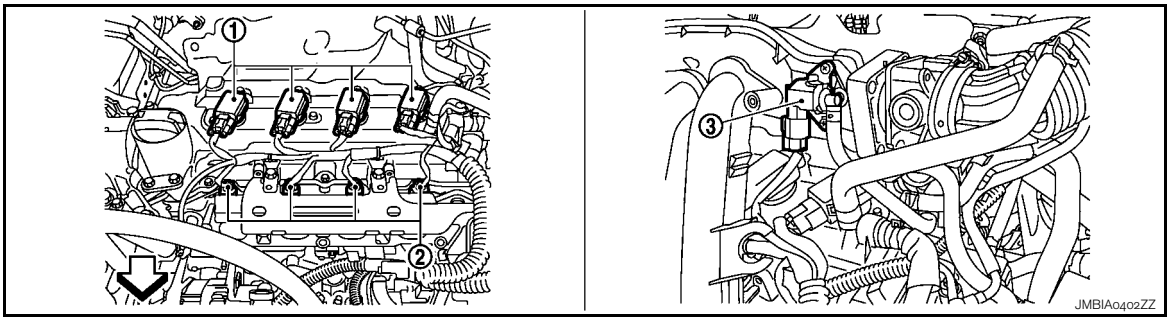
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



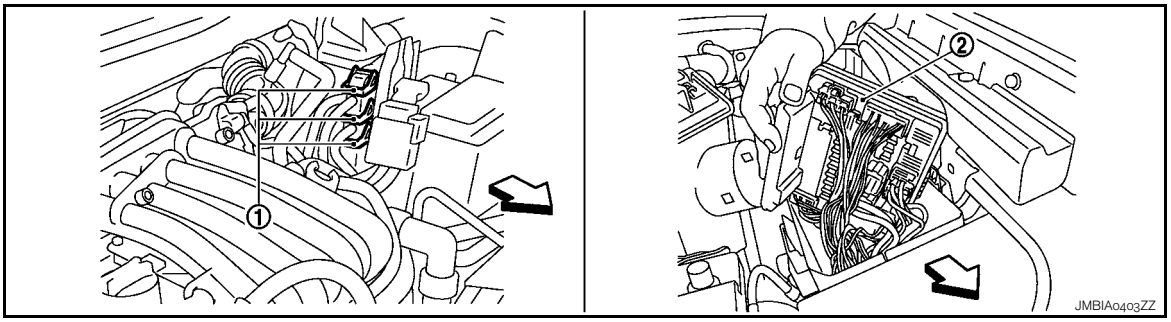
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

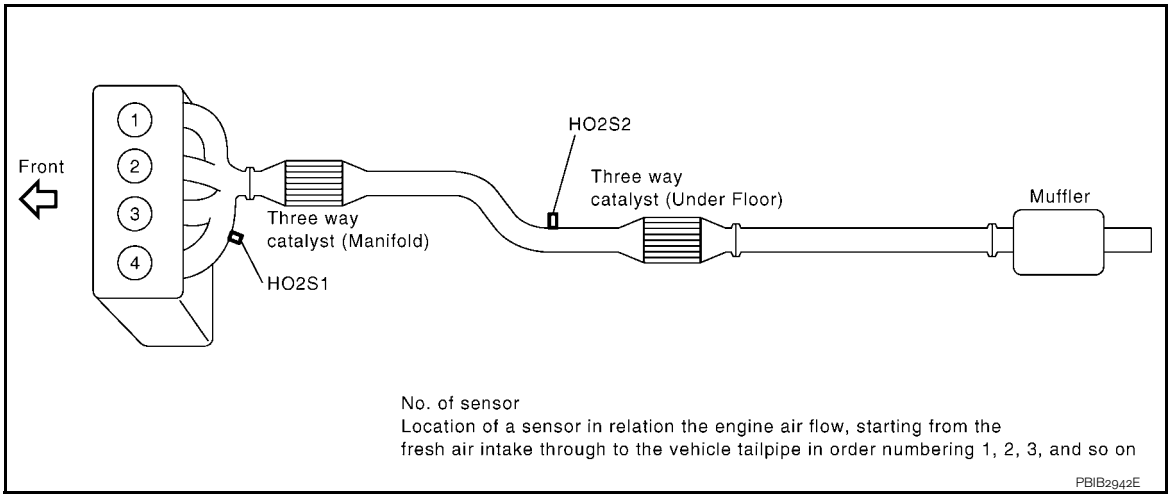
⇦ Vehicle front

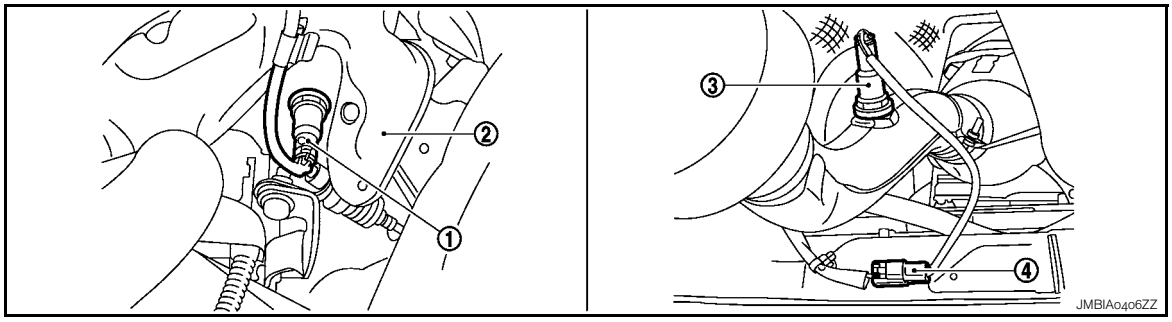


1. ECM harness connector
2. IPDM E/R

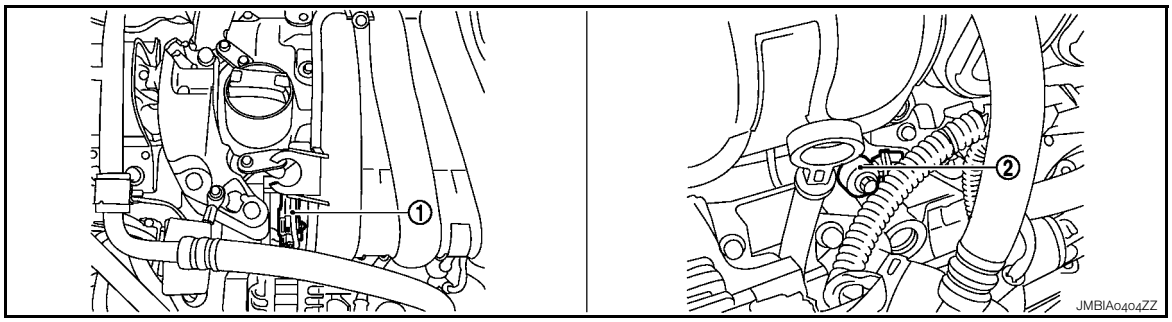
⇦ Vehicle front

cardiagn.com

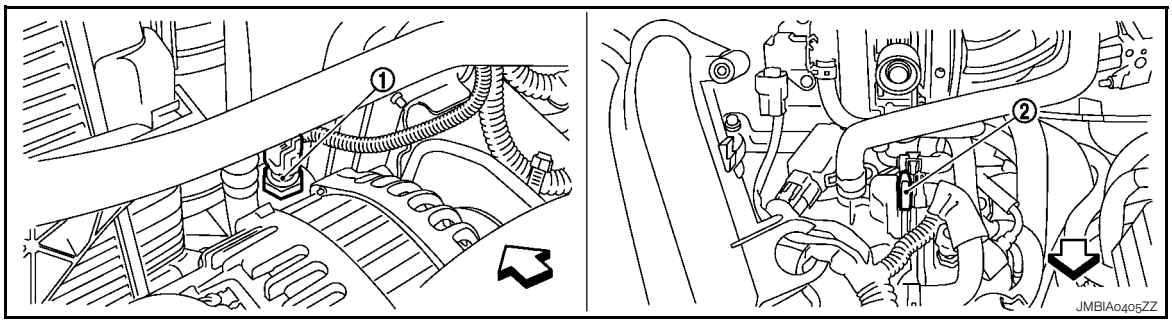




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



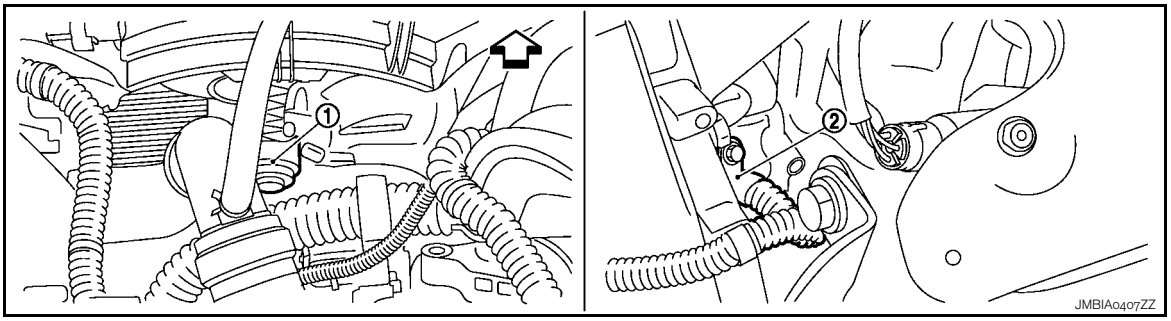
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

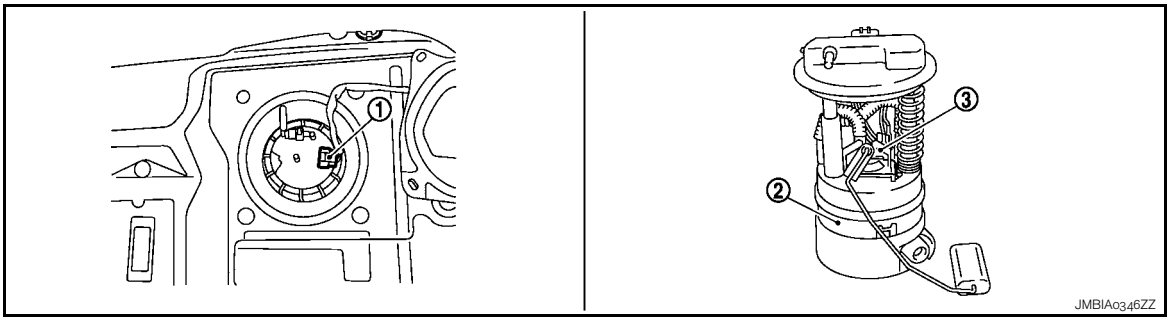
⇦ Vehicle front

cardiagn.com

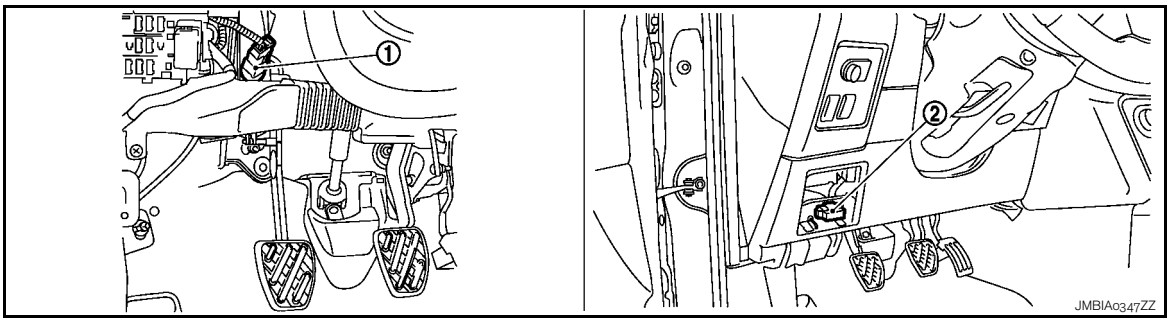


1. Cooling fan motor
2. Crankshaft position sensor (POS)

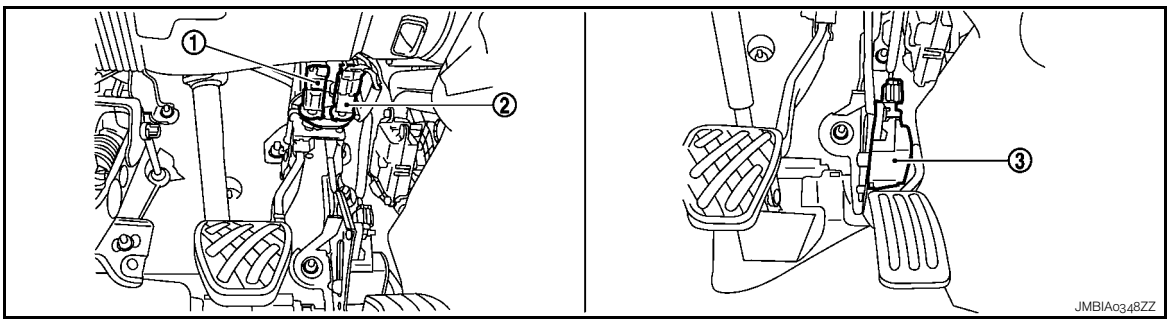
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

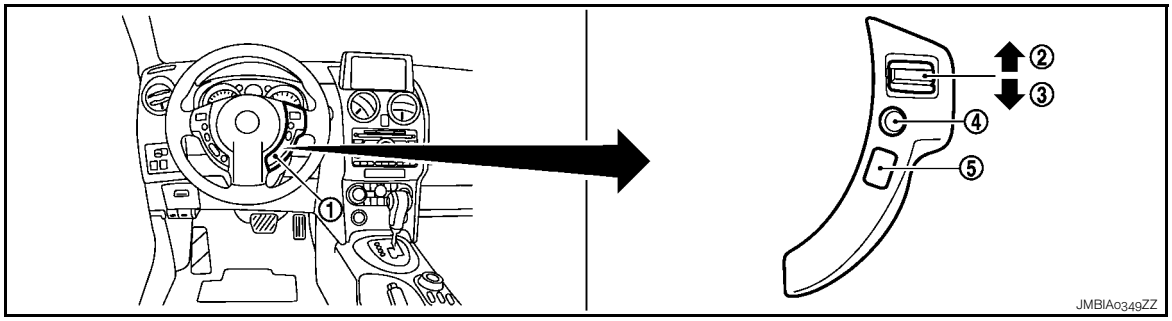


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001056157

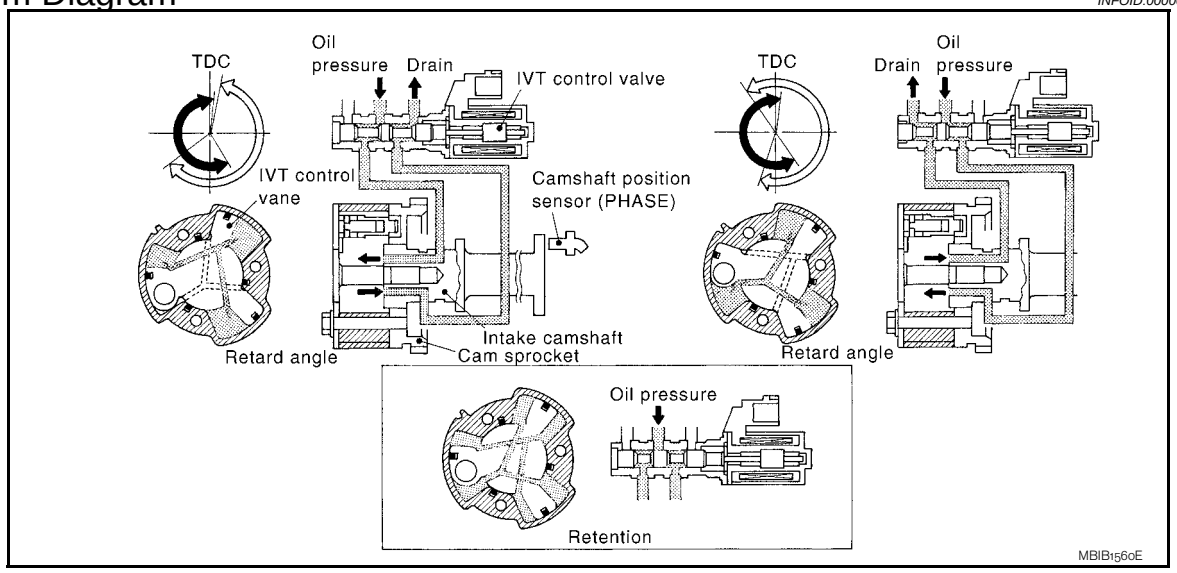
Component	Reference
Accelerator pedal position sensor	EC-280, "Description"
Camshaft position sensor (PHASE)	EC-197, "Description"
Crankshaft position sensor (POS)	EC-193, "Description"
Engine coolant temperature sensor	EC-135, "Description"
EVAP canister purge volume control solenoid valve	EC-206, "Description"
Heated oxygen sensor 1	EC-141, "Description"
Mass air flow sensor	EC-127, "Description"
Throttle position sensor	EC-138, "Description"
Vehicle speed sensor	EC-209, "Description"

cardiagn.com

INTAKE VALVE TIMING CONTROL

System Diagram

INFOID:0000000001056158



System Description

INFOID:0000000001056159

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed and piston position	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Combination meter*	Vehicle speed		

*: This signal is sent to the ECM through CAN communication line

SYSTEM DESCRIPTION

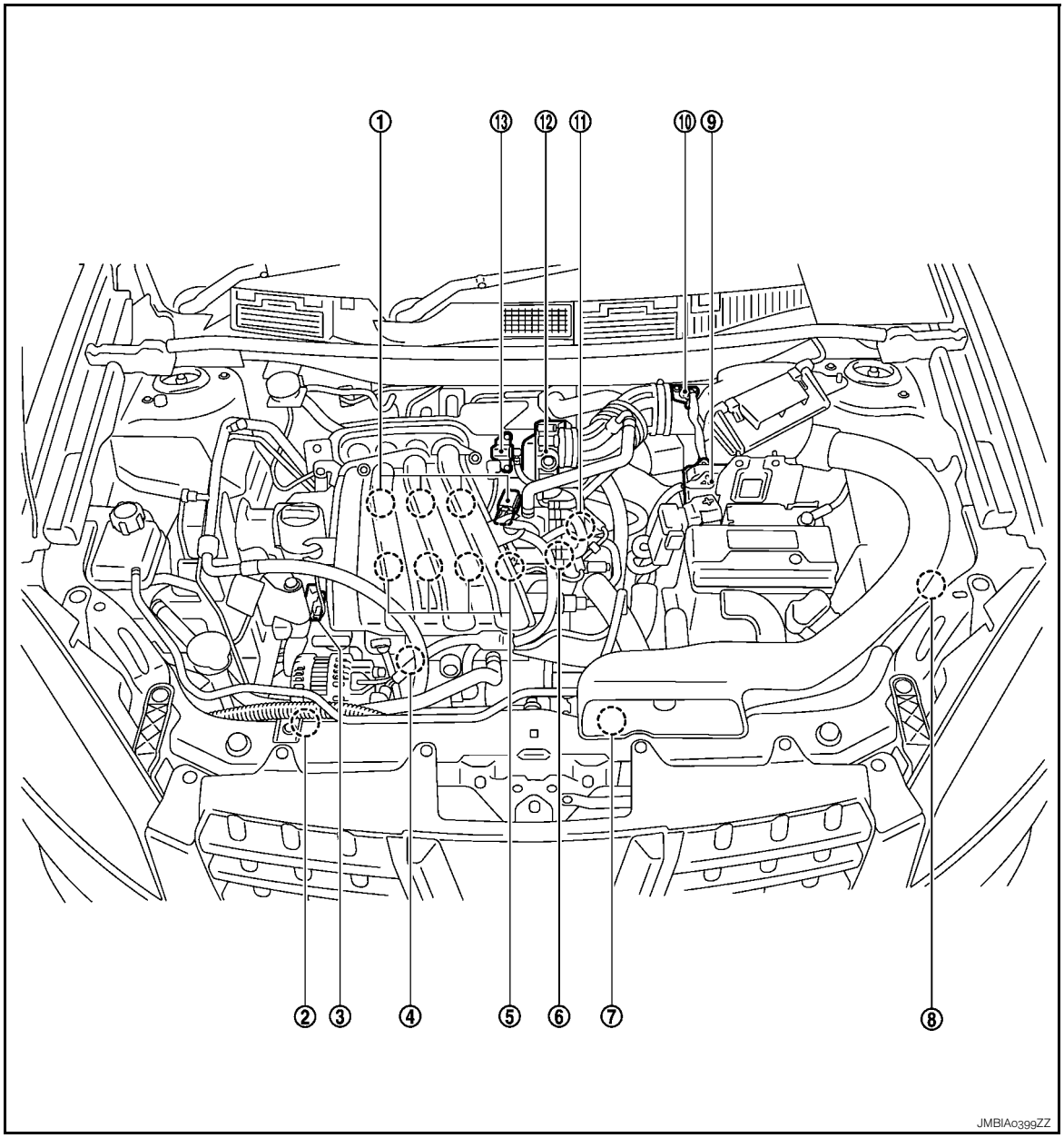
This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing (IVT) control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

Component Parts Location

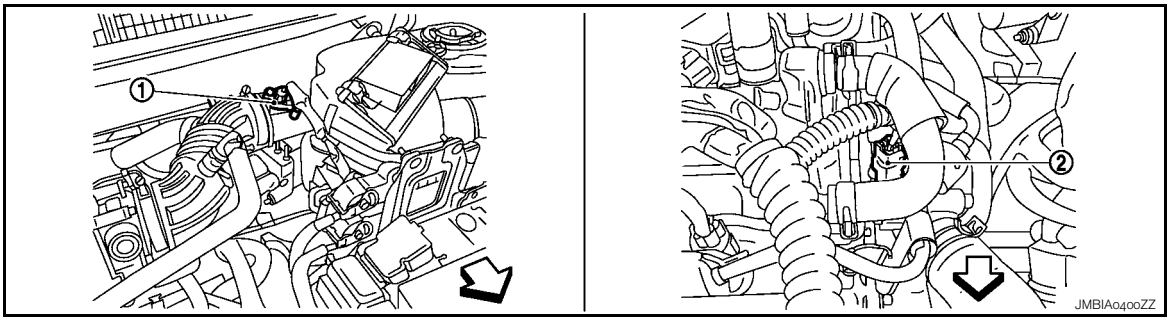
INFOID:0000000001060015

cardiagn.com



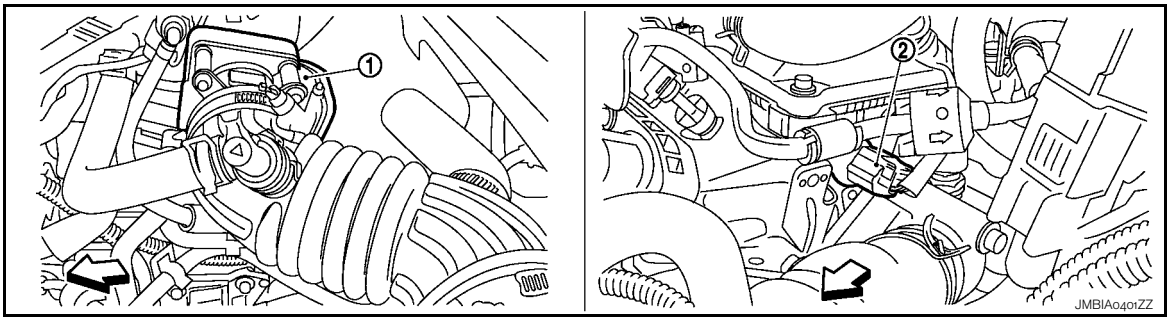
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



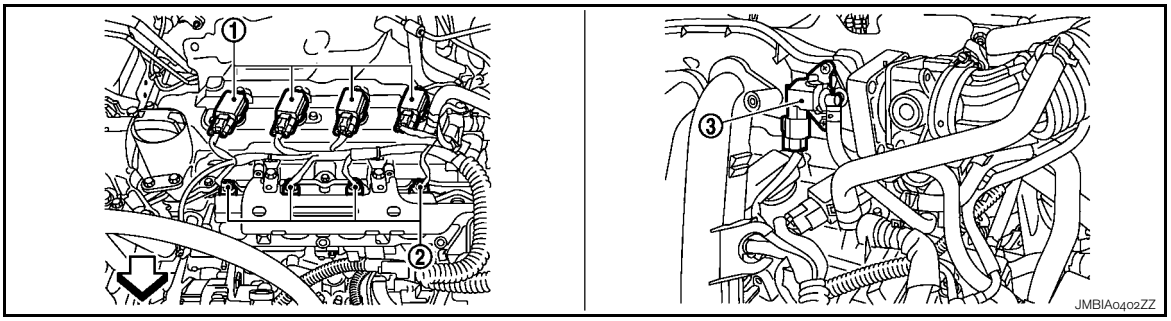
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



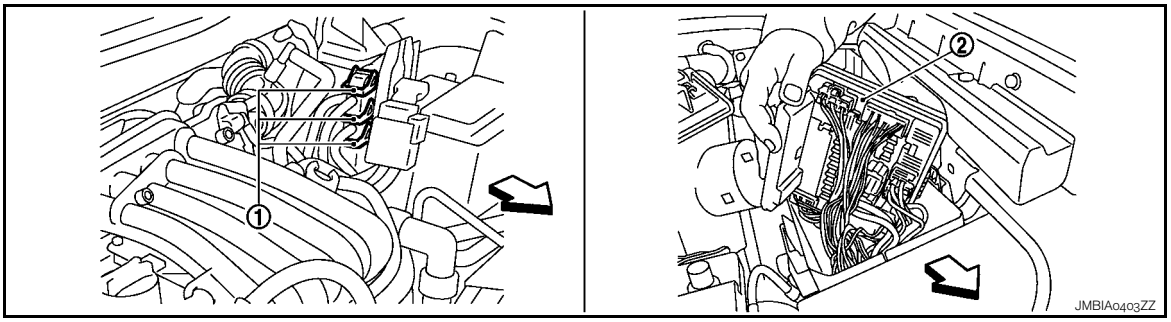
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

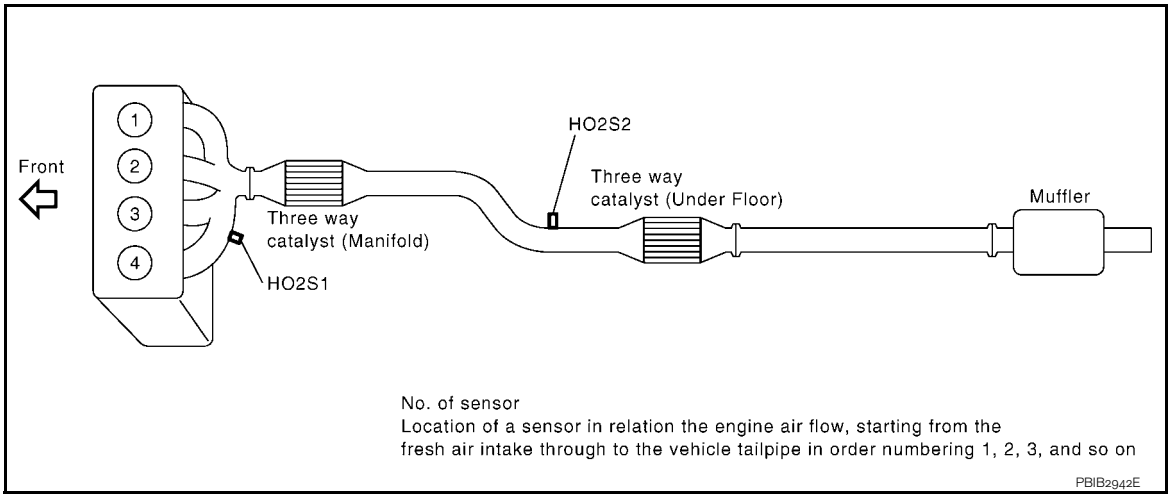
⇦ Vehicle front

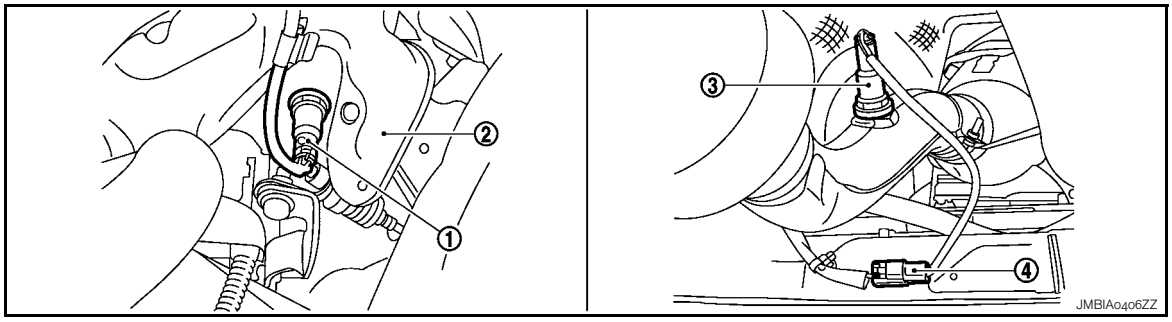


1. ECM harness connector
2. IPDM E/R

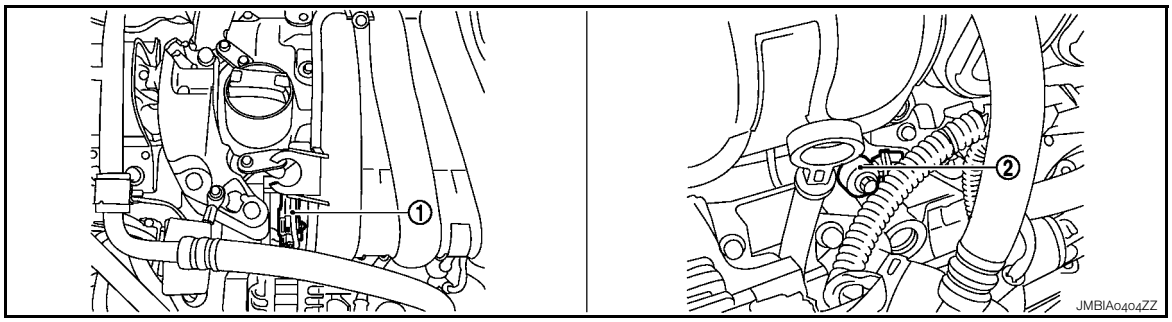
⇦ Vehicle front

cardiagn.com

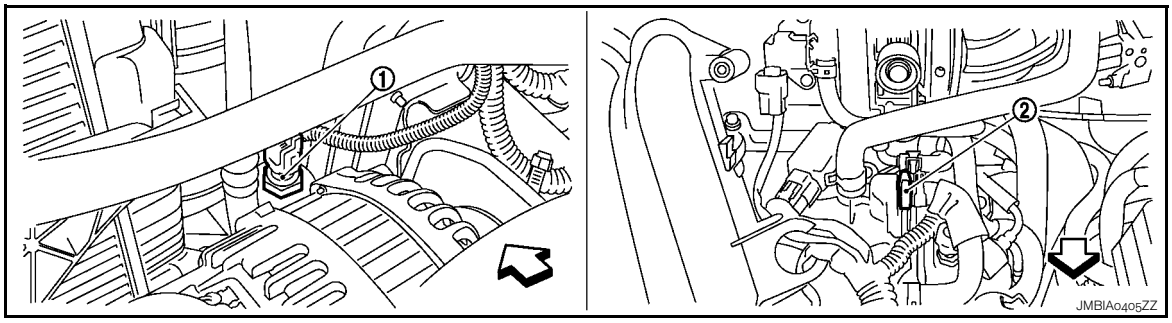




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



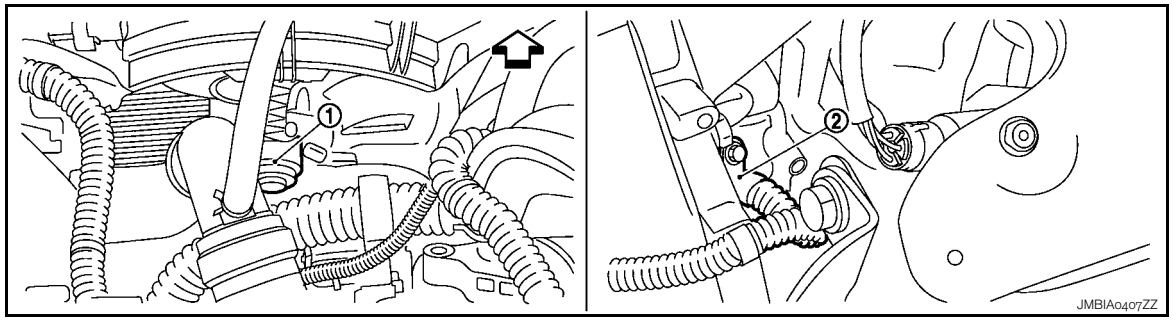
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

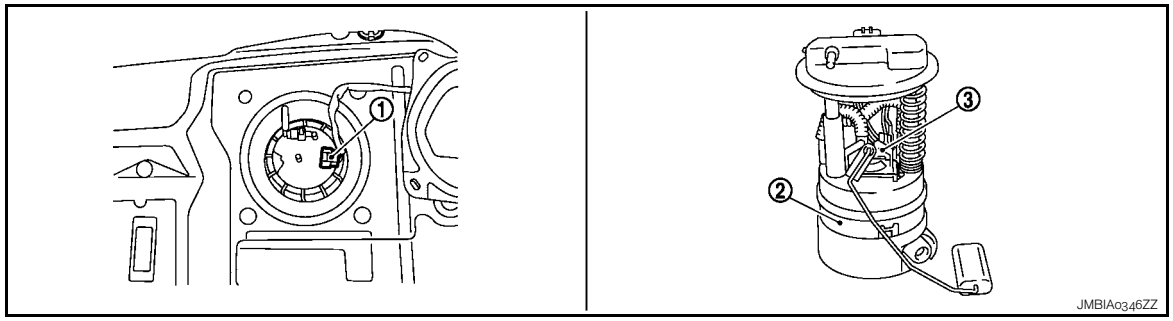
⇦ Vehicle front

cardiagn.com

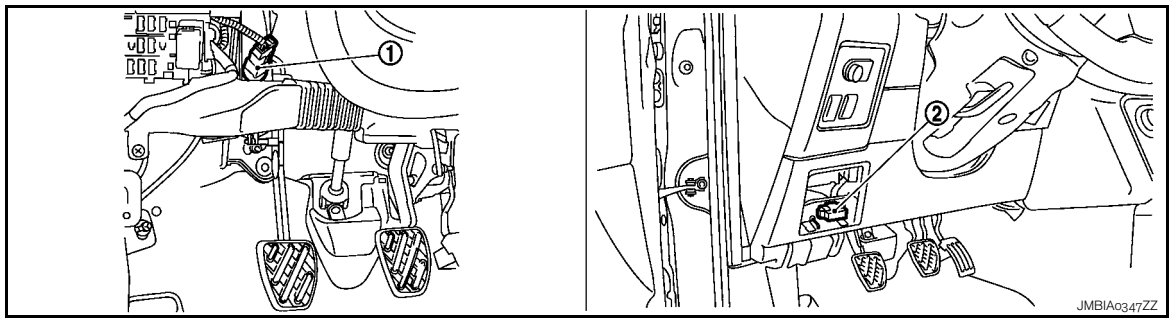


1. Cooling fan motor
2. Crankshaft position sensor (POS)

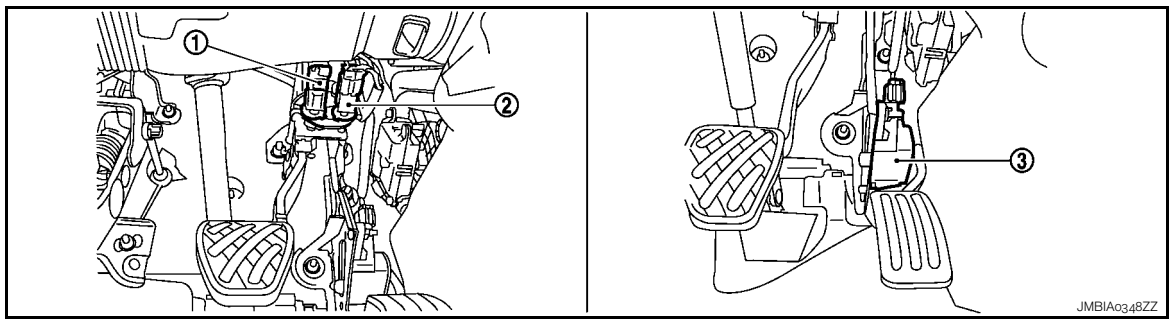
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

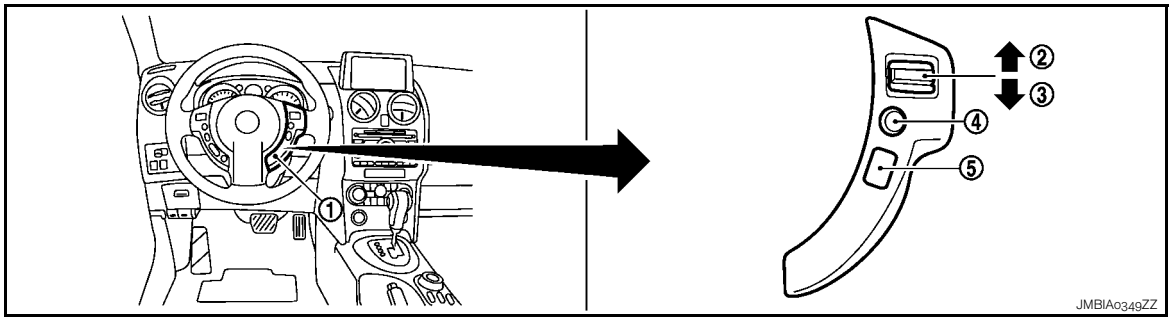


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001056161

Component	Reference
Camshaft position sensor (PHASE)	EC-197, "Description"
Crankshaft position sensor (POS)	EC-193, "Description"
Engine coolant temperature sensor	EC-135, "Description"
Intake valve timing control solenoid valve	EC-81, "System Description"
Vehicle speed sensor	EC-209, "Description"

cardiagn.com

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000001056166

INTRODUCTION

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	Diagnostic service
Diagnostic Trouble Code (DTC)	Service $03 of ISO 15031-5
Freeze Frame data	Service $02 of ISO 15031-5
System Readiness Test (SRT) code	Service $01 of ISO 15031-5
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Service $07 of ISO 15031-5
1st Trip Freeze Frame data	
Test values and Test limits	Service $06 of ISO 15031-5

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-III	×	×	×	×	×	—
GST	×	×	×	—	×	×
ECM	×	×*	—	—	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator lamp (MI) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-339, "Fail Safe".)

TWO TRIP DETECTION LOGIC

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MI will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MI lights up. The MI lights up at the same time when the DTC is stored. <2nd trip>

The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MI, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

×: Applicable —: Not applicable

Items	MI				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to EC-341, "DTC Index".)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

DTC AND FREEZE FRAME DATA

DTC and 1st Trip DTC

cardiagn.com

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.
If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MI will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MI lights up. In other words, the DTC is stored in the ECM memory and the MI lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MI during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.
Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”.
For malfunctions in which 1st trip DTCs are displayed, refer to “EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS”. These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-III.
1st trip DTC is specified in Service $07 of ISO 15031-5. 1st trip DTC detection occurs without lighting up the MI and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.
When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to EC-22, "Work Flow". Then perform DTC CONFIRMATION PROCEDURE or Component Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, absolute throttle position, base fuel schedule and intake air temperature at the moment a malfunction is detected.
Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST.
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MI on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.
Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”.

How to Read DTC and 1st Trip DTC

With CONSULT-III

With GST

CONSULT-III or GST (Generic Scan Tool) Examples: P0340, P1148, 1706, etc.
These DTCs are prescribed by ISO 15031-5.

cardiagn.com

(CONSULT-III also displays the malfunctioning component or system.)

No Tools

The number of blinks of the MI in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0340, 1148, 1706, etc.

These DTCs are controlled by NISSAN.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST or the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-III can identify malfunction status as shown below. Therefore, using CONSULT-III (if available) is recommended.**

DTC or 1st trip DTC of a malfunction is displayed in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-III. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be [0].

If a 1st trip DTC is stored in the ECM, the time data will be [1t].

How to Erase DTC and 1st Trip DTC

With CONSULT-III

The emission related diagnostic information in the ECM can be erased by selecting “All Erase” in the “Description” of “FINAL CHECK” mode with CONSULT-III.

With GST

The emission related diagnostic information in the ECM can be erased by selecting Service $04 with GST.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Select Service $04 with GST (Generic Scan Tool).

No Tools

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal.

- **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**
- **The following data are cleared when the ECM memory is erased.**

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Service $01 of ISO 15031-5.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating “INCMP”, use the information in this Service Manual to set the SRT to “CMPLT”.

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate “CMPLT” for each application system. Once set as “CMPLT”, the SRT status remains “CMPLT” until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate “INCMP” for these items.

NOTE:

The SRT will also indicate “INCMP” if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates “CMPLT” for all test items, the inspector will continue with the emissions test. However, if the SRT indicates “INCMP” for one or more of the SRT items the vehicle is returned to the customer untested.

NOTE:

cardiagn.com

If MI is ON during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates “CMPLT” for all test items. Therefore, it is important to check SRT (“CMPLT”) and DTC (No DTCs) before the inspection.

SRT Item

The table below shows required self-diagnostic items to set the SRT to “CMPLT”.

SRT item (CONSULT-III indication)	Performance Priority*	Required self-diagnostic items to set the SRT to “CMPLT”	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
HO2S	1	Heated oxygen sensor 1	P0133
		Heated oxygen sensor 1	P1143
		Heated oxygen sensor 1	P1144
		Heated oxygen sensor 2	P0139
		Heated oxygen sensor 2	P1146
HO2S HTR	1	Heated oxygen sensor 1 heater	P0135
		Heated oxygen sensor 2 heater	P0141

*: If completion of several SRTs is required, perform driving patterns (DTC CONFIRMATION PROCEDURE), one by one based on the priority for models with CONSULT-III.

SRT Set Timing

SRT is set as “CMPLT” after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example				
		Diagnosis	Ignition cycle ← ON → OFF ← ON → OFF ← ON → OFF ← ON →			
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)
		P0402	OK (1)	— (1)	— (1)	OK (2)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“CMPLT”	“CMPLT”	“CMPLT”	“CMPLT”
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)
		P0402	— (0)	— (0)	OK (1)	— (1)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“INCMP”	“INCMP”	“CMPLT”	“CMPLT”
NG exists	Case 3	P0400	OK	OK	—	—
		P0402	—	—	—	—
		P1402	NG	—	NG	NG (Consecutive NG)
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MI ON)
		SRT of EGR	“INCMP”	“INCMP”	“INCMP”	“CMPLT”

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate “CMPLT”. → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate “CMPLT” at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate “CMPLT”. → Case 3 above

cardiagn.com

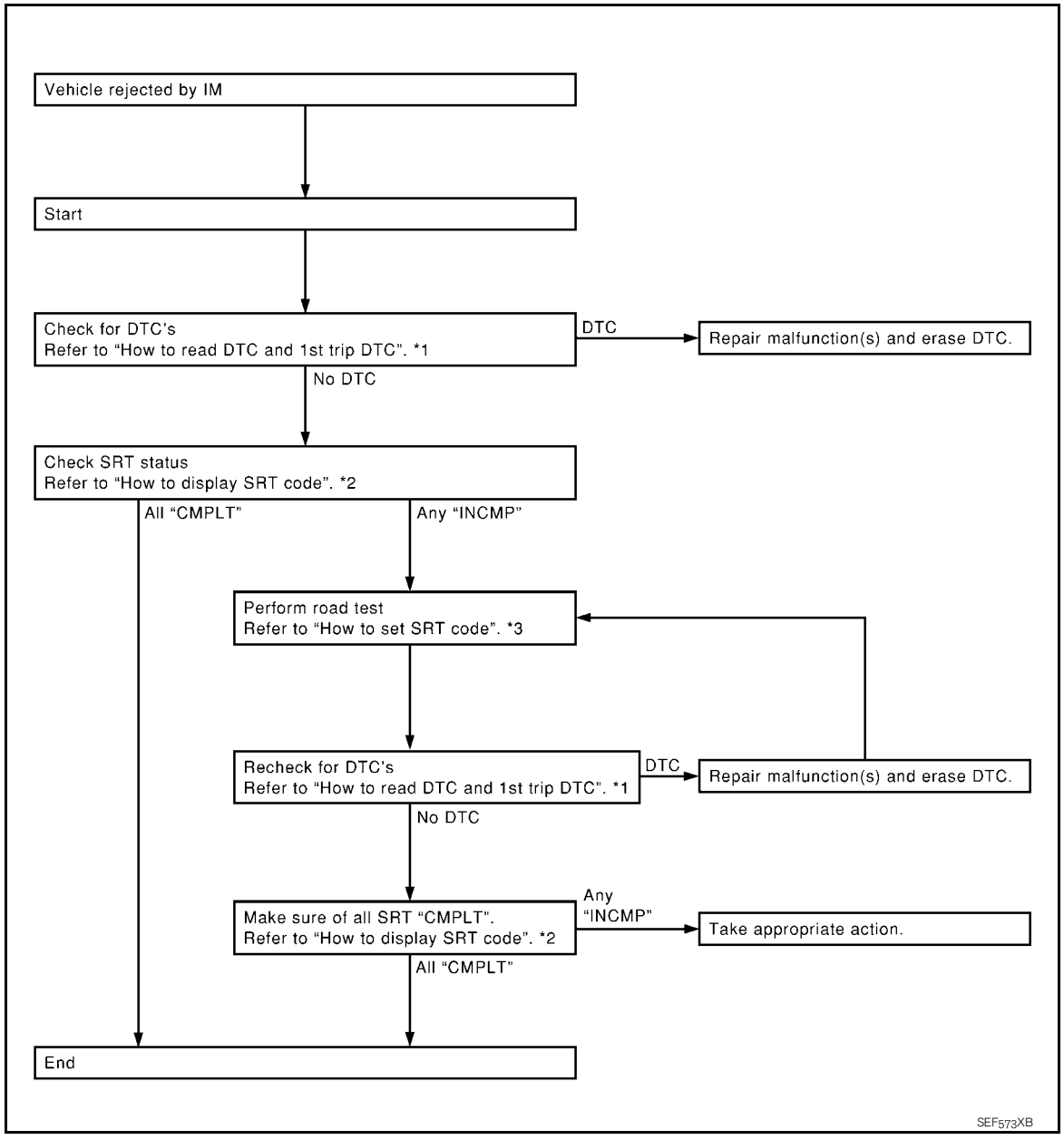
The table above shows that the minimum number of cycles for setting SRT as “INCMP” is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate “CMPLT” at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires “CMPLT” of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to “CMPLT” of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate “INCMP”.

NOTE:
SRT can be set as “CMPLT” together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates “CMPLT”.

SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating “INCMP”, review the flowchart diagnostic sequence on the next page.



*1 “How to Read DTC and 1st Trip DTC” *2 “How to Display SRT Status” *3 “How to Set SRT Code”

How to Display SRT Status

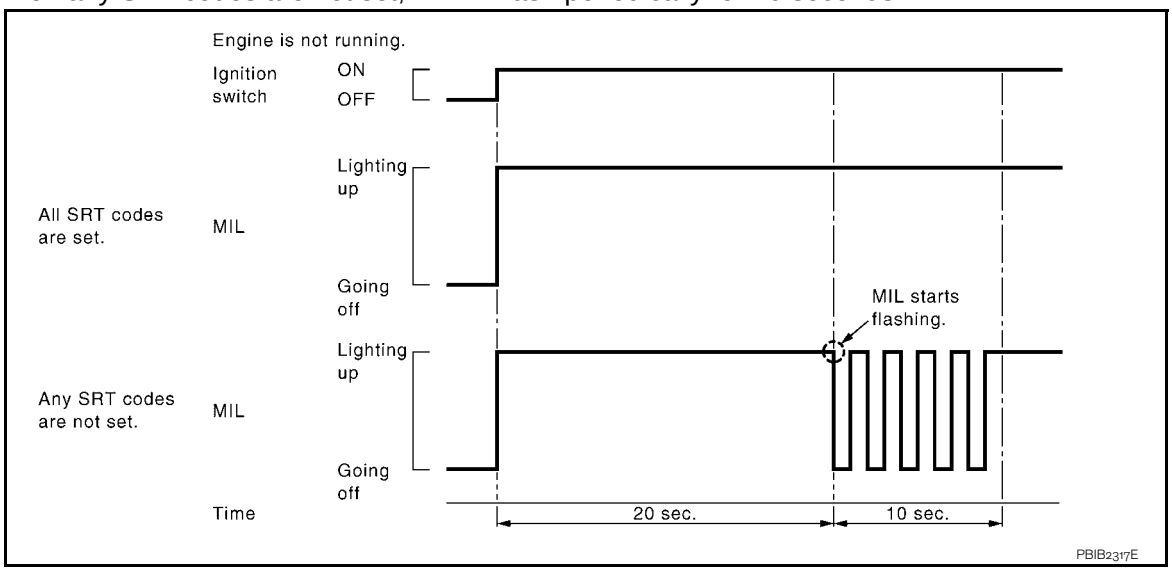
cardiagn.com

WITH CONSULT-III
Selecting “SRT STATUS” in “DTC CONFIRMATION” mode with CONSULT-III.
For items whose SRT codes are set, a “CMPLT” is displayed on the CONSULT-III screen; for items whose SRT codes are not set, “INCMP” is displayed.

WITH GST
Selecting Service $01 with GST (Generic Scan Tool)

NO TOOLS
A SRT code itself can not be displayed while only SRT status can be.

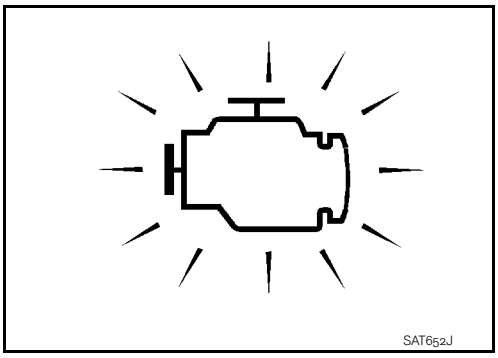
1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown below.
   - When all SRT codes are set, MI lights up continuously.
   - When any SRT codes are not set, MI will flash periodically for 10 seconds.



MALFUNCTION INDICATOR (MI)

Description
The MI is located on the instrument panel.

1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   If the MI does not light up, refer to EC-314, "Component Function Check".
2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



On Board Diagnostic System Function
The on board diagnostic system has the following four functions.

cardiagn.com

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position Engine stopped	BULB CHECK	This function checks the MI bulb for damage (blown, open circuit, etc.). If the MI does not come on, check MI circuit.
	Engine running	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MI will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MI in the 1st trip. • Misfire (Possible three way catalyst damage) • One trip detection diagnoses
Mode II	Ignition switch in ON position Engine stopped	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

MI Flashing Without DTC

If the ECM is in Diagnostic Test Mode II, MI may flash when engine is running. In this case, check ECM diagnostic test mode. How to switch the diagnostic test function modes, and details of the above functions are described later.

The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble code
- 1st trip diagnostic trouble code
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

Diagnostic Test Mode I — Bulb Check

In this mode, the MI on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to EC-314, "Component Function Check".

Diagnostic Test Mode I — Malfunction Warning

MI	Condition
ON	When the malfunction is detected.
OFF	No malfunction.

This DTC number is clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

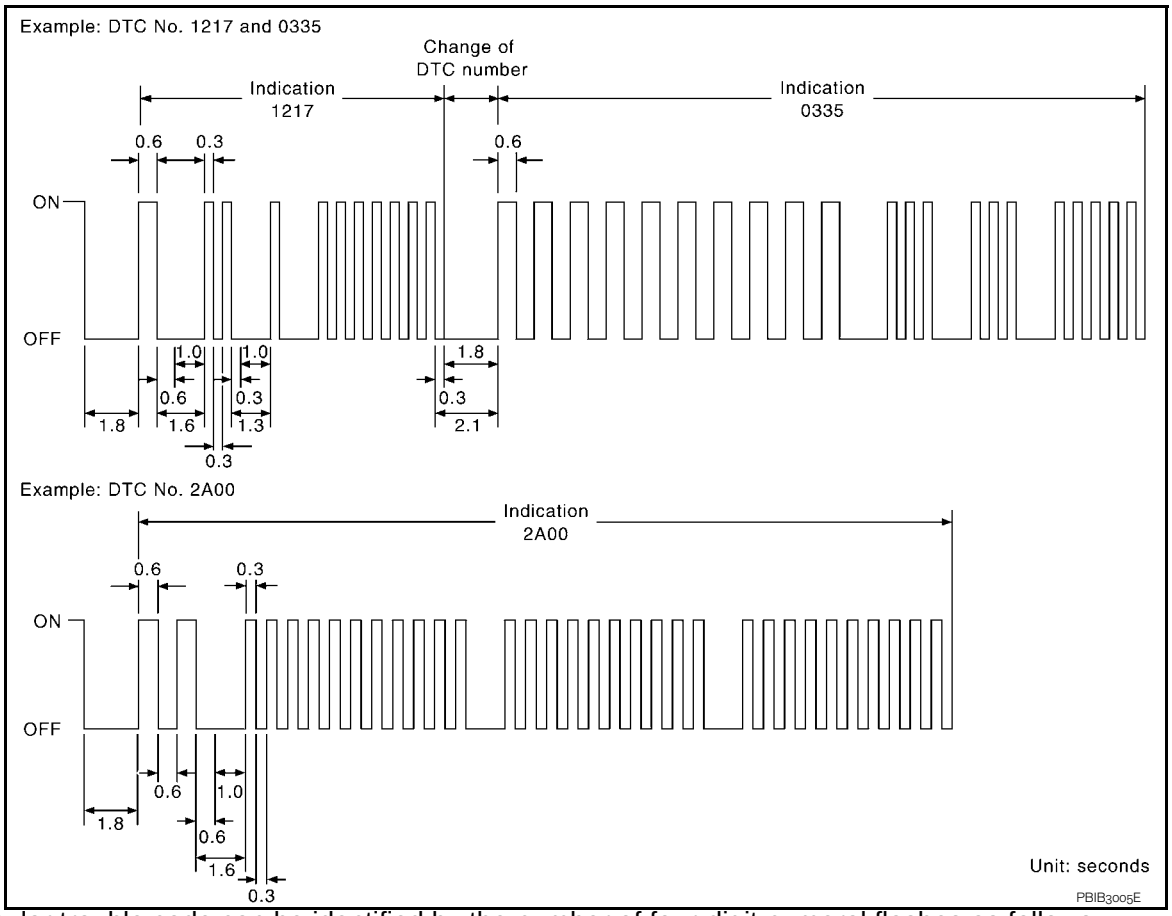
Diagnostic Test Mode II — Self-diagnostic Results

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MI as shown below.

The DTC and 1st trip DTC are displayed at the same time. If the MI does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MI illumi-

cardiagn.com

nates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT-III or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes as follows.

Number	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Flashes	10	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16

The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.
The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.
A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.
A change from one trouble code to another occurs at an interval of 1.8-second OFF.
In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See EC-341, "DTC Index")

Diagnostic Test Mode II — Heated oxygen sensor 1 monitor
In this mode, the MI displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MI	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.
To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.
Nest run engine at about 2,000 rpm for about 2 minutes under no load conditions. Then make sure that the MI comes ON more than 5 times within 1 seconds with engine running at 2,000 rpm under no load.

cardiagn.com

How to Switch Diagnostic Test Mode

NOTE:

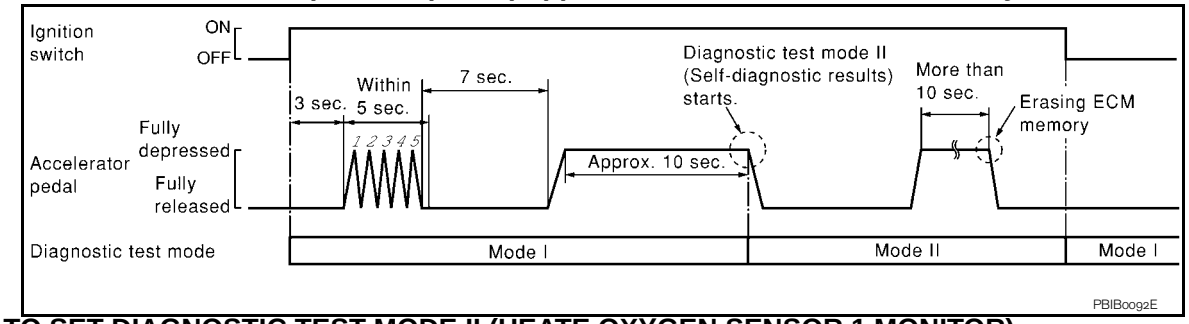
- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**
- **Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.**

HOW TO SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.

- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.

3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MI starts blinking.
   NOTE:
   Do not release the accelerator pedal for 10 seconds if MI may start blinking on the halfway of this 10 seconds. This blinking is displaying SRT status and is continued for another 10 seconds.
4. Fully release the accelerator pedal.
   ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).
   NOTE:
   Wait until the same DTC (or 1st trip DTC) appears to confirm all DTCs certainly.



HOW TO SET DIAGNOSTIC TEST MODE II (HEATE OXYGEN SENSOR 1 MONITOR)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results).
   Refer to “How to Set Diagnostic Test Mode II (Self-diagnostic Results)”.
2. Start Engine.
   ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).

HOW TO ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to “How to Set Diagnostic Test Mode II (Self-diagnostic Results)”.
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.
   The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to “How to Erase Diagnostic Test Mode II (Self-diagnostic Results)”.

- **If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- **Be careful not to erase the stored memory before starting trouble diagnoses.**

OBD System Operation Chart

Relationship Between MI, 1st Trip DTC, DTC and Detectable Items

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MI will come on.
- The MI will go off after the vehicle is driven 3 times (pattern B) with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (pattern C) without

cardiagn.com

the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-III will count the number of times the vehicle is driven.

- The 1st trip DTC is not displayed when the self-diagnosis results in OK for the 2nd trip.

Summary Chart

Items	Fuel Injection System	Misfire	Other
MI (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

For details about patterns B and C under “Fuel Injection System” and “Misfire”, see “EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”.

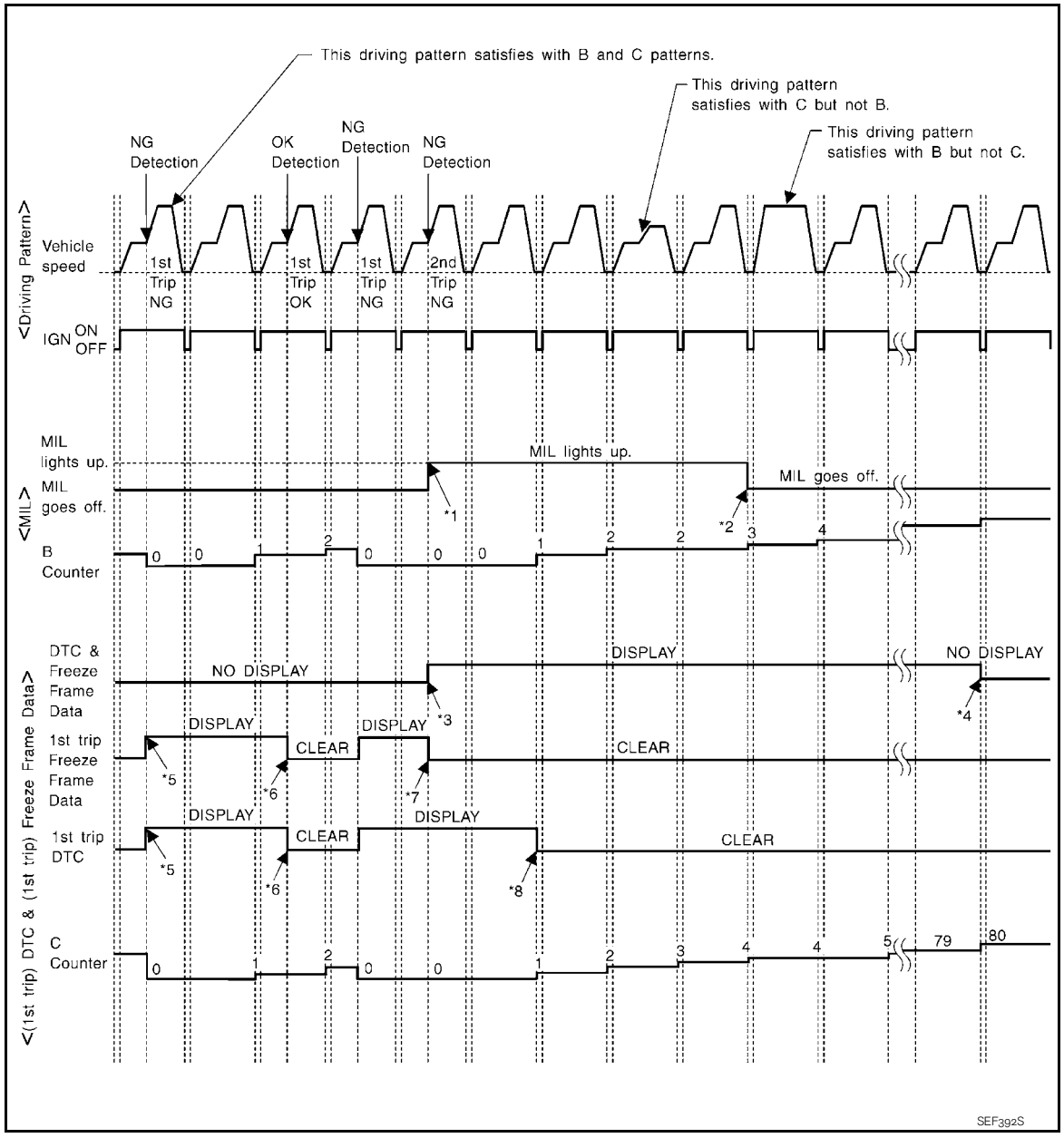
For details about patterns A and B under Other, see “EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”.

*1: Clear timing is at the moment OK is detected.

*2: Clear timing is when the same malfunction is detected in the 2nd trip.

Relationship Between MI, DTC, 1st Trip DTC and Driving Patterns for “Misfire <Exhaust Quality Deterioration>”, “Fuel Injection System”

cardiagn.com



*1: When the same malfunction is detected in two consecutive trips, MI will light up.

*2: MI will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

Explanation for Driving Patterns for “Misfire <Exhaust Quality Deterioration>”, “Fuel Injection System” <Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

cardiagn.com

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MI will go off when the B counter reaches 3. (*2 in “OBD SYSTEM OPERATION CHART”)

<Driving Pattern C>
Driving pattern C means the vehicle operation as follows:
The following conditions should be satisfied at the same time:
Engine speed: (Engine speed in the freeze frame data) ±375 rpm
Calculated load value: (Calculated load value in the freeze frame data) x (1±0.1) [%]
Engine coolant temperature (T) condition:

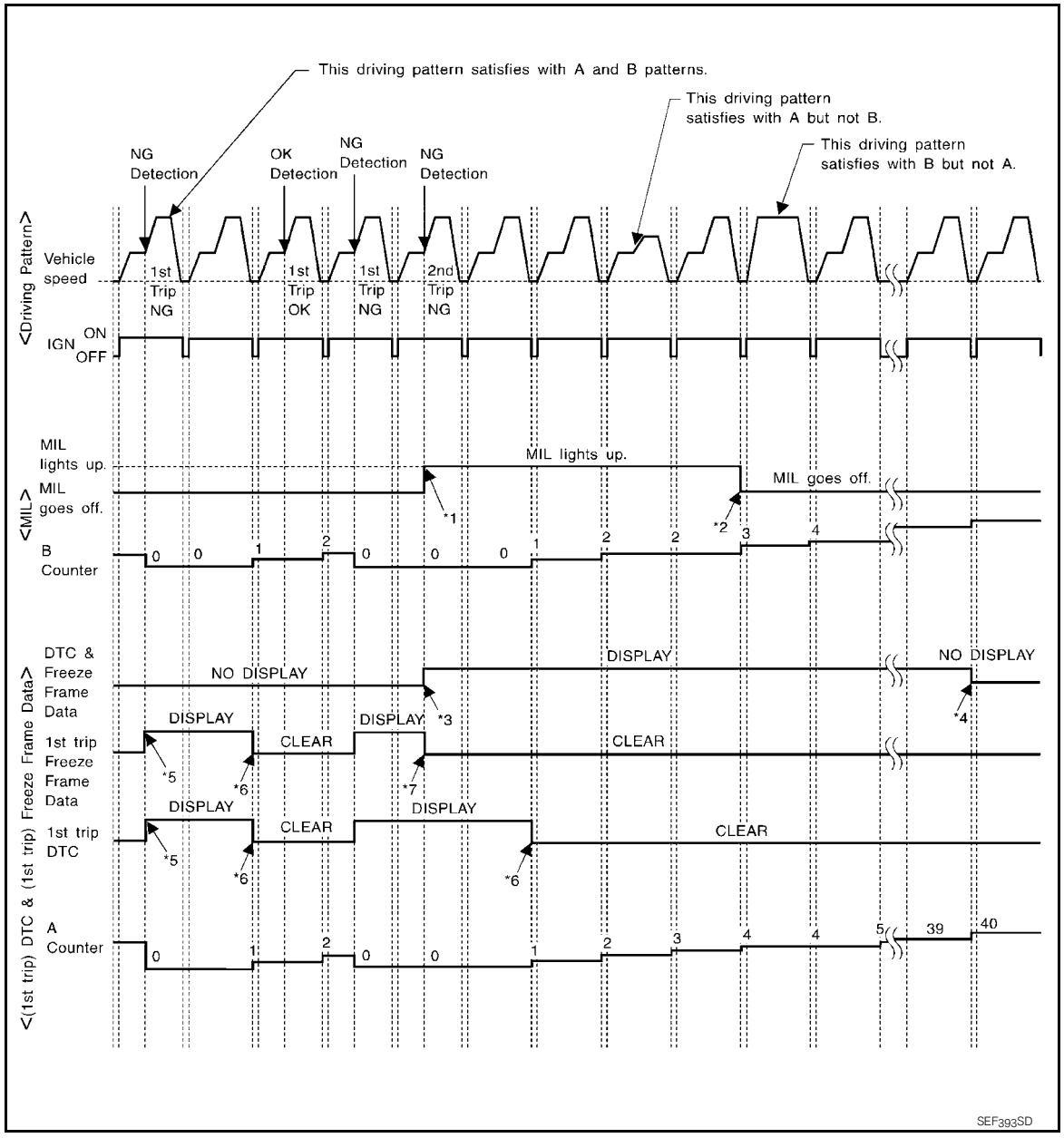
- When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F).

Example:
If the stored freeze frame data is as follows:
Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)
To be satisfied with driving pattern C, the vehicle should run under the following conditions:
Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

Relationship Between MI, DTC, 1st Trip DTC and Driving Patterns Except For “Misfire <Exhaust Quality Deterioration>”, “Fuel Injection System”

cardiagn.com



*1: When the same malfunction is detected in two consecutive trips, MI will light up.

*2: MI will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

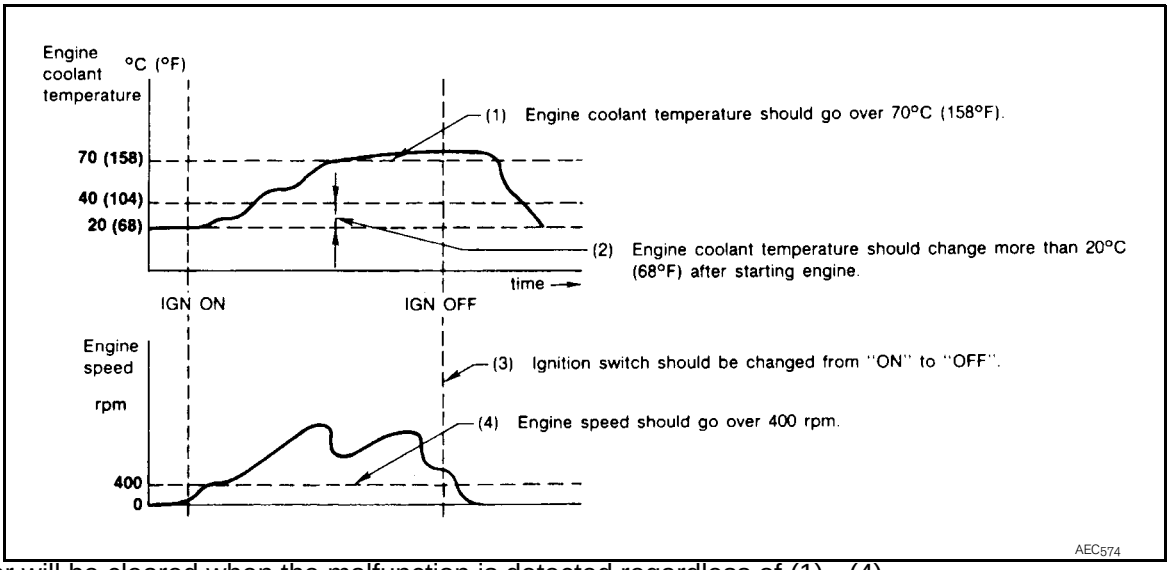
*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

Explanation for Driving Patterns Except for “Misfire <Exhaust Quality Deterioration>”, “Fuel Injection System”

cardiagn.com

<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MI will go off when the B counter reaches 3 (*2 in OBD SYSTEM OPERATION CHART).

CONSULT-III Function

INFOID:0000000001056167

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECU part number	ECM part number can be read.

*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

cardiagn.com

Item			DIAGNOSTIC TEST MODE						
			WORK SUPPORT	SELF-DIAGNOSTIC RESULTS		DATA MONITOR	ACTIVE TEST	DTC & SRT CONFIRMATION	
				DTC*1	FREEZE FRAME DATA*2			SRT STATUS	DTC WORK SUPPORT
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor (POS)		×	×	×			
		Camshaft position sensor (PHASE)		×	×	×			
		Mass air flow sensor		×		×			
		Engine coolant temperature sensor		×	×	×	×		
		Heated oxygen sensor 1		×		×		×	×
		Heated oxygen sensor 2		×		×		×	×
		Vehicle speed sensor		×	×	×			
		Accelerator pedal position sensor		×		×			
		Throttle position sensor		×	×	×			
		Intake air temperature sensor		×	×	×			
		Knock sensor		×					
		Refrigerant pressure sensor				×			
		Closed throttle position switch (accelerator pedal position sensor signal)				×			
		Air conditioner switch				×			
		Park/neutral position (PNP) switch		×		×			
		Stop lamp switch		×		×			
		EPS control unit				×			
		Battery voltage				×			
		Load signal				×			
		ASCD steering switch		×		×			
		ASCD brake switch		×		×			
ENGINE COTNROL COMPONENT PARTS	OUTPUT	Fuel injector				×	×		
		Power transistor (Ignition timing)				×	×		
		Throttle control motor relay		×		×			
		Throttle control motor		×					
		EVAP canister purge volume control solenoid valve		×		×	×		×
		Air conditioner relay				×			
		Fuel pump relay	×			×	×		
		Cooling fan relay		×		×	×		
		Heated oxygen sensor 1 heater		×		×		×	
		Heated oxygen sensor 2 heater		×		×		×	
		Intake valve timing control solenoid valve		×		×	×		
		Calculated load value			×	×			

X: Applicable

*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-III screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-87, "Diagnosis Description".

WORK SUPPORT MODE

cardiagn.com

Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	• FUEL PUMP WILL STOP BY TOUCHING “START” DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	• THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.	When learning the idle air volume
SELF-LEARNING CONT	• THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.	When clearing mixture ratio self-learning value
TARGET IDLE RPM ADJ*	• IDLE CONDITION	When setting target idle speed
TARGET IGN TIM ADJ*	• IDLE CONDITION	When adjusting target ignition timing

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item
Regarding items of DTC and 1st trip DTC, refer to EC-341, "DTC Index".)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	• The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to EC-341, "DTC Index".)
FUEL SYS-B1	• “Fuel injection system status” at the moment a malfunction is detected is displayed. • One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	• The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	• The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	• “Long-term fuel trim” at the moment a malfunction is detected is displayed. • The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	• “Short-term fuel trim” at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	• The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	• The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH·P/S [%]	• The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	• The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	• The intake air temperature at the moment a malfunction is detected is displayed.
INT MANI PRES [kPa]	• Always a certain value is displayed. • This item is not efficient for J10 models.

*: The items are the same as those of 1st trip freeze frame data.

DATA MONITOR MODE

cardiagn.com

Monitored Item

×: Applicable

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	• Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	• Accuracy becomes poor if engine speed drops below the idle rpm. • If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1	V	• The signal voltage of the mass air flow sensor is displayed.	• When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”.
B/FUEL SCHDL	msec	• “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	• When engine is running specification range is indicated in “SPEC”.
A/F ALPHA-B1	%	• The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	• When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”. • This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S	°C or °F	• The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	• When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
HO2 SEN1 (B1)	V	• The A/F signal computed from the input signal of the heated oxygen sensor 1 is displayed.	
HO2S2 (B1)	V	• The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S1 MNTR(B1)	RICH/LEAN	• Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH: means the mixture became ″rich″, and control is being affected toward a leaner mixture. LEAN: means the mixture became ″lean″, and control is being affected toward a rich mixture.	• After turning ON the ignition switch, ″RICH″ is displayed until air-fuel mixture ratio feedback control begins. • When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S2 MNTR(B1)	RICH/LEAN	• Display of heated oxygen sensor 2 signal: RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large.	• When the engine is stopped, a certain value is indicated.
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
BATTERY VOLT	V	• The power supply voltage of ECM is displayed.	
ACCEL SEN 1	V	• The accelerator pedal position sensor signal voltage is displayed.	• ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
ACCEL SEN 2			
TP SEN 1-B1	V	• The throttle position sensor signal voltage is displayed.	• TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
TP SEN 2-B1			
INT/A TEMP SE	°C or °F	• The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
START SIGNAL	ON/OFF	• Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.	• After starting the engine, [OFF] is displayed regardless of the starter signal.

cardiagn.com

Monitored item	Unit	Description	Remarks
CLSD THL POS	ON/OFF	• Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.	
AIR COND SIG	ON/OFF	• Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW	ON/OFF	• Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.	
PW/ST SIGNAL	ON/OFF	• [ON/OFF] condition of the power steering system (determined by the signal sent from EPS control unit) is indicated.	
LOAD SIGNAL	ON/OFF	• Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF.	
IGNITION SW	ON/OFF	• Indicates [ON/OFF] condition from ignition switch signal.	
CLUTCH P/P SW	ON/OFF	• Indicates [ON/OFF] condition from the clutch switch signal.	
HEATER FAN SW	ON/OFF	• Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW	ON/OFF	• Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1	msec	• Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	• When the engine is stopped, a certain computed value is indicated.
IGN TIMING	BTDC	• Indicates the ignition timing computed by ECM according to the input signals.	• When the engine is stopped, a certain value is indicated.
CAL/LD VALUE	%	• “Calculated load value” indicates the value of the current air flow divided by peak air flow.	
MASS AIRFLOW	g·m/s	• Indicates the mass air flow computed by ECM according to the signal voltage of the mass air flow sensor.	
PURG VOL C/V	%	• Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. • The opening becomes larger as the value increases.	
INT/V TIM (B1)	°CA	• Indicates [°CA] of intake camshaft advance angle.	
INT/V SOL-B1	%	• The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. • The advance angle becomes larger as the value increases.	
AIR COND RLY	ON/OFF	• The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.	
FUEL PUMP RLY	ON/OFF	• Indicates the fuel pump relay control condition determined by ECM according to the input signals.	
THRTL RELAY	ON/OFF	• Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	

cardiagn.com

Monitored item	Unit	Description	Remarks
COOLING FAN	HI/LOW/OFF	• Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation LOW: Low speed operation OFF: Stop	
HO2S1 HTR (B1)	ON/OFF	• Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals.	
HO2S2 HTR (B1)	ON/OFF	• Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.	
IDL A/V LEARN	YET/CMPLT	• Display the condition of Idle Air Volume Learning YET: Idle air volume learning has not been performed yet. CMPLT: Idle air volume learning has already been performed successfully.	
TRVL AFTER MIL	km or mile	• Distance traveled while MI is activated.	
O2 SEN HTR DTY	%	• Heated oxygen sensor 1 heater control value computed by ECM according to the input signals. • The current flow to the heater becomes larger as the value increases.	
AC PRESS SEN	V	• The signal voltage from the refrigerant pressure sensor is displayed.	
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
SET VHCL SPD	km/h or mph	• The preset vehicle speed is displayed.	
MAIN SW	ON/OFF	• Indicates [ON/OFF] condition from MAIN switch signal.	
CANCEL SW	ON/OFF	• Indicates [ON/OFF] condition from CANCEL switch signal.	
RESUME/ACC SW	ON/OFF	• Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal.	
SET SW	ON/OFF	• Indicates [ON/OFF] condition from SET/COAST switch signal.	
BRAKE SW1	ON/OFF	• Indicates [ON/OFF] condition from ASCD brake switch signal.	
BRAKE SW2	ON/OFF	• Indicates [ON/OFF] condition of stop lamp switch signal.	
VHCL SPD CUT	NON/CUT	• Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.	
LO SPEED CUT	NON/CUT	• Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off.	
CRUISE LAMP	ON/OFF	• Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.	
SET LAMP	ON/OFF	• Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.	

cardiagn.com

Monitored item	Unit	Description	Remarks
Voltage	V	• Voltage, frequency, duty cycle or pulse width measured by the probe.	• Only "#" is displayed if item is unable to be measured. • Figures with "#"s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency	msec, Hz or %		
DUTY-HI	—		
DUTY-LOW			
PLS WIDTH-HI			
PLS WIDTH-LOW			

NOTE:

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	• Engine: Return to the original trouble condition • Change the amount of fuel injection using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Fuel injector • Heated oxygen sensor 1
IGNITION TIMING	• Engine: Return to the original trouble condition • Timing light: Set • Retard the ignition timing using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Perform Idle Air Volume Learning.
POWER BALANCE	• Engine: After warming up, idle the engine. • A/C switch OFF • Shift lever: Neutral • Cut off each fuel injector signal one at a time using CONSULT-III.	Engine runs rough or dies.	• Harness and connectors • Compression • Fuel injector • Power transistor • Spark plug • Ignition coil
COOLING FAN*	• Ignition switch: ON • Turn the cooling fan "LOW", "HI" and "OFF" CONSULT-III.	Cooling fan moves and stops.	• Harness and connectors • IPDM E/R (Cooling fan relay) • Cooling fan motor
ENG COOLANT TEMP	• Engine: Return to the original trouble condition • Change the engine coolant temperature using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Engine coolant temperature sensor • Fuel injector
FUEL PUMP RELAY	• Ignition switch: ON (Engine stopped) • Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound.	Fuel pump relay makes the operating sound.	• Harness and connectors • Fuel pump relay
PURG VOL CONT/V	• Engine: After warming up, run engine at 1,500 rpm. • Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III.	Engine speed changes according to the opening percent.	• Harness and connectors • Solenoid valve
V/T ASSIGN ANGLE	• Engine: Return to the original trouble condition • Change intake valve timing using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Intake valve timing control solenoid valve

*: Leaving cooling fan OFF with CONSULT-III while engine is running may cause the engine to overheat.

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

For details, refer to EC-87, "Diagnosis Description".

SRT WORK SUPPORT Mode

cardiagn.com

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

DTC WORK SUPPORT Mode

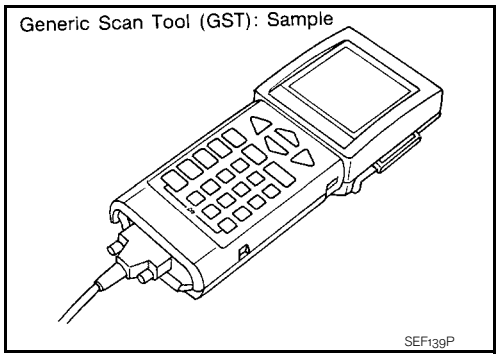
Test mode	Test item	Condition	Reference page
HO2S1	HO2S1 (B1) P0133	Refer to corresponding trouble diagnosis for DTC.	EC-145
	HO2S1 (B1) P0134		EC-151
	HO2S1 (B1) P1143		EC-228
	HO2S1 (B1) P1144		EC-233
HO2S2	HO2S2 (B1) P0139		EC-164
	HO2S2 (B1) P1146		EC-238
	HO2S2 (B1) P1147		EC-245

Diagnosis Tool Function

INFOID:0000000001056168

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with ISO 15031 has 8 different functions explained below.
ISO9141 is used as the protocol.
The name “GST” or “Generic Scan Tool” is used in this service manual.



FUNCTION

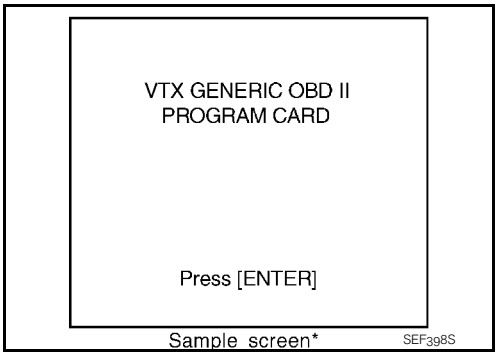
Diagnostic Service		Function
Service $01	READINESS TESTS	This diagnostic service gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
Service $02	(FREEZE DATA)	This diagnostic service gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-341, "DTC Index".
Service $03	DTCs	This diagnostic service gains access to emission-related power train trouble codes which were stored by ECM.
Service $04	CLEAR DIAG INFO	This diagnostic service can clear all emission-related diagnostic information. This includes: • Clear number of diagnostic trouble codes (Service $01) • Clear diagnostic trouble codes (Service $03) • Clear trouble code for freeze frame data (Service $01) • Clear freeze frame data (Service $02) • Reset status of system monitoring test (Service $01) • Clear on board monitoring test results (Service $06 and $07)
Service $06	(ON BOARD TESTS)	This diagnostic service accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
Service $07	(ON BOARD TESTS)	This diagnostic service enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
Service $08	—	This diagnostic service is not applicable on this vehicle.
Service $09	(CALIBRATION ID)	This diagnostic service enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

INSPECTION PROCEDURE

1. Turn ignition switch OFF.
2. Connect “GST” to data link connector, which is located under dash panel near the hood opener handle.

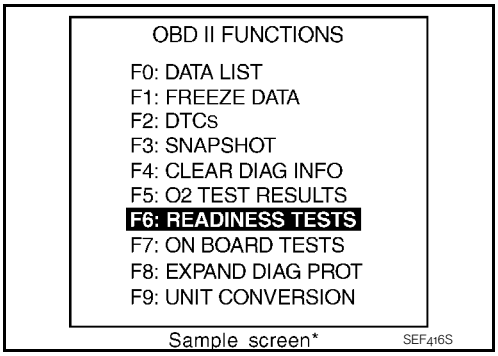
cardiagn.com

3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.
   (*: Regarding GST screens in this section, sample screens are shown.)



Sample screen* SEF398S

5. Perform each diagnostic mode according to each service procedure.
   For further information, see the GST Operation Manual of the tool maker.



Sample screen* SEF416S

cardiagn.com

COMPONENT DIAGNOSIS

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:0000000001056169

The specification (SP) value indicates the tolerance of the value that is displayed in “SPEC” of “DATA MONITOR” mode of CONSULT-III during normal operation of the Engine Control System. When the value in “SPEC” of “DATA MONITOR” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “SPEC” of “DATA MONITOR” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.
The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MI.
The SP value will be displayed for the following three items:
- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

Component Function Check

INFOID:0000000001056170

1. START

Make sure that all of the following conditions are satisfied.
- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (0.983 - 1.043 bar, 1.003 - 1.064 kg/cm^2, 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up
- After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- Electrical load: Not applied*
- Engine speed: Idle

*: Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.

>> GO TO 2.

2. PERFORM “SPEC” OF “DATA MONITOR” MODE

With CONSULT-III
NOTE:
Perform “SPEC” in “DATA MONITOR” mode in maximum scale display.
1. Perform EC-26, "BASIC INSPECTION : Special Repair Requirement".
2. Select “B/FUEL SCHDL”, “A/F ALPHA-B1” and “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode with CONSULT-III.
3. Make sure that monitor items are within the SP value.

Is the inspection result normal?

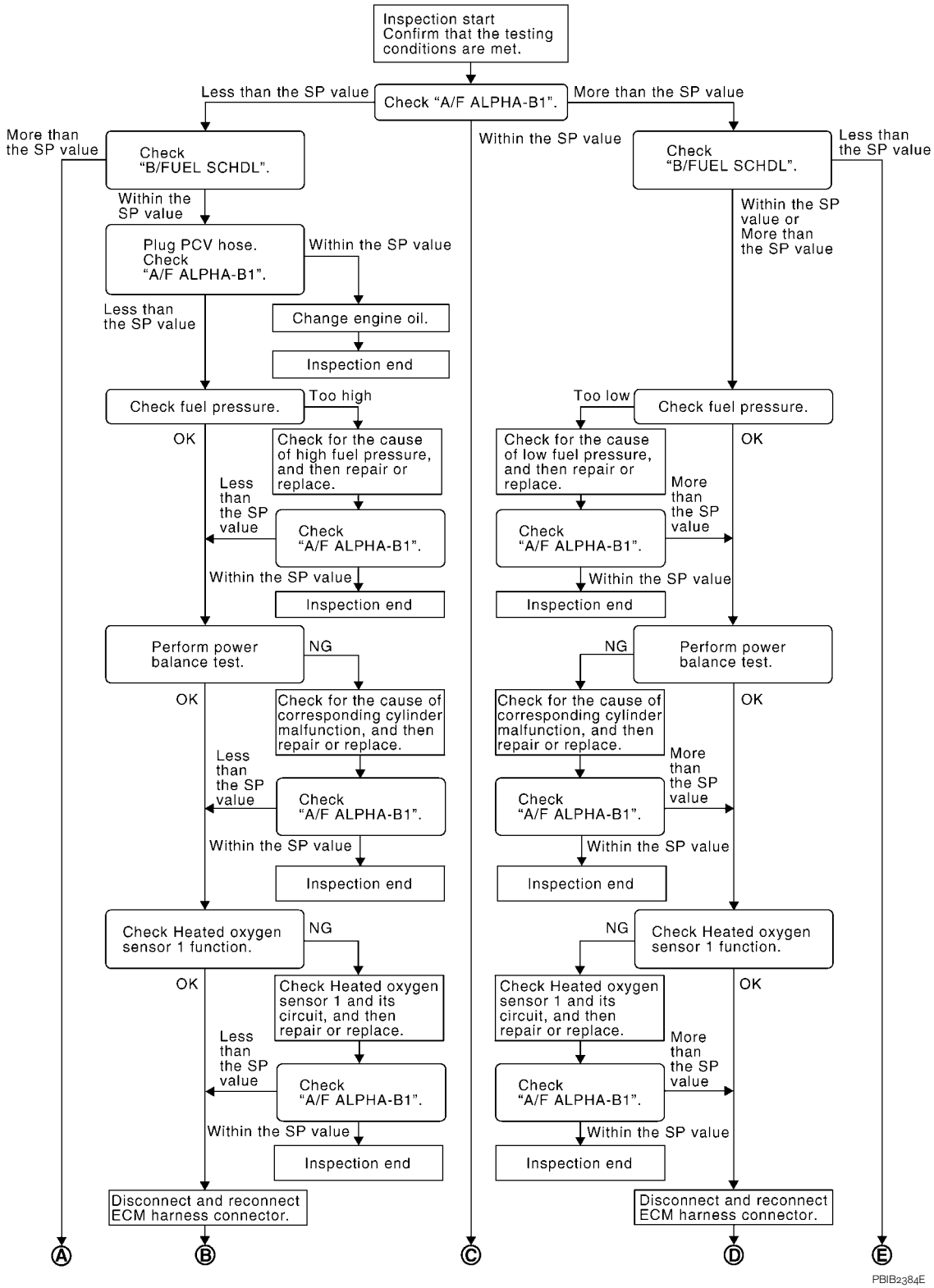
YES >> END
NO >> Go to EC-109, "Diagnosis Procedure".

Diagnosis Procedure

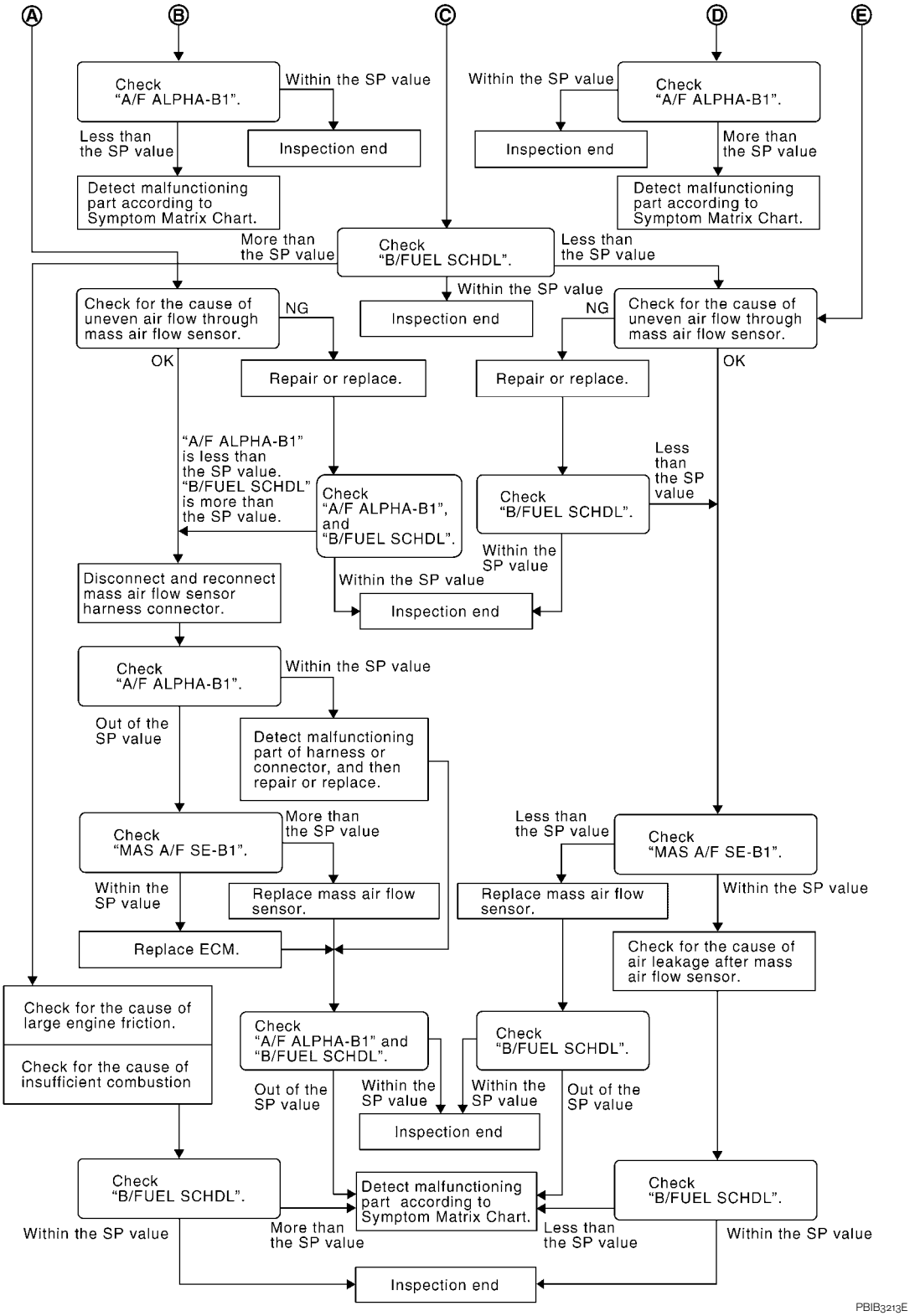
INFOID:0000000001056171

cardiagn.com

OVERALL SEQUENCE



cardiagn.com



DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1"

With CONSULT-III

1. Start engine.
2. Confirm that the testing conditions are met. Refer to EC-109, "Component Function Check".
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

NOTE:

cardiagn.com

Check “A/F ALPHA-B1” for approximately 1 minute because they may fluctuate. It is NG if the indication is out of the SP value even a little.

Is the measurement value within the SP value?

YES >> GO TO 17.
NO-1 >> Less than the SP value: GO TO 2.
NO-2 >> More than the SP value: GO TO 3.

2. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 4.
NO >> More than the SP value: GO TO 19.

3. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 6.
NO-1 >> More than the SP value: GO TO 6.
NO-2 >> Less than the SP value: GO TO 25.

4. CHECK “A/F ALPHA-B1”

1. Stop the engine.
2. Disconnect PCV hose, and then plug it.
3. Start engine.
4. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 5.
NO >> GO TO 6.

5. CHANGE ENGINE OIL

1. Stop the engine.
2. Change engine oil.
   NOTE:
   This symptom may occur when a large amount of gasoline is mixed with engine oil because of driving conditions (such as when engine oil temperature does not rise enough since a journey distance is too short during winter). The symptom will not be detected after changing engine oil or changing driving condition.

>> **INSPECTION END**

6. CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-357, "Inspection".)

Is the inspection result normal?

YES >> GO TO 9.
NO-1 >> Fuel pressure is too high: Replace “fuel filter and fuel pump assembly” and then GO TO 8.
NO-2 >> Fuel pressure is too low: GO TO 7.

7. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly” and then GO TO 8.
NO >> Repair or replace and then GO TO 8.

8. CHECK “A/F ALPHA-B1”

1. Start engine.

cardiagn.com

2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 9.

9. PERFORM POWER BALANCE TEST

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.
1. Ignition coil and its circuit (Refer to EC-309, "Component Function Check".)
2. Fuel injector and its circuit (Refer to EC-303, "Component Function Check".)
3. Intake air leakage
4. Low compression pressure (Refer to EM-24, "Inspection".)

Is the inspection result normal?

YES >> Replace fuel injector and then GO TO 11.
NO >> Repair or replace malfunctioning part and then GO TO 11.

11. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 12.

12. CHECK HEATED OXYGEN SENSOR 1 FUNCTION

1. Run engine at about 2,000 rpm for about 2minutes under no load.
2. Select “HO2S MNTR (B1)”, in “DATA MONITOR” mode.
3. Running engine at 2,000 rpm under no load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time : RICH → LEAN → RICH
2 times : RICH → LEAN → RICH → LEAN → RICH

Is the inspection result more than 5 times during 10 seconds?

YES >> GO TO 15.
NO >> GO TO 13.

13. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT

Check heated oxygen sensor and its circuit. Refer to EC-141, "DTC Logic".

>> GO TO 14.

14. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 15.

15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

cardiagn.com

1. Stop the engine.
2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.

>> GO TO 16.

16. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-346, "Symptom Table".

17. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO-1 >> More than the SP value: GO TO 18.
NO-2 >> Less than the SP value: GO TO 25.

18. DETECT MALFUNCTIONING PART

1. Check for the cause of large engine friction. Refer to the following.
- Engine oil level is too high
- Engine oil viscosity
- Belt tension of alternator, A/C compressor, etc. is excessive
- Noise from engine
- Noise from transmission, etc.
2. Check for the cause of insufficient combustion. Refer to the following.
- Valve clearance malfunction
- Intake valve timing control function malfunction
- Camshaft sprocket installation malfunction, etc.

>> Repair or replace malfunctioning part, and then GO TO 30.

19. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 21.
NO >> Repair or replace malfunctioning part, and then GO TO 20.

20. CHECK “A/F ALPHA-B1”, AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

YES >> **INSPECTION END**
NO >> “B/FUEL SCHDL” is more, “A/F ALPHA-B1” is less than the SP value: GO TO 21

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

cardiagn.com

22. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to EC-127, "DTC Logic". Then GO TO 29.
NO >> GO TO 23.

23. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 24.
NO >> More than the SP value: Replace mass air flow sensor, and then GO TO 29.

24. REPLACE ECM

1. Replace ECM.
2. Go to EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> GO TO 29.

25. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 27.
NO >> Repair or replace malfunctioning part, and then GO TO 26.

26. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Less than the SP value: GO TO 27.

27. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 28.
NO >> Less than the SP value: Replace mass air flow sensor, and then GO TO 30.

28. CHECK INTAKE SYSTEM

Check for the cause of air leak after the mass air flow sensor. Refer to the following.
- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts

cardiagn.com

- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

29. CHECK “A/F ALPHA-B1” AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-346, "Symptom Table".

30. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and then make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-346, "Symptom Table".

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000001056172

1.INSPECTION START

Start engine.

Is engine running?

YES >> GO TO 8.
NO >> GO TO 2.

2.CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	93	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E105, M77
- 10A fuse (No. 4)
- Harness for open or short between ECM and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK GROUND CONNECTION-I

1. Turn ignition switch OFF.
2. Check ground connection E21. Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace ground connection.

5.CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connectors.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
F7	10	Ground	Existed
	11		
E16	108		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between ECM and ground

cardiagn.com

>> Repair open circuit or short to power in harness or connectors.

7.CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connectors.
2. Turn ignition switch ON.
3. Check the voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage
Connector	Terminal		
E11	15	Ground	Battery voltage

Is the inspection result normal?

YES >> Go to EC-309, "Diagnosis Procedure".
NO >> GO TO 8.

8.CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	After turning ignition switch OFF, battery voltage will exist for more than a few seconds, then drop approximately 0V.

Is the inspection result normal?

YES >> GO TO 15.
NO-1 >> Battery voltage does not exist: GO TO 9.
NO-2 >> Battery voltage exists for more than a few seconds: GO TO 12.

9.CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 12.

10.CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E16	105	E11	9	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair open circuit or short to ground or short power in harness or connectors.

11.CHECK ECM POWER SUPPLY CIRCUIT-VI

cardiagn.com

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	32	E11	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 13.
NO >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK 20A FUSE

1. Disconnect 20A fuse (No. 51) from IPDM E/R.
2. Check 20A fuse.

Is the inspection result normal?

YES >> GO TO 17.
NO >> Replace 20A fuse.

14. CHECK GROUND CONNECTION-II

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace ground connection.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
F7	10	Ground	Existed
	11		
E16	108		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 17.
NO >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors F121, E7
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

cardiagn.com

17. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to power in harness or connectors.

cardiagn.com

U1001 CAN COMM CIRCUIT

Description

INFOID:0000000001056173

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000001056174

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission related diagnosis) for 2 seconds or more.	• Harness or connectors (CAN communication line is open or shorted)

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.

Is DTC detected?

YES >> EC-121, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056175

Go toLAN-46, "Trouble Diagnosis Flow Chart".

cardiagn.com

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000001056176

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000001056177

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1010	CAN communication bus	When detecting error during the initial diagnosis of CAN controller of ECM.	• ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-122, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056178

1.INSPECTION START

With CONSULT-III
1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. Perform DTC CONFIRMATION PROCEDURE.
   See EC-122, "DTC Logic".
5. Check DTC.

With GST
1. Turn ignition switch ON.
2. Select “Service $04” with GST.
3. Perform DTC CONFIRMATION PROCEDURE.
   See EC-122, "DTC Logic".
4. Check DTC.

Is the DTC U1010 displayed again?

YES >> GO TO 2.
NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Go to EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

cardiagn.com

P0011 IVT CONTROL

DTC Logic

INFOID:0000000001056179

DTC DETECTION LOGIC

NOTE:

- **If DTC P0011 is displayed with DTC P1111, first perform the trouble diagnosis for DTC P1111, refer to EC-215, "Description".**

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	• Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 3.5 msec
Shift lever	Neutral position

CAUTION:

Always drive at a safe speed.

4. Stop vehicle with engine running and let engine idle for 10 seconds.
5. Check 1st trip DTC.

With GST

Follow the procedure “With CONSULT-III” above.

Is 1st trip DTC detected?

YES >> Go to EC-124, "Diagnosis Procedure"

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

With CONSULT-III

1. Maintain the following conditions for at least 20 consecutive seconds.

cardiagn.com

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 70°C (221°F)
Shift lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

CAUTION:
Always drive at a safe speed.

2. Check 1st trip DTC.

With GST

Follow the procedure “With CONSULT-III” above.

Is 1st trip DTC detected?

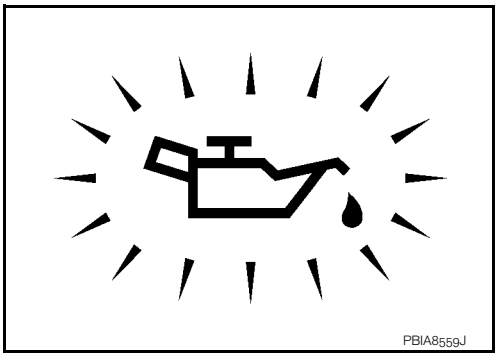
YES >> Go to EC-124, "Diagnosis Procedure"
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056180

1. CHECK OIL PRESSURE WARNING LAMP

1. Start engine.
2. Check oil pressure warning lamp and confirm it is not illuminated.



Is oil pressure warning lamp illuminated?

YES >> Go to MWI-34, "Description".
NO >> GO TO 2.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-125, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace intake valve timing control solenoid valve.

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-196, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace crankshaft position sensor (POS).

4. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-199, "Component Inspection".

Is the inspection result normal?

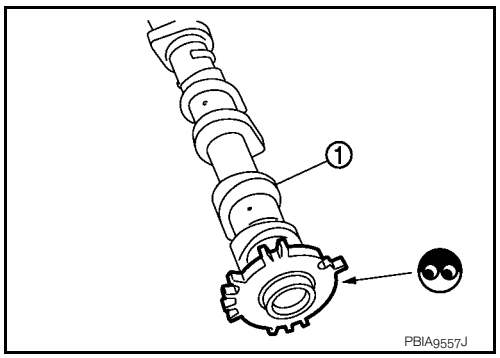
YES >> GO TO 5.
NO >> Replace camshaft position sensor (PHASE).

5. CHECK CAMSHAFT (INTAKE)

Check the following.

cardiagn.com

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end



Is the inspection result normal?

YES >> GO TO 6.
NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.

6. CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misaligned.

Are there any service records that may cause timing chain misaligned?

YES >> Check timing chain installation. Refer to EM-46, "Removal and Installation".
NO >> GO TO 7.

7. CHECK LUBRICATION CIRCUIT

Refer to LU-3, "Engine Lubrication System".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056181

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	6.7 - 7.7 Ω
1 or 2 and ground	∞ Ω (Continuity should not exist)

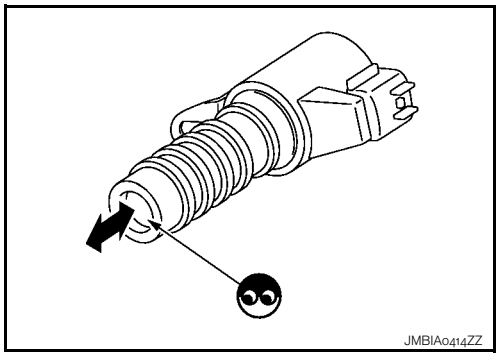
Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace intake valve timing control solenoid valve.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve.
2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:
Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
NOTE:
Always replace O-ring when intake valve timing control solenoid valve is removed.



Is the inspection result normal?

cardiagn.com

YES >> INSPECTION END
NO >> Replace intake valve timing control solenoid valve.

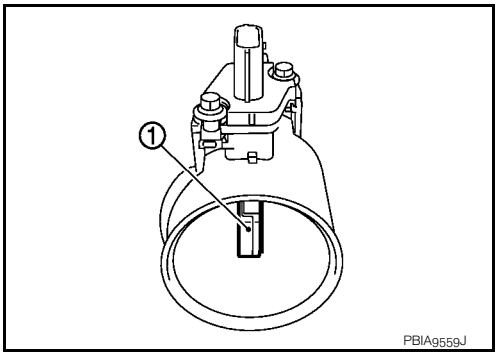
cardiagn.com

P0102, P0103 MAF SENSOR

Description

INFOID:0000000001056203

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



DTC Logic

INFOID:0000000001056204

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor
P0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

Which DTC is detected?

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102

1. Start engine and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-128, "Diagnosis Procedure".
NO >> INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-I

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-128, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-II

1. Start engine and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-128, "Diagnosis Procedure".

cardiagn.com

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056205

1.INSPECTION START

Confirm the detected DTC.

Which DTC is detected?

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2.CHECK INTAKE SYSTEM

Check the following for connection.
- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

Is the inspection result normal?

YES >> GO TO 3.
NO >> Reconnect the parts.

3.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace ground connection.

4.CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between MAF sensor harness connector and ground.

MAF sensor		Ground	Voltage
Connector	Terminal		
E18	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between MAF sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	4	F8	52	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between mass air flow sensor and ECM

cardiagn.com

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between MAF sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	3	F8	45	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to EC-129, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056206

1. CHECK MASS AIR FLOW SENSOR-I

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Connect CONSULT-III and select “DATA MONITOR” mode.
5. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
	Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
			Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK MASS AIR FLOW SENSOR-II

With CONSULT-III

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT-III and select “DATA MONITOR” mode.
4. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
	Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
			Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4.CHECK MASS AIR FLOW SENSOR-III

With CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector and reconnect it again.
3. Start engine and warm it up to normal operating temperature.
4. Connect CONSULT-III and select “DATA MONITOR” mode.
5. Select “MAS A/F SE-B1” and check indication.

cardiagn.com

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
	Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector and reconnect it again.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
			Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Clean or replace mass air flow sensor.

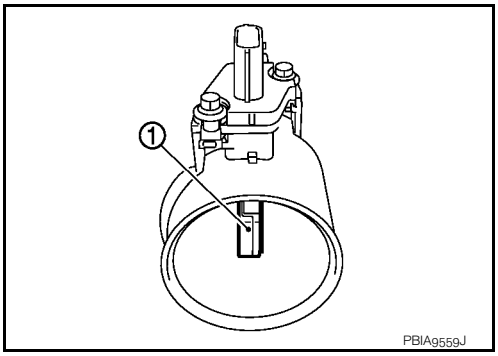
cardiagn.com

P0112, P0113 IAT SENSOR

Description

INFOID:0000000001056207

The intake air temperature sensor is built-into mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



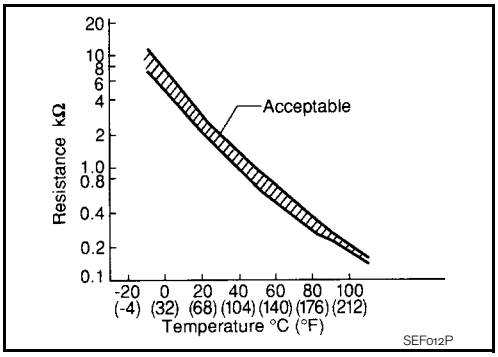
<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: These data are reference values and are measured between ECM terminal 46 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



DTC Logic

INFOID:0000000001056208

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air temperature sensor
P0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-133, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000001056209

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor (with intake air temperature sensor) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between mass air flow sensor harness connector and ground.

MAF sensor		Ground	Voltage
Connector	Terminal		
E18	2	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between mass air flow sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	1	F8	55	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-133, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace mass air flow sensor (with intake air temperature sensor).

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056210

1.CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as follows.

cardiagn.com

Terminals	Condition		Resistance
1 and 2	Temperature C°(F°)	25 (77)	1.800 - 2.200 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace mass air flow sensor (with intake air temperature sensor).

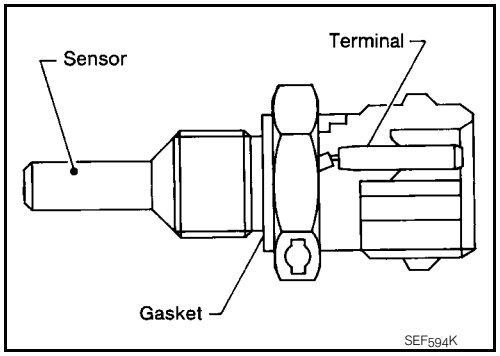
cardiagn.com

P0117, P0118 ECT SENSOR

Description

INFOID:0000000001056211

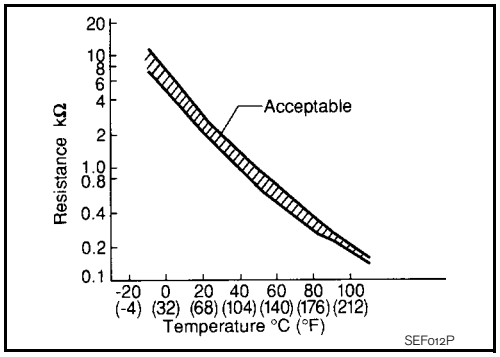
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 38 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:0000000001056212

DTC DETECTION LOGIC

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Engine coolant temperature sensor
P0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-136, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000001056213

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between ECT sensor harness connector and ground.

ECT sensor		Ground	Voltage
Connector	Terminal		
F28	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECT sensor harness connector and ECM harness connector.

ECT sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F28	2	F8	44	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-136, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace engine coolant temperature sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

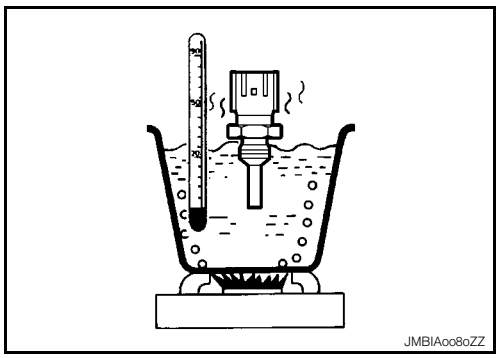
INFOID:0000000001056214

1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Remove engine coolant temperature sensor.

cardiagn.com

4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.



Terminals	Condition		Resistance
1 and 2	Temperature °C (°F)	20 (68)	2.1 - 2.9 kΩ
		50 (122)	0.68 - 1.00 kΩ
		90 (194)	0.236 - 0.260 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace engine coolant temperature sensor.

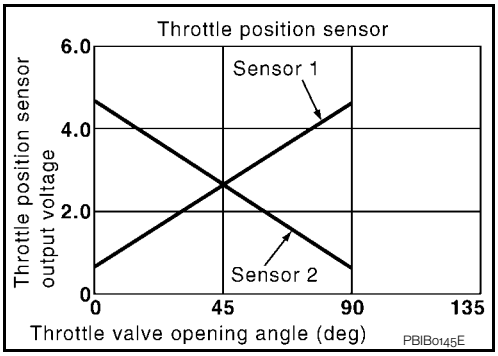
cardiagn.com

P0122, P0123 TP SENSOR

Description

INFOID:0000000001056215

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001056216

DTC DETECTION LOGIC

NOTE:
If DTC P0122 or P0123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	• Harness or connectors (TP sensor 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 2)
P0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-138, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056217

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

cardiagn.com

3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	3	F8	34	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-139, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-140, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056218

cardiagn.com

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to 1st position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-140, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056219

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

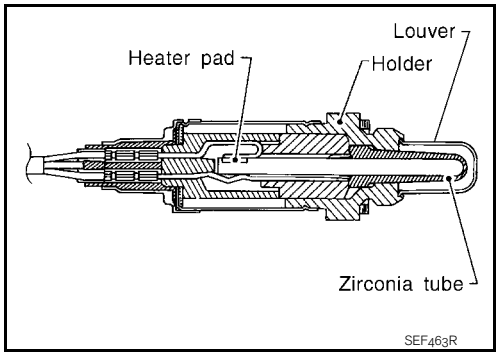
cardiagn.com

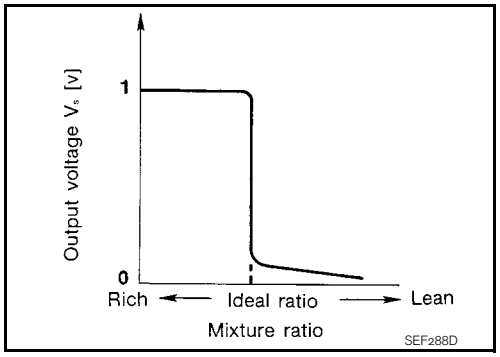
P0132 HO2S1

Description

INFOID:0000000001095653

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



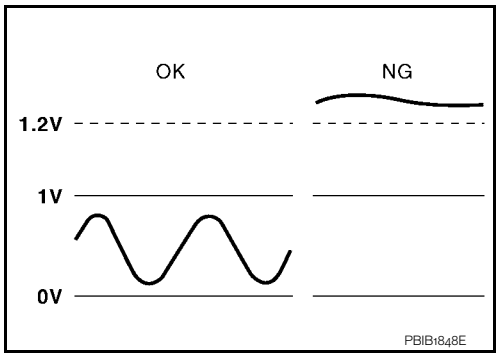


DTC Logic

INFOID:0000000001095654

DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0132	heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • heated oxygen sensor 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

cardiagn.com

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for 2 minutes.
4. Check 1st trip DTC.

Is 1st trip DTC is detected?

YES >> Go to EC-142, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001095655

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	existed

2. Check harness continuity between HO2S1 harness connector or ECM harness connector.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

cardiagn.com

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HO2S1 CONNECTOR FOR WATER

Check heated oxygen sensor 1 connector for water.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 1

Refer to EC-143, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace heated oxygen sensor 1.

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001095656

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

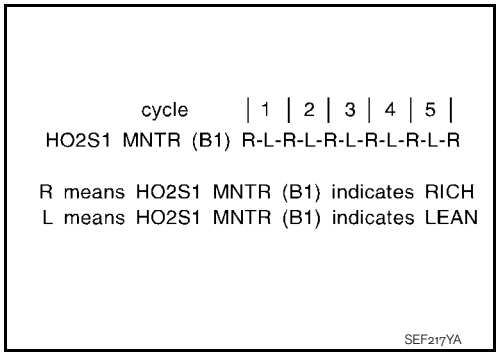
YES >> GO TO 2.
NO >> GO TO 3.

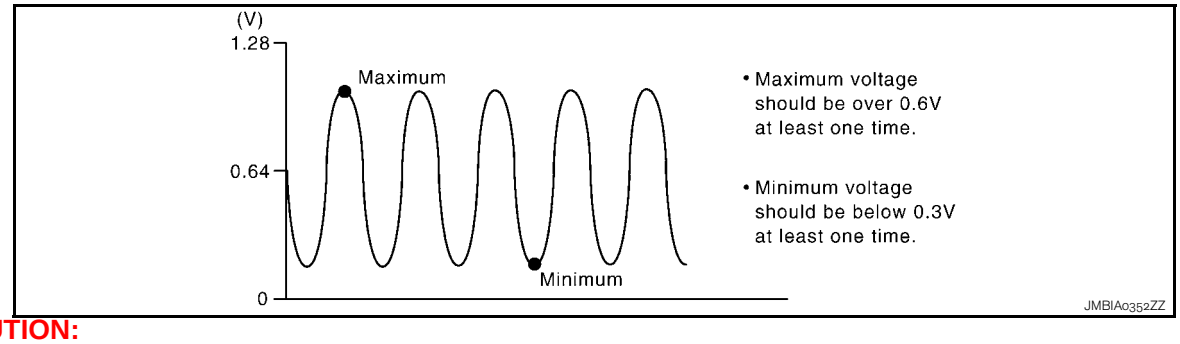
2.CHECK HEATED OXYGEN SENSOR 1

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.





CAUTION:

cardiagn.com

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3.CHECK HEATED OXYGEN SENSOR 1

Ⓧ Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4.REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

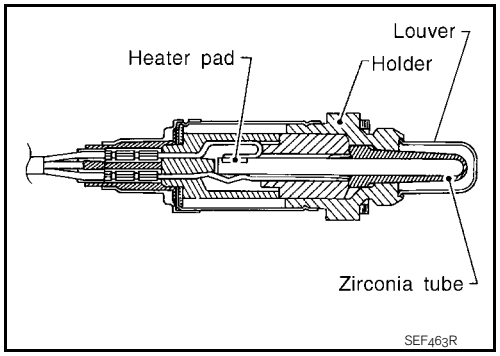
cardiagn.com

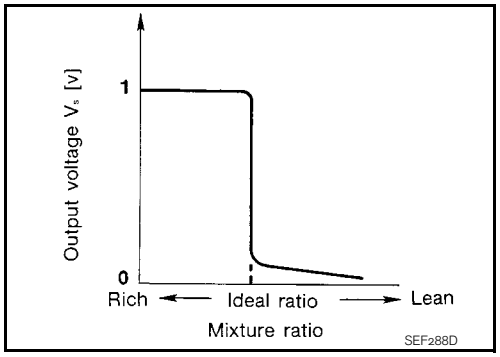
P0133 HO2S1

Description

INFOID:0000000001095657

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



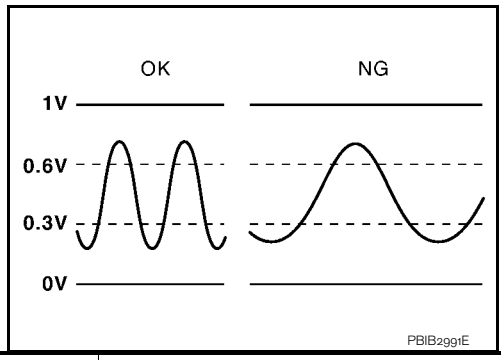


DTC Logic

INFOID:0000000001095658

DTC DETECTION LOGIC

To judge the malfunction of heated oxygen sensor 1, this diagnosis measures response time of heated oxygen sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 temperature index. Judgment is based on whether the compensated time (heated oxygen sensor 1 cycling time index) is inordinately long or not.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0133	Heated oxygen sensor 1 circuit slow response	• The response of the voltage signal from the sensor takes more than the specified time.	• Harness or connectors (The sensor circuit is open or shorted.) • Heated oxygen sensor 1 • Fuel pressure • Fuel injector • Intake air leaks • Exhaust gas leaks • PCV valve • Mass air flow sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

cardiagn.com

TESTING CONDITION:
Always perform at a temperature above -10°C (14°F).
Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.
   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-III screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 40 to 50 seconds.)
   CAUTION:
   Always drive vehicle at a safe speed.

ENG SPEED	2,400 - 4,200 rpm
VHCL SPEED SE	More than 80 km/h (50 MPH)
B/FUEL SCHDL	2.8 - 12.0 msec
Shift lever	Suitable position

If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Touch “SELF-DIAG RESULTS”.

Which displayed on COUSULT-III screen?

OK >> INSPECTION END.
NG >> Go to EC-146, "Diagnosis Procedure".

3.PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 yo 0.3v and 0.6 to 1.0v more than 5 times within 10 seconds. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-146, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001095659

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

cardiagn.com

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. RETIGHTEN HEATED OXYGEN SENSOR 1

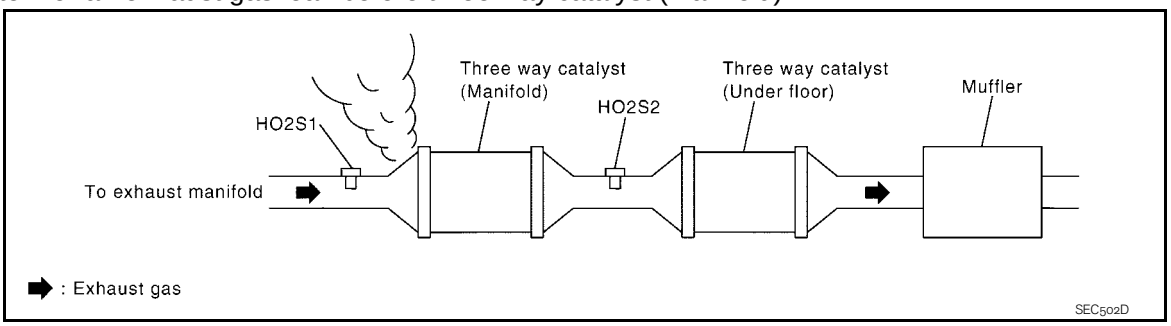
Loosen and retighten the heated oxygen sensor 1.

Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 4.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 5.

5. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to EC-33, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P172 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to EC-174, "DTC Logic" or EC-178, "DTC Logic".
NO >> GO TO 6.

6. CHECK HEATED OXYGEN SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	Existed

4. Check the continuity between HO2S1 harness connector or ECM harness connector and ground.

cardiagn.com

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor.
Refer to EC-129, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace mass air flow sensor.

8.CHECK PCV VALVE

Refer to EC-315, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace PCV valve.

9.CHECK HEATED OXYGEN SENSOR 1

Perform EC-148, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace heated oxygen sensor 1.

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001095660

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

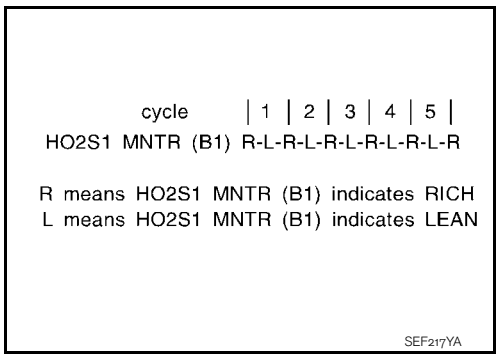
2.CHECK HEATED OXYGEN SENSOR 1

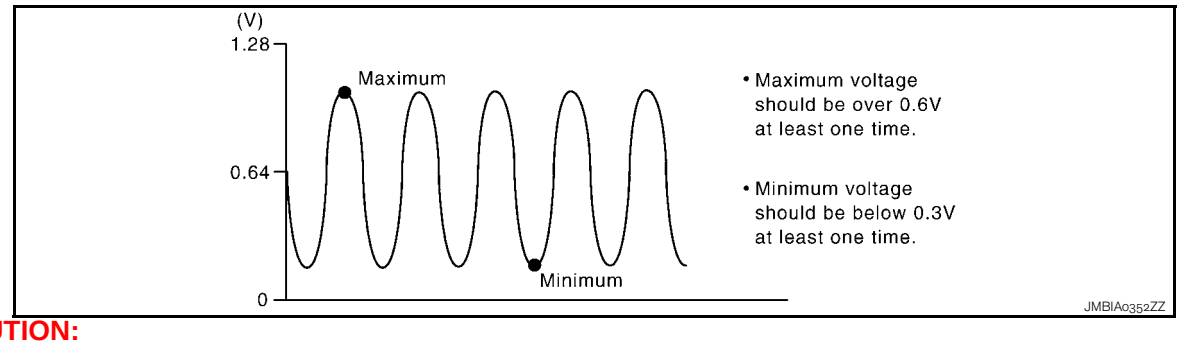
With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.

cardiagn.com

6. Check the following.
- "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- "HO2S1 (B1)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)" voltage never exceeds 1.0V.





CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.
CAUTION:

cardiagn.com

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

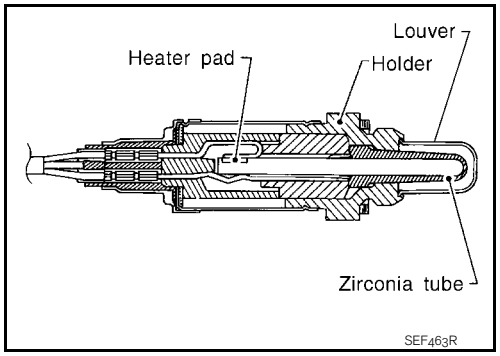
cardiagn.com

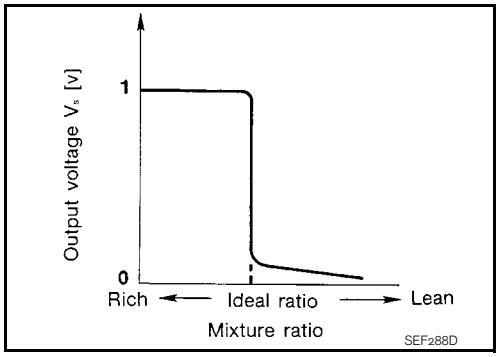
P0134 HO2S1

Description

INFOID:0000000001082937

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



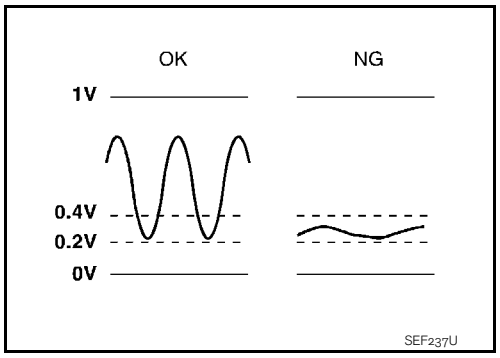


DTC Logic

INFOID:0000000001097223

DTC DETECTION LOGIC

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	• Harness or connectors (The sensor circuit is open or shorted.) • Heated oxygen sensor 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform at a temperature above -10°C (14°F).

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Do you have CONSULT-III?

cardiagn.com

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.
   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-III screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 40 to 50 seconds.)
   CAUTION:
   Always drive vehicle at a safe speed.

ENG SPEED	1,800 - 3,400 rpm
VHCL SPEED SE	More than 60 km/h (40 MPH)
B/FUEL SCHDL	2.0 - 12.0 msec
Shift lever	Suitable position

If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Touch “SELF-DIAG RESULTS”.

Which displayed on COUSULT-III screen?

OK >> INSPECTION END.
NG >> Go to EC-765, "Diagnosis Procedure".

3.PERFORM COMPONENT FUNCTION CHECK

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set volmeter probes between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage dose not remain in the range of 0.2 to 0.4.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-765, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001082939

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.

cardiagn.com

3. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	Existed

4. Also check harness for short to ground and short to power.

Is inspection result normal?

YES >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 harness connector and ECM harness connector 49.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	Existed

2. Check harness continuity between ECM harness connector 49 or HO2S1 harness connector and ground.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HEATED OXYGEN SENSOR 1

Refer to EC-153, "Component Inspection".

Is inspection result normal?

YES >> GO TO 5.
NO >> Replace heated oxygen sensor 1.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001082940

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

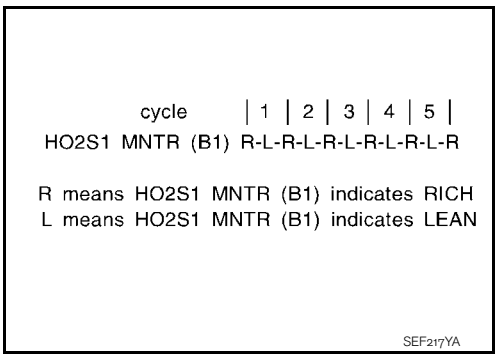
2.CHECK HEATED OXYGEN SENSOR 1

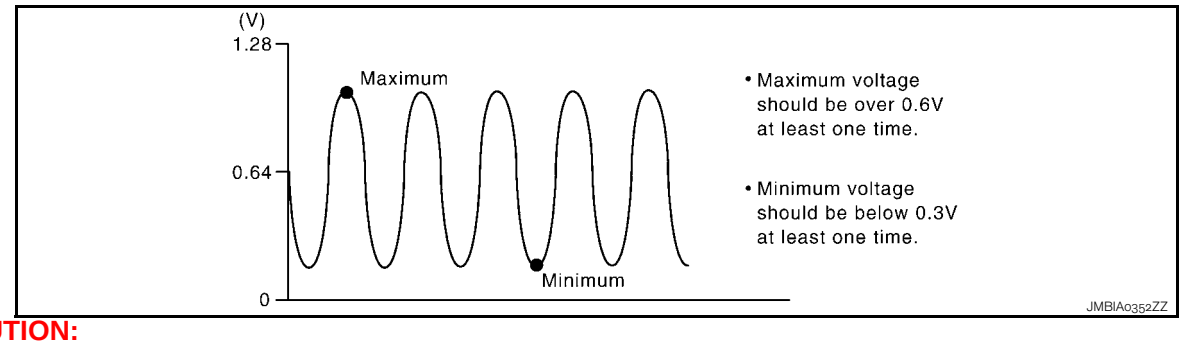
With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.

cardiagn.com

6. Check the following.
- "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- "HO2S1 (B1)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)" voltage never exceeds 1.0V.





CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.
CAUTION:

cardiagn.com

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

P0135 HO2S1 HEATER

Description

INFOID:0000000001056182

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF duty control of the Heated oxygen sensor 1 heater corresponding to the engine operating condition to keep the temperature of Heated oxygen sensor 1 element at the specified range.

OPERATION

Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600 rpm after the following conditions are met. • Engine: After warming up	ON

DTC Logic

INFOID:0000000001056183

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031	Heated oxygen sensor 1 heater control circuit low	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	• Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.) • heated oxygen sensor 1 heater

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than between 11V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-156, "Diagnosis Procedure".
NG >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056184

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

cardiagn.com

2. CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Disconnect HO2S1 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S1 harness connector and ground.

HO2S1		Ground	Voltage
Connector	Terminal		
F30	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- 10A fuse (No. 56)
- Harness for open or short between HO2S1 and fuse

>> Repair or replace harness or connectors.

4. CHECK HO2S1 HEATER OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	3	F7	3	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HO2S1 HEATER

Refer to EC-158, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. REPLACE HO2S1

Replace HO2S1.

CAUTION:
- **Discard any heated oxygen sensor 1 which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new heated oxygen sensor 1, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Perform GI-39, "Intermittent Incident".

>> Repair or replace.

cardiagn.com

Component Inspection

INFOID:0000000001056185

1. CHECK HEATED OXYGEN SENSOR 1

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check resistance between HO2S1 terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
2 and 3	3.4 - 4.4 Ω
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:

- **Discard any sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

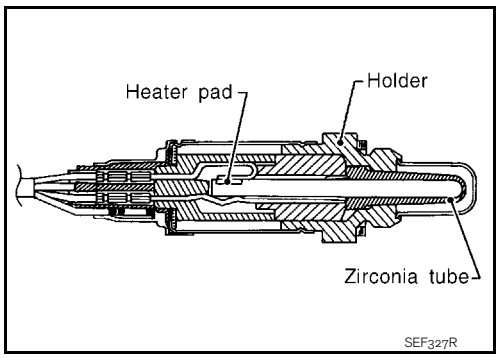
cardiagn.com

P0138 HO2S2

Description

INFOID:0000000001082941

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

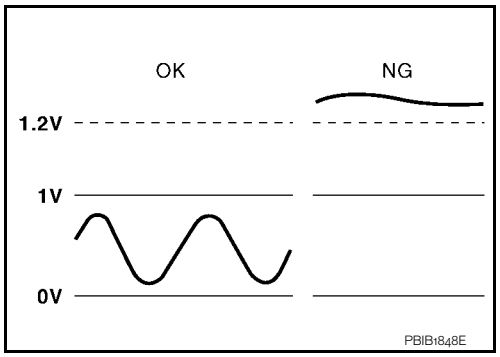


DTC Logic

INFOID:0000000001082942

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time.
To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 2 minutes.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-160, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001082943

cardiagn.com

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between HO2S2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F8	50	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between HO2S2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK HO2S2 CONNECTOR FOR WATER

Check connectors for water.

cardiagn.com

Water should not exist.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace harness or connectors.

7.CHECK HEATED OXYGEN SENSOR 2

Refer to EC-161, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

9.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001082944

1.INSPECTION START

Do you have CONSULT-III?

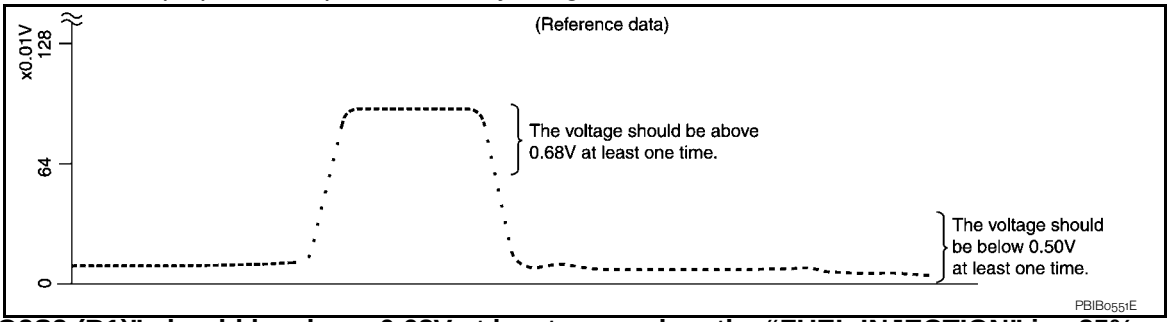
Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

cardiagn.com

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 4th gear position	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

cardiagn.com

>> INSPECTION END

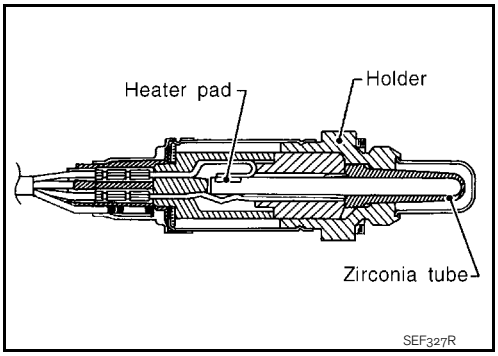
cardiagn.com

P0139 HO2S2

Description

INFOID:0000000001082945

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

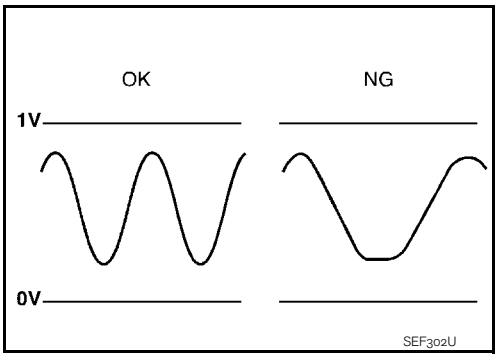


DTC Logic

INFOID:0000000001082946

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 11.

2.PRECONDITIONING

NOTE:
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds.
- **For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F)**
- **"COMPLETED" will appear on CONSULT-III screen when all tests "COND1", "COND2" and "COND3" are completed.**

TESTING CONDITION:
Never stop engine during this procedure. If the engine is stopped, retry this procedure from 4. PERFORM PROCEDURE FOR COND1-I.

cardiagn.com

>> GO TO 3.

3. PERFORM PROCEDURE FOR COND1

Start engine and warm it up to normal operating temperature.

>> GO TO 4.

4. PERFORM PROCEDURE FOR COND1-I

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 5.

5. PERFORM PROCEDURE FOR COND1-II

1. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
2. Let engine idle 1 minute.
3. Select “HO2S2 (B1) P0139” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 30 seconds.
6. Rev engine up to 2,000 rpm two or three times quickly under no load.

Is “CONPLETED” appears on CONSULT-III screen?

YES >> GO TO 9.
NO >> GO TO 6.

6. PERFORM PROCEDURE FOR COND1-I

When the following conditions are met, “TESTING” will be displayed at “COND1” on the CONSULT-III screen. Maintain the condition continuously until “TESTING” changes to “COMPLETED” (It will take approximately 60 seconds.)

ENG SPEED	More than 1,000 rpm
B/FUEL SCHDL	More than 1.0 msec
COOLAN TEMP/S	More than 70°C (158°F)
Shift level	Suitable position

Which displayed on CONSULT-III screen?

COND1: OUT OF CONDITION>>GO TO 4.
COND1: COMPLETED COND2: INCOMPLETED>>GO TO 7.
COND1: COMPLETED COND2: COMPLETED>>GO TO 8.

7. PERFORM PROCEDURE FOR COND2

While driving, release accelerator pedal completely from the above condition until “INCOMPLETED” at “COND2” on CONSULT-III screen has turned to “COMPLETED”. (It will take approximately 4 seconds.)

Which displayed on CONSULT-III screen?

COND2: COMPLETED COND3: INCOMPLETED>>GO TO 8.
COND2: COMPLETED COND3: COMPLETED>>GO TO 9.

8. PERFORM PROCEDURE FOR COND3

Stop vehicle and let it idle until “INCOMPLETED” of “COND3” on CONSULT-III screen has turned to “COMPLETED”. (It will take a maximum of approximately 6 minutes.)

>> GO TO 9.

9. PERFORM PROCEDURE FOR COND3-I

Touch “SELF DIAGRESULTS”.

Which displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-167, "Diagnosis Procedure".
CAN NOT BE DIAGNOSED>>GO TO 10.

cardiagn.com

10. PERFORM PROCEDURE FOR COND3-II

1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
2. Turn ignition switch ON and select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-III.
3. Start engine and warm it up while monitoring “COOLAN TEMP/S” indication on CONSULT-III.
4. When “COOLAN TEMP/S” indication reaches to 70°C (158°F).

>> GO TO 5.

11. PREFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-168, "Component Inspection".
NOTE:
Use component function check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-168, "Component Inspection".

Component Function Check

INFOID:0000000001082947

1. PERFORM COMPONENT FUNCTION CHECK-I

Without CONSULT-III
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	A change of voltage should be more than 0.12V for 1 second during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	A change of voltage should be more than 0.12V for 1 second during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 4th gear position	A change of voltage should be more than 0.12V for 1 second during this procedure.

Is the inspection result normal?

cardiagn.com

YES >> INSPECTION END
NO >> Go to EC-167, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001082948

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to EC-33, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to EC-174, "DTC Logic" or EC-178, "DTC Logic".
NO >> GO TO 3.

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between HO2S2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F8	50	Ground	Not existed

3. Also check harness for short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between HO2S2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK HEATED OXYGEN SENSOR 2

Refer to EC-168, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001082949

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

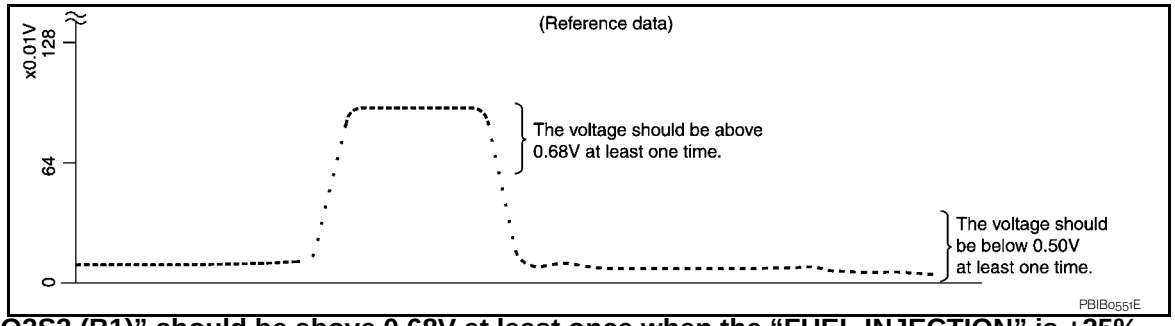
YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

cardiagn.com

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

cardiagn.com

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 4th gear position	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

P0141 HO2S2 HEATER

Description

INFOID:0000000001056186

SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,900	OFF
Below 3,900 rpm after the following conditions are met. • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON

DTC Logic

INFOID:0000000001056187

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0141	Heated oxygen sensor 2 heater control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	• Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.) • Heated oxygen sensor 2 heater

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Check 1st trip DTC.

With GST

Follow the procedure “With CONSULT-III” above.

Is 1st tip DTC detected?

YES >> Go to EC-172, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000001056188

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Disconnect HO2S2 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S2 harness connector and ground.

HO2S2		Ground	Voltage
Connector	Terminal		
E58	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- 10A fuse (No. 56)
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	3	F7	5	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between heated oxygen sensor 2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK HO2S2 HEATER

Refer to EC-173, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

cardiagn.com

7. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056189

1. CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check resistance between HO2S2 terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
2 and 3	3.3 - 4.4 Ω
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

P0171 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:0000000001056275

DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensors 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.
In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MI (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0171	Fuel injection system too lean	• Fuel injection system does not operate properly. • The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)	• Intake air leaks • Heated oxygen sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Lack of fuel • Mass air flow sensor • Incorrect PCV hose connection

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to EC-33, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Start engine.

Is it difficult to start engine?

YES >> GO TO 3.
NO >> GO TO 4.

3.RESTART ENGINE

If it is difficult to start engine, the fuel injection system has a malfunction, too.
Crank engine while depressing accelerator pedal.

Does engine start?

YES >> Go to EC-175, "Diagnosis Procedure".
NO >> Check exhaust and intake air leak visually.

4.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Start engine and let it idle for at least 10 minutes.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-175, "Diagnosis Procedure".
NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-III

1. Turn ignition switch OFF and wait at least 10 seconds.

cardiagn.com

2. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
Hold the accelerator pedal as steady as possible.
The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

3. Check 1st trip DTC.

Is 1st trip DTC detected?

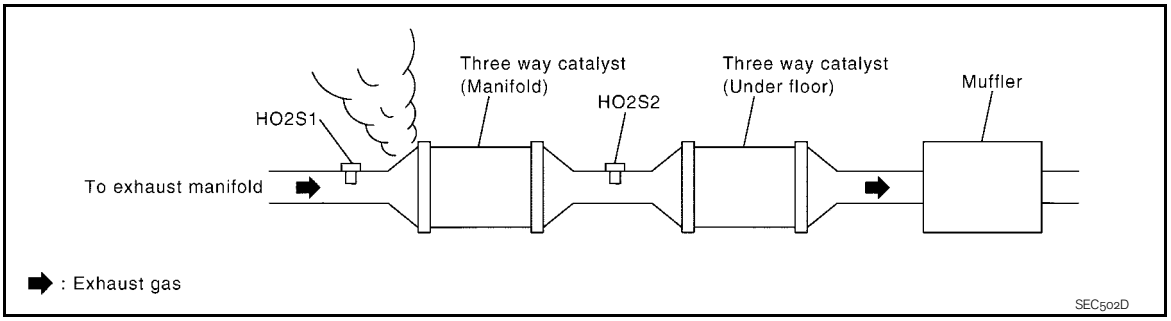
YES >> Go to EC-175, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056276

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 2.

2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Listen for an intake air leak after the mass air flow sensor.
2. Check PCV hose connection.

Intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect corresponding heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between heated oxygen sensor 1 harness connector and ECM harness connector.

Heated oxygen sensor 1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	Existed

5. Check the continuity between heated oxygen sensor 1 harness connector or ECM harness connector and ground.

cardiagn.com

Heated oxygen sensor 1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-357, "Inspection".
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-357, "Inspection".

At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2, 51 psi)

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly”.
NO >> Repair or replace

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Install all removed parts.
2. Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT-III.

1.0 - 4.0 g·m/sec: at idling
2.0 - 10.0 g·m/sec: at 2,500 rpm

With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in Service $01 with GST.

1.0 - 4.0 g·m/sec: at idling
2.0 - 10.0 g·m/sec: at 2,500 rpm

Is the measurement value within the specification?

YES >> GO TO 7.
NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or grounds. Refer to EC-127, "DTC Logic".

7. CHECK FUNCTION OF FUEL INJECTOR

With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

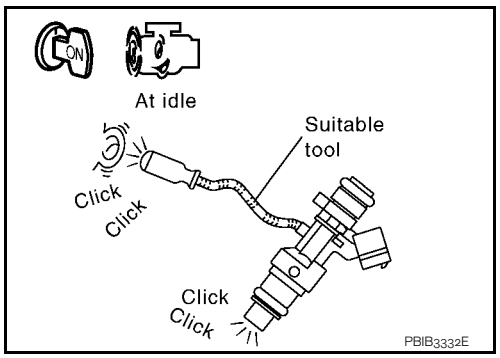
Without CONSULT-III

1. Let engine idle.

cardiagn.com

2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



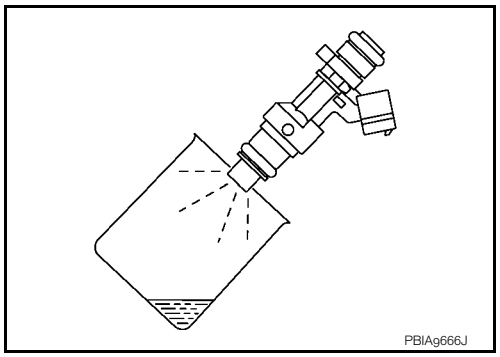
Is the inspection result normal?

YES >> GO TO 8.
NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to EC-303, "Component Function Check".

8. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect all fuel injector harness connectors.
4. Remove fuel tube assembly. Refer to EM-35, "Removal and Installation".
   Keep fuel hose and all fuel injectors connected to fuel tube.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each fuel injector.
7. Crank engine for about 3 seconds.

Fuel should be sprayed evenly for each fuel injector.



Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace fuel injectors from which fuel does not spray out. Always replace O-ring with new ones.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P0172 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:0000000001056277

DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensors 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.
In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MI (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator
heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172	Fuel injection system too rich	• Fuel injection system does not operate properly. • The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	• Heated oxygen sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Mass air flow sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to EC-33, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Start engine.

Is it difficult to start engine?

YES >> GO TO 3.
NO >> GO TO 4.

3.RESTART ENGINE

If it is difficult to start engine, the fuel injection system has a malfunction, too.
Crank engine while depressing accelerator pedal.

Does engine start?

YES >> Go to EC-179, "Diagnosis Procedure".
NO >> Remove spark plugs and check for fouling, etc.

4.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Start engine and let it idle for at least 10 minutes.

Is 1st trip DTC detected?

YES >> Go to EC-179, "Diagnosis Procedure".
NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
   Hold the accelerator pedal as steady as possible.

cardiagn.com

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

3. Check 1st trip DTC.

Is 1st trip DTC detected?

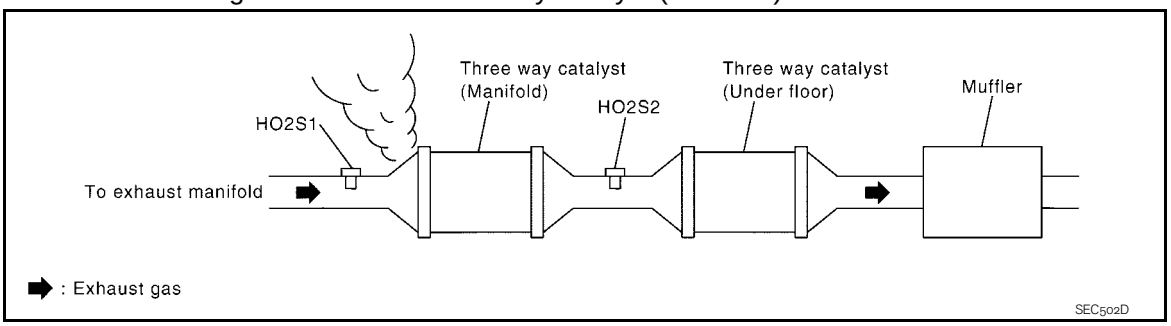
YES >> Go to EC-179, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056278

1.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 2.

2.CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 3.

3.CHECK HEATED OXYGEN SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect corresponding heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between heated oxygen sensor 1 harness connector and ECM harness connector.

Heated oxygen sensor 1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	Existed

5. Check the continuity between heated oxygen sensor 1 harness connector or ECM harness connector and ground.

Heated oxygen sensor 1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

cardiagn.com

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-357, "Inspection".
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-357, "Inspection".

At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2, 51 psi)

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly”.
NO >> Repair or replace

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Install all removed parts.
2. Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT-III.

1.0 - 4.0 g·m/sec: at idling
2.0 - 10.0 g·m/sec: at 2,500 rpm

With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in “Service $01” with GST.

1.0 - 4.0 g·m/sec: at idling
2.0 - 10.0 g·m/sec: at 2,500 rpm

Is the measurement value within the specification?

YES >> GO TO 7.
NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or grounds. Refer to EC-127, "DTC Logic".

7. CHECK FUNCTION OF FUEL INJECTOR

With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

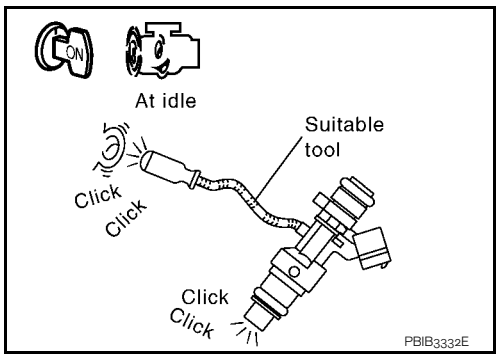
Without CONSULT-III

1. Let engine idle.

cardiagn.com

2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



Is the inspection result normal?

YES >> GO TO 8.
NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to EC-303, "Component Function Check".

8. CHECK FUELINJECTOR

1. Remove fuel injector assembly. Refer to EM-35, "Removal and Installation".
   Keep fuel hose and all fuel injectors connected to fuel tube.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect all fuel injector harness connectors.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each fuel injectors.
6. Crank engine for about 3 seconds.
   Make sure fuel does not drip from fuel injector.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new one.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

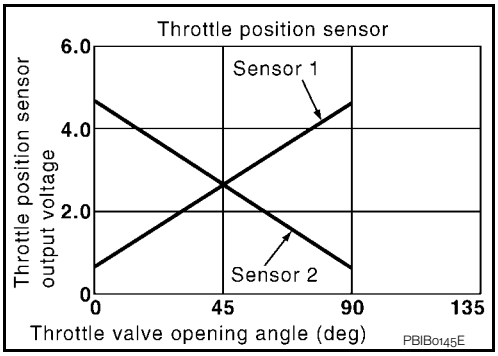
cardiagn.com

P0222, P0223 TP SENSOR

Description

INFOID:0000000001056287

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001056288

DTC DETECTION LOGIC

NOTE:
If DTC P0222 or P0223 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	• Harness or connectors (TP sensor 1 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1)
P0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-182, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056289

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

cardiagn.com

3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	2	F8	33	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-183, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-184, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056290

cardiagn.com

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to 1st position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-184, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056291

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P0300, P0301, P0302, P0303, P0304 MISFIRE

DTC Logic

INFOID:0000000001056292

DTC DETECTION LOGIC

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)
   On the 1st trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MI will blink.
   When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.
   When the misfire condition decreases to a level that will not damage the TWC, the MI will turn off.
   If another misfire condition occurs that can damage the TWC on a second trip, the MI will blink.
   When the misfire condition decreases to a level that will not damage the TWC, the MI will remain on.
   If another misfire condition occurs that can damage the TWC, the MI will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)
   For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MI will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.
   A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	• Improper spark plug • Insufficient compression • Incorrect fuel pressure • The fuel injector circuit is open or shorted • Fuel injector • Intake air leak • The ignition signal circuit is open or shorted • Lack of fuel • Signal plate • Heated oxygen sensor 1 • Incorrect PCV hose connection
P0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	
P0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	
P0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	
P0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for about 15 minutes.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-186, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Turn ignition switch OFF and wait at least 10 seconds.

cardiagn.com

2. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to the table below.
Hold the accelerator pedal as steady as possible.
The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.
CAUTION:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

The time to driving varies according to the engine speed in the freeze frame data.

Engine speed	Time
Around 1,000 rpm	Approximately 10 minutes
Around 2,000 rpm	Approximately 5 minutes
More than 3,000 rpm	Approximately 3.5 minutes

3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-186, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056293

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

Is intake air leak detected?

YES >> Discover air leak location and repair.
NO >> GO TO 2.

2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 3.
YES-2 >> Without CONSULT-III: GO TO 4.
NO >> Repair or replace it.

3. PERFORM POWER BALANCE TEST

With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 4.

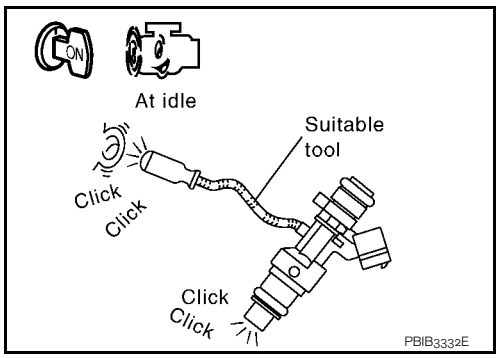
4. CHECK FUNCTION OF FUEL INJECTOR

1. Start engine and let engine idle.

cardiagn.com

2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



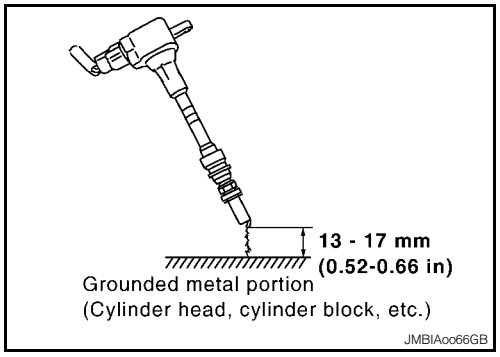
Is the inspection result normal?

YES >> GO TO 5.
NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to EC-304, "Component Inspection".

5. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
   NOTE:
   Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- **Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 6.

6. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Check ignition coil, power transistor and their circuits. Refer to EC-309, "Component Function Check".

cardiagn.com

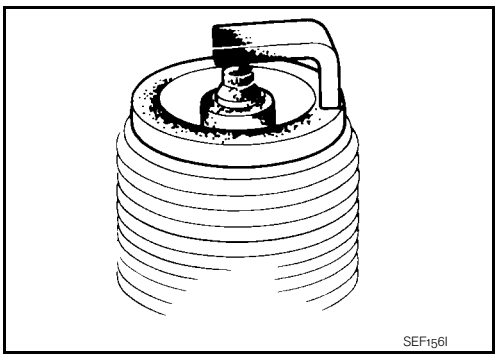
7. CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

Is the inspection result normal?

YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-19, "Removal and Installation".

NO >> Repair or clean spark plug. Then GO TO 8



8. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-19, "Removal and Installation".

9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-24, "Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

10. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to EC-357, "Inspection".
3. Install fuel pressure gauge and check fuel pressure. Refer to EC-357, "Inspection".

At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2, 51 psi)

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly”.

NO >> Repair or replace.

12. CHECK IGNITION TIMING

Check the following items.
For procedure, refer to EC-26, "BASIC INSPECTION : Special Repair Requirement".
For specification, refer to EC-360, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Follow the EC-26, "BASIC INSPECTION : Special Repair Requirement".

13. CHECK HO2S1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.

cardiagn.com

2. Disconnect corresponding HO2S1 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	Existed

5. Check the continuity between HO2S1 harness connector or ECM harness connector and ground.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK HO2S1 HEATER

Refer to EC-158, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Replace HO2S sensor 1.

15. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT-III.

1.0 - 4.0 g·m/sec : at idling
2.0 - 10.0 g·m/sec : at 2,500 rpm

With GST

Check mass air flow sensor signal in Service $01 with GST.

1.0 - 4.0 g·m/sec : at idling
2.0 - 10.0 g·m/sec : at 2,500 rpm

Is the measurement value within the specification?

YES >> GO TO 16.
NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to EC-127, "DTC Logic".

16. CHECK SYMPTOM TABLE

Check items on the rough idle symptom in EC-346, "Symptom Table".

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair or replace.

17. ERASE THE 1ST TRIP DTC

Some tests may cause a 1st trip DTC to be set.
Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-87, "Diagnosis Description".

>> GO TO 18.

18. CHECK INTERMITTENT INCIDENT

cardiagn.com

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P0327, P0328 KS

Description

INFOID:0000000001056294

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.

DTC Logic

INFOID:0000000001056295

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detected condition	Possible cause
P0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Knock sensor
P0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-191, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056296

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK KNOCK SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect knock sensor harness connector and disconnect ECM harness connector.
2. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	2	F8	40	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

cardiagn.com

3.CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	1	F8	37	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK KNOCK SENSOR

Refer to EC-192, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace knock sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056297

1.CHECK KNOCK SENSOR

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check resistance between knock sensor terminals as follows.
   NOTE:
   It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	Approx. 532 - 588 kΩ

CAUTION:
Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace knock sensor.

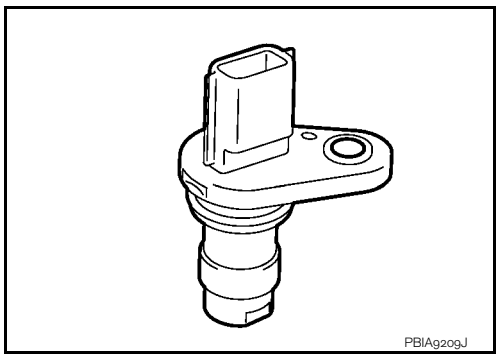
cardiagn.com

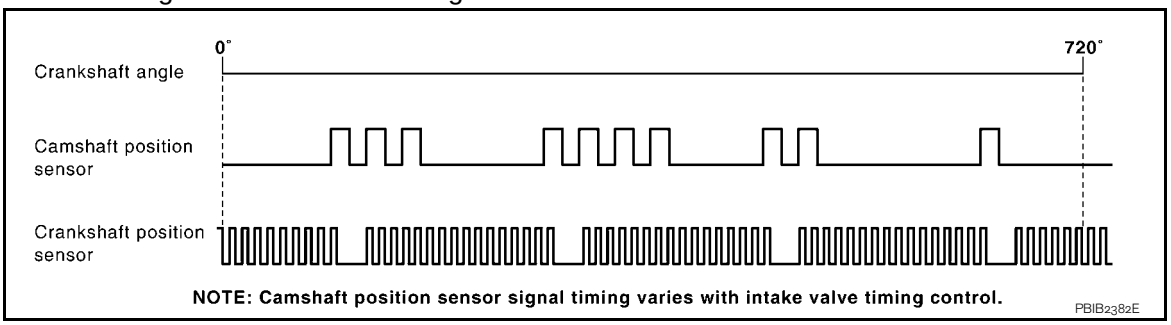
P0335 CKP SENSOR (POS)

Description

INFOID:0000000001056298

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at end of the crankshaft. It detects the fluctuation of the engine revolution.
The sensor consists of a permanent magnet and Hall IC.
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
The ECM receives the voltage signal and detects the fluctuation of the engine revolution.
ECM receives the signals as shown in the figure.





DTC Logic

INFOID:0000000001056299

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335	Crankshaft position sensor (POS) circuit	• The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. • The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. • The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.	• Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Refrigerant pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • Accelerator pedal position sensor • Signal plate

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.
   If engine does not start, crank engine for at least 2 seconds.

cardiagn.com

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-194, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056300

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CKP sensor (POS) harness connector and ground.

CKP sensor (POS)		Ground	Voltage
Connector	Terminal		
F20	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	1	F8	75	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit.

4.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.
- Refrigerant pressure sensor (Refer to HAC-161, "Component Inspection")

cardiagn.com

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace malfunctioning components.

6. CHECK APP SENSOR

Refer to EC-285, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 7.

7. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-286, "Special Repair Requirement".

>> INSPECTION END

8. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	2	F8	62	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	3	F8	61	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-196, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace crankshaft position sensor (POS).

11. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

Is the inspection result normal?

YES >> GO TO 12.
NO >> Replace the signal plate.

12. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

cardiagn.com

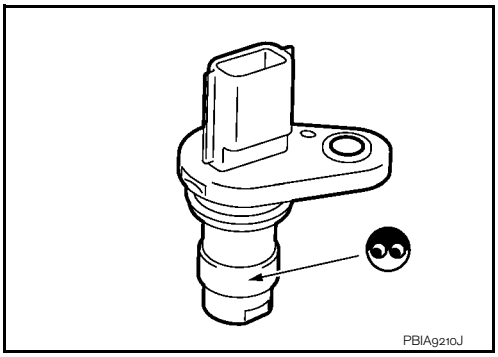
>> INSPECTION END

Component Inspection

INFOID:0000000001056301

1. CHECK CRANKSHAFT POSITION SENSOR (POS)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect crankshaft position sensor (POS) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.



Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace crankshaft position sensor (POS).

2. CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance between crankshaft position sensor (POS) terminals as follows.

Terminals (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace crankshaft position sensor (POS).

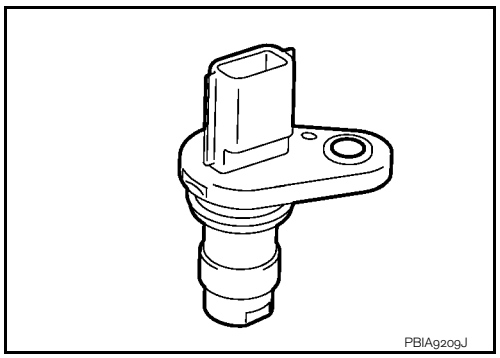
cardiagn.com

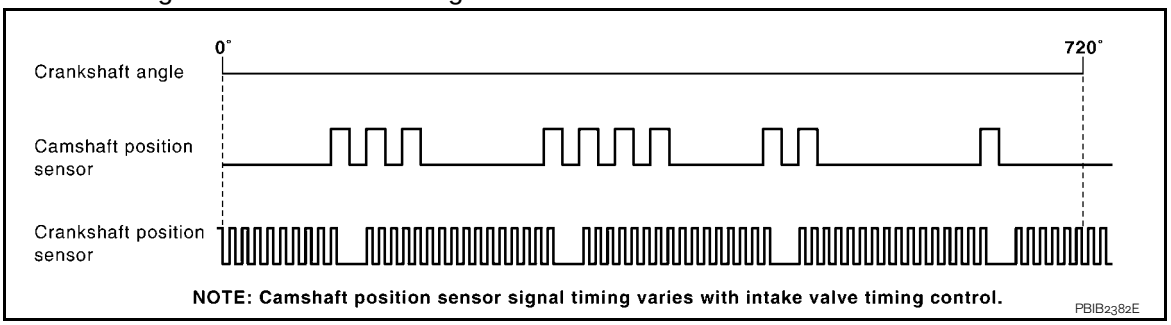
P0340 CMP SENSOR (PHASE)

Description

INFOID:0000000001056302

The camshaft position sensor (PHASE) senses the protrusion of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.
The sensor consists of a permanent magnet and Hall IC.
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
ECM receives the signals as shown in the figure.





DTC Logic

INFOID:0000000001056303

DTC DETECTION LOGIC

NOTE:
If DTC P0340 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sensor (PHASE) circuit	• The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. • The cylinder No. signal is not sent to ECM during engine running. • The cylinder No. signal is not in the normal pattern during engine running.	• Harness or connectors (The sensor circuit is open or shorted) • Camshaft position sensor (PHASE) • Camshaft (INT) • Starter motor • Starting system circuit • Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Start engine and let it idle for at least 5 seconds.
   If engine does not start, crank engine for at least 2 seconds.
2. Check 1st trip DTC.

cardiagn.com

Is 1st trip DTC detected?

YES >> Go to EC-198, "Diagnosis Procedure".
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-198, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056304

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over? Does the starter motor operate?

YES >> GO TO 2.
NO >> Check starting system.

2. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace ground connection.

3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CMP sensor (PHASE) harness connector and ground.

CMP sensor (PHASE)		Ground	Voltage
Connector	Terminal		
F26	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	2	F8	63	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

cardiagn.com

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	3	F8	65	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-199, "Component Inspection".

Is the inspection result normal?

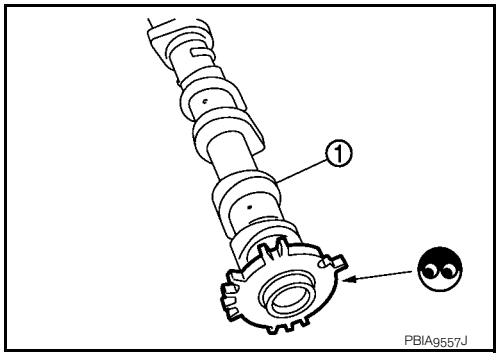
YES >> GO TO 7.
NO >> Replace camshaft position sensor (PHASE).

7.CHECK CAMSHAFT (INT)

Check the following.
- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

Is the inspection result normal?

YES >> GO TO 8.
NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

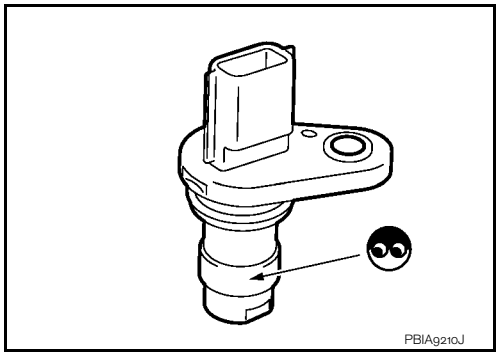
INFOID:0000000001056305

1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect camshaft position sensor (PHASE) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace camshaft position sensor (PHASE).



2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as follows.

cardiagn.com

Terminals (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace camshaft position sensor (PHASE).

cardiagn.com

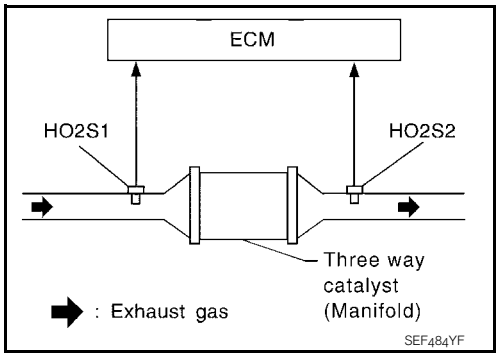
P0420 THREE WAY CATALYST FUNCTION

DTC Logic

INFOID:0000000001056306

DTC DETECTION LOGIC

The ECM monitors the switching frequency ratio of heated oxygen sensor 1 and heated oxygen sensor 2.
A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.
When the frequency ratio of heated oxygen sensor 1 and heated oxygen sensor 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0420	Catalyst system efficiency below threshold	• Three way catalyst (manifold) does not operate properly. • Three way catalyst (manifold) does not have enough oxygen storage capacity.	• Three way catalyst (manifold) • Exhaust tube • Intake air leaks • Fuel injector • Fuel injector leaks • Spark plug • Improper ignition timing

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 7.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Do not hold engine speed for more than the specified minutes below.

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III
1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
   If not, warm up engine and go to next step when “COOLAN TEMP/S” indication reaches to 70°C (158°F).
7. Open engine hood.
8. Select “DTC & SRT CONFIRMATION” then “SRT WORK SUPPORT” mode with CONSULT-III.
9. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
10. Check the indication of “CATALYST”.

Which is displayed on CONSULT-III screen?

cardiagn.com

CMPLT >> GO TO 6.
INCMP >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Wait 5 seconds at idle.
2. Rev engine up to 2,000 to 3,000 rpm and maintain it until “INCMP” of “CATALYST” changes to “CMPLT” (It will take approximately 5 minutes).

Does the indication change to “CMPLT”?

YES >> GO TO 6.
NO >> GO TO 5.

5. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Stop engine and cool it down to less than 70°C (158°F).
2. Perform DTC CONFIRMATION PROCEDURE again.

>> GO TO 3.

6. PERFORM DTC CONFIRMATION PROCEDURE-III

Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-203, "Diagnosis Procedure".
NO >> INSPECTION END

7. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-202, "Component Function Check".

NOTE:
Use component function check to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-203, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001096408

1. PERFORM COMPONENT FUNCTION CHECK-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Specification
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Keeping engine speed at 2,000 rpm constant under no load	The voltage switch peridically more than 5 times within 10 seconds.

Is the inspection result normal?

YES >> GO TO 2
NO >> Go to EC-764, "DTC Logic".

2. PERFORM COMPONENT FUNCTION CHECK-II

Without CONSULT-III

1. Set voltmeter probes between ECM terminals and ground.
2. Make sure that the voltage switching frequency (high&low) HO2S2 voltage is very less than that of HO2S1 voltage under the following condition.

cardiagn.com

ECM		Ground	Condition	Specification
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Keeping engine speed at 2,000 rpm constant under no load	Switching freqency ratio (A/B) : Less than 0.75 A : Heated oxygen sensor 2 voltage switching frequency B : Heated oxygen sensor 1 voltage switching frequency
	50 (HO2S2 signal)			

Is the inspection result normal?

YES >> INSPECTION END
NO >> If the ratio is greater than above (0.75), it means three way catalyst does not operate properly. Go to EC-819, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056308

1.CHECK EXHAUST SYSTEM

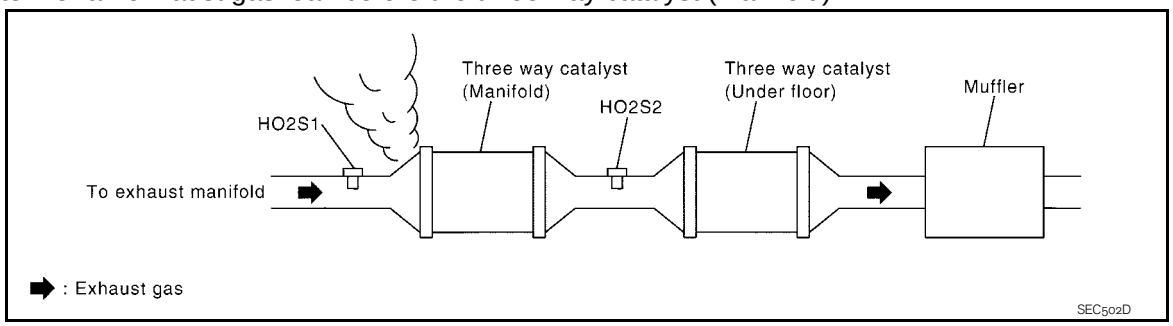
Visually check exhaust tubes and muffler for dent.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace.

2.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 3.

3.CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 4.

4.CHECK IGNITION TIMING AND IDLE SPEED

Check the following items. Refer to EC-26, "BASIC INSPECTION : Special Repair Requirement".
For specification, refer to EC-360, "Ignition Timing"
For specification, refer to EC-360, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Follow the EC-26, "BASIC INSPECTION : Special Repair Requirement".

5.CHECK FUEL INJECTOR

1. Stop engine and then turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Voltage
Connector	Terminal		
F7	31	Ground	Battery voltage
	30		
	29		
	25		

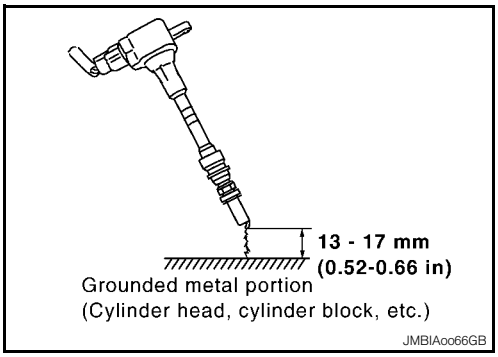
Is the inspection result normal?

YES >> GO TO 6.
NO >> Perform EC-303, "Diagnosis Procedure".

6. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
   NOTE:
   Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:
- **Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 7.

7. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

Is the inspection result normal?

YES >> GO TO 8.

cardiagn.com

NO >> Check ignition coil, power transistor and their circuits. Refer to EC-309, "Diagnosis Procedure".

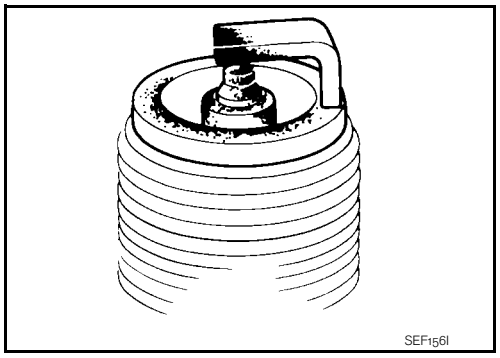
8. CHECK SPARK PLUG

Check the initial spark plug for fouling, etc. EM-20, "Inspection"

Is the inspection result normal?

YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-43, "Removal and Installation".

NO >> Repair or clean spark plug. Then GO TO 9



9. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about three seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-43, "Removal and Installation".

10. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
   Refer to EM-35, "Removal and Installation".
   Keep fuel hose and all fuel injectors connected to fuel tube.
3. Disconnect all ignition coil harness connectors.
4. Reconnect all fuel injector harness connectors disconnected.
5. Turn ignition switch ON.

Does fuel drip from fuel injector?

YES >> GO TO 11.

NO >> Replace the fuel injector(s) from which fuel is dripping.

11. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the trouble fixed?

YES >> INSPECTION END

NO >> Replace three way catalyst assembly.

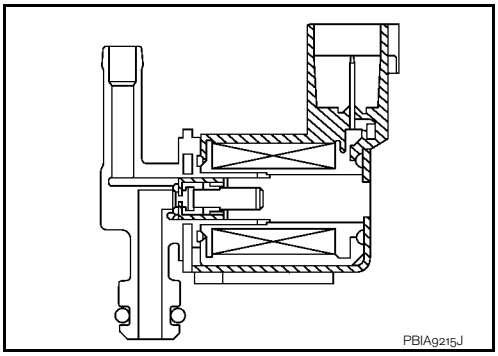
cardiagn.com

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:0000000001056319

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



DTC Logic

INFOID:0000000001056320

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	• Harness or connectors (The solenoid valve circuit is open or shorted.) • EVAP canister purge volume control solenoid valve

DTC CONFIRMATION PROCEDURE

1.CONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 13 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-206, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056321

1.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

EVAP canister purge volume control solenoid valve		Ground	Voltage
Connector	Terminal		
F32	1	Ground	Battery voltage

Is the inspection result normal?

cardiagn.com

YES >> GO TO 3.
NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.

EVAP canister purge volume control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F32	2	F7	9	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 4.
YES-2 >> Without CONSULT-III: GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III
1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Does engine speed vary according to the valve opening?

YES >> GO TO 6.
NO >> GO TO 5.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-207, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace EVAP canister purge volume control solenoid valve.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

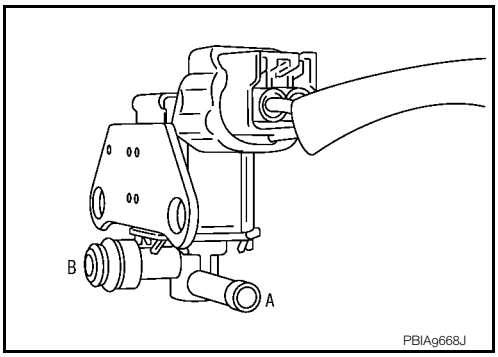
INFOID:0000000001056322

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III
1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
4. Turn ignition switch ON.

cardiagn.com

5. Select “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-III.
6. Touch “Qd” and “Qu” on CONSULT-III screen to adjust “PURG VOL CONT/V” opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



Condition (PURG VOL CONT/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between (A) and (B)
12V direct current supply between terminals 1 and 2	Existed
No supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace EVAP canister purge volume control solenoid valve

cardiagn.com

P0500 VSS

Description

INFOID:0000000001056360

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

DTC Logic

INFOID:0000000001056361

DTC DETECTION LOGIC

NOTE:

- **If DTC P0500 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001.Refer to** EC-121, "DTC Logic".
- **If DTC P0500 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to** **EC-122, "DTC Logic"**.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	• Harness or connectors (The CAN communication line is open or shorted) • Harness or connectors (The vehicle speed signal circuit is open or shorted) • Wheel sensor • Combination meter

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 3.

3.CHECK VEHICLE SPEED SENSOR FUNCTION

NOTE:
This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

With CONSULT-III

1. Start engine.
2. Read “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT-III. The vehicle speed on CONSULT-III should exceed 10 km/h (6 mph) when rotating wheels with suitable gear position.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Go to EC-210, "Diagnosis Procedure".

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Warm engine up to normal operating temperature.
3. Maintain the following conditions for at least 50 consecutive seconds.
   CAUTION:
   Always drive vehicle at a safe speed.

cardiagn.com

ENG SPEED	2,500 - 6,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	4.3 - 31.8 msec
Shift lever	Except Neutral position
PW/ST SIGNAL	OFF

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-210, "Diagnosis Procedure".
NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-210, "Component Function Check".
Use component function check to check the overall function of the vehicle speed sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-210, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001056362

1.PERFORM COMPONENT FUNCTION CHECK

With GST

1. Lift up drive wheels.
2. Start engine.
3. Read vehicle speed sensor signal in Service $01 with GST.
   The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-210, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056363

1.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to BRC-57, "DTC No. Index".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace.

2.CHECK COMBINATION METER

Refer to MWI-51, "DTC Index".

>> INSPECTION END

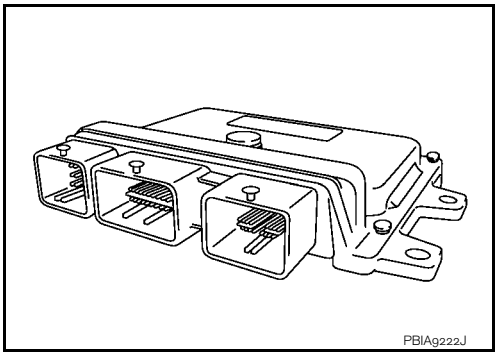
cardiagn.com

P0605 ECM

Description

INFOID:0000000001056377

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



DTC Logic

INFOID:0000000001056378

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605	Engine control module	A)	ECM calculation function is malfunctioning.	• ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

1. Turn ignition switch ON.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-212, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

1. Turn ignition switch ON and wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-212, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and waitait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Repeat step 2 for 32 times.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-212, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000001056379

1. INSPECTION START

With CONSULT-III

1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. Perform DTC CONFIRMATION PROCEDURE.
   See EC-211, "DTC Logic".

With GST

1. Turn ignition switch ON.
2. Select Service $04 with GST.
3. Perform DTC CONFIRMATION PROCEDURE.
   See EC-211, "DTC Logic".

Is the 1st trip DTC P0605 displayed again?

YES >> GO TO 2.
NO >> INSPECTION END

2. REPLACE ECM

1. Replace ECM.
2. Go to EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

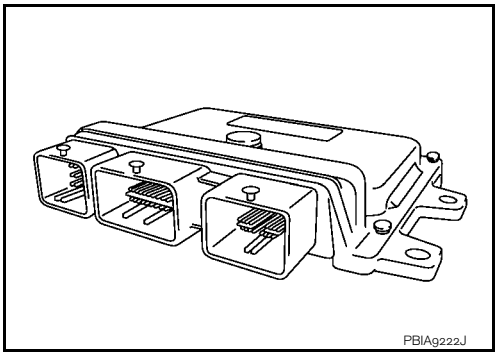
cardiagn.com

P1065 ECM

Description

INFOID:0000000001077001

ECM has the memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the Idle Air Volume Learning value memory, etc. even when the ignition switch is turned OFF.



DTC Logic

INFOID:0000000001077002

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065	Engine control module	ECM back-up RAM system does not function properly.	• ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Start engine and let it idle for 1 second.
3. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
4. Repeat steps 2 and 3 for four times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-213, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001077003

1.INSPECTION START

With CONSULT-III
1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. **Perform DTC CONFIRMATION PROCEDURE.**
   See EC-213, "DTC Logic".

With GST
1. Turn ignition switch ON.
2. Select Service $04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
   See EC-213, "DTC Logic".

Is the 1st trip DTC P1065 displayed again?

YES >> GO TO 2.

cardiagn.com

NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Go to EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

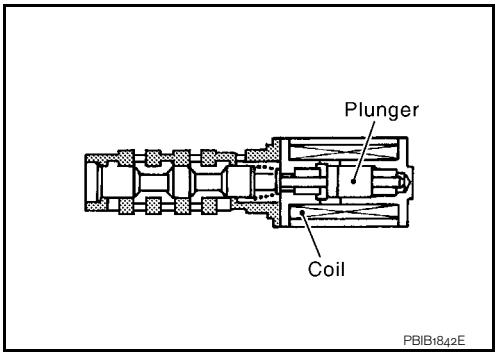
cardiagn.com

P1111 IVT CONTROL SOLENOID VALVE

Description

INFOID:0000000001056194

Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.
The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.
The longer pulse width advances valve angle.
The shorter pulse width retards valve angle.
When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



DTC Logic

INFOID:0000000001056195

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) • Intake valve timing control solenoid valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-215, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056196

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake valve timing control solenoid valve harness connector and ground.

IVT control solenoid valve		Ground	Voltage
Connector	Terminal		
F41	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN

cardiagn.com

AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between intake valve timing control solenoid valve harness connector and ECM harness connector.

IVT control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F41	1	F8	73	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-216, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace intake valve timing control solenoid valve.

4. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056197

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	6.7 - 7.7 Ω
1 or 2 and ground	∞Ω (Continuity should not exist)

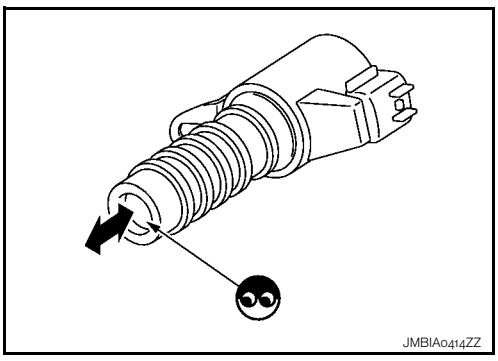
Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace intake valve timing control solenoid valve.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve.
2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:
Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
NOTE:
Always replace O-ring when intake valve timing control solenoid valve is removed.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace intake valve timing control solenoid valve.

cardiagn.com

P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:0000000001056458

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001056459

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	• Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detect the throttle valve is stuck open.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to 1st position and wait at least 3 seconds.
3. Set shift lever to Neutral position.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set shift lever to 1st position and wait at least 3 seconds.
7. Set shift lever to Neutral position.
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.

Is DTC detected?

YES >> Go to EC-217, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to 1st position and wait at least 3 seconds.
3. Set shift lever to Neutral position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.

Is DTC detected?

YES >> Go to EC-217, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

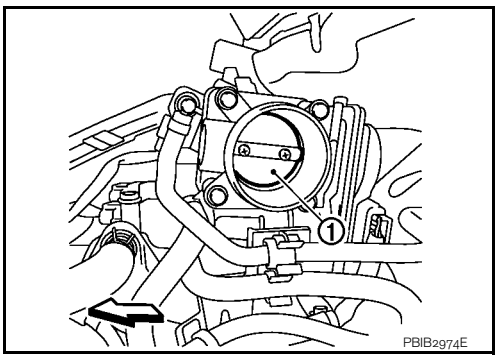
INFOID:0000000001056460

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

cardiagn.com

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.

⇦ : Vehicle front



Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-218, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056461

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:0000000001056448

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001056449

DTC DETECTION LOGIC

NOTE:
If DTC P1122 is displayed with DTC P1121 or P1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to EC-223, "DTC Logic" or EC-217, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122	Electric throttle control performance	Electric throttle control function does not operate properly.	• Harness or connectors (Throttle control motor circuit is open or shorted) • Electric throttle control actuator

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-219, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056450

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch OFF	Approx. 0V
			Ignition switch ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 3.

3.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	32	F7	2	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F12, E9
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Check voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

7.CHECK FUSE

1. Disconnect 15A fuse (No. 51) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace 15A fuse.

8.CHECK INTERMITTENT INCIDENT

cardiagn.com

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

9. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

5. Also check harness for short to ground and short to power.

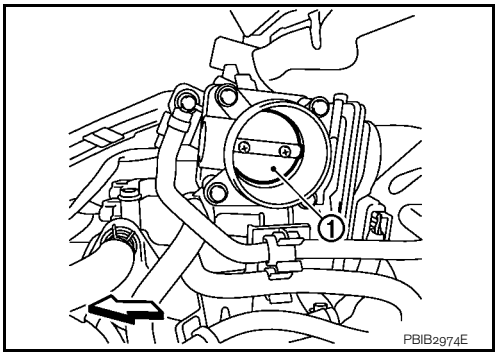
Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace.

10. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve (1) and the housing.

⇦ : Vehicle front



Is the inspection result normal?

YES >> GO TO 11.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

11. CHECK THROTTLE CONTROL MOTOR

Refer to EC-221, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 13.

12. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair or replace harness or connectors.

13. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace malfunction electric throttle control actuator.
2. Go to EC-222, "Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000001056451

cardiagn.com

1.CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance [at 25 °C (77°F)]
5 and 6	Approx. 1 - 15 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-222, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056452

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Description

INFOID:0000000001056445

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

DTC Logic

INFOID:0000000001056446

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	• Harness or connectors (Throttle control motor relay circuit is shorted) • Throttle control motor relay
P1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	• Harness or connectors (Throttle control motor relay circuit is open) • Throttle control motor relay

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V.

Witch DTC is detected?

P1124 >> GO TO 2.
P1126 >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P1124

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-223, "Diagnosis Procedure".
NO >> INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P1126

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-223, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056447

1.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Check voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E12.
4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	15	E12	25	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NG >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Reconnect ECM and IPDM E/R harness connectors.
2. Turn ignition switch ON.
3. Check voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 6.

6.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Check the continuity between ECM harness connector and IPDM E/R harness connector.

cardiagn.com

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	2	E12	32	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F12, E9
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

8. CHECK FUSE

1. Disconnect 15A fuse (No. 51) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace 15A fuse.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

cardiagn.com

P1128 THROTTLE CONTROL MOTOR

Description

INFOID:0000000001056453

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001056454

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	• Harness or connectors (Throttle control motor circuit is shorted.) • Electric throttle control actuator (Throttle control motor)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-226, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056455

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect electric throttle control actuator harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

cardiagn.com

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK THROTTLE CONTROL MOTOR

Refer to EC-227, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 5.

4.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-227, "Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000001056456

1.CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance [at 25 °C (77°F)]
5 and 6	Approx. 1 - 15 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-227, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056457

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

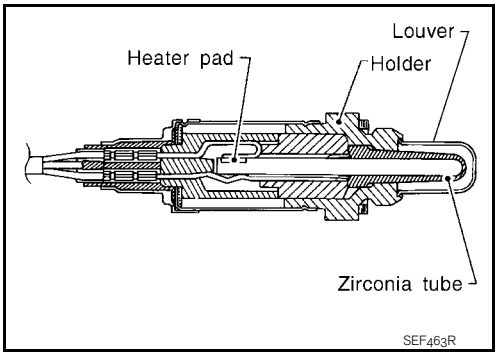
cardiagn.com

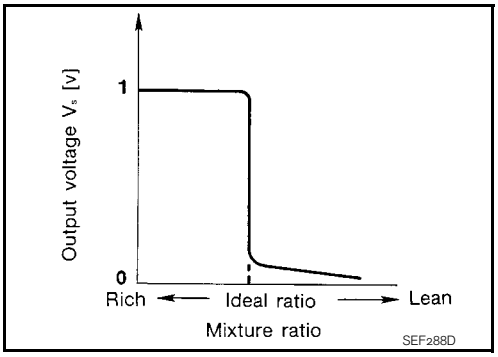
P1143 HO2S1

Description

INFOID:0000000001095662

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



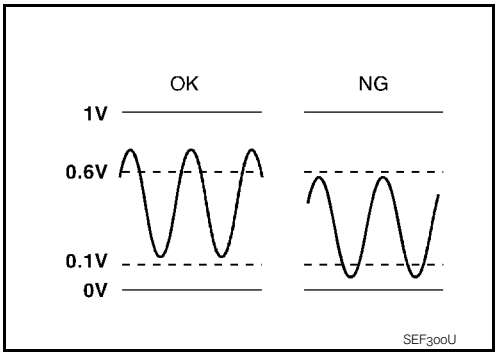


DTC Logic

INFOID:0000000001095663

DTC DETECTION LOGIC

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high and whether the “lean” output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1143	Heated oxygen sensor 1 lean shift monitoring	The maximum and minimum voltage from the sensor are not reached to the specified voltages.	• Heated oxygen sensor 1 • Heated oxygen sensor 1 heater • Fuel pressure • Fuel injector • Intake air leaks

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform at a temperature above -10°C (14°F)

cardiagn.com

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P1143” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.
   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-III screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)
   CAUTION:
   Always drive vehicle at a safe speed.

ENG SPEED	1,500 - 3,900 rpm
VHCL SPEED SE	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	2.0 - 12.0 msec
Shift lever	Suitable position

   If “TESTING” is not displayed after 5 minutes, retry from step 2.
7. Touch “SELF-DIAG RESULT”

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-229, "Diagnosis Procedure".

3.PERFORM COMPONENT FUNCTION CHECK

With GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between EM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load	• The maximum voltage is over 0.6 at least 1 time. • The minimum voltage is over 0.1 at least 1 time.

NOTE:
Use component function check to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-229, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001095664

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CLEAR THE SELF-LEARNING DATA

1. Clear the mixture ratio self-learning value, refer to EC-33, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 detected? Is it difficult to start engine?

Yes >> Perform trouble diagnosis for DTC P0171. Refer to EC-174, "DTC Logic".
No >> GO TO 4.

4.CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-230, "Component Inspection".

Is inspection result normal?

YES >> GO TO 5.
NO >> Replace heated oxygen sensor 1.

5.CHECK INTERMITTENT INCIDENT

Perform GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

>> INSPECTION END

Component Inspection

INFOID:0000000001095665

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

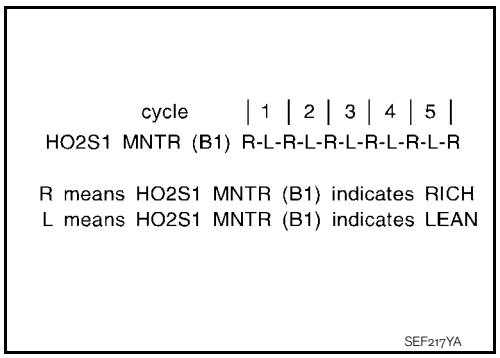
2.CHECK HEATED OXYGEN SENSOR 1

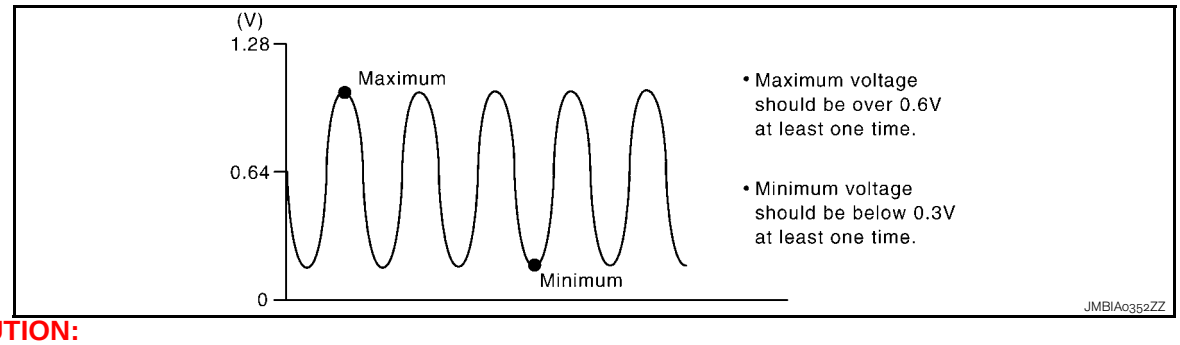
With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.

cardiagn.com

6. Check the following.
- "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- "HO2S1 (B1)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)" voltage never exceeds 1.0V.





CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.
CAUTION:

cardiagn.com

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

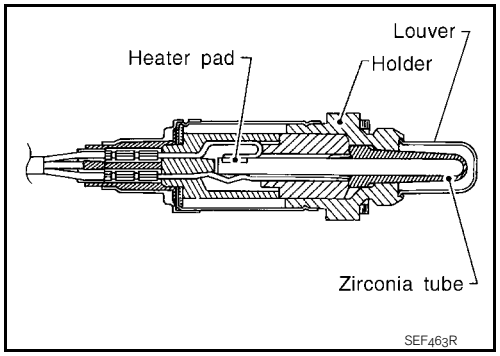
cardiagn.com

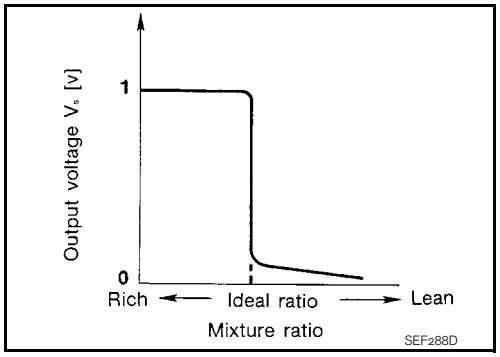
P1144 HO2S1

Description

INFOID:0000000001095666

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



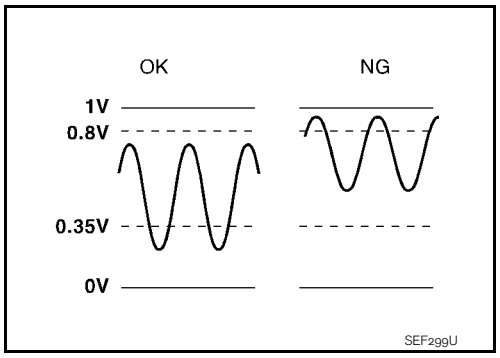


DTC Logic

INFOID:0000000001095667

DTC DETECTION LOGIC

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high and “lean” output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1144	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	• Heated oxygen sensor 1 • Heated oxygen sensor 1 heater • Fuel pressure • Fuel injector

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform at a temperature above -10°C (14°F).

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

cardiagn.com

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P1143” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.
   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-III screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)
   CAUTION:
   Always drive vehicle at a safe speed.

ENG SPEED	1,500 - 3,900 rpm
VHCL SPEED SE	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	2.0 - 12.0 msec
Shift lever	Suitable position

If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Touch “SELF-DIAG RESULT”

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-229, "Diagnosis Procedure".

3.PERFORM COMPONENT FUNCTION CHECK

With GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between EM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load	• The maximum voltage is over 0.8 at least 1 time. • The minimum voltage is over 0.35 at least 1 time.

NOTE:
Use component function check to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-229, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001095668

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

cardiagn.com

2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3. CLEAR THE SELF-LEARNING DATA

1. Clear the mixture ratio self-learning value, refer to EC-33, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected or difficult to start engine?

Yes >> Perform trouble diagnosis for DTC P0172. Refer to EC-178, "DTC Logic".
No >> GO TO 4

4. CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-158, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace heated oxygen sensor 1.

6. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-242, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace heated oxygen sensor 1.

7. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".
For circuit, refer to EC-329, "Wiring Diagram - ENGINE CONTROL SYSTEM -".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001095669

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK HEATED OXYGEN SENSOR 1

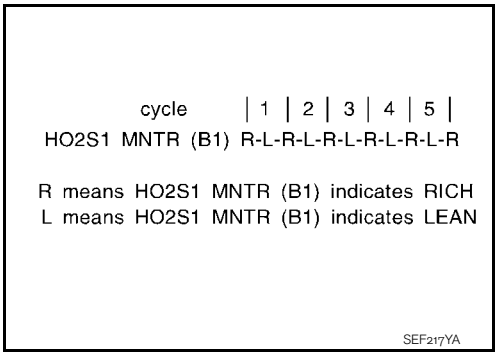
With CONSULT-III

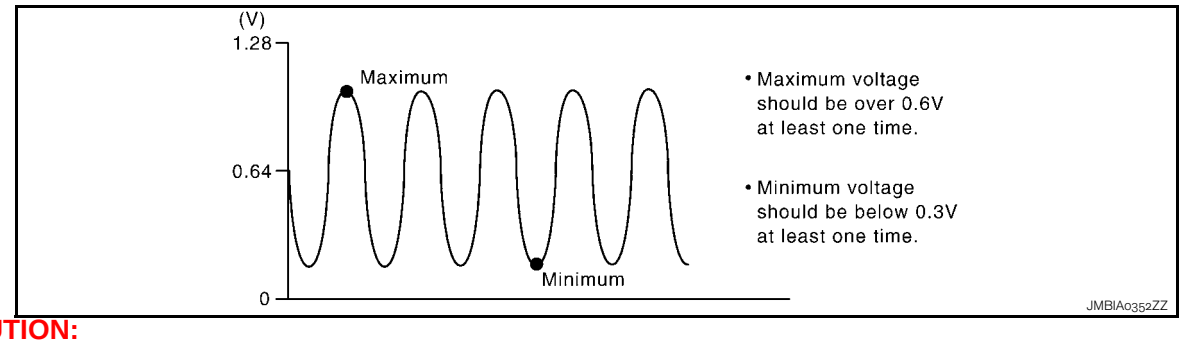
1. Start engine and warm it up to normal operating temperature.

cardiagn.com

2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.





CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

cardiagn.com

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

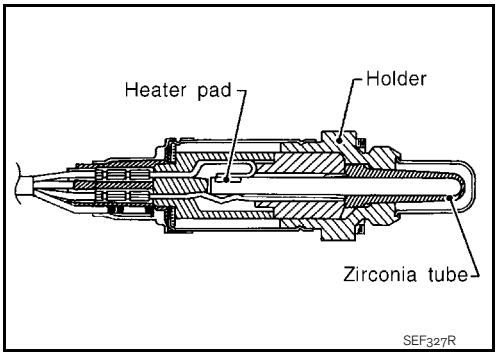
cardiagn.com

P1146 HO2S2

Description

INFOID:0000000001088479

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

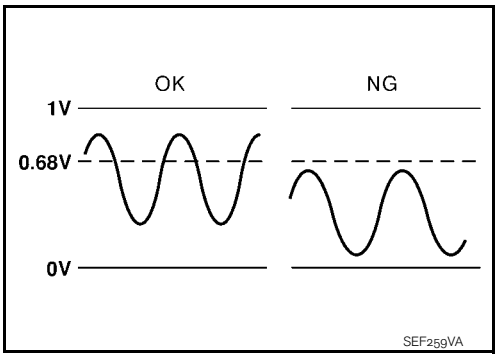


DTC Logic

INFOID:0000000001088480

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1146	Heated oxygen sensor 2 circuit low voltage	The maximum voltage from the sensor is not reached to the specified voltage.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 11.

2.PRECONDITIONING

"COMPLETED" will appear on CONSULT-III screen when all tests "COND1", "COND2" and "COND3" are completed.
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
For the best results, perform ″DTC WORK SUPPORT″ at a temperature of 0 to 30°C (32 to 86°F).
Never stop engine during this procedure. If the engine is stopped, retry this procedure from 4. PERFORM PROCEDURE FOR COND1-I.

cardiagn.com

>> GO TO 3.

3. PERFORM PROCEDURE FOR COND1

Start engine and warm it up to normal operating temperature.

>> GO TO 4.

4. PERFORM PROCEDURE FOR COND1-I

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 5.

5. PERFORM PROCEDURE FOR COND1-II

1. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
2. Let engine idle 1 minute.
3. Select “HO2S2 (B1) P1146” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 30 seconds.
6. Rev engine up to 2,000 rpm two or three times quickly under no load.

Is “CONPLETED” appears on CONSULT-III screen?

YES >> GO TO 7.
NO >> GO TO 4.

6. PERFORM PROCEDURE FOR COND1-I

When the following conditions are met, “TESTING” will be displayed at “COND1” on the CONSULT-III screen. Maintain the condition continuously until “TESTING” changes to “COMPLETED” (It will take approximately 60 seconds.)

ENG SPEED	More than 1,200 rpm
B/FUEL SCHDL	More than 1.0 msec
COOLAN TEMP/S	More than 70°C (158°F)
Shift level	Suitable position

Which displayed on CONSULT-III screen?

COND1: OUT OF CONDITION>>GO TO 4.
COND1: COMPLETED COND2: INCOMPLETED>>GO TO 7.
COND1: COMPLETED COND2: COMPLETED>>GO TO 8.

7. PERFORM PROCEDURE FOR COND2

While driving, release accelerator pedal completely from the above condition until “INCOMPLETED” at “COND2” on CONSULT-III screen has turned to “COMPLETED”. (It will take approximately 4 seconds.)

Which displayed on CONSULT-III screen?

COND2: COMPLETED COND3: INCOMPLETED>>GO TO 8.
COND2: COMPLETED COND3: COMPLETED>>GO TO 9.

8. PERFORM PROCEDURE FOR COND3

Stop vehicle and let it idle until “INCOMPLETED” of “COND3” on CONSULT-III screen has turned to “COMPLETED”. (It will take a maximum of approximately 6 minutes.)

>> GO TO 9.

9. PERFORM PROCEDURE FOR COND3-I

Touch “SELF DIAGRESULTS”.

Which displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-241, "Diagnosis Procedure".
CAN NOT BE DIAGNOSED>>GO TO 10.

cardiagn.com

10. PERFORM PROCEDURE FOR COND3-II

1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
2. Turn ignition switch ON and select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-III.
3. Start engine and warm it up while monitoring “COOLAN TEMP/S” indication on CONSULT-III.
4. When “COOLAN TEMP/S” indication reaches to 70°C (158°F).

>> GO TO 5.

11. PREFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-242, "Component Inspection".
NOTE:
Use component function check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-241, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001088481

1. PERFORM COMPONENT FUNCTION CHECK-I

With GST
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 4th gear position	The voltage should be above 0.68V at least once during this procedure.

Is the inspection result normal?

cardiagn.com

YES >> INSPECTION END
NO >> Go to EC-241, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001088482

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CLEAR THE SELF-LEARNING DATA

1. Clear the mixture ratio self-learning value, refer to EC-33, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0172. Refer to EC-178, "DTC Logic".
NO >> GO TO 3.

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between HO2S2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F8	50	Ground	Not existed

3. Also check harness for short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6..

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between HO2S2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-242, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001088483

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

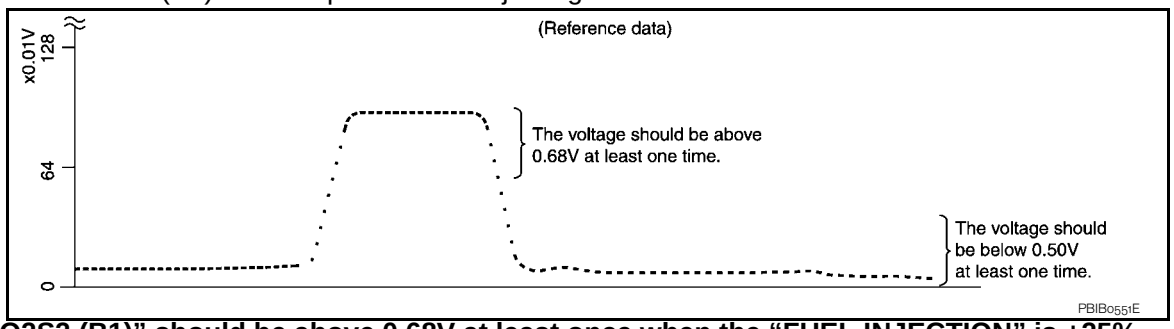
2. CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.

cardiagn.com

7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

cardiagn.com

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 4th gear position	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

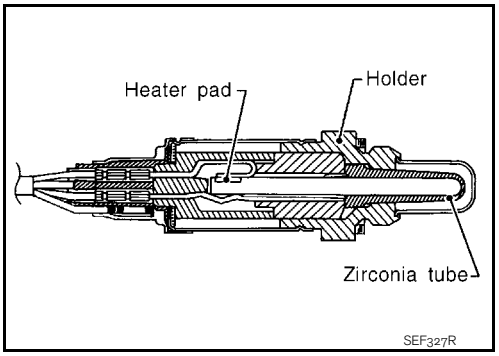
cardiagn.com

P1147 HO2S2

Description

INFOID:0000000001088484

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

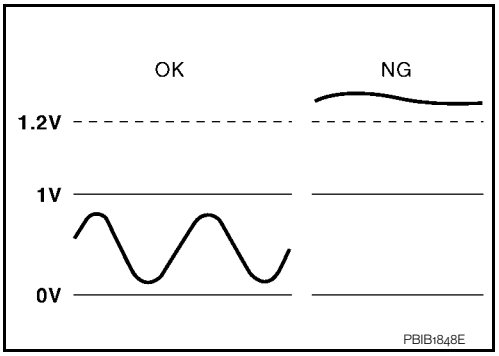


DTC Logic

INFOID:0000000001088485

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time.
To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1147	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 11.

2.PRECONDITIONING

"COMPLETED" will appear on CONSULT-III screen when all tests "COND1", "COND2" and "COND3" are completed.
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).
Never stop engine during this procedure. If the engine is stopped, retry this procedure from 4. PERFORM PROCEDURE FOR COND1-I.

>> GO TO 3.

cardiagn.com

3.PERFORM PROCEDURE FOR COND1

Start engine and warm it up to normal operating temperature.

>> GO TO 4.

4.PERFORM PROCEDURE FOR COND1-I

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 5.

5.PERFORM PROCEDURE FOR COND1-II

1. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
2. Let engine idle 1 minute.
3. Select “HO2S2 (B1) P1147” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 30 seconds.
6. Rev engine up to 2,000 rpm two or three times quickly under no load.

Is “CONPLETED” appears on CONSULT-III screen?

YES >> GO TO 9.
NO >> GO TO 6.

6.PERFORM PROCEDURE FOR COND1-I

When the following conditions are met, “TESTING” will be displayed at “COND1” on the CONSULT-III screen. Maintain the condition continuously until “TESTING” changes to “COMPLETED” (It will take approximately 60 seconds.)

ENG SPEED	More than 1,200 rpm
B/FUEL SCHDL	More than 1.0 msec
COOLAN TEMP/S	More than 70°C (158 °F)
Shift level	Suitable position

Which displayed on CONSULT-III screen?

COND1: OUT OF CONDITION>>GO TO 4.
COND1: COMPLETED COND2: INCOMPLETED>>GO TO 7.
COND1: COMPLETED COND2: COMPLETED>>GO TO 8.

7.PERFORM PROCEDURE FOR COND2

While driving, release accelerator pedal completely from the above condition until “INCOMPLETED” at “COND2” on CONSULT-III screen has turned to “COMPLETED”. (It will take approximately 4 seconds.)

Which displayed on CONSULT-III screen?

COND2: COMPLETED COND3: INCOMPLETED>>GO TO 8.
COND2: COMPLETED COND3: COMPLETED>>GO TO 9.

8.PERFORM PROCEDURE FOR COND3

Stop vehicle and let it idle until “INCOMPLETED” of “COND3” on CONSULT-III screen has turned to “COMPLETED”. (It will take a maximum of approximately 6 minutes.)

>> GO TO 9.

9.PERFORM PROCEDURE FOR COND3-I

Touch “SELF DIAGRESULTS”.

Which displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-248, "Diagnosis Procedure".
CAN NOT BE DIAGNOSED>>GO TO 10.

cardiagn.com

10. PERFORM PROCEDURE FOR COND3-II

1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
2. Turn ignition switch ON and select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-III.
3. Start engine and warm it up while monitoring “COOLAN TEMP/S” indication on CONSULT-III.
4. When “COOLAN TEMP/S” indication reaches to 70°C (158°F).

>> GO TO 5.

11. PREFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-249, "Component Inspection".

NOTE:

Use component function check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-248, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001088486

1. PERFORM COMPONENT FUNCTION CHECK-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 4th gear position	The voltage should be above 0.50V at least once during this procedure.

Is the inspection result normal?

cardiagn.com

YES >> INSPECTION END
NO >> Go to EC-248, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001088487

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

- Harness connectors F121, E7.
- Harness for open or short between HO2S2 and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F8	50	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

- Harness connectors F121, E7.
- Harness for open or short between HO2S2 and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK HO2S2 CONNECTOR FOR WATER

cardiagn.com

Check connectors for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace harness or connectors.

7. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-249, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001088488

1. INSPECTION START

Do you have CONSULT-III?

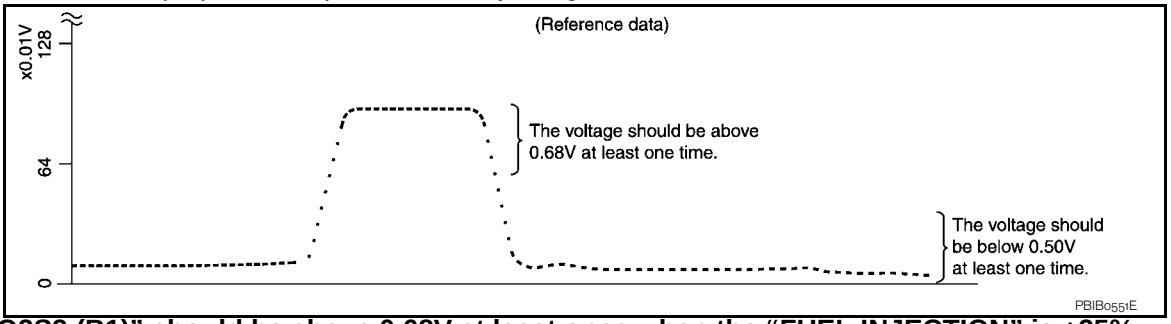
Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

cardiagn.com

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 4th gear position	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

cardiagn.com

>> INSPECTION END

cardiagn.com

P1212 TCS COMMUNICATION LINE

Description

INFOID:0000000001116296

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and “ABS actuator and electric unit (control unit)”.
Be sure to erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

DTC Logic

INFOID:0000000001116297

DTC DETECTION LOGIC

NOTE:
- **If DTC P1212 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-121, "DTC Logic".**
- **If DTC P1212 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-122, "DTC Logic".**

Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212	TCS communication line	ECM can not receive the information from “ABS actuator and electric unit (control unit)” continuously.	• Harness or connectors (The CAN communication line is open or shorted.) • ABS actuator and electric unit (control unit) • Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-252, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116298

Go to BRC-6, "Work Flow".

cardiagn.com

P1217 ENGINE OVER TEMPERATURE

DTC Logic

INFOID:0000000001056387

DTC DETECTION LOGIC

NOTE:

- **If DTC P1217 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-121, "DTC Logic".**
- **If DTC P1217 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-122, "DTC Logic".**

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.
When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217	Engine over temperature (Overheat)	• Cooling fan does not operate properly (Overheat). • Cooling fan system does not operate properly (Overheat). • Engine coolant was not added to the system using the proper filling method. • Engine coolant is not within the specified range.	• Harness or connectors (The cooling fan circuit is open or shorted.) • IPDM E/R (Cooling fan relays -1 and -3) • Cooling fan motor • Radiator hose • Radiator • Radiator cap • Reservoir tank • Water pump • Thermostat

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to CO-9, "Inspection". Also, replace the engine oil. Refer to LU-6, "Inspection".

1. **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to LU-6, "Inspection".**
2. **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-253, "Component Function Check".

NOTE:

Use component function check to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-254, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001056388

1.PERFORM COMPONENT FUNCTION CHECK-I

WARNING:

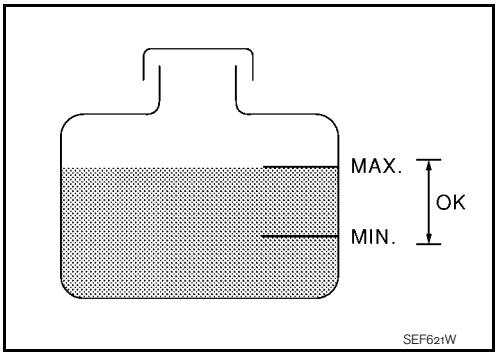
Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.
Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

cardiagn.com

Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.

Is the coolant level in the reservoir tank and/or radiator below the proper range?

YES >> Go to EC-254, "Diagnosis Procedure".
NO >> GO TO 2



2.PERFORM COMPONENT FUNCTION CHECK-II

Confirm whether customer filled the coolant or not.

Did customer fill the coolant?

YES >> Go to EC-254, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

With CONSULT-III
1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that cooling fan motor operate at each speed (LOW/HI).

Without CONSULT-III
Perform IPDM E/R auto active test and check cooling fan motor operation, refer to PCS-9, "Diagnosis Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to PCS-9, "Diagnosis Description".

Diagnosis Procedure

INFOID:0000000001056389

1.CHECK COOLING FAN OPERATION

With CONSULT-III
1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that cooling fan motor operate at each speed (LOW/HI).

Without CONSULT-III
1. Perform IPDM E/R auto active test and check cooling fan motor operation, refer to PCS-9, "Diagnosis Description".
2. Make sure that cooling fan motor operate at each speed (Low/High).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-299, "Diagnosis Procedure".

2.CHECK COOLING SYSTEM FOR LEAK-I

Check cooling system for leak. Refer to CO-9, "Inspection".

Is leakage detected?

YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK COOLING SYSTEM FOR LEAK-II

Check the following for leak. Refer to CO-9, "Inspection".
- Hose
- Radiator
- Water pump

cardiagn.com

>> Repair or replace malfunctioning part.

4. CHECK RADIATOR CAP

Check radiator cap. Refer to CO-13, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace radiator cap.

5. CHECK THERMOSTAT

Check thermostat. Refer to CO-19, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace thermostat.

6. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-136, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace engine coolant temperature sensor.

7. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, check the following.

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	• Blocked radiator • Blocked condenser • Blocked radiator grille • Blocked bumper	• Visual	No blocking	—
	2	• Coolant mixture	• Coolant tester	50 - 50% coolant mixture	CO-9, "Inspection"
	3	• Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-9, "Inspection"
	4	• Radiator cap	• Pressure tester	59 - 98 kPa (0.6 - 1.0 bar, 0.6 - 1.0 kg/cm^2, 9 - 14 psi) (Limit)	CO-14, "Inspection"
ON*2	5	• Coolant leaks	• Visual	No leaks	CO-9, "Inspection"
ON*2	6	• Thermostat	• Touch the upper and lower radiator hoses	Both hoses should be hot	CO-20, "Inspection"
ON*1	7	• Cooling fan motor	• CONSULT-III	Operating	EC-300, "Component Inspection (Cooling Fan Motor)"
OFF	8	• Combustion gas leak	• Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	• Coolant temperature gauge	• Visual	Gauge less than 3/4 when driving	—
		• Coolant overflow to reservoir tank	• Visual	No overflow during driving and idling	CO-9, "Inspection"
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	CO-9, "Inspection"
OFF	11	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	EM-80, "Inspection"
	12	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	EM-101, "Inspection"

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

cardiagn.com

*4: After 60 minutes of cool down time.

For more information, refer to CO-5, "Troubleshooting Chart".

>> INSPECTION END

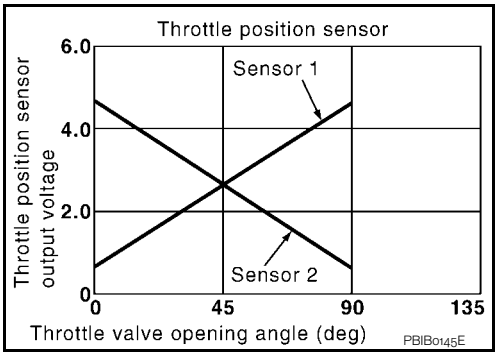
cardiagn.com

P1225 TP SENSOR

Description

INFOID:0000000001056390

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001056391

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-257, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056392

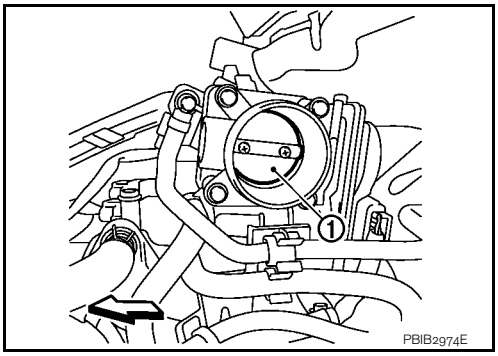
1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

cardiagn.com

3. Check if foreign matter is caught between the throttle valve (1) and the housing.

⇦ : Vehicle front



Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-258, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056393

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

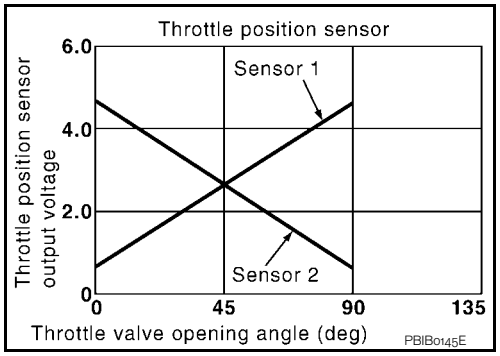
cardiagn.com

P1226 TP SENSOR

Description

INFOID:0000000001056394

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001056395

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226	Closed throttle position learning performance	Closed throttle position learning is not performed successfully, repeatedly.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF, wait at least 10 seconds.
3. Turn ignition switch ON.
4. Repeat steps 2 and 3 for 32 times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-259, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

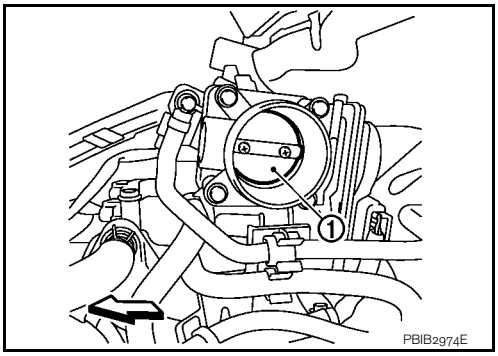
INFOID:0000000001056396

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

cardiagn.com

3. Check if foreign matter is caught between the throttle valve (1) and the housing.



⇦ : Vehicle front

Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-258, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056397

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1229 SENSOR POWER SUPPLY

DTC Logic

INFOID:0000000001062567

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	• Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.] • Accelerator pedal position sensor • Throttle position sensor • Camshaft position sensor (PHASE)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-261, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001062568

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

cardiagn.com

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	72	Electric throttle control actuator	F29	1
	78	CMP sensor (PHASE)	F26	1
E16	106	APP sensor	E110	4

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair short to ground or short to power in harness or connectors.

4.CHECK COMPONENTS

Check the following.
• Camshaft position sensor (PHASE) (Refer to EC-199, "Component Inspection".)

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace malfunctioning component.

5.CHECK TP SENSOR

Refer to EC-183, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> INSPECTION END

7.CHECK APP SENSOR

Refer to EC-282, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> INSPECTION END

9.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P1564 ASCD STEERING SWITCH

Description

INFOID:0000000001116260

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.
Refer to EC-60, "System Description" for the ASCD function.

DTC Logic

INFOID:0000000001116261

DTC DETECTION LOGIC

NOTE:
If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-211, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564	ASCD steering switch	• An excessively high voltage signal from the ASCD steering switch is sent to ECM. • ECM detects that input signal from the ASCD steering switch is out of the specified range. • ECM detects that the ASCD steering switch is stuck ON.	• Harness or connectors (The switch circuit is open or shorted.) • ASCD steering switch • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Wait at least 10 seconds.
3. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Check DTC.

Is DTC detected?

YES >> Go to EC-263, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116262

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YS >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-III
1. Turn ignition switch ON.

cardiagn.com

2. Select “MAIN SW”, “CANCEL SW”, “RESUME/ACC SW” and “SET SW” in “DATA MONITOR” mode with CONSULT-III.
3. Check each item indication under the following conditions.

Monitor item	Condition		Indication
MAIN SW	MAIN switch	Pressed	ON
		Released	OFF
CANCEL SW	CANCEL switch	Pressed	ON
		Released	OFF
RESUME/ACC SW	RESUME/ACCELERATE switch	Pressed	ON
		Released	OFF
SET SW	SET/COAST switch	Pressed	ON
		Released	OFF

Without CONSULT-III
1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
E16	94 (ASCD steering switch signal)	Ground	MAIN switch: Pressed	Approx. 0V
			CANSEL switch: Pressed	Approx. 1V
			SET/COAST switch: Pressed	Approx. 2V
			RESUME/ACCELERATE switch: Pressed	Approx. 3V
			All ASCD steering switches: Released	Approx. 4V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect combination switch harness connector M352.
4. Check the continuity between ASCD steering switch and ECM harness connector.

ASCD steering switch	ECM		Continuity
Terminal	Connector	Terminal	
15	E16	95	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCE steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

cardiagn.com

1. Check the continuity between ECM harness connector and ASCD steering switch.

ASCD steering switch	ECM		Continuity
Terminal	Connector	Terminal	
14	E16	94	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCE steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD STEERING SWITCH

Refer to EC-265, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace ASCD steering switch.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001116263

1. CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the continuity between combination switch harness connector terminals under following conditions.

Combination meter		Condition	Resistance
Connector	Terminals		
M325	14 and 15	MAIN switch: Pressed	Approx. 0 Ω
		CANCEL switch: Pressed	Approx. 250 Ω
		SET/COAST switch: Pressed	Approx. 660 Ω
		RESUME/ACCELERATE switch: Pressed	Approx. 1,480 Ω
		All ASCD steering switches: Released	Approx. 4,000 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD steering switch

cardiagn.com

P1572 ASCD BRAKE SWITCH

Description

INFOID:0000000001116264

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-60, "System Description" for the ASCD function.

DTC Logic

INFOID:0000000001116265

DTC DETECTION LOGIC

NOTE:

- **If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-211, "DTC Logic".**
- **This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.**

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1572	ASCD brake switch	A)	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the ECM at the same time.	• Harness or connectors (The stop lamp switch circuit is shorted.) • Harness or connectors (The ASCD brake switch circuit is shorted.) • Harness or connectors (The ASCD clutch switch circuit is shorted.) • Stop lamp switch • ASCD brake switch • ASCD clutch switch • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • Incorrect ASCD clutch switch installation • ECM
		B)	ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

With CONSULT-III

1. Start engine.
2. Select “DATA MONITOR” mode with CONSULT-III.
3. Press MAIN switch and make sure that CRUISE indicator is displayed in combination meter.
4. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

   CAUTION:

   Always drive vehicle at a safe speed.

   NOTE:

   This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

cardiagn.com

VHCL SPEED SE	More than 30 km/h (19 mph)
Shift lever	Suitable position

5. Check 1st trip DTC.

With GST

Follow the procedure “With CONSULT-III” above.

Is 1st trip DTC detected?

YES >> Go to EC-267, "Diagnosis Procedure".
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

With CONSULT-III

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed.

2. Check 1st trip DTC.

With GST

Follow the procedure “With CONSULT-III” above.

Is 1st trip DTC detected?

YES >> Go to EC-267, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116266

1. CHECK OVERALL FUNCTION-I

With CONSULT-III

1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-III.
3. Check “BRAKE SW1” indication under the following conditions.

Monitor item	Condition		Indication
BRAKE SW1	Brake pedal and clutch pedal	Slightly depressed	OFF
		Fully released	ON

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal and clutch pedal	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> GO TO 3.

2.CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD Clutch switch		Ground	Condition		Voltage (V)
Connector	Terminal				
E112	1	Ground	Clutch pedal	Slightly depressed	Approx. 0
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground	Voltage
Connector	Terminal		
E111	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Junction block connector E105, M77
- 10A fuse (No.4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD brake switch		ASCD clutch switch		Continuity
Connector	Terminal	Connector	Terminal	
E112	1	E111	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK ASCD BRAKE SWITCH

Refer to EC-270, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 14.

cardiagn.com

NO >> Replace ASCD brake switch.

7. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and ASCD brake switch harness connector.

ECM		ASCD brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E16	100	E112	2	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK ASCD CLUTCH SWITCH

Refer to EC-270, "Component Inspection (ASCD Clutch Switch)".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace ASCD clutch switch.

9. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.
- 10A fuse (No.11)
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

ECM		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E10	106	E114	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 13.
NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

cardiagn.com

• Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK STOP LAMP SWITCH

Refer to EC-271, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 14.
NO >> Replace stop lamp switch.

14. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:0000000001116267

1. CHECK ASCD BRAKE SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to BR-18, "Inspection and Adjustment".
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:0000000001116268

1. CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

cardiagn.com

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to CL-8, "Removal and Installation".
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

Component Inspection (Stop Lamp Switch)

INFOID:0000000001116269

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-18, "Inspection and Adjustment".
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

cardiagn.com

P1574 ASCD VEHICLE SPEED SENSOR

Description

INFOID:0000000001116270

The ECM receives two vehicle speed sensor signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to EC-60, "System Description" for ASCD functions.

DTC Logic

INFOID:0000000001116271

DTC DETECTION LOGIC

NOTE:

- **If DTC P1574 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-121, "DTC Logic".**
- **If DTC P1574 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-122, "DTC Logic".**
- **If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to EC-209, "DTC Logic"**
- **If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-211, "DTC Logic"**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	• Harness or connectors (The CAN communication line is open or shorted.) (Combination meter circuit is open or shorted.) • Combination meter • ABS actuator and electric unit (control unit) • Wheel sensor • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Drive the vehicle at more than 40 km/h (25 MPH).
   CAUTION:
   Always drive vehicle at a safe speed.
   NOTE:
   This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-272, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116272

1.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to BRC-17, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace.

2.CHECK COMBINATION METER

Check combination meter function.
Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

>> INSPECTION END

cardiagn.com

P1706 PNP SWITCH

Description

INFOID:0000000001062572

When the shift lever position is in the neutral position, ECM detects the position because the continuity of the line (the ON signal) exists.

DTC Logic

INFOID:0000000001062573

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	• Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] • Park/neutral position (PNP) switch

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 3.

3.CHECK PNP SWITCH FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-III. Then check the “P/N POSI SW” signal under the following conditions.

Position (Shift lever)	Known-good signal
Neutral position	ON
Except above position	OFF

Is the inspection result normal?

YES >> GO TO 4.
NO >> Go to EC-275, "Diagnosis Procedure".

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to normal operating temperature.
3. Maintain the following conditions for at least 50 consecutive seconds.

CAUTION:
Always drive vehicle at a safe speed.

ENG SPEED	1,925 - 6,375 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	2.5 - 31.8 msec

cardiagn.com

VHCL SPEED SE	More than 64 km/h (40 mph)
Shift lever	Suitable position

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-275, "Diagnosis Procedure".
NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-275, "Component Function Check".

NOTE:
Use component function check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-275, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001062574

1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	69 (PNP switch signal)	Ground	Shift lever	Neutral position	Approx. 0V
				Except above	BATTERY VOLTAGE

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-275, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001062575

1.CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Park/neutral position (PNP) switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between PNP switch harness connector and ground.

PNP switch		Ground	Voltage
Connector	Terminal		
F46	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following
- Harness connectors E6, F123
- Harness for open or short between neutral position switch and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

cardiagn.com

2. Disconnect ECM harness connector.
3. Check the continuity between PNP switch harness connector and ECM harness connector.

PNP switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F46	3	F8	69	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK PNP SWITCH

Refer to TM-10, "PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace PNP switch.

5. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P1805 BRAKE SWITCH

Description

INFOID:0000000001056434

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

DTC Logic

INFOID:0000000001056435

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805	Brake switch	A brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	• Harness or connectors (Stop lamp switch circuit is open or shorted.) • Stop lamp switch

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-III.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-277, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056436

1.CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

Is 1st trip DTC detected?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
• Harness connectors E105, M77

cardiagn.com

- 10A fuse (No. 11)
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

ECM		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E16	99	E114	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK STOP LAMP SWITCH

Refer to EC-278, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace stop lamp switch.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (Stop Lamp Switch)

INFOID:0000000001056437

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-18, "Inspection and Adjustment"(LHD) or BR-62, "Inspection and Adjustment"(LHD).
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

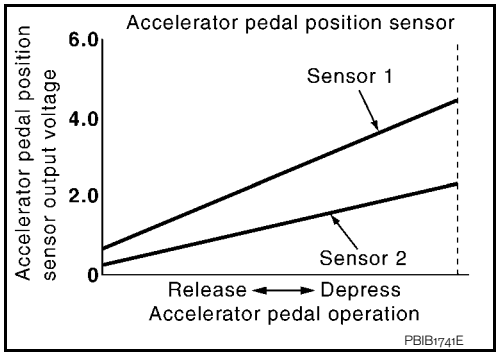
cardiagn.com

P2122, P2123 APP SENSOR

Description

INFOID:0000000001056462

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

DTC Logic

INFOID:0000000001056463

DTC DETECTION LOGIC

NOTE:
If DTC P2122 or P2123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	• Harness or connectors (APP sensor 1 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 1)
P2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-280, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056464

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E16	111	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK APP SENSOR

Refer to EC-282, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-282, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

Component Inspection

INFOID:0000000001056465

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-282, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056466

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

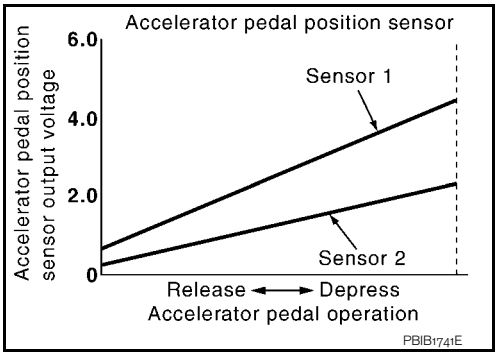
cardiagn.com

P2127, P2128 APP SENSOR

Description

INFOID:0000000001056467

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

DTC Logic

INFOID:0000000001056468

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	• Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor
P2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-283, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056469

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 3.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	5	E16	102	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-196, "Component Inspection".)
- Refrigerant pressure sensor (Refer to HAC-70, "Component Inspection".)

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace malfunctioning component.

6.CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

cardiagn.com

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	1	E16	104	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	6	E16	103	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK APP SENSOR

Refer to EC-285, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-286, "Special Repair Requirement".

>> INSPECTION END

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056470

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-286, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056471

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

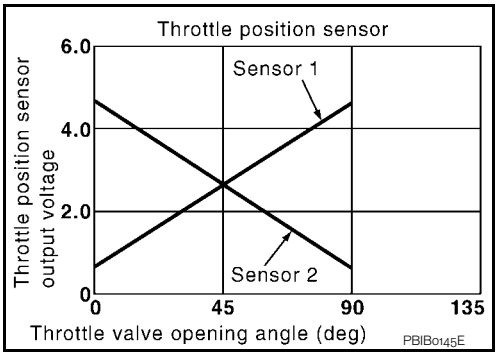
cardiagn.com

P2135 TP SENSOR

Description

INFOID:0000000001056472

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001056473

DTC DETECTION LOGIC

NOTE:
If DTC P2135 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135	Throttle position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	• Harness or connector (TP sensor 1 and 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-287, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056474

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.

cardiagn.com

2. Turn ignition switch ON.
3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	1	F8	72	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit.

4. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	2	F8	33	Existed
	3		34	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THROTTLE POSITION SENSOR

Refer to EC-289, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

cardiagn.com

7.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. EC-289, "Special Repair Requirement"

>> INSPECTION END

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056475

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-289, "Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to 1st position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-289, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056476

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

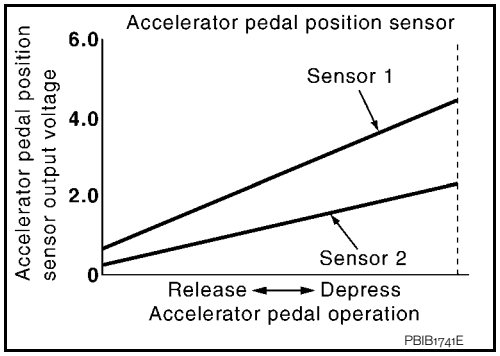
cardiagn.com

P2138 APP SENSOR

Description

INFOID:0000000001056477

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



DTC Logic

INFOID:0000000001056478

DTC DETECTION LOGIC

NOTE:
If DTC P2138 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138	Accelerator pedal position sensor circuit range/ performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	• Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 1 and 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-290, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001056479

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

cardiagn.com

2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 4.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	5	E16	102	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

5.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair short to ground or short to power in harness or connectors.

6.CHECK COMPONENTS

cardiagn.com

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-196, "Component Inspection".)
- Refrigerant pressure sensor (Refer to HAC-70, "Component Inspection".)

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace malfunctioning component.

7.CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector as follows.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	1	E16	104	Existed
	2		111	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

8.CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector as follows.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed
	6		103	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

9.CHECK APP SENSOR

Refer to EC-292, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-293, "Special Repair Requirement".

>> INSPECTION END

11.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001056480

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

cardiagn.com

2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E110	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-293, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001056481

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-30, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

cardiagn.com

ASCD BRAKE SWITCH

Description

INFOID:0000000001056487

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-60, "System Description" for the ASCD function.

Component Function Check

INFOID:0000000001056488

1.CHECK FOR ASCD BRAKE SWITCH FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-III.
3. Check “BRAKE SW1” indication under the following conditions.

Monitor item	Condition		Indication
BRAKE SW1	Brake pedal and clutch pedal	Slightly depressed	OFF
		Fully released	ON

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal and clutch pedal	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-294, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056489

1.CHECK ASCD BRAKE SWITCH CIRCUIT - I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD clutch switch		Ground	Voltage (V)
Connector	Terminal		
E112	1	Ground	Battery voltage

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT - II

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

cardiagn.com

ASCD clutch switch		Ground	Voltage (V)
Connector	Terminal		
E111	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors E105, M77
- 10A fuse (No. 4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD brake switch		ASCD clutch switch		Continuity
Connector	Terminal	Connector	Terminal	
E112	1	E111	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD CLUTCH SWITCH

Refer to EC-296, "Component Inspection (ASCD Clutch Switch)".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace ASCD clutch switch.

6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

ASCD brake switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E16	100	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD BRAKE SWITCH

Refer to EC-296, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace ASCD brake switch.

cardiagn.com

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:0000000001056490

1.CHECK ASCD BRAKE SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to BR-17, "Removal and Installation" (LHD) or BR-61, "Removal and Installation" (RHD).
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:0000000001056491

1.CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to CL-8, "Removal and Installation".
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

cardiagn.com

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

cardiagn.com

ASCD INDICATOR

Description

INFOID:0000000001056492

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.
CRUISE lamp illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.
SET lamp illuminates when following conditions are met.
- CRUISE lamp is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET lamp remains lit during ASCD control.
Refer to EC-60, "System Description" for the ASCD function.

Component Function Check

INFOID:0000000001056493

1.ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	• Ignition switch: ON	• MAIN switch: Pressed at the 1st time →at the 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	• ASCD: Operating	ON
		• ASCD: Not operating	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-298, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056494

1.CHECK DTC

Check that DTC U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1001. Refer to EC-121, "DTC Logic".

2.CHECK COMBINATION METER OPERATION

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check combination meter circuit. Refer to MWI-43, "Wiring Diagram - METER -".

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

COOLING FAN

Description

INFOID:0000000001056495

Cooling fan operates at low and high speed when the current flows in the cooling fan motor.
Refer to EC-68, "System Diagram" for cooling fan operation.

Component Function Check

INFOID:0000000001056496

1.CHECK COOLING FAN LOW SPEED FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that cooling fan operates at low and high speed.

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motor operation, refer to PCS-9, "Diagnosis Description".
2. Make sure that cooling fan operates at low and high speed.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-299, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056497

1.CHECK IPDM E/R POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E14.
3. Check the voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage
Connector	Terminal		
E14	53	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors

2.CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor harness connector.
3. Check the continuity between cooling fan motor harness connector and IPDM E/R harness connector.

Cooling fan motor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E3	1	E14	52	Existed
			54	

4. Check the continuity between cooling fan motor harness connector and ground.

Cooling fan motor		IPDM/ER		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E3	2	E10	5	Ground	Existed
			6		

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

cardiagn.com

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Resistor E57.
- Harness for open or short between IPDM E/R and cooling fan.
- Harness for open or short between cooling fan and ground.
- Harness for open or short between IPDM E/R and ground.

>> Repair or replace malfunctioning part.

4. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace ground connection.

5. CHECK COOLING FAN MOTOR

Refer to EC-300, "Component Inspection (Cooling Fan Motor)".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace malfunctioning cooling fan motor.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connector.

Component Inspection (Cooling Fan Motor)

INFOID:0000000001056498

1. CHECK COOLING FAN MOTOR

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor harness connector E3.
3. Supply cooling fan motor terminals with battery voltage and check operation.

Terminals		Operation
(+)	(–)	
1	2	Cooling fan operates.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace cooling fan motor.

cardiagn.com

ELECTRICAL LOAD SIGNAL

Description

INFOID:0000000001056500

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

Component Function Check

INFOID:0000000001056501

1.CHECK REAR WINDOW DEFOGGER SWITCH FUNCTION

1. Turn ignition switch ON.
2. Connect CONSULT-III and select “DATA MONITOR” mode.
3. Select “LOAD SIGNAL” and check indication under the following conditions.

Monitor item	Condition		Indication
LOAD SIGNAL	Rear window defogger switch	ON	ON
		OFF	OFF

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-301, "Diagnosis Procedure".

2.CHECK LIGHTING SWITCH FUNCTION

Check “LOAD SIGNAL” indication under the following conditions.

Monitor item	Condition		Indication
LOAD SIGNAL	Lighting switch	ON at 2nd position	ON
		OFF	OFF

Is the inspection result normal?

YES >> GO TO 3.
NO >> Go to EC-301, "Diagnosis Procedure".

3.CHECK HEATER FAN CONTROL SWITCH FUNCTION

Select “HEATER FAN SW” and check indication under the following conditions.

Monitor item	Condition		Indication
HEATER FAN SW	Heater fan control switch	ON	ON
		OFF	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-301, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056502

1.INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to EC-301, "Component Function Check".

Which circuit is related to the incident?

Rear window defogger>>GO TO 2
Headlamp>>GO TO 3.
Heater fan>>GO TO 4.

2.CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to DEF-3, "Work Flow".

cardiagn.com

>> INSPECTION END

3.CHECK HEADLAMP SYSTEM

Refer to EXL-191, "System Description".

>> INSPECTION END

4.CHECK HEATER FAN CONTROL SYSTEM

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

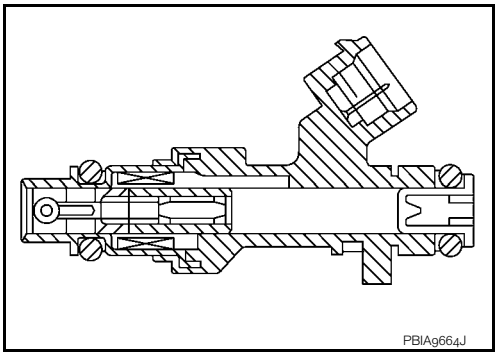
cardiagn.com

FUEL INJECTOR

Description

INFOID:0000000001056503

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the fuel injector circuit, the coil in the fuel injector is energized. The energized coil pulls the ball valve back and allows fuel to flow through the fuel injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the fuel injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



Component Function Check

INFOID:0000000001056504

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.
NO >> Go to EC-303, "Diagnosis Procedure".

2. CHECK FUEL INJECTOR FUNCTION

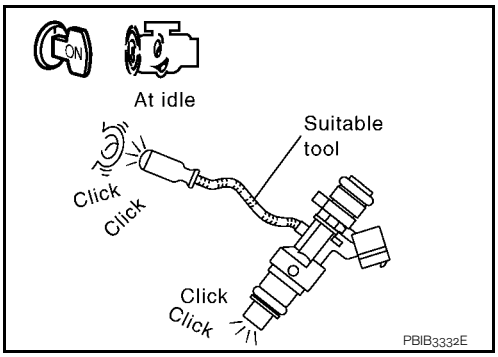
With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-303, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056505

1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel injector harness connector and ground.

cardiagn.com

Fuel injector			Ground	Voltage
Cylinder	Connector	Terminal		
1	F37	1	Ground	Battery voltage
2	F38	1		
3	F39	1		
4	F40	1		

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- 10A fuse (No. 58)
- Harness for open or short between fuel injector and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between fuel injector harness connector and ECM harness connector.

Fuel injector			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F37	2	F7	31	Existed
2	F38	2		30	
3	F39	2		29	
4	F40	2		25	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK FUEL INJECTOR

Refer to EC-304, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace malfunctioning fuel injector.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

Component Inspection

INFOID:0000000001056506

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check resistance between fuel injector terminals as follows.

cardiagn.com

Terminals	Resistance [at 10 - 60°C (50 - 140°F)]
1 and 2	11.1 - 14.5 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace malfunctioning fuel injector.

cardiagn.com

FUEL PUMP

Description

INFOID:0000000001056507

Sensor	Input signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay ↓ Fuel pump
Battery	Battery voltage*		

*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine startability. If the ECM receives a engine speed signal from the crankshaft position sensor and camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

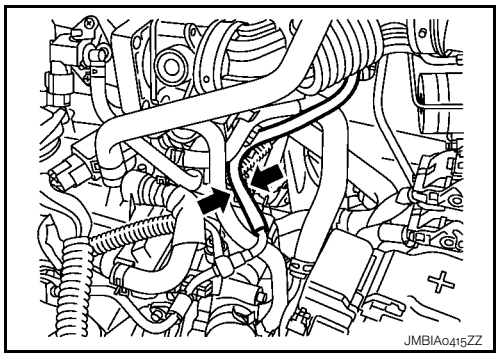
Component Function Check

INFOID:0000000001056508

1.CHECK FUEL PUMP FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose with two fingers.

Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.



Is the inspection result normal?

YES >> INSPECTION END
NO >> EC-306, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116056

1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	23	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect IDPDM E/R harness connector.
3. Check the continuity between IPDM E/R harness connector and ECM harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	23	E13	33	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors E6, F123.
- Harness for open or short to ground and short power.

>> Repair harness or connectors.

4. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect “fuel level sensor unit and fuel pump” harness connector.
4. Turn ignition switch ON.
5. Check voltage between “fuel level sensor unit and fuel pump” harness connector and ground.

Fuel level sensor unit and fuel pump		Ground	Voltage
Connector	Terminal		
B40	1	Ground	Battery voltage should exist 1 second after ignition switch is turn ON.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 5.

5. CHECK 10A FUSE

1. Turn ignition switch OFF.
2. Disconnect 10A fuse (No. 57) from IPDM E/R.
3. Check 10A fuse.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace fuse.

6. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector.
2. Check the continuity between IPDM E/R harness connector and “fuel level sensor unit and fuel pump” harness connector.

IPDM E/R		Fuel level sensor unit and fuel pump		Continuity
Connector	Terminal	Connector	Terminal	
F13	42	B40	1	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.

cardiagn.com

NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B10, E101
- Harness for open or short between IPDM E/R and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to power in harness or connectors.

8. CHECK FUEL PUMP GROUND CIRCUIT

1. Check the continuity between “fuel level sensor unit and fuel pump” and ground.

Fuel level sensor unit and fuel pump		Ground	Continuity
Connector	Terminal		
B40	3	Ground	Existed

2. Also heck harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to power in harness or connectors.

9. CHECK FUEL PUMP

Refer to EC-928, "Component Inspection (Fuel Pump)".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace fuel pump.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

Component Inspection (Fuel Pump)

INFOID:0000000001056510

1. CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Check resistance between “fuel level sensor unit and fuel pump” terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
1 and 3	0.2 - 5.0 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace “fuel level sensor unit and fuel pump”.

cardiagn.com

IGNITION SIGNAL

Description

INFOID:0000000001056512

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns ON and OFF the ignition coil primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.

Component Function Check

INFOID:0000000001056513

1.INSPECTION START

Turn ignition switch OFF, and restart engine.

Does the engine start?

YES-1 >> With CONSULT-III: GO TO 2.
YES-2 >> Without CONSULT-III: GO TO 3.
NO >> Go to EC-309, "Diagnosis Procedure".

2.IGNITION SIGNAL FUNCTION

With CONSULT-III

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
2. Make sure that each circuit produces a momentary engine speed drop.

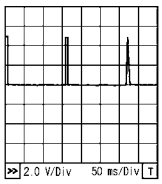
Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-309, "Diagnosis Procedure".

3.IGNITION SIGNAL FUNCTION

Without CONSULT-III

1. Let engine idle.
2. Read the voltage signal between ECM harness connector and ground.

ECM		Ground	Voltage signal
Connector	Terminal		
F7	17	Ground	 PBIAg2265J
	18		
	22		
	21		

NOTE:
The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-309, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056514

1.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	Battery voltage

cardiagn.com

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-117, "Diagnosis Procedure".

2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Turn ignition switch ON.
4. Check the voltage between condenser harness connector and ground.

Condenser		Ground	Voltage
Connector	Terminal		
F13	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between IPDM E/R harness connector and condenser harness connector.

IPDM E/R		Condenser		Continuity
Connector	Terminal	Connector	Terminal	
E11	10	F13	1	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Go to EC-117, "Diagnosis Procedure".
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between condenser harness connector and ground.

Condenser		Ground	Continuity
Connector	Terminal		
F13	2	Ground	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK CONDENSER

Refer to EC-312, "Component Inspection (Condenser)"

Is the inspection result normal?

YES >> GO TO 6.
NG >> Replace condenser.

6.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Reconnect all harness connectors disconnected.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

cardiagn.com

Ignition coil			Ground	Voltage
Cylinder	Connector	Terminal		
1	F33	3	Ground	Battery voltage
2	F34	3		
3	F35	3		
4	F36	3		

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

Ignition coil			Ground	Continuity
Cylinder	Connector	Terminal		
1	F33	2	Ground	Existed
2	F34	2		
3	F35	2		
4	F36	2		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ignition coil harness connector.

Ignition coil			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F33	1	F7	17	Existed
2	F34	1		18	
3	F35	1		22	
4	F36	1		21	

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-312, "Component Inspection (Ignition Coil with Power Transistor)".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace malfunctioning ignition coil with power transistor.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

Component Inspection (Ignition Coil with Power Transistor)

INFOID:0000000001056515

1. CHECK IGNITION COIL WITH POWER TRANSISTOR-I

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
1 and 2	Except 0 or ∞ Ω
1 and 3	Except 0 Ω
2 and 3	

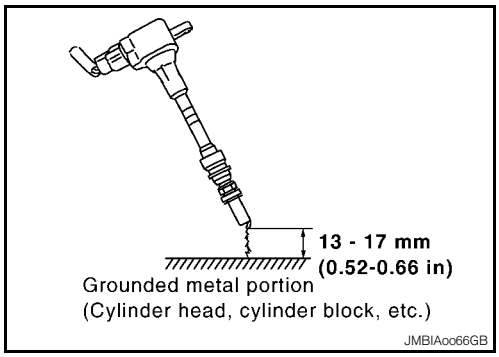
Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace malfunctioning ignition coil with power transistor.

2. CHECK IGNITION COIL WITH POWER TRANSISTOR-II

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
   NOTE:
   Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.
4. Start engine.
5. After engine stalls, crank it two or three times to release all fuel pressure.
6. Turn ignition switch OFF.
7. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
8. Remove ignition coil and spark plug of the cylinder to be checked.
9. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
10. Connect spark plug and harness connector to ignition coil.
11. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
12. Crank engine for about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- **Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace malfunctioning ignition coil with power transistor.

Component Inspection (Condenser)

INFOID:0000000001056516

1. CHECK CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.

cardiagn.com

3. Check resistance between condenser terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
1 and 2	Above 1 MΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace condenser.

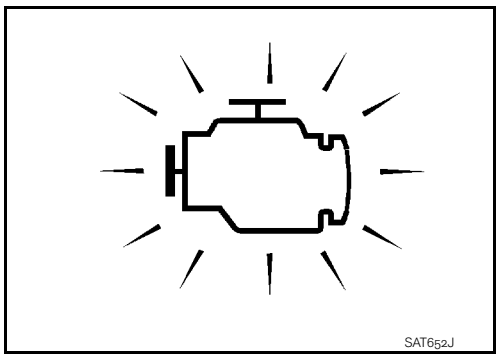
cardiagn.com

MALFUNCTION INDICATOR

Description

INFOID:0000000001056517

The Malfunction Indicator (MI) is located on the combination meter.
The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
When the engine is started, the MI should go off. If the MI remains on, the on board diagnostic system has detected an engine system malfunction.
For details, refer to EC-314, "Diagnosis Procedure".



Component Function Check

INFOID:0000000001056518

1.CHECK MI FUNCTION

1. Turn ignition switch ON.
2. Make sure that MI lights up.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-314, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056519

1.CHECK DTC

Check that DTC U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1001. Refer to EC-121, "Diagnosis Procedure".

2.CHECK COMBINATION METER

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

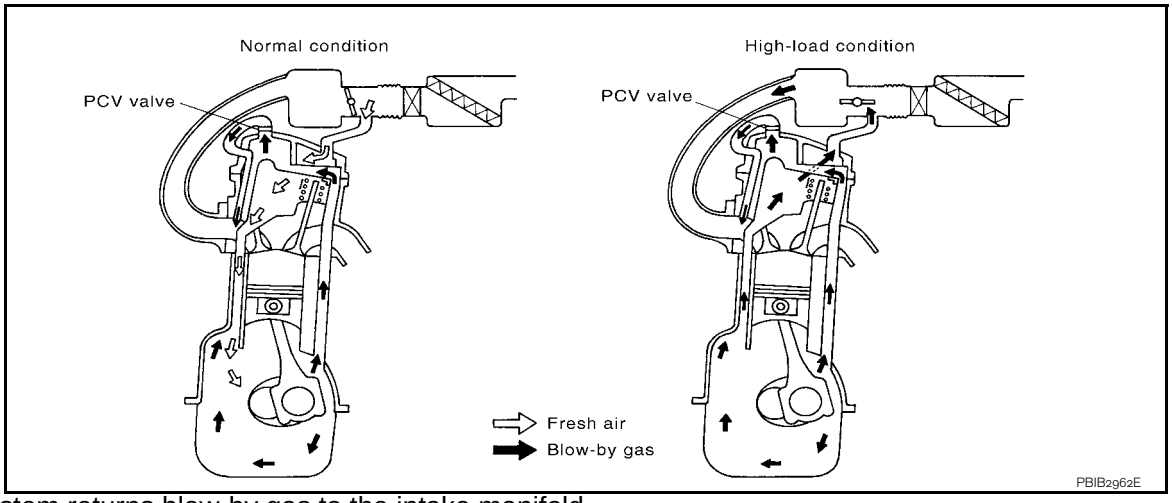
YES >> Replace combination meter.
NO >> Repair or replace.

cardiagn.com

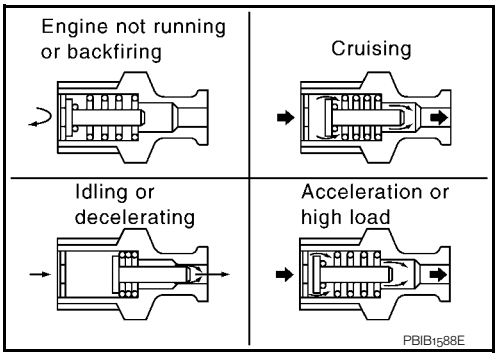
POSITIVE CRANKCASE VENTILATION

Description

INFOID:0000000001056524



This system returns blow-by gas to the intake manifold.
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.
Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.
The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.
Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.

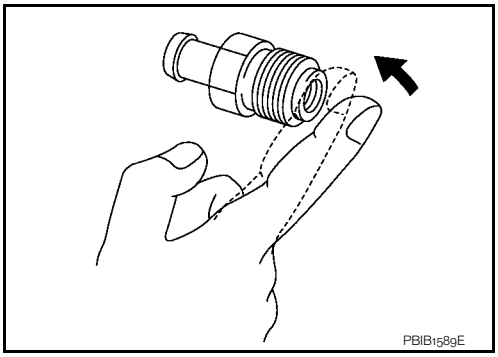


Component Inspection

INFOID:0000000001056525

1. CHECK PCV VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace PCV valve.

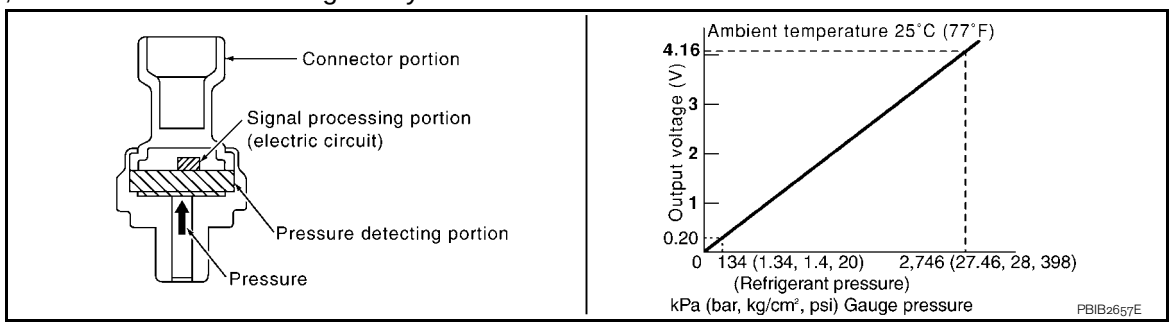
cardiagn.com

REFRIGERANT PRESSURE SENSOR

Description

INFOID:0000000001056526

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



Component Function Check

INFOID:0000000001056527

1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower fan switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F8	41 (Refrigerant pressure sensor signal)	Ground	1.0 - 4.0V

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-316, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001056528

1. CHECK GROUND CONNECTION

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine.
3. Turn ignition switch OFF.
4. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between refrigerant pressure sensor harness connector and ground.

Refrigerant pressure sensor		Ground	Voltage
Connector	Terminal		
E49	3	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

cardiagn.com

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E49	1	F8	48	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and refrigerant pressure sensor harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E49	2	F8	41	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor.
NO >> Repair or replace.

cardiagn.com

ECU DIAGNOSIS

ECM

Reference Value

INFOID:0000000001056529

VALUES ON THE DIAGNOSIS TOOL

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

*Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition		Values/Status
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.		Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-109, "Diagnosis Procedure".		
B/FUEL SCHDL	See EC-109, "Diagnosis Procedure".		
A/F ALPHA-B1	See EC-109, "Diagnosis Procedure".		
COOLAN TEMP/S	• Engine: After warming up		More than 70°C (158F)
HO2S1 (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds
HO2S2 MNTR (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		LEAN ←→ RICH
VHCL SPEED SE	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as speedometer indication
BATTERY VOLT	• Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN 1	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN 2	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
THRL SEN 1-B1	• Ignition switch: ON (Engine stopped) • Shift lever: 1st	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
THRL SEN 2-B1	• Ignition switch: ON (Engine stopped) • Shift lever:1st	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
START SIGNAL	• Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

cardiagn.com

Monitor Item	Condition		Values/Status
AIR COND SIG	• Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	• Ignition switch: ON	Shift lever: Neutral	ON
		Shift lever: Except above	OFF
PW/ST SIGNAL	• Engine: After warming up, idle the engine	Steering wheel: Not being turned	OFF
		Steering wheel: Being turned	ON
LOAD SIGNAL	• Ignition switch: ON	Rear window defogger switch: ON and/or Lighting switch: 2nd position	ON
		Rear window defogger switch and lighting switch: OFF	OFF
IGNITION SW	• Ignition switch: ON → OFF → ON		ON → OFF → ON
HEATER FAN SW	• Engine: After warming up, idle the engine	Heater fan switch: ON	ON
		Heater fan switch: OFF	OFF
BRAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	10° - 20° BTDC
		2,000 rpm	25° - 45° BTDC
CAL/ALD VALUE	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	1.0 - 4.0 g·m/s
		2,500 rpm	2.0 - 10.0 g·m/s
PURG VOL C/V	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	0%
		2,000 rpm	0% - 50%
INT/V TIM (B1)	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	–5° - 5°CA
		2,000 rpm	Approx. 0° - 40°CA
INT/V SOL (B1)	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	0% - 2%
		2,000 rpm	Approx. 0% - 90%
AIR COND RLY	• Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	• For 1 seconds after turning ignition switch: ON • Engine running or cranking		ON
	• Except above		OFF
THRTL RELAY	• Ignition switch: ON		ON

cardiagn.com

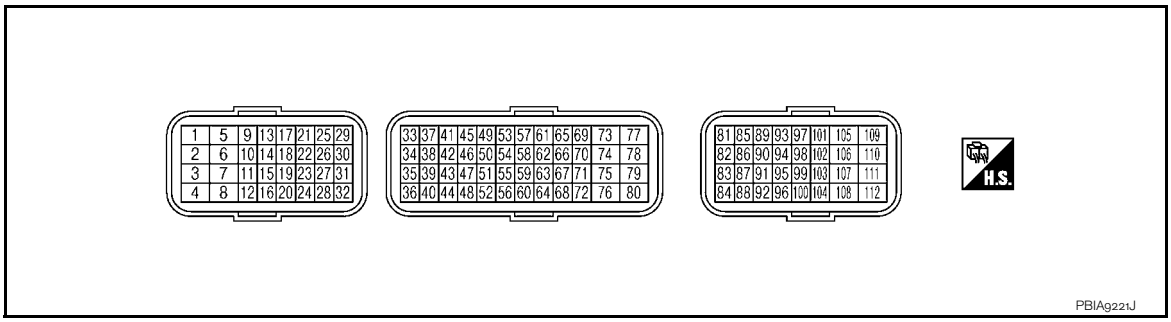
Monitor Item	Condition		Values/Status
COOLING FAN	• Engine: After warning up, idle the engine • Air conditioner switch: OFF	Engine coolant temperature is 98°C (208F) or less	OFF
		Engine coolant temperature is between 98°C (208°F) and 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH
HO2S1 HTR (B1)	• Engine: After warming up • Engine speed: Below 3,600rpm		ON
	• Engine speed: Above 3,600 rpm		OFF
HO2S2 HTR (B1)	• Engine speed: Below 3,900 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		ON
VEHICLE SPEED	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as the speedometer indication
IDL A/V LEARN	• Engine: running	Idle air volume learning has not been performed yet.	YET
		Idle air volume learning has already been performed successfully.	CMPLT
TRVL AFTER MIL	• Ignition switch: ON	Vehicle has traveled after MI has turned ON.	0 - 65,535 km (0 - 40,723 miles)
O2 SEN HTR DTY	• Engine coolant temperature when engine started: More than 80°C (176 − F) • Engine speed: Below 3,600 rpm		Approx. 30%
AC PRESS SEN	• Engine: Idle • Both A/C switch and blower fan switch: ON (Compressor operates)		1.0 - 4.0V
VHCL SPEED SE	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as the speedometer indication
SET VHCL SPD	• Engine: Running	ASCD: Operating	The preset vehicle speed is displayed
MAIN SW	• Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	Brake pedal and clutch pedal: Fully released	ON
		Brake pedal and/or clutch pedal: Slightly depressed	OFF
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
VHCL SPD CUT	• Ignition switch: ON		NON
LO SPEED CUT	• Ignition switch: ON		NON
AT OD MONITOR	• Ignition switch: ON		OFF
AT OD CANCEL	• Ignition switch: ON		OFF
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at the 1st time → at the 2nd time	ON → OFF

cardiagn.com

Monitor Item	Condition		Values/Status
SET LAMP	• MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

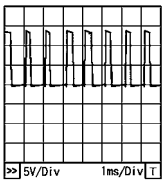
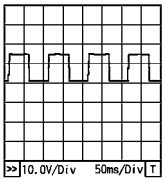
TERMINAL LAYOUT



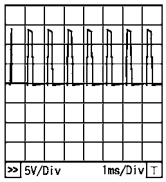
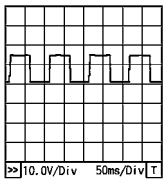
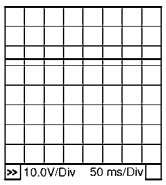
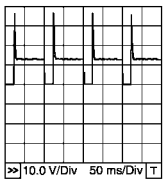
PHYSICAL VALUES

NOTE:
- ECM is located in the engine room left side near battery.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

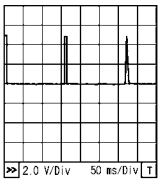
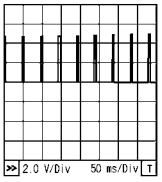
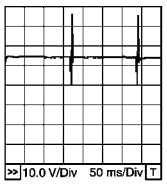
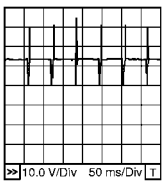
CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/Output	Condition	Value (Approx.)
1	Ground	L/W	Throttle control motor (Open)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully depressed	3.2V★  PBIA8150J
2	Ground	R/Y	Throttle control motor relay power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
3	Ground	LG/R	Heated oxygen sensor 1 heater	Output	[Engine is running] • Warm up condition • Engine speed: Below 3,600 rpm	Approximately 3.2V★  PBIA8148J
					[Engine is running] • Warm-up condition • Idle speed [Engine is running] • Engine speed: Above 3,600 rpm	BATTERY VOLTAGE (11 - 14V)

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
4	Ground	P	Throttle control motor (Close)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully released	0 - 14V★  PBIA8149J
5	Ground	R	Heated oxygen sensor 2 heater	Output	[Engine is running] • Engine speed: Below 3,900 rpm after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	10V★  PBIA8148J
					[Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: Above 3,900 rpm	BATTERY VOLTAGE (11 - 14V)
9	Ground	W/B	EVAP canister purge volume control solenoid valve	Output	[Engine is running] • Idle speed	BATTERY VOLTAGE (11 - 14V)★  PBIB0050E
					[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.)	BATTERY VOLTAGE (11 - 14V)★  PBIB0520E
10 11	Ground	B B/W	ECM ground	—	[Engine is running] • Idle speed	Body ground
15	Ground	G/L	Throttle control motor relay	Output	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)
					[Ignition switch: ON]	0 - 1.0V

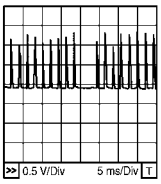
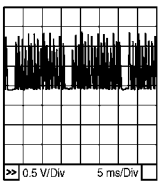
cardiagn.com

Terminal No. +	Terminal No. −	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
17 18 21 22	Ground	L/Y BR/Y R/G SB	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 3	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 0.3V★  PBIAg265J
					[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	0.2 - 0.5V★  PBIAg266J
23	Ground	B/O	Fuel pump relay	Output	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0V
					[Ignition switch: ON] • More than a few seconds after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)
25 29 30 31	Ground	R/O Y O L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14V)★  PBIB0529E
					[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★  PBIA4943J
32	Ground	Y/L	ECM relay (Self shut-off)	Output	[Engine is running] [Ignition switch: OFF] • A few seconds after turning ignition switch OFF	0 - 1.0V
					[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)

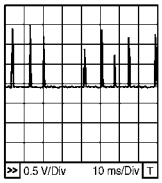
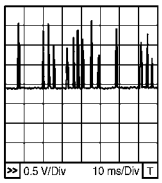
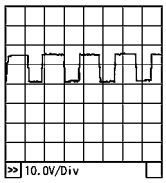
cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
33	Ground	L/R	Throttle position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully released	More than 0.36V
					[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully depressed	Less than 4.75V
34	Ground	L/O	Throttle position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully released	Less than 4.75V
					[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully depressed	More than 0.36V
36	Ground	V/W	Sensor ground (Throttle position sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
37	Ground	W	Knock sensor	Input	[Engine is running] • Idle speed	2.5V
38	Ground	GR/B	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with engine coolant temperature.
40	Ground	—	Sensor ground (Knock sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
41	Ground	G/P	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0V
44	Ground	B	Sensor ground (Engine coolant temperature sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
45	Ground	BR	Mass air flow sensor	Input	[Ignition switch ON] • Engine stopped	0.4V
					[Engine is running] • Warm-up condition • Idle speed	1.0 - 1.3V
					[Engine is running] • Warm-up condition • Engine is revving from idle to about 4,000 rpm	1.0 - 1.3 to 2.4V (Check for linear voltage rise in response to engine being increased to about 4,000 rpm.)
46	Ground	V	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with intake air temperature.
48	Ground	R/L	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
49	Ground	L/G	Heated oxygen sensor 1	—	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0 - 1.0V (Periodically change)
50	Ground	Y	Heated oxygen sensor 2	Input	[Engine is running] • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - 1.0V
52	Ground	LG	Sensor ground (Mass air flow sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
55	Ground	O	Sensor power supply (Intake air temperature sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
56	Ground	P	Sensor ground (Heated oxygen sensor 1)	—	[Engine is running] • Warm-up condition • Idle speed	0V
59	Ground	SB	Sensor ground (Heated oxygen sensor 2)	—	[Engine is running] • Warm-up condition • Idle speed	0V
61	Ground	LG/B	Crankshaft position sensor (POS)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 1.0V★  MBIB1453E
					[Engine is running] • Engine speed: 2,000 rpm	0 - 1.0V★  MBIB1454E
62	Ground	GR/L	Sensor ground [Crankshaft position sensor (POS)]	—	[Engine is running] • Warm-up condition • Idle speed	0V
63	Ground	L	Sensor ground [Camshaft position sensor (PHASE)]	—	[Engine is running] • Warm-up condition • Idle speed	0V

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
65	Ground	G	Camshaft position sensor (PHASE)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 1.0V★  MBIB1455E
					[Engine is running] • Engine speed is 2,000 rpm	0 - 1.0V★  MBIB1456E
69	Ground	W/B	Neutral position switch	Input	[Ignition switch: ON] • Neutral	BATTERY VOLTAGE (11 - 14V)
					[Ignition switch: ON] • Shift lever: Except above position	0V
72	Ground	V/R	Sensor power supply (Throttle position sensor)	—	[Ignition switch: ON]	5V
73	Ground	Y/R	Intake valve timing control solenoid valve	Output	[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14V)
					[Engine is running] • Warm-up condition • Engine speed: 2,000rpm	7 - 10V★  PBIA4937J
74	Ground	Y/W	Sensor power supply (Refrigerant pressure sensor)	—	[Ignition switch: ON]	5V
75	Ground	L/W	Sensor power supply [Crankshaft position sensor (POS)]	—	[Ignition switch: ON]	5V
78	Ground	Y/V	Sensor power supply [Camshaft position sensor (PHASE)]	—	[Ignition switch: ON]	5V
83	Ground	P	CAN communication line	Input/ Output	—	—
84	Ground	L	CAN communication line	Input/ Output	—	—
88	Ground	O	Data link connector	Input/ Output	[Ignition switch: ON] • CONSULT-III or GST: Disconnected	2.7V
93	Ground	W/L	Ignition switch	Input	[Ignition switch: OFF]	0V
					[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

cardiagn.com

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
94	Ground	V	ASCD steering switch	Input	[Ignition switch: ON] • ASCD steering switch: OFF	4V
					[Ignition switch: ON] • CANCEL switch: Pressed	1V
					[Ignition switch: ON] • MAIN switch: Pressed	0V
					[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	3V
					[Ignition switch: ON] • SET/COAST switch: Pressed	2V
95	Ground	B	Sensor ground (ASCD steering switch)	—	[Engine is running] • Warm-up condition • Idle speed	0V
99	Ground	R/W	Stop lamp switch	Input	[Ignition switch: OFF] • Brake pedal: Fully released	0V
					[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
100	Ground	R	ASCD brake switch	Input	[Ignition switch: ON] • Brake pedal and clutch pedal: Slightly depressed	0V
					[Ignition switch: ON] • Brake pedal and/or clutch pedal: Fully released	BATTERY VOLTAGE (11 - 14V)
102	Ground	BR	Sensor power supply (Accelerator pedal position sensor 2)	—	[Ignition switch: ON]	5V
103	Ground	GR	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6V
					[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4V
104	Ground	Y	Sensor ground (Accelerator pedal position sensor 2)	—	[Engine is running] • Warm-up condition • Idle speed	0V
105	Ground	G	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
106	Ground	V	Sensor power supply (Accelerator pedal position sensor 1)	—	[Ignition switch: ON]	5V
108	Ground	B	ECM ground	—	[Engine is running] • Idle speed	Body ground

cardiagn.com

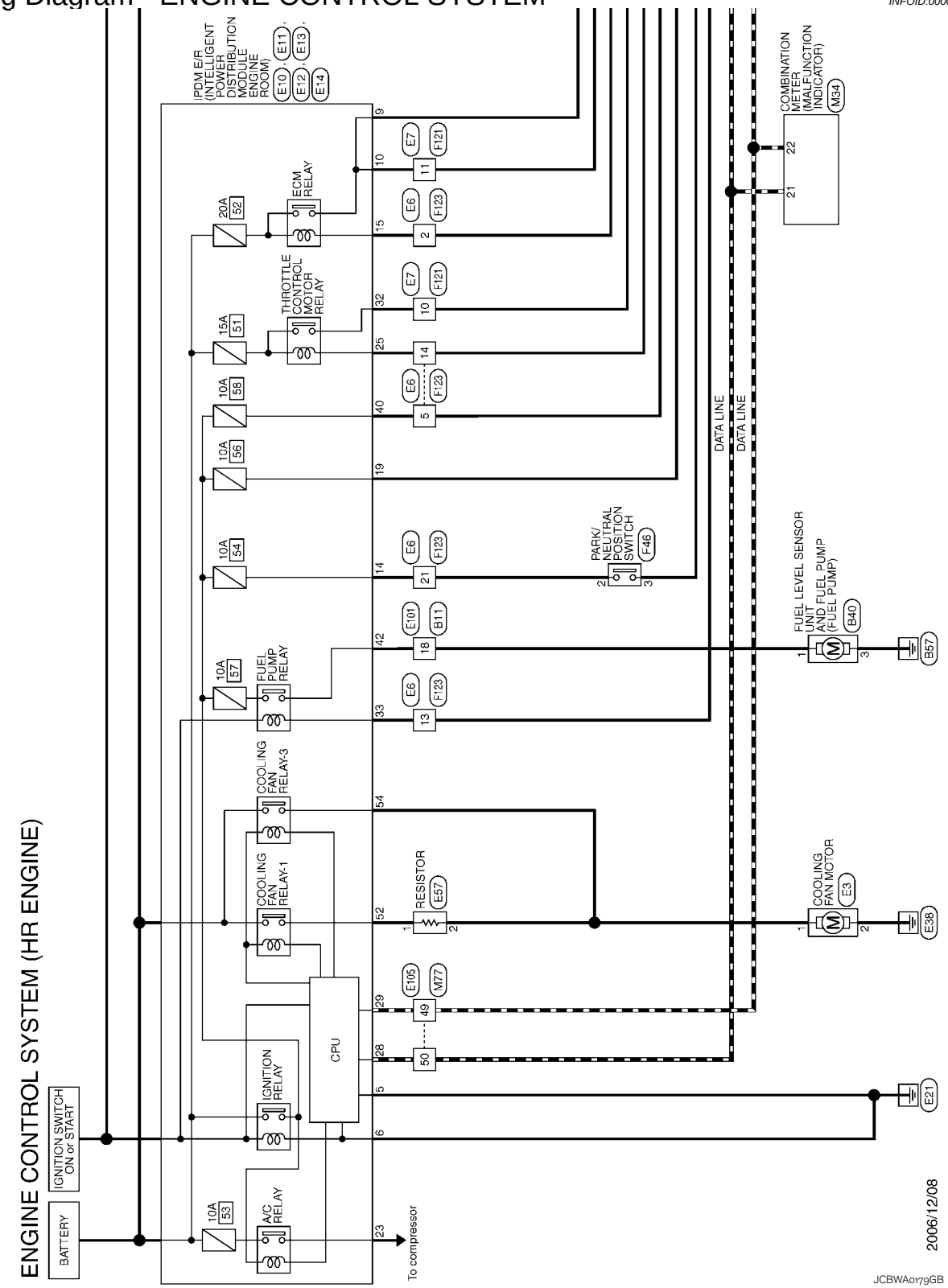
Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
110	Ground	G	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9V
					[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7V
111	Ground	R	Sensor ground (Accelerator pedal position sensor 1)	—	[Engine is running] • Warm-up condition • Idle speed	0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

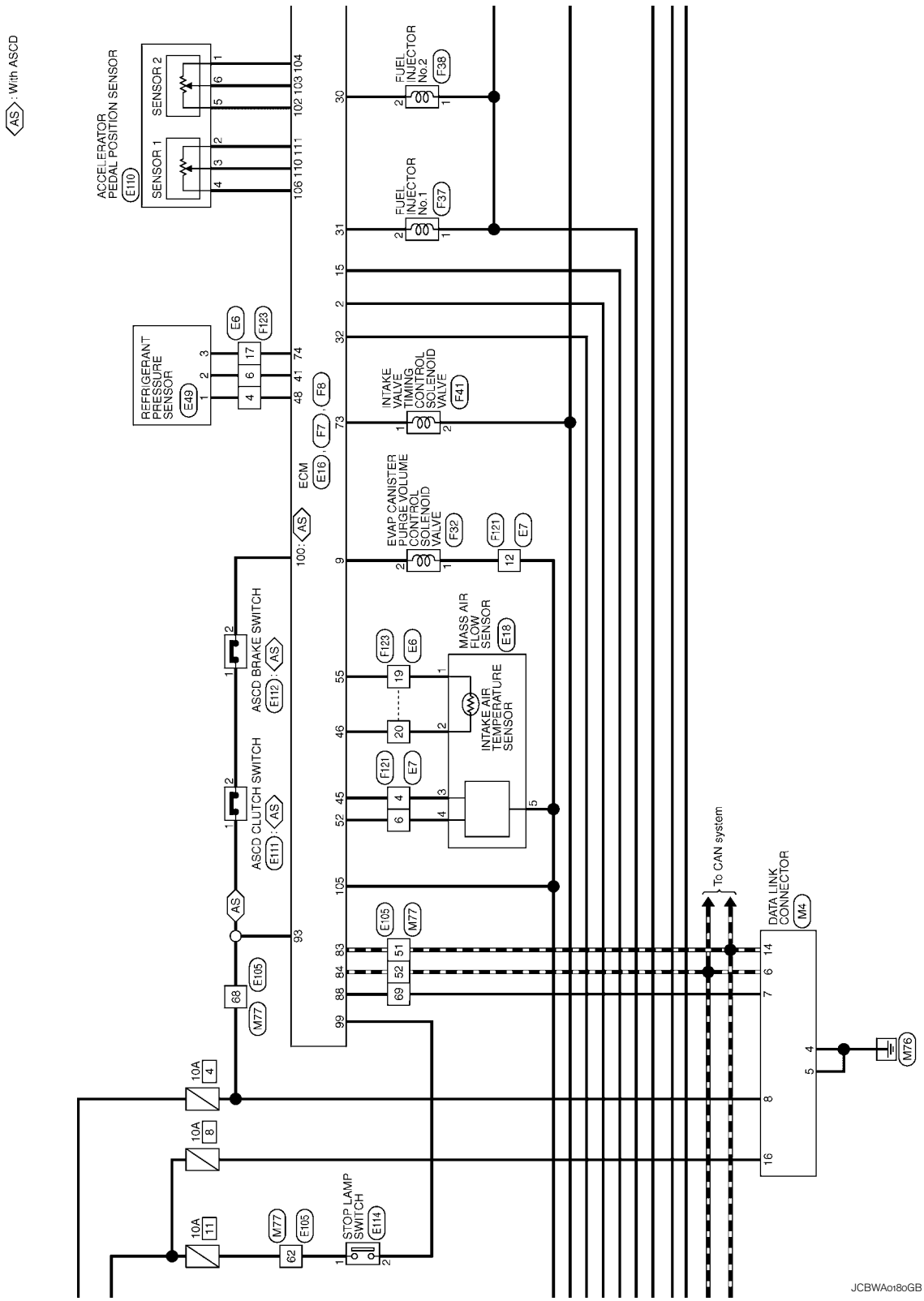
cardiagn.com

Wiring Diagram - ENGINE CONTROL SYSTEM -

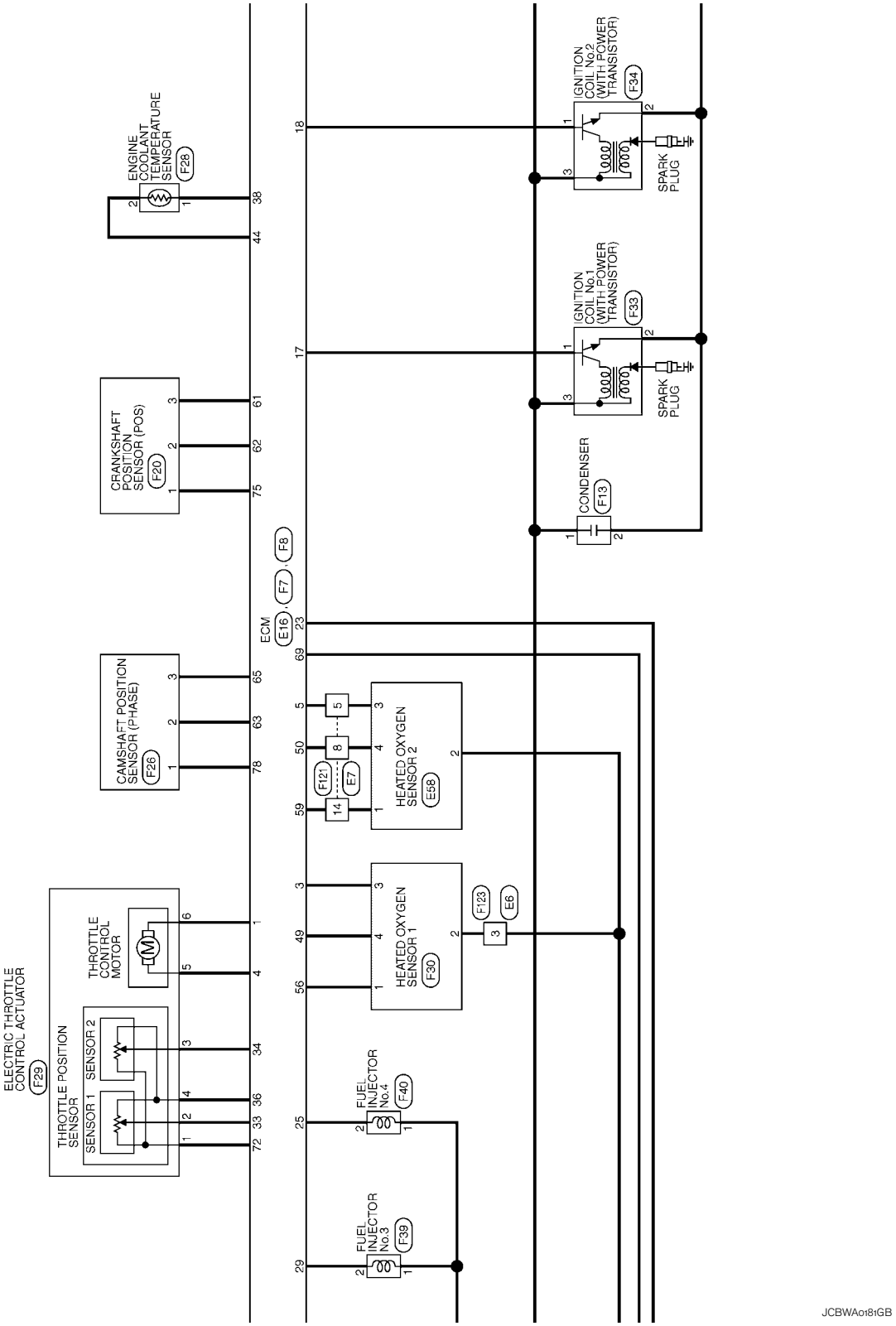
INFOID:0000000001056530



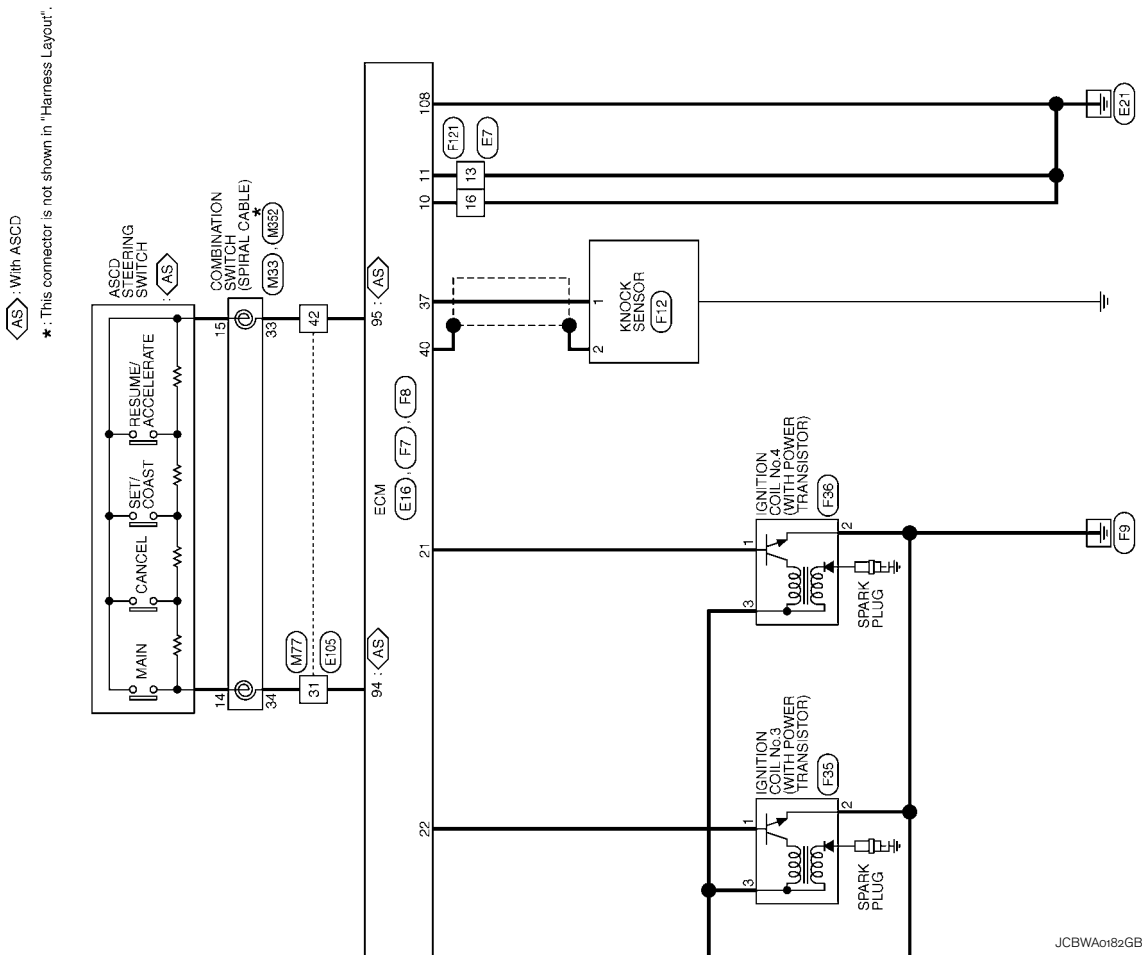
cardiagn.com



cardiagn.com

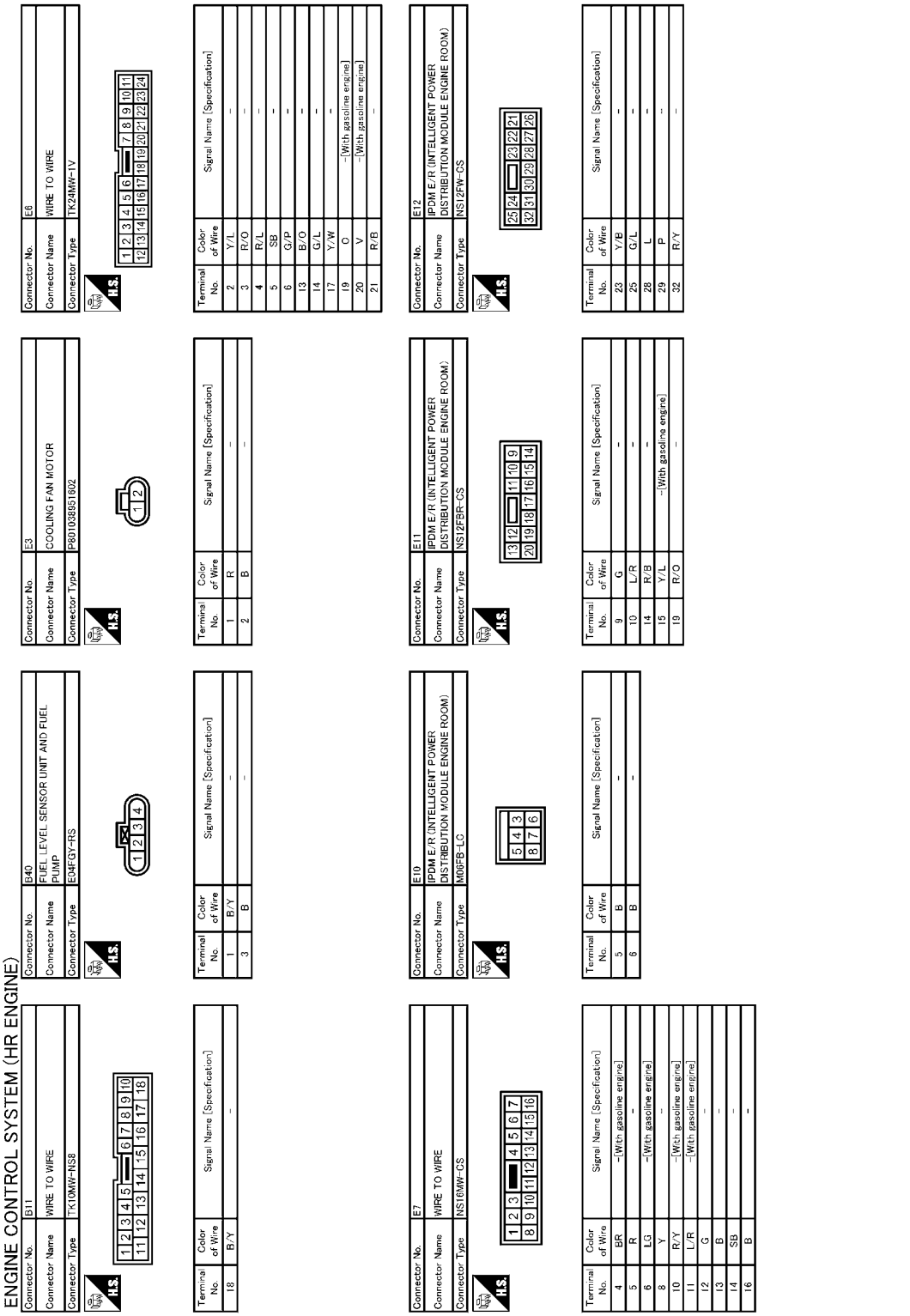


cardiagn.com



cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)



JCBWA0183GB

cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

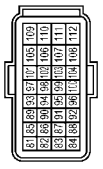
Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
33	B/O	–
40	BR/Y	–[With HR engine]
42	B/Y	–

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7263-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
52	W	–
54	R	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-ME48-LH



Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-LI
84	L	CAN-HI
88	O	K-LINE
93	W/L	IGN SW
94	V	ASCD STRG SW
95	B	GND-ASCD STRG SW
99	R/W	BRAKE
100	R	BNCSW(BNC)
102	BR	AVCC-APS2[With HR engine]
103	GR	APS2
104	Y	GND-A-APS2[With HR engine]

105	G	VBR
106	V	AVCC-APS1[With HR engine]
108	B	GND
110	G	APS1[With HR engine]
111	R	GND-A-APS1[With HR engine]

Connector No.	E18
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH05FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–
3	BR	–
4	LG	–
5	G	–

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	–
2	G/P	–
3	Y/W	–

Connector No.	E57
Connector Name	RESISTOR
Connector Type	P801038951602

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	R	–

Connector No.	E58
Connector Name	HEATED OXYGEN SENSOR 2
Connector Type	AF204FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	R/O	–
3	R	–
4	Y	–

JCBWA0184GB

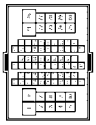
cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

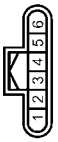
Terminal No.	Color of Wire	Signal Name [Specification]
18	B/Y	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
31	V	–
42	B	–
49	P	–
50	L	–
51	P	–
52	L	–
62	V	–
68	W/L	–
69	O	–

Connector No.	E110
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RH06FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	– [With HR engine]
2	R	– [With HR engine]
3	G	– [With HR engine]
4	V	– [With HR engine]
5	BR	– [With HR engine]
6	GR	– [Except K9K engine]

Connector No.	E111
Connector Name	ASCD CLUTCH SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/L	– [With gasoline engine]
2	O	– [With gasoline engine]

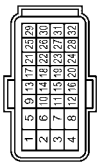
Connector No.	E112
Connector Name	ASCD BRAKE SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	– [With M/T]
1	W/L	– [With CVT]
2	R	–

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–

Connector No.	F7
Connector Name	ECM
Connector Type	MAA24FGY-MEA8-RH



Terminal No.	Color of Wire	Signal Name [Specification]
1	L/W	MOTOR1
2	R/Y	VMOT
3	LG/R	O2HF[With HR engine]
4	P	MOTOR2
5	R	O2HR
9	W/B	EVAP
10	B	GND
11	B/W	GND
15	G/L	MOTRLY
17	L/Y	IGN COIL#1
18	BR/Y	IGN COIL#2
21	R/G	IGN COIL#4
22	Sb	IGN COIL#3[With HR engine]
23	B/O	FPR
25	R/O	INJ#4
29	Y	INJ#3[With HR engine]
30	O	INJ#2[With HR engine]
31	L	INJ#1
32	Y/L	SSOFF

JCBWA0185GB

cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

Connector No.	F8
Connector Name	ECM
Connector Type	MA440FBR-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
33	L/R	TPS1[With HR engine]
34	L/O	TPS2[With HR engine]
36	V/W	GND-A TPS[With HR engine]
37	W	KNK
38	GR/B	TW[With HR engine]
40	SHIELD	GND-A KNK
41	G/P	PDPRESS
44	B	GND-A TW[With HR engine]
45	BR	GA+
46	V	TA
48	R/L	GND-A(PDPRES)

Terminal No.	Color of Wire	Signal Name [Specification]
49	L/G	O2SF[With HR engine]
50	Y	O2SR
52	LG	GA-
55	O	GND-TA
56	P	GND-A O2SF[With HR engine]
59	SB	O2SR-GND
61	LG/B	POS
62	GR/L	GND-POS[With HR engine]
63	L	GND-(A)-PHASE[With HR engine]
65	G	PHASE[With HR engine]
69	W/B	NEUT HIGH
72	V/R	AVCC-TPS[With HR engine]
73	Y/R	CYTC
74	Y/W	AVCC(PDPRES)
75	L/W	POS AVCC
76	Y/V	PHASE AVCC

Connector No.	F20
Connector Name	CRANKSHAFT POSITION SENSOR (POS)
Connector Type	RH03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/W	-
2	GR/L	-[With HR engine]
3	LG/B	-

Connector No.	F26
Connector Name	CAMSHAFT POSITION SENSOR (PHASE)
Connector Type	RH03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/V	-
2	L	-[With HR engine]
3	G	-[With HR engine]

Connector No.	F12
Connector Name	KNOCK SENSOR
Connector Type	BS02FB-AHY-S

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B/W	-

Connector No.	F28
Connector Name	ENGINE COOLANT TEMPERATURE SENSOR
Connector Type	E02FGY-RS

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR/B	-[With HR engine]
2	B	-[With HR engine]

Connector No.	F13
Connector Name	CONDENSER
Connector Type	MG2FW-GY-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/R	-
2	B	-

Connector No.	F29
Connector Name	ELECTRIC THROTTLE CONTROL ACTUATOR
Connector Type	RH06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V/R	-[With HR engine]
2	L/R	-[With HR engine]
3	L/O	-[With HR engine]
4	V/W	-[With HR engine]
5	P	-
6	L/W	-

JCBWA0186GB

cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

Connector No.	F30
Connector Name	HEATED OXYGEN SENSOR 1
Connector Type	AFZ04FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	– [With HR engine]
2	R/O	–
3	LG/R	– [With HR engine]
4	L/G	– [With HR engine]

Connector No.	F32
Connector Name	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
Connector Type	E02FL-RS-LGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	W/B	–

Connector No.	F33
Connector Name	IGNITION COIL No.1 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/Y	–
2	B	–
3	L/R	–

Connector No.	F34
Connector Name	IGNITION COIL No.2 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR/Y	–
2	B	–
3	L/R	–

Connector No.	F35
Connector Name	IGNITION COIL No.3 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	– [With HR engine]
2	B	–
3	L/R	–

Connector No.	F36
Connector Name	IGNITION COIL No.4 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/G	–
2	B	–
3	L/R	–

Connector No.	F37
Connector Name	FUEL INJECTOR No.1
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	L	–

Connector No.	F38
Connector Name	FUEL INJECTOR No.2
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	– [With HR engine]

JCBWA0187GB

cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

Connector No.	F39
Connector Name	FUEL INJECTOR No.3
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	Y	–[With HR engine]

Connector No.	F40
Connector Name	FUEL INJECTOR No.4
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	R/O	–

Connector No.	F41
Connector Name	INTAKE VALVE TIMING CONTROL SOLENOID VALVE
Connector Type	E02FG-RS-LGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/R	–
2	L/R	–

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/B	–
3	W/B	–

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	BR	–[With gasoline engine]
5	R	–
6	LG	–[With gasoline engine]
8	Y	–
10	R/Y	–[With gasoline engine]
11	L/R	–[With gasoline engine]
12	G	–
13	B	–
14	SB	–
16	B	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	Y/L	–
3	R/O	–
4	R/L	–
5	SB	–
6	G/P	–
13	B/O	–
14	G/L	–
17	Y/W	–
19	O	–[With gasoline engine]
20	V	–[With gasoline engine]
21	R/B	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	B	–
5	B	–
6	L	–
7	O	–
8	W	–
14	P	–
16	Y	–

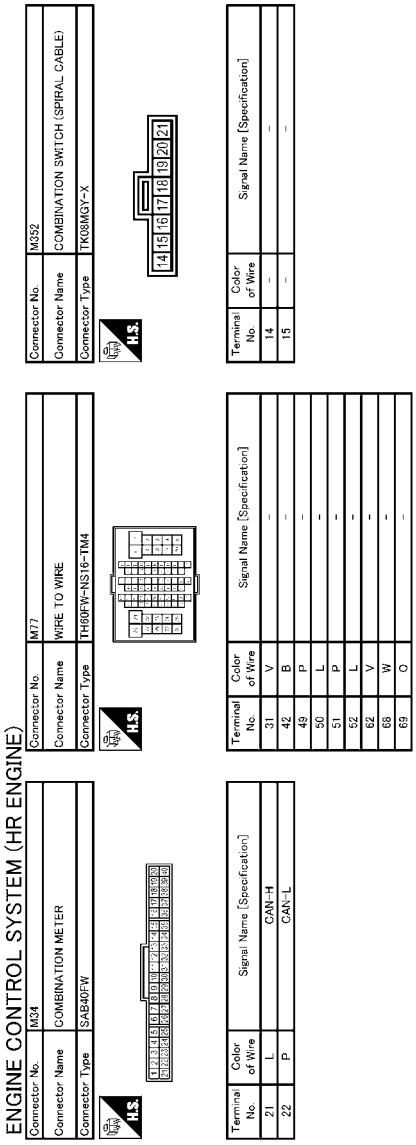
Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
33	B	–
34	V	–

JCBWA0188GB

cardiagn.com



JCBWA0189GB

Fail Safe

INFOID:0000000001056531

NON DTC RELATED ITEM

cardiagn.com

Engine operating condition in fail-safe mode	Detected items	Remarks	Reference page
Engine speed will not rise more than 2,500 rpm due to the fuel cut	Malfunction indicator lamp circuit	When there is an open circuit on MI circuit, the ECM cannot warn the driver by lighting up MI when there is malfunction on engine control system. Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MI circuit is open by means of operating fail-safe function. The fail-safe function also operates when above diagnoses except MI circuit are detected and demands the driver to repair the malfunction.	EC-314

DTC RELATED ITEM

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0011	Intake valve timing control	The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.	
P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
P0117 P0118	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-III displays the engine coolant temperature decided by ECM.	
		Condition	Engine coolant temperature decided (CONSULT-III display)
		Just as ignition switch is turned ON or START	40°C (104°F)
		More than approx. 4 minutes after ignition ON or START	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.	
P0605	ECM	(When ECM calculation function is malfunctioning:) ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation.	
P1121	Electric throttle control actuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.	
		(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.	
		(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in Neutral position, and engine speed will not exceed 1,000 rpm or more.	
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	
P1124 P1126	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	

cardiagn.com

DTC No.	Detected items	Engine operating condition in fail-safe mode
P1128	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1229	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1805	Brake switch	ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor. Vehicle condition: Driving condition When engine is idling: Normal When accelerating: Poor acceleration
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Inspection Priority Chart

INFOID:0000000001056532

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	• U1001 CAN communication line • U1010 CAN communication • P0102 P0103 Mass air flow sensor • P0112 P0113 Intake air temperature sensor • P0117 P0118 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0500 Vehicle speed sensor • P0605 ECM • P1229 Sensor power supply • P1610 - P1615 NATS • P1706 Park/neutral position (PNP) switch • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	• P0132 P0133 P0134 P1143 P1144 Heated oxygen sensor 1 • P0135 Heated oxygen sensor 1 heater • P0138 P0139 P1146 P1147 Heated oxygen sensor 2 • P0141 Heated oxygen sensor 2 heater • P0444 EVAP canister purge volume control solenoid valve • P1065 ECM • P1111 Intake valve timing control solenoid valve • P1122 Electric throttle control function • P1124 P1126 Throttle control motor relay • P1128 Throttle control motor • P1217 Engine over temperature (OVERHEAT) • P1805 Brake switch • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD vehicle speed sensor
3	• P0011 Intake valve timing control • P0171 P0172 Fuel injection system function • P0300 - P0304 Misfire • P0420 Three way catalyst function • P1121 Electric throttle control actuator • P1212 ESP communication line

DTC Index

INFOID:0000000001056533

cardiagn.com

×:Applicable —: Not applicable

DTC*1		Items (CONSULT-III screen terms)	SRT code	Test value/ Test limit (GST only)	Trip	MI	Reference page
CONSULT-III GST*2	ECM*3						
U1001	1001*4	CAN COMM CIRCUIT	—	—	2	—	EC-121
U1010	1010	CONTROL UNIT(CAN)	—	—	2	—	EC-122
P0000	**0000**	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	—	—	—	**Flashing***7	**—**
P0011	0011	INT/V TIM CONT-B1	—	—	2	—	EC-123
P0102	0102	MAF SEN/CIRCUIT-B1	—	—	1	×	EC-127
P0103	0103	MAF SEN/CIRCUIT-B1	—	—	1	×	EC-127
P0112	0112	IAT SEN/CIRCUIT-B1	—	—	2	×	EC-132
P0113	0113	IAT SEN/CIRCUIT-B1	—	—	2	×	EC-132
P0117	0117	ECT SEN/CIRC	—	—	1	×	EC-135
P0118	0118	ECT SEN/CIRC	—	—	1	×	EC-135
P0122	0122	TP SEN 2/CIRC-B1	—	—	1	×	EC-138
P0123	0123	TP SEN 2/CIRC-B1	—	—	1	×	EC-138
P0132	0132	HO2S1 (B1)	—	×	2	×	EC-141
P0133	0133	HO2S1 (B1)	×	×	2	×	EC-145
P0134	0134	HO2S1 (B1)	—	×	2	×	EC-151
P0135	0135	HO2S1 HTR (B1)	×	×	2	×	EC-156
P0138	0138	HO2S2 (B1)	×	×	2	×	EC-159
P0139	0139	HO2S2 (B1)	×	×	2	×	EC-164
P0141	0141	HO2S2 HTR (B1)	×	×	2	×	EC-171
P0171	0171	FUEL SYS-LEAN-B1	—	—	2	×	EC-174
P0172	0172	FUEL SYS-RICH-B1	—	—	2	×	EC-178
P0222	0222	TP SEN 1/CIRC-B1	—	—	1	×	EC-182
P0223	0223	TP SEN 1/CIRC-B1	—	—	1	×	EC-182
P0300	0300	MULTICYL MISFIRE	—	—	2	×	EC-185
P0301	0301	CYL 1 MISFIRE	—	—	2	×	EC-185
P0302	0302	CYL 2 MISFIRE	—	—	2	×	EC-185
P0303	0303	CYL 3 MISFIRE	—	—	2	×	EC-185
P0304	0304	CYL 4 MISFIRE	—	—	2	×	EC-185
P0327	0327	KNOCK SEN/CIRC-B1	—	—	2	—	EC-191
P0328	0328	KNOCK SEN/CIRC-B1	—	—	2	—	EC-191
P0335	0335	CKP SEN/CIRCUIT	—	—	2	×	EC-193
P0340	0340	CMP SEN/CIRC-B1	—	—	2	×	EC-197
P0420	0420	TW CATALYST SYS-B1	×	×	2	×	EC-201
P0444	0444	PURG VOLUME CONT/V	—	—	2	×	EC-206
P0500	0500	VEH SPEED SEN/CIRC*5	—	—	2	×	EC-209
P0605	0605	ECM	—	—	1 or 2	× or —	EC-211
P1065	1065	ECM BACK UP/CIRCUIT	—	—	2	×	EC-213
P1111	1111	INT/V TIM C/CIRC	—	—	1	×	EC-215
P1121	1121	ETC ACTR-B1	—	—	1	×	EC-217

cardiagn.com

DTC*1		Items (CONSULT-III screen terms)	SRT code	Test value/ Test limit (GST only)	Trip	MI	Reference page
CONSULT-III GST*2	ECM*3						
P1122	1122	ETC FUNCTION/CIRC-B1	—	—	1	×	EC-219
P1124	1124	ETC MOT PWP	—	—	1	×	EC-223
P1126	1126	ETC MOT PWP-B1	—	—	1	×	EC-223
P1128	1128	ETC MOT-B1	—	—	1	×	EC-226
P1143	1143	HO2S1 (B1)	×	×	2	×	EC-228
P1144	1144	HO2S1 (B1)	×	×	2	×	EC-233
P1146	1146	HO2S2 (B1)	×	×	2	×	EC-238
P1147	1147	HO2S2 (B1)	×	×	2	×	EC-245
P1212	1212	TCS/CIRC	—	—	2	—	EC-252
P1217	1217	ENG OVER TEMP	—	—	1	×	EC-253
P1225	1225	CTP LEARNING-B1	—	—	2	—	EC-257
P1226	1226	CTP LEARNING-B1	—	—	2	—	EC-259
P1229	1129	SENSOR POWER/CIRC	—	—	1	×	EC-261
P1564	1564	ASCD SW	—	—	1	—	EC-263
P1572	1572	ASCD BRAKE SW	—	—	1	—	EC-266
P1574	1574	ASCD VHL SPD SEN	—	—	1	—	EC-272
P1610	1610	LOCK MODE	—	—	2	—	SEC-14
P1611	1611	ID DISCARD IMM-ECM	—	—	2	—	SEC-14
P1612	1612	CHAIN OF ECM-IMMU	—	—	2	—	SEC-14
P1615	1615	DIFFERENCE OF KEY	—	—	2	—	SEC-14
P1706	1706	P-N POS SW/CIRCUIT	—	—	2	×	EC-274
P1805	1805	BRAKE SW/CIRCUIT	—	—	2	—	EC-277
P2122	2122	APP SEN 1/CIRC	—	—	1	×	EC-280
P2123	2123	APP SEN 1/CIRC	—	—	1	×	EC-280
P2127	2127	APP SEN 2/CIRC	—	—	1	×	EC-283
P2128	2128	APP SEN 2/CIRC	—	—	1	×	EC-283
P2135	2135	TP SENSOR-B1	—	—	1	×	EC-287
P2138	2138	APP SENSOR	—	—	1	×	EC-290

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by 15031-5.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

*4: The troubleshooting for this DTC needs CONSULT-III.

*5: When the fail-safe operations for both self-diagnoses occur, the MI illuminates.

*6: SRT code will not be set if the self-diagnostic result is NG.

*7: When the ECM is in the mode of displaying SRT status, MI may flash. For the details, refer to “How to Display SRT Status”.

How to Set SRT Code

INFOID:0000000001056534

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

WITH CONSULT-III

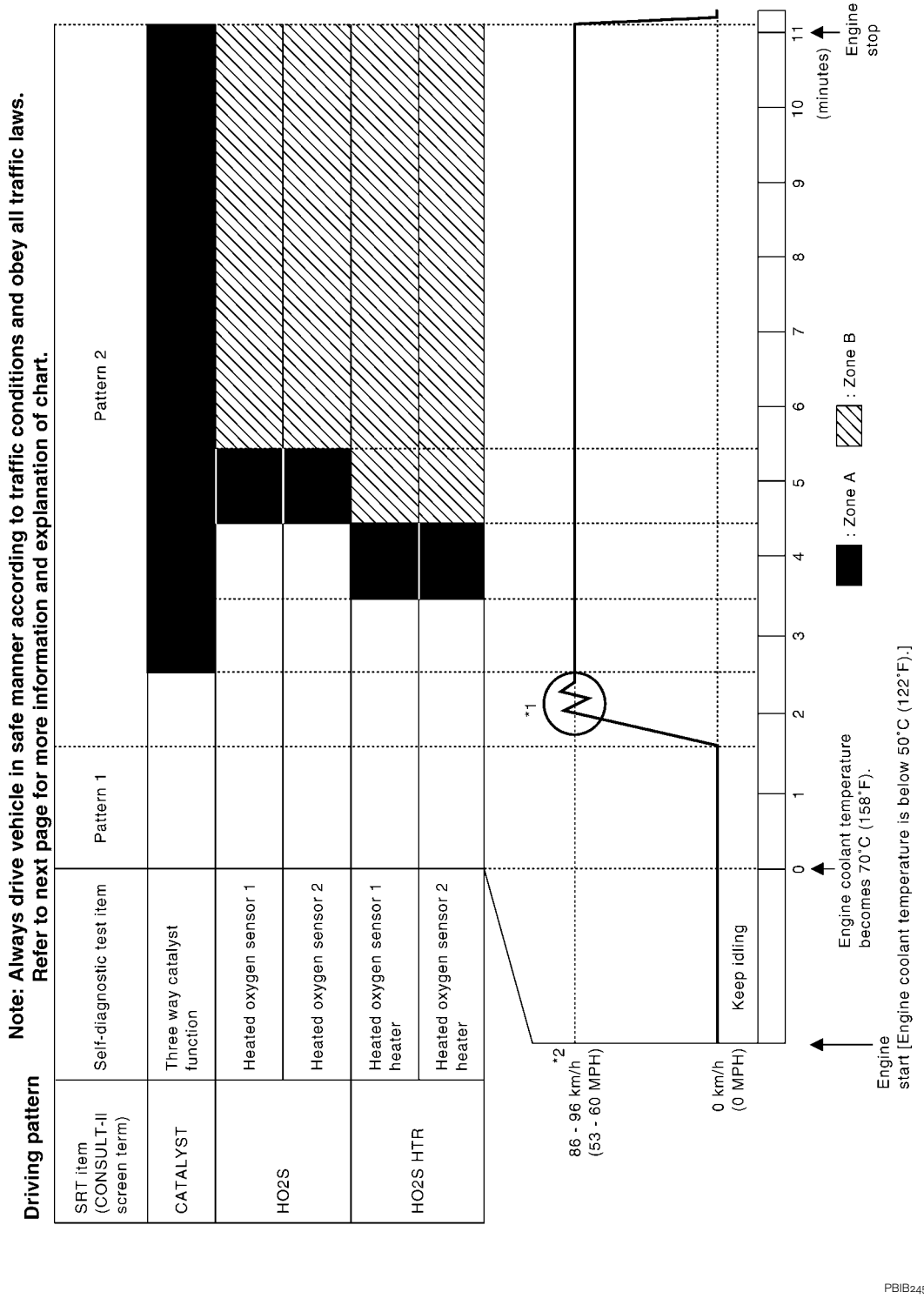
Perform corresponding DTC CONFIRMATION PROCEDURE one by one based on Performance Priority in the table on “SRT Item”.

WITHOUT CONSULT-III

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

cardiagn.com

DRIVING PATTERN



- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
  Zone A refers to the range where the time, required for the diagnosis under normal conditions*, is the shortest.
  Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

cardiagn.com

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.
  Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of −10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 38 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 38 and ground is lower than 1.4V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.
*2: Checking the vehicle speed with GST is advised.

Test Value and Test Limit

INFOID:0000000001056535

The following is the information specified in Service $06 of ISO 15031-5.
The test value is a parameter used to determine whether a system/circuit diagnostic test is OK or NG while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.
These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

Item	Self-diagnostic test item	DTC	Test value (GST display)		Test limit
			TID	CID	
CATALYST	Three way catalyst function	P0420	01H	81H	Min.
		P0420	02H	81H	Min.
HO2S	Heated oxygen sensor 1	P0133	09H	04H	Max.
		P1143	0AH	84H	Min.
		P1144	08H	04H	Max.
		P0132	0CH	04H	Max.
		P0134	0DH	04H	Max.
	Heated oxygen sensor 2	P0139	19H	86H	Min.
		P1147	1AH	86H	Min.
		P1146	1BH	06H	Max.
		P0138	1CH	06H	Max.
HO2S HEATER	Heated oxygen sensor 1 heater	P0135	29H	08H	Max.
			2AH	88H	Min.
	Heated oxygen sensor 2 heater	P0141	2DH	0AH	Max.
			2EH	8AH	Min.

cardiagn.com

SYMPTOM DIAGNOSIS

ENGINE CONTROL SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000001056536

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-306
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-357
	Fuel injector circuit	1	1	2	3	2		2	2			2			EC-303
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-74
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-315
	Incorrect idle speed adjustment						1	1	1	1		1			EC-30
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-217, EC-219, EC-226
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-30
	Ignition circuit	1	1	2	2	2		2	2			2			EC-309
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-117
Mass air flow sensor circuit		1			2										EC-127, EC-127
Engine coolant temperature sensor circuit							3			3					EC-135
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			EC-141, EC-145, EC-151, EC-151, EC-156
Throttle position sensor circuit							2			2					EC-138, EC-182, EC-257, EC-259, EC-287
Accelerator pedal position sensor circuit				3	2	1									EC-280, EC-283, EC-290
Knock sensor circuit				2								3			EC-191

cardiagn.com

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Crankshaft position sensor (POS) circuit	2	2												EC-193
Camshaft position sensor (PHASE) circuit	3	2												EC-197
Vehicle speed signal circuit		2	3		3						3			EC-209
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-211, EC-213
Intake valve timing control solenoid valve circuit		3	2		1	3	2	2	3		3			EC-215
PNP switch circuit			3		3		3	3			3			EC-274
Refrigerant pressure sensor circuit		2				3			3		4			EC-316
Electrical load signal circuit							3							EC-301
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	HAC-108 ,HAC-187
ABS actuator and electric unit (control unit)			4											BRC-9

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

cardiagn.com

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank	5													FL-16 ,FL-19
	Fuel piping			5	5	5		5	5			5			FL-5
	Vapor lock		5												—
	Valve deposit	5		5	5	5		5	5			5			—
	Poor fuel (Heavy weight gasoline, Low octane)														—
Air	Air duct														EM-28
	Air cleaner														EM-28
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)	5	5	5	5	5	5	5	5	5		5			EM-28
	Electric throttle control actuator														EM-29
	Air leakage from intake manifold/ Collector/Gasket														EM-29
Cranking	Battery	1	1	1		1		1	1			1		1	PG-3
	Generator circuit														CHG-15
	Starter circuit	3													STR-18
	Signal plate	6													EM-101
	PNP switch	4													TM-10
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-80
	Cylinder head gasket										4		3		
	Cylinder block	6	6	6	6	6		6	6			6	4		EM-101
	Piston														
	Piston ring														
	Connecting rod														
	Bearing														
	Crankshaft														
Valve mecha-nism	Timing chain	5	5	5	5	5		5	5			5			EM-53
	Camshaft														EM-65
	Intake valve timing control														EM-53
	Intake valve												3		EM-80
	Exhaust valve														

cardiagn.com

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			EM-75, EM-32
	Three way catalyst														
Lubrica-tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			EM-42, EM-92, LU-9, LU-3
	Oil level (Low)/Filthy oil														LU-6
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5		5	5		4	5			CO-12
	Thermostat									5					CO-20
	Water pump														CO-18
	Water gallery														CO-22
	Cooling fan									5					CO-15
	Coolant level (Low)/Contaminat-ed coolant														CO-9
NATS (NISSAN Vehicle Immobilizer System)		1	1												SEC-14

1 - 6: The numbers refer to the order of inspection.

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000001056537

FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 2,500 rpm under no load (for example, the shift lever position is neutral and engine speed is over 2,500 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 2,000 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, EC-40, "System Description".

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001100451

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

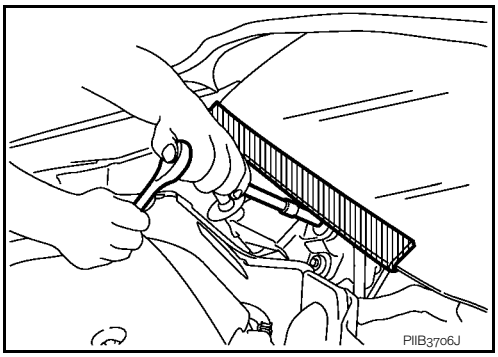
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001056539

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:0000000001056540

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

On Board Diagnostic (OBD) System of Engine

INFOID:0000000001056541

cardiagn.com

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MI) to warn the driver of a malfunction causing emission deterioration.

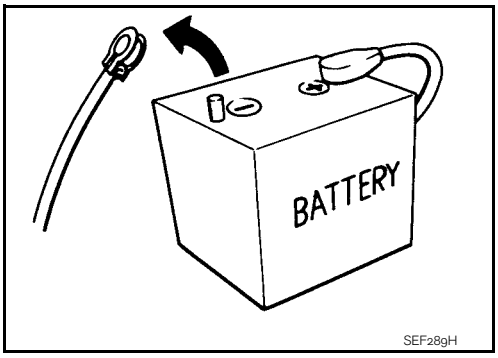
CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-105, "Description".**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MI to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to the malfunction of the EVAP system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM before returning the vehicle to the customer.**

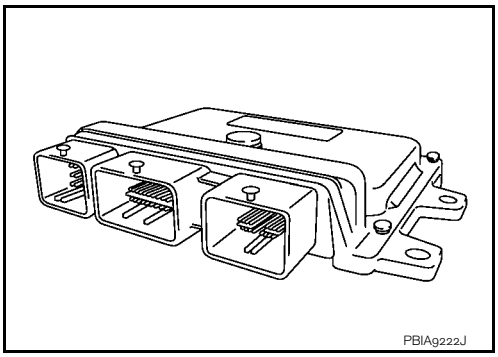
General Precautions

INFOID:0000000001056542

- **Always use a 12 volt battery as power source.**
- **Do not attempt to disconnect battery cables while engine is running.**
- **Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.**
- **Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.**

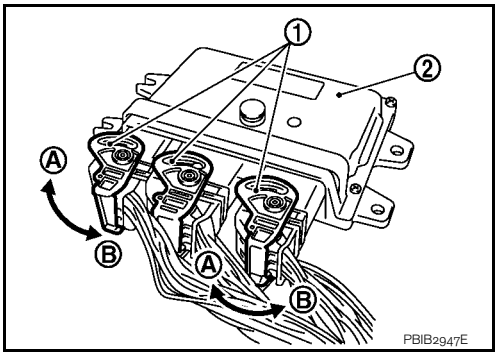


- **Do not disassemble ECM.**
- **If a battery cable is disconnected, the memory will return to the ECM value.**
  The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.
- **If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.**
  - **Diagnostic trouble codes**
  - **1st trip diagnostic trouble codes**
  - **Freeze frame data**
  - **1st trip freeze frame data**
  - **System readiness test (SRT) codes**
  - **Test values**



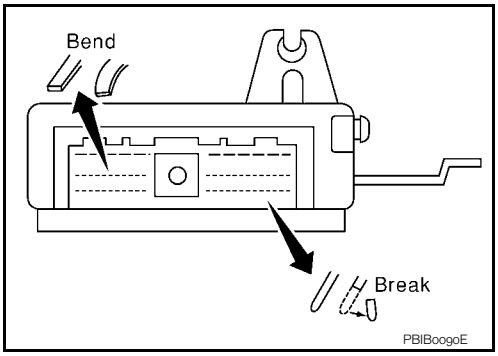
- **When connecting ECM harness connector (1), fasten (B) it securely with a lever as far as it will go as shown in the figure.**

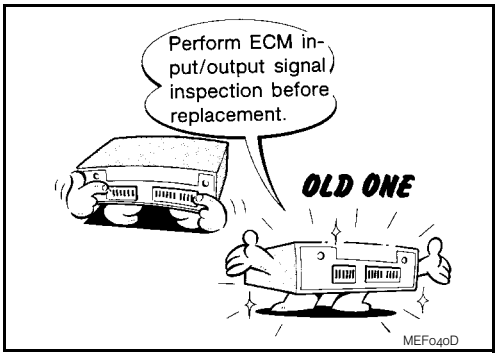
2. ECM
A. Loosen



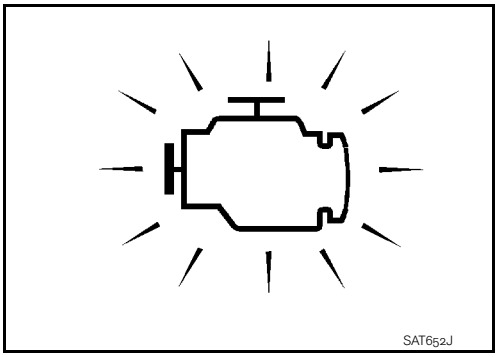
cardiagn.com

- **When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- **Securely connect ECM harness connectors.**
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- **Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.**
- **Keep engine control system parts and harness dry.**
- **Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-318, "Reference Value".**
- **Handle mass air flow sensor carefully to avoid damage.**
- **Do not clean mass air flow sensor with any type of detergent.**
- **Do not disassemble electric throttle control actuator.**
- **Even a slight leak in the air intake system can cause serious incidents.**
- **Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).**



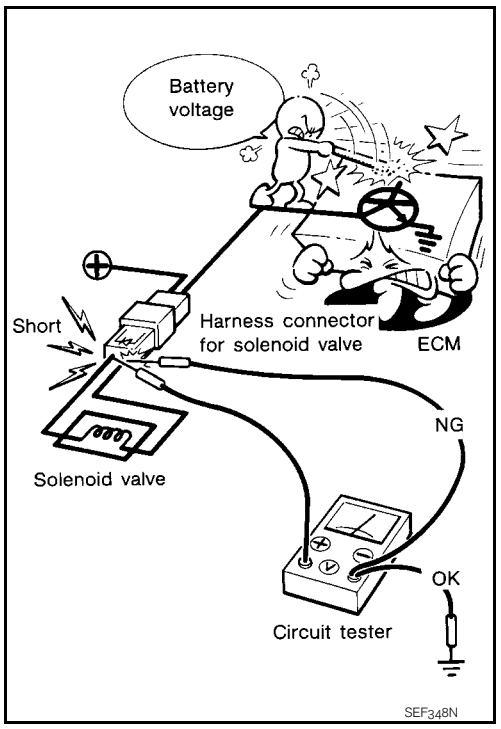


- **After performing each TROUBLE DIAGNOSIS, perform DTC CONFIRMATION PROCEDURE or Component Function Check.** The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.



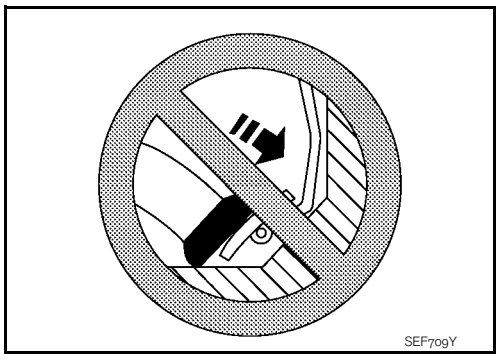
cardiagn.com

- **When measuring ECM signals with a circuit tester, never allow the two tester probes to contact.**
  Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- **Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

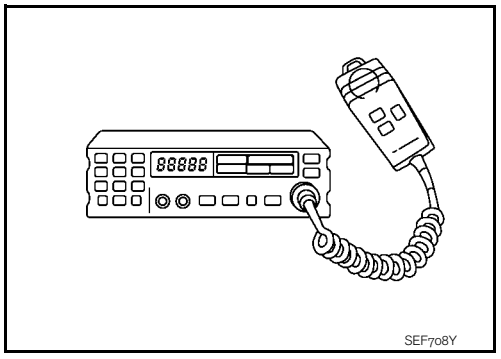


- **Do not operate fuel pump when there is no fuel in lines.**
- **Tighten fuel hose clamps to the specified torque.**

- **Do not depress accelerator pedal when starting.**
- **Immediately after starting, do not rev up engine unnecessarily.**
- **Do not rev up engine just prior to shutdown.**



- **When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.**
- **Keep the antenna as far as possible from the electronic control units.**
- **Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.**
  Do not let them run parallel for a long distance.
- **Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.**
- **Be sure to ground the radio to vehicle body.**



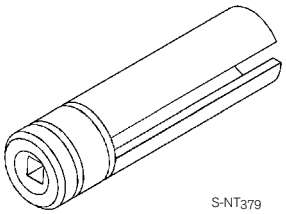
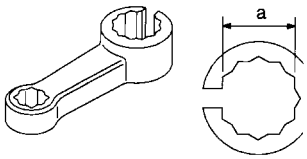
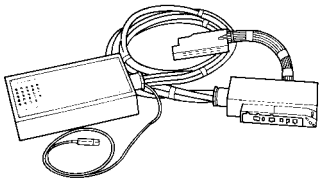
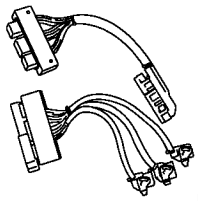
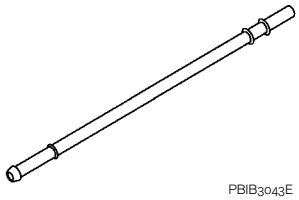
cardiagn.com

PREPARATION

PREPARATION

Special Service Tools

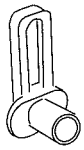
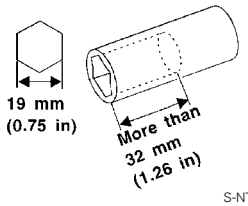
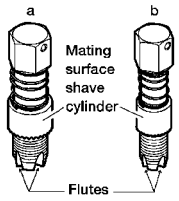
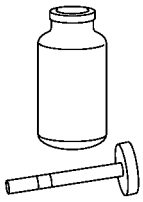
INFOID:0000000001056543

Tool number Tool name	Description
KV10117100 Heated oxygen sensor wrench  S-NT379	Loosening or tightening heated oxygen sensor with 22 mm (0.87 in) hexagon nut
KV10114400 Heated oxygen sensor wrench  S-NT636	Loosening or tightening heated oxygen sensor 2 **a: 22 mm (0.87 in)**
EG17550000 Break-out box  ZZA1194D	Measuring ECM signals with a circuit tester
EG17680000 Y-cable adapter  PBIA9379J	Measuring ECM signals with a circuit tester
KV10118400 Fuel tube adapter  PBIB3043E	Measuring fuel pressure

Commercial Service Tools

INFOID:0000000001056544

cardiagn.com

Tool name	Description
Quick connector release  PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Par No. 16441 6N210)
Socket wrench  S-NT705	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. **a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor** **b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor**
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)  S-NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

cardiagn.com

ON-VEHICLE MAINTENANCE

FUEL PRESSURE

Inspection

INFOID:0000000001077006

FUEL PRESSURE RELEASE

With CONSULT-III

1. Turn ignition switch ON.
2. Perform “FUEL PRESSURE RELEASE” in “WORK SUPPORT” mode with CONSULT-III.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

With CONSULT-III

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.

FUEL PRESSURE CHECK

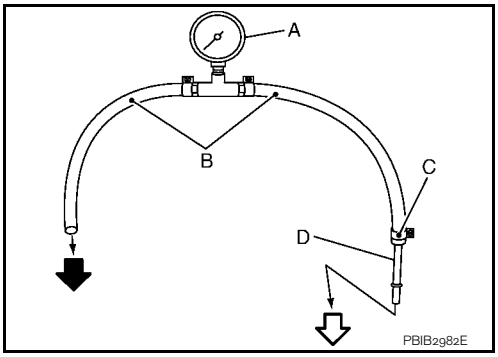
CAUTION:

- **Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.**
- **The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.**
- **Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains sealability with O-rings inside.**
- **Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.**

NOTE:

Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because J10 models do not have fuel return system.

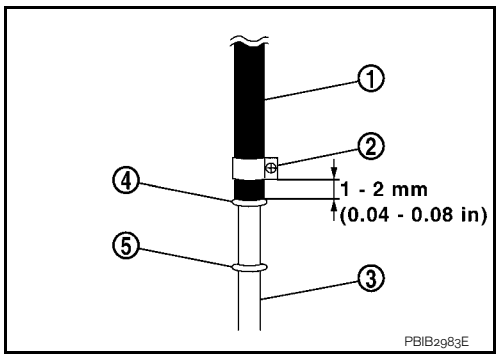
1. Release fuel pressure to zero.
2. Prepare fuel hose for fuel pressure check B and fuel tube adapter (KV10118400) D, then connect fuel pressure gauge A.
   - ⇦: To quick connector
   - ⬅: To fuel tube (engine side)
   - C: Clamp
   - Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
   - To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
   - Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
   - Use Pressure Gauge to check fuel pressure.



3. Remove fuel hose.
   - Do not twist or kink fuel hose because it is plastic hose.

cardiagn.com

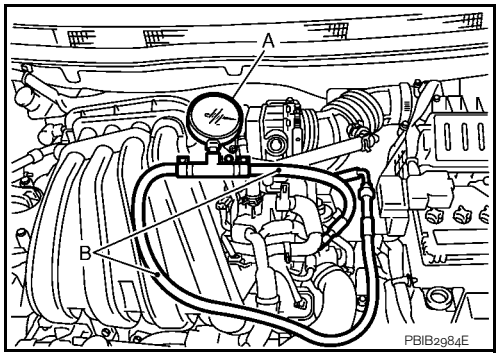
4. Connect fuel hose for fuel pressure check (1) to fuel tube (engine side) with clamp (2) as shown in the figure.
   - No.2 spool (5)
   - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
   - Apply proper amount of gasoline between top of the fuel tube (3) and No.1 spool (4).
   - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
   - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
   - When reconnecting fuel line, always use new clamps.
   - Use a torque driver to tighten clamps.
   - Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



Tightening torque: 1 - 1.5 N·m (0.1 - 0.15 kg-m, 9 - 13 in-lb)

   - Make sure that clamp screw does not contact adjacent parts.

5. Connect fuel tube adapter to quick connector.
   - A: Fuel pressure gauge
   - B: Fuel hose for fuel pressure check
6. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
7. Turn ignition switch ON and check for fuel leakage.
8. Start engine and check for fuel leakage.
9. Read the indication of fuel pressure gauge.
   - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
   - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.



At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2, 51 psi)

10. If result is unsatisfactory, go to next step.
11. Check the following.
    - Fuel hoses and fuel tubes for clogging
    - Fuel filter for clogging
    - Fuel pump
    - Fuel pressure regulator for clogging

    If OK, replace fuel pressure regulator.
    If NG, repair or replace.

cardiagn.com

EVAPORATIVE EMISSION SYSTEM

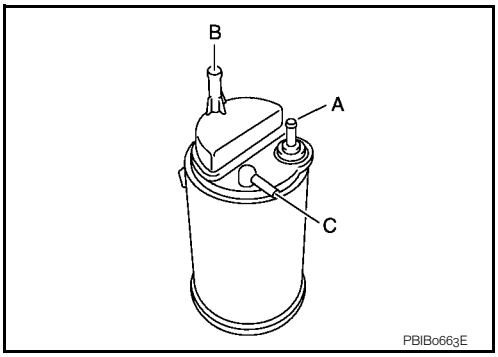
Inspection

INFOID:0000000001077700

1. Visually inspect EVAP vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Check EVAP canister as follows:

a. Block port (B). Orally blow air through port (A). Check that air flows freely through port (C).

b. Block port (A). Orally blow air through port (B). Check that air flows freely through port (C).

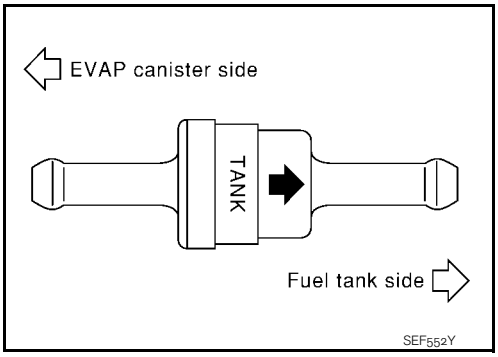


3. Visually inspect the fuel check valve for cracks, damage, loose connections chafing and deterioration.
4. Check fuel check valve as follows:

a. Blow air through connector on the fuel tank side. A considerable resistance should be felt and a portion of air flow should be directed toward the EVAP canister side.

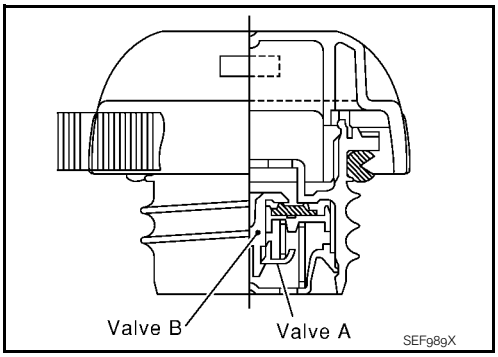
b. Blow air through connector on EVAP canister side. Air flow should be smoothly directed toward fuel tank side.

c. If fuel check valve is suspected or not properly functioning in step 1 and 2 above, replace it.



5. Inspect fuel tank filler cap vacuum relief valve for clogging, sticking, etc.

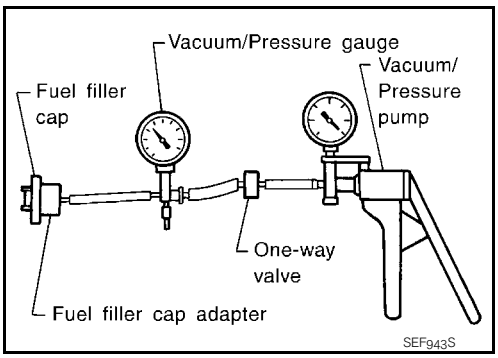
a. Wipe clean valve housing.



b. Check valve opening pressure and vacuum.

Pressure:	15.3 - 20.0 kPa (0.153 - 0.200 bar, 0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)
Vacuum:	–6.0 to –3.4 kPa (–0.06 bar to –-0.034bar, –0.061 to –0.035 kg/cm^2, –0.87 to –0.49 psi)

c. If out of specification, replace fuel filler cap as an assembly.



cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

INFOID:0000000001059496

Transmission	Condition	Specification
M/T	No load* (in Neutral position)	650 ±50 rpm

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Ignition Timing

INFOID:0000000001059497

Transmission	Condition	Specification
M/T	No load* (in Neutral position)	15 ± 5° BTDC

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

INFOID:0000000001059498

Condition	Specification (Using CONSULT-III or GST)
At idle	10 – 35 %
At 2,500 rpm	10 – 35 %

Mass Air Flow Sensor

INFOID:0000000001059499

Supply voltage	Battery voltage (11 – 14 V)
Output voltage at idle	1.0 – 1.3V*
Mass air flow (Using CONSULT-III or GST)	1.0 – 4.0 g·m/sec at idle* 2.0 – 10.0 g·m/sec at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no load.

cardiagn.com

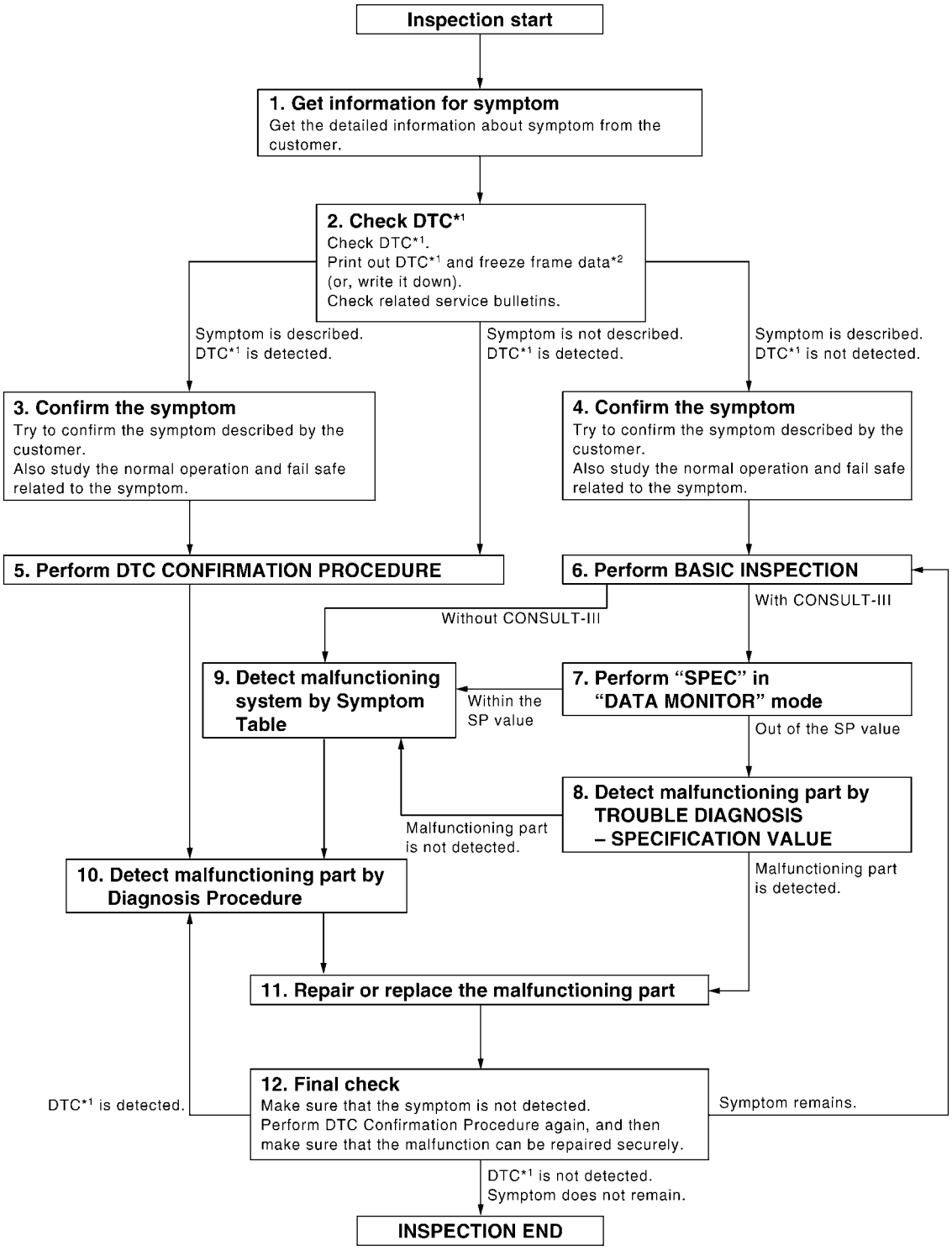
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001096723

OVERALL SEQUENCE



*1: Include 1st trip DTC.
*2: Include 1st trip freeze frame data.

JMBIA0078GB

DETAILED FLOW

cardiagn.com

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the “Diagnostic Work Sheet”. (Refer to EC-363, "Diagnostic Work Sheet".)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.

- Record DTC and freeze frame data. (Print them out with CONSULT-III.)
- Erase DTC. (Refer to EC-426, "Diagnosis Description".)
- Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to EC-623, "Symptom Table".)

3. Check related service bulletins for information.

Is any symptom described and is any DTC detected?

Symptom is described, DTC is detected>>GO TO 3.
Symptom is described, DTC is not detected>>GO TO 4.
Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MI ON).
Also study the normal operation and fail safe related to the symptom. Refer to EC-627, "Description" and EC-618, "Fail Safe".
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail safe related to the symptom. Refer to EC-627, "Description" and EC-618, "Fail Safe".
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.
If two or more DTCs are detected, refer to EC-620, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.
  If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.
NO >> Check according to EC-620, "DTC Index".

6.PERFORM BASIC INSPECTION

Perform EC-365, "BASIC INSPECTION : Special Repair Requirement".

Do you have CONSULT-III?

cardiagn.com

YES >> GO TO 7.
NO >> GO TO 9.

7. PERFORM SPEC IN DATA MONITOR MODE

With CONSULT-III

Make sure that “MAS A/F SE-B1”, “B/FUEL SCHDL” and “A/F ALPHA-B1” are within the SP value using CONSULT-III in “SPEC” of “DATA MONITOR” mode. Refer to EC-438, "Component Function Check".

Is the measurement value within the SP value?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to EC-438, "Diagnosis Procedure".

Is malfunctioning part detected?

YES >> GO TO 11.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to EC-623, "Symptom Table" based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

>> GO TO 10.

10. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

NOTE:

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to Circuit Inspection in GI-41, "Circuit Inspection".

Is malfunctioning part detected?

YES >> GO TO 11.
NO >> Monitor input data from related sensors or check the voltage of related ECM terminals using CONSULT-III. Refer to EC-598, "Reference Value".

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to EC-426, "Diagnosis Description".

>> GO TO 12.

12. FINAL CHECK

When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then make sure that the malfunction have been repaired securely.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 10.
YES-2 >> Symptom remains: GO TO 6.
NO >> Before returning the vehicle to the customer, make sure to erase unnecessary DTC in ECM. (Refer to EC-426, "Diagnosis Description".)

Diagnostic Work Sheet

INFOID:0000000001096724

DESCRIPTION

cardiagn.com

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

KEY POINTS

WHAT ..... Vehicle & engine model
WHEN ..... Date, Frequencies
WHERE..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SEF907L

WORKSHEET SAMPLE

Customer name MR/MS	Model & Year	VIN
Engine #	Trans.	Mileage
Incident Date	Manuf. Date	In Service Date
Fuel and fuel filler cap	☐ Vehicle ran out of fuel causing misfire ☐ Fuel filler cap was left off or incorrectly screwed on.	
Symptoms ☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]	
☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading	
Incident occurrence	☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime	
Frequency	☐ All the time ☐ Under certain conditions ☐ Sometimes	
Weather conditions	☐ Not affected	
Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]	
Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F	
Engine conditions	☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions	☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)	
Driving conditions	☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp	☐ Turned on ☐ Not turned on	

MTBL0017

cardiagn.com

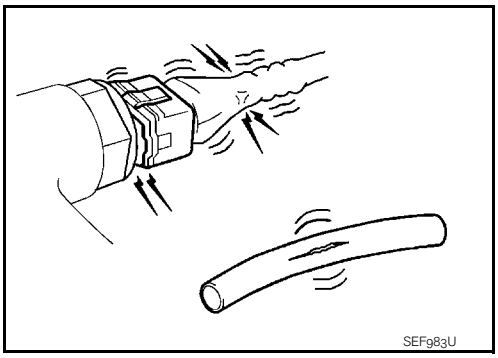
INSPECTION AND ADJUSTMENT
BASIC INSPECTION

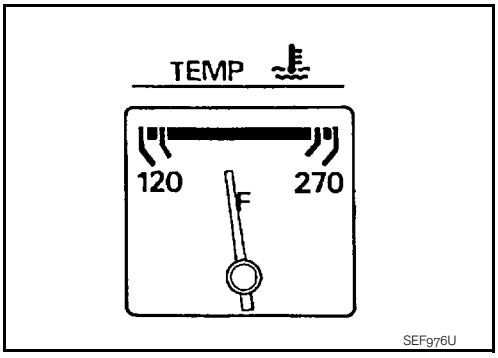
BASIC INSPECTION : Special Repair Requirement

INFOID:0000000001096725

1.INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
- Harness connectors for improper connections
- Wiring harness for improper connections, pinches and cut
- Vacuum hoses for splits, kinks and improper connections
- Hoses and ducts for leaks
- Air cleaner clogging
- Gasket
3. Confirm that electrical or mechanical loads are not applied.
- Headlamp switch is OFF.
- Air conditioner switch is OFF.
- Rear window defogger switch is OFF.
- Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
   Ensure engine stays below 1,000 rpm.


SEF983U

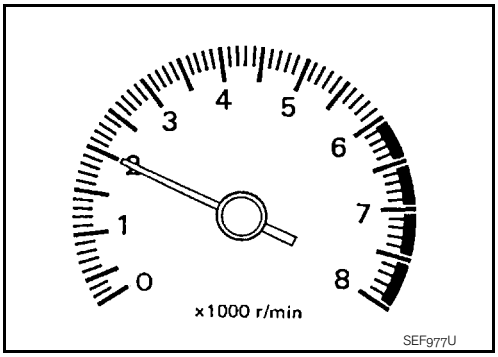


SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-III.

Is any DTC detected?

YES >> GO TO 2.
NO >> GO TO 3.



SEF977U

2.REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding Diagnostic Procedure.

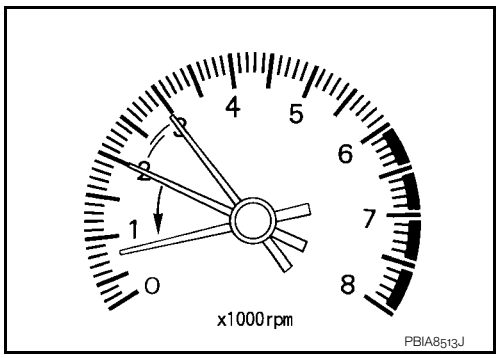
>> GO TO 3

3.CHECK TARGET IDLE SPEED

1. Run engine at about 2,000 rpm for about 2 minutes under no load.

cardiagn.com

2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed.
   For procedure, refer to EC-369, "IDLE SPEED : Special Repair Requirement".
   For specification, refer to EC-637, "Idle Speed".



Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-369, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 7.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
   For procedure, refer to EC-369, "IDLE SPEED : Special Repair Requirement".
   For specification, refer to EC-637, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the Following.
- Check camshaft position sensor (PHASE) and circuit. Refer to EC-489, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-485, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace. Then GO TO 4.

9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

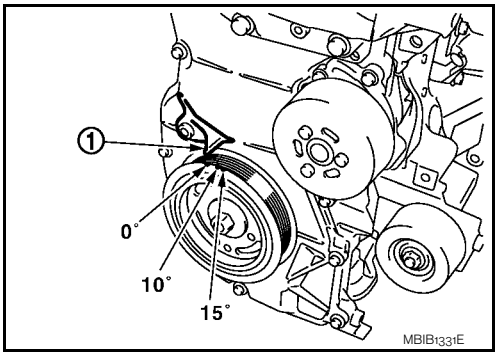
>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.

cardiagn.com

2. Check ignition timing with a timing light.
For procedure, refer to EC-369, "IGNITION TIMING : Special Repair Requirement".
For specification, refer to EC-637, "Ignition Timing".



1 : Timing indicator

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-369, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 14.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

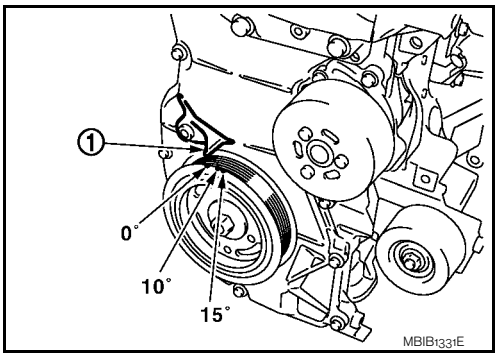
1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
For procedure, refer to EC-369, "IDLE SPEED : Special Repair Requirement".
For specification, refer to EC-637, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 15.
NO >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.
For procedure, refer to EC-369, "IGNITION TIMING : Special Repair Requirement".
For specification, refer to EC-637, "Ignition Timing".



1 : Timing indicator

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-46, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair the timing chain installation. Then GO TO 4.

cardiagn.com

17.DETECT MALFUNCTIONING PART

Check the following.
- Check camshaft position sensor (PHASE) and circuit. Refer to EC-489, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-485, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair or replace. Then GO TO 4.

18.CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

>> GO TO 4.

19.INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, go to EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000001096726

When replacing ECM, this procedure must be performed.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000001096727

1.PERFORM INITIALIZATION OF NATS SYSTEM AND REGISTRATION OF ALL NATS IGNITION KEY IDS

Refer to EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> GO TO 2.

2.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> GO TO 3.

3.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 4.

4.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-31, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

IDLE SPEED

IDLE SPEED : Description

INFOID:0000000001096728

cardiagn.com

This describes how to check the idle speed. For the actual procedure, follow the instructions in “BASIC INSPECTION”.

IDLE SPEED : Special Repair Requirement

INFOID:0000000001096729

1.CHECK IDLE SPEED

With CONSULT-III
Check idle speed in “DATA MONITOR” mode with CONSULT-III.

Without CONSULT-III
Check the idle speed by installing the pulse type tachometer clamp on No.4 ignition coil harness.

>> INSPECTION END

IGNITION TIMING

IGNITION TIMING : Description

INFOID:0000000001096730

This describes how to check the ignition timing. For the actual procedure, follow the instructions in “BASIC INSPECTION”.

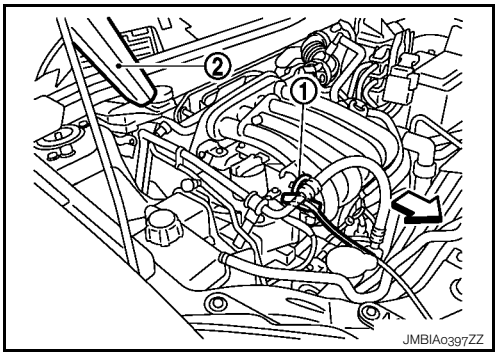
IGNITION TIMING : Special Repair Requirement

INFOID:0000000001096731

1.CHECK IGNITION TIMING

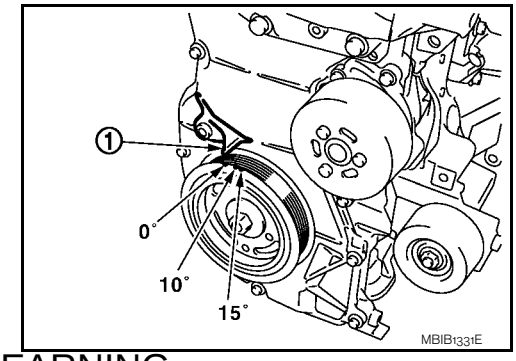
1. Attach timing light to No.1 ignition coil wire harness (1) as shown.

2 : Timing light
⇦ : Vehicle front



2. Check ignition timing.

1 : Timing indicator



>> INSPECTION END

ACCELERATOR PEDAL RELEASED POSITION LEARNING

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description

INFOID:0000000001096732

Accelerator Pedal Released Position Learning is a function of ECM to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement

INFOID:0000000001096733

1.START

1. Make sure that accelerator pedal is fully released.

cardiagn.com

2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF and wait at least 10 seconds.

>> END

THROTTLE VALVE CLOSED POSITION LEARNING

THROTTLE VALVE CLOSED POSITION LEARNING : Description

INFOID:0000000001096734

Throttle Valve Closed Position Learning is a function of ECM to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

INFOID:0000000001096735

1.START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
   Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

>> END

IDLE AIR VOLUME LEARNING

IDLE AIR VOLUME LEARNING : Description

INFOID:0000000001096736

Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps each engine idle speed within the specific range. It must be performed under any of the following conditions:
- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

IDLE AIR VOLUME LEARNING : Special Repair Requirement

INFOID:0000000001096737

1.PRECONDITIONING

Make sure that all of the following conditions are satisfied.
Learning will be cancelled if any of the following conditions are missed for even a moment.
- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- Park/neutral position switch: ON
- Electric load switch: OFF
  (Air conditioner, headlamp, rear window defogger)
  On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
- Drive vehicle for 10 minutes

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.IDLE AIR VOLUME LEARNING

With CONSULT-III
1. Perform Accelerator Pedal Released Position Learning. Refer to EC-369, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
2. Perform Throttle Valve Closed Position Learning. Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

cardiagn.com

3. Start engine and warm it up to normal operating temperature.
4. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.
5. Touch “START” and wait 20 seconds.

Is “CMPLT” displayed on CONSULT-III screen?

YES >> GO TO 4.
NO >> GO TO 5.

3. IDLE AIR VOLUME LEARNING

Without CONSULT-III

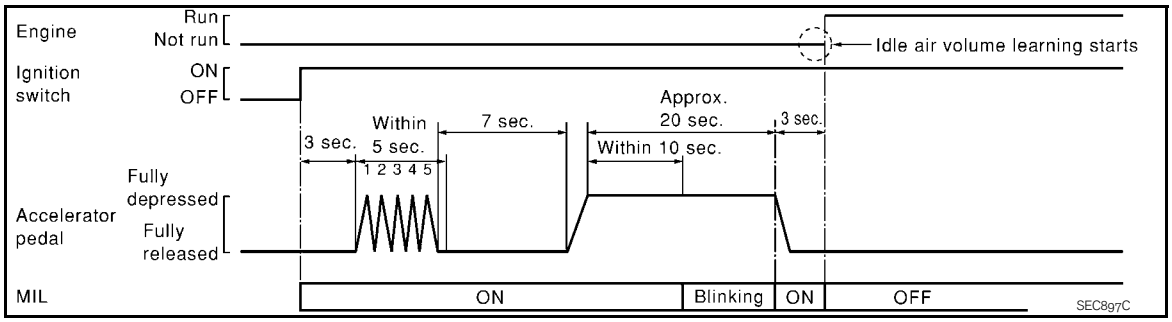
NOTE:

- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**

1. Perform Accelerator Pedal Released Position Learning. Refer to EC-369, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
2. Perform Throttle Valve Closed Position Learning. Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
3. Start engine and warm it up to normal operating temperature.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
6. Repeat the following procedure quickly five times within 5 seconds.

- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.

7. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MI stops blinking and turned ON.
8. Fully release the accelerator pedal within 3 seconds after the MI turned ON.
9. Start engine and let it idle.
10. Wait 20 seconds.



>> GO TO 4.

4. CHECK IDLE SPEED AND IGNITION TIMING

Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

For specification, refer to EC-637, "Idle Speed" and EC-637, "Ignition Timing".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following

- Check that throttle valve is fully closed.
- Check PCV valve operation.
- Check that downstream of throttle valve is free from air leakage.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace malfunctioning part.

6. DETECT MALFUNCTIONING PART

cardiagn.com

Engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.
It is useful to perform “TROUBLE DIAGNOSIS - SPECIFICATION VALUE”. Refer to EC-438, "Description".
If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:
- Engine stalls.
- Erroneous idle.

>> INSPECTION END

MIXTURE RATIO SELF-LEARNING VALUE CLEAR

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:0000000001096738

This describes how to erase the mixture ratio self-learning value. For the actual procedure, follow the instructions in “Diagnosis Procedure”.

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:0000000001096739

1. START

With CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-III.
3. Clear mixture ratio self-learning value by touching “CLEAR”.

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-426, "Diagnosis Description".
7. Make sure that DTC P0000 is displayed.

>> END

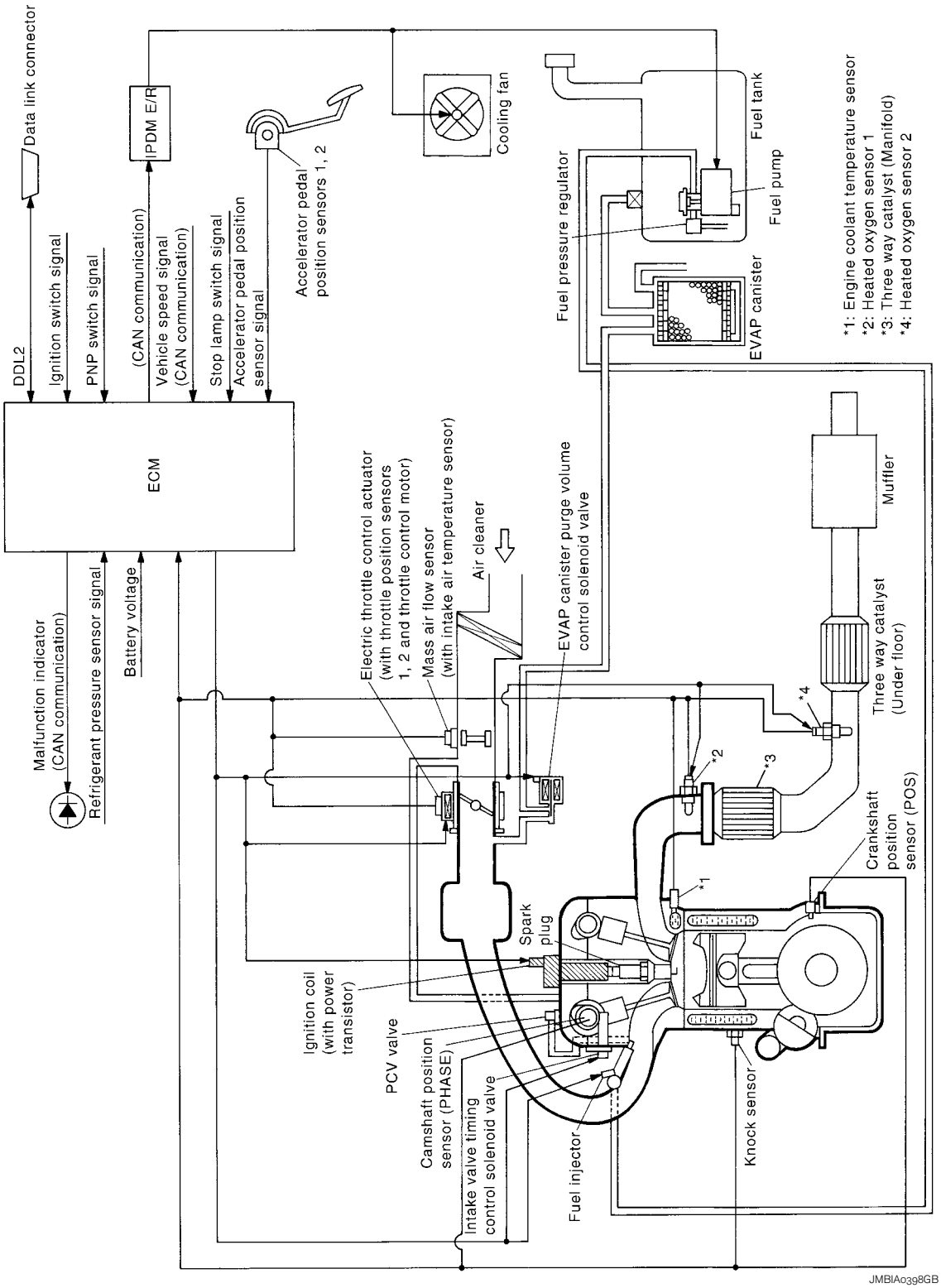
cardiagn.com

FUNCTION DIAGNOSIS

ENGINE CONTROL SYSTEM

System Diagram

INFOID:0000000001096740



System Description

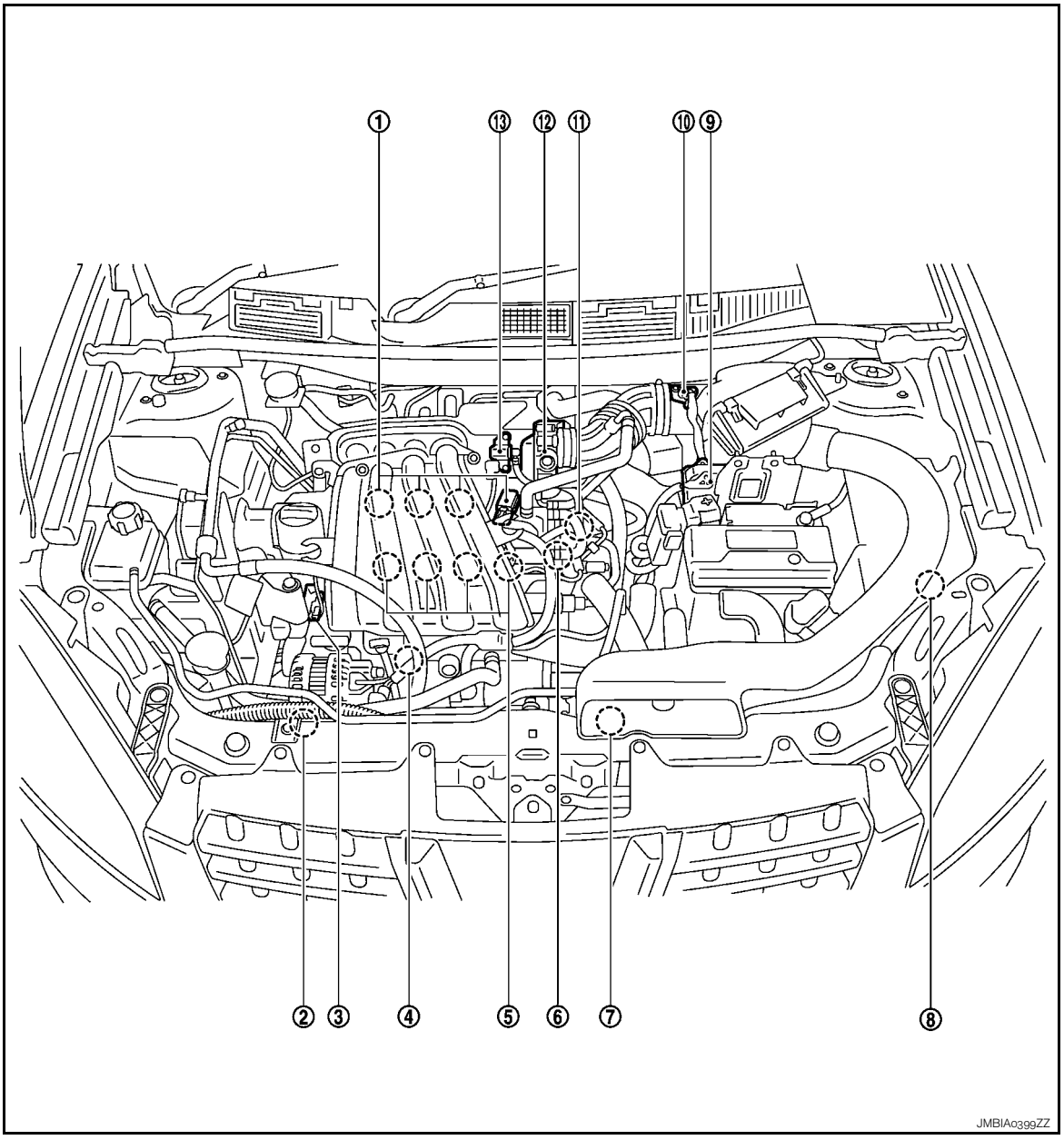
INFOID:0000000001096741

cardiagn.com

ECM performs various controls such as fuel injection control and ignition timing control.

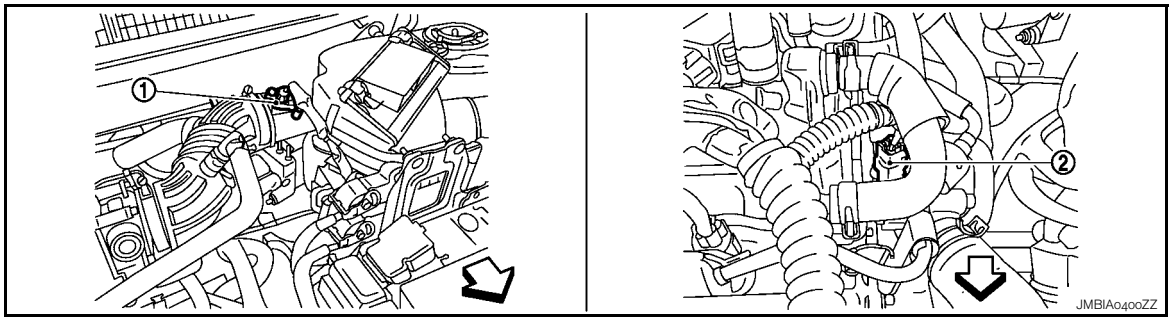
Component Parts Location

INFOID:0000000001096742



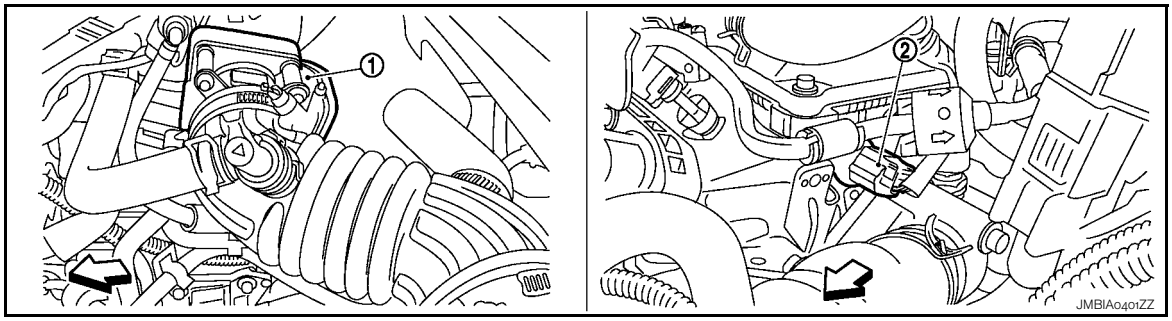
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



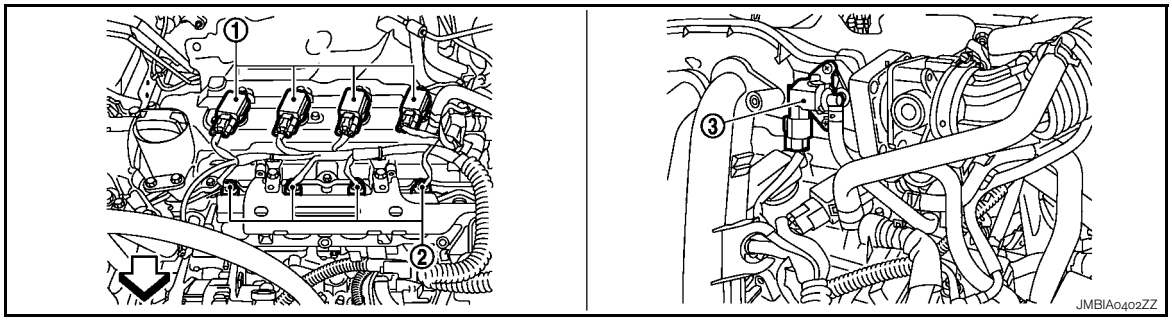
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



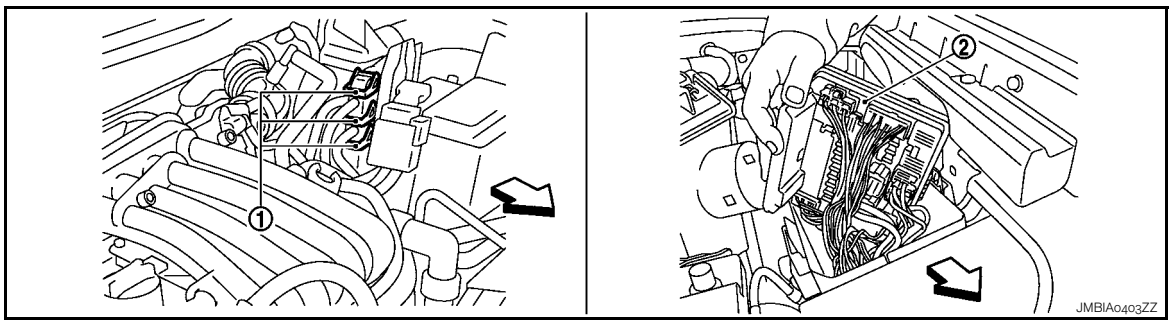
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

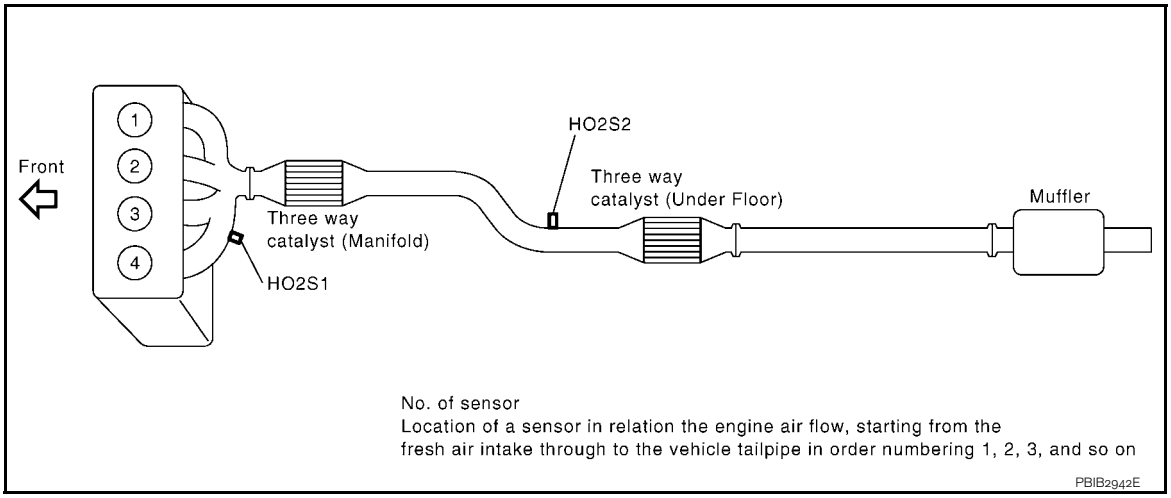
⇦ Vehicle front

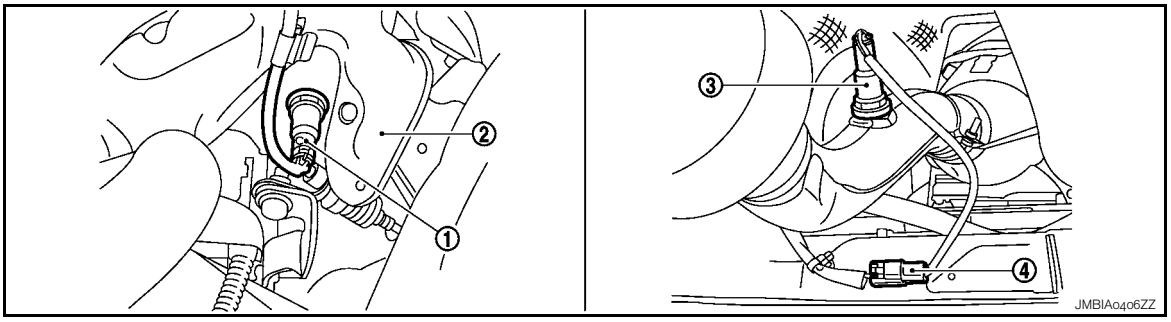


1. ECM harness connector
2. IPDM E/R

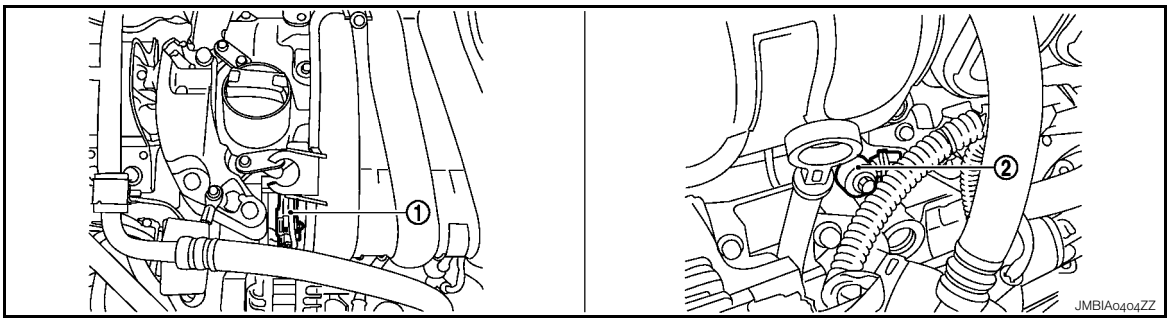
⇦ Vehicle front

cardiagn.com

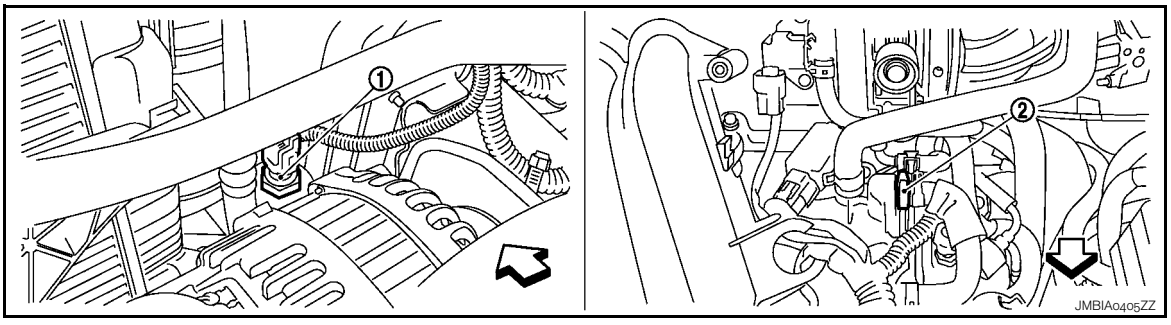




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



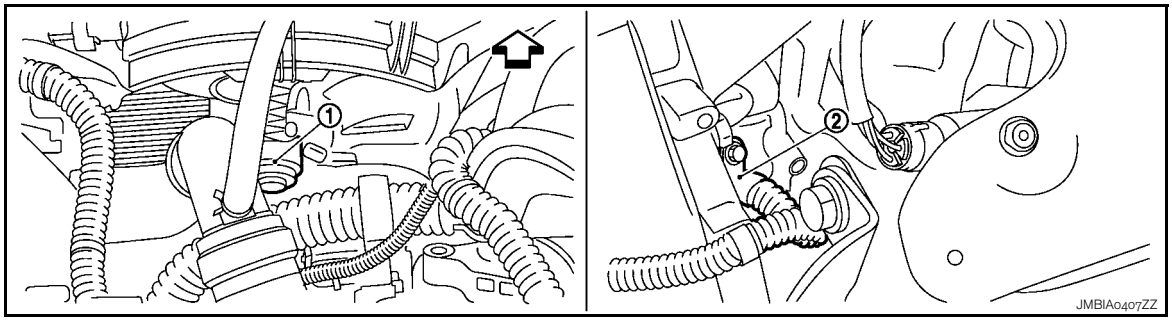
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

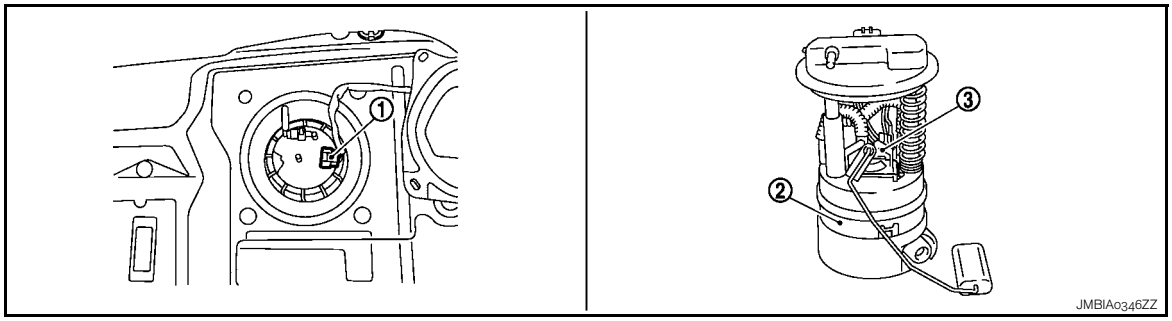
⇦ Vehicle front

cardiagn.com

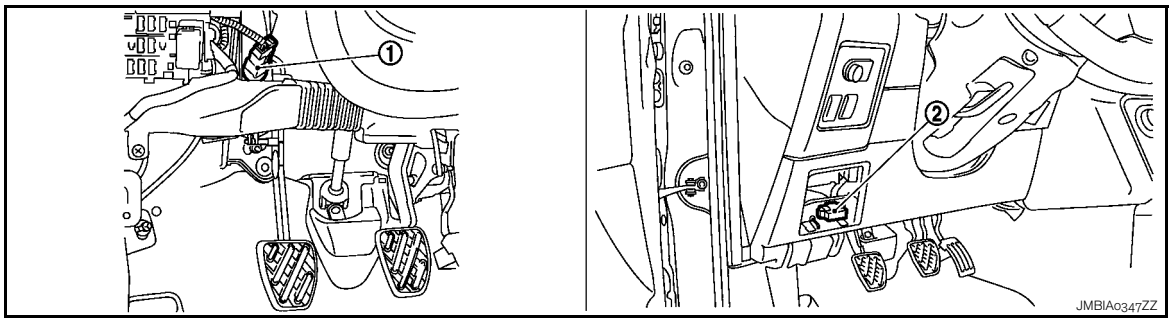


1. Cooling fan motor
2. Crankshaft position sensor (POS)

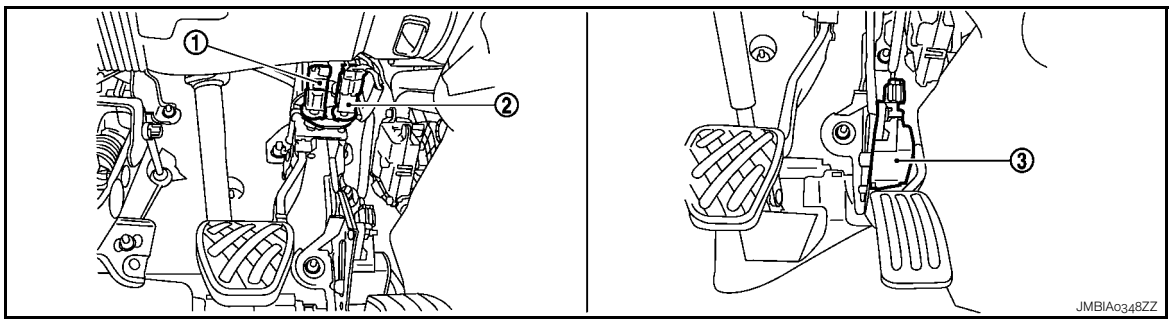
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

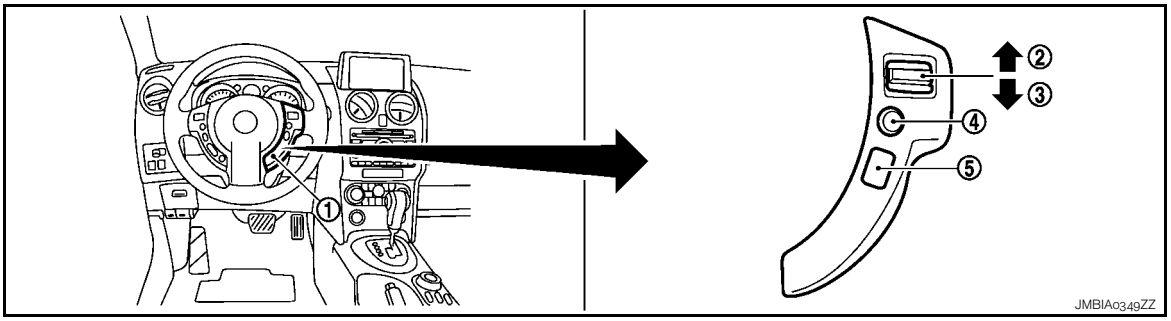


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001096743

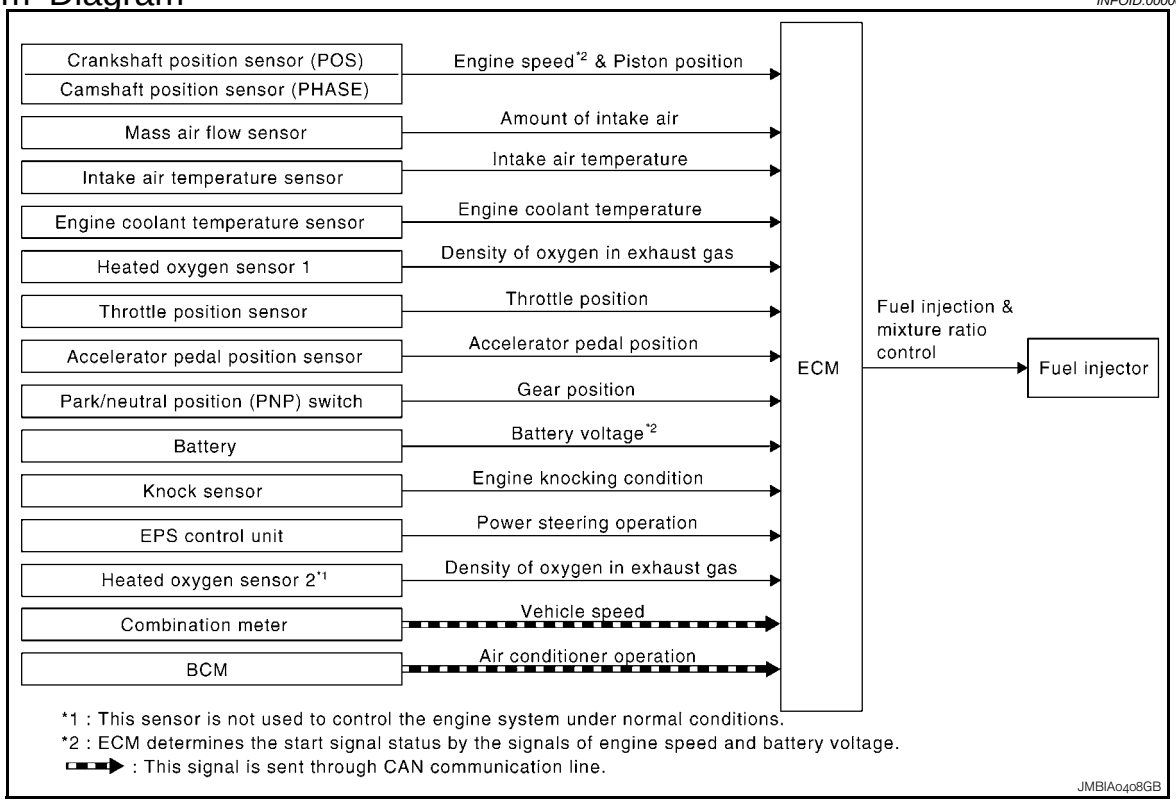
Component	Reference
Accelerator pedal position sensor	EC-539, "Description"
ASCD brake switch	EC-553, "Description"
ASCD steering switch	EC-263, "Description"
ASCD vehicle speed sensor	EC-272, "Description"
Camshaft position sensor (PHASE)	EC-489, "Description"
Crankshaft position sensor (POS)	EC-485, "Description"
Cooling fan motor	EC-558, "Description"
Electric throttle control actuator	EC-499, "Description"
Engine coolant temperature sensor	EC-461, "Description"
Fuel injector	EC-565, "Description"
Fuel pump	EC-568, "Description"
Heated oxygen sensor 1	EC-141, "Description"
Heated oxygen sensor 1 heater	EC-576, "Description"
Heated oxygen sensor 2	EC-475, "Description"
Heated oxygen sensor 2 heater	EC-583, "Description"
Ignition signal	EC-588, "Description"
Intake air temperature sensor	EC-586, "Description"
Intake valve timing control solenoid valve	EC-497, "Description"
Knock sensor	EC-483, "Description"
Mass air flow sensor	EC-456, "Description"
Park/neutral position switch	EC-533, "Description"
PCV valve	EC-594, "Description"
Refrigerant pressure sensor	EC-595, "Description"
Stop lamp switch	EC-536, "Description"
Throttle control motor	EC-508, "Description"
Throttle control motor relay	EC-505, "Description"
Throttle position sensor	EC-464, "Description"
Vehicle speed sensor	EC-597, "Description"

cardiagn.com

MULTIPORT FUEL INJECTION SYSTEM

System Diagram

INFOID:0000000001096744



System Description

INFOID:0000000001096745

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*3 Piston position	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Intake air temperature sensor	Intake air temperature		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage*3		
Knock sensor	Engine knocking condition		
EPS control unit	Power steering operation		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
BCM*2	Air conditioner operation		
Combination meter*2	Vehicle speed		

*1: This sensor is not used to control the engine system under normal conditions.

*2: This signal is sent to the ECM through CAN communication line.

*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

cardiagn.com

SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from the crankshaft position sensor (POS), camshaft position sensor (PHASE) and the mass air flow sensor.

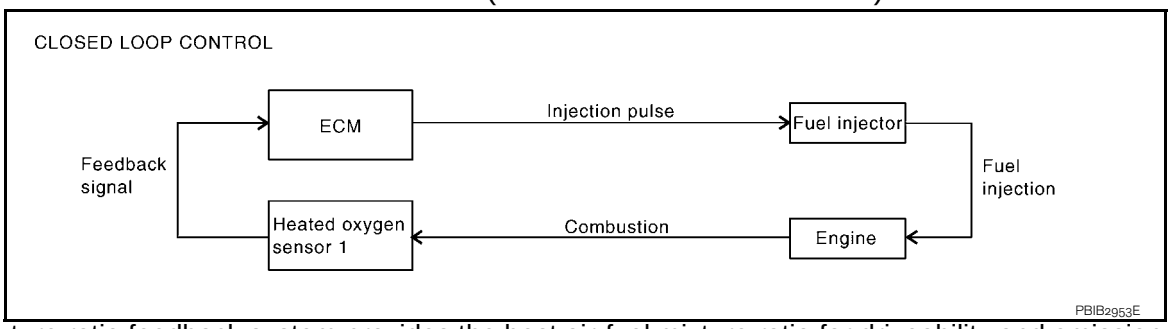
VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- High-load, high-speed operation

<Fuel decrease>
- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to EC-141, "DTC Logic". This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).
This stage is referred to as the closed loop control condition.
heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

- Open Loop Control
  The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 or its circuit
- Insufficient activation of heated sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- When starting the engine

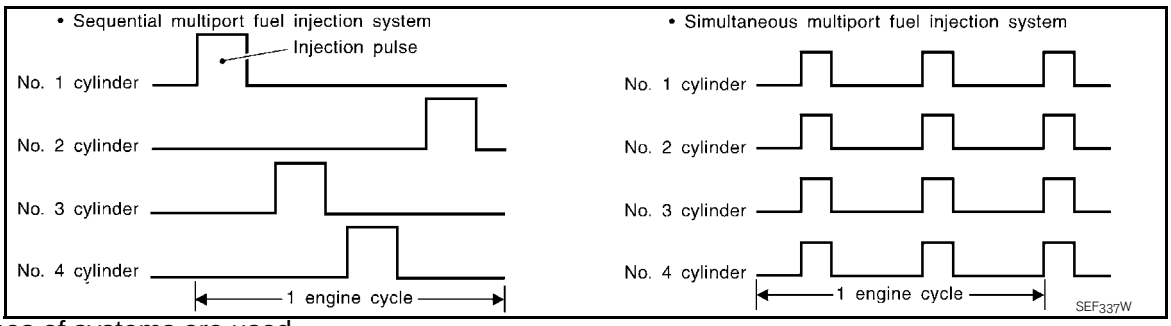
MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) and characteristic changes during operation (i.e., fuel injector clogging) directly affect mixture ratio.
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.

cardiagn.com

"Fuel trim" refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.
"Short term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.
"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.
- Sequential Multiport Fuel Injection System
  Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.
- Simultaneous Multiport Fuel Injection System
  Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
  The four injectors will then receive the signals two times for each engine cycle.
  This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

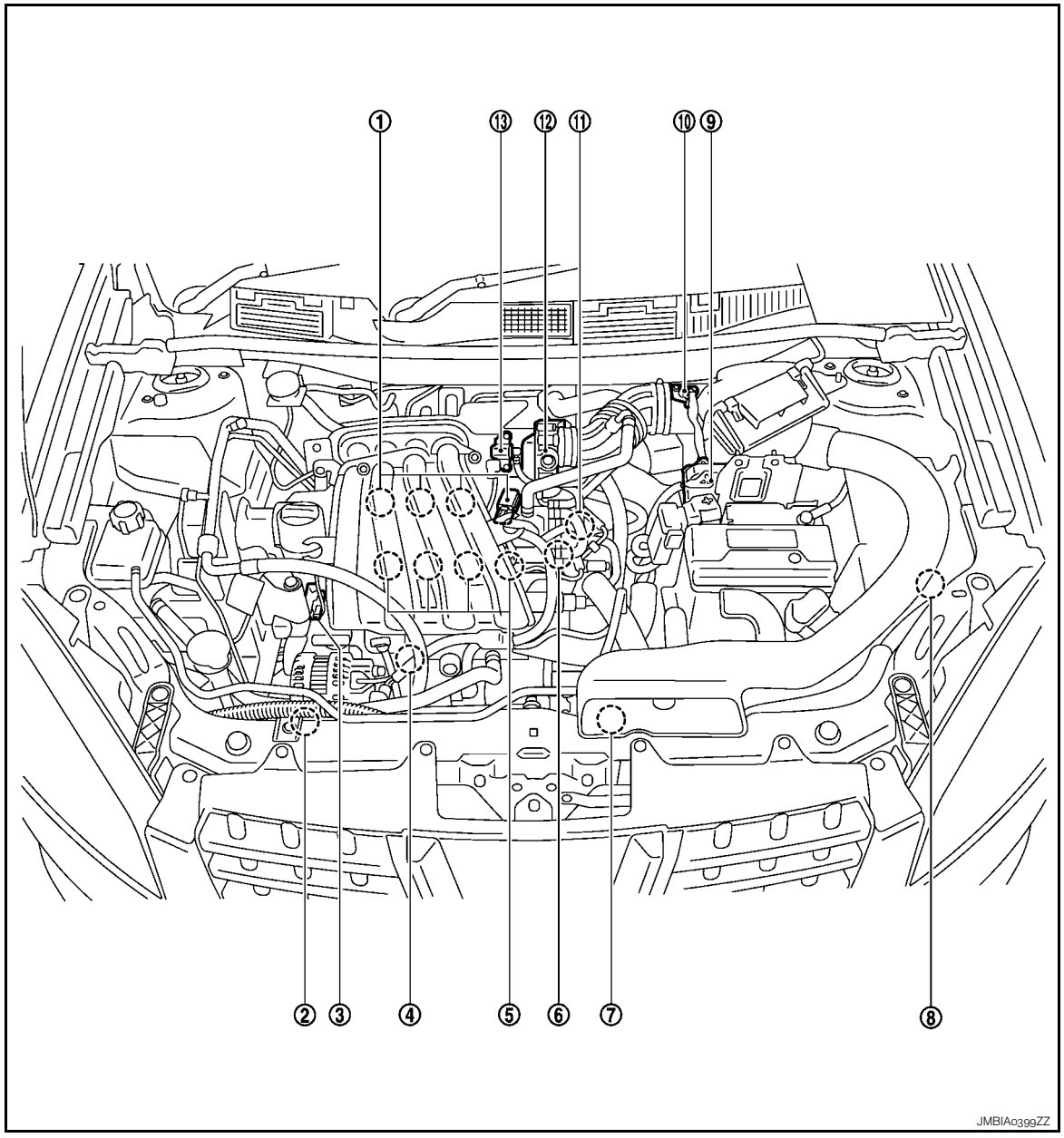
FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration, operation of the engine at excessively high speeds or operation of the vehicle at excessively high speeds.

Component Parts Location

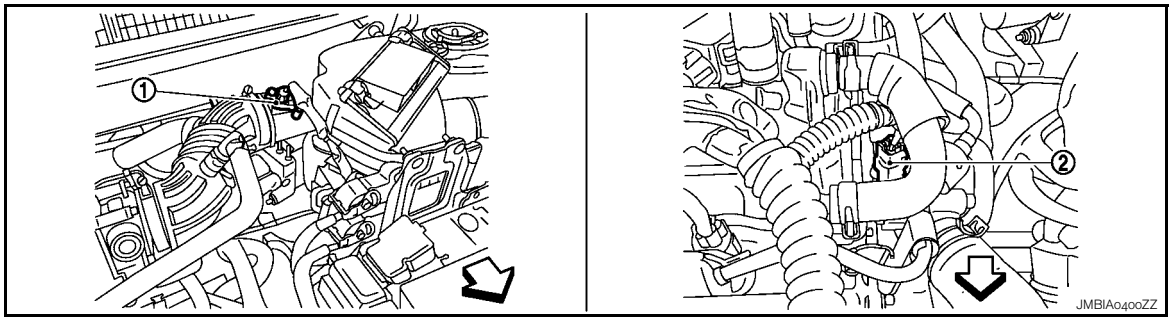
INFOID:0000000001096746

cardiagn.com



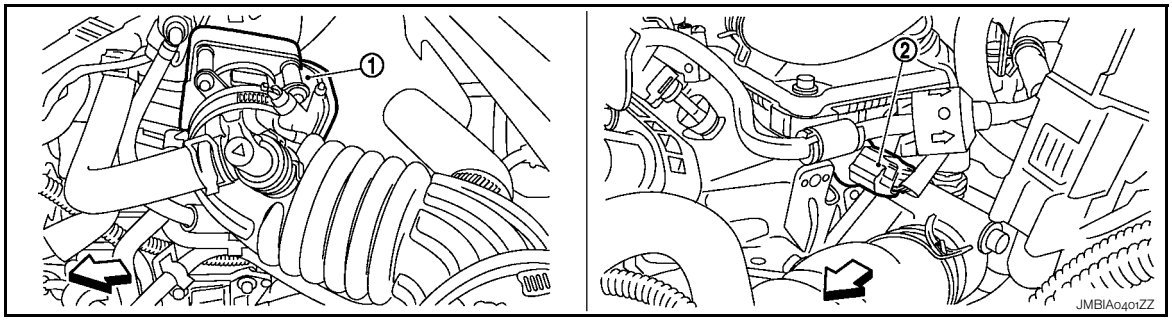
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



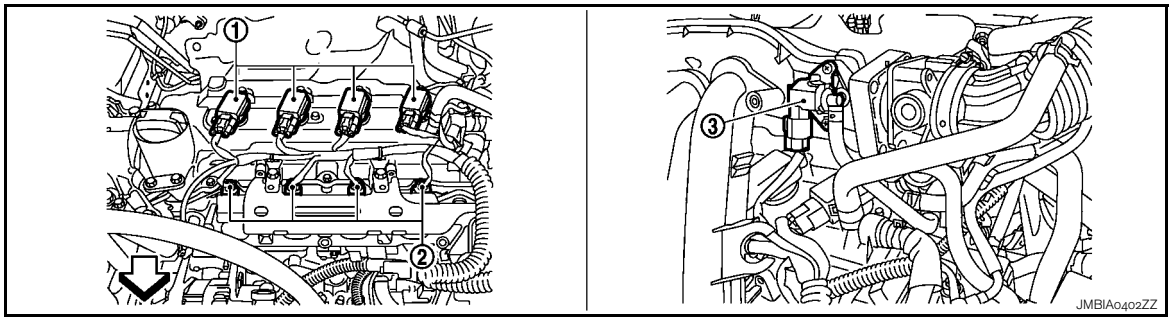
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



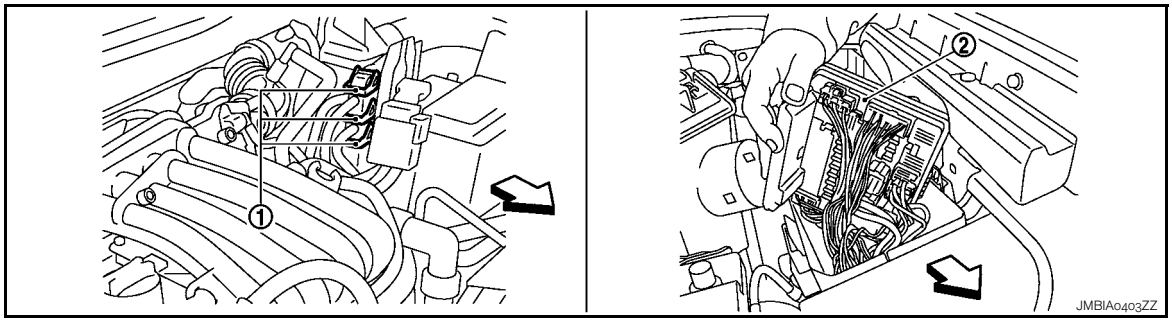
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

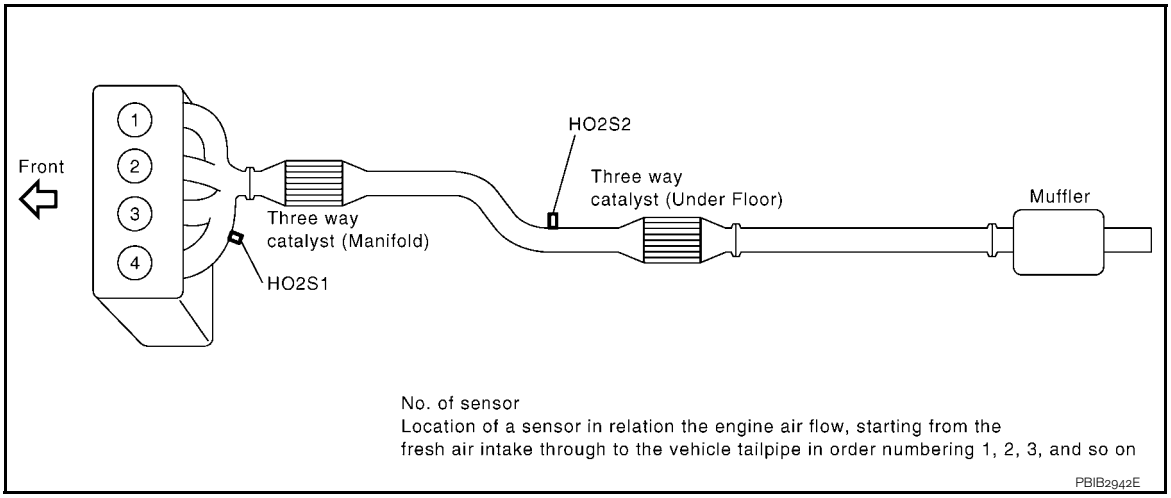
⇦ Vehicle front

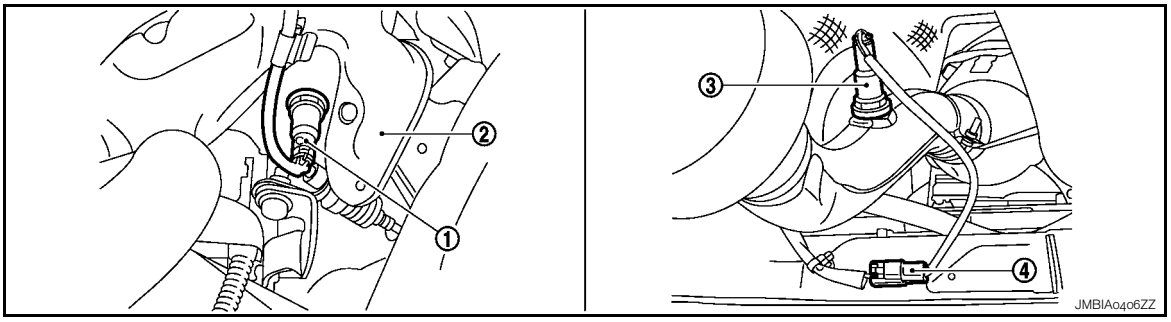


1. ECM harness connector
2. IPDM E/R

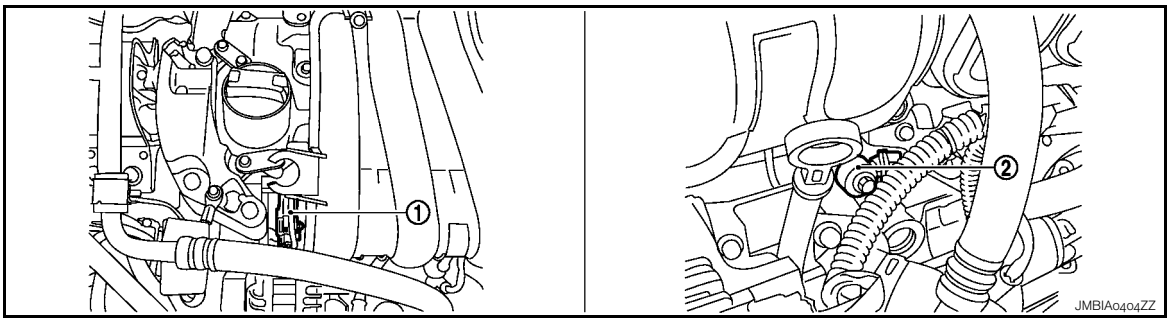
⇦ Vehicle front

cardiagn.com

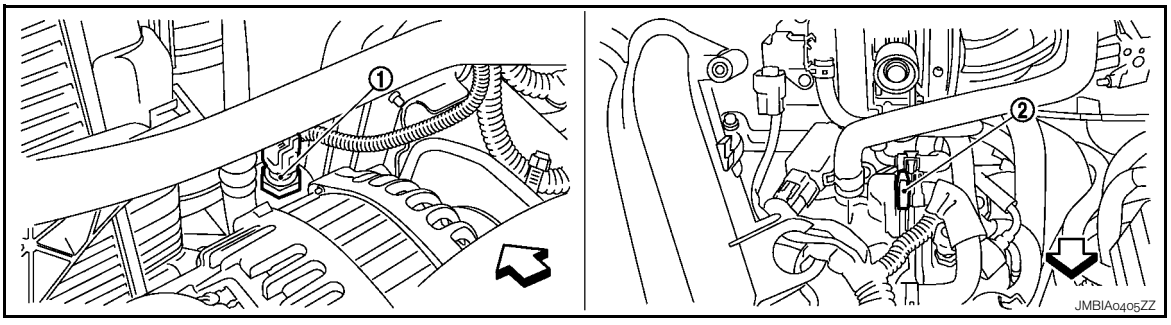




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



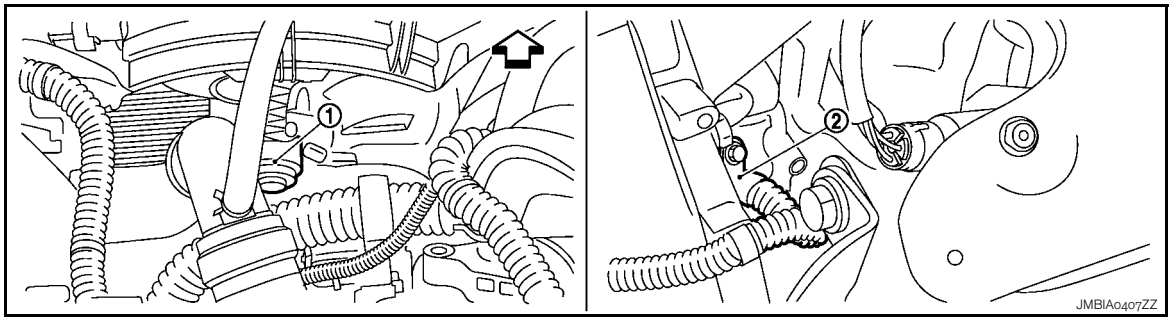
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

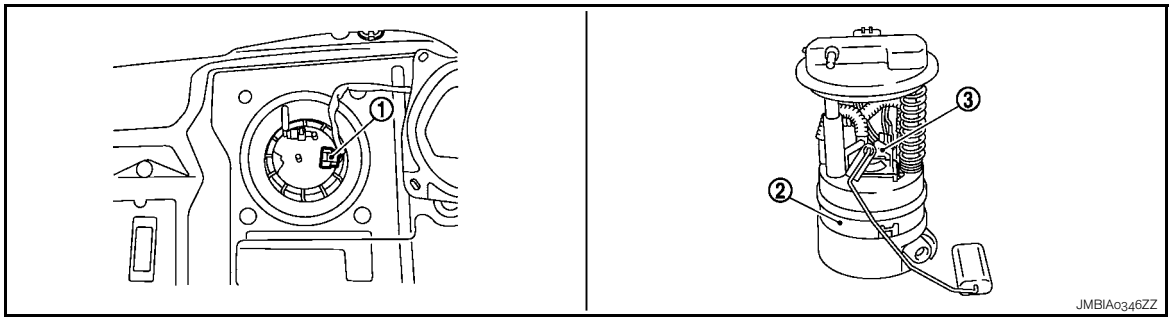
⇦ Vehicle front

cardiagn.com

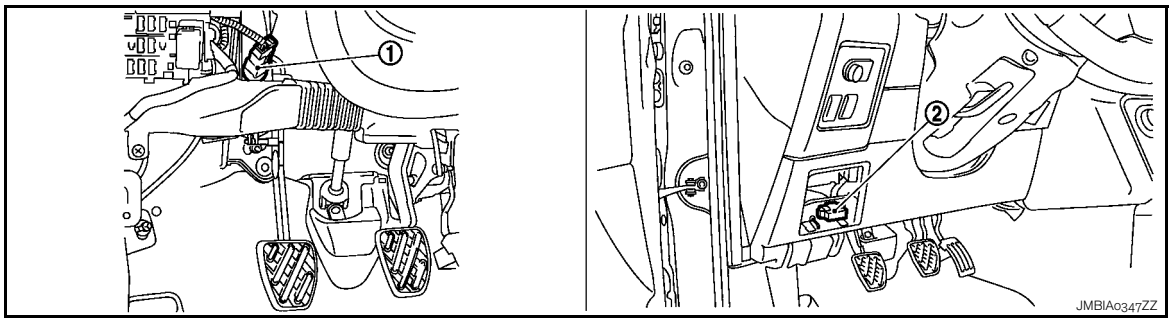


1. Cooling fan motor
2. Crankshaft position sensor (POS)

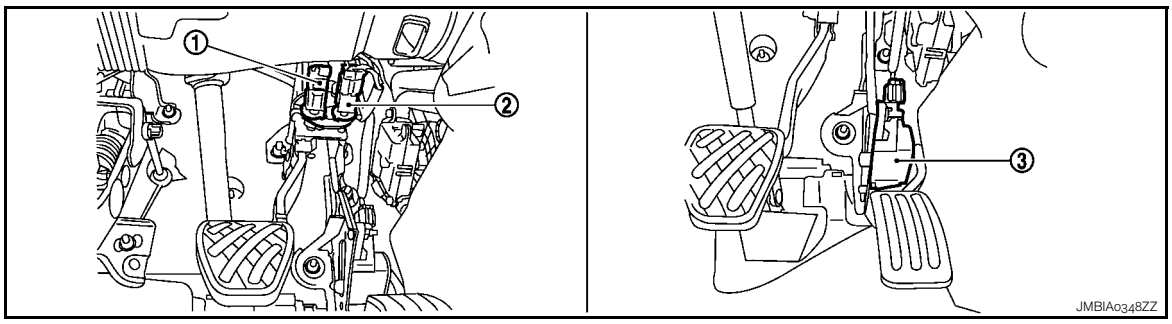
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

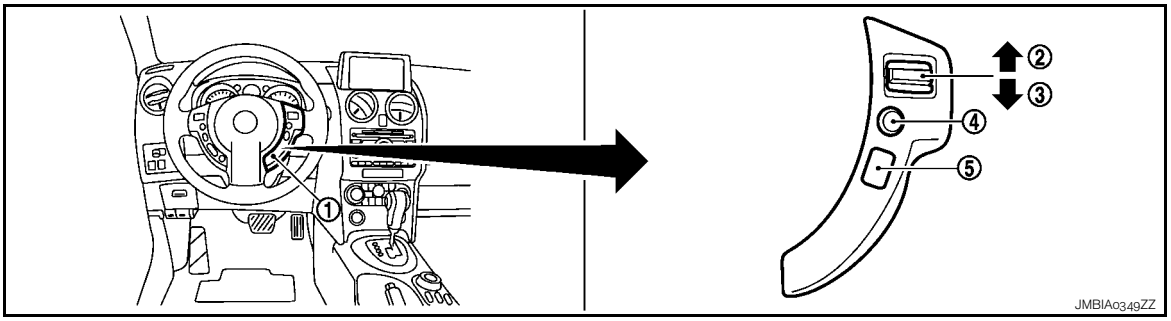


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001096747

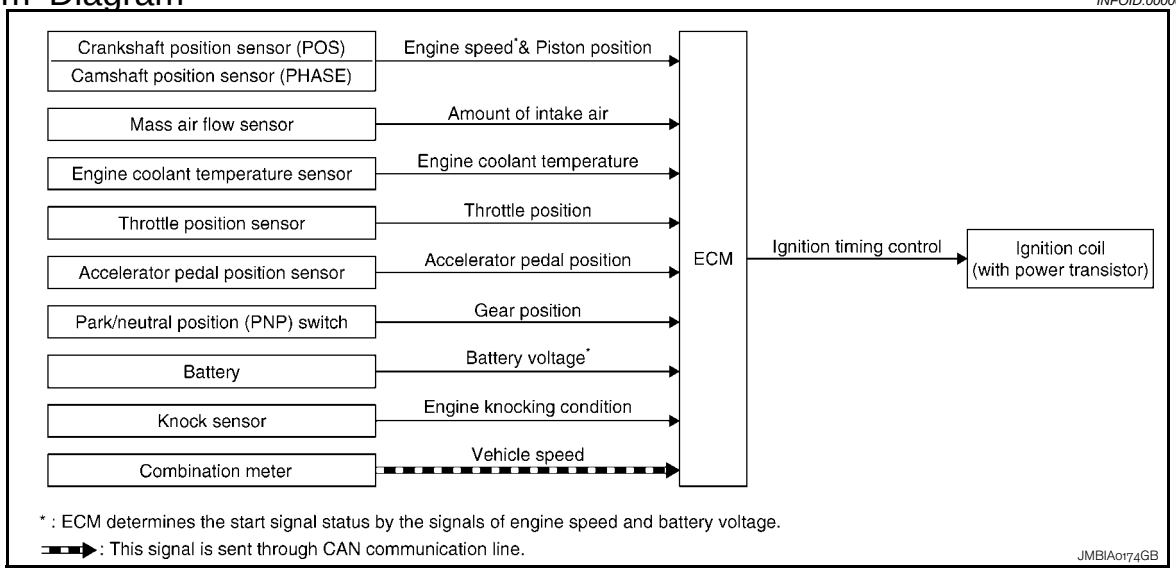
Component	Reference
Accelerator pedal position sensor	EC-539, "Description"
Camshaft position sensor (PHASE)	EC-489, "Description"
Crankshaft position sensor (POS)	EC-485, "Description"
Engine coolant temperature sensor	EC-461, "Description"
Fuel injector	EC-565, "Description"
Heated oxygen sensor 1	EC-141, "Description"
Heated oxygen sensor 2	EC-583, "Description"
Intake air temperature sensor	EC-586, "Description"
Knock sensor	EC-483, "Description"
Mass air flow sensor	EC-456, "Description"
Park/neutral position (PNP) switch	EC-533, "Description"
Throttle position sensor	EC-464, "Description"
Vehicle speed sensor	EC-597, "Description"

cardiagn.com

ELECTRIC IGNITION SYSTEM

System Diagram

INFOID:0000000001096748



System Description

INFOID:0000000001096749

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2 Piston position	Ignition timing control	Ignition coil (with power transistor)
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Combination meter*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM.

The ECM receives information such as the injection pulse width and camshaft position sensor (PHASE) signal. Computing this information, ignition signals are transmitted to the power transistor.

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

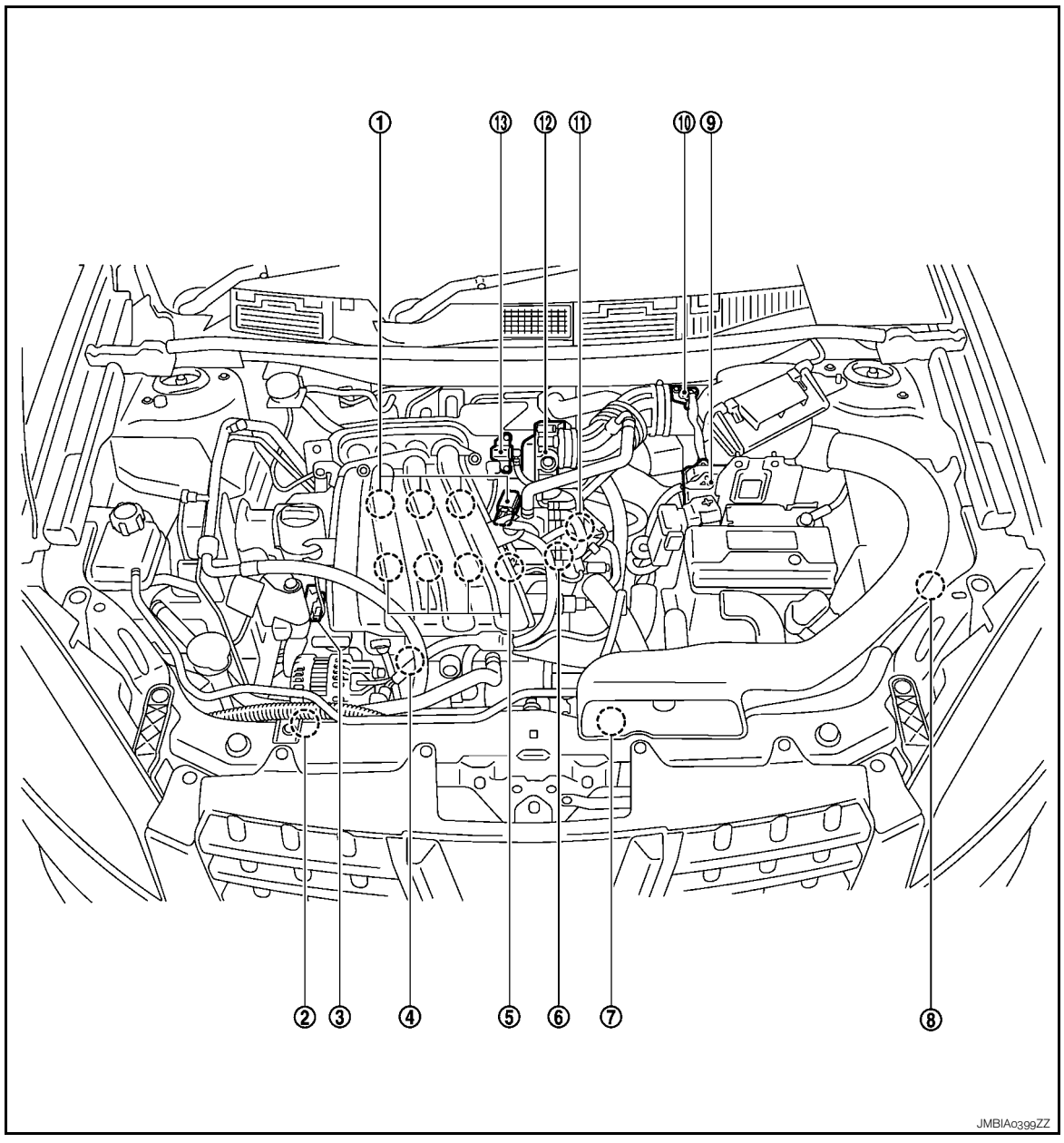
The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not

cardiagn.com

operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

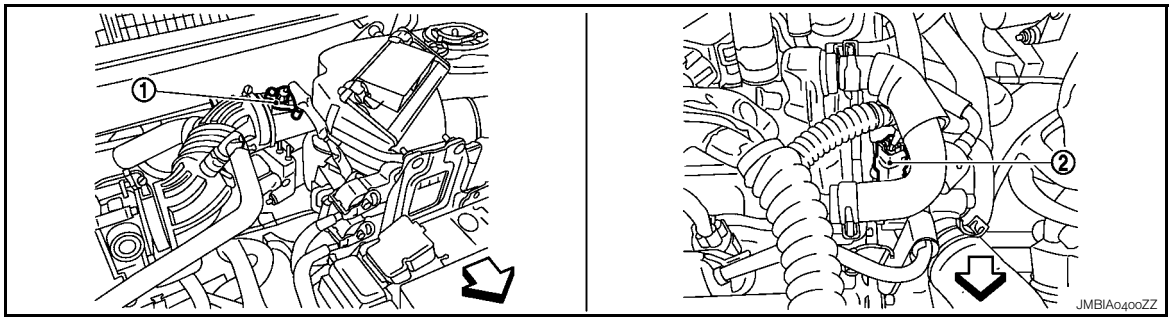
Component Parts Location

INFOID:0000000001096750



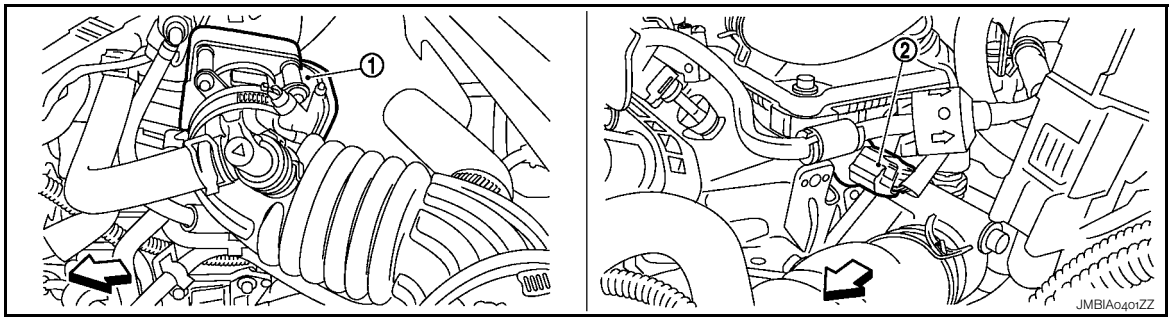
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



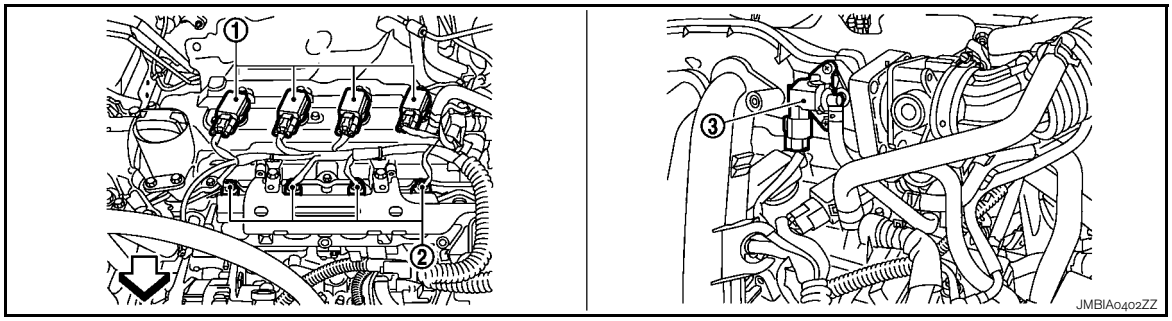
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



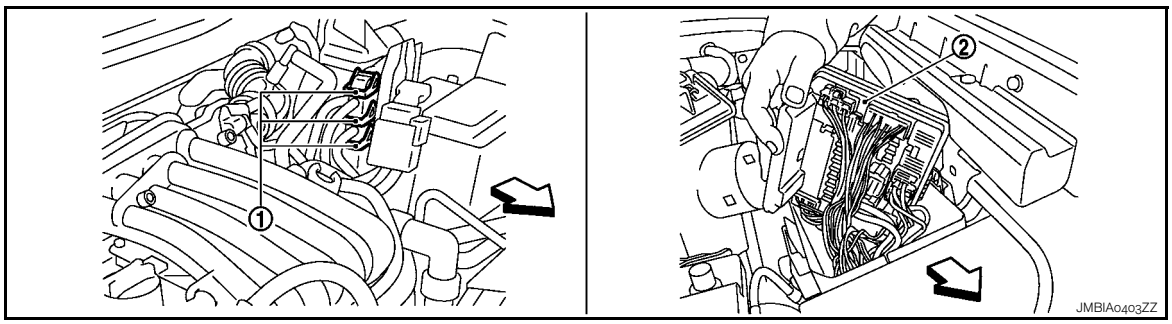
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

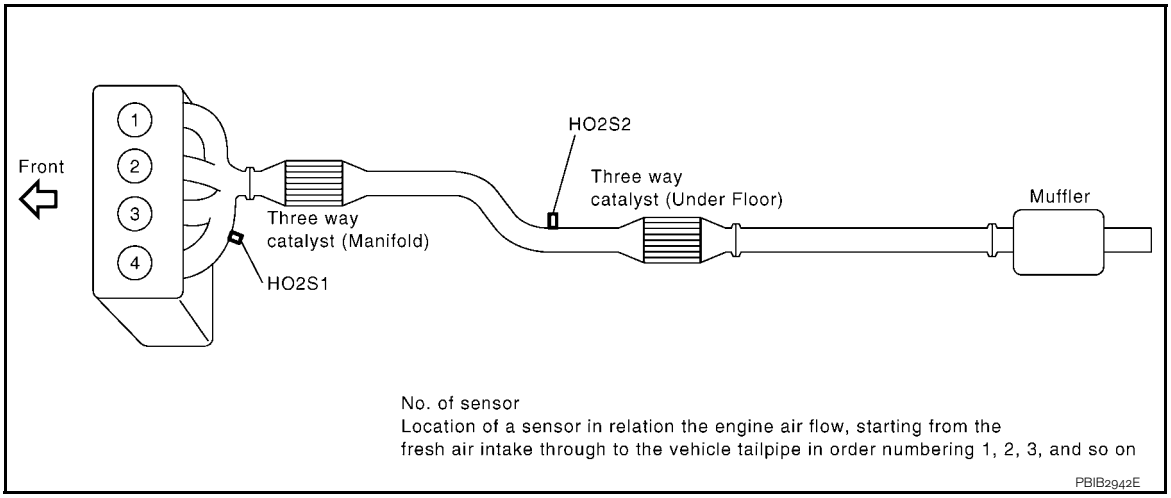
⇦ Vehicle front

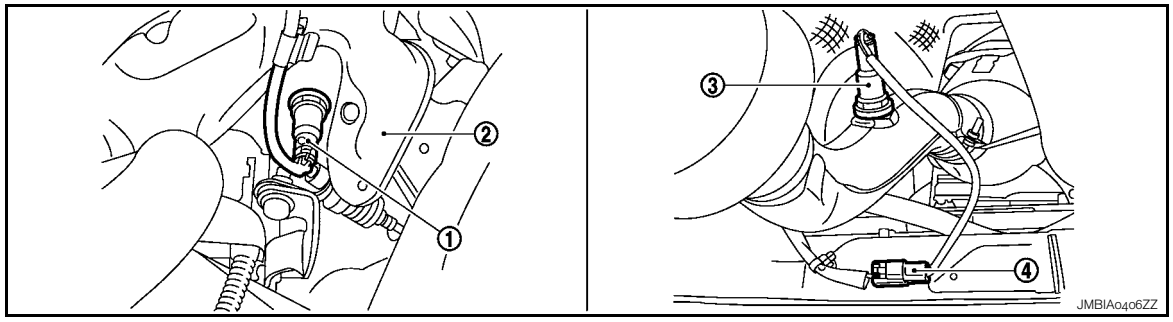


1. ECM harness connector
2. IPDM E/R

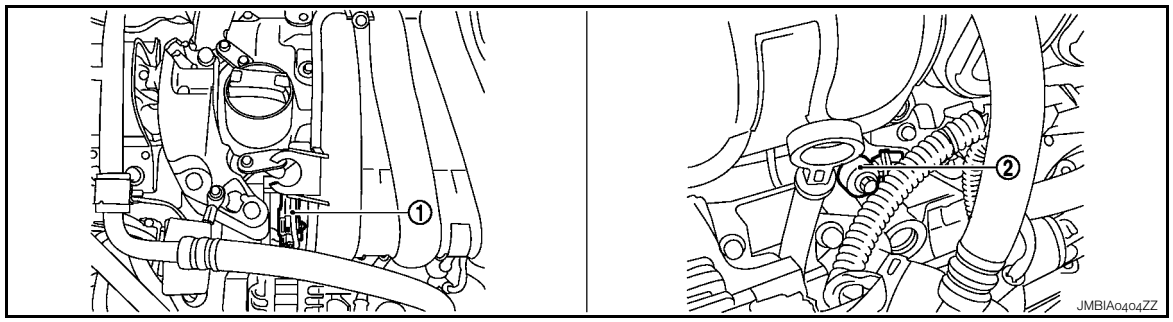
⇦ Vehicle front

cardiagn.com

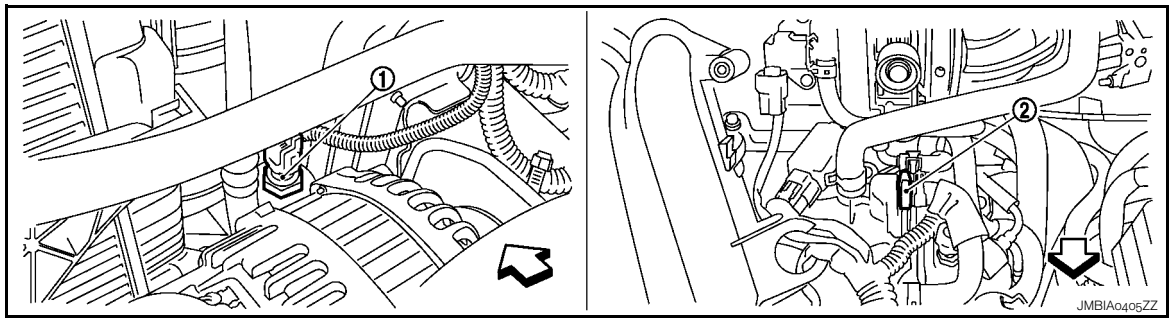




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



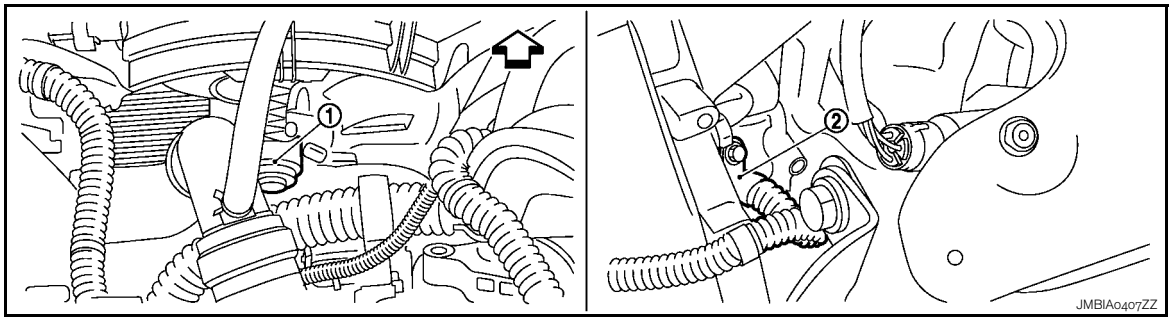
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

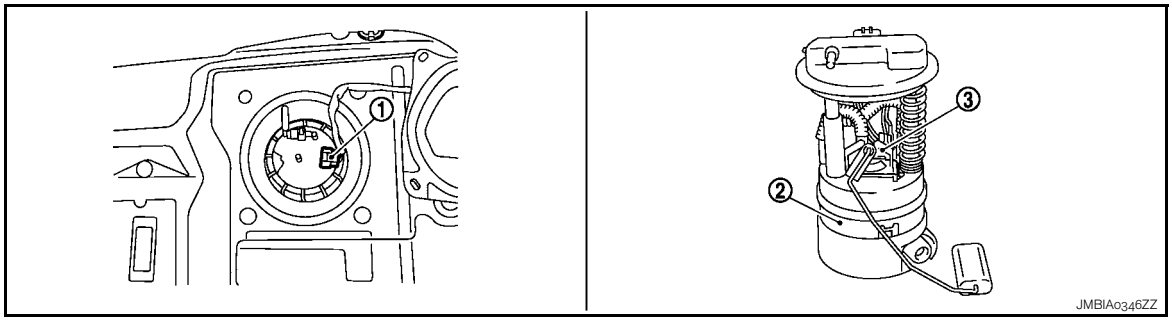
⇦ Vehicle front

cardiagn.com

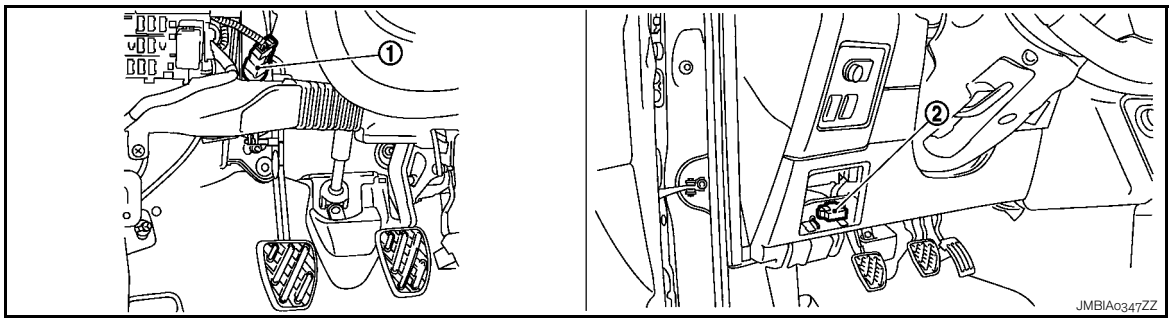


1. Cooling fan motor
2. Crankshaft position sensor (POS)

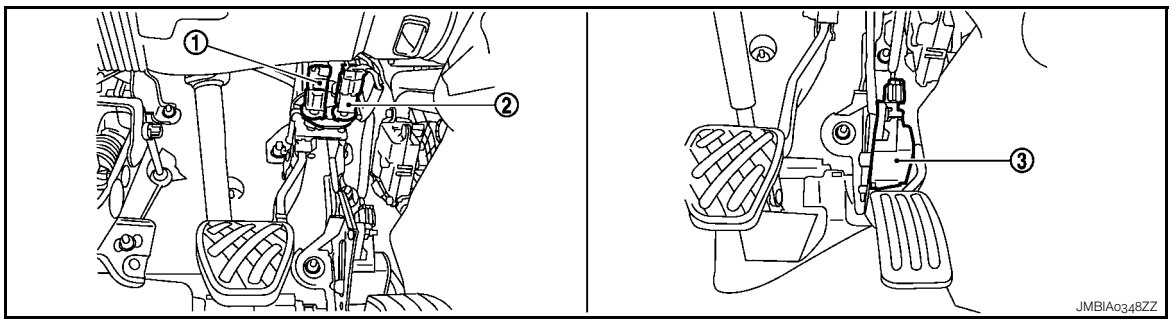
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

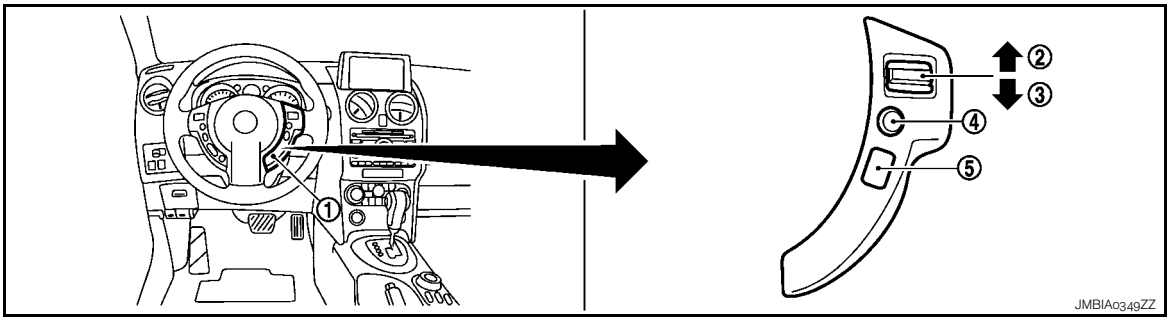


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001096751

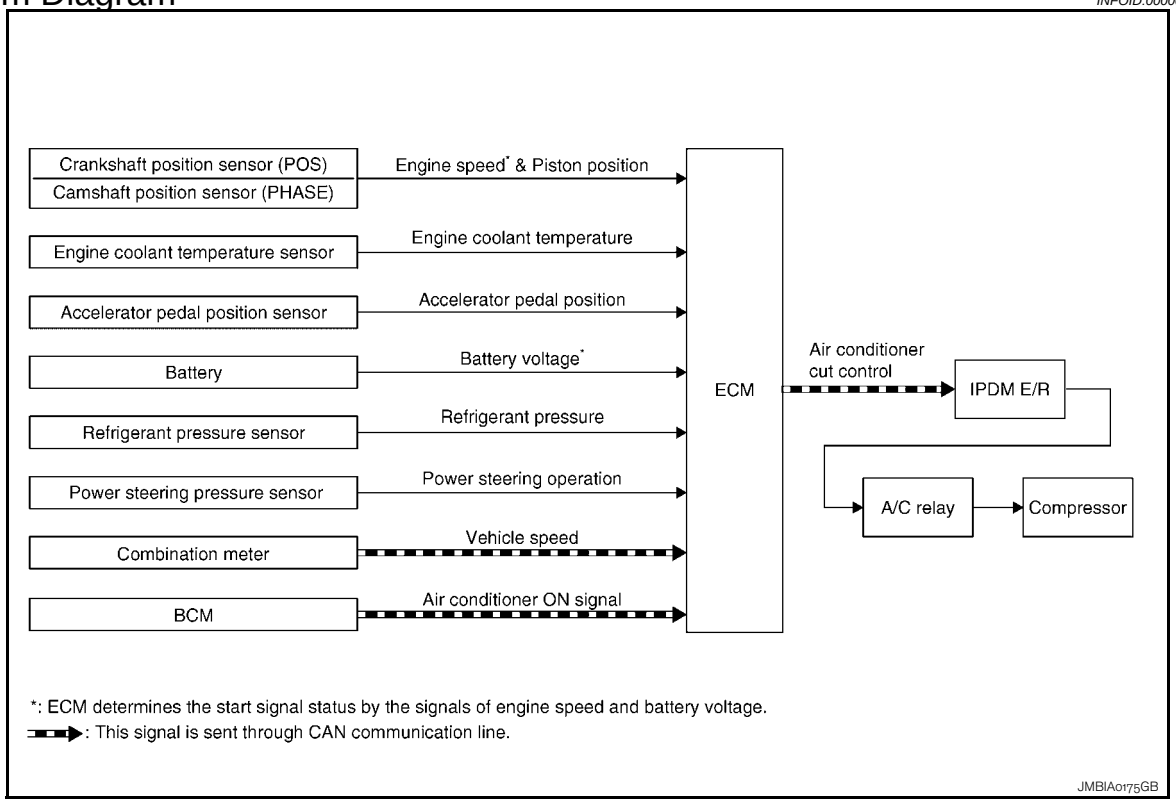
Component	Reference
Accelerator pedal position sensor	EC-539, "Description"
Camshaft position sensor (PHASE)	EC-489, "Description"
Crankshaft position sensor (POS)	EC-485, "Description"
Engine coolant temperature sensor	EC-461, "Description"
Ignition signal	EC-588, "Description"
Knock sensor	EC-483, "Description"
Mass air flow sensor	EC-127, "Description"
Park/neutral position (PNP) switch	EC-274, "Description"
Throttle position sensor	EC-464, "Description"
Vehicle speed sensor	EC-597, "Description"

cardiagn.com

AIR CONDITIONING CUT CONTROL

System Diagram

INFOID:0000000001096752



System Description

INFOID:0000000001096753

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
BCM*1	Air conditioner ON signal	Air conditioner cut control	IPDM E/R ↓ Air conditioner relay ↓ Compressor
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Refrigerant pressure sensor	Refrigerant pressure		
EPS control unit*1	Power steering operation		
Combination meter*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

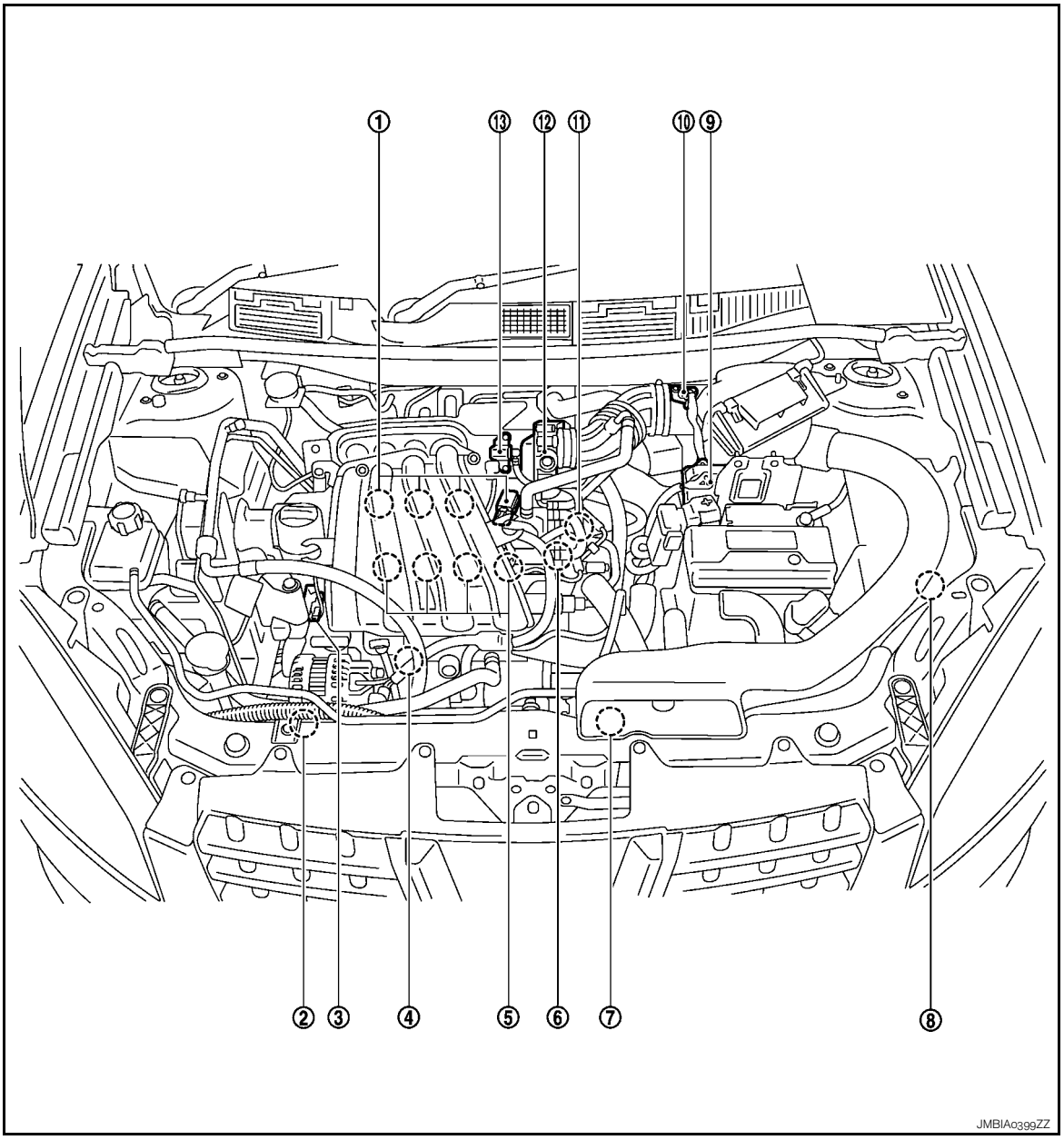
This system improves engine operation when the air conditioner is used.
Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

cardiagn.com

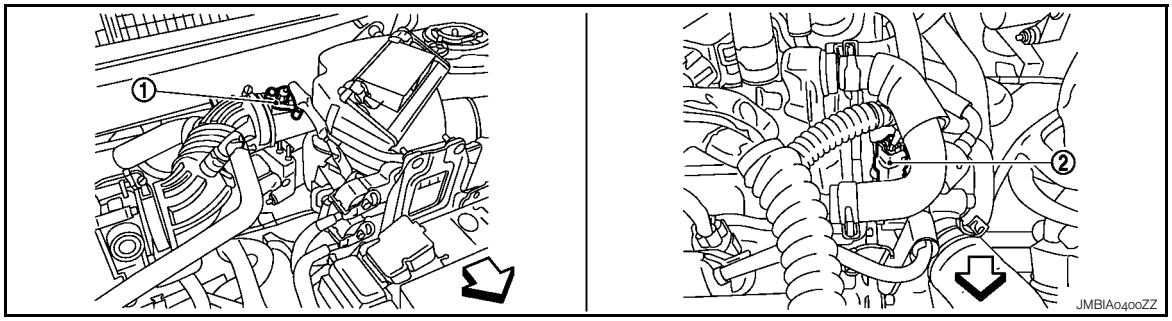
Component Parts Location

INFOID:0000000001096754



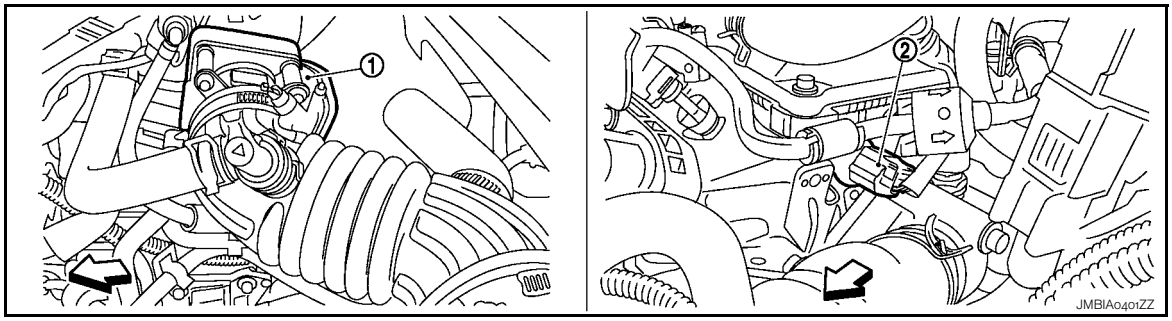
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



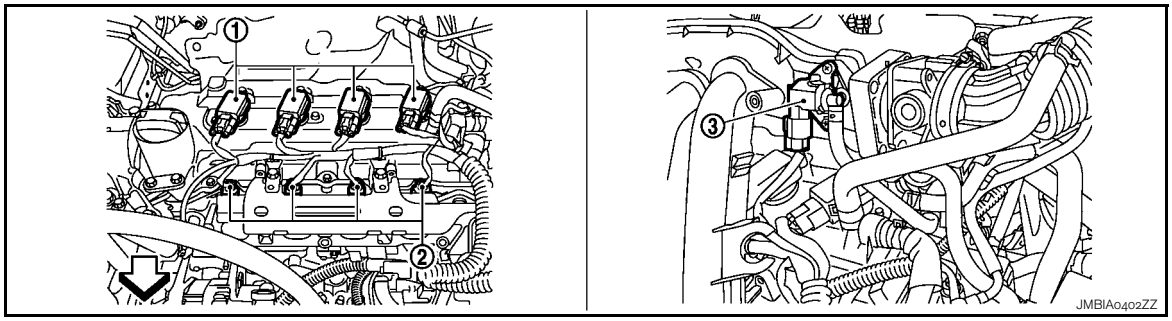
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



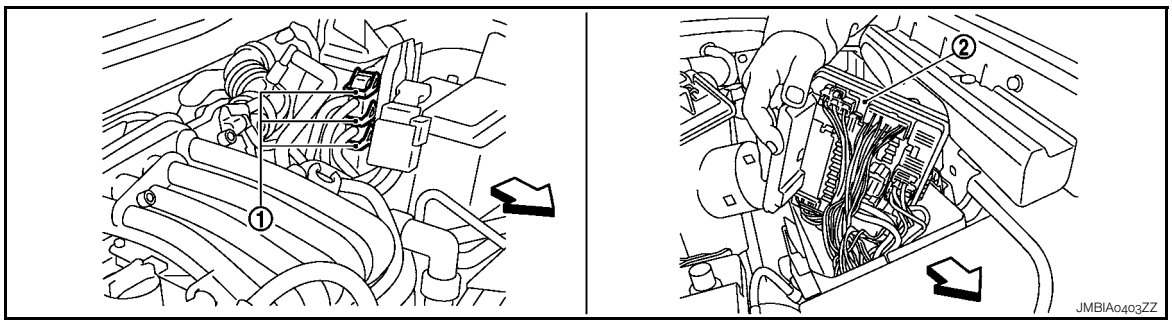
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

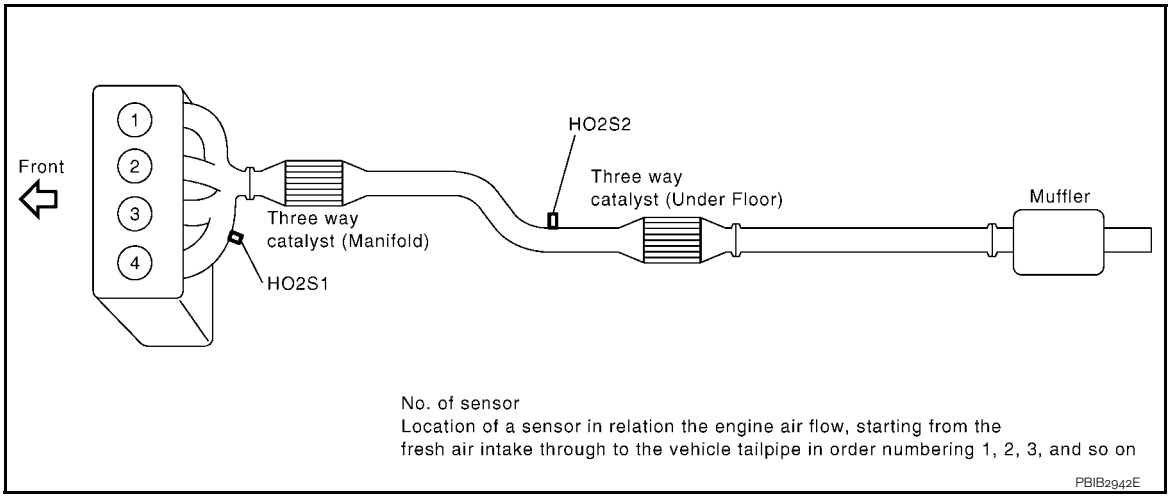
⇦ Vehicle front

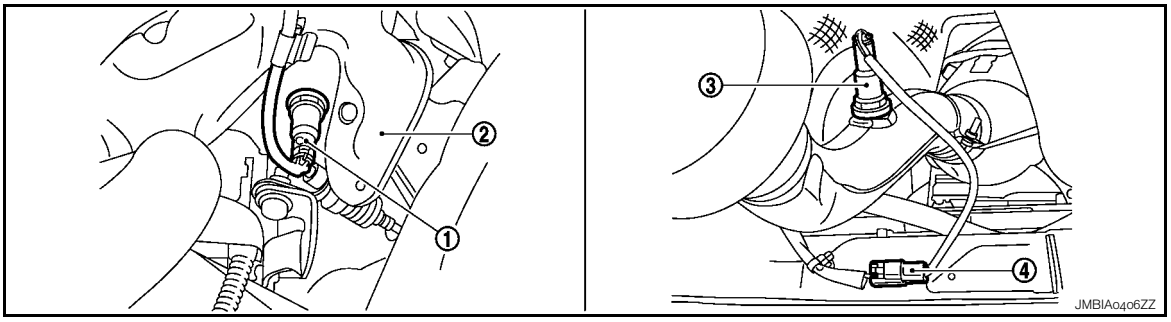


1. ECM harness connector
2. IPDM E/R

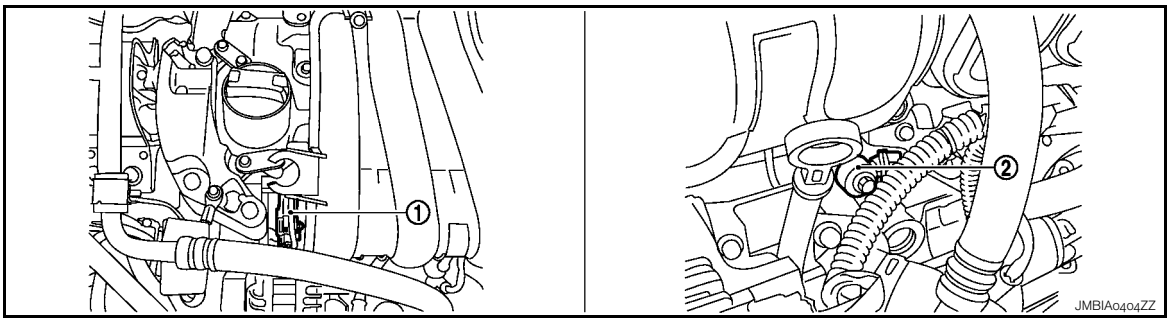
⇦ Vehicle front

cardiagn.com

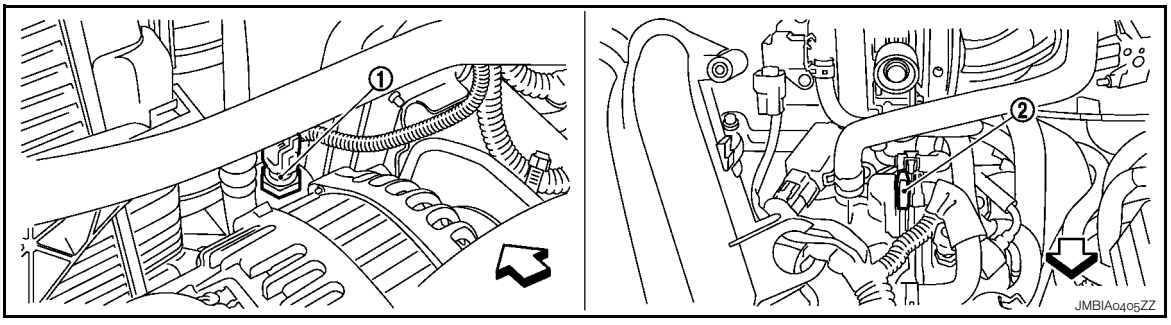




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



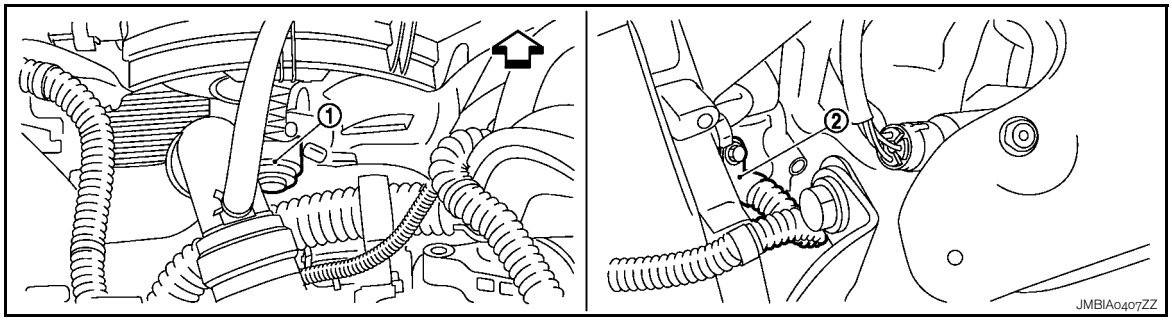
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

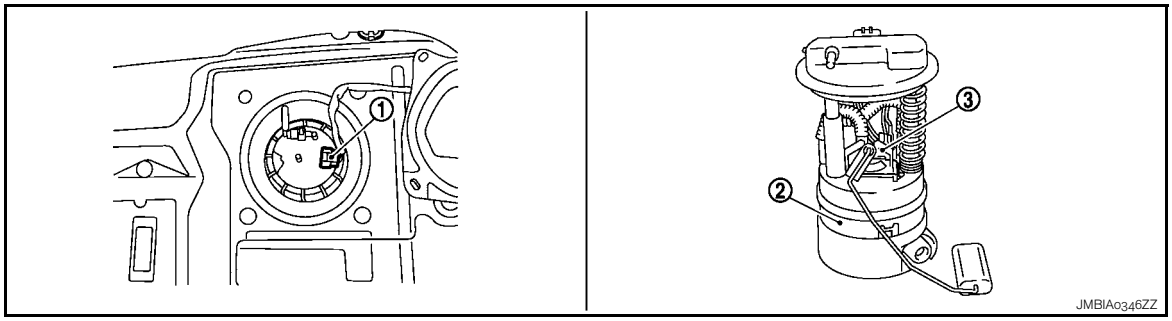
⇦ Vehicle front

cardiagn.com

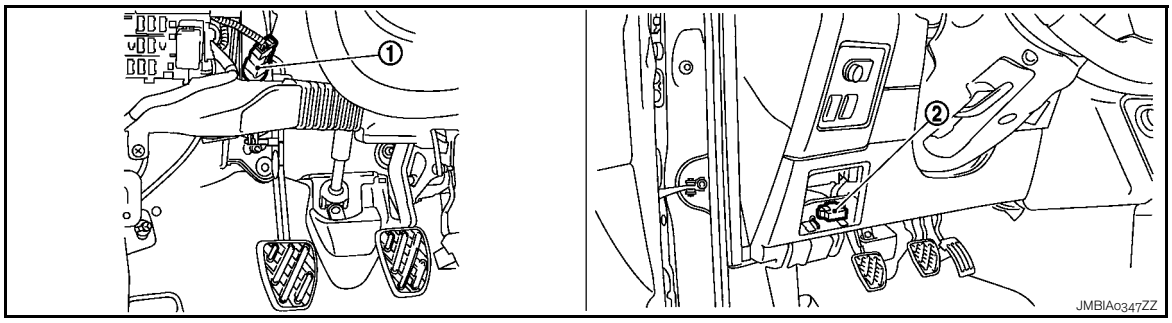


1. Cooling fan motor
2. Crankshaft position sensor (POS)

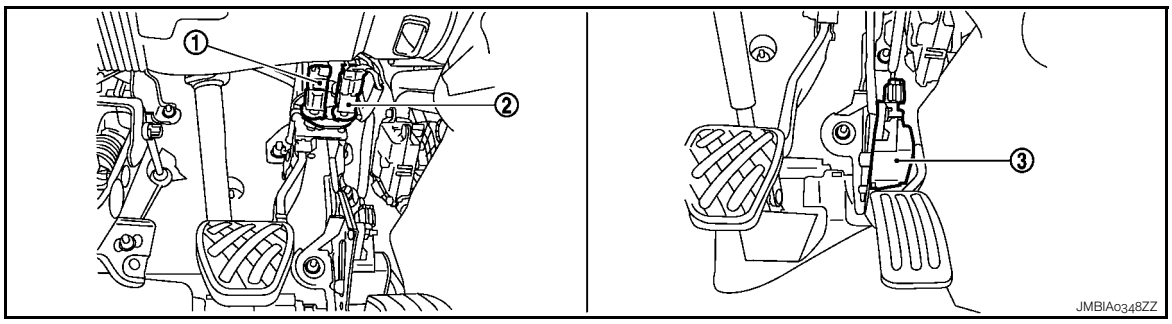
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

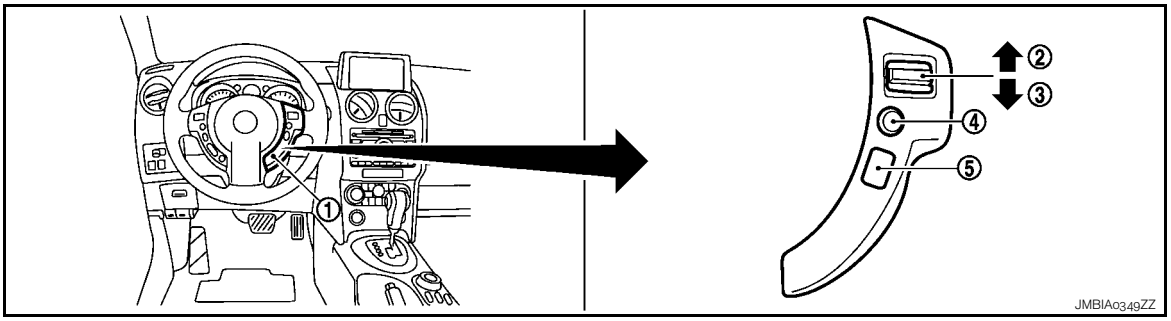


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001096755

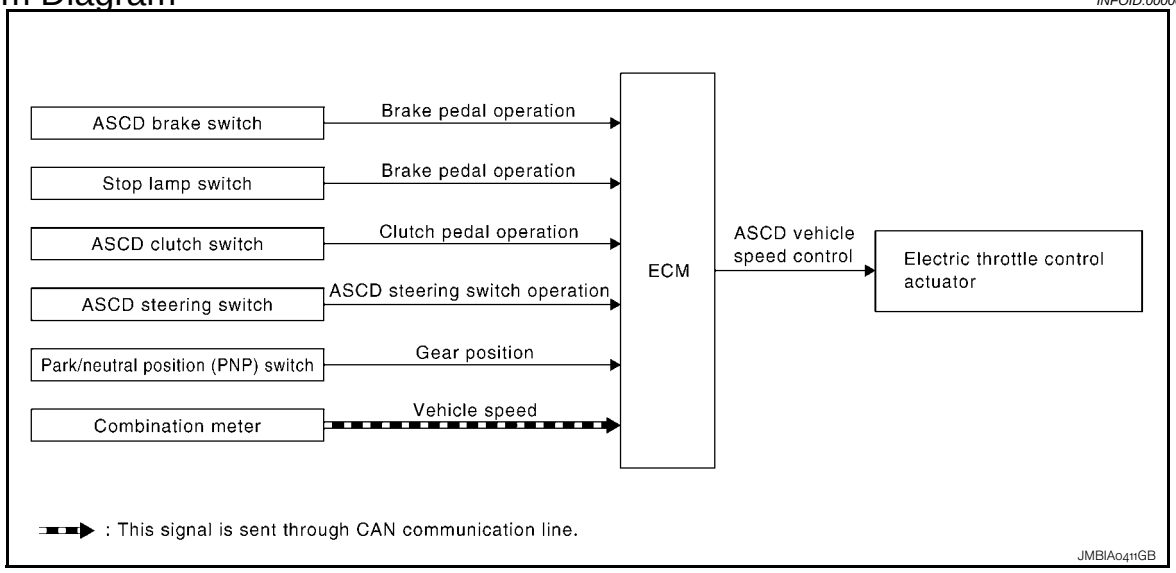
Component	Reference
Accelerator pedal position sensor	EC-539, "Description"
Camshaft position sensor (PHASE)	EC-489, "Description"
Crankshaft position sensor (POS)	EC-485, "Description"
Engine coolant temperature sensor	EC-461, "Description"
EPS contro unit	STC-4, "System Description"
Refrigerant pressure sensor	EC-595, "Description"
Vehicle speed sensor	EC-597, "Description"

cardiagn.com

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Diagram

INFOID:0000000001096756



System Description

INFOID:0000000001096757

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch			
ASCD clutch switch	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/neutral position switch	Gear position		
Combination meter*	Vehicle speed		

*: This signal is sent to the ECM through CAN communication line

BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.
Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 180 km/h (112 MPH).
ECM controls throttle angle of electric throttle control actuator to regulate engine speed.
Operation status of ASCD is indicated by CRUISE lamp and SET lamp in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.
NOTE:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

SET OPERATION

Press MAIN switch. (The CRUISE lamp in combination meter illuminates.)
When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 180 km/h (112 MPH), press SET/COAST switch. (Then SET lamp in combination meter illuminates.)

ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is pressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.
And then ASCD will keep the new set speed.

CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.
- CANCEL switch is pressed

cardiagn.com

- More than 2 switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to neutral position.
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.
  When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ ACCELERATE switch.
- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

COAST OPERATION

When the SET/COAST switch is pressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

RESUME OPERATION

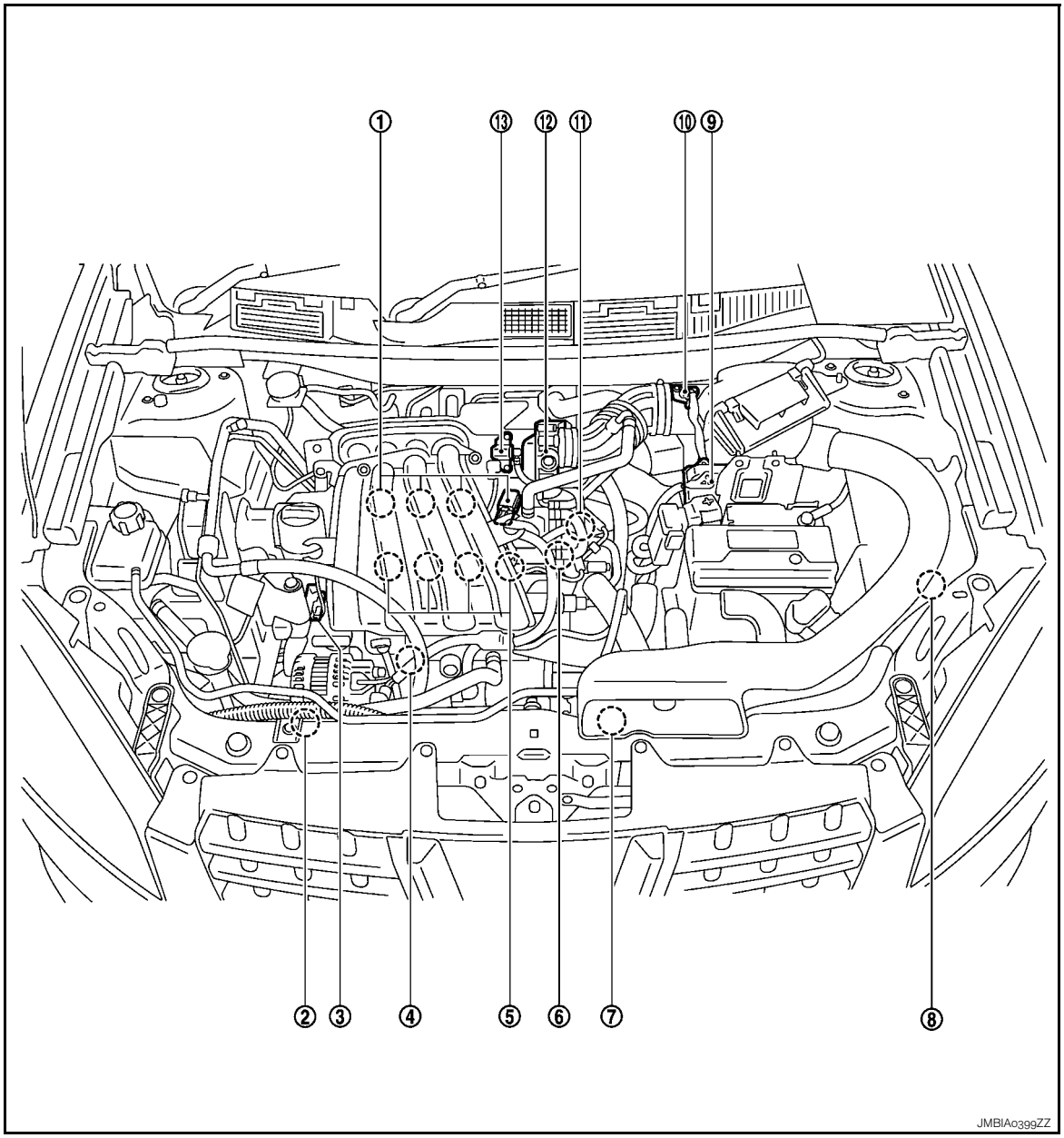
When the RESUME/ACCELERATE switch is pressed after cancel operation other than pressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released
- Clutch pedal is released
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 180km/h (112 MPH)

Component Parts Location

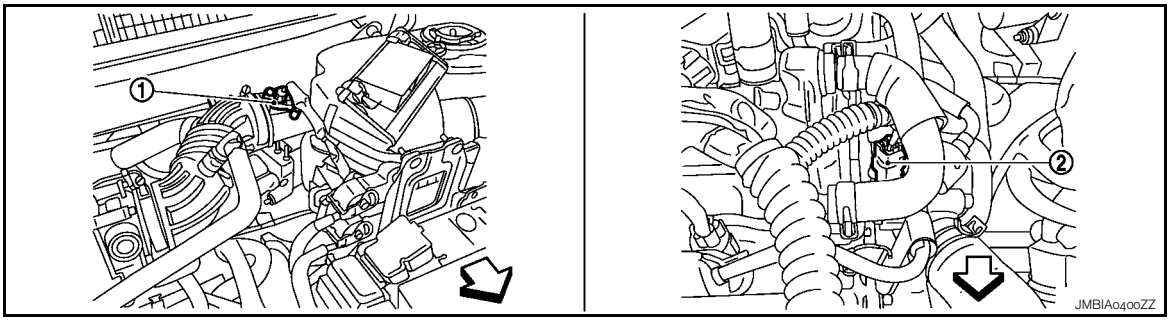
INFOID:0000000001096758

cardiagn.com



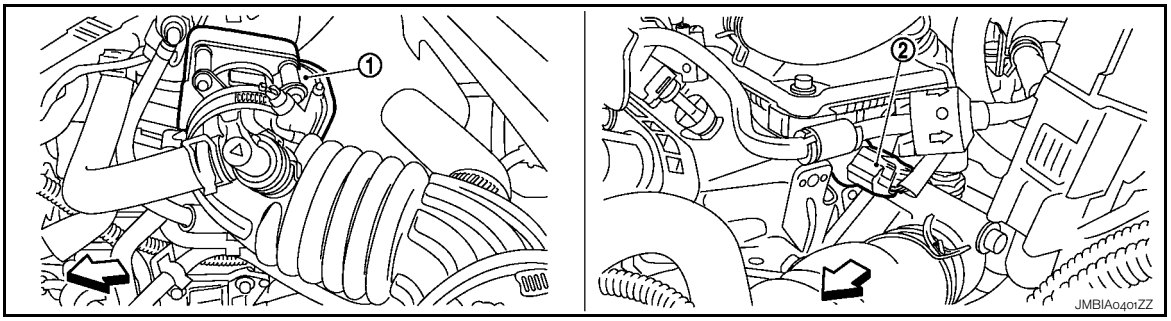
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



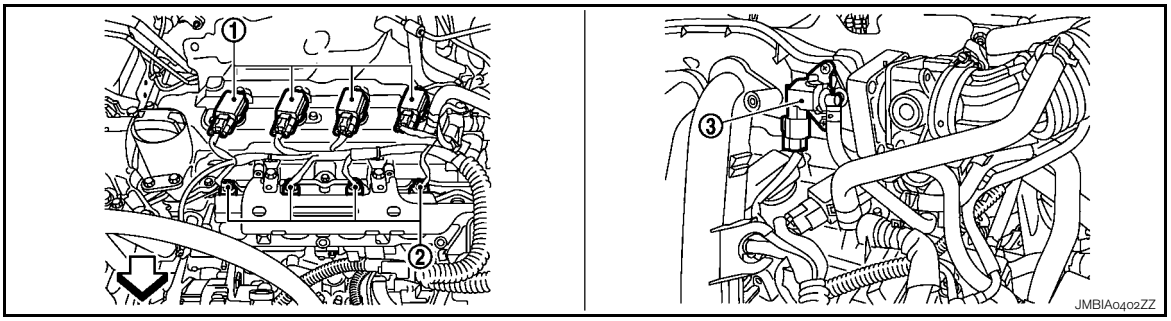
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



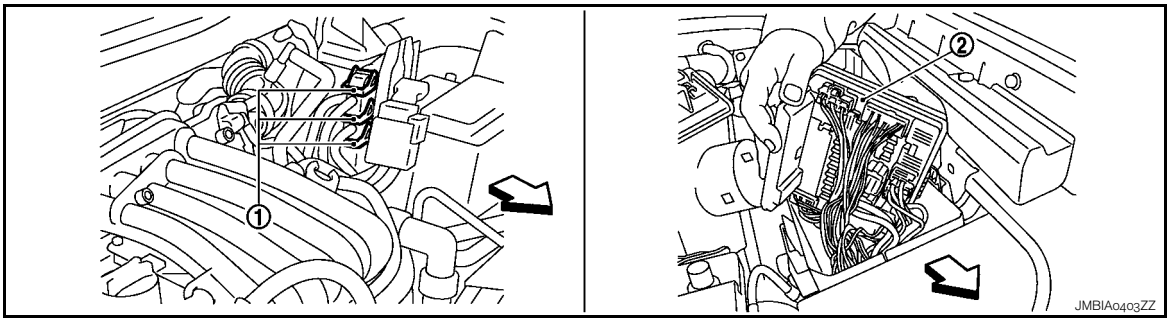
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

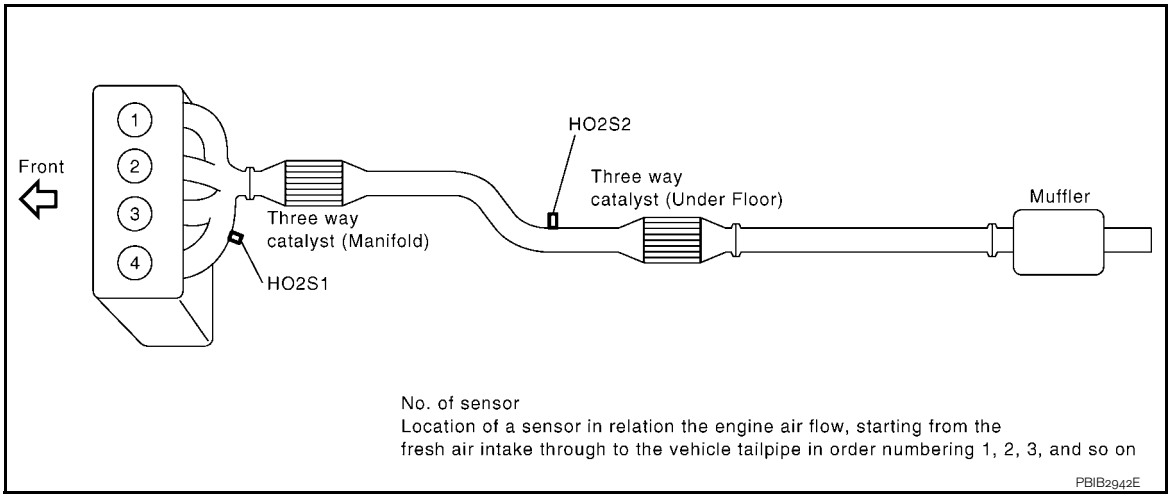
⇦ Vehicle front

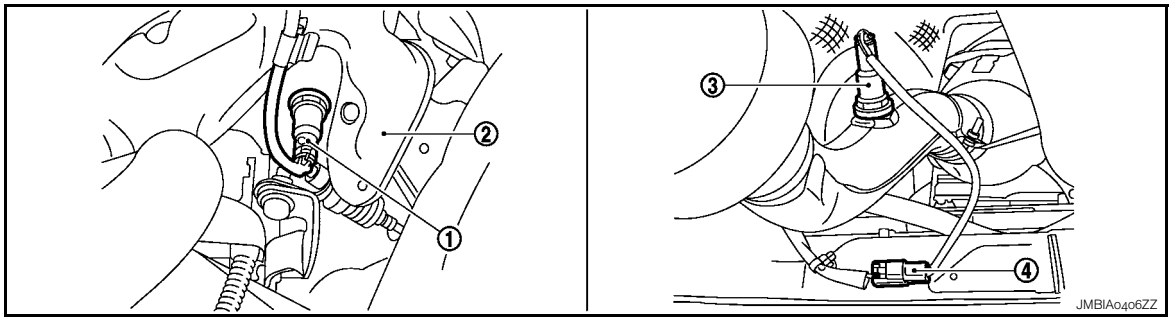


1. ECM harness connector
2. IPDM E/R

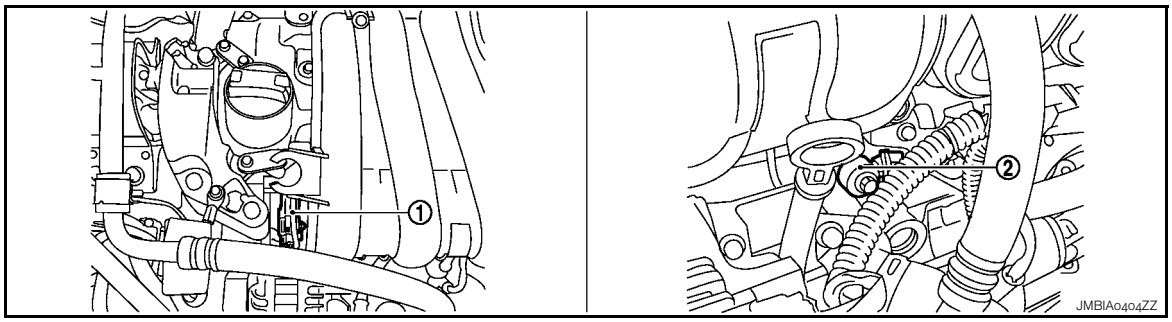
⇦ Vehicle front

cardiagn.com

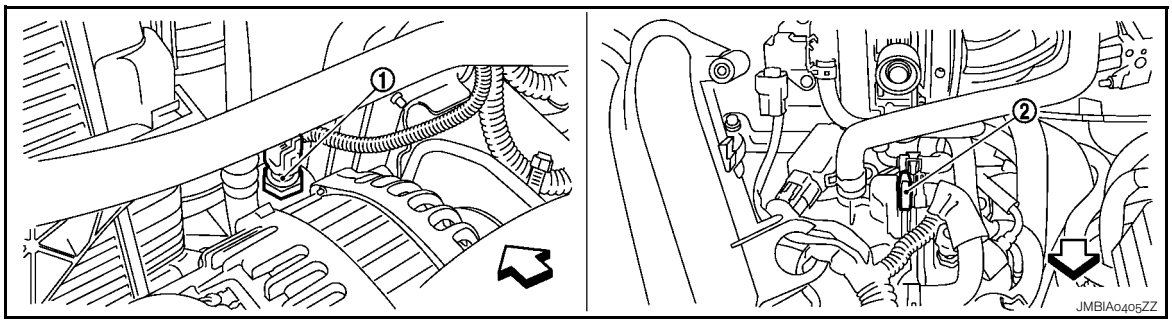




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



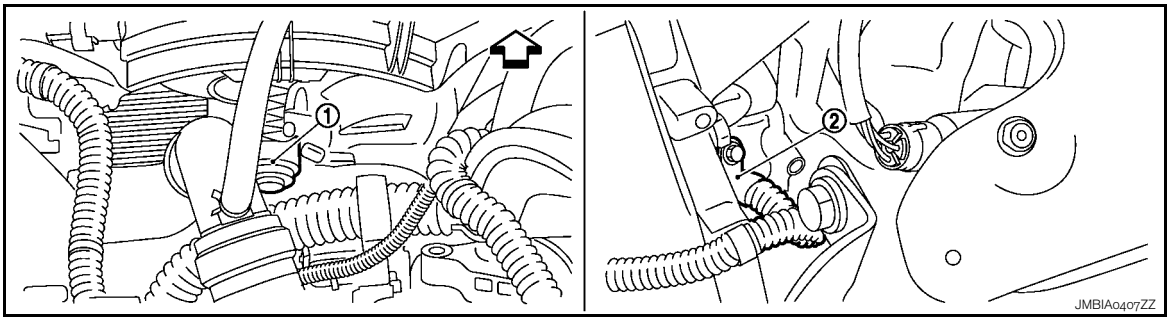
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

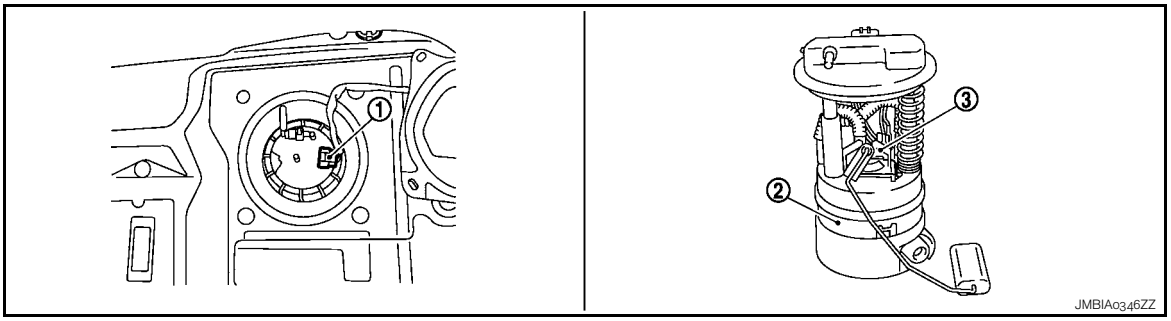
⇦ Vehicle front

cardiagn.com

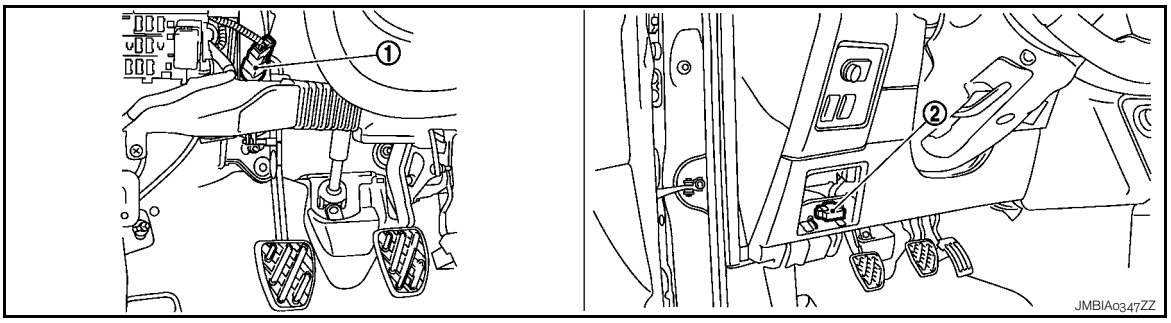


1. Cooling fan motor
2. Crankshaft position sensor (POS)

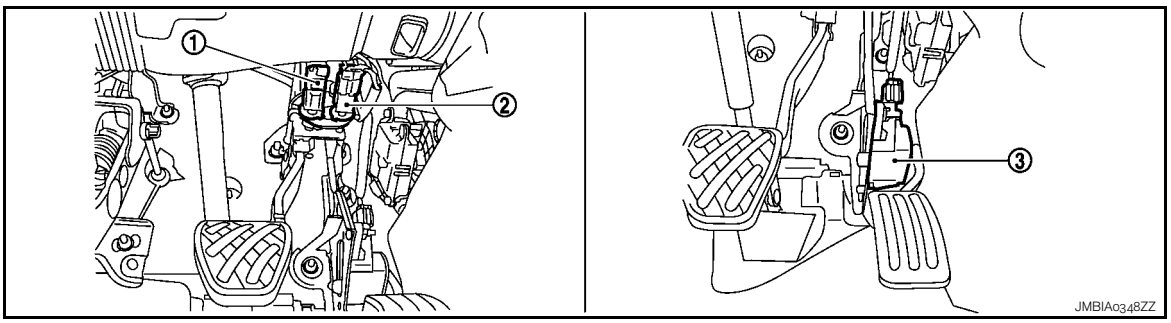
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

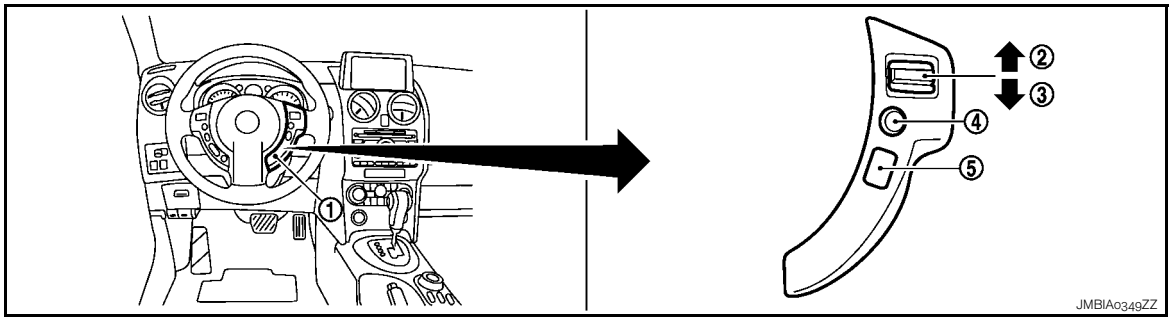


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001096759

Component	Reference
ASCD steering switch	EC-263, "Description"
ASCD clutch switch	EC-553, "Description"
ASCD brake switch	EC-294, "Description"
ASCD indicator	EC-557, "Description"
Stop lamp switch	EC-536, "Description"
Electric throttle control actuator	EC-499, "Description"

cardiagn.com

CAN COMMUNICATION

System Description

INFOID:0000000001096760

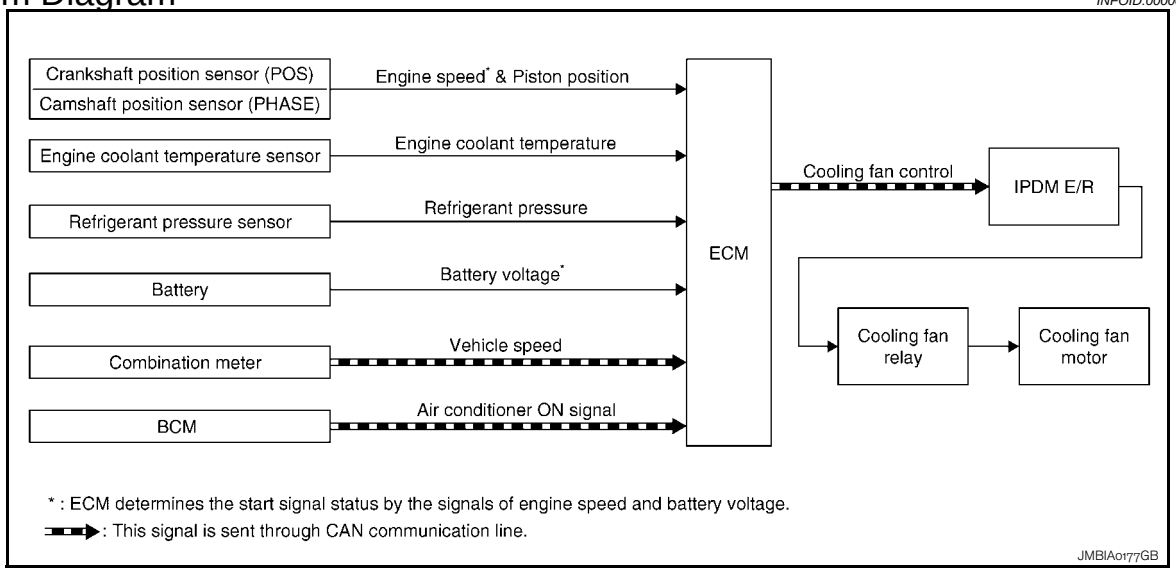
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
Refer to LAN-59, "CAN Communication Signal Chart", about CAN communication for detail.

cardiagn.com

COOLING FAN CONTROL

System Diagram

INFOID:0000000001096761



System Description

INFOID:0000000001096762

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	IPDM E/R ↓ Cooling fan relay ↓ Cooling fan motor
Battery	Battery voltage*1		
Combination meter	Vehicle speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
BCM	Air conditioner ON signal*2		
Refrigerant pressure sensor	Refrigerant pressure		

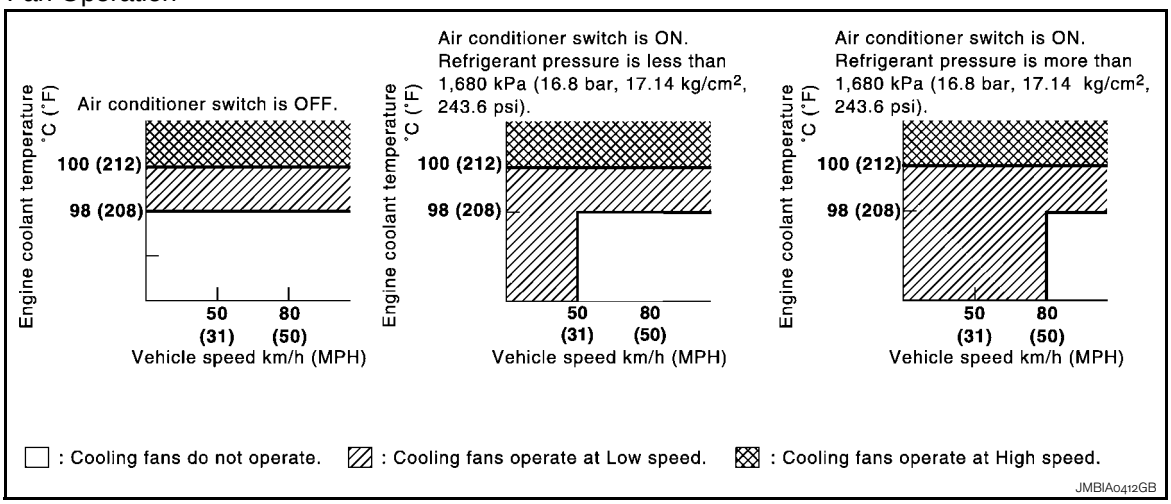
*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to ECM through CAN communication line.

SYSTEM DESCRIPTION

ECM controls cooling fan speed corresponding to vehicle speed, engine coolant temperature, refrigerant pressure, air conditioner ON signal. Then control system has 3-step control [HIGH/LOW/OFF].

Cooling Fan Operation



cardiagn.com

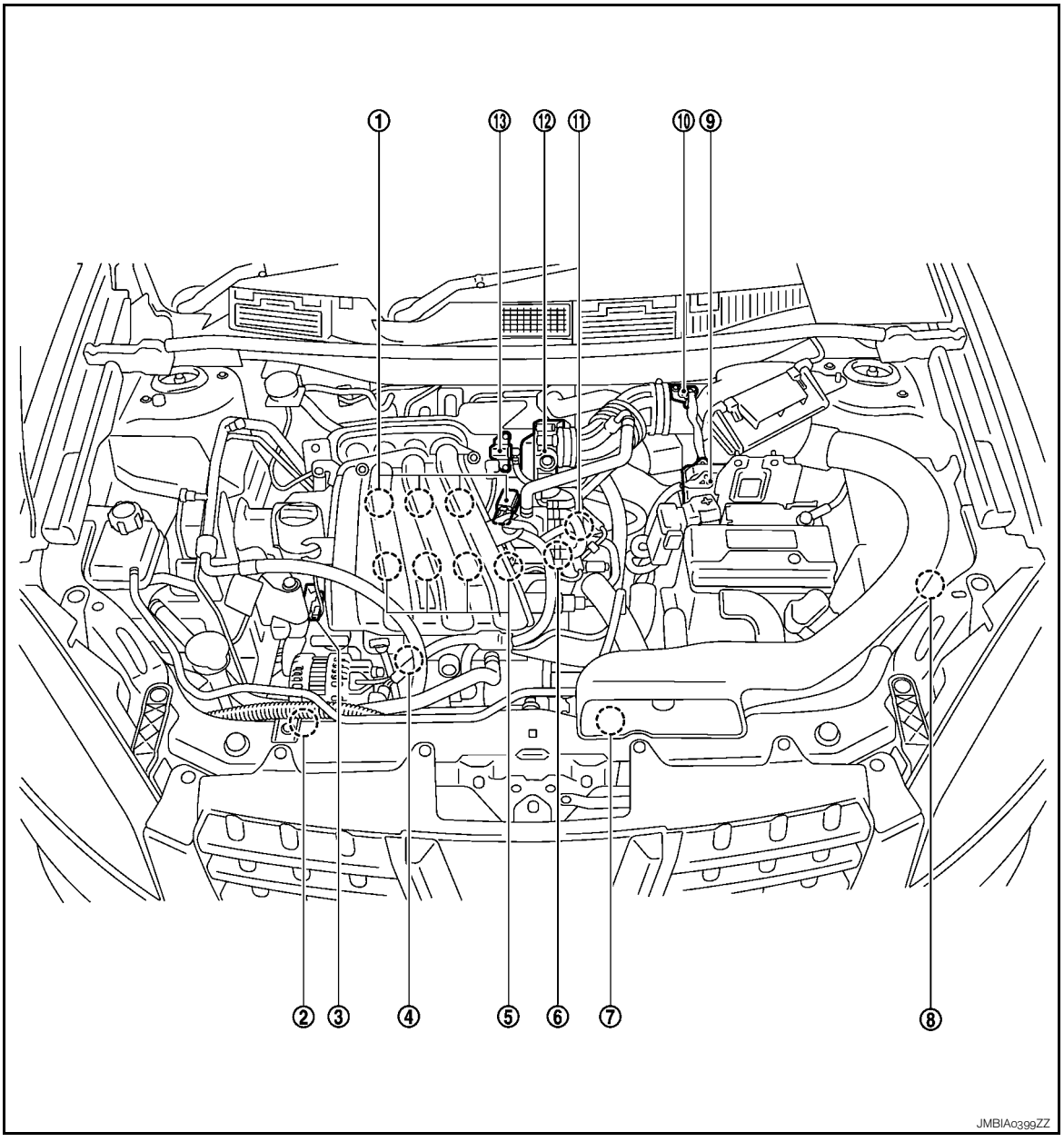
Cooling Fan Relay Operation

The ECM controls cooling fan relays through CAN communication line.

Cooling fan speed	Cooling fan relay	
	1	3
Stop (OFF)	OFF	OFF
Low (LOW)	ON	OFF
High (HI)	OFF	ON

Component Parts Location

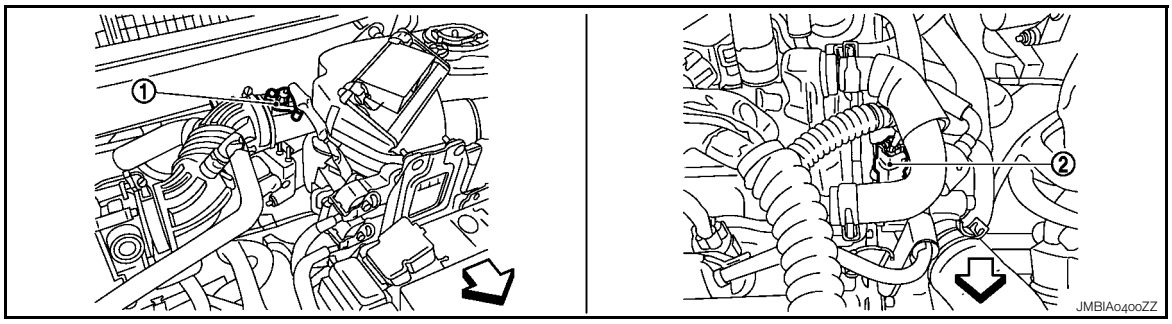
INFOID:0000000001096763



1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM

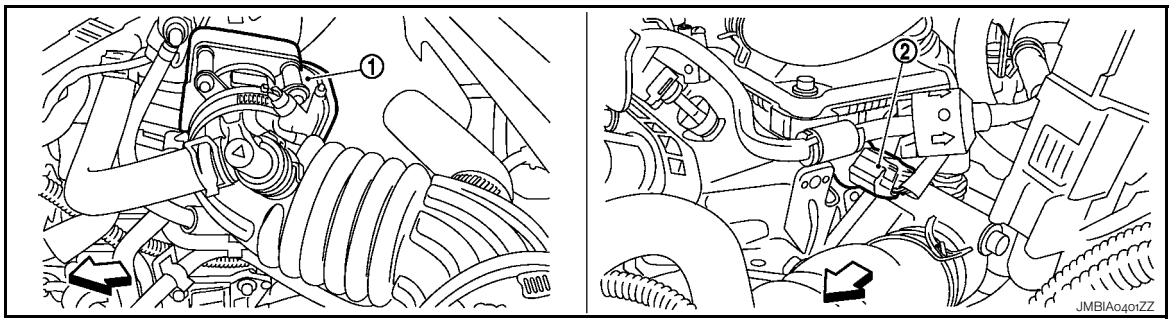
cardiagn.com

10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve



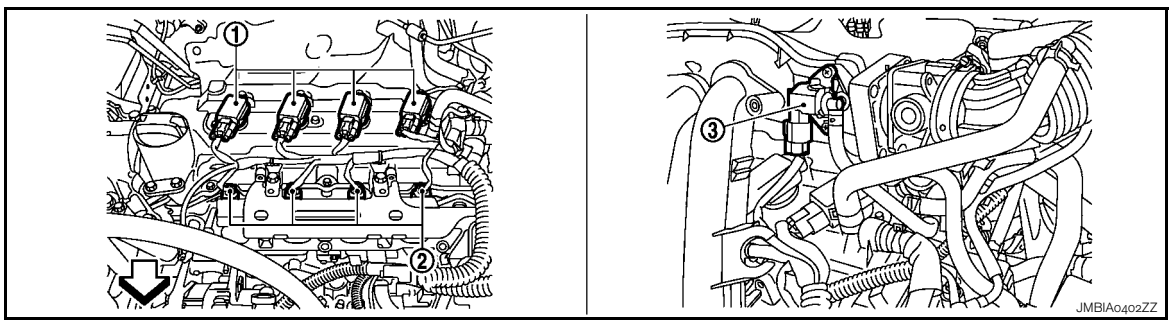
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

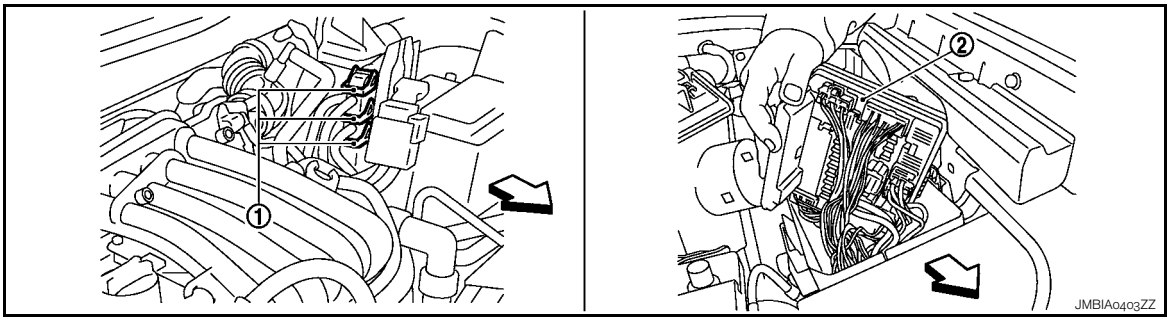
⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

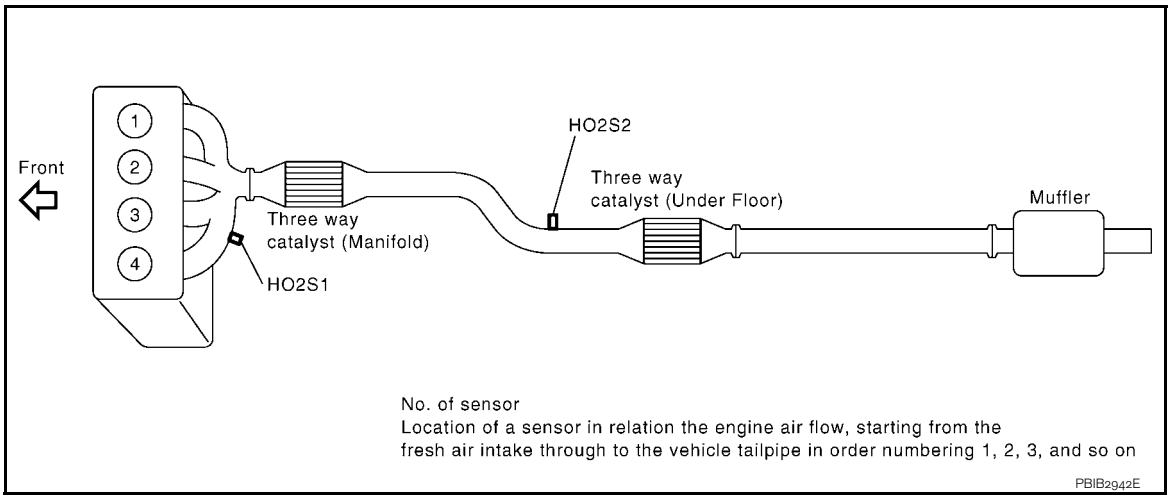
⇦ Vehicle front

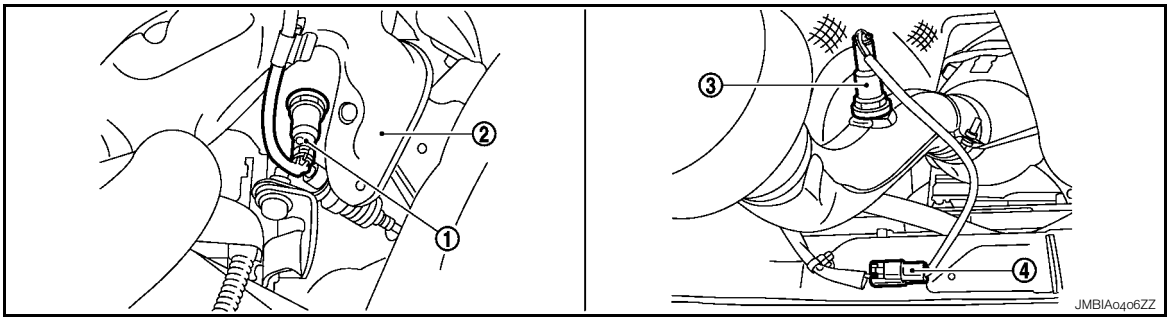
cardiagn.com



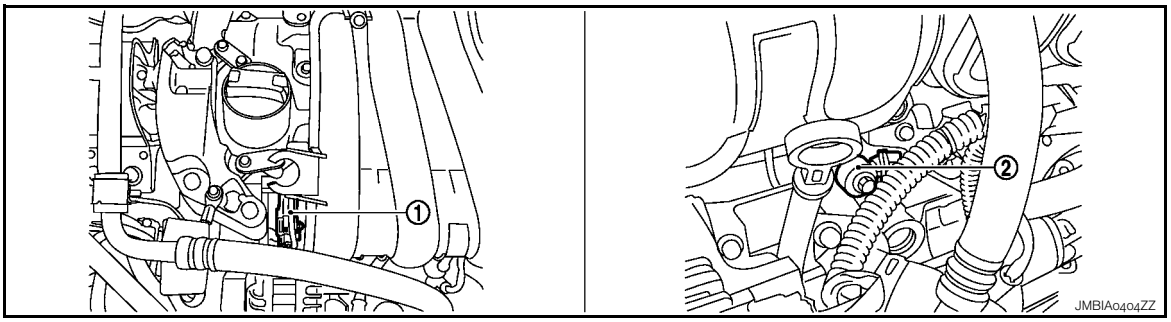
1. ECM harness connector
2. IPDM E/R

⇦ Vehicle front



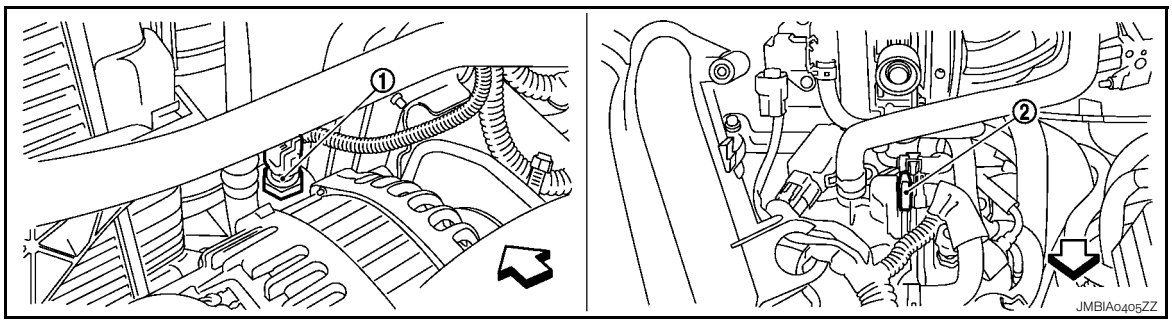


1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



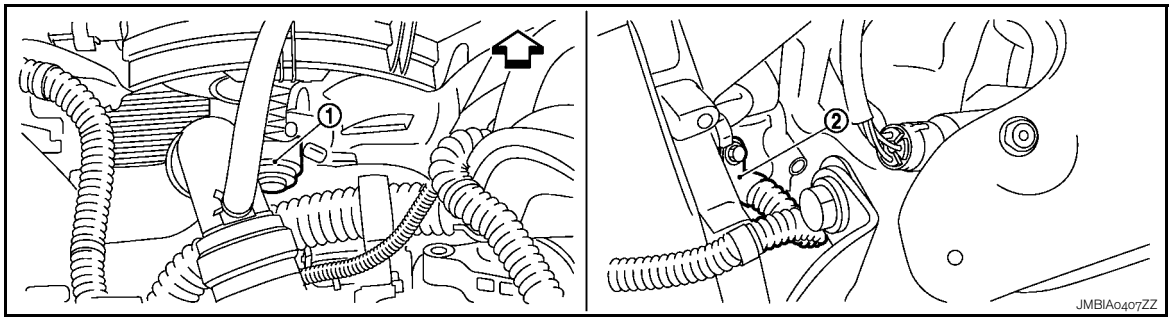
1. Intake valve timing control solenoid valve
2. Knock sensor

cardiagn.com



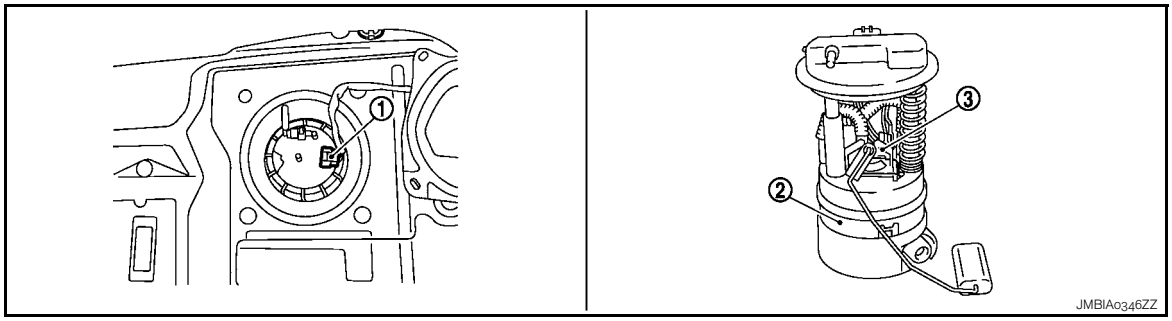
1. Refrigerant pressure sensor
2. PCV valve

⇦ Vehicle front

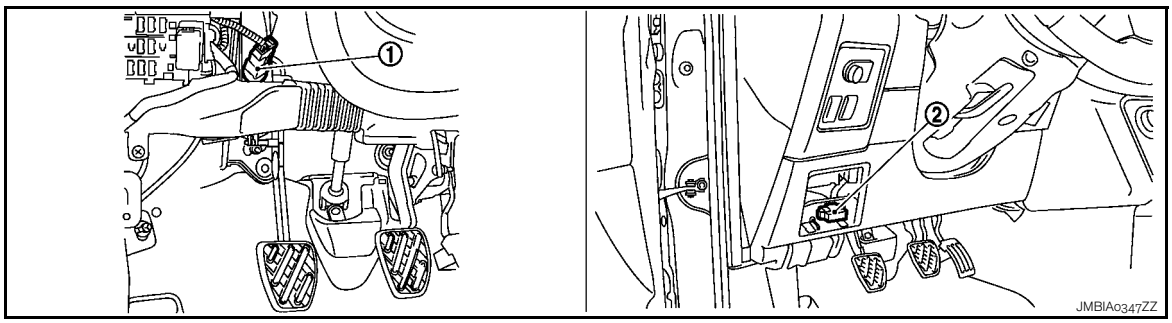


1. Cooling fan motor
2. Crankshaft position sensor (POS)

⇦ Vehicle front

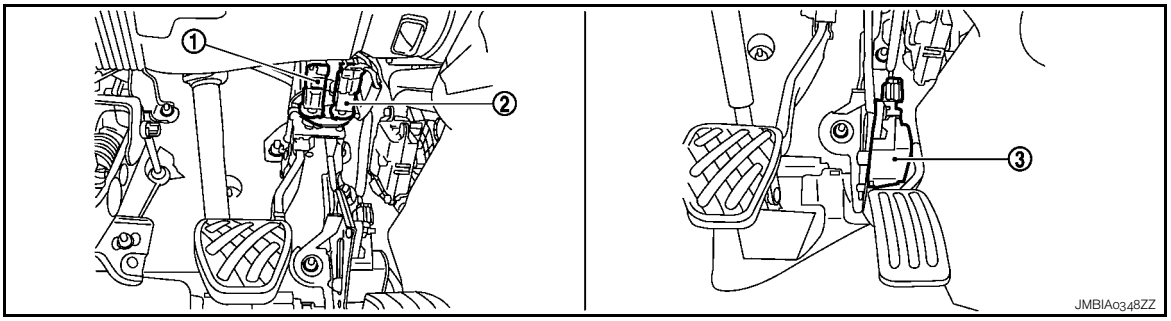


1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

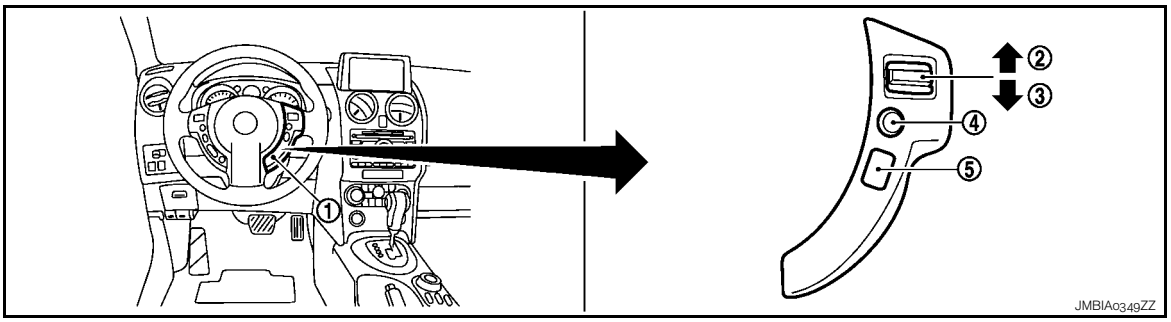


1. ASCD clutch switch
2. Data link connector

cardiagn.com



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001096764

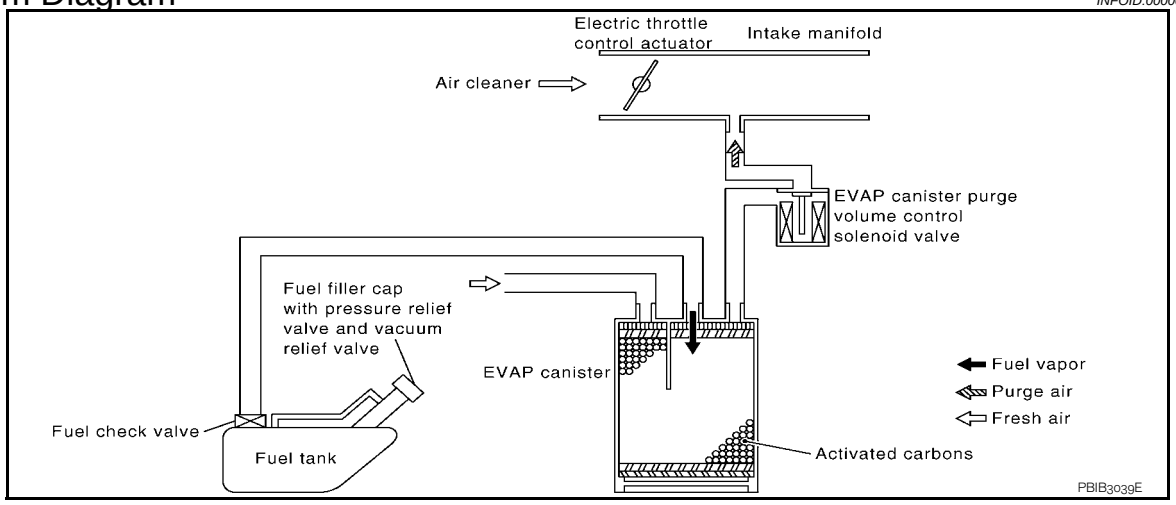
Component	Reference
Camshaft position sensor (PHASE)	EC-489, "Description"
Crankshaft position sensor (POS)	EC-485, "Description"
Cooling fan motor	EC-407, "System Description"
Engine coolant temperature sensor	EC-461, "Description"
Refrigerant pressure sensor	EC-595, "Description"

cardiagn.com

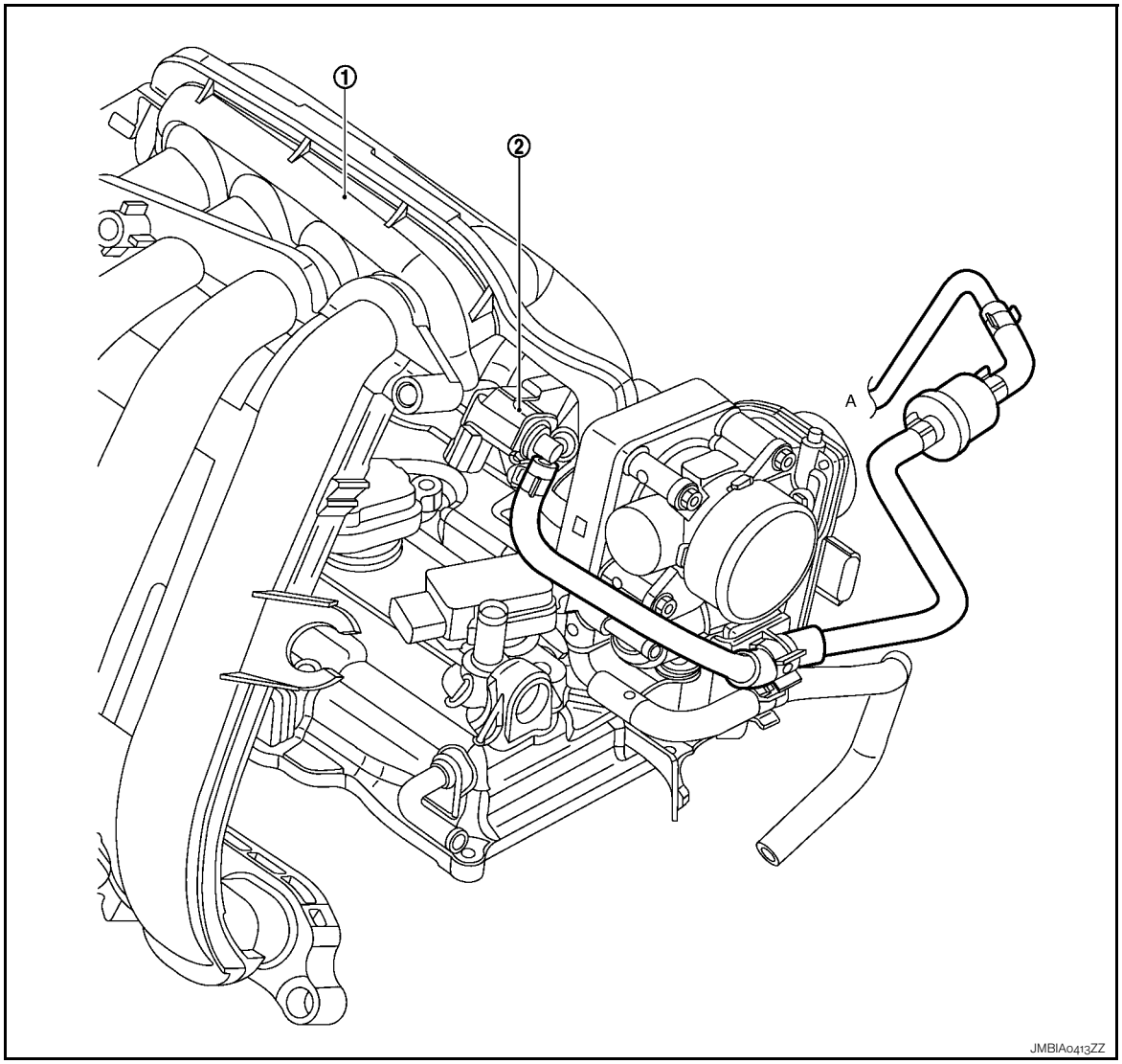
EVAPORATIVE EMISSION SYSTEM

System Diagram

INFOID:0000000001096765



EVAPORATIVE EMISSION LINE DRAWING



cardiagn.com

1. Intake manifold collector
2. EVAP canister purge volume control solenoid valve

A. To EVAP canister

NOTE:
Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

System Description

INFOID:0000000001096766

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Combination meter*2	Vehicle speed		

*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

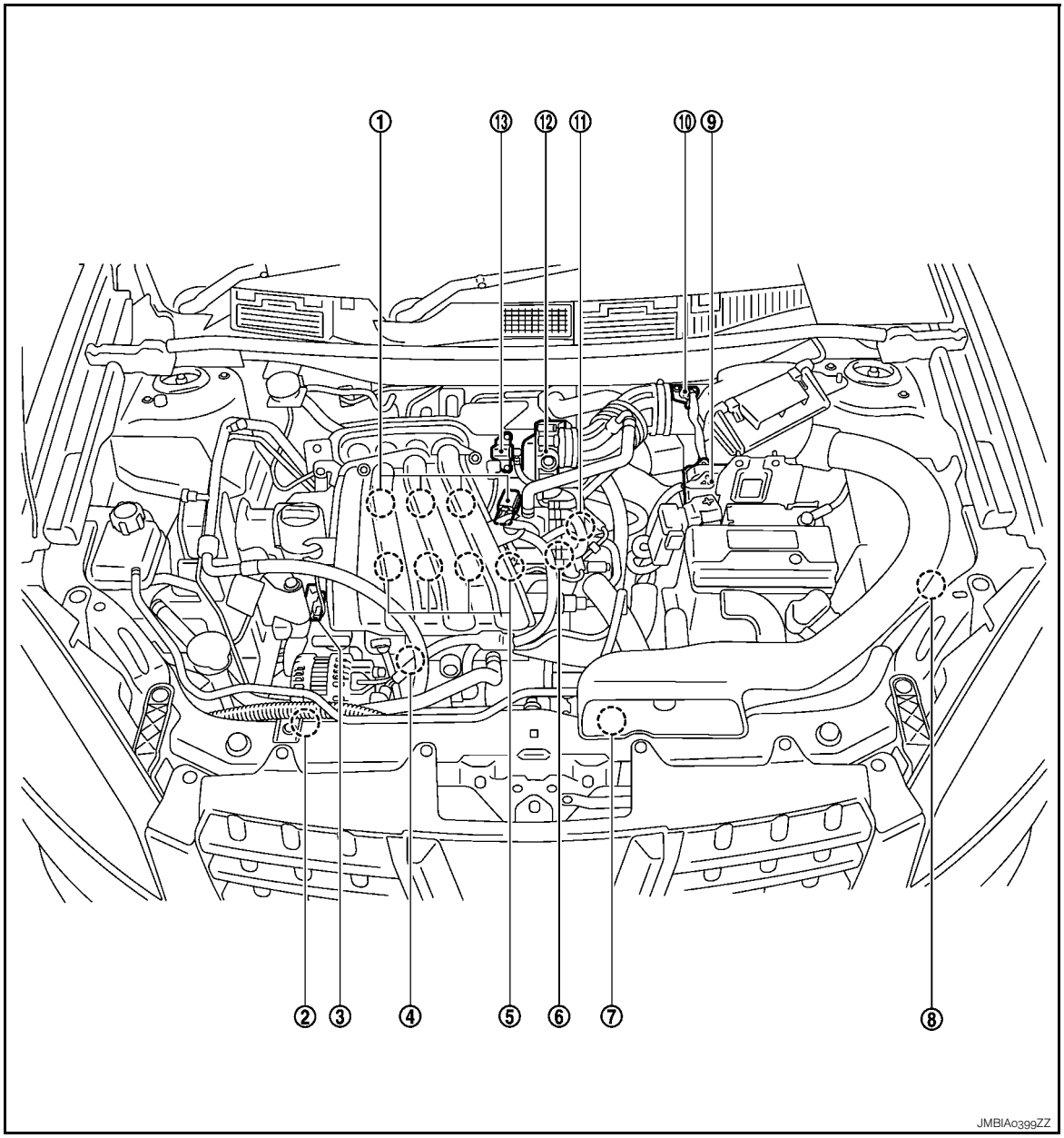
*2: This signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION

The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating.

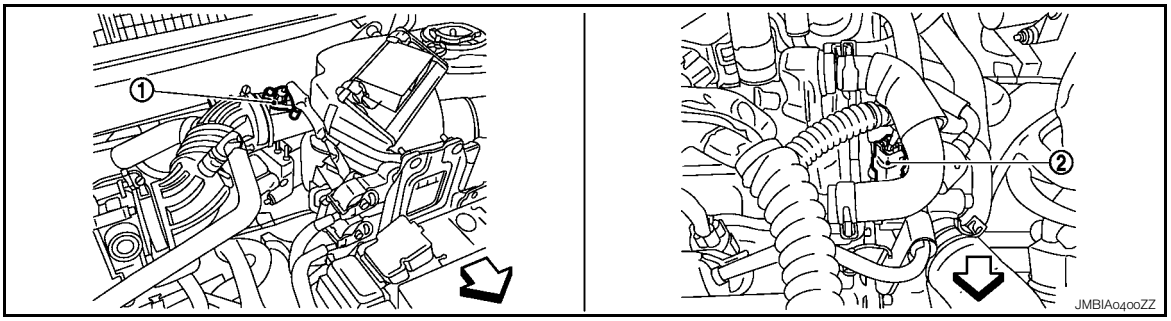
Component Parts Location

INFOID:0000000001096767



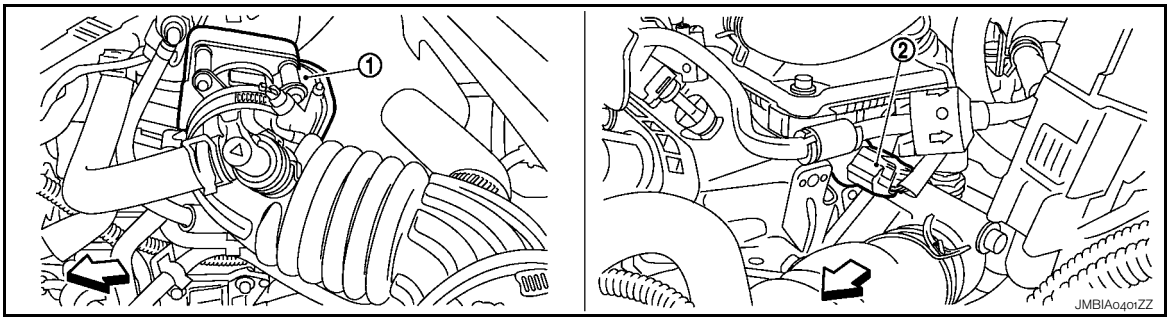
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



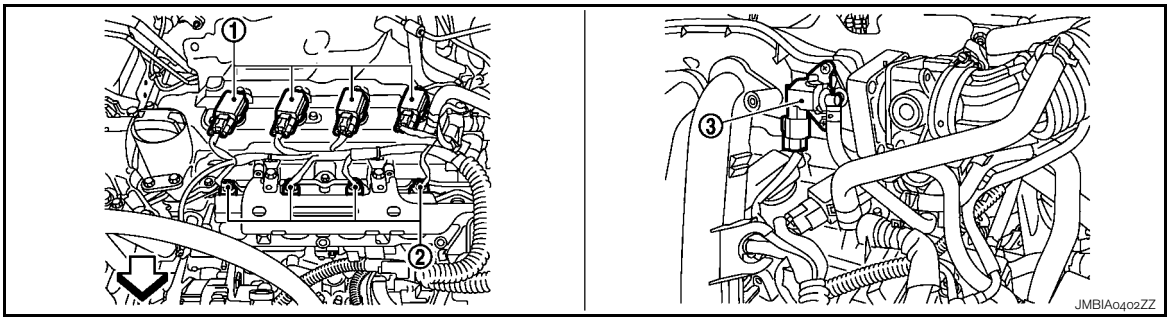
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



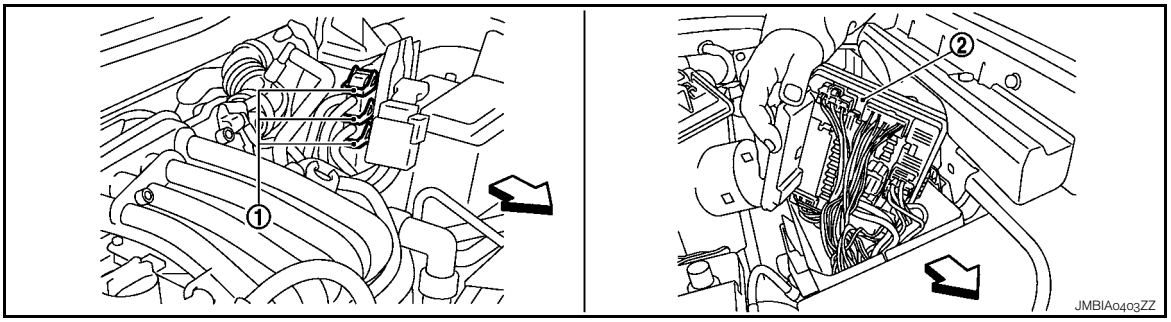
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

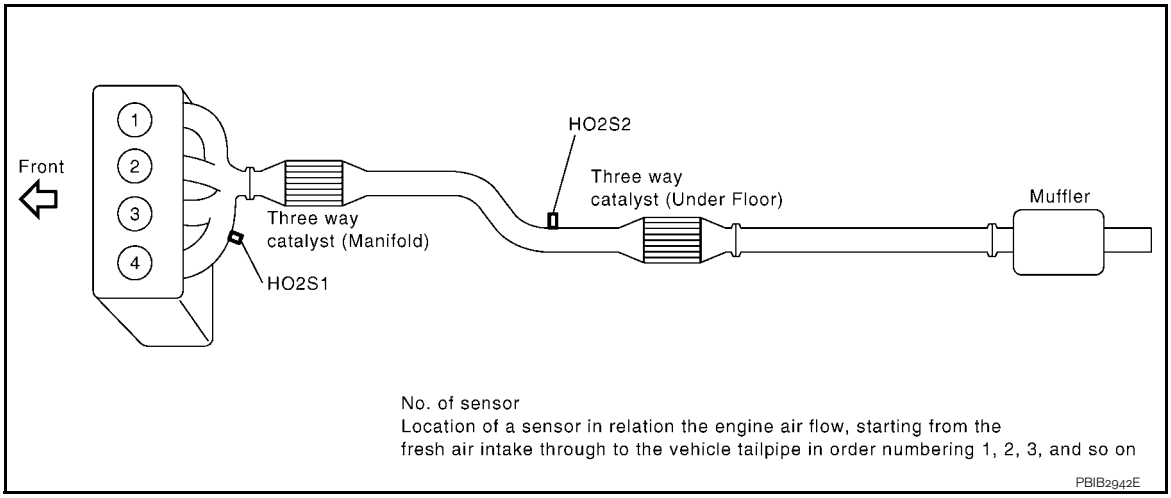
⇦ Vehicle front

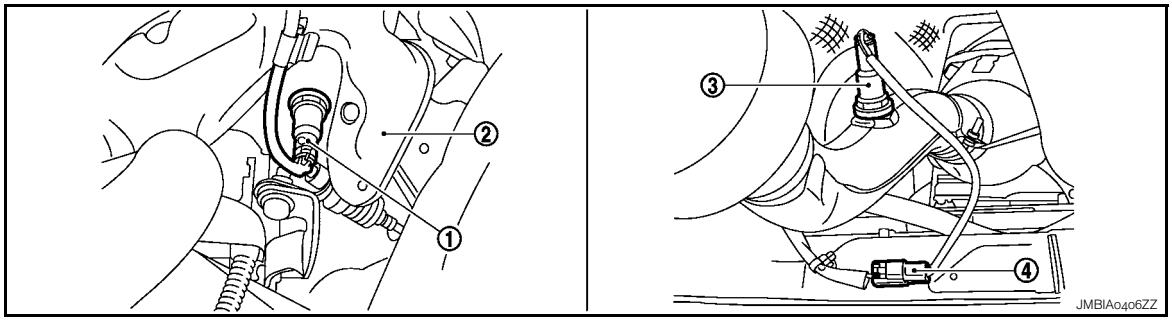


1. ECM harness connector
2. IPDM E/R

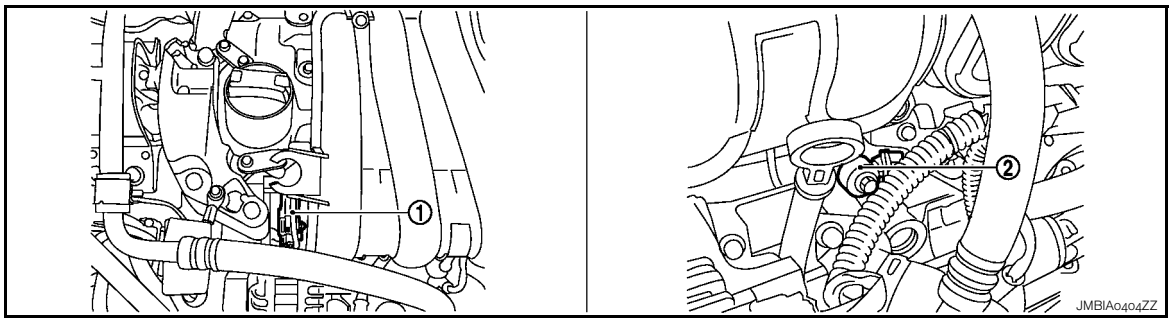
⇦ Vehicle front

cardiagn.com

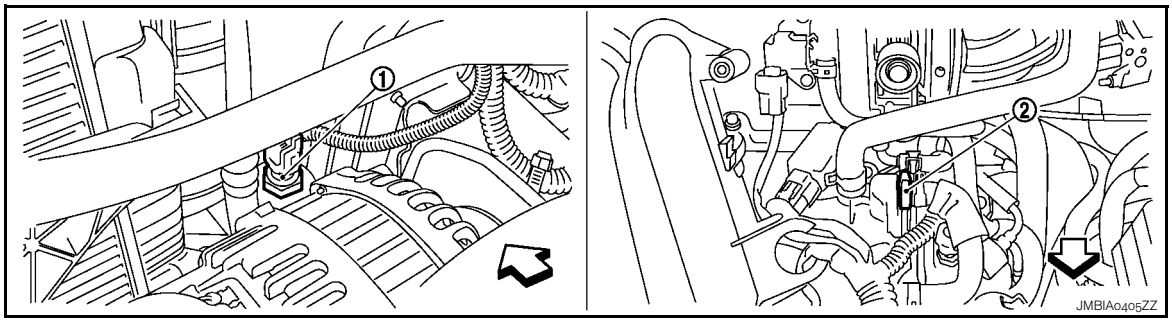




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



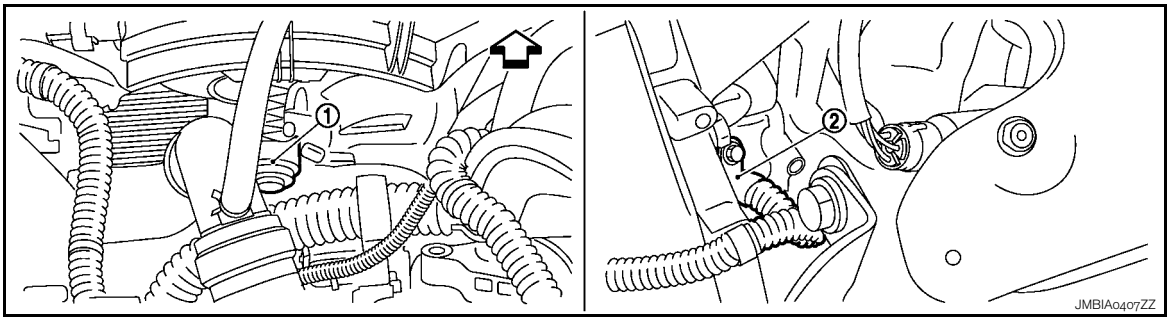
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

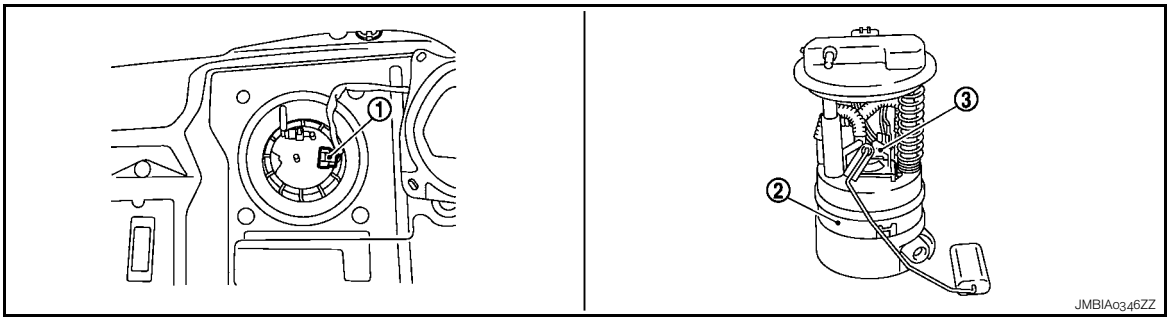
⇦ Vehicle front

cardiagn.com

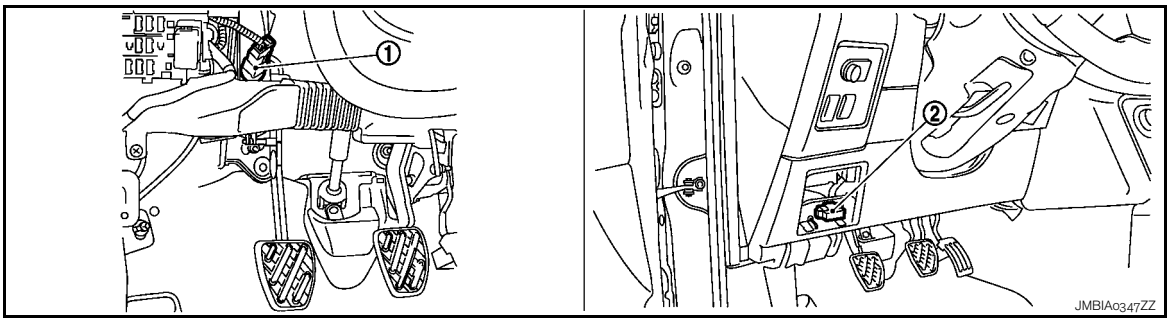


1. Cooling fan motor
2. Crankshaft position sensor (POS)

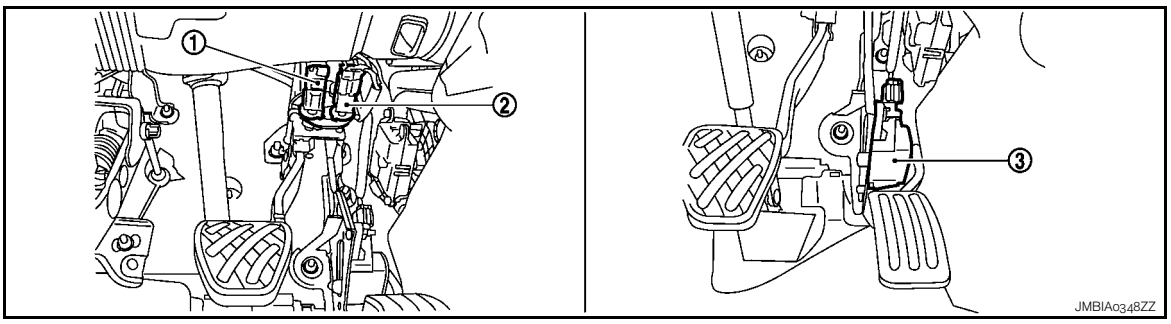
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

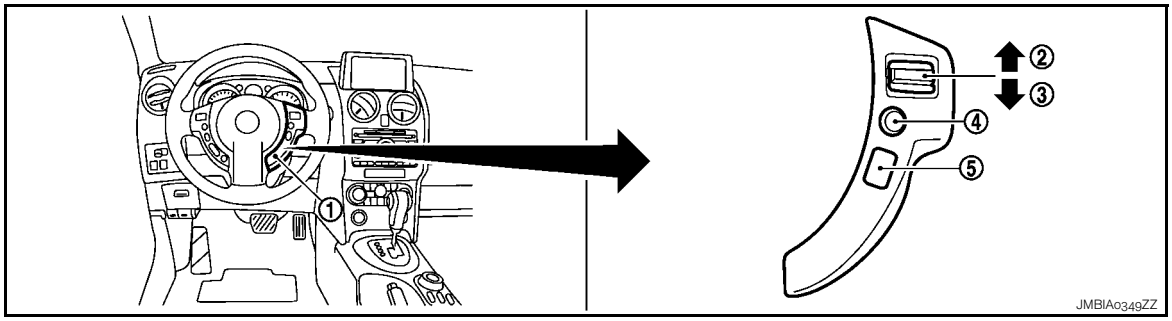


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001096768

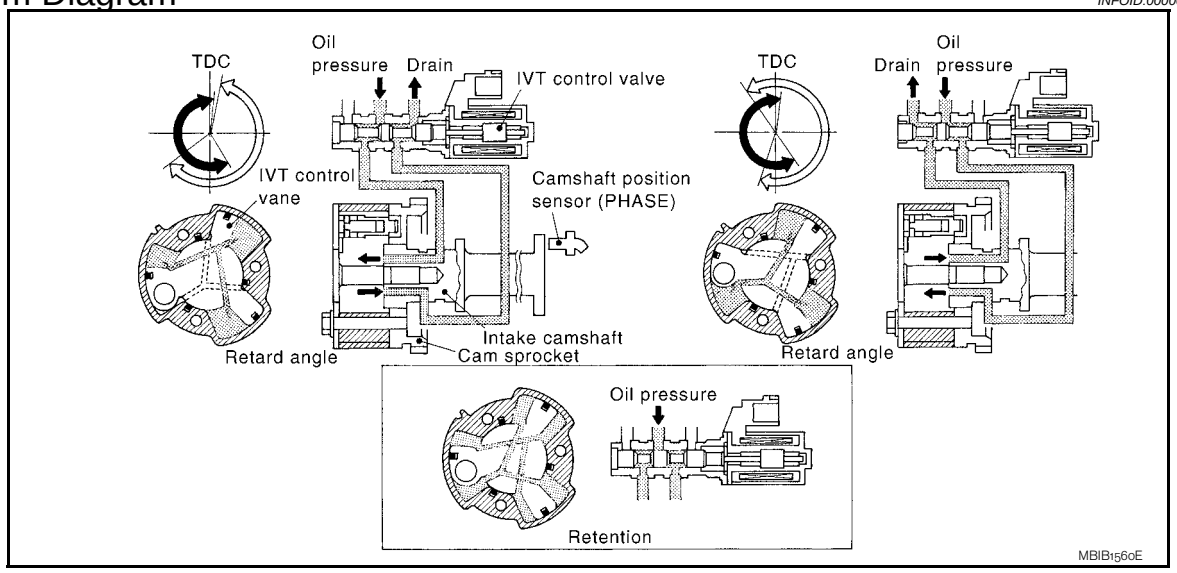
Component	Reference
Accelerator pedal position sensor	EC-539, "Description"
Camshaft position sensor (PHASE)	EC-489, "Description"
Crankshaft position sensor (POS)	EC-485, "Description"
Engine coolant temperature sensor	EC-461, "Description"
EVAP canister purge volume control solenoid valve	EC-562, "Description"
Heated oxygen sensor 1	EC-467, "Description"
Mass air flow sensor	EC-456, "Description"
Throttle position sensor	EC-464, "Description"
Vehicle speed sensor	EC-597, "Description"

cardiagn.com

INTAKE VALVE TIMING CONTROL

System Diagram

INFOID:0000000001096769



System Description

INFOID:0000000001096770

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed and piston position	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Combination meter*	Vehicle speed		

*: This signal is sent to the ECM through CAN communication line

SYSTEM DESCRIPTION

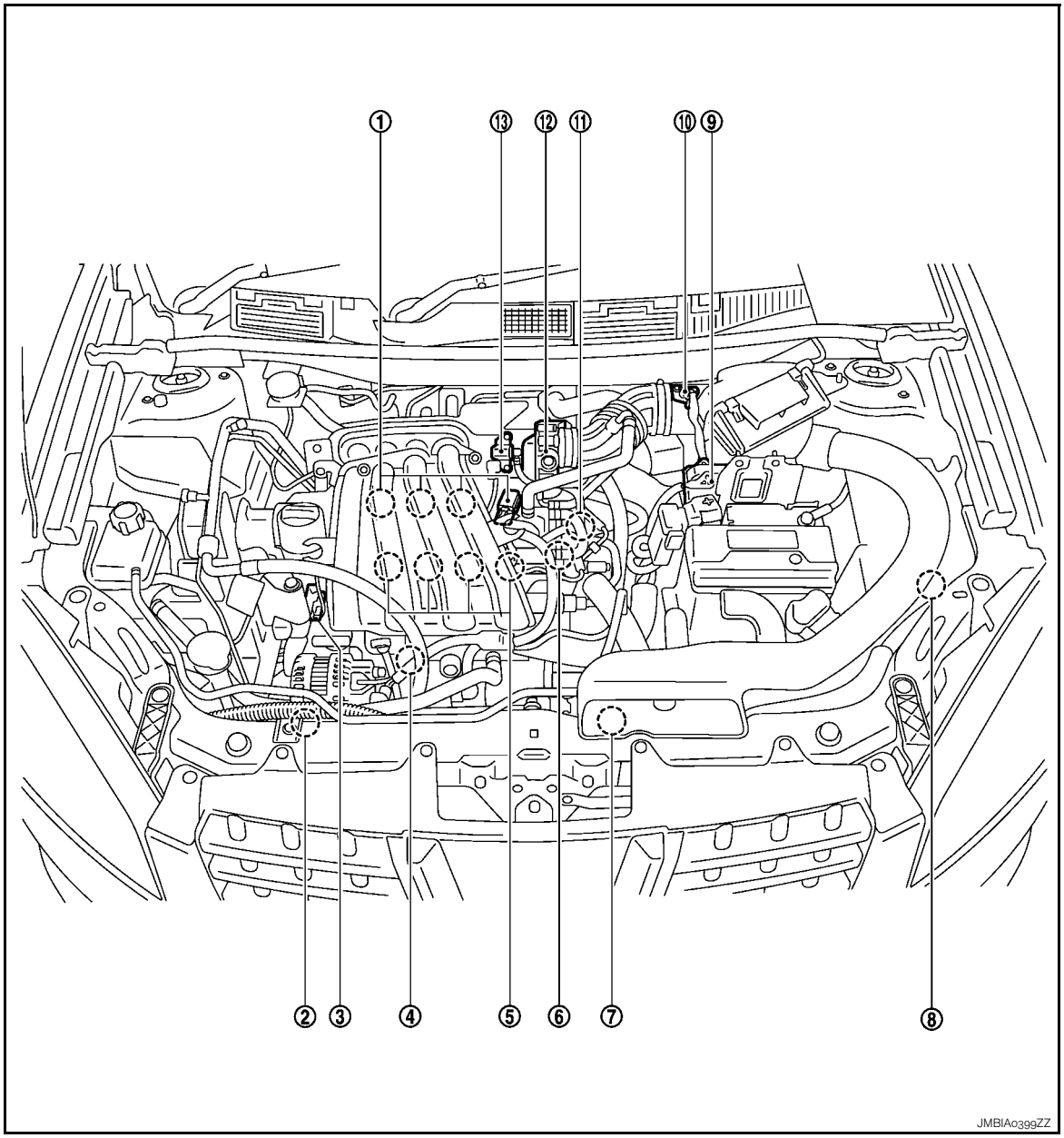
This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing (IVT) control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

Component Parts Location

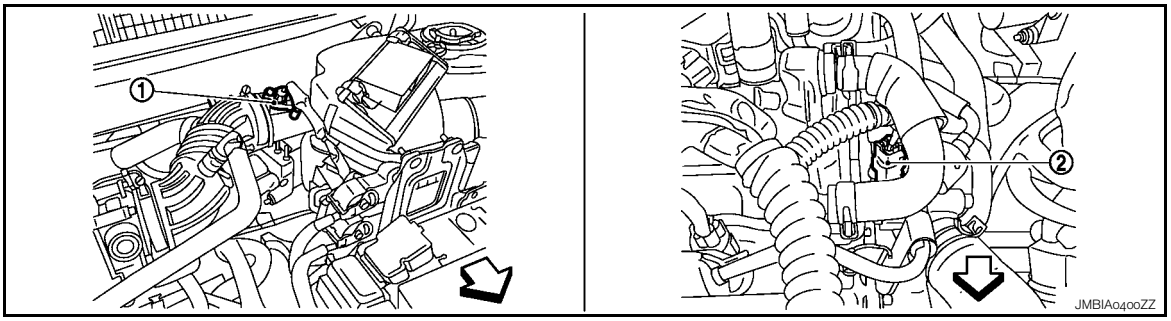
INFOID:0000000001096771

cardiagn.com



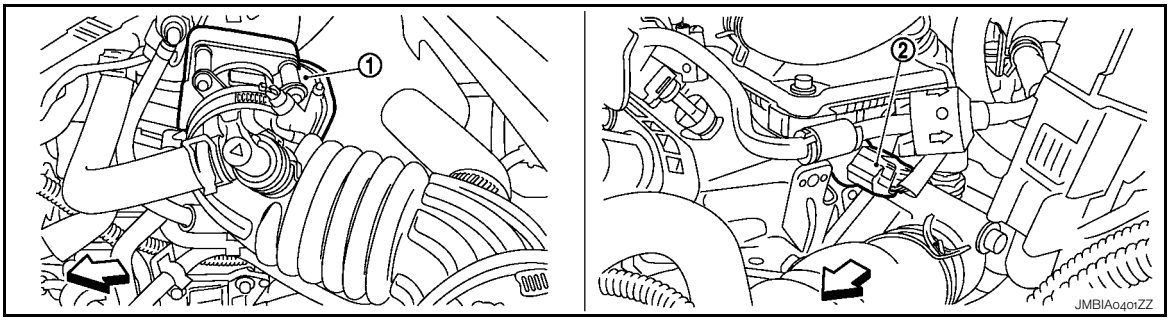
1. Ignition coil (with power transistor) and spark plug
2. Refrigerant pressure sensor
3. Intake valve timing control solenoid valve
4. Knock sensor, Crankshaft position sensor (POS)
5. Fuel injector
6. Camshaft position sensor (PHASE)
7. Cooling fan motor
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

cardiagn.com



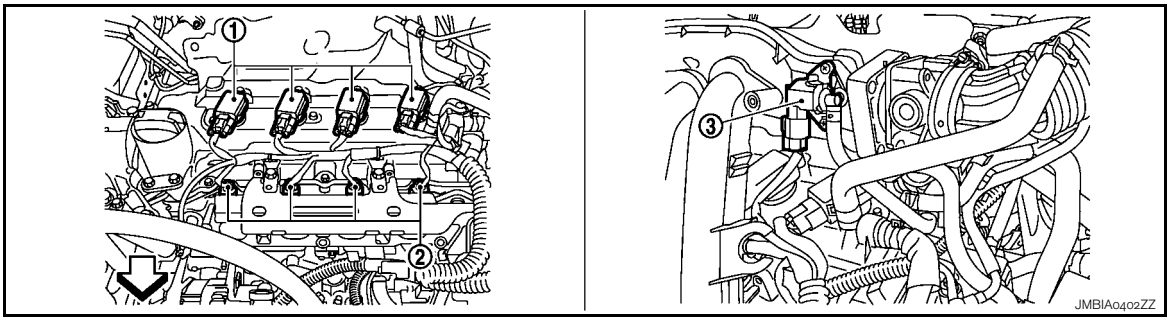
1. Mass air flow sensor
2. Engine coolant temperature sensor

⇦ Vehicle front



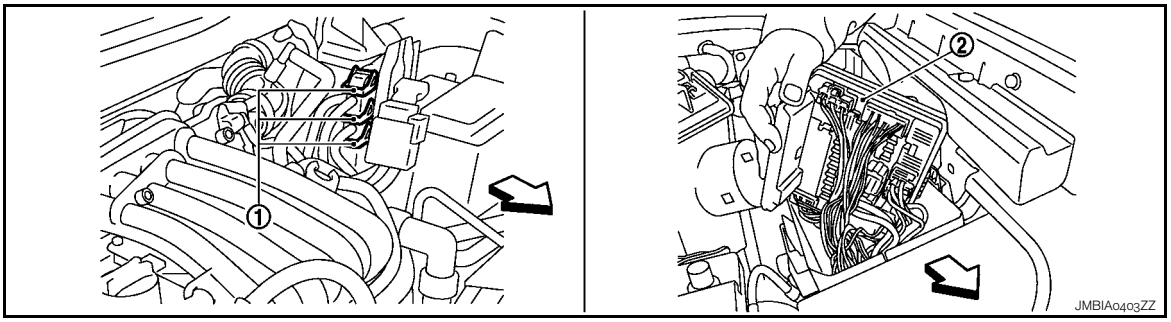
1. Electric throttle control actuator
2. Camshaft position sensor (PHASE)

⇦ Vehicle front



1. Ignition coil (with power transistor) and spark plug
2. Fuel injector
3. EVAP canister purge volume control solenoid valve

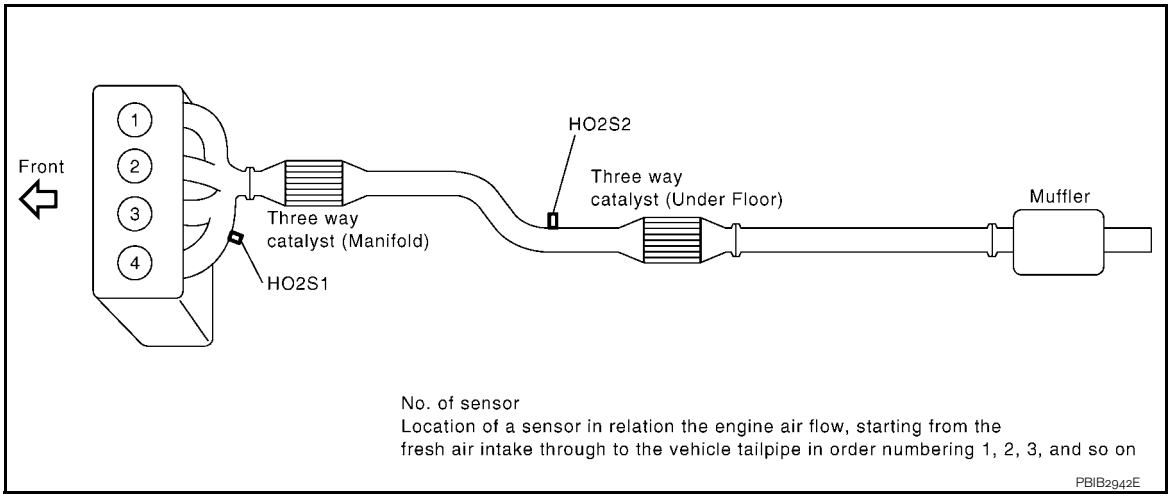
⇦ Vehicle front

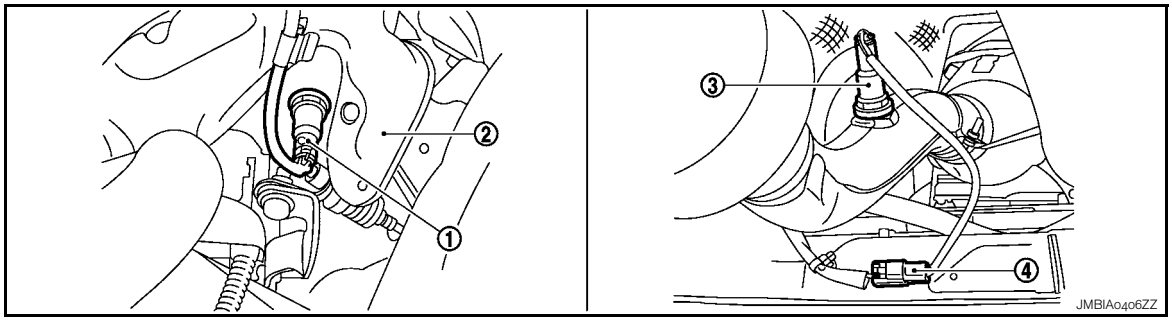


1. ECM harness connector
2. IPDM E/R

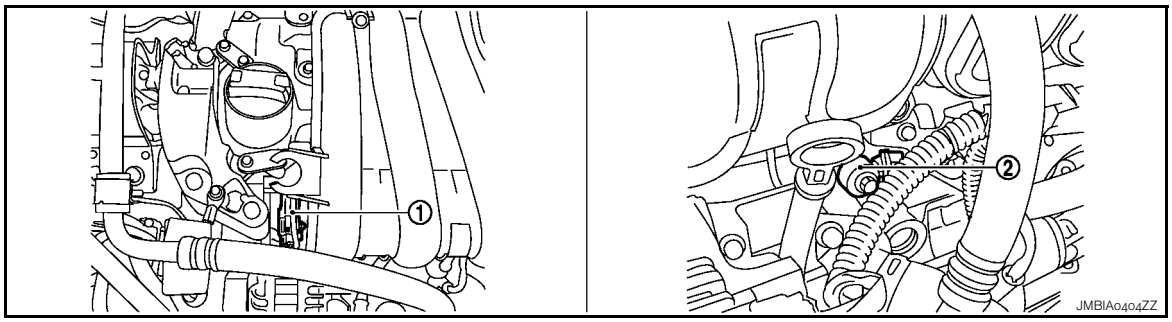
⇦ Vehicle front

cardiagn.com

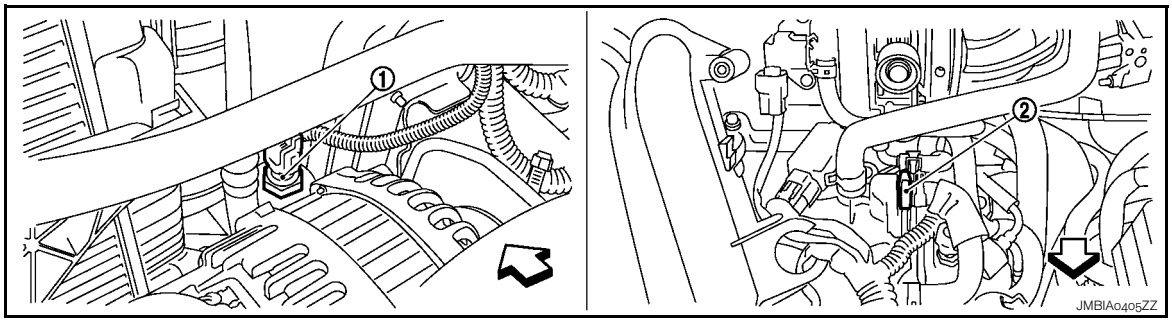




1. Heated oxygen sensor 1
2. Exhaust manifold cover
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector



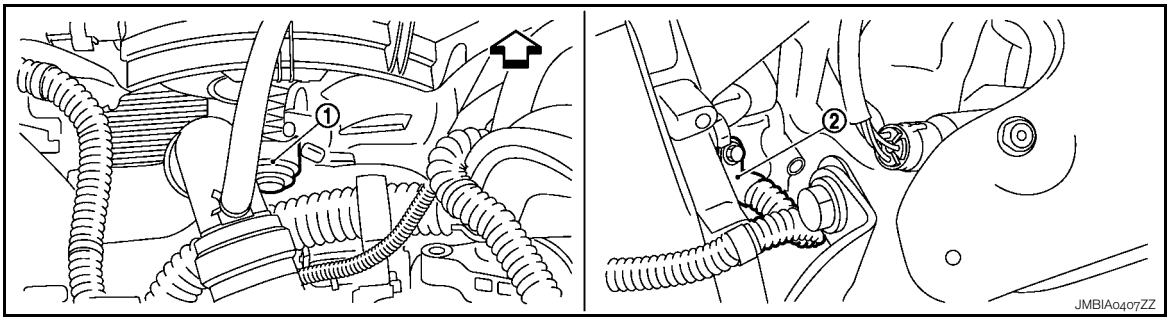
1. Intake valve timing control solenoid valve
2. Knock sensor



1. Refrigerant pressure sensor
2. PCV valve

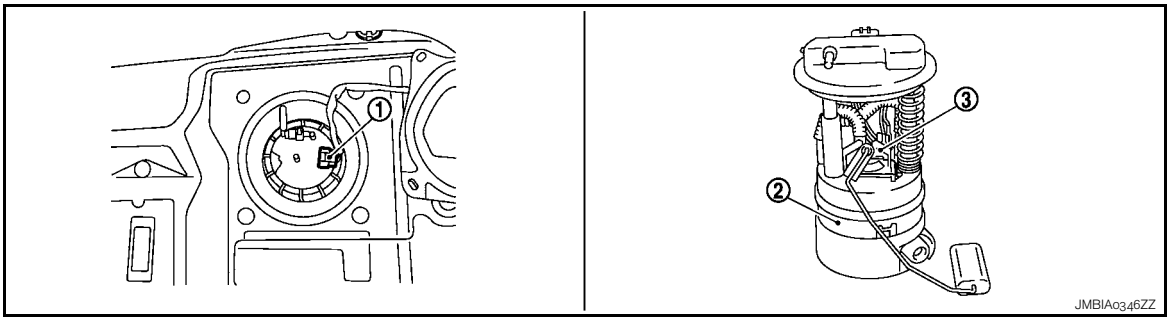
⇦ Vehicle front

cardiagn.com

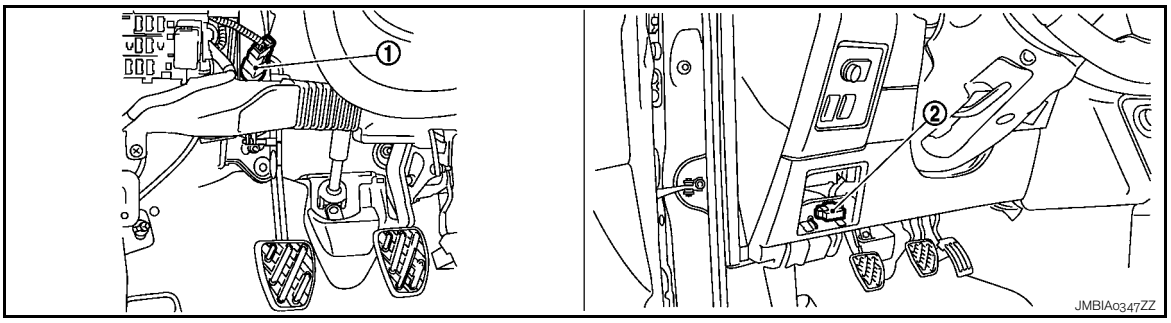


1. Cooling fan motor
2. Crankshaft position sensor (POS)

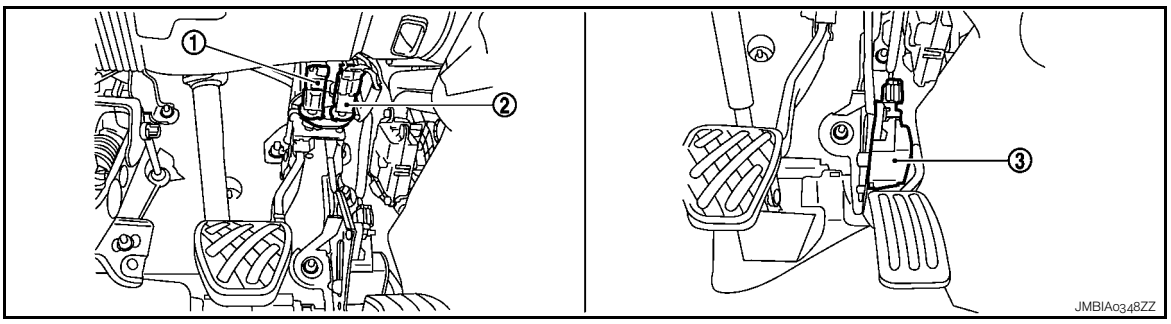
⇦ Vehicle front



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

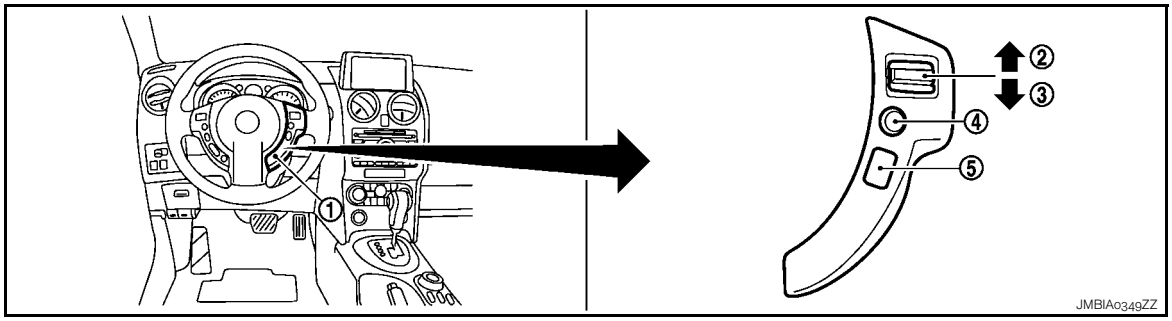


1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake pedal
3. Accelerator pedal position sensor

cardiagn.com



1. ASCD steering switch
2. CANSEL switch
3. RESUME/ACCELERATE switch
4. SET/COAST switch
5. MAIN switch

Component Description

INFOID:0000000001096772

Component	Reference
Camshaft position sensor (PHASE)	EC-489, "Description"
Crankshaft position sensor (POS)	EC-485, "Description"
Engine coolant temperature sensor	EC-461, "Description"
Intake valve timing control solenoid valve	EC-497, "Description"
Vehicle speed sensor	EC-597, "Description"

cardiagn.com

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000001098020

INTRODUCTION

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information
Diagnostic Trouble Code (DTC)
Freeze Frame data
1st Trip Diagnostic Trouble Code (1st Trip DTC)
1st Trip Freeze Frame data

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data
CONSULT-III	×	×	×	×
ECM	×	×*	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator (MI) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-959, "Fail Safe".)

TWO TRIP DETECTION LOGIC

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MI will not light up at this stage. <1st trip>
If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MI lights up. The MI lights up at the same time when the DTC is stored. <2nd trip>
The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.

DTC AND FREEZE FRAME DATA

DTC and 1st Trip DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.
If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MI will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MI lights up. In other words, the DTC is stored in the ECM memory and the MI lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MI during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.
Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”.
When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to EC-638, "Work Flow". Then perform DTC CONFIRMATION PROCEDURE or Component Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, absolute throttle position, base fuel schedule and intake air temperature at the moment a malfunction is detected.

cardiagn.com

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-III. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen.
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC.
Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”.

How to Read DTC and 1st Trip DTC

With CONSULT-III
CONSULT-III displays the DTC in ″SELF-DIAG RESULTS″ mode. Examples: P0340, P1148, P1706, etc.
(CONSULT-III also displays the malfunctioning component or system.)

Without CONSULT-III
The number of blinks of the MI in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: P0340, P1148, P1706, etc.
These DTCs are controlled by NISSAN.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-III can identify malfunction status as shown below. Therefore, using CONSULT-III (if available) is recommended.**

DTC or 1st trip DTC of a malfunction is displayed in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-III. Time data indicates how many times the vehicle was driven after the last detection of a DTC.
If the DTC is being detected currently, the time data will be [0].
If a 1st trip DTC is stored in the ECM, the time data will be [1t].

How to Erase DTC and 1st Trip DTC

With CONSULT-III
The emission related diagnostic information in the ECM can be erased by selecting “All Erase” in the “Description” of “FINAL CHECK” mode with CONSULT-III.

Without CONSULT-III
1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform EC-426, "Diagnosis Description".
3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal.

- **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**
- **The following data are cleared when the ECM memory is erased.**

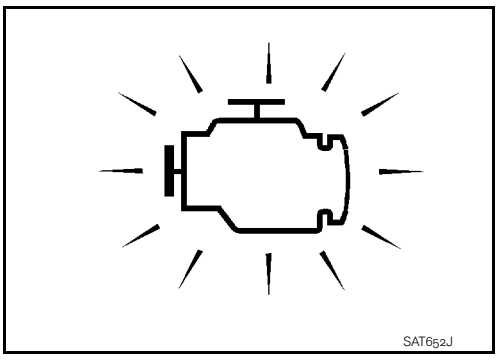
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

MALFUNCTION INDICATOR (MI)

Description
The MI is located on the instrument panel.

1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   If the MI does not light up, check MI circuit. Refer to EC-593, or see MWI-15.
2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



On Board Diagnostic System Function

cardiagn.com

The on board diagnostic system has the following four functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position Engine stopped	BULB CHECK	This function checks the MI bulb for damage (blown, open circuit, etc.). If the MI does not come on, check MI circuit.
	Engine running	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MI will light up to inform the driver that a malfunction has been detected. One trip detection diagnoses will light up the MI in the 1st trip.
Mode II	Ignition switch in ON position Engine stopped	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

When there is an open circuit on MI circuit, the ECM cannot warn the driver by lighting up MI when there is malfunction on engine control system.
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MI circuit is open by means of operating fail-safe function.
The fail-safe function also operates when above diagnoses except MI circuit are detected and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

MI FLASHING WITHOUT DTC
If the ECM is in Diagnostic Test Mode II, MI may flash when engine is running. In this case, check ECM diagnostic test mode. How to switch the diagnostic test (function) modes, and details of the above functions are described later. Refer to HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
The following emission-related diagnostic information is cleared when the ECM memory is erased.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data

How to Switch Diagnostic Test Mode
NOTE:
- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**
- **Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.**

HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)
1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.

cardiagn.com

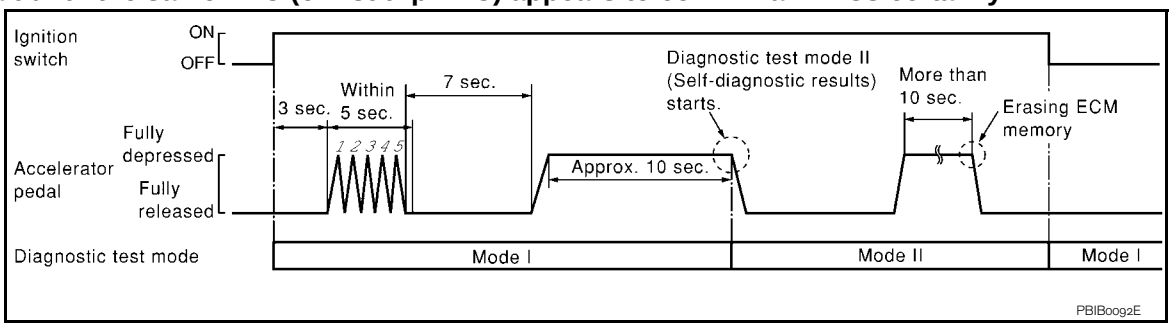
2. Repeat the following procedure quickly five times within 5 seconds.

a. Fully depress the accelerator pedal.

b. Fully release the accelerator pedal.

3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MI starts blinking.

4. Fully release the accelerator pedal.
ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).
NOTE:
Wait until the same DTC (or 1st trip DTC) appears to confirm all DTCs certainly.



HOW to SET DIAGNOSTIC TEST MODE II (HEATED OXYGEN SENSOR 1 MONITOR)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results).
Refer to HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
2. Start Engine.
ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).

HOW to ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.
The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

Diagnostic Test Mode I — Bulb Check

In this mode, the MI on the instrument panel should stay ON. If it remains OFF, check MI circuit. Refer to EC-593 or see MWI-15.

Diagnostic Test Mode I — Malfunction Warning

MI	Condition
ON	When the malfunction is detected.
OFF	No malfunction.

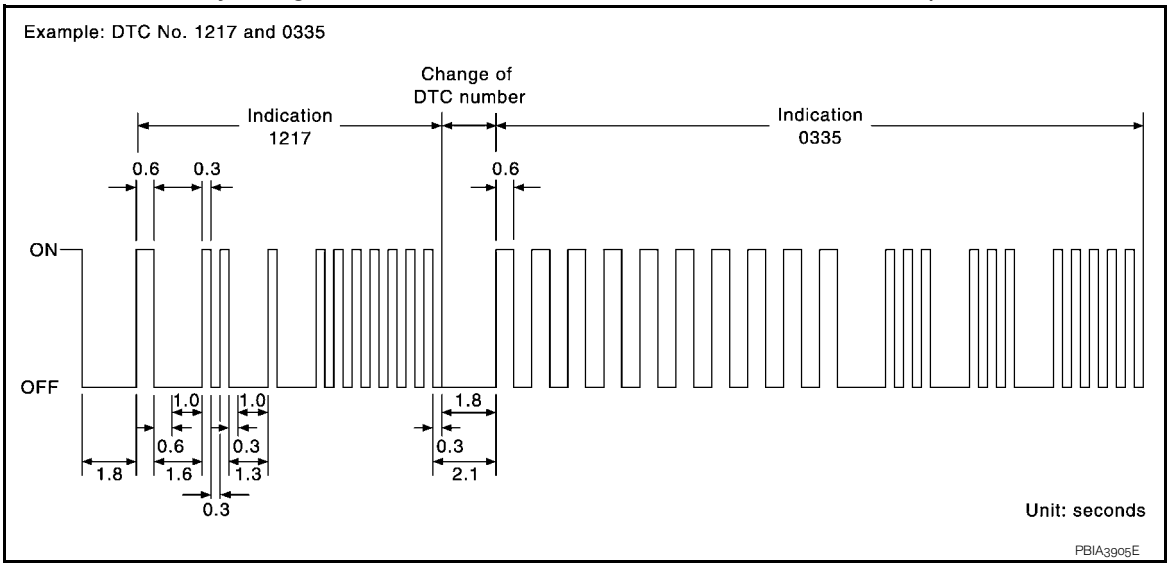
This DTC number is clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

Diagnostic Test Mode II — Self-diagnostic Results

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MI as shown below.
The DTC and 1st trip DTC are displayed at the same time. If the MI does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MI illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are dis-

cardiagn.com

played, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT-III. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.
The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.
A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.
A change from one trouble code to another occurs at an interval of 1.8-second OFF.
In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See EC-620.)
HOW TO ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)
The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to HOW to ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
- **If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- **Be careful not to erase the stored memory before starting trouble diagnoses.**

Diagnostic Test Mode II — Heated Oxygen Sensor 1 Monitor
In this mode, the MI displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MI	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.
To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.
Next run engine at about 2,000 rpm for about 2 minutes under no load conditions. Then make sure that the MI comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no load.

CONSULT-III Function

INFOID:0000000001096774

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*

cardiagn.com

Diagnostic test mode	Function
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECU part number	ECM part number can be read.

*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item			DIAGNOSTIC TEST MODE				
			WORK SUPPORT	SELF-DIAGNOSTIC RESULTS		DATA MONITOR	ACTIVE TEST
				DTC*1	FREEZE FRAME DATA*2		
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor (POS)		×	×	×	
		Camshaft position sensor (PHASE)		×	×	×	
		Mass air flow sensor		×		×	
		Engine coolant temperature sensor		×	×	×	×
		Heated oxygen sensor 1		×		×	
		Heated oxygen sensor 2		×		×	
		Vehicle speed sensor		×	×	×	
		Accelerator pedal position sensor		×		×	
		Throttle position sensor		×	×	×	
		Intake air temperature sensor		×	×	×	
		Knock sensor		×			
		Refrigerant pressure sensor				×	
		Closed throttle position switch (accelerator pedal position sensor signal)				×	
		Air conditioner switch				×	
		Park/neutral position (PNP) switch		×		×	
		Stop lamp switch		×		×	
		EPS control unit				×	
		Battery voltage				×	
		Load signal				×	
		ASCD steering switch		×		×	
		ASCD brake switch		×		×	

cardiagn.com

Item			DIAGNOSTIC TEST MODE				
			WORK SUPPORT	SELF-DIAGNOSTIC RESULTS		DATA MONITOR	ACTIVE TEST
				DTC*1	FREEZE FRAME DATA*2		
ENGINE COTNROL COMPONENT PARTS	OUTPUT	Fuel injector				×	×
		Power transistor (Ignition timing)				×	×
		Throttle control motor relay		×		×	
		Throttle control motor		×			
		EVAP canister purge volume control solenoid valve		×		×	×
		Air conditioner relay				×	
		Fuel pump relay	×			×	×
		Cooling fan relay		×		×	×
		Heated oxygen sensor 1 heater		×		×	
		Heated oxygen sensor 2 heater		×		×	
		Intake valve timing control solenoid valve		×		×	×

X: Applicable

*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-III screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-426, "Diagnosis Description".

INSPECTION PROCEDURE

Refer to CONSULT-III Operators Manual.

WORK SUPPORT MODE

Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	• FUEL PUMP WILL STOP BY TOUCHING “START” DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	• THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.	When learning the idle air volume
SELF-LEARNING CONT	• THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.	When clearing mixture ratio self-learning value
TARGET IDLE RPM ADJ*	• IDLE CONDITION	When setting target idle speed
TARGET IGN TIM ADJ*	• IDLE CONDITION	When adjusting target ignition timing

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to EC-620, "DTC Index".)

Freeze Frame Data and 1st Trip Freeze Frame Data

cardiagn.com

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	• The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to EC-620, "DTC Index".)
FUEL SYS-B1	• “Fuel injection system status” at the moment a malfunction is detected is displayed. • One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	• The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	• The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	• “Long-term fuel trim” at the moment a malfunction is detected is displayed. • The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	• “Short-term fuel trim” at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	• The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	• The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH·P/S [%]	• The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	• The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	• The intake air temperature at the moment a malfunction is detected is displayed.
INT MANI PRES [kPa]	• Always a certain value is displayed. • This item is not efficient for J10 models.

*: The items are the same as those of 1st trip freeze frame data.

DATA MONITOR MODE

Monitored Item

×: Applicable

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	• Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	• Accuracy becomes poor if engine speed drops below the idle rpm. • If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1	V	• The signal voltage of the mass air flow sensor is displayed.	• When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”.
B/FUEL SCHDL	msec	• “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	• When engine is running specification range is indicated in “SPEC”.
A/F ALPHA-B1	%	• The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	• When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”. • This data also includes the data for the air-fuel ratio learning control.

cardiagn.com

Monitored item	Unit	Description	Remarks
COOLAN TEMP/S	°C or °F	• The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	• When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
HO2 SEN1 (B1)	V	• The A/F signal computed from the input signal of the heated oxygen sensor 1 is displayed.	
HO2S2 (B1)	V	• The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S1 MNTR(B1)	RICH/LEAN	• Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH: means the mixture became ″rich″, and control is being affected toward a leaner mixture. LEAN: means the mixture became ″″lean″, and control is being affected toward a rich mixture.	• After turning ON the ignition switch, ″RICH″ is displayed until air-fuel mixture ratio feedback control begins. • When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S2 MNTR(B1)	RICH/LEAN	• Display of heated oxygen sensor 2 signal: RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large.	• When the engine is stopped, a certain value is indicated.
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
BATTERY VOLT	V	• The power supply voltage of ECM is displayed.	
ACCEL SEN 1	V	• The accelerator pedal position sensor signal voltage is displayed.	• ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
ACCEL SEN 2			
TP SEN 1-B1	V	• The throttle position sensor signal voltage is displayed.	• TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
TP SEN 1-B2			
INT/A TEMP SE	°C or °F	• The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
START SIGNAL	ON/OFF	• Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.	• After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS	ON/OFF	• Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.	
AIR COND SIG	ON/OFF	• Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW	ON/OFF	• Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.	
PW/ST SIGNAL	ON/OFF	• [ON/OFF] condition of the power steering system (determined by the signal sent from EPS control unit) is indicated.	
LOAD SIGNAL	ON/OFF	• Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF.	
IGNITION SW	ON/OFF	• Indicates [ON/OFF] condition from ignition switch signal.	
CLUTCH P/P SW	ON/OFF	• Indicates [ON/OFF] condition from the clutch switch signal.	

cardiagn.com

Monitored item	Unit	Description	Remarks
HEATER FAN SW	ON/OFF	• Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW	ON/OFF	• Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1	msec	• Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	• When the engine is stopped, a certain computed value is indicated.
IGN TIMING	BTDC	• Indicates the ignition timing computed by ECM according to the input signals.	• When the engine is stopped, a certain value is indicated.
CAL/LD VALUE	%	• "Calculated load value" indicates the value of the current air flow divided by peak air flow.	
MASS AIRFLOW	g·m/s	• Indicates the mass air flow computed by ECM according to the signal voltage of the mass air flow sensor.	
PURG VOL C/V	%	• Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. • The opening becomes larger as the value increases.	
INT/V TIM (B1)	°CA	• Indicates [°CA] of intake camshaft advance angle.	
INT/V SOL-B1	%	• The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. • The advance angle becomes larger as the value increases.	
AIR COND RLY	ON/OFF	• The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.	
FUEL PUMP RLY	ON/OFF	• Indicates the fuel pump relay control condition determined by ECM according to the input signals.	
THRTL RELAY	ON/OFF	• Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
COOLING FAN	HI/LOW/OFF	• Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation LOW: Low speed operation OFF: Stop	
HO2S1 HTR (B1)	ON/OFF	• Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals.	
HO2S2 HTR (B1)	ON/OFF	• Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.	
IDL A/V LEARN	YET/CMPLT	• Display the condition of Idle Air Volume Learning YET: Idle air volume learning has not been performed yet. CMPLT: Idle air volume learning has already been performed successfully.	
TRVL AFTER MIL	km or mile	• Distance traveled while MI is activated.	
O2 SEN HTR DTY	%	• Heated oxygen sensor 1 heater control value computed by ECM according to the input signals. • The current flow to the heater becomes larger as the value increases.	

cardiagn.com

Monitored item	Unit	Description	Remarks
AC PRESS SEN	V	• The signal voltage from the refrigerant pressure sensor is displayed.	
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
SET VHCL SPD	km/h or mph	• The preset vehicle speed is displayed.	
MAIN SW	ON/OFF	• Indicates [ON/OFF] condition from MAIN switch signal.	
CANCEL SW	ON/OFF	• Indicates [ON/OFF] condition from CANCEL switch signal.	
RESUME/ACC SW	ON/OFF	• Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal.	
SET SW	ON/OFF	• Indicates [ON/OFF] condition from SET/COAST switch signal.	
BRAKE SW1	ON/OFF	• Indicates [ON/OFF] condition from ASCD brake switch signal.	
BRAKE SW2	ON/OFF	• Indicates [ON/OFF] condition of stop lamp switch signal.	
VHCL SPD CUT	NON/CUT	• Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.	
LO SPEED CUT	NON/CUT	• Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off.	
CRUISE LAMP	ON/OFF	• Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.	
SET LAMP	ON/OFF	• Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.	
Voltage	V	• Voltage, frequency, duty cycle or pulse width measured by the probe.	• Only “#” is displayed if item is unable to be measured. • Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency	msec, Hz or %		
DUTY-HI	—		
DUTY-LOW			
PLS WIDTH-HI			
PLS WIDTH-LOW			

NOTE:

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

Test Item

cardiagn.com

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	• Engine: Return to the original trouble condition • Change the amount of fuel injection using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Fuel injector • Heated oxygen sensor 1
IGNITION TIMING	• Engine: Return to the original trouble condition • Timing light: Set • Retard the ignition timing using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Perform Idle Air Volume Learning.
POWER BALANCE	• Engine: After warming up, idle the engine. • A/C switch OFF • Shift lever: Neutral • Cut off each fuel injector signal one at a time using CONSULT-III.	Engine runs rough or dies.	• Harness and connectors • Compression • Fuel injector • Power transistor • Spark plug • Ignition coil
COOLING FAN*	• Ignition switch: ON • Turn the cooling fan “LOW”, “HI” and “OFF” CONSULT-III.	Cooling fan moves and stops.	• Harness and connectors • IPDM E/R (Cooling fan relay) • Cooling fan motor
ENG COOLANT TEMP	• Engine: Return to the original trouble condition • Change the engine coolant temperature using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Engine coolant temperature sensor • Fuel injector
FUEL PUMP RELAY	• Ignition switch: ON (Engine stopped) • Turn the fuel pump relay “ON” and “OFF” using CONSULT-III and listen to operating sound.	Fuel pump relay makes the operating sound.	• Harness and connectors • Fuel pump relay
PURG VOL CONT/V	• Engine: After warming up, run engine at 1,500 rpm. • Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III.	Engine speed changes according to the opening percent.	• Harness and connectors • Solenoid valve
V/T ASSIGN ANGLE	• Engine: Return to the original trouble condition • Change intake valve timing using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Intake valve timing control solenoid valve

*: Leaving cooling fan OFF with CONSULT-III while engine is running may cause the engine to overheat.

cardiagn.com

COMPONENT DIAGNOSIS

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:0000000001096776

The specification (SP) value indicates the tolerance of the value that is displayed in “SPEC” of “DATA MONITOR” mode of CONSULT-III during normal operation of the Engine Control System. When the value in “SPEC” of “DATA MONITOR” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “SPEC” of “DATA MONITOR” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.
The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MI.
The SP value will be displayed for the following three items:
- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

Component Function Check

INFOID:0000000001096777

1. START

Make sure that all of the following conditions are satisfied.
- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (0.983 - 1.043 bar, 1.003 - 1.064 kg/cm^2, 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up
- After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- Electrical load: Not applied*
- Engine speed: Idle

*: Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.

>> GO TO 2.

2. PERFORM “SPEC” OF “DATA MONITOR” MODE

With CONSULT-III
NOTE:
Perform “SPEC” in “DATA MONITOR” mode in maximum scale display.
1. Perform EC-365, "BASIC INSPECTION : Special Repair Requirement".
2. Select “B/FUEL SCHDL”, “A/F ALPHA-B1” and “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode with CONSULT-III.
3. Make sure that monitor items are within the SP value.

Is the inspection result normal?

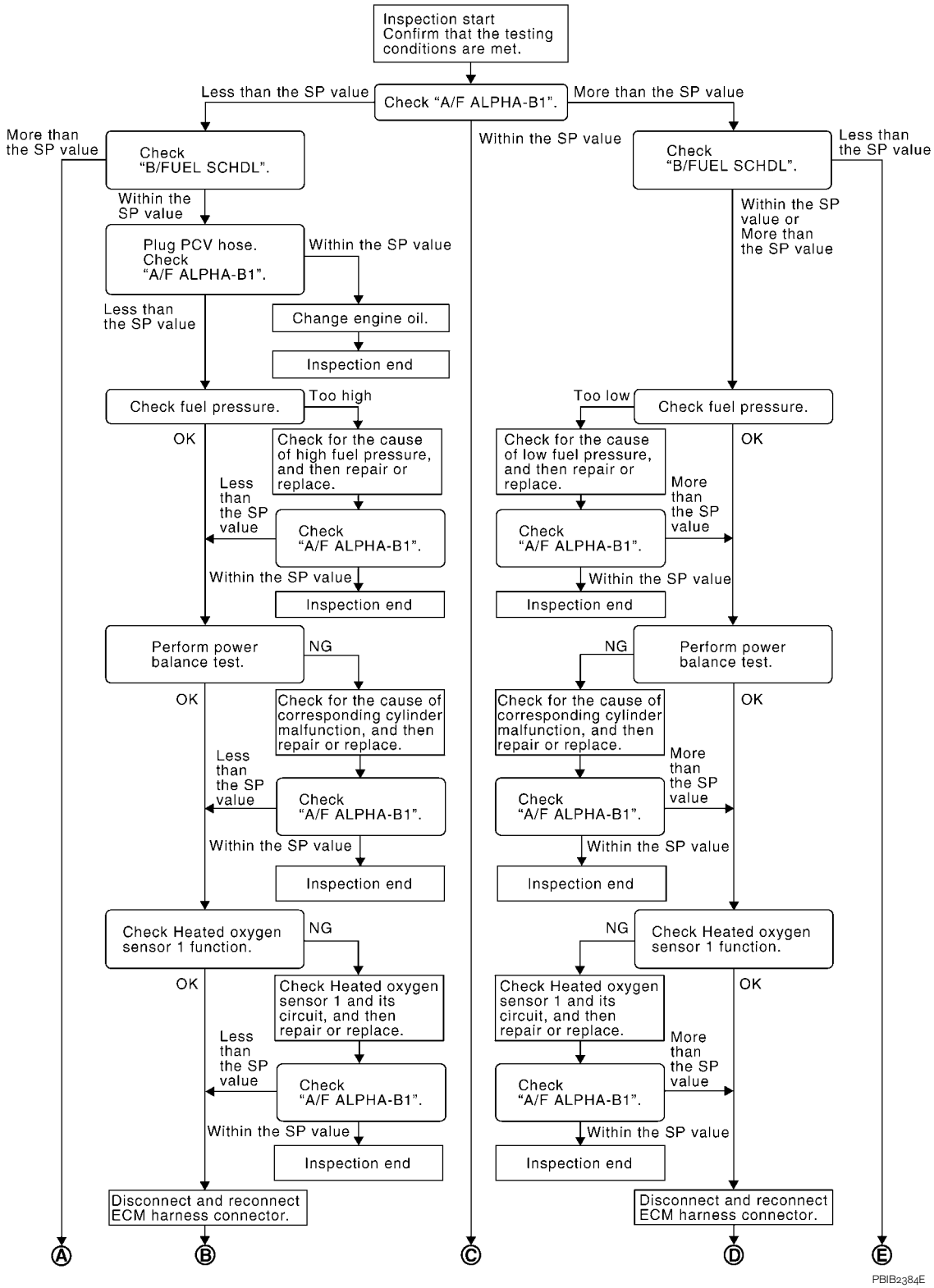
YES >> END
NO >> Go to EC-438, "Diagnosis Procedure".

Diagnosis Procedure

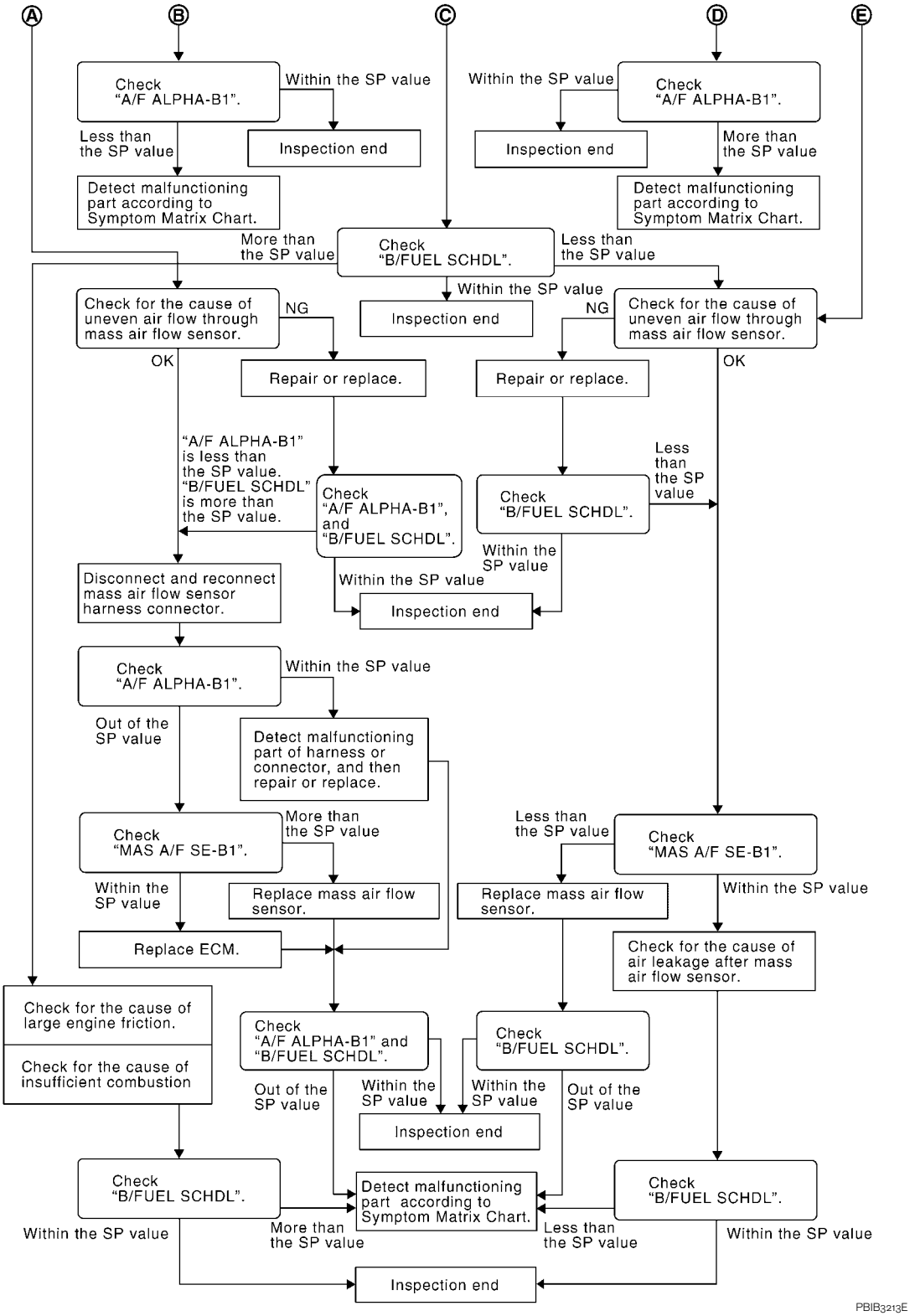
INFOID:0000000001096778

cardiagn.com

OVERALL SEQUENCE



cardiagn.com



DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1"

With CONSULT-III

1. Start engine.
2. Confirm that the testing conditions are met. Refer to EC-438, "Component Function Check".
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

NOTE:

cardiagn.com

Check “A/F ALPHA-B1” for approximately 1 minute because they may fluctuate. It is NG if the indication is out of the SP value even a little.

Is the measurement value within the SP value?

YES >> GO TO 17.
NO-1 >> Less than the SP value: GO TO 2.
NO-2 >> More than the SP value: GO TO 3.

2. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 4.
NO >> More than the SP value: GO TO 19.

3. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 6.
NO-1 >> More than the SP value: GO TO 6.
NO-2 >> Less than the SP value: GO TO 25.

4. CHECK “A/F ALPHA-B1”

1. Stop the engine.
2. Disconnect PCV hose, and then plug it.
3. Start engine.
4. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 5.
NO >> GO TO 6.

5. CHANGE ENGINE OIL

1. Stop the engine.
2. Change engine oil.
   NOTE:
   This symptom may occur when a large amount of gasoline is mixed with engine oil because of driving conditions (such as when engine oil temperature does not rise enough since a journey distance is too short during winter). The symptom will not be detected after changing engine oil or changing driving condition.

>> **INSPECTION END**

6. CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-634, "Inspection".)

Is the inspection result normal?

YES >> GO TO 9.
NO-1 >> Fuel pressure is too high: Replace “fuel filter and fuel pump assembly” and then GO TO 8.
NO-2 >> Fuel pressure is too low: GO TO 7.

7. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly” and then GO TO 8.
NO >> Repair or replace and then GO TO 8.

8. CHECK “A/F ALPHA-B1”

1. Start engine.

cardiagn.com

2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 9.

9. PERFORM POWER BALANCE TEST

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.
1. Ignition coil and its circuit (Refer to EC-588, "Component Function Check".)
2. Fuel injector and its circuit (Refer to EC-565, "Component Function Check".)
3. Intake air leakage
4. Low compression pressure (Refer to EM-24, "Inspection".)

Is the inspection result normal?

YES >> Replace fuel injector and then GO TO 11.
NO >> Repair or replace malfunctioning part and then GO TO 11.

11. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 12.

12. CHECK HEATED OXYGEN SENSOR 1 FUNCTION

1. Run engine at about 2,000 rpm for about 2minutes under no load.
2. Select “HO2S MNTR (B1)”, in “DATA MONITOR” mode.
3. Running engine at 2,000 rpm under no load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time : RICH → LEAN → RICH
2 times : RICH → LEAN → RICH → LEAN → RICH

Is the inspection result more than 5 times during 10 seconds?

YES >> GO TO 15.
NO >> GO TO 13.

13. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT

Check heated oxygen sensor 1 and its circuit. Refer to EC-467, "DTC Logic".

>> GO TO 14.

14. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 15.

15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

cardiagn.com

1. Stop the engine.
2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.

>> GO TO 16.

16. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-623, "Symptom Table".

17. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO-1 >> More than the SP value: GO TO 18.
NO-2 >> Less than the SP value: GO TO 25.

18. DETECT MALFUNCTIONING PART

1. Check for the cause of large engine friction. Refer to the following.
- Engine oil level is too high
- Engine oil viscosity
- Belt tension of alternator, A/C compressor, etc. is excessive
- Noise from engine
- Noise from transmission, etc.
2. Check for the cause of insufficient combustion. Refer to the following.
- Valve clearance malfunction
- Intake valve timing control function malfunction
- Camshaft sprocket installation malfunction, etc.

>> Repair or replace malfunctioning part, and then GO TO 30.

19. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 21.
NO >> Repair or replace malfunctioning part, and then GO TO 20.

20. CHECK “A/F ALPHA-B1”, AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

YES >> **INSPECTION END**
NO >> “B/FUEL SCHDL” is more, “A/F ALPHA-B1” is less than the SP value: GO TO 21

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

cardiagn.com

22. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to EC-456, "DTC Logic". Then GO TO 29.
NO >> GO TO 23.

23. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 24.
NO >> More than the SP value: Replace mass air flow sensor, and then GO TO 29.

24. REPLACE ECM

1. Replace ECM.
2. Go to EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> GO TO 29.

25. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 27.
NO >> Repair or replace malfunctioning part, and then GO TO 26.

26. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Less than the SP value: GO TO 27.

27. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 28.
NO >> Less than the SP value: Replace mass air flow sensor, and then GO TO 30.

28. CHECK INTAKE SYSTEM

Check for the cause of air leak after the mass air flow sensor. Refer to the following.
- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts

cardiagn.com

- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

29. CHECK “A/F ALPHA-B1” AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-623, "Symptom Table".

30. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and then make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-623, "Symptom Table".

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000001096779

1.INSPECTION START

Start engine.

Is engine running?

YES >> GO TO 8.
NO >> GO TO 2.

2.CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	93	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E105, M77
- 10A fuse (No. 4)
- Harness for open or short between ECM and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK GROUND CONNECTION-I

1. Turn ignition switch OFF.
2. Check ground connection E21. Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace ground connection.

5.CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connectors.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
F7	10	Ground	Existed
	11		
E16	108		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between ECM and ground

cardiagn.com

>> Repair open circuit or short to power in harness or connectors.

7. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connectors.
2. Turn ignition switch ON.
3. Check the voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage
Connector	Terminal		
E11	15	Ground	Battery voltage

Is the inspection result normal?

YES >> Go to EC-588, "Diagnosis Procedure".
NO >> GO TO 8.

8. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	After turning ignition switch OFF, battery voltage will exist for more than a few seconds, then drop approximately 0V.

Is the inspection result normal?

YES >> GO TO 15.
NO-1 >> Battery voltage does not exist: GO TO 9.
NO-2 >> Battery voltage exists for more than a few seconds: GO TO 12.

9. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 12.

10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E16	105	E11	9	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair open circuit or short to ground or short power in harness or connectors.

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

cardiagn.com

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	32	E11	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 13.
NO >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK 20A FUSE

1. Disconnect 20A fuse (No. 51) from IPDM E/R.
2. Check 20A fuse.

Is the inspection result normal?

YES >> GO TO 17.
NO >> Replace 20A fuse.

14. CHECK GROUND CONNECTION-II

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace ground connection.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
F7	10	Ground	Existed
	11		
E16	108		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 17.
NO >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors F121, E7
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

cardiagn.com

17. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to power in harness or connectors.

cardiagn.com

U1001 CAN COMM CIRCUIT

Description

INFOID:0000000001096780

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000001096781

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission related diagnosis) for 2 seconds or more.	• Harness or connectors (CAN communication line is open or shorted)

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.

Is DTC detected?

YES >> EC-450, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096782

Go toLAN-46, "Trouble Diagnosis Flow Chart".

cardiagn.com

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000001096783

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000001096784

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1010	CAN communication bus	When detecting error during the initial diagnosis of CAN controller of ECM.	• ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-451, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096785

1.INSPECTION START

With CONSULT-III

1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. Perform DTC CONFIRMATION PROCEDURE.
   See EC-451, "DTC Logic".
5. Check DTC.

Without CONSULT-III

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II Self-diagnostic results) memory.
3. Perform DTC CONFIRMATION PROCEDURE.
   See EC-451, "DTC Logic".
4. Check DTC.

Is the DTC U1010 displayed again?

YES >> GO TO 2.
NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Go to EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

cardiagn.com

P0011 IVT CONTROL

DTC Logic

INFOID:0000000001096786

DTC DETECTION LOGIC

NOTE:

- **If DTC P0011 is displayed with DTC P1111, first perform the trouble diagnosis for DTC P1111, refer to EC-497, "Description".**
- **The MI will not light up for this self-diagnosis.**

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	• Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 3.5 msec
Shift lever	Neutral position

CAUTION:

Always drive at a safe speed.

4. Stop vehicle with engine running and let engine idle for 10 seconds.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-453, "Diagnosis Procedure"
NO >> GO TO 4.

cardiagn.com

4. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 70°C (221°F)
Shift lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

CAUTION:
Always drive at a safe speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-453, "Diagnosis Procedure"
NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to.

NOTE:
Use component function check to check the overall function of intake valve timing control system. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-453, "Diagnosis Procedure"

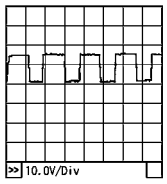
Component Function Check

INFOID:0000000001098044

1. PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle.
4. Check the voltage between ECM harness connector and ground under the following condition.

Connector	ECM Terminal	Ground	Condition	Voltage signal
F8	73 IVT control solenoid valve	Ground	At idle	BATTERY VOLTAGE (11 - 14V)
			Engine speed: 2,000 rpm	7-12V*  PBIA4937J

*: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-303, "Diagnosis Procedure".

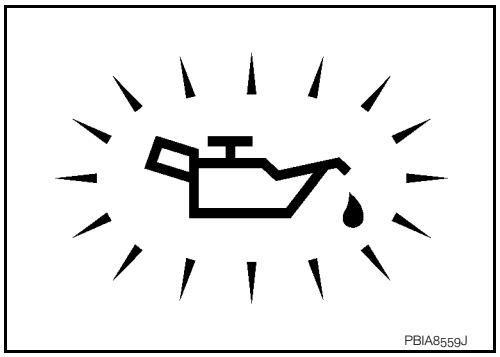
Diagnosis Procedure

INFOID:0000000001096787

1. CHECK OIL PRESSURE WARNING LAMP

cardiagn.com

1. Start engine.
2. Check oil pressure warning lamp and confirm it is not illuminated.



Is oil pressure warning lamp illuminated?

YES >> Go to MWI-34, "Description".
NO >> GO TO 2.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-455, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace intake valve timing control solenoid valve.

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-488, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace crankshaft position sensor (POS).

4. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-491, "Component Inspection".

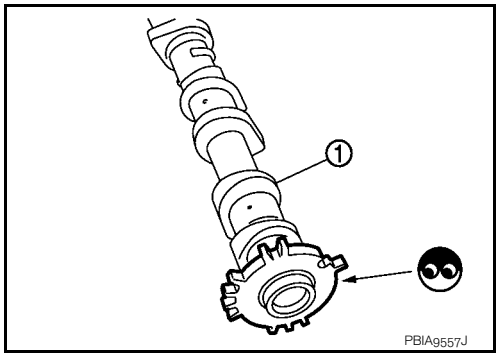
Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace camshaft position sensor (PHASE).

5. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end



Is the inspection result normal?

YES >> GO TO 6.
NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.

6. CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misaligned.

Are there any service records that may cause timing chain misaligned?

YES >> Check timing chain installation. Refer to EM-46, "Removal and Installation".
NO >> GO TO 7.

7. CHECK LUBRICATION CIRCUIT

Refer to LU-3, "Engine Lubrication System".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

cardiagn.com

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096788

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

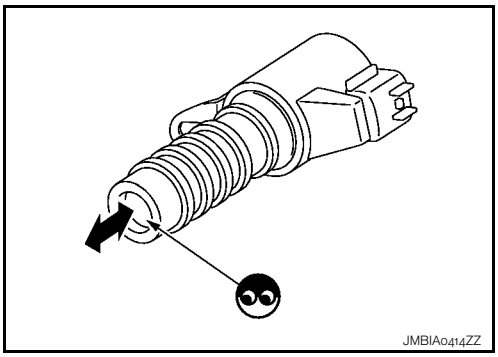
Terminals	Resistance [at 20°C (68°F)]
1 and 2	6.7 - 7.7 Ω
1 or 2 and ground	∞ Ω (Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace intake valve timing control solenoid valve.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve.
2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.
   CAUTION:
   Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
   NOTE:
   Always replace O-ring when intake valve timing control solenoid valve is removed.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace intake valve timing control solenoid valve.

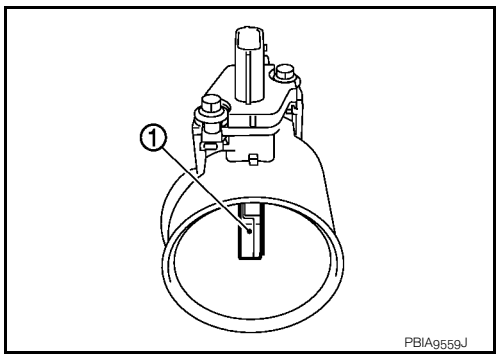
cardiagn.com

P0102, P0103 MAF SENSOR

Description

INFOID:0000000001096789

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



DTC Logic

INFOID:0000000001096790

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor
P0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

Which DTC is detected?

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102

1. Start engine and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-457, "Diagnosis Procedure".
NO >> INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-I

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-457, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-II

1. Start engine and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-457, "Diagnosis Procedure".

cardiagn.com

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096791

1.INSPECTION START

Confirm the detected DTC.

Which DTC is detected?

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2.CHECK INTAKE SYSTEM

Check the following for connection.
- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

Is the inspection result normal?

YES >> GO TO 3.
NO >> Reconnect the parts.

3.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace ground connection.

4.CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between MAF sensor harness connector and ground.

MAF sensor		Ground	Voltage
Connector	Terminal		
E18	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between MAF sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	4	F8	52	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between mass air flow sensor and ECM

cardiagn.com

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between MAF sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	3	F8	45	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to EC-458, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096792

1. CHECK MASS AIR FLOW SENSOR-I

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Connect CONSULT-III and select “DATA MONITOR” mode.
5. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
	Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
			Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK MASS AIR FLOW SENSOR-II

With CONSULT-III

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT-III and select “DATA MONITOR” mode.
4. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
	Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
			Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4.CHECK MASS AIR FLOW SENSOR-III

With CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector and reconnect it again.
3. Start engine and warm it up to normal operating temperature.
4. Connect CONSULT-III and select “DATA MONITOR” mode.
5. Select “MAS A/F SE-B1” and check indication.

cardiagn.com

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
	Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector and reconnect it again.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.3V
			Idle to about 4,000 rpm	1.0 - 1.3V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Clean or replace mass air flow sensor.

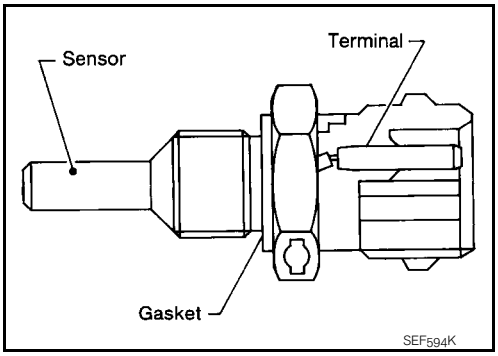
cardiagn.com

P0117, P0118 ECT SENSOR

Description

INFOID:0000000001096797

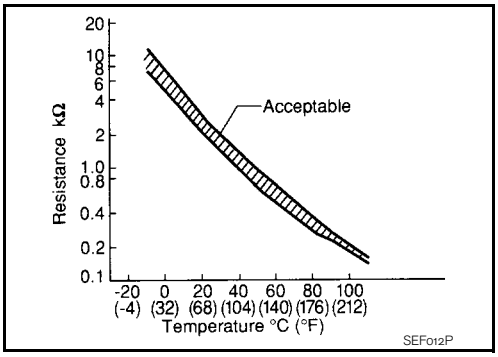
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 38 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:0000000001096798

DTC DETECTION LOGIC

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Engine coolant temperature sensor
P0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-462, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000001096799

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between ECT sensor harness connector and ground.

ECT sensor		Ground	Voltage
Connector	Terminal		
F28	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECT sensor harness connector and ECM harness connector.

ECT sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F28	2	F8	44	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-462, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace engine coolant temperature sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

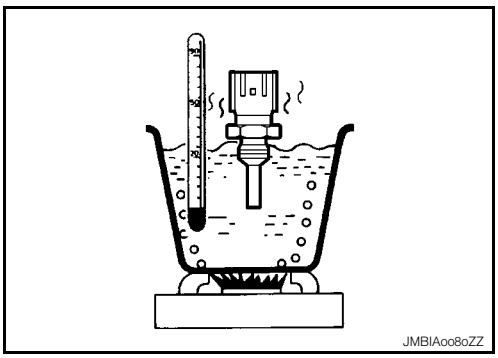
INFOID:0000000001096800

1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Remove engine coolant temperature sensor.

cardiagn.com

4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.



Terminals	Condition		Resistance
1 and 2	Temperature °C (°F)	20 (68)	2.1 - 2.9 kΩ
		50 (122)	0.68 - 1.00 kΩ
		90 (194)	0.236 - 0.260 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace engine coolant temperature sensor.

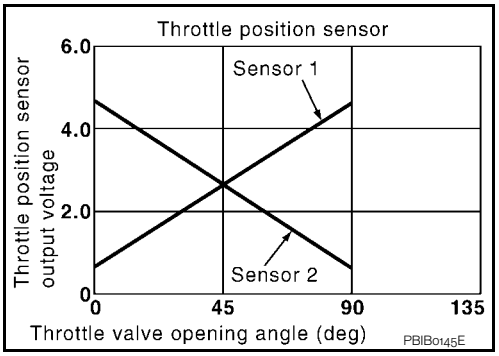
cardiagn.com

P0122, P0123 TP SENSOR

Description

INFOID:0000000001096801

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001096802

DTC DETECTION LOGIC

NOTE:
If DTC P0122 or P0123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	• Harness or connectors (TP sensor 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 2)
P0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-464, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096803

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

cardiagn.com

3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	3	F8	34	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-465, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-466, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096804

cardiagn.com

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to 1st position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-466, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096805

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

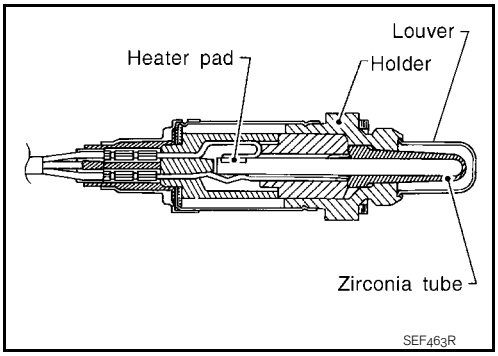
cardiagn.com

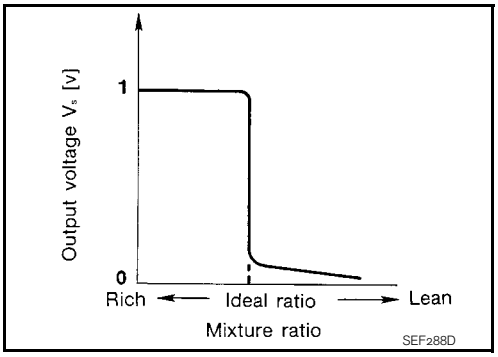
P0132 HO2S1

Description

INFOID:0000000001096806

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



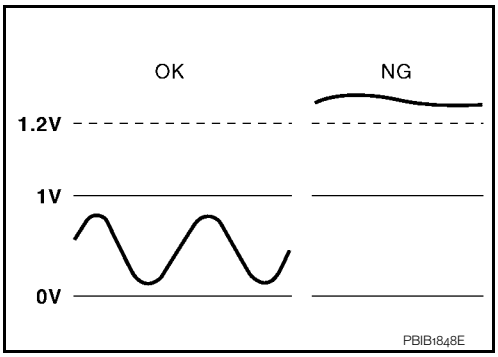


DTC Logic

INFOID:0000000001102030

DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0132	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Heated oxygen sensor 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

cardiagn.com

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for 2 minutes.
4. Check 1st trip DTC.

Is 1st trip DTC is detected?

YES >> Go to EC-1091, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096808

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	existed

2. Check harness continuity between HO2S1 harness connector or ECM harness connector.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

cardiagn.com

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HO2S1 CONNECTOR FOR WATER

Check heated oxygen sensor 1 connector for water.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 1

Refer to EC-469, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace heated oxygen sensor 1.

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001096809

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

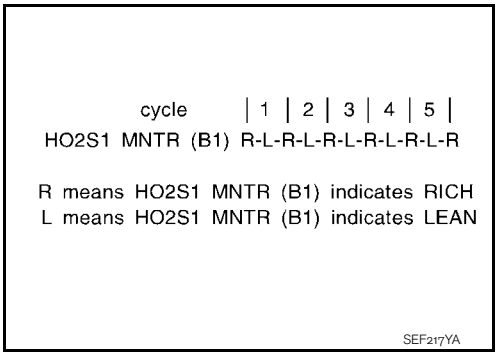
YES >> GO TO 2.
NO >> GO TO 3.

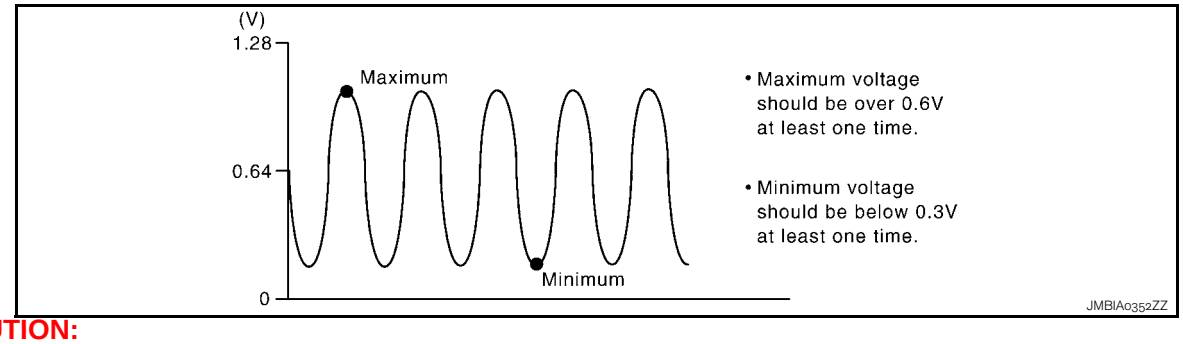
2.CHECK HEATED OXYGEN SENSOR 1

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.





CAUTION:

cardiagn.com

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

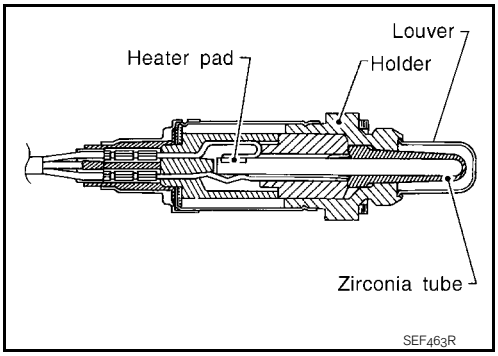
cardiagn.com

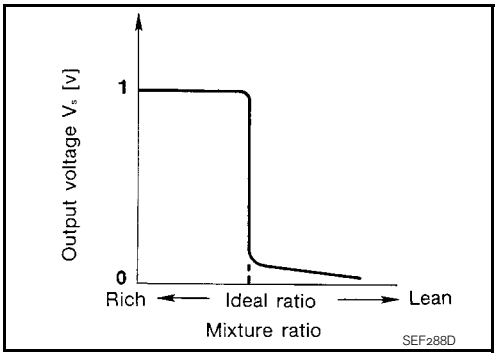
P0134 HO2S1

Description

INFOID:0000000001096814

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



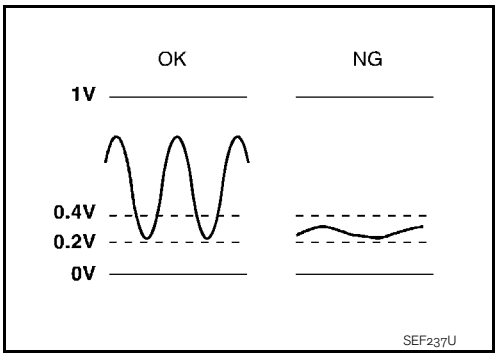


DTC Logic

INFOID:0000000001102039

DTC DETECTION LOGIC

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	• Harness or connectors (The sensor circuit is open or shorted.) • Heated oxygen sensor 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform at a temperature above -10°C (14°F).

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Do you have CONSULT-III?

cardiagn.com

YES >> GO TO 2.
NO >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" in "DATA MONITOR" mode with CONSULT-III, and select "HO2S1 (B1)".
3. Hold engine speed at 2,000 rpm under no load.
4. Make sure that the indications do not remain in the range between 0.2V to 0.4V.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-765, "Diagnosis Procedure".

3. PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set volmeter probes between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage dose not remain in the range of 0.2 to 0.4.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-765, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096816

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	Existed

4. Also check harness for short to ground and short to power.

Is inspection result normal?

YES >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 harness connector and ECM harness connector 49.

cardiagn.com

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	Existed

2. Check harness continuity between ECM harness connector 49 or HO2S1 harness connector and ground.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HEATED OXYGEN SENSOR 1

Refer to EC-473, "Component Inspection".

Is inspection result normal?

YES >> GO TO 5.
NO >> Replace heated oxygen sensor 1.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001096817

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

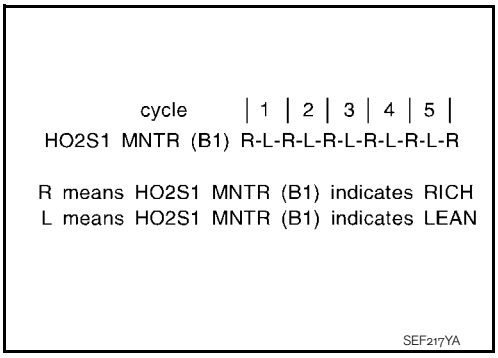
YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 1

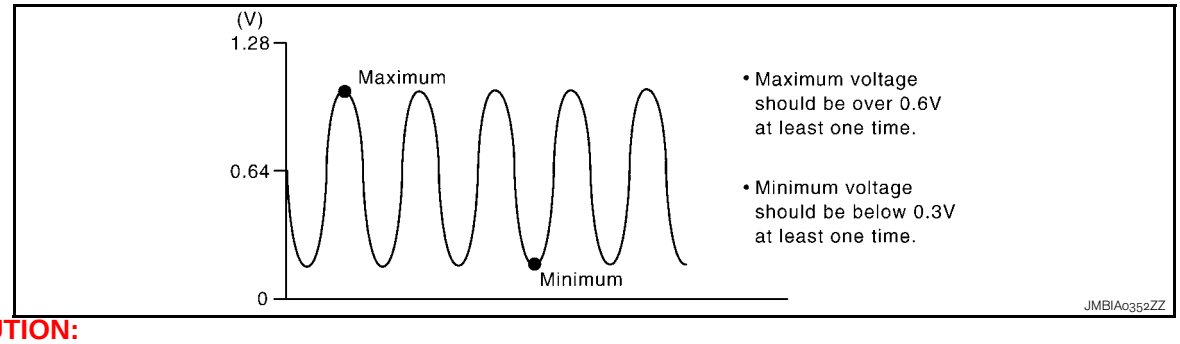
With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.



cardiagn.com



CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

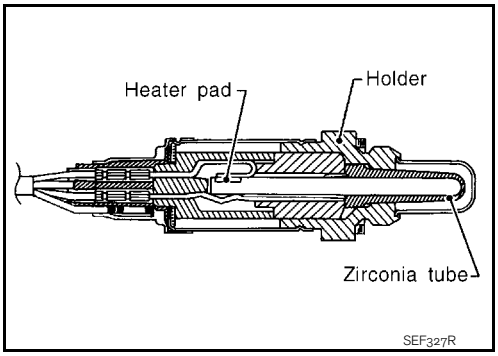
cardiagn.com

P0138 HO2S2

Description

INFOID:0000000001096822

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

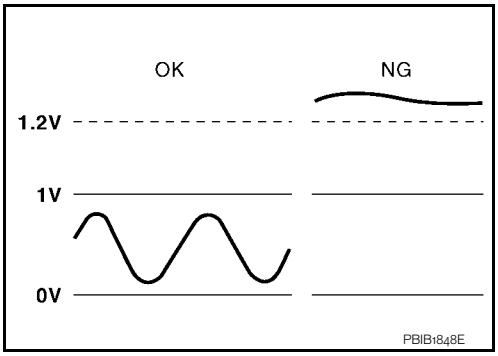


DTC Logic

INFOID:0000000001096823

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time.
To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 2 minutes.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-476, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096824

cardiagn.com

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between HO2S2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F8	50	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between HO2S2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK HO2S2 CONNECTOR FOR WATER

Check connectors for water.

cardiagn.com

Water should not exist.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace harness or connectors.

7.CHECK HEATED OXYGEN SENSOR 2

Refer to EC-477, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

9.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096825

1.INSPECTION START

Do you have CONSULT-III?

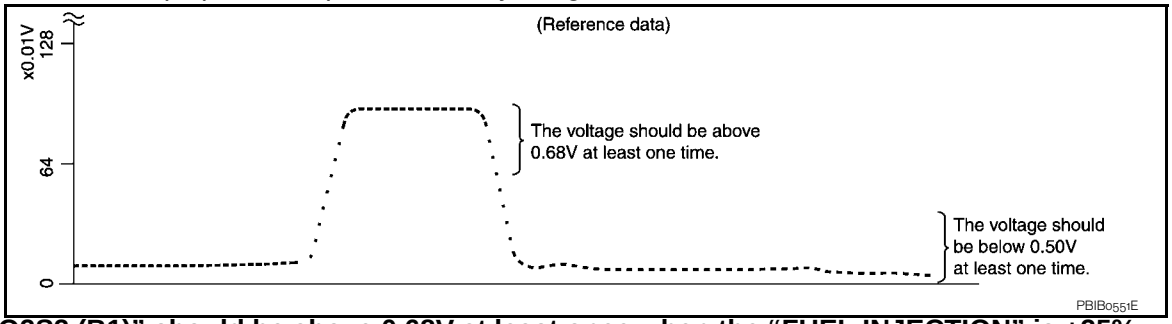
Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

cardiagn.com

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 4th gear position	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

cardiagn.com

>> INSPECTION END

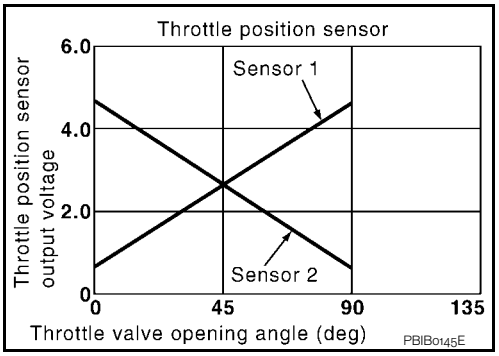
cardiagn.com

P0222, P0223 TP SENSOR

Description

INFOID:0000000001096839

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001096840

DTC DETECTION LOGIC

NOTE:
If DTC P0222 or P0223 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-519, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	• Harness or connectors (TP sensor 1 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1)
P0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-480, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096841

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

cardiagn.com

3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	2	F8	33	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-481, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-482, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096842

cardiagn.com

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to 1st position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-482, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096843

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P0327, P0328 KS

Description

INFOID:0000000001096846

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.

DTC Logic

INFOID:0000000001096847

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detected condition	Possible cause
P0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Knock sensor
P0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-483, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096848

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK KNOCK SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect knock sensor harness connector and disconnect ECM harness connector.
2. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	2	F8	40	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

cardiagn.com

3.CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	1	F8	37	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK KNOCK SENSOR

Refer to EC-484, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace knock sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096849

1.CHECK KNOCK SENSOR

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check resistance between knock sensor terminals as follows.
   NOTE:
   It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	Approx. 532 - 588 kΩ

CAUTION:
Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace knock sensor.

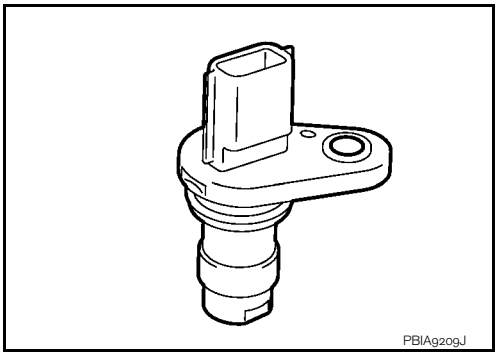
cardiagn.com

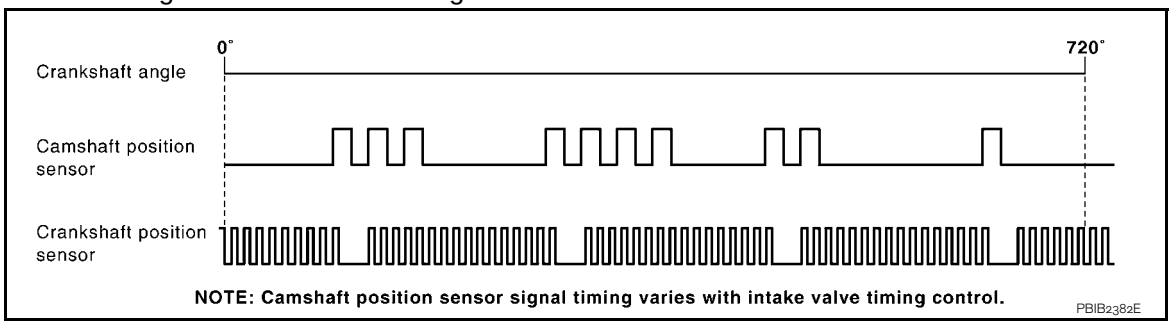
P0335 CKP SENSOR (POS)

Description

INFOID:0000000001096850

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at end of the crankshaft. It detects the fluctuation of the engine revolution.
The sensor consists of a permanent magnet and Hall IC.
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
The ECM receives the voltage signal and detects the fluctuation of the engine revolution.
ECM receives the signals as shown in the figure.


PBIAg209J



NOTE: Camshaft position sensor signal timing varies with intake valve timing control.
PBIB2382E

DTC Logic

INFOID:0000000001096851

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335	Crankshaft position sensor (POS) circuit	• The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. • The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. • The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.	• Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Refrigerant pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • Accelerator pedal position sensor • Signal plate

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.
   If engine does not start, crank engine for at least 2 seconds.

cardiagn.com

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-486, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096852

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CKP sensor (POS) harness connector and ground.

CKP sensor (POS)		Ground	Voltage
Connector	Terminal		
F20	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	1	F8	75	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit.

4.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.
- Refrigerant pressure sensor (Refer to HAC-161, "Component Inspection")

cardiagn.com

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace malfunctioning components.

6.CHECK APP SENSOR

Refer to EC-544, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 7.

7.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-545, "Special Repair Requirement".

>> INSPECTION END

8.CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	2	F8	62	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9.CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	3	F8	61	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-488, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace crankshaft position sensor (POS).

11.CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

Is the inspection result normal?

YES >> GO TO 12.
NO >> Replace the signal plate.

12.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

cardiagn.com

>> INSPECTION END

Component Inspection

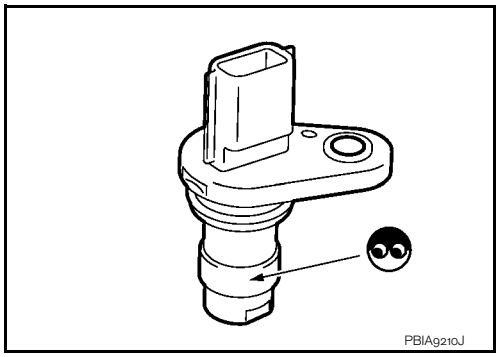
INFOID:0000000001096853

1. CHECK CRANKSHAFT POSITION SENSOR (POS)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect crankshaft position sensor (POS) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace crankshaft position sensor (POS).



2. CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance between crankshaft position sensor (POS) terminals as follows.

Terminals (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace crankshaft position sensor (POS).

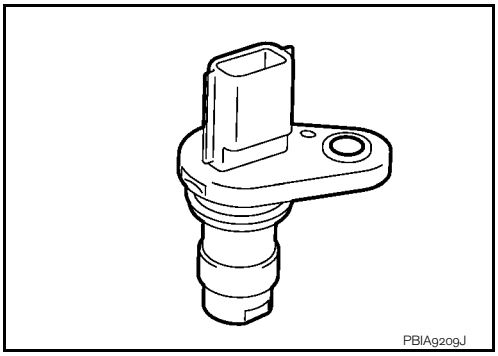
cardiagn.com

P0340 CMP SENSOR (PHASE)

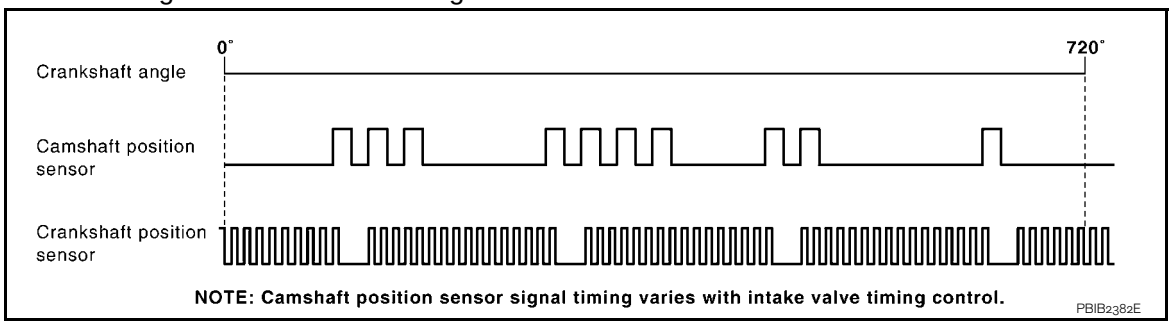
Description

INFOID:0000000001096854

The camshaft position sensor (PHASE) senses the protrusion of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.
The sensor consists of a permanent magnet and Hall IC.
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.


PBIAg209J

Due to the changing magnetic field, the voltage from the sensor changes.
ECM receives the signals as shown in the figure.



DTC Logic

INFOID:0000000001096855

DTC DETECTION LOGIC

NOTE:
If DTC P0340 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sensor (PHASE) circuit	• The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. • The cylinder No. signal is not sent to ECM during engine running. • The cylinder No. signal is not in the normal pattern during engine running.	• Harness or connectors (The sensor circuit is open or shorted) • Camshaft position sensor (PHASE) • Camshaft (INT) • Starter motor • Starting system circuit • Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Start engine and let it idle for at least 5 seconds.
   If engine does not start, crank engine for at least 2 seconds.
2. Check 1st trip DTC.

cardiagn.com

Is 1st trip DTC detected?

YES >> Go to EC-490, "Diagnosis Procedure".
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-490, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096856

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over? Does the starter motor operate?

YES >> GO TO 2.
NO >> Check starting system.

2. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace ground connection.

3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CMP sensor (PHASE) harness connector and ground.

CMP sensor (PHASE)		Ground	Voltage
Connector	Terminal		
F26	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	2	F8	63	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

cardiagn.com

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	3	F8	65	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-491, "Component Inspection".

Is the inspection result normal?

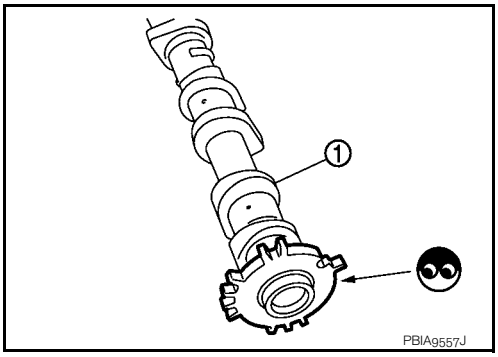
YES >> GO TO 7.
NO >> Replace camshaft position sensor (PHASE).

7.CHECK CAMSHAFT (INT)

Check the following.
- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

Is the inspection result normal?

YES >> GO TO 8.
NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

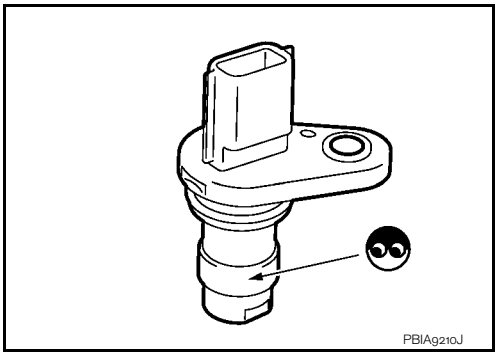
INFOID:0000000001096857

1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect camshaft position sensor (PHASE) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace camshaft position sensor (PHASE).



2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as follows.

cardiagn.com

Terminals (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace camshaft position sensor (PHASE).

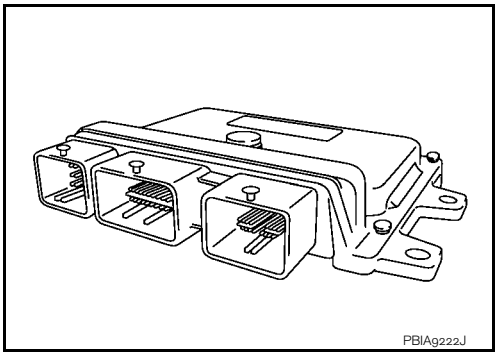
cardiagn.com

P0605 ECM

Description

INFOID:0000000001096869

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



DTC Logic

INFOID:0000000001096870

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605	Engine control module	A)	ECM calculation function is malfunctioning.	• ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

1. Turn ignition switch ON.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-494, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

1. Turn ignition switch ON and wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-494, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and waitait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Repeat step 2 for 32 times.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-494, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000001096871

1.INSPECTION START

With CONSULT-III

1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. Perform DTC CONFIRMATION PROCEDURE.
   See EC-493, "DTC Logic".

Without CONSULT-III

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory.
3. Perform DTC CONFIRMATION PROCEDURE.
   See EC-493, "DTC Logic".

Is the 1st trip DTC P0605 displayed again?

YES >> GO TO 2.
NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Go to EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

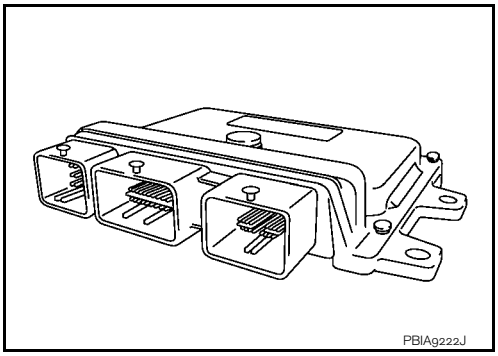
cardiagn.com

P1065 ECM

Description

INFOID:0000000001096872

ECM has the memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the Idle Air Volume Learning value memory, etc. even when the ignition switch is turned OFF.



DTC Logic

INFOID:0000000001096873

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065	Engine control module	ECM back-up RAM system does not function properly.	• ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Start engine and let it idle for 1 second.
3. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
4. Repeat steps 2 and 3 for four times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-495, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096874

1.INSPECTION START

With CONSULT-III
1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. Perform DTC CONFIRMATION PROCEDURE.
   See EC-495, "DTC Logic".

Without CONSULT-III
1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory.
3. Perform DTC CONFIRMATION PROCEDURE.
   See EC-495, "DTC Logic".

Is the 1st trip DTC P1065 displayed again?

YES >> GO TO 2.

cardiagn.com

NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Go to EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

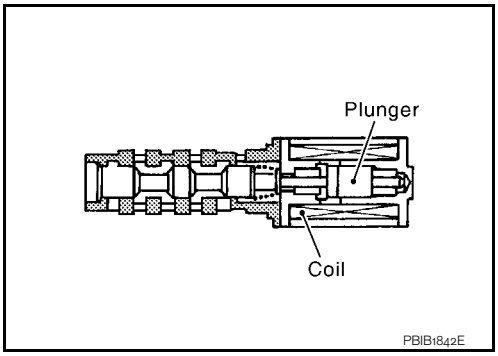
cardiagn.com

P1111 IVT CONTROL SOLENOID VALVE

Description

INFOID:0000000001096875

Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.
The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.
The longer pulse width advances valve angle.
The shorter pulse width retards valve angle.
When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



DTC Logic

INFOID:0000000001096876

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) • Intake valve timing control solenoid valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-497, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096877

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake valve timing control solenoid valve harness connector and ground.

IVT control solenoid valve		Ground	Voltage
Connector	Terminal		
F41	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN

cardiagn.com

AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between intake valve timing control solenoid valve harness connector and ECM harness connector.

IVT control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F41	1	F8	73	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-498, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace intake valve timing control solenoid valve.

4.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096878

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	6.7 - 7.7 Ω
1 or 2 and ground	∞ Ω (Continuity should not exist)

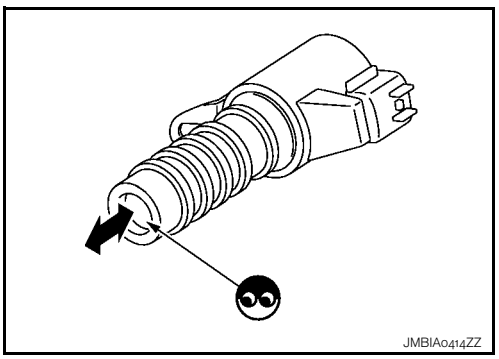
Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace intake valve timing control solenoid valve.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve.
2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:
Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
NOTE:
Always replace O-ring when intake valve timing control solenoid valve is removed.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace intake valve timing control solenoid valve.

cardiagn.com

P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:0000000001096879

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001096880

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	• Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detect the throttle valve is stuck open.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to 1st position and wait at least 3 seconds.
3. Set shift lever to Neutral position.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set shift lever to 1st position and wait at least 3 seconds.
7. Set shift lever to Neutral position.
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.

Is DTC detected?

YES >> Go to EC-499, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to 1st position and wait at least 3 seconds.
3. Set shift lever to Neutral position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.

Is DTC detected?

YES >> Go to EC-499, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

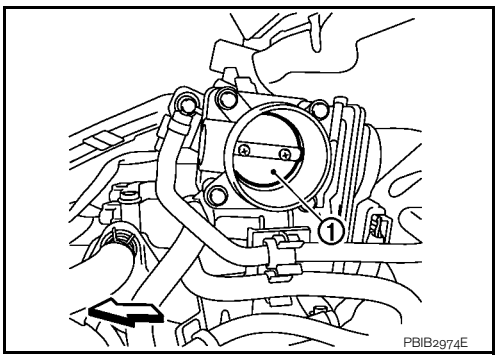
INFOID:0000000001096881

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

cardiagn.com

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.

⇦ : Vehicle front



Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-500, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096882

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:0000000001096883

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001096884

DTC DETECTION LOGIC

NOTE:
If DTC P1122 is displayed with DTC P1121 or P1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to EC-505, "DTC Logic" or EC-499, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122	Electric throttle control performance	Electric throttle control function does not operate properly.	• Harness or connectors (Throttle control motor circuit is open or shorted) • Electric throttle control actuator

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-501, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096885

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch OFF	Approx. 0V
			Ignition switch ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 3.

3.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	32	F7	2	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F12, E9
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Check voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

7.CHECK FUSE

1. Disconnect 15A fuse (No. 51) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace 15A fuse.

8.CHECK INTERMITTENT INCIDENT

cardiagn.com

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

9. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

5. Also check harness for short to ground and short to power.

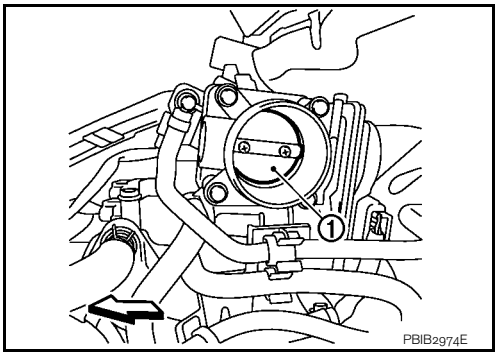
Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace.

10. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve (1) and the housing.

⇦ : Vehicle front



Is the inspection result normal?

YES >> GO TO 11.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

11. CHECK THROTTLE CONTROL MOTOR

Refer to EC-503, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 13.

12. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair or replace harness or connectors.

13. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace malfunction electric throttle control actuator.
2. Go to EC-504, "Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000001096886

cardiagn.com

1.CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance [at 25 °C (77°F)]
5 and 6	Approx. 1 - 15 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-504, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096887

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Description

INFOID:0000000001096888

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

DTC Logic

INFOID:0000000001096889

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	• Harness or connectors (Throttle control motor relay circuit is shorted) • Throttle control motor relay
P1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	• Harness or connectors (Throttle control motor relay circuit is open) • Throttle control motor relay

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V.

Witch DTC is detected?

P1124 >> GO TO 2.
P1126 >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P1124

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-505, "Diagnosis Procedure".
NO >> INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P1126

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-505, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096890

1.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Check voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E12.
4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	15	E12	25	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NG >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Reconnect ECM and IPDM E/R harness connectors.
2. Turn ignition switch ON.
3. Check voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 6.

6.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Check the continuity between ECM harness connector and IPDM E/R harness connector.

cardiagn.com

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	2	E12	32	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F12, E9
- Harness for open or short between throttle motor relay and ECM

>> Repair open or short to ground or short to power in harness or connectors.

8. CHECK FUSE

1. Disconnect 15A fuse (No. 51) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace 15A fuse.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

cardiagn.com

P1128 THROTTLE CONTROL MOTOR

Description

INFOID:0000000001096891

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001096892

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	• Harness or connectors (Throttle control motor circuit is shorted.) • Electric throttle control actuator (Throttle control motor)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-508, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096893

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect electric throttle control actuator harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

cardiagn.com

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK THROTTLE CONTROL MOTOR

Refer to EC-509, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 5.

4.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-509, "Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000001096894

1.CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance [at 25 °C (77°F)]
5 and 6	Approx. 1 - 15 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-509, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096895

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1212 TCS COMMUNICATION LINE

Description

INFOID:0000000001116301

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and “ABS actuator and electric unit (control unit)”.
Be sure to erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

DTC Logic

INFOID:0000000001116302

DTC DETECTION LOGIC

NOTE:
- **If DTC P1212 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-450, "DTC Logic".**
- **If DTC P1212 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-450, "DTC Logic".**

Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212	TCS communication line	ECM can not receive the information from “ABS actuator and electric unit (control unit)” continuously.	• Harness or connectors (The CAN communication line is open or short-ed.) • ABS actuator and electric unit (control unit) • Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-510, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116303

Go to BRC-6, "Work Flow".

cardiagn.com

P1217 ENGINE OVER TEMPERATURE

DTC Logic

INFOID:0000000001096914

DTC DETECTION LOGIC

NOTE:

- **If DTC P1217 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-450, "DTC Logic".**
- **If DTC P1217 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-451, "DTC Logic".**

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.
When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217	Engine over temperature (Overheat)	• Cooling fan does not operate properly (Overheat). • Cooling fan system does not operate properly (Overheat). • Engine coolant was not added to the system using the proper filling method. • Engine coolant is not within the specified range.	• Harness or connectors (The cooling fan circuit is open or shorted.) • IPDM E/R (Cooling fan relays -1 and -3) • Cooling fan motor • Radiator hose • Radiator • Radiator cap • Reservoir tank • Water pump • Thermostat

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to CO-9, "Inspection". Also, replace the engine oil. Refer to LU-6, "Inspection".

1. **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to LU-6, "Inspection".**
2. **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-511, "Component Function Check".

NOTE:

Use component function check to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-512, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001096915

1.PERFORM COMPONENT FUNCTION CHECK-I

WARNING:

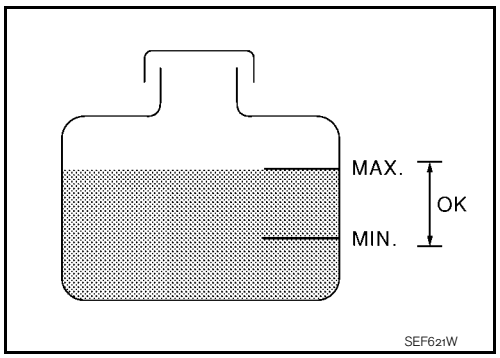
Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.
Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

cardiagn.com

Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.

Is the coolant level in the reservoir tank and/or radiator below the proper range?

YES >> Go to EC-512, "Diagnosis Procedure".
NO >> GO TO 2



2. PERFORM COMPONENT FUNCTION CHECK-II

Confirm whether customer filled the coolant or not.

Did customer fill the coolant?

YES >> Go to EC-512, "Diagnosis Procedure".
NO >> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK-III

With CONSULT-III
1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that cooling fan motor operate at each speed (LOW/HI).

Without CONSULT-III
Perform IPDM E/R auto active test and check cooling fan motor operation, refer to PCS-9, "Diagnosis Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to PCS-9, "Diagnosis Description".

Diagnosis Procedure

INFOID:0000000001096916

1. CHECK COOLING FAN OPERATION

With CONSULT-III
1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that cooling fan motor operate at each speed (LOW/HI).

Without CONSULT-III
1. Perform IPDM E/R auto active test and check cooling fan motor operation, refer to PCS-9, "Diagnosis Description".
2. Make sure that cooling fan motor operate at each speed (Low/High).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-558, "Diagnosis Procedure".

2. CHECK COOLING SYSTEM FOR LEAK-I

Check cooling system for leak. Refer to CO-9, "Inspection".

Is leakage detected?

YES >> GO TO 3.
NO >> GO TO 4.

3. CHECK COOLING SYSTEM FOR LEAK-II

Check the following for leak. Refer to CO-9, "Inspection".
- Hose
- Radiator
- Water pump

cardiagn.com

>> Repair or replace malfunctioning part.

4. CHECK RADIATOR CAP

Check radiator cap. Refer to CO-13, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace radiator cap.

5. CHECK THERMOSTAT

Check thermostat. Refer to CO-19, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace thermostat.

6. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-462, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace engine coolant temperature sensor.

7. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, check the following.

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	• Blocked radiator • Blocked condenser • Blocked radiator grille • Blocked bumper	• Visual	No blocking	—
	2	• Coolant mixture	• Coolant tester	50 - 50% coolant mixture	CO-9, "Inspection"
	3	• Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-9, "Inspection"
	4	• Radiator cap	• Pressure tester	59 - 98 kPa (0.6 - 1.0 bar, 0.6 - 1.0 kg/cm^2, 9 - 14 psi) (Limit)	CO-14, "Inspection"
ON*2	5	• Coolant leaks	• Visual	No leaks	CO-9, "Inspection"
ON*2	6	• Thermostat	• Touch the upper and lower radiator hoses	Both hoses should be hot	CO-20, "Inspection"
ON*1	7	• Cooling fan motor	• CONSULT-III	Operating	EC-559, "Component Inspection (Cooling Fan Motor)"
OFF	8	• Combustion gas leak	• Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	• Coolant temperature gauge	• Visual	Gauge less than 3/4 when driving	—
		• Coolant overflow to reservoir tank	• Visual	No overflow during driving and idling	CO-9, "Inspection"
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	CO-9, "Inspection"
OFF	11	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	EM-80, "Inspection"
	12	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	EM-101, "Inspection"

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

cardiagn.com

*4: After 60 minutes of cool down time.

For more information, refer to CO-5, "Troubleshooting Chart".

>> INSPECTION END

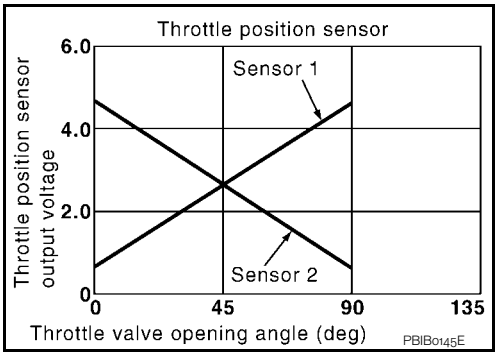
cardiagn.com

P1225 TP SENSOR

Description

INFOID:0000000001096917

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001096918

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-515, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

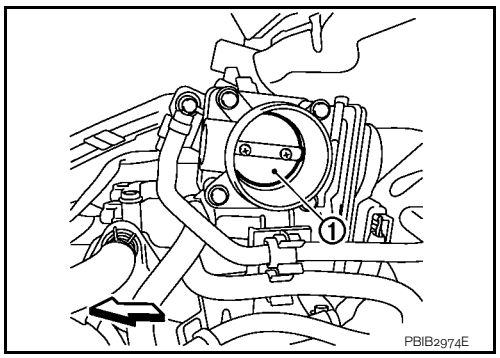
INFOID:0000000001096919

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

cardiagn.com

3. Check if foreign matter is caught between the throttle valve (1) and the housing.



⇦ : Vehicle front

Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-516, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096920

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

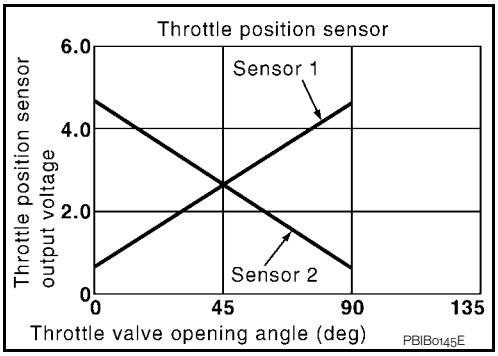
cardiagn.com

P1226 TP SENSOR

Description

INFOID:0000000001096921

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001096922

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226	Closed throttle position learning performance	Closed throttle position learning is not performed successfully, repeatedly.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF, wait at least 10 seconds.
3. Turn ignition switch ON.
4. Repeat steps 2 and 3 for 32 times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-517, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096923

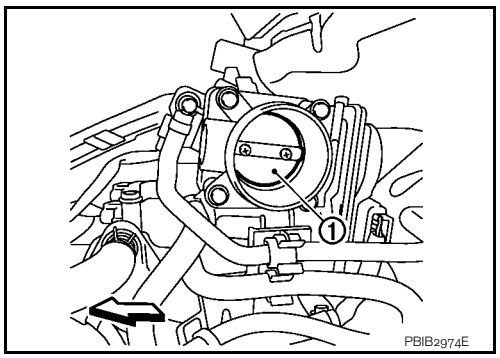
1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

cardiagn.com

3. Check if foreign matter is caught between the throttle valve (1) and the housing.

⇦ : Vehicle front



Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-516, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096924

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1229 SENSOR POWER SUPPLY

DTC Logic

INFOID:0000000001096925

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	• Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.] • Accelerator pedal position sensor • Throttle position sensor • Camshaft position sensor (PHASE)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-519, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096926

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

cardiagn.com

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	72	Electric throttle control actuator	F29	1
	78	CMP sensor (PHASE)	F26	1
E16	106	APP sensor	E110	4

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair short to ground or short to power in harness or connectors.

4. CHECK COMPONENTS

Check the following.
• Camshaft position sensor (PHASE) (Refer to EC-491, "Component Inspection".)

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace malfunctioning component.

5. CHECK TP SENSOR

Refer to EC-481, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-369, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> INSPECTION END

7. CHECK APP SENSOR

Refer to EC-541, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-369, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P1564 ASCD STEERING SWITCH

Description

INFOID:0000000001116278

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.
Refer to EC-399, "System Description" for the ASCD function.

DTC Logic

INFOID:0000000001116279

DTC DETECTION LOGIC

NOTE:
If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-827, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564	ASCD steering switch	• An excessively high voltage signal from the ASCD steering switch is sent to ECM. • ECM detects that input signal from the ASCD steering switch is out of the specified range. • ECM detects that the ASCD steering switch is stuck ON.	• Harness or connectors (The switch circuit is open or shorted.) • ASCD steering switch • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Wait at least 10 seconds.
3. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Check DTC.

Is DTC detected?

YES >> Go to EC-521, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116280

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YS >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-III
1. Turn ignition switch ON.

cardiagn.com

2. Select “MAIN SW”, “CANCEL SW”, “RESUME/ACC SW” and “SET SW” in “DATA MONITOR” mode with CONSULT-III.
3. Check each item indication under the following conditions.

Monitor item	Condition		Indication
MAIN SW	MAIN switch	Pressed	ON
		Released	OFF
CANCEL SW	CANCEL switch	Pressed	ON
		Released	OFF
RESUME/ACC SW	RESUME/ACCELERATE switch	Pressed	ON
		Released	OFF
SET SW	SET/COAST switch	Pressed	ON
		Released	OFF

Without CONSULT-III
1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
E16	94 (ASCD steering switch signal)	Ground	MAIN switch: Pressed	Approx. 0V
			CANSEL switch: Pressed	Approx. 1V
			SET/COAST switch: Pressed	Approx. 2V
			RESUME/ACCELERATE switch: Pressed	Approx. 3V
			All ASCD steering switches: Released	Approx. 4V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect combination switch harness connector M352.
4. Check the continuity between ASCD steering switch and ECM harness connector.

ASCD steering switch	ECM		Continuity
Terminal	Connector	Terminal	
15	E16	95	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCE steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

cardiagn.com

1. Check the continuity between ECM harness connector and ASCD steering switch.

ASCD steering switch	ECM		Continuity
Terminal	Connector	Terminal	
14	E16	94	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCE steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD STEERING SWITCH

Refer to EC-523, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace ASCD steering switch.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001116281

1. CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the continuity between combination switch harness connector terminals under following conditions.

Combination meter		Condition	Resistance
Connector	Terminals		
M325	14 and 15	MAIN switch: Pressed	Approx. 0 Ω
		CANCEL switch: Pressed	Approx. 250 Ω
		SET/COAST switch: Pressed	Approx. 660 Ω
		RESUME/ACCELERATE switch: Pressed	Approx. 1,480 Ω
		All ASCD steering switches: Released	Approx. 4,000 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD steering switch

cardiagn.com

P1572 ASCD BRAKE SWITCH

Description

INFOID:0000000001116282

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-60, "System Description" for the ASCD function.

DTC Logic

INFOID:0000000001116283

DTC DETECTION LOGIC

NOTE:

- **If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-827, "DTC Logic".**
- **This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.**

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1572	ASCD brake switch	A)	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the ECM at the same time.	• Harness or connectors (The stop lamp switch circuit is shorted.) • Harness or connectors (The ASCD brake switch circuit is shorted.) • Harness or connectors (The ASCD clutch switch circuit is shorted.) • Stop lamp switch • ASCD brake switch • ASCD clutch switch • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • Incorrect ASCD clutch switch installation • ECM
		B)	ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?.

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

NOTE:
Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

With CONSULT-III

1. Start engine.
2. Select “DATA MONITOR” mode with CONSULT-III.
3. Press MAIN switch and make sure that CRUISE indicator is displayed in combination meter.
4. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

CAUTION:
Always drive vehicle at a safe speed.

cardiagn.com

NOTE:
This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

VHCL SPEED SE	More than 30 km/h (19 mph)
Shift lever	Suitable position

5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-526, "Diagnosis Procedure".
NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

With CONSULT-III

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-526, "Diagnosis Procedure".
NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK

Perform component check. Refer to
Use component function check to check the overall function of the ASCD brake circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-526, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001116284

1. PERFORM COMPONENT FUNCTION CHECK-I

Without CONSSULT-III

1. Turn ignition switch ON.
2. Check voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal and clutch pedal	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-826, "Diagnosis Procedure".

2. PERFORM COMPONENT FUNCTION CHECK-II

cardiagn.com

Without CONSSULT-III
Check voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	99 (Stop lamp switch signal)	Ground	Brake pedal and clutch pedal	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-826, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116285

1. CHECK OVERALL FUNCTION-I

With CONSULT-III
1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-III.
3. Check “BRAKE SW1” indication under the following conditions.

Monitor item	Condition		Indication
BRAKE SW1	Brake pedal and clutch pedal	Slightly depressed	OFF
		Fully released	ON

Without CONSULT-III
1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal and clutch pedal	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

With CONSULT-III
Select “BRAKE SW2” and check indication in “DATA MONITOR” mode.

Monitor item	Condition		Indication
BRAKE SW2	Brake pedal and clutch pedal	Slightly depressed	ON
		Fully released	OFF

Without CONSULT-III
Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	99 (Stop lamp switch signal)	Ground	Brake pedal and clutch pedal	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

cardiagn.com

YES >> GO TO 15.
NO >> GO TO 6.

3. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD Clutch switch		Ground	Condition		Voltage (V)
Connector	Terminal				
E112	1	Ground	Clutch pedal	Slightly depressed	Approx. 0
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 4.

4. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground	Voltage
Connector	Terminal		
E111	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Junction block connector E105, M77
- 10A fuse (No.4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD brake switch		ASCD clutch switch		Continuity
Connector	Terminal	Connector	Terminal	
E112	1	E111	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD BRAKE SWITCH

Refer to EC-529, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

cardiagn.com

YES >> GO TO 11.
NO >> Replace ASCD brake switch.

8. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and ASCD brake switch harness connector.

ECM		ASCD brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E16	100	E112	2	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK ASCD CLUTCH SWITCH

Refer to EC-529, "Component Inspection (ASCD Clutch Switch)".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Replace ASCD clutch switch.

10. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 12.

11. DETECT MALFUNCTIONING PART

Check the following.
- 10A fuse (No.11)
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

ECM		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E10	106	E114	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 14.
NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

cardiagn.com

Check the following.
• Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK STOP LAMP SWITCH

Refer to EC-530, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Replace stop lamp switch.

15. CHECK INTERMITTENT INCIDENT

Refer to .

>> INSPECTION ENDGI-39, "Intermittent Incident"

Component Inspection (ASCD Brake Switch)

INFOID:0000000001116286

1. CHECK ASCD BRAKE SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to BR-8, "Inspection and Adjustment".
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:0000000001116287

1. CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to CL-5, "Inspection and Adjustment".
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

Component Inspection (Stop Lamp Switch)

INFOID:0000000001116288

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-18, "Inspection and Adjustment"
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

cardiagn.com

P1574 ASCD VEHICLE SPEED SENSOR

Description

INFOID:0000000001116289

The ECM receives two vehicle speed sensor signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to EC-60, "System Description" for ASCD functions.

DTC Logic

INFOID:0000000001116290

DTC DETECTION LOGIC

NOTE:

- **If DTC P1574 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-450, "DTC Logic".**
- **If DTC P1574 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-451, "DTC Logic".**
- **If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-493, "DTC Logic"**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	• Harness or connectors (The CAN communication line is open or shorted.) (Combination meter circuit is open or shorted.) • Combination meter • ABS actuator and electric unit (control unit) • Wheel sensor • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Drive the vehicle at more than 40 km/h (25 MPH).
   CAUTION:
   Always drive vehicle at a safe speed.
   NOTE:
   This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-531, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116291

1.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to BRC-57, "DTC No. Index".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace.

2.CHECK COMBINATION METER

cardiagn.com

Check combination meter function.
Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

>> INSPECTION END

cardiagn.com

P1706 PNP SWITCH

Description

INFOID:0000000001096927

When the shift lever position is in the neutral position, ECM detects the position because the continuity of the line (the ON signal) exists.

DTC Logic

INFOID:0000000001096928

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	• Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] • Park/neutral position (PNP) switch

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 3.

3.CHECK PNP SWITCH FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-III. Then check the “P/N POSI SW” signal under the following conditions.

Position (Shift lever)	Known-good signal
Neutral position	ON
Except above position	OFF

Is the inspection result normal?

YES >> GO TO 4.
NO >> Go to EC-534, "Diagnosis Procedure".

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to normal operating temperature.
3. Maintain the following conditions for at least 50 consecutive seconds.

CAUTION:
Always drive vehicle at a safe speed.

ENG SPEED	1,925 - 6,375 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	2.5 - 31.8 msec

cardiagn.com

VHCL SPEED SE	More than 64 km/h (40 mph)
Shift lever	Suitable position

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-534, "Diagnosis Procedure".
NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

With CONSULT-III

Perform component function check. Refer to EC-534, "Component Function Check".

NOTE:

Use component function check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-534, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001096929

1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	69 (PNP switch signal)	Ground	Shift lever	Neutral position	Approx. 0V
				Except above	BATTERY VOLTAGE

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-534, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096930

1.CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Park/neutral position (PNP) switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between PNP switch harness connector and ground.

PNP switch		Ground	Voltage
Connector	Terminal		
F46	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following

- Harness connectors E6, F123
- Harness for open or short between neutral position switch and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between PNP switch harness connector and ECM harness connector.

PNP switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F46	3	F8	69	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK PNP SWITCH

Refer to TM-10, "PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace PNP switch.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P1805 BRAKE SWITCH

Description

INFOID:0000000001096931

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

DTC Logic

INFOID:0000000001096932

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805	Brake switch	A brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	• Harness or connectors (Stop lamp switch circuit is open or shorted.) • Stop lamp switch

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-III.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-536, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096933

1.CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

Is 1st trip DTC detected?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
• Harness connectors E105, M77

cardiagn.com

- 10A fuse (No. 11)
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

ECM		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E16	99	E114	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK STOP LAMP SWITCH

Refer to EC-537, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace stop lamp switch.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (Stop Lamp Switch)

INFOID:0000000001096934

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-18, "Inspection and Adjustment"(LHD) or BR-62, "Inspection and Adjustment"(LHD).
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

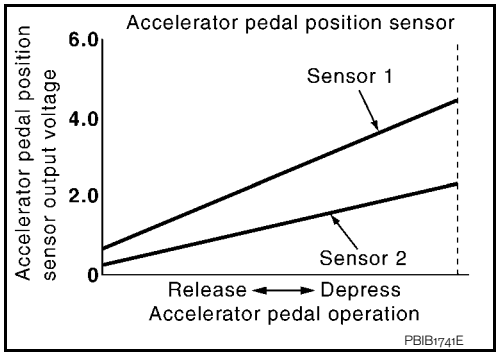
cardiagn.com

P2122, P2123 APP SENSOR

Description

INFOID:0000000001096935

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

DTC Logic

INFOID:0000000001096936

DTC DETECTION LOGIC

NOTE:
If DTC P2122 or P2123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-519, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	• Harness or connectors (APP sensor 1 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 1)
P2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-539, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096937

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E16	111	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK APP SENSOR

Refer to EC-541, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-541, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

Component Inspection

INFOID:0000000001096938

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-541, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096939

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-369, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

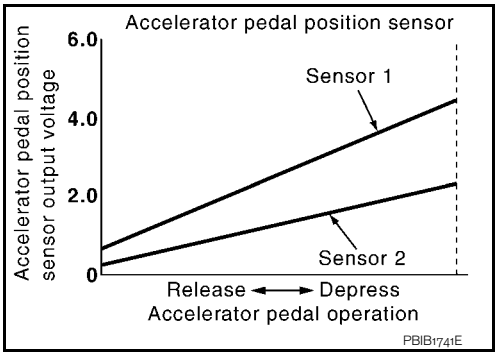
cardiagn.com

P2127, P2128 APP SENSOR

Description

INFOID:0000000001096940

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

DTC Logic

INFOID:0000000001096941

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	• Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor
P2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-542, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096942

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 3.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	5	E16	102	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-488, "Component Inspection".)
- Refrigerant pressure sensor (Refer to HAC-70, "Component Inspection".)

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace malfunctioning component.

6.CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

cardiagn.com

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	1	E16	104	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	6	E16	103	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK APP SENSOR

Refer to EC-544, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-545, "Special Repair Requirement".

>> INSPECTION END

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096943

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-545, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096944

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-369, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

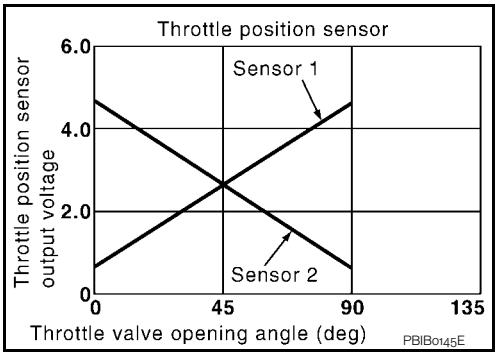
cardiagn.com

P2135 TP SENSOR

Description

INFOID:0000000001096945

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001096946

DTC DETECTION LOGIC

NOTE:
If DTC P2135 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135	Throttle position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	• Harness or connector (TP sensor 1 and 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-546, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096947

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.

cardiagn.com

2. Turn ignition switch ON.
3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	1	F8	72	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit.

4. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	2	F8	33	Existed
	3		34	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THROTTLE POSITION SENSOR

Refer to EC-548, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

cardiagn.com

7. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. EC-548, "Special Repair Requirement"

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096948

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-548, "Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to 1st position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-548, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096949

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

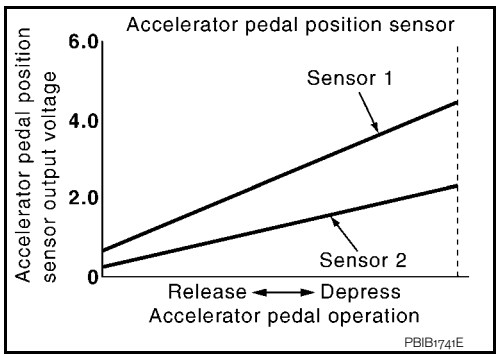
cardiagn.com

P2138 APP SENSOR

Description

INFOID:0000000001096950

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

DTC Logic

INFOID:0000000001096951

DTC DETECTION LOGIC

NOTE:
If DTC P2138 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-261, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138	Accelerator pedal position sensor circuit range/ performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	• Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 1 and 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-549, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001096952

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

cardiagn.com

2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 4.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	5	E16	102	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

5.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair short to ground or short to power in harness or connectors.

6.CHECK COMPONENTS

cardiagn.com

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-488, "Component Inspection".)
- Refrigerant pressure sensor (Refer to HAC-70, "Component Inspection".)

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace malfunctioning component.

7.CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector as follows.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	1	E16	104	Existed
	2		111	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

8.CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector as follows.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed
	6		103	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

9.CHECK APP SENSOR

Refer to EC-551, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-552, "Special Repair Requirement".

>> INSPECTION END

11.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096953

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

cardiagn.com

2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E110	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-552, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001096954

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-369, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-370, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-370, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

cardiagn.com

ASCD BRAKE SWITCH

Description

INFOID:0000000001096955

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-399, "System Description" for the ASCD function.

Component Function Check

INFOID:0000000001096956

1. CHECK FOR ASCD BRAKE SWITCH FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-III.
3. Check “BRAKE SW1” indication under the following conditions.

Monitor item	Condition		Indication
BRAKE SW1	Brake pedal and clutch pedal	Slightly depressed	OFF
		Fully released	ON

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal and clutch pedal	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-553, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096957

1. CHECK ASCD BRAKE SWITCH CIRCUIT - I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD clutch switch		Ground	Voltage (V)
Connector	Terminal		
E112	1	Ground	Battery voltage

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT - II

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

cardiagn.com

ASCD clutch switch		Ground	Voltage (V)
Connector	Terminal		
E111	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors E105, M77
- 10A fuse (No. 4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD brake switch		ASCD clutch switch		Continuity
Connector	Terminal	Connector	Terminal	
E112	1	E111	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD CLUTCH SWITCH

Refer to EC-555, "Component Inspection (ASCD Clutch Switch)".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace ASCD clutch switch.

6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

ASCD brake switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E16	100	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD BRAKE SWITCH

Refer to EC-555, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace ASCD brake switch.

cardiagn.com

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:0000000001096958

1.CHECK ASCD BRAKE SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to BR-17, "Removal and Installation" (LHD) or BR-61, "Removal and Installation" (RHD).
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:0000000001096959

1.CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to CL-8, "Removal and Installation".
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

cardiagn.com

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

cardiagn.com

ASCD INDICATOR

Description

INFOID:0000000001096960

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.
CRUISE lamp illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.
SET lamp illuminates when following conditions are met.
- CRUISE lamp is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET lamp remains lit during ASCD control.
Refer to EC-399, "System Description" for the ASCD function.

Component Function Check

INFOID:0000000001096961

1.ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	• Ignition switch: ON	• MAIN switch: Pressed at the 1st time →at the 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	• ASCD: Operating	ON
		• ASCD: Not operating	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-557, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096962

1.CHECK DTC

Check that DTC U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1001. Refer to EC-450, "DTC Logic".

2.CHECK COMBINATION METER OPERATION

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check combination meter circuit. Refer to MWI-43, "Wiring Diagram - METER -".

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

COOLING FAN

Description

INFOID:0000000001096963

Cooling fan operates at low and high speed when the current flows in the cooling fan motor.
Refer to EC-407, "System Diagram" for cooling fan operation.

Component Function Check

INFOID:0000000001096964

1.CHECK COOLING FAN LOW SPEED FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that cooling fan operates at low and high speed.

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motor operation, refer to PCS-9, "Diagnosis Description".
2. Make sure that cooling fan operates at low and high speed.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-558, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096965

1.CHECK IPDM E/R POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E14.
3. Check the voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage
Connector	Terminal		
E14	53	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors

2.CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor harness connector.
3. Check the continuity between cooling fan motor harness connector and IPDM E/R harness connector.

Cooling fan motor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E3	1	E14	52	Existed
			54	

4. Check the continuity between cooling fan motor harness connector and ground.

Cooling fan motor		IPDM/ER		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E3	2	E10	5	Ground	Existed
			6		

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

cardiagn.com

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Resistor E57.
- Harness for open or short between IPDM E/R and cooling fan.
- Harness for open or short between cooling fan and ground.
- Harness for open or short between IPDM E/R and ground.

>> Repair or replace malfunctioning part.

4. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace ground connection.

5. CHECK COOLING FAN MOTOR

Refer to EC-559, "Component Inspection (Cooling Fan Motor)".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace malfunctioning cooling fan motor.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connector.

Component Inspection (Cooling Fan Motor)

INFOID:0000000001096966

1. CHECK COOLING FAN MOTOR

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor harness connector E3.
3. Supply cooling fan motor terminals with battery voltage and check operation.

Terminals		Operation
(+)	(–)	
1	2	Cooling fan operates.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace cooling fan motor.

cardiagn.com

ELECTRICAL LOAD SIGNAL

Description

INFOID:0000000001096967

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

Component Function Check

INFOID:0000000001096968

1.CHECK REAR WINDOW DEFOGGER SWITCH FUNCTION

1. Turn ignition switch ON.
2. Connect CONSULT-III and select “DATA MONITOR” mode.
3. Select “LOAD SIGNAL” and check indication under the following conditions.

Monitor item	Condition		Indication
LOAD SIGNAL	Rear window defogger switch	ON	ON
		OFF	OFF

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-560, "Diagnosis Procedure".

2.CHECK LIGHTING SWITCH FUNCTION

Check “LOAD SIGNAL” indication under the following conditions.

Monitor item	Condition		Indication
LOAD SIGNAL	Lighting switch	ON at 2nd position	ON
		OFF	OFF

Is the inspection result normal?

YES >> GO TO 3.
NO >> Go to EC-560, "Diagnosis Procedure".

3.CHECK HEATER FAN CONTROL SWITCH FUNCTION

Select “HEATER FAN SW” and check indication under the following conditions.

Monitor item	Condition		Indication
HEATER FAN SW	Heater fan control switch	ON	ON
		OFF	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-560, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096969

1.INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to EC-560, "Component Function Check".

Which circuit is related to the incident?

Rear window defogger>>GO TO 2
Headlamp>>GO TO 3.
Heater fan>>GO TO 4.

2.CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to DEF-3, "Work Flow".

cardiagn.com

>> INSPECTION END

3.CHECK HEADLAMP SYSTEM

Refer to EXL-11, "System Description".

>> INSPECTION END

4.CHECK HEATER FAN CONTROL SYSTEM

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

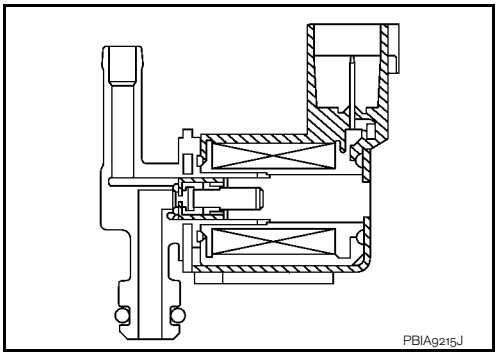
cardiagn.com

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:0000000001096861

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



Component Function Check

INFOID:0000000001098054

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE FUNCTION

With CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect the EVAP purge hose from EVAP canister purge volume control solenoid valve (EVAP canister side).
3. Start engine and let it idle.
4. Select “PURG VOL CONT/V” in “ACTIVE TEST” mode wit CONSULT-III.
5. Touch “Qu” and “Qd” on CONSULT-III screen to adjust “PURG VOL CONT/V” and check vacuum existence under the following conditions.

PURG VOL CONT/V	Vacuum
100%	Existed
0 %	Not existed

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect the EVAP purge hose from EVAP canister purge volume control solenoid valve (EVAP canister side).
3. Start engine and let it idle for at least 100 seconds.
4. Check vacuum existence under the following conditions.

Condition	Vacuum
At idle	Not existed
About 2,000 rpm	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-562, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096863

1. CHECK EVAP CANISTER

Refer to EC-636, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace.

2. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.

cardiagn.com

3. Turn ignition switch ON.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

EVAP canister purge volume control solenoid valve		Ground	Voltage
Connector	Terminal		
F32	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.

EVAP canister purge volume control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F32	2	F7	9	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 5.
YES-2 >> Without CONSULT-III: GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Does engine speed vary according to the valve opening?

YES >> GO TO 7.
NO >> GO TO 6.

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-564, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace EVAP canister purge volume control solenoid valve.

7. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

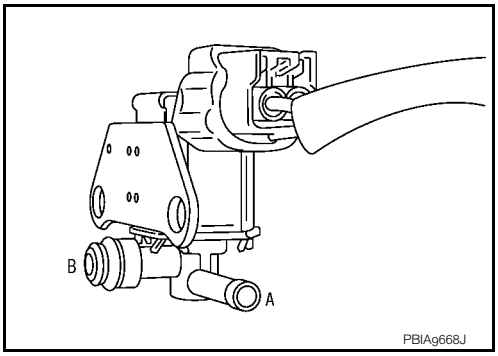
Component Inspection

INFOID:0000000001096864

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
4. Turn ignition switch ON.
5. Select “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-III.
6. Touch “Qd” and “Qu” on CONSULT-III screen to adjust “PURG VOL CONT/V” opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



Condition (PURG VOL CONT/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between (A) and (B)
12V direct current supply between terminals 1 and 2	Existed
No supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace EVAP canister purge volume control solenoid valve

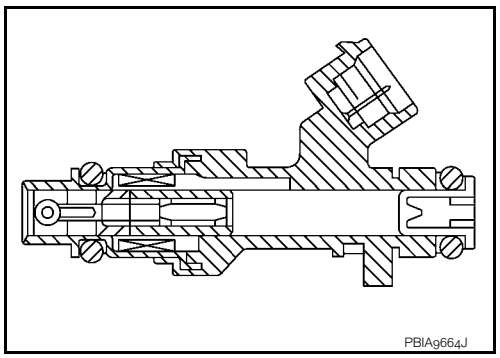
cardiagn.com

FUEL INJECTOR

Description

INFOID:0000000001096970

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the fuel injector circuit, the coil in the fuel injector is energized. The energized coil pulls the ball valve back and allows fuel to flow through the fuel injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the fuel injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



Component Function Check

INFOID:0000000001096971

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.
NO >> Go to EC-565, "Diagnosis Procedure".

2. CHECK FUEL INJECTOR FUNCTION

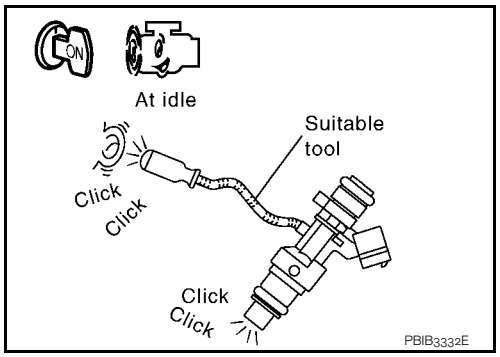
With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-565, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096972

1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel injector harness connector and ground.

cardiagn.com

Fuel injector			Ground	Voltage
Cylinder	Connector	Terminal		
1	F37	1	Ground	Battery voltage
2	F38	1		
3	F39	1		
4	F40	1		

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- 10A fuse (No. 58)
- Harness for open or short between fuel injector and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between fuel injector harness connector and ECM harness connector.

Fuel injector			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F37	2	F7	31	Existed
2	F38	2		30	
3	F39	2		29	
4	F40	2		25	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK FUEL INJECTOR

Refer to EC-566, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace malfunctioning fuel injector.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

Component Inspection

INFOID:0000000001096973

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check resistance between fuel injector terminals as follows.

cardiagn.com

Terminals	Resistance [at 10 - 60°C (50 - 140°F)]
1 and 2	11.1 - 14.5 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace malfunctioning fuel injector.

cardiagn.com

FUEL PUMP

Description

INFOID:0000000001096974

Sensor	Input signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay ↓ Fuel pump
Battery	Battery voltage*		

*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine startability. If the ECM receives a engine speed signal from the crankshaft position sensor and camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

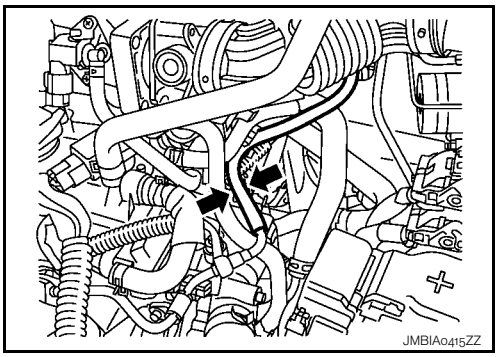
Component Function Check

INFOID:0000000001096975

1.CHECK FUEL PUMP FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose with two fingers.

Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.



Is the inspection result normal?

YES >> INSPECTION END
NO >> EC-306, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116057

1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	23	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect IDPDM E/R harness connector.
3. Check the continuity between IPDM E/R harness connector and ECM harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	23	E13	33	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors E6, F123.
- Harness for open or short to ground and short power.

>> Repair harness or connectors.

4. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect “fuel level sensor unit and fuel pump” harness connector.
4. Turn ignition switch ON.
5. Check voltage between “fuel level sensor unit and fuel pump” harness connector and ground.

Fuel level sensor unit and fuel pump		Ground	Voltage
Connector	Terminal		
B40	1	Ground	Battery voltage should exist 1 second after ignition switch is turn ON.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 5.

5. CHECK 10A FUSE

1. Turn ignition switch OFF.
2. Disconnect 10A fuse (No. 57) from IPDM E/R.
3. Check 10A fuse.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace fuse.

6. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector.
2. Check the continuity between IPDM E/R harness connector and “fuel level sensor unit and fuel pump” harness connector.

IPDM E/R		Fuel level sensor unit and fuel pump		Continuity
Connector	Terminal	Connector	Terminal	
F13	42	B40	1	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.

cardiagn.com

NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B10, E101
- Harness for open or short between IPDM E/R and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to power in harness or connectors.

8.CHECK FUEL PUMP GROUND CIRCUIT

1. Check the continuity between “fuel level sensor unit and fuel pump” and ground.

Fuel level sensor unit and fuel pump		Ground	Continuity
Connector	Terminal		
B40	3	Ground	Existed

2. Also heck harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to power in harness or connectors.

9.CHECK FUEL PUMP

Refer to EC-928, "Component Inspection (Fuel Pump)".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace fuel pump.

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

Component Inspection (Fuel Pump)

INFOID:0000000001096977

1.CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Check resistance between “fuel level sensor unit and fuel pump” terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
1 and 3	0.2 - 5.0 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace “fuel level sensor unit and fuel pump”.

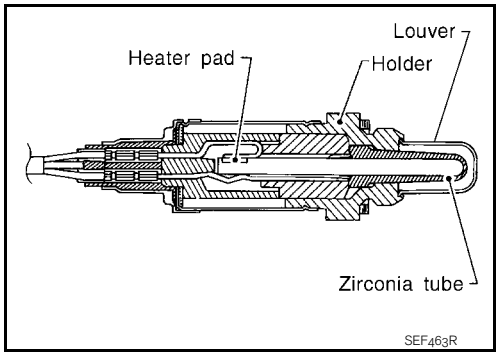
cardiagn.com

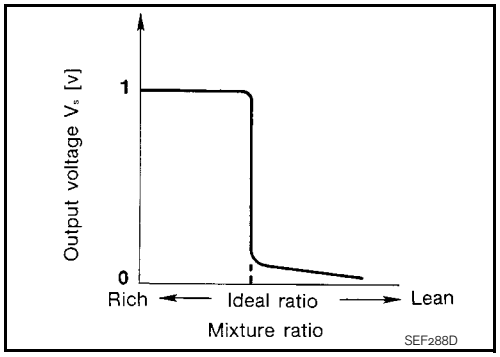
HO2S1

Description

INFOID:0000000001096810

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





Component Function Check

INFOID:0000000001098057

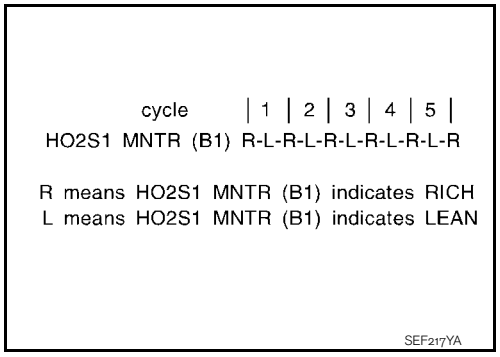
1. CHECK HEATED OXYGEN SENSOR 1 FUNCTION

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select “HO2S1 MNITOR (B1)” in ”DATA MONITOR” mode with CONSULT-III.
3. Keep the engine speed at 2,000 rpm under no load, and make sure that the monitors fluctuates between LEAN and RICH more than five times in 10 seconds.

1 times: RICH →LEAN → RICH

2 times: RICH → LEAN → RICH → LEAN → RICH

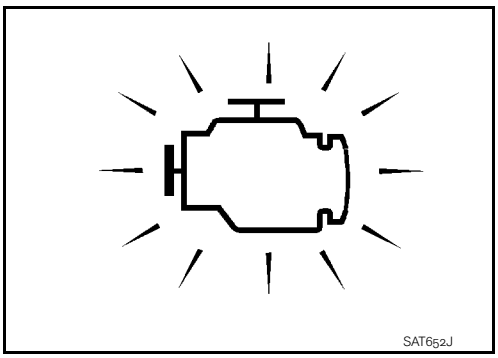


Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Set ECM in Diagnostic test mode - II (Heated oxygen sensor 1 monitor).

cardiagn.com

4. Keep the engine speed at 2,000 rpm under no load, and make sure that the MI comes ON more than five times in 10 seconds.



Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-146, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096812

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

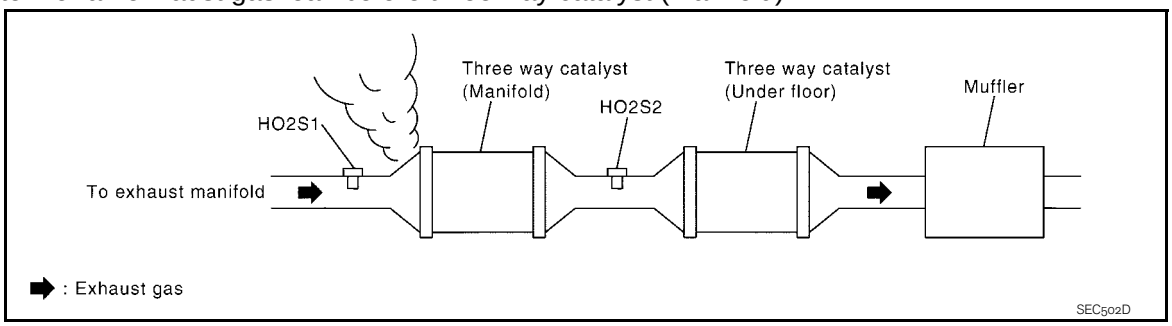
Loosen and retighten the heated oxygen sensor 1.

Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 4.

4.CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 5.

5.CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

cardiagn.com

2. Disconnect heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	Existed

2. Check the continuity between HO2S1 harness connector or ECM harness connector and ground.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor.
Refer to EC-458, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace mass air flow sensor.

8.CHECK PCV VALVE

Refer to EC-935, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace PCV valve.

9.CHECK HEATED OXYGEN SENSOR 1

Perform EC-573, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace heated oxygen sensor 1.

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096813

cardiagn.com

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

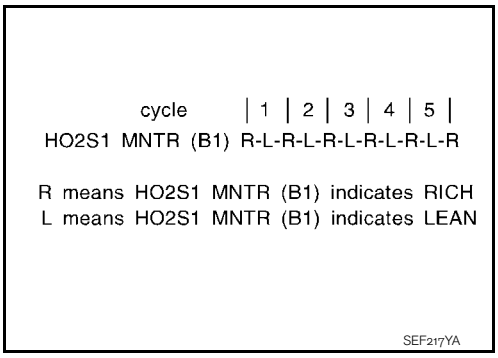
YES >> GO TO 2.
NO >> GO TO 3.

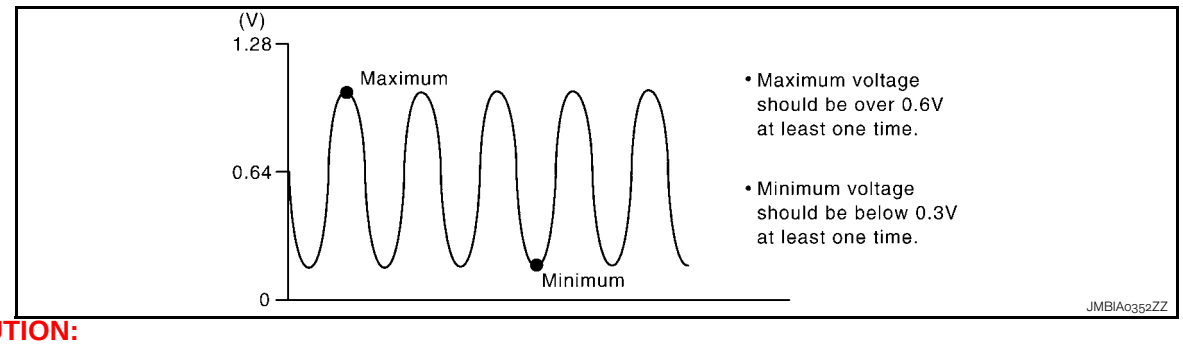
2. CHECK HEATED OXYGEN SENSOR 1

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.





CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

cardiagn.com

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

HO2S1 HEATER

Description

INFOID:0000000001096818

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF duty control of the Heated oxygen sensor 1 heater corresponding to the engine operating condition to keep the temperature of Heated oxygen sensor 1 element at the specified range.

OPERATION

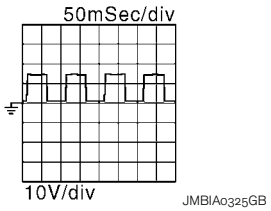
Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600 rpm after the following conditions are met. • Engine: After warming up	ON

Component Function Check

INFOID:0000000001102383

1.CHECK HEATED OXYGEN SENSOR 2 HEATER FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Set tester prove between ECM harness connection and ground.
4. Start engine and let it idle.
5. Check the voltage under the following conditions.Verify that the oscilloscope screen shows the signal waves as shown below.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	3 (HO2S1 HEATER signal)	Ground	At idle	Approximately 7.0★ 
			Engine speed is above 3,600 rpm	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-146, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096820

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2. CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Disconnect HO2S1 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S1 harness connector and ground.

HO2S1		Ground	Voltage
Connector	Terminal		
F30	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- 10A fuse (No. 56)
- Harness for open or short between HO2S1 and fuse

>> Repair or replace harness or connectors.

4. CHECK HO2S1 HEATER OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	3	F7	3	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HO2S1 HEATER

Refer to EC-578, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 1

Replace Heated oxygen sensor 1.

CAUTION:
- **Discard any heated oxygen sensor 1 which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new heated oxygen sensor 1, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Perform GI-39, "Intermittent Incident".

>> Repair or replace.

cardiagn.com

Component Inspection

INFOID:0000000001096821

1. CHECK HEATED OXYGEN SENSOR 1

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check resistance between HO2S1 terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
2 and 3	3.4 - 4.4 Ω
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:

- **Discard any sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

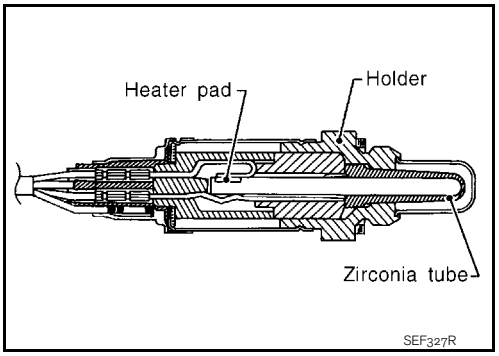
cardiagn.com

HO2S2

Description

INFOID:0000000001096826

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



Component Function Check

INFOID:0000000001102386

1. PERFORM COMPONENT FUNCTION CHECK-I

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage does not remain in the range of 0.2 - 0.4V.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage does not remain in the range of 0.2 - 0.4V.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 3rd gear position	The voltage does not remain in the range of 0.2 - 0.4V.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1200, "Diagnosis Procedure".

cardiagn.com

Diagnosis Procedure

INFOID:0000000001096829

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F42	1	F13	35	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

- Harness or connectors F121, E7
- Harness for open or short between HO2S2 and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F42	4	F13	33	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F42	4	F13	33	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

- Harness or connectors F121, E7
- Harness for open or short between HO2S2 and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 2

Refer to EC-581, "Component Inspection".

cardiagn.com

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096830

1. INSPECTION START

Do you have CONSULT-III?

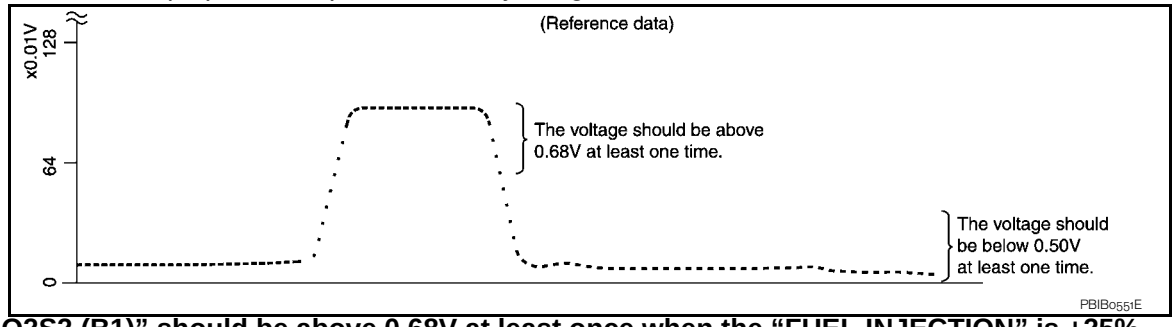
Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is –25%.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.

cardiagn.com

4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in 4th gear position	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

HO2S2 HEATER

Description

INFOID:0000000001096831

SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

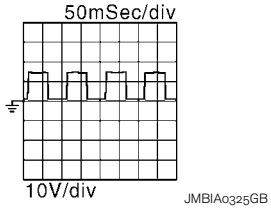
Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,900	OFF
Below 3,900 rpm after the following conditions are met. • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON

Component Function Check

INFOID:0000000001102384

1. CHECK HEATED OXYGEN SENSOR 2 HRATER FUNCTION

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle.
4. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage signal
Connector	Terminal			
F7	5 (HO2S2 heater signal)	Ground	At idle	Approx. 10V★ 
			Engine speed: Above 3,900 rpm	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-583, "Diagnosis Procedure"

Diagnosis Procedure

INFOID:0000000001096833

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Disconnect HO2S2 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S2 harness connector and ground.

HO2S2		Ground	Voltage
Connector	Terminal		
E58	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- IPDM E/R connector E11
- 10A fuse (No. 56)
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	3	F7	5	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between heated oxygen sensor 2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK HO2S2 HEATER

Refer to EC-585, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

cardiagn.com

>> INSPECTION END

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096834

1.CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check resistance between HO2S2 terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
2 and 3	3.3 - 4.4 Ω
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

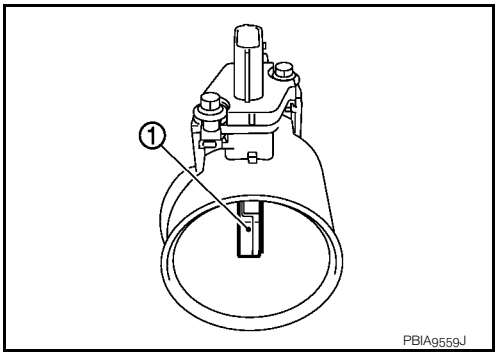
cardiagn.com

IAT SENSOR

Description

INFOID:0000000001096793

The intake air temperature sensor is built-into mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



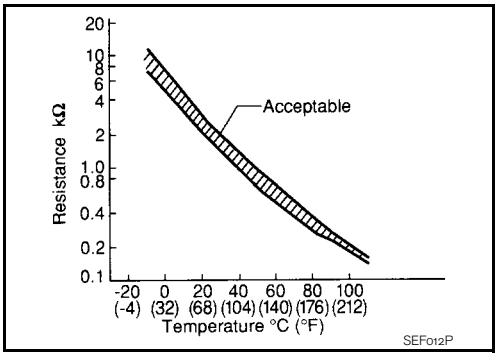
<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: These data are reference values and are measured between ECM terminal 46 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



Component Function Check

INFOID:0000000001102385

1.CHECK INTAKE AIR TEMPERATURE SENSOR FUNCTION

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F8	46	Ground	Approx. 0 - 4.8V

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-586, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096795

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor (with intake air temperature sensor) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between mass air flow sensor harness connector and ground.

cardiagn.com

MAF sensor		Ground	Voltage
Connector	Terminal		
E18	2	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between mass air flow sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	1	F8	55	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-587, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace mass air flow sensor (with intake air temperature sensor).

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001096796

1.CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as follows.

Terminals	Condition		Resistance
1 and 2	Temperature C°° (F°)	25 (77)	1.800 - 2.200 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace mass air flow sensor (with intake air temperature sensor).

cardiagn.com

IGNITION SIGNAL

Description

INFOID:0000000001096978

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns ON and OFF the ignition coil primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.

Component Function Check

INFOID:0000000001096979

1.INSPECTION START

Turn ignition switch OFF, and restart engine.

Does the engine start?

YES-1 >> With CONSULT-III: GO TO 2.
YES-2 >> Without CONSULT-III: GO TO 3.
NO >> Go to EC-588, "Diagnosis Procedure".

2.IGNITION SIGNAL FUNCTION

With CONSULT-III

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
2. Make sure that each circuit produces a momentary engine speed drop.

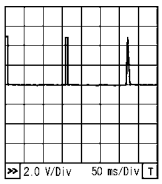
Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-588, "Diagnosis Procedure".

3.IGNITION SIGNAL FUNCTION

Without CONSULT-III

1. Let engine idle.
2. Read the voltage signal between ECM harness connector and ground.

ECM		Ground	Voltage signal
Connector	Terminal		
F7	17	Ground	
	18		
	22		
	21		

PBIAg2265J

NOTE:
The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-588, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096980

1.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	Battery voltage

cardiagn.com

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-446, "Diagnosis Procedure".

2. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Turn ignition switch ON.
4. Check the voltage between condenser harness connector and ground.

Condenser		Ground	Voltage
Connector	Terminal		
F13	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between IPDM E/R harness connector and condenser harness connector.

IPDM E/R		Condenser		Continuity
Connector	Terminal	Connector	Terminal	
E11	10	F13	1	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Go to EC-446, "Diagnosis Procedure".
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between condenser harness connector and ground.

Condenser		Ground	Continuity
Connector	Terminal		
F13	2	Ground	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CONDENSER

Refer to EC-591, "Component Inspection (Condenser)"

Is the inspection result normal?

YES >> GO TO 6.
NG >> Replace condenser.

6. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Reconnect all harness connectors disconnected.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

cardiagn.com

Ignition coil			Ground	Voltage
Cylinder	Connector	Terminal		
1	F33	3	Ground	Battery voltage
2	F34	3		
3	F35	3		
4	F36	3		

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

Ignition coil			Ground	Continuity
Cylinder	Connector	Terminal		
1	F33	2	Ground	Existed
2	F34	2		
3	F35	2		
4	F36	2		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ignition coil harness connector.

Ignition coil			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F33	1	F7	17	Existed
2	F34	1		18	
3	F35	1		22	
4	F36	1		21	

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-591, "Component Inspection (Ignition Coil with Power Transistor)".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace malfunctioning ignition coil with power transistor.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

Component Inspection (Ignition Coil with Power Transistor)

INFOID:0000000001096981

1. CHECK IGNITION COIL WITH POWER TRANSISTOR-I

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
1 and 2	Except 0 or ∞ Ω
1 and 3	Except 0 Ω
2 and 3	

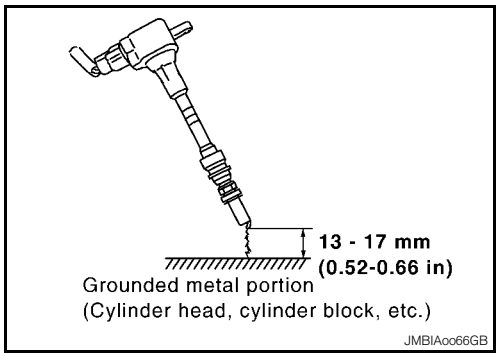
Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace malfunctioning ignition coil with power transistor.

2. CHECK IGNITION COIL WITH POWER TRANSISTOR-II

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
   NOTE:
   Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.
4. Start engine.
5. After engine stalls, crank it two or three times to release all fuel pressure.
6. Turn ignition switch OFF.
7. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
8. Remove ignition coil and spark plug of the cylinder to be checked.
9. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
10. Connect spark plug and harness connector to ignition coil.
11. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
12. Crank engine for about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- **Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace malfunctioning ignition coil with power transistor.

Component Inspection (Condenser)

INFOID:0000000001096982

1. CHECK CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.

cardiagn.com

3. Check resistance between condenser terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
1 and 2	Above 1 MΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace condenser.

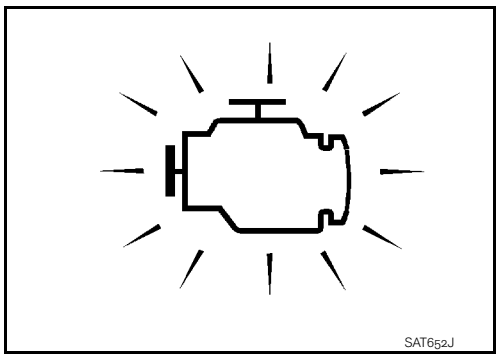
cardiagn.com

MALFUNCTION INDICATOR

Description

INFOID:0000000001096983

The Malfunction Indicator (MI) is located on the combination meter.
The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
When the engine is started, the MI should go off. If the MI remains on, the on board diagnostic system has detected an engine system malfunction.
For details, refer to EC-593, "Diagnosis Procedure".



Component Function Check

INFOID:0000000001096984

1.CHECK MI FUNCTION

1. Turn ignition switch ON.
2. Make sure that MI lights up.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-593, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096985

1.CHECK DTC

Check that DTC U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1001. Refer to EC-450, "Diagnosis Procedure".

2.CHECK COMBINATION METER

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

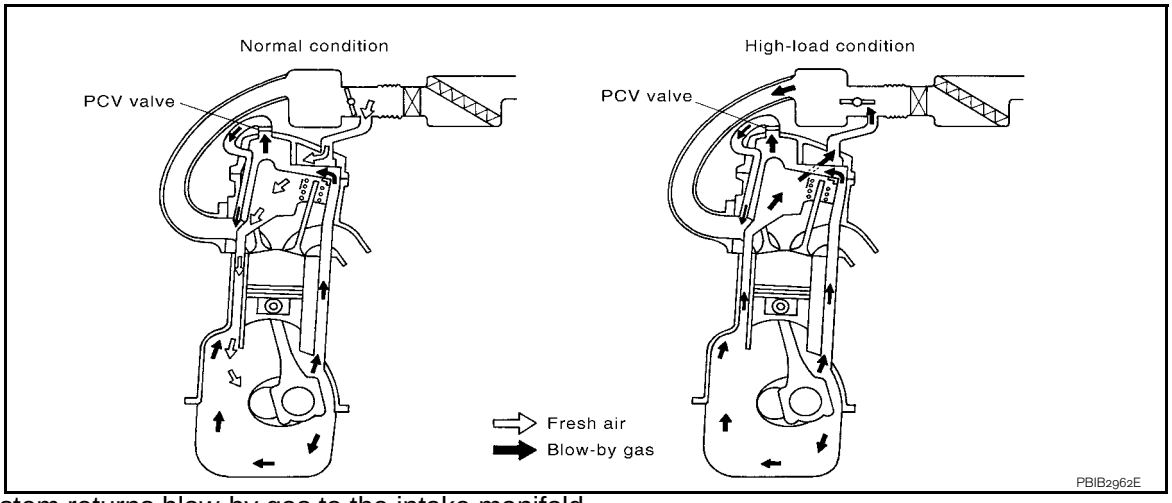
YES >> Replace combination meter.
NO >> Repair or replace.

cardiagn.com

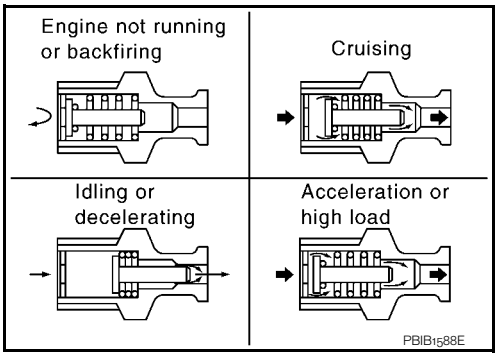
POSITIVE CRANKCASE VENTILATION

Description

INFOID:0000000001096986



This system returns blow-by gas to the intake manifold.
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.
Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.
The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.
Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.

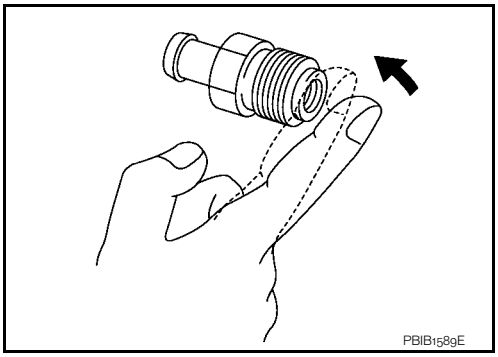


Component Inspection

INFOID:0000000001096987

1. CHECK PCV VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace PCV valve.

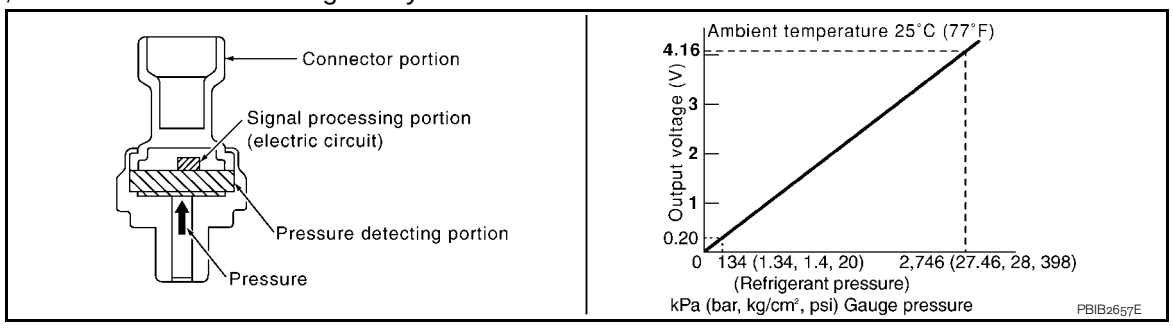
cardiagn.com

REFRIGERANT PRESSURE SENSOR

Description

INFOID:0000000001096988

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



Component Function Check

INFOID:0000000001096989

1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower fan switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F8	41 (Refrigerant pressure sensor signal)	Ground	1.0 - 4.0V

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-595, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096990

1. CHECK GROUND CONNECTION

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine.
3. Turn ignition switch OFF.
4. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between refrigerant pressure sensor harness connector and ground.

Refrigerant pressure sensor		Ground	Voltage
Connector	Terminal		
E49	3	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

cardiagn.com

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E49	1	F8	48	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and refrigerant pressure sensor harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E49	2	F8	41	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor.
NO >> Repair or replace.

cardiagn.com

VSS

Description

INFOID:0000000001102381

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

Diagnosis Procedure

INFOID:0000000001102382

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch OFF.
2. Lift up the vehicle.
3. Start engine and let it idle.
4. Select “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT-III.
5. Select “VHCL SPEED SE” indication whe n rotating wheels with suitable gear position.

“VHCL SPEED SE” indication should exceed 10 km/h (6 MPH).

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to BRC-35, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace.

4.CHECK COMBINATION METER FUNCTION

Refer to MWI-27, "DTC Logic".

>> INSPECTION END

cardiagn.com

ECU DIAGNOSIS

ECM

Reference Value

INFOID:0000000001096991

VALUES ON THE DIAGNOSIS TOOL

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

*Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition		Values/Status
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.		Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-438, "Diagnosis Procedure".		
B/FUEL SCHDL	See EC-438, "Diagnosis Procedure".		
A/F ALPHA-B1	See EC-438, "Diagnosis Procedure".		
COOLAN TEMP/S	• Engine: After warming up		More than 70°C (158F)
HO2S1 (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds
HO2S2 MNTR (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		LEAN ←→ RICH
VHCL SPEED SE	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as speedometer indication
BATTERY VOLT	• Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN 1	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN 2	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
THRL SEN 1-B1	• Ignition switch: ON (Engine stopped) • Shift lever: 1st	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
THRL SEN 2-B1	• Ignition switch: ON (Engine stopped) • Shift lever:1st	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
START SIGNAL	• Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

cardiagn.com

Monitor Item	Condition		Values/Status
AIR COND SIG	• Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	• Ignition switch: ON	Shift lever: Neutral	ON
		Shift lever: Except above	OFF
PW/ST SIGNAL	• Engine: After warming up, idle the engine	Steering wheel: Not being turned	OFF
		Steering wheel: Being turned	ON
LOAD SIGNAL	• Ignition switch: ON	Rear window defogger switch: ON and/or Lighting switch: 2nd position	ON
		Rear window defogger switch and lighting switch: OFF	OFF
IGNITION SW	• Ignition switch: ON → OFF → ON		ON → OFF → ON
HEATER FAN SW	• Engine: After warming up, idle the engine	Heater fan switch: ON	ON
		Heater fan switch: OFF	OFF
BRAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	10° - 20° BTDC
		2,000 rpm	25° - 45° BTDC
PURG VOL C/V	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	0%
		2,000 rpm	0% - 50%
INT/V TIM (B1)	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	–5° - 5°CA
		2,000 rpm	Approx. 0° - 40°CA
INT/V SOL (B1)	• Engine: After warming up • Shift lever: Neutral • Air conditioner switch: OFF • No load	Idle	0% - 2%
		2,000 rpm	Approx. 0% - 90%
AIR COND RLY	• Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	• For 1 seconds after turning ignition switch: ON • Engine running or cranking		ON
	• Except above		OFF
THRTL RELAY	• Ignition switch: ON		ON
COOLING FAN	• Engine: After warning up, idle the engine • Air conditioner switch: OFF	Engine coolant temperature is 98°C (208F) or less	OFF
		Engine coolant temperature is between 98°C (208°F) and 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH
HO2S1 HTR (B1)	• Engine: After warming up • Engine speed: Below 3,600rpm		ON
	• Engine speed: Above 3,600 rpm		OFF

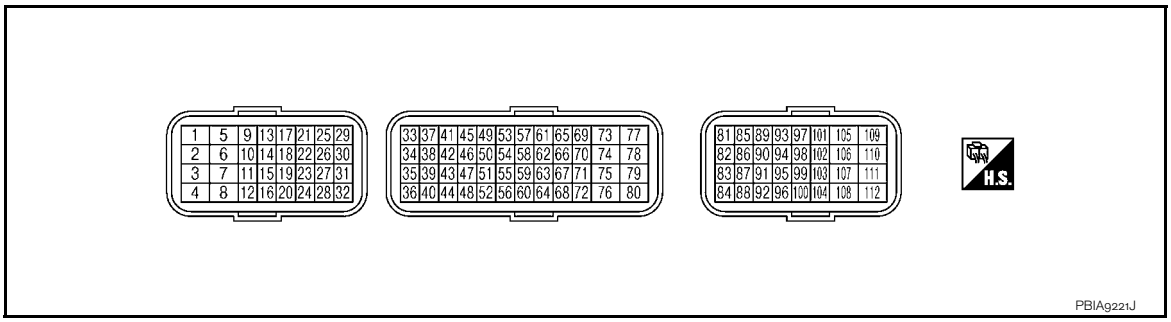
cardiagn.com

Monitor Item	Condition		Values/Status
HO2S2 HTR (B1)	• Engine speed: Below 3,900 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		ON
VEHICLE SPEED	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as the speedometer indication
IDL A/V LEARN	• Engine: running	Idle air volume learning has not been performed yet.	YET
		Idle air volume learning has already been performed successfully.	CMPLT
TRVL AFTER MIL	• Ignition switch: ON	Vehicle has traveled after MI has turned ON.	0 - 65,535 km (0 - 40,723 miles)
O2 SEN HTR DTY	• Engine coolant temperature when engine started: More than 80°C (176 − F) • Engine speed: Below 3,600 rpm		Approx. 30%
AC PRESS SEN	• Engine: Idle • Both A/C switch and blower fan switch: ON (Compressor operates)		1.0 - 4.0V
VHCL SPEED SE	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as the speedometer indication
SET VHCL SPD	• Engine: Running	ASCD: Operating	The preset vehicle speed is displayed
MAIN SW	• Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	Brake pedal and clutch pedal: Fully released	ON
		Brake pedal and/or clutch pedal: Slightly depressed	OFF
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
VHCL SPD CUT	• Ignition switch: ON		NON
LO SPEED CUT	• Ignition switch: ON		NON
AT OD MONITOR	• Ignition switch: ON		OFF
AT OD CANCEL	• Ignition switch: ON		OFF
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at the 1st time → at the 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

cardiagn.com

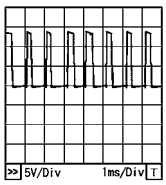
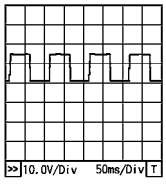
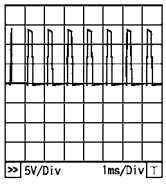
TERMINAL LAYOUT



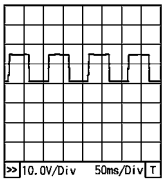
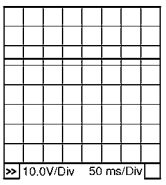
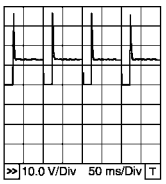
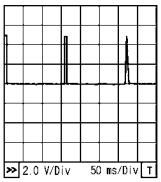
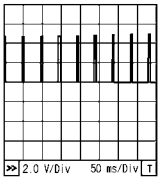
PHYSICAL VALUES

NOTE:
- ECM is located in the engine room left side near battery.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

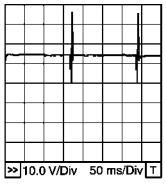
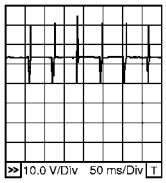
CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
1	Ground	L/W	Throttle control motor (Open)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully depressed	3.2V★  PBIA8150J
2	Ground	R/Y	Throttle control motor relay power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
3	Ground	LG/R	Heated oxygen sensor 1 heater	Output	[Engine is running] • Warm up condition • Engine speed: Below 3,600 rpm	Approximately 3.2V★  PBIA8148J
					[Engine is running] • Warm-up condition • Idle speed [Engine is running] • Engine speed: Above 3,600 rpm	BATTERY VOLTAGE (11 - 14V)
4	Ground	P	Throttle control motor (Close)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully released	0 - 14V★  PBIA8149J

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
5	Ground	R	Heated oxygen sensor 2 heater	Output	[Engine is running] • Engine speed: Below 3,900 rpm after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	10V★  PBIA8148J
					[Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: Above 3,900 rpm	BATTERY VOLTAGE (11 - 14V)
9	Ground	W/B	EVAP canister purge volume control solenoid valve	Output	[Engine is running] • Idle speed	BATTERY VOLTAGE (11 - 14V)★  PBIB0050E
					[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.)	BATTERY VOLTAGE (11 - 14V)★  PBIB0520E
10 11	Ground	B B/W	ECM ground	—	[Engine is running] • Idle speed	Body ground
15	Ground	G/L	Throttle control motor relay	Output	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)
					[Ignition switch: ON]	0 - 1.0V
17 18 21 22	Ground	L/Y BR/Y R/G SB	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 3	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 0.3V★  PBIA9265J
					[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	0.2 - 0.5V★  PBIA9266J

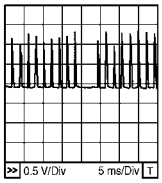
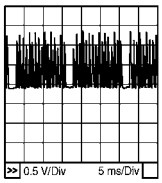
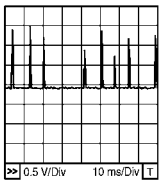
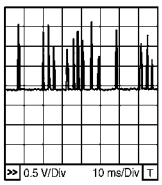
cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
23	Ground	B/O	Fuel pump relay	Output	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0V
					[Ignition switch: ON] • More than a few seconds after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)
25 29 30 31	Ground	R/O Y O L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14V)★  PBIB0529E
					[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★  PBIA4943J
32	Ground	Y/L	ECM relay (Self shut-off)	Output	[Engine is running] [Ignition switch: OFF] • A few seconds after turning ignition switch OFF	0 - 1.0V
					[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
33	Ground	L/R	Throttle position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully released	More than 0.36V
					[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully depressed	Less than 4.75V
34	Ground	L/O	Throttle position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully released	Less than 4.75V
					[Ignition switch: ON] • Engine stopped • Shift lever: 1st • Accelerator pedal: Fully depressed	More than 0.36V

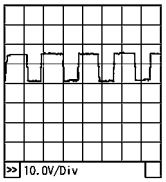
cardiagn.com

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
36	Ground	V/W	Sensor ground (Throttle position sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
37	Ground	W	Knock sensor	Input	[Engine is running] • Idle speed	2.5V
38	Ground	GR/B	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with engine coolant temperature.
40	Ground	—	Sensor ground (Knock sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
41	Ground	G/P	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0V
44	Ground	B	Sensor ground (Engine coolant temperature sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
45	Ground	BR	Mass air flow sensor	Input	[Ignition switch ON] • Engine stopped	0.4V
					[Engine is running] • Warm-up condition • Idle speed	1.0 - 1.3V
					[Engine is running] • Warm-up condition • Engine is revving from idle to about 4,000 rpm	1.0 - 1.3 to 2.4V (Check for linear voltage rise in response to engine being increased to about 4,000 rpm.)
46	Ground	V	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with intake air temperature.
48	Ground	R/L	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
49	Ground	L/G	Heated oxygen sensor 1	—	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0 - 1.0V (Periodically change)
50	Ground	Y	Heated oxygen sensor 2	Input	[Engine is running] • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - 1.0V
52	Ground	LG	Sensor ground (Mass air flow sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
55	Ground	O	Sensor power supply (Intake air temperature sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
56	Ground	P	Sensor ground (Heated oxygen sensor 1)	—	[Engine is running] • Warm-up condition • Idle speed	0V

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
59	Ground	SB	Sensor ground (Heated oxygen sensor 2)	—	[Engine is running] • Warm-up condition • Idle speed	0V
61	Ground	LG/B	Crankshaft position sensor (POS)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 1.0V★  MBIB1453E
					[Engine is running] • Engine speed: 2,000 rpm	0 - 1.0V★  MBIB1454E
62	Ground	GR/L	Sensor ground [Crankshaft position sensor (POS)]	—	[Engine is running] • Warm-up condition • Idle speed	0V
63	Ground	L	Sensor ground [Camshaft position sensor (PHASE)]	—	[Engine is running] • Warm-up condition • Idle speed	0V
65	Ground	G	Camshaft position sensor (PHASE)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 1.0V★  MBIB1455E
					[Engine is running] • Engine speed is 2,000 rpm	0 - 1.0V★  MBIB1456E
69	Ground	W/B	Neutral position switch	Input	[Ignition switch: ON] • Neutral	BATTERY VOLTAGE (11 - 14V)
					[Ignition switch: ON] • Shift lever: Except above position	0V
72	Ground	V/R	Sensor power supply (Throttle position sensor)	—	[Ignition switch: ON]	5V

cardiagn.com

Terminal No. +	Terminal No. −	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
73	Ground	Y/R	Intake valve timing control solenoid valve	Output	[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14V)
					[Engine is running] • Warm-up condition • Engine speed: 2,000rpm	7 - 10V★  PBIA4937J
74	Ground	Y/W	Sensor power supply (Refrigerant pressure sensor)	—	[Ignition switch: ON]	5V
75	Ground	L/W	Sensor power supply [Crankshaft position sensor (POS)]	—	[Ignition switch: ON]	5V
78	Ground	Y/V	Sensor power supply [Camshaft position sensor (PHASE)]	—	[Ignition switch: ON]	5V
83	Ground	P	CAN communication line	Input/ Output	—	—
84	Ground	L	CAN communication line	Input/ Output	—	—
88	Ground	O	Data link connector	Input/ Output	[Ignition switch: ON] • CONSULT-III: Disconnected	2.7V
93	Ground	W/L	Ignition switch	Input	[Ignition switch: OFF]	0V
					[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
94	Ground	V	ASCD steering switch	Input	[Ignition switch: ON] • ASCD steering switch: OFF	4V
					[Ignition switch: ON] • CANCEL switch: Pressed	1V
					[Ignition switch: ON] • MAIN switch: Pressed	0V
					[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	3V
					[Ignition switch: ON] • SET/COAST switch: Pressed	2V
95	Ground	B	Sensor ground (ASCD steering switch)	—	[Engine is running] • Warm-up condition • Idle speed	0V
99	Ground	R/W	Stop lamp switch	Input	[Ignition switch: OFF] • Brake pedal: Fully released	0V
					[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)

cardiagn.com

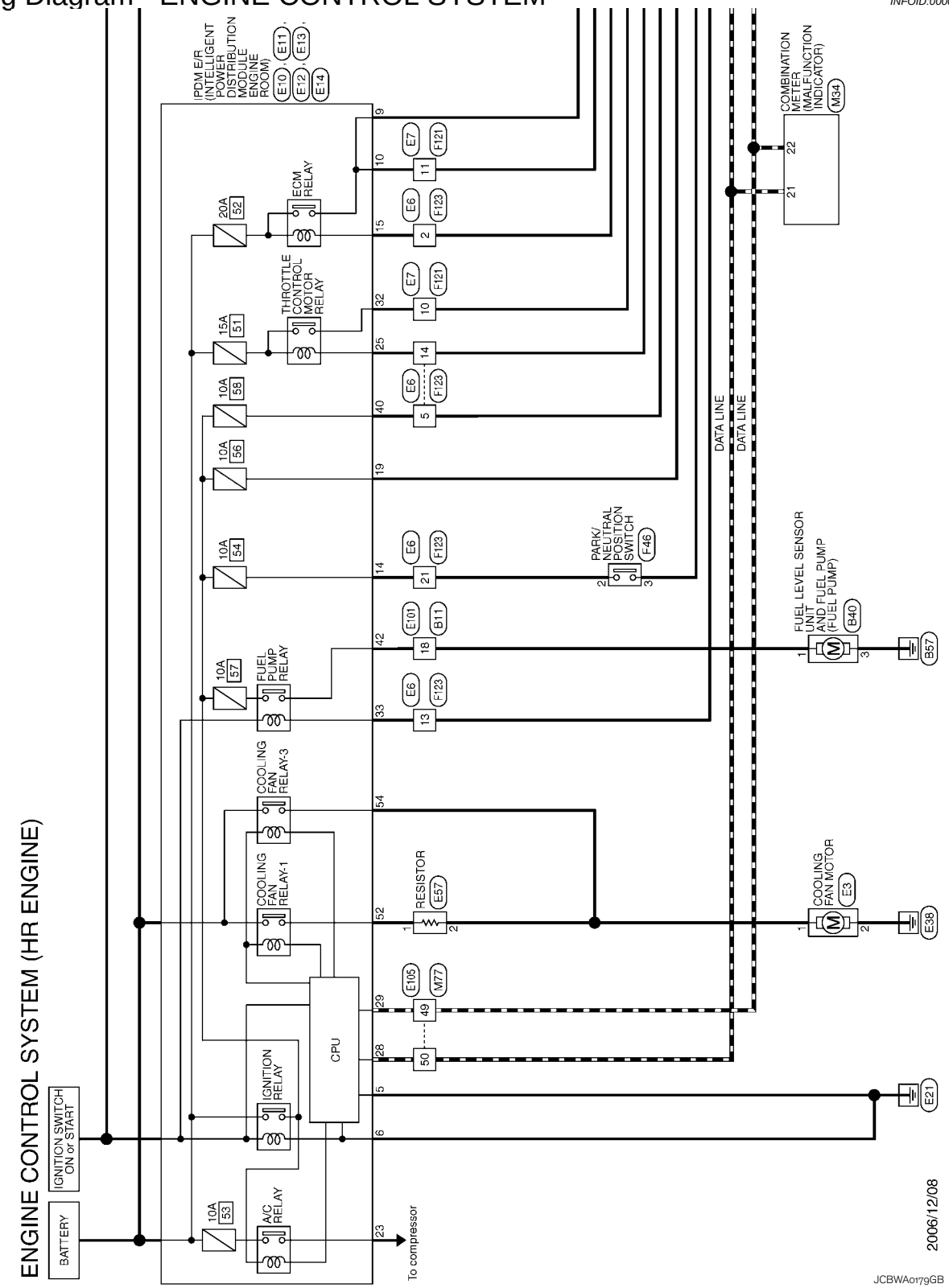
Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
100	Ground	R	ASCD brake switch	Input	[Ignition switch: ON] • Brake pedal and clutch pedal: Slightly depressed	0V
					[Ignition switch: ON] • Brake pedal and/or clutch pedal: Fully released	BATTERY VOLTAGE (11 - 14V)
102	Ground	BR	Sensor power supply (Accelerator pedal position sensor 2)	—	[Ignition switch: ON]	5V
103	Ground	GR	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6V
					[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4V
104	Ground	Y	Sensor ground (Accelerator pedal position sensor 2)	—	[Engine is running] • Warm-up condition • Idle speed	0V
105	Ground	G	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
106	Ground	V	Sensor power supply (Accelerator pedal position sensor 1)	—	[Ignition switch: ON]	5V
108	Ground	B	ECM ground	—	[Engine is running] • Idle speed	Body ground
110	Ground	G	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9V
					[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7V
111	Ground	R	Sensor ground (Accelerator pedal position sensor 1)	—	[Engine is running] • Warm-up condition • Idle speed	0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

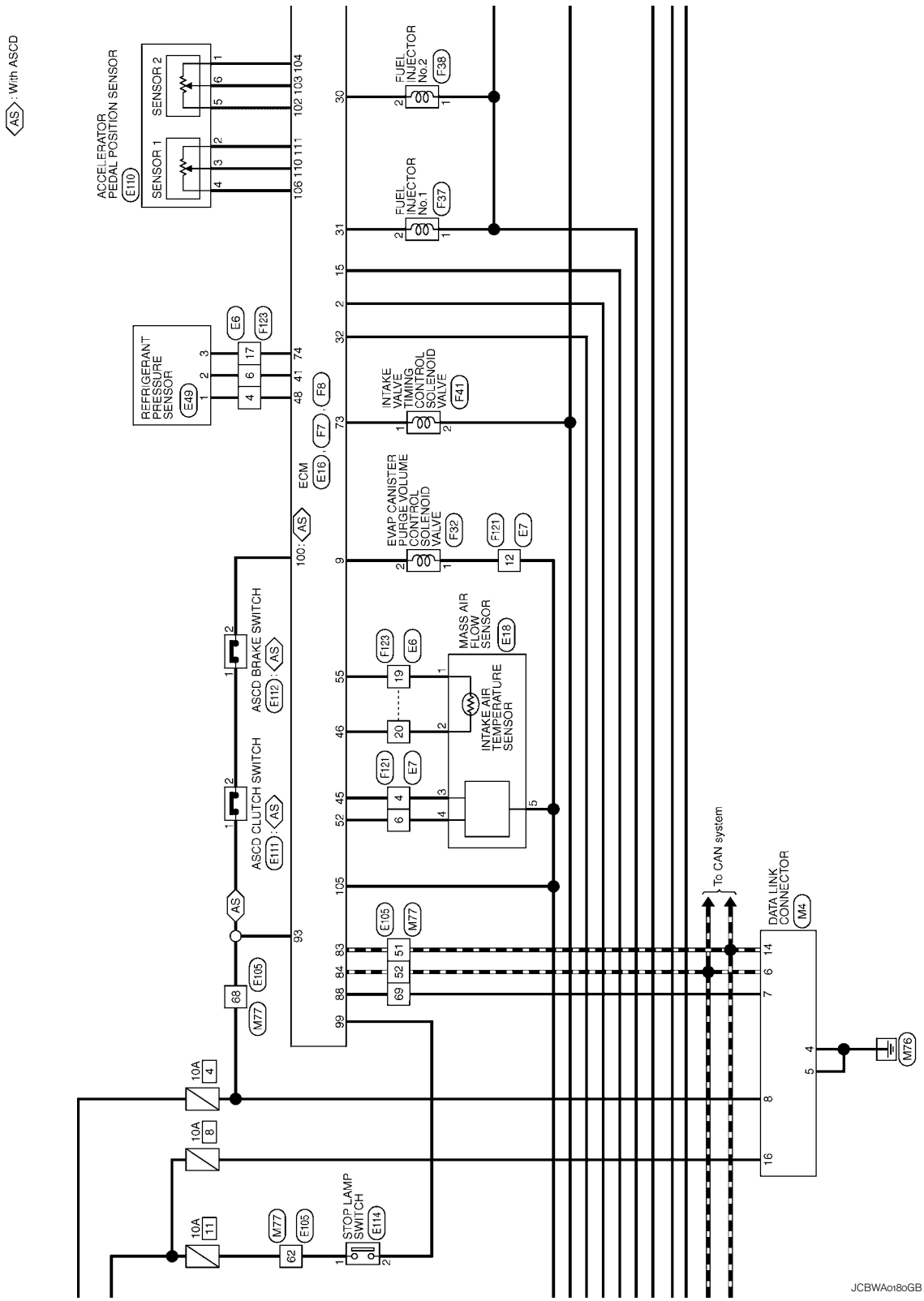
cardiagn.com

Wiring Diagram - ENGINE CONTROL SYSTEM -

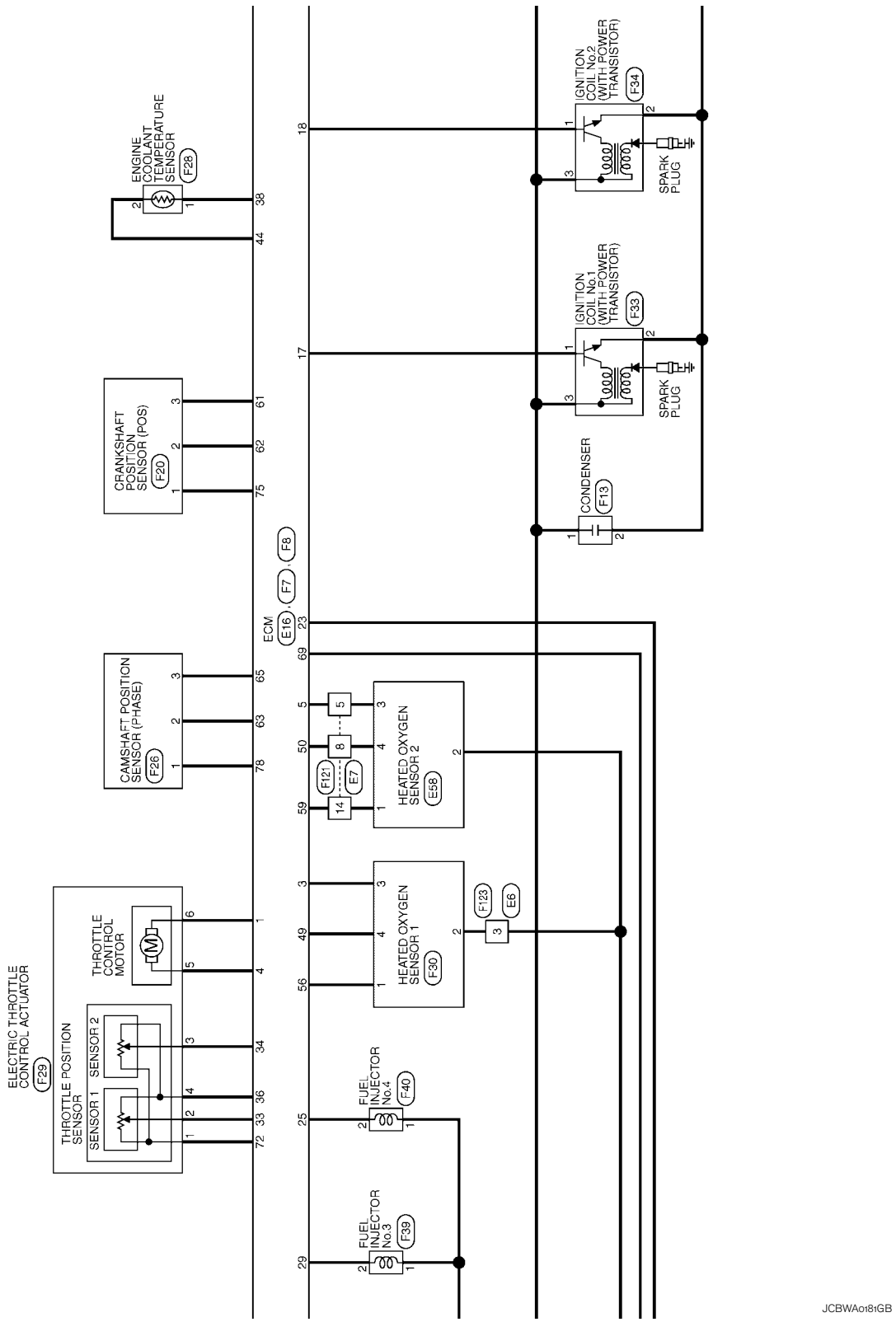
INFOID:0000000001125392



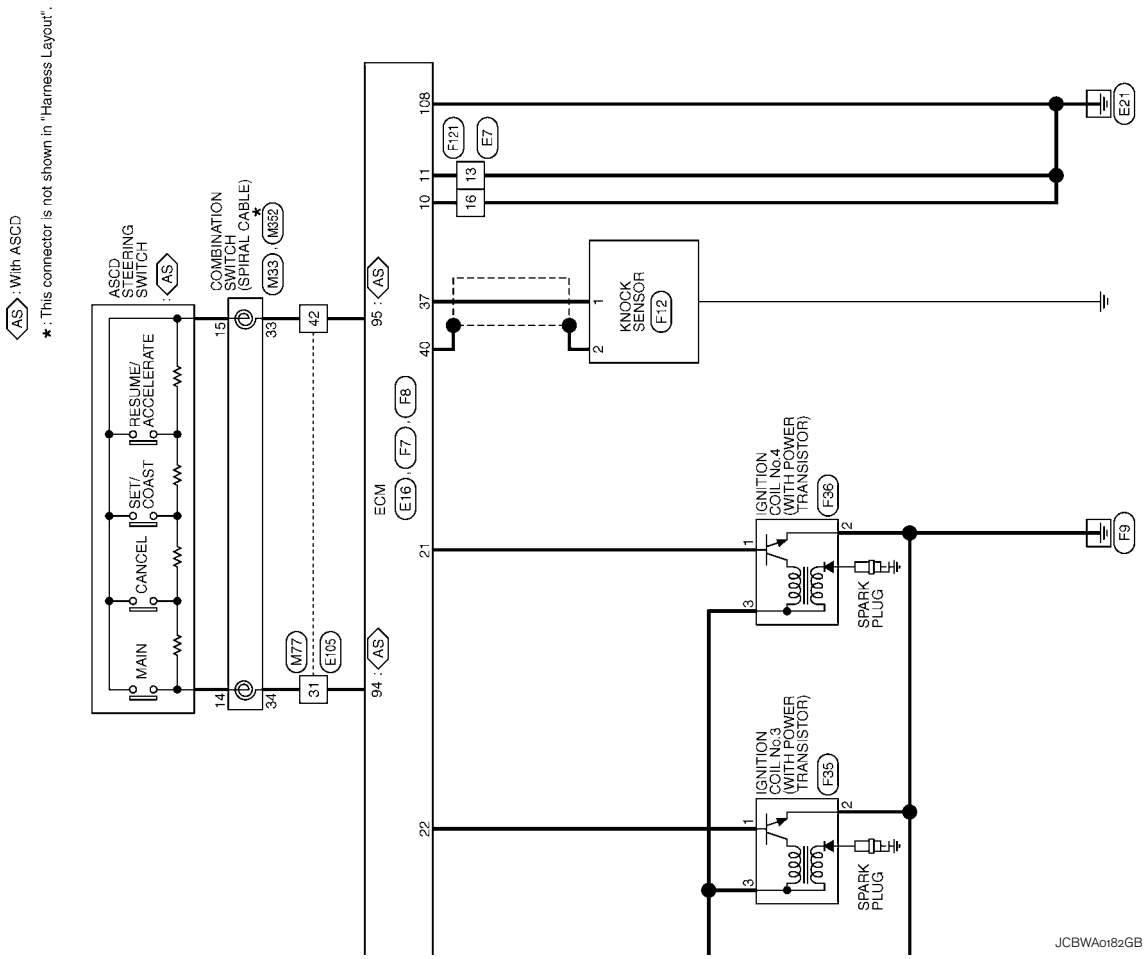
cardiagn.com



cardiagn.com

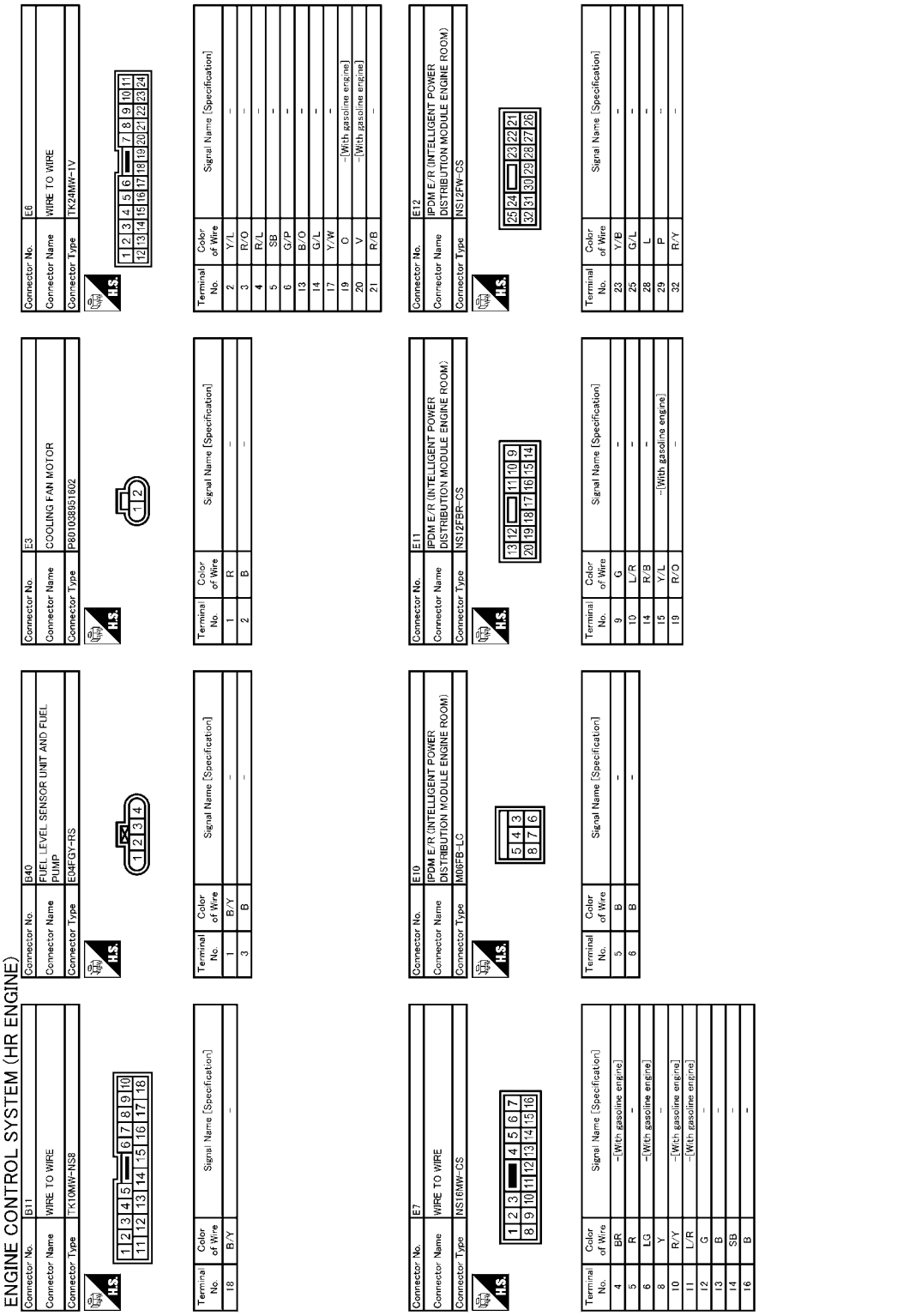


cardiagn.com



cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)



JCBWA0183GB

cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
33	B/O	–
40	BR/Y	– [With HR engine]
42	B/Y	–

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7263-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
52	W	–
54	R	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-LI
84	L	CAN-HI
88	O	K-LINE
93	W/L	IGN SW
94	V	ASCD STRG SW
95	B	GND-ASCD STRG SW
99	R/W	BRAKE
100	R	BNCSW(BNC)
102	BR	AVCC-APS2[With HR engine]
103	GR	APS2
104	Y	GND-A-APS2[With HR engine]

105	G	VBR
106	V	AVCC-APS1[With HR engine]
108	B	GND
110	G	APS1[With HR engine]
111	R	GND-A-APS1[With HR engine]

Connector No.	E18
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH05FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–
3	BR	–
4	LG	–
5	G	–

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	–
2	G/P	–
3	Y/W	–

Connector No.	E57
Connector Name	RESISTOR
Connector Type	P801038951602

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	R	–

Connector No.	E58
Connector Name	HEATED OXYGEN SENSOR 2
Connector Type	AF204FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	R/O	–
3	R	–
4	Y	–

JCBWA0184GB

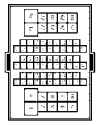
cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

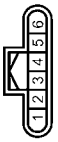
Terminal No.	Color of Wire	Signal Name [Specification]
18	B/Y	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4



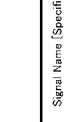
Terminal No.	Color of Wire	Signal Name [Specification]
31	V	–
42	B	–
49	P	–
50	L	–
51	P	–
52	L	–
62	V	–
68	W/L	–
69	O	–

Connector No.	E110
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RH06FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	– [With HR engine]
2	R	– [With HR engine]
3	G	– [With HR engine]
4	V	– [With HR engine]
5	BR	– [With HR engine]
6	GR	– [Except K9K engine]

Connector No.	E111
Connector Name	ASCD CLUTCH SWITCH
Connector Type	M02FBR-LC

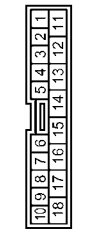


Terminal No.	Color of Wire	Signal Name [Specification]
1	W/L	– [With gasoline engine]
2	O	– [With gasoline engine]

Connector No.	E112
Connector Name	ASCD BRAKE SWITCH
Connector Type	M02FBR-LC

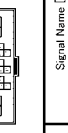
Terminal No.	Color of Wire	Signal Name [Specification]
1	O	– [With M/T]
1	W/L	– [With CVT]
2	R	–

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–

Connector No.	F7
Connector Name	ECM
Connector Type	MAA24FGY-MEA8-RH



Terminal No.	Color of Wire	Signal Name [Specification]
1	L/W	MOTOR1
2	R/Y	VMOT
3	LG/R	O2HF[With HR engine]
4	P	MOTOR2
5	R	O2HR
9	W/B	EVAP
10	B	GND
11	B/W	GND
15	G/L	MOTRLY
17	L/Y	IGN COIL#1
18	BR/Y	IGN COIL#2
21	R/G	IGN COIL#4
22	Sb	IGN COIL#3[With HR engine]
23	B/O	FPR
25	R/O	INJ#4
29	Y	INJ#3[With HR engine]
30	O	INJ#2[With HR engine]
31	L	INJ#1
32	Y/L	SSOFF

JCBWA0185GB

cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

Connector No.	F8
Connector Name	ECM
Connector Type	MA40FBR-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
33	L/R	TPS1[With HR engine]
34	L/O	TPS2[With HR engine]
36	V/W	GND-A TPS[With HR engine]
37	W	KNK
38	GR/B	TW[With HR engine]
40	SHIELD	GND-A KNK
41	G/P	PDPRESS
44	B	GND-A TW[With HR engine]
45	BR	OA+
46	V	TA
48	R/L	GND-A(PDPRES)

Connector No.	F20
Connector Name	CRANKSHAFT POSITION SENSOR (POS)
Connector Type	RH03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/W	-
2	GR/L	-[With HR engine]
3	LG/B	-

Terminal No.	Color of Wire	O2SF[With HR engine]
49	L/G	O2SR
50	Y	OA-
52	LG	GND-TA
55	O	GND-A O2SF[With HR engine]
56	P	O2SR-GND
59	SB	POS
61	LG/B	GND-POS[With HR engine]
62	GR/L	GND-(A)-PHASE[With HR engine]
63	L	PHASE[With HR engine]
65	G	NEUT HIGH
69	W/B	AVCC-TPS[With HR engine]
72	V/R	CYTC
73	Y/R	AVCC(PDPRES)
74	Y/W	POS AVCC
75	L/W	PHASE AVCC
76	Y/V	

Connector No.	F26
Connector Name	CAMSHAFT POSITION SENSOR (PHASE)
Connector Type	RH03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/V	-
2	L	-[With HR engine]
3	G	-[With HR engine]

Connector No.	F12
Connector Name	KNOCK SENSOR
Connector Type	BS02FB-AHY-S

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B/W	-

Connector No.	F28
Connector Name	ENGINE COOLANT TEMPERATURE SENSOR
Connector Type	E02FGY-RS

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR/B	-[With HR engine]
2	B	-[With HR engine]

Connector No.	F13
Connector Name	CONDENSER
Connector Type	M02FW-GY-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/R	-
2	B	-

Connector No.	F29
Connector Name	ELECTRIC THROTTLE CONTROL ACTUATOR
Connector Type	RH06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V/R	-[With HR engine]
2	L/R	-[With HR engine]
3	L/O	-[With HR engine]
4	V/W	-[With HR engine]
5	P	-
6	L/W	-

JCBWA0186GB

cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

Connector No.	F30
Connector Name	HEATED OXYGEN SENSOR 1
Connector Type	AFZ04FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	– [With HR engine]
2	R/O	–
3	LG/R	– [With HR engine]
4	L/G	– [With HR engine]

Connector No.	F32
Connector Name	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
Connector Type	E02FL-RS-LGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	W/B	–

Connector No.	F33
Connector Name	IGNITION COIL No.1 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/Y	–
2	B	–
3	L/R	–

Connector No.	F34
Connector Name	IGNITION COIL No.2 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR/Y	–
2	B	–
3	L/R	–

Connector No.	F35
Connector Name	IGNITION COIL No.3 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	– [With HR engine]
2	B	–
3	L/R	–

Connector No.	F36
Connector Name	IGNITION COIL No.4 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/G	–
2	B	–
3	L/R	–

Connector No.	F37
Connector Name	FUEL INJECTOR No.1
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	L	–

Connector No.	F38
Connector Name	FUEL INJECTOR No.2
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	– [With HR engine]

JCBWA0187GB

cardiagn.com

ENGINE CONTROL SYSTEM (HR ENGINE)

Connector No.	F39
Connector Name	FUEL INJECTOR No.3
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	Y	–[With HR engine]

Connector No.	F40
Connector Name	FUEL INJECTOR No.4
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	R/O	–

Connector No.	F41
Connector Name	INTAKE VALVE TIMING CONTROL SOLENOID VALVE
Connector Type	E02FG-RS-LGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/R	–
2	L/R	–

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/B	–
3	W/B	–

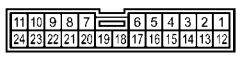
Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	BR	–[With gasoline engine]
5	R	–
6	LG	–[With gasoline engine]
8	Y	–
10	R/Y	–[With gasoline engine]
11	L/R	–[With gasoline engine]
12	G	–
13	B	–
14	SB	–
16	B	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

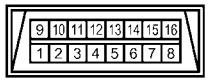
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	Y/L	–
3	R/O	–
4	R/L	–
5	SB	–
6	G/P	–
13	B/O	–
14	G/L	–
17	Y/W	–
19	O	–[With gasoline engine]
20	V	–[With gasoline engine]
21	R/B	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
4	B	–
5	B	–
6	L	–
7	O	–
8	W	–
14	P	–
16	Y	–

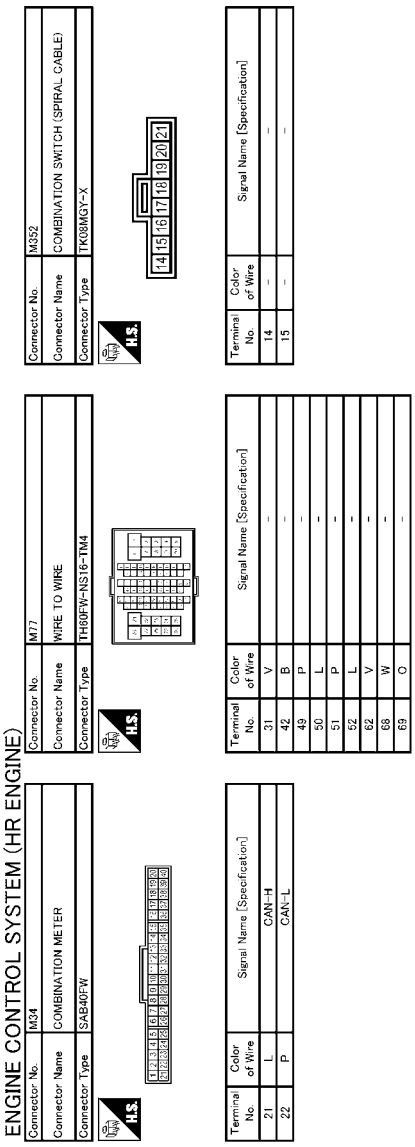
Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
33	B	–
34	V	–

JCBWA0188GB

cardiagn.com



JCBWA0189GB

Fail Safe

INFOID:0000000001096993

NON DTC RELATED ITEM

cardiagn.com

Engine operating condition in fail-safe mode	Detected items	Remarks	Reference page
Engine speed will not rise more than 2,500 rpm due to the fuel cut	Malfunction indicator lamp circuit	When there is an open circuit on MI circuit, the ECM cannot warn the driver by lighting up MI when there is malfunction on engine control system. Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MI circuit is open by means of operating fail-safe function. The fail-safe function also operates when above diagnoses except MI circuit are detected and demands the driver to repair the malfunction.	EC-426

DTC RELATED ITEM

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
P0117 P0118	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-III displays the engine coolant temperature decided by ECM.	
		Condition	Engine coolant temperature decided (CONSULT-III display)
		Just as ignition switch is turned ON or START	40°C (104°F)
		More than approx. 4 minutes after ignition ON or START	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.	
P1121	Electric throttle control actuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.	
		(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.	
		(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in Neutral position, and engine speed will not exceed 1,000 rpm or more.	
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	
P1124 P1126	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	
P1128	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	
P1229	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	

cardiagn.com

DTC No.	Detected items	Engine operating condition in fail-safe mode
P1805	Brake switch	ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.
		Vehicle condition: When engine is idling — Driving condition: Normal Vehicle condition: When accelerating — Driving condition: Poor acceleration
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Inspection Priority Chart

INFOID:0000000001096994

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	• U1001 CAN communication line • U1010 CAN communication • P0102 P0103 Mass air flow sensor • P0117 P0118 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0605 ECM • P1229 Sensor power supply • P1610 - P1615 NATS • P1706 Park/neutral position (PNP) switch • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	• P0132 P0134 Heated oxygen sensor 1 • P0138 Heated oxygen sensor 2 • P1065 ECM power supply • P1111 Intake valve timing control solenoid valve • P1122 Electric throttle control function • P1124 P1126 Throttle control motor relay • P1128 Throttle control motor • P1217 Engine over temperature (OVERHEAT) • P1564 ASCD steering switch • P1572 ASCD brake switch • P1572 ASCD vehicle speed sensor • P1805 Brake switch
3	• P0011 Intake valve timing control • P1121 Electric throttle control actuator • P1212 ESP communication line

DTC Index

INFOID:0000000001096995

×:Applicable —: Not applicable

DTC*1		Items (CONSULT-III screen terms)	Trip	MI	Reference page
CONSULT-III*2	ECM*3				
U1001	1001*4	CAN COMM CIRCUIT	2	—	EC-450
U1010	1010	CONTROL UNIT(CAN)	2	—	EC-451
P0000	**0000**	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	—	**Flashing**	**—**
P0011	0011	INT/V TIM CONT-B1	2	—	EC-452

cardiagn.com

DTC*1		Items (CONSULT-III screen terms)	Trip	MI	Reference page
CONSULT-III*2	ECM*3				
P0102	0102	MAF SEN/CIRCUIT-B1	1	×	EC-456
P0103	0103	MAF SEN/CIRCUIT-B1	1	×	EC-456
P0117	0117	ECT SEN/CIRC	1	×	EC-461
P0118	0118	ECT SEN/CIRC	1	×	EC-461
P0122	0122	TP SEN 2/CIRC-B1	1	×	EC-464
P0123	0123	TP SEN 2/CIRC-B1	1	×	EC-464
P0132	0132	HO2S1 (B1)	2	×	EC-467
P0134	0134	HO2S1 (B1)	2	×	EC-471
P0138	0138	HO2S2 (B1)	2	×	EC-475
P0222	0222	TP SEN 1/CIRC-B1	1	×	EC-480
P0223	0223	TP SEN 1/CIRC-B1	1	×	EC-480
P0327	0327	KNOCK SEN/CIRC-B1	2	—	EC-483
P0328	0328	KNOCK SEN/CIRC-B1	2	—	EC-483
P0335	0335	CKP SEN/CIRCUIT	2	×	EC-485
P0340	0340	CMP SEN/CIRC-B1	2	×	EC-489
P0605	0605	ECM	1 or 2	× or —	EC-493
P1065	1065	ECM BACK UP/CIRCUIT	2	×	EC-495
P1111	1111	INT/V TIM C/CIRC	1	×	EC-497
P1121	1121	ETC ACTR-B1	1	×	EC-499
P1122	1122	ETC FUNCTION/CIRC-B1	1	×	EC-501
P1124	1124	ETC MOT PWP	1	×	EC-505
P1126	1126	ETC MOT PWP-B1	1	×	EC-505
P1128	1128	ETC MOT-B1	1	×	EC-508
P1212	1212	TCS/CIRC	2	—	EC-252
P1217	1217	ENG OVER TEMP	1	×	EC-511
P1225	1225	CTP LEARNING-B1	2	—	EC-515
P1226	1226	CTP LEARNING-B1	2	—	EC-517
P1229	1129	SENSOR POWER/CIRC	1	×	EC-519
P1564	1564	ASCD SW	1	—	EC-263
P1572	1572	ASCD BRAKE SW	1	—	EC-266
P1574	1574	ASCD VHL SPD SEN	1	—	EC-272
P1610	1610	LOCK MODE	2	—	SEC-14
P1611	1611	ID DISCARD IMM-ECM	2	—	SEC-14
P1612	1612	CHAIN OF ECM-IMMU	2	—	SEC-14
P1615	1615	DIFFERENCE OF KEY	2	—	SEC-14
P1706	1706	P-N POS SW/CIRCUIT	2	×	EC-533
P1805	1805	BRAKE SW/CIRCUIT	2	—	EC-536
P2122	2122	APP SEN 1/CIRC	1	×	EC-539
P2123	2123	APP SEN 1/CIRC	1	×	EC-539
P2127	2127	APP SEN 2/CIRC	1	×	EC-542
P2128	2128	APP SEN 2/CIRC	1	×	EC-542
P2135	2135	TP SENSOR-B1	1	×	EC-546
P2138	2138	APP SENSOR	1	×	EC-549

cardiagn.com

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by 15031-5.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

*4: The troubleshooting for this DTC needs CONSULT-III.

cardiagn.com

SYMPTOM DIAGNOSIS

ENGINE CONTROL SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000001096998

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-306
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-634
	Fuel injector circuit	1	1	2	3	2		2	2			2			EC-565
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-413
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-594
	Incorrect idle speed adjustment						1	1	1	1		1			EC-369
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-217, EC-219, EC-499
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-369
	Ignition circuit	1	1	2	2	2		2	2			2			EC-588
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-446
Mass air flow sensor circuit		1			2										EC-456, EC-456
Engine coolant temperature sensor circuit							3			3					EC-461
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			EC-467, EC-471, EC-571, EC-571, EC-571
Throttle position sensor circuit							2			2					EC-464, EC-480, EC-515, EC-517, EC-546
Accelerator pedal position sensor circuit				3	2	1									EC-539, EC-542, EC-549
Knock sensor circuit				2								3			EC-483

cardiagn.com

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Crankshaft position sensor (POS) circuit	2	2												EC-485
Camshaft position sensor (PHASE) circuit	3	2												EC-489
Vehicle speed signal circuit		2	3		3						3			EC-597
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-493, EC-495
Intake valve timing control solenoid valve circuit		3	2		1	3	2	2	3		3			EC-497
PNP switch circuit			3		3		3	3			3			EC-533
Refrigerant pressure sensor circuit		2				3			3		4			EC-595
Electrical load signal circuit							3							EC-560
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	HAC-108 ,HAC-187
ABS actuator and electric unit (control unit)			4											BRC-9

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

cardiagn.com

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank	5													FL-16 ,FL-19
	Fuel piping			5	5	5		5	5			5			FL-5
	Vapor lock		5												—
	Valve deposit	5		5	5	5		5	5			5			—
	Poor fuel (Heavy weight gasoline, Low octane)														—
Air	Air duct														EM-28
	Air cleaner														EM-28
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)	5	5	5	5	5	5	5	5	5		5			EM-28
	Electric throttle control actuator														EM-29
	Air leakage from intake manifold/ Collector/Gasket														EM-29
Cranking	Battery	1	1	1		1		1	1			1		1	PG-3
	Generator circuit														CHG-15
	Starter circuit	3													STR-18
	Signal plate	6													EM-101
	PNP switch	4													TM-10
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-80
	Cylinder head gasket										4		3		
	Cylinder block	6	6	6	6	6		6	6			6	4		EM-101
	Piston														
	Piston ring														
	Connecting rod														
	Bearing														
	Crankshaft														
Valve mecha-nism	Timing chain	5	5	5	5	5		5	5			5			EM-53
	Camshaft														EM-65
	Intake valve timing control														EM-53
	Intake valve												3		EM-80
	Exhaust valve														

cardiagn.com

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			EM-75, EM-32
	Three way catalyst														
Lubrica-tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			EM-42, EM-92, LU-9, LU-3
	Oil level (Low)/Filthy oil														LU-6
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5		5	5		4	5			CO-12
	Thermostat									5					CO-20
	Water pump														CO-18
	Water gallery														CO-22
	Cooling fan									5					CO-15
	Coolant level (Low)/Contaminat-ed coolant														CO-9
NATS (NISSAN Vehicle Immobilizer System)		1	1												SEC-14

1 - 6: The numbers refer to the order of inspection.

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000001096999

FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 2,500 rpm under no load (for example, the shift lever position is neutral and engine speed is over 2,500 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 2,000 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, EC-379, "System Description".

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001100457

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

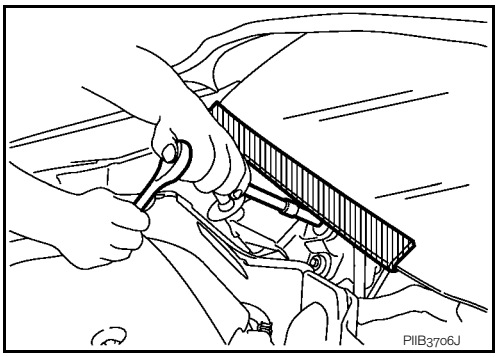
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001097001

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:0000000001097002

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

On Board Diagnostic (OBD) System of Engine

INFOID:0000000001097003

cardiagn.com

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MI) to warn the driver of a malfunction causing emission deterioration.

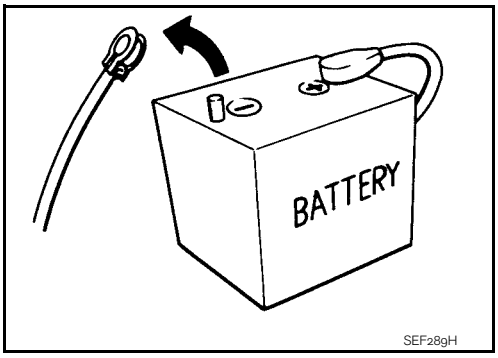
CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-105, "Description".**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MI to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to the malfunction of the EVAP system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM before returning the vehicle to the customer.**

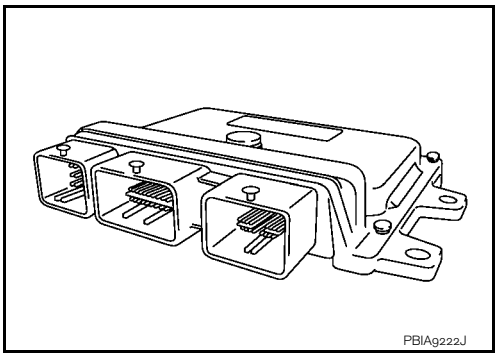
General Precautions

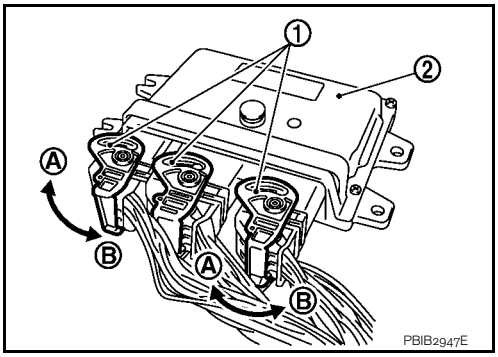
INFOID:0000000001097004

- **Always use a 12 volt battery as power source.**
- **Do not attempt to disconnect battery cables while engine is running.**
- **Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.**
- **Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.**



- **Do not disassemble ECM.**
- **If a battery cable is disconnected, the memory will return to the ECM value.**
  The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.
- **If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.**
  - **Diagnostic trouble codes**
  - **1st trip diagnostic trouble codes**
  - **Freeze frame data**
  - **1st trip freeze frame data**
- **When connecting ECM harness connector (1), fasten (B) it securely with a lever as far as it will go as shown in the figure.**

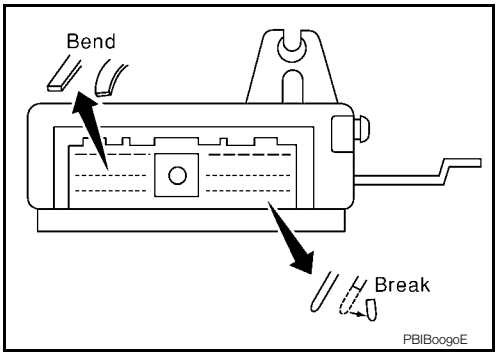


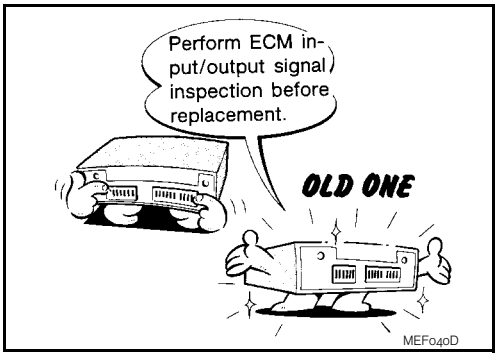


2. ECM
A. Loosen

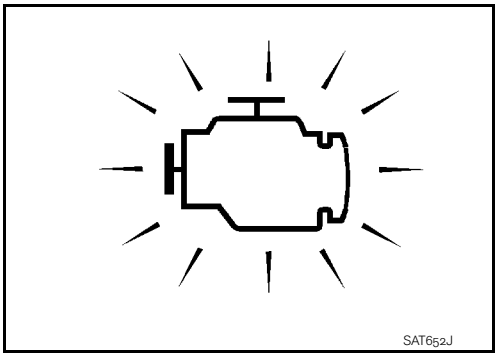
cardiagn.com

- **When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- **Securely connect ECM harness connectors.**
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- **Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.**
- **Keep engine control system parts and harness dry.**
- **Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-598, "Reference Value".**
- **Handle mass air flow sensor carefully to avoid damage.**
- **Do not clean mass air flow sensor with any type of detergent.**
- **Do not disassemble electric throttle control actuator.**
- **Even a slight leak in the air intake system can cause serious incidents.**
- **Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).**



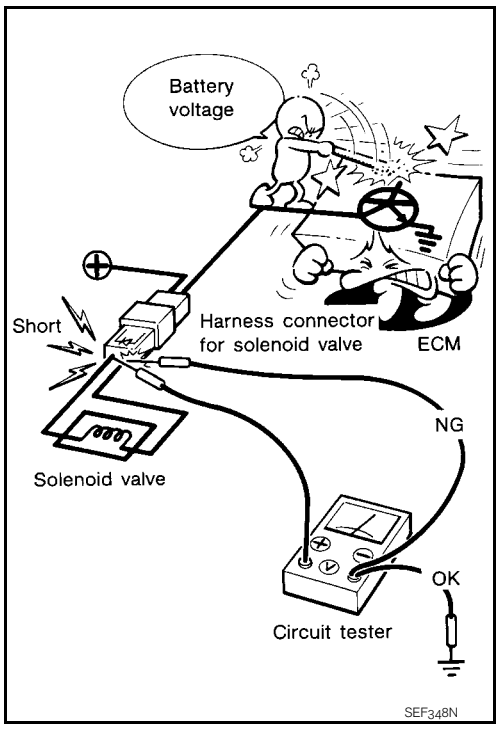


- **After performing each TROUBLE DIAGNOSIS, perform DTC CONFIRMATION PROCEDURE or Component Function Check.** The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.



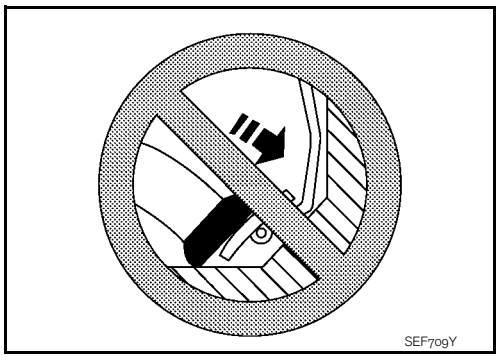
cardiagn.com

- **When measuring ECM signals with a circuit tester, never allow the two tester probes to contact.**
  Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- **Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

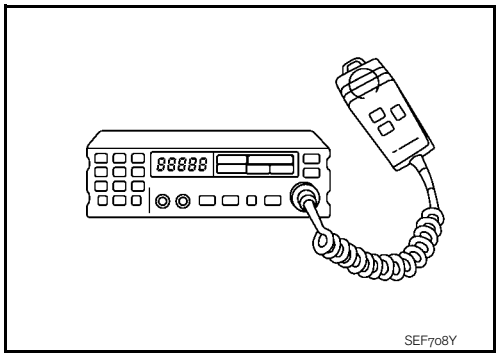


- **Do not operate fuel pump when there is no fuel in lines.**
- **Tighten fuel hose clamps to the specified torque.**

- **Do not depress accelerator pedal when starting.**
- **Immediately after starting, do not rev up engine unnecessarily.**
- **Do not rev up engine just prior to shutdown.**



- **When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.**
- **Keep the antenna as far as possible from the electronic control units.**
- **Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.**
  Do not let them run parallel for a long distance.
- **Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.**
- **Be sure to ground the radio to vehicle body.**



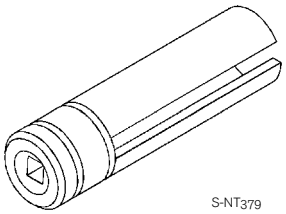
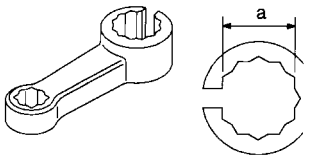
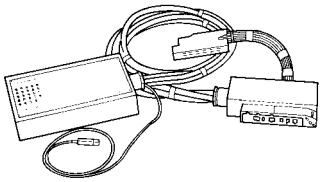
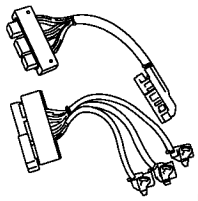
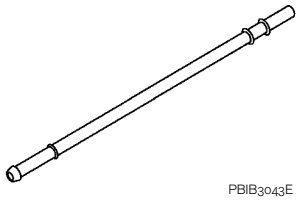
cardiagn.com

PREPARATION

PREPARATION

Special Service Tools

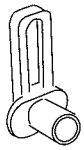
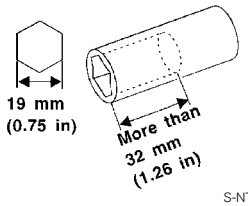
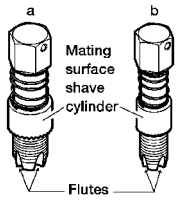
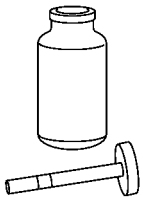
INFOID:0000000001097005

Tool number Tool name	Description
KV10117100 Heated oxygen sensor wrench  S-NT379	Loosening or tightening heated oxygen sensor with 22 mm (0.87 in) hexagon nut
KV10114400 Heated oxygen sensor wrench  S-NT636	Loosening or tightening heated oxygen sensor 2 **a: 22 mm (0.87 in)**
EG17550000 Break-out box  ZZA1194D	Measuring ECM signals with a circuit tester
EG17680000 Y-cable adapter  PBIA9379J	Measuring ECM signals with a circuit tester
KV10118400 Fuel tube adapter  PBIB3043E	Measuring fuel pressure

Commercial Service Tools

INFOID:0000000001115716

cardiagn.com

Tool name	Description
Quick connector release  PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Par No. 16441 6N210)
Socket wrench  S-NT705	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. **a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor** **b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor**
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)  S-NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

cardiagn.com

ON-VEHICLE MAINTENANCE

FUEL PRESSURE

Inspection

INFOID:0000000001097007

FUEL PRESSURE RELEASE

With CONSULT-III

1. Turn ignition switch ON.
2. Perform “FUEL PRESSURE RELEASE” in “WORK SUPPORT” mode with CONSULT-III.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

With CONSULT-III

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.

FUEL PRESSURE CHECK

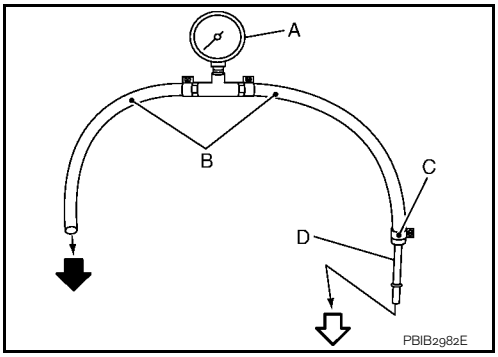
CAUTION:

- **Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.**
- **The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.**
- **Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains sealability with O-rings inside.**
- **Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.**

NOTE:

Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because J10 models do not have fuel return system.

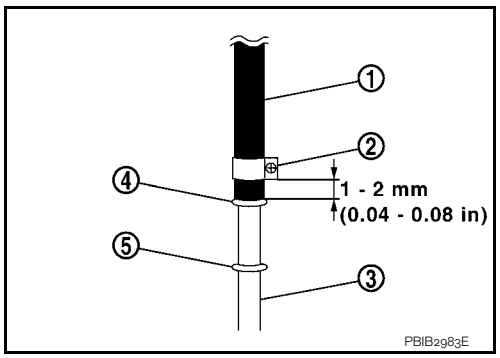
1. Release fuel pressure to zero.
2. Prepare fuel hose for fuel pressure check B and fuel tube adapter (KV10118400) D, then connect fuel pressure gauge A.
   - ⇦: To quick connector
   - ⬅: To fuel tube (engine side)
   - C: Clamp
   - Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
   - To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
   - Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
   - Use Pressure Gauge to check fuel pressure.



3. Remove fuel hose.
   - Do not twist or kink fuel hose because it is plastic hose.

cardiagn.com

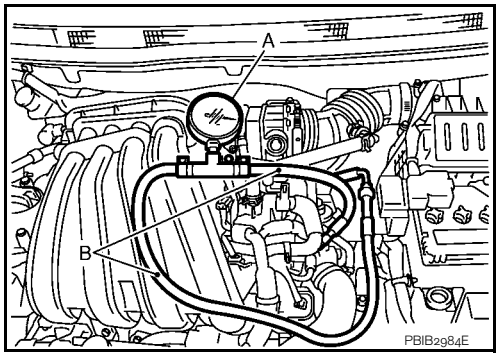
4. Connect fuel hose for fuel pressure check (1) to fuel tube (engine side) with clamp (2) as shown in the figure.
   - No.2 spool (5)
   - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
   - Apply proper amount of gasoline between top of the fuel tube (3) and No.1 spool (4).
   - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
   - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
   - When reconnecting fuel line, always use new clamps.
   - Use a torque driver to tighten clamps.
   - Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



Tightening torque: 1 - 1.5 N·m (0.1 - 0.15 kg-m, 9 - 13 in-lb)

   - Make sure that clamp screw does not contact adjacent parts.

5. Connect fuel tube adapter to quick connector.
   - A: Fuel pressure gauge
   - B: Fuel hose for fuel pressure check
6. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
7. Turn ignition switch ON and check for fuel leakage.
8. Start engine and check for fuel leakage.
9. Read the indication of fuel pressure gauge.
   - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
   - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.



At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2, 51 psi)

10. If result is unsatisfactory, go to next step.
11. Check the following.
    - Fuel hoses and fuel tubes for clogging
    - Fuel filter for clogging
    - Fuel pump
    - Fuel pressure regulator for clogging

    If OK, replace fuel pressure regulator.
    If NG, repair or replace.

cardiagn.com

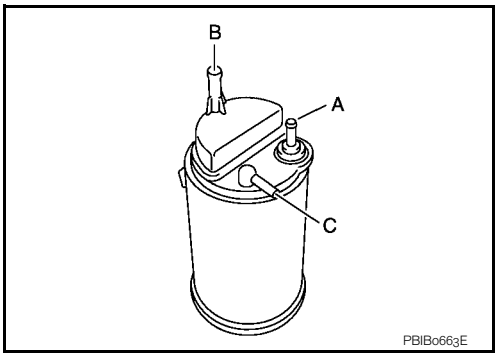
EVAPORATIVE EMISSION SYSTEM

Inspection

INFOID:0000000001097008

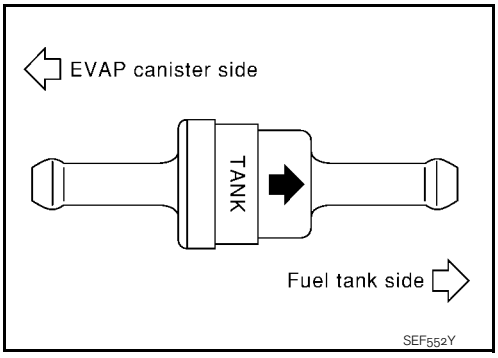
1. Visually inspect EVAP vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Check EVAP canister as follows:

a. Block port (B). Orally blow air through port (A). Check that air flows freely through port (C).
b. Block port (A). Orally blow air through port (B). Check that air flows freely through port (C).



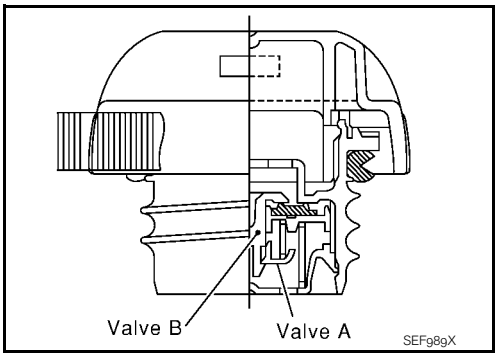
3. Visually inspect the fuel check valve for cracks, damage, loose connections chafing and deterioration.
4. Check fuel check valve as follows:

a. Blow air through connector on the fuel tank side. A considerable resistance should be felt and a portion of air flow should be directed toward the EVAP canister side.
b. Blow air through connector on EVAP canister side. Air flow should be smoothly directed toward fuel tank side.
c. If fuel check valve is suspected or not properly functioning in step 1 and 2 above, replace it.



5. Inspect fuel tank filler cap vacuum relief valve for clogging, sticking, etc.

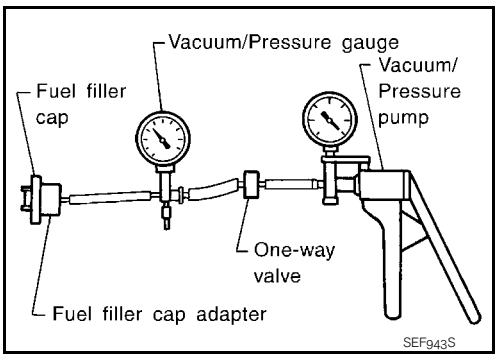
a. Wipe clean valve housing.



b. Check valve opening pressure and vacuum.

Pressure:	15.3 - 20.0 kPa (0.153 - 0.200 bar, 0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)
Vacuum:	–6.0 to –3.4 kPa (–0.06 bar to –-0.034bar, –0.061 to –0.035 kg/cm^2, –0.87 to –0.49 psi)

c. If out of specification, replace fuel filler cap as an assembly.



cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

INFOID:0000000001097009

Transmission	Condition	Specification
M/T	No load* (in Neutral position)	650 ±50 rpm

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Ignition Timing

INFOID:0000000001097010

Transmission	Condition	Specification
M/T	No load* (in Neutral position)	15 ± 5° BTDC

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

cardiagn.com

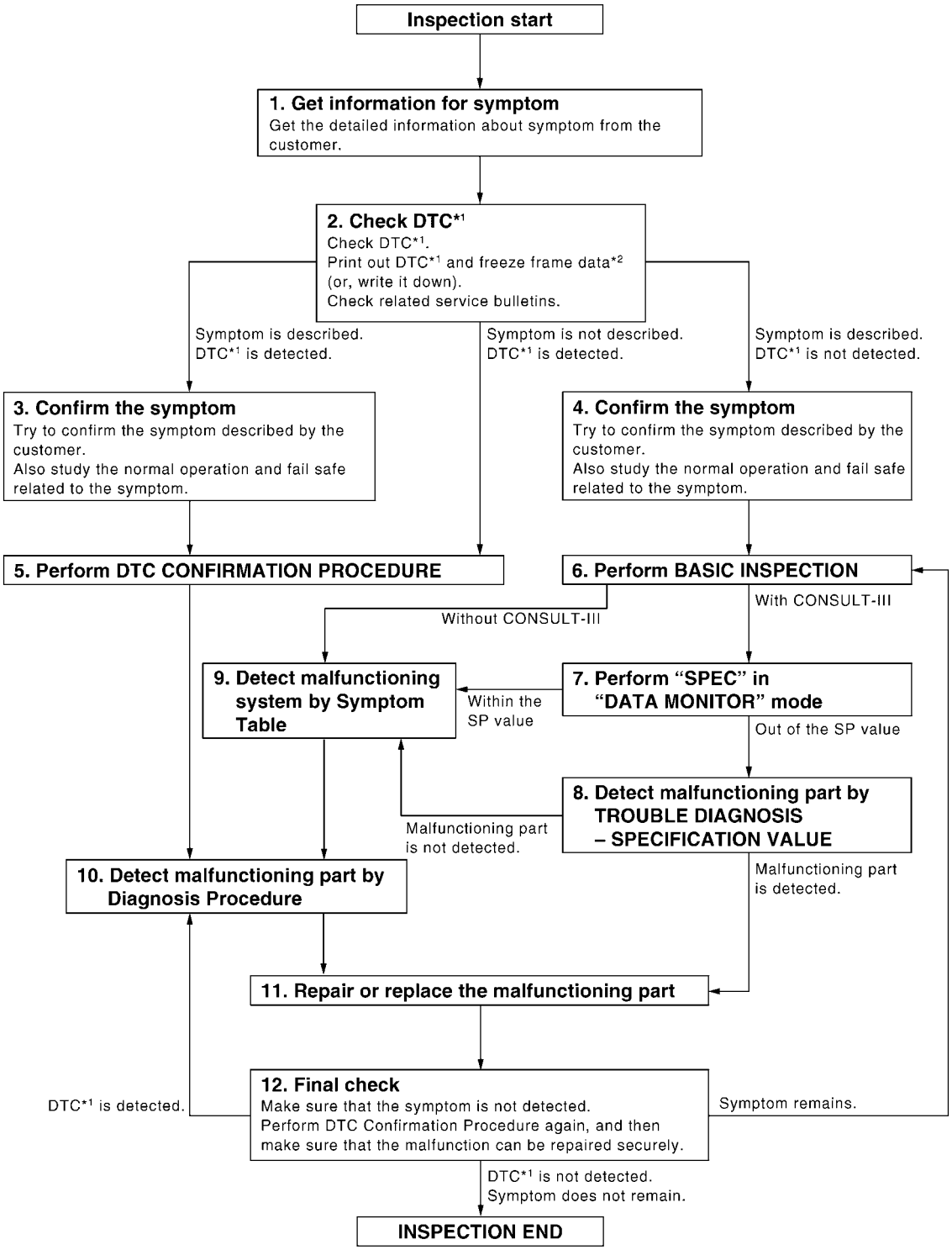
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000936579

OVERALL SEQUENCE



*1: Include 1st trip DTC.
*2: Include 1st trip freeze frame data.

JMBIA0078GB

DETAILED FLOW

cardiagn.com

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the “Diagnostic Work Sheet”. (Refer to EC-640, "Diagnostic Work Sheet".)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.

- Record DTC and freeze frame data. (Print them out with CONSULT-III or GST.)
- Erase DTC. (Refer to EC-706, "Diagnosis Description".)
- Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to EC-967, "Symptom Table".)

3. Check related service bulletins for information.

Is any symptom described and is any DTC detected?

Symptom is described, DTC is detected>>GO TO 3.
Symptom is described, DTC is not detected>>GO TO 4.
Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MI ON).
Also study the normal operation and fail safe related to the symptom. Refer to EC-971, "Description" and EC-959, "Fail Safe".
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail safe related to the symptom. Refer to EC-971, "Description" and EC-959, "Fail Safe".
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.
If two or more DTCs are detected, refer to EC-961, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.
  If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.
NO >> Check according to EC-962, "DTC Index".

6.PERFORM BASIC INSPECTION

Perform EC-642, "BASIC INSPECTION : Special Repair Requirement".

Do you have CONSULT-III?

cardiagn.com

YES >> GO TO 7.
NO >> GO TO 9.

7. PERFORM SPEC IN DATA MONITOR MODE

With CONSULT-III

Make sure that “MAS A/F SE-B1”, “B/FUEL SCHDL” and “A/F ALPHA-B1” are within the SP value using CONSULT-III in “SPEC” of “DATA MONITOR” mode. Refer to EC-728, "Component Function Check".

Is the measurement value within the SP value?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to EC-728, "Diagnosis Procedure".

Is malfunctioning part detected?

YES >> GO TO 11.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to EC-967, "Symptom Table" based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

>> GO TO 10.

10. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

NOTE:

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to Circuit Inspection in GI-41, "Circuit Inspection".

Is malfunctioning part detected?

YES >> GO TO 11.
NO >> Monitor input data from related sensors or check the voltage of related ECM terminals using CONSULT-III. Refer to EC-938, "Reference Value".

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to EC-706, "Diagnosis Description".

>> GO TO 12.

12. FINAL CHECK

When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then make sure that the malfunction have been repaired securely.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 10.
YES-2 >> Symptom remains: GO TO 6.
NO >> Before returning the vehicle to the customer, make sure to erase unnecessary DTC in ECM and TCM (Transmission Control Module). (Refer to EC-706, "Diagnosis Description".) If the completion of SRT is needed, drive vehicle under the specific DRIVING PATTERN in EC-964, "How to Set SRT Code".

Diagnostic Work Sheet

INFOID:0000000000936580

DESCRIPTION

cardiagn.com

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.
Some conditions may cause the MI to come on steady or blink and DTC to be detected. Examples:
Vehicle ran out of fuel, which caused the engine to misfire.

KEY POINTS

WHAT ..... Vehicle & engine model
WHEN ..... Date, Frequencies
WHERE..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SEF907L

WORKSHEET SAMPLE

Customer name MR/MS	Model & Year	VIN
Engine #	Trans.	Mileage
Incident Date	Manuf. Date	In Service Date
Fuel and fuel filler cap	☐ Vehicle ran out of fuel causing misfire ☐ Fuel filler cap was left off or incorrectly screwed on.	
Symptoms – ☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]	
Symptoms – ☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
Symptoms – ☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
Symptoms – ☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading	
Incident occurrence	☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime	
Frequency	☐ All the time ☐ Under certain conditions ☐ Sometimes	
Weather conditions	☐ Not affected	
Weather conditions – Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]	
Weather conditions – Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F	
Engine conditions	☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions	☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)	
Driving conditions	☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp	☐ Turned on ☐ Not turned on	

MTBL0017

cardiagn.com

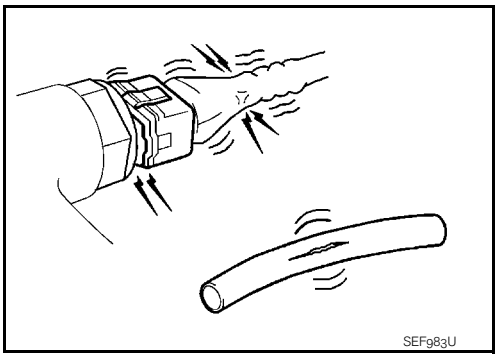
INSPECTION AND ADJUSTMENT
BASIC INSPECTION

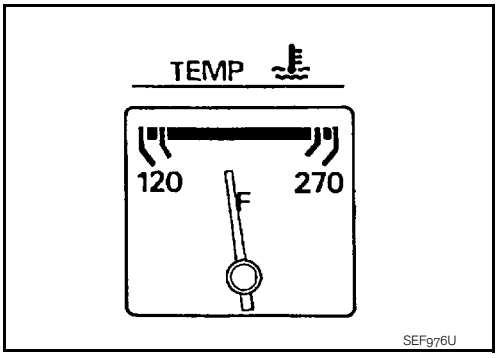
BASIC INSPECTION : Special Repair Requirement

INFOID:0000000000936581

1.INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
- Harness connectors for improper connections
- Wiring harness for improper connections, pinches and cut
- Vacuum hoses for splits, kinks and improper connections
- Hoses and ducts for leaks
- Air cleaner clogging
- Gasket
3. Confirm that electrical or mechanical loads are not applied.
- Headlamp switch is OFF.
- Air conditioner switch is OFF.
- Rear window defogger switch is OFF.
- Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
   Ensure engine stays below 1,000 rpm.


SEF983U

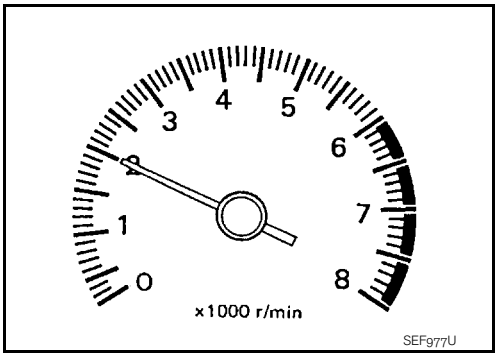


SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-III or GST.

Is any DTC detected?

YES >> GO TO 2.
NO >> GO TO 3.



SEF977U

2.REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding Diagnostic Procedure.

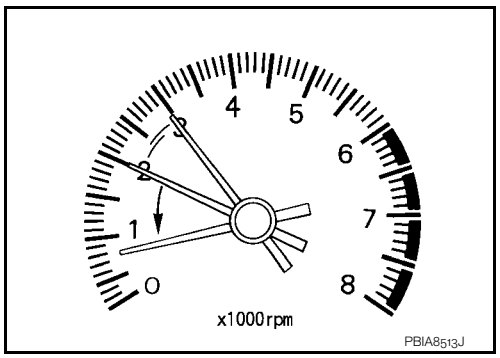
>> GO TO 3.

3.CHECK TARGET IDLE SPEED

1. Run engine at about 2,000 rpm for about 2 minutes under no load.

cardiagn.com

2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed.
   For procedure, refer to EC-646, "IDLE SPEED : Special Repair Requirement".
   For specification, refer to EC-981, "Idle Speed".



Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 7.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
   For procedure, refer to EC-646, "IDLE SPEED : Special Repair Requirement".
   For specification, refer to EC-981, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the Following.
- Check camshaft position sensor (PHASE) and circuit. Refer to EC-813, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-809, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace. Then GO TO 4

9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

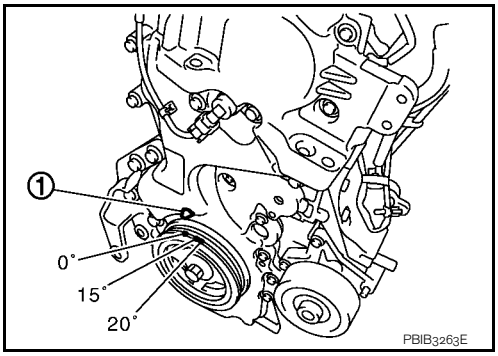
>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.

cardiagn.com

2. Check ignition timing with a timing light.
For procedure, refer to EC-646, "IGNITION TIMING : Special Repair Requirement"
For specification, refer to EC-981, "Ignition Timing".



1 : Timing indicator

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 14.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

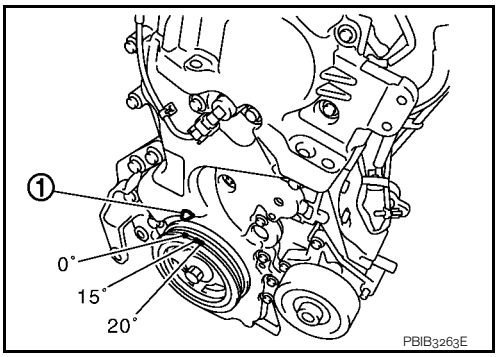
1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
For procedure, refer to EC-646, "IDLE SPEED : Special Repair Requirement".
For specification, refer to EC-981, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 15.
NO >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.
For procedure, refer to EC-646, "IGNITION TIMING : Special Repair Requirement".
For specification, refer to EC-981, "Ignition Timing".



1 : Timing indicator

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-163, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair the timing chain installation. Then GO TO 4.

cardiagn.com

17. DETECT MALFUNCTIONING PART

Check the following.
- Check camshaft position sensor (PHASE) and circuit. Refer to EC-813, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-809, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair or replace. Then GO TO 4

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

>> GO TO 4.

19. INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, go to EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000000936582

When replacing ECM, this procedure must be performed.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000000936583

1. PERFORM INITIALIZATION OF NATS SYSTEM AND REGISTRATION OF ALL NATS IGNITION KEY IDS

Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

>> GO TO 2.

2. PERFORM VIN REGISTRATION

Refer to EC-646, "VIN REGISTRATION : Special Repair Requirement".

>> GO TO 3.

3. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 4.

4. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 5.

5. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

cardiagn.com

IDLE SPEED

IDLE SPEED : Description

INFOID:0000000000936584

This describes how to check the idle speed. For the actual procedure, follow the instructions in “BASIC INSPECTION”.

IDLE SPEED : Special Repair Requirement

INFOID:0000000000936585

1.CHECK IDLE SPEED

With CONSULT-III
Check idle speed in “DATA MONITOR” mode with CONSULT-III.
With GST
Check idle speed with Service $01 of GST.

>> INSPECTION END

IGNITION TIMING

IGNITION TIMING : Description

INFOID:0000000000936586

This describes how to check the ignition timing. For the actual procedure, follow the instructions in “BASIC INSPECTION”.

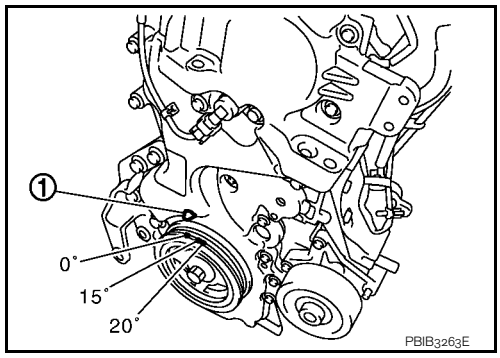
IGNITION TIMING : Special Repair Requirement

INFOID:0000000000936587

1.CHECK IGNITION TIMING

1. Attach timing light to the ignition coil No.4 harness.
2. Check ignition timing.

1 : Timing indicator



>> INSPECTION END

VIN REGISTRATION

VIN REGISTRATION : Description

INFOID:0000000000936588

VIN Registration is an operation to registering VIN in ECM. It must be performed each time ECM is replaced.
NOTE:
Accurate VIN which is registered in ECM may be required for Inspection & Maintenance (I/M).

VIN REGISTRATION : Special Repair Requirement

INFOID:0000000000936589

1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to GI-22, "Information About Identification or Model Code".

>> GO TO 2.

2.PERFORM VIN REGISTRATION

With CONSULT-III
1. Turn ignition switch ON and engine stopped.
2. Select “VIN REGISTRATION” in “WORK SUPPORT” mode.
3. Follow the instruction of CONSULT-III display.

cardiagn.com

>> END

ACCELERATOR PEDAL RELEASED POSITION LEARNING

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description

INFOID:0000000000936590

Accelerator Pedal Released Position Learning is a function of ECM to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement

INFOID:0000000000936591

1.START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF and wait at least 10 seconds.

>> END

THROTTLE VALVE CLOSED POSITION LEARNING

THROTTLE VALVE CLOSED POSITION LEARNING : Description

INFOID:0000000000936592

Throttle Valve Closed Position Learning is a function of ECM to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

INFOID:0000000000936593

1.START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
   Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

>> END

IDLE AIR VOLUME LEARNING

IDLE AIR VOLUME LEARNING : Description

INFOID:0000000000936594

Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps each engine idle speed within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

IDLE AIR VOLUME LEARNING : Special Repair Requirement

INFOID:0000000000936595

1.PRECONDITIONING

Make sure that all of the following conditions are satisfied.
Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- PNP switch: ON
- Electric load switch: OFF
  (Air conditioner, headlamp, rear window defogger)

cardiagn.com

On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.

- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up

- CVT models
- With CONSULT-III: Drive vehicle until “ATF TENP SEN” in “DATA MONITOR” mode of “CVT” system indicates less than 0.9V.
- Without CONSULT-III: Drive vehicle for 10 minutes.

- M/T models
- Drive vehicle for 10 minutes.

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2. IDLE AIR VOLUME LEARNING

With CONSULT-III

1. Perform Accelerator Pedal Released Position Learning. Refer to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
2. Perform Throttle Valve Closed Position Learning. Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
3. Start engine and warm it up to normal operating temperature.
4. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.
5. Touch “START” and wait 20 seconds.

Is “CMPLT” displayed on CONSULT-III screen?

YES >> GO TO 4.
NO >> GO TO 5.

3. IDLE AIR VOLUME LEARNING

Without CONSULT-III

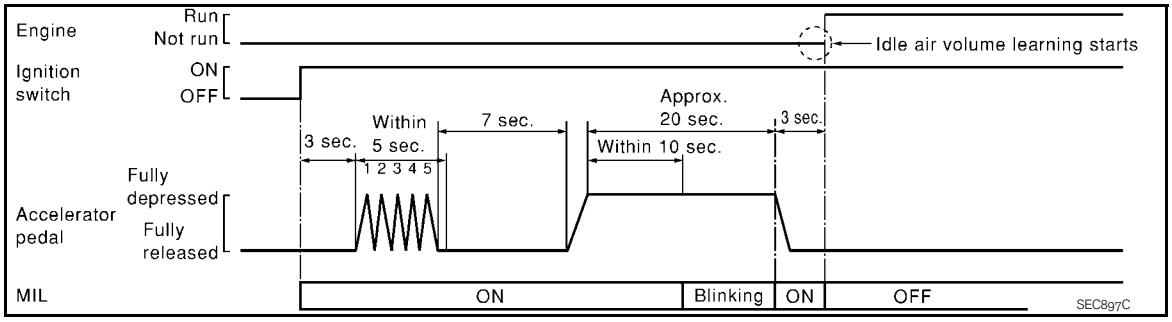
NOTE:

- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**

1. Perform Accelerator Pedal Released Position Learning. Refer to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
2. Perform Throttle Valve Closed Position Learning. Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
3. Start engine and warm it up to normal operating temperature.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
6. Repeat the following procedure quickly five times within 5 seconds.

- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.

7. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MI stops blinking and turned ON.
8. Fully release the accelerator pedal within 3 seconds after the MI turned ON.
9. Start engine and let it idle.
10. Wait 20 seconds.



cardiagn.com

>> GO TO 4

4. CHECK IDLE SPEED AND IGNITION TIMING

Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications. For specification, refer to EC-981, "Idle Speed" and EC-981, "Ignition Timing".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following
- Check that throttle valve is fully closed.
- Check PCV valve operation.
- Check that downstream of throttle valve is free from air leakage.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace malfunctioning part.

6. DETECT MALFUNCTIONING PART

Engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.
It is useful to perform “TROUBLE DIAGNOSIS - SPECIFICATION VALUE”. Refer to EC-728, "Description".
If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:
- Engine stalls.
- Erroneous idle.

>> INSPECTION END

MIXTURE RATIO SELF-LEARNING VALUE CLEAR

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:0000000001092493

This describes how to erase the mixture ratio self-learning value. For the actual procedure, follow the instructions in “Diagnosis Procedure”.

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:0000000001092494

1. START

With CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-III.
3. Clear mixture ratio self-learning value by touching “CLEAR”.

With GST
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service $03 with GST. Make sure DTC P0102 is detected.
7. Select Service $04 with GST to erase the DTC P0102.

>> END

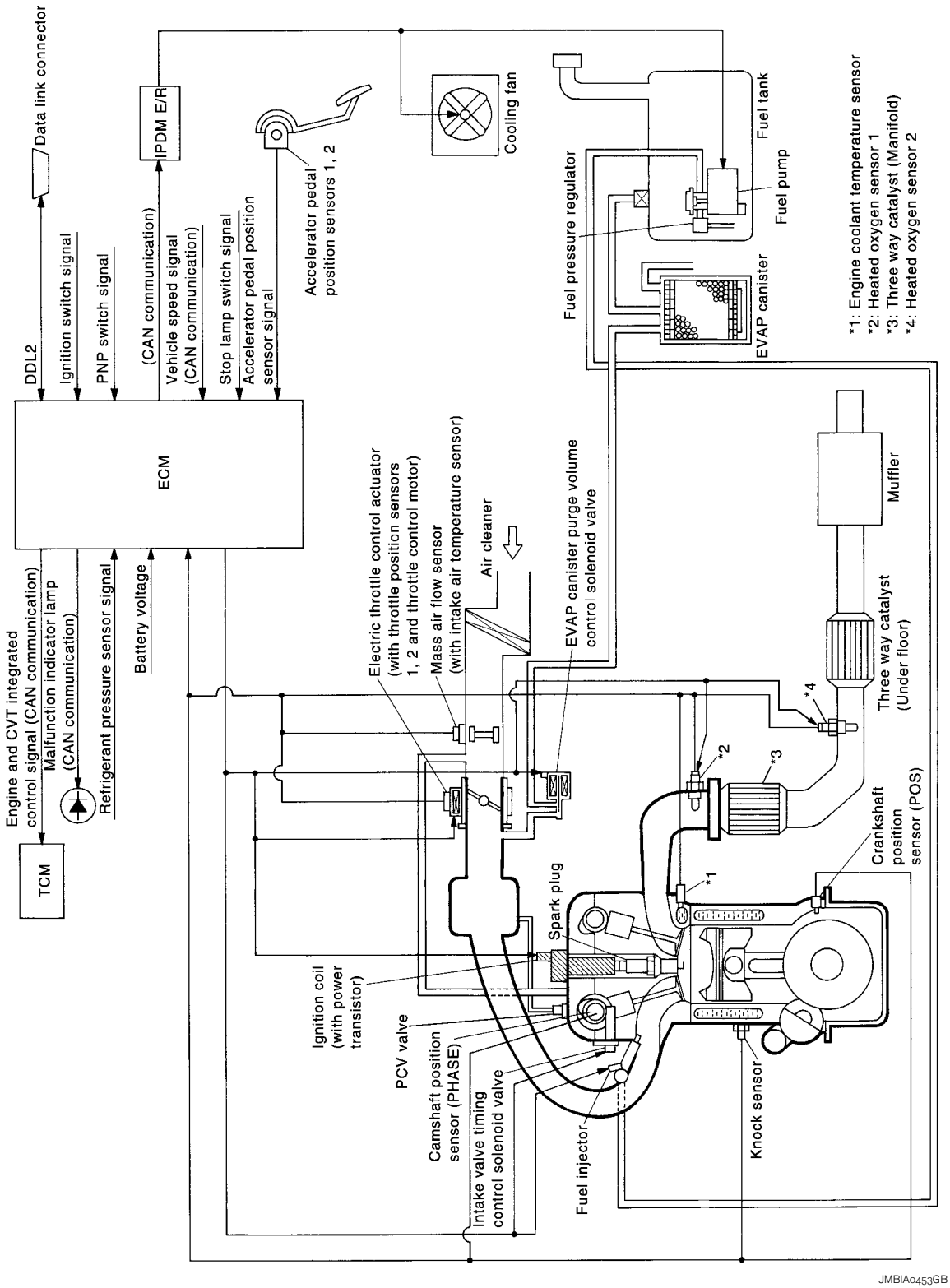
cardiagn.com

FUNCTION DIAGNOSIS

ENGINE CONTROL SYSTEM

System Diagram

INFOID:0000000000936604



JMBIA0453GB

System Description

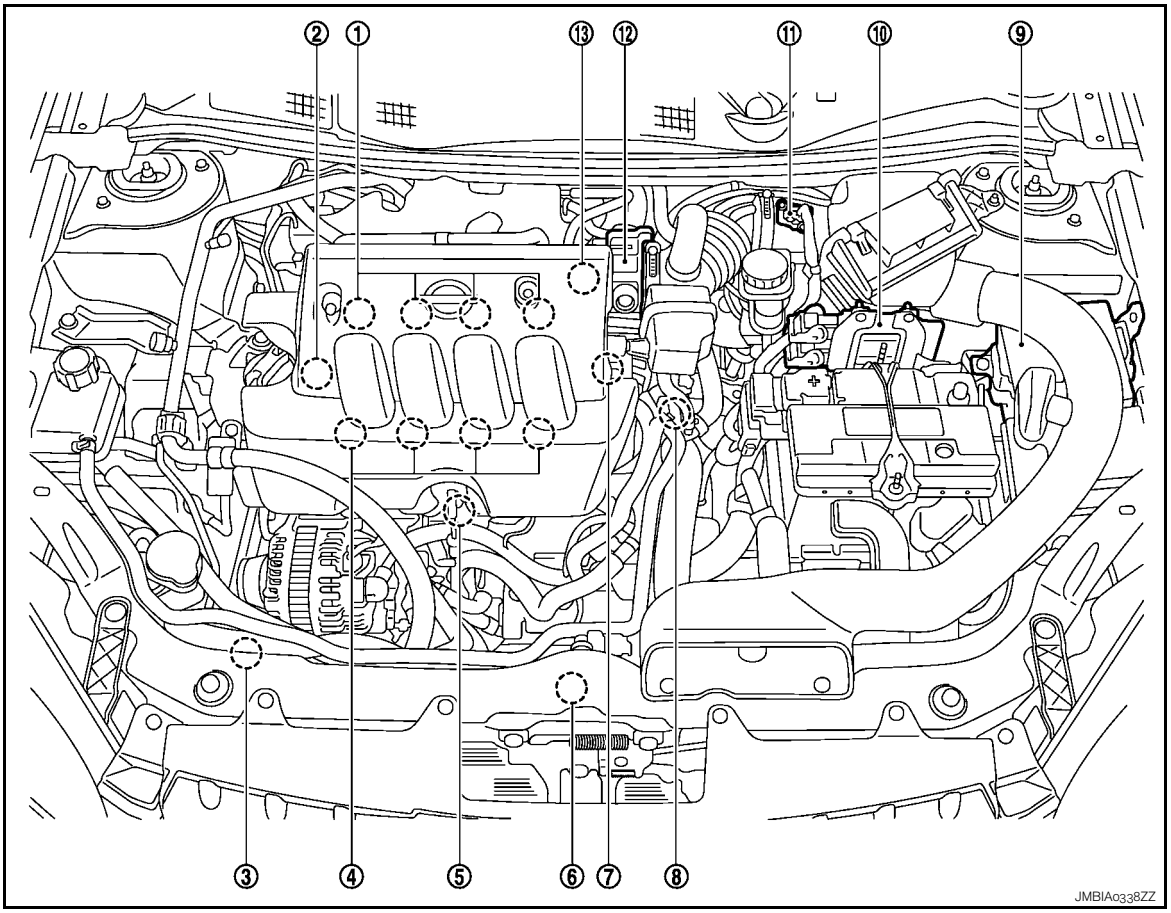
INFOID:0000000000936605

cardiagn.com

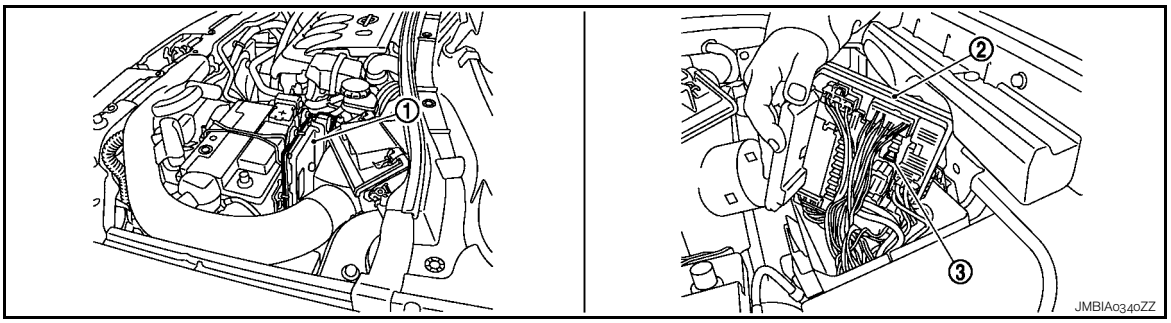
ECM performs various controls such as fuel injection control and ignition timing control.

Component Parts Location

INFOID:0000000001093462

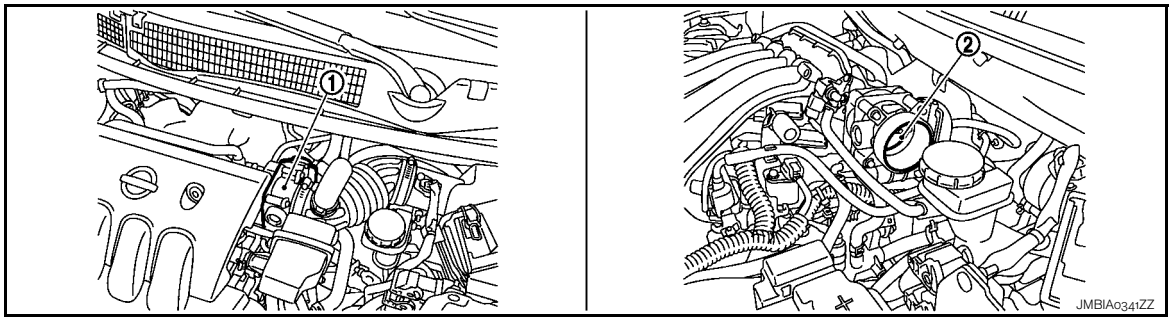


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

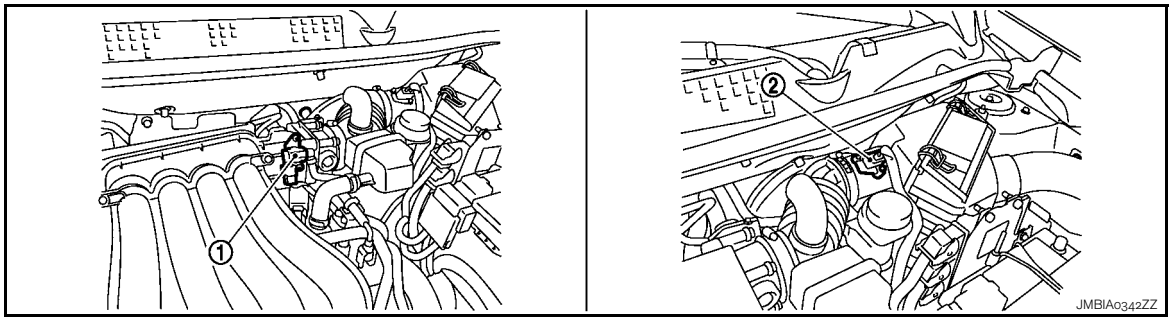


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

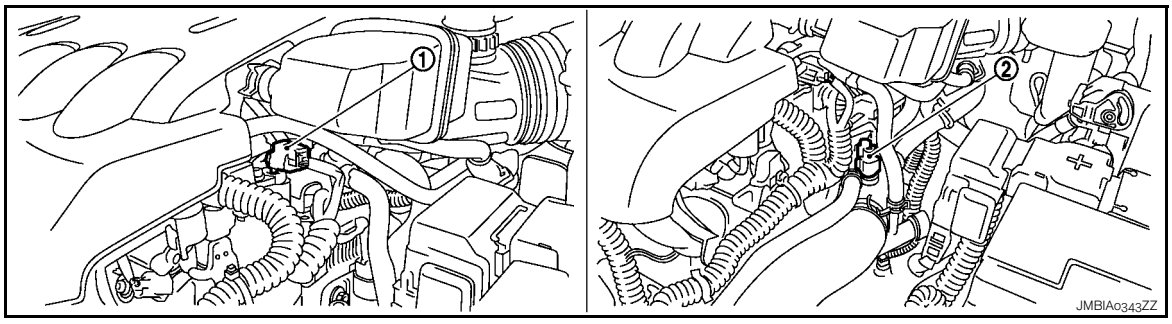
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

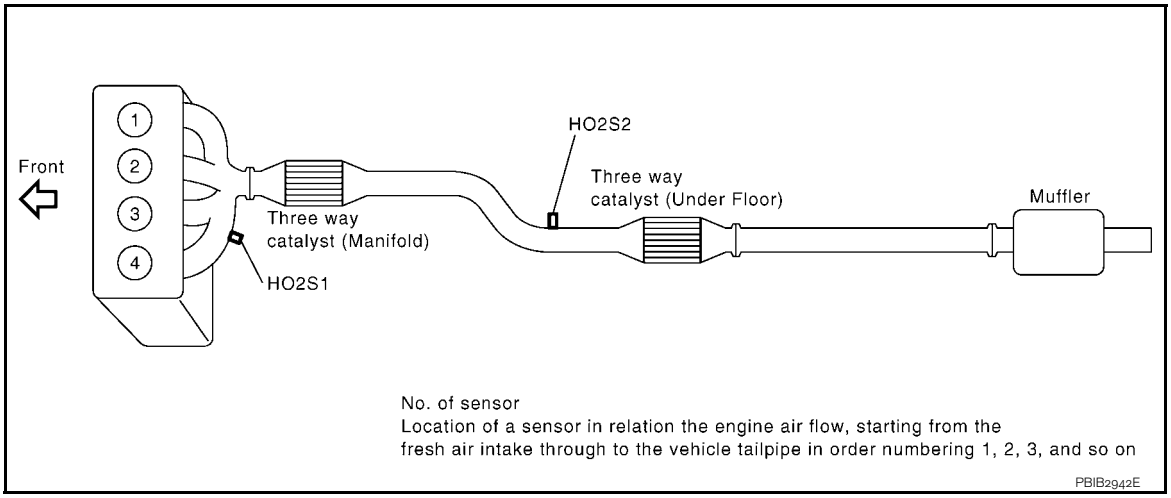


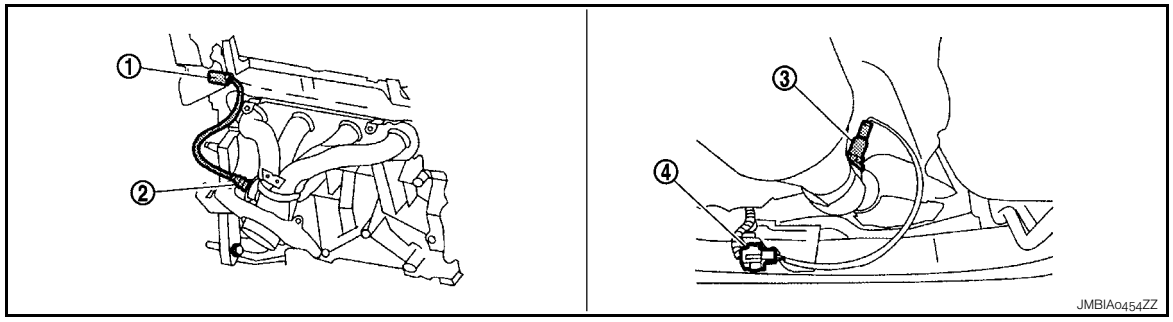
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



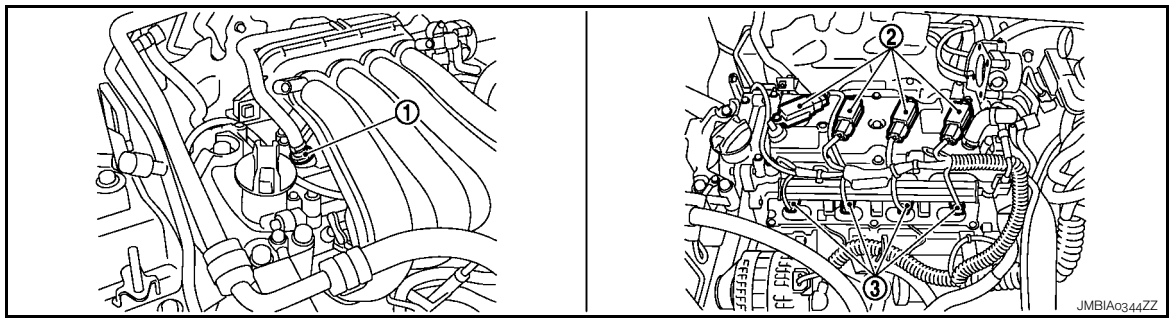
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

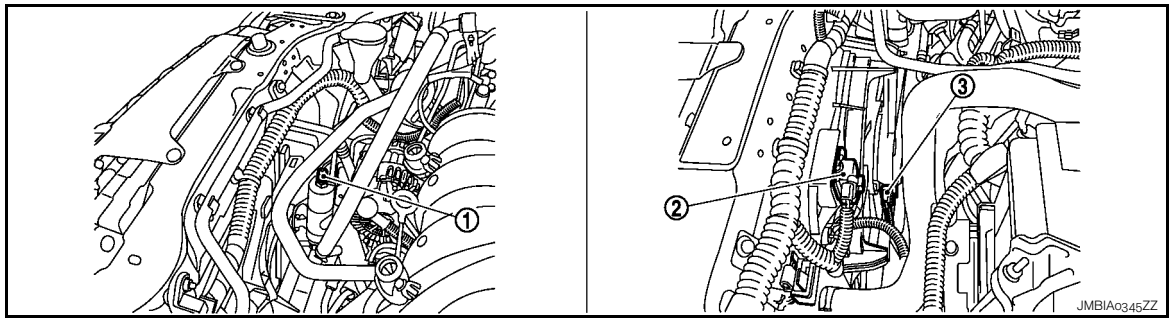




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

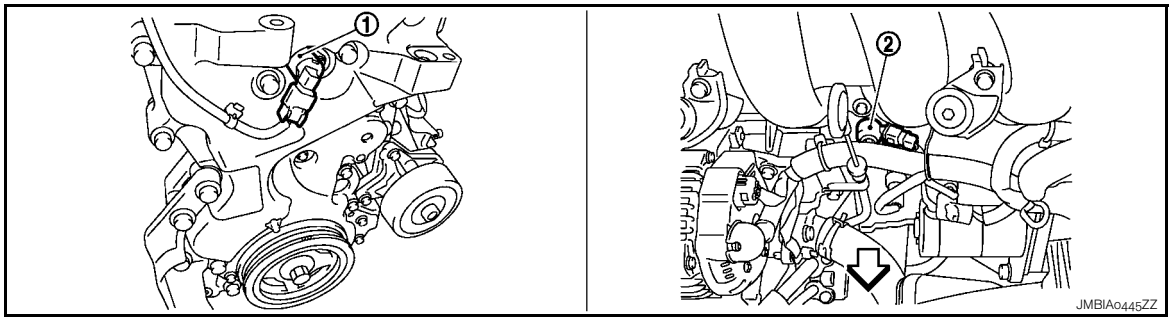


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

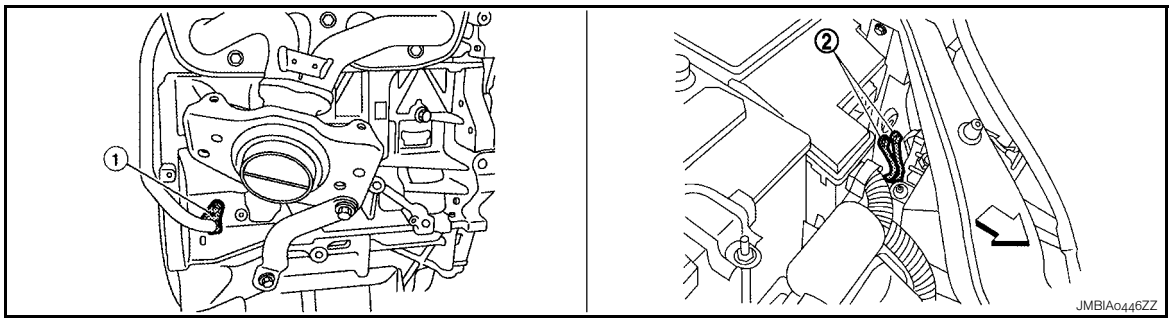


cardiagn.com

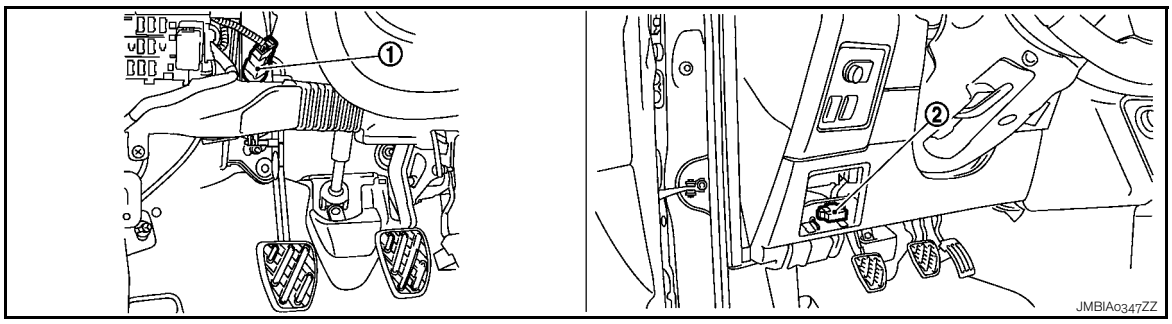
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



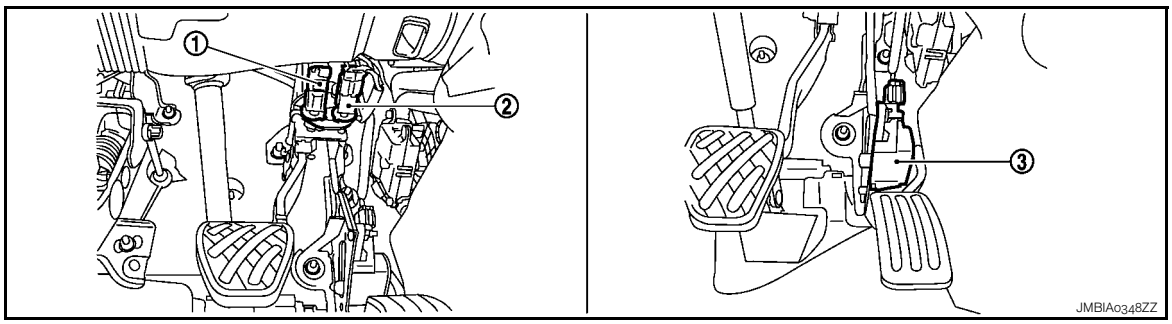
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

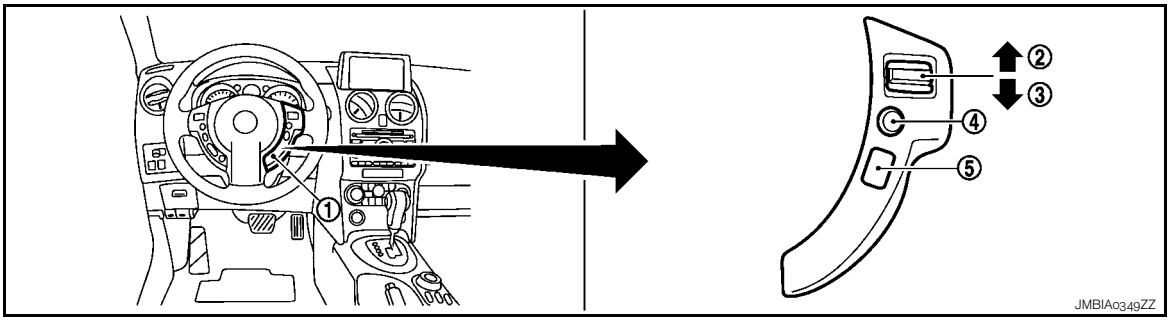


1. ASCD clutch switch 2. Data link connector

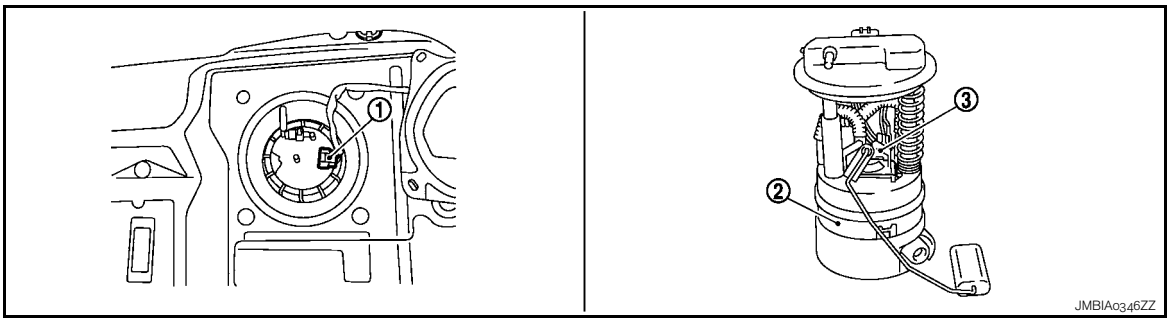


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000000936607

Component	Reference
Accelerator pedal position sensor	EC-899, "Description"
ASCD brake switch	EC-883, "Description"
ASCD steering switch	EC-880, "Description"
ASCD vehicle speed sensor	EC-890, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Cooling fan motor	EC-685, "System Diagram"
Electric throttle control actuator	EC-832, "Description"
Engine coolant temperature sensor	EC-754, "Description"
EVAP canister purge volume control solenoid valve	EC-822, "Description"
Fuel injector	EC-923, "Description"
Fuel pump	EC-926, "Description"
Heated oxygen sensor 1	EC-760, "Description"
Heated oxygen sensor 1 heater	EC-775, "Description"
Heated oxygen sensor 2	EC-778, "Description"
Heated oxygen sensor 2 heater	EC-788, "Description"

cardiagn.com

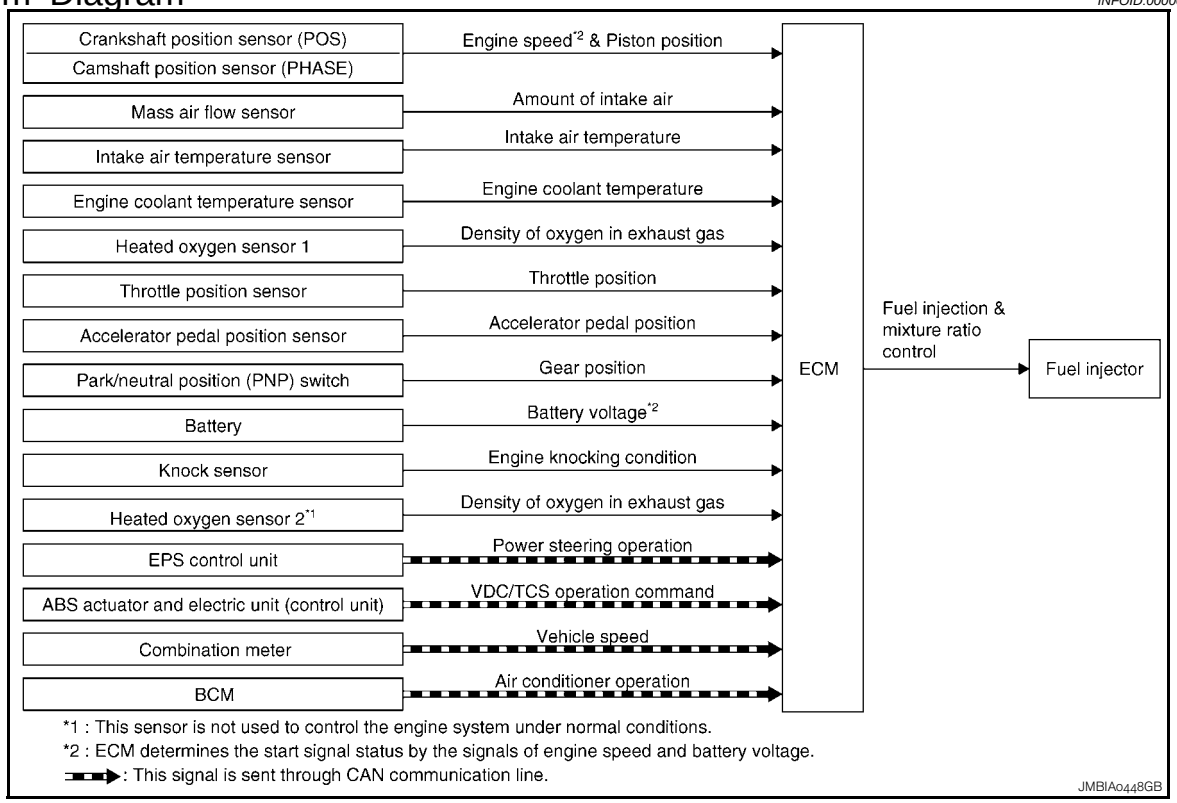
Component	Reference
Ignition signal	EC-929, "Description"
Intake air temperature sensor	EC-751, "Description"
Intake valve timing control solenoid valve	EC-700, "System Description"
Knock sensor	EC-807, "Description"
Mass air flow sensor	EC-746, "Description"
Park/neutral position (PNP) switch	EC-892, "Description"
PCV valve	EC-935, "Description"
Refrigerant pressure sensor	EC-936, "Description"
Stop lamp switch	EC-896, "Description"
Throttle control motor	EC-841, "Description"
Throttle control motor relay	EC-838, "Description"
Throttle position sensor	EC-874, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

MULTIPORT FUEL INJECTION SYSTEM

System Diagram

INFOID:0000000000936608



System Description

INFOID:0000000000936609

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*3 Piston position	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Intake air temperature sensor	Intake air temperature		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage*3		
Knock sensor	Engine knocking condition		
EPS control unit	Power steering operation		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
ABS actuator and electric unit (control unit)*2	ABS operation command		
Air conditioner switch*2	Air conditioner operation		
Combination meter*2	Vehicle speed		

*1: This sensor is not used to control the engine system under normal conditions.

*2: This signal is sent to the ECM through CAN communication line.

cardiagn.com

*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from the crankshaft position sensor (POS), camshaft position sensor (PHASE) and the mass air flow sensor.

VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (CVT models)
- High-load, high-speed operation

<Fuel decrease>
- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)

The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to EC-760, "Description". This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).
This stage is referred to as the closed loop control condition.
Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

- Open Loop Control
  The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D (CVT models)
- When starting the engine

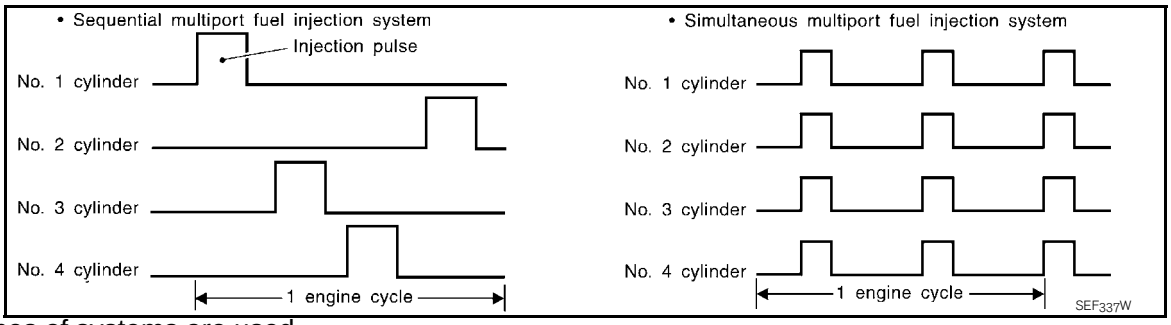
MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) and characteristic changes during operation (i.e., fuel injector clogging) directly affect mixture ratio.
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.
“Fuel trim” refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.
“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

cardiagn.com

"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

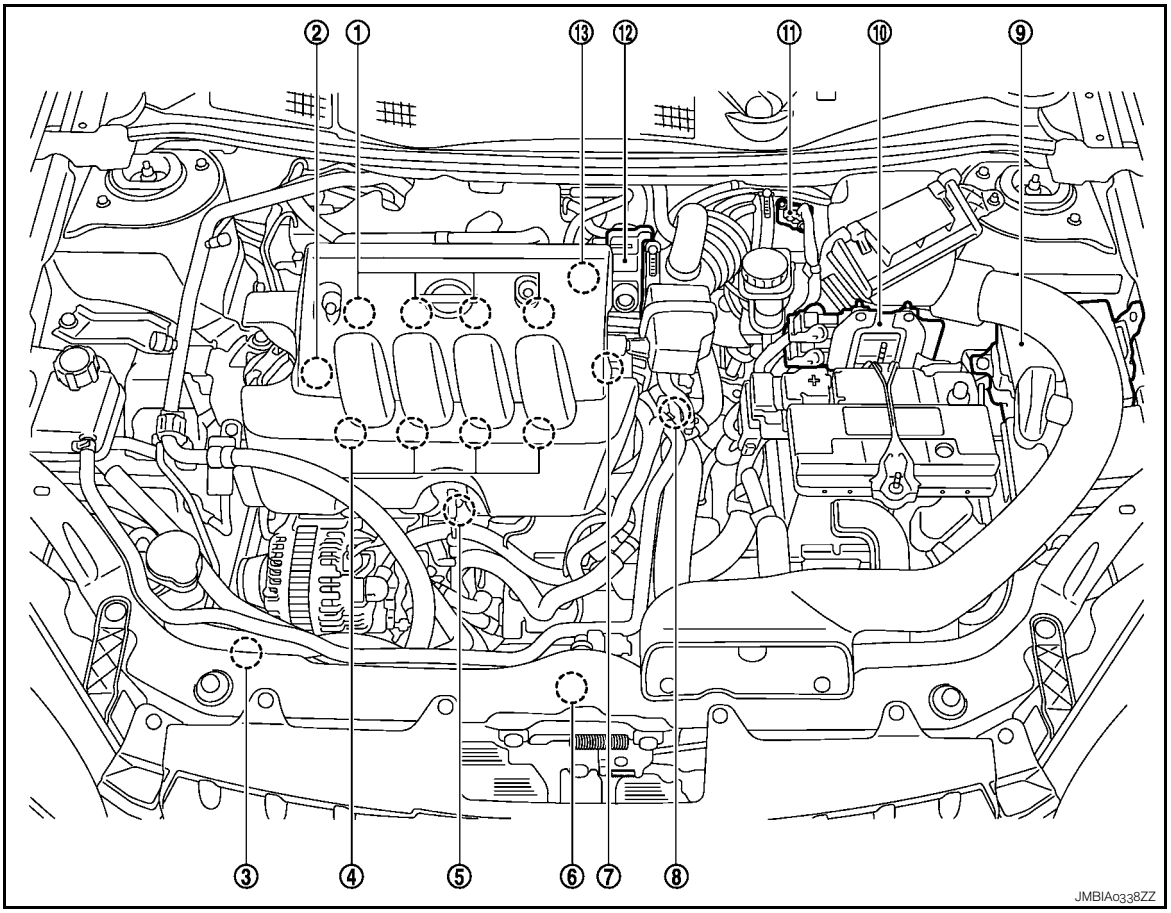
- Sequential Multiport Fuel Injection System
  Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.
- Simultaneous Multiport Fuel Injection System
  Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
  The four injectors will then receive the signals two times for each engine cycle.
  This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration, operation of the engine at excessively high speeds or operation of the vehicle at excessively high speeds.

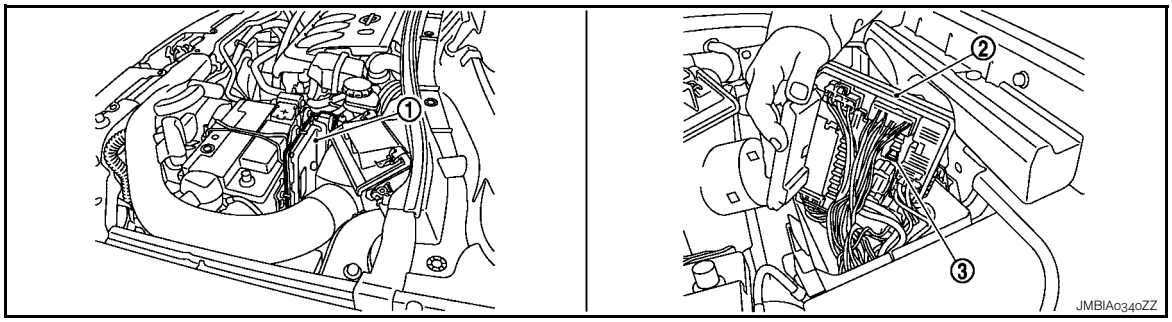
Component Parts Location

INFOID:0000000001093562

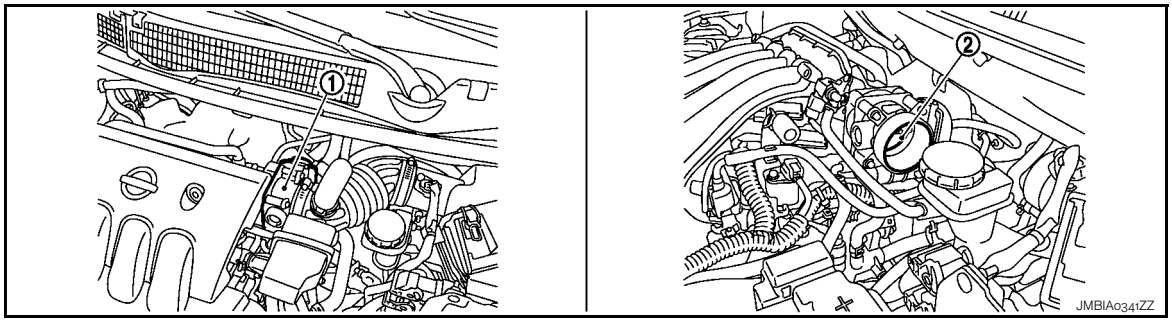


cardiagn.com

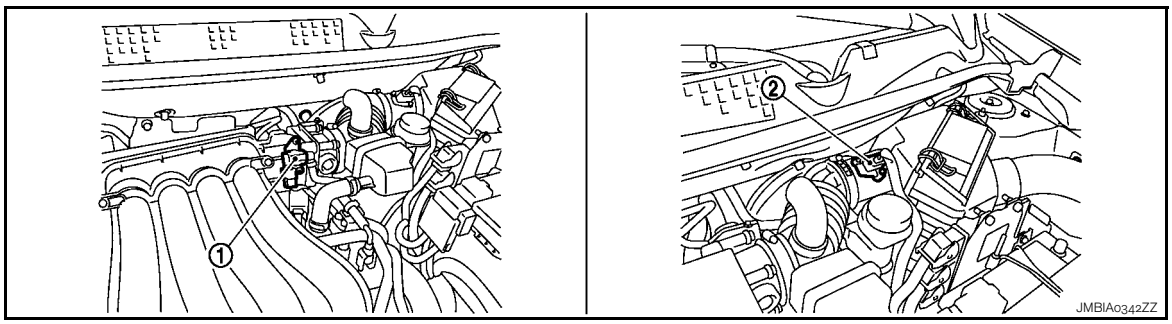
1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve



1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

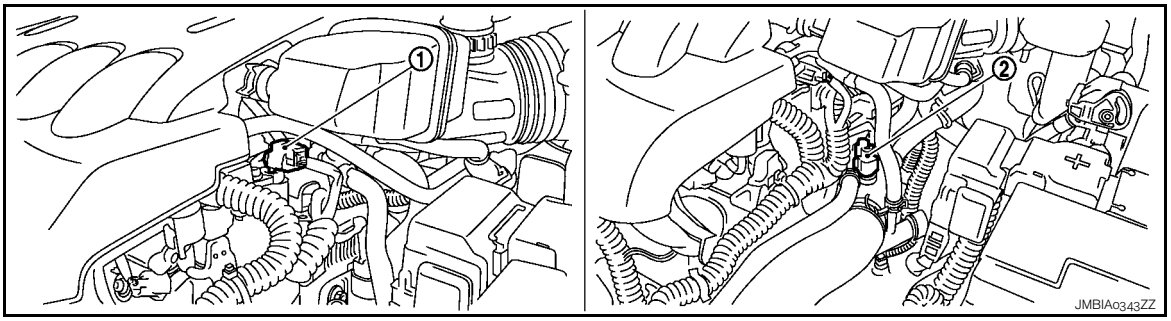


1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

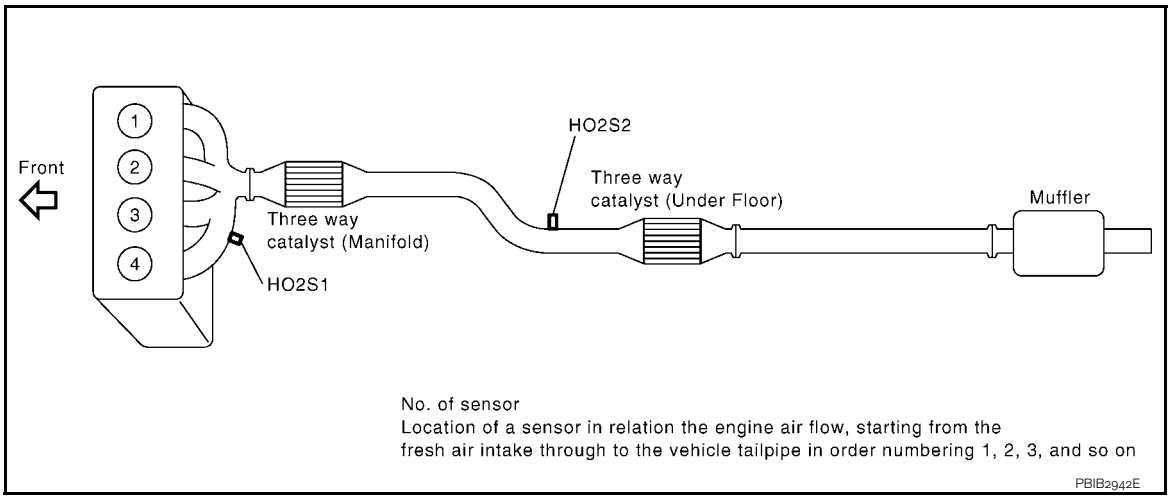


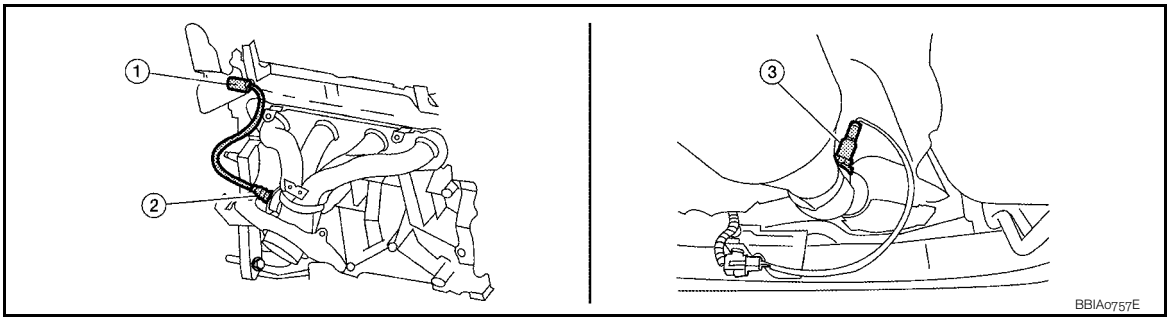
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)

cardiagn.com

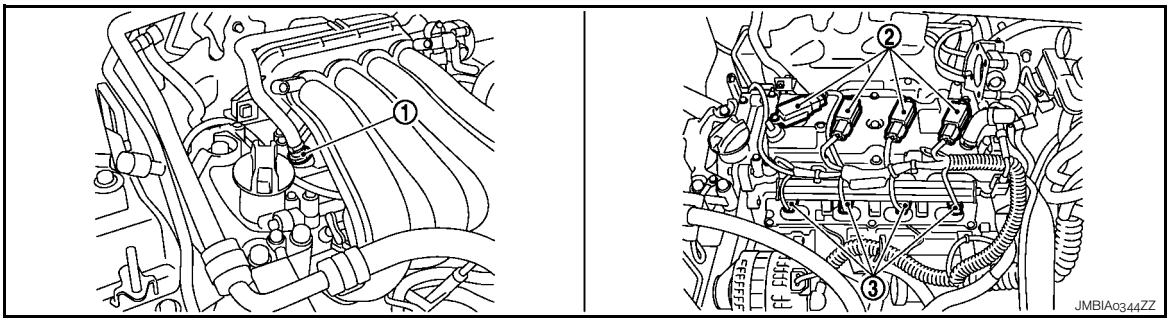


1. Camshaft position sensor
2. Engine coolant temperature sensor



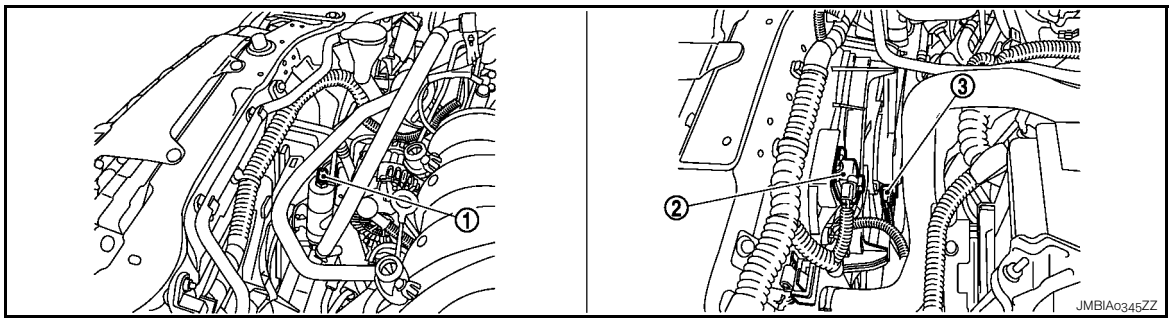


1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

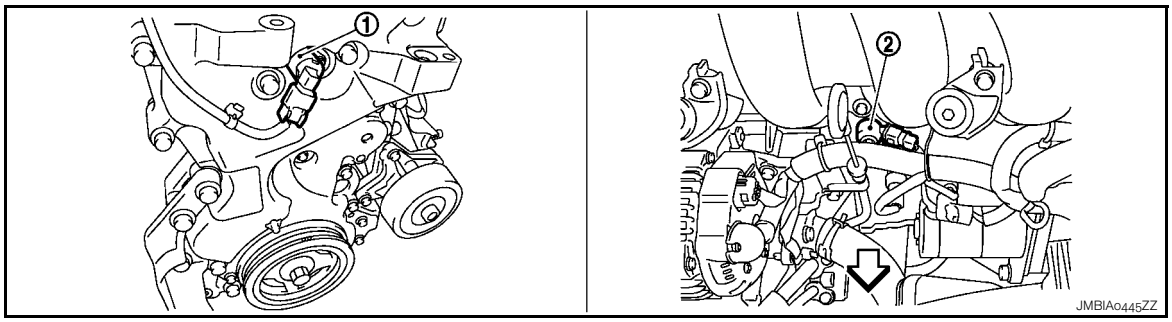


cardiagn.com

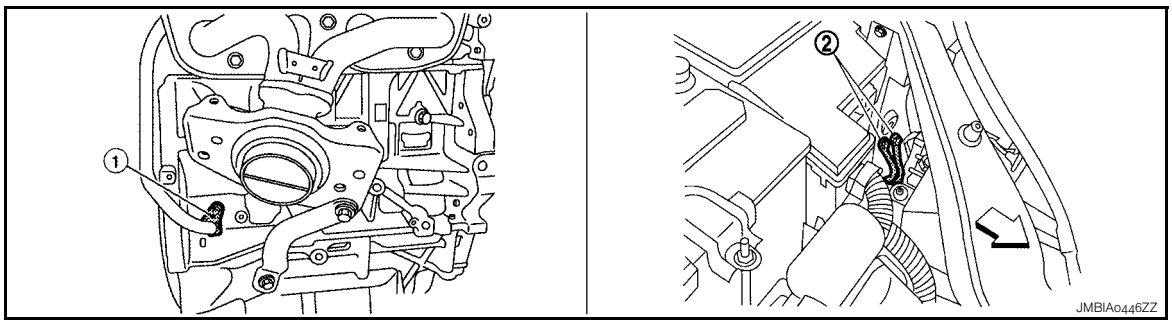
1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection



1. Refrigerant pressure sensor
2. Resister
3. Cooling fan motor

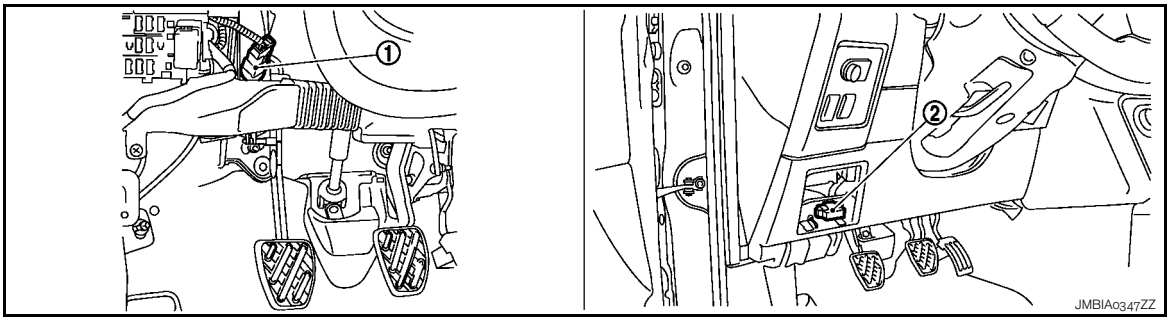


1. Intake valve timing control solenoid valve
2. Knock sensor

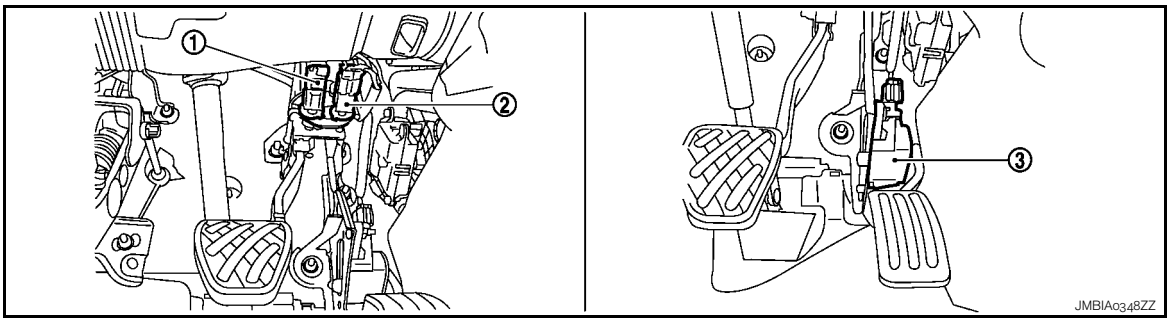


1. Crankshaft position sensor (POS)
2. Ground

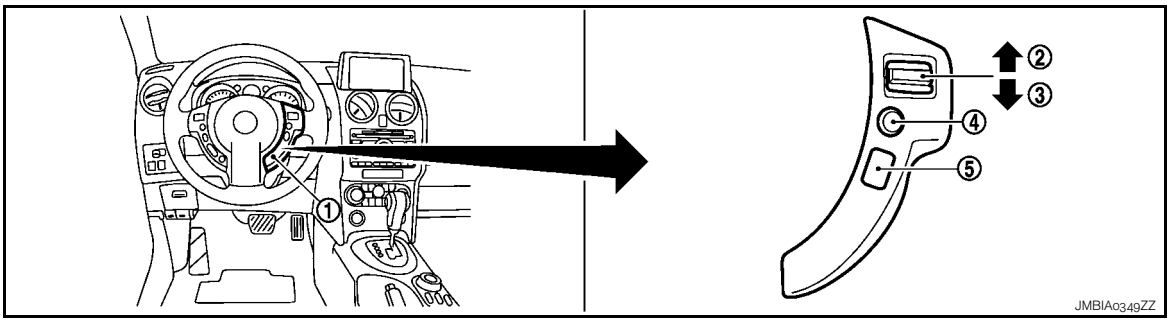
cardiagn.com



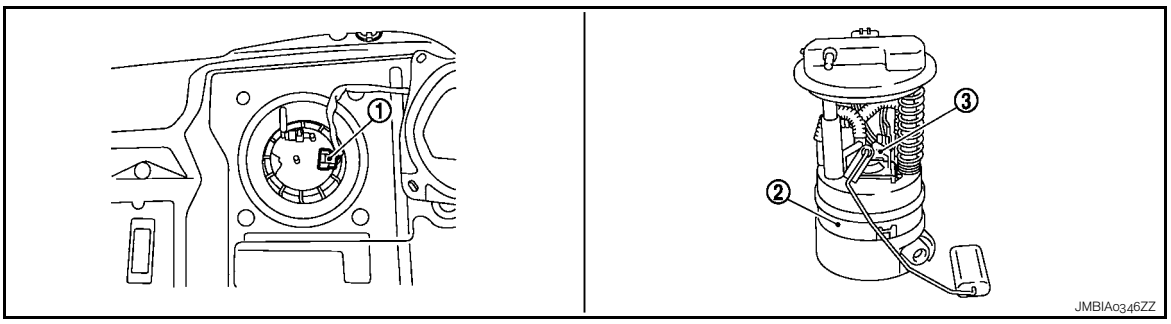
1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

cardiagn.com

Component Description

INFOID:0000000000936611

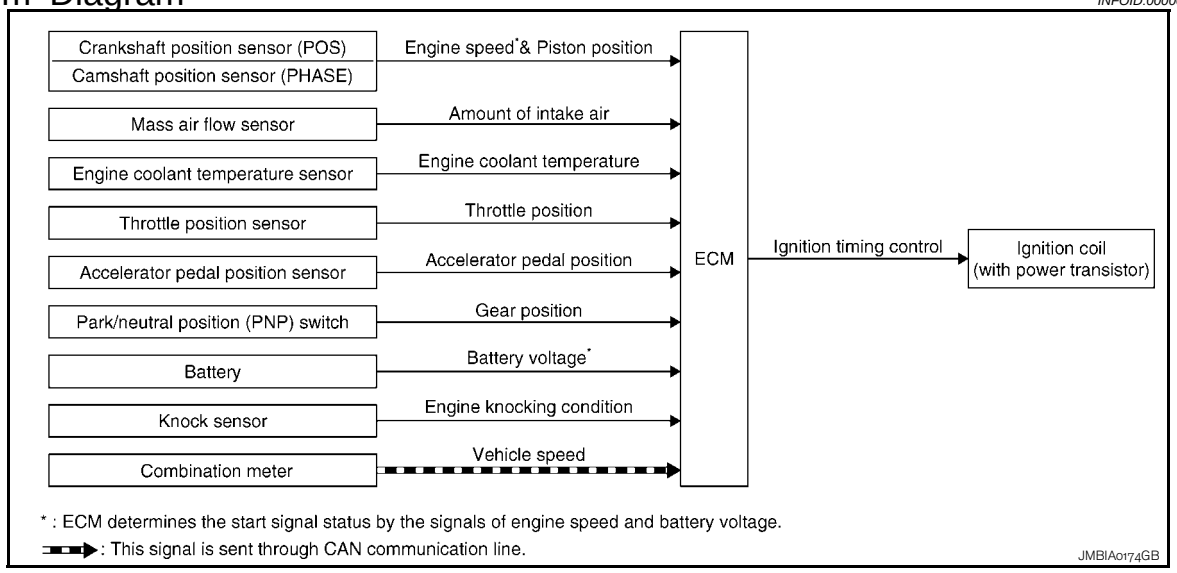
Component	Reference
Accelerator pedal position sensor	EC-909, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
Fuel injector	EC-923, "Description"
Heated oxygen sensor 1	EC-760, "Description"
Heated oxygen sensor 2	EC-778, "Description"
Intake air temperature sensor	EC-751, "Description"
Knock sensor	EC-807, "Description"
Mass air flow sensor	EC-746, "Description"
Park/neutral position (PNP) switch	EC-892, "Description"
Throttle position sensor	EC-757, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

ELECTRIC IGNITION SYSTEM

System Diagram

INFOID:0000000000936612



System Description

INFOID:0000000000936613

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2 Piston position	Ignition timing control	Ignition coil (with power transistor)
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking condition		
Park/neutral position (PNP) switch	Gear position		
Combination meter*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM.

The ECM receives information such as the injection pulse width and camshaft position sensor (PHASE) signal. Computing this information, ignition signals are transmitted to the power transistor.

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

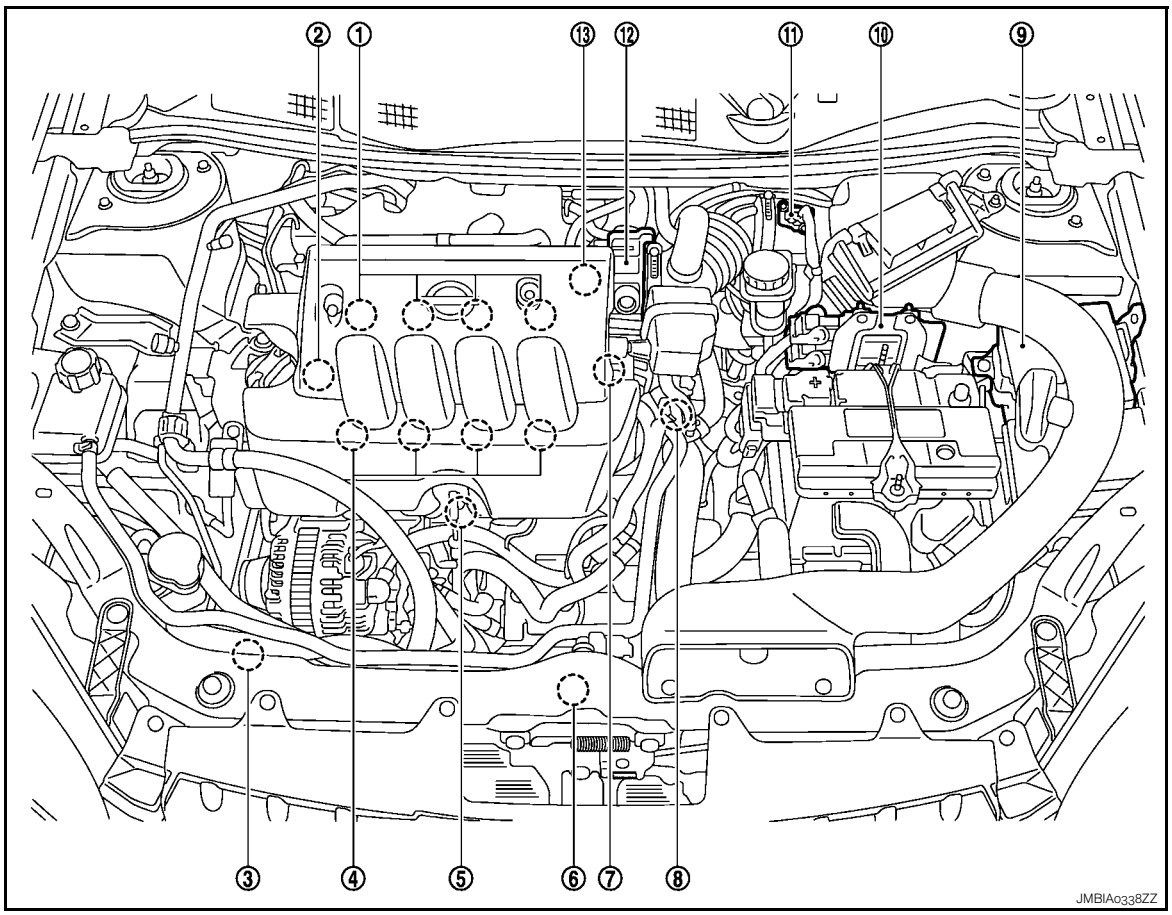
The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not

cardiagn.com

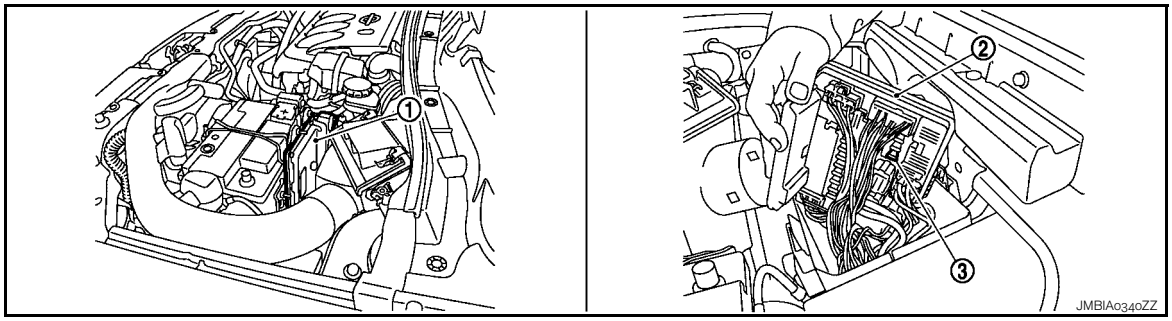
operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Component Parts Location

INFOID:0000000001093563

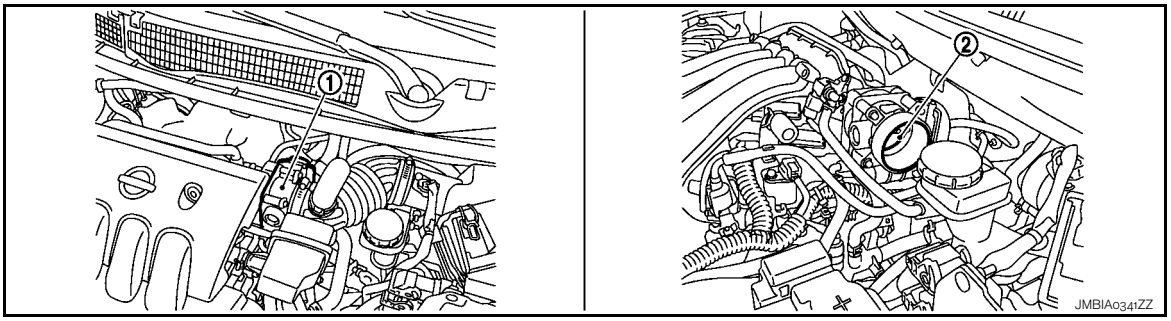


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

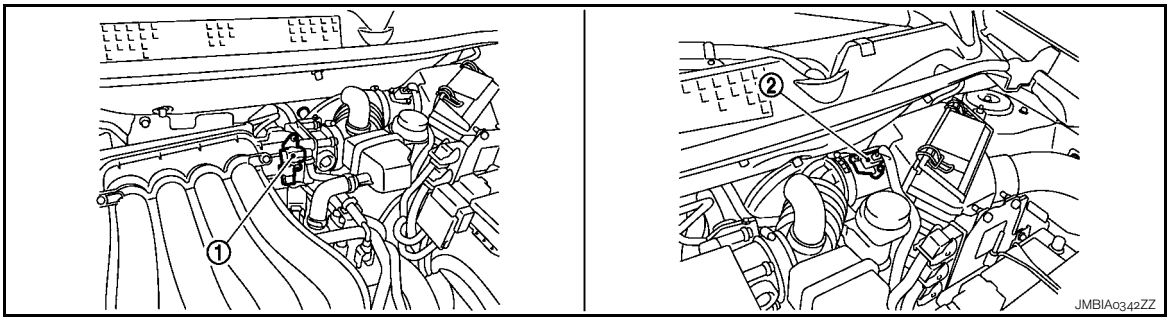


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

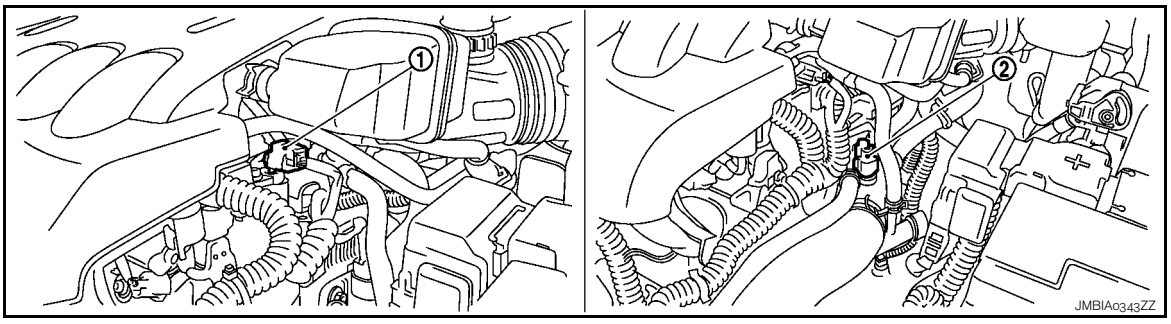
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

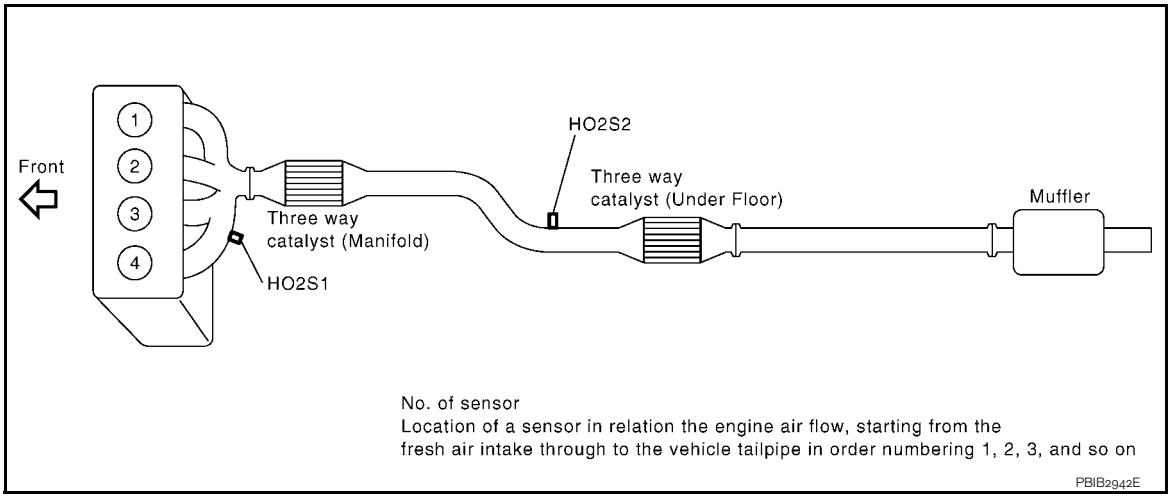


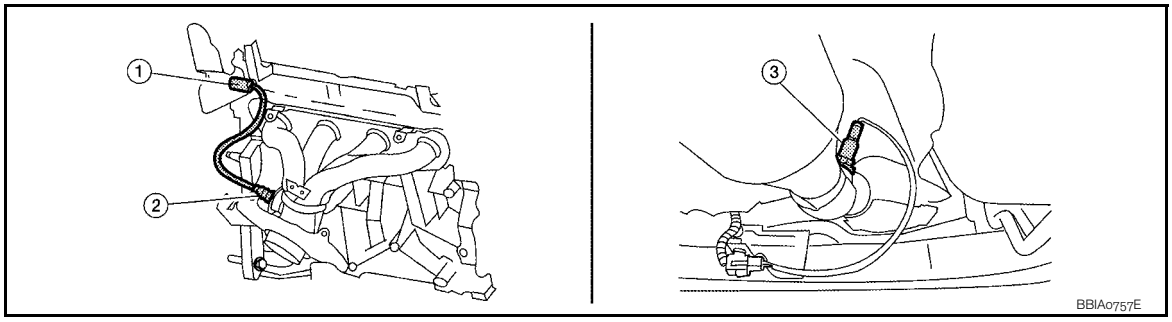
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



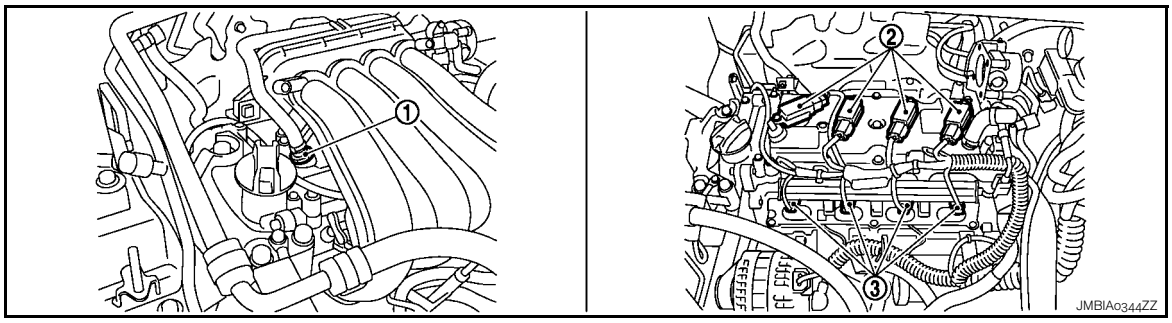
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

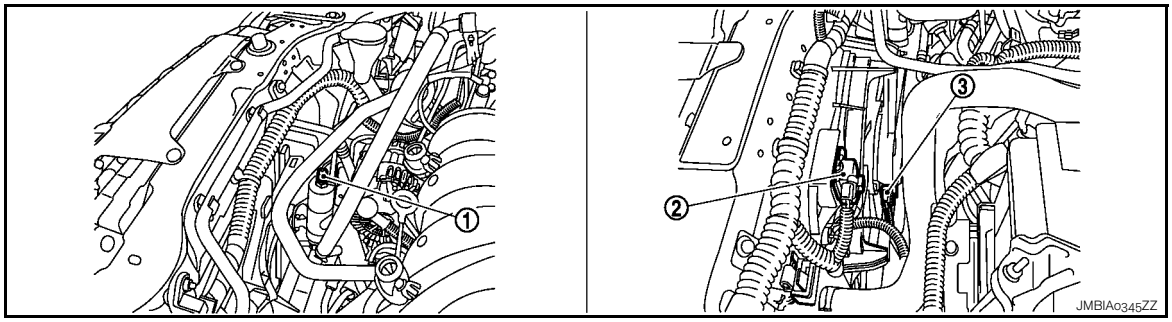




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

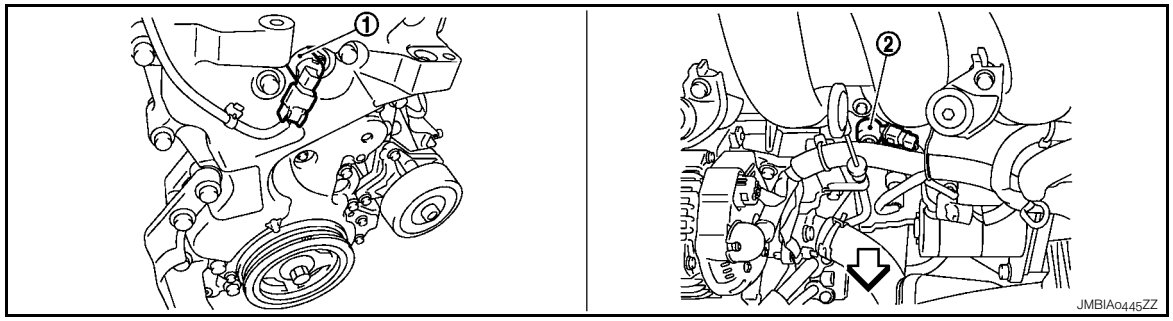


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

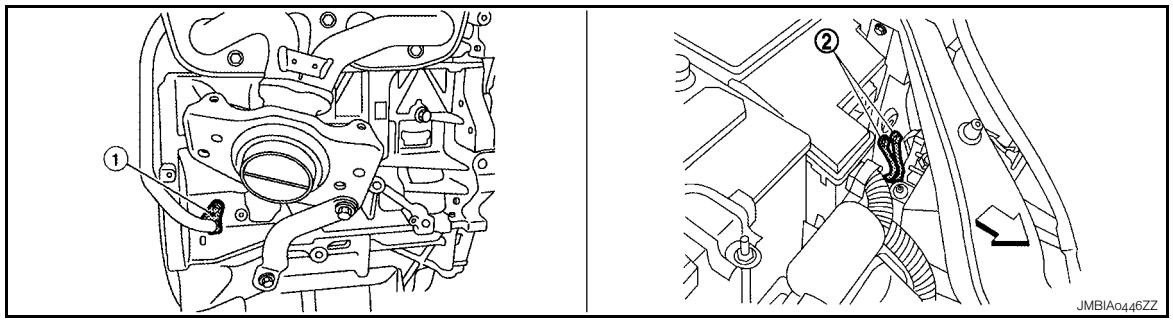


cardiagn.com

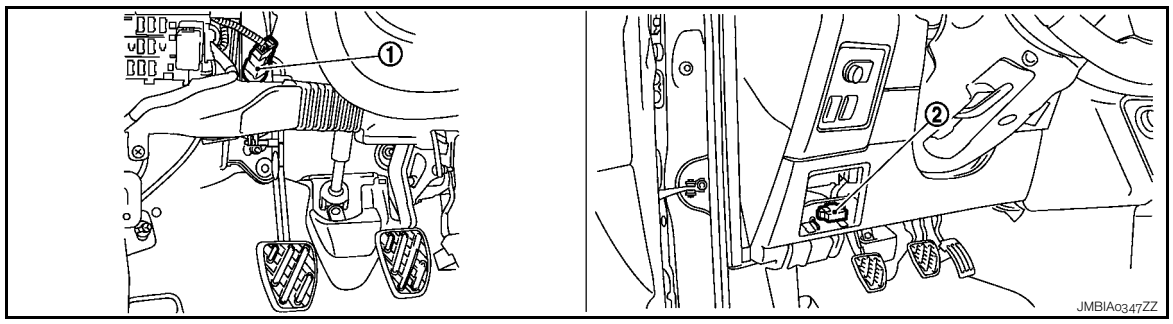
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



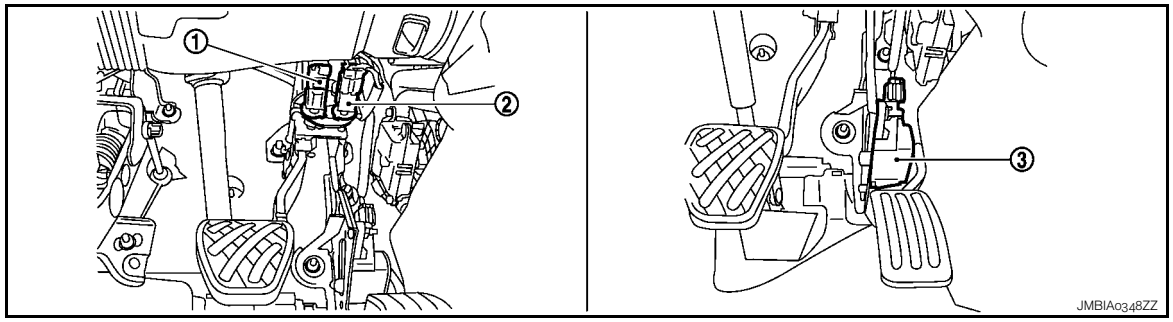
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

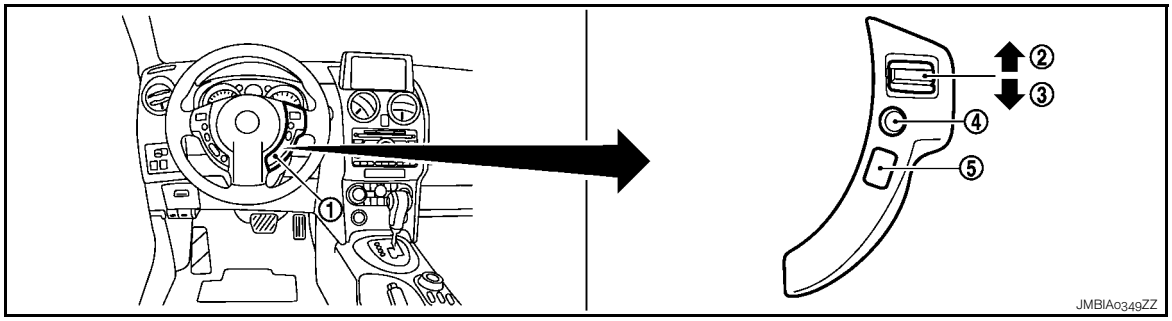


1. ASCD clutch switch 2. Data link connector

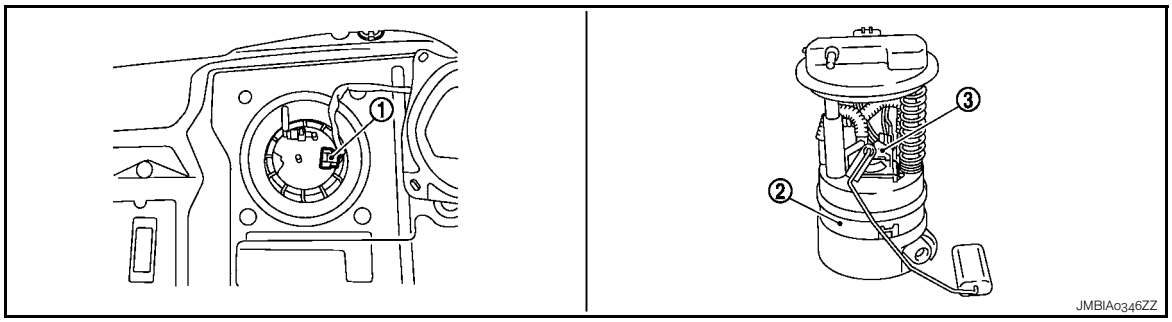


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000000936615

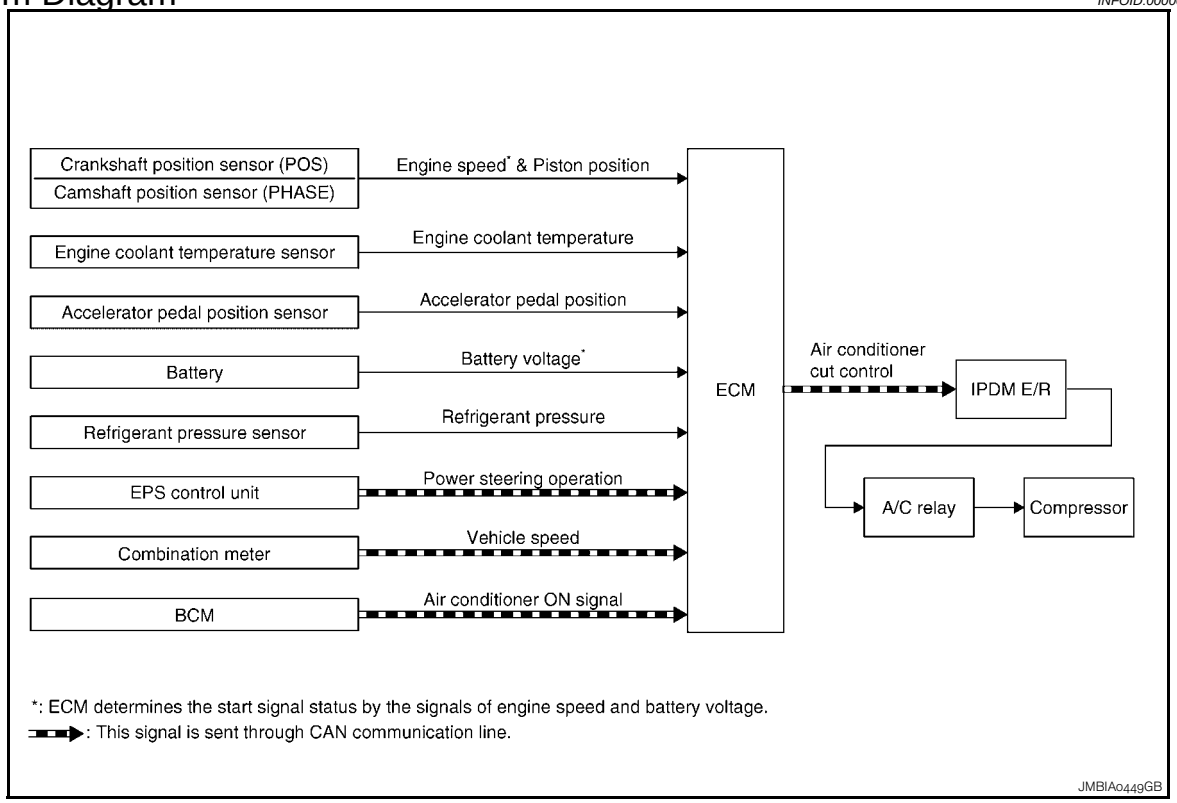
Component	Reference
Accelerator pedal position sensor	EC-909, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
Ignition signal	EC-929, "Description"
Knock sensor	EC-807, "Description"
Mass air flow sensor	EC-746, "Description"
Park/neutral position (PNP) switch	EC-892, "Description"
Throttle position sensor	EC-757, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

AIR CONDITIONING CUT CONTROL

System Diagram

INFOID:0000000000936616



System Description

INFOID:0000000000936617

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch*1	Air conditioner ON signal	Air conditioner cut control	IPDM E/R ↓ Air conditioner relay ↓ Compressor
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Refrigerant pressure sensor	Refrigerant pressure		
EPS control unit*1	Power steering operation		
Combination meter*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

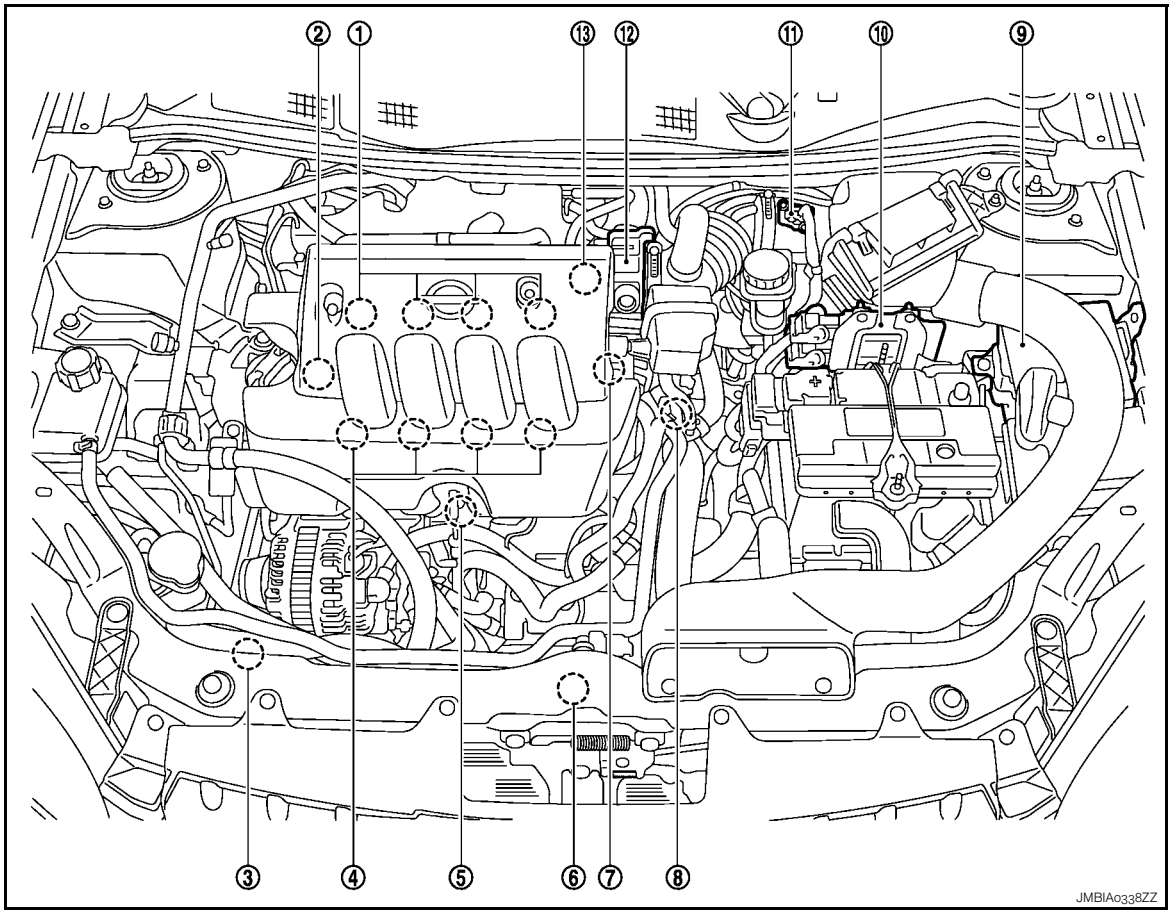
This system improves engine operation when the air conditioner is used.
Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

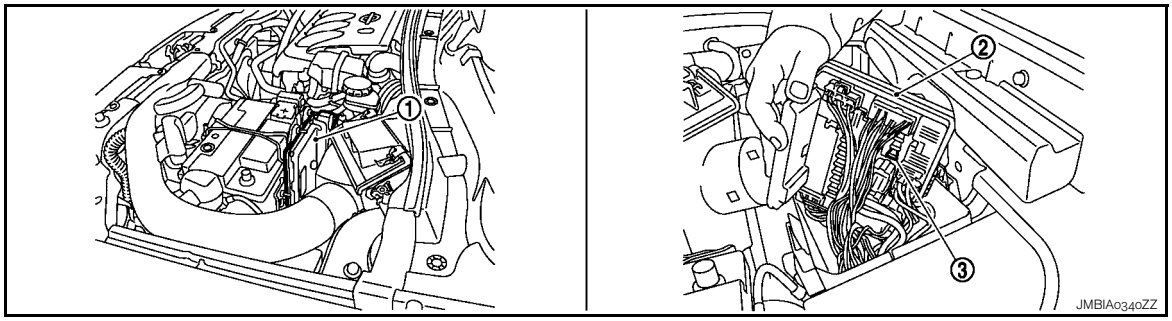
cardiagn.com

Component Parts Location

INFOID:0000000001093564

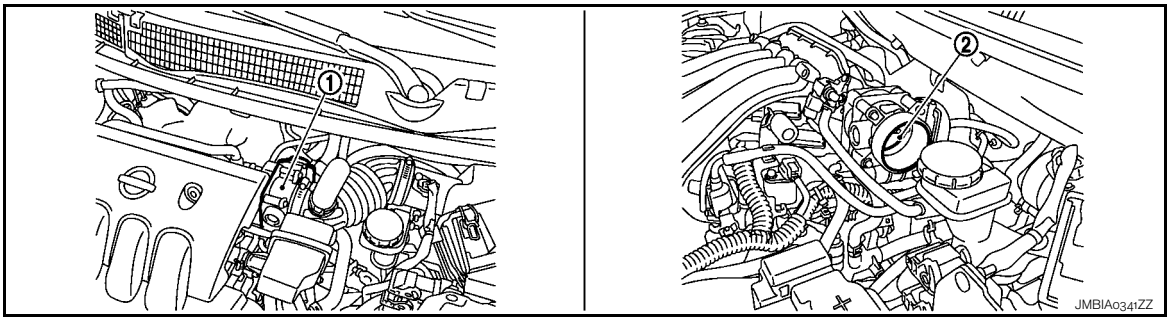


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

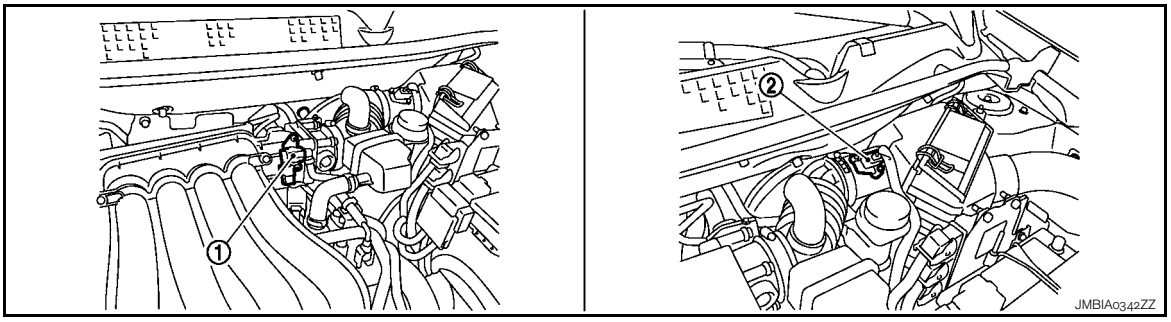


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

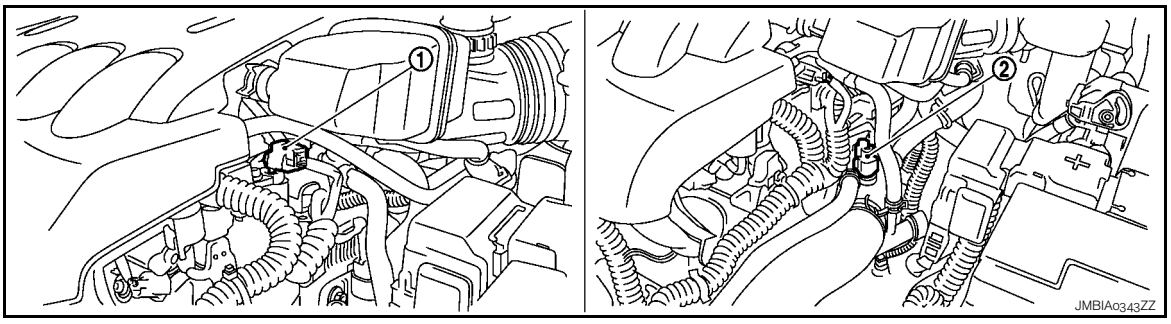
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

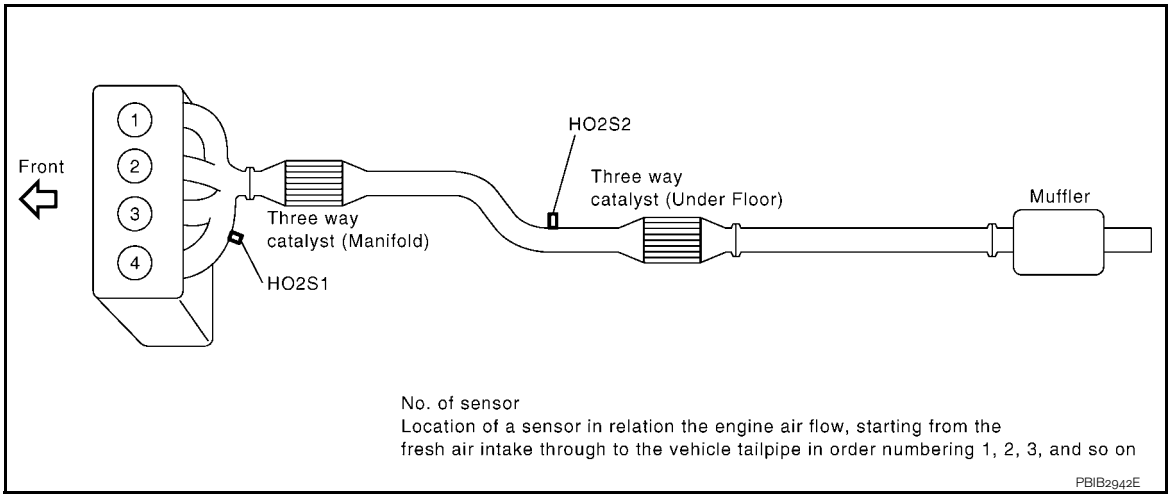


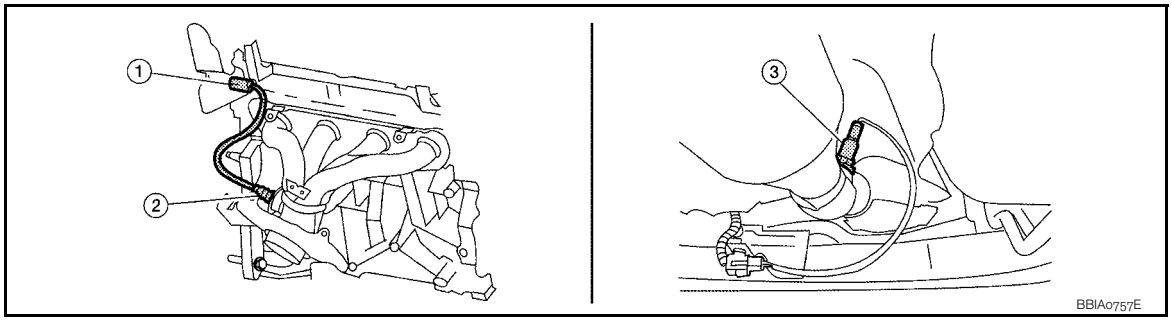
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



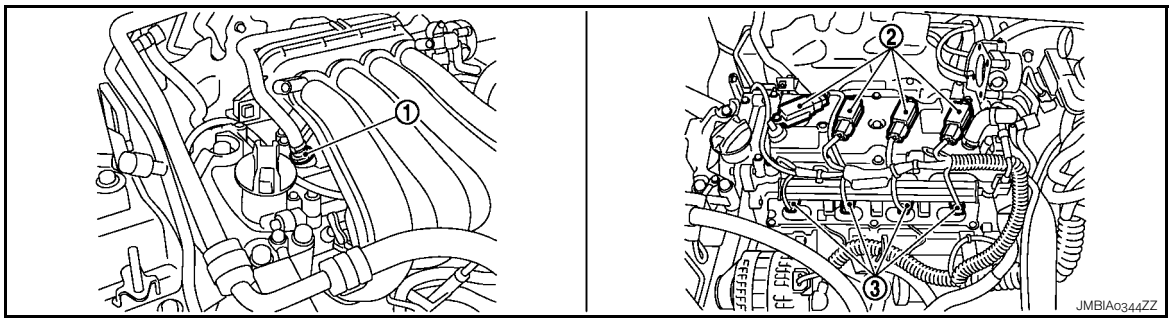
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

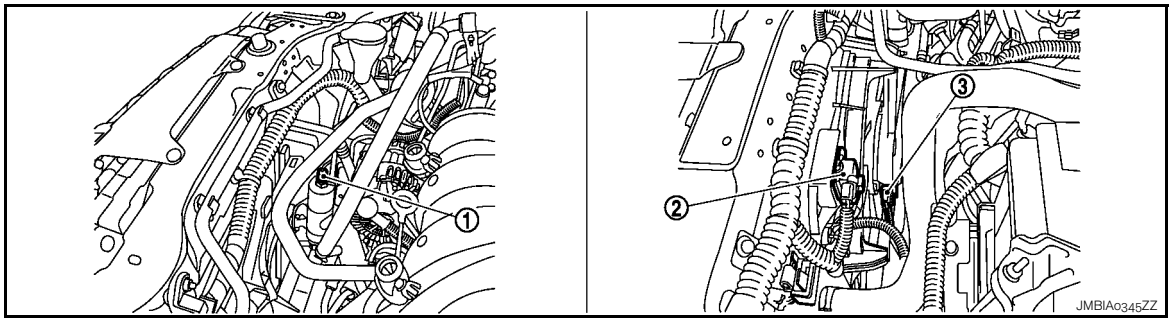




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

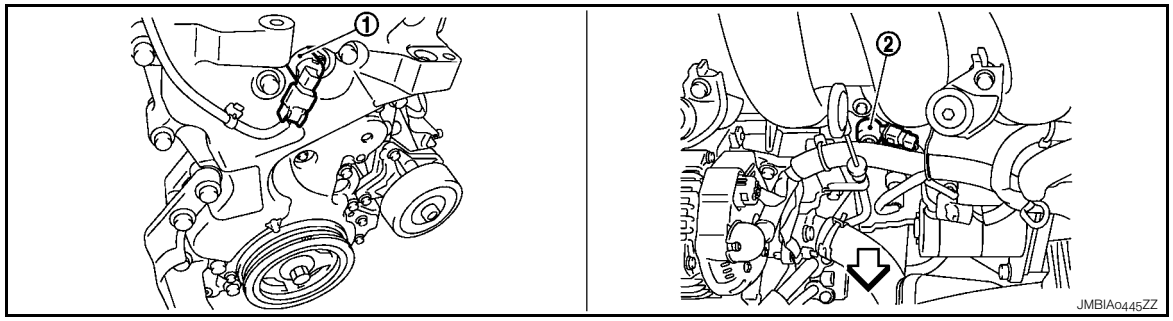


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

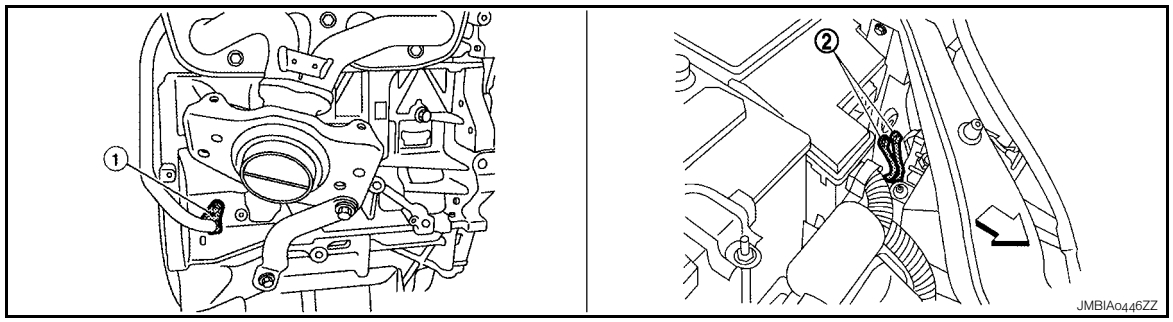


cardiagn.com

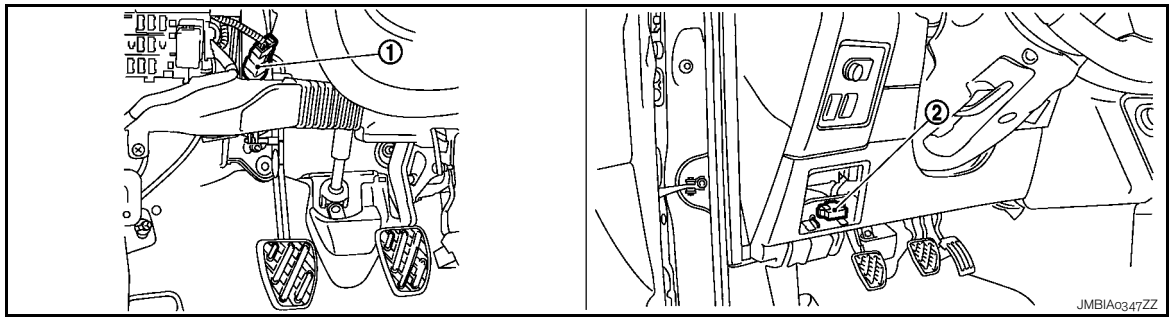
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



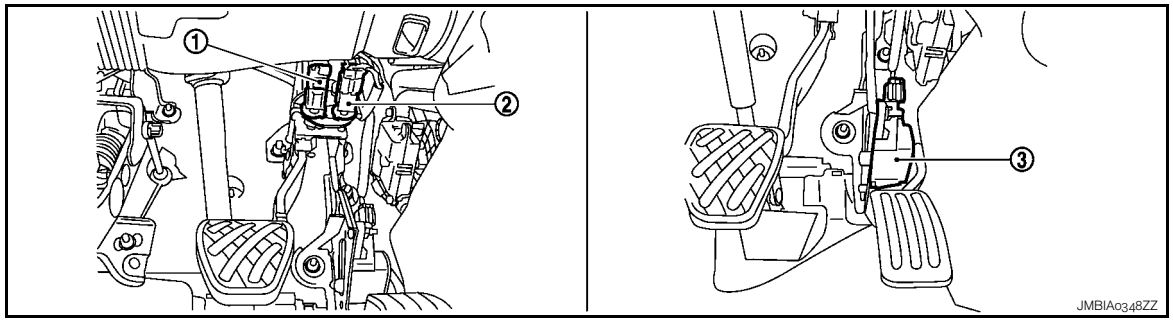
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

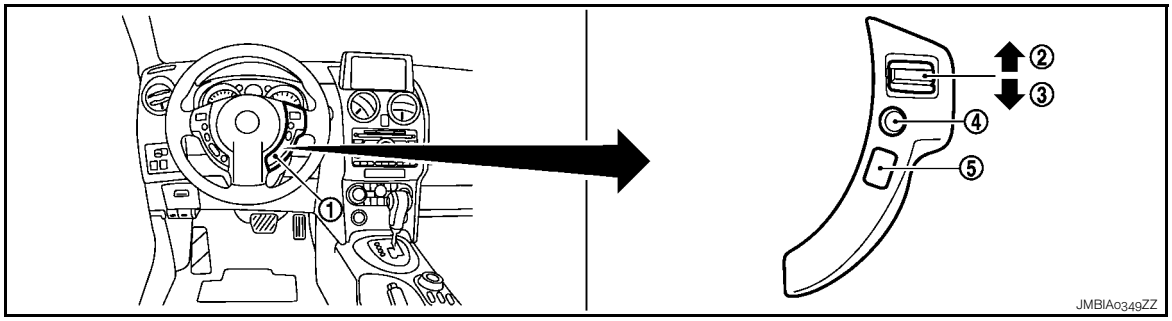


1. ASCD clutch switch 2. Data link connector

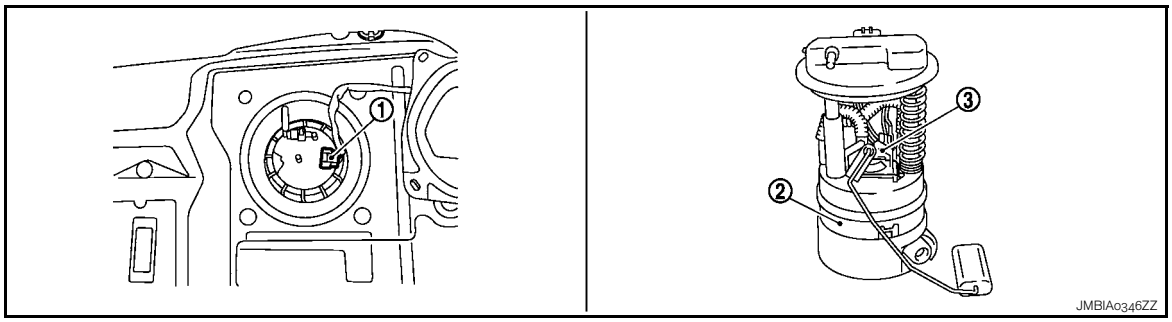


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000000936619

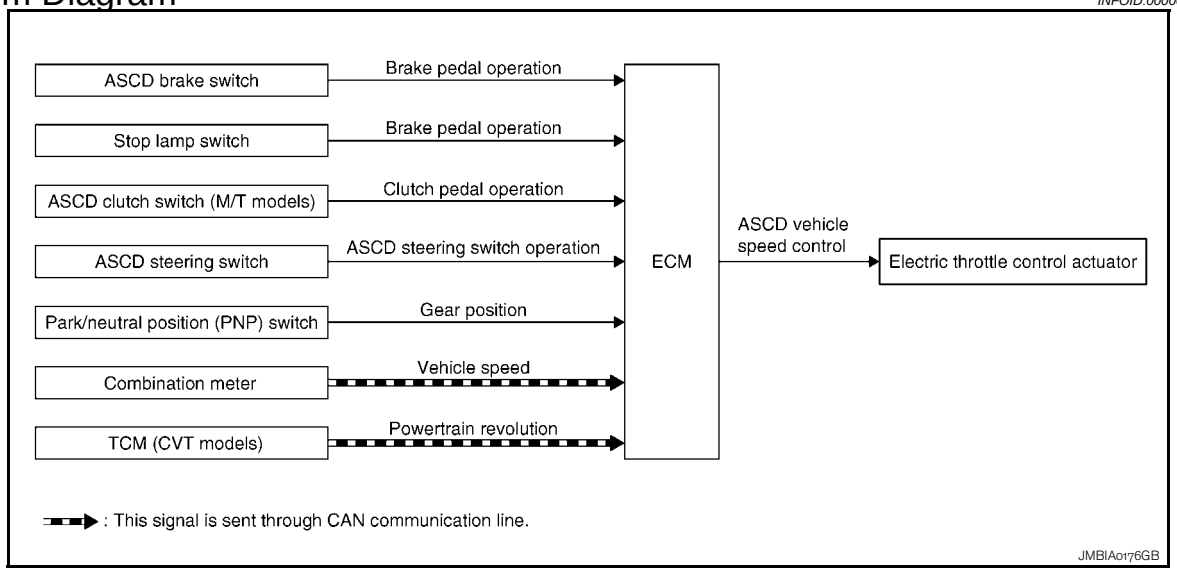
Component	Reference
Accelerator pedal position sensor	EC-899, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
Refrigerant pressure sensor	EC-936, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Diagram

INFOID:0000000000936620



System Description

INFOID:0000000000936621

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch			
ASCD clutch switch (M/T models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/neutral position (PNP) switch	Gear position		
Combination meter*	Vehicle speed		
TCM* (CVT models)	Powertrain revolution		

*: This signal is sent to the ECM through CAN communication line

BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.
Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 180 km/h (112 MPH).
ECM controls throttle angle of electric throttle control actuator to regulate engine speed.
Operation status of ASCD is indicated by CRUISE lamp and SET lamp in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.
NOTE:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

SET OPERATION

Press MAIN switch. (The CRUISE lamp in combination meter illuminates.)
When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 180 km/h (112 MPH), press SET/COAST switch. (Then SET lamp in combination meter illuminates.)

ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is pressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.
And then ASCD will keep the new set speed.

CANCEL OPERATION

cardiagn.com

When any of following conditions exist, cruise operation will be canceled.
- CANCEL switch is pressed
- More than 2 switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to neutral position. (M/T models)
- Selector lever is changed to N, P, R position (CVT models)
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.
- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.
  When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ ACCELERATE switch.
- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

COAST OPERATION

When the SET/COAST switch is pressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

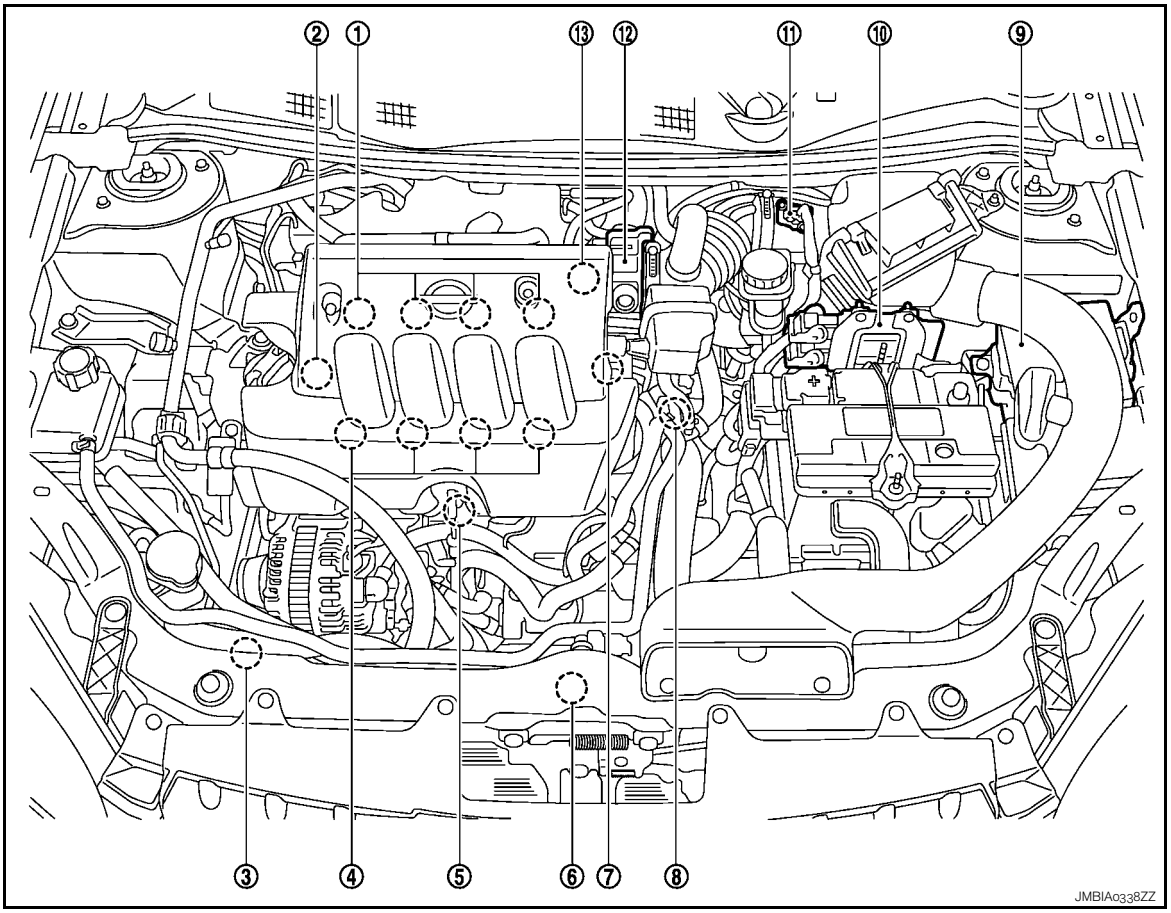
RESUME OPERATION

When the RESUME/ACCELERATE switch is pressed after cancel operation other than pressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.
- Brake pedal is released
- Clutch pedal is released (M/T models)
- Selector lever is in other than P and N positions (CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 180 km/h (112 MPH)

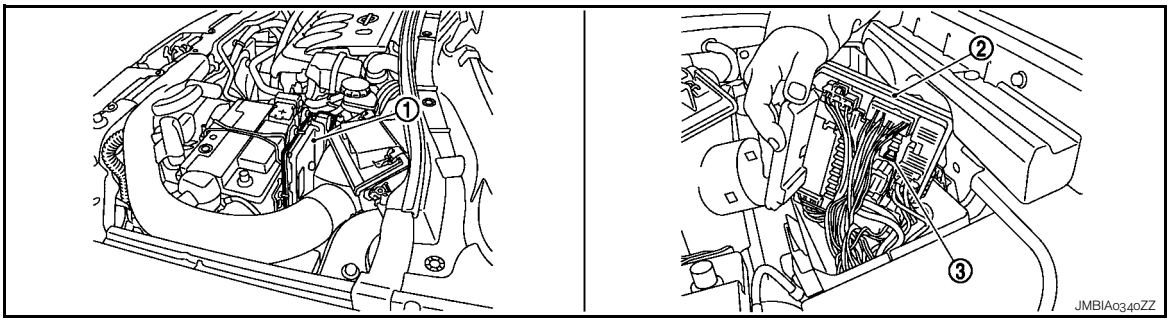
Component Parts Location

INFOID:0000000001093565

cardiagn.com

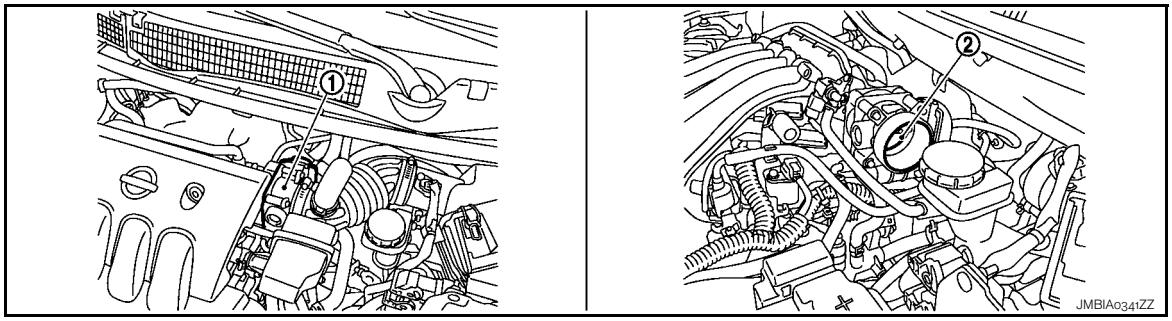


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

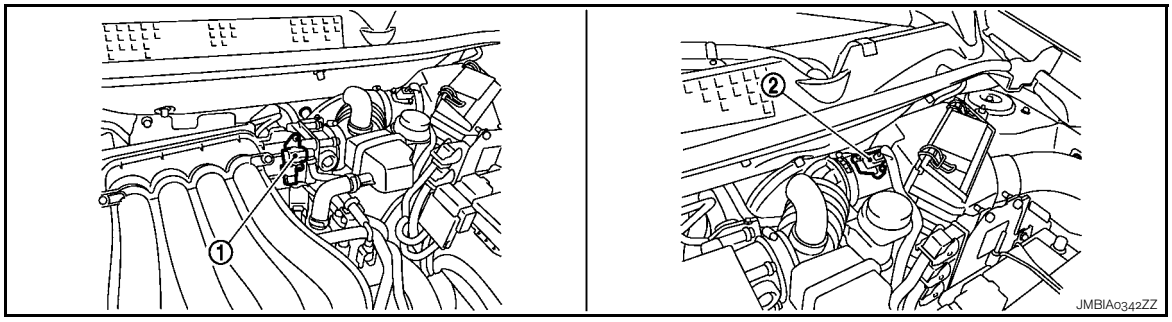


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

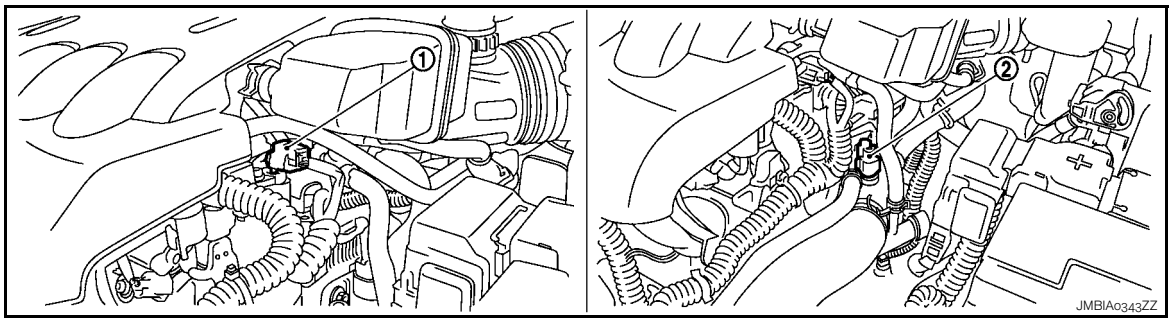
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

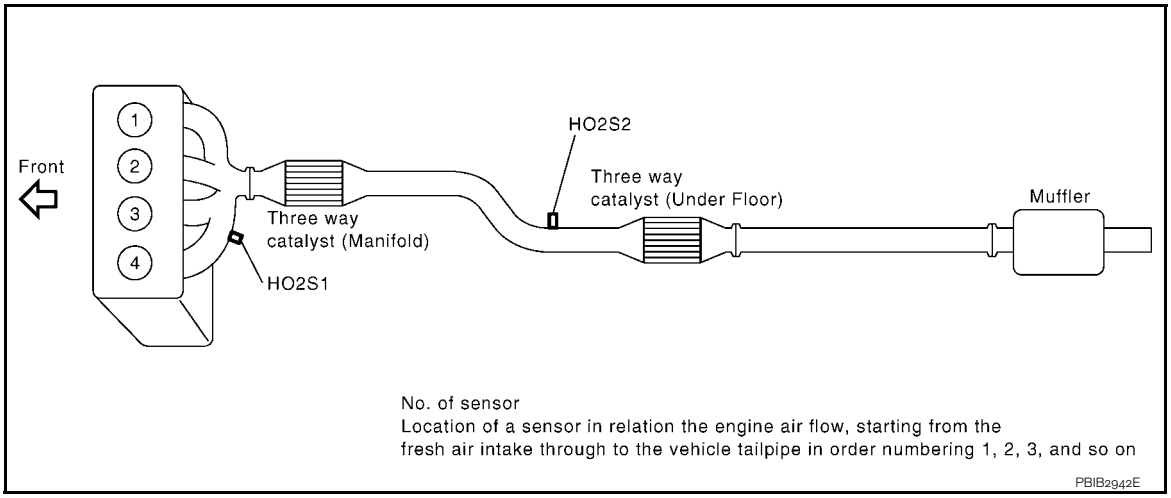


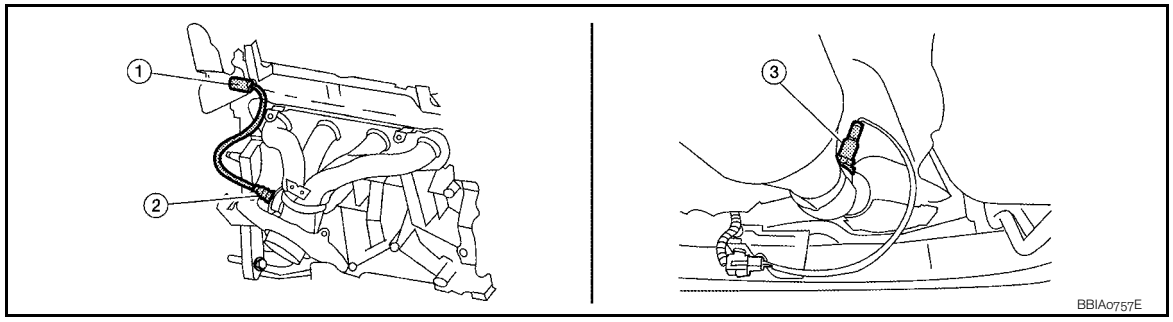
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



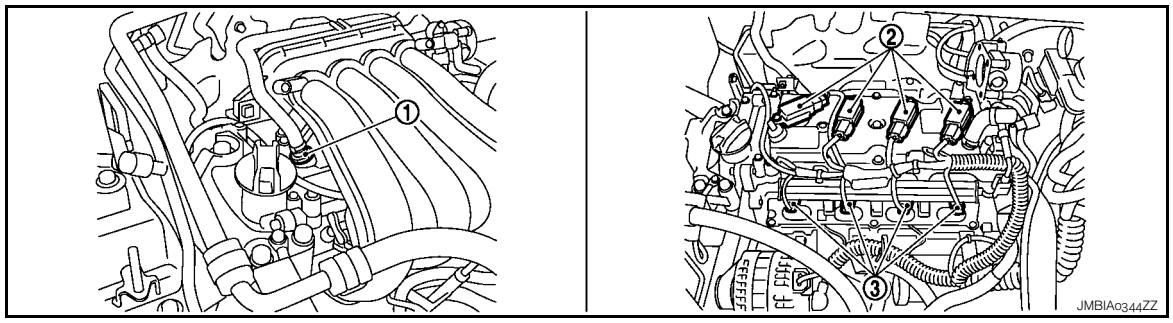
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

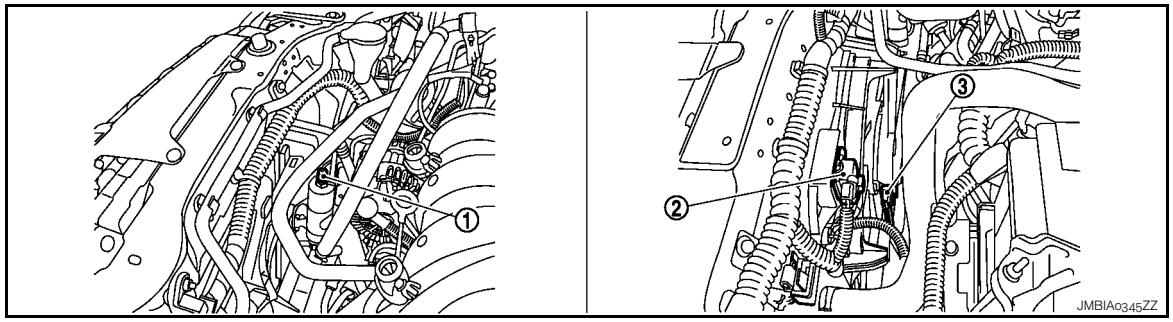




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

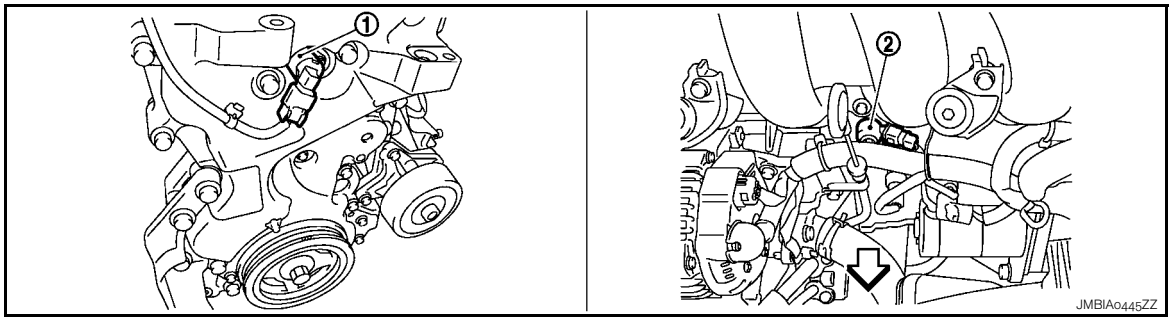


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

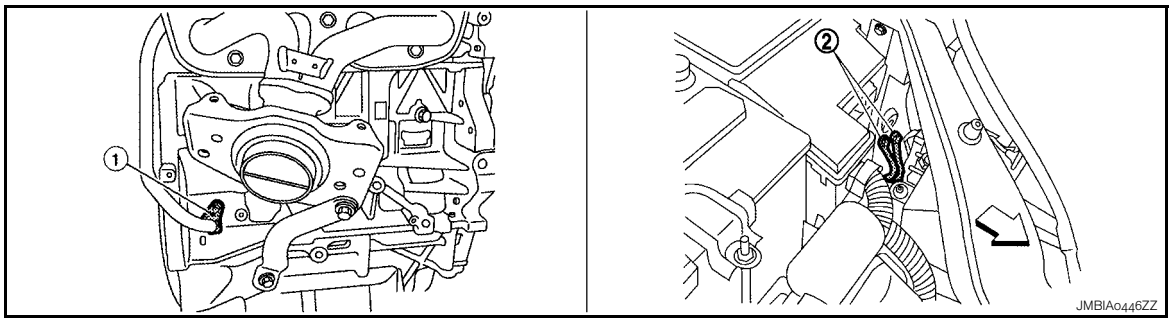


cardiagn.com

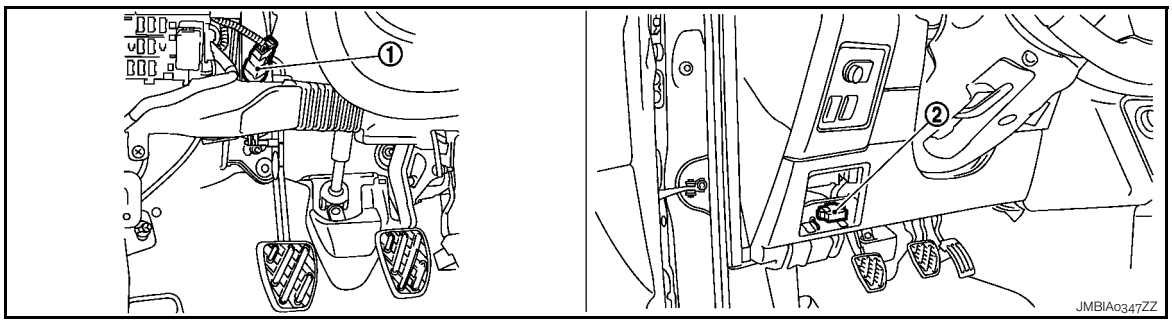
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



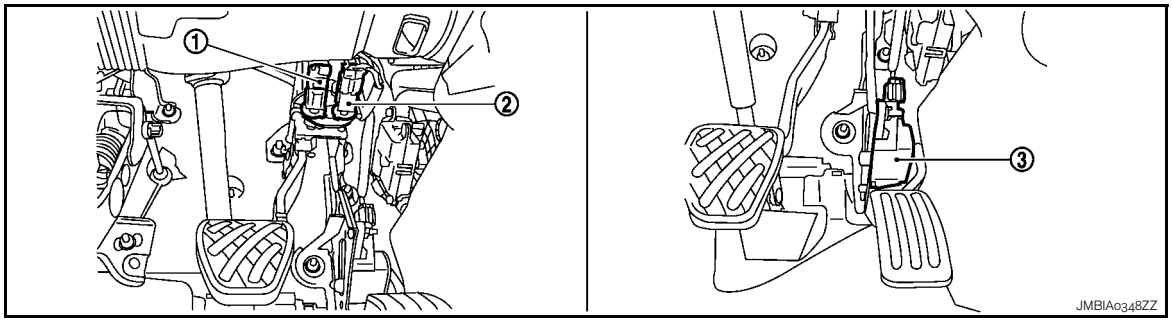
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

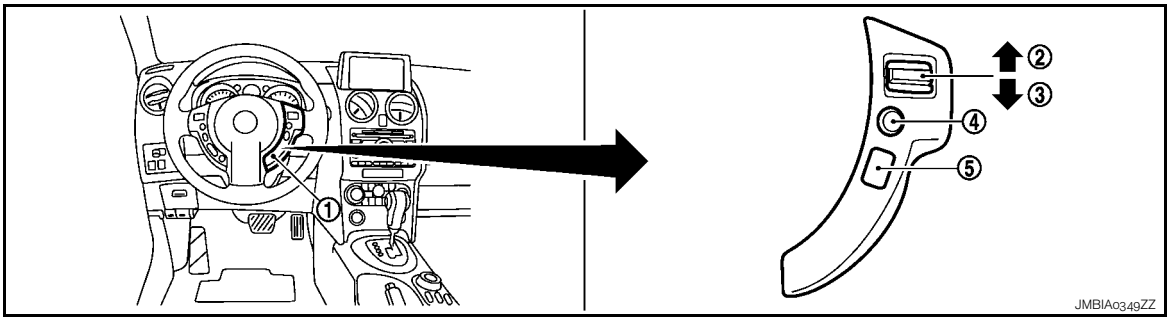


1. ASCD clutch switch 2. Data link connector

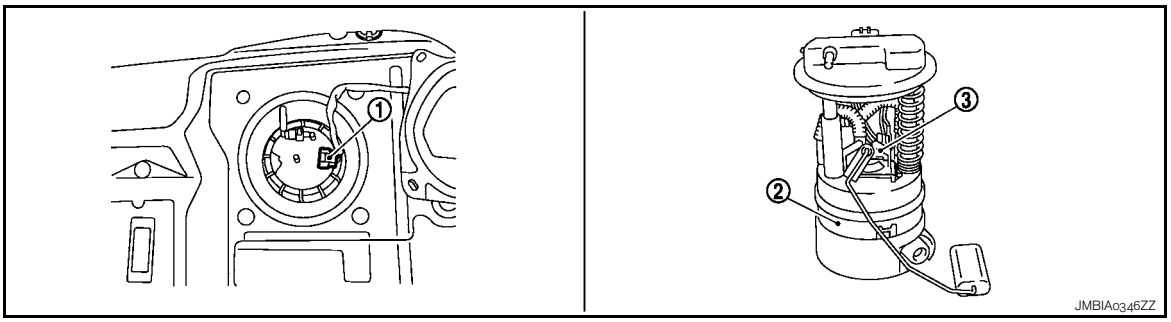


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000000936623

Component	Reference
ASCD steering switch	EC-880, "Description"
ASCD clutch switch	EC-883, "Description"
ASCD brake switch	EC-883, "Description"
ASCD indicator	EC-917, "Description"
Stop lamp switch	EC-896, "Description"
Electric throttle control actuator	EC-832, "Description"

cardiagn.com

CAN COMMUNICATION

System Description

INFOID:0000000000936624

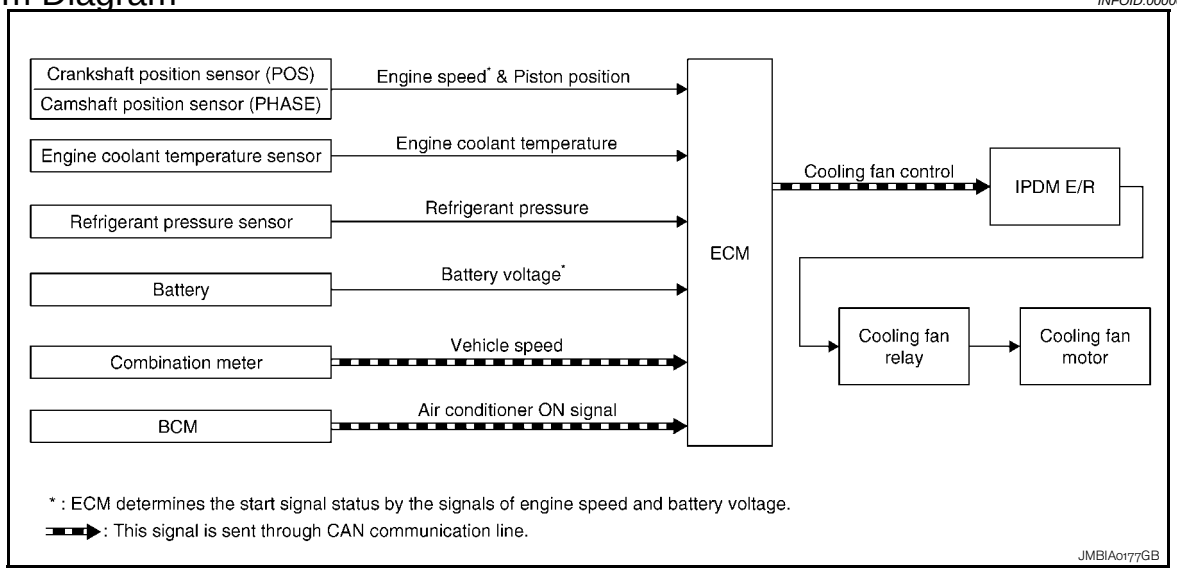
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
Refer to LAN-59, "CAN Communication Signal Chart", about CAN communication for detail..

cardiagn.com

COOLING FAN CONTROL

System Diagram

INFOID:0000000000936625



System Description

INFOID:0000000000936626

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	IPDM E/R ↓ Cooling fan relay ↓ Cooling fan motor
Battery	Battery voltage*1		
Combination meter	Vehicle speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
BCM	Air conditioner ON signal*2		
Refrigerant pressure sensor	Refrigerant pressure		

*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

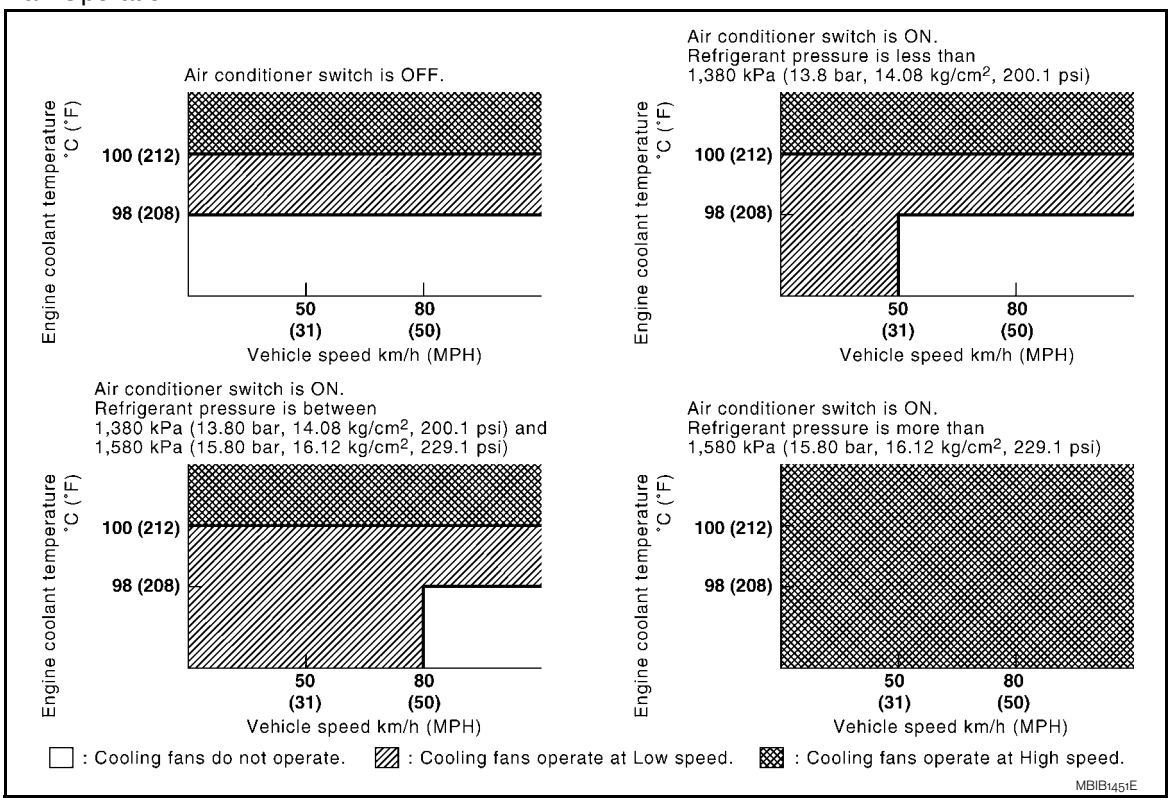
*2: This signal is sent to ECM through CAN communication line.

SYSTEM DESCRIPTION

ECM controls cooling fan speed corresponding to vehicle speed, engine coolant temperature, refrigerant pressure, air conditioner ON signal. Then control system has 3-step control [HIGH/LOW/OFF].

cardiagn.com

Cooling Fan Operation



Cooling Fan Relay Operation

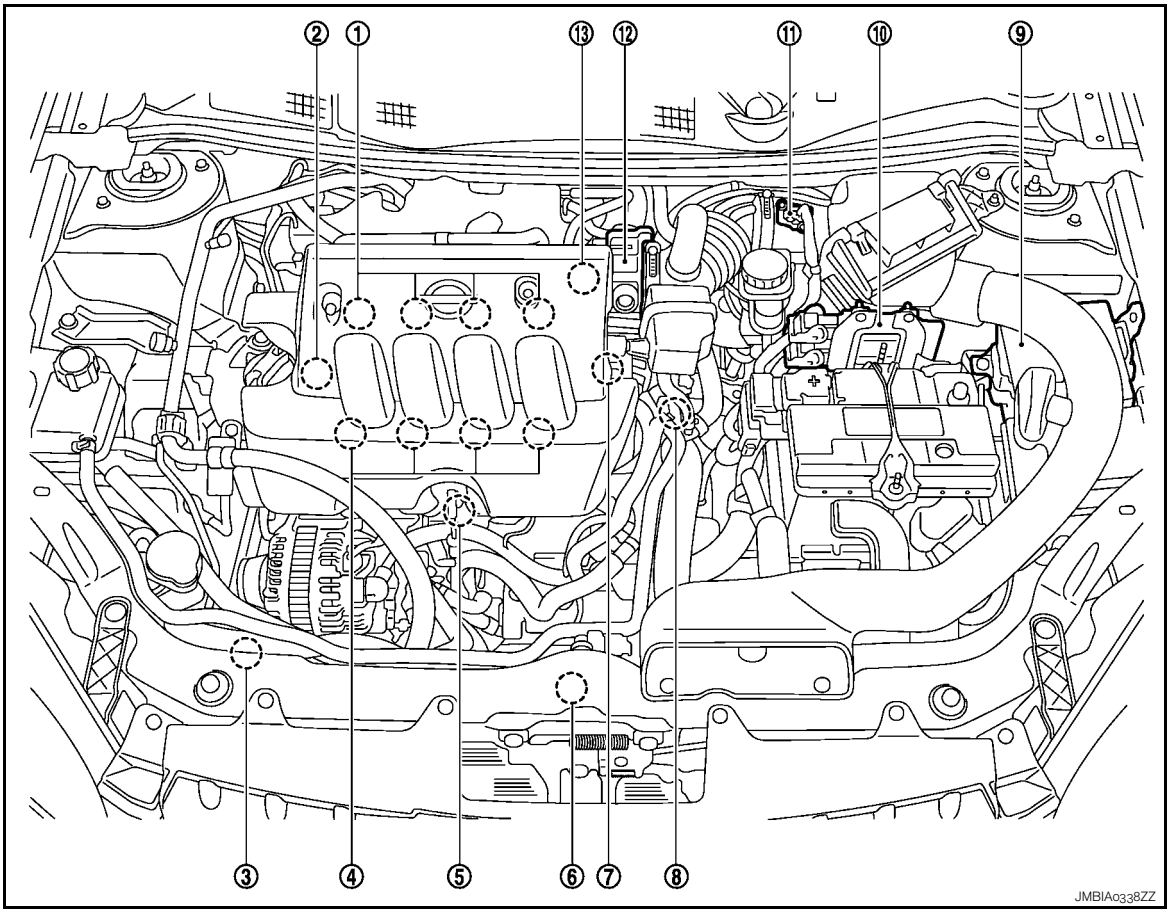
The ECM controls cooling fan relays through CAN communication line.

Cooling fan speed	Cooling fan relay	
	1	3
Stop (OFF)	OFF	OFF
Low (LOW)	ON	OFF
High (HI)	OFF	ON

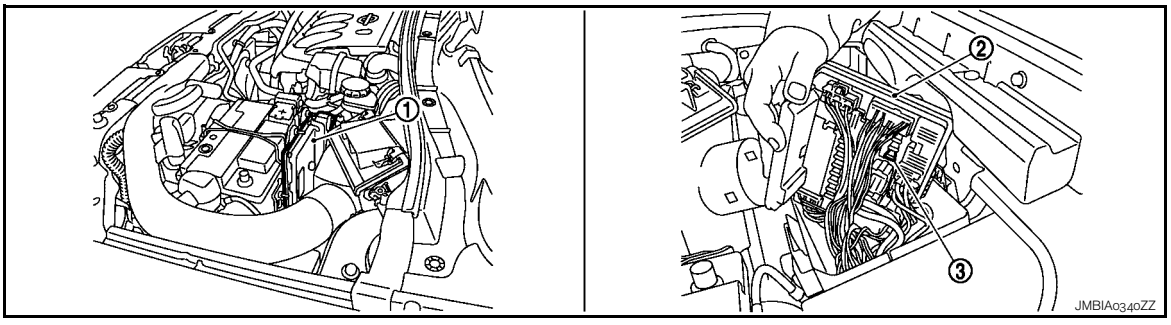
Component Parts Location

INFOID:0000000001093566

cardiagn.com

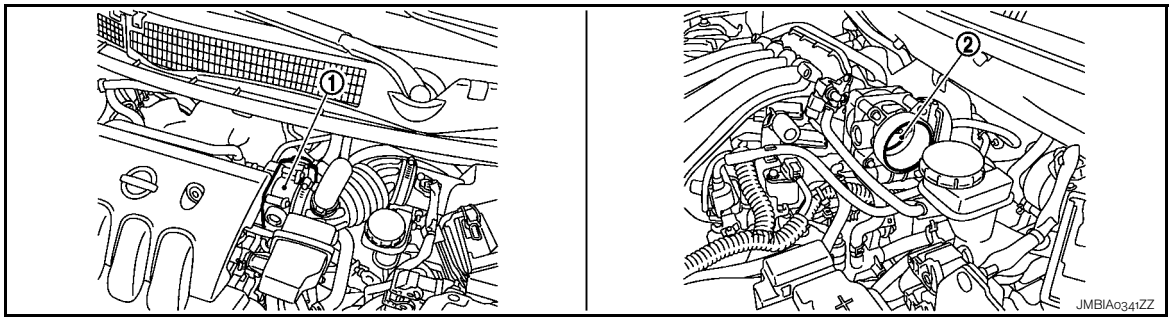


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

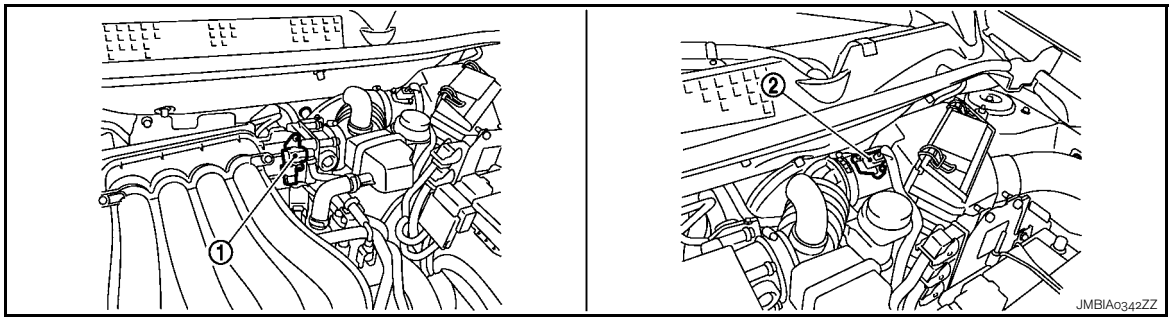


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

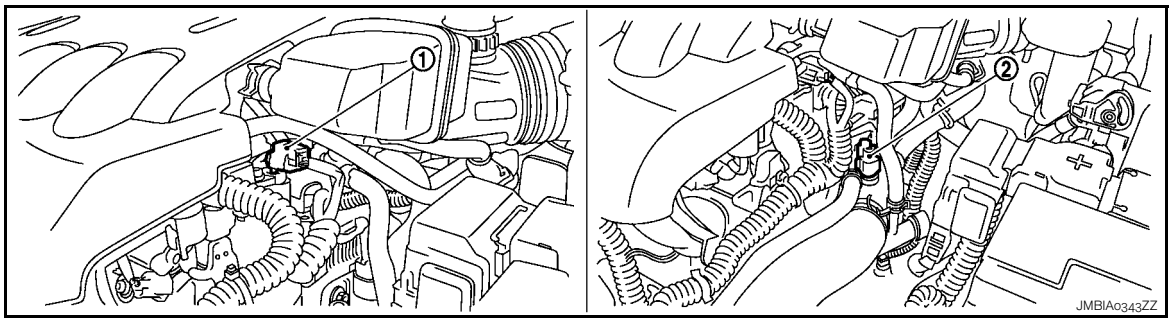
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

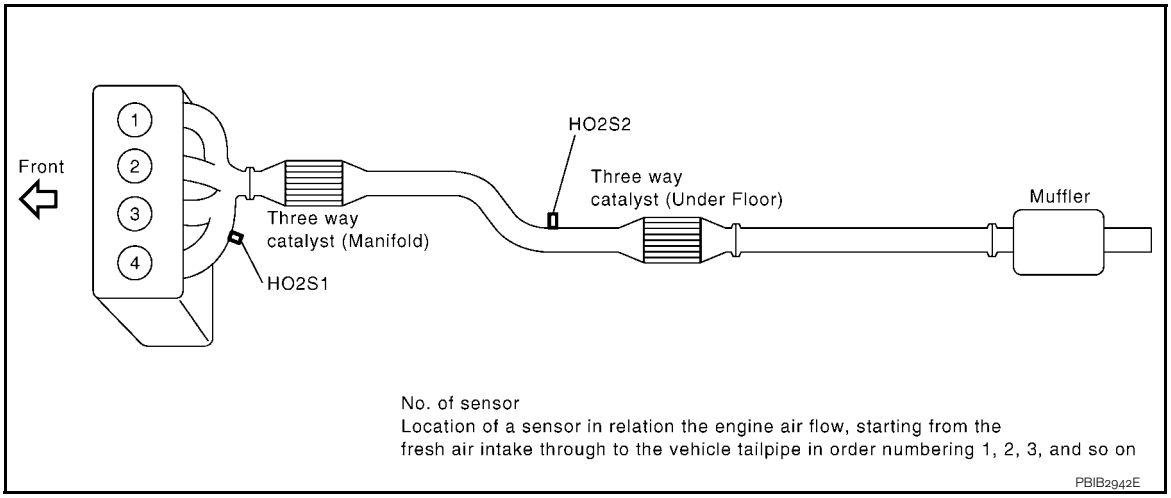


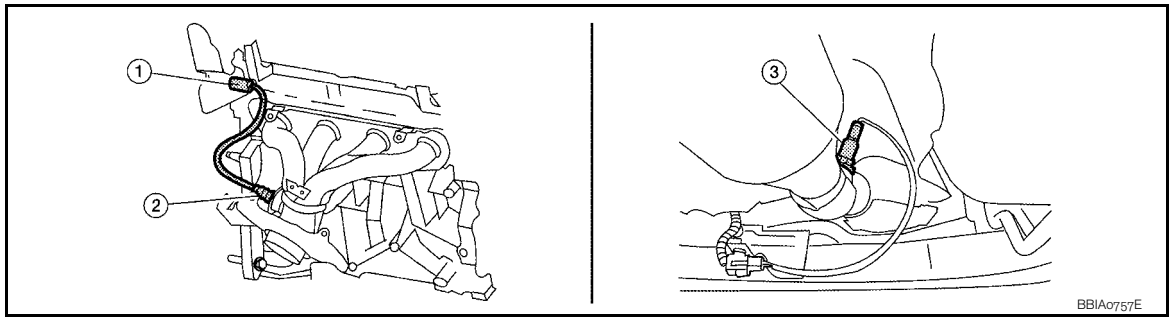
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



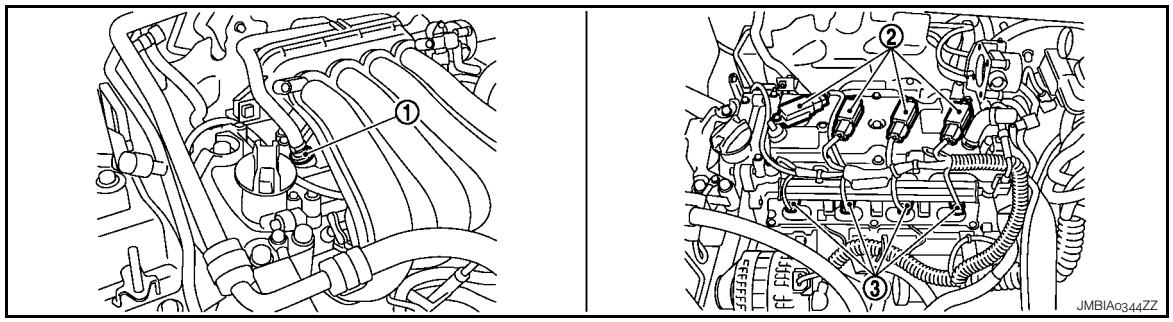
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

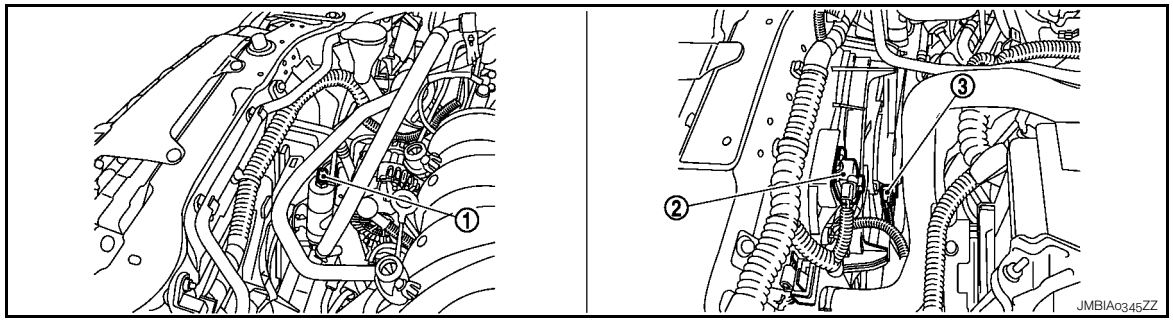




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

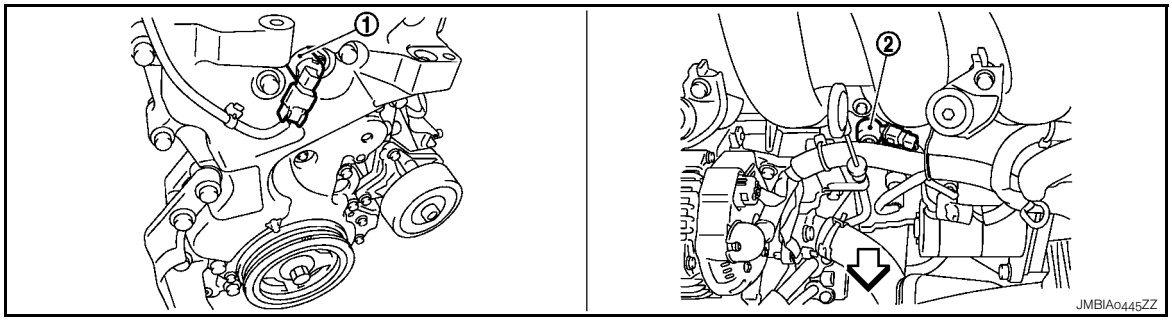


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

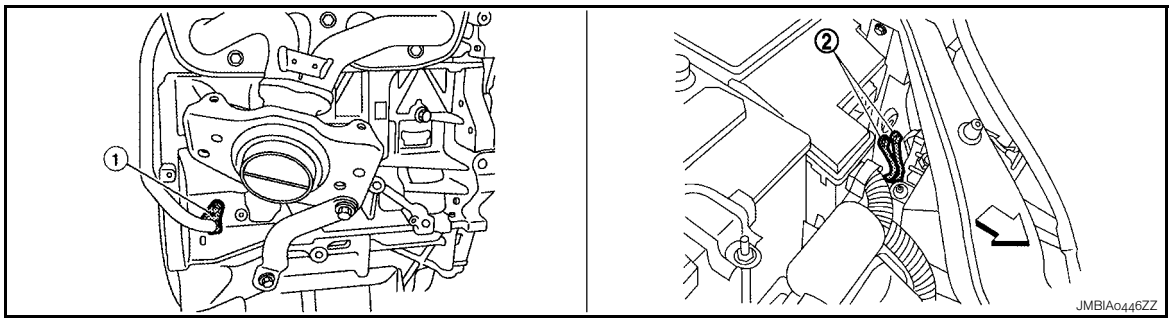


cardiagn.com

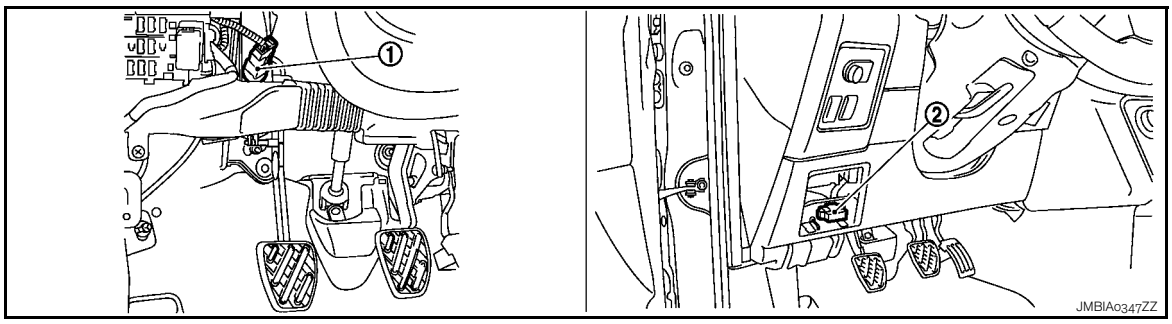
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



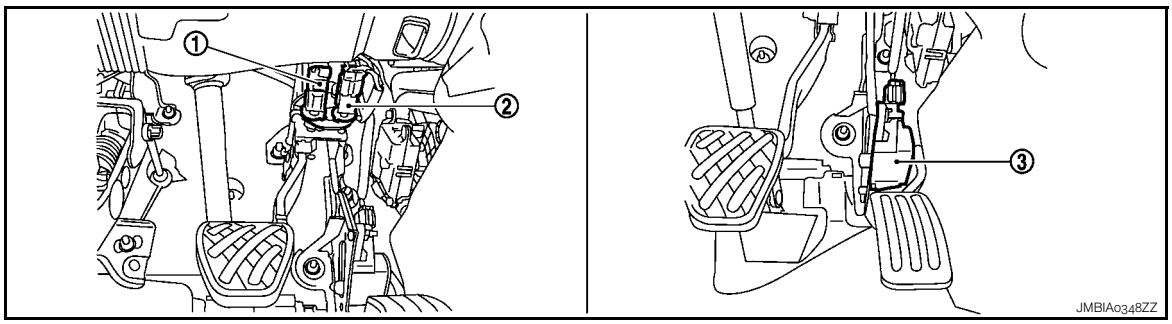
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

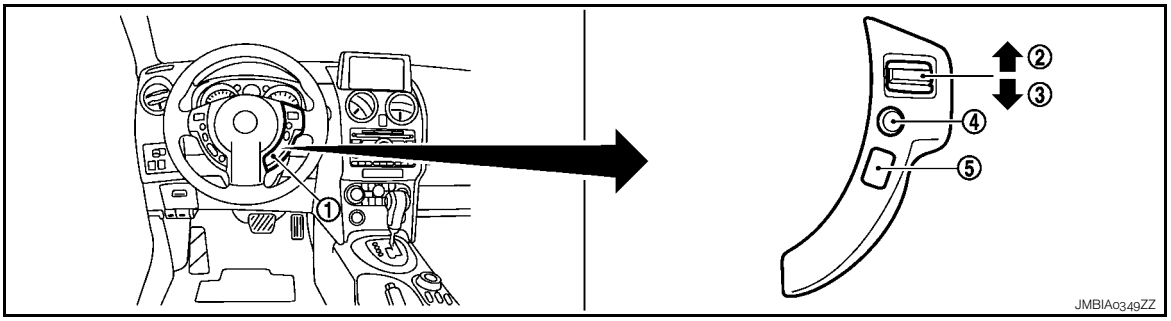


1. ASCD clutch switch 2. Data link connector

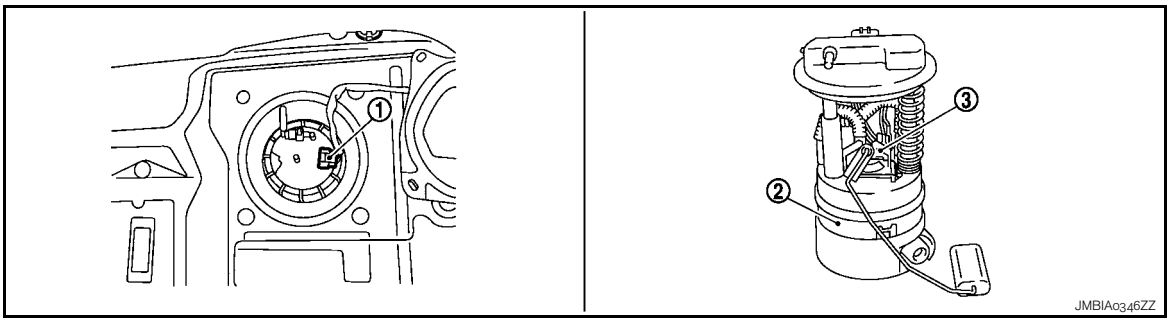


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000000936628

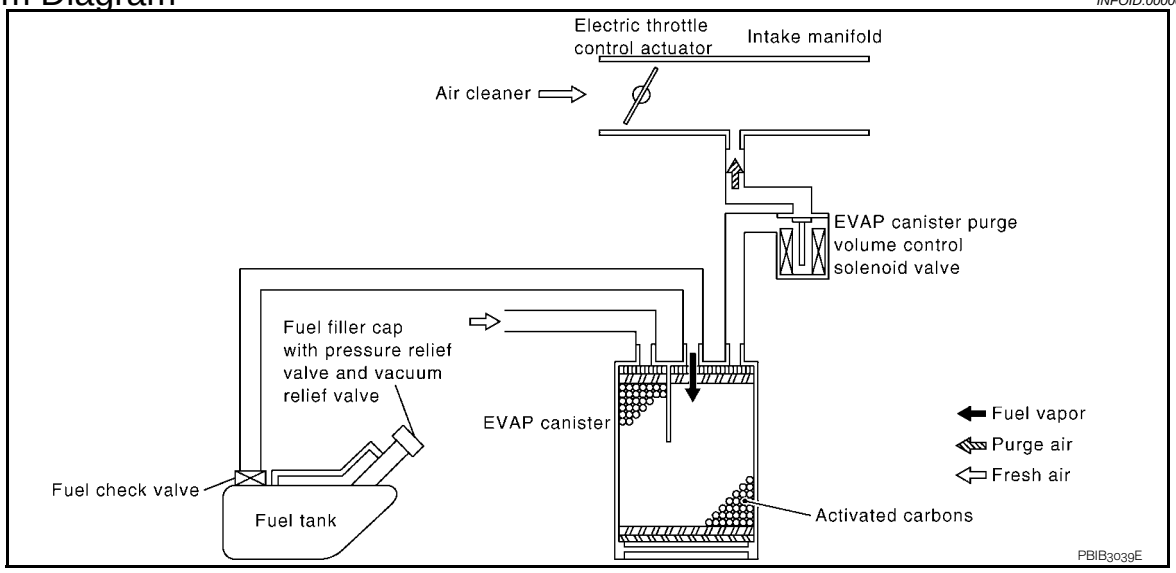
Component	Reference
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Cooling fan motor	EC-685, "System Diagram"
Engine coolant temperature sensor	EC-754, "Description"
Refrigerant pressure sensor	EC-936, "Description"

cardiagn.com

EVAPORATIVE EMISSION SYSTEM

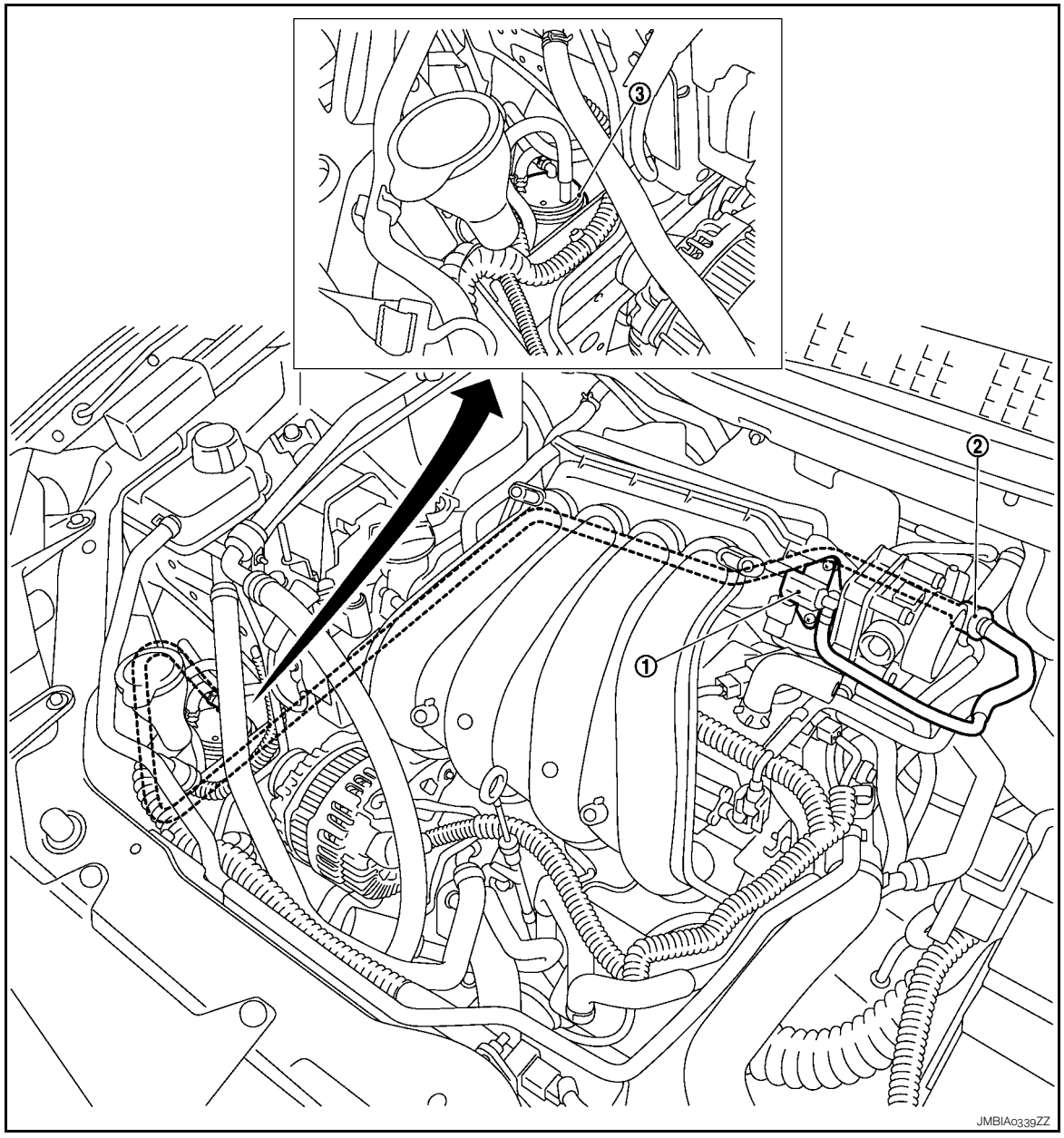
System Diagram

INFOID:0000000000936629



EVAPORATIVE EMISSION LINE DRAWING

cardiagn.com



1. EVAP canister purge volume control solenoid valve
2. EVAP purge resonator
3. EVAP canister

NOTE:
Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

System Description

INFOID:0000000000936630

INPUT/OUTPUT SIGNAL CHART

cardiagn.com

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Wheel sensor*2	Vehicle speed		

*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM through CAN communication line.

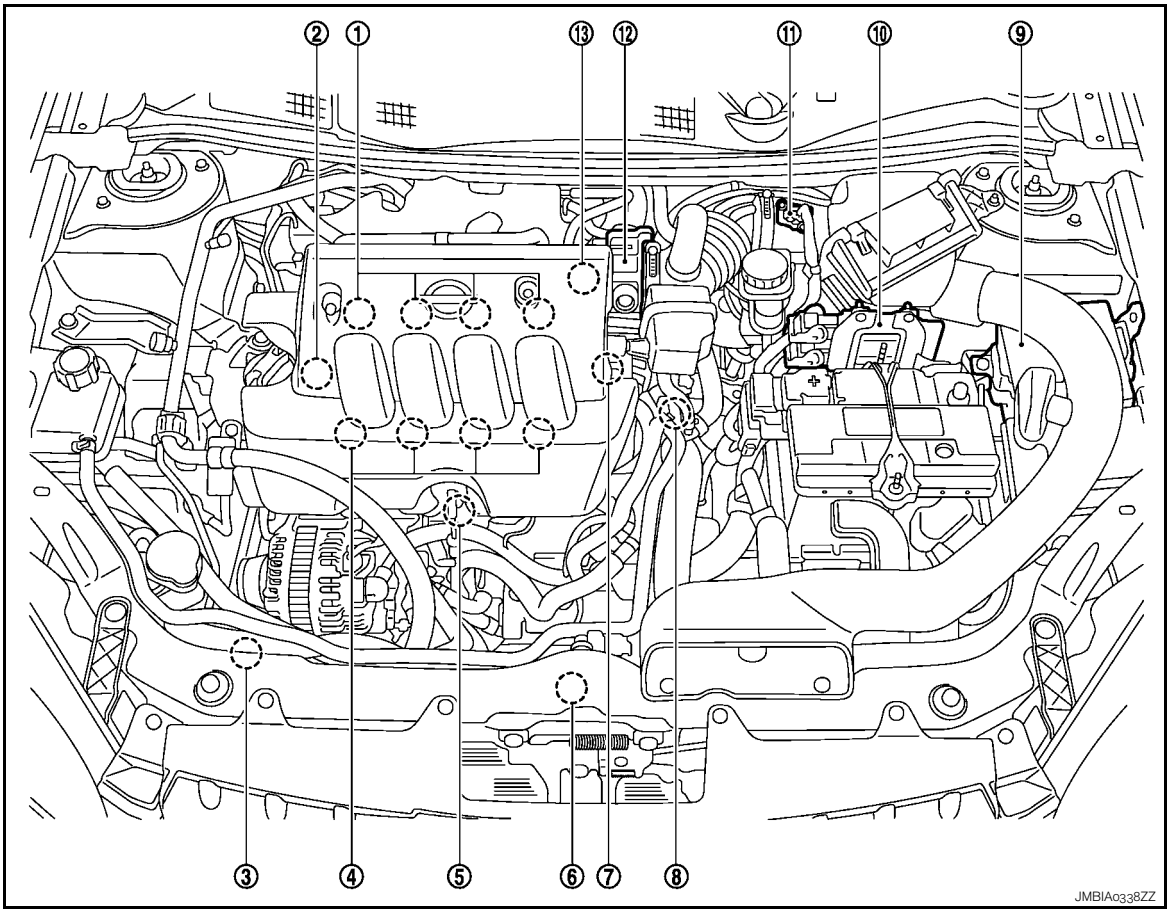
SYSTEM DESCRIPTION

The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating.

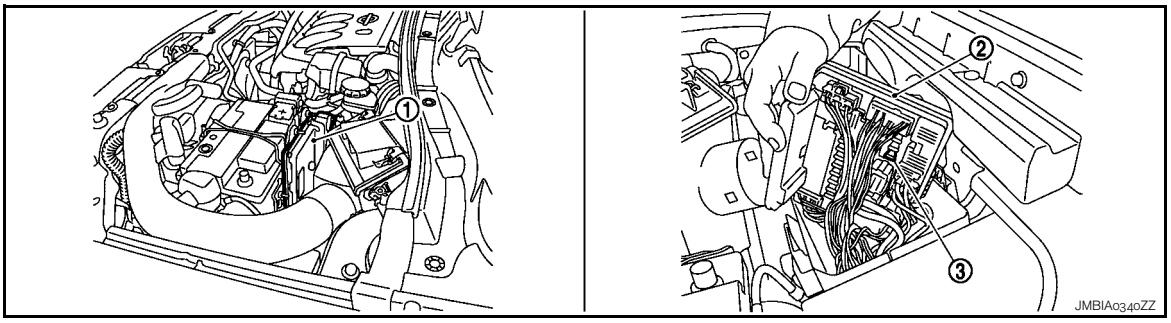
Component Parts Location

INFOID:0000000001093567

cardiagn.com

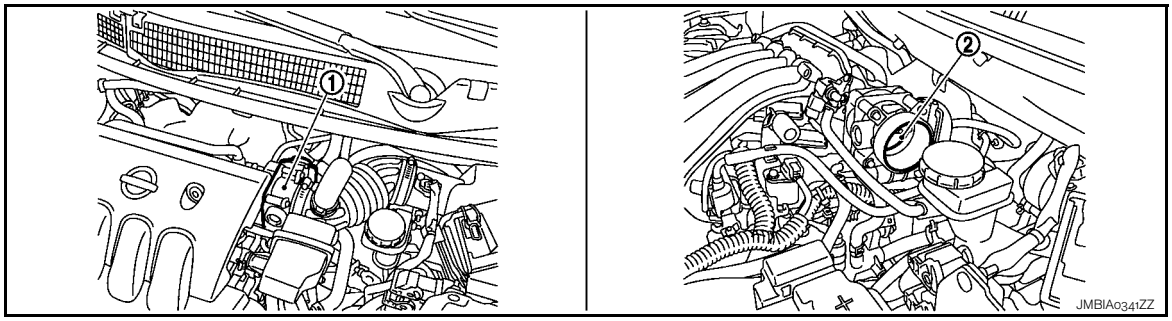


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

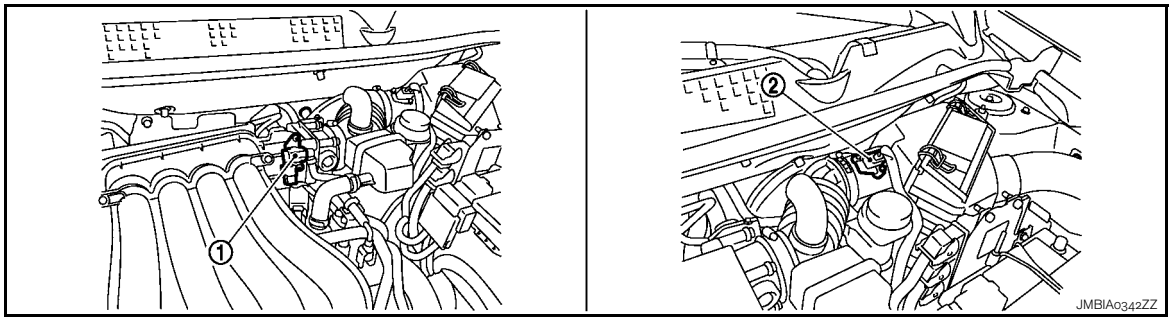


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

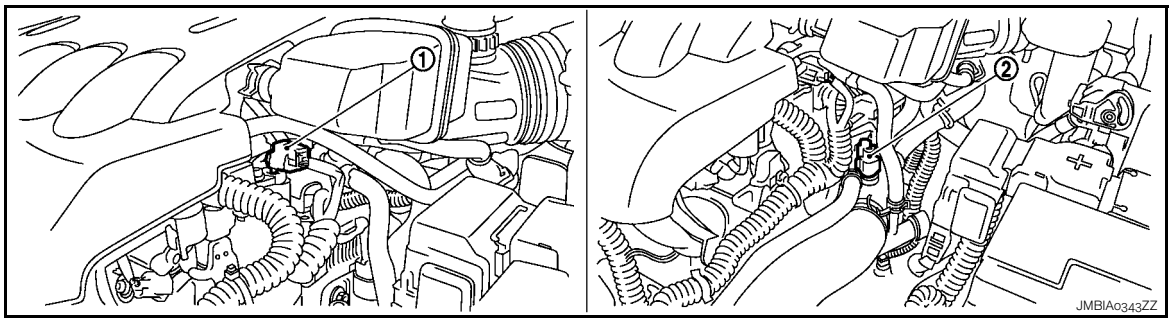
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

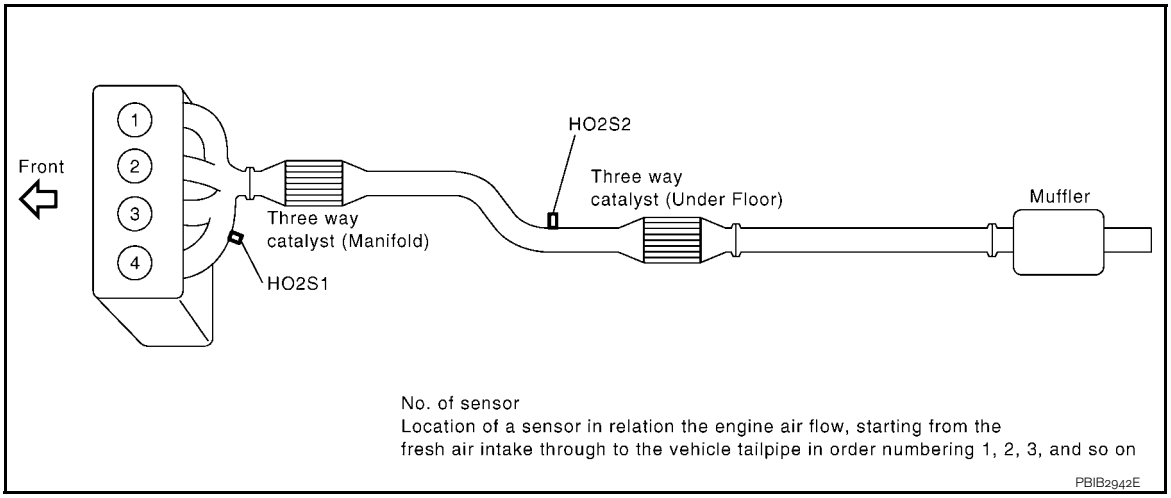


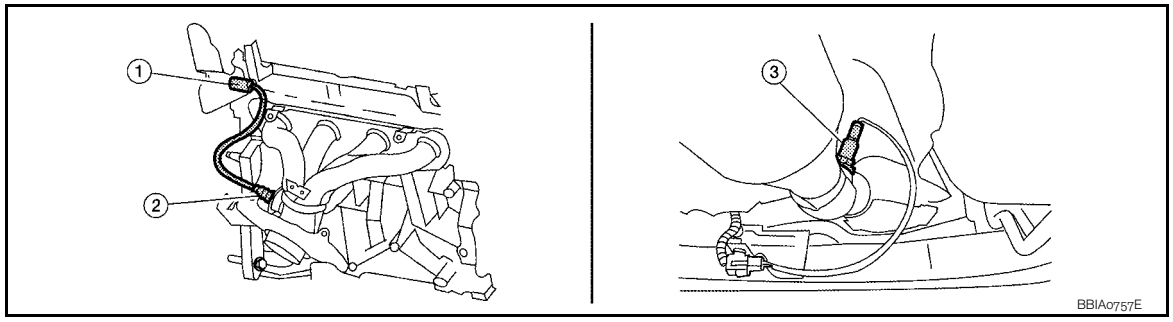
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



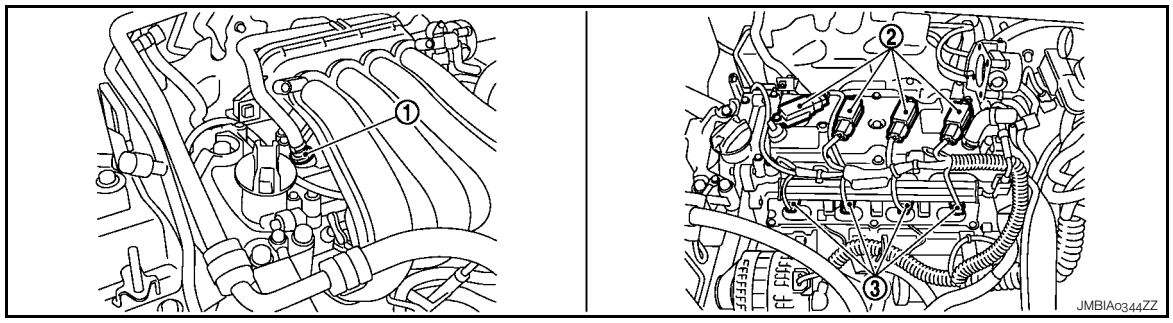
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

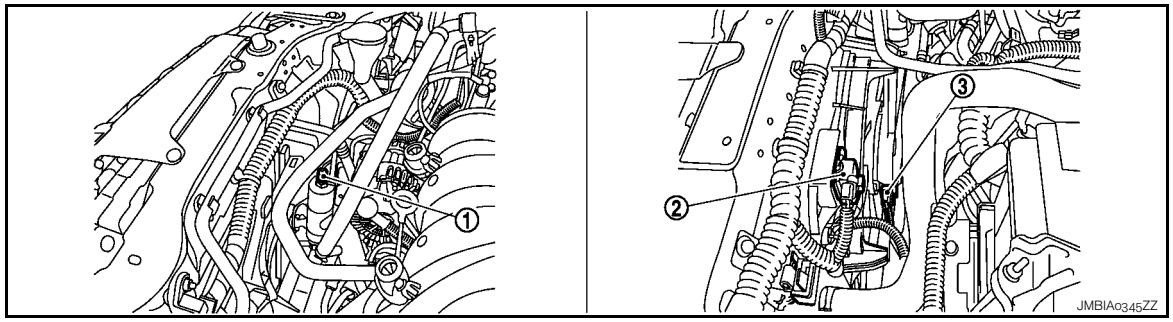




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

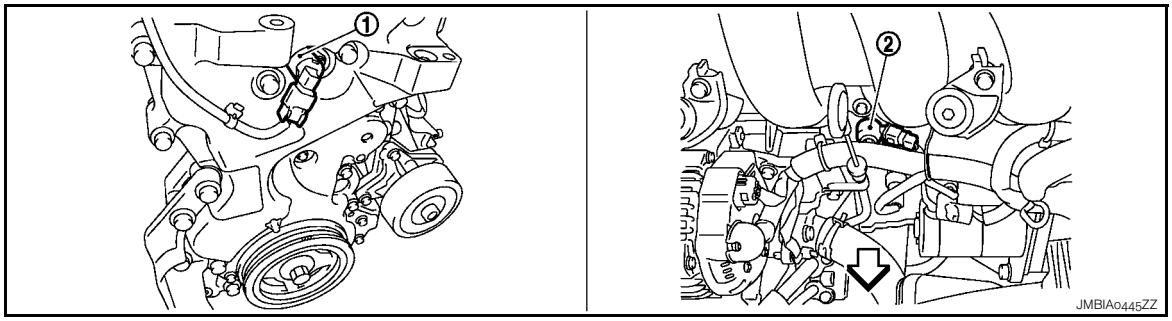


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

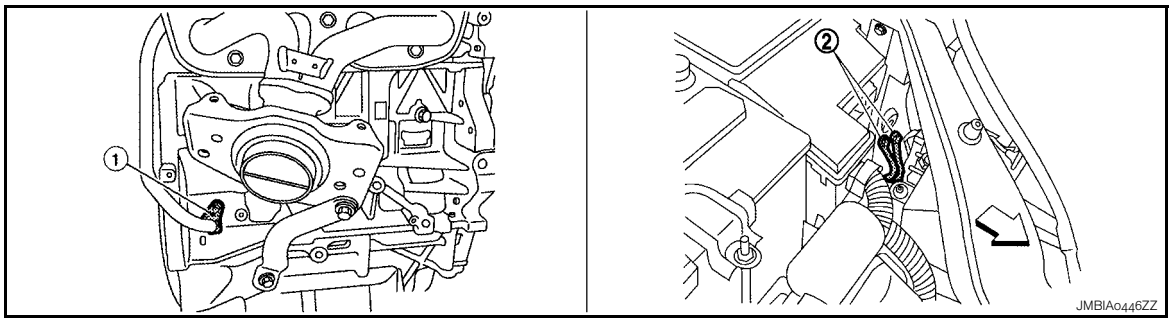


cardiagn.com

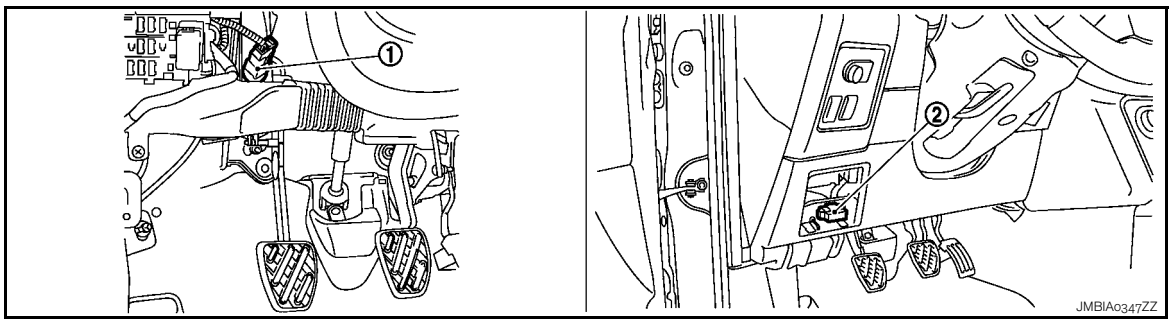
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



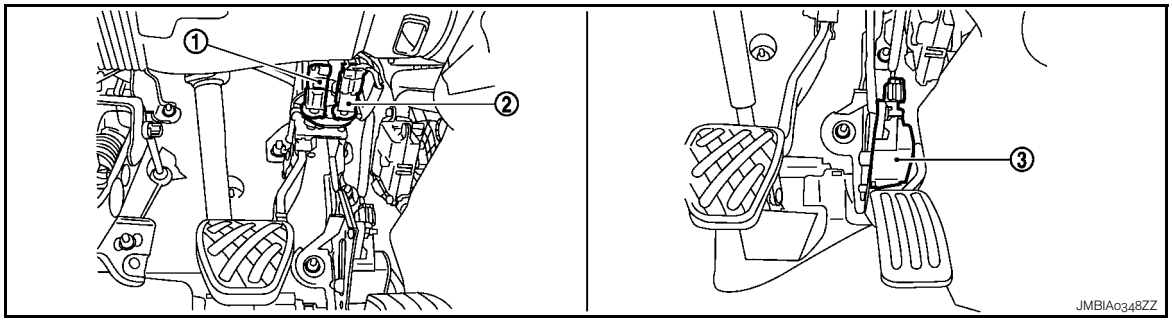
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

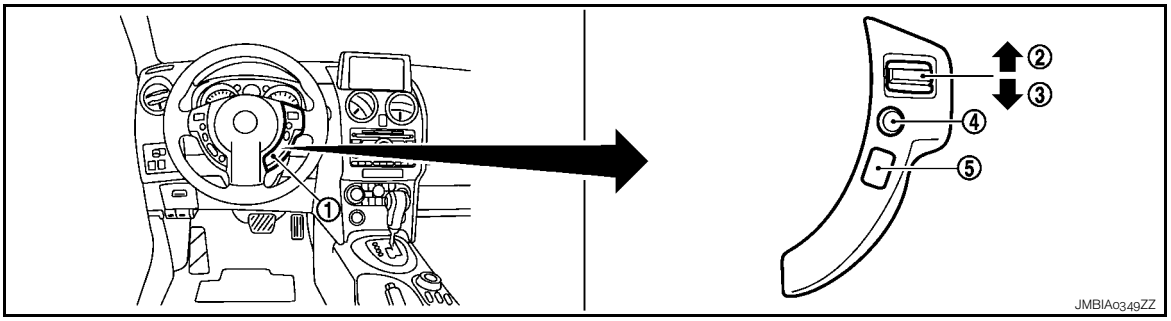


1. ASCD clutch switch 2. Data link connector

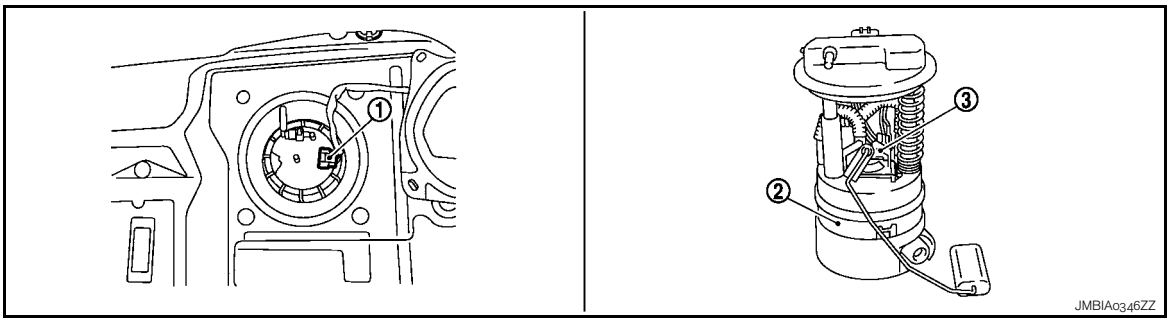


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000000936632

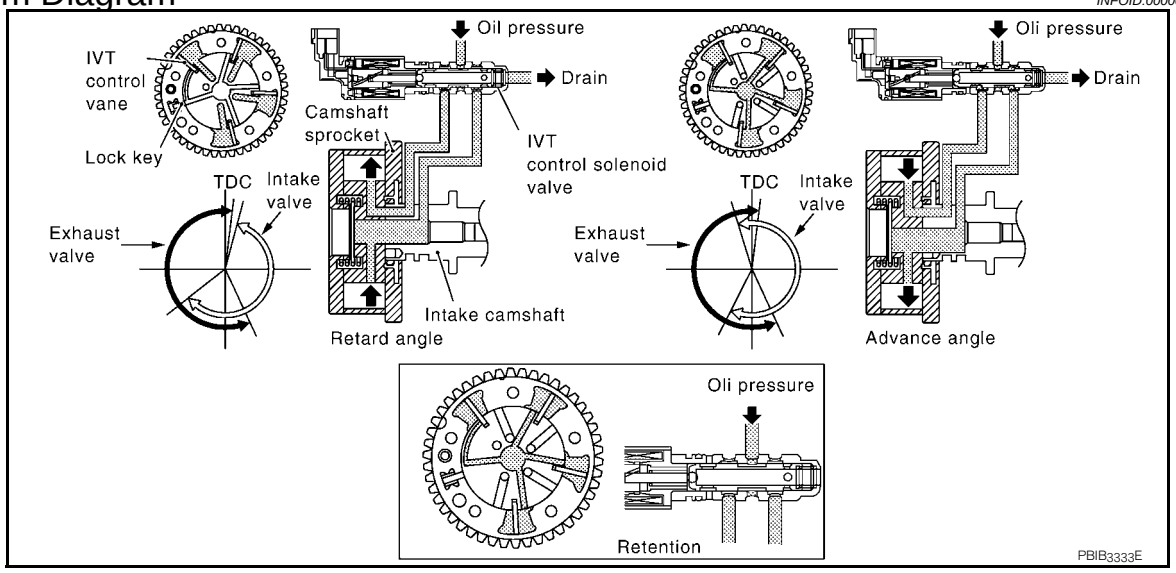
Component	Reference
Accelerator pedal position sensor	EC-909, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
EVAP canister purge volume control solenoid valve	EC-822, "Description"
Heated oxygen sensor 1	EC-760, "Description"
Mass air flow sensor	EC-746, "Description"
Throttle position sensor	EC-757, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

INTAKE VALVE TIMING CONTROL

System Diagram

INFOID:0000000000936633



System Description

INFOID:0000000000936634

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed and piston position	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Wheel sensor*	Vehicle speed		

*: This signal is sent to the ECM through CAN communication line

SYSTEM DESCRIPTION

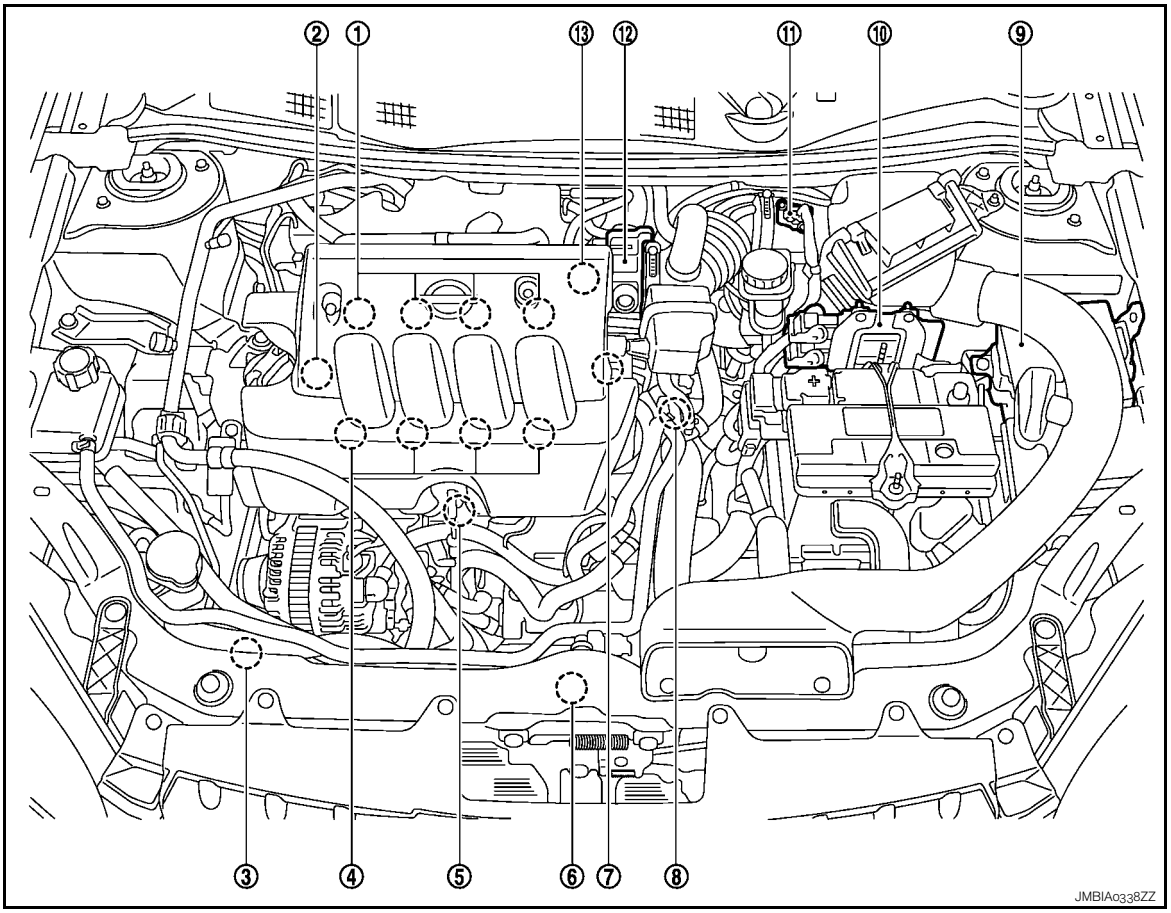
This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing (IVT) control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

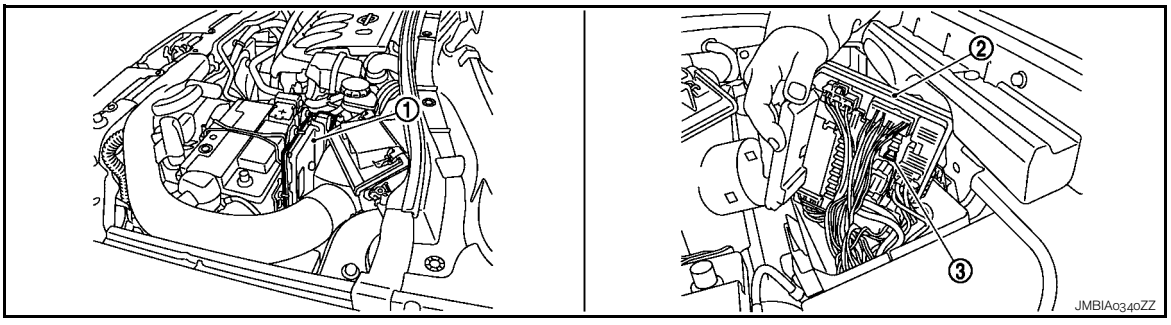
Component Parts Location

INFOID:0000000001093568

cardiagn.com

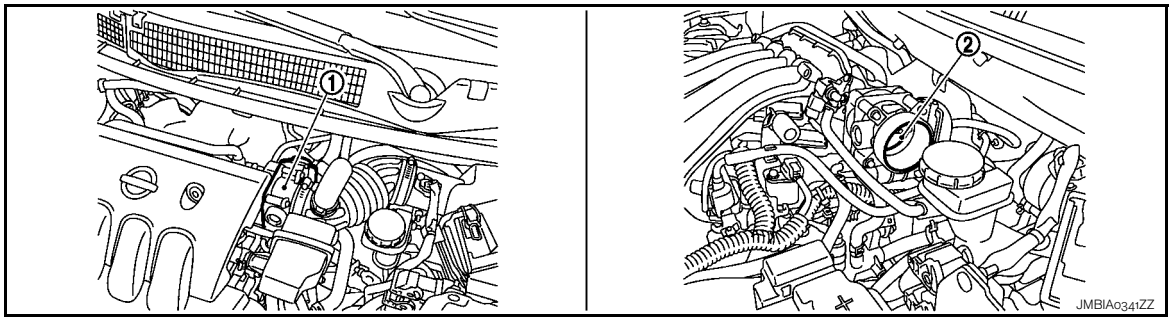


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

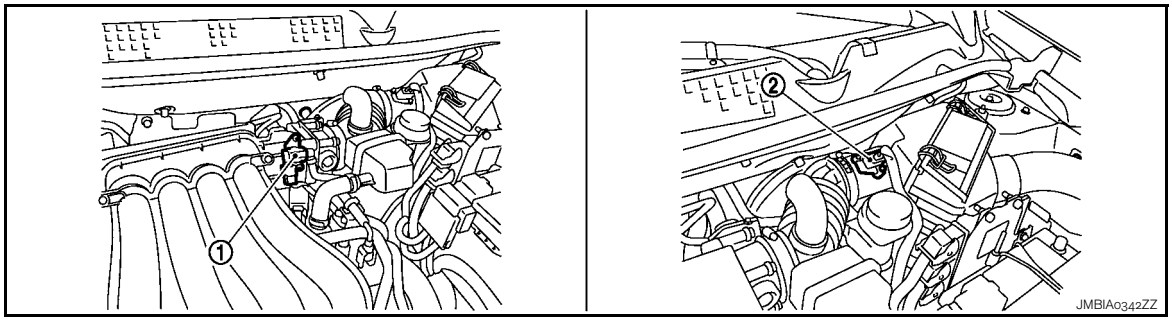


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

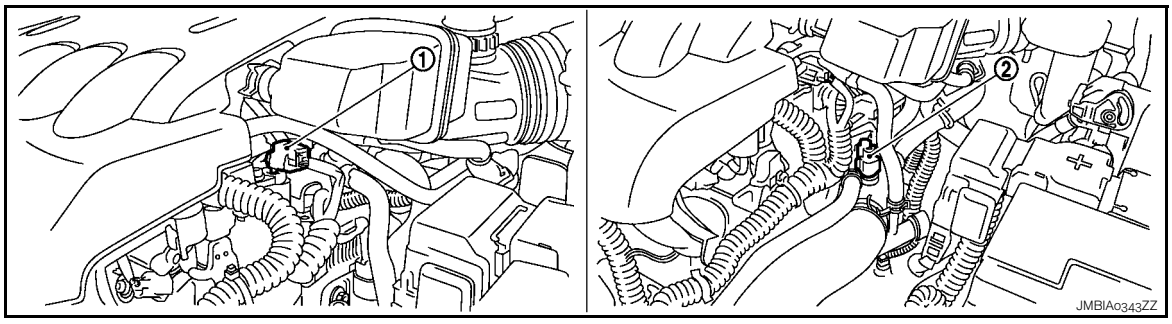
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

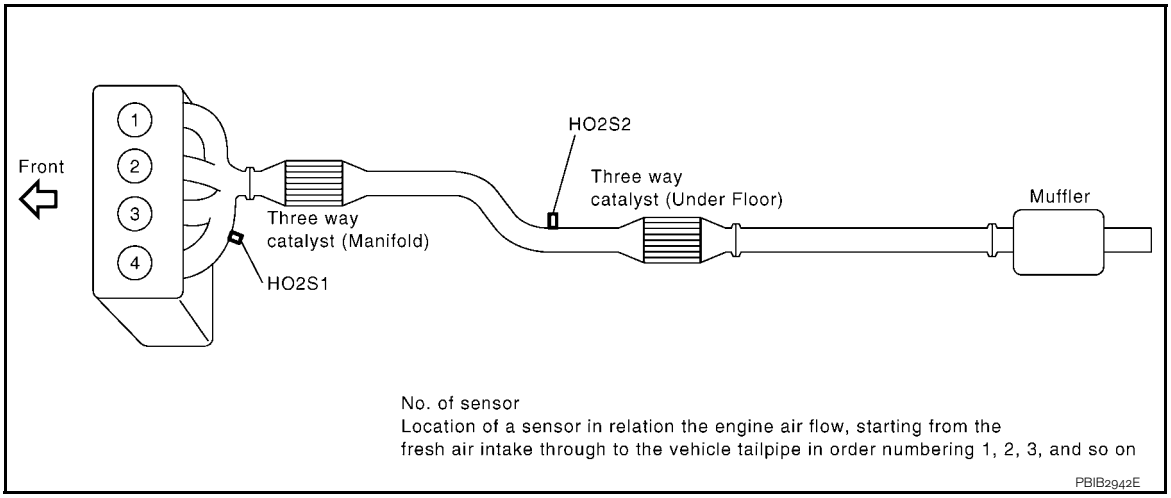


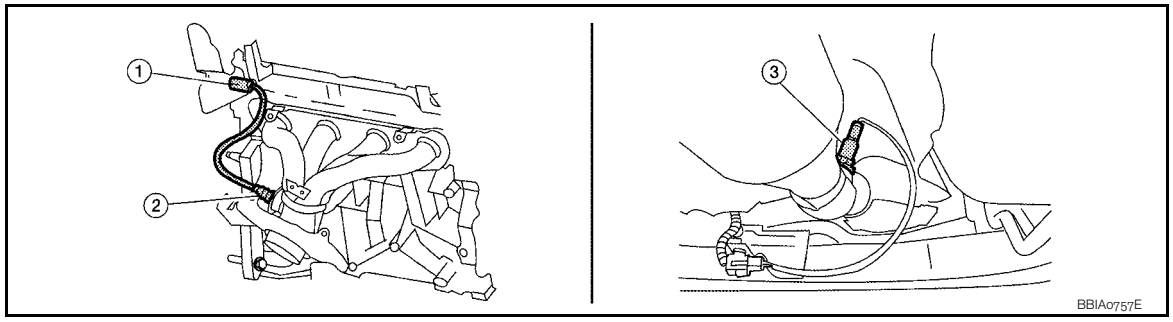
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



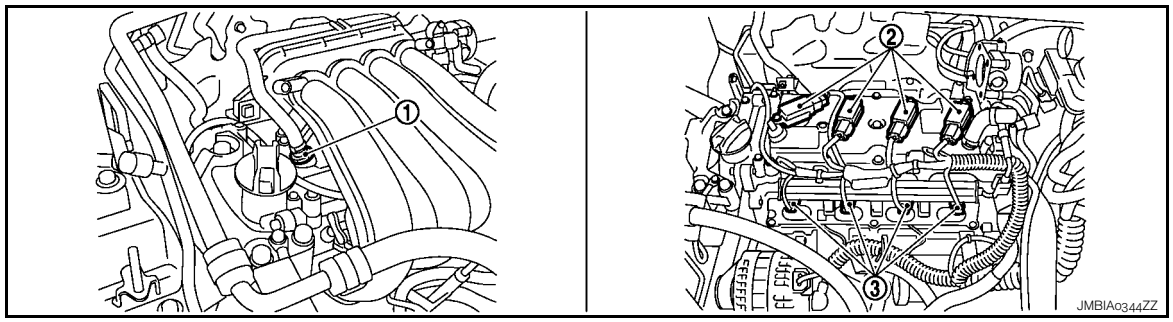
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

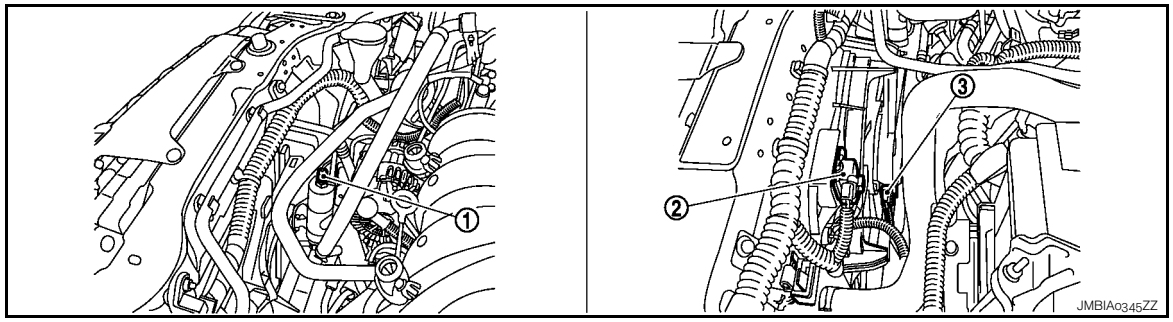




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

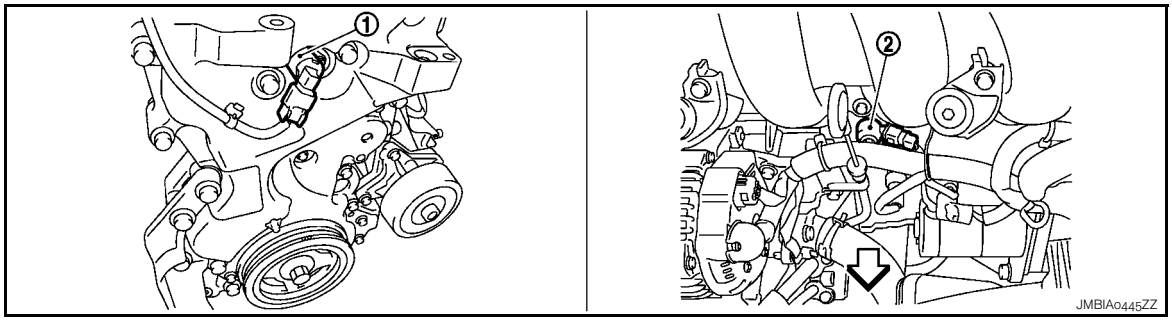


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

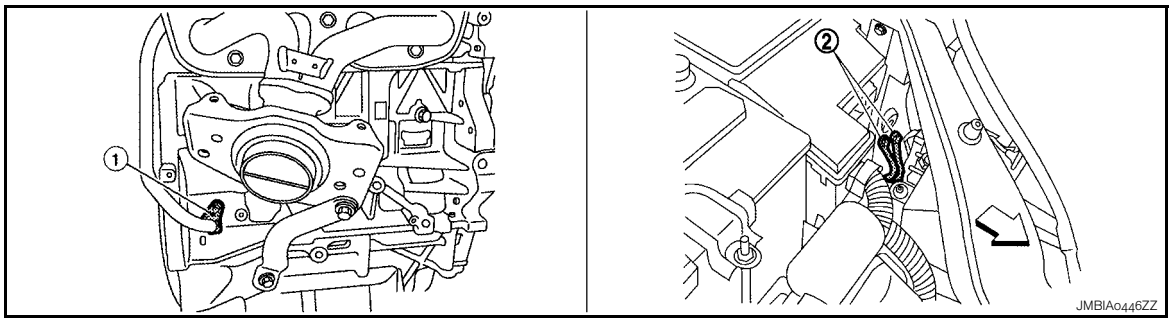


cardiagn.com

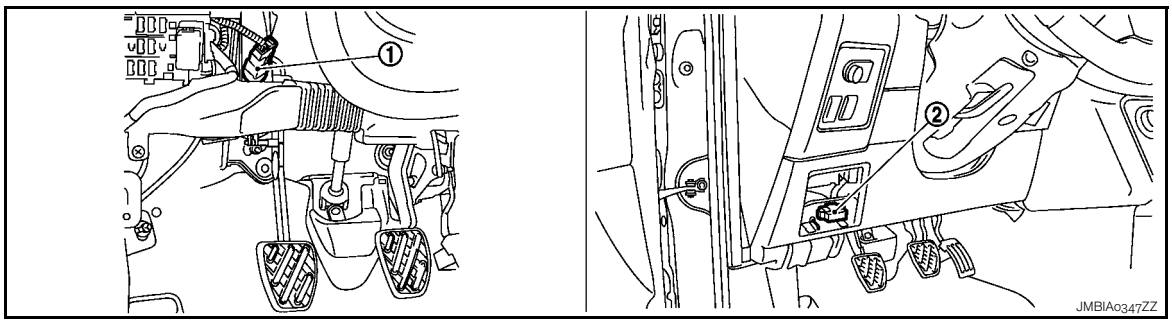
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



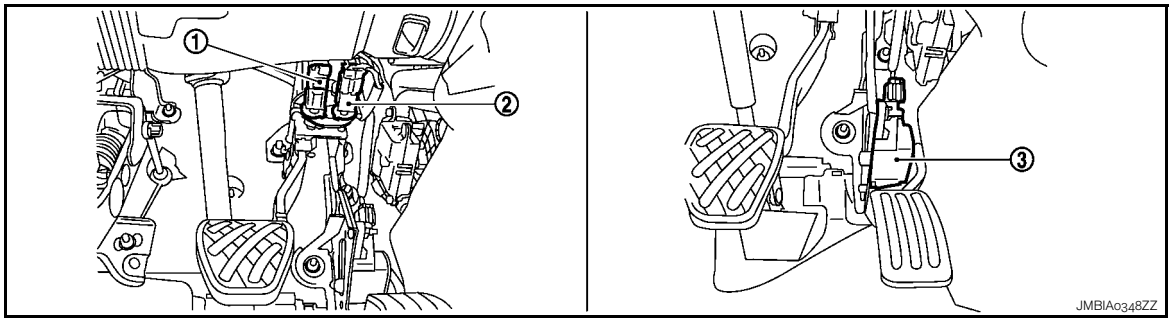
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

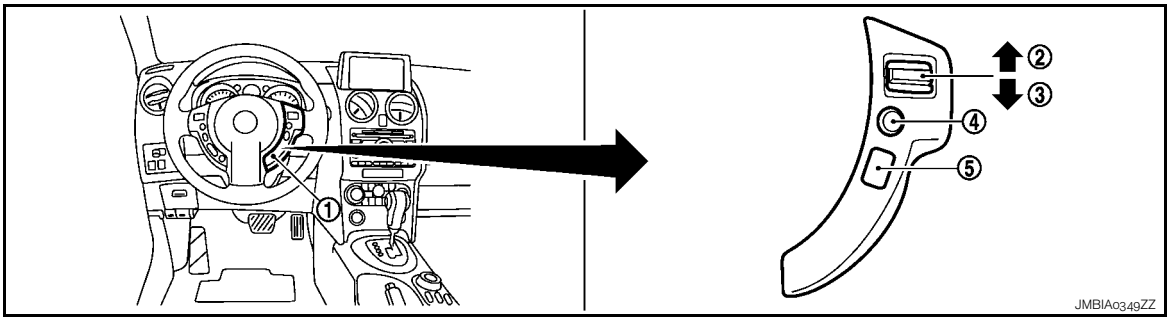


1. ASCD clutch switch 2. Data link connector

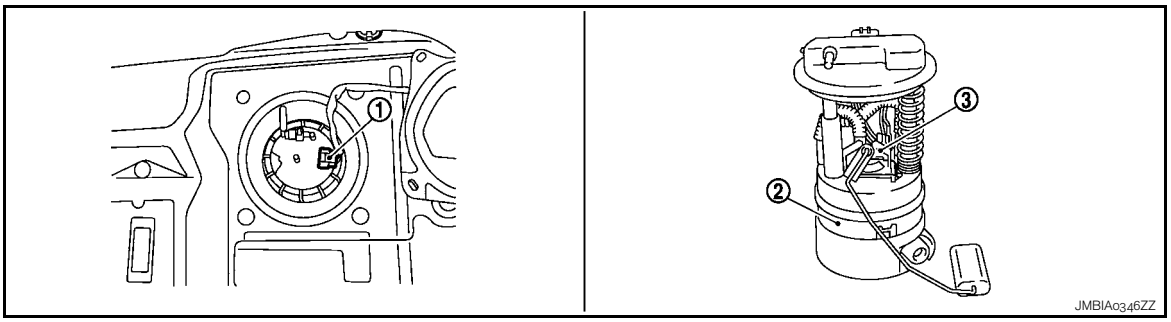


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000000936636

Component	Reference
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
Intake valve timing control solenoid valve	EC-700, "System Diagram"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000000936637

INTRODUCTION

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	Diagnostic service
Diagnostic Trouble Code (DTC)	Service $03 of SAE J1979
Freeze Frame data	Service $02 of SAE J1979
System Readiness Test (SRT) code	Service $01 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Service $07 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Service $06 of SAE J1979
Calibration ID	Service $09 of SAE J1979

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-III	×	×	×	×	×	—
GST	×	×	×	—	×	×
ECM	×	×*	—	—	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator (MI) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-959, "Fail Safe".)

TWO TRIP DETECTION LOGIC

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MI will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MI lights up. The MI lights up at the same time when the DTC is stored. <2nd trip>

The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MI, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

×: Applicable —: Not applicable

Items	MI				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to EC-962, "DTC Index".)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

DTC AND FREEZE FRAME DATA

DTC and 1st Trip DTC

cardiagn.com

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.
If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MI will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MI lights up. In other words, the DTC is stored in the ECM memory and the MI lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MI during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.
Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”.
For malfunctions in which 1st trip DTCs are displayed, refer to “EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS”. These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-III.
1st trip DTC is specified in Service $07 of SAE J1979. 1st trip DTC detection occurs without lighting up the MI and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.
When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to EC-638, "Work Flow". Then perform DTC CONFIRMATION PROCEDURE or Component Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, absolute throttle position, base fuel schedule and intake air temperature at the moment a malfunction is detected.
Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST.
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MI on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes CVT related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.
Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”.

How to Read DTC and 1st Trip DTC

With CONSULT-III
With GST
CONSULT-III or GST (Generic Scan Tool) Examples: P0340, P1148, P1706, etc.
These DTCs are prescribed by SAE J2012.

cardiagn.com

(CONSULT-III also displays the malfunctioning component or system.)

No Tools

The number of blinks of the MI in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0340, 1148, 1706, etc.

These DTCs are controlled by NISSAN.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST or the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-III can identify malfunction status as shown below. Therefore, using CONSULT-III (if available) is recommended.**

DTC or 1st trip DTC of a malfunction is displayed in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-III. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be [0].

If a 1st trip DTC is stored in the ECM, the time data will be [1t].

How to Erase DTC and 1st Trip DTC

With CONSULT-III

The emission related diagnostic information in the ECM can be erased by selecting “All Erase” in the “Description” of “FINAL CHECK” mode with CONSULT-III.

With GST

The emission related diagnostic information in the ECM can be erased by selecting Service $04 with GST.

NOTE:

If the DTC is not for CVT related items (see EC-962, "DTC Index"), skip step 2.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform TM-214, "Diagnosis Description". (The DTC in TCM will be erased)
3. Select Service $04 with GST (Generic Scan Tool).

No Tools

NOTE:

If the DTC is not for CVT related items (see EC-962, "DTC Index"), skip step 2.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform TM-214, "Diagnosis Description". (The DTC in the TCM will be erased.)
3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal.

- **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**
- **The following data are cleared when the ECM memory is erased.**

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Service $01 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating “INCMP”, use the information in this Service Manual to set the SRT to “CMPLT”.

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate “CMPLT” for each application system. Once set as “CMPLT”, the SRT status remains “CMPLT” until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate “INCMP” for these items.

NOTE:

The SRT will also indicate “INCMP” if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

cardiagn.com

If, during the state emissions inspection, the SRT indicates “CMPLT” for all test items, the inspector will continue with the emissions test. However, if the SRT indicates “INCMP” for one or more of the SRT items the vehicle is returned to the customer untested.

NOTE:

If MI is ON during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates “CMPLT” for all test items. Therefore, it is important to check SRT (“CMPLT”) and DTC (No DTCs) before the inspection.

SRT Item

The table below shows required self-diagnostic items to set the SRT to “CMPLT”.

SRT item (CONSULT-III indication)	Performance Priority*	Required self-diagnostic items to set the SRT to “CMPLT”	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
HO2S	1	Heated oxygen sensor 1	P1133
		Heated oxygen sensor 1	P1143
		Heated oxygen sensor 1	P1144
		Heated oxygen sensor 2	P0139
		Heated oxygen sensor 2	P1146
		Heated oxygen sensor 2	P1147
HO2S HTR	1	Heated oxygen sensor 1 heater	P0135
		Heated oxygen sensor 2 heater	P0141

*: If completion of several SRTs is required, perform driving patterns (DTC CONFIRMATION PROCEDURE), one by one based on the priority for models with CONSULT-III.

SRT Set Timing

SRT is set as “CMPLT” after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example				
		Diagnosis	Ignition cycle ← ON → OFF ← ON → OFF ← ON → OFF ← ON →			
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)
		P0402	OK (1)	— (1)	— (1)	OK (2)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“CMPLT”	“CMPLT”	“CMPLT”	“CMPLT”
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)
		P0402	— (0)	— (0)	OK (1)	— (1)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“INCMP”	“INCMP”	“CMPLT”	“CMPLT”
NG exists	Case 3	P0400	OK	OK	—	—
		P0402	—	—	—	—
		P1402	NG	—	NG	NG (Consecutive NG)
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MI ON)
		SRT of EGR	“INCMP”	“INCMP”	“INCMP”	“CMPLT”

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

cardiagn.com

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate “CMPLT”. → Case 1 above
When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate “CMPLT” at the time the respective self-diagnoses have at least one OK result. → Case 2 above
If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate “CMPLT”. → Case 3 above
The table above shows that the minimum number of cycles for setting SRT as “INCMP” is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

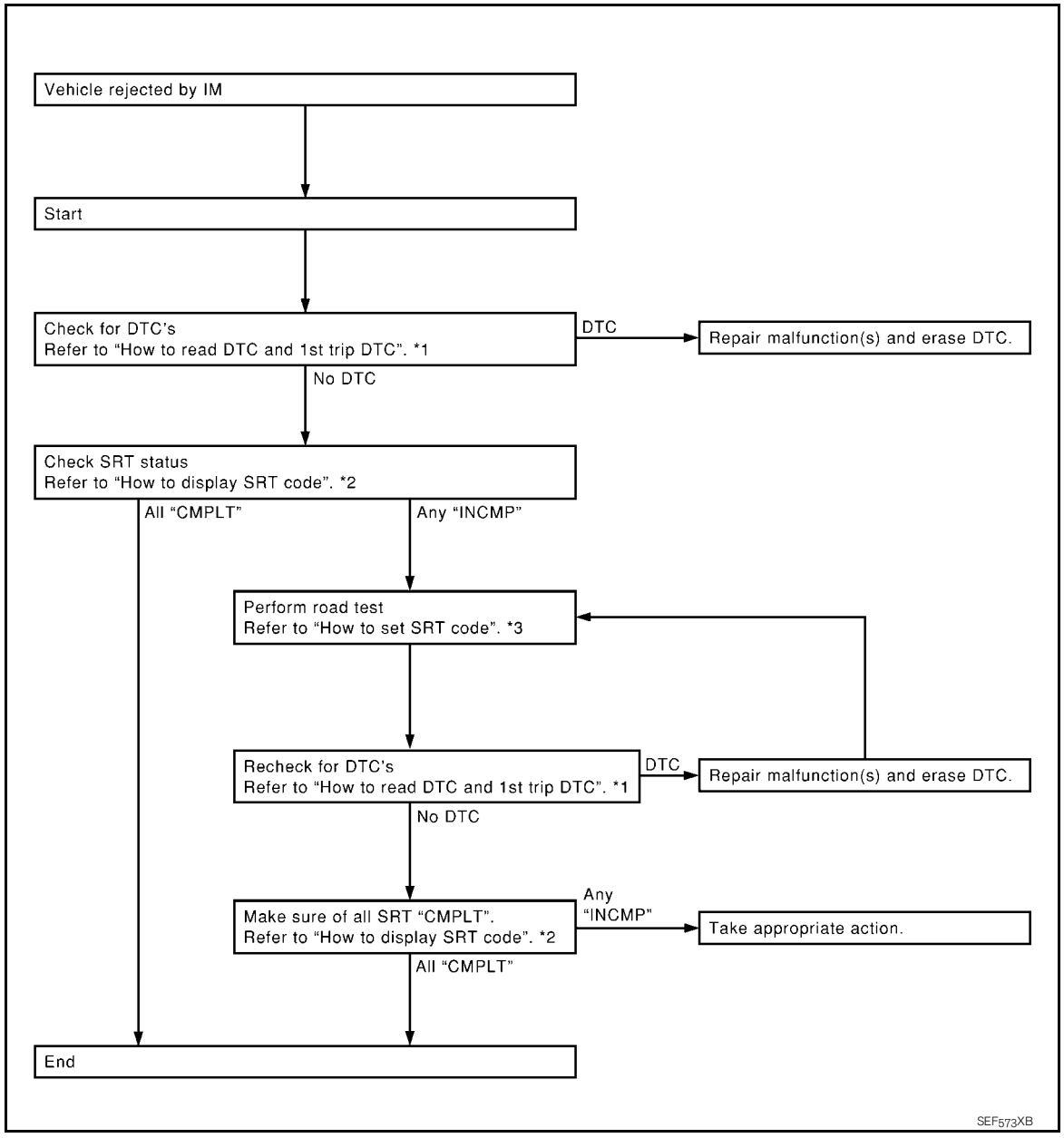
- The SRT will indicate “CMPLT” at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires “CMPLT” of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to “CMPLT” of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate “INCMP”.

  NOTE:
  SRT can be set as “CMPLT” together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates “CMPLT”.

SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating “INCMP”, review the flowchart diagnostic sequence on the next page.

cardiagn.com



*1 "How to Read DTC and 1st Trip DTC" *2 "How to Display SRT Status" *3 "How to Set SRT Code"

How to Display SRT Code

WITH CONSULT-III

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-III.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-III screen; for items whose SRT codes are not set, "INCMP" is displayed.

WITH GST

Selecting Service $01 with GST (Generic Scan Tool)

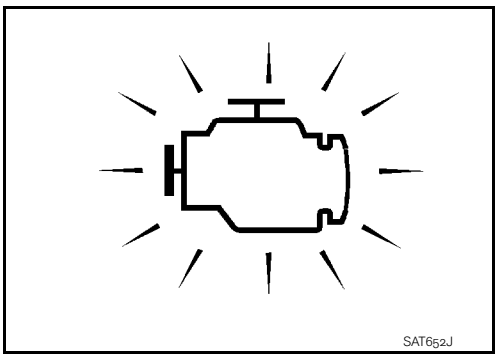
MALFUNCTION INDICATOR (MI)

Description

cardiagn.com

The MI is located on the instrument panel.

1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   If the MI does not light up, check MI circuit. Refer to MWI-15, "WARNING LAMPS/INDICATOR LAMPS : System Diagram".
2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



On Board Diagnostic System Function
The on board diagnostic system has the following four functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position Engine stopped	BULB CHECK	This function checks the MI bulb for damage (blown, open circuit, etc.). If the MI does not come on, check MI circuit.
	Engine running	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MI will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MI in the 1st trip. • Misfire (Possible three way catalyst damage) • One trip detection diagnoses
Mode II	Ignition switch in ON position Engine stopped	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

Diagnostic Test Mode I — Bulb Check
In this mode, the MI on the instrument panel should stay ON. If it remains OFF, check MI circuit. Refer to MWI-15, "WARNING LAMPS/INDICATOR LAMPS : System Diagram".

Diagnostic Test Mode I — Malfunction Warning

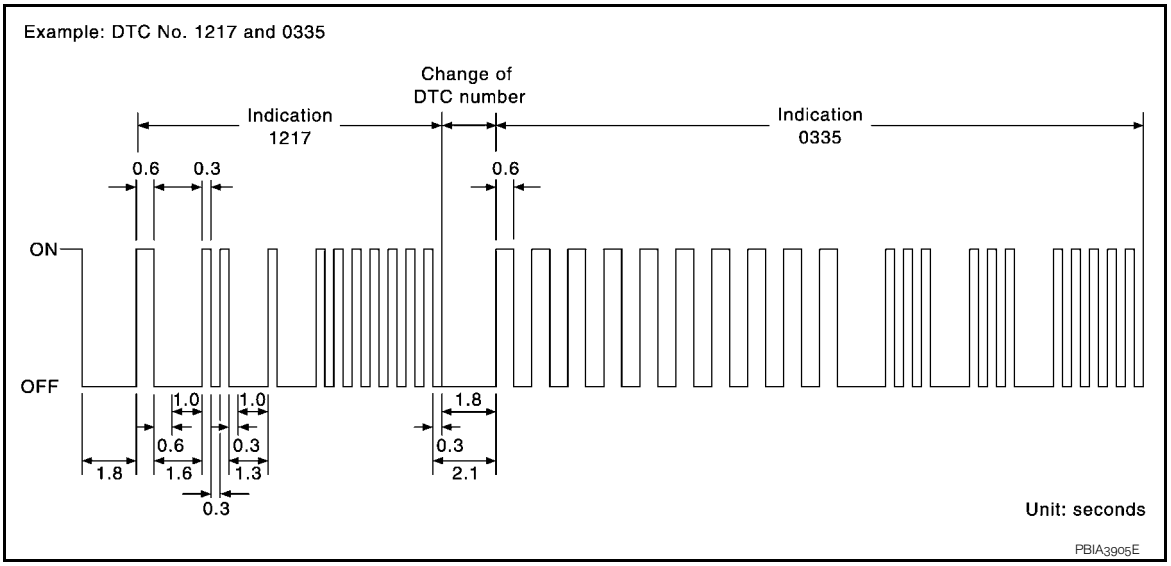
MI	Condition
ON	When the malfunction is detected.
OFF	No malfunction.

This DTC number is clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

Diagnostic Test Mode II — Self-diagnostic Results

cardiagn.com

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MI as shown below.
The DTC and 1st trip DTC are displayed at the same time. If the MI does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MI illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT-III or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.
The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.
A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.
A change from one trouble code to another occurs at an interval of 1.8-second OFF.
In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See EC-962, "DTC Index".)
HOW TO ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)
The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to “HOW to ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)”.
- **If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- **Be careful not to erase the stored memory before starting trouble diagnoses.**

Diagnostic Test Mode II — Heated Oxygen Sensor 1 Monitor
In this mode, the MI displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MI	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.
Next run engine at about 2,000 rpm for about 2 minutes under no load conditions. Then make sure that the MI comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no load.
MI FLASHING WITHOUT DTC
If the ECM is in Diagnostic Test Mode II, MI may flash when engine is running. In this case, check ECM diagnostic test mode. How to switch the diagnostic test (function) modes, and details of the above functions are described later. Refer to “How to Switch Diagnostic Test Mode”.
The following emission-related diagnostic information is cleared when the ECM memory is erased.
- Diagnostic trouble codes

cardiagn.com

- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

How to Switch Diagnostic Test Mode

NOTE:

- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**
- **Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.**

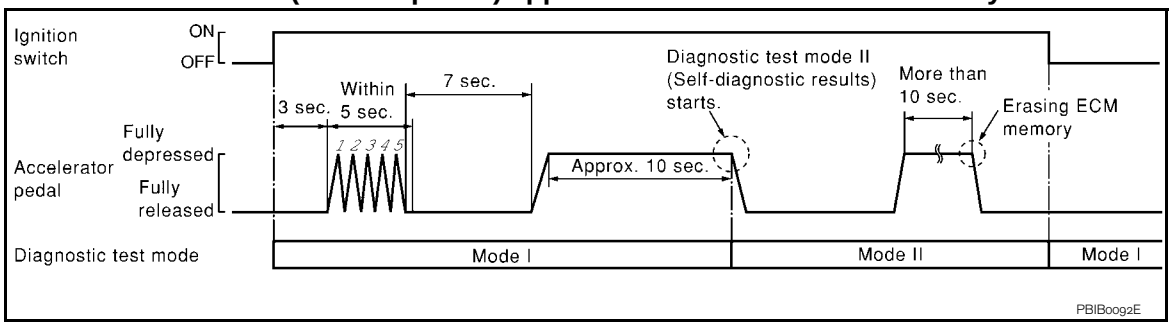
HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.

a. Fully depress the accelerator pedal.

b. Fully release the accelerator pedal.

3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MI starts blinking.
4. Fully release the accelerator pedal.
   ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).
   NOTE:
   Wait until the same DTC (or 1st trip DTC) appears to confirm all DTCs certainly.



HOW to SET DIAGNOSTIC TEST MODE II (HEATED OXYGEN SENSOR 1 MONITOR)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results).
   Refer to “HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)”.
2. Start Engine.
   ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).

HOW to ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to “HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)”.
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.
   The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

OBD System Operation Chart

Relationship Between MI, 1st Trip DTC, DTC and Detectable Items

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MI will come on.
- The MI will go off after the vehicle is driven 3 times (pattern B) with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (pattern C) without the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-III will count the number of times the vehicle is driven.

cardiagn.com

• The 1st trip DTC is not displayed when the self-diagnosis results in OK for the 2nd trip.

Summary Chart

Items	Fuel Injection System	Misfire	Other
MI (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

For details about patterns B and C under “Fuel Injection System” and “Misfire”, see “EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”.

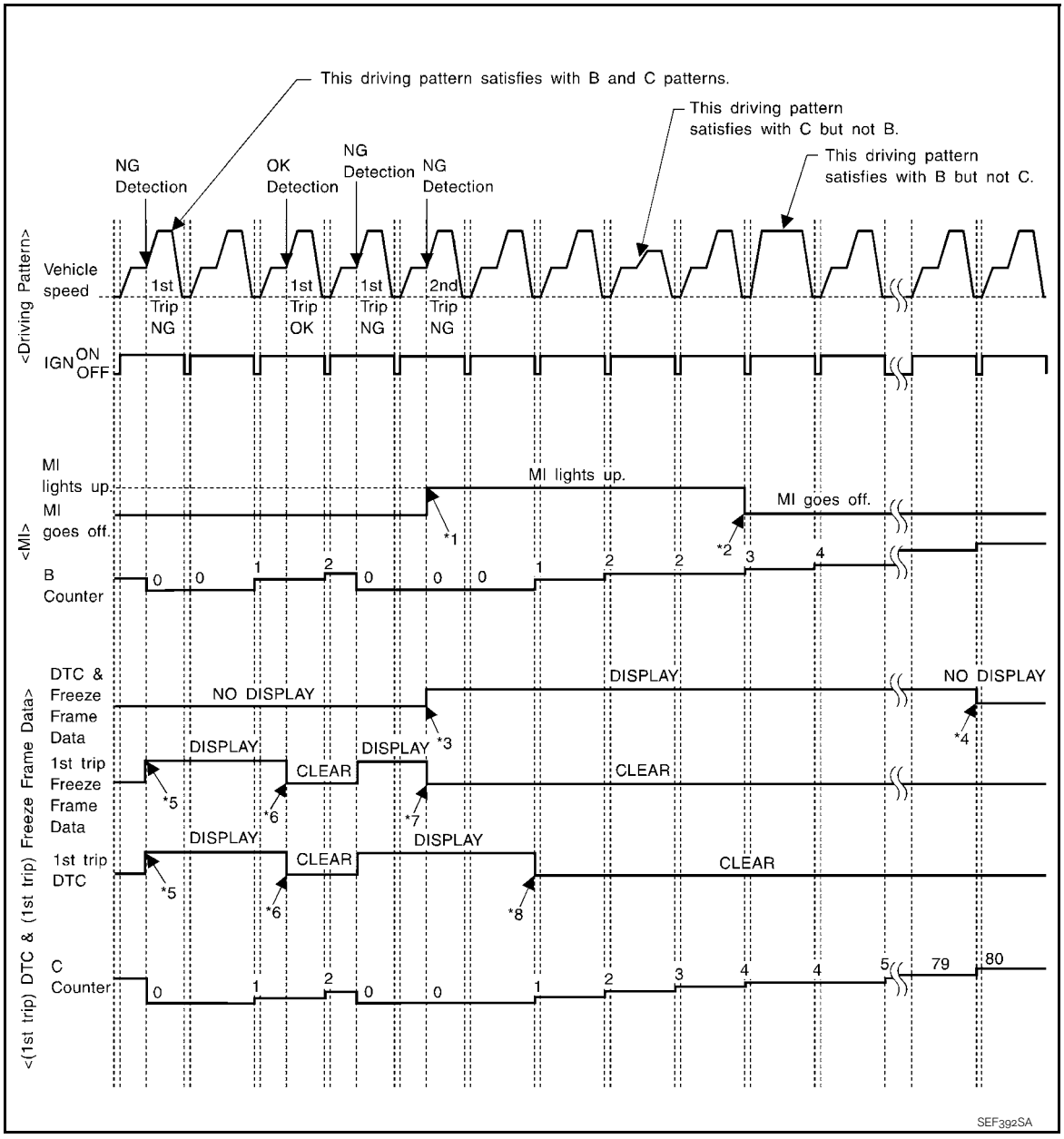
For details about patterns A and B under Other, see “EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”.

*1: Clear timing is at the moment OK is detected.

*2: Clear timing is when the same malfunction is detected in the 2nd trip.

Relationship Between MI, DTC, 1st Trip DTC and Driving Patterns for “Misfire <Exhaust Quality Deterioration>”, “Fuel Injection System”

cardiagn.com



*1: When the same malfunction is detected in two consecutive trips, MI will light up.

*2: MI will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

Explanation for Driving Patterns for “Misfire <Exhaust Quality Deterioration>”, “Fuel Injection System”
<Driving Pattern B>
Driving pattern B means the vehicle operation as follows:
All components and systems should be monitored at least once by the OBD system.

cardiagn.com

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MI will go off when the B counter reaches 3. (*2 in “OBD SYSTEM OPERATION CHART”)

<Driving Pattern C>
Driving pattern C means the vehicle operation as follows:
The following conditions should be satisfied at the same time:
Engine speed: (Engine speed in the freeze frame data) ±375 rpm
Calculated load value: (Calculated load value in the freeze frame data) x (1±0.1) [%]
Engine coolant temperature (T) condition:

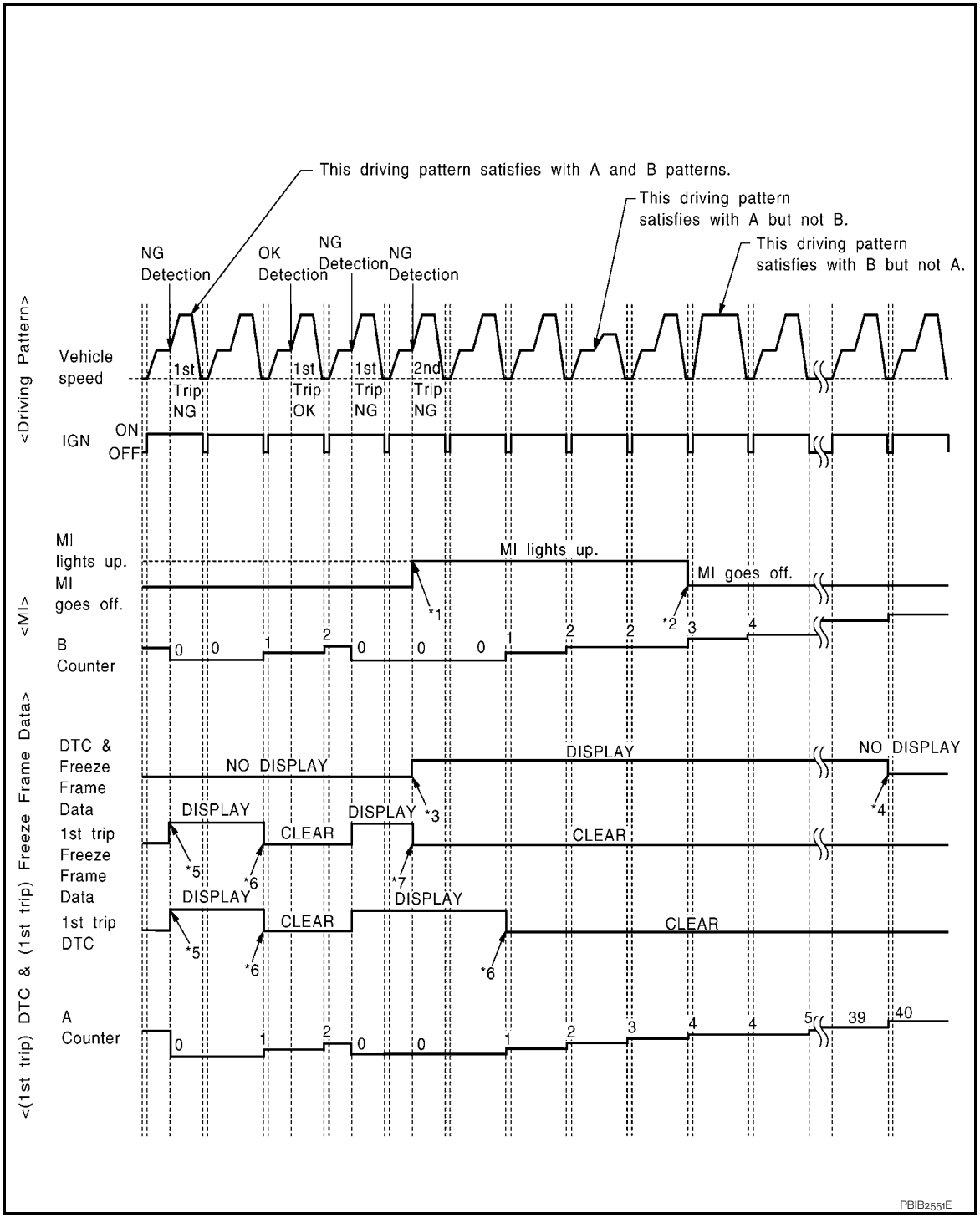
- When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F).

Example:
If the stored freeze frame data is as follows:
Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)
To be satisfied with driving pattern C, the vehicle should run under the following conditions:
Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

Relationship Between MI, DTC, 1st Trip DTC and Driving Patterns Except For “Misfire <Exhaust Quality Deterioration>”, “Fuel Injection System”

cardiagn.com



*1: When the same malfunction is detected in two consecutive trips, MI will light up.

*2: MI will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

cardiagn.com

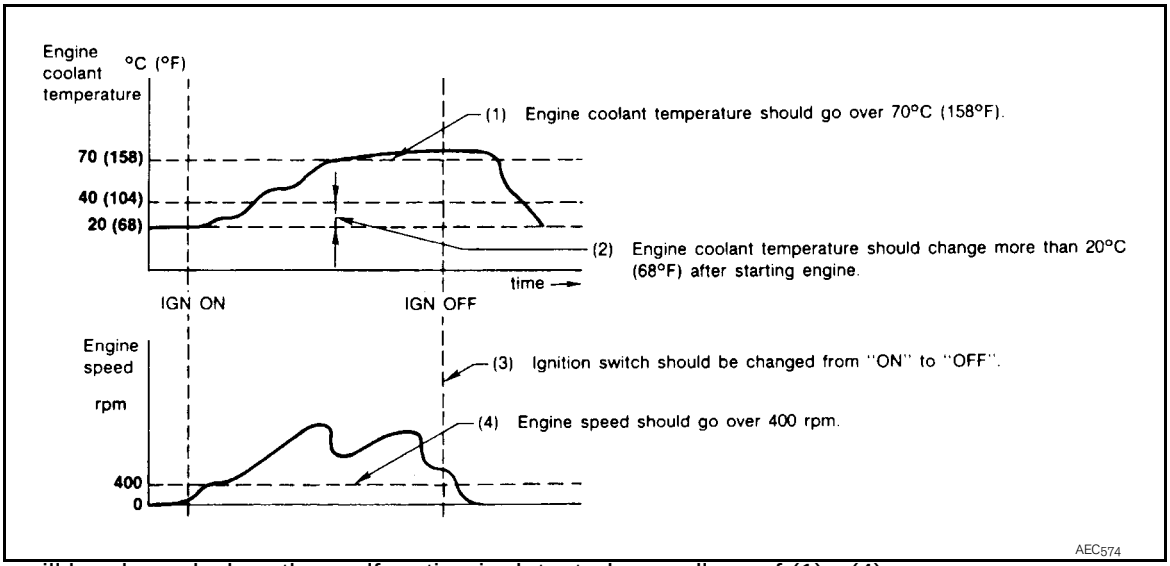
*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

Explanation for Driving Patterns Except for “Misfire <Exhaust Quality Deterioration>”, “Fuel Injection System”
<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>
Driving pattern B means the vehicle operation as follows:
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MI will go off when the B counter reaches 3 (*2 in OBD SYSTEM OPERATION CHART).

CONSULT-III Function

INFOID:0000000000936638

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECU part number	ECM part number can be read.

*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data

cardiagn.com

- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

		Item	DIAGNOSTIC TEST MODE							
			WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
				DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor (POS)		×	×	×	×			
		Camshaft position sensor (PHASE)		×	×	×	×			
		Mass air flow sensor		×		×	×			
		Engine coolant temperature sensor		×	×	×	×	×		
		Heated oxygen sensor 1		×		×	×		×	×
		Heated oxygen sensor 2		×		×	×		×	×
		Wheel sensor		×	×	×	×			
		Accelerator pedal position sensor		×		×	×			
		Throttle position sensor		×		×	×			
		Intake air temperature sensor		×	×	×	×			
		Knock sensor		×						
		EPS control unit				×	×			
		Refrigerant pressure sensor				×	×			
		Closed throttle position switch (accelerator pedal position sensor signal)				×	×			
		Air conditioner switch				×	×			
		Park/neutral position (PNP) switch		×		×	×			
		Stop lamp switch		×		×	×			
		Battery voltage				×	×			
		Load signal				×	×			
		ASCD steering switch		×		×				
		ASCD break switch		×		×				
ENGINE CONTROL COMPONENT PARTS	OUTPUT	Fuel injector				×	×	×		
		Power transistor (Ignition timing)				×	×	×		
		Throttle control motor relay		×		×	×			
		Throttle control motor		×						
		EVAP canister purge volume control solenoid valve		×		×	×	×		×
		Air conditioner relay				×	×			
		Fuel pump relay	×			×	×	×		
		Cooling fan relay		×		×	×	×		
		Heated oxygen sensor 1 heater		×		×	×		×	
		Heated oxygen sensor 2 heater		×		×	×		×	
		Intake valve timing control solenoid valve		×		×	×	×		
		Calculated load value			×	×	×			

cardiagn.com

X: Applicable

*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-706, "Diagnosis Description".

WORK SUPPORT MODE

Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	• FUEL PUMP WILL STOP BY TOUCHING “START” DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	• THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.	When learning the idle air volume
SELF-LEARNING CONT	• THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.	When clearing mixture ratio self-learning value
TARGET IDLE RPM ADJ*	• IDLE CONDITION	When setting target idle speed
TARGET IGN TIM ADJ*	• IDLE CONDITION	When adjusting target ignition timing

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to EC-962, "DTC Index".)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	• The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to EC-962, "DTC Index".)
FUEL SYS-B1	• “Fuel injection system status” at the moment a malfunction is detected is displayed. • One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop
COOLANT TEMP [°C] or [°F]	• The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	• “Long-term fuel trim” at the moment a malfunction is detected is displayed. • The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	• “Short-term fuel trim” at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	• The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	• The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH·P/S [%]	• The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	• The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	• The intake air temperature at the moment a malfunction is detected is displayed.

*: The items are the same as those of 1st trip freeze frame data.

cardiagn.com

DATA MONITOR MODE

Monitored Item

×: Applicable

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	• Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	• Accuracy becomes poor if engine speed drops below the idle rpm. • If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1	V	• The signal voltage of the mass air flow sensor is displayed.	• When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”.
B/FUEL SCHDL	msec	• “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	• When engine is running specification range is indicated in “SPEC”.
A/F ALPHA-B1	%	• The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	• When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”. • This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S	°C or °F	• The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	• When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
H02S1 (B1)	V	• The signal voltage of the heated oxygen sensor 1 is displayed.	
HO2S2 (B1)	V	• The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S1 MNTR (B1)	RICH/LEAN	• Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH: means the mixture became “rich”, and control is being affected toward a leaner mixture. LEAN: means the mixture became “lean”, and control is being affected toward a rich mixture.	• After turning ON the ignition switch, “RICH” is displayed until air-fuel mixture ratio feedback control begins. • When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S2 MNTR(B1)	RICH/LEAN	• Display of heated oxygen sensor 2 signal: RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large.	• When the engine is stopped, a certain value is indicated.
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
BATTERY VOLT	V	• The power supply voltage of ECM is displayed.	
ACCEL SEN 1	V	• The accelerator pedal position sensor signal voltage is displayed.	• ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
ACCEL SEN 2			
THRTL SEN 1-B1	V	• The throttle position sensor signal voltage is displayed.	• THRTL SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
THRTL SEN 2-B1			
START SIGNAL	ON/OFF	• Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.	• After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS	ON/OFF	• Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.	

cardiagn.com

Monitored item	Unit	Description	Remarks
AIR COND SIG	ON/OFF	• Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW	ON/OFF	• Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.	
PW/ST SIGNAL	ON/OFF	• [ON/OFF] condition of the power steering system (determined by the signal sent from ESP control unit) is indicated.	
LOAD SIGNAL	ON/OFF	• Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF.	
IGNITION SW	ON/OFF	• Indicates [ON/OFF] condition from ignition switch signal.	
HEATER FAN SW	ON/OFF	• Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW	ON/OFF	• Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1	msec	• Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	• When the engine is stopped, a certain computed value is indicated.
IGN TIMING	BTDC	• Indicates the ignition timing computed by ECM according to the input signals.	• When the engine is stopped, a certain value is indicated.
PURG VOL C/V	%	• Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. • The opening becomes larger as the value increases.	
INT/V TIM (B1)	°CA	• Indicates [°CA] of intake camshaft advance angle.	
INT/V SOL-B1	%	• The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. • The advance angle becomes larger as the value increases.	
AIR COND RLY	ON/OFF	• The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.	
FUEL PUMP RLY	ON/OFF	• Indicates the fuel pump relay control condition determined by ECM according to the input signals.	
THRTL RELAY	ON/OFF	• Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
COOLING FAN	HI/LOW/OFF	• Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation LOW: Low speed operation OFF: Stop	
HO2S1 HTR (B1)	ON/OFF	• Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM accordining to the input signals.	
HO2S2 HTR (B1)	ON/OFF	• Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.	

cardiagn.com

Monitored item	Unit	Description	Remarks
VEHICLE SPEED	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.	
IDL A/V LEARN	YET/CMPLT	• Display the condition of Idle Air Volume Learning YET: Idle air volume learning has not been performed yet. CMPLT: Idle air volume learning has already been performed successfully.	
02SEN HTR DTY	%	• Indicates the heated oxygen sensor 1 heater control value computed by the ECM according to the input signals.	
AC PRESS SEN	V	• The signal voltage from the refrigerant pressure sensor is displayed.	
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
SET VHCL SPD	km/h or mph	• The preset vehicle speed is displayed.	
MAIN SW	ON/OFF	• Indicates [ON/OFF] condition from MAIN switch signal.	
CANCEL SW	ON/OFF	• Indicates [ON/OFF] condition from CANCEL switch signal.	
RESUME/ACC SW	ON/OFF	• Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal.	
SET SW	ON/OFF	• Indicates [ON/OFF] condition from SET/COAST switch signal.	
BRAKE SW1	ON/OFF	• Indicates [ON/OFF] condition from ASCD brake switch signal.	
BRAKE SW2	ON/OFF	• Indicates [ON/OFF] condition of stop lamp switch signal.	
VHCL SPD CUT	NON/CUT	• Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.	
LO SPEED CUT	NON/CUT	• Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off.	
AT OD MONITOR	ON/OFF	• Indicates [ON/OFF] condition of CVT O/D according to the input signal from the TCM.	• For M/T models, always “OFF” is displayed.
AT OD CANCEL	ON/OFF	• Indicates [ON/OFF] condition of CVT O/D cancel request signal.	• For M/T models, always “OFF” is displayed.
CRUISE LAMP	ON/OFF	• Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.	
SET LAMP	ON/OFF	• Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.	
Voltage	V	• Voltage, frequency, duty cycle or pulse width measured by the probe.	• Only “#” is displayed if item is unable to be measured. • Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency	msec, Hz or %		
DUTY-HI	—		
DUTY-LOW			
PLS WIDTH-HI			
PLS WIDTH-LOW			

NOTE:

cardiagn.com

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	• Engine: Return to the original trouble condition • Change the amount of fuel injection using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Fuel injector • Heated oxygen sensor 1
IGNITION TIMING	• Engine: Return to the original trouble condition • Timing light: Set • Retard the ignition timing using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Perform Idle Air Volume Learning.
POWER BALANCE	• Engine: After warming up, idle the engine. • A/C switch OFF • Shift lever: P or N (CVT), Neutral (M/T) • Cut off each fuel injector signal one at a time using CONSULT-III.	Engine runs rough or dies.	• Harness and connectors • Compression • Fuel injector • Power transistor • Spark plug • Ignition coil
COOLING FAN*	• Ignition switch: ON • Turn the cooling fan “LOW”, “HI” and “OFF” CONSULT-III.	Cooling fan moves and stops.	• Harness and connectors • IPDM E/R (Cooling fan relay) • Cooling fan motor
ENG COOLANT TEMP	• Engine: Return to the original trouble condition • Change the engine coolant temperature using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Engine coolant temperature sensor • Fuel injector
FUEL PUMP RELAY	• Ignition switch: ON (Engine stopped) • Turn the fuel pump relay “ON” and “OFF” using CONSULT-III and listen to operating sound.	Fuel pump relay makes the operating sound.	• Harness and connectors • Fuel pump relay
PURG VOL CONT/V	• Engine: After warming up, run engine at 1,500 rpm. • Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III.	Engine speed changes according to the opening percent.	• Harness and connectors • Solenoid valve
V/T ASSIGN ANGLE	• Engine: Return to the original trouble condition • Change intake valve timing using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Intake valve timing control solenoid valve

*: Leaving cooling fan OFF with CONSULT-III while engine is running may cause the engine to overheat.

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode
For details, refer to EC-706, "Diagnosis Description".

SRT WORK SUPPORT Mode
This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

DTC WORK SUPPORT Mode

cardiagn.com

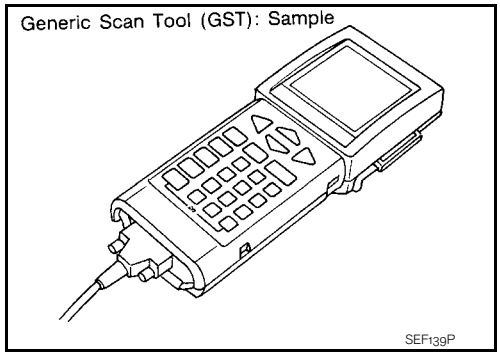
Test mode	Test item	Condition	Reference page
HO2S1	HO2S1 (B1) P0133	Refer to corresponding trouble diagnosis for DTC.	EC-764
	HO2S1 (B1) P0134		EC-770
	HO2S1 (B1) P1143		EC-770
	HO2S1 (B1) P1144		EC-849
HO2S2	HO2S2 (B1) P0139		EC-782
	HO2S2 (B1) P1146		EC-854
	HO2S2 (B1) P1147		EC-861

Diagnosis Tool Function

INFOID:0000000000936639

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained below.
ISO9141 is used as the protocol.
The name “GST” or “Generic Scan Tool” is used in this service manual.



FUNCTION

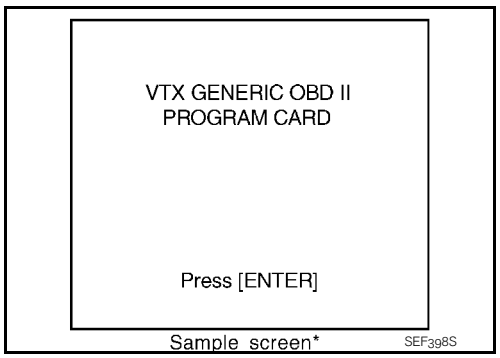
Diagnostic Service		Function
Service $01	READINESS TESTS	This diagnostic service gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
Service $02	(FREEZE DATA)	This diagnostic service gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-962, "DTC Index".
Service $03	DTCs	This diagnostic service gains access to emission-related power train trouble codes which were stored by ECM.
Service $04	CLEAR DIAG INFO	This diagnostic service can clear all emission-related diagnostic information. This includes: • Clear number of diagnostic trouble codes (Service $01) • Clear diagnostic trouble codes (Service $03) • Clear trouble code for freeze frame data (Service $01) • Clear freeze frame data (Service $02) • Reset status of system monitoring test (Service $01) • Clear on board monitoring test results (Service $06 and $07)
Service $06	(ON BOARD TESTS)	This diagnostic service accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
Service $07	(ON BOARD TESTS)	This diagnostic service enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
Service $08	—	This diagnostic service is not applicable on this vehicle.
Service $09	(CALIBRATION ID)	This diagnostic service enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

INSPECTION PROCEDURE

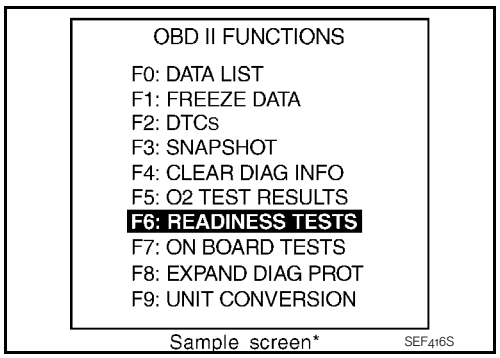
1. Turn ignition switch OFF.
2. Connect “GST” to data link connector, which is located under LH dash panel near the hood opener handle.

cardiagn.com

3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.
   (*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.
   For further information, see the GST Operation Manual of the tool maker.



cardiagn.com

COMPONENT DIAGNOSIS

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:0000000000936640

The specification (SP) value indicates the tolerance of the value that is displayed in “SPEC” of “DATA MONITOR” mode of CONSULT-III during normal operation of the Engine Control System. When the value in “SPEC” of “DATA MONITOR” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “SPEC” of “DATA MONITOR” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.
The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MI.
The SP value will be displayed for the following three items:
- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

Component Function Check

INFOID:0000000000936641

1. START

Make sure that all of the following conditions are satisfied.
- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (0.983 - 1.043 bar, 1.003 - 1.064 kg/cm^2, 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up
- CVT models: After the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (CVT fluid temperature sensor signal) indicates more than 60°C (140°F).
- M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- Electrical load: Not applied*
- Engine speed: Idle

*: Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.

>> GO TO 2.

2. PERFORM “SPEC” OF “DATA MONITOR” MODE

With CONSULT-III
NOTE:
Perform “SPEC” in “DATA MONITOR” mode in maximum scale display.
1. Perform EC-642, "BASIC INSPECTION : Special Repair Requirement".
2. Select “B/FUEL SCHDL”, “A/F ALPHA-B1” and “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode with CONSULT-III.
3. Make sure that monitor items are within the SP value.

Is the inspection result normal?

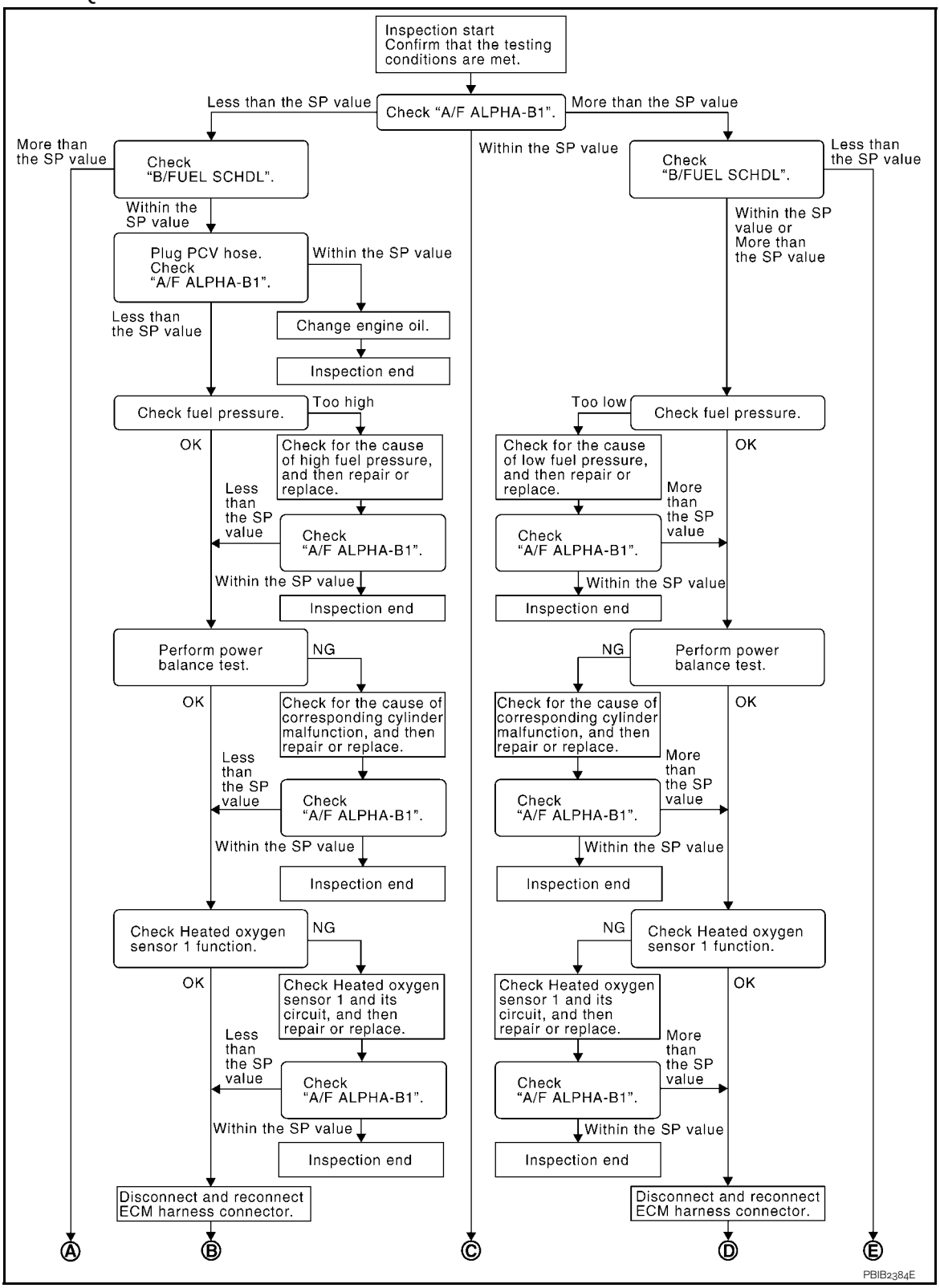
YES >> END
NO >> Go to EC-728, "Diagnosis Procedure".

Diagnosis Procedure

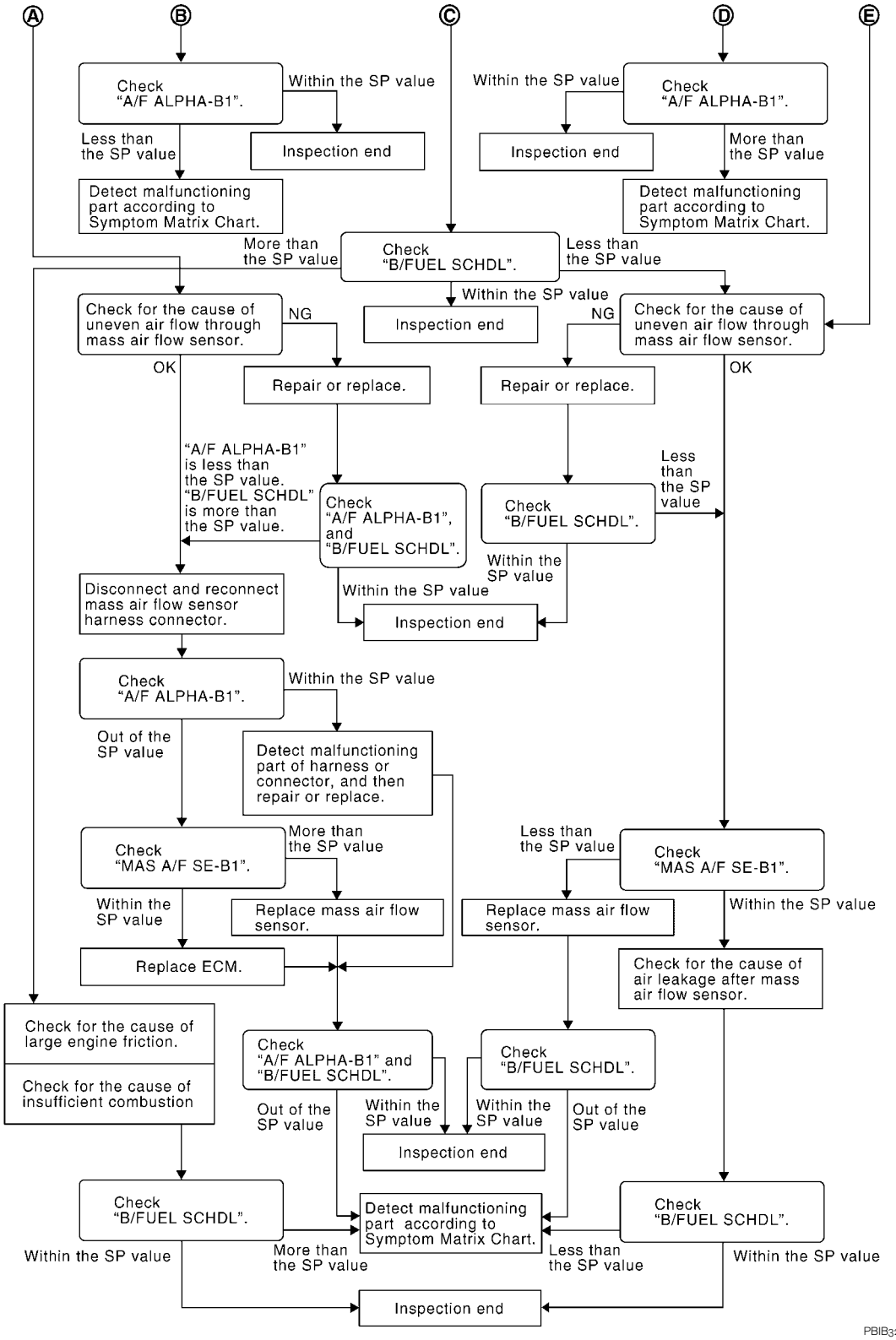
INFOID:0000000000936642

cardiagn.com

OVERALL SEQUENCE



cardiagn.com



DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1"

With CONSULT-III

1. Start engine.
2. Confirm that the testing conditions are met. Refer to EC-728, "Component Function Check".
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

cardiagn.com

NOTE:
Check “A/F ALPHA-B1” for approximately 1 minute because they may fluctuate. It is NG if the indication is out of the SP value even a little.

Is the measurement value within the SP value?

YES >> GO TO 17.
NO-1 >> Less than the SP value: GO TO 2.
NO-2 >> More than the SP value: GO TO 3.

2. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 4.
NO >> More than the SP value: GO TO 19.

3. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 6.
NO-1 >> More than the SP value: GO TO 6.
NO-2 >> Less than the SP value: GO TO 25.

4. CHECK “A/F ALPHA-B1”

1. Stop the engine.
2. Disconnect PCV hose, and then plug it.
3. Start engine.
4. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 5.
NO >> GO TO 6.

5. CHANGE ENGINE OIL

1. Stop the engine.
2. Change engine oil.

NOTE:
This symptom may occur when a large amount of gasoline is mixed with engine oil because of driving conditions (such as when engine oil temperature does not rise enough since a journey distance is too short during winter). The symptom will not be detected after changing engine oil or changing driving condition.

>> **INSPECTION END**

6. CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-978, "Inspection".)

Is the inspection result normal?

YES >> GO TO 9.
NO-1 >> Fuel pressure is too high: Replace “fuel filter and fuel pump assembly” and then GO TO 8.
NO-2 >> Fuel pressure is too low: GO TO 7.

7. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly” and then GO TO 8.
NO >> Repair or replace and then GO TO 8.

8. CHECK “A/F ALPHA-B1”

cardiagn.com

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 9.

9.PERFORM POWER BALANCE TEST

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 10.

10.DETECT MALFUNCTIONING PART

Check the following.
1. Ignition coil and its circuit (Refer to EC-929, "Component Function Check".)
2. Fuel injector and its circuit (Refer to EC-923, "Component Function Check".)
3. Intake air leakage
4. Low compression pressure (Refer to EM-142, "Inspection".)

Is the inspection result normal?

YES >> Replace fuel injector and then GO TO 11.
NO >> Repair or replace malfunctioning part and then GO TO 11.

11.CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

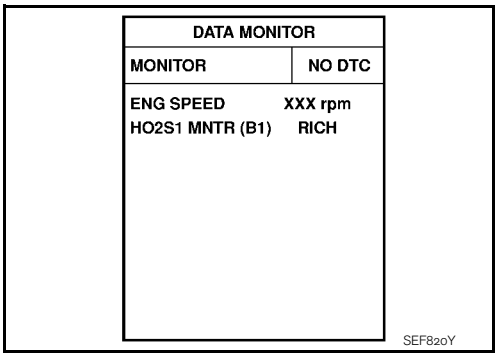
Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 12.

12.CHECK HEATED OXYGEN SENSOR 1 FUNCTION

1. Run engine at about 2,000 rpm for about 2minutes under no load.
2. Select “HO2S MNTR (B1)”, in “DATA MONITOR” mode.
3. Running engine at 2,000 rpm under no load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time : RICH → LEAN → RICH
2 times : RICH → LEAN → RICH → LEAN → RICH



Is the inspection result more than 5 times during 10 seconds?

YES >> GO TO 15.
NO >> GO TO 13.

13.CHECK HEATED OXYGEN SENSOR 1 CIRCUIT

Check heated oxygen sensor 1 and its circuit, refer to.

>> GO TO 14.

14.CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 15.

15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.

>> GO TO 16.

16. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-967, "Symptom Table".

17. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO-1 >> More than the SP value: GO TO 18.
NO-2 >> Less than the SP value: GO TO 25.

18. DETECT MALFUNCTIONING PART

1. Check for the cause of large engine friction. Refer to the following.
- Engine oil level is too high
- Engine oil viscosity
- Belt tension of alternator, A/C compressor, etc. is excessive
- Noise from engine
- Noise from transmission, etc.
2. Check for the cause of insufficient combustion. Refer to the following.
- Valve clearance malfunction
- Intake valve timing control function malfunction
- Camshaft sprocket installation malfunction, etc.

>> Repair or replace malfunctioning part, and then GO TO 30.

19. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 21.
NO >> Repair or replace malfunctioning part, and then GO TO 20.

20. CHECK “A/F ALPHA-B1”, AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

YES >> **INSPECTION END**
NO >> “B/FUEL SCHDL” is more, “A/F ALPHA-B1” is less than the SP value: GO TO 21.

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.

cardiagn.com

2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

22. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to EC-746, "DTC Logic". Then GO TO 29.
NO >> GO TO 23.

23. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 24.
NO >> More than the SP value: Replace mass air flow sensor, and then GO TO 29.

24. REPLACE ECM

1. Replace ECM.
2. Go to EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> GO TO 29.

25. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 27.
NO >> Repair or replace malfunctioning part, and then GO TO 26.

26. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Less than the SP value: GO TO 27.

27. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 28.
NO >> Less than the SP value: Replace mass air flow sensor, and then GO TO 30.

28. CHECK INTAKE SYSTEM

Check for the cause of air leak after the mass air flow sensor. Refer to the following.
- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve

cardiagn.com

- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts
- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

29. CHECK “A/F ALPHA-B1” AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-967, "Symptom Table".

30. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and then make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-967, "Symptom Table".

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000000936643

1.INSPECTION START

Start engine.

Is engine running?

YES >> GO TO 8.
NO >> GO TO 2.

2.CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	93	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E105, M77
- 10A fuse (No. 4)
- Harness for open or short between ECM and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK GROUND CONNECTION-I

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace ground connection.

5.CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connectors.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
F7	10	Ground	Existed
	11		
E16	108		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between ECM and ground

cardiagn.com

>> Repair open circuit or short to power in harness or connectors.

7. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connectors.
2. Turn ignition switch ON.
3. Check the voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage
Connector	Terminal		
E11	10	Ground	Battery voltage

Is the inspection result normal?

YES >> Go to EC-929, "Diagnosis Procedure".
NO >> GO TO 8.

8. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V.

Is the inspection result normal?

YES >> GO TO 14.
NO-1 >> Battery voltage does not exist: GO TO 9.
NO-2 >> Battery voltage exists for more than a few seconds: GO TO 12.

9. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 11.

10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E16	105	E11	9	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair open circuit or short to ground or short power in harness or connectors.

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

cardiagn.com

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	32	E11	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 13.
NO >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.
- Junction block connectors E6, F123
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK 20A FUSE

1. Disconnect 20A fuse (No. 62) from IPDM E/R.
2. Check 20A fuse.

Is the inspection result normal?

YES >> GO TO 17.
NO >> Replace 20A fuse.

14. CHECK GROUND CONNECTION-II

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace ground connection.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
F7	10	Ground	Existed
	11		
E16	108		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 17.
NO >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors F121, E7
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

cardiagn.com

17.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to power in harness or connectors.

cardiagn.com

U1001 CAN COMM CIRCUIT

Description

INFOID:0000000000936644

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000000936645

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission related diagnosis) for 2 seconds or more.	• Harness or connectors (CAN communication line is open or shorted)

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.

Is DTC detected?

YES >> EC-740, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000936646

Go to LAN-46, "Trouble Diagnosis Flow Chart".

cardiagn.com

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000000936647

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000000936648

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1010	CAN communication bus	When detecting error during the initial diagnosis of CAN controller of ECM.	• ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-741, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000936649

1.INSPECTION START

With CONSULT-III
1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. Perform DTC CONFIRMATION PROCEDURE.
   See EC-741, "DTC Logic".
5. Check DTC.

With GST
1. Turn ignition switch ON.
2. Select “Service $04” with GST.
3. Perform DTC CONFIRMATION PROCEDURE.
   See EC-741, "DTC Logic".
4. Check DTC.

Is the DTC U1010 displayed again?

YES >> GO TO 2.
NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Go to EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

cardiagn.com

P0011 IVT CONTROL

DTC Logic

INFOID:0000000000936650

DTC DETECTION LOGIC

NOTE:
If DTC P0011 is displayed with DTC P1111, first perform the trouble diagnosis for EC-829, "DTC Logic".

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	• Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III
1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 3.5 msec (CVT) More than 4.2 msec (M/T)
Shift lever	P or N position (CVT) N position (M/T)

4. Stop vehicle with engine running and let engine idle for 10 seconds.
5. Check 1st trip DTC.

With GST
Follow the procedure “With CONSULT-III” above.

Is 1st trip DTC detected?

YES >> Go to EC-743, "Diagnosis Procedure"
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

With CONSULT-III
1. Maintain the following conditions for at least 20 consecutive seconds.

cardiagn.com

ENG SPEED	2,000 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 70°C (221°F)
Shift lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

CAUTION:
Always drive at a safe speed.

2. Check 1st trip DTC.

With GST

Follow the procedure “With CONSULT-III” above.

Is 1st trip DTC detected?

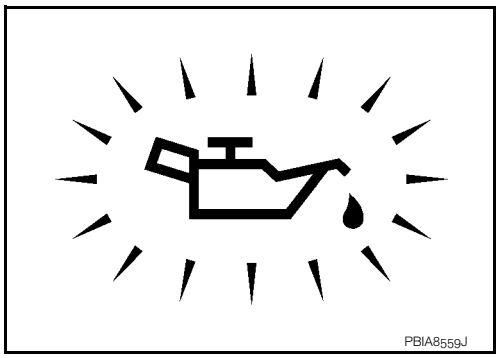
YES >> Go to EC-743, "Diagnosis Procedure"
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000936651

1. CHECK OIL PRESSURE WARNING LAMP

1. Start engine.
2. Check oil pressure warning lamp and confirm it is not illuminated.



Is oil pressure warning lamp illuminated?

YES >> Go to LU-14, "Inspection".
NO >> GO TO 2.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-744, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace intake valve timing control solenoid valve.

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-812, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace crankshaft position sensor (POS).

4. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-815, "Component Inspection".

Is the inspection result normal?

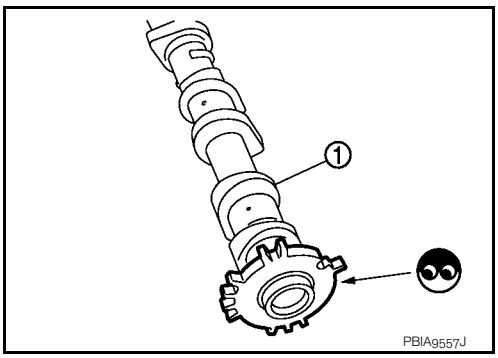
YES >> GO TO 5.
NO >> Replace camshaft position sensor (PHASE).

5. CHECK CAMSHAFT (INTAKE)

Check the following.

cardiagn.com

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end



Is the inspection result normal?

YES >> GO TO 6.
NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.

6. CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misaligned.

Are there any service records that may cause timing chain misaligned?

YES >> Check timing chain installation. Refer to EM-163, "Removal and Installation".
NO >> GO TO 7.

7. CHECK LUBRICATION CIRCUIT

Refer to EM-177, "Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000000936652

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	6.7 - 7.7 Ω
1 or 2 and ground	∞ Ω (Continuity should not exist)

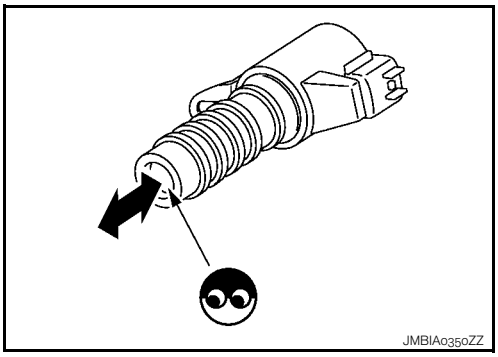
Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace intake valve timing control solenoid valve.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve.
2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:
Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
NOTE:
Always replace O-ring when intake valve timing control solenoid valve is removed.



Is the inspection result normal?

cardiagn.com

YES >> INSPECTION END
NO >> Replace intake valve timing control solenoid valve.

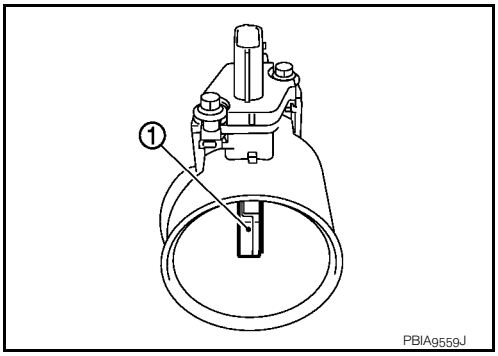
cardiagn.com

P0102, P0103 MAF SENSOR

Description

INFOID:0000000000936670

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



DTC Logic

INFOID:0000000000936671

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor
P0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

Which DTC is detected?

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102

1. Start engine and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-747, "Diagnosis Procedure".
NO >> INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-I

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-747, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-II

1. Start engine and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-747, "Diagnosis Procedure".

cardiagn.com

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000936672

1. INSPECTION START

Confirm the detected DTC.

Which DTC is detected?

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2. CHECK INTAKE SYSTEM

Check the following for connection.
- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

Is the inspection result normal?

YES >> GO TO 3.
NO >> Reconnect the parts.

3. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace ground connection.

4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between MAF sensor harness connector and ground.

MAF sensor		Ground	Voltage
Connector	Terminal		
E18	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between MAF sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	4	F8	52	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between MAF sensor harness connector and ECM harness connector.

cardiagn.com

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	3	F8	45	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK MASS AIR FLOW SENSOR

Refer to EC-748, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace mass air flow sensor.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000000936673

1.CHECK MASS AIR FLOW SENSOR-I

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Connect CONSULT-III and select “DATA MONITOR” mode.
5. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
	Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
			Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

cardiagn.com

1. Turn ignition switch OFF.
2. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK MASS AIR FLOW SENSOR-II

With CONSULT-III

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT-III and select “DATA MONITOR” mode.
4. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
	Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
			Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK MASS AIR FLOW SENSOR-III

With CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector and reconnect it again.
3. Start engine and warm it up to normal operating temperature.
4. Connect CONSULT-III and select “DATA MONITOR” mode.
5. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
	Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector and reconnect it again.

cardiagn.com

3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
			Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Clean or replace mass air flow sensor.

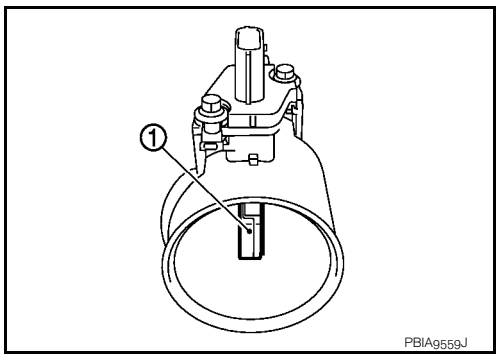
cardiagn.com

P0112, P0113 IAT SENSOR

Description

INFOID:0000000000936674

The intake air temperature sensor is built-into mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



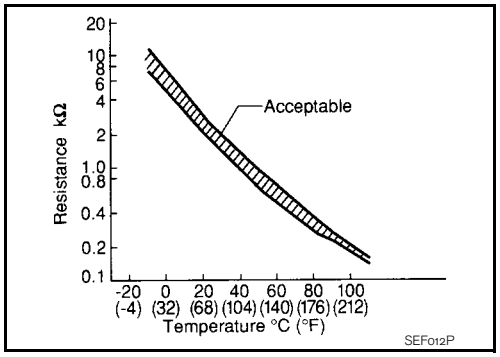
<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: These data are reference values and are measured between ECM terminal 46 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



DTC Logic

INFOID:0000000000936675

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air temperature sensor
P0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-752, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000000936676

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor (with intake air temperature sensor) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between mass air flow sensor harness connector and ground.

MAF sensor		Ground	Voltage
Connector	Terminal		
E18	2	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between mass air flow sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	1	F8	55	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- Harness for open or short between intake air temperature sensor and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-752, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace mass air flow sensor (with intake air temperature sensor).

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000000936677

cardiagn.com

1. CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as follows.

Terminals	Condition		Resistance
1 and 2	Temperature °C (°F)	25 (77)	1.800 - 2.200 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace mass air flow sensor (with intake air temperature sensor).

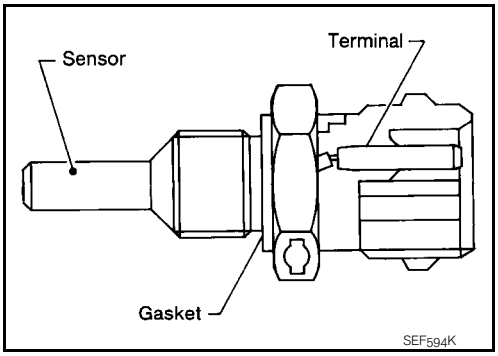
cardiagn.com

P0117, P0118 ECT SENSOR

Description

INFOID:0000000000936678

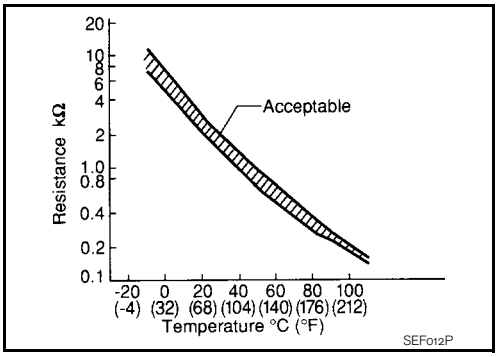
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 38 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:0000000000936679

DTC DETECTION LOGIC

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Engine coolant temperature sensor
P0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-755, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000000936680

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between ECT sensor harness connector and ground.

ECT sensor		Ground	Voltage
Connector	Terminal		
F28	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECT sensor harness connector and ECM harness connector.

ECT sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F28	2	F8	44	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-755, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace engine coolant temperature sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

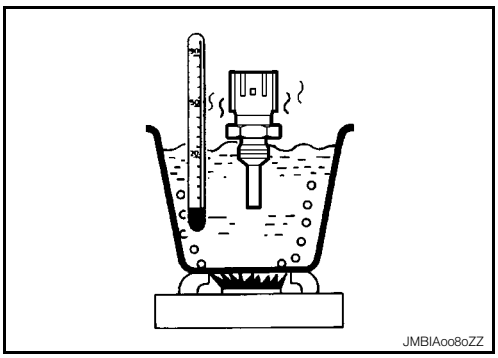
INFOID:0000000000936681

1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Remove engine coolant temperature sensor.

cardiagn.com

4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.



Terminals	Condition		Resistance
1 and 2	Temperature °C (°F)	20 (68)	2.1 - 2.9 kΩ
		50 (122)	0.68 - 1.00 kΩ
		90 (194)	0.236 - 0.260 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace engine coolant temperature sensor.

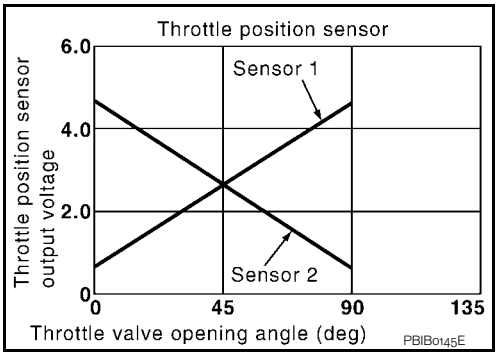
cardiagn.com

P0122, P0123 TP SENSOR

Description

INFOID:0000000000936682

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000000936683

DTC DETECTION LOGIC

NOTE:
If DTC P0122 or P0123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-878, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	• Harness or connectors (TP sensor 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 2)
P0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-757, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000936684

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

cardiagn.com

3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	3	F8	34	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-758, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-759, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000000936685

cardiagn.com

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-759, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000000936686

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

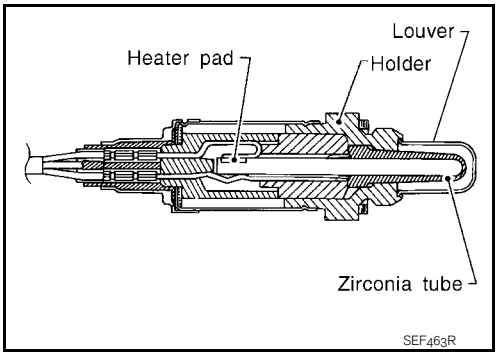
cardiagn.com

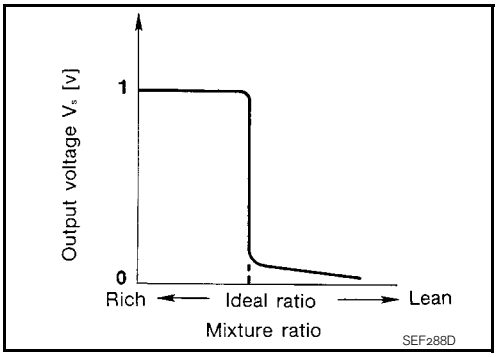
P0132 HO2S1

Description

INFOID:0000000001089335

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



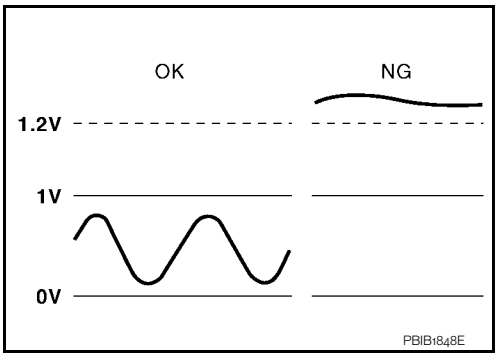


DTC Logic

INFOID:0000000001089336

DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0132	heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • heated oxygen sensor 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

cardiagn.com

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for 2 minutes.
4. Check 1st trip DTC.

Is 1st trip DTC is detected?

YES >> Go to EC-761, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089337

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	existed

2. Check harness continuity between HO2S1 harness connector or ECM harness connector and ground.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

cardiagn.com

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HO2S1 CONNECTOR FOR WATER

Check heated oxygen sensor 1 connector for water.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 1

Refer to EC-762, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace heated oxygen sensor 1.

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001089338

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

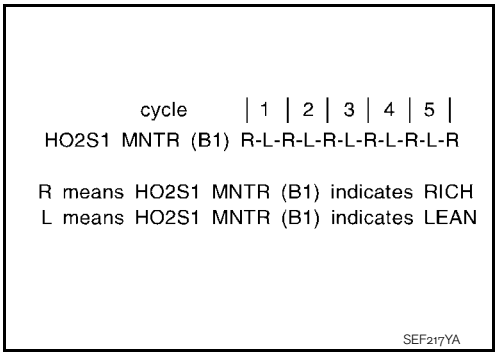
YES >> GO TO 2.
NO >> GO TO 3.

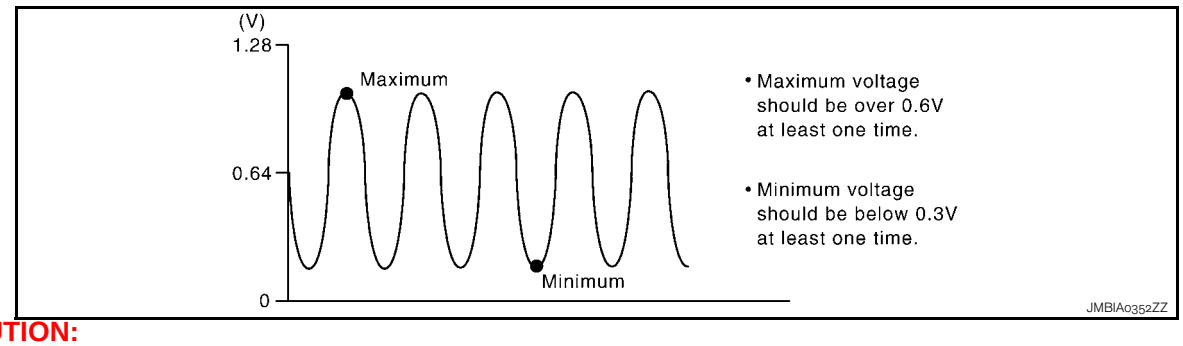
2.CHECK HEATED OXYGEN SENSOR 1

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.





CAUTION:

cardiagn.com

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

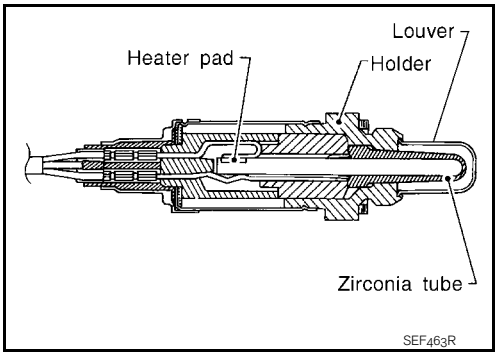
cardiagn.com

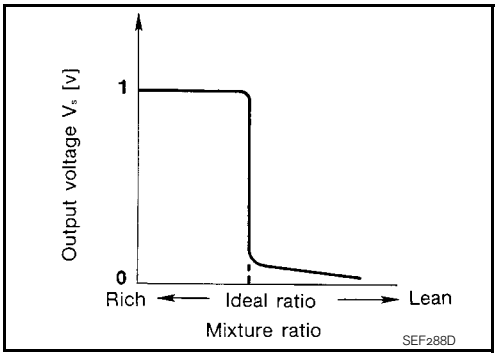
P0133 HO2S1

Description

INFOID:0000000001089339

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



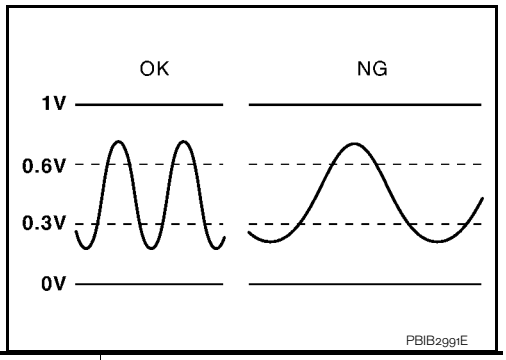


DTC Logic

INFOID:0000000001089340

DTC DETECTION LOGIC

To judge the malfunction of heated oxygen sensor 1, this diagnosis measures response time of heated oxygen sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 temperature index. Judgment is based on whether the compensated time (heated oxygen sensor 1 cycling time index) is inordinately long or not.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0133	Heated oxygen sensor 1 circuit slow response	• The response of the voltage signal from the sensor takes more than the specified time.	• Harness or connectors (The sensor circuit is open or shorted.) • Heated oxygen sensor 1 • Fuel pressure • Fuel injector • Intake air leaks • Exhaust gas leaks • PCV valve • Mass air flow sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

cardiagn.com

TESTING CONDITION:
Always perform at a temperature above -10°C (14°F).
Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.
   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-III screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 40 to 50 seconds.)
   CAUTION:
   Always drive vehicle at a safe speed.

ENG SPEED	A/T: 1,300 - 3,500 rpm M/T: 1,300 - 3,500 rpm
VHCL SPEED SE	More than 80 km/h (50 MPH)
B/FUEL SCHDL	A/T: 3 - 15 msec M/T: 3 - 15 msec
Shift lever	Suitable position

   If “TESTING” is not displayed after 5 minutes, retry from step 2.
7. Touch “SELF-DIAG RESULTS”.

Which displayed on COUSULT-III screen?

OK >> INSPECTION END.
NG >> Go to EC-765, "Diagnosis Procedure".

3. PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set volmeter probes between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 yo 0.3v and 0.6 to 1.0v more than 5 times within 10 seconds. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-765, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089342

1. CHECK GROUND CONNECTION

cardiagn.com

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

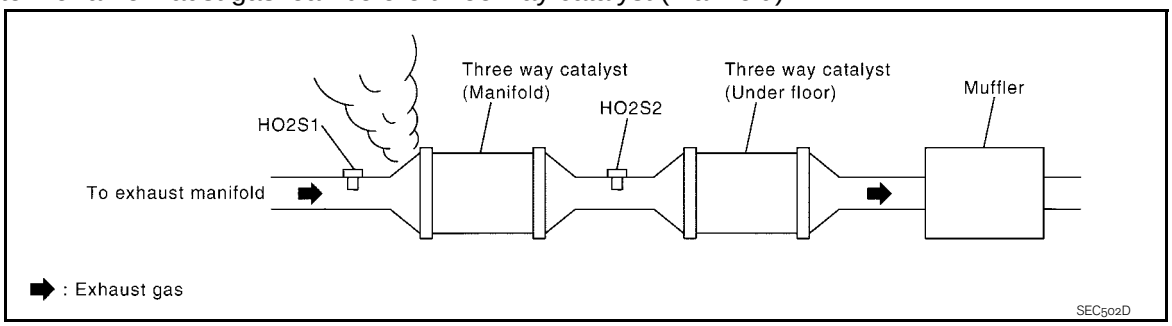
Loosen and retighten the heated oxygen sensor 1.

Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 4.

4.CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 5.

5.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to EC-649, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P172 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to EC-791, "DTC Logic" or EC-795, "DTC Logic".
NO >> GO TO 6.

6.CHECK HEATED OXYGEN SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	Existed

4. Check the continuity between HO2S1 harness connector or ECM harness connector and ground.

cardiagn.com

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor.
Refer to EC-748, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace mass air flow sensor.

8.CHECK PCV VALVE

Refer to EC-935, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace PCV valve.

9.CHECK HEATED OXYGEN SENSOR 1

Perform EC-767, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace heated oxygen sensor 1.

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089343

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

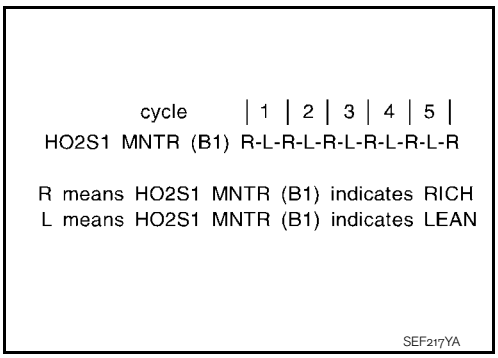
YES >> GO TO 2.
NO >> GO TO 3.

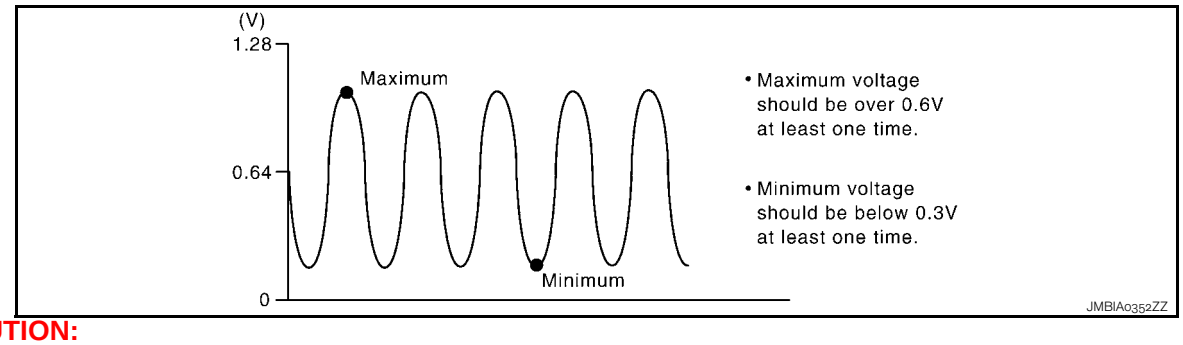
2.CHECK HEATED OXYGEN SENSOR 1

With CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.

cardiagn.com

6. Check the following.
- "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- "HO2S1 (B1)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)" voltage never exceeds 1.0V.





CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.
CAUTION:

cardiagn.com

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

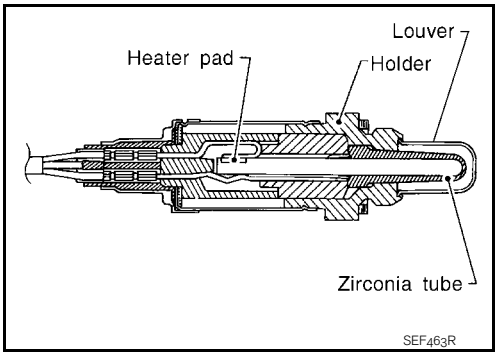
cardiagn.com

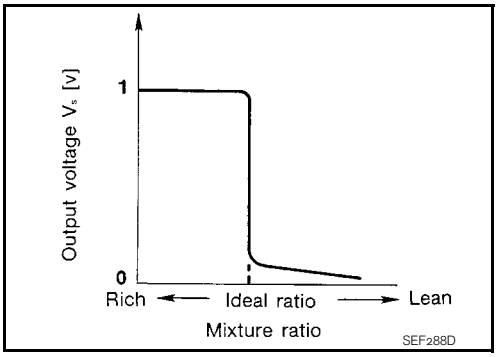
P0134 HO2S1

Description

INFOID:0000000001089344

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



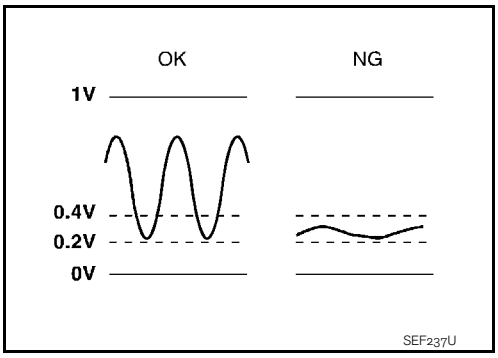


DTC Logic

INFOID:0000000001089345

DTC DETECTION LOGIC

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	• Harness or connectors (The sensor circuit is open or shorted.) • Heated oxygen sensor 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Do you have CONSULT-III?

cardiagn.com

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.
   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-III screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 40 to 50 seconds.)
   CAUTION:
   Always drive vehicle at a safe speed.

ENG SPEED	A/T: 1,300 - 3,500 rpm M/T: 1,300 - 3,500 rpm
VHCL SPEED SE	More than 80 km/h (50 MPH)
B/FUEL SCHDL	A/T: 3 - 15 msec M/T: 3 - 15 msec
Shift lever	Suitable position

   If “TESTING” is not displayed after 5 minutes, retry from step 2.
7. Touch “SELF-DIAG RESULTS”.

Which displayed on COUSULT-III screen?

OK >> INSPECTION END.
NG >> Go to EC-765, "Diagnosis Procedure".

3.PERFORM COMPONENT FUNCTION CHECK

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage dose not remain in the range of 0.2 to 0.4.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-765, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089346

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace ground connection.

2.CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

cardiagn.com

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM harness connector and HO2S1 harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	Existed

2. Check harness continuity between ECM harness connector or HO2S1 harness connector and ground.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HEATED OXYGEN SENSOR 1

Refer to EC-772, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace heated oxygen sensor 1.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001089347

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 1

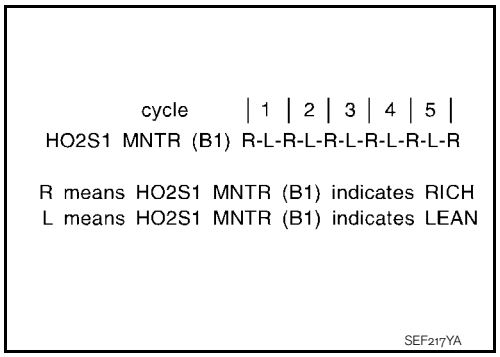
With CONSULT-III

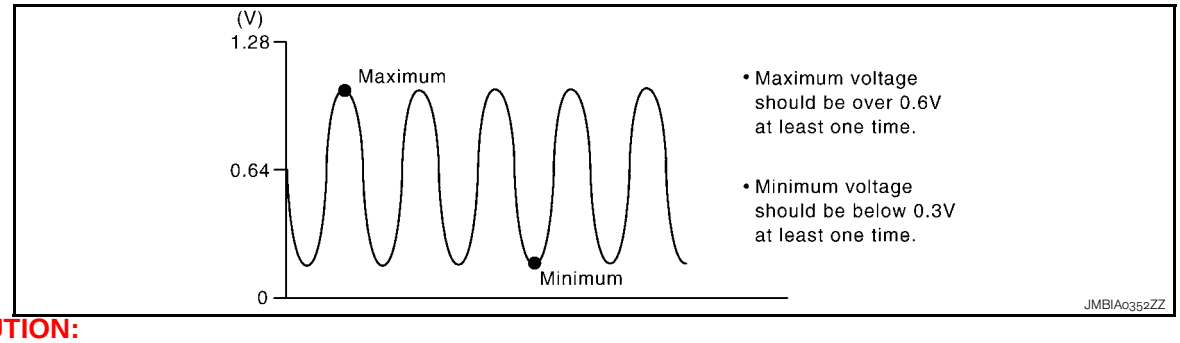
1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.

cardiagn.com

5. Touch “RECORD” on CONSULT-III screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.





CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

cardiagn.com

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

P0135 HO2S1 HEATER

Description

INFOID:0000000001089348

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF duty control of the heated oxygen sensor 1 heater corresponding to the engine speed and engine coolant temperature. The duty percent varies with engine coolant temperature when engine is started.

DTC Logic

INFOID:0000000001089349

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0135	Heated oxygen sensor 1 heater control circuit low	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	• Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.) • Heated oxygen sensor 1 heater

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than between 11V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-III.
3. Wait at least 5 seconds.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-775, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089350

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S1 sensor 1 harness connector and ground.

cardiagn.com

HO2S1		Ground	Voltage
Connector	Terminal		
F30	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- 10A fuse (No. 56)
- Harness for open or short between heated oxygen sensor 1 and fuse

>> Repair or replace harness or connectors.

4.CHECK HO2S1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	3	F7	3	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-776, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Perform GI-39, "Intermittent Incident".

>> Repair or replace.

Component Inspection

INFOID:0000000001089351

1.CHECK HEATED OXYGEN SENSOR 1

1. Turn ignition switch OFF.
2. Disconnect HO2S1 harness connector.
3. Check resistance between HO2S1 terminals as follows.

cardiagn.com

Terminals	Resistance [at 25°C (77°F)]
2 and 3	3.4 - 4.4 Ω
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:

- **Discard any sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

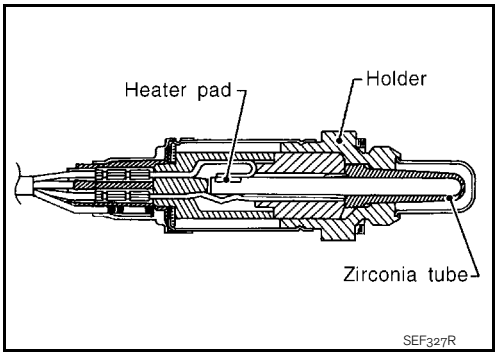
cardiagn.com

P0138 HO2S2

Description

INFOID:0000000001089352

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

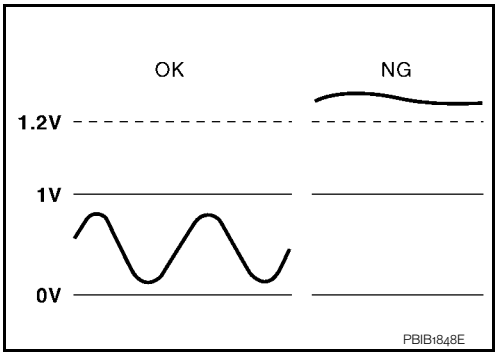


DTC Logic

INFOID:0000000001089353

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time.
To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 2 minutes.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-779, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089354

cardiagn.com

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK GROUND CONNECTION

Check the following.
- Harness conectors F121, E7
- Harness for open or short between heated oxygen sensor 2 and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F8	50	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HO2S2 CONNECTOR FOR WATER

Check connectors for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 2

cardiagn.com

Refer to EC-780, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089355

1. INSPECTION START

Do you have CONSULT-III?

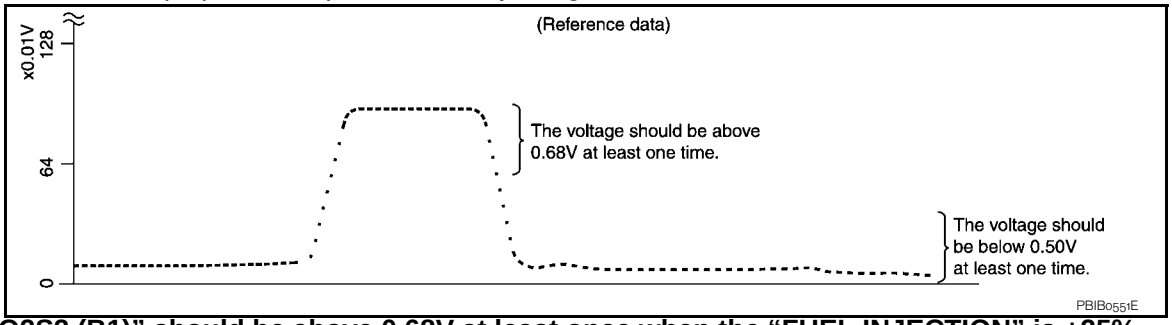
Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.

cardiagn.com

3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

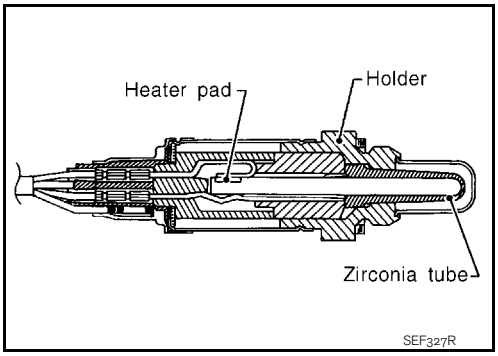
cardiagn.com

P0139 HO2S2

Description

INFOID:0000000001089356

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

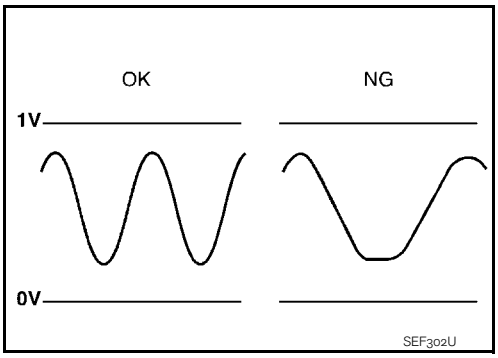


DTC Logic

INFOID:0000000001089357

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 11.

2.PRECONDITIONING

"COMPLETED" will appear on CONSULT-III screen when all tests "COND1", "COND2" and "COND3" are completed.
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION
For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).
Never stop engine during this procedure. If the engine is stopped, retry this procedure from PERFORM PROCEDURE FOR COND1 - II.

cardiagn.com

>> GO TO 3.

3. PERFORM PROCEDURE FOR COND1-I

Start engine and warm it up to normal operating temperature.

>> GO TO 4.

4. PERFORM PROCEDURE FOR COND1-II

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 5.

5. PERFORM PROCEDURE FOR COND1-III

1. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
2. Let engine idle 1 minute.
3. Select “HO2S2 (B1) P0139” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 30 seconds.
6. Rev engine up to 2,000 rpm two or three times quickly under no load.

Is “CONPLETED” appears on CONSULT-III screen?

YES >> GO TO 9.
NO >> GO TO 6.

6. PERFORM PROCEDURE FOR COND1-IV

When the following conditions are met, “TESTING” will be displayed at “COND1” on the CONSULT-III screen. Maintain the condition continuously until “TESTING” changes to “COMPLETED” (It will take approximately 60 seconds.)

ENG SPEED	More than 1,000 rpm
B/FUEL SCHDL	More than 1.0 msec
COOLAN TEMP/S	More than 70°C (158°F)
Shift level	Suitable position

Which displayed on CONSULT-III screen?

COND1: OUT OF CONDITION>>GO TO 4.
COND1: COMPLETED COND2: INCOMPLETED>>GO TO 7.
COND1: COMPLETED COND2: COMPLETED>>GO TO 8.

7. PERFORM PROCEDURE FOR COND2

While driving, release accelerator pedal completely from the above condition until “INCOMPLETED” at “COND2” on CONSULT-III screen has turned to “COMPLETED”. (It will take approximately 4 seconds.)

Which displayed on CONSULT-III screen?

COND2: COMPLETED COND3: INCOMPLETED>>GO TO 8.
COND2: COMPLETED COND3: COMPLETED>>GO TO 9.

8. PERFORM PROCEDURE FOR COND3-I

Stop vehicle and let it idle until “INCOMPLETED” of “COND3” on CONSULT-III screen has turned to “COMPLETED”. (It will take a maximum of approximately 6 minutes.)

>> GO TO 9.

9. PERFORM PROCEDURE FOR COND3-II

Touch “SELF DIAGRESULTS”.

Which displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-785, "Diagnosis Procedure".
CAN NOT BE DIAGNOSED>>GO TO 10.

cardiagn.com

10. PERFORM PROCEDURE FOR COND3-III

1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
2. Turn ignition switch ON and select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-III.
3. Start engine and warm it up while monitoring “COOLAN TEMP/S” indication on CONSULT-III.
4. When “COOLAN TEMP/S” indication reaches to 70°C (158°F).

>> GO TO 5.

11. PREFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-784, "Component Function Check".
NOTE:
Use component function check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-785, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001089358

1. PERFORM COMPONENT FUNCTION CHECK-I

Without CONSULT-III
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	A change of voltage should be more than 0.12 V for 1 second during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	A change of voltage should be more than 0.12 V for 1 second during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 3rd gear position (M/T)	A change of voltage should be more than 0.12 V for 1 second during this procedure.

Is the inspection result normal?

cardiagn.com

YES >> INSPECTION END
NO >> Go to EC-785, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089359

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to EC-649, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to EC-791, "DTC Logic" or EC-795, "DTC Logic".
NO >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F8	50	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-786, "Component Inspection".

Is the inspection result normal?

cardiagn.com

YES >> GO TO 7.
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089360

1. INSPECTION START

Do you have CONSULT-III?

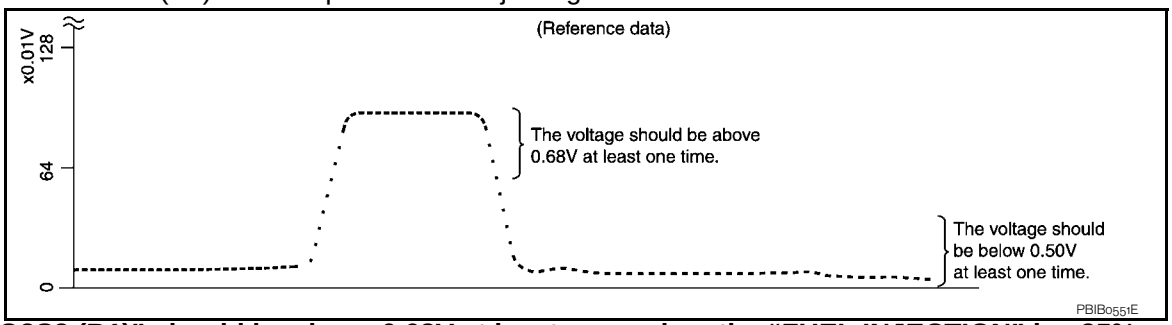
Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.

cardiagn.com

5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

P0141 HO2S2 HEATER

Description

INFOID:0000000001089361

SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
Below 3,600 rpm after the following conditions are met. • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON

DTC Logic

INFOID:0000000001089362

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0141	Heated oxygen sensor 2 heater control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	• Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.) • Heated oxygen sensor 2 heater

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Wait at least 5 seconds.
3. Check 1st trip DTC.

With GST

Follow the procedure “With CONSULT-III” above.

Is 1st tip DTC detected?

YES >> Go to EC-788, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089363

cardiagn.com

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S2 harness connector and ground.

HO2S2		Ground	Voltage
Connector	Terminal		
E58	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- 10A fuse (No. 56)
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	3	F7	5	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to EC-790, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089364

1.CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check resistance between HO2S2 terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
2 and 3	3.3 - 4.4 Ω
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

P0171 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:0000000001089365

DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensors 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.
In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MI (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0171	Fuel injection system too lean	• Fuel injection system does not operate properly. • The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)	• Intake air leaks • Heated oxygen sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Lack of fuel • Mass air flow sensor • Incorrect PCV hose connection

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to EC-649, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Start engine.

Is it difficult to start engine?

YES >> GO TO 3.
NO >> GO TO 4.

3.RESTART ENGINE

If it is difficult to start engine, the fuel injection system has a malfunction, too.
Crank engine while depressing accelerator pedal.

Does engine start?

YES >> Go to EC-792, "Diagnosis Procedure".
NO >> Check exhaust and intake air leak visually.

4.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Start engine and let it idle for at least 10 minutes.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-792, "Diagnosis Procedure".
NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-III

1. Turn ignition switch OFF and wait at least 10 seconds.

cardiagn.com

2. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
Hold the accelerator pedal as steady as possible.
The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

3. Check 1st trip DTC.

Is 1st trip DTC detected?

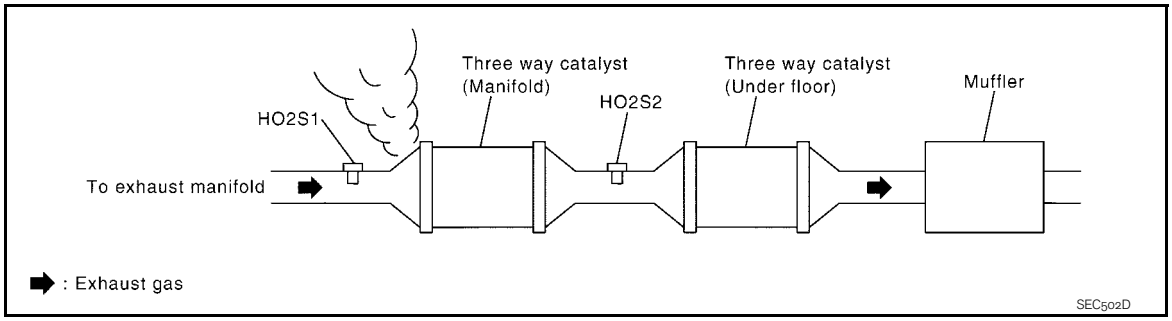
YES >> Go to EC-792, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089366

1.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 2.

2.CHECK FOR INTAKE AIR LEAK

1. Listen for an intake air leak after the mass air flow sensor.
2. Check PCV hose connection.

Intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 3.

3.CHECK HEATED OXYGEN SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect corresponding heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between heated oxygen sensor 1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	Existed

5. Check the continuity between heated oxygen sensor 1 harness connector or ECM harness connector and ground.

cardiagn.com

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-978, "Inspection".
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-978, "Inspection".

At idling: Approximately 350 kPa (3.57 kg/cm^2, 51 psi)

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly”.
NO >> Repair or replace

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Install all removed parts.
2. Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT-III.

1.0 - 4.0 g·m/sec: at idling
4.0 - 10.0 g·m/sec: at 2,500 rpm

With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in Service $01 with GST.

1.0 - 4.0 g·m/sec: at idling
4.0 - 10.0 g·m/sec: at 2,500 rpm

Is the measurement value within the specification?

YES >> GO TO 7.
NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or grounds. Refer to EC-746, "DTC Logic".

7. CHECK FUNCTION OF FUEL INJECTOR

With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

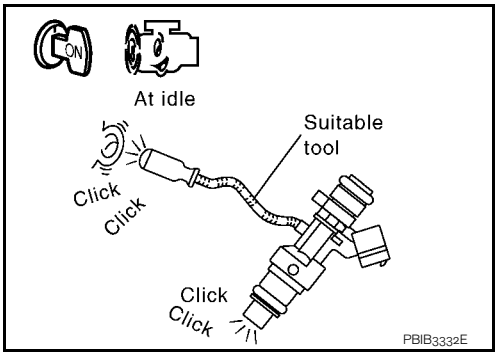
Without CONSULT-III

1. Let engine idle.

cardiagn.com

2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



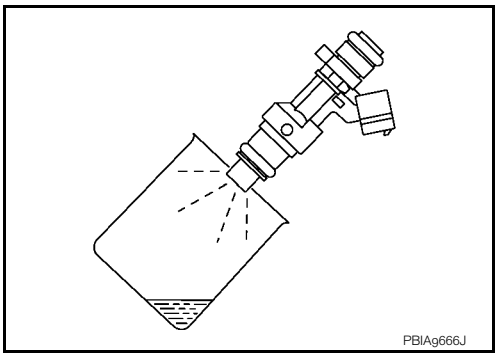
Is the inspection result normal?

YES >> GO TO 8.
NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to EC-923, "Component Function Check".

8. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect all fuel injector harness connectors.
4. Remove fuel tube assembly. Refer to EM-155, "Removal and Installation".
   Keep fuel hose and all fuel injectors connected to fuel tube.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each fuel injector.
7. Crank engine for about 3 seconds.

Fuel should be sprayed evenly for each fuel injector.



Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace fuel injectors from which fuel does not spray out. Always replace O-ring with new ones.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P0172 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:0000000001089367

DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensors 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.
In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MI (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172	Fuel injection system too rich	• Fuel injection system does not operate properly. • The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	• Heated oxygen sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Mass air flow sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to EC-649, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Start engine.

Is it difficult to start engine?

YES >> GO TO 3.
NO >> GO TO 4.

3.RESTART ENGINE

If it is difficult to start engine, the fuel injection system has a malfunction, too.
Crank engine while depressing accelerator pedal.

Does engine start?

YES >> Go to EC-796, "Diagnosis Procedure".
NO >> Remove spark plugs and check for fouling, etc.

4.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Start engine and let it idle for at least 10 minutes.

Is 1st trip DTC detected?

YES >> Go to EC-796, "Diagnosis Procedure".
NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
   Hold the accelerator pedal as steady as possible.

cardiagn.com

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

3. Check 1st trip DTC.

Is 1st trip DTC detected?

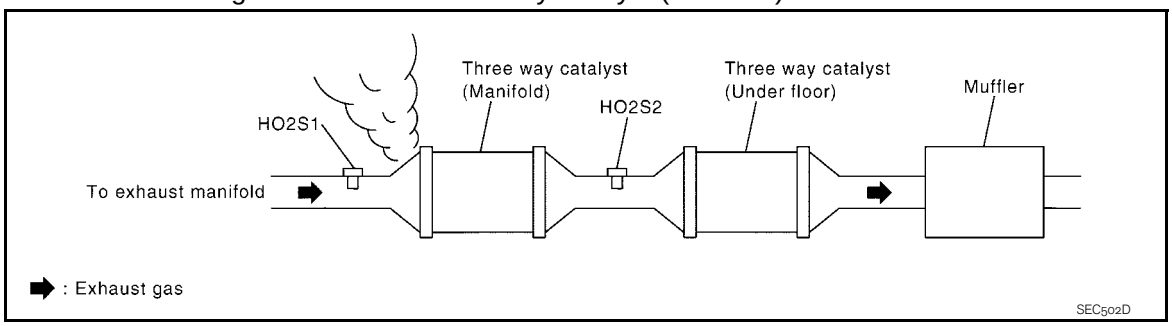
YES >> Go to EC-796, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089368

1.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 2.

2.CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 3.

3.CHECK HEATED OXYGEN SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect corresponding heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between heated oxygen sensor 1 harness connector and ECM harness connector.

HO2S1 sensor 1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	Existed

5. Check the continuity between heated oxygen sensor 1 harness connector or ECM harness connector and ground.

HO2S1 sensor 1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

cardiagn.com

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-978, "Inspection".
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-978, "Inspection".

At idling: Approximately 350 kPa (3.57 kg/cm^2, 51 psi)

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly”.
NO >> Repair or replace

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Install all removed parts.
2. Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT-III.

1.0 - 4.0 g·m/sec: at idling
4.0 - 10.0 g·m/sec: at 2,500 rpm

With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in “Service $01” with GST.

1.0 - 4.0 g·m/sec: at idling
4.0 - 10.0 g·m/sec: at 2,500 rpm

Is the measurement value within the specification?

YES >> GO TO 7.
NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or grounds. Refer to EC-746, "DTC Logic".

7. CHECK FUNCTION OF FUEL INJECTOR

With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

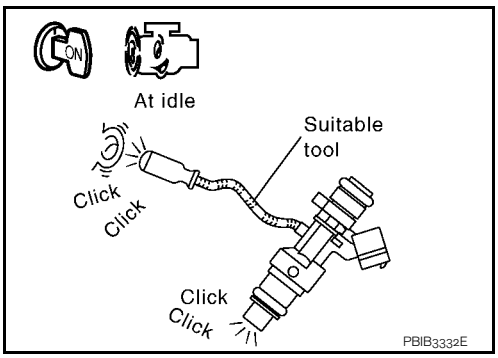
Without CONSULT-III

1. Let engine idle.

cardiagn.com

2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



Is the inspection result normal?

YES >> GO TO 8.
NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to EC-923, "Component Function Check".

8. CHECK FUELINJECTOR

1. Remove fuel injector assembly. Refer to EM-155, "Removal and Installation".
   Keep fuel hose and all fuel injectors connected to fuel tube.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect all fuel injector harness connectors.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each fuel injectors.
6. Crank engine for about 3 seconds.
   Make sure fuel does not drip from fuel injector.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new one.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

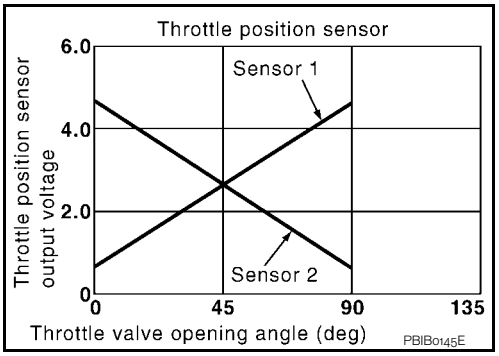
cardiagn.com

P0222, P0223 TP SENSOR

Description

INFOID:0000000001089369

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001089370

DTC DETECTION LOGIC

NOTE:
If DTC P0222 or P0223 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-878, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	• Harness or connectors (TP sensor 1 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1)
P0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-799, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089371

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

cardiagn.com

3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	2	F8	33	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-800, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-801, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089372

cardiagn.com

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-801, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089373

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-991, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-991, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P0300, P0301, P0302, P0303, P0304 MISFIRE

DTC Logic

INFOID:0000000001089374

DTC DETECTION LOGIC

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)
   On the 1st trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MI will blink.
   When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.
   When the misfire condition decreases to a level that will not damage the TWC, the MI will turn off.
   If another misfire condition occurs that can damage the TWC on a second trip, the MI will blink.
   When the misfire condition decreases to a level that will not damage the TWC, the MI will remain on.
   If another misfire condition occurs that can damage the TWC, the MI will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)
   For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MI will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.
   A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	• Improper spark plug • Insufficient compression • Incorrect fuel pressure • The fuel injector circuit is open or shorted • Fuel injector • Intake air leak • The ignition signal circuit is open or shorted • Lack of fuel • Signal plate • Heated oxygen sensor 1 • Incorrect PCV hose connection
P0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	
P0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	
P0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	
P0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for about 15 minutes.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-803, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Turn ignition switch OFF and wait at least 10 seconds.

cardiagn.com

2. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to the table below.
Hold the accelerator pedal as steady as possible.
The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.
CAUTION:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

The time to driving varies according to the engine speed in the freeze frame data.

Engine speed	Time
Around 1,000 rpm	Approximately 10 minutes
Around 2,000 rpm	Approximately 5 minutes
More than 3,000 rpm	Approximately 3.5 minutes

3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-803, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089375

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

Is intake air leak detected?

YES >> Discover air leak location and repair.
NO >> GO TO 2.

2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 3.
YES-2 >> Without CONSULT-III: GO TO 4.
NO >> Repair or replace it.

3. PERFORM POWER BALANCE TEST

With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

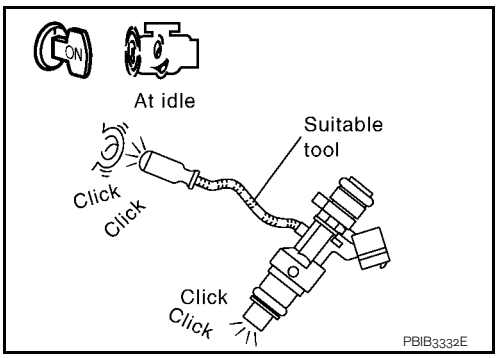
YES >> GO TO 9.
NO >> GO TO 4.

4. CHECK FUNCTION OF FUEL INJECTOR

1. Start engine and let engine idle.

cardiagn.com

2. Listen to each fuel injector operating sound.



Clicking noise should be heard.

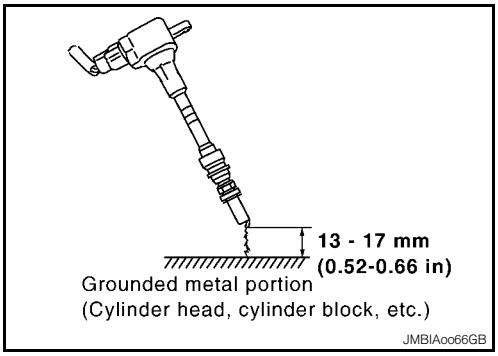
Is the inspection result normal?

YES >> GO TO 5.
NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to EC-924, "Component Inspection".

5. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
   NOTE:
   Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- **Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 6.

6. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Check ignition coil, power transistor and their circuits. Refer to EC-929, "Component Function Check".

cardiagn.com

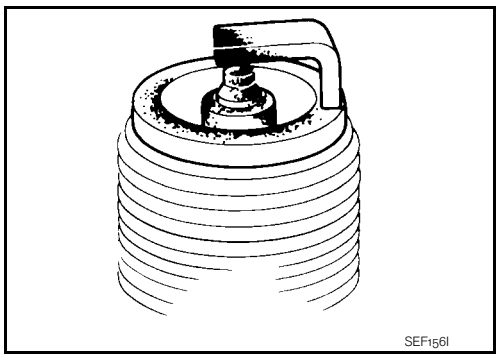
7. CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

Is the inspection result normal?

YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-160, "Removal and Installation".

NO >> Repair or clean spark plug. Then GO TO 8.



8. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-160, "Removal and Installation".

9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-142, "Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

10. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to EC-978, "Inspection".
3. Install fuel pressure gauge and check fuel pressure. Refer to EC-978, "Inspection".

At idling: Approximately 350 kPa (3.57 kg/cm^2, 51 psi)

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly”.

NO >> Repair or replace.

12. CHECK IGNITION TIMING

For procedure, refer to EC-642, "BASIC INSPECTION : Special Repair Requirement".
For specification, refer to EC-981, "Idle Speed" and EC-981, "Ignition Timing".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Follow the EC-646, "IGNITION TIMING : Special Repair Requirement".

13. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-776, "Component Inspection".

Is the inspection result normal?

cardiagn.com

YES >> GO TO 14.
NO >> Replace heated oxygen sensor 1.

14. CHECK MASS AIR FLOW SENSOR

With CONSULT-III
Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT-III.
For specification, refer to EC-981, "Mass Air Flow Sensor".

With GST
Check mass air flow sensor signal in Service $01 with GST.
For specification, refer to EC-981, "Mass Air Flow Sensor".

Is the measurement value within the specification?

YES >> GO TO 15.
NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to EC-746, "DTC Logic".

15. CHECK SYMPTOM TABLE

Check items on the rough idle symptom in EC-967, "Symptom Table".

Is the inspection result normal?

YES >> GO TO 16.
NO >> Repair or replace.

16. ERASE THE 1ST TRIP DTC

Some tests may cause a 1st trip DTC to be set.
Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-706, "Diagnosis Description".

>> GO TO 17.

17. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P0327, P0328 KS

Description

INFOID:0000000001089376

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.

DTC Logic

INFOID:0000000001089377

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detected condition	Possible cause
P0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Knock sensor
P0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-807, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089378

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK KNOCK SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect knock sensor harness connector and disconnect ECM harness connector.
2. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	2	F8	40	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

cardiagn.com

3.CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	1	F8	37	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK KNOCK SENSOR

Refer to EC-808, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace knock sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089379

1.CHECK KNOCK SENSOR

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check resistance between knock sensor terminals as follows.
   NOTE:
   It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	Approx. 532 - 588 kΩ

CAUTION:
Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace knock sensor.

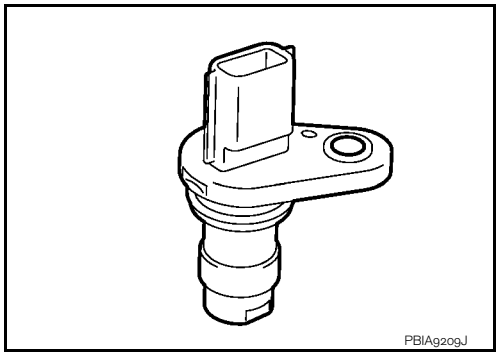
cardiagn.com

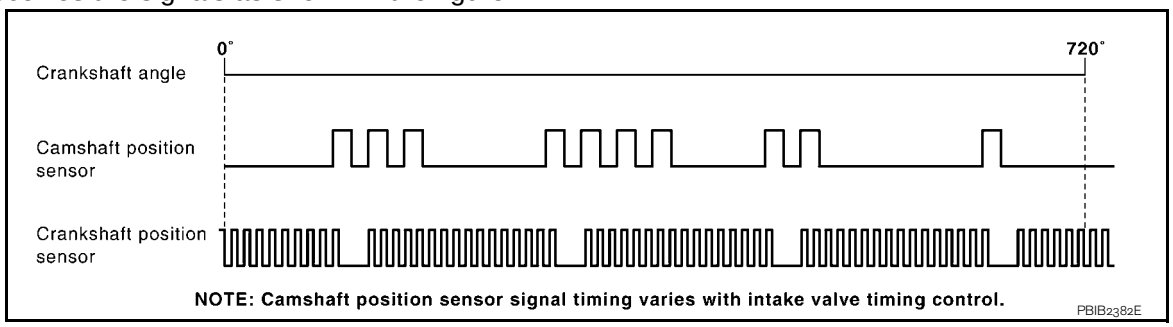
P0335 CKP SENSOR (POS)

Description

INFOID:0000000001089380

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate. It detects the fluctuation of the engine revolution.
The sensor consists of a permanent magnet and Hall IC.
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
The ECM receives the voltage signal and detects the fluctuation of the engine revolution.
ECM receives the signals as shown in the figure.


PBIA9209J



NOTE: Camshaft position sensor signal timing varies with intake valve timing control.
PBIB2382E

DTC Logic

INFOID:0000000001089381

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335	Crankshaft position sensor (POS) circuit	• The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. • The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. • The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.	• Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Refrigerant pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • Accelerator pedal position sensor • Signal plate

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.
   If engine does not start, crank engine for at least 2 seconds.
2. Check 1st trip DTC.

cardiagn.com

Is 1st trip DTC detected?

YES >> Go to EC-810, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089382

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CKP sensor (POS) harness connector and ground.

CKP sensor (POS)		Ground	Voltage
Connector	Terminal		
F20	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	1	F8	75	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit.

4.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.
- Refrigerant pressure sensor (Refer to EC-936, "Diagnosis Procedure".)

Is the inspection result normal?

cardiagn.com

YES >> GO TO 6.
NO >> Replace malfunctioning components.

6.CHECK APP SENSOR

Refer to EC-904, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 7.

7.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-905, "Special Repair Requirement".

>> INSPECTION END

8.CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	2	F8	62	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9.CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	3	F8	61	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-812, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace crankshaft position sensor (POS).

11.CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

Is the inspection result normal?

YES >> GO TO 12.
NO >> Replace the signal plate.

12.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

cardiagn.com

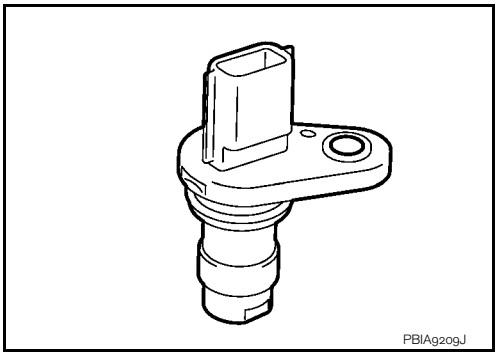
>> INSPECTION END

Component Inspection

INFOID:0000000001089383

1. CHECK CRANKSHAFT POSITION SENSOR (POS)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect crankshaft position sensor (POS) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.



Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace crankshaft position sensor (POS).

2. CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance between crankshaft position sensor (POS) terminals as follows.

Terminals (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace crankshaft position sensor (POS).

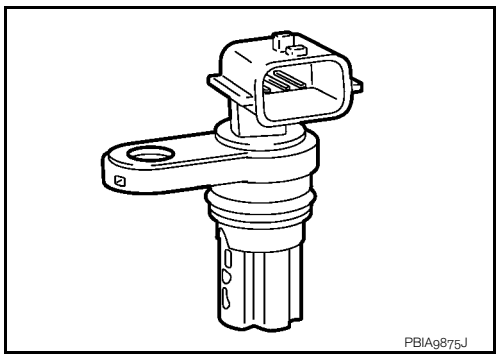
cardiagn.com

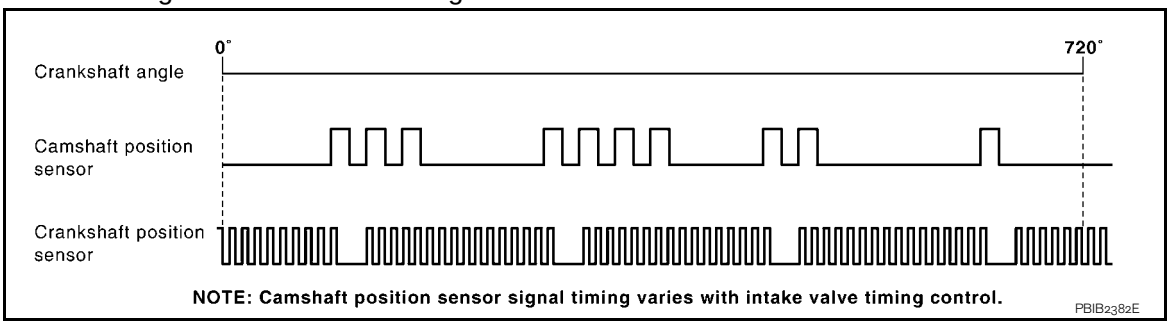
P0340 CMP SENSOR (PHASE)

Description

INFOID:0000000001089384

The camshaft position sensor (PHASE) senses the retraction of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.
The sensor consists of a permanent magnet and Hall IC.
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
ECM receives the signals as shown in the figure.





DTC Logic

INFOID:0000000001089385

DTC DETECTION LOGIC

NOTE:
If DTC P0340 is displayed with DTC P1129, first perform the trouble diagnosis for DTC P1129. Refer to EC-878, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sensor (PHASE) circuit	• The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. • The cylinder No. signal is not sent to ECM during engine running. • The cylinder No. signal is not in the normal pattern during engine running.	• Harness or connectors (The sensor circuit is open or shorted) • Camshaft position sensor (PHASE) • Camshaft (INT) • Starter motor • Starting system circuit • Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Start engine and let it idle for at least 5 seconds.
   If engine does not start, crank engine for at least 2 seconds.
2. Check 1st trip DTC.

cardiagn.com

Is 1st trip DTC detected?

YES >> Go to EC-814, "Diagnosis Procedure".
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-814, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089386

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over? Does the starter motor operate?

YES >> GO TO 2.
NO >> Check starting system.

2. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21 Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace ground connection.

3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CMP sensor (PHASE) harness connector and ground.

CMP sensor (PHASE)		Ground	Voltage
Connector	Terminal		
F26	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	2	F8	63	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

cardiagn.com

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	3	F8	65	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-815, "Component Inspection".

Is the inspection result normal?

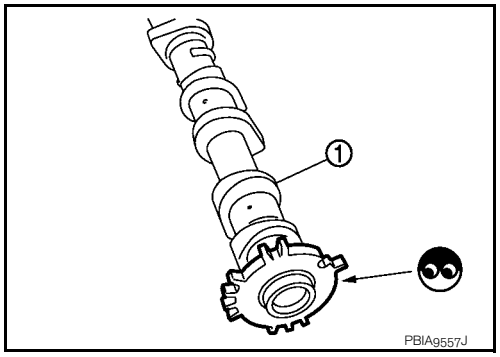
YES >> GO TO 7.
NO >> Replace camshaft position sensor (PHASE).

7.CHECK CAMSHAFT (INT)

Check the following.
- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

Is the inspection result normal?

YES >> GO TO 8.
NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

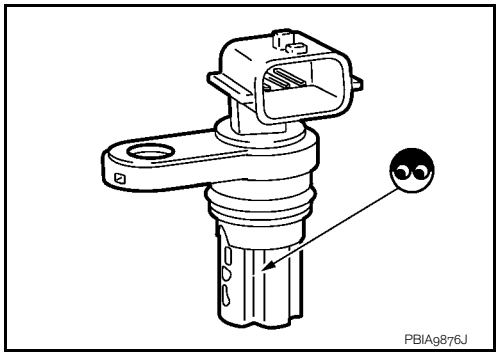
INFOID:0000000001089387

1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect camshaft position sensor (PHASE) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace camshaft position sensor (PHASE).



2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as follows.

cardiagn.com

Terminals (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace camshaft position sensor (PHASE).

cardiagn.com

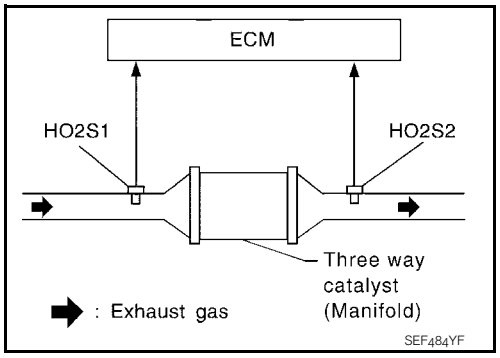
P0420 THREE WAY CATALYST FUNCTION

DTC Logic

INFOID:0000000001089388

DTC DETECTION LOGIC

The ECM monitors the switching frequency ratio of heated oxygen sensor 1 and heated oxygen sensor 2.
A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.
When the frequency ratio of heated oxygen sensor 1 and heated oxygen sensor 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0420	Catalyst system efficiency below threshold	• Three way catalyst (manifold) does not operate properly. • Three way catalyst (manifold) does not have enough oxygen storage capacity.	• Three way catalyst (manifold) • Exhaust tube • Intake air leaks • Fuel injector • Fuel injector leaks • Spark plug • Improper ignition timing

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 7.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Do not hold engine speed for more than the specified minutes below.

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
   If not, warm up engine and go to next step when “COOLAN TEMP/S” indication reaches to 70°C (158°F).
7. Open engine hood.
8. Select “DTC & SRT CONFIRMATION” then “SRT WORK SUPPORT” mode with CONSULT-III.
9. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
10. Check the indication of “CATALYST”.

Which is displayed on CONSULT-III screen?

cardiagn.com

CMPLT >> GO TO 6.
INCMP >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Wait 5 seconds at idle.
2. Rev engine up to 2,000 to 3,000 rpm and maintain it until “INCMP” of “CATALYST” changes to “CMPLT” (It will take approximately 5 minutes).

Does the indication change to “CMPLT”?

YES >> GO TO 6.
NO >> GO TO 5.

5. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Stop engine and cool it down to less than 70°C (158°F).
2. Perform DTC CONFIRMATION PROCEDURE again.

>> GO TO 3.

6. PERFORM DTC CONFIRMATION PROCEDURE-III

Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-819, "Diagnosis Procedure".
NO >> INSPECTION END

7. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-818, "Component Function Check".

NOTE:
Use component function check to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-819, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001089389

1. PERFORM COMPONENT FUNCTION CHECK-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Specification
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Keeping engine speed at 2,000 rpm constant under no load	The voltage switch periodically more than 5 times within 10 seconds.

Is the inspection result normal?

YES >> GO TO 2
NO >> Go to EC-764, "DTC Logic".

2. PERFORM COMPONENT FUNCTION CHECK-II

Without CONSULT-III

1. Set voltmeter probes between ECM terminals and ground.
2. Make sure that the voltage switching frequency (high&low) HO2S2 voltage is very less than that of HO2S1 voltage under the following condition.

cardiagn.com

ECM		Ground	Condition	Specification
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Keeping engine speed at 2,000 rpm constant under no load	Switching freqency ratio (A/B) : Less than 0.75 A : Heated oxygen sensor 2 voltage switching frequency B : Heated oxygen sensor 1 voltage switching frequency
	50 (HO2S2 signal)			

Is the inspection result normal?

YES >> INSPECTION END
NO >> If the ratio is greater than above (0.75), it means three way catalyst does not operate properly. Go to EC-819, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089390

1.CHECK EXHAUST SYSTEM

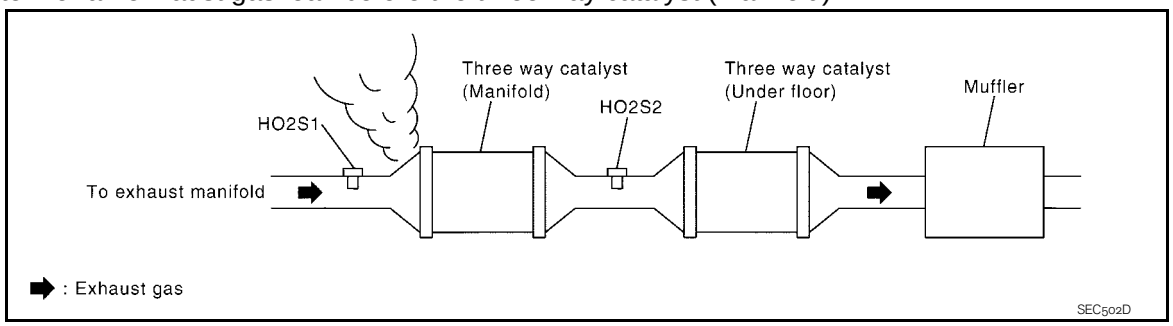
Visually check exhaust tubes and muffler for dent.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace.

2.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 3.

3.CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 4.

4.CHECK IGNITION TIMING AND IDLE SPEED

Check the following items. Refer to EC-642, "BASIC INSPECTION : Special Repair Requirement"
For specification, refer to EC-981, "Ignition Timing", EC-981, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Follow the EC-646, "IGNITION TIMING : Special Repair Requirement",EC-646, "IDLE SPEED : Special Repair Requirement".

5.CHECK FUEL INJECTOR

1. Stop engine and then turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Voltage
Connector	Terminal		
F7	25	Ground	Battery voltage
	29		
	30		
	31		

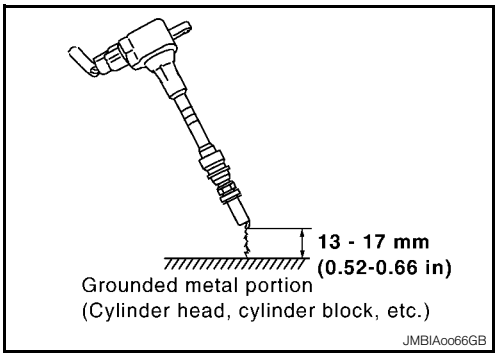
Is the inspection result normal?

YES >> GO TO 6.
NO >> Perform EC-923, "Diagnosis Procedure".

6. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
   NOTE:
   Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:
- **Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 7.

7. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

Is the inspection result normal?

YES >> GO TO 8.

cardiagn.com

NO >> Check ignition coil, power transistor and their circuits. Refer to EC-929, "Diagnosis Procedure".

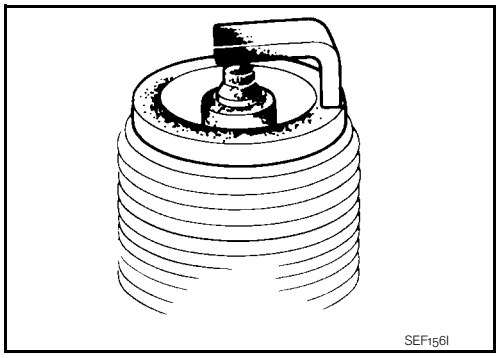
8. CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

Is the inspection result normal?

YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-160, "Removal and Installation".

NO >> Repair or clean spark plug. Then GO TO 9.



9. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about three seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-160, "Removal and Installation".

10. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
   Refer to EM-155, "Removal and Installation".
   Keep fuel hose and all fuel injectors connected to fuel tube.
3. Disconnect all ignition coil harness connectors.
4. Reconnect all fuel injector harness connectors disconnected.
5. Turn ignition switch ON.

Does fuel drip from fuel injector?

YES >> GO TO 11.

NO >> Replace the fuel injector(s) from which fuel is dripping.

11. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the trouble fixed?

YES >> INSPECTION END

NO >> Replace three way catalyst assembly.

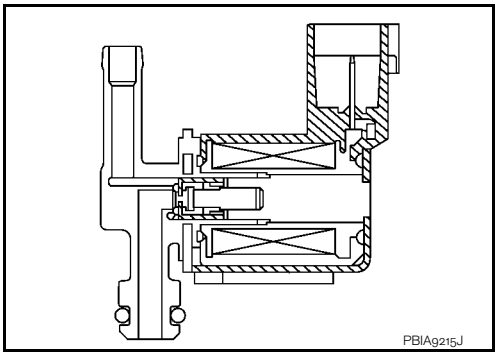
cardiagn.com

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:0000000001089391

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



DTC Logic

INFOID:0000000001089392

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	• Harness or connectors (The solenoid valve circuit is open or shorted.) • EVAP canister purge volume control solenoid valve

DTC CONFIRMATION PROCEDURE

1.CONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 13 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-822, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089393

1.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

EVAP canister purge volume control solenoid valve		Ground	Voltage
Connector	Terminal		
F32	1	Ground	Battery voltage

Is the inspection result normal?

cardiagn.com

YES >> GO TO 3.
NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.

EVAP canister purge volume control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F32	2	F7	9	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 4.
YES-2 >> Without CONSULT-III: GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III
1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Does engine speed vary according to the value opening?

YES >> GO TO 6.
NO >> GO TO 5.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-823, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace EVAP canister purge volume control solenoid valve.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

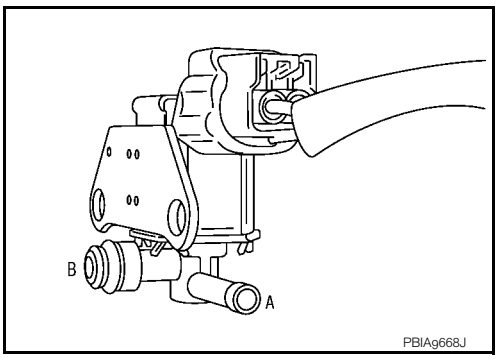
INFOID:0000000001089394

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III
1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.

cardiagn.com

4. Turn ignition switch ON.
5. Select “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-III.
6. Touch “Qd” and “Qu” on CONSULT-III screen to adjust “PURG VOL CONT/V” opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



Condition (PURG VOL CONT/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between (A) and (B)
12V direct current supply between terminals 1 and 2	Existed
No supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace EVAP canister purge volume control solenoid valve

cardiagn.com

P0500 VSS

Description

INFOID:0000000001089395

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

DTC Logic

INFOID:0000000001089396

DTC DETECTION LOGIC

NOTE:

- **If DTC P0500 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001.Refer to** EC-1073, "DTC Logic".
- **If DTC P0500 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-741, "DTC Logic"**.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	• Harness or connectors (The CAN communication line is open or shorted) • Harness or connectors (The vehicle speed signal circuit is open or shorted) • Wheel sensor • Combination meter • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 3.

3.CHECK VEHICLE SPEED SENSOR FUNCTION

NOTE:
This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

With CONSULT-III

1. Start engine.
2. Read “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT-III. The vehicle speed on CONSULT-III should exceed 10 km/h (6 mph) when rotating wheels with suitable gear position.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-826, "Diagnosis Procedure".

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Warm engine up to normal operating temperature.
3. Maintain the following conditions for at least 50 consecutive seconds.
   CAUTION:

cardiagn.com

Always drive vehicle at a safe speed.

ENG SPEED	CVT: 1,600 - 6,000 rpm M/T: 1,600 - 6,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	7.2 - 31.8 msec
Shift lever	Except P or N position (CVT) Except Neutral position (M/T)
PW/ST SIGNAL	OFF

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-826, "Diagnosis Procedure".
NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-826, "Component Function Check".
Use component function check to check the overall function of the vehicle speed sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-826, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001089397

1.PERFORM COMPONENT FUNCTION CHECK

With GST

1. Lift up drive wheels.
2. Start engine.
3. Read vehicle speed sensor signal in Service $01 with GST.
   The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-826, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089398

1.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to BRC-17, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace.

2.CHECK COMBINATION METER

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

>> INSPECTION END

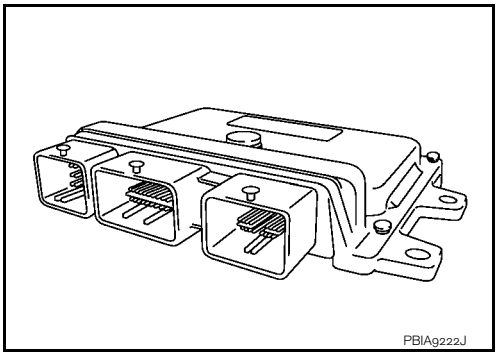
cardiagn.com

P0605 ECM

Description

INFOID:0000000001089399

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



DTC Logic

INFOID:0000000001089400

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605	Engine control module	A)	ECM calculation function is malfunctioning.	• ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

1. Turn ignition switch ON.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-828, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

1. Wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-828, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Repeat step 2 for 32 times.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-828, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000001089401

1. INSPECTION START

With CONSULT-III

1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. **Perform DTC CONFIRMATION PROCEDURE.**
   See EC-827, "DTC Logic".

With GST

1. Turn ignition switch ON.
2. Select Service $04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
   See EC-827, "DTC Logic".

Is the 1st trip DTC P0605 displayed again?

YES >> GO TO 2.
NO >> INSPECTION END

2. REPLACE ECM

1. Replace ECM.
2. Go to EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

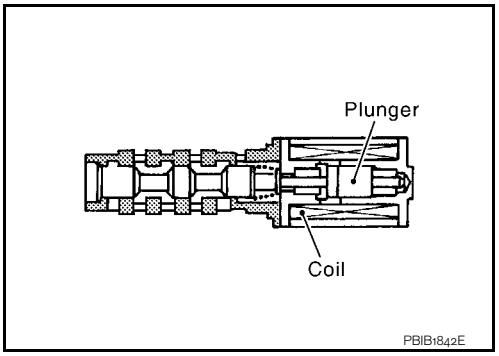
cardiagn.com

P1111 IVT CONTROL SOLENOID VALVE

Description

INFOID:0000000001089402

Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.
The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.
The longer pulse width advances valve angle.
The shorter pulse width retards valve angle.
When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



DTC Logic

INFOID:0000000001089403

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) • Intake valve timing control solenoid valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-829, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089404

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake valve timing control solenoid valve harness connector and ground.

IVT control solenoid valve		Ground	Voltage
Connector	Terminal		
F41	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTION PART

cardiagn.com

Check the following.
- Harness connectors E7, F121
- Harness for open or short between intake valve timing control solenoid valve and IPDM E/R

>> Repair or replace harness or connectors.

3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between intake valve timing control solenoid valve harness connector and ECM harness connector.

IVT control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F41	1	F8	73	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-830, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace intake valve timing control solenoid valve.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089405

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	6.7 - 7.7 Ω
1 or 2 and ground	∞ Ω (Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace intake valve timing control solenoid valve.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve.

cardiagn.com

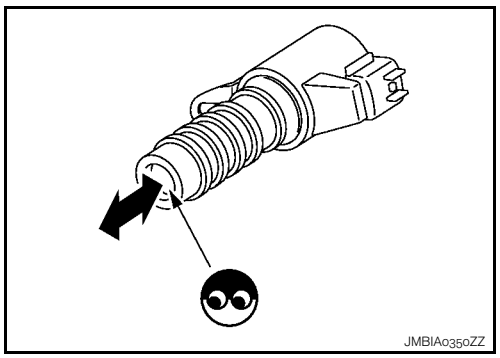
2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:

Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.

NOTE:

Always replace O-ring when intake valve timing control solenoid valve is removed.



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve.

cardiagn.com

P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:0000000001089406

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001089407

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	• Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detect the throttle valve is stuck open.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set shift lever to P (CVT) or Neutral (M/T) position.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
7. Set shift lever to P (CVT) or Neutral (M/T) position.
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.

Is DTC detected?

YES >> Go to EC-832, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set shift lever to N, P (CVT) or Neutral (M/T) position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.

Is DTC detected?

YES >> Go to EC-832, "Diagnosis Procedure".
NO >> INSPECTION END

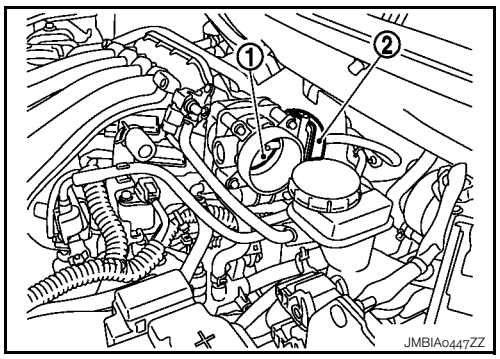
Diagnosis Procedure

INFOID:0000000001089408

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

cardiagn.com

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.



2. Electric throttle control actuator

Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-833, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089409

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

cardiagn.com

P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:0000000001089410

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001089411

DTC DETECTION LOGIC

NOTE:
If DTC P1122 is displayed with DTC P1121 or P1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to EC-838, "DTC Logic" or EC-832, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122	Electric throttle control performance	Electric throttle control function does not operate properly.	• Harness or connectors (Throttle control motor circuit is open or shorted) • Electric throttle control actuator

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-834, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089412

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch OFF	Approx. 0V
			Ignition switch ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 3.

3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 4.

4. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E12.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	25	F7	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness connectors.

6. CHECK FUSE

1. Disconnect 15A fuse (No. 51) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace 15A fuse.

7. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	32	F7	2	Existed

2. Also check harness for short to ground and short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness connectors.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

10. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

5. Also check harness for short to ground and short to power.

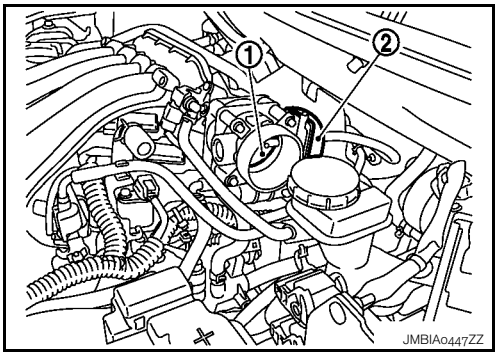
Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace.

11. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve (1) and the housing.

2. Electric throttle control actuator



Is the inspection result normal?

YES >> GO TO 12.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

12. CHECK THROTTLE CONTROL MOTOR

Refer to EC-837, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 13.
NO >> GO TO 14.

13. CHECK INTERMITTENT INCIDENT

cardiagn.com

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair or replace harness or connectors.

14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace malfunction electric throttle control actuator.
2. Go to EC-837, "Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000001089413

1. CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance
5 and 6	Approx. 1 - 15 Ω [at 25 °C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-837, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089414

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Description

INFOID:0000000001089415

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

DTC Logic

INFOID:0000000001089416

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	• Harness or connectors (Throttle control motor relay circuit is open) • Throttle control motor relay
P1126	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	• Harness or connectors (Throttle control motor relay circuit is shorted) • Throttle control motor relay

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V.

Witch DTC is detected?

P1126 >> GO TO 2.
P1124 >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P1126

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-838, "Diagnosis Procedure".
NO >> INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P1124

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-838, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089417

1.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E12.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	25	F7	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness connectors.

4. CHECK FUSE

1. Disconnect 15A fuse (No. 51) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace 15A fuse.

5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch OFF	Approx. 0V
			Ignition switch ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 6.

6. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	32	F7	2	Existed

2. Also check harness for short to ground and short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

cardiagn.com

P1128 THROTTLE CONTROL MOTOR

Description

INFOID:0000000001089418

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001089419

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	• Harness or connectors (Throttle control motor circuit is shorted.) • Electric throttle control actuator (Throttle control motor)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-841, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089420

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect electric throttle control actuator harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

cardiagn.com

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK THROTTLE CONTROL MOTOR

Refer to EC-842, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 5.

4.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-842, "Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000001089421

1.CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance
5 and 6	Approx. 1 - 15 Ω [at 25 °C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-842, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089422

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

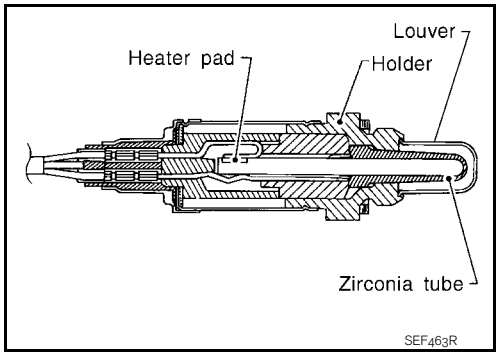
cardiagn.com

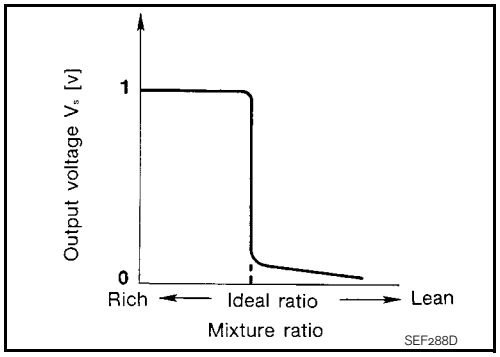
P1143 HO2S1

Description

INFOID:0000000001089423

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



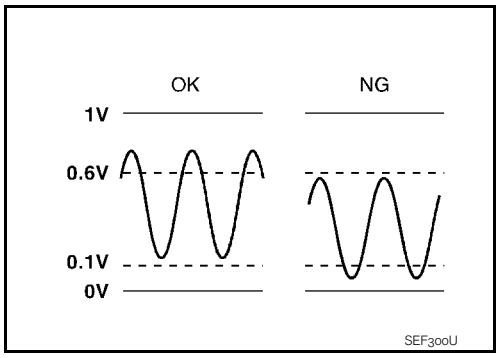


DTC Logic

INFOID:0000000001089424

DTC DETECTION LOGIC

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high and whether the “lean” output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1143	Heated oxygen sensor 1 lean shift monitoring	The maximum and minimum voltage from the sensor are not reached to the specified voltages.	• Heated oxygen sensor 1 • Heated oxygen sensor 1 heater • Fuel pressure • Fuel injector • Intake air leaks

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform at a temperature above -10°C (14°F)

cardiagn.com

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P1143” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.
   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-III screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)
   CAUTION:
   Always drive vehicle at a safe speed.

ENG SPEED	A/T: 1,375 - 2,600 rpm M/T: 1,375 - 2,600 rpm
VHCL SPEED SE	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	A/T: 3.7 - 10.0 msec M/T: 3.7 - 10.0 msec
Shift lever	Suitable position

   If “TESTING” is not displayed after 5 minutes, retry from step 2.
7. Touch “SELF-DIAG RESULT”

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-845, "Diagnosis Procedure".

3.PERFORM COMPONENT FUNCTION CHECK

With GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between EM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load	• The maximum voltage is over 0.6 at least 1 time. • The minimum voltage is over 0.1 at least 1 time.

NOTE:
Use component function check to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-845, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089426

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

cardiagn.com

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CLEAR THE SELF-LEARNING DATA

1. Clear mixture ratio self-learning value, refer to EC-649, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 detected or difficult to start engine?

Yes >> Perform trouble diagnosis for DTC P0171. Refer to EC-791, "DTC Logic".
No >> GO TO 4.

4.CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-776, "Component Inspection".

Is inspection result normal?

YES >> GO TO 5.
NO >> Replace heated oxygen sensor 1.

5.CHECK INTERMITTENT INCIDENT

Perform GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

>> INSPECTION END

Component Inspection

INFOID:0000000001091321

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

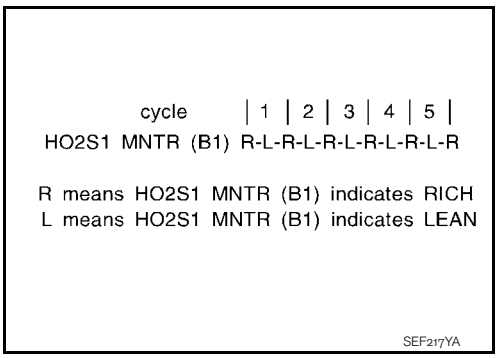
2.CHECK HEATED OXYGEN SENSOR 1

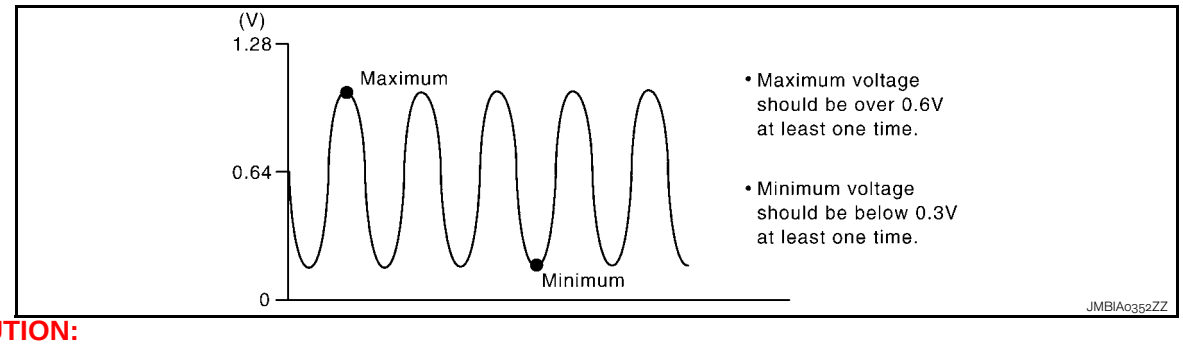
With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.

cardiagn.com

6. Check the following.
- "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- "HO2S1 (B1)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)" voltage never exceeds 1.0V.





CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.
CAUTION:

cardiagn.com

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

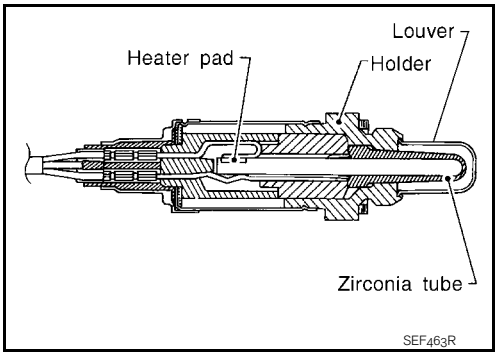
cardiagn.com

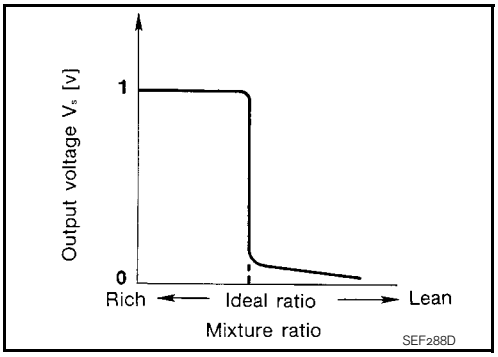
P1144 HO2S1

Description

INFOID:0000000001089428

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



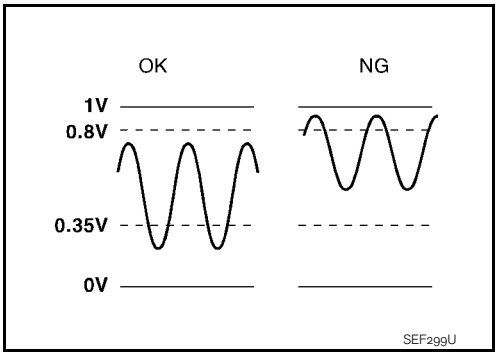


DTC Logic

INFOID:0000000001089429

DTC DETECTION LOGIC

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high and “lean” output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1144	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	• Heated oxygen sensor 1 • Heated oxygen sensor 1 heater • Fuel pressure • Fuel injector

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform at a temperature above -10°C (14°F).

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

cardiagn.com

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P1143” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.
   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-III screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)
   CAUTION:
   Always drive vehicle at a safe speed.

ENG SPEED	A/T: 1,375 - 2,600 rpm M/T: 1,375 - 2,600 rpm
VHCL SPEED SE	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	A/T: 3.7 - 10.0 msec M/T: 3.7 - 10.0 msec
Shift lever	Suitable position

   If “TESTING” is not displayed after 5 minutes, retry from step 2.
7. Touch “SELF-DIAG RESULT”

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-845, "Diagnosis Procedure".

3.PERFORM COMPONENT FUNCTION CHECK

With GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between EM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load	• The maximum voltage is over 0.8 at least 1 time. • The minimum voltage is over 0.35 at least 1 time.

NOTE:
Use component function check to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-845, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089431

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CLEAR THE SELF-LEARNING DATA

1. Clear the mixture ratio self-learning value, refer to EC-649, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected or difficult to start engine?

Yes >> Perform trouble diagnosis for DTC P0172. Refer to EC-791, "DTC Logic".
No >> GO TO 4

4.CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-776, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace heated oxygen sensor 1.

6.CHECK HEATED OXYGEN SENSOR 1

Refer to EC-762, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace heated oxygen sensor 1.

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001089432

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 1

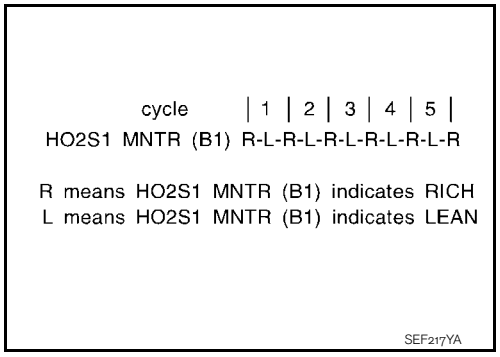
With CONSULT-III

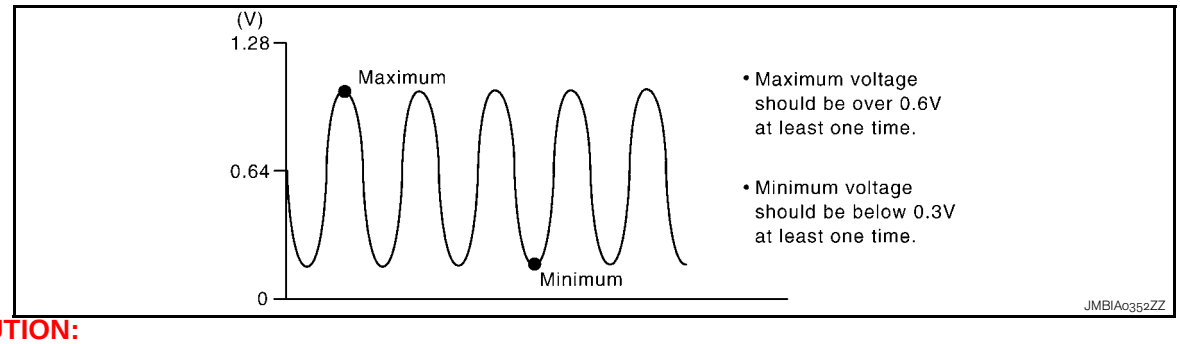
1. Start engine and warm it up to normal operating temperature.

cardiagn.com

2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.





CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

cardiagn.com

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

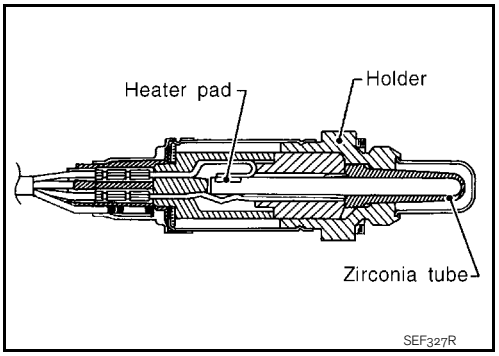
cardiagn.com

P1146 HO2S2

Description

INFOID:0000000001089433

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

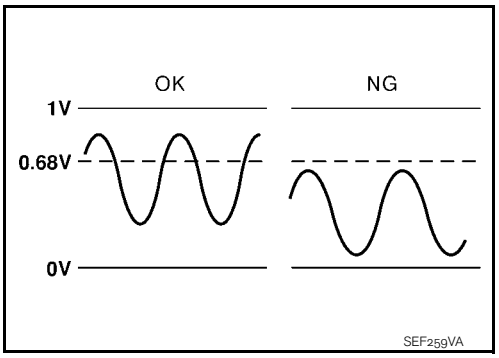


DTC Logic

INFOID:0000000001089434

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1146	Heated oxygen sensor 2 circuit low voltage	The maximum voltage from the sensor is not reached to the specified voltage.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 11.

2. PRECONDITIONING

"COMPLETED" will appear on CONSULT-III screen when all tests "COND1", "COND2" and "COND3" are completed.
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- **For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).**
- **Never stop engine during this procedure. If the engine is stopped, retry this procedure from step 2 in Procedure for COND1.**

CAUTION:

Always drive at safe speed.

cardiagn.com

>> GO TO 3.

3.PERFORM PROCEDURE FOR COND1-I

Start engine and warm it up to normal operating temperature.

>> GO TO 4.

4.PERFORM PROCEDURE FOR COND1-II

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 5.

5.PERFORM PROCEDURE FOR COND1-IV

1. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
2. Let engine idle 1 minute.
3. Select “HO2S2 (B1) P1146” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 30 seconds.
6. Rev engine up to 2,000 rpm two or three times quickly under no load.

Is “CONPLETED” appears on CONSULT-III screen?

YES >> GO TO 9.
NO >> GO TO 6.

6.PERFORM PROCEDURE FOR COND1-I

When the following conditions are met, “TESTING” will be displayed at “COND1” on the CONSULT-III screen. Maintain the condition continuously until “TESTING” changes to “COMPLETED” (It will take approximately 60 seconds.)

ENG SPEED	More than 1,000 rpm
B/FUEL SCHDL	More than 1.0 msec
COOLAN TEMP/S	More than 70°C (158°F)
Shift level	Suitable position

Which displayed on CONSULT-III screen?

COND1: OUT OF CONDITION>>GO TO 4.
COND1: COMPLETED COND2: INCOMPLETED>>GO TO 7.
COND1: COMPLETED COND2: COMPLETED>>GO TO 8.

7.PERFORM PROCEDURE FOR COND2

While driving, release accelerator pedal completely from the above condition until “INCOMPLETED” at “COND2” on CONSULT-III screen has turned to “COMPLETED”. (It will take approximately 4 seconds.)

Which displayed on CONSULT-III screen?

COND2: COMPLETED COND3: INCOMPLETED>>GO TO 8.
COND2: COMPLETED COND3: COMPLETED>>GO TO 9.

8.PERFORM PROCEDURE FOR COND3

Stop vehicle and let it idle until “INCOMPLETED” of “COND3” on CONSULT-III screen has turned to “COMPLETED”. (It will take a maximum of approximately 6 minutes.)

>> GO TO 9.

9.PERFORM PROCEDURE FOR COND3-I

Touch “SELF DIAGRESULTS”.

Which displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-857, "Diagnosis Procedure".

cardiagn.com

CAN NOT BE DIAGNOSED>>GO TO 10.

10. PERFORM PROCEDURE FOR COND3-II

1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
2. Turn ignition switch ON and select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-III.
3. Start engine and warm it up while monitoring “COOLAN TEMP/S” indication on CONSULT-III.
4. When “COOLAN TEMP/S” indication reaches to 70°C (158°F).

>> GO TO 5.

11. PREFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-856, "Component Function Check".

NOTE:

Use component function check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-857, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001089435

1. PERFORM COMPONENT FUNCTION CHECK-I

With GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68V at least once during this procedure.

cardiagn.com

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-857, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089436

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CLEAR THE SELF-LEARNING DATA

1. Clear mixture ratio self-learning value, refer to EC-649, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0172. Refer to EC-795, "DTC Logic".
NO >> GO TO 3.

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between heated oxygen sensor 2 and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F8	50	Ground	Not existed

3. Also check harness for short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between heated oxygen sensor 2 and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-858, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 9.

8. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089437

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

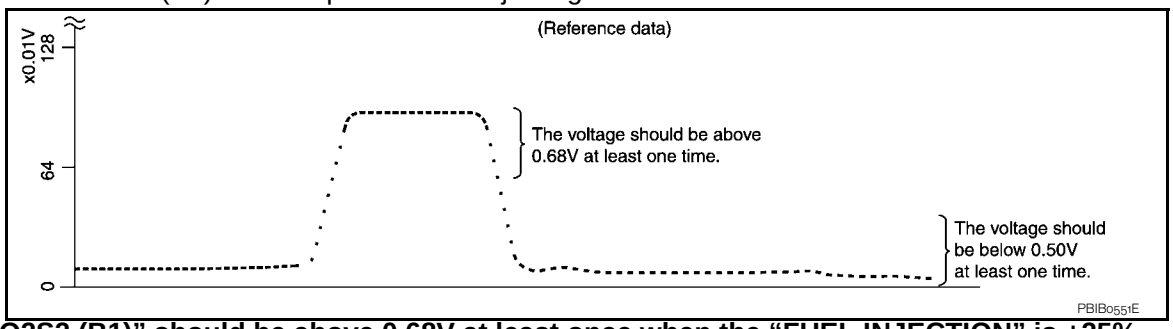
2. CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.

cardiagn.com

7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

cardiagn.com

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

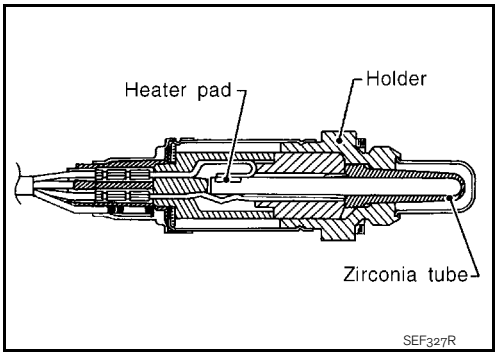
cardiagn.com

P1147 HO2S2

Description

INFOID:0000000001089438

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

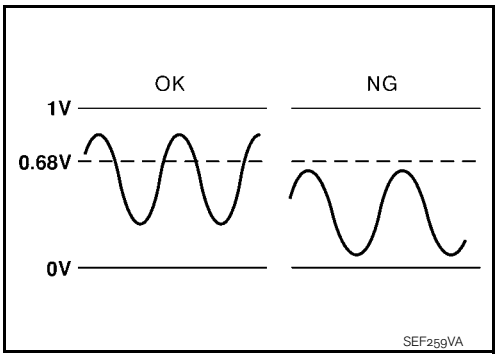


DTC Logic

INFOID:0000000001115349

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1146	Heated oxygen sensor 2 circuit low voltage	The maximum voltage from the sensor is not reached to the specified voltage.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 11.

2.PRECONDITIONING

"COMPLETED" will appear on CONSULT-III screen when all tests "COND1", "COND2" and "COND3" are completed.
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- **For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).**
- **Never stop engine during this procedure. If the engine is stopped, retry this procedure from step 2 in Procedure for COND1.**

CAUTION:

Always drive at safe speed.

cardiagn.com

>> GO TO 3.

3. PERFORM PROCEDURE FOR COND1-I

Start engine and warm it up to normal operating temperature.

>> GO TO 4.

4. PERFORM PROCEDURE FOR COND1-II

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 5.

5. PERFORM PROCEDURE FOR COND1-IV

1. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
2. Let engine idle 1 minute.
3. Select “HO2S2 (B1) P1146” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-III.
4. Touch “START”.
5. Start engine and let it idle for at least 30 seconds.
6. Rev engine up to 2,000 rpm two or three times quickly under no load.

Is “CONPLETED” appears on CONSULT-III screen?

YES >> GO TO 9.
NO >> GO TO 6.

6. PERFORM PROCEDURE FOR COND1-I

When the following conditions are met, “TESTING” will be displayed at “COND1” on the CONSULT-III screen. Maintain the condition continuously until “TESTING” changes to “COMPLETED” (It will take approximately 60 seconds.)

ENG SPEED	More than 1,000 rpm
B/FUEL SCHDL	More than 1.0 msec
COOLAN TEMP/S	More than 70°C (158°F)
Shift level	Suitable position

Which displayed on CONSULT-III screen?

COND1: OUT OF CONDITION>>GO TO 4.
COND1: COMPLETED COND2: INCOMPLETED>>GO TO 7.
COND1: COMPLETED COND2: COMPLETED>>GO TO 8.

7. PERFORM PROCEDURE FOR COND2

While driving, release accelerator pedal completely from the above condition until “INCOMPLETED” at “COND2” on CONSULT-III screen has turned to “COMPLETED”. (It will take approximately 4 seconds.)

Which displayed on CONSULT-III screen?

COND2: COMPLETED COND3: INCOMPLETED>>GO TO 8.
COND2: COMPLETED COND3: COMPLETED>>GO TO 9.

8. PERFORM PROCEDURE FOR COND3

Stop vehicle and let it idle until “INCOMPLETED” of “COND3” on CONSULT-III screen has turned to “COMPLETED”. (It will take a maximum of approximately 6 minutes.)

>> GO TO 9.

9. PERFORM PROCEDURE FOR COND3-I

Touch “SELF DIAGRESULTS”.

Which displayed on CONSULT-III screen?

OK >> INSPECTION END
NG >> Go to EC-864, "Diagnosis Procedure".

cardiagn.com

CAN NOT BE DIAGNOSED>>GO TO 10.

10.PERFORM PROCEDURE FOR COND3-II

1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
2. Turn ignition switch ON and select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-III.
3. Start engine and warm it up while monitoring “COOLAN TEMP/S” indication on CONSULT-III.
4. When “COOLAN TEMP/S” indication reaches to 70°C (158°F).

>> GO TO 5.

11.PREFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-856, "Component Function Check".

NOTE:

Use component function check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-864, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001089440

1.PERFORM COMPONENT FUNCTION CHECK-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68V at least once during this procedure.

cardiagn.com

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-864, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115350

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CLEAR THE SELF-LEARNING DATA

1. Clear mixture ratio self-learning value, refer to EC-649, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement".
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0172. Refer to EC-795, "DTC Logic".
NO >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between heated oxygen sensor 2 and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F8	50	Ground	Not existed

3. Also check harness for short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between heated oxygen sensor 2 and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-858, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 9.

8. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089442

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

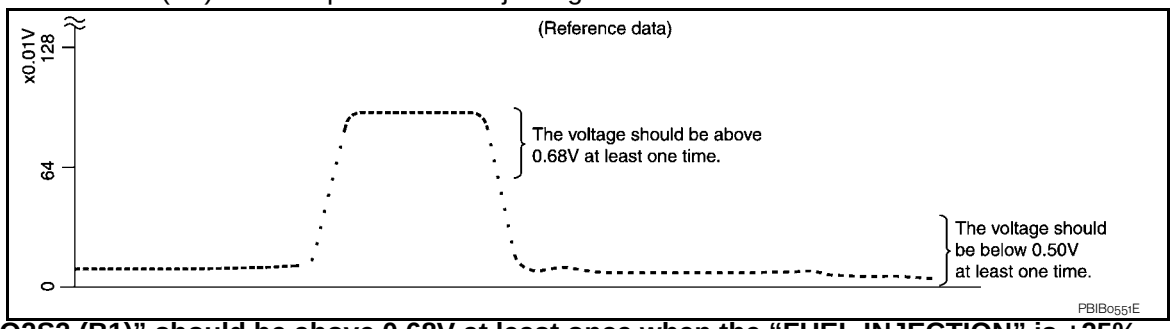
2. CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.

cardiagn.com

7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

cardiagn.com

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

P1211 TCS CONTROL UNIT

Description

INFOID:0000000001089443

The malfunction information related to TCS is transferred through the CAN communication line from “ABS actuator and electric unit (control unit)” to ECM.
Be sure to erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

DTC Logic

INFOID:0000000001089444

DTC DETECTION LOGIC

Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211	TCS control unit	ECM receives a malfunction information from “ABS actuator and electric unit (control unit)”.	• ABS actuator and electric unit (control unit) • TCS related parts

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 60 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> EC-868, "Diagnosis Procedure"
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089445

Go to BRC-74, "Work Flow".

cardiagn.com

P1212 TCS COMMUNICATION LINE

Description

INFOID:0000000001089446

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and “ABS actuator and electric unit (control unit)”.
Be sure to erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

DTC Logic

INFOID:0000000001089447

DTC DETECTION LOGIC

NOTE:
- **If DTC P1212 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-740, "DTC Logic".**
- **If DTC P1212 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-741, "DTC Logic".**

Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212	TCS communication line	ECM can not receive the information from “ABS actuator and electric unit (control unit)” continuously.	• Harness or connectors (The CAN communication line is open or short-ed.) • ABS actuator and electric unit (control unit) • Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-869, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089448

Go to BRC-74, "Work Flow".

cardiagn.com

P1217 ENGINE OVER TEMPERATURE

DTC Logic

INFOID:0000000001089449

DTC DETECTION LOGIC

NOTE:

- **If DTC P1217 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-740, "DTC Logic".**
- **If DTC P1217 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-741, "DTC Logic".**

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217	Engine over temperature (Overheat)	• Cooling fan does not operate properly (Overheat). • Cooling fan system does not operate properly (Overheat). • Engine coolant was not added to the system using the proper filling method. • Engine coolant is not within the specified range.	• Harness or connectors (The cooling fan circuit is open or shorted.) • IPDM E/R (Cooling fan relay-1) • Cooling fan relay -3 • Cooling fan motor • Radiator hose • Radiator • Radiator cap • Reservoir tank • Water pump • Thermostat • Water control valve

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to CO-30, "Inspection". Also, replace the engine oil. Refer to LU-15, "Draining".

1. **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-21, "SAE Viscosity Number".**
2. **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-870, "Component Function Check".

NOTE:

Use component function check to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-871, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001089450

1.PERFORM COMPONENT FUNCTION CHECK-I

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

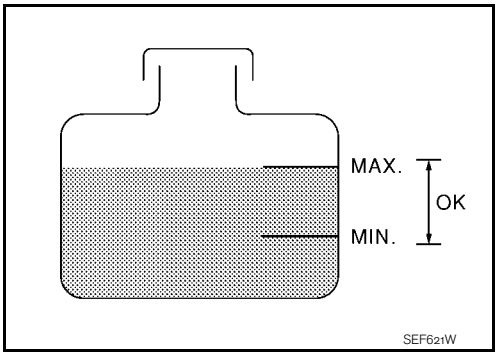
Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

cardiagn.com

Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.

Is the coolant level in the reservoir tank and/or radiator below the proper range?

YES >> Go to EC-871, "Diagnosis Procedure".
NO >> GO TO 2.



2.PERFORM COMPONENT FUNCTION CHECK-II

Confirm whether customer filled the coolant or not.

Did customer fill the coolant?

YES >> Go to EC-871, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

With CONSULT-III
1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that cooling fan motor operate at each speed (LOW/HI).

Without CONSULT-III
Perform IPDM E/R auto active test and check cooling fan motors operation, refer to PCS-9, "Diagnosis Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-871, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089451

1.INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.
No >> GO TO 4.

2.CHECK COOLING FAN LOW SPEED OPERATION

With CONSULT-III
1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III and touch “LOW” on the CONSULT-III screen.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check cooling fan control circuit.

3.CHECK COOLING FAN HIGH SPEED OPERATION

With CONSULT-III
1. Touch “HIGH” on the CONSULT-III screen.
2. Make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check cooling fan control circuit.

4.CHECK COOLING FAN LOW SPEED OPERATION

cardiagn.com

Without CONSULT-III
1. Start engine and let it idle.
2. Turn air conditioner switch ON.
3. Turn blower fan switch ON.
4. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check cooling fan low speed control circuit.

5. CHECK COOLING FAN HIGH SPEED OPERATION

Without CONSULT-III
1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check cooling fan high speed control circuit.

6. CHECK COOLING SYSTEM FOR LEAK

Check cooling system for leak. Refer to CO-30, "Inspection".

Is leakage detected?

YES >> GO TO 8.
NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following for leak. Refer to CO-30, "Inspection".
- Hose
- Radiator
- Water pump
- Reservoir tank

>> Repair or replace.

8. CHECK RESERVOIR TANK CAP

Check radiator cap. Refer to CO-33, "RESERVOIR TANK CAP : Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace radiator cap.

9. CHECK THERMOSTAT

Check thermostat.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace thermostat.

10. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor.

Is the inspection result normal?

OK >> GO TO 11.
NG >> Replace engine coolant temperature sensor.

11. CHECK MAIN 13 CAUSES

If the cause cannot be isolated, check the following.

cardiagn.com

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	• Blocked radiator • Blocked condenser • Blocked radiator grille • Blocked bumper	• Visual	No blocking	—
	2	• Coolant mixture	• Coolant tester	50 - 50% coolant mixture	MA-21, "SAE Viscosity Number"
	3	• Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-30, "Inspection"
	4	• Reservoir tank cap	• Pressure tester	59 - 98 kPa (0.6 - 1.0 bar, 0.6 - 1.0 kg/cm^2, 9 - 14 psi) (Limit)	CO-35, "Removal and Installation"
ON*2	5	• Coolant leaks	• Visual	No leaks	CO-30, "Inspection"
ON*2	6	• Thermostat	• Touch the upper and lower radiator hoses	Both hoses should be hot	CO-41, "Removal and Installation"
ON*1	7	• Cooling fan motor	• CONSULT-III	Operating	EC-920, "Component Inspection (Cooling Fan Motor)"
OFF	8	• Combustion gas leak	• Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	• Coolant temperature gauge	• Visual	Gauge less than 3/4 when driving	—
		• Coolant overflow to reservoir tank	• Visual	No overflow during driving and idling	CO-30, "Inspection"
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	CO-30, "Inspection"
OFF	11	• Water control valve	• Remove and inspect the valve	Within the specified value	CO-44, "Removal and Installation"
OFF	12	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	EM-186, "Removal and Installation"
	13	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	EM-191, "Inspection"

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to CO-26, "Troubleshooting Chart".

>> INSPECTION END

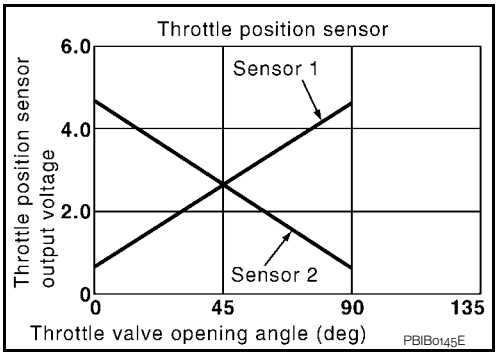
cardiagn.com

P1225 TP SENSOR

Description

INFOID:0000000001089453

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001089454

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-874, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

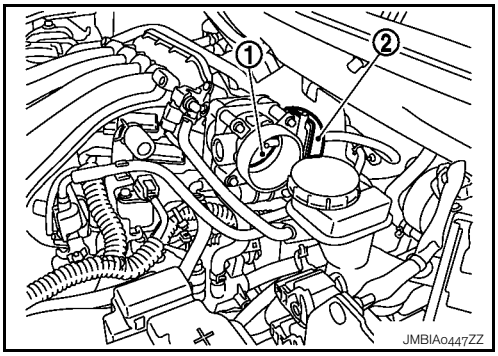
INFOID:0000000001089455

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

cardiagn.com

3. Check if foreign matter is caught between the throttle valve (1) and the housing.



2. Electric throttle control actuator

Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-875, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089456

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

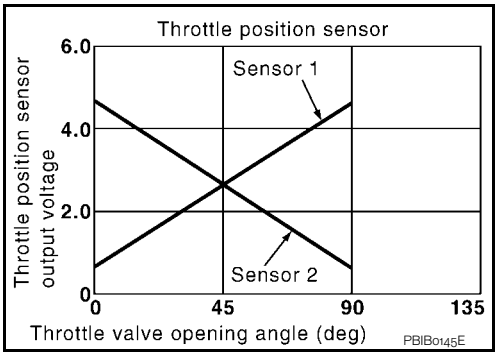
cardiagn.com

P1226 TP SENSOR

Description

INFOID:0000000001089457

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001089458

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226	Closed throttle position learning performance	Closed throttle position learning is not performed successfully, repeatedly.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF, wait at least 10 seconds.
3. Turn ignition switch ON.
4. Repeat steps 2 and 3 for 32 times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-876, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

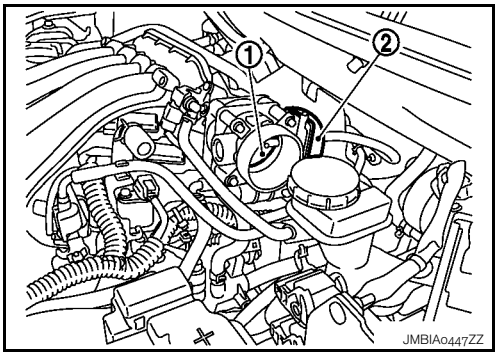
INFOID:0000000001089459

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

cardiagn.com

3. Check if foreign matter is caught between the throttle valve (1) and the housing.



2. Electric throttle control actuator

Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-875, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089460

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1229 SENSOR POWER SUPPLY

DTC Logic

INFOID:0000000001089461

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	• Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.] • Accelerator pedal position sensor • Throttle position sensor • Camshaft position sensor (PHASE)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-878, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089462

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

cardiagn.com

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	72	Electric throttle control actuator	F29	1
	78	CMP sensor (PHASE)	F26	1
E16	106	APP sensor	E110	4

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair short to ground or short to power in harness or connectors.

4.CHECK COMSHAFT PSITION SENSOR

Refer to EC-815, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace malfunctioning component.

5.CHECK TP SENSOR

Refer to EC-908, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-833, "Special Repair Requirement".

>> INSPECTION END

7.CHECK APP SENSOR

Refer to EC-901, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> INSPECTION END

9.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P1564 ASCD STEERING SWITCH

Description

INFOID:0000000001089463

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.
Refer to EC-677, "System Description" for the ASCD function.

DTC Logic

INFOID:0000000001089464

DTC DETECTION LOGIC

NOTE:
If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-827, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564	ASCD steering switch	• An excessively high voltage signal from the ASCD steering switch is sent to ECM. • ECM detects that input signal from the ASCD steering switch is out of the specified range. • ECM detects that the ASCD steering switch is stuck ON.	• Harness or connectors (The switch circuit is open or shorted.) • ASCD steering switch • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Wait at least 10 seconds.
3. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Check DTC.

Is DTC detected?

YES >> Go to EC-880, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089465

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YS >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-III
1. Turn ignition switch ON.

cardiagn.com

2. Select “MAIN SW”, “CANCEL SW”, “RESUME/ACC SW” and “SET SW” in “DATA MONITOR” mode with CONSULT-III.
3. Check each item indication under the following conditions.

Monitor item	Condition		Indication
MAIN SW	MAIN switch	Pressed	ON
		Released	OFF
CANCEL SW	CANCEL switch	Pressed	ON
		Released	OFF
RESUME/ACC SW	RESUME/ACCELERATE switch	Pressed	ON
		Released	OFF
SET SW	SET/COAST switch	Pressed	ON
		Released	OFF

Without CONSULT-III
1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
E16	94 (ASCD steering switch signal)	Ground	MAIN switch: Pressed	Approx. 0V
			CANSEL switch: Pressed	Approx. 1V
			SET/COAST switch: Pressed	Approx. 2V
			RESUME/ACCELERATE switch: Pressed	Approx. 3V
			All ASCD steering switches: Released	Approx. 4V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect combination switch harness connector M352.
4. Check the continuity between ASCD steering switch and ECM harness connector.

ASCD steering switch	ECM		Continuity
Terminal	Connector	Terminal	
15	E16	95	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCE steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

cardiagn.com

1. Check the continuity between ECM harness connector and ASCD steering switch.

ASCD steering switch	ECM		Continuity
Terminal	Connector	Terminal	
14	E16	94	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCE steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD STEERING SWITCH

Refer to EC-882, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace ASCD steering switch.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089466

1. CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the continuity between combination switch harness connector terminals under following conditions.

Combination meter		Condition	Resistance
Connector	Terminals		
M325	14 and 15	MAIN switch: Pressed	Approx. 0 Ω
		CANCEL switch: Pressed	Approx. 250 Ω
		SET/COAST switch: Pressed	Approx. 660 Ω
		RESUME/ACCELERATE switch: Pressed	Approx. 1,480 Ω
		All ASCD steering switches: Released	Approx. 4,000 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD steering switch

cardiagn.com

P1572 ASCD BRAKE SWITCH

Description

INFOID:0000000001089467

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-677, "System Description" for the ASCD function.

DTC Logic

INFOID:0000000001089468

DTC DETECTION LOGIC

NOTE:

- **If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-827, "DTC Logic".**
- **This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.**

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1572	ASCD brake switch	A)	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the ECM at the same time.	• Harness or connectors (The stop lamp switch circuit is shorted.) • Harness or connectors (The ASCD brake switch circuit is shorted.) • Harness or connectors (The ASCD clutch switch circuit is shorted.) (M/T) • Stop lamp switch • ASCD brake switch • ASCD clutch switch (M/T) • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • Incorrect ASCD clutch switch installation (M/T) • ECM
		B)	ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

With CONSULT-III

1. Start engine.
2. Select “DATA MONITOR” mode with CONSULT-III.
3. Press MAIN switch and make sure that CRUISE indicator is displayed in combination meter.
4. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

   CAUTION:

   Always drive vehicle at a safe speed.

   NOTE:

   This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

cardiagn.com

VHCL SPEED SE	More than 30 km/h (19 mph)
Shift lever	Suitable position

5. Check 1st trip DTC.

With GST

Follow the procedure “With CONSULT-III” above.

Is 1st trip DTC detected?

YES >> Go to EC-884, "Diagnosis Procedure".
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

With CONSULT-III

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed.

2. Check 1st trip DTC.

With GST

Follow the procedure “With CONSULT-III” above.

Is 1st trip DTC detected?

YES >> Go to EC-884, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089469

1. CHECK OVERALL FUNCTION-I

With CONSULT-III

1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-III.
3. Check “BRAKE SW1” indication under the following conditions.

Monitor item	Condition		Indication
BRAKE SW1	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	OFF
		Fully released	ON

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO-1 >> CVT models: GO TO 3.
NO-1 >> M/T models: GO TO 7.

2.CHECK OVERALL FUNCTION-II

With CONSULT-III
Select “BRAKE SW2” and check indication in “DATA MONITOR” mode.

Monitor item	Condition		Indication
BRAKE SW2	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	ON
		Fully released	OFF

Without CONSULT-III
Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	99 (Stop lamp switch signal)	Ground	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 14.

3.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD brake switch		Ground	Voltage
Connector	Terminal		
E112	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Junction block connector E105, M77
- 10A fuse (No.4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM ASCD harness connector.
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

ASCD brake switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E16	100	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

cardiagn.com

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD BRAKE SWITCH

Refer to EC-888, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 19.
NO >> Replace ASCD brake switch.

7. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD Clutch switch		Ground	Condition		Voltage (V)
Connector	Terminal				
E112	1	Ground	Clutch pedal	Slightly depressed	Approx. 0
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 8.

8. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground	Voltage
Connector	Terminal		
E111	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.
- Junction block connector E105, M77
- 10A fuse (No.4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD brake switch		ASCD clutch switch		Continuity
Connector	Terminal	Connector	Terminal	
E112	1	E111	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

cardiagn.com

YES >> GO TO 11.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK ASCD BRAKE SWITCH

Refer to EC-888, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 19.
NO >> Replace ASCD brake switch.

12. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and ASCD brake switch harness connector.

ECM		ASCD brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E16	100	E112	2	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK ASCD CLUTCH SWITCH

Refer to EC-888, "Component Inspection (ASCD Clutch Switch)".

Is the inspection result normal?

YES >> GO TO 19.
NO >> Replace ASCD clutch switch.

14. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114 (M/T) E115 (CVT)	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 16.
NO >> GO TO 15.

15. DETECT MALFUNCTIONING PART

Check the following.
- 10A fuse (No.11)
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

16. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

cardiagn.com

ECM		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E10	106	E114 (M/T) E115 (CVT)	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 18.
NG >> GO TO 17.

17. DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

18. CHECK STOP LAMP SWITCH

Refer to EC-889, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 19.
NO >> Replace stop lamp switch.

19. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:0000000001089470

1. CHECK ASCD BRAKE SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to BR-8, "Inspection and Adjustment" (LHD models) or BR-52, "Inspection and Adjustment" (RHD models).
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:0000000001089471

cardiagn.com

1.CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to CL-5, "Inspection and Adjustment".
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

Component Inspection (Stop Lamp Switch)

INFOID:0000000001089472

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-8, "Inspection and Adjustment" (LHD models) or BR-52, "Inspection and Adjustment" (RHD models).
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

cardiagn.com

P1574 ASCD VEHICLE SPEED SENSOR

Description

INFOID:0000000001089473

The ECM receives two vehicle speed sensor signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to EC-677, "System Description" for ASCD functions.

DTC Logic

INFOID:0000000001089474

DTC DETECTION LOGIC

NOTE:

- **If DTC P1574 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-740, "DTC Logic".**
- **If DTC P1574 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-741, "DTC Logic".**
- **If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to EC-825, "DTC Logic"**
- **If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-827, "DTC Logic"**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	• Harness or connectors (The CAN communication line is open or shorted.) (Combination meter circuit is open or shorted.) • Combination meter • ABS actuator and electric unit (control unit) • Wheel sensor • TCM (CVT models) • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Drive the vehicle at more than 40 km/h (25 MPH).
   CAUTION:
   Always drive vehicle at a safe speed.
   NOTE:
   This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-890, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089475

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-214, "Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Perform trouble shooting relevant to DTC indicated.

2.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to BRC-17, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK COMBINATION METER

Check combination meter function.
Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

>> INSPECTION END

cardiagn.com

P1706 PNP SWITCH

Description

INFOID:0000000001089476

When the shift lever position is P or N (CVT), Neutral position (M/T), park/neutral position (PNP) switch is ON. ECM detects the position because the continuity of the line (the ON signal) exists.

DTC Logic

INFOID:0000000001089477

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	• Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] • Park/neutral position (PNP) switch

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 3.

3.CHECK PNP SWITCH FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-III. Then check the “P/N POSI SW” signal under the following conditions.

Position (Shift lever)	Known-good signal
N or P position (CVT) Neutral position (M/T)	ON
Except above position	OFF

Is the inspection result normal?

YES >> GO TO 4.
NO >> Go to EC-893, "Diagnosis Procedure".

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to normal operating temperature.
3. Maintain the following conditions for at least 50 consecutive seconds.

CAUTION:
Always drive vehicle at a safe speed.

ENG SPEED	CVT: 1,500 - 6,375 rpm M/T: 1,500 - 6,375 rpm
COOLAN TEMP/S	More than 70°C (158°F)

cardiagn.com

B/FUEL SCHDL	CVT: 2.4 - 31.8 msec M/T: 3.5 - 31.8 msec
VHCL SPEED SE	More than 64 km/h (40 mph)
Shift lever	Suitable position

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-893, "Diagnosis Procedure".
NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-893, "Component Function Check".

NOTE:
Use component function check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-893, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001089478

1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	69 (PNP switch signal)	Ground	Shift lever	P or N (CVT) Neutral (M/T)	Approx. 0V
				Except above	BATTERY VOLTAGE

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-893, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089479

1.CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Park/neutral position (PNP) switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between PNP switch harness connector and ground.

PNP switch		Ground	Voltage
Connector	Terminal		
F21 (CVT)	7	Ground	Battery voltage
F46 (M/T 2W)	2		
F48 (M/T 4W)	2		

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DTECTED MALFUNCTIONING PART

Check the following.
- Harness connectors E6, F123

cardiagn.com

• Harness for open or short between PNP switch and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between PNP switch harness connector and ECM harness connector.

PNP switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F21 (CVT)	6	E10	102	Existed
F46 (M/T 2W)	3			
F48 (M/T 4W)	1			

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO-1 >> Repair open circuit or short to ground or short to power in harness or connectors. (M/T)
NO-2 >> GO TO 4. (CVT)

4. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Check the continuity between PNP switch harness connector and ECM harness connector.

PNP switch		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F21 (CVT)	7	E11	14	Existed

2. Check the continuity between IPDM E/R harness connector and ECM harness connector.

ECM		IPDM		Continuity
Connector	Terminal	Connector	Terminal	
F8	69	E11	14	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK PNP SWITCH

Refer to TM-227, "Component Inspection" (CVT) or TM-54, "PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection" (M/T).

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace PNP switch.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

Description

INFOID:0000000001089480

ECM receives primary speed sensor signal from TCM through CAN communication line. ECM uses this signal for engine control.

DTC Logic

INFOID:0000000001089481

DTC DETECTION LOGIC

NOTE:

- **If DTC P1715 is displayed with DTC U1001 first perform the trouble diagnosis for DTC U1001. Refer to EC-740, "DTC Logic".**
- **If DTC P1715 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-741, "DTC Logic".**
- **If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to EC-809, "DTC Logic".**
- **If DTC P1715 is displayed with DTC P0340, first perform the trouble diagnosis for DTC P0340. Refer to EC-813, "DTC Logic".**
- **If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-827, "DTC Logic".**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715	Input speed sensor (Primary speed sensor) (TCM output)	Primary speed sensor signal is different from the theoretical value calculated by ECM from secondary speed sensor signal and engine rpm signal.	• Harness or connectors (The CAN communication line is open or shorted) • Harness or connectors (Primary speed sensor circuit is open or shorted) • TCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and drive the vehicle at more than 50 km/h (31 MPH) for at least 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-895, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089482

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-214, "Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble shooting relevant to DTC indicated.

2.REPLACE TCM

Replace TCM.

>> INSPECTION END

cardiagn.com

P1805 BRAKE SWITCH

Description

INFOID:0000000001089483

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

DTC Logic

INFOID:0000000001089484

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805	Brake switch	A brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	• Harness or connectors (Stop lamp switch circuit is open or shorted.) • Stop lamp switch

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-III.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-896, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089485

1.CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

Is 1st trip DTC detected?

YES >> GO TO 4
NO >> GO TO 2

2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114 (M/T)	1	Ground	Battery voltage
E115 (CVT)			

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connector.

3.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

cardiagn.com

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

ECM		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E16	99	E114 (M/T)	2	Existed
		E115 (CVT)		

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NG >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK STOP LAMP SWITCH

Refer to EC-897, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace stop lamp switch.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (Stop Lamp Switch)

INFOID:0000000001089486

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to EC-897, "Component Inspection (Stop Lamp Switch)".
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> Replace stop lamp switch.

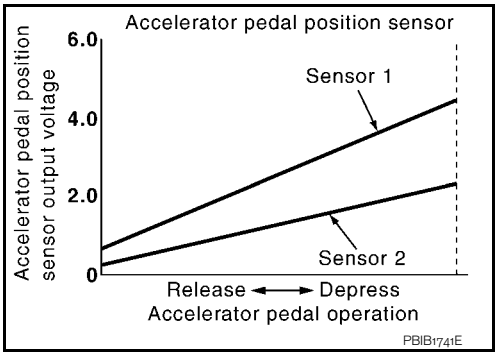
cardiagn.com

P2122, P2123 APP SENSOR

Description

INFOID:0000000001089487

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



DTC Logic

INFOID:0000000001089488

DTC DETECTION LOGIC

NOTE:
If DTC P2122 or P2123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-878, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	• Harness or connectors (APP sensor 1 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 1)
P2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-899, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089489

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	9	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E16	111	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK APP SENSOR

Refer to EC-901, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-901, "Special Repair Requirement".

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

Component Inspection

INFOID:0000000001089490

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-901, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089491

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

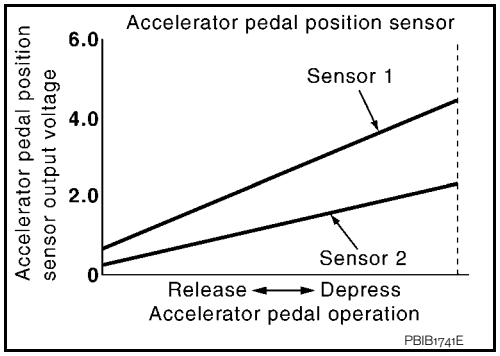
cardiagn.com

P2127, P2128 APP SENSOR

Description

INFOID:0000000001089492

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

DTC Logic

INFOID:0000000001089493

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	• Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor
P2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-902, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089494

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 3.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	5	E16	102	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-812, "Component Inspection".)
- Refrigerant pressure sensor (Refer to EC-936, "Diagnosis Procedure".)

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace malfunctioning component.

6.CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

cardiagn.com

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	1	E16	104	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	6	E16	103	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK APP SENSOR

Refer to EC-904, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-905, "Special Repair Requirement".

>> INSPECTION END

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089495

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-905, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089496

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

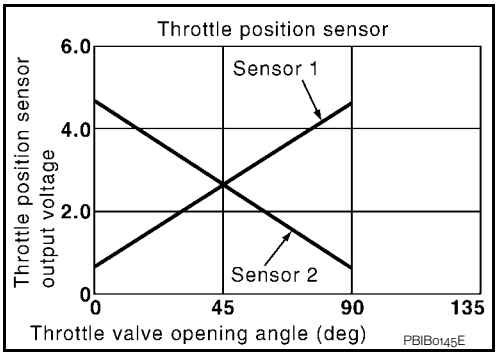
cardiagn.com

P2135 TP SENSOR

Description

INFOID:0000000001089497

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001089498

DTC DETECTION LOGIC

NOTE:
If DTC P2135 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-878, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135	Throttle position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	• Harness or connector (TP sensor 1 and 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-906, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089499

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.

cardiagn.com

2. Turn ignition switch ON.
3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	1	F8	72	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit.

4. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	2	F8	33	Existed
	3		34	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THROTTLE POSITION SENSOR

Refer to EC-908, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

cardiagn.com

7.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. EC-908, "Special Repair Requirement"

>> INSPECTION END

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089500

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-908, "Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-908, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089501

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

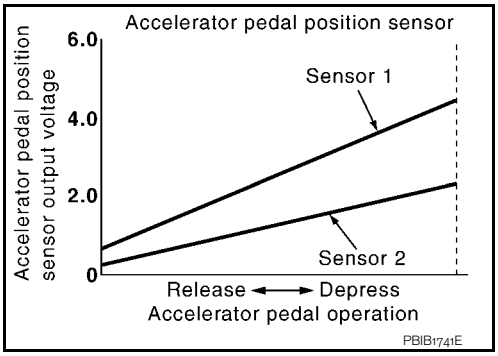
cardiagn.com

P2138 APP SENSOR

Description

INFOID:0000000001089502

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



DTC Logic

INFOID:0000000001089503

DTC DETECTION LOGIC

NOTE:
If DTC P2138 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-878, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138	Accelerator pedal position sensor circuit range/ performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	• Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 1 and 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-909, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001089504

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

cardiagn.com

2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 4.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	5	E16	102	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

5.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair short to ground or short to power in harness or connectors.

6.CHECK COMPONENTS

cardiagn.com

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-812, "Component Inspection".)
- Refrigerant pressure sensor (Refer to EC-936, "Diagnosis Procedure".)

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace malfunctioning component.

7.CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector as follows.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E16	111	Existed
	1		104	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

8.CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector as follows.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed
	6		103	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

9.CHECK APP SENSOR

Refer to EC-911, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-912, "Special Repair Requirement".

>> INSPECTION END

11.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089505

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

cardiagn.com

2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E110	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-912, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001089506

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

cardiagn.com

ASCD BRAKE SWITCH

Description

INFOID:0000000001089507

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-677, "System Description" for the ASCD function.

Component Function Check

INFOID:0000000001089508

1.CHECK FOR ASCD BRAKE SWITCH FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-III.
3. Check “BRAKE SW1” indication under the following conditions.

Monitor item	Condition		Indication
BRAKE SW1	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	OFF
		Fully released	ON

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-913, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089509

1.CHECK OVERALL FUNCTION-I

Check which type of transmission the vehicle is equipped with.

Is the inspection result normal?

CVT >> GO TO 2.
M/T >> GO TO 6.

2.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD brake switch		Ground	Voltage
Connector	Terminal		
E112	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

cardiagn.com

- Junction block connector M77, E105
- 10A fuse (No. 4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

ASCD brake switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E16	100	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD BRAKE SWITCH

Refer to EC-915, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace ASCD brake switch.

6. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the continuity between ASCD brake switch harness connector and ground.

ASCD brake switch		Ground	Condition		Voltage (V)
Connector	Terminal				
E112	1	Ground	Clutch pedal	Slightly depressed	Approx. 0
				Fully released	Battery voltage

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 7.

7. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground	Voltage
Connector	Terminal		
E111	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

cardiagn.com

Check the following.
- Junction block connector M77,E105
- 10A fuse (No. 4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

9.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD brake switch		ASCD clutch switch		Continuity
Connector	Terminal	Connector	Terminal	
E112	1	E111	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK ASCD CLUTCH SWITCH

Refer to EC-888, "Component Inspection (ASCD Clutch Switch)".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace ASCD clutch switch.

11.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

ASCD brake switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E16	100	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

12.CHECK ASCD BRAKE SWITCH

Refer to EC-888, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace ASCD brake switch.

13.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:0000000001089510

1.CHECK ASCD BRAKE SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.

cardiagn.com

3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to BR-8, "Inspection and Adjustment" (LHD miodels) orBR-52, "Inspection and Adjustment" (RHD models).
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:0000000001089511

1. CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to CL-5, "Inspection and Adjustment".
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

cardiagn.com

ASCD INDICATOR

Description

INFOID:0000000001089512

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.
CRUISE lamp illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.
SET lamp illuminates when following conditions are met.
- CRUISE lamp is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET lamp remains lit during ASCD control.
Refer to EC-677, "System Description" for the ASCD function.

Component Function Check

INFOID:0000000001089513

1.ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	• Ignition switch: ON	• MAIN switch: Pressed at the 1st time →at the 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	• ASCD: Operating	ON
		• ASCD: Not operating	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-917, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089514

1.CHECK DTC

Check that DTC U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1001. Refer to EC-740, "DTC Logic".

2.CHECK COMBINATION METER OPERATION

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check combination meter circuit. Refer to MWI-4, "METER SYSTEM : System Diagram".

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

COOLING FAN

Description

INFOID:0000000001089515

Cooling fan operates at each speed when the current flows in the cooling fan motor as follows.
Refer to EC-685, "System Diagram" for cooling fan operation.

Component Function Check

INFOID:0000000001089516

1.CHECK COOLING FAN LOW SPEED FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III and touch “LOW” on the CONSULT-III screen.
3. Make sure that cooling fans operates at low speed.

Without CONSULT-III

1. Start engine and let it idle.
2. Turn air conditioner switch and blower fan switch ON.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check cooling fan low speed control circuit.

2.CHECK COOLING FAN HIGH SPEED FUNCTION

With CONSULT-III

1. Touch “HI” on the CONSULT-III screen.
2. Make sure that cooling fans operates at higher speed than low speed.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check cooling fan high speed control circuit.

Diagnosis Procedure

INFOID:0000000001089517

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector and cooling fan relay-3 harness connector.
3. Check the voltage between IPDM E/R harness connector or cooling fan relay-3 harness connector and ground.

IPDM E/R		cooling fan relay-3		Ground	Voltage
Connector	Terminal	Connector	Terminal		
E14	53	E59	1	Ground	Battery voltage
			3		

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.

cardiagn.com

- 50A fusible link (letter M)
- Harness for open or short between IPDM E/R cooling fan relay-3 and battery

>> Repair or replace malfunctioning part.

3. CHECK COOLING FAN MOTORS CIRCUIT FOR OPEN AND SHORT

1. Disconnect cooling fan motor harness connector.
2. Check the continuity between IPDM E/R harness connector or cooling fan relay-3 harness connector and cooling fan motor harness connector.

Cooling fan relay-3		IPDM E/R		Cooling fan motor		Continuity
Connector	Terminal	Connector	Terminal	Connec-tor	Terminal	
E59	2	E14	52	E3	1	Existed

3. Check the continuity between cooling fan relay-3 harness connector and IPDM E/R harness connector.

Cooling fan relay-3		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E59	4	E13	48	Existed

4. Check the continuity between cooling fan motor harness connector or IPDM E/R harness connector and ground.

Cooling fan motor		IPDM E/R		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E3	2	E10	5	Ground	Existed
			6		

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between cooling fan motor and IPDM E/R
- Harness for open or short between cooling fan motor and cooling fan relay
- Harness for open or short between cooling fan relay-3 and IPDM E/R
- Harness for open or short between cooling fan motor and ground
- Harness for open or short between IPDM E/R and ground
- Resistor E57

>> Repair or replace malfunctioning part.

5. CHECK GROUND CONNECTION

Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace ground connection.

6. CHECK COOLING FAN RELAYS

Refer to EC-920, "Component Inspection (Cooling Fan Relay)".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace malfunctioning cooling fan relay.

cardiagn.com

7. CHECK COOLING FAN MOTOR

Refer to EC-920, "Component Inspection (Cooling Fan Motor)".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace malfunctioning cooling fan motor.

8. CHECK INTERMITTENT INCIDENT

Perform GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connector.

Component Inspection (Cooling Fan Motor)

INFOID:0000000001089518

1. CHECK COOLING FAN MOTOR

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor harness connector.
3. Supply cooling fan motor terminals with battery voltage and check operation.

Terminals		Operation
(+)	(–)	
1	2	Cooling fans operates .

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace cooling fan motor.

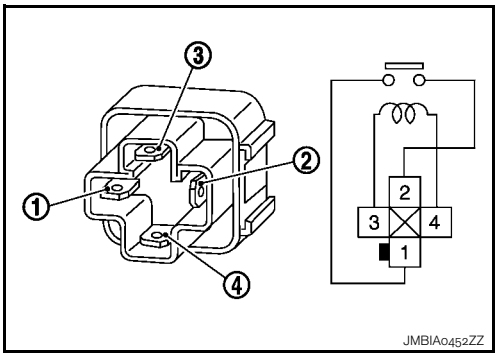
Component Inspection (Cooling Fan Relay)

INFOID:0000000001089519

1. CHECK COOLING FAN RELAY

1. Turn ignition switch OFF.
2. Remove cooling fan relay-3.
3. Check the continuity between cooling fan relay terminals under the following conditions.

Terminals	Conditions	Continuity
1 and 2	12V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed



JMBIA0452ZZ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace cooling fan relay.

cardiagn.com

ELECTRICAL LOAD SIGNAL

Description

INFOID:0000000001089520

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

Component Function Check

INFOID:0000000001089521

1.CHECK REAR WINDOW DEFOGGER SWITCH FUNCTION

1. Turn ignition switch ON.
2. Connect CONSULT-III and select “DATA MONITOR” mode.
3. Select “LOAD SIGNAL” and check indication under the following conditions.

Monitor item	Condition		Indication
LOAD SIGNAL	Rear window defogger switch	ON	ON
		OFF	OFF

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-921, "Diagnosis Procedure".

2.CHECK LIGHTING SWITCH FUNCTION

Check “LOAD SIGNAL” indication under the following conditions.

Monitor item	Condition		Indication
LOAD SIGNAL	Lighting switch	ON at 2nd position	ON
		OFF	OFF

Is the inspection result normal?

YES >> GO TO 3.
NO >> Go to EC-921, "Diagnosis Procedure".

3.CHECK HEATER FAN CONTROL SWITCH FUNCTION

Select “HEATER FAN SW” and check indication under the following conditions.

Monitor item	Condition		Indication
HEATER FAN SW	Heater fan control switch	ON	ON
		OFF	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-921, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089522

1.INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to EC-921, "Component Function Check".

Which circuit is related to the incident?

Rear window defogger>>GO TO 2
Headlamp>>GO TO 3.
Heater fan>>GO TO 4.

2.CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to DEF-4, "System Diagram".

cardiagn.com

>> INSPECTION END

3.CHECK HEADLAMP SYSTEM

Refer to EXL-11, "System Diagram" (XENON TYPE) or EXL-191, "System Diagram" (HALOGEN TYPE).

>> INSPECTION END

4.CHECK HEATER FAN CONTROL SYSTEM

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

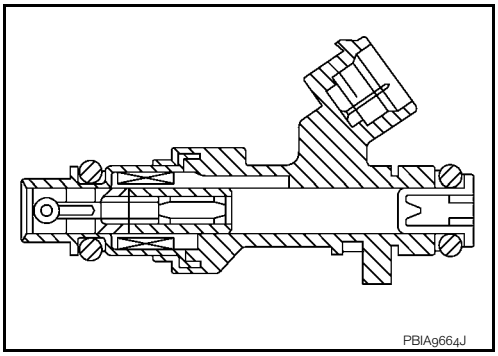
cardiagn.com

FUEL INJECTOR

Description

INFOID:0000000001089523

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the fuel injector circuit, the coil in the fuel injector is energized. The energized coil pulls the ball valve back and allows fuel to flow through the fuel injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the fuel injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



Component Function Check

INFOID:0000000001089524

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.
NO >> Go to EC-923, "Diagnosis Procedure".

2. CHECK FUEL INJECTOR FUNCTION

With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

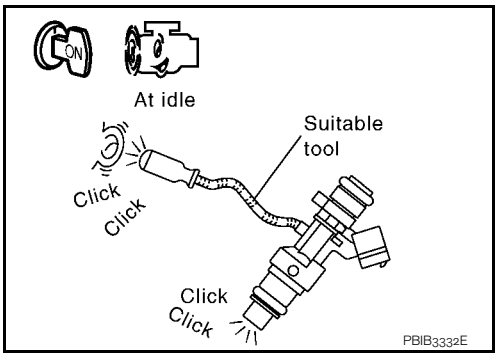
Without CONSULT-III

1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-923, "Diagnosis Procedure".



Diagnosis Procedure

INFOID:0000000001089525

1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel injector harness connector and ground.

cardiagn.com

Fuel injector			Ground	Voltage
Cylinder	Connector	Terminal		
1	F37	1	Ground	Battery voltage
2	F38	1		
3	F39	1		
4	F40	1		

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- 10A fuse (No. 58)
- Harness for open or short between fuel injector and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between fuel injector harness connector and ECM harness connector.

Fuel injector			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F37	2	F7	31	Existed
2	F38	2		30	
3	F39	2		29	
4	F40	2		25	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK FUEL INJECTOR

Refer to EC-924, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace malfunctioning fuel injector.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

Component Inspection

INFOID:0000000001089526

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check resistance between fuel injector terminals as follows.

cardiagn.com

Terminals	Resistance [at 10 - 60°C (50 - 140°F)]
1 and 2	11.1 - 14.5Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace malfunctioning fuel injector.

cardiagn.com

FUEL PUMP

Description

INFOID:0000000001089527

Sensor	Input signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay ↓ Fuel pump
Battery	Battery voltage*		

*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine startability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

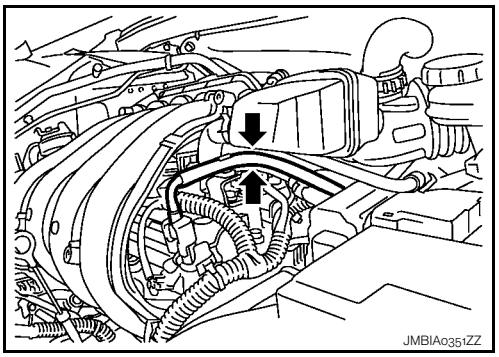
Component Function Check

INFOID:0000000001089528

1.CHECK FUEL PUMP FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose with two fingers.

Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.



Is the inspection result normal?

YES >> INSPECTION END
NO >> EC-926, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089529

1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	23	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect IDPDM E/R harness connector.
3. Check the continuity between IPDM E/R harness connector and ECM harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	23	E13	33	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors E6, F123.
- Harness for open or short to ground and short power.

>> Repair harness or connectors.

4. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect “fuel level sensor unit and fuel pump” harness connector.
4. Turn ignition switch ON.
5. Check voltage between “fuel level sensor unit and fuel pump” harness connector and ground.

Fuel level sensor unit and fuel pump		Ground	Voltage
Connector	Terminal		
B40	1	Ground	Battery voltage should exist 1 second after ignition switch is turn ON.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 5.

5. CHECK 10A FUSE

1. Turn ignition switch OFF.
2. Disconnect 10A fuse (No. 57) from IPDM E/R.
3. Check 10A fuse.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace fuse.

6. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector.
2. Check the continuity between IPDM E/R harness connector and “fuel level sensor unit and fuel pump” harness connector.

IPDM E/R		Fuel level sensor unit and fuel pump		Continuity
Connector	Terminal	Connector	Terminal	
F13	42	B40	1	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.

cardiagn.com

NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B10, E101
- Harness for open or short between IPDM E/R and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to power in harness or connectors.

8. CHECK FUEL PUMP GROUND CIRCUIT

1. Check the continuity between “fuel level sensor unit and fuel pump” and ground.

Fuel level sensor unit and fuel pump		Ground	Continuity
Connector	Terminal		
B40	3	Ground	Existed

2. Also heck harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to power in harness or connectors.

9. CHECK FUEL PUMP

Refer to EC-928, "Component Inspection (Fuel Pump)".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace fuel pump.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

Component Inspection (Fuel Pump)

INFOID:0000000001089530

1. CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Check resistance between “fuel level sensor unit and fuel pump” terminals as follows.

Terminals	Resistance
1 and 3	0.2 - 5.0Ω [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace “fuel level sensor unit and fuel pump”.

cardiagn.com

IGNITION SIGNAL

Description

INFOID:0000000001089531

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns ON and OFF the ignition coil primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.

Component Function Check

INFOID:0000000001089532

1.INSPECTION START

Turn ignition switch OFF, and restart engine.

Does the engine start?

YES-1 >> With CONSULT-III: GO TO 2.
YES-2 >> Without CONSULT-III: GO TO 3.
NO >> Go to EC-929, "Diagnosis Procedure".

2.IGNITION SIGNAL FUNCTION

With CONSULT-III

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
2. Make sure that each circuit produces a momentary engine speed drop.

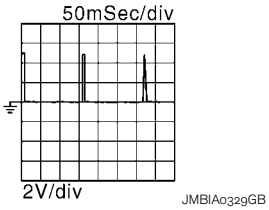
Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-929, "Diagnosis Procedure".

3.IGNITION SIGNAL FUNCTION

Without CONSULT-III

1. Let engine idle.
2. Read the voltage signal between ECM harness connector and ground.

ECM		Ground	Voltage signal
Connector	Terminal		
F7	17	Ground	
	18		
	21		
	22		

NOTE:
The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-929, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089533

1.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	Battery voltage

cardiagn.com

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-736, "Diagnosis Procedure".

2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Turn ignition switch ON.
4. Check the voltage between condenser harness connector and ground.

Condenser		Ground	Voltage
Connector	Terminal		
F13	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between IPDM E/R harness connector and condenser harness connector.

IPDM E/R		Condenser		Continuity
Connector	Terminal	Connector	Terminal	
E11	9	F13	1	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Go to EC-736, "Diagnosis Procedure".
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between condenser harness connector and ground.

Condenser		Ground	Continuity
Connector	Terminal		
F13	2	Ground	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK CONDENSER

Refer to EC-932, "Component Inspection (Condenser)"

Is the inspection result normal?

YES >> GO TO 6.
NG >> Replace condenser.

6.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Reconnect all harness connectors disconnected.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

cardiagn.com

Ignition coil			Ground	Voltage
Cylinder	Connector	Terminal		
1	F33	3	Ground	Battery voltage
2	F34	3		
3	F35	3		
4	F36	3		

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

Ignition coil			Ground	Continuity
Cylinder	Connector	Terminal		
1	F33	2	Ground	Existed
2	F34	2		
3	F35	2		
4	F36	2		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ignition coil harness connector.

Ignition coil			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F33	1	F7	17	Existed
2	F34	1		18	
3	F35	1		22	
4	F36	1		21	

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-932, "Component Inspection (Ignition Coil with Power Transistor)".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace malfunctioning ignition coil with power transistor.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

Component Inspection (Ignition Coil with Power Transistor)

INFOID:0000000001089534

1. CHECK IGNITION COIL WITH POWER TRANSISTOR-I

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
1 and 2	Except 0 or ∞ Ω
1 and 3	Except 0 Ω
2 and 3	

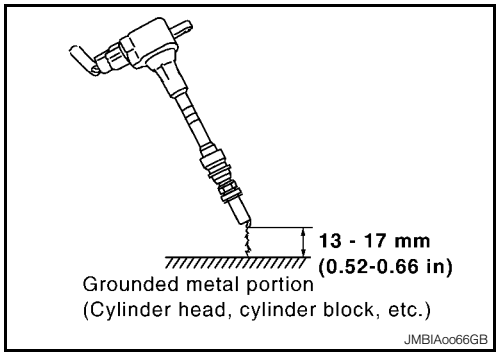
Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace malfunctioning ignition coil with power transistor.

2. CHECK IGNITION COIL WITH POWER TRANSISTOR-II

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
   NOTE:
   Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.
4. Start engine.
5. After engine stalls, crank it two or three times to release all fuel pressure.
6. Turn ignition switch OFF.
7. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
8. Remove ignition coil and spark plug of the cylinder to be checked.
9. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
10. Connect spark plug and harness connector to ignition coil.
11. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
12. Crank engine for about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- **Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm 0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace malfunctioning ignition coil with power transistor.

Component Inspection (Condenser)

INFOID:0000000001089535

1. CHECK CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.

cardiagn.com

3. Check resistance between condenser terminals as follows.

Terminals	Resistance
1 and 2	Above 1 MΩ [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace condenser.

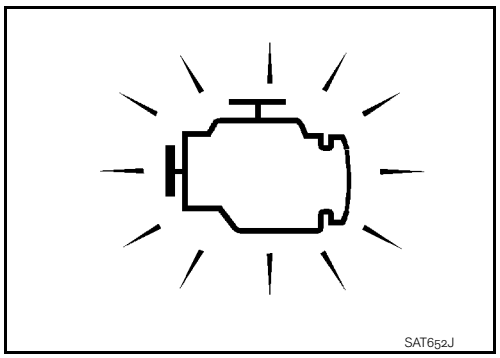
cardiagn.com

MALFUNCTION INDICATOR

Description

INFOID:0000000001089536

The Malfunction Indicator (MI) is located on the combination meter. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
When the engine is started, the MI should go off. If the MI remains on, the on board diagnostic system has detected an engine system malfunction.
For details, refer to EC-934, "Diagnosis Procedure".



Component Function Check

INFOID:0000000001089537

1.CHECK MI FUNCTION

1. Turn ignition switch ON.
2. Make sure that MI lights up.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-934, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089538

1.CHECK DTC

Check that DTC U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1001. Refer to EC-740, "Diagnosis Procedure".

2.CHECK DTC WITH COMBINATION METER

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

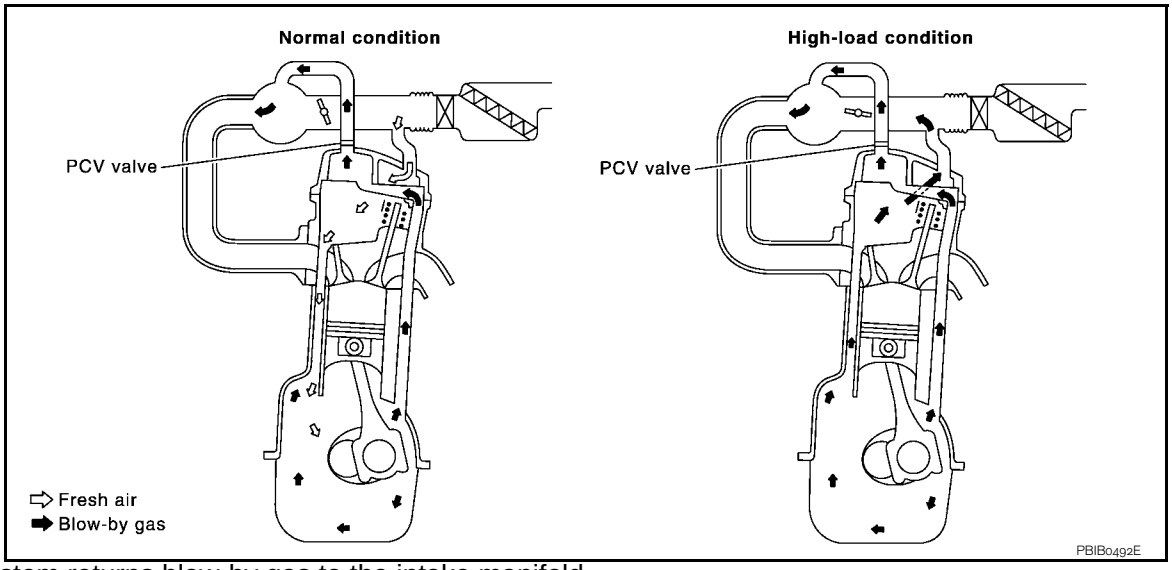
YES >> Replace combination meter.
NO >> Repair or replace.

cardiagn.com

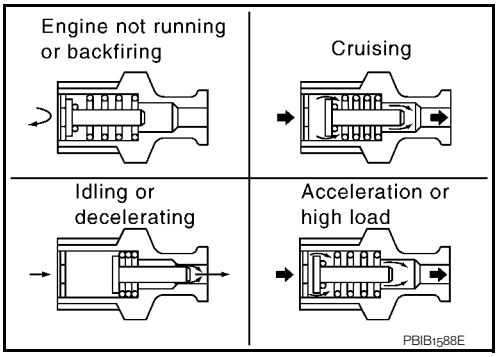
POSITIVE CRANKCASE VENTILATION

Description

INFOID:0000000001089543



This system returns blow-by gas to the intake manifold.
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.
Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.
The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.
Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.

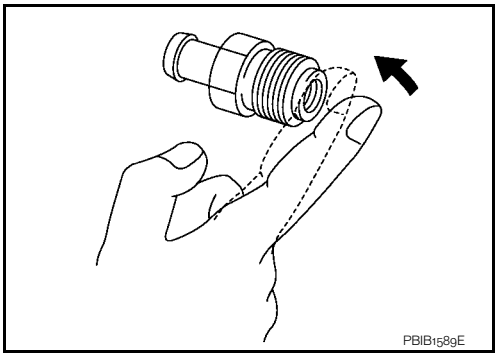


Component Inspection

INFOID:0000000001089544

1. CHECK PCV VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace PCV valve.

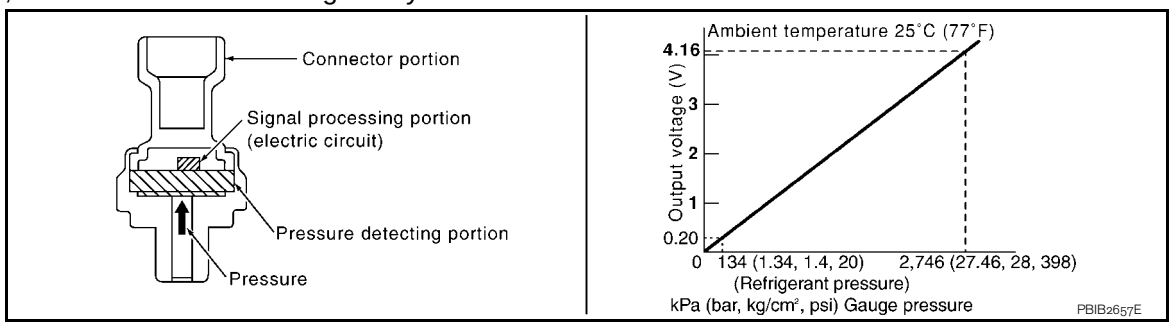
cardiagn.com

REFRIGERANT PRESSURE SENSOR

Description

INFOID:0000000001089545

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



Component Function Check

INFOID:0000000001089546

1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower fan switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F8	41 (Refrigerant pressure sensor signal)	Ground	1.0 - 4.0V

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-936, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089547

1. CHECK GROUND CONNECTION

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine.
3. Turn ignition switch OFF.
4. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between refrigerant pressure sensor harness connector and ground.

Refrigerant pressure sensor		Ground	Voltage
Connector	Terminal		
E49	3	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

cardiagn.com

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E6, F123
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E49	1	F8	48	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E6, F123
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and refrigerant pressure sensor harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E49	2	F8	41	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E6, F123
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor.
NO >> Repair or replace.

cardiagn.com

ECU DIAGNOSIS

ECM

Reference Value

INFOID:0000000000936971

VALUES ON THE DIAGNOSIS TOOL

Remarks:

l Specification data are reference values.

l Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition		Values/Status
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.		Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-728, "Diagnosis Procedure".		
B/FUEL SCHDL	See EC-728, "Diagnosis Procedure".		
A/F ALPHA-B1	See EC-728, "Diagnosis Procedure".		
COOLAN TEMP/S	• Engine: After warming up		More than 70°C (158°F)
HO2S1 (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→→RICH Change more than 5 times during 10 seconds.
HO2S2 MNTR (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		LEAN ←→ RICH
VHCL SPEED SE	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as speedometer indication
BATTERY VOLT	• Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN 1	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
THRL SEN 1-B1	• Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
THRL SEN 2-B1*	• Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
INT/A TEMP SE	• Ignition switch: ON		Indicates intake air temperature
START SIGNAL	• Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

cardiagn.com

Monitor Item	Condition		Values/Status
AIR COND SIG	• Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	• Ignition switch: ON	Shift lever: P or N (CVT), Neutral (M/T)	ON
		Selector lever: Except above	OFF
PW/ST SIGNAL	• Engine: After warming up, idle the engine	Steering wheel: Not being turned	OFF
		Steering wheel: Being turned	ON
LOAD SIGNAL	• Ignition switch: ON	Rear window defogger switch: ON and/or Lighting switch: 2nd position	ON
		Rear window defogger switch and lighting switch: OFF	OFF
IGNITION SW	• Ignition switch: ON → OFF → ON		ON → OFF → ON
HEATER FAN SW	• Engine: After warming up, idle the engine	Heater fan switch: ON	ON
		Heater fan switch: OFF	OFF
BRAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	10° - 20° BTDC
		2,000 rpm	25° - 45° BTDC
PURG VOL C/V	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle (Accelerator pedal: Not depressed even slightly, after engine starting.)	0%
		2,000 rpm	20% - 90%
INT/V TIM (B1)	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	–5° - 5°CA
		2,000 rpm	Approx. 0° - 20°CA
INT/V SOL (B1)	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	0%
		2,000 rpm	Approx. 0% - 60%
AIR COND RLY	• Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	• For 1 seconds after turning ignition switch: ON • Engine running or cranking		ON
	• Except above		OFF
THRTL RELAY	• Ignition switch: ON		ON

cardiagn.com

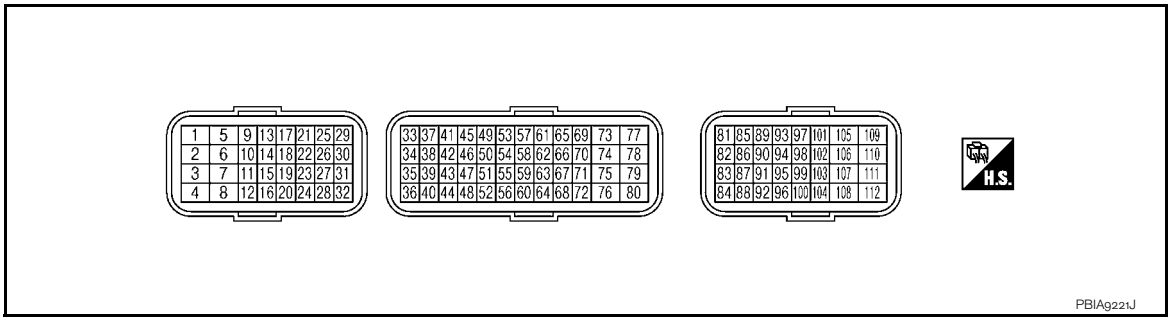
Monitor Item	Condition		Values/Status
COOLING FAN	• Engine: After warming up, idle the engine • Air conditioner switch: OFF	Engine coolant temperature is 94 °C (201°F) or less.	OFF
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F)	LOW*2
		Engine coolant temperature is 100°C (212°F) or more	HIGH*2
HO2S1 HTR (B1)	• Engine: After warming up • Engine speed: Above 3,600 rpm		ON
	Engine speed: Above 3,600 rpm		OFF
HO2S2 HTR (B1)	• Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		ON
	• Engine speed: Above 3,600 rpm		OFF
VEHICLE SPEED	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as the speedometer indication
IDL A/V LEARN	• Engine: running	Idle air volume learning has not been performed yet.	YET
		Idle air volume learning has already been performed successfully.	CMPLT
O2SEN HTR DTY	• Engine coolant temperature when engine started: More than 80°C (176°F) • Engine speed: below 3,600 rpm		Approx. 30%
AC PRESS SEN	• Engine: Idle • Both A/C switch and blower fan switch: ON (Compressor operates)		1.0 - 4.0V
VHCL SPEED SE	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as the speedometer indication
SET VHCL SPD	• Engine: Running	ASCD: Operating	The preset vehicle speed is displayed
MAIN SW	• Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	ON
		• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	OFF
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
VHCL SPD CUT	• Ignition switch: ON		NON
LO SPEED CUT	• Ignition switch: ON		NON
AT OD MONITOR	• Ignition switch: ON		OFF
AT OD CANCEL	• Ignition switch: ON		OFF

cardiagn.com

Monitor Item	Condition		Values/Status
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at the 1st time → at the 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

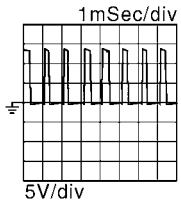
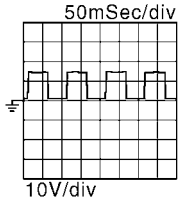
TERMINAL LAYOUT



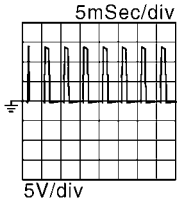
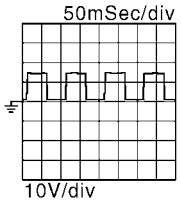
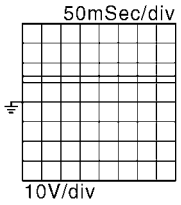
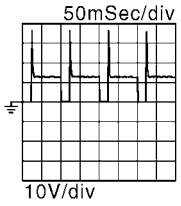
PHYSICAL VALUES

NOTE:
- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

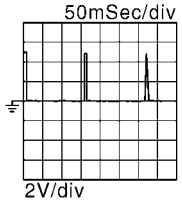
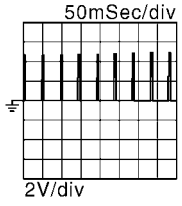
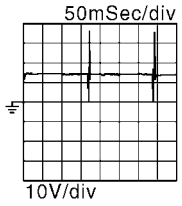
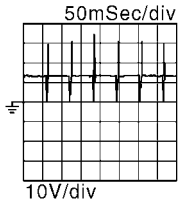
CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No. +	Terminal No. −	Wire color	Description: Signal name	Description: Input/Output	Condition	Value (Approx.)
1	Ground	L	Throttle control motor (Open)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	3.2V★  JMBIAo324GB
2	Ground	Y/R	Throttle control motor relay power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
3	Ground	BR/Y	Heated oxygen sensor 1 heater	Output	[Engine is running] • Warm-up condition • Engine speed: Below 3,600 rpm	2.9 - 8.8V★  JMBIAo325GB
					[Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: below 3,600 rpm	BATTERY VOLTAGE (11-14V)

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
4	Ground	P	Throttle control motor (Close)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	1.8V★  JMBIA0326GB
5	Ground	R	Heated oxygen sensor 2 heater	Output	[Engine is running] • Engine speed: Below 3,600 rpm after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	10V★  JMBIA0325GB
					[Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: Above 3,600 rpm	BATTERY VOLTAGE (11 - 14V)
9	Ground	W/D	EVAP canister purge volume control solenoid valve	Output	[Engine is running] • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting	BATTERY VOLTAGE (11 - 14V)★  JMBIA0327GB
					[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.)	 JMBIA0328GB
10 11	Ground	B	ECM ground	—	[Engine is running] • Idle speed	Body ground
15	Ground	G	Throttle control motor relay	Output	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)
					[Ignition switch: ON]	0 - 1.0V

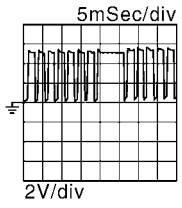
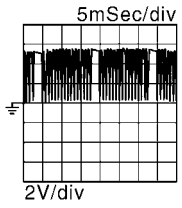
cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
17 18 21 22	Ground	V BR/Y O Y	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 3	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 0.3V★  JMBIA0329GB
					[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0.2 - 0.5V★  JMBIA0330GB
23	Ground	B/O	Fuel pump relay	Output	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0V
25 29 30 31	Ground	R U GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14V)★  JMBIA0331GB
					[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★  JMBIA0332GB
					[Engine is running] • More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)
32	Ground	R/B	ECM relay (Self shut-off)	Output	[Engine is running] [Ignition switch: OFF] • A few seconds after turning ignition switch OFF	0 - 1.0V
					[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)

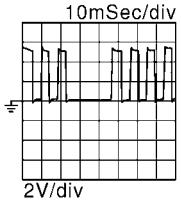
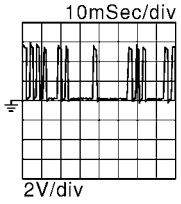
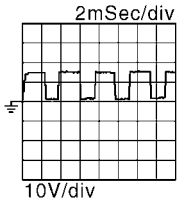
cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
33	Ground	Y	Throttle position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36V
					[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75V
34	Ground	R	Throttle position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75V
					[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36V
36	Ground	B	Sensor ground (Throttle position sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
37	Ground	W	Knock sensor	Input	[Engine is running] • Idle speed	2.5V
38	Ground	P	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with engine coolant temperature.
40	Ground	B	Sensor ground (Knock sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
41	Ground	G	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0V
44	Ground	O	Sensor ground (Engine coolant temperature sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
45	Ground	BR	Mass air flow sensor	Input	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.2V
					[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	1.5 - 1.8V
46	Ground	Y	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with intake air temperature.
48	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
49	Ground	Y	Heated oxygen sensor 1	Input	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0 - 1.0V
50	Ground	Y	Heated oxygen sensor 2	Input	[Engine is running] • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - 1.0V
52	Ground	LG	Sensor ground (Mass air flow sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
55	Ground	O	Sensor power supply (Intake air temperature sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
56	Ground	B	Sensor ground (Heated oxygen sensor 1)	—	[Engine is running] • Warm-up condition • Idle speed	0 - 4.8V Output voltage varies with engine coolant temperature.
59	Ground	SB	Sensor ground (Heated oxygen sensor 2)	—	[Engine is running] • Warm-up condition • Idle speed	0V
61	Ground	Y	Crankshaft position sensor (POS)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	4.0V★  JMBIA0333GB
					[Engine is running] • Engine speed: 2,000 rpm	4.0V★  JMBIA0334GB
62	Ground	B	Sensor ground [Crankshaft position sensor (POS)]	—	[Engine is running] • Warm-up condition • Idle speed	0V
63	Ground	B	Sensor ground [Camshaft position sensor (PHASE)]	—	[Engine is running] • Warm-up condition • Idle speed	0V

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
65	Ground	R	Camshaft position sensor (PHASE)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	1.0 - 2.0★  JMBIA0335GB
					[Engine is running] • Engine speed is 2,000 rpm	1.0 - 2.0★  JMBIA0336GB
69	Ground	W/B	PNP switch	Input	[Ignition switch: ON] • Shift lever: P or N (CVT), Neutral (M/T)	BATTERY VOLTAGE (11 - 14V)
					[Ignition switch: ON] • Shift lever: Except above	0V
72	Ground	L	Sensor power supply (Throttle position sensor)	—	[Ignition switch: ON]	5V
73	Ground	Y/R	Intake valve timing control solenoid valve	Output	[Engine is running] • Warm-up condition • Idle speed	0V
					[Engine is running] • Warm-up condition • Engine speed: 2,000rpm	7 - 10V★  JMBIA0337GB
74	Ground	L	Sensor power supply (Refrigerant pressure sensor)	Input	[Ignition switch: ON]	5V
75	Ground	G	Sensor power supply [Crankshaft position sensor (POS)]	—	[Ignition switch: ON]	5V
78	Ground	LG	Sensor power supply [Camshaft position sensor (PHASE)]	—	[Ignition switch: ON]	5V
83	Ground	P	CAN communication line	Input/ Output	—	—
84	Ground	L	CAN communication line	Input/ Output	—	—
88	Ground	O	Data link connector	Input/ Output	[Ignition switch: ON] • CONSULT-III or GST: Disconnected	10.5V
93	Ground	W/L	Ignition switch	Input	[Ignition switch: OFF]	0V
					[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

cardiagn.com

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
94	Ground	V	ASCD steering switch	Input	[Ignition switch: ON] • ASCD steering switch: OFF	4V
					[Ignition switch: ON] • MAIN switch: Pressed	0V
					[Ignition switch: ON] • CANCEL switch: Pressed	1V
					[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	3V
					[Ignition switch: ON] • SET/COAST switch: Pressed	2V
95	Ground	B	Sensor ground (ASCD steering switch)	—	[Engine is running] • Warm-up condition • Idle speed	0V
99	Ground	R/W	Stop lamp switch	Input	[Ignition switch: OFF] • Brake pedal: Fully released	0V
					[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
100	Ground	G/B	ASCD brake switch	Input	[Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and clutch pedal: Slightly depressed (M/T)	0V
					[Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and/or clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14V)
102	Ground	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	—	[Ignition switch: ON]	5V
104	Ground	B	Sensor ground (Accelerator pedal position sensor 2)	—	[Engine is running] • Warm-up condition • Idle speed	0V
105	Ground	G	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
106	Ground	O	Sensor power supply (Accelerator pedal position sensor 1)	—	[Ignition switch: ON]	5V
108	Ground	B	ECM ground	—	[Engine is running] • Idle speed	Body ground
110	Ground	R	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9V
					[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7V

cardiagn.com

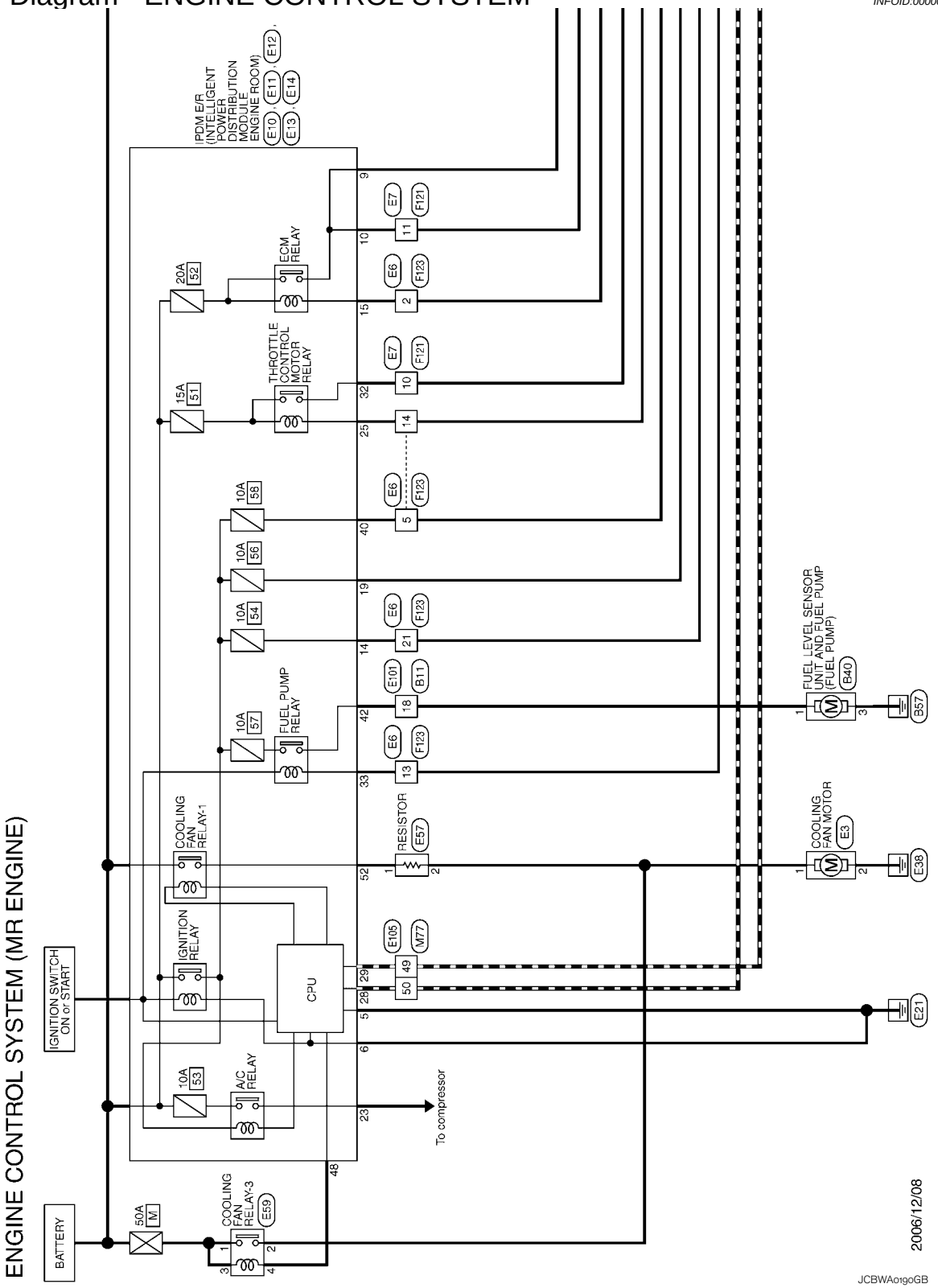
Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
103	Ground	GR	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6V
					[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4V
111	Ground	B/Y	Sensor ground (Accelerator pedal position sensor 1)	—	[Engine is running] • Warm-up condition • Idle speed	0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

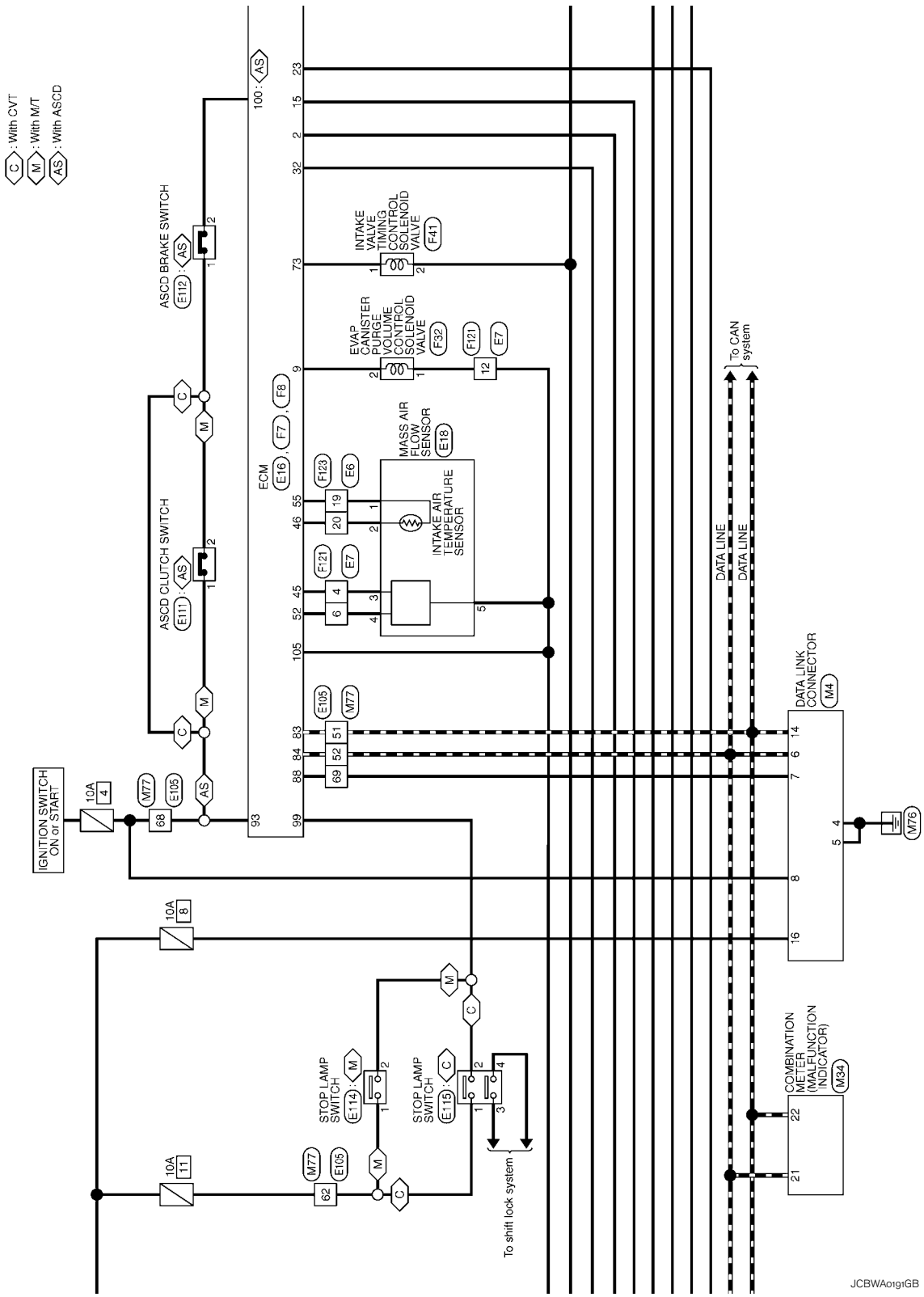
cardiagn.com

Wiring Diagram - ENGINE CONTROL SYSTEM -

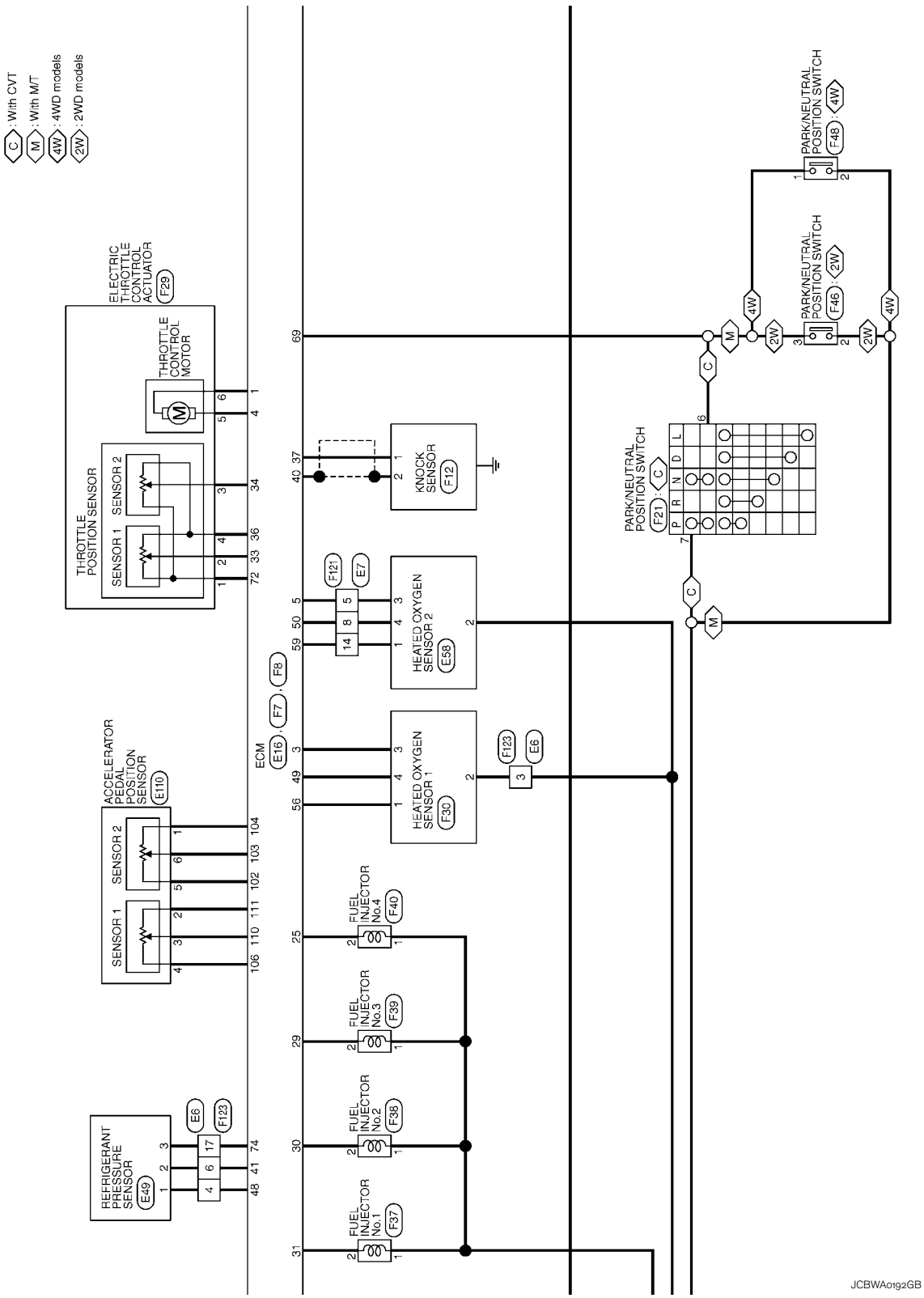
INFOID:0000000000936972



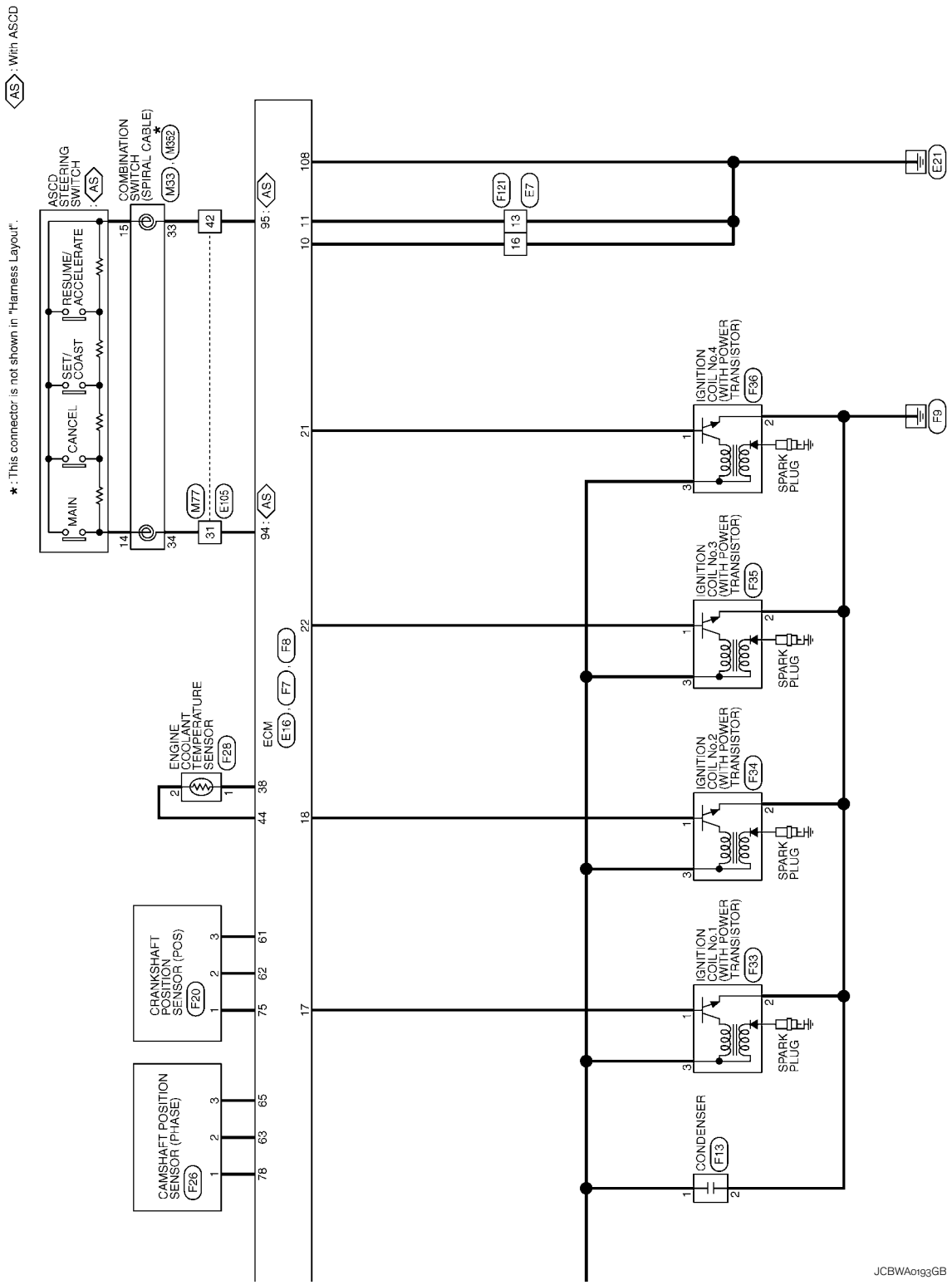
cardiagn.com



cardiagn.com



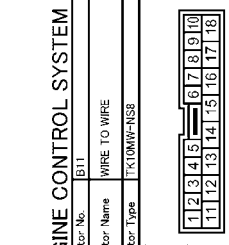
cardiagn.com



cardiagn.com

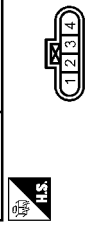
ENGINE CONTROL SYSTEM (MR ENGINE)

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
18	B/Y	–

Connector No.	B40
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	E04FGY-RS

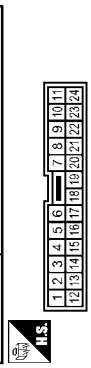


Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	–
3	B	–

Connector No.	E3
Connector Name	COOLING FAN MOTOR
Connector Type	P80103B951602

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	B	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V



Terminal No.	Color of Wire	Signal Name [Specification]
2	Y/L	–
3	R/O	–
4	R/L	–
5	SB	–
6	G/P	–
13	B/O	–
14	G/L	–
17	Y/W	–
19	O	–[With gasoline engine]
20	V	–[With gasoline engine]
21	R/B	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
4	BR	–[With gasoline engine]
5	R	–
6	LG	–[With gasoline engine]
8	Y	–
10	R/Y	–[With gasoline engine]
11	L/R	–[With gasoline engine]
12	G	–
13	B	–
14	SB	–
16	B	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

Terminal No.	Color of Wire	Signal Name [Specification]
9	G	–
10	L/R	–
14	R/B	–
15	Y/L	–[With gasoline engine]
19	R/O	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
23	Y/B	–
25	G/L	–
28	L	–
29	P	–
32	R/Y	–

JCBWA0194GB

cardiagn.com

ENGINE CONTROL SYSTEM (MR ENGINE)

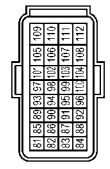
Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
33	B/O	–
40	SB	–[With MR engine]
42	B/Y	–
48	Y	–

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7263-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
52	W	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-LI
84	L	CAN-HI
88	O	K-LINE
93	W/L	IGN SW
94	V	ASCD STRG SW
95	B	GND-ASCD STRG SW
99	R/W	BRAKE
100	R	BNCSW(BNC)
102	BR/Y	AVCC-APS2[With MR engine]
103	GR	APS2
104	B	GND-A-APS2[With MR engine]

105	G	VBR
106	O	AVCC-APS1[With MR engine]
108	B	GND
110	W	APS1[With MR engine]
111	B/Y	GND-A-APS1[With MR engine]

Connector No.	E18
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–
3	BR	–
4	LG	–
5	G	–

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	–
2	G/P	–
3	Y/W	–

Connector No.	E57
Connector Name	RESISTOR
Connector Type	P801038951602

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	R	–

Connector No.	E58
Connector Name	HEATED OXYGEN SENSOR 2
Connector Type	AF204FB

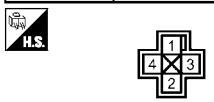
Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	R/O	–
3	R	–
4	Y	–

JCBWA0195GB

cardiagn.com

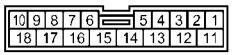
ENGINE CONTROL SYSTEM (MR ENGINE)

Connector No.	E59
Connector Name	COOLING FAN RELAY-3
Connector Type	24347 9F900



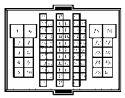
Terminal No.	Color of Wire	Signal Name [Specification]
1	W/B	-
2	R	-
3	W/B	-
4	W	-

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
18	B/Y	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
31	V	-
42	B	-
49	P	-
50	L	-
51	P	-
52	L	-
62	V	-
68	W/L	-
69	O	-

Connector No.	E110
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RH06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-[Except HR engine]
2	B/Y	-[With MR engine]
3	W	-[Except HR engine]
4	O	-[With MR engine]
5	BR/Y	-[With MR engine]
6	GR	-[Except K9K engine]

Connector No.	E111
Connector Name	ASCD CLUTCH SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/L	-[With gasoline engine]
2	O	-[With gasoline engine]

Connector No.	E112
Connector Name	ASCD BRAKE SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-[With M/T]
1	W/L	-[With CVT]
2	R	-

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	R/W	-

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	R/W	-
3	G	-[With CVT]
4	B	-[With CVT]

JCBWA0g66GB

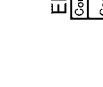
cardiagn.com

ENGINE CONTROL SYSTEM (MR ENGINE)

Connector No.	F7
Connector Name	ECM
Connector Type	MA424FGY-MEA8-RH

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/W	MOTOR1
2	R/Y	VMOT
3	L/G	O2HF[With MR engine]
4	P	MOTOR2
5	R	O2HR
9	W/B	EVAP
10	B	GND
11	B/W	GND
15	G/L	MOTRLY
17	L/Y	IGN COIL#1
18	BR/Y	IGN COIL#2

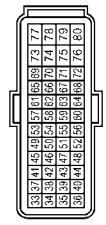
Connector No.	F12
Connector Name	KNOCK SENSOR
Connector Type	BS02FB-AHY-S



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B/W	-

21	R/G	IGN COIL#4
22	Y	IGN COIL#3[With MR engine]
23	B/O	FPR
25	R/O	INJ#4
29	O	INJ#3[With MR engine]
30	GR	INJ#2[With MR engine]
31	L	INJ#1
32	Y/L	SSOFF

Connector No.	F8
Connector Name	ECM
Connector Type	MA440FBR-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
33	V/W	TPS1[With MR engine]
34	L/R	TPS2[With MR engine]
36	B	GND-A TPS[With MR engine]
37	W	KNK
38	P	TW[With MR engine]
40	SHIELD	GND-A KNK
41	G/P	PDPRESS
44	W/G	GND-A[With MR engine]
45	BR	OA+
46	V	TA
48	R/L	GND-A[PDPRES]

Connector No.	F13
Connector Name	CONDENSER
Connector Type	M02FW-GY-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/R	-
2	B	-

Connector No.	F20
Connector Name	CRANKSHAFT POSITION SENSOR (POS)
Connector Type	RH03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/W	-
2	B/O	-[With MR engine]
3	LG/B	-

49	LG/R	O2SF[With MR engine]
50	Y	O2SR
52	LG	OA-
55	O	GND-TA
56	B/Y	GND-A O2SF[With MR engine]
59	SB	O2SR-GND
61	LG/B	POS
62	B/O	GND-POS[With MR engine]
63	B/L	GND-PHASE[With MR engine]
65	GR/L	PHASE[With MR engine]
69	W/B	NEUT HIGH
72	L/O	AVCC-TPS[With MR engine]
73	Y/R	CVTC
74	Y/W	AVCC(PDPRES)
75	L/W	POS AVCC
78	Y/V	PHASE AVCC

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
6	W/B	-
7	R/B	-

JCBWA0197GB

cardiagn.com

ENGINE CONTROL SYSTEM (MR ENGINE)

Connector No.	F26
Connector Name	CAMSHAFT POSITION SENSOR (PHASE)
Connector Type	RH03FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/V	–
2	B/L	–[With MR engine]
3	GR/L	–[With MR engine]

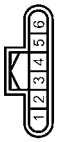
Connector No.	F28
Connector Name	ENGINE COOLANT TEMPERATURE SENSOR
Connector Type	E02FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–[With MR engine]
2	W/G	–[With MR engine]

Connector No.	F29
Connector Name	ELECTRIC THROTTLE CONTROL ACTUATOR
Connector Type	RH06FB

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	L/O	–[With MR engine]
2	V/W	–[With MR engine]
3	L/R	–[With MR engine]
4	B	–[With MR engine]
5	P	–
6	L/W	–

Connector No.	F30
Connector Name	HEATED OXYGEN SENSOR 1
Connector Type	AF204FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/V	–[With MR engine]
2	R/O	–
3	L/G	–[With MR engine]
4	LG/R	–[With MR engine]

Connector No.	F32
Connector Name	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
Connector Type	E02FL-RS-LGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	W/B	–

Connector No.	F33
Connector Name	IGNITION COIL No.1 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/Y	–
2	B	–
3	L/R	–

Connector No.	F34
Connector Name	IGNITION COIL No.2 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR/Y	–
2	B	–
3	L/R	–

Connector No.	F35
Connector Name	IGNITION COIL No.3 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–[With MR engine]
2	B	–
3	L/R	–

JCBWA0198GB

cardiagn.com

ENGINE CONTROL SYSTEM (MR ENGINE)

Connector No.	F36
Connector Name	IGNITION COIL No.4 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/G	–
2	B	–
3	L/R	–

Connector No.	F37
Connector Name	FUEL INJECTOR No.1
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	L	–

Connector No.	F38
Connector Name	FUEL INJECTOR No.2
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	GR	–[With MR engine]

Connector No.	F39
Connector Name	FUEL INJECTOR No.3
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	–[With MR engine]

Connector No.	F40
Connector Name	FUEL INJECTOR No.4
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	R/O	–

Connector No.	F41
Connector Name	INTAKE VALVE TIMING CONTROL SOLENOID VALVE
Connector Type	E02FG-RS-LGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/R	–
2	L/R	–

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/B	–
3	W/B	–

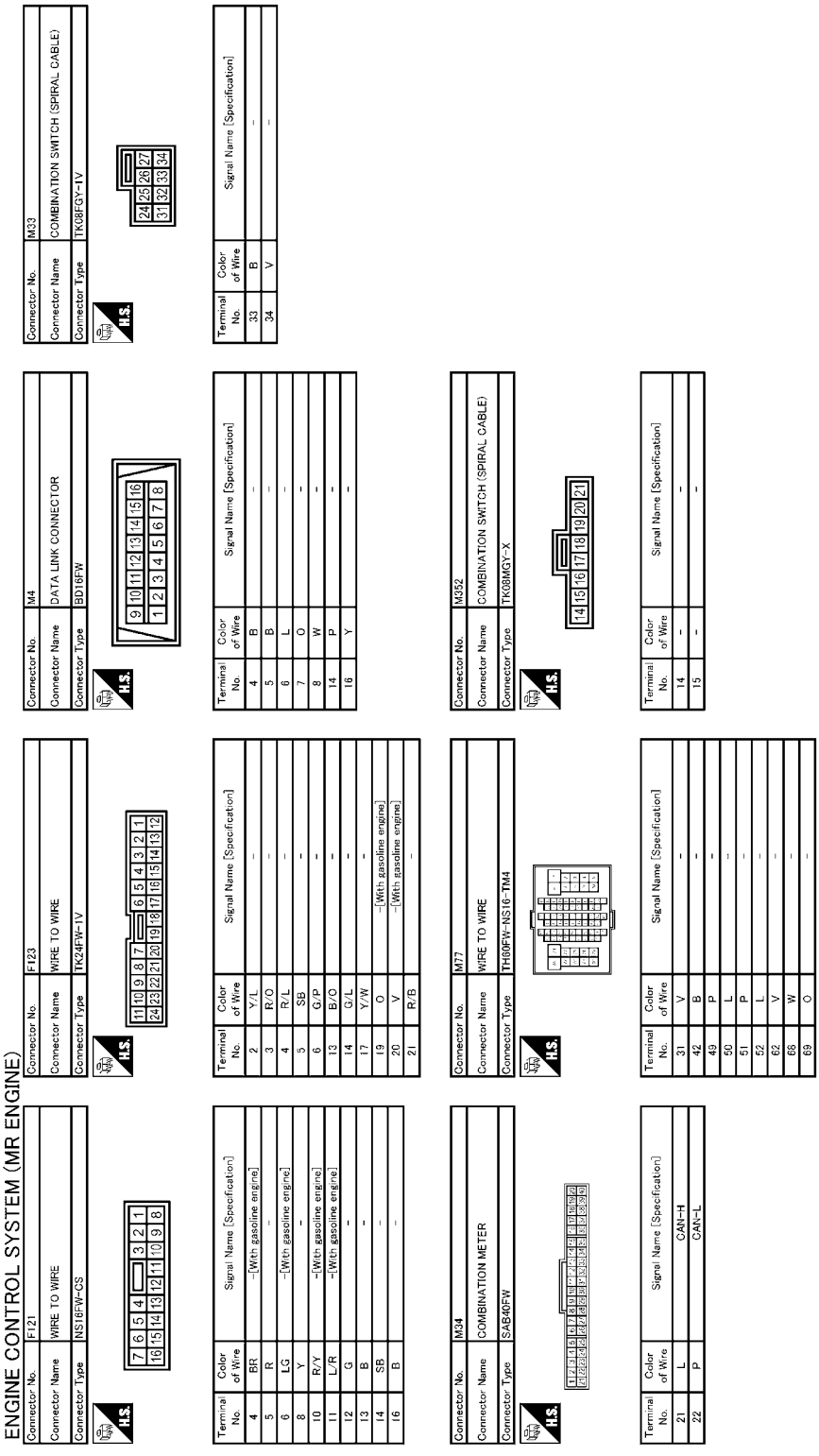
Connector No.	F48
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/B	–
2	R/B	–

JCBWA0199GB

cardiagn.com



JCBWA0200GB

Fail Safe

INFOID:0000000000936973

NON DTC RELATED ITEM

cardiagn.com

Engine operating condition in fail-safe mode	Detected items	Remarks	Reference page
Engine speed will not rise more than 2,500 rpm due to the fuel cut	Malfunction indicator circuit	When there is an open circuit on MI circuit, the ECM cannot warn the driver by lighting up MI when there is malfunction on engine control system. Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MI circuit is open by means of operating fail-safe function. The fail-safe function also operates when above diagnoses except MI circuit are detected and demands the driver to repair the malfunction.	EC-934

DTC RELATED ITEM

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0011	Intake valve timing control	The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.	
P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
P0117 P0118	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-III displays the engine coolant temperature decided by ECM.	
		Condition	Engine coolant temperature decided (CONSULT-III display)
		Just as ignition switch is turned ON or START	40°C (104°F)
		More than approx. 4 minutes after ignition ON or START	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.	
P0500	Vehicle speed sensor	When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (Highest) while engine is running.	
P0605	ECM	(When ECM calculation function is malfunctioning:) ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation.	
P1121	Electric throttle control actuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.	
		(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.	
		(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P (CVT), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more.	
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	

cardiagn.com

<table>
<tr><th>DTC No.</th><th>Detected items</th><th colspan="2">Engine operating condition in fail-safe mode</th></tr>
<tr><td>P1124
P1126</td><td>Throttle control motor relay</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td>P1128</td><td>Throttle control motor</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td>P1229</td><td>Sensor power supply</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td rowspan="4">P1805</td><td rowspan="4">Brake switch</td><td colspan="2">ECM controls the electric throttle control actuator by regulating the throttle opening to a small range.
Therefore, acceleration will be poor.</td></tr>
<tr><td>Vehicle condition</td><td>Driving condition</td></tr>
<tr><td>When engine is idling</td><td>Normal</td></tr>
<tr><td>When accelerating</td><td>Poor acceleration</td></tr>
<tr><td>P2122
P2123
P2127
P2128
P2138</td><td>Accelerator pedal position sensor</td><td colspan="2">The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.
The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.
So, the acceleration will be poor.</td></tr>
</table>

DTC Inspection Priority Chart

INFOID:0000000000936974

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	• U1001 CAN communication line • U1010 CAN communication • P0102 P0103 Mass air flow sensor • P0112 P0113 P0127 Intake air temperature sensor • P0117 P0118 P0125 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0500 Vehicle speed sensor • P0605 ECM • P0705 P0850 Park/neutral position (PNP) switch • P1229 sensor power supply • P1610 P1611 P1612 P1615 NATS • P1706 Park/Neutral position (PNP) switch • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor

cardiagn.com

Priority	Detected items (DTC)
2	• P0132 P0133 P0134 P1143 P1144 Heated oxygen • P0135 Heated oxygen sensor 1 heater • P0138 P0139 P1146 P1147 Heated oxygen sensor 2 • P0141 Heated oxygen sensor 2 heater • P0444 EVAP canister purge volume control solenoid valve • P0710 P0715 P0720 P0740 P0744 P0776 P0778 P0840 P0845 P1740 P1777 P1778 CVT related sensors, solenoid valves and switches • P1111 Intake valve timing control solenoid valve • P1122 Electric throttle control function • P1124 P1126 Throttle control motor relay • P1128 Throttle control motor • P1217 Engine over temperature (OVERHEAT) • P1805 Brake switch
3	• P0011 Intake valve timing control • P0171 P0172 Fuel injection system function • P0300 - P0304 Misfire • P0420 Three way catalyst function • P1121 Electric throttle motor actuator • P1211 TCS control unit • P1212 TCS communication line • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD vehicle speed sensor • P1715 Primary speed sensor

DTC Index

INFOID:0000000000936975

×:Applicable —: Not applicable

DTC*1		Items (CONSULT-III screen terms)	SRT code	Test value/ Test limit (GST only)	Trip	MI	Reference page
CONSULT-III GST*2	ECM*3						
U1001	1001*4	CAN COMM CIRCUIT	—	—	2	—	EC-740
U1010	1010	CONTROL UNIT(CAN)	—	—	1 (CVT) 2 (M/T)	× —	EC-741
P0000	**0000**	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	—	—	—	**Flashing***6	**—**
P0011	0011	INT/V TIM CONT-B1	—	—	2	—	EC-742
P0102	0102	MAF SEN/CIRCUIT-B1	—	—	1	×	EC-746
P0103	0103	MAF SEN/CIRCUIT-B1	—	—	1	×	EC-746
P0112	0112	IAT SEN/CIRCUIT-B1	—	—	2	×	EC-751
P0113	0113	IAT SEN/CIRCUIT-B1	—	—	2	×	EC-751
P0117	0117	ECT SEN/CIRC	—	—	1	×	EC-754
P0118	0118	ECT SEN/CIRC	—	—	1	×	EC-754
P0122	0122	TP SEN 2/CIRC-B1	—	—	1	×	EC-757
P0123	0123	TP SEN 2/CIRC-B1	—	—	1	×	EC-757
P0132	0132	HO2S1 (B1)	—	×	2	×	EC-760
P0133	0133	HO2S1 (B1)	×	×	2	×	EC-764
P0134	0134	HO2S1 (B1)	—	×	2	×	EC-770
P0135	0135	HO2S1 HTR (B1)	×	×	2	×	EC-775
P0138	0138	HO2S2 (B1)	×	×	2	×	EC-778
P0139	0139	HO2S2 (B1)	×	×	2	×	EC-782
P0141	0141	HO2S2 HTR (B1)	×	×	2	×	EC-788

cardiagn.com

DTC*1		Items (CONSULT-III screen terms)	SRT code	Test value/ Test limit (GST only)	Trip	MI	Reference page
CONSULT-III GST*2	ECM*3						
P0171	0171	FUEL SYS-LEAN-B1	—	—	2	×	EC-791
P0172	0172	FUEL SYS-RICH-B1	—	—	2	×	EC-795
P0222	0222	TP SEN 1/CIRC-B1	—	—	1	×	EC-799
P0223	0223	TP SEN 1/CIRC-B1	—	—	1	×	EC-799
P0300	0300	MULTICYL MISFIRE	—	—	2	×	EC-802
P0301	0301	CYL 1 MISFIRE	—	—	2	×	EC-802
P0302	0302	CYL 2 MISFIRE	—	—	2	×	EC-802
P0303	0303	CYL 3 MISFIRE	—	—	2	×	EC-802
P0304	0304	CYL 4 MISFIRE	—	—	2	×	EC-802
P0327	0327	KNOCK SEN/CIRC-B1	—	—	2	—	EC-807
P0328	0328	KNOCK SEN/CIRC-B1	—	—	2	—	EC-807
P0335	0335	CKP SEN/CIRCUIT	—	—	2	×	EC-809
P0340	0340	CMP SEN/CIRC-B1	—	—	2	×	EC-813
P0420	0420	TW CATALYST SYS-B1	×	×	2	×	EC-817
P0444	0444	PURG VOLUME CONT/V	—	—	2	×	EC-822
P0500	0500	VEH SPEED SEN/CIRC*5	—	—	2	×	EC-825
P0605	0605	ECM	—	—	1 or 2	× or —	EC-827
P0705	0705	PNP SW/CIRC	—	—	2	×	TM-226
P0710	0710	ATF TEMP SEN/CIRC	—	—	1	×	TM-229
P0715	0715	INPUT SPD SEN/CIRC	—	—	2	×	TM-231
P0720	0720	VEH SPD SEN/CIR AT*5	—	—	2	×	TM-234
P0740	0740	TCC SOLENOID/CIRC	—	—	2	×	TM-240
P0744	0744	A/T TCC S/V FNCTN	—	—	2	×	TM-242
P0746	0746	PRS CNT SOL/A FCTN	—	—	1	×	TM-246
P0776	0776	PRS CNT SOL/B FCTN	—	—	2	×	TM-248
P0778	0778	PRS CNT SOL/B CIRC	—	—	2	×	TM-250
P0840	0840	TR PRS SENS/A CIRC	—	—	2	×	TM-255
P0845	0845	TR PRS SENS/B CIRC	—	—	2	×	TM-260
P1111	1111	INT/V TIM C/CIRC	—	—	1	×	EC-829
P1121	1121	ETC ACTR - B1	—	—	1	×	EC-832
P1122	1122	ETC FUNCTION/CIRC - B1	—	—	1	×	EC-834
P1124	1124	ETC MOT PWP	—	—	1	×	EC-838
P1126	1126	ETC MOT PWP - B1	—	—	1	×	EC-838
P1128	1128	ETC MOT - B1	—	—	1	×	EC-841
P1143	1143	HO2S1 (B1)	×	×	2	×	EC-844
P1144	1144	HO2S1 (B1)	×	×	2	×	EC-849
P1146	1146	HO2S2 (B1)	×	×	2	×	EC-854
P1147	1147	HO2S2 (B1)	×	×	2	×	EC-861
P1211	1211	TCS C/U FUNCTN	—	—	2	—	EC-868
P1212	1212	TCS/CIRC	—	—	2	—	EC-869
P1217	1217	ENG OVER TEMP	—	—	1	×	EC-870
P1225	1225	CTP LEARNING-B1	—	—	2	—	EC-874

cardiagn.com

DTC*1		Items (CONSULT-III screen terms)	SRT code	Test value/ Test limit (GST only)	Trip	MI	Reference page
CONSULT-III GST*2	ECM*3						
P1226	1226	CTP LEARNING-B1	—	—	2	—	EC-876
P1229	1129	SENSOR POWER/CIRC	—	—	1	×	EC-878
P1564	1564	ASCD SW	—	—	1	—	EC-880
P1572	1572	ASCD BRAKE SW	—	—	1	—	EC-883
P1574	1574	ASCD VHL SPD SEN	—	—	1	—	EC-890
P1610	1610	LOCK MODE	—	—	2	—	SEC-181
P1611	1611	ID DISCARD IMM-ECM	—	—	2	—	SEC-177
P1612	1612	CHAIN OF ECM-IMMU	—	—	2	—	SEC-178
P1615	1615	DIFFERENCE OF KEY	—	—	2	—	SEC-176
P1706	1706	P-N POS SW/CIRCUIT	—	—	2	×	EC-892
P1715	1715	IN PULY SPEED	—	—	2	—	EC-895
P1740	1740	LU-SLCT SOL/CIRC	—	—	2	×	TM-273
P1777	1777	STEP MOTOR CIRC	—	—	1	×	TM-276
P1778	1778	STEP MOTOR FNCT	—	—	2	×	TM-278
P1805	1805	BRAKE SW/CIRCUIT	—	—	2	—	EC-896
P2122	2122	APP SEN 1/CIRC	—	—	1	×	EC-899
P2123	2123	APP SEN 1/CIRC	—	—	1	×	EC-899
P2127	2127	APP SEN 2/CIRC	—	—	1	×	EC-902
P2128	2128	APP SEN 2/CIRC	—	—	1	×	EC-902
P2135	2135	TP SENSOR-B1	—	—	1	×	EC-906
P2138	2138	APP SENSOR	—	—	1	×	EC-909

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

*4: The troubleshooting for this DTC needs CONSULT-III.

*5: When the fail-safe operations for both self-diagnoses occur, the MI illuminates.

*6: When the ECM is in the mode of displaying SRT status, MI may flash. For the details, refer to “How to Display SRT Status”.

How to Set SRT Code

INFOID:0000000000936976

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

WITH CONSULT-III

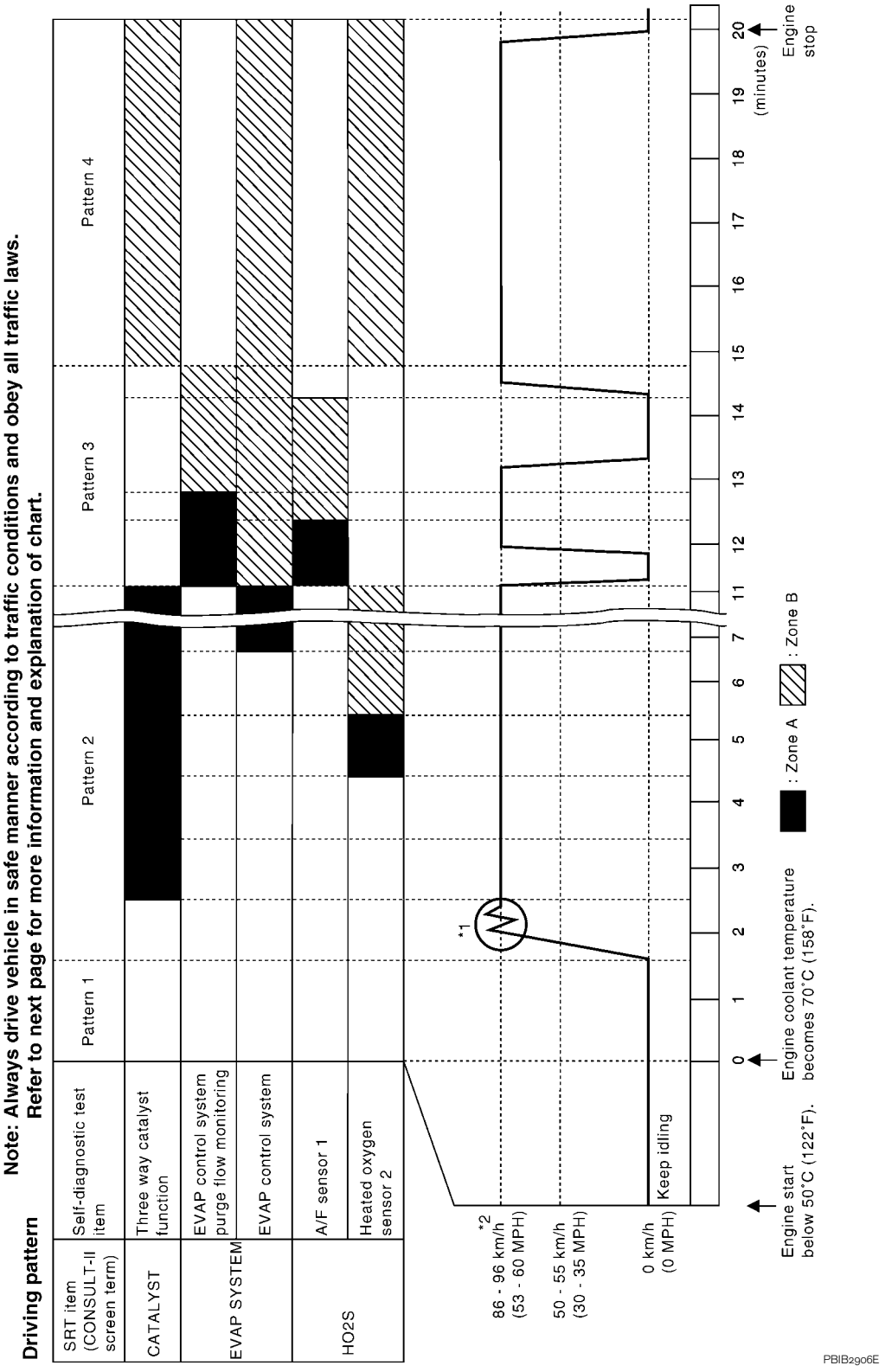
Perform corresponding DTC CONFIRMATION PROCEDURE one by one based on Performance Priority in the table on “SRT Item”.

WITHOUT CONSULT-III

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

cardiagn.com

DRIVING PATTERN



- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
  Zone A refers to the range where the time, required for the diagnosis under normal conditions*, is the shortest.
  Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

cardiagn.com

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.
  Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of −10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 46 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 46 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 95 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Test Value and Test Limit

INFOID:0000000000936977

The following is the information specified in Service $06 of SAE J1979.
The test value is a parameter used to determine whether a system/circuit diagnostic test is OK or NG while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.
These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

SRT item	Self-diagnostic test item	DTC	Test value (GST display)		Test limit
			TID	CID	
CATALYST	Three way catalyst function	P0420	01H	01H	Max.
		P0420	02H	81H	Min.
HO2S	Heated oxygen sensor 1	P0133	09H	04H	Max.
		P1143	0AH	84H	Min.
		P1144	0BH	04H	Max.
		P0132	0CH	04H	Max.
		P0134	0DH	04H	Max.
	Heated oxygen sensor 2	P0139	19H	86H	Min.
		P1147	1AH	86H	Min.
		P1146	1BH	06H	Max.
		P0138	1CH	06H	Max.
HO2S HTR	Heated oxygen sensor 1 heater	P0135	29H	08H	Max.
			2AH	88H	Min.
	Heated oxygen sensor 2 heater	P0141	2DH	0AH	Max.
			2EH	8AH	Min.

cardiagn.com

SYMPTOM DIAGNOSIS

ENGINE CONTROL SYSTEM

Symptom Table

INFOID:0000000000936978

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-926
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-978
	Fuel injector circuit	1	1	2	3	2		2	2			2			EC-923
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-692
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-935
	Incorrect idle speed adjustment						1	1	1	1		1			EC-646
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-832, EC-834
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-646
	Ignition circuit	1	1	2	2	2		2	2			2			EC-929
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-736
Mass air flow sensor circuit		1			2										EC-746
Engine coolant temperature sensor circuit							3			3					EC-754
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			EC-760, EC-764, EC-770, EC-844, EC-849
Throttle position sensor circuit							2			2					EC-757, EC-799, EC-874, EC-876, EC-906
Accelerator pedal position sensor circuit				3	2	1									EC-899, EC-902, EC-906
Knock sensor circuit				2								3			EC-807
Crankshaft position sensor (POS) circuit		2	2												EC-809

cardiagn.com

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Camshaft position sensor (PHASE) circuit	3	2												EC-813
Vehicle speed signal circuit		2	3		3						3			EC-825
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-827
Intake valve timing control solenoid valve circuit		3	2		1	3	2	2	3		3			EC-829
PNP switch circuit			3		3		3	3			3			EC-892
Refrigerant pressure sensor circuit		2				3			3		4			EC-936
Electrical load signal circuit							3							EC-921
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	HA-12
ABS actuator and electric unit (control unit)			4											BRC-9

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

cardiagn.com

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank	5													FL-15, FL-17
	Fuel piping			5	5	5		5	5			5			EM-155
	Vapor lock		5												—
	Valve deposit	5		5	5	5		5	5			5			—
	Poor fuel (Heavy weight gasoline, Low octane)														—
Air	Air duct														EM-146
	Air cleaner														EM-144
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)	5	5	5	5	5	5	5	5	5		5			EM-146
	Electric throttle control actuator														
	Air leakage from intake manifold/ Collector/Gasket														
Cranking	Battery	1	1	1		1		1	1			1		1	PG-118
	Generator circuit														CHG-8
	Starter circuit	3													STR-8
	Signal plate	6													EM-195, EM-199
	PNP switch	4													TM-226 or TM-324
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-186
	Cylinder head gasket										4		3		
	Cylinder block	6	6	6	6	6		6	6			6	4		EM-187
	Piston														
	Piston ring														
	Connecting rod														
	Bearing														
	Crankshaft														

cardiagn.com

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Valve mechanism	Timing chain	5	5	5	5	5		5	5			5			EM-163
	Camshaft														EM-163
	Intake valve timing control														EM-163
	Intake valve												3		EM-163
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			EM-149, EX-10
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			EM-152, LU-18, LU-17,
	Oil level (Low)/Filthy oil														LU-14
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5		5	5		4	5			CO-35
	Thermostat									5					CO-41
	Water pump														CO-39
	Water gallery														CO-24, CO-25
	Cooling fan									5					CO-37
	Coolant level (Low)/Contaminated coolant														CO-30
NVIS (NISSAN Vehicle Immobilizer System — NATS)		1	1												SEC-14

1 - 6: The numbers refer to the order of inspection.

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000000936979

FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 1,800 rpm under no load (for example, the selector lever position is neutral and engine speed is over 1,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 1,500 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, EC-657, "System Diagram".

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001099091

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

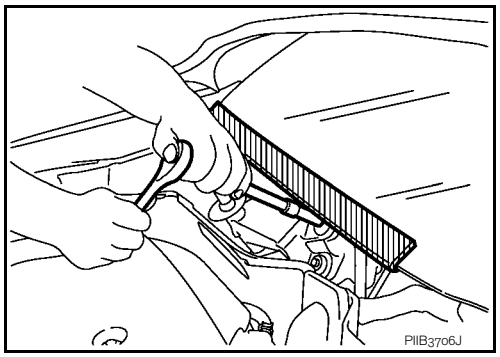
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001099090

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



On Board Diagnostic (OBD) System of Engine and CVT

INFOID:0000000000936980

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MI) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

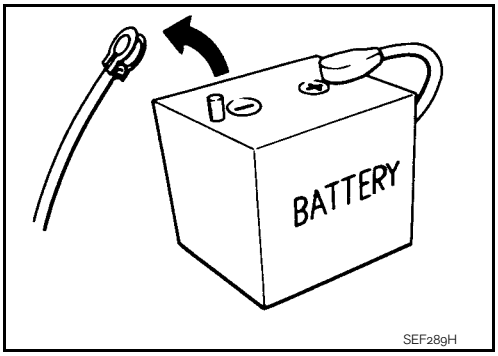
- **Be sure to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-105, "Description".**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MI to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to the malfunction of the EVAP system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.**

General Precautions

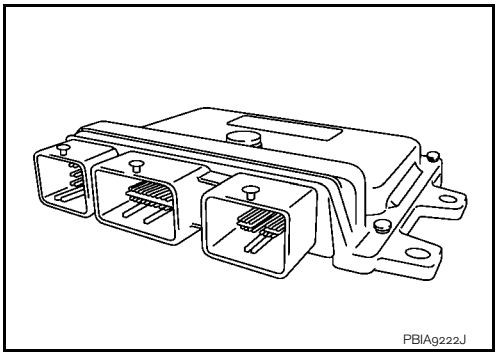
INFOID:0000000000936981

cardiagn.com

- **Always use a 12 volt battery as power source.**
- **Do not attempt to disconnect battery cables while engine is running.**
- **Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.**
- **Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.**

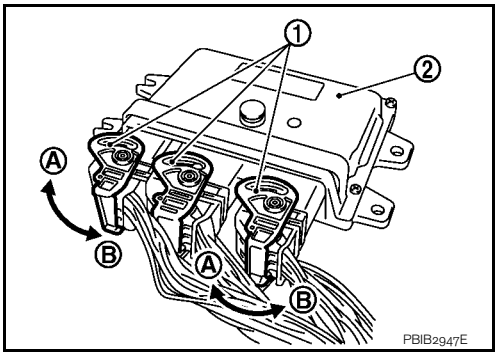


- **Do not disassemble ECM.**
- **If a battery cable is disconnected, the memory will return to the ECM value.**
  The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.
- **If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.**
- **Diagnostic trouble codes**
- **1st trip diagnostic trouble codes**
- **Freeze frame data**
- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

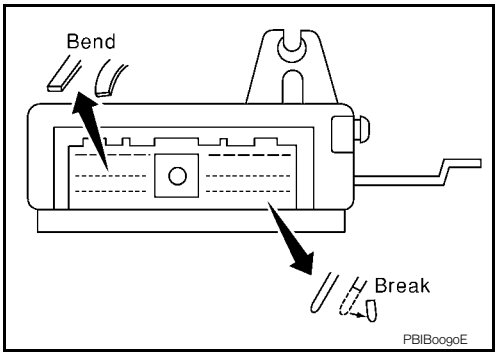


- **When connecting ECM harness connector (1), fasten (B) it securely with a lever as far as it will go as shown in the figure.**

  2. ECM
  A. Loosen

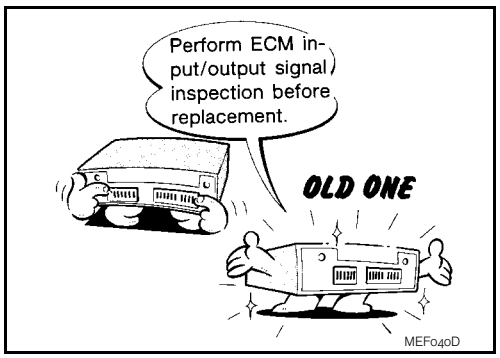


- **When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- **Securely connect ECM harness connectors.**
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- **Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.**
- **Keep engine control system parts and harness dry.**

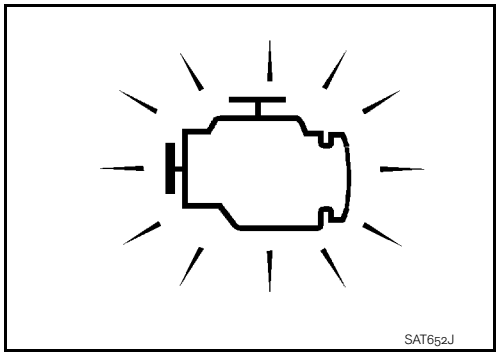


cardiagn.com

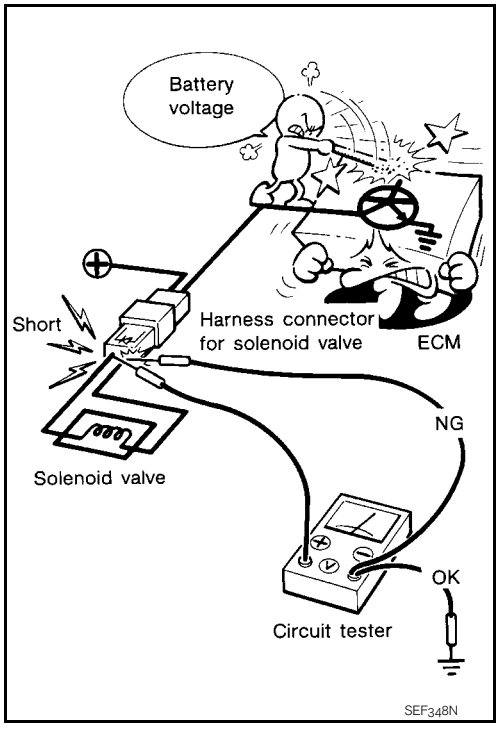
- **Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-938, "Reference Value".**
- **Handle mass air flow sensor carefully to avoid damage.**
- **Do not clean mass air flow sensor with any type of detergent.**
- **Do not disassemble electric throttle control actuator.**
- **Even a slight leak in the air intake system can cause serious incidents.**
- **Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).**



- **After performing each TROUBLE DIAGNOSIS, perform DTC CONFIRMATION PROCEDURE or Component Function Check.** The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.



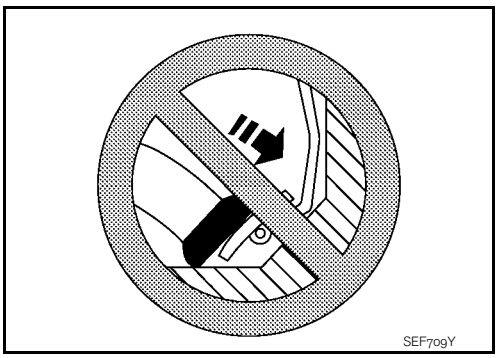
- **When measuring ECM signals with a circuit tester, never allow the two tester probes to contact.**
  Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- **Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**



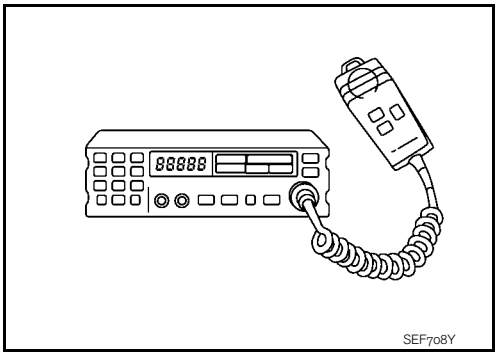
- **Do not operate fuel pump when there is no fuel in lines.**
- **Tighten fuel hose clamps to the specified torque.**

cardiagn.com

- **Do not depress accelerator pedal when starting.**
- **Immediately after starting, do not rev up engine unnecessarily.**
- **Do not rev up engine just prior to shutdown.**



- **When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.**
  - **Keep the antenna as far as possible from the electronic control units.**
  - **Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.**
    Do not let them run parallel for a long distance.
  - **Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.**
  - **Be sure to ground the radio to vehicle body.**



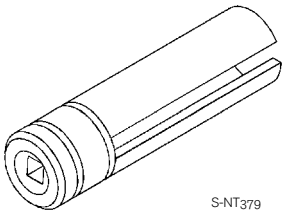
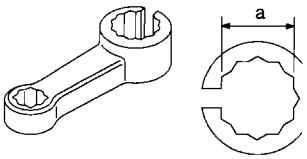
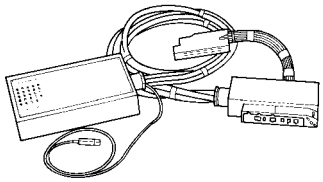
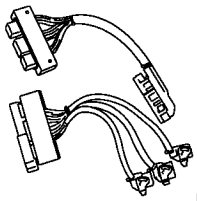
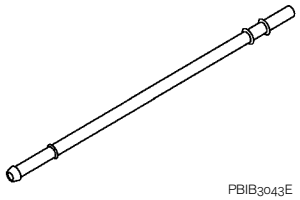
cardiagn.com

PREPARATION

PREPARATION

Special Service Tools

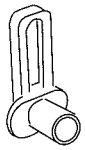
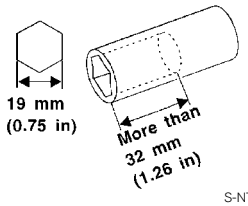
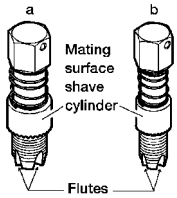
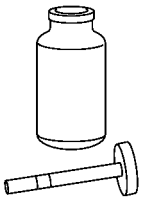
INFOID:0000000001093275

Tool number Tool name		Description
KV10117100 Heated oxygen sensor wrench	 S-NT379	Loosening or tightening heated oxygen sensor with 22 mm (0.87 in) hexagon nut
KV10114400 Heated oxygen sensor wrench	 S-NT636	Loosening or tightening heated oxygen sensor 2 **a: 22 mm (0.87 in)**
EG17550000 Break-out box	 ZZA1194D	Measuring ECM signals with a circuit tester
EG17680000 Y-cable adapter	 PBIA9379J	Measuring ECM signals with a circuit tester
KV10118400 Fuel tube adapter	 PBIB3043E	Measuring fuel pressure

Commercial Service Tools

INFOID:0000000001115676

cardiagn.com

Tool name	Description
Quick connector release  PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Par No. 16441 6N210)
Socket wrench  S-NT705	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. **a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor** **b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor**
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)  S-NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

cardiagn.com

ON-VEHICLE REPAIR

FUEL PRESSURE

Inspection

INFOID:0000000001092491

FUEL PRESSURE RELEASE

With CONSULT-III

1. Turn ignition switch ON.
2. Perform “FUEL PRESSURE RELEASE” in “WORK SUPPORT” mode with CONSULT-III.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

With CONSULT-III

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.

FUEL PRESSURE CHECK

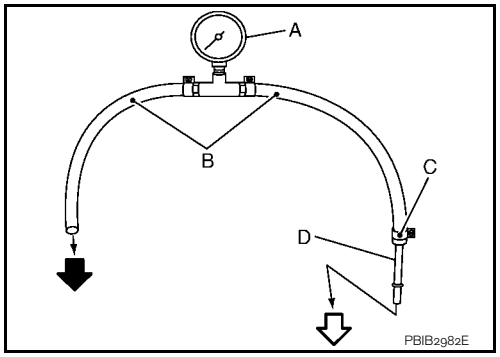
CAUTION:

- **Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.**
- **The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.**
- **Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains sealability with O-rings inside.**
- **Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.**

NOTE:

Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because J10 models do not have fuel return system.

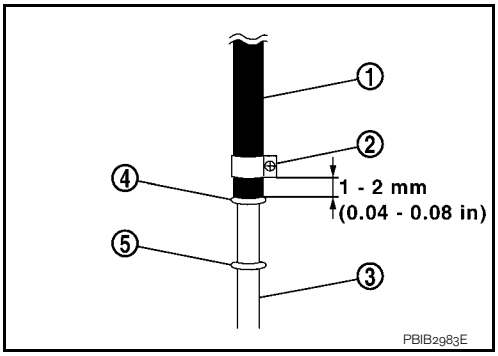
1. Release fuel pressure to zero.
2. Prepare fuel hose for fuel pressure check B and fuel tube adapter (KV10118400) D, then connect fuel pressure gauge A.
   - ⇦: To quick connector
   - ⬅: To fuel tube (engine side)
   - C: Clamp
   - Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
   - To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
   - Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
   - Use Pressure Gauge to check fuel pressure.



3. Remove fuel hose.
   - Do not twist or kink fuel hose because it is plastic hose.

cardiagn.com

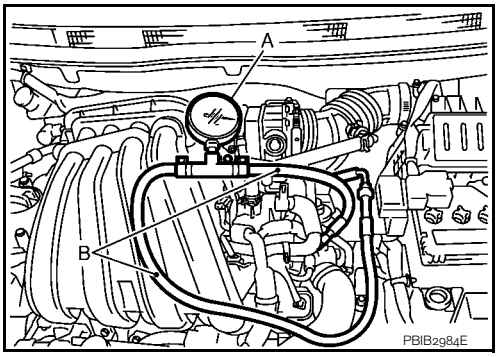
4. Connect fuel hose for fuel pressure check (1) to fuel tube (engine side) with clamp (2) as shown in the figure.
   - No.2 spool (5)
   - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
   - Apply proper amount of gasoline between top of the fuel tube (3) and No.1 spool (4).
   - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
   - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
   - When reconnecting fuel line, always use new clamps.
   - Use a torque driver to tighten clamps.
   - Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



Tightening torque: 1 - 1.5 N·m (0.1 - 0.15 kg-m, 9 - 13 in-lb)

   - Make sure that clamp screw does not contact adjacent parts.

5. Connect fuel tube adapter to quick connector.
   - A: Fuel pressure gauge
   - B: Fuel hose for fuel pressure check
6. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
7. Turn ignition switch ON and check for fuel leakage.
8. Start engine and check for fuel leakage.
9. Read the indication of fuel pressure gauge.
   - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
   - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.



At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2, 51 psi)

10. If result is unsatisfactory, go to next step.
11. Check the following.
    - Fuel hoses and fuel tubes for clogging
    - Fuel filter for clogging
    - Fuel pump
    - Fuel pressure regulator for clogging

    If OK, replace fuel pressure regulator.
    If NG, repair or replace.

cardiagn.com

EVAPORATIVE EMISSION SYSTEM

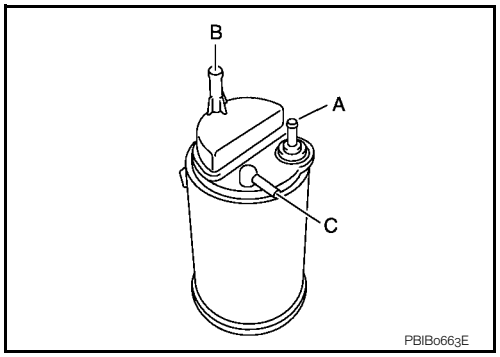
Inspection

INFOID:0000000001092492

1. Visually inspect EVAP vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Check EVAP canister as follows:

a. Block port (B). Orally blow air through port (A). Check that air flows freely through port (C).

b. Block port (A). Orally blow air through port (B). Check that air flows freely through port (C).

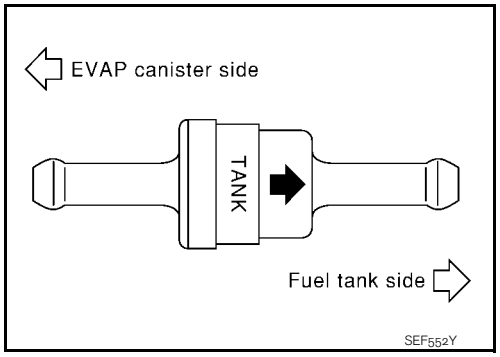


3. Visually inspect the fuel check valve for cracks, damage, loose connections chafing and deterioration.
4. Check fuel check valve as follows:

a. Blow air through connector on the fuel tank side. A considerable resistance should be felt and a portion of air flow should be directed toward the EVAP canister side.

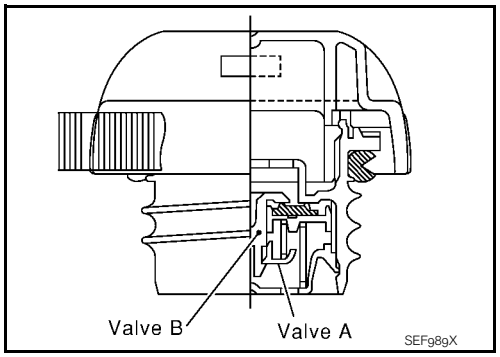
b. Blow air through connector on EVAP canister side. Air flow should be smoothly directed toward fuel tank side.

c. If fuel check valve is suspected or not properly functioning in step 1 and 2 above, replace it.



5. Inspect fuel tank filler cap vacuum relief valve for clogging, sticking, etc.

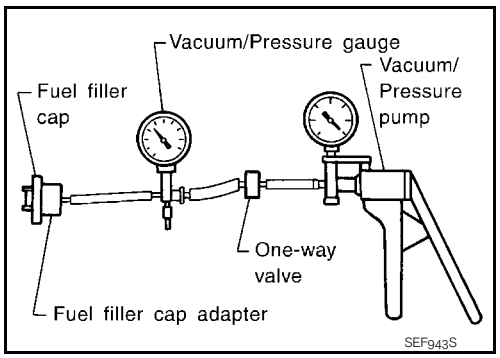
a. Wipe clean valve housing.



b. Check valve opening pressure and vacuum.

Pressure:	15.3 - 20.0 kPa (0.153 - 0.200 bar, 0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)
Vacuum:	–6.0 to –3.4 kPa (–0.06 bar to –-0.034bar, –0.061 to –0.035 kg/cm^2, –0.87 to –0.49 psi)

c. If out of specification, replace fuel filler cap as an assembly.



cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

INFOID:0000000001089050

Transmission	Condition	Specification
CVT	No load* (in P or N position)	700 ± 50 rpm
M/T	No load* (in Neutral position)	700 ± 50 rpm

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Ignition Timing

INFOID:0000000001089051

Transmission	Condition	Specification
CVT	No load* (in P or N position)	15 ± 5° BTDC
M/T	No load* (in Neutral position)	15 ± 5° BTDC

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

INFOID:0000000001089052

Condition	Specification (Using CONSULT-III or GST)
At idle	10 – 35 %
At 2,500 rpm	10 – 35 %

Mass Air Flow Sensor

INFOID:0000000001089053

Supply voltage	Battery voltage (11 – 14 V)
Output voltage at idle	1.0 – 1.3V*
Mass air flow (Using CONSULT-III or GST)	1.0 – 4.0 g·m/sec at idle* 2.0 – 10.0 g·m/sec at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no load.

cardiagn.com

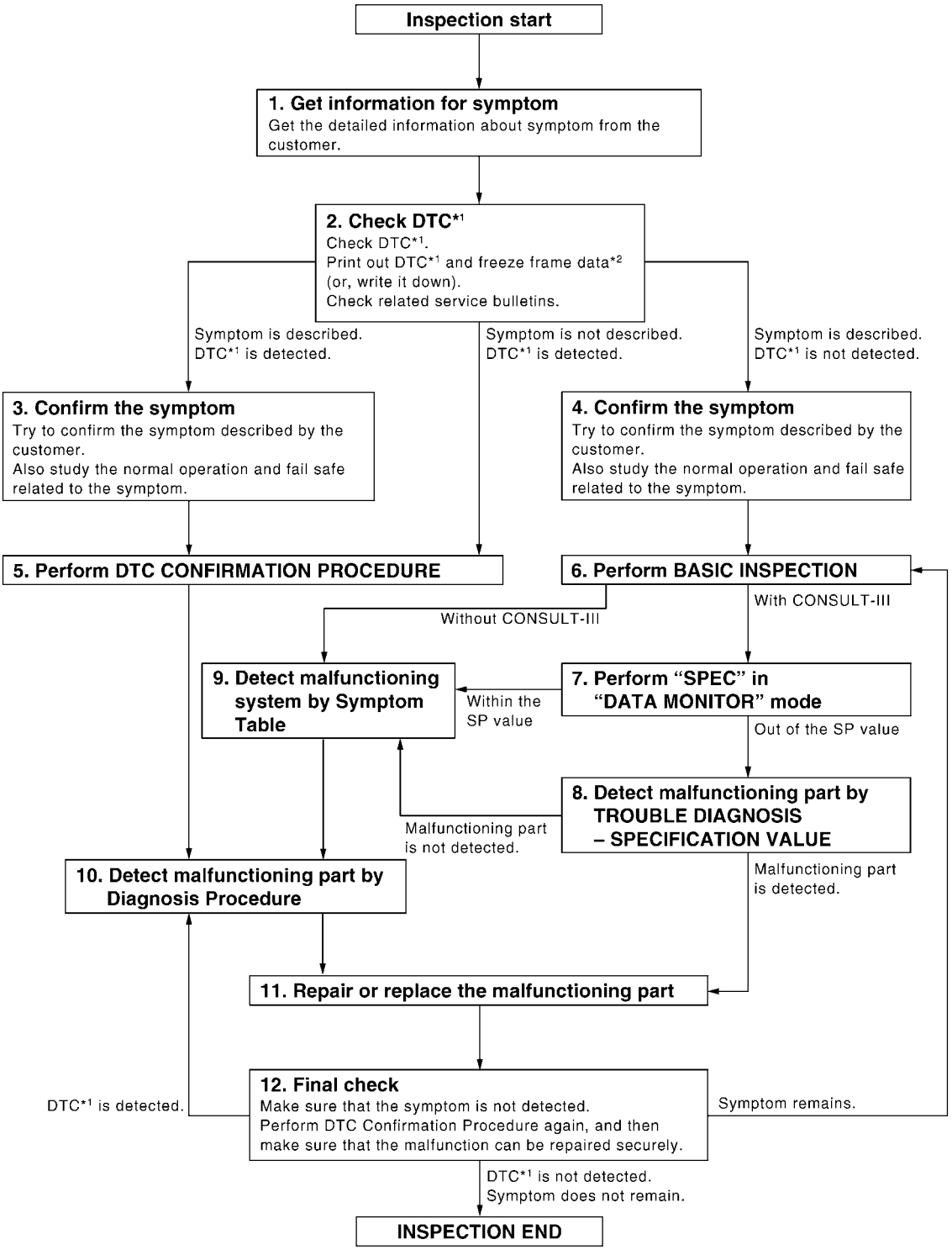
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001094030

OVERALL SEQUENCE



*1: Include 1st trip DTC.
*2: Include 1st trip freeze frame data.

JMBIA0078GB

DETAILED FLOW

cardiagn.com

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the “Diagnostic Work Sheet”. (Refer to EC-984, "Diagnostic Work Sheet".)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.

- Record DTC and freeze frame data. (Print them out with CONSULT-III.)
- Erase DTC. (Refer to EC-1050, "Diagnosis Description".)
- Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to EC-1243, "Symptom Table".)

3. Check related service bulletins for information.

Is any symptom described and is any DTC detected?

Symptom is described, DTC is detected>>GO TO 3.
Symptom is described, DTC is not detected>>GO TO 4.
Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MI ON).
Also study the normal operation and fail safe related to the symptom. Refer to EC-1247, "Description" and EC-1239, "Fail Safe".
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail safe related to the symptom. Refer to EC-1247, "Description" and EC-1239, "Fail Safe".
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.
If two or more DTCs are detected, refer to EC-1241, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.
  If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.
NO >> Check according to EC-1241, "DTC Index".

6.PERFORM BASIC INSPECTION

Perform EC-986, "BASIC INSPECTION : Special Repair Requirement".

Do you have CONSULT-III?

cardiagn.com

YES >> GO TO 7.
NO >> GO TO 9.

7. PERFORM SPEC IN DATA MONITOR MODE

With CONSULT-III

Make sure that “MAS A/F SE-B1”, “B/FUEL SCHDL” and “A/F ALPHA-B1” are within the SP value using CONSULT-III in “SPEC” of “DATA MONITOR” mode. Refer to EC-1061, "Component Function Check".

Is the measurement value within the SP value?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to EC-1061, "Diagnosis Procedure".

Is malfunctioning part detected?

YES >> GO TO 11.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to EC-1243, "Symptom Table" based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

>> GO TO 10.

10. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

NOTE:

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to Circuit Inspection in GI-41, "Circuit Inspection".

Is malfunctioning part detected?

YES >> GO TO 11.
NO >> Monitor input data from related sensors or check the voltage of related ECM terminals using CONSULT-III. Refer to EC-1218, "Reference Value".

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to EC-1050, "Diagnosis Description".

>> GO TO 12.

12. FINAL CHECK

When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then make sure that the malfunction have been repaired securely.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 10.
YES-2 >> Symptom remains: GO TO 6.
NO >> Before returning the vehicle to the customer, make sure to erase unnecessary DTC in ECM and TCM (Transmission Control Module). (Refer to EC-1050, "Diagnosis Description".)

Diagnostic Work Sheet

INFOID:0000000001094031

DESCRIPTION

cardiagn.com

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

KEY POINTS

WHAT ..... Vehicle & engine model
WHEN ..... Date, Frequencies
WHERE..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SEF907L

WORKSHEET SAMPLE

Customer name MR/MS	Model & Year	VIN
Engine #	Trans.	Mileage
Incident Date	Manuf. Date	In Service Date
Fuel and fuel filler cap	☐ Vehicle ran out of fuel causing misfire ☐ Fuel filler cap was left off or incorrectly screwed on.	
Symptoms – ☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]	
Symptoms – ☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
Symptoms – ☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
Symptoms – ☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading	
Incident occurrence	☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime	
Frequency	☐ All the time ☐ Under certain conditions ☐ Sometimes	
Weather conditions	☐ Not affected	
Weather conditions – Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]	
Weather conditions – Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F	
Engine conditions	☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions	☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)	
Driving conditions	☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp	☐ Turned on ☐ Not turned on	

MTBL0017

cardiagn.com

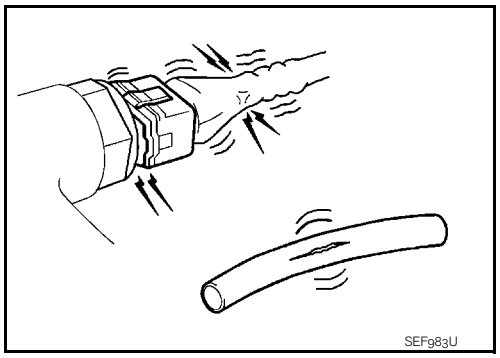
INSPECTION AND ADJUSTMENT
BASIC INSPECTION

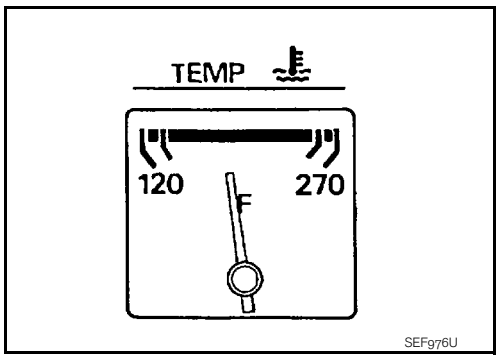
BASIC INSPECTION : Special Repair Requirement

INFOID:0000000001094032

1.INSPECTION START

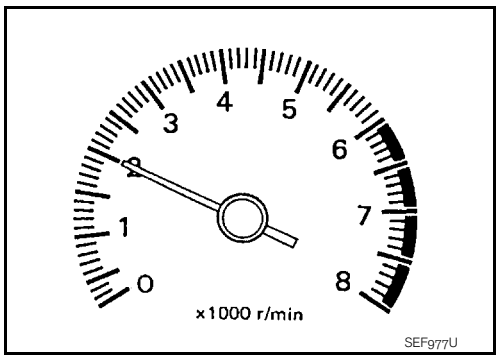
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
- Harness connectors for improper connections
- Wiring harness for improper connections, pinches and cut
- Vacuum hoses for splits, kinks and improper connections
- Hoses and ducts for leaks
- Air cleaner clogging
- Gasket
3. Confirm that electrical or mechanical loads are not applied.
- Headlamp switch is OFF.
- Air conditioner switch is OFF.
- Rear window defogger switch is OFF.
- Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
   Ensure engine stays below 1,000 rpm.


SEF983U



SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-III or ECM [Diagnostic Test Mode II (self-diagnostic results)].



SEF977U

Is any DTC detected?

YES >> GO TO 2.
NO >> GO TO 3.

2.REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding Diagnostic Procedure.

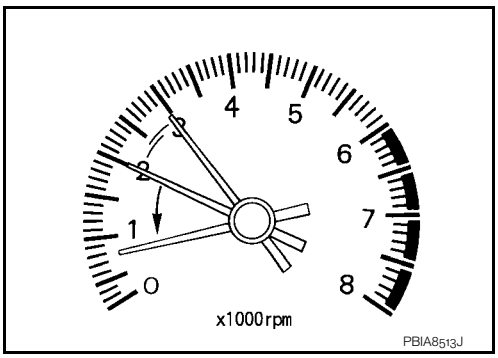
>> GO TO 3.

3.CHECK TARGET IDLE SPEED

1. Run engine at about 2,000 rpm for about 2 minutes under no load.

cardiagn.com

2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed.
   For procedure, refer to EC-990, "IDLE SPEED : Special Repair Requirement".
   For specification, refer to EC-981, "Idle Speed".



Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-991, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-991, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-991, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 7.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
   For procedure, refer to EC-990, "IDLE SPEED : Special Repair Requirement".
   For specification, refer to EC-981, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the Following.
- Check camshaft position sensor (PHASE) and circuit. Refer to EC-1107, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-1103, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace. Then GO TO 4

9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

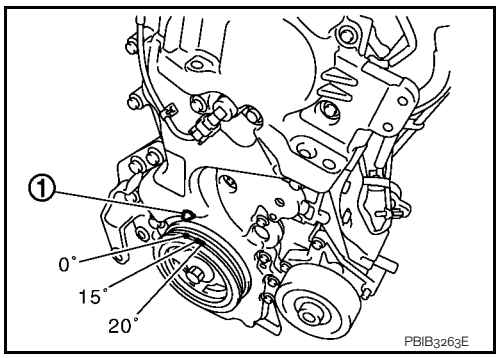
>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.

cardiagn.com

2. Check ignition timing with a timing light.
For procedure, refer to EC-990, "IGNITION TIMING : Special Repair Requirement"
For specification, refer to EC-981, "Ignition Timing".



1 : Timing indicator

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-991, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-991, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-991, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 14.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

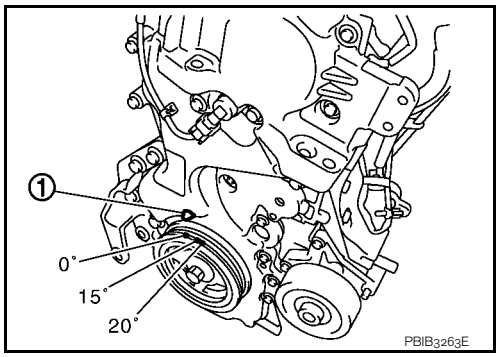
1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
For procedure, refer to EC-990, "IDLE SPEED : Special Repair Requirement".
For specification, refer to EC-981, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 15.
NO >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.
For procedure, refer to EC-990, "IGNITION TIMING : Special Repair Requirement".
For specification, refer to EC-981, "Ignition Timing".



1 : Timing indicator

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-163, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair the timing chain installation. Then GO TO 4.

cardiagn.com

17. DETECT MALFUNCTIONING PART

Check the following.
- Check camshaft position sensor (PHASE) and circuit. Refer to EC-1107, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-1103, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair or replace. Then GO TO 4

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

>> GO TO 4.

19. INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, go to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

>> INSPECTION END

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000001094033

When replacing ECM, this procedure must be performed.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000001094034

1. PERFORM INITIALIZATION OF NATS SYSTEM AND REGISTRATION OF ALL NATS IGNITION KEY IDS

Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

>> GO TO 2.

2. PERFORM VIN REGISTRATION

Refer to EC-990, "VIN REGISTRATION : Special Repair Requirement".

>> GO TO 3.

3. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-991, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 4.

4. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-991, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 5.

5. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-991, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

cardiagn.com

IDLE SPEED

IDLE SPEED : Description

INFOID:0000000001094035

This describes how to check the idle speed. For the actual procedure, follow the instructions in “BASIC INSPECTION”.

IDLE SPEED : Special Repair Requirement

INFOID:0000000001094036

1.CHECK IDLE SPEED

With CONSULT-III
Check idle speed in “DATA MONITOR” mode with CONSULT-III.

Without CONSULT-III
Check idle speed by installing the pulse type tachometer clamp on suitable high-tension wire whitch installed between No.4 ignition coil and No.4 Spark plug.

>> INSPECTION END

IGNITION TIMING

IGNITION TIMING : Description

INFOID:0000000001094037

This describes how to check the ignition timing. For the actual procedure, follow the instructions in “BASIC INSPECTION”.

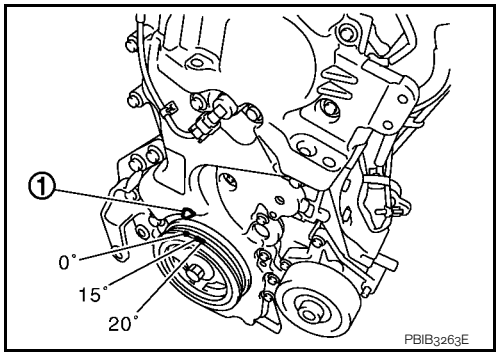
IGNITION TIMING : Special Repair Requirement

INFOID:0000000001094038

1.CHECK IGNITION TIMING

1. Attach timing light to the ignition coil No.4 harness.
2. Check ignition timing.

1 : Timing indicator



>> INSPECTION END

VIN REGISTRATION

VIN REGISTRATION : Description

INFOID:0000000001094039

VIN Registration is an operation to registering VIN in ECM. It must be performed each time ECM is replaced.

NOTE:
Accurate VIN which is registered in ECM may be required for Inspection & Maintenance (I/M).

VIN REGISTRATION : Special Repair Requirement

INFOID:0000000001094040

1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to GI-22, "Information About Identification or Model Code".

>> GO TO 2.

2.PERFORM VIN REGISTRATION

With CONSULT-III
1. Turn ignition switch ON and engine stopped.
2. Select “VIN REGISTRATION” in “WORK SUPPORT” mode.

cardiagn.com

3. Follow the instruction of CONSULT-III display.

>> END

ACCELERATOR PEDAL RELEASED POSITION LEARNING

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description

INFOID:0000000001094041

Accelerator Pedal Released Position Learning is a function of ECM to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement

INFOID:0000000001094042

1.START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF and wait at least 10 seconds.

>> END

THROTTLE VALVE CLOSED POSITION LEARNING

THROTTLE VALVE CLOSED POSITION LEARNING : Description

INFOID:0000000001094043

Throttle Valve Closed Position Learning is a function of ECM to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

INFOID:0000000001094044

1.START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
   Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

>> END

IDLE AIR VOLUME LEARNING

IDLE AIR VOLUME LEARNING : Description

INFOID:0000000001094045

Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps each engine idle speed within the specific range. It must be performed under any of the following conditions:
- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

IDLE AIR VOLUME LEARNING : Special Repair Requirement

INFOID:0000000001094046

1.PRECONDITIONING

Make sure that all of the following conditions are satisfied.
Learning will be cancelled if any of the following conditions are missed for even a moment.
- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- PNP switch: ON
- Electric load switch: OFF

cardiagn.com

(Air conditioner, headlamp, rear window defogger)
On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up

- CVT models
- With CONSULT-III: Drive vehicle until “ATF TENP SEN” in “DATA MONITOR” mode of “CVT” system indicates less than 0.9V.
- Without CONSULT-III: Drive vehicle for 10 minutes.

- M/T models
- Drive vehicle for 10 minutes.

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2. IDLE AIR VOLUME LEARNING

With CONSULT-III

1. Perform Accelerator Pedal Released Position Learning. Refer to EC-991, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
2. Perform Throttle Valve Closed Position Learning. Refer to EC-991, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
3. Start engine and warm it up to normal operating temperature.
4. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.
5. Touch “START” and wait 20 seconds.

Is “CMPLT” displayed on CONSULT-III screen?

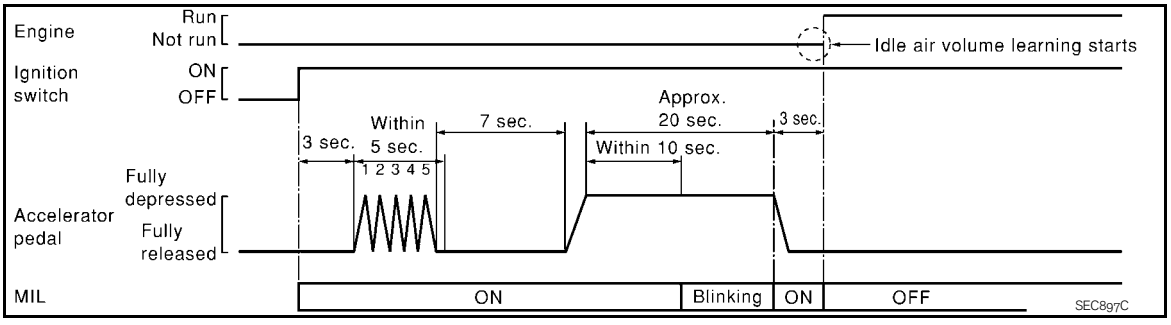
YES >> GO TO 4.
NO >> GO TO 5.

3. IDLE AIR VOLUME LEARNING

Without CONSULT-III

NOTE:
- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**

1. Perform Accelerator Pedal Released Position Learning. Refer to EC-991, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
2. Perform Throttle Valve Closed Position Learning. Refer to EC-991, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
3. Start engine and warm it up to normal operating temperature.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
6. Repeat the following procedure quickly five times within 5 seconds.
- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.
7. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MI stops blinking and turned ON.
8. Fully release the accelerator pedal within 3 seconds after the MI turned ON.
9. Start engine and let it idle.
10. Wait 20 seconds.



cardiagn.com

>> GO TO 4

4. CHECK IDLE SPEED AND IGNITION TIMING

Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications. For specification, refer to EC-981, "Idle Speed" and EC-981, "Ignition Timing".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following
- Check that throttle valve is fully closed.
- Check PCV valve operation.
- Check that downstream of throttle valve is free from air leakage.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace malfunctioning part.

6. DETECT MALFUNCTIONING PART

Engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.
It is useful to perform “TROUBLE DIAGNOSIS - SPECIFICATION VALUE”. Refer to EC-1061, "Description".
If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:
- Engine stalls.
- Erroneous idle.

>> INSPECTION END

MIXTURE RATIO SELF-LEARNING VALUE CLEAR

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:0000000001094047

This describes how to erase the mixture ratio self-learning value. For the actual procedure, follow the instructions in “Diagnosis Procedure”.

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:0000000001094048

1. START

With CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-III.
3. Clear mixture ratio self-learning value by touching “CLEAR”.

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-1241, "DTC Index".
7. Make sure that DTC P0000 is displayed.

>> END

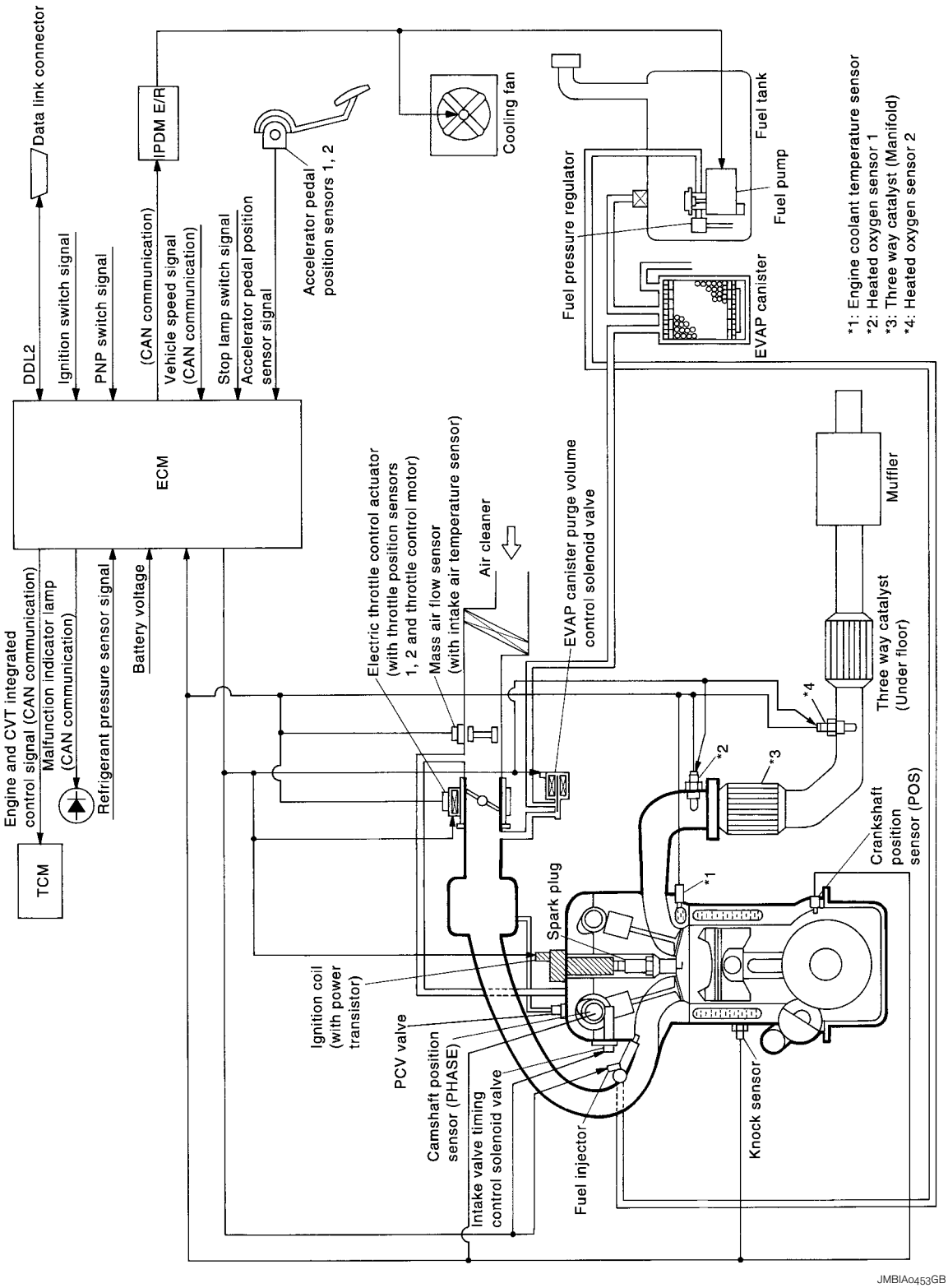
cardiagn.com

FUNCTION DIAGNOSIS

ENGINE CONTROL SYSTEM

System Diagram

INFOID:0000000001094049



JMBIA0453GB

System Description

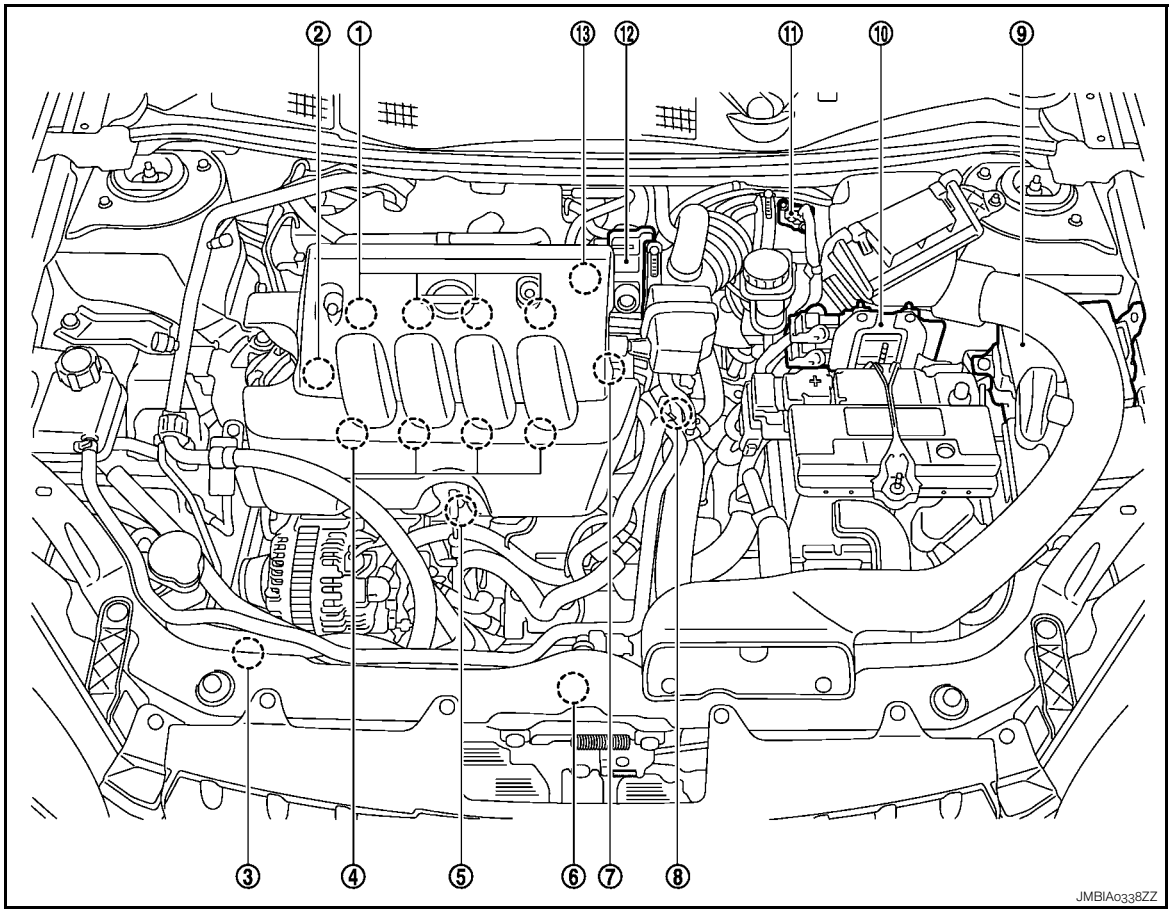
INFOID:0000000001094050

cardiagn.com

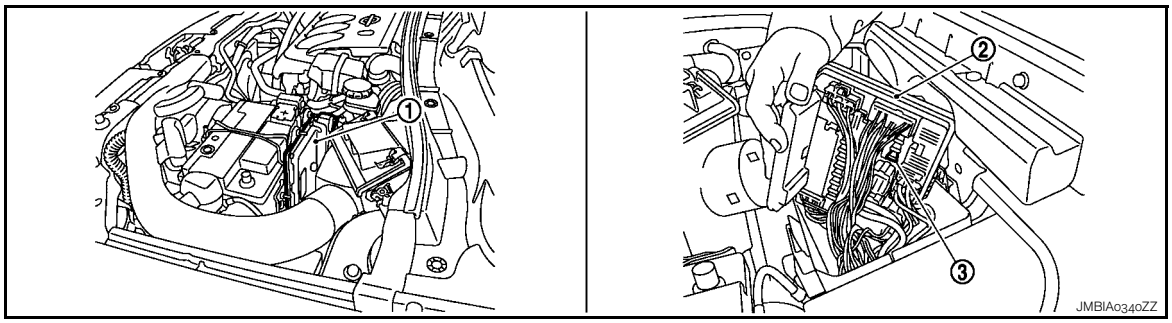
ECM performs various controls such as fuel injection control and ignition timing control.

Component Parts Location

INFOID:0000000001094051

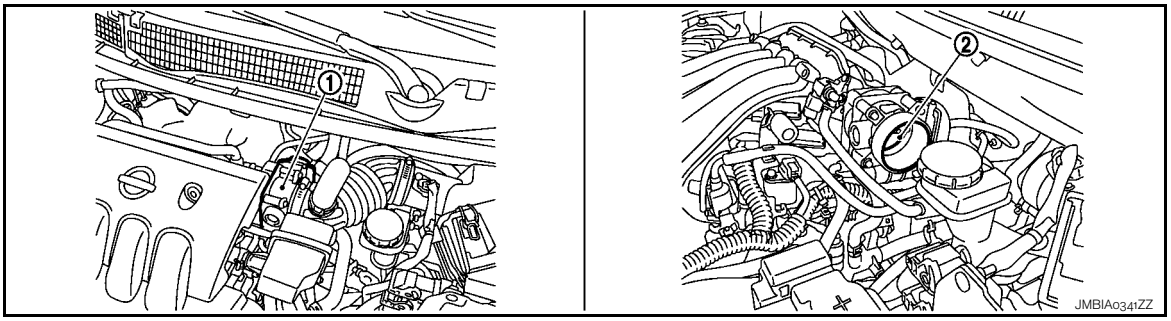


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

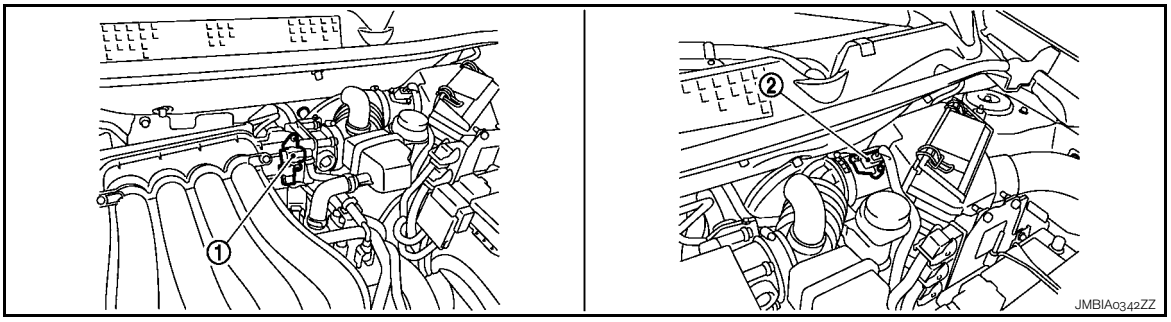


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

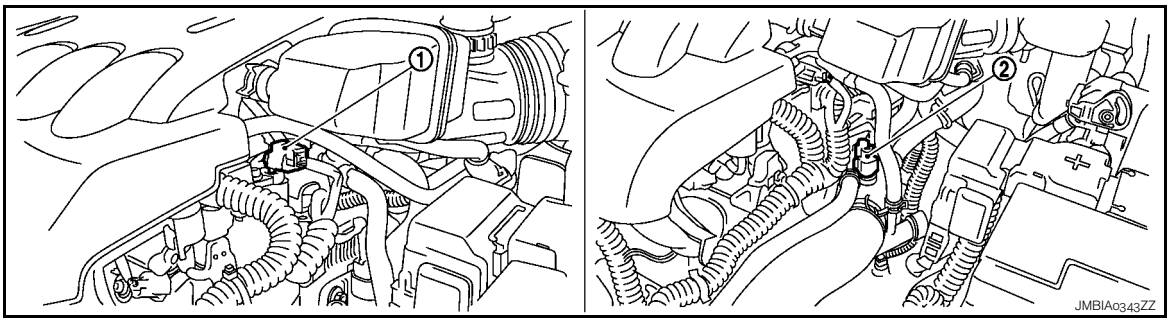
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

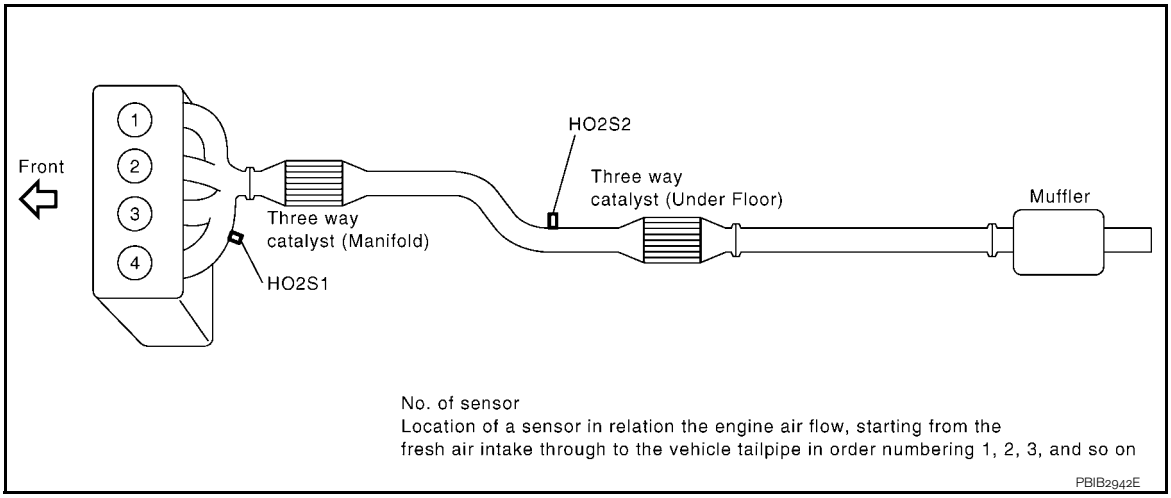


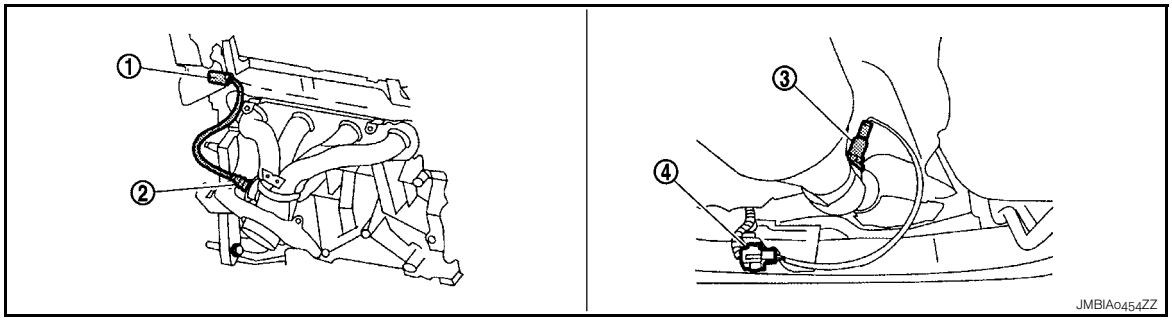
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



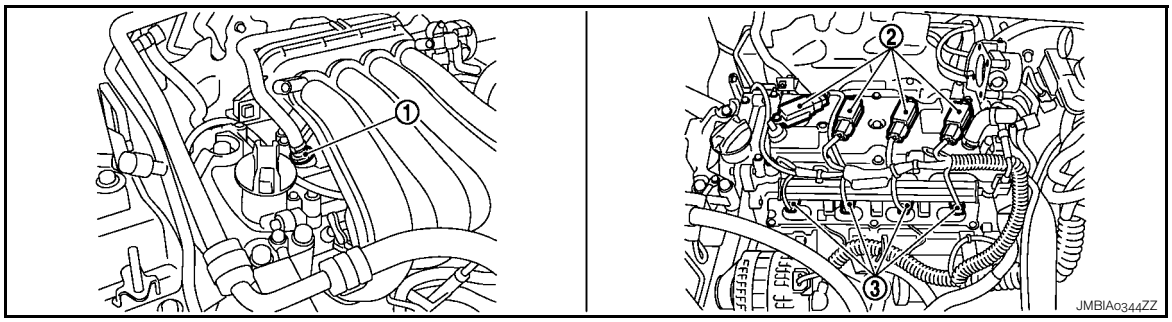
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

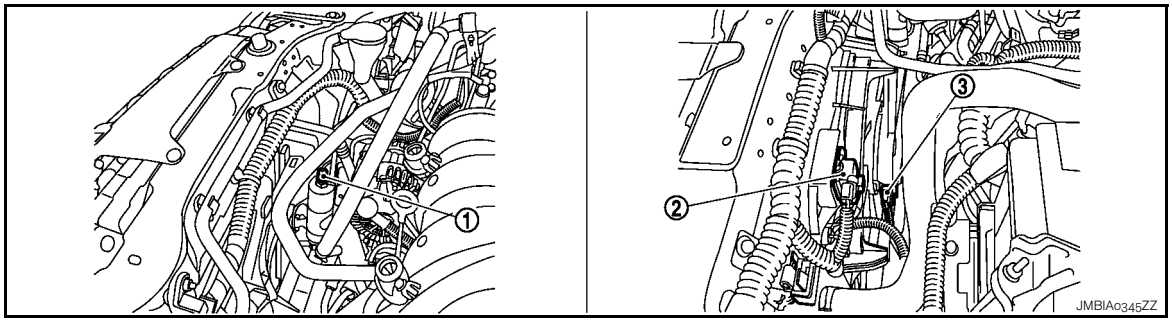




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

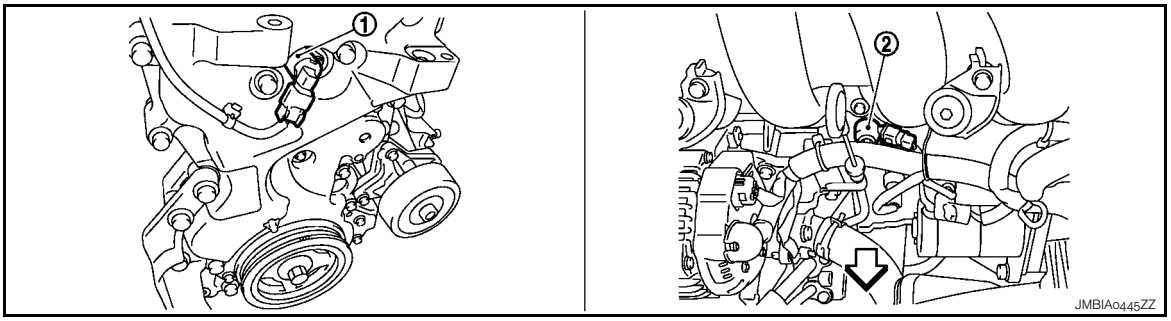


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

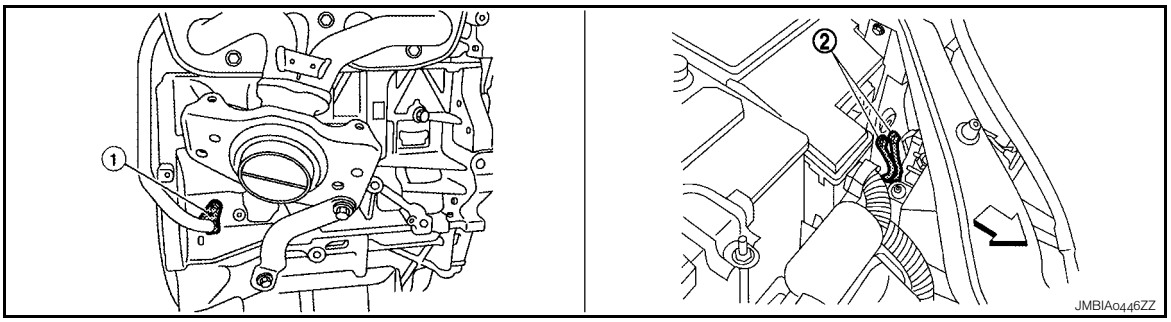


cardiagn.com

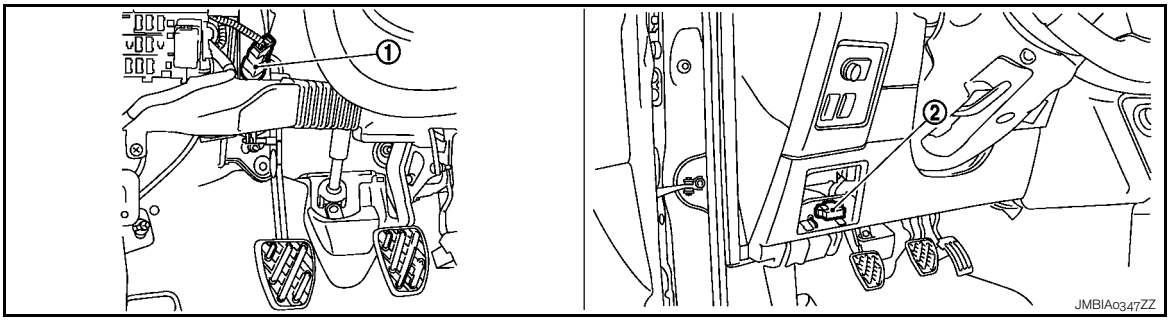
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



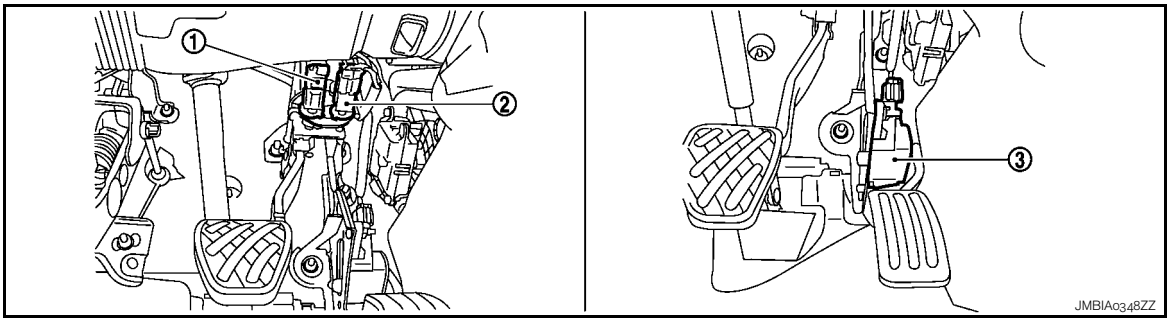
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

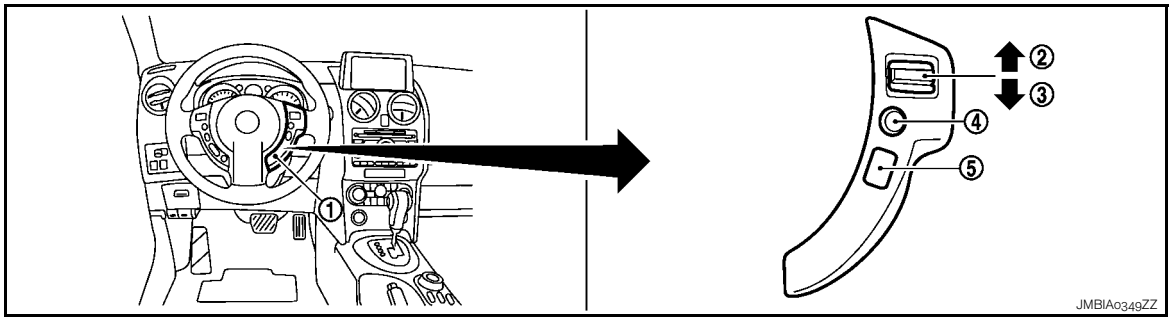


1. ASCD clutch switch 2. Data link connector

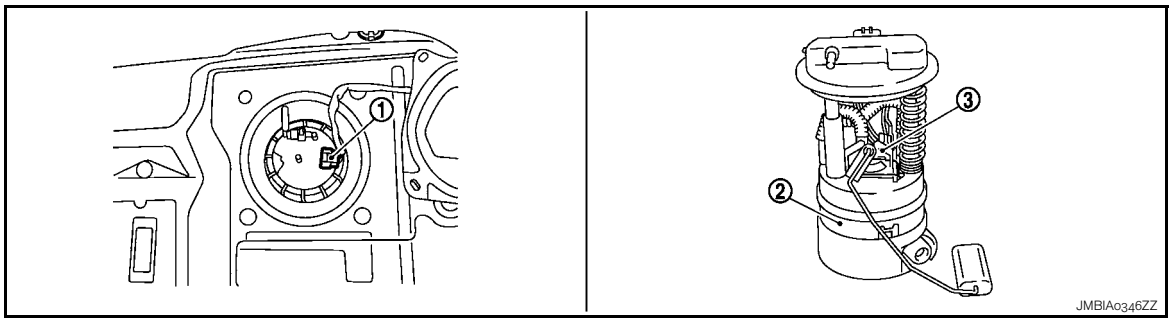


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000001094052

Component	Reference
Accelerator pedal position sensor	EC-899, "Description"
ASCD brake switch	EC-883, "Description"
ASCD steering switch	EC-880, "Description"
ASCD vehicle speed sensor	EC-890, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Cooling fan motor	EC-685, "System Diagram"
Electric throttle control actuator	EC-832, "Description"
Engine coolant temperature sensor	EC-754, "Description"
EVAP canister purge volume control solenoid valve	EC-822, "Description"
Fuel injector	EC-923, "Description"
Fuel pump	EC-926, "Description"
Heated oxygen sensor 1	EC-760, "Description"
Heated oxygen sensor 1 heater	EC-775, "Description"
Heated oxygen sensor 2	EC-778, "Description"
Heated oxygen sensor 2 heater	EC-788, "Description"

cardiagn.com

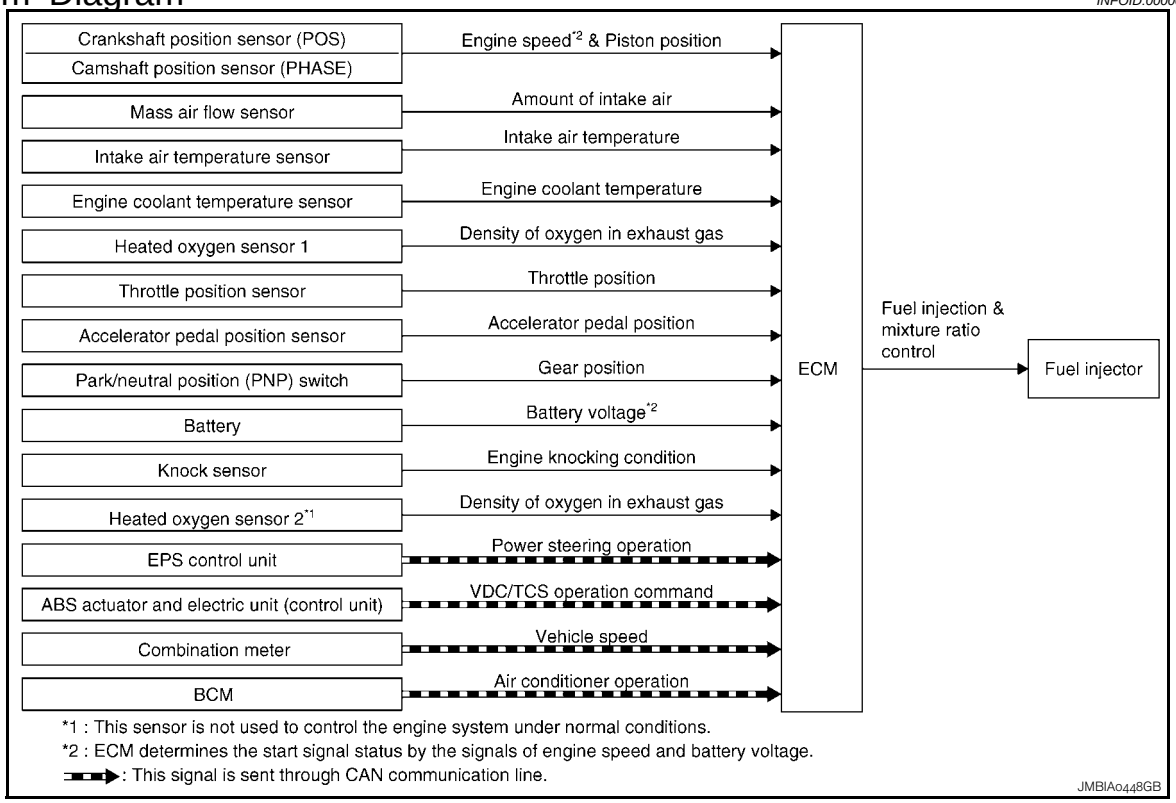
Component	Reference
Ignition signal	EC-929, "Description"
Intake air temperature sensor	EC-1206, "Description"
Intake valve timing control solenoid valve	EC-1044, "System Description"
Knock sensor	EC-807, "Description"
Mass air flow sensor	EC-746, "Description"
Park/neutral position (PNP) switch	EC-892, "Description"
PCV valve	EC-935, "Description"
Refrigerant pressure sensor	EC-936, "Description"
Stop lamp switch	EC-896, "Description"
Throttle control motor	EC-841, "Description"
Throttle control motor relay	EC-838, "Description"
Throttle position sensor	EC-874, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

MULTIPORT FUEL INJECTION SYSTEM

System Diagram

INFOID:0000000001094053



System Description

INFOID:0000000001094054

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*3 Piston position	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Intake air temperature sensor	Intake air temperature		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage*3		
Knock sensor	Engine knocking condition		
EPS control unit	Power steering operation		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
ABS actuator and electric unit (control unit)*2	ABS operation command		
Air conditioner switch*2	Air conditioner operation		
Combination meter*2	Vehicle speed		

*1: This sensor is not used to control the engine system under normal conditions.

*2: This signal is sent to the ECM through CAN communication line.

cardiagn.com

*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from the crankshaft position sensor (POS), camshaft position sensor (PHASE) and the mass air flow sensor.

VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (CVT models)
- High-load, high-speed operation

<Fuel decrease>
- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)

The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to EC-760, "Description". This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).
This stage is referred to as the closed loop control condition.
Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

- Open Loop Control
  The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D (CVT models)
- When starting the engine

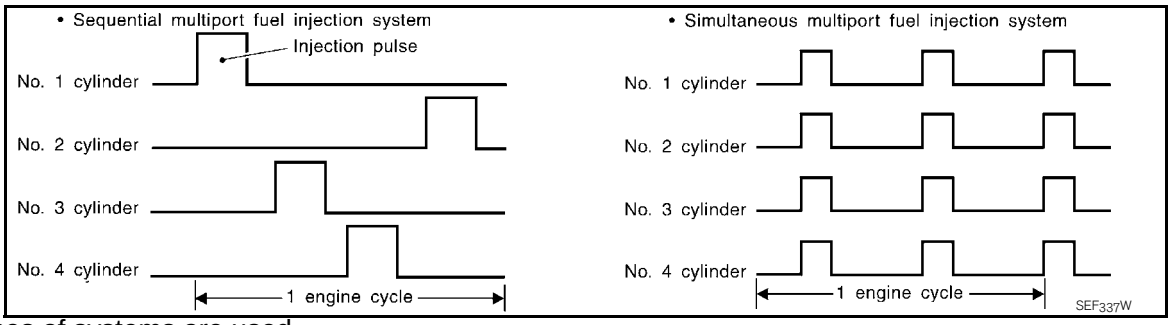
MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) and characteristic changes during operation (i.e., fuel injector clogging) directly affect mixture ratio.
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.
“Fuel trim” refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.
“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

cardiagn.com

"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

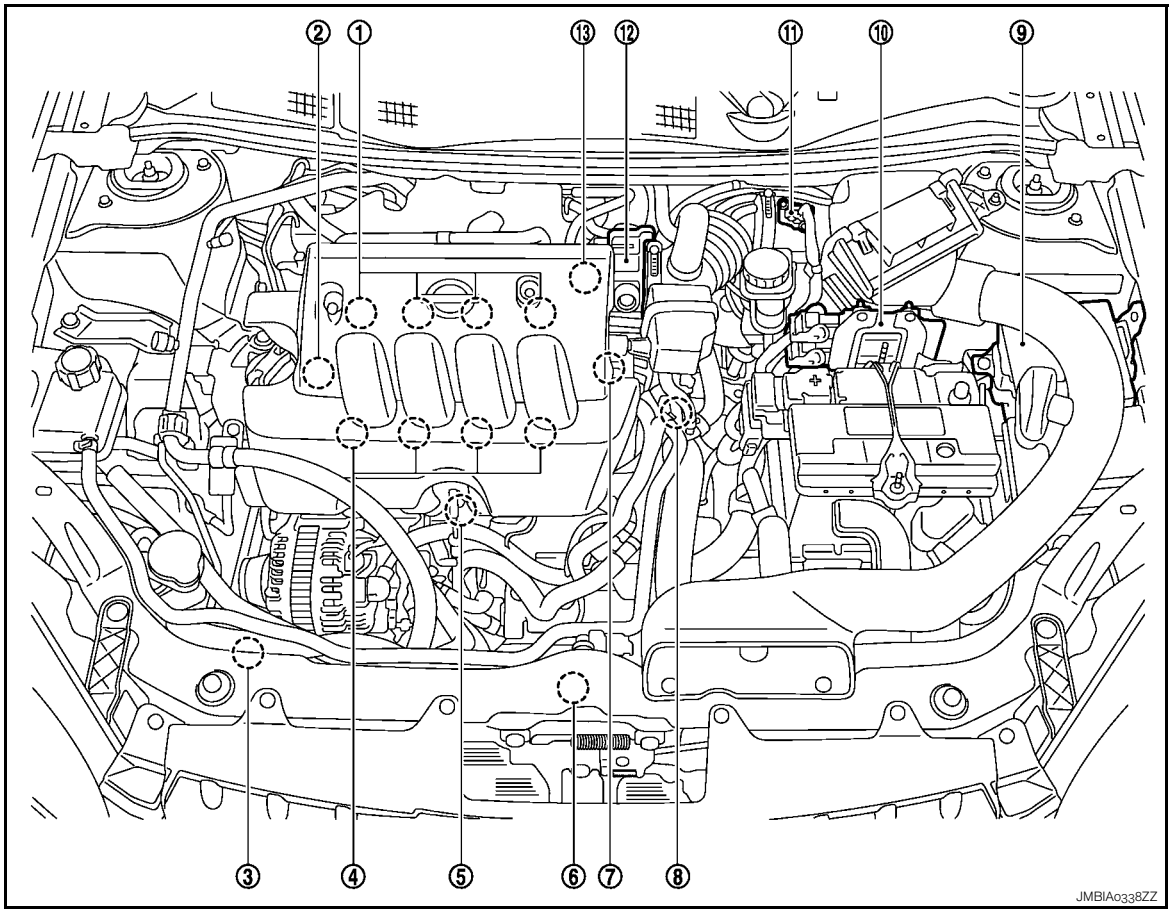
- Sequential Multiport Fuel Injection System
  Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.
- Simultaneous Multiport Fuel Injection System
  Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
  The four injectors will then receive the signals two times for each engine cycle.
  This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration, operation of the engine at excessively high speeds or operation of the vehicle at excessively high speeds.

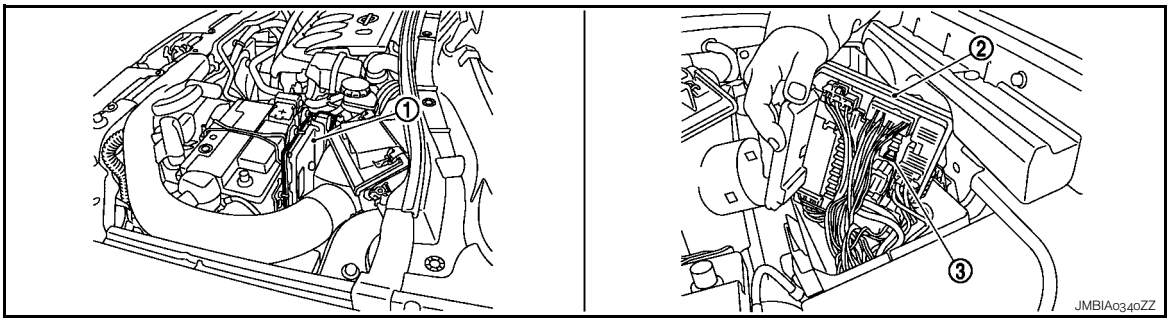
Component Parts Location

INFOID:0000000001115783



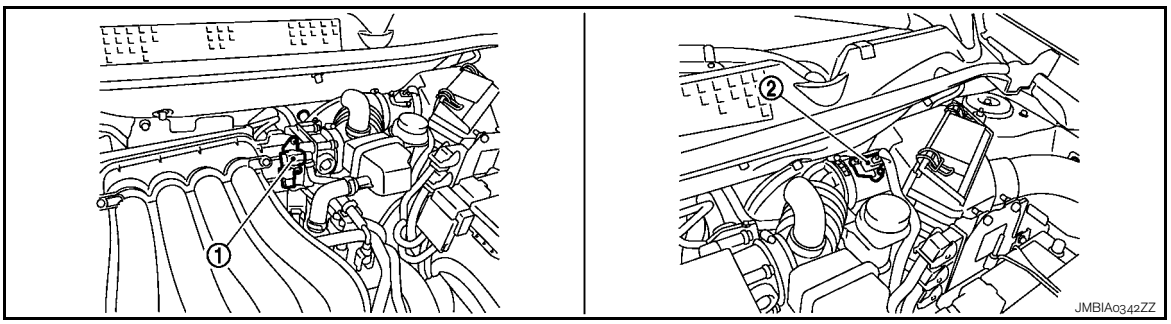
cardiagn.com

1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve



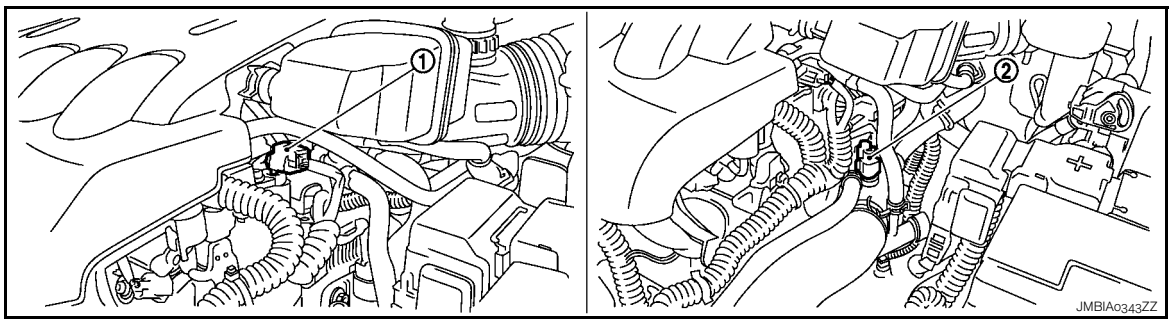
1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

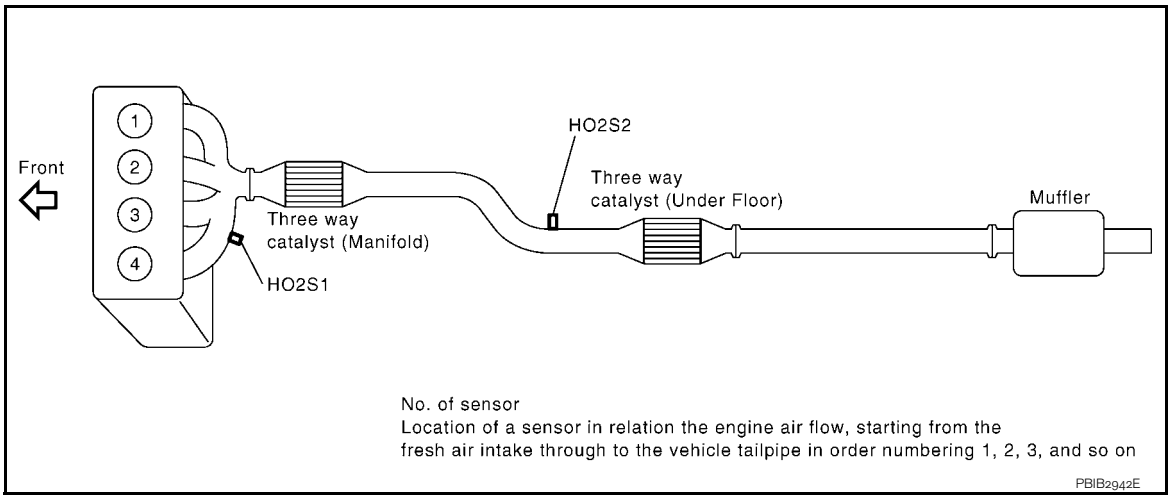


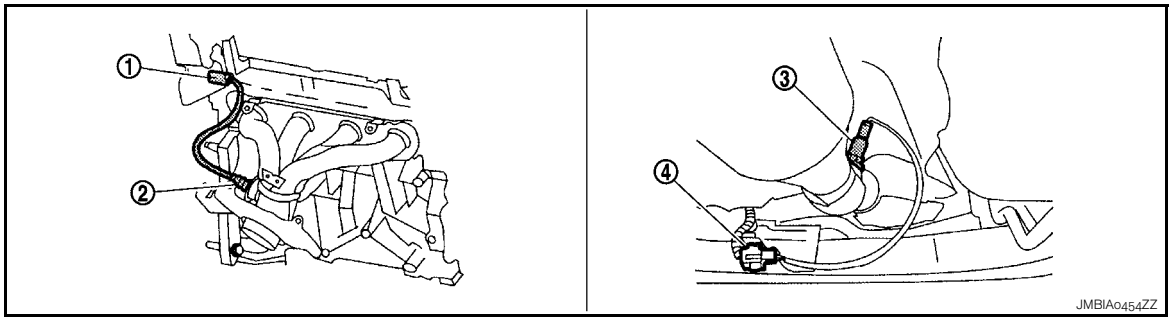
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)

cardiagn.com

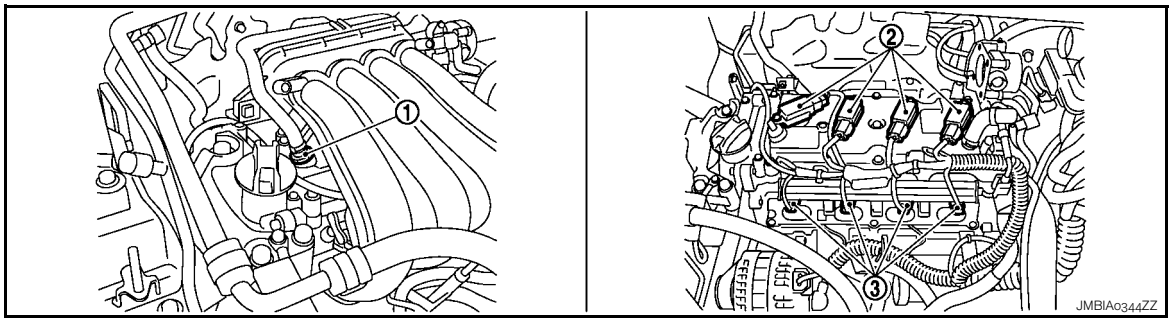


1. Camshaft position sensor
2. Engine coolant temperature sensor



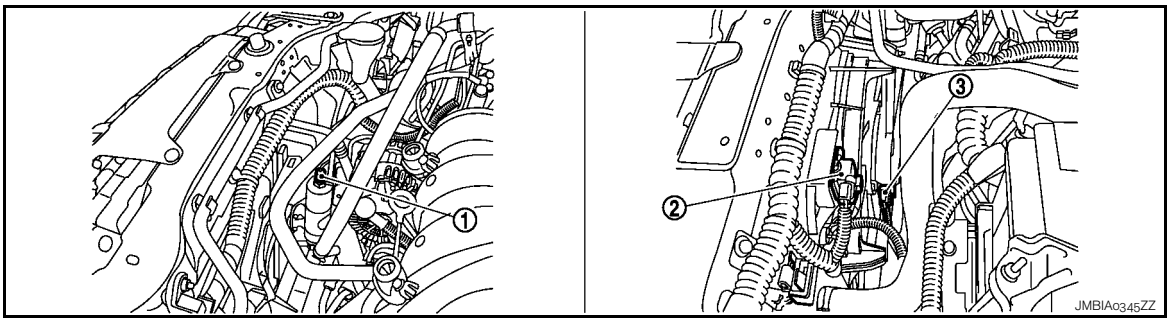


1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

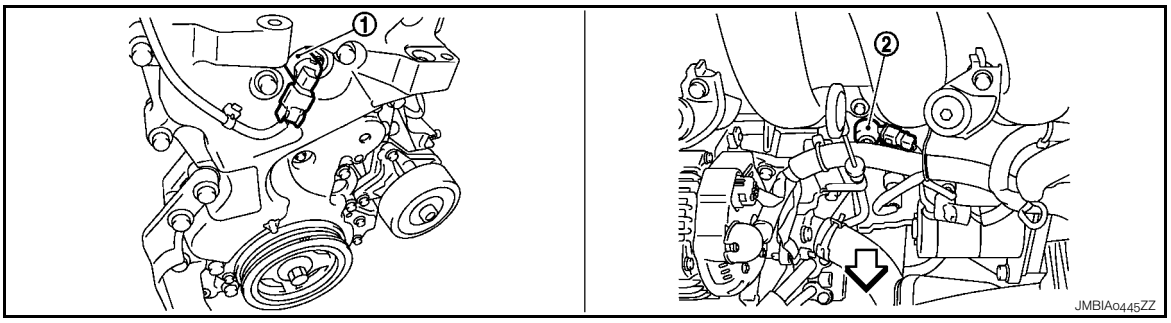


cardiagn.com

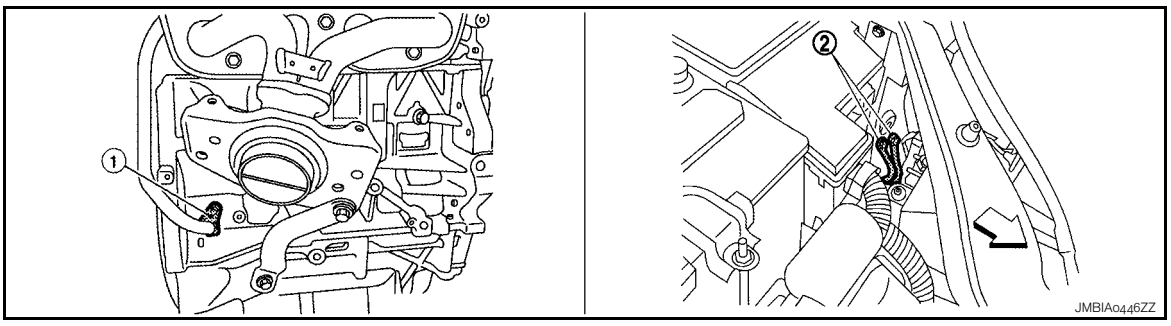
1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection



1. Refrigerant pressure sensor
2. Resister
3. Cooling fan motor

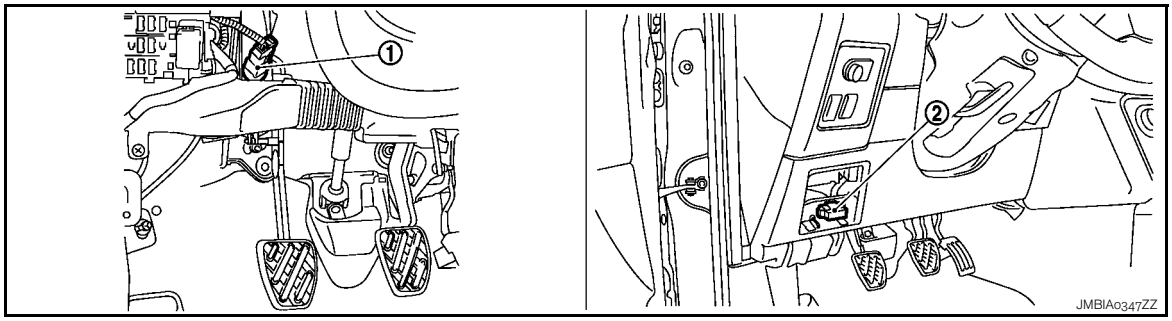


1. Intake valve timing control solenoid valve
2. Knock sensor

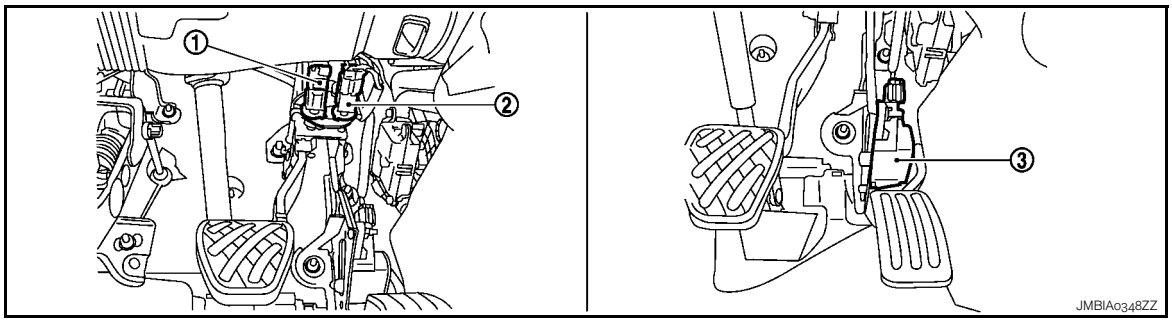


1. Crankshaft position sensor (POS)
2. Ground

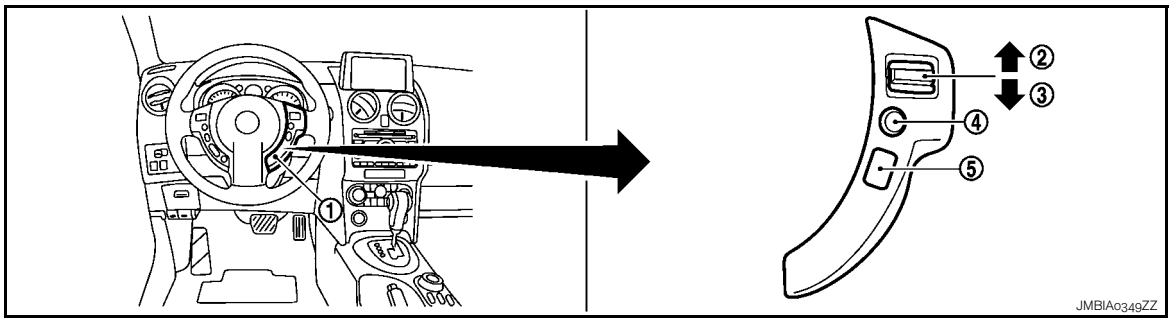
cardiagn.com



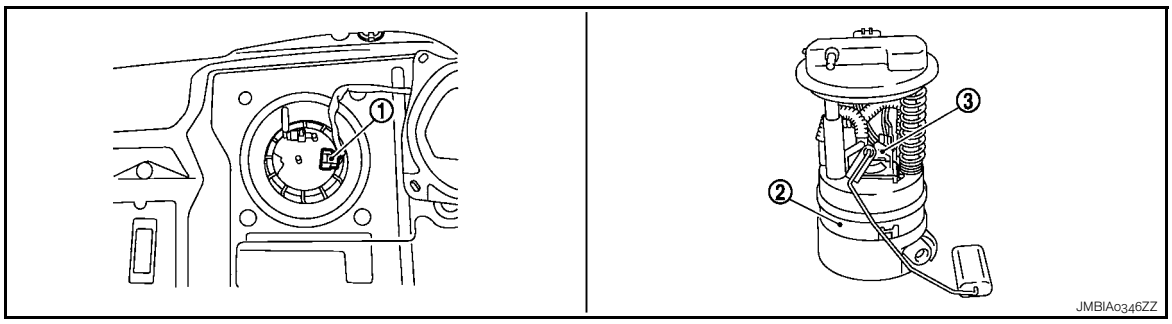
1. ASCD clutch switch
2. Data link connector



1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

cardiagn.com

Component Description

INFOID:0000000001094056

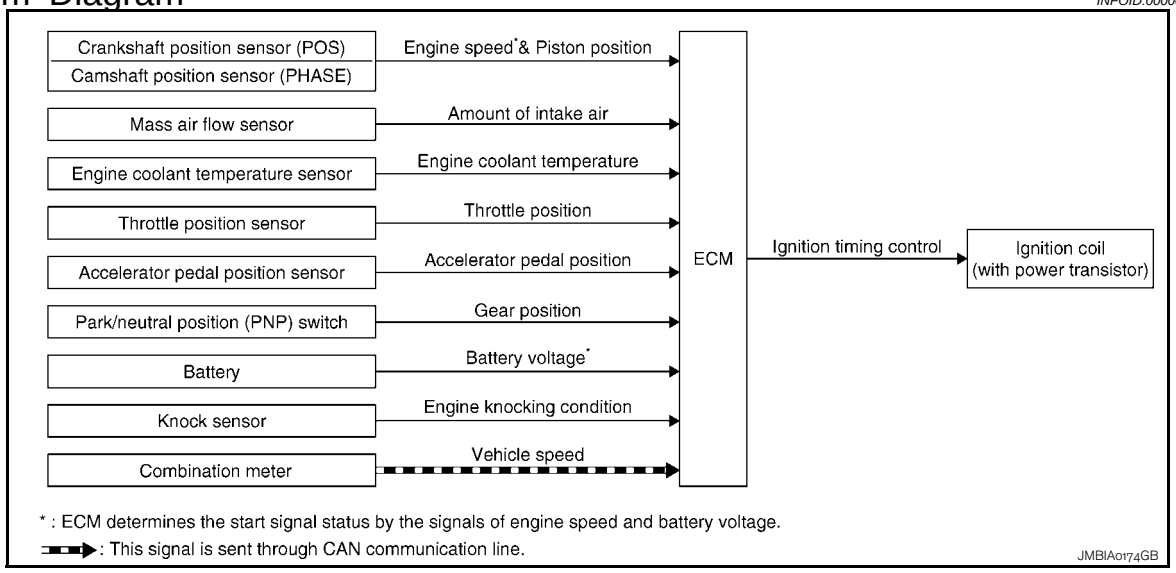
Component	Reference
Accelerator pedal position sensor	EC-909, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
Fuel injector	EC-923, "Description"
Heated oxygen sensor 1	EC-760, "Description"
Heated oxygen sensor 2	EC-778, "Description"
Intake air temperature sensor	EC-751, "Description"
Knock sensor	EC-807, "Description"
Mass air flow sensor	EC-746, "Description"
Park/neutral position (PNP) switch	EC-892, "Description"
Throttle position sensor	EC-757, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

ELECTRIC IGNITION SYSTEM

System Diagram

INFOID:0000000001094057



System Description

INFOID:0000000001094058

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2 Piston position	Ignition timing control	Ignition coil (with power transistor)
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking condition		
Park/neutral position (PNP) switch	Gear position		
Combination meter*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM.

The ECM receives information such as the injection pulse width and camshaft position sensor (PHASE) signal. Computing this information, ignition signals are transmitted to the power transistor.

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

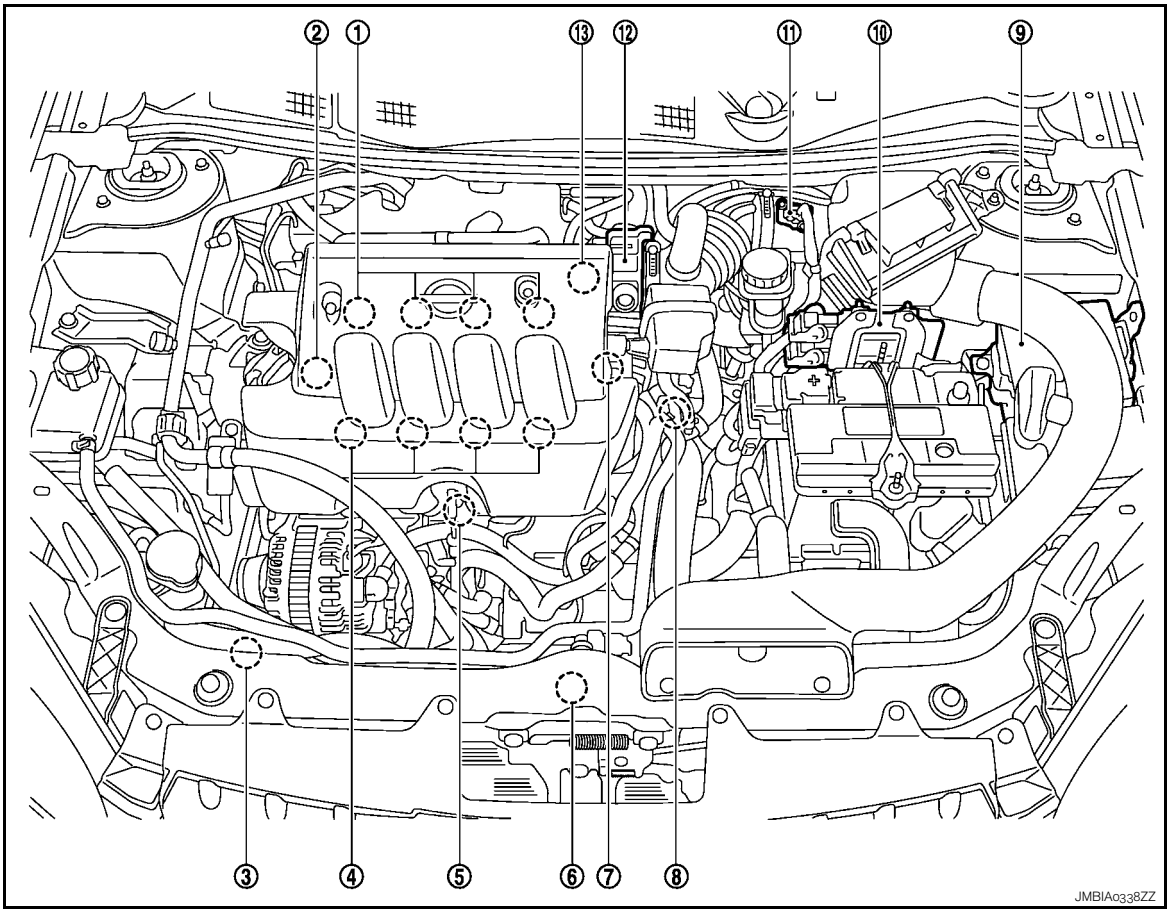
The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not

cardiagn.com

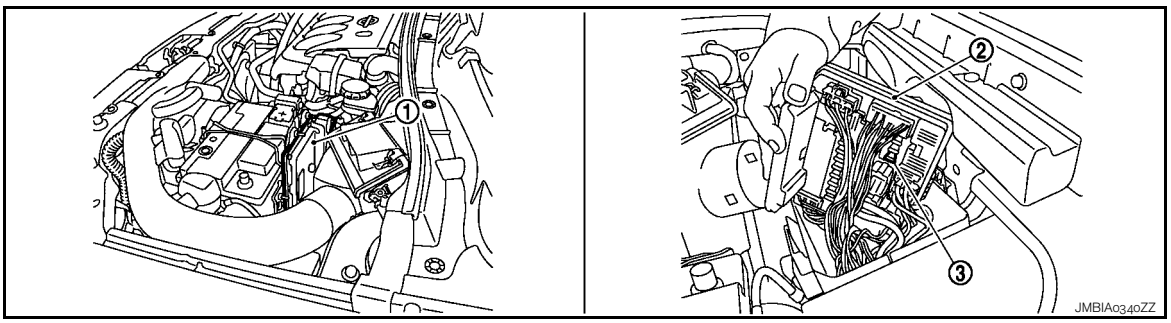
operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Component Parts Location

INFOID:0000000001115784

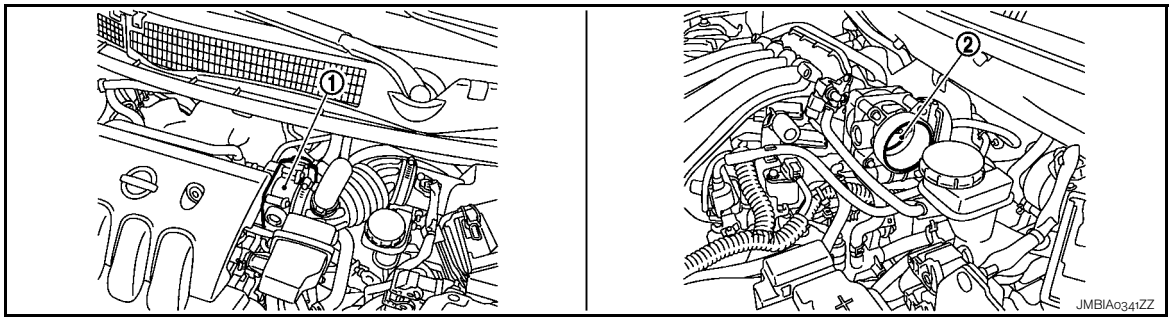


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

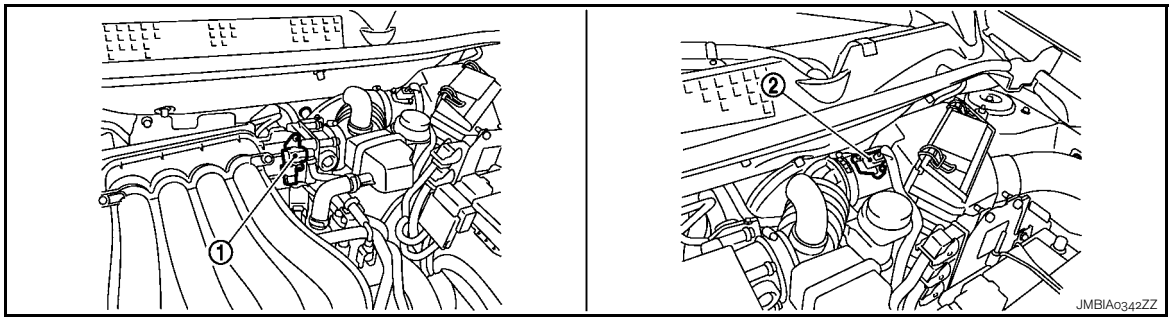


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

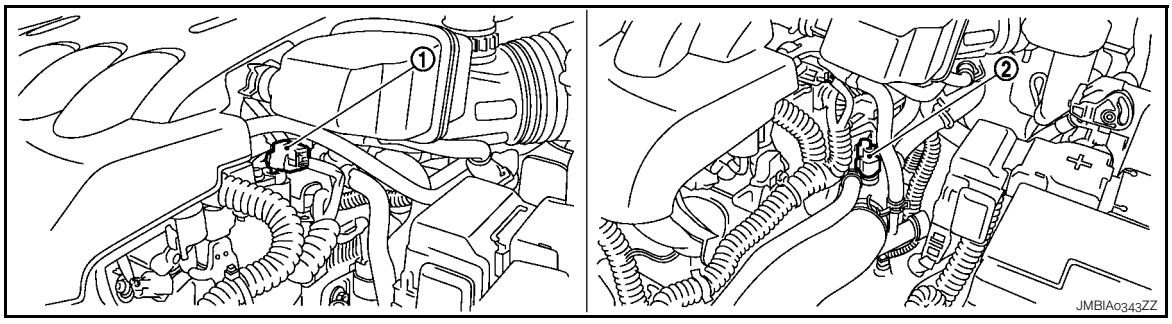
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

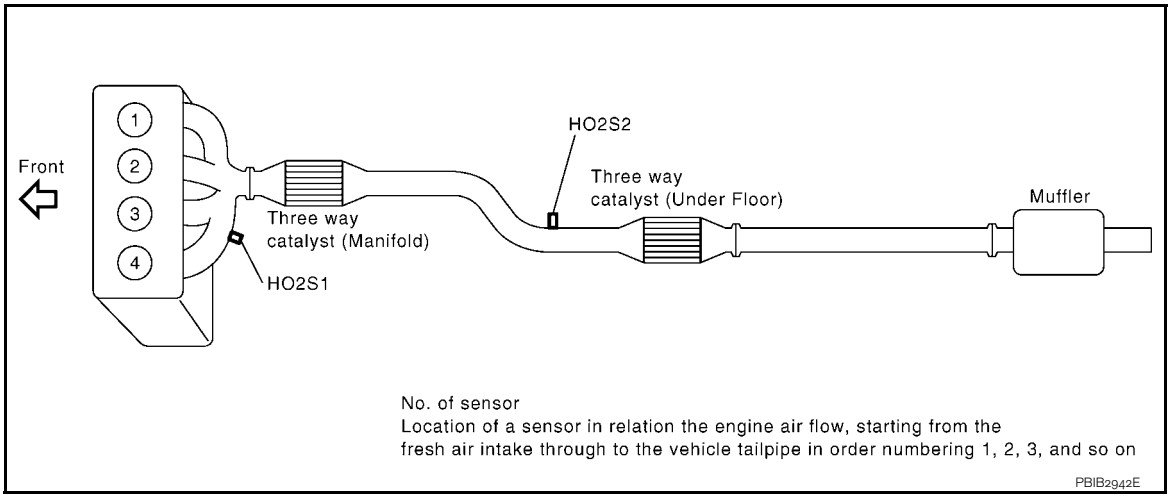


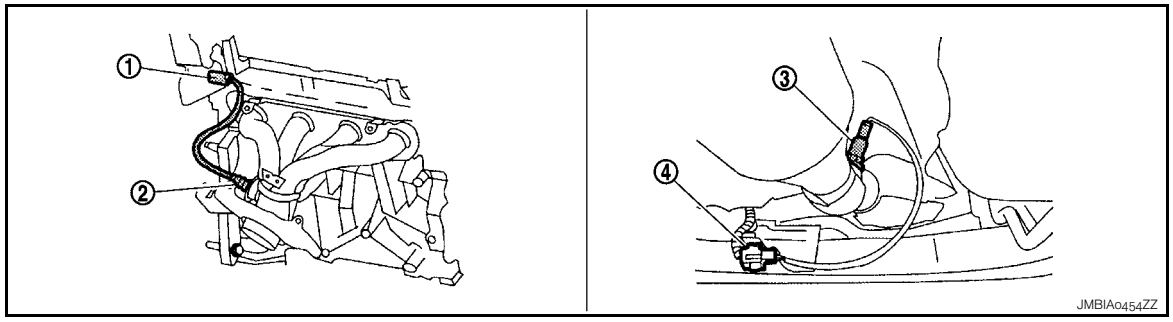
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



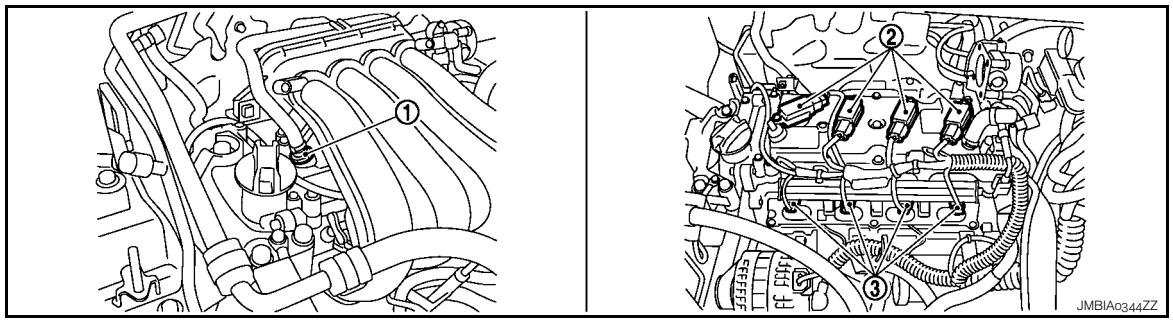
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

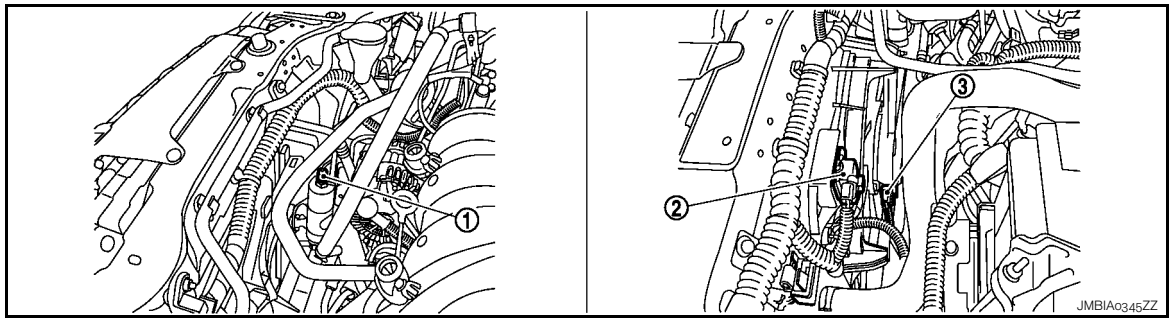




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

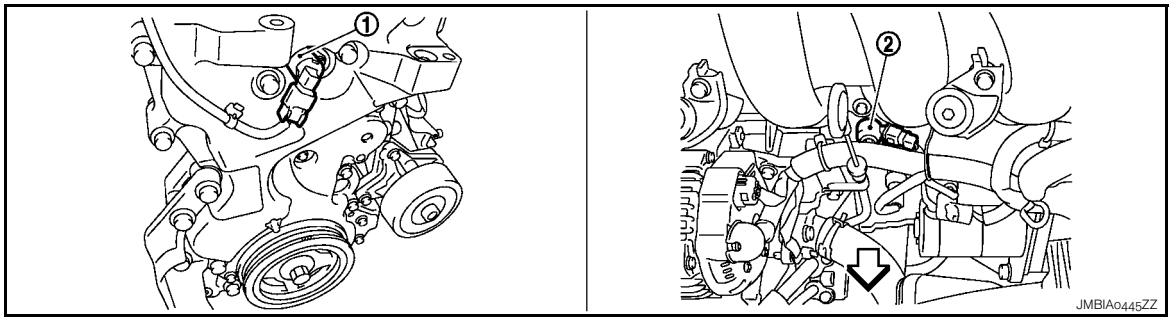


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

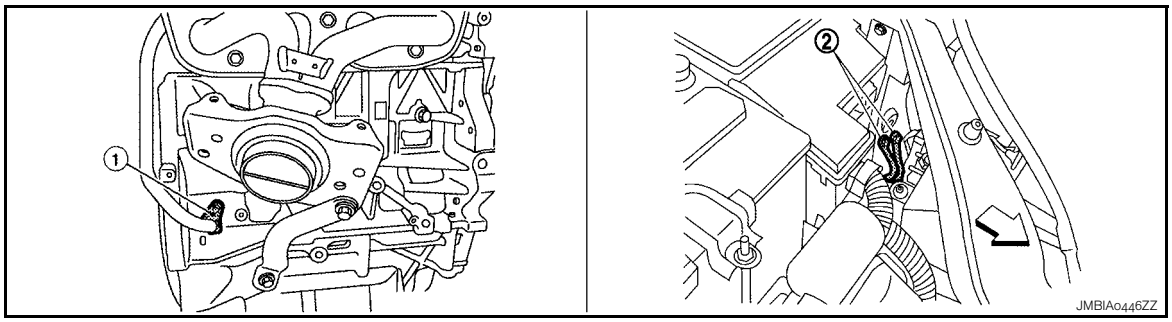


cardiagn.com

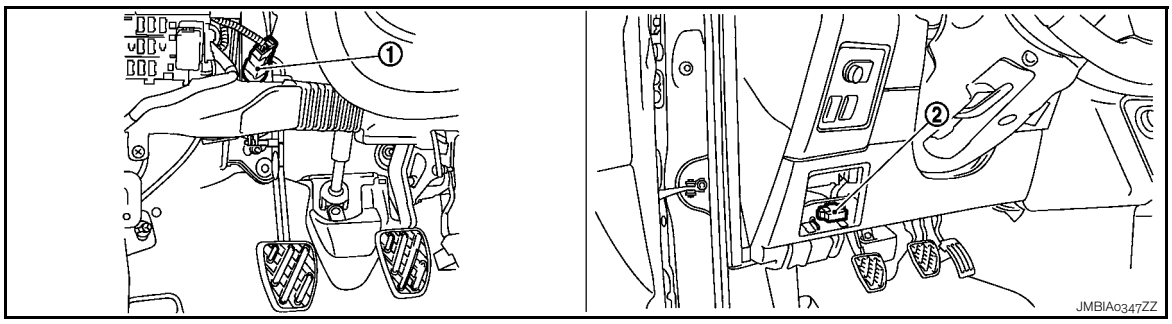
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



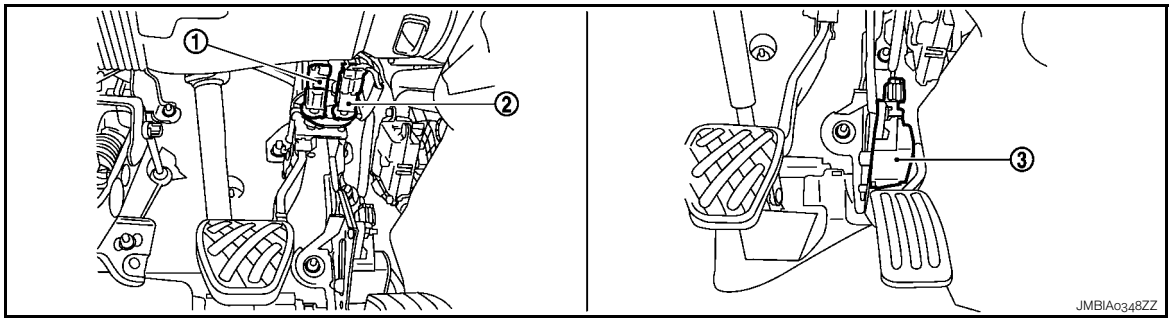
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

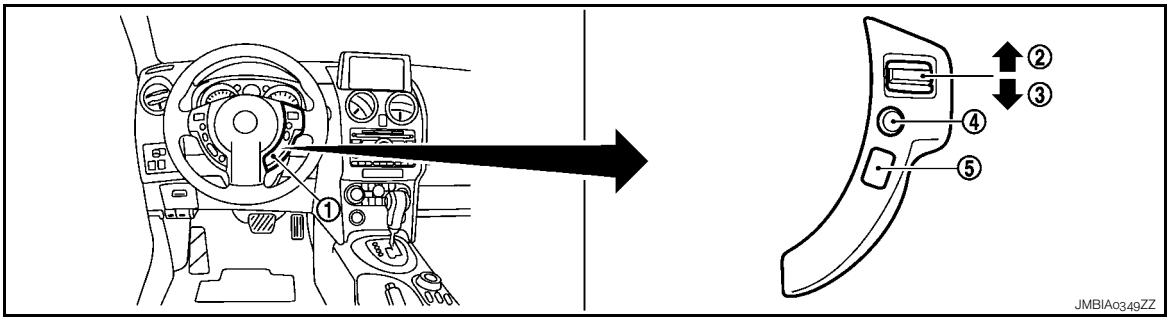


1. ASCD clutch switch 2. Data link connector

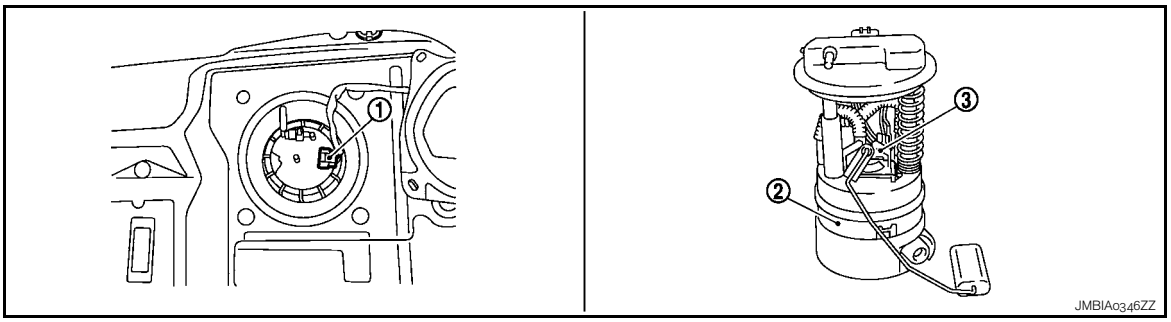


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000001094060

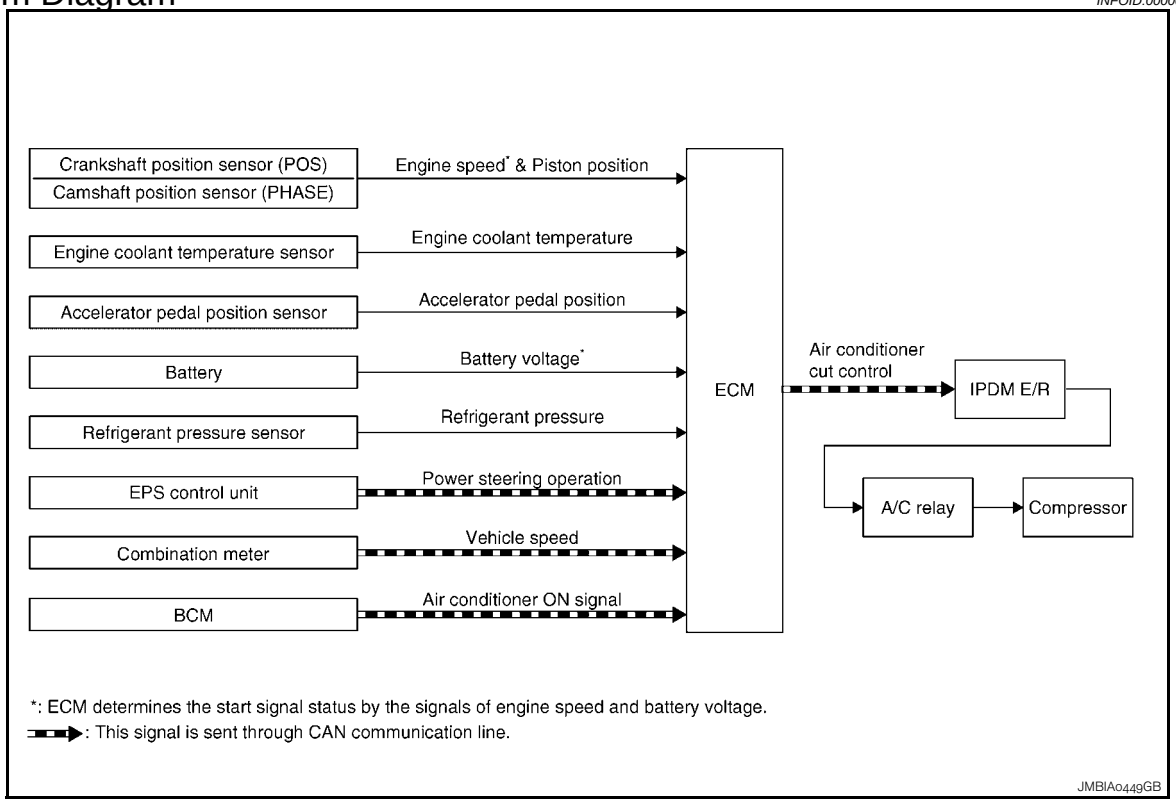
Component	Reference
Accelerator pedal position sensor	EC-909, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
Ignition signal	EC-929, "Description"
Knock sensor	EC-807, "Description"
Mass air flow sensor	EC-746, "Description"
Park/neutral position (PNP) switch	EC-892, "Description"
Throttle position sensor	EC-757, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

AIR CONDITIONING CUT CONTROL

System Diagram

INFOID:0000000001094061



System Description

INFOID:0000000001094062

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch*1	Air conditioner ON signal	Air conditioner cut control	IPDM E/R ↓ Air conditioner relay ↓ Compressor
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Refrigerant pressure sensor	Refrigerant pressure		
EPS control unit*1	Power steering operation		
Combination meter*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

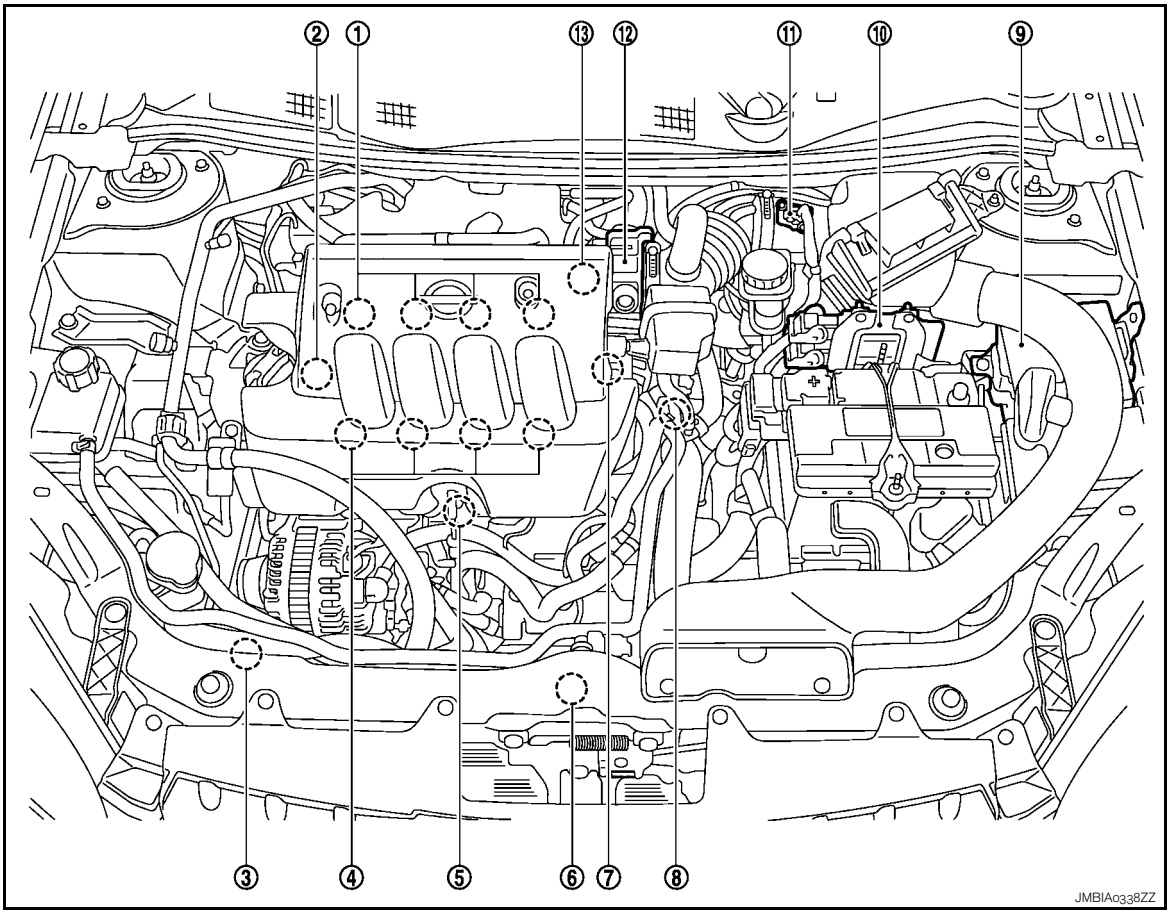
This system improves engine operation when the air conditioner is used.
Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

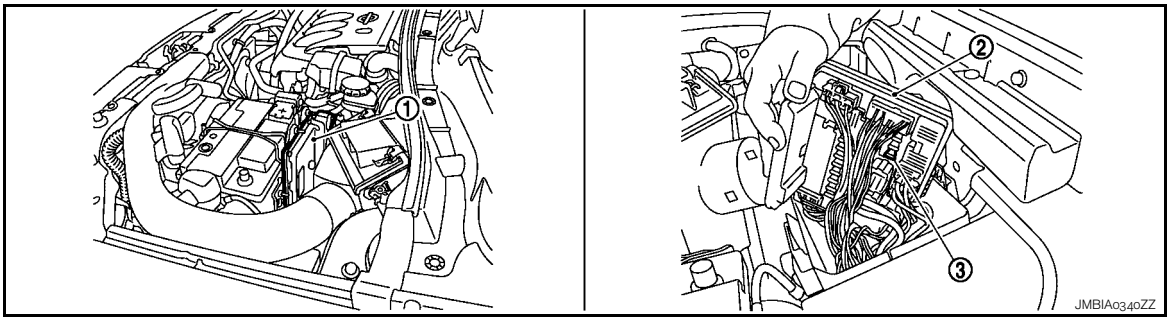
cardiagn.com

Component Parts Location

INFOID:0000000001115785

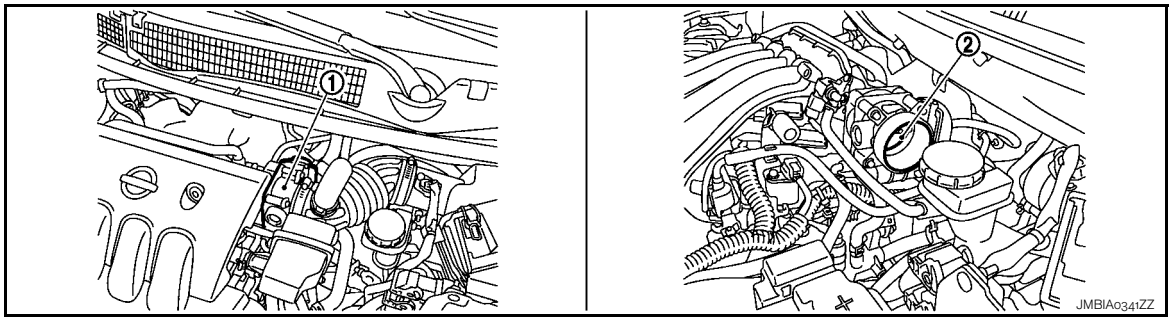


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

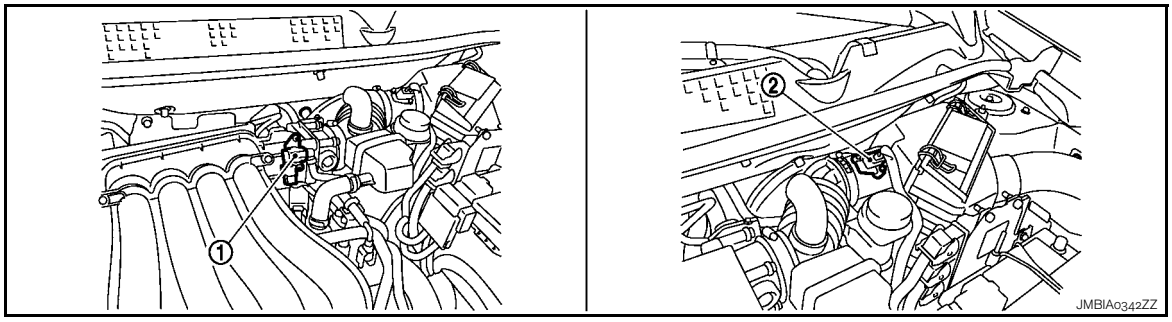


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

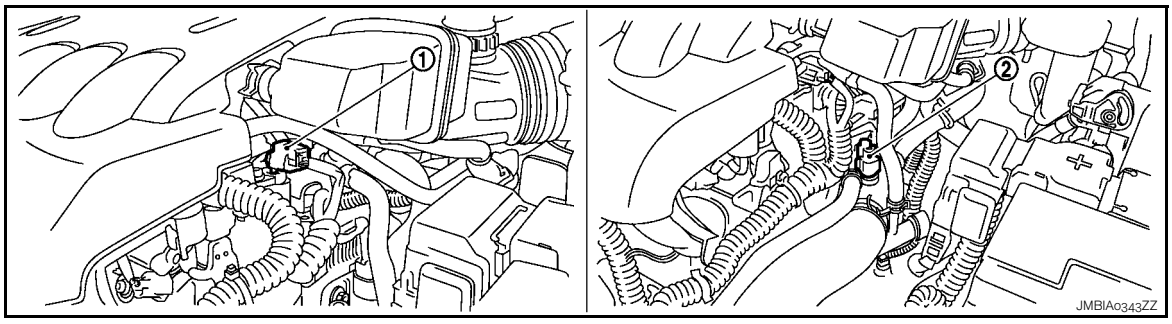
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

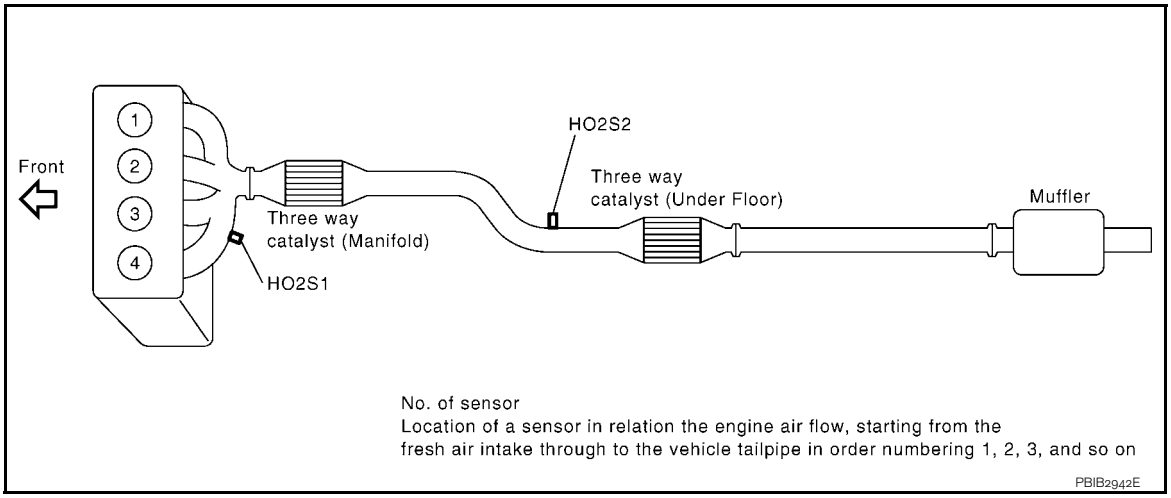


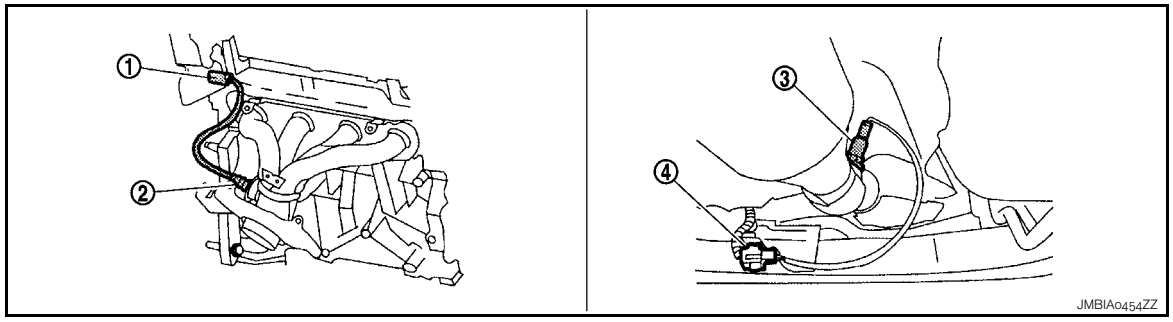
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



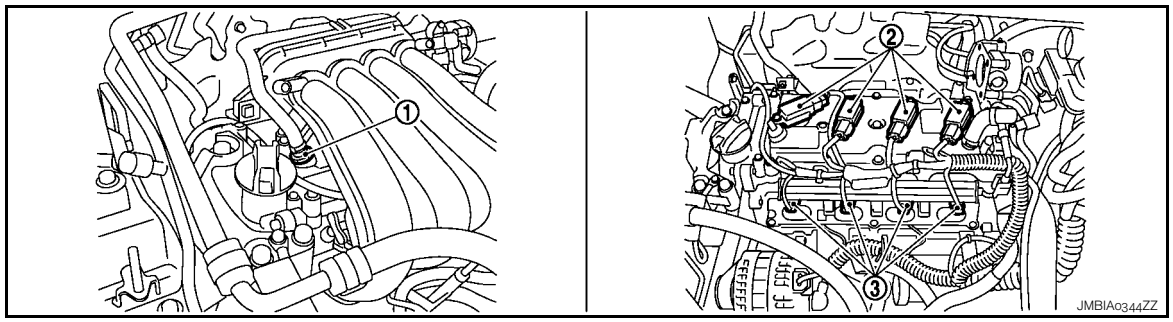
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

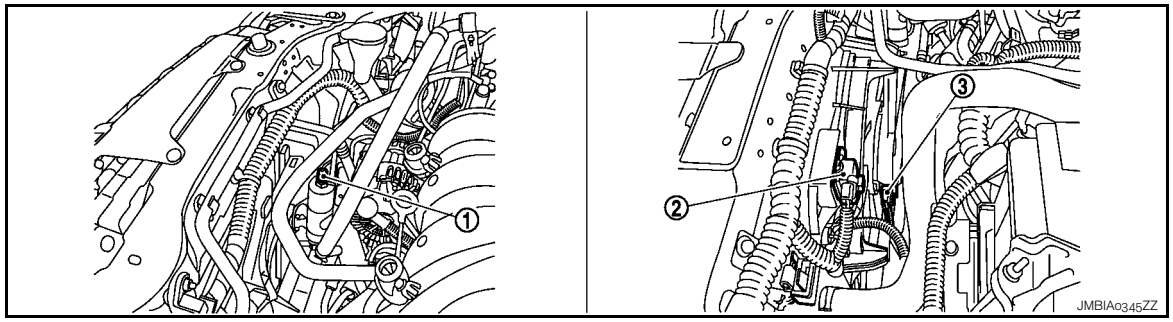




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

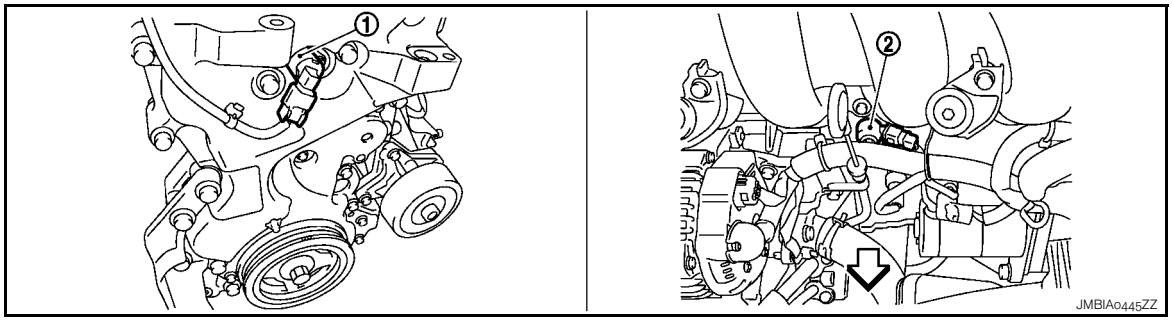


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

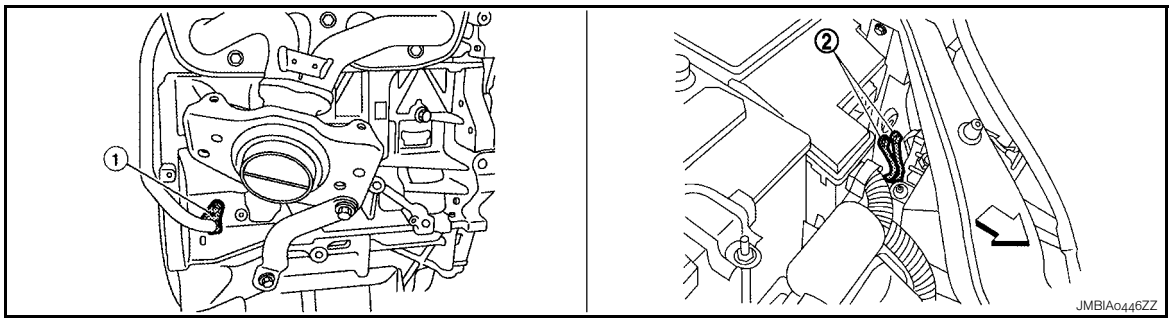


cardiagn.com

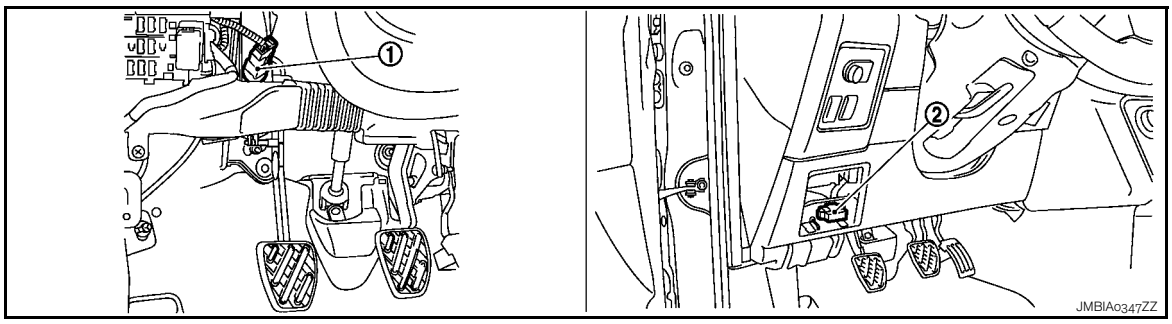
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



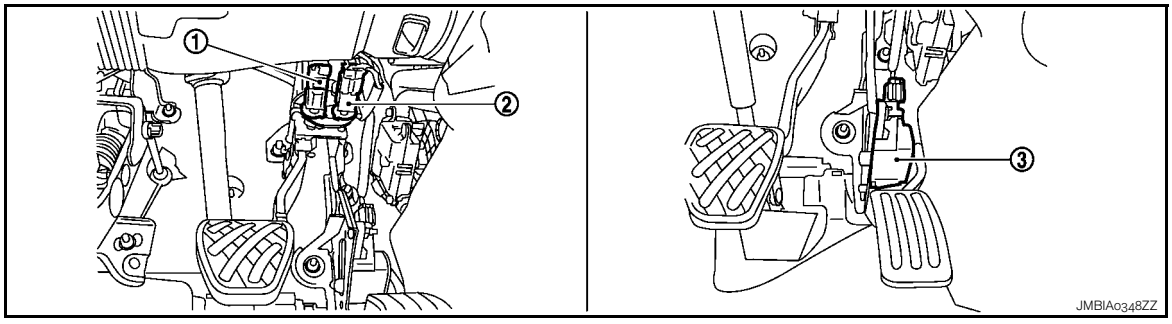
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

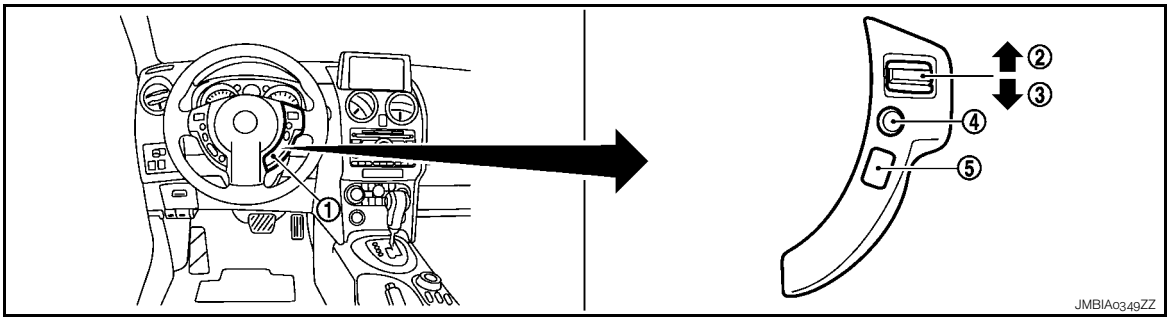


1. ASCD clutch switch 2. Data link connector

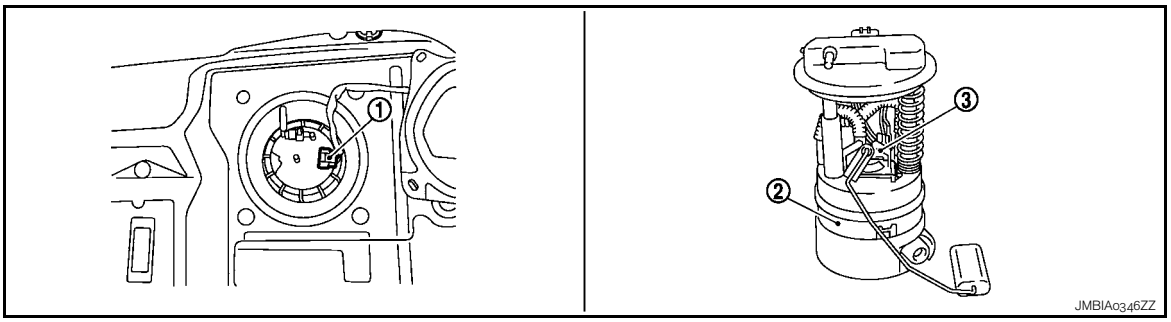


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000001094064

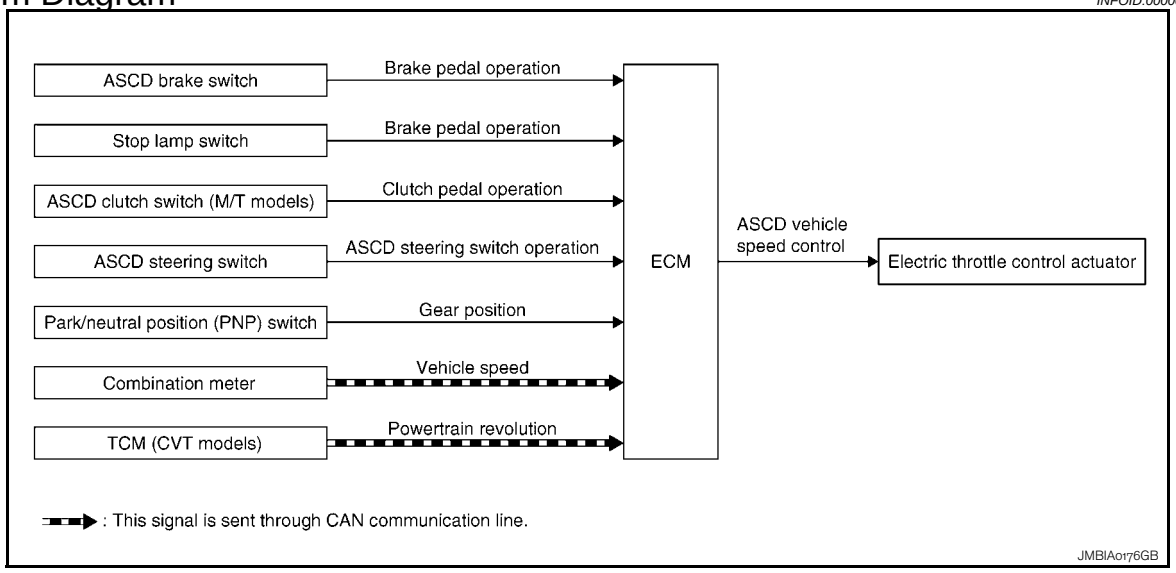
Component	Reference
Accelerator pedal position sensor	EC-899, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
Refrigerant pressure sensor	EC-936, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Diagram

INFOID:0000000001094065



System Description

INFOID:0000000001094066

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch			
ASCD clutch switch (M/T models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/neutral position (PNP) switch	Gear position		
Combination meter*	Vehicle speed		
TCM* (CVT models)	Powertrain revolution		

*: This signal is sent to the ECM through CAN communication line

BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.
Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 180 km/h (112 MPH).
ECM controls throttle angle of electric throttle control actuator to regulate engine speed.
Operation status of ASCD is indicated by CRUISE lamp and SET lamp in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.
NOTE:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

SET OPERATION

Press MAIN switch. (The CRUISE lamp in combination meter illuminates.)
When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 180 km/h (112 MPH), press SET/COAST switch. (Then SET lamp in combination meter illuminates.)

ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is pressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.
And then ASCD will keep the new set speed.

CANCEL OPERATION

cardiagn.com

When any of following conditions exist, cruise operation will be canceled.
- CANCEL switch is pressed
- More than 2 switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to neutral position. (M/T models)
- Selector lever is changed to N, P, R position (CVT models)
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.
- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.
  When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ ACCELERATE switch.
- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

COAST OPERATION

When the SET/COAST switch is pressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

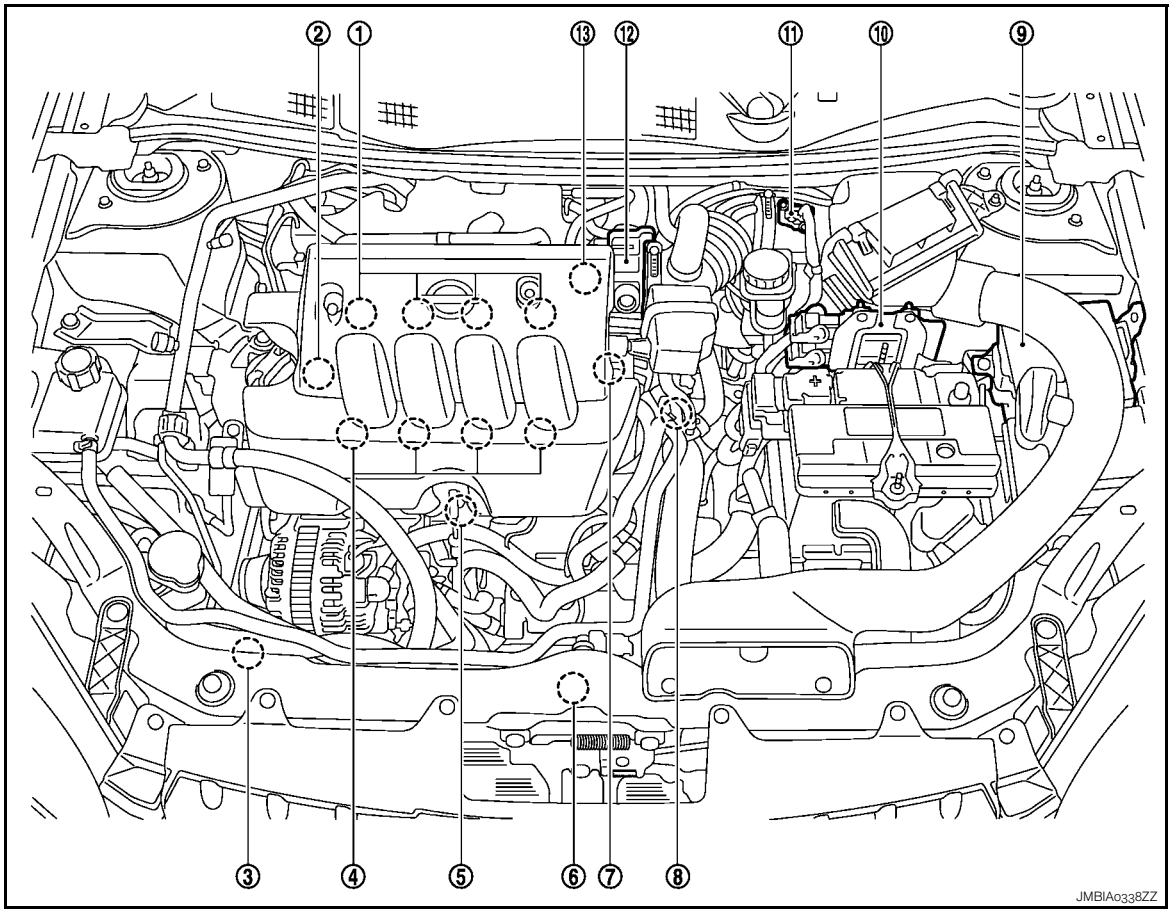
RESUME OPERATION

When the RESUME/ACCELERATE switch is pressed after cancel operation other than pressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.
- Brake pedal is released
- Clutch pedal is released (M/T models)
- Selector lever is in other than P and N positions (CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 180 km/h (112 MPH)

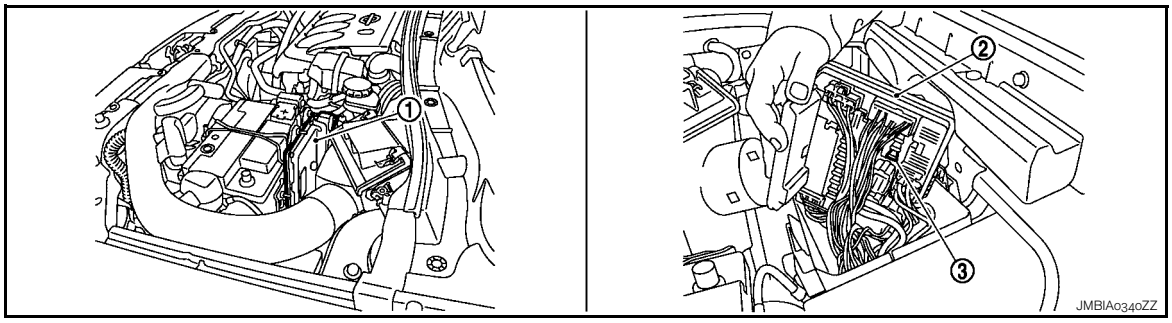
Component Parts Location

INFOID:0000000001115786

cardiagn.com

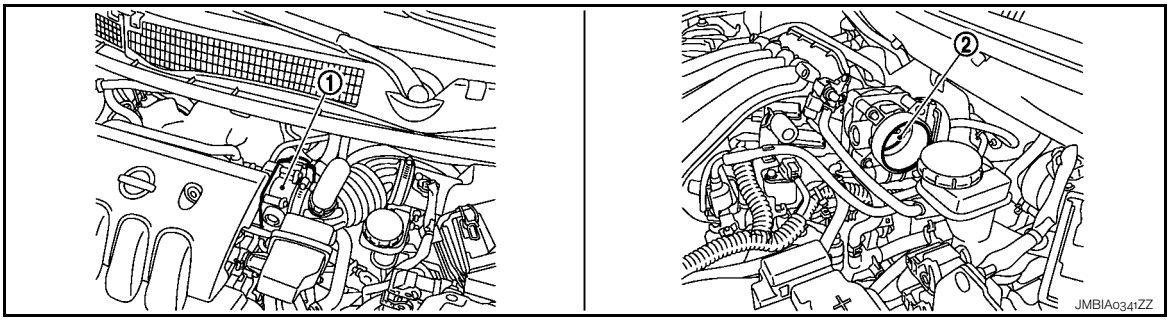


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

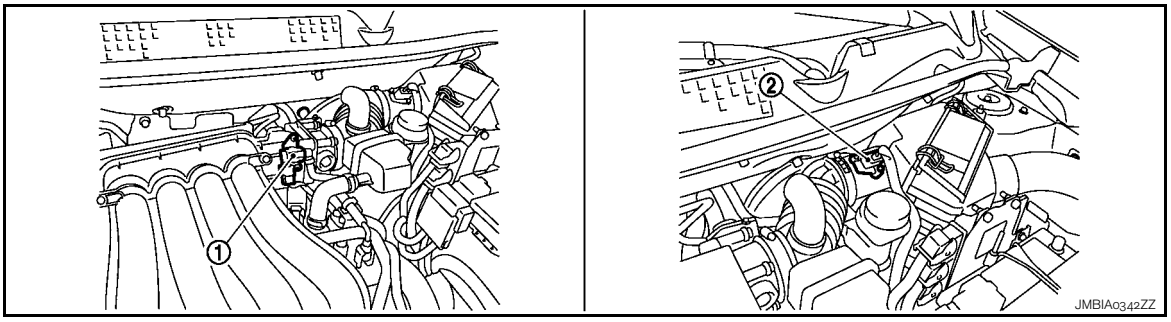


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

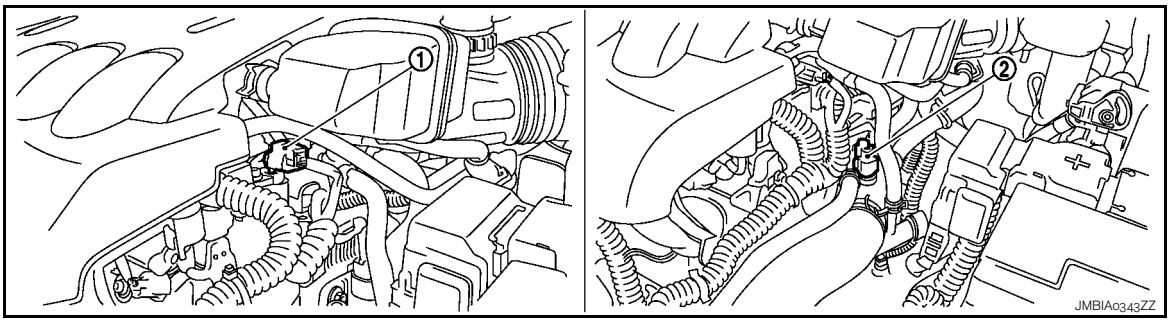
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

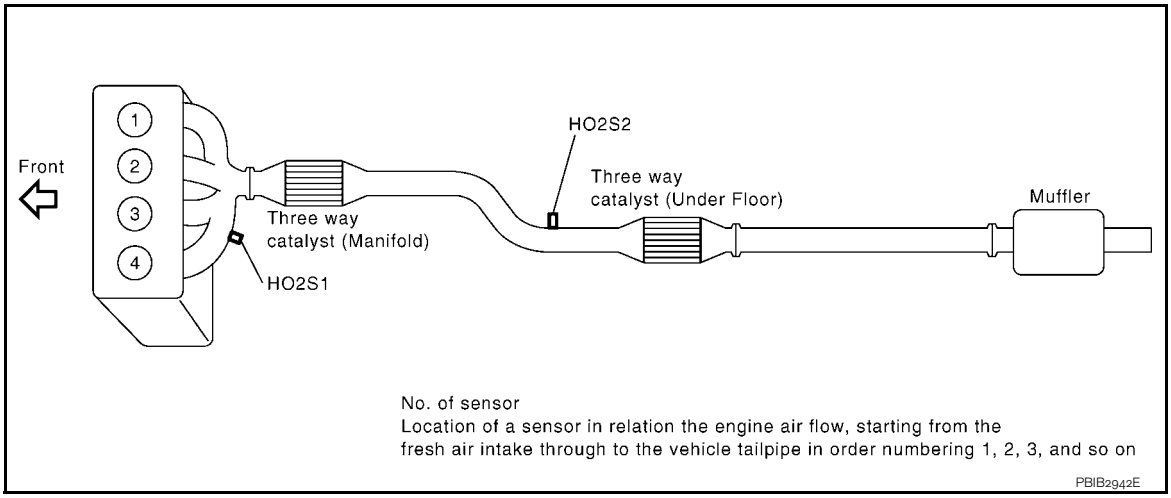


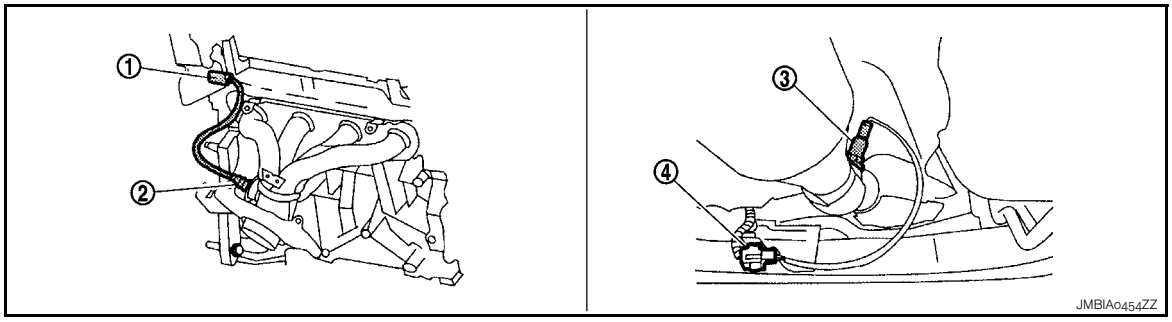
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



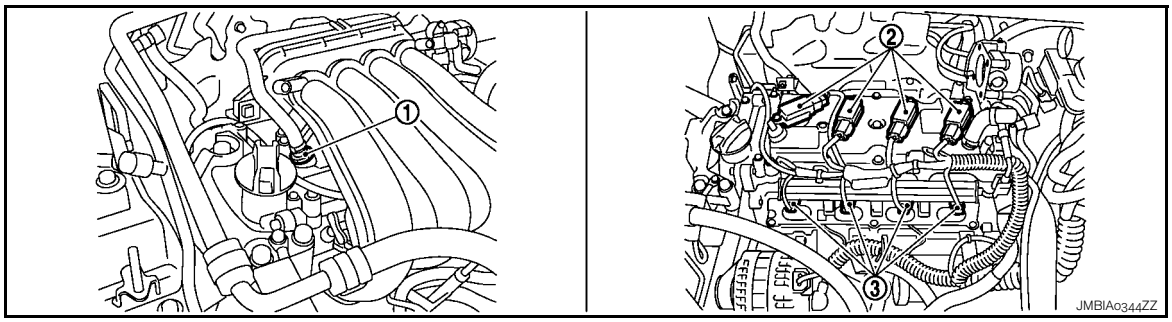
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

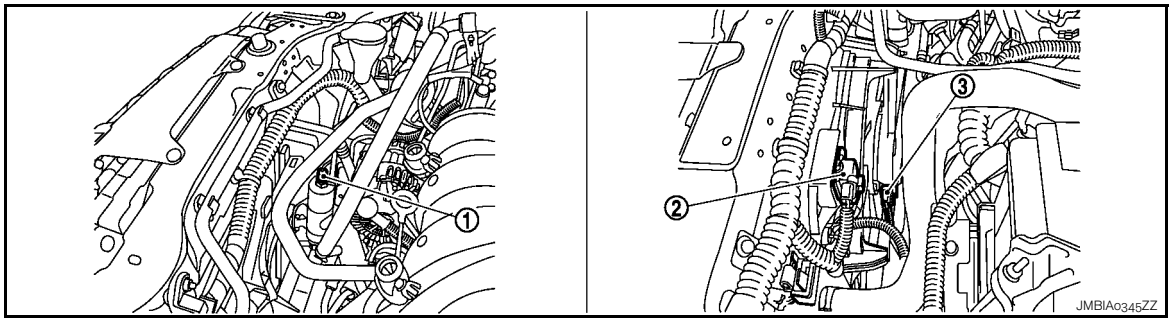




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

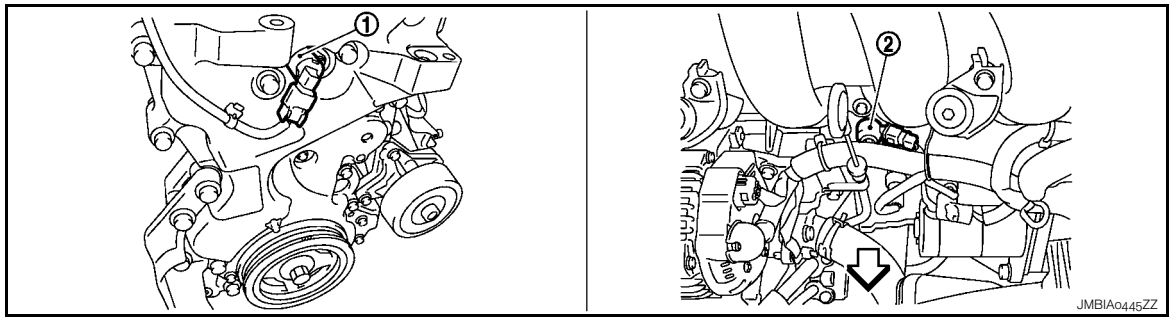


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

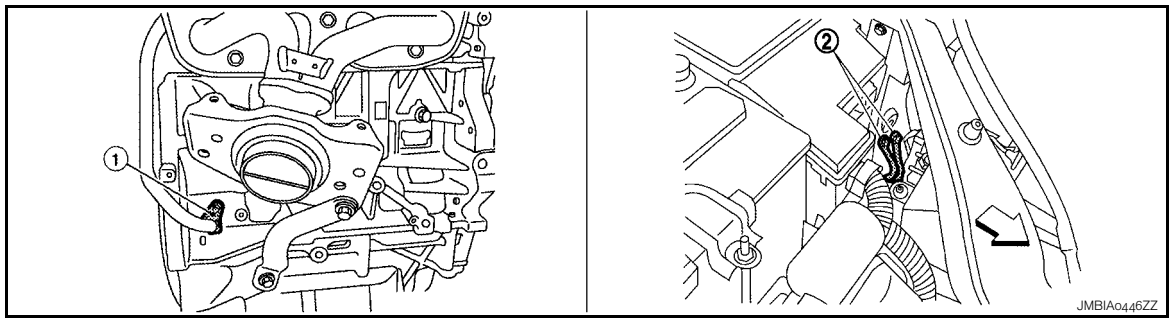


cardiagn.com

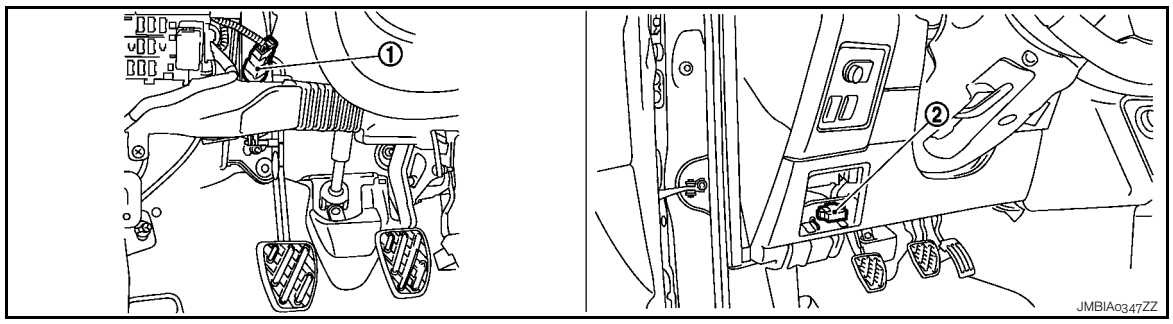
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



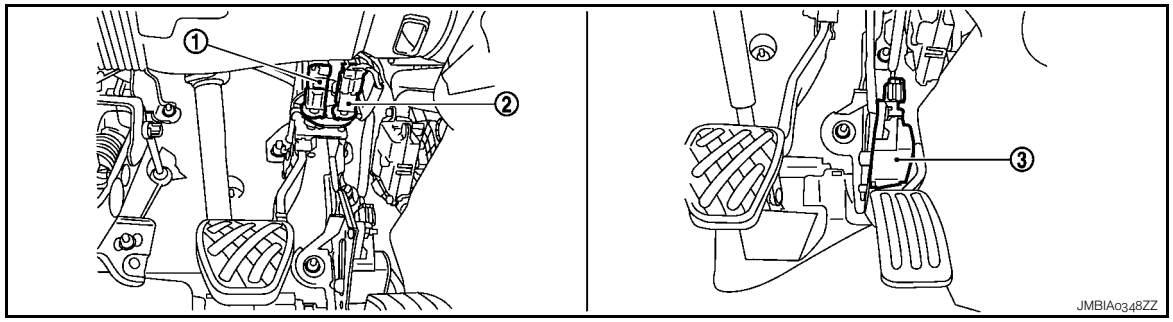
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

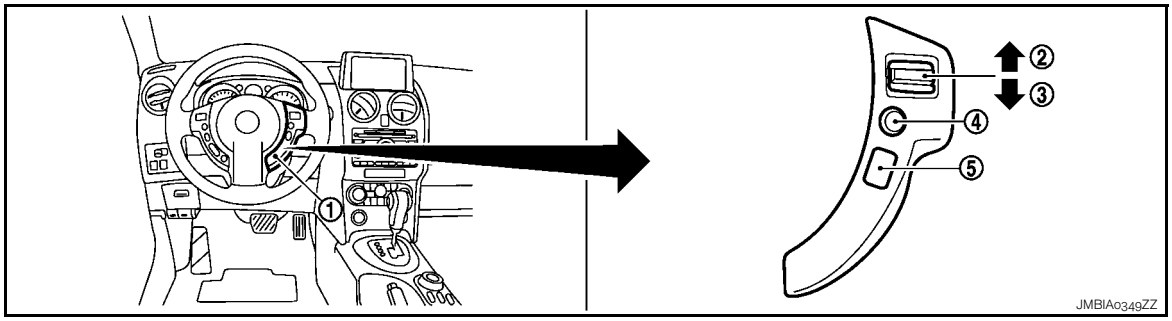


1. ASCD clutch switch 2. Data link connector

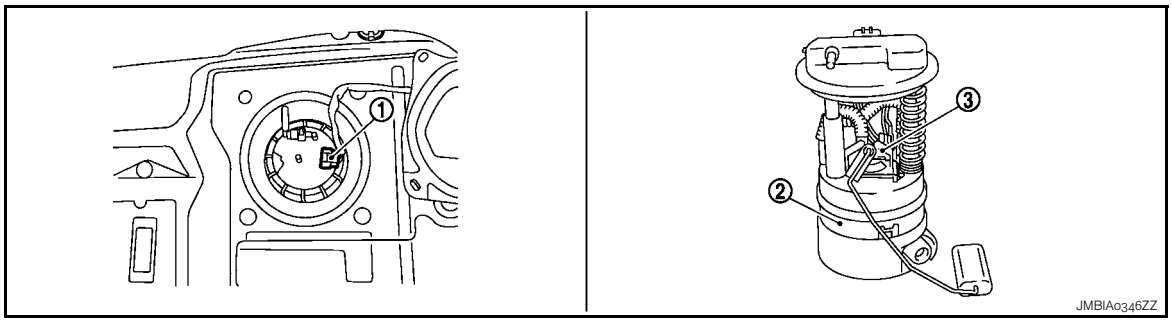


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000001094068

Component	Reference
ASCD steering switch	EC-880, "Description"
ASCD clutch switch	EC-883, "Description"
ASCD brake switch	EC-883, "Description"
ASCD indicator	EC-917, "Description"
Stop lamp switch	EC-896, "Description"
Electric throttle control actuator	EC-832, "Description"

cardiagn.com

CAN COMMUNICATION

System Description

INFOID:0000000001094069

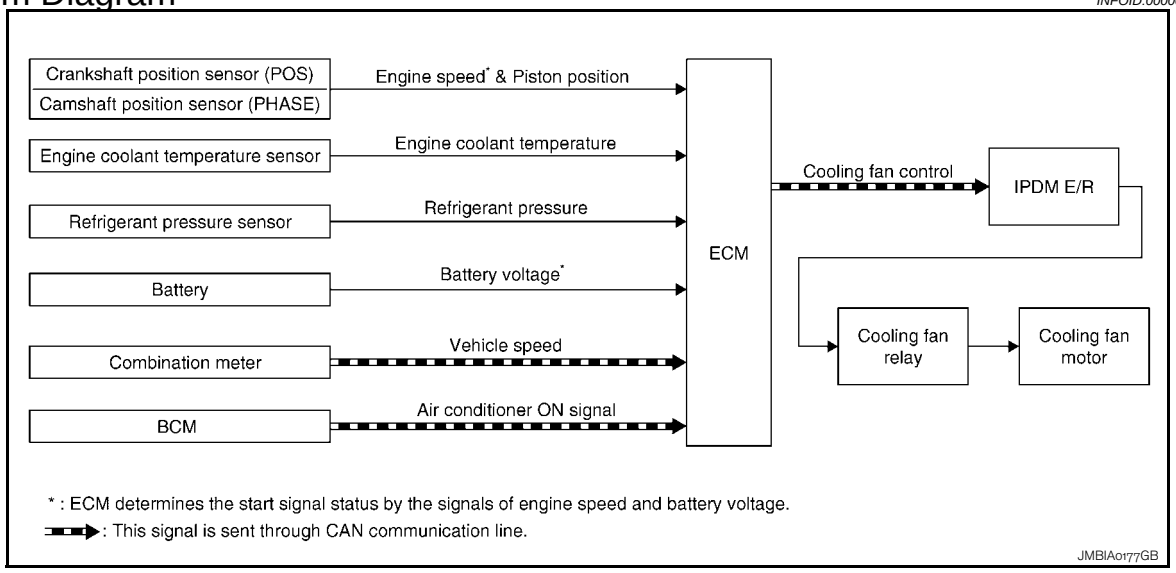
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
Refer to LAN-59, "CAN Communication Signal Chart", about CAN communication for detail..

cardiagn.com

COOLING FAN CONTROL

System Diagram

INFOID:0000000001094070



System Description

INFOID:0000000001094071

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	IPDM E/R ↓ Cooling fan relay ↓ Cooling fan motor
Battery	Battery voltage*1		
Combination meter	Vehicle speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
BCM	Air conditioner ON signal*2		
Refrigerant pressure sensor	Refrigerant pressure		

*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

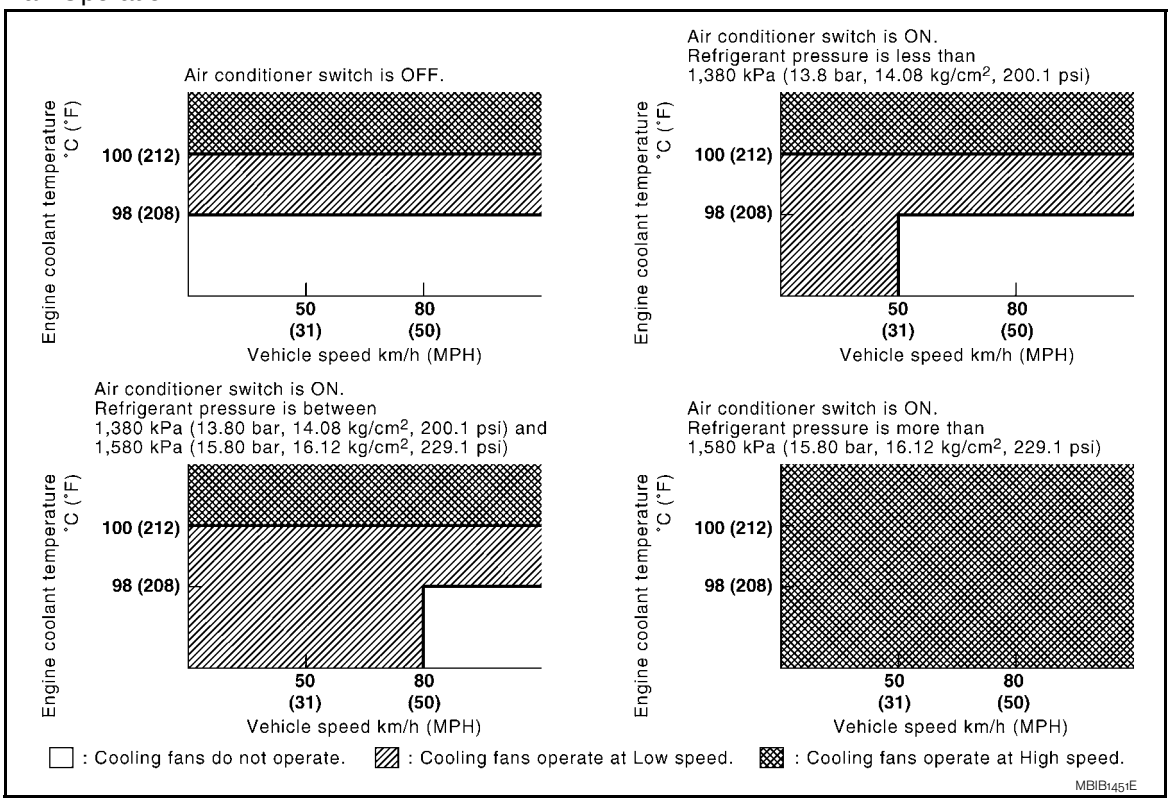
*2: This signal is sent to ECM through CAN communication line.

SYSTEM DESCRIPTION

ECM controls cooling fan speed corresponding to vehicle speed, engine coolant temperature, refrigerant pressure, air conditioner ON signal. Then control system has 3-step control [HIGH/LOW/OFF].

cardiagn.com

Cooling Fan Operation



Cooling Fan Relay Operation

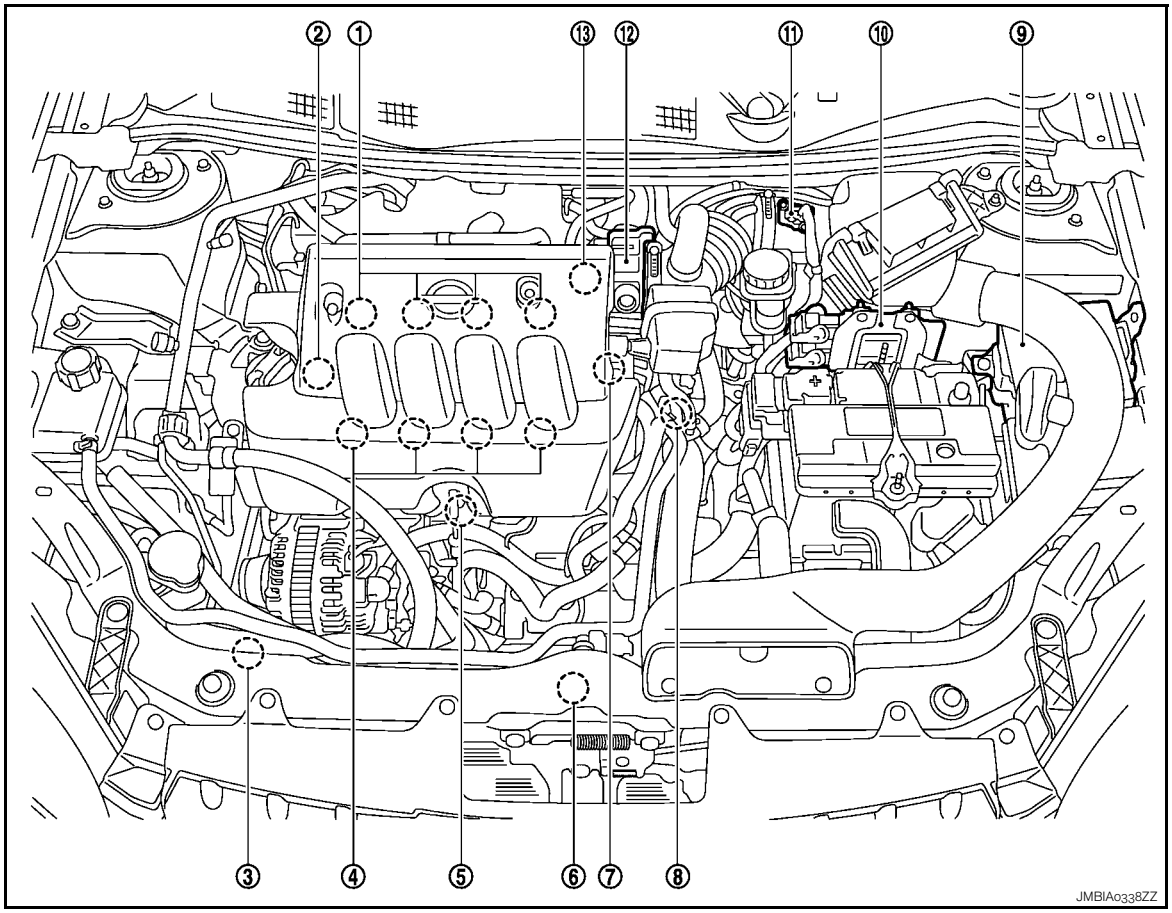
The ECM controls cooling fan relays through CAN communication line.

Cooling fan speed	Cooling fan relay	
	1	3
Stop (OFF)	OFF	OFF
Low (LOW)	ON	OFF
High (HI)	OFF	ON

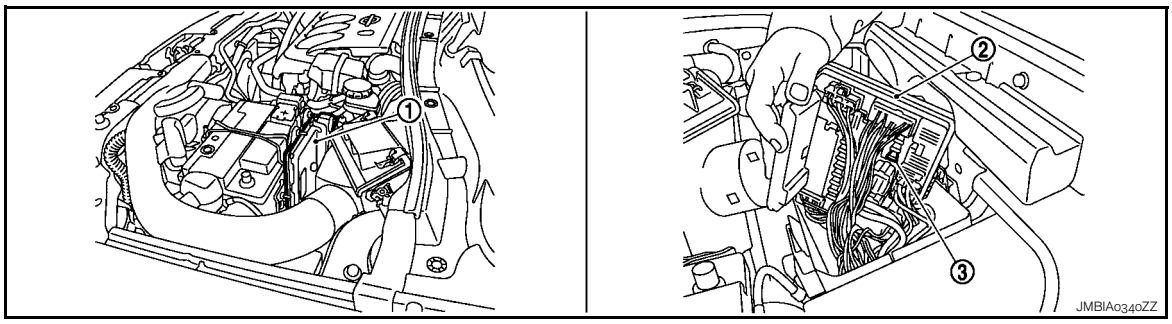
Component Parts Location

INFOID:0000000001115787

cardiagn.com

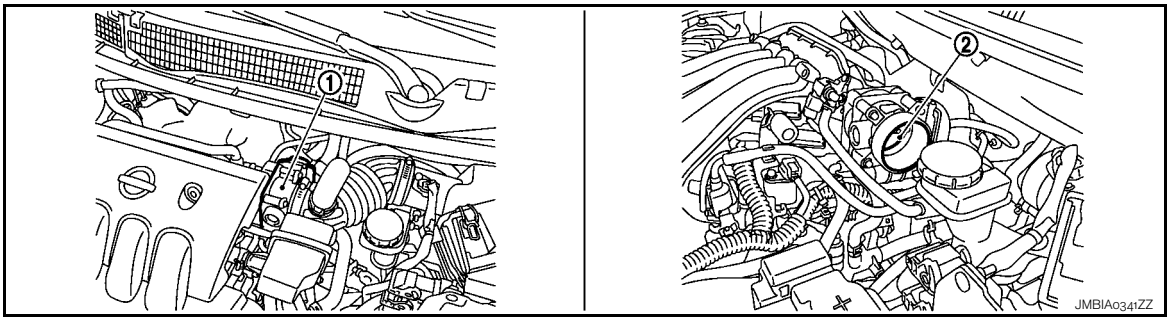


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

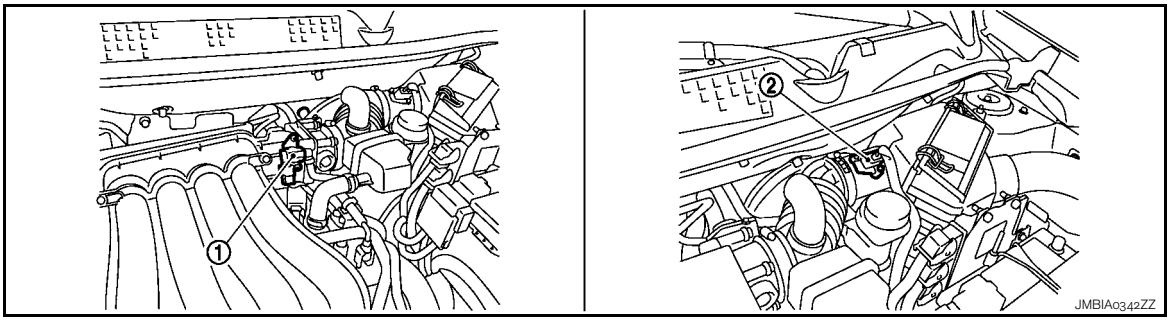


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

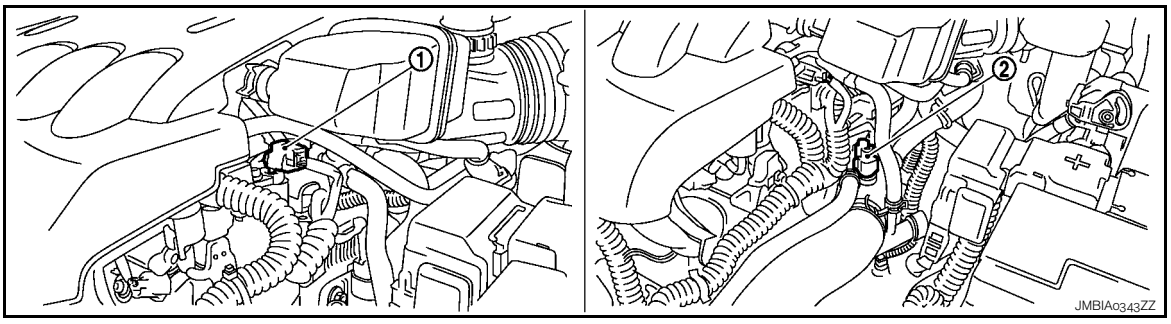
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

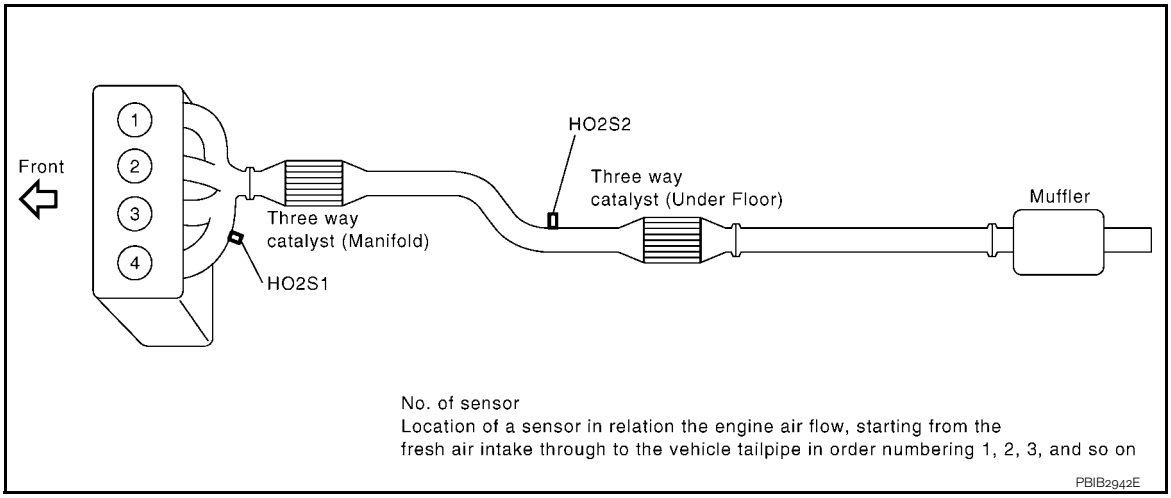


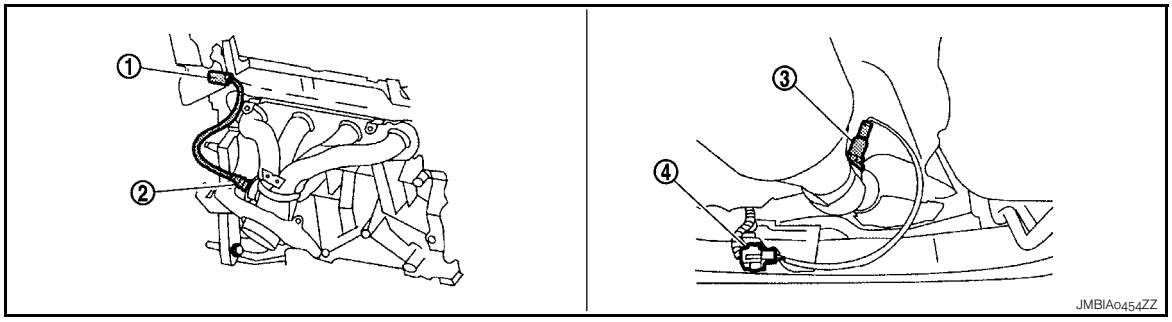
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



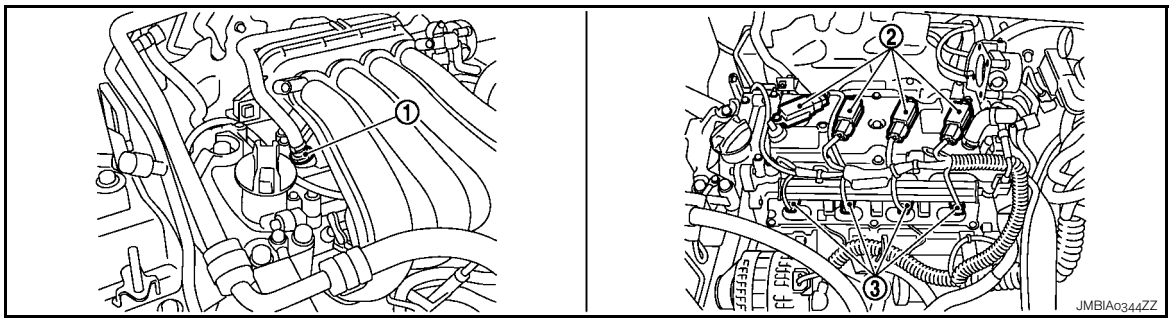
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

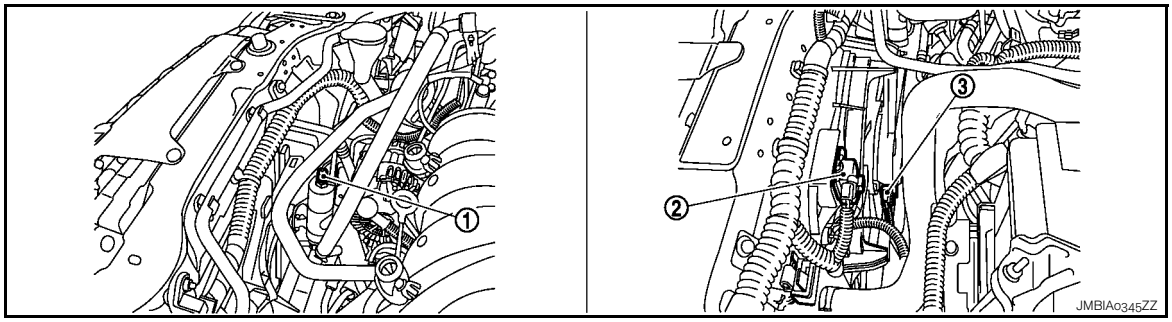




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

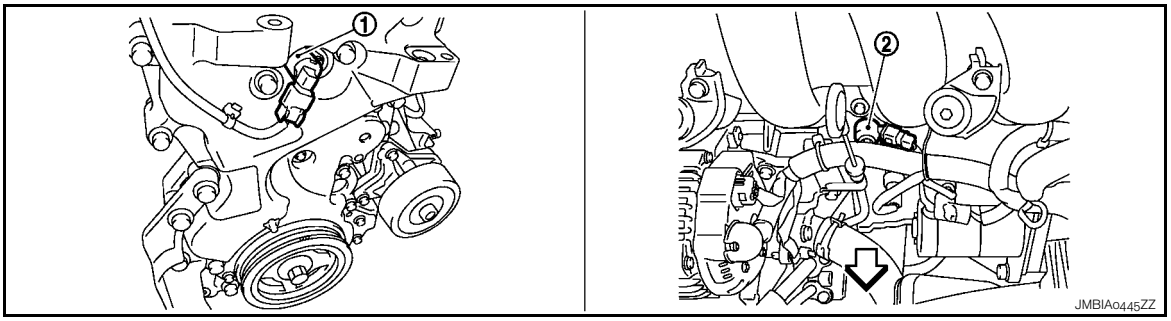


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

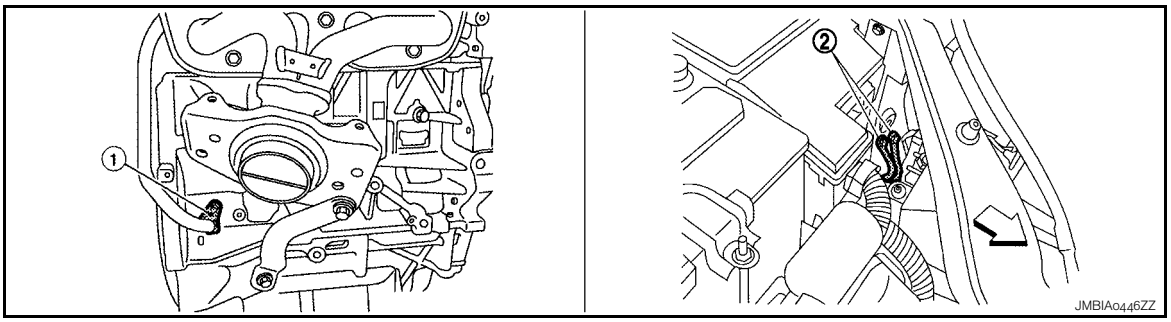


cardiagn.com

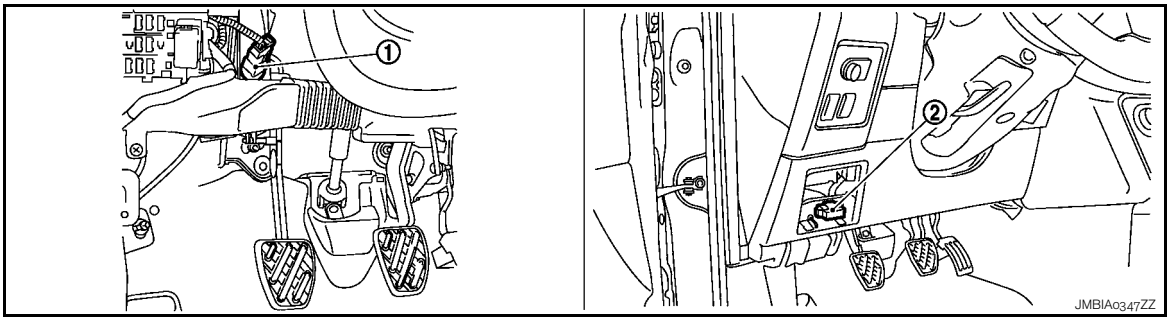
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



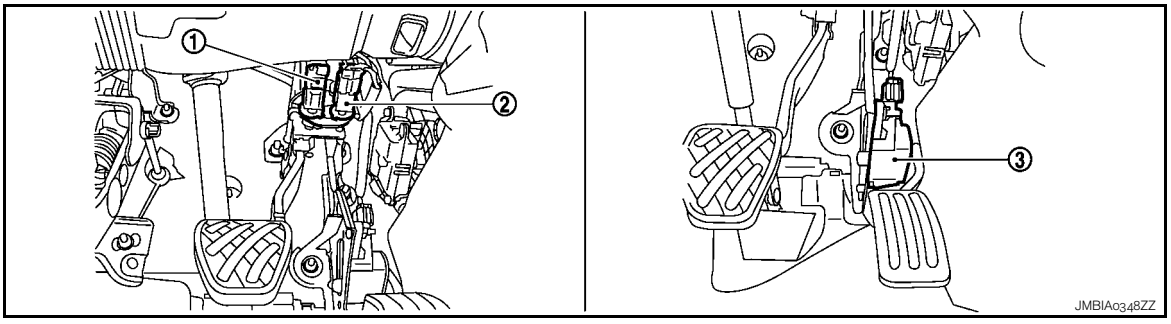
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

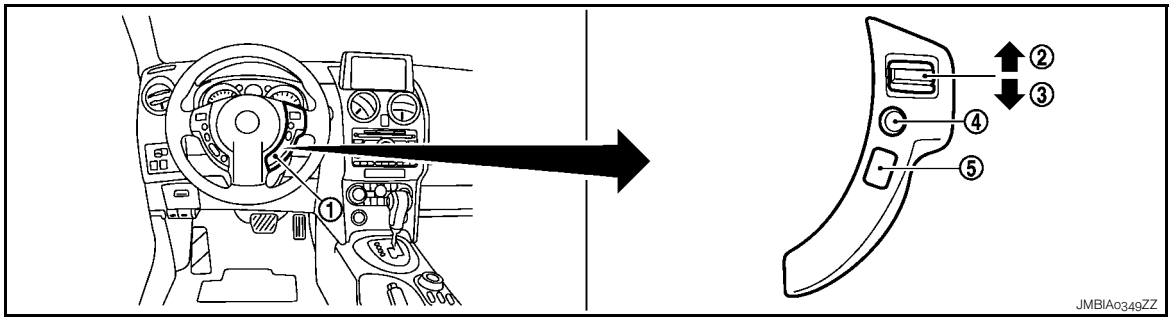


1. ASCD clutch switch 2. Data link connector

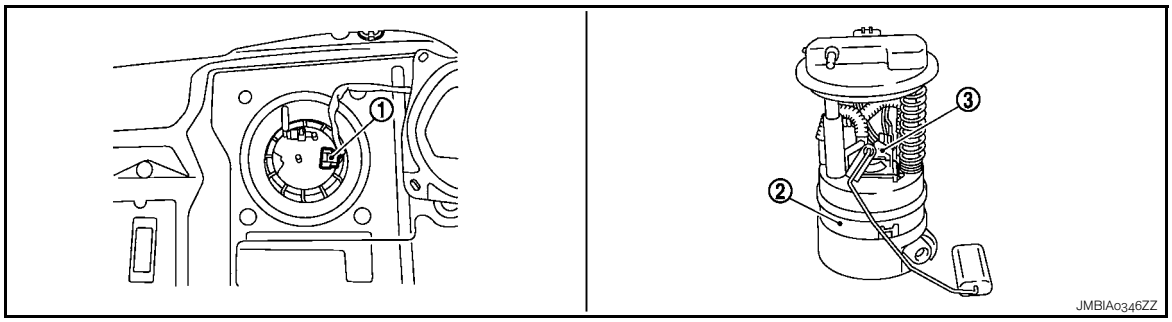


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000001094073

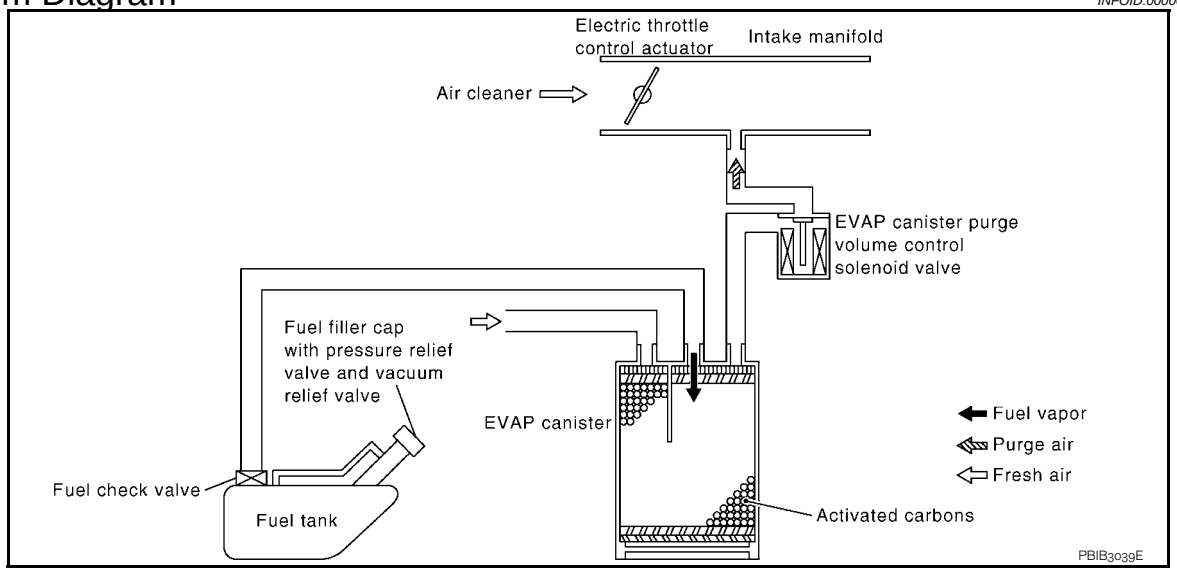
Component	Reference
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Cooling fan motor	EC-685, "System Diagram"
Engine coolant temperature sensor	EC-754, "Description"
Refrigerant pressure sensor	EC-936, "Description"

cardiagn.com

EVAPORATIVE EMISSION SYSTEM

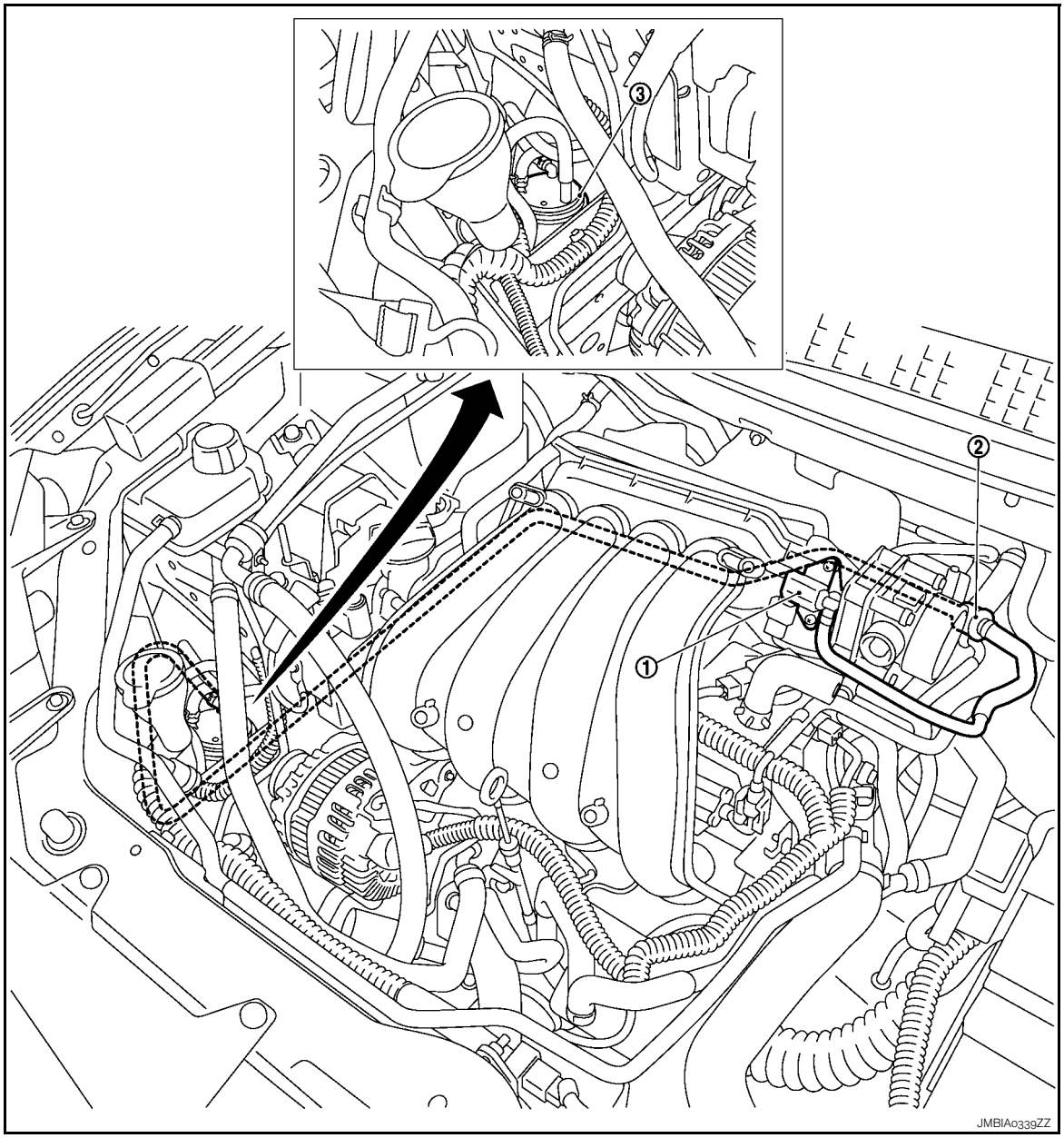
System Diagram

INFOID:0000000001094074



EVAPORATIVE EMISSION LINE DRAWING

cardiagn.com



1. EVAP canister purge volume control solenoid valve
2. EVAP purge resonator
3. EVAP canister

NOTE:
Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

System Description

INFOID:0000000001094075

INPUT/OUTPUT SIGNAL CHART

cardiagn.com

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Wheel sensor*2	Vehicle speed		

*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM through CAN communication line.

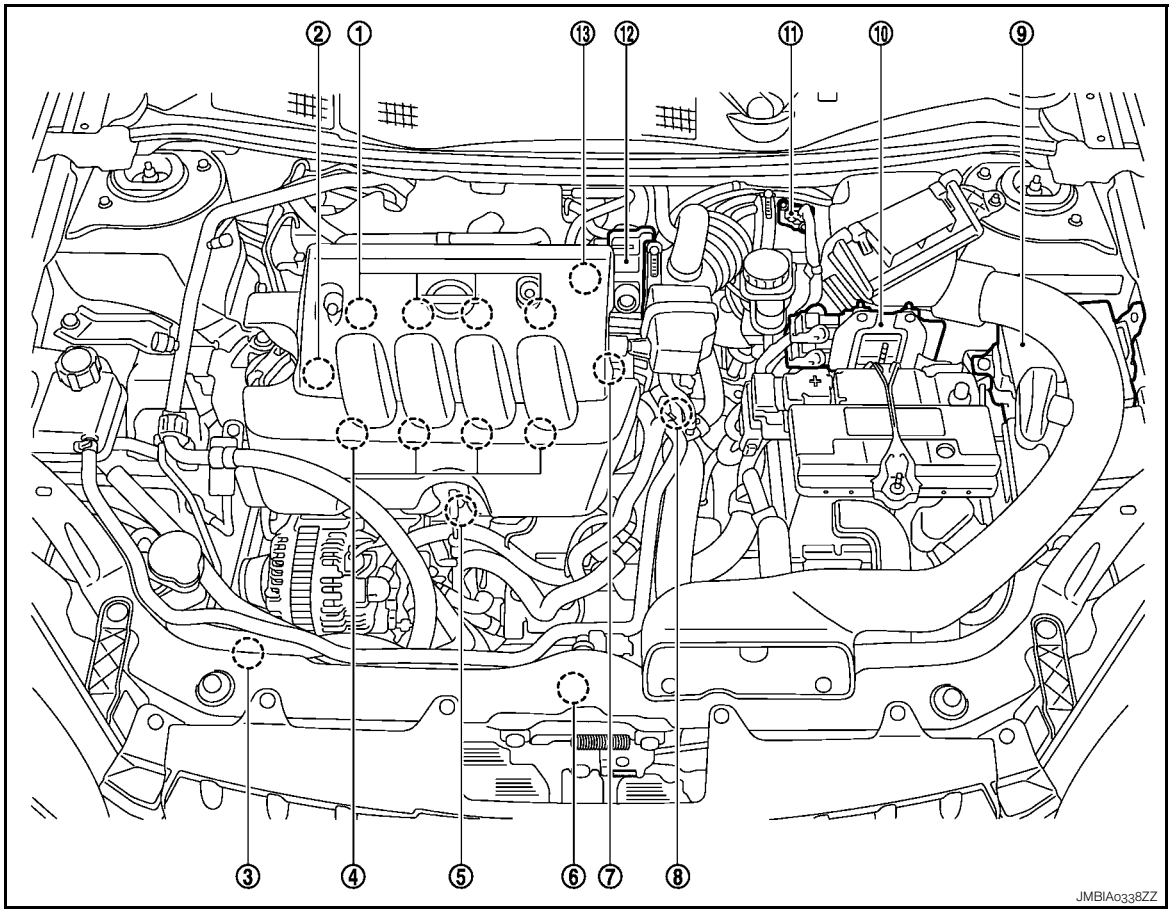
SYSTEM DESCRIPTION

The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating.

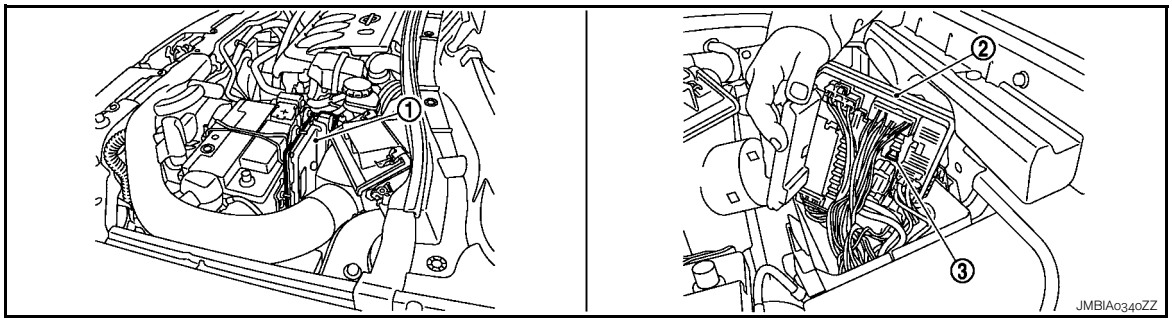
Component Parts Location

INFOID:0000000001115788

cardiagn.com

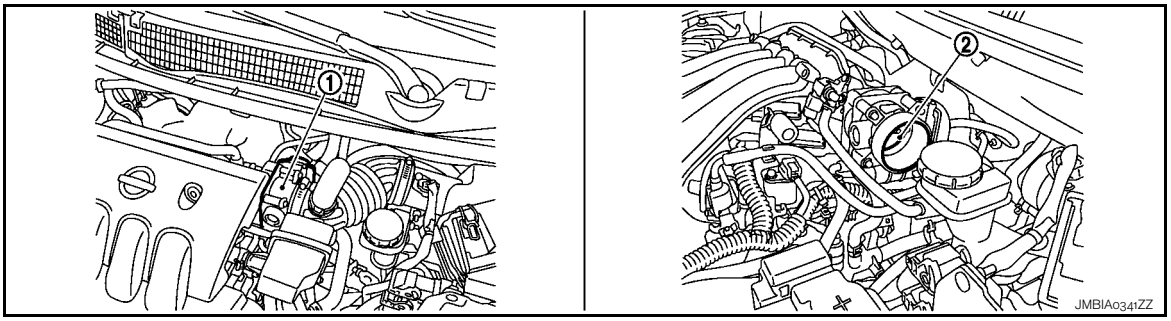


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

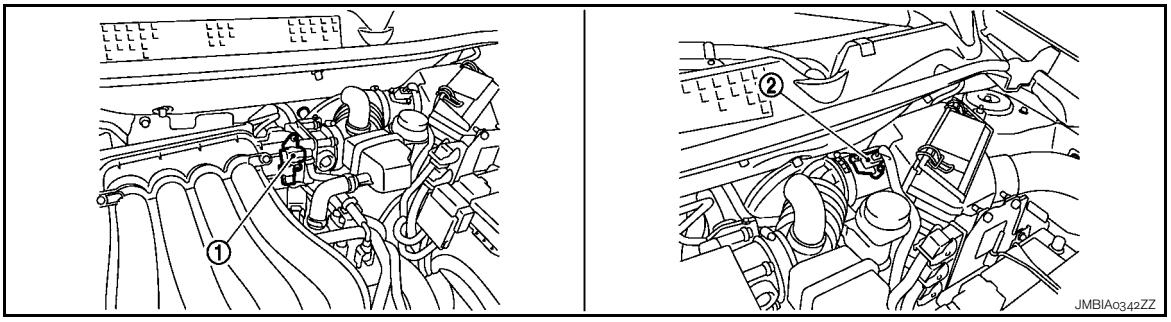


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

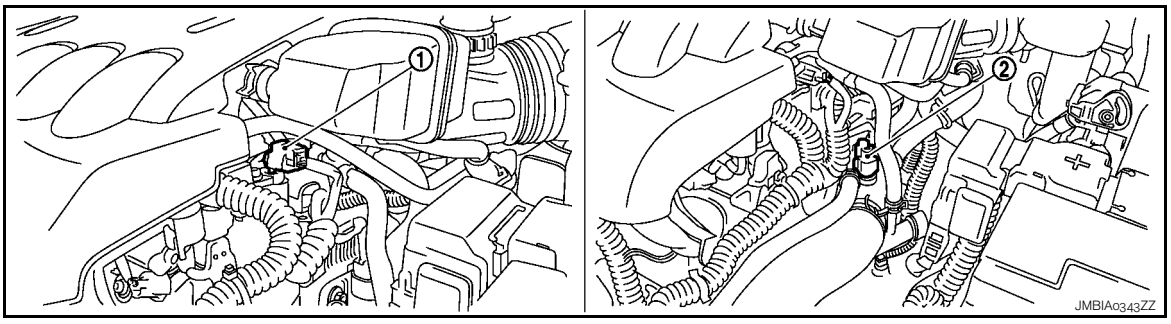
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

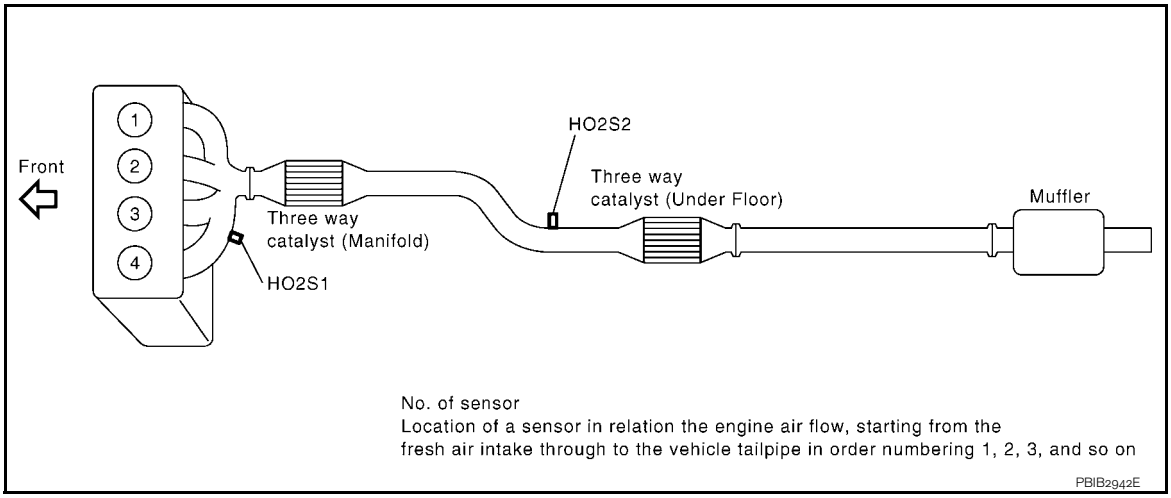


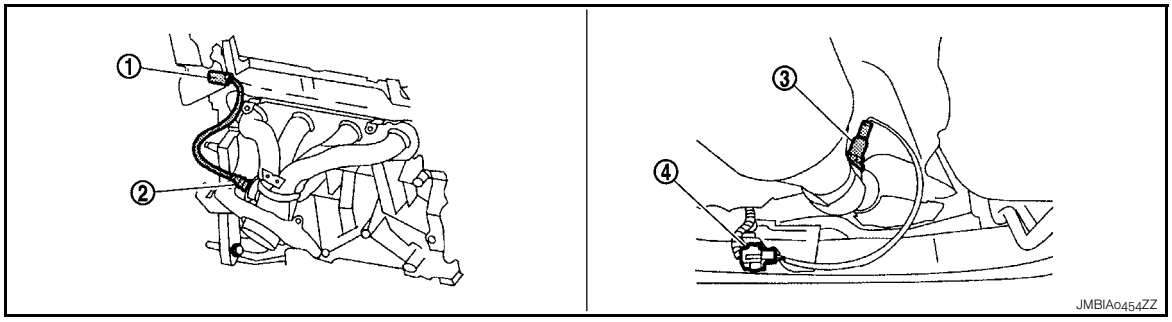
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



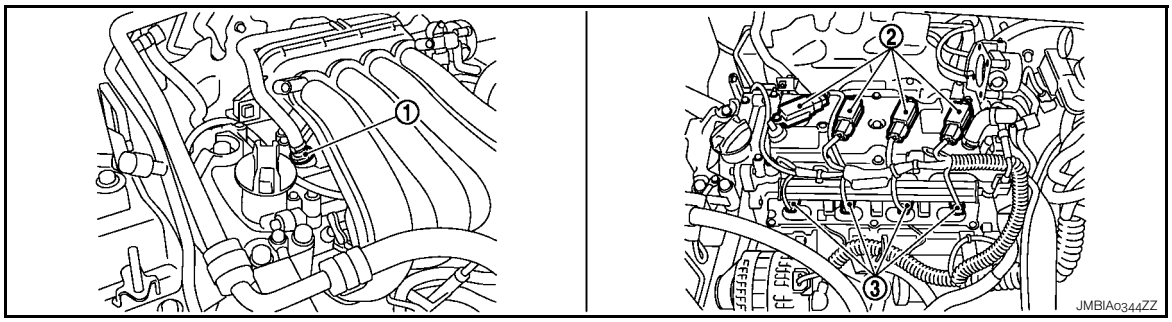
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

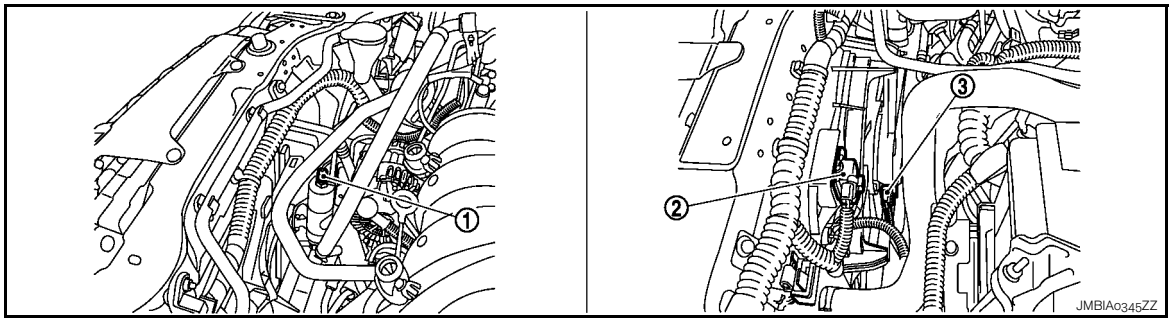




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

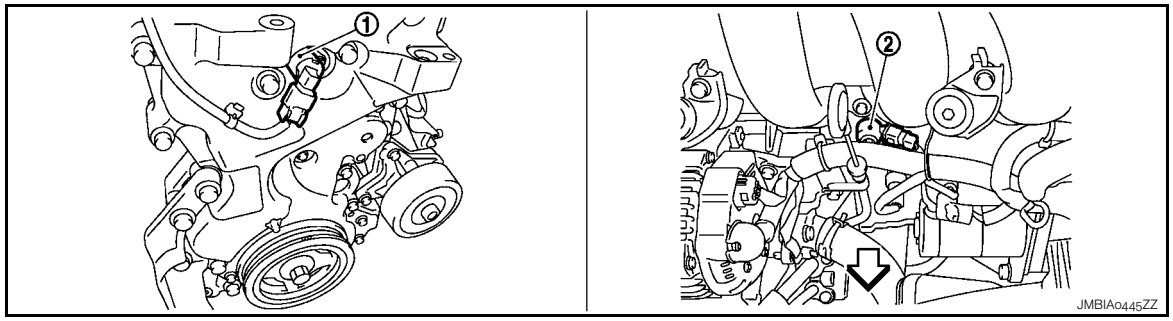


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

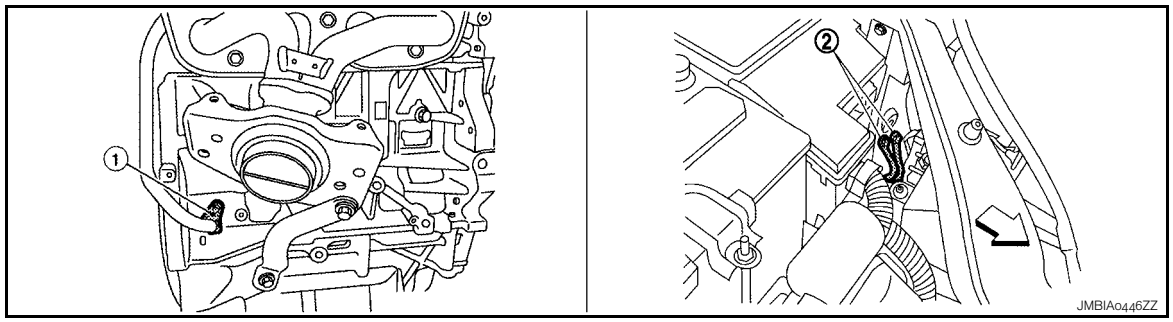


cardiagn.com

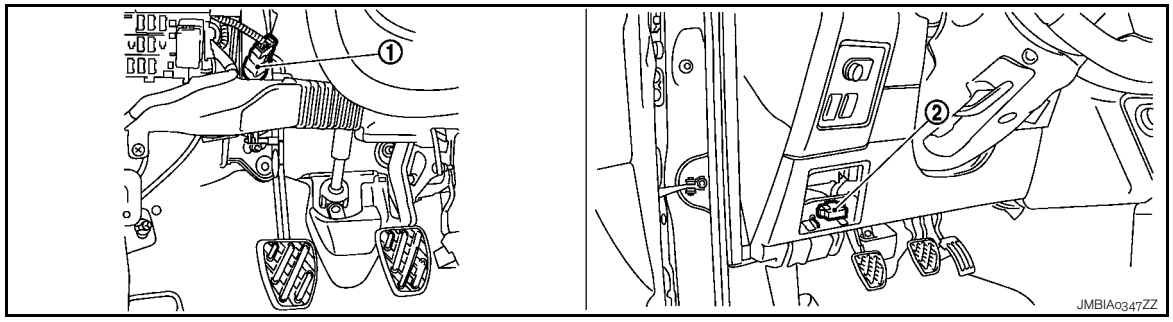
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



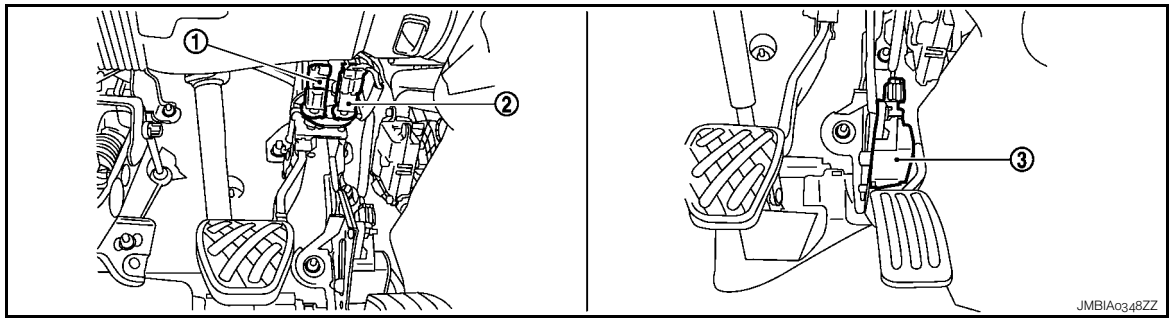
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

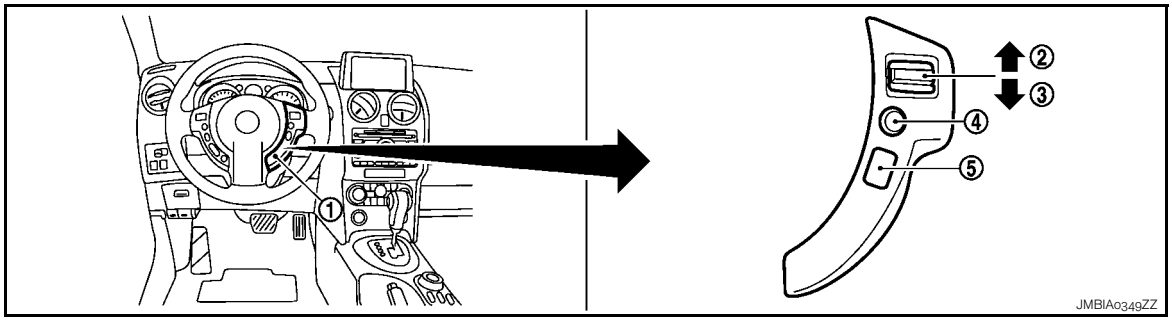


1. ASCD clutch switch 2. Data link connector

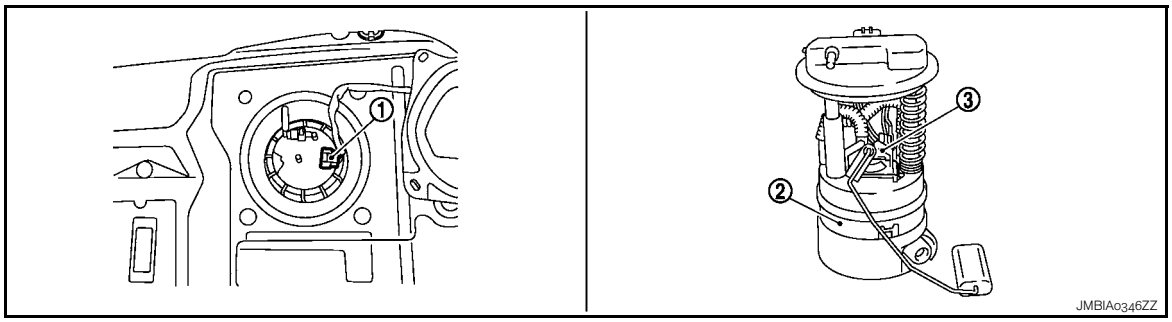


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000001094077

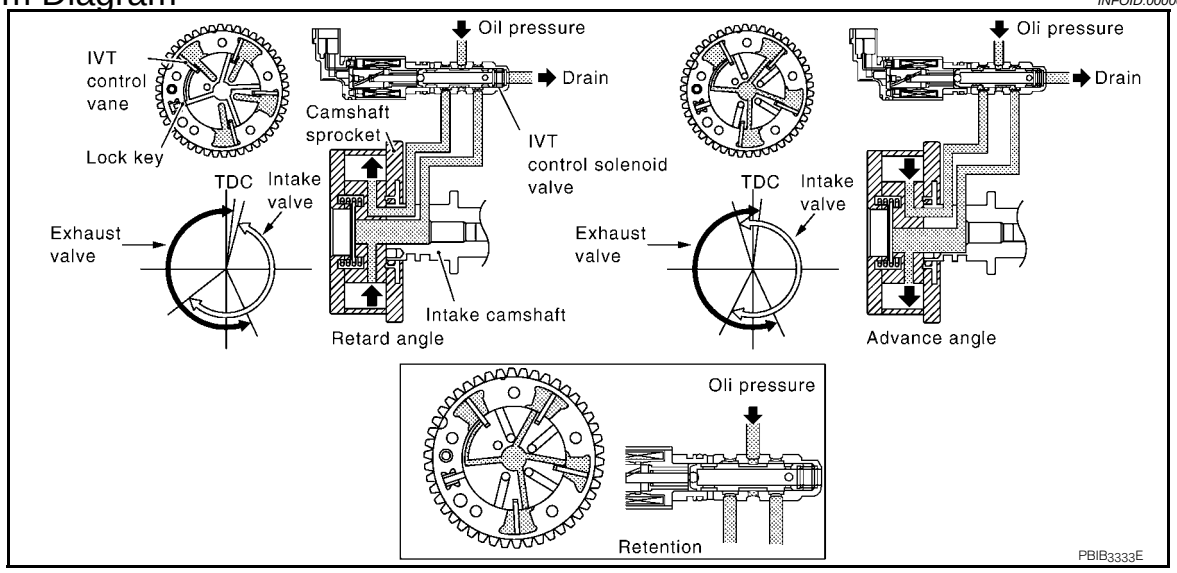
Component	Reference
Accelerator pedal position sensor	EC-909, "Description"
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
EVAP canister purge volume control solenoid valve	EC-822, "Description"
Heated oxygen sensor 1	EC-760, "Description"
Mass air flow sensor	EC-746, "Description"
Throttle position sensor	EC-757, "Description"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

INTAKE VALVE TIMING CONTROL

System Diagram

INFOID:0000000001094078



System Description

INFOID:0000000001094079

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed and piston position	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Wheel sensor*	Vehicle speed		

*: This signal is sent to the ECM through CAN communication line

SYSTEM DESCRIPTION

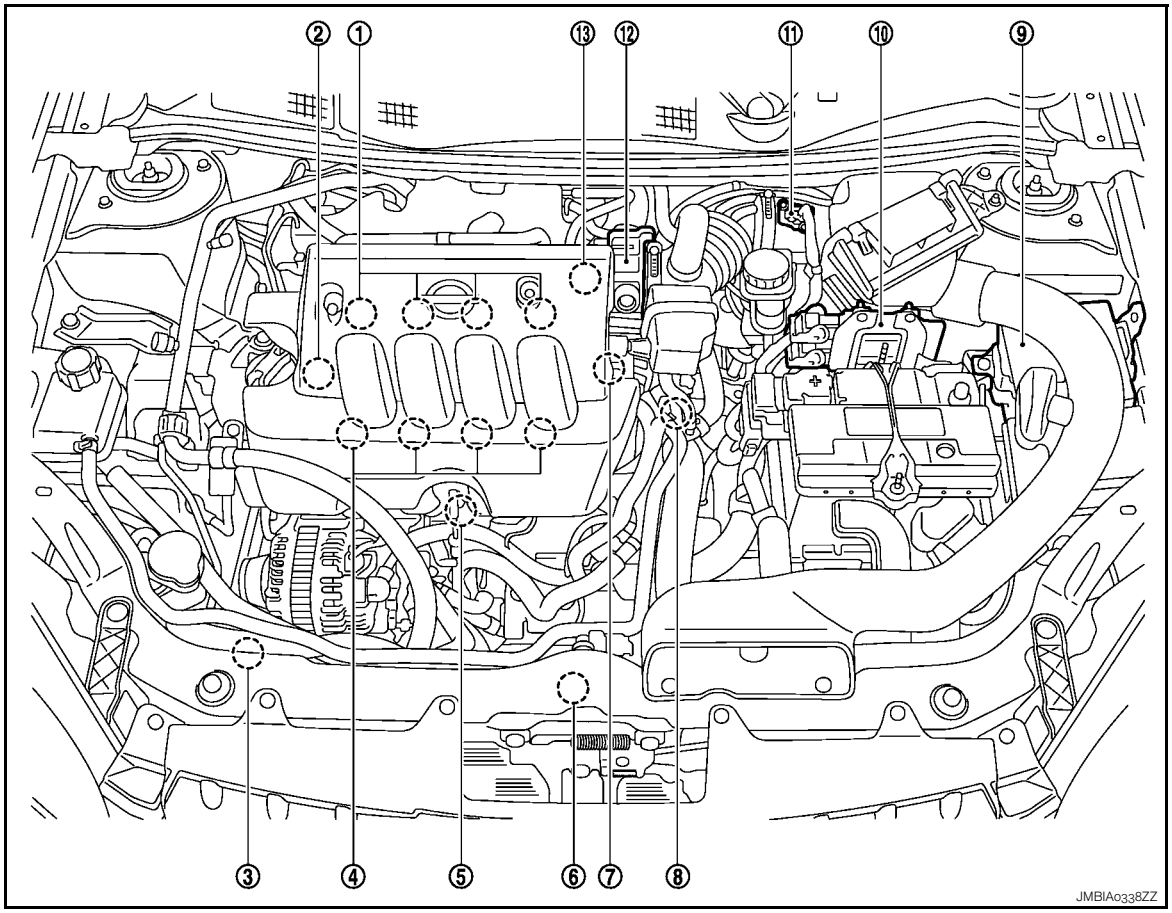
This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing (IVT) control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

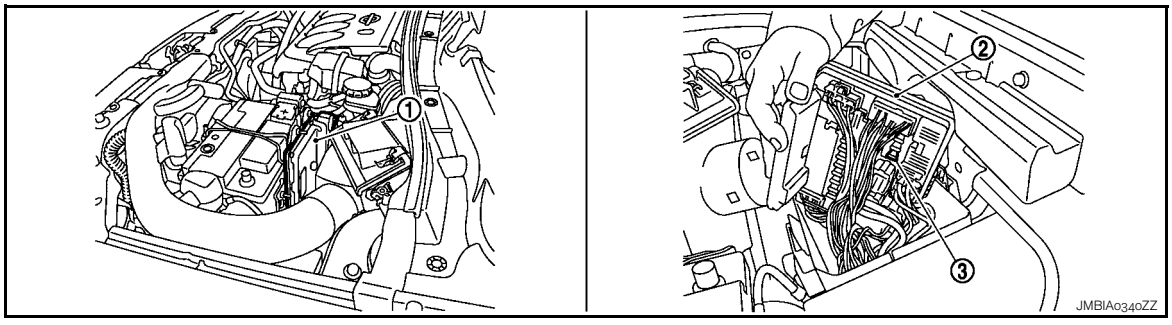
Component Parts Location

INFOID:0000000001115789

cardiagn.com

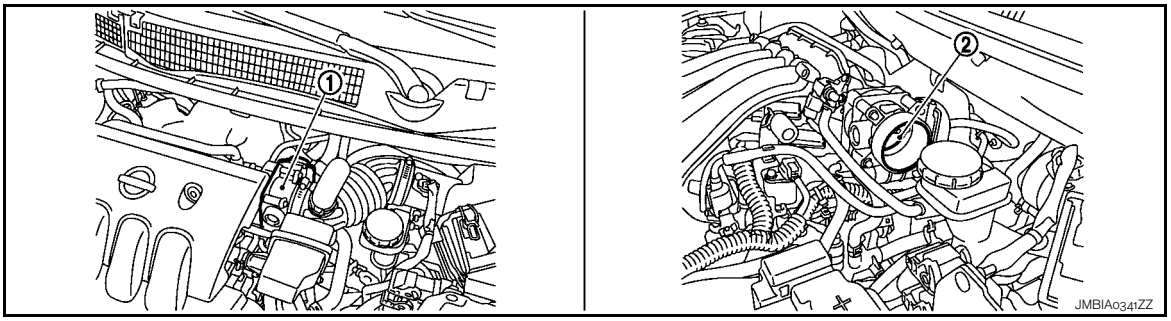


1. Ignition coil (with power transistor) and spark plug
2. PCV valve
3. Refrigerant pressure sensor
4. Fuel injector
5. Knock sensor
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. Engine coolant temperature sensor
9. IPDM E/R
10. ECM
11. Mass air flow sensor (with intake temperature sensor)
12. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
13. EVAP canister purge volume control solenoid valve

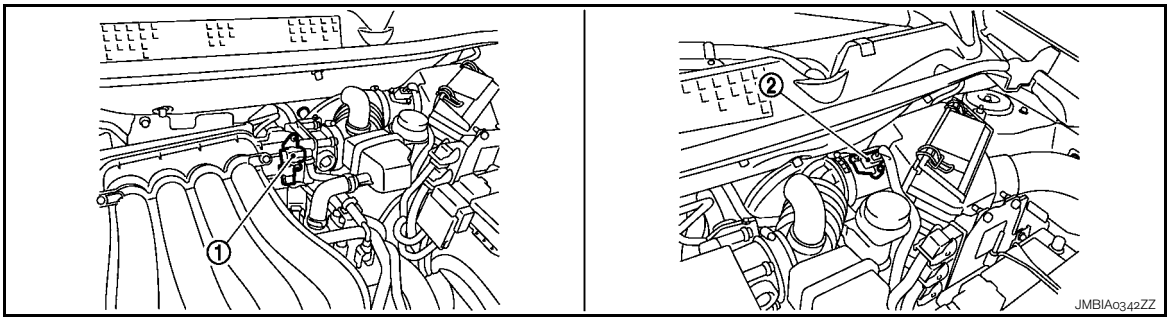


1. ECM
2. IPDM E/R
3. Fuel pump fuse (15A)

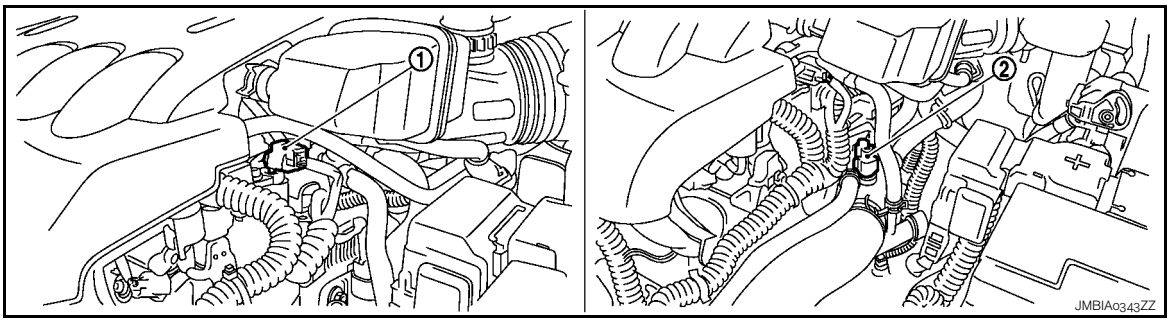
cardiagn.com



1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
2. Throttle valve

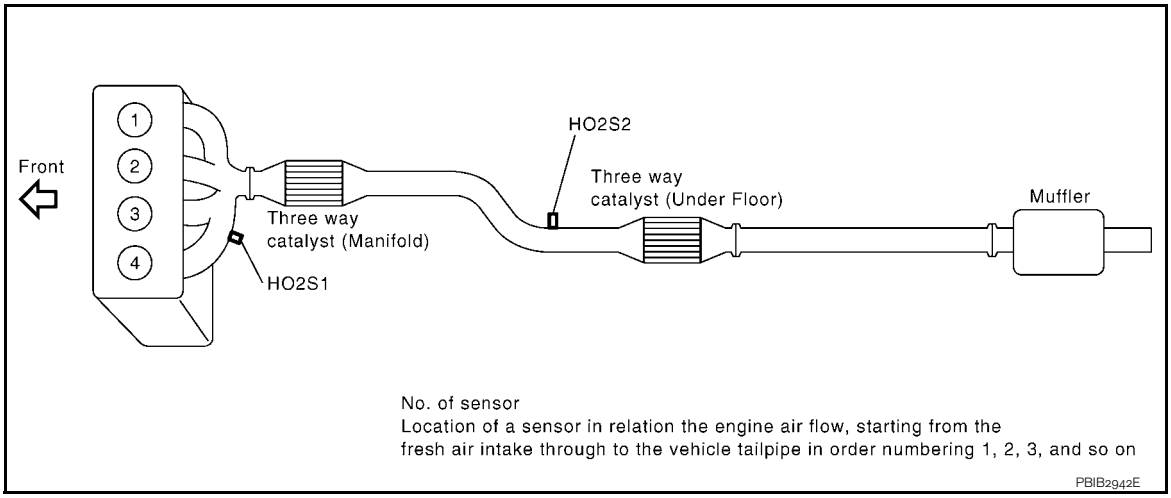


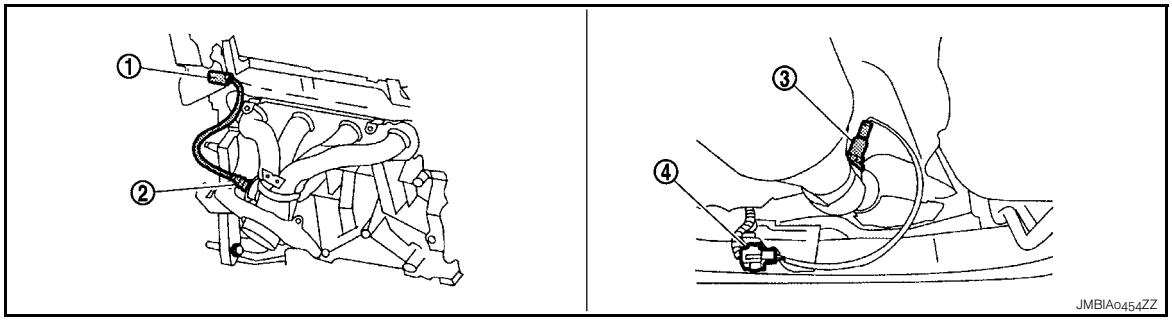
1. EVAP canister purge volume control solenoid valve
2. Mass air flow sensor (with intake air temperature sensor)



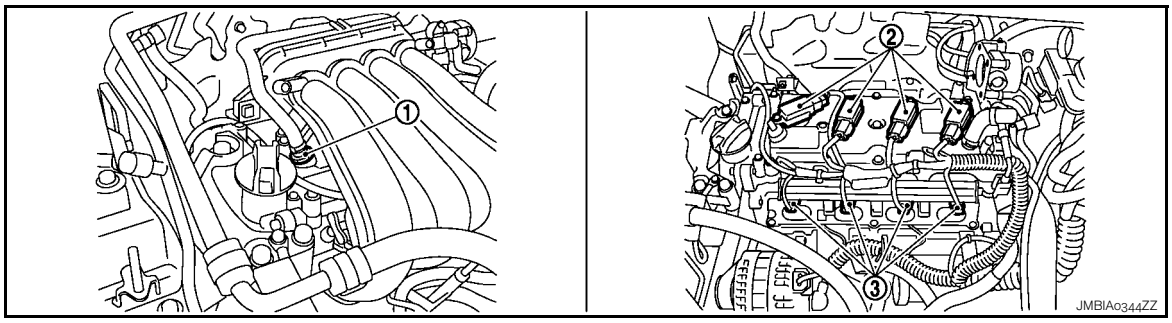
1. Camshaft position sensor
2. Engine coolant temperature sensor

cardiagn.com

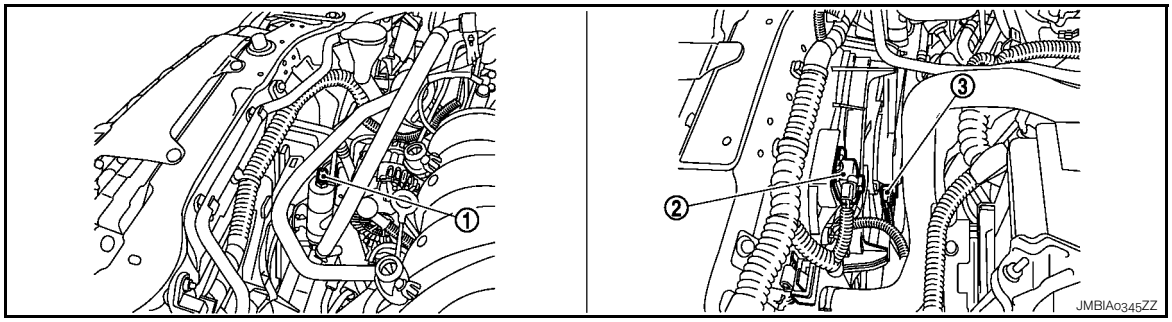




1. Heated oxygen sensor 1 harness connector
2. Heated oxygen sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

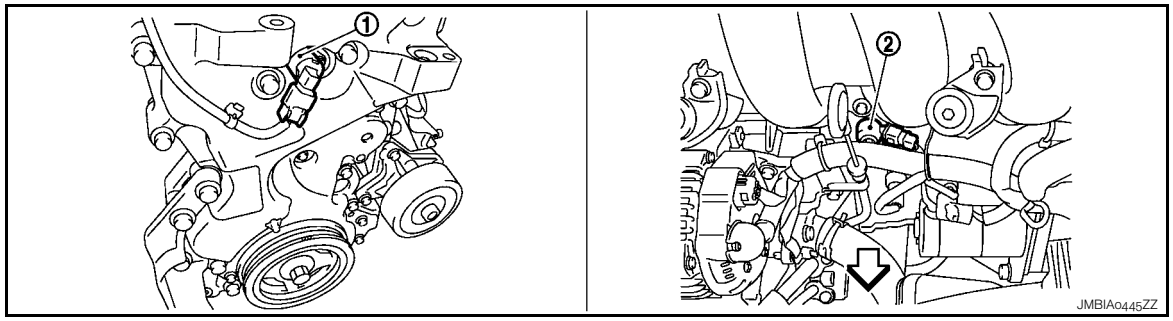


1. PCV valve
2. Ignition coil (with power transistor) and spark plug
3. Fuel injection

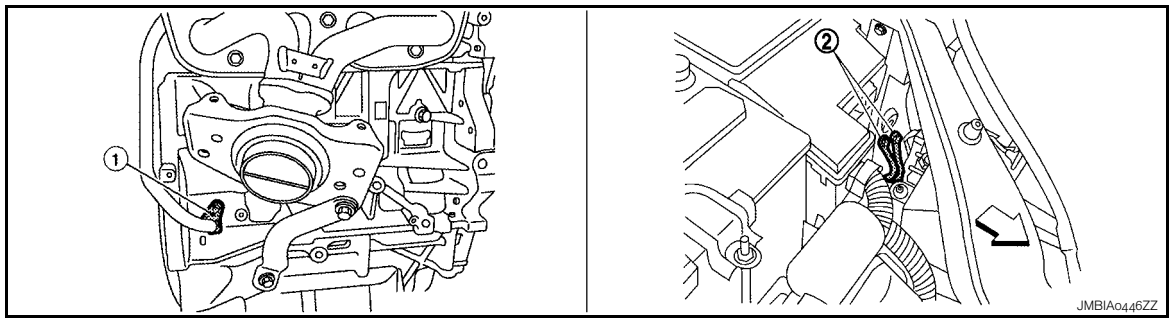


cardiagn.com

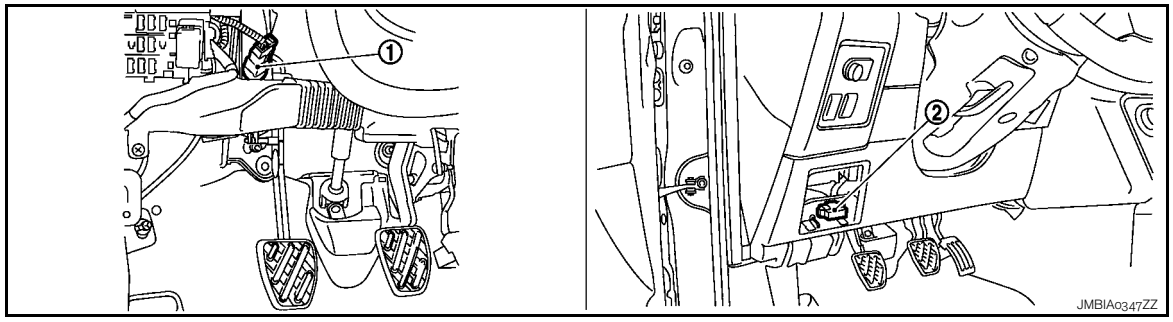
1. Refrigerant pressure sensor 2. Resister 3. Cooling fan motor



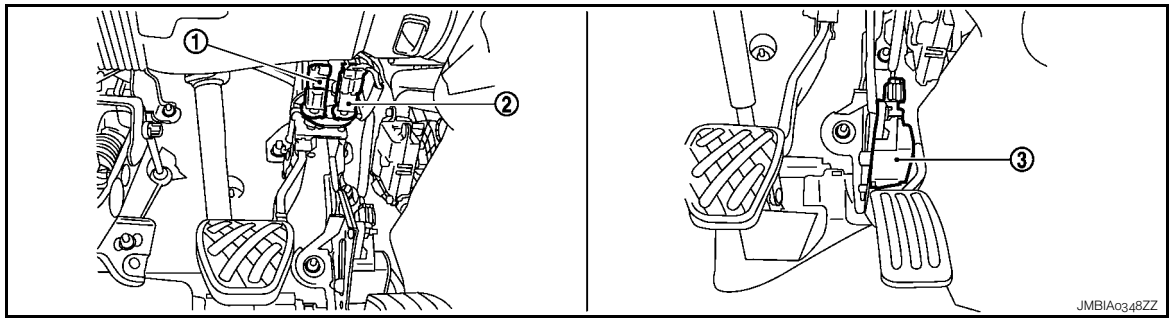
1. Intake valve timing control solenoid valve 2. Knock sensor



1. Crankshaft position sensor (POS) 2. Ground

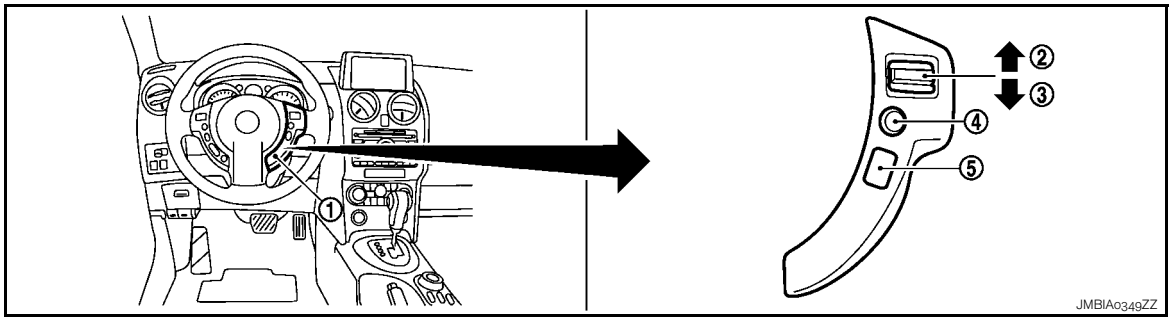


1. ASCD clutch switch 2. Data link connector

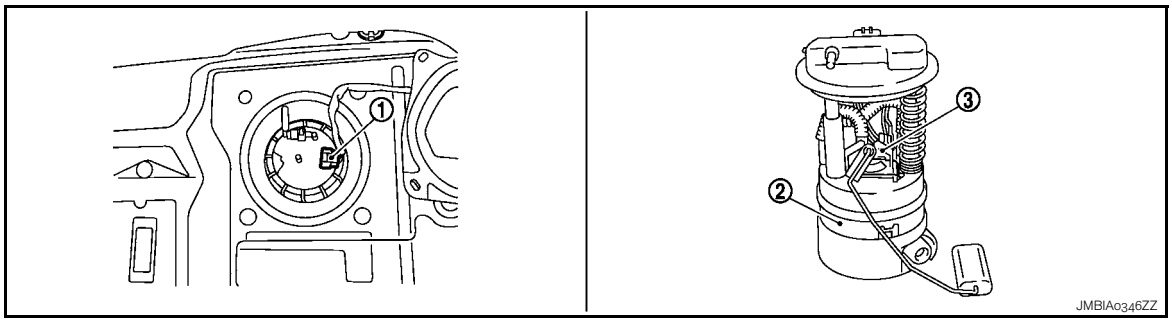


cardiagn.com

1. Stop lamp switch
2. ASCD brake switch
3. Accelerator pedal position sensor



1. ASDC steering switch
2. CANSEL switch
3. RESUME/ACCCELERATE switch
4. SET/COAST switch
5. MAIN SWITCH
6.



1. Fuel level sensor unit and fuel pump harness connector
2. Fuel level sensor unit and fuel pump
3. Fuel pressure regulator

Component Description

INFOID:0000000001094081

Component	Reference
Camshaft position sensor (PHASE)	EC-813, "Description"
Crankshaft position sensor (POS)	EC-809, "Description"
Engine coolant temperature sensor	EC-754, "Description"
Intake valve timing control solenoid valve	EC-700, "System Diagram"
Vehicle speed sensor	EC-825, "Description"

cardiagn.com

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000001094082

INTRODUCTION

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information
Diagnostic Trouble Code (DTC)
Freeze Frame data
1st Trip Diagnostic Trouble Code (1st Trip DTC)
1st Trip Freeze Frame data

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data
CONSULT-III	×	×	×	×
ECM	×	×*	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator (MI) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-1239, "Fail Safe".)

TWO TRIP DETECTION LOGIC

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MI will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MI lights up. The MI lights up at the same time when the DTC is stored. <2nd trip>

The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MI, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

DTC AND FREEZE FRAME DATA

DTC and 1st Trip DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MI will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MI lights up. In other words, the DTC is stored in the ECM memory and the MI lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MI during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to EC-982, "Work Flow". Then perform DTC CONFIRMATION PROCEDURE or Component Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, absolute throttle position, base fuel schedule and intake air temperature at the moment a malfunction is detected.

cardiagn.com

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-III. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen,.
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MI on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM.
Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”.

How to Read DTC and 1st Trip DTC

With CONSULT-III
CONSULT-III displays the DTC in "SELF-DIAG RESULTS" mode Examples: P0117, P0340, P1217, etc.
(CONSULT-III also displays the malfunctioning component or system.)

Without CONSULT-III
The number of blinks of the MI in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0117, 0340, 1217, etc.
These DTCs are controlled by NISSAN.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-III can identify malfunction status as shown below. Therefore, using CONSULT-III (if available) is recommended.**

DTC or 1st trip DTC of a malfunction is displayed in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-III. Time data indicates how many times the vehicle was driven after the last detection of a DTC.
If the DTC is being detected currently, the time data will be [0].
If a 1st trip DTC is stored in the ECM, the time data will be [1t].

How to Erase DTC and 1st Trip DTC

With CONSULT-III
The emission related diagnostic information in the ECM can be erased by selecting “All Erase” in the “Description” of “FINAL CHECK” mode with CONSULT-III.

Without CONSULT-III
NOTE:
If the DTC is not for CVT related items (see EC-1241, "DTC Index"), skip step 2.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform TM-214, "Diagnosis Description". (The DTC in the TCM will be erased.)
3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal.

- **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**
- **The following data are cleared when the ECM memory is erased.**

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- Test values

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

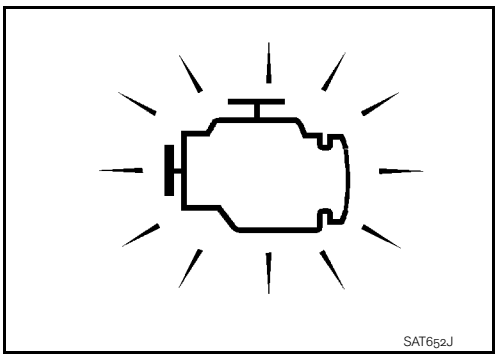
MALFUNCTION INDICATOR (MI)

Description

cardiagn.com

The MI is located on the instrument panel.

1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   If the MI does not light up, check MI circuit. Refer to MWI-15, "WARNING LAMPS/INDICATOR LAMPS : System Diagram".
2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



On Board Diagnostic System Function

The on board diagnostic system has the following four functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position Engine stopped	BULB CHECK	This function checks the MI bulb for damage (blown, open circuit, etc.). If the MI does not come on, check MI circuit.
	Engine running	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MI will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MI in the 1st trip. • Misfire (Possible three way catalyst damage) • One trip detection diagnoses
Mode II	Ignition switch in ON position Engine stopped	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

Diagnostic Test Mode I — Bulb Check

In this mode, the MI on the instrument panel should stay ON. If it remains OFF, check MI circuit. Refer to MWI-15, "WARNING LAMPS/INDICATOR LAMPS : System Diagram".

Diagnostic Test Mode I — Malfunction Warning

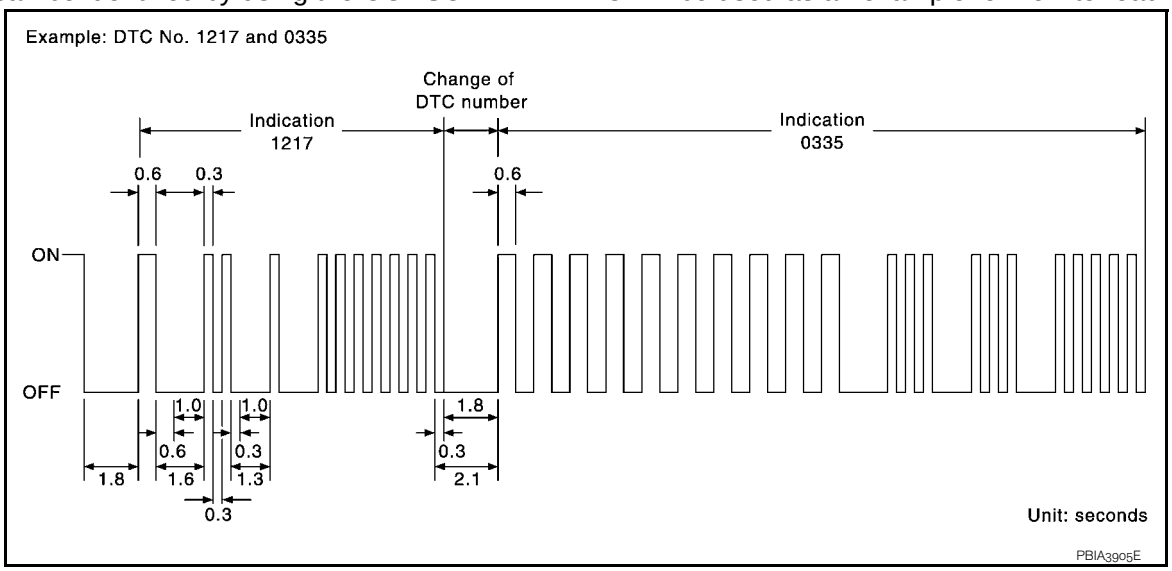
MI	Condition
ON	When the malfunction is detected.
OFF	No malfunction.

This DTC number is clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

Diagnostic Test Mode II — Self-diagnostic Results

cardiagn.com

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MI as shown below.
The DTC and 1st trip DTC are displayed at the same time. If the MI does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MI illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT-III. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.
The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.
A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.
A change from one trouble code to another occurs at an interval of 1.8-second OFF.
In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See EC-1241, "DTC Index".)
HOW TO ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)
The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to “HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULT)”.
- **If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- **Be careful not to erase the stored memory before starting trouble diagnoses.**

Diagnostic Test Mode II — Heated Oxygen Sensor 1 Monitor
In this mode, the MI displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MI	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.
Next run engine at about 2,000 rpm for about 2 minutes under no load conditions. Then make sure that the MI comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no load.
MI FLASHING WITHOUT DTC
If the ECM is in Diagnostic Test Mode II, MI may flash when engine is running. In this case, check ECM diagnostic test mode. How to switch the diagnostic test (function) modes, and details of the above functions are described later.
The following emission-related diagnostic information is cleared when the ECM memory is erased.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes

cardiagn.com

- Freeze frame data
- 1st trip freeze frame data
- Test values

How to Switch Diagnostic Test Mode

NOTE:

- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**
- **Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.**

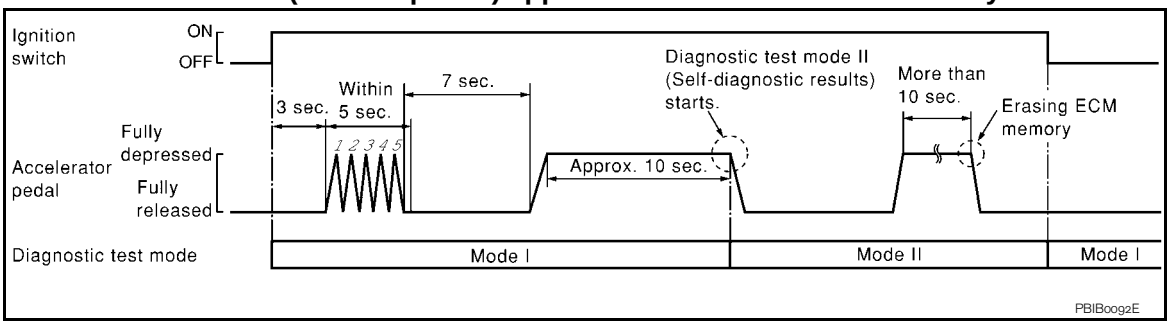
HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.

a. Fully depress the accelerator pedal.

b. Fully release the accelerator pedal.

3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MI starts blinking.
4. Fully release the accelerator pedal.
   ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).
   NOTE:
   Wait until the same DTC (or 1st trip DTC) appears to confirm all DTCs certainly.



HOW to SET DIAGNOSTIC TEST MODE II (HEATED OXYGEN SENSOR 1 MONITOR)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results).
   Refer to “HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)”.
2. Start Engine.
   ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).

HOW to ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to “HOW to SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)”.
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.
   The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

CONSULT-III Function

INFOID:0000000001094083

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECU part number	ECM part number can be read.

cardiagn.com

*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- Test values

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item			DIAGNOSTIC TEST MODE					
			WORK SUPPORT	SELF-DIAGNOSTIC RESULTS		DATA MONITOR	DATA MONITOR (SPEC)	ACTIVE TEST
				DTC*1	FREEZE FRAME DATA*2			
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor (POS)		×	×	×	×	
		Camshaft position sensor (PHASE)		×	×	×	×	
		Mass air flow sensor		×		×	×	
		Engine coolant temperature sensor		×	×	×	×	×
		Heated oxygen sensor 1		×		×	×	
		Heated oxygen sensor 2		×		×	×	
		Wheel sensor		×	×	×	×	
		Accelerator pedal position sensor		×		×	×	
		Throttle position sensor		×		×	×	
		Intake air temperature sensor		×	×	×	×	
		Knock sensor		×				
		EPS control unit				×	×	
		Refrigerant pressure sensor				×	×	
		Closed throttle position switch (accelerator pedal position sensor signal)				×	×	
		Air conditioner switch				×	×	
		Park/neutral position (PNP) switch		×		×	×	
		Stop lamp switch		×		×	×	
		Battery voltage				×	×	
		Load signal				×	×	
ENGINE CONTROL COMPONENT PARTS	OUTPUT	Fuel injector				×	×	×
		Power transistor (Ignition timing)				×	×	×
		Throttle control motor relay		×		×	×	
		Throttle control motor		×				
		EVAP canister purge volume control solenoid valve		×		×	×	×
		Air conditioner relay				×	×	
		Fuel pump relay	×			×	×	×
		Cooling fan relay		×		×	×	×
		Heated oxygen sensor 1 heater		×		×	×	
		Heated oxygen sensor 2 heater		×		×	×	
		Intake valve timing control solenoid valve		×		×	×	×
		Calculated load value			×	×	×	

X: Applicable

cardiagn.com

*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-1050, "Diagnosis Description".

WORK SUPPORT MODE

Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	• FUEL PUMP WILL STOP BY TOUCHING “START” DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	• THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.	When learning the idle air volume
SELF-LEARNING CONT	• THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.	When clearing mixture ratio self-learning value
TARGET IDLE RPM ADJ*	• IDLE CONDITION	When setting target idle speed
TARGET IGN TIM ADJ*	• IDLE CONDITION	When adjusting target ignition timing

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item
Regarding items of DTC and 1st trip DTC, refer to EC-1241, "DTC Index".)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	• The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to EC-1241, "DTC Index".)
FUEL SYS-B1	• “Fuel injection system status” at the moment a malfunction is detected is displayed. • One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop
COOLANT TEMP [°C] or [°F]	• The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	• “Long-term fuel trim” at the moment a malfunction is detected is displayed. • The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	• “Short-term fuel trim” at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	• The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	• The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH·P/S [%]	• The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	• The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	• The intake air temperature at the moment a malfunction is detected is displayed.

*: The items are the same as those of 1st trip freeze frame data.

cardiagn.com

DATA MONITOR MODE

Monitored Item

×: Applicable

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	• Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	• Accuracy becomes poor if engine speed drops below the idle rpm. • If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1	V	• The signal voltage of the mass air flow sensor is displayed.	• When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”.
B/FUEL SCHDL	msec	• “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	• When engine is running specification range is indicated in “SPEC”.
A/F ALPHA-B1	%	• The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	• When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”. • This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S	°C or °F	• The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	• When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
H02S1 (B1)	V	• The signal voltage of the heated oxygen sensor 1 is displayed.	
HO2S2 (B1)	V	• The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S1 MNTR (B1)	RICH/LEAN	• Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH: means the mixture became “rich”, and control is being affected toward a leaner mixture. LEAN: means the mixture became “lean”, and control is being affected toward a rich mixture.	• After turning ON the ignition switch, “RICH” is displayed until air-fuel mixture ratio feedback control begins. • When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S2 MNTR(B1)	RICH/LEAN	• Display of heated oxygen sensor 2 signal: RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large.	• When the engine is stopped, a certain value is indicated.
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
BATTERY VOLT	V	• The power supply voltage of ECM is displayed.	
ACCEL SEN 1	V	• The accelerator pedal position sensor signal voltage is displayed.	• ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
ACCEL SEN 2			
THRTL SEN 1-B1	V	• The throttle position sensor signal voltage is displayed.	• THRTL SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
THRTL SEN 2-B1			
START SIGNAL	ON/OFF	• Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.	• After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS	ON/OFF	• Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.	

cardiagn.com

Monitored item	Unit	Description	Remarks
AIR COND SIG	ON/OFF	• Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW	ON/OFF	• Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.	
PW/ST SIGNAL	ON/OFF	• [ON/OFF] condition of the power steering system (determined by the signal voltage of the power steering pressure sensor) is indicated.	
LOAD SIGNAL	ON/OFF	• Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF.	
IGNITION SW	ON/OFF	• Indicates [ON/OFF] condition from ignition switch signal.	
HEATER FAN SW	ON/OFF	• Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW	ON/OFF	• Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1	msec	• Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	• When the engine is stopped, a certain computed value is indicated.
IGN TIMING	BTDC	• Indicates the ignition timing computed by ECM according to the input signals.	• When the engine is stopped, a certain value is indicated.
PURG VOL C/V	%	• Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. • The opening becomes larger as the value increases.	
INT/V TIM (B1)	°CA	• Indicates [°CA] of intake camshaft advance angle.	
INT/V SOL-B1	%	• The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. • The advance angle becomes larger as the value increases.	
AIR COND RLY	ON/OFF	• The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.	
FUEL PUMP RLY	ON/OFF	• Indicates the fuel pump relay control condition determined by ECM according to the input signals.	
THRTL RELAY	ON/OFF	• Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
COOLING FAN	HI/LOW/OFF	• Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation LOW: Low speed operation OFF: Stop	
HO2S1 HTR (B1)	ON/OFF	• Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM accordining to the input signals.	
HO2S2 HTR (B1)	ON/OFF	• Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.	

cardiagn.com

Monitored item	Unit	Description	Remarks
VEHICLE SPEED	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.	
IDL A/V LEARN	YET/CMPLT	• Display the condition of Idle Air Volume Learning YET: Idle air volume learning has not been performed yet. CMPLT: Idle air volume learning has already been performed successfully.	
02SEN HTR DTY	%	• Indicates the heated oxygen sensor 1 heater control value computed by the ECM according to the input signals.	
AC PRESS SEN	V	• The signal voltage from the refrigerant pressure sensor is displayed.	
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
SET VHCL SPD	km/h or mph	• The preset vehicle speed is displayed.	
MAIN SW	ON/OFF	• Indicates [ON/OFF] condition from MAIN switch signal.	
CANCEL SW	ON/OFF	• Indicates [ON/OFF] condition from CANCEL switch signal.	
RESUME/ACC SW	ON/OFF	• Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal.	
SET SW	ON/OFF	• Indicates [ON/OFF] condition from SET/COAST switch signal.	
BRAKE SW1	ON/OFF	• Indicates [ON/OFF] condition from ASCD brake switch signal.	
BRAKE SW2	ON/OFF	• Indicates [ON/OFF] condition of stop lamp switch signal.	
VHCL SPD CUT	NON/CUT	• Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.	
LO SPEED CUT	NON/CUT	• Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off.	
AT OD MONITOR	ON/OFF	• Indicates [ON/OFF] condition of CVT according to the input signal from the TCM.	• For M/T models, always “OFF” is displayed.
AT OD CANCEL	ON/OFF	• Indicates [ON/OFF] condition of CVT cancel request signal.	• For M/T models, always “OFF” is displayed.
CRUISE LAMP	ON/OFF	• Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.	
SET LAMP	ON/OFF	• Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.	
Voltage	V	• Voltage, frequency, duty cycle or pulse width measured by the probe.	• Only “#” is displayed if item is unable to be measured. • Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency	msec, Hz or %		
DUTY-HI	—		
DUTY-LOW			
PLS WIDTH-HI			
PLS WIDTH-LOW			

cardiagn.com

NOTE:

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	• Engine: Return to the original trouble condition • Change the amount of fuel injection using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Fuel injector • Heated oxygen sensor 1
IGNITION TIMING	• Engine: Return to the original trouble condition • Timing light: Set • Retard the ignition timing using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Perform Idle Air Volume Learning.
POWER BALANCE	• Engine: After warming up, idle the engine. • A/C switch OFF • Shift lever: P or N (CVT), Neutral (M/T) • Cut off each fuel injector signal one at a time using CONSULT-III.	Engine runs rough or dies.	• Harness and connectors • Compression • Fuel injector • Power transistor • Spark plug • Ignition coil
COOLING FAN*	• Ignition switch: ON • Turn the cooling fan “LOW”, “HI” and “OFF” CONSULT-III.	Cooling fan moves and stops.	• Harness and connectors • IPDM E/R (Cooling fan relay) • Cooling fan motor
ENG COOLANT TEMP	• Engine: Return to the original trouble condition • Change the engine coolant temperature using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Engine coolant temperature sensor • Fuel injector
FUEL PUMP RELAY	• Ignition switch: ON (Engine stopped) • Turn the fuel pump relay “ON” and “OFF” using CONSULT-III and listen to operating sound.	Fuel pump relay makes the operating sound.	• Harness and connectors • Fuel pump relay
PURG VOL CONT/V	• Engine: After warming up, run engine at 1,500 rpm. • Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III.	Engine speed changes according to the opening percent.	• Harness and connectors • Solenoid valve
V/T ASSIGN ANGLE	• Engine: Return to the original trouble condition • Change intake valve timing using CONSULT-III.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Intake valve timing control solenoid valve

*: Leaving cooling fan OFF with CONSULT-III while engine is running may cause the engine to overheat.

cardiagn.com

COMPONENT DIAGNOSIS

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:0000000001094085

The specification (SP) value indicates the tolerance of the value that is displayed in “SPEC” of “DATA MONITOR” mode of CONSULT-III during normal operation of the Engine Control System. When the value in “SPEC” of “DATA MONITOR” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “SPEC” of “DATA MONITOR” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.
The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MI.
The SP value will be displayed for the following three items:
- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

Component Function Check

INFOID:0000000001094086

1. START

Make sure that all of the following conditions are satisfied.
- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (0.983 - 1.043 bar, 1.003 - 1.064 kg/cm^2, 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up
- CVT models: After the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (CVT fluid temperature sensor signal) indicates more than 60°C (140°F).
- M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- Electrical load: Not applied*
- Engine speed: Idle

*: Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.

>> GO TO 2.

2. PERFORM “SPEC” OF “DATA MONITOR” MODE

With CONSULT-III
NOTE:
Perform “SPEC” in “DATA MONITOR” mode in maximum scale display.
1. Perform EC-986, "BASIC INSPECTION : Special Repair Requirement".
2. Select “B/FUEL SCHDL”, “A/F ALPHA-B1” and “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode with CONSULT-III.
3. Make sure that monitor items are within the SP value.

Is the inspection result normal?

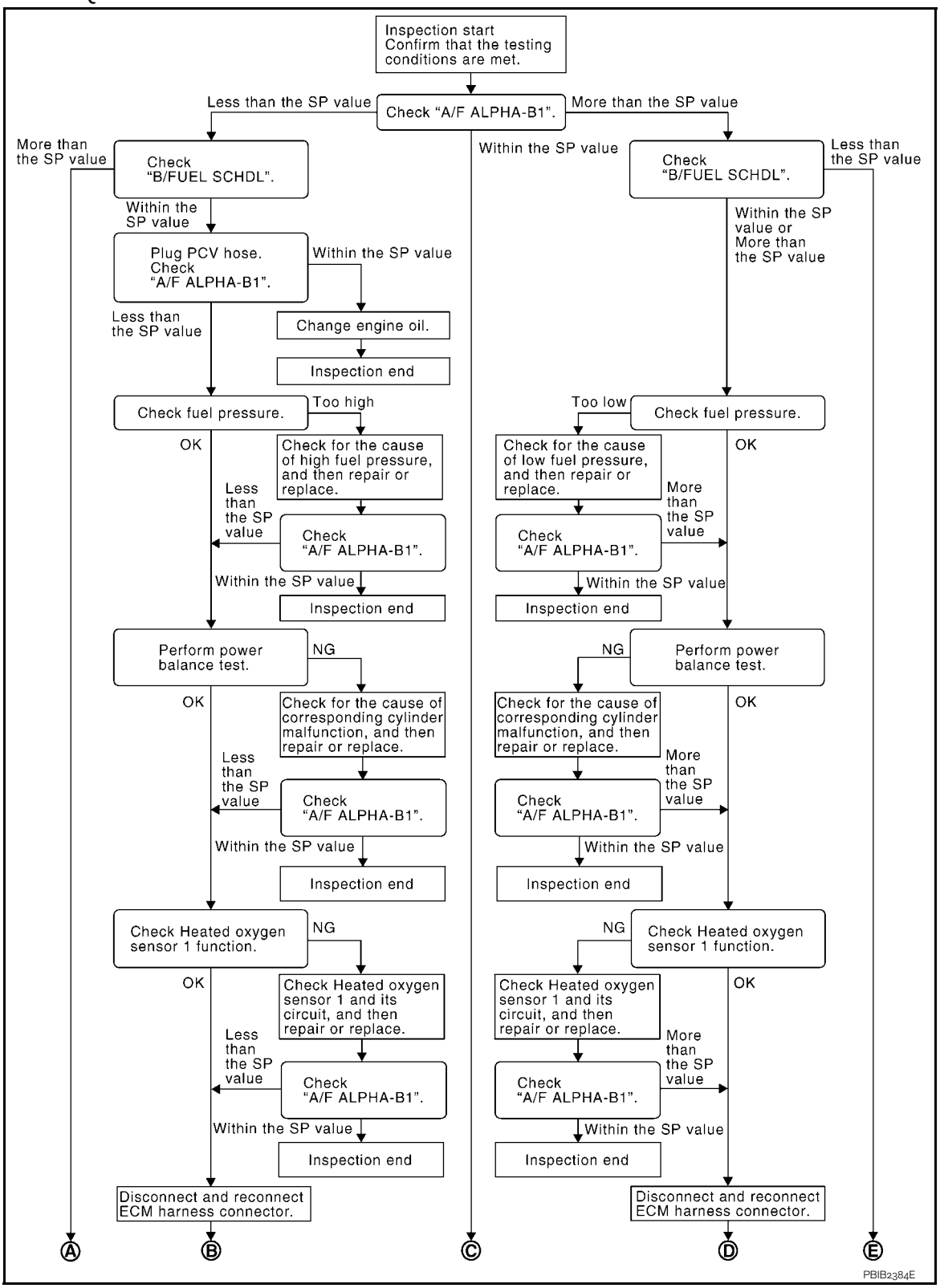
YES >> END
NO >> Go to EC-1061, "Diagnosis Procedure".

Diagnosis Procedure

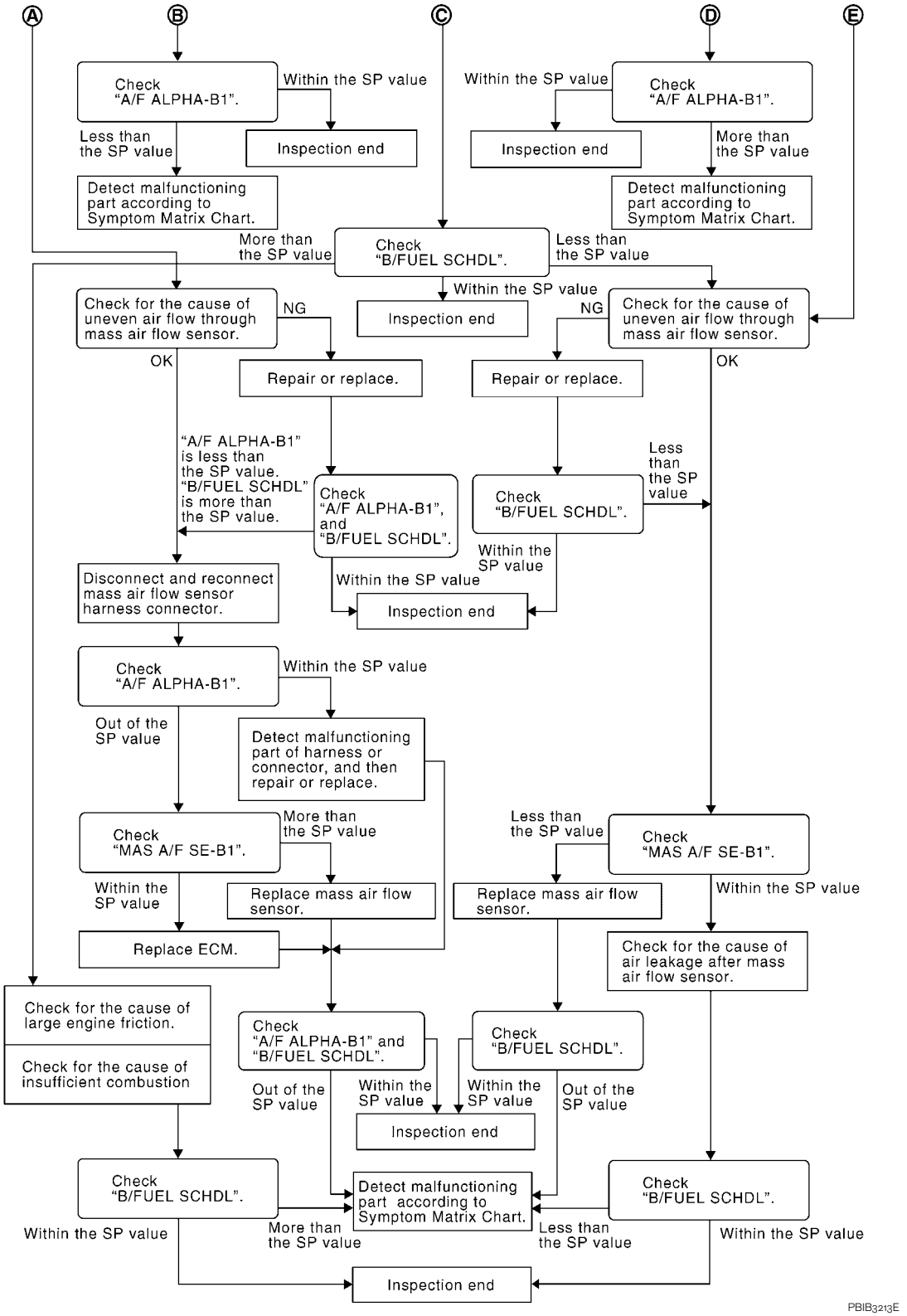
INFOID:0000000001094087

cardiagn.com

OVERALL SEQUENCE



cardiagn.com



DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1"

With CONSULT-III

1. Start engine.
2. Confirm that the testing conditions are met. Refer to EC-1061, "Component Function Check".
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

cardiagn.com

NOTE:
Check “A/F ALPHA-B1” for approximately 1 minute because they may fluctuate. It is NG if the indication is out of the SP value even a little.

Is the measurement value within the SP value?

YES >> GO TO 17.
NO-1 >> Less than the SP value: GO TO 2.
NO-2 >> More than the SP value: GO TO 3.

2. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 4.
NO >> More than the SP value: GO TO 19.

3. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 6.
NO-1 >> More than the SP value: GO TO 6.
NO-2 >> Less than the SP value: GO TO 25.

4. CHECK “A/F ALPHA-B1”

1. Stop the engine.
2. Disconnect PCV hose, and then plug it.
3. Start engine.
4. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 5.
NO >> GO TO 6.

5. CHANGE ENGINE OIL

1. Stop the engine.
2. Change engine oil.

NOTE:
This symptom may occur when a large amount of gasoline is mixed with engine oil because of driving conditions (such as when engine oil temperature does not rise enough since a journey distance is too short during winter). The symptom will not be detected after changing engine oil or changing driving condition.

>> **INSPECTION END**

6. CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-978, "Inspection".)

Is the inspection result normal?

YES >> GO TO 9.
NO-1 >> Fuel pressure is too high: Replace “fuel filter and fuel pump assembly” and then GO TO 8.
NO-2 >> Fuel pressure is too low: GO TO 7.

7. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging

Is the inspection result normal?

YES >> Replace “fuel filter and fuel pump assembly” and then GO TO 8.
NO >> Repair or replace and then GO TO 8.

8. CHECK “A/F ALPHA-B1”

cardiagn.com

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 9.

9.PERFORM POWER BALANCE TEST

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 10.

10.DETECT MALFUNCTIONING PART

Check the following.
1. Ignition coil and its circuit (Refer to EC-929, "Component Function Check".)
2. Fuel injector and its circuit (Refer to EC-923, "Component Function Check".)
3. Intake air leakage
4. Low compression pressure (Refer to EM-142, "Inspection".)

Is the inspection result normal?

YES >> Replace fuel injector and then GO TO 11.
NO >> Repair or replace malfunctioning part and then GO TO 11.

11.CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

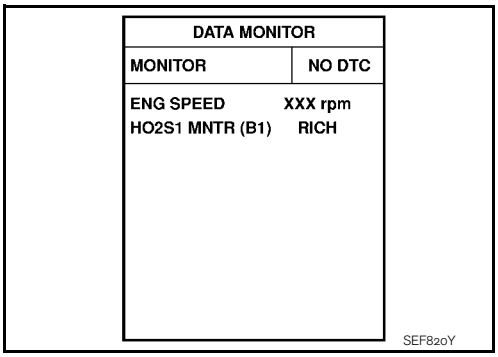
Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> GO TO 12.

12.CHECK HEATED OXYGEN SENSOR 1 FUNCTION

1. Run engine at about 2,000 rpm for about 2minutes under no load.
2. Select “HO2S MNTR (B1)”, in “DATA MONITOR” mode.
3. Running engine at 2,000 rpm under no load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time : RICH → LEAN → RICH
2 times : RICH → LEAN → RICH → LEAN → RICH



Is the inspection result more than 5 times during 10 seconds?

YES >> GO TO 15.
NO >> GO TO 13.

13.CHECK HEATED OXYGEN SENSOR 1 CIRCUIT

Check heated oxygen sensor 1 and its circuit, refer to.

>> GO TO 14.

14.CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 15.

15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.

>> GO TO 16.

16. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-967, "Symptom Table".

17. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO-1 >> More than the SP value: GO TO 18.
NO-2 >> Less than the SP value: GO TO 25.

18. DETECT MALFUNCTIONING PART

1. Check for the cause of large engine friction. Refer to the following.
- Engine oil level is too high
- Engine oil viscosity
- Belt tension of alternator, A/C compressor, etc. is excessive
- Noise from engine
- Noise from transmission, etc.
2. Check for the cause of insufficient combustion. Refer to the following.
- Valve clearance malfunction
- Intake valve timing control function malfunction
- Camshaft sprocket installation malfunction, etc.

>> Repair or replace malfunctioning part, and then GO TO 30.

19. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 21.
NO >> Repair or replace malfunctioning part, and then GO TO 20.

20. CHECK “A/F ALPHA-B1”, AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

YES >> **INSPECTION END**
NO >> “B/FUEL SCHDL” is more, “A/F ALPHA-B1” is less than the SP value: GO TO 21.

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.

cardiagn.com

2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

22. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to EC-746, "DTC Logic". Then GO TO 29.
NO >> GO TO 23.

23. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 24.
NO >> More than the SP value: Replace mass air flow sensor, and then GO TO 29.

24. REPLACE ECM

1. Replace ECM.
2. Go to EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> GO TO 29.

25. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 27.
NO >> Repair or replace malfunctioning part, and then GO TO 26.

26. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Less than the SP value: GO TO 27.

27. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 28.
NO >> Less than the SP value: Replace mass air flow sensor, and then GO TO 30.

28. CHECK INTAKE SYSTEM

Check for the cause of air leak after the mass air flow sensor. Refer to the following.
- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve

cardiagn.com

- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts
- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

29. CHECK “A/F ALPHA-B1” AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-967, "Symptom Table".

30. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and then make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END
NO >> Detect malfunctioning part according to EC-967, "Symptom Table".

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000001094088

1.INSPECTION START

Start engine.

Is engine running?

YES >> GO TO 8.
NO >> GO TO 2.

2.CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	93	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E105, M77
- 10A fuse (No. 4)
- Harness for open or short between ECM and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK GROUND CONNECTION-I

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace ground connection.

5.CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connectors.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
F7	10	Ground	Existed
	11		
E16	108		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between ECM and ground

cardiagn.com

>> Repair open circuit or short to power in harness or connectors.

7. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connectors.
2. Turn ignition switch ON.
3. Check the voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage
Connector	Terminal		
E11	10	Ground	Battery voltage

Is the inspection result normal?

YES >> Go to EC-929, "Diagnosis Procedure".
NO >> GO TO 8.

8. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V.

Is the inspection result normal?

YES >> GO TO 14.
NO-1 >> Battery voltage does not exist: GO TO 9.
NO-2 >> Battery voltage exists for more than a few seconds: GO TO 12.

9. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 11.

10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E16	105	E11	9	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair open circuit or short to ground or short power in harness or connectors.

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

cardiagn.com

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	32	E11	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 13.
NO >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.
- Junction block connectors E6, F123
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK 20A FUSE

1. Disconnect 20A fuse (No. 62) from IPDM E/R.
2. Check 20A fuse.

Is the inspection result normal?

YES >> GO TO 17.
NO >> Replace 20A fuse.

14. CHECK GROUND CONNECTION-II

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace ground connection.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
F7	10	Ground	Existed
	11		
E16	108		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 17.
NO >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors F121, E7
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

cardiagn.com

17. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to power in harness or connectors.

cardiagn.com

U1001 CAN COMM CIRCUIT

Description

INFOID:0000000001094089

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000001094090

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission related diagnosis) for 2 seconds or more.	• Harness or connectors (CAN communication line is open or shorted)

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.

Is DTC detected?

YES >> EC-1073, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094091

Go to LAN-46, "Trouble Diagnosis Flow Chart".

cardiagn.com

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000001094092

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000001094093

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1010	CAN communication bus	When detecting error during the initial diagnosis of CAN controller of ECM.	• ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1074, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094094

1.INSPECTION START

With CONSULT-III

1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. Perform DTC CONFIRMATION PROCEDURE.
   See EC-1074, "DTC Logic".
5. Check DTC.

Without CONSULT-III

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory.
3. Perform DTC CONFIRMATION PROCEDURE.
   See EC-1074, "DTC Logic".
4. Check DTC.

Is the DTC U1010 displayed again?

YES >> GO TO 2.
NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Go to EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

cardiagn.com

P0011 IVT CONTROL

DTC Logic

INFOID:0000000001094095

DTC DETECTION LOGIC

NOTE:
If DTC P0011 is displayed with DTC P1111, first perform the trouble diagnosis for EC-829, "DTC Logic".

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	• Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 4.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 3.5 msec (CVT) More than 4.2 msec (M/T)
Shift lever	P or N position (CVT) N position (M/T)

4. Let engine idle for 10 seconds.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1076, "Diagnosis Procedure"
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

With CONSULT-III

1. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	2,000 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 70°C (221°F)

cardiagn.com

Shift lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

CAUTION:
Always drive at a safe speed.

2. Check 1st trip DTC.

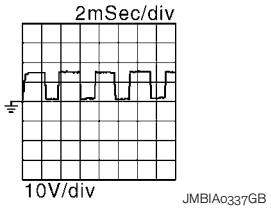
Is 1st trip DTC detected?

YES >> Go to EC-1076, "Diagnosis Procedure"
NO >> INSPECTION END

4.PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle.
4. Check the voltage between ECM harness connector and ground under the following condition.

MAF sensor		Ground	Condition	Voltage
Connector	Terminal			
E18	5	Ground	At idle	Battery voltage
			When revving engine up to 2,000 rpm quickly	 JMBIA0337GB

Is the inspection result normal?

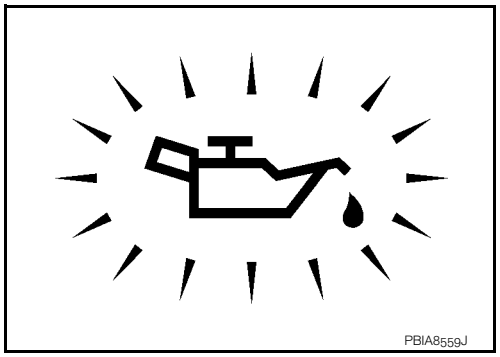
YES >> INSPECTION END
NO >> Go to EC-1076, "Diagnosis Procedure"

Diagnosis Procedure

INFOID:0000000001094096

1.CHECK OIL PRESSURE WARNING LAMP

1. Start engine.
2. Check oil pressure warning lamp and confirm it is not illuminated.


PBIA8559J

Is oil pressure warning lamp illuminated?

YES >> Go to LU-14, "Inspection".
NO >> GO TO 2.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-1077, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace intake valve timing control solenoid valve.

3.CHECK CRANKSHAFT POSITION SENSOR (POS)

cardiagn.com

Refer to EC-812, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace crankshaft position sensor (POS).

4.CHECK CAMSHAFT POSITION SENSOR (PHASE)

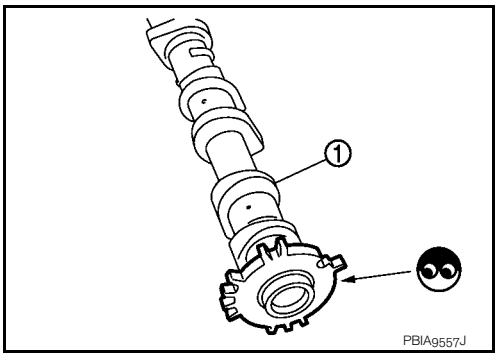
Refer to EC-815, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace camshaft position sensor (PHASE).

5.CHECK CAMSHAFT (INTAKE)

Check the following.
- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end



Is the inspection result normal?

YES >> GO TO 6.
NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.

6.CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misaligned.

Are there any service records that may cause timing chain misaligned?

YES >> Check timing chain installation. Refer to EM-163, "Removal and Installation".
NO >> GO TO 7.

7.CHECK LUBRICATION CIRCUIT

Refer to EM-177, "Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Clean lubrication line.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001094097

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	6.7 - 7.7 Ω
1 or 2 and ground	∞ Ω (Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace intake valve timing control solenoid valve.

cardiagn.com

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

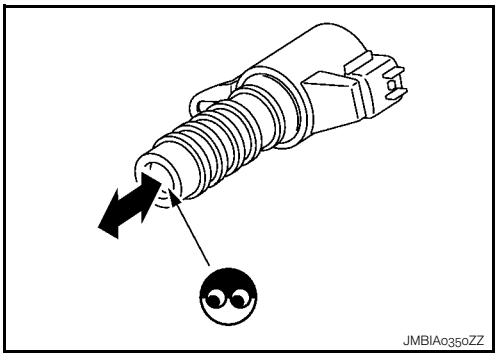
1. Remove intake valve timing control solenoid valve.
2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:

Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.

NOTE:

Always replace O-ring when intake valve timing control solenoid valve is removed.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace intake valve timing control solenoid valve.

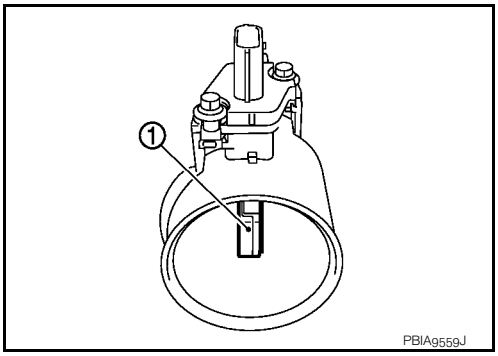
cardiagn.com

P0102, P0103 MAF SENSOR

Description

INFOID:0000000001094098

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



DTC Logic

INFOID:0000000001094099

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor
P0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

Which DTC is detected?

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102

1. Start engine and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1080, "Diagnosis Procedure".
NO >> INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-I

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1080, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-II

1. Start engine and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1080, "Diagnosis Procedure".

cardiagn.com

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094100

1. INSPECTION START

Confirm the detected DTC.

Which DTC is detected?

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2. CHECK INTAKE SYSTEM

Check the following for connection.
- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

Is the inspection result normal?

YES >> GO TO 3.
NO >> Reconnect the parts.

3. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace ground connection.

4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between MAF sensor harness connector and ground.

MAF sensor		Ground	Voltage
Connector	Terminal		
E18	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between MAF sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	4	F8	52	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between MAF sensor harness connector and ECM harness connector.

cardiagn.com

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	3	F8	45	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK MASS AIR FLOW SENSOR

Refer to EC-1081, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace mass air flow sensor.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001094101

1.CHECK MASS AIR FLOW SENSOR-I

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Connect CONSULT-III and select “DATA MONITOR” mode.
5. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
	Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
			Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

cardiagn.com

1. Turn ignition switch OFF.
2. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK MASS AIR FLOW SENSOR-II

With CONSULT-III

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT-III and select “DATA MONITOR” mode.
4. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
	Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
			Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK MASS AIR FLOW SENSOR-III

With CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector and reconnect it again.
3. Start engine and warm it up to normal operating temperature.
4. Connect CONSULT-III and select “DATA MONITOR” mode.
5. Select “MAS A/F SE-B1” and check indication.

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4V
	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
	Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector and reconnect it again.

cardiagn.com

3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4V
			Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
			Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Clean or replace mass air flow sensor.

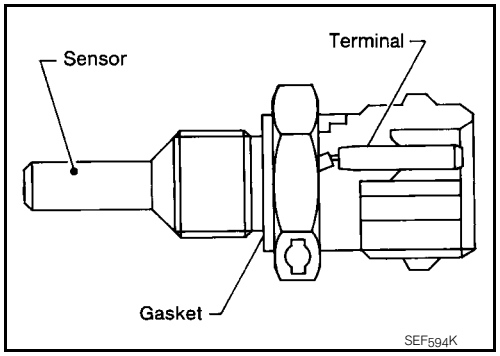
cardiagn.com

P0117, P0118 ECT SENSOR

Description

INFOID:0000000001094106

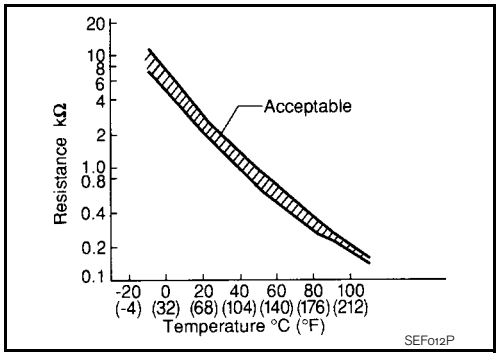
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 38 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:0000000001094107

DTC DETECTION LOGIC

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Engine coolant temperature sensor
P0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1085, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000001094108

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between ECT sensor harness connector and ground.

ECT sensor		Ground	Voltage
Connector	Terminal		
F28	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECT sensor harness connector and ECM harness connector.

ECT sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F28	2	F8	44	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-1085, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace engine coolant temperature sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

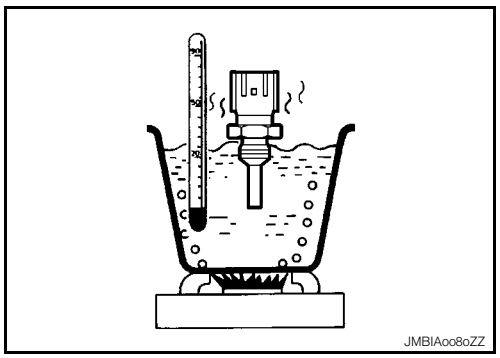
INFOID:0000000001094109

1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Remove engine coolant temperature sensor.

cardiagn.com

4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.



Terminals	Condition		Resistance
1 and 2	Temperature °C (°F)	20 (68)	2.1 - 2.9 kΩ
		50 (122)	0.68 - 1.00 kΩ
		90 (194)	0.236 - 0.260 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace engine coolant temperature sensor.

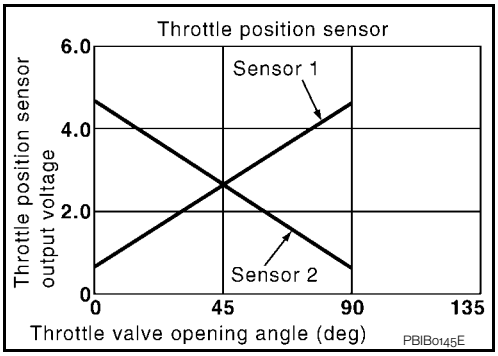
cardiagn.com

P0122, P0123 TP SENSOR

Description

INFOID:0000000001094110

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001094111

DTC DETECTION LOGIC

NOTE:
If DTC P0122 or P0123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-878, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	• Harness or connectors (TP sensor 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 2)
P0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1087, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094112

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

cardiagn.com

3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	3	F8	34	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-1088, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1089, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001094113

cardiagn.com

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-991, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1089, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094114

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-991, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-991, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

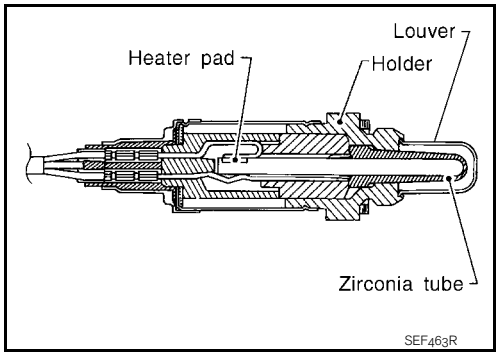
cardiagn.com

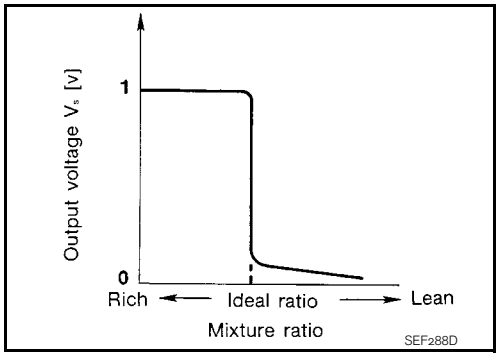
P0132 HO2S1

Description

INFOID:0000000001094115

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



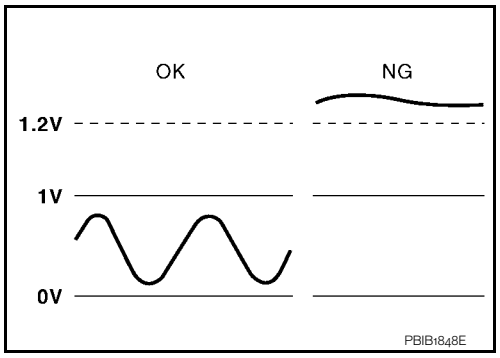


DTC Logic

INFOID:0000000001094116

DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0132	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Heated oxygen sensor 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

cardiagn.com

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-III.
5. Restart engine and let it idle for 2 minutes.
6. If 1st trip DTC is detected.

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for 2 minutes.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Perform Diagnostic Test Mode II (Self- diagnostic results) with ECM.
6. If 1st trip DTC is detected.

Is 1st trip DTC is detected?

YES >> Go to EC-1091, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094117

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	existed

cardiagn.com

2. Check harness continuity between HO2S1 harness connector or ECM harness connector and ground.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HO2S1 CONNECTOR FOR WATER

Check heated oxygen sensor 1 connector for water.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 1

Refer to EC-762, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace heated oxygen sensor 1.

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001094118

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

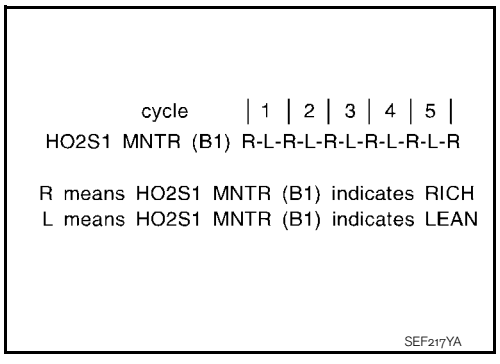
YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 1

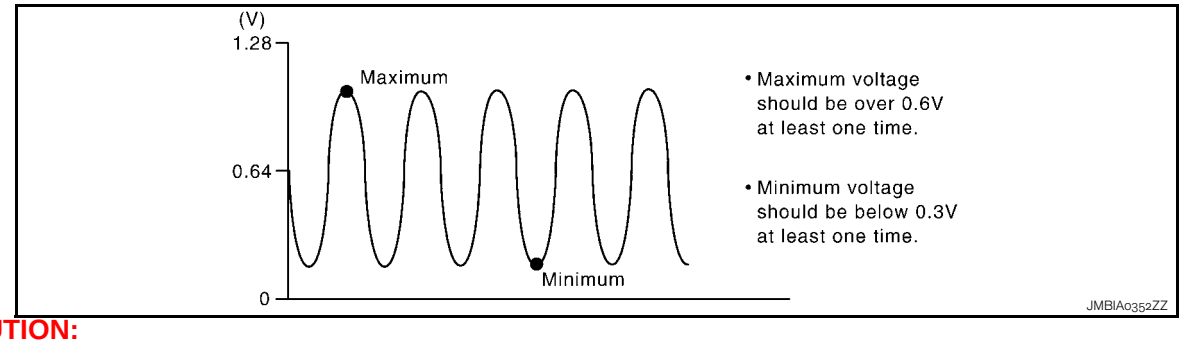
With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.



cardiagn.com



CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

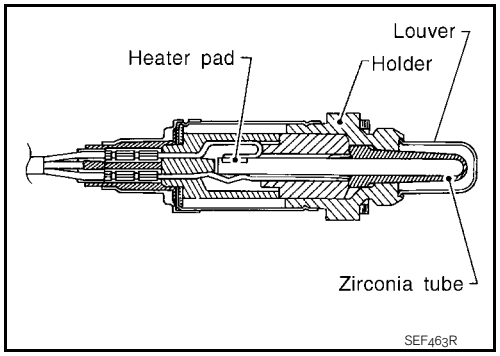
cardiagn.com

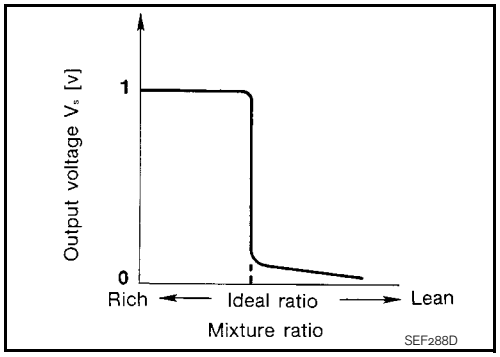
P0134 HO2S1

Description

INFOID:0000000001094124

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



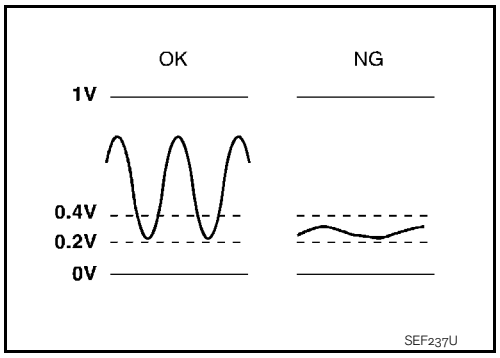


DTC Logic

INFOID:0000000001094125

DTC DETECTION LOGIC

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	• Harness or connectors (The sensor circuit is open or shorted.) • Heated oxygen sensor 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform at a temperature above -10°C (14°F).

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Do you have CONSULT-III?

cardiagn.com

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" in "DATA MONITOR" mode with CONSULT-III, and select "HO2S1 (B1)".
3. Hold engine speed at 2,000 rpm under no load.
4. Make sure that the indications do not remain in the range between 0.2V to 0.4V.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-765, "Diagnosis Procedure".

3.PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set volmeter probes between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage dose not remain in the range of 0.2 to 0.4.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-765, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094126

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace ground connection.

2.CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM harness connector and HO2S1 harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 harness connector and ECM harness connector.

cardiagn.com

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	49	Existed

2. Check harness continuity between ECM harness connector or HO2S1 harness connector and ground.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HEATED OXYGEN SENSOR 1

Refer to EC-772, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace heated oxygen sensor 1.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001094127

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

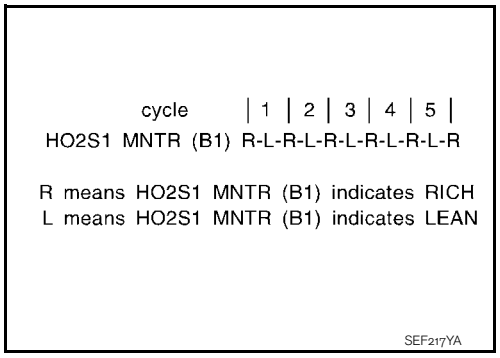
YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 1

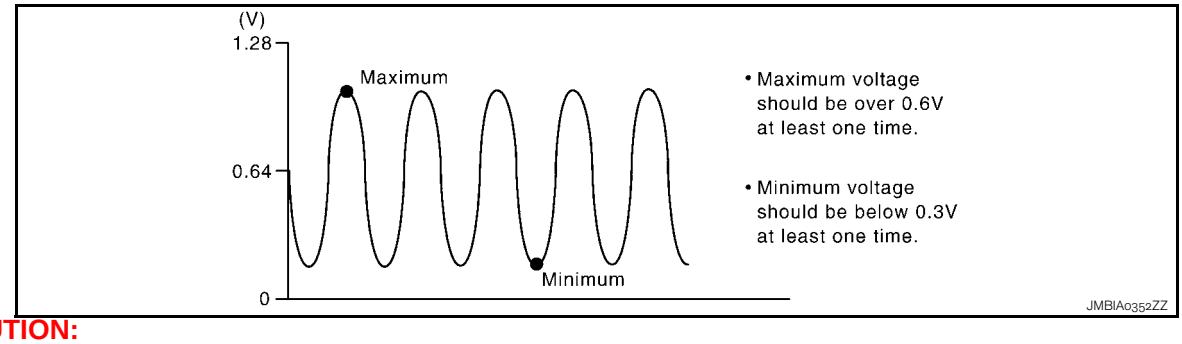
With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-III.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-III screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.



cardiagn.com



CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III
1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

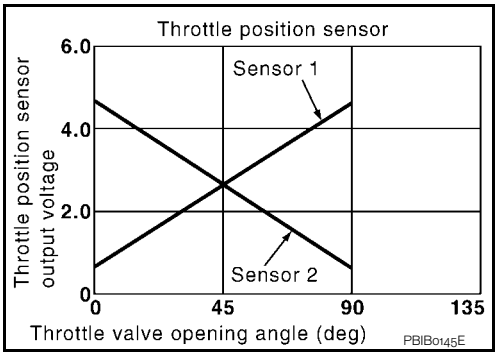
cardiagn.com

P0222, P0223 TP SENSOR

Description

INFOID:0000000001094149

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001094150

DTC DETECTION LOGIC

NOTE:
If DTC P0222 or P0223 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-878, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	• Harness or connectors (TP sensor 1 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1)
P0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1098, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094151

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

cardiagn.com

3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	2	F8	33	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-1099, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1100, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001094152

cardiagn.com

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1100, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094153

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-991, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-991, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P0327, P0328 KS

Description

INFOID:0000000001094156

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.

DTC Logic

INFOID:0000000001094157

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detected condition	Possible cause
P0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Knock sensor
P0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1101, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094158

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK KNOCK SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect knock sensor harness connector and disconnect ECM harness connector.
2. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	2	F8	40	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

cardiagn.com

3.CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	1	F8	37	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK KNOCK SENSOR

Refer to EC-1102, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace knock sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001094159

1.CHECK KNOCK SENSOR

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check resistance between knock sensor terminals as follows.
   NOTE:
   It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	Approx. 532 - 588 kΩ

CAUTION:
Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace knock sensor.

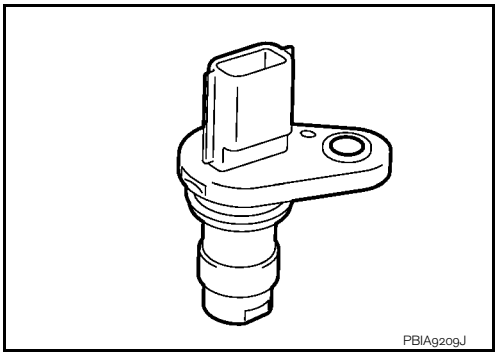
cardiagn.com

P0335 CKP SENSOR (POS)

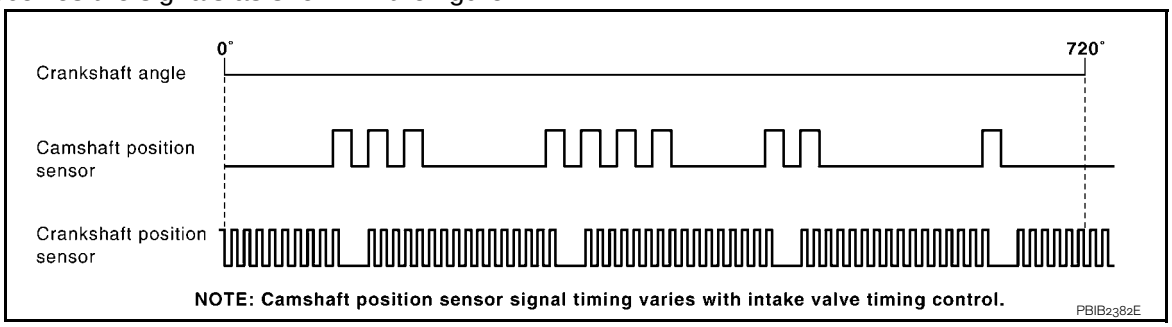
Description

INFOID:0000000001094160

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate. It detects the fluctuation of the engine revolution.
The sensor consists of a permanent magnet and Hall IC.
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
The ECM receives the voltage signal and detects the fluctuation of the engine revolution.


PBIAg209J

ECM receives the signals as shown in the figure.



DTC Logic

INFOID:0000000001094161

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335	Crankshaft position sensor (POS) circuit	• The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. • The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. • The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.	• Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Refrigerant pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • Accelerator pedal position sensor • Signal plate

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.
   If engine does not start, crank engine for at least 2 seconds.
2. Check 1st trip DTC.

cardiagn.com

Is 1st trip DTC detected?

YES >> Go to EC-1104, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094162

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CKP sensor (POS) harness connector and ground.

CKP sensor (POS)		Ground	Voltage
Connector	Terminal		
F20	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	1	F8	75	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit.

4. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5. CHECK COMPONENTS

Check the following.
- Refrigerant pressure sensor (Refer to EC-936, "Diagnosis Procedure".)

Is the inspection result normal?

cardiagn.com

YES >> GO TO 6.
NO >> Replace malfunctioning components.

6.CHECK APP SENSOR

Refer to EC-1163, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 7.

7.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-1164, "Special Repair Requirement".

>> INSPECTION END

8.CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	2	F8	62	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9.CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	3	F8	61	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-1106, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace crankshaft position sensor (POS).

11.CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

Is the inspection result normal?

YES >> GO TO 12.
NO >> Replace the signal plate.

12.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

cardiagn.com

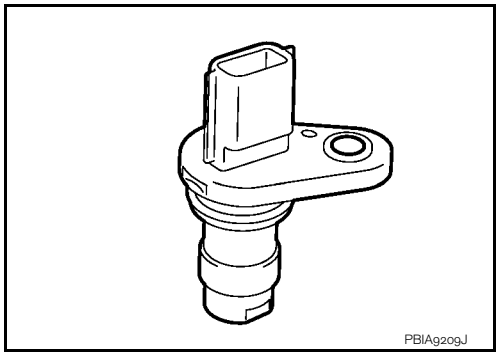
>> INSPECTION END

Component Inspection

INFOID:0000000001094163

1. CHECK CRANKSHAFT POSITION SENSOR (POS)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect crankshaft position sensor (POS) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.



Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace crankshaft position sensor (POS).

2. CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance between crankshaft position sensor (POS) terminals as follows.

Terminals (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace crankshaft position sensor (POS).

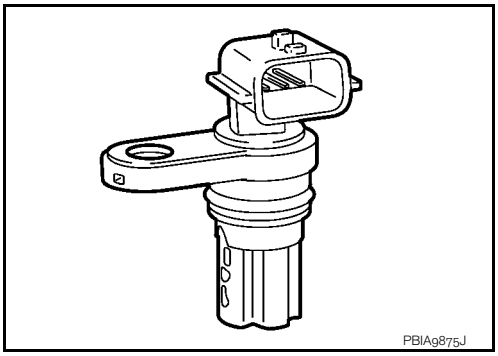
cardiagn.com

P0340 CMP SENSOR (PHASE)

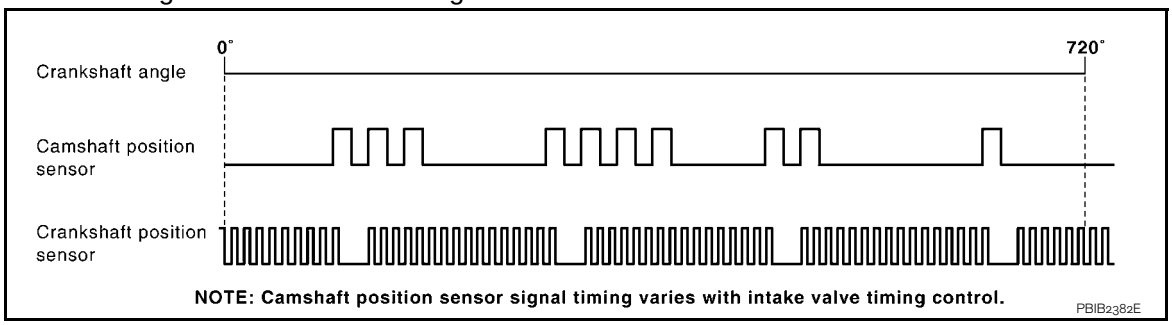
Description

INFOID:0000000001094164

The camshaft position sensor (PHASE) senses the retraction of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.
The sensor consists of a permanent magnet and Hall IC.
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.



Due to the changing magnetic field, the voltage from the sensor changes.
ECM receives the signals as shown in the figure.



DTC Logic

INFOID:0000000001094165

DTC DETECTION LOGIC

NOTE:
If DTC P0340 is displayed with DTC P1129, first perform the trouble diagnosis for DTC P1129. Refer to EC-1137, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sensor (PHASE) circuit	• The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. • The cylinder No. signal is not sent to ECM during engine running. • The cylinder No. signal is not in the normal pattern during engine running.	• Harness or connectors (The sensor circuit is open or shorted) • Camshaft position sensor (PHASE) • Camshaft (INT) • Starter motor • Starting system circuit • Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Start engine and let it idle for at least 5 seconds.
   If engine does not start, crank engine for at least 2 seconds.
2. Check 1st trip DTC.

cardiagn.com

Is 1st trip DTC detected?

YES >> Go to EC-1108, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1108, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094166

1.CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over? Does the starter motor operate?

YES >> GO TO 2.
NO >> Check starting system.

2.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21 Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace ground connection.

3.CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CMP sensor (PHASE) harness connector and ground.

CMP sensor (PHASE)		Ground	Voltage
Connector	Terminal		
F26	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	2	F8	63	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

cardiagn.com

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	3	F8	65	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-1109, "Component Inspection".

Is the inspection result normal?

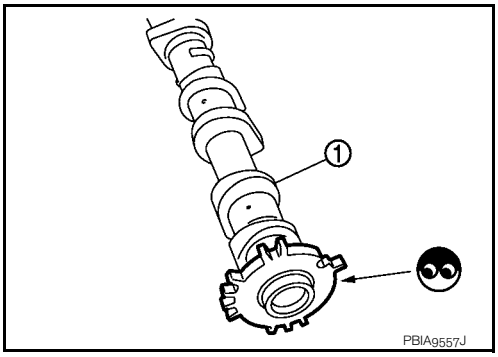
YES >> GO TO 7.
NO >> Replace camshaft position sensor (PHASE).

7.CHECK CAMSHAFT (INT)

Check the following.
- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

Is the inspection result normal?

YES >> GO TO 8.
NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

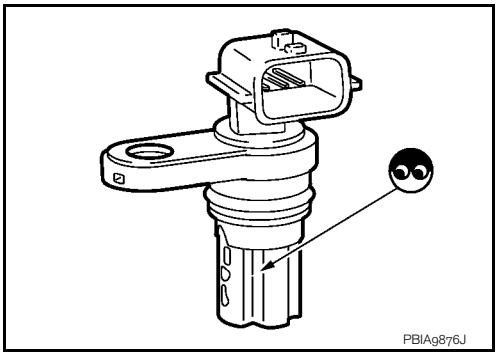
INFOID:0000000001094167

1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect camshaft position sensor (PHASE) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace camshaft position sensor (PHASE).



2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as follows.

cardiagn.com

Terminals (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace camshaft position sensor (PHASE).

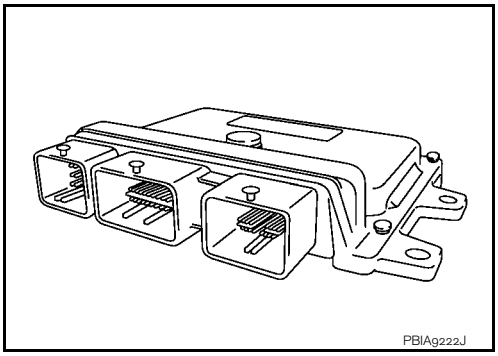
cardiagn.com

P0605 ECM

Description

INFOID:0000000001094179

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



DTC Logic

INFOID:0000000001094180

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605	Engine control module	A)	ECM calculation function is malfunctioning.	• ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

1. Turn ignition switch ON.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1112, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

1. Wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1112, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Repeat step 2 for 32 times.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1112, "Diagnosis Procedure".
NO >> INSPECTION END

cardiagn.com

Diagnosis Procedure

INFOID:0000000001094181

1.INSPECTION START

With CONSULT-III

1. Turn ignition switch ON.
2. Select “SELF-DIAG RESULTS” mode with CONSULT-III.
3. Touch “ERASE”.
4. **Perform DTC CONFIRMATION PROCEDURE.**
   See EC-1111, "DTC Logic".

Without CONSULT-III

1. Turn ignition switch ON.
2. Erase the diagnostic Test Mode II (Self-diagnostic results) memory.
3. **Perform DTC CONFIRMATION PROCEDURE.**
   See EC-1111, "DTC Logic".

Is the 1st trip DTC P0605 displayed again?

YES >> GO TO 2.
NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Go to EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

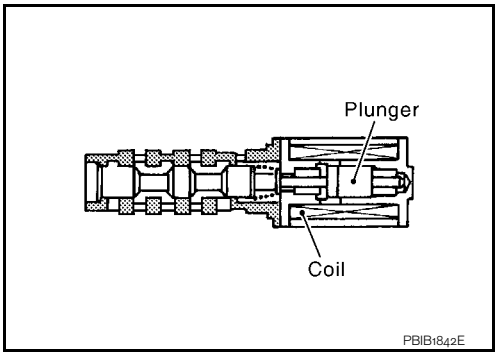
cardiagn.com

P1111 IVT CONTROL SOLENOID VALVE

Description

INFOID:0000000001094182

Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.
The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.
The longer pulse width advances valve angle.
The shorter pulse width retards valve angle.
When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



DTC Logic

INFOID:0000000001094183

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) • Intake valve timing control solenoid valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1113, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094184

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake valve timing control solenoid valve harness connector and ground.

IVT control solenoid valve		Ground	Voltage
Connector	Terminal		
F41	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTION PART

cardiagn.com

Check the following.
- Harness connectors E7, F121
- Harness for open or short between intake valve timing control solenoid valve and IPDM E/R

>> Repair or replace harness or connectors.

3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between intake valve timing control solenoid valve harness connector and ECM harness connector.

IVT control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F41	1	F8	73	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-1114, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace intake valve timing control solenoid valve.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001094185

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

Terminals	Resistance [at 20°C (68°F)]
1 and 2	6.7 - 7.7 Ω
1 or 2 and ground	∞ Ω (Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace intake valve timing control solenoid valve.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve.

cardiagn.com

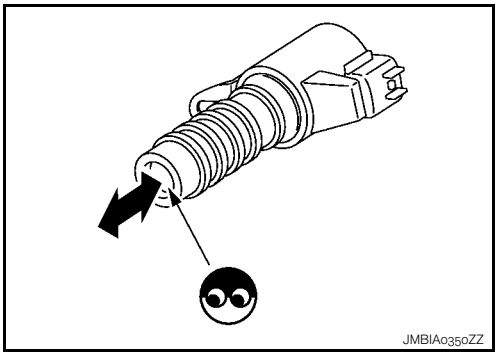
2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:

Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.

NOTE:

Always replace O-ring when intake valve timing control solenoid valve is removed.



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve.

cardiagn.com

P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:0000000001094186

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001094187

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	• Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detect the throttle valve is stuck open.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set shift lever to P (CVT) or Neutral (M/T) position.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
7. Set shift lever to P (CVT) or Neutral (M/T) position.
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.

Is DTC detected?

YES >> Go to EC-1116, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set shift lever to N, P (CVT) or Neutral (M/T) position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.

Is DTC detected?

YES >> Go to EC-1116, "Diagnosis Procedure".
NO >> INSPECTION END

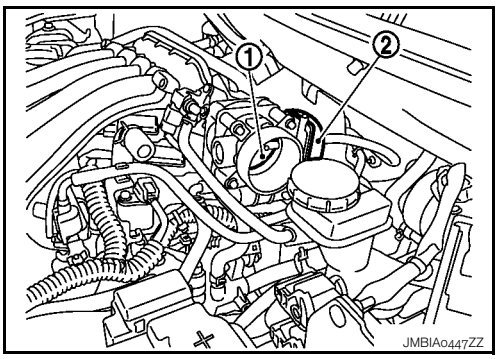
Diagnosis Procedure

INFOID:0000000001094188

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

cardiagn.com

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.



2. Electric throttle control actuator

Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1117, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094189

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

cardiagn.com

P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:0000000001094190

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001094191

DTC DETECTION LOGIC

NOTE:
If DTC P1122 is displayed with DTC P1121 or P1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to EC-1122, "DTC Logic" or EC-1116, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122	Electric throttle control performance	Electric throttle control function does not operate properly.	• Harness or connectors (Throttle control motor circuit is open or shorted) • Electric throttle control actuator

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-1118, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001115766

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch OFF	Approx. 0V
			Ignition switch ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 3.

3.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 4.

4.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E12.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	25	F7	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness connectors.

6.CHECK FUSE

1. Disconnect 15A fuse (No. 51) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace 15A fuse.

7.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	32	F7	2	Existed

2. Also check harness for short to ground and short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness connectors.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

10. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

5. Also check harness for short to ground and short to power.

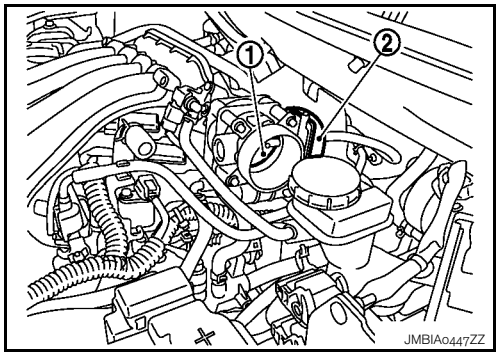
Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace.

11. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve (1) and the housing.

2. Electric throttle control actuator



Is the inspection result normal?

YES >> GO TO 12.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

12. CHECK THROTTLE CONTROL MOTOR

Refer to EC-837, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 13.
NO >> GO TO 14.

13. CHECK INTERMITTENT INCIDENT

cardiagn.com

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair or replace harness or connectors.

14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace malfunction electric throttle control actuator.
2. Go to EC-837, "Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000001094193

1. CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance
5 and 6	Approx. 1 - 15 Ω [at 25 °C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1121, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094194

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Description

INFOID:0000000001094195

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

DTC Logic

INFOID:0000000001094196

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	• Harness or connectors (Throttle control motor relay circuit is open) • Throttle control motor relay
P1126	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	• Harness or connectors (Throttle control motor relay circuit is shorted) • Throttle control motor relay

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V.

Witch DTC is detected?

P1126 >> GO TO 2.
P1124 >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P1126

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-1122, "Diagnosis Procedure".
NO >> INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P1124

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1122, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094197

1.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E12.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	25	F7	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness connectors.

4.CHECK FUSE

1. Disconnect 15A fuse (No. 51) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace 15A fuse.

5.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch OFF	Approx. 0V
			Ignition switch ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 6.

6.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E12	32	F7	2	Existed

2. Also check harness for short to ground and short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

cardiagn.com

P1128 THROTTLE CONTROL MOTOR

Description

INFOID:0000000001094198

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:0000000001094199

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	• Harness or connectors (Throttle control motor circuit is shorted.) • Electric throttle control actuator (Throttle control motor)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-1125, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094200

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect electric throttle control actuator harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

cardiagn.com

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK THROTTLE CONTROL MOTOR

Refer to EC-1126, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 5.

4.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1126, "Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:0000000001094201

1.CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance
5 and 6	Approx. 1 - 15 Ω [at 25 °C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1126, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094202

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1212 TCS COMMUNICATION LINE

Description

INFOID:0000000001094224

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and “ABS actuator and electric unit (control unit)”.
Be sure to erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

DTC Logic

INFOID:0000000001094225

DTC DETECTION LOGIC

NOTE:
- **If DTC P1212 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-740, "DTC Logic".**
- **If DTC P1212 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-741, "DTC Logic".**

Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212	TCS communication line	ECM can not receive the information from “ABS actuator and electric unit (control unit)” continuously.	• Harness or connectors (The CAN communication line is open or shorted.) • ABS actuator and electric unit (control unit) • Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-869, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094226

Go to BRC-74, "Work Flow".

cardiagn.com

P1217 ENGINE OVER TEMPERATURE

DTC Logic

INFOID:0000000001094227

DTC DETECTION LOGIC

NOTE:

- **If DTC P1217 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-740, "DTC Logic".**
- **If DTC P1217 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-741, "DTC Logic".**

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.
When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217	Engine over temperature (Overheat)	• Cooling fan does not operate properly (Overheat). • Cooling fan system does not operate properly (Overheat). • Engine coolant was not added to the system using the proper filling method. • Engine coolant is not within the specified range.	• Harness or connectors (The cooling fan circuit is open or shorted.) • IPDM E/R (Cooling fan relay-1) • Cooling fan relay -3 • Cooling fan motor • Radiator hose • Radiator • Radiator cap • Reservoir tank • Water pump • Thermostat • Water control valve

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to CO-30, "Inspection". Also, replace the engine oil. Refer to LU-15, "Draining".

1. **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-21, "SAE Viscosity Number".**
2. **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-1129, "Component Function Check".

NOTE:

Use component function check to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1130, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001094228

1.PERFORM COMPONENT FUNCTION CHECK-I

WARNING:

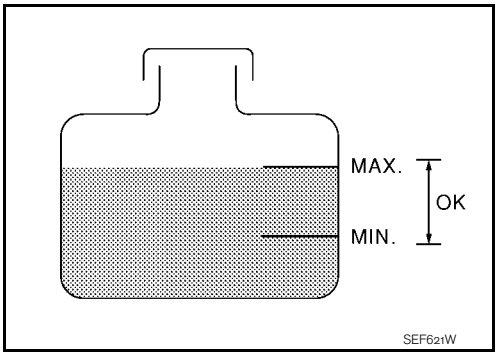
Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.
Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

cardiagn.com

Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.

Is the coolant level in the reservoir tank and/or radiator below the proper range?

YES >> Go to EC-1130, "Diagnosis Procedure".
NO >> GO TO 2.



2.PERFORM COMPONENT FUNCTION CHECK-II

Confirm whether customer filled the coolant or not.

Did customer fill the coolant?

YES >> Go to EC-1130, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

With CONSULT-III
1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that cooling fan motor operate at each speed (LOW/HI).

Without CONSULT-III
Perform IPDM E/R auto active test and check cooling fan motors operation, refer to PCS-9, "Diagnosis Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1130, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094229

1.INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.
No >> GO TO 4.

2.CHECK COOLING FAN LOW SPEED OPERATION

With CONSULT-III
1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III and touch “LOW” on the CONSULT-III screen.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check cooling fan control circuit.

3.CHECK COOLING FAN HIGH SPEED OPERATION

With CONSULT-III
1. Touch “HIGH” on the CONSULT-III screen.
2. Make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check cooling fan control circuit.

4.CHECK COOLING FAN LOW SPEED OPERATION

cardiagn.com

Without CONSULT-III
1. Start engine and let it idle.
2. Turn air conditioner switch ON.
3. Turn blower fan switch ON.
4. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check cooling fan low speed control circuit.

5.CHECK COOLING FAN HIGH SPEED OPERATION

Without CONSULT-III
1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check cooling fan high speed control circuit.

6.CHECK COOLING SYSTEM FOR LEAK

Check cooling system for leak. Refer to CO-30, "Inspection".

Is leakage detected?

YES >> GO TO 8.
NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following for leak. Refer to CO-30, "Inspection".
- Hose
- Radiator
- Water pump
- Reservoir tank

>> Repair or replace.

8.CHECK RESERVOIR TANK CAP

Check radiator cap. Refer to CO-33, "RESERVOIR TANK CAP : Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace radiator cap.

9.CHECK THERMOSTAT

Check thermostat.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace thermostat.

10.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor.

Is the inspection result normal?

OK >> GO TO 11.
NG >> Replace engine coolant temperature sensor.

11.CHECK MAIN 13 CAUSES

If the cause cannot be isolated, check the following.

cardiagn.com

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	• Blocked radiator • Blocked condenser • Blocked radiator grille • Blocked bumper	• Visual	No blocking	—
	2	• Coolant mixture	• Coolant tester	50 - 50% coolant mixture	MA-21, "SAE Viscosity Number"
	3	• Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-30, "Inspection"
	4	• Reservoir tank cap	• Pressure tester	59 - 98 kPa (0.6 - 1.0 bar, 0.6 - 1.0 kg/cm^2, 9 - 14 psi) (Limit)	CO-35, "Removal and Installation"
ON*2	5	• Coolant leaks	• Visual	No leaks	CO-30, "Inspection"
ON*2	6	• Thermostat	• Touch the upper and lower radiator hoses	Both hoses should be hot	CO-41, "Removal and Installation"
ON*1	7	• Cooling fan motor	• CONSULT-III	Operating	EC-920, "Component Inspection (Cooling Fan Motor)"
OFF	8	• Combustion gas leak	• Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	• Coolant temperature gauge	• Visual	Gauge less than 3/4 when driving	—
		• Coolant overflow to reservoir tank	• Visual	No overflow during driving and idling	CO-30, "Inspection"
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	CO-30, "Inspection"
OFF	11	• Water control valve	• Remove and inspect the valve	Within the specified value	CO-44, "Removal and Installation"
OFF	12	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	EM-186, "Removal and Installation"
	13	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	EM-191, "Inspection"

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to CO-26, "Troubleshooting Chart".

>> INSPECTION END

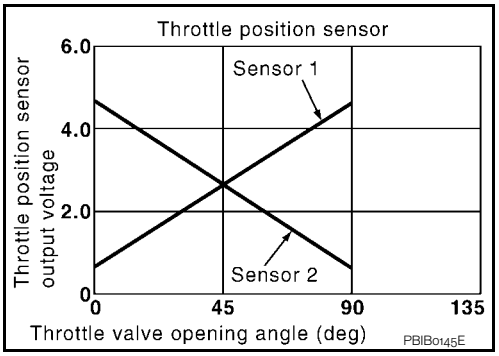
cardiagn.com

P1225 TP SENSOR

Description

INFOID:0000000001094230

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001094231

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1133, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

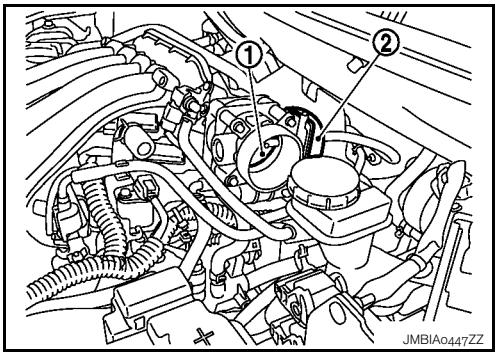
INFOID:0000000001094232

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

cardiagn.com

3. Check if foreign matter is caught between the throttle valve (1) and the housing.



2. Electric throttle control actuator

Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1134, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094233

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

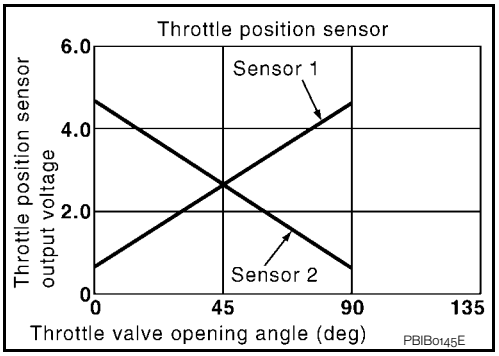
cardiagn.com

P1226 TP SENSOR

Description

INFOID:0000000001094234

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001094235

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226	Closed throttle position learning performance	Closed throttle position learning is not performed successfully, repeatedly.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF, wait at least 10 seconds.
3. Turn ignition switch ON.
4. Repeat steps 2 and 3 for 32 times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1135, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

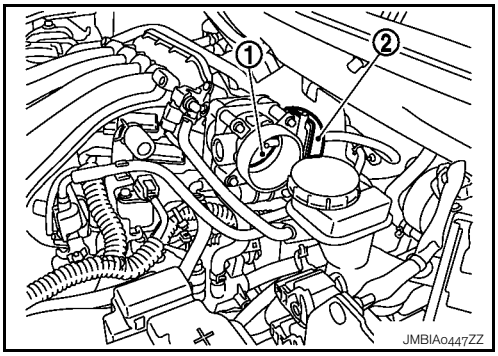
INFOID:0000000001094236

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

cardiagn.com

3. Check if foreign matter is caught between the throttle valve (1) and the housing.



2. Electric throttle control actuator

Is the inspection result normal?

YES >> GO TO 2.
NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1134, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094237

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

cardiagn.com

P1229 SENSOR POWER SUPPLY

DTC Logic

INFOID:0000000001094238

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	• Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.] • Accelerator pedal position sensor • Throttle position sensor • Camshaft position sensor (PHASE)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1137, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094239

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

cardiagn.com

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	72	Electric throttle control actuator	F29	1
	78	CMP sensor (PHASE)	F26	1
E16	106	APP sensor	E110	4

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair short to ground or short to power in harness or connectors.

4.CHECK COMSHAFT PSITION SENSOR

Refer to EC-1109, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace malfunctioning component.

5.CHECK TP SENSOR

Refer to EC-908, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-833, "Special Repair Requirement".

>> INSPECTION END

7.CHECK APP SENSOR

Refer to EC-901, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> INSPECTION END

9.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P1564 ASCD STEERING SWITCH

Description

INFOID:0000000001116077

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.
Refer to EC-677, "System Description" for the ASCD function.

DTC Logic

INFOID:0000000001116078

DTC DETECTION LOGIC

NOTE:
If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-827, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564	ASCD steering switch	• An excessively high voltage signal from the ASCD steering switch is sent to ECM. • ECM detects that input signal from the ASCD steering switch is out of the specified range. • ECM detects that the ASCD steering switch is stuck ON.	• Harness or connectors (The switch circuit is open or shorted.) • ASCD steering switch • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Wait at least 10 seconds.
3. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Check DTC.

Is DTC detected?

YES >> Go to EC-1139, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116079

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YS >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-III
1. Turn ignition switch ON.

cardiagn.com

2. Select “MAIN SW”, “CANCEL SW”, “RESUME/ACC SW” and “SET SW” in “DATA MONITOR” mode with CONSULT-III.
3. Check each item indication under the following conditions.

Monitor item	Condition		Indication
MAIN SW	MAIN switch	Pressed	ON
		Released	OFF
CANCEL SW	CANCEL switch	Pressed	ON
		Released	OFF
RESUME/ACC SW	RESUME/ACCELERATE switch	Pressed	ON
		Released	OFF
SET SW	SET/COAST switch	Pressed	ON
		Released	OFF

Without CONSULT-III
1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
E16	94 (ASCD steering switch signal)	Ground	MAIN switch: Pressed	Approx. 0V
			CANSEL switch: Pressed	Approx. 1V
			SET/COAST switch: Pressed	Approx. 2V
			RESUME/ACCELERATE switch: Pressed	Approx. 3V
			All ASCD steering switches: Released	Approx. 4V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect combination switch harness connector M352.
4. Check the continuity between ASCD steering switch and ECM harness connector.

ASCD steering switch	ECM		Continuity
Terminal	Connector	Terminal	
15	E16	95	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCE steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

cardiagn.com

1. Check the continuity between ECM harness connector and ASCD steering switch.

ASCD steering switch	ECM		Continuity
Terminal	Connector	Terminal	
14	E16	94	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCE steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD STEERING SWITCH

Refer to EC-1141, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace ASCD steering switch.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001116080

1. CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the continuity between combination switch harness connector terminals under following conditions.

Combination meter		Condition	Resistance
Connector	Terminals		
M325	14 and 15	MAIN switch: Pressed	Approx. 0 Ω
		CANCEL switch: Pressed	Approx. 250 Ω
		SET/COAST switch: Pressed	Approx. 660 Ω
		RESUME/ACCELERATE switch: Pressed	Approx. 1,480 Ω
		All ASCD steering switches: Released	Approx. 4,000 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD steering switch

cardiagn.com

P1572 ASCD BRAKE SWITCH

Description

INFOID:0000000001116081

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-677, "System Description" for the ASCD function.

DTC Logic

INFOID:0000000001116082

DTC DETECTION LOGIC

NOTE:

- **If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-827, "DTC Logic".**
- **This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.**

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1572	ASCD brake switch	A)	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the ECM at the same time.	• Harness or connectors (The stop lamp switch circuit is shorted.) • Harness or connectors (The ASCD brake switch circuit is shorted.) • Harness or connectors (The ASCD clutch switch circuit is shorted.) (M/T) • Stop lamp switch • ASCD brake switch • ASCD clutch switch (M/T) • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • Incorrect ASCD clutch switch installation (M/T) • ECM
		B)	ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?.

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

With CONSULT-III

1. Start engine.
2. Select “DATA MONITOR” mode with CONSULT-III.
3. Press MAIN switch and make sure that CRUISE indicator is displayed in combination meter.
4. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

CAUTION:

cardiagn.com

Always drive vehicle at a safe speed.
NOTE:
This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

VHCL SPEED SE	More than 30 km/h (19 mph)
Shift lever	Suitable position

5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1144, "Diagnosis Procedure".
NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

With CONSULT-III

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.
CAUTION:
Always drive vehicle at a safe speed.
NOTE:
This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1144, "Diagnosis Procedure".
NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK

Perform component check. Refer to EC-1143, "Component Function Check"
Use component function check to check the overall function of the ASCD brake circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1144, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001116275

1. PERFORM COMPONENT FUNCTION CHECK-I

Without CONSSULT-III

1. Turn ignition switch ON.
2. Check voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-826, "Diagnosis Procedure".

cardiagn.com

2.PERFORM COMPONENT FUNCTION CHECK-II

Without CONSSULT-III
Check voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	99 (Stop lamp switch signal)	Ground	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-826, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116083

1.CHECK OVERALL FUNCTION-I

With CONSULT-III
1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-III.
3. Check “BRAKE SW1” indication under the following conditions.

Monitor item	Condition		Indication
BRAKE SW1	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	OFF
		Fully released	ON

Without CONSULT-III
1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO-1 >> CVT models: GO TO 3.
NO-1 >> M/T models: GO TO 7.

2.CHECK OVERALL FUNCTION-II

With CONSULT-III
Select “BRAKE SW2” and check indication in “DATA MONITOR” mode.

Monitor item	Condition		Indication
BRAKE SW2	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	ON
		Fully released	OFF

Without CONSULT-III
Check the voltage between ECM harness connector and ground.

cardiagn.com

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	99 (Stop lamp switch signal)	Ground	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 14.

3. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD brake switch		Ground	Voltage
Connector	Terminal		
E112	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Junction block connector E105, M77
- 10A fuse (No.4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM ASCD harness connector.
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

ASCD brake switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E16	100	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD BRAKE SWITCH

Refer to EC-1148, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 19.
NO >> Replace ASCD brake switch.

7. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

cardiagn.com

ASCD Clutch switch		Ground	Condition		Voltage (V)
Connector	Terminal				
E112	1	Ground	Clutch pedal	Slightly depressed	Approx. 0
				Fully released	Battery voltage

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 8.

8.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground	Voltage
Connector	Terminal		
E111	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9.DETECT MALFUNCTIONING PART

Check the following.
- Junction block connector E105, M77
- 10A fuse (No.4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD brake switch		ASCD clutch switch		Continuity
Connector	Terminal	Connector	Terminal	
E112	1	E111	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

11.CHECK ASCD BRAKE SWITCH

Refer to EC-888, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 19.
NO >> Replace ASCD brake switch.

12.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and ASCD brake switch harness connector.

cardiagn.com

ECM		ASCD brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E16	100	E112	2	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK ASCD CLUTCH SWITCH

Refer to EC-888, "Component Inspection (ASCD Clutch Switch)".

Is the inspection result normal?

YES >> GO TO 19.
NO >> Replace ASCD clutch switch.

14. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114 (M/T) E115 (CVT)	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 16.
NO >> GO TO 15.

15. DETECT MALFUNCTIONING PART

Check the following.
- 10A fuse (No.11)
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

16. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

ECM		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E10	106	E114 (M/T) E115 (CVT)	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 18.
NG >> GO TO 17.

17. DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

cardiagn.com

18. CHECK STOP LAMP SWITCH

Refer to EC-889, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 19.
NO >> Replace stop lamp switch.

19. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:0000000001116084

1. CHECK ASCD BRAKE SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to BR-8, "Inspection and Adjustment" (LHD models) or BR-52, "Inspection and Adjustment" (RHD models).
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:0000000001116085

1. CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to CL-5, "Inspection and Adjustment".

cardiagn.com

2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

Component Inspection (Stop Lamp Switch)

INFOID:0000000001116086

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-8, "Inspection and Adjustment" (LHD models) or BR-52, "Inspection and Adjustment" (RHD models).
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

cardiagn.com

P1574 ASCD VEHICLE SPEED SENSOR

Description

INFOID:0000000001116087

The ECM receives two vehicle speed sensor signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to EC-677, "System Description" for ASCD functions.

DTC Logic

INFOID:0000000001116088

DTC DETECTION LOGIC

NOTE:

- **If DTC P1574 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to EC-740, "DTC Logic".**
- **If DTC P1574 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to EC-741, "DTC Logic".**
- **If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to EC-825, "DTC Logic"**
- **If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-827, "DTC Logic"**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	• Harness or connectors (The CAN communication line is open or shorted.) (Combination meter circuit is open or shorted.) • Combination meter • ABS actuator and electric unit (control unit) • Wheel sensor • TCM (CVT models) • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Drive the vehicle at more than 40 km/h (25 MPH).
   CAUTION:
   Always drive vehicle at a safe speed.
   NOTE:
   This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.
3. Check DTC.

Is DTC detected?

YES >> Go to EC-1150, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116089

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-214, "Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Perform trouble shooting relevant to DTC indicated.

2. CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to BRC-17, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3. CHECK COMBINATION METER

Check combination meter function.
Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

>> INSPECTION END

cardiagn.com

P1706 PNP SWITCH

Description

INFOID:0000000001094253

When the shift lever position is P or N (CVT), Neutral position (M/T), park/neutral position (PNP) switch is ON. ECM detects the position because the continuity of the line (the ON signal) exists.

DTC Logic

INFOID:0000000001094254

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	• Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] • Park/neutral position (PNP) switch

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 3.

3.CHECK PNP SWITCH FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-III. Then check the “P/N POSI SW” signal under the following conditions.

Position (Shift lever)	Known-good signal
N or P position (CVT) Neutral position (M/T)	ON
Except above position	OFF

Is the inspection result normal?

YES >> GO TO 4.
NO >> Go to EC-1153, "Diagnosis Procedure".

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to normal operating temperature.
3. Maintain the following conditions for at least 50 consecutive seconds.

CAUTION:
Always drive vehicle at a safe speed.

ENG SPEED	CVT: 1,500 - 6,375 rpm M/T: 1,500 - 6,375 rpm
COOLAN TEMP/S	More than 70°C (158°F)

cardiagn.com

B/FUEL SCHDL	CVT: 2.4 - 31.8 msec M/T: 3.5 - 31.8 msec
VHCL SPEED SE	More than 64 km/h (40 mph)
Shift lever	Suitable position

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1153, "Diagnosis Procedure".
NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-1153, "Component Function Check".

NOTE:
Use component function check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1153, "Diagnosis Procedure".

Component Function Check

INFOID:0000000001094255

1. PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	69 (PNP switch signal)	Ground	Shift lever	P or N (CVT) Neutral (M/T)	Approx. 0V
				Except above	BATTERY VOLTAGE

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1153, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094256

1. CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Park/neutral position (PNP) switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between PNP switch harness connector and ground.

PNP switch		Ground	Voltage
Connector	Terminal		
F21 (CVT)	7	Ground	Battery voltage
F46 (M/T 2W)	2		
F48 (M/T 4W)	2		

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2. DTECTED MALFUNCTIONING PART

Check the following.
- Harness connectors E6, F123

cardiagn.com

• Harness for open or short between PNP switch and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between PNP switch harness connector and ECM harness connector.

PNP switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F21 (CVT)	6	E10	102	Existed
F46 (M/T 2W)	3			
F48 (M/T 4W)	1			

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO-1 >> Repair open circuit or short to ground or short to power in harness or connectors. (M/T)
NO-2 >> GO TO 4. (CVT)

4. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Check the continuity between PNP switch harness connector and ECM harness connector.

PNP switch		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F21 (CVT)	7	E11	14	Existed

2. Check the continuity between IPDM E/R harness connector and ECM harness connector.

ECM		IPDM		Continuity
Connector	Terminal	Connector	Terminal	
F8	69	E11	14	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK PNP SWITCH

Refer to TM-227, "Component Inspection" (CVT) or TM-54, "PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection" (M/T).

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace PNP switch.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P1805 BRAKE SWITCH

Description

INFOID:0000000001094260

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

DTC Logic

INFOID:0000000001094261

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805	Brake switch	A brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	• Harness or connectors (Stop lamp switch circuit is open or shorted.) • Stop lamp switch

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-III.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-1155, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094262

1.CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

Is 1st trip DTC detected?

YES >> GO TO 4
NO >> GO TO 2

2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114 (M/T)	1	Ground	Battery voltage
E115 (CVT)			

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connector.

3.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

cardiagn.com

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

ECM		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E16	99	E114 (M/T)	2	Existed
		E115 (CVT)		

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NG >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M77, E105
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK STOP LAMP SWITCH

Refer to EC-1156, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace stop lamp switch.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (Stop Lamp Switch)

INFOID:0000000001094263

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to EC-897, "Component Inspection (Stop Lamp Switch)".
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> Replace stop lamp switch.

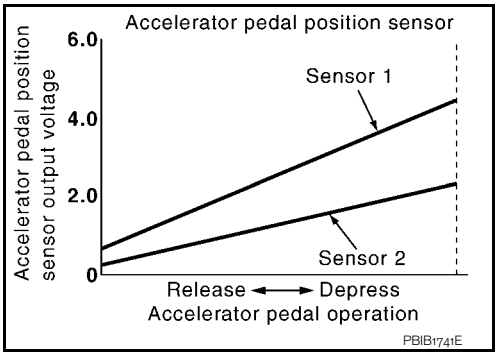
cardiagn.com

P2122, P2123 APP SENSOR

Description

INFOID:0000000001094264

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



DTC Logic

INFOID:0000000001094265

DTC DETECTION LOGIC

NOTE:
If DTC P2122 or P2123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-1137, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	• Harness or connectors (APP sensor 1 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 1)
P2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1158, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094266

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	9	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E16	111	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK APP SENSOR

Refer to EC-1160, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-1160, "Special Repair Requirement".

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

Component Inspection

INFOID:0000000001094267

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-1160, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094268

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

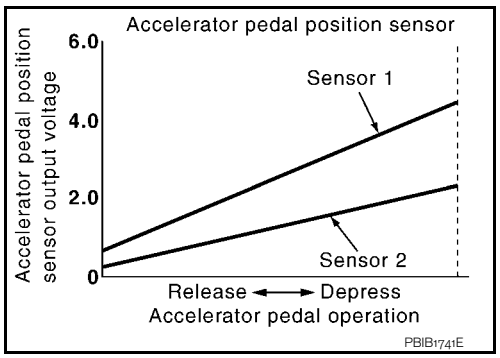
cardiagn.com

P2127, P2128 APP SENSOR

Description

INFOID:0000000001094269

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

DTC Logic

INFOID:0000000001094270

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	• Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor
P2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1161, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094271

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 3.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	5	E16	102	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-1106, "Component Inspection".)
- Refrigerant pressure sensor (Refer to EC-936, "Diagnosis Procedure".)

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace malfunctioning component.

6.CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

cardiagn.com

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	1	E16	104	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	6	E16	103	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK APP SENSOR

Refer to EC-1163, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-1164, "Special Repair Requirement".

>> INSPECTION END

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001094272

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-1164, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094273

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

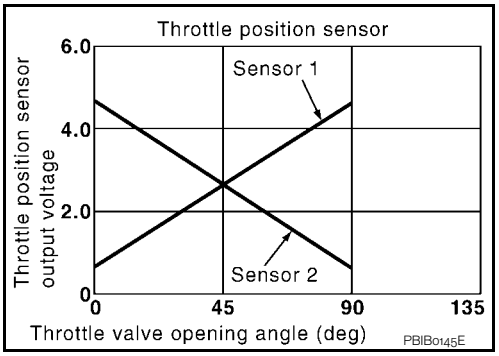
cardiagn.com

P2135 TP SENSOR

Description

INFOID:0000000001094274

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC Logic

INFOID:0000000001094275

DTC DETECTION LOGIC

NOTE:
If DTC P2135 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-1137, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135	Throttle position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	• Harness or connector (TP sensor 1 and 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1165, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094276

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.

cardiagn.com

2. Turn ignition switch ON.
3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	1	F8	72	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit.

4. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	4	F8	36	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	2	F8	33	Existed
	3		34	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THROTTLE POSITION SENSOR

Refer to EC-1167, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

cardiagn.com

7. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. EC-1167, "Special Repair Requirement"

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001094277

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform EC-1167, "Special Repair Requirement".
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully depressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully depressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to EC-1167, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094278

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

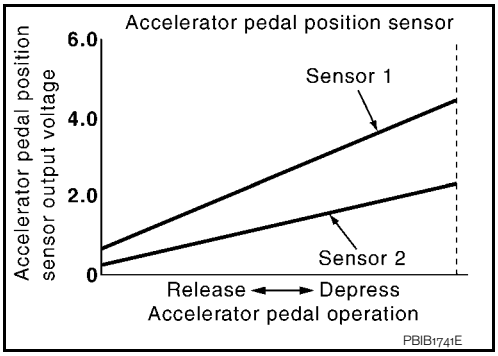
cardiagn.com

P2138 APP SENSOR

Description

INFOID:0000000001094279

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



DTC Logic

INFOID:0000000001094280

DTC DETECTION LOGIC

NOTE:
If DTC P2138 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-1137, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138	Accelerator pedal position sensor circuit range/ performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	• Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 1 and 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

YES >> Go to EC-1168, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001094281

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

cardiagn.com

2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 4.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	5	E16	102	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

5.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Item	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair short to ground or short to power in harness or connectors.

6.CHECK COMPONENTS

cardiagn.com

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-1106, "Component Inspection".)
- Refrigerant pressure sensor (Refer to EC-936, "Diagnosis Procedure".)

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace malfunctioning component.

7.CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector as follows.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E16	111	Existed
	1		104	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

8.CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector as follows.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed
	6		103	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or shot to power in harness or connectors.

9.CHECK APP SENSOR

Refer to EC-1170, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-1171, "Special Repair Requirement".

>> INSPECTION END

11.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001094282

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

cardiagn.com

2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E110	110 (APP sensor 1 signal)	Ground	Accelerator pedal	Fully released	0.6 - 0.9V
				Fully depressed	3.9 - 4.7V
	103 (APP sensor 2 signal)			Fully released	0.3 - 0.6V
				Fully depressed	1.95 - 2.4V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to EC-1171, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:0000000001094283

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-647, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-647, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

cardiagn.com

ASCD BRAKE SWITCH

Description

INFOID:0000000001094284

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-677, "System Description" for the ASCD function.

Component Function Check

INFOID:0000000001094285

1.CHECK FOR ASCD BRAKE SWITCH FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-III.
3. Check “BRAKE SW1” indication under the following conditions.

Monitor item	Condition		Indication
BRAKE SW1	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	OFF
		Fully released	ON

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E16	100 (ASCD brake switch signal)	Ground	Brake pedal (CVT) Brake pedal and clutch pedal (M/T)	Slightly depressed	Approx. 0V
				Fully released	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-1172, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094286

1.CHECK OVERALL FUNCTION-I

Check which type of transmission the vehicle is equipped with.

Is the inspection result normal?

CVT >> GO TO 2.
M/T >> GO TO 6.

2.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD brake switch		Ground	Voltage
Connector	Terminal		
E112	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

cardiagn.com

- Junction block connector M77, E105
- 10A fuse (No. 4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

ASCD brake switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E16	100	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD BRAKE SWITCH

Refer to EC-1174, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace ASCD brake switch.

6. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.
4. Check the continuity between ASCD brake switch harness connector and ground.

ASCD brake switch		Ground	Condition		Voltage (V)
Connector	Terminal				
E112	1	Ground	Clutch pedal	Slightly depressed	Approx. 0
				Fully released	Battery voltage

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 7.

7. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground	Voltage
Connector	Terminal		
E111	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

cardiagn.com

Check the following.
- Junction block connector M77,E105
- 10A fuse (No. 4)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

9.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD brake switch		ASCD clutch switch		Continuity
Connector	Terminal	Connector	Terminal	
E112	1	E111	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK ASCD CLUTCH SWITCH

Refer to EC-888, "Component Inspection (ASCD Clutch Switch)".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace ASCD clutch switch.

11.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

ASCD brake switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E16	100	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

12.CHECK ASCD BRAKE SWITCH

Refer to EC-888, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace ASCD brake switch.

13.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:0000000001094287

1.CHECK ASCD BRAKE SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.

cardiagn.com

3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to BR-8, "Inspection and Adjustment" (LHD miodels) orBR-52, "Inspection and Adjustment" (RHD models).
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:0000000001094288

1.CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to CL-5, "Inspection and Adjustment".
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

cardiagn.com

ASCD INDICATOR

Description

INFOID:0000000001094289

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.
CRUISE lamp illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.
SET lamp illuminates when following conditions are met.
- CRUISE lamp is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET lamp remains lit during ASCD control.
Refer to EC-677, "System Description" for the ASCD function.

Component Function Check

INFOID:0000000001094290

1.ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	• Ignition switch: ON	• MAIN switch: Pressed at the 1st time →at the 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	• ASCD: Operating	ON
		• ASCD: Not operating	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1176, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094291

1.CHECK DTC

Check that DTC U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1001. Refer to EC-740, "DTC Logic".

2.CHECK COMBINATION METER OPERATION

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check combination meter circuit. Refer to MWI-4, "METER SYSTEM : System Diagram".

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

COOLING FAN

Description

INFOID:0000000001094292

Cooling fan operates at each speed when the current flows in the cooling fan motor as follows.
Refer to EC-685, "System Diagram" for cooling fan operation.

Component Function Check

INFOID:0000000001094293

1.CHECK COOLING FAN LOW SPEED FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-III and touch “LOW” on the CONSULT-III screen.
3. Make sure that cooling fans operates at low speed.

Without CONSULT-III

1. Start engine and let it idle.
2. Turn air conditioner switch and blower fan switch ON.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check cooling fan low speed control circuit.

2.CHECK COOLING FAN HIGH SPEED FUNCTION

With CONSULT-III

1. Touch “HI” on the CONSULT-III screen.
2. Make sure that cooling fans operates at higher speed than low speed.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check cooling fan high speed control circuit.

Diagnosis Procedure

INFOID:0000000001094294

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector and cooling fan relay-3 harness connector.
3. Check the voltage between IPDM E/R harness connector or cooling fan relay-3 harness connector and ground.

IPDM E/R		cooling fan relay-3		Ground	Voltage
Connector	Terminal	Connector	Terminal		
E14	53	E59	1	Ground	Battery voltage
			3		

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.

cardiagn.com

- 50A fusible link (letter M)
- Harness for open or short between IPDM E/R cooling fan relay-3 and battery

>> Repair or replace malfunctioning part.

3. CHECK COOLING FAN MOTORS CIRCUIT FOR OPEN AND SHORT

1. Disconnect cooling fan motor harness connector.
2. Check the continuity between IPDM E/R harness connector or cooling fan relay-3 harness connector and cooling fan motor harness connector.

Cooling fan relay-3		IPDM E/R		Cooling fan motor		Continuity
Connector	Terminal	Connector	Terminal	Connec-tor	Terminal	
E59	2	E14	52	E3	1	Existed

3. Check the continuity between cooling fan relay-3 harness connector and IPDM E/R harness connector.

Cooling fan relay-3		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E59	4	E13	48	Existed

4. Check the continuity between cooling fan motor harness connector or IPDM E/R harness connector and ground.

Cooling fan motor		IPDM E/R		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E3	2	E10	5	Ground	Existed
			6		

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between cooling fan motor and IPDM E/R
- Harness for open or short between cooling fan motor and cooling fan relay
- Harness for open or short between cooling fan relay-3 and IPDM E/R
- Harness for open or short between cooling fan motor and ground
- Harness for open or short between IPDM E/R and ground
- Resistor E57

>> Repair or replace malfunctioning part.

5. CHECK GROUND CONNECTION

Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace ground connection.

6. CHECK COOLING FAN RELAYS

Refer to EC-1179, "Component Inspection (Cooling Fan Relay)".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace malfunctioning cooling fan relay.

cardiagn.com

7.CHECK COOLING FAN MOTOR

Refer to EC-1179, "Component Inspection (Cooling Fan Motor)".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace malfunctioning cooling fan motor.

8.CHECK INTERMITTENT INCIDENT

Perform GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connector.

Component Inspection (Cooling Fan Motor)

INFOID:0000000001094295

1.CHECK COOLING FAN MOTOR

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor harness connector.
3. Supply cooling fan motor terminals with battery voltage and check operation.

Terminals		Operation
(+)	(–)	
1	2	Cooling fans operates .

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace cooling fan motor.

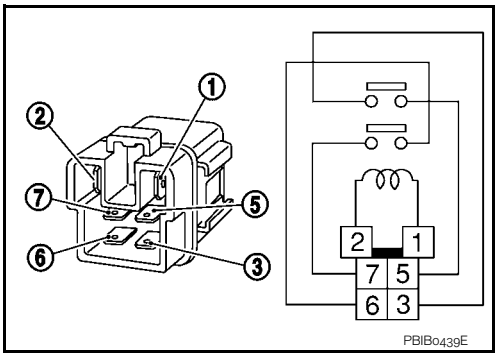
Component Inspection (Cooling Fan Relay)

INFOID:0000000001094296

1.CHECK COOLING FAN RELAY

1. Turn ignition switch OFF.
2. Remove cooling fan relay-3.
3. Check the continuity between cooling fan relay terminals under the following conditions.

Terminals	Conditions	Continuity
1 and 2	12V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace cooling fan relay.

cardiagn.com

ELECTRICAL LOAD SIGNAL

Description

INFOID:0000000001094297

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

Component Function Check

INFOID:0000000001094298

1.CHECK REAR WINDOW DEFOGGER SWITCH FUNCTION

1. Turn ignition switch ON.
2. Connect CONSULT-III and select “DATA MONITOR” mode.
3. Select “LOAD SIGNAL” and check indication under the following conditions.

Monitor item	Condition		Indication
LOAD SIGNAL	Rear window defogger switch	ON	ON
		OFF	OFF

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-1180, "Diagnosis Procedure".

2.CHECK LIGHTING SWITCH FUNCTION

Check “LOAD SIGNAL” indication under the following conditions.

Monitor item	Condition		Indication
LOAD SIGNAL	Lighting switch	ON at 2nd position	ON
		OFF	OFF

Is the inspection result normal?

YES >> GO TO 3.
NO >> Go to EC-1180, "Diagnosis Procedure".

3.CHECK HEATER FAN CONTROL SWITCH FUNCTION

Select “HEATER FAN SW” and check indication under the following conditions.

Monitor item	Condition		Indication
HEATER FAN SW	Heater fan control switch	ON	ON
		OFF	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1180, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094299

1.INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to EC-1180, "Component Function Check".

Which circuit is related to the incident?

Rear window defogger>>GO TO 2
Headlamp>>GO TO 3.
Heater fan>>GO TO 4.

2.CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to DEF-4, "System Diagram".

cardiagn.com

>> INSPECTION END

3.CHECK HEADLAMP SYSTEM

Refer to EXL-11, "System Diagram" (XENON TYPE) or EXL-191, "System Diagram" (HALOGEN TYPE).

>> INSPECTION END

4.CHECK HEATER FAN CONTROL SYSTEM

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

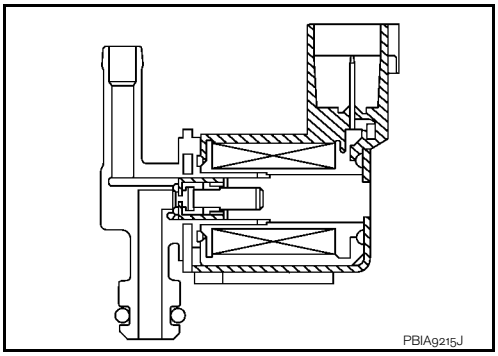
cardiagn.com

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:0000000001102408

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



Component Function Check

INFOID:0000000001102409

1.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE FUNCTION

With CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect the EVAP purge hose from EVAP canister purge volume control solenoid valve (EVAP canister side).
3. Start engine and let it idle.
4. Select “PURG VOL CONT/V” in “ACTIVE TEST” mode wit CONSULT-III.
5. Touch “Qu” and “Qd” on CONSULT-III screen to adjust “PURG VOL CONT/V” and check vacuum existence under the following conditions.

PURG VOL CONT/V	Vacuum
100%	Existed
0 %	Not existed

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect the EVAP purge hose from EVAP canister purge volume control solenoid valve (EVAP canister side).
3. Start engine and let it idle for at least 100 seconds.
4. Check vacuum existence under the following conditions.

Condition	Vacuum
At idle	Not existed
About 2,000 rpm	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1182, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102410

1.CHECK EVAP CANISTER

Refer to EC-636, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repaor or replace.

2.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.

cardiagn.com

3. Turn ignition switch ON.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

EVAP canister purge volume control solenoid valve		Ground	Voltage
Connector	Terminal		
F32	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E7, F121
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.

EVAP canister purge volume control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F32	2	F7	9	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 5.
YES-2 >> Without CONSULT-III: GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Does engine speed vary according to the valve opening?

YES >> GO TO 7.
NO >> GO TO 6.

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-1184, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace EVAP canister purge volume control solenoid valve.

7. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

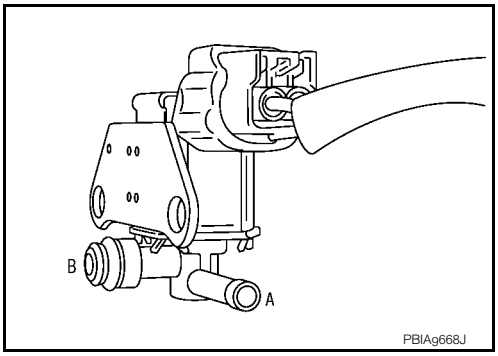
Component Inspection

INFOID:0000000001102411

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
4. Turn ignition switch ON.
5. Select “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-III.
6. Touch “Qd” and “Qu” on CONSULT-III screen to adjust “PURG VOL CONT/V” opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



Condition (PURG VOL CONT/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between (A) and (B)
12V direct current supply between terminals 1 and 2	Existed
No supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace EVAP canister purge volume control solenoid valve

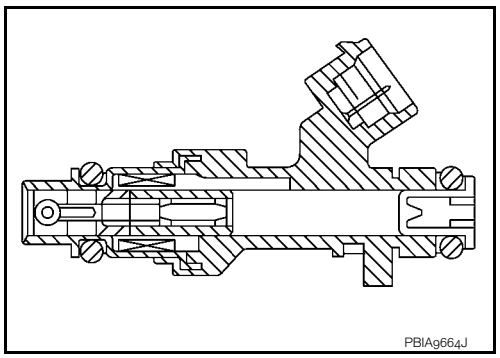
cardiagn.com

FUEL INJECTOR

Description

INFOID:0000000001094300

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the fuel injector circuit, the coil in the fuel injector is energized. The energized coil pulls the ball valve back and allows fuel to flow through the fuel injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the fuel injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



Component Function Check

INFOID:0000000001094301

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.
NO >> Go to EC-1185, "Diagnosis Procedure".

2. CHECK FUEL INJECTOR FUNCTION

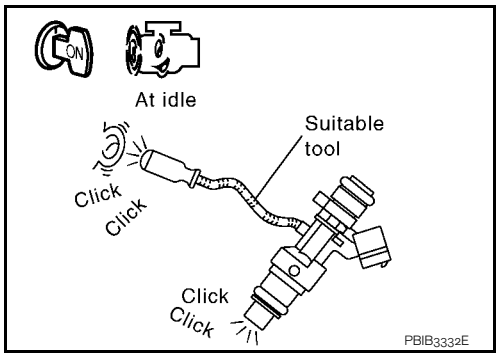
With CONSULT-III

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1185, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094302

1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel injector harness connector and ground.

cardiagn.com

Fuel injector			Ground	Voltage
Cylinder	Connector	Terminal		
1	F37	1	Ground	Battery voltage
2	F38	1		
3	F39	1		
4	F40	1		

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- 10A fuse (No. 58)
- Harness for open or short between fuel injector and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between fuel injector harness connector and ECM harness connector.

Fuel injector			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F37	2	F7	31	Existed
2	F38	2		30	
3	F39	2		29	
4	F40	2		25	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK FUEL INJECTOR

Refer to EC-1186, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace malfunctioning fuel injector.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

Component Inspection

INFOID:0000000001094303

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check resistance between fuel injector terminals as follows.

cardiagn.com

Terminals	Resistance [at 10 - 60°C (50 - 140°F)]
1 and 2	11.1 - 14.5Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace malfunctioning fuel injector.

cardiagn.com

FUEL PUMP

Description

INFOID:0000000001094304

Sensor	Input signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay ↓ Fuel pump
Battery	Battery voltage*		

*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine startability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

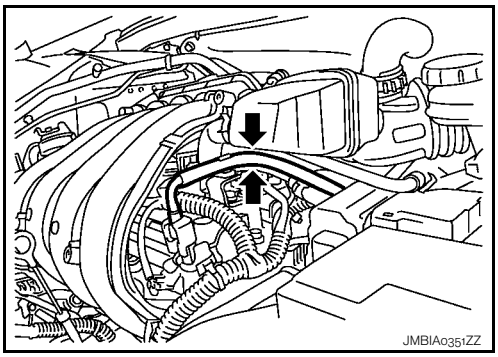
Component Function Check

INFOID:0000000001094305

1.CHECK FUEL PUMP FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose with two fingers.

Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.



Is the inspection result normal?

YES >> INSPECTION END
NO >> EC-1188, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094306

1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F7	23	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect IDPDM E/R harness connector.
3. Check the continuity between IPDM E/R harness connector and ECM harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	23	E13	33	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors E6, F123.
- Harness for open or short to ground and short power.

>> Repair harness or connectors.

4. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect “fuel level sensor unit and fuel pump” harness connector.
4. Turn ignition switch ON.
5. Check voltage between “fuel level sensor unit and fuel pump” harness connector and ground.

Fuel level sensor unit and fuel pump		Ground	Voltage
Connector	Terminal		
B40	1	Ground	Battery voltage should exist 1 second after ignition switch is turn ON.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 5.

5. CHECK 10A FUSE

1. Turn ignition switch OFF.
2. Disconnect 10A fuse (No. 57) from IPDM E/R.
3. Check 10A fuse.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace fuse.

6. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector.
2. Check the continuity between IPDM E/R harness connector and “fuel level sensor unit and fuel pump” harness connector.

IPDM E/R		Fuel level sensor unit and fuel pump		Continuity
Connector	Terminal	Connector	Terminal	
F13	42	B40	1	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.

cardiagn.com

NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B10, E101
- Harness for open or short between IPDM E/R and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to power in harness or connectors.

8.CHECK FUEL PUMP GROUND CIRCUIT

1. Check the continuity between “fuel level sensor unit and fuel pump” and ground.

Fuel level sensor unit and fuel pump		Ground	Continuity
Connector	Terminal		
B40	3	Ground	Existed

2. Also heck harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to power in harness or connectors.

9.CHECK FUEL PUMP

Refer to EC-1190, "Component Inspection (Fuel Pump)".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace fuel pump.

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

Component Inspection (Fuel Pump)

INFOID:0000000001094307

1.CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Check resistance between “fuel level sensor unit and fuel pump” terminals as follows.

Terminals	Resistance
1 and 3	0.2 - 5.0Ω [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace “fuel level sensor unit and fuel pump”.

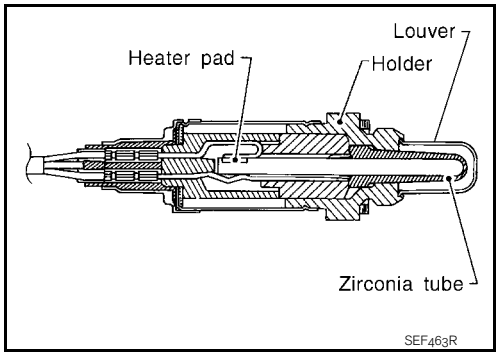
cardiagn.com

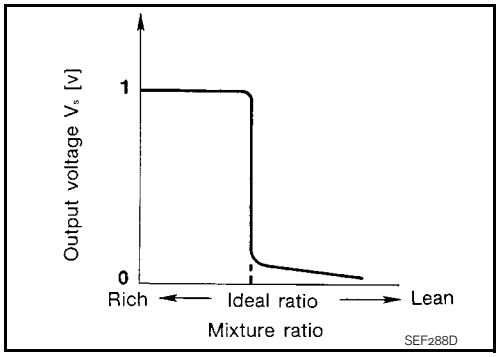
HO2S1

Description

INFOID:0000000001102117

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





Component Function Check

INFOID:0000000001102118

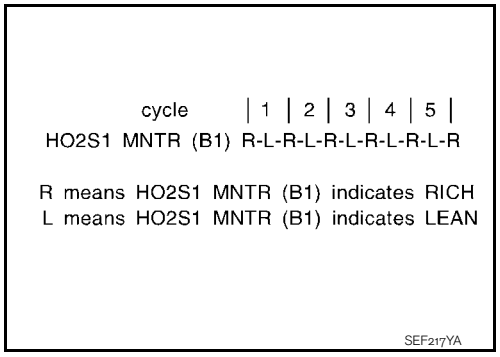
1. CHECK HEATED OXYGEN SENSOR 1 FUNCTION

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select “HO2S1 MNITOR (B1)” in “DATA MONITOR” mode with CONSULT-III.
3. Keep the engine speed at 2,000 rpm under no load, and make sure that the monitors fluctuates between LEAN and RICH more than five times in 10 seconds.

1 times: RICH →LEAN→ RICH

2 times: RICH →LEAN→RICH→LEAN→ RICH

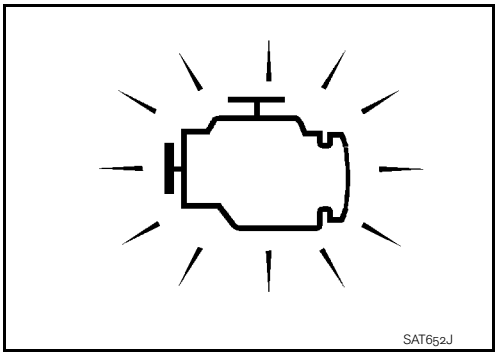


Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Set ECM in Diagnostic test mode - II (Heated oxygen sensor 1 monitor).

cardiagn.com

4. Keep the engine speed at 2,000 rpm under no load, and make sure that the MI comes ON more than five times in 10 seconds.



Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-146, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102119

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace ground connection.

2.RETIGHTEN HEATED OXYGEN SENSOR 1

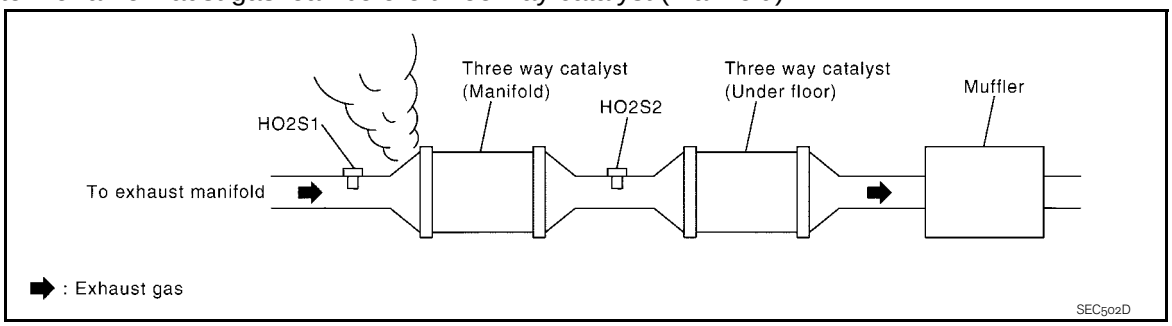
Loosen and retighten the heated oxygen sensor 1.

Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.
NO >> GO TO 4.

4.CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.
NO >> GO TO 5.

5.CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

cardiagn.com

2. Disconnect heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	56	Existed

2. Check the continuity between HO2S1 harness connector or ECM harness connector and ground.

HO2S1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
F30	4	F8	49	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor.
Refer to EC-1081, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace mass air flow sensor.

8.CHECK PCV VALVE

Refer to EC-935, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace PCV valve.

9.CHECK HEATED OXYGEN SENSOR 1

Perform EC-1193, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace heated oxygen sensor 1.

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001102120

cardiagn.com

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 1

With CONSULT-III

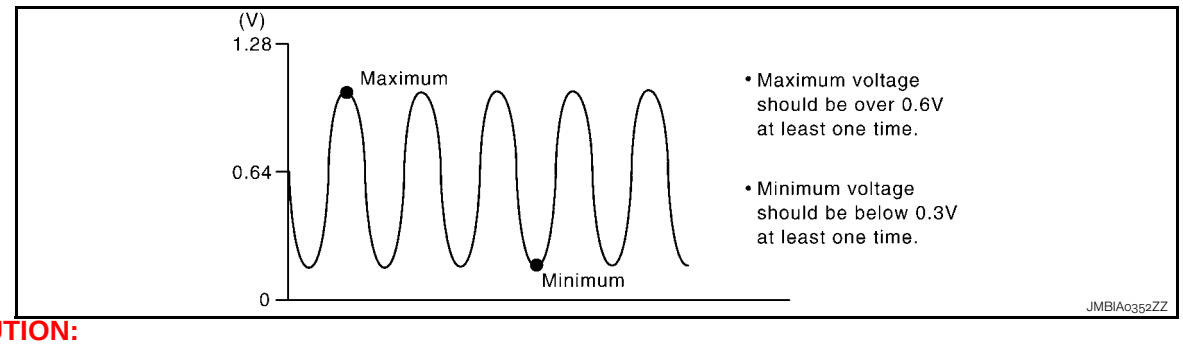
1. Start engine and warm it up to normal operating temperature.
2. Set “POST TRIGGER” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.
6. Check the following.

- “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
  5 times (cycles) are counted as shown in the figure.
- “HO2S1 (B1)” voltage goes above 0.6V at least once.
- “HO2S1 (B1)” voltage goes below 0.3V at least once.
- “HO2S1 (B1)” voltage never exceeds 1.0V.

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R				

R means HO2S1 MNTR (B1) indicates RICH
L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3.CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check the voltage between ECM harness connector and ground under the following condition.

cardiagn.com

ECM		ground	Condition	Voltage
Connector	Terminal			
F8	49 (HO2S1 signal)	Ground	Engine speed held at 2,000 rpm constant under no load.	• The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least 1 time. • The minimum voltage is below 0.3V at least 1 time. • The voltage never exceeds 1.0V. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4

4. REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

HO2S1 HEATER

Description

INFOID:0000000001102121

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF duty control of the Heated oxygen sensor 1 heater corresponding to the engine operating condition to keep the temperature of Heated oxygen sensor 1 element at the specified range.

OPERATION

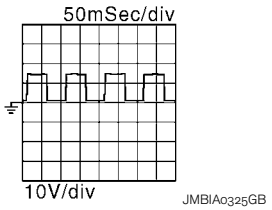
Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600 rpm after the following conditions are met. • Engine: After warming up	ON

Component Function Check

INFOID:0000000001102122

1.PERFORM COMPONENT FUNCTION CHECK

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Set tester prove between ECM harness connectior and ground.
5. Start engine and let it idle.
6. Check the woltage under the following conditions.Verify that the oscilloscope screen shows the signal waves as shown below.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	3 (HO2S1 HEATER signal)	Ground	At idlw	Approximately 7.0★  JMBIA0325GB
			Engine speed is above 3,600 rpm	BATTERY VOLTAGE (11 - 14V)

★ : Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-146, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102123

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

cardiagn.com

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Disconnect HO2S1 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S1 harness connector and ground.

HO2S1		Ground	Voltage
Connector	Terminal		
F30	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F123, E6
- IPDM E/R harness connector E11
- 10A fuse (No. 63)
- Harness for open or short between HO2S1 and fuse

>> Repair or replace harness or connectors.

4.CHECK HO2S1 HEATER OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S1 harness connector and ECM harness connector.

HO2S1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	3	F7	3	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HO2S1 HEATER

Refer to EC-1198, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 1

Replace HEATED OXYGEN SENSOR 1.

CAUTION:
- **Discard any heated oxygen sensor 1 which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new heated oxygen sensor 1, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Perform GI-39, "Intermittent Incident".

cardiagn.com

>> Repair or replace.

Component Inspection

INFOID:0000000001102124

1.CHECK HEATED OXYGEN SENSOR 1

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check resistance between HO2S1 terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
2 and 3	3.4 - 4.4 Ω
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE HEATED OXYGEN SENSOR 1

Replace heated oxygen sensor 1.

CAUTION:

- **Discard any sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

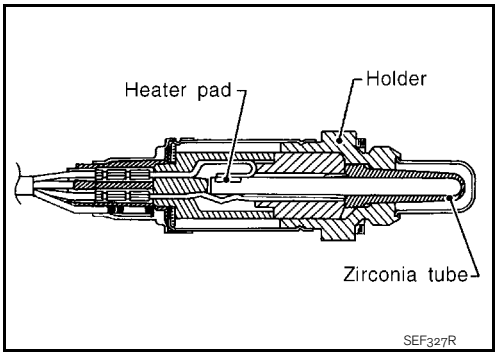
cardiagn.com

HO2S2

Description

INFOID:0000000001102125

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



Component Function Check

INFOID:0000000001102126

1. PERFORM COMPONENT FUNCTION CHECK-I

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage does not remain inthe range of 0.2 - 0.4V.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage does not remain inthe range of 0.2 - 0.4V.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position with OD “OFF”(CVT), 3rd gear position	The voltage does not remain inthe range of 0.2 - 0.4V.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1200, "Diagnosis Procedure".

cardiagn.com

Diagnosis Procedure

INFOID:0000000001102127

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	1	F8	59	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	4	F8	50	Existed

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal		
E58	4	F7	5	Ground	Not existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HEATED OXYGEN SENSOR 2

Refer to EC-1201, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

cardiagn.com

>> INSPECTION END

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001102128

1. INSPECTION START

Do you have CONSULT-III?

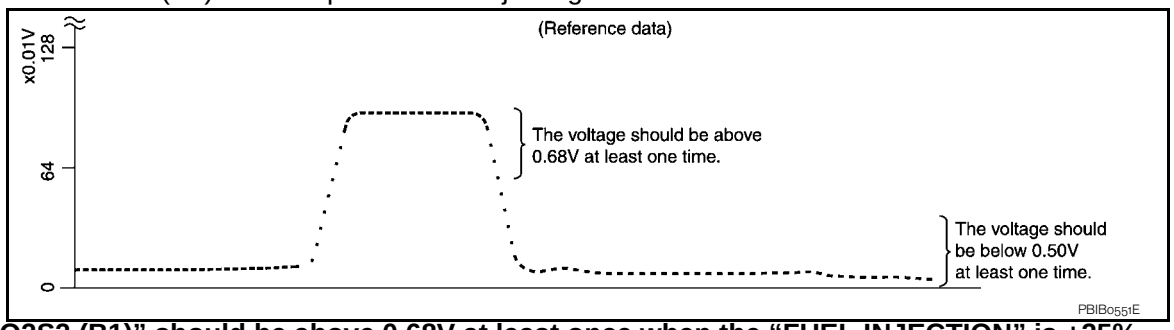
Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-III.
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is −25%.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position with OD “OFF”(A/T), 3rd gear position	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.50V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

cardiagn.com

HO2S2 HEATER

Description

INFOID:0000000001102129

SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

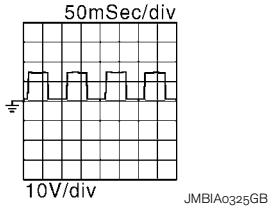
Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,900	OFF
Below 3,900 rpm after the following conditions are met. • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON

Component Function Check

INFOID:0000000001102130

1. CHECK HEATED OXYGEN SENSOR 2 HRATER FUNCTION

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle.
4. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage signal
Connector	Terminal			
F7	5 [HO2S2 heater signal]	Ground	At idle	Approx. 10V★ 
			Engine speed: Above 3,600 rpm	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1196, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102131

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

cardiagn.com

NO >> Repair or replace ground connection.

2.CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Disconnect HO2S2 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S2 harness connector and ground.

HO2S2		Ground	Voltage
Connector	Terminal		
E58	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- IPDM E/R connector E11
- 10A fuse (No. 63)
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E58	3	F7	5	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F121, E7
- Harness for open or short between heated oxygen sensor 2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK HO2S2 HEATER

Refer to EC-1205, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

cardiagn.com

>> INSPECTION END

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001102132

1.CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check resistance between HO2S2 terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
2 and 3	3.3 - 4.4 Ω
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool and approved anti-seize lubricant.**

>> INSPECTION END

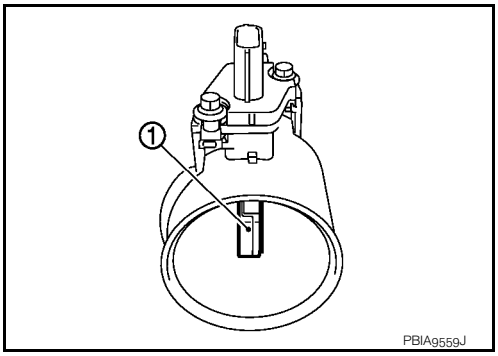
cardiagn.com

IAT SENSOR

Description

INFOID:0000000001102133

The intake air temperature sensor is built-into mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



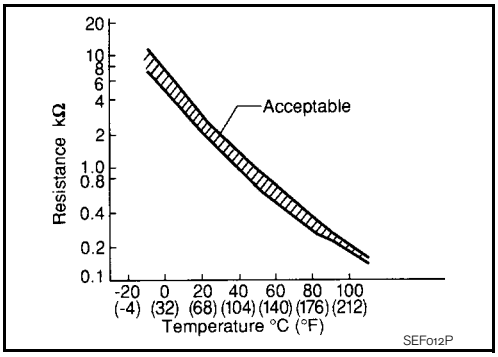
<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: These data are reference values and are measured between ECM terminal 50 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



Component Function Check

INFOID:0000000001102134

1.CHECK INTAKE AIR TEMPERATURE SENSOR FUNCTION

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F8	46	Ground	Approx. 0 - 4.8V

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1206, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102135

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor (with intake air temperature sensor) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between mass air flow sensor harness connector and ground.

cardiagn.com

MAF sensor		Ground	Voltage
Connector	Terminal		
E18	2	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between mass air flow sensor harness connector and ECM harness connector.

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E18	1	F8	55	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-1207, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace mass air flow sensor (with intake air temperature sensor).

5. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001102136

1. CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as follows.

Terminals	Resistance [°C (77°F)]
1 and 2	1.800 - 2.200 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace mass air flow sensor (with intake air temperature sensor).

cardiagn.com

IGNITION SIGNAL

Description

INFOID:0000000001094308

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns ON and OFF the ignition coil primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.

Component Function Check

INFOID:0000000001094309

1.INSPECTION START

Turn ignition switch OFF, and restart engine.

Does the engine start?

YES-1 >> With CONSULT-III: GO TO 2.
YES-2 >> Without CONSULT-III: GO TO 3.
NO >> Go to EC-1208, "Diagnosis Procedure".

2.IGNITION SIGNAL FUNCTION

With CONSULT-III

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-III.
2. Make sure that each circuit produces a momentary engine speed drop.

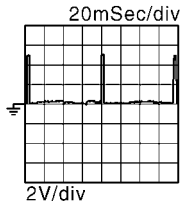
Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1208, "Diagnosis Procedure".

3.IGNITION SIGNAL FUNCTION

Without CONSULT-III

1. Let engine idle.
2. Read the voltage signal between ECM harness connector and ground.

ECM		Ground	Voltage signal
Connector	Terminal		
F7	17	Ground	
	18		
	21		
	22		

NOTE:
The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1208, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094310

1.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	Battery voltage

cardiagn.com

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to EC-736, "Diagnosis Procedure".

2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Turn ignition switch ON.
4. Check the voltage between condenser harness connector and ground.

Condenser		Ground	Voltage
Connector	Terminal		
F13	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between IPDM E/R harness connector and condenser harness connector.

IPDM E/R		Condenser		Continuity
Connector	Terminal	Connector	Terminal	
E11	9	F13	1	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Go to EC-736, "Diagnosis Procedure".
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between condenser harness connector and ground.

Condenser		Ground	Continuity
Connector	Terminal		
F13	2	Ground	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK CONDENSER

Refer to EC-1211, "Component Inspection (Condenser)"

Is the inspection result normal?

YES >> GO TO 6.
NG >> Replace condenser.

6.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Reconnect all harness connectors disconnected.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

cardiagn.com

Ignition coil			Ground	Voltage
Cylinder	Connector	Terminal		
1	F33	3	Ground	Battery voltage
2	F34	3		
3	F35	3		
4	F36	3		

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

Ignition coil			Ground	Continuity
Cylinder	Connector	Terminal		
1	F33	2	Ground	Existed
2	F34	2		
3	F35	2		
4	F36	2		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ignition coil harness connector.

Ignition coil			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F33	1	F7	17	Existed
2	F34	1		18	
3	F35	1		22	
4	F36	1		21	

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-1211, "Component Inspection (Ignition Coil with Power Transistor)".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace malfunctioning ignition coil with power transistor.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

Component Inspection (Ignition Coil with Power Transistor)

INFOID:0000000001094311

1. CHECK IGNITION COIL WITH POWER TRANSISTOR-I

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminals	Resistance [at 25°C (77°F)]
1 and 2	Except 0 or ∞ Ω
1 and 3	Except 0 Ω
2 and 3	

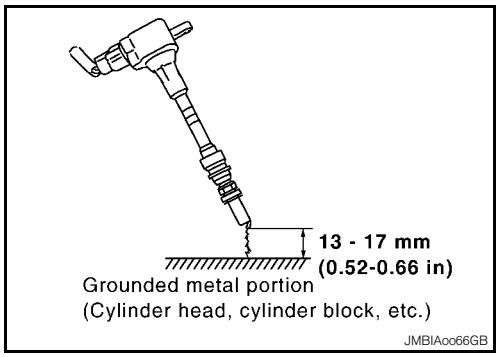
Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace malfunctioning ignition coil with power transistor.

2. CHECK IGNITION COIL WITH POWER TRANSISTOR-II

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
   NOTE:
   Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.
4. Start engine.
5. After engine stalls, crank it two or three times to release all fuel pressure.
6. Turn ignition switch OFF.
7. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
8. Remove ignition coil and spark plug of the cylinder to be checked.
9. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
10. Connect spark plug and harness connector to ignition coil.
11. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
12. Crank engine for about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- **Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm 0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace malfunctioning ignition coil with power transistor.

Component Inspection (Condenser)

INFOID:0000000001094312

1. CHECK CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.

cardiagn.com

3. Check resistance between condenser terminals as follows.

Terminals	Resistance
1 and 2	Above 1 MΩ [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace condenser.

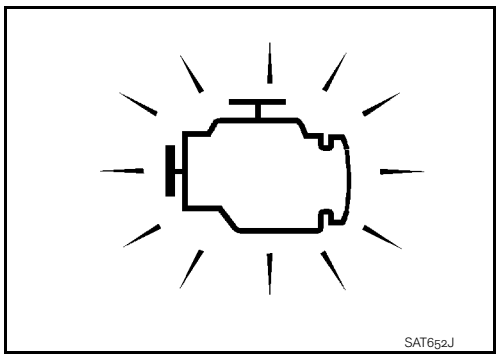
cardiagn.com

MALFUNCTION INDICATOR

Description

INFOID:0000000001094313

The Malfunction Indicator (MI) is located on the combination meter. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
When the engine is started, the MI should go off. If the MI remains on, the on board diagnostic system has detected an engine system malfunction.
For details, refer to EC-1213, "Diagnosis Procedure".



Component Function Check

INFOID:0000000001094314

1.CHECK MI FUNCTION

1. Turn ignition switch ON.
2. Make sure that MI lights up.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1213, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094315

1.CHECK DTC

Check that DTC U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1001. Refer to EC-740, "Diagnosis Procedure".

2.CHECK DTC WITH COMBINATION METER

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

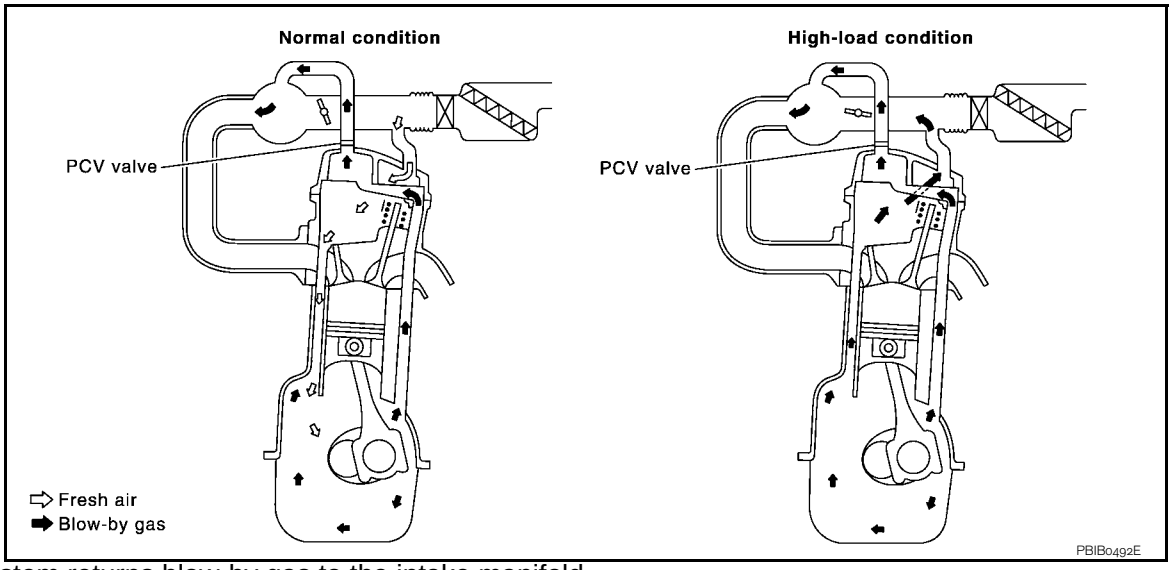
YES >> Replace combination meter.
NO >> Repair or replace.

cardiagn.com

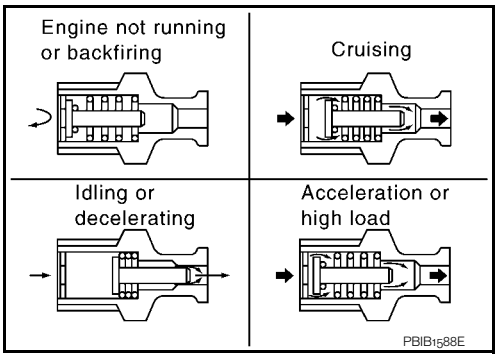
POSITIVE CRANKCASE VENTILATION

Description

INFOID:0000000001094316



This system returns blow-by gas to the intake manifold.
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.
Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.
The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.
Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.

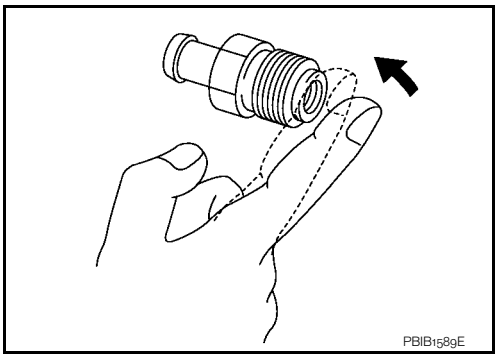


Component Inspection

INFOID:0000000001094317

1. CHECK PCV VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace PCV valve.

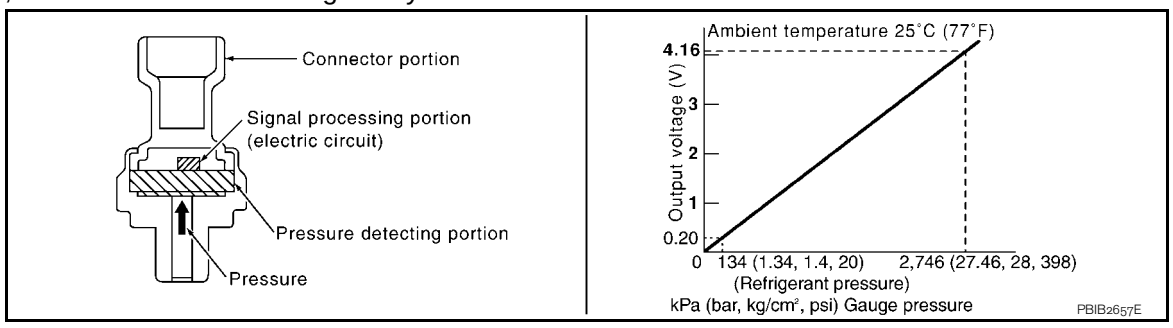
cardiagn.com

REFRIGERANT PRESSURE SENSOR

Description

INFOID:0000000001094318

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



Component Function Check

INFOID:0000000001094319

1.CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower fan switch ON.
3. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F8	41 (Refrigerant pressure sensor signal)	Ground	1.0 - 4.0V

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to EC-1215, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094320

1.CHECK GROUND CONNECTION

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine.
3. Turn ignition switch OFF.
4. Check ground connection E21. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between refrigerant pressure sensor harness connector and ground.

Refrigerant pressure sensor		Ground	Voltage
Connector	Terminal		
E49	3	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

cardiagn.com

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E6, F123
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E49	1	F8	48	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E6, F123
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and refrigerant pressure sensor harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E49	2	F8	41	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E6, F123
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor.
NO >> Repair or replace.

cardiagn.com

VSS

Description

INFOID:0000000001102137

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

Diagnosis Procedure

INFOID:0000000001102139

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch OFF.
2. Lift up the vehicle.
3. Start engine and let it idle.
4. Select “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT-III.
5. Select “VHCL SPEED SE” indication whe n rotating wheels with suitable gear position.

“VHCL SPEED SE” indication should exceed 10 km/h (6 MPH).

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to @@@.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace.

4.CHECK COMBINATION METER FUNCTION

Refer to @@@.

>> INSPECTION END

cardiagn.com

ECU DIAGNOSIS

ECM

Reference Value

INFOID:0000000001094321

VALUES ON THE DIAGNOSIS TOOL

Remarks:

l Specification data are reference values.

l Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition		Values/Status
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.		Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-1061, "Diagnosis Procedure".		
B/FUEL SCHDL	See EC-1061, "Diagnosis Procedure".		
A/F ALPHA-B1	See EC-1061, "Diagnosis Procedure".		
COOLAN TEMP/S	• Engine: After warming up		More than 70°C (158°F)
HO2S1 (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→→RICH Change more than 5 times during 10 seconds.
HO2S2 MNTR (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		LEAN ←→ RICH
VHCL SPEED SE	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as speedometer indication
BATTERY VOLT	• Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN 1	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
THRL SEN 1-B1	• Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
THRL SEN 2-B1*	• Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
INT/A TEMP SE	• Ignition switch: ON		Indicates intake air temperature
START SIGNAL	• Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

cardiagn.com

Monitor Item	Condition		Values/Status
AIR COND SIG	• Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	• Ignition switch: ON	Shift lever: P or N (CVT), Neutral (M/T)	ON
		Selector lever: Except above	OFF
PW/ST SIGNAL	• Engine: After warming up, idle the engine	Steering wheel: Not being turned	OFF
		Steering wheel: Being turned	ON
LOAD SIGNAL	• Ignition switch: ON	Rear window defogger switch: ON and/or Lighting switch: 2nd position	ON
		Rear window defogger switch and lighting switch: OFF	OFF
IGNITION SW	• Ignition switch: ON → OFF → ON		ON → OFF → ON
HEATER FAN SW	• Engine: After warming up, idle the engine	Heater fan switch: ON	ON
		Heater fan switch: OFF	OFF
BRAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	10° - 20° BTDC
		2,000 rpm	25° - 45° BTDC
PURG VOL C/V	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle (Accelerator pedal: Not depressed even slightly, after engine starting.)	0%
		2,000 rpm	20% - 90%
INT/V TIM (B1)	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	–5° - 5°CA
		2,000 rpm	Approx. 0° - 20°CA
INT/V SOL (B1)	• Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	0%
		2,000 rpm	Approx. 0% - 60%
AIR COND RLY	• Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	• For 1 seconds after turning ignition switch: ON • Engine running or cranking		ON
	• Except above		OFF
THRTL RELAY	• Ignition switch: ON		ON

cardiagn.com

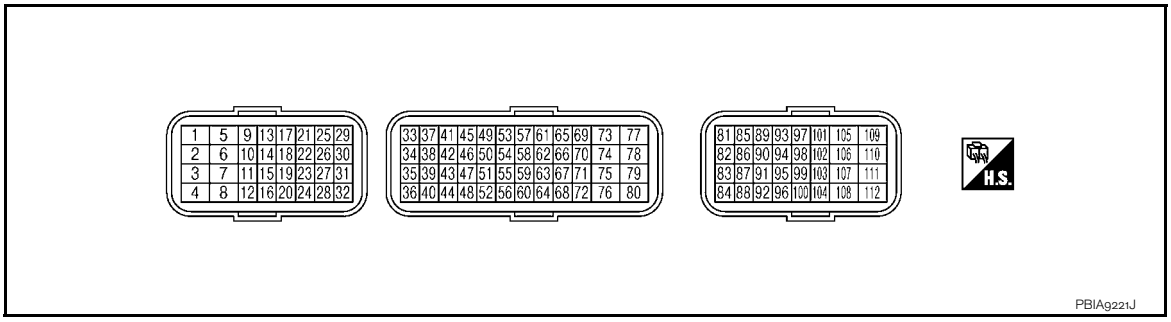
Monitor Item	Condition		Values/Status
COOLING FAN	• Engine: After warming up, idle the engine • Air conditioner switch: OFF	Engine coolant temperature is 94 °C (201°F) or less.	OFF
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F)	LOW*2
		Engine coolant temperature is 100°C (212°F) or more	HIGH*2
HO2S1 HTR (B1)	• Engine: After warming up • Engine speed: Above 3,600 rpm		ON
	Engine speed: Above 3,600 rpm		OFF
HO2S2 HTR (B1)	• Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		ON
	• Engine speed: Above 3,600 rpm		OFF
VEHICLE SPEED	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as the speedometer indication
IDL A/V LEARN	• Engine: running	Idle air volume learning has not been performed yet.	YET
		Idle air volume learning has already been performed successfully.	CMPLT
O2SEN HTR DTY	• Engine coolant temperature when engine started: More than 80°C (176°F) • Engine speed: below 3,600 rpm		Approx. 30%
AC PRESS SEN	• Engine: Idle • Both A/C switch and blower fan switch: ON (Compressor operates)		1.0 - 4.0V
VHCL SPEED SE	• Turn drive wheels and compare CONSULT-III value with the speedometer indication.		Almost the same speed as the speedometer indication
SET VHCL SPD	• Engine: Running	ASCD: Operating	The preset vehicle speed is displayed
MAIN SW	• Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	ON
		• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	OFF
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
VHCL SPD CUT	• Ignition switch: ON		NON
LO SPEED CUT	• Ignition switch: ON		NON
AT OD MONITOR	• Ignition switch: ON		OFF
AT OD CANCEL	• Ignition switch: ON		OFF

cardiagn.com

Monitor Item	Condition		Values/Status
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at the 1st time → at the 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

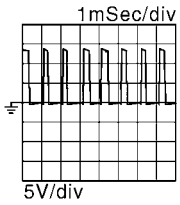
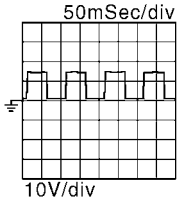
TERMINAL LAYOUT



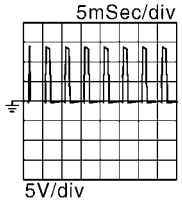
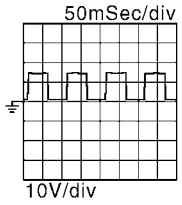
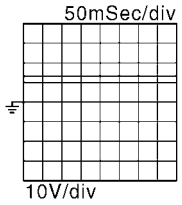
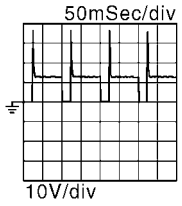
PHYSICAL VALUES

NOTE:
- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

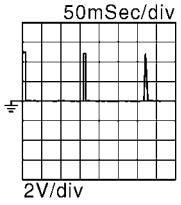
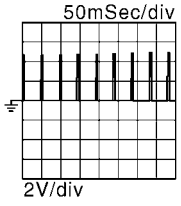
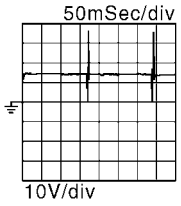
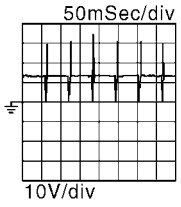
CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No. +	Terminal No. −	Wire color	Description: Signal name	Description: Input/Output	Condition	Value (Approx.)
1	Ground	L	Throttle control motor (Open)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	3.2V★  JMBIA0324GB
2	Ground	Y/R	Throttle control motor relay power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
3	Ground	BR/Y	Heated oxygen sensor 1 heater	Output	[Engine is running] • Warm-up condition • Engine speed: Below 3,600 rpm	2.9 - 8.8V★  JMBIA0325GB
					[Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: below 3,600 rpm	BATTERY VOLTAGE (11-14V)

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
4	Ground	P	Throttle control motor (Close)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	1.8V★  JMBIA0326GB
5	Ground	R	Heated oxygen sensor 2 heater	Output	[Engine is running] • Engine speed: Below 3,600 rpm after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	10V★  JMBIA0325GB
					[Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: Above 3,600 rpm	BATTERY VOLTAGE (11 - 14V)
9	Ground	W/D	EVAP canister purge volume control solenoid valve	Output	[Engine is running] • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting	BATTERY VOLTAGE (11 - 14V)★  JMBIA0327GB
					[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.)	 JMBIA0328GB
10 11	Ground	B	ECM ground	—	[Engine is running] • Idle speed	Body ground
15	Ground	G	Throttle control motor relay	Output	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)
					[Ignition switch: ON]	0 - 1.0V

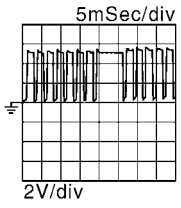
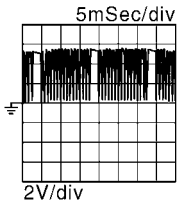
cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
17 18 21 22	Ground	V BR/Y O Y	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 3	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 0.3V★ 
					[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0.2 - 0.5V★ 
23	Ground	B/O	Fuel pump relay	Output	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0V
25 29 30 31	Ground	R U GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14V)★ 
					[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★ 
					[Engine is running] • More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)
32	Ground	R/B	ECM relay (Self shut-off)	Output	[Engine is running] [Ignition switch: OFF] • A few seconds after turning ignition switch OFF	0 - 1.0V
					[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)

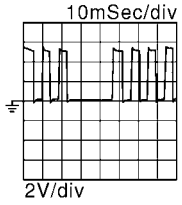
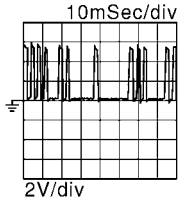
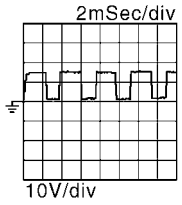
cardiagn.com

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
33	Ground	Y	Throttle position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36V
					[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75V
34	Ground	R	Throttle position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75V
					[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36V
36	Ground	B	Sensor ground (Throttle position sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
37	Ground	W	Knock sensor	Input	[Engine is running] • Idle speed	2.5V
38	Ground	P	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with engine coolant temperature.
40	Ground	B	Sensor ground (Knock sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
41	Ground	G	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0V
44	Ground	O	Sensor ground (Engine coolant temperature sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
45	Ground	BR	Mass air flow sensor	Input	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.2V
					[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	1.5 - 1.8V
46	Ground	Y	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with intake air temperature.
48	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
49	Ground	Y	Heated oxygen sensor 1	Input	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0 - 1.0V
50	Ground	Y	Heated oxygen sensor 2	Input	[Engine is running] • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - 1.0V
52	Ground	LG	Sensor ground (Mass air flow sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
55	Ground	O	Sensor power supply (Intake air temperature sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0V
56	Ground	B	Sensor ground (Heated oxygen sensor 1)	—	[Engine is running] • Warm-up condition • Idle speed	0 - 4.8V Output voltage varies with engine coolant temperature.
59	Ground	SB	Sensor ground (Heated oxygen sensor 2)	—	[Engine is running] • Warm-up condition • Idle speed	0V
61	Ground	Y	Crankshaft position sensor (POS)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	4.0V★  JMBIA0333GB
					[Engine is running] • Engine speed: 2,000 rpm	4.0V★  JMBIA0334GB
62	Ground	B	Sensor ground [Crankshaft position sensor (POS)]	—	[Engine is running] • Warm-up condition • Idle speed	0V
63	Ground	B	Sensor ground [Camshaft position sensor (PHASE)]	—	[Engine is running] • Warm-up condition • Idle speed	0V

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
65	Ground	R	Camshaft position sensor (PHASE)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	1.0 - 2.0★  JMBIA0335GB
					[Engine is running] • Engine speed is 2,000 rpm	1.0 - 2.0★  JMBIA0336GB
69	Ground	W/B	PNP switch	Input	[Ignition switch: ON] • Shift lever: P or N (CVT), Neutral (M/T)	BATTERY VOLTAGE (11 - 14V)
					[Ignition switch: ON] • Shift lever: Except above	0V
72	Ground	L	Sensor power supply (Throttle position sensor)	—	[Ignition switch: ON]	5V
73	Ground	Y/R	Intake valve timing control solenoid valve	Output	[Engine is running] • Warm-up condition • Idle speed	0V
					[Engine is running] • Warm-up condition • Engine speed: 2,000rpm	7 - 10V★  JMBIA0337GB
74	Ground	L	Sensor power supply (Refrigerant pressure sensor)	Input	[Ignition switch: ON]	5V
75	Ground	G	Sensor power supply [Crankshaft position sensor (POS)]	—	[Ignition switch: ON]	5V
78	Ground	LG	Sensor power supply [Camshaft position sensor (PHASE)]	—	[Ignition switch: ON]	5V
83	Ground	P	CAN communication line	Input/ Output	—	—
84	Ground	L	CAN communication line	Input/ Output	—	—
88	Ground	O	Data link connector	Input/ Output	[Ignition switch: ON] • CONSULT-III : Disconnected	10.5V
93	Ground	W/L	Ignition switch	Input	[Ignition switch: OFF]	0V
					[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
94	Ground	V	ASCD steering switch	Input	[Ignition switch: ON] • ASCD steering switch: OFF	4V
					[Ignition switch: ON] • MAIN switch: Pressed	0V
					[Ignition switch: ON] • CANCEL switch: Pressed	1V
					[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	3V
					[Ignition switch: ON] • SET/COAST switch: Pressed	2V
95	Ground	B	Sensor ground (ASCD steering switch)	—	[Engine is running] • Warm-up condition • Idle speed	0V
99	Ground	R/W	Stop lamp switch	Input	[Ignition switch: OFF] • Brake pedal: Fully released	0V
					[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
100	Ground	G/B	ASCD brake switch	Input	[Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and clutch pedal: Slightly depressed (M/T)	0V
					[Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and/or clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14V)
102	Ground	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	—	[Ignition switch: ON]	5V
104	Ground	B	Sensor ground (Accelerator pedal position sensor 2)	—	[Engine is running] • Warm-up condition • Idle speed	0V
105	Ground	G	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
106	Ground	O	Sensor power supply (Accelerator pedal position sensor 1)	—	[Ignition switch: ON]	5V
108	Ground	B	ECM ground	—	[Engine is running] • Idle speed	Body ground
110	Ground	R	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9V
					[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7V

cardiagn.com

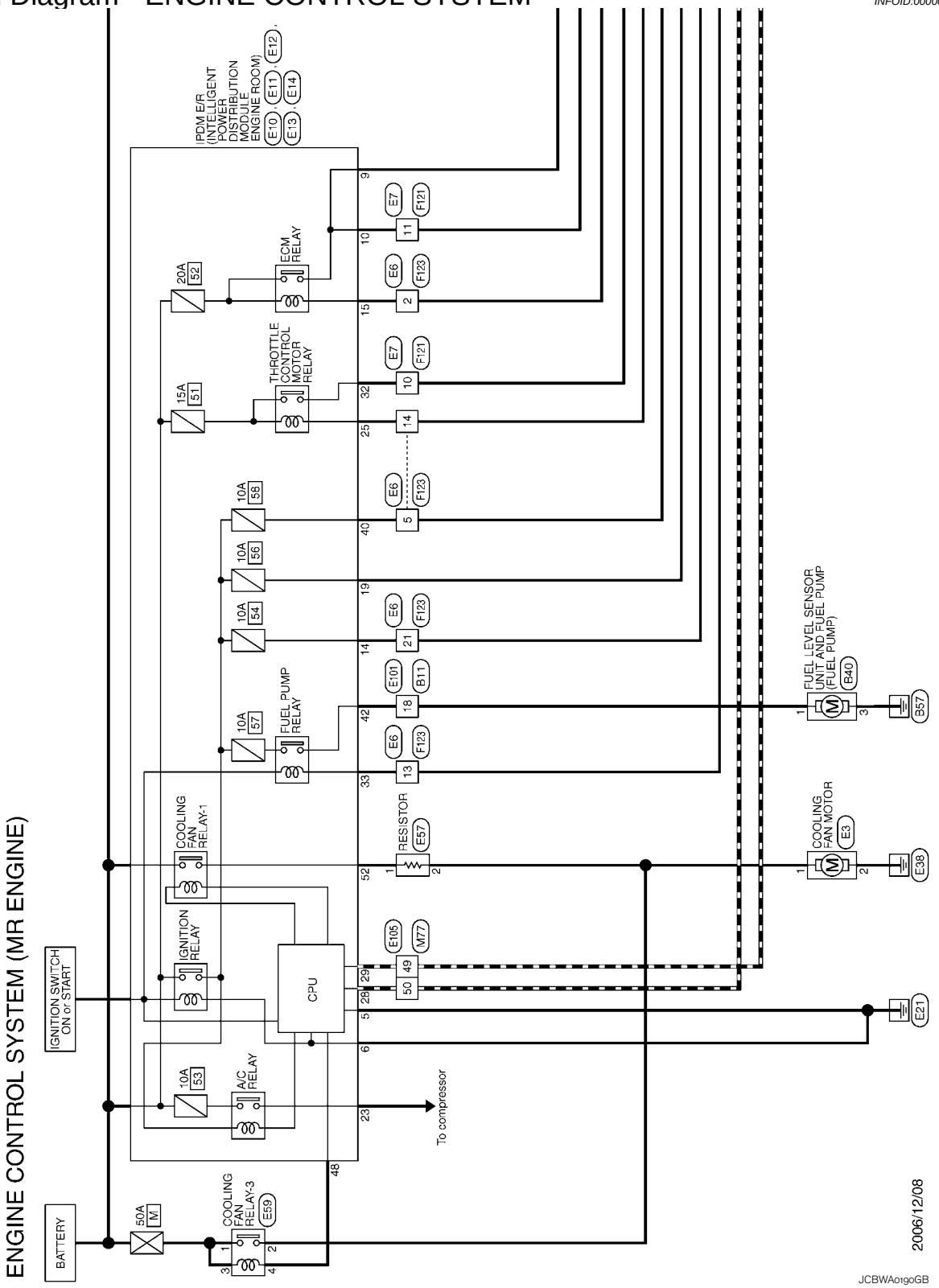
Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
103	Ground	GR	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6V
					[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4V
111	Ground	B/Y	Sensor ground (Accelerator pedal position sensor 1)	—	[Engine is running] • Warm-up condition • Idle speed	0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

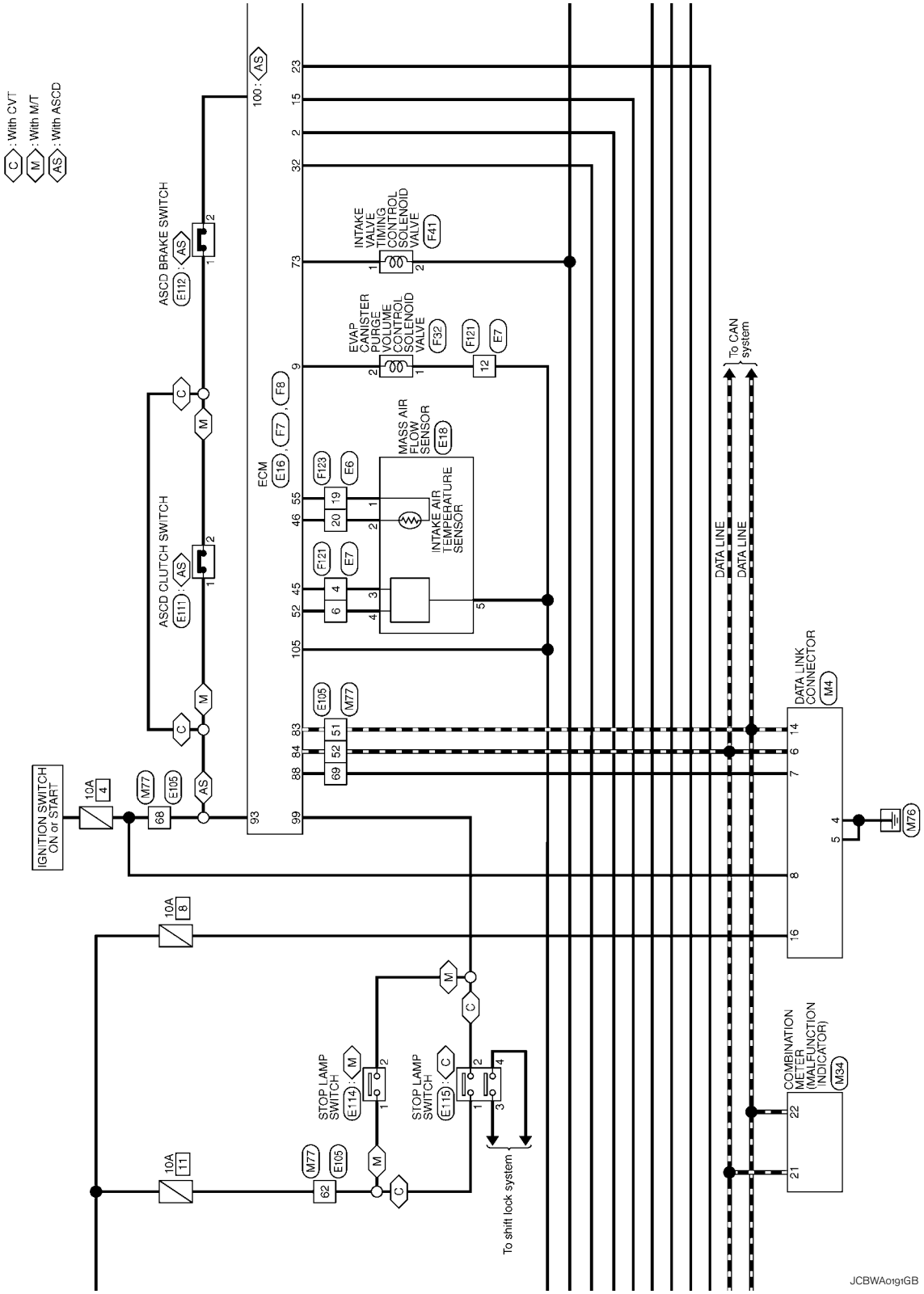
cardiagn.com

Wiring Diagram - ENGINE CONTROL SYSTEM -

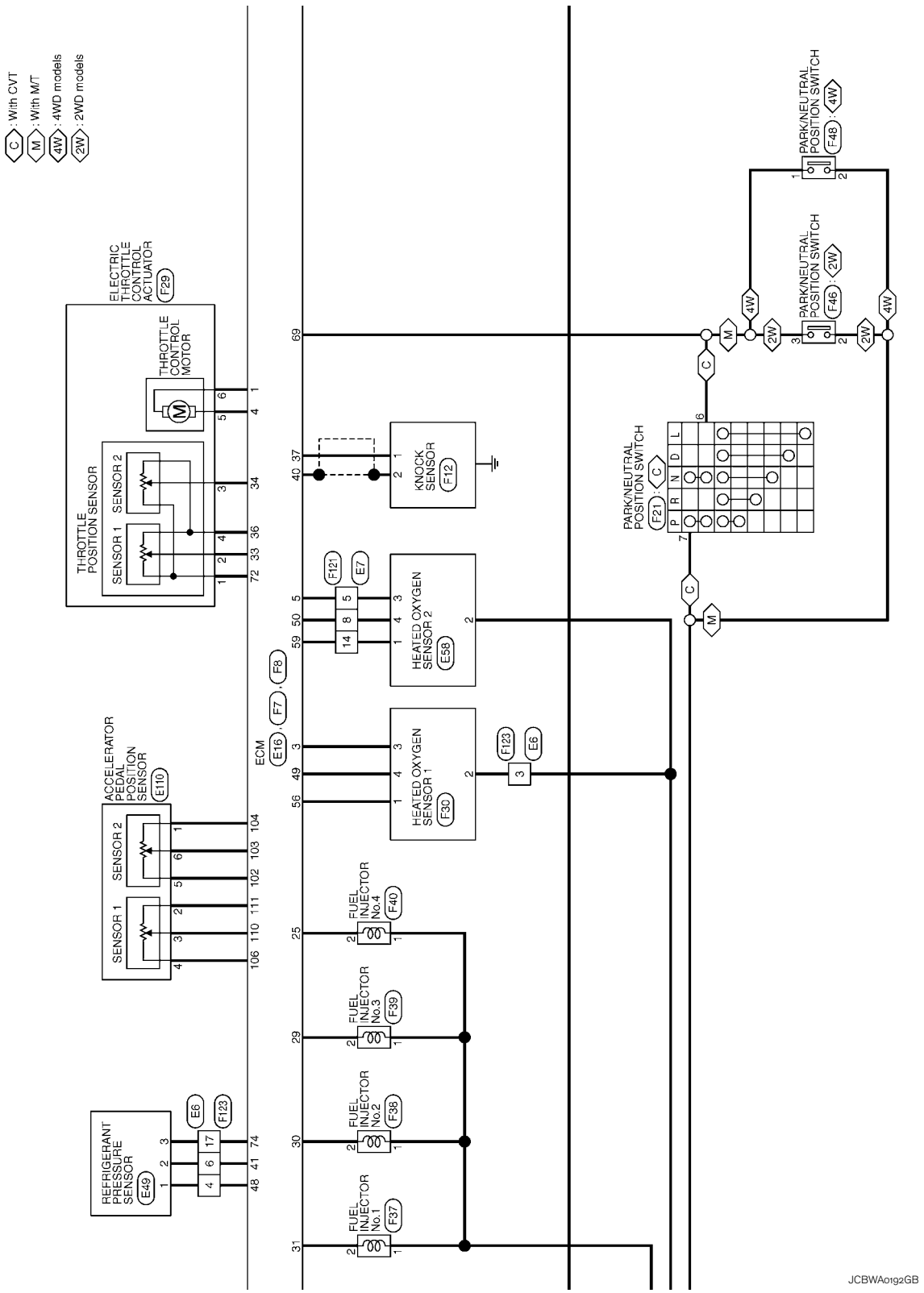
INFOID:0000000001094322



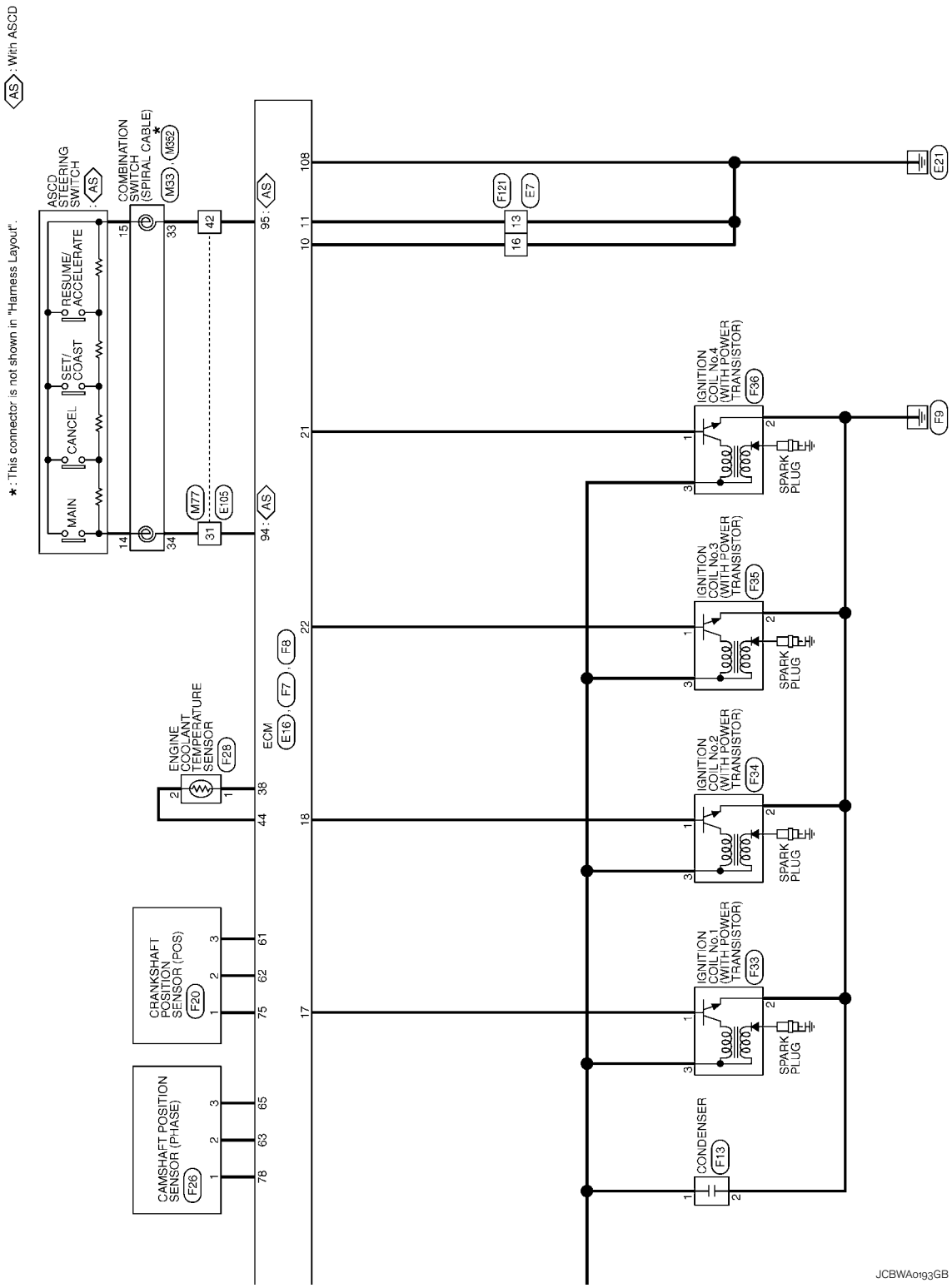
cardiagn.com



cardiagn.com

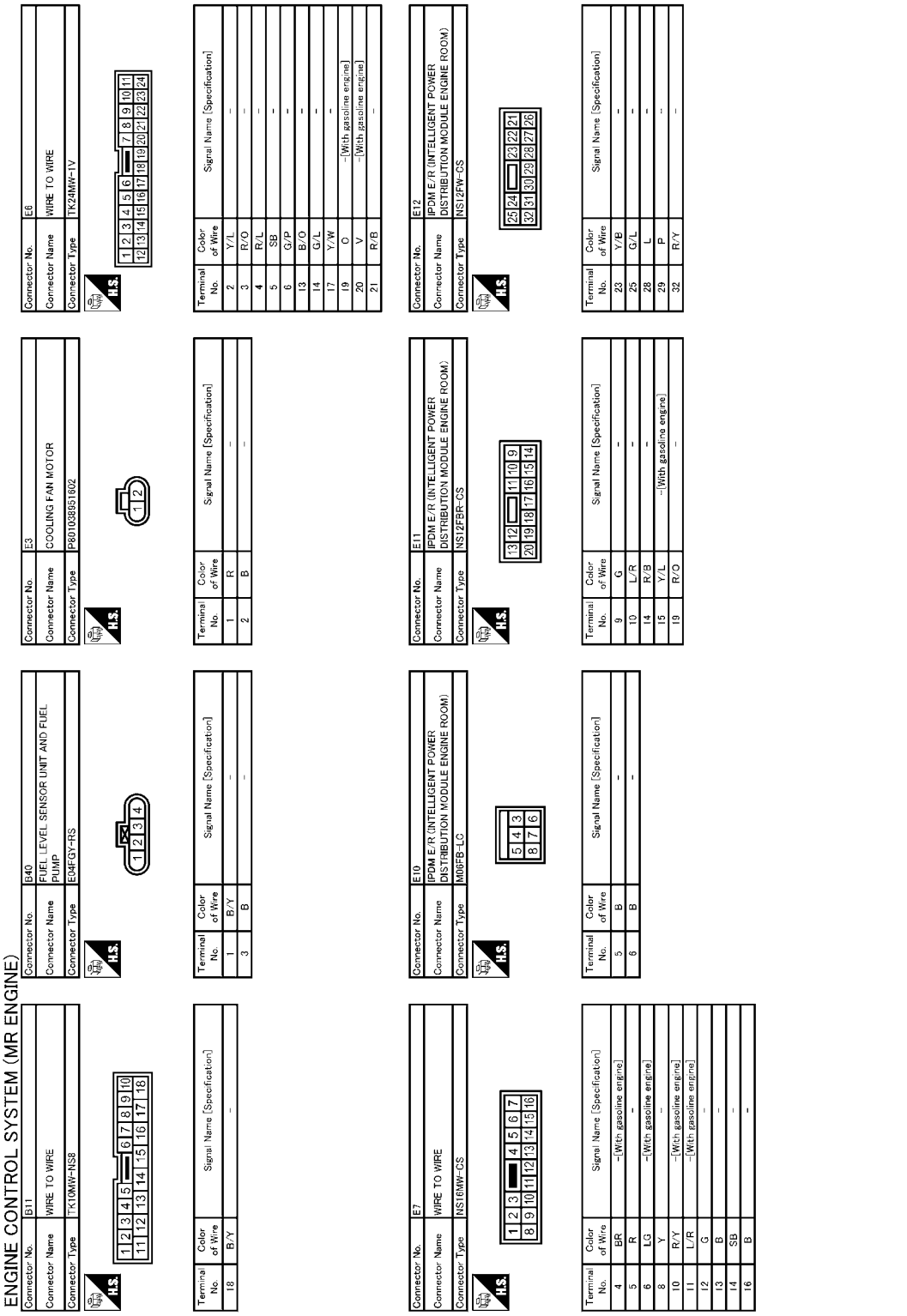


cardiagn.com



cardiagn.com

ENGINE CONTROL SYSTEM (MR ENGINE)

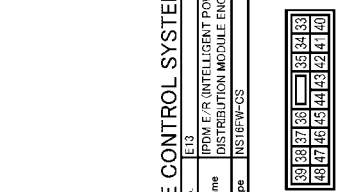


JCBWA0194GB

cardiagn.com

ENGINE CONTROL SYSTEM (MR ENGINE)

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

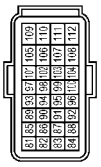


Terminal No.	Color of Wire	Signal Name [Specification]
33	B/O	–
40	SB	– [With MR engine]
42	B/Y	–
48	Y	–

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2ZK 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
52	W	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-ME48-LH



Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1
88	O	K-LINE
93	W/L	IGN SW
94	V	ASCD STRG SW
95	B	GND ASCD STRG SW
99	R/W	BRAKE
100	R	BNCSW(BNC)
102	BR/Y	AVCC-APS2 [With MR engine]
103	GR	APS2
104	B	GND-A-APS2 [With MR engine]

105	G	VBR
106	O	AVCC-APS1 [With MR engine]
108	B	GND
110	W	APS1 [With MR engine]
111	B/Y	GND-A-APS1 [With MR engine]

Connector No.	E18
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	V	–
3	BR	–
4	LG	–
5	G	–

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	–
2	G/P	–
3	Y/W	–

Connector No.	E57
Connector Name	RESISTOR
Connector Type	P801038951602

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	R	–

Connector No.	E58
Connector Name	HEATED OXYGEN SENSOR 2
Connector Type	AF204FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	R/O	–
3	R	–
4	Y	–

JCBWA0195GB

cardiagn.com

ENGINE CONTROL SYSTEM (MR ENGINE)

Connector No.	E59
Connector Name	COOLING FAN RELAY-3
Connector Type	24347 9F900

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/B	–
2	R	–
3	W/B	–
4	W	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
18	B/Y	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
31	V	–
42	B	–
49	P	–
50	L	–
51	P	–
52	L	–
62	V	–
68	W/L	–
69	O	–

Connector No.	E110
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RH08FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–[Except HR engine]
2	B/Y	–[With MR engine]
3	W	–[Except HR engine]
4	O	–[With MR engine]
5	BR/Y	–[With MR engine]
6	GR	–[Except K9K engine]

Connector No.	E111
Connector Name	ASCD CLUTCH SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/L	–[With gasoline engine]
2	O	–[With gasoline engine]

Connector No.	E112
Connector Name	ASCD BRAKE SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–[With M/T]
1	W/L	–[With CVT]
2	R	–

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

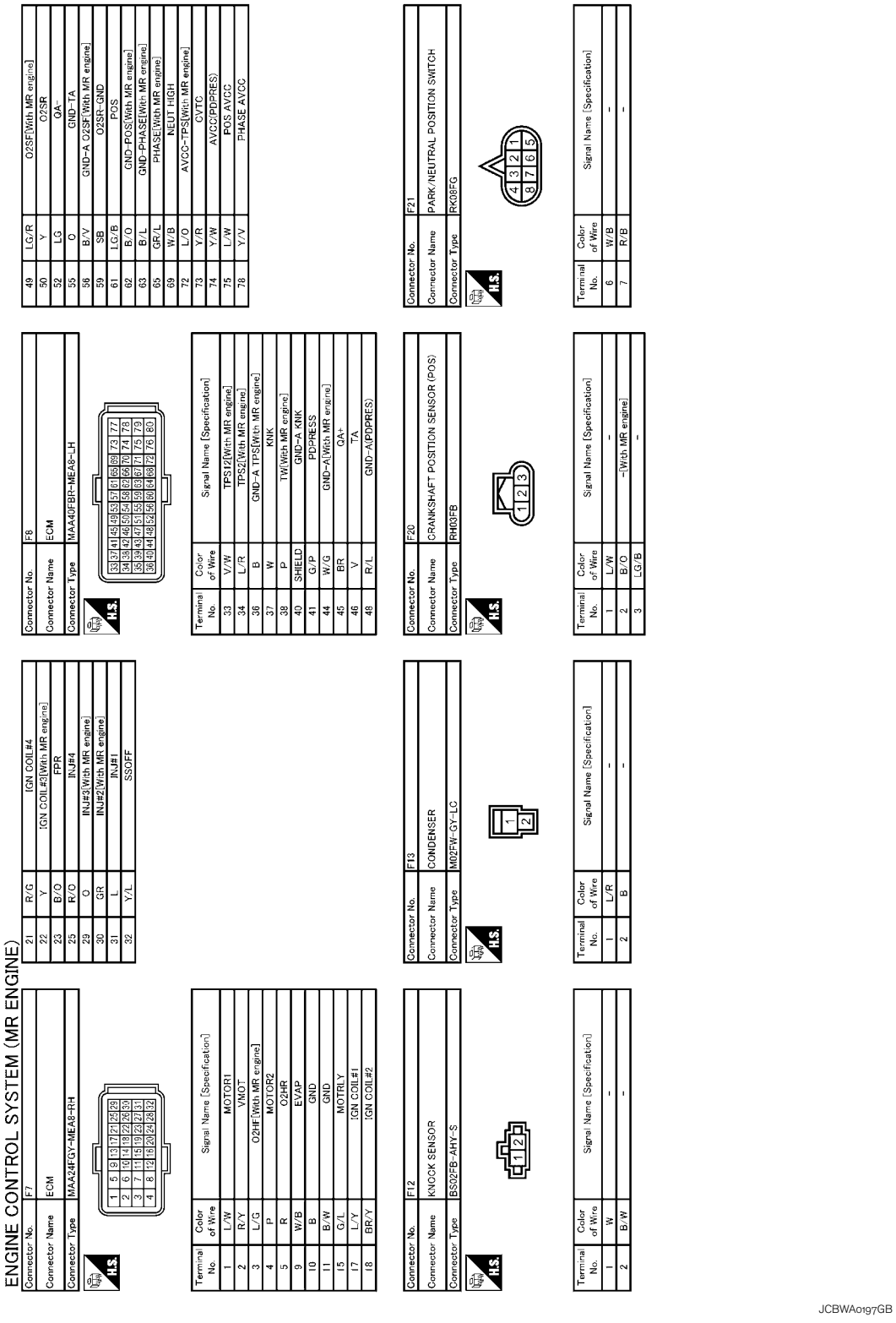
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–
3	G	–[With CVT]
4	B	–[With CVT]

JCBWA0196GB

cardiagn.com



cardiagn.com

ENGINE CONTROL SYSTEM (MR ENGINE)

Connector No.	F28
Connector Name	CAMSHAFT POSITION SENSOR (PHASE)
Connector Type	RH03FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/V	–
2	B/L	–[With MR engine]
3	GR/L	–[With MR engine]

Connector No.	F28
Connector Name	ENGINE COOLANT TEMPERATURE SENSOR
Connector Type	E02FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–[With MR engine]
2	W/G	–[With MR engine]

Connector No.	F29
Connector Name	ELECTRIC THROTTLE CONTROL ACTUATOR
Connector Type	RH06FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/O	–[With MR engine]
2	V/W	–[With MR engine]
3	L/R	–[With MR engine]
4	B	–[With MR engine]
5	P	–
6	L/W	–

Connector No.	F30
Connector Name	HEATED OXYGEN SENSOR 1
Connector Type	AF204FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/V	–[With MR engine]
2	R/O	–
3	L/G	–[With MR engine]
4	LG/R	–[With MR engine]

Connector No.	F32
Connector Name	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
Connector Type	E02FL-RS-LGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	W/B	–

Connector No.	F33
Connector Name	IGNITION COIL No.1 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/Y	–
2	B	–
3	L/R	–

Connector No.	F34
Connector Name	IGNITION COIL No.2 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR/Y	–
2	B	–
3	L/R	–

Connector No.	F35
Connector Name	IGNITION COIL No.3 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–[With MR engine]
2	B	–
3	L/R	–

JCBWA0198GB

cardiagn.com

ENGINE CONTROL SYSTEM (MR ENGINE)

Connector No.	F36
Connector Name	IGNITION COIL No.4 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/G	–
2	B	–
3	L/R	–

Connector No.	F37
Connector Name	FUEL INJECTOR No.1
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	L	–

Connector No.	F38
Connector Name	FUEL INJECTOR No.2
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	GR	–[With MR engine]

Connector No.	F39
Connector Name	FUEL INJECTOR No.3
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	O	–[With MR engine]

Connector No.	F40
Connector Name	FUEL INJECTOR No.4
Connector Type	HS02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	R/O	–

Connector No.	F41
Connector Name	INTAKE VALVE TIMING CONTROL SOLENOID VALVE
Connector Type	E02FG-RS-LGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/R	–
2	L/R	–

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/B	–
3	W/B	–

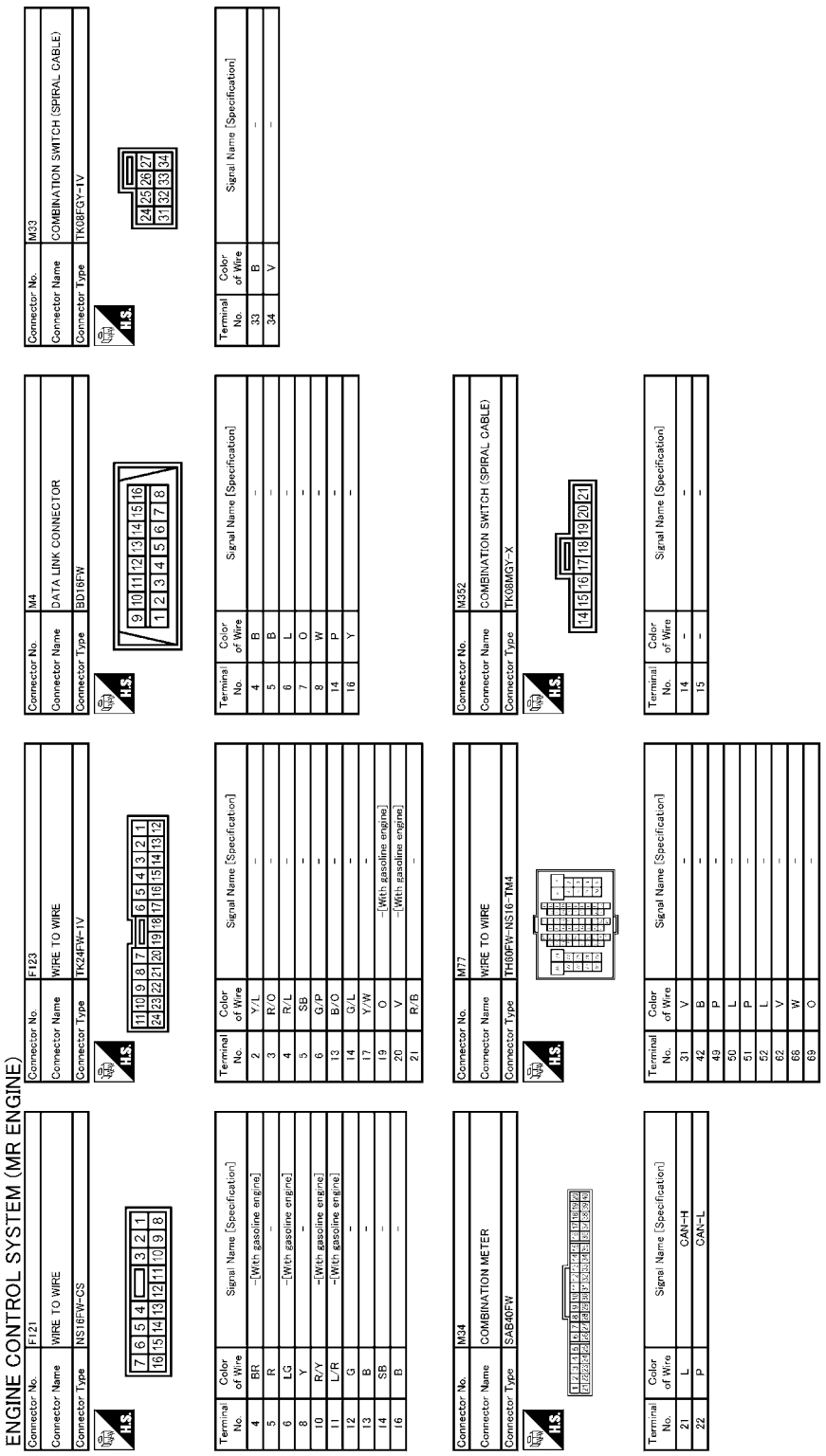
Connector No.	F48
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/B	–
2	R/B	–

JCBWA0199GB

cardiagn.com



JCBWA0200GB

Fail Safe

INFOID:0000000001094323

NON DTC RELATED ITEM

cardiagn.com

Engine operating condition in fail-safe mode	Detected items	Remarks	Reference page
Engine speed will not rise more than 2,500 rpm due to the fuel cut	Malfunction indicator circuit	When there is an open circuit on MI circuit, the ECM cannot warn the driver by lighting up MI when there is malfunction on engine control system. Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MI circuit is open by means of operating fail-safe function. The fail-safe function also operates when above diagnoses except MI circuit are detected and demands the driver to repair the malfunction.	EC-1213

DTC RELATED ITEM

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0011	Intake valve timing control	The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.	
P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
P0117 P0118	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-III displays the engine coolant temperature decided by ECM.	
		Condition	Engine coolant temperature decided (CONSULT-III display)
		Just as ignition switch is turned ON or START	40°C (104°F)
		More than approx. 4 minutes after ignition ON or START	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.	
P0605	ECM	(When ECM calculation function is malfunctioning:) ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation.	
P1121	Electric throttle control actuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.	
		(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.	
		(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P (CVT), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more.	
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	
P1124 P1126	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	

cardiagn.com

DTC No.	Detected items	Engine operating condition in fail-safe mode
P1128	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1229	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1805	Brake switch	ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.
		Vehicle condition / Driving condition
		When engine is idling / Normal
		When accelerating / Poor acceleration
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Inspection Priority Chart

INFOID:0000000001094324

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	• U1001 CAN communication line • U1010 CAN communication • P0102 P0103 Mass air flow sensor • P0117 P0118 P0125 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0605 ECM • P1229 sensor power supply • P1610 P1611 P1612 P1615 NATS • P1706 Park/Neutral position (PNP) switch • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	• P0132 P0134 Heated oxygen • P1111 Intake valve timing control solenoid valve • P1122 Electric throttle control function • P1124 P1126 Throttle control motor relay • P1128 Throttle control motor • P1217 Engine over temperature (OVERHEAT) • P1805 Brake switch
3	• P0011 Intake valve timing control • P1121 Electric throttle motor actuator • P1212 TCS communication line

DTC Index

INFOID:0000000001096238

×:Applicable —: Not applicable

DTC*1		Items (CONSULT-III screen terms)	Trip	MI	Reference page
CONSULT-III	ECM*2				
U1001	1001*3	CAN COMM CIRCUIT	2	—	EC-1073
U1010	1010	CONTROL UNIT(CAN)	1 (CVT) 2 (M/T)	× —	EC-1074
P0000	**0000**	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	—	Flashing*4	—

cardiagn.com

DTC*1		Items (CONSULT-III screen terms)	Trip	MI	Reference page
CONSULT-III	ECM*2				
P0011	0011	INT/V TIM CONT-B1	2	—	EC-1075
P0102	0102	MAF SEN/CIRCUIT-B1	1	×	EC-1079
P0103	0103	MAF SEN/CIRCUIT-B1	1	×	EC-1079
P0117	0117	ECT SEN/CIRC	1	×	EC-1084
P0118	0118	ECT SEN/CIRC	1	×	EC-1084
P0122	0122	TP SEN 2/CIRC-B1	1	×	EC-1087
P0123	0123	TP SEN 2/CIRC-B1	1	×	EC-1087
P0132	0132	HO2S1 (B1)	2	×	EC-1090
P0134	0134	HO2S1 (B1)	2	×	EC-1094
P0222	0222	TP SEN 1/CIRC-B1	1	×	EC-1098
P0223	0223	TP SEN 1/CIRC-B1	1	×	EC-1098
P0327	0327	KNOCK SEN/CIRC-B1	2	—	EC-1101
P0328	0328	KNOCK SEN/CIRC-B1	2	—	EC-1101
P0335	0335	CKP SEN/CIRCUIT	2	×	EC-1103
P0340	0340	CMP SEN/CIRC-B1	2	×	EC-1107
P0605	0605	ECM	1 or 2	× or —	EC-1111
P1111	1111	INT/V TIM C/CIRC	1	×	EC-1113
P1121	1121	ETC ACTR -B1	1	×	EC-1116
P1122	1122	ETC FUNCTION/CIRC-B1	1	×	EC-1118
P1124	1124	ETC MOT PWP	1	×	EC-1122
P1126	1126	ETC MOT PWP-B1	1	×	EC-1122
P1128	1128	ETC MOT-B1	1	×	EC-1125
P1212	1212	TCS/CIRC	2	—	EC-1128
P1217	1217	ENG OVER TEMP	1	×	EC-1129
P1225	1225	CTP LEARNING-B1	2	—	EC-1133
P1226	1226	CTP LEARNING-B1	2	—	EC-1135
P1229	1129	SENSOR POWER/CIRC	1	×	EC-1137
P1610	1610	LOCK MODE	2	—	SEC-44
P1611	1611	ID DISCARD IMM-ECM	2	—	SEC-36
P1612	1612	CHAIN OF ECM-IMMU	2	—	SEC-38
P1615	1615	DIFFERENCE OF KEY	2	—	SEC-35
P1706	1706	P-N POS SW/CIRCUIT	2	×	EC-1152
P1805	1805	BRAKE SW/CIRCUIT	2	—	EC-1155
P2122	2122	APP SEN 1/CIRC	1	×	EC-1158
P2123	2123	APP SEN 1/CIRC	1	×	EC-1158
P2127	2127	APP SEN 2/CIRC	1	×	EC-1161
P2128	2128	APP SEN 2/CIRC	1	×	EC-1161
P2135	2135	TP SENSOR-B1	1	×	EC-1165
P2138	2138	APP SENSOR	1	×	EC-1168

*1: 1st trip DTC No. is the same as DTC No.

*2: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

*3: The troubleshooting for this DTC needs CONSULT-III.

*4: When engine is running, MI may flash. For details, refer to EC-1050, "Diagnosis Description".

cardiagn.com

SYMPTOM DIAGNOSIS

ENGINE CONTROL SYSTEM

Symptom Table

INFOID:0000000001094328

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-926
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-978
	Fuel injector circuit	1	1	2	3	2		2	2			2			EC-923
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-1036
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-935
	Incorrect idle speed adjustment						1	1	1	1		1			EC-646
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-832, EC-834
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-646
	Ignition circuit	1	1	2	2	2		2	2			2			EC-929
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-1069
Mass air flow sensor circuit		1			2										EC-746
Engine coolant temperature sensor circuit							3			3					EC-1084
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			EC-760, EC-764, EC-770, EC-844, EC-849
Throttle position sensor circuit							2			2					EC-1087, EC-799, EC-874, EC-876, EC-906
Accelerator pedal position sensor circuit				3	2	1									EC-899, EC-902, EC-906
Knock sensor circuit				2								3			EC-807
Crankshaft position sensor (POS) circuit		2	2												EC-809

cardiagn.com

	SYMPTOM													
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Camshaft position sensor (PHASE) circuit	3	2												EC-813
Vehicle speed signal circuit		2	3		3						3			EC-825
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-827
Intake valve timing control solenoid valve circuit		3	2		1	3	2	2	3		3			EC-829
PNP switch circuit			3		3		3	3			3			EC-892
Refrigerant pressure sensor circuit		2				3			3		4			EC-936
Electrical load signal circuit							3							EC-921
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	HA-12
ABS actuator and electric unit (control unit)			4											BRC-9

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

cardiagn.com

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank	5													FL-15, FL-17
	Fuel piping			5	5	5		5	5			5			EM-155
	Vapor lock		5												—
	Valve deposit	5		5	5	5		5	5			5			—
	Poor fuel (Heavy weight gasoline, Low octane)														—
Air	Air duct														EM-146
	Air cleaner														EM-144
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)	5	5	5	5	5	5	5	5	5		5			EM-146
	Electric throttle control actuator														
	Air leakage from intake manifold/ Collector/Gasket														
Cranking	Battery	1	1	1		1		1	1			1		1	PG-118
	Generator circuit														CHG-8
	Starter circuit	3													STR-8
	Signal plate	6													EM-195, EM-199
	PNP switch	4													TM-226 or TM-324
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-186
	Cylinder head gasket										4		3		
	Cylinder block	6	6	6	6	6		6	6			6	4		EM-187
	Piston														
	Piston ring														
	Connecting rod														
	Bearing														
	Crankshaft														

cardiagn.com

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Valve mechanism	Timing chain	5	5	5	5	5		5	5			5			EM-163
	Camshaft														EM-163
	Intake valve timing control														EM-163
	Intake valve												3		EM-163
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			EM-149, EX-10
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			EM-152, LU-18, LU-17,
	Oil level (Low)/Filthy oil														LU-14
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5		5	5		4	5			CO-35
	Thermostat									5					CO-41
	Water pump														CO-39
	Water gallery														CO-24, CO-25
	Cooling fan									5					CO-37
	Coolant level (Low)/Contaminated coolant														CO-30
NVIS (NISSAN Vehicle Immobilizer System — NATS)		1	1												SEC-14

1 - 6: The numbers refer to the order of inspection.

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000001094329

FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 1,800 rpm under no load (for example, the selector lever position is neutral and engine speed is over 1,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 1,500 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, EC-1001, "System Diagram".

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001099092

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

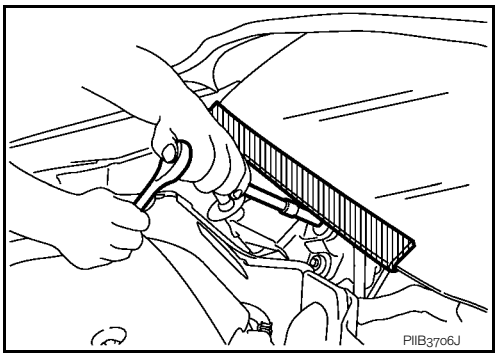
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001099093

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



On Board Diagnostic (OBD) System of Engine and CVT

INFOID:0000000001099094

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MI) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

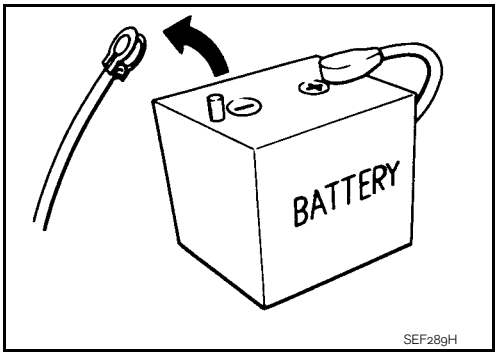
- **Be sure to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-105, "Description".**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MI to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to the malfunction of the EVAP system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.**

General Precautions

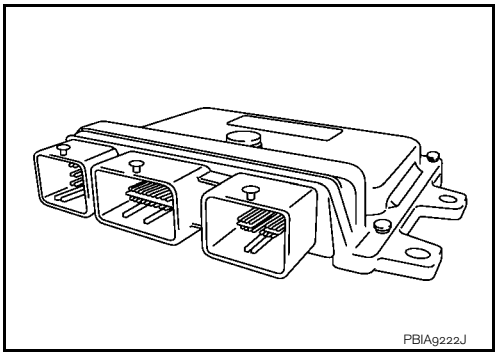
INFOID:0000000001099095

cardiagn.com

- **Always use a 12 volt battery as power source.**
- **Do not attempt to disconnect battery cables while engine is running.**
- **Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.**
- **Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.**

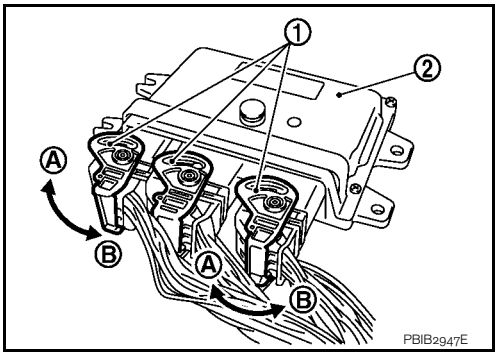


- **Do not disassemble ECM.**
- **If a battery cable is disconnected, the memory will return to the ECM value.**
  The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.
- **If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.**
- **Diagnostic trouble codes**
- **1st trip diagnostic trouble codes**
- **Freeze frame data**
- **1st trip freeze frame data**

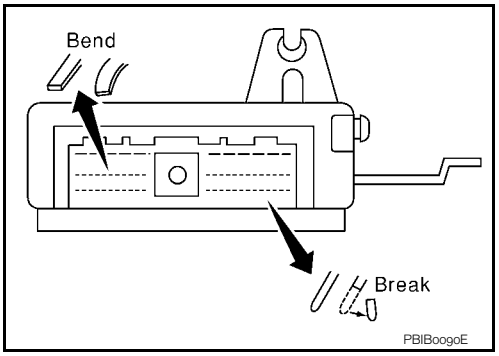


- **When connecting ECM harness connector (1), fasten (B) it securely with a lever as far as it will go as shown in the figure.**

2. ECM
A. Loosen

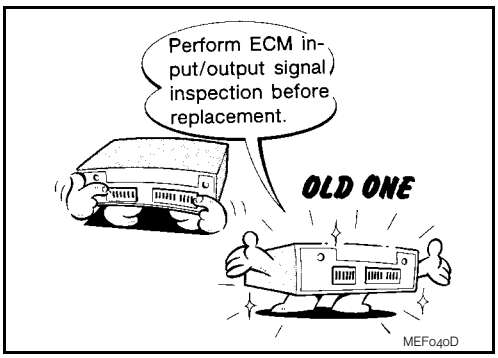


- **When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- **Securely connect ECM harness connectors.**
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- **Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.**
- **Keep engine control system parts and harness dry.**

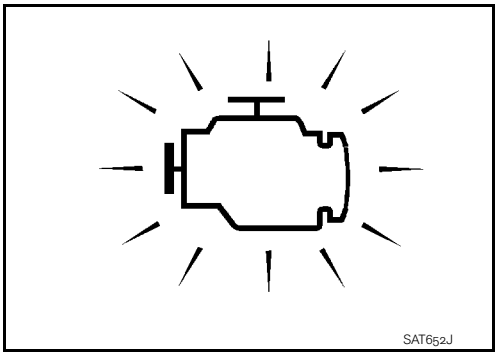


cardiagn.com

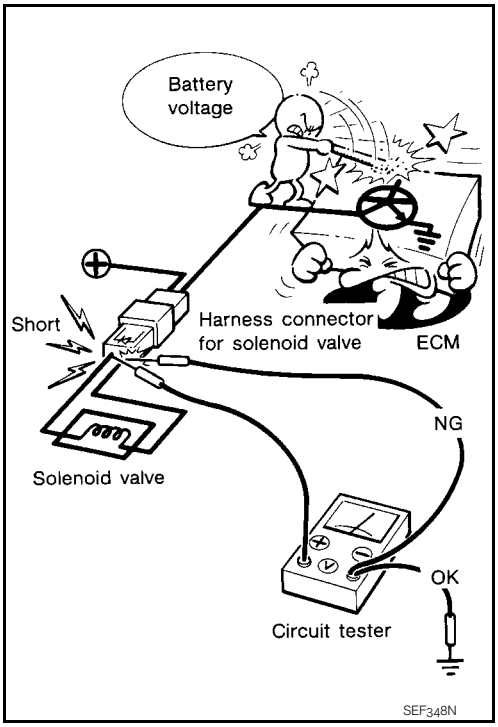
- **Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-938, "Reference Value".**
- **Handle mass air flow sensor carefully to avoid damage.**
- **Do not clean mass air flow sensor with any type of detergent.**
- **Do not disassemble electric throttle control actuator.**
- **Even a slight leak in the air intake system can cause serious incidents.**
- **Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).**



- **After performing each TROUBLE DIAGNOSIS, perform DTC CONFIRMATION PROCEDURE or Component Function Check.** The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.



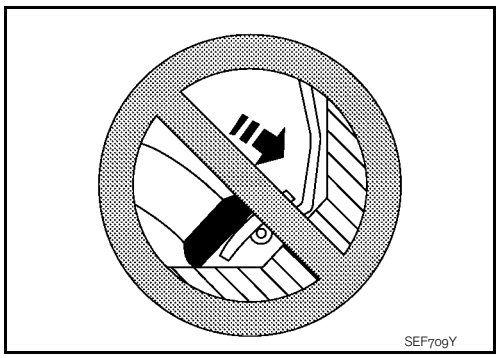
- **When measuring ECM signals with a circuit tester, never allow the two tester probes to contact.**
  Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- **Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**



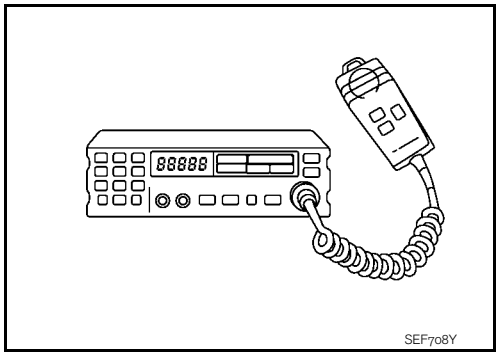
- **Do not operate fuel pump when there is no fuel in lines.**
- **Tighten fuel hose clamps to the specified torque.**

cardiagn.com

- **Do not depress accelerator pedal when starting.**
- **Immediately after starting, do not rev up engine unnecessarily.**
- **Do not rev up engine just prior to shutdown.**



- **When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.**
- **Keep the antenna as far as possible from the electronic control units.**
- **Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.**
  Do not let them run parallel for a long distance.
- **Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.**
- **Be sure to ground the radio to vehicle body.**



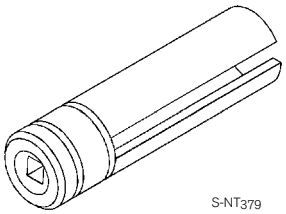
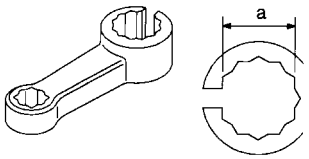
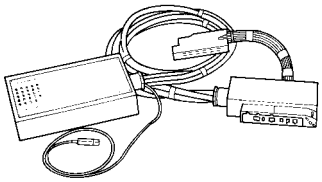
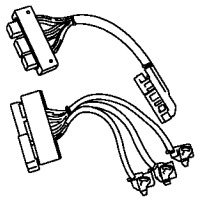
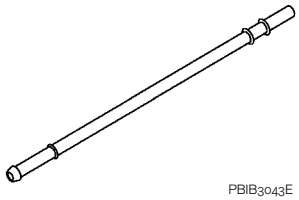
cardiagn.com

PREPARATION

PREPARATION

Special Service Tools

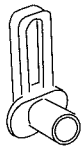
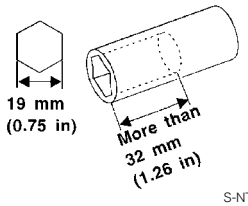
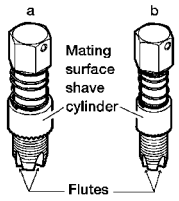
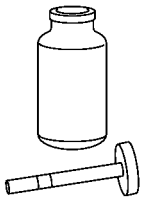
INFOID:0000000001094332

Tool number Tool name	Description
KV10117100 Heated oxygen sensor wrench  S-NT379	Loosening or tightening heated oxygen sensor with 22 mm (0.87 in) hexagon nut
KV10114400 Heated oxygen sensor wrench  S-NT636	Loosening or tightening heated oxygen sensor 2 **a: 22 mm (0.87 in)**
EG17550000 Break-out box  ZZA1194D	Measuring ECM signals with a circuit tester
EG17680000 Y-cable adapter  PBIA9379J	Measuring ECM signals with a circuit tester
KV10118400 Fuel tube adapter  PBIB3043E	Measuring fuel pressure

Commercial Service Tools

INFOID:0000000001115677

cardiagn.com

Tool name	Description
Quick connector release  PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Par No. 16441 6N210)
Socket wrench  S-NT705	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. **a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor** **b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor**
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)  S-NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

cardiagn.com

ON-VEHICLE REPAIR

FUEL PRESSURE

Inspection

INFOID:0000000001094334

FUEL PRESSURE RELEASE

With CONSULT-III

1. Turn ignition switch ON.
2. Perform “FUEL PRESSURE RELEASE” in “WORK SUPPORT” mode with CONSULT-III.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

With CONSULT-III

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.

FUEL PRESSURE CHECK

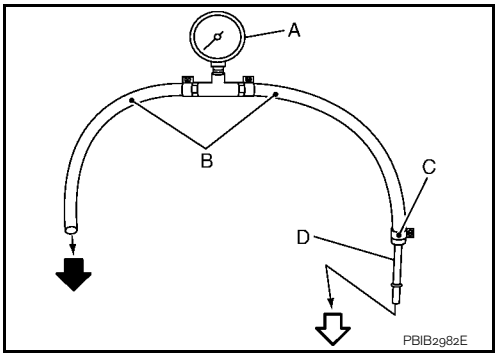
CAUTION:

- **Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.**
- **The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.**
- **Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains sealability with O-rings inside.**
- **Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.**

NOTE:

Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because J10 models do not have fuel return system.

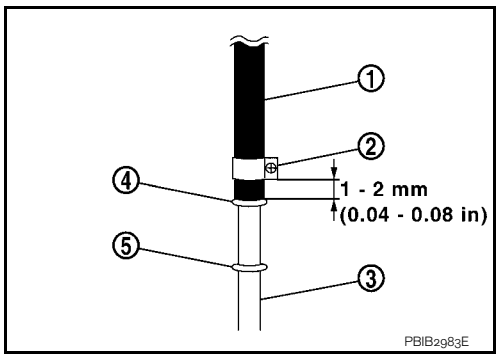
1. Release fuel pressure to zero.
2. Prepare fuel hose for fuel pressure check B and fuel tube adapter (KV10118400) D, then connect fuel pressure gauge A.
   - ⇦: To quick connector
   - ⬅: To fuel tube (engine side)
   - C: Clamp
   - Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
   - To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
   - Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
   - Use Pressure Gauge to check fuel pressure.



3. Remove fuel hose.
   - Do not twist or kink fuel hose because it is plastic hose.

cardiagn.com

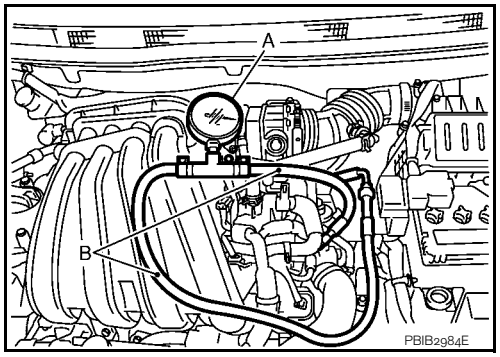
4. Connect fuel hose for fuel pressure check (1) to fuel tube (engine side) with clamp (2) as shown in the figure.
   - No.2 spool (5)
   - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
   - Apply proper amount of gasoline between top of the fuel tube (3) and No.1 spool (4).
   - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
   - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
   - When reconnecting fuel line, always use new clamps.
   - Use a torque driver to tighten clamps.
   - Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



Tightening torque: 1 - 1.5 N·m (0.1 - 0.15 kg-m, 9 - 13 in-lb)

   - Make sure that clamp screw does not contact adjacent parts.

5. Connect fuel tube adapter to quick connector.
   - A: Fuel pressure gauge
   - B: Fuel hose for fuel pressure check
6. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
7. Turn ignition switch ON and check for fuel leakage.
8. Start engine and check for fuel leakage.
9. Read the indication of fuel pressure gauge.
   - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
   - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.



At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2, 51 psi)

10. If result is unsatisfactory, go to next step.
11. Check the following.
    - Fuel hoses and fuel tubes for clogging
    - Fuel filter for clogging
    - Fuel pump
    - Fuel pressure regulator for clogging

    If OK, replace fuel pressure regulator.
    If NG, repair or replace.

cardiagn.com

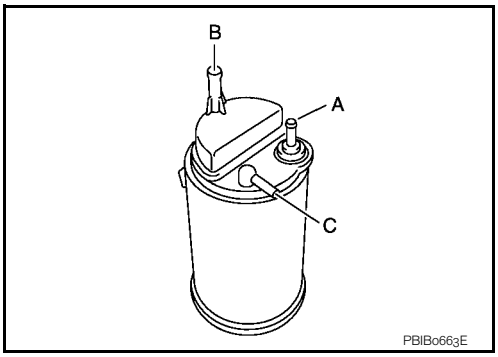
EVAPORATIVE EMISSION SYSTEM

Inspection

INFOID:0000000001094335

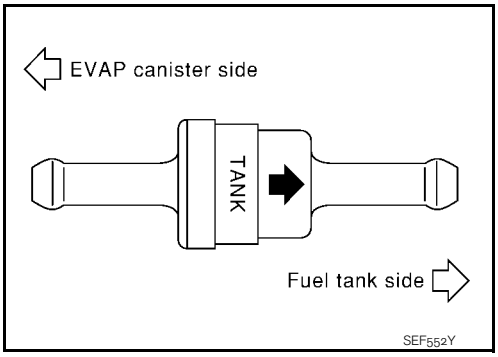
1. Visually inspect EVAP vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Check EVAP canister as follows:

a. Block port (B). Orally blow air through port (A). Check that air flows freely through port (C).
b. Block port (A). Orally blow air through port (B). Check that air flows freely through port (C).



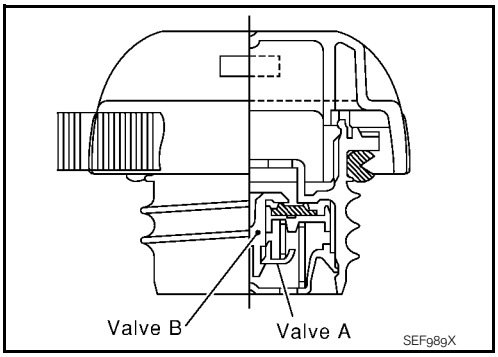
3. Visually inspect the fuel check valve for cracks, damage, loose connections chafing and deterioration.
4. Check fuel check valve as follows:

a. Blow air through connector on the fuel tank side. A considerable resistance should be felt and a portion of air flow should be directed toward the EVAP canister side.
b. Blow air through connector on EVAP canister side. Air flow should be smoothly directed toward fuel tank side.
c. If fuel check valve is suspected or not properly functioning in step 1 and 2 above, replace it.



5. Inspect fuel tank filler cap vacuum relief valve for clogging, sticking, etc.

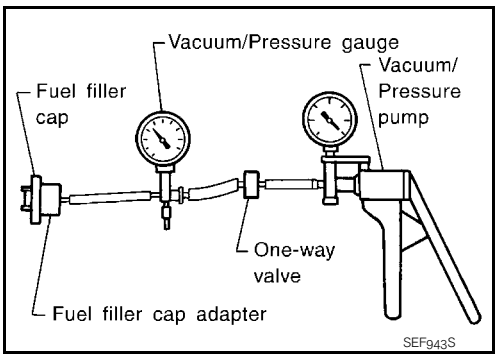
a. Wipe clean valve housing.



b. Check valve opening pressure and vacuum.

Pressure:	15.3 - 20.0 kPa (0.153 - 0.200 bar, 0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)
Vacuum:	–6.0 to –3.4 kPa (–0.06 bar to –-0.034bar, –0.061 to –0.035 kg/cm^2, –0.87 to –0.49 psi)

c. If out of specification, replace fuel filler cap as an assembly.



cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

INFOID:0000000001094336

Transmission	Condition	Specification
CVT	No load* (in P or N position)	700 ± 50 rpm
M/T	No load* (in Neutral position)	700 ± 50 rpm

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Ignition Timing

INFOID:0000000001094337

Transmission	Condition	Specification
CVT	No load* (in P or N position)	15 ± 5° BTDC
M/T	No load* (in Neutral position)	15 ± 5° BTDC

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Mass Air Flow Sensor

INFOID:0000000001094339

Supply voltage	Battery voltage (11 – 14 V)
Output voltage at idle	1.0 – 1.3V*

*: Engine is warmed up to normal operating temperature and running under no load.

cardiagn.com

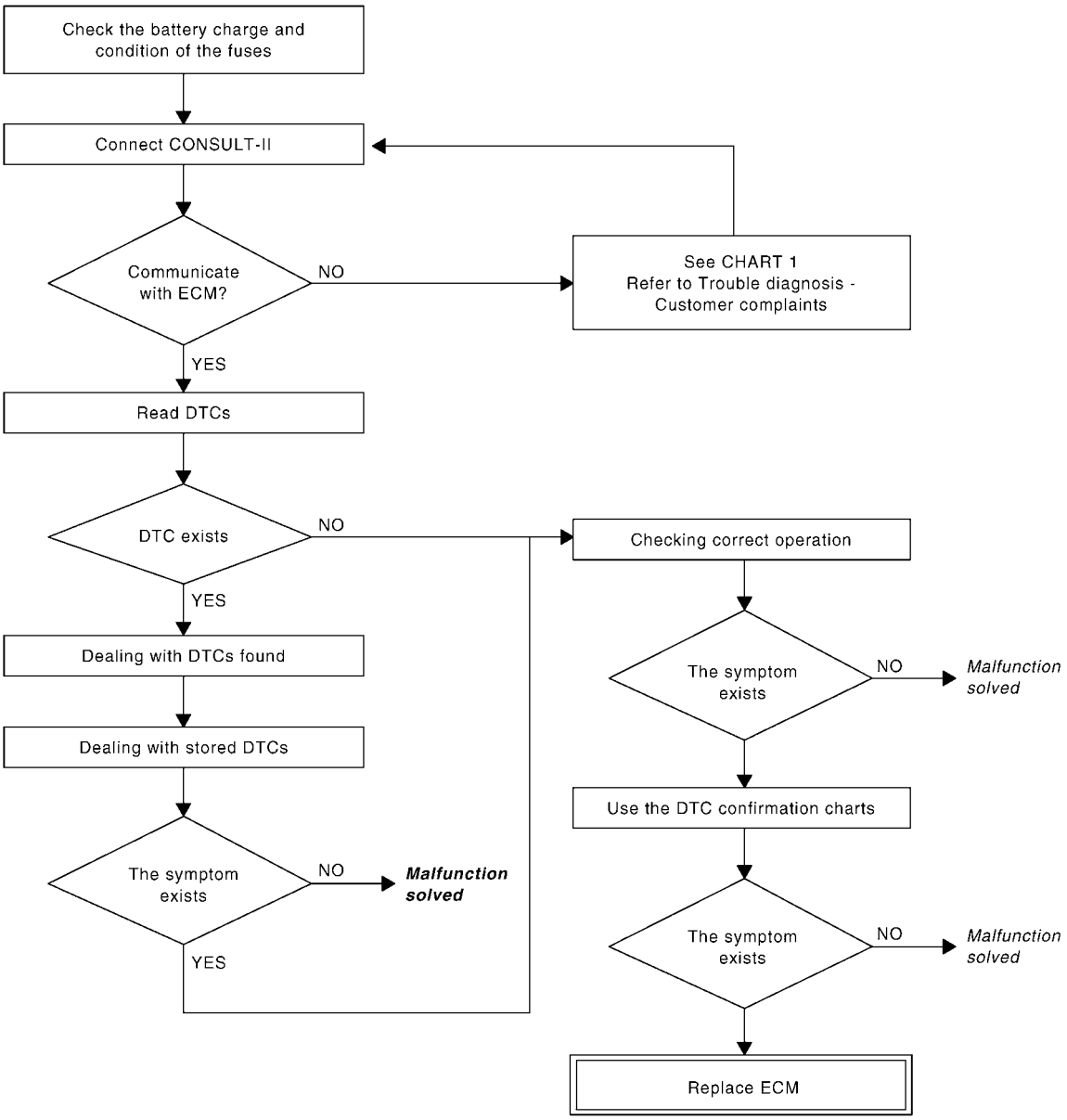
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000894501

OVERALL SEQUENCE



MBIB1484E

Diagnostics Malfunctions

cardiagn.com

- Malfunctions are declared as either present or stored (depending on whether they appeared in a certain context and have disappeared since, or whether they remain present but have not been diagnosed within the current context).
- The present or stored status of faults should be taken into consideration when the diagnostic tool is used following the + after ignition supply being switched on (without acting on the system components).
- For a present fault, apply the procedure described in the Interpretation of faults section.
- For a stored fault, note the faults displayed and apply the instructions in the Notes section.
- If the malfunction is confirmed when the instructions in the Notes section are applied, the malfunction is present. Deal with the malfunction
- If the malfunction is not confirmed, check:

- the electrical lines which correspond to the fault,
- the connectors for these lines (for oxidation, bent pins, etc),
- the condition of the wires (insulation has melted or been cut, abrasions).
- the resistance of the component detected as faulty,

Conformity Check

- The aim of the conformity check is to check data that does not produce a fault on the diagnostic tool because the data is inconsistent. Therefore, this phase is used to:

- carry out fault finding on faults that do not have a fault display, and which may correspond to a customer complaint.
- check that the system is operating correctly and that there is no risk of a fault recurring after repairs.

- This section gives the fault finding procedures for statuses and parameters and the conditions for checking them.
- If a status is not behaving normally or a parameter is outside the permitted tolerance values, consult the corresponding malfunction finding page.

Customer Complaints - Malfunction finding chart

If the test with the diagnostic tool is OK but the customer complaint is still present, the fault should be processed by customer complaint.

NOTE:

A synopsis of the general procedure to follow is provided on the preceding page in the form of a flow chart.

Malfunction Finding Procedure (Wiring Check)

Diagnostics malfunctions

Removing the connectors and/or handling the wirings may temporarily remove the origin of a DTC. The measurements of the electrical voltages, resistance and insulation are generally correct, especially when the DTC is not present at the time of the analysis (stored DTC).

Visual Check

Look for impacts under the bonnet and in the passenger compartment.
Perform a careful check of the protections, insulation and correct running of wirings.
Look for traces of oxidation.

Tactile Check

While manipulating the wirings, use the diagnostic tool to detect a change in DTC status from “stored” to “present”.
Ensure that the connectors are correctly engaged.
Apply light stresses to the connectors.
Gently manipulate the wiring harness.
If a change of status occurs, try to isolate the origin of the incident.

Inspection of each component

Disconnect the connectors and check the appearance of the clips and blades and their crimping (no crimping on the insulating part).
Check that the clips and blades are properly engaged in the receptacles.
Ensure that there is no rebounding of clips or blades at the time of connection.
Check the contact pressure of the clips using a suitable model blade.

Resistance Control

Test the continuity of the lines in their entirety, then section by section.
Try to create a short-circuit to earth, on the + 12 V or with another wire.
If a DTC is detected, repair or replace the wiring.

REMINDERS

Trouble Diagnosis:

cardiagn.com

There are present DTCs and stored DTCs (which appeared in a certain context and have since disappeared or which are still present but have not had trouble diagnosis performed on them in the current context).
The “present” or “stored” status of DTCs must be considered when activating the diagnostic tool after power is supplied to the ECM (without activating the system components).
Deal with present DTCs according to the procedure specified in the corresponding DTC trouble diagnosis.
For stored DTCs, note the DTCs displayed and follow the instructions in the Notes section.
If the DTC is confirmed when the instructions in the Notes section are applied, the malfunction is present. Deal with the DTC.

If the DTC is not confirmed, check:
- Electrical lines which correspond to the malfunction
- Connectors for these lines (for oxidation, bent pins, etc.)
- Resistance of the malfunction component
- Condition of the wires (melted or cut insulation, wear)

Conformity Check
The conformity check is designed to check the states and data monitor items which do not display any DTCs on the diagnostic tool when inconsistent. This phase therefore allows:
- Diagnoses malfunctions that do not have a DTC display, and which may correspond to a customer complaint.
- Checks that the system is operating correctly and that there is no risk of a DTC reappearing after repairs.

This section gives the trouble diagnosis procedures for states and parameters and the conditions for checking them.
If a state is not operating normally or a data monitor value is outside permitted tolerance values, you should consult the corresponding trouble diagnosis page.

Customer Complaints - Trouble Diagnosis
If the test with the CONSULT-III is OK, but the customer complaint still present, the malfunction should be treated by customer complaints.

A synopsis of the general procedure to follow is provided on the previous page in the form of a flow chart.

SAFETY ADVICE
- The safety instructions must be followed at all times when working on components, to avoid damage or injury:
- make sure that the battery is properly charged to avoid damaging the computers with a low load,
- use the appropriate tools,
- do not touch the xenon bulbs.

Diagnostic Work Sheet

INFOID:0000000000903764

DESCRIPTION

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.
Some conditions may cause the MI to come on steady or blink and DTC to be detected. Examples:
- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.

KEY POINTS

WHAT ..... Vehicle & engine model
WHEN ..... Date, Frequencies
WHERE..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SEF907L

cardiagn.com

WORKSHEET SAMPLE

Customer name MR/MS		Model & Year	VIN
Engine #		Trans.	Mileage
Incident Date		Manuf. Date	In Service Date
Fuel and fuel filler cap		☐ Vehicle ran out of fuel causing misfire ☐ Fuel filler cap was left off or incorrectly screwed on.	
Symptoms	☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]	
	☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
	☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
	☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading	
Incident occurrence		☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime	
Frequency		☐ All the time ☐ Under certain conditions ☐ Sometimes	
Weather conditions		☐ Not affected	
	Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]	
	Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F	
Engine conditions		☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions		☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)	
Driving conditions		☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp		☐ Turned on ☐ Not turned on	

MTBL0017

cardiagn.com

INSPECTION AND ADJUSTMENT
BASIC INSPECTION

BASIC INSPECTION : Description

INFOID:0000000000945894

NOTE:
Only consult the tests after following the diagnostic procedure chart.
Some specific checks are grouped under the “tests” heading and are used as required in different diagnostic charts.

Basic test	Trouble diagnosis	Reference page
Low pressure fuel supply system check	TEST 1	EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)"
Internal fuel transfer pump check	TEST 2	EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)"
High pressure supply pump (Pressure control valve) check	TEST 3	EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]"
High pressure supply pump (Volumetric control valve) check	TEST 4	EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]"
Rail high pressure regulation check	TEST 5	EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)"
Major leak in fuel injectors/fuel injectors open	TEST 6	EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)"
Incorrect fuel injection quantity	TEST 7	EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)"

BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)

INFOID:0000000001083085

NOTE:
- **CAUSE**
- No fuel can be seen in the transparent supply pipe leading to the pump or large air bubbles can be seen (small air bubbles are permitted).
- engine does not start.

1.CHECK CONFORMITY

Check the conformity and presence of the fuel (gasoline instead of diesel, contaminated fuel).

Is the inspection result normal?

Yes >> GO TO 2.
No >> Bleed the fuel supply system with the manual priming pump.

cardiagn.com

2.CHECK FUEL CIRCUIT

Does the fuel circulate correctly when pumped manually?

Yes or No

Yes >> GO TO 5.
No >> GO TO 3.

3.CHECK FOR LEAK

Look for leaks on the unions.

Are there leaks in the hoses and unions?

Yes >> Carry out the required repairs.
No >> GO TO 4.

4.CHECK FUEL FILTER

Check the correctness of the fuel filter.

Is the fuel filter correct?

Yes >> GO TO 5.
No >> Replace the fuel filter with a genuine part.

5.INSPECTION END

Low pressure circuit OK.

>> **INSPECTION END**

BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)

INFOID:0000000001083086

NOTE:
- **CONDITIONS PRIOR TO TEST**
- Test 1 Low pressure fuel supply system check has been carried out previously and results are satisfactory.
- **CAUSE**
- Fuel can be seen in the transparent supply pipe leading to the pump.
- However, fuel does not move during starting.

1.CHECK INTERNAL FUEL TRANSFER PUMP

1. Disconnect high pressure supply pump (volumetric control valve) harness connector
2. Remove fuel return pipe from the pump and block it so that it is sealed. Connect a pipe to the pump to measure the flow of diesel.
3. To authorise a 15 second cranking engine and carry out this test it is essential to carry out the following procedure: measure the flow of diesel.

- Turn ignition switch ON.
- Perform “SAVE DATA FOR CPU REPLC” in WORK SUPPORT mode with CONSULT-III.
- Perform “PRGRM_REINITIALIZE” in WORK SUPPORT mode with CONSULT-III.
- Cranking engine for at least 15 seconds (starting speed 250 rpm)
- Check the flow rate of the fuel being collected in a graduated measuring cylinder (500 ml minimum).The minimum flow rate must be 25 ml every 15 sec.
- Perform “WRT DATA AFTR REPLC CPU” in WORK SUPPORT mode with CONSULT-III.

Does the flow measure less than 25ml?

Yes >> Replace high pressure supply pump.
No >> GO TO 2.

2.INSPECTION END

Low pressure system OK.

>> **INSPECTION END**

BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]

INFOID:0000000001083087

cardiagn.com

NOTE:
- **CONDITIONS PRIOR TO TEST**
- The entire low pressure system must be in good condition.
- Check the sealing of the high pressure pipes and unions.
- **CAUSE**
- Rail pressure approximately 5000 kPa(50 bar, 51 kg/cm^2, 725 psi) during starting.

1.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE) POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect high pressure supply pump (pressure control valve) harness connector.
3. Turn ignition switch ON.
4. Check the voltage between high pressure supply pump (pressure control valve) harness connector and ground.

High pressure supply pump (Pressure control valve)		Ground	Voltage
Connector	Terminal		
F107	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- IPDM E/R
- Harness connector E7, F121
- Harness for open or short between IPDM E/R and high pressure supply pump (pressure control valve)
- Harness for open or short between ECM and high pressure supply pump (pressure control valve)

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE) OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between high pressure supply pump (pressure control valve) harness connector and ECM harness connector.

High pressure supply pump (Pressure control valve)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F107	4	F68	49	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE) CHECK

Refer to EC-1334, "Component Inspection".

Is the inspection result normal?

Yes >> INSPECTION END
No >> Replace high pressure supply pump.

BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]

INFOID:0000000001083088

cardiagn.com

NOTE:
- **CONDITIONS PRIOR TO TEST**
- The entire low pressure system must be in good condition.
- Check the sealing of the high pressure pipes and unions.
- **CAUSE**
- Not enough or no rail pressure during starting.
- Rail reference pressure during starting, minimum 15 000 kPa (150 bar, 153 kg/cm^2, 2175 psi).

1. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)-II

Refer to EC-1321, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2
NO >> Replace high pressure supply pump.

2. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)-I

- Reconnect all harness connectors disconnected.
- Turn ignition switch ON.
- Select “DATA MONITOR” mode with CONSULT-III.
- Check that the “FUEL_FLOW_S/V_CU” indication when the cranking engine.

Is the excitation current between 0.6 - 1.0A?

YES >> GO TO 6.
NO >> GO TO 3.

3. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE) POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect high pressure supply pump (volumetric control valve) harness connector.
3. Turn ignition switch ON.
4. Check the voltage between high pressure supply pump (volumetric control valve) harness connector and ground.

High pressure supply pump (volumetric control valve)		Ground	Voltage
Connector	Terminal		
F106	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- IPDM E/R
- Harness connector E7, F121
- Harness for open or short between ECM and high pressure supply pump (volumetric control valve)
- Harness for open or short between IPDM E/R and high pressure supply pump (volumetric control valve)

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE) OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between high pressure supply pump (volumetric control valve) harness connector and ECM harness connector.

cardiagn.com

High pressure supply pump (volumetric control valve)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F106	2	F68	50	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK ENGINE CONDITION

Start engine.

Is the engine start?

YES >> GO TO 7.
NO >> GO TO 9.

7.CHECK ENGINE CONDITION

- Check that the oil level is correct and that the engine coolant temperature is normal operation temperature 60°C (140°F)
- Engine running at idle speed.
- Select “HIGH PRES CIRCUIT LEAK TEST” in “ACTIVE TEST” mode with CONSULT-III.
- Engine will perform 4 acceleration cycles.
- Select “DATA MONITOR” mode with CONSULT-III.
- Check that the “RAIL PRES SET” and “RAIL PRESSURE” indication.
- Does “RAIL PRESSURER” follow “RAIL PRES SET” at ± 5000 kPa(50 bar, 51 kg/cm^2, 725 psi) during the phase of the 4 acceleration cycles?

NOTE:
If the rail pressure does not reach the setpoint there is an fuel injector leak that is too great or the pressure signal is incorrect.

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 8.

8.CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Carry out TEST 5.

>> GO TO 11.

9.CHECK ENGINE CONDITION

- Check that the oil level is correct.
- Select “DATA MONITOR” mode with CONSULT-III.
- Check that the “RAIL PRES SET” and “RAIL PRESSURE” indication.
- Does “RAIL PRESSURER” follow “RAIL PRES_SET” when the cranking engine.

NOTE:
If the rail pressure does not reach the setpoint there is an fuel injector leak that is too great or the pressure signal is incorrect.

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10.CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Carry out TEST 6.

>> GO TO 11.

11.INSPECTION END

High pressure supply pump (volumetric control valve) OK.

cardiagn.com

>> **INSPECTION END**

BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)

INFOID:0000000001083090

NOTE:
- If contaminants (swarf) can be seen in the transparent return pipe, the entire fuel injection system (fuel injectors, pump, rail, high pressure pipes and all return pipes) must be replaced.
- **CONDITIONS PRIOR TO TEST**
- Engine coolant temperature between 80 - 90°C (176 - 194°F).
- All the electrical load are switched off.
- Air conditioning is switched off.
- The tank is at least half-full.
- The pipe connections and unions have been checked.
- Check the sealing of the high pressure pipes and unions.
- **CAUSE**
- Rail pressure variations around the setpoint.
- The rail reference pressure is not reached.
- Rough idle.
- Possibly noisy combustion.

1.CHECK AIR BUBBLES

1. Start engine
2. Are there large air bubbles in the transparent supply pipe going to the pump?

Is the inspection result normal?

YES >> Check low pressure system.
NO >> GO TO 2.

2.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)-I

Disconnect high pressure supply pump (volumetric control valve) harness connector.

Does the engine stop?

YES >> GO TO 3.
NO >> Replace high pressure supply pump (the high pressure supply pump [volumetric control valve] remains open mechanically).

3.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)-I

1. Reconnect high pressure supply pump (volumetric control valve) harness connector.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start engine.
4. Disconnect high pressure supply pump (pressure control valve) harness connector.

Does the engine stop?

YES >> GO TO 4.
NO >> Replace high pressure supply pump (the high pressure supply pump [pressure control valve] remains open mechanically).

4.CHECK FUEL INJECTOR

1. Reconnect high pressure supply pump (pressure control valve) harness connector.
2. Wait at least 30 seconds.
3. Start engine and let it idle speed.
4. Select “DATA MONITOR” mode with CONSULT-III.
5. Check that the “F/FLOW_CORR_CYL1”, “F/FLOW_CORR_CYL2”, “F/FLOW_CORR_CYL3”, “F/FLOW_CORR_CYL4” indication.

Are the reference value 0.3 - 1.9?

YES >> GO TO 6.
NO >> GO TO 5.

5.CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Carry out TEST 6.

cardiagn.com

>> INSPECTION END

6. CHECK ENGINE CONDITION

- Check that the oil level is correct and that the engine coolant temperature is normal operation temperature.60°C (140°F)
- Engine running at idle speed.
- Select “HIGH PRES CIRCUIT LEAK TEST” in “ACTIVE TEST” mode with CONSULT-III.
- Engine will perform 4 acceleration cycles.
- Select DATA MONITOR mode with CONSULT-III.
- Check that the “RAIL PRES SET” and “RAIL PRESSURE” indication.
- Does “RAIL PRESSURE” follow “RAIL PRES SET” at during the phase of 4 acceleration cycles?

Is the inspection result normal?

YES >> GO TO 22.
NO >> GO TO 7.

7. CHECK ENGINE COOLANT TEMPERATURE AND FUEL TEMPERATURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Check that the “FUEL TEMP” indication when operating at idle speed is between 60 - 80°C (140 - 176°F)
3. Check that the “WATER TEM” indication is between 80 - 90°C (176 - 194°F)

NOTE:

- When the fuel temperature is above 136°C (277°F), the maximum rail pressure is reduced to protect the plastic pipes.
- When the coolant temperature is above 100°C (212°F), the maximum rail pressure is reduced to protect the engine.

Are the “FUEL TEMP” and “WATER TEMP” within the reference value range?

YES >> GO TO 8.
NO >> Check the fuel pump temperature sensor (Refer to EC-1348, "Component Inspection") or engine coolant temperature sensor (Refer to EC-1344, "Component Inspection").

8. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE) POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect high pressure supply pump (volumetric control valve) harness connector.
3. Turn ignition switch ON.
4. Check the voltage between high pressure supply pump (volumetric control valve) harness connector and ground.

High pressure supply pump (volumetric control valve)		Ground	Voltage
Connector	Terminal		
F106	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R
- Harness connector E7, F121
- Harness for open or short between ECM and high pressure supply pump (volumetric control valve)
- Harness for open or short between IPDM E/R and high pressure supply pump (volumetric control valve)

>> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE) OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

cardiagn.com

3. Check the continuity between high pressure supply pump (volumetric control valve) harness connector and ECM harness connector.

High pressure supply pump (volumetric control valve)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F106	2	F68	50	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)-II

Refer to EC-1321, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.
NO >> Replace high pressure supply pump.

12. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE) POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect high pressure supply pump (pressure control valve) harness connector.
3. Turn ignition switch ON.
4. Check the voltage between high pressure supply pump (pressure control valve) harness connector and ground.

High pressure supply pump (Pressure control valve)		Ground	Voltage
Connector	Terminal		
F107	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 14.
NO >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.
- IPDM E/R
- Harness connector E7, F121
- Harness for open or short between IPDM E/R and high pressure supply pump (pressure control valve)
- Harness for open or short between ECM and high pressure supply pump (pressure control valve)

>> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE) OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between high pressure supply pump (pressure control valve) harness connector and ECM harness connector.

High pressure supply pump (Pressure control valve)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F107	4	F68	49	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

cardiagn.com

YES >> GO TO 15.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)-II

Refer to EC-1334, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 16.
NO >> Replace high pressure supply pump.

16. CHECK FUEL RAIL PRESSURE SENSOR POWER SUUPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel rail pressure sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel rail pressure sensor harness connector and ground.

Fuel rail pressure sensor		Ground	Voltage (V)
Connector	Terminal		
F102	3	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

17. CHECK FUEL RAIL PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between fuel rail pressure sensor harness connector and ECM harness connector.

Fuel rail pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F102	2	F85	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

18. CHECK FUEL RAIL PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between fuel rail pressure sensor harness connector and ECM harness connector.

Fuel rail pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F102	1	F85	19	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 19.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

19. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-1350, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 20.
NO >> Replace fuel rail.

20. CHECK FUEL RAIL PRESSURE-I

1. Reconnect all harness connectors disconnected.

cardiagn.com

2. Start engine and let it idle speed.
3. Select “DATA MONITOR” mode with CONSULT-III.
4. Check that the “RAIL PRESSURE” indication under the following conditions.
   NOTE:
   An unusual combustion noise may be heard.

CONDITION (ENGINE SPEED)	INDICATION
At idle speed	190 - 210 bar
2000 rpm	400 - 500 bar
3000 rpm	500 - 700 bar
4000 rpm	700 - 900 bar

Is the inspection result normal?

YES >> GO TO 22.
NO >> GO TO 21.

21. CHECK FUEL RAIL PRESSURE-II

1. Turn ignition switch OFF.
2. Replace fuel rail. Refer to EM-277, "Removal and Installation"
3. Start engine and let it idle speed.
4. Select “DATA MONITOR” mode with CONSULT-III.
5. Check that the “RAIL PRESSURE” indication under the following conditions.
   NOTE:
   An unusual combustion noise may be heard.

CONDITION (ENGINE SPEED)	INDICATION
At idle speed	190 - 210 bar
2000 rpm	400 - 500 bar
3000 rpm	500 - 700 bar
4000 rpm	700 - 900 bar

Is the inspection result normal?

YES >> GO TO 22.
NO >> Replace high pressure supply pump.

22. INSPECTION END

High pressure supply pump (volumetric control valve) OK.

>> **INSPECTION END**

BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)

INFOID:0000000001083091

NOTE:
- **CONDITIONS PRIOR TO TEST**
- The entire low pressure system must be in good condition.
- Check the sealing of the high pressure pipes and unions.
- Test 3 High pressure supply pump (pressure control valve) check is OK
- Test 4 High pressure supply pump (volumetric control valve) check is OK
- Test 5 Rail high pressure regulation circuit check is OK.
- **CAUSE**
- Not enough or no rail pressure during starting.
- The engine does not start.

1. CHECK FUEL INJECTOR-I

Refer to EC-1352, "Component Inspection".

Is the inspection result normal?

cardiagn.com

YES >> GO TO 2.
NO >> Replace malfunctioning fuel injector.

2.CHECK INTERNAL FUEL TRANSFER PUMP

1. Turn ignition switch OFF.
2. Disconnect the return system connections at the fuel injectors and close off the return pipes so they are leak-tight.
3. To authorise a 15 second cranking engine and carry out this test it is essential to carry out the following procedure:

- Disconnect high pressure supply pump (volumetric control valve) harness connector
- Turn ignition switch ON.
- Perform “SAVE DATA FOR CPU REPLC” in WORK SUPPORT mode with CONSULT-III.
- Perform “PRGRM_REINITIALIZE” in WORK SUPPORT mode with CONSULT-III.
- Cranking engine for at least 15 seconds (starting speed 250 rpm)
- Perform “WRT DATA AFTR REPLC CPU” in WORK SUPPORT mode with CONSULT-III.

Is the return volume at the fuel injectors more than 20 ml per fuel injector for the starting phase?

NOTE:

- Do not repeat this procedure more than 3 times and wait 30 seconds between each 15 second cranking engine.
- Then wait 30 minutes before cranking the engine for 3 15 second cycles.
- Follow this instruction so that the starter does not get damaged.

Does the flow measure more than 20ml?

Yes >> Replace malfunctioning fuel injector.
No >> GO TO 3.

3.CHECK FUEL INJECTOR-II

1. Turn ignition switch OFF.
2. Reconnect return pipes.
3. Start Engine.
4. Select “DATA MONITOR” mode with CONSULT-III.
5. Check “RAIL PRESSURE” and “RAIL PRES SET” indication.
6. Does “RAIL PRESSURE” follow “RAIL PRES SET” during the 3 second cranking engine?

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.CHECK GLOW PLUG

1. Turn ignition switch OFF.
2. Remove the glow plugs and check for moisture.
3. If the glow plugs are wet with fuel, it is possible that the fuel injector is leaking.

Are the glow plugs wet with fuel?

Yes >> Replace malfunction fuel injector.
No >> Replace high pressure supply pump.

5.INSPECTION END

Fuel injector system OK.

>> **INSPECTION END**

BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)

INFOID:0000000001083092

NOTE:

- **CONDITIONS PRIOR TO TEST**

- The entire low pressure system must be in good condition.
- Check the sealing of the high pressure pipes and unions.
- Test 3 High pressure supply pump (pressure control valve) check is OK
- Test 4 High pressure supply pump (volumetric control valve) check is OK
- Test 5 Rail high pressure regulation circuit check is OK.

cardiagn.com

- All the electrical loads are switched off.
- Air conditioning is switched off.

• **CAUSE**

- The engine runs poorly at idle speed, possibly emits white smoke.

1.CHECK FUEL INJECTOR

Refer to EC-1352, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace malfunctioning fuel injector.

2.CHECK ENGINE COOLANT TEMPERATURE AND FUEL TEMPERATURE

1. Start engine let it idle speed.
2. Select “DATA MONITOR” mode with CONSULT-III.
3. Check “FUEL TEMP” indication is above 60°C (140°F)
4. Check “F/FLOW CORR CYL1“, “F/FLOW CORR CYL2”, “F/FLOW CORR CYL3”, “F/FLOW CORR CYL4” indication.

Are the reference value 0.3 - 1.9?

YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK INTERNAL FUEL TRANSFER PUMP

1. Turn ignition switch OFF.
2. Disconnect the return system connections at the fuel injectors and close off the return pipes so they are leak-tight. While the engine is idling, check the return flow rate at the fuel injector. After 5 minutes the return volume must be between 16 - 24 ml per fuel injector.

Is there more than 24 ml or less than 16 ml of return for each fuel injector?

Yes >> Replace malfunctioning fuel injector.
No >> INSPECTION END

4.CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-263, "Inspection".

>> INSPECTION END

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000000894656

When replacing ECM, this procedure must be performed.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000000903972

1.PRECONDITIONING

- Connect a CONSULT-III
- Connect a battery charger
- Electric load switch is OFF
- Wait for the engine to cool [engine coolant temperature < 60°C (140°F and air temperature < 50°C (122°F)].

NOTE:
While the ECM is being programmed the cooling fan motors are triggered automatically.

>> GO TO 2.

2.SAVE ECM DATA

Turn ignition switch ON.
Perform “SAVE DATA FOR CPU REPLC” in WORK SUPPORT mode with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.REPLACE ECM

Replace ECM.

>> GO TO 4.

4.WRITE ECM DATA

1. Turn ignition switch OFF, wait at least 30 seconds and then turn ON.
2. Perform “PRGRM_REINITIALIZE” in WORK SUPPORT mode with CONSULT-III.
3. Perform “WRT DATA AFTR REPLC CPU” in WORK SUPPORT mode with CONSULT-III.
4. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".
5. Turn ignition switch OFF, wait at least 30 seconds and then turn ON.
6. Select “DATA MONITOR” mode in ECM with CONSULT-III.
7. Check that the “CODE_PROGRAM” indication.

Which is displayed on CONSULT-III?

YES >> GO TO 6.
NO >> GO TO 5.

5.WRITE ECM DATA

1. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".
2. Turn ignition switch OFF, wait at least 30 seconds and then turn ON.
3. Select “DATA MONITOR” mode in ECM with CONSULT-III.
4. Check that the “CODE_PROGRAM” indication.

Which is displayed on CONSULT-III?

YES >> GO TO 6.
NO >> Repeat above steps.

6.PERFORM VIN REGISTRATION

1. Start engine and warm it up to normal operating temperature.
   NOTE:
   The start-up phase may last up to 30 seconds.
2. Turn ignition switch OFF, wait at least 30 seconds and then turn ON.
3. Perform “WRITE VIN” in WORK SUPPORT mode with CONSULT-III.
4. Follow the instruction of CONSULT-III display.
   NOTE:
   After replace ECM, stored DTC may appear on other control unit. Clear the malfunction memory of these control unit.

>> END

EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING

EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Description

INFOID:0000000001082271

EGR Volume Control Valve Closed Position Learning is an operation to learn the fully closed position of the EGR volume control valve by monitoring the EGR volume control valve control position sensor output signal.

EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement

INFOID:0000000001082272

1.START

1. Turn ignition switch ON.
2. Perform “EGR ADAPTIVES” in WORK SUPPORT mode with CONSULT-III.
3. Turn ignition switch OFF.and wait at least 30 seconds.
4. Start engine and let it idle.

cardiagn.com

5. Select “DATA MONITOR” mode with CONSULT-III.
6. Check that the “NEW EGR/V OFFSET” and “LAST EGR/V OFSET” indication.

0.75V < NEW EGR/V OFFSET = LAST EGR/V OFSET < 1.5V

>> END

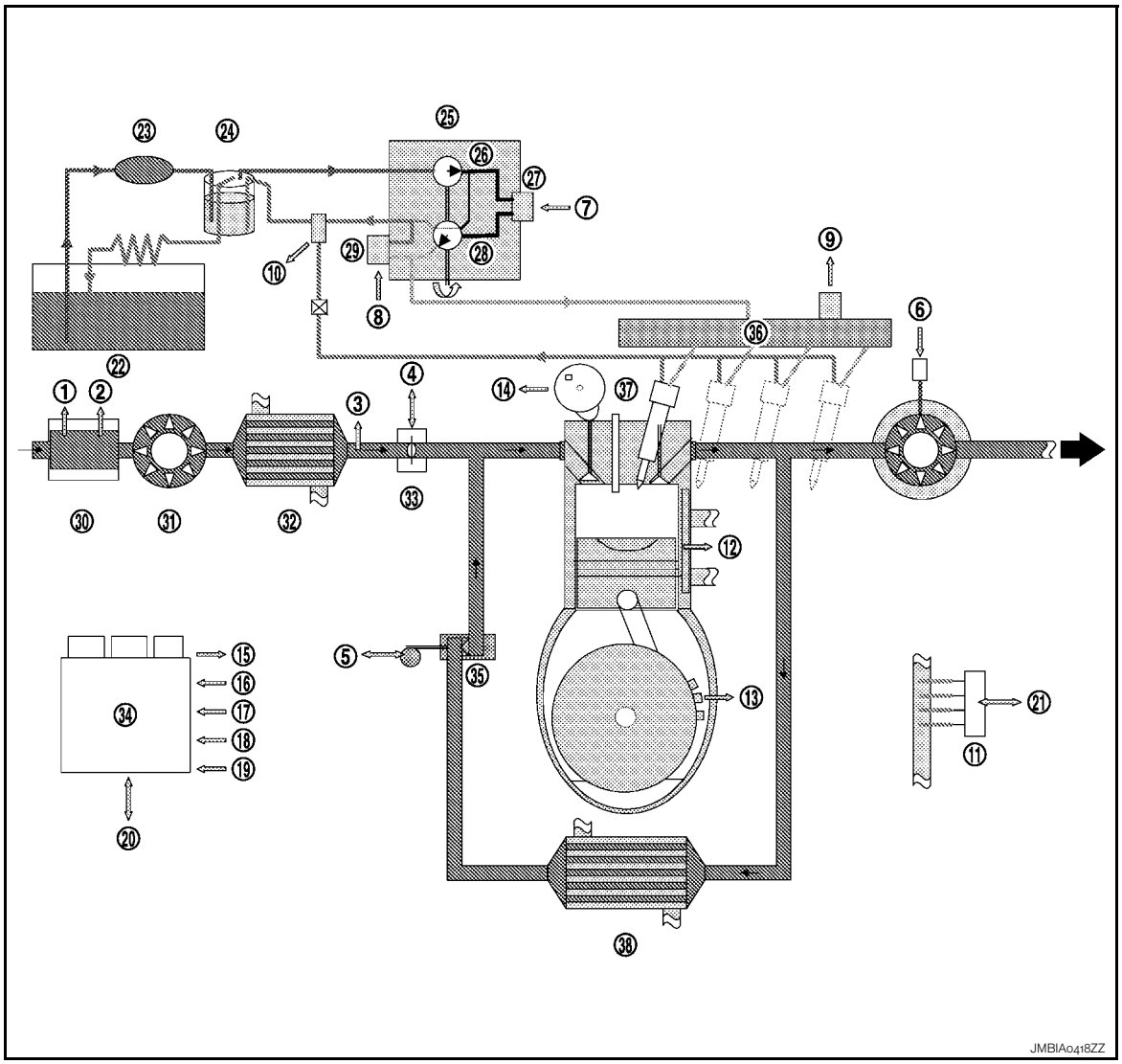
cardiagn.com

FUNCTION DIAGNOSIS

ENGINE CONTROL SYSTEM

System Diagram

INFOID:0000000000894699



1. Mass air flow sensor signal
2. Intake air temperature sensor signal
3. Turbocharger boost sensor signal
4. Throttle position sensor signal
5. EGR Volume Control Valve Control Position Sensor signal
6. Turbocharger boost control solenoid valve signal
7. High Pressure Supply Pump (volumetric Control Valve) signal
8. High Pressure Supply Pump (pressure Control Valve) signal
9. Fuel rail pressure sensor signal
10. Fuel Pump Temperature Sensor
11. Glow plug
12. Engine coolant temperature sensor signal
13. Crankshaft Position Sensor signal
14. Camshaft Position Sensor signal
15. Barometric pressure sensor signal
16. Refrigerant pressure sensor signal
17. Accelerator pedal position sensor signal
18. Clutch switch signal
19. Brake switch signal
20. CAN communication
21. Glow plug signal
22. Fuel tank
23. Fuel pump
24. Fuel filter
25. High Pressure Supply Pump
26. High Pressure Supply Pump (internal transfer pump)
27. High Pressure Supply Pump (volumetric Control Valve)
28. High Pressure Supply Pump (high pressure pump)
29. High Pressure Supply Pump (pressure Control Valve)
30. Mass air flow sensor (with intake air temperature sensor)

cardiagn.com

31. Compressor
32. Charge air cooler
33. Electric throttle control actuator
34. ECM
35. EGR volume control valve
36. Fuel rail
37. Fuel injector
38. EGR cooler

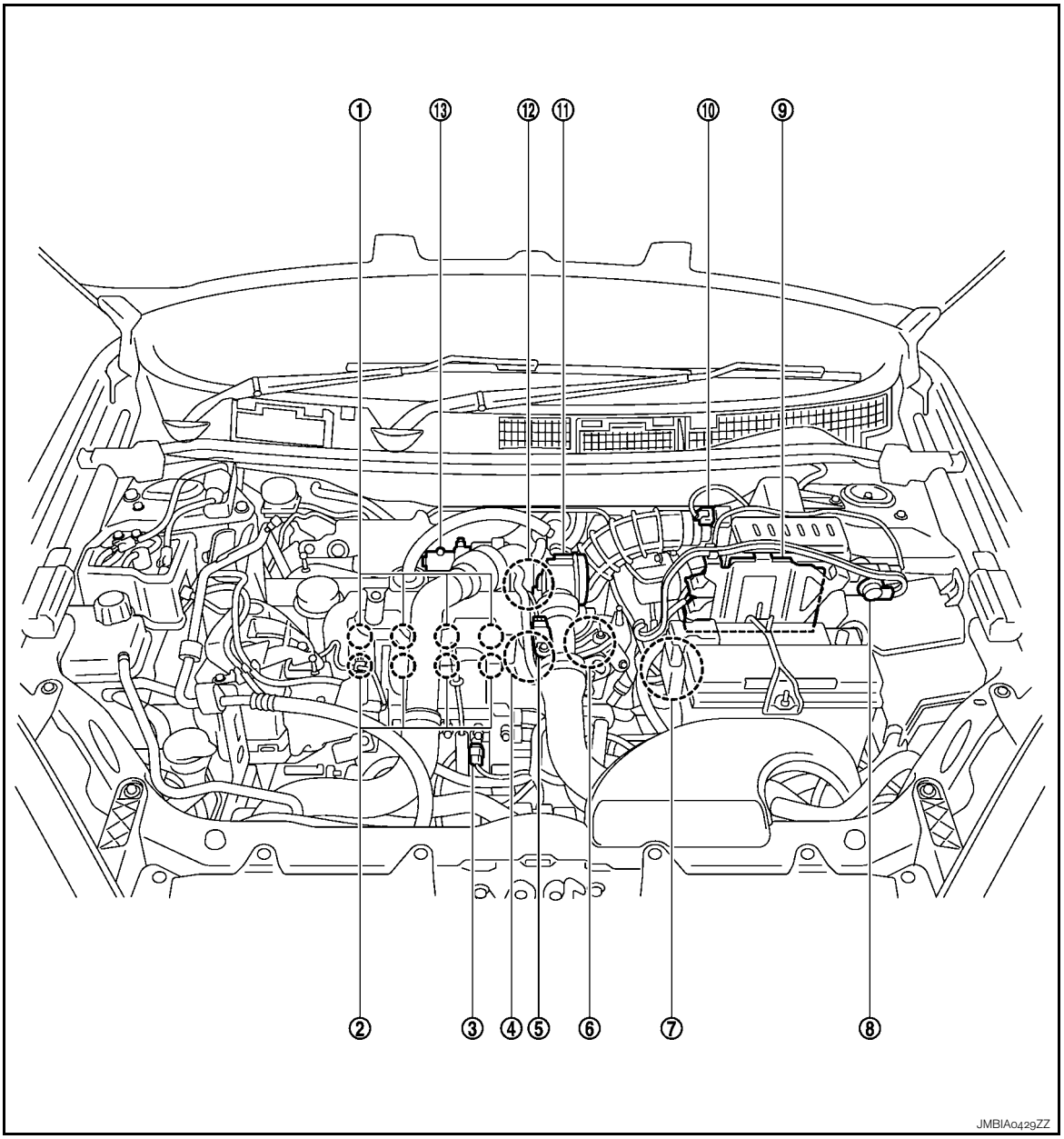
System Description

INFOID:0000000000897207

ECM performs various controls such as fuel injection control and furl pressure control.

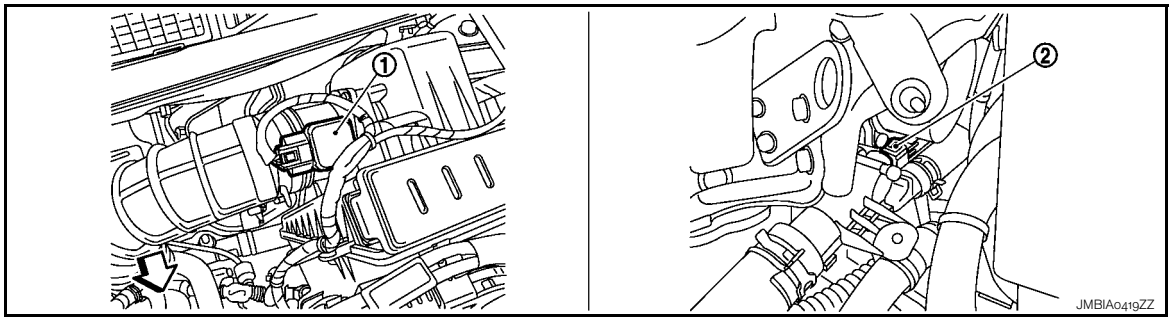
Component Parts Location

INFOID:0000000001078627



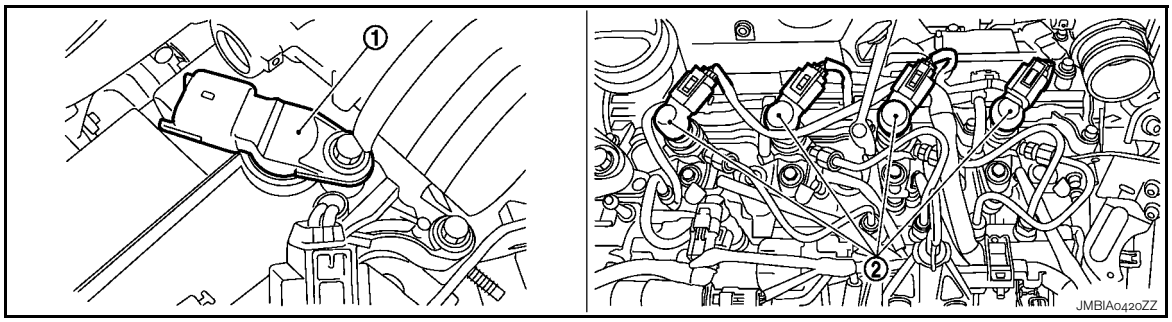
1. Fuel injector
2. Glow plug
3. Fuel rail pressure sensor
4. Crankshaft position sensor
5. Turbocharger boost sensor
6. Engine coolant temperature sensor
7. Glow relay
8. Turbocharger boost control solenoid valve
9. ECM
10. Mass air flow sensor (with intake air temperature sensor)
11. Electric throttle control actuator
12. Camshaft position sensor
13. EGR volume control valve

cardiagn.com

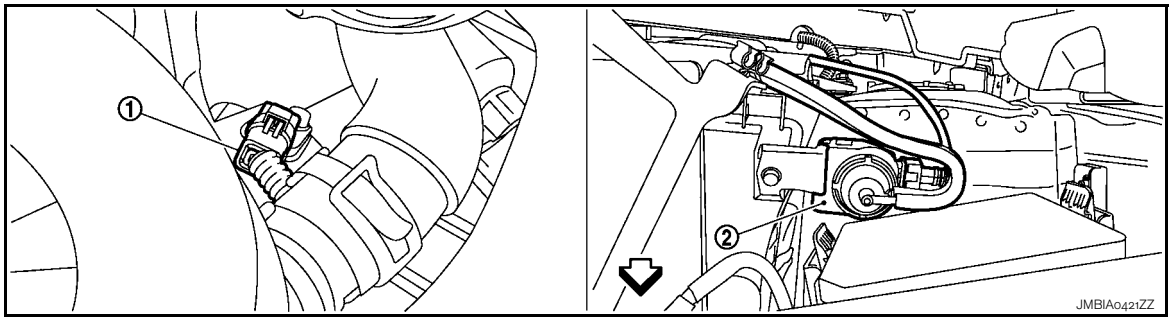


⇦ : Vehicle front

1. Mass air flow sensor (with intake air temperature sensor)
2. Engine coolant temperature sensor

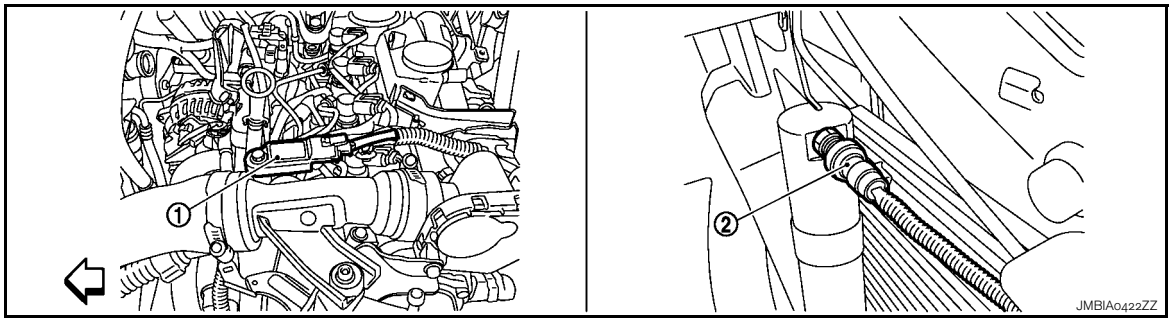


1. Camshaft Position Sensor
2. Fuel injector



⇦ : Vehicle front

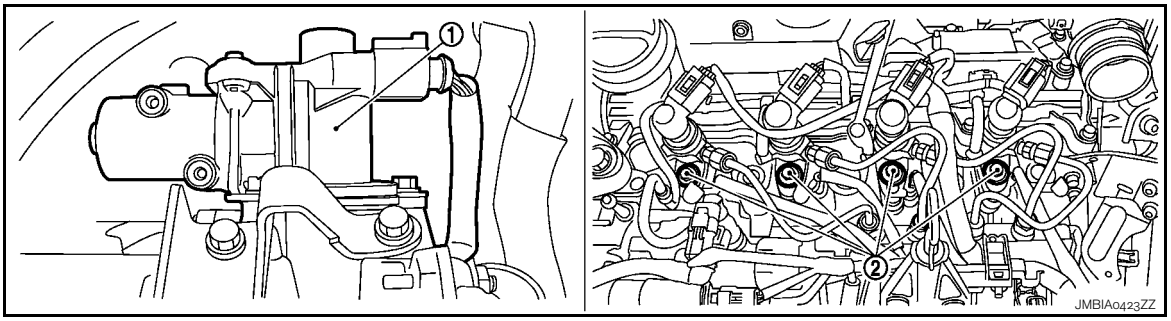
1. Crankshaft position sensor
2. Turbocharger boost control solenoid valve



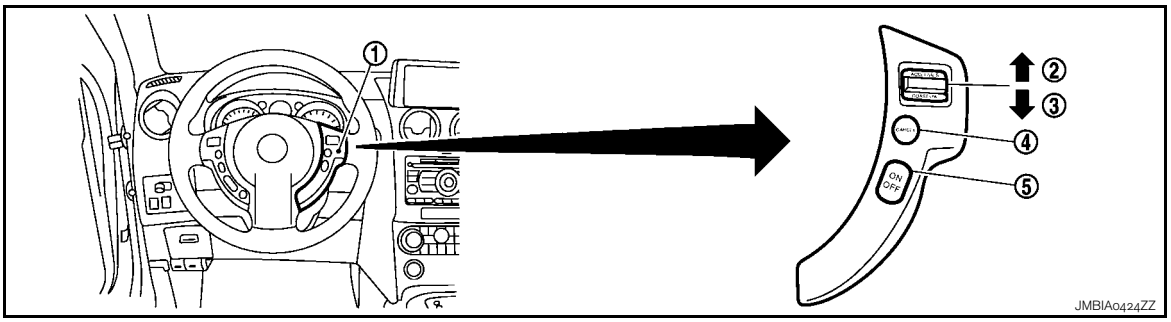
⇦ : Vehicle front

1. Turbocharger boost sensor
2. Refrigerant pressure sensor

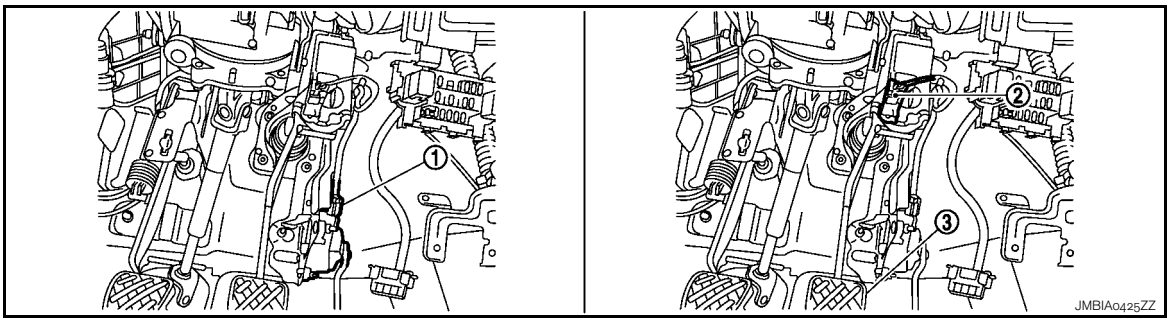
cardiagn.com



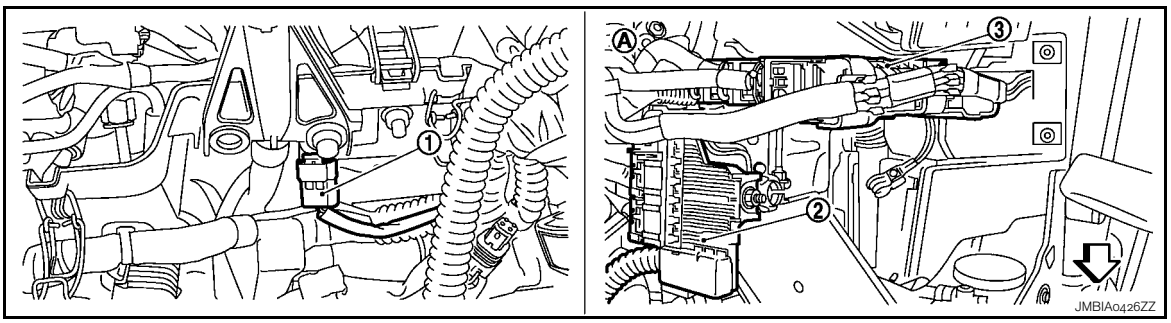
1. EGR volume control valve 2. Glow plug



1. ASCD steering switch 2. RESUME/ACCELERATE switch 3. SET/COAST switch
4. CANCEL switch 5. MAIN switch

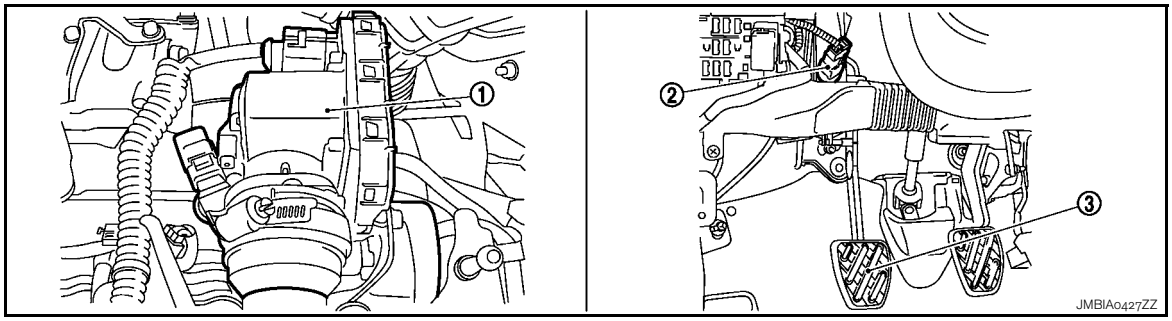


1. Accelerator pedal position sensor 2. Stop lamp switch 3. Brake pedal

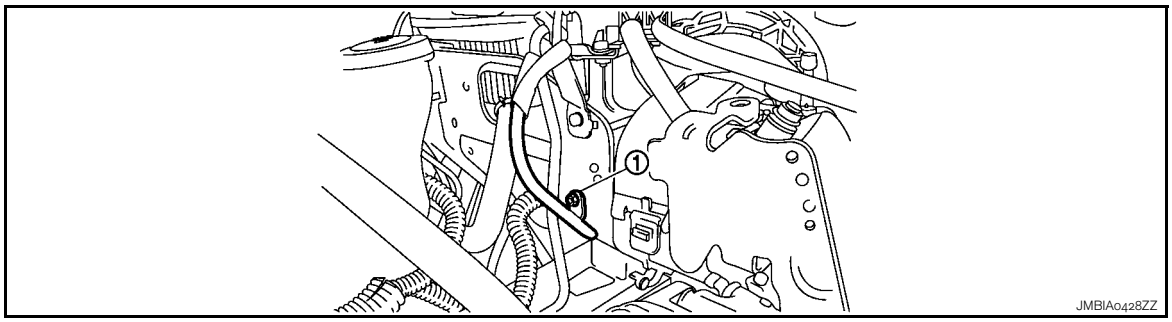


1. Fuel rail pressure sensor 2. Glow relay 3. ECM
A. View with battery removed

cardiagn.com



1. Electric throttle control actuator 2. Clutch switch 3. Clutch pedal



1. Body ground E17

Component Description

INFOID:0000000000897219

Component	Reference
Accelerator pedal position sensor	EC-1407, "Description"
ASCD steering switch	EC-1388, "Description"
Clutch switch	EC-1400, "Description"
Cooling fan motor	EC-1422, "Description"
Electric throttle control actuator	EC-1345, "Description"
Engine coolant temperature sensor	EC-1343, "Description"
Fuel pump temperature sensor	EC-1347, "Description"
Fuel rail pressure sensor	EC-1349, "Description"
Intake air temperature sensor	EC-1341, "Description"
Mass air flow sensor	EC-1338, "Description"
Refrigerant pressure sensor	EC-1380, "Description"
Stop lamp switch	EC-1425, "Description"
Throttle control motor	EC-1345, "Description"
Throttle position sensor	EC-1345, "Description"
Turbocharger boost sensor	EC-1361, "Description"
Vehicle speed sensor	EC-1379, "Description"

cardiagn.com

FUEL INJECTION CONTROL

System Description

INFOID:0000000000897234

SYSTEM DESCRIPTION

The high pressure injection system is designed to deliver a precise quantity of diesel fuel to the engine at a set moment. The Siemens VDO piezo Common Rail system used on the K9K Step 2 engine is a second generation Common Rail injection system. Fuel pressure in the rail can reach a maximum of 1,600 bar. It uses fuel injectors controlled by piezoelectric actuators. The fuel is pressurised by means of a high pressure pump then sent to a rail which supplies the four fuel injectors.

- The circuit comprises two subsystems, which are distinguished by the fuel pressure level:
  - the low pressure circuit comprises the tank, the diesel fuel filter, the transfer pump and the fuel injector return lines,
  - the high-pressure circuit comprises the high-pressure (HP) pump, the rail, the fuel injectors and the high-pressure (HP) pipes.

Finally, there are a number of control sensors and actuators which enable the entire system to be controlled and monitored.

- The system comprises:
  - Priming bulb
  - Fuel filter
  - High pressure supply pump
  - Fuel rail
  - Fuel rail pressure sensor
  - Fuel injector
  - Fuel pump temperature sensor
  - Engine coolant temperature sensor
  - Camshaft position sensor
  - Crankshaft position sensor
  - Turbocharger boost sensor
  - EGR volume control valve control position sensor
  - EGR volume control valve
  - Barometric pressure sensor (built in ECM)
  - Mass air flow sensor
  - Intake air temperature sensor
  - Electric throttle control actuator

High Pressure Supply Pump

The high pressure supply pump consists of the following components:

- Internal fuel transfer pump:
  - This pump is a vane-type rotary pump. It draws in fuel from the fuel tank through a fuel filter and supplies the high pressure pump with fuel.
- Volumetric control valve:
  - This solenoid valve regulates the flow of fuel entering the high pressure pump and enables an optimum quantity of fuel to be pressurised according to operating phase; this improves the output of the high pressure supply pump and thereby the output of the engine as well.
- High pressure pump:
  - This pump is a 3-piston radial pump, it generates the required pressure in the rail.
- Pressure control valve:
  - This solenoid valve regulates the output pressure of the high pressure pump.

Fuel Injector (Piezo Type)

CAUTION:

The fuel injector voltage is very high (much higher than that of conventional fuel injectors). This voltage can be as much as 150 V.

The piezo fuel injectors enable rapid, precise metering of the quantity of fuel injected, with excellent injection process repetitivity.

The piezo actuator operates like a capacitor. To control the fuel injector, the computer sends, at the correct time, a quantity of energy which is sufficient to enable the actuator to deform and the fuel injector to open.

During the injection period, the piezo actuator stores this energy.

At the end of the injection period, the computer recovers the energy sent at the start of the control operation. The piezo actuator discharges and returns to its original shape. The fuel injector closes. To improve output, the

cardiagn.com

energy returned by the piezo actuator is reused, which keeps down the amount of energy that has to be supplied for the next injection process.

Engine Synchronisation

One of the determining factors for fuel injection control is knowing the position of each of the pistons in their respective cylinders at all times.
The angular position is measured by means of a magneto-inductive sensor which is excited by the teeth machined onto the flywheel; this is known as the crankshaft position sensor. The flywheel has 60 teeth, each 6 degrees apart; 2 of these teeth are missing to form a notch.
A second sensor (Hall-effect sensor), stimulated by a tooth machined onto the camshaft, which turns at half the engine speed, provides a signal relating to the progress of the injection cycle. Indeed, when the piston of cylinder 1 is at top dead centre (TDC), either at the end of the compression stroke or at the end of the exhaust stroke, the camshaft position sensor enables a distinction to be made between these two states.
By comparing the signals from these two sensors, the computer is able to provide all its systems with synchronisation parameters, namely: the angular position of the flywheel, engine speed, the number of the active fuel injector and the progress of the injection cycle.
This module also supplies the system with the rotation speed signal.
The camshaft position sensor is only used when starting the engine. As soon as the engine is running by itself (not being cranked by the starter), the signal provided by the crankshaft position sensor is sufficient. If the camshaft position sensor should fail while the engine is running, this will not affect the operation of the engine.

Quantity of Fuel Injected and Control of Start of Injection

- The parameters for controlling injection are, for each cylinder, the quantity to be injected and the start of injection. These are calculated by the ECM from the following information:

- Engine speed.
- Accelerator pedal position.
- Turbocharge air pressure.
- Engine coolant temperature.
- Intake air temperature.
- Fuel pump temperature.
- Mass air flow.
- Pressure of fuel in the rail.

Station to Station Flow Regulation

The aim of this regulation process is to facilitate smooth engine operation by compensating for the system variations (fuel injectors, compression rate, etc.) which affect the torque generated by each cylinder during combustion.
The regulation process is only active at idle speed, with a warm engine and on condition that the engine speed is sufficiently stable. An injection timing correction coefficient is assigned to each cylinder; this is "learning" all the time the regulation process is active and remains fixed at the last value that was learned when the regulation is inactive.
At each new cycle, the coefficients are initialised to 1.

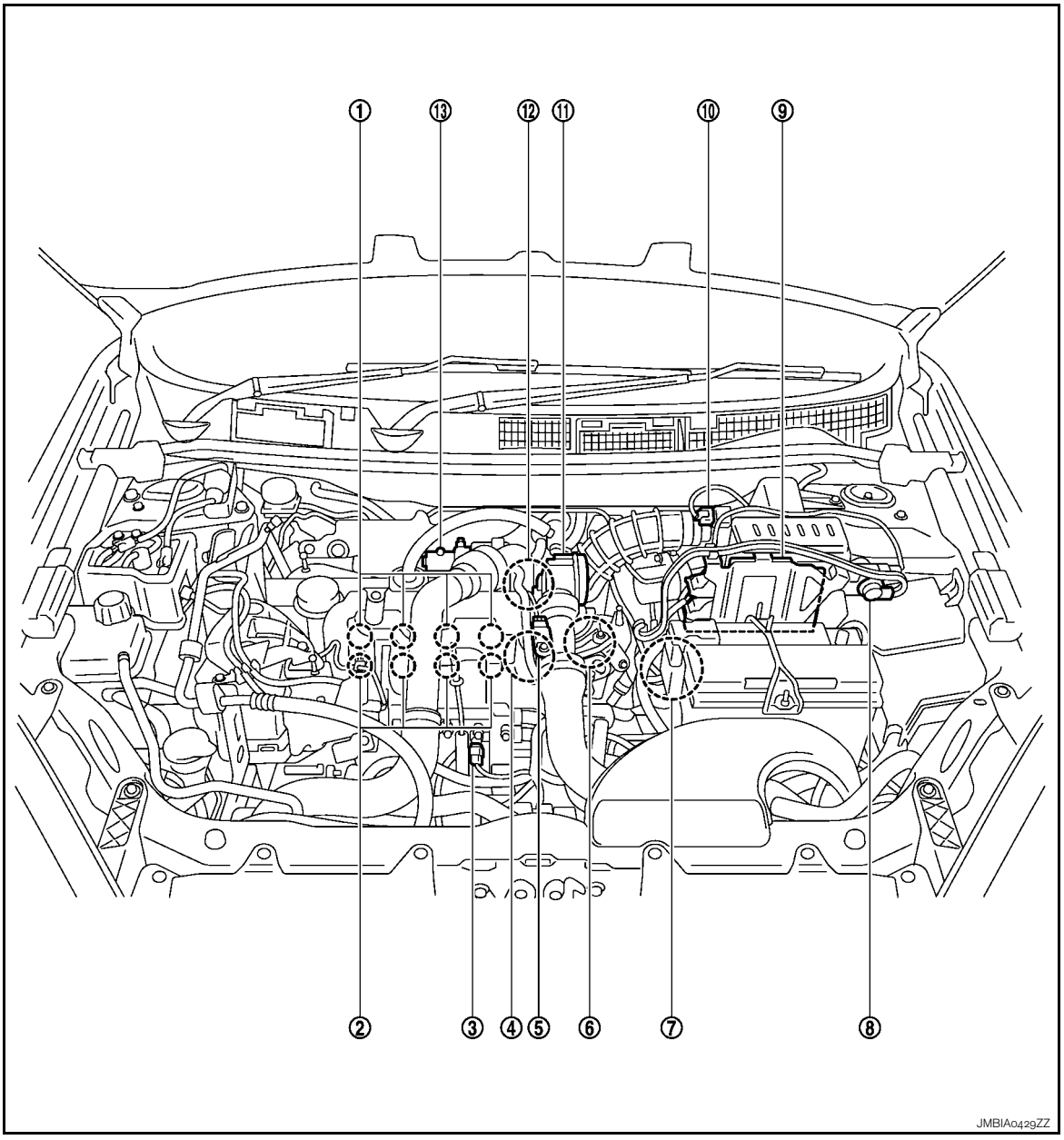
Cylinder Balancing Control

This controller allows smooth behavior of running engine, reduction of noise and oscillations in the drivetrain by compensating for system dispersions (fuel injectors, compression ratio, manufacturing tolerances of cylinders or valves...) having an influence on the torque generated by each cylinder during combustion.
The controller is only activated if engine is in idle, warm and not too rough. Corrective coefficient on the injection time is associated with each cylinder that is learnt as soon as the regulation is active. Otherwise it remains with its last memorized value.
At each new driving cycle, coefficients are initialized to 1.

Component Parts Location

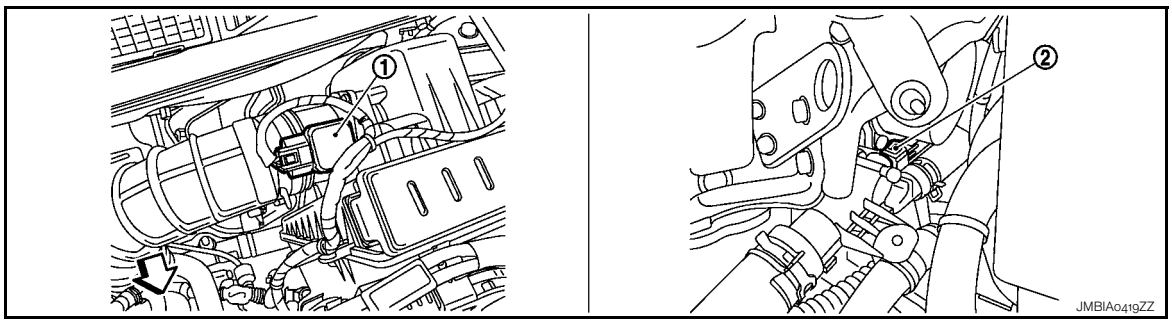
INFOID:0000000001078673

cardiagn.com



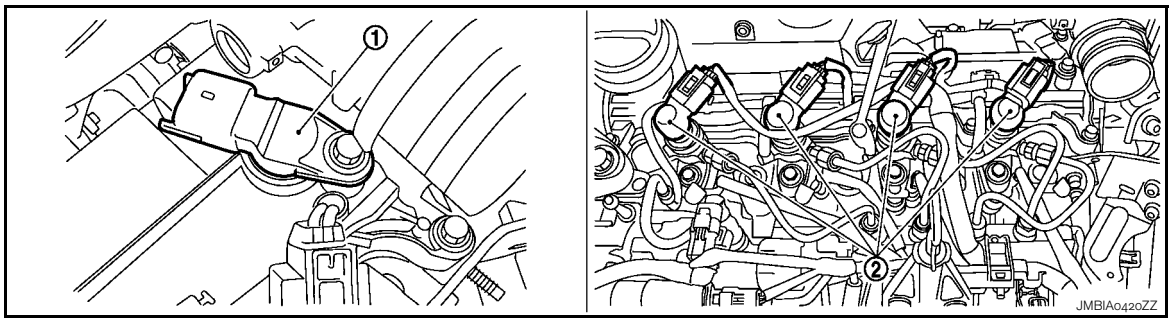
1. Fuel injector
2. Glow plug
3. Fuel rail pressure sensor
4. Crankshaft position sensor
5. Turbocharger boost sensor
6. Engine coolant temperature sensor
7. Glow relay
8. Turbocharger boost control solenoid valve
9. ECM
10. Mass air flow sensor (with intake air temperature sensor)
11. Electric throttle control actuator
12. Camshaft position sensor
13. EGR volume control valve

cardiagn.com

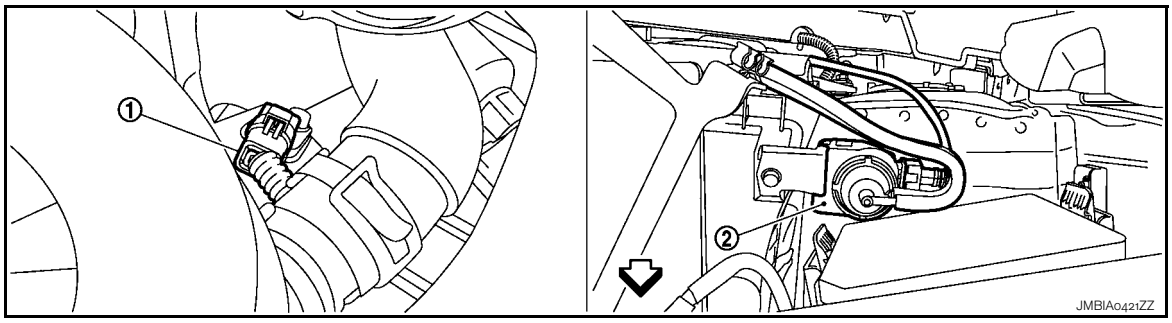


⇦ : Vehicle front

1. Mass air flow sensor (with intake air temperature sensor)
2. Engine coolant temperature sensor

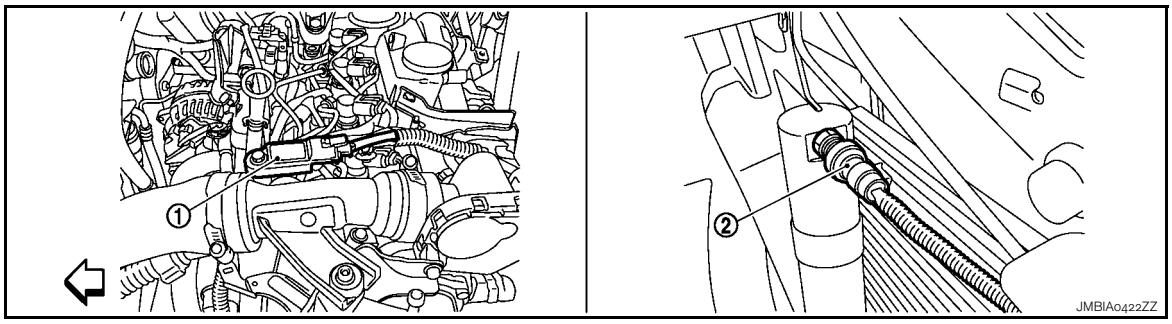


1. Camshaft Position Sensor
2. Fuel injector



⇦ : Vehicle front

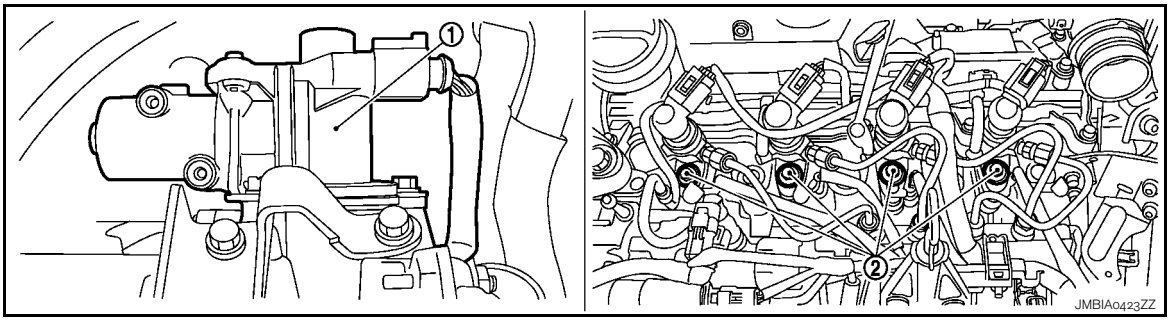
1. Crankshaft position sensor
2. Turbocharger boost control solenoid valve



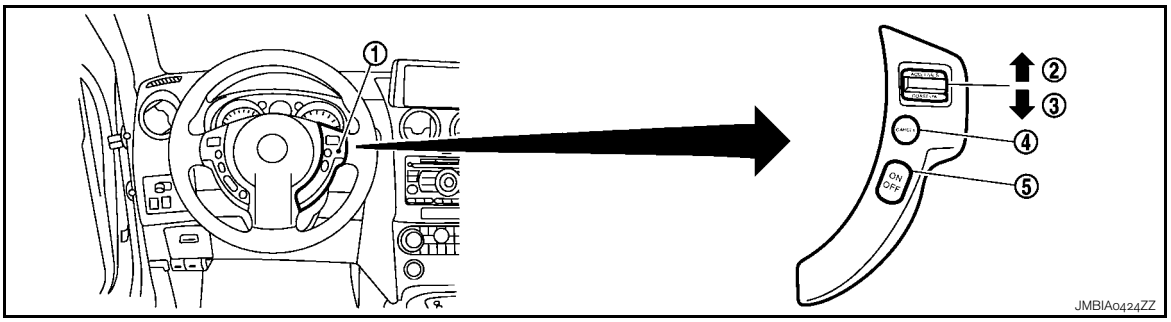
⇦ : Vehicle front

1. Turbocharger boost sensor
2. Refrigerant pressure sensor

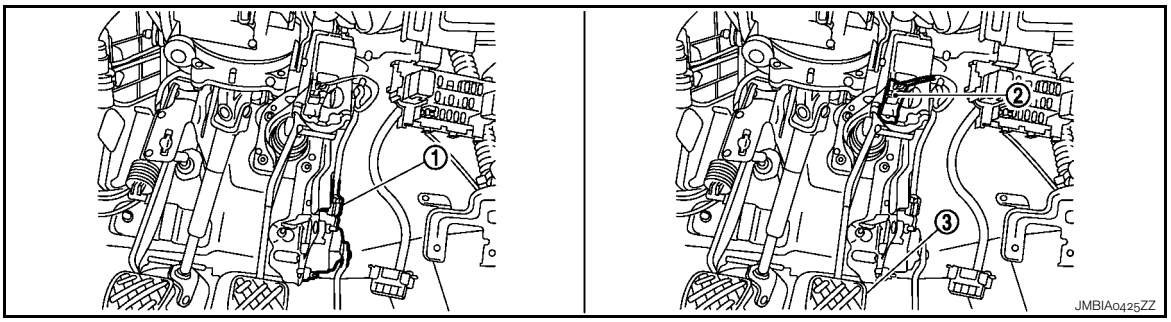
cardiagn.com



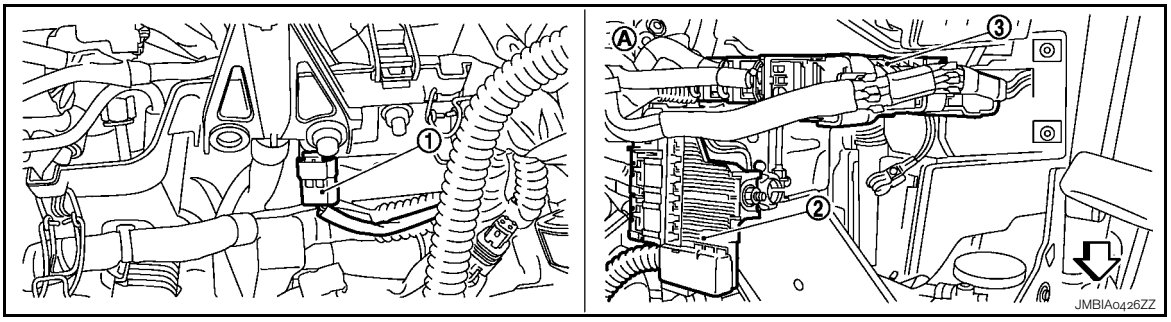
1. EGR volume control valve 2. Glow plug



1. ASCD steering switch 2. RESUME/ACCELERATE switch 3. SET/COAST switch
4. CANCEL switch 5. MAIN switch

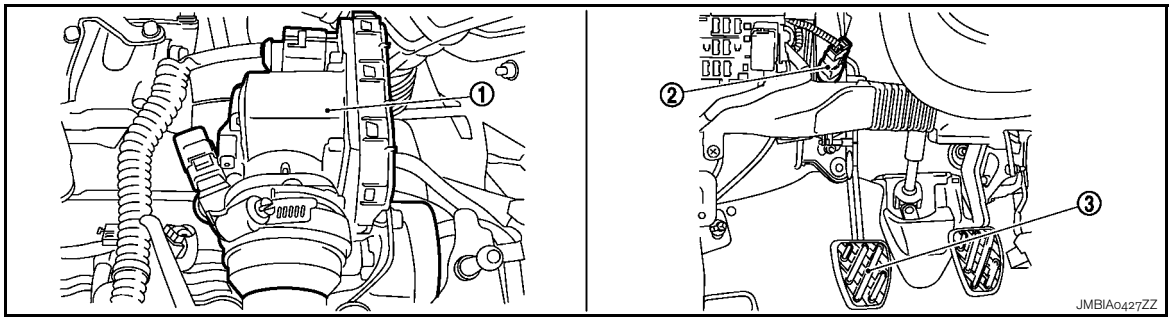


1. Accelerator pedal position sensor 2. Stop lamp switch 3. Brake pedal

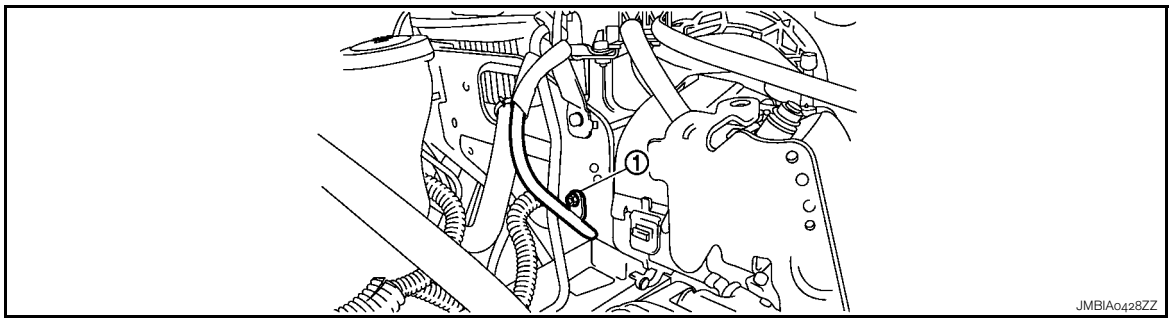


1. Fuel rail pressure sensor 2. Glow relay 3. ECM
A. View with battery removed

cardiagn.com



1. Electric throttle control actuator 2. Clutch switch 3. Clutch pedal



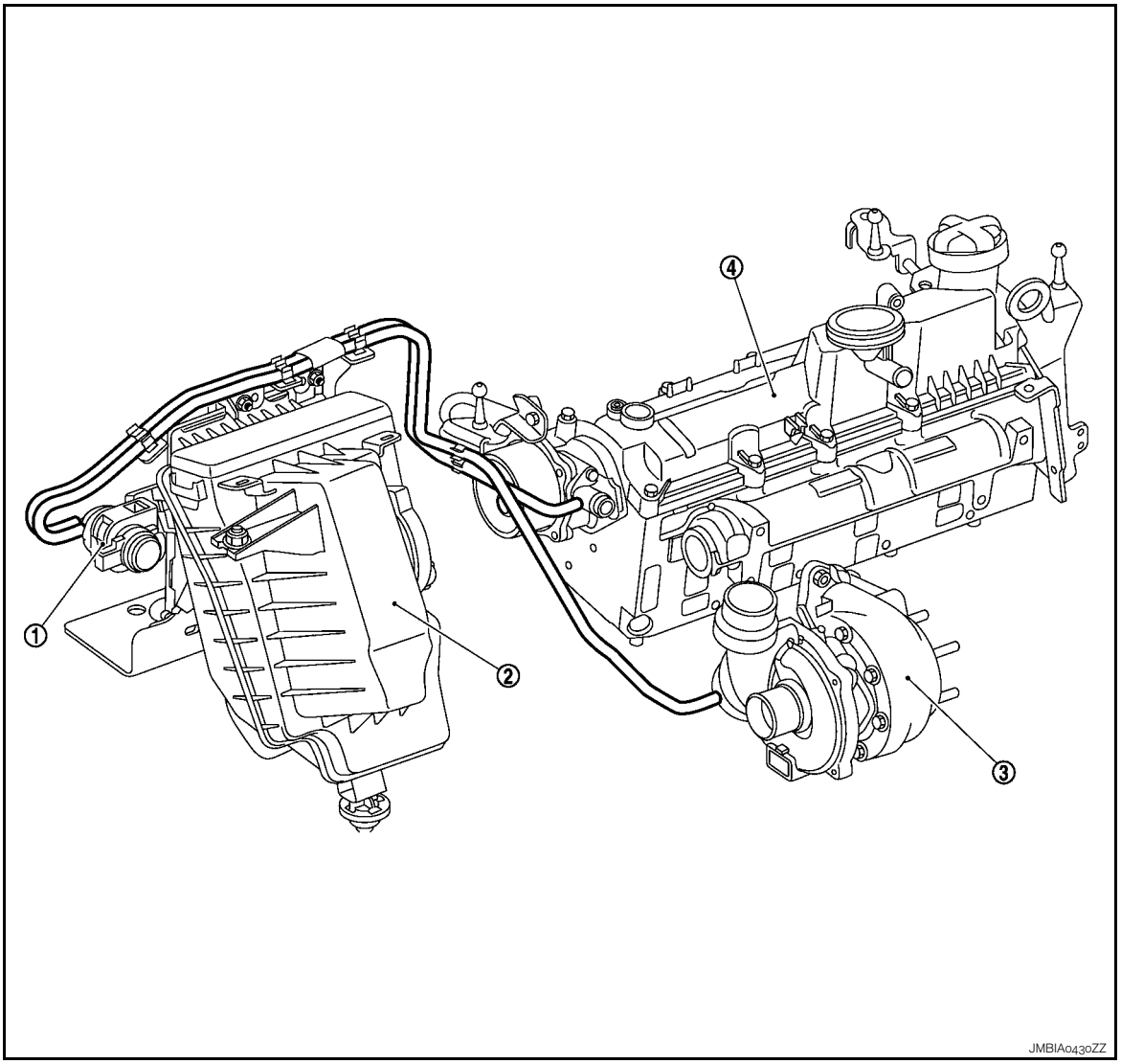
1. Body ground E17

cardiagn.com

TURBOCHARGER BOOST CONTROL

Vacuum Hose Drawing

INFOID:0000000001078841



1. Turbocharger boost control solenoid valve
2. Air cleaner
3. Turbocharger
4. Rocker cover
5. Vacuum pump

NOTE: Do not use soapy water or any type of solvent while installing vacuum hose.

System Description

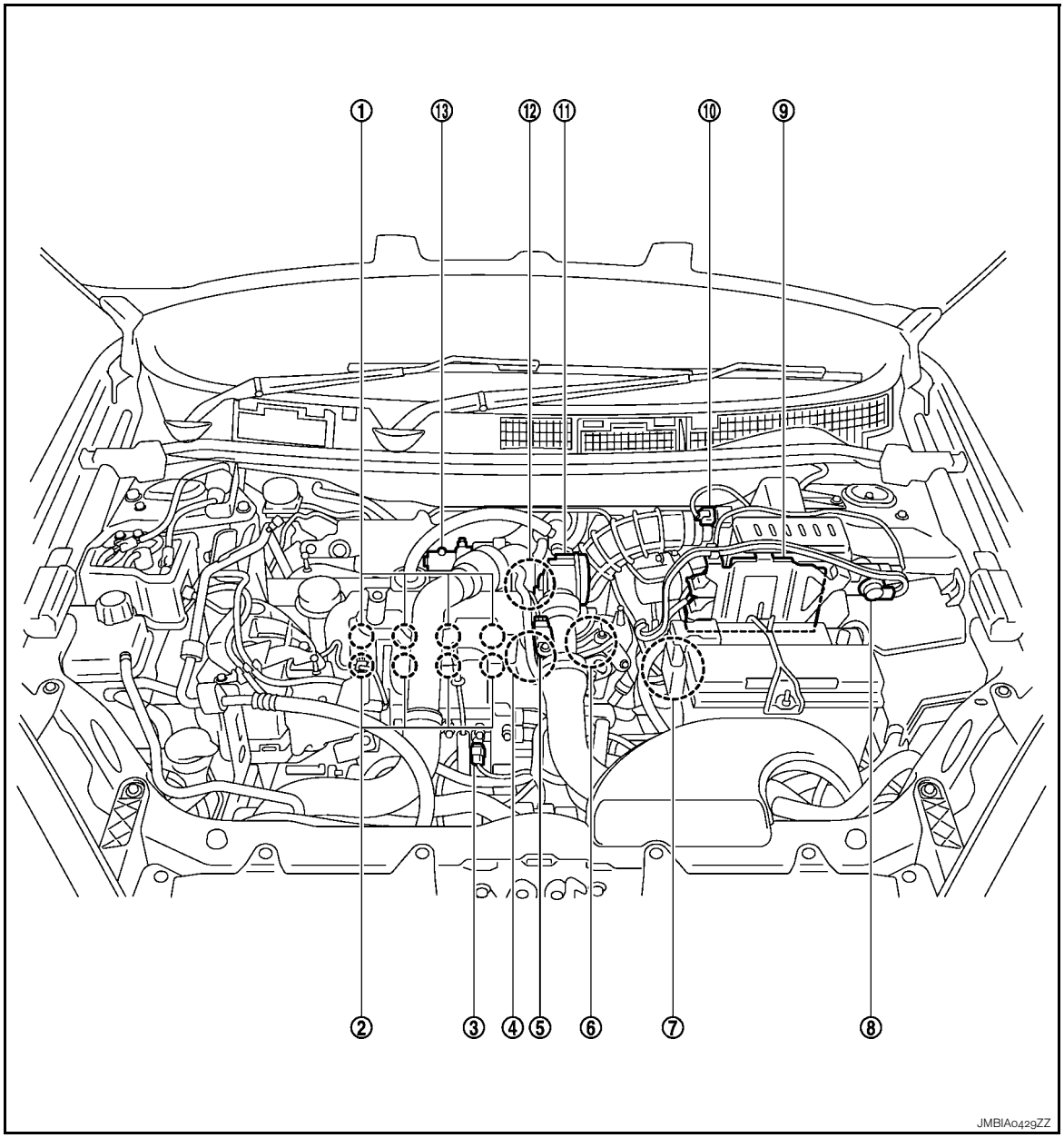
INFOID:0000000001078839

The turbocharger system consists of a solenoid valve connected to the vacuum pump circuit; this enables the vanes to be controlled by means of a diaphragm so as to create either an overpressure or a vacuum in the fresh air inlet circuit.

Component Parts Location

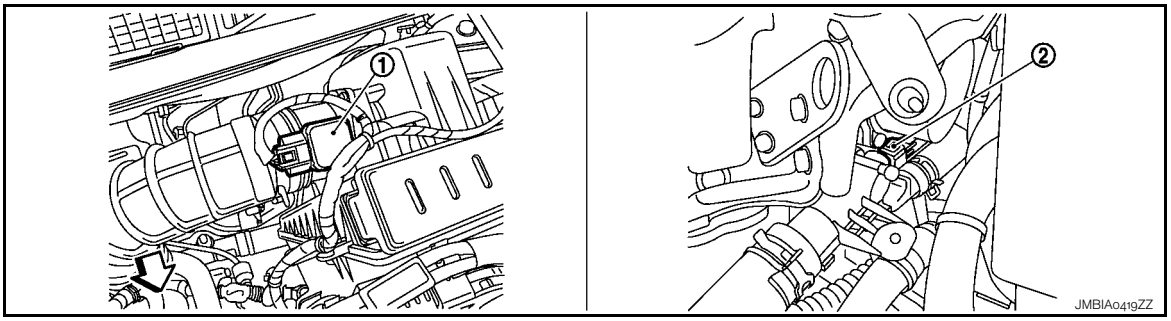
INFOID:0000000001078840

cardiagn.com



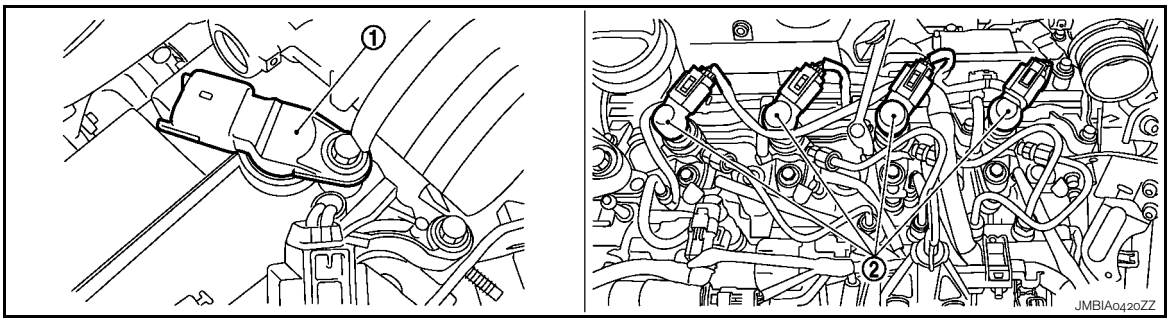
1. Fuel injector
2. Glow plug
3. Fuel rail pressure sensor
4. Crankshaft position sensor
5. Turbocharger boost sensor
6. Engine coolant temperature sensor
7. Glow relay
8. Turbocharger boost control solenoid valve
9. ECM
10. Mass air flow sensor (with intake air temperature sensor)
11. Electric throttle control actuator
12. Camshaft position sensor
13. EGR volume control valve

cardiagn.com

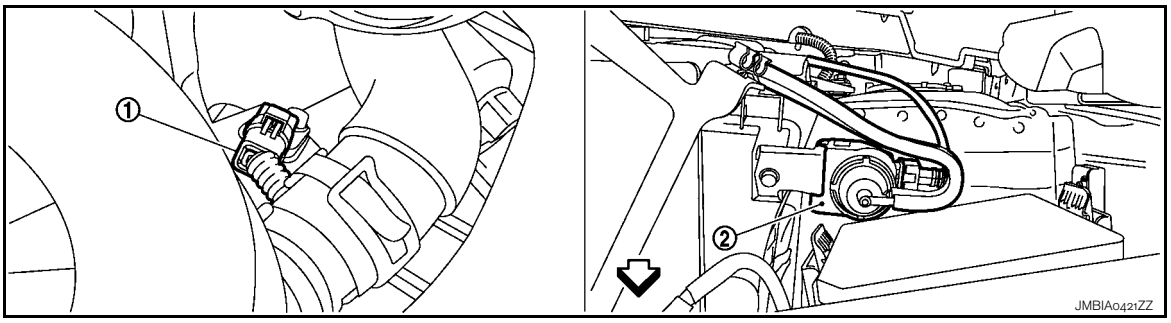


⇦: Vehicle front

1. Mass air flow sensor (with intake air temperature sensor)
2. Engine coolant temperature sensor

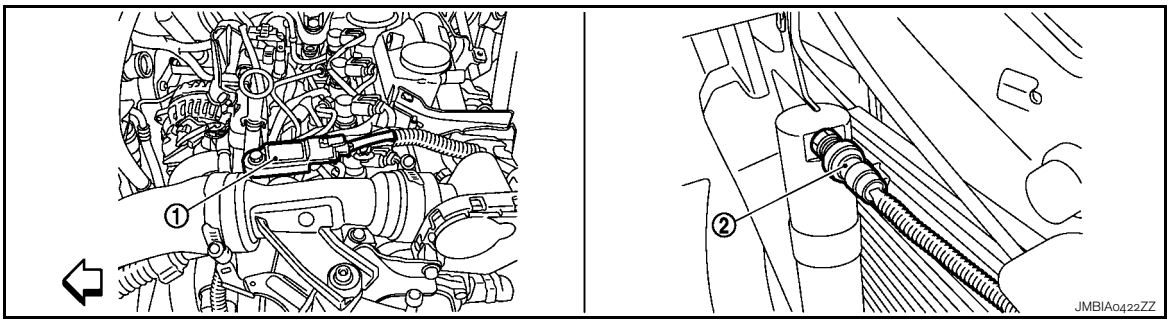


1. Camshaft Position Sensor
2. Fuel injector



⇦: Vehicle front

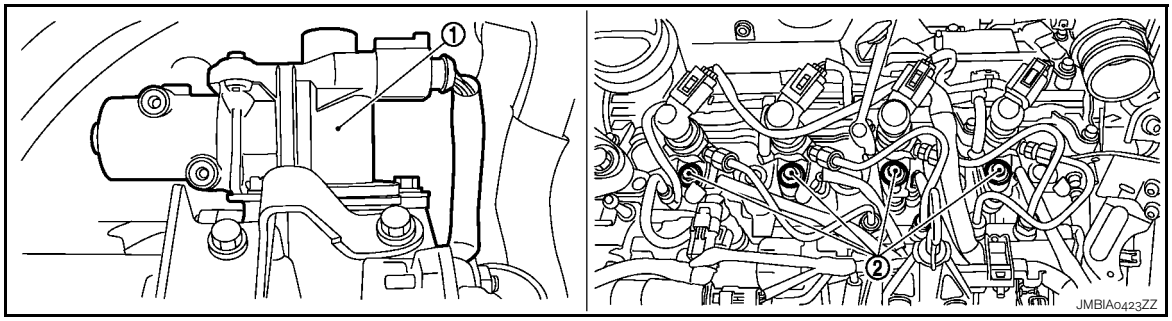
1. Crankshaft position sensor
2. Turbocharger boost control solenoid valve



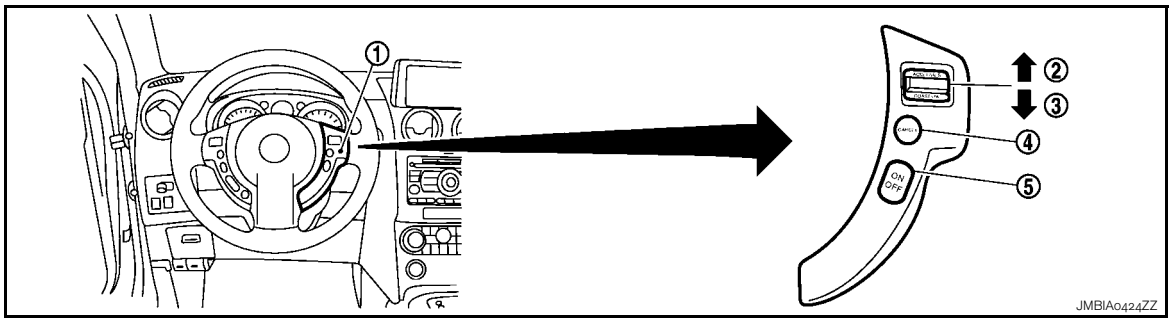
⇦: Vehicle front

1. Turbocharger boost sensor
2. Refrigerant pressure sensor

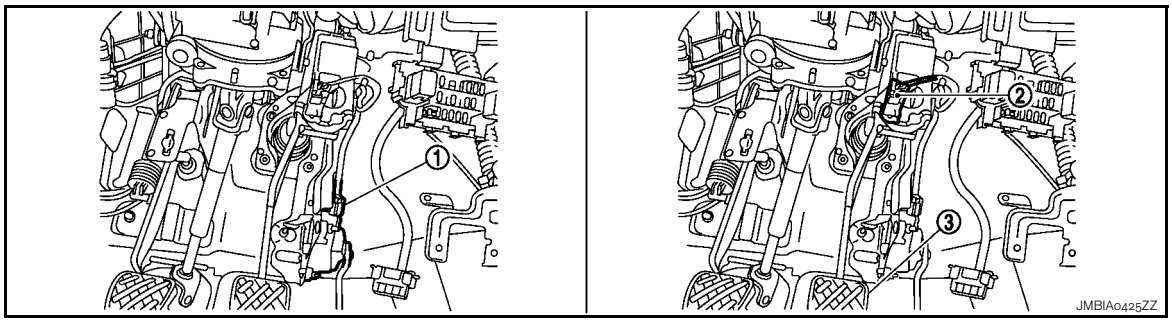
cardiagn.com



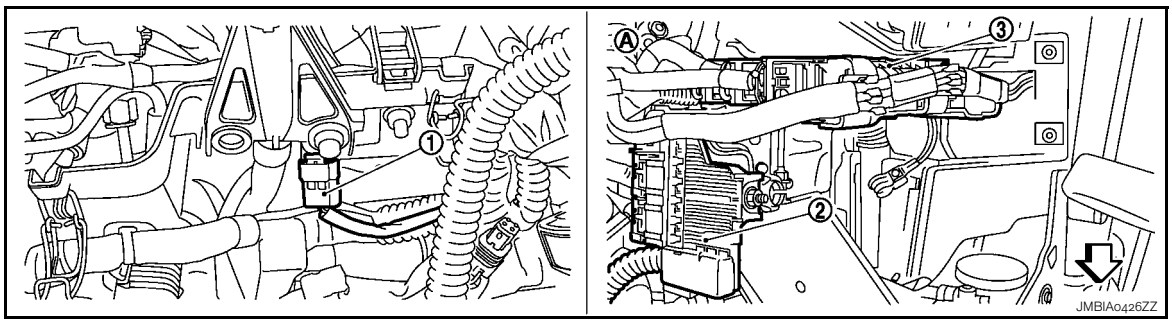
1. EGR volume control valve
2. Glow plug



1. ASCD steering switch
2. RESUME/ACCELERATE switch
3. SET/COAST switch
4. CANCEL switch
5. MAIN switch



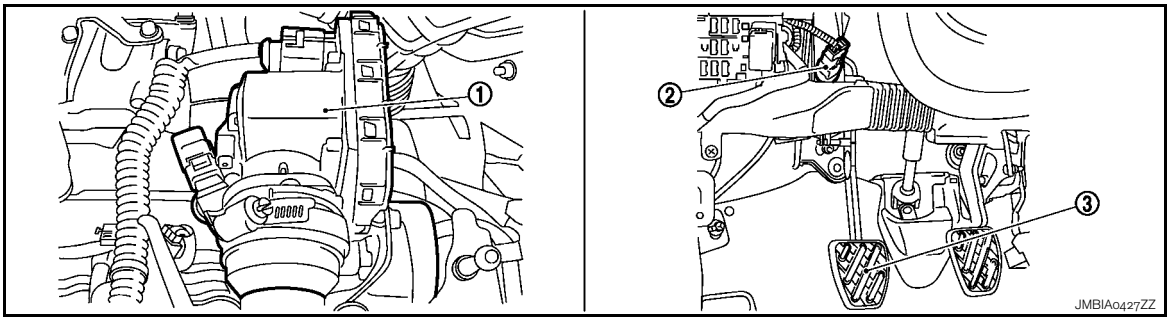
1. Accelerator pedal position sensor
2. Stop lamp switch
3. Brake pedal



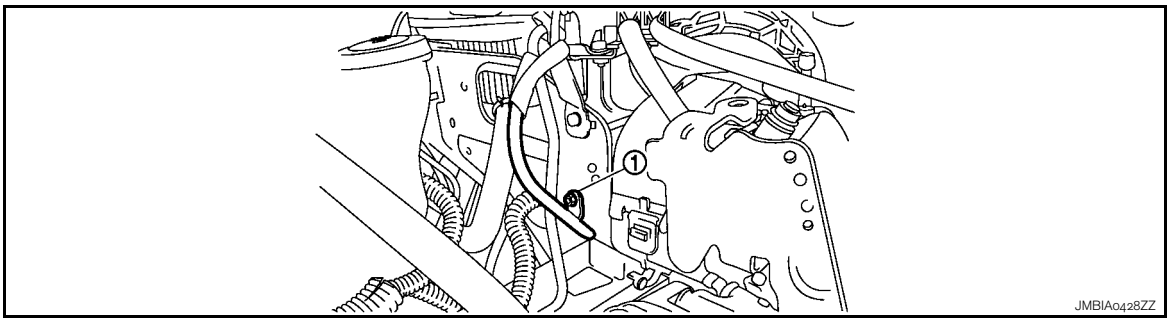
1. Fuel rail pressure sensor
2. Glow relay
3. ECM

A. View with battery removed

cardiagn.com



1. Electric throttle control actuator 2. Clutch switch 3. Clutch pedal



1. Body ground E17

cardiagn.com

EGR SYSTEM

System Description

INFOID:0000000000897371

EGR SYSTEM

EGR Valve Control

The EGR (exhaust gas recirculation) system consists of a direct current EGR volume control valve fitted with a EGR volume control valve control position sensor. The EGR volume control valve is controlled in a closed-loop via the EGR volume control valve control position sensor. Up to a certain rate, exhaust gas recirculation enables nitrogen oxide (NOx) emissions to be reduced significantly.

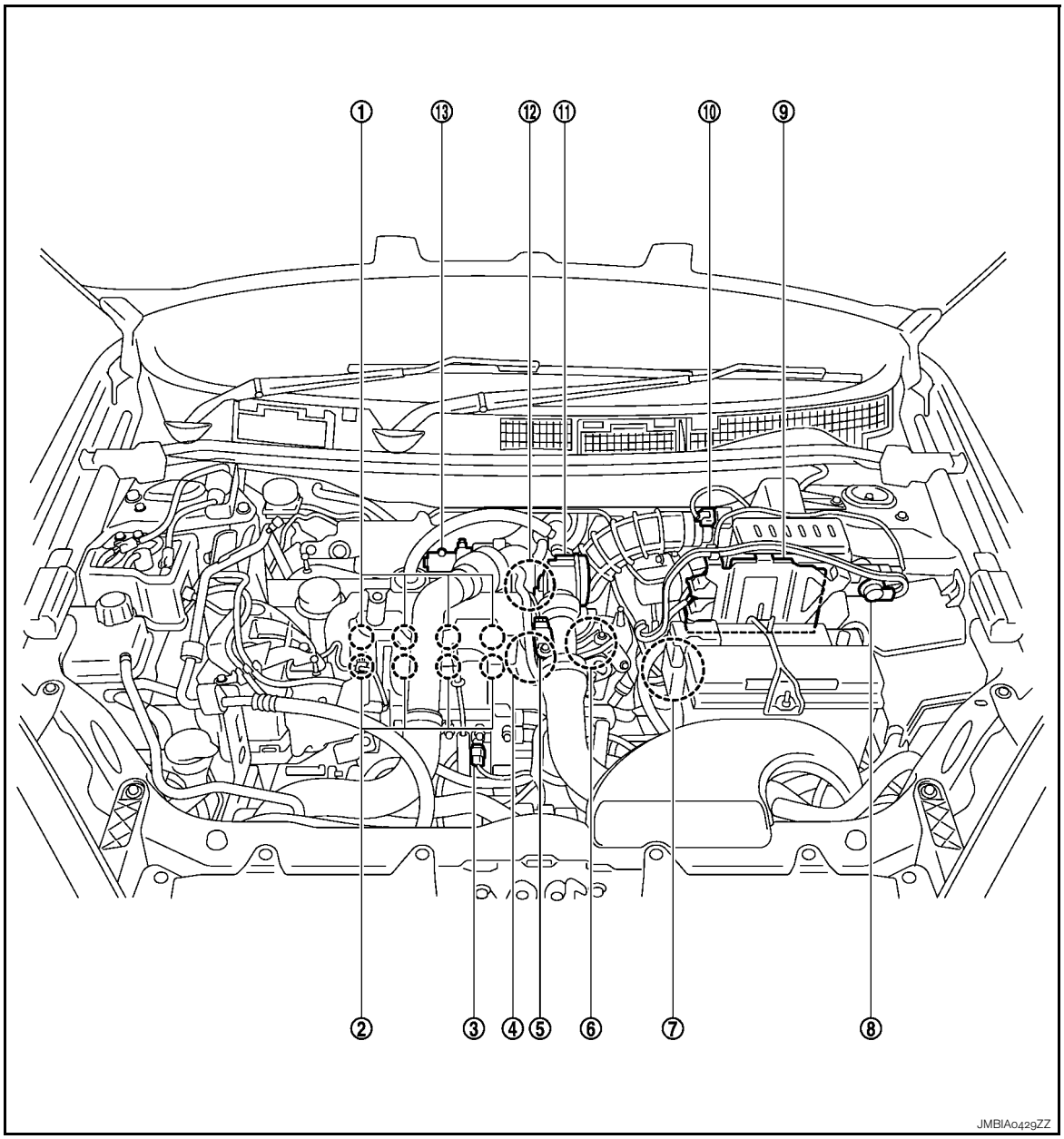
Measurement of the Fresh Air Flow

The flow of fresh air entering the engine is calculated by a mass air flow sensor (ratiometric hot-wire sensor). An intake air temperature sensor is integrated into the mass air flow sensor.

The mass air flow sensor facilitates control of the quantity of exhaust gas sent for recirculation, thus ensuring the best possible recirculation rates. Air flow measurement allows closed-loop control via the EGR valve.

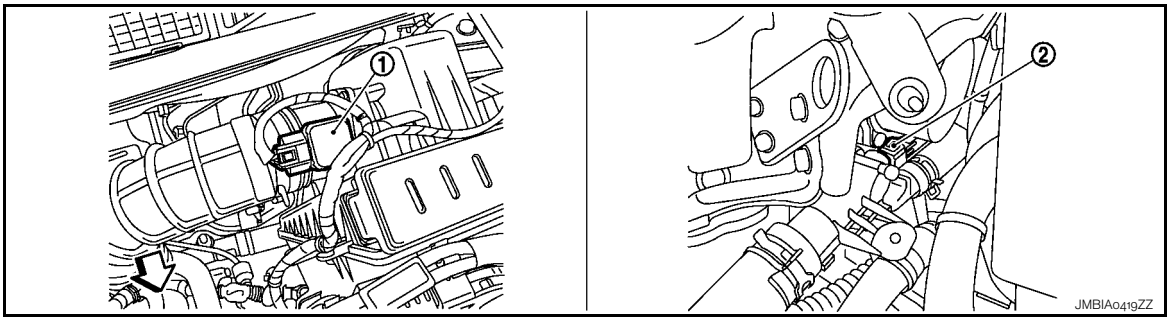
Component Parts Location

INFOID:0000000001078869



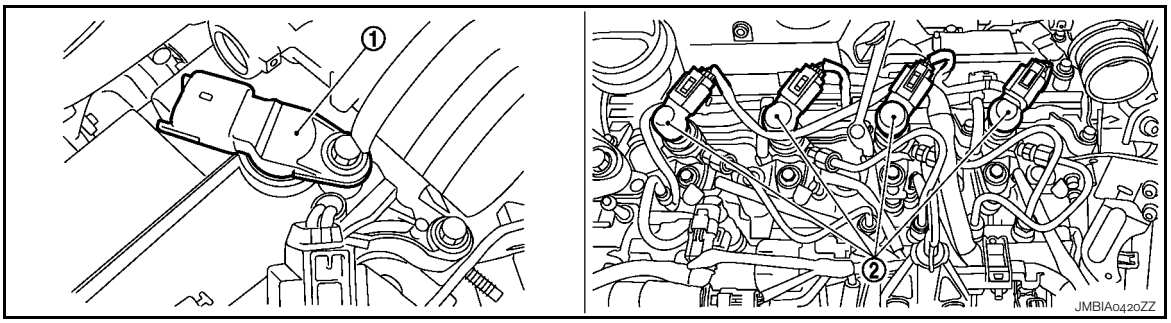
cardiagn.com

1. Fuel injector
2. Glow plug
3. Fuel rail pressure sensor
4. Crankshaft position sensor
5. Turbocharger boost sensor
6. Engine coolant temperature sensor
7. Glow relay
8. Turbocharger boost control solenoid valve
9. ECM
10. Mass air flow sensor (with intake air temperature sensor)
11. Electric throttle control actuator
12. Camshaft position sensor
13. EGR volume control valve

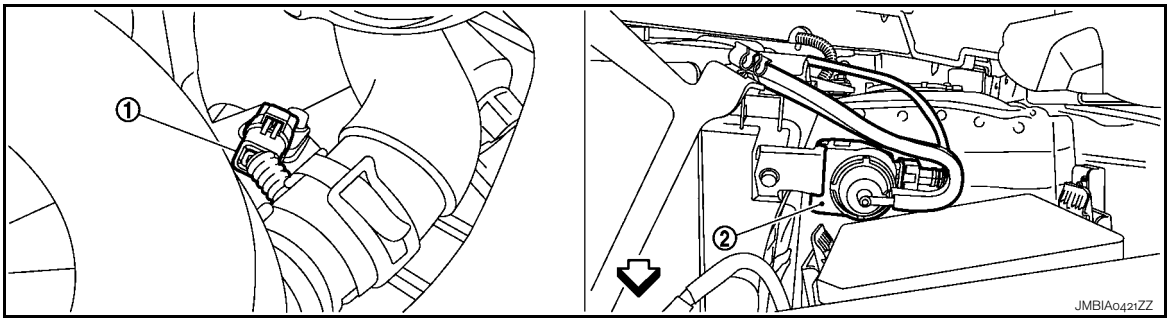


⇦: Vehicle front

1. Mass air flow sensor (with intake air temperature sensor)
2. Engine coolant temperature sensor



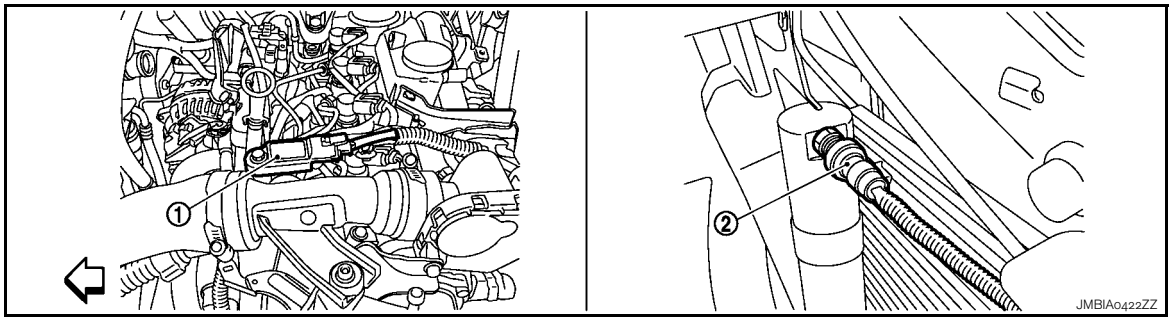
1. Camshaft Position Sensor
2. Fuel injector



⇦: Vehicle front

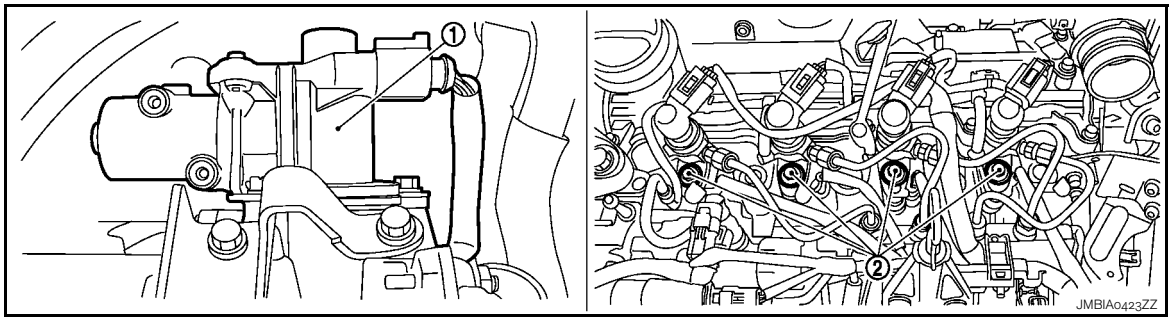
1. Crankshaft position sensor
2. Turbocharger boost control solenoid valve

cardiagn.com

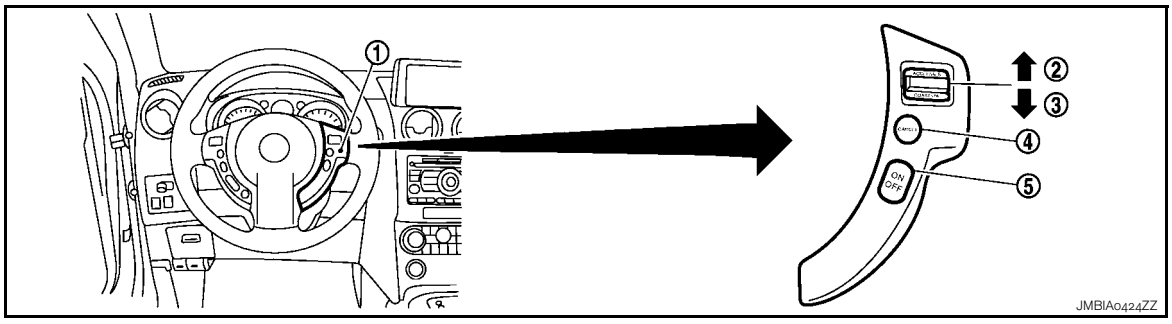


⇦ : Vehicle front

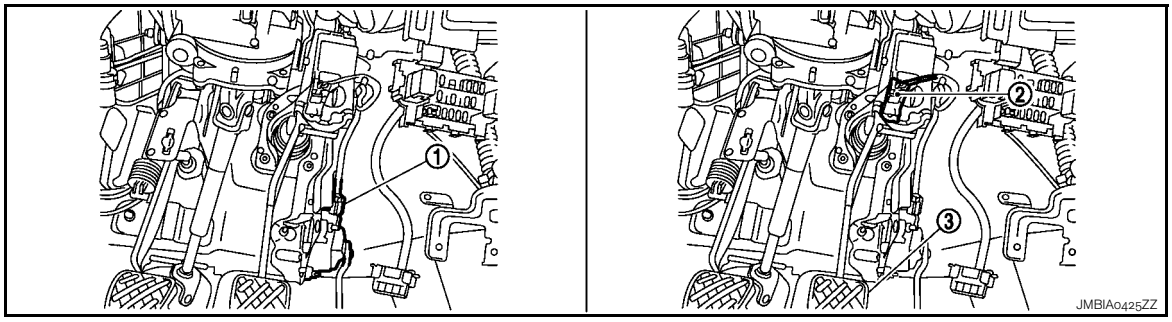
1. Turbocharger boost sensor 2. Refrigerant pressure sensor



1. EGR volume control valve 2. Glow plug

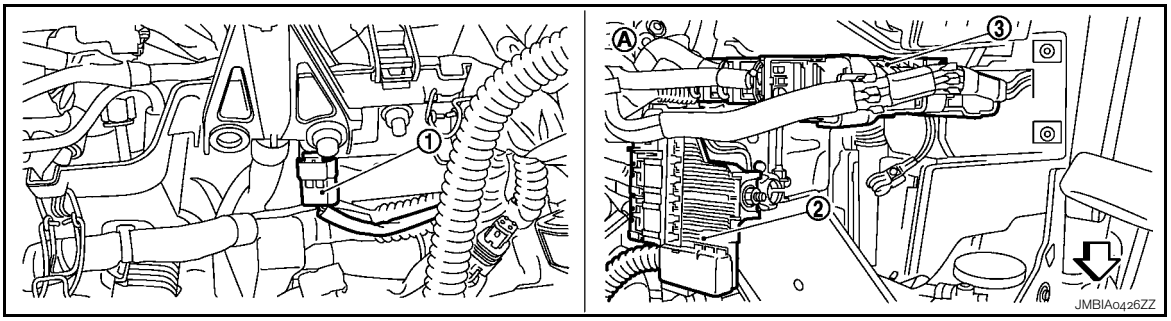


1. ASCD steering switch 2. RESUME/ACCELERATE switch 3. SET/COAST switch
4. CANCEL switch 5. MAIN switch

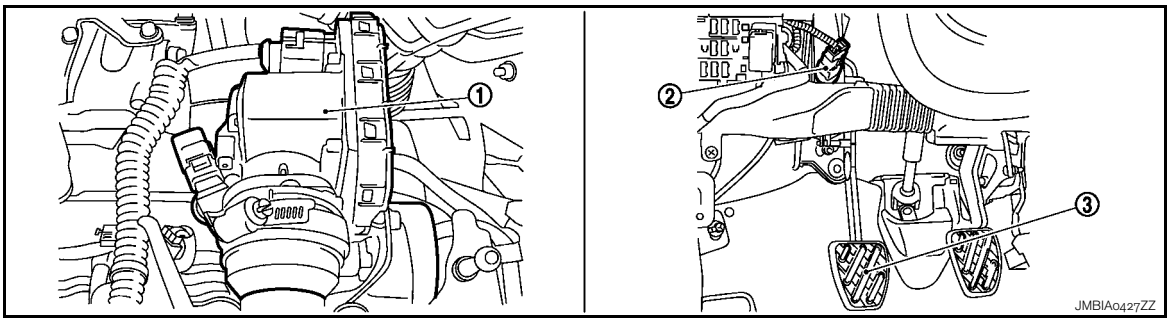


1. Accelerator pedal position sensor 2. Stop lamp switch 3. Brake pedal

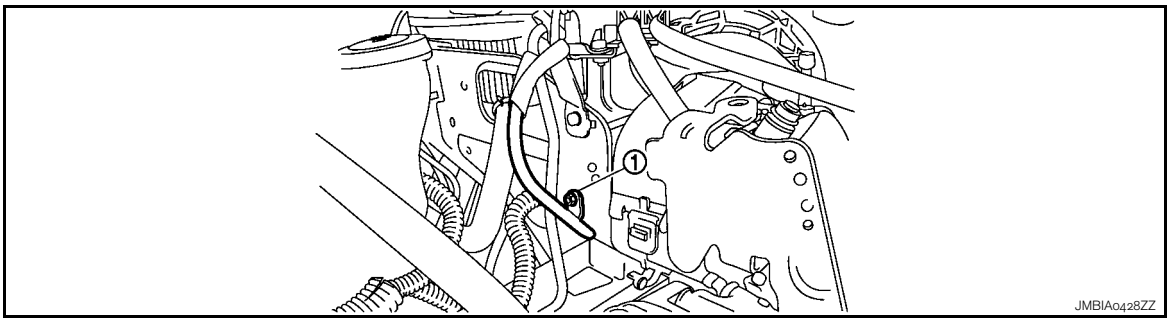
cardiagn.com



1. Fuel rail pressure sensor 2. Glow relay 3. ECM
A. View with battery removed



1. Electric throttle control actuator 2. Clutch switch 3. Clutch pedal



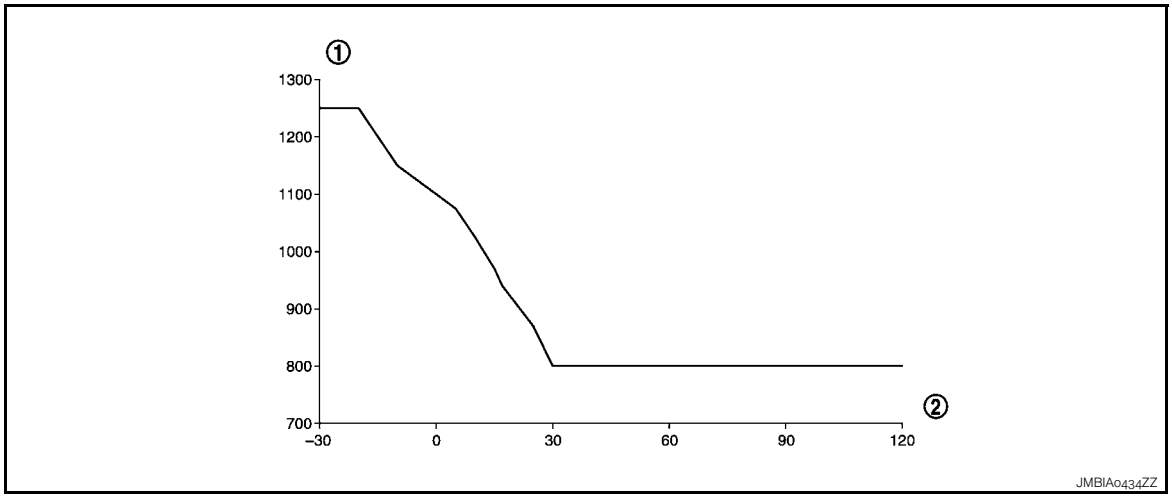
1. Body ground E17

cardiagn.com

IDLE SPEED CONTROL

System Diagram

INFOID:0000000001102318



1. Engine speed in rpm
2. Engine coolant temperature °C

System Description

INFOID:0000000001080389

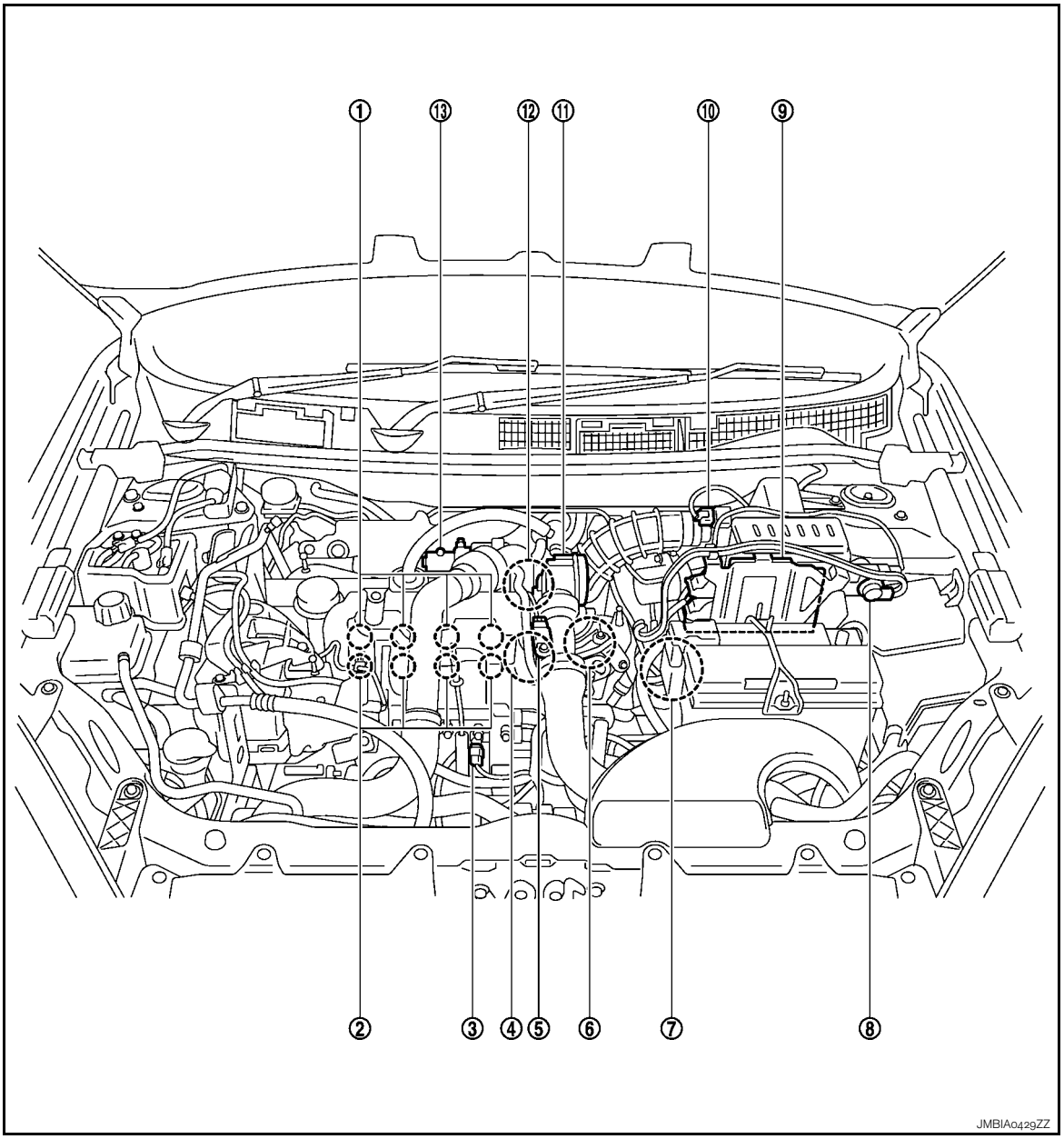
The ECM is responsible for regulating the idle speed as a function of the idle speed setpoint which it calculates.

- The idle speed setpoint is dependent on:
- Engine coolant temperature
- Emission control program
- Air conditioning requirement
- Gear engaged
- Electrical load
- Battery voltage

Component Parts Location

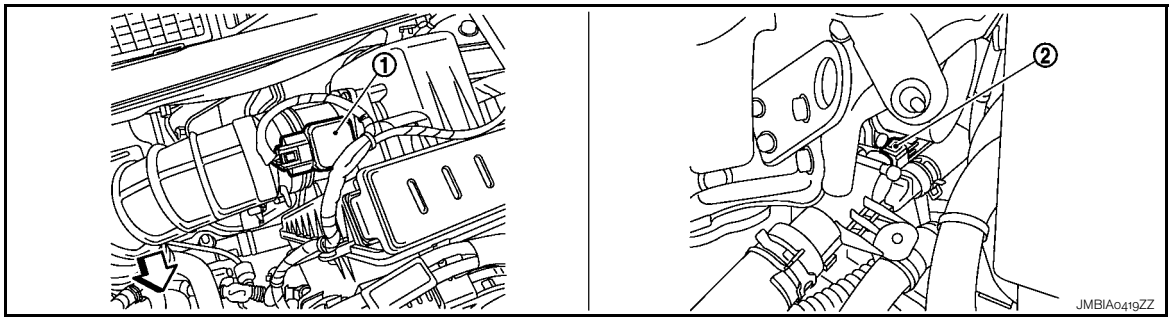
INFOID:0000000001080391

cardiagn.com



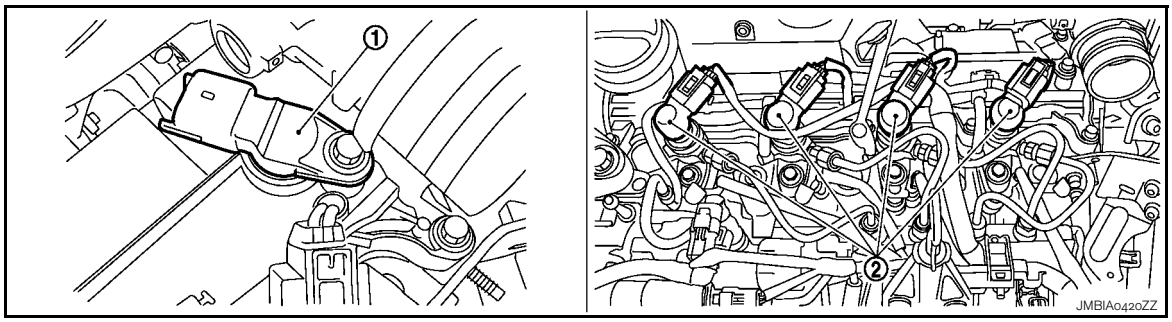
1. Fuel injector
2. Glow plug
3. Fuel rail pressure sensor
4. Crankshaft position sensor
5. Turbocharger boost sensor
6. Engine coolant temperature sensor
7. Glow relay
8. Turbocharger boost control solenoid valve
9. ECM
10. Mass air flow sensor (with intake air temperature sensor)
11. Electric throttle control actuator
12. Camshaft position sensor
13. EGR volume control valve

cardiagn.com

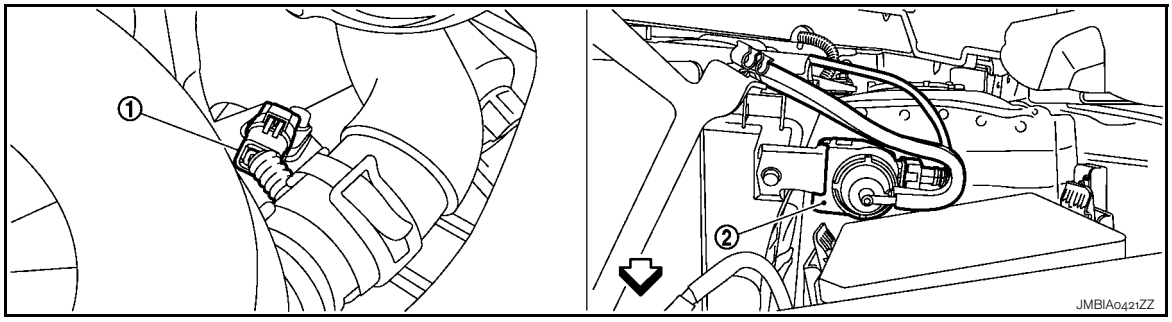


⇦ : Vehicle front

1. Mass air flow sensor (with intake air temperature sensor)
2. Engine coolant temperature sensor

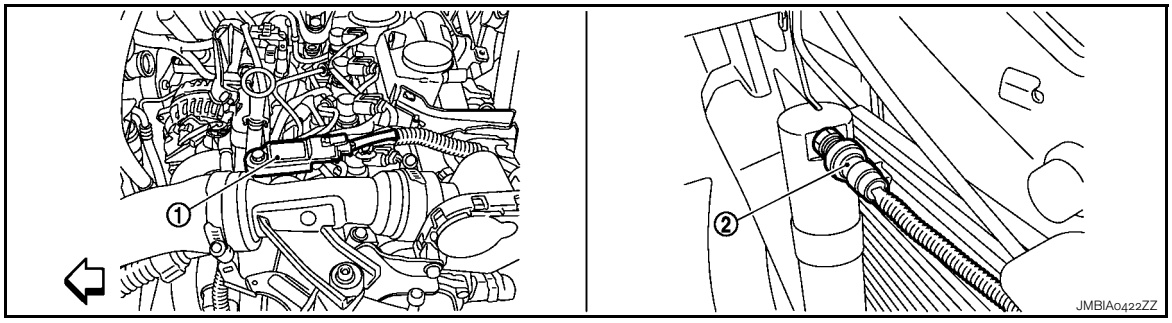


1. Camshaft Position Sensor
2. Fuel injector



⇦ : Vehicle front

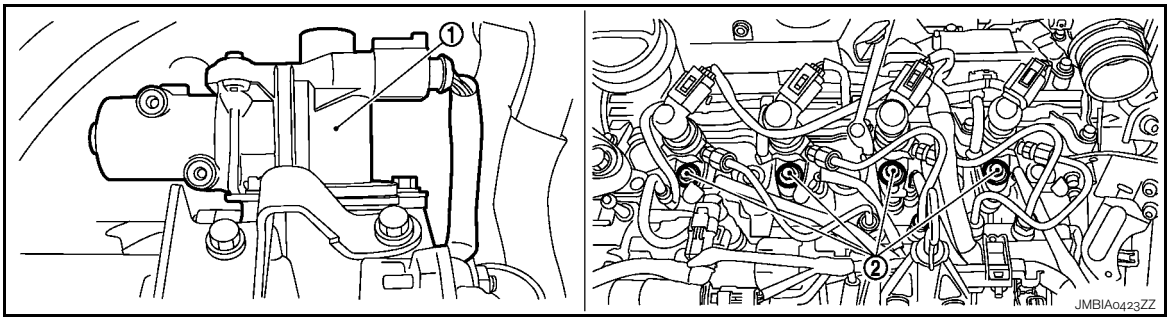
1. Crankshaft position sensor
2. Turbocharger boost control solenoid valve



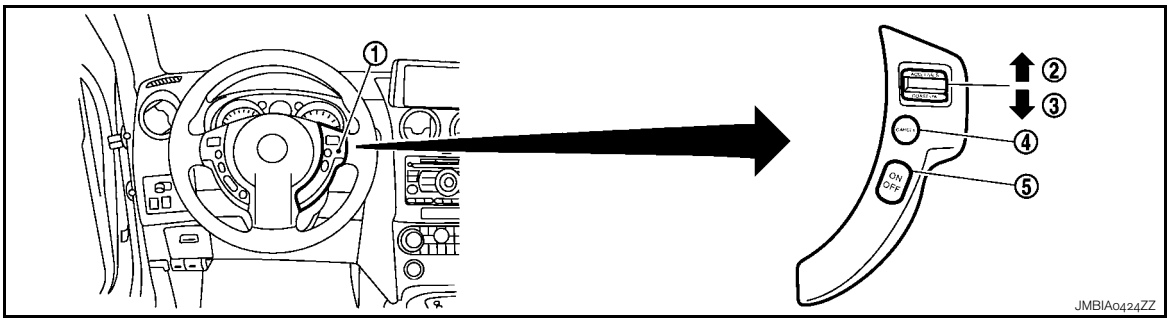
⇦ : Vehicle front

1. Turbocharger boost sensor
2. Refrigerant pressure sensor

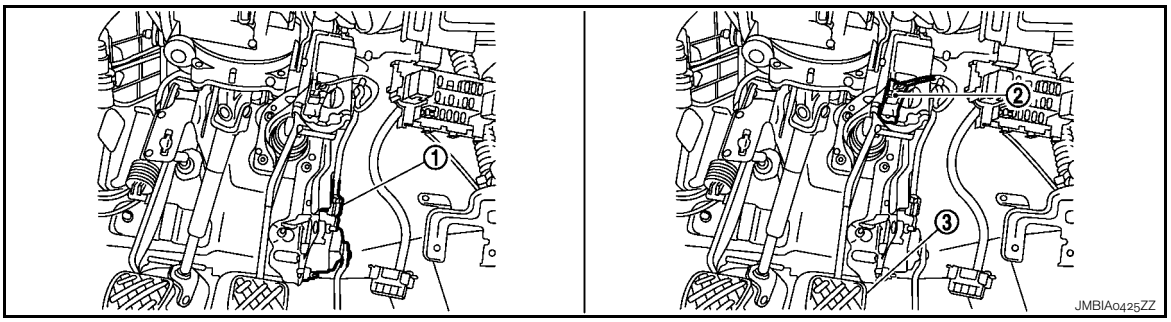
cardiagn.com



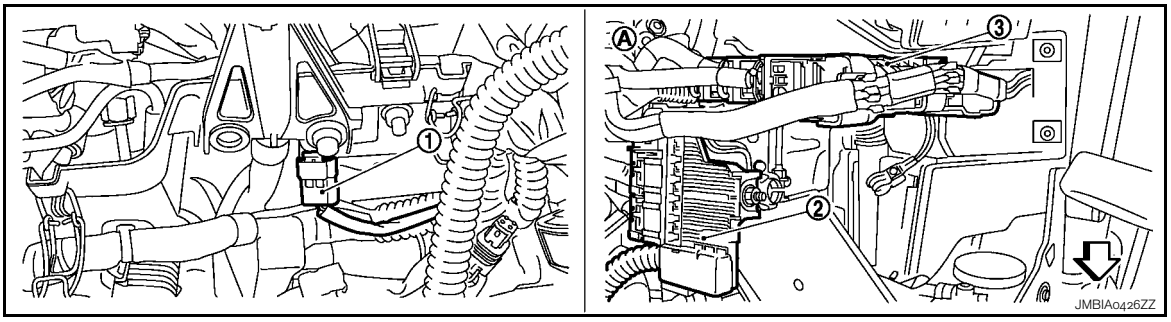
1. EGR volume control valve 2. Glow plug



1. ASCD steering switch 2. RESUME/ACCELERATE switch 3. SET/COAST switch
4. CANCEL switch 5. MAIN switch

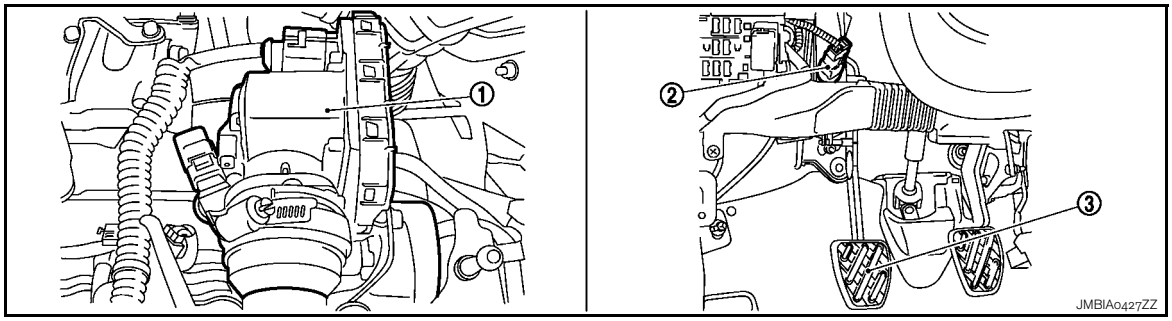


1. Accelerator pedal position sensor 2. Stop lamp switch 3. Brake pedal

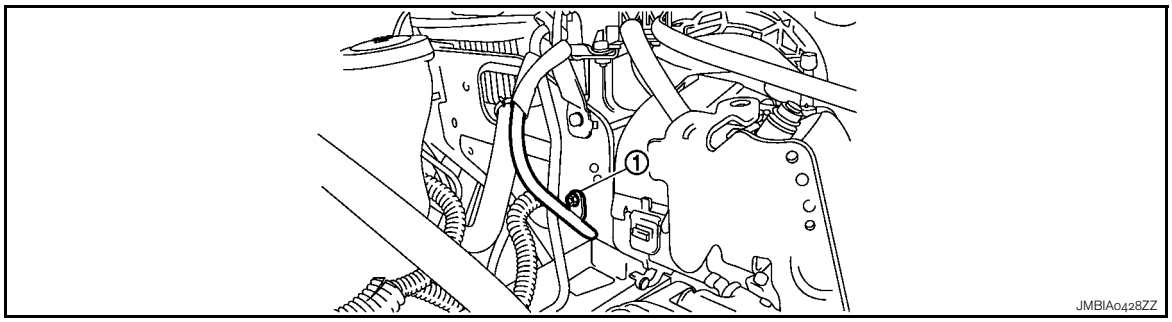


1. Fuel rail pressure sensor 2. Glow relay 3. ECM
A. View with battery removed

cardiagn.com



1. Electric throttle control actuator 2. Clutch switch 3. Clutch pedal



1. Body ground E17

cardiagn.com

ENGINE TORQUE CONTROL

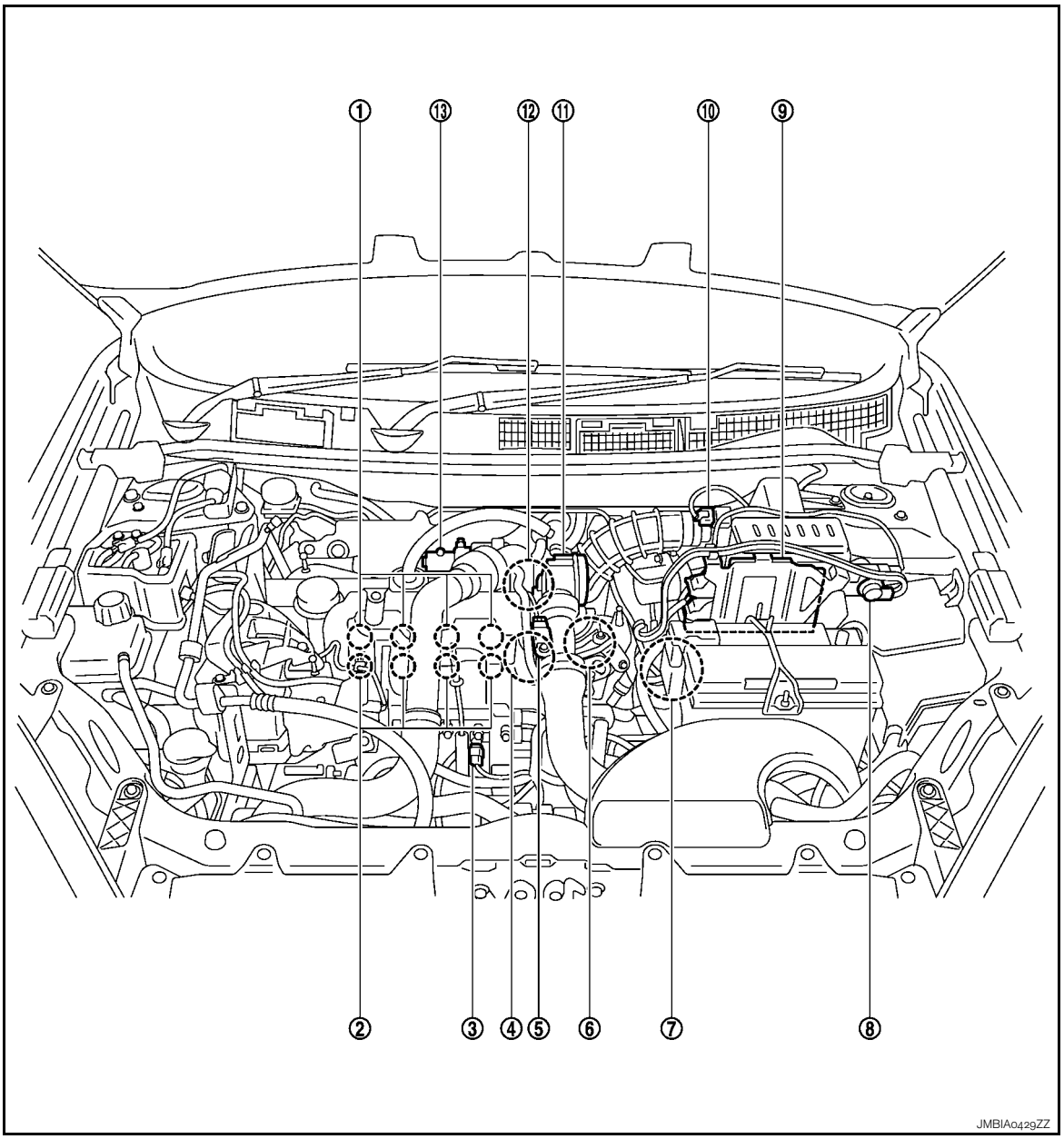
System Description

INFOID:0000000001080654

The torque structure is the system which translates the driver's request into a torque supplied by the engine. It is required for certain functions such as the electronic stability program (ESP), the automatic gearbox or the sequentialgearbox if fitted).
Each inter-system (ESP, automatic gearbox, sequential gearbox) sends the ECM a torque request viathe CAN communication. The computer arbitrates between the inter-system torque requests and the driver's request (comprised of the accelerator pedal or the cruise control/speed limiter function). The result of the arbitration gives thetorque setpoint.
From this torque setpoint, the computer determines the quantity of fuel to be injected (injection duration and numberof injections) and the amount of air required (turbocharging pressure and EGR rate) so that the engine is able toprovide the torque required in the best possible conditions (in terms of smooth running performance, pollutantemissions, etc.).

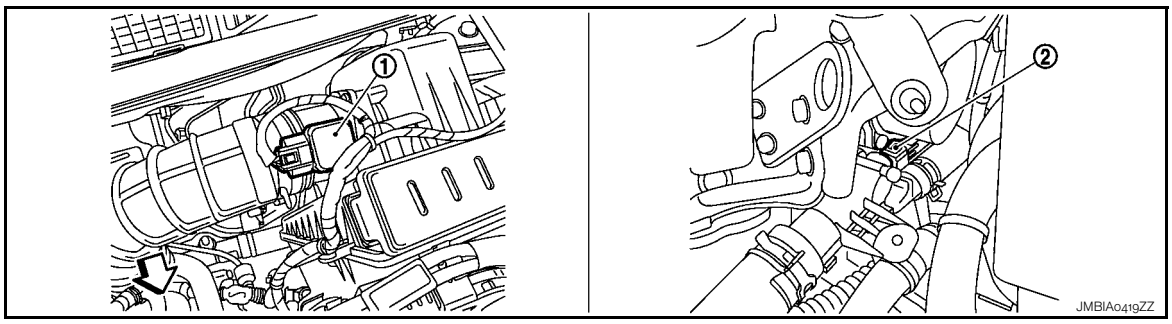
Component Parts Location

INFOID:0000000001080655



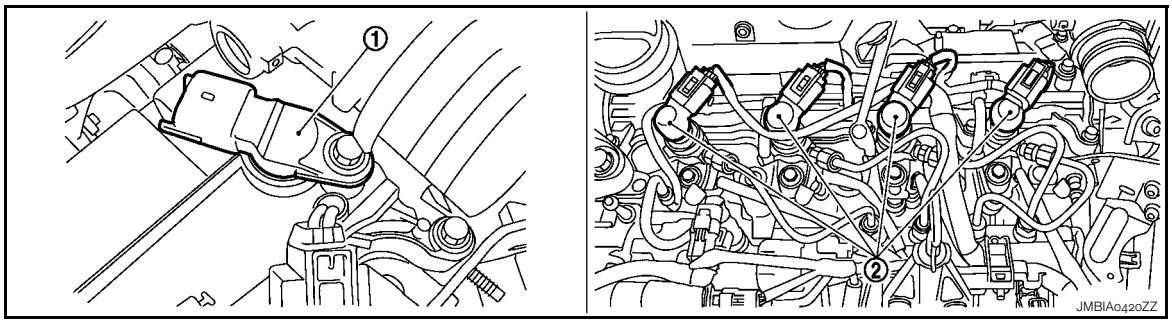
cardiagn.com

1. Fuel injector
2. Glow plug
3. Fuel rail pressure sensor
4. Crankshaft position sensor
5. Turbocharger boost sensor
6. Engine coolant temperature sensor
7. Glow relay
8. Turbocharger boost control solenoid valve
9. ECM
10. Mass air flow sensor (with intake air temperature sensor)
11. Electric throttle control actuator
12. Camshaft position sensor
13. EGR volume control valve

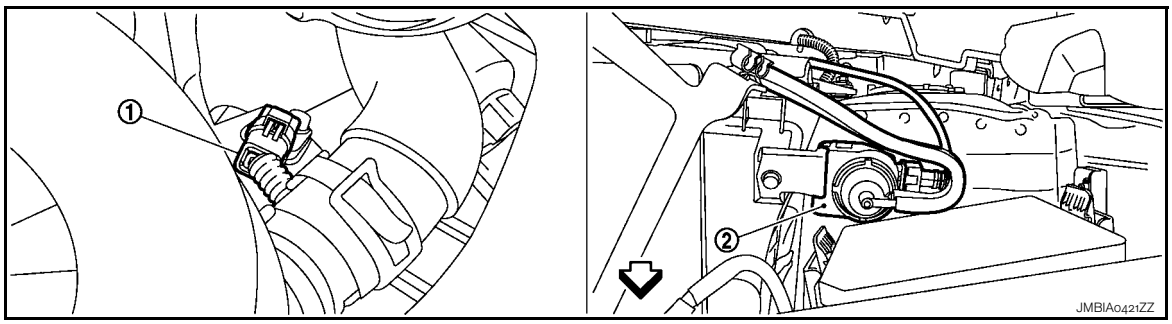


⇦ : Vehicle front

1. Mass air flow sensor (with intake air temperature sensor)
2. Engine coolant temperature sensor



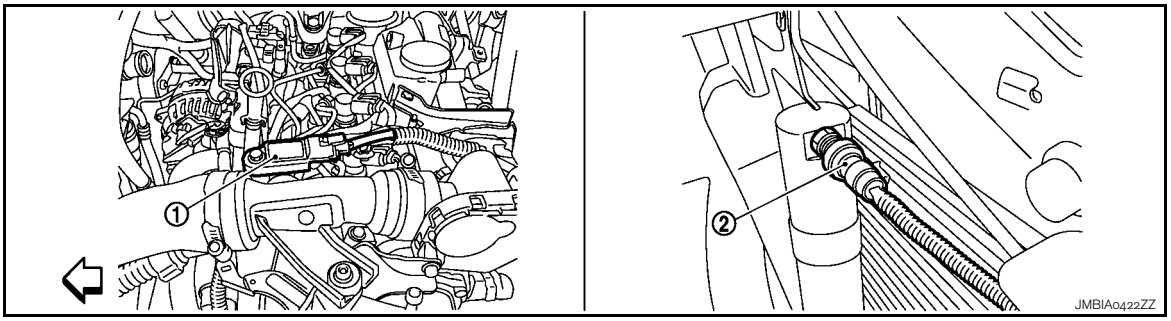
1. Camshaft Position Sensor
2. Fuel injector



⇦ : Vehicle front

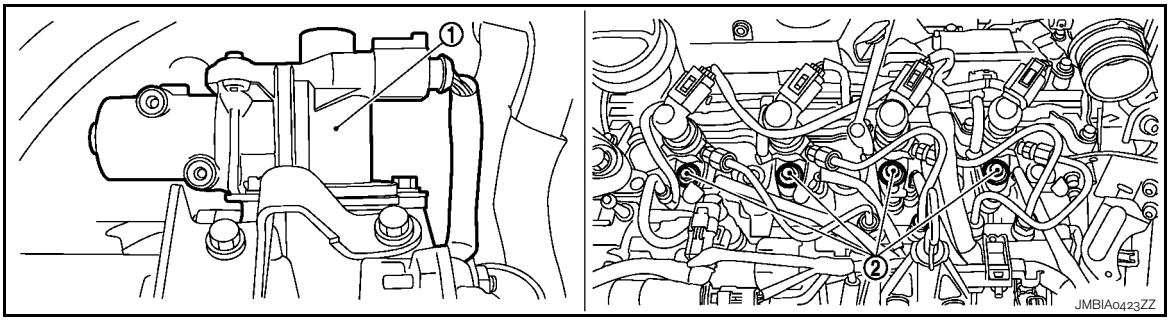
1. Crankshaft position sensor
2. Turbocharger boost control solenoid valve

cardiagn.com

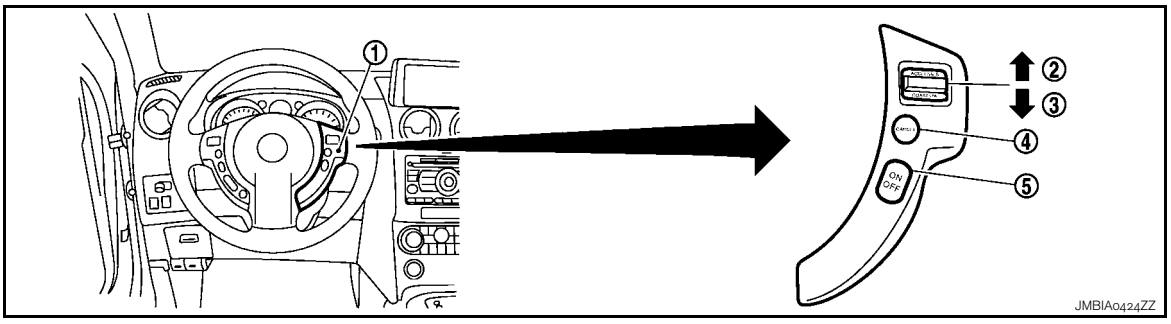


⇦ : Vehicle front

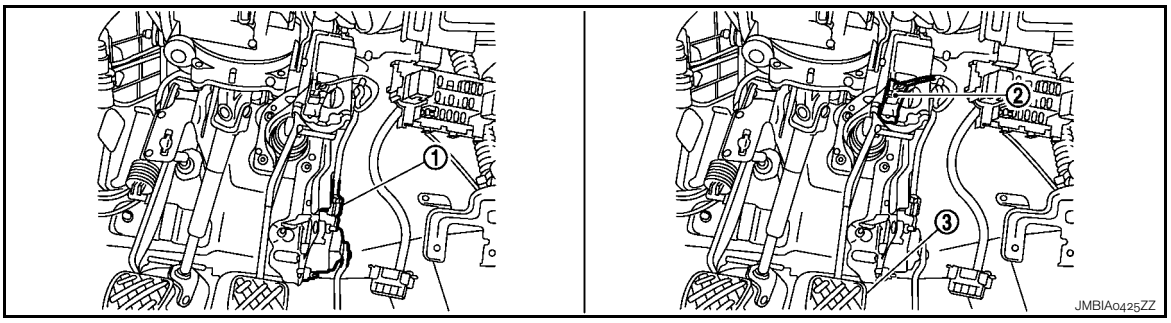
1. Turbocharger boost sensor
2. Refrigerant pressure sensor



1. EGR volume control valve
2. Glow plug

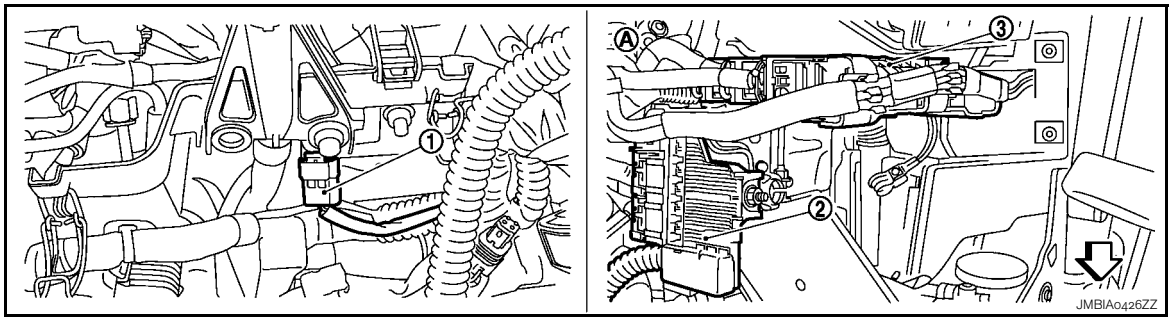


1. ASCD steering switch
2. RESUME/ACCELERATE switch
3. SET/COAST switch
4. CANCEL switch
5. MAIN switch



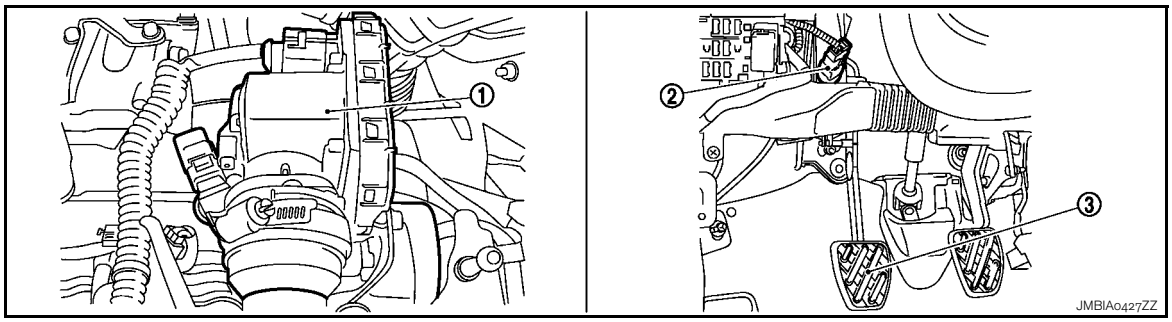
1. Accelerator pedal position sensor
2. Stop lamp switch
3. Brake pedal

cardiagn.com

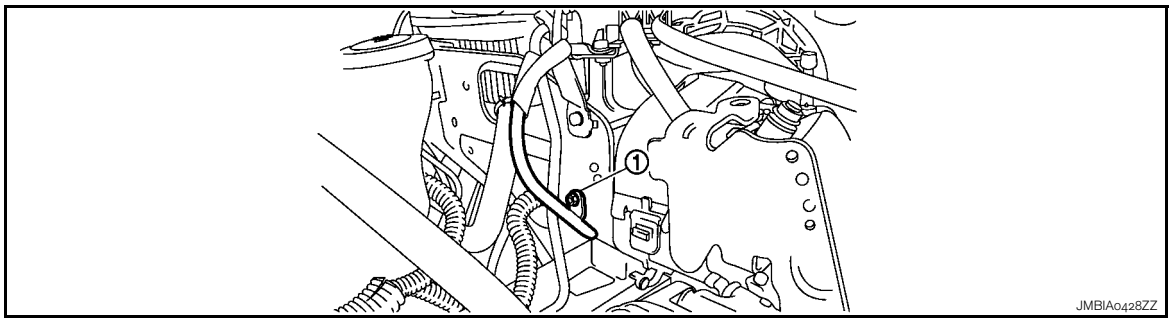


1. Fuel rail pressure sensor
2. Glow relay
3. ECM

A. View with battery removed



1. Electric throttle control actuator
2. Clutch switch
3. Clutch pedal



1. Body ground E17

cardiagn.com

GLOW CONTROL

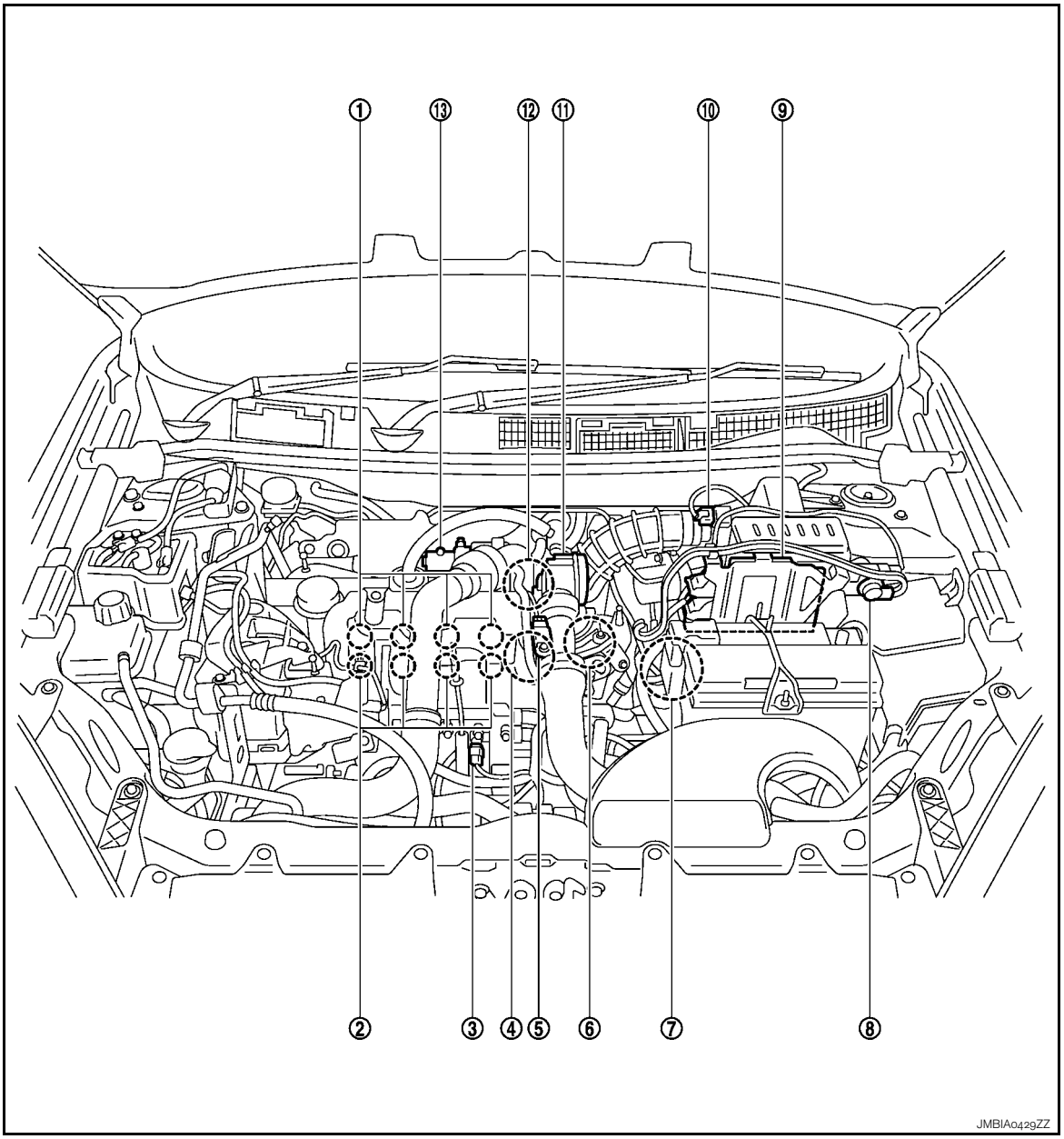
System Description

INFOID:0000000000897322

Glow control involves controlling the glow plugs and the glow plugs "on" indicator light on the instrument panel (via the can communication). The glow plugs are activated by a relay box and the power is provided by the battery.
After the ignition is switched on. Preheating is activated for a period of time. The indicator light comes on for the activation period which is dependent on the battery voltage, barometric pressure and engine coolant temperature. When the engine coolant temperature is below a certain threshold, a postheating function enables combustion stability, and thereby engine operation, to be improved (reduction in unburnt fuel and pollutant emissions).

Component Parts Location

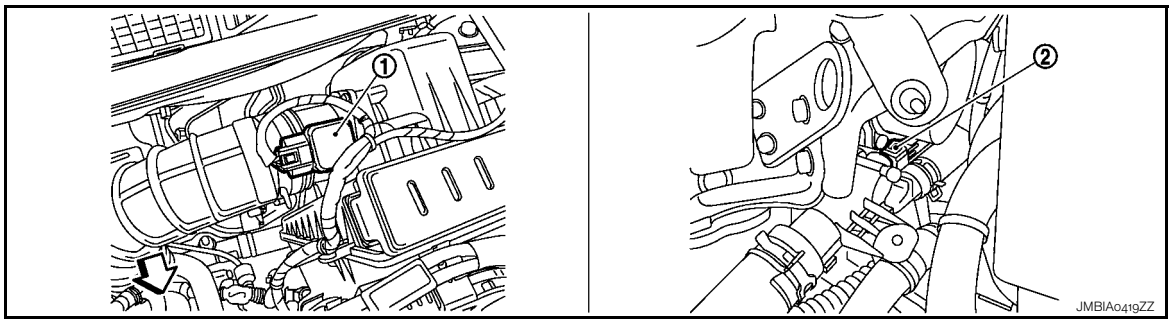
INFOID:0000000001109424



1. Fuel injector
2. Glow plug
3. Fuel rail pressure sensor
4. Crankshaft position sensor
5. Turbocharger boost sensor
6. Engine coolant temperature sensor

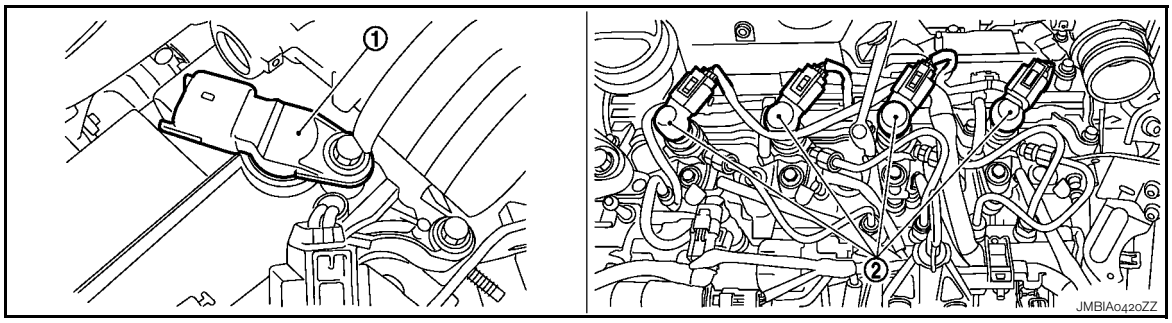
cardiagn.com

7. Glow relay
8. Turbocharger boost control solenoid valve
9. ECM
10. Mass air flow sensor (with intake air temperature sensor)
11. Electric throttle control actuator
12. Camshaft position sensor
13. EGR volume control valve

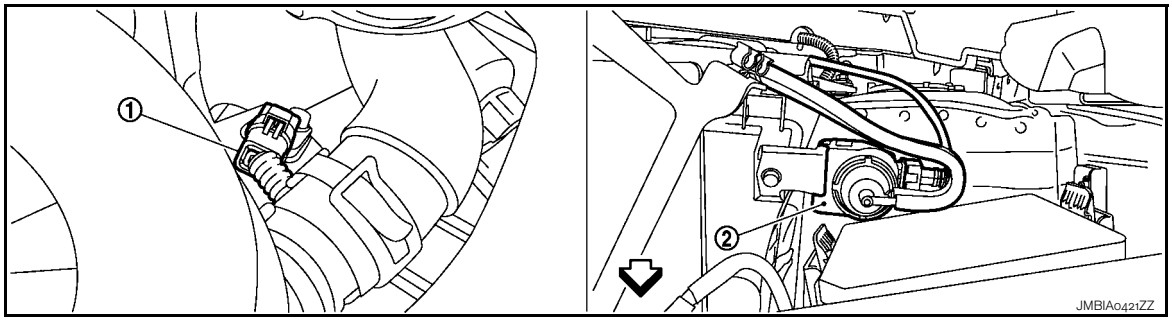


⇦ : Vehicle front

1. Mass air flow sensor (with intake air temperature sensor)
2. Engine coolant temperature sensor



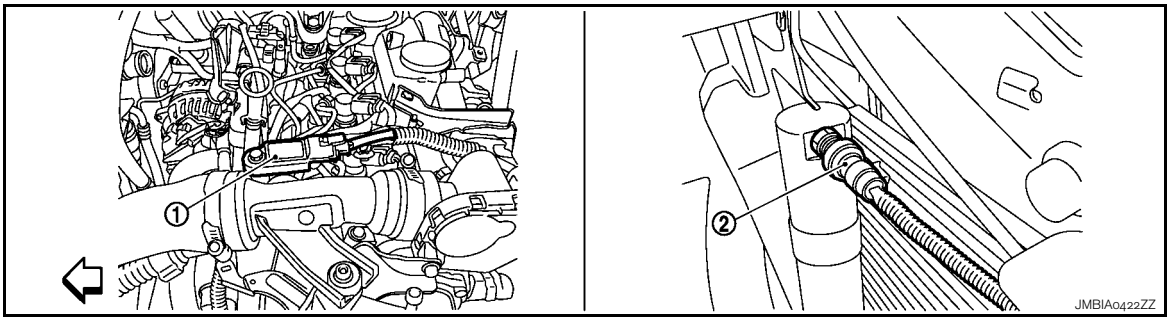
1. Camshaft Position Sensor
2. Fuel injector



⇦ : Vehicle front

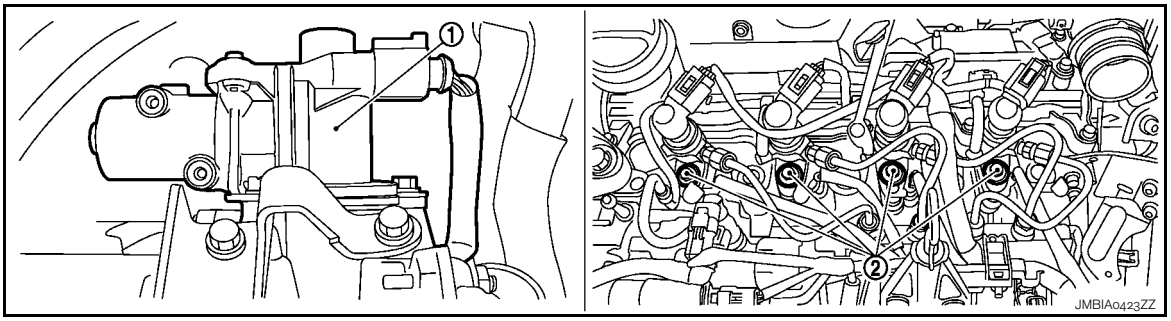
1. Crankshaft position sensor
2. Turbocharger boost control solenoid valve

cardiagn.com

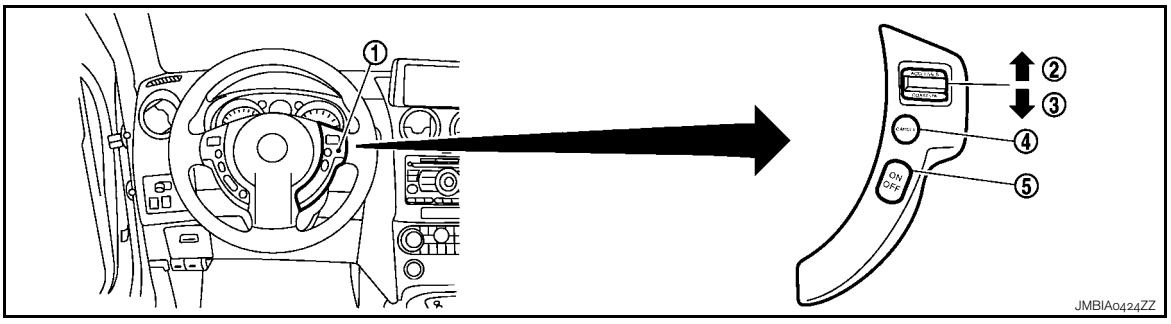


⇦ : Vehicle front

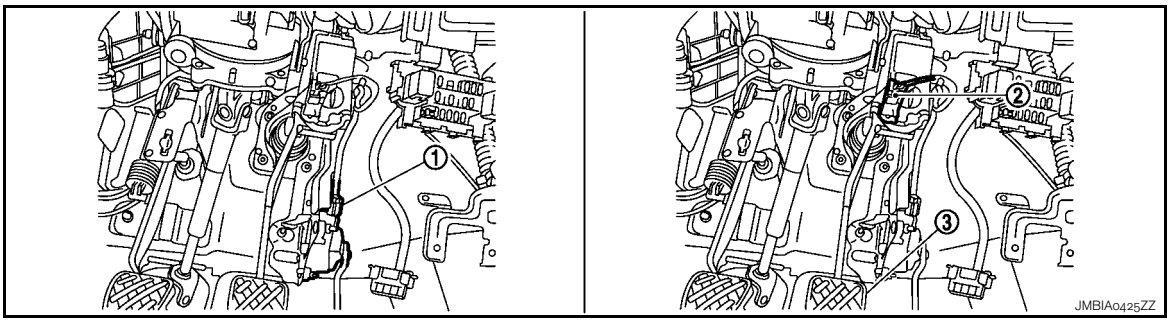
1. Turbocharger boost sensor
2. Refrigerant pressure sensor



1. EGR volume control valve
2. Glow plug

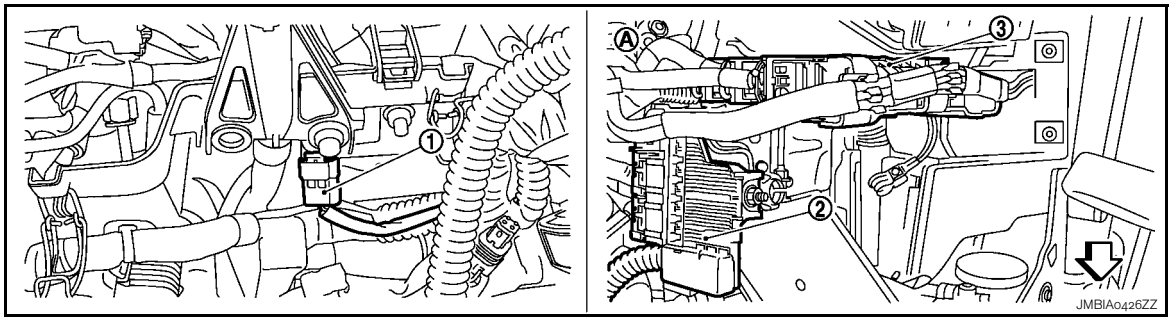


1. ASCD steering switch
2. RESUME/ACCELERATE switch
3. SET/COAST switch
4. CANCEL switch
5. MAIN switch



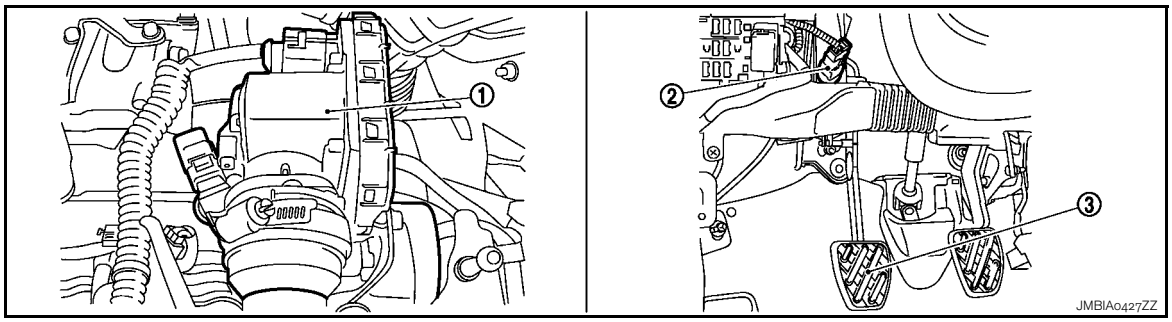
1. Accelerator pedal position sensor
2. Stop lamp switch
3. Brake pedal

cardiagn.com

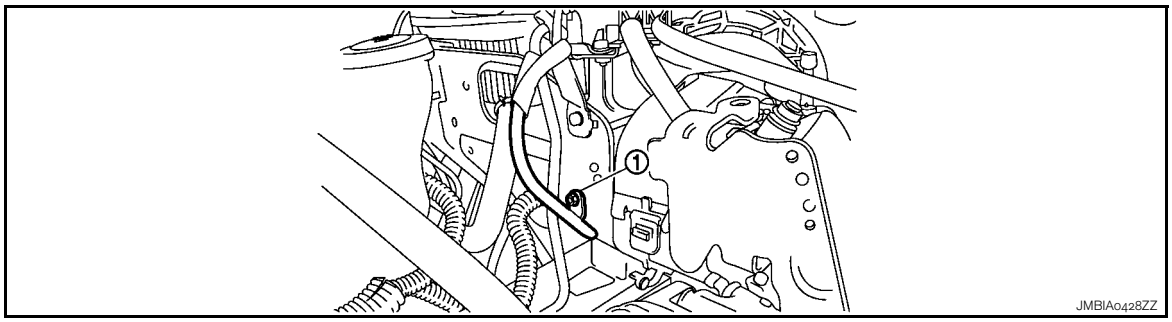


1. Fuel rail pressure sensor
2. Glow relay
3. ECM

A. View with battery removed



1. Electric throttle control actuator
2. Clutch switch
3. Clutch pedal



1. Body ground E17

cardiagn.com

COOLING FAN CONTROL

System Description

INFOID:0000000000911871

The cooling fan motor is controlled by the ECM.

COOLING FAN OPERATION WITH THE ENGINE RUNNING

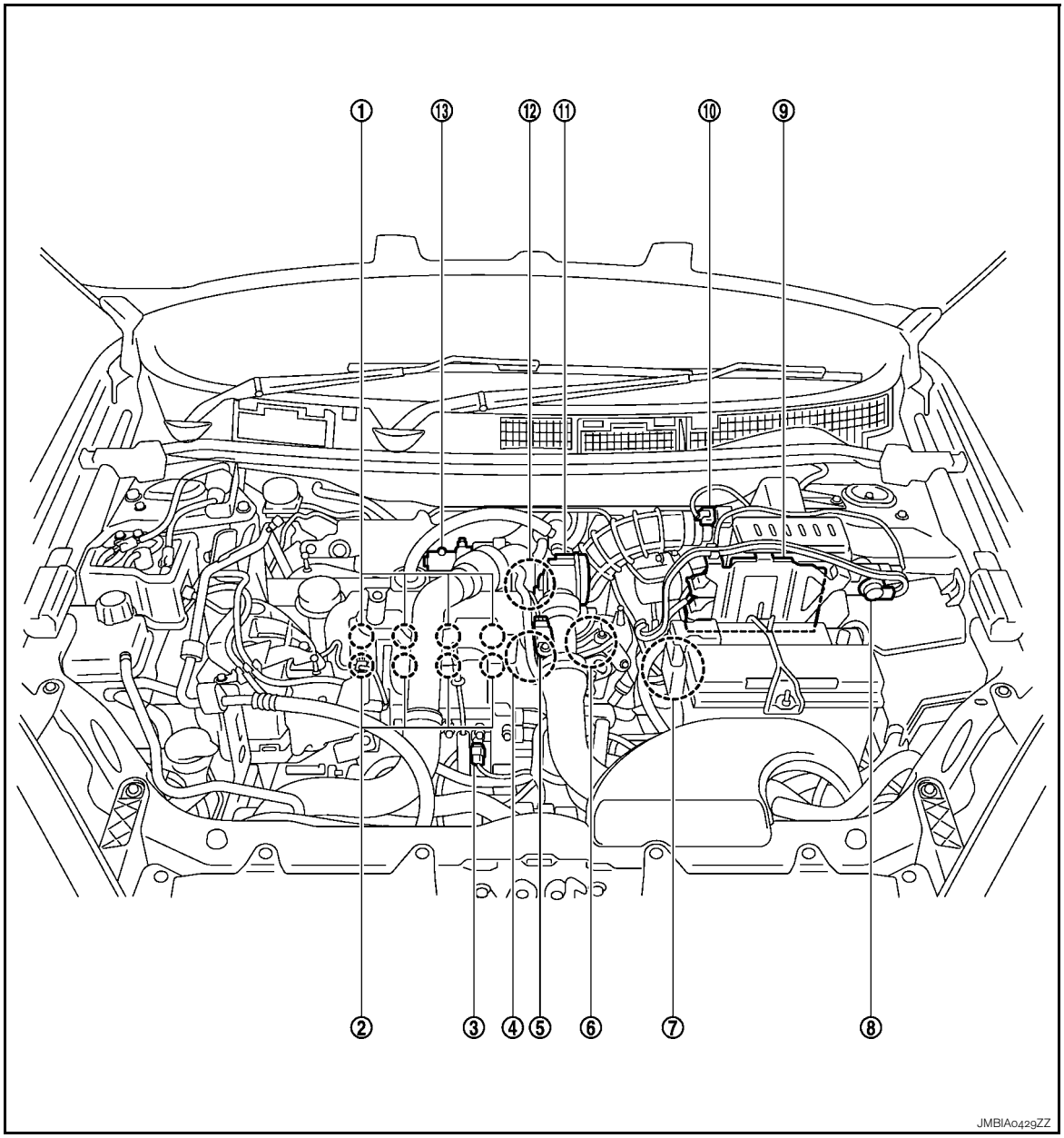
Cooling fan operate is guaranteed by a 2-speed fan assembly (LOW speed and HIGH speed).The ECM requests the IPDM E/R to actuate them via the can communication. To provide cooling:

- Engine running
  - LOW speed is actuated when the engine coolant temperature exceeds 96 °C (205°F) and is deactivated when it drops below 94 °C (201°F).
  - HIGH speed is actuated when the engine coolant temperature exceeds 104 °C (219°F) and is deactivated when it drops below 102 °C (216°F).
- If the engine coolant temperature exceeds the threshold of 115°C (239°F), the ECM requests the IPDM E/R, via the CAN communication, to switch off the air conditioning compressor so as to reduce the load on the engine and attempt to limit the rise in temperature. The cut-off request is cancelled if the engine coolant temperature drops below 110°C (230°F).
- If a malfunction in the engine coolant temperature sensor circuit is detected, the ECM requests that HIGH speed operation.
- In addition to engine management, the ECM centralises the cooling requirements for the climate control and automatic transmission/sequential gearbox functions (where fitted).

Component Parts Location

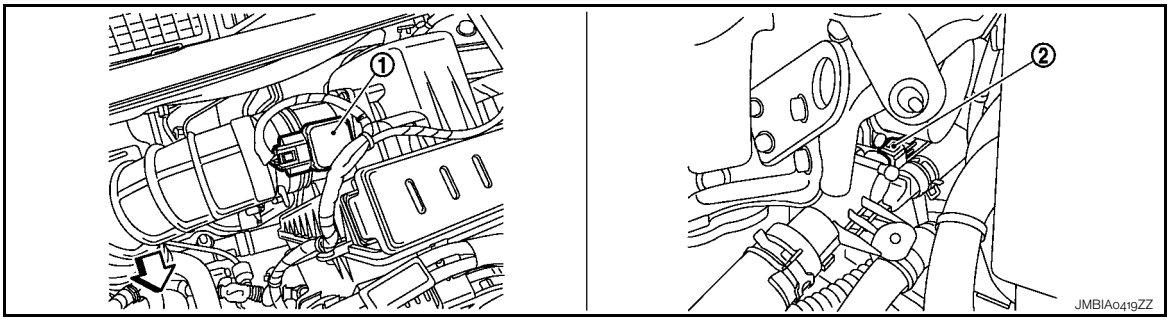
INFOID:0000000001109423

cardiagn.com



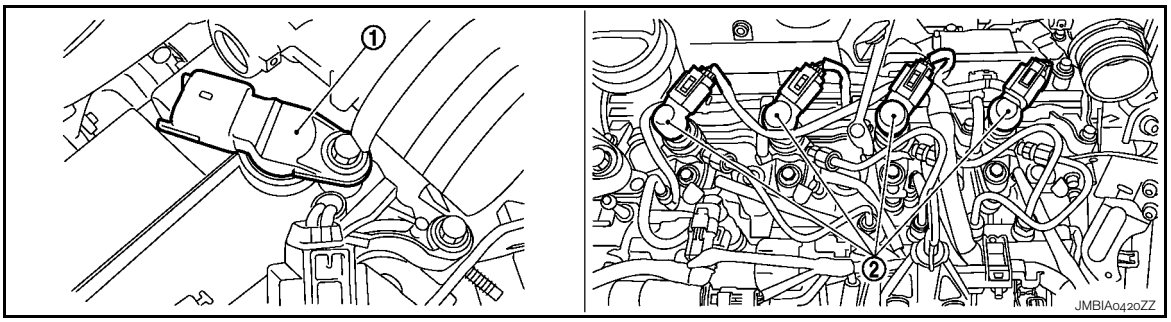
1. Fuel injector
2. Glow plug
3. Fuel rail pressure sensor
4. Crankshaft position sensor
5. Turbocharger boost sensor
6. Engine coolant temperature sensor
7. Glow relay
8. Turbocharger boost control solenoid valve
9. ECM
10. Mass air flow sensor (with intake air temperature sensor)
11. Electric throttle control actuator
12. Camshaft position sensor
13. EGR volume control valve

cardiagn.com

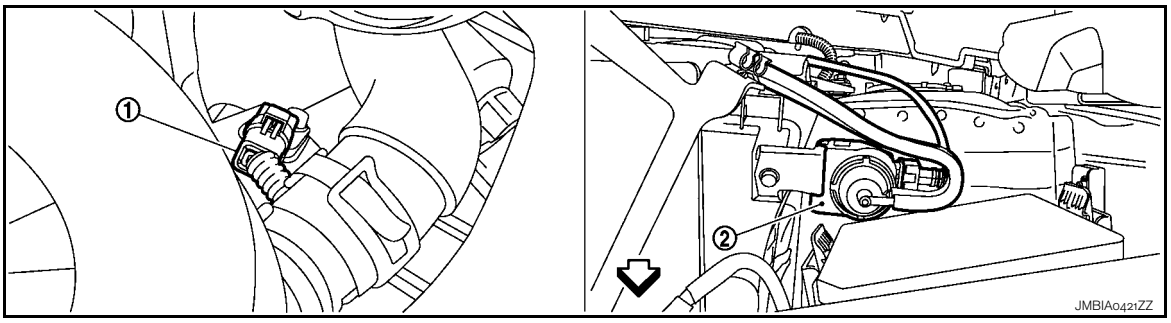


⇦: Vehicle front

1. Mass air flow sensor (with intake air temperature sensor)
2. Engine coolant temperature sensor

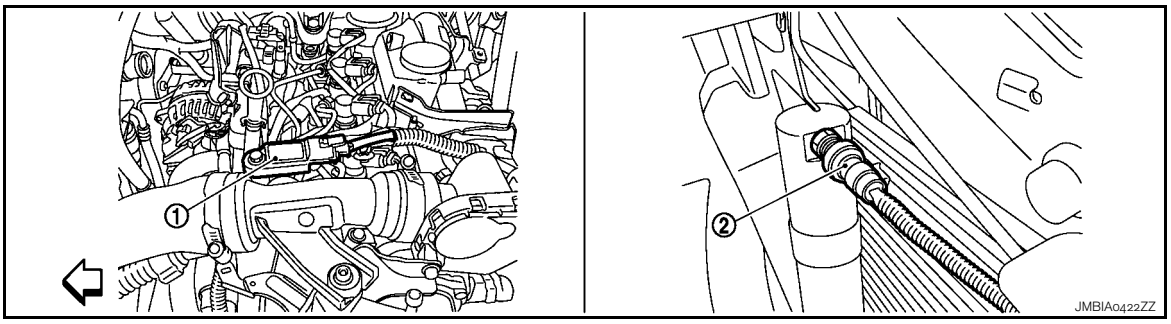


1. Camshaft Position Sensor
2. Fuel injector



⇦: Vehicle front

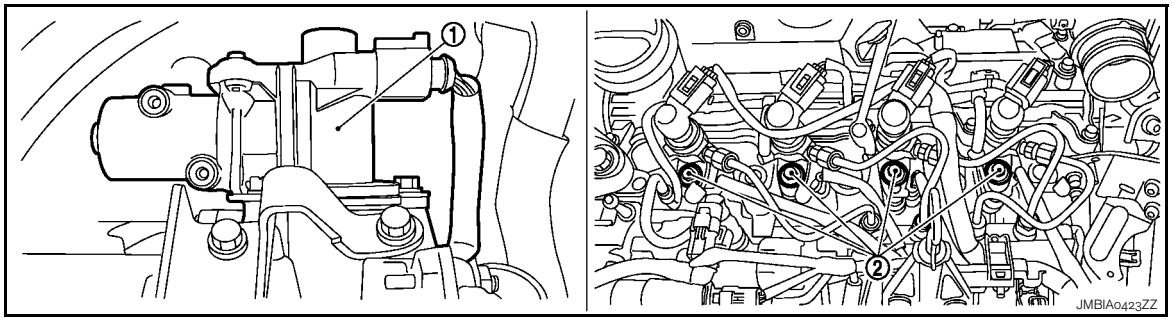
1. Crankshaft position sensor
2. Turbocharger boost control solenoid valve



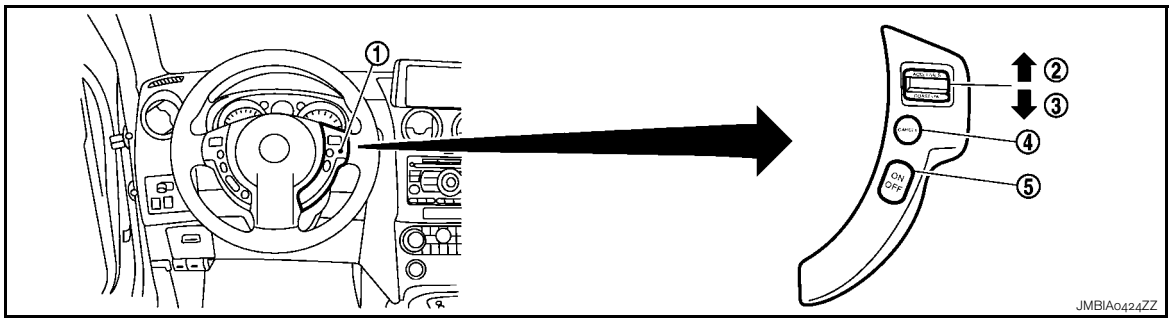
⇦: Vehicle front

1. Turbocharger boost sensor
2. Refrigerant pressure sensor

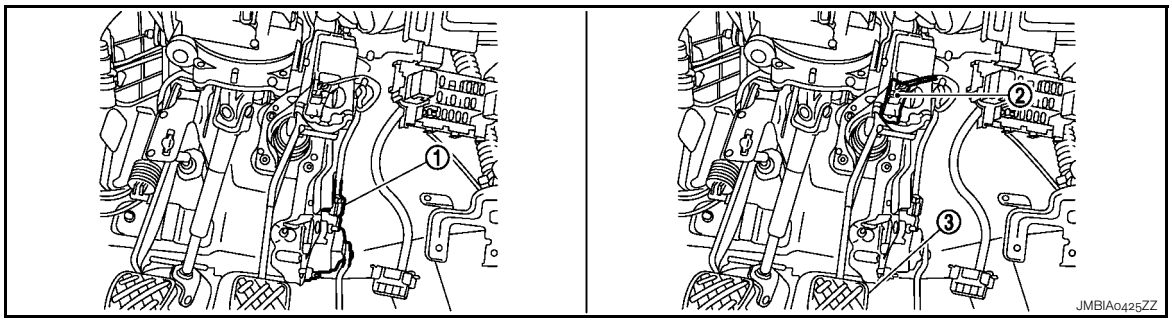
cardiagn.com



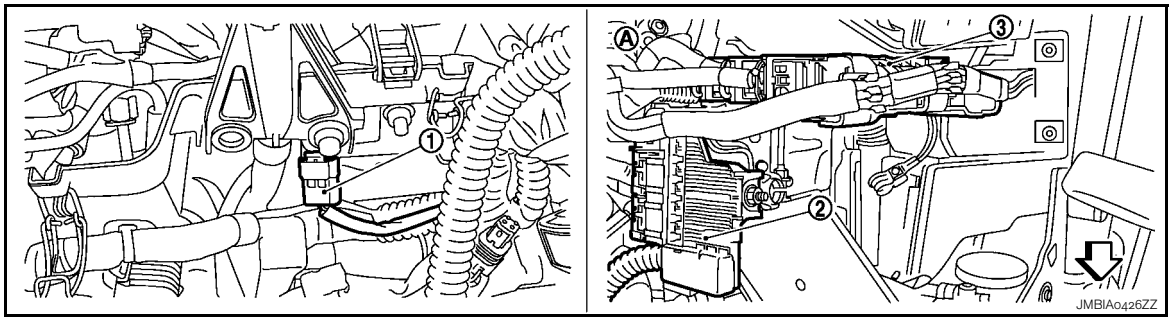
1. EGR volume control valve
2. Glow plug



1. ASCD steering switch
2. RESUME/ACCELERATE switch
3. SET/COAST switch
4. CANCEL switch
5. MAIN switch



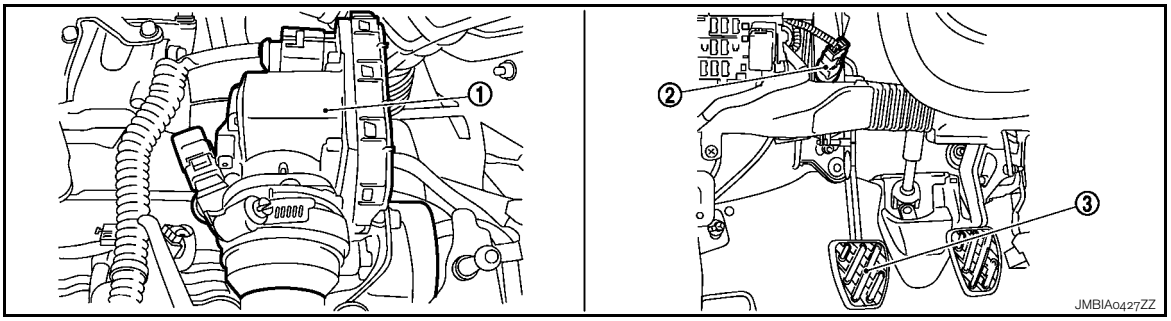
1. Accelerator pedal position sensor
2. Stop lamp switch
3. Brake pedal



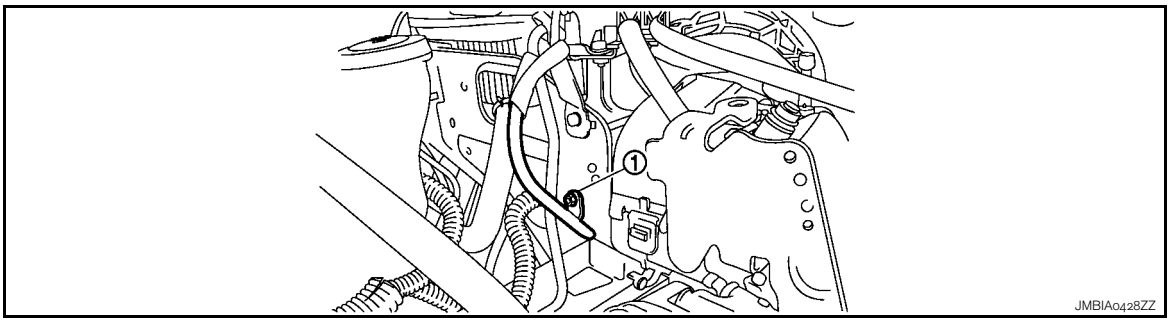
1. Fuel rail pressure sensor
2. Glow relay
3. ECM

A. View with battery removed

cardiagn.com



1. Electric throttle control actuator 2. Clutch switch 3. Clutch pedal



1. Body ground E17

cardiagn.com

CAN COMMUNICATION

System Description

INFOID:0000000000902333

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
Refer to LAN-59, "CAN Communication Signal Chart", about CAN communication for detail.

cardiagn.com

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000000902323

The ECM controls the display on the instrument panel of certain information relating to the operation of the engine.
Four functions are involved here: The OBD malfunction indicator [MI (Yellow)] for the EOBD (European On Board Diagnostics), the pre/post heating, the engine coolant temperature and engine malfunction [MI (Red)]. These four functions are represented by four lights given out by the ECM

GLOW LAMP

This lamp indicates that the glow control system has been activated.

ENGINE COOLANT TEMPERATURE LIGHT

This light is used as an indicator of engine overheating.
- In the event of overheating, it is up to the driver whether to stop the vehicle or not.

MALFUNCTION INDICATOR

The OBD malfunction indicator [MI (Yellow)] is used to alert the driver to the existence of engine control system malfunctions involving excessive pollution or if the EOBD system is deactivated.
The ECM makes a request for lighting of the MI (Yellow) only where there is a malfunction present at the end of three consecutive cycles.
The 3-second visual check upon powering up (automatic test procedure controlled by the IPDM E/R) is performed by the ECM.
In the event of a confirmed OBD malfunction by lighting of the MI, no flashing of the light must be observed following the lighting test.

DTCs Causing MI to Light

DTC	Description	Reference page
P0201	Cylinder 1 fuel injector control circuit	EC-1353
P0202	Cylinder 2 fuel injector control circuit	EC-1353
P0203	Cylinder 3 fuel injector control circuit	EC-1353
P0204	Cylinder 4 fuel injector control circuit	EC-1353
P0409	EGR Volume control valve control position sensor circuit	EC-1372
P0606	ECM	EC-1391
P2413	EGR volume control valve	EC-1415

ENGINE WARNING LIGHT

In the event of an engine malfunction, the ECM may request the display of an engine warning light [MI (Red)].

HOW TO ERASE DTC, 1ST TRIP DTC AND 2ND TRIP DTC

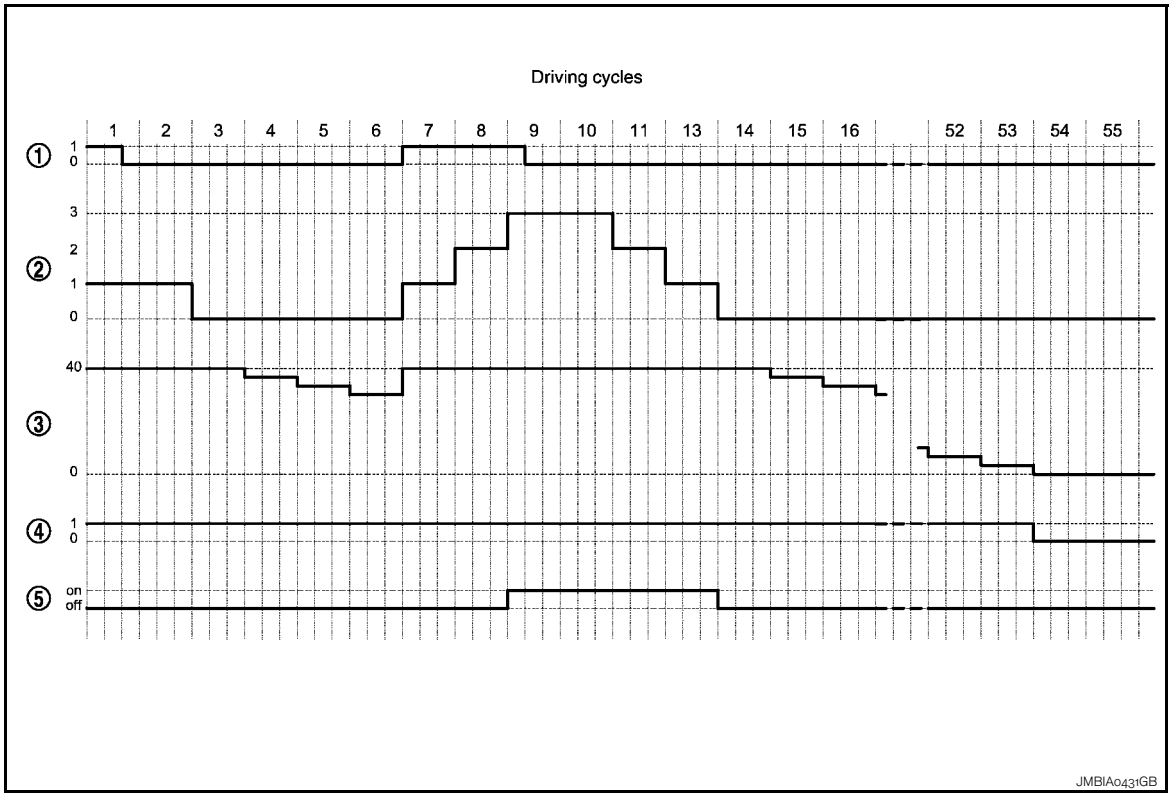
With CONSULT-II

The emission related diagnostic information in the ECM can be erased by selecting “ALL ERASE” in the “Description” of “FINAL CHECK” mode with CONSULT-III.

MI OPERATION CHART

Some malfunction must switch on MI to warn driver, that his engine emissions exceed OBD thresholds (Euro 3 x 2.5).
The rule is to switch on MI after 3 consecutive driving cycles (engine start + engine stop + power latch) with a present OBD malfunction.
To switch off the MI (without CONSULT-III), vehicle has to drive 3 consecutive cycles without present OBD malfunction.
Ignition switch OFF → ON transition, MI remains switched on in pre-drive check mode until engine start.If MI does not switch off whereas engine is running, there is at least one present OBD malfunction.

cardiagn.com



1. Present malfunction
2. Driving cycle counter
3. Warm up cycle counter
4. Memorised malfunction
5. MI state

NOTE: Driving cycle and warm up cycle are both detected in the same cycle.

cardiagn.com

COMPONENT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000001070365

1.INSPECTION START

Start engine.

Is engine running?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F68	69	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- 10A fuse (No. 5)
- Harness for open or short between ECM and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK GROUND CONNECTION-I

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace ground connection.

5.CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connectors.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
E60	123	Ground	Existed
	124		
	125		
	128		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to power in harness or connectors.

6.CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.

cardiagn.com

2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F68	53	Ground	After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V.
	54		

Is the inspection result normal?

YES >> GO TO 12.
NO-1 >> Battery voltage does not exist: GO TO 7.
NO-2 >> Battery voltage exists for more than a few seconds: GO TO 10.

7. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F68	60	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 10.

8. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E68	53	E11	9	Existed
	54			

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 14.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors E7, E121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F68	60	E11	15	Existed

4. Also check harness for short to ground and short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair open circuit or short to ground or short power in harness or connectors.

11. CHECK 20A FUSE

1. Disconnect 20A fuse (No. 52) from IPDM E/R.
2. Check 20A fuse.

Is the inspection result normal?

YES >> GO TO 14.
NO >> Replace 20A fuse.

12. CHECK GROUND CONNECTION-II

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair or replace ground connection.

13. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
E60	123	Ground	Existed
	124		
	125		
	128		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair open circuit or short power in harness or connectors.

14. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to power in harness or connectors.

cardiagn.com

P0001 FUEL PUMP

DTC Logic

INFOID:0000000001115046

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0001	HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE) CIRCUIT • CO: Open circuit • CO.0: Short circuit to ground • CC.1: Short circuit to +12V • 1.DEF: Parameter at maximum level	• Harness or connectors [High pressure supply pump (volumetric control valve) circuit is open or shorted.] • High pressure supply pump (volumetric control valve) • Fuel line

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC becomes present after the engine is started.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000001034174

1.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE) POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect high pressure supply pump (volumetric control valve) harness connector.
3. Turn ignition switch ON.
4. Check the voltage between high pressure supply pump (volumetric control valve) harness connector and ground.

High pressure supply pump (volumetric control valve)		Ground	Voltage
Connector	Terminal		
F106	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E7, F121
- Harness for open or short between ECM and high pressure supply pump (volumetric control valve)
- Harness for open or short between IPDM E/R and high pressure supply pump (volumetric control valve)

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE) OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between high pressure supply pump (volumetric control valve) harness connector and ECM harness connector.

High pressure supply pump (volumetric control valve)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F106	2	F68	50	Existed

4. Also check harness for short to ground and short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Refer to EC-1321, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace high pressure supply pump.

5. CHECK FUEL LINE

Check fuel line cleanliness.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Fuel line cleanliness.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001034175

1. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

1. Turn ignition switch OFF.
2. Disconnect high pressure supply pump (volumetric control valve) harness connector.
3. Check resistance between high pressure supply pump (volumetric control valve) terminals as follows.

Terminals	Resistance
1 and 2	1.5 - 15Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace high pressure supply pump.

cardiagn.com

P0002 FUEL PUMP

DTC Logic

INFOID:0000000001115051

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0002	HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE) ADAPTIVE • 1.DEF: Parameter at maximum stop • 2.DEF: Parameter at maximum level	• Harness or connectors [High pressure supply pump (volumetric control valve) circuit is open or shorted.] (Fuel rail pressure sensor circuit is open or shorted.) • High pressure supply pump (volumetric control valve) • Fuel rail pressure sensor

NOTE:

- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present when after the engine is started or following a load test.

Diagnosis Procedure

INFOID:0000000001034260

1.CHECK LOW PRESSURE FUEL SUPPLY SYSTEM

Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

Is the inspection result normal?

OK >> GO TO 2.
NG >> Replace or replace. Then GO TO 9.

2.CHECK INTERNAL FUEL TRANSFER PUMP

Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

Is the inspection result normal?

OK >> GO TO 3.
NG >> Replace or replace. Then GO TO 9.

3.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

Is the inspection result normal?

OK >> GO TO 4.
NG >> Replace or replace. Then GO TO 9.

4.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

Is the inspection result normal?

OK >> GO TO 5.
NG >> Replace or replace. Then GO TO 9.

5.CHECK RAIL HIGH PRESSURE REGULATION

Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

Is the inspection result normal?

OK >> GO TO 6.
NG >> Replace or replace. Then GO TO 9.

6.CHECK MAJOR LEAK IN FUEL INJECTORS/FUEL INJECTORS OPEN

cardiagn.com

Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/ Fuel Injectors Open)".

Is the inspection result normal?

OK >> GO TO 7.
NG >> Replace or replace. Then GO TO 9.

7.CHECK INCORRECT FUEL INJECTION QUANTITY

Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

Is the inspection result normal?

OK >> GO TO 8.
NG >> Replace or replace. Then GO TO 9.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> INSPECTIO END.
NO >> Repair or replace. Then GO TO 9.

9.CLEAR PRESSURE REGULATION

Perform “PRESS_REG_ADAPTIVE” in WORK SUPPORT mode with CONSULT-III.

>> **INSPECTION END**.

Component Inspection

INFOID:0000000001034261

1.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

1. Turn ignition switch OFF.
2. Disconnect high pressure supply pump (volumetric control valve) harness connector.
3. Check resistance between high pressure supply pump (volumetric control valve) terminals as follows.

Terminals	Resistance
1 and 2	1.5 - 15Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace high pressure supply pump.

cardiagn.com

P0016 CKP - CMP CORRELATION

DTC Logic

INFOID:0000000001115053

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0016	CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION	• Harness or connectors (CMP sensor circuit is open or shorted.) • Camshaft position sensor • Timing belt • Signal plate

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present when cranking the engine or at idle speed.
- **If the DTC is present:**
  Longer starting time, requires several attempts to start the vehicle.

Diagnosis Procedure

INFOID:0000000000952664

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK CMP SENSOR

1. Turn ignition switch OFF.
2. Disconnect camshaft position (CMP) sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between CMP sensor harness connector and ground.

CMP sensor		Ground	Voltage
Connector	Terminal		
F87	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E7, F121
- Harness for open or short between ECM and CMP sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CMP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between CMP sensor harness connector and ECM harness connector.

CMP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F87	1	F68	65	Existed

cardiagn.com

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between CMP sensor harness connector and ECM harness connector.

CMP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F87	2	F68	75	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK CMP SENSOR

Refer to EC-1325, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace camshaft position sensor.

7. CHECK SPROCKET

Visually check for chipping signal plate gear tooth.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace sprocket.

8. CHECK TIMING BELT

Refer to EM-287, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace timing belt.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

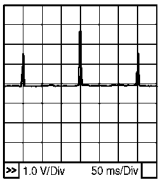
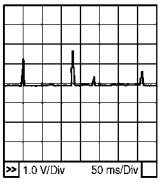
Component Inspection

INFOID:0000000001088003

1. CHECK CMP SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Measure the voltage signal between ECM harness connector and ground under the following conditions.

cardiagn.com

ECM		Condition	Voltage
Connector	Terminal		
F68	75 (CMP sensor signal)	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	0 - 1V ★  MBIB1510E
		[Engine is running] • **Warm-up condition** • Engine speed: 2,000 rpm	0 - 1V ★  MBIB1511E

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace CMP sensor.

cardiagn.com

P0045 TC BOOST CONTROL SOLENOID VALVE

DTC Logic

INFOID:0000000001115054

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0045	TURBOCHARGER BOOST CONTROL SOLENOID VALVE CIRCUIT • CO: Open circuit • CO.0: Open circuit or short circuit to ground • CC.1: Short circuit to +12V	• Harness or connectors (The solenoid valve circuit is open or shorted.) • Turbocharger boost control solenoid valve

NOTE:
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000001088004

1.CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect turbocharger boost control solenoid valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between turbocharger boost control solenoid valve harness connector and ground.

Turbocharger boost control solenoid valve		Ground	Voltage
Connector	Terminal		
E55	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between IPDM E/R and turbocharger boost control solenoid valve
- Harness for open or short between ECM and turbocharger boost control solenoid valve

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between turbocharger boost control solenoid valve harness connector and ECM harness connector.

Turbocharger boost control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E55	1	F68	52	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E7, F121

cardiagn.com

- Harness for open or short between ECM and turbocharger boost control solenoid valve

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE

Refer to EC-1328, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace turbocharger boost control solenoid valve.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001088005

1. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect turbocharger boost control solenoid valve harness connector.
3. Check resistance between turbocharger boost control solenoid valve terminals as follows.

Terminals	Resistance
1 and 2	18.9 - 23.1Ω [at 23°C (73°F)]

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace high pressure supply pump.

cardiagn.com

P0069 TC BOOST SENSOR, BARO SENSOR CORRELATION

DTC Logic

INFOID:0000000001115055

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0069	TURBOCHARGER BOOST SENSOR - BAROMETRIC PRESSURE SENSOR CORRELATION • 1.DEF: Signal outside lower level • 2.DED: Signal outside upper level	• Harness or connectors (Turbocharger boost sensor) • Turbocharger boost sensor • Barometric pressure sensor

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC becomes present after the engine is started.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000953026

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK TUBOCHARGER BOOST SENSOR SUPPLY CIRCUIT

1. Disconnect turbocharger boost sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between turbocharger boost sensor connector and ground.

Turbocharger boost sensor		Ground	Voltage
Connector	Terminal		
F91	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK TUBOCHARGER BOOST SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between turbocharger boost sensor harness connector and ECM harness connector.

Turbocharger boost sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F91	2	F85	43	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK TUBOCHARGER BOOST SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between turbocharger boost sensor harness connector and ECM harness connector.

cardiagn.com

Turbocharger boost sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F91	3	F85	44	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK TUBOCHARGER BOOST SENSOR

Refer to EC-1364, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace turbocharger boost sensor.

6.REPLACE ECM

1. Perform EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".
2. Perform EGR volume control valve closed position learning. Refer to EC-1274, "EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001088007

1.CHECK TURBOCHARGER BOOST SENSOR-I

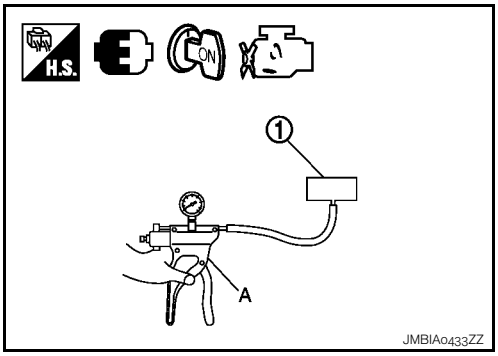
1. Turn ignition switch OFF.
2. Remove turbocharger boost sensor with its harness connected.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-III.
5. Check “BOOST_PRESS” and “ATOMOS_PRESS” indication.

If the value is not very close to “ATOMOS_PRESS”, maximum pressure difference between “ATOMOS_PRESS” and “BOOST_PRESS” with the ignition switch ON (engine stop) = ± 50 mbar?

YES >> GO TO 2.
NO >> Replace turbocharger boost sensor.

2.CHECK TURBOCHARGER BOOST SENSOR-II

1. Use pump to apply turbocharger boost sensor as shown in the figure.
2. Apply a pressure of between 10kPa(0.100 bar, 0.102 kg/cm^2, 1.5 psi) - 13kPa(0.130 bar, 0.133 kg/cm^2, 1.9 psi) [maximum pressure to be applied: 13kPa(0.130 bar, 0.133 kg/cm^2, 1.9 psi)].
3. Select “DATA MONITOR” mode with CONSULT-III.
4. Check “BOOST_PRESS” indication with that given by the vacuum pump.



If there is no discrepancy?

YES >> INSPECTION END
NO >> Replace turbocharger boost sensor.

cardiagn.com

P0087 FUEL PUMP

DTC Logic

INFOID:0000000001115058

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0087	RAIL PRESSURE 1.DEF: Rail pressure too low on starting	• High pressure supply pump • High pressure supply pump (Pressure control valve) • High pressure supply pump (Volumetric control valve) • Fuel injector • Fuel rail pressure sensor • Air mixed with fuel • Lack of fuel • Fuel rail pressure relief valve • Fuel line • Harness or connector

NOTE:

- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC becomes present during the first 30 seconds after the engine starts.
- In low ambient temperature conditions, diagnostic can.t make difference between a normal long engine start and abnormal long engine start. So, DTC must be take in account only if customer complains about too long or impossible engine start not only in cold conditions but also and especially in warm conditions. If customer complains only in cold conditions, root cause of the problem could elsewhere like low battery level, bad fuel specification (too viscous fuel). This DTC could appear after fuel filter too.
- **Special notes:**
  Starting and engine operation difficult or impossible.

Diagnosis Procedure

INFOID:0000000000952676

1.CHECK LOW PRESSURE FUEL SUPPLY SYSTEM

Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

Is the inspection result normal?

OK >> GO TO 2.
NG >> Replace or replace. Then GO TO 7.

2.CHECK INTERNAL FUEL TRANSFER PUMP

Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

Is the inspection result normal?

OK >> GO TO 3.
NG >> Replace or replace. Then GO TO 7.

3.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

Is the inspection result normal?

OK >> GO TO 4.
NG >> Replace or replace. Then GO TO 7.

4.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

Is the inspection result normal?

OK >> GO TO 5.

cardiagn.com

NG >> Replace or replace. Then GO TO 7.

5.CHECK RAIL HIGH PRESSURE REGULATION

Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

Is the inspection result normal?

OK >> GO TO 6.
NG >> Replace or replace. Then GO TO 7.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> INSPECTIO END.
NO >> Repair or replace. Then GO TO 7.

7.CLEAR PRESSURE REGULATION

Perform “PRESS_REG_ADAPTIVE” in WORK SUPPORT mode with CONSULT-III.

>> **INSPECTION END**.

cardiagn.com

P0090 FUEL PUMP

DTC Logic

INFOID:0000000001115060

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0090	HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE) CIRCUIT • CO: Open circuit • CO.0: Short circuit to ground • CC.1: Short circuit to +12V • 1.DEF: Parameter at maximum level	• Harness or connectors [High pressure supply pump (pressure control valve) circuit is open or shorted.] • High pressure supply pump (pressure control valve)

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC becomes present after the engine is started.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000953542

1.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE) POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect high pressure supply pump (pressure control valve) harness connector.
3. Turn ignition switch ON.
4. Check the voltage between high pressure supply pump (pressure control valve) harness connector and ground.

High pressure supply pump (Pressure control valve)		Ground	Voltage
Connector	Terminal		
F107	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- IPDM E/R
- Harness connector E7, F121
- Harness for open or short between IPDM E/R and high pressure supply pump (pressure control valve)
- Harness for open or short between ECM and high pressure supply pump (pressure control valve)

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE) OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between high pressure supply pump (pressure control valve) harness connector and ECM harness connector.

High pressure supply pump (Pressure control valve)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F107	4	F68	49	Existed

cardiagn.com

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE) CHECK

Refer to EC-1334, "Component Inspection".

Is the inspection result normal?

Yes >> GO TO 5.
No >> Replace high pressure supply pump.

5. INSPECTION END

High pressure supply pump (pressure control valve) OK.

>> **INSPECTION END**

Component Inspection

INFOID:0000000001034422

1. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

1. Turn ignition switch OFF.
2. Disconnect high pressure supply pump (pressure control valve) harness connector.
3. Check resistance between high pressure supply pump (pressure control valve) terminals as follows.

Terminals	Resistance
3 and 4	1.5 - 15Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace high pressure supply pump.

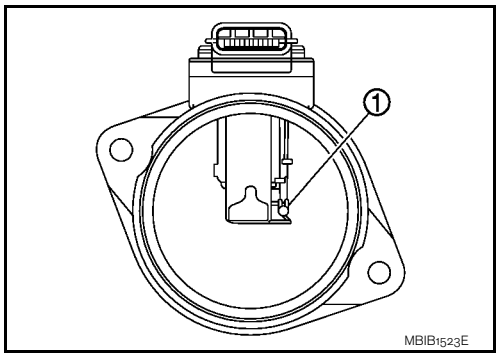
cardiagn.com

P0100 MAF SENSOR

Description

INFOID:0000000001115154

The mass air flow sensor is placed in the stream of intake air.
- Intake air temperature sensor (1)



DTC Logic

INFOID:0000000001115061

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0100	MASS AIR FLOW SENSOR CIRCUIT • CC.0: Short circuit to ground • CO.1: Open circuit or short circuit to +12V	• Harness or connectors (Mass air flow sensor circuit is open or shorted.) • Mass air flow sensor

NOTE:
- **If DTC P0100 is displayed with DTC P0641, first perform trouble diagnosis for DTC P0641. Refer to EC-1393, "DTC Logic".**
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the ignition has been switched on.

Diagnosis Procedure

INFOID:0000000001089002

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK MASS AIR FLOW SENSOR POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between mass air flow sensor harness connector and ground.

Mass air flow sensor		Ground	Voltage
Connector	Terminal		
E15	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between IPDM E/R and mass air flow sensor

cardiagn.com

• Harness for open or short between ECM and mass air flow sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK MASS AIR FLOW SENSOR POWER SUPPLY CIRCUIT-II

Check the voltage between mass air flow sensor harness connector and ground.

Mass air flow sensor		Ground	Voltage
Connector	Terminal		
E15	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
• Harness connector E7, F121
• Harness for open or short between ECM and mass air flow sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MASS AIR FLOW SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between mass air flow sensor harness connector and ECM harness connector.

Mass air flow sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E15	2	F85	30	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
• Harness connector E6, F123
• Harness for open or short between ECM and mass air flow sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR NPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between mass air flow sensor harness connector and ECM harness connector.

Mass air flow sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E15	6	F85	35	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.
• Harness connector E7, F121
• Harness for open or short between ECM and mass air flow sensor

cardiagn.com

>> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK MASS AIR FLOW SENSOR

Refer to EC-1364, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace mass air flow sensor.

11. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089000

1. CHECK MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. Check the voltage between mass air flow sensor harness connector.

Mass air flow sensor			Voltage
Connector	Terminal		
E15	2 (Mass air flow sensor ground)	6 (Mass air flow sensor signal)	0.3 - 0.7V

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace mass air flow sensor.

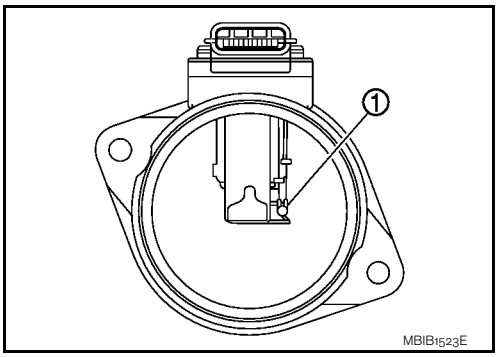
cardiagn.com

P0101 MAF SENSOR

Description

INFOID:0000000001115261

The mass air flow sensor is placed in the stream of intake air.
- Intake air temperature sensor (1)



DTC Logic

INFOID:0000000001115063

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0101	REQUESTED AIR FLOW • 1.DEF: Signal outside lower level • 2.DEF: Signal outside upper level	• Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor • Intake air leaks • Intake air duct obstructed • Air filter obstructed

NOTE:
- **If DTC P0101 is displayed with DTC P0641, first perform trouble diagnosis for DTC P0641. Refer to EC-1393, "DTC Logic".**

Diagnosis Procedure

INFOID:0000000000953547

1.CHECK AIR FILTER

Check that air filter is not obstructed.

Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 2.

2.CHECK INTAKE AIR DUCT

Check that intake air duct is not obstructed.

Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 3.

3.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace ground connection.

4.CHECK MASS AIR FLOW SENSOR POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between mass air flow sensor harness connector and ground.

cardiagn.com

Mass air flow sensor		Ground	Voltage
Connector	Terminal		
E15	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between IPDM E/R and mass air flow sensor
- Harness for open or short between ECM and mass air flow sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MASS AIR FLOW SENSOR POWER SUPPLY CIRCUIT-II

Check the voltage between mass air flow sensor harness connector and ground.

Mass air flow sensor		Ground	Voltage
Connector	Terminal		
E15	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E7, F121
- Harness for open or short between ECM and mass air flow sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between mass air flow sensor harness connector and ECM harness connector.

Mass air flow sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E15	2	F85	30	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E6, F123
- Harness for open or short between ECM and mass air flow sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK MASS AIR FLOW SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between mass air flow sensor harness connector and ECM harness connector.

cardiagn.com

Mass air flow sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E15	6	F85	35	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E7, F121
- Harness for open or short between ECM and mass air flow sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK MASS AIR FLOW SENSOR

Refer to EC-1364, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace mass air flow sensor.

13. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089001

1. CHECK MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. Check the voltage between mass air flow sensor harness connector.

Mass air flow sensor			Voltage
Connector	Terminal		
E15	2 (Mass air flow sensor ground)	6 (Mass air flow sensor signal)	0.3 - 0.7V

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace mass air flow sensor.

cardiagn.com

P0110 IAT SENSOR

Description

INFOID:0000000001089055

The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

DTC Logic

INFOID:0000000001115064

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0110	INTAKE AIR TEMPERATURE SENSOR CIRCUIT • CC.0: Short circuit to ground • CO.1: Open circuit or short circuit to +12V • 1.DEF: Micro-breaks	• Harness or connectors (Intake air temperature sensor circuit is open or shorted.) • Intake air temperature sensor

NOTE:
- **If DTC P0110 is displayed with DTC P0641, first perform trouble diagnosis for DTC P0641. Refer to EC-1393, "DTC Logic".**
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the ignition has been switched on for at least 10 seconds.

Diagnosis Procedure

INFOID:0000000001089004

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT-II

1. Disconnect mass air flow sensor (with intake air temperature sensor) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between mass air flow sensor harness connector and ground.

Mass air flow sensor		Ground	Voltage
Connector	Terminal		
E15	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E6, F123
- Harness for open or short between ECM and mass air flow sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between mass air flow sensor harness connector and ECM harness connector.

cardiagn.com

Mass air flow sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E15	2	F85	30	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E6, F123
- Harness for open or short between ECM and mass air flow sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-1364, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace mass air flow sensor (with intake air temperature sensor).

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089003

1.CHECK INTAKE AIR TEMPERATURE SENSOR

Check resistance between mass air flow sensor terminals 1 and 2 under the following conditions.

Condition	Resistance (Ω)
10°C (50°F)	3,714 ± 161
20°C (68°F)	2,448 ± 95
30°C (86°F)	1,671 ± 58

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace mass air flow sensor (with intake air temperature sensor).

cardiagn.com

P0115 ECT SENSOR

Description

INFOID:0000000001089056

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

DTC Logic

INFOID:0000000001115067

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0115	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT • CC.0: Short circuit to ground • CO.1: Open circuit or short circuit to +12V • 1.DEF: Micro-breaks • 2.DEF: Signal incoherence	• Harness or connectors (Engine coolant temperature sensor circuit is open or shorted.) • Engine coolant temperature sensor

NOTE:

- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the ignition has been switched on for at least 10 seconds.
- **If the DTC is present:**

- Cooling fan motor is always operate.
- Air conditioner is not operate.

Diagnosis Procedure

INFOID:0000000001089006

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ENGINE COOLANT TEMPERATURE SENSOR SUPPLY CIRCUIT

1. Disconnect engine coolant temperature sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between engine coolant temperature sensor connector and ground.

Engine coolant temperature sensor		Ground	Voltage
Connector	Terminal		
F79	3	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK ENGINE COOLANT TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between engine coolant temperature sensor harness connector and ECM harness connector.

Engine coolant temperature sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F79	2	F85	33	Existed

cardiagn.com

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-1344, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace engine coolant temperature sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089007

1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check resistance between engine coolant temperature sensor terminals 2 and 3 under the following conditions.

Terminal	Condition	Resistance (Ω)
2 and 3	25°C (77°F)	2,252 ± 112.16
	50°C (112°F)	810 ± 39
	80°C (176°F)	283 ± 8

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace Engine coolant temperature sensor.

cardiagn.com

P0120 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:0000000000970739

By default the valve is open when in the rest position and is actuated only when the engine is stopped; this has a damping effect and helps to stop the engine.

DTC Logic

INFOID:0000000001115068

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0120	ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT • CC.0: Short circuit to ground • CC.1: Short circuit to +12V • CO: Open circuit	• Harness or connectors (Electric throttle control actuator circuit is open or shorted.) • Throttle position sensor • Throttle control motor

NOTE:
- The electric throttle control actuator function is no longer ensured when the engine is stopped or the valve is closed, then the engine stalls or starting is impossible.

Diagnosis Procedure

INFOID:0000000000970741

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Turn ignition switch ON.
4. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F81	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- IPDM E/R
- Harness connector E7, F121
- Harness for open or short between IPDM E/R and electric throttle control actuator
- Harness for open or short between ECM and electric throttle control actuator

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

cardiagn.com

3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F81	5	F68	72	Existed
	2		94	
	4		90	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace electric throttle control actuator.
NO >> Repair or replace.

cardiagn.com

P0180 FPT SENSOR

Description

INFOID:0000000000955026

Fuel pump temperature sensor is built in the fuel pump. The sensor detects the fuel temperature in the fuel pump and calibrates the fuel injection amount change by fuel temperature.

DTC Logic

INFOID:0000000001115069

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0180	FUEL PUMP TEMPERATURE SENSOR CIRCUIT • CC.0: Short circuit to ground • CO.1: Open circuit or short circuit to +12V • 1.DEF: Micro-breaks • 2.DEF: Signal incoherence	• Harness or connectors (Fuel pump temperature sensor circuit is open or shorted.) • Fuel pump temperature sensor

NOTE:

- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the ignition has been switched on for at least 10 seconds.

Diagnosis Procedure

INFOID:0000000001089060

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK FUEL PUMP TEMPERATURE SENSOR SUPPLY CIRCUIT

1. Disconnect fuel pump temperature sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between fuel pump temperature sensor connector and ground.

Fuel pump temperature sensor		Ground	Voltage
Connector	Terminal		
F100	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK FUEL PUMP TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between fuel pump temperature sensor harness connector and ECM harness connector.

Fuel pump temperature sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F100	2	F85	29	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

cardiagn.com

4.CHECK FUEL PUMP TEMPERATURE SENSOR

Refer to EC-1348, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace fuel pump temperature sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089061

1.CHECK FUEL PUMP TEMPERATURE SENSOR

Check resistance between fuel pump temperature sensor terminals 1 and 2 under the following conditions.

Condition	Resistance (Ω)
25°C (77°F)	2,051 ± 123
50°C (112°F)	811 ± 47
80°C (176°F)	309 ± 17

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace Engine coolant temperature sensor.

cardiagn.com

P0190 FRP SENSOR

Description

INFOID:0000000001089064

The fuel rail pressure (FRP) sensor is placed to the fuel rail. It measures the fuel pressure in the fuel rail. The sensor sends voltage signal to the ECM. As the pressure increases, the voltage rises.The ECM controls the fuel pressure in the fuel rail. The ECM uses the signal from fuel rail pressure sensor as a feedback signal.

DTC Logic

INFOID:0000000001115070

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0190	FUEL RAIL PRESSURE SENSOR CIRCUIT • CO.0: Short circuit to ground • CO.1: Open circuit or short circuit to +12V • 1.DEF: malfunctioning sensor • 2.DEF: Signal outside upper level • 3.DEF: Micro-breaks	• Harness or connectors (Fuel rail pressure sensor circuit is open or shorted.) • Fuel rail pressure sensor

NOTE:

- **If DTC P0190 is displayed with DTC P0641, first perform trouble diagnosis for DTC P0641. Refer to EC-1393, "DTC Logic".**
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
- The DTC is declared present after the ignition is switched on when the engine is running outside idle speed.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000001089062

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK FUEL RAIL PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect fuel rail pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between fuel rail pressure sensor connector and ground.

Fuel rail pressure sensor		Ground	Voltage
Connector	Terminal		
F102	3	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK FUEL RAIL PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between fuel rail pressure sensor harness connector and ECM harness connector.

Fuel rail pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F102	2	F85	15	Existed

cardiagn.com

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK FUEL RAIL PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between fuel rail pressure sensor harness connector and ECM harness connector.

Fuel rail pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F102	1	F85	19	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-1350, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace fuel rail pressure sensor.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001041202

1.CHECK FUEL RAIL PRESSURE SENSOR

1. Turn ignition switch OFF and wait at least 1 minutes.
2. Reconnect harness connector disconnected.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-III.
5. Check that the “RAIL PRESSURE” indication.

If the value is lower than 30 bar?

YES >> **INSPECTION END**.
NO >> Replace fuel rail pressure sensor.

cardiagn.com

P0200 FUEL INJECTOR

DTC Logic

INFOID:0000000001115071

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0200	FUEL INJECTOR CONTROL • 1.DEF: Voltage outside permitted range of values • 2.DEF: Configuration/ Initialisation • 3.DEF: Signal incoherence	• Harness or connectors (The fuel injector circuit is open or shorted.) • Fuel injector

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the engine has been started.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000954969

1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector harness connector.
4. Check the continuity between fuel injector harness connector and ECM harness connector.

Fuel injector			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F70	1	F85	8	Existed
2	F71	1	F85	7	
3	F72	1	F85	6	
4	F73	1	F85	5	

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK FUEL INJECTOR OUTPUT CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between fuel injector harness connector and ECM harness connector.

Fuel injector			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F70	2	F85	4	Existed
2	F71	2	F85	3	
3	F72	2	F85	2	
4	F73	2	F85	1	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK FUEL INJECTOR

Refer to EC-1352, "Component Inspection".

Is the inspection result normal?

cardiagn.com

YES >> GO TO 4.
NO >> Replace engine coolant temperature sensor.

4.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001041774

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check resistance between fuel injector terminals as follows.

Terminals	Resistance
1 and 2	150 - 250Ω [at 20°C (68°F)]

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace malfunctioning fuel injector.

cardiagn.com

P0201, P0202, P0203, P0204 FUEL INJECTOR

DTC Logic

INFOID:0000000001115072

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0201	NO. 1 CYLINDER FUEL INJECTOR CIRCUIT • CO: Open circuit • CC: Short circuit • 1.DEF: Line in open circuit • 2.DEF: Open circuit or internal electronic malfunction	• Harness or connectors (The fuel injector circuit is open or shorted.) • Fuel injector
P0202	NO. 2 CYLINDER FUEL INJECTOR CIRCUIT • CO: Open circuit • CC: Short circuit • 1.DEF: Line in open circuit • 2.DEF: Open circuit or internal electronic malfunction	
P0203	NO. 3 CYLINDER FUEL INJECTOR CIRCUIT • CO: Open circuit • CC: Short circuit • 1.DEF: Line in open circuit • 2.DEF: Open circuit or internal electronic malfunction	
P0204	NO. 4 CYLINDER FUEL INJECTOR CIRCUIT • CO: Open circuit • CC: Short circuit • 1.DEF: Line in open circuit • 2.DEF: Open circuit or internal electronic malfunction	

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the engine has been started.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**
- **Malfunction indicator (Yellow) lights up.**

Diagnosis Procedure

INFOID:0000000001089320

1.CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector harness connector.
4. Check the continuity between fuel injector harness connector and ECM harness connector.

Fuel injector			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F70	1	F85	8	Existed
2	F71	1	F85	7	
3	F72	1	F85	6	
4	F73	1	F85	5	

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2.CHECK FUEL INJECTOR OUTPUT CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between fuel injector harness connector and ECM harness connector.

cardiagn.com

Fuel injector			ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F70	2	F85	4	Existed
2	F71	2	F85	3	
3	F72	2	F85	2	
4	F73	2	F85	1	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK FUEL INJECTOR

Refer to EC-1354, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace engine coolant temperature sensor.

4.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089321

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check resistance between fuel injector terminals as follows.

Terminals	Resistance
1 and 2	150 - 250Ω [at 20°C (68°F)]

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace malfunctioning fuel injector.

cardiagn.com

P0217 ENGINE OVER TEMPERATURE

DTC Logic

INFOID:0000000001102011

DTC DETECTION LOGIC

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.
When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	Possible cause
P0217	Engine over temperature (Overheat)	• Harness or connectors (The cooling fan circuit is open or shorted.) • IPDM E/R (Cooling fan relay-1) • Cooling fan relay-3 • Cooling fan motor • Radiator hose • Radiator • Radiator cap • Water pump • Thermostat

Diagnosis Procedure

INFOID:0000000001102013

1.CHECK COOLING FAN LOW SPEED FUNCTION

1. Start engine and let it idle.
2. Turn air conditioner switch and blower fan switch ON.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refer to EC-1422, "Diagnosis Procedure".

2.CHECK COOLING FAN HIGH SPEED FUNCTION

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refer to EC-1422, "Diagnosis Procedure".

3.CHECK COOLING SYSTEM FOR LEAK-I

Check cooling system for leak. Refer to CO-52, "Inspection".

Is leakage detected?

YES >> GO TO 4.
NO >> GO TO 5.

4.CHECK COOLING SYSTEM FOR LEAK-II

Check the following for leak. Refer to CO-52, "Inspection".
- Hose
- Radiator
- Water pump

>> Repair or replace malfunctioning part.

5.CHECK RADIATOR CAP

cardiagn.com

Check radiator cap. Refer to CO-55, "RADIATOR CAP : Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace radiator cap.

6.CHECK THERMOSTAT

Check thermostat. Refer to CO-62, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace thermostat.

7.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-1344, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace engine coolant temperature sensor.

8.CHECK MAIN 12 CAUSES

If the cause cannot be isolated, check the following.

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	• Blocked radiator • Blocked condenser • Blocked radiator grille • Blocked bumper	• Visual	No blocking	—
	2	• Coolant mixture	• Coolant tester	50 - 50% coolant mixture	MA-21, "SAE Viscosity Number"
	3	• Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-52, "Inspection"
	4	• Radiator cap	• Pressure tester	CO-55, "RADIATOR CAP : Inspection"	CO-55, "RADIATOR CAP : Inspection"
ON*2	5	• Coolant leaks	• Visual	No leaks	CO-52, "Inspection"
ON*2	6	• Thermostat	• Touch the upper and lower radiator hoses	Both hoses should be hot	CO-62, "Exploded View"
ON*1	7	• Cooling fan motor	• IPDM E/R (auto active test)	Operating	EC-1424, "Component Inspection (Cooling Fan Motor)"
OFF	8	• Combustion gas leak	• Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	• Coolant temperature gauge	• Visual	Gauge less than 3/4 when driving	—
		• Coolant overflow to reservoir tank	• Visual	No overflow during driving and idling	CO-52, "Inspection"
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	CO-52, "Inspection"
OFF	11	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	EM-296, "Inspection"
	12	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	—

*1: Engine running at idle speed.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to CO-48, "Troubleshooting Chart".

cardiagn.com

>> INSPECTION END

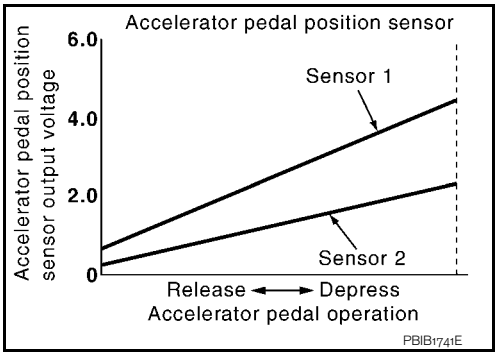
cardiagn.com

P0225 APP SENSOR

Description

INFOID:0000000001090480

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



DTC Logic

INFOID:0000000001115074

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0225	ACCELERATOR PEDAL POSITION SENSOR 1 AND ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT • CC.1: Short circuit to +12V • 1.DEF: Signal incoherence • 2.DEF: No signal • CO.0: Open circuit or short circuit to ground	• Harness or connectors (APP sensor 1 and 2 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 1 and 2.)

NOTE:
- **If DTC P0225 is displayed with DTC P0641, first perform trouble diagnosis for DTC P0641. Refer to EC-1393, "DTC Logic".**
- **If DTC P0225 is displayed with DTC P0651, first perform trouble diagnosis for DTC P0651. Refer to EC-1395, "DTC Logic".**
- **If DTC P2120 is present at the same time, check that the APP sensor connector is connected correctly.**
- Conditions for applying the diagnostic procedure to the stored DTCs:
- The DTC is declared present after a series of full load/no load action on the accelerator.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000955712

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between accelerator pedal position sensor connector and ground.

Accelerator pedal position sensor			Ground	Voltage
Sensor	Connector	Terminal		
1	E110	4	Ground	Approx. 5V
2		5		

cardiagn.com

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

Accelerator pedal position sensor			ECM		Continuity
Sensor	Connector	Terminal	Connector	Terminal	
1	E110	2	E60	127	Existed
2		1		120	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

Accelerator pedal position sensor			ECM		Continuity
Sensor	Connector	Terminal	Connector	Terminal	
1	E110	3	E60	126	Existed
2		6		119	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to EC-1359, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace accelerator pedal position sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001089326

1. CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Turn ignition switch OFF.
2. Disconnect accelerator pedal position sensor harness connector.
3. Check resistance between accelerator pedal position sensor as follows.

Sensor	Terminals	Resistance
1	2 and 4	1.7 ± 0.9 KΩ
2	1 and 5	2.85 ± 2.05 KΩ

cardiagn.com

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace accelerator pedal position sensor.

cardiagn.com

P0235 TC BOOST SENSOR

Description

INFOID:0000000001090439

The turbocharger boost sensor detects pressure in the exit side of the charge air cooler. The sensor output voltage to the ECM increases as pressure increases.

DTC Logic

INFOID:0000000001115075

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0235	• CC.1: short circuit to +12V • CO.0: Open circuit or Short circuit to ground • 1.DEF: Micro-breaks • 2.DEF: Signal outside lower level • 3.DEF: Signal outside upper level	• Harness or connectors (Turbocharger boost sensor) • Turbocharger boost sensor

NOTE:
- **If DTC P0235 is displayed with DTC P0651, first perform trouble diagnosis for DTC P0651. Refer to EC-1395, "DTC Logic".**
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the ignition has been switched on for 1 second, with a warm engine when the vehicle is stationary.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000001089850

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK TUBOCHARGER BOOST SENSOR SUPPLY CIRCUIT

1. Disconnect turbocharger boost sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between turbocharger boost sensor connector and ground.

Turbocharger boost sensor		Ground	Voltage
Connector	Terminal		
F91	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK TUBOCHARGER BOOST SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between turbocharger boost sensor harness connector and ECM harness connector.

Turbocharger boost sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F91	2	F85	43	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

cardiagn.com

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK TUBOCHARGER BOOST SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between turbocharger boost sensor harness connector and ECM harness connector.

Turbocharger boost sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F91	3	F85	44	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK TUBOCHARGER BOOST SENSOR

Refer to EC-1364, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace turbocharger boost sensor.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000001090195

1.CHECK TURBOCHARGER BOOST SENSOR-I

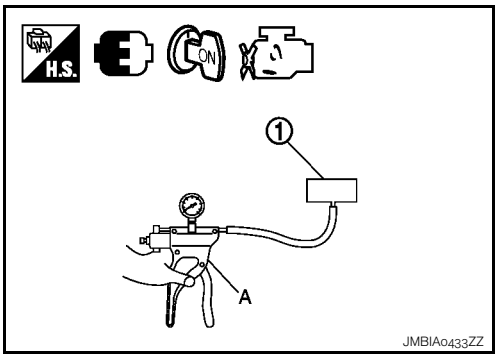
1. Turn ignition switch OFF.
2. Remove turbocharger boost sensor with its harness connected.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-III.
5. Check “BOOST_PRESS” and “ATOMOS_PRESS” indication.

If the value is not very close to “ATOMOS_PRESS”, maximum pressure difference between “ATOMOS_PRESS” and “BOOST_PRESS” with the ignition switch ON (engine stop) = ± 50 mbar?

YES >> GO TO 2.
NO >> Replace turbocharger boost sensor.

2.CHECK TURBOCHARGER BOOST SENSOR-II

1. Use pump to apply turbocharger boost sensor as shown in the figure.
2. Apply a pressure of between 10kPa(0.100 bar, 0.102 kg/cm^2, 1.5 psi) - 13kPa(0.130 bar, 0.133 kg/cm^2, 1.9 psi) [maximum pressure to be applied: 13kPa(0.130 bar, 0.133 kg/cm^2, 1.9 psi)].
3. Select “DATA MONITOR” mode with CONSULT-III.
4. Check “BOOST_PRESS” indication with that given by the vacuum pump.



If there is no discrepancy?

YES >> INSPECTION END
NO >> Replace turbocharger boost sensor.

cardiagn.com

P0335 CKP SENSOR

DTC Logic

INFOID:0000000001115076

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT • 1.DEF: Signal incoherence • 2.DEF: No signal • 3.DEF: Signal out side level • 4.DEF: Value out side level • 5.DEF: Configuration/ initialisation	• Harness or connectors (The sensor circuit is open or shorted.) • Crankshaft position sensor • Signal plate

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present with the engine cranking or idling.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000955831

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK CKP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect crankshaft position (CKP) sensor (1) harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between CKP sensor harness connector and ECM harness connector.

CKP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F89	2	F68	88	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK CKP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between CKP sensor harness connector and ECM harness connector.

CKP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F89	1	F68	84	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CKP SENSOR

Refer to EC-1364, "Component Inspection".

cardiagn.com

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace crankshaft position sensor.

5.CHECK GEAR TOOTH

Visually check for chipping flywheel gear tooth.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace signal plate.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000000955832

1.CHECK CKP SENSOR

1. Turn ignition switch OFF.
2. Disconnect CKP sensor harness connector.
3. Check resistance between CKP sensor terminals as follows.

Terminals	Resistance
1 and 2	612 - 748Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace CKP sensor.

cardiagn.com

P0340 CMP SENSOR

DTC Logic

INFOID:0000000001115077

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0340	CAMSHAFT POSITION SENSOR CIRCUIT • 1.DEF: Signal incoherence • 2.DEF: No signal • 3.DEF: Value out side level • 4.DEF: Configuration/ initialisation	• Harness or connectors (The sensor circuit is open or shorted.) • Camshaft position sensor • Timing belt • Signal plate

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the engine is started or following a load test.
- **Special note:**
  Longer starting time, requires several attempts to start the vehicle.

Diagnosis Procedure

INFOID:0000000000955836

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK CMP SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect camshaft position (CMP) sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between CMP sensor harness connector and ground.

CMP sensor		Ground	Voltage
Connector	Terminal		
F87	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E7, F121
- Harness for open or short between ECM and CMP sensor
- Harness for open or short between IPDM E/R and CMP sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CMP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between CMP sensor harness connector and ECM harness connector.

cardiagn.com

CMP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F87	1	F68	65	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK CMP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between CMP sensor harness connector and ECM harness connector.

CMP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F87	2	F68	75	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK CMP SENSOR

Refer to EC-1364, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace camshaft position sensor.

7.CHECK SPROCKET

Visually check for chipping signal plate gear tooth.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace sprocket.

8.CHECK TIMING BELT

Refer to EM-287, "Exploded View".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace timing belt.

9.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

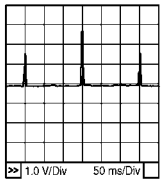
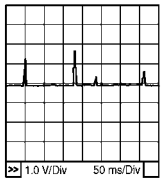
Component Inspection

INFOID:0000000000955837

1.CHECK CMP SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Measure the voltage signal between ECM harness connector and ground under the following conditions.

cardiagn.com

ECM		Condition	Voltage
Connector	Terminal		
F68	75 (CMP sensor signal)	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	0 - 1V ★  MBIB1510E
		[Engine is running] • **Warm-up condition** • Engine speed: 2,000 rpm	0 - 1V ★  MBIB1511E

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace CMP sensor.

cardiagn.com

P0380 GLOW RELAY

DTC Logic

INFOID:0000000001115078

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0380	GLOW PLUG DIAGNOSTIC CONNECTION • CO: Open circuit • CC.0: Short circuit to ground • CC.1: Short circuit to +12V	• Harness or connectors (The glow relay circuit is open or shorted.) • Glow relay

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after attempts have been made to start the engine.
- **Special notes:**
  If the DTC is present, it will be difficult to start the vehicle, or even impossible when cold, or preheating will be continuous and the heater plugs will deteriorate.

Diagnosis Procedure

INFOID:0000000000956057

1.CHECK GLOW RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect glow relay harness connector.
3. Turn ignition switch ON.
4. Check the voltage between glow relay connector and ground.

Glow relay		Ground	Voltage
Connector	Terminal		
F94	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- 80A fusible link (letter N)
- Harness for open and short between glow relay and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK GLOW RELAY INPUT CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between glow relay harness connector and ECM harness connector.

Glow relay		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F94	3	F68	80	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK GLOW RELAY INPUT CIRCUIT FOR OPEN AND SHORT-II

1. Check the continuity between glow relay harness connector and ECM harness connector.

cardiagn.com

Glow relay		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F94	8	F68	76	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace glow relay.
NO >> Repair or replace.

cardiagn.com

P0381 GLOW CONTROL SYSTEM

DTC Logic

INFOID:0000000001115079

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0381	GLOW CONTROL UNIT CIRCUIT • CC.0: Short circuit to ground • CO.1: Open circuit or short circuit to +12V	• Harness or connectors (The glow relay circuit is open or shorted.) • Glow relay • Glow plug

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after several attempts have been made to start the engine.
- **Special notes:**
  If the DTC is present, it will be difficult to start the vehicle, or even impossible when cold, or preheating will be continuous and the heater plugs will deteriorate.

Diagnosis Procedure

INFOID:0000000001091154

1.CHECK GLOW RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect glow relay harness connector.
3. Turn ignition switch ON.
4. Check the voltage between glow relay connector and ground.

Glow relay		Ground	Voltage
Connector	Terminal		
F94	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- 80A fusible link (letter N)
- Harness for open and short between glow relay and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK GLOW RELAY INPUT CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between glow relay harness connector and ECM harness connector.

Glow relay		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F94	3	F68	80	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK GLOW RELAY INPUT CIRCUIT FOR OPEN AND SHORT-II

1. Check the continuity between glow relay harness connector and ECM harness connector.

cardiagn.com

Glow relay		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F94	8	F68	76	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK GLOW RELAY OUTPUT CIRCUIT FOR OPEN AND SHORT

1. Disconnect glow plug harness connector.
2. Check the continuity between glow plug harness connector and ECM harness connector.

Glow relay			Glow plug		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	
1	F94	2	F95	1	Existed
2		7	F96	1	
3		1	F97	1	
4		6	F98	1	

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK GLOW PLUG

Refer to EC-1371, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace malfunctioning glow plug.

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace glow relay.
NO >> Repair or replace.

Component Inspection

INFOID:0000000001091182

1.CHECK GLOW PLUG

1. Turn ignition switch OFF.
2. Disconnect glow plug harness connector.
3. Check resistance between glow plug terminals as follows.

Terminal	Resistance
1 and engine ground	Not less than 2Ω [at 20°C (68°F)]

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace malfunctioning glow plug.

cardiagn.com

P0409 EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR

DTC Logic

INFOID:0000000001115080

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible Cause
P0409	EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR CIRCUIT • CO.0: Open circuit or short circuit to ground • CC.1: Short circuit to +12V	• Harness or connectors (The EGR volume control valve control position sensor circuit is open or shorted.) • EGR volume control valve control position sensor

NOTE:
- **If DTC P0409 is displayed with DTC P0651, first perform trouble diagnosis for DTC P0651. Refer to EC-1395, "DTC Logic".**
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the engine started.
- **If the DTC is present:**
- **Malfunction indicator (Yellow) lights up.**

Diagnosis Procedure

INFOID:0000000000956107

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect EGR volume control valve harness connector.
2. Turn ignition switch ON.
3. Check the voltage between EGR volume control valve control position sensor connector and ground.

EGR volume control valve control position sensor		Ground	Voltage
Connector	Terminal		
F99	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between EGR volume control valve control position sensor harness connector and ECM harness connector.

EGR volume control valve control position sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F99	3	F85	82	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

cardiagn.com

4.CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR INPUT CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between EGR volume control valve control position sensor harness connector and ECM harness connector.

EGR volume control valve control position sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F99	5	F85	86	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.REPLACE EGR VOLUME CONTROL VALVE

1. Replace the EGR volume control valve.
2. Perform EC-1274, "EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> **INSPECTIO END**

cardiagn.com

P0487 EGR VOLUME CONTROL VALVE

DTC Logic

INFOID:0000000001115081

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0487	EGR VOLUME CONTROL VALVE CIRCUIT • CO: Open circuit • CC.0: Short circuit to ground • CC.1: Short circuit to +12V • 1.DEF: Values outside the level • CC: Short circuit	• Harness or connectors (The EGR volume control valve control motor circuit is open or shorted.) • EGR volume control motor valve

NOTE:

- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present with the engine idle speed.

Diagnosis Procedure

INFOID:0000000000956112

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK EGR VOLUME CONTROL VALVE CONTROL MOTOR CIRCUIT

1. Disconnect EGR volume control valve harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals.

EGR volume control valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F99	2	F68	95	Existed
			96	Not existed
	6		95	Not existed
			96	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK EGR VOLUME CONTROL VALVE

Refer to EC-1375, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.REPLACE EGR VOLUME CONTROL VALVE

1. Replace the EGR volume control valve.
2. Perform EC-1274, "EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> **INSPECTIO END**

cardiagn.com

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

INFOID:0000000000956113

1.CHECK EGR VOLUME CONTROL VALVE CONTROL MOTOR

1. Turn ignition switch OFF.
2. Disconnect EGR volume control valve harness connector.
3. Check resistance between EGR volume control valve terminals as follows.

Terminals	Resistance
2 and 6	2.3 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace EGR volume control valve.

cardiagn.com

P0488 EGR SYSTEM

DTC Logic

INFOID:0000000001115082

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0488	EGR VOLUME CONTROL • 1.DEF: Signal incoherence • 2.DEF: Signal outside lower level • 3.DEF: Signal outside upper level • 4.DEF: Valve outside level • 5.DEF: Defective sensor	• Harness or connectors (The EGR volume control valve circuit is open or shorted.) (The EGR volume control valve control position sensor circuit is open or shorted.) • EGR volume control valve • EGR volume control valve control position sensor • Incorrect EGR volume control valve installation • EGR volume control valve stuck closed • EGR passage clogged

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the engine is started.
- **Special notes:**
- Engine instability, possibly even stalling.
- Difficult to start engine or even impossible when cold.
- Loss of performance.
- Possible smoke emissions.
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000956116

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK EGR VOLUME CONTROL VALVE INSTALLATION

Check that EGR volume control valve is installed properly.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Install EGR volume control valve properly.

3.CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect EGR volume control valve harness connector.
2. Turn ignition switch ON.
3. Check the voltage between EGR volume control valve control position sensor connector and ground.

GR volume control valve control position sensor		Ground	Voltage
Connector	Terminal		
F99	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR GROUND CIRCUIT FOR

cardiagn.com

OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between EGR volume control valve control position sensor harness connector and ECM harness connector.

EGR volume control valve control position sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F99	3	F85	82	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR INPUT CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between EGR volume control valve control position sensor harness connector and ECM harness connector.

EGR volume control valve control position sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F99	5	F85	86	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK EGR VOLUME CONTROL VALVE CONTROL MOTOR CIRCUIT

1. Check harness continuity between the following terminals.

EGR volume control valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F99	2	F68	95	Existed
			96	Not existed
	6		95	Not existed
			96	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK EGR VOLUME CONTROL VALVE VISUALLY

1. Remove the EGR volume control valve
2. Check if foreign matter is caught between the EGR volume control valve and the housing.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Remove the foreign matter and clean the EGR volume control valve.

8.CHECK EGR PASSAGE

Check the following for clogging and cracks.
- EGR tube

cardiagn.com

- EGR hose
- EGR cooler

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace EGR passage.

9.CHECK EGR VOLUME CONTROL VALVE

Refer to EC-1378, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 11.

10.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace.

11.REPLACE EGR VOLUME CONTROL VALVE

1. Replace the EGR volume control valve.
2. Perform EC-1274, "EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> **INSPECTIO END**

Component Inspection

INFOID:0000000001091544

1.CHECK EGR VOLUME CONTROL VALVE CONTROL MOTOR

1. Turn ignition switch OFF.
2. Disconnect EGR volume control valve harness connector.
3. Check resistance between EGR volume control valve terminals as follows.

Terminals	Resistance
2 and 6	2.3 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace EGR volume control valve.

cardiagn.com

P0500 VSS

Description

INFOID:0000000000956135

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

DTC Logic

INFOID:0000000001115083

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0500	VEHICLE SPEED SIGNAL • 1.DEF: Value outside level	• Harness or connectors (The CAN communication line is open or shorted) • Harness or connectors (The vehicle speed signal circuit is open or shorted) • Wheel sensor • Combination meter • ABS actuator and electric unit (control unit)

Diagnosis Procedure

INFOID:0000000000956137

1.CHECK CAN COMMUNICATION LINE

Refer to LAN-59, "CAN Communication Signal Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace

2.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to BRC-17, "CONSULT-III Function (ABS)" (with out ESP) or BRC-96, "CONSULT-III Function (ABS)" (with ESP).

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK COMBINATION METER

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

>> **INSPECTION END**

cardiagn.com

P0530 REFRIGERANT PRESSURE SENSOR

Description

INFOID:0000000001115155

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

DTC Logic

INFOID:0000000001115084

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0530	REFRIGERANT PRESSURE SENSOR CIRCUIT • CO.0: Short circuit to +12V or open circuit • CC.1: Short circuit to ground	• Harness or connectors (Refrigerant pressure sensor circuit is open or shorted.) • Refrigerant pressure sensor

NOTE:

- **If DTC P0530 is displayed with DTC P0641, first perform the trouble diagnosis for DTC P0641 Refer to EC-1393, "DTC Logic".**

Diagnosis Procedure

INFOID:0000000000956142

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between refrigerant pressure sensor connector and ground.

Refrigerant pressure sensor		Ground	Voltage
Connector	Terminal		
E50	3	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- Harness connector E6, F123
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

cardiagn.com

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E50	1	F68	74	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E6, F123
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E50	2	F68	78	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E6, F123
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor.
NO >> Repair or replace.

cardiagn.com

P0560 BATTERY VOLTAGE

DTC Logic

INFOID:0000000001115085

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0560	BATTERY VOLTAGE • 1.DEF: Signal outside lower level • 2.DEF: Signal outside upper level	• Harness connectors (ECM power supply circuit is open or shorted.) • Battery • Battery terminal • Alternator • IPDM E/R

NOTE:

- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present when the engine is running.

Diagnosis Procedure

INFOID:0000000000956409

1.CHECK BATTERY VOLTAGE

1. Turn ignition switch ON.
2. Check battery voltage.

Voltage: Above 11V

Is the inspection result normal?

YES >> GO TO 2.
NO >> Recharge the battery.

2.CHECK BATTERY TERMINALS

1. Turn ignition switch OFF.
2. Check battery terminals condition.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the battery terminals.

3.CHECK BATTERY AND ALTERNATOR

Check that the proper type of battery and type of alternator are installed.
Refer to, STR-8, "System Diagram" and CHG-8, "System Diagram".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace with a proper one.

4.CHECK ECM POWER SUPPLY CIRCUIT-I

Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F68	60	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 7.

5.CHECK ECM POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.

cardiagn.com

3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E68	53	E11	9	Existed
	54			

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors E7, E121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F68	60	E11	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short power in harness or connectors.

8. CHECK 20A FUSE

1. Disconnect 20A fuse (No. 52) from IPDM E/R.
2. Check 20A fuse.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace 20A fuse.

9. CHECK GROUND CONNECTION

Check ground connection E9. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace ground connection.

10. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
E60	123	Ground	Existed
	124		
	125		
	128		

cardiagn.com

2. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair open circuit or short power in harness or connectors.

11. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace.

cardiagn.com

P0571 ASCD BRAKE SWITCH

DTC Logic

INFOID:0000000001115094

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0571	ASCD BRAKE SWITCH CIRCUIT • 1.DEF: Values outside the levels • 2.DEF: Signal incoherence • 3.DEF: Signal outside upper level	• Harness or connectors (Stop lamp switch circuit is open or shorted) (The CAN communication line is open or shorted) • Stop lamp switch • BCM

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after a series of actions on the brake pedal.

Diagnosis Procedure

INFOID:0000000000967569

1.CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E60	116 (ASCD brake switch)	Ground	Brake pedal	Fully released	0V
				Slightly depressed	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch (with ASCD brake switch) harness connector.
3. Turn ignition switch ON.
4. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E115	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E105, M77
- 10A fuse (No. 4)
- Harness for open or short between fuse and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

cardiagn.com

3. Check the continuity between stop lamp switch harness connector and ECM harness connector.

Stop lamp switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E115	3	E60	116	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK ASCD BRAKE SWITCH

Refer to EC-1321, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace stop lamp switch.

6.CHECK BCM

Refer to EC-1321, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace

7.CHECK CAN COMMUNICATION LINE

Refer to EC-1321, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000000967570

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2 (Stop lamp switch)	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed
3 and 4 (ASCD brake switch)	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-8, "Inspection and Adjustment" (LHD models) or BR-52, "Inspection and Adjustment" (RHD models).
2. Check the continuity between stop lamp switch terminals under the following conditions.

cardiagn.com

Terminals	Condition		Continuity
1 and 2 (Stop lamp switch)	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed
3 and 4 (ASCD brake switch)	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

cardiagn.com

P0575 ASCD STEERING SWITCH

Description

INFOID:0000000001109187

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.

DTC Logic

INFOID:0000000001115095

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0575	CRUISE CONTROL/SPEED LIMITER FUNCTION • 1.DEF: Values outside the levels • CC.1: Short circuit to +12V • 2.DEF: Signal outside upper level	• Harness or connectors (ASCD steering switch circuit is open or shorted) • ASCD steering switch • Combination switch

NOTE:
- **Special note:**
  If the DTC is present, the cruise control/speed limiter function will be inhibited.

Diagnosis Procedure

INFOID:0000000000967575

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ASCD STEERING SWITCH CIRCUIT

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
E60	110 (ASCD steering switch signal)	Ground	MAIN switch: Pressed	Approx. 0V
			CANSEL switch: Pressed	Approx. 1V
			SET/COAST switch: Pressed	Approx. 2V
			RESUME/ACCELERATE switch: Pressed	Approx. 3V
			All ASCD steering switches: Released	Approx. 4V

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK ASCD STEERING SWITCH CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination switch harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between combination switch harness connector and ECM harness connector.

Combination switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
M352	15	E60	111	Existed

5. Also check harness for short to ground and short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING PART

- Combination switch (spiral cable)
- Harness for open or short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between combination switch harness connector and ECM harness connector.

Combination switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
M352	14	E60	110	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

- Combination switch (spiral cable)
- Harness for open or short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD STEERING SWITCH

Refer to EC-1350, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace ASCD steering switch.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001098400

1. CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector M352.
2. Check the continuity between combination switch harness connector terminals under following conditions.

Combination meter		Condition	Resistance
Connector	Terminals		
M352	14 and 15 (Combination switch)	MAIN switch: Pressed	Approx. 0 Ω
		CANCEL switch: Pressed	Approx. 250 Ω
		SET/COAST switch: Pressed	Approx. 660 Ω
		RESUME/ACCELERATE switch: Pressed	Approx. 1,480 Ω
		All ASCD steering switches: Released	Approx. 4,000 Ω

Is the inspection result normal?

YES >> INSPECTION END

cardiagn.com

NO >> Replace ASCD steering switch

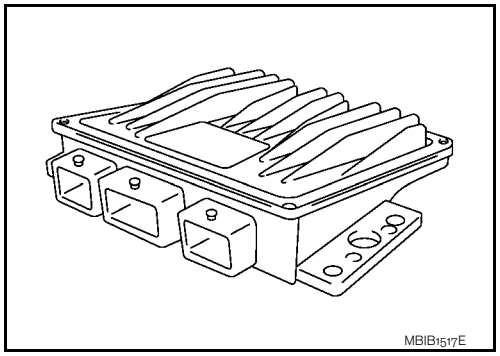
cardiagn.com

P0606 ECM

Description

INFOID:0000000000967577

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



DTC Logic

INFOID:0000000001115096

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0606	ECM • 1.DEF to 20.DEF: Internal electric malfunction	• ECM

NOTE:
- **If DTC P0606 is displayed with other DTC, first perform the trouble diagnosis for other DTC.**
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after an attempted start, or with the engine running.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**
- **Malfunction indicator (Yellow) lights up.**

Diagnosis Procedure

INFOID:0000000000967579

1.CHECK DTC

Make sure that which malfunction (DTC second line indication) is displayed.

A	Except 9.DEFF
B	9.DEF

A or B

A >> GO TO 2.
B >> GO TO 3.

2.REPLACE ECM

1. Perform EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".
2. Perform EC-1274, "EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> **INSPECTION END**

3.CHECK CAN COMMUNICATION LINE

Refer to LAN-59, "CAN Communication Signal Chart".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4.CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

cardiagn.com

Refer to BRC-17, "CONSULT-III Function (ABS)" (without ESP) or BRC-96, "CONSULT-III Function (ABS)" (with ESP).

OK or NG

OK >> GO TO 5.
NG >> Repair or replace.

5. REPLACE ECM

1. Perform EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".
2. Perform EC-1274, "EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> **INSPECTION END**

cardiagn.com

P0641 SENSOR POWER SUPPLY

DTC Logic

INFOID:0000000001115097

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0641	SENSOR POWER SUPPLY CIRCUIT • 1.DEF: Signal outside lower level • 2.DEF: Signal outside upper level	• Harness or connectors (The APP sensor 2 power supply circuit is shorted.) (Fuel rail pressure sensor circuit is shorted.) (EGR volume control valve control position sensor circuit is shorted.) (Mass air flow sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Fuel rail pressure sensor • EGR volume control valve control position sensor • Mass air flow sensor • Refrigerant pressure sensor

NOTE:
- **If DTC P0641 is displayed with DTC P0100, P0101, P0110, P0190, P0225, P0409, P0530, P2120, first perform trouble diagnosis for DTC P0641.**
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the ignition has been switched on.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000001098423

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
E60	118	APP sensor	E110	5

cardiagn.com

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F68	89	Refrigerant pressure sensor	E50	3
	85	EGR volume control valve (EGR volume control valve control position sensor)	F99	1
F85	20	Fuel rail pressure sensor	F102	3
	28	Mass air flow sensor	E15	5

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

4. CHECK SENSOR GROUND CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
E60	120	APP sensor	E110	1
F68	74	Refrigerant pressure sensor	E50	1
	82	EGR volume control valve (EGR volume control valve control position sensor)	F99	3
F85	15	Fuel rail pressure sensor	F102	2
	30	Mass air flow sensor	E15	2

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5. CHECK COMPONENTS

Check the following.
- Refrigerant pressure sensor (Refer to EC-1380, "Diagnosis Procedure".)
- EGR volume control valve (EGR volume control valve control position sensor) (Refer to EC-1372, "Diagnosis Procedure".)
- Fuel rail pressure sensor (Refer to EC-1350, "Component Inspection".)
- Mass air flow sensor (Refer to EC-1337, "Component Inspection".)

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace malfunctioning component.

6. CHECK APP SENSOR

Refer to EC-1359, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace APP sensor.

7. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P0651 SENSOR POWER SUPPLY

DTC Logic

INFOID:0000000001115098

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0651	SENSOR POWER SUPPLY CIRCUIT • 1.DEF: Parameter at minimum level • 2.DEF: Parameter at maximum level	• Harness or connectors (The APP sensor 1 power supply circuit is shorted.) (Turbocharger boost sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 1) • Turbocharger boost sensor

NOTE:
- **If DTC P0651 is displayed with DTC P0225, P0235, first perform trouble diagnosis for DTC P0651.**
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the ignition has been switched on.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000001098822

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
E60	122	APP sensor	E110	4
F85	36	Turbocharger boost sensor	F91	1

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

4.CHECK SENSOR GROUND CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

cardiagn.com

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
E60	127	APP sensor	E110	2
F85	43	Turbocharger boost sensor	F91	2

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5.CHECK TURBOCHARGER BOOST SENSOR

- Turbocharger boost sensor (Refer to EC-1330, "Component Inspection".)

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace Turbocharger boost sensor.

6.CHECK APP SENSOR

Refer to EC-1359, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace APP sensor.

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P0685 ECM RELAY

DTC Logic

INFOID:0000000001115099

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0685	ECM RELAY CIRCUIT • CO: Open circuit • CC.0: Short circuit to ground • CC.1: Short circuit to +12V	• Harness or connectors (The ECM relay circuit is open or shorted.) • IPDM E/R (ECM relay)

NOTE:
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000967588

1.CHECK ECM POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage
Connector	Terminal		
F68	60	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK ECM POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E68	53	E11	9	Existed
	54			

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness or connectors E7, E121
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ECM POWER SUPPLY CIRCUIT-III

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E11.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

cardiagn.com

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F68	60	E11	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5
NO >> Repair open circuit or short to ground or short power in harness or connectors.

5.CHECK 20A FUSE

1. Disconnect 20A fuse (No. 52) from IPDM E/R.
2. Check 20A fuse.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace 20A fuse.

6.CHECK GROUND CONNECTION

Check ground connection E9. Refer to Ground Inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace ground connection.

7.CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and ground.

ECM		Ground	Continuity
Connector	Terminal		
E60	123	Ground	Existed
	124		
	125		
	128		

2. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short power in harness or connectors.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace.

cardiagn.com

P0812 PNP SWITCH

DTC Logic

INFOID:0000000001115100

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0812	REVERSE GEAR SIGNAL • 1.DEF: Values outside the levels	• Harness or connectors (CAN communication line is open or shorted.) • Park/neutral position switch

NOTE:
- **If DTC P0812 is displayed, the reversing light will not work.**

Diagnosis Procedure

INFOID:0000000000967593

1.CHECK CAN COMMUNICATION LINE

Refer to LAN-59, "CAN Communication Signal Chart".

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2.CHECK PNP SWITCH

Refer to TM-54, "PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

cardiagn.com

P0830 ASCD CLUTCH SWITCH

Description

INFOID:0000000000969604

ASCD clutch switch signal is applied to the ECM through the ASCD clutch switch when the clutch pedal is depressed.

DTC Logic

INFOID:0000000001115101

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P0830	ASCD CLUTCH SWITCH CIRCUIT • 1.DEF: No possible classification	• Harness or connectors (ASCD clutch switch circuit is open or shorted.) • ASCD clutch switch

NOTE:

- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after a series of actions on the clutch pedal during a road test [speed greater than 90 km/h (54 mph)].

Diagnosis Procedure

INFOID:0000000000967598

1.CHECK ASCD CLUTCH SWITCH SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground	Voltage
Connector	Terminal		
E111	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2.CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT

1. Check the continuity between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground	Continuity
Connector	Terminal		
E111	2	E60	Existed

2. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to power in harness or connectors.

3.CHECK ASCD CLUTCH SWITCH

Refer to EC-1401, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace ASCD clutch switch.

4.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

cardiagn.com

>> INSPECTION END

Component Inspection

INFOID:0000000000967599

1. CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to CL-5, "Inspection and Adjustment".
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

cardiagn.com

P1089 FUEL PUMP

DTC Logic

INFOID:0000000001115103

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P1089	FUEL RAIL PRESSURE REGULATION FUNCTION • 1.DEF: High pressure supply pump (Pressure control valve) closed • 2.DEF: High pressure supply pump (Pressure control valve) open • 3.DEF: High pressure supply pump (Volumetric control valve) open • 4.DEF: High pressure supply pump (Volumetric control valve) closed • 5.DEF: Component malfunction: High pressure supply pump (Pressure control valve or Volumetric control valve) • 6.DEF: High pressure supply pump (Pressure control valve) oscillation • 7.DEF: High pressure supply pump (Volumetric control valve)) oscillation	• Harness or connectors [High pressure supply pump (volumetric control valve) circuit is open or shorted.] [High pressure supply pump (Pressure control valve) circuit is open or shorted.] (Fuel rail pressure sensor circuit is open or shorted.) • High pressure supply pump • High pressure supply pump (Pressure control valve) • High pressure supply pump (Volumetric control valve) • Fuel line • Fuel rail • Fuel injector • Fuel rail pressure sensor • Fuel rail pressure relief valve • Air mixture with fuel • Lack of fuel

NOTE:
- **NOTE:**
- **If DTC P1089 is displayed with DTC P0180, first perform trouble diagnosis for DTC P0180. Refer to EC-1347, "DTC Logic".**
- **If DTC P1089 is displayed with DTC P0190, first perform trouble diagnosis for DTC P0190. Refer to EC-1349, "DTC Logic".**
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC appears when the engine is running.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000970737

1.CHECK LOW PRESSURE FUEL SUPPLY SYSTEM

Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

Is the inspection result normal?

OK >> GO TO 2.
NG >> Replace or replace. Then GO TO 9.

2.CHECK INTERNAL FUEL TRANSFER PUMP

Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

Is the inspection result normal?

OK >> GO TO 3.
NG >> Replace or replace. Then GO TO 9.

3.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

Is the inspection result normal?

OK >> GO TO 4.
NG >> Replace or replace. Then GO TO 9.

cardiagn.com

4. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

Is the inspection result normal?

OK >> GO TO 5.
NG >> Replace or replace. Then GO TO 9.

5. CHECK RAIL HIGH PRESSURE REGULATION

Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

Is the inspection result normal?

OK >> GO TO 6.
NG >> Replace or replace. Then GO TO 9.

6. CHECK MAJOR LEAK IN FUEL INJECTORS/FUEL INJECTORS OPEN

Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

Is the inspection result normal?

OK >> GO TO 7.
NG >> Replace or replace. Then GO TO 9.

7. CHECK INCORRECT FUEL INJECTION QUANTITY

Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

Is the inspection result normal?

OK >> GO TO 8.
NG >> Replace or replace. Then GO TO 9.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> INSPECTIO END.
NO >> Repair or replace. Then GO TO 9.

9. CLEAR PRESSURE REGULATION

Perform “PRESS_REG_ADAPTIVE” in WORK SUPPORT mode with CONSULT-III.

>> **INSPECTION END**.

cardiagn.com

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:0000000000955032

By default the valve is open when in the rest position and is actuated only when the engine is switched off; this has a damping effect and helps to stop the engine.

DTC Logic

INFOID:0000000001115104

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P2101	THROTTLECONTROL MOTOR CIRCUIT • 1.DEF: No signal • 2.DEF: • 3.DEF: Values out of range • 4.DEF: Signal incoherence	• Harness or connectors (Throttle control motor circuit is open or shorted.) • Throttle control motor

NOTE:

- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the engine is started or following a load test.
- **Special note:**
  If DTC P2101 2.DEF is displayed, first perform trouble diagnosis for DTC P0120. Refer to EC-1345, "DTC Logic".

Diagnosis Procedure

INFOID:0000000000955036

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Turn ignition switch ON.
4. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F81	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R
- Harness connector E7, F121
- Harness for open or short between IPDM E/R and electric throttle control actuator
- Harness for open or short between ECM and electric throttle control actuator

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT-I

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F81	5	F68	72	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT-II

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F81	2	F68	94	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT-III

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F81	4	F68	90	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace electric throttle control actuator.
NO >> Repair or replace.

Component Inspection

INFOID:0000000000955037

1.CHECK THROTTLE CONTROL MOTOR

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance
1 and 2	21 ± 2.1Ω [23°C (73°F)]

Is the inspection result normal?

cardiagn.com

YES >> INSPECTION END
NO >> Replace electric throttle control actuator.

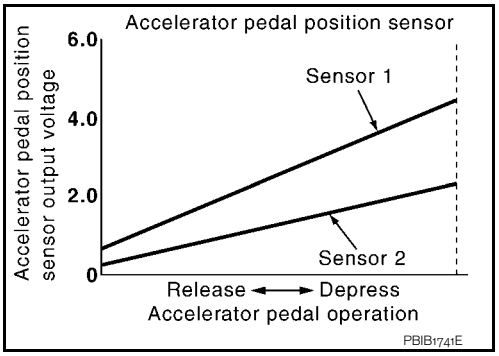
cardiagn.com

P2120 APP SENSOR

Description

INFOID:0000000001098978

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



DTC Logic

INFOID:0000000001115105

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P2120	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT • CC.1: Short circuit to +12V • CO.0: Open circuit or short circuit to ground	• Harness or connectors (APP sensor 2 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 2)

NOTE:

- **If DTC P2120 is displayed with DTC P0641, first perform trouble diagnosis for DTC P0641. Refer to EC-1393, "DTC Logic".**
- Conditions for applying the diagnostic procedure to the stored DTCs:
  - The DTC is declared present after a series of full load-no load accelerator pedal actions have been carried out (engine stopped, ignition on).
- **If the DTC is present:**
  - **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000970745

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between accelerator pedal position sensor connector and ground.

Accelerator pedal position sensor			Ground	Voltage
Sensor	Connector	Terminal		
2	E110	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

cardiagn.com

2. Disconnect accelerator pedal position sensor.
3. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

Accelerator pedal position sensor			ECM		Continuity
Sensor	Connector	Terminal	Connector	Terminal	
2	E110	1	E60	120	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK ACCELERATOR PEDAL POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

Accelerator pedal position sensor			ECM		Continuity
Sensor	Connector	Terminal	Connector	Terminal	
2	E110	6	E60	119	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to EC-1359, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace accelerator pedal position sensor.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001098962

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Turn ignition switch OFF.
2. Disconnect accelerator pedal position sensor harness connector.
3. Check resistance between accelerator pedal position sensor as follows.

Sensor	Terminals	Resistance
1	2 and 4	1.7 ± 0.9 KΩ
2	1 and 5	2.85 ± 2.05 KΩ

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace accelerator pedal position sensor.

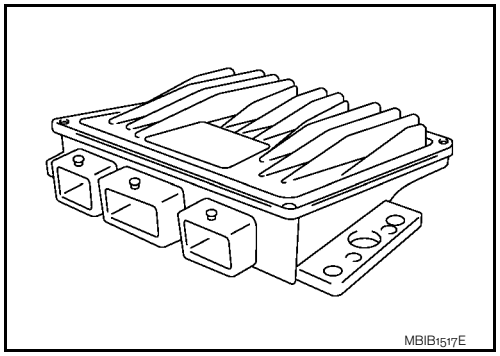
cardiagn.com

P2226 BARO SENSOR

Description

INFOID:0000000000970747

The barometric pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the microcomputer.



DTC Logic

INFOID:0000000001115106

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P2226	BAROMETRIC PRESSURE SENSOR CIRCUIT • CC.1: Short circuit to +12V • CO.0: Short circuit to ground or open circuit • CO.0: Micro -breaks	• ECM

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC is declared present after the ignition has been switched on for at least 10 seconds.
- **Special note:**
  The barometric pressure sensor is integrated into the ECM, and cannot be separated.

Diagnosis Procedure

INFOID:0000000000970749

1.REPLACE ECM

1. Perform EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".
2. Perform EC-1274, "EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> **INSPECTION END**

cardiagn.com

P2263 TC SYSTEM

DTC Logic

INFOID:0000000001115107

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P2263	AIR INLET CIRCUIT • 1.DEF: Permanent at minimum limit • 2.DEF: Permanent at maximum limit	• Harness or connectors (Turbocharger boost control solenoid valve circuit is open or shorted.) • Air inlet circuit • Vacuum pump • Vacuum hose • Turbocharger • Turbocharger boost control solenoid valve • Turbocharger boost sensor • Electric throttle control actuator

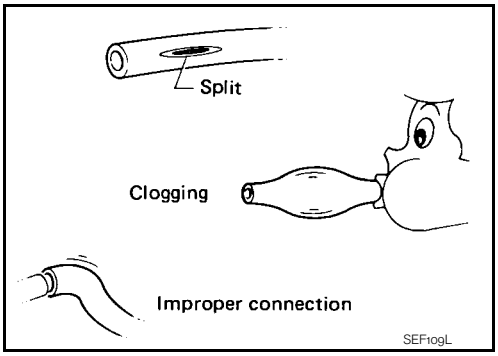
NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC becomes present after the engine is started.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000970753

1.CECHECK VACUUM HOSES AND VACUUM GALLERY

1. Turn ignition switch OFF.
2. Check vacuum hoses and vacuum gallery for clogging, cracks or improper connection. Refer to EC-1287, "Vacuum Hose Drawing".



Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 2.

2.CHECK AIR FILTER

Check that air filter is not obstructed.

Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 3.

3.CHECK INTAKE AIR DUCT

Check that intake air duct is not obstructed.

Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 4.

4.CHECK VACUUM PUMP

Check vacuum pump.

Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 5.

5.CHECK TURBOCHARGER

cardiagn.com

Check turbocharger.

Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 6.

6. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect turbocharger boost control solenoid valve harness connector.
2. Turn ignition switch ON.
3. Check the voltage between turbocharger boost control solenoid valve harness connector and ground.

Turbocharger boost control solenoid valve		Ground	Voltage
Connector	Terminal		
E55	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between turbocharger boost control solenoid valve harness connector and ECM harness connector.

Turbocharger boost control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E55	1	F68	52	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE

Refer to EC-1328, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace turbocharger boost control solenoid valve.

9. CHECK TURBOCHARGER BOOST SENSOR

Refer to EC-1330, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace turbocharger boost sensor.

10. CHECK THROTTLE CONTROL MOTOR

Refer to EC-1405, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace turbocharger boost sensor.

11. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

cardiagn.com

P2299 ACCELERATOR/BRAKE PEDAL POSITION INCONSISTENCY

DTC Logic

INFOID:0000000001115113

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P2299	ACCELERATOR PEDAL/BRAKE PEDAL INCONSISTENCY • 1.DEF: Inconsistency	• Harness or connectors (APP sensor 1 and 2 circuit is open or shorted.) (Stop lamp switch circuit is open or short-ed.) • Accelerator pedal position sensor (APP sensor 1 and 2.) • Stop lamp switch • Accelerator pedal

NOTE:
- **Special note:**
  The brake and accelerator pedals were detected as depressed simultaneously for 30 seconds.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000970929

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK BRAKE SWITCH CIRCUIT

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E60	115 (ASCD brake switch)	Ground	Brake pedal	Fully released	0V
				Slightly depressed	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 7.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect accelerator pedal position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between accelerator pedal position sensor connector and ground.

Accelerator pedal position sensor			Ground	Voltage
Sensor	Connector	Terminal		
1	E110	4	Ground	Approx. 5V
2		5		

Is the inspection result normal?

YES >> GO TO 4.

cardiagn.com

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

Accelerator pedal position sensor			ECM		Continuity
Sensor	Connector	Terminal	Connector	Terminal	
1	E110	2	E60	127	Existed
2		1		120	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ACCELERATOR PEDAL POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

Accelerator pedal position sensor			ECM		Continuity
Sensor	Connector	Terminal	Connector	Terminal	
1	E110	3	E60	126	Existed
2		6		119	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to EC-1359, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace accelerator pedal position sensor.

7. CHECK BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E115	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E105, M77
- 10A fuse (No. 11)
- Harness for open or short between fuse and stop lamp switch

cardiagn.com

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK BRAKE SWITCH INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between stop lamp switch harness connector and ECM harness connector.

Stop lamp switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E115	2	E60	115	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK STOP LAMP SWITCH

Refer to EC-1359, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace stop lamp switch.

11. CHECK ACCELERATOR PEDAL

Refer to ACC-3, "Inspection".

Is the inspection result normal?

YES >> GO TO 12.
NO >> Replace accelerator pedal position sensor.

12. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

P2413 EGR SYSTEM

DTC Logic

INFOID:0000000001115114

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P2413	EGR VOLUME CONTROL • 1.DEF: Jammed component	• Harness or connectors (The EGR volume control valve circuit is open or shorted.) (The EGR volume control valve control position sensor circuit is open or shorted.) • EGR volume control valve • EGR volume control valve control position sensor • Incorrect EGR volume control valve installation • EGR volume control valve stuck closed • EGR passage clogged

NOTE:
- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC becomes present after the engine is started.
- **Special notes:**
- Engine instability, possibly even stalling.
- Difficult to start engine or even impossible when cold.
- Loss of performance.
- Possible smoke emissions.
- **If the DTC is present:**
- **Malfunction indicator (Red) lights up.**

Diagnosis Procedure

INFOID:0000000000970932

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Check ground connection E17. Refer to Ground inspection in GI-41, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK EGR VOLUME CONTROL VALVE INSTALLATION

Check that EGR volume control valve is installed properly.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Install EGR volume control valve properly.

3.CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect EGR volume control valve harness connector.
2. Turn ignition switch ON.
3. Check the voltage between EGR volume control valve control position sensor connector and ground.

GR volume control valve control position sensor		Ground	Voltage
Connector	Terminal		
F99	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR GROUND CIRCUIT FOR

cardiagn.com

OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between EGR volume control valve control position sensor harness connector and ECM harness connector.

EGR volume control valve control position sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F99	3	F85	82	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR INPUT CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between EGR volume control valve control position sensor harness connector and ECM harness connector.

EGR volume control valve control position sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F99	5	F85	86	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK EGR VOLUME CONTROL VALVE CONTROL MOTOR CIRCUIT

1. Check harness continuity between the following terminals.

EGR volume control valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F99	2	F68	95	Existed
			96	Not existed
	6		95	Not existed
			96	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK EGR VOLUME CONTROL VALVE VISUALLY

1. Remove the EGR volume control valve
2. Check if foreign matter is caught between the EGR volume control valve and the housing.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Remove the foreign matter and clean the EGR volume control valve.

8.CHECK EGR PASSAGE

Check the following for clogging and cracks.
- EGR tube

cardiagn.com

- EGR hose
- EGR cooler

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace EGR passage.

9. CHECK EGR VOLUME CONTROL VALVE

Refer to EC-1378, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace.

11. REPLACE EGR VOLUME CONTROL VALVE

1. Replace the EGR volume control valve.
2. Perform EC-1274, "EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> **INSPECTIO END**

cardiagn.com

P2502 BATTERY VOLTAGE

DTC Logic

INFOID:0000000001115115

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P2502	ALTERNATOR CHARGE SIGNAL • 1.DEF: Values outside level	• Harness or connectors (The CAN communication line is open or shorted) • Alternator

NOTE:

- **Conditions for applying the diagnostic procedure to the stored DTCs:**
  The DTC becomes present after the engine is started.

Diagnosis Procedure

INFOID:0000000000970935

1.CHECK CAN COMMUNICATION LINE

Refer to LAN-59, "CAN Communication Signal Chart".

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2.CHECK ALTERNATOR

Refer to CHG-8, "System Diagram".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

cardiagn.com

P2610 ENGINE SAFETY STOP

DTC Logic

INFOID:0000000001115116

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	Possible cause
P2610	ENGINE SAFETY STOP • 1.DEF: Electric • 2.DEF: Hydraulic	• Harness or connectors (Fuel injector circuit is shorted) • Turbocharger • Fuel injector • Intake air leas • Electric throttle control actuator

NOTE:
- **Priorities when dealing with a number of DTCs:**
  If DTC P2610 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.
- **Special notes:**
- The engine only stops after the ignition is switched off.

Diagnosis Procedure

INFOID:0000000000970938

1.CHECK INTAKE AIR DUCT

Check that intake air duct is not obstructed.

Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 2.

2.CHECK VACUUM PUMP

Check vacuum pump.

Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 3.

3.CHECK TURBOCHARGER

Check turbocharger.

Is the inspection result normal?

Yes >> Repair or replace.
No >> GO TO 4.

4.CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE

Refer to EC-1327, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace turbocharger boost control solenoid valve.

5.CHECK THROTTLE CONTROL MOTOR

Refer to EC-1404, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace turbocharger boost sensor.

6.CHECK FUEL INJECTOR

Refer to EC-1353, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace fuel injector.

cardiagn.com

7.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> **INSPECTION END**

cardiagn.com

ASCD INDICATOR

Description

INFOID:0000000001102019

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.
CRUISE lamp illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.
SET lamp illuminates when following conditions are met.
- CRUISE lamp is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET lamp remains lit during ASCD control.

Component Function Check

INFOID:0000000001102020

1.ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

CONDITION		INDICATOR
• Ignition switch: ON	• MAIN switch: Pressed at the 1st time →at the 2nd time	Illuminated → Not illuminated
• MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	• ASCD: Operating	Illuminated
	• ASCD: Not operating	Not illuminated

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Go to EC-1421, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102021

1.CHECK CAN COMMUNICATION LINE

Refer to LAN-59, "CAN Communication Signal Chart".

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2.CHECK COMBINATION METER OPERATION

Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check combination meter circuit. Refer to MWI-4, "METER SYSTEM : System Diagram".

3.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

cardiagn.com

COOLING FAN

Description

INFOID:0000000001102014

Cooling fan operates at each speed when the current flows in the cooling fan motor as follows.
Refer to EC-1309, "System Description" for cooling fan operation.

Component Function Check

INFOID:0000000001102015

1.CHECK COOLING FAN LOW SPEED FUNCTION

1. Start engine and let it idle.
2. Turn air conditioner switch and blower fan switch ON.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refer to EC-1422, "Diagnosis Procedure".

2.CHECK COOLING FAN HIGH SPEED FUNCTION

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Refer to EC-1422, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102016

1.CHECK CAN COMMUNICATION LINE

Refer to EC-1321, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace

2.CHECK COOLING FAN RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relay-3 harness connector.
3. Check the voltage between cooling fan relay-3 harness connectors and ground.

Cooling fan motor-1		Ground	Voltage
Connector	Terminal		
E59	1	Ground	Battery voltage
	3		

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- 50A fusible link (letter M)
- Harness for open or short between cooling fan motor-3 and battery

>> Repair or replace malfunctioning part.

4.CHECK COOLING FAN CIRCUIT FOR OPEN AND SHORT

cardiagn.com

1. Disconnect cooling fan motor harness connector.
2. Disconnect IPDM E/R harness connectors E13 and E14.
3. Check the continuity between cooling fan motor harness connector and IPDM E/R harness connector.

Cooling fan motor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E3	1	E14	52	Existed

4. Check the continuity between cooling fan motor harness connector and cooling fan relay-3 harness connector.

Cooling fan motor		Cooling fan relay-3		Continuity
Connector	Terminal	Connector	Terminal	
E3	1	E59	2	Existed

5. Check the continuity between IPDM E/R harness connector and cooling fan relay-3 harness connector.

IPDM E/R		Cooling fan relay-3		Continuity
Connector	Terminal	Connector	Terminal	
E13	48	E59	4	Existed

6. Check the continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E10	5	Ground	Existed
	6		

7. Check the continuity between cooling fan relay-3 and ground harness connector.

Cooling fan motor		Ground	Continuity
Connector	Terminal		
E3	2	Ground	Existed

8. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between cooling fan motor and IPDM E/R
- Harness for open or short between cooling fan motor and cooling fan relay-3
- Harness for open or short between IPDM E/R and cooling fan relay-3
- Harness for open or short between IPDM E/R and ground
- Harness for open or short between cooling fan relay-3 anf ground
- Resitor E57

>> Repair or replace malfunctioning part.

6. CHECK COOLING FAN RELAY

Refer to EC-1424, "Component Inspection (Cooling Fan Relay)".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace malfunctioning cooling fan relay.

cardiagn.com

7. CHECK COOLING FAN MOTOR

Refer to EC-1424, "Component Inspection (Cooling Fan Motor)".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace cooling fan motor.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connector.

Component Inspection (Cooling Fan Motor)

INFOID:0000000001102017

1. CHECK COOLING FAN MOTOR

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor harness connector E3.
3. Supply cooling fan motor terminal with battery voltage and check operation.

Terminals		Operation
(+)	(–)	
1	2	Cooling fans operate

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace cooling fan motor.

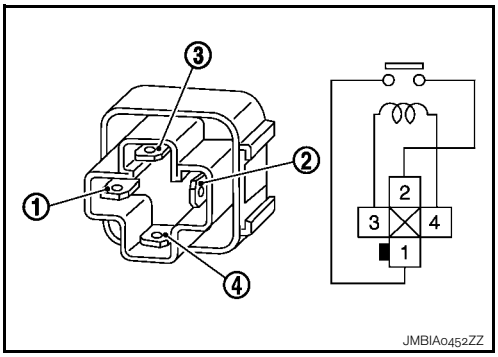
Component Inspection (Cooling Fan Relay)

INFOID:0000000001102018

1. CHECK COOLING FAN RELAYS

1. Turn ignition switch OFF.
2. Remove cooling fan relay.
3. Check the continuity between cooling fan relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 4	12V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed



JMBIA0452ZZ

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace cooling fan relay.

cardiagn.com

STOP LAMP SWITCH

Description

INFOID:0000000001102060

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

Component Function Check

INFOID:0000000001102059

1.CHECK BRAKE SWITCH CIRCUIT

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition		Voltage
Connector	Terminal				
E60	115 (Brake switch signal)	Ground	Brake pedal	Fully released	0V
				Slightly depressed	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Go to EC-1425, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001102022

1.CHECK BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E115	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connector E105, M77
- 10A fuse (No. 11)
- Harness for open or short between fuse and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK BRAKE SWITCH INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between stop lamp switch harness connector and ECM harness connector.

Stop lamp switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E115	2	E60	115	Existed

4. Also check harness for short to ground and short to power.

cardiagn.com

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK STOP LAMP SWITCH

Refer to EC-1359, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace stop lamp switch.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:0000000001102061

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2 (Stop lamp switch)	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed
3 and 4 (ASCD brake switch)	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-8, "Inspection and Adjustment" (LHD models) or BR-52, "Inspection and Adjustment" (RHD models).
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2 (Stop lamp switch)	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed
3 and 4 (ASCD brake switch)	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

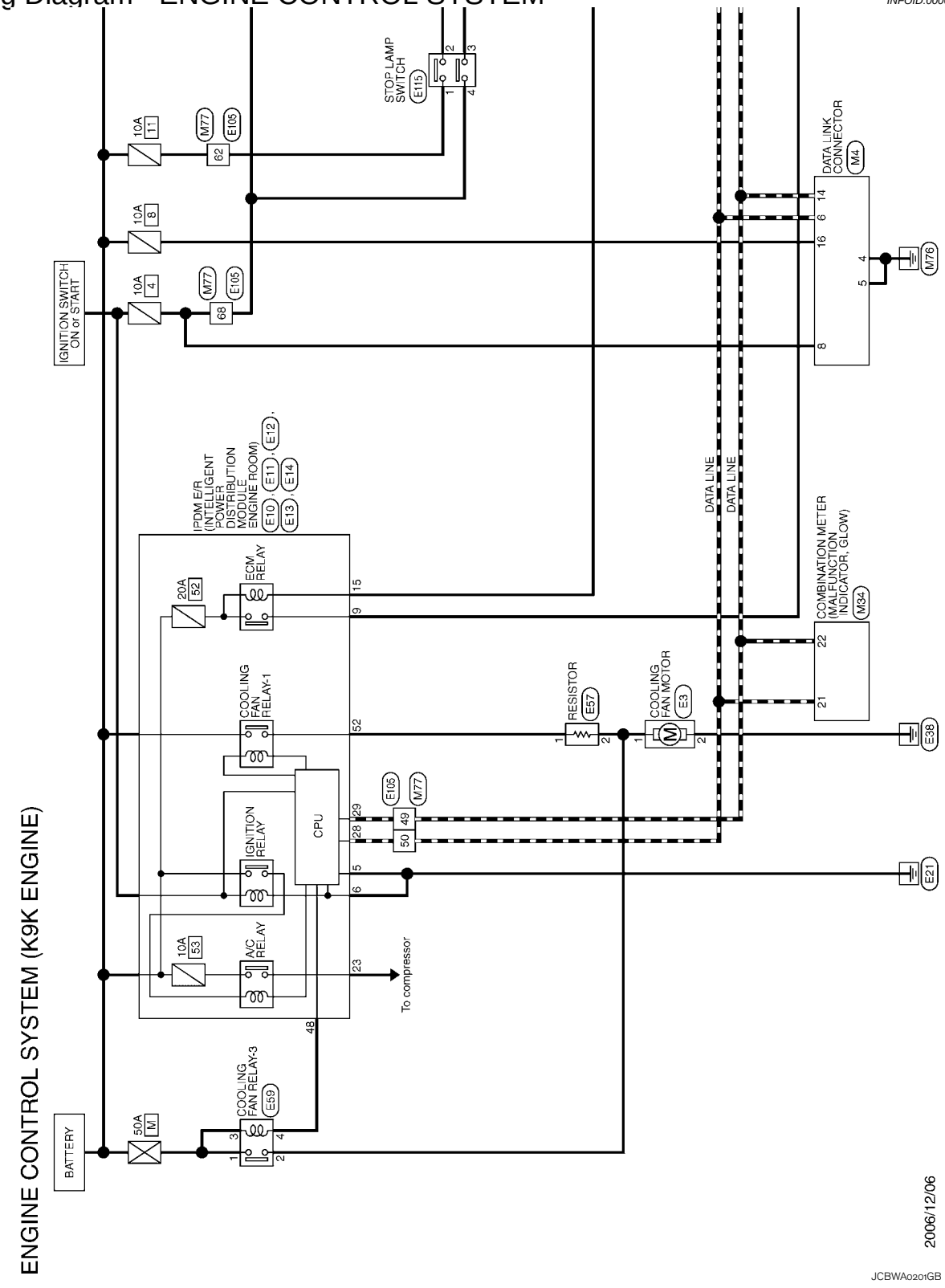
cardiagn.com

ECU DIAGNOSIS

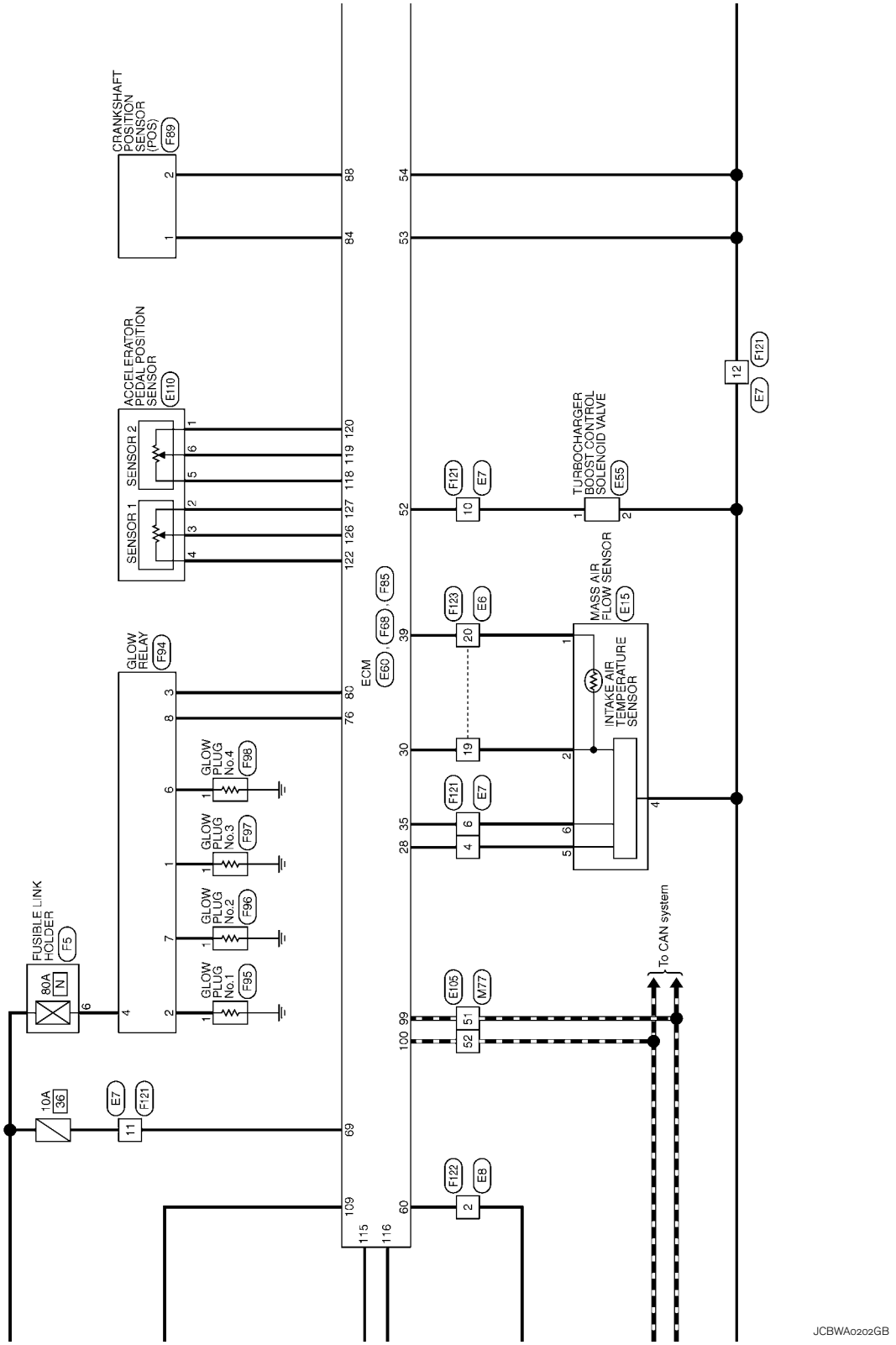
ECM

Wiring Diagram - ENGINE CONTROL SYSTEM -

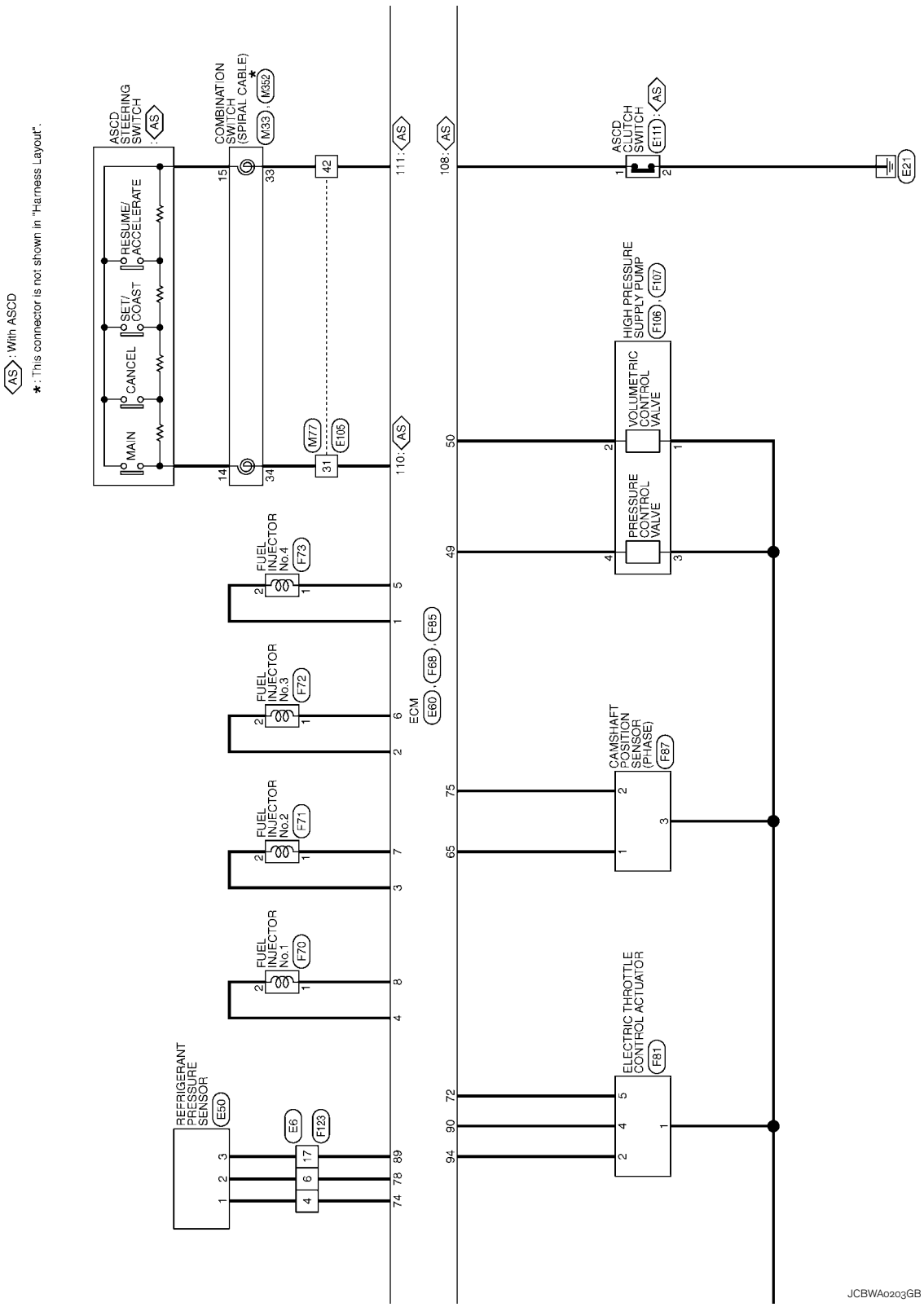
INFOID:0000000000902368



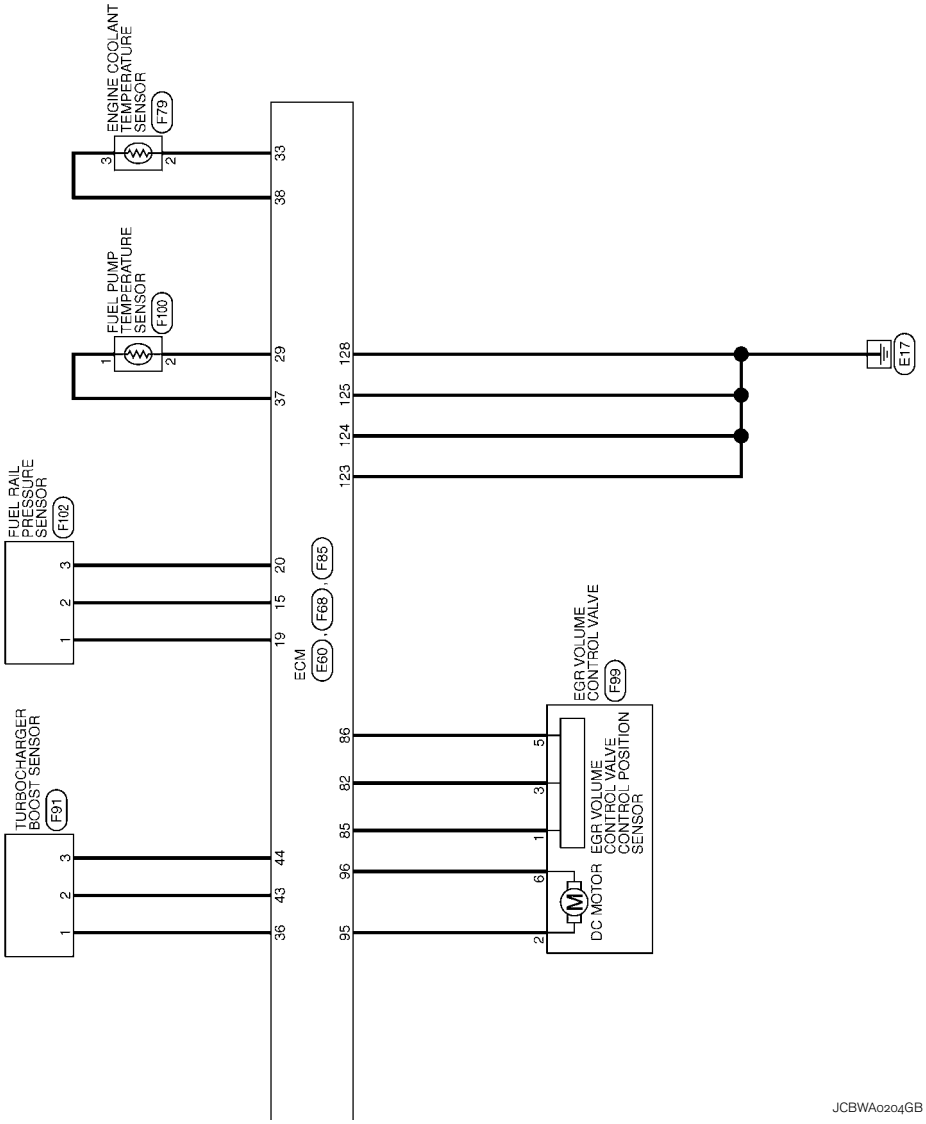
cardiagn.com



cardiagn.com



cardiagn.com



cardiagn.com

ENGINE CONTROL SYSTEM (K9K ENGINE)

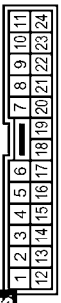
Connector No.	E3
Connector Name	COOLING FAN MOTOR
Connector Type	P80103895160Z

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	B	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	–
6	G/P	–
17	Y/W	–
19	GR/R	–[With diesel engine]
20	LG	–[With diesel engine]

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	R	–[With diesel engine]
6	B/Y	–[With diesel engine]
10	G/R	–[With diesel engine]
11	L/B	–[With diesel engine]
12	G	–

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B/R	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	G	–
15	B/R	–[With diesel engine]

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
23	Y/B	–
28	L	–
29	P	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
46	Y	–

JCBWA0205GB

cardiagn.com

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
92	W	-

Connector No.	E15
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH06FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	GR/R	-
4	G	-
5	R	-
6	B/Y	-

Connector No.	E50
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	D400997F

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	G/P	-
3	Y/W	-

Connector No.	E55
Connector Name	TURBOCHARGER BOOST CONTROL SOLENOID VALVE
Connector Type	SUPPLIRE REF 282788-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G/R	-
2	G	-

Connector No.	E57
Connector Name	RESISTOR
Connector Type	P8010389516O2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	R	-

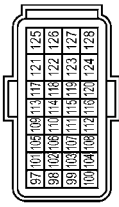
Connector No.	E59
Connector Name	COOLING FAN RELAY-3
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/B	-
2	R	-
3	W/B	-
4	W	-

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
93	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)
108	G	CLUTCH PED SWITCH
109	W/L	IGN
110	V	ASCD STRG SW(+)
111	B	ASCD STRG SW(-)
115	O	BRAKE SWITCH MAIN
116	R/W	BNC SW
118	R	ACCEL PED SENS-2 +V
119	W	ACCEL PED SENS-2
120	B	ACCEL PED SENS-2 GND

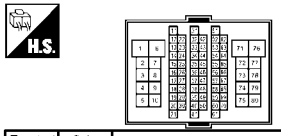
122	R	ACCEL PED SENS-1 +V
123	B	GND
124	B	GND
125	B	GND
126	W	ACCEL PED SENS-1
127	B	ACCEL PED SENS-1 GND
128	B	GND

JCBWA0206GB

cardiagn.com

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
31	V	–
42	B	–
49	P	–
50	L	–
51	P	–
52	L	–
62	V	–
88	W/L	–

Connector No.	E110
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RH06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–[Except HR engine]
2	B	–[With K9K engine]
3	W	–[Except HR engine]
4	R	–[With K9K engine]
5	R	–[With K9K engine]
6	W	–[With K9K engine]

Connector No.	E111
Connector Name	ASCD CLUTCH SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–[With diesel engine]
2	B	–[With diesel engine]

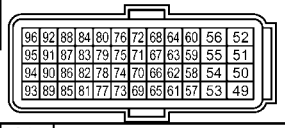
Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–
3	O	–[With diesel engine]
4	W/L	–[With diesel engine]

Connector No.	F5
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L01FB-MC

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	–

Connector No.	F68
Connector Name	ECM
Connector Type	MAA40FBR-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
49	SB	HP PRES VALVE DRIVE
50	LG/B	HP REG VALVE DRIVE
52	G/R	VNT CONTROL VALVE
53	G	VBATT
54	G	VBATT
60	B/R	CU RELAY DRIVE
65	O	CAMSHAFT GND
69	L/B	VBD (DIRECTVBATT)
72	L	PWM SIGNAL
74	R/L	FREON PRESS GND
75	W	CAMSHAFT SENS
76	L/Y	GLOW-PLUG COMMOND
78	G/P	FREON PRESS SENS
80	R/G	GLOW PLUG DIAGNOSTICS
82	GR	EGR POSS GND
84	R/O	CRANKSHAFT SENS +
85	SB	EGR POSS +V
86	Y/G	EGR POSS SENS
88	L/O	CRANKSHAFT SENS –
89	Y/W	FREON PRESURE +V
90	R/Y	INLET THROTTLE FBACK
94	O	INLET THROTTLE GND
95	R	EGR DC MOTOR+
96	L/W	EGR DC MOTOR–

Connector No.	F70
Connector Name	FUEL INJECTOR No.1
Connector Type	KOSTAL 09441231

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	R/Y	–

JCBWA0207GB

cardiagn.com

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	F71
Connector Name	FUEL INJECTOR No.2
Connector Type	KOSTAL 09441231

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	L/W	-

Connector No.	F72
Connector Name	FUEL INJECTOR No.3
Connector Type	KOSTAL 09441231

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	G/Y	-

Connector No.	F73
Connector Name	FUEL INJECTOR No.4
Connector Type	KOSTAL 09441231

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	B/R	-

Connector No.	F79
Connector Name	ENGINE COOLANT TEMPERATURE SENSOR
Connector Type	GHW 1784300000-F

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	Y/B	-
3	GR/L	-

Connector No.	F81
Connector Name	ELECTRIC THROTTLE CONTROL ACTUATOR
Connector Type	FEP 42121200

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	O	-
4	R/Y	-
5	L	-

Connector No.	F85
Connector Name	ECM
Connector Type	MAA40FGY-MEAB-RH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/R	PIEZO INJECTOR 4 LSD
2	G/Y	PIEZO INJECTOR 3 LSD
3	L/W	PIEZO INJECTOR 2 LSD
4	R/Y	PIEZO INJECTOR 1 LSD
5	B	PIEZO INJECTOR 4 HSD
6	G	PIEZO INJECTOR 3 HSD
7	L	PIEZO INJECTOR 2 HSD
8	R	PIEZO INJECTOR 1 HSD
15	GR	RAIL PRESS GND
19	LG	RAIL PRESS SENS
20	L	RAIL PRESS +V

28	R	AIR MASS FLOW SENS +V
29	L/G	FUEL TEMP GND
30	GR/R	AIR MASS-FLOW SENS GND
33	Y/B	WATER TEMP GND
35	B/Y	AIR MASS FLOW
36	V	BOOST PRES +V
37	P	FUEL TEMP SENS
38	GR/L	WATER TEMP SENS
39	LG	INTAKE AIR TEMP SENS
43	G	BOOST PRES GND
44	O	BOOST PRES SENS

Connector No.	F87
Connector Name	CAMSHAFT POSITION SENSOR (PHASE)
Connector Type	FEA03FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	W	-
3	G	-

JCBWA0208GB

cardiagn.com

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	F89
Connector Name	CRANKSHAFT POSITION SENSOR (POS)
Connector Type	FEA02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/O	–
2	L/O	–

Connector No.	F91
Connector Name	TURBOCHARGER BOOST SENSOR
Connector Type	BOSCH 1928404073

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	G	–
3	O	–

Connector No.	F94
Connector Name	GLOW RELAY
Connector Type	FCI 240PC089S0015

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	L	–
3	R/G	–
4	W	–
6	Y	–
7	LG	–
8	L/Y	–

Connector No.	F95
Connector Name	GLOW PLUG No.1
Connector Type	–

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–

Connector No.	F96
Connector Name	GLOW PLUG No.2
Connector Type	–

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–

Connector No.	F97
Connector Name	GLOW PLUG No.3
Connector Type	–

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–

Connector No.	F98
Connector Name	GLOW PLUG No.4
Connector Type	–

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–

Connector No.	F99
Connector Name	EGR VOLUME CONTROL VALVE
Connector Type	FEP-4212/200

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	R	–
3	GR	–
5	Y/G	–
6	L/W	–

JCBWA0209GB

cardiagn.com

ENGINE CONTROL SYSTEM (K9K ENGINE)

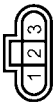
Connector No.	F100
Connector Name	FUEL PUMP TEMPERATURE SENSOR
Connector Type	FEA02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	L/G	-

Connector No.	F102
Connector Name	FUEL RAIL PRESSURE SENSOR
Connector Type	FCI-211PC032S2049

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	GR	-
3	L	-

Connector No.	F106
Connector Name	HIGH PRESSURE SUPPLY PUMP
Connector Type	FEA02FO

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	LG/B	-

Connector No.	F107
Connector Name	HIGH PRESSURE SUPPLY PUMP
Connector Type	FEA02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	G	-
4	SB	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	R	-[With diesel engine]
6	B/Y	-[With diesel engine]
10	G/R	-[With diesel engine]
11	L/B	-[With diesel engine]
12	G	-

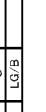
Connector No.	F122
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B/R	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

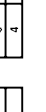
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-
6	G/P	-
17	Y/W	-
19	GR/R	-[With diesel engine]
20	LG	-[With diesel engine]

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

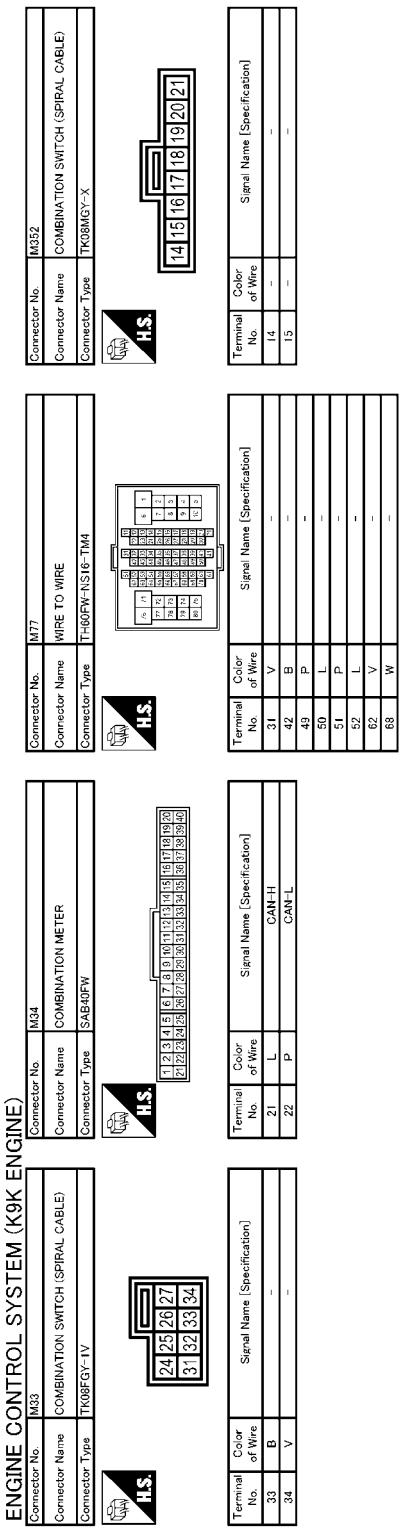
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
4	B	-
5	B	-
6	L	-
8	W	-
14	P	-
16	Y	-

JCBWA0210GB

cardiagn.com



JCBWA0211GB

DTC Index

INFOID:0000000000896336

X: Applicable —: Not applicable

DTC*	Items (CONSULT-III screen item)	Trip	MI lighting up		Reference page
			Yellow	Red	
P0001	FUEL SYSTEM	3	–	×	EC-1320
P0002	FUEL SYSTEM	3	–	–	EC-1320

cardiagn.com

DTC*	Items (CONSULT-III screen item)	Trip	MI lighting up		Reference page
			Yellow	Red	
P0016	COHERENCE CMSFT/SN	3	–	–	EC-1320
P0045	TURBO ACT CIRC	3	–	×	EC-1327
P0069	PRESSURE COHERENCE	3	–	×	EC-1329
P0087	LOW FUEL PRESS	3	–	–	EC-1331
P0090	FUEL SYSTEM	3	–	×	EC-1333
P0100	AIR FLOW SEN CIRC	3	–	–	EC-1335
P0101	AIR FLOW SEN CIRC	3	–	–	EC-1338
P0110	IN-AIR TMP SEN CIR	3	–	–	EC-1341
P0115	WATER TMP SEN	1 or 3	–	–	EC-1343
P0120	TP SEN CIRC	3	–	–	EC-1345
P0180	FUEL TEMP SEN CIRC	1 or 3	–	–	EC-1347
P0190	RAIL/PRESS SEN CIR	3	–	×	EC-1349
P0200	INJECTOR CTRL CIRC	3	–	×	EC-1351
P0201	CYL 1 INJ CTRL CIR	3	×	×	EC-1353
P0202	CYL 2 INJ CTRL CIR	3	×	×	EC-1353
P0203	CYL 3 INJ CTRL CIR	3	×	×	EC-1353
P0204	CYL 4 INJ CTRL CIR	3	×	×	EC-1353
P0217	ENG OVER TEMP	1	–	–	EC-1355
P0225	PDL POTEN CIRC TK1	3	–	×	EC-1358
P0235	IN-MANI PRES CIRC	3	–	×	EC-1361
P0335	ENGNE SPD SEN CIRC	1	–	×	EC-1363
P0340	CAMSHAFT SEN CIRC	3	–	–	EC-1365
P0380	PRHT UNIT CTRL CIR	3	–	–	EC-1368
P0381	PRHT DGNSTC CNECT	3	–	–	EC-1370
P0409	EGR POSITN OFFSET	3	×	–	EC-1372
P0487	EGR COMMAND CIRC	3	–	–	EC-1374
P0488	EGR/V POSITN CTRL	3	–	× or –	EC-1376
P0500	VEHL/SPD INF CIRC	1	–	–	EC-1379
P0530	REFRIGERNT SEN CIR	1	–	–	EC-1380
P0560	CPU SUPPLY VOLTAGE	1	–	–	EC-1382
P0571	BRAKE SWITCH CIRC	1	–	–	EC-1385
P0575	SPD LIM/CRS CTRL	1	–	–	EC-1388
P0606	COMPUTER(C/U)	1 or 3	× or –	×	EC-1391
P0641	SEN SUPPLY N-1 VOL	3	–	×	EC-1393
P0651	SEN SUPPLY N-2 VOL	3	–	×	EC-1395
P0685	MAIN RLY CTRL CIRC	3	–	×	EC-1397
P0812	REVERSE INFO	1	–	–	EC-1399
P0830	CLUTCH SWITCH CIRC	1	–	–	EC-1400
P1089	RAIL PRESS REGULTN	3	–	× or –	EC-1402
P2101	ETC FUNCTION/CIRC	3	–	–	EC-1404
P2120	PDL POTEN CIRC TK2	3	–	×	EC-1407
P2226	ATMOS PRES SE CIR	3	–	–	EC-1409
P2263	T/C SYSTEM	3	–	×	EC-1410

cardiagn.com

DTC*	Items (CONSULT-III screen item)	Trip	MI lighting up		Reference page
			Yellow	Red	
P2299	BRK/ACCEL PDL PSTN	3	–	×	EC-1412
P2413	EGR SYSTEM	3	×	×	EC-1415
P2502	ALT CHARGE INFO	1	–	–	EC-1418
P2610	ENGINE PROTECTION	1	–	–	EC-1419

*: This number is prescribed by ISO 15031-6.

cardiagn.com

SYMPTOM DIAGNOSIS

ENGINE CONTROL SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000000902356

NOTE:
Only consult this customer complaint after a complete check using the CONSULT-III.

Symptom		Trouble diagnosis	Reference page
No communication with the ECM		CHART 1	EC-1441, "Diagnosis Procedure"
Starting malfunction	Engine does not start or starts with difficulty	CHART 2	EC-1442, "Diagnosis Procedure"
	Starting difficult with cold engine	CHART 3	EC-1444, "Diagnosis Procedure"
	Impossible to shut off engine	CHART 4	EC-1446, "Diagnosis Procedure"
Idle speed malfunction	Engine Idle speed too high	CHART 5	EC-1447, "Diagnosis Procedure"
	Engine Idle speed too low or unstable	CHART 6	EC-1448, "Diagnosis Procedure"
Behavior while driving	Engine stalling	CHART 7	EC-1450, "Diagnosis Procedure"
	No or very little acceleration, increase in engine speed	CHART 8	EC-1452, "Diagnosis Procedure"
	Engine bucking	CHART 9	EC-1455, "Diagnosis Procedure"
	Erratic acceleration	CHART 10	EC-1457, "Diagnosis Procedure"
	No engine braking	CHART 11	EC-1459, "Diagnosis Procedure"
	Loss of power	CHART 12	EC-1460, "Diagnosis Procedure"
	Too much power	CHART 13	EC-1463, "Diagnosis Procedure"
	Overspeed at idle speed or on releasing brake	CHART 14	EC-1465, "Diagnosis Procedure"
	Excessive consumption	CHART 15	EC-1466, "Diagnosis Procedure"
	Engine knock	CHART 16	EC-1468, "Diagnosis Procedure"
	Engine overheating	CHART 17	EC-1470, "Diagnosis Procedure"
Noise, odors or smoke	Engine smokes when started	CHART 18	EC-1471, "Diagnosis Procedure"
	Engine emits blue smoke	CHART 19	EC-1472, "Diagnosis Procedure"
	Engine smokes when revved	CHART 20	EC-1474, "Diagnosis Procedure"
	Engine emits white smoke (especially when starting)	CHART 21	EC-1475, "Diagnosis Procedure"
	Emission control not satisfactory	CHART 22	EC-1476, "Diagnosis Procedure"

cardiagn.com

NOT COMMUNICATION WITH THE ECM

Description

INFOID:0000000000912031

CHART 1: NO COMMUNICATION WITH THE ECM

Diagnosis Procedure

INFOID:0000000000912033

1.INSPECTION START

Ensure that CONSULT-III is not causing the malfunction by trying to establish dialogue with an ECM on another vehicle. If the CONSULT-III is not at malfunction, and dialogue cannot be established with any other ECM on the same vehicle, the cause could be a suspected ECM interfering on the CAN communication line.
Check the voltage of the battery and carry out the operations necessary to obtain a voltage which is to specification (9.5 V < U battery < 17.5 V).

>> GO TO 2.

2.CHECK CAN COMMUNICATION

Perform trouble diagnosis on the CAN communication line using CONSULT-III. Refer to LAN-59, "CAN Communication Signal Chart".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK ECM GROUND

Check the ECM earth (ground) point on the side strut tower.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace ground connection.

4.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connector.

5.CHECK DATA LINK CONNECTOR CIRCUIT

Check for the presence of 12 V on terminal 16 with ignition switch OFF, 12 V on terminal 8 with ignition switch ON and an earth (ground) on terminals 4 and 5 of the data link connector.
Repair if necessary.

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Repair or replace harness or connector.

cardiagn.com

ENGINE DOES NOT START OR STARTS WITH DIFFICULTY

Description

INFOID:0000000000912038

CHART 2: ENGINE DOES NOT START OR STARTS WITH DIFFICULTY

Diagnosis Procedure

INFOID:0000000000912039

1.CHECK FUEL

Check that the fuel reservoir is correctly filled and with the right fuel.

>> GO TO 2.

2.CHECK BATTERY

Check the battery. Refer to PG-118, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace battery. Refer to PG-118, "Removal and Installation"

3.CHECK STARTER MOTOR

Check the starter and starter motor relay. Refer to STR-8, "System Diagram".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace starter motor or starter relay. Refer to STR-20, "K9K MODELS : Removal and Installation"

4.CHECK ECM RELAY

Check the ECM relay. Refer to EC-1397, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".

5.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness or connector.

6.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace harness or connector.

7.CHECK CAMSHAFT POSITION SENSOR

Check the camshaft position sensor. Refer to EC-1366, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace.

8.CHECK CAMSHAFT

Check the camshaft. Refer to EM-296, "Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace camshaft. Refer to EM-294, "Removal and Installation".

9.CHECK AIR INTAKE SYSTEM

cardiagn.com

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace air intake system. Refer to EM-265, "Removal and Installation"

10. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace.

11. CHECK LOW PRESSURE CIRCUIT

Perform the TEST 1: LOW PRESSURE CIRCUIT CHECK. Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

>> GO TO 12.

12. CHECK INTERNAL FUEL TRANSFER PUMP

Perform the TEST 2: INTERNAL FUEL TRANSFER PUMP CHECK. Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

>> GO TO 13.

13. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 14.

14. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 15.

15. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 16.

16. CHECK MAJOR LEAK IN FUEL INJECTORS/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 17.

17. CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

STARTING DIFFICULT WITH COLD ENGINE

Description

INFOID:0000000000912047

CHART 3: STARTING DIFFICULT WITH COLD ENGINE

Diagnosis Procedure

INFOID:0000000000912048

1.CHECK ENGINE OIL LEVEL

Is the engine oil level correct?

Yes or No

Yes >> GO TO 2.
No >> Top up the oil.

2.CHECK ENGINE OIL

Check the grade of engine oil. Refer to LU-23, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace engine oil. Refer to LU-24, "Refilling"

3.CHECK BATTERY

Check the battery. Refer to PG-118, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace battery. Refer to PG-118, "Removal and Installation"

4.CHECK STARTER MOTOR

Check the starter motor. Refer to STR-20, "K9K MODELS : Removal and Installation".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace starter motor. Refer to STR-20, "K9K MODELS : Removal and Installation"

5.CHECK COMPONENT PART

Check the following.
- Engine coolant temperature sensor. Refer to EC-1344, "Component Inspection".
- Fuel pump temperature sensor. Refer to EC-1348, "Component Inspection".
- Intake air temperature sensor. Refer to EC-1342, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK GLOW SYSTEM

Check the glow system. Refer to EC-1370, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace glow system. Refer to EM-275, "Removal and Installation"

7.CHECK LOW PRESSURE CIRCUIT

Perform the TEST 1: LOW PRESSURE CIRCUIT CHECK. Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

>> GO TO 8.

8.CHECK INTERNAL FUEL TRANSFER PUMP

Perform the TEST 2: INTERNAL FUEL TRANSFER PUMP CHECK. Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

cardiagn.com

>> GO TO 9.

9. CHECK COMPRESSION PRESSURE

Check the compression pressure. Refer to EM-263, "Inspection".

>> **INSPECTION END**

cardiagn.com

IMPOSSIBLE TO SHUT OFF ENGINE

Description

INFOID:0000000000912051

CHART 4: IMPOSSIBLE TO SHUT OFF ENGINE

Diagnosis Procedure

INFOID:0000000000912052

1.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness or connector.

2.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Repair or replace harness or connector.

cardiagn.com

ENGINE IDLE SPEED TOO HIGH

Description

INFOID:0000000000912063

CHART 5: ENGINE IDLE SPEED TOO HIGH

Diagnosis Procedure

INFOID:0000000000912064

1.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness or connector.

2.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check the accelerator pedal position sensor. Refer to EC-1408, "Component Inspection".

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Repair or replace.

cardiagn.com

ENGINE IDLE SPEED TOO LOW OR UNSTABLE

Description

INFOID:0000000000912060

CHART 6: ENGINE IDLE SPEED TOO LOW OR UNSTABLE

Diagnosis Procedure

INFOID:0000000000912061

1.CHECK FUEL

Check that the fuel reservoir is correctly filled and with the right fuel.

>> GO TO 2.

2.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness or connector.

4.CHECK AIR INTAKE SYSTEM

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace air intake system. Refer to EM-265, "Removal and Installation".

5.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace.

7.CHECK REFRIGERANT PRESSURE SENSOR

Check refrigerant pressure sensor. Refer to EC-1380, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace.

8.CHECK EGR SYSTEM

Check EGR system. Refer to EC-1415, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace.

9.CHECK CATALYTIC CONVERTER

Is the catalytic converter clogged or deteriorated?

cardiagn.com

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace.

10. CHECK LOW PRESSURE CIRCUIT

Perform the TEST 1: LOW PRESSURE CIRCUIT CHECK. Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

>> GO TO 11.

11. CHECK INTERNAL FUEL TRANSFER PUMP

Perform the TEST 2: INTERNAL FUEL TRANSFER PUMP CHECK. Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

>> GO TO 12.

12. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 13.

13. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 14.

14. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 15.

15. CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 16.

16. CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

ENGINE STALLING

Description

INFOID:0000000000912066

CHART 7: ENGINE STALLING

Diagnosis Procedure

INFOID:0000000000912067

1.CHECK FUEL

Check that the fuel reservoir is correctly filled and with the right fuel.

>> GO TO 2.

2.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness or connector.

4.CHECK AIR INTAKE SYSTEM

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace air intake system.

5.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace.

7.CHECK EGR SYSTEM

Check EGR system. Refer to EC-1415, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace.

8.CHECK CATALYTIC CONVERTER

Is the catalytic converter clogged or deteriorated?

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace.

9.CHECK CAN COMMUNICATION

cardiagn.com

Perform trouble diagnosis on the CAN communication line using CONSULT-III. Refer to LAN-59, "CAN Communication Signal Chart".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace harness or connector.

10. CHECK LOW PRESSURE CIRCUIT

Perform the TEST 1: LOW PRESSURE CIRCUIT CHECK. Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

>> GO TO 11.

11. CHECK INTERNAL FUEL TRANSFER PUMP

Perform the TEST 2: INTERNAL FUEL TRANSFER PUMP CHECK. Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

>> GO TO 12.

12. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 13.

13. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 14.

14. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 15.

15. CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 16.

16. CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

NO OR VERY LITTLE ACCELERATION, INCREASE IN ENGINE SPEED

Description

INFOID:0000000000912069

CHART 8: NO OR VERY LITTLE ACCELERATION, INCREASE IN ENGINE SPEED

Diagnosis Procedure

INFOID:0000000000912070

1.CHECK FUEL

Check that the fuel reservoir is correctly filled and with the right fuel.

>> GO TO 2.

2.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness or connector.

4.CHECK AIR INTAKE SYSTEM

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace air intake system.

5.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace.

7.CHECK TURBOCHARGER

Check that the turbocharger is working properly. Refer to EC-1410, "Diagnosis Procedure".

Is the turbocharger correct?

Yes >> GO TO 8.
No >> Repair or replace.

8.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check the accelerator pedal position sensor. Refer to EC-1408, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace.

9.CHECK EGR SYSTEM

Check EGR system. Refer to EC-1415, "Diagnosis Procedure".

cardiagn.com

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace.

10. CHECK CATALYTIC CONVERTER

Is the catalytic converter clogged or deteriorated?

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace.

11. CHECK CAN COMMUNICATION

Perform trouble diagnosis on the CAN communication line using CONSULT-III. Refer to LAN-59, "CAN Communication Signal Chart".

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair or replace harness or connector.

12. CHECK LOW PRESSURE CIRCUIT

Perform the TEST 1: LOW PRESSURE CIRCUIT CHECK. Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

>> GO TO 13.

13. CHECK INTERNAL FUEL TRANSFER PUMP

Perform the TEST 2: INTERNAL FUEL TRANSFER PUMP CHECK. Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

>> GO TO 14.

14. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 15.

15. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 16.

16. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 17.

17. CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 18.

18. CHECK INCORRECT FUEL INJECTION QUANTITY

cardiagn.com

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

ENGINE BUCKING

Description

INFOID:0000000000912072

CHART 9: ENGINE BUCKING

Diagnosis Procedure

INFOID:0000000000912073

1.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness or connector.

2.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check the accelerator pedal position sensor. Refer to EC-1408, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace.

4.CHECK ASCD CLUTCH SWITCH

Check ASCD clutch switch. Refer to EC-1401, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace.

5.CHECK VEHICLE SPEED SIGNAL

Check the following component.

- “ABS actuator and electric unit (control unit)” [Refer to BRC-17, "CONSULT-III Function (ABS)" (without ESP) or BRC-96, "CONSULT-III Function (ABS)" (with ESP).]
- Combination meter (Refer to MWI-23, "CONSULT-III Function (METER/M&A)".)

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK CAN COMMUNICATION

Perform trouble diagnosis on the CAN communication line using CONSULT-III. Refer to LAN-59, "CAN Communication Signal Chart".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace harness or connector.

7.CHECK AIR INTAKE SYSTEM

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace air intake system.

8.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

cardiagn.com

YES >> GO TO 9.
NO >> Repair or replace.

9.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace.

10.CHECK LOW PRESSURE CIRCUIT

Perform the TEST 1: LOW PRESSURE CIRCUIT CHECK. Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

>> GO TO 11.

11.CHECK INTERNAL FUEL TRANSFER PUMP

Perform the TEST 2: INTERNAL FUEL TRANSFER PUMP CHECK. Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

>> GO TO 12.

12.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 13.

13.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 14.

14.CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 15.

15.CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 16.

16.CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

ERRATIC ACCELERATION

Description

INFOID:0000000000912075

CHART 10: Erratic acceleration

Diagnosis Procedure

INFOID:0000000000912076

1.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness or connector.

2.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check the accelerator pedal position sensor. Refer to EC-1408, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace.

4.CHECK ASCD CLUTCH SWITCH

Check ASCD clutch switch. Refer to EC-1401, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace.

5.CHECK VEHICLE SPEED SIGNAL

Check the following component.

- “ABS actuator and electric unit (control unit)” [Refer to BRC-17, "CONSULT-III Function (ABS)" (without ESP) or BRC-96, "CONSULT-III Function (ABS)" (with ESP).]
- Combination meter (Refer to MWI-23, "CONSULT-III Function (METER/M&A)".)

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK CAN COMMUNICATION

Perform trouble diagnosis on the CAN communication line using CONSULT-III. Refer to LAN-59, "CAN Communication Signal Chart".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace harness or connector.

7.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 8.

8.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

cardiagn.com

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 9.

9. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 10.

10. CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 11.

11. CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

NO ENGINE BRAKING

Description

INFOID:0000000000912078

CHART 11: NO ENGINE BRAKING

Diagnosis Procedure

INFOID:0000000000912079

1.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness or connector.

2.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check the accelerator pedal position sensor. Refer to EC-1408, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace.

4.CHECK IDLE SPEED

Check idle speed. Refer to EC-1483, "Idle Speed".

>> GO TO 5.

5.CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 6.

6.CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

LOSS OF POWER

Description

INFOID:0000000000912081

CHART 12: LOSS OF POWER

Diagnosis Procedure

INFOID:0000000000912082

1.CHECK FUEL

Check that the fuel reservoir is correctly filled and with the right fuel.

>> GO TO 2.

2.CHECK FUEL FILTER

Check the correctness of the fuel filter.

Is the fuel filter correct?

Yes >> GO TO 3.
No >> Replace the fuel filter with an genuine part.

3.CHECK ENGINE OIL

Check the grade of engine oil. Refer to LU-23, "Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace engine oil. Refer to LU-24, "Refilling"

4.CHECK ENGINE OIL LEVEL

Is the engine oil level correct?

Yes or No

Yes >> GO TO 5.
No >> Top up the oil.

5.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness or connector.

6.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace harness or connector.

7.CHECK AIR INTAKE SYSTEM

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace.

8.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace.

9.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

cardiagn.com

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace.

10. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check the accelerator pedal position sensor. Refer to EC-1408, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace.

11. CHECK ASCD CLUTCH SWITCH

Check ASCD clutch switch. Refer to EC-1401, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair or replace.

12. CHECK VEHICLE SPEED SIGNAL

Check the following component.

- "ABS actuator and electric unit (control unit)" [Refer to BRC-17, "CONSULT-III Function (ABS)" (without ESP) or BRC-96, "CONSULT-III Function (ABS)" (with ESP).]
- Combination meter (Refer to MWI-23, "CONSULT-III Function (METER/M&A)".)

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair or replace.

13. CHECK TURBOCHARGER

Check that the turbocharger is working properly. Refer to EC-1410, "Diagnosis Procedure".

Is the turbocharger correct?

Yes >> GO TO 14.
No >> Repair or replace.

14. CHECK CAN COMMUNICATION

Perform trouble diagnosis on the CAN communication line using CONSULT-III. Refer to LAN-59, "CAN Communication Signal Chart".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace harness or connector.

15. CHECK EGR SYSTEM

Check EGR system. Refer to EC-1415, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 16.
NO >> Repair or replace.

16. CHECK CATALYTIC CONVERTER

Is the catalytic converter clogged or deteriorated?

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair or replace.

17. CHECK LOW PRESSURE CIRCUIT

Perform the TEST 1: LOW PRESSURE CIRCUIT CHECK. Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

>> GO TO 18.

18. CHECK INTERNAL FUEL TRANSFER PUMP

cardiagn.com

Perform the TEST 2: INTERNAL FUEL TRANSFER PUMP CHECK. Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

>> GO TO 19.

19. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 20.

20. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 21.

21. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 22.

22. CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 23.

23. CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

TOO MUCH POWER

Description

INFOID:0000000000912084

CHART 13: TOO MUCH POWER

Diagnosis Procedure

INFOID:0000000000912085

1.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness or connector.

2.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to EC-1344, "Component Inspection".

Is the turbocharger correct?

Yes >> GO TO 4.
No >> Repair or replace.

4.CHECK TURBOCHARGER

Check that the turbocharger is working properly. Refer to EC-1410, "Diagnosis Procedure".

Is the turbocharger correct?

Yes >> GO TO 5.
No >> Repair or replace.

5.CHECK CLUTCH SWITCH

Check clutch switch. Refer to EC-1401, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK VEHICLE SPEED SIGNAL

Check the following component.

- “ABS actuator and electric unit (control unit)” [Refer to BRC-17, "CONSULT-III Function (ABS)" (without ESP) or BRC-96, "CONSULT-III Function (ABS)" (with ESP).]
- Combination meter (Refer to MWI-23, "CONSULT-III Function (METER/M&A)".)

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace.

7.CHECK CAN COMMUNICATION

Perform trouble diagnosis on the CAN communication line using CONSULT-III. Refer to LAN-59, "CAN Communication Signal Chart".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace harness or connector.

8.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

cardiagn.com

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 9.

9. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 10.

10. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 11.

11. CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 12.

12. CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

OVERSPEED AT IDLE SPEED OR ON RELEASING BRAKE

Description

INFOID:0000000000912087

CHART 14: OVERSPEED AT IDLE SPEED OR ON RELEASING BRAKE

Diagnosis Procedure

INFOID:0000000000912088

1.CHECK ENGINE OIL

Check the grade of engine oil. Refer to LU-23, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace engine oil. Refer to LU-24, "Refilling"

2.CHECK ENGINE OIL LEVEL

Is the engine oil level correct?

Yes or No

Yes >> GO TO 3.
No >> Top up the oil.

3.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness or connector.

4.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connector.

5.CHECK CAN COMMUNICATION

Perform trouble diagnosis on the CAN communication line using CONSULT-III. Refer to LAN-59, "CAN Communication Signal Chart".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness or connector.

6.CHECK “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Perform trouble diagnosis on the “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”. Refer to BRC-17, "CONSULT-III Function (ABS)" (without ESP) or BRC-96, "CONSULT-III Function (ABS)" (with ESP).

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Repair or replace.

cardiagn.com

EXCESSIVE CONSUMPTION

Description

INFOID:0000000000912090

CHART 15:EXCESSIVE CONSUMPTION

Diagnosis Procedure

INFOID:0000000000912091

1.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness or connector.

2.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK AIR INTAKE SYSTEM

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace air intake system.

4.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace.

5.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK TURBOCHARGER

Check that the turbocharger is working properly. Refer to EC-1410, "Diagnosis Procedure".

Is the turbocharger correct?

Yes >> GO TO 7.
No >> Repair or replace.

7.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to EC-1344, "Component Inspection".

Is the inspection result normal?

Yes >> GO TO 8.
No >> Repair or replace.

8.CHECK LOW PRESSURE CIRCUIT

Perform the TEST 1: LOW PRESSURE CIRCUIT CHECK. Refer to EC-1262, "BASIC INSPECTION : Special Repair Requirement (TEST 1: Low Pressure Fuel Supply System Check)".

>> GO TO 9.

9.CHECK INTERNAL FUEL TRANSFER PUMP

cardiagn.com

Perform the TEST 2: INTERNAL FUEL TRANSFER PUMP CHECK. Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement (TEST 2: Internal Fuel Transfer Pump Check)".

>> GO TO 10.

10. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 11.

11. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 12.

12. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 13.

13. CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 14.

14. CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

ENGINE KNOCK

Description

INFOID:0000000000912093

CHART 16: ENGINE KNOCK

Diagnosis Procedure

INFOID:0000000000912094

1.CHECK ENGINE OIL

Check the grade of engine oil. Refer to LU-23, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace engine oil. Refer to LU-24, "Refilling"

2.CHECK ENGINE OIL LEVEL

Is the engine oil level correct?

Yes or No

Yes >> GO TO 3.
No >> Top up the oil.

3.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness or connector.

4.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connector.

5.CHECK AIR INTAKE SYSTEM

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace air intake system.

6.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace.

7.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace.

8.CHECK CATALYTIC CONVERTER

Is the catalytic converter clogged or deteriorated?

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace.

9.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

cardiagn.com

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 10.

10. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 11.

11. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 12.

12. CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 13.

13. CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

ENGINE OVERHEATING

Description

INFOID:0000000000912096

CHART 17: ENGINE OVERHEATING

Diagnosis Procedure

INFOID:0000000000912097

1.CHECK COOLING SYSTEM

Check the cooling system. Refer to CO-48, "Troubleshooting Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace.

2.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness or connector.

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to EC-1344, "Component Inspection".

Is the inspection result normal?

Yes >> GO TO 5.
No >> Repair or replace.

5.CHECK COOLING FAN OPERATION

Check cooling fan operation. Refer to EC-1422, "Component Function Check".

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Repair or replace.

cardiagn.com

ENGINE SMOKES WHEN STARTED

Description

INFOID:0000000000912099

CHART 18: ENGINE SMOKES WHEN STARTED

Diagnosis Procedure

INFOID:0000000000912100

1.CHECK ENGINE OIL

Check the grade of engine oil. Refer to LU-23, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace engine oil. Refer to LU-24, "Refilling"

2.CHECK ENGINE OIL LEVEL

Is the engine oil level correct?

Yes or No

Yes >> GO TO 3.
No >> Top up the oil.

3.CHECK FUEL PUMP TEMPERATURE SENSOR

Check fuel pump temperature sensor. Refer to EC-1348, "Component Inspection".

Is the inspection result normal?

Yes >> GO TO 4.
No >> Repair or replace.

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to EC-1344, "Component Inspection".

Is the inspection result normal?

Yes >> GO TO 5.
No >> Repair or replace.

5.CHECK COOLING SYSTEM

Check the cooling system. Refer to CO-48, "Troubleshooting Chart".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 7.

7.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 8.

8.CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> **INSPECTION END**

cardiagn.com

ENGINE EMITS BLUE SMOKE

Description

INFOID:0000000000912102

CHART 19: ENGINE EMITS BLUE SMOKE

Diagnosis Procedure

INFOID:0000000000912103

1.CHECK ENGINE OIL

Check the grade of engine oil. Refer to LU-23, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace engine oil. Refer to LU-24, "Refilling"

2.CHECK ENGINE OIL LEVEL

Is the engine oil level correct?

Yes or No

Yes >> GO TO 3.
No >> Top up the oil.

3.CHECK FUEL

Check that the fuel reservoir is correctly filled and with the right fuel.

>> GO TO 4.

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to EC-1344, "Component Inspection".

Is the inspection result normal?

Yes >> GO TO 5.
No >> Repair or replace.

5.CHECK AIR INTAKE SYSTEM

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace air intake system.

6.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace.

7.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace.

8.CHECK TURBOCHARGER

Check that the turbocharger is working properly. Refer to EC-1410, "Diagnosis Procedure".

Is the turbocharger correct?

Yes >> GO TO 9.
No >> Repair or replace.

9.CHECK EGR SYSTEM

Check EGR system. Refer to EC-1415, "Diagnosis Procedure".

cardiagn.com

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace.

10. CHECK CATALYTIC CONVERTER

Is the catalytic converter clogged or deteriorated?

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace.

11. CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 12.

12. CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 13.

13. CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 14.

14. CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 15.

15. CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> GO TO 16.

16. CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair or replace harness or connector.

17. CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Repair or replace harness or connector.

cardiagn.com

ENGINE SMOKES WHEN REVVED

Description

INFOID:0000000000912111

CHART 20: ENGINE SMOKES WHEN REVVED

Diagnosis Procedure

INFOID:0000000000912112

1.CHECK ENGINE OIL

Check the grade of engine oil. Refer to LU-23, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace engine oil. Refer to LU-24, "Refilling"

2.CHECK ENGINE OIL LEVEL

Is the engine oil level correct?

Yes or No

Yes >> GO TO 3.
No >> Top up the oil.

3.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1344, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness or connector.

4.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness or connector.

5.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Repair or replace.

cardiagn.com

ENGINE EMITS WHITE SMOKE (ESPECIALLY WHEN STARTING)

Description

INFOID:0000000000912105

CHART 21: ENGINE EMITS WHITE SMOKE (ESPECIALLY WHEN STARTING)

Diagnosis Procedure

INFOID:0000000000912106

1.CHECK FUEL

Check that the fuel reservoir is correctly filled and with the right fuel.

>> GO TO 2.

2.CHECK COOLING SYSTEM

Check the cooling system. Refer to CO-48, "Troubleshooting Chart".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK GLOW SYSTEM

Check the glow system. Refer to EC-1370, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace glow system. Refer to EM-275, "Removal and Installation"

4.CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 5.

5.CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

EMISSION CONTROL NOT SATISFACTORY

Description

INFOID:0000000000912108

CHART 22: EMISSION CONTROL NOT SATISFACTORY

Diagnosis Procedure

INFOID:0000000000912109

1.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-1317, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness or connector.

2.CHECK WIRING HARNESS

Visually check the condition of the engine wiring harness.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connector.

3.CHECK AIR INTAKE SYSTEM

Check air intake system. Refer to EM-265, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace air intake system.

4.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Check electric throttle control actuator. Refer to EC-1345, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace.

5.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-1337, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace.

6.CHECK TURBOCHARGER

Check that the turbocharger is working properly. Refer to EC-1410, "Diagnosis Procedure".

Is the turbocharger correct?

Yes >> GO TO 7.
No >> Repair or replace.

7.CHECK EGR SYSTEM

Check EGR system. Refer to EC-1415, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace.

8.CHECK HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE)

Perform the TEST 3: HIGH PRESSURE SUPPLY PUMP (PRESSURE CONTROL VALVE). Refer to EC-1263, "BASIC INSPECTION : Special Repair Requirement [TEST 3: High Pressure Supply Pump (Pressure Control Valve) Check]".

>> GO TO 9.

cardiagn.com

9.CHECK HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE)

Perform the TEST 4: HIGH PRESSURE SUPPLY PUMP (VOLUMETRIC CONTROL VALVE). Refer to EC-1264, "BASIC INSPECTION : Special Repair Requirement [TEST 4: High Pressure Supply Pump (Volumetric Control Valve) Check]".

>> GO TO 10.

10.CHECK RAIL HIGH PRESSURE CONTROL CIRCUIT

Perform the TEST 5: RAIL HIGH PRESSURE CONTROL CIRCUIT CHECK. Refer to EC-1267, "BASIC INSPECTION : Special Repair Requirement (TEST 5: Rail High Pressure Regulation Check)".

>> GO TO 11.

11.CHECK MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN

Perform the TEST 6: MAJOR LEAK IN FUEL INJECTOR/FUEL INJECTORS OPEN. Refer to EC-1271, "BASIC INSPECTION : Special Repair Requirement (TEST 6: Major Leak in Fuel Injectors/Fuel Injectors Open)".

>> GO TO 12.

12.CHECK INCORRECT FUEL INJECTION QUANTITY

Perform the TEST 7: INCORRECT FUEL INJECTION QUANTITY. Refer to EC-1272, "BASIC INSPECTION : Special Repair Requirement (TEST 7: Incorrect Fuel Injection Quantity)".

>> **INSPECTION END**

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001102479

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

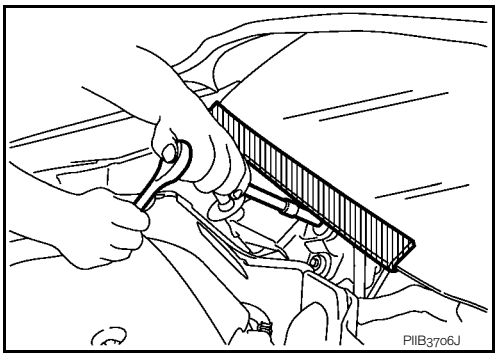
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001102480

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



On Board Diagnostic (OBD) System of Engine

INFOID:0000000000913967

The ECM has an on board diagnostic system. It will light up the malfunction indicator (MI) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

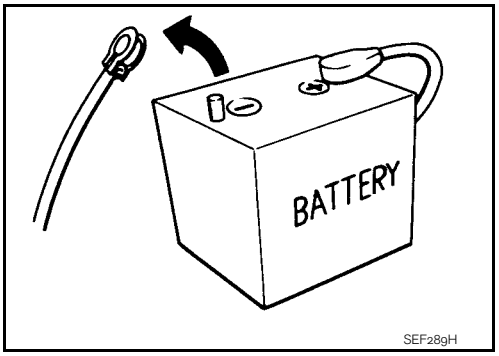
- **Be sure to turn the ignition switch OFF and disconnect the battery negative cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-105, "Description".**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MI to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to the malfunction of the fuel system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM before returning the vehicle to the customer.**

General Precautions

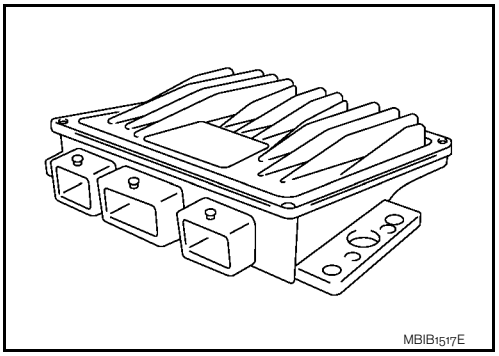
INFOID:0000000000913950

cardiagn.com

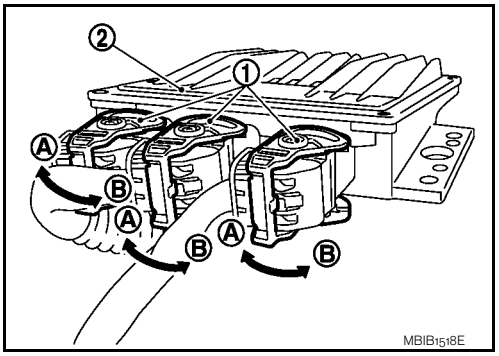
- **Always use a 12 volt battery as power source.**
- **Do not attempt to disconnect battery cables while engine is running.**
- **Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF, wait 3 minutes and disconnect battery negative cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.**
- **Before removing parts, turn ignition switch OFF and then disconnect battery negative cable.**



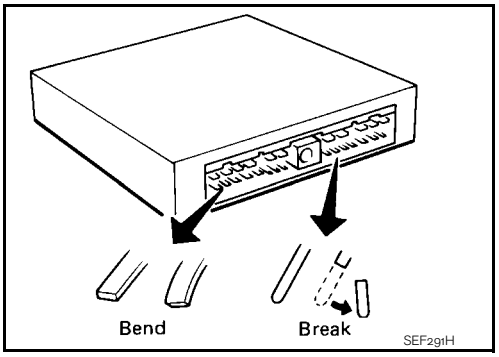
- **Do not disassemble ECM.**



- **When connecting ECM harness connector, fasten (A) it securely with levers (1) as far as they will go as shown in the figure.**
- **ECM (2)**
- **Loosen (B)**

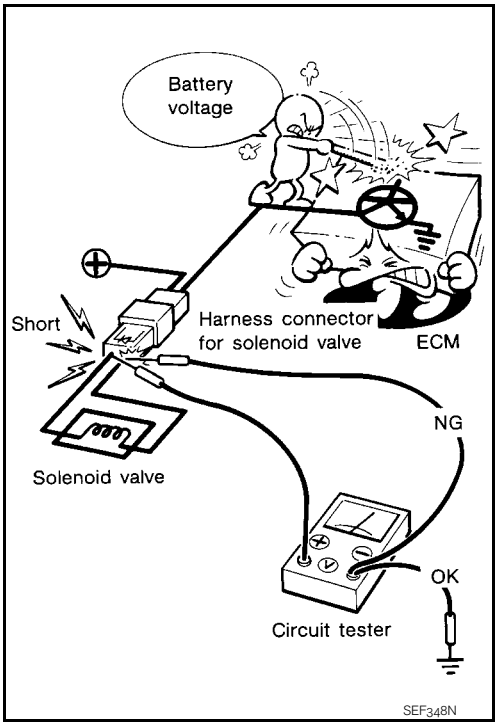


- **When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- **Securely connect ECM harness connectors.**
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to IC's.
- **Keep engine control system harness at least 10cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of IC's, etc.**
- **Keep engine control system parts and harness dry.**
- **Handle mass air flow sensor carefully to avoid damage.**
- **Do not disassemble mass air flow sensor.**
- **Do not clean mass air flow sensor with any type of detergent.**
- **Even a slight leak in the air intake system can cause serious incidents.**
- **Do not shock or jar the camshaft position sensor, crankshaft position sensor.**

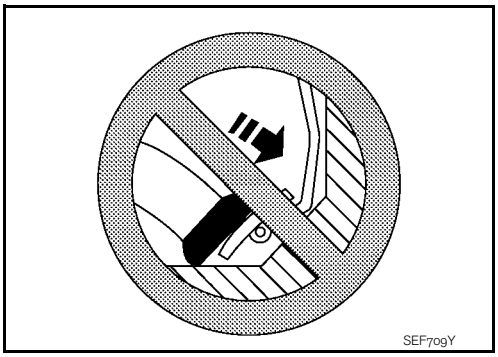


cardiagn.com

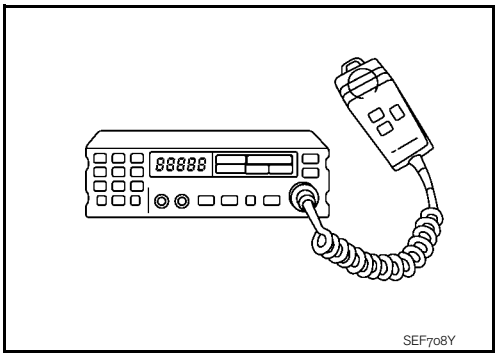
- **When measuring ECM signals with a circuit tester, never allow the two tester probes to contact.**
  Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- **Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**
- **Do not disassemble fuel pump.**
  If NG, take proper action.
- **Do not disassemble fuel injector.**
  If NG, replace fuel injector.



- **Do not depress accelerator pedal when staring.**
- **Immediately after staring, do not rev up engine unnecessarily.**
- **Do not rev up engine just prior to shutdown.**

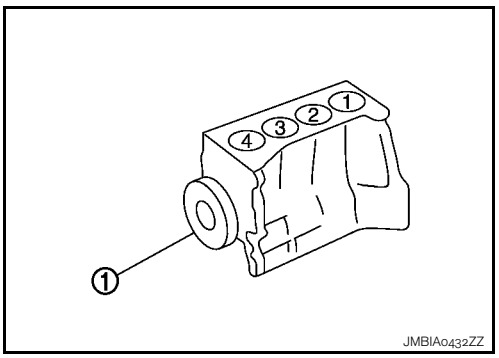


- **When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.**
- **Keep the antenna as far as possible from the electronic control units.**
- **Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.**
  Do not let them run parallel for a long distance.
- **Adjust the antenna and feeder line so that the standingwave radio can be kept smaller.**
- **Be sure to ground the radio to vehicle body.**



cardiagn.com

- **Cylinder NO.1 is at the flywheel end.**
  -1: Crankshaft pulley



ENGINE RUNNING

- **No work should be carried out on the hydraulic system while engine is running.**
- **Remember that fuel pressure values in hydraulic circuit can reach up to 1,600 bar.**
- **Keep hands or face (particularly eyes) out of any high pressure leak.**
- **Recall that fuel is dangerous for health.**

FUEL RAIL PRESSURE SENSOR

- **Under warranty, do not remove the fuel rail pressure sensor from the rail.**
- **Do not try to measure the resistance of the fuel rail pressure sensor. This test is destructive for the internal components.**

FUEL INJECTOR

- **Fuel injectors are driven by over 100V.**
- **FUEL injector electronics are polarised. In case of intervention on wiring harness, do not invertwires. It is destructive for the piezo components.**
- **Do not drive the fuel injectors if their body is not connected to the battery ground (risk ofelectro-static discharge). For instance, fuel injector body have to be in contact with cylinder.**
- **Piezo fuel injector connector must not be unplugged while engine is running. Risk of majordamage to the engine (fuel injector could stay opened).**

Cleanliness

INFOID:0000000001077696

Cleanliness

RISKS ASSOCIATED WITH CONTAMINATION

The high pressure direct injection system is highly sensitive to contamination. The risks associated withcontamination are:

- damage to or destruction of the high pressure injection system,
- components jamming,
- components losing seal integrity.

All After-Sales operations must be performed under very clean conditions. This means that no impurities (particles a few microns in size) should have entered the system during dismantling.

The cleanliness principle must be applied from the filter to the fuel injectors.

What are the sources of contamination?

- metal or plastic chips,
- paint,
- fibres:
  - from cardboard,
  - from brushes,
  - from paper,
  - from clothing,
  - from cloths,
- foreign bodies such as hair,
- ambient air
- etc.

NOTE:

Cleaning the engine using a high pressure washer is prohibited because of the risk of damaging connections. In addition, moisture may collect in the connectors and create electrical connection malfunction.

INSTRUCTIONS TO BE FOLLOWED BEFORE CARRYING OUT ANY WORK

cardiagn.com

NOTE:
Before any work is carried out on the high pressure injection system, protect:
- the accessories and timing belts,
- the electrical accessories, (starter, alternator, electric power assisted steering pump),
- the flywheel surface, to prevent any diesel from running onto the clutch friction plate.

- Check that you have plugs for the unions to be opened (set of plugs available from the Parts Department). The plugs are single-use only. After use, they must be discarded (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plugs must be discarded.
- Check that you have hermetically resealable plastic bags for storing removed parts. Stored parts will therefore be less subject to the risk of impurities. The bags are to be used once only, and discarded after use.
- Use lint-free cleaning cloths. Using normal cloth or paper is prohibited. They are not lint-free and could contaminate the fuel circuit. Each cloth should only be used once.
- Use fresh cleaning agent for each operation (used cleaning agent is contaminated). Pour it into an uncontaminated container.
- For each operation, use a clean brush in good condition (the brush must not shed its bristles).
- Use a brush and cleaning agent to clean the unions to be opened.
- Blast compressed air over the cleaned parts (tools, workbench, the parts, unions and injection system zones). Check that no bristles remain.
- Wash your hands before and during the operation if necessary.
- When wearing leather protective gloves cover them with latex gloves to prevent contamination.

INSTRUCTIONS TO BE FOLLOWED WHEN CARRYING OUT ANY WORK
- As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Department. The plugs must not be reused under any circumstances.
- Seal the pouch shut, even if it has to be opened shortly afterwards. Ambient air carries contamination.
- All components removed from the injection system must be stored in a hermetically sealed plastic bag once they have been plugged.
- Using a brush, cleaning agent, air gun, sponge or normal cloth is strictly prohibited once the circuit has been opened. These items could allow contamination to enter the system.
- A new component replacing an old one must not be removed from its packaging until it is to be fitted to the vehicle.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

INFOID:0000000001102283

Condition	Specification
No load* (in Neutral position)	800 ± 50 rpm

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, glow plug, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

cardiagn.com

cardiagn.com

cardiagn.com

cardiagn.com

cardiagn.com

SECTION CO
ENGINE COOLING SYSTEM

CONTENTS

HR16DE

FUNCTION DIAGNOSIS 4

DESCRIPTION 4
Engine Cooling System 4
Engine Cooling System Schematic 4

SYMPTOM DIAGNOSIS 5

OVERHEATING CAUSE ANALYSIS 5
Troubleshooting Chart 5

PRECAUTION 7

PRECAUTIONS 7
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 7

PREPARATION 8

PREPARATION 8
Special Service Tools 8

ON-VEHICLE MAINTENANCE 9

ENGINE COOLANT 9
Inspection 9
Draining 9
Refilling 9
Flushing 10

RADIATOR 12

RESERVOIR TANK CAP 12
RESERVOIR TANK CAP : Inspection 12

RADIATOR 12
RADIATOR : Inspection 12

ON-VEHICLE REPAIR 13

RADIATOR 13
Exploded View 13
Removal and Installation 13
Inspection 14

COOLING FAN 15
Exploded View 15
Removal and Installation 15
Disassembly and Assembly 15
Inspection 16

WATER PUMP 17
Exploded View 17
Removal and Installation 17
Inspection 18

THERMOSTAT 19
Exploded View 19
Removal and Installation 19
Inspection 20

WATER OUTLET 21
Exploded View 21
Removal and Installation 21
Inspection 22

SERVICE DATA AND SPECIFICATIONS (SDS) 23

SERVICE DATA AND SPECIFICATIONS (SDS) 23
Periodical Maintenance Specification 23
Radiator 23
Thermostat 23

MR20DE

FUNCTION DIAGNOSIS 24

DESCRIPTION 24

M/T 24
M/T : Engine Cooling System 24
M/T : Engine Cooling System Schematic 24

cardiagn.com

CVT **25**
CVT : Engine Cooling System 25
CVT : Engine Cooling System Schematic 25

SYMPTOM DIAGNOSIS **26**

OVERHEATING CAUSE ANALYSIS **26**
Troubleshooting Chart 26

PRECAUTION **28**

PRECAUTIONS **28**
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 28

PREPARATION **29**

PREPARATION **29**
Special Service Tools 29

ON-VEHICLE MAINTENANCE **30**

ENGINE COOLANT **30**
Inspection 30
Draining 30
Refilling 30
Flushing 31

RADIATOR **33**

RESERVOIR TANK CAP **33**
RESERVOIR TANK CAP : Inspection 33

RADIATOR **33**
RADIATOR : Inspection 33

ON-VEHICLE REPAIR **34**

RADIATOR **34**
Exploded View 34
Removal and Installation 35
Inspection 36

COOLING FAN **37**
Exploded View 37
Removal and Installation 37
Disassembly and Assembly 37
Inspection 38

WATER PUMP **39**
Exploded View 39
Removal and Installation 39
Inspection 39

THERMOSTAT **41**
Exploded View 41
Removal and Installation 41
Inspection 42

WATER OUTLET **44**
Exploded View 44
Removal and Installation 44
Inspection 45

SERVICE DATA AND SPECIFICATIONS (SDS) **46**

SERVICE DATA AND SPECIFICATIONS (SDS) **46**
Periodical Maintenance Specification 46
Radiator 46
Thermostat 46
Heater Thermostat (CVT models) 46
Water Control Valve 46

K9K

FUNCTION DIAGNOSIS **47**

DESCRIPTION **47**
Engine Cooling System 47

SYMPTOM DIAGNOSIS **48**

OVERHEATING CAUSE ANALYSIS **48**
Troubleshooting Chart 48

PRECAUTION **50**

PRECAUTIONS **50**
Precaution for Liquid Gasket 50

PREPARATION **51**

PREPARATION **51**
Special Service Tools 51
Commercial Service Tools 51

ON-VEHICLE MAINTENANCE **52**

ENGINE COOLANT **52**
Inspection 52
Draining 52
Refilling 52
Flushing 53

RADIATOR **55**

RADIATOR CAP **55**
RADIATOR CAP : Inspection 55

RADIATOR **55**
RADIATOR : Inspection 55

ON-VEHICLE REPAIR **56**

RADIATOR **56**
Exploded View 56
Removal and Installation 56
Inspection 57

COOLING FAN **58**
Exploded View 58
Removal and Installation 58
Disassembly and Assembly 58

cardiagn.com

Inspection 59

WATER PUMP 60
Exploded View 60
Removal and Installation 60
Inspection 60

WATER OUTLET AND THERMOSTAT ASSEMBLY 62
Exploded View 62
Removal and Installation 62
Inspection 62

SERVICE DATA AND SPECIFICATIONS (SDS) 64

SERVICE DATA AND SPECIFICATIONS (SDS) 64
Periodical Maintenance Specification 64
Radiator 64
Thermostat 64

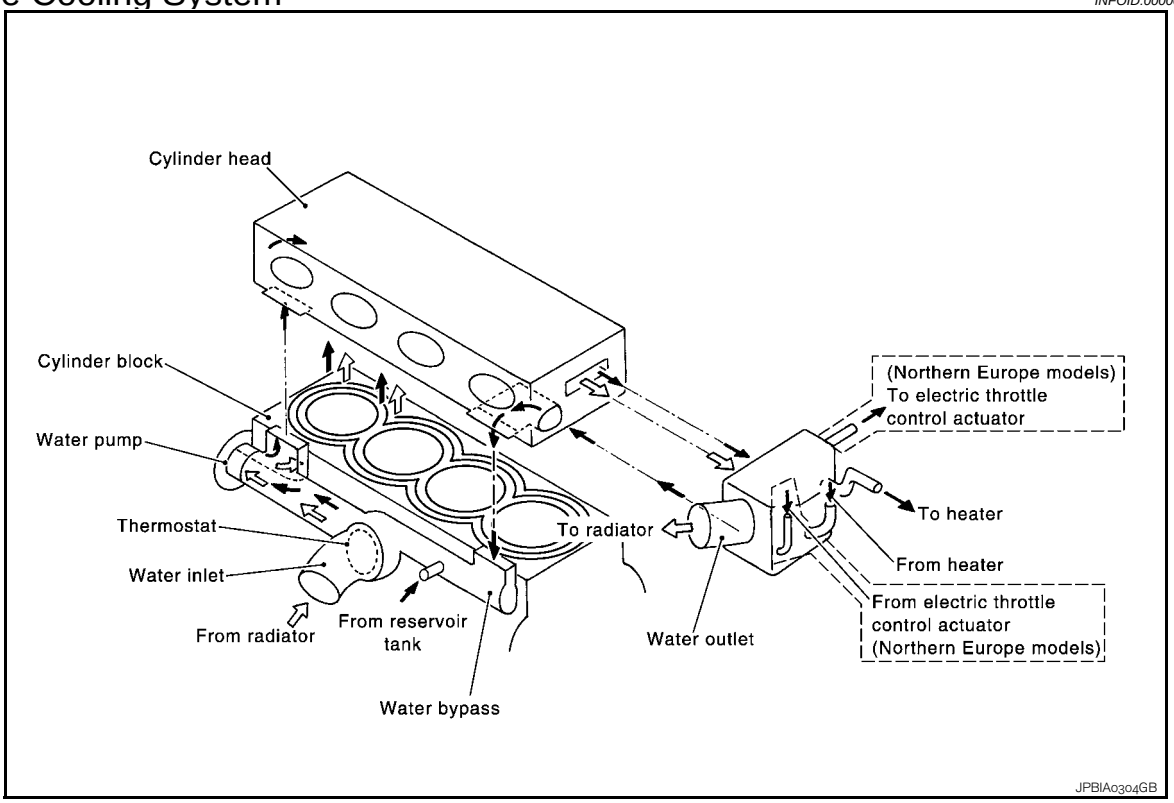
cardiagn.com

FUNCTION DIAGNOSIS

DESCRIPTION

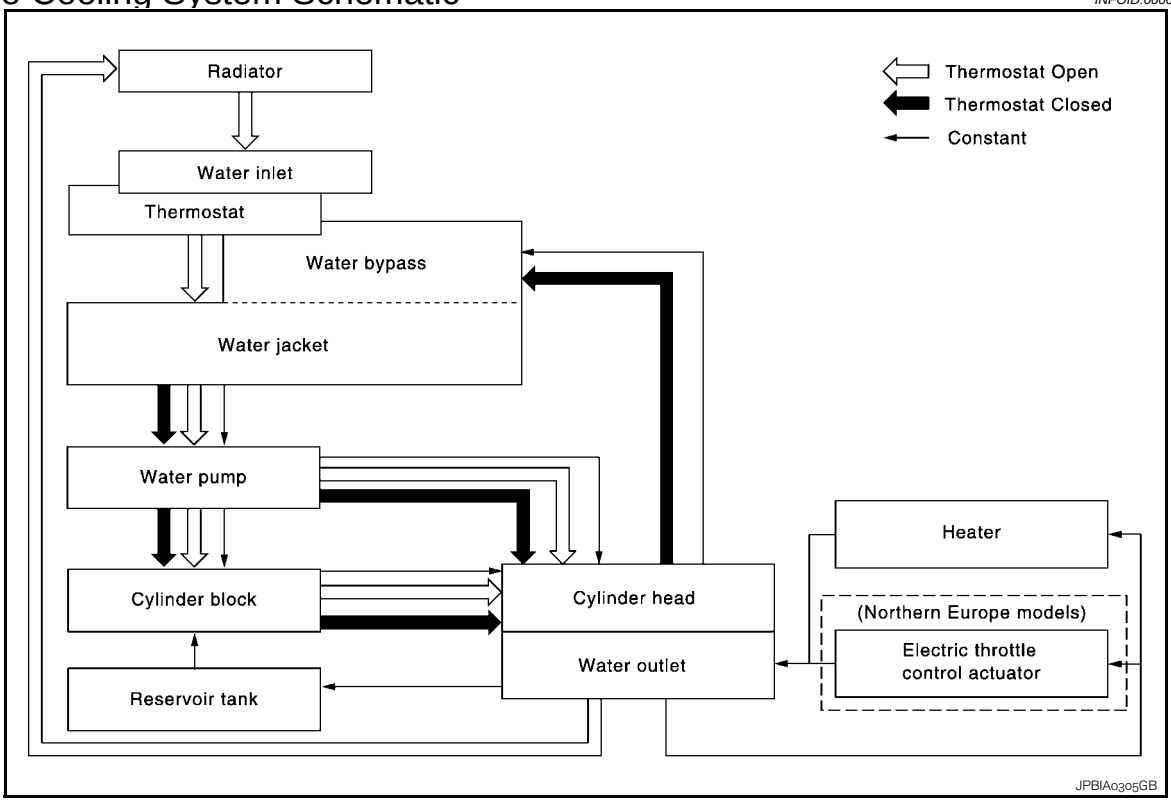
Engine Cooling System

INFOID:0000000000903731



Engine Cooling System Schematic

INFOID:0000000000903732



cardiagn.com

SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000000903733

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Physical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper engine coolant mixture ratio	—	—	—
	Poor engine coolant quality	—	Engine coolant viscosity	—
	Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Reservoir tank cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

cardiagn.com

	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Power train system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	Blocked or restricted air flow	Blocked bumper	—	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
		Blocked radiator	—	
		Blocked condenser	Blocked air flow	
		Installed large fog lamp		

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001094853

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

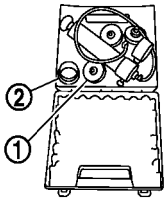
cardiagn.com

PREPARATION

PREPARATION

Special Service Tools

INFOID:0000000000903729

Tool number (RENAULT tool number) Tool name	Description
— (M.S. 554-07) Reservoir tank cap tester 1. Adapter A — (M.S. 554-01) 2. Adapter B — (M.S. 554-06)  E1BIA0058ZZ	Checking radiator and reservoir tank cap

cardiagn.com

ON-VEHICLE MAINTENANCE

ENGINE COOLANT

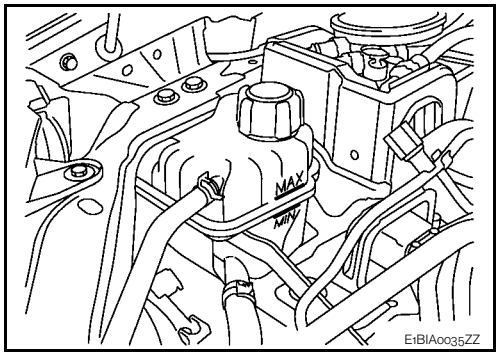
Inspection

INFOID:0000000000903734

LEVEL

- Check if the reservoir tank engine coolant level is within the “MIN” to “MAX” when the engine is cool.
- Adjust the engine coolant level as necessary.
- Check that the reservoir tank cap is tightened.

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.

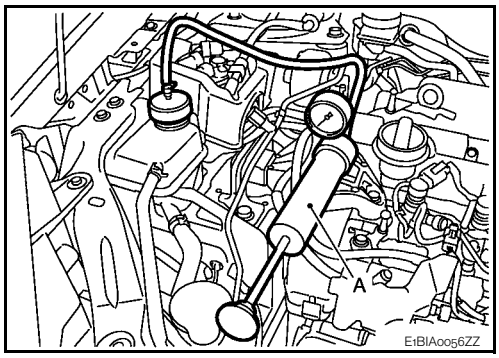


LEAKAGE

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.

Testing pressure: Refer to CO-23, "Radiator".

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.
CAUTION:
Higher test pressure than specified may cause radiator damage.



- If anything is found, repair or replace damaged parts.

Draining

INFOID:0000000000903735

WARNING:
- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around the reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Disconnect radiator hose (lower) and reservoir tank cap.
   When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to EM-93, "Exploded View".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing. Refer to CO-13, "Exploded View".
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to CO-12, "RADIATOR : Inspection".

Refilling

INFOID:0000000000903736

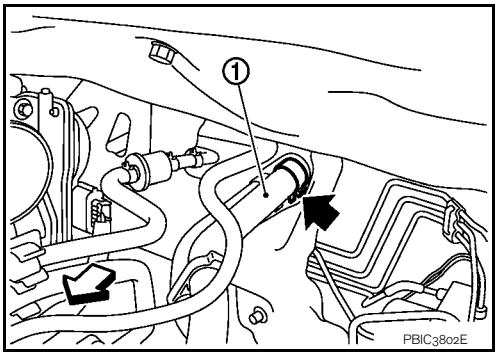
1. Install reservoir tank if removed.
2. Connect radiator hose (lower).
   - If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-74, "Exploded View".
3. Make sure that each hose clamp has been firmly tightened.

cardiagn.com

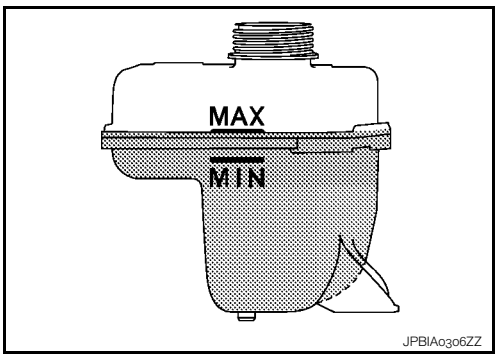
4. Disconnect heater hose (1) at position (⬅) in the figure.

⇦ : Vehicle front

- Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.



5. Fill reservoir tank to specified level.
   - **Pour coolant slowly of less than 2 (1-3/4 lmp qt) a minute to allow air in system to escape.**
   - **When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.**
   - **Start engine without closing reservoir tank cap.**
   - **Keep engine racing at 1,500 rpm for about 2-3 minutes, filling reservoir tank up to MAX. Level, if necessary.**
   - **Use Genuine Nissan Engine Coolant or equivalent mixed with water (distilled or demineralized). Refer to MA-21, "Fluids and Lubricants".**



Engine coolant capacity
(With reservoir tank at "MAX" level)

Refer to **CO-23, "Periodical Maintenance Specification".**

Reservoir tank engine coolant capacity
(At "MAX" level)

Refer to: CO-23, "Periodical Maintenance Specification".

6. Install reservoir tank cap.
7. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 2,000 - 2,500 rpm.
   - Make sure thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

   CAUTION:
   Watch water temperature gauge so as not to overheat engine.
8. Stop the engine and cool down to less than approximately 50°C (122°F).
   - Cool down using fan to reduce the time.
9. Refill reservoir tank to "MAX" level line with engine coolant, if necessary.
10. Repeat steps 6 through 9 two or more times with reservoir tank cap installed until reservoir tank level no longer drops.
11. Check cooling system for leaks with engine running.
12. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
    - Sound may be noticeable at heater unit.
13. Repeat step 12 three times.
14. If sound is heard, bleed air from cooling system by repeating step 6 through 9 until reservoir tank level no longer drops.
15. Check that the reservoir tank cap is tightened.

Flushing

INFOID:0000000000903737

1. Install reservoir tank if removed.
2. Disconnect radiator hose (lower) and reservoir tank cap.

cardiagn.com

If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-83, "Exploded View".

3. Fill reservoir tank with water and reinstall reservoir tank cap.
4. Run the engine and warm it up to normal operating temperature.
5. Rev the engine two or three times under no-load.
6. Stop the engine and wait until it cools down.
7. Drain water from the system. Refer to CO-9, "Draining".
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.
9. Check that the reservoir tank cap is tightened.

cardiagn.com

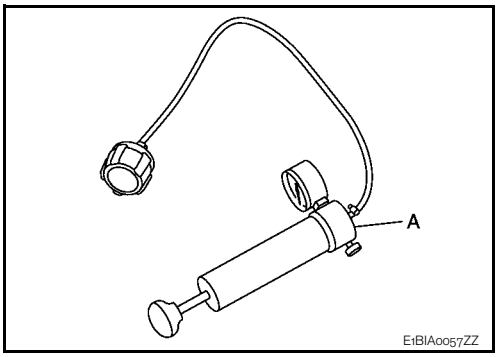
RADIATOR

RESERVOIR TANK CAP

RESERVOIR TANK CAP : Inspection

INFOID:0000000000903738

- Fit the adapter to the reservoir tank cap tester [SST: — (M.S. 554-07)] (A) as shown.
- When connecting the reservoir tank cap to the reservoir tank cap tester, apply water or LLC to the reservoir tank cap seal part.
- Check reservoir tank cap relief pressure.



Standard and limit : Refer to CO-23, "Radiator".

- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.

CAUTION:

When installing reservoir tank cap, thoroughly wipe out the reservoir tank filler neck to remove any waxy residue or foreign material.

RADIATOR

RADIATOR : Inspection

INFOID:0000000000903739

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:

- **Be careful not to bend or damage radiator fins.**
- **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and connectors to prevent water from entering.**

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

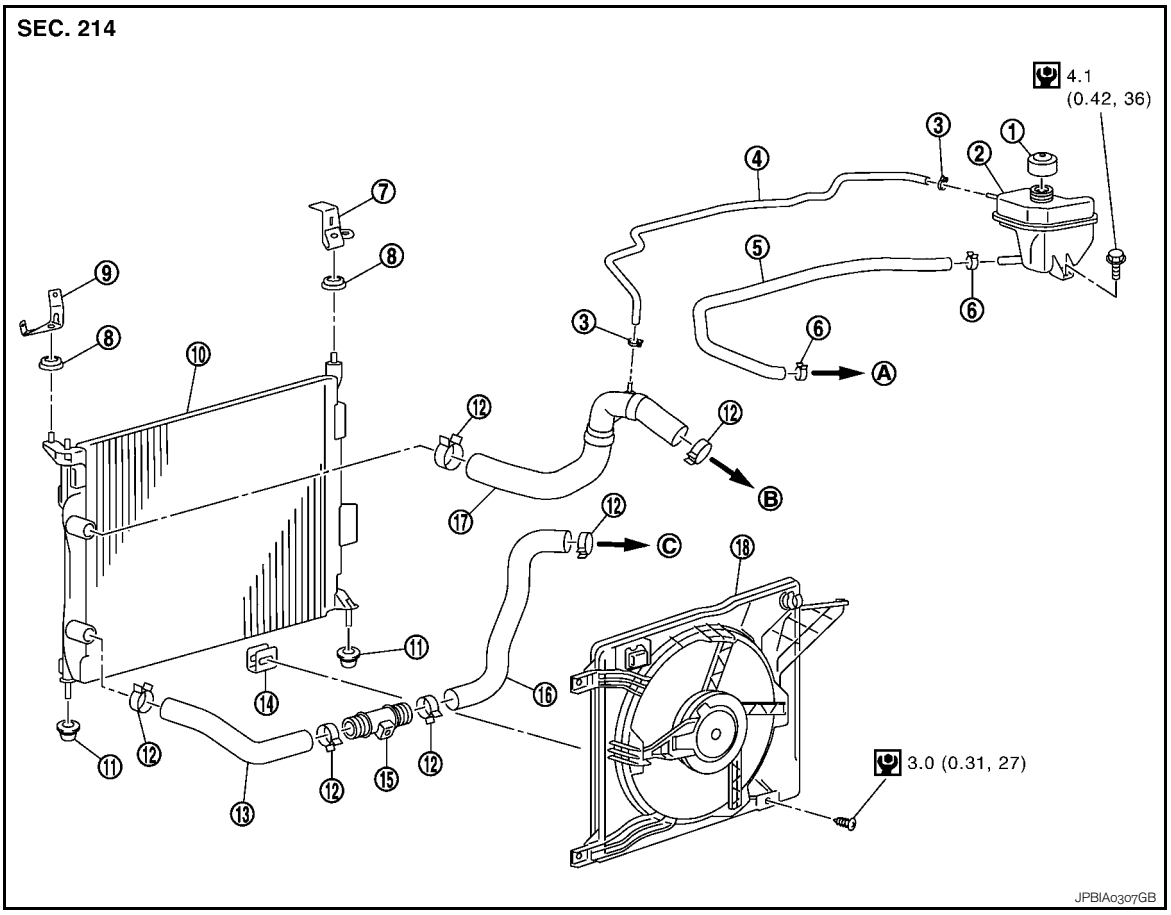
cardiagn.com

ON-VEHICLE REPAIR

RADIATOR

Exploded View

INFOID:0000000000903740



1. Reservoir tank cap	2. Reservoir tank	3. Clamp
4. Reservoir tank hose	5. Reservoir tank hose	6. Clamp
7. Bracket	8. Mounting rubber (upper)	9. Bracket
10. Radiator	11. Mounting rubber (lower)	12. Clamp
13. Radiator hose (lower)	14. Clip	15. Radiator hose pipe
16. Radiator hose (lower)	17. Radiator hose (upper)	18. Cooling fan assembly
A. To cylinder block	B. To water outlet	C. To water inlet

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000903741

REMOVAL

WARNING:

- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Drain engine coolant from radiator. Refer to CO-9, "Draining".

   CAUTION:

   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**

cardiagn.com

2. Remove air duct (inlet). Refer to EM-27, "Exploded View".
3. Remove reservoir tank hose at radiator hose (upper) side.
4. Disconnect connector from resistor and fan motor, and move harness to aside.
5. Remove cooling fan assembly. Refer to CO-15, "Exploded View".
   CAUTION:
   Be careful not to damage radiator core.
6. Remove radiator hose (upper and lower).
7. Remove liquid tank bracket mounting bolts. Refer to HA-36, "Exploded View".
8. Remove mounting bracket (upper).
9. Lift up the A/C condenser to disengage the radiator, and then remove the radiator.
   CAUTION:
   Be careful not to damage or scratch radiator and A/C condenser core.

INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:0000000000903742

INSPECTION AFTER INSTALLATION

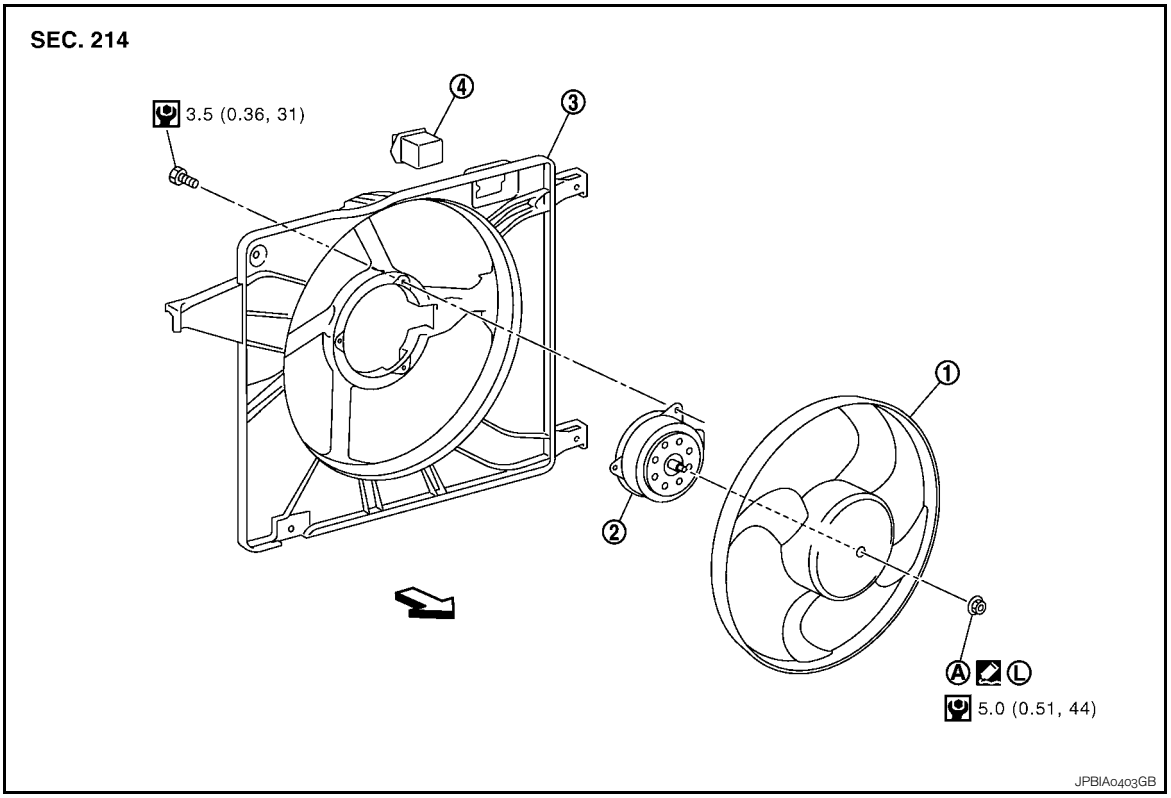
- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07). Refer to CO-9, "Inspection".
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

cardiagn.com

COOLING FAN

Exploded View

INFOID:0000000000903743



1.	Cooling fan	2.	Fan motor	3.	Fan shroud
4.	Resistor				
A.	Reverse screw				

: Apply thread locking sealant.

: Vehicle front

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000903744

REMOVAL

1. Remove air duct (inlet). Refer to EM-27, "Exploded View".
2. Disconnect harness connector from resistor and fan motor, and move harness to aside.
3. Remove cooling fan assembly.
   CAUTION:
   Be careful not to damage or scratch on radiator core.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged).

NOTE:

Cooling fan is controlled by ECM. For details, refer to EC-299, "Description".

Disassembly and Assembly

INFOID:0000000000905131

DISASSEMBLY

cardiagn.com

1. Remove resistor from fan shroud.
   CAUTION:
   Handle carefully to avoid dropping and shocks.
2. Remove cooling fan mounting nuts, and then remove the cooling fan.
   CAUTION:
   Reverse screw is used for the fan attachment nut. When removing or attaching, turn the screw the opposite way as for a normal screw.
3. Remove fan motor.

ASSEMBLY

Assembly is the reverse order of disassembly.
- Apply thread locking sealant on fan motor shaft.

Inspection

INFOID:0000000001008369

INSPECTION AFTER DISASSEMBLY

Cooling Fan

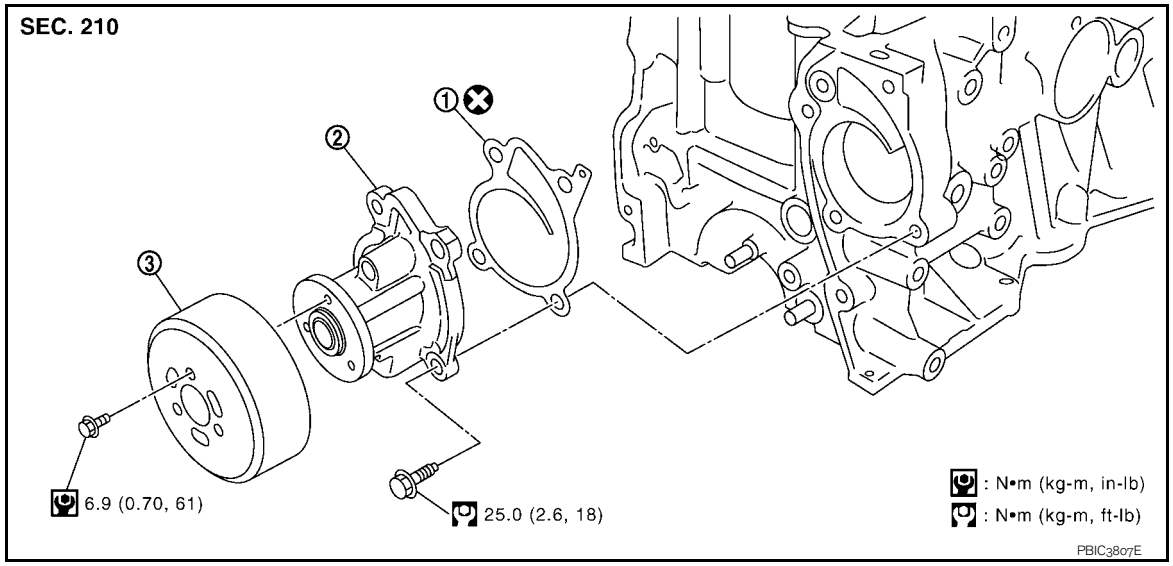
Inspect cooling fan for crack or unusual bend.
- If anything is found, replace cooling fan.

cardiagn.com

WATER PUMP

Exploded View

INFOID:0000000000903746



1. Gasket
2. Water pump
3. Water pump pulley

Refer to GI-4, "Components" for symbols in the figure.

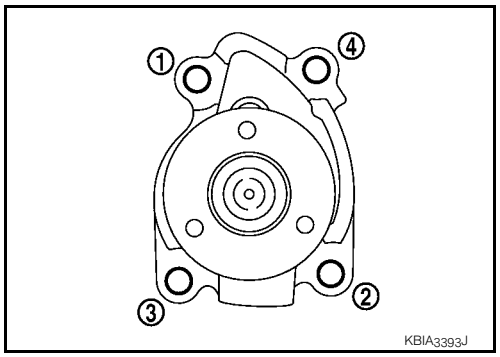
Removal and Installation

INFOID:0000000000903747

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-9, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
2. Steer front wheel to the right.
3. Remove front fender protector (RH). Refer to fender protector.
4. Loosen mounting bolts of water pump pulley before loosening belt tension of drive belt.
5. Remove drive belt. Refer to EM-16, "Removal and Installation".
6. Remove water pump pulley.
7. Remove water pump.
   - Loosen mounting bolts in reverse order as shown in the figure.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.

   CAUTION:
   - **Handle water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassemble and should replaced as a unit.**



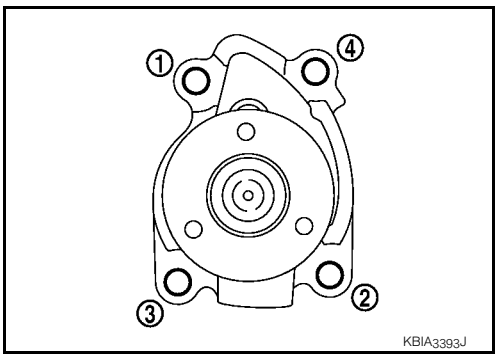
INSTALLATION

Note the following, and install in the reverse order of removal.

Water pump

cardiagn.com

- Tighten mounting bolts in numerical order as shown in the figure.

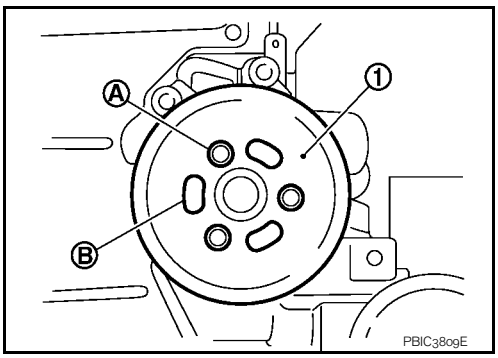


Water pump pulley

CAUTION:

Never install mounting bolts (A) to oblong holes (B).

1 : Water pump pulley

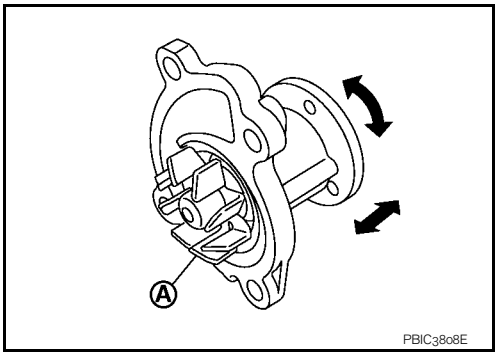


Inspection

INFOID:0000000000903748

INSPECTION AFTER REMOVAL

- Visually check if there is no significant dirt or rusting on water pump body and vane (A).
- Make sure that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



INSPECTION AFTER INSTALLATION

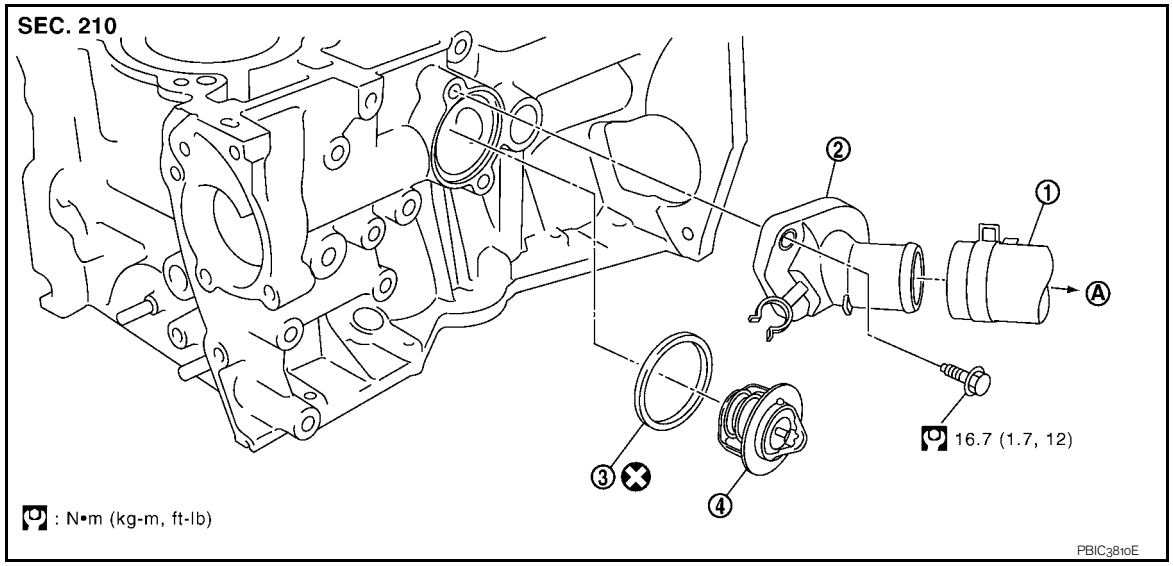
- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07). Refer to CO-9, "Inspection".
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

cardiagn.com

THERMOSTAT

Exploded View

INFOID:0000000000903749



1. Radiator hose (lower)
2. Water inlet
3. Rubber ring
4. Thermostat
A. To radiator

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000903750

REMOVAL

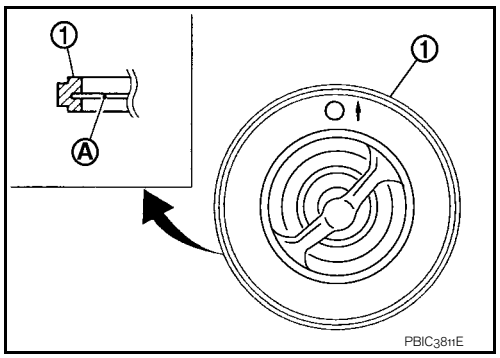
1. Drain engine coolant from radiator. Refer to CO-9, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Add paint mark, then disconnect radiator hose (lower) from water inlet. Refer to CO-13, "Exploded View".
3. Remove water inlet and thermostat.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.

INSTALLATION

Note the following, and install in the reverse order of removal.

Thermostat

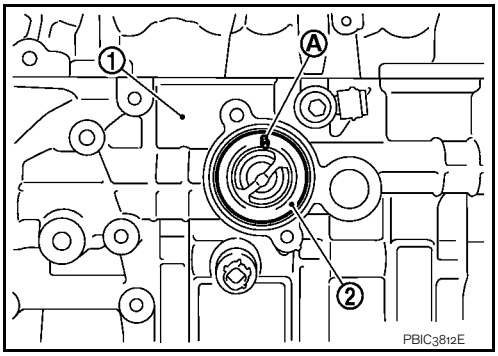
- Install thermostat with making rubber ring (1) groove fit to thermostat flange (A) with the whole circumference.



cardiagn.com

- Install thermostat (2) with jiggle valve (A) facing upwards.

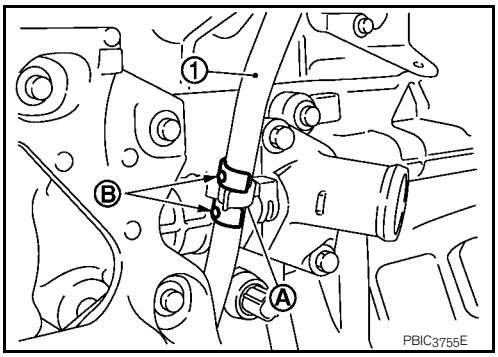
1 : Cylinder block



Water Inlet

After installation, fix water inlet clip (A) on the oil level gauge guide (1) as shown in the figure.

B : Positioning



Inspection

INFOID:0000000000903751

INSPECTION AFTER REMOVAL

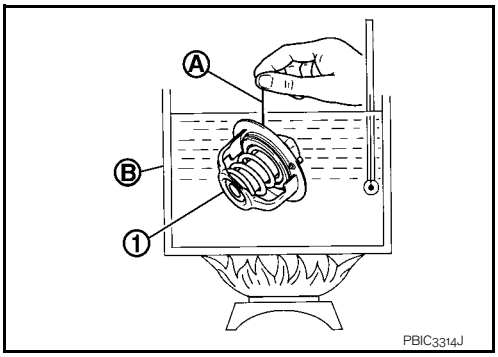
WARNING:

Use a protector to prevent a burn during the work.

Thermostat

- Place a thread (A) so that it is caught in the valves of thermostat (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full open valve lift amount.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.

Standard: Refer to CO-23, "Thermostat".



- If out of the standard, replace thermostat.

INSPECTION AFTER INSTALLATION

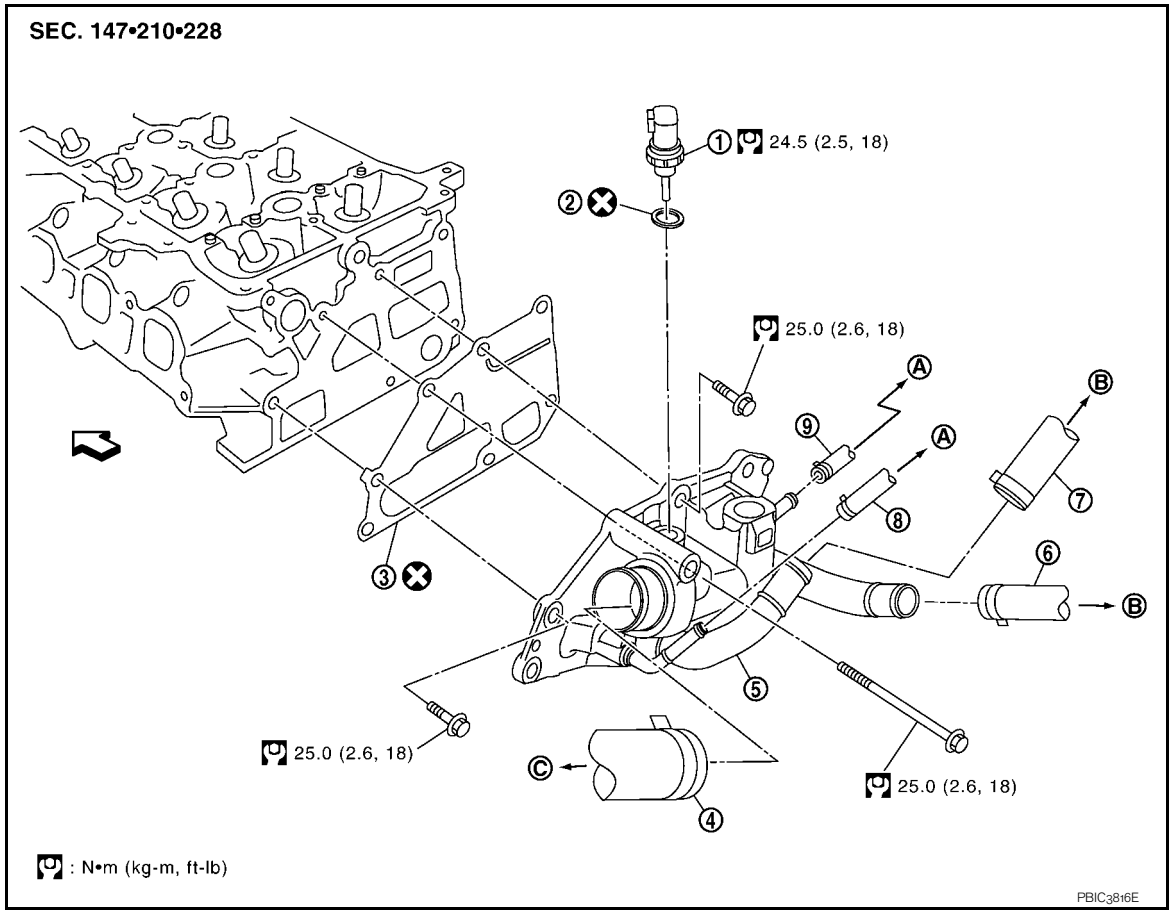
- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07). Refer to CO-9, "Inspection".
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

cardiagn.com

WATER OUTLET

Exploded View

INFOID:0000000000903752



1.	Engine coolant temperature sensor	2.	Washer	3.	Gasket
4.	Radiator hose (upper)	5.	Water outlet	6.	Heater hose
7.	Heater hose	8.	Water hose (Northern Europe models)	9.	Water hose (Northern Europe models)
A.	To electric throttle control actuator	B.	To heater core	C.	To radiator

⇦ : Engine front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000903753

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-9, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Disconnect radiator hose (upper). Refer to CO-13, "Exploded View".
3. Disconnect harness connector from engine coolant temperature sensor.
4. Remove water hoses (Northern Europe models).
5. Remove heater hoses.
6. Remove water outlet.
7. Remove engine coolant temperature sensor from water outlet, if necessary.

INSTALLATION

cardiagn.com

Installation is the reverse order of removal.

Inspection

INFOID:0000000000903754

INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07). Refer to CO-9, "Inspection".
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000000903759

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity [With reservoir tank (“MAX” level)]	5.9 (5-1/4)
Reservoir tank engine coolant capacity (At “MAX” level)	0.78 (5/8)

Radiator

INFOID:0000000000903760

RESERVOIR TANK CAP

Unit: kPa (bar, kg/cm^2, psi)

Cap relief pressure	Standard	140 (1.4, 1.43, 20.3)
	Limit	150 (1.5, 1.53, 21.75)

RADIATOR

Unit: kPa (bar, kg/cm^2, psi)

Leakage testing pressure	150 (1.5, 1.53, 21.75)

Thermostat

INFOID:0000000000903761

Thermostat	Standard
Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8.0 mm/95°C (0.315 in/203°F)
Valve closing temperature	77°C (171°F)

cardiagn.com

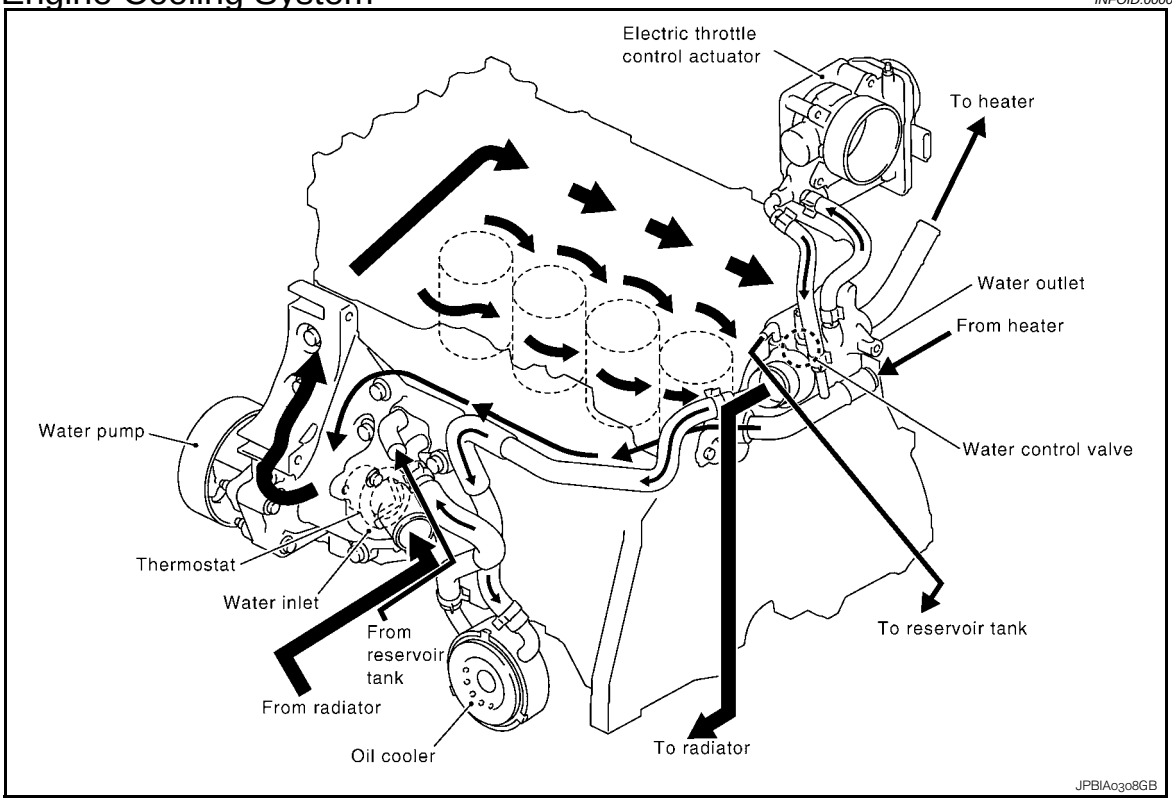
FUNCTION DIAGNOSIS

DESCRIPTION

M/T

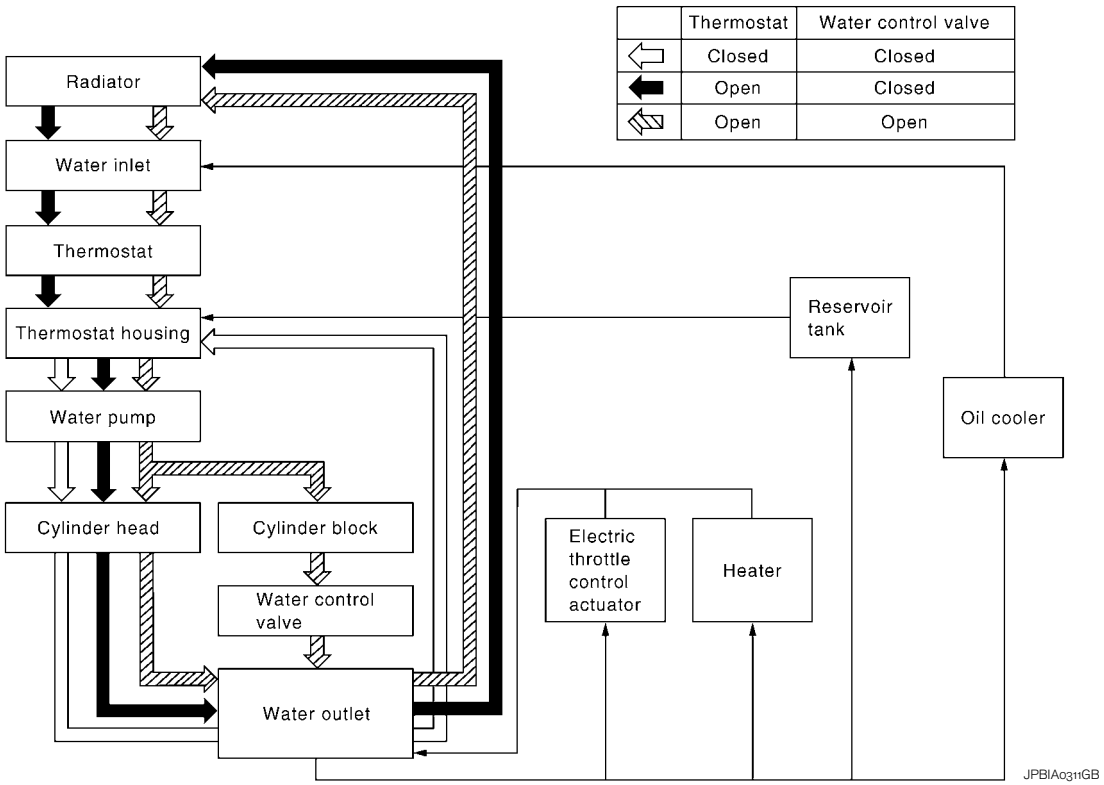
M/T : Engine Cooling System

INFOID:0000000000905183



M/T : Engine Cooling System Schematic

INFOID:0000000000905186

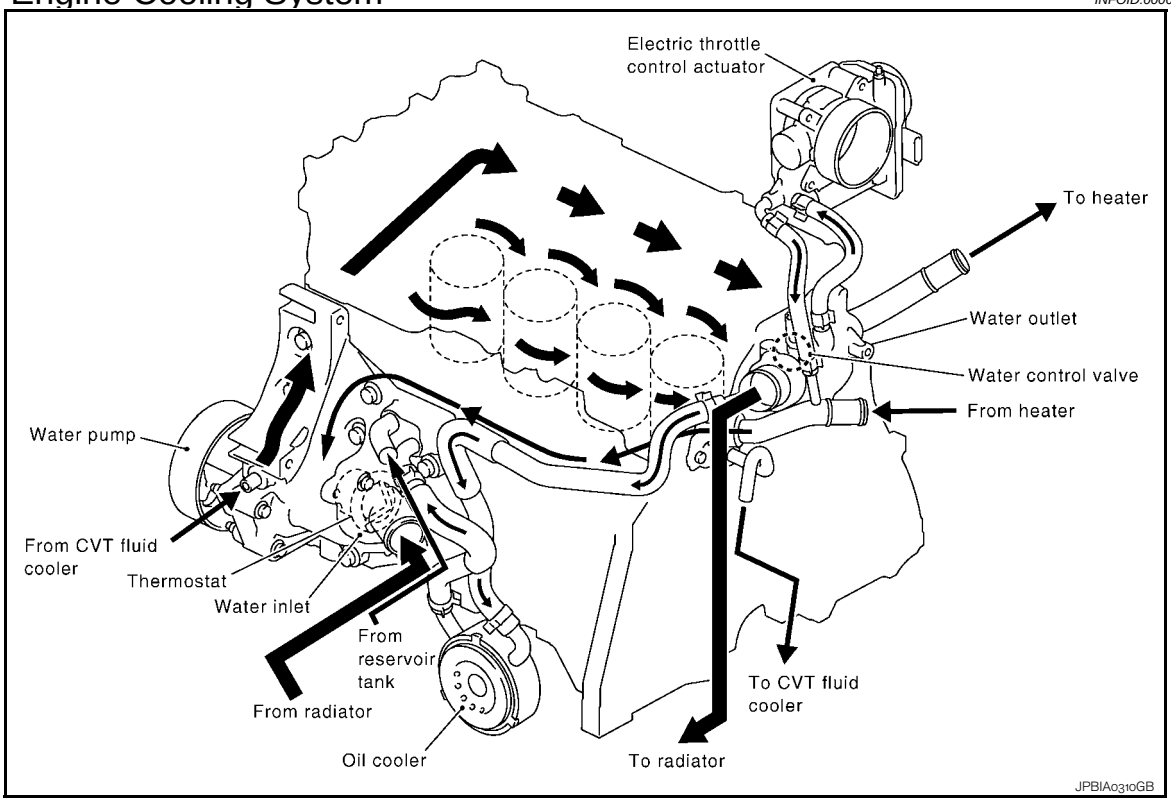


cardiagn.com

CVT

CVT : Engine Cooling System

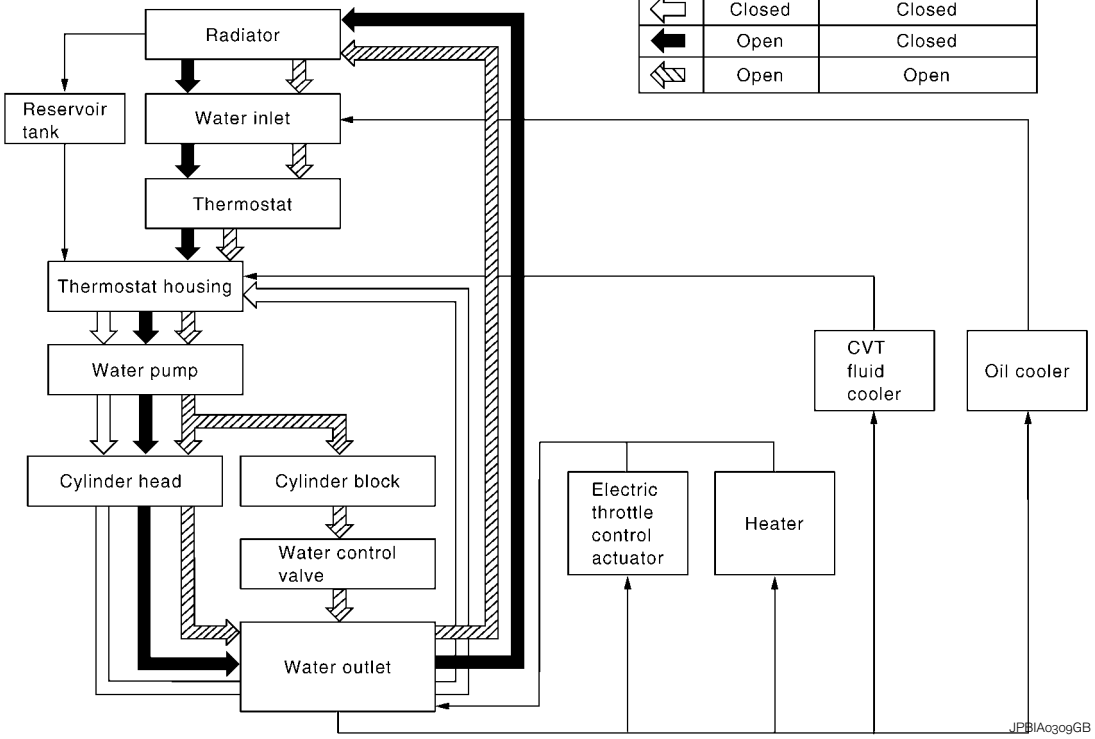
INFOID:0000000000905185



CVT : Engine Cooling System Schematic

INFOID:0000000000905184

	Thermostat	Water control valve
⇦	Closed	Closed
⬅	Open	Closed
⇦	Open	Open



cardiagn.com

SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000000905141

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat and water control valve stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Physical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper engine coolant mixture ratio	—	—	—
	Poor engine coolant quality	—	Engine coolant viscosity	—
	Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Reservoir tank cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

cardiagn.com

	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Power train system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	Blocked or restricted air flow	Blocked bumper	—	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
		Blocked radiator	—	
		Blocked condenser	Blocked air flow	
		Installed large fog lamp		

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001094854

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

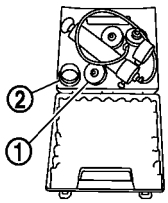
cardiagn.com

PREPARATION

PREPARATION

Special Service Tools

INFOID:0000000000905135

Tool number (RENAULT tool number) Tool name	Description
— (M.S. 554-07) Reservoir tank cap tester 1. Adapter A — (M.S. 554-01) 2. Adapter B — (M.S. 554-06)  E1BIA0058ZZ	Checking radiator and reservoir tank cap

cardiagn.com

ON-VEHICLE MAINTENANCE

ENGINE COOLANT

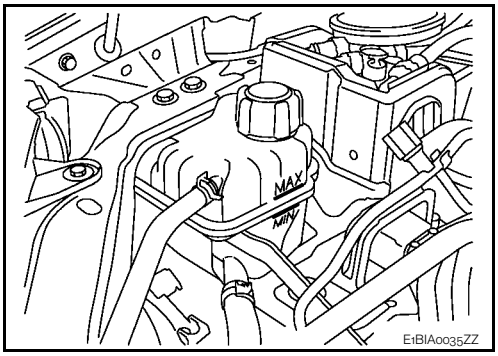
Inspection

INFOID:0000000000905143

LEVEL

- Check if the reservoir tank engine coolant level is within the “MIN” to “MAX” when the engine is cool.
- Adjust the engine coolant level as necessary.
- Check that the reservoir tank cap is tightened.

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.

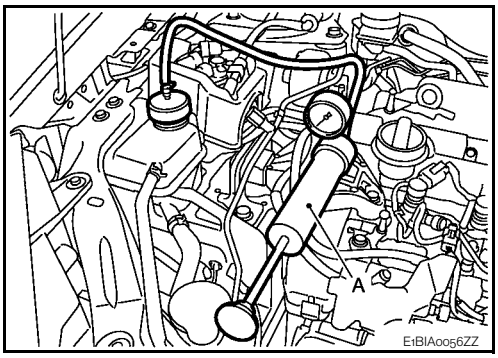


LEAKAGE

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.

Testing pressure: Refer to CO-46, "Radiator".

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.
CAUTION:
Higher test pressure than specified may cause radiator damage.



- If anything is found, repair or replace damaged parts.

Draining

INFOID:0000000000905144

WARNING:
- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around the reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Disconnect radiator hose (lower) and reservoir tank cap.
   When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to EM-210, "Exploded View".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing.
   - Remove of engine mounting insulator (RH) is necessary. Refer to EM-194, "M/T : Exploded View" (M/T models) or EM-198, "CVT : Exploded View" (CVT models).
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to CO-33, "RADIATOR : Inspection".

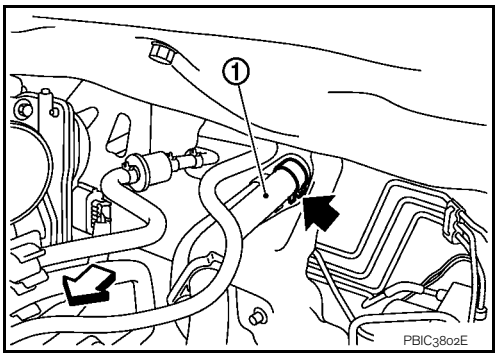
Refilling

INFOID:0000000000905145

1. Install reservoir tank if removed.
2. Connect radiator hose (lower).
   If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-210, "Exploded View".

cardiagn.com

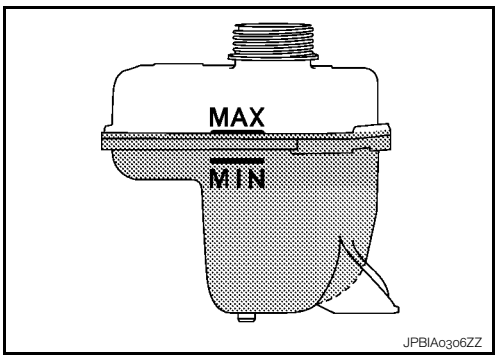
3. Make sure that each hose clamp has been firmly tightened.
4. Disconnect heater hose (1) at position (⇦) in the figure.



⇦ : Vehicle front

- Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.

5. Fill reservoir tank to specified level.
   - **Pour coolant slowly of less than 2 (1-3/4 lmp qt) a minute to allow air in system to escape.**
   - **When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.**
   - **Start engine without closing reservoir tank cap.**
   - **Keep engine racing at 1,500 rpm for about 2-3 minutes, filling reservoir tank up to MAX. Level, if necessary.**
   - **Use Genuine Nissan Engine Coolant or equivalent mixed with water (distilled or demineralized). Refer to MA-21, "Fluids and Lubricants".**



Engine coolant capacity
(With reservoir tank at "MAX" level)
Refer to :CO-46, "Periodical Maintenance Specification"

Reservoir tank engine coolant capacity
(At "MAX" level)
Refer to CO-46, "Periodical Maintenance Specification".

6. Install reservoir tank cap.
7. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 2,000 - 2,500 rpm.
   - Make sure thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

   CAUTION:
   Watch water temperature gauge so as not to overheat engine.
8. Stop the engine and cool down to less than approximately 50°C (122°F).
   - Cool down using fan to reduce the time.
9. Refill reservoir tank to "MAX" level line with engine coolant, if necessary.
10. Repeat steps 6 through 9 two or more times with reservoir tank cap installed until reservoir tank level no longer drops.
11. Check cooling system for leaks with engine running.
12. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
    - Sound may be noticeable at heater unit.
13. Repeat step 12 three times.
14. If sound is heard, bleed air from cooling system by repeating step 6 through 9 until reservoir tank level no longer drops.
15. Check that the reservoir tank cap is tightened.

Flushing

INFOID:0000000000905146

cardiagn.com

1. Install reservoir tank if removed.
2. Disconnect radiator hose (lower) and reservoir tank cap.
   If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-210, "Exploded View".
3. Fill reservoir tank with water and reinstall reservoir tank cap.
4. Run the engine and warm it up to normal operating temperature.
5. Rev the engine two or three times under no-load.
6. Stop the engine and wait until it cools down.
7. Drain water from the system. Refer to CO-30, "Draining".
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.
9. Check that the reservoir tank cap is tightened.

cardiagn.com

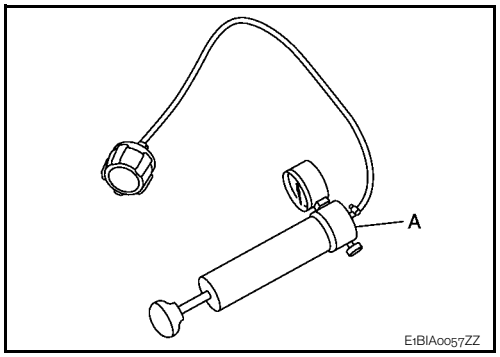
RADIATOR

RESERVOIR TANK CAP

RESERVOIR TANK CAP : Inspection

INFOID:0000000000905149

- Fit the adapter to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.
- When connecting the reservoir tank cap to the reservoir tank cap tester, apply water or LLC to the reservoir tank cap seal part.
- Check reservoir tank cap relief pressure.



Standard and limit: Refer to CO-46, "Radiator".

- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.

CAUTION:

When installing reservoir tank cap, thoroughly wipe out the reservoir tank filler neck to remove any waxy residue or foreign material.

RADIATOR

RADIATOR : Inspection

INFOID:0000000000905151

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:

- **Be careful not to bend or damage radiator fins.**
- **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and connectors to prevent water from entering.**

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

cardiagn.com

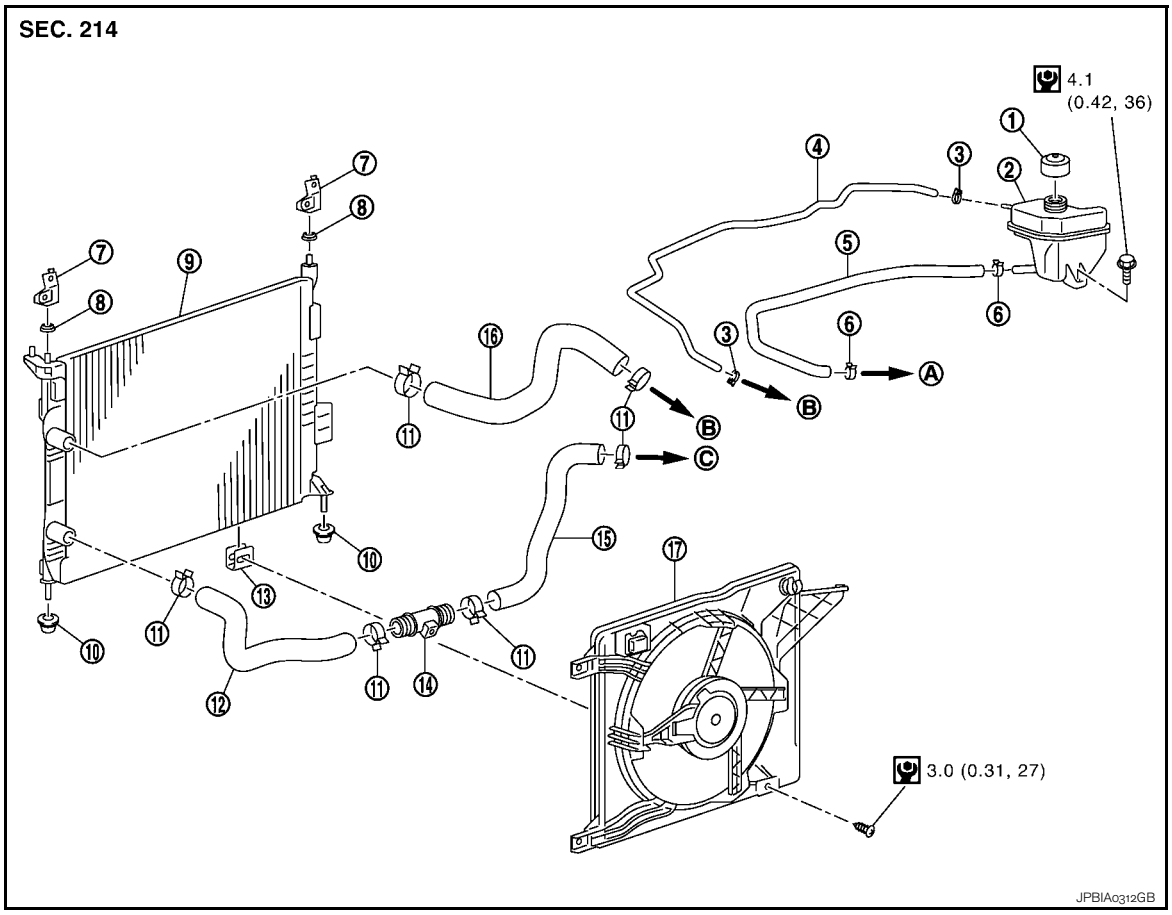
ON-VEHICLE REPAIR

RADIATOR

Exploded View

INFOID:0000000000905153

M/T models

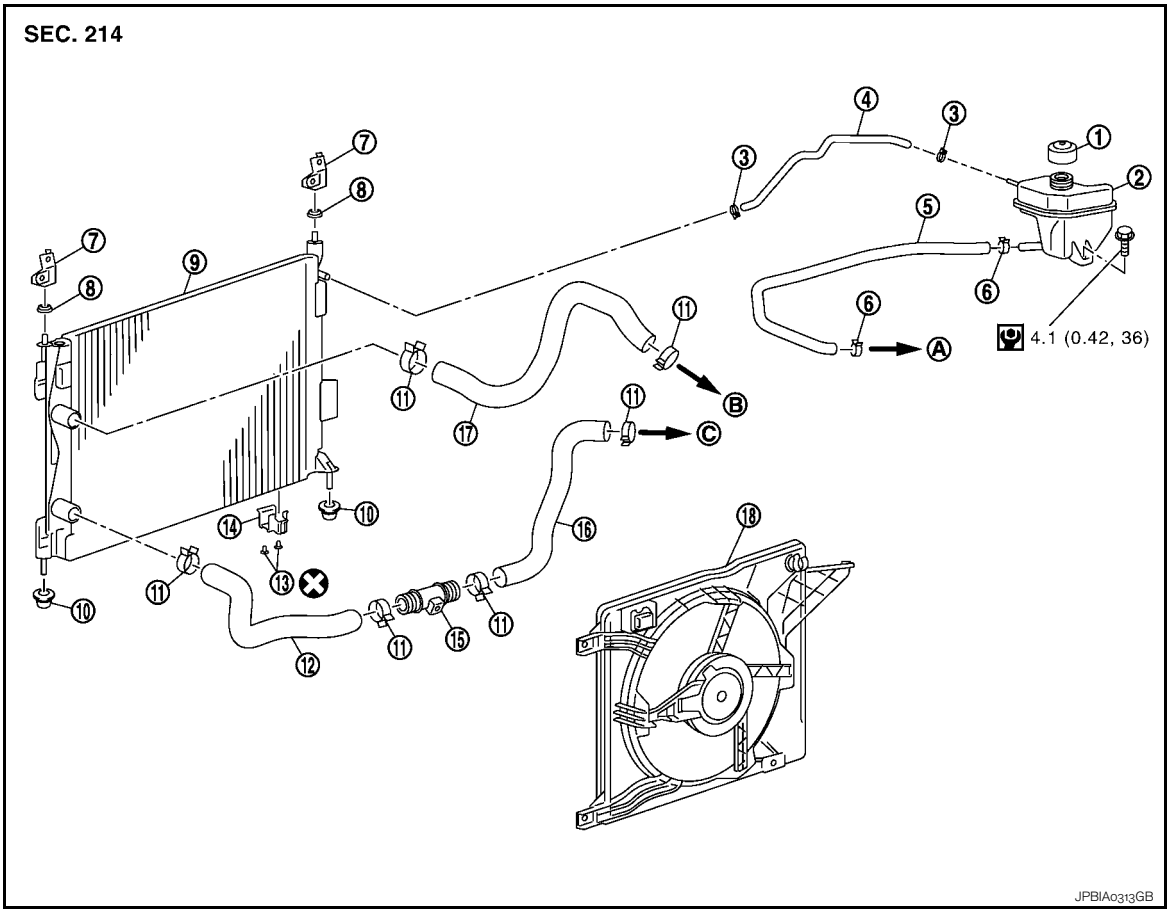


1.	Reservoir tank cap	2.	Reservoir tank	3.	Clamp
4.	Reservoir tank hose	5.	Reservoir tank hose	6.	Clamp
7.	Bracket	8.	Mounting rubber (upper)	9.	Radiator
10.	Mounting rubber (lower)	11.	Clamp	12.	Radiator hose (lower)
13.	Clip	14.	Radiator hose pipe	15.	Radiator hose (lower)
16.	Radiator hose (upper)	17.	Cooling fan assembly		
A.	To thermostat housing	B.	To water outlet	C.	To water inlet

Refer to GI-4, "Components" for symbols in the figure.

CVT models

cardiagn.com



1. Reservoir tank cap	2. Reservoir tank	3. Clamp
4. Reservoir tank hose	5. Reservoir tank hose	6. Clamp
7. Bracket	8. Mounting rubber (upper)	9. Radiator
10. Mounting rubber (lower)	11. Clamp	12. Radiator hose (lower)
13. Rivet	14. Clip	15. Radiator hose pipe
16. Radiator hose (lower)	17. Radiator hose (upper)	18. Cooling fan assembly
A. To thermostat housing	B. To water outlet	C. To water inlet

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000905154

REMOVAL

WARNING:

- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around the reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
2. Remove air duct (inlet). Refer to EM-144, "Exploded View".
3. Remove reservoir tank hose at radiator side (CVT models).
4. Disconnect connector from resistor and fan motor, and move harness to aside.
5. Remove cooling fan assembly. Refer to CO-37, "Exploded View".
   CAUTION:
   Be careful not to damage radiator core.

cardiagn.com

6. Remove radiator hose (upper and lower).
7. Remove liquid tank bracket mounting bolts. Refer to HA-36, "Exploded View".
8. Remove mounting bracket (upper).
9. Lift up the A/C condenser to disengage the radiator, and then remove the radiator.
   CAUTION:
   Be careful not to damage or scratch radiator and A/C condenser core.

INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:0000000000905155

INSPECTION AFTER INSTALLATION

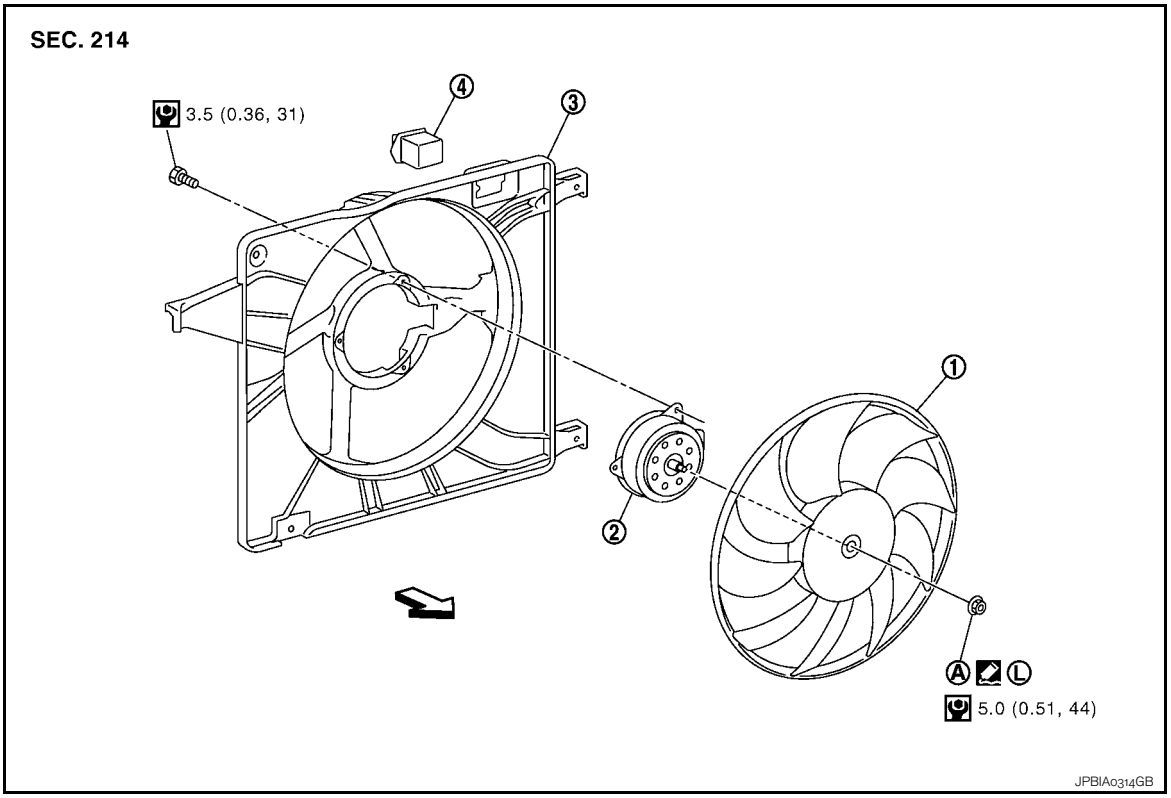
- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07). Refer to CO-30, "Inspection".
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

cardiagn.com

COOLING FAN

Exploded View

INFOID:0000000000905157



1.	Cooling fan	2.	Fan motor	3.	Fan shroud
4.	Resistor				
A.	Reverse screw				

: Apply thread locking sealant.

: Vehicle front

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000905158

REMOVAL

1. Remove air duct (inlet). Refer to EM-144, "Exploded View".
2. Disconnect harness connector from resistor and fan motor, and move harness to aside.
3. Remove cooling fan assembly.
   CAUTION:
   Be careful not to damage or scratch on radiator core.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged). (M/T models)

NOTE:

Cooling fan is controlled by ECM. For details, refer to EC-918, "Description".

Disassembly and Assembly

INFOID:0000000000905174

DISASSEMBLY

cardiagn.com

1. Remove resistor from fan shroud.
   CAUTION:
   Handle carefully to avoid dropping and shocks.
2. Remove cooling fan mounting nut, and then remove the cooling fan.
   CAUTION:
   Reverse screw is used for the fan attachment screw. When removing or attaching, turn the screw the opposite way as for a normal screw.
3. Remove fan motor.

ASSEMBLY

Assembly is the reverse order of disassembly.

- Apply thread locking sealant on fan motor shaft.

Inspection

INFOID:0000000000905177

INSPECTION AFTER DISASSEMBLY

Cooling Fan

Inspect cooling fan for crack or unusual bend.

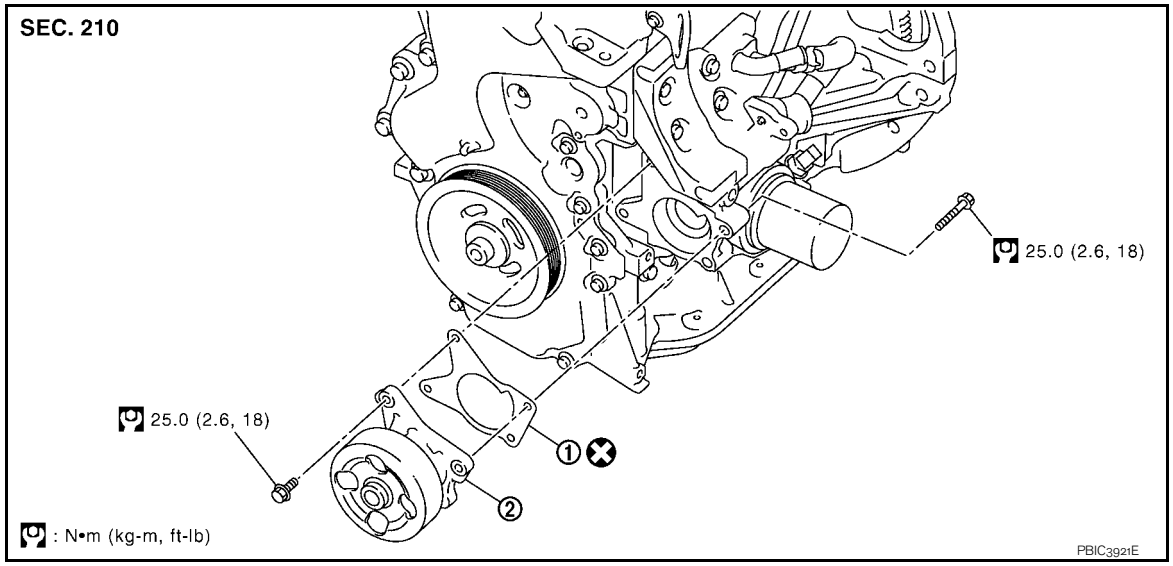
- If anything is found, replace cooling fan.

cardiagn.com

WATER PUMP

Exploded View

INFOID:0000000000905161



1. Gasket
2. Water pump

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000905162

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
2. Remove front fender protector (RH). Refer to EXT-21, "Exploded View".
3. Remove drive belt. Refer to EM-143, "Removal and Installation".
4. Remove water pump.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.

   CAUTION:
   - **Handle water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassemble and should replaced as a unit.**

INSTALLATION

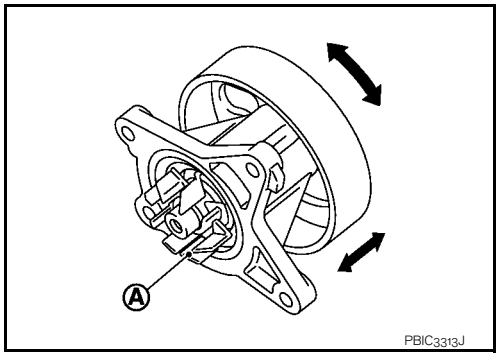
Install in the reverse order of removal.

Inspection

INFOID:0000000000905163

INSPECTION AFTER REMOVAL

- Visually check if there is no significant dirt or rusting on water pump body and vane (A).
- Make sure that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



cardiagn.com

INSPECTION AFTER INSTALLATION

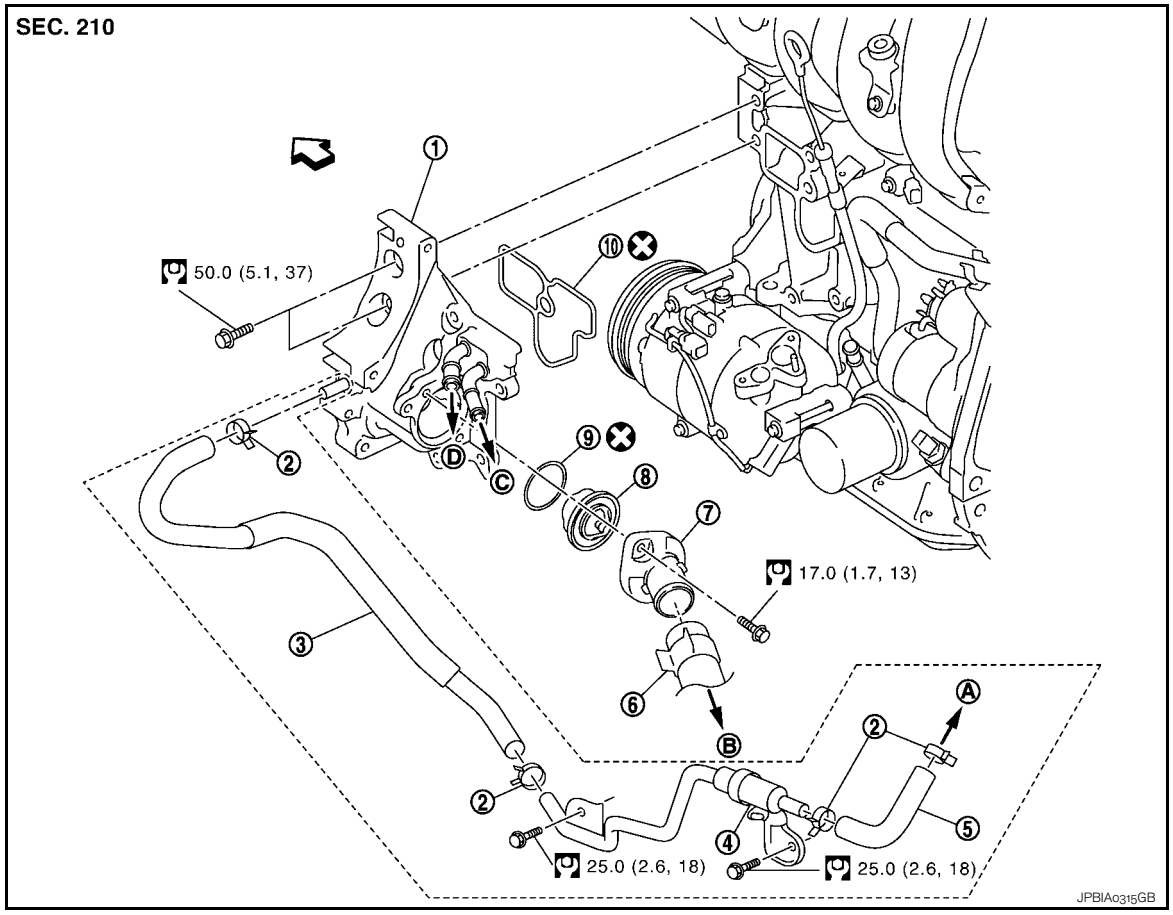
- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07). Refer to CO-30, "Inspection".
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

cardiagn.com

THERMOSTAT

Exploded View

INFOID:0000000000905165



1. Thermostat housing
2. Clamp (CVT models)
3. Water hose (CVT models)
4. Heater thermostat (CVT models)
5. Water hose (CVT models)
6. Radiator hose (lower)
7. Water inlet
8. Thermostat
9. Rubber ring
10. Gasket

A. To CVT fluid cooler
B. To radiator
C. To oil cooler
D. To reservoir tank

⇦ : Engine front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000905166

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Disconnect the battery cable from the negative terminal. Refer to PG-118, "Exploded View".
3. Add paint mark, then disconnect radiator hose (lower) from water inlet. Refer to CO-34, "Exploded View".
4. Remove water inlet and thermostat.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.
5. Remove thermostat housing with the following procedure:

a. Remove water pump. Refer to CO-39, "Exploded View".

cardiagn.com

b. Remove alternator. Refer to CHG-29, "MR20DE MODELS : Exploded View".

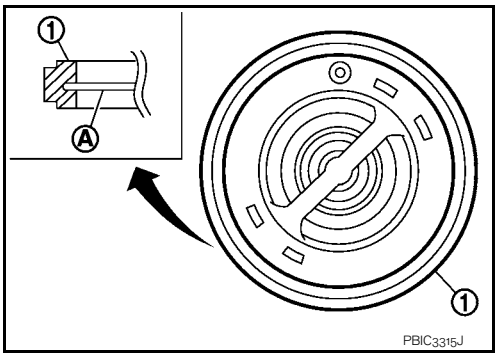
c. Disconnect water hoses.

INSTALLATION

Note the following, and install in the reverse order of removal.

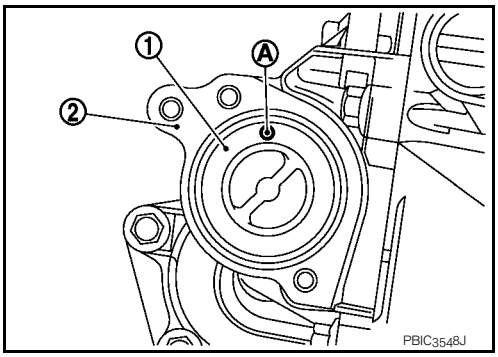
Thermostat

- Install thermostat with making rubber ring (1) groove fit to thermostat flange (A) with the whole circumference.



- Install thermostat (1) with jiggle valve (A) facing upwards.

2 : Cylinder block



Inspection

INFOID:0000000000905167

INSPECTION AFTER REMOVAL

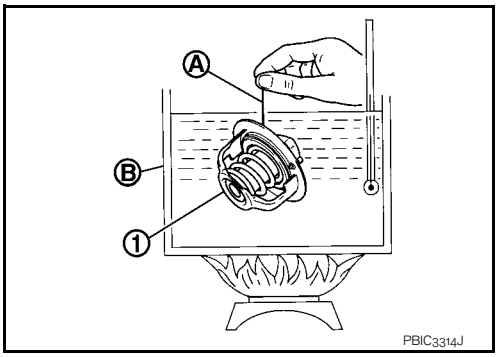
WARNING:

Use a protector to prevent a burn during the work.

Thermostat

- Place a thread (A) so that it is caught in the valves of thermostat (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full open valve lift amount.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.

Standard: Refer to CO-46, "Thermostat".

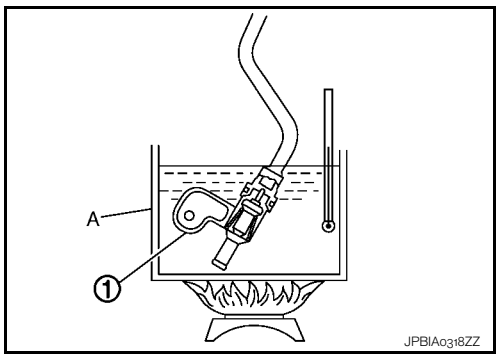


- If out of the standard, replace thermostat.

Heater Thermostat (CVT models)

cardiagn.com

- Fully immerse the heater thermostat (1) in a container (A) filled with water. Continue heating the water while stirring.
- Continue heating the heater thermostat for 5 minutes or more after bringing the water to a boil.
- Quickly take the heater thermostat out of the hot water, measure the heater thermostat within 10 seconds.

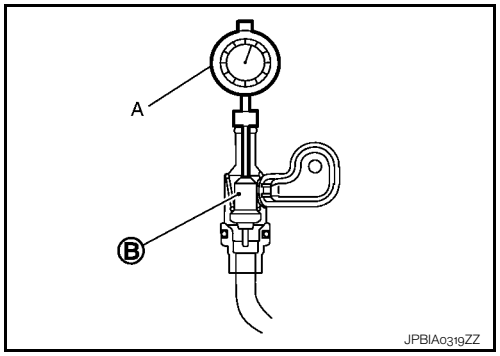


- Place dial indicator (A) on the pellet (B) and measure the elongation from the initial state.

Standard

: Refer to CO-46, "Heater Thermostat (CVT models)".

- If out of the standard, replace heater thermostat.



INSPECTION AFTER INSTALLATION

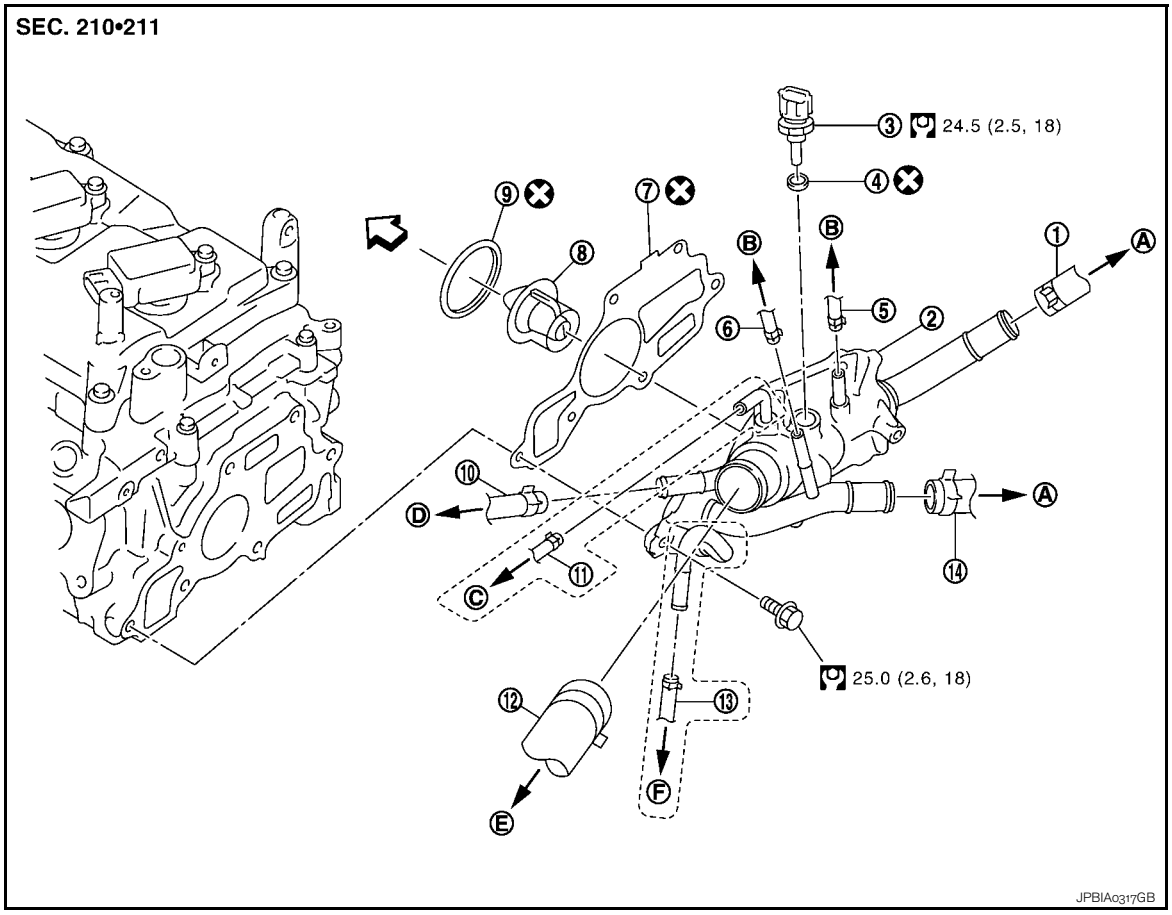
- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07). Refer to CO-30, "Inspection".
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

cardiagn.com

WATER OUTLET

Exploded View

INFOID:0000000000905169



1.	Heater hose	2.	Water outlet	3.	Engine coolant temperature sensor
4.	Washer	5.	Water hose	6.	Water hose
7.	Gasket	8.	Water control valve	9.	Rubber ring
10.	Water hose	11.	Reservoir tank hose (M/T models)	12.	Radiator hose (upper)
13.	Water hose (CVT models)	14.	Heater hose		
A.	To heater	B.	To electric throttle control actuator	C.	To reservoir tank
D.	To oil cooler	E.	To radiator	F.	To CVT fluid cooler

⇦ : Engine front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000905170

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Disconnect radiator hose (upper). Refer to CO-34, "Exploded View".
3. Disconnect harness connector from engine coolant temperature sensor.
4. Remove reservoir tank hose (M/T models). Refer to CO-34, "Exploded View".
5. Remove water hoses and heater hoses.
6. Remove water outlet.

cardiagn.com

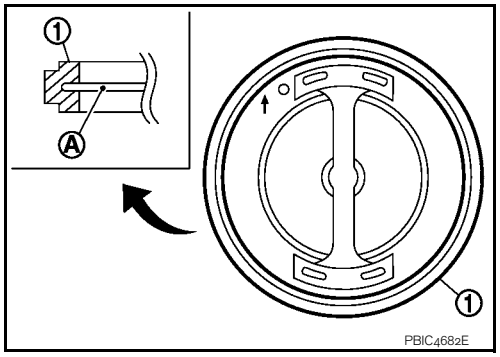
7. Remove engine coolant temperature sensor from water outlet, if necessary.

INSTALLATION

Note the following, and install in the reverse order of removal.

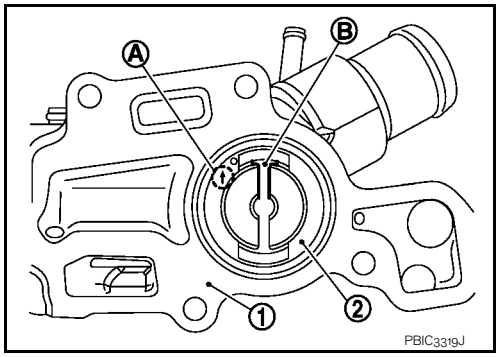
Water Control Valve

- Install water control valve with making rubber ring (1) groove fit to water control valve flange (A) with the whole circumference.



- Install water control valve (2) with the arrow (A) facing up and the frame center part (B) facing upwards.

1 : Water outlet



Inspection

INFOID:0000000000905639

INSPECTION AFTER REMOVAL

WARNING:

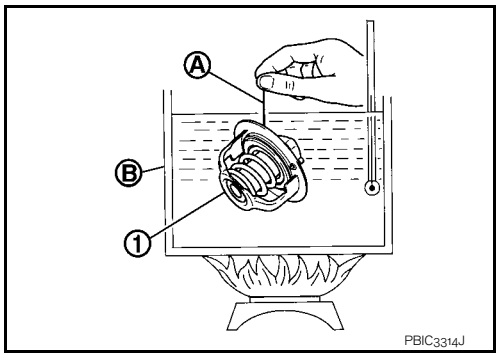
Use a protector to prevent a burn during the work.

Water Control Valve

- Place a thread (A) so that it is caught in the valves of water control valve (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the continuous valve lifting toward maximum valve lift.

  NOTE:

  The maximum valve lift amount standard temperature for water control valve is the reference value.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.



Standard: **Refer to CO-46, "Water Control Valve".**

- If out of the standard, replace water control valve.

INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07). Refer to CO-30, "Inspection".
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000000905179

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity (With reservoir tank at “MAX” level)	M/T models	7.6 (6-5/8)
	CVT models	8.9 (7-7/8)
Reservoir tank engine coolant capacity (At “MAX” level)		0.78 (5/8)

Radiator

INFOID:0000000000905180

RESERVOIR TANK CAP

Unit: kPa (bar, kg/cm^2, psi)

Reservoir tank cap relief pressure	Standard	140 (1.4, 1.43, 20.3)
	Limit	150 (1.5, 1.53, 21.75)

RADIATOR

Unit: kPa (bar, kg/cm^2, psi)

Leakage testing pressure	150 (1.5, 1.53, 21.75)

Thermostat

INFOID:0000000000905181

Standard

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8.0 mm/95°C (0.315 in/203°F)
Valve closing temperature	77°C (171°F)

Heater Thermostat (CVT models)

INFOID:0000000000905646

Standard

Valve lift	More than 4.5 mm (0.177 in)

Reference value

Valve opening temperature	82°C (180°F)
Maximum valve lift	5.0 mm/95°C (0.197 in/203°F)

Water Control Valve

INFOID:0000000000905645

Standard

Valve opening temperature	93.5 - 96.5°C (200 - 206°F)
Maximum valve lift	8.0 mm/108°C (0.315 in/226°F)
Valve closing temperature	90°C (194°F)

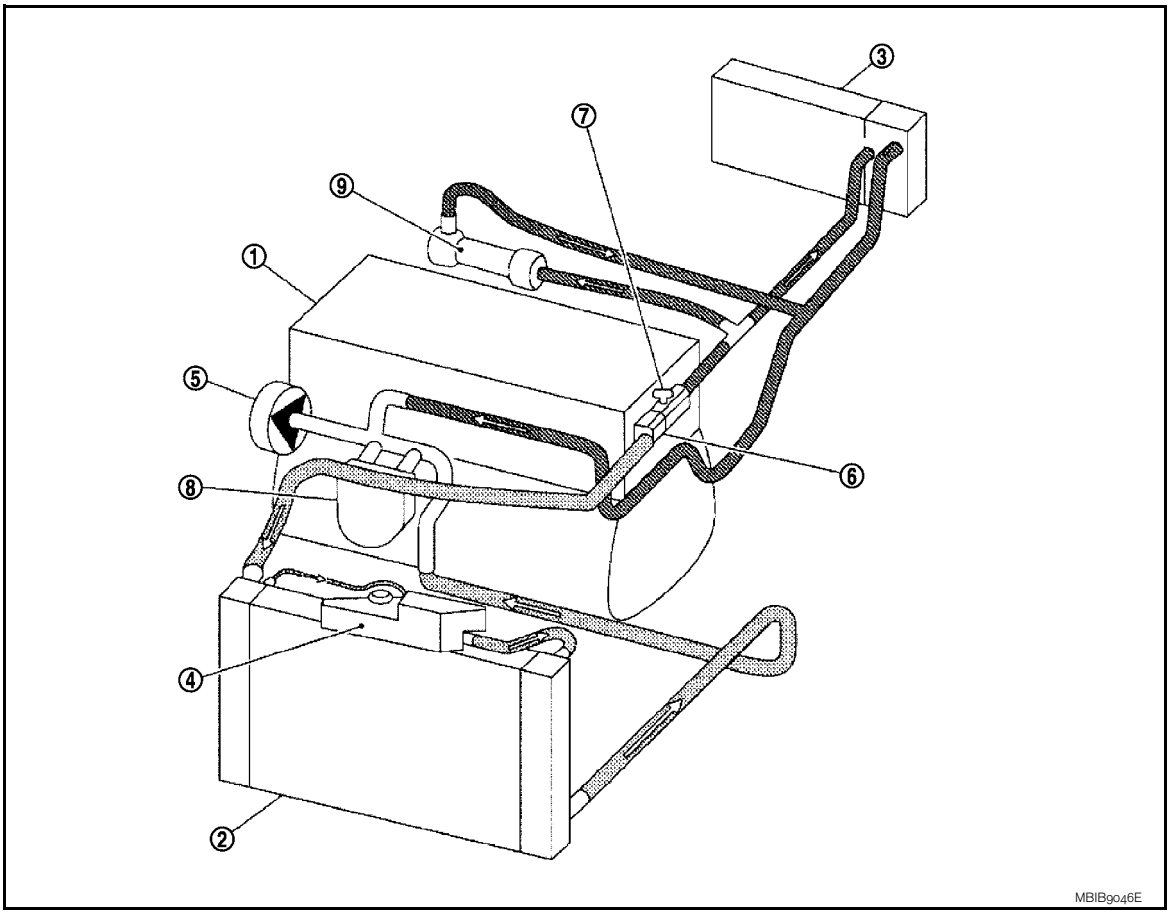
cardiagn.com

FUNCTION DIAGNOSIS

DESCRIPTION

Engine Cooling System

INFOID:0000000001062324



1. Engine
2. Radiator
3. Heater core
4. Reservoir tank
5. Water pump
6. Thermostat
7. Air relief plug
8. Oil cooler
9. EGR cooler

cardiagn.com

SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000001062495

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn timing belt	—
		Thermostat stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Mechanical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper coolant mixture ratio	—	—	—
	Poor coolant quality	—	—	—
	Insufficient coolant	Coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Reservoir tank cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

cardiagn.com

	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Powertrain system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	Blocked or restricted air flow	Blocked bumper	—	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
		Blocked radiator	—	
		Blocked condenser	—	
		Installed large fog lamp		

cardiagn.com

PRECAUTION

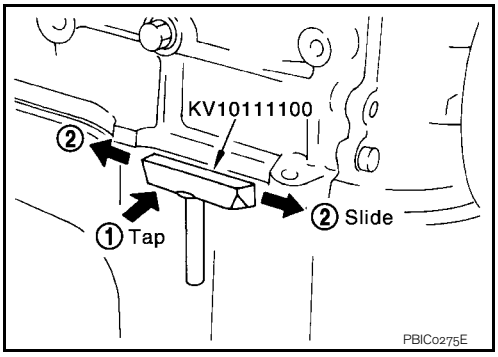
PRECAUTIONS

Precaution for Liquid Gasket

INFOID:0000000001062496

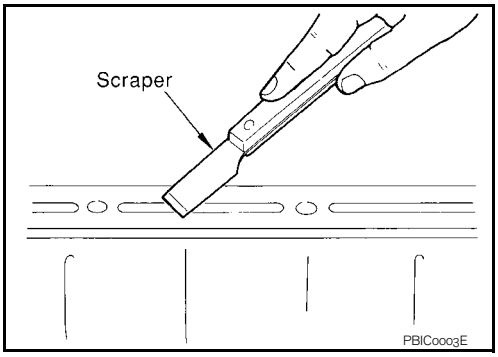
REMOVAL OF LIQUID GASKET

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.
  CAUTION:
  Be careful not to damage the mating surfaces.
- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the gasket applied area.
  CAUTION:
  If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.

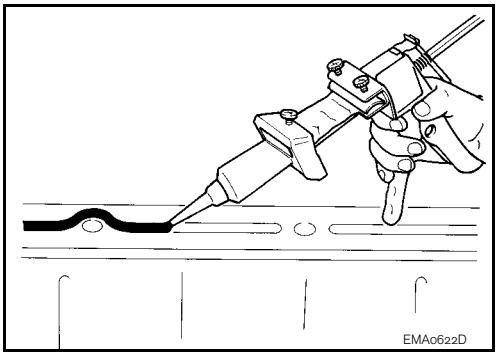


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
   - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.
2. Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Attach the liquid gasket to the tube presser.
   Use Genuine Liquid Gasket or equivalent.

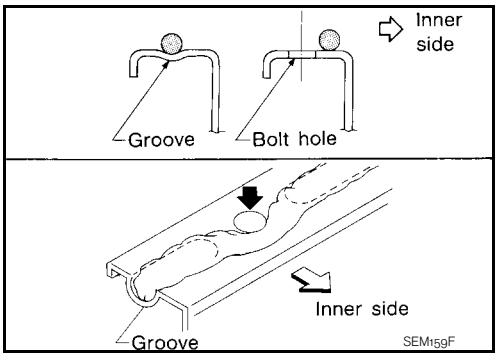


4. Apply the gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the gasket to the groove.



   - As for the bolt holes, normally apply the gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the instruction in this manual.
   - Within five minutes of gasket application, install the mating component.
   - If the liquid gasket protrudes, wipe it off immediately.
   - Do not retighten after the installation.
   - After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

   CAUTION:
   If there are instructions in this manual, observe them.



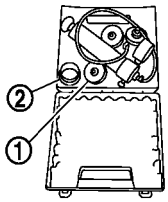
cardiagn.com

PREPARATION

PREPARATION

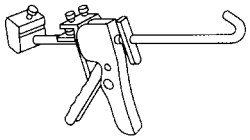
Special Service Tools

INFOID:0000000001062497

NISSAN tool number (RENAULT tool number) Tool name		Description
— (M.S. 554-07) Reservoir tank cap tester 1. Adapter A — (M.S. 554-01) 2. Adapter B — (M.S. 554-06)	 E1BIA0058ZZ	Leak checking Checking reservoir tank cap

Commercial Service Tools

INFOID:0000000001115768

NISSAN tool number Tool name		Description
WS39930000 Tube pressure	 S-NT052	Pressing the tube of liquid gasket

cardiagn.com

ON-VEHICLE MAINTENANCE

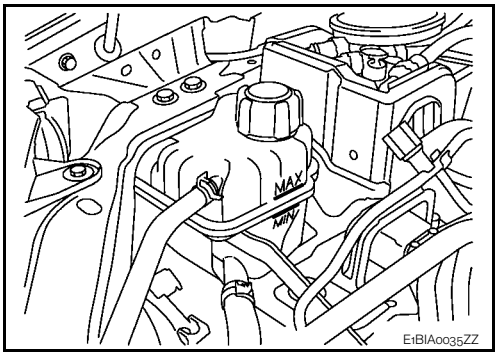
ENGINE COOLANT

Inspection

INFOID:0000000001062331

LEVEL

1. Check if the reservoir tank coolant level is within MIN to MAX when engine is cool.
2. Adjust coolant if too much or too little.

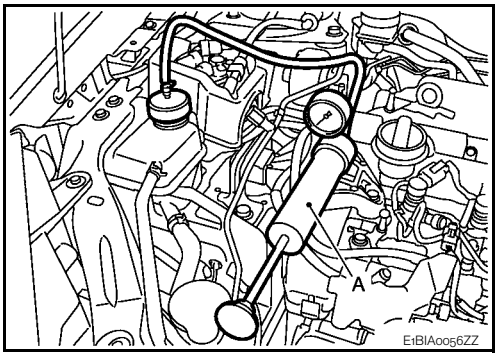


LEAKAGE

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the tester [SST: — (M.S. 554-07)] (A) as shown.
- Warm up the engine and turn it off.
- To check for leaks, apply pressure to the cooling system with the radiator cap tester and radiator reservoir cap tester adapter.

Testing pressure : Refer to CO-64, "Radiator".

- If the pressure drops, look for leakage.
- Unscrew slowly the adapter from the reservoir tank to reduce the pressure in cooling system, and install the reservoir tank cap.



WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure engine coolant escaping from the radiator.

CAUTION:

Higher pressure than specified may cause radiator damage.

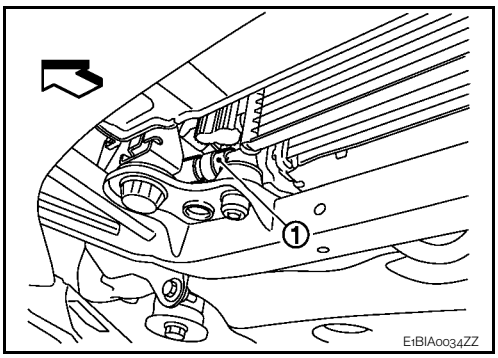
Draining

INFOID:0000000001062332

WARNING:

- **To avoid being scalded, never change the coolant when the engine is hot.**
- **Wrap a thick cloth around cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

1. Remove engine undercover.
2. Disconnect reservoir tank hose (lower) (1) from radiator and remove reservoir tank cap.
3. Remove air relief plug from water outlet. Refer to CO-62, "Exploded View".
4. Remove reservoir tank, then clean reservoir tank.
5. Check drained coolant for contaminants such as rust, corrosion or discoloration.
   If contaminated, flush engine cooling system. Refer to CO-53, "Flushing".



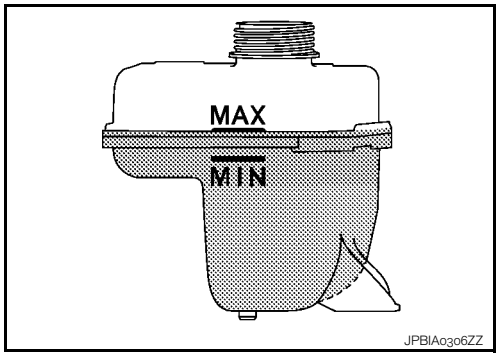
Refilling

INFOID:0000000001062333

- **Before start working, turn off the automatic air conditioner and the blower motor.**

cardiagn.com

1. Install reservoir tank, lower radiator hose and air relief plug.
2. Fill reservoir tank slowly with coolant until coolant spills from the air relief hole. Refer to CO-62, "Exploded View".
   - **Put a cloth under the air relief plug to prevent engine coolant to dampen the crankshaft position sensor.**
   - Pour coolant to the MAX level line of the reservoir tank at a rate of 2 liter (1-3/4 lmp qt)/min or lower.
3. Close the air relief plug.
   CAUTION:
   If the filling rate is too fast, this could lead to air being mixed in the coolant. Be sure to fill the coolant slowly according to the rate indicated above.
   Use Nissan Genuine Coolant L250 or equivalent mixed with water (distilled or demineralised). Refer to MA-22, "Engine Coolant Mixture Ratio".



Engine coolant capacity (With reservoir tank)	**: Refer to CO-64, "Periodical Maintenance Specification".**
Reservoir tank capacity	**: Refer to CO-64, "Periodical Maintenance Specification".**

4. Start engine without closing reservoir tank cap and keep engine racing at 1,500 rpm for about 2-3 minutes. If neccesary, pour engine coolant up to MAX level.
   - **If coolant overflows reservoir tank hole, install filler cap.**
   - **Watch engine coolant temperature gauge so as not overheat the engine during all of the operation.**

   WARNING:
   - **Be careful not be scaled with hot engine coolant or vacuum pump when operating.**
   - **Radiator fan blade can start at any time and make personal injuries.**
5. Turn off the engine and loose air relief plug until coolant spills from air relief hole.
6. Close the air relief plug and run the engine at 2,000 rpm until the upper hose comes hot and radiator fan operates. Let the engine running approximately 5 minutes at idle speed and check for sound of coolant flow while running engine from idle up to 3,000 rpm.
   - Sound may be noticeable at heater water cock.
7. If sound is heard, bleed air from cooling system by repeating steps 4 to 6 until coolant lever no longer drops.
   - Check the radiator lower hose for any signs of leakage.
8. Turn off the engine and let it cool down.
   - Cool down using a fan to reduce the time.
9. After cooling period, loose the air relief plug and check if coolant spills from the air relief hole. In other case, remove the air relief plug until the coolant spills, and then close the relief air plug. Bleed air from cooling system by repeating steps 6 to 10 until the coolant spills immediately.
10. Check the engine coolant level when engine is cool and refill to MAX level line if the level is lower.
    - Clean excess coolant from engine.
11. Check that the reservoir tank cap is tightened.

Flushing

INFOID:0000000001062334

1. Fill reservoir tank with water until water spills from the air relief hole, then close air relief plug. Reinstall reservoir tank cap.
2. Run engine and warm it up to normal operating temperature.
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water.
6. Repeat steps 1 through 5 until clear water begins to drain from radiator.

cardiagn.com

7. Blow compressed air into cooling circuit through the reservoir tank valve hole to drain all the water.

cardiagn.com

RADIATOR

RADIATOR CAP

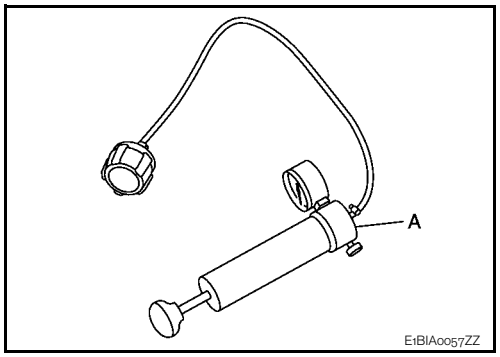
RADIATOR CAP : Inspection

INFOID:0000000001062335

- Fit the adapter to the tester as shown.
- When connecting the reservoir tank cap to the tester [SST: — (M.S. 554-07)] (A), apply water or LLC to the cap seal part.
- Check reservoir tank cap relief pressure.

Standard : Refer to CO-64, "Radiator".

- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.



RADIATOR

RADIATOR : Inspection

INFOID:0000000001062336

Check radiator for mud or clogging. If necessary, clean radiator as follows.

- Be careful not to bend or damage the radiator fins.
- When radiator is cleaned without removal, remove all surrounding parts such as radiator fan, radiator shroud and horns. Then tape the harness and connectors to prevent water from entering.

1. Apply water by hose to the back side of the radiator core vertically downwards.
2. Apply water again to all radiator core surface once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downwards.

- Use compressed air lower than 490 kPa (4.9 bar 5 kg/cm^2, 71psi) and keep distance more than 30 cm (11.8 in).

5. Blow air again into all the radiator core surface once per minute until no water sprays out.

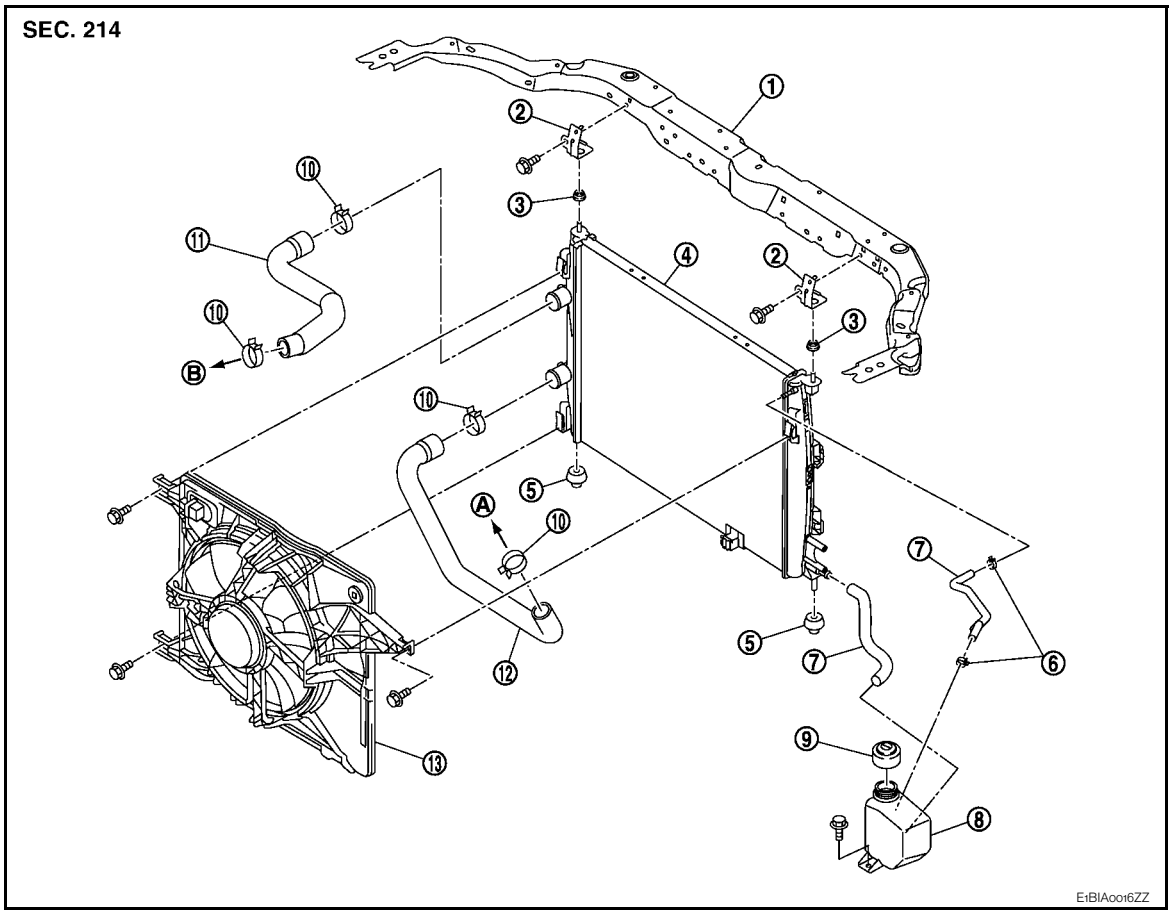
cardiagn.com

ON-VEHICLE REPAIR

RADIATOR

Exploded View

INFOID:0000000001062337



1. Radiator core support
2. Mounting bracket
3. Mounting rubber (upper)
4. Radiator
5. Mounting rubber (lower)
6. Clamp
7. Reservoir tank hose
8. Reservoir tank
9. Reservoir tank cap
10. Clamp
11. Radiator hose (upper)
12. Radiator hose (lower)
13. Cooling fan assembly

A. To water inlet
B. To water outlet

Removal and Installation

INFOID:0000000001062338

WARNING:
Never remove the reservoir tank cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator. Wrap a thick cloth around the cap. Slowly turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by turning it all the way.

REMOVAL

1. Remove engine cover. Refer to EM-266, "Removal and Installation".
2. Remove air cleaner case and air duct (inlet). Refer to EM-265, "Removal and Installation".
3. Remove reservoir tank hose bracket bolt from radiator upper mounting bracket (RH side).
4. Remove radiator fan motor harnesses.
5. Remove engine undercover.
6. Drain engine coolant. Refer to CO-52, "Draining".

cardiagn.com

CAUTION:
Perform when engine is cold.

7. Disconnect radiator upper hose, reservoir tank hose and mounting bracket.
8. Release charge air cooler from the radiator. Refer to EM-266, "Removal and Installation".
9. Remove radiator and radiator fan assembly.
   NOTE:
   Remove radiator and condenser assembly. Refer to HA-100, "Removal and Installation" and HA-202, "Removal and Installation".

CAUTION:
- **Do not damage or scratch radiator core when removing.**

INSTALLATION
- Reinstall any parts removed in reverse order of removal.
- Check for engine coolant leaks. Refer to CO-52, "Inspection".

Inspection

INFOID:0000000001115351

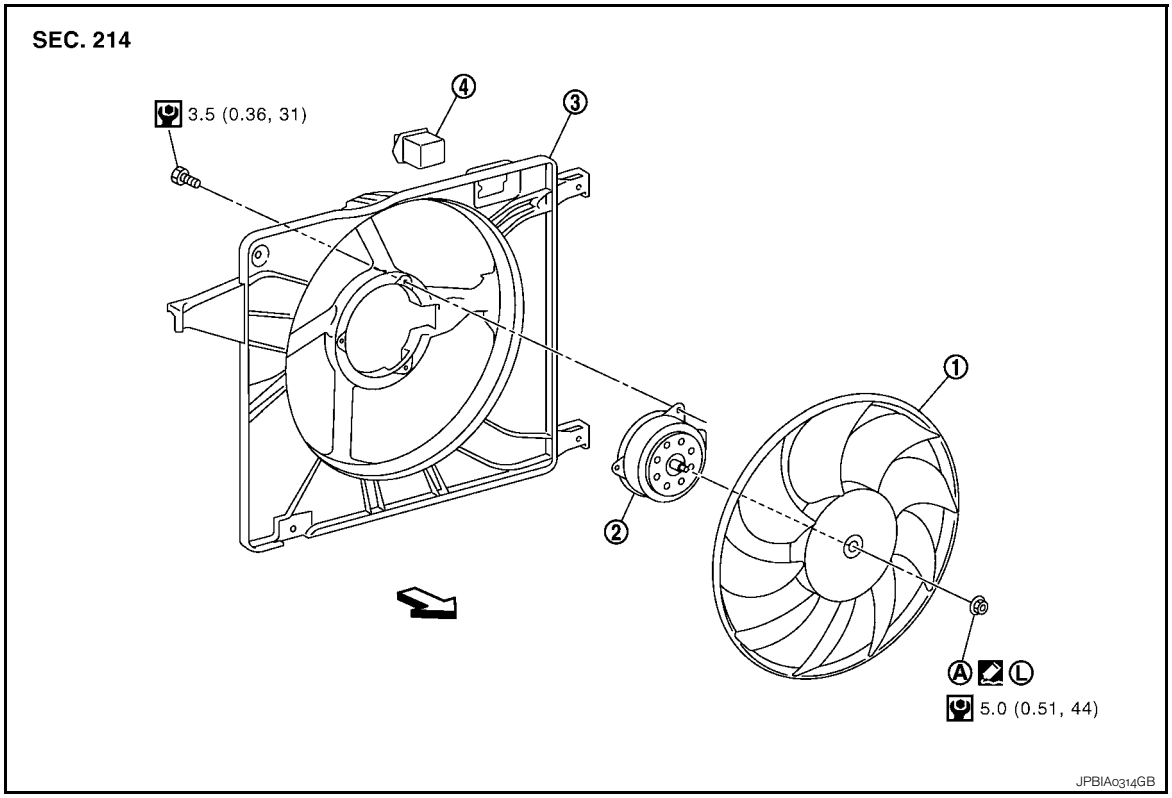
INSPECTION AFTER INSTALLATION
- Check for engine coolant leaks using reservoir tank cap tester. Refer to CO-52, "Inspection".

cardiagn.com

COOLING FAN

Exploded View

INFOID:0000000001111177



1.	Cooling fan	2.	Fan motor	3.	Fan shroud
4.	Resistor				
A.	Reverse screw				
	:	Apply thread locking sealant.			
	:	Vehicle front			

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001111178

REMOVAL

1. Remove air duct (inlet). Refer to EM-265, "Exploded View".
2. Disconnect harness connector from resistor and fan motor, and move harness to aside.
3. Remove cooling fan assembly.
   CAUTION:
   Be careful not to damage or scratch on radiator core.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged).

NOTE:

Cooling fan is controlled by ECM. For details, refer to EC-1309, "System Description".

Disassembly and Assembly

INFOID:0000000001111179

DISASSEMBLY

cardiagn.com

1. Remove resistor from fan shroud.
   CAUTION:
   Handle carefully to avoid dropping and shocks.
2. Remove cooling fan mounting nut, and then remove the cooling fan.
   CAUTION:
   Reverse screw is used for the fan attachment screw. When removing or attaching, turn the screw the opposite way as for a normal screw.
3. Remove fan motor.

ASSEMBLY

Assembly is the reverse order of disassembly.

- Apply thread locking sealant on fan motor shaft.

Inspection

INFOID:0000000001111180

INSPECTION AFTER DISASSEMBLY

Cooling Fan

Inspect cooling fan for crack or unusual bend.

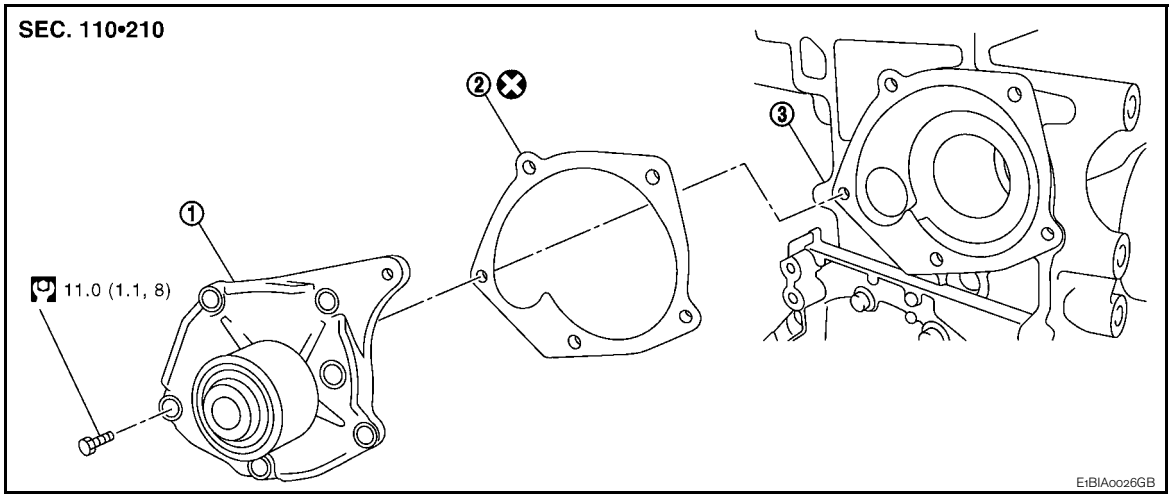
- If anything is found, replace cooling fan.

cardiagn.com

WATER PUMP

Exploded View

INFOID:0000000001062345



1. Water pump
2. Gasket
3. Cylinder block

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001062512

WARNING:
Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.

REMOVAL

1. Remove the following parts.
   - Battery ground cable
   - Undercover
   - RH front wheel
2. Remove right side splash cover.
3. Remove drive belt. Refer to EM-259, "Removal and Installation".
4. Drain engine coolant. Refer to CO-52, "Draining".
   CAUTION:
   Perform when engine is cold.
5. Remove timing belt and inner cover. Refer to EM-287, "Removal and Installation".
6. Remove the water pump.
   - Coolant will leak from the cylinder block, so have a receptacle ready below.

   CAUTION:
   - **Handle the water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassembled and should be replaced as a unit.**

INSTALLATION

Install in the reverse order of removal.

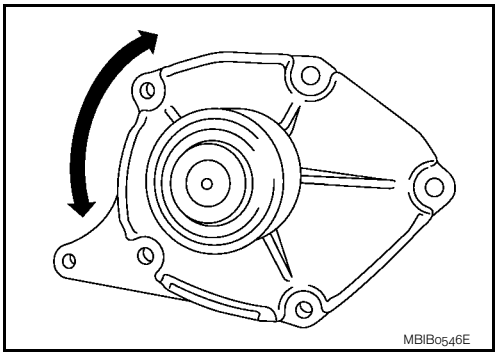
Inspection

INFOID:0000000001062347

INSPECTION AFTER REMOVAL

cardiagn.com

- Visually make sure there is no significant dirt or rusting on the water pump body and vane.
- Make sure there is no looseness in the vane shaft, and that it turns smoothly when rotated by hand.
- If there are any unusualness, replace the water pump assembly.



INSPECTION AFTER INSTALLATION

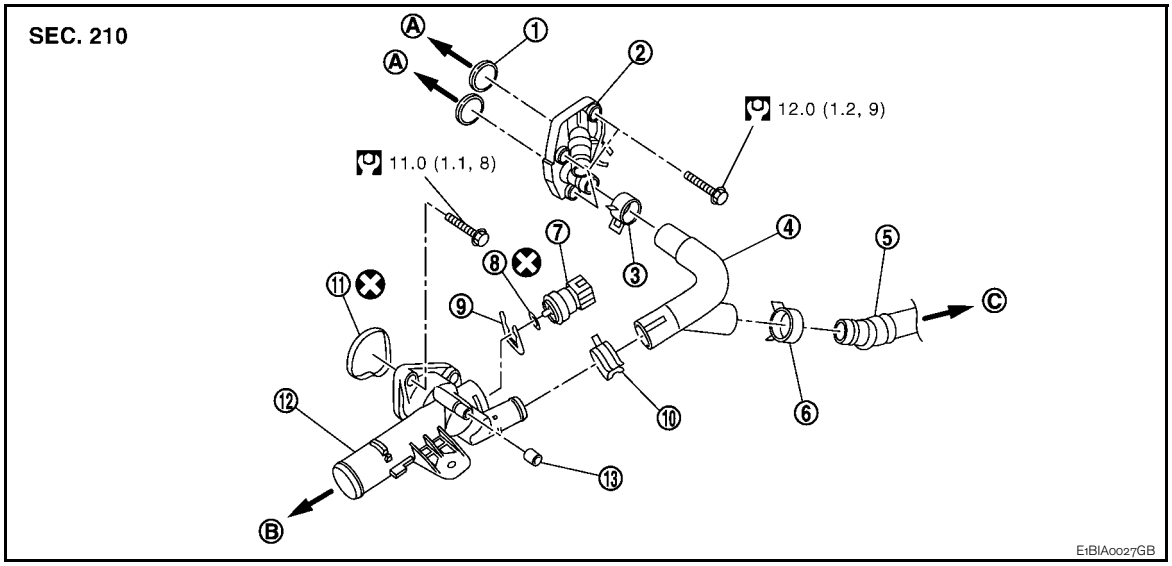
- Check for engine coolant leaks using reservoir tank cap tester. Refer to CO-52, "Inspection".

cardiagn.com

WATER OUTLET AND THERMOSTAT ASSEMBLY

Exploded View

INFOID:0000000001062351



1. O-ring
2. EGR cooler cover
3. Clamp
4. Water pipe
5. Heater hose
6. Clamp
7. Engine coolant temperature sensor
8. O-ring
9. Lock plate
10. Clamp
11. Gasket
12. Water outlet and thermostat assembly
13. Air relief plug

A. To EGR volume control valve housing B. To radiator hose (upper) C. To heater core

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001062517

REMOVAL

1. Remove engine cover. Refer to EM-266, "Removal and Installation".
2. Remove air cleaner case and air duct (inlet). Refer to EM-265, "Removal and Installation".
3. Remove rear engine slinger. Refer to EM-302, "Exploded View".
4. Remove vacuum hose.
5. Remove vacuum pump. Refer to EM-276, "Removal and Installation".
6. Drain engine coolant. Refer to CO-52, "Draining".
   CAUTION:
   Perform when engine is cold.
7. Remove radiator upper hose. Refer to CO-56, "Exploded View".
8. Remove heater hose.
9. Disconnect reservoir tank hose. Refer to CO-56, "Exploded View".
10. Remove water outlet.

INSTALLATION

Install in the reverse order of removal.

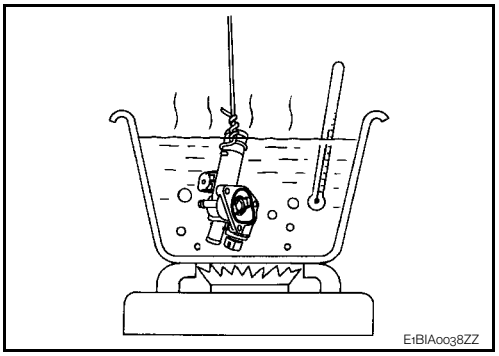
Inspection

INFOID:0000000001062513

INSPECTION AFTER REMOVAL

cardiagn.com

- Place a thread so that it is caught in the valves of the thermostat. Immerse fully in a container filled with water. Heat while stirring. (The example in the figure shows the thermostat.)
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full-open lift amount.
- After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.
- If the measured value is out of the standard value or unusual valve seating condition is found, replace water inlet and thermostat assembly.



	Temperature °C (°F)
Start of opening	89 (192)
End of opening	97 - 101 (207 - 214)

INSPECTION AFTER INSTALLATION

- Check for engine coolant leaks using reservoir tank cap tester. Refer to CO-52, "Inspection".

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000001062354

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity [With reservoir tank (“MAX” level)]	7.0 (6-1/8)
Reservoir tank engine coolant capacity (At “MAX” level)	0.8 (3/4)

Radiator

INFOID:0000000001062355

Unit: kPa (kg/cm^2, psi, bar)

Reservoir tank cap relief pressure	130 - 150 (1.33 - 1.53, 18.9 - 21.8, 1.3 - 1.5)
Leakage testing pressure	10 (0.10, 1.5, 0.1)

Thermostat

INFOID:0000000001062356

Unit: °C (°F)

Temperature of start opening	89 (192)
Temperature of end opening	97 - 101 (207 - 214)

cardiagn.com

SECTION LU

ENGINE LUBRICATION SYSTEM

CONTENTS

HR16DE

FUNCTION DIAGNOSIS 3

DESCRIPTION 3
Engine Lubrication System 3
Engine Lubrication System Schematic 3

PRECAUTION 4

PRECAUTIONS 4
Liquid Gasket 4

PREPARATION 5

PREPARATION 5
Special Service Tools 5
Commercial Service Tools 5

ON-VEHICLE MAINTENANCE 6

ENGINE OIL 6
Inspection 6
Draining 7
Refilling 7

OIL FILTER 9
Removal and Installation 9
Inspection 9

SERVICE DATA AND SPECIFICATIONS (SDS) 10

SERVICE DATA AND SPECIFICATIONS (SDS) 10
Periodical Maintenance Specification 10
Engine Oil Pressure 10

MR20DE

FUNCTION DIAGNOSIS 11

DESCRIPTION 11
Engine Lubrication System 11
Engine Lubrication System Schematic 11

PRECAUTION 12

PRECAUTIONS 12
Liquid Gasket 12

PREPARATION 13

PREPARATION 13
Special Service Tools 13
Commercial Service Tools 13

ON-VEHICLE MAINTENANCE 14

ENGINE OIL 14
Inspection 14
Draining 15
Refilling 15

OIL FILTER 17
Removal and Installation 17
Inspection 17

ON-VEHICLE REPAIR 18

OIL COOLER 18
Exploded View 18
Removal and Installation 18
Inspection 19

SERVICE DATA AND SPECIFICATIONS (SDS) 20

SERVICE DATA AND SPECIFICATIONS (SDS) 20
Periodical Maintenance Specification 20
Engine Oil Pressure 20

K9K

PRECAUTION 21

PRECAUTIONS 21

cardiagn.com

Precaution for Liquid Gasket 21

PREPARATION 22

PREPARATION 22
Special Service Tools 22
Commercial Service Tools 22

ON-VEHICLE MAINTENANCE 23

ENGINE OIL 23
Inspection 23
Draining 23
Refilling 24

OIL FILTER 25
Replacement 25

ON-VEHICLE REPAIR 26

OIL FILTER BRACKET 26
Exploded View 26
Removal and Installation 26

OIL COOLER 27
Exploded View 27
Removal and Installation 27
Inspection 28

OIL PUMP 29
Exploded View 29
Removal and Installation 29

SERVICE DATA AND SPECIFICATIONS (SDS) 30

SERVICE DATA AND SPECIFICATIONS (SDS) 30
Periodical Maintenance Specification 30
Engine Oil Pressure 30

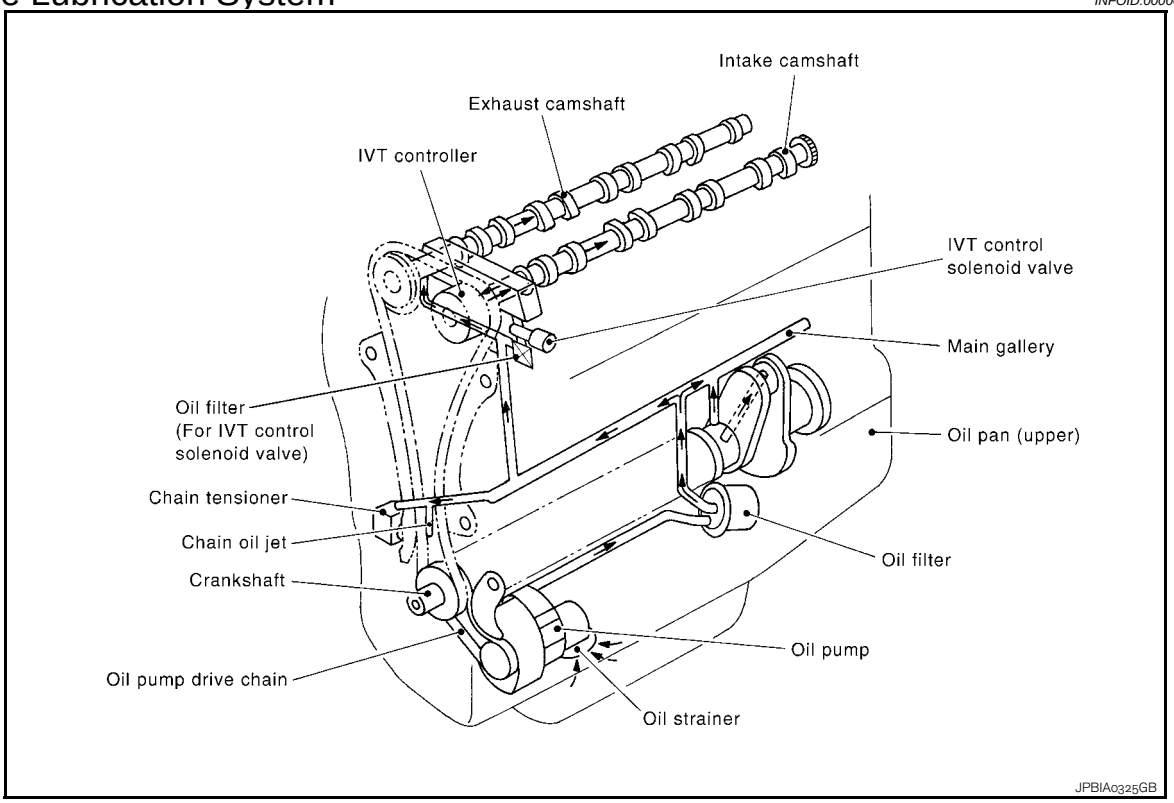
cardiagn.com

FUNCTION DIAGNOSIS

DESCRIPTION

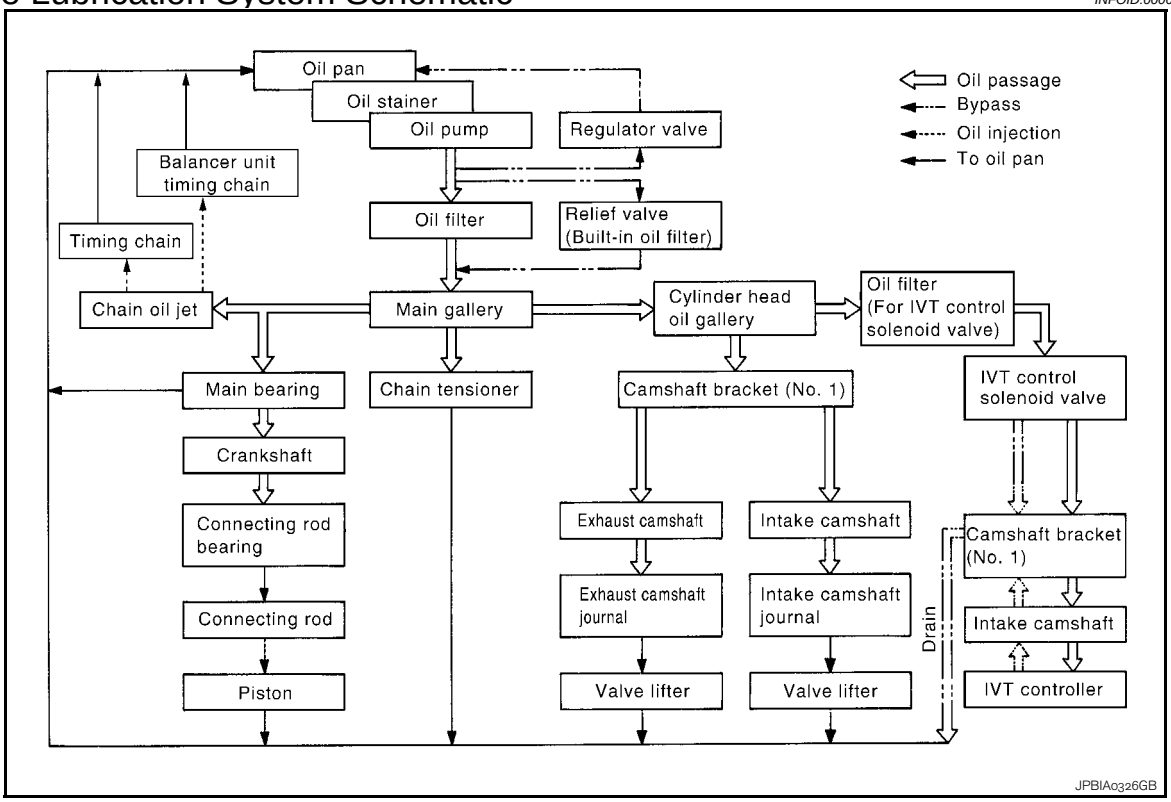
Engine Lubrication System

INFOID:0000000000902409



Engine Lubrication System Schematic

INFOID:0000000000902410



cardiagn.com

PRECAUTION

PRECAUTIONS

Liquid Gasket

INFOID:0000000000902406

LIQUID GASKET APPLICATION PROCEDURE

1. Remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove liquid gasket completely from the liquid gasket application surface, mounting bolts, and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Apply liquid gasket to the liquid gasket application surface.
   Use Genuine liquid gasket or equivalent.
   - Within five minutes of liquid gasket application, install the mating component.
   - If liquid gasket protrudes, wipe it off immediately.
   - Do not retighten mounting bolts or nuts after the installation.
   - After 30 minutes or more have passed from the installation, fill engine oil and engine coolant.

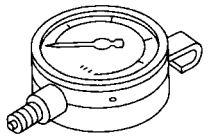
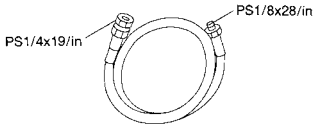
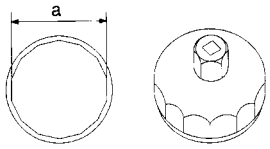
cardiagn.com

PREPARATION

PREPARATION

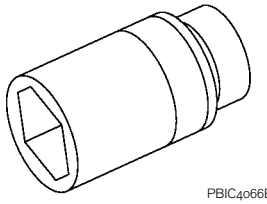
Special Service Tools

INFOID:0000000000902407

Tool number Tool name	Description
ST25051001 Oil pressure gauge  NT050	Measuring oil pressure **Maximum measuring range:** 2,452 kPa (24.52 bar, 25 kg-cm^2, 356 psi)
ST25052000 Hose  S-NT559	Adapting oil pressure gauge to cylinder block
KV10115801 Oil filter wrench  S-NT375	Removing and installing oil filter **a: 64.3 mm (2.531 in)**

Commercial Service Tools

INFOID:0000000000902408

Tool name	Description
Deep socket  PBIC4066E	Removing and installing oil pressure switch **a: 27 mm (1.06 in)**

cardiagn.com

ON-VEHICLE MAINTENANCE

ENGINE OIL

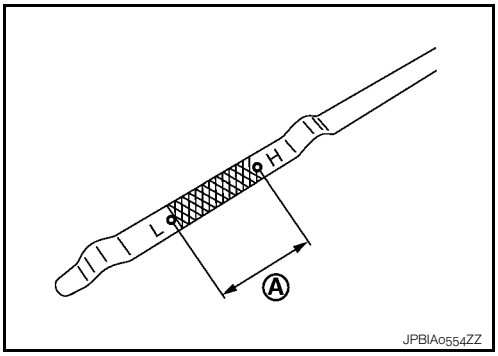
Inspection

INFOID:0000000000902411

ENGINE OIL LEVEL

NOTE:
Before starting engine, put vehicle horizontally and check the engine oil level. If engine is already started, stop it and allow 10 minutes before checking.

1. Pull out oil level gauge and wipe it clean.
2. Insert oil level gauge and make sure the engine oil level is within the range (A) shown in the figure.
3. If it is out of range, adjust it.



ENGINE OIL APPEARANCE

- Check engine oil for white turbidity or heavy contamination.
- If engine oil becomes turbid and white, it is highly probable that it is contaminated with engine coolant. Repair or replace damaged parts.

ENGINE OIL LEAKAGE

Check for engine oil leakage around the following area.

- Oil pan (upper and lower)
- Oil pan drain plug
- Oil pressure switch
- Oil level sensor
- Oil filter
- Intake valve timing control solenoid valve
- Front cover
- Mating surface between cylinder head and camshaft bracket
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Crankshaft oil seals (front and rear)
- Oil filter (for intake valve timing control)

OIL PRESSURE CHECK

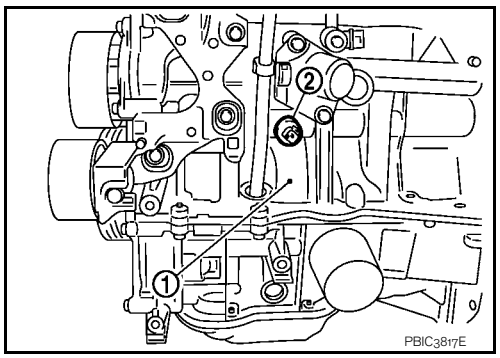
WARNING:

- **Be careful not to get burned, as engine oil may be hot.**
- **When checking engine oil pressure, shift position should be “Neutral”, and apply parking brake securely.**

1. Check engine oil level. Refer to LU-6, "Inspection".

cardiagn.com

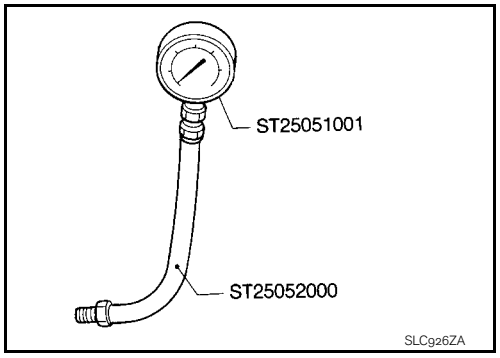
2. Disconnect harness connector at oil pressure switch (2), and remove oil pressure switch using a deep socket (commercial service tool).



1 : Cylinder block

CAUTION:
Never drop or shock oil pressure switch.

3. Install oil pressure gauge and hose (SST).



4. Start engine and warm it up to normal operating temperature.
5. Check oil pressure with engine running under no-load.
NOTE:
When engine oil temperature is low, engine oil pressure becomes high.

Engine oil pressure : Refer to LU-10, "Engine Oil Pressure".

If difference is extreme, check oil passage and oil pump for oil leaks.

6. After the inspections, install oil pressure switch as follows:
a. Remove old liquid gasket adhering to oil pressure switch and engine.
b. Apply liquid gasket and tighten oil pressure switch to specification.
Use Genuine Liquid Gasket or equivalent.

Tightening torque : Refer to EM-93, "Exploded View".

c. Check engine oil level. Refer to LU-6, "Inspection".
d. After warming up engine, make sure there is no leaks of engine oil with running engine.

Draining

INFOID:0000000000902412

WARNING:
- **Be careful not to get burned, as engine oil may be hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used engine oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up the engine, and check for engine oil leakage from engine components. Refer to LU-6, "Inspection".
2. Stop the engine and wait for 10 minutes.
3. Loosen oil filler cap.
4. Remove drain plug and then drain engine oil.

Refilling

INFOID:0000000000902413

cardiagn.com

1. Install drain plug with new washer. Refer to EM-40, "Exploded View".
   CAUTION:
   Be sure to clean drain plug and install with new washer.

   Tightening torque : Refer to EM-40, "Exploded View".

2. Refill with new engine oil.
   Engine oil specification and viscosity: Refer to MA-21, "Fluids and Lubricants".

   Engine oil capacity : Refer to LU-10, "Periodical Maintenance Specification".

   CAUTION:
   - **The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.**
   - **Always use oil level gauge to determine the proper amount of engine oil in the engine.**
3. Warm up engine and check area around drain plug and oil filter for engine oil leakage.
4. Stop engine and wait for 10 minutes.
5. Check the engine oil level. Refer to LU-6, "Inspection".

cardiagn.com

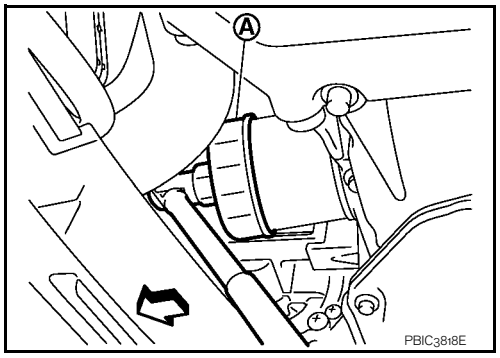
OIL FILTER

Removal and Installation

INFOID:0000000000902504

REMOVAL

- Using oil filter wrench [SST: KV10115801] (A), remove oil filter.



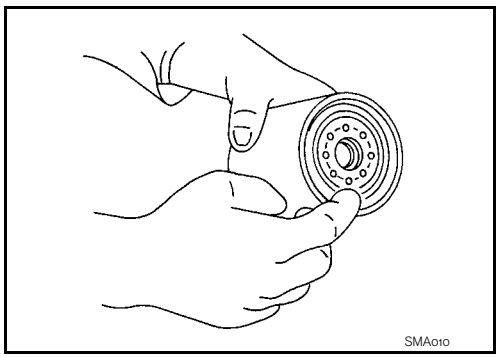
⇦ : Vehicle font

CAUTION:

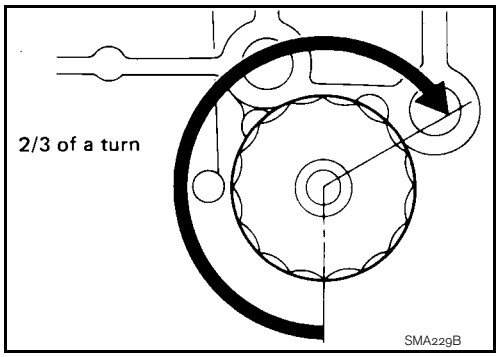
- **Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.**
- **Be careful not to get burned when engine and engine oil may be hot.**
- **When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Completely wipe off any engine oil that adheres to engine and vehicle.**

INSTALLATION

1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.



3. Screw oil filter manually until it touches the installation surface, then tighten it by 2/3 turn. Or tighten to specification.



Oil filter:

: 17.7 N·m (1.8 kg-m, 13 ft-lb)

Inspection

INFOID:0000000000902415

INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to LU-6, "Inspection".
2. Start the engine, and check there is no leak of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level, and adjust the level. Refer to LU-6, "Inspection".

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000000902428

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	4.3 (3-3/4)
	Without oil filter change	4.1 (3-5/8)
Dry engine (Overhaul)		4.8 (4-1/4)

Engine Oil Pressure

INFOID:0000000000902429

Engine speed (rpm)	Approximate discharge pressure* [kPa (bar, kg/cm^2, psi)]
Idle speed	More than 60 (0.60, 0.61, 9)
2,000	More than 270 (2.7, 2.8, 39)

*: Engine oil temperature at 80°C (176°F)

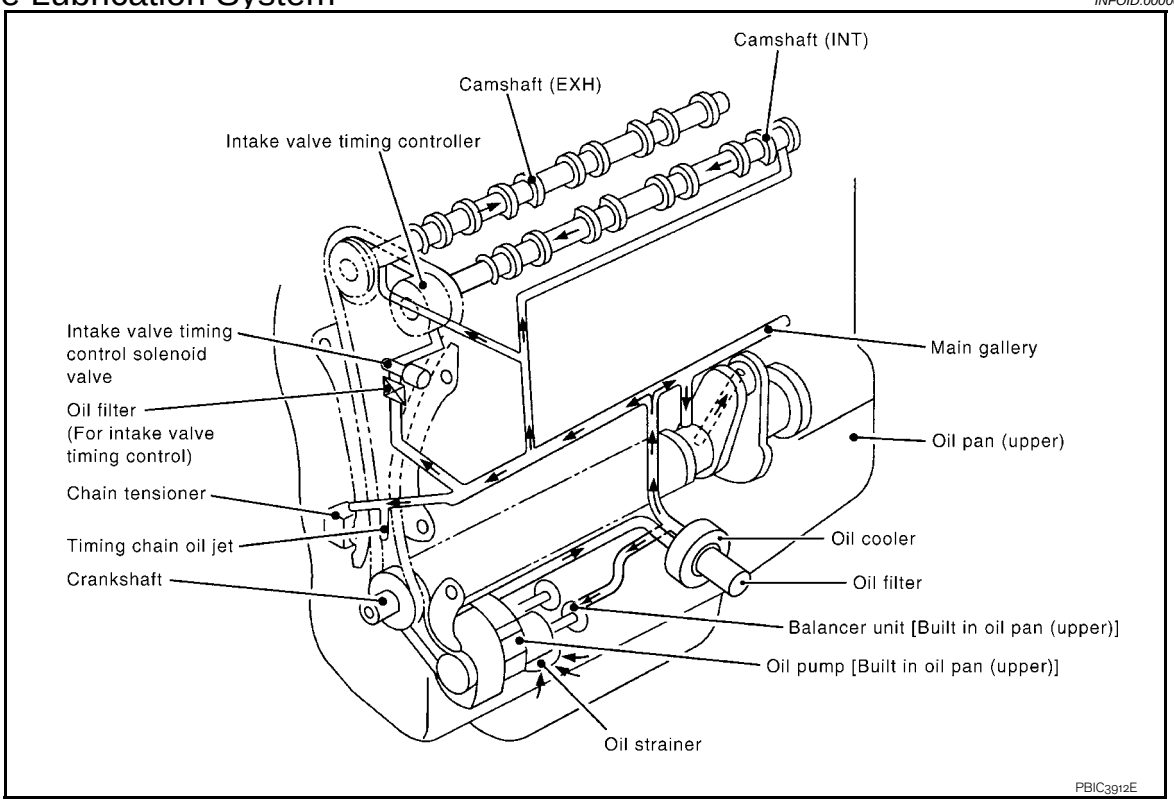
cardiagn.com

FUNCTION DIAGNOSIS

DESCRIPTION

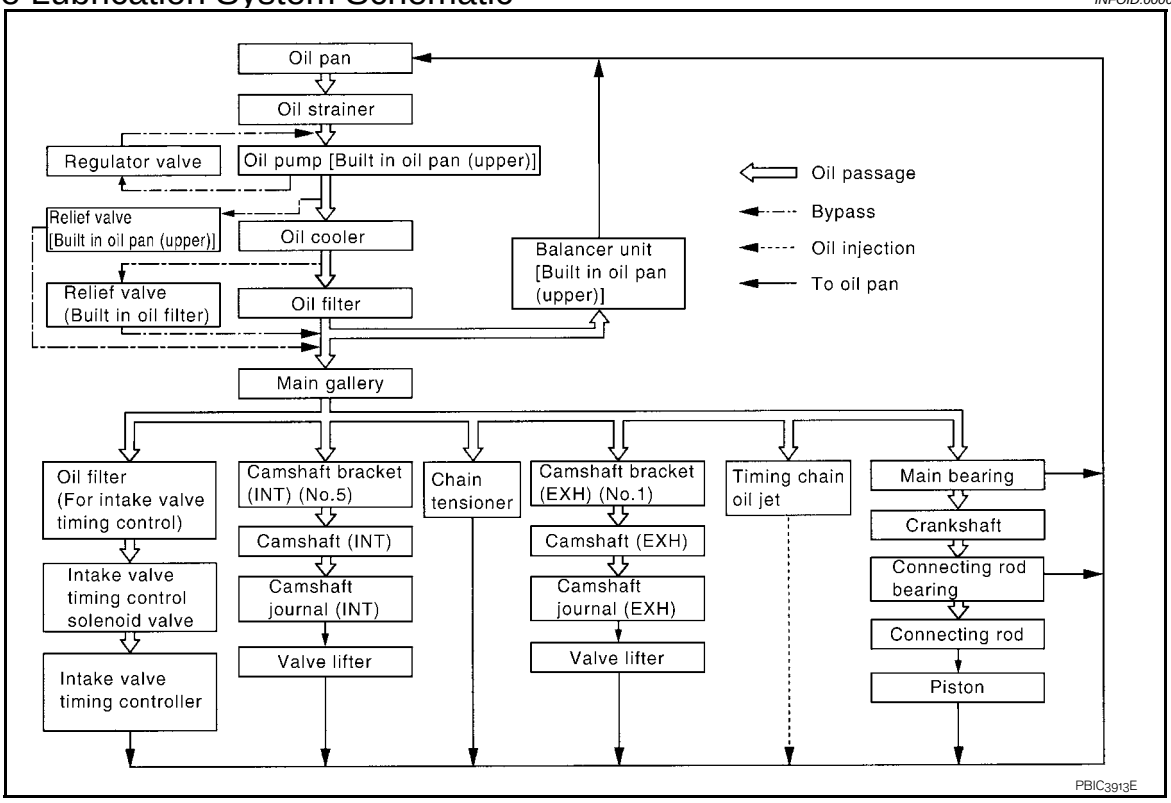
Engine Lubrication System

INFOID:0000000000902583



Engine Lubrication System Schematic

INFOID:0000000000902584



cardiagn.com

PRECAUTION

PRECAUTIONS

Liquid Gasket

INFOID:0000000000902580

LIQUID GASKET APPLICATION PROCEDURE

1. Remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove liquid gasket completely from the liquid gasket application surface, mounting bolts, and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Apply liquid gasket to the liquid gasket application surface.
   Use Genuine liquid gasket or equivalent.
   - Within five minutes of liquid gasket application, install the mating component.
   - If liquid gasket protrudes, wipe it off immediately.
   - Do not retighten mounting bolts or nuts after the installation.
   - After 30 minutes or more have passed from the installation, fill engine oil and engine coolant.

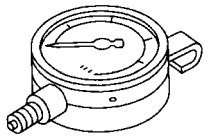
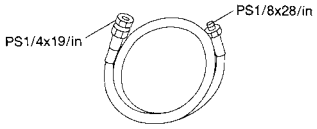
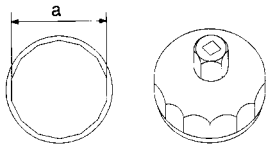
cardiagn.com

PREPARATION

PREPARATION

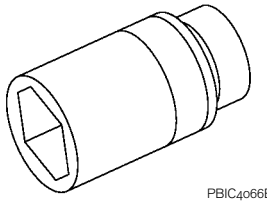
Special Service Tools

INFOID:0000000000902581

Tool number Tool name	Description
ST25051001 Oil pressure gauge  NT050	Measuring oil pressure **Maximum measuring range:** 2,452 kPa (24.52 bar, 25 kg-cm^2, 356 psi)
ST25052000 Hose  S-NT559	Adapting oil pressure gauge to cylinder block
KV10115801 Oil filter wrench  S-NT375	Removing and installing oil filter **a: 64.3 mm (2.531 in)**

Commercial Service Tools

INFOID:0000000000902582

Tool name	Description
Deep socket  PBIC4066E	Removing and installing oil pressure switch **a: 27 mm (1.06 in)**

cardiagn.com

ON-VEHICLE MAINTENANCE

ENGINE OIL

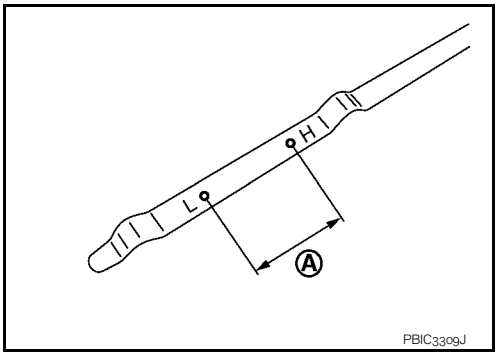
Inspection

INFOID:0000000000902586

ENGINE OIL LEVEL

NOTE:
Before starting engine, put vehicle horizontally and check the engine oil level. If engine is already started, stop it and allow 10 minutes before checking.

1. Pull out oil level gauge and wipe it clean.
2. Insert oil level gauge and make sure the engine oil level is within the range (A) shown in the figure.
3. If it is out of range, adjust it.



ENGINE OIL APPEARANCE

- Check engine oil for white turbidity or heavy contamination.
- If engine oil becomes turbid and white, it is highly probable that it is contaminated with engine coolant. Repair or replace damaged parts.

ENGINE OIL LEAKAGE

Check for engine oil leakage around the following area.

- Oil pan (upper and lower)
- Oil pan drain plug
- Oil pressure switch
- Oil level sensor
- Oil filter
- Oil cooler
- Intake valve timing control solenoid valve
- Front cover
- Mating surface between cylinder head and camshaft bracket
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Crankshaft oil seals (front and rear)

OIL PRESSURE CHECK

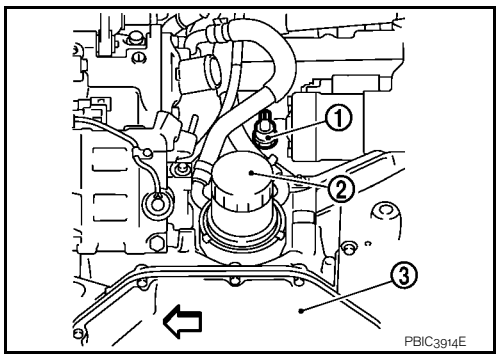
WARNING:

- **Be careful not to get burned, as engine oil may be hot.**
- **When checking engine oil pressure, shift position should be “Parking” (CVT models) or “Neutral” (M/T models), and apply parking brake securely.**

1. Check engine oil level. Refer to LU-14, "Inspection".

cardiagn.com

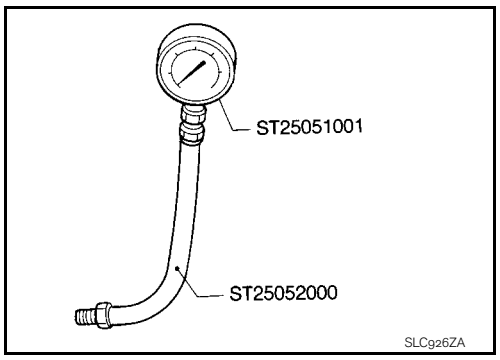
2. Disconnect harness connector at oil pressure switch (1), and remove oil pressure switch using a deep socket (commercial service tool).



2 : Oil filter
3 : Oil pan (lower)
⇦ : Engine front

CAUTION:
Never drop or shock oil pressure switch.

3. Install oil pressure gauge and hose (SST).



4. Start engine and warm it up to normal operating temperature.
5. Check oil pressure with engine running under no-load.
NOTE:
When engine oil temperature is low, engine oil pressure becomes high.

Engine oil pressure : Refer to LU-20, "Engine Oil Pressure".

If difference is extreme, check oil passage and oil pump for oil leaks.

6. After the inspections, install oil pressure switch as follows:
a. Remove old liquid gasket adhering to oil pressure switch and engine.
b. Apply liquid gasket and tighten oil pressure switch to specification.
Use Genuine Liquid Gasket or equivalent.

Tightening torque : Refer to EM-210, "Exploded View".

c. Check engine oil level. Refer to LU-14, "Inspection".
d. After warming up engine, make sure there is no leaks of engine oil with running engine.

Draining

INFOID:0000000000902587

WARNING:
- **Be careful not to get burned, as engine oil may be hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used engine oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up the engine, and check for engine oil leakage from engine components. Refer to LU-14, "Inspection".
2. Stop the engine and wait for 10 minutes.
3. Loosen oil filler cap.
4. Remove drain plug and then drain engine oil.

Refilling

INFOID:0000000000902588

cardiagn.com

1. Install drain plug with new washer. Refer to EM-152, "Exploded View".
   CAUTION:
   Be sure to clean drain plug and install with new washer.

   Tightening torque : Refer to EM-152, "Exploded View".

2. Refill with new engine oil.
   Engine oil specification and viscosity: Refer to MA-21, "Fluids and Lubricants".

   Engine oil capacity : Refer to LU-20, "Periodical Maintenance Specification".

   CAUTION:
   - **The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.**
   - **Always use oil level gauge to determine the proper amount of engine oil in the engine.**
3. Warm up engine and check area around drain plug and oil filter for engine oil leakage.
4. Stop engine and wait for 10 minutes.
5. Check the engine oil level. Refer to LU-14, "Inspection".

cardiagn.com

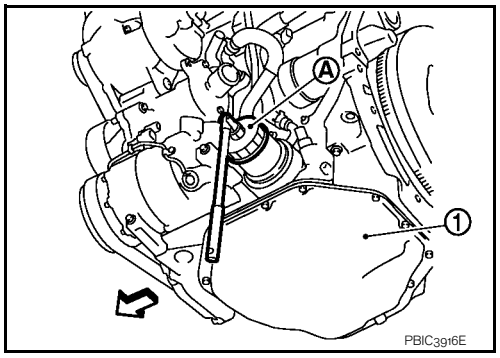
OIL FILTER

Removal and Installation

INFOID:0000000000902591

REMOVAL

- Using oil filter wrench [SST: KV10115801] (A), remove oil filter.



1 : Oil pan (lower)

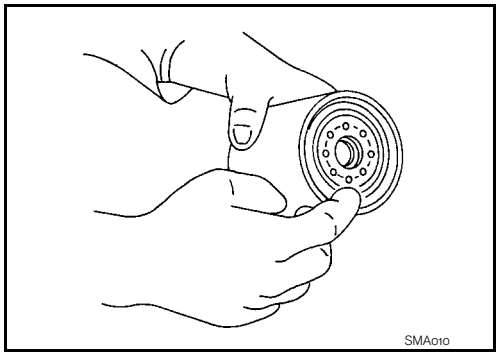
⇦ : Vehicle front

CAUTION:

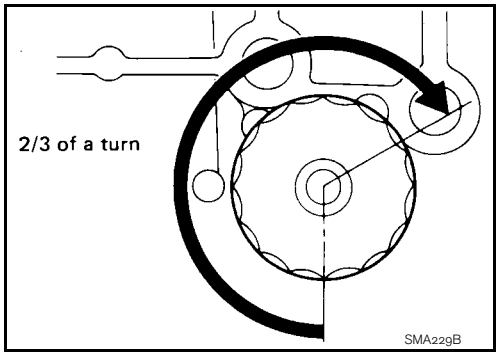
- **Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.**
- **Be careful not to get burned when engine and engine oil may be hot.**
- **When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Completely wipe off any engine oil that adheres to engine and vehicle.**

INSTALLATION

1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.



3. Screw oil filter manually until it touches the installation surface, then tighten it by 2/3 turn. Or tighten to specification.



Oil filter:

: 17.7 N·m (1.8 kg-m, 13 ft-lb)

Inspection

INFOID:0000000000902593

INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to LU-14, "Inspection".
2. Start the engine, and check there is no leak of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level, and adjust the level. Refer to LU-14, "Inspection".

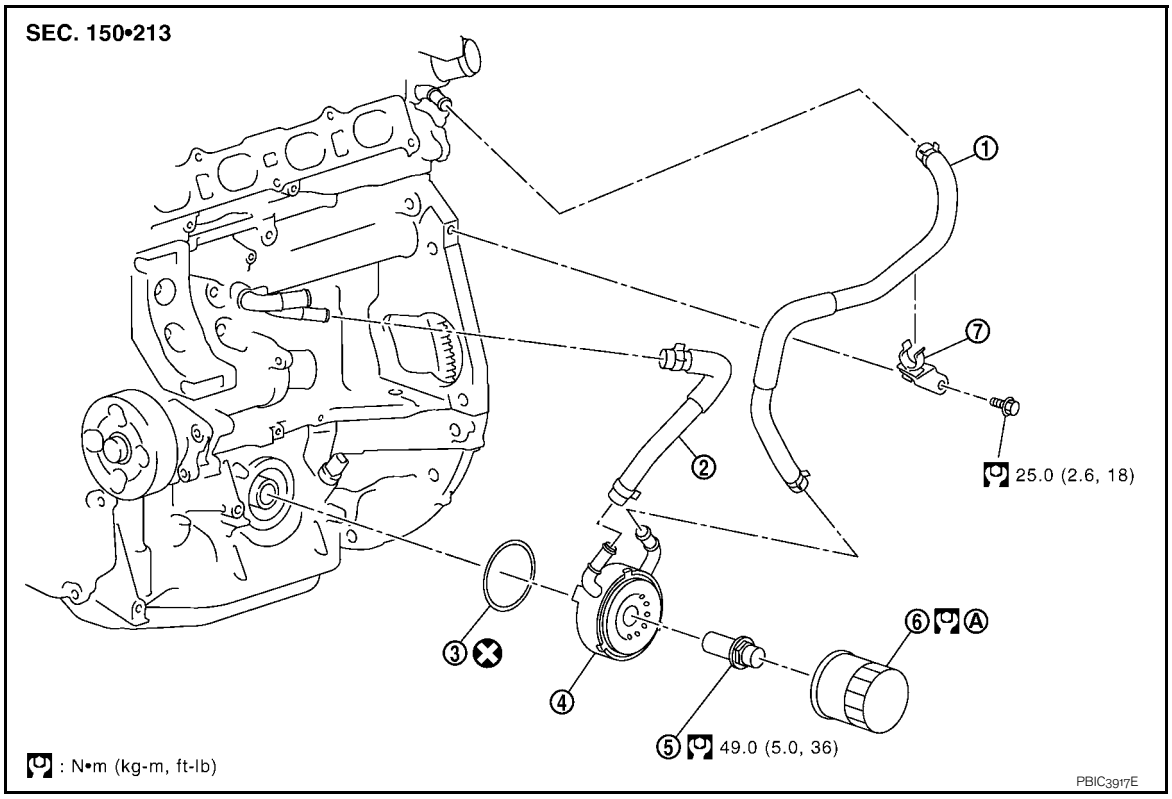
cardiagn.com

ON-VEHICLE REPAIR

OIL COOLER

Exploded View

INFOID:0000000000902598



1. Water hose
2. Water hose
3. O-ring
4. Oil cooler
5. Connector bolt
6. Oil filter
7. Bracket
A. Refer to LU-17

Refer to GI-4, "Components" for symbol marks in the figure.

Removal and Installation

INFOID:0000000000902599

REMOVAL

WARNING:
Be careful not to get burn yourself, as engine oil and engine coolant may be hot.

1. Drain engine coolant from radiator and cylinder block. Refer to CO-30, "Draining" and EM-210, "Exploded View".
2. Using oil filter wrench [SST: KV10115801], remove oil filter. Refer to LU-17, "Removal and Installation".
3. Disconnect water hoses from oil cooler.
   - When removing oil cooler only, pinching water hoses near oil cooler to prevent engine coolant from spilling out.
   - Remaining engine coolant in piping will come out. Use a tray to collect it.

   CAUTION:
   Perform this step when the engine is cold.
4. Remove connector bolt, and remove oil cooler.
   NOTE:
   For reference when installing, put a matching mark on oil cooler and oil pan (upper).

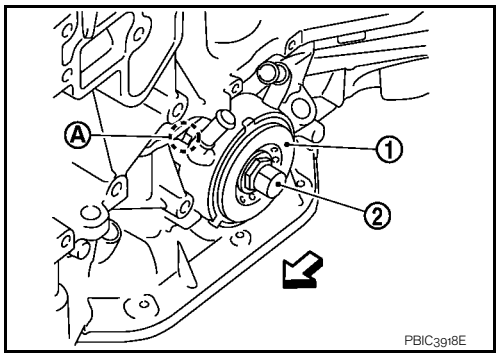
INSTALLATION

cardiagn.com

Installation in the reverse order of removal.

- Tighten the connecting bolt (2) after aligning the stopper (A) on the oil pan (upper) side with protrusion of oil cooler (1).

⇦ : Engine front



Inspection

INFOID:0000000000902600

INSPECTION AFTER REMOVAL

Oil Cooler

Check oil cooler for cracks. Check oil cooler for clogging by blowing through engine coolant inlet. If necessary, replace oil cooler.

INSPECTION AFTER INSTALLATION

1. Check the engine oil level and the engine coolant level and add engine oil and engine coolant. Refer to LU-14, "Inspection" and CO-30, "Inspection".
2. Start the engine, and check there is no leaks of engine oil or engine coolant.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level and the engine coolant level again. Refer to LU-14, "Inspection" and CO-30, "Inspection".

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000000902604

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	4.4 (3-7/8)
	Without oil filter change	4.2 (3-3/4)
Dry engine (Overhaul)		5.2 (4-5/8)

Engine Oil Pressure

INFOID:0000000000902605

Engine speed (rpm)	Approximate discharge pressure* [kPa (bar, kg/cm^2, psi)]
Idle speed	More than 80 (0.80, 0.8, 12)
2,000	More than 450 (4.50, 4.6, 65)

*: Engine oil temperature at 80°C (176°F)

cardiagn.com

PRECAUTION

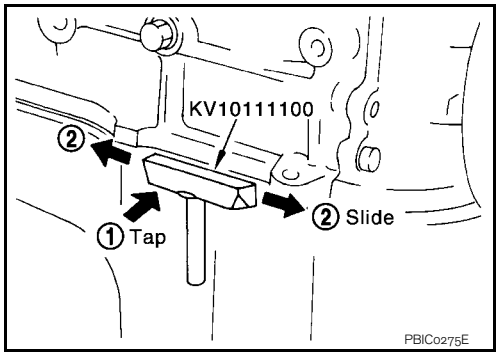
PRECAUTIONS

Precaution for Liquid Gasket

INFOID:0000000001062305

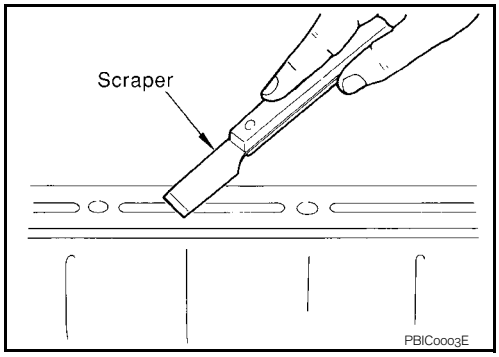
REMOVAL OF LIQUID GASKET

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.
  CAUTION:
  Be careful not to damage the mating surfaces.
- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the gasket applied area.
  CAUTION:
  If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.

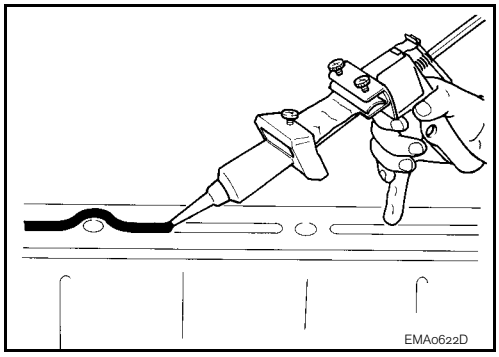


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
   - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.
2. Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Attach the liquid gasket to the tube presser.
   Use Genuine Liquid Gasket or equivalent.

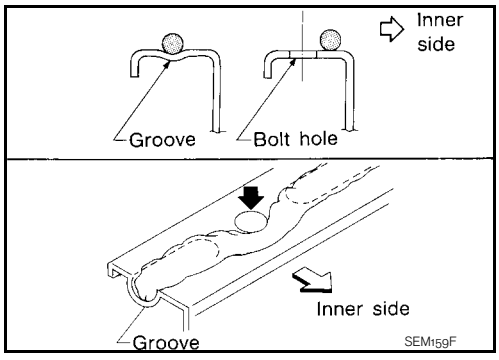


4. Apply the gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the gasket to the groove.



   - As for the bolt holes, normally apply the gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the instruction in this manual.
   - Within five minutes of gasket application, install the mating component.
   - If the liquid gasket protrudes, wipe it off immediately.
   - Do not retighten after the installation.
   - After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

   CAUTION:
   If there are instructions in this manual, observe them.



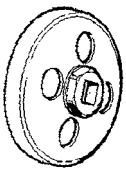
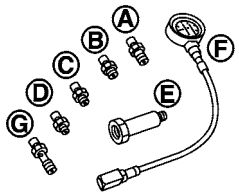
cardiagn.com

PREPARATION

PREPARATION

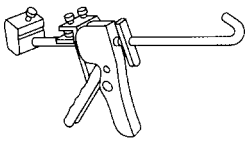
Special Service Tools

INFOID:0000000001062306

NISSAN tool number (RENAULT tool number) Tool name	Description
KV113C0010 (Mot.1329) Oil filter wrench  MBIBo369E	Removing and installing oil filter
KV113E0020 (Mot.836-05) Oil pressure gauge set  MBIBo663E	Measuring oil pressure Use C, E, F.

Commercial Service Tools

INFOID:0000000001115769

NISSAN tool number Tool name	Description
WS39930000 Tube presser  S-NTo52	Pressing the tube of liquid gasket

cardiagn.com

ON-VEHICLE MAINTENANCE

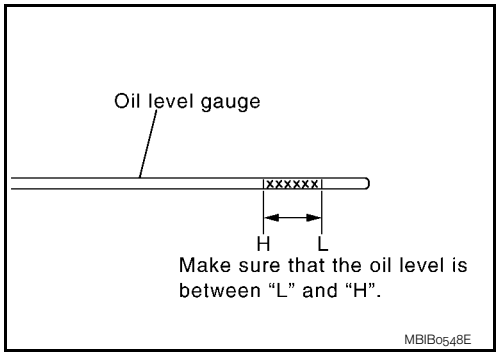
ENGINE OIL

Inspection

INFOID:0000000001062307

OIL LEVEL AND MUDDINESS

- Before starting the engine, check the oil level placing vehicle horizontally. If the engine is already started, stop it and allow 10 minutes before checking.
- Make sure the oil level is within the range shown in the figure.
- If it is out of range, adjust it.
- Check the oil for white turbidity or remarkable contamination.
- If the oil becomes turbid and white, it is highly probable that it is contaminated with coolant. Find the cause and repair.



OIL LEAKAGE

Check for oil leakage around the following area.

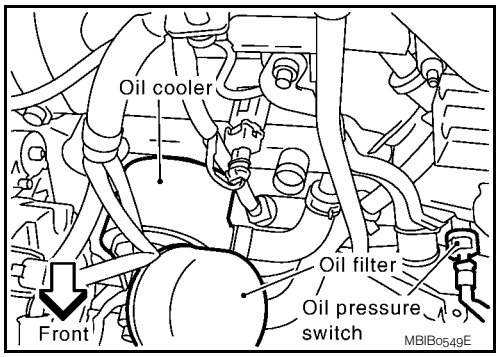
- Oil pan
- Oil pan drain plug
- Oil pressure switch
- Oil filter bracket
- Vacuum pump
- Oil pump housing
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Oil cooler
- Crankshaft oil seals

OIL PRESSURE CHECK

WARNING:

- **Be careful not to burn yourself, as the engine oil is hot.**
- **Oil pressure check should be done in Neutral “N” position.**

1. Check the oil level.
2. Remove engine undercover.
3. Remove the oil pressure switch to connect the oil pressure gauge [SST: KV113E0020 (Mot. 836-05)].
4. After warming up the engine, make sure oil pressure corresponding to the engine speed is produced.



Idle speed : Refer to LU-30, "Engine Oil Pressure".

3000 rpm : Refer to LU-30, "Engine Oil Pressure".

5. After checking, install the oil pressure switch as follows.

a. Remove old sealant adhering to the switch and engine.

b. Apply thread sealant.
Use Genuine Liquid Gasket or equivalent.

Oil pressure switch:

: 25 N·m (2.55 kg-m, 18.4 ft-lb)

6. Start engine and check for oil leakage.

Draining

INFOID:0000000001062308

cardiagn.com

WARNING:

- **Be careful not to burn yourself, as the engine oil is hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer: try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Put vehicle horizontally.
2. Warm up engine, and check for oil leakage from engine components.
3. Stop engine and wait for 10 minutes.
4. Loosen oil filler cap.
5. Remove drain plug and then drain engine oil.

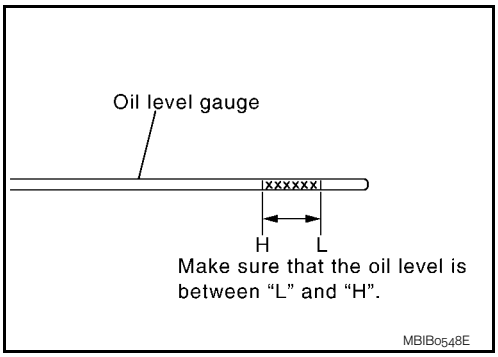
Refilling

INFOID:0000000001062309

1. Refill with new engine oil.
   - Refer to MA-21, "Fluids and Lubricants".

Oil capacity (Approximate)

: Refer to LU-30, "Periodical Maintenance Specification".



- The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.
  Always use the dipstick to the determine when the proper amount of oil is in the engine.

CAUTION:

- **Be sure to clean drain plug and install with new washer.**
- **The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.**
  Always use the dipstick to the determine when the proper amount of oil is in the engine.

2. Warm up engine and check area around drain plug and oil filter for oil leakage.
3. Stop engine and wait for 10 minutes.
4. Check oil level.

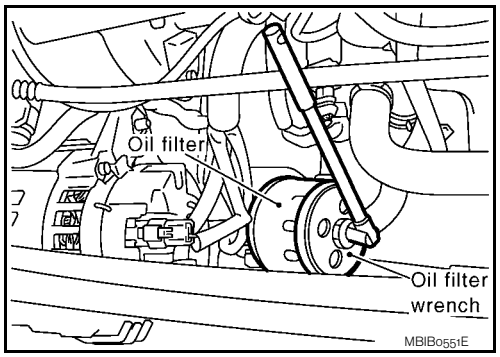
cardiagn.com

OIL FILTER

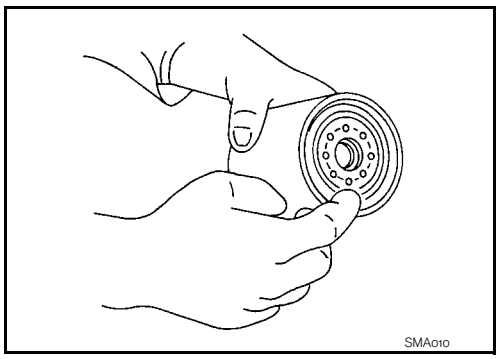
Replacement

INFOID:0000000001062311

1. Using an oil filter wrench [SST: KV113C0010 (Mot. 1329)], remove oil filter.
   CAUTION:
   - **Be careful not to get burned when the engine and engine oil are hot.**
   - **When removing, prepare a shop cloth to absorb any oil leakage or spillage.**
   - **Do not allow engine oil to adhere to the drive belts.**
   - **Completely wipe off any oil that adhere to the engine and the vehicle.**



2. Remove foreign materials adhering to the oil filter installation surface.
3. Install oil filter bracket to oil cooler.
   CAUTION:
   Install oil filter bracket, positioning lug in the hole of oil cooler.
4. Apply engine oil to the oil seal contact surface of the new oil filter.
5. Install the oil filter until it comes into contact with the oil seal on the engine bracket.
6. Using an oil filter wrench [SST: KV113C0010 (Mot. 1329)], tighten oil filter.



   : 14 N·m (1.4 kg-m, 10 ft-lb)
7. After warming up the engine, check for engine oil leakage.
8. Check oil level and add engine oil. Refer to LU-23.

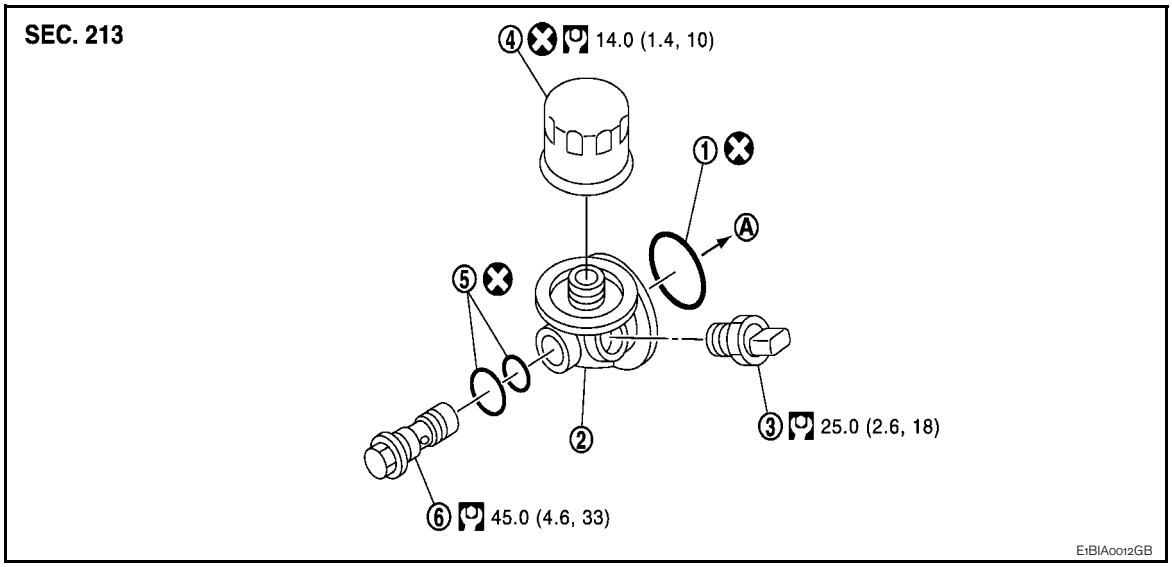
cardiagn.com

ON-VEHICLE REPAIR

OIL FILTER BRACKET

Exploded View

INFOID:0000000001062314



1. O-ring
2. Oil filter bracket
3. Oil pressure switch
4. Oil filter
5. O-ring
6. Connecting bolt

A. To oil cooler

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001062313

REMOVAL

CAUTION:

- **Be careful not to get burned when the engine and engine oil are hot.**
- **When removing, prepare a shop cloth to absorb any oil leakage or spillage.**
- **Do not allow engine oil to adhere to the drive belts.**
- **Completely wipe off any oil that adhere to the engine and the vehicle.**

1. Remove oil filter. Refer to LU-25, "Replacement".
2. Remove oil filter bracket.

INSTALLATION

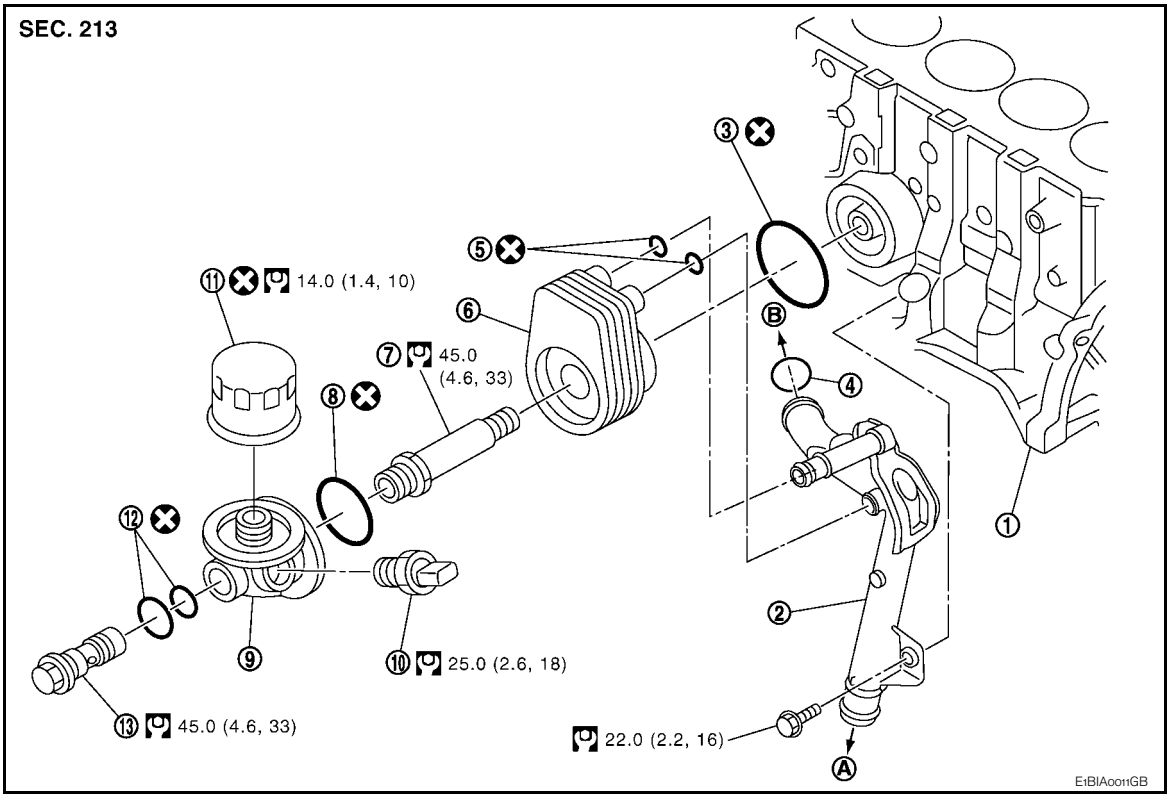
Install in the reverse order of removal.

cardiagn.com

OIL COOLER

Exploded View

INFOID:0000000001062315



1. Cylinder block	2. Water pipe	3. O-ring
4. O-ring	5. O-ring	6. Oil cooler
7. Connecting stud	8. O-ring	9. Oil filter bracket
10. Oil pressure switch	11. Oil filter	12. O-ring
13. Connecting bolt		
A. To radiator lower hose	B. To water pump	

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001062316

CAUTION:
- **Be careful not to get burned when the engine and engine oil are hot.**
- **When removing, prepare a shop cloth to absorb any oil leakage or spillage.**
- **Completely wipe off any oil that adhere to the engine and the vehicle.**

REMOVAL

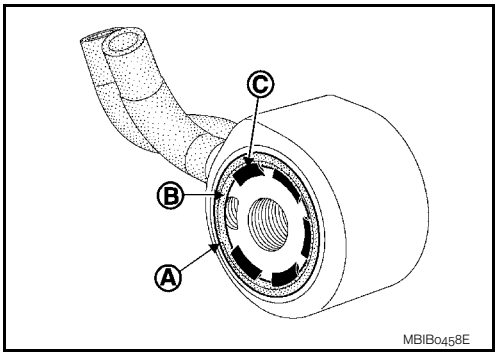
1. Drain engine coolant. Refer to CO-52, "Draining".
   CAUTION:
   Perform when engine is cold.
2. Remove oil filter and oil filter bracket. Refer to LU-26, "Removal and Installation".
3. Remove water hoses from oil cooler.
4. Remove oil cooler.

INSTALLATION

Installation is in reverse order of removal.

cardiagn.com

- Replace the O-ring (A) of the oil cooler, positioning the lip (B) of the seal behind the lug (C) of the oil cooler.
- Confirm that no foreign objects are adhering to the installation planes of the oil cooler and block.



Inspection

INFOID:0000000001062318

INSPECTION AFTER REMOVAL

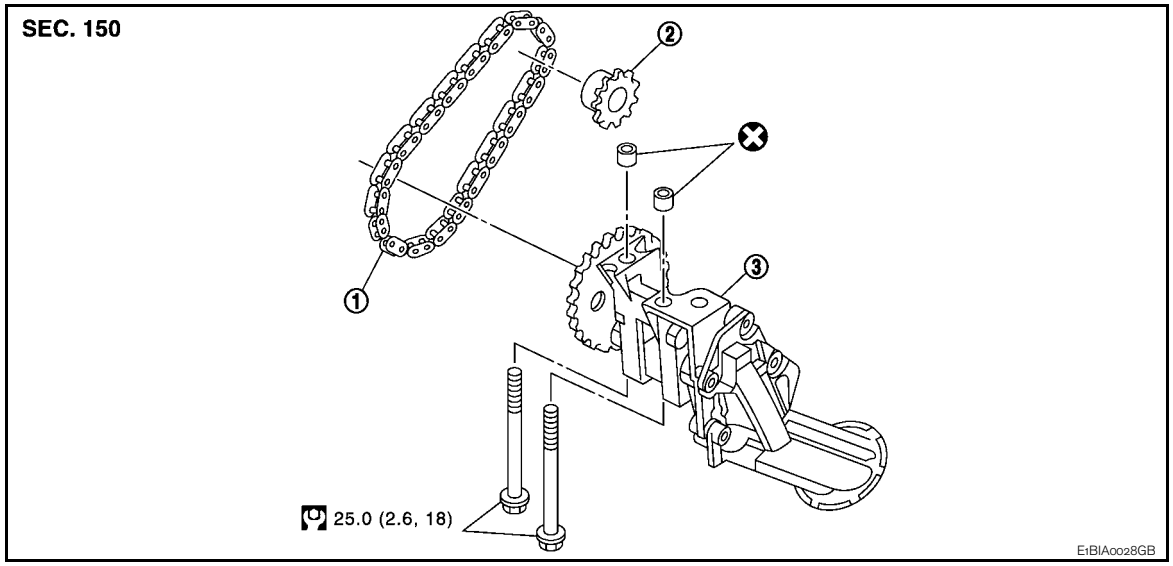
Check oil cooler for cracks and clogging by blowing through coolant inlet. If necessary, replace oil cooler assembly.

cardiagn.com

OIL PUMP

Exploded View

INFOID:0000000001062319



1. Oil pump drive chain
2. Crankshaft sprocket (oil pump drive chain)
3. Oil pump

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001062317

REMOVAL

1. Remove the following parts.
   - Battery ground cable
   - Undercover
   - RH front wheel
2. Remove right side splash cover.
3. Remove drive belt. Refer to EM-259, "Removal and Installation".
4. Remove oil pan. Refer to EM-280, "Removal and Installation".
5. Remove rear oil seal retainer. Refer to EM-310, "Disassembly and Assembly".
6. Remove oil pump drive chain. Refer to EM-310, "Disassembly and Assembly".
7. Remove oil pump assembly.

INSTALLATION

Refer to EM-310, "Disassembly and Assembly".

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000001062322

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ·(Imp qt)

With oil filter change	4.55 (4)
Without oil filter change	4.39 (3-7/8)
Dry engine (overhaul)	4.71 (4-1/8)

Engine Oil Pressure

INFOID:0000000001062323

kPa (bar, kg/cm^2, psi)

Engine speed	Approximate discharge pressure
Idle speed	120 (1.2, 1.22, 17.4)
3,000 rpm	350 (3.5, 5.57, 50.8)

cardiagn.com

SECTION EM
ENGINE MECHANICAL

CONTENTS

HR16DE

SYMPTOM DIAGNOSIS 6

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 6
NVH Troubleshooting - Engine Noise 6
Use the Chart Below to Help You Find the Cause of the Symptom 6

PRECAUTION 8

PRECAUTIONS 8
Precaution for Procedure without Cowl Top Cover 8
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 8
Draining Engine Coolant 8
Disconnecting Fuel Piping 8
Removal and Disassembly 8
Inspection, Repair and Replacement 9
Assembly and Installation 9
Parts Requiring Angle Tightening 9
Liquid Gasket 9

PREPARATION 11

PREPARATION 11
Special Service Tools 11
Commercial Service Tools 12

ON-VEHICLE MAINTENANCE 15

DRIVE BELTS 15
Checking 15
Tension Adjustment 15
Removal and Installation 16

AIR CLEANER FILTER 18
Removal and Installation 18

SPARK PLUG 19
Exploded View 19
Removal and Installation 19
Inspection 20

CAMSHAFT VALVE CLEARANCE 21
Inspection and Adjustment 21

COMPRESSION PRESSURE 24
Inspection 24

ON-VEHICLE REPAIR 25

DRIVE BELT IDLER PULLEY 25
Exploded View 25
Removal and Installation 25

AIR CLEANER AND AIR DUCT 27
Exploded View 27
Removal and Installation 27
Inspection 28

INTAKE MANIFOLD 29
Exploded View 29
Removal and Installation 29

EXHAUST MANIFOLD 32
Exploded View 32
Removal and Installation 32
Inspection 33

FUEL INJECTOR AND FUEL TUBE 35
Exploded View 35
Removal and Installation 35
Inspection 39

OIL PAN (LOWER) 40
Exploded View 40
Removal and Installation 40
Inspection 42

IGNITION COIL, SPARK PLUG AND ROCKER COVER 43
Exploded View 43
Removal and Installation 43

cardiagn.com

TIMING CHAIN 46
Exploded View 46
Removal and Installation 46
Inspection 53

CAMSHAFT 55
Exploded View 55
Removal and Installation 55
Inspection 65

OIL SEAL 71

VALVE OIL SEAL 71
VALVE OIL SEAL : Removal and Installation 71

FRONT OIL SEAL 71
FRONT OIL SEAL : Removal and Installation 71

REAR OIL SEAL 72
REAR OIL SEAL : Removal and Installation 72

CYLINDER HEAD 74
Exploded View 74
Removal and Installation 75
Disassembly and Assembly 76
Inspection 80

REMOVAL AND INSTALLATION 83

ENGINE ASSEMBLY 83
Exploded View 83
Removal and Installation 83
Inspection 86

DISASSEMBLY AND ASSEMBLY 87

ENGINE STAND SETTING 87
Setting 87

ENGINE UNIT 88
Disassembly 88
Assembly 88

OIL PAN (UPPER) 89
Exploded View 89
Removal and Installation 89
Inspection 92

CYLINDER BLOCK 93
Exploded View 93
Disassembly and Assembly 94
Inspection 101

HOW TO SELECT PISTON AND BEARING .. 110
Description 110
Connecting Rod Bearing 110
Main Bearing 112

SERVICE DATA AND SPECIFICATIONS (SDS) 115

SERVICE DATA AND SPECIFICATIONS (SDS) 115
General Specification 115
Drive Belts 115
Spark Plug 116
Exhaust Manifold 116
Camshaft 116
Cylinder Head 118
Cylinder Block 120
Connecting Rod Bearing 123
Main Bearing 124

MR20DE

SYMPTOM DIAGNOSIS 125

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 125
NVH troubleshooting Chart 125

PRECAUTION 127

PRECAUTIONS 127
Precaution for Procedure without Cowl Top Cover. 127
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 127
Draining Engine Coolant 127
Disconnecting Fuel Piping 127
Removal and Disassembly 127
Inspection, Repair and Replacement 128
Assembly and Installation 128
Parts Requiring Angle Tightening 128
Liquid Gasket 128

PREPARATION 130

PREPARATION 130
Special Service Tools 130
Commercial Service Tools 131

ON-VEHICLE MAINTENANCE 134

DRIVE BELTS 134
Exploded View 134
Checking 134
Tension Adjustment 134
Removal and Installation 134

AIR CLEANER FILTER 136
Removal and Installation 136

SPARK PLUG 137
Exploded View 137
Removal and Installation 137
Inspection 138

CAMSHAFT VALVE CLEARANCE 139
Inspection and Adjustment 139

COMPRESSION PRESSURE 142
Inspection 142

cardiagn.com

ON-VEHICLE REPAIR 143

DRIVE BELT AUTO-TENSIONER 143
Exploded View 143
Removal and Installation 143

AIR CLEANER AND AIR DUCT 144
Exploded View 144
Removal and Installation 144
Inspection 145

INTAKE MANIFOLD 146
Exploded View 146
Removal and Installation 146

EXHAUST MANIFOLD 149
Exploded View 149
Removal and Installation 149
Inspection 150

OIL PAN (LOWER) 152
Exploded View 152
Removal and Installation 152
Inspection 154

FUEL INJECTOR AND FUEL TUBE 155
Exploded View 155
Removal and Installation 155
Inspection 158

IGNITION COIL , SPRAK PLUG AND ROCKER COVER 160
Exploded View 160
Removal and Installation 160

TIMING CHAIN 162
Exploded View 162
Removal and Installation 163
Inspection 171

CAMSHAFT 173
Exploded View 173
Removal and Installation 173
Inspection 177

OIL SEAL 182

VALVE OIL SEAL 182
VALVE OIL SEAL : Removal and Installation 182

FRONT OIL SEAL 182
FRONT OIL SEAL : Removal and Installation 182

REAR OIL SEAL 183
REAR OIL SEAL : Removal and Installation 183

CYLINDER HEAD 185
Exploded View 185
Removal and Installation 186
Disassembly and Assembly 187
Inspection 191

REMOVAL AND INSTALLATION 194

ENGINE ASSEMBLY 194

M/T 194
M/T : Exploded View 194
M/T : Removal and Installation 195
M/T : Inspection 198

CVT 198
CVT : Exploded View 198
CVT : Removal and Installation 199
CVT : Inspection 202

DISASSEMBLY AND ASSEMBLY 203

ENGINE STAND SETTING 203
Setting 203

ENGINE UNIT 205
Disassembly 205
Assembly 205

OIL PAN (UPPER) 206
Exploded View 206
Removal and Installation 206
Inspection 209

CYLINDER BLOCK 210
Exploded View 210
Disassembly and Assembly 211
Inspection 219

HOW TO SELECT PISTON AND BEARING .. 229
Description 229
Piston 229
Connecting Rod Bearing 230
Main Bearing 232

SERVICE DATA AND SPECIFICATIONS (SDS) 236

SERVICE DATA AND SPECIFICATIONS (SDS) 236
General Specification 236
Drive Belt 236
Spark Plug 236
Exhaust Manifold 236
Camshaft 237
Cylinder Head 238
Cylinder Block 241
Connecting Rod Bearing 244
Main Bearing 245

K9K

SYMPTOM DIAGNOSIS 246

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 246
NVH Troubleshooting - Engine Noise 246

cardiagn.com

Use the Chart Below to Help You Find the Cause of the Symptom 246

PRECAUTION 248

PRECAUTIONS 248
Precaution for Drain Coolant 248
Precaution for Disconnecting Fuel Piping 248
Precaution for Removal and Disassembly 248
Precaution for Inspection, Repair and Replacement 248
Precaution for Assembly and Installation 248
Parts Requiring Angular Tightening 248
Precaution for Liquid Gasket 248
Precaution for Diesel Equipment 249
Installation of Thread Inserts 253

PREPARATION 254

PREPARATION 254
Special Service Tools 254
Commercial Service Tools 256

ON-VEHICLE MAINTENANCE 259

DRIVE BELTS 259
Exploded View 259
Inspection and Adjustment 259
Removal and Installation 259

AIR CLEANER FILTER 261
Removal and Installation 261

CAMSHAFT VALVE CLEARANCE 262
Inspection and Adjustment 262

COMPRESSION PRESSURE 263
Inspection 263

ON-VEHICLE REPAIR 264

DRIVE BELT AUTO-TENSIONER 264
Exploded View 264
Removal and Installation 264

AIR CLEANER AND AIR DUCT 265
Exploded View 265
Removal and Installation 265

CHARGE AIR COOLER 266
Exploded View 266
Removal and Installation 266
Inspection 267

EGR SYSTEM 268
Exploded View 268
Removal and Installation 268

CATALYST 270
Exploded View 270
Removal and Installation 270
Inspection 270

TURBOCHARGER 271
Exploded View 271
Removal and Installation 271
Inspection 271

EXHAUST MANIFOLD 273
Exploded View 273
Removal and Installation 273
Inspection 274

GLOW PLUG 275
Exploded View 275
Removal and Installation 275

VACUUM PUMP 276
Exploded View 276
Removal and Installation 276
Inspection 276

INJECTION TUBE AND FUEL INJECTOR 277
Exploded View 277
Removal and Installation 277

OIL PAN 280
Exploded View 280
Removal and Installation 280
Inspection 282

HIGH PRESSURE SUPPLY PUMP 283
Exploded View 283
Removal and Installation 283

ROCKER COVER 285
Exploded View 285
Removal and Installation 285

TIMING BELT 287
Exploded View 287
Removal and Installation 287

CAMSHAFT 294
Exploded View 294
Removal and Installation 294
Inspection 296

REMOVAL AND INSTALLATION 298

ENGINE ASSEMBLY 298
Exploded View 298
Removal and Installation 298
Inspection 300

DISASSEMBLY AND ASSEMBLY 301

ENGINE STAND SETTING 301
Setting 301

CYLINDER HEAD 302
Exploded View 302
Removal and Installation 302
Disassembly and Assembly 303
Cleaning 306

cardiagn.com

Inspection 307

CYLINDER BLOCK 310
Exploded View 310
Disassembly and Assembly 310
Inspection 326

SERVICE DATA AND SPECIFICATIONS (SDS) 329

SERVICE DATA AND SPECIFICATIONS (SDS) 329
General Specification 329
Drive Belt 329
Camshaft 329
Cylinder Head 331
Cylinder Block 333
Turbocharger 335

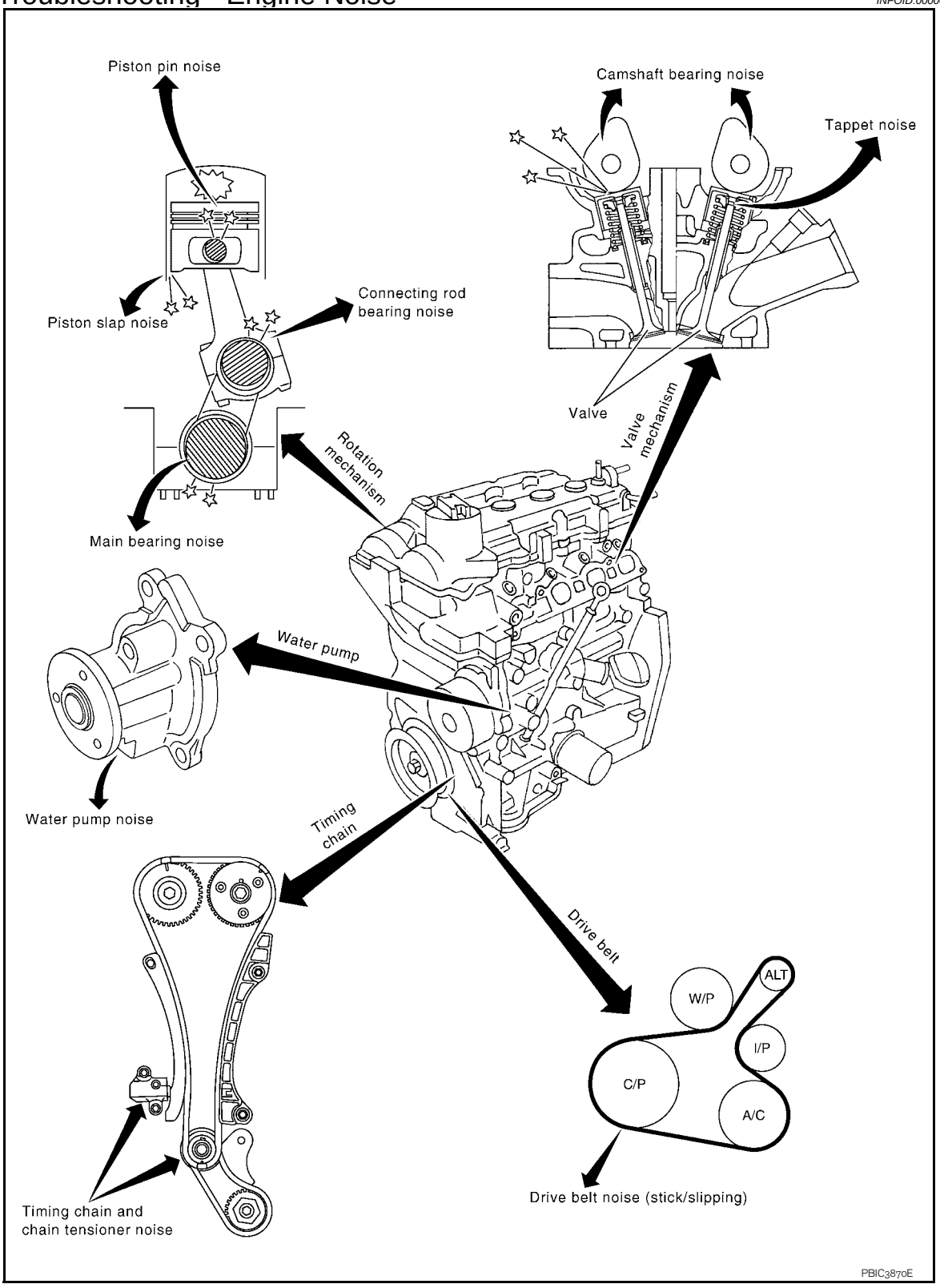
cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting - Engine Noise

INFOID:0000000000894012



Use the Chart Below to Help You Find the Cause of the Symptom

INFOID:0000000000894013

cardiagn.com

1. Locate the area where noise occurs.
2. Confirm the type of noise.
3. Specify the operating condition of engine.
4. Check specified noise source.

If necessary, repair or replace these parts.

Location of noise	Type of noise	Operating condition of engine						Source of noise	Check item	Reference page
		Before warm-up	After warm-up	When starting	When idling	When racing	While driving			
Top of engine Rocker cover Cylinder head	Ticking or clicking	C	A	—	A	B	—	Tappet noise	Valve clearance	EM-21
	Rattle	C	A	—	A	B	C	Camshaft bearing noise	Camshaft journal oil clearance Camshaft runout	EM-116 EM-116
Crankshaft pulley Cylinder block (Side of engine) Oil pan	Slap or knock	—	A	—	B	B	—	Piston pin noise	Piston to piston pin oil clearance Connecting rod small end clearance	EM-120 EM-123
	Slap or rap	A	—	—	B	B	A	Piston slap noise	Piston to cylinder bore clearance Piston ring side clearance Piston ring end gap Connecting rod bend and torsion	EM-120 EM-120 EM-120 EM-123
	Knock	A	B	C	B	B	B	Connecting rod bearing noise	Connecting rod small end clearance Connecting rod bearing oil clearance	EM-120 EM-123
	Knock	A	B	—	A	B	C	Main bearing noise	Main bearing oil clearance Crankshaft runout	EM-124 EM-120
Front of engine Front cover	Tapping or ticking	A	A	—	B	B	B	Timing chain and chain tensioner noise	Timing chain cracks and wear Timing chain tensioner operation	EM-53
Front of engine	Squeaking or fizzing	A	B	—	B	—	C	Drive belt (Sticking or slipping)	Drive belt deflection	EM-115
	Creaking	A	B	A	B	A	B	Drive belt (Slipping)	Idler pulley bearing operation	
	Squall Creak	A	B	—	B	A	B	Water pump noise	Water pump operation	CO-18

A: Closely related B: Related C: Sometimes related —: Not related

cardiagn.com

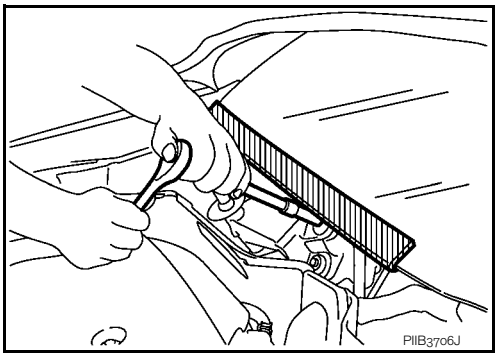
PRECAUTION

PRECAUTIONS

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001117285

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001117286

NOTE:
- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Draining Engine Coolant

INFOID:0000000000893815

Drain engine coolant and engine oil when the engine is cooled.

Disconnecting Fuel Piping

INFOID:0000000000893816

- Before starting work, make sure no fire or spark producing items are in the work area.
- Release fuel pressure before disconnecting and disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

Removal and Disassembly

INFOID:0000000000893817

cardiagn.com

- When instructed to use SST, use specified tools. Always be careful to work safely, avoid forceful or unin-structed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Dowel pins are used for several parts alignment. When replacing and reassembling parts with dowel pins, make sure that dowel pins are installed in the original position.
- Cover openings of engine system with a tape or equivalent, if necessary, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and re-assembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used in the step.

Inspection, Repair and Replacement

INFOID:0000000000893818

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

Assembly and Installation

INFOID:0000000000893819

- Use torque wrench to tighten bolts or nuts to specification.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check engine oil or engine coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- Release air within route when refilling after draining engine coolant.
- After repairing, start the engine and increase engine speed to check engine coolant, fuel, engine oil, and exhaust gases for leakage.

Parts Requiring Angle Tightening

INFOID:0000000000893820

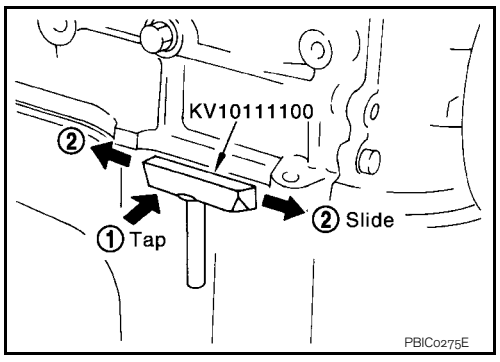
- Use the angle wrench [SST: KV10112100] for the final tightening of the following engine parts:
- Cylinder head bolts
- Main bearing cap bolts
- Connecting rod cap bolts
- Crankshaft pulley bolt (No the angle wrench is required as bolt flange is provided with notches for angle tightening)
- Never use a torque value for final tightening.
- The torque value for these parts are for a preliminary step.
- Ensure thread and seat surfaces are clean and coated with engine oil.

Liquid Gasket

INFOID:0000000000893821

REMOVAL OF LIQUID GASKET

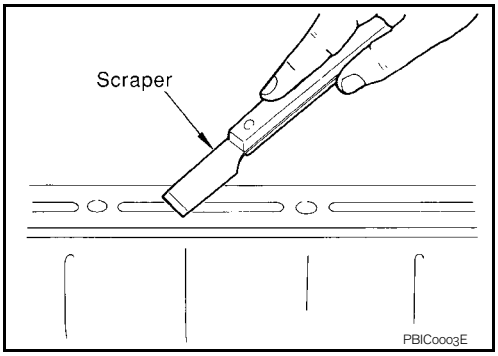
- After removing the mounting bolts and nuts, separate the mating surface using seal cutter (SST) and remove the old liquid gasket sealing.
  CAUTION:
  Be careful not to damage the mating surfaces.
- Tap seal cutter to insert it (1), and then slide it (2) by tapping on the side as shown in the figure.
- In areas where seal cutter is difficult to use, use plastic hammer to lightly tap the parts, to remove it.
  CAUTION:
  If for some unavoidable reason tool such as screwdriver is used, be careful not to damage the mating surfaces.



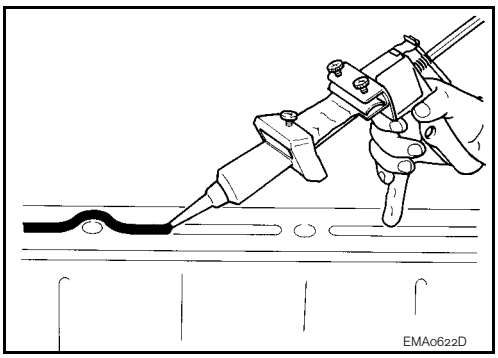
LIQUID GASKET APPLICATION PROCEDURE

cardiagn.com

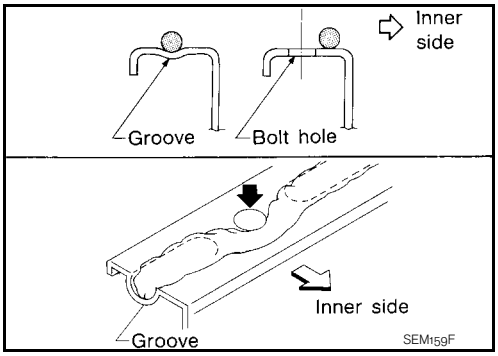
1. Using a scraper, remove the old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove the liquid gasket completely from the groove of the liquid gasket application surface, mounting bolts and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.



3. Attach liquid gasket tube to the tube presser (commercial service tool).
   Use Genuine Liquid Gasket or equivalent.
4. Apply the liquid gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the liquid gasket to the groove.



   - As for the bolt holes, normally apply the liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Make sure to read the text of service manual.
   - Within 5 minutes of liquid gasket application, install the mating component.
   - If the liquid gasket protrudes, wipe it off immediately.
   - Do not retighten mounting bolts or nut after the installation.
   - Wait 30 minutes or more after installation before refilling engine oil and engine coolant.



CAUTION:
If there are specific instructions in this manual, observe them.

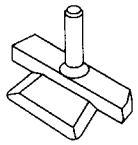
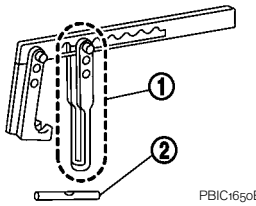
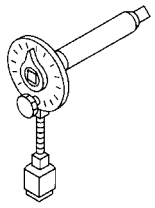
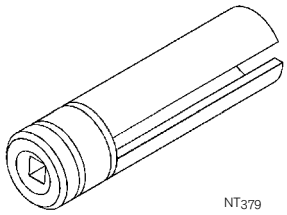
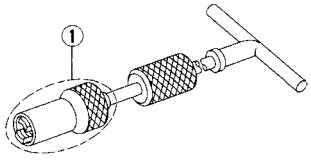
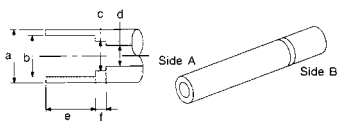
cardiagn.com

PREPARATION

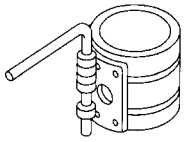
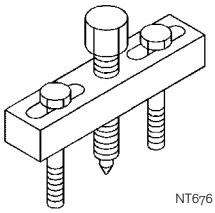
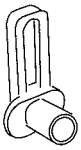
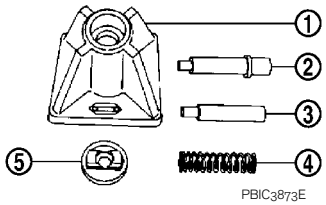
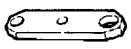
PREPARATION

Special Service Tools

INFOID:0000000000893822

Tool number Tool name	Description
KV10111100 Seal cutter  S-NT046	Removing oil pan (lower and upper) etc.
KV10116200 Valve spring compressor 1. KV10115900 Attachment 2. KV10109220 Adapter  PBIC1650E	Disassembling and assembling valve mechanism Part (1) is a component of KV10116200, but Part (2) is not so.
KV10112100 Angle wrench  S-NT014	Tightening bolts for bearing cap, cylinder head, etc. in angle
KV10117100 Heated oxygen sensor wrench  NT379	Loosening or tightening heated oxygen sensor 1 **For 22 mm (0.87 in) width hexagon nut**
KV10107902 Valve oil seal puller 1. KV10116100 Valve oil seal puller adapter  SZNT605	Removing valve oil seal
KV10115600 Valve oil seal drift  S-NT603	Installing valve oil seal **Use side A.** **a: 20 (0.79) dia.** **d: 8 (0.31) dia.** **b: 13 (0.51) dia.** **e: 10.7 (0.421)** **c: 10.3 (0.406) dia.** **f: 5 (0.20)** Unit: mm (in)

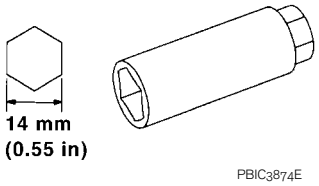
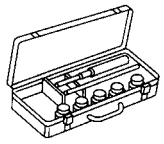
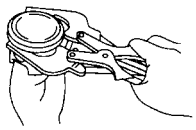
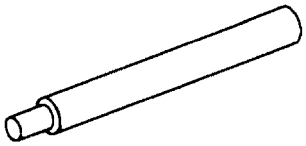
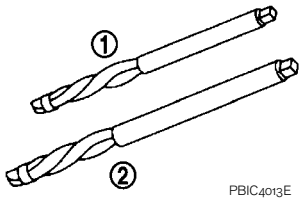
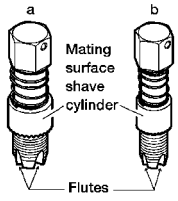
cardiagn.com

Tool number Tool name	Description
EM03470000 Piston ring compressor  S-NT044	Installing piston assembly into cylinder bore
KV11103000 Pulley puller  NT676	Removing crankshaft pulley
Quick connector release  PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Part No. 16441 6N210)
1. Press stand: ST13030020 2. Center shaft: KV10114120 3. Drift: KV10109730 4. Spring: ST13030030 5. Center cap: KV10110310  PBIC3873E	Installing and removing piston pin
KV11105210 Stopper plate  ZZA0009D	Fixing drive plate and flywheel

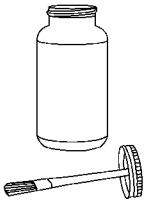
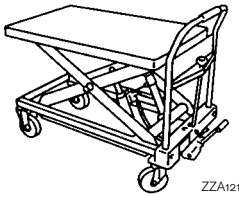
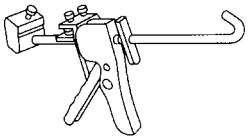
Commercial Service Tools

INFOID:0000000000893823

cardiagn.com

Tool name	Description
Spark plug wrench  PBIC3874E	Removing and installing spark plug
Valve seat cutter set  S-NT048	Finishing valve seat dimensions
Piston ring expander  S-NT030	Removing and installing piston ring
Valve guide drift  PBIC4012E	Removing and installing valve guide
Valve guide reamer  PBIC4013E	1: Reaming valve guide inner hole 2: Reaming hole for oversize valve guide
Oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new heated oxygen sensor (Use with anti-seize lubricant shown below.) **a = 18 mm (0.71 in) dia. for zirconia heated oxygen sensor** **b = 12 mm (0.47 in) dia. for titania heated oxygen sensor**
Acoustic tension gauge PBIC3881E	Checking drive belt tension

cardiagn.com

Tool name	Description
Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907)  AEM489	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads
Manual lift table caddy  ZZA1210D	Removing and installing engine
Tube presser  S-NT052	Pressing the tube of liquid gasket

cardiagn.com

ON-VEHICLE MAINTENANCE

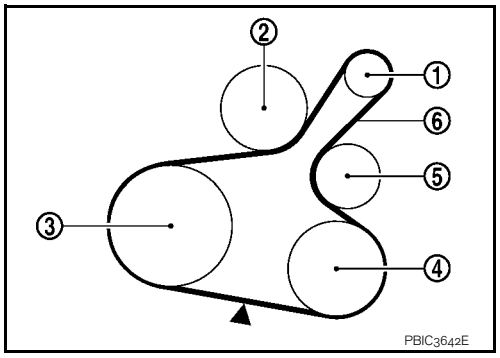
DRIVE BELTS

Checking

INFOID:0000000000893827

- Inspection should be done only when engine is cold or over 30 minutes after the engine is stopped.

1 : Alternator
2 : Water pump
3 : Crankshaft pulley
4 : A/C compressor (with A/C models)
: Idler pulley (without A/C models)
5 : Idler pulley
6 : Drive belt



PBIC3642E

- Visually check belts for wear, damage, and cracks on inside and edges.
- Turn crankshaft pulley two time clockwise, and make sure tension on all pulleys is equal before doing the test.
- When measuring deflection, apply 98 N (10 kg, 22 lb) at the (▼) marked point.
- Measure the belt tension and frequency with acoustic tension gauge (commercial service tool) at the (▼) marked point.

CAUTION:
- **When the tension and frequency are measured, the acoustic tension gauge should be used.**
- **When checking immediately after installation, first adjust it to the specified value. Then, after turning crankshaft two turns or more, re-adjust to the specified value to avoid variation in deflection between pulleys.**

Belt Deflection / Belt Tension and Frequency:

Refer to EM-115, "Drive Belts".

Tension Adjustment

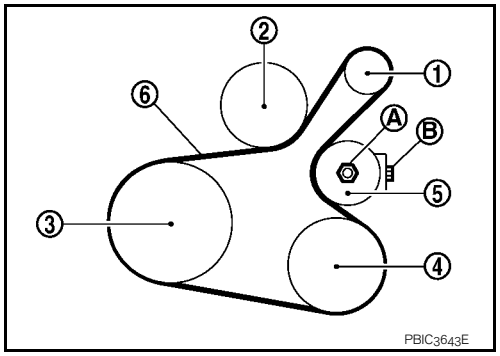
INFOID:0000000000893828

Location	Location of adjuster and tightening method
Drive belt	Adjusting bolt on idler pulley

CAUTION:
- **When belt is replaced with new one, adjust belt tension to the value for “New belt”, because new belt will not fully seat in the pulley groove.**
- **When tension of the belt being used exceeds “Limit”, adjust it to the value for “After adjusted”.**
- **When installing a belt, make sure it is correctly engaged with the pulley groove.**
- **Never allow oil or engine coolant to get on the belt.**
- **Never twist or bend the belt strongly.**

1. Remove front fender protector (RH). Refer to EXT-21, "Exploded View".
2. Loosen the idler pulley lock nut (A) from the tightening position with the specified torque by 45 degrees.

1 : Alternator
2 : Water pump
3 : Crankshaft pulley
4 : A/C compressor (with A/C models)
: Idler pulley (without A/C models)
5 : Idler pulley
6 : Drive belt
B : Adjusting bolt



PBIC3643E

cardiagn.com

CAUTION:
- **When the lock nut is loosened excessively, the idler pulley tilts and the correct tension adjustment cannot be performed. Never loosen it excessively (more than 45 degrees).**
- **Put a matching mark on the lock nut, and check turning angle with a protractor. Never visually check the tightening angle.**

3. Adjust the belt tension by turning the adjusting bolt.

CAUTION:
- **When checking immediately after installation, first adjust it to the specified value. Then, after turning crankshaft two turns or more, re-adjust to the specified value to avoid variation in deflection between pulleys.**
- **When the tension adjustment is performed, the lock nut should be in the condition at step“2”. If the tension adjustment is performed when the lock nut is loosened more than the standard, the idler pulley tilts and the correct tension adjustment cannot be performed.**

4. Tighten the lock nut.

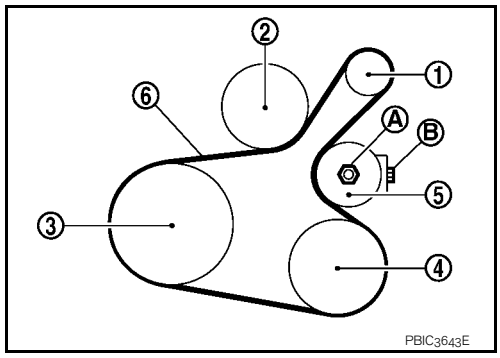
: 34.8 N·m (3.5 kg-m, 26 ft-lb)

Removal and Installation

INFOID:0000000000894049

REMOVAL

1. Remove front fender protector (RH). Refer to EXT-21, "Exploded View".
2. Loosen the idler pulley lock nut (A), and then adjust the belt tension by turning the adjusting bolt (B).

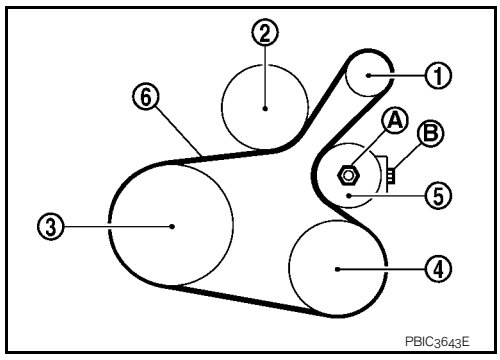


1 : Alternator
2 : Water pump
3 : Crankshaft pulley
4 : A/C compressor (with A/C models)
: Idler pulley (without A/C models)
5 : Idler pulley
6 : Drive belt

3. Remove drive belt.

INSTALLATION

1. Pull the idler pulley in the loosening direction, and then temporarily tighten the lock nut (A) to the following torque.



1 : Alternator
2 : Water pump
3 : Crankshaft pulley
4 : A/C compressor (with A/C models)
: Idler pulley (without A/C models)
5 : Idler pulley
6 : Drive belt
B : Adjusting bolt

: 4.4 N·m (0.45 kg-m, 39 in-lb)

NOTE:
Do not move the lock nut from the tightened position. Go to step “2”.

2. Install the drive belt to each pulley.

CAUTION:
- **Make sure that there is no oil, grease, or coolant, etc. in pulley grooves.**
- **Make sure that the belt is securely inside the groove on each pulley.**

3. Adjust drive belt tension by turning the adjusting bolt. Refer to EM-15, "Tension Adjustment".

cardiagn.com

CAUTION:

- **Perform the belt tension adjustment with the lock nut temporarily tightened at the step "1" so as not to tilt the idler pulley.**
- **When checking immediately after installation, first adjust it to the specified value. Then, after turning crankshaft two turns or more, re-adjust to the specified value to avoid variation in deflection between pulleys.**

4. Tighten the lock nut.

: 34.8 N·m (3.5 kg-m, 26 ft-lb)

5. Make sure that belt tension of each belt within the standard.

cardiagn.com

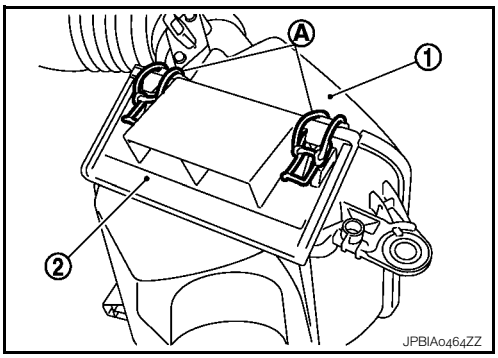
AIR CLEANER FILTER

Removal and Installation

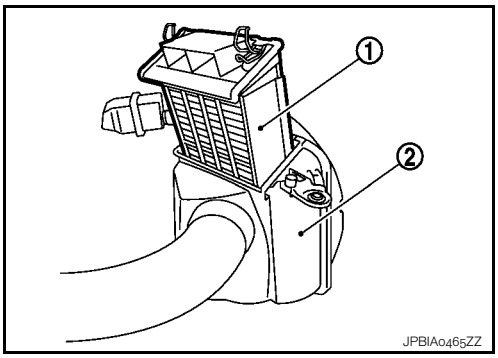
INFOID:0000000000893830

REMOVAL

1. Unhook clips (A) and remove holder (2) from air cleaner case (1).



2. Remove air cleaner filter (1) from air cleaner case (2).



INSTALLATION

Note the following, and install in the reverse order of removal.

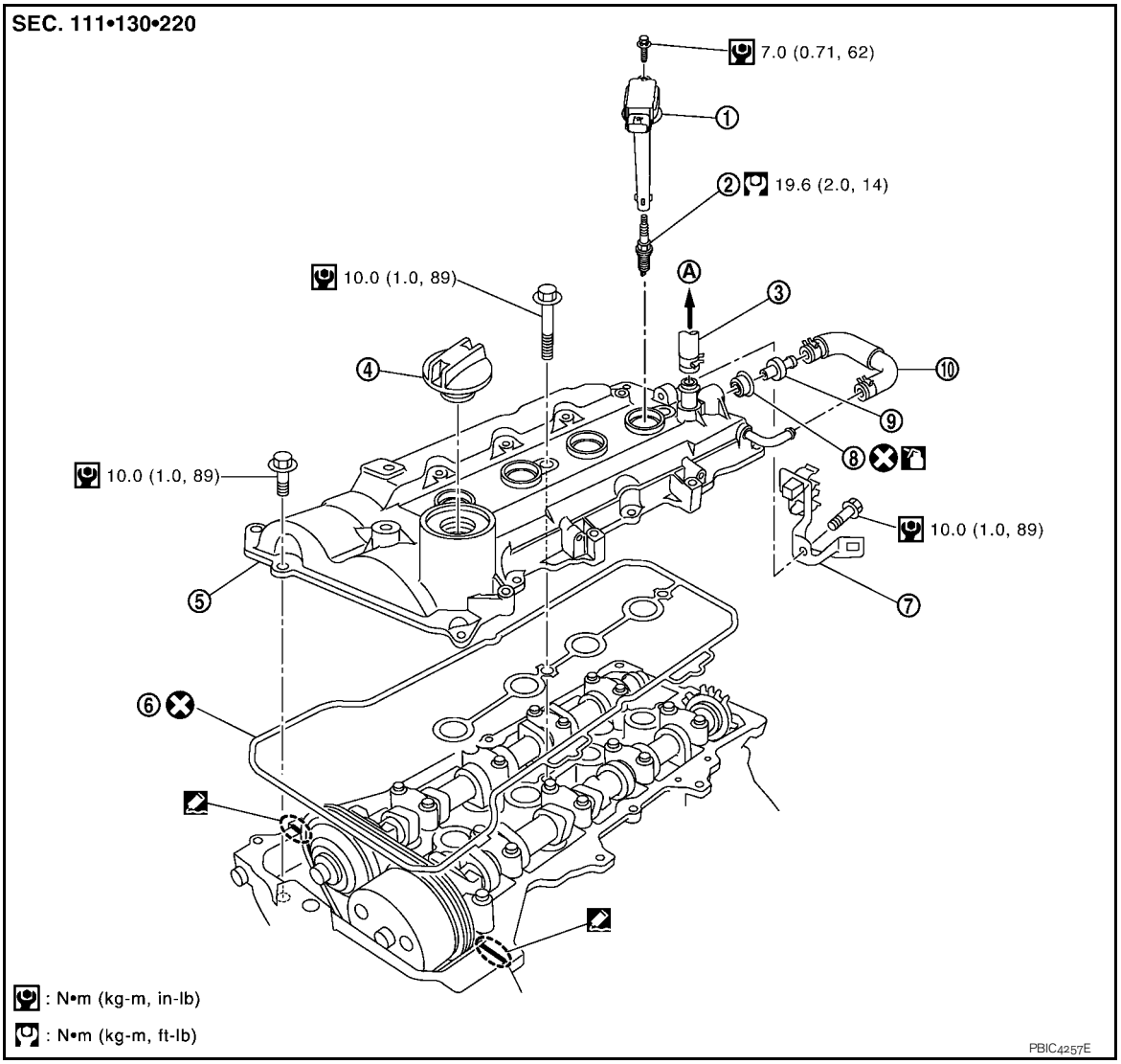
- Install the air cleaner filter by aligning the seal with the notch of air cleaner case.

cardiagn.com

SPARK PLUG

Exploded View

INFOID:0000000000893831



1. Ignition coil
2. Spark plug
3. PCV hose
4. Oil filler cap
5. Rocker cover
6. Gasket
7. Bracket
8. Grommet
9. PCV valve
10. PCV hose
A. To air duct

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

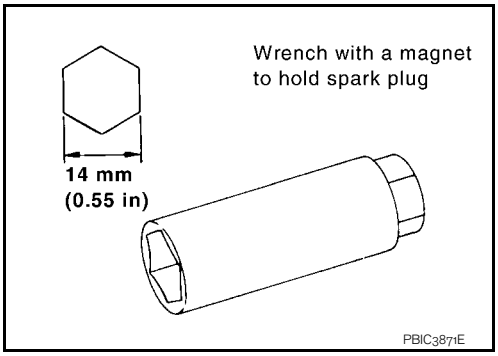
INFOID:0000000000893832

REMOVAL

1. Remove intake manifold. Refer to EM-29, "Removal and Installation".
2. Remove ignition coil. Refer to EM-43, "Removal and Installation".

cardiagn.com

3. Remove spark plug with a spark plug wrench (commercial service tool).



INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:0000000000893833

INSPECTION AFTER REMOVAL

Use the standard type spark plug for normal condition.

Spark plug (Standard type): Refer to EM-116, "Spark Plug".

CAUTION:

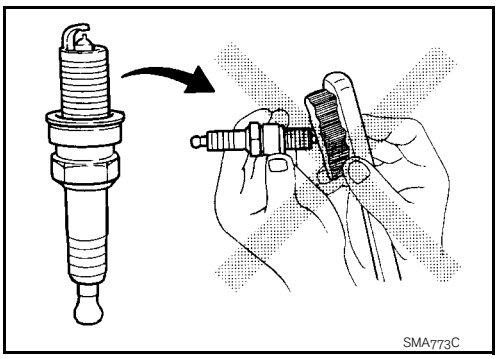
- **Never drop or shock spark plug.**
- **Never use a wire brush for cleaning.**
- **If plug tip is covered with carbon, spark plug cleaner may be used.**

Cleaner air pressure:

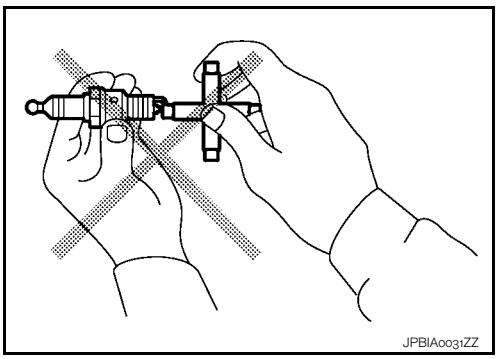
Less than 588 kPa (6 kg/cm^2, 85 psi)

Cleaning time:

Less than 20 seconds



- **Checking and adjusting plug gap is not required between change intervals.**



cardiagn.com

CAMSHAFT VALVE CLEARANCE

Inspection and Adjustment

INFOID:0000000000893834

INSPECTION

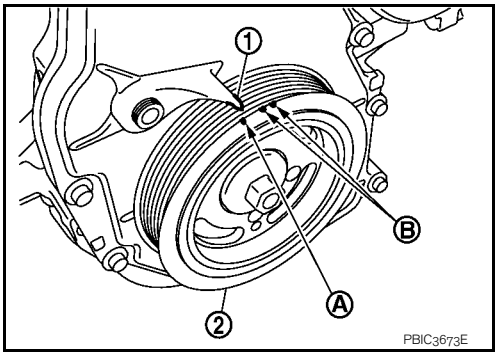
Perform inspection as follows after removal, installation or replacement of camshaft or valve-related parts, or if there is unusual engine conditions regarding valve clearance.

1. Remove rocker cover. Refer to EM-43, "Exploded View".
2. Measure the valve clearance with the following procedure:

a. Set No. 1 cylinder at TDC of its compression stroke.

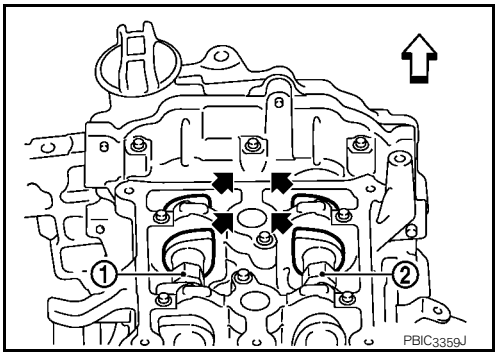
- Rotate crankshaft pulley (2) clockwise and align TDC mark (without paint mark) (A) to timing indicator (1) on front cover.

B : White paint mark (Not use for service)



- At the same time, make sure that both intake and exhaust cam noses of No. 1 cylinder face outside as shown in the figure.

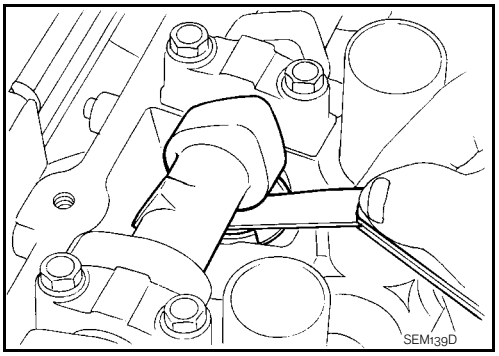
1 : Camshaft (INT)
2 : Camshaft (EXH)
⇦ : Engine front



- If they do not face outside, rotate crankshaft pulley once more (360 degrees) and align as shown in the figure.

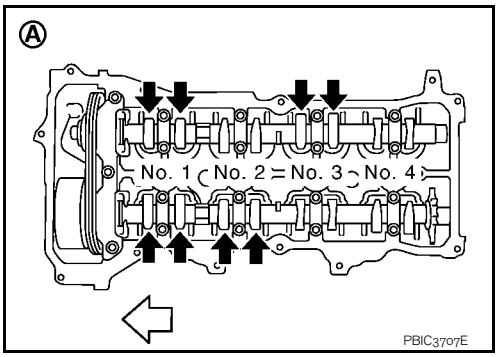
b. Use a feeler gauge, measure the clearance between valve lifter and camshaft.

Valve Clearance: Refer to EM-116, "Camshaft".



- By referring to the figure, measure the valve clearances at locations marked "×" as shown in the table below [locations indicated with black arrow (⬅) in the figure] with a feeler gauge.

A : No. 1 cylinder compression TDC
⇦ : Engine front

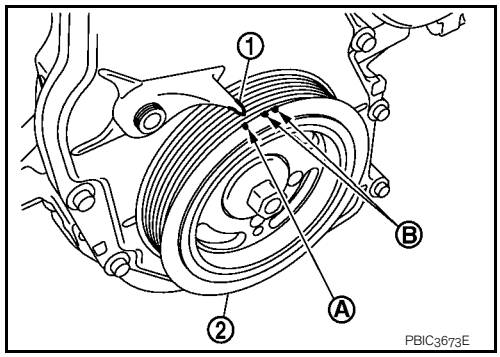


cardiagn.com

Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
Measurement position	EXH	×		×	
	INT	×	×		

c. Rotate crankshaft pulley (2) one revolution (360 degrees) and align TDC mark (without paint mark) (A) to timing indicator (1) on front cover.

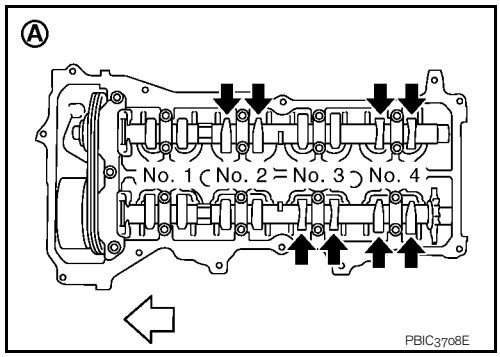
B : White paint mark (Not use for service)



- By referring to the figure, measure the valve clearance at locations marked "×" as shown in the table below [locations indicated with black arrow (⬅) in the figure] with a feeler gauge.

A : No. 4 cylinder compression TDC

⇦ : Engine front



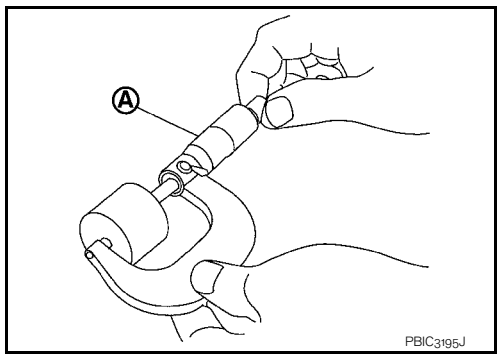
Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
Measurement point	EXH		×		×
	INT			×	×

3. If out of standard, perform adjustment. Refer to "ADJUSTMENT".

ADJUSTMENT

- Perform adjustment depending on selected head thickness of valve lifter.

1. Remove camshaft. Refer to EM-55, "Exploded View".
2. Remove valve lifters at the locations that are out of the standard.
3. Measure the center thickness of the removed valve lifters with a micrometer (A).



4. Use the equation below to calculate valve lifter thickness for replacement.

Valve lifter thickness calculation: $t = t_1 + (C_1 - C_2)$

t = Valve lifter thickness to be replaced

t_1 = Removed valve lifter thickness

C_1 = Measured valve clearance

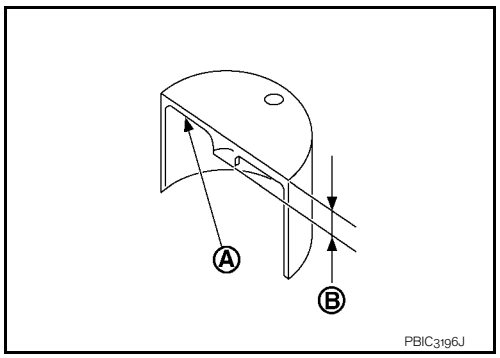
C_2 = Standard valve clearance:

Intake : 0.30 mm (0.012 in)

Exhaust : 0.33 mm (0.013 in)

cardiagn.com

- Thickness of new valve lifter (B) can be identified by stamp mark (A) on the reverse side (inside the cylinder).
- Stamp mark “300” indicates 3.00 mm (0.118 in) in thickness.



NOTE:
Available thickness of valve lifter: 26 sizes range 3.00 to 3.50 mm (0.1181 to 0.1378 in) in steps of 0.02 mm (0.0008 in) (when manufactured at factory). Refer to EM-116, "Camshaft".

5. Install the selected valve lifter.
6. Install camshaft. Refer to EM-55, "Exploded View".
7. Manually rotate crankshaft pulley a few rotations.
8. Make sure that valve clearances for cold engine are within specifications by referring to the specified values.
9. Install all removed parts in the reverse order of removal.
10. Warm up the engine, and check for unusual noise and vibration.

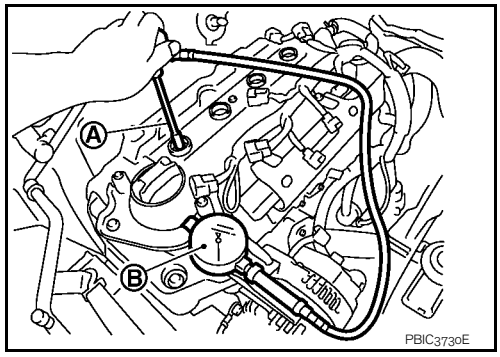
cardiagn.com

COMPRESSION PRESSURE

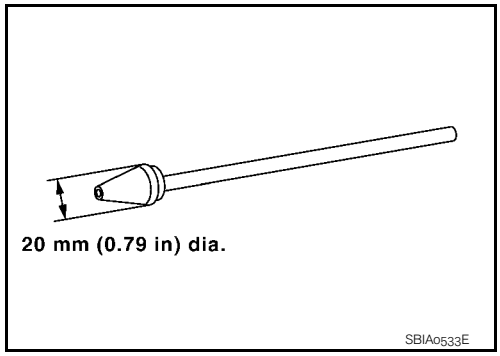
Inspection

INFOID:0000000000893835

1. Warm up engine thoroughly. Then, stop it.
2. Release fuel pressure. Refer to EC-357, "Inspection".
3. Remove ignition coil and spark plug from each cylinder. Refer to EM-43, "Exploded View".
4. Connect an engine tachometer (not required in use of CONSULT-III).
5. Install a compression tester (B) with an adapter (commercial service tool) (A) onto spark plug hole.



- Use the adapter whose picking up end inserted to spark plug hole is smaller than 20 mm (0.79 in) in diameter. Otherwise, it may be caught by cylinder head during removal.



6. With accelerator pedal fully depressed, turn ignition switch to “START” for cranking. When the gauge pointer stabilizes, read the compression pressure and the engine rpm. Perform these steps to check each cylinder.

Compression Pressure: **Refer to EM-115, "General Specification".**

CAUTION:

Always use fully a changed battery to obtain the specified engine speed.

- If the engine speed is out of the specified range, check battery liquid for proper gravity. Check engine speed again with normal battery gravity.
- If compression pressure is below minimum value, check valve clearances and parts associated with combustion chamber (Valve, valve seat, piston, piston ring, cylinder bore, cylinder head, cylinder head gasket). After the checking, measure the compression pressure again.
- If some cylinder has low compression pressure, pour small amount of engine oil into the spark plug hole of the cylinder to re-check it for compression.
  - If the added engine oil improves the compression, piston rings may be worn out or damaged. Check piston rings and replace if necessary.
  - If the compression pressure remains at low level despite the addition of engine oil, valves may be malfunctioning. Check valves for damage. Replace valve or valve seat accordingly.
- If two adjacent cylinders have respectively low compression pressure and their compression remains low even after the addition of engine oil, cylinder head gasket is leaking. In such a case, replace cylinder head gasket.

7. After inspection is completed, install removed parts.
8. Start the engine, and confirm that the engine runs smoothly.
9. Perform trouble diagnosis. If DTC appears, erase it. Refer to EC-109, "Description".

cardiagn.com

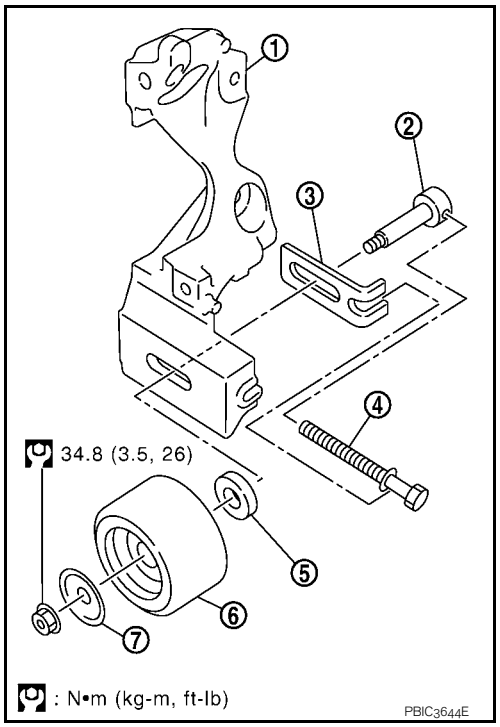
ON-VEHICLE REPAIR

DRIVE BELT IDLER PULLEY

Exploded View

INFOID:0000000001093109

1 : Alternator bracket
2 : Center shaft
3 : Spacer
4 : Adjusting bolt
5 : Washer
6 : Idler pulley
7 : Plate



Removal and Installation

INFOID:0000000001093106

REMOVAL

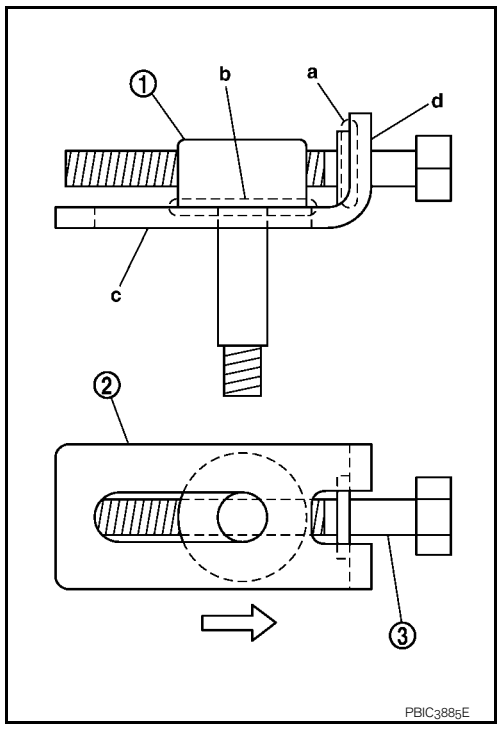
1. Remove drive belt. Refer to EM-16, "Removal and Installation".
2. Remove the lock nut, and then remove the plate, idler pulley, and washer.
3. Remove the center shaft together with the spacer with inserting the adjusting bolt.

INSTALLATION

cardiagn.com

1. Insert the center shaft (1) into the slide groove of the spacer (2). Fully screw in the adjusting bolt (3) in the belt loosening direction (⇦).
   - At that time, place the flange (a) of the adjusting bolt and the seat (b) of the center shaft on the spacer.
2. Place each surface (c, d) of the spacer on the alternator bracket. Install the washer, idler pulley, and plate, and then temporarily tighten the lock nut.

   : 3.9 N·m (0.40 kg-m, 35 in-lb)



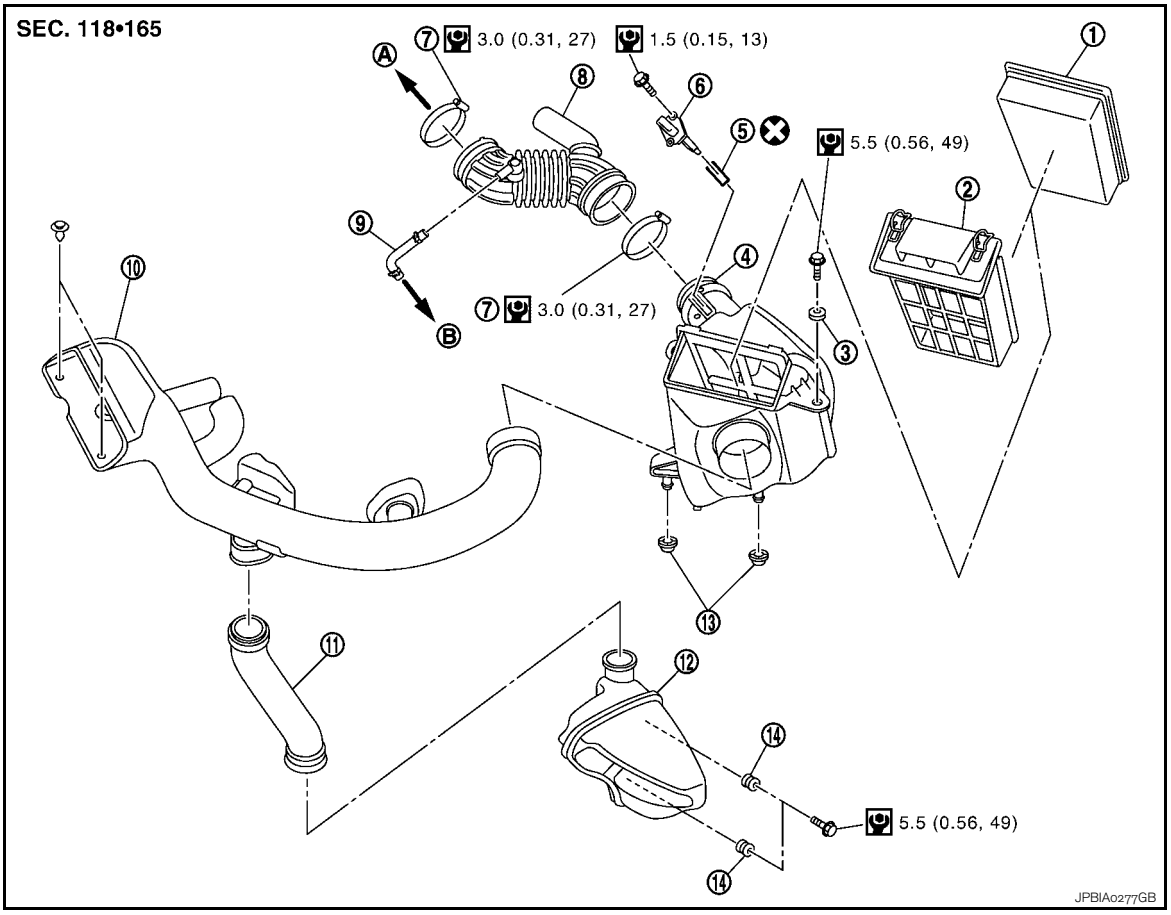
3. Install removed parts in the reverse order of removal.

cardiagn.com

AIR CLEANER AND AIR DUCT

Exploded View

INFOID:0000000000893838



1. Air cleaner filter
2. Holder
3. Grommet
4. Air cleaner case
5. O-ring
6. Mass air flow sensor
7. Clamp
8. Air duct and resonator assembly
9. PCV hose
10. Air duct (inlet)
11. Air duct
12. Resonator
13. Grommet
14. Grommet

A. To electric throttle control actuator
B. To rocker cover

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000894018

REMOVAL

1. Remove the air duct (inlet).
2. Disconnect mass air flow sensor harness connector.
3. Remove the PCV hose.
4. Remove air cleaner case/mass air flow sensor assembly and air duct and resonator assembly disconnecting their joints.
   - Add marks as necessary for easier installation.
5. Remove air cleaner case.
6. Remove the mass air flow sensor from the air cleaner case, if necessary.
   CAUTION:
   - **Handle mass air flow sensor carefully and avoid impacts.**
   - **Never touch sensor part.**

cardiagn.com

INSTALLATION

Note the following, and install in the reverse order of removal.

- Align marks. Attach each joint. Screw clamps firmly.

Inspection

INFOID:0000000000893840

INSPECTION AFTER REMOVAL

Inspect air duct and resonator assembly for crack or tear.

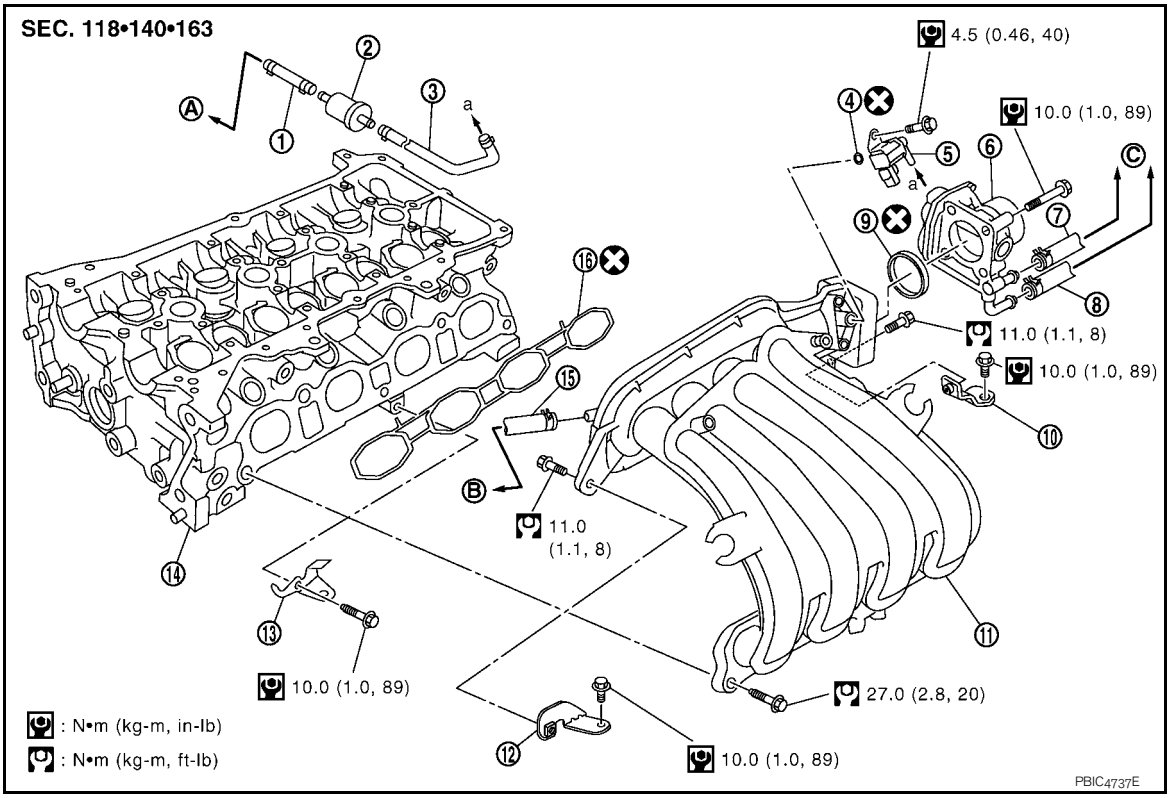
- If anything found, replace air duct and resonator assembly.

cardiagn.com

INTAKE MANIFOLD

Exploded View

INFOID:0000000000893844



1.	EVAP hose	2.	Vacuum tank	3.	EVAP hose
4.	O-ring	5.	EVAP canister purge volume control solenoid valve	6.	Electric throttle control actuator
7.	Water hose (Northern Europe models)	8.	Water hose (Northern Europe models)	9.	Gasket
10.	Intake manifold support (rear)	11.	Intake manifold	12.	Intake manifold support (front)
13.	Intake manifold support (center)	14.	Cylinder head	15.	Vacuum hose
16.	Gasket				
A.	To centralized under-floor piping	B.	To brake booster	C.	To water outlet

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

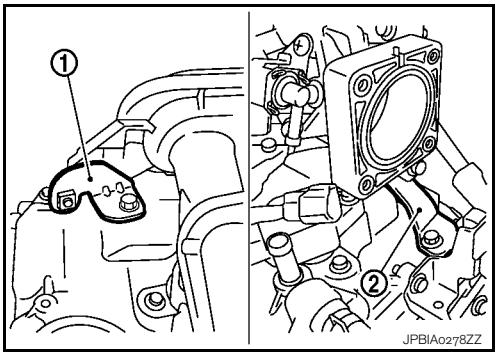
INFOID:0000000000894020

REMOVAL

1. Remove the air duct (inlet) and the air duct and resonator assembly. Refer to EM-27, "Exploded View".
2. Disconnect water hoses from electric throttle control actuator, attach blind plug to prevent engine coolant leakage. (Northern Europe models)
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
3. Pull out oil level gauge.
   CAUTION:
   Cover the oil level gauge guide openings to avoid entry of foreign materials.
4. Remove electric throttle control actuator.
   CAUTION:
   - **Handle electric throttle control actuator carefully and avoid impacts.**
   - **Never disassemble or adjust electric throttle control actuator.**

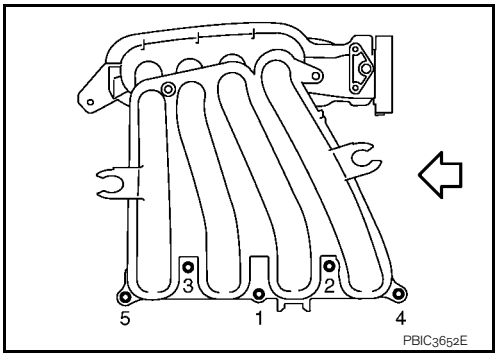
cardiagn.com

5. Disconnect the harness connector and EVAP hose from the EVAP canister purge volume control solenoid valve.
6. Disconnect vacuum hose for brake booster from intake manifold.
7. Remove intake manifold support front (1) and rear (2).



8. Remove intake manifold.
   - Loosen bolts in the reverse of the order shown in the figure.

   ⇦ : Engine front



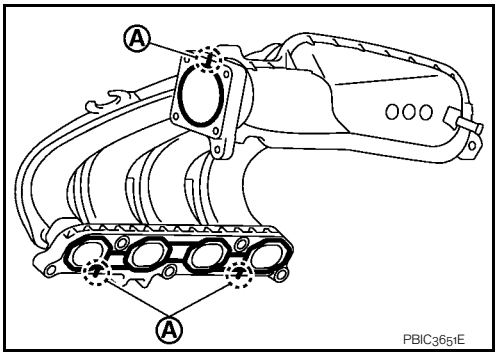
9. Remove EVAP canister purge volume control solenoid valve from intake manifold, if necessary.
   CAUTION:
   Handle EVAP canister purge volume control solenoid valve carefully and avoid impacts.
10. Remove intake manifold support (center) from cylinder head, if necessary.
    NOTE:
    The intake manifold support (center) functions as the guide when the intake manifold is installed.

INSTALLATION

Note the following, and install in the reverse order of removal.

Intake Manifold

1. Install the gasket to the intake manifold.
   - Align the protrusion (A) of gasket to the groove of intake manifold.

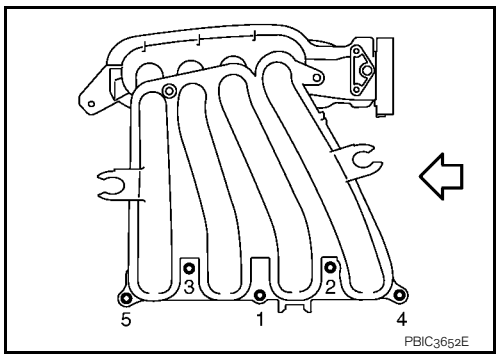


2. Place the intake manifold into the installation position.
   CAUTION:
   Make sure that the oil level gauge guide is not disconnected from the fixing clip of water inlet due to interference with intake manifold.

cardiagn.com

3. Tighten bolts in the numerical order shown in the figure.

⇦ : Engine front



4. Install intake manifold support (front and rear).

Electric Throttle Control Actuator

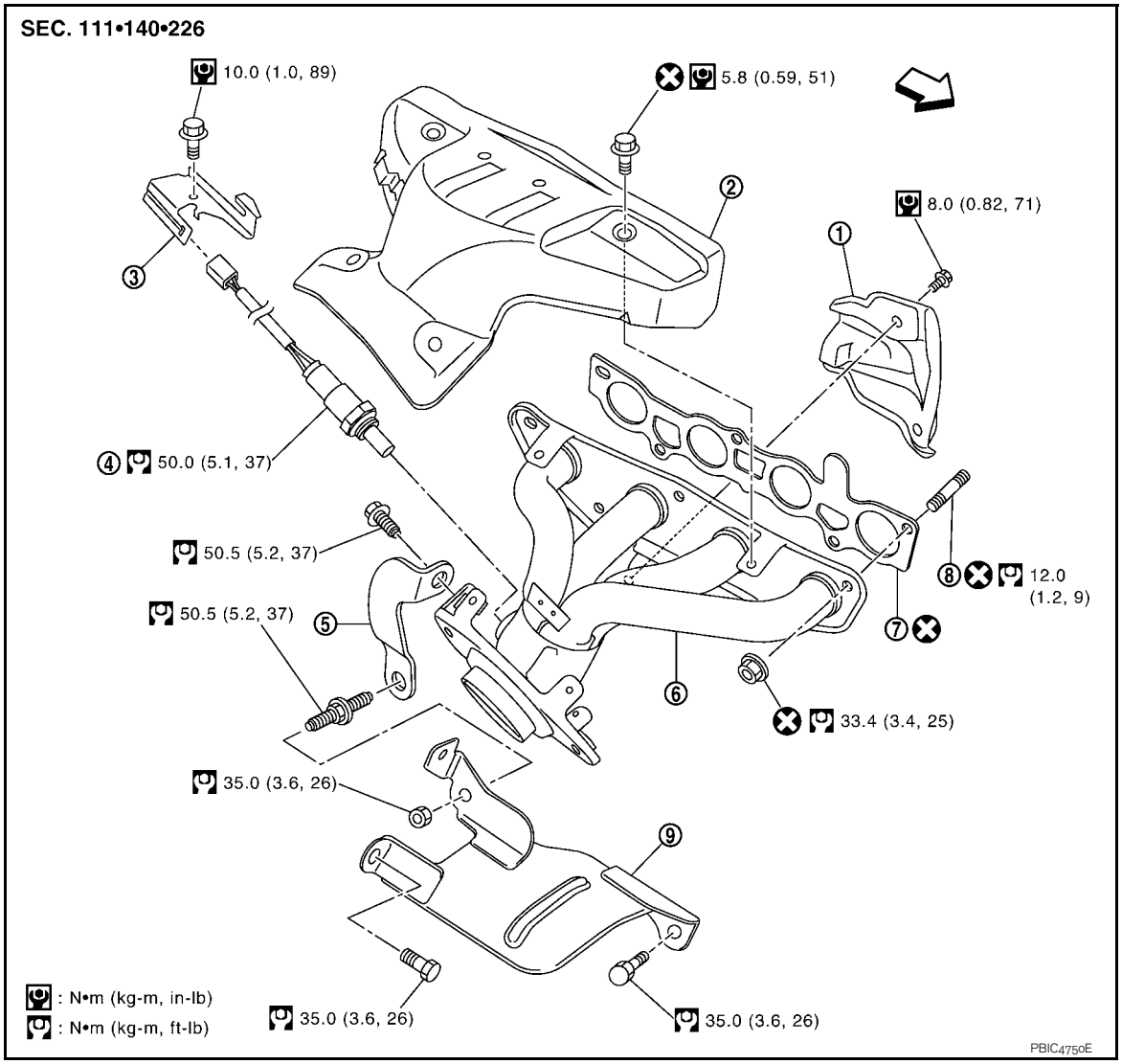
- Tighten bolts of electric throttle control actuator equally and diagonally in several steps.
- Perform “Throttle Valve Closed Position Learning” after repair when removing harness connector of the electric throttle control actuator. Refer to EC-31, "THROTTLE VALVE CLOSED POSITION LEARNING : Description".
- Perform “Throttle Valve Closed Position Learning” and “Idle Air Volume Learning” after repair when replacing electric throttle control actuator. Refer to EC-31, "IDLE AIR VOLUME LEARNING : Description".

cardiagn.com

EXHAUST MANIFOLD

Exploded View

INFOID:0000000000893847



1. Exhaust manifold cover
2. Exhaust manifold cover
3. Harness bracket
4. Heated oxygen sensor 1
5. Exhaust manifold stay
6. Exhaust manifold
7. Gasket
8. Stud bolt
9. Heat insulator

⇦ : Engine front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000894021

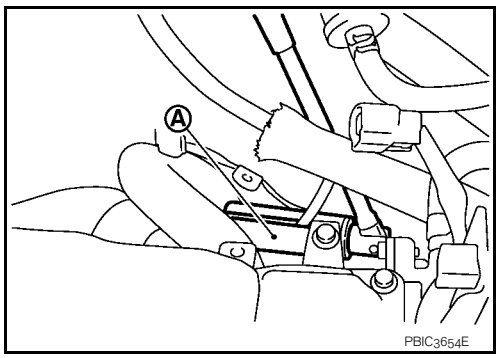
REMOVAL

1. Remove exhaust front tube. Refer to EX-5, "Exploded View".
2. Remove the harness bracket of heated oxygen sensor 1 from the cylinder head.
3. Remove exhaust manifold cover.
4. Remove the heated oxygen sensor 1.

cardiagn.com

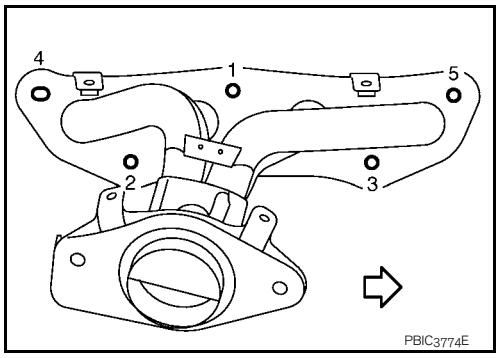
- Using heated oxygen sensor wrench [SST: KV10117100] (A), remove heated oxygen sensor 1.

CAUTION:
Handle heated oxygen sensor 1 carefully and avoid impacts.
NOTE:
The exhaust manifold can be removed and installed without removing the heated oxygen sensor 1 (Disassembly of harness connector is necessary).



5. Remove exhaust manifold side mounting bolt of exhaust manifold stay.
6. Remove exhaust manifold.
   - Loosen nuts in the reverse of the order shown in the figure.

⇦ : Engine front



7. Remove gasket.
   CAUTION:
   Cover engine openings to avoid entry of foreign materials.
8. Remove exhaust manifold cover from back of exhaust manifold.

INSTALLATION

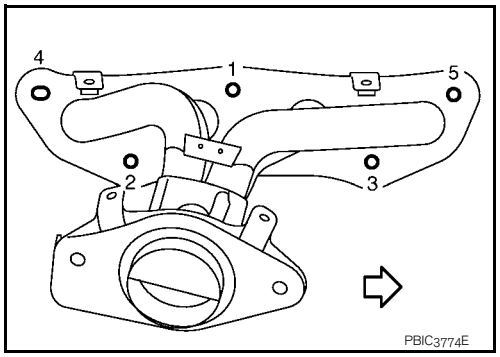
Note the following, and install in the reverse order of removal.

Exhaust Manifold

1. Tighten nuts in numerical order shown in the figure.

⇦ : Engine front

2. Tighten to the specified torque again.



Inspection

INFOID:0000000000893849

INSPECTION AFTER REMOVAL

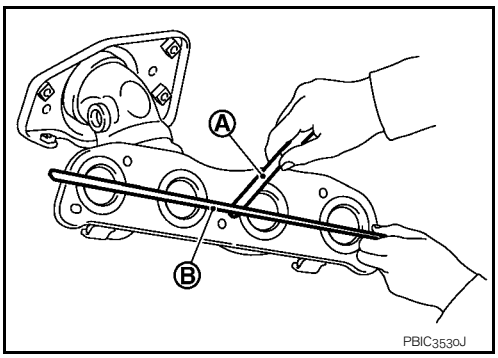
Mounting Surface Distortion

cardiagn.com

- Using a straightedge (B) and feeler gauge (A), check distortion of exhaust manifold mounting surface.

Limit: **Refer to EM-116, "Exhaust Manifold".**

- Replace exhaust manifold if outside the limit.

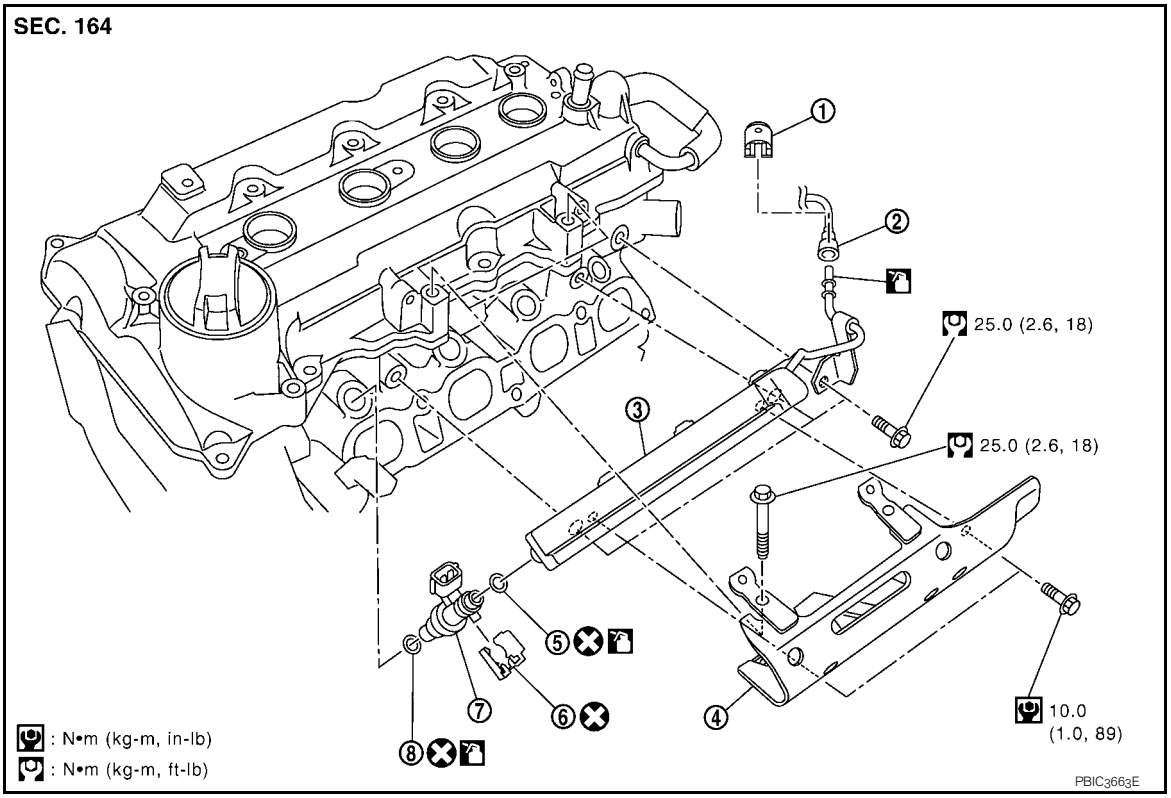


cardiagn.com

FUEL INJECTOR AND FUEL TUBE

Exploded View

INFOID:0000000000893850



1. Quick connector cap
2. Fuel feed hose
3. Fuel tube
4. Fuel tube protector
5. O-ring (black)
6. Clip
7. Fuel injector
8. O-ring (green)

Refer to GI-4, "Components" for symbols in the figure.

CAUTION:
Never remove or disassemble parts unless instructed as shown in the figure.

Removal and Installation

INFOID:0000000000894022

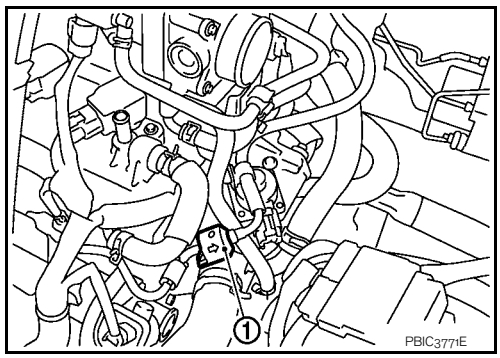
WARNING:
- **Put a "CAUTION: FLAMMABLE" sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Never smoke while servicing fuel system. Keep open flames and sparks away from the work area.**

REMOVAL

1. Release the fuel pressure. Refer to EC-357, "Inspection".
2. Remove intake manifold. Refer to EM-29, "Exploded View".

cardiagn.com

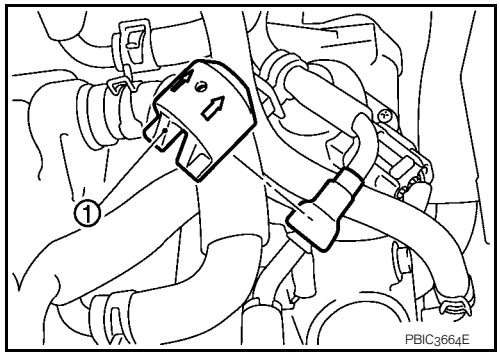
3. Disconnect quick connector with the following procedure. Disconnect fuel feed hose from fuel tube.



1 : Quick connector cap

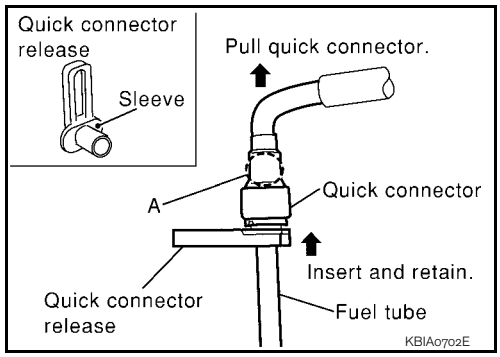
NOTE:
There is no fuel return path.

a. Remove quick connector cap (1) from quick connector connection.
b. Disconnect fuel feed hose from hose clamp.



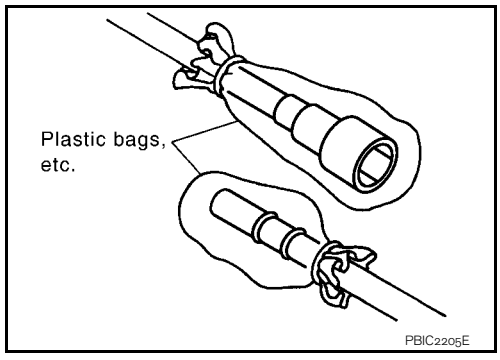
c. With the sleeve side of quick connector release (SST) facing quick connector, install quick connector release onto fuel tube.
d. Insert quick connector release into quick connector until sleeve contacts and goes no further. Hold quick connector release on that position.

CAUTION:
Inserting quick connector release hard will not disconnect quick connector. Hold quick connector release where it contacts and goes no further.



e. Draw and pull out quick connector straight from fuel tube.

CAUTION:
- **Pull quick connector holding “A” position in the figure.**
- **Never pull with lateral force applied. O-ring inside quick connector may be damaged.**
- **Prepare container and cloth beforehand as fuel will leak out.**
- **Avoid fire and sparks.**
- **Keep parts away from heat source. Especially, be careful when welding is performed around them.**
- **Never expose parts to battery electrolyte or other acids.**
- **Never bend or twist connection between quick connector and fuel feed hose during installation/ removal.**
- **To keep clean the connecting portion and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.**

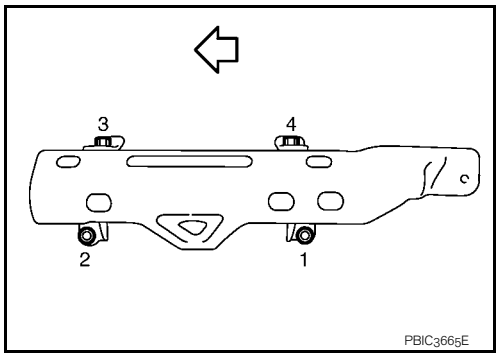


4. Disconnect harness connector from fuel injector.

cardiagn.com

5. Remove fuel tube protector.
   - Loosen bolts in the reverse of the order shown in the figure.

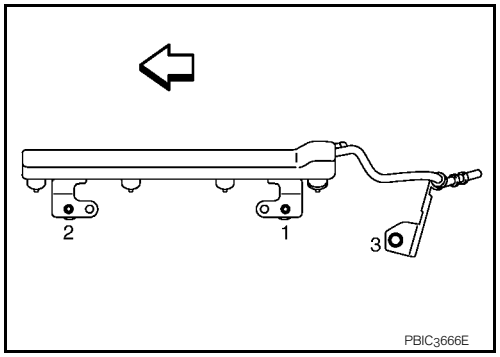
   ⇦ : Engine front



6. Remove the fuel injector and fuel tube assembly.
   - Loosen bolts in the reverse of the order shown in the figure.

   ⇦ : Engine front

   CAUTION:
   - **When removing, be careful to avoid any interference with fuel injector.**
   - **Use a shop cloth to absorb any fuel leaks from fuel tube.**

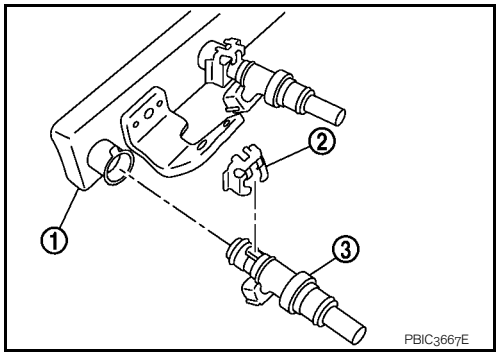


7. Remove the fuel injector (3) from the fuel tube (1) with the following procedure.

a. Open and remove the clip (2).

b. Remove fuel injector from the fuel tube by pulling straight.

   CAUTION:
   - **Be careful about fuel leakage remaining in fuel tube.**
   - **Be careful not to damage the nozzle of fuel injector.**
   - **Never subject fuel injector to impact by dropping or hitting.**
   - **Never disassemble.**



INSTALLATION

1. Install new the O-ring to the fuel injector, paying attention to the following.

   CAUTION:
   - **The upper and lower O-rings are different. Be careful not to confuse them.**

Fuel tube side	**: Black**
Nozzle side	**: Green**

   - **Handle O-ring with bare hands. (Never wear gloves.)**
   - **Lubricate O-ring with engine oil.**
   - **Never clean O-ring with solvent.**
   - **Make sure that the O-ring and its mating part are free of foreign material.**
   - **Be careful not to scratch O-ring with tool or fingernails when installing it. Also be careful not to twist or stretch O-ring. If O-ring is stretched while installing, never insert it into fuel tube immediately.**
   - **Insert O-ring straight into fuel tube. Never decenter or twist it.**

cardiagn.com

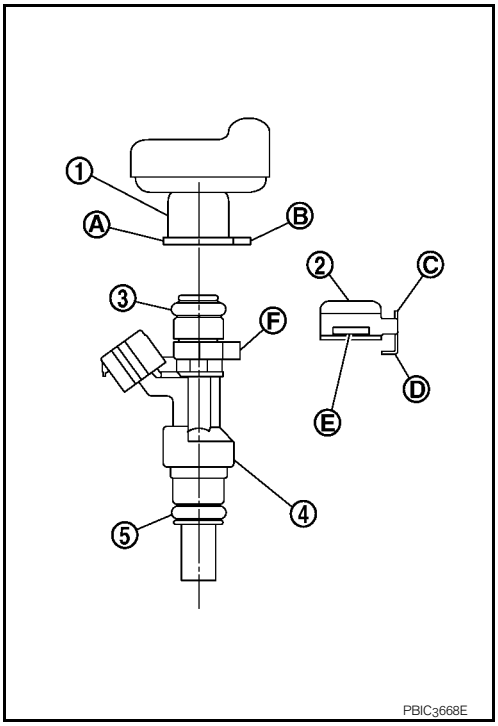
2. Install the fuel injector (4) onto the fuel tube (1) with the following procedure:

   3 : O-ring (Black)
   5 : O-ring (Green)

a. Insert the clips (2) into the clip mounting grooves on the fuel injector.
   • Insert clip cut-out (D) into fuel injector protrusion (F).
   CAUTION:
   • **Always replace clip with new one.**
   • **Make sure that the clip does not interfere with the O-ring. If interference occurs, replace the O-ring.**

b. Insert the fuel injector into the fuel tube with clip attached.
   • Make sure that the axis is lined up when inserting.
   • Insert clip cut-out (C) into fuel tube protrusion (B).
   • Make sure that the flange (A) on the fuel tube fits securely in the clip flange fixing groove (E).

c. Make sure that installation is complete by checking that fuel injector does not rotate or come off.

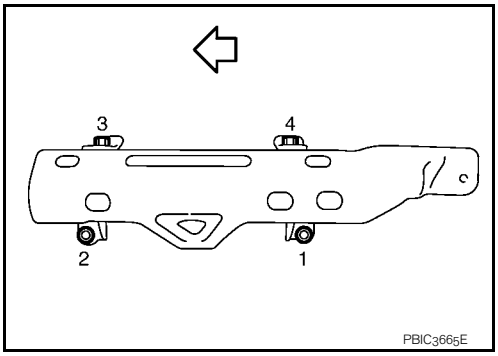


PBIC3668E

3. Install fuel tube and injector assembly onto cylinder head.
   • Tighten bolts in the numerical order shown in the figure.

   ⇦ : Engine front

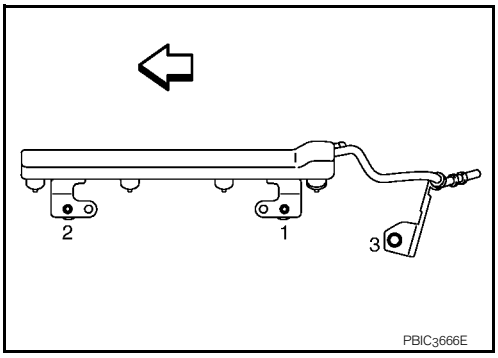
   CAUTION:
   Be careful not to let tip of injector nozzle interfere with other parts.



PBIC3665E

4. Install fuel tube protector.
   • Tighten bolts in the numerical order shown in the figure.

   ⇦ : Engine front



PBIC3666E

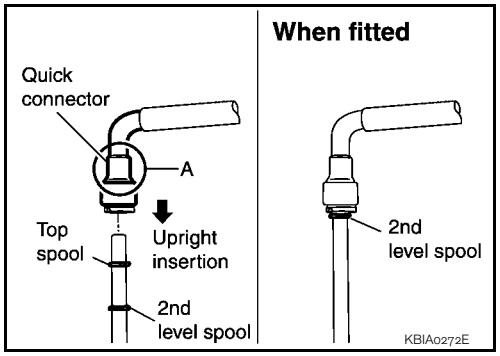
5. Connect harness connector to fuel injector.
6. Connect fuel feed hose with the following procedure.

a. Check for damage or foreign material on the fuel tube and quick connector.
b. Apply new engine oil lightly to area around the top of fuel tube.

cardiagn.com

c. Align center to insert quick connector straightly into fuel tube.
- Insert quick connector to fuel tube until the top spool on fuel tube is inserted completely and the 2nd level spool is positioned slightly below quick connector bottom end.

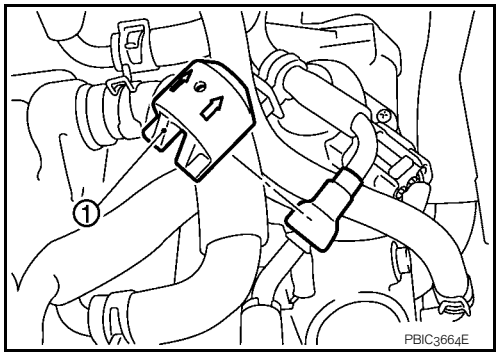
CAUTION:
- **Hold “A” position in the figure when inserting fuel tube into quick connector.**
- **Carefully align center to avoid inclined insertion to prevent damage to O-ring inside quick connector.**
- **Insert until you hear a “click” sound and actually feel the engagement.**
- **To avoid misidentification of engagement with a similar sound, be sure to perform the next step.**



d. Before clamping fuel feed hose with hose clamp, pull quick connector hard by hand holding “A” position. Make sure it is completely engaged (connected) so that it does not come out from fuel tube.

e. Install quick connector cap (1) to quick connector connection.
- Install quick connector cap with the side arrow facing quick connector side (fuel feed hose side).

CAUTION:
- **Make sure that the quick connector and fuel tube are securely engaged with the quick connector cap mounting groove.**
- **Quick connector may not be connected correctly if quick connector cap cannot be installed easily. Remove the quick connector cap, and then check the connection of quick connector again.**



f. Install fuel feed hose to hose clamp.

7. Install in the reverse order of removal, for the rest of parts.

Inspection

INFOID:0000000000893852

INSPECTION AFTER INSTALLATION

Check on Fuel Leakage

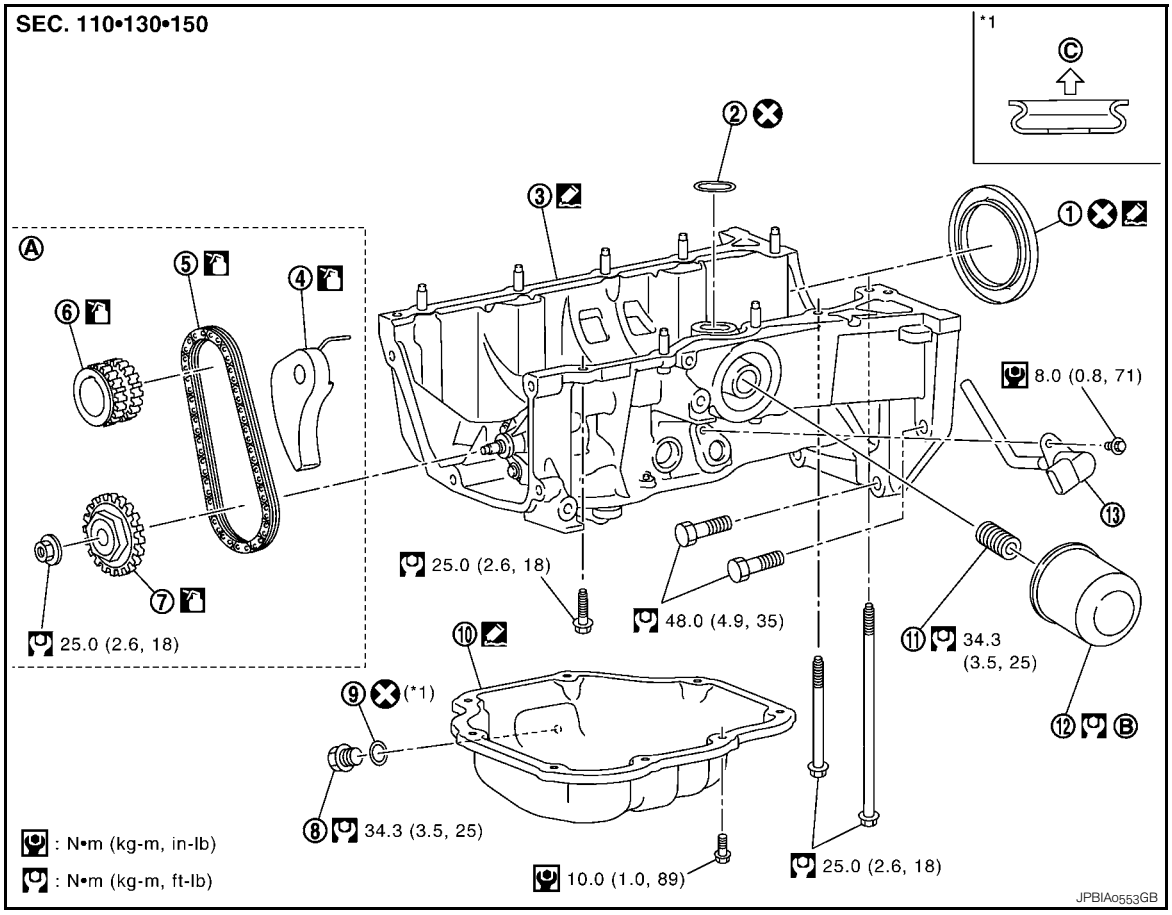
1. Turn ignition switch “ON” (with the engine stopped). With fuel pressure applied to fuel piping, make sure there are no fuel leaks at connection points.
   NOTE:
   Use mirrors for checking at points out of clear sight.
2. Start the engine. With engine speed increased, make sure again that there are no fuel leaks at connection points.
   CAUTION:
   Never touch the engine immediately after stopped, as the engine becomes extremely hot.

cardiagn.com

OIL PAN (LOWER)

Exploded View

INFOID:0000000000894120



1.	Rear oil seal	2.	O-ring	3.	Oil pan (upper)
4.	Chain tensioner	5.	Oil pump drive chain	6.	Crankshaft sprocket
7.	Oil pump sprocket	8.	Oil pan drain plug	9.	Washer
10.	Oil pan (lower)	11.	Oil filter stud bolt	12.	Oil filter
13.	Oil level sensor				
A.	Refer to EM-46	B.	Refer to LU-9	C.	Oil pan side

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000894123

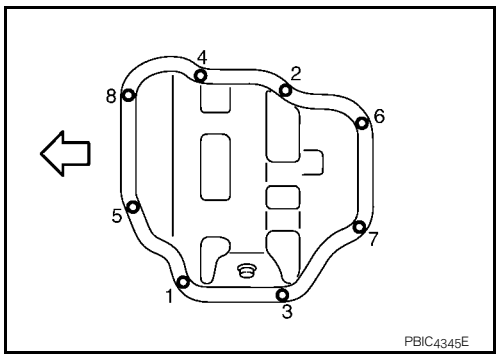
REMOVAL

1. Drain engine oil. Refer to LU-7, "Draining".
2. Remove the oil pan (lower) with the following procedure.

cardiagn.com

a. Loosen bolts in the reverse of the order shown in the figure.

⇦ : Engine front



b. Insert the seal cutter [SST: KV10111100] between oil pan (upper) and oil pan (lower).

CAUTION:

- **Be careful not to damage the mating surface.**
- **A more adhesive liquid gasket is applied compared to previous types when shipped, so it should not be forced off using a flat- bladed screwdriver, etc.**

INSTALLATION

1. Install oil pan (lower) with the following procedure.

a. Use scraper to remove old liquid gasket from mating surfaces.
- Also remove the old liquid gasket from mating surface of oil pan (upper).
- Remove old liquid gasket from the bolt holes and threads.

CAUTION:

Never scratch or damage the mating surfaces when cleaning off old liquid gasket.

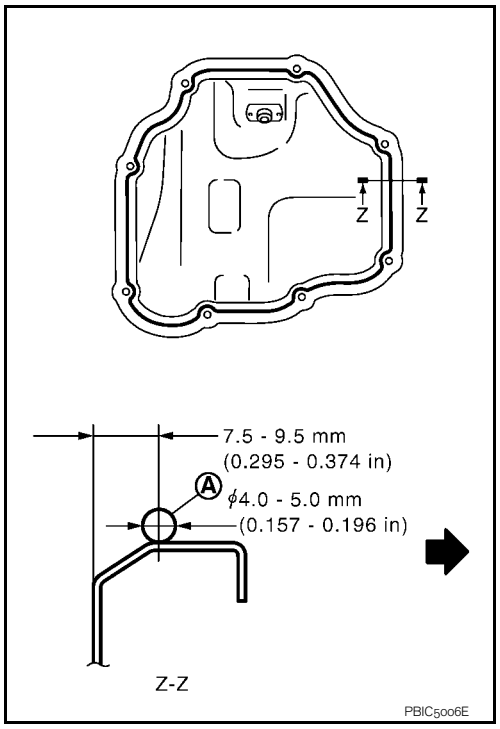
b. Apply a continuous bead of liquid gasket (A) with the tube presser (commercial service tool) to areas shown in the figure.

⇦ : Engine out side

Use Genuine Liquid Gasket or equivalent.

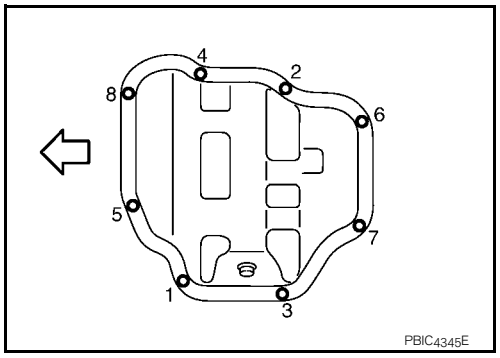
CAUTION:

Attaching should be done within 5 minutes after coating.



c. Tighten bolts in the numerical order shown in the figure.

⇦ : Engine front



2. Install oil pan drain plug.
- For installation direction of washer. Refer to EM-40, "Exploded View".

3. Install in the reverse order of removal, for the rest of parts.

CAUTION:

cardiagn.com

Pour engine oil at least 30 minutes after oil pan is installed.

Inspection

INFOID:0000000000893856

INSPECTION AFTER INSTALLATION

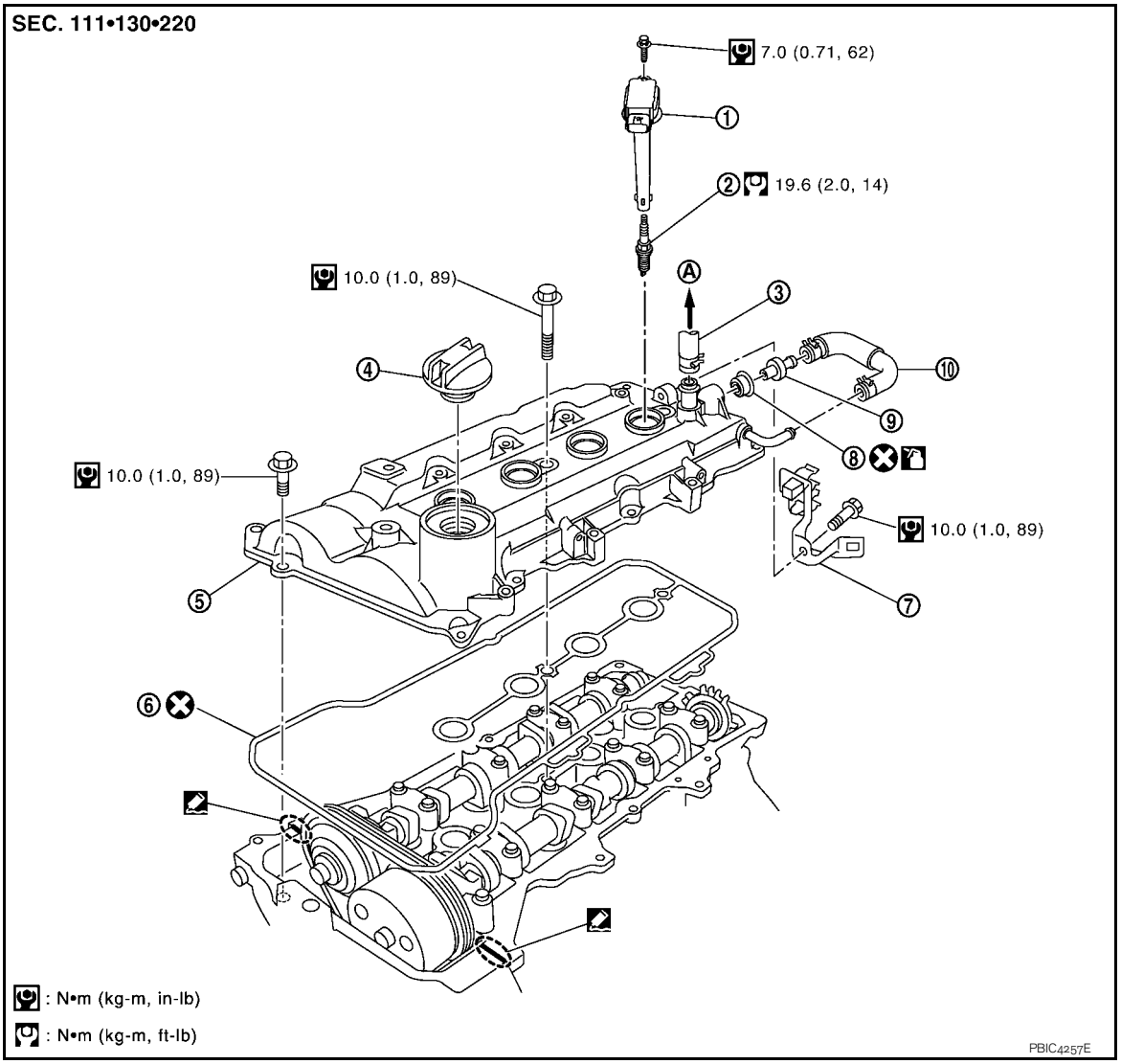
1. Check the engine oil level and adjust engine oil. Refer to LU-6, "Inspection".
2. Start engine, and check there is no leak of engine oil.
3. Stop engine and wait for 10 minutes.
4. Check the engine oil level again. Refer to LU-6, "Inspection".

cardiagn.com

IGNITION COIL, SPARK PLUG AND ROCKER COVER

Exploded View

INFOID:0000000000893857



1. Ignition coil
2. Spark plug
3. PCV hose
4. Oil filler cap
5. Rocker cover
6. Gasket
7. Bracket
8. Grommet
9. PCV valve
10. PCV hose
A. To air duct

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000893858

REMOVAL

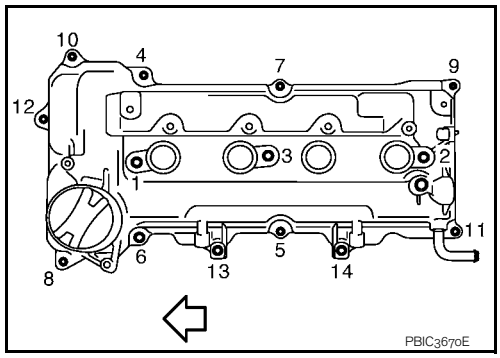
1. Remove intake manifold. Refer to EM-29, "Exploded View".
2. Remove ignition coil.
   CAUTION:
   - **Handle ignition coil carefully and avoid impacts.**
   - **Never disassemble.**
3. Remove grand cable (RH).

cardiagn.com

4. Support the bottom surface of engine using a transmission jack, and then remove the engine mounting bracket and insulator (RH). Refer to EM-83, "Exploded View".
5. Remove fuel tube protector.
6. Remove oil filler cap.
7. Remove rocker cover.
   - Loosen bolts in reverse order shown in the figure.

   ⇦ : Engine front

   NOTE:
   13 and 14 shown in the figure are used to tighten the fuel tube protector.

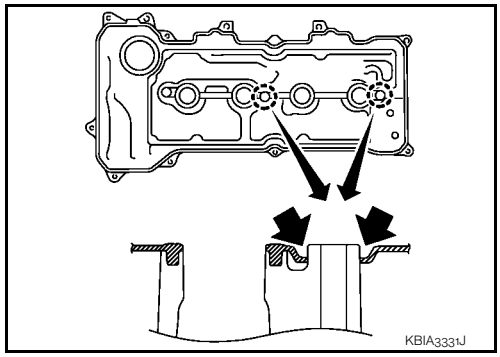


8. Remove rocker cover gasket from rocker cover.
9. Use scraper to remove all traces of liquid gasket from cylinder head and front cover.
   CAUTION:
   Never scratch or damage the mating surface when cleaning off old liquid gasket.

INSTALLATION

1. Install the rocker cover with the following procedure.

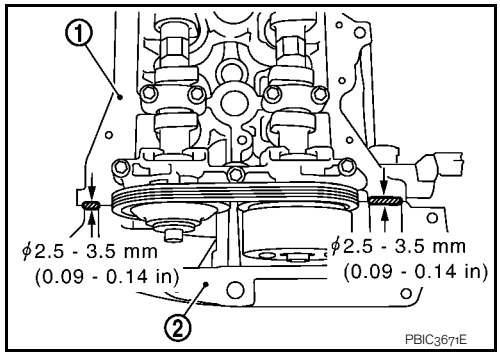
a. Install the gasket to the rocker cover.
   - Check for damage or foreign material.
   - Make sure that it is securely inserted in the mounting groove of rocker cover.
   - For the 2 bolt holes shown in the figure, push the gasket into the boss for the rocker cover bolt hole to prevent it from falling.



b. Apply liquid gasket to the position shown in the figure.

   1 : Cylinder head
   2 : Front cover

   Use Genuine Liquid Gasket or equivalent.

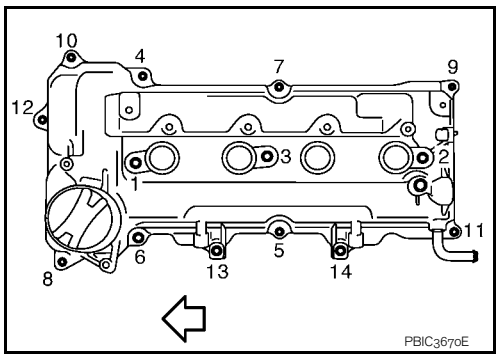


2. Install rocker cover to the cylinder head.
   CAUTION:
   Make sure the gasket is not dropped.
3. Install rocker cover.

cardiagn.com

- Tighten bolts in two steps separately in numerical order as shown in the figure.

⇦ : Engine front



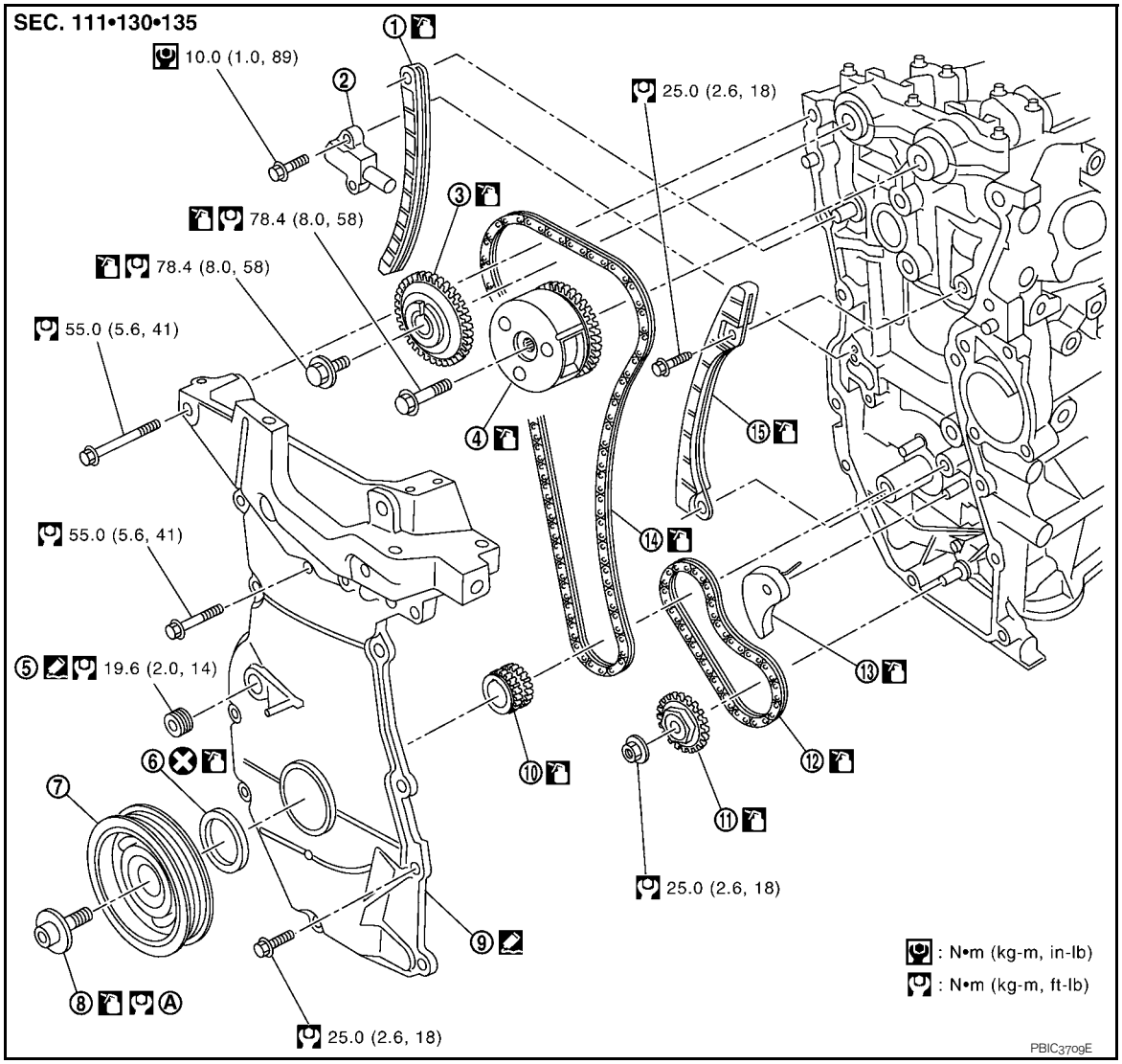
4. Install in the reverse order of removal, for the rest of parts.

cardiagn.com

TIMING CHAIN

Exploded View

INFOID:0000000000893859



1. Timing chain slack guide
2. Chain tensioner (for timing chain)
3. Camshaft sprocket (EXH)
4. Camshaft sprocket (INT)
5. Plug
6. Front oil seal
7. Crankshaft pulley
8. Crankshaft pulley bolt
9. Front cover
10. Crankshaft sprocket
11. Oil pump sprocket
12. Oil pump drive chain
13. Chain tensioner (for oil pump drive chain)
14. Timing chain
15. Timing chain tension guide

A. Refer to EM-46

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000894024

CAUTION:
The rotation direction indicated in the text indicates all directions seen from the engine front direction.

REMOVAL

1. Remove front wheel (RH). Refer to WT-4, "Road Wheel".
2. Remove front fender protector (RH). Refer to EXT-21, "Exploded View".
3. Drain engine oil. Refer to LU-7, "Draining".
   CAUTION:

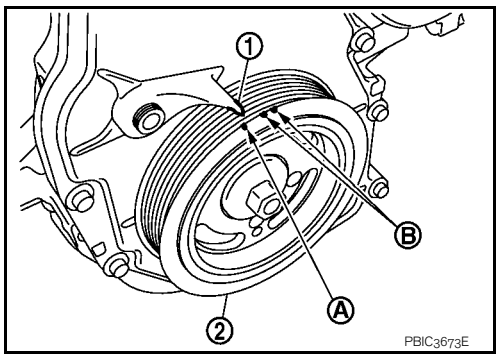
cardiagn.com

Be sure to perform this step when engine is cold.

4. Remove the following parts.
   - Intake manifold: Refer to EM-29, "Exploded View".
   - Drive belt: Refer to EM-16, "Removal and Installation".
   - Water pump pulley: Refer to CO-17, "Exploded View".
   - Ground cable (RH)
5. Support the bottom surface of engine using a transmission jack, and then remove the engine mounting bracket and insulator (RH). Refer to EM-83, "Exploded View".
6. Remove rocker cover. Refer to EM-43, "Exploded View".
7. Set No. 1 cylinder at TDC of its compression stroke with the following procedure:

a. Rotate crankshaft pulley (2) clockwise and align TDC mark (without paint mark) (A) to timing indicator (1) on front cover.

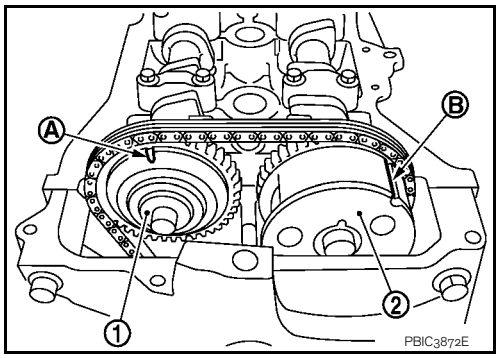
B : White paint mark (Not use for service)



b. Make sure the matching marks on each camshaft sprocket are positioned as shown in the figure.

1 : Camshaft sprocket (EXH)
2 : Camshaft sprocket (INT)
A : Matching mark (stamp)
B : Matching mark (peripheral stamp line)

- If not, rotate crankshaft pulley one more turn to align matching marks to the positions in the figure.

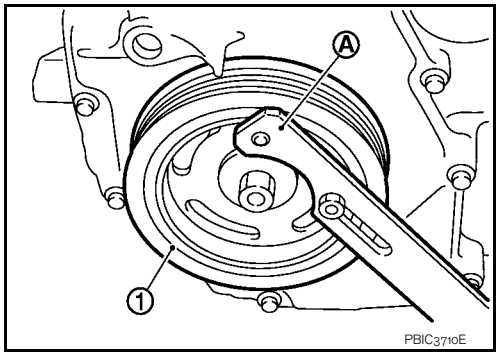


8. Remove crankshaft pulley with the following procedure:

a. Secure crankshaft pulley (1) using a pulley holder (commercial service tool) (A).

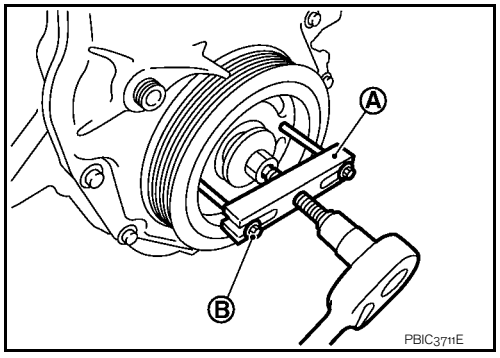
b. Loosen and pull out crankshaft pulley bolts.

CAUTION:
Never remove the mounting bolts as they are used as a supporting point for the pulley puller.



c. Attach a pulley puller [SST: KV11103000] (A) in the M 6 thread hole on crankshaft pulley, and remove crankshaft pulley.

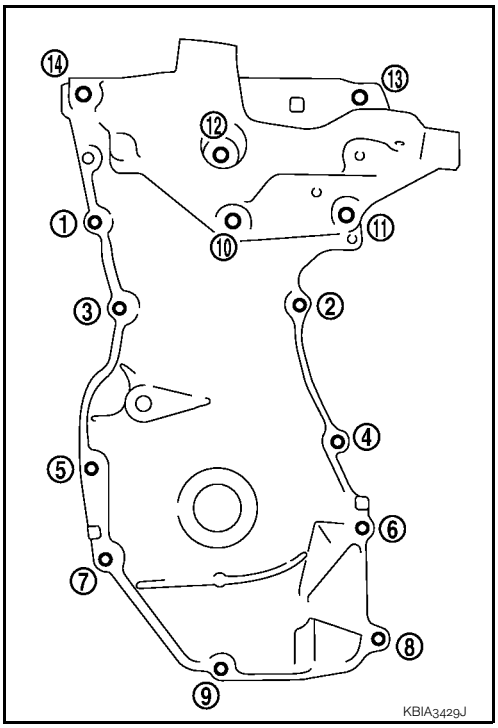
B : M6 bolt



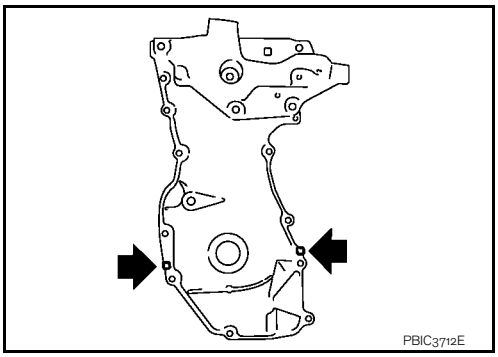
cardiagn.com

9. Remove front cover with the following procedure:

a. Loosen bolts in the reverse of the order shown in the figure.



b. Cut liquid gasket by prying the position (⬅) shown in the figure, and then remove the front cover.



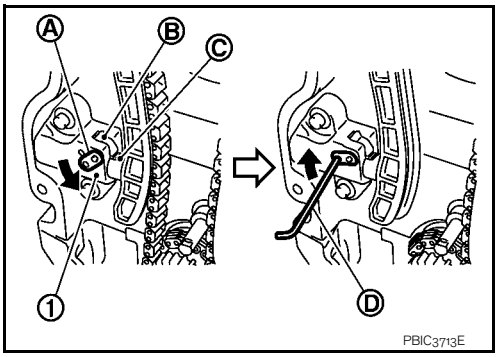
10. Remove front oil seal from front cover.
    - Remove by lifting it up using a suitable tool.

    CAUTION:
    Be careful not to damage the front cover.

11. Remove chain tensioner (1) with the following procedure.

a. Fully push down the chain tensioner lever (A), and then push the plunger (C) into the inside of tensioner.
   - The tab (B) is released by fully pushing the lever down. As a result, the plunger can be moved.

b. Pull up the lever to align its hole position with the body hole position.
   - When the lever hole is aligned with the body hole position, the plunger is fixed.
   - When the protrusion parts of the plunger ratchet and the tab face each other, both hole positions are not aligned. At that time, correctly engage them and align these hole positions by slightly moving the plunger.

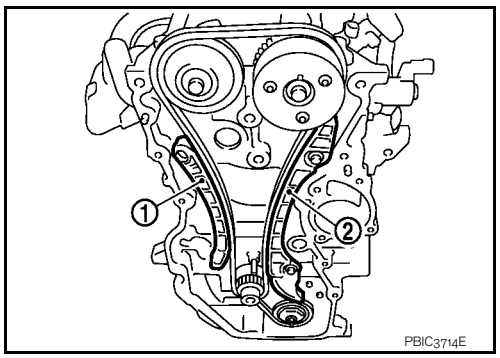


c. Insert the stopper pin (D) into the body hole through the lever hole, and then fix the lever at the upper position.
   - Figure shows the example that a hexagonal wrench for 2.5 mm (0.098 in) is used.

d. Remove chain tensioner.

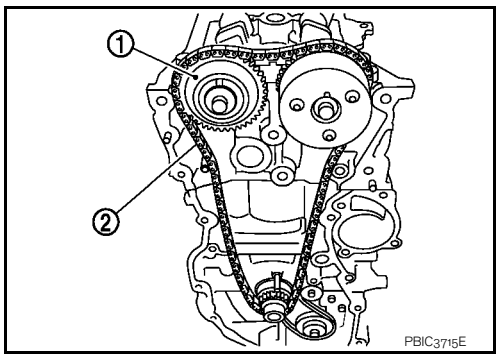
cardiagn.com

12. Remove the timing chain tension guide (2) and the timing chain slack guide (1).



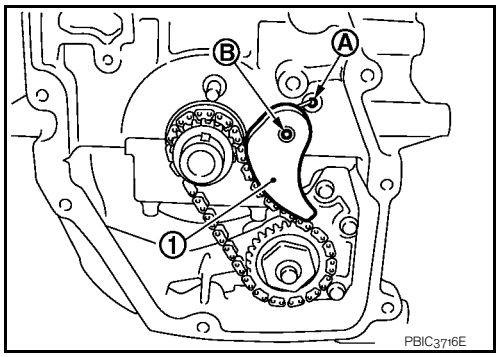
13. Remove the timing chain (2).
    - Pull the looseness of timing chain toward the camshaft sprocket (EXH) (1), and then remove the timing chain and start the removal from camshaft sprocket (EXH) side.

    CAUTION:
    Never rotate crankshaft or camshaft while timing chain is removed. It causes interference between valve and piston.



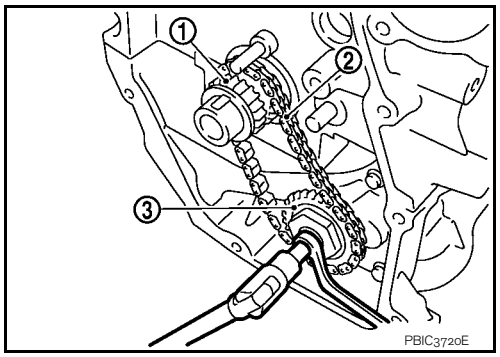
14. Remove the crankshaft sprocket and the oil pump drive related parts with the following procedure.

a. Remove chain tensioner (1).
   - Pull out from the shaft (B) and spring fixing holes (A).



b. Hold the top of the oil pump shaft using the TORX socket (size: E8), and then loosen the oil pump sprocket nuts and remove them.

c. Remove the crankshaft sprocket (1), the oil pump drive chain (2), and the oil pump sprocket (3) at the same time.

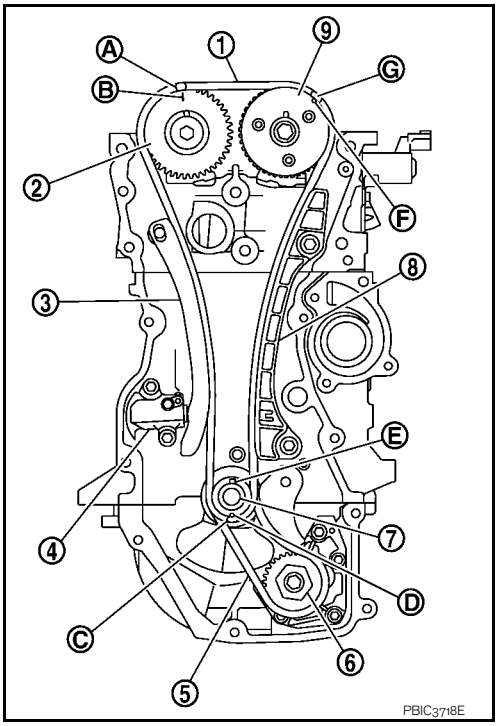


INSTALLATION

NOTE:

cardiagn.com

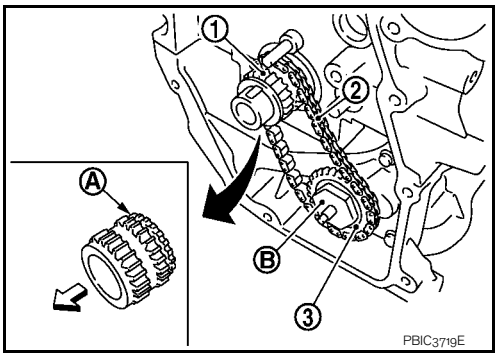
The figure shows the relationship between the matching mark on each timing chain and that on the corresponding sprocket, with the components installed.



1 : Timing chain
2 : Camshaft sprocket (EXH)
3 : Timing chain slack guide
4 : Chain tensioner
5 : Oil pump drive chain
6 : Oil pump sprocket
7 : Crankshaft sprocket
8 : Timing chain tension guide
9 : Camshaft sprocket (INT)
A : Dark blue link
B : Matching mark (stamp)
C : Orange link
D : Matching mark (stamp)
E : Crankshaft key (point straight up)
F : Matching mark (peripheral stamp line)
G : Dark blue link

1. Install the crankshaft sprocket and the oil pump drive related parts with the following procedure:

a. Install the crankshaft sprocket (1), the oil pump drive chain (2), and the oil pump sprocket (3) at the same time.

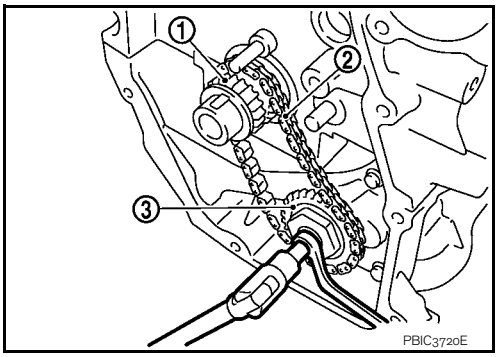


⇦ : Engine front

- Install the crankshaft sprocket so that its invalid gear area (A) is towards the back of the engine.
- Install the oil pump sprocket so that its hexagonal surface faces (B) the front of engine.

NOTE:
There is no matching mark in the oil pump drive related parts.

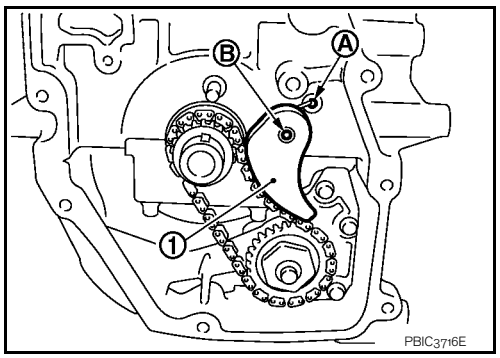
b. Hold the top of the oil pump shaft using the TORX socket (size: E8), and then tighten the oil pump sprocket nuts.



1 : Crankshaft sprocket
2 : Oil pump drive chain
3 : Oil pump sprocket

cardiagn.com

c. Install chain tensioner (1).
- Insert the body into the shaft (B) while inserting the spring into the fixing hole (A) of cylinder block front surface.
- Make sure that the tension is applied to the oil pump drive chain after installing.

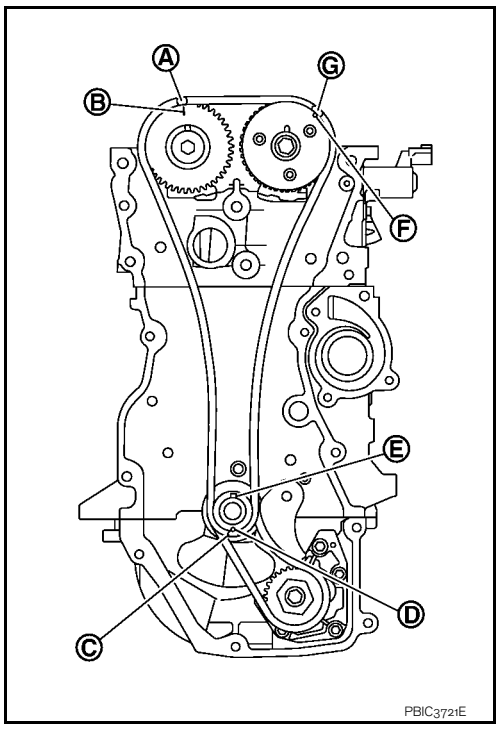


2. Install timing chain with the following procedure.

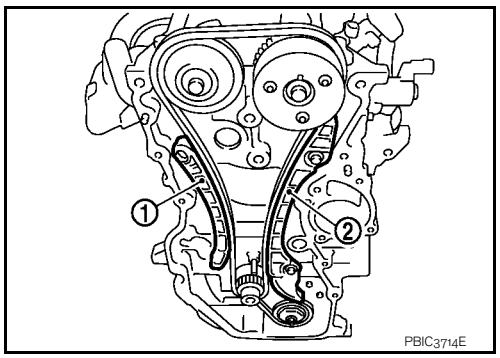
A : Dark blue link
B : Matching mark (stamp)
C : Orange link
D : Matching mark (stamp)
E : Crankshaft key (point straight up)
F : Matching mark (peripheral stamp line)
G : Dark blue link

- Install by aligning matching marks on each sprocket and timing chain.
- If these matching marks are not aligned, rotate the camshaft slightly to correct the position.

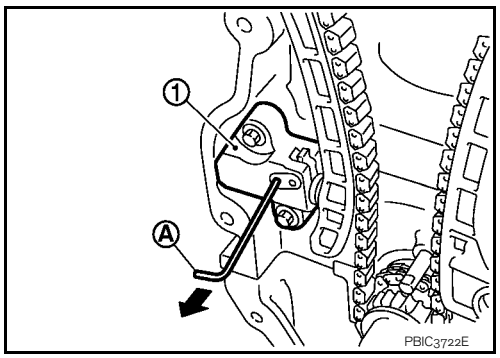
CAUTION:
- **Check matching mark position of each sprocket and timing chain again after installing the timing chain, keep matching marks aligned by holding them with a hand.**
- **To avoid skipped teeth, never rotate crankshaft and camshaft until front cover is installed.**



3. Install timing chain tension guide (2) and timing chain slack guide (1).



4. Install chain tensioner (1).
- Fix the plunger at the most compressed position using a stopper pin (A), and then install it.
- Securely pull out the stopper pin after installing the chain tensioner.

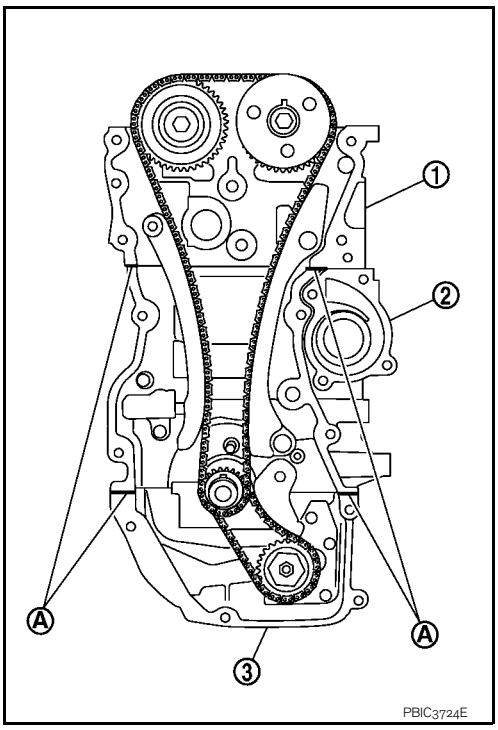


cardiagn.com

5. Check matching mark position of timing chain and each sprocket again.
6. Install the front oil seal to the front cover. Refer to EM-71, "FRONT OIL SEAL : Removal and Installation"
7. Install front cover with the following procedure:

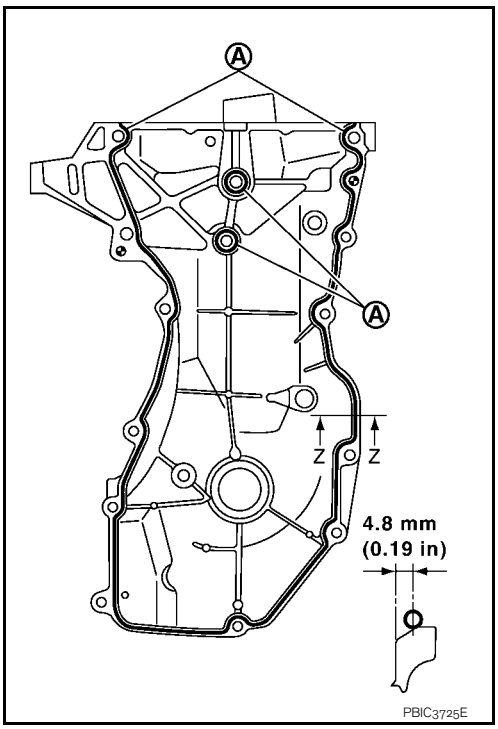
a. Apply a continuous bead of liquid gasket with tube presser (commercial service tool) to front cover as shown in the figure.
Use Genuine Liquid Gasket or equivalent.

1 : Cylinder head
2 : Cylinder block
3 : Oil pan (upper)
A : Liquid gasket application area ϕ 3.0 - 4.0 mm (0.12 - 0.16 in)



b. Apply a continuous bead of liquid gasket with tube presser (commercial service tool) to front cover as shown in the figure.
Use Genuine Liquid Gasket or equivalent.

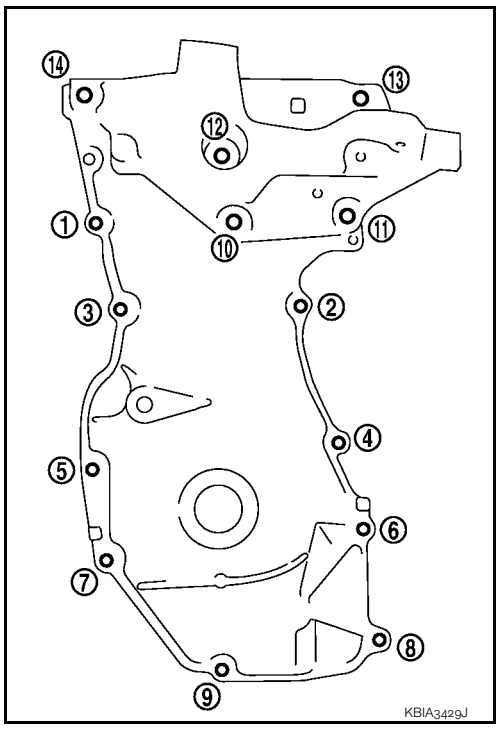
A : Liquid gasket application area ϕ 3.0 - 4.0 mm (0.12 - 0.16 in)



cardiagn.com

c. Tighten bolts in the numerical order shown in the figure.

d. After all bolts are tightened, retighten them to specified torque in numerical order as shown in the figure.
CAUTION:
Be sure to wipe off any excessive liquid gasket leaking to surface.



8. Insert crankshaft pulley by aligning with crankshaft key.
   - When inserting crankshaft pulley with a plastic hammer, tap on its center portion (not circumference).
   CAUTION:
   Never damage front oil seal lip section.
9. Tighten crankshaft pulley bolt with the following procedure:
   - Secure crankshaft pulley with a pulley holder (commercial service tool), and tighten crankshaft pulley bolt.

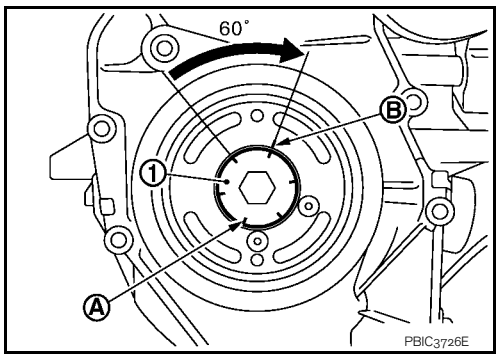
a. Apply new engine oil to thread and seat surfaces of crankshaft pulley bolt.

b. Tighten crankshaft pulley bolt.

: **35.0 N·m (3.6 kg-m, 26 ft-lb)**

c. Put a paint mark (B) on crankshaft pulley, mating with any one of six easy to recognize angle marks (A) on crankshaft bolt flange (1).

d. Turn another 60 degrees clockwise (angle tightening).
   - Check the tightening angle with movement of one angle mark.



10. Make sure that crankshaft turns smoothly by rotating by hand clockwise.
11. Install in the reverse order of removal, for the rest of parts.

Inspection

INFOID:0000000000893861

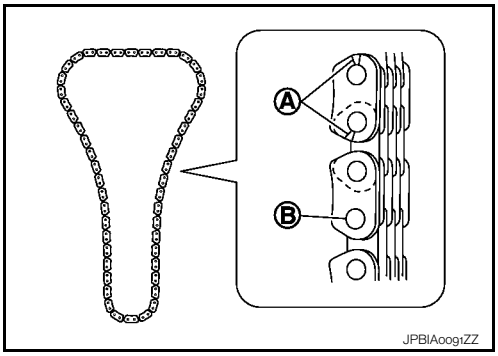
INSPECTION AFTER REMOVAL

Timing Chain

cardiagn.com

Check for cracks and any excessive wear at link plates and roller links of timing chain. Replace timing chain as necessary.

A : Crack
B : Wear



INSPECTION AFTER INSTALLATION

Inspection for Leaks

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-21, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

  NOTE:

  If hydraulic pressure inside chain tensioner drops after removal/installation, slack in guide may generate a pounding noise during and just after the engine start. However, this does not indicate an unusualness. Noise will stop after hydraulic pressure rises.
- Warm up engine thoroughly to make sure there is no leakage of fuel, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Items	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage

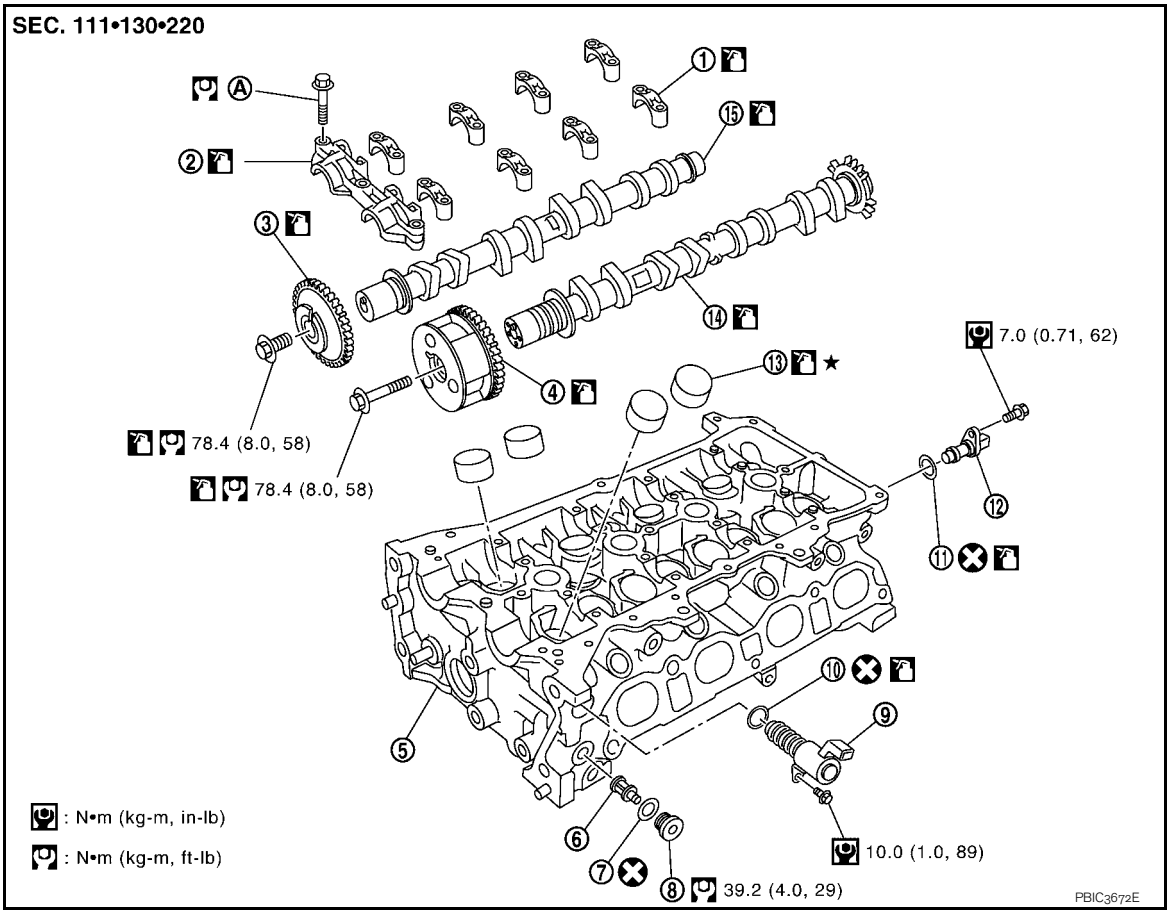
* Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

cardiagn.com

CAMSHAFT

Exploded View

INFOID:0000000000893862



1. Camshaft bracket (No. 2 to 5)
2. Camshaft bracket (No.1)
3. Camshaft sprocket (EXH)
4. Camshaft sprocket (INT)
5. Cylinder head
6. Oil filter (for intake valve timing control)
7. Washer
8. Plug
9. Intake valve timing control solenoid valve
10. O-ring
11. O-ring
12. Camshaft position sensor (PHASE)
13. Valve lifter
14. Camshaft (INT)
15. Camshaft (EXH)

A. Refer to EM-55

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000894025

CAUTION:
The rotation direction in the text indicates all directions seen from the engine front.

REMOVAL

NOTE:
This section describes the procedure for removal and installation of camshaft with front cover. If the front cover is removed first, change the following procedure.

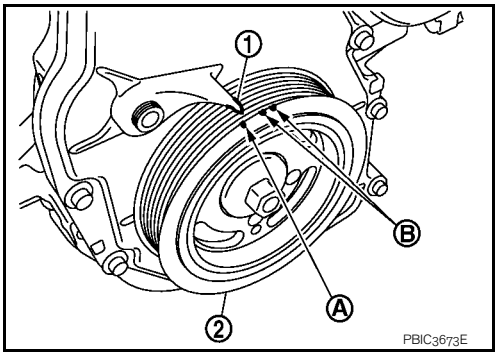
·Step 8 : After camshaft sprocket is removed, remove the camshaft brackets (No. 2 to 5).
·Step 9 : The camshaft (EXH) can be removed simultaneously with the camshaft (INT).
·Step 10 : When the camshaft sprocket (INT) mounting bolt is removed, the lifting up of camshaft is not necessary.

cardiagn.com

1. Support the bottom surface of engine using a transmission jack, and then remove the engine mounting bracket and insulator (RH). Refer to EM-83, "Exploded View".
2. Remove rocker cover. Refer to EM-43, "Removal and Installation".
3. Remove camshaft position sensor (PHASE) from rear end of cylinder head.
   CAUTION:
   Handle it carefully and avoid impacts.
4. Place cylinder No. 1 at TDC of its compression stroke with the following procedure.

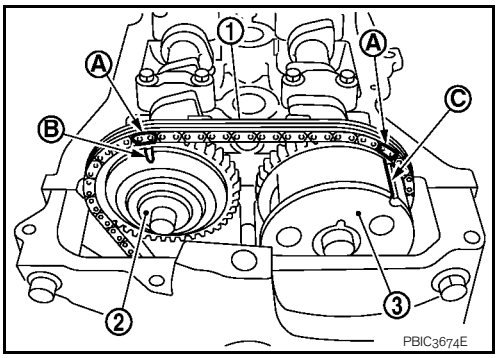
a. Rotate crankshaft pulley (2) clockwise and align TDC mark (without paint mark) (A) to timing indicator (1) on front cover.

B : White paint mark (Not use for service)



b. Make sure that the matching marks on each the camshaft sprockets are in the position shown in the figure.

1 : Timing chain
2 : Camshaft sprocket (EXH)
3 : Camshaft sprocket (INT)
A : Matching mark (Paint)
B : Matching mark (Stamp)
C : Matching mark (Peripheral stamp line)

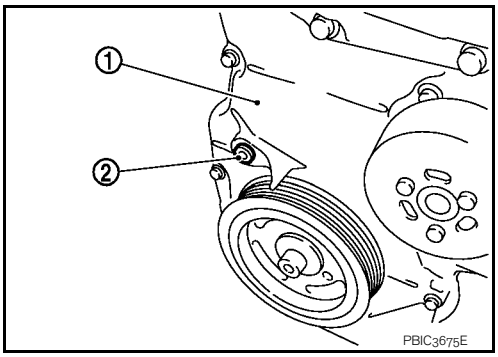


- If not, rotate crankshaft pulley one more turn to align matching marks to the positions in the figure.

c. Paint matching marks on the timing chain links

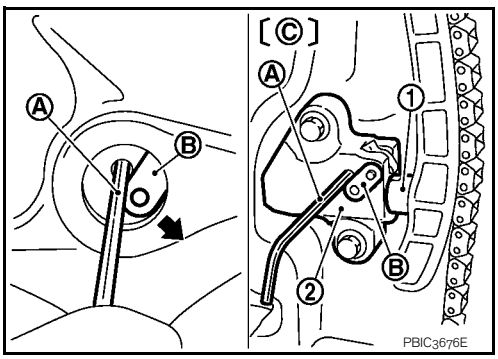
5. Secure the plunger of chain tensioner in the fully compressed position with the following procedure. And then, loosen the timing chain tension.

a. Remove the plug (2) from the front cover (1).



b. Fully push down the lever (B) of chain tensioner (2) from the plug hole, and then insert the stopper pin (A) into the body side hole and secure the lever at the lowest position.

C : Front cover has been omitted



- The tab is released by fully pushing the lever down. As a result, the plunger (1) can be moved.

NOTE:
Hexagonal wrench [2.5 mm (0.098 in)] is used for a stopper pin as an example.
CAUTION:

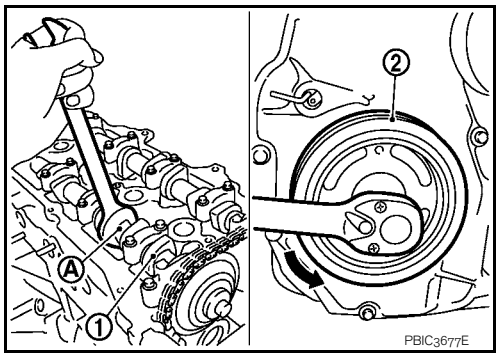
cardiagn.com

The stopper pin must use a shape that cannot fall in the front cover when dropping out.

c. Turn the crankshaft pulley (2) counterclockwise with the camshaft (EXH) (1) fixing. Apply the tension to the timing chain, and then push the plunger of into the inside of chain tensioner.

CAUTION:

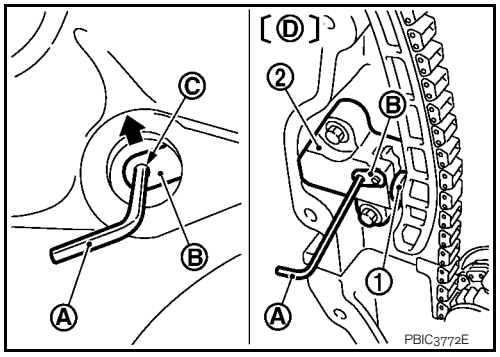
Hold the camshaft hexagonal part (A), and then secure the camshaft.



d. Pull out the stopper pin (A) of chain tensioner (2) side from plug hole. Lift the lever (B) up to align its hole position with the hole of the body.

D : Front cover has been omitted

- When the lever hole (C) is aligned with the body hole position, the plunger (1) is fixed.
- When the protrusion parts of the plunger ratchet and the tab face each other, both hole positions are not aligned. At that time, correctly engage them and align these hole positions by slightly moving the plunger.

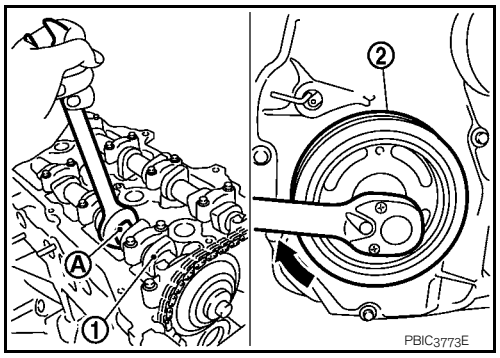


e. Insert the stopper pin into the body hole through the lever hole, and then fix the lever at the upper position.

f. Slightly rotate the crankshaft pulley (2) clockwise to loosen the timing chain on camshaft sprocket (EXH) (1) side.

CAUTION:

Hold the camshaft hexagonal part (A), and then secure the camshaft.



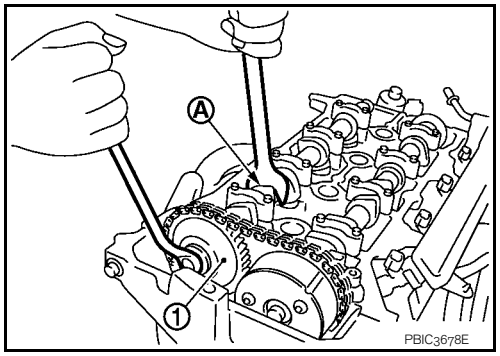
6. Remove camshaft sprocket (EXH) (1).

CAUTION:

- **Hold the camshaft hexagonal part (A), and then secure the camshaft.**
- **Never rotate crankshaft and camshaft separately, so as not to contact valve with piston in the following steps.**

NOTE:

The timing chain with the front cover installed is not disengaged from the crankshaft sprocket and it is not dropped into the front cover. Therefore, the timing chain tension holding device is not necessary.



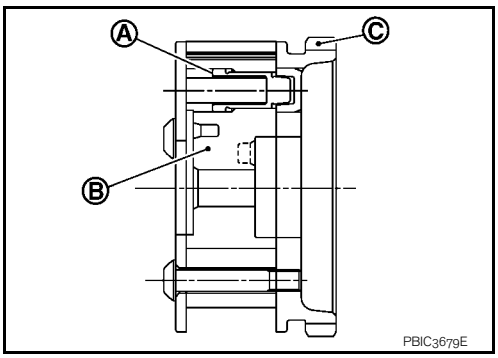
7. Turn the camshaft sprocket (INT) to the most advanced position.

CAUTION:

Installation and removal of the camshaft sprocket (INT) must be done in the most advanced position for the following reasons.

cardiagn.com

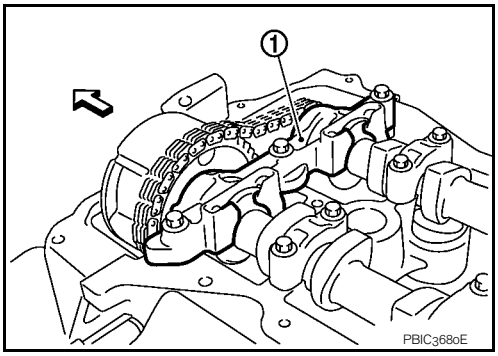
- **The sprocket (C) and vane (camshaft coupling) (B) are designed to spin and move within the range of a certain angle.**
- **With the engine stopped and the vane in the most retarded angle, it will not spin because it is locked to the sprocket side by the internal lock pin (A).**
- **If the camshaft sprocket mounting bolts are turned in the situation described above, the lock pin will become damaged and cause malfunctions because of the increased horizontal load (cutting force) on the lock pin.**



a. Remove camshaft bracket (No. 1) (1).

⇦ : Engine front

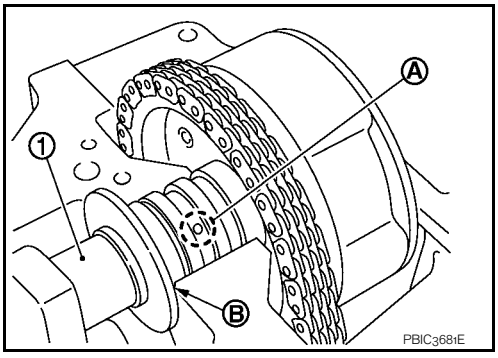
- Loosen the bolts in several steps, and then remove them.



b. Apply the following air pressure to the No. 1 journal oil hole (A) of camshaft (INT) (1) shown in the figure using an air gun.

Pressure : 300 kPa (3.0 bar, 3.1 kg/cm^2 , 44 psi) or more

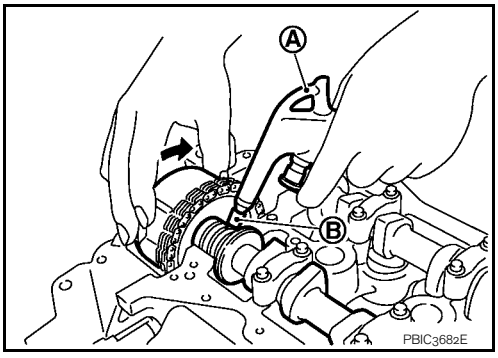
- Apply the air pressure into the oil hole on the second groove from the front of camshaft thrust (B).
- Proceed all the way through step “e” with the air pressure on.



- Attach the rubber nozzle (B) narrowed to the top of the air gun (A) to prevent air leakage from the oil hole. Securely apply the air pressure to the oil hole.

CAUTION:

- **There are other oil holes in the side grooves. Never use the incorrect oil holes.**
- **Be sure not to damage the oil path with the tip of the air gun.**
- **Wipe all the oil off the air gun to prevent oil from being blown all over along with the air, and the area around the air gun should be wiped with a rag when applying air pressure. Eye protection should be worn as needed.**



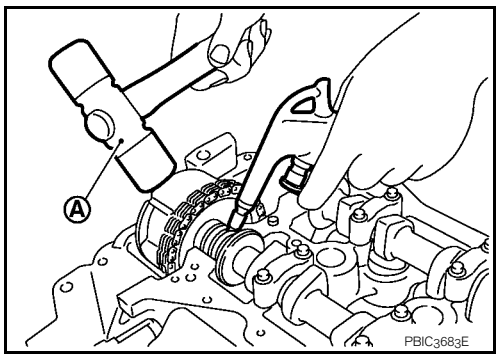
NOTE:

The air pressure is used to move the lock pin into the disengage position.

c. Hold the camshaft sprocket (INT) with hands, and then apply the power counterclockwise/clockwise alternatively.
- Finally rotate the sprocket of the camshaft sprocket (INT) counterclockwise [the direction shown by the arrow (⬅)].
- Perform the work while applying the air pressure to the oil hole.

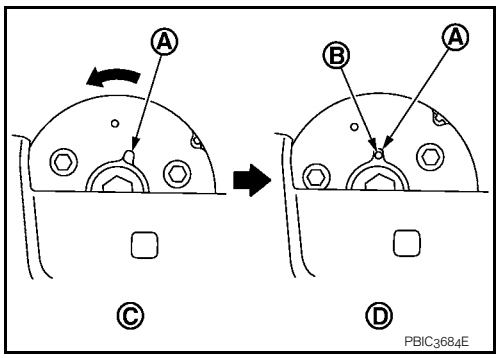
cardiagn.com

- If the lock pin is not released by hands, tap the camshaft sprocket (INT) lightly with a plastic hammer (A).
- If the camshaft sprocket (INT) is not rotated counterclockwise even if the above procedures are performed, check the air pressure and the oil hole position.



d. While doing the above, once you hear a click (the sound of the internal lock pin disengaging) from inside the camshaft sprocket (INT), start turning the camshaft sprocket (INT) in the counter-clockwise direction in the most advanced angle position.

C : Most retarded angle (lock pin engaged)
D : Most advanced angle

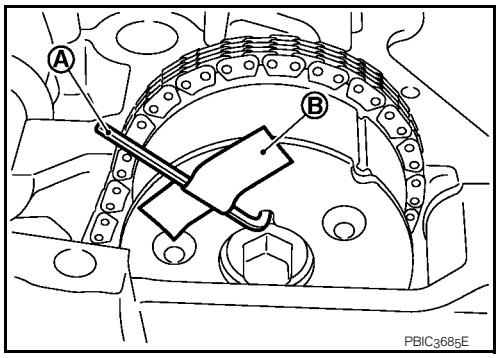


- Keep the air pressure on.
- If there is no click, as soon as the vane-side (camshaft side) starts moving independently of the sprocket, the lock pin has become disengaged.
- Make sure that it is in the most advanced angle position by seeing if the stopper pin groove (A) and the stopper pin hole (B) are matched up as shown in the figure.

e. Complete the applying procedure of air pressure and the holding procedure of camshaft (INT).

f. Insert the stopper pin (A) into the stopper pin holes in the camshaft sprocket (INT) and lock in the most advanced angle position.

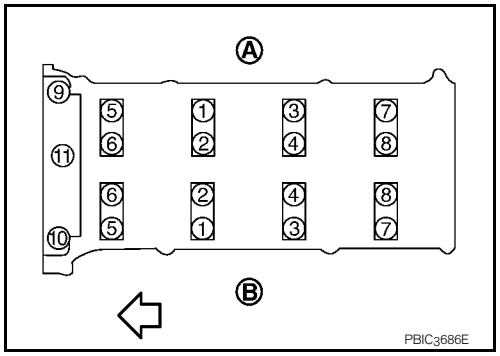
CAUTION:
No load is exerted on the stopper pin (spring reaction, etc.). Since it comes out easily, secure it with tape (B) to prevent it from coming out.
NOTE:
The stopper pin in the figure shows one example of a hexagonal wrench for 2.5 mm (0.098 in) [length of inserted section: approximately15 mm (0.59 in)].



8. Remove camshaft brackets (No. 2 to 5).
- Loosen bolts in several steps in the reverse of the order shown in the figure.

A : EXH side
B : INT side
⇦ : Engine front

NOTE:
The camshaft bracket (No. 1) has been already removed.



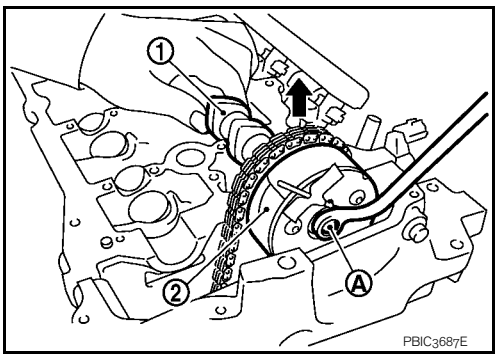
9. Remove camshaft (EXH).

cardiagn.com

10. Remove the camshaft (INT) (1) and the camshaft sprocket (INT) (2) with the following procedure.

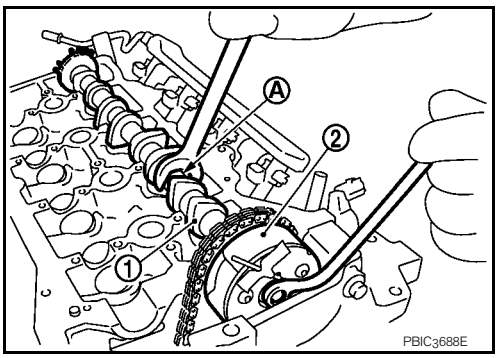
a. Lift up the camshaft sprocket (INT), and then set the thin tools (a box wrench, etc.) to the mounting bolt (A).

b. Return the camshaft (INT) to the cylinder head journal quietly.

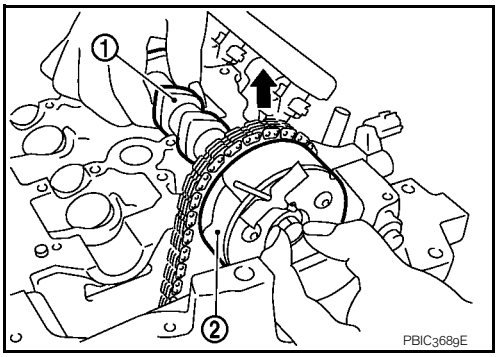


c. Keeping the camshaft hexagonal part (A) still with the wrench, loosen mounting the bolts for the camshaft sprocket (INT) (2).

1 :Camshaft (INT)

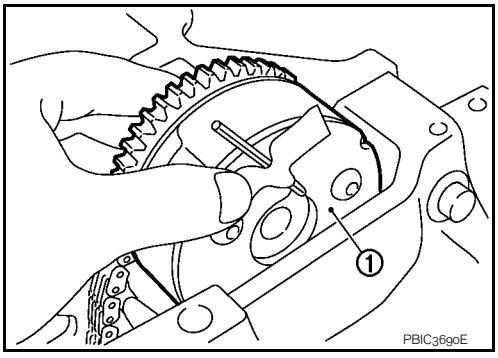


d. Lift up the camshaft (INT) (1), and then disassemble the camshaft from the camshaft sprocket (INT) (2).



e. Remove camshaft (INT) rearward.
CAUTION:
Never damage the signal plate of rear end.

f. Remove camshaft sprocket (INT) (1).
CAUTION:
Never drop stopper pin.

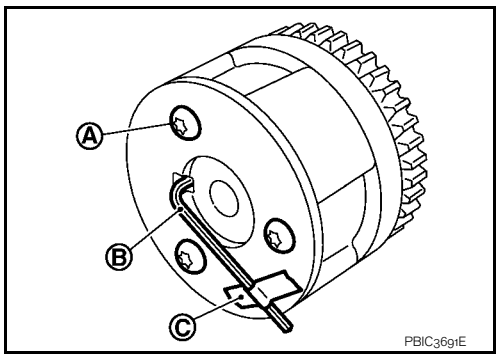


CAUTION:

cardiagn.com

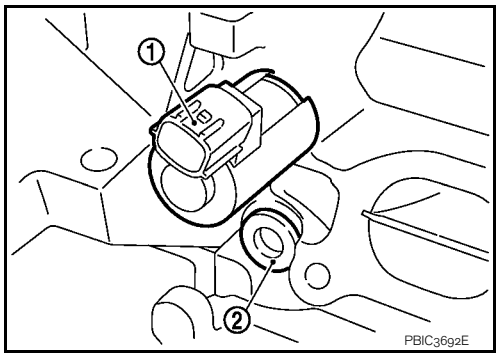
- **Tape (C) the stopper pin (B) so it does not come out.**
- **Never subject it to impact by dropping.**
- **Never disassemble. [Never loosen the three mounting bolts (A)].**

NOTE:
While removing the camshaft sprocket (INT), if you have taken out the stopper pin and the lock pin has been rejoined in the most retarded angle, do the following to restore it.



i. Install the camshaft (INT) and tighten the mounting bolts enough to prevent air from leaking out.
CAUTION:
The internal lock pin will get damaged, so keep the torque on the mounting bolts to the minimum required to prevent air from escaping.
ii. Apply the air pressure, disengage the lock pin, and turn the vane to the most advanced angle position.
iii. Insert the stopper pin.
iv. Remove camshaft sprocket (INT) from the camshaft.

11. Remove valve lifter.
    - Identify installation positions, and store them without mixing them up.
12. Remove intake valve timing control solenoid valve (1).
13. Remove the alternator and bracket, remove the plug (2), and then remove the oil filter. Refer to CHG-25, "HR16DE MODELS : Exploded View".

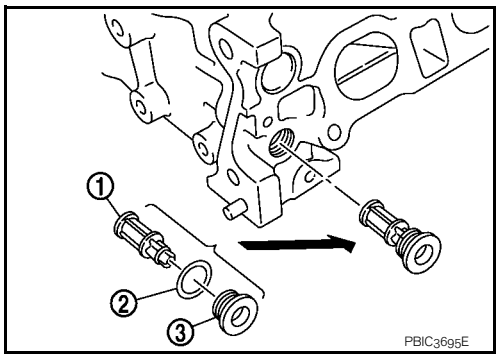


INSTALLATION

1. Install the oil filter (1).

    2 : Washer

    - The oil filter is assembled to the plug (3), and then install it to the cylinder head.

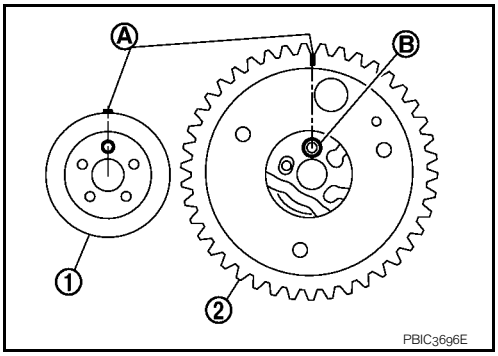


2. Install intake valve timing control solenoid valve.
    - Insert it straightly into the cylinder head.
    - Tighten bolts after placing it completely.
3. Install valve lifter.
    - If it is reused, install in its original positions.
4. Put a matching mark for positioning the camshaft (INT) and the camshaft sprocket (INT) with the following procedure.
    NOTE:
    It prevents the knock pin from engaging with the incorrect pin hole after installing the camshaft (INT) and the camshaft sprocket (INT).

cardiagn.com

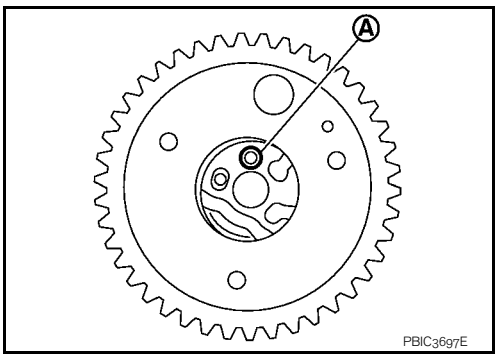
a. Put the matching marks (A) on a line extending from the knock pin position of camshaft (INT) (1) front surface.
   • Put the marks on the visible position with the camshaft sprocket installed. (The figure shows an example.)

b. Put the matching marks on a line extending from the knock pin hole (B) position of camshaft sprocket (INT) (2). (The figure shows an example.)
   • Put the marks on the visible position with it installed to the camshaft.



5. Set the camshaft sprocket (INT) to between cylinder head and front cover.
   • Set it with the knock pin hole (A) facing up.

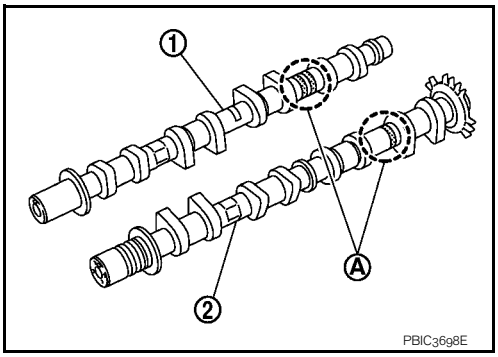
CAUTION:
Make sure the stopper pin is inserted at the most advanced position beforehand.



6. Install camshaft.

   1 : Camshaft (EXH)
   2 : Camshaft (INT)
   A : Identification mark

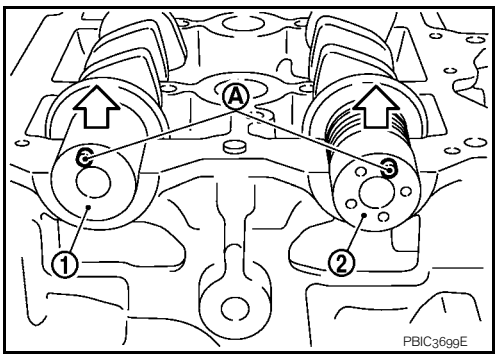
   • Distinction between camshaft (INT and EXH) is performed with the different shapes of rear end.



   • Install camshafts to the cylinder head so that knock pins (A) on front end are positioned as shown in the figure.

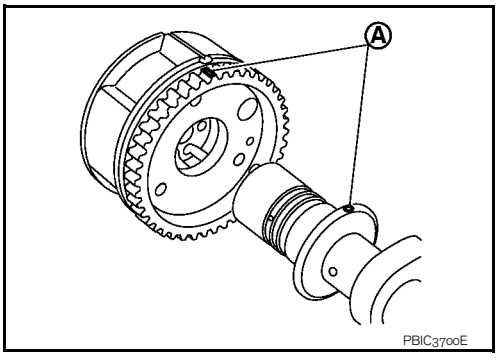
   1 : Camshaft (EXH)
   2 : Camshaft (INT)
   ⇦ : Upper side

NOTE:
Though camshaft does not stop at the portion as shown in the figure, for the placement of cam nose, it is generally accepted camshaft is placed for the same direction of the figure.



7. Install the camshaft sprocket (INT) to the camshaft (INT) with the following procedure.

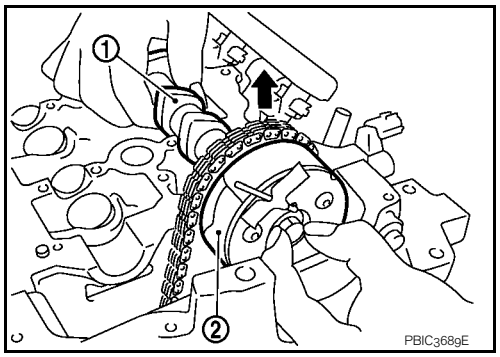
a. Refer to the matching mark (A) put according to step “4”. Securely align the knock pin and the pin hole, and then install them.



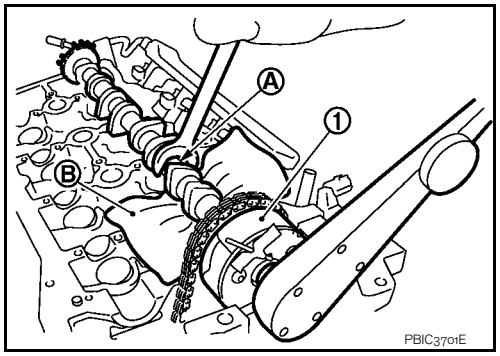
cardiagn.com

b. Lift up the front side of camshaft (INT) (1), and then temporarily tighten the bolt.

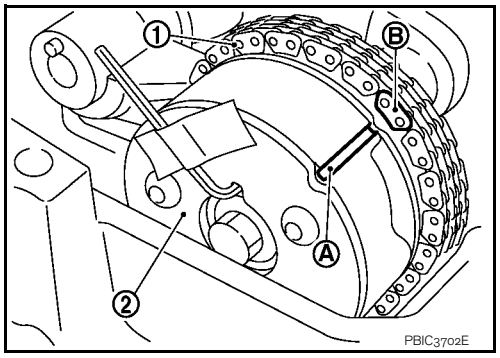
2 : Camshaft sprocket (INT)



8. Put a thick shop cloth (B) to the lower surface, and then set the tools to the bolt while lifting up the front side of camshaft (INT) (1).
9. Tighten the mounting bolt.
CAUTION:
Hold the camshaft hexagonal part (A), and then secure the camshaft.



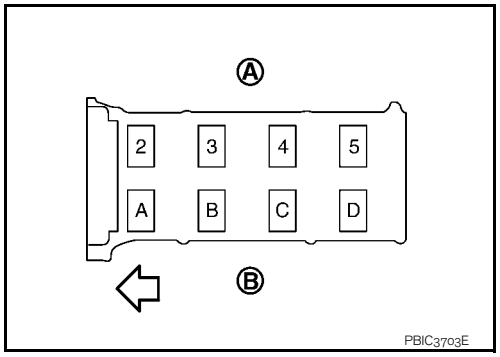
10. Return the camshaft (INT) to the cylinder head quietly.
11. Install timing chain (1) by aligning its matching mark (marked when timing chain is removed) (B) with matching mark (peripheral stamp line) (A) on camshaft sprocket (INT) (2).



12. Install camshaft brackets (No. 2 to 5) aligning the identification marks on upper surface as shown in the figure.

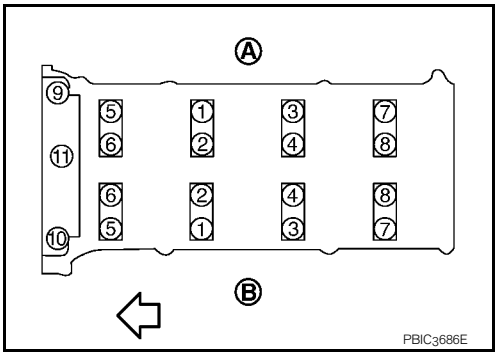
A : EXH side
B : INT side
⇦ : Engine front

- Install so that identification mark can be correctly read when viewed from the INT side.



cardiagn.com

13. Tighten mounting bolts of camshaft brackets in the following steps, in numerical order as shown in the figure.



A : EXH side
B : INT side
⇦ : Engine front

a. Tighten No. 9 to 11 in numerical order.

: 2.0 N·m (0.2 kg-m, 1 ft-lb)

b. Tighten No. 1 to 8 in numerical order.

: 2.0 N·m (0.2 kg-m, 1 ft-lb)

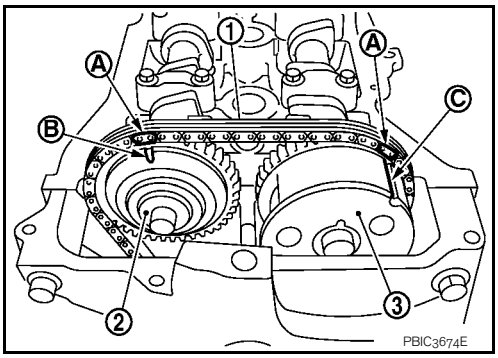
c. Tighten all bolts in numerical order.

: 5.9 N·m (0.6 kg-m, 4 ft-lb)

d. Tighten all bolts in numerical order.

: 10.4 N·m (1.1 kg-m, 8 ft-lb)

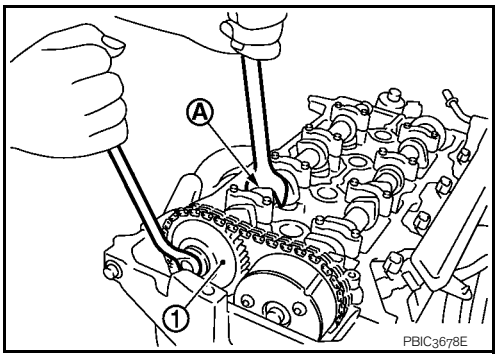
14. Install the camshaft (EXH) to the camshaft sprocket (EXH) (2) while aligning the matching make (marked when timing chain is removed) (A) and the matching mark (stamp) (B) of camshaft sprocket (EXH).



1 : Timing chain
3 : Camshaft sprocket (INT)
C : Matching mark (peripheral stamp line)

- If the positions of knock pin and pin groove are not aligned, move the camshaft (EXH) slightly to correct these positions.

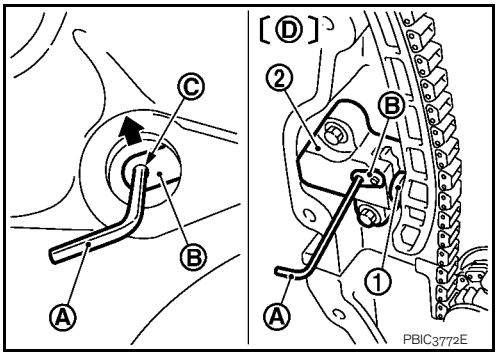
15. Tighten the mounting bolt.



1 : Camshaft sprocket (EXH)

CAUTION:
- **Hold the camshaft hexagonal part (A), and then secure the camshaft.**
- **Make sure that the matching mark (marked when timing chain is removed) and each camshaft sprocket matching mark are in the correct location.**

16. Pull out the stopper pin (A), and then apply the tension to the timing chain by rotating the crankshaft pulley clockwise slightly.

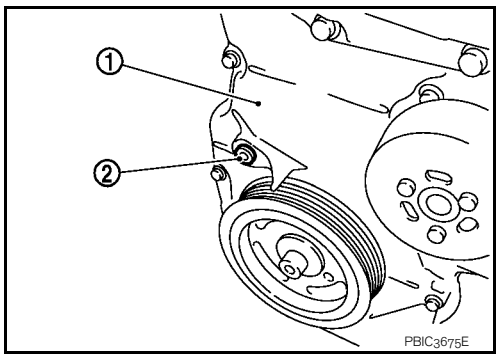


1 : Plunger
2 : Chain tensioner
B : Lever
C : Lever hole
D : Front cover has been omitted

cardiagn.com

17. Install the plug (2) to the front cover (1).
    - Apply liquid gasket to the threads, and tighten them.

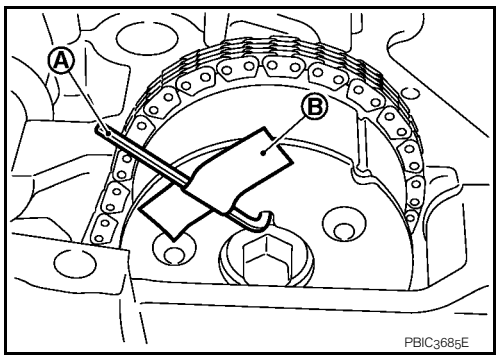
    Use Genuine Liquid Gasket or equivalent.



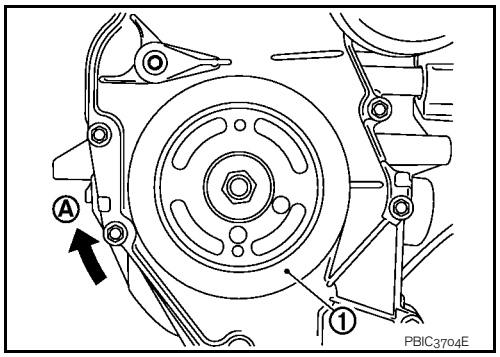
18. Return the camshaft sprocket (INT) in the most retarded position with the following procedure.

a. Remove the stopper pin (A) from the camshaft sprocket (INT).

B : Tape



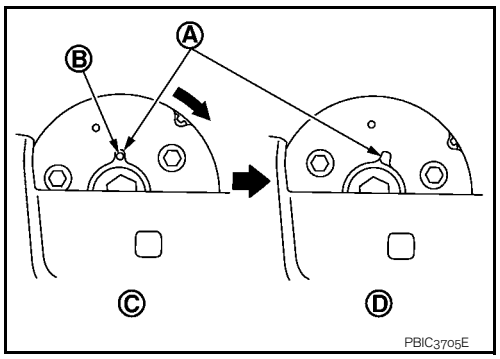
b. Turn the crankshaft pulley (1) slowly clockwise (A) and return the camshaft sprocket (INT) to the most retarded angle position.



- When first turning the crankshaft the camshaft sprocket (INT) will turn. Once it is turned more, and the vane (camshaft) also turns, then it has reached the most retarded angle position.

B : Stopper pin hole
C : Most advanced angle
D : Most retarded angle (lock pin engaged)

- The most retarded angle position can be checked by seeing if the stopper pin groove (A) is shifted clockwise.
- After spinning the crankshaft slightly in the counterclockwise direction, you can make sure the lock pin has joined by seeing if the vane (camshaft) and the sprocket move together.



19. Install the camshaft position sensor (PHASE) to the rear end of cylinder head.
    - Tighten bolts with it seated completely.
20. Check and adjust valve clearance. Refer to EM-21, "Inspection and Adjustment".
21. Install in the reverse order of removal, for the rest of parts.

Inspection

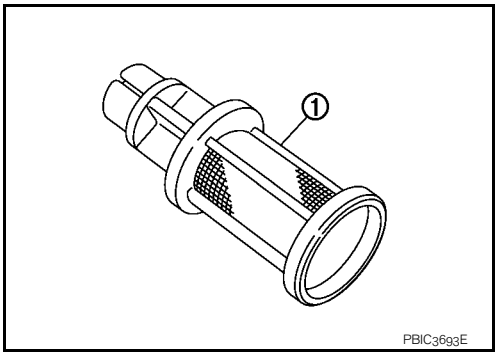
INFOID:0000000000893864

INSPECTION AFTER REMOVAL

cardiagn.com

Oil Filter

- Make sure that there is no foreign material on the oil filter (1) and check it for clogging.
- Check the oil filter for damage.
- If there is some damage, replace the oil filter, the plug, and the washer as a set.



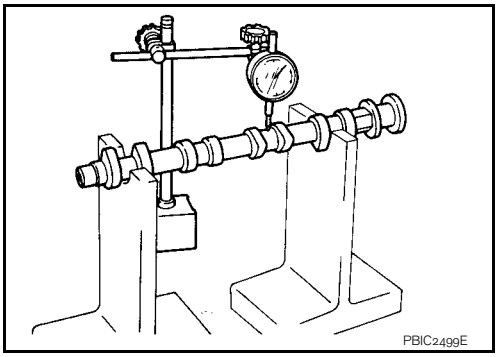
Camshaft Runout

1. Put V-block on a precise flat table, and support No. 2 and 5 journals of camshaft.
   CAUTION:
   Never support No. 1 journal (on the side of camshaft sprocket) because it has a different diameter from the other four locations.
2. Set a dial indicator vertically to No. 3 journal.
3. Turn camshaft to one direction with hands, and measure the camshaft runout on the dial indicator. (Total indicator reading)

Standard and Limit:

Refer to EM-116, "Camshaft".

4. If it exceeds the limit, replace camshaft.



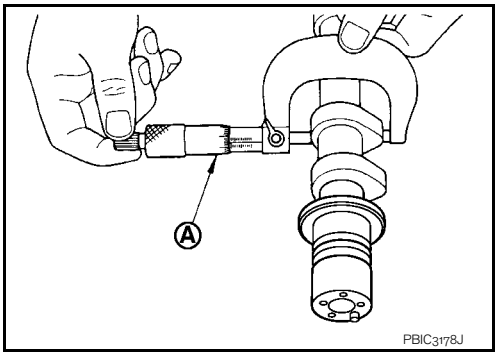
Camshaft Cam Height

1. Measure the camshaft cam height with a micrometer (A).

Standard and Cam wear Limit:

Refer to EM-116, "Camshaft".

2. If wear exceeds the limit, replace camshaft.

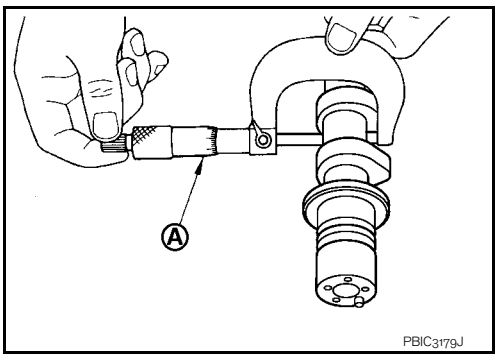


Camshaft Journal Oil Clearance

CAMSHAFT JOURNAL DIAMETER

Measure the outer diameter of camshaft journal with a micrometer (A).

Standard: Refer to EM-116, "Camshaft".



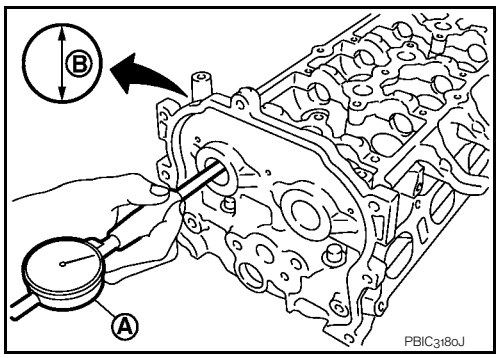
CAMSHAFT BRACKET INNER DIAMETER

- Tighten camshaft bracket bolts with the specified torque. Refer to EM-55, "Removal and Installation".

cardiagn.com

- Measure inner diameter (B) of camshaft bracket with a bore gauge (A).

Standard: Refer to EM-116, "Camshaft".



CAMSHAFT JOURNAL OIL CLEARANCE

- (Oil clearance) = (Camshaft bracket inner diameter) – (Camshaft journal diameter)

Standard and Limit: Refer to EM-116, "Camshaft".

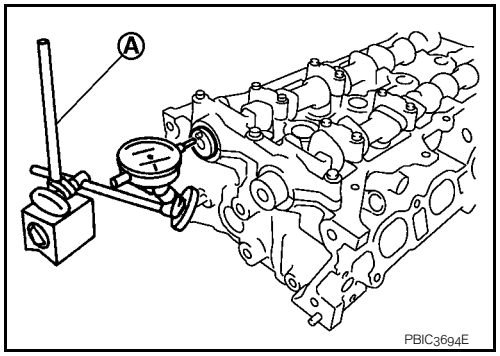
- If it exceeds the limit, replace either or both camshaft and cylinder head.

NOTE:
Camshaft brackets cannot be replaced as single parts, because they are machined together with cylinder head. Replace whole cylinder head assembly.

Camshaft End Play

1. Install camshaft in cylinder head. Refer to EM-55, "Removal and Installation".
2. Install a dial indicator (A) in thrust direction on front end of camshaft. Measure the camshaft end play on the dial indicator when camshaft is moved forward/backward (in direction to axis).

Standard and Limit: Refer to EM-116, "Camshaft".



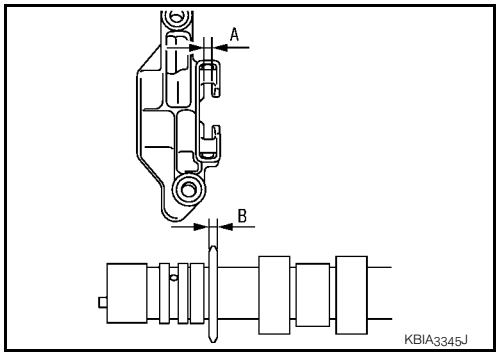
- Measure the following parts if out of the standard.
- Dimension “A” for cylinder head No. 1 journal bearing

Standard : 4.000 - 4.030 mm (0.1575 - 0.1587 in)

- Dimension “B” for camshaft thrust

Standard : 3.877 - 3.925 mm (0.1526 - 0.1545 in)

- Refer to the standards above, and then replace camshaft and/or cylinder head.



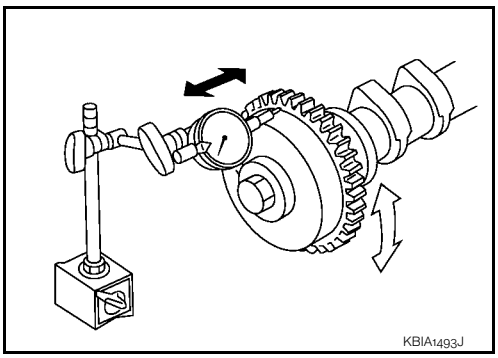
Camshaft Sprocket Runout

1. Put V-block on precise flat table, and support No. 2 and 5 journals of camshaft.

CAUTION:
Never support No. 1 journal (on the side of camshaft sprocket) because it has a different diameter from the other four locations.

cardiagn.com

2. Measure the camshaft sprocket runout with a dial indicator. (Total indicator reading)



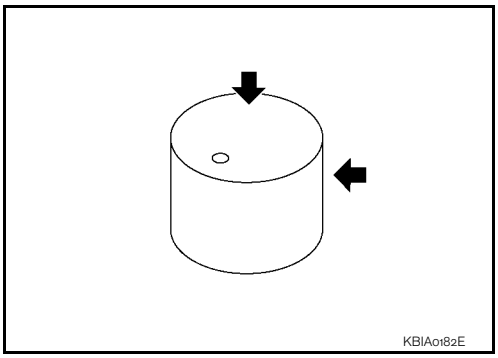
Limit: Refer to EM-116, "Camshaft".

- If it exceeds the limit, replace camshaft sprocket.

Valve Lifter

Check if surface of valve lifter has any wear or cracks.

- If anything above is found, replace valve lifter. Refer to EM-116, "Camshaft".

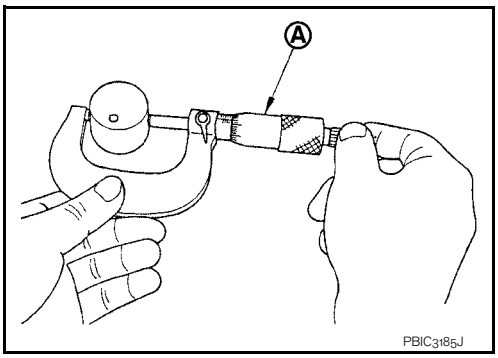


Valve Lifter Clearance

VALVE LIFTER OUTER DIAMETER

Measure the outer diameter of valve lifter with a micrometer (A).

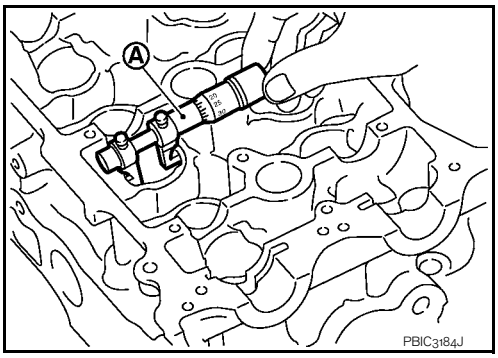
Standard: Refer to EM-116, "Camshaft".



VALVE LIFTER HOLE DIAMETER

Measure the diameter of valve lifter hole of cylinder head with an inside micrometer (A).

Standard: Refer to EM-116, "Camshaft".



VALVE LIFTER CLEARANCE

- (Valve lifter clearance) = (Valve lifter hole diameter) – (Valve lifter outer diameter)

Standard: Refer to EM-116, "Camshaft".

- If out of the standard, referring to the each standard of valve lifter outer diameter and valve lifter hole diameter, replace either or both valve lifter and cylinder head.

INSPECTION AFTER INSTALLATION

cardiagn.com

Inspection for Leaks

The following are procedures for checking fluids leak, lubricates leak.

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-21, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:
If hydraulic pressure inside timing chain tensioner drops after removal/installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.

- Warm up engine thoroughly to make sure there is no leakage of fuel, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Items	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage

*: Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

Inspection of Camshaft Sprocket (INT) Oil Groove

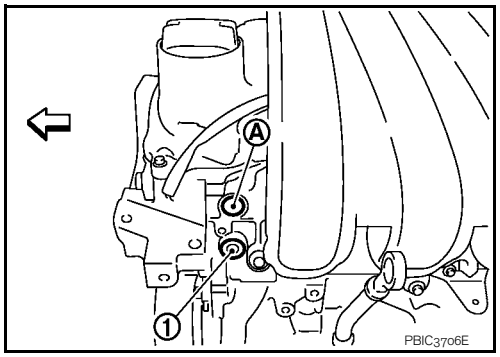
CAUTION:

- **Perform this inspection only when DTC P0011 is detected in self-diagnostic results of CONSULT-III and it is directed according to inspection procedure of EC section. Refer to EC-87, "Diagnosis Description".**
- **Check when engine is cold so as to prevent burns from the splashing engine oil.**

1. Check engine oil level. Refer to LU-6, "Inspection".
2. Perform the following procedure so as to prevent the engine from being unintentionally started while checking.

a. Release the fuel pressure. Refer to EC-357, "Inspection".
b. Remove intake manifold. Refer to EM-29, "Exploded View".
c. Disconnect ignition coil and injector harness connectors. Refer to EM-43, "Exploded View".

3. Remove intake valve timing control solenoid valve. Refer to EM-46, "Exploded View".
4. Crank engine, and then make sure that engine oil comes out from intake valve timing control solenoid valve hole (A). End crank after checking.



1 : Plug
⇦ :Engine front

WARNING:
Be careful not to touch rotating parts (drive belts, idler pulley, and crankshaft pulley, etc.).

CAUTION:

- **Prevent splashing by using a shop cloth so as to prevent the worker from injury from engine oil and so as to prevent engine oil contamination.**
- **Prevent splashing by using a shop cloth so as to prevent engine oil from being splashed to engine and vehicle. Especially, be careful not to apply engine oil to rubber parts of drive belts, engine mounting insulator, etc. Wipe engine oil off immediately if it is splashed.**

cardiagn.com

5. Perform the following inspection if engine oil does not come out from intake valve timing control solenoid valve oil hole of the cylinder head.
   - Remove oil filter, and then clean it. Refer to EM-65, "Inspection".
   - Clean oil groove between oil strainer and intake valve timing control solenoid valve. Refer to LU-3, "Engine Lubrication System" and LU-3, "Engine Lubrication System Schematic".
6. Remove components between intake valve timing control solenoid valve and camshaft sprocket (INT), and then check each oil groove for clogging.
   - Clean oil groove if necessary. Refer to LU-3, "Engine Lubrication System" and LU-3, "Engine Lubrication System Schematic".
7. After inspection, install removed parts in the reverse order.

cardiagn.com

OIL SEAL

VALVE OIL SEAL

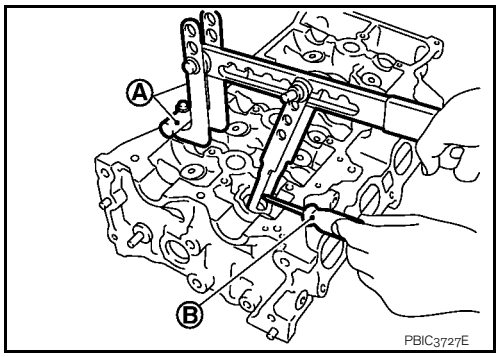
VALVE OIL SEAL : Removal and Installation

INFOID:0000000000893865

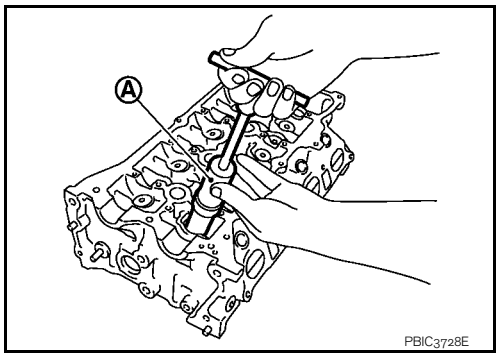
REMOVAL

1. Remove camshafts. Refer to EM-55, "Exploded View".
2. Remove valve lifters. Refer to EM-55, "Exploded View".
3. Rotate crankshaft, and set piston whose valve oil seal is to be removed to TDC. This will prevent valve from dropping into cylinder.
   CAUTION:
   When rotating crankshaft, be careful to avoid scarring front cover with timing chain.
4. Remove valve collet.
   - Compress valve spring with the valve spring compressor, the attachment and the adapter [SST: KV10116200] (A). Remove valve collet with a magnet hand (B).

   CAUTION:
   Be careful not to damage valve lifter holes.



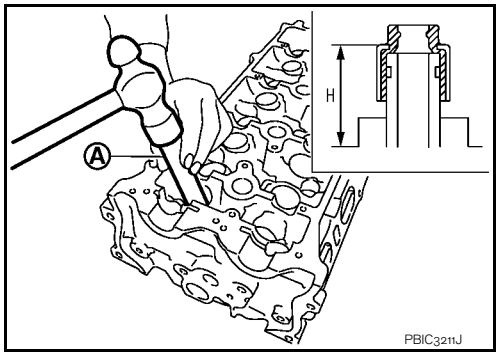
5. Remove valve spring retainer, valve spring and valve spring seat. Refer to EM-74, "Exploded View".
6. Remove valve oil seal with the valve oil seal puller [SST: KV10107902] (A).



INSTALLATION

1. Apply new engine oil to valve oil seal joint surface and seal lip.
2. Press in valve oil seal to the height “H” shown in the figure with the valve oil seal drift [SST: KV10115600] (A).

   Height “H” : 13.2 - 13.8 mm (0.520 - 0.543 in)



3. Install in the reverse order of removal, for the rest of parts.

FRONT OIL SEAL

FRONT OIL SEAL : Removal and Installation

INFOID:0000000000893866

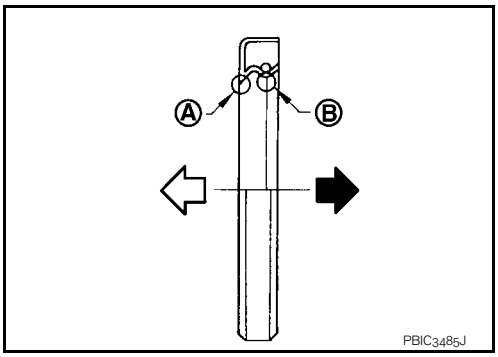
cardiagn.com

REMOVAL

1. Remove the following parts:
   - Front fender protector (RH): Refer to EXT-21, "Exploded View".
   - Drive belt: Refer to EM-16, "Removal and Installation".
   - Crankshaft pulley: Refer to EM-46, "Exploded View".
2. Remove front oil seal using a suitable tool.
   CAUTION:
   Be careful not to damage front timing chain case and crankshaft.

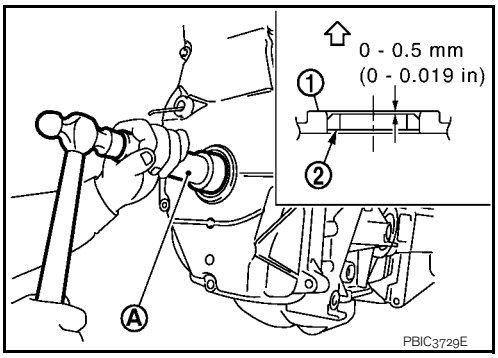
INSTALLATION

1. Apply new engine oil to both oil seal lip and dust seal lip of new front oil seal.
2. Install front oil seal.
   - Install front oil seal so that each seal lip is oriented as shown in the figure.



   A : Dust seal lip
   B : Oil seal lip
   ⇦ : Engine outside
   ⬅ : Engine inside

   - Using a suitable drift, press-fit until the height of front oil seal (2) is level with the mounting surface.



   1 : Front cover
   ⇦ : Engine outside

   - Suitable drift (A): outer diameter 50 mm (1.97 in), inner diameter 44 mm (1.73 in).
   - Make sure the garter spring is in position and seal lips not inverted

   CAUTION:
   - **Be careful not to damage front timing chain case and crankshaft.**
   - **Press-fit straight and avoid causing burrs or tilting oil seal.**
3. Install in the reverse order of removal, for the rest of parts.

REAR OIL SEAL

REAR OIL SEAL : Removal and Installation

INFOID:0000000000893867

REMOVAL

1. Remove transaxle assembly. Refer to TM-23, "Exploded View".
2. Remove clutch cover and clutch disk. Refer to CL-16, "HR16DE, MR20DE : Exploded View".
3. Remove flywheel. Refer to EM-93, "Exploded View".
4. Remove rear oil seal with a suitable tool.
   CAUTION:
   Be careful not to damage crankshaft and cylinder block.

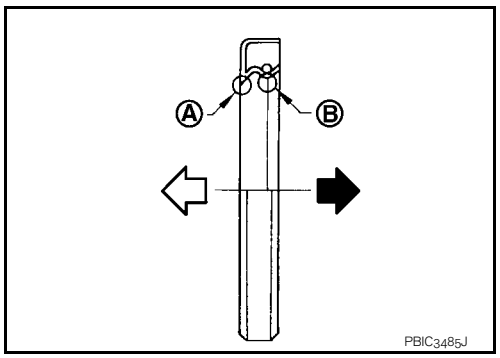
INSTALLATION

1. Apply the liquid gasket lightly to entire outside area of new rear oil seal.
   Use Genuine Liquid Gasket or equivalent.

cardiagn.com

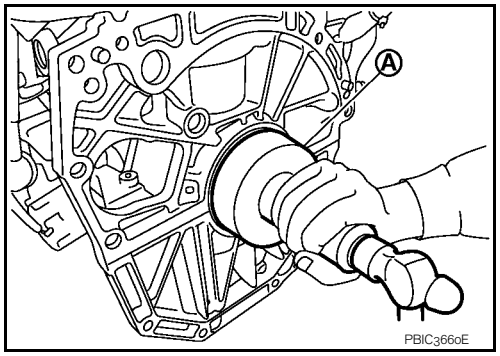
2. Install rear oil seal so that each seal lip is oriented as shown in the figure.

A : Dust seal lip
B : Oil seal lip
⇦ : Engine outside
⬅ : Engine inside



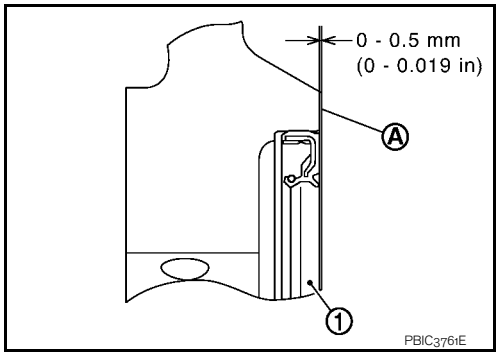
- Press-fit rear oil seal with a drift outer diameter 113 mm (4.45 in) and inner diameter 90 mm (3.54 in) (commercial service tool) (A).

CAUTION:
- **Be careful not to damage crankshaft and cylinder block.**
- **Press-fit oil seal straight to avoid causing burrs or tilting.**
- **Never touch grease applied onto oil seal lip.**



- Press in rear oil seal (1) to the position as shown in the figure.

A : Rear end surface of cylinder block



3. After press-fitting rear oil seal, completely wipe off any liquid gasket protruding to rear end surface side.
4. Install in the reverse order of removal, for the rest of parts.

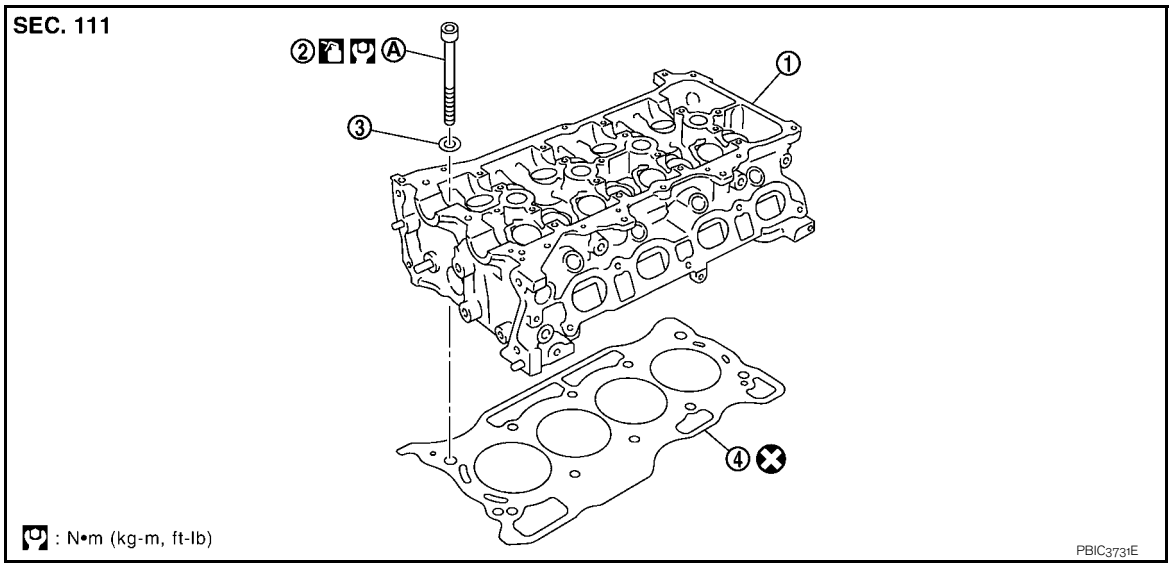
cardiagn.com

CYLINDER HEAD

Exploded View

INFOID:0000000000943691

REMOVAL

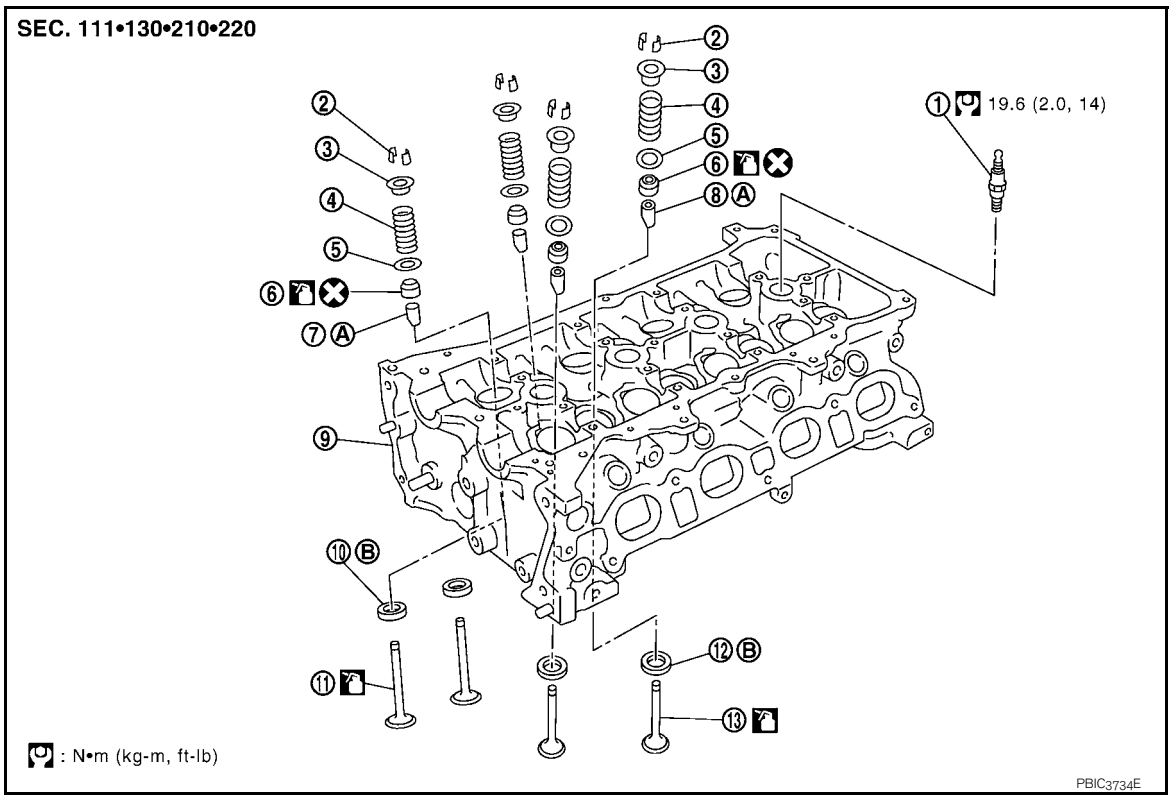


1. Cylinder head assembly
2. Cylinder head bolt
3. Washer
4. Cylinder head gasket

A. Refer to EM-75

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY



cardiagn.com

1. Spark plug
2. Valve collet
3. Valve spring retainer
4. Valve spring
5. Valve spring seat
6. Valve oil seal
7. Valve guide (EXH)
8. Valve guide (INT)
9. Cylinder head
10. Valve seat (EXH)
11. Valve (EXH)
12. Valve seat (INT)
13. Valve (INT)

A. Refer to EM-76
B. Refer to EM-76

Refer to GI-4, "Components" for symbols in the figure.

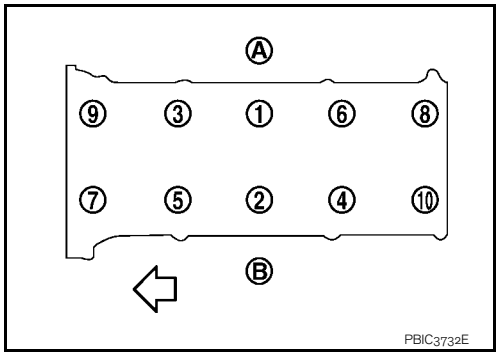
Removal and Installation

INFOID:0000000000894029

REMOVAL

1. Release fuel pressure. Refer to EC-357, "Inspection".
2. Drain engine coolant and engine oil. Refer to CO-9, "Draining" and LU-7, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant and engine oil on drive belt.**
3. Remove the following components and related parts.
   - Front fender protector (RH): Refer to EXT-21, "Exploded View".
   - Alternator: Refer to CHG-25, "HR16DE MODELS : Exploded View".
   - Exhaust front tube: Refer to EX-5, "Exploded View".
   - Exhaust manifold: Refer to EM-32, "Exploded View".
   - Intake manifold: Refer to EM-29, "Exploded View".
   - Fuel tube and fuel injector: Refer to EM-35, "Exploded View".
   - Water outlet: Refer to CO-21, "Exploded View".
   - Drive belt: Refer to EM-16, "Removal and Installation".
   - Front cover: Refer to EM-46, "Exploded View".
   - Camshaft: Refer to EM-55, "Exploded View".
4. Remove cylinder head loosening bolts in reverse order as shown in the figure with cylinder head wrench (commercial service tool).

   A : EXH side
   B : INT side
   ⇦ : Engine front



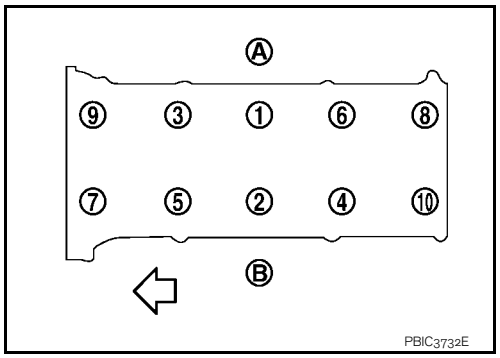
5. Remove cylinder head gasket.

INSTALLATION

1. Install new cylinder head gasket.
2. Tighten cylinder head bolts in numerical order as shown in the figure with the following procedure to install cylinder head.

   A : EXH side
   B : INT side
   ⇦ : Engine front

   CAUTION:
   If cylinder head bolts are re-used, check their outer diameters before installation. Refer to “Cylinder Head Bolts Outer Diameter”.



a. Apply new engine oil to threads and seating surfaces of mounting bolts.
b. Tighten all bolts.

cardiagn.com

: 66.7 N·m (6.8 kg-m, 49 ft-lb)

c. Completely loosen.

: 0 N·m (0 kg-m, 0 ft-lb)

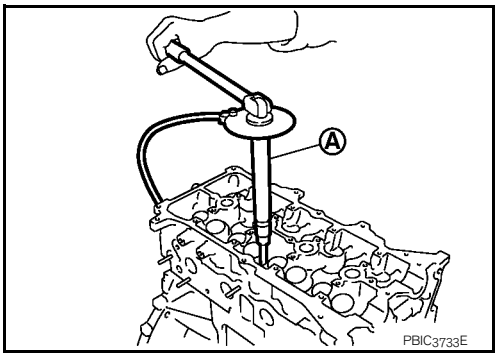
CAUTION:
In this step, loosen bolts in reverse order of that indicated in the figure.

d. Tighten all bolts.

: 40.0 N·m (4.1 kg-m, 30 ft-lb)

e. Turn all bolts 75 degrees clockwise (angle tightening).
CAUTION:
Check and confirm the tightening angle by using the angle wrench [SST: KV10112100] (A) or protractor. Avoid judgment by visual inspection without the tool.

f. Turn all bolts 75 degrees clockwise again (angle tightening).



3. Install in the reverse order of removal, for the rest of parts.

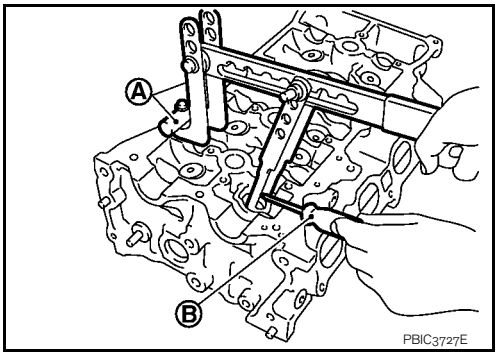
Disassembly and Assembly

INFOID:0000000000894030

DISASSEMBLY

1. Remove spark plug with a spark plug wrench (commercial service tool).
2. Remove valve lifter.
   • Identify installation positions, and store them without mixing them up.
3. Remove valve collet.
   • Compress valve spring with the valve spring compressor, the attachment and the adapter [SST: KV10116200] (A). Remove valve collet with a magnet hand (B).

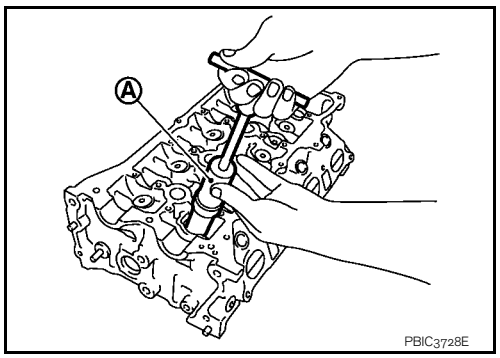
CAUTION:
Be careful not to damage valve lifter holes.



4. Remove valve spring retainer and valve spring.
5. Push valve stem to combustion chamber side, and remove valve.
   • Identify installation positions, and store them without mixing them up.

cardiagn.com

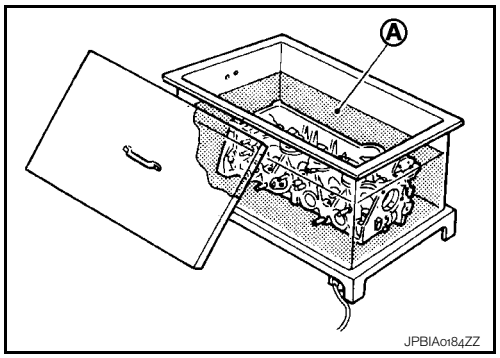
6. Remove valve oil seal with the valve oil seal puller [SST: KV10107902] (A).



7. Remove valve spring seat.
8. Remove valve seat, if valve seat must be replaced.
   - Bore out old seat until it collapses. Boring should not continue beyond the bottom face of the seat recess in cylinder head. Set the machine depth stop to ensure this.

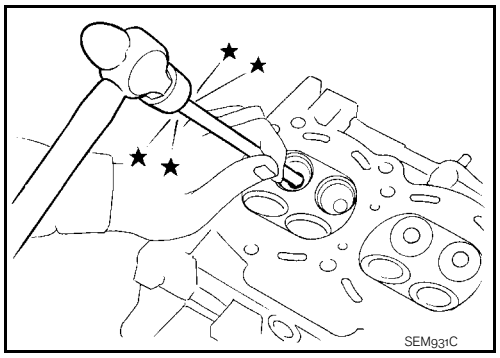
   CAUTION:
   Never bore excessively to prevent cylinder head from scratching.
9. Remove valve guide, if valve guide must be replaced.

a. To remove valve guide, heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil (A).



b. Drive out valve guide with a press [under a 20 kN (2 ton, 2.2 US ton, 2.0 lmp ton) pressure] or a hammer and the valve guide drift (commercial service tool).

WARNING:
Cylinder head contains heat. Wear protective equipment to avoid getting burned.



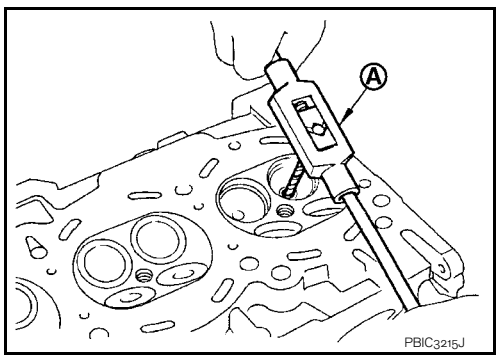
ASSEMBLY

1. When valve guide is removed, install it.

   CAUTION:
   Replace with oversize [0.2 mm (0.008 in)] valve guide.

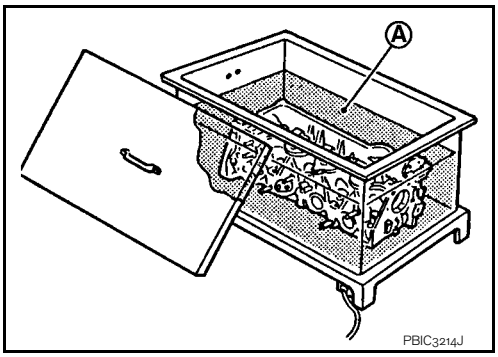
a. Using the valve guide reamer (commercial service tool) (A), ream cylinder head valve guide hole.

For service parts: Oversized [0.2 mm (0.008 in)]
Refer to EM-118, "Cylinder Head".



cardiagn.com

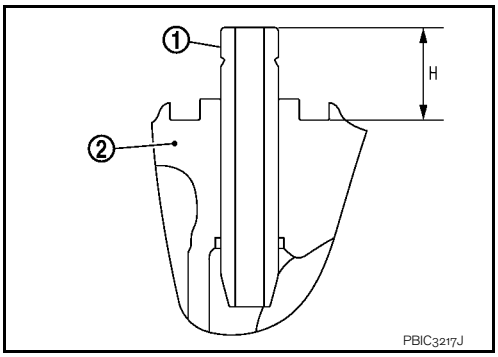
b. Heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil (A).



c. Using the valve guide drift (commercial service tool), press valve guide (1) from camshaft side to the dimensions as in the figure.

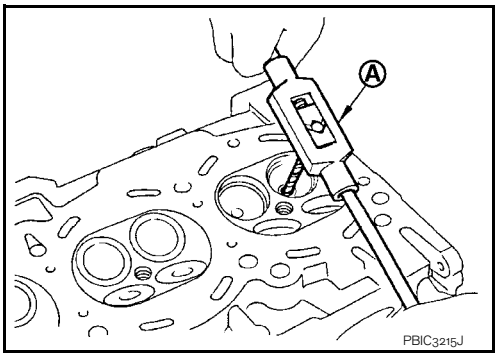
Projection “H”: Refer to EM-118, "Cylinder Head".

WARNING:
Cylinder head (2) contains heat. Wear protective equipment to avoid getting burned.



d. Using the valve guide reamer (commercial service tool) (A), apply reamer finish to valve guide.

Standard: Refer to EM-118, "Cylinder Head".

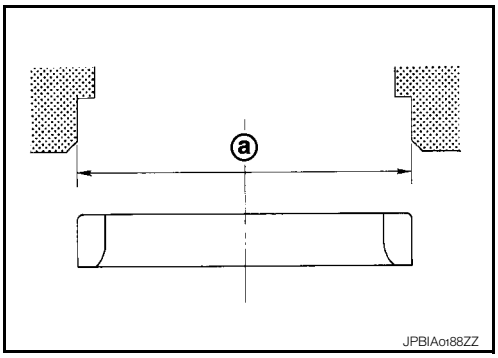


2. When valve seat is removed, install it.
CAUTION:
Replace with oversize [0.5 mm (0.020 in)] valve seat.

a. Ream cylinder head recess diameter (a) for service valve seat.

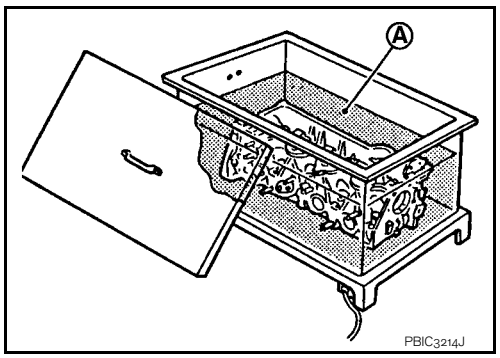
For service parts: Oversize [0.5 mm (0.020 in)]
Refer to EM-118, "Cylinder Head".

- Be sure to ream in circles concentric to valve guide center. This will enable valve to fit correctly.



cardiagn.com

b. Heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil (A).

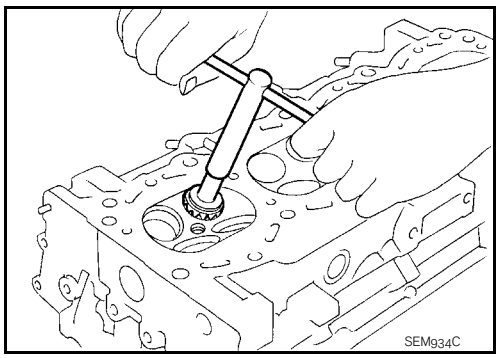


c. Provide valve seats cooled well with dry ice. Force fit valve seat into cylinder head.

WARNING:
Cylinder head contains heat. Wear protective equipment to avoid getting burned.
CAUTION:
Avoid directly touching cold valve seats.

d. Using the valve seat cutter set (commercial service tool) or valve seat grinder, finish seat to the specified dimensions. Refer to EM-118, "Cylinder Head".

CAUTION:
When using the valve seat cutter, firmly grip cutter handle with both hands. Then, press on the contacting surface all around the circumference to cut in a single drive. Improper pressure on with cutter or cutting many different times may result in stage valve seat.

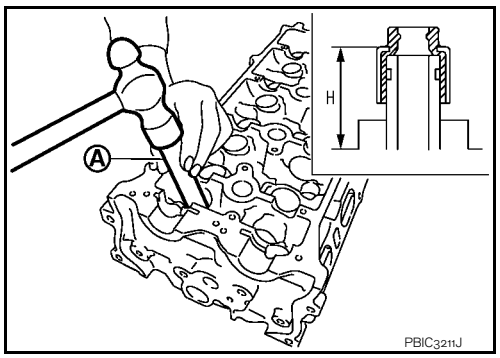


e. Using compound, grind to adjust valve fitting.

f. Check again for normal contact. Refer to EM-80, "Inspection".

3. Install valve oil seal.
   - Install with the valve oil seal drift [SST: KV10115600] (A) to match dimension in the figure.

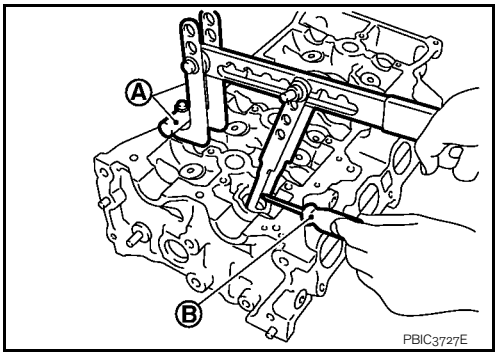
Height "H" : 13.2 - 13.8 mm (0.520 - 0.543 in)



4. Install valve spring seat.
5. Install valve.
   - Install larger diameter to intake side.
6. Install valve spring.
   NOTE:
   It can be installed in either direction.
7. Install valve spring retainer.
8. Install valve collet.

cardiagn.com

- Compress valve spring with the valve spring compressor, the attachment and the adapter [SST: KV10116200] (A). Install valve collet with a magnet hand (B).
  CAUTION:
  Be careful not to damage valve lifter holes.
- Tap valve stem edge lightly with a plastic hammer after installation to check its installed condition.



9. Install valve lifter.
10. Install spark plug with a spark plug wrench (commercial service tool).

Inspection

INFOID:0000000000943692

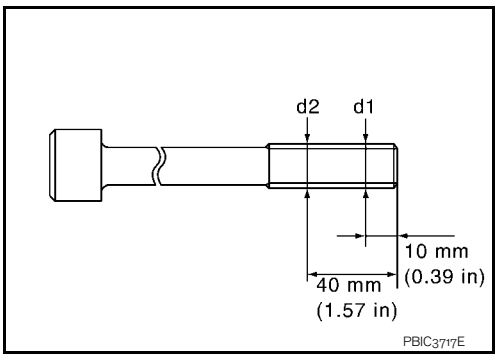
INSPECTION AFTER REMOVAL

Cylinder Head Bolts Outer Diameter

- Cylinder head bolts are tightened by plastic zone tightening method. Whenever the size difference between “d1” and “d2” exceeds the limit, replace them with a new one.

  Limit (“d1”–“d2”): 0.15 mm (0.0059 in)

- If reduction of outer diameter appears in a position other than “d2”, use it as “d2” point.



Cylinder Head Distortion

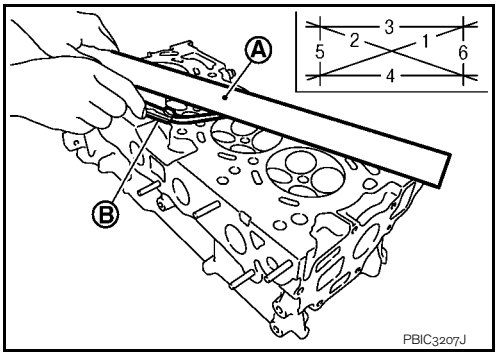
NOTE:
When performing this inspection, cylinder block distortion should be also checking. Refer to EM-120, "Cylinder Block".

1. Wipe off engine oil and remove water scale (like deposit), gasket, sealant, carbon, etc. with a scraper.
   CAUTION:
   Never allow gasket debris to enter passages for engine oil or engine coolant.
2. At each of several locations on bottom surface of cylinder head, measure the distortion in six directions.

   A : Straightedge
   B : Feeler gauge

   Limit : Refer to EM-118, "Cylinder Head".

   - If it exceeds the limit, replace cylinder head.



INSPECTION AFTER DISASSEMBLY

Valve Dimensions

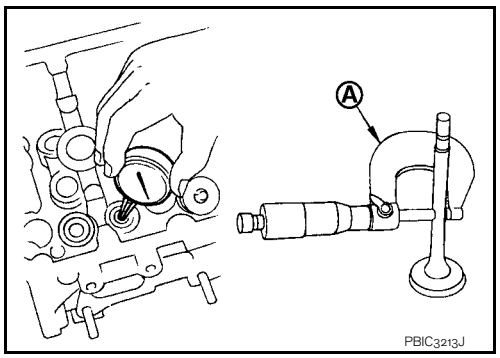
- Check the dimensions of each valve. For the dimensions, refer to EM-118, "Cylinder Head".
- If dimensions are out of the standard, replace valve and check valve seat contact. Refer to “VALVE SEAT CONTACT”.

Valve Guide Clearance

Valve Stem Diameter

cardiagn.com

- Measure the diameter of valve stem with micrometer (A).



Standard : Refer to EM-118, "Cylinder Head".

Valve Guide Inner Diameter
- Measure the inner diameter of valve guide with bore gauge.

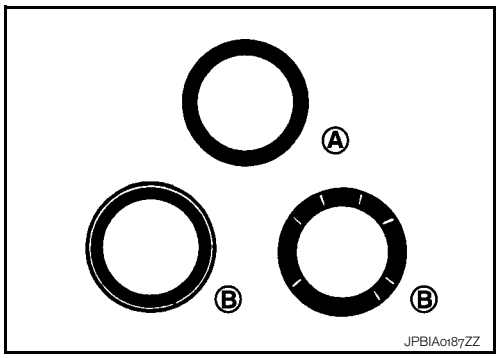
Standard : Refer to EM-118, "Cylinder Head".

Valve Guide Clearance
- (Valve guide clearance) = (Valve guide inner diameter) – (Valve stem diameter)

Standard and Limit : Refer to EM-118, "Cylinder Head".

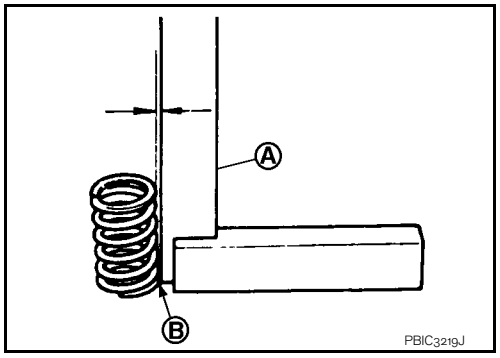
- If the calculated value exceeds the limit, replace valve and/or valve guide. When valve guide must be replaced, refer to “VALVE GUIDE REPLACEMENT”.

Valve Seat Contact
- After confirming that the dimensions of valve guides and valves are within the specifications, perform this procedure.
- Apply prussian blue (or white lead) onto contacting surface of valve seat to check the condition of the valve contact on the surface.
- Check if the contact area band is continuous all around the circumference.
- If not, grind to adjust valve fitting and check again. If the contacting surface still has “NG” conditions even after the re-check, replace valve seat. Refer to EM-76, "Disassembly and Assembly".



A : OK
B : NG

Valve Spring Squareness
- Set a try square (A) along the side of valve spring and rotate spring. Measure the maximum clearance between the top of spring and try square.

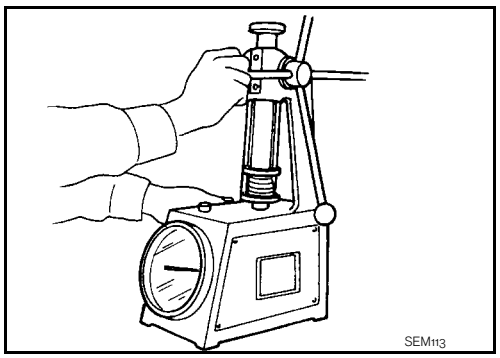


B : Contact

Limit : Refer to EM-118, "Cylinder Head".

- If it exceeds the limit, replace valve spring.

Valve Spring Dimensions and Valve Spring Pressure Load
- Check the valve spring pressure at specified spring height.



Standard : Refer to EM-118, "Cylinder Head".

- If the installation load or load with valve open is out of the standard, replace valve spring.

INSPECTION AFTER INSTALLATION

Inspection for Leaks
- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-21, "Fluids and Lubricants".

cardiagn.com

- Use procedure below to check for fuel leakage.
- Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gases, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Items	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gases	—	Leakage	—

*: Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

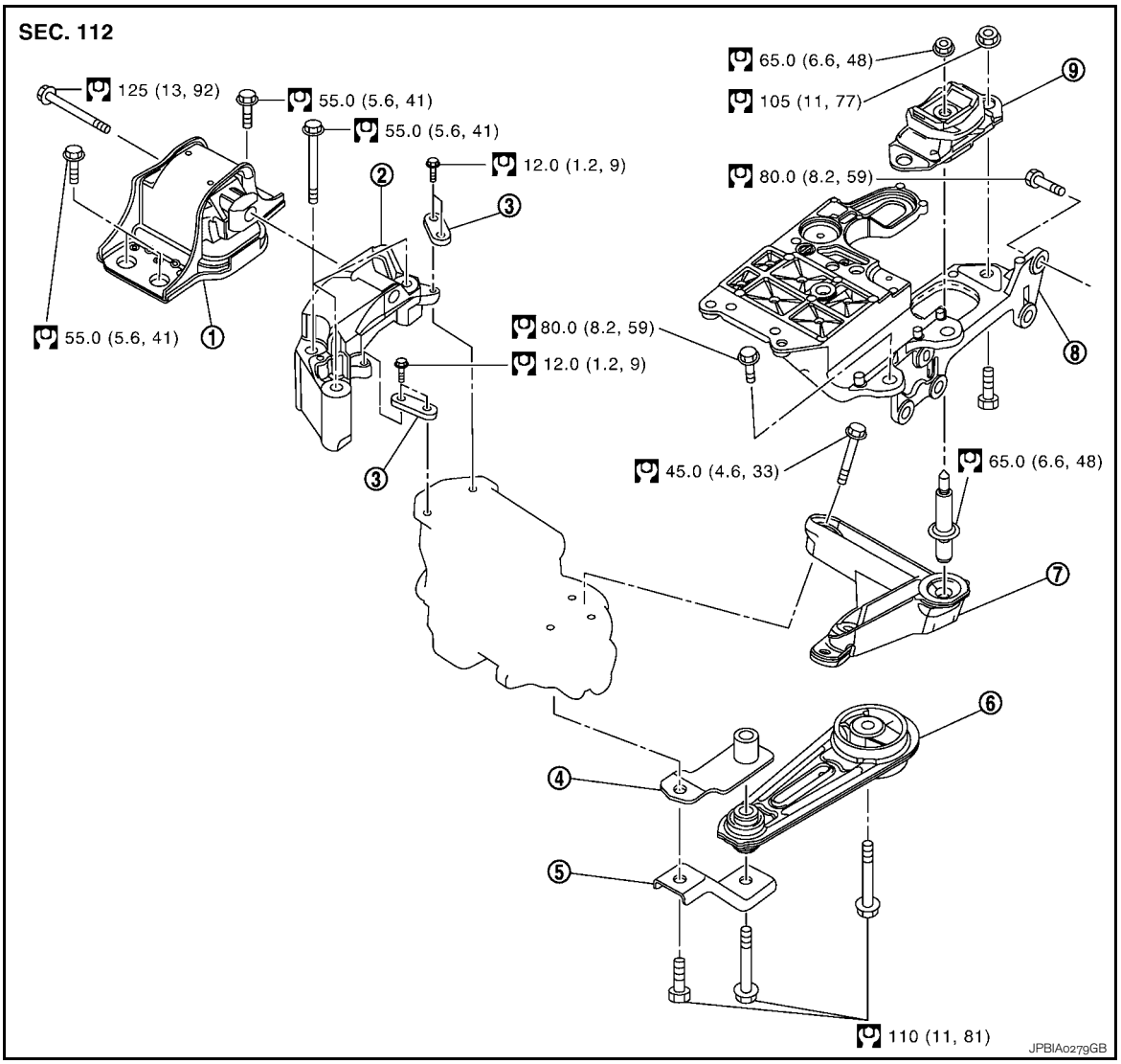
cardiagn.com

REMOVAL AND INSTALLATION

ENGINE ASSEMBLY

Exploded View

INFOID:0000000000893871



1. Engine mounting insulator (RH)
2. Engine mounting bracket (RH)
3. Engine mounting stay
4. Rear engine mounting bracket
5. Rear engine mounting bracket
6. Rear torque rod
7. Engine mounting bracket (LH)
8. Engine mounting bracket (LH)
9. Engine mounting insulator (LH)

Refer to GI-4, "Components"for symbols in the figure.

Removal and Installation

INFOID:0000000000894026

WARNING:
- **Situate the vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **Attach proper slingers and bolts described in PARTS CATALOG if engine slingers are not equipped.**

CAUTION:
- **Always be careful to work safely, avoid forceful or uninstructed operations.**
- **Never start working until exhaust system and coolant are cool enough.**
- **If items or work required are not covered by the engine section, refer to the applicable sections.**
- **Always use the support point specified for lifting.**

cardiagn.com

- **Use either 2-pole lift type or separate type lift as best you can. If board-on type is used for unavoidable reasons, support at the rear axle jacking point with a transmission jack or similar tool before starting work, in preparation for the backward shift of center of gravity.**
- **For supporting points for lifting and jacking point at rear axle, refer to GI-33, "Garage Jack and Safety Stand and 2-Pole Lift".**

REMOVAL

Outline

Remove the engine and the transaxle assembly from the vehicle downward. Separate the engine and the transaxle.

Preparation

1. Release fuel pressure. Refer to EC-357, "Inspection".
2. Drain engine coolant from radiator. Refer to CO-9, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belt.**
3. Remove the following parts.
   - Engine undercover
   - Front fender protector (RH and LH): Refer to EXT-21, "Exploded View".
   - Front road wheels and tires: Refer toWT-4, "Road Wheel".
   - Battery and battery tray: Refer to PG-118, "Exploded View".
   - Drive belt: Refer to EM-16, "Removal and Installation".
   - Air duct and air cleaner case assembly: Refer to EM-27, "Exploded View".
   - Radiator hose (upper and lower): Refer to CO-13, "Exploded View".
   - Exhaust front tube: Refer to EX-5, "Exploded View".

Engine Room LH

1. Disconnect all connections of engine harness around the engine mounting insulator (LH), and then temporarily secure the engine harness into the engine side.
   CAUTION:
   Protect connectors using a resin bag against foreign materials.
2. Disconnect fuel feed hose at engine side. Refer to EM-35, "Exploded View".
3. Disconnect heater hoses, and install plugs them to prevent engine coolant from draining. Refer to CO-21, "Exploded View".
4. Disconnect control linkage from transaxle. Refer to TM-19, "Exploded View".
5. Remove ground cable at transaxle side.

Engine Room RH

1. Remove ground cable between front cover and vehicle.
2. Alternator and alternator bracket; Refer to CHG-25, "HR16DE MODELS : Exploded View".
3. Disconnect reservoir tank hose. Refer to CO-13, "Exploded View".
4. Remove A/C compressor with piping connected from the engine. Temporarily secure it on the vehicle side with a rope to avoid putting load on it. (with A/C models) Refer to HA-39, "Exploded View".

Vehicle Underbody

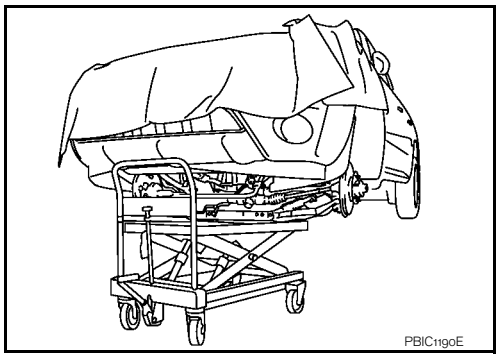
1. Remove front wheel sensor (LH and RH) for ABS from steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View".
2. Remove brake caliper assembly with piping connected from steering knuckle. Temporarily secure it on the vehicle side with a rope to avoid load on it. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View".
3. Remove stabilizer connecting rod. Refer to FSU-16, "Exploded View".
4. Remove steering knuckle mounting nuts and bolts. Refer to FSU-16, "Exploded View".
5. Disconnect steering outer socket. Refer to ST-13, "Exploded View".
6. Remove drive shafts (LH and RH) and center bearing cover bracket. Refer to FAX-15, "HR16DE MODELS : Exploded View".
7. Disconnect steering lower joint at power steering gear assembly side, and release steering lower shaft. Refer to ST-10, "Exploded View".

cardiagn.com

8. Remove rear torque rod.
9. Remove front suspension member. Refer to FSU-16, "Exploded View".
10. Preparation for the separation work of transaxle is as follows:
    - Remove transaxle joint bolts which pierce at oil pan (upper) lower rear side. Refer to EM-40, "Exploded View".

Removal

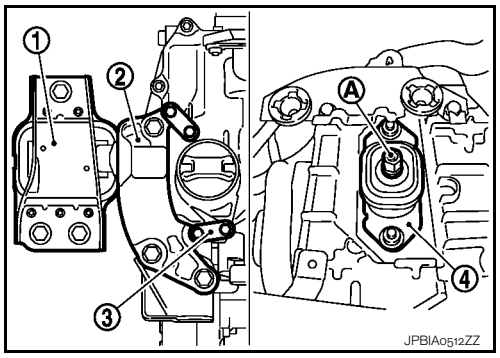
1. Use a manual lift table caddy (commercial service tool) or equivalently rigid tool such as a transmission jack. Securely support bottom of the engine and the transaxle assembly.
   CAUTION:
   Put a piece of wood or something similar as the supporting surface, secure a completely stable condition.



2. Remove engine mounting insulator (RH) (1), engine mounting bracket (RH) (2) and engine mounting stay (3).

   4 : Engine mounting insulator (LH)

3. Remove engine mounting through bolt-securing nut (A).



4. Carefully lower jack, or raise lift to remove the engine and the transaxle assembly.
   CAUTION:
   - **Make sure that no part interferes with the vehicle side.**
   - **Before and during this lifting, always check if any harnesses are left connected.**
   - **During the removal, always be careful to prevent the vehicle from falling off the lift due to changes in the center of gravity.**
   - **If necessary, support the vehicle by setting jack or suitable tool at the rear.**

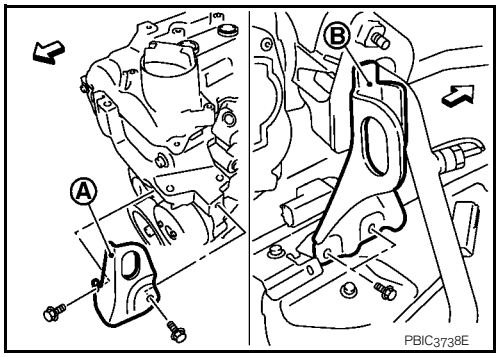
Separation

1. Install engine slinger to cylinder head front left side (A) and rear right side (B).

   ⇦ : Engine front

   Slinger bolts

   : 25.5 N·m (2.6 kg-m, 19 ft-lb)



2. Remove starter motor. Refer to STR-20, "HR16DE MODELS : Exploded View".
3. Lift with a hoist and separate the engine from the transaxle assembly. Refer to TM-23, "Exploded View".

INSTALLATION

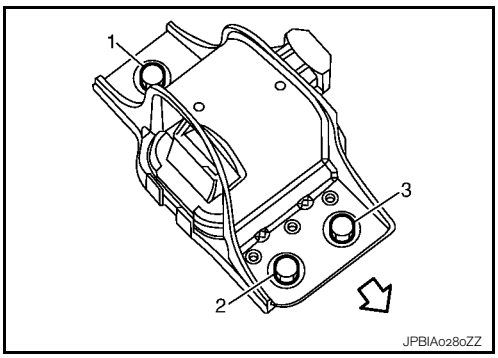
Note the following, and install in the reverse order of removal.

- Do not allow engine oil to get on engine mounting insulator. Be careful not to damage engine mounting insulator.
- Make sure that each mounting insulator is seated properly, and tighten mounting nuts and bolts.

cardiagn.com

- Tighten engine mounting insulator (RH) bolts in the numerical order shown in the figure.

⇦ : Vehicle front



Inspection

INFOID:0000000000893873

INSPECTION AFTER INSTALLATION

Inspection for Leaks

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-21, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gases, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Items	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gases	—	Leakage	—

*: Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

cardiagn.com

DISASSEMBLY AND ASSEMBLY

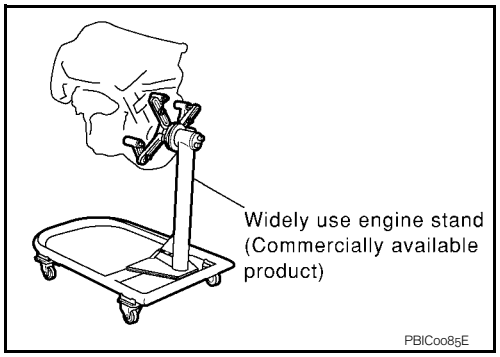
ENGINE STAND SETTING

Setting

INFOID:0000000000893874

NOTE:
Explained here is how to disassemble with engine stand supporting transmission surface. When using different type of engine stand, note with difference in steps and etc.

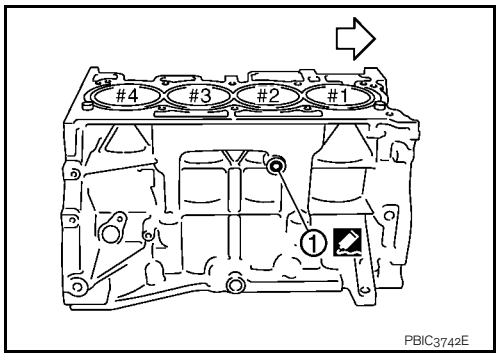
1. Remove the engine and the transaxle assembly from the vehicle, and separate the transaxle from the engine. Refer to EM-83, "Exploded View".
2. Remove clutch cover and clutch disc. Refer to CL-16, "HR16DE, MR20DE : Exploded View".
3. Remove flywheel.
   • Secure flywheel with a stopper plate [SST: KV11105210], and remove mounting bolts.
   CAUTION:
   • **Never disassemble flywheel.**
   • **Never place flywheel with signal plate facing down.**
   • **When handling signal plate, take care not to damage or scratch it.**
   • **Handle signal plate in a manner that prevents it from becoming magnetized.**
4. Lift the engine with a hoist to install it onto widely use engine stand.
   CAUTION:
   • **Use the engine stand that has a load capacity [approximately 135 kg (298 lb) or more] large enough for supporting the engine weight.**
   • If the load capacity of stand is not adequate, remove the following parts beforehand to reduce the potential risk of overturning stand.
   - Intake manifold: Refer to EM-29, "Exploded View".
   - Exhaust manifold: Refer to EM-32, "Exploded View".
   - Rocker cover: Refer to EM-43, "Exploded View".
   NOTE:
   The figure shows an example of widely use engine stand that can support mating surface of transaxle with flywheel removed.
   CAUTION:
   Before removing the hanging chains, make sure the engine stand is stable and there is no risk of overturning.



5. Drain engine oil. Refer to LU-7, "Draining".
6. Drain engine coolant by removing water drain plug (1) from inside of the engine.

   ⇦ : Engine front

   Use Genuine Liquid Gasket or equivalent.



cardiagn.com

ENGINE UNIT

Disassembly

INFOID:0000000000893875

1. Remove intake manifold. Refer to EM-29, "Exploded View".
2. Remove exhaust manifold. Refer to EM-32, "Exploded View".
3. Remove oil pan (lower). Refer to EM-40, "Exploded View".
4. Remove ignition coil, spark plug and rocker cover. Refer to EM-43, "Exploded View".
5. Remove fuel injector and fuel tube. Refer to EM-35, "Exploded View".
6. Remove timing chain. Refer to EM-46, "Exploded View".
7. Remove camshaft. Refer to EM-55, "Exploded View".
8. Remove cylinder head. Refer to EM-74, "Exploded View".

Assembly

INFOID:0000000000893876

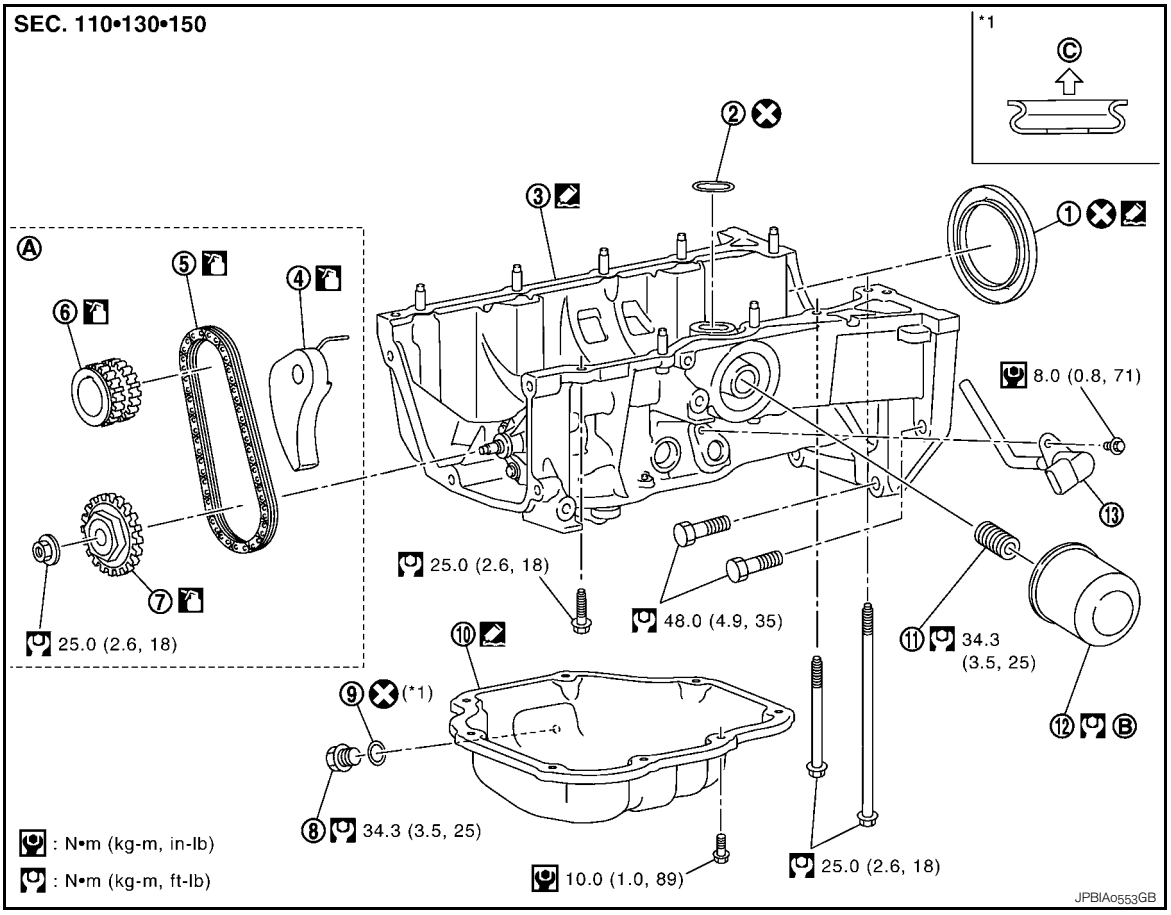
Assembly is the reverse order of disassembly.

cardiagn.com

OIL PAN (UPPER)

Exploded View

INFOID:0000000000894028



1.	Rear oil seal	2.	O-ring	3.	Oil pan (upper)
4.	Chain tensioner	5.	Oil pump drive chain	6.	Crankshaft sprocket
7.	Oil pump sprocket	8.	Oil pan drain plug	9.	Washer
10.	Oil pan (lower)	11.	Oil filter stud bolt	12.	Oil filter
13.	Oil level sensor				
A.	Refer to EM-46	B.	Refer to LU-9	C.	Oil pan side

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000894027

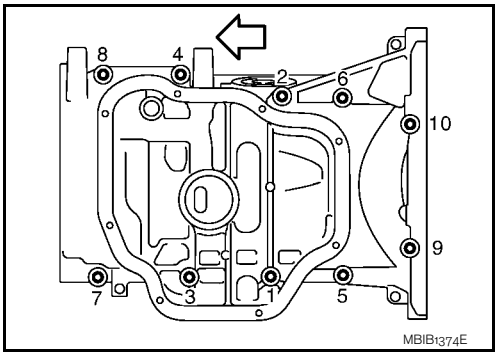
NOTE:
The oil strainer and oil pump are included in the oil pan (upper). Individual disassembly is prohibited.

REMOVAL

1. Remove the oil pan (lower). Refer to EM-40, "Exploded View".
2. Remove front cover and timing chain. Refer to EM-46, "Exploded View".
3. Remove oil pump sprocket and crankshaft sprocket together with oil pump drive chain. Refer to EM-46, "Exploded View".
4. Remove oil pan (upper) with the following procedure.

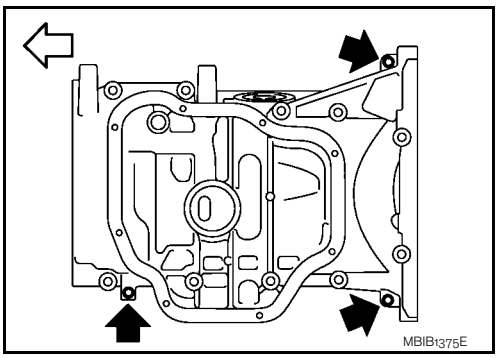
a. Loosen oil pan (upper) mounting bolts in the reverse of the order shown in the figure.

⇦ : Engine front



b. Insert a flat-bladed offset screwdriver into the arrow (⬅) in the figure and open up a crack between the oil pan (upper) cylinder block.

⇦ : Engine front



c. Insert the seal cutter [SST: KV10111100] between remove the oil pan (upper) and cylinder block. Slide seal cutter by tapping on the side of tool with a hammer.

CAUTION:

- **Be careful not to damage the mating surface.**
- **A more adhesive liquid gasket is applied compared to previous types when shipped, so it should not be forced off using a screwdriver, etc. outside the indicated location.**
- **Never remove oil pump and oil strainer from oil pan (upper).**

5. Remove oil level sensor, if necessary.
6. Remove rear oil seal from crankshaft.

INSTALLATION

1. Install the oil pan (upper) in the following procedure.

a. Use scraper to remove old liquid gasket from mating surfaces.
- Also remove the old liquid gasket from mating surface of cylinder block.
- Remove old liquid gasket from the bolt holes and threads.

CAUTION:

Never scratch or damage the mating surfaces when cleaning off old liquid gasket.

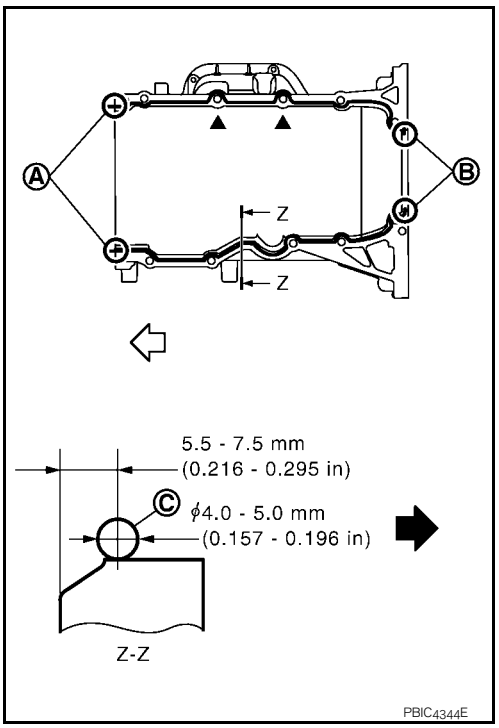
b. Install O-ring to the cylinder block.

cardiagn.com

c. Apply a continuous bead of liquid gasket (C) with the tube presser (commercial service tool) to areas shown in the figure.
Use Genuine Liquid Gasket or equivalent.

A : 2 mm (0.08 in) protruded to outside
B : 2 mm (0.08 in) protruded to rear oil seal mounting side
⇦ : Engine front
⬅ : Oil pan out side

CAUTION:
Attaching should be done within 5 minutes after coating.

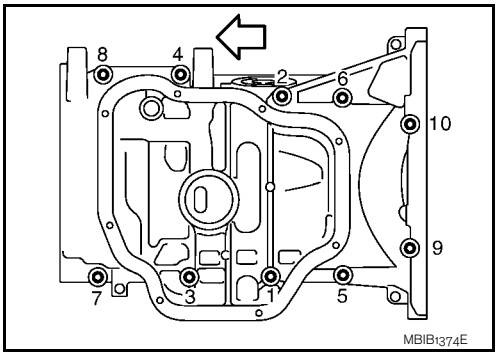


d. Tighten bolts in the numerical order shown in the figure.

⇦ : Engine front

CAUTION:
Install avoiding misalignment of both oil pan gasket and O-ring.
- The bolts are different according to the installation position. Refer to the numbers shown in the figure.

M8 × 179 mm (7.05 in)	**: No. 9, 10**
M8 × 25 mm (0.98 in)	**: No. 4, 7, 8**
M8 × 90 mm (3.54 in)	**: No. 1, 2, 3, 5, 6**

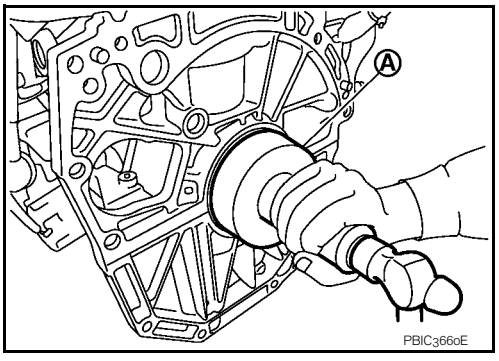


2. Install rear oil seal.
CAUTION:
- **The installation of rear oil seal should be completed within 5 minutes after installing oil pan (upper).**
- **Never touch oil seal lip.**

a. Wipe off any liquid gasket protruding to the rear oil seal mounting part of oil pan (upper) and cylinder block using a spatula.

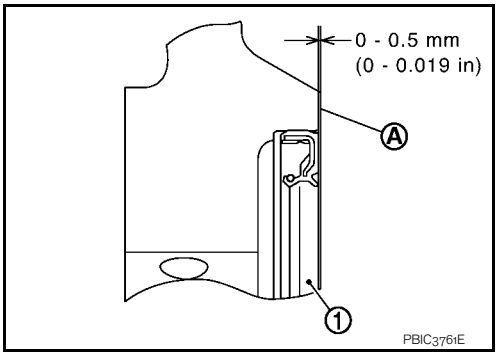
b. Apply the liquid gasket lightly to entire outside area of new rear oil seal.
Use Genuine Liquid Gasket or equivalent.

c. Press-fit the rear oil seal using a drift with outer diameter 113 mm (4.45 in) and inner diameter 90 mm (3.54 in) (commercial service tool) (A).



cardiagn.com

- Press-fit to the dimensions specified in the figure.



1. Rear oil seal

A. Rear end surface of cylinder block

CAUTION:

- **Never touch the grease applied to the oil seal lip.**
- **Be careful not to damage the rear oil seal mounting part of oil pan (upper) and cylinder block or the crankshaft.**
- **Press-fit straight make sure that oil seal does not curl or tilt.**

d. After press-fitting the rear oil seal, completely wipe off any liquid gasket protruding to rear end surface side.

3. Install crankshaft sprocket, oil pump sprocket, oil pump drive chain, and chain tensioner. Refer to EM-46, "Removal and Installation".
4. Install timing chain and related parts. Refer to EM-46, "Removal and Installation".
5. Install front cover and related parts. Refer to EM-46, "Removal and Installation".
6. Install in the reverse order of removal, for the rest of parts.
   CAUTION:
   Pour engine oil at least 30 minutes after oil pan is installed.

Inspection

INFOID:0000000000893882

INSPECTION AFTER INSTALLATION

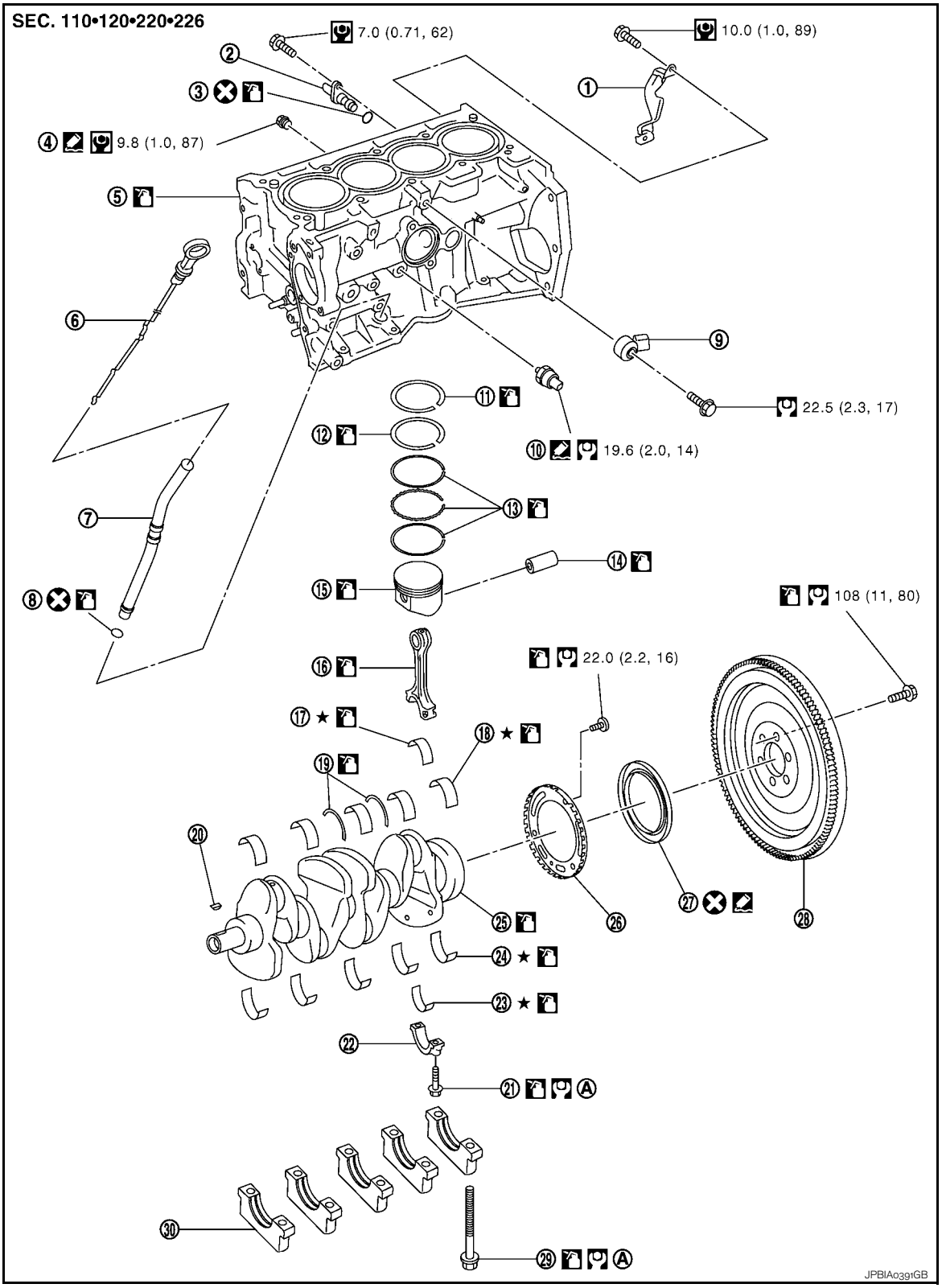
1. Check the engine oil level and adjust engine oil. Refer to LU-6, "Inspection".
2. Start engine, and check there is no leak of engine oil.
3. Stop engine and wait for 10 minutes.
4. Check the engine oil level again. Refer to LU-6, "Inspection".

cardiagn.com

CYLINDER BLOCK

Exploded View

INFOID:0000000000893890



1. Crankshaft position sensor (POS) cover
2. Crankshaft position sensor (POS)
3. O-ring
4. Water drain plug
5. Cylinder block
6. Oil level gauge
7. Oil level gauge guide
8. O-ring
9. Knock sensor

cardiagn.com

10. Oil pressure switch
11. Top ring
12. Second ring
13. Oil ring
14. Piston pin
15. Piston
16. Connecting rod
17. Connecting rod bearing (upper)
18. Main bearing (upper)
19. Thrust bearing
20. Crankshaft key
21. Connecting rod cap bolt
22. Connecting rod cap
23. Connecting rod bearing (lower)
24. Main bearing (lower)
25. Crankshaft
26. Signal plate
27. Rear oil seal
28. Flywheel
29. Main bearing cap bolt
30. Main bearing cap

A. Refer to EM-94

Refer to GI-4, "Components" for symbols in the figure.

Disassembly and Assembly

INFOID:0000000000894031

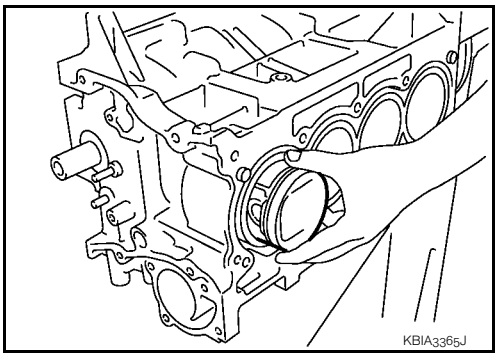
DISASSEMBLY

1. Remove oil pan (upper). Refer to EM-89, "Removal and Installation".
2. Remove cylinder head. Refer to EM-75, "Removal and Installation".
3. Remove knock sensor.
   CAUTION:
   Carefully handle knock sensor avoiding shocks.
4. Remove crankshaft position sensor (POS) and cover.
   CAUTION:
   - **Avoid impacts such as a dropping.**
   - **Never disassemble.**
   - **Keep it away from metal particles.**
   - **Never place the sensor where it is exposed to magnetism.**
5. Remove piston and connecting rod assembly with the following procedure:
   - Before removing piston and connecting rod assembly, check the connecting rod side clearance. Refer to EM-101, "Inspection".

a. Position crankshaft pin corresponding to connecting rod to be removed onto the bottom dead center.

b. Remove connecting rod cap.

c. Using a hammer handle or similar tool, push piston and connecting rod assembly out to the cylinder head side.
   CAUTION:
   - **Be careful not to damage matching surface with connecting rod cap.**
   - **Be careful not to damage the cylinder wall and crankshaft pin, resulting from an interference of the connecting rod big end.**

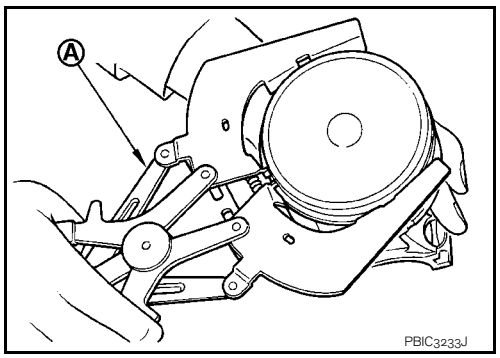


6. Remove connecting rod bearings.
   CAUTION:
   Identify installation positions, and store them without mixing up.
7. Remove piston rings form piston.
   - Before removing piston rings, check the piston ring side clearance. Refer to EM-101, "Inspection".

cardiagn.com

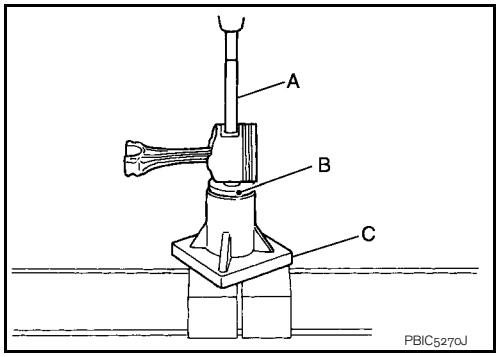
- Use a piston ring expander (commercial service tool) (A).

CAUTION:
- **When removing piston rings, be careful not to damage the piston.**
- **Be careful not to damage piston rings by expanding them excessively.**



8. Remove piston from connecting rod.
   - Use a piston pin press stand (SST) and a press to remove the piston pin.

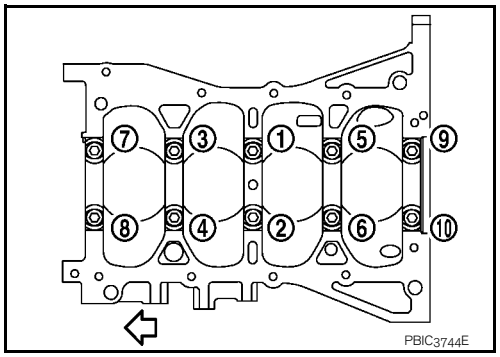
   A : Drift [KV10109730]
   B : Center cap [KV10110310]
   C : Press stand [ST13030020]



CAUTION:
Be careful not to damage the piston and connecting rod.
NOTE:
The joint between the connecting rod and the piston pin is a press fit.

9. Remove the main bearing cap in the following procedure.
   - Measure crankshaft end play before loosening main bearing cap bolts. Refer to EM-101, "Inspection"

a. Loosen and remove bolts in several steps in reverse of the numerical order shown in the figure.



⇦ : Engine front

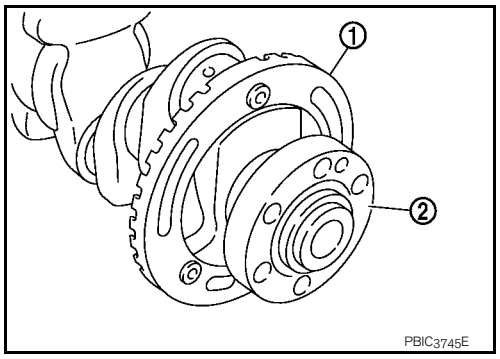
- TORX socket (size: E14) can be used.

b. Remove the main bearing cap from the cylinder block while tapping lightly with a plastic hammer.

10. Remove crankshaft (2).

CAUTION:
- **Be careful not damage or deform signal plate (1) mounted on crankshaft.**
- **When setting crankshaft on a flat floor surface, use a block of wood to avoid interference between signal plate and the floor surface.**
- **Never remove signal plate unless it is necessary to do so.**

NOTE:
When removing or installing signal plate, use TORX socket (size T40).



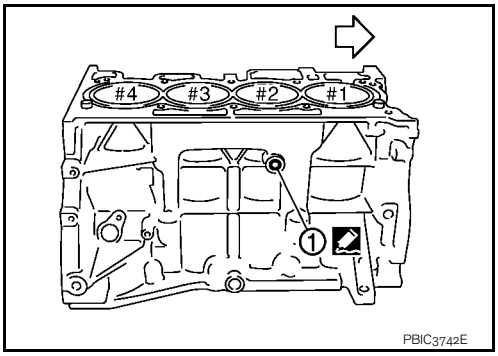
11. Pull rear oil seal out from rear end of crankshaft.
12. Remove main bearing (upper and lower) and thrust bearings from cylinder block and main bearing cap.

CAUTION:
Identify installation positions, and store them without mixing up.

ASSEMBLY

cardiagn.com

1. Fully air-blow engine coolant and engine oil passages in cylinder block, cylinder bore and crankcase to remove any foreign material.
CAUTION:
Use a goggles to protect eyes.
2. Install water drain plug (1) to cylinder block as shown in the figure.



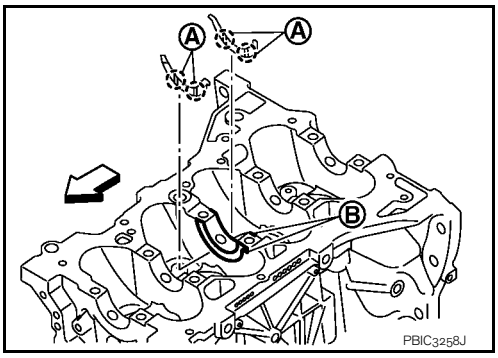
⇦ : Engine front

Use Genuine Liquid Gasket or equivalent.

3. Install main bearings and thrust bearings with the following procedure:

a. Remove dust, dirt, and engine oil on the bearing mating surfaces of cylinder block.

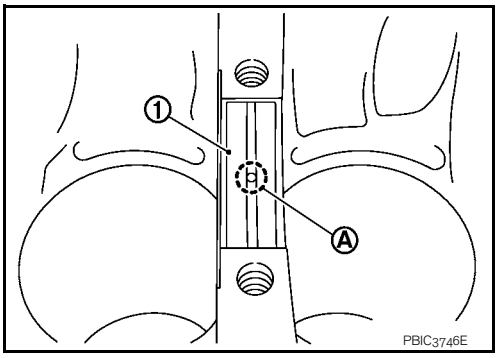
b. Install thrust bearings to the both sides of the No. 3 journal housing (B) on cylinder block.



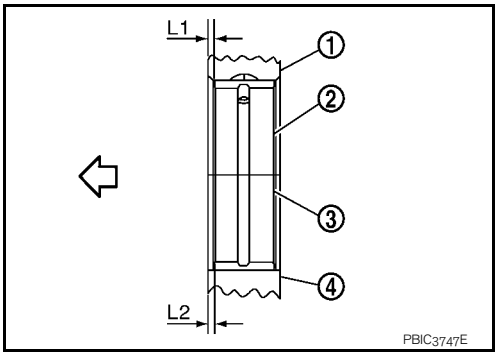
⇦ : Engine front

- Install thrust bearings with the oil groove (A) facing crankshaft arm (outside).

c. Install the main bearings (1) paying attention to the direction.
- Install the one with oil holes (A) onto cylinder block and the one without oil holes onto main bearing cap.
- Before installing main bearings, apply new engine oil to the bearing surface (inside). Do not apply engine oil to the back surface, but thoroughly clean it.
- Ensure the oil holes on cylinder block and those on the corresponding bearing are aligned.



- Install the main bearing in the position shown in the figure.



1 : Cylinder block
2 : Main bearing (upper)
3 : Main bearing (lower)
4 : Main bearing cap
⇦ : Engine front

NOTE:
Install the main bearing in the center position with the following dimension. For service operation, the center position can be checked visually.

Journal position	No. 1	No. 2	No. 3	No. 4	No. 5

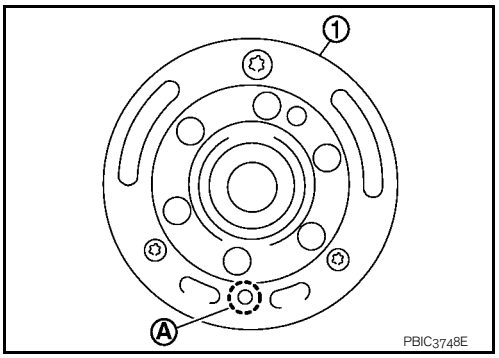
cardiagn.com

L1 [Unit: mm (in)]	1.65–2.05 (0.065-0.081)	1.25–1.65 (0.049-0.065)	2.30–2.70 (0.091-0.106)	1.25–1.65 (0.049-0.065)	1.60–2.00 (0.063-0.079)
L2 [Unit: mm (in)]	1.30–1.70 (0.051-0.067)	1.30–1.70 (0.051-0.067)	2.30–2.70 (0.091-0.106)	1.30–1.70 (0.051-0.067)	1.30–1.70 (0.051-0.067)

CAUTION:
Dimension L1 of journal No. 3 is the distance from the housing base end surface (bulk) (not the distance from the thrust bearing mounting end surface).

4. Install signal plate to crankshaft if removed.

a. Set the signal plate (1) with the flange facing toward the counter-weight side (engine front side) to the crankshaft rear surface.



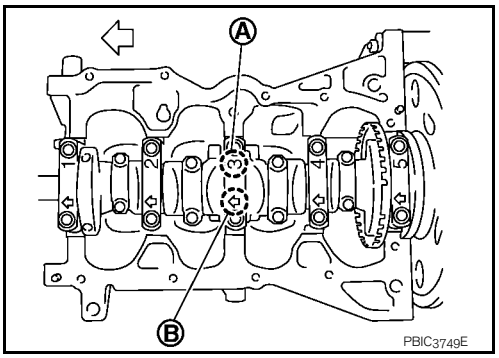
A : Dowel pin hole

b. After positioning crankshaft and signal plate with positioning dowel pin, tighten bolt.
NOTE:
Dowel pin of crankshaft and signal plate is provided as a set for each.

c. Remove dowel pin.
CAUTION:
Be sure to remove dowel pin.

5. Install crankshaft to cylinder block.
• Make sure that crankshaft turns smoothly by hand.
CAUTION:
Never install rear oil seal yet.

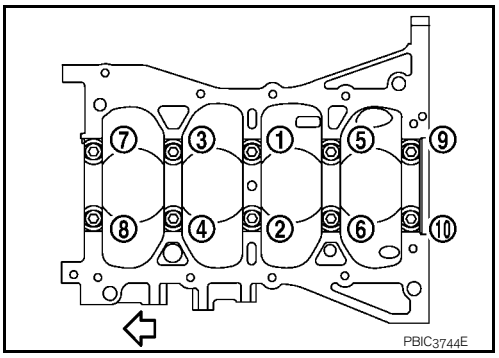
6. Install main bearing caps.
• Install the main bearing cap while referring to the front mark (B) and the journal number stamp (A).



⇦ : Engine front

NOTE:
Main bearing cap cannot be replaced as a single parts, because it is machined together with cylinder block.

7. Tighten main bearing cap bolts in numerical order shown in the figure with the following steps.



⇦ : Engine front

a. Apply new engine oil to threads and seat surfaces of the mounting bolts.

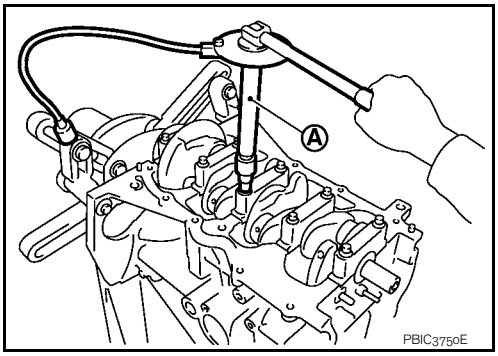
b. Tighten main bearing cap bolts.

: 32.4 N·m (3.3 kg-m, 24 ft-lb)

cardiagn.com

c. Turn main bearing cap bolts 60 degrees clockwise (angle tightening) in numerical order shown in the figure.

CAUTION:
Check and confirm the tightening angle by using the angle wrench [SST: KV10112100] (A) or protractor. Avoid judgment by visual inspection without the tool.



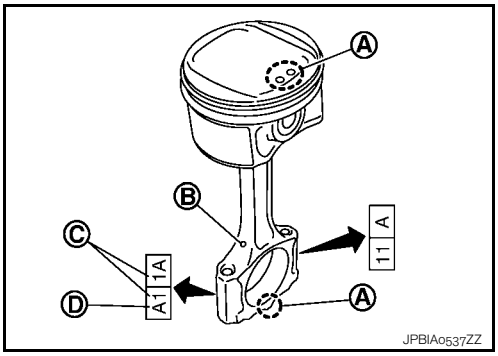
- After installing the mounting bolts, make sure that crankshaft can be rotated smoothly by hand.
- Check crankshaft end play. Refer to EM-101, "Inspection".

8. Install piston to connecting rod with the following procedure:

a. Set so that the front mark (A) on the piston head and the cylinder number (C) are in the position shown in the figure.

B : Oil hole
D : Connecting rod big end grade

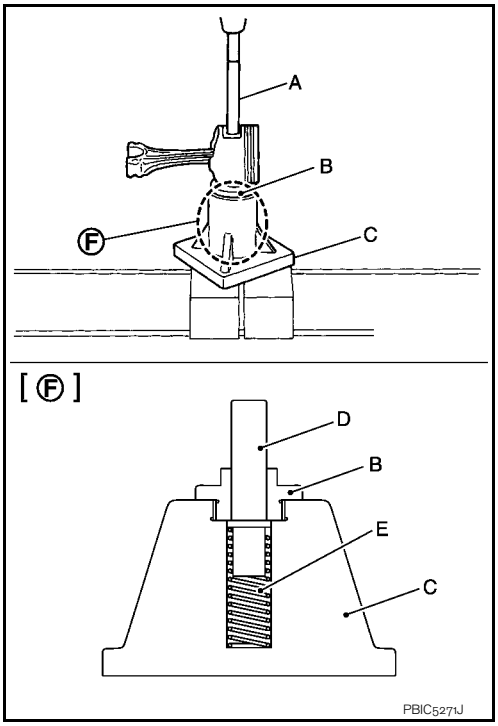
NOTE:
The symbols without notes are for management.



b. Press-fit the piston pin using the piston pin press stand (SST).

A : Drift [KV10109730]
B : Center cap [KV10110310]
C : Press stand [ST13030020]
D : Center shaft [KV10114120]
E : Spring [ST13030030]
F : For detail

CAUTION:
Press-fit the piston so as not to damage it.
NOTE:
The joint between the connecting rod and the piston pin is a press fit.

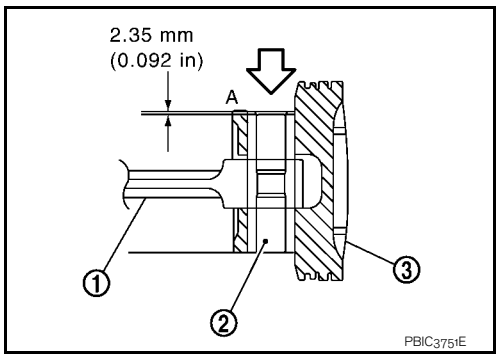


cardiagn.com

- Press-fit the piston pin (2) from piston surface “A” to the depth of 2.35 mm (0.092 in).

1 : Connecting rod
⇦ : Press-fit direction

- After finishing work, make sure that the piston (3) moves freely.



9. Using a piston ring expander (commercial service tool), install piston rings.

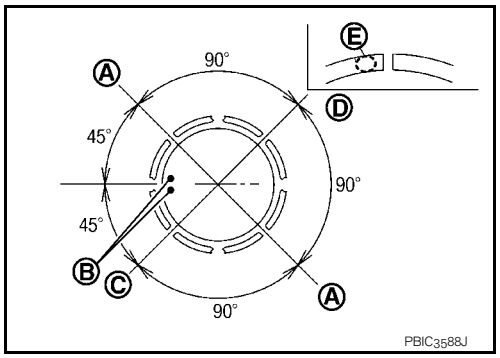
CAUTION:

- **Be careful not to damage piston.**
- **Be careful not to damage piston rings by expanding them excessively.**
- Position each ring with the gap as shown in the figure referring to the piston front mark (B).

A : Oil ring upper or lower rail gap (either of them)
C : Second ring and oil ring spacer gap
D : Top ring gap

- Install second ring with the stamped mark (E) facing upward.

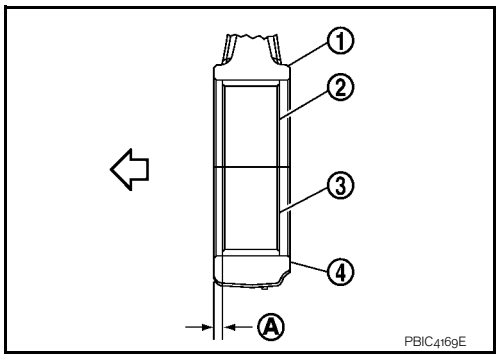
Stamped mark:
Second ring : R



10. Install connecting rod bearings to connecting rod and connecting rod cap.
- When installing connecting rod bearings, apply new engine oil to the bearing surface (inside). Do not apply engine oil to the back surface, but thoroughly clean it.
- Install the bearing in the center position.
NOTE:
There is no stopper tab.
- Make sure that the oil holes on connecting rod and connecting rod bearing are aligned.
- Install the connecting rod in the dimension shown in the figure.

1 : Connecting rod
2 : Connecting rod bearing (upper)
3 : Connecting rod bearing (lower)
4 : Connecting rod cap
⇦ : Engine front

Dimension “A” : 1.7 - 2.1 mm (0.067 - 0.083 in)



NOTE:
Install the connecting rod bearing in the center position with the dimension shown in the figure. For service operation, the center position can be checked visually.

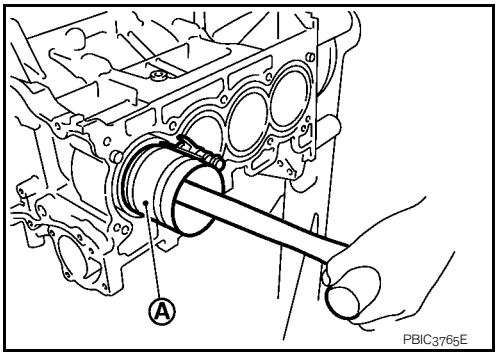
11. Install piston and connecting rod assembly to crankshaft.
- Position crankshaft pin corresponding to connecting rod to be installed onto the bottom dead center.
- Apply new engine oil sufficiently to the cylinder bore, piston and crankshaft pin.
- Match the cylinder position with the cylinder number on connecting rod to install.

cardiagn.com

- Using the piston ring compressor (SST: EM03470000) (A) or suitable tool, install piston with the front mark on the piston head facing the front of the engine.

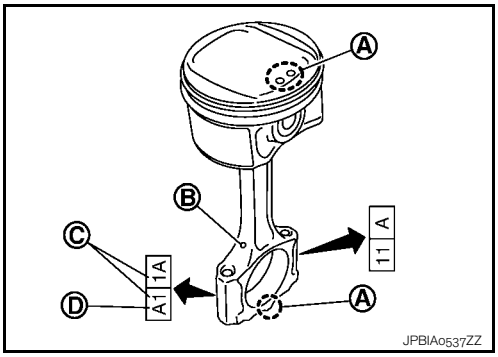
CAUTION:

- **Be careful not to damage matching surface with connecting rod cap.**
- **Be careful not to damage the cylinder wall and crankshaft pin, resulting from an interference of the connecting rod big end.**



12. Install connecting rod cap.
    - Match the stamped cylinder number marks (C) on connecting rod with those on connecting rod cap to install.

A : Front mark
B : Oil hole
D : Connecting rod big end grade



13. Inspect outer diameter of connecting rod cap bolts. Refer to EM-101, "Inspection".
14. Tighten connecting rod bolt with the following procedure:

a. Apply new engine oil to the threads and seats of connecting rod bolts.
b. Tighten bolts in several steps.

: 27.5 N·m (2.8 kg-m, 20 ft-lb)

c. Completely loosen bolts.

: 0 N·m (0 kg-m, 0 ft-lb)

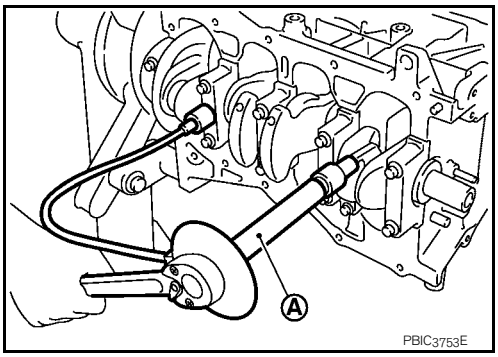
d. Tighten bolts in several steps.

: 19.6 N·m (2.0 kg-m, 14 ft-lb)

e. Then turn all bolts 60 degrees clockwise (angle tightening).

CAUTION:

Confirm the tightening angle by using the angle wrench [SST: KV10112100] (A) or protractor. Avoid judgment by visual inspection without the tool.



- After tightening connecting rod bolt, make sure that crankshaft rotates smoothly.
- Check the connecting rod side clearance. Refer to EM-101, "Inspection".

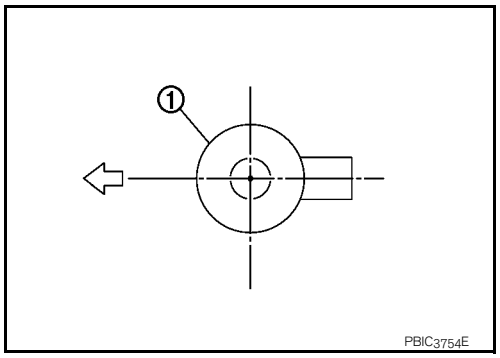
15. Install oil pan (upper). Refer to EM-89, "Exploded View".
    NOTE:
    Install the rear oil seal after installing the oil pan (upper).
16. Install rear oil seal. Refer to EM-89, "Removal and Installation".
17. Install flywheel.

cardiagn.com

- Secure crankshaft with a stopper plate [SST: KV11105210], and tighten mounting bolts crosswise over several times.

18. Install knock sensor (1).

⇦ : Engine front



- Install connectors so that they are positioned towards the rear of the engine.

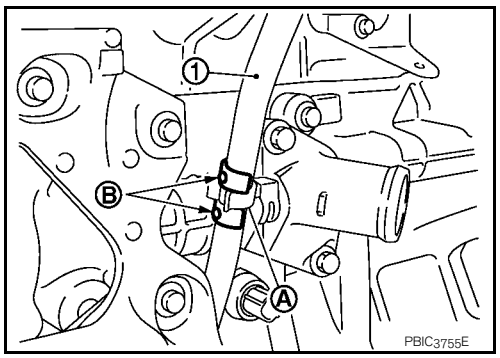
CAUTION:

- **Never tighten mounting bolt while holding the connector.**
- **If any impact by dropping is applied to knock sensor, replace it with a new one.**

NOTE:

- Make sure that there is no foreign material on the cylinder block mating surface and the back surface of knock sensor.
- Make sure that knock sensor does not interfere with other parts.

19. Install crankshaft position sensor (POS) and cover.
    - Tighten bolts with it seated completely.
20. For the oil level gauge guide (1), fix the position (B) shown in the figure to the water inlet clip (A) after inserting to the cylinder block side.



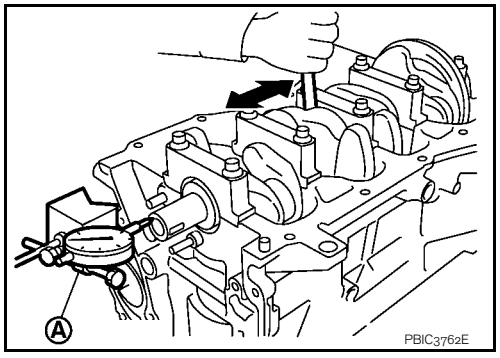
21. Assemble in the reverse order of disassembly after this step.

Inspection

INFOID:0000000000893892

CRANKSHAFT END PLAY

- Measure the clearance between thrust bearings and crankshaft arm when crankshaft is moved fully forward or backward with a dial indicator (A).

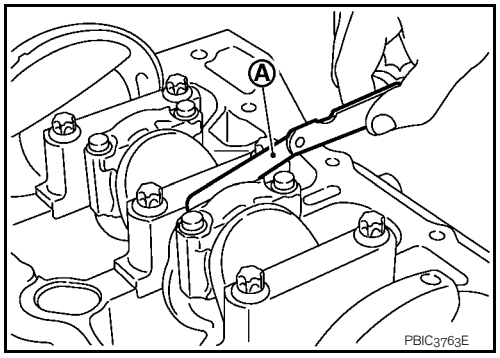


Standard and Limit : Refer to EM-120, "Cylinder Block".

- If the measured value exceeds the limit, replace thrust bearings, and measure again. If it still exceeds the limit, replace crankshaft also.

CONNECTING ROD SIDE CLEARANCE

- Measure the side clearance between connecting rod and crankshaft arm with a feeler gauge (A).



Standard : Refer to EM-120, "Cylinder Block".

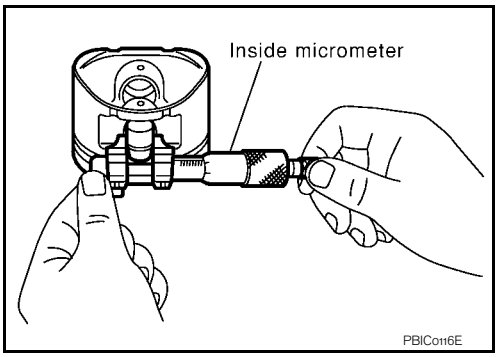
- If the measured value exceeds the limit, replace connecting rod, and measure again. If it still exceeds the standard, replace crankshaft also.

cardiagn.com

PISTON TO PISTON PIN OIL CLEARANCE

Piston Pin Hole Diameter

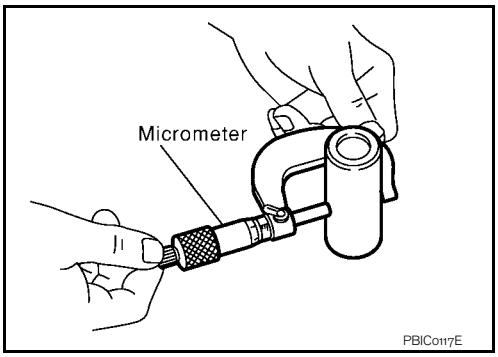
Measure the inner diameter of piston pin hole with an inside micrometer.



Standard : Refer to EM-120, "Cylinder Block".

Piston Pin Outer Diameter

Measure the outer diameter of piston pin with a micrometer.



Standard : Refer to EM-120, "Cylinder Block".

Piston to Piston Pin Oil Clearance

(Piston to piston pin oil clearance) = (Piston pin hole diameter) – (Piston pin outer diameter)

Standard : Refer to EM-120, "Cylinder Block".

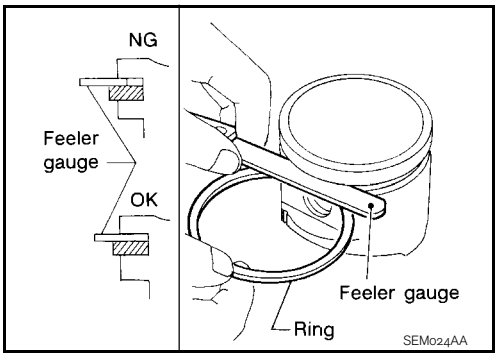
- If oil clearance is out of the standard, replace piston and piston pin assembly.

PISTON RING SIDE CLEARANCE

- Measure the side clearance of piston ring and piston ring groove with a feeler gauge.

Standard and Limit : Refer to EM-120, "Cylinder Block".

- If the measured value exceeds the limit, replace piston ring, and measure again. If it still exceeds the limit, replace piston also.

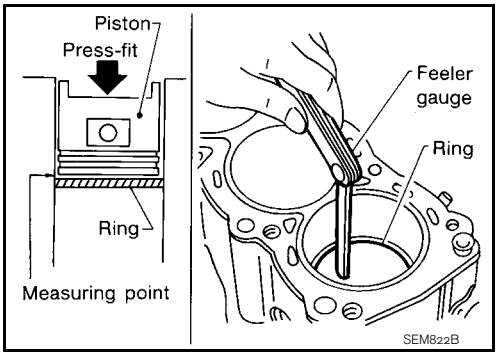


PISTON RING END GAP

- Make sure that cylinder bore inner diameter is within the specification. Refer to "Cylinder Bore Inner Diameter".
- Lubricate with new engine oil to piston and piston ring, and then insert piston ring until middle of cylinder with piston, and measure piston ring end gap with a feeler gauge.

Standard and Limit : Refer to EM-120, "Cylinder Block".

- If the measured value exceeds the limit, replace piston ring.



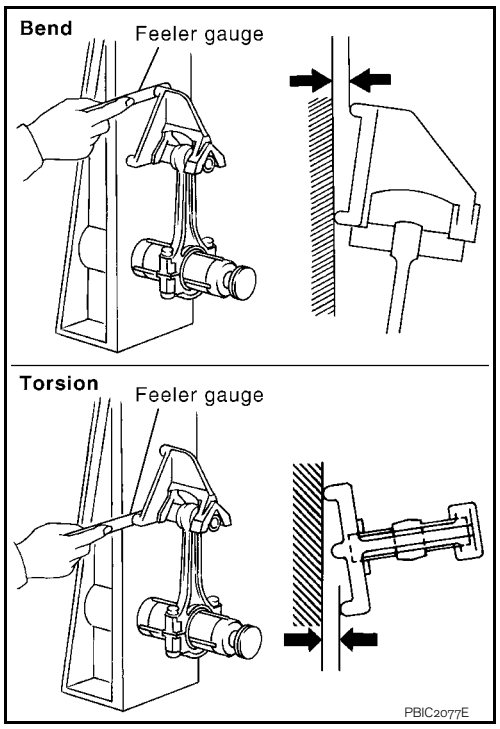
CONNECTING ROD BEND AND TORSION

cardiagn.com

- Check with a connecting rod aligner.

Limit : Refer to EM-120, "Cylinder Block".

- If it exceeds the limit, replace connecting rod assembly.

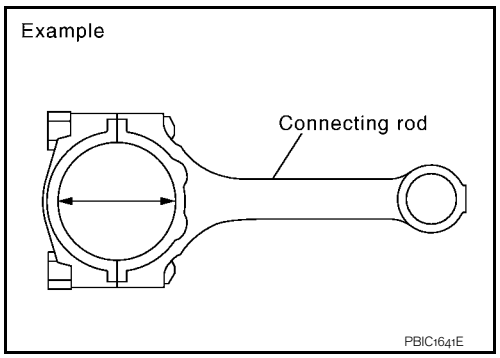


CONNECTING ROD BIG END DIAMETER

- Install connecting rod cap without connecting rod bearing installed, and tightening connecting rod bolts to the specified torque. Refer to EM-94, "Disassembly and Assembly".
- Measure the inner diameter of connecting rod big end with an inside micrometer.

Standard : Refer to EM-120, "Cylinder Block".

- If out of the standard, replace connecting rod assembly.

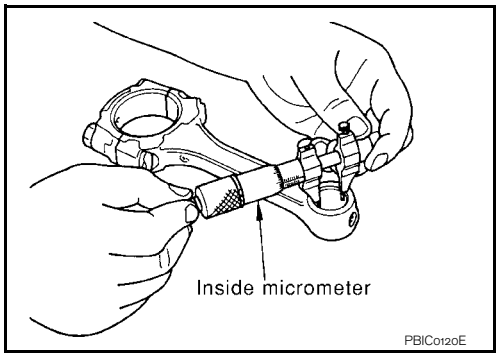


CONNECTING ROD SMALL END CLEARANCE

Connecting Rod Small End Inner Diameter

Measure the inner diameter of connecting rod small end with an inside micrometer.

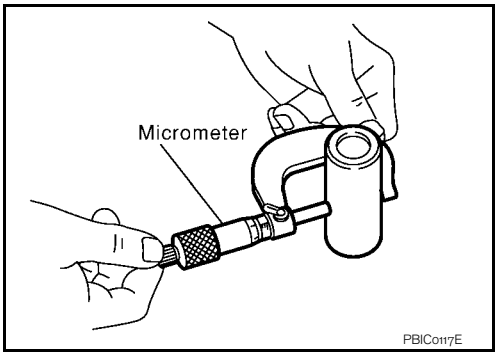
Standard : Refer to EM-120, "Cylinder Block".



Piston Pin Outer Diameter

cardiagn.com

Measure the outer diameter of piston pin with a micrometer.



Standard : Refer to EM-120, "Cylinder Block".

Connecting Rod Small End Clearance

(Connecting rod small end clearance) = (Connecting rod small end inner diameter) – (Piston pin outer diameter)

Standard : Refer to EM-120, "Cylinder Block".

- If the measured value is out of the standard, replace connecting rod assembly and/or piston and piston pin assembly.
- If replacing connecting rod assembly, refer to "CONNECTING ROD BEARING OIL CLEARANCE" to select connecting rod bearing.

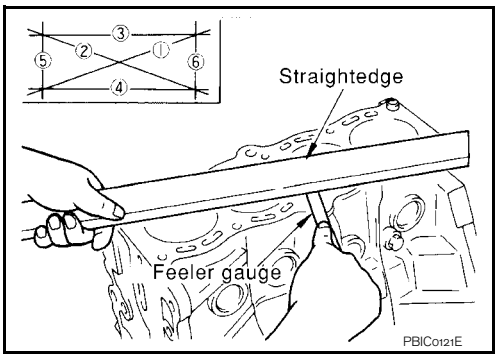
CYLINDER BLOCK TOP SURFACE DISTORTION

- Using a scraper, remove gasket on the cylinder block surface, and also remove engine oil, scale, carbon, or other contamination.

CAUTION:

Be careful not to allow gasket flakes to enter engine oil or engine coolant passages.

- Measure the distortion on the cylinder block upper face at some different points in six directions with a straight edge and a feeler gauge.

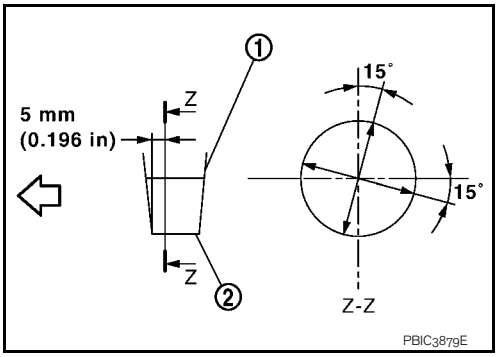


Limit : Refer to EM-120, "Cylinder Block".

- If it exceeds the limit, replace cylinder block.

MAIN BEARING HOUSING INNER DIAMETER

- Install main bearing cap without main bearings installed, and tighten main bearing cap bolts to the specified torque. Refer to EM-94, "Disassembly and Assembly".
- Measure the position shown in the figure [5 mm (0.196 in) rearward from main bearing housing front side end surface) in the 2 directions as shown in the figure. The smaller one is the measured value.



1 : Cylinder block
2 : Main bearing cap
⇦ : Engine front

Standard : Refer to EM-120, "Cylinder Block".

- If out of the standard, replace cylinder block and main bearing caps as an assembly.

NOTE:

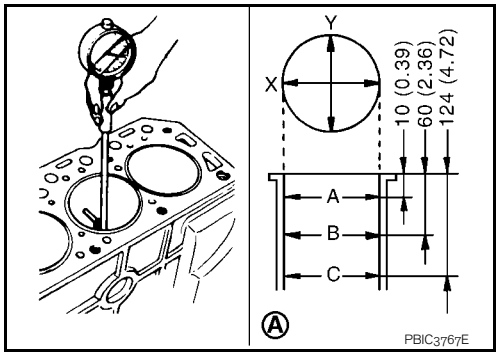
These components cannot be replaced as a single unit, because they were processed together.

PISTON TO CYLINDER BORE CLEARANCE

cardiagn.com

Cylinder Bore Inner Diameter

- Using a bore gauge, measure the cylinder bore for wear, out-of-round and taper at six different points on each cylinder. (“X” and “Y” directions at “A”, “B” and “C”) (“Y” is in longitudinal direction of the engine)



A : Unit: mm (in)

NOTE:
When determining cylinder bore grade, measure cylinder bore at “B” position.

Standard:

Cylinder bore inner diameter

: Refer to EM-120, "Cylinder Block".

Limit:

Out-of-round (Difference between“X”and“Y”)

Taper (Difference between“A”and“B”

: Refer to EM-120, "Cylinder Block".

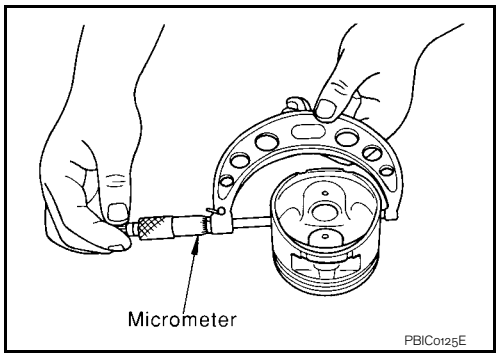
- If the measured value exceeds the limit, or if there are scratches and/or seizure on the cylinder inner wall, replace cylinder block.

NOTE:
There is no service setting for oversized piston.

Piston Skirt Diameter

Measure the outer diameter of piston skirt with a micrometer.

Standard : Refer to EM-120, "Cylinder Block".



Piston to Cylinder Bore Clearance

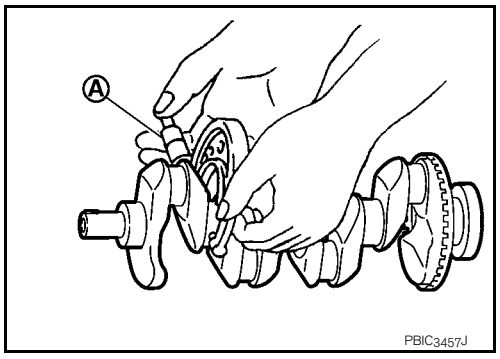
Calculate by piston skirt diameter and cylinder bore inner diameter (direction “X”, position “B”).
(Clearance) = (Cylinder bore inner diameter) – (Piston skirt diameter)

Standard and Limit : Refer to EM-120, "Cylinder Block".

- If it exceeds the limit, replace piston and piston pin assembly and/or cylinder block.

CRANKSHAFT MAIN JOURNAL DIAMETER

- Measure the outer diameter of crankshaft main journals with a micrometer (A).



Standard : Refer to EM-120, "Cylinder Block".

- If out of the standard, measure the main bearing oil clearance. Then use undersize bearing. Refer to "MAIN BEARING OIL CLEARANCE".

cardiagn.com

CRANKSHAFT PIN JOURNAL DIAMETER

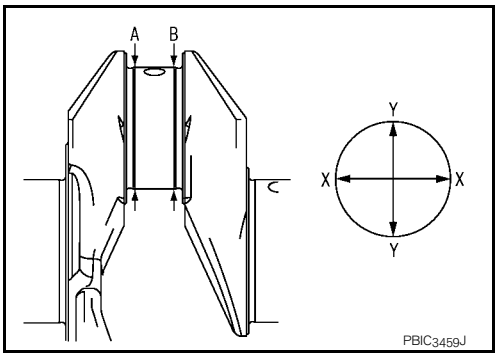
- Measure the outer diameter of crankshaft pin journal with a micrometer.

Standard : Refer to EM-120, "Cylinder Block".

- If out of the standard, measure the connecting rod bearing oil clearance. Then use undersize bearing. Refer to "CONNECTING ROD BEARING OIL CLEARANCE".

OUT-OF-ROUND AND TAPER OF CRANKSHAFT

- Measure the dimensions at four different points as shown in the figure on each main journal and pin journal with a micrometer.
- Out-of-round is indicated by the difference in dimensions between “X” and “Y” at “A” and “B”.
- Taper is indicated by the difference in dimension between “A” and “B” at “X” and “Y”.



Limit:

Out-of-round (Difference between“X”and“Y”)

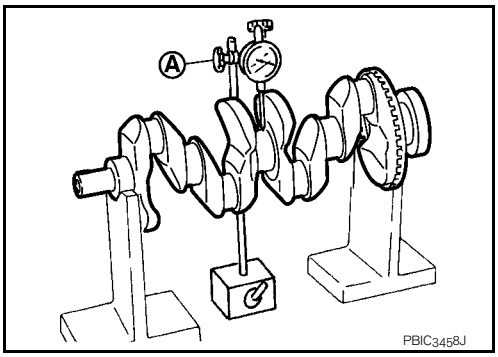
Taper (Difference between“A”and“B”)

: Refer to EM-120, "Cylinder Block".

- If the measured value exceeds the limit, correct or replace crankshaft.
- If corrected, measure the bearing oil clearance of the corrected main journal and/or pin journal. Then select main bearing and/or connecting rod bearing. Refer to "MAIN BEARING OIL CLEARANCE" and/or "CONNECTING ROD BEARING OIL CLEARANCE".

CRANKSHAFT RUNOUT

- Place a V-block on a precise flat table to support the journals on the both end of crankshaft.
- Place a dial indicator (A) straight up on the No. 3 journal.
- While rotating crankshaft, read the movement of the pointer on the dial indicator. (Total indicator reading)



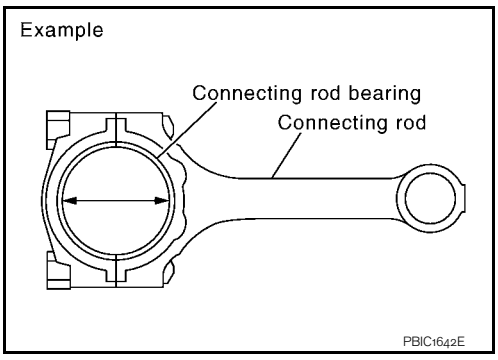
Limit : Refer to EM-120, "Cylinder Block".

- If it exceeds the limit, replace crankshaft.

CONNECTING ROD BEARING OIL CLEARANCE

Method by Calculation

- Install connecting rod bearings to connecting rod and cap, and tighten connecting rod bolts to the specified torque. Refer to EM-94, "Disassembly and Assembly".
- Measure the inner diameter of connecting rod bearing with an inside micrometer.
  (Bearing oil clearance) = (Connecting rod bearing inner diameter) – (Crankshaft pin journal diameter)



Standard and Limit

: Refer to EM-123, "Connecting Rod Bearing".

- If the clearance exceeds the limit, select proper connecting rod bearing according to connecting rod big end diameter and crankshaft pin journal diameter to obtain the specified bearing oil clearance. Refer to EM-110, "Connecting Rod Bearing".

Method of Using Plastigage

- Remove engine oil and dust on crankshaft pin and the surfaces of each bearing completely.
- Cut a plastigage slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.

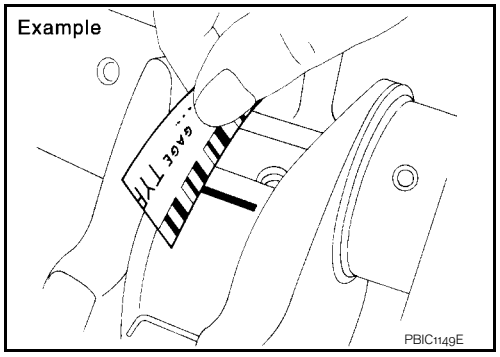
cardiagn.com

- Install connecting rod bearings to connecting rod and cap, and tighten connecting rod bolts to the specified torque. Refer to EM-94, "Disassembly and Assembly".

CAUTION:
Never rotate crankshaft.

- Remove connecting rod cap and bearing, and using the scale on the plastigage bag, measure the plastigage width.

NOTE:
The procedure when the measured value exceeds the limit is same as that described in the “Method by Calculation”.



MAIN BEARING OIL CLEARANCE

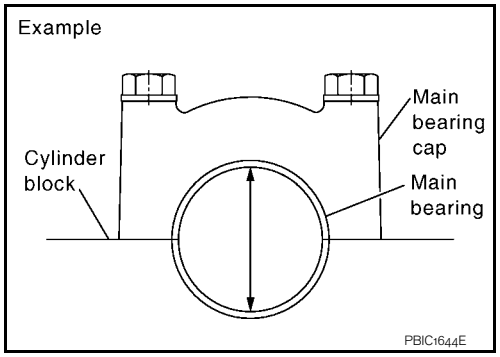
Method by Calculation

- Install main bearings to cylinder block and main bearing cap, and tighten main bearing cap bolts to the specified torque. Refer to EM-94, "Disassembly and Assembly".
- Measure the inner diameter of main bearing with a bore gauge.

(Bearing oil clearance) = (Main bearing inner diameter) – (Crankshaft main journal diameter)

Standard : Refer to EM-124, "Main Bearing".

- If the clearance exceeds the limit, select proper main bearing according to main bearing inner diameter and crankshaft main journal diameter to obtain the specified bearing oil clearance. Refer to EM-112, "Main Bearing".



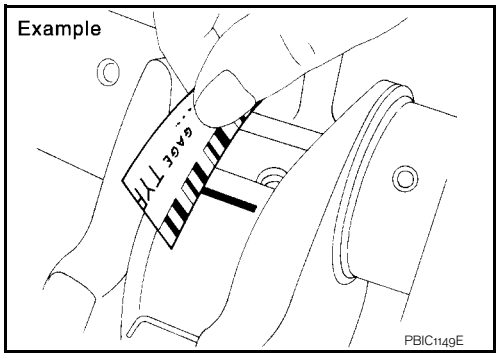
Method of Using Plastigage

- Remove engine oil and dust on crankshaft main journal and the surfaces of each bearing completely.
- Cut a plastigage slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.
- Install main bearings to cylinder block and main bearing cap, and tighten main bearing cap bolts to the specified torque. Refer to EM-94, "Disassembly and Assembly".

CAUTION:
Never rotate crankshaft.

- Remove main bearing cap and bearings, and using the scale on the plastigage bag, measure the plastigage width.

NOTE:
The procedure when the measured value exceeds the limit is same as that described in the “Method by Calculation”.



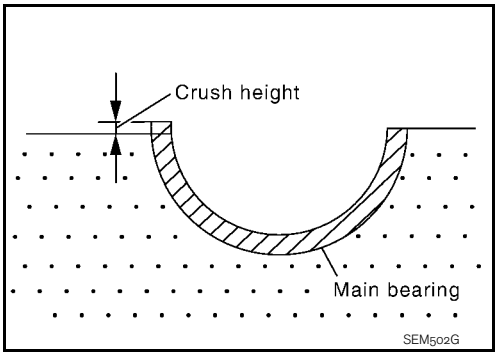
MAIN BEARING CRUSH HEIGHT

cardiagn.com

- When main bearing cap is removed after being tightened to the specified torque with main bearings installed, the tip end of bearing must protrude. Refer to EM-94, "Disassembly and Assembly".

Standard: There must be crush height.

- If the standard is not met, replace main bearings.

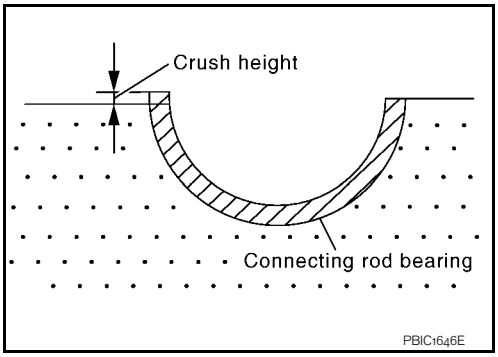


CONNECTING ROD BEARING CRUSH HEIGHT

- When connecting rod bearing cap is removed after being tightened to the specified torque with connecting rod bearings installed, the tip end of bearing must protrude. Refer to EM-94, "Disassembly and Assembly".

Standard: There must be crush height.

- If the standard is not met, replace connecting rod bearings.

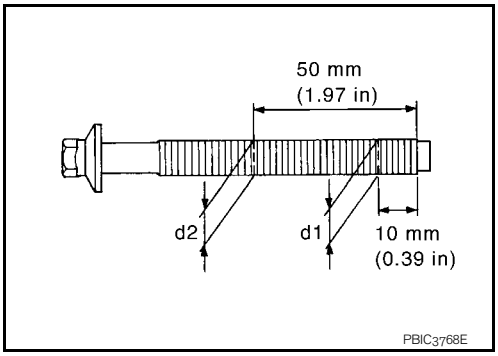


MAIN BEARING CAP BOLT OUTER DIAMETER

- Measure the outer diameters (“d_1”, “d_2”) at two positions as shown in the figure.
- If reduction appears in a position other than “d_2”, regard it as “d_2”.

Limit (“d_1”–“d_2”): 0.2 mm (0.008 in)

- If it exceeds the limit (a large difference in dimensions), replace main bearing cap bolt with a new one.

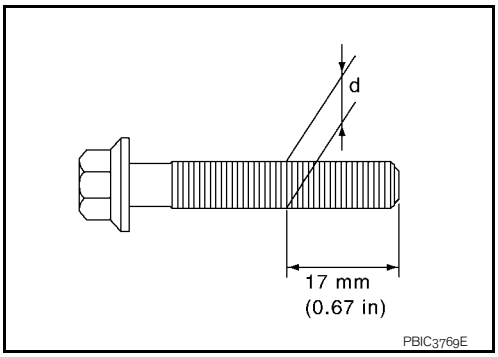


CONNECTING ROD CAP BOLT OUTER DIAMETER

- Measure the outer diameter “d” at position as shown in the figure.
- If reduction appears in a position other than “d”, regard it as “d”.

Limit: 7.75 mm (0.3051 in)

- When “d” falls below the limit (when it becomes thinner), replace connecting rod cap bolt with a new one.



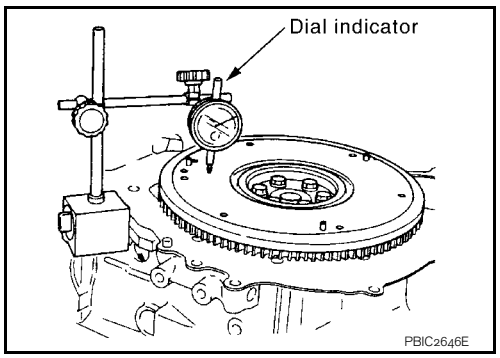
FLYWHEEL DEFLECTION

cardiagn.com

- Measure the deflection of flywheel contact surface to clutch with a dial indicator.

Standard : 0.25 mm (0.0098 in) or less.

- If measured value is out of the standard, replace flywheel.



cardiagn.com

HOW TO SELECT PISTON AND BEARING

Description

INFOID:0000000000893893

Selection points	Selection parts	Selection items	Selection methods
Between cylinder block and crankshaft	Main bearing	Main bearing grade (bearing thickness)	Determined by match of cylinder block bearing housing grade (inner diameter of housing) and crankshaft journal grade (outer diameter of journal)
Between crankshaft and connecting rod	Connecting rod bearing	Connecting rod bearing grade (bearing thickness)	Combining service grades for connecting rod big end diameter and crankshaft pin outer diameter determine connecting rod bearing selection.

- The identification grade stamped on each part is the grade for the dimension measured in new condition. This grade cannot apply to reused parts.
- For reused or repaired parts, measure the dimension accurately. Determine the grade by comparing the measurement with the values of each selection table.
- For details of the measurement method of each part, the reuse standards and the selection method of the selective fitting parts, refer to the text.

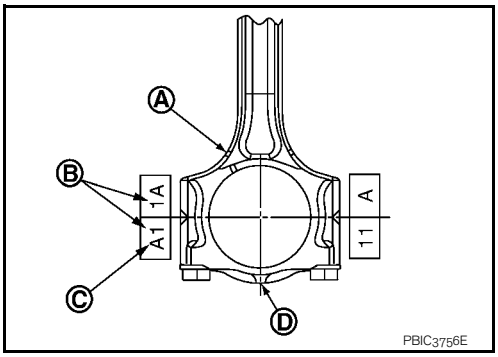
Connecting Rod Bearing

INFOID:0000000000893895

WHEN NEW CONNECTING ROD AND CRANKSHAFT ARE USED

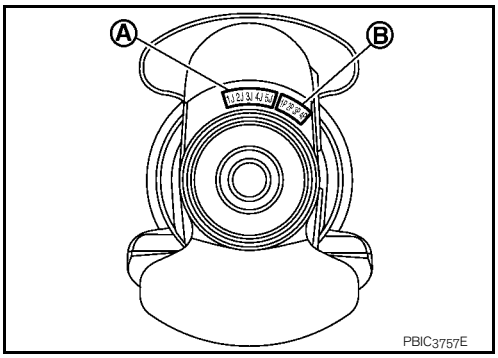
1. Apply connecting rod big end diameter grade stamped (C) on connecting rod side face to the row in the “Connecting Rod Bearing Selection Table”.

   A : Oil hole
   B : Cylinder number
   D : Front mark



2. Apply crankshaft pin journal diameter grade stamped (B) on crankshaft front side to the column in the “Connecting Rod Bearing Selection Table”.

   A : Main journal diameter grade (No. 1 to 5 from left)
   B : Crankshaft pin journal diameter grade (No. 1 to 4 from left)



3. Read the symbol at the cross point of selected row and column in the “Connecting Rod Bearing Selection Table”.
4. Apply the symbol obtained to the “Connecting Rod Bearing Grade Table” to select connecting rod bearing.

WHEN CONNECTING ROD AND CRANKSHAFT ARE REUSED

1. Measure the dimensions of the connecting rod big end diameter and crankshaft pin journal diameter individually. Refer to EM-101, "Inspection".

cardiagn.com

2. Apply the measured dimension to the “Connecting Rod Bearing Selection Table”.
3. Read the symbol at the cross point of selected row and column in the “Connecting Rod Bearing Selection Table”.
4. Apply the symbol obtained to the “Connecting Rod Bearing Grade Table” to select connecting rod bearing.

Connecting Rod Bearing Selection Table

Connecting rod big end diameter / Crankshaft pin journal diameter	I.D. mark	A	B	C	D	E	F	G	H	J	K	L	M	N
	Hole diameter Unit: mm (in)	43.000 - 43.001 (1.6929 - 1.6929)	43.001 - 43.002 (1.6929 - 1.6930)	43.002 - 43.003 (1.6930 - 1.6930)	43.003 - 43.004 (1.6930 - 1.6931)	43.004 - 43.005 (1.6931 - 1.6931)	43.005 - 43.006 (1.6931 - 1.6931)	43.006 - 43.007 (1.6931 - 1.6932)	43.007 - 43.008 (1.6932 - 1.6932)	43.008 - 43.009 (1.6932 - 1.6933)	43.009 - 43.010 (1.6933 - 1.6933)	43.010 - 43.011 (1.6933 - 1.6933)	43.011 - 43.012 (1.6933 - 1.6934)	43.012 - 43.013 (1.6934 - 1.6934)
I.D. mark	Axle diameter Unit mm (in)													
A	39.971 - 39.970 (1.5737 - 1.5736)	0	0	0	0	0	01	01	01	1	1	1	12	12
B	39.970 - 39.969 (1.5736 - 1.5736)	0	0	0	0	01	01	01	1	1	1	12	12	12
C	39.969 - 39.968 (1.5736 - 1.5735)	0	0	0	01	01	01	1	1	1	12	12	12	2
D	39.968 - 39.967 (1.5735 - 1.5735)	0	0	01	01	01	1	1	1	12	12	12	2	2
E	39.967 - 39.966 (1.5735 - 1.5735)	0	01	01	01	1	1	1	12	12	12	2	2	2
F	39.966 - 39.965 (1.5735 - 1.5734)	01	01	01	1	1	1	12	12	12	2	2	2	23
G	39.965 - 39.964 (1.5734 - 1.5734)	01	01	1	1	1	12	12	12	2	2	2	23	23
H	39.964 - 39.963 (1.5734 - 1.5733)	01	1	1	1	12	12	12	2	2	2	23	23	23
J	39.963 - 39.962 (1.5733 - 1.5733)	1	1	1	12	12	12	2	2	2	23	23	23	3
K	39.962 - 39.961 (1.5733 - 1.5733)	1	1	12	12	12	2	2	2	23	23	23	3	3
L	39.961 - 39.960 (1.5733 - 1.5732)	1	12	12	12	2	2	2	23	23	23	3	3	3
M	39.960 - 39.959 (1.5732 - 1.5732)	12	12	12	2	2	2	23	23	23	3	3	3	34
N	39.959 - 39.958 (1.5732 - 1.5731)	12	12	2	2	2	23	23	23	3	3	3	34	34
P	39.958 - 39.957 (1.5731 - 1.5731)	12	2	2	2	23	23	23	3	3	3	34	34	34
R	39.957 - 39.956 (1.5731 - 1.5731)	2	2	2	23	23	23	3	3	3	34	34	34	4
S	39.956 - 39.955 (1.5731 - 1.5730)	2	2	23	23	23	3	3	3	34	34	34	4	4
T	39.955 - 39.954 (1.5730 - 1.5730)	2	23	23	23	3	3	3	34	34	34	4	4	4
U	39.954 - 39.953 (1.5730 - 1.5729)	23	23	23	3	3	3	34	34	34	4	4	4	4

PBIC3758E

Connecting Rod Bearing Grade Table

Connecting Rod Bearing Grade Table : Refer to EM-123, "Connecting Rod Bearing".

Undersize Bearings Usage Guide

- When the specified connecting rod bearing oil clearance is not obtained with standard size connecting rod bearings, use undersize (US) bearings.
- When using undersize (US) bearing, measure the connecting rod bearing inner diameter with bearing installed, and grind the crankshaft pin so that the connecting rod bearing oil clearance satisfies the standard.

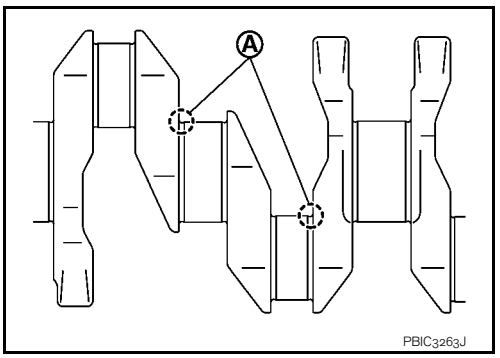
CAUTION:

cardiagn.com

In grinding crankshaft pin to use undersize bearings, keep the fillet R (A) [0.8 - 1.2 mm (0.031 - 0.047 in)].

Bearing undersize table:

Refer to EM-123, "Connecting Rod Bearing".



Main Bearing

INFOID:0000000000893896

HOW TO SELECT MAIN BEARING

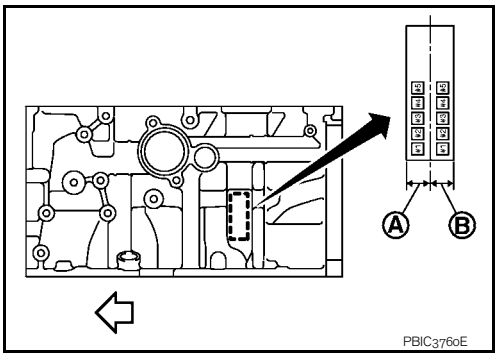
When New Cylinder Block and Crankshaft Are Used

1. "Main Bearing Selection Table" rows correspond to main bearing housing grade on left side of cylinder block.

   A : Basic stamp mark

   ⇦ : Engine front

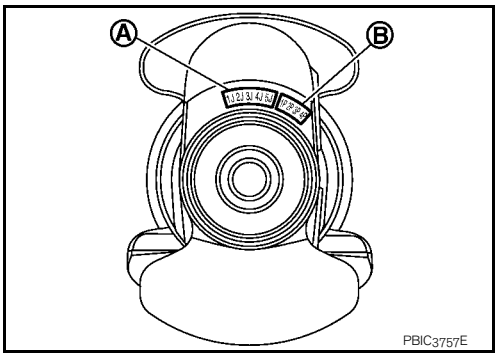
   - If there is a corrected stamp mark (B) on cylinder block, use it as a correct reference.



2. Apply main journal diameter grade stamped on crankshaft front side to column in the "Main Bearing Selection Table".

   A : Main journal diameter grade (No. 1 to 5 from left)

   B : Crankshaft pin journal diameter grade (No. 1 to 4 from left)



3. Read the symbol at the cross point of selected row and column in the "Main Bearing Selection Table".
4. Apply the symbol obtained to the "Main Bearing Grade Table" to select main bearing.
   NOTE:
   Service part is available as a set of both upper and lower.

When Cylinder Block and Crankshaft Are Reused

1. Measure the dimensions of the cylinder block main bearing housing inner diameter and crankshaft main journal diameter individually. Refer to EM-101, "Inspection".
2. Apply the measured dimension to the "Main Bearing Selection Table".
3. Read the symbol at the cross point of selected row and column in the "Main Bearing Selection Table".
4. Apply the symbol obtained to the "Main Bearing Grade Table" to select main bearing.

cardiagn.com

Main Bearing Selection Table

Crankshaft main journal diameter: I.D. mark	Crankshaft main journal diameter: Axle diameter Unit mm (in)	Cylinder block main bearing housing inner diameter: I.D. mark	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W
		Hole diameter Unit: mm (in)	51.997 - 51.998 (2.0471 - 2.0472)	51.998 - 51.999 (2.0472 - 2.0472)	51.999 - 52.000 (2.0472 - 2.0472)	52.000 - 52.001 (2.0472 - 2.0472)	52.001 - 52.002 (2.0473 - 2.0473)	52.002 - 52.003 (2.0473 - 2.0473)	52.003 - 52.004 (2.0474 - 2.0474)	52.004 - 52.005 (2.0474 - 2.0474)	52.005 - 52.006 (2.0474 - 2.0474)	52.006 - 52.007 (2.0475 - 2.0475)	52.007 - 52.008 (2.0475 - 2.0475)	52.0008 - 52.009 (2.0476 - 2.0476)	52.009 - 52.010 (2.0476 - 2.0476)	52.010 - 52.011 (2.0476 - 2.0476)	52.011 - 52.012 (2.0477 - 2.0477)	52.012 - 52.013 (2.0477 - 2.0477)	52.013 - 52.014 (2.0478 - 2.0478)	52.014 - 52.015 (2.0478 - 2.0478)	52.015 - 52.016 (2.0478 - 2.0478)	52.016 - 52.017 (2.0479 - 2.0479)
A	47.979 - 47.978 (1.8889 - 1.8889)		0	0	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23
B	47.978 - 47.977 (1.8889 - 1.8889)		0	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23
C	47.977 - 47.976 (1.8889 - 1.8888)		0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23
D	47.976 - 47.975 (1.8888 - 1.8888)		0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3
E	47.975 - 47.974 (1.8888 - 1.8887)		0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3
F	47.974 - 47.973 (1.8887 - 1.8887)		0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3
G	47.973 - 47.972 (1.8887 - 1.8887)		0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34
H	47.972 - 47.971 (1.8887 - 1.8886)		01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34
J	47.971 - 47.970 (1.8886 - 1.8886)		01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34
K	47.970 - 47.969 (1.8886 - 1.8885)		01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4
L	47.969 - 47.968 (1.8885 - 1.8885)		1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4
M	47.968 - 47.967 (1.8885 - 1.8885)		1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4
N	47.967 - 47.966 (1.8885 - 1.8884)		1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45
P	47.966 - 47.965 (1.8884 - 1.8884)		12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45
R	47.965 - 47.964 (1.8884 - 1.8883)		12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45
S	47.964 - 47.963 (1.8883 - 1.8883)		12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5
T	47.963 - 47.962 (1.8883 - 1.8883)		2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5
U	47.962 - 47.961 (1.8883 - 1.8882)		2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5
V	47.961 - 47.960 (1.8882 - 1.8882)		2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	5
W	47.960 - 47.959 (1.8882 - 1.8881)		23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	5	5

PBIC3759E

Main Bearing Grade Table

Main Bearing Grade Table : Refer to EM-124, "Main Bearing".

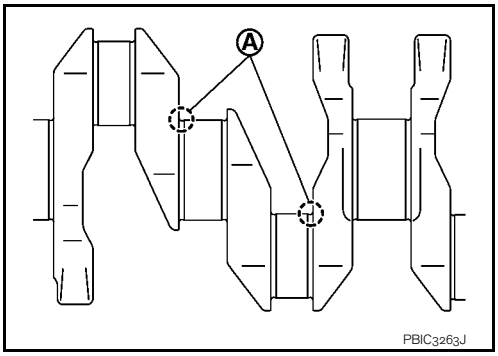
Use Undersize Bearing Usage Guide

- When the specified main bearing oil clearance is not obtained with standard size main bearings, use undersize (US) bearing.
- When using undersize (US) bearing, measure the main bearing inner diameter with bearing installed, and grind main journal so that the main bearing oil clearance satisfies the standard.

CAUTION:

cardiagn.com

In grinding crankshaft main journal to use undersize bearings, keep fillet R (A) [0.8 - 1.2 mm (0.031 - 0.047 in)].



Bearing undersize table:

Refer to EM-124, "Main Bearing".

cardiagn.com

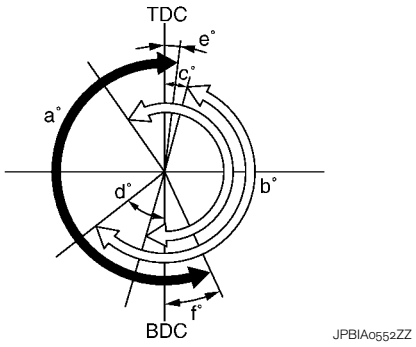
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000000893897

GENERAL SPECIFICATIONS

Engine type		HR16DE
Cylinder arrangement		In-line 4
Displacement cm^3 (cu in)		1,598 (97.51)
Bore and stroke mm (in)		78.0 x 83.6 (3.071 x 3.291)
Valve arrangement		DOHC
Firing order		1-3-4-2
Number of piston rings	Compression	2
	Oil	1
Number of main bearings		4
Compression ratio		10.7
Compression pressure kPa (bar, kg/cm^2, psi)/200 rpm	Standard	1,500 (15.0, 15.3, 217.5)
	Minimum	1,471 (14.7, 15.0, 213.3)
	Differential limit between cylinders	6.2 (0.06, 0.06, 0.9)
Valve timing (Intake valve timing control - “ON”)		

JPBIA0552ZZ

Unit: degree

a	b	c	d	e	f
208	228	-11 (24)	59 (24)	4	24

Drive Belts

INFOID:0000000001083029

BELT DEFLECTION:

Location		Deflection adjustment *		Unit: mm (in)
		Used belt		New belt
		Limit	After adjusted	
Drive belt	With A/C models	7.9 (0.31)	4.8 - 5.3 (0.19 - 0.21)	4.2 - 4.5 (0.17 - 0.18)
	Without A/C models	7.1 (0.28)	4.3 - 4.7 (0.17 - 0.19)	3.6 - 3.9 (0.14 - 0.15)
Applied pushing force		98 N (10 kg, 22 lb)		

*: When engine is cold.

BELT TENSION AND FREQUENCY:

cardiagn.com

Location		Tension adjustment *		Unit: N (kg, lb)	Frequency adjustment *		Unit: Hz
		Used belt		New belt	Used belt		New belt
		Limit	After adjusted		Limit	After adjusted	
Drive belt	With A/C models	500 (51.0, 112)	876 - 964 (89.4 - 98.3, 197 - 217)	1064 - 1152 (108.5 - 117.5, 239 - 259)	163	216 - 225	238 - 246
	Without A/C models	500 (51.0, 112)	876 - 964 (89.4 - 98.3, 197 - 217)	1064 - 1152 (108.5 - 117.5, 239 - 259)	183	242 - 252	266 - 276

*: When engine is cold.

Spark Plug

INFOID:0000000000893899

SPARK PLUG (PLATINUM-TIPPED TYPE)

Unit: mm (in)

Make	NGK
Standard type	PLZKAR6A-11
Gap (Nominal)	1.1 (0.043)

Exhaust Manifold

INFOID:0000000000893901

EXHAUST MANIFOLD

Unit: mm (in)

Items		Limit
Surface distortion	Exhaust manifold	0.3 (0.012)

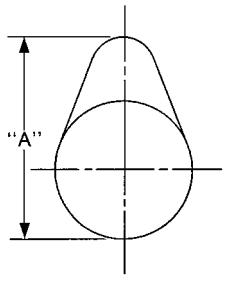
Camshaft

INFOID:0000000000893902

CAMSHAFT

Unit: mm (in)

Items	Standard	Limit
Camshaft runout [TIR*]	0.02 (0.0008)	0.1 (0.004)



SEM671

Camshaft cam height "A"	Intake	41.705 - 41.895 (1.6419 - 1.6494)	—
	Exhaust	40.175 - 40.365 (1.5817 - 1.5892)	—
Camshaft journal diameter	No. 1	27.935 - 27.955 (1.0998 - 1.1006)	—
	No. 2, 3, 4, 5	24.950 - 24.970 (0.9823 - 0.9831)	—
Camshaft bracket inner diameter	No. 1	28.000 - 28.021 (1.1024 - 1.1032)	—
	No. 2, 3, 4, 5	25.000 - 25.021 (0.9843 - 0.9851)	—
Camshaft journal oil clearance	No. 1	0.045 - 0.086 (0.0018 - 0.0034)	0.15 (0.0059)
	No. 2, 3, 4, 5	0.030 - 0.071 (0.0012 - 0.0028)	

cardiagn.com

Items	Standard	Limit
Camshaft end play	0.075 - 0.153 (0.0030 - 0.0060)	0.2 (0.008)
Camshaft sprocket runout [TIR*]	—	0.15 (0.0059)

*: Total indicator reading

VALVE LIFTER

Unit: mm (in)

Items	Standard
Valve lifter outer diameter	29.977 - 29.987 (1.1802 - 1.1806)
Valve lifter hole diameter	30.000 - 30.021 (1.1811 - 1.1819)
Valve lifter clearance	0.013 - 0.044 (0.0005 - 0.0017)

VALVE CLEARANCE

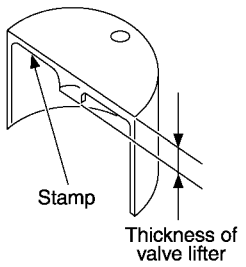
Unit: mm (in)

Items	Cold	Hot* (reference data)
Intake	0.26 - 0.34 (0.010 - 0.013)	0.304 - 0.416 (0.012 - 0.016)
Exhaust	0.29 - 0.37 (0.011 - 0.015)	0.308 - 0.432 (0.012 - 0.017)

*: Approximately 80°C (176°F)

AVAILABLE VALVE LIFTER

Thickness mm (in)	Identification mark



KBIA0119E

3.00 (0.1181)	300
3.02 (0.1189)	302
3.04 (0.1197)	304
3.06 (0.1205)	306
3.08 (0.1213)	308
3.10 (0.1220)	310
3.12 (0.1228)	312
3.14 (0.1236)	314
3.16 (0.1244)	316
3.18 (0.1252)	318
3.20 (0.1260)	320
3.22 (0.1268)	322
3.24 (0.1276)	324
3.26 (0.1283)	326
3.28 (0.1291)	328
3.30 (0.1299)	330
3.32 (0.1307)	332

cardiagn.com

Thickness mm (in)	Identification mark
3.34 (0.1315)	334
3.36 (0.1323)	336
3.38 (0.1331)	338
3.40 (0.1339)	340
3.42 (0.1346)	342
3.44 (0.1354)	344
3.46 (0.1362)	346
3.48 (0.1370)	348
3.50 (0.1378)	350

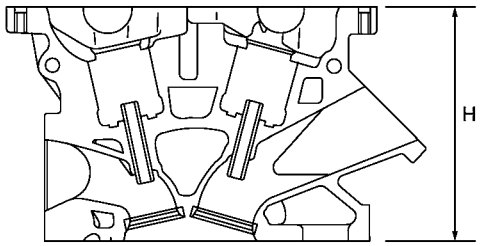
Cylinder Head

INFOID:0000000000893903

CYLINDER HEAD

Unit: mm (in)

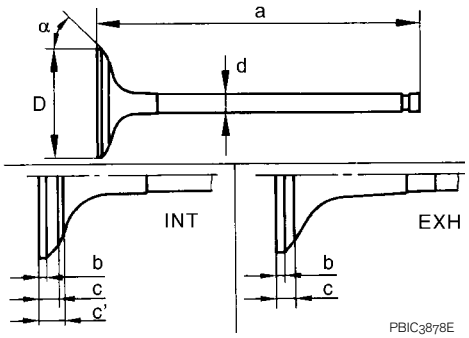
Items	Standard	Limit
Head surface distortion	—	0.1 (0.004)
Normal cylinder head height “H”	125.0 (4.92)	—



PBIC0924E

VALVE DIMENSIONS

Unit: mm (in)



PBIC3878E

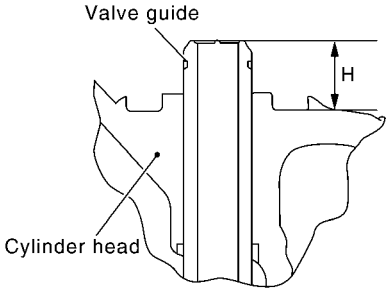
Valve head diameter “D”	Intake	31.0 - 31.3 (1.220 - 1.232)
	Exhaust	25.3 - 25.6 (0.996 - 1.008)
Valve length “a”	Intake	101.65 (4.002)
	Exhaust	102.46 (4.034)
“b”	Intake	1.0 (0.039)
	Exhaust	

cardiagn.com

"c"	Intake	2.1 - 2.8 (0.083 - 0.110)
	Exhaust	2.3 - 3.0 (0.091 - 0.118)
"c'"	Intake	3.0 (0.118)
	Exhaust	–
Valve stem diameter "d "	Intake	4.965 - 4.980 (0.1955 - 0.1961)
	Exhaust	4.955 - 4.970 (0.1951 - 0.1957)
Valve seat angle "α"	Intake	45°15′ - 45°45′
	Exhaust	

VALVE GUIDE

Unit: mm (in)



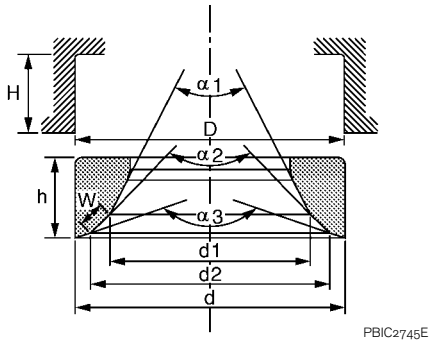
PBIC2187E

Items		Standard	Oversize (service) [0.2 (0.008)]
Valve guide	Outer diameter	9.023 - 9.034 (0.3552 - 0.3557)	9.223 - 9.234 (0.3631 - 0.3635)
	Inner diameter (Finished size)	5.000 - 5.018 (0.1969 - 0.1976)	
Cylinder head valve guide hole diameter		8.975 - 8.996 (0.3533 - 0.3542)	9.175 - 9.196 (0.3612 - 0.3620)
Interference fit of valve guide		0.027 - 0.059 (0.0011 - 0.0023)	

Items		Standard	Limit
Valve guide clearance	Intake	0.020 - 0.053 (0.0008 - 0.0021)	0.1 (0.004)
	Exhaust	0.030 - 0.063 (0.0012 - 0.0025)	
Projection length "H"		11.4 - 11.8 (0.449 - 0.465)	

VALVE SEAT

Unit: mm (in)



PBIC2745E

Items		Standard	Oversize (service) [0.5 (0.02)]
Cylinder head seat recess diameter "D"	Intake	31.400 - 31.416 (1.2362 - 1.2368)	31.900 - 31.916 (1.2559 - 1.2565)
	Exhaust	25.900 - 25.916 (1.0197 - 1.0203)	26.400 - 26.416 (1.0394 - 1.0400)
Valve seat outer diameter "d"	Intake	31.497 - 31.513 (1.2400 - 1.2407)	31.997 - 32.013 (1.2597 - 1.2604)
	Exhaust	25.997 - 26.013 (1.0235 - 1.0241)	26.497 - 26.513 (1.0432 - 1.0438)

cardiagn.com

Valve seat interference fit	Intake	0.081 - 0.113 (0.0032 - 0.0044)	
	Exhaust		
Diameter “d1”*1	Intake	29.0 (1.142)	
	Exhaust	23.0 (0.906)	
Diameter “d2”*2	Intake	30.3 - 30.8 (1.193 - 1.213)	
	Exhaust	24.6 - 25.1 (0.969 - 0.988)	
Angle “α1”	Intake	60°	
	Exhaust	45°	
Angle “α2”	Intake	88°45′ - 90°15′	
	Exhaust		
Angle “α3”	Intake	120°	
	Exhaust		
Contacting width “W”*3	Intake	1.05 - 1.35 (0.0413 - 0.0531)	
	Exhaust	1.25 - 1.55 (0.0492 - 0.0610)	
Height “h”	Intake	6.0 (0.236)	5.45 (0.215)
	Exhaust		5.43 (0.214)
Depth “H”		6.0 (0.236)	

*1 : Diameter made by intersection point of conic angles α1 and α2

*2 : Diameter made by intersection point of conic angles α2 and α3

*3 : Machining data

VALVE SPRING

Items	Standard
Free height	42.26 mm (1.6638 in)
Installation height	32.40 mm (1.2756 in)
Installation load	136 - 154 N (13.9 - 15.7 kg, 31 - 35 lb)
Height during valve open	23.96 mm (0.9433 in)
Load with valve open	262 - 296 N (26.7 - 30.2 kg, 59 - 67 lb)

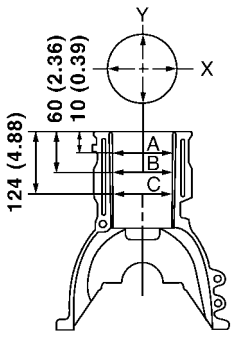
Items	Limit
Valve spring squareness	1.8 mm (0.071 in)

Cylinder Block

INFOID:0000000000893904

CYLINDER BLOCK

Unit: mm (in)



PBIC3924E

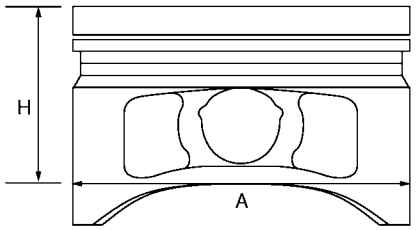
Cylinder block top surface distortion	Limit	0.1 (0.004)

cardiagn.com

Cylinder bore inner diameter	Standard		78.000 - 78.015 (3.0709 - 3.0715)
Out-of-round	Limit		0.015 (0.0006)
Taper			0.010 (0.0004)
Cylinder block main bearing housing inner diameter grade		Grade No. A	51.997 - 51.998 (2.0471 - 2.0472)
		Grade No. B	51.998 - 51.999 (2.0472 - 2.0472)
		Grade No. C	51.999 - 52.000 (2.0472 - 2.0472)
		Grade No. D	52.000 - 52.001 (2.0472 - 2.0473)
		Grade No. E	52.001 - 52.002 (2.0473 - 2.0473)
		Grade No. F	52.002 - 52.003 (2.0473 - 2.0474)
		Grade No. G	52.003 - 52.004 (2.0474 - 2.0474)
		Grade No. H	52.004 - 52.005 (2.0474 - 2.0474)
		Grade No. J	52.005 - 52.006 (2.0474 - 2.0475)
		Grade No. K	52.006 - 52.007 (2.0475 - 2.0475)
		Grade No. L	52.007 - 52.008 (2.0475 - 2.0476)
		Grade No. M	52.008 - 52.009 (2.0476 - 2.0476)
		Grade No. N	52.009 - 52.010 (2.0476 - 2.0476)
		Grade No. P	52.010 - 52.011 (2.0476 - 2.0477)
		Grade No. R	52.011 - 52.012 (2.0477 - 2.0477)
		Grade No. S	52.012 - 52.013 (2.0477 - 2.0478)
		Grade No. T	52.013 - 52.014 (2.0478 - 2.0478)
		Grade No. U	52.014 - 52.015 (2.0478 - 2.0478)
		Grade No. V	52.015 - 52.016 (2.0478 - 2.0479)
		Grade No. W	52.016 - 52.017 (2.0479 - 2.0479)
Difference in inner diameter between cylinders	Standard		Less than 0.03 (0.0012)

AVAILABLE PISTON

Unit: mm (in)



PBICo188E

Item	Standard	Limit
Piston skirt diameter “A”	77.965 - 77.980 (3.0695 - 3.0701)	—
Measure point “H”	37.1 (1.461)	—
Piston pin hole diameter	19.006 - 19.012 (0.7483 - 0.7485)	—
Piston to cylinder bore clearance	0.020 - 0.050 (0.0008 - 0.0020)	0.09 (0.0035)

PISTON RING

Unit: mm (in)

Items		Standard	Limit
Piston ring side clearance	Top	0.040 - 0.080 (0.0016 - 0.0031)	0.11 (0.0043)
	2nd	0.030 - 0.070 (0.0012 - 0.0028)	0.10 (0.0039)
	Oil (rail ring)	0.045 - 0.125 (0.0018 - 0.0049)	—
Piston ring end gap	Top	0.20- 0.30 (0.0079 - 0.0118)	0.50 (0.0197)
	2nd	0.35 - 0.50 (0.0138 - 0.0197)	0.66 (0.0260)
	Oil (rail ring)	0.20 - 0.60 (0.0079 - 0.0236)	0.92 (0.0362)

PISTON PIN

cardiagn.com

Unit: mm (in)

Piston pin outer diameter		18.996 - 19.002 (0.7479 - 0.7481)
Piston to piston pin oil clearance	Standard	0.008 - 0.012 (0.0003 - 0.0005)

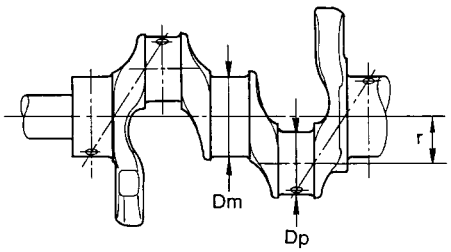
CONNECTING ROD

Unit: mm (in)

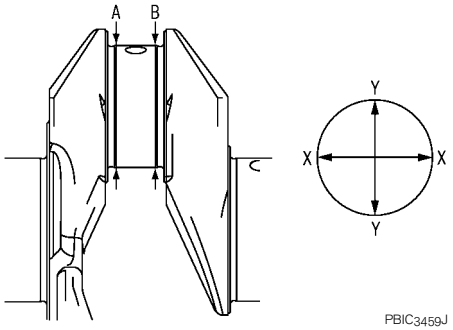
Center distance		129.84 - 129.94 (5.11 - 5.12)
Bend [per 100 (3.94)]	Limit	0.15 (0.0059)
Torsion [per 100 (3.94)]	Limit	0.30 (0.0118)
Connecting rod small end clearance	Standard	–0.018 - –0.044 (–0.0007 - –0.0017)
Connecting rod small end inner diameter	Standard	18.958 - 18.978 (0.7464 - 0.7472)
Connecting rod side clearance	Standard	0.200 - 0.352 (0.0079 - 0.0139)
Connecting rod big end diameter	Grade No. A Grade No. B Grade No. C Grade No. D Grade No. E Grade No. F Grade No. G Grade No. H Grade No. J Grade No. K Grade No. L Grade No. M Grade No. N	43.000 - 43.001 (1.6929 - 1.6929) 43.001 - 43.002 (1.6929 - 1.6930) 43.002 - 43.003 (1.6930 - 1.6930) 43.003 - 43.004 (1 6930 - 1.6931) 43.004 - 43.005 (1.6931 - 1.6931) 43.005 - 43.006 (1.6931 - 1.6931) 43.006 - 43.007 (1.6931 - 1.6932) 43.007 - 43.008 (1.6932 - 1.6932) 43.008 - 43.009 (1.6932 - 1.6933) 43.009 - 43.010 (1.6933 - 1.6933) 43.010 - 43.011 (1.6933 - 1.6933) 43.011 - 43.012 (1.6933 - 1.6934) 43.012 - 43.013 (1.6934 - 1.6934)

CRANKSHAFT

Unit: mm (in)



SEM645



PBIC3459J

Center distance “r”		41.68 - 41.76 (1.6409 - 1.6441)
Out-of-round	Limit	0.003 (0.0001)
Taper	Limit	0.004 (0.0002)
Runout [TIR*]	Limit	0.10 (0.0039)
Crankshaft end play	Standard	0.098 - 0.260 (0.0039 - 0.0102)
	Limit	0.35 (0.0138)

cardiagn.com

Crankshaft pin journal diameter grade. “Dp”	Grade No. A	39.971 - 39.970 (1.5737 - 1.5736)
	Grade No. B	39.970 - 39.969 (1.5736 - 1.5736)
	Grade No. C	39.969 - 39.968 (1.5736 - 1.5735)
	Grade No. D	39.968 - 39.967 (1.5735 - 1.5735)
	Grade No. E	39.967 - 39.966 (1.5735 - 1.5735)
	Grade No. F	39.966 - 39.965 (1.5735 - 1.5734)
	Grade No. G	39.965 - 39.964 (1.5734 - 1.5734)
	Grade No. H	39.964 - 39.963 (1.5734 - 1.5733)
	Grade No. J	39.963 - 39.962 (1.5733 - 1.5733)
	Grade No. K	39.962 - 39.961 (1.5733 - 1.5733)
	Grade No. L	39.961 - 39.960 (1.5733 - 1.5732)
	Grade No. M	39.960 - 39.959 (1.5732 - 1.5732)
	Grade No. N	39.959 - 39.958 (1.5732 - 1.5731)
	Grade No. P	39.958 - 39.957 (1.5731 - 1.5731)
	Grade No. R	39.957 - 39.956 (1.5731 - 1.5731)
	Grade No. S	39.956 - 39.955 (1.5731 - 1.5730)
	Grade No. T	39.955 - 39.954 (1.5730 - 1.5730)
	Grade No. U	39.954 - 39.953 (1.5730 - 1.5729)
Crankshaft main journal diameter grade. “Dm”	Grade No. A	47.979 - 47.978 (1.8889 - 1.8889)
	Grade No. B	47.978 - 47.977 (1.8889 - 1.8889)
	Grade No. C	47.977 - 47.976 (1.8889 - 1.8888)
	Grade No. D	47.976 - 47.975 (1.8888 - 1.8888)
	Grade No. E	47.975 - 47.974 (1.8888 - 1.8887)
	Grade No. F	47.974 - 47.973 (1.8887 - 1.8887)
	Grade No. G	47.973 - 47.972 (1.8887 - 1.8887)
	Grade No. H	47.972 - 47.971 (1.8887 - 1.8886)
	Grade No. J	47.971 - 47.970 (1.8886 - 1.8886)
	Grade No. K	47.970 - 47.969 (1.8886 - 1.8885)
	Grade No. L	47.969 - 47.968 (1.8885 - 1.8885)
	Grade No. M	47.968 - 47.967 (1.8885 - 1.8885)
	Grade No. N	47.967 - 47.966 (1.8885 - 1.8884)
	Grade No. P	47.966 - 47.965 (1.8884 - 1.8884)
	Grade No. R	47.995 - 47.964 (1.8884 - 1.8883)
	Grade No. S	47.994 - 47.963 (1.8883 - 1.8883)
	Grade No. T	47.963 - 47.962 (1.8883 - 1.8883)
	Grade No. U	47.962 - 47.961 (1.8883 - 1.8882)
	Grade No. V	47.961 - 47.960 (1.8882 - 1.8882)
	Grade No. W	47.960 - 47.959 (1.8882 - 1.8881)

*: Total indicator reading

Connecting Rod Bearing

INFOID:0000000000893906

CONNECTING ROD BEARING GRADE TABLE

Unit: mm (in)

Grade number		Thickness	Identification color	Remarks
0		1.498 - 1.501 (0.0590 - 0.0591)	Black	Grade and color are the same for upper and lower bearings.
1		1.501 - 1.504 (0.0591 - 0.0592)	Brown	
2		1.504 - 1.507 (0.0592 - 0.0593)	Green	
3		1.507 - 1.510 (0.0593 - 0.0594)	Yellow	
4		1.510 - 1.513 (0.0594 - 0.0596)	Blue	
01	UPR	1.498 - 1.501 (0.0590 - 0.0591)	Black	Grade and color are different for upper and lower bearings.
	LWR	1.501 - 1.504 (0.0591 - 0.0592)	Brown	
12	UPR	1.501 - 1.504 (0.0591 - 0.0592)	Brown	
	LWR	1.504 - 1.507 (0.0592 - 0.0593)	Green	
23	UPR	1.504 - 1.507 (0.0592 - 0.0593)	Green	
	LWR	1.507 - 1.510 (0.0593 - 0.0594)	Yellow	
34	UPR	1.507 - 1.510 (0.0593 - 0.0594)	Yellow	
	LWR	1.510 - 1.513 (0.0594 - 0.0596)	Blue	

cardiagn.com

UNDERSIZE TABLE

Unit: mm (in)

Item	Thickness	Crankshaft pin journal diameter
US 0.25 (0.0098)	1.627 - 1.635 (0.0641 - 0.0644)	Grind so that bearing clearance is the specified value.

CONNECTING ROD BEARING OIL CLEARANCE

Unit: mm (in)

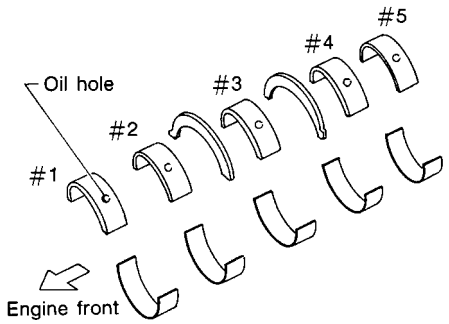
Connecting rod bearing oil clearance	Standard	0.029 - 0.039 (0.0011 - 0.0015)
	Limit	0.10 (0.0039)

Main Bearing

INFOID:0000000000893905

MAIN BEARING GRADE TABLE

Unit: mm (in)



SEM685D

Grade number		Thickness	Identification color	Remarks
0		1.996 - 1.999 (0.0786 - 0.0787)	Black	Grade and color are the same for upper and lower bearings.
1		1.999 - 2.002 (0.0787 - 0.0788)	Brown	
2		2.002 - 2.005 (0.0788 - 0.0789)	Green	
3		2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
4		2.008 - 2.011 (0.0791 - 0.0792)	Blue	
5		2.011 - 2.014 (0.0792 - 0.0793)	Pink	
01	UPR	1.996 - 1.999 (0.0786 - 0.0787)	Black	Grade and color are different for upper and lower bearings.
	LWR	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
12	UPR	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
	LWR	2.002 - 2.005 (0.0788 - 0.0789)	Green	
23	UPR	2.002 - 2.005 (0.0788 - 0.0789)	Green	
	LWR	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
34	UPR	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
	LWR	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
45	UPR	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
	LWR	2.011 - 2.014 (0.0792 - 0.0793)	Pink	

UNDERSIZE TABLE

Unit: mm (in)

Items	Thickness	Main journal diameter
0.25 (0.0098)	2.126 - 2.134 (0.0837 - 0.0840)	Grind so that bearing clearance is the specified value.

MAIN BEARING OIL CLEARANCE

Unit: mm (in)

Main bearing oil clearance	Standard	0.024 - 0.034 (0.0009 - 0.0013)

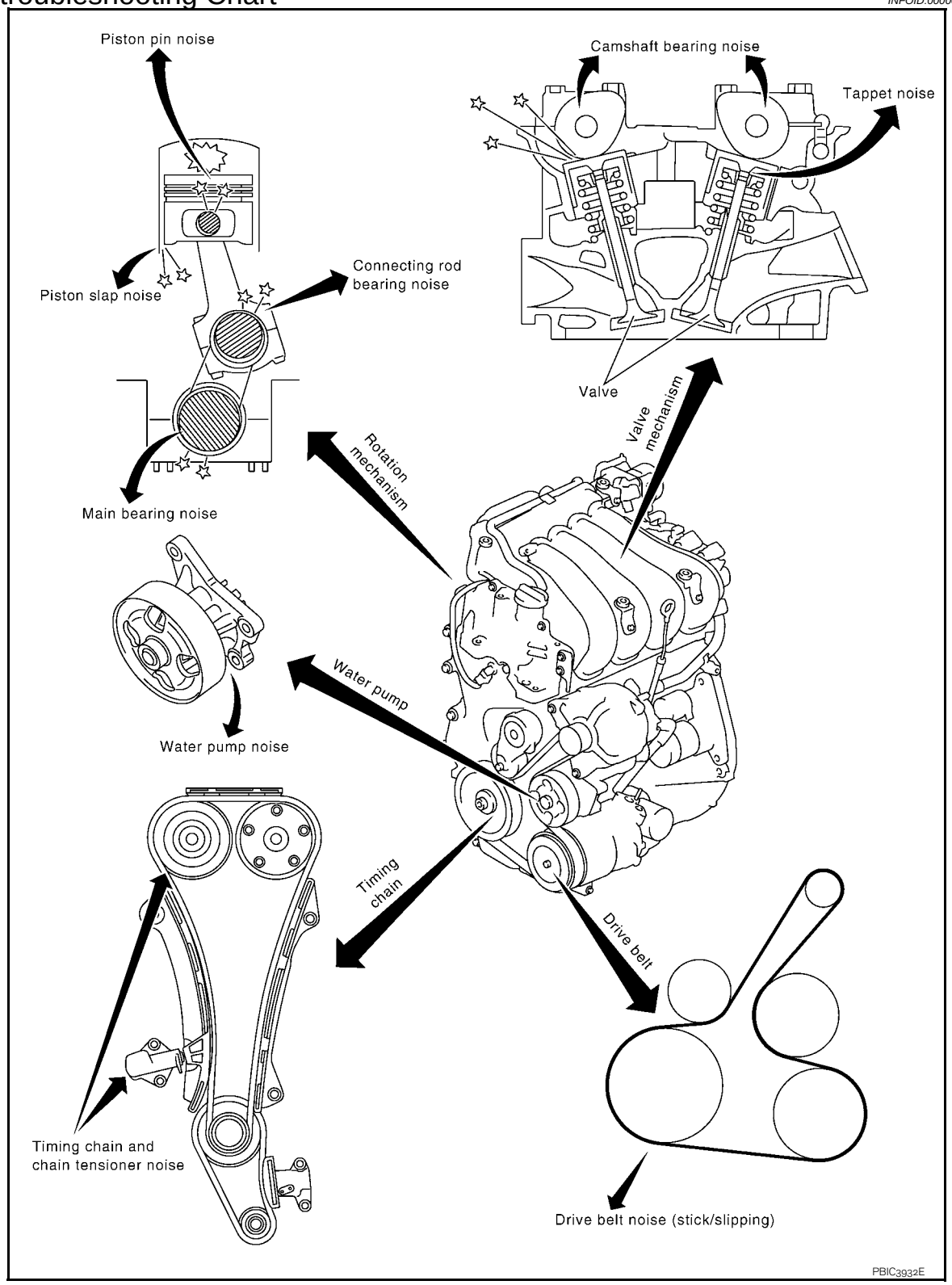
cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH troubleshooting Chart

INFOID:0000000000893919



1. Locate the area where noise occurs.
2. Confirm the type of noise.
3. Specify the operating condition of engine.
4. Check specified noise source.

cardiagn.com

If necessary, repair or replace these parts.

Location of noise	Type of noise	Operating condition of engine						Source of noise	Check item	Reference page
		Before warm-up	After warm-up	When starting	When idling	When racing	While driving			
Top of engine Rocker cover Cylinder head	Ticking or clicking	C	A	—	A	B	—	Tappet noise	Valve clearance	EM-139
	Rattle	C	A	—	A	B	C	Camshaft bearing noise	Camshaft journal oil clearance Camshaft runout	EM-237 EM-237
Crankshaft pulley Cylinder block (Side of engine) Oil pan	Slap or knock	—	A	—	B	B	—	Piston pin noise	Piston to piston pin oil clearance Connecting rod bushing oil clearance	EM-241 EM-241
	Slap or rap	A	—	—	B	B	A	Piston slap noise	Piston to cylinder bore clearance Piston ring side clearance Piston ring end gap Connecting rod bend and torsion	EM-241 EM-241 EM-241 EM-241
	Knock	A	B	C	B	B	B	Connecting rod bearing noise	Connecting rod bushing oil clearance Connecting rod bearing oil clearance	EM-241 EM-244
	Knock	A	B	—	A	B	C	Main bearing noise	Main bearing oil clearance Crankshaft runout	EM-245 EM-245
Front of engine Front cover	Tapping or ticking	A	A	—	B	B	B	Timing chain and chain tensioner noise	Timing chain cracks and wear Timing chain tensioner operation	EM-171 EM-163
Front of engine	Squeaking or fizzing	A	B	—	B	—	C	Drive belt (Sticking or slipping)	Drive belt deflection	EM-134
	Creaking	A	B	A	B	A	B	Drive belt (Slipping)	Idler pulley bearing operation	
	Squall Creak	A	B	—	B	A	B	Water pump noise	Water pump operation	CO-39

A: Closely related B: Related C: Sometimes related —: Not related

cardiagn.com

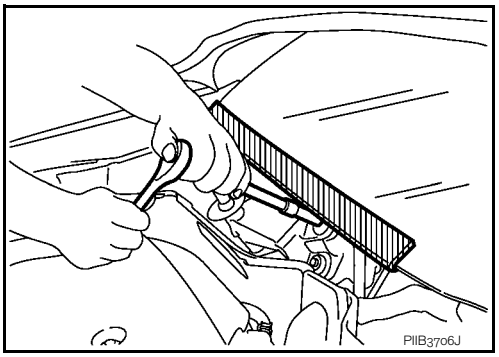
PRECAUTION

PRECAUTIONS

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001117288

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001117287

NOTE:
- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Draining Engine Coolant

INFOID:0000000000893910

Drain engine coolant and engine oil when the engine is cooled.

Disconnecting Fuel Piping

INFOID:0000000000893911

- Before starting work, make sure no fire or spark producing items are in the work area.
- Release fuel pressure before disconnecting and disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

Removal and Disassembly

INFOID:0000000000893912

cardiagn.com

- When instructed to use SST, use specified tools. Always be careful to work safely, avoid forceful or uninstructed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Dowel pins are used for several parts alignment. When replacing and reassembling parts with dowel pins, make sure that dowel pins are installed in the original position.
- Cover openings of engine system with a tape or equivalent, if necessary, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and re-assembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used in the step.

Inspection, Repair and Replacement

INFOID:0000000000893913

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

Assembly and Installation

INFOID:0000000000893914

- Use torque wrench to tighten bolts or nuts to specification.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check engine oil or engine coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- Release air within route when refilling after draining engine coolant.
- After repairing, start the engine and increase engine speed to check engine coolant, fuel, engine oil, and exhaust gases for leakage.

Parts Requiring Angle Tightening

INFOID:0000000000893915

- Use the angle wrench [SST: KV10112100] for the final tightening of the following engine parts:
- Camshaft sprocket (INT) bolt
- Cylinder head bolts
- Main bearing cap bolts
- Connecting rod cap bolts
- Crankshaft pulley bolt (No the angle wrench is required as bolt flange is provided with notches for angle tightening)
- Do not use a torque value for final tightening.
- The torque value for these parts are for a preliminary step.
- Ensure thread and seat surfaces are clean and coated with engine oil.

Liquid Gasket

INFOID:0000000000893916

REMOVAL OF LIQUID GASKET SEALING

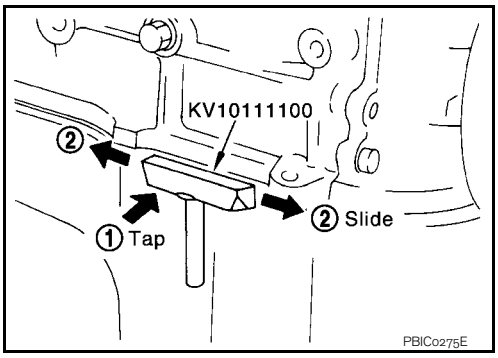
- After removing mounting nuts and bolts, separate the mating surface using the seal cutter (SST) and remove old liquid gasket sealing.

  CAUTION:

  Be careful not to damage the mating surfaces.
- Tap the seal cutter to insert it (1), and then slide it (2) by tapping on the side as shown in the figure.
- In areas where the seal cutter (SST) is difficult to use, use a plastic hammer to lightly tap the parts, to remove it.

  CAUTION:

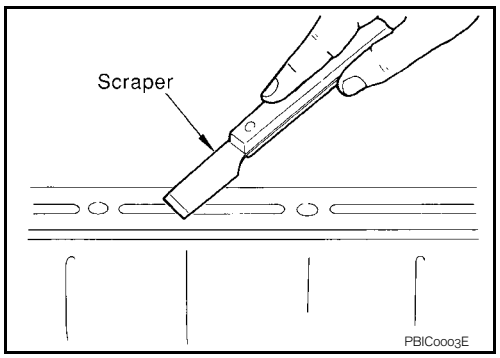
  If for some unavoidable reason tool such as a screwdriver is used, be careful not to damage the mating surfaces.



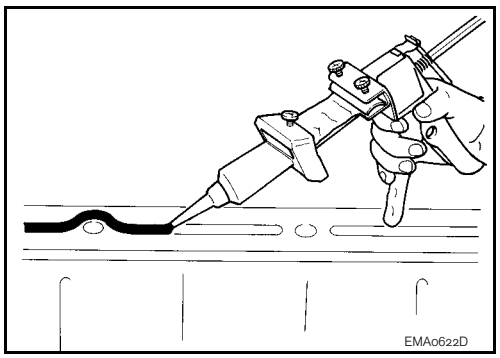
LIQUID GASKET APPLICATION PROCEDURE

cardiagn.com

1. Using a scraper, remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove liquid gasket completely from the groove of the liquid gasket application surface, mounting bolts, and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.

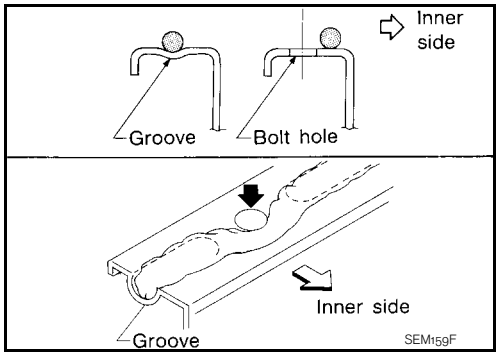


3. Attach liquid gasket tube to the tube presser (commercial service tool).
   Use Genuine Liquid Gasket or equivalent.
4. Apply liquid gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for liquid gasket application, apply liquid gasket to the groove.



- As for bolt holes, normally apply liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Make sure to read the text of this manual.
- Within five minutes of liquid gasket application, install the mating component.
- If liquid gasket protrudes, wipe it off immediately.
- Do not retighten mounting bolts or nuts after the installation.
- After 30 minutes or more have passed from the installation, fill engine oil and engine coolant.

CAUTION:
If there are specific instructions in this manual, observe them.



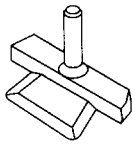
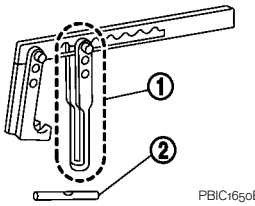
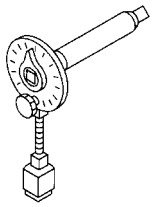
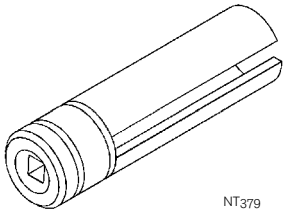
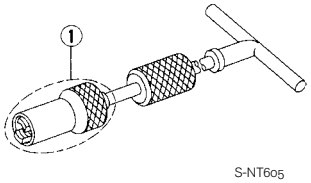
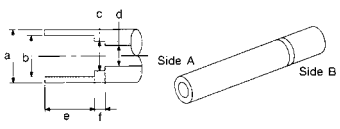
cardiagn.com

PREPARATION

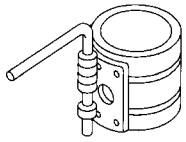
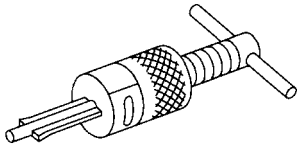
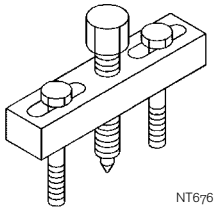
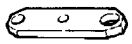
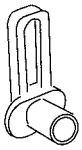
PREPARATION

Special Service Tools

INFOID:0000000000893917

Tool number Tool name	Description
KV10111100 Seal cutter  S-NT046	Removing oil pan (upper and lower) etc.
KV10116200 Valve spring compressor 1. KV10115900 Attachment 2. KV10109220 Adapter  PBIC1650E	Disassembling and assembling valve mechanism Part (1) is a component of KV10116200, but Part (2) is not so.
KV10112100 Angle wrench  S-NT014	Tightening bolts for main bearing cap, cylinder head, etc.
KV10117100 Heated oxygen sensor wrench  NT379	Loosening or tightening heated oxygen sensor 1 **For 22 mm (0.87 in) width hexagon nut**
KV10107902 Valve oil seal puller 1. KV10116100 Valve oil seal puller adapter  S-NT605	Removing valve oil seal
KV10115600 Valve oil seal drift  S-NT603	Installing valve oil seal **Use side A.** **a: 20 (0.79) dia.** **d: 8 (0.31) dia.** **b: 13 (0.51) dia.** **e: 10.7 (0.421)** **c: 10.3 (0.406) dia.** **f: 5 (0.20)** Unit: mm (in)

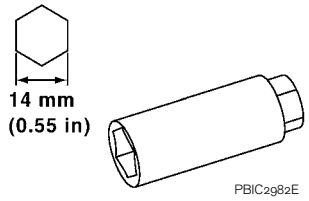
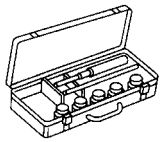
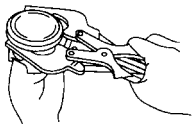
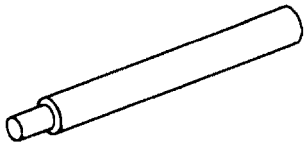
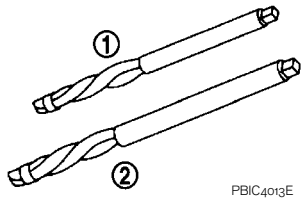
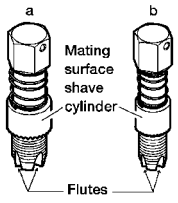
cardiagn.com

Tool number Tool name	Description
EM03470000 Piston ring compressor  S-NT044	Installing piston assembly into cylinder bore
ST16610001 Pilot bushing puller  S-NT045	Removing pilot converter (A/T models)
KV11103000 Pulley puller  NT676	Removing crankshaft pulley
KV11105210 Stopper plate  ZZA0009D	Fixing drive plate and flywheel
Quick connector release  PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Part No. 16441 6N210)

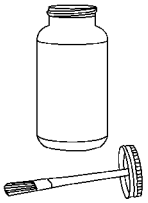
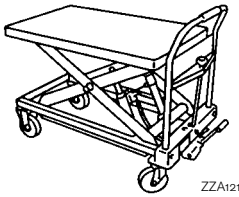
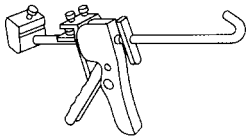
Commercial Service Tools

INFOID:0000000000893918

cardiagn.com

Tool name	Description
Spark plug wrench  PBIC2982E	Removing and installing spark plug
Pulley holder ZZA1010D	Crankshaft pulley removing and installing
Valve seat cutter set  S-NT048	Finishing valve seat dimensions
Piston ring expander  S-NT030	Removing and installing piston ring
Valve guide drift  PBIC4012E	Removing and installing valve guide
Valve guide reamer  PBIC4013E	1: Reaming valve guide inner hole 2: Reaming hole for oversize valve guide
Oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new heated oxygen sensor (Use with anti-seize lubricant shown below.) **a = 18 mm (0.71 in) dia. for zirconia heated oxygen sensor** **b = 12 mm (0.47 in) dia. for titania heated oxygen sensor**

cardiagn.com

Tool name	Description
Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907)  AEM489	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads
Manual lift table caddy  ZZA1210D	Removing and installing engine
Tube presser  S-NT052	Pressing the tube of liquid gasket

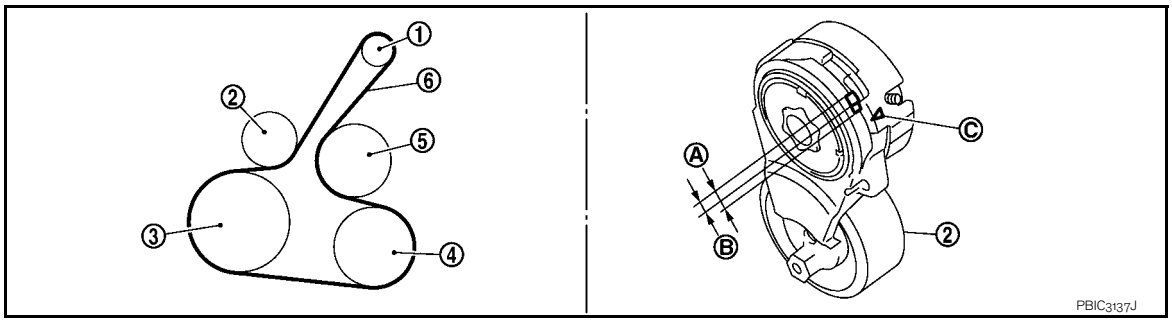
cardiagn.com

ON-VEHICLE MAINTENANCE

DRIVE BELTS

Exploded View

INFOID:0000000000895581



1.	Alternator	2.	Drive belt auto-tensioner	3.	Crankshaft pulley
4.	A/C compressor (with A/C models) Idler pulley (without A/C models)	5.	Water pump	6.	Drive belt
A.	Possible use range	B.	Range when new drive belt is installed	C.	Indicator

Checking

INFOID:0000000000895582

WARNING:
Perform this step when engine is stopped.

- Make sure that the indicator (notch on fixed side) of drive belt auto-tensioner is within the possible use range (A) in the figure.
  NOTE:
  - Check the drive belt auto-tensioner indication when the engine is cold.
  - When new drive belt is installed, the indicator (notch on fixed side) should be within the range (B) in the figure.
- Visually check entire drive belt for wear, damage or cracks.
- If the indicator (notch on fixed side) is out of the possible use range or belt is damaged, replace drive belt.

Tension Adjustment

INFOID:0000000000895583

Refer to : EM-236, "Drive Belt".

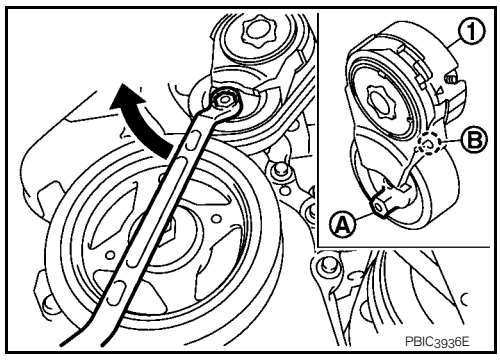
Belt tension is not necessary, as it is automatically adjusted by drive belt auto-tensioner.

Removal and Installation

INFOID:0000000000893920

REMOVAL

1. Hold the hexagonal part (A) of drive belt auto-tensioner (1) with a wrench securely. Then move the wrench handle in the direction of arrow (loosening direction of tensioner).
   CAUTION:
   Avoid placing hand in a location where pinching may occur if the holding tool accidentally comes off.
2. Insert a rod approximately 6 mm (0.24 in) in diameter such as short-length screwdriver into the hole (B) of the retaining boss to fix drive belt auto-tensioner.
   - Keep drive belt auto-tensioner pulley arm locked after drive belt is removed.
3. Remove drive belt.



INSTALLATION

cardiagn.com

1. Install drive belt.
   CAUTION:
   - **Confirm drive belt is completely set to pulleys.**
   - **Check for engine oil, working fluid and engine coolant are not adhered to drive belt and each pulley groove.**
2. Release drive belt auto-tensioner, and apply tension to drive belt.
3. Turn crankshaft pulley clockwise several times to equalize tension between each pulley.
4. Confirm tension of drive belt at indicator (notch on fixed side) is within the possible use range. Refer to EM-134, "Exploded View".

cardiagn.com

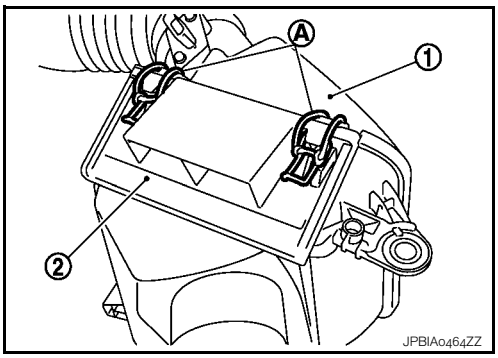
AIR CLEANER FILTER

Removal and Installation

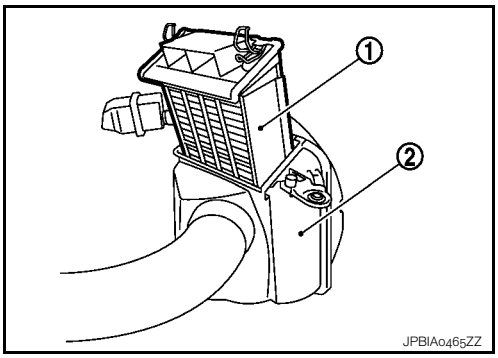
INFOID:0000000000893922

REMOVAL

1. Unhook clips (A) and remove holder (2) from air cleaner case (1).



2. Remove air cleaner filter (1) from air cleaner case (2).



INSTALLATION

Note the following, and install in the reverse order of removal.

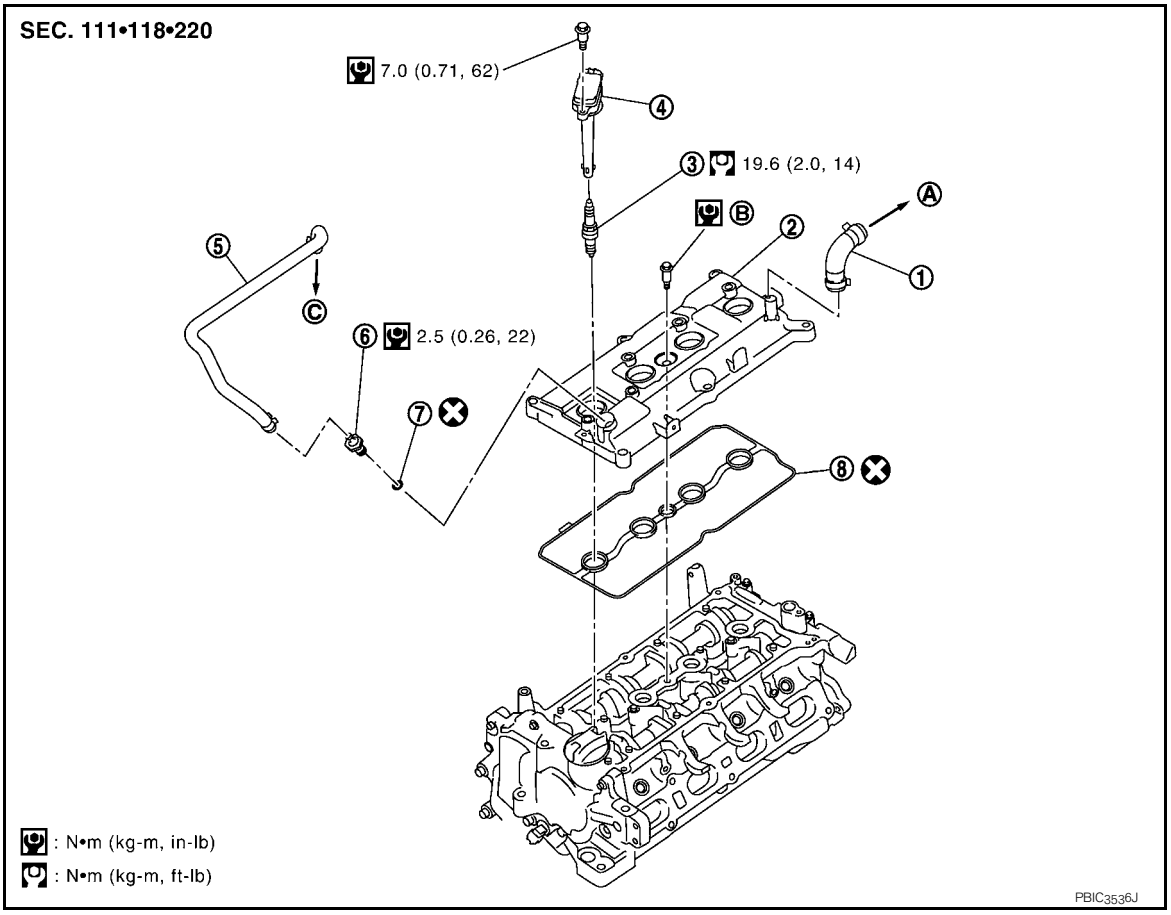
- Install the air cleaner filter by aligning the seal with the notch of air cleaner case.

cardiagn.com

SPARK PLUG

Exploded View

INFOID:0000000000893923



1. PCV hose
2. Rocker cover
3. Spark plug
4. Ignition coil
5. PCV hose
6. PCV valve
7. O-ring
8. Gasket
A. To air duct
B. Refer to EM-160
C. To intake manifold

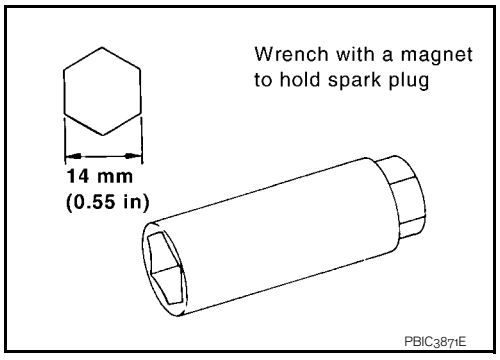
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000893924

REMOVAL

1. Remove ignition coil. Refer to EM-160, "Exploded View".
2. Remove spark plug with a spark plug wrench (commercial service tool).



INSTALLATION

cardiagn.com

Installation is the reverse order of removal.

Inspection

INFOID:0000000000893925

INSPECTION AFTER REMOVAL

Use the standard type spark plug for normal condition.

Spark plug (standard) : Refer to EM-236, "Spark Plug".

CAUTION:

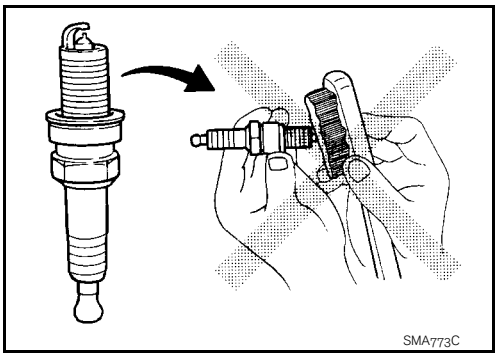
- **Never drop or shock spark plug.**
- **Never use a wire brush for cleaning.**
- **If plug tip is covered with carbon, spark plug cleaner may be used.**

Cleaner air pressure:

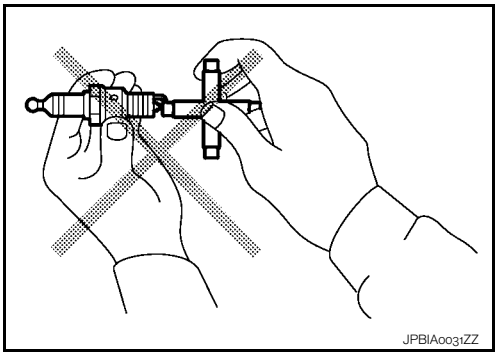
Less than 588 kPa (6 kg/cm^2, 85 psi)

Cleaning time:

Less than 20 seconds



- **Checking and adjusting plug gap is not required between change intervals.**



cardiagn.com

CAMSHAFT VALVE CLEARANCE

Inspection and Adjustment

INFOID:0000000000893926

INSPECTION

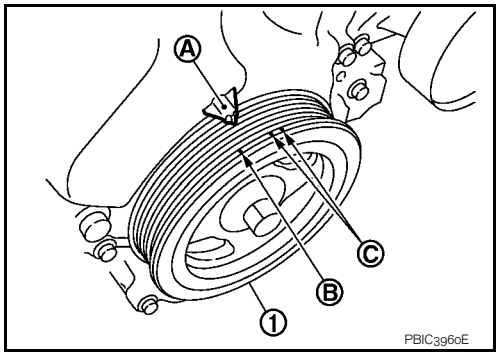
Perform inspection as follows after removal, installation or replacement of camshaft or valve-related parts, or if there is unusual engine conditions regarding valve clearance.

1. Remove rocker cover. Refer to EM-160, "Exploded View".
2. Measure the valve clearance with the following procedure:

a. Set No. 1 cylinder at TDC of its compression stroke.

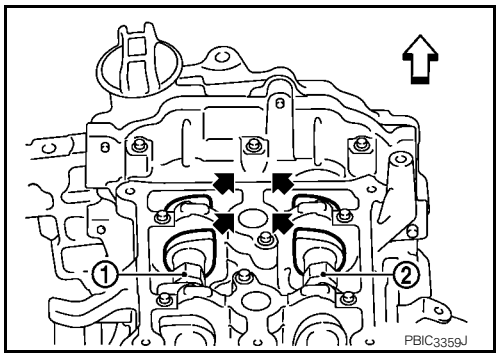
- Rotate crankshaft pulley (1) clockwise and align TDC mark (no paint) (B) to timing indicator (A) on front cover.

C : White paint mark (Not use for service)



- At the same time, make sure that both intake and exhaust cam noses of No. 1 cylinder face inside (⬅) as shown in the figure.

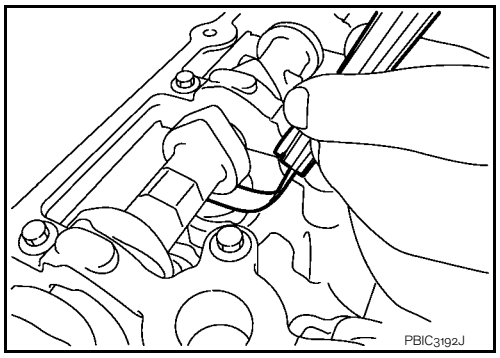
1 : Camshaft (INT)
2 : Camshaft (EXH)
⇦ : Engine front



- If they do not face inside, rotate crankshaft pulley once more (360 degrees) and align as shown in the figure.

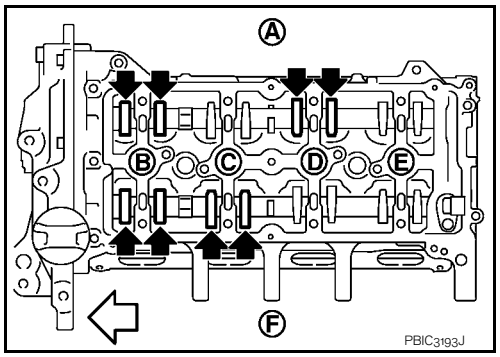
b. Use a feeler gauge, measure the clearance between valve lifter and camshaft.

Valve clearance : Refer to EM-237, "Camshaft".



- By referring to the figure, measure the valve clearances at locations marked "×" as shown in the table below [locations indicated with black arrow (⬅) in the figure] with a feeler gauge.

A : Exhaust side
B : No.1 cylinder
C : No.2 cylinder
D : No.3 cylinder
E : No.4 cylinder



cardiagn.com

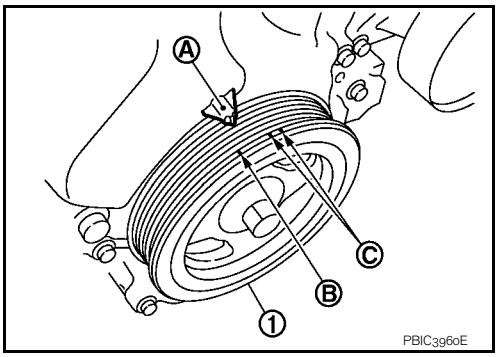
F : Intake side

⇦ : Engine front

Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
No. 1 cylinder at compression TDC	EXH	×		×	
	INT	×	×		

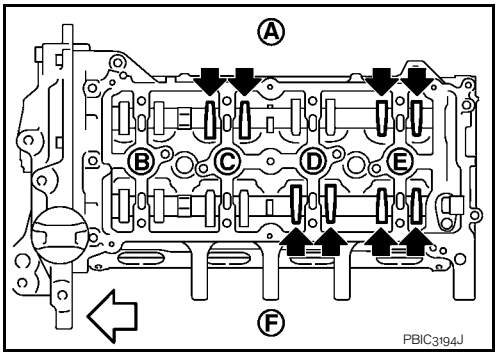
c. Set No.4 cylinder at TDC of its compression stroke.
- Rotate crankshaft pulley (1) one revolution (360 degrees) and align TDC mark (no paint) (B) to timing indicator (A) on front cover.

C : White paint mark (Not use for service)



- By referring to the figure, measure the valve clearance at locations marked "×" as shown in the table below [locations indicated with black arrow (⬅) in the figure] with a feeler gauge.

A : Exhaust side
B : No.1 cylinder
C : No.2 cylinder
D : No.3 cylinder
E : No.4 cylinder
F : Intake side
⇦ : Engine front



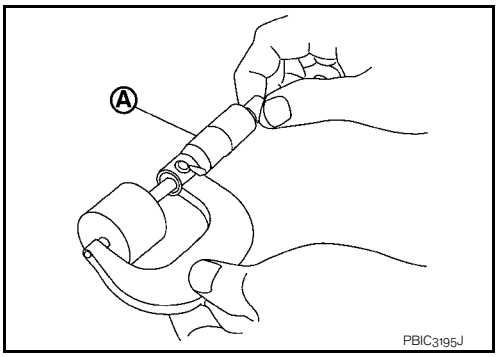
Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
No. 4 cylinder at compression TDC	EXH		×		×
	INT			×	×

3. If out of standard, perform adjustment. Refer to "ADJUSTMENT".

ADJUSTMENT

- Perform adjustment depending on selected head thickness of valve lifter.

1. Remove camshaft. Refer to EM-173, "Exploded View".
2. Remove valve lifters at the locations that are out of the standard.
3. Measure the center thickness of the removed valve lifters with a micrometer (A).



4. Use the equation below to calculate valve lifter thickness for replacement.

cardiagn.com

Valve lifter thickness calculation: $t = t_1 + (C_1 - C_2)$

t = Valve lifter thickness to be replaced

t_1 = Removed valve lifter thickness

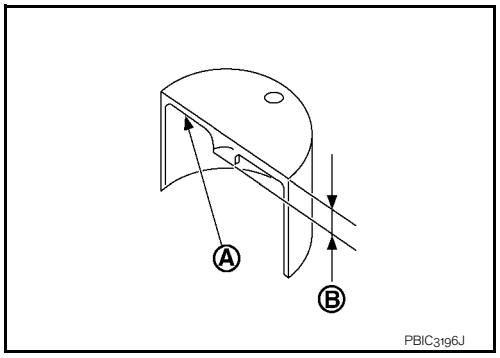
C_1 = Measured valve clearance

C_2 = Standard valve clearance:

Intake : 0.30 mm (0.012 in)

Exhaust : 0.33 mm (0.013 in)

- Thickness of new valve lifter (B) can be identified by stamp mark (A) on the reverse side (inside the cylinder).
- Stamp mark “302” indicates 3.02 mm (0.118 in) in thickness.



NOTE:
Available thickness of valve lifter: 26 sizes range 3.00 to 3.50 mm (0.1181 to 0.1378 in) in steps of 0.02 mm (0.0008 in) (when manufactured at factory). Refer to EM-237, "Camshaft".

5. Install the selected valve lifter.
6. Install camshaft. Refer to EM-173, "Exploded View".
7. Install timing chain and related parts. Refer to EM-162, "Exploded View".
8. Manually rotate crankshaft pulley a few rotations.
9. Make sure that the valve clearances is within the standard. Refer to “INSPECTION”.
10. Install remaining parts in the reverse order of removal.
11. Warm up the engine, and check for unusual noise and vibration.

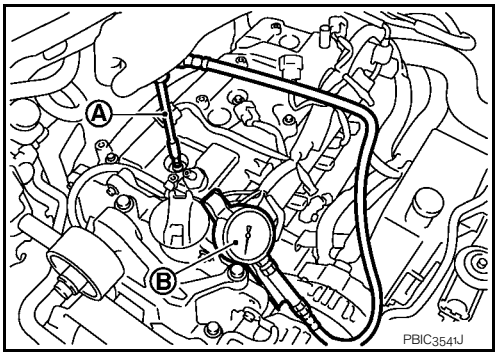
cardiagn.com

COMPRESSION PRESSURE

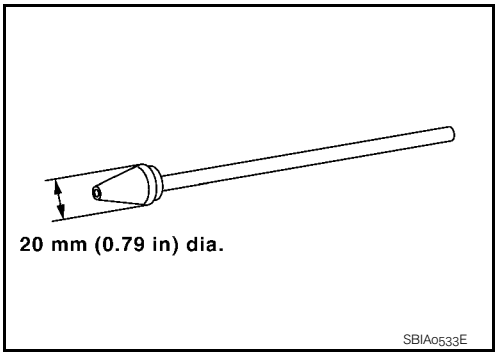
Inspection

INFOID:0000000000893927

1. Warm up engine thoroughly. Then, stop it.
2. Release fuel pressure. Refer to EC-357, "Inspection".
3. Remove ignition coil and spark plug from each cylinder. Refer to EM-160, "Exploded View".
4. Connect engine tachometer (not required in use of CONSULT-III).
5. Install compression gauge (B) with an adapter (A) (commercial service tool) onto spark plug hole.



- Use the adapter whose picking up end inserted to spark plug hole is smaller than 20 mm (0.79 in) in diameter. Otherwise, it may be caught by cylinder head during removal.



6. With accelerator pedal fully depressed, turn ignition switch to “START” for cranking. When the gauge pointer stabilizes, read the compression pressure and the engine rpm. Perform these steps to check each cylinder.

Compression pressure : Refer to EM-236, "General Specification".

CAUTION:

Always use a fully changed battery to obtain the specified engine speed.

- If the engine speed is out of the specified range, check battery liquid for proper gravity. Check the engine speed again with normal battery gravity.
- If compression pressure is below minimum value, check valve clearances and parts associated with combustion chamber (valve, valve seat, piston, piston ring, cylinder bore, cylinder head, cylinder head gasket). After the checking, measure compression pressure again.
- If some cylinder has low compression pressure, pour small amount of engine oil into the spark plug hole of the cylinder to re-check it for compression.
  - If the added engine oil improves the compression, piston rings may be worn out or damaged. Check piston rings and replace if necessary.
  - If the compression pressure remains at low level despite the addition of engine oil, valves may be malfunctioning. Check valves for damage. Replace valve or valve seat accordingly.
- If two adjacent cylinders have respectively low compression pressure and their compression remains low even after the addition of engine oil, cylinder head gaskets are leaking. In such a case, replace cylinder head gaskets.

7. After inspection is completed, install removed parts.
8. Start the engine, and make sure that the engine runs smoothly.
9. Perform trouble diagnosis. If DTC appears, erase it. Refer to EC-109, "Description".

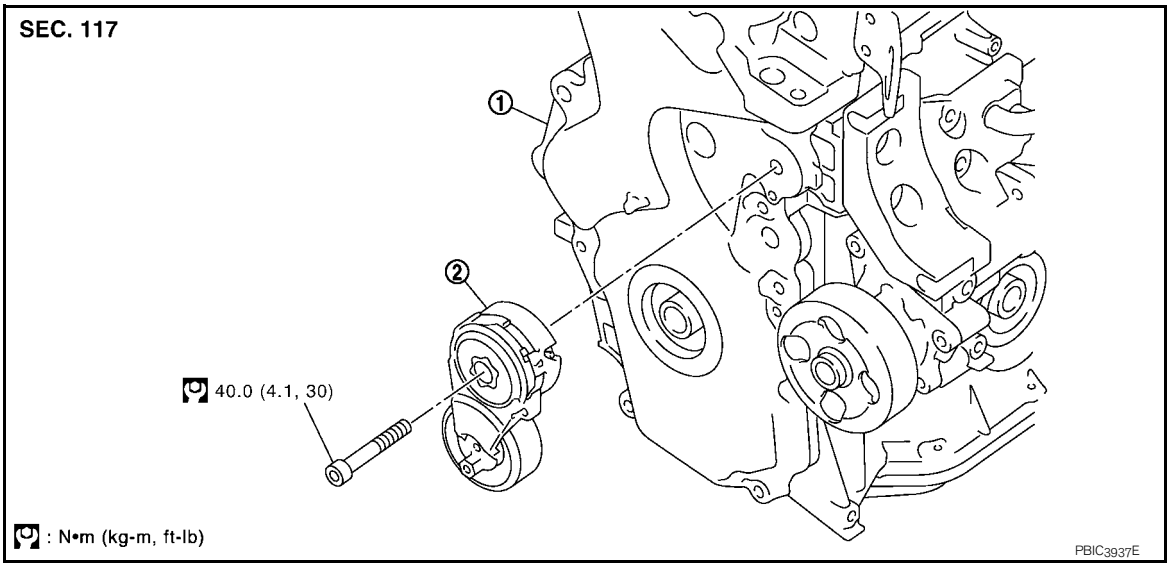
cardiagn.com

ON-VEHICLE REPAIR

DRIVE BELT AUTO-TENSIONER

Exploded View

INFOID:0000000000902357



1. Front cover
2. Drive belt auto-tensioner

Removal and Installation

INFOID:0000000000902358

Removal

1. Remove drive belt. Refer to EM-134, "Exploded View".
   - Keep drive belt auto-tensioner pulley arm locked after drive belt is removed.
2. Remove front fender protector (RH). Refer to STR-31, "Starter Motor".
3. Support the bottom surface of engine using a transmission jack, and then remove the engine mounting stay and the engine mounting insulator (RH). Refer to EM-194, "M/T : Exploded View" (M/T models) or EM-198, "CVT : Exploded View" (CVT models).
4. Loosen mounting bolt and remove drive belt auto-tensioner.
   - Lift the front side of the engine with a jack sustaining engine base to remove mounting bolt.

   NOTE:
   Use TORX socket (size T50).

Installation

Installation is the reverse order of removal.

CAUTION:

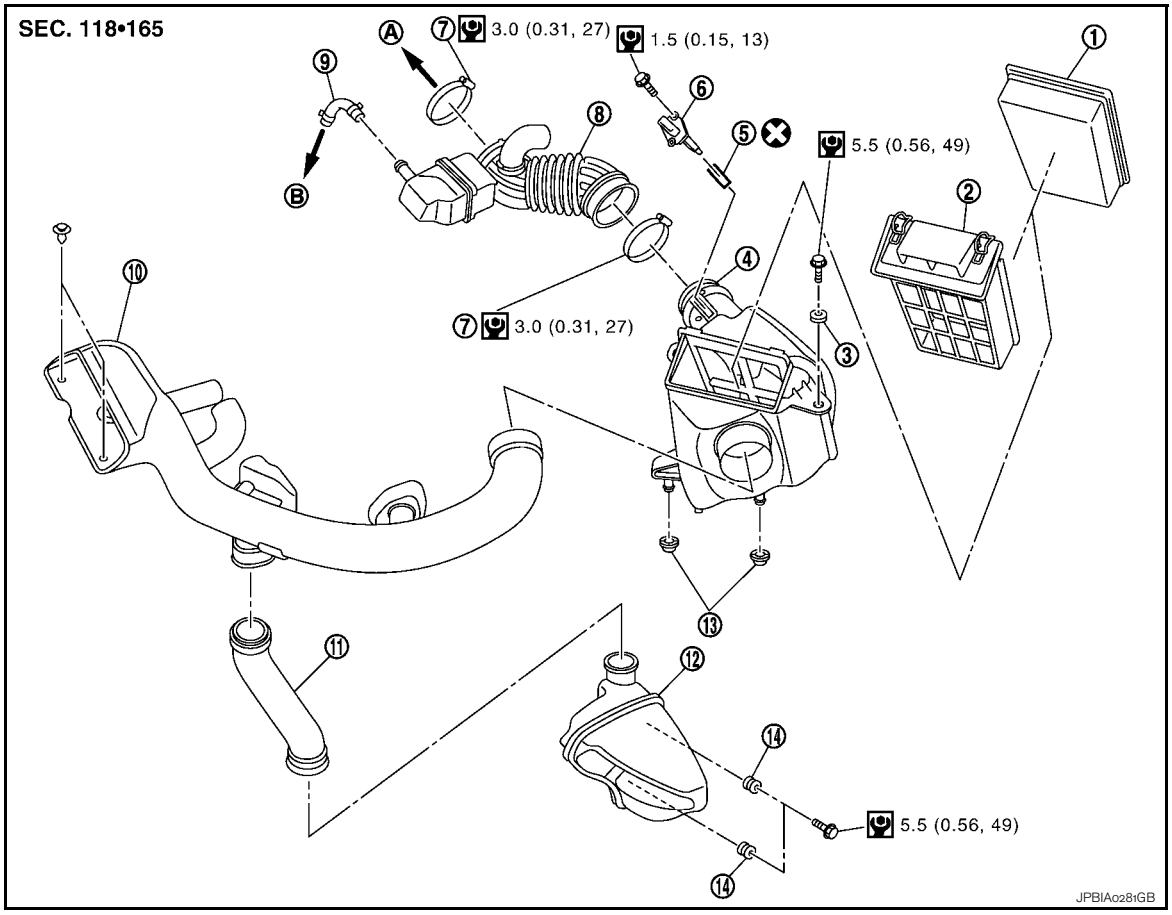
When installing drive belt auto-tensioner, be careful not to interfere with water pump pulley.

cardiagn.com

AIR CLEANER AND AIR DUCT

Exploded View

INFOID:0000000000893928



1. Air cleaner filter
2. Holder
3. Grommet
4. Air cleaner case
5. O-ring
6. Mass air flow sensor
7. Clamp
8. Air duct and resonator assembly
9. PCV hose
10. Air duct (inlet)
11. Air duct
12. Resonator
13. Grommet
14. Grommet

A. To electric throttle control actuator
B. To rocker cover

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000893929

REMOVAL

1. Remove air duct (inlet).
2. Remove engine cover. Refer to EM-146, "Exploded View".
3. Disconnect mass air flow sensor harness connector.
4. Disconnect PCV hose.
5. Remove the battery stay, and then move the battery.
6. Remove air cleaner case/mass air flow sensor assembly and air duct and resonator assembly disconnecting their joints.
   - Add marks as necessary for easier installation.
7. Remove mass air flow sensor from air cleaner case, if necessary.
   CAUTION:
   - **Never shock mass air flow sensor.**

cardiagn.com

- **Never disassemble mass air flow sensor.**

INSTALLATION

Note the following, and install in the reverse order of removal.

- Align marks. Attach each joint. Screw clamps firmly.

Inspection

INFOID:0000000000893930

INSPECTION AFTER REMOVAL

Inspect air duct and resonator assembly for crack or tear.

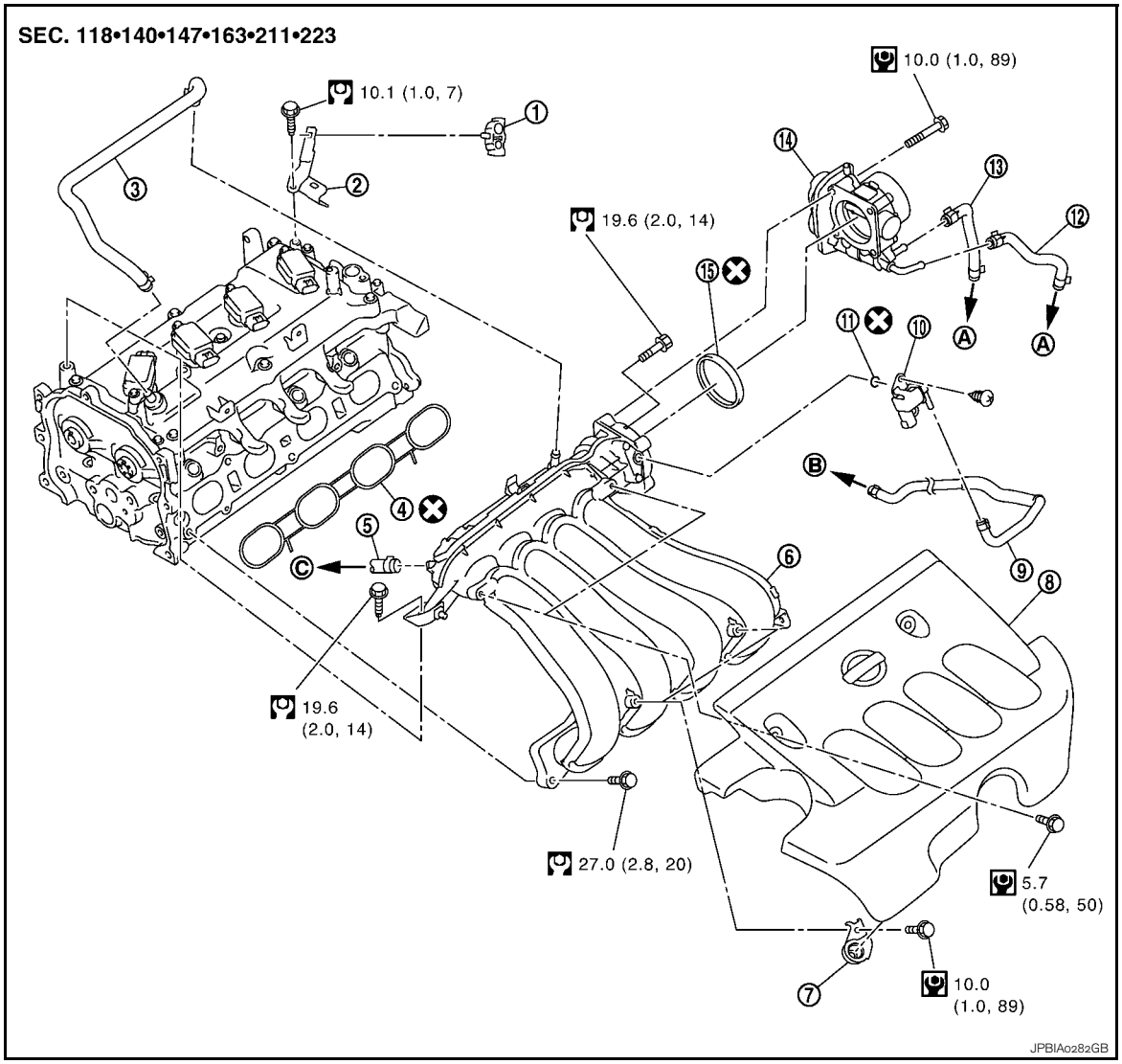
- If anything found, replace air duct and resonator assembly.

cardiagn.com

INTAKE MANIFOLD

Exploded View

INFOID:0000000000893931



1.	Clamp	2.	Harness bracket	3.	PCV hose
4.	Gasket	5.	Vacuum hose	6.	Intake manifold
7.	Bracket	8.	Engine cover	9.	EVAP hose
10.	EVAP canister purge volume control solenoid valve	11.	O-ring	12.	Water hose
13.	Water hose	14.	Electric throttle control actuator	15.	Gasket
A.	To water outlet	B.	To centralized under-floor piping	C.	To brake booster

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000893932

REMOVAL

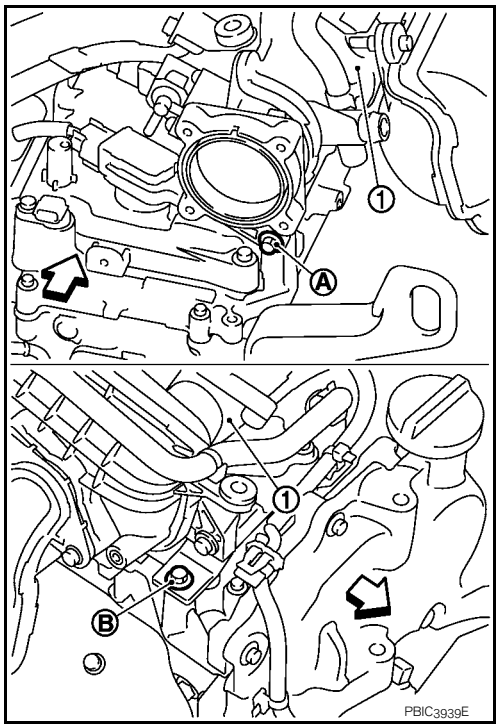
1. Remove engine cover.
2. Pull out oil level gauge.
   CAUTION:
   Cover the oil level gauge guide openings to avoid entry of foreign materials.
3. Disconnect PCV hose from intake manifold and rocker cover.

cardiagn.com

4. Remove air duct and resonator assembly. Refer to EM-144, "Exploded View".
5. Disconnect vacuum hose from intake manifold. Refer to EM-146, "Exploded View".
6. Disconnect water hoses from electric throttle control actuator, attach blind plug to prevent engine coolant leakage.
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
7. Remove electric throttle control actuator.
   CAUTION:
   - **Handle carefully to avoid any shock to electric throttle control actuator.**
   - **Never disassemble electric throttle control actuator.**
8. Remove intake manifold (1) with the following procedure:

a. Loosen and remove intake manifold mounting bolts (A) and (B).

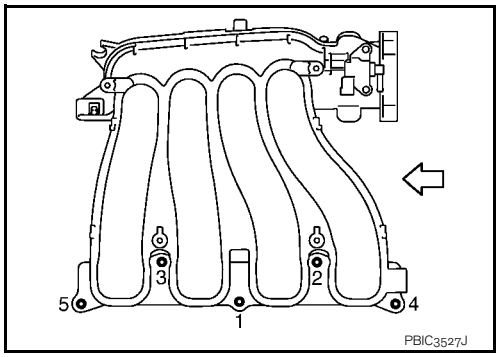
⇦ : Engine front



b. Loosen mounting bolts in reverse order as shown in the figure.

⇦ : Engine front

CAUTION:
Cover engine openings to avoid entry of foreign materials.



9. Remove brackets from intake manifold, if necessary.
10. Remove EVAP canister purge volume control solenoid valve from intake manifold, if necessary.

INSTALLATION

Note the following, and install in the reverse order of removal.

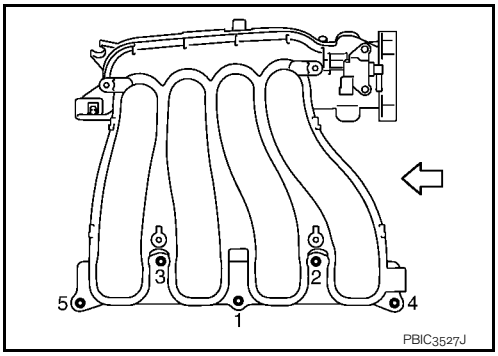
Intake Manifold

1. Check if gasket is not dropped from the installation groove of intake manifold.
2. Install intake manifold with the following procedure:

cardiagn.com

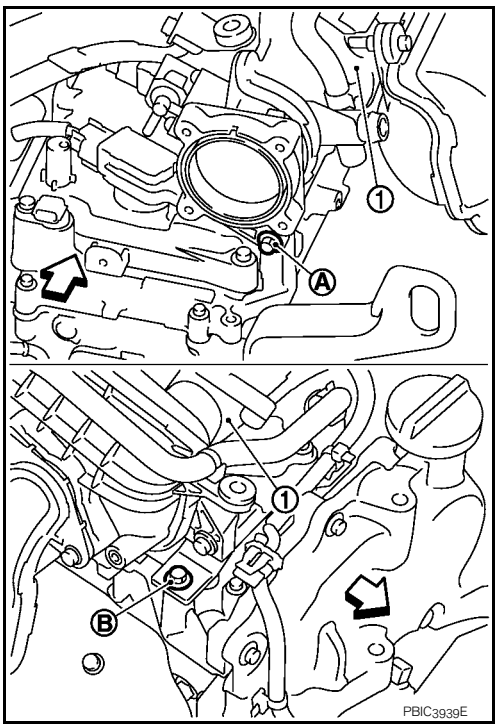
a. Tighten in numerical order as shown in the figure.

⇦ : Engine front



b. Tighten intake manifold (1) mounting bolt (A). Then tighten intake manifold mounting bolt (B).

⇦ : Engine front



Electric Throttle Control Actuator

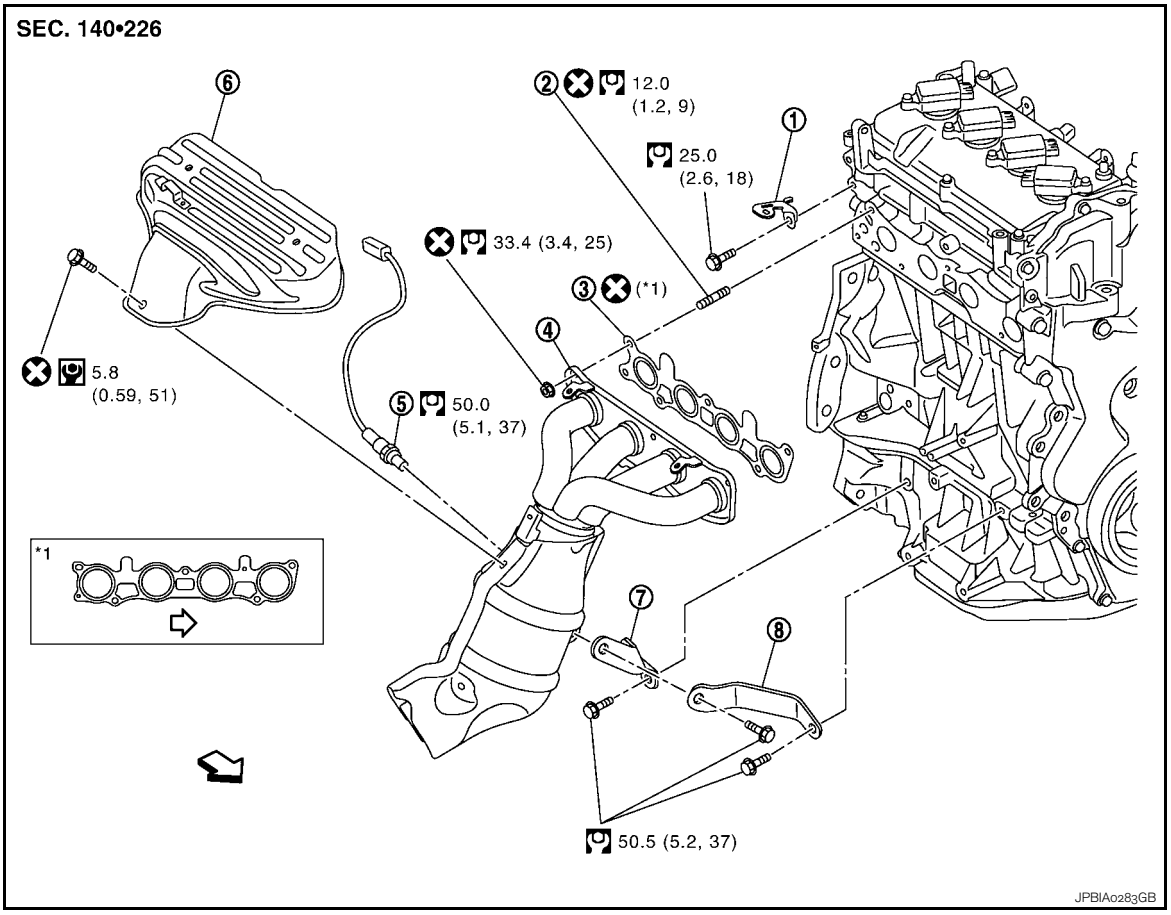
- Tighten bolts of electric throttle control actuator equally and diagonally in several steps.
- Perform “Throttle Valve Closed Position Learning” after repair when removing harness connector of the electric throttle control actuator. Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Description".
- Perform “Throttle Valve Closed Position Learning” and “Idle Air Volume Learning” after repair when replacing electric throttle control actuator. Refer to EC-647, "THROTTLE VALVE CLOSED POSITION LEARNING : Description" and EC-647, "IDLE AIR VOLUME LEARNING : Description".

cardiagn.com

EXHAUST MANIFOLD

Exploded View

INFOID:0000000000893934



1. Harness bracket
2. Stud bolt
3. Gasket
4. Exhaust manifold
5. Heated oxygen sensor 1
6. Exhaust manifold cover
7. Exhaust manifold stay (2WD models)
8. Exhaust manifold stay (4WD models)

⇦ : Engine front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000893935

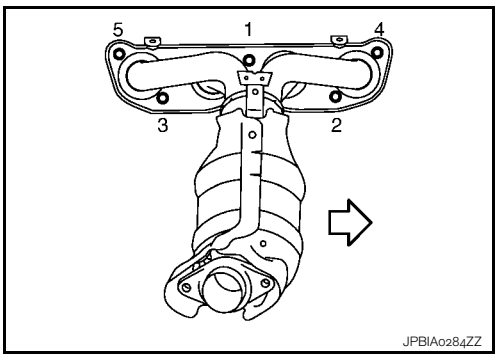
REMOVAL

1. Remove exhaust front tube. Refer to EX-10, "Exploded View".
2. Remove exhaust manifold cover.
3. Remove the heated oxygen sensor 1.
   • Using heated oxygen sensor wrench [SST: KV10117100], remove heated oxygen sensor 1.
   CAUTION:
   Handle heated oxygen sensor 1 carefully and avoid impacts.
   NOTE:
   The exhaust manifold can be removed and installed without removing the heated oxygen sensor 1 (Disassembly of harness connector is necessary)
4. Remove drive shaft (RH) and drive shaft support bearing bracket. Refer to EX-10, "Exploded View".
5. Remove exhaust manifold stay.
6. Remove exhaust manifold.

cardiagn.com

- Loosen nuts in reverse order as shown in the figure

⇦ : Engine front

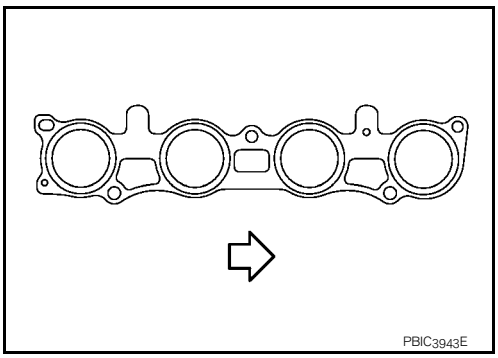


7. Remove gasket.
CAUTION:
Cover engine openings to avoid entry of foreign materials.

INSTALLATION

1. Install gasket to cylinder head as shown in the figure.

⇦ : Engine front

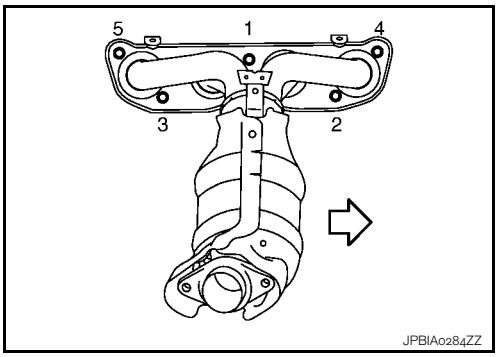


2. Install exhaust manifold with the following procedure:

a. Tighten nuts in numerical order as shown in the figure.

⇦ : Engine front

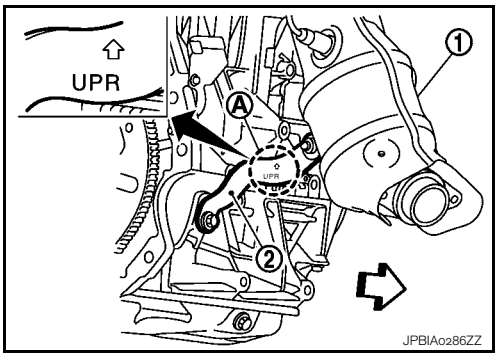
b. Tighten nuts in numerical order as shown in the figure again.



c. Install exhaust manifold stay (2) in the direction as shown in the figure.

1 : Exhaust manifold
A : Upper mark
⇦ : Engine front

NOTE:
This figure shows 2WD models as an example.



3. Install remaining parts in the reverse order of removal.

Inspection

INFOID:0000000000893936

INSPECTION AFTER REMOVAL

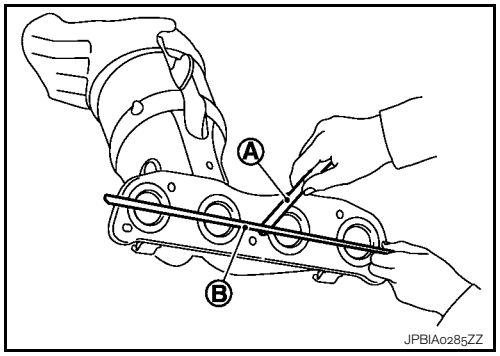
cardiagn.com

Surface Distortion

- Using straightedge (B) and feeler gauge (A), check the surface distortion of exhaust manifold mating surface in each exhaust port and entire part.

Limit : Refer to EM-236, "Exhaust Manifold".

- If it exceeds the limit, replace exhaust manifold.

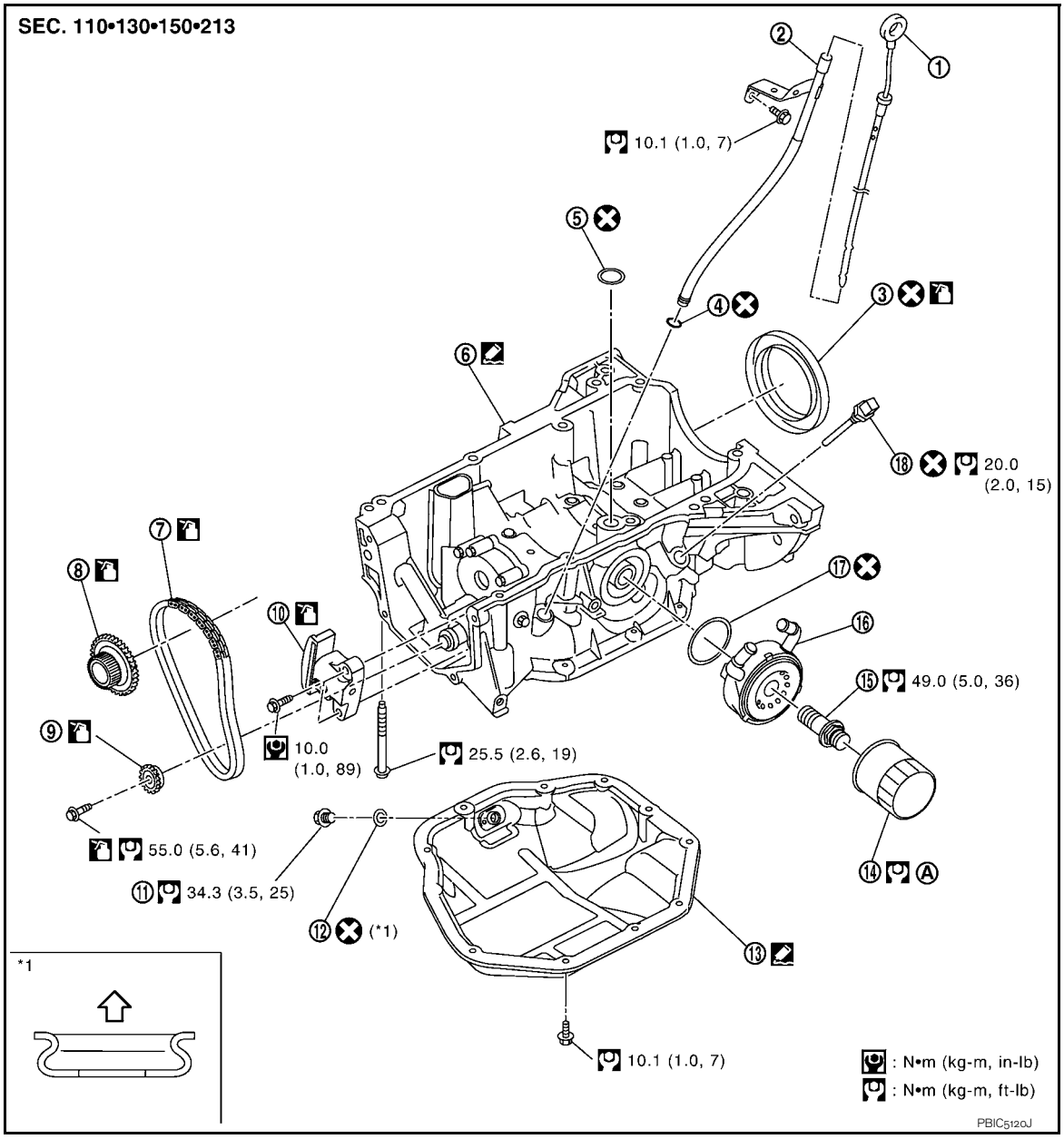


cardiagn.com

OIL PAN (LOWER)

Exploded View

INFOID:0000000000893937



1. Oil level gauge
2. Oil level gauge guide
3. Rear oil seal
4. O-ring
5. O-ring
6. Oil pan (upper)
7. Balancer unit timing chain
8. Crankshaft sprocket
9. Balancer unit sprocket
10. Balancer unit timing chain tensioner
11. Drain plug
12. Drain plug washer
13. Oil pan (lower)
14. Oil filter
15. Connector bolt
16. Oil cooler
17. O-ring
18. Oil level sensor

A. Refer to LU-17

⇦ : Oil pan side

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000893938

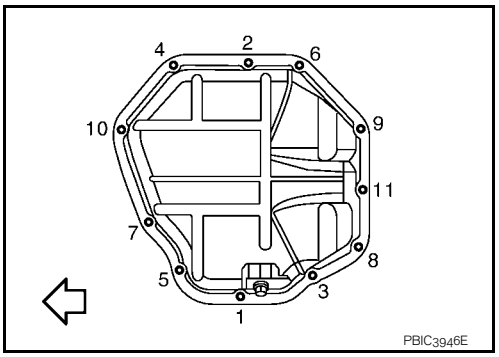
cardiagn.com

REMOVAL

1. Remove engine undercover.
2. Drain engine oil. Refer to LU-15, "Draining".
3. Remove oil pan (lower) with the following procedure:

a. Loosen mounting bolts in reverse order as shown in the figure.

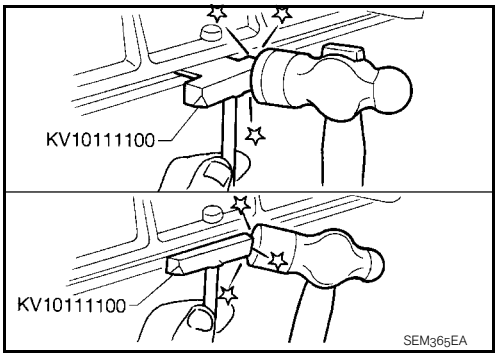
⇦ : Engine front



b. Insert seal cutter (SST) between oil pan (upper) and oil pan (lower).

CAUTION:

Be careful not to damage the mating surface.

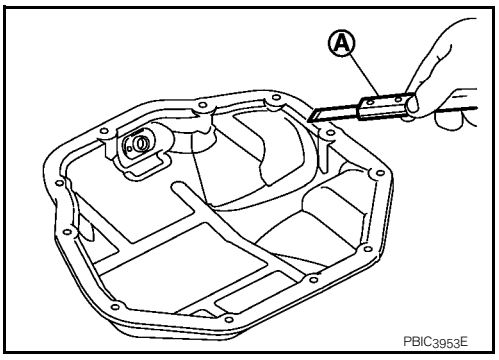


INSTALLATION

Note the following, and install in the reverse order of removal.

1. Install oil pan (lower) with the following procedure:

a. Use a scraper (A) to remove old liquid gasket from mating surfaces.
- Also remove old liquid gasket from mating surface of oil pan (upper).
- Remove old liquid gasket from the bolt holes and threads.



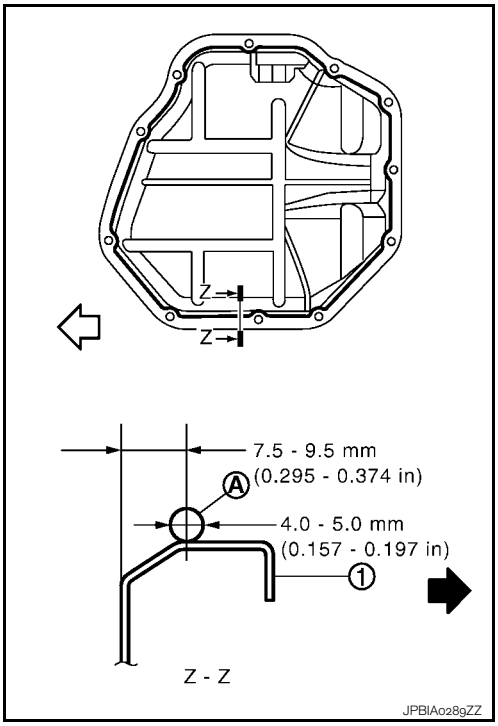
cardiagn.com

b. Apply a continuous bead of liquid gasket (A) with a tube presser (commercial service tool) as shown in the figure.

1 : Oil pan (lower)

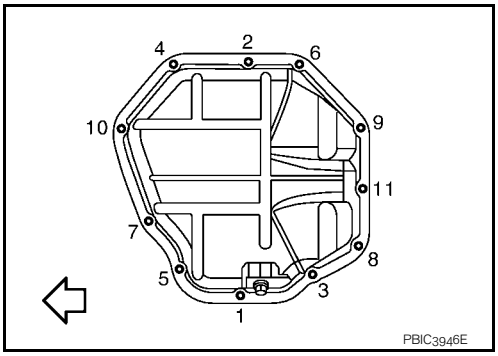
⬅ : Engine outside

Use Genuine Liquid Gasket or equivalent.



c. Tighten bolts in numerical order as shown in the figure.

⇦ : Engine front



Inspection

INFOID:0000000000893939

INSPECTION AFTER REMOVAL

Clean oil strainer portion [part of the oil pan (upper)] if any object attached.

INSPECTION AFTER INSTALLATION

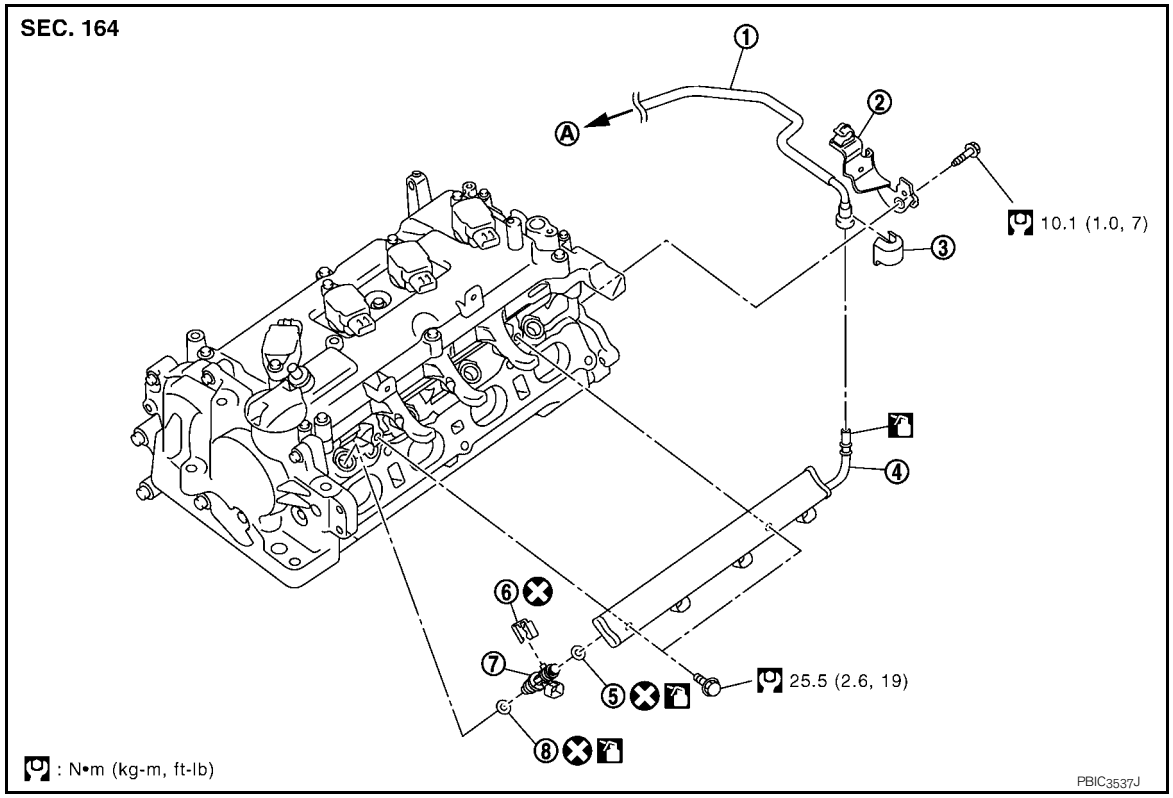
1. Check the engine oil level and adjust engine oil. Refer to LU-14, "Inspection".
2. Start engine, and check there is no leak of engine oil.
3. Stop engine and wait for 10 minutes.
4. Check the engine oil level again. Refer to LU-14, "Inspection".

cardiagn.com

FUEL INJECTOR AND FUEL TUBE

Exploded View

INFOID:0000000000893940



1. Fuel feed tube
2. Bracket
3. Quick connector cap
4. Fuel tube
5. O-ring (black)
6. Clip
7. Injector
8. O-ring (green)

A. To centralized under-floor piping

Refer to GI-4, "Components" for symbols in the figure.

CAUTION:
Never remove or disassemble parts unless instructed in the figure.

Removal and Installation

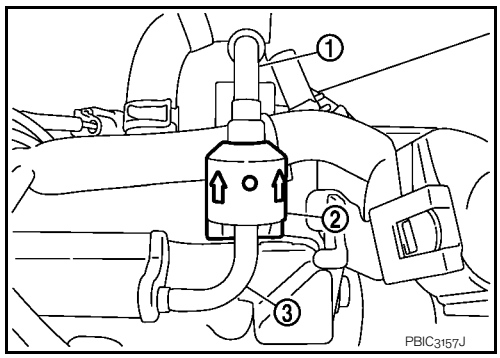
INFOID:0000000000893941

WARNING:
- **Put a “CAUTION: FLAMMABLE” sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Never smoke while servicing fuel system. Keep open flames and sparks away from the work area.**

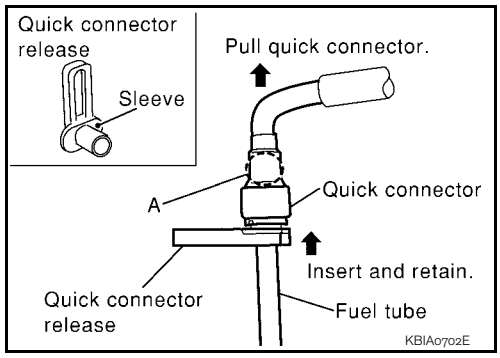
REMOVAL

1. Release the fuel pressure. Refer to EC-978, "Inspection".
2. Remove intake manifold. Refer to EM-29, "Exploded View".

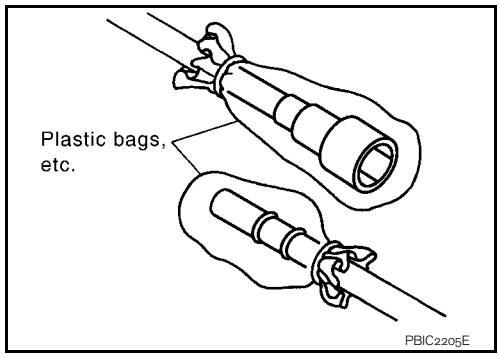
3. Disconnect quick connector with the following procedure. Disconnect fuel feed hose (1) from fuel tube (3).
NOTE:
There is no fuel return path.



a. Remove quick connector cap (2) from quick connector connection.
b. Disconnect fuel feed hose from hose clamp.
c. With the sleeve side of quick connector release facing quick connector, install quick connector release onto fuel tube.
d. Insert quick connector release into quick connector until sleeve contacts and goes no further. Hold quick connector release on that position.
CAUTION:
Inserting quick connector release hard will not disconnect quick connector. Hold quick connector release where it contacts and goes no further.

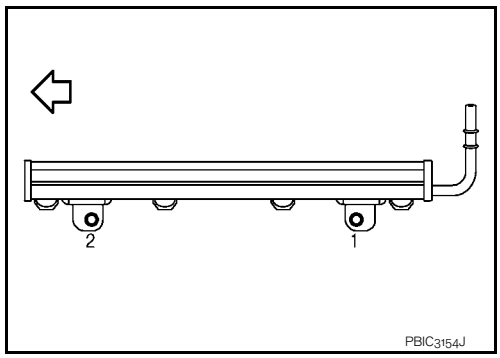


e. Draw and pull out quick connector straight from fuel tube.
CAUTION:
- **Pull quick connector holding “A” position in the figure.**
- **Never pull with lateral force applied. O-ring inside quick connector may be damaged.**
- **Prepare container and cloth beforehand as fuel will leak out.**
- **Avoid fire and sparks.**
- **Keep parts away from heat source. Especially, be careful when welding is performed around them.**
- **Never expose parts to battery electrolyte or other acids.**
- **Never bend or twist connection between quick connector and fuel feed hose during installation/ removal.**
- **To keep clean the connecting portion and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.**



4. Disconnect harness connector from fuel injector.
5. Remove fuel tube and fuel injector assembly.
- Loosen mounting bolts in reverse order as shown in the figure.

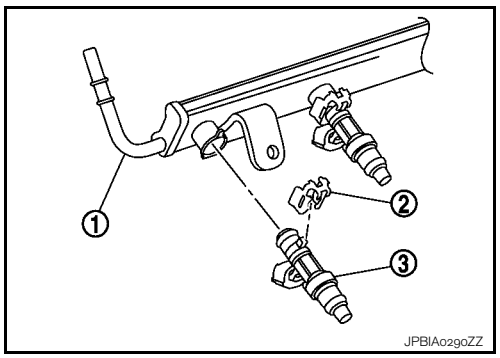
⇦ : Engine front



CAUTION:
- **When removing, be careful to avoid any interference with fuel injector.**
- **Use a shop cloth to absorb any fuel leaks from fuel tube.**

cardiagn.com

6. Remove fuel injector (3) from fuel tube (1) with the following procedure:



a. Open and remove clip (2).

b. Remove fuel injector from fuel tube by pulling straight.

CAUTION:
- **Be careful with remaining fuel that may go out from fuel tube.**
- **Be careful not to damage fuel injector nozzle during removal.**
- **Never bump or drop fuel injector.**
- **Never disassemble fuel injector.**

INSTALLATION

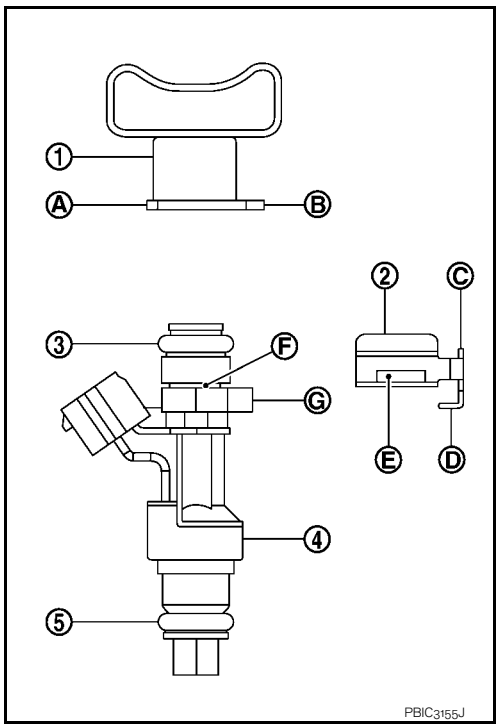
1. Note the following, and install O-rings to fuel injector.

CAUTION:
- **Upper and lower O-rings are different. Be careful not to confuse them.**

Fuel tube side	**: Black**
Nozzle side	**: Green**

- **Handle O-ring with bare hands. Never wear gloves.**
- **Lubricate O-ring with new engine oil.**
- **Never clean O-ring with solvent.**
- **Make sure that O-ring and its mating part are free of foreign material.**
- **When installing O-ring, be careful not to scratch it with tool or fingernails. Also be careful not to twist or stretch O-ring. If O-ring is stretched while installing, never insert it quickly into fuel tube.**
- **Insert O-ring straight into fuel tube. Never decenter or twist it.**

2. Install fuel injector (4) to fuel tube (1) with the following procedure:



3 : O–ring (black)
5 : O–ring (green)

a. Insert clip (2) into clip mounting groove (F) on fuel injector.
- Insert clip so that protrusion (G) of fuel injector matches cut-out (D) of clip.

CAUTION:
- **Never reuse clip. Replace it with a new one.**
- **Be careful to keep clip from interfering with O-ring. If interference occurs, replace O-ring.**

b. Insert fuel injector into fuel tube with clip attached.
- Insert it while matching it to the axial center.
- Insert fuel injector so that protrusion (B) of fuel tube matches cut-out (C) of clip.
- Make sure that fuel tube flange (A) is securely fixed in flange fixing groove (E) on clip.

c. Make sure that installation is complete by making sure that fuel injector does not rotate or come off.

3. Set fuel tube and fuel injector assembly at its position for installation on cylinder head.

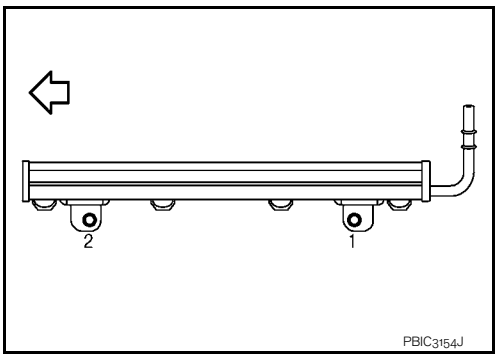
CAUTION:
For installation, be careful not to interfere with fuel injector nozzle.

4. Install fuel tube and injector assembly onto cylinder.

cardiagn.com

- Tighten mounting bolts in numerical order as shown in the figure.

⇦ : Engine front



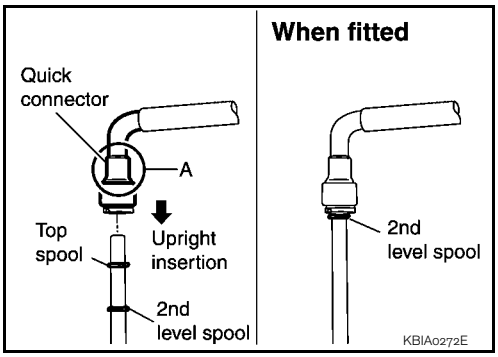
5. Connect harness connector to fuel injector.
6. Connect fuel feed hose with the following procedure.

a. Check for damage or foreign material on the fuel tube and quick connector.

b. Apply new engine oil lightly to area around the top of fuel tube.

c. Align center to insert quick connector straightly into fuel tube.
- Insert quick connector to fuel tube until the top spool on fuel tube is inserted completely and the 2nd level spool is positioned slightly below quick connector bottom end.

CAUTION:
- **Hold “A” position in the figure when inserting fuel tube into quick connector.**
- **Carefully align center to avoid inclined insertion to prevent damage to O-ring inside quick connector.**
- **Insert until you hear a “click” sound and actually feel the engagement.**
- **To avoid misidentification of engagement with a similar sound, be sure to perform the next step.**



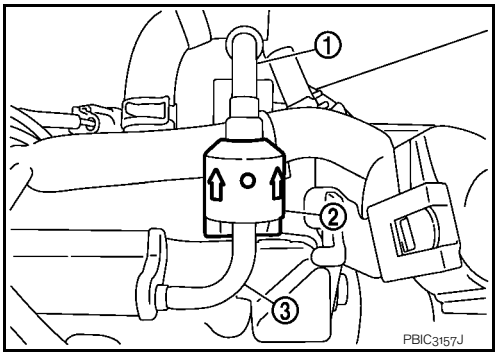
d. Before clamping fuel feed hose with hose clamp, pull quick connector hard by hand holding “A” position. Make sure it is completely engaged (connected) so that it does not come out from fuel tube.

e. Install quick connector cap (2) to quick connector connection.

1. Fuel feed hose
3. Fuel tube

- Install quick connector cap with the side arrow facing quick connector side (fuel feed hose side).

CAUTION:
- **Make sure that the quick connector and fuel tube are securely engaged with the quick connector cap mounting groove.**
- **Quick connector may not be connected correctly if quick connector cap cannot be installed easily. Remove the quick connector cap, and then check the connection of quick connector again.**



f. Install fuel feed hose to hose clamp.

7. Install remaining parts in the reverse order of removal.

Inspection

INFOID:0000000000893942

INSPECTION AFTER INSTALLATION

Check on Fuel Leakage

1. Turn ignition switch “ON” (with the engine stopped). With fuel pressure applied to fuel piping, make sure there are no fuel leaks at connection points.
NOTE:
Use mirrors for checking at points out of clear sight.

cardiagn.com

2. Start the engine. With engine speed increased, make sure again that there are no fuel leaks at connection points.

CAUTION:

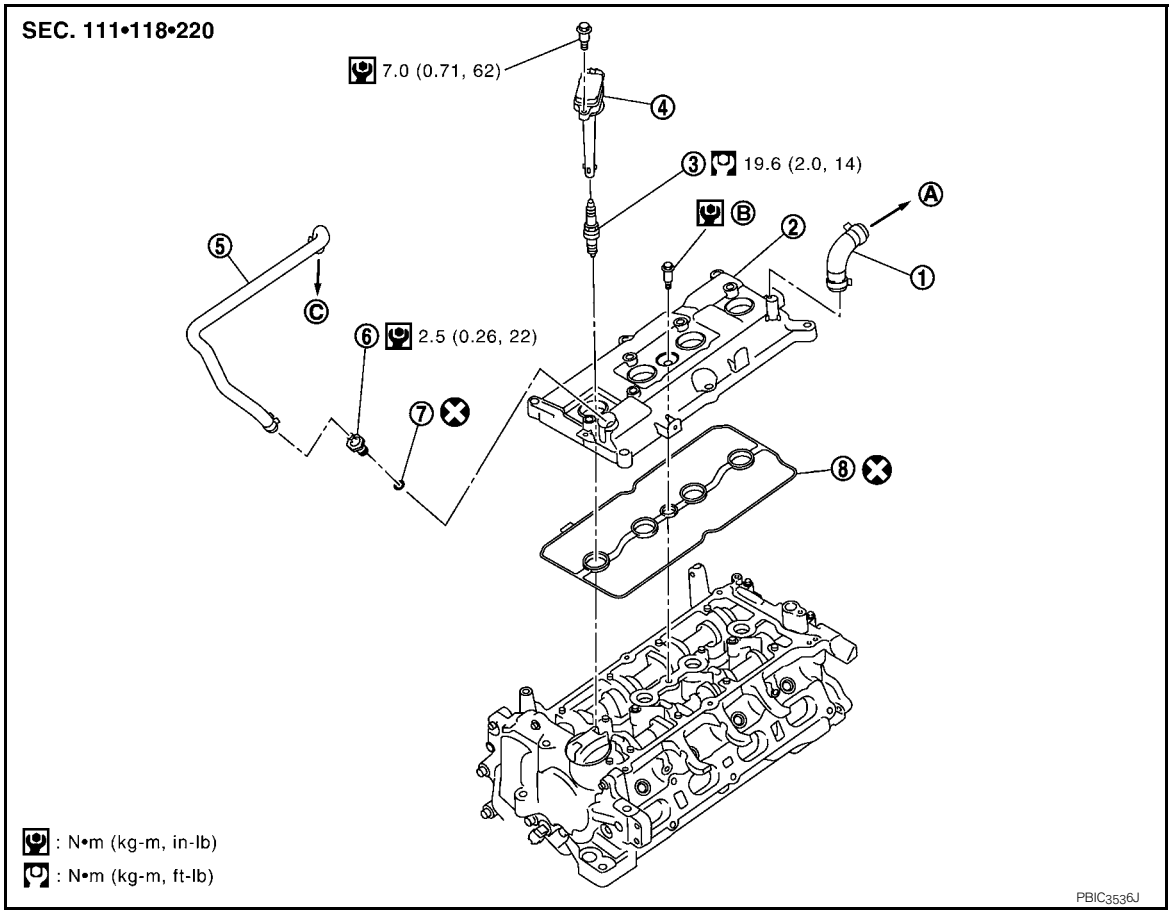
Never touch the engine immediately after stopped, as the engine becomes extremely hot.

cardiagn.com

IGNITION COIL , SPRAK PLUG AND ROCKER COVER

Exploded View

INFOID:0000000000896389



1. PCV hose
2. Rocker cover
3. Spark plug
4. Ignition coil
5. PCV hose
6. PCV valve
7. O-ring
8. Gasket
A. To air duct
B. Refer to EM-160
C. To intake manifold

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000896390

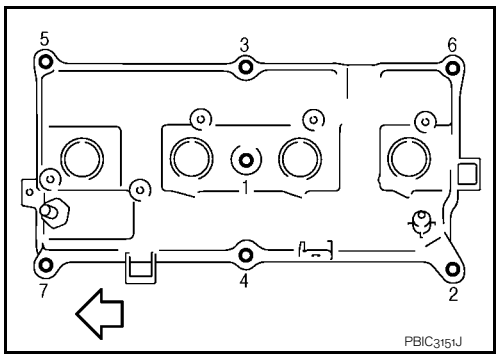
REMOVAL

1. Remove intake manifold. Refer to EM-146, "Removal and Installation".
2. Remove ignition coil.
   CAUTION:
   - **Handle ignition coil carefully and avoid impacts.**
   - **Never disassemble ignition coil.**
3. Remove rocker cover.

cardiagn.com

- Loosen bolts in reverse order shown in the figure.

⇦ : Engine front

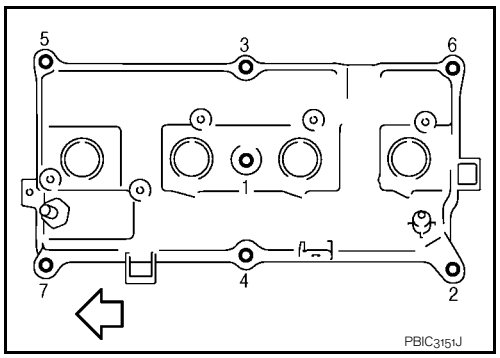


4. Remove rocker cover gasket from rocker cover.
5. Use scraper to remove all traces of liquid gasket from cylinder head and front cover.
   CAUTION:
   Never scratch or damage the mating surface when cleaning off old liquid gasket.

INSTALLATION

1. Install the rocker cover gasket to rocker cover.
   CAUTION:
   Make sure the gasket is not dropped.
2. Install rocker cover.
   - Tighten bolts in two steps separately in numerical order as shown in the figure.

⇦ : Engine front



1st step
: 1.96 N·m (0.20 kg-m, 17 in-lb)

2nd step
: 8.33 N·m (0.85 kg-m, 74 in-lb)

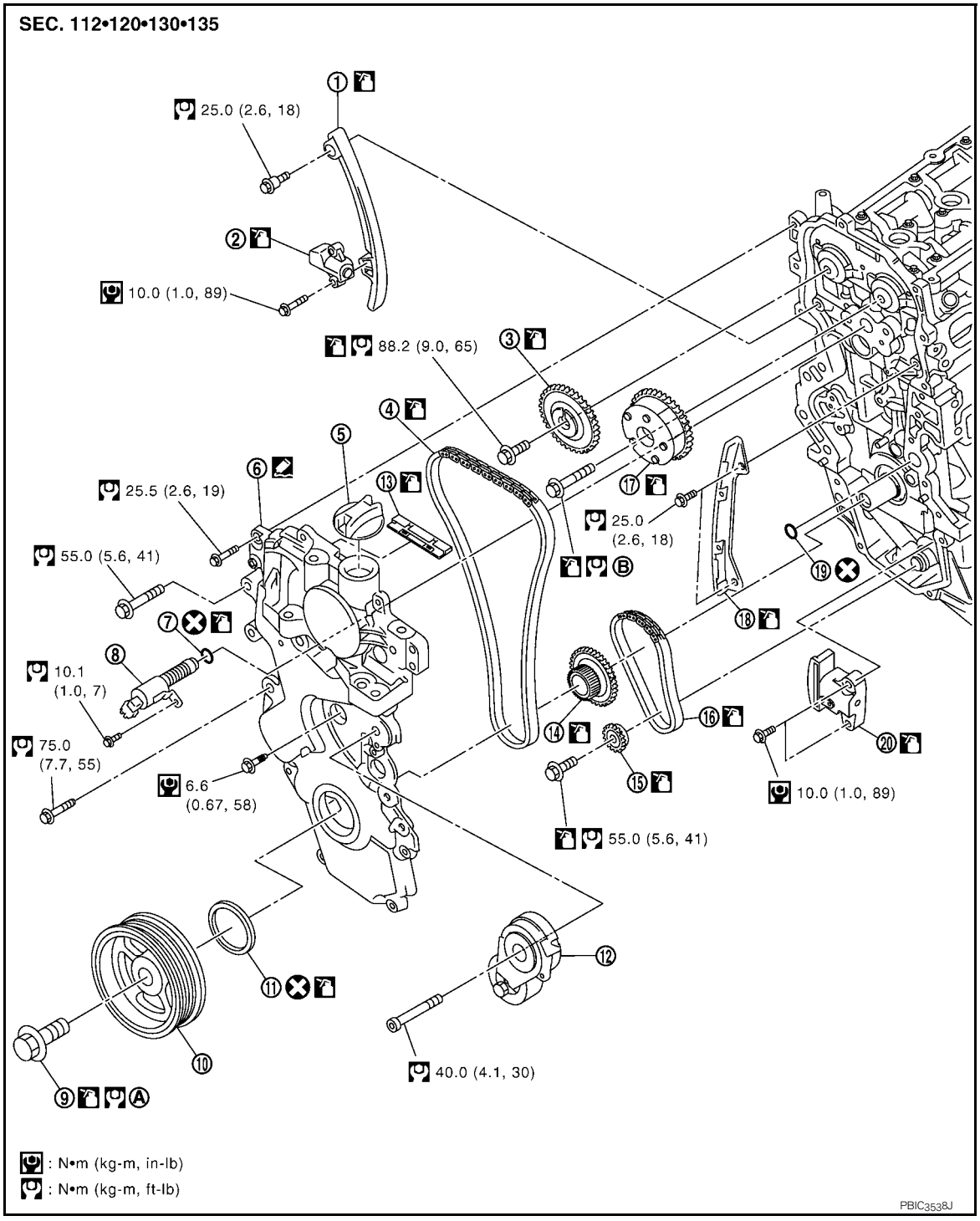
3. Install in the reverse order of removal, for the rest of parts.

cardiagn.com

TIMING CHAIN

Exploded View

INFOID:0000000000893947



1.	Timing chain slack guide	2.	Timing chain tensioner	3.	Camshaft sprocket (EXH)
4.	Timing chain	5.	Oil filler cap	6.	Front cover
7.	O-ring	8.	Intake valve timing control solenoid valve	9.	Crankshaft pulley bolt
10.	Crankshaft pulley	11.	Front oil seal	12.	Drive belt auto-tensioner
13.	Timing chain tension guide (front cover side)	14.	Crankshaft sprocket	15.	Balancer unit sprocket

cardiagn.com

16. Balancer unit timing chain
17. Camshaft sprocket (INT)
18. Timing chain tension guide
19. O-ring
20. Balancer unit timing chain tensioner
A. Refer to EM-163
B. Refer to EM-163

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000893948

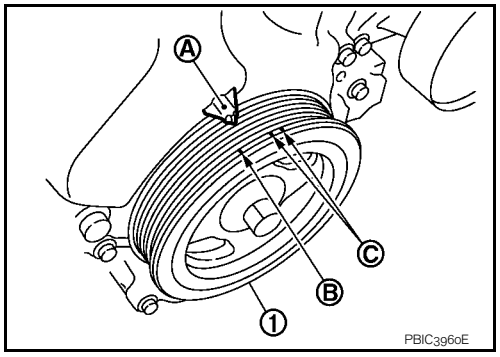
REMOVAL

CAUTION:
The rotating direction in the text indicates all directions seen from the engine front.

1. Remove front wheel (RH). Refer to WT-4, "Road Wheel".
2. Remove front fender protector (RH). Refer to EXT-21, "Exploded View".
3. Drain engine oil. Refer to LU-15, "Draining".
   CAUTION:
   Perform this step when engine is cold.
4. Remove the following parts.
   - Intake manifold: Refer to EM-146, "Exploded View".
   - Rocker cover: Refer to EM-160, "Exploded View".
   - Drive belt: Refer to EM-134, "Removal and Installation".
5. Set No. 1 cylinder at TDC on its compression stroke with the following procedure:

a. Rotate crankshaft pulley (1) clockwise and align TDC mark (no paint) (B) to timing indicator (A) on front cover.

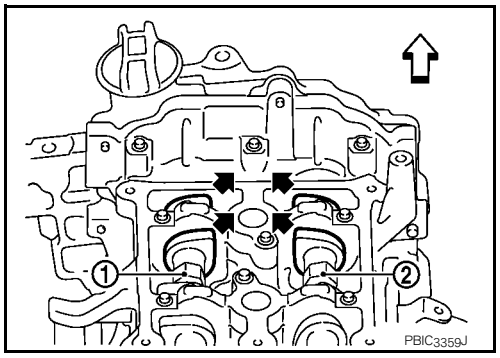
C : White paint mark (Not use for service)



b. At the same time, make sure that the cam noses of the No.1 cylinder are located (⇦) as shown in the figure.

1 : Camshaft (INT)
2 : Camshaft (EXH)
⇦ : Engine front

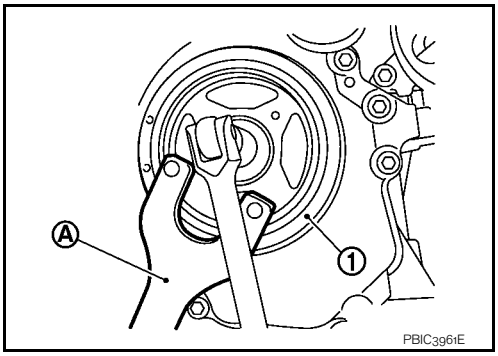
- If not, rotate crankshaft pulley one revolution (360 degrees) and align as shown in the figure.



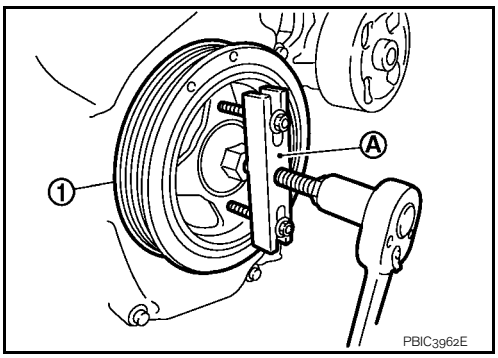
6. Remove crankshaft pulley with the following procedure:

cardiagn.com

a. Fix crankshaft pulley (1) with a pulley holder (A) (commercial service tool), loosen crankshaft pulley bolt, and locate bolt seating surface at 10 mm (0.39 in) from its original position.
CAUTION:
Never remove the crankshaft pulley bolt as they will be used as a supporting point for the pulley puller [SST: KV11103000].

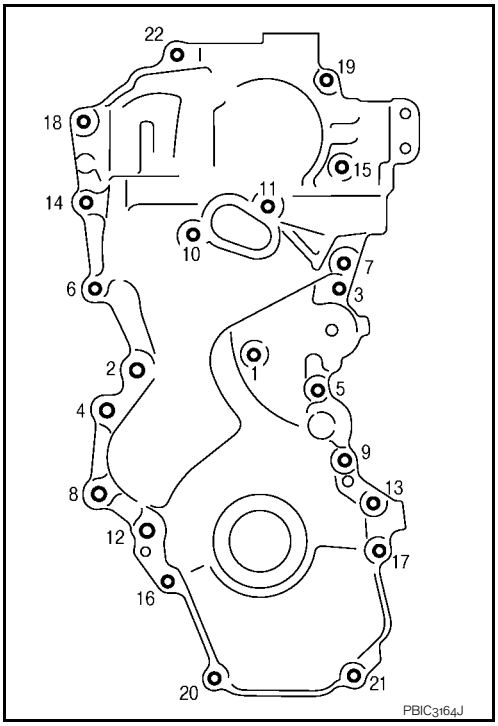


b. Attach a pulley puller (A) [SST: KV11103000] in the M6 thread hole on crankshaft pulley (1), and remove crankshaft pulley.



7. Remove rear torque rod. Refer to EM-194, "M/T : Exploded View" (M/T models) or EM-198, "CVT : Exploded View" (CVT models).
8. Support the bottom surface of engine using a transmission jack, and then remove the engine mounting stay and the engine mounting insulator (RH). Refer to EM-194, "M/T : Exploded View" (M/T models) or EM-198, "CVT : Exploded View" (CVT models).
9. Remove oil pan (lower). Refer to EM-152, "Exploded View".
NOTE:
If crankshaft sprocket and balancer unit component are not removed, this step is unnecessary.
10. Remove intake valve timing control solenoid valve.
11. Remove drive belt auto-tensioner.
12. Remove front cover with the following procedure:

a. Loosen mounting bolts in reverse order as shown in the figure.

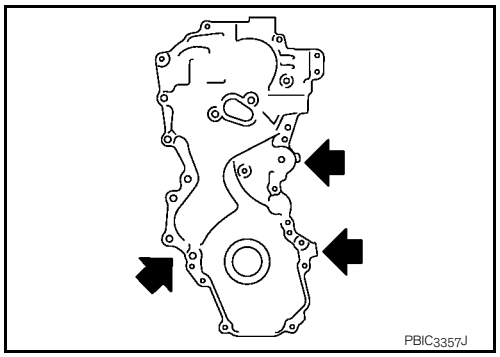


cardiagn.com

b. Cut liquid gasket by prying the position (⬅) shown in the figure, and then remove the front cover.

CAUTION:

- **Be careful not to damage the mating surface.**
- **A more adhesive liquid gasket is applied compared to previous types when shipped, so it should not be forced off the position not specified.**



13. Remove front oil seal from front cover.
    - Lift up front oil seal using a screwdriver.

CAUTION:

Be careful not to damage front cover.

14. Remove timing chain tensioner with the following procedure:

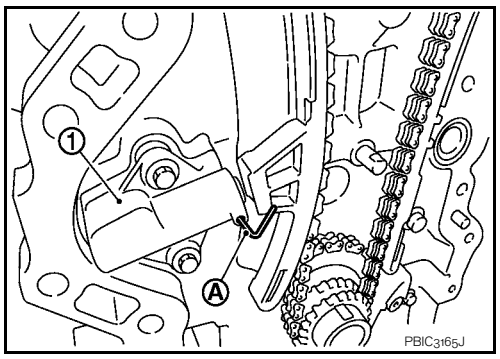
a. Push in timing chain tensioner plunger.

b. Insert a stopper pin (A) into the body hole, and then fix it with the plunger pushed in.

NOTE:

Use approximately 1.5 mm (0.059 in) diameter. hard metal pin as a stopper pin.

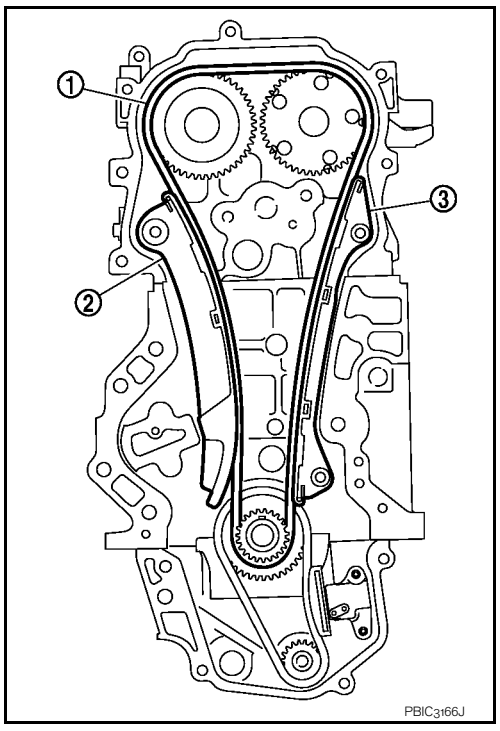
c. Remove timing chain tensioner (1).



15. Remove timing chain slack guide (2), timing chain tension guide (3) and timing chain (1).

CAUTION:

Never rotate each crankshaft and camshaft individually while timing chain is removed. It causes interference between valve and piston.



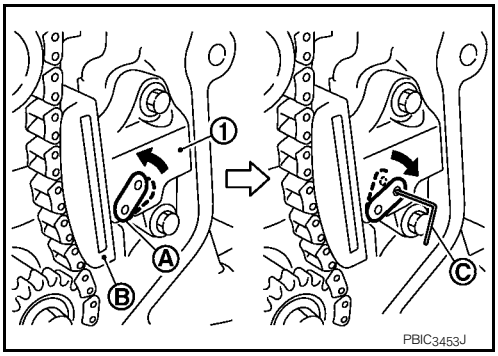
16. Remove crankshaft sprocket and balancer unit drive component with the following procedure:

cardiagn.com

a. Fully lift up lever (A), and push the timing chain slack guide (B) into the inside of balancer unit timing chain tensioner (1).
   • The slack guide is released by fully lifting the lever up. As the result, the slack guide can be moved.

b. Matching the hole on lever with the hole on tensioner body, insert a stopper pin (C) to secure the slack guide.
   NOTE:
   Use approximately 1.0 mm (0.04 in) diameter. hard metal pin as a stopper pin.

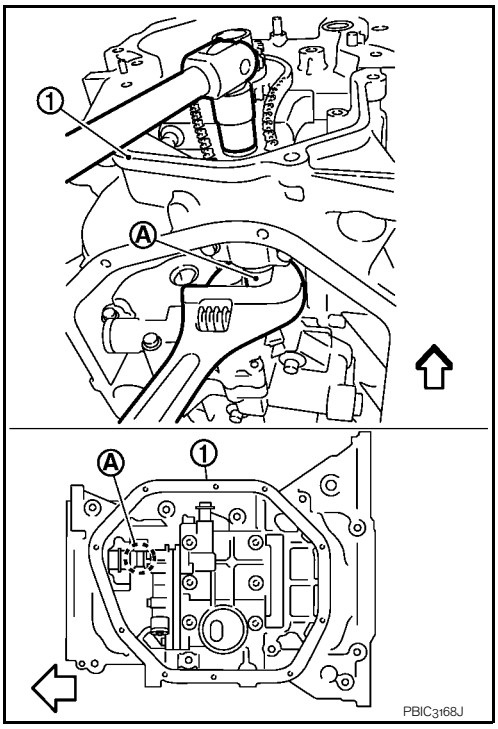
c. Remove balancer unit timing chain tensioner.
   • When the holes on lever and tensioner body cannot be aligned, align these holes by slightly moving the slack guide.



d. Hold the WAF part of balancer shaft [WAF:19.0 mm (0.75 in)] (A), and then loosen the balancer unit sprocket bolt.

   1 : Oil pan (upper)
   ⇦ : Engine front

   CAUTION:
   • **Secure the balancer unit shaft with the WAF part.**
   • **Never loosen the balancer unit sprocket bolt by tightening the balancer unit drive chain.**



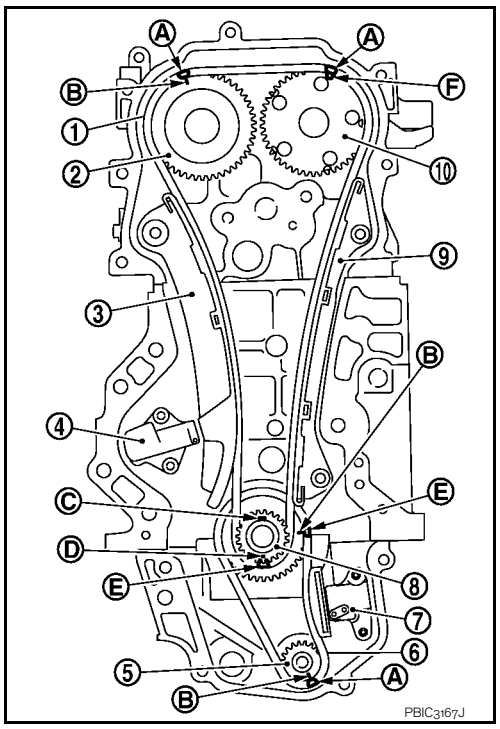
e. Remove crankshaft sprocket, balancer unit sprocket and balancer unit timing chain as a set.

17. Remove timing chain tension guide (front cover side) from front cover, if necessary.

INSTALLATION
NOTE:

cardiagn.com

The figure shows the relationship between the matching mark on each timing chain and that on the corresponding sprocket, with the components installed.



1. Make sure that crankshaft key points straight up.

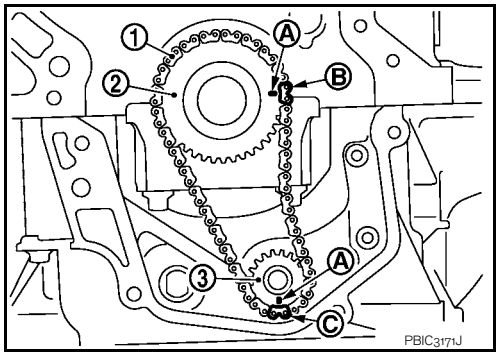
1 : Timing chain
2 : Camshaft sprocket (EXH)
3 : Timing chain slack guide
4 : Timing chain tensioner
5 : Balancer unit sprocket
6 : Balancer unit drive chain
7 : Balancer unit timing chain tensioner
8 : Crankshaft sprocket
9 : Timing chain tension guide
10 : Camshaft sprocket (INT)
A : Matching mark (dark blue link)
B : Matching mark (stamping)
C : Crankshaft key position (straight up)
D : Matching mark (stamping)
E : Matching mark (orange link)
F : Matching mark (outer groove*)

*: There are two outer grooves in camshaft sprocket (INT). The wider one is a matching mark.

2. If the timing chain tension guide (front cover side) is removed, install it to the front cover.

CAUTION:
Check the joint condition by sound or feeling.

3. Install crankshaft sprocket (2), balancer unit sprocket (3) and balancer unit timing chain (1).



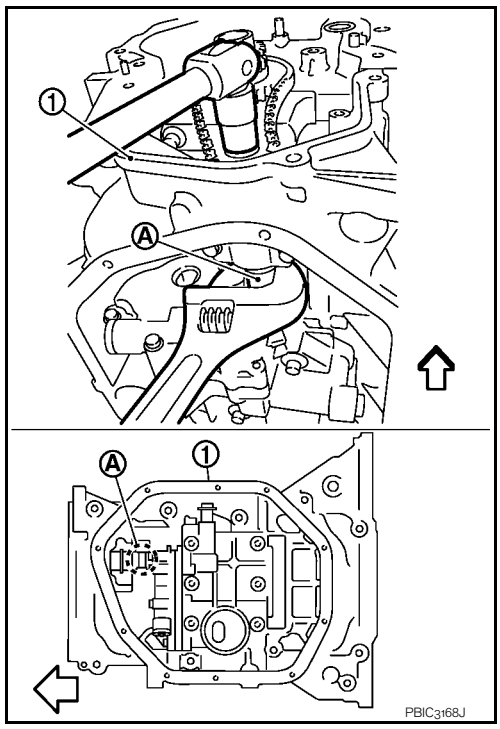
A : Matching mark (stamping)
B : Matching mark (orange link)
C : Matching mark (dark blue link)

- Install it by aligning matching marks on each sprocket and balancer unit timing chain.
- If these matching marks are not aligned, rotate the balancer shaft slightly to correct the position.

CAUTION:
Check matching mark position of each sprocket after installing the balancer unit timing chain.

cardiagn.com

4. Hold the WAF part of balancer unit shaft [WAF: 19.0 mm (0.75 in)] (A), and then tighten the balancer shaft sprocket bolt.



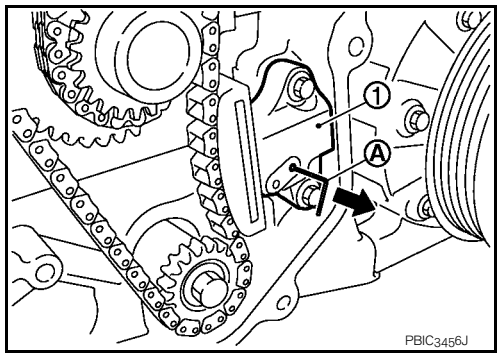
1 : Oil pan (upper)

⇦ : Engine front

CAUTION:

- **Secure the balancer unit shaft with the WAF part.**
- **Never loosen the balancer shaft sprocket bolt by tightening the balancer unit timing chain.**

5. Install balancer unit timing chain tensioner (1).
   - Fix the plunger at the most compressed position using a stopper pin (A), and then install it.
   - Securely pull out (⬅) the stopper pin after installing the balancer unit timing chain tensioner.
   - Check matching mark position of balancer unit timing chain and each sprocket again.



cardiagn.com

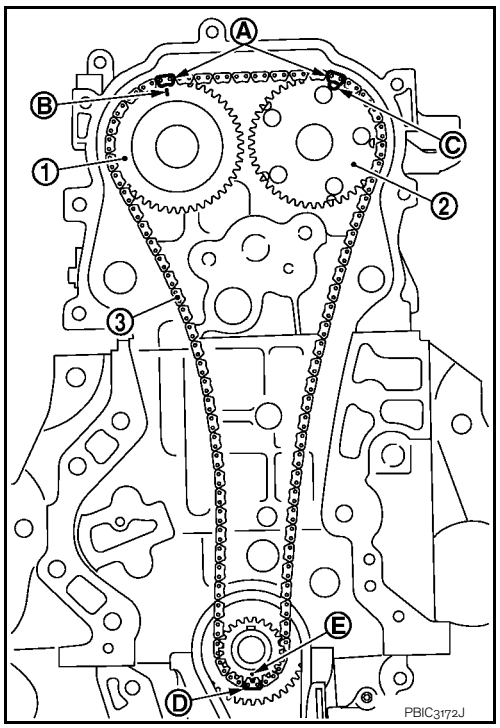
6. Align the matching marks of each sprocket with the matching marks of timing chain.

1 : Camshaft sprocket (EXH)
2 : Camshaft sprocket (INT)
3 : Timing chain
A : Matching mark (dark blue link)
B : Matching mark (stamping)
C : Matching mark (outer groove*)
D : Matching mark (orange link)
E : Matching mark (stamping)

*: There are 2 outer grooves in camshaft sprocket (INT). The wider one is a matching mark.

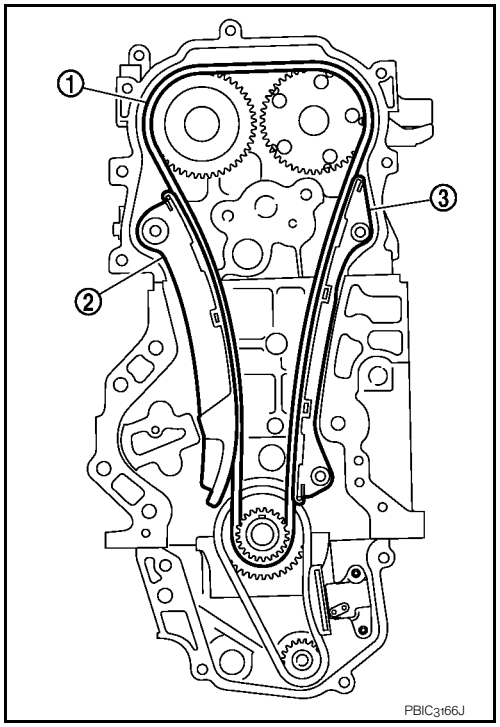
- If these matching marks are not aligned, rotate the camshaft slightly by holding the hexagonal portion to correct the position.

CAUTION:
Check matching mark position of each sprocket and timing chain again after installing the timing chain.

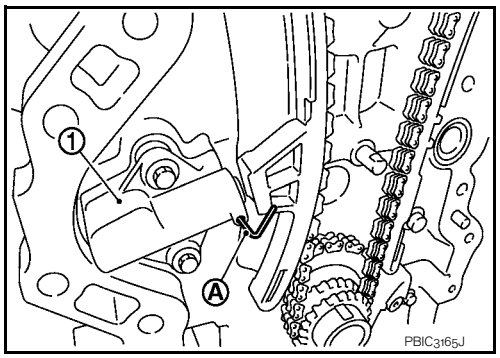


7. Install the timing chain tension guide (3) and the timing chain slack guide (2).

1 : Timing chain



8. Install timing chain tensioner (1).
- Fix the plunger at the most compressed position using a stopper pin (A), and then install it.
- Securely pull out the stopper pin after installing the timing chain tensioner.



cardiagn.com

9. Check matching mark position of timing chain and each sprocket again.
10. Install front oil seal. Refer to EM-182, "FRONT OIL SEAL : Removal and Installation".
11. Install front cover with the following procedure:

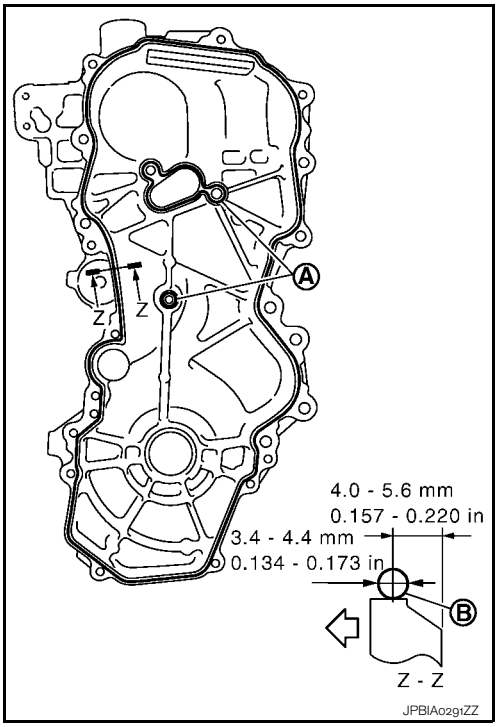
a. Install new O-ring to cylinder block.
CAUTION:
Never misalign O-ring.

b. Apply a continuous bead of liquid gasket (B) with a tube presser (commercial service tool) to front cover as shown in the figure.

A : Liquid gasket application area

⇦ : Engine outside

Use Genuine Liquid Gasket or equivalent.



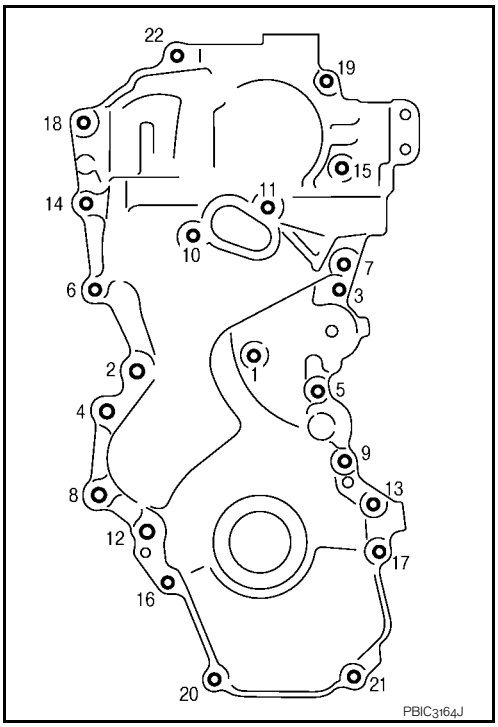
c. Make sure that matching marks of timing chain and each sprocket are still aligned. Then install front cover.
CAUTION:
- **Make sure O-ring on cylinder block is correctly installed.**
- **Be careful not to damage front oil seal by interference with front end of crankshaft.**

d. Install front cover, and tighten mounting bolts in numerical order as shown in the figure.
- Refer to the following for the installation position of bolts.

M6 : No.1
M10 : No. 6, 7, 10, 11, 14
M12 : No. 2, 4, 8, 12
M8 : Except the above

CAUTION:
Attaching should be done within 5 minutes after liquid gasket application.

e. After all bolts are tightened, retighten them to specified torque in numerical order as shown in the figure.
CAUTION:
Be sure to wipe off any excessive liquid gasket leaking.



12. Install crankshaft pulley with the following procedure:

cardiagn.com

a. When inserting crankshaft pulley with a plastic hammer, tap on its center portion (not circumference).
CAUTION:
Never damage front oil seal lip section.

b. Secure crankshaft pulley (1) with a pulley holder (A) (commercial service tool).

c. Apply new engine oil to thread and seat surfaces of crankshaft pulley bolt.

d. Tighten crankshaft pulley bolt.

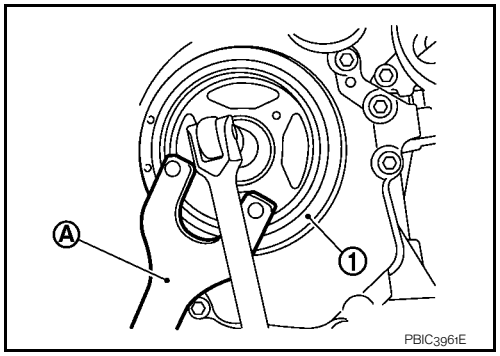
: **68.6 N·m (7.0 kg-m, 51 ft-lb)**

e. Completely loosen.

: **0 N·m (0 kg-m, 0 ft-lb)**

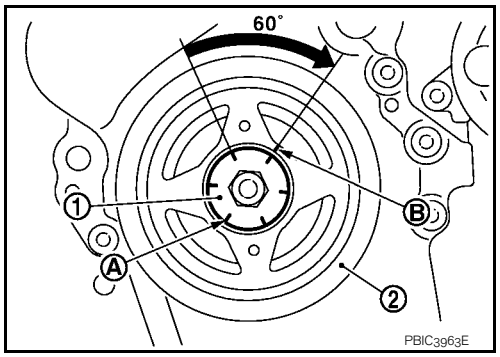
f. Tighten crankshaft pulley bolt.

: **29.4 N·m (3.0 kg-m, 22 ft-lb)**



g. Put a paint mark (B) on crankshaft pulley (2), matching with any one of six easy to recognize angle marks (A) on crankshaft pulley bolt (1) flange.

h. Turn another 60 degrees clockwise (angle tightening).
• Check the tightening angle with movement of one angle mark.



i. Make sure that crankshaft rotates clockwise smoothly.

13. Install remaining parts in the reverse order of removal.

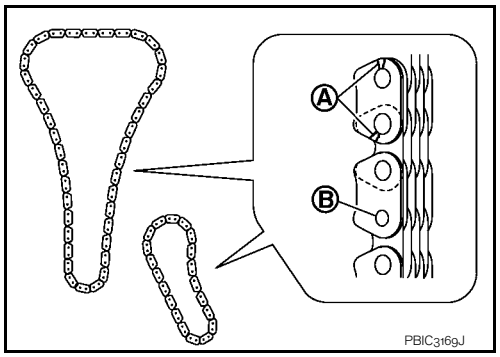
Inspection

INFOID:0000000000893949

INSPECTION AFTER REMOVAL

Timing Chain

Check for cracks (A) and any excessive wear (B) at link plates and roller links of timing chain. Replace timing chain as necessary.



INSPECTION AFTER INSTALLATION

Inspection for Leaks

• Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-21, "Fluids and Lubricants".
• Use procedure below to check for fuel leakage.
- Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.

cardiagn.com

- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:

If hydraulic pressure inside chain tensioner drops after removal/installation, slack in guide may generate a pounding noise during and just after the engine start. However, this does not indicate an unusualness. Noise will stop after hydraulic pressure rises.

- Warm up engine thoroughly to make sure there is no leakage of fuel, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Item	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage

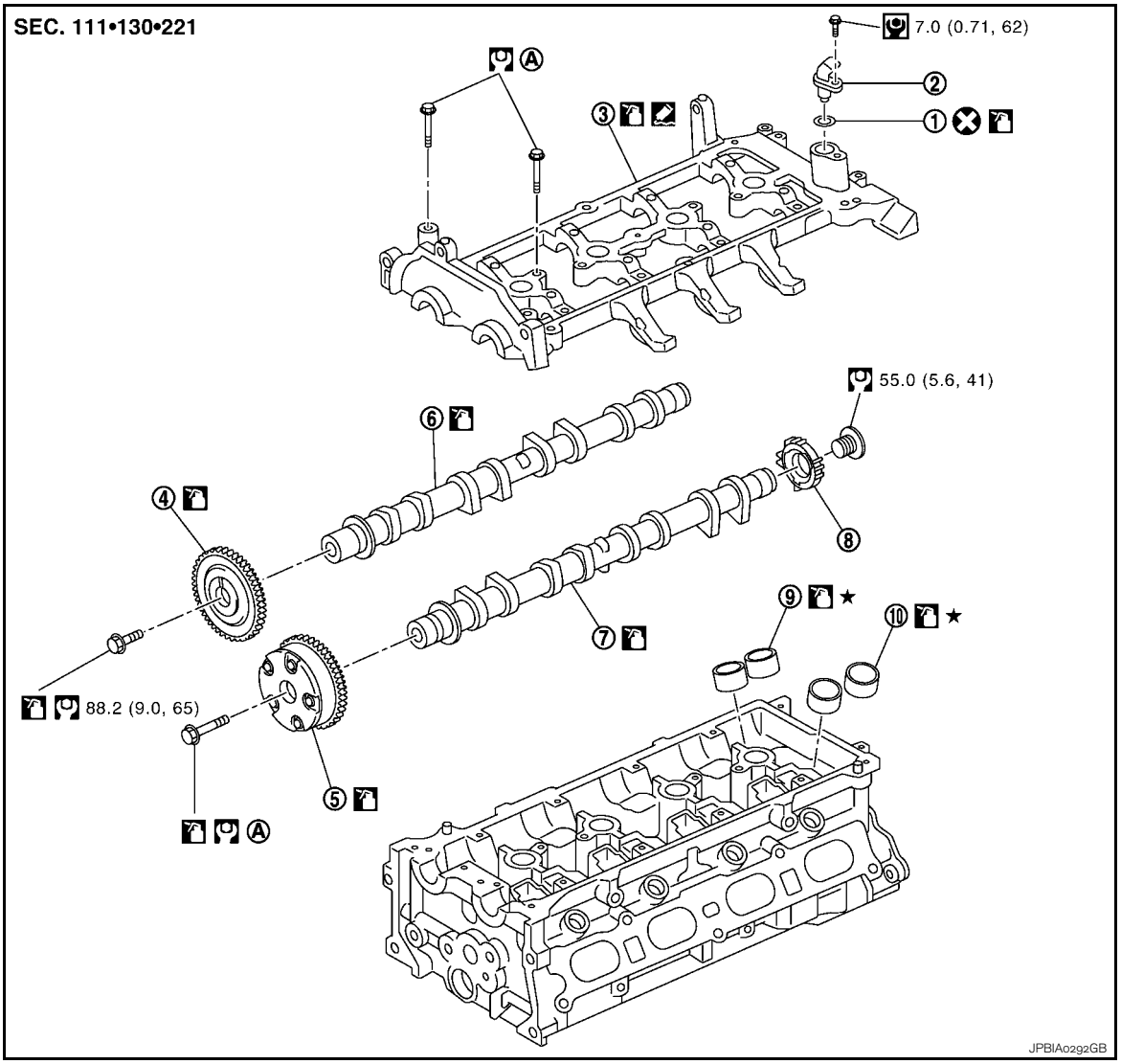
* Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

cardiagn.com

CAMSHAFT

Exploded View

INFOID:0000000000893950



1. O-ring
2. Camshaft position sensor (PHASE)
3. Camshaft bracket
4. Camshaft sprocket (EXH)
5. Camshaft sprocket (INT)
6. Camshaft (EXH)
7. Camshaft (INT)
8. Signal plate
9. Valve lifter (EXH)
10. Valve lifter (INT)

A. Refer to EM-173

Refer to GI-4, "Components" for symbols shown in the figure.

Removal and Installation

INFOID:0000000000893951

CAUTION:
The rotating direction in the text indicates all directions seen from the engine front.

REMOVAL

1. Remove the following parts.
   - Intake manifold: Refer to EM-146, "Exploded View".
   - Rocker cover: Refer to EM-160, "Exploded View".
   - Front cover and timing chain related parts: Refer to EM-162, "Exploded View".

   NOTE:

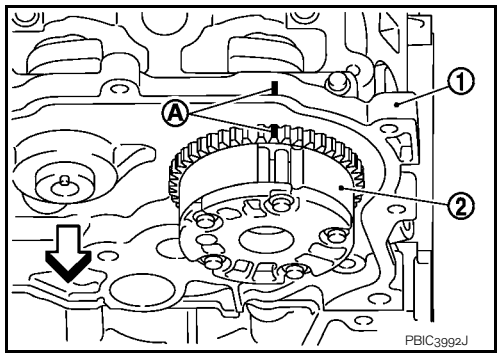
cardiagn.com

Removal of balancer unit related part is not necessary.

2. Remove camshaft position sensor (PHASE) from camshaft bracket.

CAUTION:
- **Handle camshaft position sensor (PHASE) carefully and avoid impacts.**
- **Never disassemble camshaft position sensor (PHASE).**
- **Never place sensor where it is exposed to magnetism.**

3. Put the matching mark (A) on the camshaft sprocket (INT) (2) and the camshaft bracket (1) as shown in the figure.

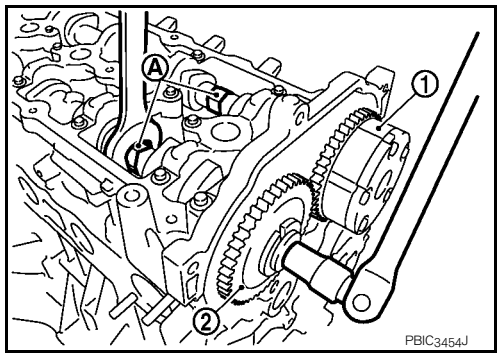


⇦ : Engine front

NOTE:
It prevents the knock pin of the camshaft (INT) from engaging with the incorrect pin hole when installing the camshaft sprocket (INT).

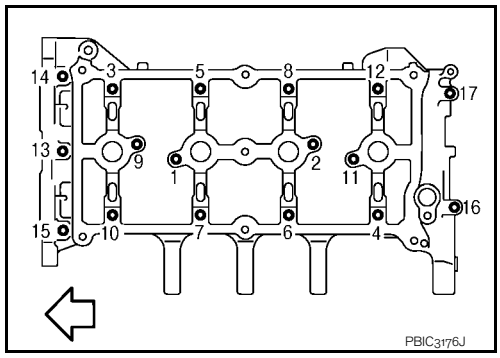
4. Remove camshaft sprockets (INT) (1) and (EXH) (2).
- Secure hexagonal part (A) of camshaft with a wrench. Loosen camshaft sprocket mounting bolts and remove camshaft sprocket.

CAUTION:
- **Never rotate crankshaft or camshaft while timing chain is removed. It causes interference between valve and piston.**
- **Never loosen the mounting bolts with securing anything other than the camshaft hexagonal part or with tensioning the timing chain.**



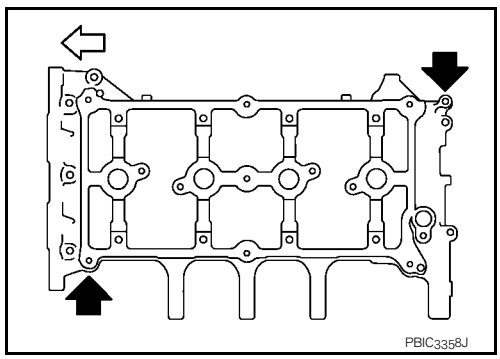
5. Remove camshaft bracket with the following procedure:

a. Loosen mounting bolts in reverse order as shown in the figure.



⇦ : Engine front

b. Cut liquid gasket by prying the position (⬅) shown in the figure, and then remove the camshaft bracket.



⇦ : Engine front

CAUTION:
- **Be careful not to damage the mating surface.**
- **A more adhesive liquid gasket is applied compared to previous types when shipped, so it should not be forced off the position not specified.**

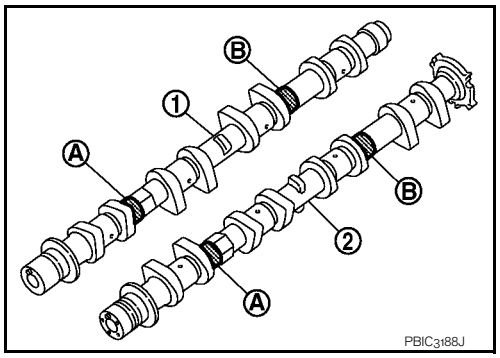
6. Remove camshafts.
7. Remove valve lifters.
- Identify installation positions, and store them without mixing them up.

cardiagn.com

8. Remove signal plate from camshaft (INT), if necessary.

INSTALLATION

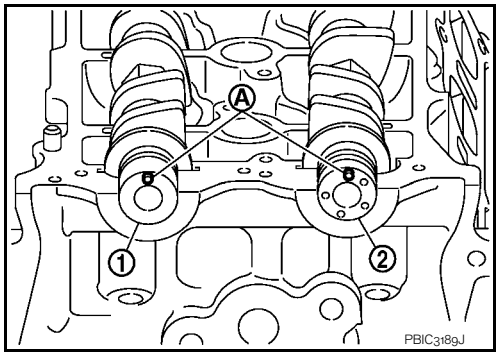
1. Install valve lifters.
   - Install them in the original positions.
2. Install camshafts.
   - Clean camshaft journal to remove any foreign material.
   - Distinguish between the intake and the exhaust by looking at the different shapes of the front and rear ends of the camshaft or using the identification colors (A) and (B).



1 : Camshaft (EXH)
2 : Camshaft (INT)

Identification color	A	B
Camshaft (EXH)	—	White
Camshaft (INT)	White	—

   - Install camshafts so that camshaft dowel pins (A) on the front side are positioned as shown in the figure.



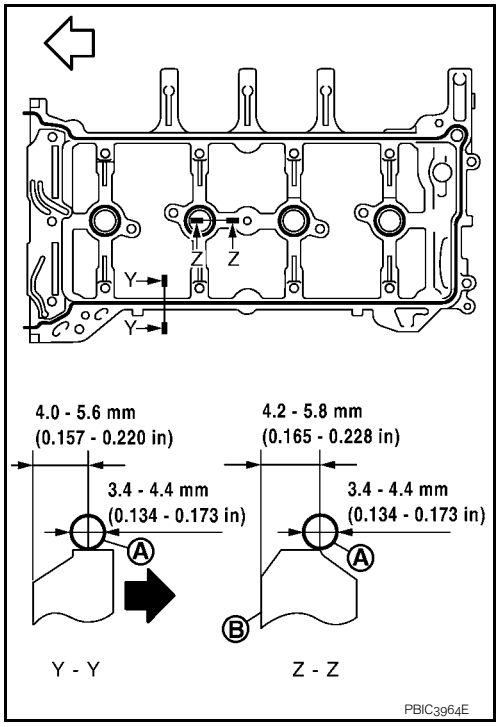
1 : Camshaft (EXH)
2 : Camshaft (INT)

NOTE:
Though camshaft does not stop at the positions as shown in the figure, for the placement of cam nose, it is generally accepted camshaft is placed for the same direction of the figure.

3. Install camshaft bracket with the following procedure:

a. Remove foreign material completely from camshaft bracket backside and from cylinder head installation face.

b. Apply liquid gasket (A) to camshaft bracket as shown in the figure.

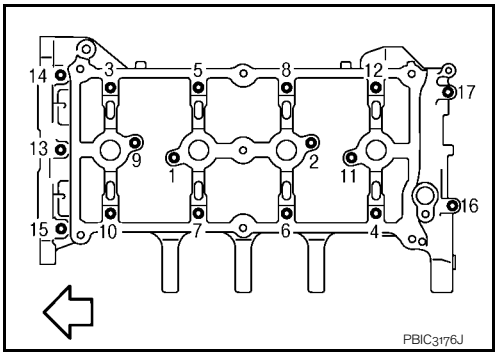


B : Plug hole inner wall
⇦ : Engine front
⬅ : Engine outside

Use Genuine Liquid Gasket or equivalent.

cardiagn.com

c. Tighten mounting bolts of camshaft brackets in the following steps, in numerical order as shown in the figure.



⇦ : Engine front

- There are two types of mounting bolts. Refer to the following for locating bolts.

M6 bolts [thread length: 57.5 mm (2.264 in)]
: 13, 14 and 15 in the figure
M6 bolts [thread length: 35.00 mm (1.378 in)]
: Except the above

i. Tighten mounting bolts in numerical order.

: 1.96 N·m (0.20 kg-m, 17 in-lb)

ii. Tighten mounting bolts in numerical order.

: 5.88 N·m (0.60 kg-m, 52 in-lb)

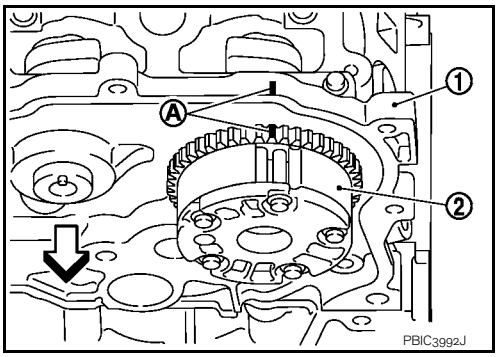
iii. Tighten mounting bolts in numerical order.

: 9.5 N·m (0.97 kg-m, 84 in-lb)

CAUTION:
After tightening mounting bolts of camshaft brackets, be sure to wipe off excessive liquid gasket from the mating surface of cylinder head.

4. Install the camshaft sprocket (INT) to the camshaft (INT) with the following procedure.

a. When the camshaft sprocket (INT) (2) is removed, refer to the paint mark (A) put according to step “3”. Securely align the knock pin and the pin hole, and then install them.



1 : Camshaft bracket

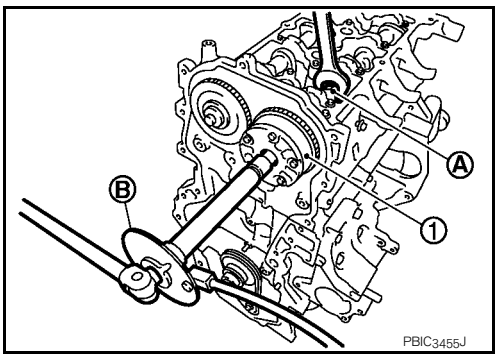
⇦ : Engine front

b. Tighten bolts in the following steps.
- Secure the hexagonal part of camshaft (INT) using wrench to tighten mounting bolt.

i. Tighten camshaft (INT) mounting bolt.

: 35.0 N·m (3.6 kg-m, 26 ft-lb)

ii. Turn 67 degrees clockwise (angle tightening).



1 : Camshaft sprocket (INT)

A : Camshaft (INT) hexagonal part

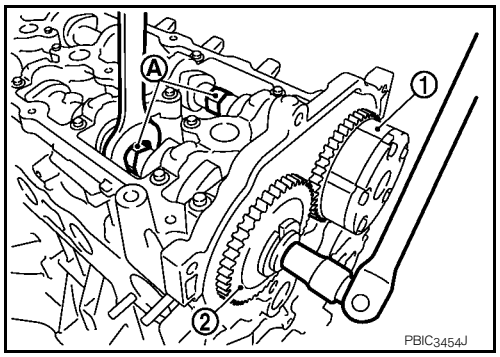
CAUTION:
Check the tightening angle by using an angle wrench [SST: KV10112100] (B) or protractor. Never judge by visual inspection without an angle wrench.

cardiagn.com

5. Install camshaft sprocket (EXH) (2).

1 : Camshaft sprocket (INT)

- Secure the hexagonal part (A) of camshaft (EXH) using wrench to tighten mounting bolt.



6. Install timing chain and related parts. Refer to EM-162, "Exploded View".
7. Inspect and adjust valve clearance. Refer to EM-139, "Inspection and Adjustment".
8. Install remaining parts in the reverse order of removal.

Inspection

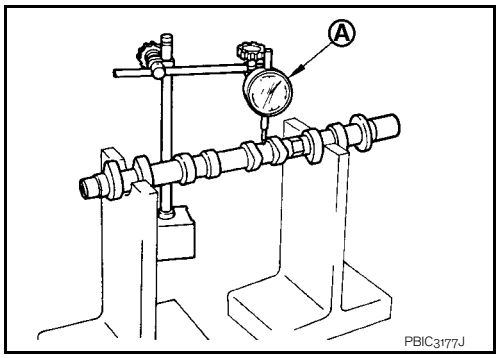
INFOID:0000000000893952

INSPECTION AFTER REMOVAL

Camshaft Runout

1. Put V-block on a precise flat table, and support No. 2 and 5 journal of camshaft.
   CAUTION:
   Never support No. 1 journal (on the side of camshaft sprocket) because it has a different diameter from the other four locations.
2. Set dial indicator (A) vertically to No. 3 journal.
3. Turn camshaft to one direction with hands, and measure the camshaft runout on dial indicator. (Total indicator reading)

Standard and Limit : Refer to EM-237, "Camshaft".

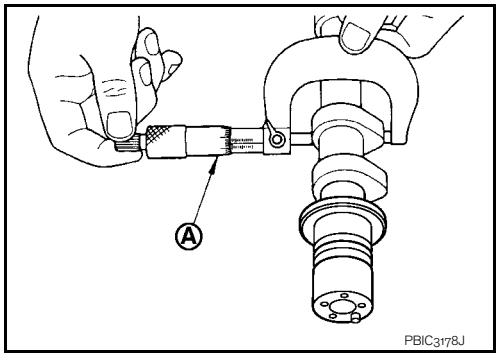


4. If it exceeds the limit, replace camshaft.

Camshaft Cam Height

1. Measure the camshaft cam height with a micrometer (A).

Standard and Limit : Refer to EM-237, "Camshaft".



2. If it exceeds the limit, replace camshaft.

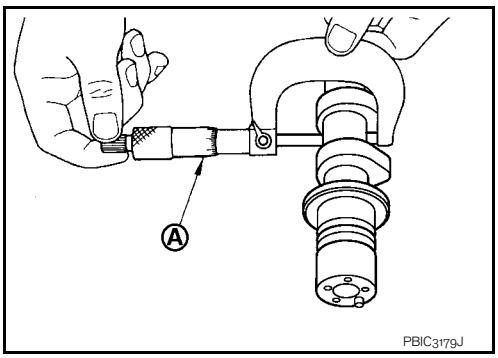
Camshaft Journal Oil Clearance

CAMSHAFT JOURNAL OUTER DIAMETER

cardiagn.com

Measure the outer diameter of camshaft journal with a micrometer (A).

Standard : Refer to EM-237, "Camshaft".

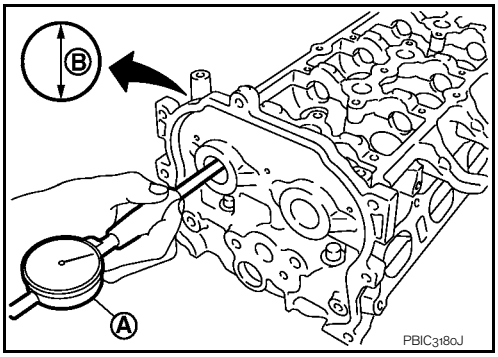


CAMSHAFT BRACKET INNER DIAMETER

- Tighten camshaft bracket bolts with specified torque. Refer to EM-173, "Removal and Installation".
- Measure the inner diameter of camshaft bracket with a bore gauge (A).

B : Measuring direction of inner diameter

Standard : Refer to EM-237, "Camshaft".



CAMSHAFT JOURNAL OIL CLEARANCE

- (Oil clearance) = (Camshaft bracket inner diameter) – (Camshaft journal diameter)

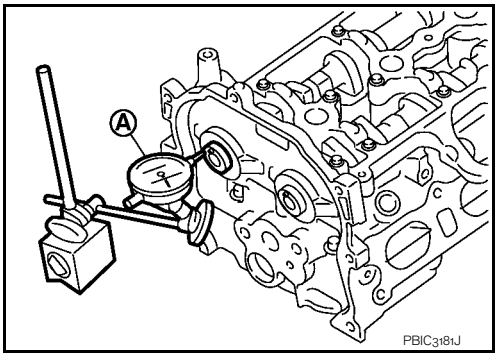
Standard and Limit : Refer to EM-237, "Camshaft".

- If it exceeds the limit, replace camshaft or cylinder head, or both.
  NOTE:
  Camshaft bracket cannot be replaced as a single part, because it is machined together with cylinder head. Replace whole cylinder head assembly.

Camshaft End Play

1. Install camshaft in cylinder head. Refer to EM-173, "Removal and Installation".
2. Install dial indicator in thrust direction on front end of camshaft. Read the end play of dial indicator (A) when camshaft is moved forward/backward (in direction to axis).

Standard and Limit : Refer to EM-237, "Camshaft".



cardiagn.com

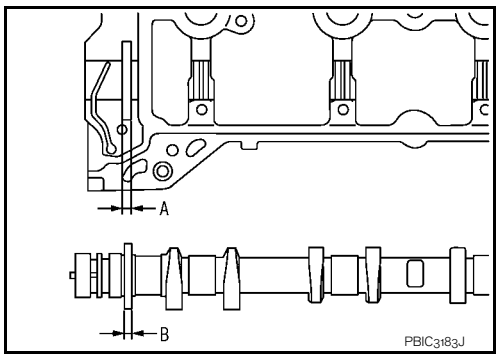
- Measure the following parts if out of the standard.
- Dimension “A” for groove of cylinder head No. 1 journal

Standard : 4.000 - 4.030 mm (0.1575 - 0.1587 in)

- Dimension “B” for camshaft flange

Standard : 3.877 - 3.925 mm (0.1526 - 0.1545 in)

- Refer to the standards above, and then replace camshaft and/or cylinder head.

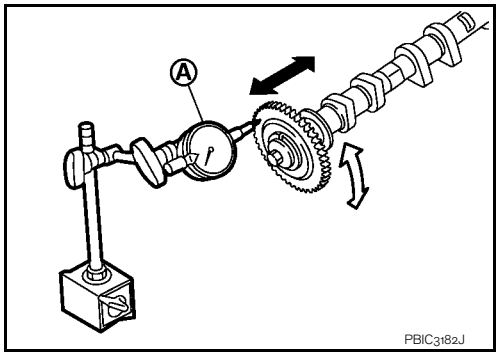


Camshaft Sprocket Runout

1. Put V-block on precise flat table, and support No. 2 and 5 journals of camshaft.
   CAUTION:
   Never support No. 1 journal (on the side of camshaft sprocket) because it has a different diameter from the other four locations.
2. Measure the camshaft sprocket runout with a dial indicator (A). (Total indicator reading)

Limit : Refer to EM-237, "Camshaft".

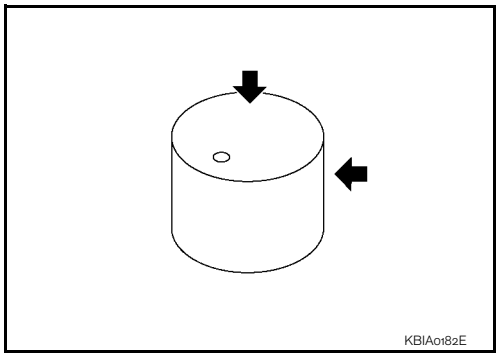
- If it exceeds the limit, replace camshaft sprocket.



Valve Lifter

Check if surface of valve lifter has any wear or cracks.

- If anything above is found, replace valve lifter. Refer to EM-237, "Camshaft".

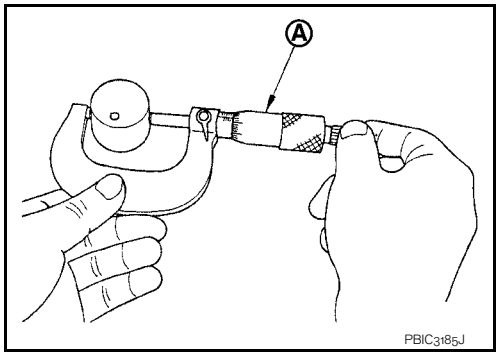


Valve Lifter Clearance

VALVE LIFTER OUTER DIAMETER

- Measure the outer diameter of valve lifter with a micrometer (A).

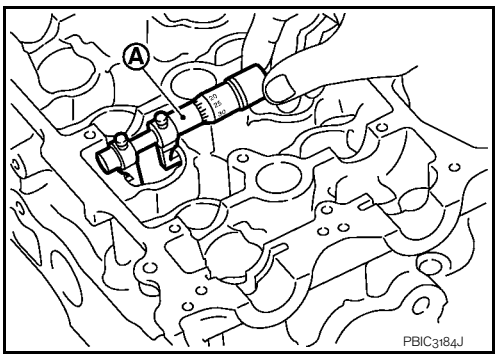
Standard : Refer to EM-237, "Camshaft".



VALVE LIFTER HOLE DIAMETER

cardiagn.com

Measure the diameter of valve lifter hole of cylinder head with an inside micrometer (A).



Standard : Refer to EM-237, "Camshaft".

VALVE LIFTER CLEARANCE

- (Valve lifter clearance) = (Valve lifter hole diameter) – (Valve lifter outer diameter)

Standard : Refer to EM-237, "Camshaft".

- If out of the standard, referring to the each standard of valve lifter outer diameter and valve lifter hole diameter, replace either or both valve lifter and cylinder head.

INSPECTION AFTER INSTALLATION

Inspection of Camshaft Sprocket (INT) Oil Groove

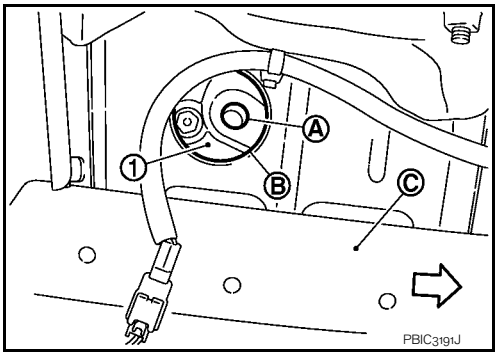
CAUTION:

- **Perform this inspection only when DTC P0011 is detected in self-diagnostic results of CONSULT-III and it is directed according to inspection procedure of EC section. Refer to EC-706, "Diagnosis Description".**
- **Check when engine is cold so as to prevent burns by the splashing engine oil.**

1. Check engine oil level. Refer to LU-14, "Inspection".
2. Perform the following procedure so as to prevent the engine from being unintentionally started while checking.

a. Release the fuel pressure. Refer to EC-978, "Inspection".
b. Remove intake manifold. Refer to EM-146, "Exploded View".
c. Disconnect ignition coil and injector harness connectors.

3. Remove intake valve timing control solenoid valve. Refer to EM-162, "Exploded View".
4. Clean the mounting area of intake valve timing control solenoid valve, and then insert a clean waste with no oil adhesion into the oil hole (A) of the cylinder head.



1 : Front cover
B : Service hole
C : Member on RH side
⇦ :Engine front

5. Install engine mounting insulator (RH). (After the removal of intake valve timing control solenoid valve and insertion of a waste into the oil hole.)
6. Perform cranking to check that engine oil comes out from the oil hole (mounting hole of intake valve timing control solenoid valve) of cylinder head.
   - Regarding the engine oil check, judge it by the amount of oil adhered to the wasted inserted into the oil hole.

   WARNING:
   - **Never insert fingers into the oil hole from the service hole of the member on the RH side.**
   - **Be careful not to touch rotating parts (drive belt, idler pulleys and crankshaft pulley, etc.).**

   CAUTION:
   - **Never perform cranking without installing the engine mounting insulator (RH).**
   - **Prevent splashing by using a shop cloth so as to prevent the worker from injury from engine oil and so as to prevent engine oil contamination.**
   - **Prevent splashing by using a shop cloth so as to prevent engine oil from being splashed to engine and vehicle. Especially, be careful not to apply engine oil to rubber parts of drive belt, engine mounting insulator, etc. Wipe engine oil off immediately if it is splashed.**
7. Perform the following inspection if engine oil does not come out from intake valve timing control solenoid valve oil hole of the cylinder head.

cardiagn.com

- Remove oil filter (for intake valve timing control solenoid), and then clean it. Refer to EM-162, "Exploded View".
- Clean oil groove between oil strainer and intake valve timing control solenoid valve. Refer to LU-11, "Engine Lubrication System" and LU-11, "Engine Lubrication System Schematic".

8. Remove components between intake valve timing control solenoid valve and camshaft sprocket (INT), and then check each oil groove for clogging.
   - Clean oil groove if necessary. Refer to LU-11, "Engine Lubrication System" and LU-11, "Engine Lubrication System Schematic".
9. After inspection, install removed parts in the reverse order.

cardiagn.com

OIL SEAL

VALVE OIL SEAL

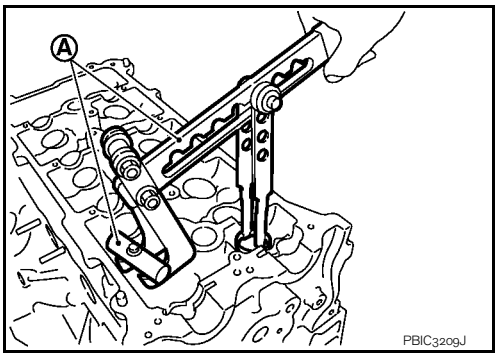
VALVE OIL SEAL : Removal and Installation

INFOID:0000000000893953

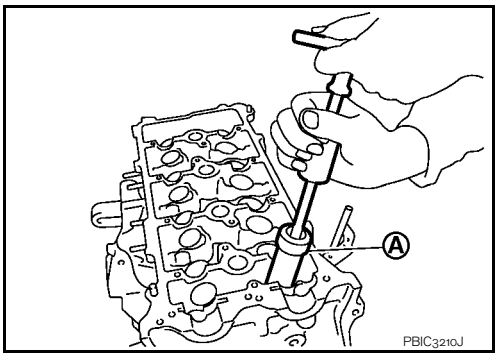
REMOVAL

1. Remove camshafts. Refer to EM-173, "Exploded View".
2. Remove valve lifters. Refer to EM-173, "Exploded View".
3. Rotate crankshaft, and set piston whose valve oil seal is to be removed to TDC. This will prevent valve from dropping into cylinder.
   CAUTION:
   When rotating crankshaft, be careful to avoid scarring front cover with timing chain.
4. Remove valve collet.
   - Compress valve spring with the valve spring compressor, the attachment and the adapter [SST: KV10116200] (A).

   CAUTION:
   Be careful not to damage valve lifter holes.



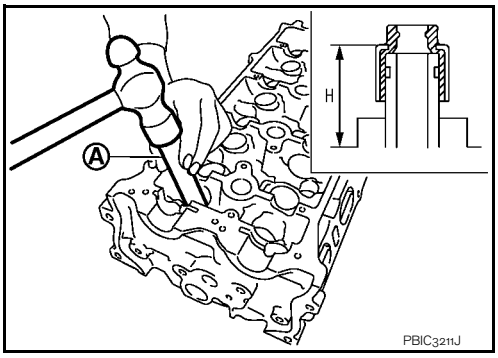
5. Remove valve spring retainer, valve spring and valve spring seat.
6. Remove valve oil seal with the valve oil seal puller [SST: KV10107902] (A).



INSTALLATION

1. Apply new engine oil to valve oil seal joint surface and seal lip.
2. Press in valve oil seal to the height “H” shown in the figure with the valve oil seal drift [SST: KV10115600] (A).

   Height “H” : 15.1 - 15.7 mm (0.594 - 0.618 in)



3. Install in the reverse order of removal, for the rest of parts.

FRONT OIL SEAL

FRONT OIL SEAL : Removal and Installation

INFOID:0000000000893954

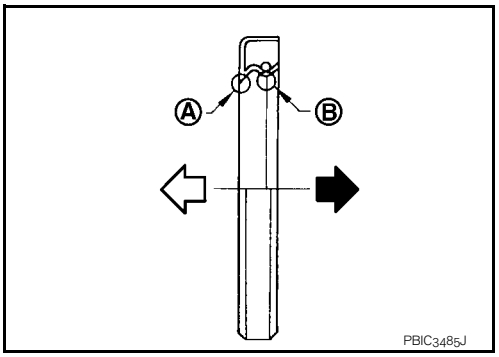
cardiagn.com

REMOVAL

1. Remove the following parts.
   - Front fender protector (RH): Refer to EXT-21, "Exploded View".
   - Drive belt: Refer to EM-134, "Exploded View".
   - Crankshaft pulley: Refer to EM-162, "Exploded View".
2. Remove front oil seal with a suitable tool.
   CAUTION:
   Be careful not to damage front cover and crankshaft.

INSTALLATION

1. Apply new engine oil to new front oil seal joint surface and seal lip.
2. Install front oil seal so that each seal lip is oriented as shown in the figure.



A : Dust seal lip
B : Oil seal lip
⇦ : Engine outside
⬅ : Engine inside

   - Press-fit front oil seal using a suitable drift with outer diameter 57 mm (2.24 in) and inner diameter 45 mm (1.77 in).

   Within 0.3 mm (0.012 in) toward engine front (crankshaft pulley side)
   Within 0.5 mm (0.020 in) toward engine rear (crankshaft sprocket side)

   CAUTION:
   - **Be careful not to damage front cover and crankshaft.**
   - **Press-fit oil seal straight to avoid causing burrs or tilting.**

3. Install in the reverse order of removal, for the rest of parts.

REAR OIL SEAL

REAR OIL SEAL : Removal and Installation

INFOID:0000000000893955

REMOVAL

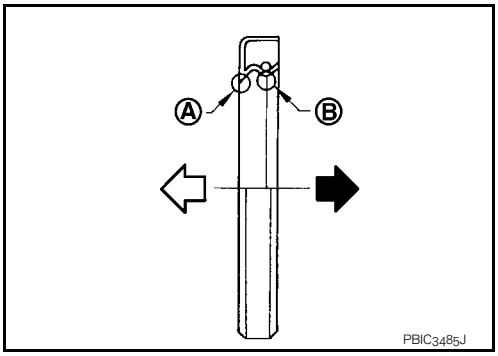
1. Remove transaxle assembly. Refer to TM-68, "Exploded View" or TM-123, "Exploded View" (M/T models) or TM-351, "2WD : Exploded View" or TM-354, "4WD : Exploded View" (CVT models).
2. Remove clutch cover and clutch disk (M/T models). Refer to CL-16, "HR16DE, MR20DE : Exploded View".
3. Remove drive plate (CVT models) or flywheel (M/T models). Refer to EM-210, "Exploded View".
4. Remove rear oil seal with a suitable tool.
   CAUTION:
   Be careful not to damage crankshaft and cylinder block.

INSTALLATION

1. Apply the liquid gasket lightly to entire outside area of new rear oil seal.
   Use Genuine Liquid Gasket or equivalent.

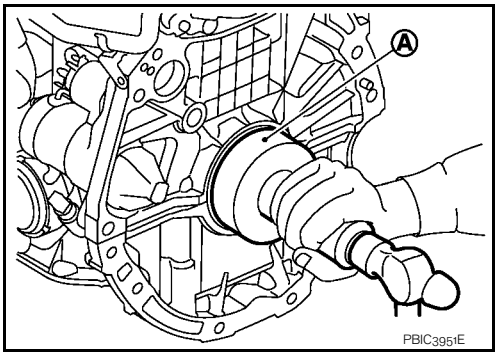
cardiagn.com

2. Install rear oil seal so that each seal lip is oriented as shown in the figure.



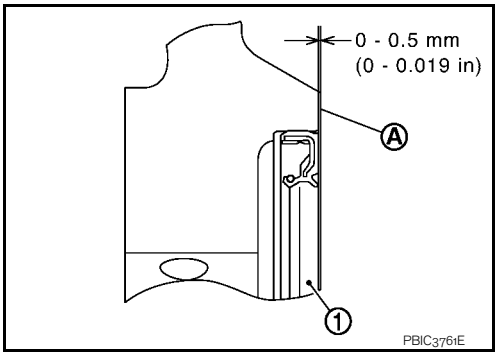
A : Dust seal lip
B : Oil seal lip
⇦ : Engine outside
⬅ : Engine inside

- Press-fit rear oil seal with a suitable drift outer diameter 113 mm (4.45 in) and inner diameter 90 mm (3.54 in) (A).
  CAUTION:
  - **Be careful not to damage crankshaft and cylinder block.**
  - **Press-fit oil seal straight to avoid causing burrs or tilting.**
  - **Never touch grease applied onto oil seal lip.**



- Press in rear oil seal (1) to the position as shown in the figure.

A : Rear end surface of cylinder block



3. Install in the reverse order of removal, for the rest of parts.

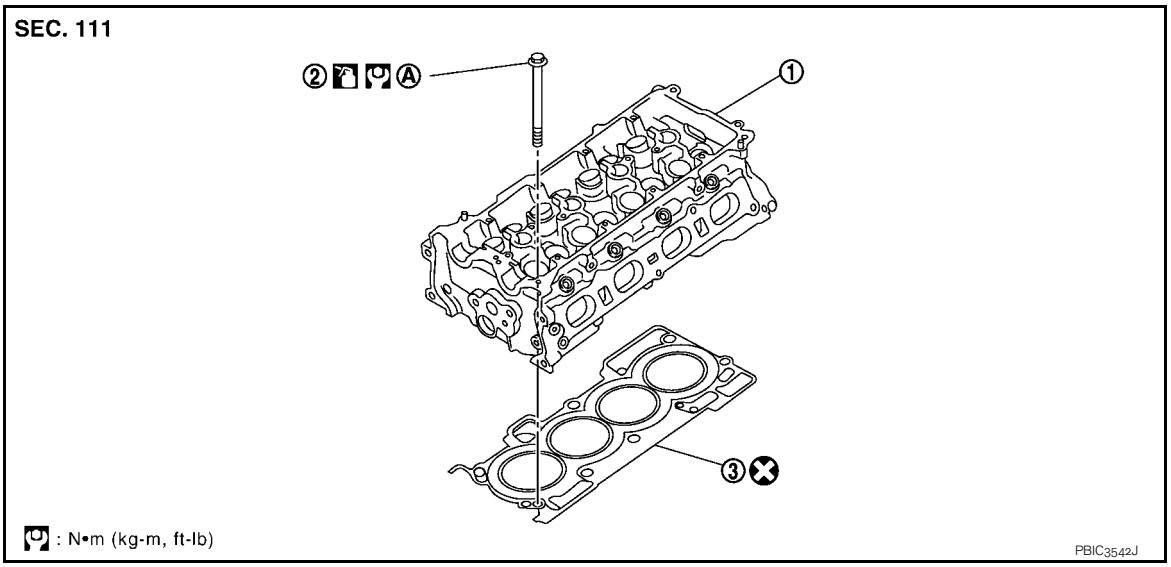
cardiagn.com

CYLINDER HEAD

Exploded View

INFOID:0000000000893956

REMOVAL

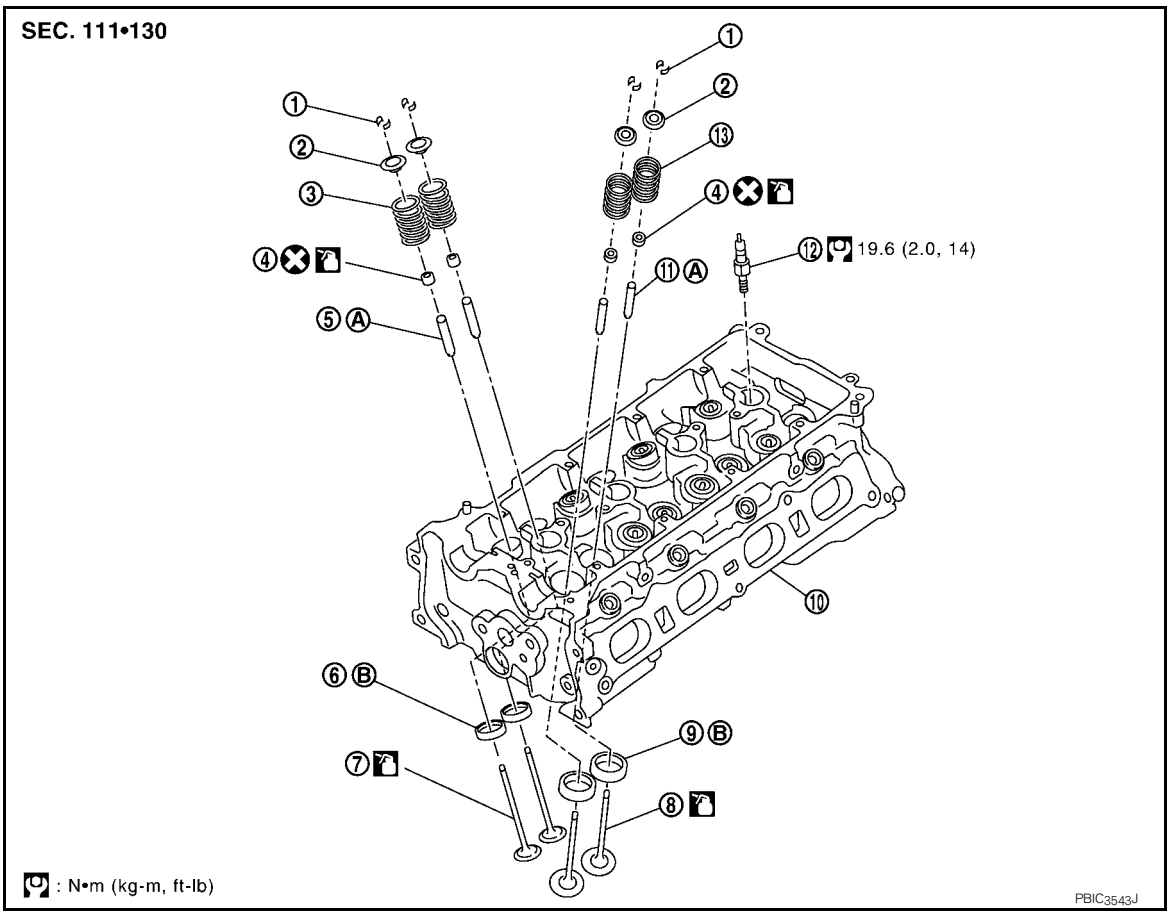


1. Cylinder head assembly
2. Cylinder head bolt
3. Cylinder head gasket

A. Refer to EM-186

Refer to GI-4, "Components" for symbols in the figure.

DISSASEMBLY



cardiagn.com

1. Valve collet
2. Valve spring retainer
3. Valve spring (EXH) (with valve spring seat)
4. Valve oil seal
5. Valve guide (EXH)
6. Valve seat (EXH)
7. Valve (EXH)
8. Valve (INT)
9. Valve seat (INT)
10. Cylinder head
11. Valve guide (INT)
12. Spark plug
13. Valve spring (INT) (with valve spring seat)

A. Refer to EM-187
B. Refer to EM-187

Refer to GI-4, "Components" for symbols shown in the figure.

Removal and Installation

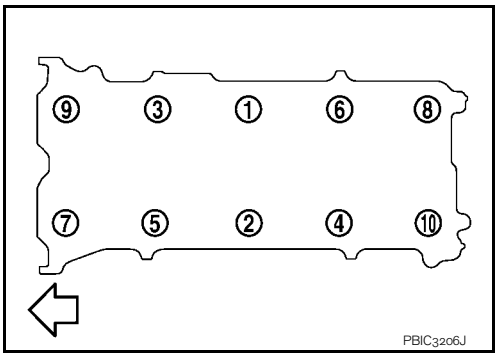
INFOID:0000000000893957

REMOVAL

1. Release fuel pressure. Refer to EC-978, "Inspection".
2. Drain engine coolant and engine oil. Refer to CO-30, "Draining" and LU-15, "Draining".
3. Remove the following components and related parts.
   - Exhaust manifold: Refer to EM-149, "Exploded View".
   - Intake manifold: Refer to EM-146, "Exploded View".
   - Fuel tube and fuel injector assembly: Refer to EM-155, "Exploded View".
   - Water outlet: Refer to CO-44, "Exploded View".
   - Rocker cover: Refer to EM-160, "Exploded View".
   - Front cover, timing chain: Refer to EM-162, "Exploded View".
   - Camshaft: Refer to EM-173, "Exploded View".
4. Remove cylinder head.
   - Loosen mounting bolts in reverse order as shown in the figure.

     ⇦ : Engine front

   - Using TORX socket (size E18), loosen cylinder head bolts.



5. Remove cylinder head gasket.

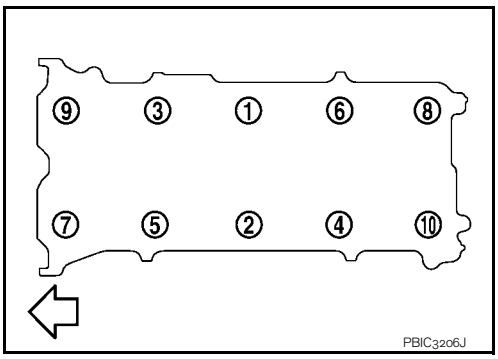
INSTALLATION

1. Install cylinder head gasket.
2. Install cylinder head, and tighten cylinder head bolts in numerical order as shown in figure with the following procedure.

   ⇦ : Engine front

   CAUTION:
   If cylinder head bolts are re-used, check their outer diameters before installation. Refer to EM-191, "Inspection".

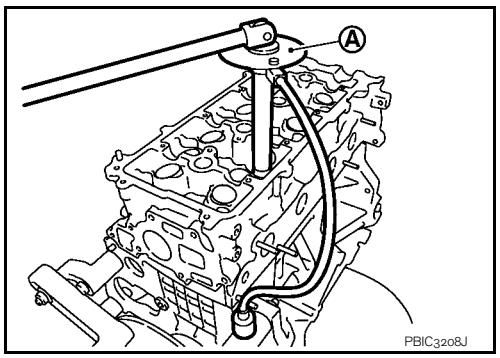
a. Apply new engine oil to threads and seating surface of mounting bolts.
b. Tighten all bolts.



: 40.0 N·m (4.1 kg-m, 30 ft-lb)

cardiagn.com

c. Turn all bolts 100 degrees clockwise (angle tightening).
CAUTION:
Check and confirm the tightening angle by using an angle wrench [SST: KV10112100] (A) or protractor. Never judge by visual inspection without the tool.



d. Completely loosen.

: 0 N·m (0 kg-m, 0 ft-lb)

CAUTION:
In this step, loosen bolts in reverse order that indicated in the figure.

e. Tighten all bolts.

: 40.0 N·m (4.1 kg-m, 30 ft-lb)

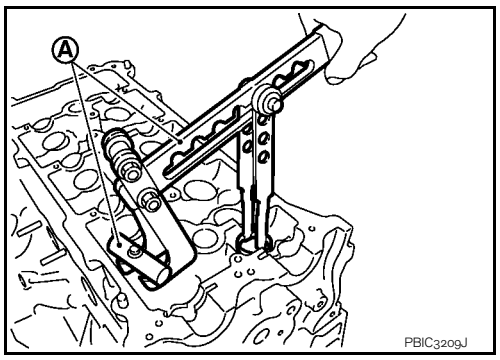
f. Turn all bolts 100 degrees clockwise (angle tightening).
g. Turn all bolts 100 degrees clockwise again (angle tightening).
3. Install in the reverse order of removal, for the rest of parts.

Disassembly and Assembly

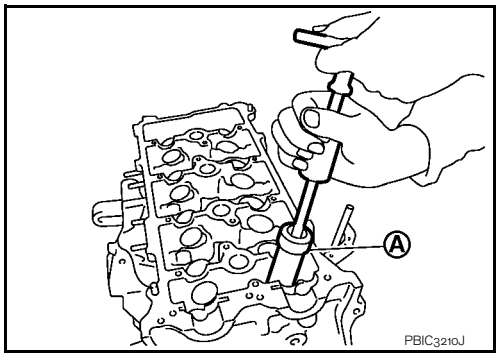
INFOID:0000000000893967

Disassembly

1. Remove spark plug with spark plug wrench (commercial service tool).
2. Remove valve lifter.
   • Identify installation positions, and store them without mixing them up.
3. Remove valve collet.
   • Compress valve spring with valve spring compressor, attachment and adapter [SST: KV10116200] (A). Remove valve collet with a magnet hand.
   CAUTION:
   Be careful not to damage valve lifter holes.



4. Remove valve spring retainer and valve spring (with valve spring seat).
   CAUTION:
   Never remove valve spring seat from valve spring.
5. Push valve stem to combustion chamber side, and remove valve.
   • Identify installation positions, and store them without mixing them up.
6. Remove valve oil seal with a valve oil seal puller [SST: KV10107902] (A).



7. When valve seat must be replaced.

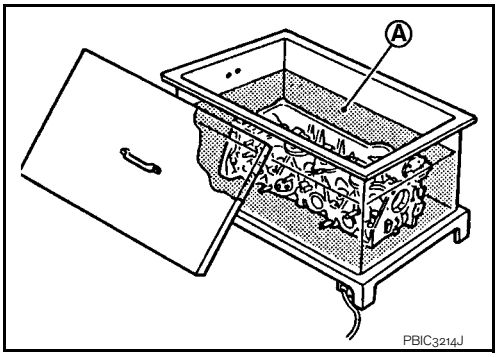
cardiagn.com

- Bore out old seat until it collapses. Boring should not continue beyond the bottom face of the seat recess in cylinder head. Set the machine depth stop to ensure this. Refer to EM-238, "Cylinder Head".

CAUTION:
Never bore excessively to prevent cylinder head from scratching.

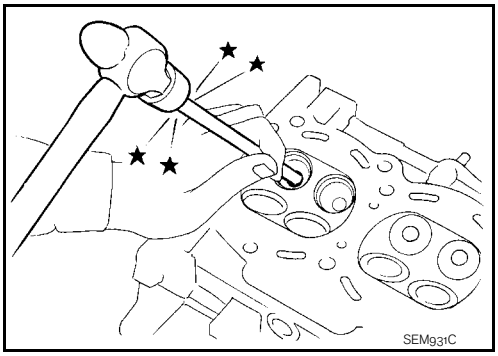
8. When valve guide must be replaced.

a. To remove valve guide, heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil (A).



b. Drive out valve guide with a hammer and valve guide drift (commercial service tool).

CAUTION:
Cylinder head contains heat, wear protective equipment to avoid getting burned.



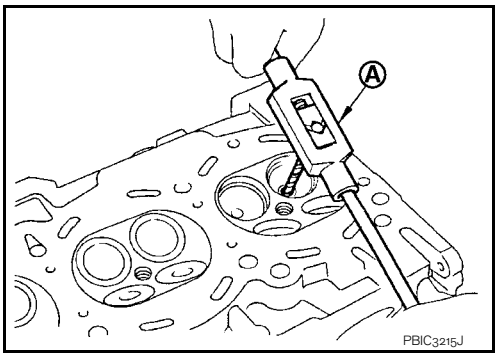
Assembly

1. When valve guide is removed, install it.

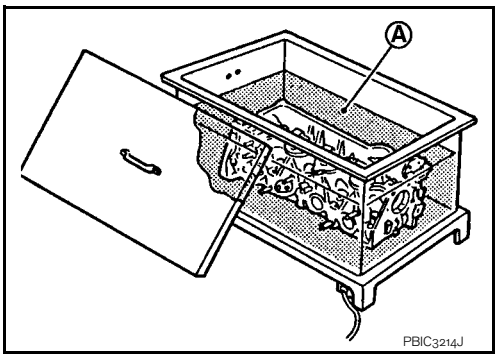
CAUTION:
Replace with oversize [0.2 mm (0.008 in)] valve guide.

a. Ream cylinder head valve guide hole with a valve guide reamer (commercial service tool) (A).

For service parts: Oversize [0.2 mm (0.008 in)]
Refer to EM-238, "Cylinder Head".



b. Heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil (A).



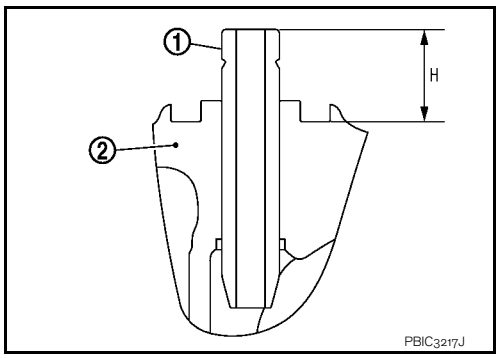
cardiagn.com

c. Press valve guide (1) from camshaft side to dimensions as shown in the figure.

2 : Cylinder head

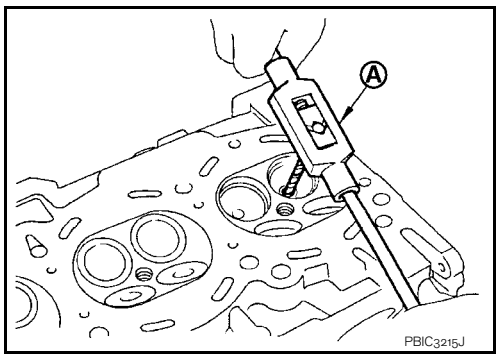
Projection "H" : Refer to EM-238, "Cylinder Head".

CAUTION:
Cylinder head contains heat, wear protective equipment to avoid getting burned.



d. Apply reamer finish to valve guide with a valve guide reamer (commercial service tool) (A).

Standard : Refer to EM-238, "Cylinder Head".



2. When valve seat is removed, install it.

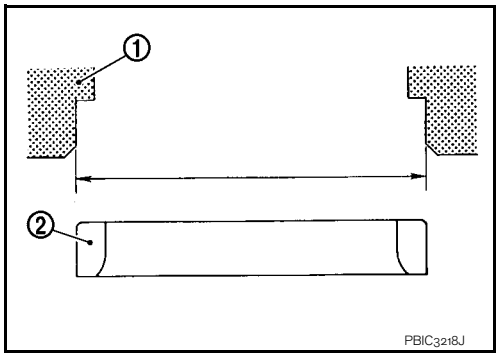
CAUTION:
Replace with oversize [0.5 mm (0.020 in)] valve seat.

a. Ream cylinder head (1) recess diameter for service valve seat.

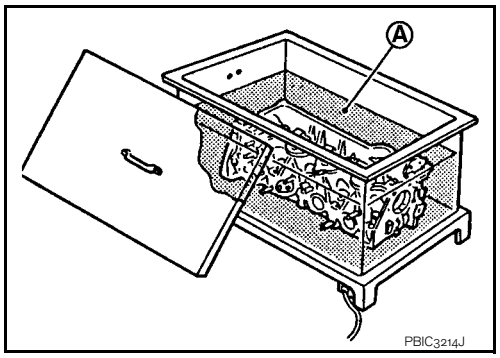
2 : Valve seat

For service parts: Oversize [0.5 mm (0.020 in)]
Refer to EM-238, "Cylinder Head".

- Be sure to ream in circles concentric to the valve guide center. This will enable valve seat to fit correctly.



b. Heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil (A).



c. Provide valve seats cooled well with dry ice. Press-fit valve seat into cylinder head.

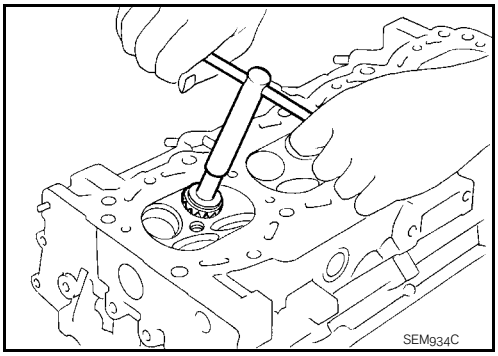
CAUTION:
- **Never touch cold valve seats directly.**
- **Cylinder head contains heat, wear protective equipment to avoid getting burned.**

cardiagn.com

d. Using valve seat cutter set (commercial service tool) or valve seat grinder, finish valve seat to the specified dimensions. For dimensions, refer to EM-238, "Cylinder Head".

CAUTION:

When using valve seat cutter, firmly grip the cutter handle with both hands. Then, press on the contacting surface all around the circumference to cut in a single drive. Improper pressure on with the cutter or cutting many different times may result in stage valve seat.



e. Using compound, grind to adjust valve fitting.

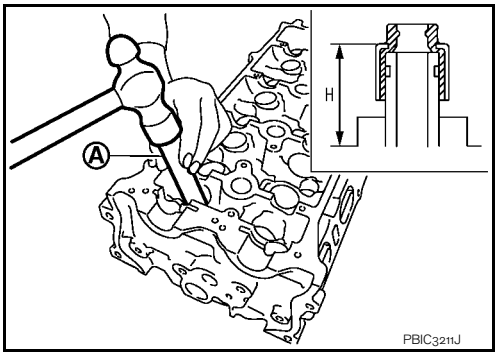
f. Check again for normal contact. Refer to EM-191, "Inspection".

3. Install valve oil seal.
   - Install with a valve oil seal drift [SST:KV10115600] (A) to match dimension in the figure.

   NOTE:

   Dimension “H” is height that measured before installing valve spring (with valve spring seat).

   Height “H” : 15.1 - 15.7 mm (0.594 - 0.618 in)



4. Install valve.
   - Install larger diameter to intake side.

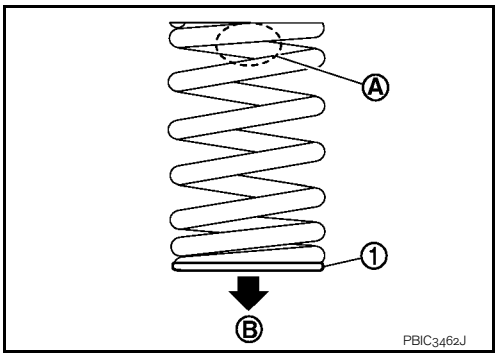
5. Install valve spring (with valve spring seat).
   - Install smaller pitch (valve spring seat side) to cylinder head side (B).

   1 : Valve spring seat (Do not remove from valve spring.)

   - Confirm identification color (A) of valve spring.

   Intake : Green

   Exhaust : Purple

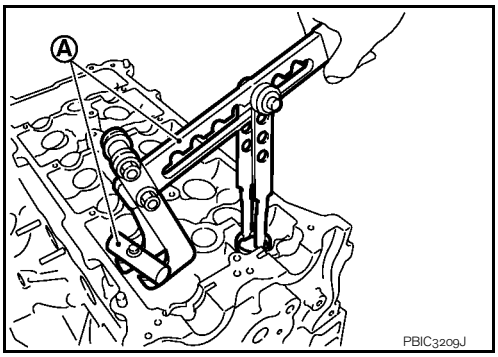


6. Install valve spring retainer.

7. Install valve collet.
   - Compress valve spring with a valve spring compressor, attachment and adapter [SST: KV10116200] (A). Install valve collet with a magnet hand.

   CAUTION:

   Be careful not to damage valve lifter holes.
   - Tap valve stem edge lightly with a plastic hammer after installation to check its installed condition.



8. Install valve lifter.
   - Install it in the original position.

cardiagn.com

9. Install spark plug with spark plug wrench (commercial service tool).

Inspection

INFOID:0000000000893958

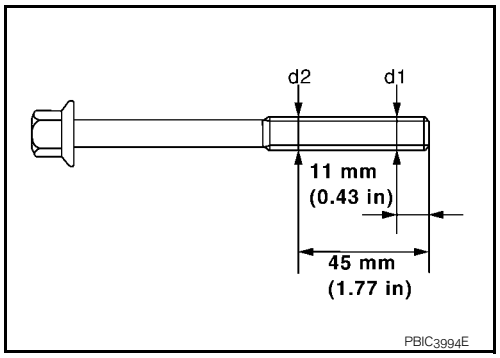
INSPECTION AFTER REMOVAL

Cylinder Head Bolts Outer Diameter

- Cylinder head bolts are tightened by plastic zone tightening method. Whenever the size difference between “d1” and “d2” exceeds the limit, replace them with a new one.

Limit (“d1”–“d2”): 0.15 mm (0.0059 in)

- If reduction of outer diameter appears in a position other than “d2”, use it as “d2” point.



Cylinder Head Distortion

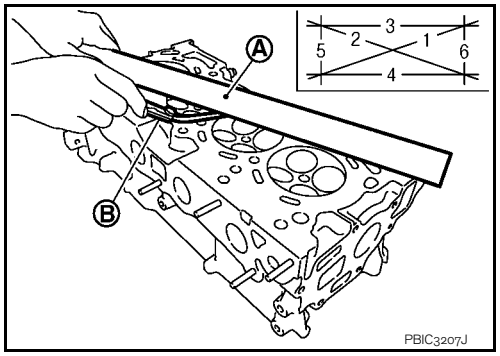
NOTE:

When performing this inspection, cylinder block distortion should be also checked. Refer to EM-241, "Cylinder Block".

1. Wipe off engine oil and remove water scale (like deposit), gasket, sealant, carbon, etc. with a scraper.
   CAUTION:
   Never allow gasket debris to enter passages for engine oil or water.
2. At each of several locations on bottom surface of cylinder head, measure the distortion in six directions using straightedge (A) and feeler gauge (B).

Limit: Refer to EM-238, "Cylinder Head".

- If it exceeds the limit, replace cylinder head.



INSPECTION AFTER DISASSEMBLY

VALVE DIMENSIONS

- Check the dimensions of each valve. For the dimensions, refer to EM-238, "Cylinder Head".
- If dimensions are out of the standard, replace valve and check valve seat contact.

VALVE GUIDE CLEARANCE

Valve Stem Diameter

- Measure the diameter of valve stem with micrometer (A).

Standard : Refer to EM-238, "Cylinder Head".

Valve Guide Inner Diameter

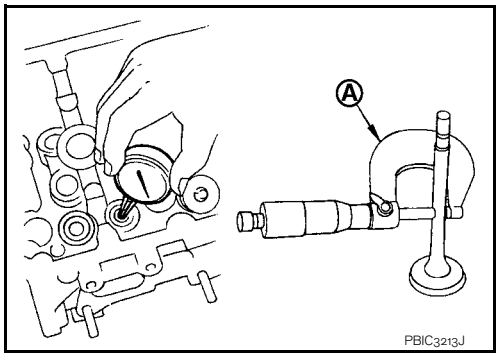
- Measure the inner diameter of valve guide with bore gauge.

Standard : Refer to EM-238, "Cylinder Head".

Valve Guide Clearance

- (Valve guide clearance) = (Valve guide inner diameter) – (Valve stem diameter)

Standard and Limit : Refer to EM-238, "Cylinder Head".



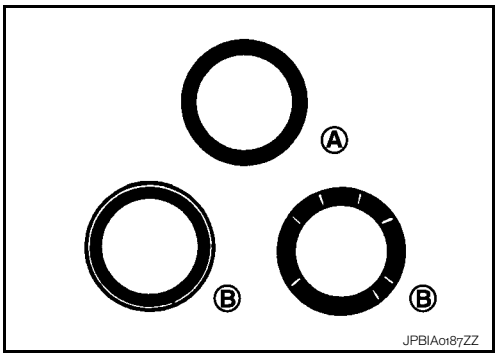
cardiagn.com

- If the calculated value exceeds the limit, replace valve and/or valve guide. When valve guide must be replaced. Refer to EM-187, "Disassembly and Assembly".

VALVE SEAT CONTACT

- After confirming that the dimensions of valve guides and valves are within the specifications, perform this procedure.
- Apply prussian blue (or white lead) onto contacting surface of valve seat to check the condition of the valve contact on the surface.
- Check if the contact area band is continuous all around the circumference.

A : OK
B : NG



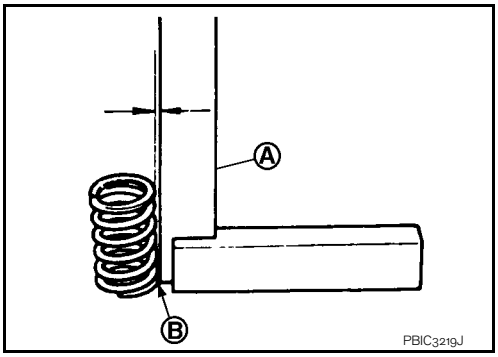
- If not, grind to adjust valve fitting and check again. If the contacting surface still has “NG” conditions even after the re-check, replace valve seat. Refer to EM-187, "Disassembly and Assembly".

VALVE SPRING SQUARENESS

- Set a try square (A) along the side of valve spring and rotate spring. Measure the maximum clearance between the top of spring and try square.

B : Contact

Limit : Refer to EM-238, "Cylinder Head".



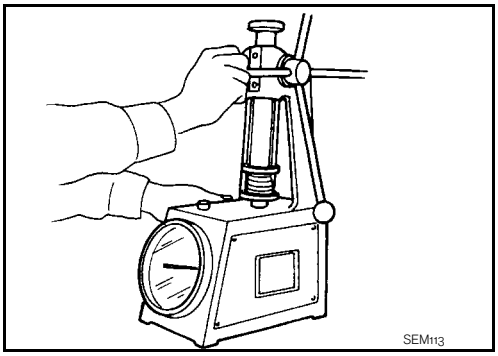
- If it exceeds the limit, replace valve spring.

VALVE SPRING DIMENSIONS AND VALVE SPRING PRESSURE LOAD

- Check valve spring pressure with valve spring seat installed at the specified spring height.

CAUTION:
Never remove valve spring seat from valve spring.

Standard : Refer to EM-238, "Cylinder Head".



- If the installation load or load with valve open is out of the standard, replace valve spring (with valve spring seat).

INSPECTION AFTER INSTALLATION

Inspection for Leaks

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-21, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gases, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

cardiagn.com

Summary of the inspection items:

Item	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gases	—	Leakage	—

* Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

cardiagn.com

REMOVAL AND INSTALLATION

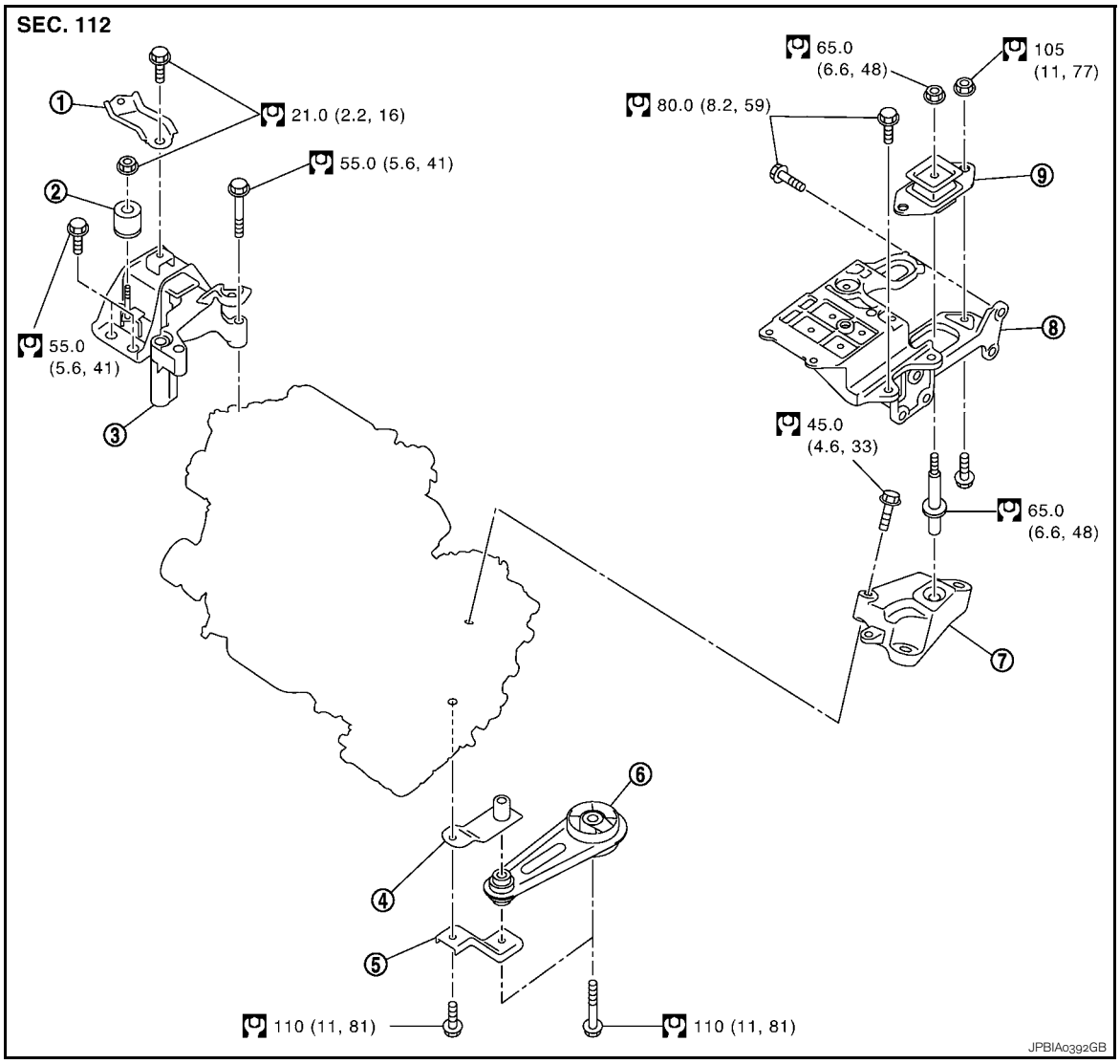
ENGINE ASSEMBLY

M/T

M/T : Exploded View

INFOID:0000000000893959

2WD models

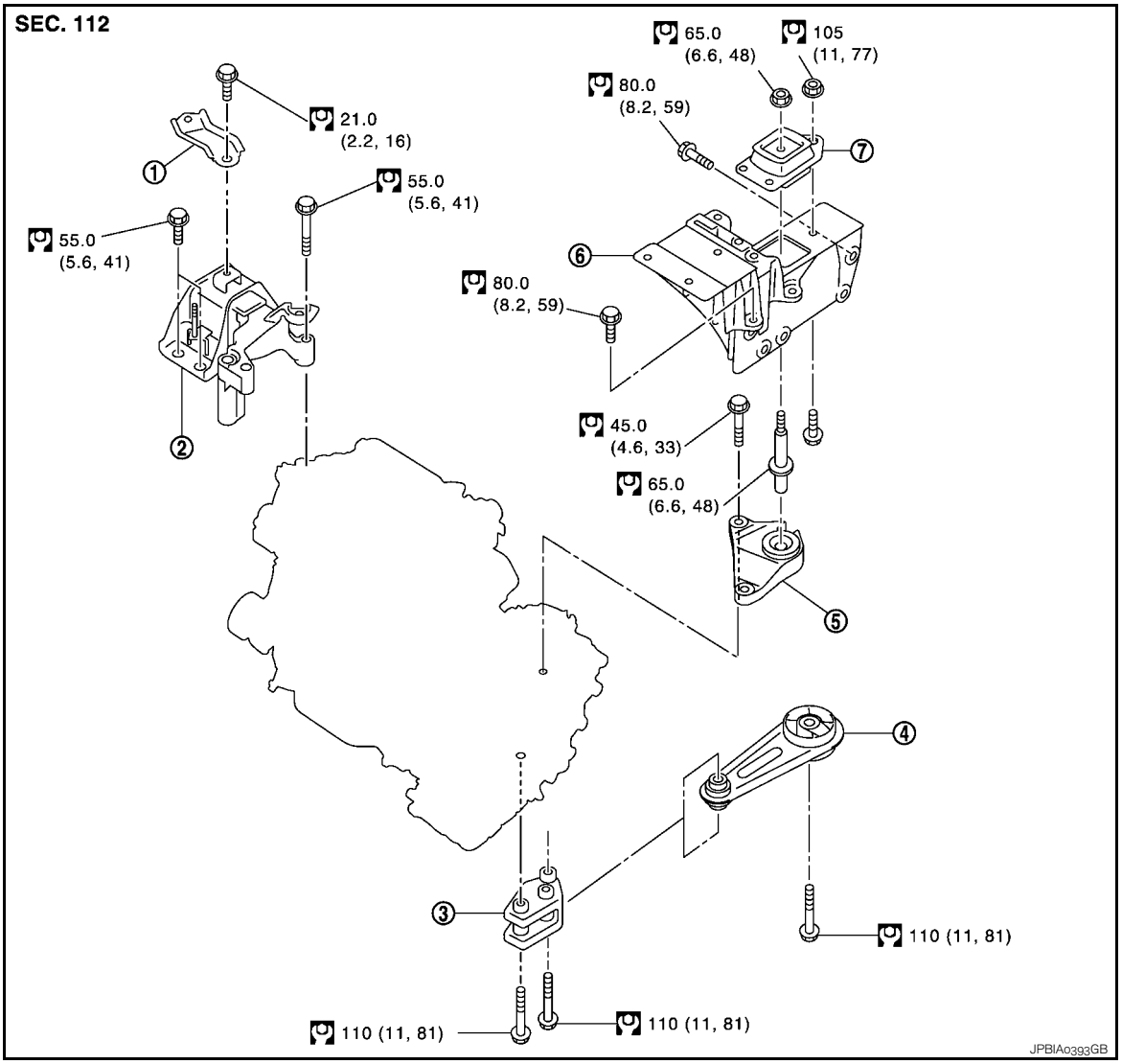


1. Engine mounting stay
2. Dynamic damper
3. Engine mounting insulator (RH)
4. Rear engine mounting bracket
5. Rear engine mounting bracket
6. Rear torque rod
7. Engine mounting bracket (LH)
8. Engine mounting bracket (LH)
9. Engine mounting insulator (LH)

Refer to GI-4, "Components" for symbols in the figure.

4WD models

cardiagn.com



1. Engine mounting stay
2. Engine mounting insulator (RH)
3. Rear engine mounting bracket
4. Rear torque rod
5. Engine mounting bracket (LH)
6. Engine mounting bracket (LH)
7. Engine mounting insulator (LH)

Refer to GI-4, "Components" for symbols in the figure.

M/T : Removal and Installation

INFOID:0000000000893960

WARNING:
- **Situate the vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **Attach proper slingers and bolts described in PARTS CATALOG if engine slingers are not equipped.**

CAUTION:
- **Always be careful to work safely, avoid forceful or uninstructed operations.**
- **Never start working until exhaust system and coolant are cool enough.**
- **If items or work required are not covered by the engine section, refer to the applicable sections.**
- **Always use the support point specified for lifting.**
- **Use either 2-pole lift type or separate type lift as best you can. If board-on type is used for unavoidable reasons, support at the rear axle jacking point with a transmission jack or similar tool before starting work, in preparation for the backward shift of center of gravity.**
- **For supporting points for lifting and jacking point at rear axle, refer to GI-33, "Garage Jack and Safety Stand and 2-Pole Lift".**

REMOVAL

cardiagn.com

Outline

Remove the engine and the transaxle assembly from the vehicle downward. Separate the engine and the transaxle.

Preparation

1. Release fuel pressure. Refer to EC-978, "Inspection".
2. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belt.**
3. Remove the following parts.
   - Engine undercover
   - Engine cover: Refer to EM-146, "Exploded View".
   - Front fender protector (RH and LH): Refer to EXT-21, "Exploded View".
   - Front road wheels and tires: Refer to WT-4, "Road Wheel".
   - Battery and battery tray: Refer to PG-118, "Exploded View".
   - Air duct and air cleaner case assembly: Refer to EM-144, "Exploded View".
   - Radiator hose (upper and lower) and cooling fan assembly: Refer to CO-34, "Exploded View".
   - Exhaust front tube: Refer to EX-10, "Exploded View".

Engine Room LH

1. Disconnect all connections of engine harness around the engine mounting insulator (LH), and then temporarily secure the engine harness into the engine side.
   CAUTION:
   Protect connectors using a resin bag against foreign materials during the operation.
2. Disconnect fuel feed hose at engine side. Refer to EM-155, "Exploded View".
3. Disconnect heater hoses. Refer to CO-44, "Exploded View".
4. Disconnect control linkage from transaxle. Refer to TM-63, "Exploded View".
5. Remove ground cable at transaxle side.

Engine Room RH

1. Disconnect vacuum hose from intake manifold. Refer to EM-146, "Exploded View".
2. Disconnect A/C piping from A/C compressor, and temporarily fasten it on vehicle with a rope (with A/C models). Refer to HA-39, "Exploded View".
3. Disconnect reservoir tank hoses. Refer to CO-34, "Exploded View".

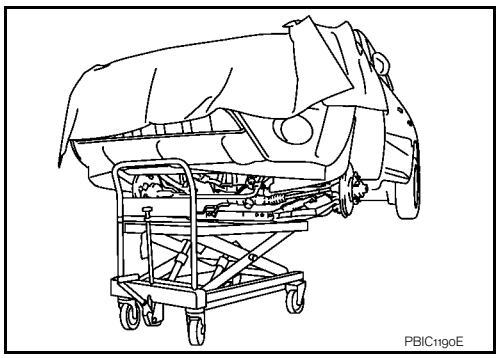
Vehicle Underbody

1. Remove front wheel sensor (LH and RH) for ABS from steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View".
2. Remove brake caliper assembly with piping connected from steering knuckle. Temporarily secure it on the vehicle side with a rope to avoid load on it. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View".
3. Disconnect steering outer sockets from steering knuckle. Refer to ST-13, "Exploded View".
4. Remove rear torque rod.
5. Remove drive shafts (LH and RH). Refer to FAX-15, "HR16DE MODELS : Exploded View" (2WD models) or FAX-55, "Exploded View" (4WD models).
6. Remove propeller shaft (4WD models). Refer to DLN-110, "Exploded View".
7. Remove stabilizer connecting rod. Refer to FSU-16, "Exploded View".
8. Disconnect steering lower joint at steering gear assembly side, and release steering lower shaft. Refer to ST-10, "Exploded View".
9. Remove front suspension member. Refer to FSU-16, "Exploded View".
10. Preparation for the separation work of transaxle is as follows:
    - Remove transaxle joint bolts which pierce at oil pan (upper) lower rear side. Refer to EM-152, "Exploded View".

Removal

cardiagn.com

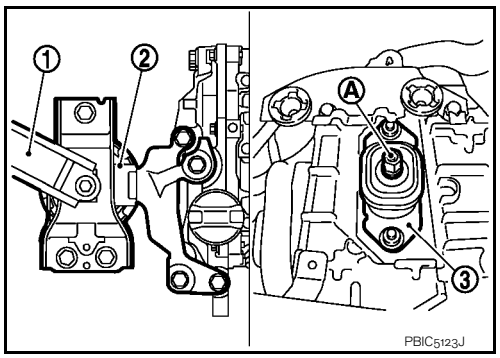
1. Use a manual lift table caddy (commercial service tool) or equivalently rigid tool such as a transmission jack. Securely support bottom of the engine and the transaxle assembly.
CAUTION:
Put a piece of wood or an equivalent as the supporting surface, secure a completely stable condition.



2. Remove engine mounting stay (1), engine mounting insulator (RH) (2).

3 :Engine mounting insulator (LH)

3. Remove engine mounting through bolt-securing nut (A).



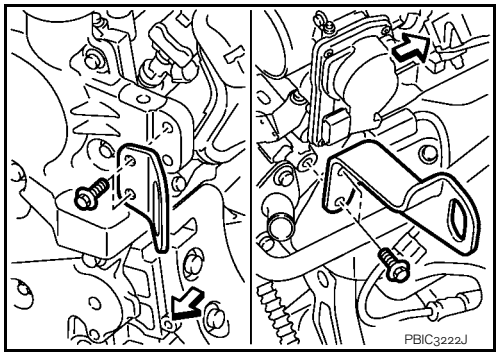
4. Carefully lower jack, or raise lift to remove the engine and the transaxle assembly. When performing work, observe the following caution.
CAUTION:
- **Make sure that no part interferes with the vehicle side.**
- **Before and during this lifting, always check if any harnesses are left connected.**
- **During the removal, always be careful to prevent the vehicle from falling off the lift due to changes in the center of gravity.**
- **If necessary, support the vehicle by setting jack or suitable tool at the rear.**

Separation

1. Install engine slinger to front cover front left side and cylinder head rear right side.

⇦ : Engine front

Slinger bolts
Front cover side: **: 32.9 N·m (3.4 kg-m, 24 ft-lb)**
Cylinder head side: **: 25.0 N·m (2.6 kg-m, 18 ft-lb)**



2. Remove starter motor. Refer to STR-25, "MR20DE MODELS : Exploded View".
3. Lift with a hoist and separate the engine from the transaxle assembly. Refer to TM-68, "Exploded View" (RS6F94R M/T) or TM-123, "Exploded View" (RS6F52A M/T).

INSTALLATION

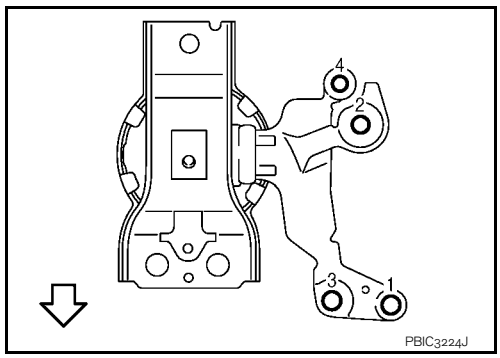
Note the following, and install in the reverse order of removal.
CAUTION:
- **Never allow engine oil to get on engine mounting insulator. Be careful not to damage engine mounting insulator.**
- **Make sure that each mounting insulator is seated properly, and tighten mounting nuts and bolts.**

Engine Mounting Insulator (RH)

cardiagn.com

1. Temporarily tighten the bolt “4” shown in the figure.
2. Tighten bolts to the specified torque according to the numerical order shown in the figure.

⇦ : Vehicle front



M/T : Inspection

INFOID:0000000000893961

INSPECTION AFTER INSTALLATION

Inspection for Leaks

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-21, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gases, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Item	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gases	—	Leakage	—

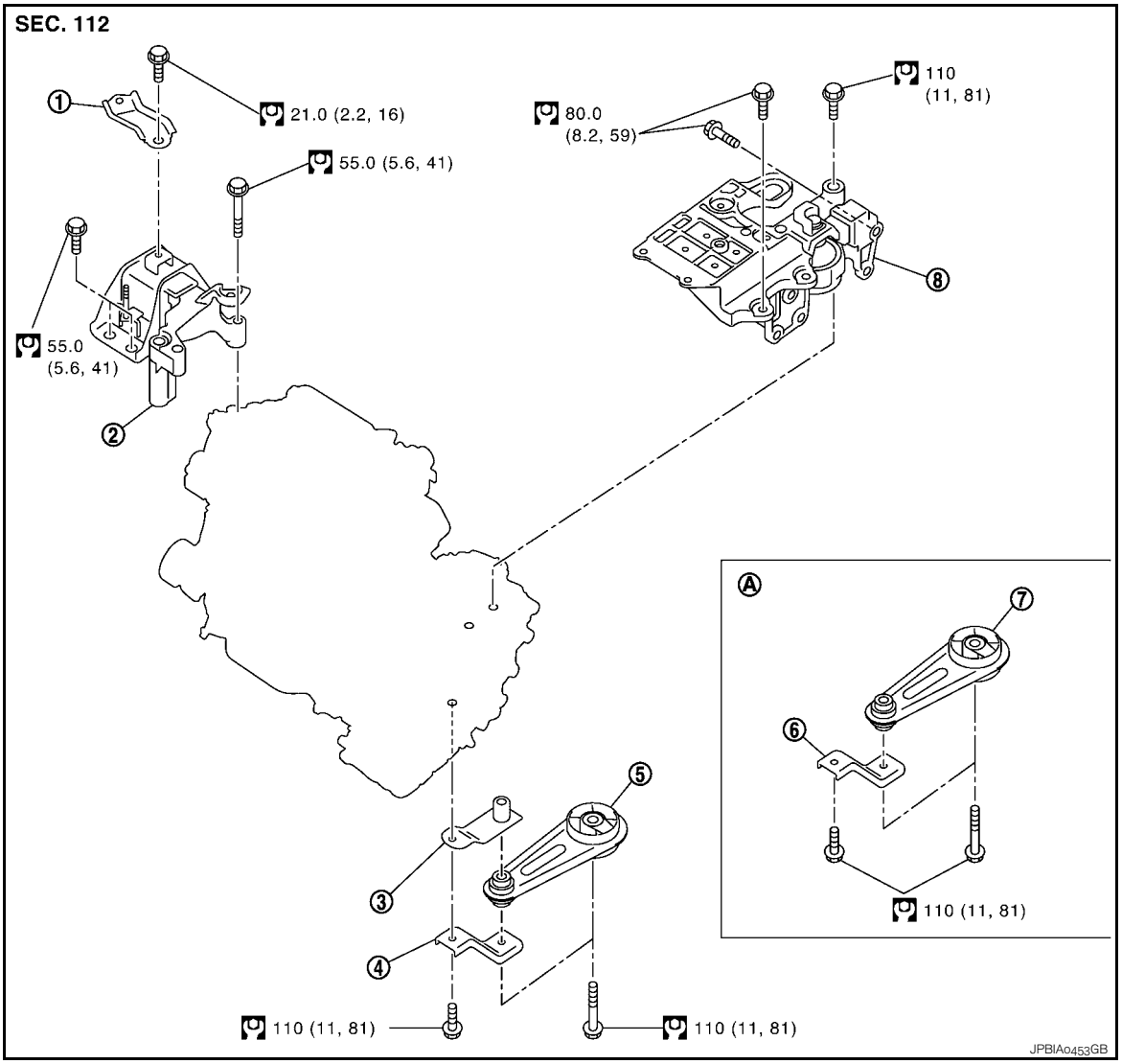
* Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

CVT

CVT : Exploded View

INFOID:0000000000893962

cardiagn.com



1. Engine mounting stay
2. Engine mounting insulator (RH)
3. Rear engine mounting bracket
4. Rear engine mounting bracket
5. Rear torque rod
6. Rear engine mounting bracket
7. Rear torque rod
8. Engine mounting insulator (LH)

A. 4WD models

Refer to GI-4, "Components" for symbols in the figure.

CVT : Removal and Installation

INFOID:0000000000893963

WARNING:

- **Situate the vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **Attach proper slingers and bolts described in PARTS CATALOG if engine slingers are not equipped.**

CAUTION:

- **Always be careful to work safely, avoid forceful or uninstructed operations.**
- **Never start working until exhaust system and coolant are cool enough.**
- **If items or work required are not covered by the engine section, refer to the applicable sections.**
- **Always use the support point specified for lifting.**
- **Use either 2-pole lift type or separate type lift as best you can. If board-on type is used for unavoidable reasons, support at the rear axle jacking point with a transmission jack or similar tool before starting work, in preparation for the backward shift of center of gravity.**
- **For supporting points for lifting and jacking point at rear axle, refer to GI-33, "Garage Jack and Safety Stand and 2-Pole Lift".**

cardiagn.com

REMOVAL

Outline

Remove the engine and the transaxle assembly from the vehicle downward. Separate the engine and the transaxle.

Preparation

1. Release fuel pressure. Refer to EC-978, "Inspection".
2. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belt.**
3. Remove the following parts.
   - Engine undercover
   - Engine cover: Refer to EM-146, "Exploded View".
   - Front fender protector (RH and LH): Refer to EXT-21, "Exploded View".
   - Front road wheels and tires: Refer to WT-4, "Road Wheel".
   - Battery and battery tray: Refer to PG-118, "Exploded View".
   - Air duct and air cleaner case assembly: Refer to EM-144, "Exploded View".
   - Radiator hose (upper and lower), CVT fluid cooler hose and cooling fan assembly: Refer to CO-34, "Exploded View".
   - Exhaust front tube: Refer to EX-10, "Exploded View".

Engine Room LH

1. Disconnect all connections of engine harness around the engine mounting insulator (LH), and then temporarily secure the engine harness into the engine side.
   CAUTION:
   Protect connectors using a resin bag against foreign materials during the operation.
2. Disconnect fuel feed hose at engine side. Refer to EM-155, "Exploded View".
3. Disconnect heater hoses, and install plugs them to prevent engine coolant from draining. Refer to CO-44, "Exploded View".
4. Disconnect control cable from transaxle. Refer to TM-330, "Exploded View".
5. Remove ground cable at transaxle side.

Engine Room RH

1. Disconnect vacuum hose from intake manifold. Refer to EM-146, "Exploded View".
2. Disconnect A/C piping from A/C compressor, and temporarily fasten it on vehicle with a rope (with A/C models). Refer to HA-39, "Exploded View".
3. Disconnect reservoir tank hoses. Refer to CO-34, "Exploded View".

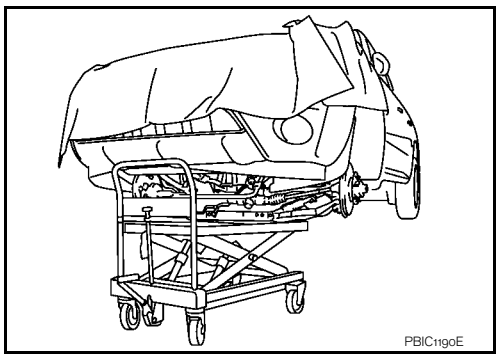
Vehicle Underbody

1. Remove front wheel sensor (LH and RH) for ABS from steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View".
2. Remove brake caliper assembly with piping connected from steering knuckle. Temporarily secure it on the vehicle side with a rope to avoid load on it. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View".
3. Disconnect steering outer sockets from steering knuckle. Refer to ST-13, "Exploded View".
4. Remove rear torque rod.
5. Remove drive shafts (LH and RH). Refer to FAX-22, "MR20DE MODELS : Exploded View" (2WD models) or FAX-55, "Exploded View" (4WD models).
6. Remove propeller shaft (4WD models). Refer to DLN-110, "Exploded View".
7. Remove stabilizer connecting rod. Refer to FSU-16, "Exploded View".
8. Disconnect steering lower joint at steering gear assembly side, and release steering lower shaft. Refer to ST-10, "Exploded View".
9. Remove front suspension member. Refer to FSU-16, "Exploded View".
10. Preparation for the separation work of transaxle is as follows:
    - Remove transaxle joint bolts which pierce at oil pan (upper) lower rear side. Refer to EM-152, "Exploded View".

cardiagn.com

Removal

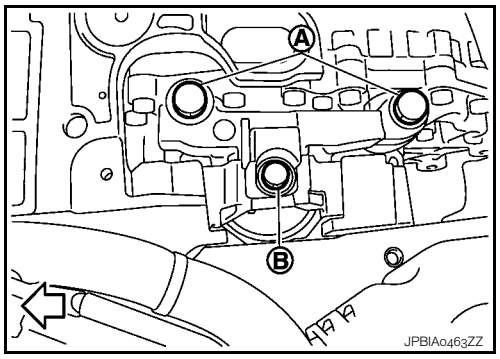
1. Use a manual lift table caddy (commercial service tool) or equivalently rigid tool such as a transmission jack. Securely support bottom of the engine and the transaxle assembly.
CAUTION:
Put a piece of wood or an equivalent as the supporting surface, secure a completely stable condition.



2. Remove four mounting bolts on engine mounting insulator (RH) (front cover side).
3. Remove two mounting bolts (A) on engine mounting insulator (LH) (transaxle side).

⇦ :Vehicle front

CAUTION:
Never remove the bolt (B) coupling insulator and bracket. (part not for disassembly)



4. Carefully lower jack, or raise lift to remove the engine and the transaxle assembly. When performing work, observe the following caution.
CAUTION:
- **Make sure that no part interferes with the vehicle side.**
- **Before and during this lifting, always check if any harnesses are left connected.**
- **During the removal, always be careful to prevent the vehicle from falling off the lift due to changes in the center of gravity.**
- **If necessary, support the vehicle by setting jack or suitable tool at the rear.**

Separation

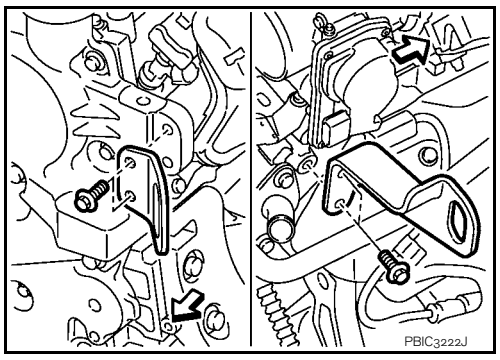
1. Install engine slinger to front cover front left side and cylinder head rear right side.

⇦ : Engine front

Slinger bolts

Front cover side: **: 32.9 N·m (3.4 kg-m, 24 ft-lb)**

Cylinder head side: **: 25.0 N·m (2.6 kg-m, 18 ft-lb)**



2. Remove starter motor. Refer to STR-25, "MR20DE MODELS : Exploded View".
3. Lift with a hoist and separate the engine from the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD models) or TM-354, "4WD : Exploded View" (4WD models).

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:
- **Never allow engine oil to get on engine mounting insulator. Be careful not to damage engine mounting insulator.**
- **Make sure that each mounting insulator is seated properly, and tighten mounting nuts and bolts.**

Engine mounting insulator (RH)

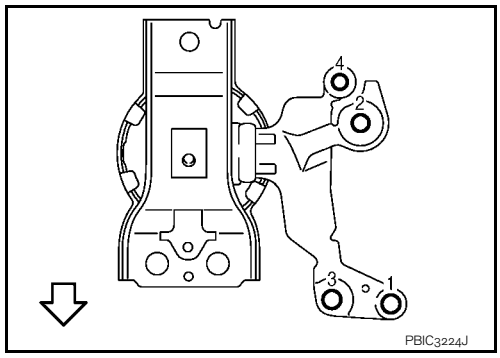
cardiagn.com

• Install engine mounting insulator (RH) to the engine side according to the following procedure.

1. Temporarily tighten mounting bolts the engine mounting insulator (RH) and the engine.

⇦ :Vehicle front

2. Tighten mounting bolts in the numerical order shown in the figure.



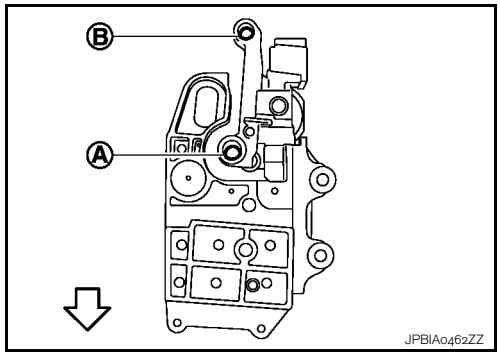
Engine mounting insulator (LH)

• Install engine mounting insulator (LH) to the transaxle side according to the following procedure.

1. Temporarily tighten the mounting bolt (A).

⇦ :Vehicle front

2. Tighten mounting bolt (B) to the specified torque.
3. Tighten mounting bolt (A) to the specified torque.



CVT : Inspection

INFOID:0000000000893964

INSPECTION AFTER INSTALLATION

Inspection for Leaks

• Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-21, "Fluids and Lubricants".
• Use procedure below to check for fuel leakage.
- Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
• Run engine to check for unusual noise and vibration.
• Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gases, or any oil/fluids including engine oil and engine coolant.
• Bleed air from lines and hoses of applicable lines, such as in cooling system.
• After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Item	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gases	—	Leakage	—

* Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

cardiagn.com

DISASSEMBLY AND ASSEMBLY

ENGINE STAND SETTING

Setting

INFOID:0000000000893965

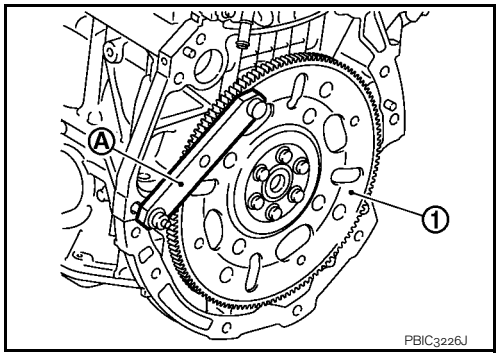
NOTE:
Explained here is how to disassemble with engine stand supporting transaxle surface. When using different type of engine stand, note with difference in steps and etc.

1. Remove the engine and the transaxle assembly from the vehicle, and separate the transaxle from the engine. Refer to EM-194, "M/T : Exploded View" (M/T models) or EM-198, "CVT : Exploded View" (CVT models).
2. Install engine to engine stand with the following procedure:

a. Remove flywheel (M/T models) or drive plate (1) (CVT models).
- Secure flywheel or drive plate with a stopper plate [SST: KV11105210] (A), and remove mounting bolts.

CAUTION:
- **Never disassemble them.**
- **Never place them with signal plate facing down.**
- **When handling signal plate, take care not to damage or scratch them.**
- **Handle signal plate in a manner that prevents them from becoming magnetized.**

NOTE:
This figure shows CVT models as an example.

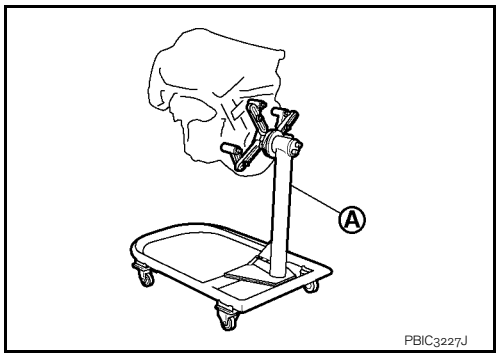


b. Lift the engine with a hoist to install it onto widely use engine stand.

CAUTION:
- **Use the engine stand that has a load capacity [approximately 135 kg (298 lb) or more] large enough for supporting the engine weight.**
- If the load capacity of stand is not adequate, remove the following parts beforehand to reduce the potential risk of overturning stand.
- Intake manifold: Refer to EM-146, "Exploded View".
- Exhaust manifold: Refer to EM-149, "Exploded View".
- Rocker cover: Refer to EM-160, "Exploded View".

NOTE:
The figure shows an example of widely used engine stand (A) that can support mating surface of transaxle with flywheel (M/T models) or drive plate (CVT models) removed.

CAUTION:
Before removing the hanging chains, make sure the engine stand is stable and there is no risk of overturning.

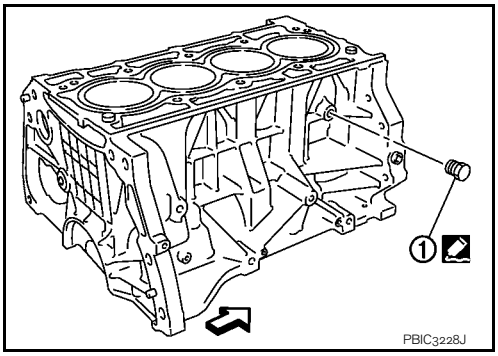


3. Drain engine oil. Refer to LU-15, "Draining".

CAUTION:
Be sure to clean drain plug and install with new washer.

cardiagn.com

4. Drain engine coolant by removing water drain plug (1) from inside of the engine.



⇦ : Engine front

Tightening torque : Refer to EM-210, "Exploded View"

Use Genuine Liquid Gasket or equivalent.

cardiagn.com

ENGINE UNIT

Disassembly

INFOID:0000000000893996

1. Remove intake manifold. Refer to EM-146, "Exploded View".
2. Remove exhaust manifold. Refer to EM-149, "Exploded View".
3. Remove oil pan (lower). Refer to EM-152, "Exploded View".
4. Remove oil cooler. Refer to LU-18, "Exploded View".
5. Remove ignition coil, spark plug and rocker cover. Refer to EM-160, "Exploded View".
6. Remove fuel injector and fuel tube. Refer to EM-155, "Exploded View".
7. Remove timing chain. Refer to EM-162, "Exploded View".
8. Remove camshaft. Refer to EM-173, "Exploded View".
9. Remove water inlet. Refer to CO-41, "Exploded View".
10. Remove water outlet. Refer to CO-44, "Exploded View".
11. Remove cylinder head. Refer to EM-185, "Exploded View".

Assembly

INFOID:0000000000893997

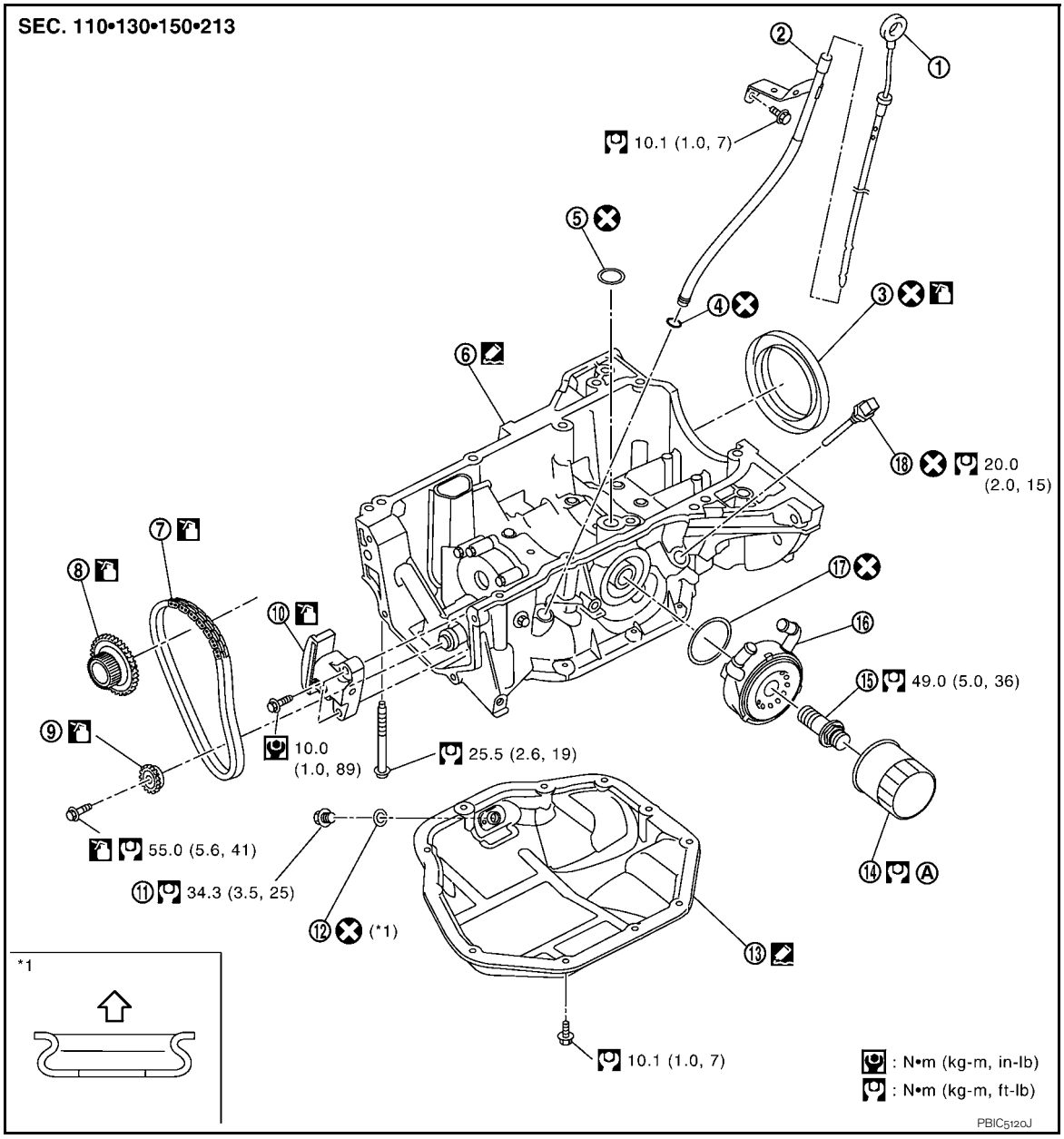
Assembly is the reverse order of disassembly.

cardiagn.com

OIL PAN (UPPER)

Exploded View

INFOID:0000000000971166



1. Oil level gauge
2. Oil level gauge guide
3. Rear oil seal
4. O-ring
5. O-ring
6. Oil pan (upper)
7. Balancer unit timing chain
8. Crankshaft sprocket
9. Balancer unit sprocket
10. Balancer unit timing chain tensioner
11. Drain plug
12. Drain plug washer
13. Oil pan (lower)
14. Oil filter
15. Connector bolt
16. Oil cooler
17. O-ring
18. Oil level sensor

A. Refer to LU-17

⇦ : Oil pan side

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000971165

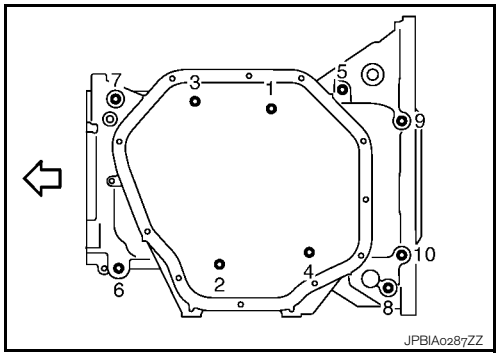
cardiagn.com

REMOVAL

1. Remove oil pan (lower). Refer to EM-152, "Exploded View".
2. Remove oil cooler and oil filter. Refer to LU-18, "Exploded View".
   NOTE:
   For reference when installing, put a matching mark on oil cooler and oil pan (upper).
3. Remove front cover, timing chain, balancer unit timing chain and other related parts. Refer to EM-162, "Exploded View".
4. Remove oil level gauge and oil level gauge guide.
5. Remove oil level sensor, if necessary.
   CAUTION:
   Never drop or shock oil level sensor.
6. Remove oil pan (upper) with the following procedure:

a. Loosen bolts in reverse order as shown in the figure.

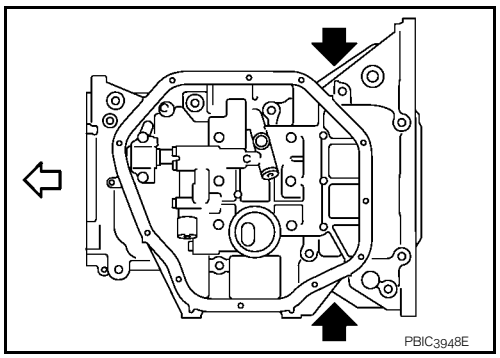
⇦ : Engine front



b. Insert a screwdriver shown by the arrow (⬅) in the figure and open up a crack between oil pan (upper) and cylinder block.

⇦ : Engine front

CAUTION:
A more adhesive liquid gasket is applied compared to previous types when shipped, so it should not be forced off the position not specified.



c. Insert seal cutter [SST: KV10111100] between oil pan (upper) and cylinder block, and slide it by tapping on the side of the tool with a hammer.
   CAUTION:
   Be careful not to damage the mating surface.

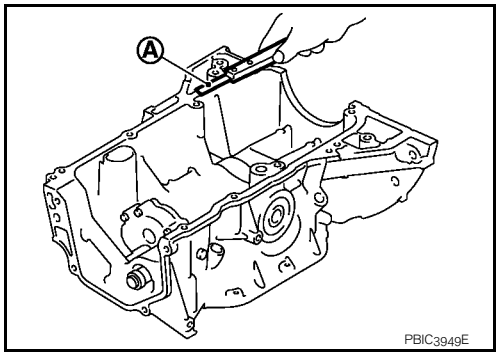
7. Remove O-ring between cylinder block and oil pan (upper).

INSTALLATION

1. Install oil pan (upper) with the following procedure:

a. Use a scraper (A) to remove old liquid gasket from mating surfaces.
   - Remove the old liquid gasket from mating surface of cylinder block.
   - Remove old liquid gasket from the bolt holes and threads.

   CAUTION:
   Never scratch or damage the mating surfaces when cleaning off old liquid gasket.

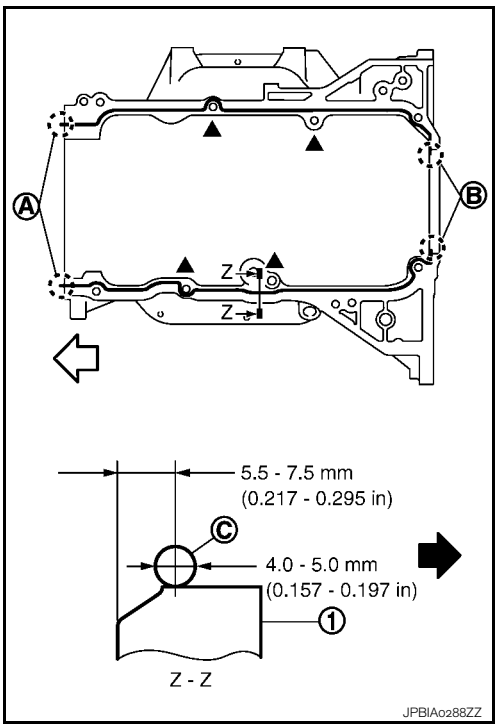


cardiagn.com

b. Apply a continuous bead of liquid gasket (C) with a tube presser (commercial service tool) as shown in the figure.

1 : Oil pan (upper)
A : 2 mm protruded to outside
B : 2 mm protruded to rear oil seal mounting side
⇦ : Engine front
⬅ : Engine outside

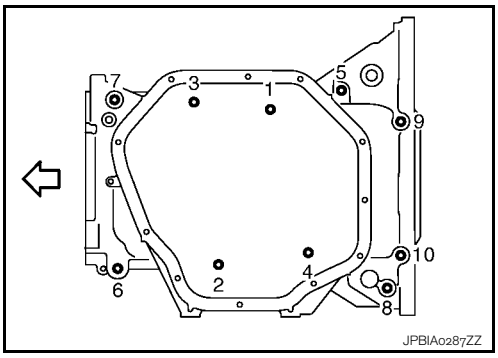
Use Genuine Liquid Gasket or equivalent.
CAUTION:
Apply liquid gasket to outside of bolt hole for the positions shown by ▲ marks.



c. Install new O-ring at cylinder block side.
CAUTION:
Install avoiding misalignment of O-ring.

d. Tighten bolts in numerical order as shown in the figure.

⇦ : Engine front

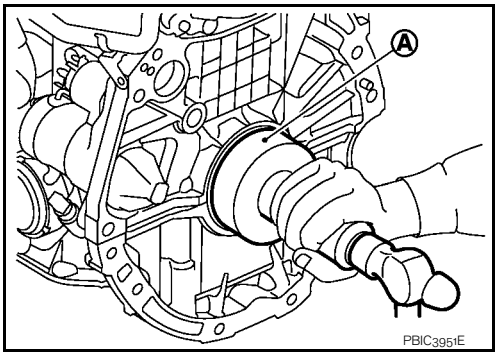


2. Install rear oil seal with the following procedure.
CAUTION:
- **The installation of rear oil seal should be completed within 5 minutes after installing oil pan (upper).**
- **Always replace rear oil seal with new one.**
- **Never touch oil seal lip.**

a. Wipe off liquid gasket protruding to the rear oil seal mounting part of oil pan (upper) and cylinder block using a scraper.

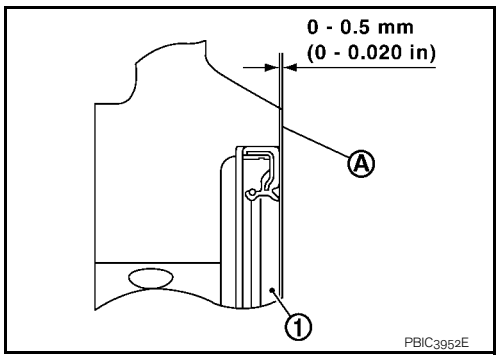
b. Apply engine oil to entire outside area of rear oil seal.

c. Press-fit the rear oil seal using a suitable drift with outer diameter 115 mm (4.53 in) and inner diameter 90 mm (3.54 in) (A).



cardiagn.com

- Press-fit to the specified dimensions as shown in the figure.



1 : Rear oil seal
A : Cylinder block rear end surface

CAUTION:
- **Never touch the grease applied to the oil seal lip.**
- **Be careful not to damage the rear oil seal mounting part of oil pan (upper) and cylinder block or the crankshaft.**
- **Press-fit straight, making sure that rear oil seal does not curl or tilt.**

NOTE:
The standard surface of the dimension is the rear end surface of cylinder block.

3. Install in the reverse order of removal, for the rest of parts.

Inspection

INFOID:0000000000971205

INSPECTION AFTER REMOVAL

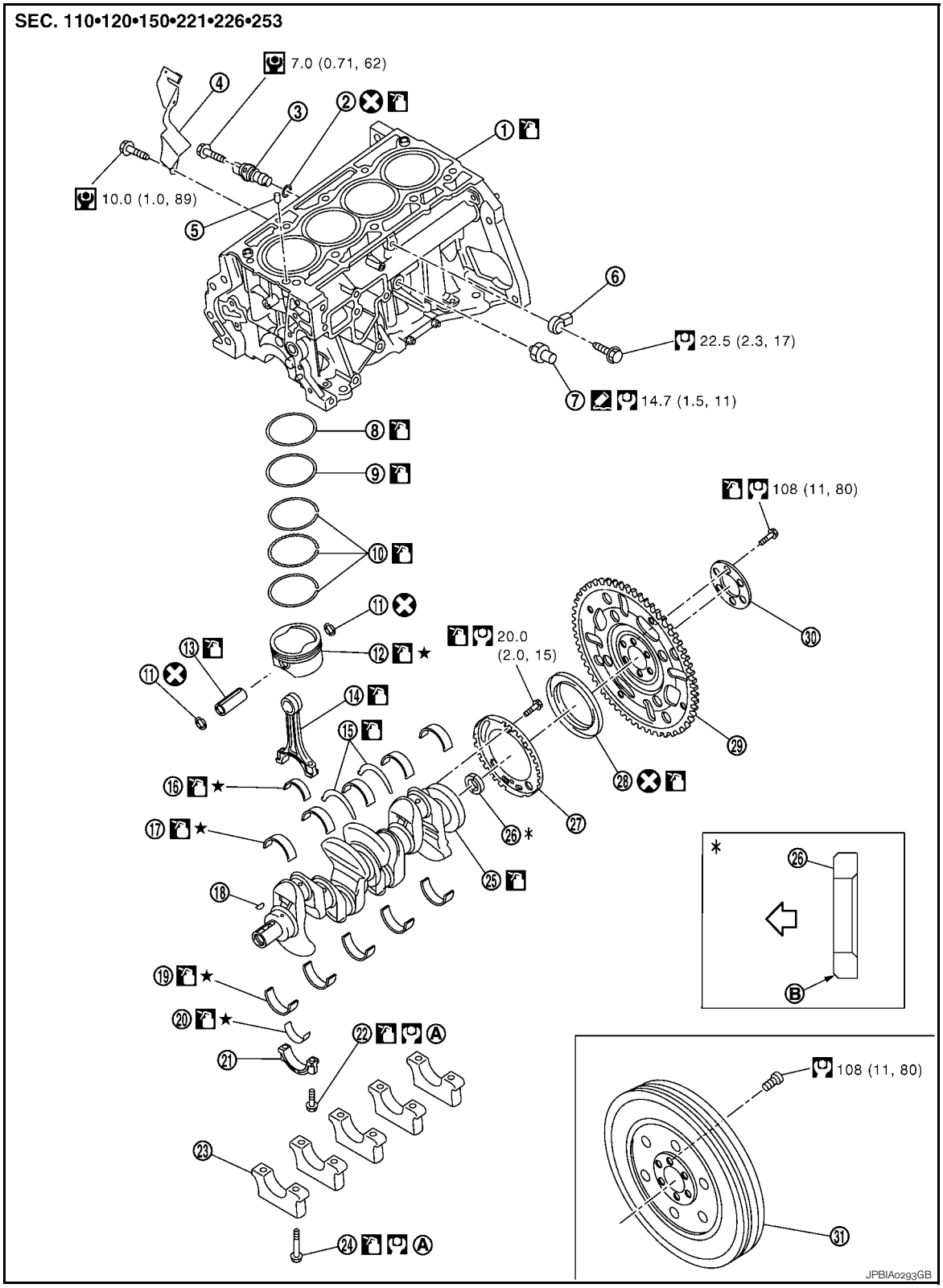
Clean oil strainer portion (part of the oil pump) if any object attached.

cardiagn.com

CYLINDER BLOCK

Exploded View

INFOID:0000000000902309



1. Cylinder block
2. O-ring
3. Crankshaft position sensor (POS)
4. Crankshaft position sensor (POS) cover
5. Oil filter (for intake valve timing control)
6. Knock sensor
7. Oil pressure switch
8. Top ring
9. Second ring

cardiagn.com

10. Oil ring
11. Snap ring
12. Piston
13. Piston pin
14. Connecting rod
15. Thrust bearing
16. Connecting rod bearing (upper)
17. Main bearing (upper)
18. Crankshaft key
19. Main bearing (lower)
20. Connecting rod bearing (lower)
21. Connecting rod cap
22. Connecting rod cap bolt
23. Main bearing cap
24. Main bearing cap bolt
25. Crankshaft
26. Pilot converter (CVT models)
27. Signal plate
28. Rear oil seal
29. Drive plate (CVT models)
30. Reinforcement plate (CVT models)
31. Flywheel (M/T models)

A. Refer to EM-211
B. Chamfered

⇦ : Crankshaft side

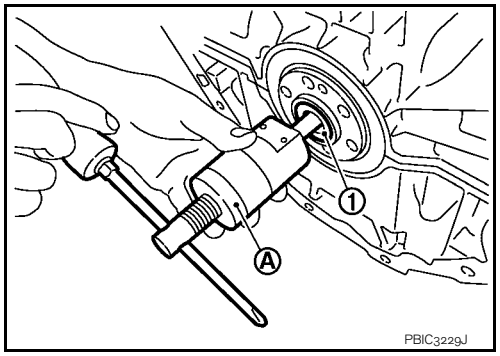
Refer to GI-4, "Components" for symbols shown in the figure.

Disassembly and Assembly

INFOID:0000000000893999

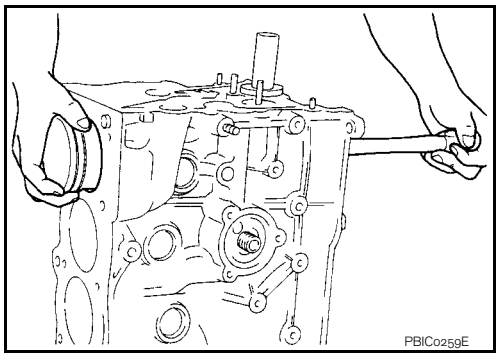
Disassembly

1. Remove oil pan (upper). Refer to EM-206, "Exploded View".
2. Remove thermostat housing. Refer to CO-41, "Exploded View".
3. Remove knock sensor.
   CAUTION:
   Handle it carefully and avoid impacts.
4. Remove crankshaft position sensor (POS) cover and crankshaft position sensor (POS).
   CAUTION:
   - **Handle it carefully and avoid impacts.**
   - **Never disassemble.**
   - **Never place sensor in a location where it is exposed to magnetism.**
5. Remove oil filter (for intake valve timing control).
6. Remove pilot converter (1) using pilot bushing puller [SST: ST16610001] (A) or suitable tool. (CVT models)
   NOTE:
   M/T models have no pilot converter.



7. Remove piston and connecting rod assembly with the following procedure:
   - Before removing piston and connecting rod assembly, check the connecting rod side clearance. Refer to EM-219, "Inspection".

a. Position crankshaft pin corresponding to connecting rod to be removed onto the bottom dead center.
b. Remove connecting rod cap.
c. Using a hammer handle or similar tool, push piston and connecting rod assembly out to the cylinder head side.
   CAUTION:
   - **Be careful not to damage matching surface with connecting rod cap.**
   - **Be careful not to damage the cylinder wall and crankshaft pin, resulting from an interference of the connecting rod big end.**



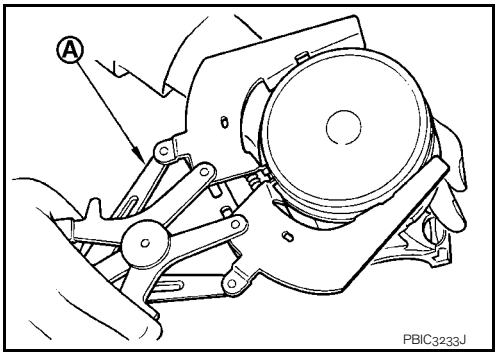
8. Remove connecting rod bearings.

cardiagn.com

CAUTION:
When removing them, note the installation position. Keep them in the correct.

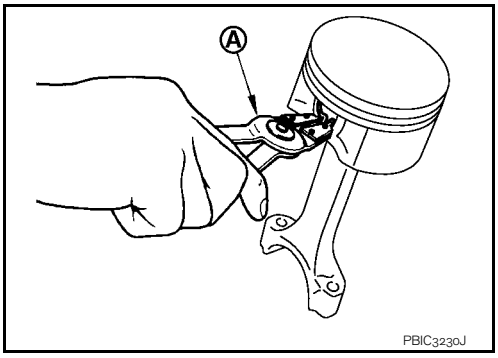
9. Remove piston rings form piston.
   - Before removing piston rings, check the piston ring side clearance. Refer to EM-219, "Inspection".
   - Use a piston ring expander (commercial service tool) (A).

   CAUTION:
   - **When removing piston rings, be careful not to damage the piston.**
   - **Be careful not to damage piston rings by expanding them excessively.**

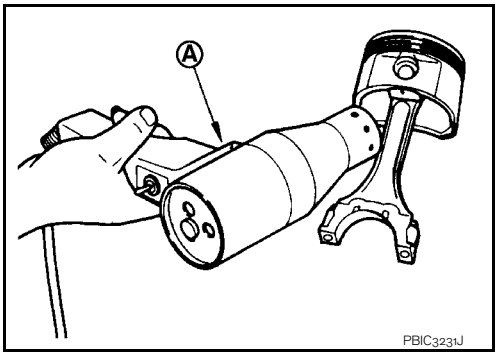


10. Remove piston from connecting rod with the following procedure:

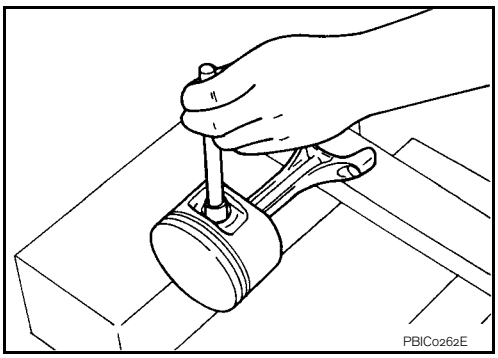
a. Using snap ring pliers (A), remove snap rings.



b. Heat piston to 60 to 70°C (140 to 158°F) with an industrial use drier (A) or equivalent.



c. Push out piston pin with stick of outer diameter approximately 18 mm (0.71 in).



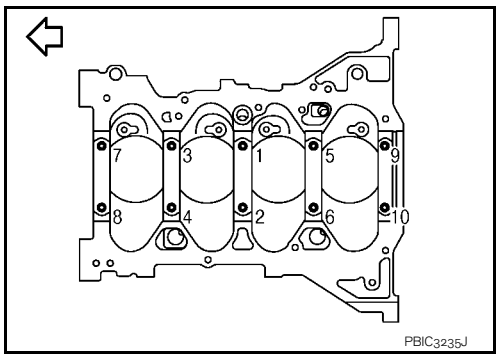
11. Remove main bearing cap mounting bolts.
   - Measure crankshaft end play before loosening main bearing cap mounting bolts. Refer to EM-219, "Inspection".

cardiagn.com

- Loosen and remove bolts in reverse order as shown in the figure.

⇦ : Engine front

- Use TORX socket (size E14).

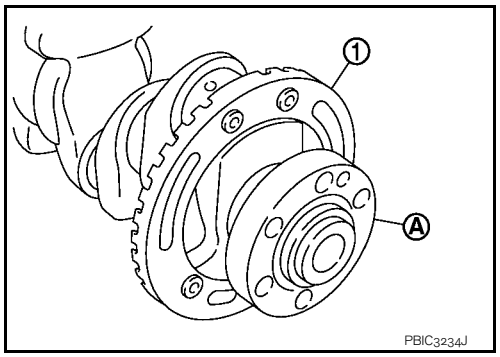


12. Remove main bearing caps.
    - Tap main bearing caps lightly with a plastic hammer for removal.

    CAUTION:
    Be careful not to damage the mounting surface.
13. Remove crankshaft.

    CAUTION:
    - **Be careful not to damage or deform signal plate (1) mounted on rear end of crankshaft (A).**
    - **When setting crankshaft on a flat floor surface, use a block of wood to avoid interference between signal plate and the floor surface.**
    - **Never remove signal plate unless it is necessary to do so.**

    NOTE:
    When removing or installing signal plate, use TORX socket (size T30).



14. Pull rear oil seal out from rear end of crankshaft.
15. Remove main bearings and thrust bearings from cylinder block and main bearing caps.

    CAUTION:
    Identify installation positions, and store them without mixing them up.

Assembly

1. Fully air-blow engine coolant and engine oil passages in cylinder block, cylinder bore and crankcase to remove any foreign material.

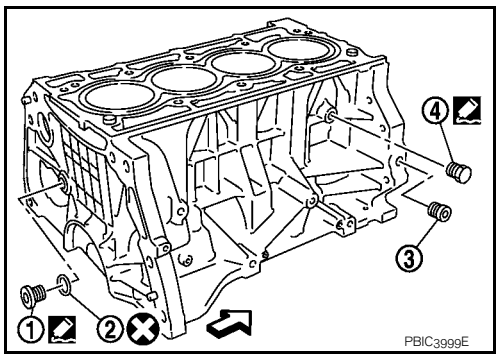
   CAUTION:
   Use a goggles to protect your eye.
2. Install each plug to cylinder block as shown in the figure.

   2 : Washer

   ⇦ : Engine front

   - Apply liquid gasket to the thread of water drain plug (4).
     Use Genuine Liquid Gasket or equivalent.
   - Apply sealant to the thread of plug (1).
     Use Thread Locking Sealant or equivalent.

     NOTE:
     Do not apply liquid gasket or thread locking sealant to the plug (3).



   - Tighten each plug as specified below.

Part	Washer	Tightening torque
1	Yes	54.0 N·m (5.5 kg-m, 40 ft-lb)

cardiagn.com

Part	Washer	Tightening torque
3	No	19.6 N·m (2.0 kg-m, 14 ft-lb)
4	No	9.8 N·m (1.0 kg-m, 87 in-lb)

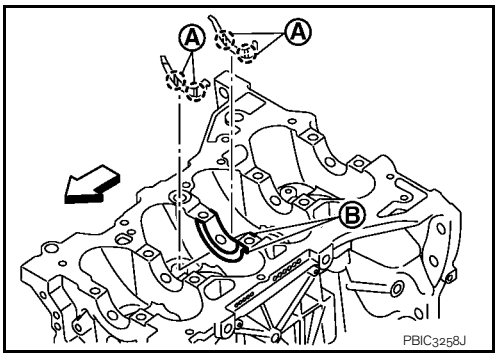
3. Install main bearings and thrust bearings with the following procedure:

a. Remove dust, dirt, and engine oil on the bearing mating surfaces of cylinder block and main bearing cap.

b. Install thrust bearings to the both sides of the No. 3 journal housing (B) on cylinder block.

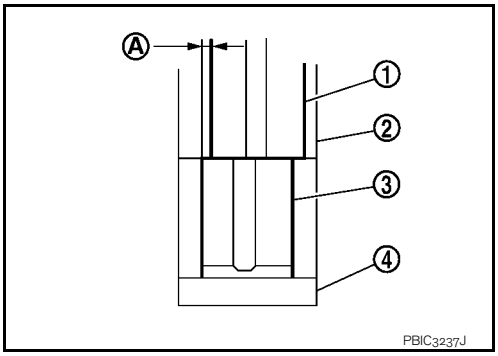
⇦ : Engine front

- Install thrust bearings with the oil groove (A) facing crankshaft arm (outside).

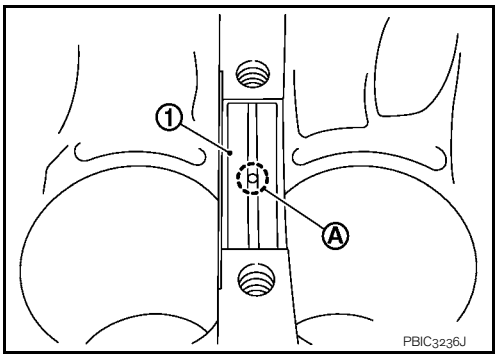


c. Install the main bearings paying attention to the direction.
- Before installing main bearings, apply new engine oil to the bearing surface (inside). Do not apply new engine oil to the back surface, but thoroughly clean it.
- When installing, align main bearing to the center position of cylinder block and main bearing cap.
- The difference (A) between main bearing upper (1) and main bearing lower (3) should be 0.85 mm (0.033 in) or less when installing.

2 : Cylinder block
4 : Main bearing cap



- Ensure the oil holes on cylinder block and oil holes (A) on the main bearings (1) are aligned.



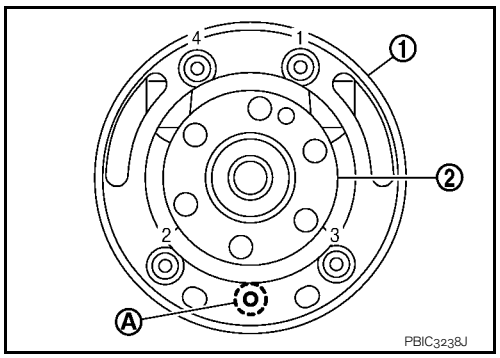
4. Install signal plate to crankshaft if removed.

a. Set the signal plate with the flange facing toward the counter weight side (engine front side) to the crankshaft rear surface.

b. Apply new engine oil to threads and seat surfaces of mounting bolts.

cardiagn.com

c. Position crankshaft (2) and signal plate (1) using a dowel pin (service part), and tighten mounting bolts in numerical order as shown in the figure using TORX socket.



A : Dowel pin hole

NOTE:
Dowel pin of crankshaft and signal plate is provided as a set for each.

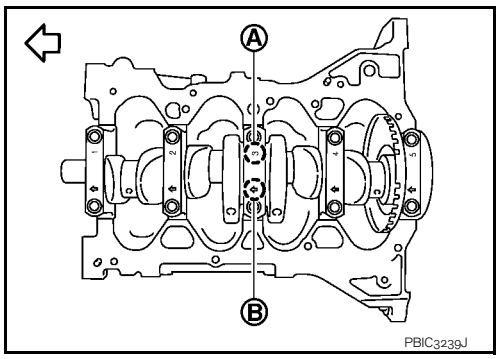
d. Tighten mounting bolts in numerical order as shown in the figure again.

e. Remove dowel pin. (service parts)
CAUTION:
Be sure to remove dowel pin.

5. Install crankshaft to cylinder block.
• While turning crankshaft by hand, make sure that it turns smoothly.

6. Install main bearing caps with the following procedure:

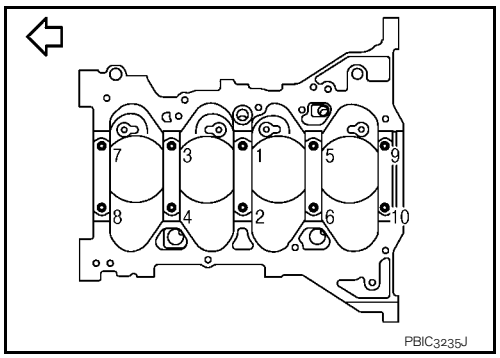
a. Install main bearing caps referring to the journal No. stamp (A) and front mark (B) as shown in the figure.



⇦ : Engine front

NOTE:
Main bearing cap cannot be replaced as a single part, because it is machined together with cylinder block.

b. Tighten main bearing cap bolts in numerical order as shown in the figure with the following procedure:



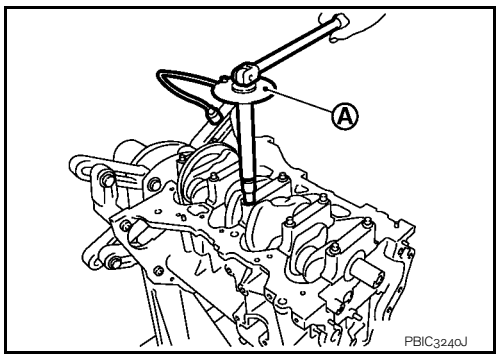
⇦ : Engine front

i. Apply new engine oil to threads and seat surfaces of mounting bolts.

ii. Tighten main bearing cap bolts.

: 34.3 N·m (3.5 kg-m, 25 ft-lb)

iii. Turn main bearing cap bolts 60 degrees clockwise (angle tightening) in order from No. 1 to 10 in the figure.
CAUTION:
Confirm the tightening angle by using an angle wrench [SST: KV10112100] (A) or protractor. Never judge by visual inspection without the tool.



• After installing mounting bolts, make sure that crankshaft can be rotated smoothly by hand.
• Check crankshaft end play. Refer to EM-219, "Inspection".

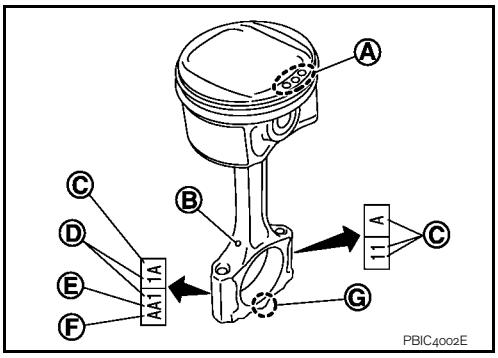
7. Install piston to connecting rod with the following procedure:

a. Using snap ring pliers, install new snap ring to the groove of the piston rear side.
• Insert it fully into groove to install.

b. Assemble piston to connecting rod.

cardiagn.com

- Using an industrial use drier or similar tool, heat the piston until the piston pin can be pushed in by hand without excess force [approximately 60 to 70°C (140 to 158°F)]. From the front to the rear, insert piston pin into piston and connecting rod.
- Assemble so that the front mark (A) on the piston head and the oil hole (B) and the cylinder number (D) on connecting rod are positioned as shown in the figure.

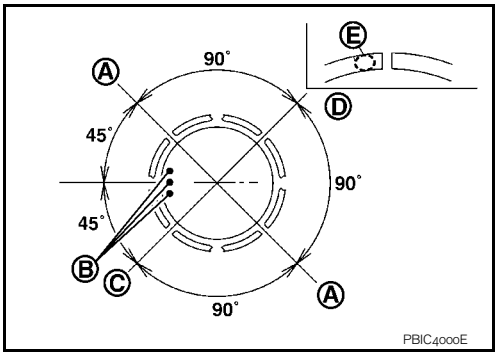


C : Management code
E : Big end diameter grade
F : Small end diameter grade
G : Front mark (connecting rod cap)

c. Install new snap ring to the groove of the piston front side.
- Insert it fully into groove to install.
- After installing, make sure that connecting rod moves smoothly.

8. Using a piston ring expander (commercial service tool), install piston rings.

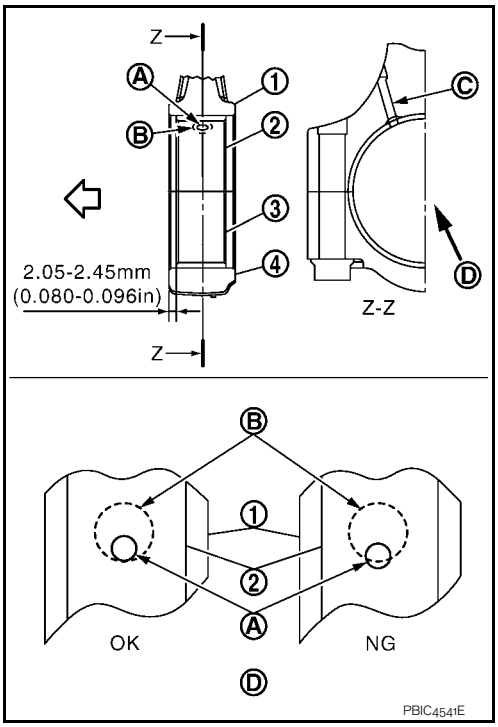
CAUTION:
- **Be careful not to damage piston.**
- **Be careful not to damage piston rings by expanding them excessively.**
- Position each ring with the gap as shown in the figure referring to the piston front mark.



A : Oil ring upper or lower rail gap
B : Front mark
C : Second ring and oil ring spacer gap
D : Top ring gap
E : Stamped mark

CAUTION:
Never contact the rail end gap under the oil ring with the oil drain cast groove of piston.
- Install second ring with the stamped surface facing upward.

9. Install connecting rod bearing upper (2) and lower (3) to connecting rod (1) and connecting rod cap (4).



C : Oil hole (connecting rod)
D : Arrow view
⇦ : Engine front

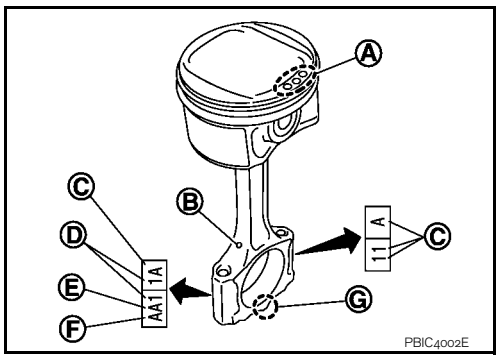
- Install the connecting rod in the dimension shown in the figure.
- Make sure that connecting rod bearing oil hole (A) is completely in the inside of connecting rod oil hole chamfered area (B).
- When installing connecting rod bearings, apply new engine oil to the bearing surface (inside). Do not apply new engine oil to the back surface, but thoroughly clean it.

NOTE:
- There is no positioning tab.
- Install the connecting rod bearings in the center of connecting rod and connecting rod cap as shown in the figure. For service operation, the center position can be checked, visually.

10. Install piston and connecting rod assembly to crankshaft.

cardiagn.com

- Position crankshaft pin corresponding to connecting rod to be installed onto the bottom dead center.
- Apply new engine oil sufficiently to the cylinder bore, piston and crankshaft pin.
- Match the cylinder position with the cylinder number (D) on connecting rod to install.

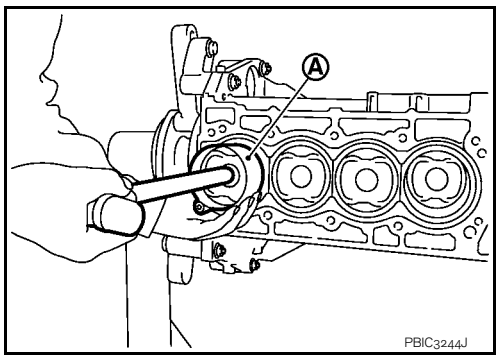


B : Oil hole
C : Management code
E : Big end diameter grade
F : Small end diameter grade
G : Front mark (connecting rod cap)

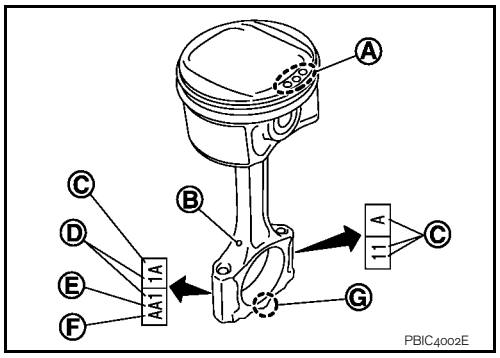
- Install so that front mark (A) on the piston head faces the front of engine.

- Using a piston ring compressor [SST: EM03470000] (A) or suitable tool, install piston with the front mark on the piston head facing the front of the engine.

CAUTION:
Be careful not to damage the cylinder wall and crankshaft pin, resulting from an interference of the connecting rod big end.



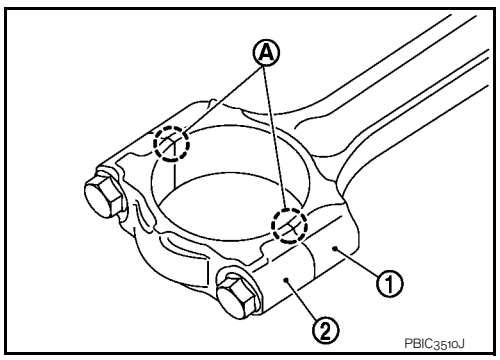
11. Install connecting rod cap.
- Match the stamped cylinder number marks (D) on connecting rod with those on connecting rod cap to install.



A : Front mark (piston)
B : Oil hole
C : Management code
E : Big end diameter grade
F : Small end diameter grade
G : Front mark (connecting rod cap)

12. Tighten connecting rod bolt with the following procedure:

CAUTION:
- **Make sure that there is no gap in the thrust surface (A) of the joint between connecting rod (1) and connecting rod cap (2) and that these parts are in the correct position. And then, tighten the connecting rod cap bolts.**
- **If the connecting rod bolts are reused, measure the outer diameter. Refer to EM-219, "Inspection".**



a. Apply new engine oil to the threads and seats of connecting rod cap bolts.
b. Tighten bolts.

: 27.4 N·m (2.8 kg-m, 20 ft-lb)

c. Completely loosen bolts.

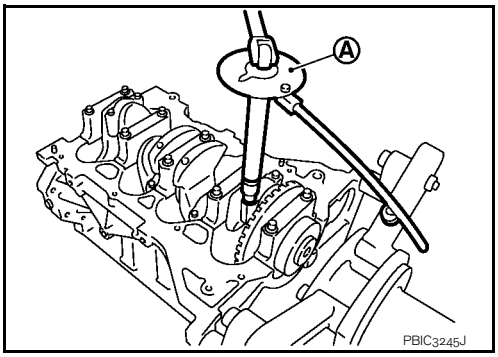
: 0 N·m (0 kg-m, 0 ft-lb)

d. Tighten bolts.

cardiagn.com

: 19.6 N·m (2.0 kg-m, 14 ft-lb)

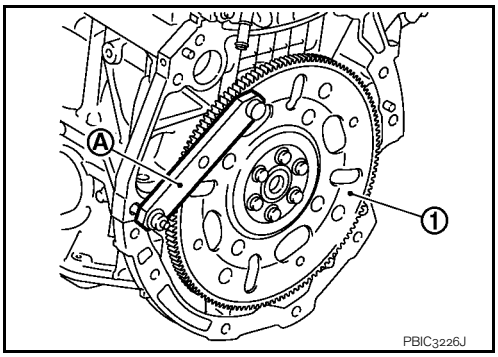
e. Then turn all bolts 60 degrees clockwise (Angle tightening).
CAUTION:
Check and confirm the tightening angle by using an angle wrench [SST: KV10112100] (A) or protractor. Never judge by visual inspection without the tool.



- After tightening connecting rod cap bolt, make sure that crankshaft rotates smoothly.
- Check the connecting rod side clearance. Refer to EM-219, "Inspection".

13. Install oil pan (upper). Refer to EM-206, "Exploded View".
NOTE:
Install the rear oil seal after installing the oil pan (upper).
14. Install rear oil seal. Refer to EM-206, "Exploded View".
15. Install drive plate (1) (CVT models) or flywheel (M/T models).

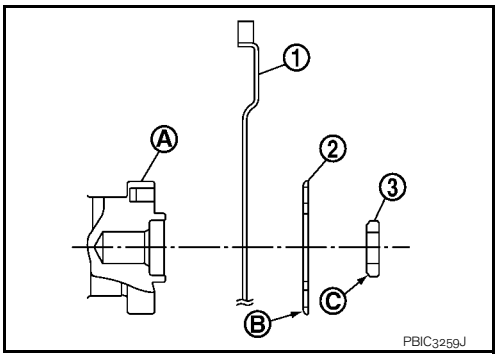
Drive plate
- Secure crankshaft with a stopper plate [SST: KV11105210] (A), and tighten mounting bolts crosswise over several times.



- Install drive plate (1), reinforcement plate (2) and pilot converter (3) as shown in figure.

A : Crankshaft rear end
B : Rounded
C : Chamfered

- Using a drift of 33 mm (1.30 in) in diameter, press-fit pilot converter into the end of crankshaft until it stops.



Flywheel
- Secure crankshaft with a stopper plate [SST: KV11105210], and tighten mounting bolts crosswise over several times.

NOTE:
M/T models have no pilot bushing and reinforcement plate.

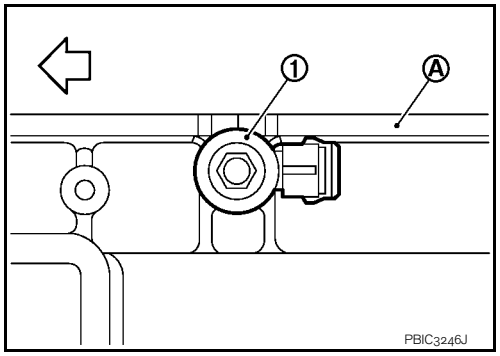
16. Install knock sensor.

cardiagn.com

- Install knock sensor (1) with connector facing toward the rear of engine.

A : Cylinder block left side

⇦ : Engine front



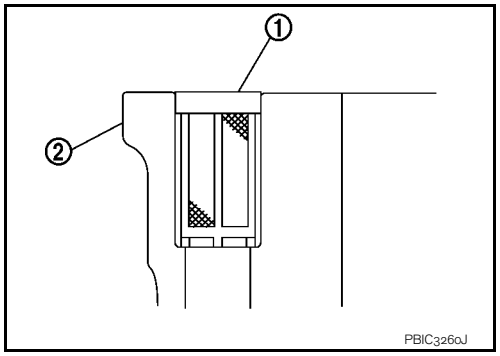
CAUTION:
- **Never tighten mounting bolts while holding the connector.**
- **If any impact by dropping is applied to knock sensor, replace it with a new one.**

NOTE:
- Make sure that there is no foreign material on the cylinder block mating surface and the back surface of knock sensor.
- Make sure that knock sensor does not interfere with other parts.

17. Install crankshaft position sensor (POS) and crankshaft position sensor (POS) cover.

CAUTION:
- **Handle it carefully and avoid impacts.**
- **Never disassemble.**
- **Never place sensor in a location where it is exposed to magnetism.**

18. Install oil filter (for intake valve timing control) (1) in the direction shown in the figure.
    - Make sure that the oil filter does not protrude from the upper surface of cylinder block (2) after installation.



19. Assemble in the reverse order of disassembly.

Inspection

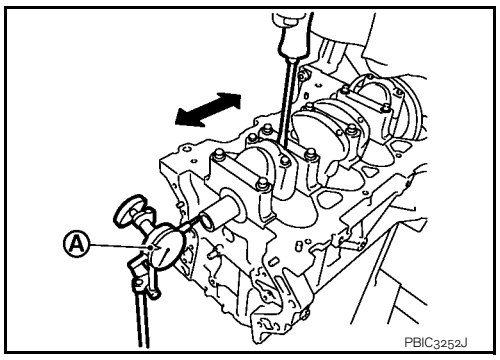
INFOID:0000000000893973

CRANKSHAFT END PLAY

- Measure the clearance between thrust bearings and crankshaft arm when crankshaft is moved fully forward or backward with a dial indicator (A).

Standard and Limit : Refer to EM-241, "Cylinder Block".

- If the measured value exceeds the limit, replace thrust bearings, and measure again. If it still exceeds the limit, replace crankshaft also.

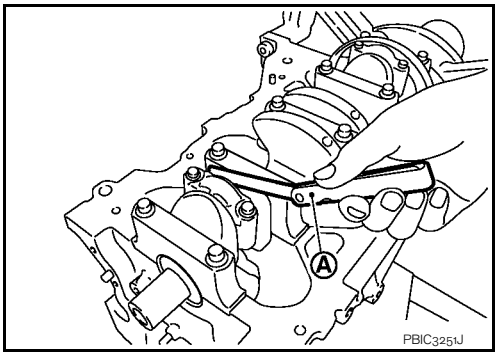


CONNECTING ROD SIDE CLEARANCE

cardiagn.com

- Measure the side clearance between connecting rod and crankshaft arm with a feeler gauge (A).

Standard and Limit : Refer to EM-241, "Cylinder Block".



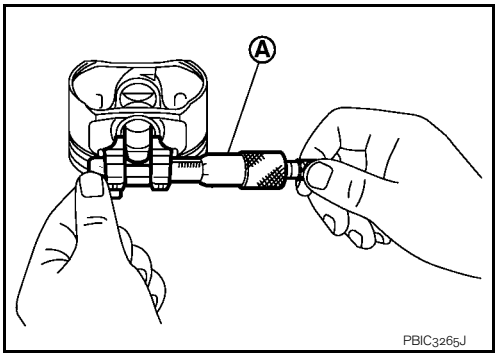
- If the measured value exceeds the limit, replace connecting rod, and measure again. If it still exceeds the limit, replace crankshaft also.

PISTON TO PISTON PIN OIL CLEARANCE

Piston Pin Hole Diameter

Measure the inner diameter of piston pin hole with an inside micrometer (A).

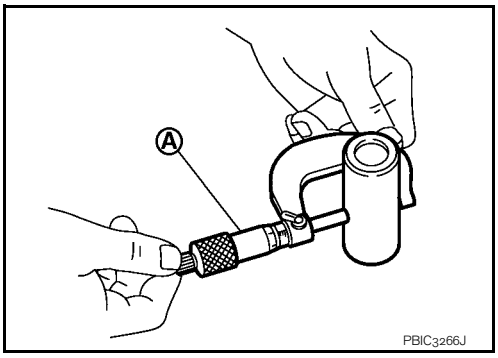
Standard : Refer to EM-241, "Cylinder Block".



Piston Pin Outer Diameter

Measure the outer diameter of piston pin with a micrometer (A).

Standard : Refer to EM-241, "Cylinder Block".



Piston to Piston Pin Oil Clearance

(Piston to piston pin oil clearance) = (Piston pin hole diameter) – (Piston pin outer diameter)

Standard : Refer to EM-241, "Cylinder Block".

- If oil clearance is out of the standard, replace piston and piston pin assembly.
- When replacing piston and piston pin assembly. Refer to EM-229, "Description".

NOTE:

- Piston is available together with piston pin as assembly.
- Piston pin (piston pin hole) grade is provided only for the parts installed at the plant. For service parts, no grades can be selected. (Only grade “0” is available.)

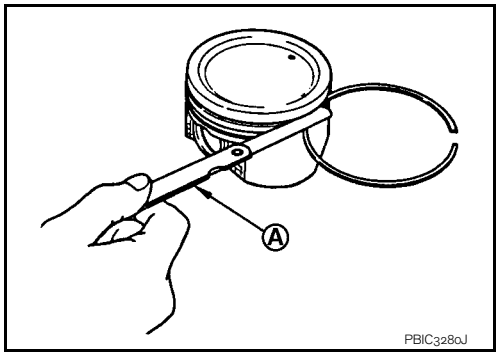
PISTON RING SIDE CLEARANCE

cardiagn.com

- Measure the side clearance of piston ring and piston ring groove with a feeler gauge (A).

Standard and Limit : Refer to EM-241, "Cylinder Block".

- If the measured value exceeds the limit, replace piston ring, and measure again. If it still exceeds the limit, replace piston also.

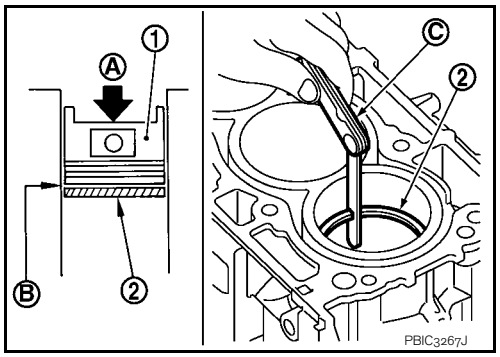


PISTON RING END GAP

- Make sure that cylinder bore inner diameter is within specification. Refer to “PISTON TO CYLINDER BORE CLEARANCE”.
- Lubricate with new engine oil to piston (1) and piston ring (2), and then insert (A) piston ring until middle of cylinder (B) with piston, and measure piston ring end gap with a feeler gauge (C).

Standard and Limit : Refer to EM-241, "Cylinder Block".

- If the measured value exceeds the limit, replace piston ring, and measure again. If it still exceeds the limit, re-bore cylinder and use oversized piston and piston rings.



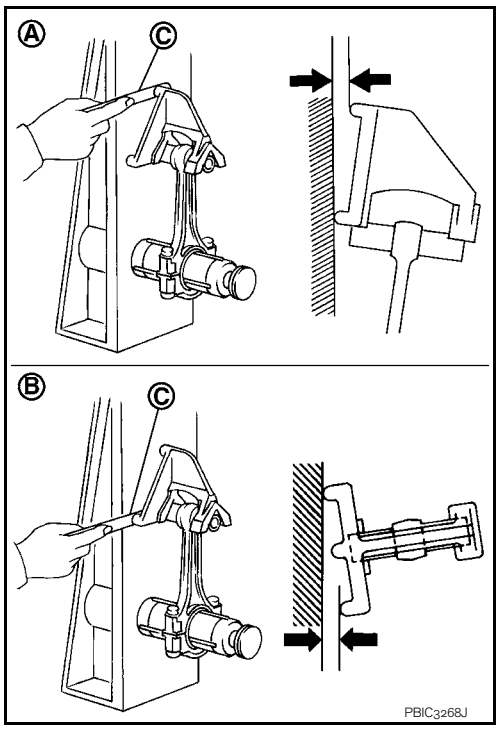
CONNECTING ROD BEND AND TORSION

- Check with a connecting rod aligner.

A : Bend
B : Torsion
C : Feeler gauge

Limit : Refer to EM-241, "Cylinder Block".

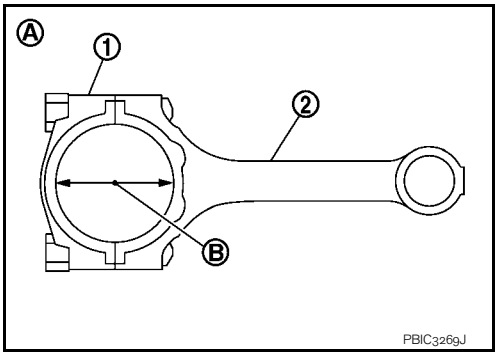
- If it exceeds the limit, replace connecting rod assembly.



CONNECTING ROD BIG END DIAMETER

cardiagn.com

- Install connecting rod cap (1) without connecting rod bearing installed, and tightening connecting rod cap bolts to the specified torque. Refer to EM-211, "Disassembly and Assembly".



2 : Connecting rod
A : Example
B : Measuring direction of inner diameter

- Measure the inner diameter of connecting rod big end with an inside micrometer.

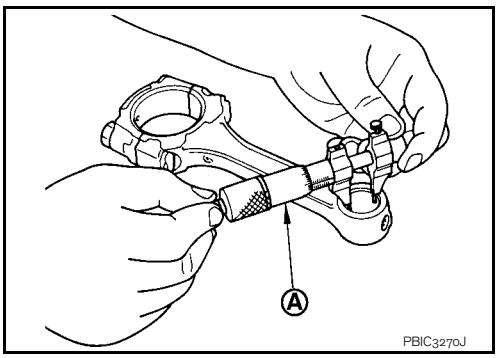
Standard : Refer to EM-241, "Cylinder Block".

- If out of the standard, replace connecting rod assembly.

CONNECTING ROD BUSHING OIL CLEARANCE

Connecting Rod Bushing Inner Diameter

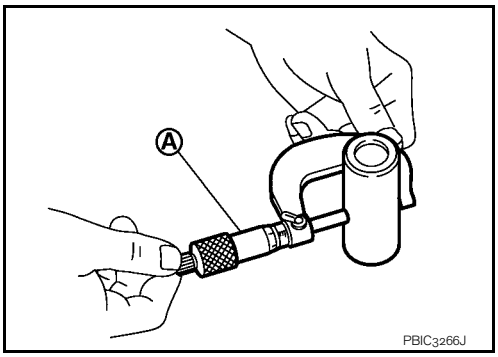
Measure the inner diameter of connecting rod bushing with an inside micrometer (A).



Standard : Refer to EM-241, "Cylinder Block".

Piston Pin Outer Diameter

Measure the outer diameter of piston pin with a micrometer (A).



Standard : Refer to EM-241, "Cylinder Block".

Connecting Rod Bushing Oil Clearance

(Connecting rod bushing oil clearance) = (Connecting rod bushing inner diameter) – (Piston pin outer diameter)

Standard and Limit : Refer to EM-241, "Cylinder Block".

- If the measured value is out of the standard, replace connecting rod assembly and/or piston and piston pin assembly.
- If replacing piston and piston pin assembly. Refer to EM-229, "Piston".
- If replacing connecting rod assembly. Refer to EM-230, "Connecting Rod Bearing".

CYLINDER BLOCK TOP SURFACE DISTORTION

- Using a scraper, remove gasket on the cylinder block surface, and also remove engine oil, scale, carbon, or other contamination.

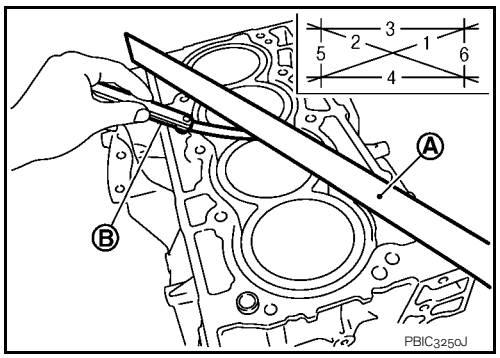
CAUTION:
Be careful not to allow gasket flakes to enter engine oil or engine coolant passages.

cardiagn.com

- Measure the distortion on the cylinder block upper face at some different points in six directions with a straight edge (A) and feeler gauge (B).

Limit : Refer to EM-241, "Cylinder Block".

- If it exceeds the limit, replace cylinder block.

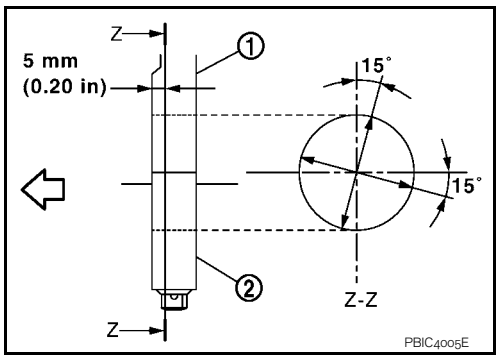


MAIN BEARING HOUSING INNER DIAMETER

- Install main bearing cap without main bearings installed, and tighten main bearing cap mounting bolts to the specified torque. Refer to EM-211, "Disassembly and Assembly".
- Measure the inner diameter of main bearing housing with a bore gauge.
- Measure the position shown in the figure [5 mm (0.20 in)] backward from main bearing housing front side in the 2 directions as shown in the figure. The smaller one is the measured value.

1 : Cylinder block
2 : Main bearing cap
⇦ : Engine front

Standard : Refer to EM-241, "Cylinder Block".



- If out of the standard, replace cylinder block and main bearing caps assembly.

NOTE:
Main bearing caps cannot be replaced as a single, because it is machined together with cylinder block.

PISTON TO CYLINDER BORE CLEARANCE

Cylinder Bore Inner Diameter

- Using a bore gauge (A), measure the cylinder bore for wear, out-of-round and taper at six different points on each cylinder. (“X” and “Y” directions at “A”, “B” and “C”) (“Y” is in longitudinal direction of engine)

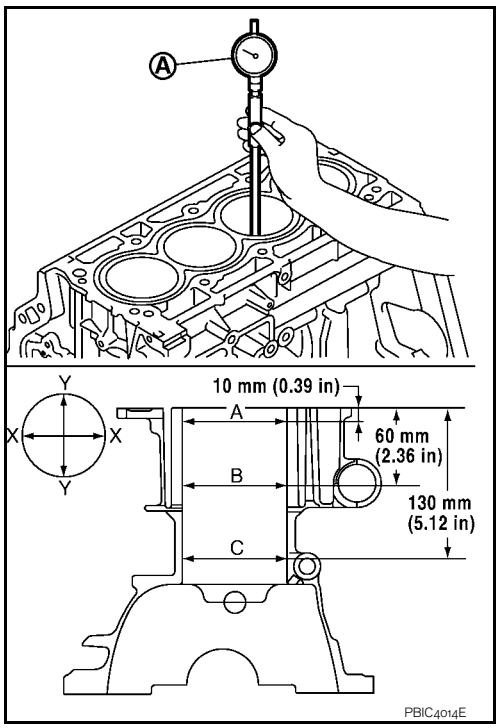
NOTE:
When determining cylinder bore grade, measure the cylinder bore “X” direction at “B” position.

Standard:
Cylinder bore inner diameter
: Refer to EM-241, "Cylinder Block".

Limit:
Out-of-round (Difference between“X”and“ Y”)
Taper (Difference between“ A”and“ B”)
: Refer to EM-241, "Cylinder Block".

- If the measured value exceeds the limit, or if there are scratches and/or seizure on the cylinder inner wall, replace cylinder block.

NOTE:
Oversize piston is not provided.

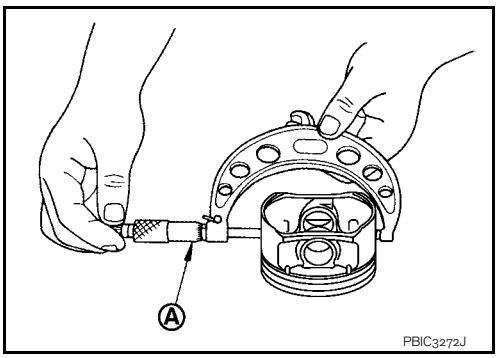


Piston Skirt Diameter

cardiagn.com

Measure the outer diameter of piston skirt with a micrometer (A).

Standard : Refer to EM-241, "Cylinder Block".



Piston to Cylinder Bore Clearance

Calculate by piston skirt diameter and cylinder bore inner diameter (direction “X”, position “B”).

(Clearance) = (Cylinder bore inner diameter) – (Piston skirt diameter)

Standard and Limit : Refer to EM-241, "Cylinder Block".

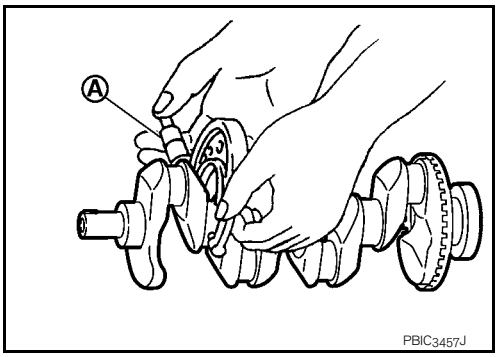
- If it exceeds the limit, replace piston and piston pin assembly and/or cylinder block. Refer to EM-229, "Piston".

CRANKSHAFT MAIN JOURNAL DIAMETER

- Measure the outer diameter of crankshaft main journals with a micrometer (A).

Standard : Refer to EM-241, "Cylinder Block".

- If out of the standard, measure the main bearing oil clearance. Then use undersize bearing. Refer to EM-245, "Main Bearing".



CRANKSHAFT PIN JOURNAL DIAMETER

- Measure the outer diameter of crankshaft pin journal with a micrometer.

Standard : Refer to EM-241, "Cylinder Block".

- If out of the standard, measure the connecting rod bearing oil clearance. Then use undersize bearing. Refer to EM-244, "Connecting Rod Bearing".

OUT-OF-ROUND AND TAPER OF CRANKSHAFT

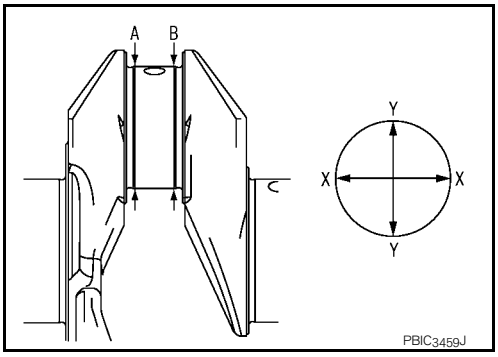
- Measure the dimensions at four different points as shown in the figure on each main journal and pin journal with a micrometer.
- Out-of-round is indicated by the difference in dimensions between “X” and “Y” at “A” and “B”.
- Taper is indicated by the difference in dimension between “A” and “B” at “X” and “Y”.

Limit:

Out-of-round (Difference between“X”and“Y”)

Taper (Difference between“A”and“B”)

: Refer to EM-241, "Cylinder Block".



- If the measured value exceeds the limit, correct or replace crankshaft.
- If corrected, measure the bearing oil clearance of the corrected main journal and/or pin journal. Then select main bearing and/or connecting rod bearing. Refer to EM-244, "Connecting Rod Bearing" and/or EM-245, "Main Bearing".

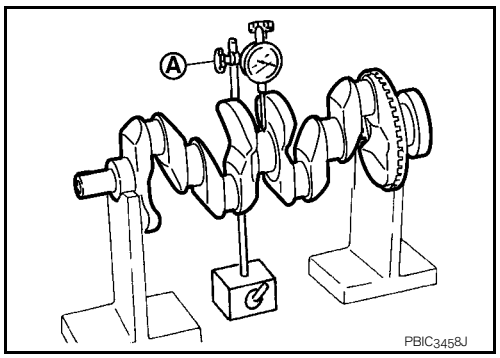
CRANKSHAFT RUNOUT

cardiagn.com

- Place a V-block on a precise flat table to support the journals on the both end of the crankshaft.
- Place a dial indicator (A) straight up on the No. 3 journal.
- While rotating crankshaft, read the movement of the pointer on the dial indicator. (Total indicator reading)

Standard and Limit : Refer to EM-241, "Cylinder Block".

- If it exceeds the limit, replace crankshaft.

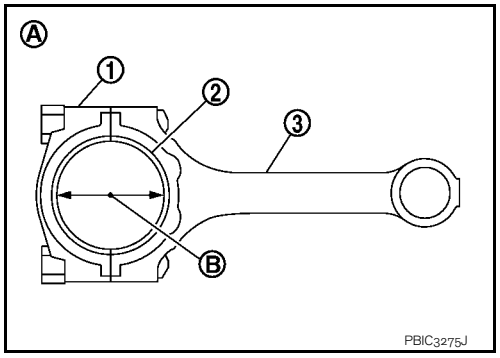


CONNECTING ROD BEARING OIL CLEARANCE

Method by Calculation

- Install connecting rod bearings (2) to connecting rod (3) and connecting rod bearing cap (1), and tighten connecting rod cap bolts to the specified torque. Refer to EM-211, "Disassembly and Assembly".

A : Example
B : Inner diameter measuring direction



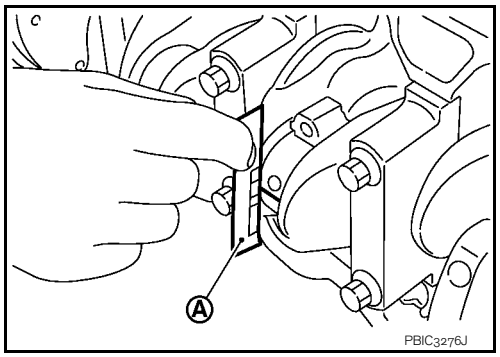
- Measure the inner diameter of connecting rod bearing with an inside micrometer.
(Bearing oil clearance) = (Connecting rod bearing inner diameter) – (Crankshaft pin journal diameter)

Standard and Limit : Refer to EM-241, "Cylinder Block".

- If clearance exceeds the limit, select proper connecting rod bearing according to connecting rod big end diameter and crankshaft pin journal diameter to obtain specified bearing oil clearance. Refer to EM-230, "Connecting Rod Bearing".

Method of Using Plastigage

- Remove engine oil and dust on crankshaft pin and the surfaces of each bearing completely.
- Cut a plastigage slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.
- Install connecting rod bearings to connecting rod and cap, and tighten connecting rod cap bolts to the specified torque. Refer to EM-211, "Disassembly and Assembly".
CAUTION:
Never rotate crankshaft.
- Remove connecting rod cap and bearing, and using the scale (A) on the plastigage bag, measure the plastigage width.
NOTE:
The procedure when the measured value exceeds the limit is same as that described in the “Method by Calculation”.



MAIN BEARING OIL CLEARANCE

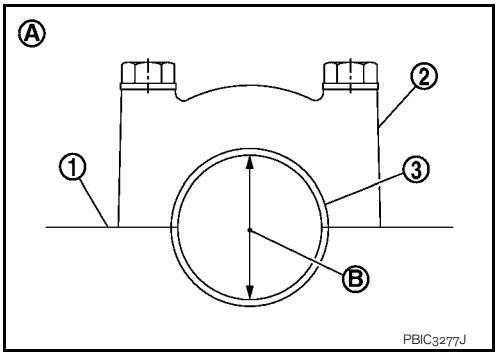
Method by Calculation

cardiagn.com

- Install main bearings (3) to cylinder block (1) and main bearing cap (2), and tighten main bearing cap mounting bolts to the specified torque. Refer to EM-211, "Disassembly and Assembly".

A : Example

B : Inner diameter measuring direction



- Measure the inner diameter of main bearing with a bore gauge.

(Bearing oil clearance) = (Main bearing inner diameter) – (Crankshaft main journal diameter)

Standard and Limit : Refer to EM-241, "Cylinder Block".

- If clearance exceeds the limit, select proper main bearing according to main bearing inner diameter and crankshaft main journal diameter to obtain specified bearing oil clearance. Refer to EM-232, "Main Bearing".

Method of Using Plastigage

- Remove engine oil and dust on crankshaft main journal and the surfaces of each bearing completely.
- Cut a plastigage slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.
- Install main bearings to cylinder block and main bearing cap, and tighten main bearing cap mounting bolts to the specified torque. Refer to EM-211, "Disassembly and Assembly".

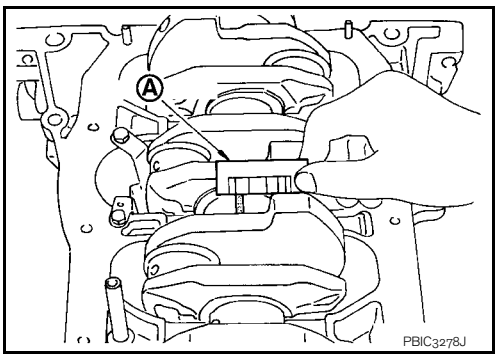
CAUTION:

Never rotate crankshaft.

- Remove main bearing cap and bearings, and using the scale (A) on the plastigage bag, measure the plastigage width.

NOTE:

The procedure when the measured value exceeds the limit is same as that described in the “Method by Calculation”.



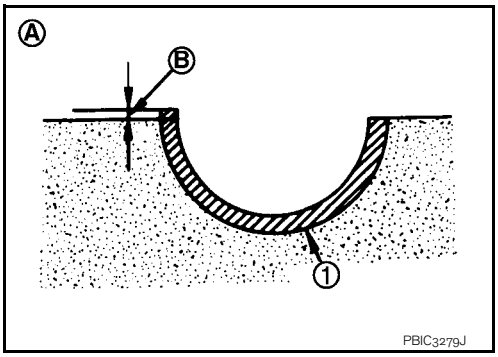
MAIN BEARING CRUSH HEIGHT

- When main bearing cap is removed after being tightened to the specified torque with main bearings (1) installed, the tip end of bearing must protrude (B). Refer to EM-211, "Disassembly and Assembly".

A : Example

Standard : There must be crush height.

- If the standard is not met, replace main bearings.



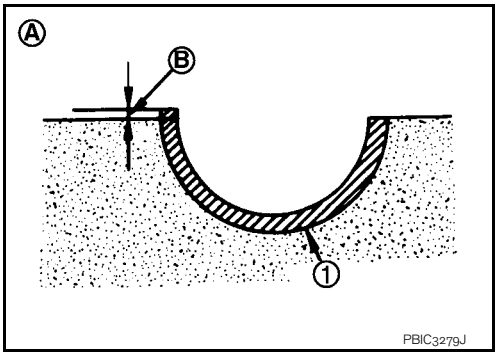
CONNECTING ROD BEARING CRUSH HEIGHT

- When connecting rod cap is removed after being tightened to the specified torque with connecting rod bearings (1) installed, the tip end of bearing must protrude (B). Refer to EM-211, "Disassembly and Assembly".

A : Example

Standard : There must be crush height.

- If the standard is not met, replace connecting rod bearings.

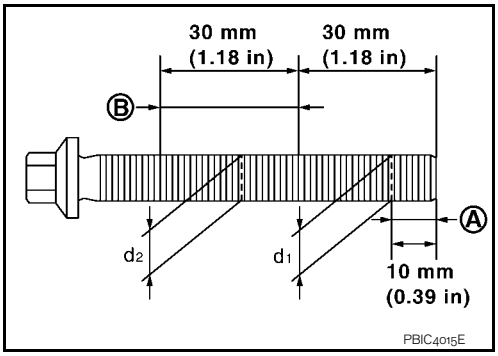


cardiagn.com

MAIN BEARING CAP BOLT OUTER DIAMETER

- Measure the outer diameters (“d_1”, “d_2”) at two positions as shown in the figure.

A : “d1” measuring position
B : “d2” measuring position



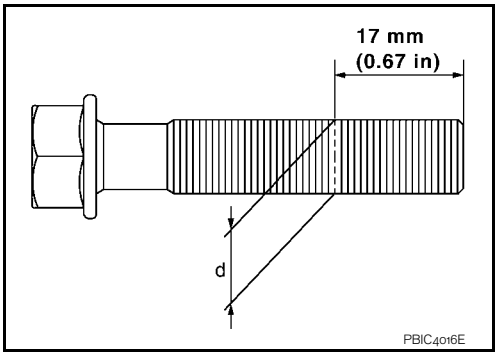
- If reduction appears in places other than “B” range, regard it as “d_2”.

Limit (“d_1”–“d_2”): 0.15 mm (0.0059 in)

- If it exceeds the limit (a large difference in dimensions), replace main bearing cap mounting bolt with a new one.

CONNECTING ROD CAP BOLT OUTER DIAMETER

- Measure the outer diameter “d” at position as shown in the figure.
- If reduction appears in a position other than “d”, regard it as “d”.

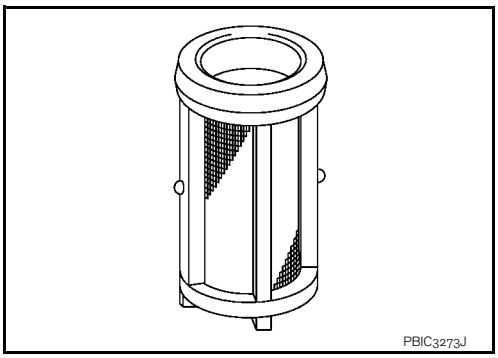


Limit: 7.75 mm (0.3051 in)

- When “d” exceeds the limit (when it becomes thinner), replace connecting rod cap bolt with a new one.

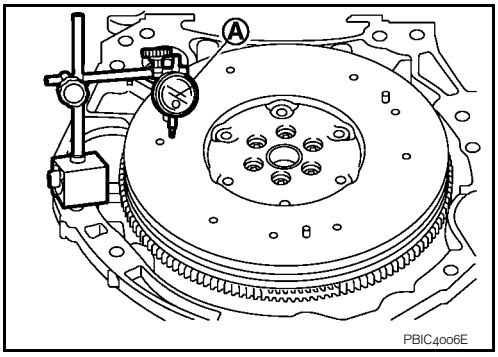
CLOGGED OR DAMAGED OIL FILTER (FOR INTAKE VALVE TIMING CONTROL)

- Make sure that there is no foreign material on the oil filter and check it for clogging.
- Clean it if necessary.
- Check the oil filter for damage.
- Replace it if necessary.



FLYWHEEL DEFLECTION (M/T MODELS)

- Measure the deflection of flywheel contact surface to torque with a dial indicator (A).
- Measure the deflection at 210 mm (8.27 in) diameter.



Limit : 0.45 mm (0.0177 in) or less.

- If measured value is out of the standard, replace flywheel.
- If a trace of burn or discoloration is found on the surface, repair it with sandpaper.

CAUTION:
When measuring, keep magnetic fields (such as dial indicator stand) away from signal plate of the rear end of crankshaft.

MOVEMENT AMOUNT OF FLYWHEEL (M/T MODELS)

CAUTION:
Never disassemble double mass flywheel.

Movement Amount of Thrust (Fore-and-Aft) Direction

- Measure the movement amount of thrust (fore-and-aft) direction when 100 N (10.2 kg, 22 lb) force is added at the portion of 125 mm (4.92 in) radius from the center of flywheel.

cardiagn.com

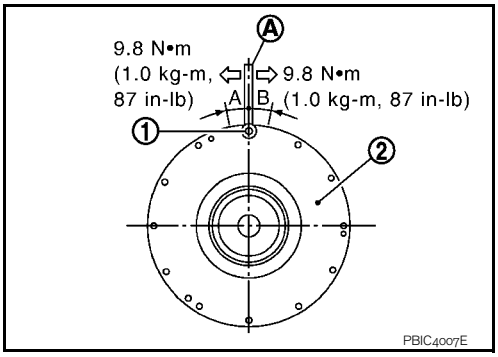
Standard : 1.8 mm (0.071 in) or less

- If measured value is out of the standard, replace flywheel.

Movement Amount in Radial (Rotation) Direction

Check the movement amount of radial (rotation) direction with the following procedure:

1. Install clutch cover mounting bolt (1) to clutch cover mounting hole, and place a torque wrench (A) on the extended line of the flywheel (2) center line.
   - Tighten bolt at a force of 9.8 N·m (1.0 kg-m, 87 in-lb) to keep it from loosening.
2. Put a mating mark on circumferences of the two flywheel masses without applying any load (Measurement standard points).
3. Apply a force of 9.8 N·m (1.0 kg-m, 87 in-lb) in each direction, and mark the movement amount on the mass on the transaxle side.
4. Measure the dimensions of movement amounts “A” and “B” on circumference of the flywheel on the transaxle side.

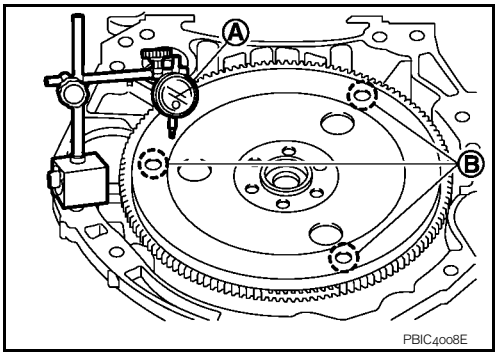


Limit : 33.2 mm (1.307 in) or less.

- If measured value is out of the standard, replace flywheel.

DRIVE PLATE DEFLECTION (CVT MODELS)

- Measure the deflection of drive plate contact surface to torque converter with a dial indicator (A).
- Measure the deflection at the area limited between 12.4 mm (0.488 in) dia and 20.0 mm (0.787 in) dia around hole (B).



Limit : 0.35 mm (0.0138 in) or less.

- If measured value is out of the standard, replace drive plate.

cardiagn.com

HOW TO SELECT PISTON AND BEARING

Description

INFOID:0000000000893974

Selection points	Selection parts	Selection items	Selection methods
Between cylinder block and crankshaft	Main bearing	Main bearing grade (bearing thickness)	Determined by match of cylinder block bearing housing grade (inner diameter of housing) and crankshaft journal grade (outer diameter of journal)
Between crankshaft and connecting rod	Connecting rod bearing	Connecting rod bearing grade (bearing thickness)	Combining service grades for connecting rod big end diameter and crankshaft pin outer diameter determine connecting rod bearing selection.
Between cylinder block and piston	Piston and piston pin assembly (piston is available together with piston pin as an assembly.)	Piston grade (piston outer diameter)	Piston grade = cylinder bore grade (inner diameter of bore)

- The identification grade stamped on each part is the grade for the dimension measured in new condition. This grade cannot apply to reused parts.
- For reused or repaired parts, measure the dimension accurately. Determine the grade by comparing the measurement with the values of each selection table.
- For details of the measurement method of each part, the reuse standards and the selection method of the selective fitting parts, refer to the text.

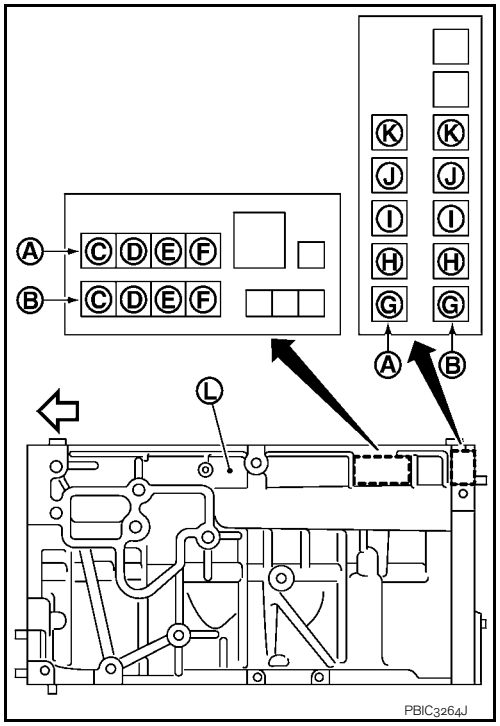
Piston

INFOID:0000000000893975

WHEN NEW CYLINDER BLOCK IS USED

- Check the cylinder bore grade on rear left side of cylinder block (L), and select piston of the same grade.

A : Correction stamp
B : Standard stamp
C : Cylinder No. 1 bore grade
D : Cylinder No. 2 bore grade
E : Cylinder No. 3 bore grade
F : Cylinder No. 4 bore grade
G : No. 1 main bearing housing grade
H : No. 2 main bearing housing grade
I : No. 3 main bearing housing grade
J : No. 4 main bearing housing grade
K : No. 5 main bearing housing grade
⇦ : Engine front



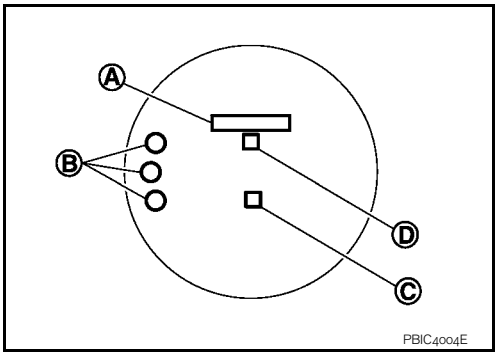
- If there is a correction stamp mark on the cylinder block, use it as a correct reference.

WHEN CYLINDER BLOCK IS REUSED

1. Measure the cylinder bore inner diameter. Refer to EM-241, "Cylinder Block".
2. Determine the bore grade by comparing the measurement with the values under the cylinder bore inner diameter of the “Piston Selection Table”.

cardiagn.com

3. Select piston of the same grade.



A : Identification code
B : Front mark
C : Sub grade number
D : Piston grade number

PISTON SELECTION TABLE

Unit: mm (in)

Grade number (Mark)	1	2 [or no mark (piston only)]
Cylinder bore Inner diameter	84.000 - 84.010 (3.3071 - 3.3075)	84.010 - 84.020 (3.3075 - 3.3079)
Piston skirt diameter	83.970 - 83.980 (3.3059 - 3.3063)	83.980 - 83.990 (3.3063 - 3.3067)

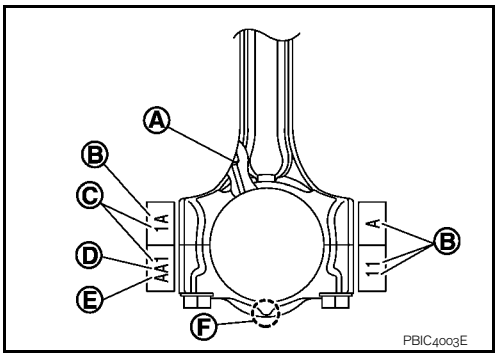
NOTE:
Piston is available together with piston pin as an assembly.

Connecting Rod Bearing

INFOID:0000000000893976

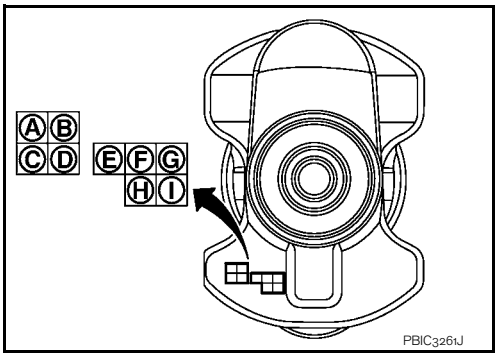
WHEN NEW CONNECTING ROD AND CRANKSHAFT ARE USED

1. Apply connecting rod big end diameter grade stamped on connecting rod side face to the row in the “Connecting Rod Bearing Selection Table”.



A : Oil hole
B : Management
C : Cylinder number
D : Big end diameter grade
E : Small end diameter grade
F : Front mark

2. Apply crankshaft pin journal diameter grade stamped on crankshaft front side to the column in the “Connecting Rod Bearing Selection Table”.



A : No. 1 pin journal diameter grade
B : No. 2 pin journal diameter grade
C : No. 3 pin journal diameter grade
D : No. 4 pin journal diameter grade
E : No. 1 main journal diameter grade
F : No. 2 main journal diameter grade
G : No. 3 main journal diameter grade
H : No. 4 main journal diameter grade
I : No. 5 main journal diameter grade

3. Read the symbol at the cross point of selected row and column in the “Connecting Rod Bearing Selection Table”.
4. Apply the symbol obtained to the “Connecting Rod Bearing Grade Table” to select connecting rod bearing.

WHEN CONNECTING ROD AND CRANKSHAFT ARE REUSED

1. Measure the dimensions of the connecting rod big end diameter and crankshaft pin journal diameter individually. Refer to EM-219, "Inspection".

cardiagn.com

2. Apply the measured dimension to the “Connecting Rod Bearing Selection Table”.
3. Read the symbol at the cross point of selected row and column in the “Connecting Rod Bearing Selection Table”.
4. Apply the symbol obtained to the “Connecting Rod Bearing Grade Table” to select connecting rod bearing.

CONNECTING ROD BEARING SELECTION TABLE

Crankshaft pin journal diameter Unit: mm (in) / Connecting rod big end diameter Unit: mm (in)		Mark	A	B	C	D	E	F	G	H	J	K	L	M	N
Mark	Axle diameter	Hole diameter	47.000 - 47.001 (1.8504 - 1.8504)	47.001 - 47.002 (1.8504 - 1.8505)	47.002 - 47.003 (1.8505 - 1.8505)	47.003 - 47.004 (1.8505 - 1.8505)	47.004 - 47.005 (1.8505 - 1.8506)	47.005 - 47.006 (1.8506 - 1.8506)	47.006 - 47.007 (1.8506 - 1.8507)	47.007 - 47.008 (1.8507 - 1.8507)	47.008 - 47.009 (1.8507 - 1.8507)	47.009 - 47.010 (1.8507 - 1.8508)	47.010 - 47.011 (1.8508 - 1.8508)	47.011 - 47.012 (1.8508 - 1.8509)	47.012 - 47.013 (1.8509 - 1.8509)
A	43.970 - 43.971 (1.7311 - 1.7311)		0	0	0	0	0	01	01	01	1	1	1	12	12
B	43.969 - 43.970 (1.7311 - 1.7311)		0	0	0	0	01	01	01	1	1	1	12	12	12
C	43.968 - 43.969 (1.7310 - 1.7311)		0	0	0	01	01	01	1	1	1	12	12	12	2
D	43.967 - 43.968 (1.7310 - 1.7310)		0	0	01	01	01	1	1	1	12	12	12	2	2
E	43.966 - 43.967 (1.7309 - 1.7310)		0	01	01	01	1	1	1	12	12	12	2	2	2
F	43.965 - 43.966 (1.7309 - 1.7309)		01	01	01	1	1	1	12	12	12	2	2	2	23
G	43.964 - 43.965 (1.7309 - 1.7309)		01	01	1	1	1	12	12	12	2	2	2	23	23
H	43.963 - 43.964 (1.7308 - 1.7309)		01	1	1	1	12	12	12	2	2	2	23	23	23
J	43.962 - 43.963 (1.7308 - 1.7308)		1	1	1	12	12	12	2	2	2	23	23	23	3
K	43.961 - 43.962 (1.7307 - 1.7308)		1	1	12	12	12	2	2	2	23	23	23	3	3
L	43.960 - 43.961 (1.7307 - 1.7307)		1	12	12	12	2	2	2	23	23	23	3	3	3
M	43.959 - 43.960 (1.7307 - 1.7307)		12	12	12	2	2	2	23	23	23	3	3	3	34
N	43.958 - 43.959 (1.7306 - 1.7307)		12	12	2	2	2	23	23	23	3	3	3	34	34
P	43.957 - 43.958 (1.7306 - 1.7306)		12	2	2	2	23	23	23	3	3	3	34	34	34
R	43.956 - 43.957 (1.7305 - 1.7306)		2	2	2	23	23	23	3	3	3	34	34	34	4
S	43.955 - 43.956 (1.7305 - 1.7305)		2	2	23	23	23	3	3	3	34	34	34	4	4
T	43.954 - 43.955 (1.7305 - 1.7305)		2	23	23	23	3	3	3	34	34	34	4	4	4
U	43.953 - 43.954 (1.7304 - 1.7305)		23	23	23	3	3	3	34	34	34	4	4	4	4

PBIC4077E

CONNECTING ROD BEARING GRADE TABLE

Connecting rod bearing grade table **: Refer to EM-244, "Connecting Rod Bearing".**

UNDERSIZE BEARINGS USAGE GUIDE

- When the specified connecting rod bearing oil clearance is not obtained with standard size connecting rod bearings, use undersize (US) bearings.
- When using undersize (US) bearing, measure the connecting rod bearing inner diameter with bearing installed, and grind the crankshaft pin so that the connecting rod bearing oil clearance satisfies the standard.

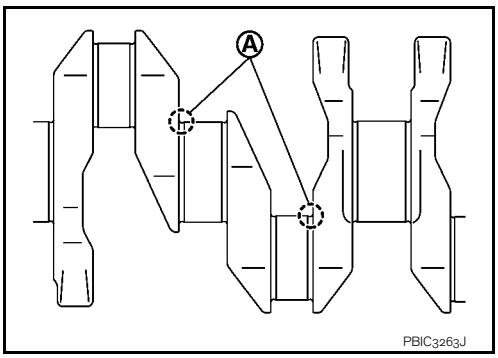
CAUTION:

cardiagn.com

In grinding crankshaft pin to use undersize bearings, keep the fillet R [1.5 - 1.7 mm (0.059 - 0.067 in)] (A).

Bearing undersize table

: Refer to EM-244, "Connecting Rod Bearing"



Main Bearing

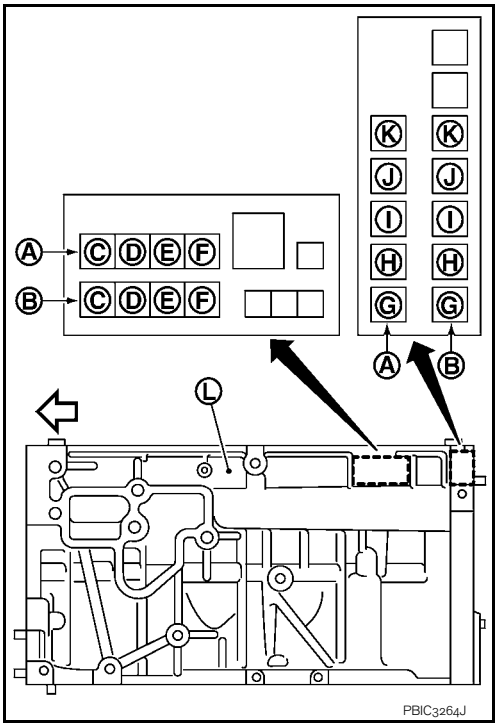
INFOID:0000000000893977

WHEN NEW CYLINDER BLOCK AND CRANKSHAFT ARE USED

1. "Main Bearing Selection Table" rows correspond to main bearing housing grade on rear left side of cylinder block (L).

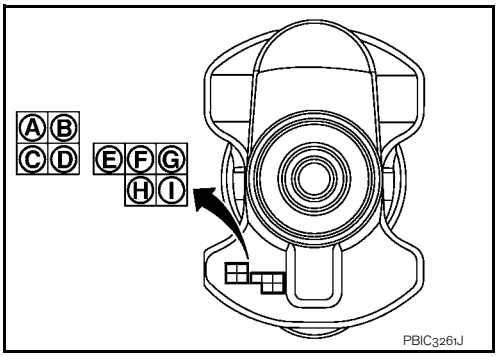
A : Correction stamp
B : Standard stamp
C : Cylinder No. 1 bore grade
D : Cylinder No. 2 bore grade
E : Cylinder No. 3 bore grade
F : Cylinder No. 4 bore grade
G : No. 1 main bearing housing grade
H : No. 2 main bearing housing grade
I : No. 3 main bearing housing grade
J : No. 4 main bearing housing grade
K : No. 5 main bearing housing grade
⇦ : Engine front

- If there is a correction stamp mark on cylinder block, use it as a correct reference.



2. Apply main journal diameter grade stamped on crankshaft front side to column in the "Main Bearing Selection Table".

A : No. 1 pin journal diameter grade
B : No. 2 pin journal diameter grade
C : No. 3 pin journal diameter grade
D : No. 4 pin journal diameter grade
E : No. 1 main journal diameter grade
F : No. 2 main journal diameter grade
G : No. 3 main journal diameter grade
H : No. 4 main journal diameter grade
I : No. 5 main journal diameter grade



3. Read the symbol at the cross point of selected row and column in the "Main Bearing Selection Table".
CAUTION:
There are two main bearing selection tables. One is for No. 1, 4 and 5 journals and the other is for No. 2 and 3 journals. Make certain to use the appropriate table. This is due to differences in the specified clearances.

cardiagn.com

4. Apply the symbol obtained to the “Main Bearing Grade Table” to select main bearing.
NOTE:
Service part is available as a set of both upper and lower.

WHEN CYLINDER BLOCK AND CRANKSHAFT ARE REUSED

1. Measure the dimensions of the cylinder block main bearing housing inner diameter and crankshaft main journal diameter individually. Refer to EM-219, "Inspection".
2. Apply the measured dimension to the “Main Bearing Selection Table”.
3. Read the symbol at the cross point of selected row and column in the “Main Bearing Selection Table”.
CAUTION:
There are two main bearing selection tables. One is for No. 1, 4 and 5 journals and the other is for No. 2 and 3 journals. Make certain to use the appropriate table. This is due to differences in the specified clearances.
4. Apply the symbol obtained to the “Main Bearing Grade Table” to select main bearing.
NOTE:
Service part is available as a set of both upper and lower.

MAIN BEARING SELECTION TABLE (No. 1, 4 AND 5 JOURNAL)

Crankshaft main journal diameter Unit: mm (in) / Cylinder block main bearing housing inner diameter Unit: mm (in)		Mark	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W
		Hole diameter	55.997 - 55.998 (2.2046 - 2.2046)	55.998 - 55.999 (2.2046 - 2.2047)	55.999 - 56.000 (2.2047 - 2.2047)	56.000 - 56.001 (2.2047 - 2.2048)	56.001 - 56.002 (2.2048 - 2.2048)	56.002 - 56.003 (2.2048 - 2.2048)	56.003 - 56.004 (2.2048 - 2.2049)	56.004 - 56.005 (2.2049 - 2.2049)	56.005 - 56.006 (2.2049 - 2.2050)	56.006 - 56.007 (2.2050 - 2.2050)	56.007 - 56.008 (2.2050 - 2.2050)	56.008 - 56.009 (2.2050 - 2.2051)	56.009 - 56.010 (2.2051 - 2.2051)	56.010 - 56.011 (2.2051 - 2.2052)	56.011 - 56.012 (2.2052 - 2.2052)	56.012 - 56.013 (2.2052 - 2.2052)	56.013 - 56.014 (2.2052 - 2.2053)	56.014 - 56.015 (2.2053 - 2.2053)	56.015 - 56.016 (2.2053 - 2.2053)	56.016 - 56.017 (2.2053 - 2.2054)
Mark	Axle diameter																					
A	51.978 - 51.979 (2.0464 - 2.0464)		0	0	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23
B	51.977 - 51.978 (2.0463 - 2.0464)		0	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23
C	51.976 - 51.977 (2.0463 - 2.0463)		0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23
D	51.975 - 51.976 (2.0463 - 2.0463)		0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3
E	51.974 - 51.975 (2.0462 - 2.0463)		0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3
F	51.973 - 51.974 (2.0462 - 2.0462)		0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3
G	51.972 - 51.973 (2.0461 - 2.0462)		0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34
H	51.971 - 51.972 (2.0461 - 2.0461)		01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34
J	51.970 - 51.971 (2.0461 - 2.0461)		01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34
K	51.969 - 51.970 (2.0460 - 2.0461)		01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4
L	51.968 - 51.969 (2.0460 - 2.0460)		1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4
M	51.967 - 51.968 (2.0459 - 2.0460)		1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4
N	51.966 - 51.967 (2.0459 - 2.0459)		1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45
P	51.965 - 51.966 (2.0459 - 2.0459)		12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45
R	51.964 - 51.965 (2.0458 - 2.0459)		12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45
S	51.963 - 51.964 (2.0458 - 2.0458)		12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5
T	51.962 - 51.963 (2.0457 - 2.0458)		2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5
U	51.961 - 51.962 (2.0457 - 2.0457)		2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5
V	51.960 - 51.961 (2.0457 - 2.0457)		2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	5
W	51.959 - 51.960 (2.0456 - 2.0457)		23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	5	5

PBIC4078E

cardiagn.com

MAIN BEARING SELECTION TABLE (No. 2 AND 3 JOURNAL)

Crankshaft main journal diameter Unit: mm (in) / Cylinder block main bearing housing inner diameter Unit: mm (in)		Mark	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W
Mark	Axle diameter	Hole diameter	55.997 - 55.998 (2.2046 - 2.2046)	55.998 - 55.999 (2.2046 - 2.2047)	55.999 - 56.000 (2.2047 - 2.2047)	56.000 - 56.001 (2.2047 - 2.2048)	56.001 - 56.002 (2.2048 - 2.2048)	56.002 - 56.003 (2.2048 - 2.2048)	56.003 - 56.004 (2.2048 - 2.2049)	56.004 - 56.005 (2.2049 - 2.2049)	56.005 - 56.006 (2.2049 - 2.2050)	56.006 - 56.007 (2.2050 - 2.2050)	56.007 - 56.008 (2.2050 - 2.2050)	56.008 - 56.009 (2.2050 - 2.2051)	56.009 - 56.010 (2.2051 - 2.2051)	56.010 - 56.011 (2.2051 - 2.2052)	56.011 - 56.012 (2.2052 - 2.2052)	56.012 - 56.013 (2.2052 - 2.2052)	56.013 - 56.014 (2.2052 - 2.2053)	56.014 - 56.015 (2.2053 - 2.2053)	56.015 - 56.016 (2.2053 - 2.2053)	56.016 - 56.017 (2.2053 - 2.2054)
A	51.978 - 51.979 (2.0464 - 2.0464)		1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45
B	51.977 - 51.978 (2.0463 - 2.0464)		12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45
C	51.976 - 51.977 (2.0463 - 2.0463)		12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45
D	51.975 - 51.976 (2.0463 - 2.0463)		12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5
E	51.974 - 51.975 (2.0462 - 2.0463)		2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5
F	51.973 - 51.974 (2.0462 - 2.0462)		2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5
G	51.972 - 51.973 (2.0461 - 2.0462)		2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56
H	51.971 - 51.972 (2.0461 - 2.0461)		23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56
J	51.970 - 51.971 (2.0461 - 2.0461)		23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56
K	51.969 - 51.970 (2.0460 - 2.0461)		23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6
L	51.968 - 51.969 (2.0460 - 2.0460)		3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6
M	51.967 - 51.968 (2.0459 - 2.0460)		3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6
N	51.966 - 51.967 (2.0459 - 2.0459)		3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67
P	51.965 - 51.966 (2.0459 - 2.0459)		34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67
R	51.964 - 51.965 (2.0458 - 2.0459)		34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67
S	51.963 - 51.964 (2.0458 - 2.0458)		34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7
T	51.962 - 51.963 (2.0457 - 2.0458)		4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7
U	51.961 - 51.962 (2.0457 - 2.0457)		4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7
V	51.960 - 51.961 (2.0457 - 2.0457)		4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7	7
W	51.959 - 51.960 (2.0456 - 2.0457)		45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7	7	7

PBIC4079E

MAIN BEARING GRADE TABLE (ALL JOURNALS)

Main bearing grade table (All journals) : Refer to EM-245, "Main Bearing".

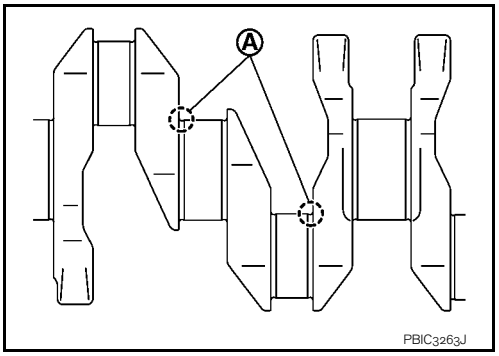
UNDERSIZE BEARING USAGE GUIDE

- When the specified main bearing oil clearance is not obtained with standard size main bearings, use undersize (US) bearing.
- When using undersize (US) bearing, measure the main bearing inner diameter with bearing installed, and grind main journal so that the main bearing oil clearance satisfies the standard.

CAUTION:

cardiagn.com

In grinding crankshaft main journal to use undersize bearings, keep the fillet R [1.5 - 1.7 mm (0.059 - 0.067 in)] (A).



Bearing undersize table:

Refer to EM-245, "Main Bearing".

cardiagn.com

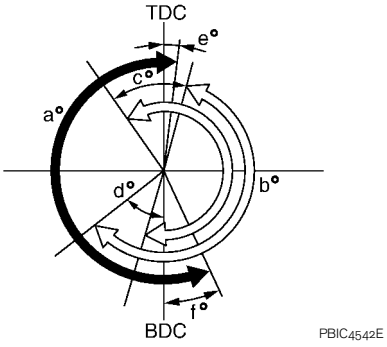
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000000893978

GENERAL SPECIFICATIONS

Engine type		MR20DE
Cylinder arrangement		In-line 4
Displacement	cm^3 (cu in)	1,997 (121.86)
Bore and stroke	mm (in)	84.0 x 90.1 (3.307 x 3.547)
Valve arrangement		DOHC
Firing order		1-3-4-2
Number of piston rings	Compression	2
	Oil	1
Compression ratio		10.2
Compression pressure kPa (bar, kg/cm^2, psi) / 250 rpm	Standard	1,390 (13.9, 14.2, 202)
	Minimum	1,140 (11.4, 11.6, 165)
	Differential limit between cylinders	100 (1.0, 1.0, 15)
Valve timing ( ) : Valve timing control “ON”	 PBIC4542E	

Unit: degree

a	b	c	d	e	f
220	232	-13 (27)	65 (25)	7	33

Drive Belt

INFOID:0000000000902337

DRIVE BELT

Tension of drive belt	Auto adjustment by auto-tensioner

Spark Plug

INFOID:0000000000893980

SPARK PLUG

Unit: mm (in)

Make	NGK
Standard type	PLZKAR6A-11
Gap (Nominal)	1.1 (0.043)

Exhaust Manifold

INFOID:0000000000893982

EXHAUST MANIFOLD

cardiagn.com

Unit: mm (in)

Items		Limit
Surface distortion	Each exhaust port	0.3 (0.012)
	Entire part	0.7 (0.028)

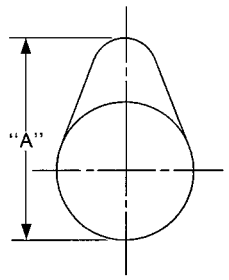
Camshaft

INFOID:0000000000893983

CAMSHAFT

Unit: mm (in)

Items		Standard	Limit
Camshaft journal oil clearance	No. 1	0.045 - 0.086 (0.0018 - 0.0034)	0.15 (0.0059)
	No. 2, 3, 4, 5	0.030 - 0.071 (0.0012 - 0.0028)	
Camshaft bracket inner diameter	No. 1	28.000 - 28.021 (1.1024 - 1.1032)	—
	No. 2, 3, 4, 5	25.000 - 25.021 (0.9843 - 0.9851)	—
Camshaft journal diameter	No. 1	27.935 - 27.955 (1.0998 - 1.1006)	—
	No. 2, 3, 4, 5	24.950 - 24.970 (0.9823 - 0.9381)	—
Camshaft end play		0.075 - 0.153 (0.0030 - 0.0060)	0.24 (0.0094)
Camshaft cam height “A”	Intake	45.265 - 45.455 (1.7821 - 1.7896)	45.065 (1.7742)
	Exhaust	43.775 - 43.965 (1.7234 - 1.7309)	43.575 (1.7155)
Camshaft runout [TIR*]		Less than 0.02 (0.0008)	0.05 (0.0020)
Camshaft sprocket runout [TIR*]		—	0.15 (0.0059)



SEM671

*: Total indicator reading

VALVE LIFTER

Unit: mm (in)

Items		Standard
Valve lifter outer diameter	Intake	33.977 - 33.987 (1.3377 - 1.3381)
	Exhaust	29.977 - 29.987 (1.1802 - 1.1806)
Valve lifter hole diameter	Intake	34.000 - 34.021 (1.3386 - 1.3394)
	Exhaust	30.000 - 30.021 (1.1811 - 1.1819)
Valve lifter clearance		0.013 - 0.044 (0.0005 - 0.0017)

VALVE CLEARANCE

Unit: mm (in)

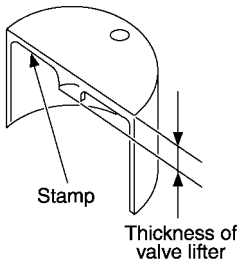
Items	Cold	Hot* (reference data)
Intake	0.26 - 0.34 (0.010 - 0.013)	0.304 - 0.416 (0.012 - 0.016)
Exhaust	0.29 - 0.37 (0.011 - 0.015)	0.308 - 0.432 (0.012 - 0.017)

*: Approximately 80°C (176°F)

AVAILABLE VALVE LIFTER

cardiagn.com

Thickness mm (in)	Identification mark



KBIAo119E

3.00 (0.1181)	300
3.02 (0.1189)	302
3.04 (0.1197)	304
3.06 (0.1205)	306
3.08 (0.1213)	308
3.10 (0.1220)	310
3.12 (0.1228)	312
3.14 (0.1236)	314
3.16 (0.1244)	316
3.18 (0.1252)	318
3.20 (0.1260)	320
3.22 (0.1268)	322
3.24 (0.1276)	324
3.26 (0.1283)	326
3.28 (0.1291)	328
3.30 (0.1299)	330
3.32 (0.1307)	332
3.34 (0.1315)	334
3.36 (0.1323)	336
3.38 (0.1331)	338
3.40 (0.1339)	340
3.42 (0.1346)	342
3.44 (0.1354)	344
3.46 (0.1362)	346
3.48 (0.1370)	348
3.50 (0.1378)	350

Cylinder Head

INFOID:0000000000893984

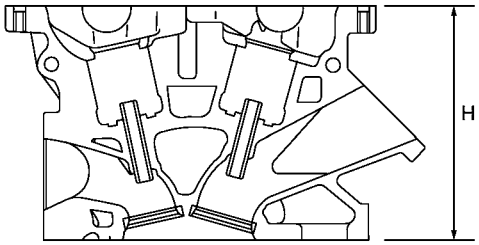
CYLINDER HEAD

Unit: mm (in)

Items	Standard	Limit
Head surface distortion	—	0.1 (0.004)

cardiagn.com

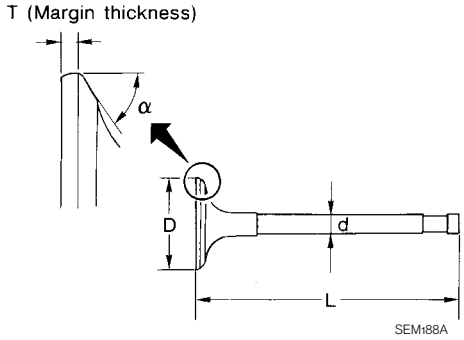
Items	Standard	Limit
Normal cylinder head height “H”	130.9 (5.15)	—



PBIC0924E

VALVE DIMENSIONS

Unit: mm (in)

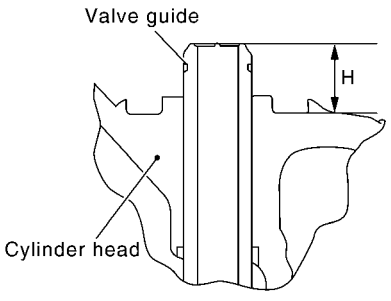


SEM188A

Valve head diameter “D”	Intake	33.8 - 34.1 (1.331 - 1.343)
	Exhaust	27.6 - 27.9 (1.087 - 1.098)
Valve length “L”	Intake	106.27 (4.184)
	Exhaust	105.26 (4.144)
Valve stem diameter “d”	Intake	5.465 - 5.480 (0.2152 - 0.2157)
	Exhaust	5.455 - 5.470 (0.2148 - 0.2154)
Valve seat angle “α”		45°15′ - 45°45′
Valve margin “T”	Intake	1.1 (0.043)
	Exhaust	1.2 (0.047)

VALVE GUIDE

Unit: mm (in)



PBIC2187E

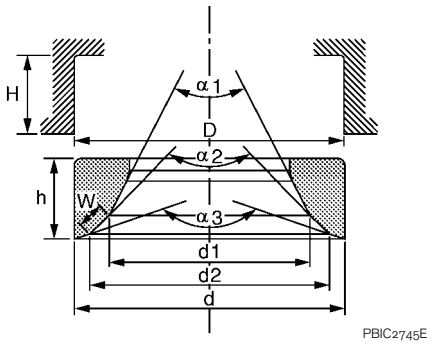
Items	Standard	Oversize (service) [0.2 (0.008)]

cardiagn.com

Valve guide	Outer diameter		9.523 - 9.534 (0.3749 - 0.3754)	9.723 - 9.734 (0.3828 - 0.3832)
	Inner diameter (Finished size)		5.500 - 5.518 (0.2165 - 0.2172)	
Cylinder head valve guide hole diameter			9.475 - 9.496 (0.3730 - 0.3739)	9.675 - 9.696 (0.3809 - 0.3817)
Interference fit of valve guide			0.027 - 0.059 (0.0011 - 0.0023)	
Items			Standard	Limit
Valve guide clearance		Intake	0.020 - 0.053 (0.0008 - 0.0021)	0.1 (0.004)
		Exhaust	0.030 - 0.063 (0.0012 - 0.0025)	
Projection length “H”			13.35 - 13.65 (0.526 - 0.537)	

VALVE SEAT

Unit: mm (in)



Items		Standard	Oversize (service) [0.5 (0.02)]
Cylinder head seat recess diameter “D”	Intake	34.700 - 34.727 (1.3661 - 1.3672)	35.200 - 35.227 (1.3858 - 1.3869)
	Exhaust	28.700 - 28.727 (1.1299 - 1.1310)	29.200 - 29.227 (1.1496 - 1.1507)
Valve seat outer diameter “d”	Intake	34.808 - 34.824 (1.3704 - 1.3710)	35.308 - 35.324 (1.3901 - 1.3907)
	Exhaust	28.808 - 28.824 (1.1342 - 1.1348)	29.308 - 29.324 (1.1539 - 1.1545)
Valve seat interference fit		0.081 - 0.124 (0.0032 - 0.0049)	
Diameter “d1”*1	Intake	31.8 (1.252)	
	Exhaust	25.3 (0.996)	
Diameter “d2”*2	Intake	33.1 - 33.6 (1.303 - 1.323)	
	Exhaust	26.9 - 27.4 (1.059 - 1.079)	
Angle “α1”	Intake	60°	
	Exhaust	45°	
Angle “α2”		88°45′ - 90°15′	
Angle “α3”		120°	
Contacting width “W”*3	Intake	1.0 - 1.4 (0.039 - 0.055)	
	Exhaust	1.2 - 1.6 (0.047 - 0.063)	
Height “h”	Intake	5.9 - 6.0 (0.232 - 0.236)	5.03 - 5.13 (0.1980 - 0.2020)
	Exhaust		4.95 - 5.05 (0.1949 - 0.1988)
Depth “H”	Intake	6.04 (0.2378)	
	Exhaust	6.05 (0.2382)	

*1: Diameter made by intersection point of conic angles “α1” and “α2”

*2: Diameter made by intersection point of conic angles “α2” and “α3”

*3: Machining data

VALVE SPRING

cardiagn.com

Items	Standard	
	Intake	Exhaust
Free height	45.59 - 46.96 mm (1.7949 - 1.8488 in)	45.13 - 46.40 mm (1.7768 - 1.8268 in)
Installation height	35.30 mm (1.390 in)	35.30 mm (1.390 in)
Installation load	151 - 175 N (15.4 - 17.9 kg, 34 - 39 lb)	140 - 162 N (14.3 - 16.5 kg, 31 - 36 lb)
Height during valve open	25.70 mm (1.0118 in)	26.88 mm (1.0583 in)
Load with valve open	333 - 379 N (34.0 - 38.7 kg, 75 - 85 lb)	283 - 323 N (28.9 - 32.9 kg, 64 - 73 lb)
Identification color	Green	Purple

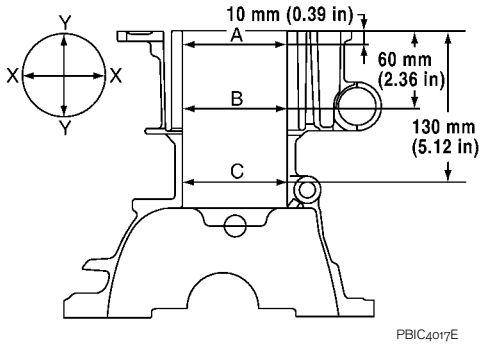
Items	Limit
Valve spring squareness	1.9 mm (0.075 in)

Cylinder Block

INFOID:0000000000893985

CYLINDER BLOCK

Unit: mm (in)

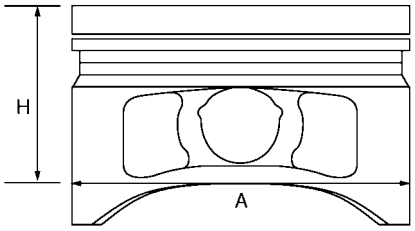


Cylinder block top surface distortion	Limit		0.1 (0.004)
Cylinder bore inner diameter	Standard	Grade No. 1	84.000 - 84.010 (3.3071 - 3.3075)
		Grade No. 2	84.010 - 84.020 (3.3075 - 3.3079)
Out-of-round	Limit		0.015 (0.0006)
Taper			0.010 (0.0004)
Main bearing housing inner diameter grade		Grade No. A	55.997 - 55.998 (2.2046 - 2.2046)
		Grade No. B	55.998 - 55.999 (2.2046 - 2.2047)
		Grade No. C	55.999 - 56.000 (2.2047 - 2.2047)
		Grade No. D	56.000 - 56.001 (2.2047 - 2.2048)
		Grade No. E	56.001 - 56.002 (2.2048 - 2.2048)
		Grade No. F	56.002 - 56.003 (2.2048 - 2.2048)
		Grade No. G	56.003 - 56.004 (2.2048 - 2.2049)
		Grade No. H	56.004 - 56.005 (2.2049 - 2.2049)
		Grade No. J	56.005 - 56.006 (2.2049 - 2.2050)
		Grade No. K	56.006 - 56.007 (2.2050 - 2.2050)
		Grade No. L	56.007 - 56.008 (2.2050 - 2.2050)
		Grade No. M	56.008 - 56.009 (2.2050 - 2.2051)
		Grade No. N	56.009 - 56.010 (2.2051 - 2.2051)
		Grade No. P	56.010 - 56.011 (2.2051 - 2.2052)
		Grade No. R	56.011 - 56.012 (2.2052 - 2.2052)
		Grade No. S	56.012 - 56.013 (2.2052 - 2.2052)
		Grade No. T	56.013 - 56.014 (2.2052 - 2.2053)
		Grade No. U	56.014 - 56.015 (2.2053 - 2.2053)
		Grade No. V	56.015 - 56.016 (2.2053 - 2.2053)
		Grade No. W	56.016 - 56.017 (2.2053 - 2.2054)

AVAILABLE PISTON

cardiagn.com

Unit: mm (in)



PBICo188E

Piston skirt diameter “A”	Standard	Grade No. 1	83.970 - 83.980 (3.3059 - 3.3063)
		Grade No. 2	83.980 - 83.990 (3.3063 - 3.3067)
Measure point “H”			39.9 (1.571)
Piston pin hole diameter			19.993 - 19.999 (0.7871 - 0.7874)
Piston to cylinder bore clearance		Standard	0.020 - 0.040 (0.0008 - 0.0016)
		Limit	0.08 (0.0031)

PISTON RING

Unit: mm (in)

Items		Standard	Limit
Piston ring side clearance	Top	0.04 - 0.08 (0.002 - 0.003)	0.11 (0.0043)
	2nd	0.03 - 0.07 (0.001 - 0.003)	0.10 (0.0039)
	Oil ring	0.015 - 0.185 (0.001 - 0.007)	—
Piston ring end gap	Top	0.20 - 0.30 (0.008 - 0.012)	0.51 (0.020)
	2nd	0.50 - 0.65 (0.020 - 0.026)	0.83 (0.033)
	Oil (rail ring)	0.15 - 0.45 (0.006 - 0.018)	0.78 (0.031)

PISTON PIN

Unit: mm (in)

Items	Standard	Limit
Piston pin outer diameter	19.989 - 19.995 (0.7870 - 0.7872)	—
Piston to piston pin oil clearance	0.002 - 0.006 (0.0001 - 0.0002)	—

CONNECTING ROD

Unit: mm (in)

Center distance		138.97 - 139.07 (5.471 - 5.475)
Bend [per 100 (3.94)]	Limit	0.15 (0.0059)
Torsion [per 100 (3.94)]	Limit	0.30 (0.0118)
Connecting rod bushing inner diameter*	Standard	20.000 - 20.012 (0.7874 - 0.7879)
Connecting rod bushing oil clearance	Standard	0.005 - 0.023 (0.0002 - 0.0009)
	Limit	0.03 (0.0012)

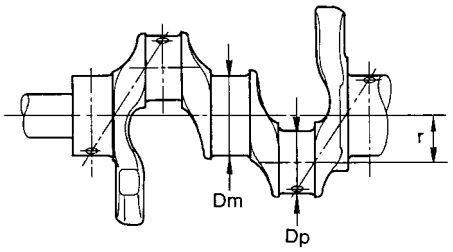
cardiagn.com

Connecting rod side clearance	Standard	0.20 - 0.35 (0.0079 - 0.0138)
	Limit	0.40 (0.0157)
Connecting rod big end diameter	Grade No. A	47.000 - 47.001 (1.8504 - 1.8504)
	Grade No. B	47.001 - 47.002 (1.8504 - 1.8505)
	Grade No. C	47.002 - 47.003 (1.8505 - 1.8505)
	Grade No. D	47.003 - 47.004 (1.8505 - 1.8505)
	Grade No. E	47.004 - 47.005 (1.8505 - 1.8506)
	Grade No. F	47.005 - 47.006 (1.8506 - 1.8506)
	Grade No. G	47.006 - 47.007 (1.8506 - 1.8507)
	Grade No. H	47.007 - 47.008 (1.8507 - 1.8507)
	Grade No. J	47.008 - 47.009 (1.8507- 1.8507)
	Grade No. K	47.009 - 47.010 (1.8507- 1.8508)
	Grade No. L	47.010 - 47.011 (1.8508 - 1.8508)
	Grade No. M	47.011 - 47.012 (1.8508 - 1.8509)
	Grade No. N	47.012 - 47.013 (1.8509 - 1.8509)

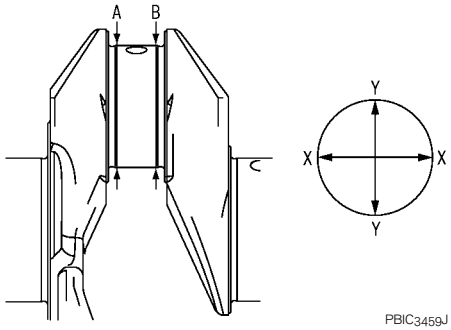
*: After installing in connecting rod

CRANKSHAFT

Unit: mm (in)



SEM645



PBIC3459J

Center distance “r”		44.89 - 44.97 (1.7673 - 1.7705)
Out-of-round	Limit	0.0035 (0.0001)
Taper	Limit	
Runout [TIR*]	Standard	0.05 (0.0020)
	Limit	0.10 (0.0039)
Crankshaft end play	Standard	0.10 - 0.26 (0.0039 - 0.0102)
	Limit	0.30 (0.012)

cardiagn.com

Crankshaft pin journal diameter grade. “Dp”	Grade No. A	43.970 - 43.971 (1.7311 - 1.7311)
	Grade No. B	43.969 - 43.970 (1.7311 - 1.7311)
	Grade No. C	43.968 - 43.969 (1.7310 - 1.7311)
	Grade No. D	43.967 - 43.968 (1.7310 - 1.7310)
	Grade No. E	43.966 - 43.967 (1.7309 - 1.7310)
	Grade No. F	43.965 - 43.966 (1.7309 - 1.7309)
	Grade No. G	43.964 - 43.965 (1.7309 - 1.7309)
	Grade No. H	43.963 - 43.964 (1.7308 - 1.7309)
	Grade No. J	43.962 - 43.963 (1.7308 - 1.7308)
	Grade No. K	43.961 - 43.962 (1.7307 - 1.7308)
	Grade No. L	43.960 - 43.961 (1.7307 - 1.7307)
	Grade No. M	43.959 - 43.960 (1.7307 - 1.7307)
	Grade No. N	43.958 - 43.959 (1.7306 - 1.7307)
	Grade No. P	43.957 - 43.958 (1.7306 - 1.7306)
	Grade No. R	43.956 - 43.957 (1.7305 - 1.7306)
	Grade No. S	43.955 - 43.956 (1.7305 - 1.7305)
	Grade No. T	43.954 - 43.955 (1.7305 - 1.7305)
	Grade No. U	43.953 - 43.954 (1.7304 - 1.7305)
Crankshaft main journal diameter grade. “Dm”	Grade No. A	51.978 - 51.979 (2.0464 - 2.0464)
	Grade No. B	51.977 - 51.978 (2.0463 - 2.0464)
	Grade No. C	51.976 - 51.977 (2.0463 - 2.0463)
	Grade No. D	51.975 - 51.976 (2.0463 - 2.0463)
	Grade No. E	51.974 - 51.975 (2.0462 - 2.0463)
	Grade No. F	51.973 - 51.974 (2.0462 - 2.0462)
	Grade No. G	51.972 - 51.973 (2.0461 - 2.0462)
	Grade No. H	51.971 - 51.972 (2.0461 - 2.0461)
	Grade No. J	51.970 - 51.971 (2.0461 - 2.0461)
	Grade No. K	51.969 - 51.970 (2.0460 - 2.0461)
	Grade No. L	51.968 - 51.969 (2.0460 - 2.0460)
	Grade No. M	51.967 - 51.968 (2.0459 - 2.0460)
	Grade No. N	51.966 - 51.967 (2.0459 - 2.0459)
	Grade No. P	51.965 - 51.966 (2.0459 - 2.0459)
	Grade No. R	51.964 - 51.965 (2.0458 - 2.0459)
	Grade No. S	51.963 - 51.964 (2.0458 - 2.0458)
	Grade No. T	51.962 - 51.963 (2.0457 - 2.0458)
	Grade No. U	51.961 - 51.962 (2.0457 - 2.0457)
	Grade No. V	51.960 - 51.961 (2.0457 - 2.0457)
	Grade No. W	51.959 - 51.960 (2.0456 - 2.0457)

*: Total indicator reading

Connecting Rod Bearing

INFOID:0000000000893987

CONNECTING ROD BEARING GRADE TABLE

Grade number		Thickness mm (in)	Identification color	Remarks
0		1.494 - 1.497 (0.0588 - 0.0589)	Black	Grade and color are the same for upper and lower bearings.
1		1.497 - 1.500 (0.0589 - 0.0591)	Brown	
2		1.500 - 1.503 (0.0591 - 0.0592)	Green	
3		1.503 - 1.506 (0.0592 - 0.0593)	Yellow	
4		1.506 - 1.509 (0.0593 - 0.0594)	Blue	
01	UPR	1.494 - 1.497 (0.0588 - 0.0589)	Black	Grade and color are different between upper and lower bearings.
	LWR	1.497 - 1.500 (0.0589 - 0.0591)	Brown	
12	UPR	1.497 - 1.500 (0.0589 - 0.0591)	Brown	
	LWR	1.500 - 1.503 (0.0591 - 0.0592)	Green	
23	UPR	1.500 - 1.503 (0.0591 - 0.0592)	Green	
	LWR	1.503 - 1.506 (0.0592 - 0.0593)	Yellow	
34	UPR	1.503 - 1.506 (0.0592 - 0.0593)	Yellow	
	LWR	1.506 - 1.509 (0.0593 - 0.0594)	Blue	

cardiagn.com

UNDERSIZE TABLE

Unit: mm (in)

Item	Thickness	Crank pin journal diameter
US 0.25 (0.0098)	1.623 - 1.631 (0.0639 - 0.0642)	Grind so that bearing clearance is the specified value.

CONNECTING ROD BEARING OIL CLEARANCE

Unit: mm (in)

Connecting rod bearing oil clearance	Standard	0.037 - 0.047 (0.0015 - 0.0019)
	Limit	0.07 (0.0028)

Main Bearing

INFOID:0000000000893986

MAIN BEARING GRADE TABLE (ALL JOURNALS)

Unit: mm (in)

Grade number		Thickness	Identification color	Remarks
0		1.996 - 1.999 (0.0786 - 0.0787)	Black	Grade and color are the same for upper and lower bearings.
1		1.999 - 2.002 (0.0787 - 0.0788)	Brown	
2		2.002 - 2.005 (0.0788 - 0.0789)	Green	
3		2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
4		2.008 - 2.011 (0.0791 - 0.0792)	Blue	
5		2.011 - 2.014 (0.0792 - 0.0793)	Pink	
6		2.014 - 2.017 (0.0793 - 0.0794)	Purple	
7		2.017 - 2.020 (0.0794 - 0.0795)	White	
01	UPR	1.996 - 1.999 (0.0786 - 0.0787)	Black	Grade and color are different between upper and lower bearings.
	LWR	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
12	UPR	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
	LWR	2.002 - 2.005 (0.0788 - 0.0789)	Green	
23	UPR	2.002 - 2.005 (0.0788 - 0.0789)	Green	
	LWR	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
34	UPR	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
	LWR	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
45	UPR	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
	LWR	2.011 - 2.014 (0.0792 - 0.0793)	Pink	
56	UPR	2.011 - 2.014 (0.0792 - 0.0793)	Pink	
	LWR	2.014 - 2.017 (0.0793 - 0.0794)	Purple	
67	UPR	2.014 - 2.017 (0.0793 - 0.0794)	Purple	
	LWR	2.017 - 2.020 (0.0794 - 0.0795)	White	

UNDERSIZE TABLE

Unit: mm (in)

Item	Thickness	Main journal diameter
US 0.25 (0.0098)	2.126 - 2.134 (0.0837 - 0.0840)	Grind so that bearing clearance is the specified value.

MAIN BEARING OIL CLEARANCE

Unit: mm (in)

Main bearing oil clearance	Standard	No. 1, 4 and 5	0.024 - 0.034 (0.0009 - 0.0013)
		No. 2 and 3	0.012 - 0.022 (0.0005 - 0.0009)
	Limit		0.065 (0.0026)

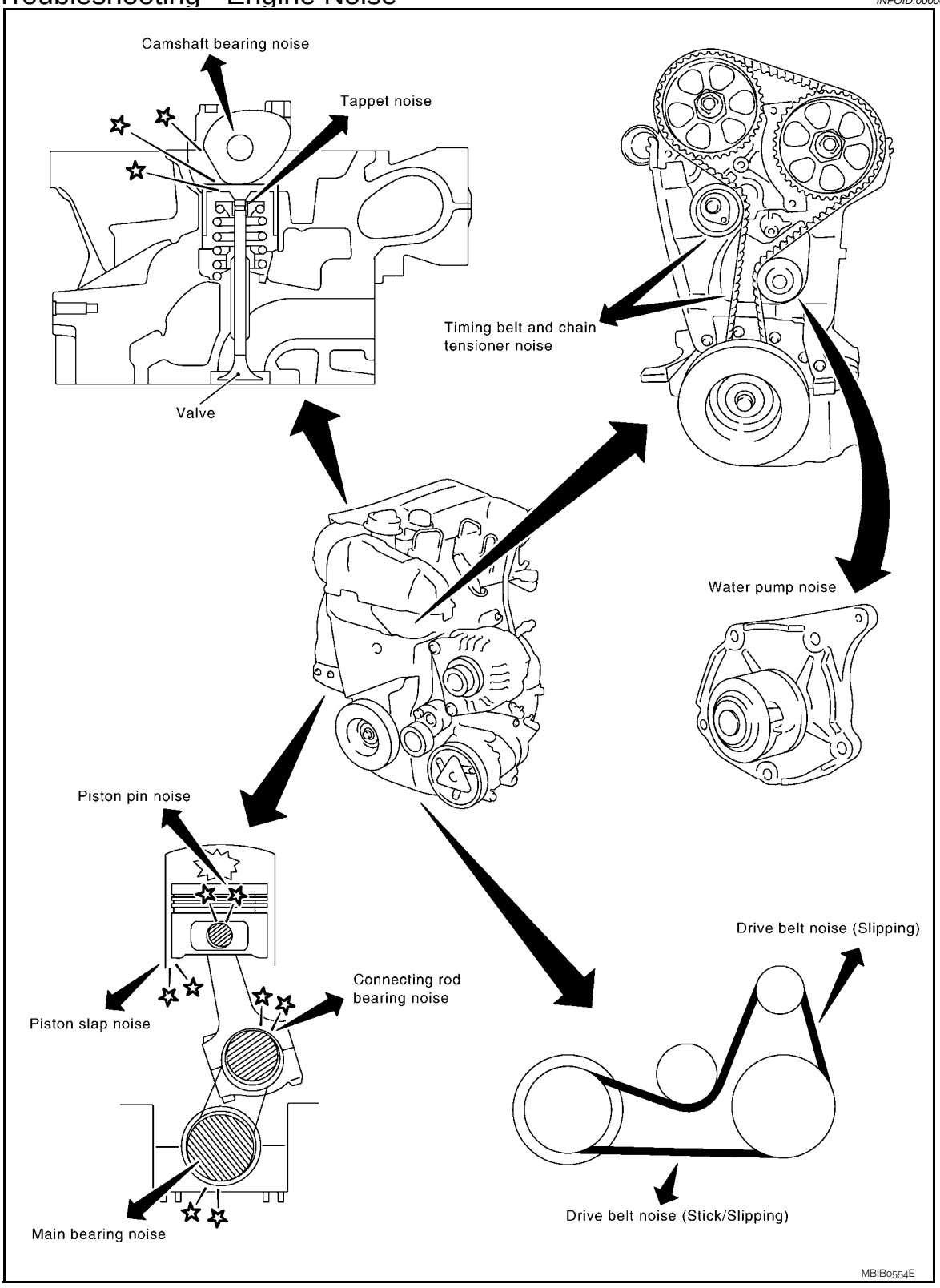
cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting - Engine Noise

INFOID:0000000001060030



Use the Chart Below to Help You Find the Cause of the Symptom

INFOID:0000000001060031

cardiagn.com

1. Locate the area where noise occurs.
2. Confirm the type of noise.
3. Specify the operating condition of engine.
4. Check specified noise source.

If necessary, repair or replace these parts.

Location of noise	Type of noise	Operating condition of engine						Source of noise	Check item	Reference page
		Before warm-up	After warm-up	When starting	When idling	When racing	While driving			
Top of engine Rocker cover Cylinder head	Ticking or clicking	C	A	—	A	B	—	Tappet noise	Valve clearance	EM-262
Crankshaft pulley Cylinder block (Side of engine) Oil pan	Slap or rap	A	—	—	B	B	A	Piston slap noise	Piston ring end gap	EM-326
Front of engine Timing belt cover	Tapping or ticking	A	A	—	B	B	B	Timing belt tensioner noise	Timing belt tensioner operation	EM-287
Front of engine	Squeaking or fizzing	A	B	—	B	—	C	Drive belts (Sticking or slipping)	Drive belts deflection	EM-259
	Squall Creak	A	B	—	B	A	B	Water pump noise	Water pump operation	CO-60

A: Closely related B: Related C: Sometimes related —: Not related

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Drain Coolant

INFOID:0000000001060032

Drain coolant when engine is cooled.

Precaution for Disconnecting Fuel Piping

INFOID:0000000001060033

- Before starting work, make sure no fire or spark producing items are in the work area.
- Release fuel pressure before disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

Precaution for Removal and Disassembly

INFOID:0000000001060034

- When instructed to use special service tools, use the specified tools. Always be careful to work safely, avoid forceful or uninstructed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Cover openings of engine system with tape or the equivalent, if necessary, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and re-assembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified.

Precaution for Inspection, Repair and Replacement

INFOID:0000000001060035

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

Precaution for Assembly and Installation

INFOID:0000000001060036

- Use torque wrench to tighten bolts or nuts to specified value.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly same as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check oil or coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assemble, spread the oil on sliding surfaces well.
- Release air within route when refilling after draining coolant.
- Before starting engine, apply fuel pressure to fuel lines with turning ignition switch ON (with engine stopped). Then make sure that there are no leaks at fuel line connections.
- After repairing, start engine and increase engine speed to check coolant, fuel, oil, and exhaust systems for leakage.

Parts Requiring Angular Tightening

INFOID:0000000001060037

- Use an angle wrench for the final tightening of the following engine parts.
- Cylinder head bolts
- Lower cylinder block bolts
- Connecting rod cap bolts
- Crankshaft pulley bolt (No angle wrench is required as the bolt flange is provided with notches for angular tightening)
- Do not use a torque value for final tightening.
- The torque value for these parts are for a preliminary step.
- Ensure thread and seat surfaces are clean and coated with engine oil.

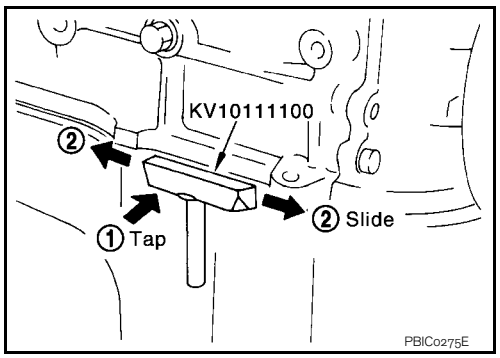
Precaution for Liquid Gasket

INFOID:0000000001060038

REMOVAL OF LIQUID GASKET

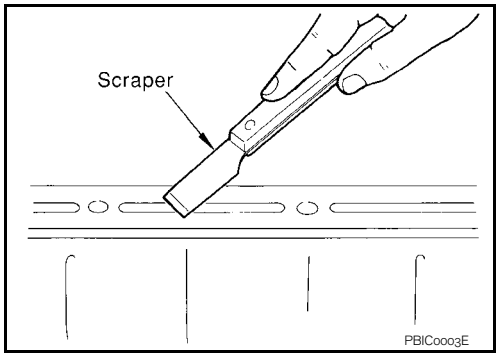
cardiagn.com

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.
  CAUTION:
  Be careful not to damage the mating surfaces.
- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the liquid gasket applied area.
  CAUTION:
  If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.

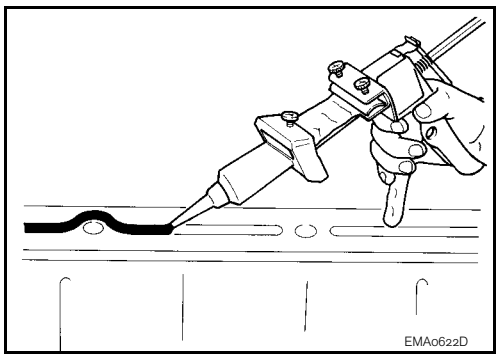


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
   - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.
2. Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Attach the liquid gasket to the tube presser.
   Use Genuine Liquid Gasket or equivalent.

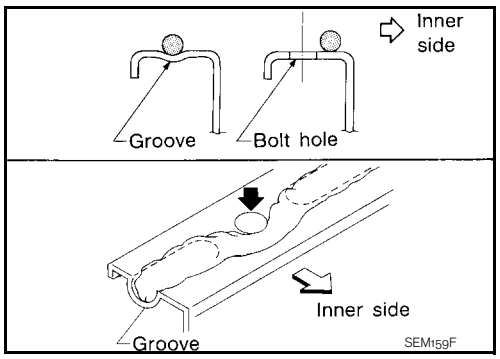


4. Apply the liquid gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the gasket to the groove.



- As for the bolt holes, normally apply the gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the instruction in this manual.
- Within five minutes of gasket application, install the mating component.
- If the liquid gasket protrudes, wipe it off immediately.
- Do not retighten after the installation.
- After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

CAUTION:
If there are instructions in this manual, observe them.



Precaution for Diesel Equipment

INFOID:0000000001060039

CLEANLINESS

CLEANLINESS INSTRUCTIONS WHICH MUST BE FOLLOWED WHEN WORKING ON THE HIGH PRESSURE DIRECT INJECTION SYSTEM

Risks relating to contamination

The system is very sensitive to contamination. The risks caused by the introduction of contamination are:
- Damage or destruction of the high pressure injection system and the engine,
- Seizing or leaking of a component.

cardiagn.com

All After-Sales operations must be performed under very clean conditions. This means that no impurities (particles a few microns in size) get into the system during dismantling or into the circuits via the fuel unions.
The cleanliness principle must be applied from the filter to the injectors.
WHAT ARE THE SOURCES OF CONTAMINATION?

Contamination is caused by:
- Metal or plastic chips,
- Paint,
- Fibres:
- Boxes,
- Brushes,
- Paper,
- Clothing,
- Cloths,
- Foreign bodies such as hair,
- Ambient air,
- Etc.

IMPORTANT: It is not possible to clean the engine using a high pressure washer because of the risk of damaging connections. In addition, moisture may collect in the connectors and create electrical connection malfunctions.
INSTRUCTIONS TO BE FOLLOWED BEFORE ANY WORK IS CARRIED OUT ON THE INJECTION SYSTEM
- Ensure that you have the plugs for the unions to be opened (bag of plugs sold at the Parts Stores - Nissan part No.: 16609 00Q0B, Renault part No.: 77 01 476 857). Plugs are to be used once only. After use, they must be thrown away (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plugs must be thrown away.
- Ensure that you have hermetically resealable plastic bags for storing removed parts. Stored parts will therefore be less subject to the risk of impurities. The bags must be used only once, and after use they must be thrown away.
- Lint-free towelettes to be used for high pressure supply pump related service purpose. The use of a normal cloth or paper for cleaning purposes is forbidden. These are not lint-free and may contaminate the fuel circuit of the system. Each lint-free cloth should only be used once.

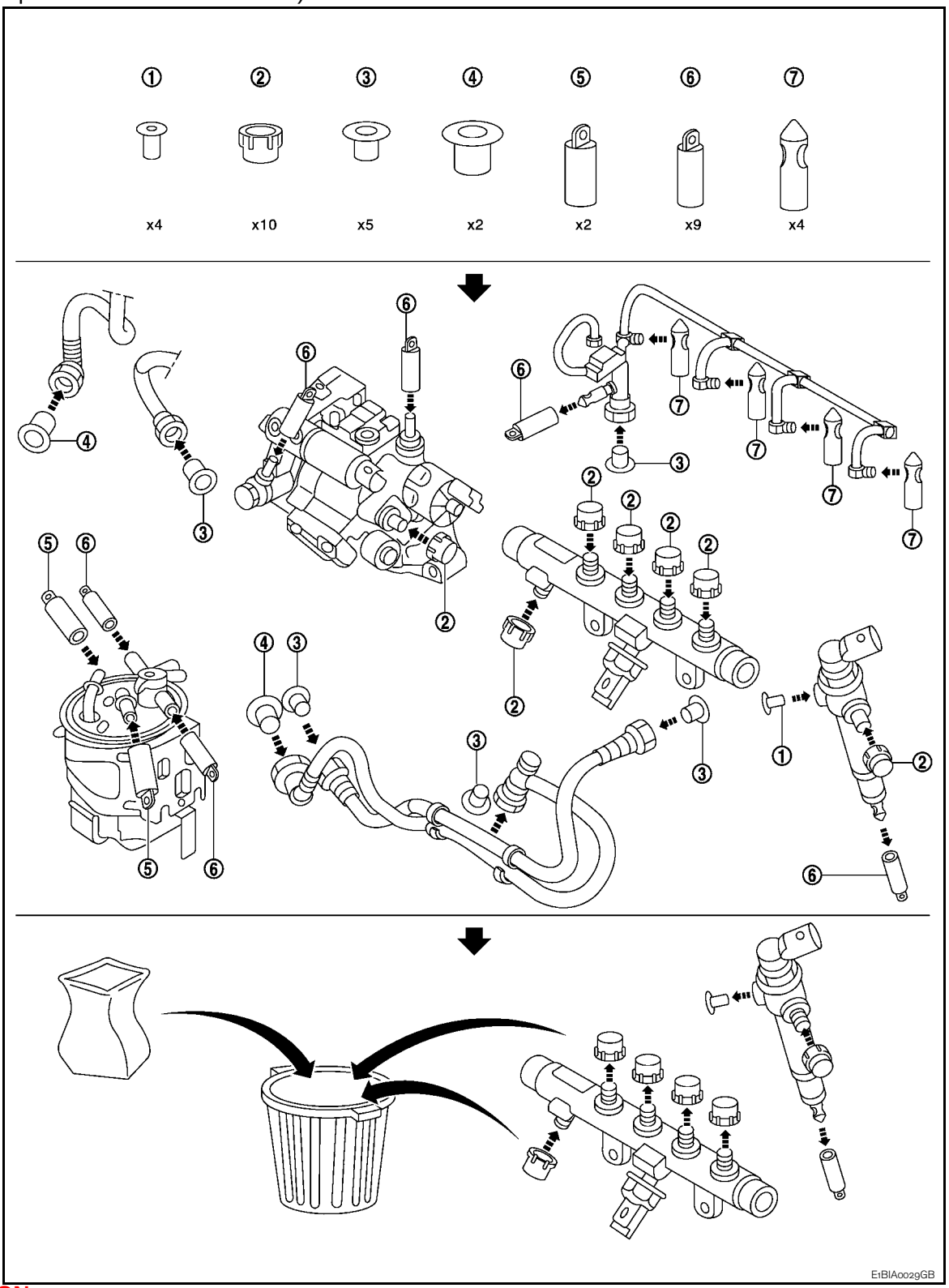
INSTRUCTIONS TO BE FOLLOWED BEFORE OPENING THE FUEL CIRCUIT
- For each operation, use new thinner (used thinner contains impurities). Pour it into a clean receptacle.
- For each operation, use a clean brush which is in good condition (the brush must not shed its bristles).
- Use a brush and thinners to clean the connections to be opened.
- Blow compressed air over the cleaned parts (tools, cleaned the same way as the parts, connections and injection system zone). Check that no bristles remain adhered.
- Wash your hands before and during the operation if necessary.
- When wearing leather protective gloves, cover these with latex gloves.

INSTRUCTIONS TO BE FOLLOWED DURING THE OPERATION
- As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Stores - Nissan part No.: 16609 00Q0B, Renault part No.: 77 01 476 857. They must not, under any circumstances, be reused.
- Close the hermetically sealed bag, even if it has to be reopened shortly afterwards. Ambient air carries contamination.
- All components of the injection system that are removed must be stored in a hermetically sealed plastic bag once the plugs have been inserted.
- The use of a brush, thinner, bellows, sponge or normal cloth is strictly forbidden once the circuit has been opened. These items are likely to allow impurities to enter the system.
- A new component replacing an old one must not be removed from its packaging until it is to be fitted to the vehicle.

Instructions for Fitting the Plugs
Nissan part number: 16609 00Q0B

cardiagn.com

(Renault part number: 77 01 476 857)



CAUTION:

- **The engine must not run with:**
- **Diesel containing more than 10% diester**
- **Petrol, even in very small amounts.**
- **The system can inject the diesel into the engine at a pressure of up to 140,000 kPa (1,400 bar, 1,428 kg/cm^2, 20,300 psi). Before carrying out any work, check that the injector rail is no longer pressurized and that the fuel temperature is not too high.**
- **You must respect the cleaning and safety advice specified in this document for any work on the high pressure injection system.**

cardiagn.com

SPECIAL FEATURES

CAUTION:

- **The engine must not operate with:**
- **Diesel engine fuel containing more than 10% diester,**
- **Petrol, even in tiny quantities.**
- **The system can inject the diesel into the engine at a pressure up to 1400 bars. Before carrying out any work, check that the injector rail is not under pressure and that the fuel temperature is not too high.**
- **You must respect the cleaning and safety advice specified in this document for any work on the high pressure injection system.**
- **Removal of the interior of the pump and injectors is prohibited. Only the flow actuator, the fuel temperature sensor and the venturi can be replaced.**
- **For safety reasons, it is strictly forbidden to slacken a injection tube union when the engine is running.**
- **It is not possible to remove the pressure sensor from the fuel rail because this may cause circuit contamination malfunctions. If the pressure sensor fails, the pressure sensor, the rail and the five injection tubes must be replaced.**
- **It is strictly forbidden to remove any high pressure supply pump pulley marked number 070 575. If the pump is being replaced, the pulley must be replaced.**
- **It is forbidden to repair the wiring connecting the knock sensor (accelerometer) and the CKP sensor (engine speed sensor). If the wiring should fail, it has to be replaced with new wiring.**
- **Applying 12 volts directly to any component in the system is prohibited.**
- **Ultrasonic carbon removal and cleaning are prohibited.**
- **Never start the engine without the battery being connected correctly.**
- **It is essential to replace all the disconnected air inlet plastic pipes.**

INSTRUCTIONS FOR INJECTION TUBES

CAUTION:

All the injection tube removed must be systematically replaced along with the clips.

TIGHTENING THE INJECTION TUBES

NOTE:

fit the pump/rail pipe before the rail/injector pipes.

Rail-pump pipe

- Undo the rail,
- Grease the threads of the injection tube nuts,
- Insert the injection tube olive into the taper of the high pressure pump outlet,
- Insert the injection tube olive into the taper of the high pressure rail inlet.
- Move the nut into position by hand, on the rail side then the pump side,
- Tighten the rail,
- Tighten the injection tube nuts on the rail side then on the pump side.

Rail/injector pipes

- Undo the rail,
- Grease the threads of the injection tube nuts,
- Insert the injection tube olive into the taper of the high pressure injector inlet,
- Insert the injection tube olive into the taper of the high pressure rail outlet,
- Move the nuts into position by hand, on the injector side then the rail side,
- Tighten the rail,
- Ensure that the new clip, supplied with the new injection tube, is fitted,
- Tighten the nuts of the injection tubes on the injector side first and then on the fuel rail side.

NOTE:

Before fitting a new injection tube, move back the nuts on the pipe then lightly lubricate the nut threads with the oil from the sachet provided in the parts kit.

CHECKING SEALING AFTER REPAIR

CAUTION:

After any operation, check that there are no diesel leaks.

- Reprime the circuit using the priming pump.
- Start the engine and allow to warm up at idle speed, visually inspecting for any fuel leaks.
- Apply tracing fluid around the high pressure connections of the pipe that has been replaced.
- Once the engine coolant temperature is above **50°C** and provided there are no malfunctions present, carry out a road test, taking the engine speed up to **4000 rpm** at least once to check that there are no leaks.
- Perform a visual inspection after the road test to make sure that there are no high pressure leaks.
- Clean off the tracing fluid.

cardiagn.com

Installation of Thread Inserts

INFOID:0000000001066552

Threaded holes on all engine component parts can be repaired by using thread inserts.

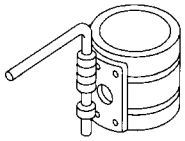
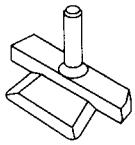
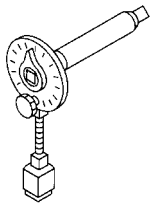
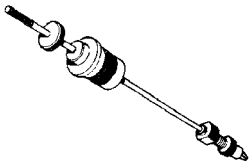
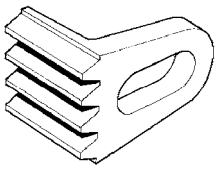
cardiagn.com

PREPARATION

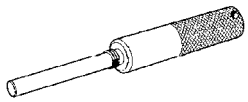
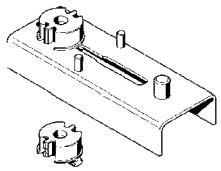
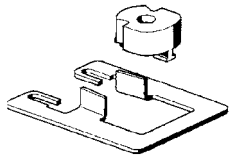
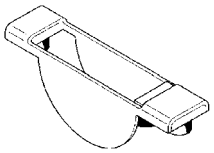
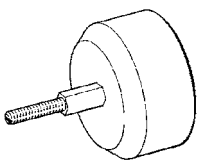
PREPARATION

Special Service Tools

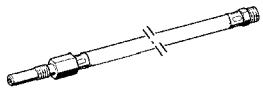
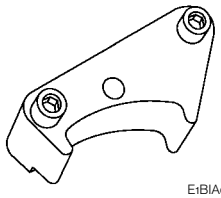
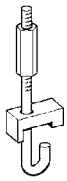
INFOID:0000000001060040

NISSAN tool number (RENAULT tool No.) Tool name	Description
EM03470000 (—) Piston ring compressor  NT044	Installing piston assembly into cylinder bore
KV10111100 (—) Seal cutter  NT046	Removing oil pan
KV10112100 (—) Angle wrench  NT014	Tightening bolts for bearing cap, cylinder head, etc. in angle
KV113B0020 (Emb. 880) Sliding hammer  MBIB0358E	Inertia extractor
KV113B0060 (Mot. 582-01) Ring gear stopper  MBIB0363E	Flywheel immobilizing tool.
KV113B0110 (Mot. 1430) TDC set pin	Set of TDC pins

cardiagn.com

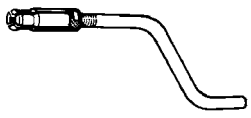
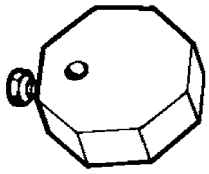
NISSAN tool number (RENAULT tool No.) Tool name	Description
KV113B0120 (Mot. 1485-01) Oil jet remover MBIB0372E	Tool for removing the piston bottom oil jets
KV113B0130 (Mot. 1489) TDC set pin  MBIB0373E	TDC setting pin
KV113B0140 (Mot. 1492) Bearing assembling set  MBIB0374E	Tool for installing connecting rod bearing
KV113B0150 (Mot. 1492-03) Bearing assembling adapter  MBIB0375E	Adaptation kit for installing the detachable cap connecting rod bearing
KV113B0160 (Mot. 1493-01) Bearing insert  MBIB0376E	Tool for installing main bearing
KV113B0170 (Mot. 1494) Oil jet remover plate	Tool for removing oil jets
KV113B0190 (Mot. 1567) Clip pliers	Pliers for exhaust gas recycling pipe clips
KV113B0210 (Mot. 1585) Front oil seal drift  MBIB0381E	Tool for installing crankshaft seals, flywheel end

cardiagn.com

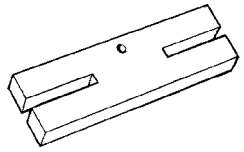
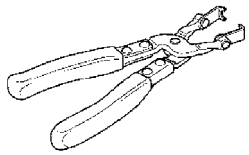
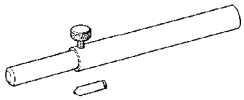
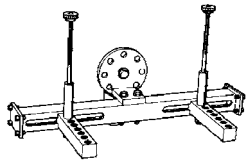
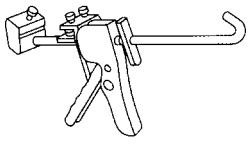
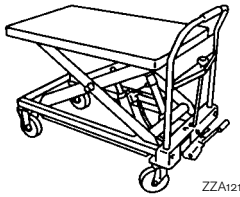
NISSAN tool number (RENAULT tool No.) Tool name	Description
KV113B0220 (Mot. 1586) Front oil seal drift set	Tool for installing crankshaft seals, timing end
KV113B0230 (Mot. 1632) Camshaft seal insert	Tool for installing inlet camshaft seals
KV113B0240 (Rou. 15-01) Shaft protector	Internal shaft protector **16 mm (0.63 in) dia.**
KV113B0400 (Mot. 1592) Compression gauge attachment  MBIB0712E	Connecting compression gauge and glow plug holex
— (Mot. 1606-A) Camshaft pulley holder  E1BIA0053ZZ	Tool for locking sprockets for toothed timing belt
— (Mot. 1638) Belt tension gauge  MBIB0382E	Setting drive belt tension

Commercial Service Tools

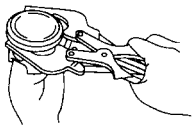
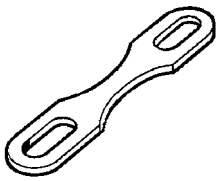
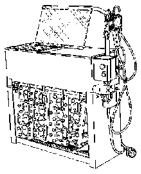
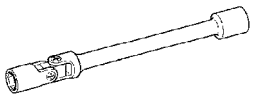
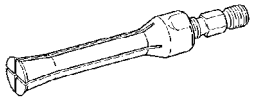
INFOID:0000000001060041

NISSAN tool number (RENAULT tool No.) Tool name	Description
KV113B0030 (Mot. 11) Crankshaft bearing remover  MBIB0359E	Crankshaft bearing extractor
KV113B0040 (Mot. 251-01) Dial gauge stand set  MBIB0360E	Gauge stand used with KV113B0050 (Mot. 252-01)

cardiagn.com

NISSAN tool number (RENAULT tool No.) Tool name	Description
KV113B0050 (Mot. 252-01) Dial gauge stand set  MBIB0361E	Thrust plate for measuring the protrusion of cylinder liners used with KV113B0040 (Mot. 251-01).
KV113B0090 (Mot. 1335) Valve seal remover  MBIB0370E	Tool for removing valve stem seals
KV113B0180 (Mot. 1511-01) Valve seal drift  MBIB0378E	Tool for installing valve stem seals
KV113B0200 (Mot. 1573) Cylinder head stand  MBIB0380E	Cylinder head support
KV113E0010 (Mot. 1566) Fuel spill tube spanner MBIB0379E	Spanner for installing and removing injection tubes
WS39930000 (—) Tube presser  NT052	Pressing the tube of liquid gasket
Manual lift table caddy  ZZA1210D	Removing and installing engine

cardiagn.com

NISSAN tool number (RENAULT tool No.) Tool name	Description
Piston ring expander  NT030	Removing and installing piston ring
(Mot. 588)  MBIB0364E	Liner retaining strap
(664000) Cylinder head test container  MBIB0383E	Tool for testing the cylinder head, including: a tray and the various kits suited for each model of cylinder head (plug, sealing plate, blanking plate).
Torx socket	Standard 1/2" (12.7 mm) square drive 8/12 /14 female torx socket.
(Mot. 1505) (Mot. 1715) Frequency meter MBIB1423E	Tool for belt tension checking with frequency
Glow plug wrench  MBIB0387E	Articulated wrench for removing and installing the glow plugs
Main bearing wrench  MBIB0388E	Wrench for removing main bearings

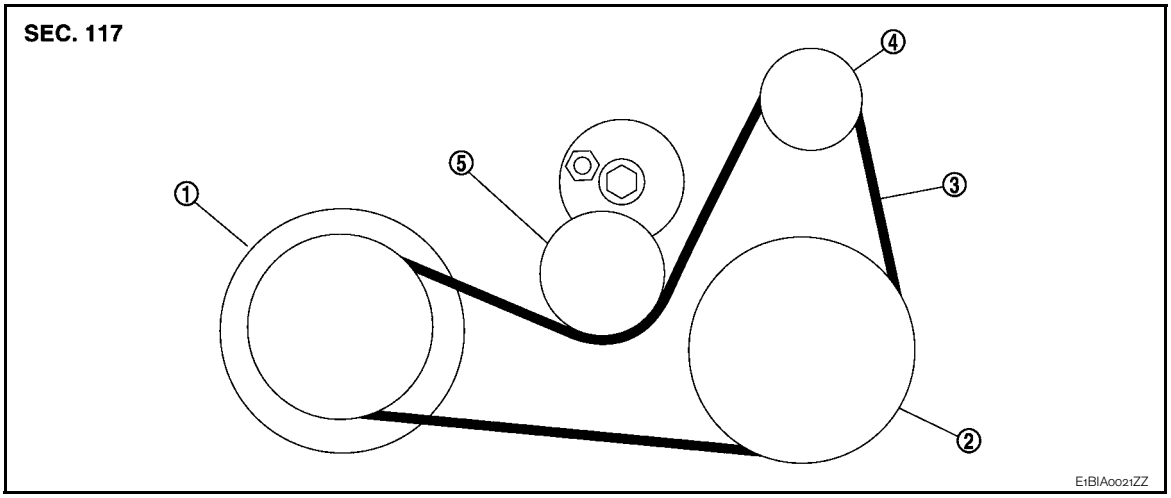
cardiagn.com

ON-VEHICLE MAINTENANCE

DRIVE BELTS

Exploded View

INFOID:0000000001060043



1. Crankshaft pulley
2. A/C compressor
3. Drive belt
4. Alternator
5. Drive belt auto-tensioner

Inspection and Adjustment

INFOID:0000000001060045

INSPECTION

WARNING:

Be sure to perform when the engine is stopped.

1. Inspect belts for cracks, fraying, wear and oil. If necessary, replace.
2. Evaluate manually if the belt is enough tensioned (tension cannot be measured by way of frequency meter).
3. When drive belt is considered as not enough tensioned, replace it.
   CAUTION:
   Auto-tensioner must be replaced with a new one when the belt is replaced.

ADJUSTMENT

Refer to EM-329, "Drive Belt".

Belt tensioning is not necessary, as it is automatically adjusted by auto-tensioner.

Removal and Installation

INFOID:0000000001082854

CAUTION:

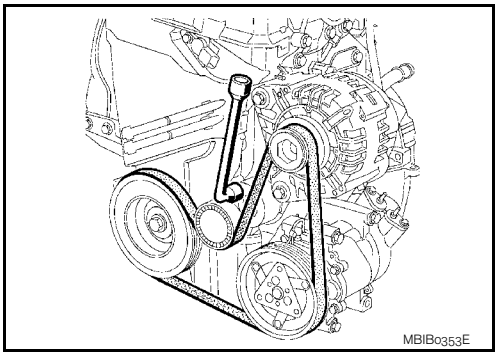
- **Replace any belt that has been removed with a new one.**
- **Auto-tensioner must be replaced with new ones when the belt is replaced.**
- **Do not run the engine without the drive belts to avoid damaging the crankshaft pulley.**

REMOVAL

1. Remove engine undercover.
2. Remove RH front wheel.
3. Remove right side splash cover.

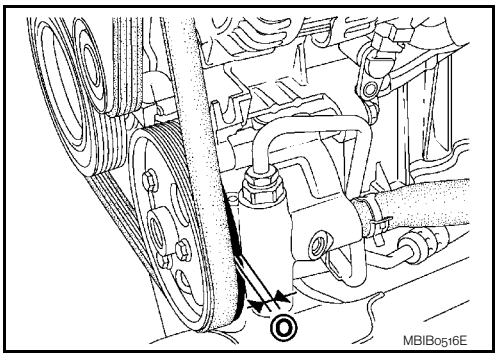
cardiagn.com

4. Remove drive belt.
   • Turn clockwise adjusting bolt.



INSTALLATION

1. Install the drive belt.
   CAUTION:
   - **Make sure belt is correctly engaged with the pulley groove.**
   - **Check for oil and coolant on belt and each pulley groove.**
   - **Certain drive belts have five teeth whereas the air conditioning compressor pulley, power-assisted steering pump pulley, and alternator pulley all have six teeth.In this case, it is essential to check that inner tooth (O) of the pulleys remains free when fitting the drive belt.**
     Never turn the engine in the opposite direction to its normal operating direction.
     Use a brush to remove any deposits from the crankshaft pulley V grooves.
     For engines fitted with a mechanical tensioning roller, it is essential to replace the tensioning roller mounting bolts.



2. Release drive belt auto-tensioner, and apply tension to drive belt.
3. Turn crankshaft pulley clockwise several times to equalize tension between each pulley.

cardiagn.com

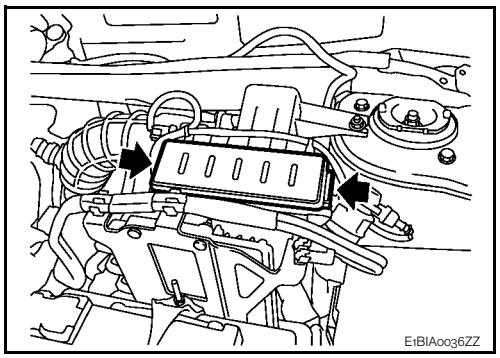
AIR CLEANER FILTER

Removal and Installation

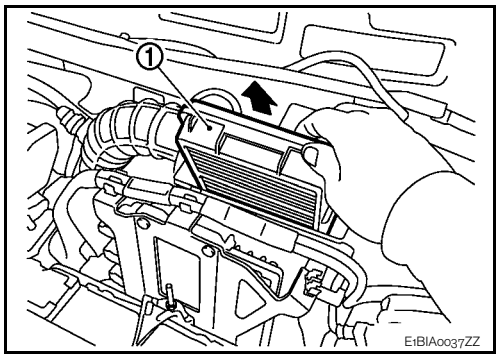
INFOID:0000000001060047

REMOVAL

1. Open air cleaner case.



2. Remove air cleaner filter (1).



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

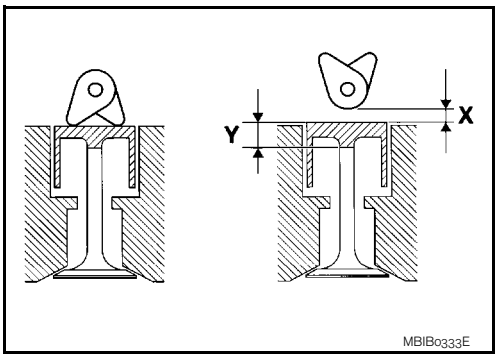
CAMSHAFT VALVE CLEARANCE

Inspection and Adjustment

INFOID:0000000001060050

INSPECTION

1. Place the valves of the cylinder concerned at the “end of exhaust - beginning of intake” position and inspect the clearance (X).
   NOTE:
   Dimension (Y) corresponds to the tappet thickness sizes (there are 25 sizes at the service parts).
2. Compare the values recorded with the values specified, then replace the tappets which are not within tolerance.

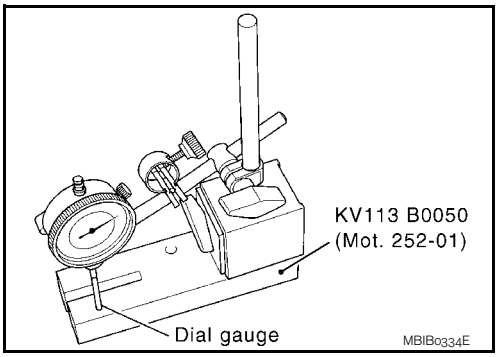


Clearance, when the engine is cold:

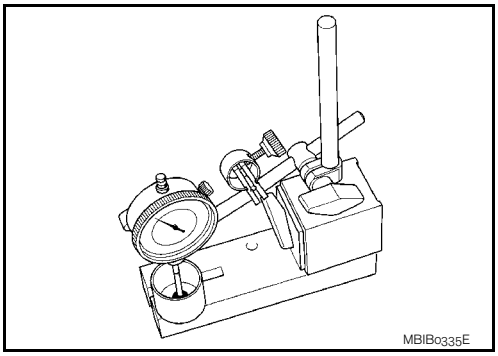
Refer to EM-329, "Camshaft".

ADJUSTMENT

1. The camshaft must be removed to replace the tappets.
   Determining dimension (Y).
2. Set up the following assembly using dial gauge stand [KV113B0050 (Mot. 252-01) (commercial service tool) or equivalent tool] and dial gauge, then calibrate the gauge.



3. Raise the gauge extension (without modifying the position of the magnetic support/gauge assembly), then slide in the tappet to be measured.
   Note dimension (Y) and repeat the operation for the tappets where the valve clearance is not within tolerance.
   Select the various thicknesses of the tappet(s). The service parts supplies 25 sizes of single-piece tappets. Refer to EM-329, "Camshaft".



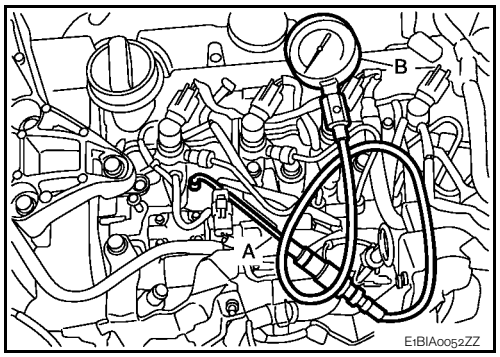
cardiagn.com

COMPRESSION PRESSURE

Inspection

INFOID:0000000001060143

1. Warm up engine thoroughly. Then stop.
2. Remove glow plug.
3. Disconnect high-pressure supply pump harness connector to avoid fuel injection during measurement.
4. Connect compression gauge attachment hose [SST: KV113B0400 (Mot. 1592)] (A) to the hole for glow plug.
5. Connect compression gauge (B) to attachment hose.
6. Turn ignition switch to START for cranking and check compression gauge.



Compression pressure

: Refer to EM-329, "General Specification".

7. Perform the same procedure for the other cylinders.
   - If compression pressure is below minimum value, check valve clearances and parts associated with combustion chamber (valve, valve seat, piston, piston ring, cylinder bore, cylinder head, cylinder head gasket). After the checking, measure compression pressure again.
   - If some cylinder has low compression pressure, pour small amount of engine oil into the glow plug hole of the cylinder to re-check it for compression.
   - If the added engine oil improves the compression, piston rings may be worn out or damaged. Check piston rings and replace if necessary.
   - If the compression pressure remains at low level despite the addition of engine oil, valves may be malfunctioning. Check valves for damage. Replace valve or valve seat accordingly.
   - If two adjacent cylinders have respectively low compression pressure and their compression remain slow even after the addition of engine oil, cylinder head gaskets are leaking. In such a case, replace cylinder head gaskets.
8. Disconnect compression gauge and attachment hose.
9. After inspection is completed, install removed parts.
10. Start the engine, and make sure that the engine runs smoothly.
11. Perform trouble diagnosis. If DTC appears, erase it. Refer to EC-1315, "Diagnosis Description".

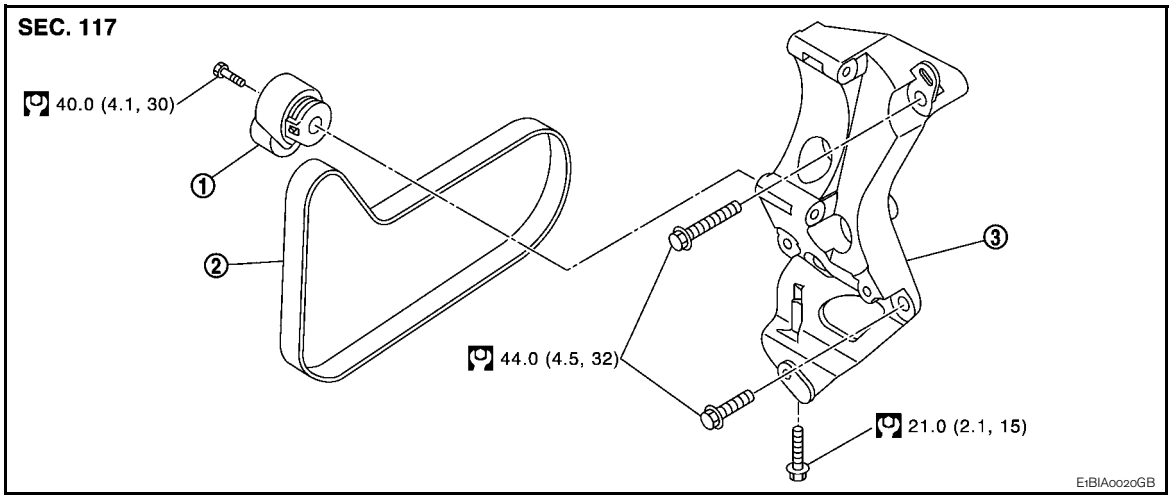
cardiagn.com

ON-VEHICLE REPAIR

DRIVE BELT AUTO-TENSIONER

Exploded View

INFOID:0000000001060172



1. Drive belt auto-tensioner
2. Drive belt
3. Multifunction bracket

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060044

CAUTION:
- **Replace any belt that has been removed with a new one.**
- **Auto-tensioner must be replaced with new ones when the belt is replaced.**
- **Do not run the engine without the drive belts to avoid damaging the crankshaft pulley.**

REMOVAL

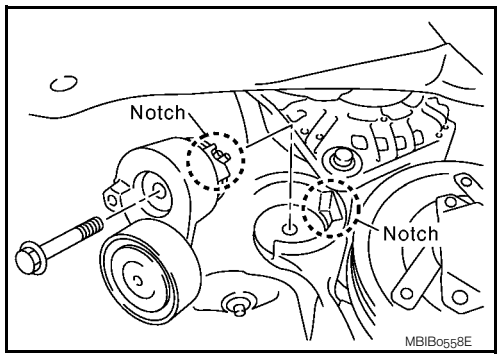
1. Remove engine undercover.
2. Remove RH front wheel.
3. Remove right side splash cover.
4. Remove drive belt. Refer to EM-259, "Removal and Installation".
5. Remove auto-tensioner.

INSTALLATION

1. Install auto-tensioner mounting bolt.

   40.0 N·m (4.1 kg-m, 30 ft-lb)

   Align the notch and tighten mounting bolt.
2. Install the drive belt. Refer to EM-259, "Removal and Installation".
3. Release drive belt auto-tensioner, and apply tension to drive belt.
4. Turn crankshaft pulley clockwise several times to equalize tension between each pulley.

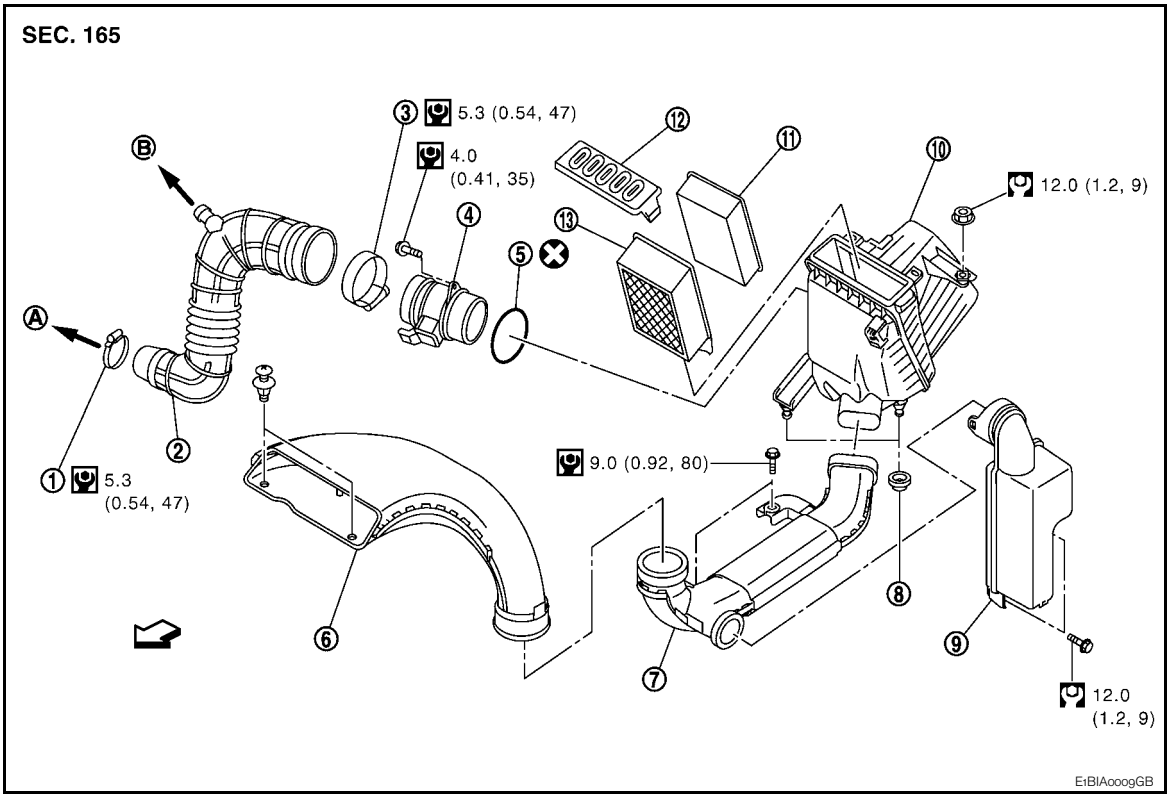


cardiagn.com

AIR CLEANER AND AIR DUCT

Exploded View

INFOID:0000000001060175



1. Clamp
2. Air duct
3. Clamp
4. Mass air flow sensor
5. O-ring
6. Air duct
7. Air duct
8. Grommet
9. Resonator
10. Air cleaner case
11. Air cleaner filter
12. Cover
13. Holder

A. To turbocharger
B. To blow-by hose

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060176

REMOVAL

1. Disconnect battery ground cable.
2. Disconnect battery positive cable.
3. Remove engine room cover. Refer to EM-266, "Removal and Installation".
4. Disconnect blow-by hose.
5. Remove air duct (suction) mounting clip and remove air duct (suction).
6. Remove battery.
7. Disconnect ECM harness connectors and remove ECM and ECM bracket.
8. Remove air duct (inlet) by loosing clamp clip.
9. Remove air cleaner case by sliding the air cleaner case upward.

CAUTION:
Slide the air cleaner case carefully so as not to damage it on the air cleaner case and harness bracket.

INSTALLATION

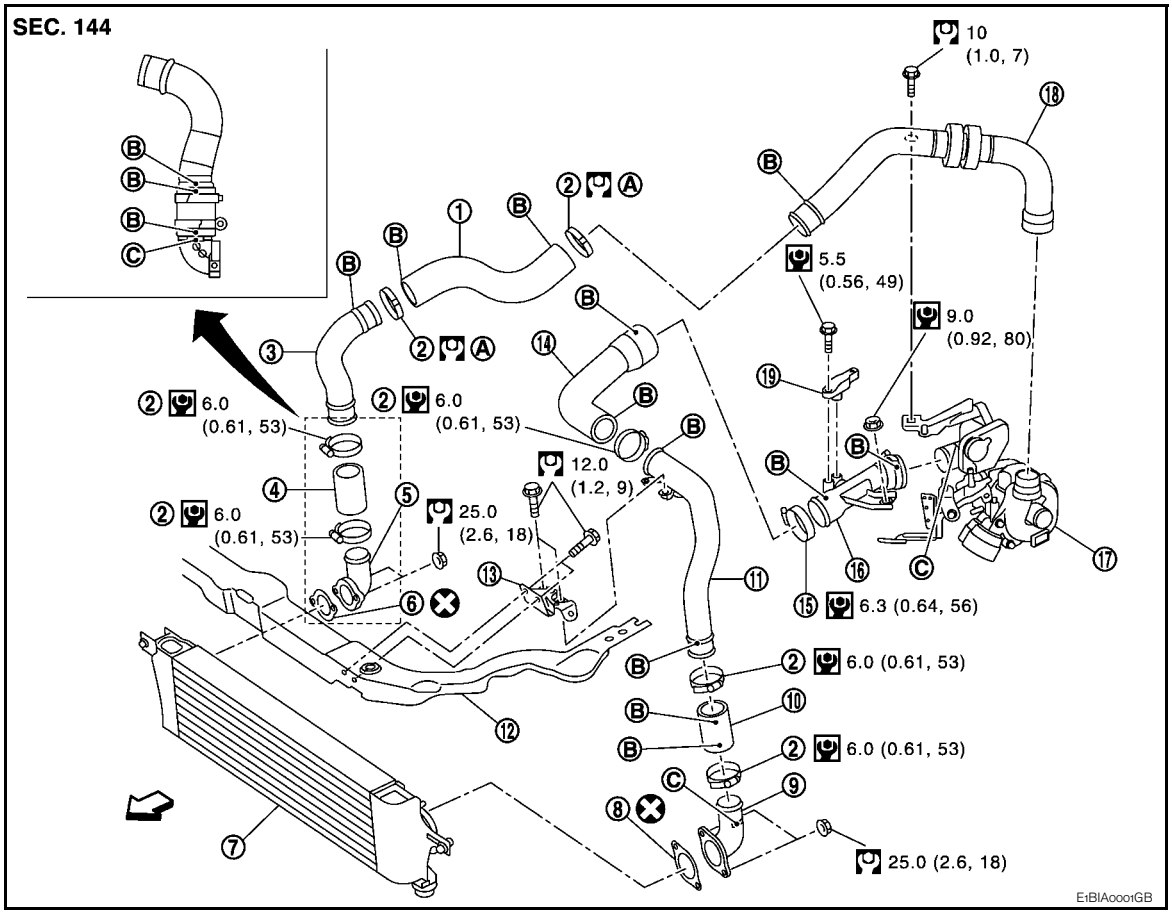
- Install in the reverse order of removal.

cardiagn.com

CHARGE AIR COOLER

Exploded View

INFOID:0000000001060209



1. Air inlet hose
2. Clamp
3. Air inlet tube
4. Air inlet hose
5. Air inlet tube
6. Gasket
7. Charge air cooler
8. Gasket
9. Air inlet tube
10. Air inlet hose
11. Air inlet tube
12. Radiator core support
13 Bracket
14. Air inlet hose
15. Clamp
16. Air inlet tube
17. Turbocharger
18. Air inlet tube
19 Turbocharger boost sensor

⇦ : Vehicle front

A. 1st step: 5.0 N·m (0.51 kg-m, 44 ft-lb) 2nd step: 7.0 N·m (0.71 kg-m, 62 ft-lb)
B. Paint mark
C. Rib to be aligned with paint mark

Refer to GI-4, "Components" for symbols in the figure.

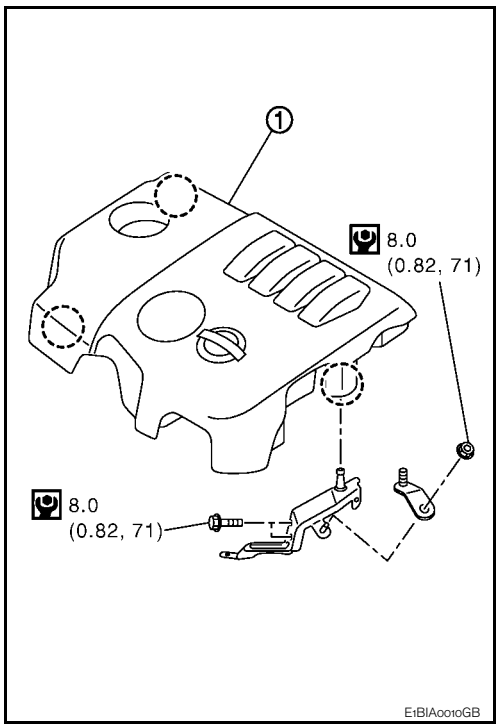
Removal and Installation

INFOID:0000000001060214

REMOVAL

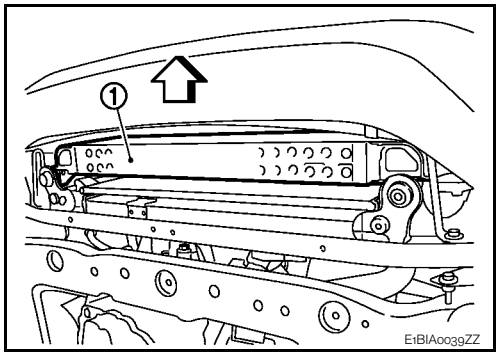
cardiagn.com

1. Remove engine cover (1).
2. Remove air inlet hoses and tubes.
3. Remove radiator undercover. Refer to EXT-11, "Exploded View".



4. Remove charge air cooler (1) from underbody.

CAUTION:
- **Avoid interference between the charge air cooler and condenser.**
- **When removing charge air cooler, close opening on turbo charger and throttle with shop cloth or other suitable material.**



INSTALLATION

Install in the reverse order of removal paying attention to the following points:
- Apply a neutral detergent (fluid) to the joint between hoses and pipes (oil is not permissible).
- Pay attention to identification mark and direction.
- When installing air inlet hoses and tubes. Refer to “Removal and Installation (For 65kW)”.

Inspection

INFOID:0000000001060391

INSPECTION AFTER REMOVAL

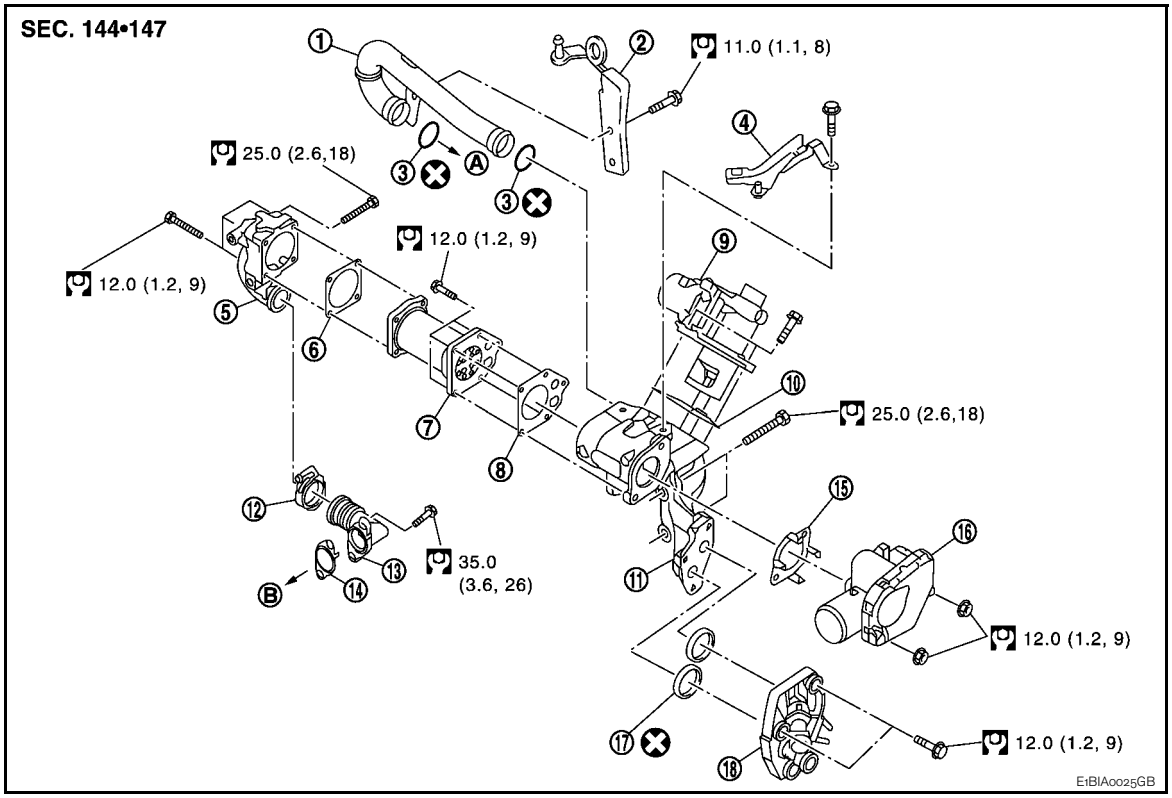
1. Check that the charge air cooler is not full of oil. In that case, clean it with cleaning agent and then let it dry.
2. Check air passages of charge air cooler core and fins for clogging, leaks or deformation. Clean or replace charge air cooler in necessary.
   - Be careful not to deform core fins.
   - For cleaning procedure of charge air cooler core, refer to CO-55, "RADIATOR : Inspection".

cardiagn.com

EGR SYSTEM

Exploded View

INFOID:0000000001060215



1. Air inlet tube
2. Engine slinger
3. O-ring
4. Bracket
5. EGR tube
6. Gasket
7. EGR cooler
8. Gasket
9. EGR volume control valve
10. Gasket
11. EGR volume control valve housing
12. Clamp
13. EGR tube
14. Gasket
15. Gasket
16. Electric throttle control actuator
17. O-ring
18. EGR cooler cover

A. To intake manifold
B. To exhaust manifold

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060420

REMOVAL

1. Remove battery ground cable.
2. Remove engine cover. Refer to EM-266, "Removal and Installation".
3. Remove air cleaner case and air duct (inlet). Refer to EM-265, "Removal and Installation".
4. Remove bulk head cover.
5. Disconnect EGR volume control valve connector.
6. Remove mounting bolts.
7. Drain engine coolant and disconnect water hose.
8. Loosen turbocharger inlet tube.
9. Remove front engine slinger..
10. Remove air inlet tube.
11. Remove electric throttle control actuator.
12. Remove EGR tube mounting bolts.

cardiagn.com

13. Remove EGR assembly.

INSTALLATION

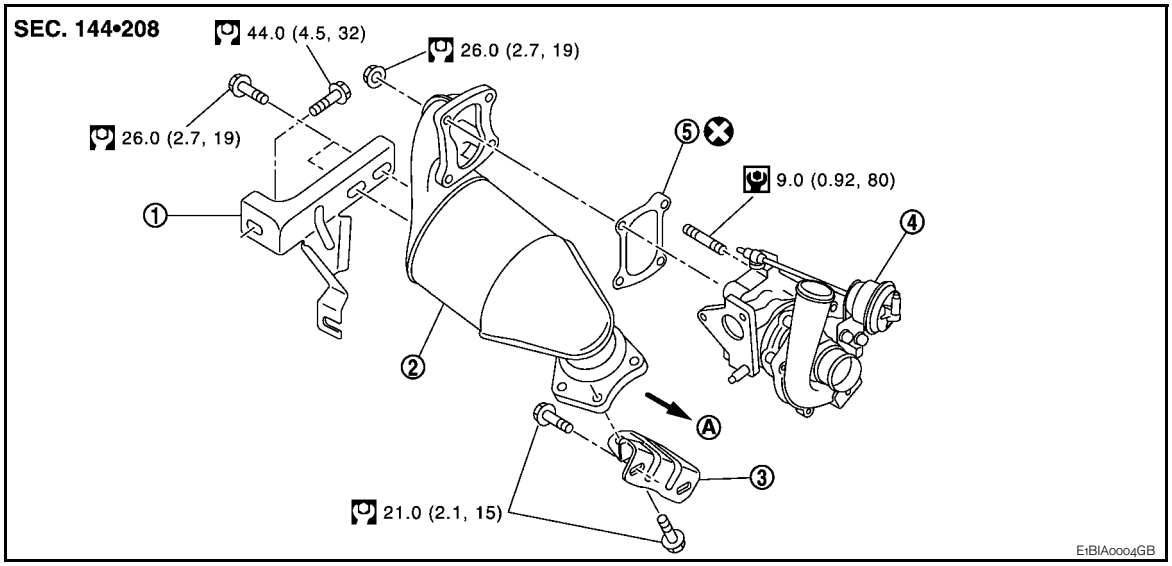
Install in the reverse order of removal.

cardiagn.com

CATALYST

Exploded View

INFOID:0000000001060261



1. Bracket
2. Catalyst
3. Bracket
4. Turbocharger
5. Gasket

A. To exhaust front tube

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060429

REMOVAL

1. Remove battery ground cable.
2. Remove engine undercover.
3. Remove exhaust front tube. Refer to EX-15, "Removal and Installation".
4. Remove catalyst mounting bolts and brackets.
5. Remove catalyst.

INSTALLATION

Install in reverse order of removal.

Inspection

INFOID:0000000001060430

INSPECTION AFTER INSTALLATION

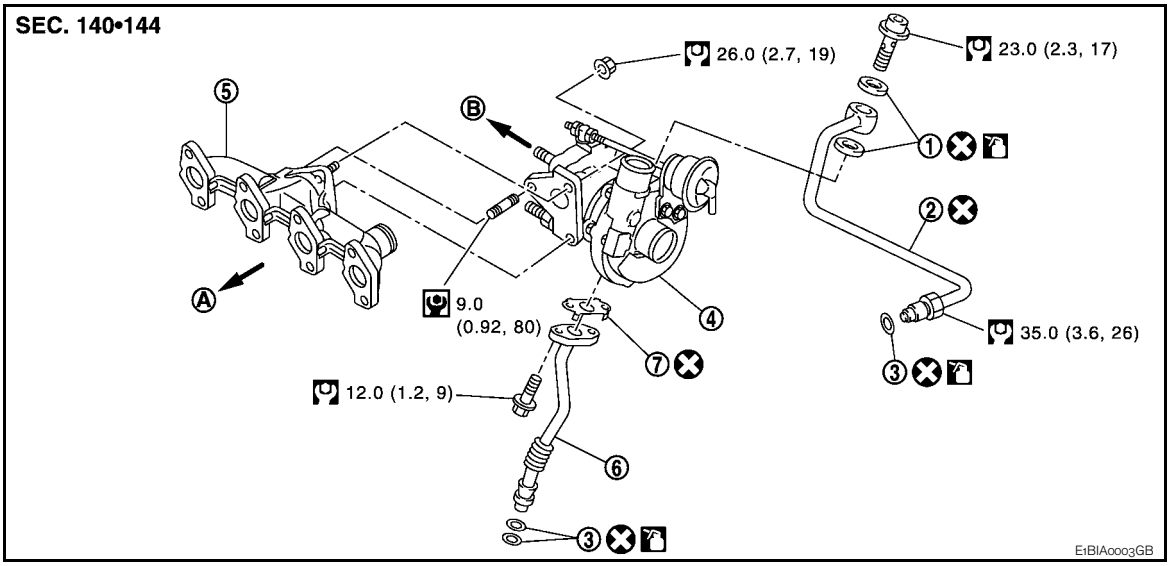
Start engine and raise engine speed to check no exhaust emission leaks.

cardiagn.com

TURBOCHARGER

Exploded View

INFOID:0000000001060244



1. Washer
2. Turbocharger oil supply tube
3. O-ring
4. Turbocharger
5. Exhaust manifold
6. Turbocharger oil outlet tube
7. Gasket
A. To cylinder head
B. To catalyst

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060245

REMOVAL

1. Remove exhaust front tube. Refer to EX-15, "Exploded View".
2. Remove catalyst. Refer to EM-270, "Removal and Installation".
3. Remove engine cover.
4. Remove air inlet tube and air duct connected to turbocharger.
5. Remove oil tubes.
   NOTE:
   After applying penetrative lubricant to the mounting nuts, check for the penetration of the lubricant, and then loosen the nuts to remove.
6. Remove turbocharger from exhaust manifold.
   CAUTION:
   Do not disassemble or adjust the turbocharger body.

INSTALLTION

Install in the reverse order of removal.

NOTE:

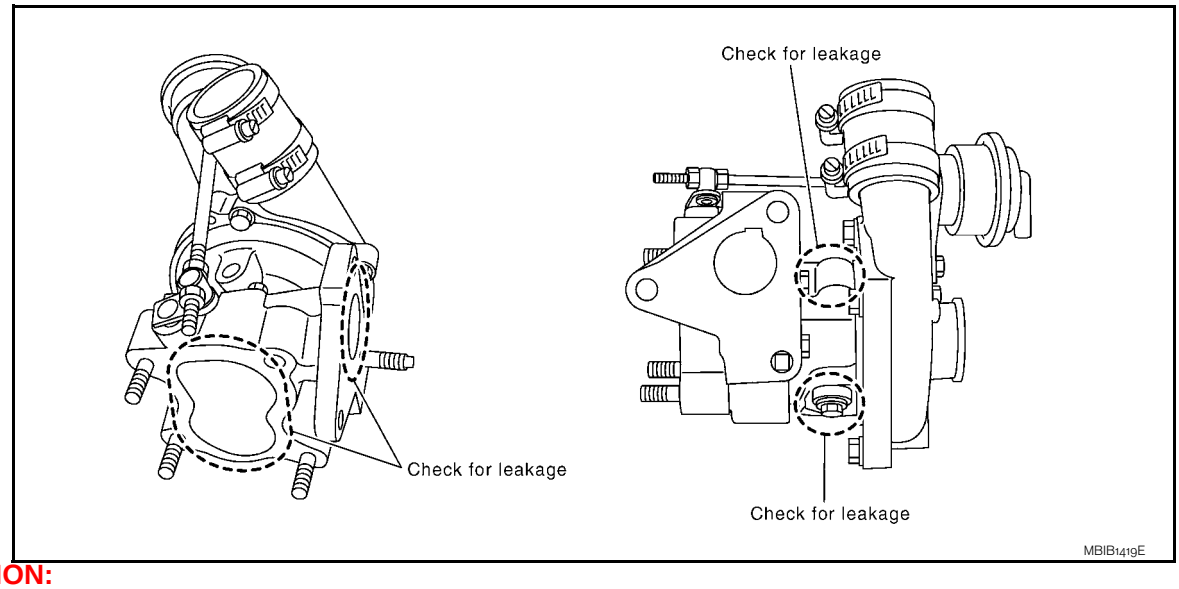
Apply engine oil to lubricate the turbocharger oil tubes.

Inspection

INFOID:0000000001060259

cardiagn.com

INSPECTION AFTER REMOVAL



CAUTION:

When the compressor wheel turbine wheel or rotor shaft is damaged, remove all the fragments and foreign matter left in the following passages in order to prevent a secondary failure:

Suction side : Between turbocharger and air cleaner

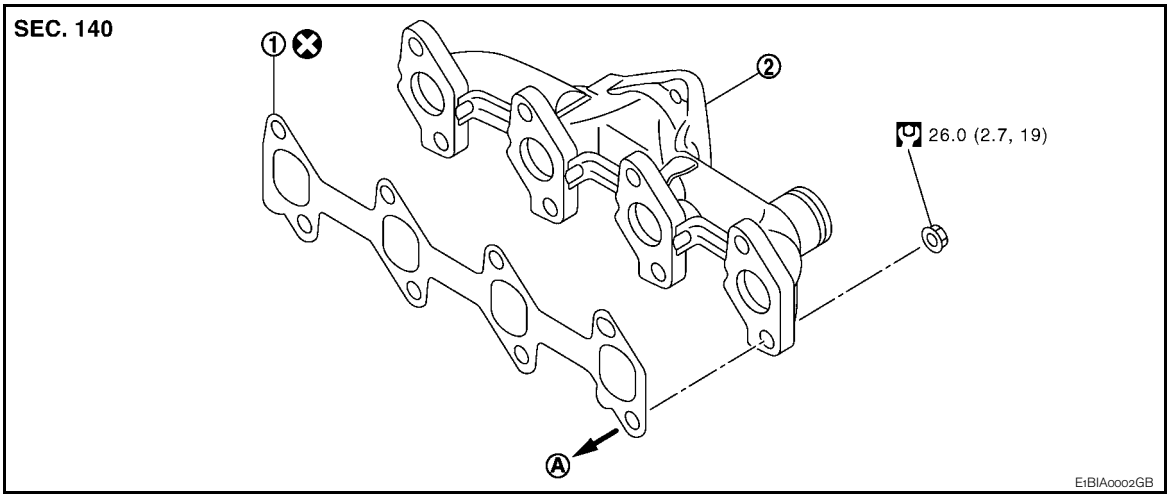
Exhaust side : Between turbocharger and catalyst

cardiagn.com

EXHAUST MANIFOLD

Exploded View

INFOID:0000000001060436



1. Gasket
2. Exhaust manifold

A. To cylinder head

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

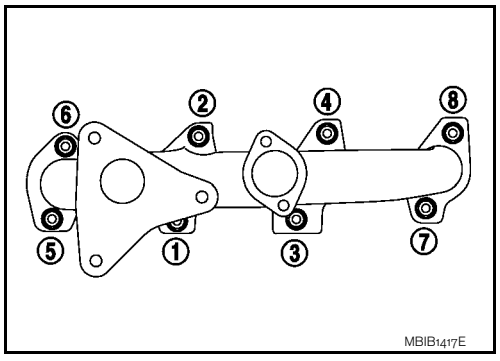
INFOID:0000000001060437

REMOVAL

1. Remove battery ground cable.
2. Remove engine undercover.
3. Remove air cleaner case and air duct (inlet). Refer to EM-265, "Removal and Installation".
4. Remove wiper assembly.
5. Remove bulk head cover.
6. Remove EGR unit assembly. Refer to EM-268, "Removal and Installation".
7. Remove turbocharger assembly. Refer to EM-271, "Removal and Installation".
8. Loosen exhaust manifold mounting nuts in the reverse order as shown. Then remove exhaust manifold.

CAUTION:

Be careful not to deform each turbocharger piping when pulling out the assembly.



INSTALLATION

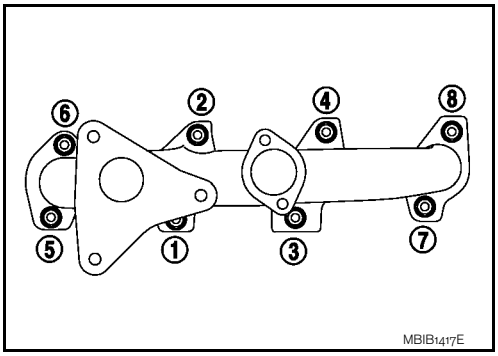
1. Clean the surface of exhaust manifold and cylinder head.
2. Install new gasket to cylinder head.

cardiagn.com

3. Tighten the mounting nuts in numerical order as shown.

: 26.0 N·m (2.7 kg-m, 19 ft-lb)

4. Install in reverse order of removal after this step.



Inspection

INFOID:0000000001060438

INSPECTION AFTER INSTALLATION

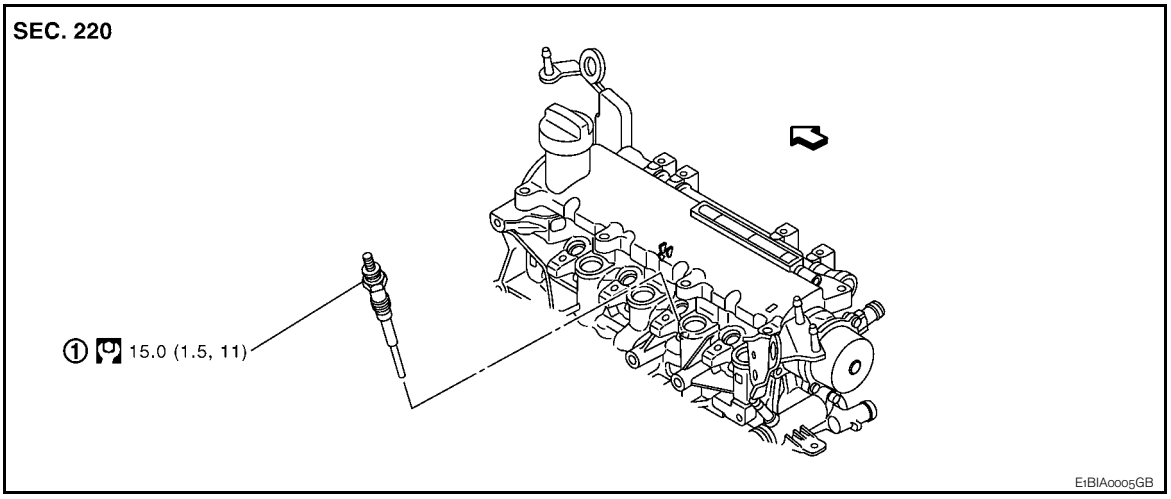
Start engine and raise engine speed to check no exhaust emission leaks.

cardiagn.com

GLOW PLUG

Exploded View

INFOID:0000000001060276



1. Glow plug

⇦: Engine front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060439

REMOVAL

CAUTION:

Remove glow plug only if necessary. If carbon adheres, it may be stuck and broken.

1. Disconnect battery ground cable.
2. Remove engine cover. Refer to EM-266, "Removal and Installation".
3. Disconnect harness connector from glow plug.
4. Remove glow plug.

   CAUTION:

   - **When removing or installing, do not use such tools as an air impact wrench.**
   - **Handle it carefully without giving any impact, even after removal. [As a guide, if it drops from height of 10 cm (3.94 in) or higher, always replace it.]**

INSTALLATION

1. Remove adhered carbon from glow plug installation hole with a reamer.
2. Install glow plug.

   : 15.0 N·m (1.5 kg-m, 11 ft-lb)

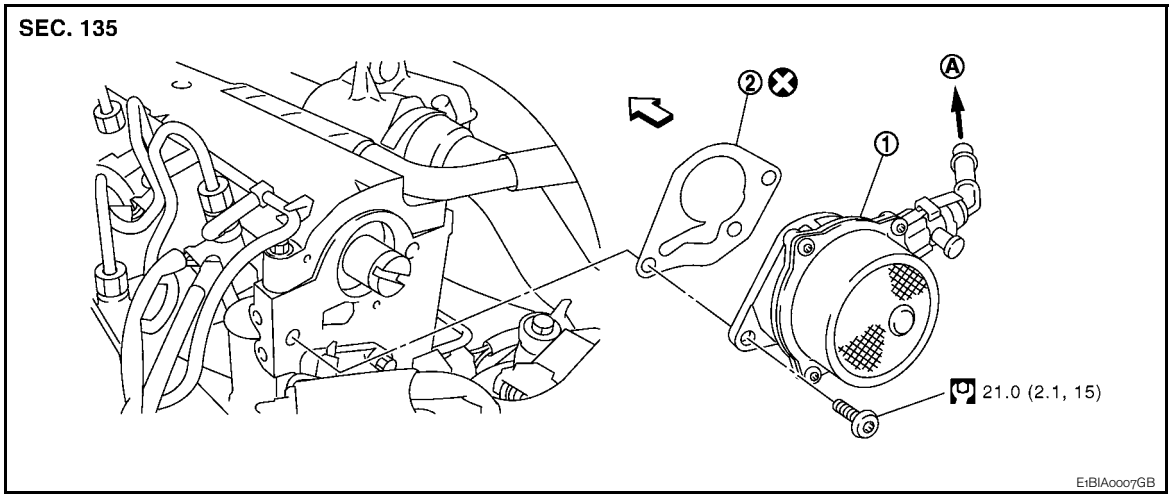
3. Install remaining parts in reverse order of removal.

cardiagn.com

VACUUM PUMP

Exploded View

INFOID:0000000001060285



1. Vacuum pump
2. Gasket

A. To vacuum hose

⇦ : Engine front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060442

REMOVAL

1. Remove engine cover. Refer to EM-266, "Removal and Installation".
2. Remove battery.
3. Remove elctric throttle control actuator.
4. Disconnect vacuum hose from vacuum pump side.
5. Remove vacuum pump.

INSTALLATION

Install in the reverse order of removal.

Inspection

INFOID:0000000001060296

INSPECTION BEFORE REMOVAL

1. Disconnect vacuum hose, and connect a vacuum gauge via 3-way connector.
   - Disconnect point where vacuum from vacuum pump can be measured directly and install 3-way connector.
2. Start engine and measure generated vacuum at idle speed.

Standard

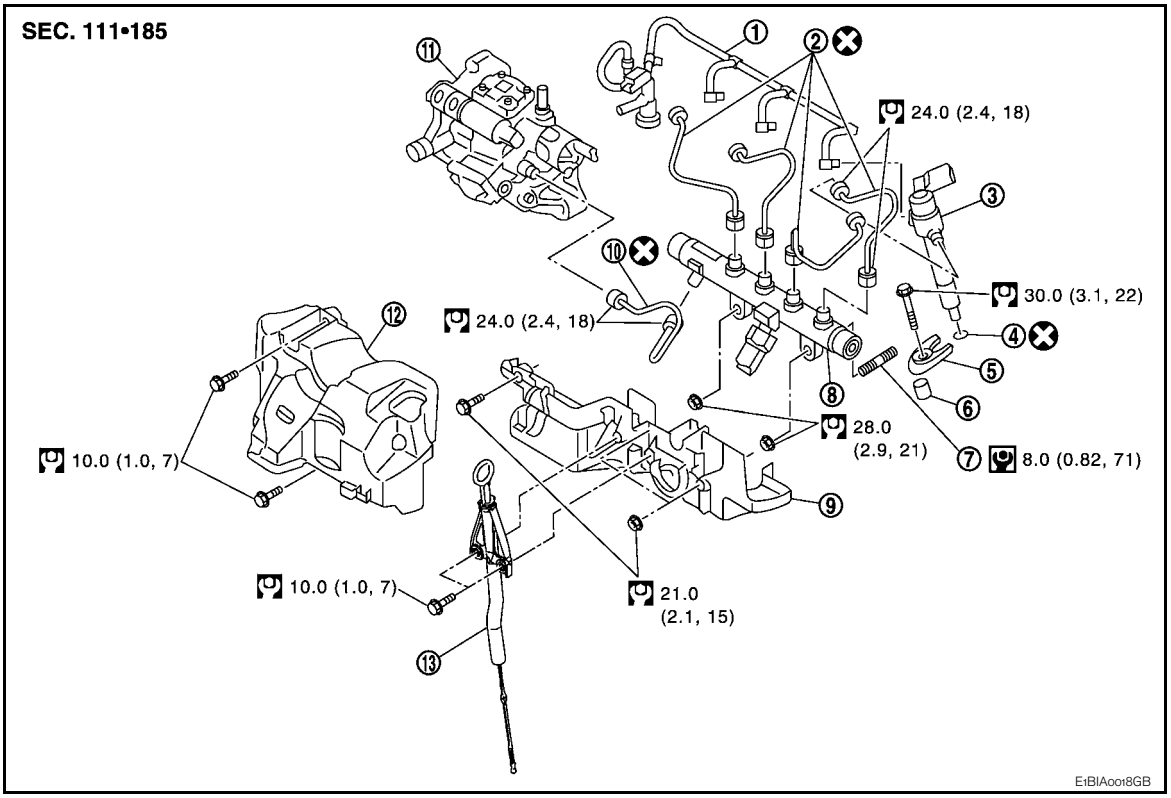
: – 86.6 to – 101.3 kPa (– 866 to – 1,013 mbar, – 650 to – 760 mmHg, – 25.59 to – 29.92 inHg)

cardiagn.com

INJECTION TUBE AND FUEL INJECTOR

Exploded View

INFOID:0000000001060309



1. Spill hose
2. Injection tube
3. Fuel injector
4. Heat protection washer
5. Fuel injector bracket
6. Fuel injector bracket spacer
7. Fuel rail stud bolt
8. Fuel rail
9. High pressure protection cover (lower)
10. Injection tube
11. High pressure supply pump
12. High pressure protection cover (upper)
13. Oil level gauge guide

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060443

REMOVAL

CAUTION:

- **Be sure to read “Precautions for Diesel Equipment”. Refer to EM-249, "Precaution for Diesel Equipment".**
- **Wait until the fuel temperature drops before carrying out any work.**
- **Order the special high pressure injection circuit plug kit.**
- **It is forbidden to open an injector. If you open an injector by mistake, you will have to change it. This is because of the manufacturing and installation tolerances and because there is a risk of contaminating the inside of the injector.**
- **The rod filter of the injector must not be removed.**

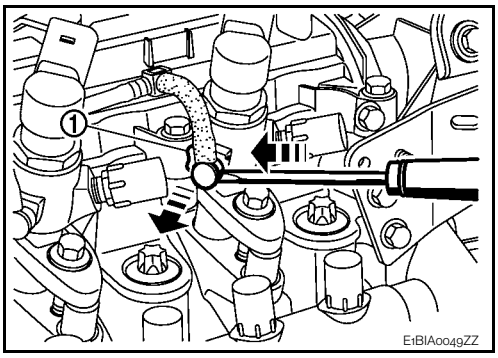
NOTE:

It is possible to replace a single injection tube.

1. Disconnect the battery.
2. Remove engine cover. Refer to EM-266, "Removal and Installation".
3. Remove charge air cooler hose and pipes. Refer to EM-266, "Removal and Installation".
4. Remove oil level gauge guide and plug the hole.

cardiagn.com

5. Remove injection tube protection cover.
6. Remove the neck located on the fuel rail,
   NOTE:
   Undo the nut on the pump side or the injector side, then the nut located on the rail side. Undo the nuts for each pipe in turn. Move the nut along the pipe keeping the olive in contact with the taper.
7. Remove all the injection tubes.
8. Plug all the holes in the injection circuit.
9. Remove fuel rail.
10. Disconnect fuel return pipe.
11. Remove retaining clip and disconnect the diesel return pipe on the injector.
12. Plug all the holes of the injection circuit.
13. Disconnect the injector harness connector.
14. Unscrew the injector bracket.
15. Remove the injector.
16. Pull off the flame shield washer.



INSTALLATION

CAUTION:

All the injection tubes removed must be systematically replaced.

1. Clean the injector sockets and the injector bodies, as well as their brackets using a lint-free cloth (use the wipes recommended for this purpose, dipped in clean solvent.
2. Dry off using a different new wipe.
3. Replace the flame shield washer with a new one.
4. Position the injector.
5. Tighten its mounting bracket.

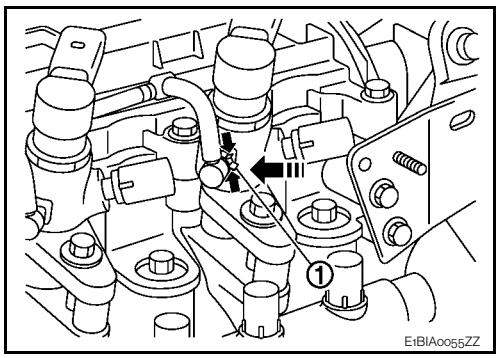
: 30.0 N·m (3.1 kg-m, 22 ft-lb)

6. Install injection tubes with new one.
7. Finger tightens the nuts.
8. Before fitting the new injection tubes, lightly lubricate the nut threads with the oil from the sachet provided in the new parts kit.
   NOTE:
   Fit the pump/rail pipe before the rail/injector tubes.
9. Fit the pump-rail injection tube as follow:
   - Remove the protective plugs from the high pressure pump outlet, the high pressure rail inlet and the pipe.
   - Insert the injection tube olive into the taper of the high pressure pump outlet,
   - Insert the injection tube olive into the taper of the high pressure rail inlet.
   - Finger tighten the nuts of the injection tube starting with the one located on the rail side.
10. Install the rail-injector injection tube.
11. Tighten the injection tube nut.

: 24.0 N·m (2.4 kg-m, 18 ft-lb)

cardiagn.com

12. Connect fuel return pipe to injector and install retaining clip.
13. Install in the reverse order to removal for the other refitting operations.

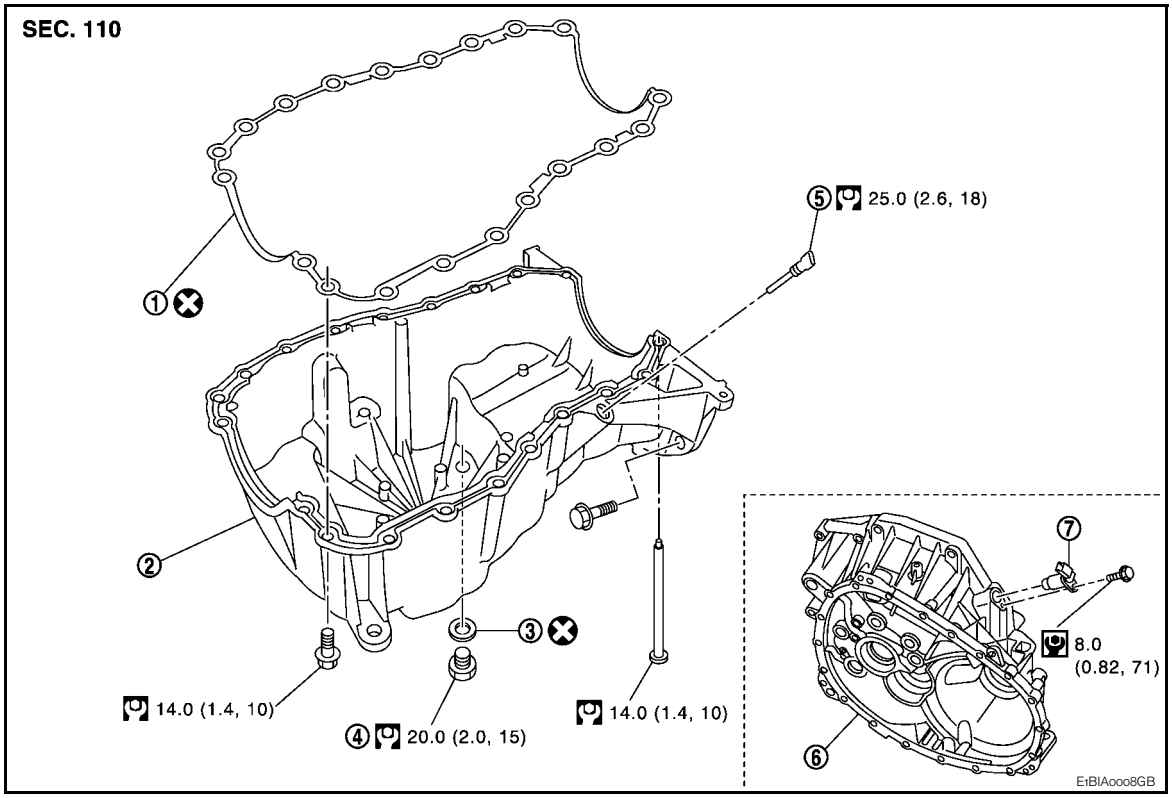


cardiagn.com

OIL PAN

Exploded View

INFOID:0000000001060322



1. Gasket
2. Oil pan
3. O-ring
4. Drain plug
5. Oil level sensor
6. Clutch housing
7. Crankshaft position sensor

Refer to GI-4, "Components" for symbols in the figure.

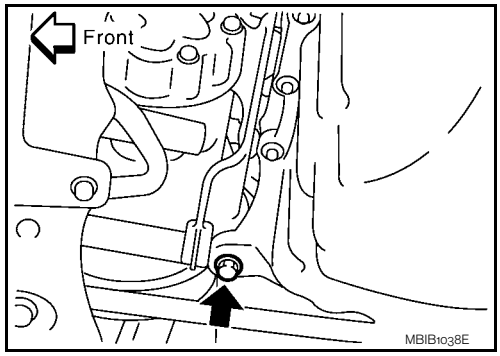
Removal and Installation

INFOID:0000000001060447

CAUTION:
To avoid the danger of being scalded, never drain the engine oil when the engine is hot.

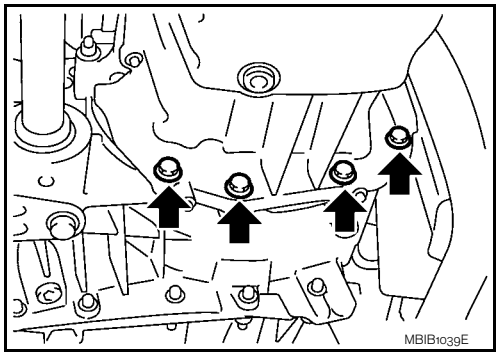
REMOVAL

1. Remove engine undercover.
2. Remove RH front wheel.
3. Remove right side splash cover.
4. Remove multifunction bracket mounting bolt as shown.
5. Remove bolts (3) from the catalyst bracket. Refer to EM-270, "Exploded View".
6. Remove oil level sensor.
7. Drain engine oil. Refer to LU-23, "Draining".
   CAUTION:
   Perform when engine is cold.

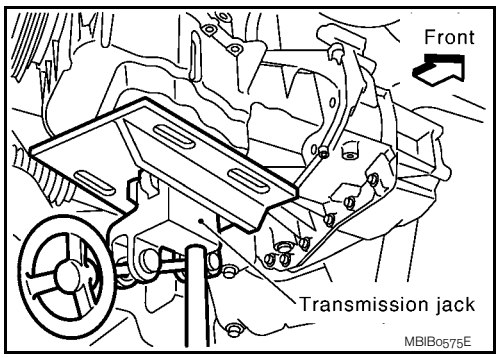


cardiagn.com

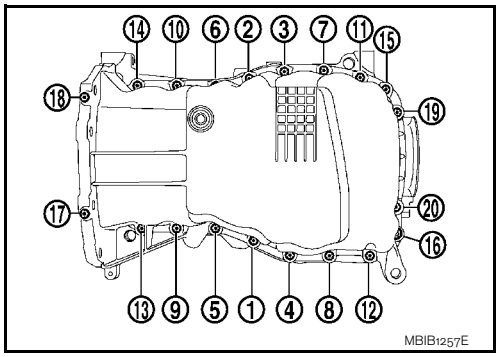
8. Remove oil pan and transaxle joint bolts.



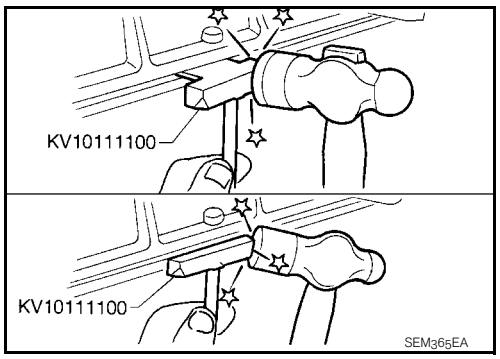
9. Support the engine bottom of the oil pan with a transmission jack etc.



10. Remove oil pan bolt reverse order as shown.



11. Insert seal cutter [SST: KV10111100 (—)] between upper oil pan and cylinder block. Slide tool by tapping on the side of the tool with a hammer.
CAUTION:
Exercise care not to damage mating surface.
12. Remove oil pan.

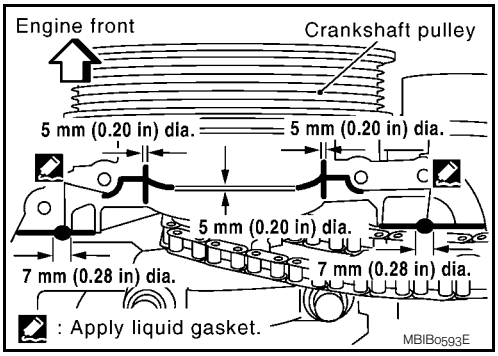


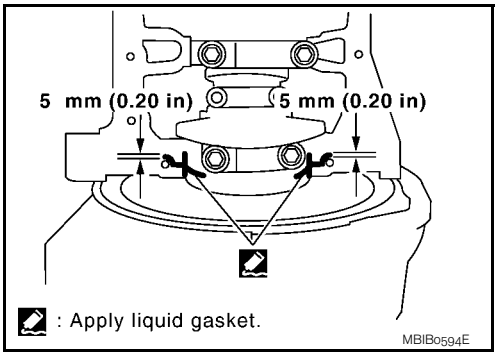
INSTALLATION

- Install in the reverse order of removal paying attention to the following.

cardiagn.com

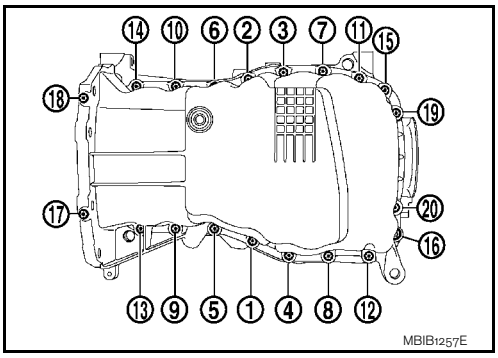
1. Apply liquid gasket as shown.
   • Use Genuine Liquid Gasket or equivalent.





2. Using ruler, align the oil pan with the cylinder block.
3. Install oil pan bolts in numerical order as shown.

   : 14.0 N·m (1.4 kg-m, 10 ft-lb)



4. At least 30 minutes after oil pan is installed, pour engine oil.

Inspection

INFOID:0000000001060324

INSPECTION AFTER REMOVAL

Clean oil pump assembly if any object attached.

INSPECTION AFTER INSTALLATION

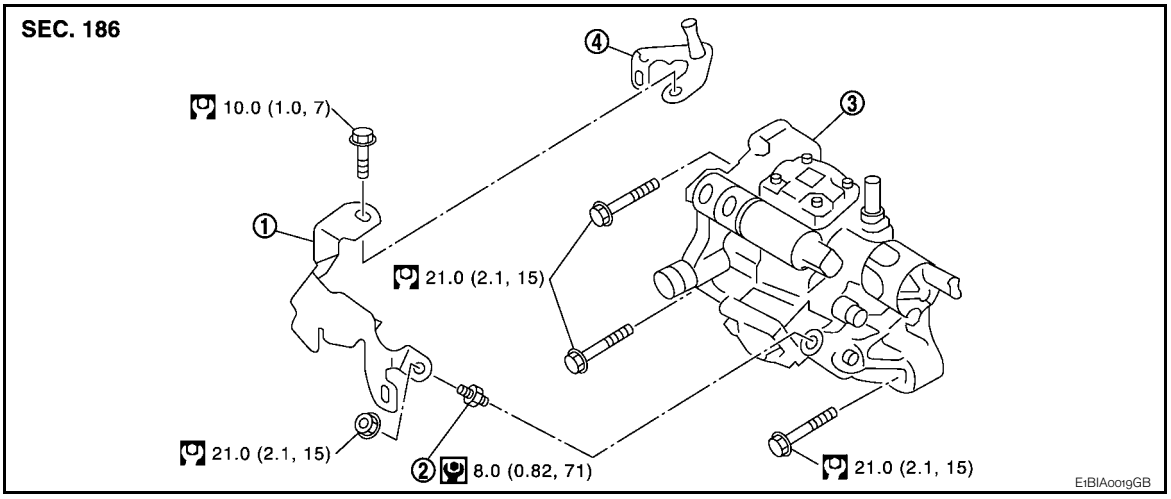
- Inspection the engine oil level. Refer to LU-23, "Inspection".
- Start the engine, and make sure there is no leak of engine oil. Refer to LU-23, "Inspection".

cardiagn.com

HIGH PRESSURE SUPPLY PUMP

Exploded View

INFOID:0000000001060378



1. High pressure supply pump protector
2. Stud bolt
3. High pressure supply pump
4. Engine cover bracket

Refer to GI-4, "Components" for symbols in the figure.

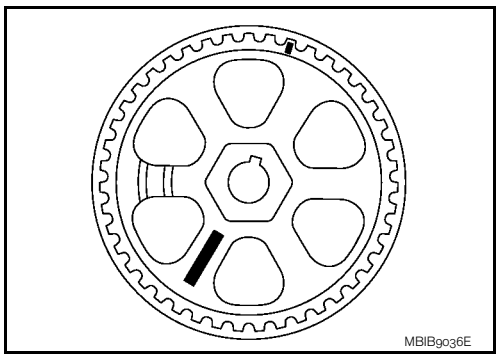
Removal and Installation

INFOID:0000000001060462

REMOVAL

CAUTION:

- **Be sure to read “Precautions for Diesel Equipment”. Refer to EM-249, "Precaution for Diesel Equipment".**
- **Wait until the fuel temperature drops before carrying out any work.**
- **Order the special high pressure injection circuit plug kit.**
- **It is strictly forbidden to remove any high pressure supply pump sprocket marked number 070 575 (see diagram). If the pump is being replaced, the pulley must be replaced.**



1. Disconnect the battery.
2. Remove engine cover. Refer to EM-266, "Removal and Installation".
3. Remove charge air cooler hose and pipes. Refer to EM-266, "Removal and Installation".
4. Remove the timing belt. Refer to EM-287, "Removal and Installation".
5. Remove the neck located on the fuel rail,
6. Remove the oil level gauge guide and plug the hole. Refer to EM-277, "Exploded View".
7. Remove high pressure protection cover. Refer to EM-277, "Exploded View".
8. Carefully disconnect:
   - The connectors from the flow actuator,
   - The connectors from the fuel temperature sensor,
   - On the pump, the fuel supply and return pipes.
   - The return pipe connecting the injectors with the pump.
9. Remove the injection tube connecting the pump to the rail. Refer to EM-277, "Removal and Installation".
10. Plug all the holes of the injection circuit.
11. Remove the three mounting bolts from the high pressure supply pump then remove it.

INSTALLATION

cardiagn.com

1. Install the pump then position the mounting bolts without tightening them.
2. Before fitting the new injection tube, lightly lubricate the nut threads with the oil from the sachet provided in the new parts kit.
3. Refit the injection tube, to do this:
   - remove the protective plugs,
   - insert the injection tube olive into the taper of the high pressure pump outlet,
   - insert the injection tube olive into the taper of the high pressure rail inlet.
4. Finger tighten the nuts of the injection tube starting with the one located on the rail side.
5. Tighten the mounting bolts on the high pressure pump.

   : 21.0 N·m (2.1 kg-m, 15 ft-lb)

6. Tighten the injection tube nut.

   : 24.0 N·m (2.4 kg-m, 18 ft-lb)

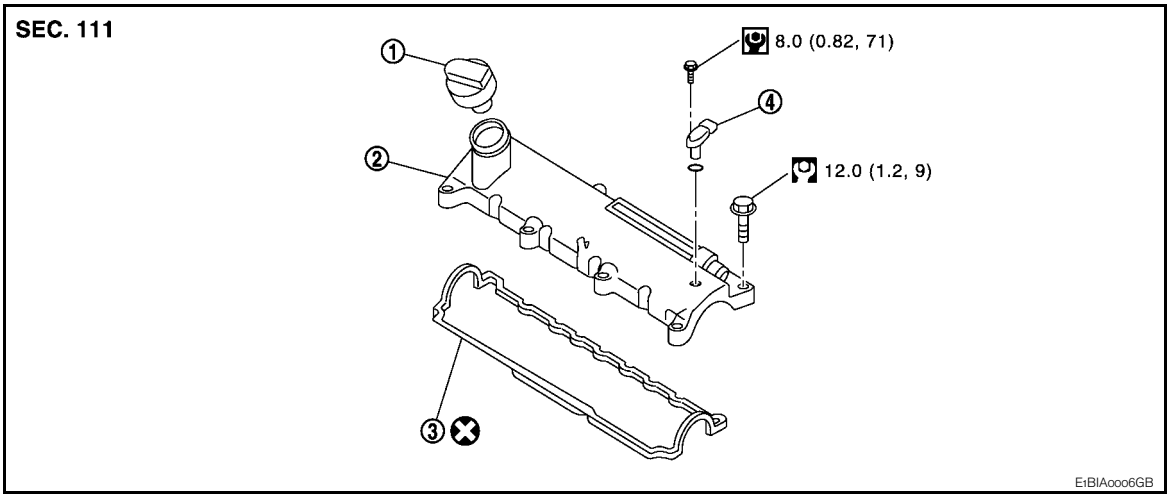
7. Refit in the reverse order to removal for the other refitting operations.
8. Test the sealing of the high pressure after it has been repaired (refer to “SPECIAL FEATURES” in EM-249, "Precaution for Diesel Equipment").

cardiagn.com

ROCKER COVER

Exploded View

INFOID:0000000001060356



1. Oil filler cap
2. Rocker cover
3. Gasket
4. Camshaft position sensor

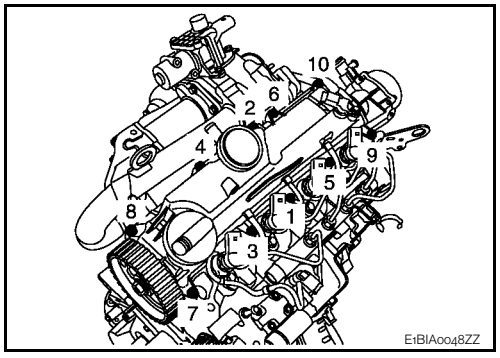
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060455

REMOVAL

1. Remove engine cover. Refer to EM-266, "Removal and Installation".
2. Remove air duct (suction). Refer to EM-265, "Exploded View".
3. Remove inlet pipe assembly and air inlet hose, and inlet pipe bracket. Refer to EM-266, "Removal and Installation".
4. Remove rear engine slinger.
5. Unclip timing belt upper cover.
6. Remove rocker cover.
   Loosen holding bolts in the reverse order as shown in the figure and remove.

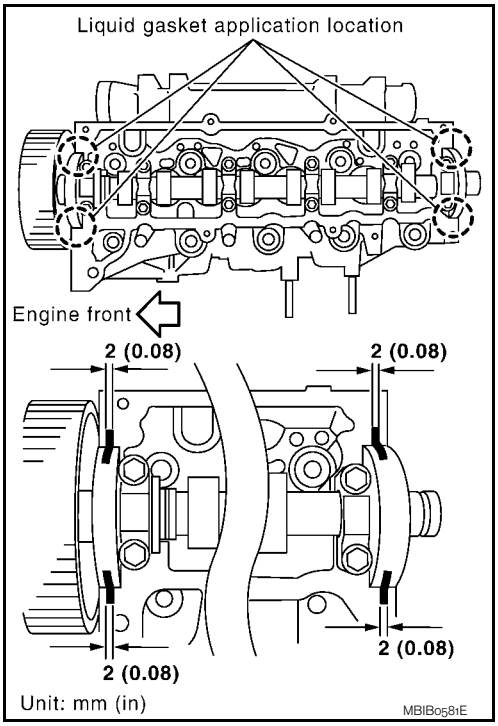


INSTALLATION

1. Install new gasket to gasket.

cardiagn.com

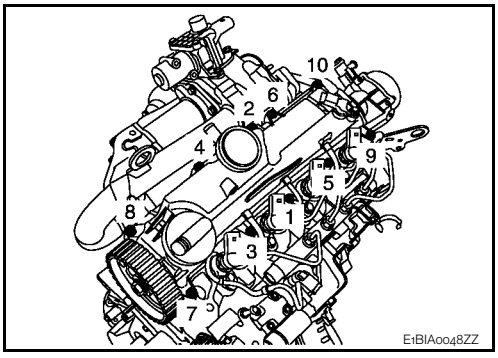
2. Apply liquid gasket on locations shown in the figure.
Use Genuine Liquid gasket or equivalent.



3. Tighten holding bolts in the numerical order as shown in the figure.

: 12.0 N·m (1.2 kg-m, 9 ft-lb)

4. Install in the reverse order of removal after this steps.

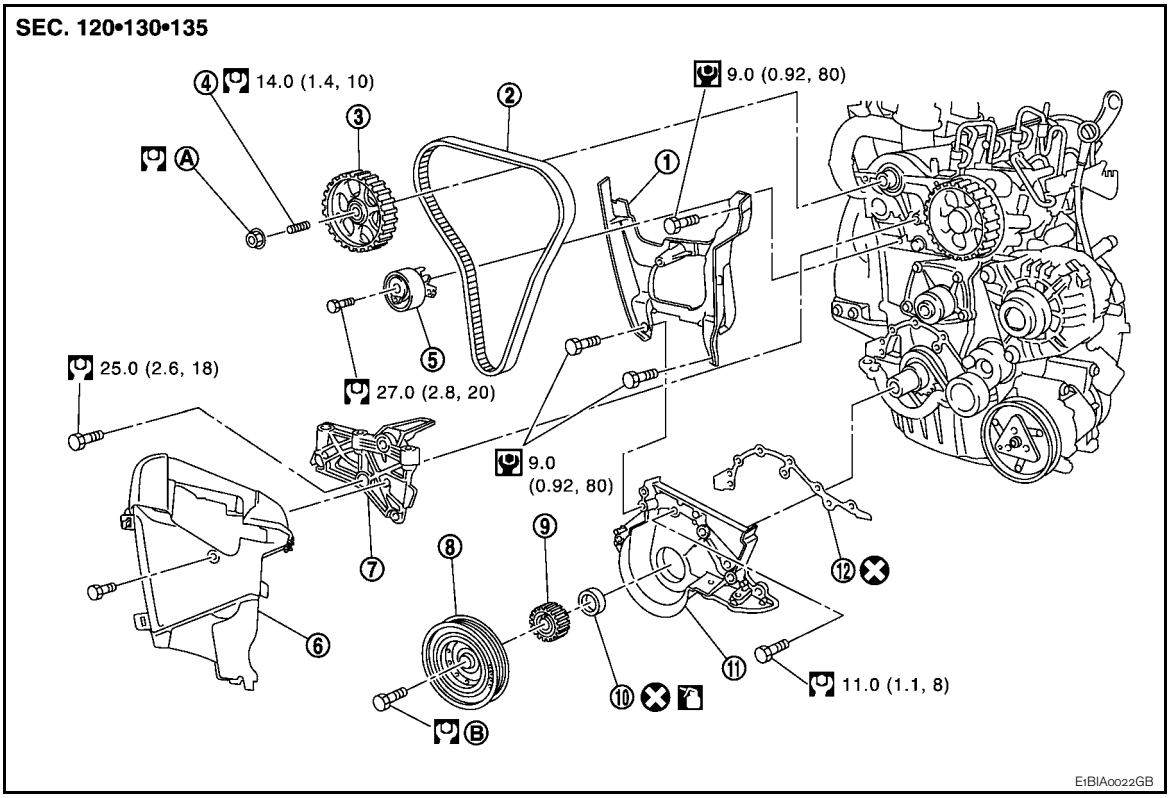


cardiagn.com

TIMING BELT

Exploded View

INFOID:0000000001060385



1. Timing belt inner cover
2. Timing belt
3. Camshaft sprocket
4. Camshaft sprocket stud bolt
5. Timing belt tensioner
6. Timing belt cover
7. Cylinder head suspended bracket
8. Crankshaft pulley
9. Crankshaft sprocket (timing belt)
10. Oil seal
11. Crankshaft cover
12. Gasket

A. 30.0 N·m (3.1 kg-m, 22 ft-lb) and 86 degrees

B. 120.0 N·m (12 kg-m, 89ft-lb) and 95 degrees

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060465

CAUTION:

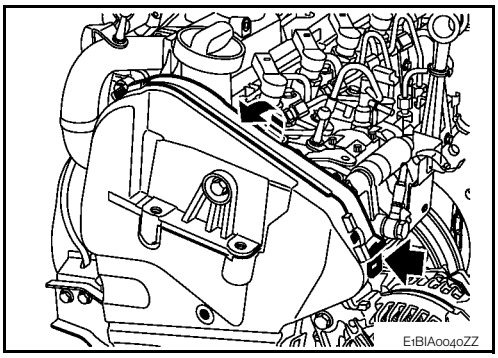
- **Apply new engine oil to parts marked in illustration before installation.**
- **Replace any belt that has been removed.**
- **Never turn the engine in the direction opposite to that of normal operation.**
- **When replacing the timing belt, be sure to replace the timing belt tensioner.**
- **Do not run the engine without the drive belts to avoid damaging the crankshaft pulley.**

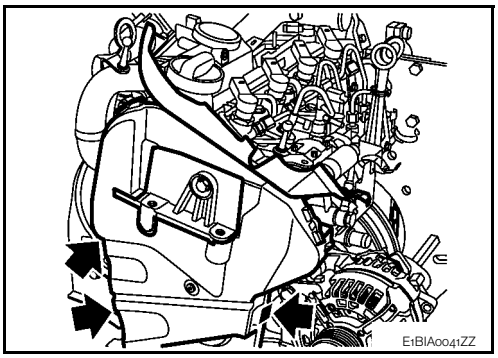
REMOVAL

1. Remove the following parts.
   - Battery ground cable
   - Undercover
   - RH front wheel
   - RH head light assembly
2. Remove right side splash cover.
3. Remove engine cover. Refer to EM-266, "Removal and Installation".
4. Remove drive belt. Refer to EM-287, "Removal and Installation".
5. Remove RH engine torque rod.

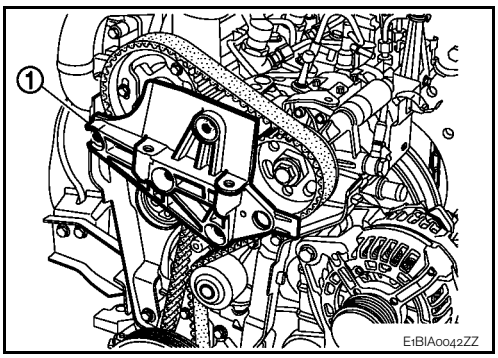
cardiagn.com

6. Remove RH engine mounting.
7. Remove RH engine mounting support bracket, RH engine mounting insulator and reservoir tank.
8. Remove upper timing cover.

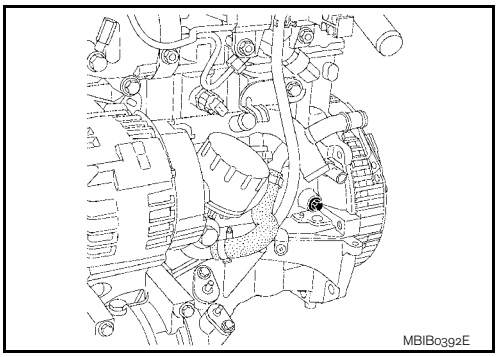




9. Remove cylinder head suspended mounting bracket (1).
10. Remove timing belt lower cover.

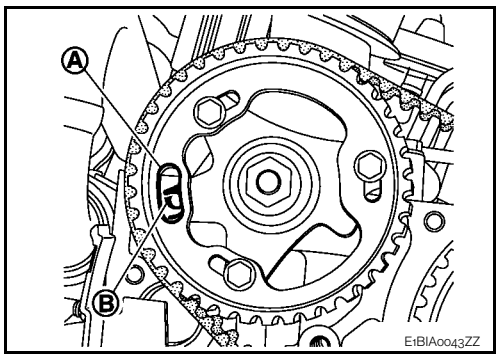


11. Remove the TDC pin plug.

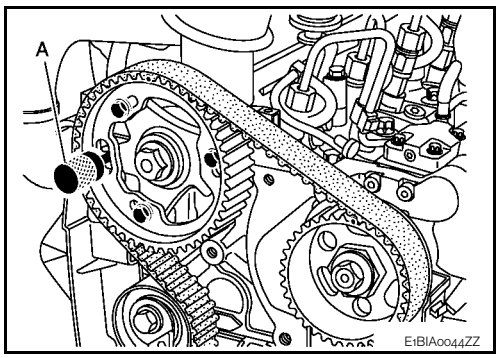


cardiagn.com

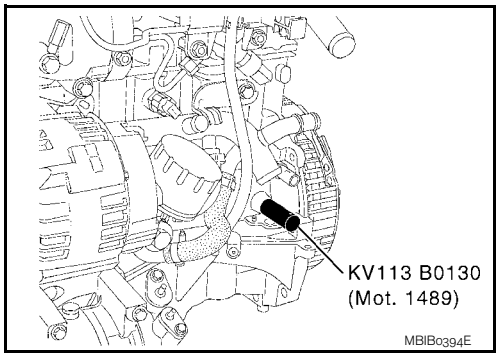
12. Rotate the crankshaft clockwise, until the position (A) of the came shaft pulley becomes opposite of the position (B) on the cylinder head.



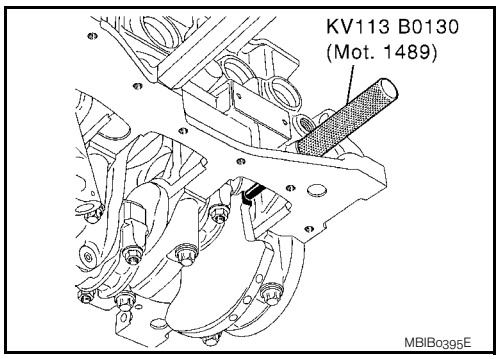
13. Insert TDC set pin [SST: KV113B0110 (Mot.1430)] (A) into the camshaft sprocket and cylinder head hole.



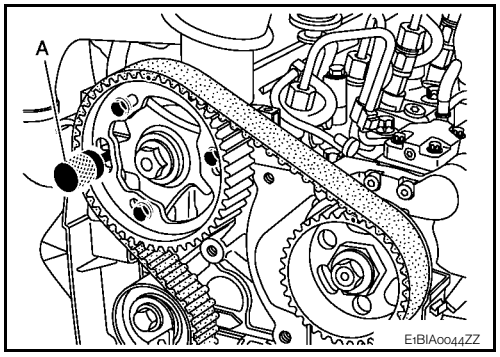
14. Screw in the TDC set pin [SST: KV113 B0130 (Mot. 1439)].



15. Turn the engine clockwise (timing side) until the crankshaft touches the TDC set pin.

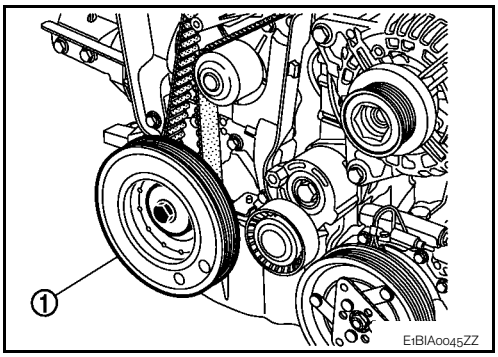


16. The pin [SST: KV113B0110 (Mot.1430)] (A) must engage in the camshaft pulley and cylinder head holes.
17. Remove crankshaft position sensor. Refer to EM-280, "Exploded View".

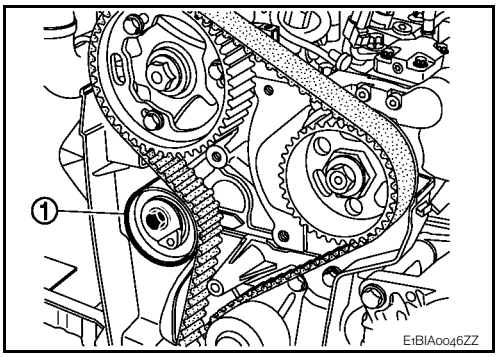


cardiagn.com

18. Insert flat-bladed screwdriver into place of crankshaft position sensor to block crankshaft and loosen crankshaft pulley bolt (1).
19. Remove crankshaft pulley.
    CAUTION:
    Do not remove fixing bolts. Keep loosened fixing bolts in place to protect removed crankshaft pulley from dropping.



20. Slacken the timing belt by loosening the bolt of tensioner (1), then remove timing belt.

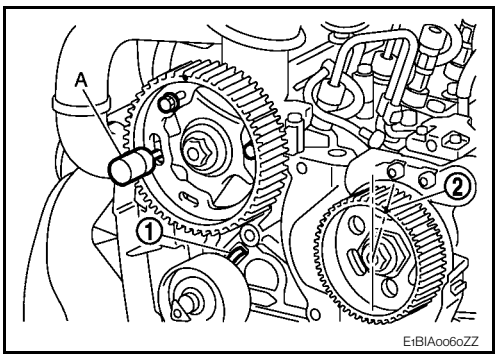


INSTALLATION

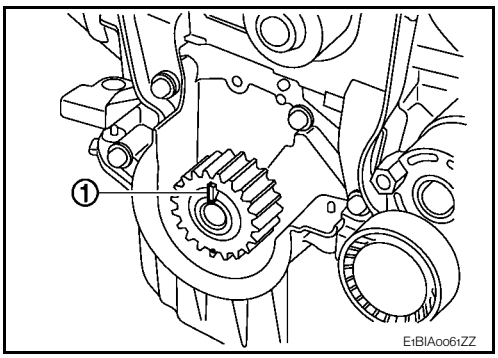
CAUTION:

It is essential to degrease the end of the crankshaft, the bore of the crankshaft sprocket and the bearing faces of the drive belt pulley to prevent any slip between the timing and the crankshaft which would risk destroying the engine.

1. Install timing belt tensioner.
   NOTE:
   Put the timing belt tensioner spigot (1) in the cylinder head groove.
2. Insert TDC set pin [SST: KV113B0110 (Mot. 1430)] (A) in the camshaft pulley and cylinder head holes.
3. Check that high pressure supply pump sprocket mark (2) has shifted one tooth to the right of vertical axle.

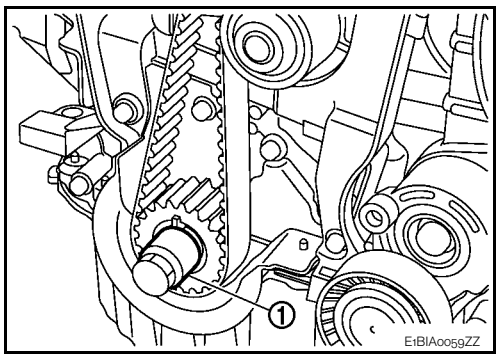


4. Turn crankshaft to set TDC set pin [SST: KV113B0130 (Mot. 1489)] (the crankshaft groove (1) must be facing upwards).

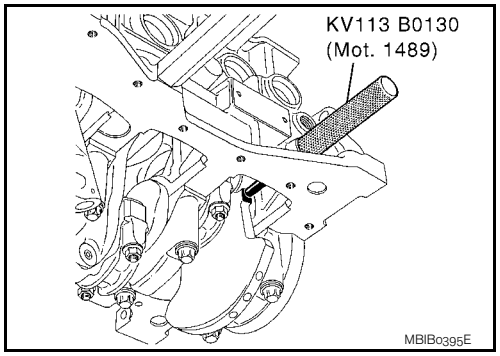


cardiagn.com

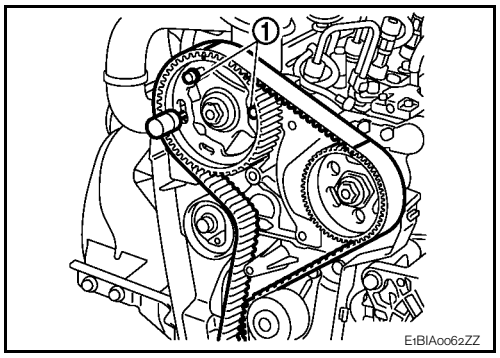
5. Tighten old crankshaft pulley bolt with a spacer (1) (which does not cover the timing sprocket mark).



6. Insert TDC set pin [SST: KV113B0130 (Mot.1489)] to crankshaft.



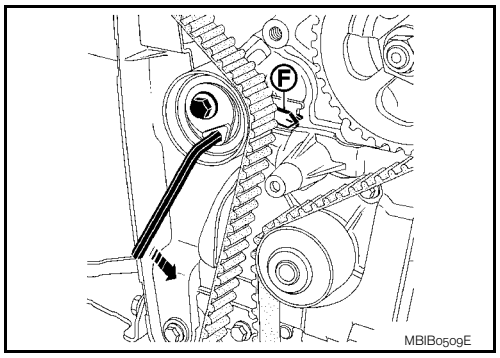
7. Remove one wheel bolt from camshaft sprocket, and then loosen the other two bolts (1).
8. Install the timing belt, aligning the marks on the bolt with those on the camshaft and high pressure supply pump sprockets (19 teeth spaces on the belt between the marks on the camshaft and pump sprockets).



9. Using a 6 mm (0.24 in) Allen key, move the movable index (F) of the drive belt tensioner into the position as shown in the figure, by turning the key counterclockwise.
10. Tighten timing belt tensioner bolt.

: 27.0 N·m (2.8 kg-m, 20 ft-lb)

11. Check that the camshaft sprocket bolts are not fully up against the camshaft sprocket wheel.
12. Install and tighten camshaft sprocket wheel bolts.

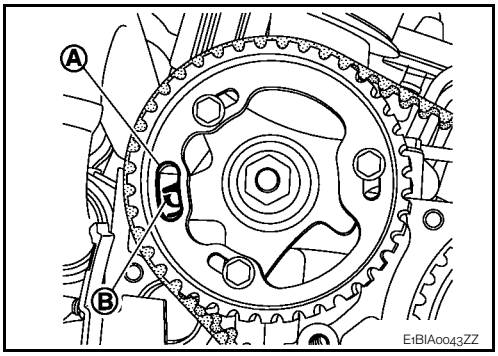


: 14.0 N·m (1.4 kg-m, 10 ft-lb)

13. Remove TDC set pin [SST: KV113B0130 (Mot. 1489)] and TDC set pin [SST: KV113B0110 (Mot. 1430)].

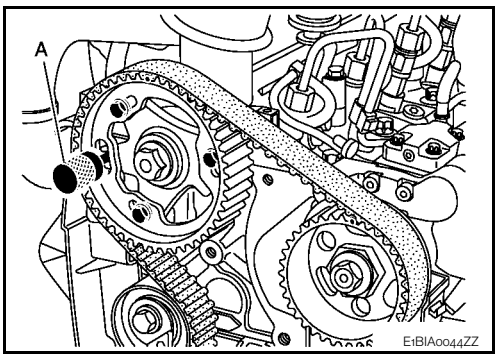
cardiagn.com

14. Turn the crankshaft two revolutions in a clockwise direction (timing side). Just before the hole (A) of the camshaft pulley is opposite the cylinder head hole (B), insert TDC set pin [SST: KV113B0130 (Mot. 1489)] into the cylinder block.
15. Then turn the crankshaft slowly and smoothly against TDC set pin.



16. Insert TDC set pin [SST: KV113B0110 (Mot. 1430)] (A).
If the pin cannot be inserted, perform the following.

a. Remove TDC set pin [SST: KV113B0130 (Mot. 1489)].
b. Loosen camshaft sprocket wheel bolts.
c. Turn camshaft pulley to adjust.
d. Confirm that the crankshaft sprocket groove is facing upward.
e. Loosen timing belt tensioner bolt.

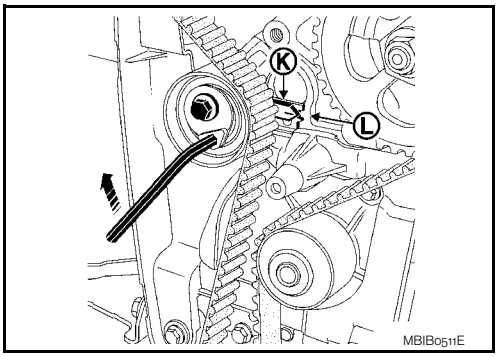


f. Move the movable index of the drive belt tensioner into the position as shown in the figure, by turning the key clockwise.
g. Tighten timing belt tensioner bolt.

: 27.0 N·m (2.8 kg-m, 20 ft-lb)

h. Install and tighten camshaft sprocket wheel bolts.

: 14.0 N·m (1.4 kg-m, 10 ft-lb)

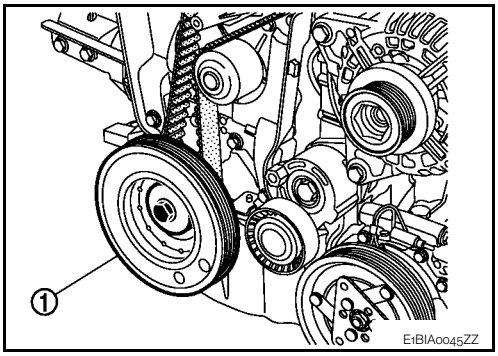


i. Turn the crankshaft two revolutions in a clockwise direction (timing side). Just before the hole (A) of the camshaft pulley is opposite the cylinder head hole (B), insert TDC set pin [SST: KV113B0130 (Mot. 1489)] into the cylinder block.
j. Then turn the crankshaft slowly and smoothly against TDC set pin.

17. Install crankshaft pulley and tighten the bolt (1).

: 120 N·m (12 kg-m, 89 ft-lb)

18. Turn bolt 95 degrees clockwise.
CAUTION:
Check and confirm the tightening angle by using the angle wrench [SST: KV10112100 (—)] or protractor. Avoid judgment by visual inspection without the tool.
19. Remove TDC set pin [SST: KV113B0130 (Mot. 1489)] and TDC set pin [SST: KV113B0110 (Mot. 1430)].
20. Apply liquid gasket to the thread of TDC pin plug.
21. Install TDC pin plug.

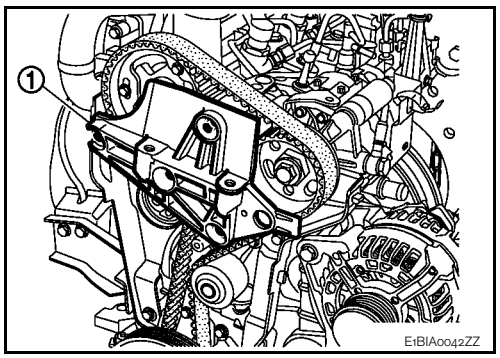


: 20 N·m (2.0 kg-m, 15 ft-lb)

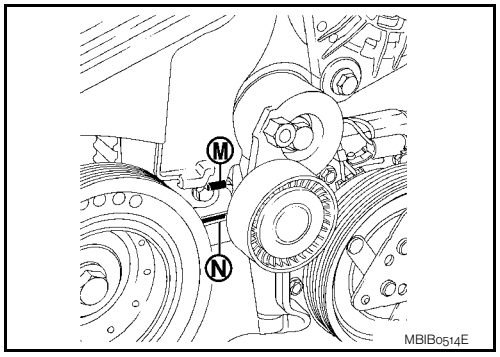
cardiagn.com

22. Install the cylinder head suspended bracket (1).

: 21 N·m (2.1 kg-m, 15 ft-lb)



23. Install the timing cover by positioning the tab (M) into the hole (N) on the inner timing cover.
24. Install in the reverse order of removal after this step.

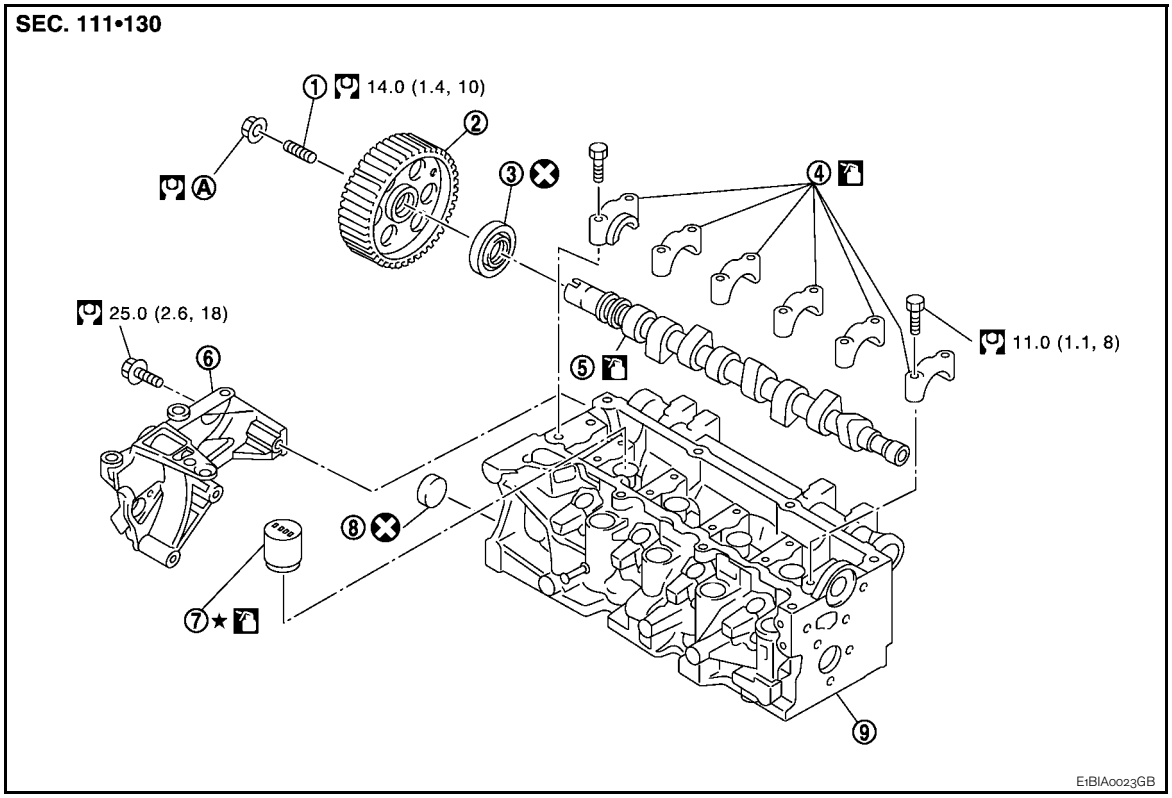


cardiagn.com

CAMSHAFT

Exploded View

INFOID:0000000001060388



1. Camshaft sprocket stud bolt
2. Camshaft sprocket
3. Oil seal
4. Camshaft bracket
5. Camshaft
6. Cylinder head suspended bracket
7. Valve lifter
8. Cap
9. Cylinder head

A. 30.0 N·m (3.1 kg-m, 22 ft-lb) and 86 degrees

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060479

CAUTION:
Apply new engine oil to parts marked in illustration before installation.

REMOVAL

1. Remove the following parts.
   - Battery ground cable
   - Undercover
   - RH front wheel
   - RH head light assembly
2. Remove right side splash cover.
3. Remove engine cover. Refer to EM-287, "Removal and Installation".
4. Remove air inlet tube and electric throttle control actuator. Refer to EM-266, "Removal and Installation" and EM-268, "Removal and Installation".
5. Remove vacuum pump. Refer to EM-276, "Removal and Installation".
6. Remove air inlet tube. Refer to EM-266, "Removal and Installation".
7. Remove drive belt. Refer to EM-259, "Removal and Installation".
8. Remove rocker cover. Refer to EM-285, "Removal and Installation".
9. Support underneath of engine by setting a manual lift table caddy (commercial service tool) or equivalent tool.

cardiagn.com

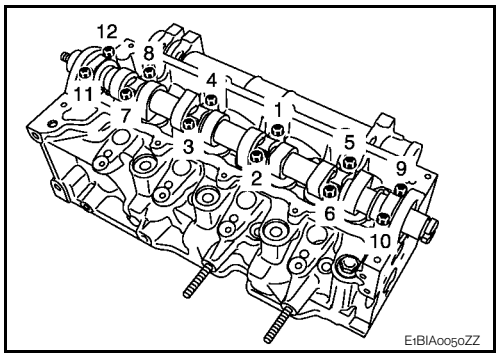
CAUTION:
Put a piece of wood or something similar as supporting surface, secure a completely stable condition.

10. Remove timing belt. Refer to EM-287, "Removal and Installation".
11. Remove camshaft brackets.
12. Remove camshaft.
13. Remove valve lifter.

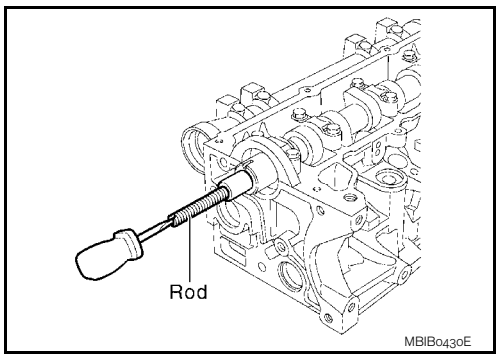
INSTALLATION

1. Install valve lifter.
2. Install camshaft.
3. Install camshaft bracket and tighten bolts in numerical order as shown in the figure.

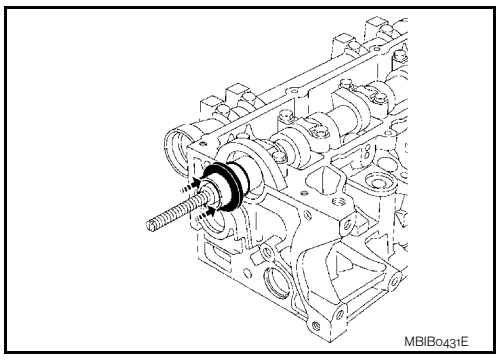
: 11 N·m (1.1 kg-m, 8 ft-lb)



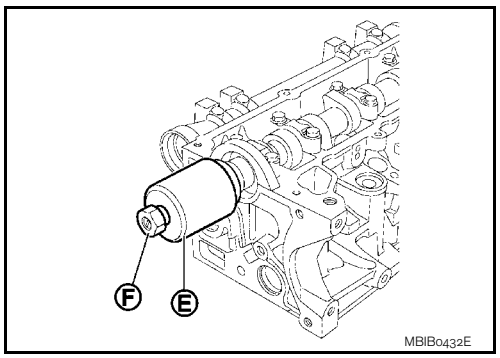
4. Screw the shouldered rod of camshaft seal insert [SST: KV113B0230 (Mot. 1632)] onto the stud of the camshaft.
5. Install the old seal on the camshaft.



6. For the new seal, put the protector with the seal on the camshaft, taking care not to touch the seal.

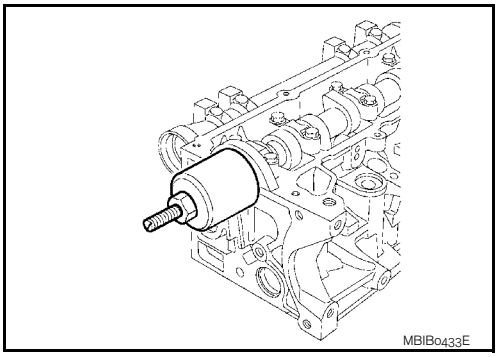


7. Install the cover (E) and the collar nut (F) of camshaft seal insert [SST: KV113B0230 (Mot. 1632)].

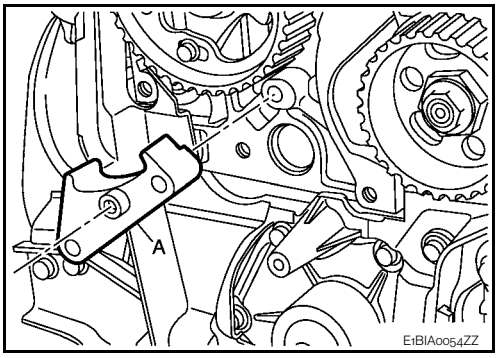


cardiagn.com

8. Screw the collar nut until the cover touches the cylinder head.
9. Install vacuum pump. Refer to EM-276, "Removal and Installation".



10. Install camshaft sprocket and sprocket holder [SST: — (Mot. 1606-A)] (A).
11. Install timing belt. Refer to EM-287, "Removal and Installation".
12. Install in the reverse order of removal.



Inspection

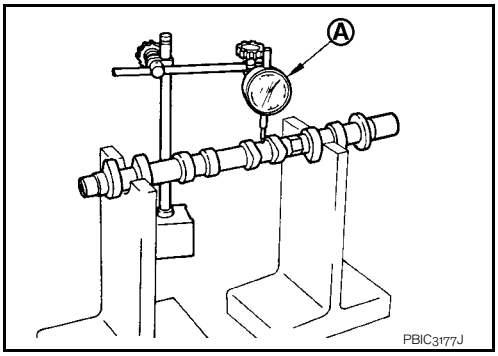
INFOID:0000000001060480

INSPECTION AFTER REMOVAL

Camshaft Runout

1. Put V-block on a precise flat table, and support No. 2 and 4 journal of camshaft.
   CAUTION:
   Never support No. 1 journal (on the side of camshaft sprocket) because it has a different diameter from the other four locations.
2. Set dial indicator (A) vertically to No. 3 journal.
3. Turn camshaft to one direction with hands, and measure the camshaft runout on dial indicator. (Total indicator reading)

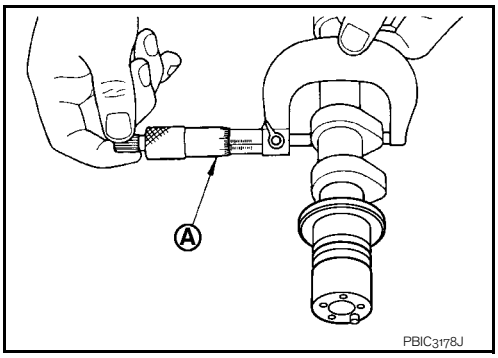
   Standard : Refer to EM-329, "Camshaft".
4. If it exceeds the limit, replace camshaft.



Camshaft Cam Height

1. Measure the camshaft cam height with a micrometer (A).

   Standard : Refer to EM-329, "Camshaft".
2. If it exceeds the limit, replace camshaft.

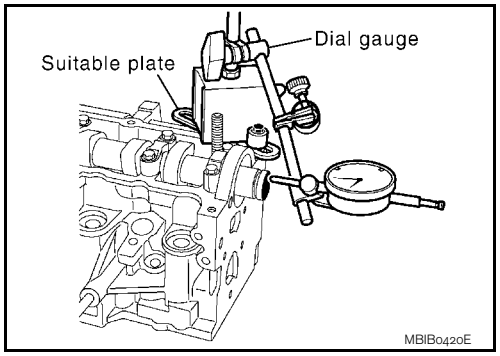


Camshaft End Play

cardiagn.com

1. Install the camshaft.
2. Install the camshaft brackets.
3. Check the end play.

Standard **: Refer to EM-329, "Camshaft".**



Valve Lifter

1. Measure outer diameter of valve lifter.

Intake and exhaust **: Refer to EM-329, "Camshaft"**

2. Measure inner diameter of valve lifter hole in cylinder head.

Intake and exhaust **: Refer to EM-329, "Camshaft"**

3. Calculate the valve lifter clearance.
(Valve lifter clearance) = (Valve lifter hole inner diameter) – (Valve lifter diameter)

Intake and exhaust **: Refer to EM-329, "Camshaft"**

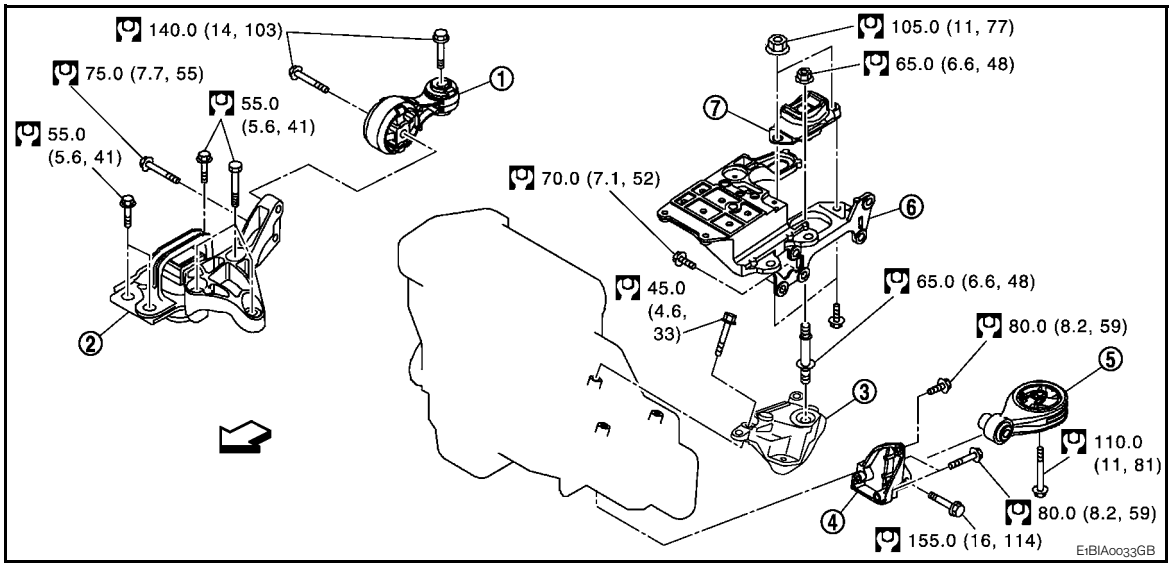
cardiagn.com

REMOVAL AND INSTALLATION

ENGINE ASSEMBLY

Exploded View

INFOID:0000000001060481



1. Engine torque rod RH
2. Engine mouting insulator RH
3. Engine mouting bracket LH
4. Rear torque rod bracket
5. Rear torque rod
6. Engine mounting frame support LH
7. Engine mouting insulator LH

⇦: Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001060482

WARNING:
- **Situate vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **For engines not equipped with engine slingers, attach proper slingers and bolts described in PARTS CATALOG.**

CAUTION:
- **Always be careful to work safely, avoid forceful or uninstructed operations.**
- **Do not start working until exhaust system and coolant are cool enough.**
- **If items or work required are not covered by the engine main body section, refer to the applicable sections.**
- **Always use the support point specified for lifting.**
- **Use either 2-pole lift type or separate type lift as best you can. If board-on type is used for unavoidable reasons, support at the rear axle jacking point with transmission jack or similar tool before starting work, in preparation for the backward shift of center of gravity.**
- **For supporting points for lifting and jacking point at rear axle, refer to GI-33, "Garage Jack and Safety Stand and 2-Pole Lift" or GI-34, "Board-On Lift".**

REMOVAL

Description of Work

Remove engine and transaxle assembly from vehicle down ward. Separate engine and transaxle.

Preparation

Remove the following parts.
- Battery ground cable
- Undercover
- Right side splash cover

cardiagn.com

- LH/RH front wheel
- RH head light assembly

Engine Room

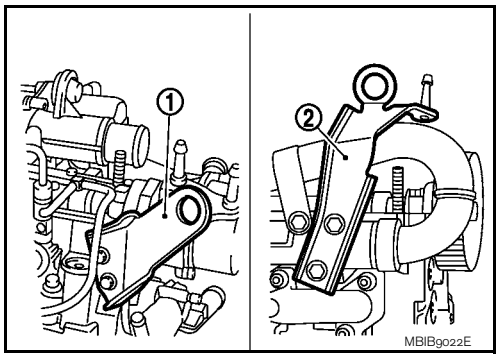
1. Drain engine coolant. Refer to CO-52, "Draining".
   CAUTION:
   Perform when engine is cold.
2. Remove engine cover. Refer to EM-266, "Removal and Installation".
3. Remove air cleaner case and air duct (suction). Refer to EM-265, "Exploded View".
4. Remove radiator upper hose. Refer to CO-56, "Exploded View".
5. Remove reservoir tank and hoses. Refer to CO-56, "Exploded View".
6. Remove fuel feed and return tubes.
7. Remove vacuum hose. Refer to EM-276, "Removal and Installation".
8. Remove turbocharger air duct. Refer to EM-271, "Removal and Installation".
9. Disconnect heater hoses.
10. Disconnect engine room harness from the engine side and set it aside for easier work.
11. Disconnect transaxle side harness and clutch hose.
12. Disconnect drain hose transaxle side.
13. Disconnect shift cable and select cable. Refer to TM-63, "Removal and Installation".
14. Loosen wire bracket.
15. Disconnect all the body-side vacuum hoses and air hoses at engine side.
16. Disconnect fuel feed and return hoses, and plug it to prevent fuel from draining.

Vehicle Underbody

1. Remove drive shaft lock pin and lock nut. Refer to FAX-33, "K9K MODELS : Removal and Installation".
2. Remove ABS sensor from brake caliper.
3. Remove strut lower bolts.
4. Remove drive shaft assembly RH and LH.
5. Remove drive belt. Refer to EM-259, "Removal and Installation".
6. Remove A/C compressor with piping connected from engine. Temporarily secure it on body with a rope to avoid putting load on it.
7. Remove exhaust front tube. Refer to EX-15, "Removal and Installation".
8. Remove engine rear mounting bracket.

Removal

1. Install engine slingers (1) into front right of cylinder head and engine slinger (2) into rear left of cylinder head.
2. Use a manual lift table caddy (commercial service tool) or equivalently rigid tool such as a jack or trestle. Securely support bottom of engine and transaxle.
   CAUTION:
   Put a piece of wood or something similar as the supporting surface, secure a completely stable condition.
3. Remove RH and LH engine mounting bolts.
4. Remove engine and transaxle assembly from vehicle downward by carefully operating supporting tools.
   CAUTION:
   - **During the operation, make sure that no part interferes with body side.**
   - **Before and during this lifting, always check if any harnesses are left connected.**
   - **During the removal operation, always be careful to prevent vehicle from falling off the lift due to changes in the center of gravity.**
   - **If necessary, support vehicle by setting a jack or equivalent tool at the rear.**



Separation Work

CAUTION:

cardiagn.com

During the operation, secure support the engine by placing a piece of wood under the engine oil pan, transaxle oil pan and suspended the engine slinger by baby crane (movable hoist) etc.

1. Remove starter motor.
2. Separate engine and transaxle.
3. Lift with a hoist and separate the engine from the transaxle assembly. Refer to TM-68, "Exploded View".

INSTALLATION

Install in the reverse order of removal.

- Do not allow oil to get on mounting insulator. Be careful not to damage mounting insulator.
- When installation directions are specified, install parts according to the direction marks on them referring to components illustration.
- Make sure that each mounting insulator is seated properly, and tighten mounting bolts and nuts.

Inspection

INFOID:0000000001060483

INSPECTION AFTER INSTALLATION

- Before starting engine check the levels of coolant, lubrications and working oils. If less than required quantity, fill to the specified level.
- Before starting engine, bleed air from fuel piping. Refer to FL-23, "Air Bleeding".
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of coolant, lubricants, working oil, fuel and exhaust gas.
- Bleed air from passages in pipes and tubes of applicable lines.

cardiagn.com

DISASSEMBLY AND ASSEMBLY

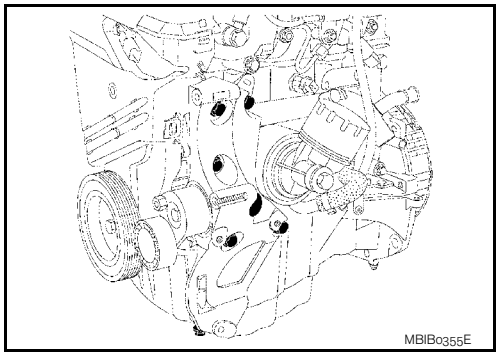
ENGINE STAND SETTING

Setting

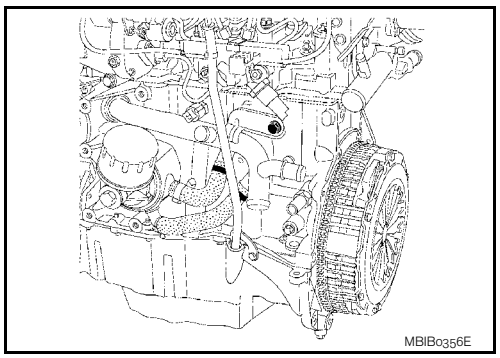
INFOID:0000000001063231

Before the engine is mounted on the engine sub-attachment, the engine's electrical harness must be removed and the engine oil drained.

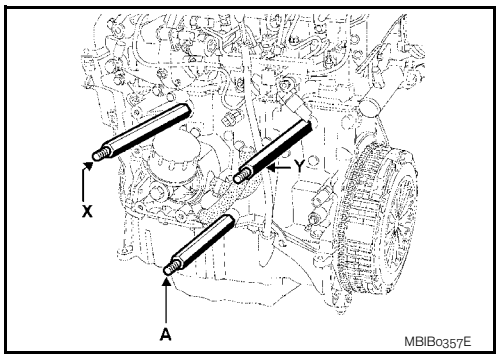
1. Remove the drive belt. Refer to EM-259, "Removal and Installation".
2. Remove the alternator.
3. Remove the air conditioning compressor.
4. Remove the multifunction support.



5. Remove the coolant inlet pipe on the water pump.



6. Place the rods (**A**), (**X**), (**Y**) on the cylinder block.

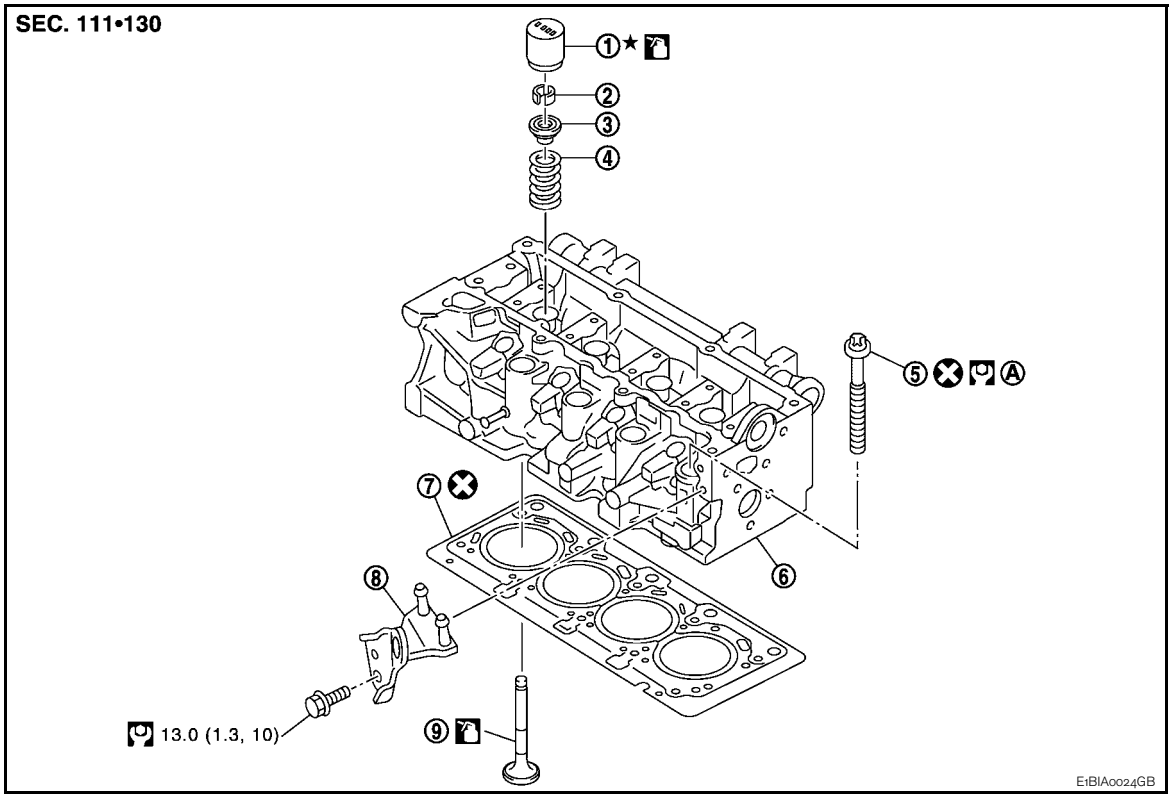


cardiagn.com

CYLINDER HEAD

Exploded View

INFOID:0000000001063235



1. Valve lifter
2. Valve collet
3. Valve spring retainer
4. Valve spring
5. Cylinder head bolt
6. Cylinder head
7. Cylinder head gasket
8. Engine slinger
9. Valve

A. 25.0 N·m (2.6 kg-m, 18ft-lb) and 255 degrees

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

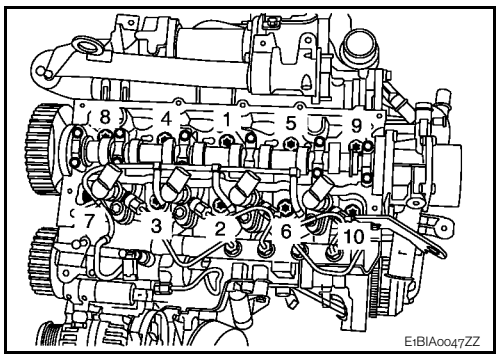
INFOID:0000000001063266

REMOVAL

1. Remove the following parts.
   - Engine cover: Refer to EM-266, "Removal and Installation".
   - Air inlet tube: Refer to EM-268, "Removal and Installation".
   - Rocker cover: Refer to EM-285, "Removal and Installation".
   - Injectiontube and fuel injector: Refer to EM-277, "Removal and Installation".
   - High pressure supply pump: EM-283, "Removal and Installation".
   - Exhaust monifold: Refer to EM-273, "Removal and Installation".
   - Tming belt: Refer to EM-287, "Removal and Installation".
   - Camshaft: Refer to EM-294, "Removal and Installation".

cardiagn.com

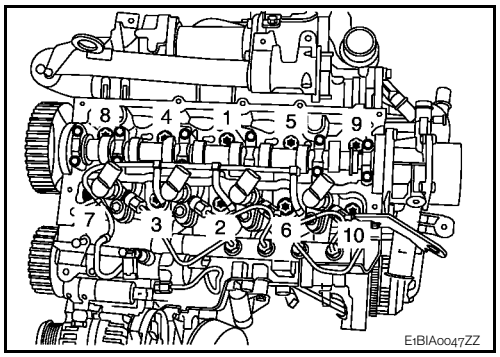
2. Remove cylinder head bolts in reverse order as shown in the figure and remove cylinder head.
3. Remove cylinder head gasket.



INSTALLATION

1. Position the pistons at mid-stroke.
2. Install new cylinder head gasket using the centering dowels of the cylinder block.
   NOTE:
   The gasket faces (cylinder head and rocker cover) must be clean, dry and free from grease (in particular, remove finger marks).
3. Install cylinder head and teghten cylinder head bolts in the numerical order as shown in the figure.

   : 25.0 N·m (2.6 kg-m, 18 ft-lb)



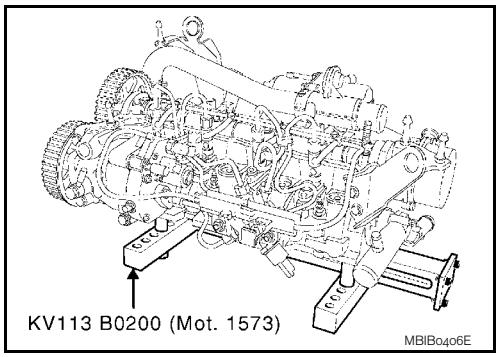
4. Turn all bolts 255 degrees clockwise (angle tightening) in the numerical order as shown in the figure.
   CAUTION:
   Check and confirm the tightening angle by using the angle wrench [SST: KV10112100 (—)] or protractor. Avoid judgment by visual inspection without the tool.
5. Install in the reverse order of removal after this step.

Disassembly and Assembly

INFOID:0000000001063267

DISASSEMBLY

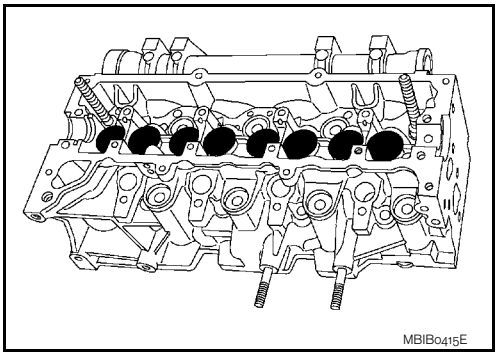
1. Place the cylinder head on cylinder head stand [KV113B0200 (Mot. 1573) (commercial service tool) or equivalent tool].
   CAUTION:
   Pay strict attention to the rules regarding cleanliness. Refer to EM-249, "Precaution for Diesel Equipment".



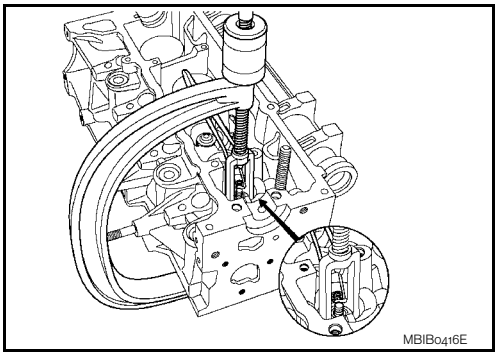
2. Remove high pressure supply pump and related parts. Refer to EM-277, "Removal and Installation".
3. Remove the injectors and glow plugs. Refer to EM-277, "Removal and Installation" and EM-275, "Removal and Installation".
4. Remove the vacuum pump and water outlet and thermostat assembly. Refer to EM-276, "Removal and Installation" and CO-62, "Removal and Installation".
5. Remove the front engine slinger, EGR assembly, air inlet pipe and exhaust manifold. Refer to EM-268, "Removal and Installation" and EM-273, "Removal and Installation".
6. Remove the camshaft sprocket. Refer to EM-287, "Removal and Installation".
7. Remove the camshaft brackets. Refer to EM-294, "Removal and Installation".

cardiagn.com

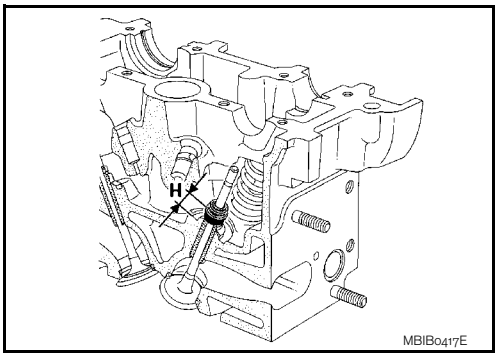
8. Remove the tappets, noting their position.



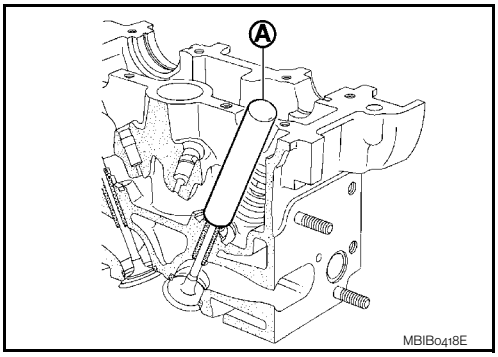
9. Compress the valve springs using the valve lifter. Remove the keys, upper cups and springs.



NOTE:
Before removing the valves and the valve stem seals, it is vital to measure position "H" of one of the old seals in relation to the cylinder head using valve seal drift [KV113B0180 (Mot. 1511-01) (commercial service tool) or equivalent tool].

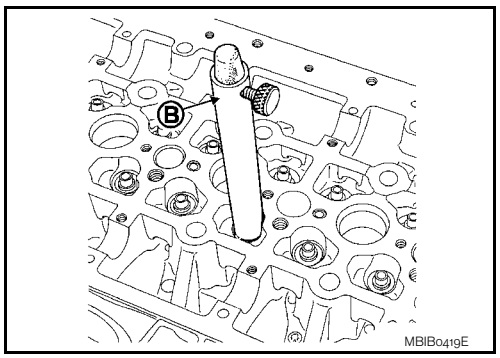


10. Install the push rod (A) of valve seal drift [KV113B0180 (Mot. 1511-01) (commercial service tool) or equivalent tool] on the valve stem seal.
NOTE:
The inner diameter of the push rod must be identical to that of the valve. In addition, the bottom of the push rod must come into contact with the metal upper section of the valve stem seal.



cardiagn.com

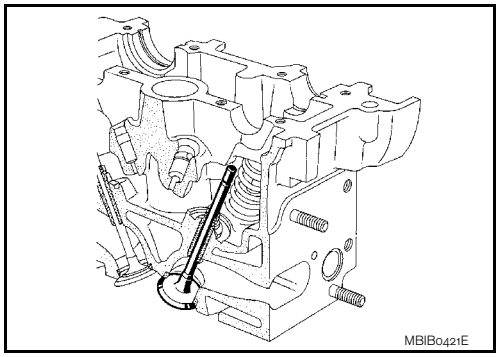
11. Install the guide tube (B) over the push rod until the guide tube comes into contact with the cylinder head, locking the push rod with the knurled wheel.
12. Remove the guide tube assembly plus push rod, being careful not to loosen the knurled wheel.
13. Remove the valves and valve guide seals using the valve seal remover [KV113B0090 (Mot. 1335) (commercial service tool) or equivalent tool].



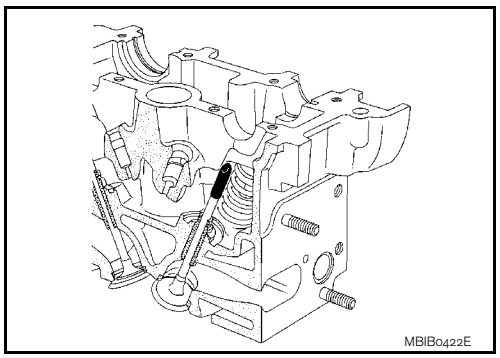
ASSEMBLY

1. Install new valves and grind them gently into their respective seats. Clean all the parts thoroughly, mark them for identification purposes, then carry out the refitting operation.
   Lubricate the inside of the valve guide.
   - It is imperative to fit the valve stem seals using valve seal drift [KV113B0180 (Mot. 1511-01) (commercial service tool) or equivalent tool].

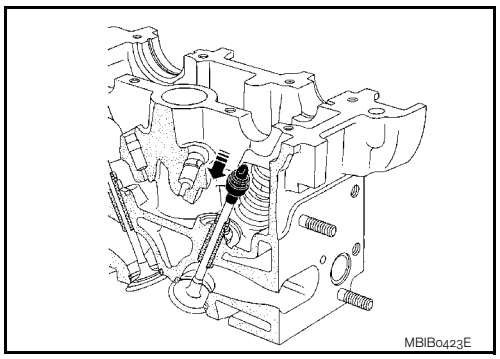
   NOTE:
   Do not lubricate the valve stem seals before fitting them.
2. Place the valve in the cylinder head.



3. Place the barrel of valve seal drift [KV113B0180 (Mot. 1511-01) (commercial service tool) or equivalent tool] over the valve stem (the inner diameter of the barrel must be identical to the diameter of the valve stem).

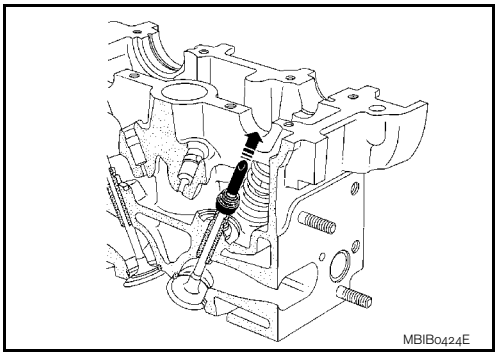


4. Keep the valve pressed against its seat.
5. Place the valve stem seal (not lubricated) over the tool barrel.

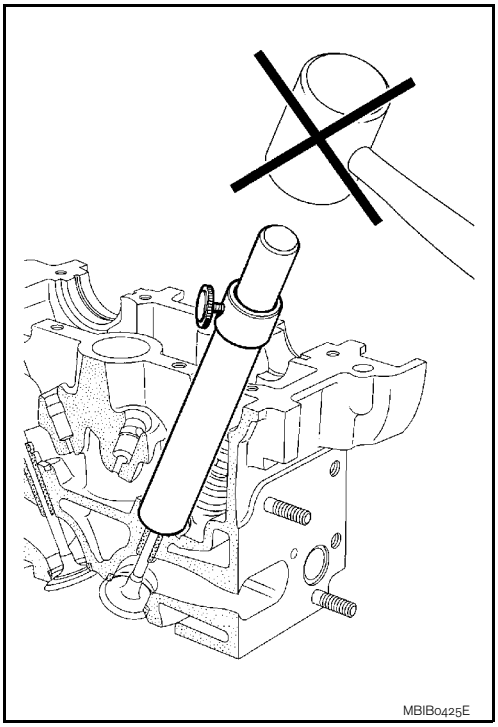


cardiagn.com

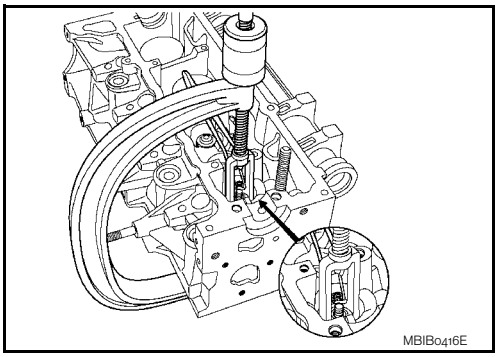
6. Push the valve stem seal past the tool barrel, then withdraw the barrel.


MBIB0424E

7. Place the guide tube plus push rod assembly on the valve stem seal.
8. Push the valve stem seal down by tapping the top of the sleeve with the palm of your hand until the guide tube touches the cylinder head.
9. Repeat these operations for all the valves.


MBIB0425E

10. Install the valve springs and upper cups using valve spring compressor.
11. Install the keys using tweezers.
12. Install in the reverse order of removal after this step.


MBIB0416E

Cleaning

INFOID:0000000001063269

- It is very important not to scratch the gasket faces of any aluminium components.
- Use suitable tool to dissolve any part of the seal which remains stuck to the metal surface.
- Apply the dissolving product to the part to be cleaned, wait approximately 10 minutes, then remove it using a wooden spatula.
- Wear gloves while carrying out this operation.
- Do not allow this dissolving product to drip on to the paintwork.
- **Great care should be taken when performing this operation, to prevent foreign objects from entering the pipes taking oil under pressure to the camshafts (pipes in both the cylinder head and its cover) and the oil return pipes.**

cardiagn.com

- **Failure to follow these instructions could lead to the blocking of the oilways, resulting in rapid and serious damage to the engine.**

Inspection

INFOID:0000000001063238

INSPECTION AFTER REMOVAL

Cylinder Head Distortion

NOTE:

When performing this inspection, cylinder block distortion should be also checked. Refer to EM-241, "Cylinder Block".

1. Wipe off engine oil and remove water scale (like deposit), gasket, sealant, carbon, etc. with a scraper.
   CAUTION:
   Use utmost care not to allow gasket debris to enter passages for engine oil or water.
2. At each of several locations on bottom surface of cylinder head, measure the distortion in six directions using straightedge and feeler gauge.

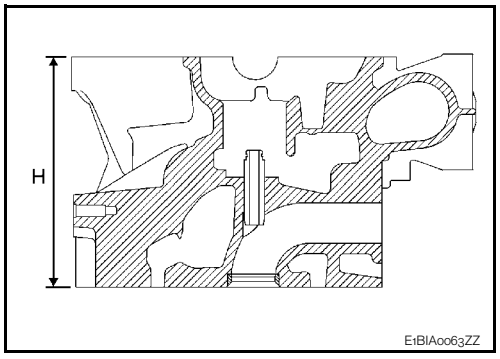
Limit : Refer to EM-331, "Cylinder Head".

- If it exceeds the limit, replace cylinder head.

Cylinder Head Height

Measure the height of cylinder head (H).

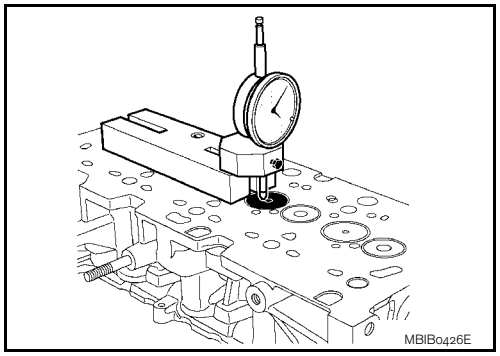
Standard : Refer to EM-331, "Cylinder Head".



Valve protrusion

Check the valve protrusion using dial gauge stand set [KV113B0040 (Mot. 251-01) (commercial service tool) or equivalent tool] and dial gauge stand set [KV113B0050 (Mot. 252-01) (commercial service tool) or equivalent tool] as shown.

Standard : –0.07 to 0.07 mm (–0.0028 to 0.0028 in)



INSPECTION AFTER DISASSEMBLY

Valve

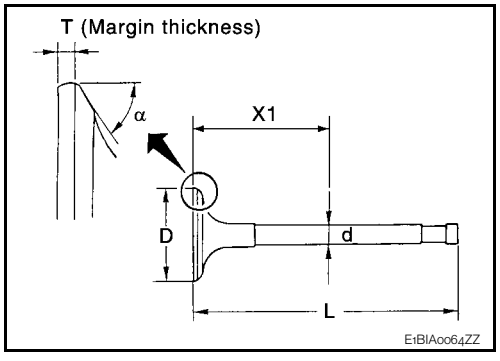
Measure the valves as follows.

- Stem daimeter (d)

Intake : Refer to EM-331, "Cylinder Head"
Exhaust : Refer to EM-331, "Cylinder Head"

- Face angle (α)

Intake : Refer to EM-331, "Cylinder Head"
Exhaust : Refer to EM-331, "Cylinder Head"



cardiagn.com

- Head diameter (D)

Intake : Refer to EM-331, "Cylinder Head"
Exhaust : Refer to EM-331, "Cylinder Head"

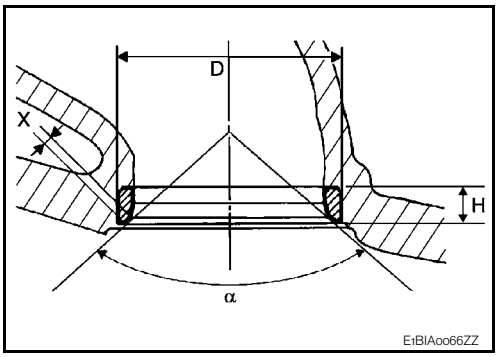
- Valve length (L)

Intake : Refer to EM-331, "Cylinder Head"
Exhaust : Refer to EM-331, "Cylinder Head"

- Valve margin (T)

Intake : Refer to EM-331, "Cylinder Head"
Exhaust : Refer to EM-331, "Cylinder Head"

Valve Seat
Measure the valve seats as follows.



- Seat angle (α)

Intake : Refer to EM-331, "Cylinder Head"
Exhaust : Refer to EM-331, "Cylinder Head"

- Contacting width (X)

Intake : Refer to EM-331, "Cylinder Head"
Exhaust : Refer to EM-331, "Cylinder Head"

- Seat outer diameter (D):

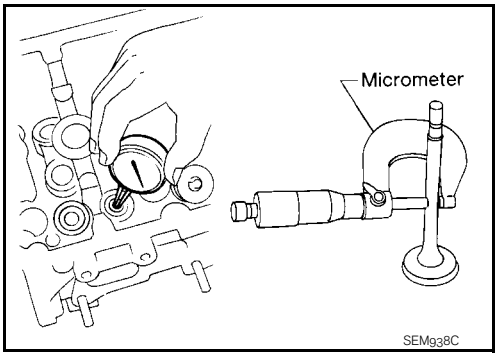
Intake : Refer to EM-331, "Cylinder Head"
Exhaust : Refer to EM-331, "Cylinder Head"

- Cylinder head seat recess diameter (D)

Intake : Refer to EM-331, "Cylinder Head"
Exhaust : Refer to EM-331, "Cylinder Head"

Valve Guide Clearance

1. Measure diameter of valve stem with micrometer.
2. Measure inner diameter of valve guide with inside micrometer.
3. Calculate the valve guide clearance.
   (Valve guide clearance) = (Valve guide inner diameter) – (Valve stem diameter)



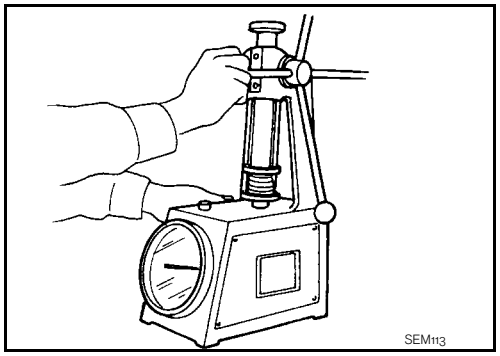
Intake : **0.020 - 0.050 mm (0.0008 - 0.0020 in)**
Exhaust : **0.030 - 0.063 mm (0.0012 - 0.0025 in)**

- If it exceeds the limit, replace and/or valve guide.

Valve Spring

cardiagn.com

Measure the valve spring as follows.



- Free height

Intake and exhaust : **Refer to** EM-331, "Cylinder Head"

- Length under load

Intake and exhaust : **Refer to** EM-331, "Cylinder Head"

- Full pressed height

Intake and exhaust : **Refer to** EM-331, "Cylinder Head"

- Wire diameter

Intake and exhaust : **Refer to** EM-331, "Cylinder Head"

- Inner diameter

Intake and exhaust : **Refer to** EM-331, "Cylinder Head"

- Outer diameter

Intake and exhaust : **Refer to** EM-331, "Cylinder Head"

- Squareness

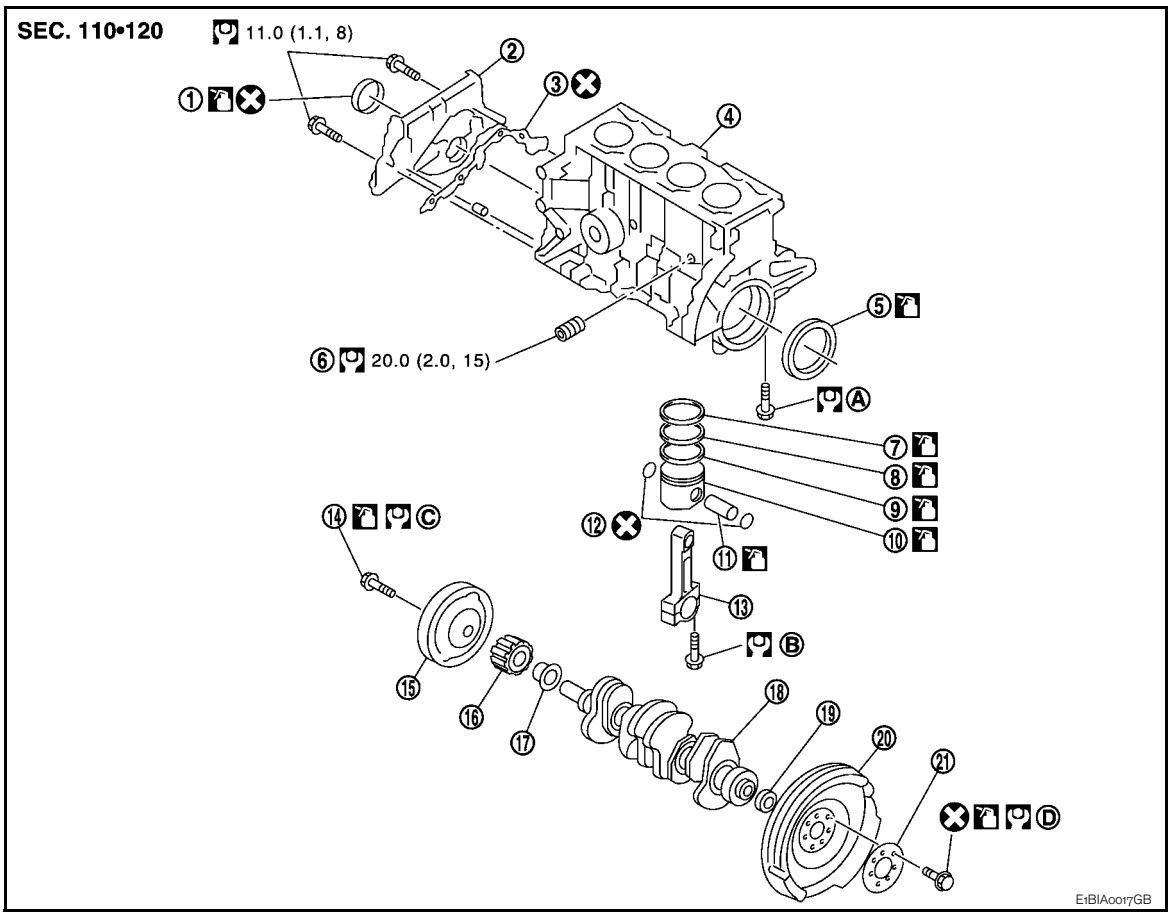
Intake and exhaust : **Refer to** EM-331, "Cylinder Head"

cardiagn.com

CYLINDER BLOCK

Exploded View

INFOID:0000000001063240



1.	Oil seal	2.	Crankshaft cover	3.	Gasket
4.	Cylinder block	5.	Oil seal	6	TDC pin plug
7.	Top ring	8.	Second ring	9.	Oil ring
10.	Piston	11.	Piston pin	12.	Snap ring
13.	Connecting rod	14.	Crankshaft pulley bolt	15.	Crankshaft pulley
16.	Crankshaft sprocket (timing belt)	17.	Crankshaft sprocket (oil pump drive chain)	18.	Crankshaft
19.	Pilot bushing	20.	Flywheel	21.	Reinforcement plate

A. 25.0 N·m (2.6 kg-m, 18 ft-lb) and 47 degrees
B. 20.0 N·m (2.0 kg-m, 15 ft-lb) and 45 degrees
C. 120.0 N·m (12 kg-m, 89 ft-lb) and 95 degrees
D. 20.0 N·m (2.0 kg-m, 15 ft-lb) and 36 degrees

Refer to GI-4, "Components" for symbols in the figure.

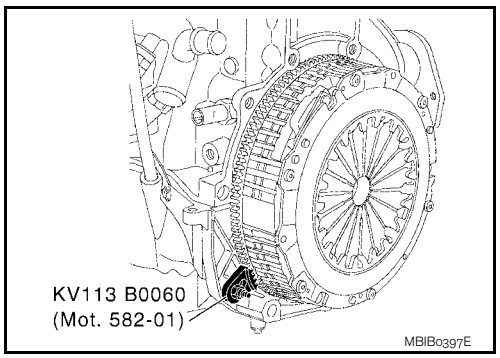
Disassembly and Assembly

INFOID:0000000001063268

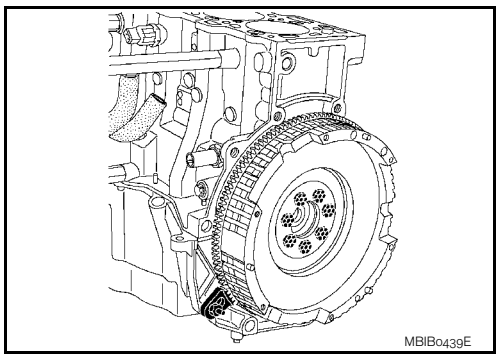
DISASSEMBLY

cardiagn.com

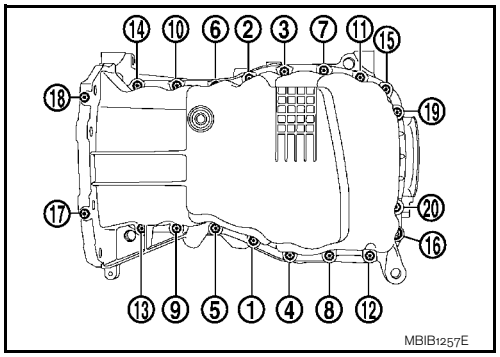
1. Install the ring gear stopper [SST: KV113B0060 (Mot. 582-01)].
2. Remove the clutch housing.



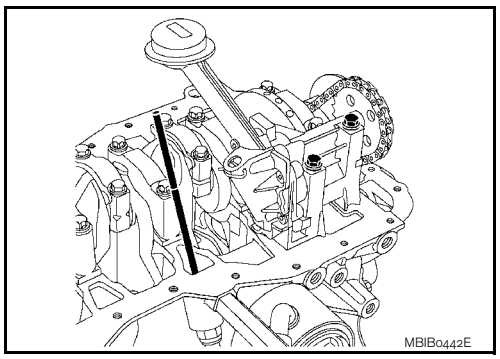
3. Remove the flywheel.



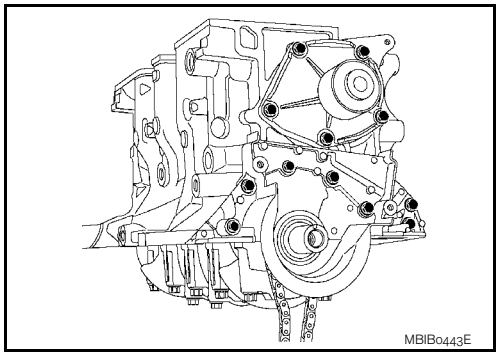
4. Remove the oil pan bolt in reverse order as shown.



5. Remove the oil level sensor.
6. Remove the oil pump.

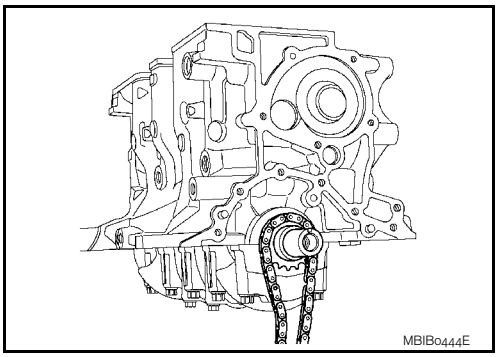


7. Remove the crankshaft cover.
8. Remove the water pump.



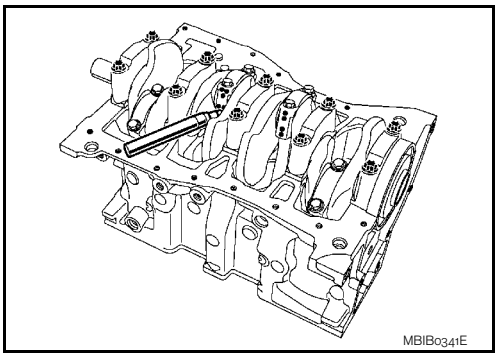
cardiagn.com

9. Remove the oil pump chain.
10. Remove the oil pump drive sprocket.

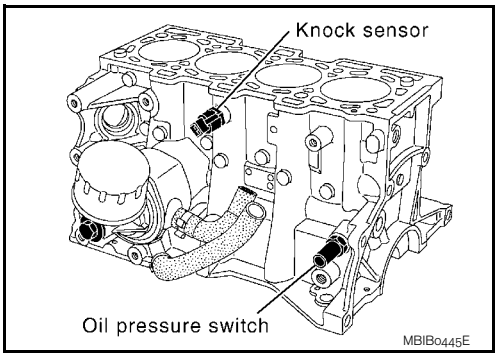


WARNING:
Do not use a sharp point to mark the bearing caps in relation to their connecting rods to avoid starting a crack in the rod. Use a permanent marker pen.

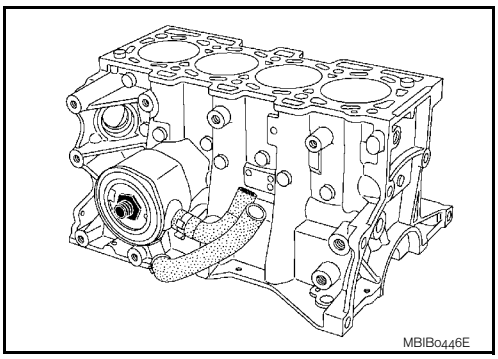
11. Remove the big end cap bolts and the connecting rod/piston assemblies.
    NOTE:
    It is essential to mark the position of the main bearing cap, as the category may be different for each bearing.
12. Remove the main bearing caps.
13. Remove the crankshaft.



14. Remove the oil pressure switch, the knock sensor and oil filter bracket connecting bolt.

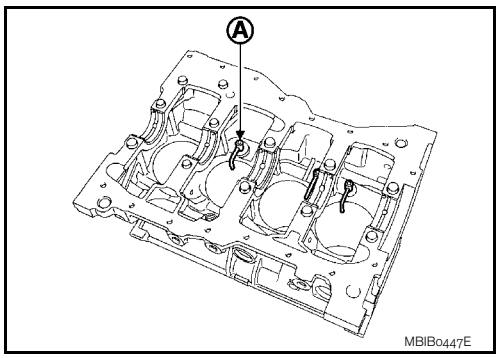


15. Remove the oil cooler connecting bolt.

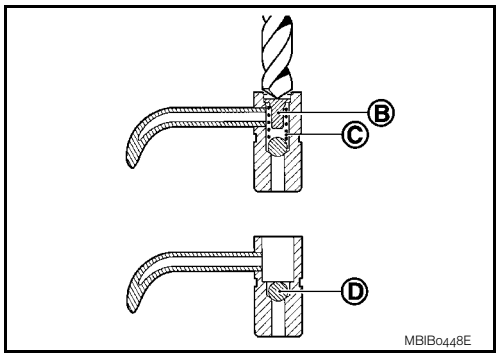


cardiagn.com

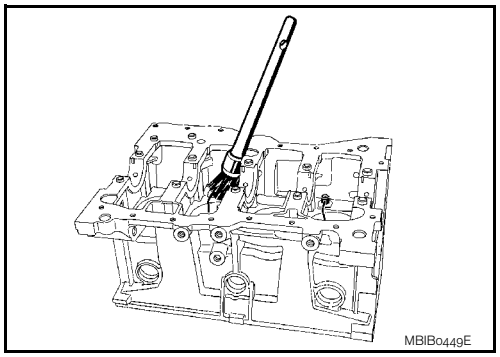
16. To remove the oil jets (A), they must be drilled with a 7 mm (0.28 in) diameter drill. This is necessary in order to remove the spring stop (B) and the spring (C).



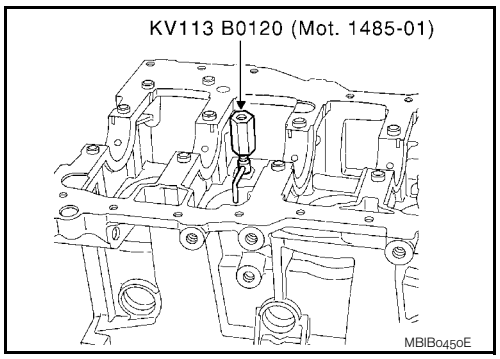
NOTE:
Do not remove the ball (D) to prevent from entering the cooling circuit.



17. Remove the using a suitable brush.

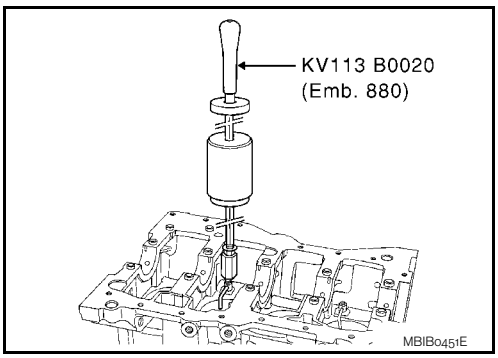


18. Screw oil jet remover [SST: KV113B0120 (Mot. 1485-01)] in the drilled out jets using a 6 mm (0.24 in) Allen key which must slide into the tool.



cardiagn.com

19. Screw sliding hammer [SST: KV113B0020 (Emb. 880)] onto oil jet remover [SST: KV113B0120 (Mot. 1485-01)] and remove the oil jet.



20. To remove the piston pin, remove the snap ring using a screwdriver, then release the pin.

Removing the Piston Pins

NOTE:
It is imperative to mark the connecting rod to match it to its piston, because the piston height classes in the same engine may be different (see Technical Specifications section).

ASSEMBLY

1. The oil jets must be installed using oil jet remover plate [SST: KV113B0170 (Mot. 1494)].
2. Install oil jets for NO. 1 and NO. 3 cylinders with the following procedure.

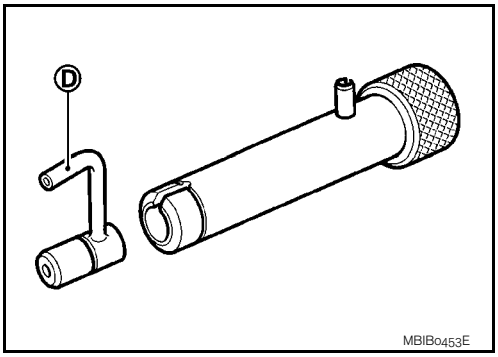
a. Install plate (A) of oil jet remover plate [SST: KV113B0170 (Mot. 1494)] onto the cylinder block (as shown in the figure) without tightening the two bolts (C).

b. Position the guide rod (B) in the plate (A) and the end of the guide rod in the hole of the oil jet to center the plate (A).

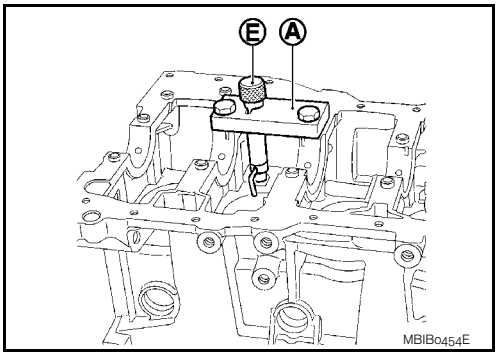
c. Tighten the two bolts (C).

d. Remove the guide rod.

e. Install the push rod instead of the guide rod, then insert the oil jet into the push rod.
NOTE:
Check that the oil jet is correctly oriented with the end of the jet (D) directed towards the center of the cylinder.



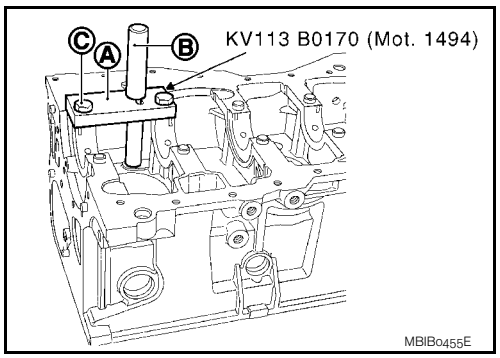
f. With a hammer, tap the push rod until the shoulder (E) of the push rod comes into contact with the plate (A).



3. Install oil jets for NO. 1 and NO.4 cylinders with the following procedure.

cardiagn.com

a. Fit plate (A) of oil jet remover plate [SST: KV113B0170 (Mot. 1494)] onto the cylinder block (as shown in the figure) without tightening the two bolts (C).

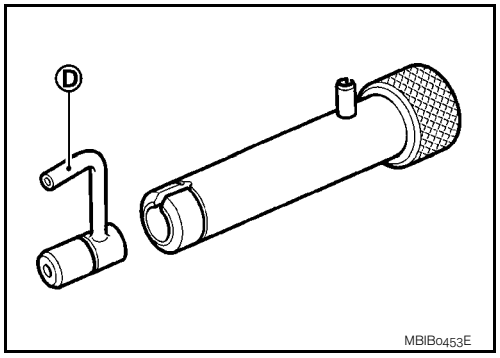


b. Position the guide rod (B) in the plate (A) and the end of the guide rod in the hole of the oil jet to center the plate (A).

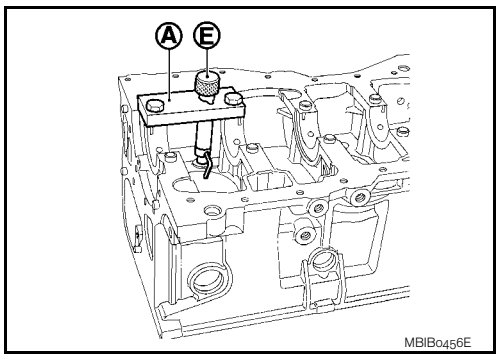
c. Tighten the two bolts (C).

d. Remove the guide rod.

e. Position the push rod instead of the guide rod, then insert the oil jet into the push rod.
NOTE:
Check that the oil jet is correctly oriented with the end of the jet (D) directed towards the center of the cylinder.

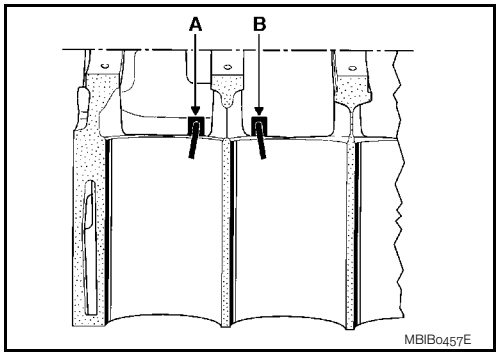


f. With a hammer, tap the push rod until the shoulder (E) of the push rod comes into contact with the plate (A).



4. Check orientation of the oil jets (see diagram below).

A	Orientation of the oil jets of No. 2 and No. 4 cylinders
B	Orientation of the oil jets of No. 1 and No. 3 cylinders



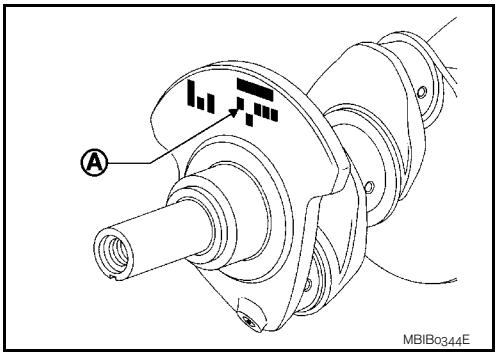
5. Clean the cylinder block and crankshaft by passing a wire through the lubrication channels.

6. Install oil level gauge guide tube.

7. Select main bearing with the following procedure.

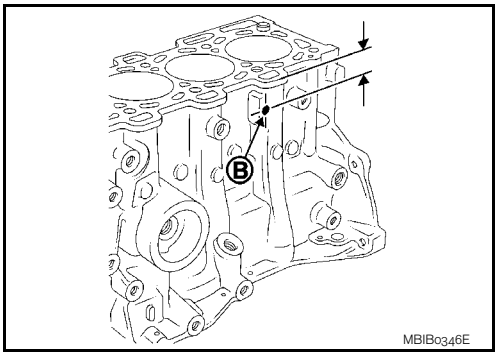
cardiagn.com

a. Identify the category of crankshaft main journal diameter (A) with checking the marking of crankshaft as shown in the figure.
NOTE:
The marking has 5 digits. Left end is the diameter category of No. 1 bearing (flywheel side) and right end is the diameter category of No. 5 bearing (Sprocket side).

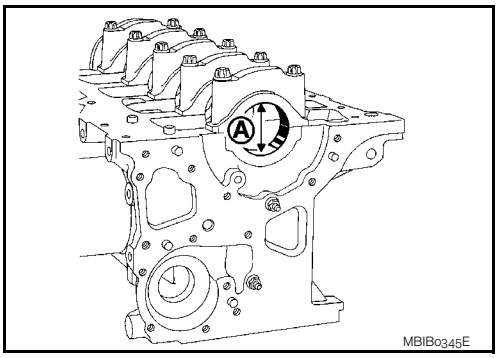


Journal diameter category mark	Journal diameter category [Diameter mm (in)]
A, G, K, R, W	D1 [47.990 - 47.997 (1.8894 - 1.8896)]
B, H, L, S, Y	D2 [47.997 - 48.003 (1.8896 - 1.8899)]
C, J, O, T, Z	D3 [48.003 - 48.010 (1.8899 - 1.8902)]

b. Identify the category of main bearing journal inner diameter on the cylinder block (A) with measuring the length between cylinder block top surface and drilled hole (B).



Position of (B)	Category marking [Inner diameter (A) mm (in)]
33 mm (1.30 in)	1 or Blue [51.936 - 51.942 (2.0447 - 2.0450)]
43 mm (1.69 in)	2 or Red [51.942 - 51.949 (2.0450 - 2.0452)]



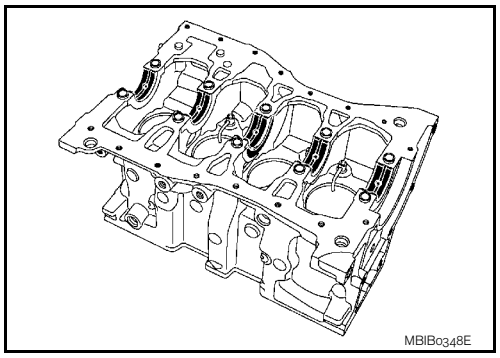
c. Select main bearing category by referring to the table.

Category of main bearing journal inner diameter on the cylinder block	Category of crankshaft main journal diameter	Main bearing category [Thickness mm (in)]
1 or Blue	D1	C1 (Yellow) [1.949 - 1.955 (0.0767 - 0.0770)]
	D2	C2 (Blue) [1.946 - 1.952 (0.0766 - 0.0769)]
	D3	C3 (Black) [1.943 - 1.949 (0.0765 - 0.0767)]
2 or Red	D1	C4 (Red) [1.953 - 1.959 (0.0769 - 0.0771)]
	D2	C1 (Yellow) [1.949 - 1.955 (0.0767 - 0.0770)]
	D3	C2 (Blue) [1.946 - 1.952 (0.0766 - 0.0769)]

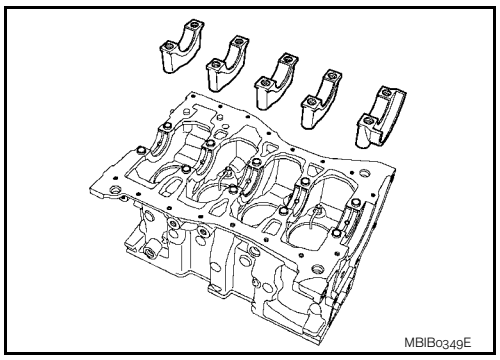
cardiagn.com

8. Install main bearing with the following procedure.

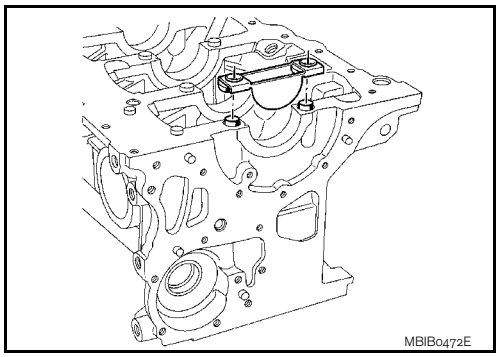
a. Position the grooved main bearing on the cylinder block.



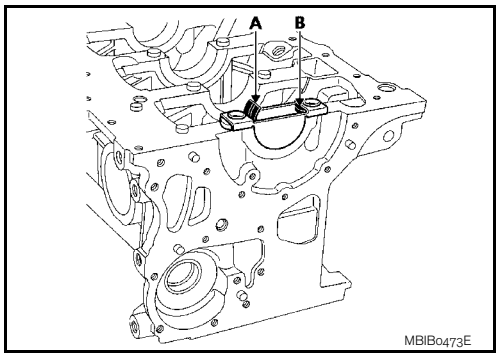
b. Install the smooth bearing cap on the bearings.



c. Position bearing insert [SST: KV113B0160 (Mot. 1493-01)] on the cylinder block.

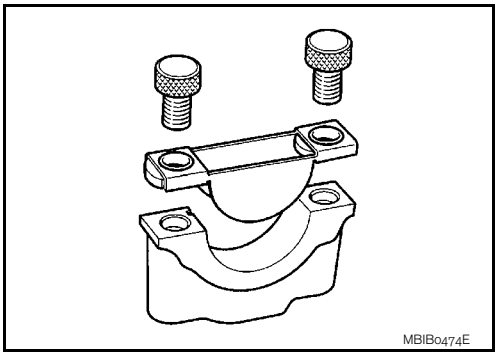


d. Install the bearing cap in bearing insert [SST: KV113B0160 (Mot. 1493-01)], then press at (A) until the bearing cap is touching at (B) with bearing insert.



cardiagn.com

e. Position bearing insert [SST: KV113B0160 (Mot. 1493-01)] on the bearing cap.

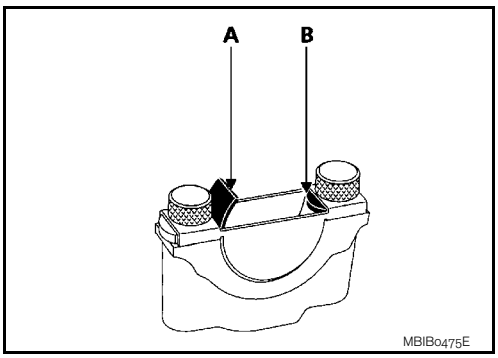


f. Install the main bearing in bearing insert [SST: KV113B0160 (Mot. 1493-01)], then press at (A) until the main bearing is touching at (B) with bearing insert.

g. Lubricate the main bearing with engine oil.

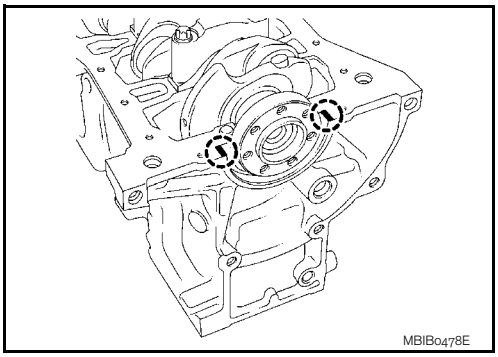
h. Install the crankshaft.

i. Install the lateral shims on bearing No. 3, putting the grooves on the crankshaft side.



j. Degrease the gasket faces (of the cylinder block and bearing No. 1). They should be clean, dry and free from grease (in particular, remove finger marks).

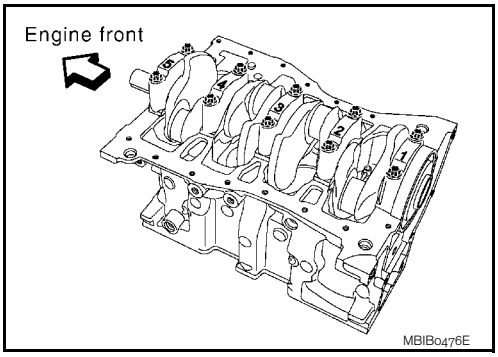
k. Lay two beads of liquid sealant with a width of 4 mm (0.16 in) on bearing No. 1 of the cylinder block.



l. Install the main bearing caps on bearing cap No. 1 (these are numbered from 1 - 5 and these numbers should be positioned opposite the water pump). Then tighten the bolts to a torque of 25 N·m (2.6 kg-m, 18 ft-lb) plus an angle tightening of 47 degrees.

: 25.0 N·m (2.6 kg-m, 18 ft-lb)

m. Turn all bolts 47 degrees clockwise (angle tightening).
CAUTION:
Check and confirm the tightening angle by using the angle wrench [SST: KV10112100 (—)] or protractor. Avoid judgment by visual inspection without the tool.

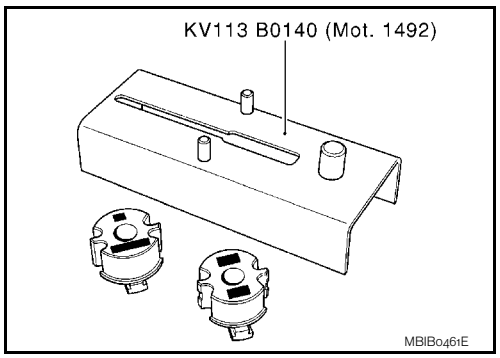


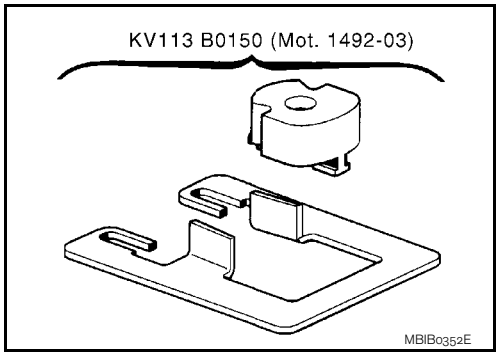
n. Check the lateral play. Refer to EM-326, "Inspection".

9. Install connecting rod bearing with the following procedure.

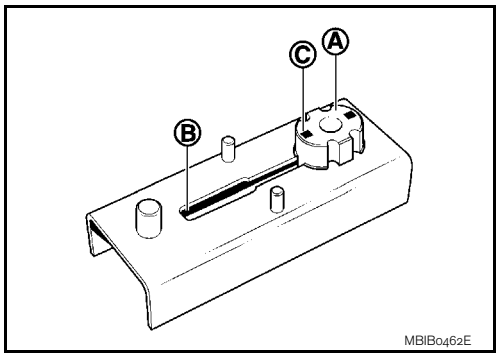
cardiagn.com

The connecting rod bearing are installed using bearing assembling set [SST: KV113B0140 (Mot. 1492)] and bearing assembling adapter [SST: KV113B0150 (Mot. 1492-03)].

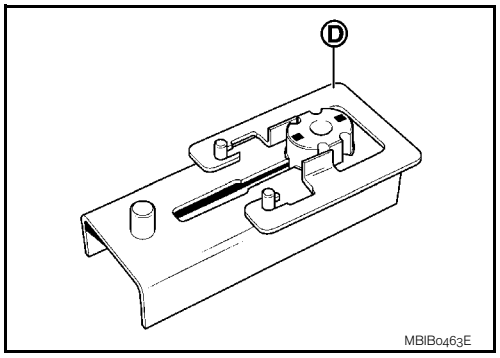




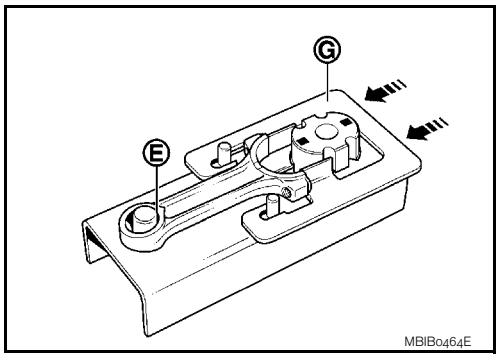
a. Slide the connecting rod bearing support (A) of bearing assembling adapter [SST: KV113B0150 (Mot. 1492-03)] (positioning the engraved mark (B) as shown in the figure)] into the groove (C) of the base of bearing assembling set [SST: KV113B0140 (Mot. 1492)].



b. Install the guide (D) of bearing assembling adapter [SST: KV113B0150 (Mot. 1492-03)] onto the base (as shown in the figure).

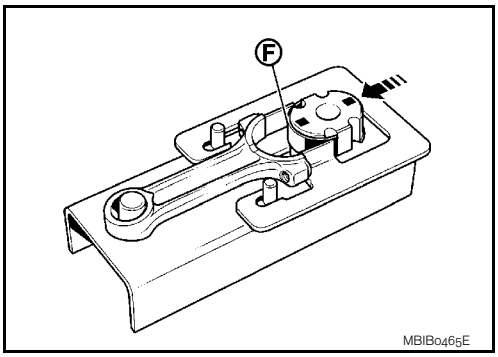


c. Lay the body of the connecting rod on the base of the tool (as shown in the diagram). Check that the lower part (E) of the small end is touching the centering pin and push the guide (G) in the direction of the arrow.



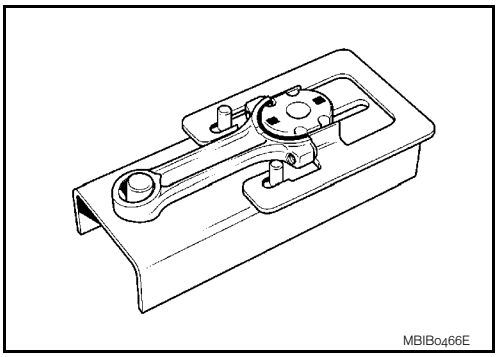
cardiagn.com

d. Lay the connecting rod bearing [with a width of 20.625 mm (0.8120 in)] (F) on the connecting rod bearing support, then push it in the direction of the arrow (as shown in the figure).



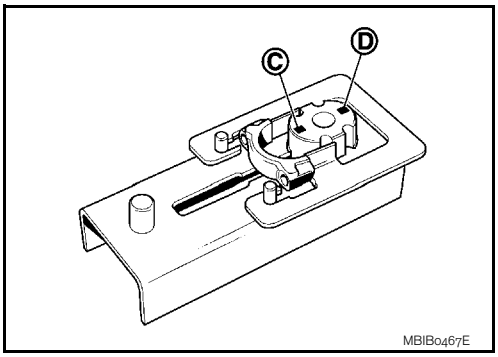
e. Bring the connecting rod support up against the base of the connecting rod body.

f. Remove the connecting rod body support and repeat the operation for the remaining connecting rod bodies.

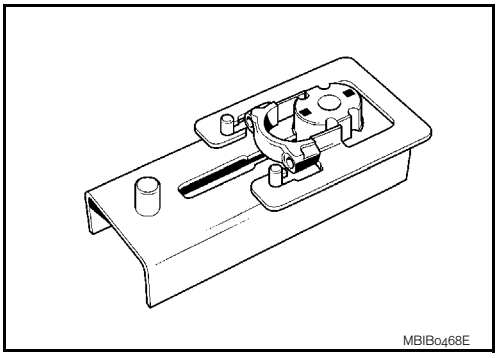


g. Position the connecting rod bearing support either on the engraved mark (C) if the width of the connecting rod bearing is equal to 20.625 mm (0.8120 in).

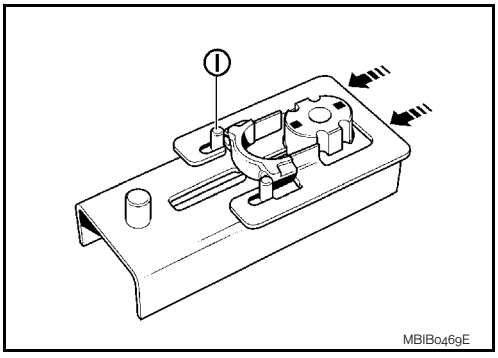
h. Position the connecting rod bearing support either on the engraved mark (D) if the width of the connecting rod bearing is equal to 17.625 mm (0.6939 in).



i. Install the connecting rod cap as shown in the figure.

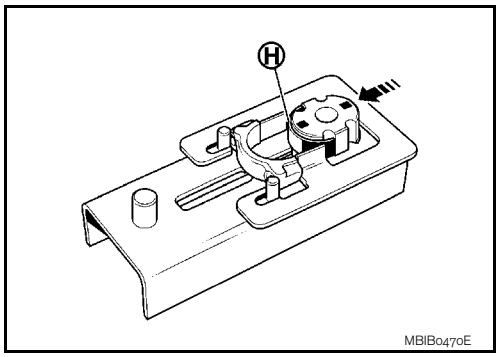


j. Push the guide (in the direction of the arrow) until the connecting rod cap is in contact with the pins (I) on the base of the tool.



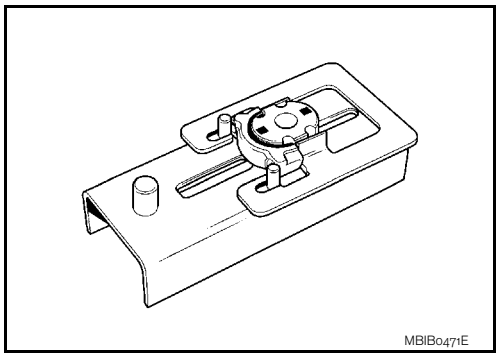
cardiagn.com

k. Install the connecting rod bearing (H) on the bearing support, then push it in the direction of the arrow (as shown in the figure).



l. Bring the connecting rod bearing support up against the base of the connecting rod cap.

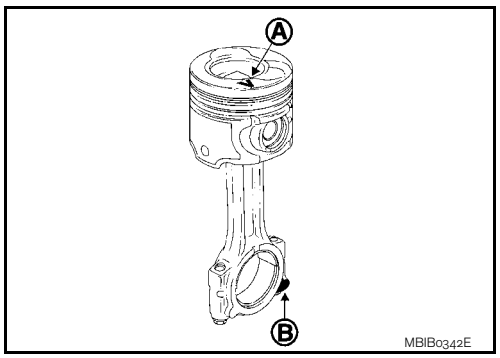
m. Remove the connecting rod bearing support and repeat the operation for the remaining connecting rod caps.



10. Assemble connecting rod and piston with the following procedure.

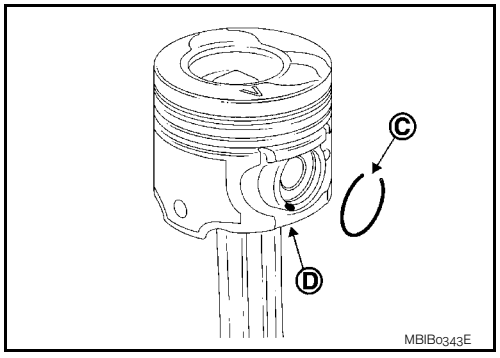
a. The pistons have a mark engraved on their heads indicating the engine rear side.
- Oil the piston pin.
- Check that the piston pins rotate correctly in the new piston and in the matching connecting rod.

b. Point the mark (A) engraved on the top of the piston upwards and the flat (B) of the big end downwards as shown in the figure.



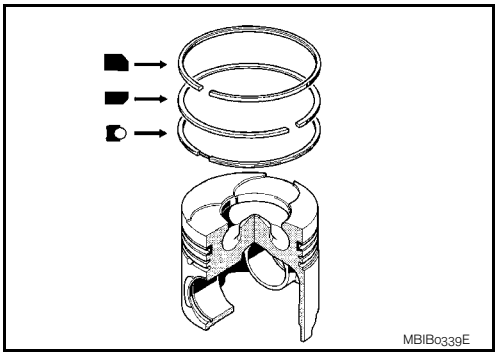
c. Position the opening (C) of the snap rings opposite the removal and fitting channel (D).

d. Install snap ring.
- Rings set to their original adjustment must be free within their channels.
- Ensure the snap rings are fitted the correct way, with the word TOP pointing upwards.



cardiagn.com

e. Ensure the break in each piston ring is correctly oriented as shown in the figure.



f. Apply new engine oil to the pistons.

g. Install the connecting rod/piston assemblies into the cylinder block using the ring, being careful to fit them the right way round (mark towards the flywheel).

h. Install the connecting rods onto the oiled crankshaft pins of the crankshaft.

i. Install the connecting rod caps, ensuring they are correctly matched.

j. Tighten the connecting rod cap bolts.

: 20.0 N·m (2.0 kg-m, 15 ft-lb)

k. Turn all bolts 45 degrees clockwise (angle tightening).

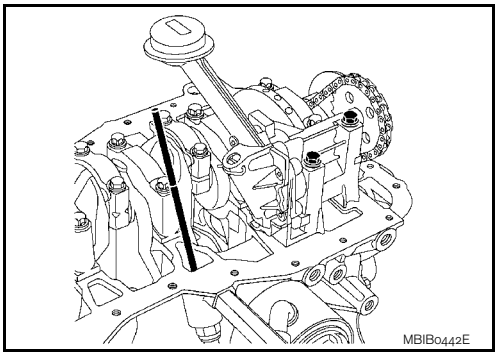
CAUTION:

Check and confirm the tightening angle by using the angle wrench [SST: KV10112100 (—)] or protractor. Avoid judgment by visual inspection without the tool.

l. Inspect that the big end lateral play. Refer to EM-326, "Inspection".

11. Install the oil pump sprocket and chain.

12. Tighten oil pump mounting bolts.



: 25.0 N·m (2.6 kg-m, 18 ft-lb)

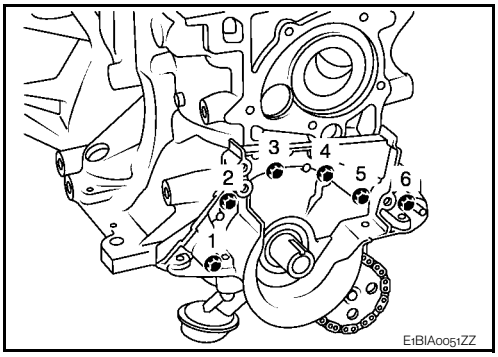
13. Install water pump, Refer to CO-60, "Removal and Installation".

NOTE:

The gasket faces (cylinder block, crankshaft cover and water pump) must be clean, dry and free from grease (in particular, remove finger marks).

14. Install crankshaft cover oil seal with a new one.

15. Install the crankshaft cover in the numerical order as shown in the figure.

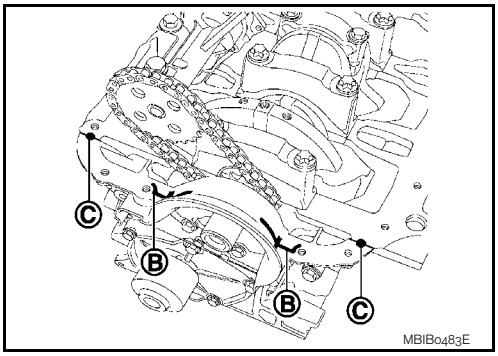


: 11.0 N·m (1.1 kg-m, 8 ft-lb)

16. Apply two beads (B) of liquid gasket, with a diameter of 5 mm (0.20 in).

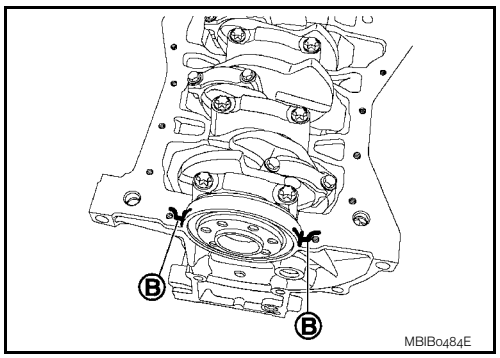
Apply two points (C) of liquid gasket, with a diameter of 5 mm (0.20 in) at the intersection of the crankshaft cover and the cylinder block.

- Use Genuine Liquid Gasket or equivalent.

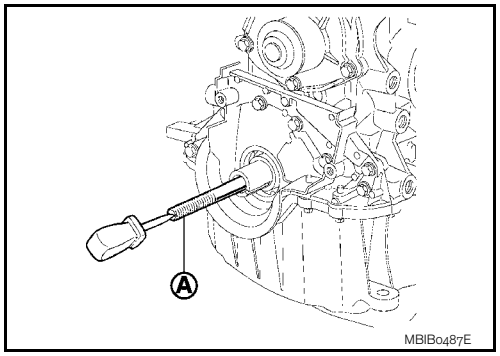


cardiagn.com

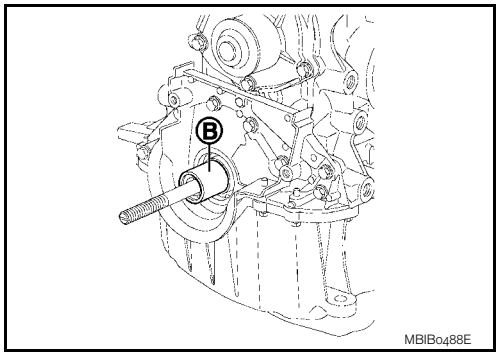
17. Apply two beads (B) of liquid gasket, with a diameter of 5 mm (0.20 in).
    - Use Genuine Liquid Gasket or equivalent.
18. Install the oil pan Refer to EM-280, "Removal and Installation".



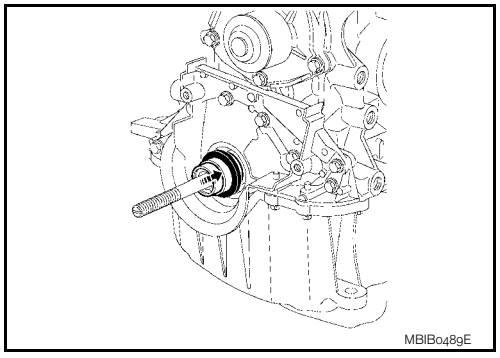
19. Crankshaft elastomer seal, timing side.
20. Screw the threaded rod (A) of front oil seal drift set [SST: KV113B0220 (Mot. 1586)] into the crankshaft.



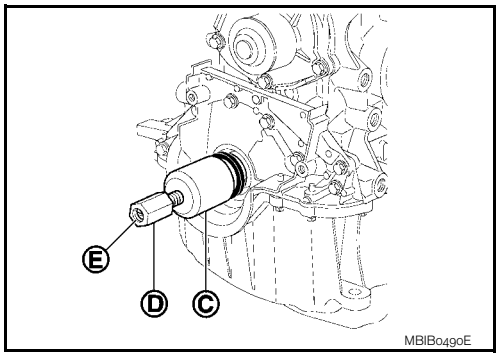
21. Position the spacer (B) of front oil seal drift set [SST: KV113B0220 (Mot. 1586)] on the crankshaft.



22. Install the protector complete with the seal onto the spacer, taking care not to touch the seal.

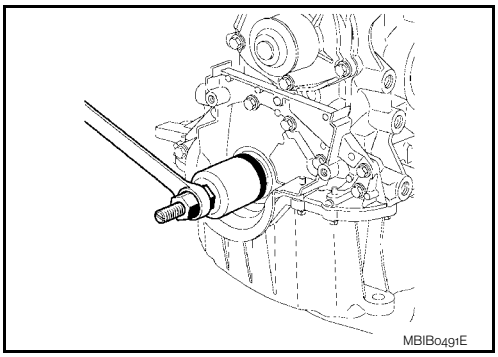


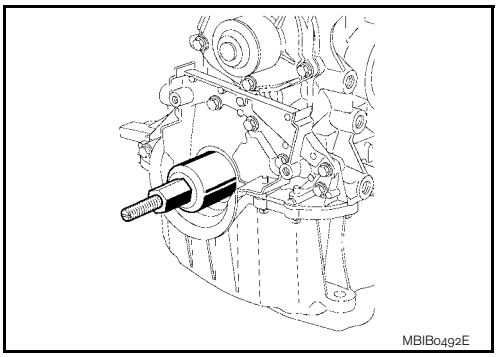
23. Install the cover (A) and the nut (B) (putting the threaded part (C) of the nut on the side away from the engine) of front oil seal drift set [SST: KV113B0220 (Mot. 1586)].



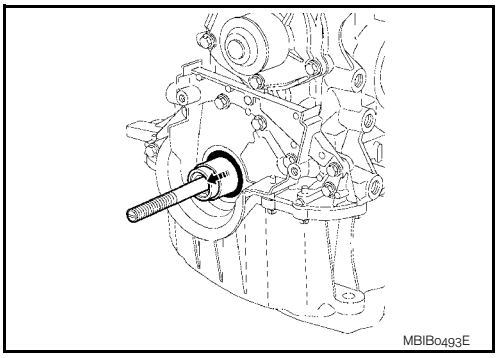
cardiagn.com

24. Tighten the nut until the cover touches the spacer.

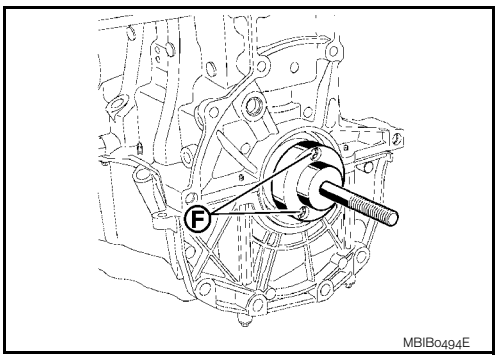

MBIB0491E


MBIB0492E

25. Remove the nut, the cover, the protector and the threaded rod.


MBIB0493E

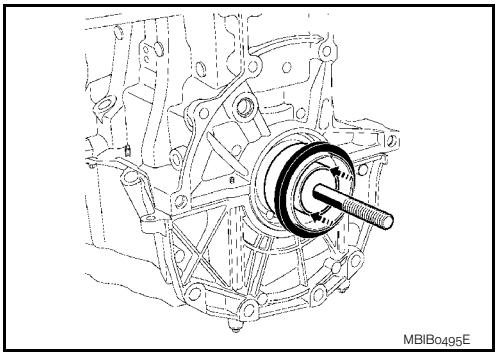
26. Crankshaft elastomer seal, flywheel side.
27. Install front oil seal drift set [SST: KV113B0210 (Mot. 1585)] on the crankshaft, securing it with bolts (F).



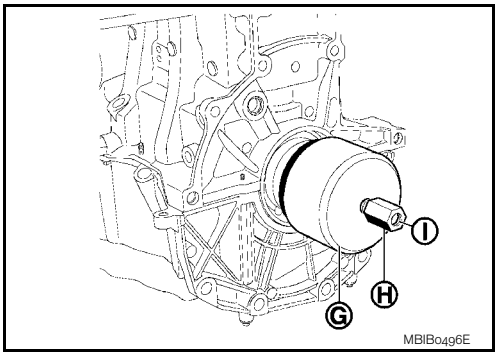
MBIB0494E

cardiagn.com

28. Put the protector complete with the seal on front oil seal drift set [SST: KV113B0210 (Mot. 1585)], being careful not to touch the seal.

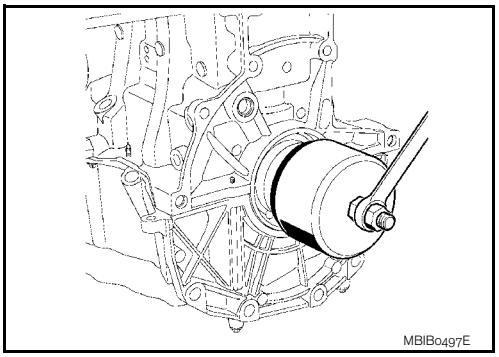

MBIB0495E

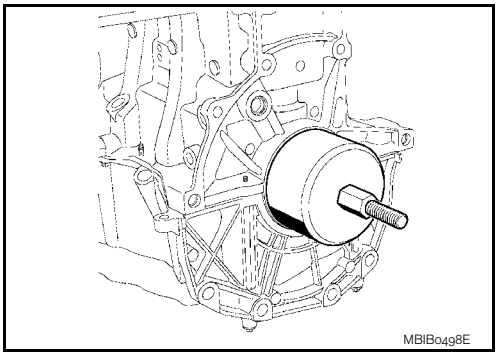
29. Install the cover (G) and nut (H) (putting the threaded part (I) of the nut on the side away from the engine) of front oil seal drift set [SST: KV113B0210 (Mot. 1585)].



MBIB0496E

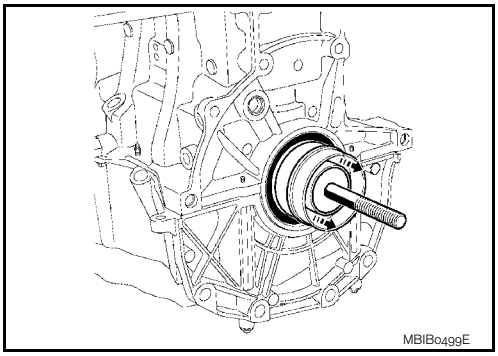
30. Tighten the nut until the cover touches the cylinder block.


MBIB0497E


MBIB0498E

cardiagn.com

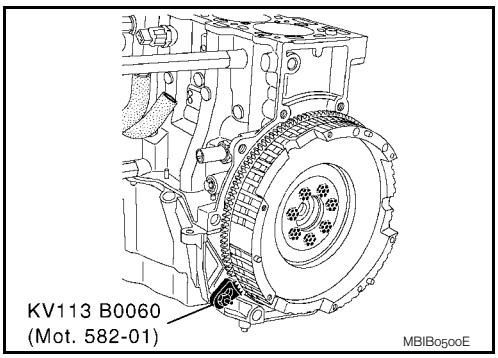
31. Remove the nut, the cover, the protector and the threaded rod.



32. Install ring gear stopper [SST: KV113B0060 (Mot. 582-01)] and tighten flywheel bolts with new one.

: **20.0 N·m (2.0 kg-m, 15 ft-lb)**

33. Turn all bolts 36 degrees clockwise (angle tightening).
CAUTION:
Check and confirm the tightening angle by using the angle wrench [SST: KV10112100 (—)] or protractor. Avoid judgment by visual inspection without the tool.
34. Install the clutch housing. Refer to CL-18, "K9K : Removal and Installation".
35. Remove ring gear stopper [SST: KV113B0060 (Mot. 582-01)].



Inspection

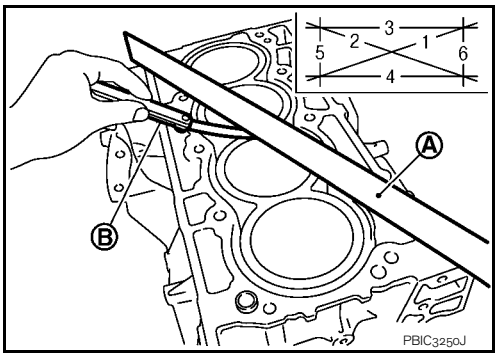
INFOID:0000000001063244

CYLINDER BLOCK TOP SURFACE DISTORTION

- Using a scraper, remove gasket on the cylinder block surface, and also remove engine oil, scale, carbon, or other contamination.
CAUTION:
Be careful not to allow gasket flakes to enter engine oil or engine coolant passages.
- Measure the distortion on the cylinder block upper face at some different points in six directions with a straight edge (A) and feeler gauge (B).

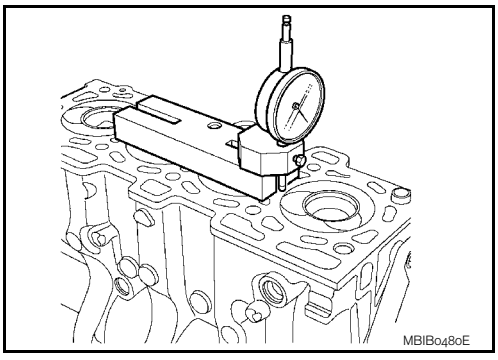
Limit : Refer to EM-333, "Cylinder Block".

- If it exceeds the limit, replace cylinder block.



PISTON PROTRUSION

1. Clean the piston head.
2. Turn the crankshaft one turn in its operating direction to bring piston No. 1 close to TDC.
3. Install dial gauge stand set [KV113B0050 (Mot. 252-01) (commercial service tool) or equivalent tool] on the piston.
4. Install dial gauge stand set [KV113B0040 (Mot. 251-01) (commercial service tool) or equivalent tool] equipped with a gauge on dial gauge stand set [KV113B0050 (Mot. 252-01) (commercial service tool) or equivalent tool], and find TDC.
NOTE:
All measurements must be carried out along the longitudinal axis of the engine, in order to eliminate any errors due to tilting of the piston.



cardiagn.com

WARNING:
The gauge follower must not be in the valve clearance.

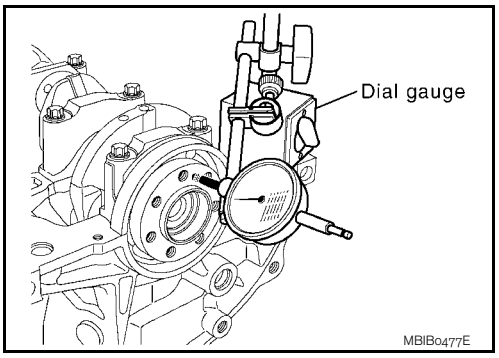
5. Inspect the piston protrusion.

Standard : Refer to EM-333, "Cylinder Block".

CRANKSHAFT LATERAL PLAY

1. Install crankshaft.
2. Inspect the lateral play.

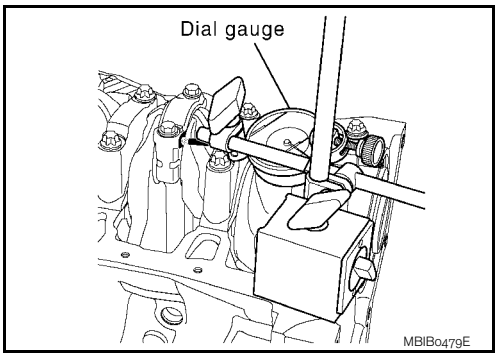
Standard : Refer to EM-333, "Cylinder Block".



CONNECTING ROD BIG END LONGITUDINAL PLAY

1. Install crankshaft.
2. Install piston and connecting rod assembly.
3. Inspect that the big end lateral play.

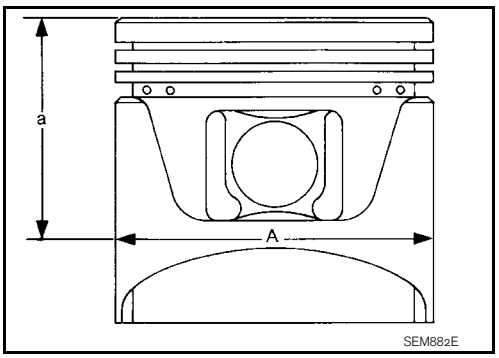
Standard : Refer to EM-333, "Cylinder Block".



PISTON DIAMETER

Measure the piston diameter.
The piston diameter (A) must be measured at height (a) = 56 mm (2.205 in).

Standard : Refer to EM-333, "Cylinder Block".



PISTON RING THICKNESS

Measure piston ring thickness with micrometer.

Standard : Refer to EM-333, "Cylinder Block".

- The piston rings are supplied ready adjusted.

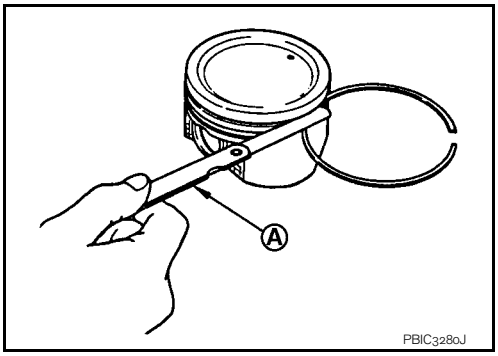
PISTON RING SIDE CLEARANCE

cardiagn.com

- Measure the side clearance of piston ring and piston ring groove with a feeler gauge (A).

Standard : Refer to EM-333, "Cylinder Block".

- If the measured value exceeds the limit, replace piston ring, and measure again. If it still exceeds the limit, replace piston also.

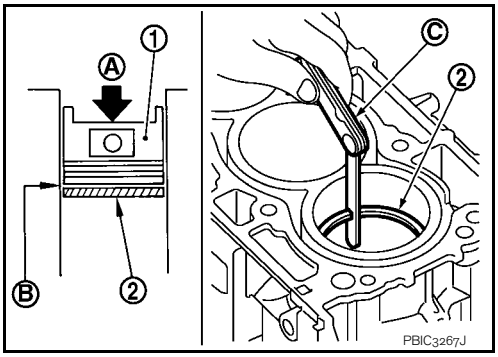


PISTON RING END GAP

- Lubricate with new engine oil to piston (1) and piston ring (2), and then insert (A) piston ring until middle of cylinder (B) with piston, and measure piston ring end gap with a feeler gauge (C).

Standard : Refer to EM-333, "Cylinder Block".

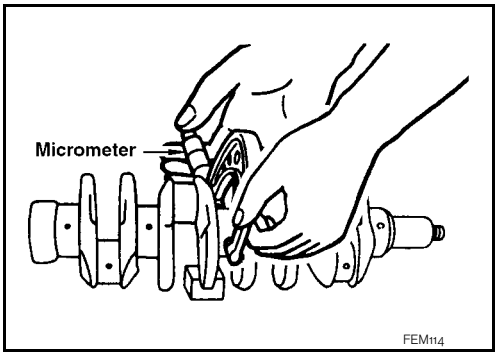
- If the measured value exceeds the limit, replace piston ring.



CRANKSHAFT MAIN JOURNAL DIAMETER

Use micrometer to measure crankshaft main journal diameter.

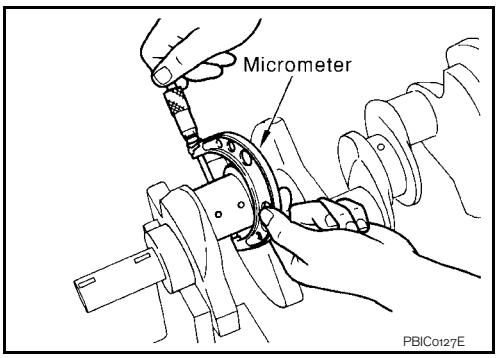
Standard : Refer to EM-333, "Cylinder Block".



CRANKSHAFT PIN JOURNAL DIAMETER

Use micrometer to measure crankshaft pin journal diameter.

Standard : Refer to EM-333, "Cylinder Block".



cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

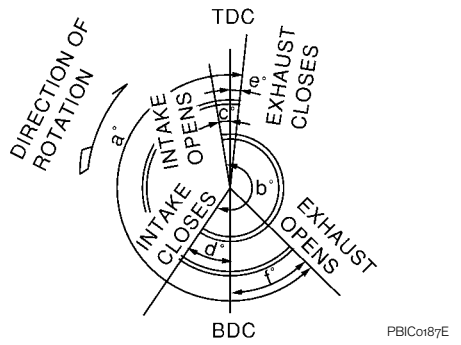
General Specification

INFOID:0000000001094019

GENERAL SPECIFICATIONS

Cylinder arrangement		In-line 4
Displacement cm^3 (cu in)		1.461 (89.15)
Bore and stroke mm (in)		76 x 80.5 (2.99 x 3.17)
Valve arrangement		SOHC
Firing order		1-3-4-2
Number of piston rings	Compression	2
	Oil	1
Number of main bearings		5
Compression ratio		15.3
Compression pressure kPa (bar, kg/cm^2, psi)		Maximum pressure must be at least 1,800 (18, 18.36, 261)

Valve timing



PBIC0187E

a	b	c	d	e	f
200°	191°	-9°	20°	-7°	27°

Drive Belt

INFOID:0000000001094020

DRIVE BELT

Tension of drive belt	Auto adjustment by auto-tensioner

Camshaft

INFOID:0000000001094024

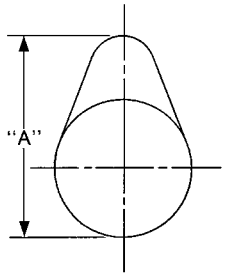
CAMSHAFT

Unit: mm (in)

Items		Standard
Camshaft bracket inner diameter	No. 1, 2, 3, 4, 5	25.04 - 25.06 (0.9858 - 0.9866)
	No. 6	28.04 - 28.06 (1.1039 - 1.1047)
Camshaft journal diameter	No. 1, 2, 3, 4, 5	24.979 - 25.000 (0.9834 - 0.9843)
	No. 6	27.979 - 28.000 (1.1015 - 1.1024)
Camshaft end play		0.080 - 0.178 (0.0031 - 0.0070)
Camshaft runout		Less than 0.05 (0.0020)

cardiagn.com

Items		Standard
Camshaft cam height “A”	Intake	43.985 - 44.045 (1.7317 - 1.7341)
	Exhaust	44.565 - 44.625 (1.7545 - 1.7569)



SEM671

VALVE LIFTER

Unit: mm (in)

Items	Standard
Valve lifter outer diameter	34.965 - 34.985 (1.3767 - 1.3774)
Valve lifter hole diameter	35.000 - 35.040 (1.3780 - 1.3795)
Valve lifter clearance	0.015 - 0.075 (0.0006 - 0.0030)

VALVE CLEARANCE

Unit: mm (in)

Items	Cold
Intake	0.125 - 0.250 (0.0049 - 0.0098)
Exhaust	0.325 - 0.450 (0.0128 - 0.0177)

AVAILABLE VALVE LIFTER

Unit: mm (in)

Part number	Thickness
13229BN700	7.550 (0.2972)
13229BN701	7.575 (0.2982)
13229BN702	7.600 (0.2992)
13229BN703	7.625 (0.3002)
13229BN704	7.650 (0.3012)
13229BN705	7.675 (0.3022)
13229BN706	7.700 (0.3031)
13229BN707	7.725 (0.3041)
13229BN708	7.750 (0.3051)
13229BN709	7.775 (0.3061)
13229BN710	7.800 (0.3071)
13229BN711	7.825 (0.3081)
13229BN712	7.850 (0.3091)
13229BN713	7.875 (0.3100)
13229BN714	7.900 (0.3110)
13229BN715	7.925 (0.3120)
13229BN716	7.950 (0.3130)
13229BN717	7.975 (0.3140)

cardiagn.com

Part number	Thickness
13229BN718	8.000 (0.3150)
13229BN719	8.025 (0.3159)
13229BN720	8.050 (0.3169)
13229BN721	8.075 (0.3179)
13229BN722	8.100 (0.3189)
13229BN723	8.125 (0.3199)
13229BN724	8.150 (0.3209)

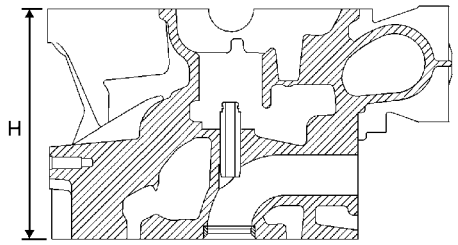
Cylinder Head

INFOID:0000000001094025

CYLINDER HEAD

Unit: mm (in)

Items	Standard
Cylinder head gasket thickness	0.68 - 0.74 (0.0269 - 0.0291)
Head surface distortion	Less than 0.05 (0.002)
Normal cylinder head height “H”	127 (5.000)



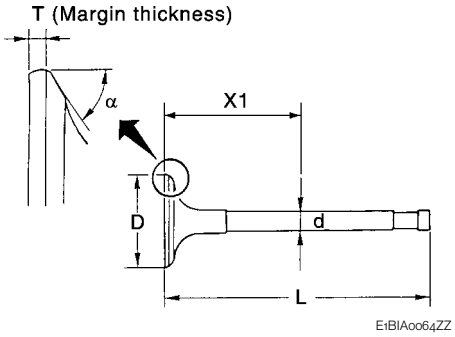
E1BIAoo63ZZ

VALVE DIMENSIONS

Items			Standard
Valve head diameter “D”	mm (in)	Intake	33.38 - 33.62 (1.314 - 1.324)
		Exhaust	28.88 - 29.12 (1.137 - 1.146)
Valve length “L”	mm (in)	Intake	100.74 - 101.16 (3.9661 - 3.9827)
		Exhaust	100.54 - 100.96 (3.9583 - 3.9748)
Valve stem diameter “d”	mm (in)	Intake	5.969 - 5.985 (0.2350 - 0.2356) Measuring point (X1) is 41 (1.61)
		Exhaust	5.955 - 5.971 (0.2344 - 0.2351) Measuring point (X1) is 41 (1.61)
Valve seat angle “α”	degree		45°00′ (45.00°)
Valve margin “T”	mm (in)		1.0 (0.039)

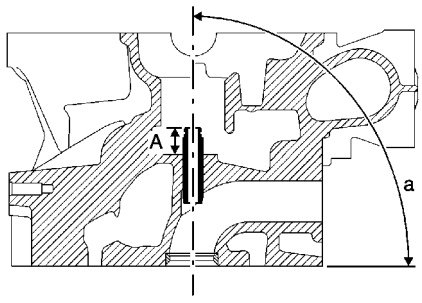
cardiagn.com

Items			Standard
Valve lift	mm (in)	Intake	8.0 (0.315)
		Exhaust	8.6 (0.339)



VALVE GUIDE

Items			Standard
Valve guide	mm (in)	Length	40.35 - 40.65 (1.5886 - 1.6004)
		Outer diameter	10.956 - 11.062 (0.4313 - 0.4355)
		Inner diameter (Finished size)	6.000 - 6.018 (0.2362 - 0.2369)
Cylinder head valve guide hole diameter	mm (in)		11.0 (0.4431)
Valve guide clearance	mm (in)	Intake	0.020 - 0.050 (0.0008 - 0.0020)
		Exhaust	0.030 - 0.063 (0.0012 - 0.0025)
Projection length “A”	mm (in)	Intake	14.0 (0.5512)
		Exhaust	14.2 (0.5591)
Valve guide inclination angle “a”	degree		90°00′ (90.00°)

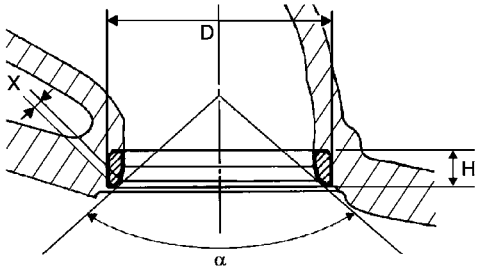


VALVE SEAT

Items			Standard
Cylinder head seat recess diameter “D”	mm (in)	Intake	34.444 - 34.474 (1.3561 - 1.3572)
		Exhaust	29.955 - 29.985 (1.1793 - 1.1805)
Valve seat outer diameter “D”	mm (in)	Intake	34.534 - 34.550 (1.3596 - 1.3602)
		Exhaust	30.035 - 30.048 (1.1825 - 1.1830)
Angle “α”	degree		89°30′ (89.50°)
Contacting width “X”	mm (in)		1.8 (0.071)
Valve seat height “H”	mm (in)	Intake	4.61 - 4.69 (0.1815 - 0.1846)
		Exhaust	5.63 - 5.71 (0.2217 - 0.2248)

cardiagn.com

Items		Standard
Cylinder head seat recess depth “H” mm (in)	Intake	6.0 (0.236)
	Exhaust	7.0 (0.276)



E1BIAoo66ZZ

VALVE SPRING

Items		Standard
Free height	mm (in)	43.31 (1.7051)
Pressure	N (kg, lb) at height mm (in)	218 - 242 (22.2 - 24.7, 49.0 - 54.4) at 33.80 (1.3307)
		477 - 523 (48.7 - 53.3, 107.2 - 117.6) at 24.80 (0.9764)
Spring squareness	mm (in)	1.2 (0.047)
Full pressed height	mm (in)	23.40 (0.9213)
Diameter of wire	mm (in)	3.45 (0.1358)
Outer diameter at the top of spring	mm (in)	20.8 - 21.2 (0.8189 - 0.8346)
Outer diameter at the bottom of spring	mm (in)	25.5 - 25.9 (1.0039 - 1.0197)
Inner diameter at the top of spring	mm (in)	13.9 - 14.3 (0.5472 - 0.5630)
Inner diameter at the bottom of spring	mm (in)	18.6 - 19.0 (0.7323 - 0.7480)

Cylinder Block

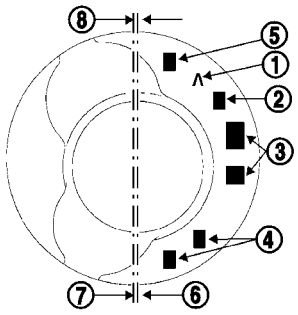
INFOID:0000000001094026

CYLINDER BLOCK

Unit: mm (in)

Items	Standard
Cylinder block top surface clearance	Less than 0.05 (0.002)

PISTON MARKING



MBIBo337E

1	Direction of fitting of the piston mark towards the flywheel
2	Height between the piston pin and the top of the piston (see table below).

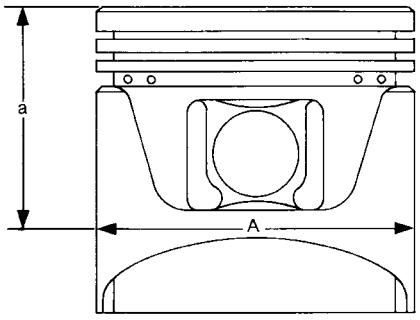
cardiagn.com

3	Used by the supplier only
4	Used by the supplier only
5	Used by the supplier only
6	Piston axis of symmetry
7	Piston pin hole axis
8	Offset between the hole axis (7) and the piston's axis of symmetry (6) is 0.3 mm (0.012 in)

PISTON

Unit: mm (in)

Items			Standard
Piston skirt diameter “A”	mm (in)		75.938 - 75.952 (2.9897 - 2.9902)
“a” dimension	mm (in)		56.0 (2.205)
Piston pin hole diameter	mm (in)	Category J	41.605 - 41.646 (1.6380 - 1.6396)
		Category K	41.647 - 41.688 (1.6396 - 1.6413)
		Category L	41.689 - 41.730 (1.6413 - 1.6429)
		Category M	41.731 - 41.772 (1.6429 - 1.6446)
		Category N	41.773 - 41.814 (1.6446 - 1.6462)
“b” dimension	mm (in)		26.0 (1.024)
Capacity of combustion chamber	m ℓ (Imp fl oz)		19.71 - 20.21 (0.67 - 0.71)
Piston protrusion	mm (in)		0.030 - 0.288 (0.0012 - 0.113)



SEM882E

PISTON RING

Unit: mm (in)

Items		Standard
Thickness	Top	1.97 - 1.99 (0.0776 - 0.0783)
	2nd	1.97 - 1.99 (0.0776 - 0.0783)
	Oil ring	2.47 - 2.49 (0.0972 - 0.0980)
Side clearance	Top	0.10 - 0.12 (0.0039 - 0.0047)
	2nd	0.08 - 0.10 (0.0031 - 0.0039)
	Oil ring	0.03 - 0.05 (0.0012 - 0.0020)
Piston ring end gap	Top	0.20 - 0.35 (0.0079 - 0.0138)
	2nd	0.70 - 0.90 (0.0276 - 0.0354)
	Oil ring	0.25 - 0.50 (0.0098 - 0.0197)

PISTON PIN

Unit: mm (in)

Items	Standard
Length	59.7 - 60.0 (2.350 - 2.362)
Piston pin outer diameter	25.995 - 26.000 (1.0234 - 1.0236)

cardiagn.com

CONNECTING ROD

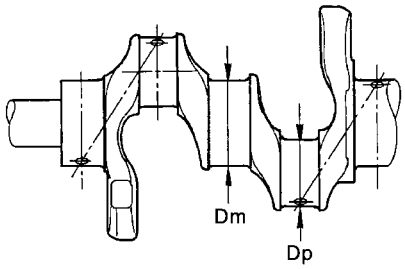
Unit: mm (in)

Items	Standard
Center distance	133.75 (5.266)
Connecting rod small end diameter (with bush)	26.013 - 26.025 (1.0241 - 1.0246)
Connecting rod big end diameter	47.610 - 47.627 (1.8744 - 1.8751)
Big end longitudinal play	0.205 - 0.467 (0.0081 - 0.0184)
Big end radial play	0.010 - 0.064 (0.004 - 0.025)

CRANKSHAFT

Unit: mm (in)

Items	Standard
Main journal diameter “Dm”	47.99 - 48.01 (1.8894 - 1.8902)
Pin journal diameter “Dp”	43.96 - 43.98 (1.7307 - 1.7315)
Maximum run-out allowed on the flywheel bearing face of the flywheel	0.6 (0.024)
Lateral play (without lateral shim)	0.045 - 0.252 (0.0018 - 0.0099)
Lateral play (with lateral shim)	0.045 - 0.852 (0.0018 - 0.0335)
Journal radial play	0.010 - 0.054 (0.0004 - 0.0021)



E1BIAoo67ZZ

Turbocharger

INFOID:0000000001096242

Items		Standard
Regulation value operating vacuum	kPa (bar, kg/cm^2, psi)	50 (0.5, 0.51, 7.3)
Valve rod moving length	mm (in)	1.7 (0.067)

cardiagn.com

SECTION EX
EXHAUST SYSTEM

CONTENTS

HR16DE

PRECAUTION 2

PRECAUTIONS 2
Removal and Installation 2

PREPARATION 3

PREPARATION 3
Special Service Tools 3
Commercial Service Tools 3

ON-VEHICLE MAINTENANCE 4

EXHAUST SYSTEM 4
Inspection 4

ON-VEHICLE REPAIR 5

EXHAUST SYSTEM 5
Exploded View 5
Removal and Installation 5
Inspection 6

MR20DE

PRECAUTION 7

PRECAUTIONS 7
Removal and Installation 7

PREPARATION 8

PREPARATION 8
Special Service Tools 8
Commercial Service Tools 8

ON-VEHICLE MAINTENANCE 9

EXHAUST SYSTEM 9
Inspection 9

ON-VEHICLE REPAIR 10

EXHAUST SYSTEM 10
Exploded View 10
Removal and Installation 10
Inspection 11

K9K

PRECAUTION 13

PRECAUTIONS 13
Removal and Installation 13

ON-VEHICLE MAINTENANCE 14

EXHAUST SYSTEM 14
Inspection 14

ON-VEHICLE REPAIR 15

EXHAUST SYSTEM 15
Exploded View 15
Removal and Installation 15
Inspection 16

cardiagn.com

PRECAUTION

PRECAUTIONS

Removal and Installation

INFOID:0000000000905770

CAUTION:

- **Be sure to use genuine exhaust system parts or equivalents which are specially designed for heat resistance, corrosion resistance, and shape.**
- **Perform the operation with the exhaust system fully cooled down because the system will be hot just after engine stops.**
- **Be careful not to cut your hand on the heat insulator edge.**

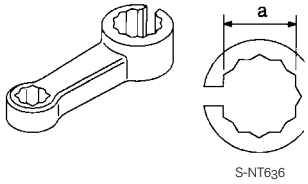
cardiagn.com

PREPARATION

PREPARATION

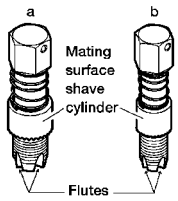
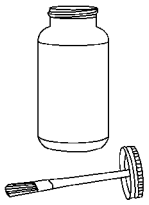
Special Service Tools

INFOID:0000000000905778

Tool number Tool name	Description
KV10114400 Heated oxygen sensor wrench  S-NT636	Loosening or tightening heated oxygen sensor 2 **For 22 mm (0.87 in) width hexagon nut**

Commercial Service Tools

INFOID:0000000000905779

Tool name	Description
Heated oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new heated oxygen sensor (Use with anti-seize lubricant shown below.) **a: 18 mm (0.71 in) dia. for zirconia heated oxygen sensor** **b: 12 mm (0.47 in) dia. for titania heated oxygen sensor**
Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907)  AEM489	Lubricating heated oxygen sensor thread cleaner when reconditioning exhaust system threads

cardiagn.com

ON-VEHICLE MAINTENANCE

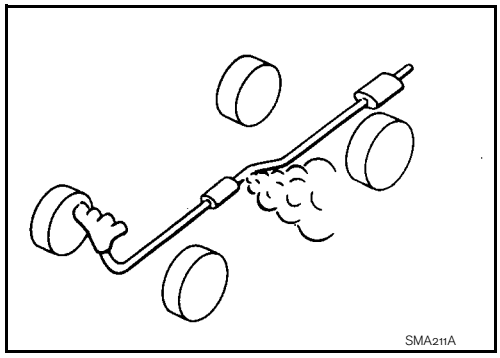
EXHAUST SYSTEM

Inspection

INFOID:0000000000905773

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage or deterioration.

- If anything is found, repair or replace damaged parts.



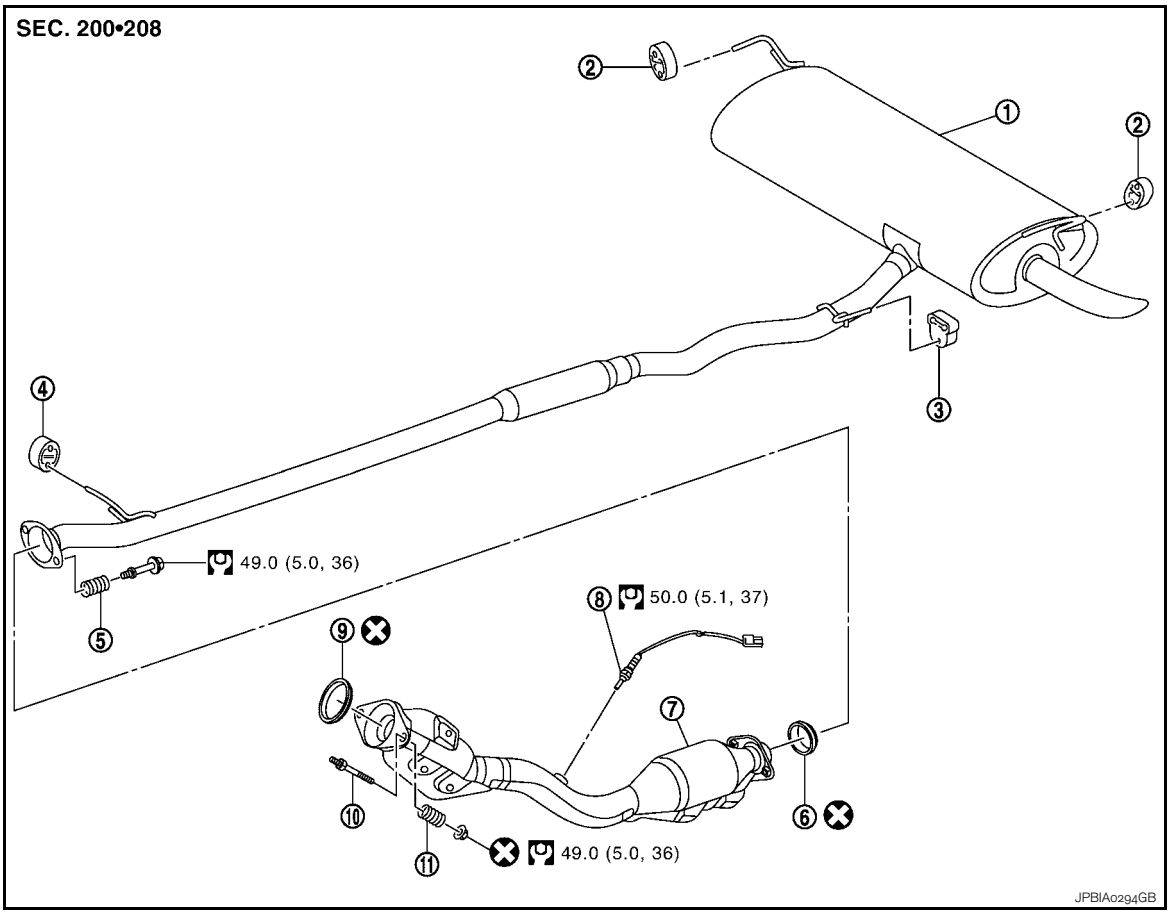
cardiagn.com

ON-VEHICLE REPAIR

EXHAUST SYSTEM

Exploded View

INFOID:0000000000905774



1. Main muffler
2. Mounting rubber
3. Mounting rubber
4. Mounting rubber
5. Spring
6. Seal bearing
7. Exhaust front tube
8. Heated oxygen sensor 2
9. Seal bearing
10. Stud bolt
11. Spring

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000905775

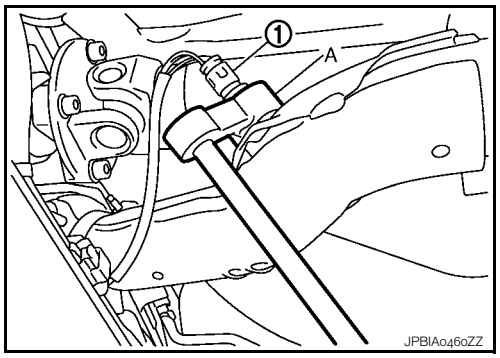
REMOVAL

- Disconnect each joint and mounting.
- Remove heated oxygen sensor 2 with following procedure.

- Using heated oxygen sensor wrench [SST: KV10114400] (A), removal heated oxygen sensor 2 (1).

CAUTION:

Be careful not to damage heated oxygen sensor 2.



cardiagn.com

INSTALLATION

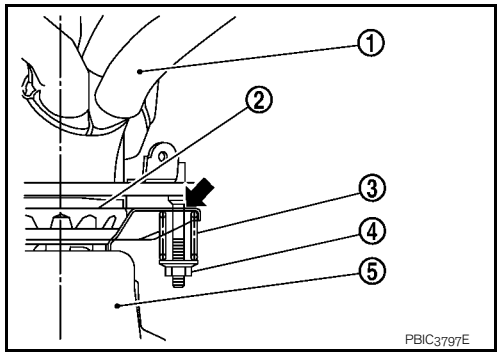
Note the following, and install in the reverse order of removal.

CAUTION:

- **Always replace seal bearings with new ones when reassembling.**
- **Discard any heated oxygen sensor 2 which has been dropped onto a hard surface such as a concrete floor; use a new one.**
- **Before installing a new heated oxygen sensor 2, clean exhaust system threads using the heated oxygen sensor thread cleaner and apply anti-seize lubricant (commercial service tool).**
- **Never over torque heated oxygen sensor 2. Doing so may cause damage to the heated oxygen sensor 2, resulting in the "MI" coming on.**
- **Remove deposits from the sealing surface of each connection. Connect them securely to avoid gas leakage.**
- **When installing each mounting rubber, avoid twisting or unusual extension in up/down and right/left directions.**
- **Temporarily tighten mounting nuts and bolts. Check each part for unusual interference, and then tighten them to the specified torque.**

Exhaust Manifold to Exhaust Front Tube

1. Securely insert seal bearing (2) into exhaust manifold (1) side in the direction shown in figure.



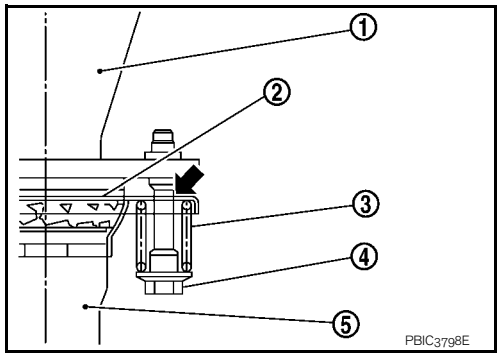
3 : Spring
4 : Mounting nut
5 : Exhaust front tube

CAUTION:
Be careful not to damage seal bearing surface when installing.

2. With spring, tighten mounting nut.
   - Be careful that mounting nut does not interfere with flanged area (⬅), and tighten it.

Exhaust Front Tube to Main Muffler

1. Securely insert seal bearing (2) into exhaust front tube (1) side in the direction shown in figure.



3 : Spring
4 : Mounting bolt
5 : Main muffler

CAUTION:
Be careful not to damage seal bearing surface when installing.

2. With spring, tighten mounting bolt.
   - Be careful that mounting bolt does not interfere with flanged area (⬅), and tighten it.

Inspection

INFOID:0000000000905776

INSPECTION AFTER INSTALLATION

- Make sure clearance between tail tube and rear bumper is even.
- With engine running, check exhaust tube joints for gas leakage and unusual noises.
- Ensure that mounting brackets and mounting rubbers are installed properly and free from undue stress. Improper installation could result in excessive noise and vibration.

cardiagn.com

PRECAUTION

PRECAUTIONS

Removal and Installation

INFOID:0000000000905816

CAUTION:

- **Be sure to use genuine exhaust system parts or equivalents which are specially designed for heat resistance, corrosion resistance, and shape.**
- **Perform the operation with the exhaust system fully cooled down because the system will be hot just after engine stops.**
- **Be careful not to cut your hand on the heat insulator edge.**

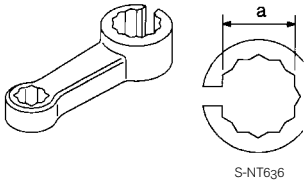
cardiagn.com

PREPARATION

PREPARATION

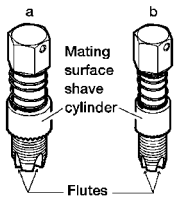
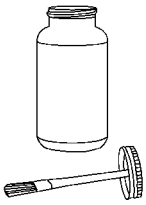
Special Service Tools

INFOID:0000000000905819

Tool number Tool name	Description
KV10114400 Heated oxygen sensor wrench  S-NT636	Loosening or tightening heated oxygen sensor 2 **For 22 mm (0.87 in) width hexagon nut**

Commercial Service Tools

INFOID:0000000000905821

Tool name	Description
Heated oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new heated oxygen sensor (Use with anti-seize lubricant shown below.) **a: 18 mm (0.71 in) dia. for zirconia heated oxygen sensor** **b: 12 mm (0.47 in) dia. for titania heated oxygen sensor**
Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907)  AEM489	Lubricating heated oxygen sensor thread cleaner when reconditioning exhaust system threads

cardiagn.com

ON-VEHICLE MAINTENANCE

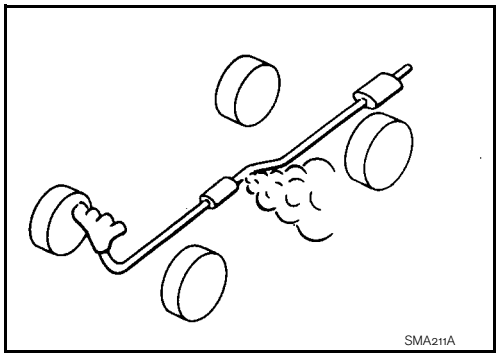
EXHAUST SYSTEM

Inspection

INFOID:0000000000905823

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage or deterioration.

- If anything is found, repair or replace damaged parts.



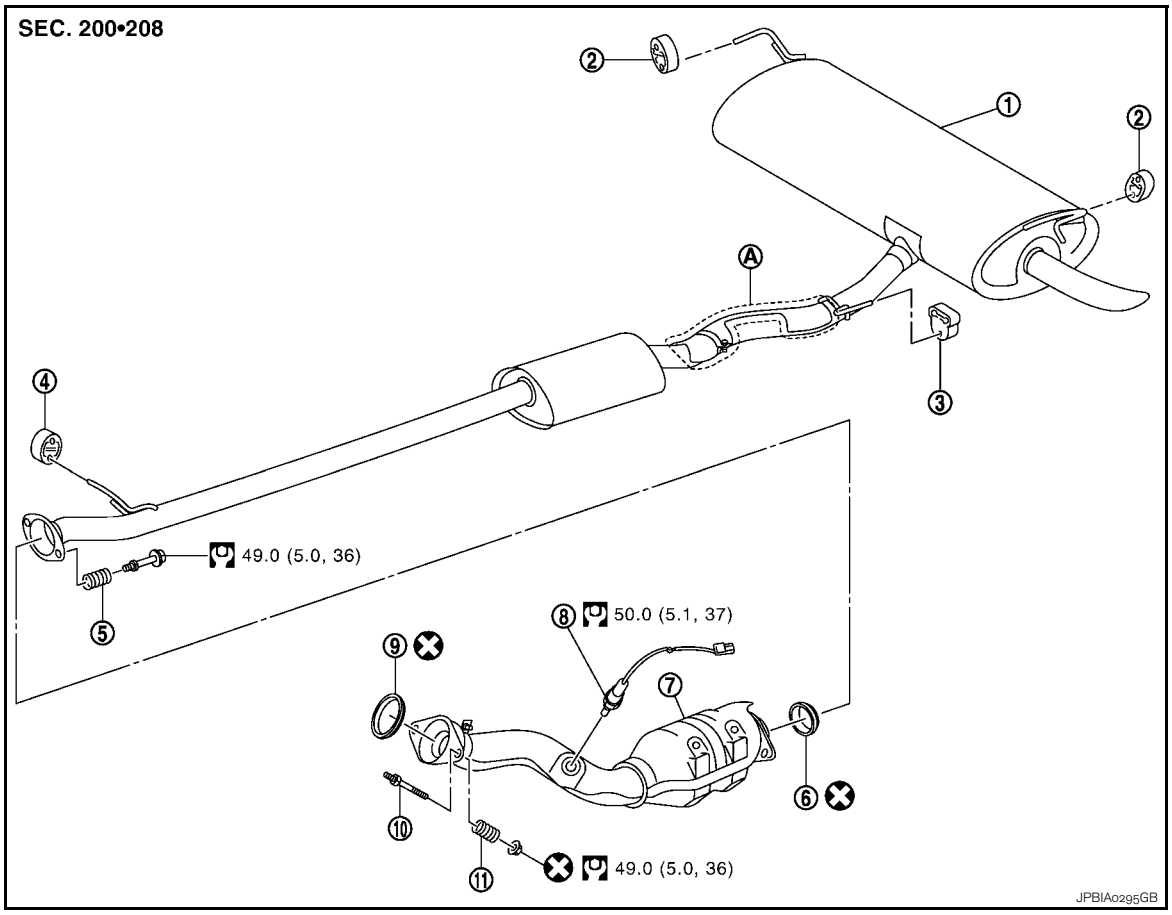
cardiagn.com

ON-VEHICLE REPAIR

EXHAUST SYSTEM

Exploded View

INFOID:0000000000905825



1. Main muffler
2. Mounting rubber
3. Mounting rubber
4. Mounting rubber
5. Spring
6. Seal bearing
7. Exhaust front tube
8. Heated oxygen sensor 2
9. Seal bearing
10. Stud bolt
11. Spring

A. Insulator (4WD models)

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000905826

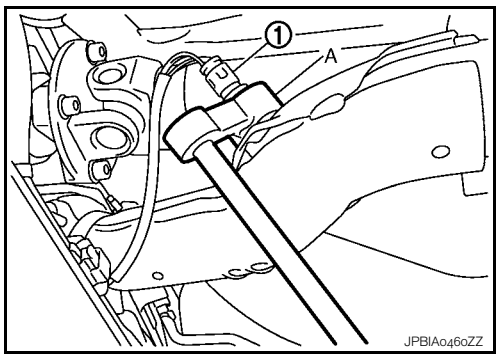
REMOVAL

- Disconnect each joint and mounting.
- Remove heated oxygen sensor 2 with following procedure.

cardiagn.com

- Using heated oxygen sensor wrench [SST: KV10114400] (A), removal heated oxygen sensor 2 (1).

CAUTION:
Be careful not to damage heated oxygen sensor 2.



INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

- **Always replace seal bearings with new ones when reassembling.**
- **Discard any heated oxygen sensor 2 which has been dropped onto a hard surface such as a concrete floor; use a new one.**
- **Before installing a new heated oxygen sensor 2, clean exhaust system threads using the heated oxygen sensor thread cleaner and apply anti-seize lubricant (commercial service tool).**
- **Never over torque heated oxygen sensor 2. Doing so may cause damage to the heated oxygen sensor 2, resulting in the "MI" coming on.**
- **Remove deposits from the sealing surface of each connection. Connect them securely to avoid gas leakage.**
- **Temporarily tighten mounting nuts and bolts. Check each part for unusual interference, and then tighten them to the specified torque.**
- **When installing each mounting rubber, avoid twisting or unusual extension in up/down and right/left directions.**

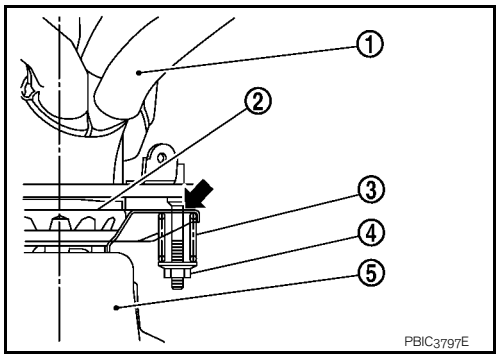
Exhaust Manifold to Exhaust Front Tube

1. Securely insert seal bearing (2) into exhaust manifold (1) side in the direction shown in figure.

   3 : Spring
   4 : Mounting nut
   5 : Exhaust front tube

   CAUTION:
   Be careful not to damage seal bearing surface when installing.

2. With spring, tighten mounting nut.
   - Be careful that mounting nut does not interfere with flanged area (⬅), and tighten it.



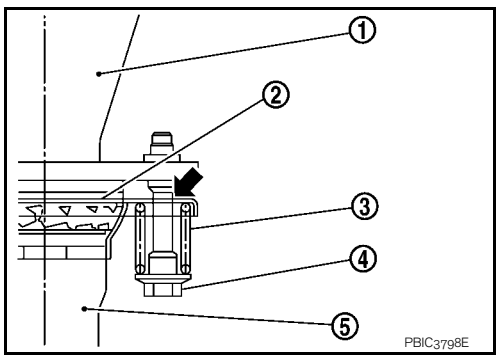
Exhaust Front Tube to Main Muffler

1. Securely insert seal bearing (2) into exhaust front tube (1) side in the direction shown in figure.

   3 : Spring
   4 : Mounting bolt
   5 : Main muffler

   CAUTION:
   Be careful not to damage seal bearing surface when installing.

2. With spring, tighten mounting bolt.
   - Be careful that mounting bolt does not interfere with flanged area (⬅), and tighten it.



Inspection

INFOID:0000000000905827

cardiagn.com

INSPECTION AFTER INSTALLATION

- Make sure clearance between tail tube and rear bumper is even.
- With engine running, check exhaust tube joints for gas leakage and unusual noises.
- Check to ensure that mounting brackets and mounting rubbers are installed properly and free from undue stress. Improper installation could result in excessive noise and vibration.

cardiagn.com

PRECAUTION

PRECAUTIONS

Removal and Installation

INFOID:0000000001062578

CAUTION:

- **Be sure to use genuine exhaust system parts or equivalents which are specially designed for heat resistance, corrosion resistance, and shape.**
- **Perform the operation with the exhaust system fully cooled down because the system will be hot just after engine stops.**
- **Be careful not to cut your hand on the heat insulator edge.**

cardiagn.com

ON-VEHICLE MAINTENANCE

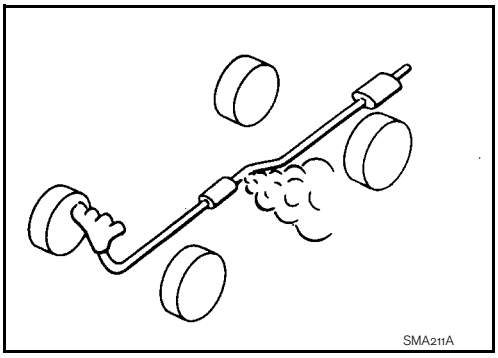
EXHAUST SYSTEM

Inspection

INFOID:0000000001062581

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage or deterioration.

- If anything is found, repair or replace damaged parts.



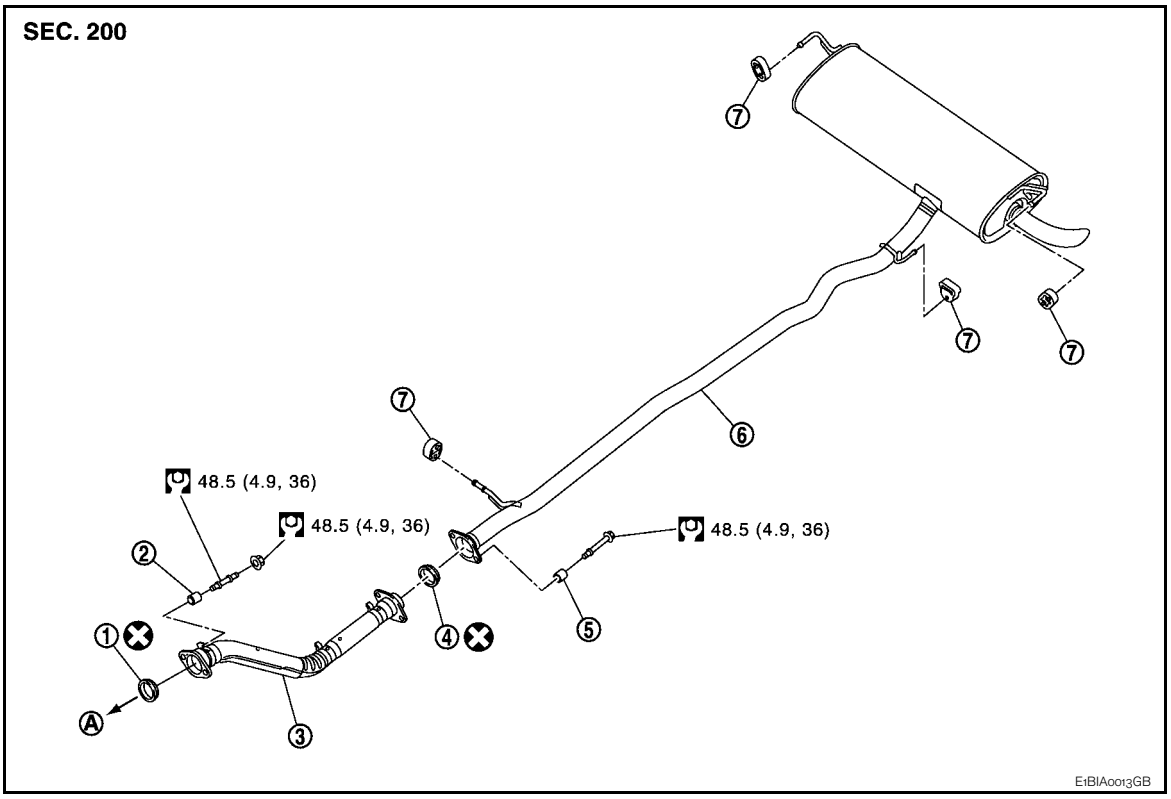
cardiagn.com

ON-VEHICLE REPAIR

EXHAUST SYSTEM

Exploded View

INFOID:0000000001062582



1. Seal bearing
2. Spring
3. Exhaust front tube
4. Seal bearing
5. Spring
6. Muffler
7. Mounting rubber
A. To catalyst

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001062587

CAUTION:
- **Be sure to use genuine exhaust system parts or equivalents which are specially designed for heat resistance, corrosion resistance and shape.**
- **Perform the operation with the exhaust system fully cooled down because the system is still hot just after the engine stops.**
- **Be careful not to cut your hand on the insulator edge.**

REMOVAL
- Disconnect each joint and mounting.

INSTALLATION
- Install in the reverse order of removal.

CAUTION:
- **Always replace exhaust gaskets with new ones when reassembling.**
- **If the insulator is badly deformed, repair or replace it. If deposits such as mud pile up on the insulator, remove them.**
- **When installing the insulator avoid large gaps or interference between the insulator and each exhaust pipe.**

cardiagn.com

- **Remove deposits from the sealing surface of each connection. Connect them securely to avoid gas leakage.**
- **Temporarily tighten mounting nuts on the exhaust manifold side and mounting bolts on the vehicle side. Check each part for unusual interference, and then tighten them to the specified torque.**
- **When installing each mounting rubber, avoid twisting or unusual extension in up/down and right/left directions.**

Inspection

INFOID:0000000001062584

INSPECTION AFTER INSTALLATION

- With the engine running, check exhaust tube joints for gas leakage and unusual noises.
- Check to ensure that mounting brackets and mounting insulators are installed properly and free from undue stress. Improper installation could result in excessive noise and vibration.

cardiagn.com

SECTION EXL
EXTERIOR LIGHTING SYSTEM

CONTENTS

XENON TYPE

BASIC INSPECTION 7

DIAGNOSIS AND REPAIR WORKFLOW 7
Work Flow 7

INSPECTION AND ADJUSTMENT 10

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 10
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 10
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement (HEADLAMP AIMING CONTROL UNIT) 10

SENSOR INITIALIZE 10
SENSOR INITIALIZE : Description 10
SENSOR INITIALIZE : Special Repair Requirement 10

FUNCTION DIAGNOSIS 11

HEADLAMP SYSTEM 11
System Diagram 11
System Description 11
Component Parts Location 12
Component Description 12

DAYTIME RUNNING LIGHT SYSTEM 13
System Diagram 13
System Description 13
Component Parts Location 13
Component Description 14

AUTO LIGHT SYSTEM 15
System Diagram 15
System Description 15
Component Parts Location 15
Component Description 16

FRONT FOG LAMP SYSTEM 17
System Diagram 17
System Description 17
Component Parts Location 17
Component Description 18

HEADLAMP AIMING CONTROL SYSTEM (AUTO) 19
System Diagram 19
System Description 19
Component Parts Location 19
Component Description 20

TURN SIGNAL AND HAZARD WARNING LAMP SYSTEM 21
System Diagram 21
System Description 21
Component Parts Location 21
Component Description 22

PARKING, LICENSE PLATE AND TAIL LAMPS SYSTEM 23
System Diagram 23
System Description 23
Component Parts Location 23
Component Description 24

REAR FOG LAMP SYSTEM 25
System Diagram 25
System Description 25
Component Parts Location 25
Component Description 26

DIAGNOSIS SYSTEM (BCM) 27

COMMON ITEM 27
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 27

HEADLAMP 27
HEADLAMP : CONSULT-III Function (BCM - HEAD LAMP) 27

A B C D E F G H I J K EXL M N O P

carDiagn.com

FLASHER 29
FLASHER : CONSULT-III Function (BCM - FLASHER) 29

DIAGNOSIS SYSTEM (IPDM E/R) 30
Diagnosis Description 30
CONSULT - III Function (IPDM E/R) 32

DIAGNOSIS SYSTEM (HEADLAMP LEVELIZER) 35
CONSULT-III Function (HEADLAMP LEVELIZER) 35

COMPONENT DIAGNOSIS 36

B2080 ECU TROUBLE 36
Description 36
DTC Logic 36
Diagnosis Procedure 36

B2081 INITIAL NOT DONE 37
DTC Logic 37
Diagnosis Procedure 37

B2082 SENSOR OUT OF RANGE 38
DTC Logic 38
Diagnosis Procedure 38

B2083 SEN SIG NOT PLAUSIBLE 39
DTC Logic 39
Diagnosis Procedure 39

B2084 VOLTAGE UNDER LIMIT 40
DTC Logic 40
Diagnosis Procedure 40

B2085 LOWBEAM SIG OPEN LINE 41
Description 41
DTC Logic 41
Diagnosis Procedure 41

B2086 FRQ. OVER LIMIT 43
Description 43
DTC Logic 43
Diagnosis Procedure 43

B2087 SHORT TO GROUND 45
DTC Logic 45
Diagnosis Procedure 45

B2088 SHORT TO BATTERY 46
DTC Logic 46
Diagnosis Procedure 46

B2089 NO CAR TYPE SELECTED 47
DTC Logic 47
Diagnosis Procedure 47

POWER SUPPLY AND GROUND CIRCUIT 48

BCM (BODY CONTROL MODULE) 48
BCM (BODY CONTROL MODULE) : Diagnosis Procedure 48

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 48
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) : Diagnosis Procedure 48

AUTO LEVELIZER CONTROL UNIT 49
AUTO LEVELIZER CONTROL UNIT : Diagnosis Procedure 49

EXTERIOR LAMP FUSE 51
Description 51
Diagnosis Procedure 51

HEADLAMP (HI) CIRCUIT 52
Component Function Check 52
Diagnosis Procedure 52

HEADLAMP (LO) CIRCUIT 54
Description 54
Component Function Check 54
Diagnosis Procedure 54

HEADLAMP GROUND CIRCUIT 56
Diagnosis Procedure 56

XENON HEADLAMP 57
Description 57
Diagnosis Procedure 57

HEADLAMP LEVELIZER CIRCUIT 59
Description 59
Component Function Check 59
Diagnosis Procedure 59

FRONT FOG LAMP CIRCUIT 62
Component Function Check 62
Diagnosis Procedure 62

PARKING LAMP CIRCUIT 64
Component Function Check 64
Diagnosis Procedure 64

TURN SIGNAL LAMP CIRCUIT 66
Description 66
Component Function Check 66
Diagnosis Procedure 66

LIGHT & RAIN SENSOR 69
Description 69
Component Function Check 69
Diagnosis Procedure 69

HAZARD SWITCH 72
Component Function Check 72
Diagnosis Procedure 72

TAIL LAMP CIRCUIT 74
Component Function Check .....

cardiagn.com

Diagnosis Procedure 74

LICENSE PLATE LAMP CIRCUIT 76
Component Function Check 76
Diagnosis Procedure 76

REAR FOG LAMP CIRCUIT 77
Component Function Check 77
Diagnosis Procedure 77

HEADLAMP SYSTEM 79
Wiring Diagram - HEADLAMP - 79

AUTO LIGHT SYSTEM 83
Wiring Diagram - AUTO LIGHT SYSTEM - 83

DAYTIME RUNNING LIGHT SYSTEM 87
Wiring Diagram - DAYTIME RUNNING LIGHT SYSTEM - 87

FRONT FOG LAMP SYSTEM 93
Wiring Diagram - FRONT FOG LAMP - 93

TURN SIGNAL AND HAZARD WARNING LAMP SYSTEM 96
Wiring Diagram - TURN AND HAZARD WARNING LAMPS - 96

PARKING, LICENSE PLATE AND TAIL LAMPS SYSTEM 100
Wiring Diagram - PARKING, LICENSE PLATE AND TAIL LAMPS - 100

STOP LAMP 105
Wiring Diagram - STOP LAMP - 105

BACK-UP LAMP 108
Wiring Diagram - BACK-UP LAMP - 108

REAR FOG LAMP SYSTEM 111
Wiring Diagram - REAR FOG LAMP - 111

ECU DIAGNOSIS 114

BCM (BODY CONTROL MODULE) 114
Reference Value 114
Wiring Diagram - BCM - 130
Fail Safe 134
DTC Inspection Priority Chart 135
DTC Index 136

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 137
Reference Value 137
Wiring Diagram - IPDM E/R - 143
Fail Safe 146
DTC Index 148

AUTO LEVELIZER CONTROL UNIT 149
Reference Value 149
Wiring Diagram - HEADLAMP AIMING CONTROL SYSTEM (AUTO) - 151
Fail Safe 153
DTC Inspection Priority Chart 154
DTC Index 154

SYMPTOM DIAGNOSIS 156

EXTERIOR LIGHTING SYSTEM SYMPTOMS. 156
Symptom Table 156

NORMAL OPERATING CONDITION 159
Description 159

BOTH SIDE HEADLAMPS (HI) ARE NOT TURNED ON 160
Description 160
Diagnosis Procedure 160

BOTH SIDE HEADLAMPS (LO) ARE NOT TURNED ON 161
Description 161
Diagnosis Procedure 161

PARKING, LICENSE PLATE AND TAIL LAMPS ARE NOT TURNED ON 162
Description 162
Diagnosis Procedure 162

BOTH SIDE FRONT FOG LAMPS ARE NOT TURNED ON 163
Description 163
Diagnosis Procedure 163

PRECAUTION 164

PRECAUTIONS 164
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 164
Precautions For Xenon Headlamp Service 164

ON-VEHICLE MAINTENANCE 165

HEADLAMP AIMING ADJUSTMENT 165
Description 165

LHD 166
LHD : Aiming Adjustment Procedure 166

RHD 167
RHD : Aiming Adjustment Procedure 167

FRONT FOG LAMP AIMING ADJUSTMENT . 169
Description 169
Aiming Adjustment Procedure 169

ON-VEHICLE REPAIR 171

FRONT COMBINATION LAMP 171
Exploded View 171
Removal and Installation 171
Replacement 172
Disassembly and Assembly 172

cardiagn.com

FRONT FOG LAMP 174
Exploded View 174
Removal and Installation 174
Replacement 174

LIGHT & RAIN SENSOR 175
Exploded View 175
Removal and Installation 175

LIGHTING & TURN SIGNAL SWITCH 177
Exploded View 177
Removal and Installation 177

SIDE TURN SIGNAL LAMP 178
Exploded View 178
Removal and Installation 178
Replacement 178

HAZARD SWITCH 179
Exploded View 179
Removal and Installation 179

AUTO LEVELIZER CONTROL UNIT 180
Exploded View 180
Removal and Installation 180

REAR COMBINATION LAMP 181
Exploded View 181
Removal and Installation 181
Replacement 181

HIGH-MOUNTED STOP LAMP 183
Exploded View 183
Removal and Installation 183

BACK-UP LAMP 184
Exploded View 184
Removal and Installation 184
Replacement 184

LICENSE PLATE LAMP 185
Exploded View 185
Removal and Installation 185
Replacement 185

REAR FOG LAMP 186
Exploded View 186
Removal and Installation 186
Replacement 186

SERVICE DATA AND SPECIFICATIONS (SDS) 187

SERVICE DATA AND SPECIFICATIONS (SDS) 187
Bulb Specifications 187

HALOGEN TYPE

BASIC INSPECTION 188

DIAGNOSIS AND REPAIR WORKFLOW 188
Work Flow 188

FUNCTION DIAGNOSIS 191

HEADLAMP SYSTEM 191
System Diagram 191
System Description 191
Component Parts Location 192
Component Description 192

DAYTIME RUNNING LIGHT SYSTEM 193
System Diagram 193
System Description 193
Component Parts Location 193
Component Description 194

AUTO LIGHT SYSTEM 195
System Diagram 195
System Description 195
Component Parts Location 195
Component Description 196

FRONT FOG LAMP SYSTEM 197
System Diagram 197
System Description 197
Component Parts Location 197
Component Description 198

TURN SIGNAL AND HAZARD WARNING LAMP SYSTEM 199
System Diagram 199
System Description 199
Component Parts Location 199
Component Description 200

PARKING, LICENSE PLATE AND TAIL LAMPS SYSTEM 201
System Diagram 201
System Description 201
Component Parts Location 201
Component Description 202

REAR FOG LAMP SYSTEM 203
System Diagram 203
System Description 203
Component Parts Location 203
Component Description 204

DIAGNOSIS SYSTEM (BCM) 205

COMMON ITEM 205
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 205

HEADLAMP 205
HEADLAMP : CONSULT-III Function (BCM - HEAD LAMP) 205

FLASHER 207
FLASHER : CONSULT-III Function (BCM - FLASHER) 207

DIAGNOSIS SYSTEM (IPDM E/R) 208
Diagnosis Description 208

cardiagn.com

CONSULT - III Function (IPDM E/R) 210

COMPONENT DIAGNOSIS 213

POWER SUPPLY AND GROUND CIRCUIT ... 213

BCM (BODY CONTROL MODULE) 213
BCM (BODY CONTROL MODULE) : Diagnosis Procedure 213

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 213
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) : Diagnosis Procedure 213

EXTERIOR LAMP FUSE 215
Description 215
Diagnosis Procedure 215

HEADLAMP (HI) CIRCUIT 216
Component Function Check 216
Diagnosis Procedure 216

HEADLAMP (LO) CIRCUIT 218
Component Function Check 218
Diagnosis Procedure 218

HEADLAMP GROUND CIRCUIT 220
Diagnosis Procedure 220

FRONT FOG LAMP CIRCUIT 221
Component Function Check 221
Diagnosis Procedure 221

PARKING LAMP CIRCUIT 223
Component Function Check 223
Diagnosis Procedure 223

TURN SIGNAL LAMP CIRCUIT 225
Description 225
Component Function Check 225
Diagnosis Procedure 225

LIGHT & RAIN SENSOR 228
Description 228
Component Function Check 228
Diagnosis Procedure 228

HAZARD SWITCH 231
Component Function Check 231
Diagnosis Procedure 231

TAIL LAMP CIRCUIT 233
Component Function Check 233
Diagnosis Procedure 233

LICENSE PLATE LAMP CIRCUIT 235
Component Function Check 235
Diagnosis Procedure 235

REAR FOG LAMP CIRCUIT 236
Component Function Check 236
Diagnosis Procedure 236

HEADLAMP SYSTEM 238
Wiring Diagram - HEADLAMP - 238

HEADLAMP AIMING CONTROL SYSTEM (MANUAL) 242
Description 242
Wiring Diagram - HEADLAMP AIMING CONTROL SYSTEM (MANUAL) - 242
Component Inspection 243

AUTO LIGHT SYSTEM 245
Wiring Diagram - AUTO LIGHT SYSTEM - 245

DAYTIME RUNNING LIGHT SYSTEM 249
Wiring Diagram - DAYTIME RUNNING LIGHT SYSTEM - 249

FRONT FOG LAMP SYSTEM 255
Wiring Diagram - FRONT FOG LAMP - 255

TURN SIGNAL AND HAZARD WARNING LAMP SYSTEM 258
Wiring Diagram - TURN AND HAZARD WARNING LAMPS - 258

PARKING, LICENSE PLATE AND TAIL LAMPS SYSTEM 262
Wiring Diagram - PARKING, LICENSE PLATE AND TAIL LAMPS - 262

STOP LAMP 267
Wiring Diagram - STOP LAMP - 267

BACK-UP LAMP 270
Wiring Diagram - BACK-UP LAMP - 270

REAR FOG LAMP SYSTEM 273
Wiring Diagram - REAR FOG LAMP - 273

ECU DIAGNOSIS 276

BCM (BODY CONTROL MODULE) 276
Reference Value 276
Wiring Diagram - BCM - 292
Fail Safe 296
DTC Inspection Priority Chart 297
DTC Index 298

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 299
Reference Value 299
Wiring Diagram - IPDM E/R - 305
Fail Safe 308
DTC Index 310

SYMPTOM DIAGNOSIS 311

EXTERIOR LIGHTING SYSTEM SYMPTOMS. 311
Symptom Table 311

carDiagn.com

NORMAL OPERATING CONDITION 314
Description 314

BOTH SIDE HEADLAMPS (HI) ARE NOT TURNED ON 315
Description 315
Diagnosis Procedure 315

BOTH SIDE HEADLAMPS (LO) ARE NOT TURNED ON 316
Description 316
Diagnosis Procedure 316

PARKING, LICENSE PLATE AND TAIL LAMPS ARE NOT TURNED ON 317
Description 317
Diagnosis Procedure 317

BOTH SIDE FRONT FOG LAMPS ARE NOT TURNED ON 318
Description 318
Diagnosis Procedure 318

PRECAUTION 319

PRECAUTIONS 319
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 319

ON-VEHICLE MAINTENANCE 320

HEADLAMP AIMING ADJUSTMENT 320
Description 320

LHD 321
LHD : Aiming Adjustment Procedure 321

RHD 322
RHD : Aiming Adjustment Procedure 322

FRONT FOG LAMP AIMING ADJUSTMENT . 324
Description 324
Aiming Adjustment Procedure 324

ON-VEHICLE REPAIR 326

FRONT COMBINATION LAMP 326
Exploded View 326
Removal and Installation 327
Replacement 327
Disassembly and Assembly 327

FRONT FOG LAMP 329
Exploded View 329
Removal and Installation 329
Replacement 329

LIGHT & RAIN SENSOR 330
Exploded View 330
Removal and Installation 330

LIGHTING & TURN SIGNAL SWITCH 332
Exploded View 332
Removal and Installation 332

SIDE TURN SIGNAL LAMP 333
Exploded View 333
Removal and Installation 333
Replacement 333

HAZARD SWITCH 334
Exploded View 334
Removal and Installation 334

HEADLAMP AIMING SWITCH 335
Exploded View 335
Removal and Installation 335

REAR COMBINATION LAMP 336
Exploded View 336
Removal and Installation 336
Replacement 336

HIGH-MOUNTED STOP LAMP 338
Exploded View 338
Removal and Installation 338

BACK-UP LAMP 339
Exploded View 339
Removal and Installation 339
Replacement 339

LICENSE PLATE LAMP 340
Exploded View 340
Removal and Installation 340
Replacement 340

REAR FOG LAMP 341
Exploded View 341
Removal and Installation 341
Replacement 341

SERVICE DATA AND SPECIFICATIONS (SDS) 342

SERVICE DATA AND SPECIFICATIONS (SDS) 342
Bulb Specifications 342

cardiagn.com

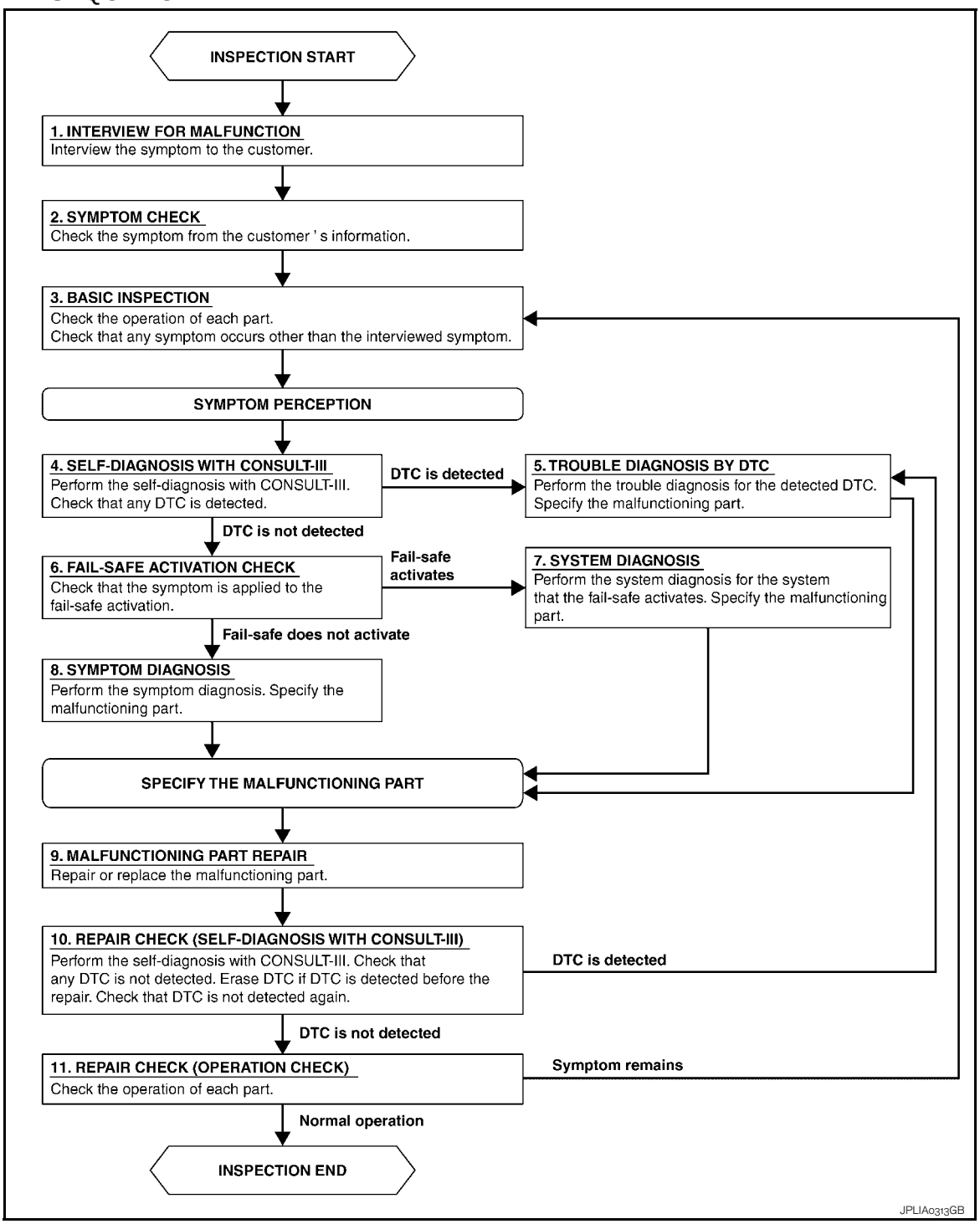
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001078334

OVERALL SEQUENCE



DETAILED FLOW

1. INTERVIEW FOR MALFUNCTION

Interview the symptom to the customer.

>> GO TO 2.

2.SYMPTOM CHECK

Check the symptom from the customer's information.

>> GO TO 3.

3.BASIC INSPECTION

Check the operation of each part. Check that any symptom occurs other than the interviewed symptom.

>> GO TO 4.

4.SELF-DIAGNOSIS WITH CONSULT-III

Perform the self-diagnosis with CONSULT-III. Check that any DTC is detected.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 6.

5.TROUBLE DIAGNOSIS BY DTC

Perform the trouble diagnosis for the detected DTC. Specify the malfunctioning part.

>> GO TO 9.

6.FAIL-SAFE ACTIVATION CHECK

Check that the symptom is applied to the fail-safe activation.

Does the fail-safe activate?

YES >> GO TO 7.
NO >> GO TO 8.

7.SYSTEM DIAGNOSIS

Perform the system diagnosis for the system that the fail-safe activates. Specify the malfunctioning part.

>> GO TO 9.

8.SYMPTOM DIAGNOSIS

Perform the symptom diagnosis. Specify the malfunctioning part.

>> GO TO 9.

9.MALFUNCTION PART REPAIR

Repair or replace the malfunctioning part.

>> GO TO 10.

10.REPAIR CHECK (SELF-DIAGNOSIS WITH CONSULT-III)

Perform the self-diagnosis with CONSULT-III. Check that any DTC is not detected. Erase DTC if DTC is detected before the repair. Check that DTC is not detected again.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 11.

11.REPAIR CHECK (OPERATION CHECK)

Check the operation of each part.

Does it operate normally?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 3.

cardiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000000955368

HEADLAMP AIMING CONTROL SYSTEM
Perform the sensor initialize with CONSULT-III when replacing the auto levelizer control unit.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement (HEADLAMP AIMING CONTROL UNIT)

INFOID:0000000000955369

1.SENSOR INITIALIZE

Perform the sensor initialize.

>> Refer to EXL-10, "SENSOR INITIALIZE : Special Repair Requirement".

SENSOR INITIALIZE

SENSOR INITIALIZE : Description

INFOID:0000000000955370

HEADLAMP AIMING CONTROL SYSTEM
Perform the sensor initialize when installing, removing and replacing the auto levelizer control unit and suspension components.

SENSOR INITIALIZE : Special Repair Requirement

INFOID:0000000000955371

1.VEHICLE CONDITION CHECK

1. Park the vehicle in the straight-forward position.
2. Unload the vehicle (no passenger aboard).

>> GO TO 2.

2.SENSOR INITIALIZE

CONSULT-III WORK SUPPORT
1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Select "SENSOR INITIALIZE" of HEADLAMP LEVELIZER work support item.
4. Select "START".
5. When "INITIALIZE COMPLETE", select "END".

CAUTION:
If "INITIALIZE NOT DONE" is indicated, auto levelizer control unit detects that the sensor lever signal changes. The sensor initialize is cancelled. In this case, turn the ignition switch OFF to prevent the vehicle from the height change. Perform the sensor initialize again.

Is the sensor initialize completed?

YES >> GO TO 3.
NO >> Perform the sensor initialize again.

3.SELF-DIAGNOSIS RESULT CHECK

Perform the self-diagnosis with CONSULT-III. Check that any DTC is not detected.

Is any DTC detected?

YES >> GO TO 2.
NO >> Sensor initialize completed.

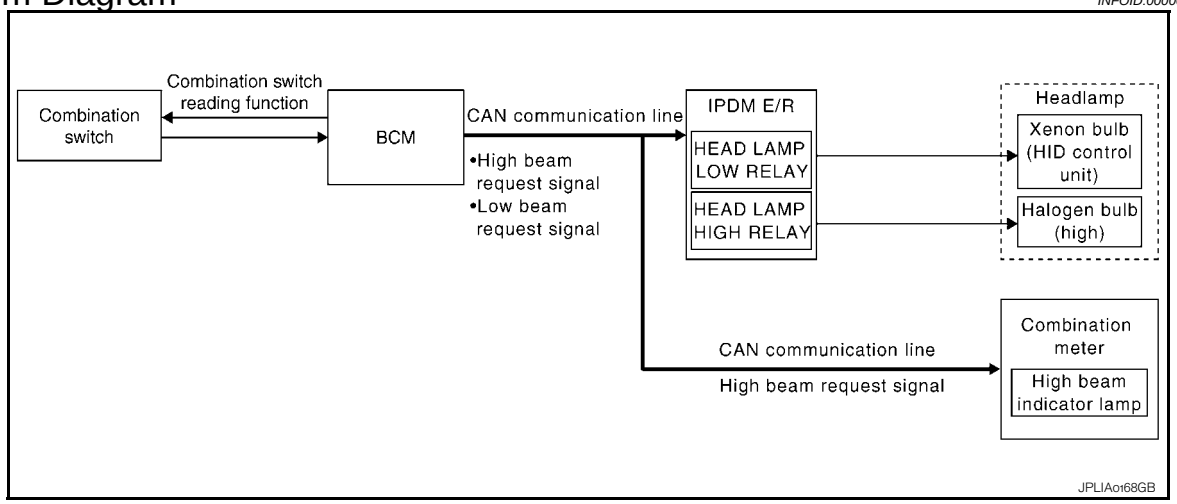
cardiagn.com

FUNCTION DIAGNOSIS

HEADLAMP SYSTEM

System Diagram

INFOID:0000000000955372



System Description

INFOID:0000000000955373

OUTLINE

Headlamp is controlled by combination switch reading function and headlamp control function of BCM, and relay control function of IPDM E/R.

HEADLAMP (LO) OPERATION

- BCM detects the combination switch condition with the combination switch reading function.
- BCM transmits the low beam request signal to IPDM E/R with CAN communication according to the headlamp (LO) ON condition.

Headlamp (LO) ON condition
- Lighting switch 2ND
- Lighting switch AUTO, and the auto light function ON judgment (With auto light system)
- Daytime running light ON judgment (With daytime running light system)

- IPDM E/R turns the integrated headlamp low relay ON, and turns the headlamp ON according to the low beam request signal.

HEADLAMP (HI) OPERATION

- BCM transmits the high beam request signal to IPDM E/R and the combination meter with CAN communication according to the headlamp (HI) ON condition.

Headlamp (HI) ON condition
- Lighting switch HI with the lighting switch 2ND or AUTO (auto light function ON judgment)
- Lighting switch PASS

- Combination meter turns the high beam indicator lamp ON according to the high beam request signal.
- IPDM E/R turns the integrated headlamp high relay ON, and turns the headlamp ON according to the high beam request signal.

FOLLOW ME HOME FUNCTION

When the driver is moving to the house entrance from the own vehicle, headlamp is kept still ON by the follow me home function of BCM.

- When BCM detects the input of lighting switch PASS with all of following condition, it transmits the low beam request signal for a period of time to IPDM E/R through CAN communication.
- IPDM E/R turns the integrated headlamp low relay ON, and turns the headlamp ON according to the low beam request signal.
- Ignition switch OFF
- Lighting switch OFF or AUTO

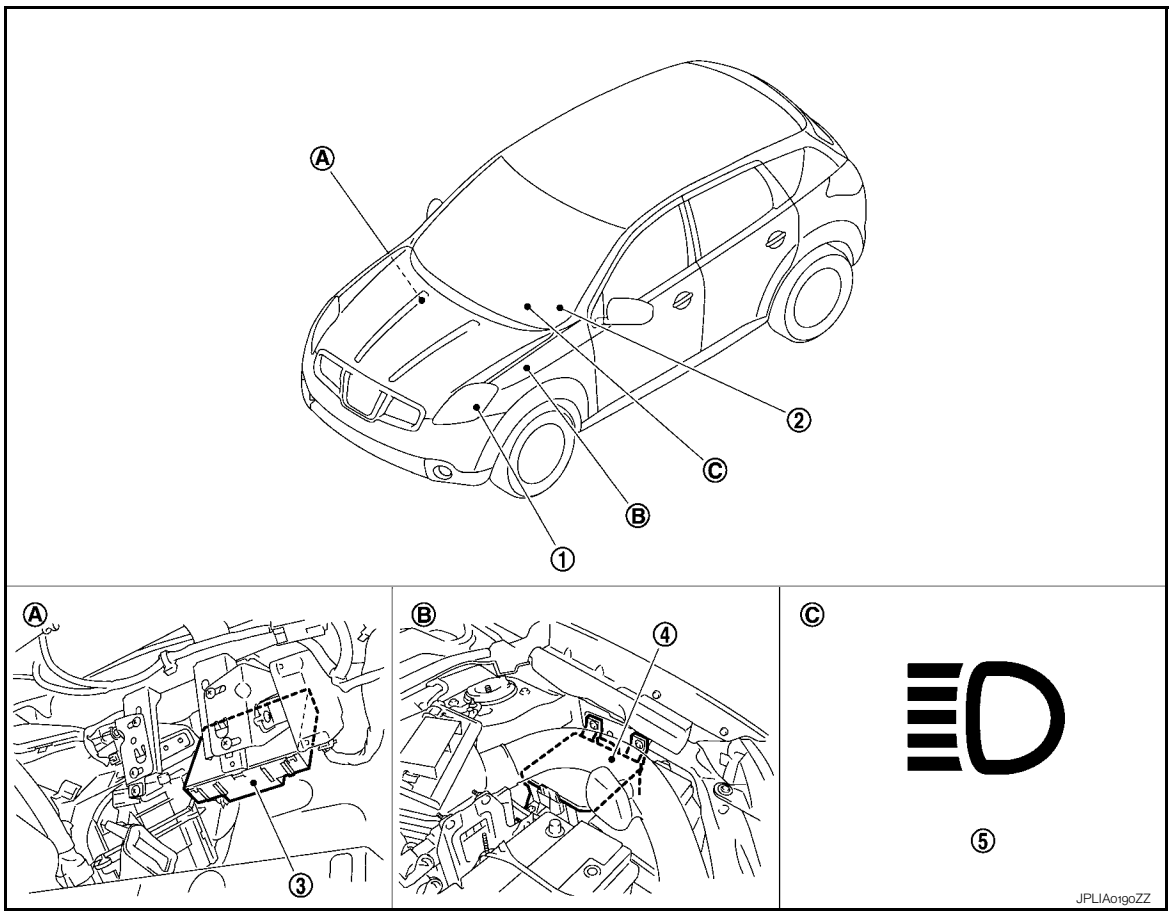
NOTE:

A B C D E F G H I J K EXL M N O P
cardiagn.com

Follow me home function activating time can be set by CONSULT-III. Refer to EXL-27, "HEADLAMP : CONSULT-III Function (BCM - HEAD LAMP)".

Component Parts Location

INFOID:0000000000955374



1. Headlamp
2. Combination switch
3. BCM
4. IPDM E/R
5. High beam indicator lamp
A. Over the glove box
B. Engine room (left side)
C. On the combination meter

Component Description

INFOID:0000000000955375

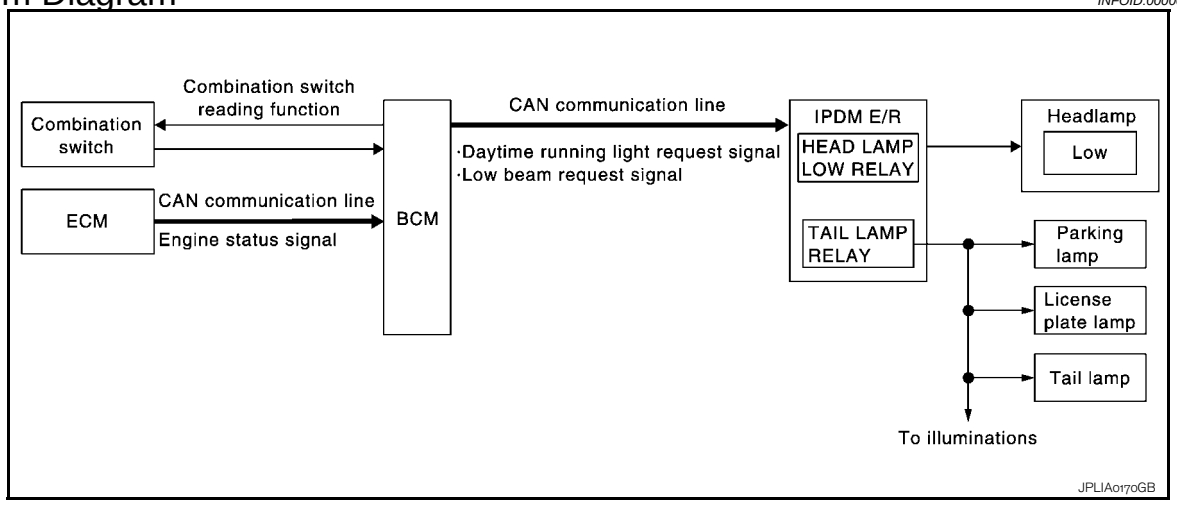
Part		Description
BCM		• Detects each switch condition by the combination switch reading function. • Judges that the headlamp is turned ON according to the vehicle condition. - Requests the headlamp relay (HI/LO) ON to IPDM E/R (with CAN communication). - Requests the high beam indicator lamp ON to the combination meter (with CAN communication).
IPDM E/R		Controls the integrated relay, and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)		Refer to BCS-9, "System Diagram".
Combination meter (High beam indicator lamp)		Turns the high beam indicator lamp ON according to the request from BCM (with CAN communication).
Front combination lamp assembly	• HID control unit • Xenon bulb	Refer to EXL-57, "Description".

cardiagn.com

DAYTIME RUNNING LIGHT SYSTEM

System Diagram

INFOID:0000000000969362



System Description

INFOID:0000000000969363

OUTLINE

- Turns the following exterior lamps ON as the daytime running light.
- headlamp (LO)
- Tail lamp, parking lamp and license plate lamp
- Daytime running light is controlled by daytime running light control function and combination switch reading function of BCM, and relay control function of IPDM E/R.

DAYTIME RUNNING LIGHT OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM detects the engine condition by the engine status signal received from ECM with CAN communication.
- BCM transmits the daytime running light request signal and low beam request signal to IPDM E/R with CAN communication according to the daytime running light ON condition.

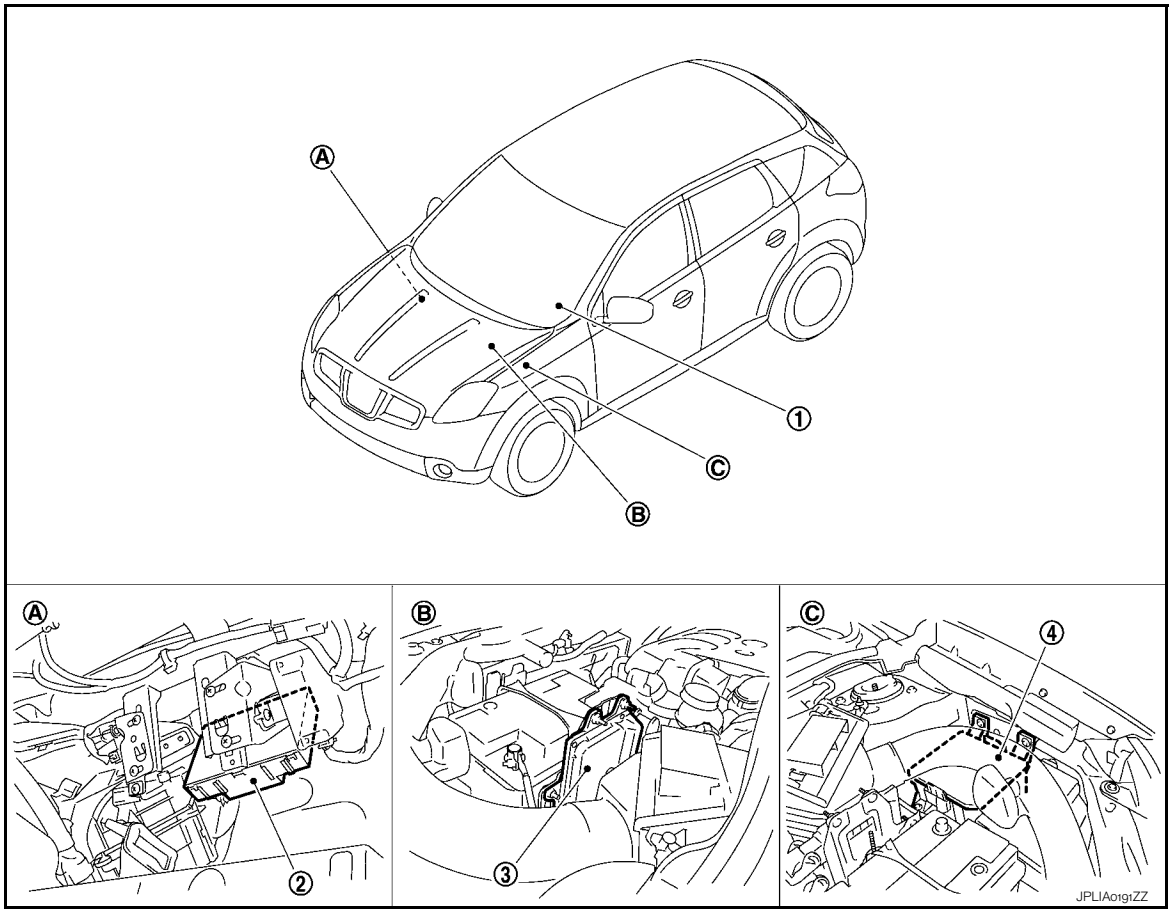
Daytime running light ON condition

- Engine running
- Lighting switch OFF or AUTO
- IPDM E/R turns the integrated headlamp low relay and tail lamp relay ON according to the daytime running light request signal and low beam request signal. And it turns each lamps ON.

Component Parts Location

INFOID:0000000000969364

A B C D E F G H I J K EXL M N O P
carDiag.com



1. Combination switch
2. BCM
3. ECM
4. IPDM E/R
A. Over the glove box
B. Engine room (left side)
C. Engine room (left side)

Component Description

INFOID:0000000000969365

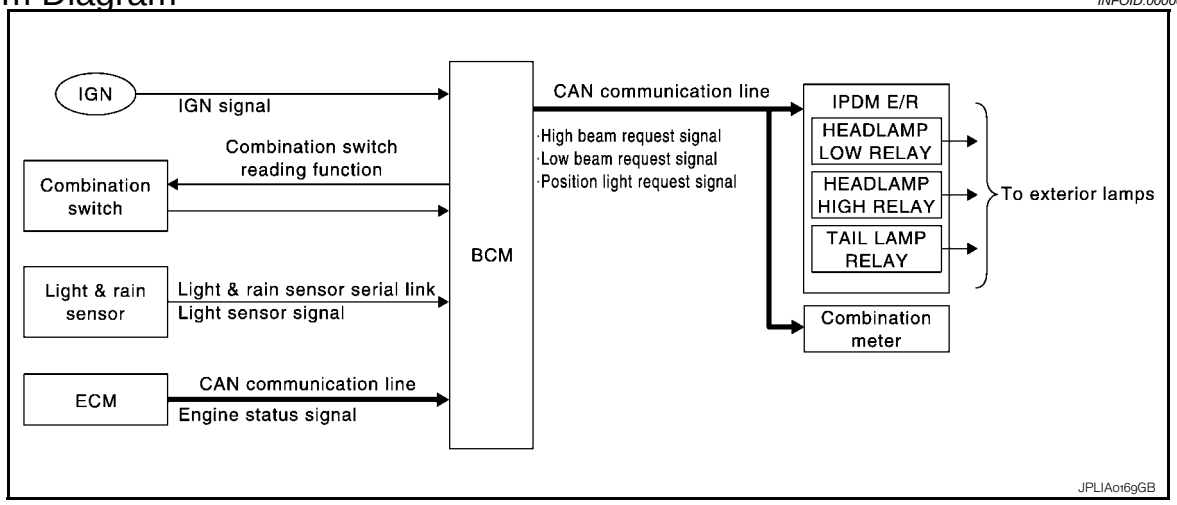
Part	Description
BCM	• Detects each switch condition with the combination switch reading function. • Judges each lamps ON/OFF condition according to the vehicle condition. Requests the each relay ON to IPDM E/R (with CAN communication).
IPDM E/R	Controls the integrated relay and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
ECM	Transmits the engine status signal to BCM with CAN communication.

cardiagn.com

AUTO LIGHT SYSTEM

System Diagram

INFOID:0000000000955376



System Description

INFOID:0000000000955377

OUTLINE

- Auto light system is controlled by each function of BCM and IPDM E/R.

Control by BCM
- Combination switch reading function
- Headlamp control function
- Auto light function

Control by IPDM E/R
- Relay control function
- Auto light function turns the exterior lamps* ON/OFF automatically according to the outside brightness.
  *: Headlamp (LO/HI), parking lamp, tail lamp (Headlamp HI depends on the combination switch condition.)

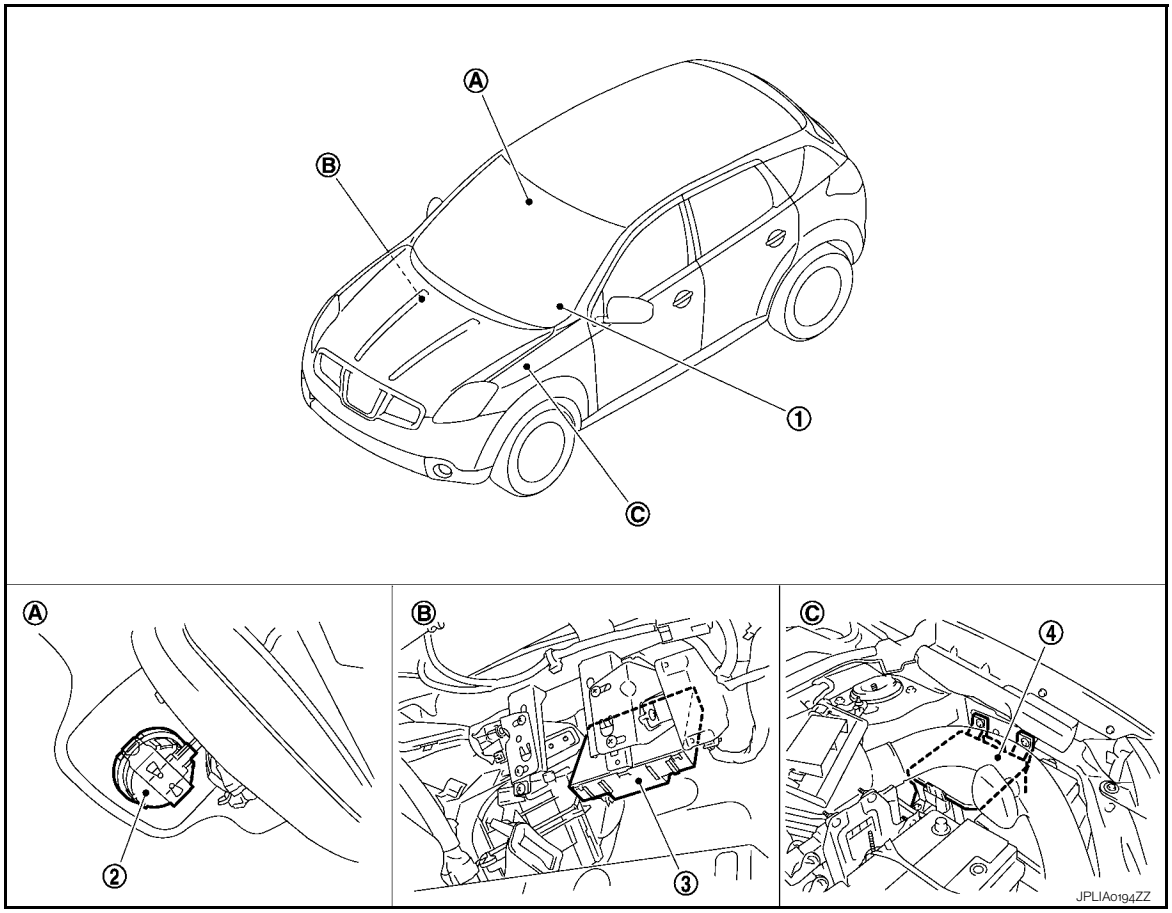
AUTO LIGHT FUNCTION

- BCM detects the combination switch condition with the combination switch reading function.
- BCM detects the engine condition by the engine status signal received from ECM with CAN communication.
- BCM receives the light sensor signal [outside brightness (lux) and the light & rain sensor condition] from light & rain sensor with the light & rain sensor serial link.
- BCM judges ON/OFF condition of the exterior lamps according to the outside brightness and the vehicle condition.
- BCM transmits each request signal to IPDM E/R with CAN communication according to ON/OFF condition by the auto light function.

Component Parts Location

INFOID:0000000000955378

cardiagn.com



1. Combination switch
2. Light & rain sensor
3. BCM
4. IPDM E/R
A. Windshield upper
B. Over the glove box
C. Engine room (left side)

Component Description

INFOID:0000000000955379

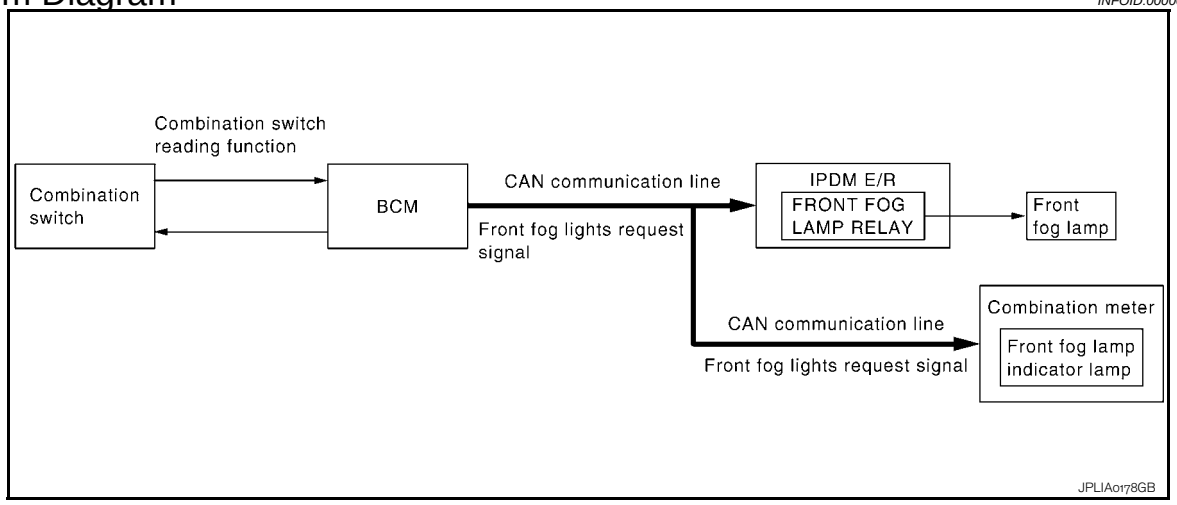
Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Detects the outside brightness from the light & rain sensor by light & rain sensor serial link. • Judges the ON/OFF status of the exterior lamp according to the outside brightness and the vehicle condition. • Requests ON/OFF of each relay to IPDM E/R (with CAN communication).
IPDM E/R	Controls the integrated relay, and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Light & rain sensor	Refer to EXL-69, "Description".

cardiagn.com

FRONT FOG LAMP SYSTEM

System Diagram

INFOID:0000000000955380



System Description

INFOID:0000000000955381

OUTLINE

Front fog lamp is controlled by combination switch reading function and front fog lamp control function of BCM, and relay control function of IPDM E/R.

FRONT FOG LAMP OPERATION

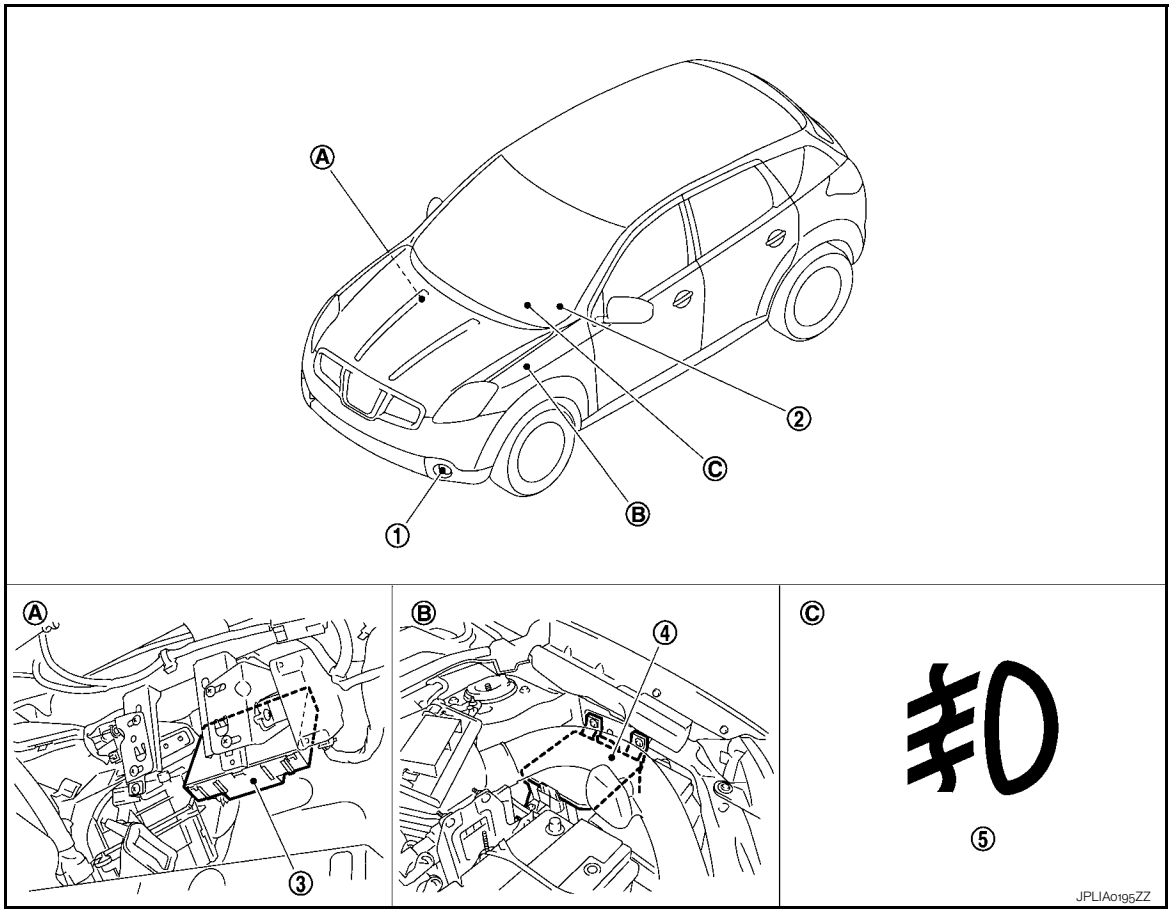
- BCM detects the combination switch condition by the combination switch reading function.
- BCM transmits the front fog lights request signal to IPDM E/R and the combination meter with CAN communication according to the front fog lamp ON condition.

Front fog lamp ON condition
- Front fog lamp switch ON
- Lighting switch 1ST, 2ND, or AUTO (ignition switch ON)

- IPDM E/R turns the integrated front fog lamp relay ON, and turns the front fog lamp ON according to the front fog lights request signal.
- Combination meter turns the front fog lamp indicator lamp ON according to the front fog lights request signal.

Component Parts Location

INFOID:0000000000955382



1. Front fog lamp
2. Combination switch
3. BCM
4. IPDM E/R
5. Front fog lamp indicator lamp
A. Over the glove box
B. Engine room (left side)
C. On the combination meter

Component Description

INFOID:0000000000955383

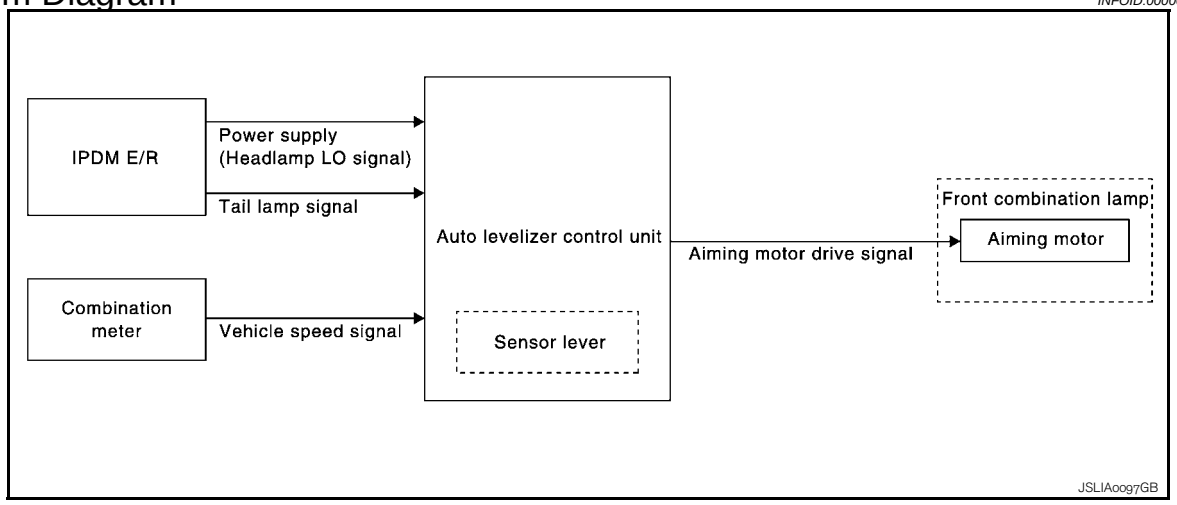
Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Judges the front fog lamp ON/OFF status according to the vehicle condition. - Requests the front fog lamp relay ON to IPDM E/R (with CAN communication). - Requests the front fog lamp indicator lamp ON to the combination meter (with CAN communication).
IPDM E/R	Controls the integrated relay and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Combination meter (Front fog lamp indicator lamp)	Turns the front fog lamp indicator lamp ON according to the request from BCM.

cardiagn.com

HEADLAMP AIMING CONTROL SYSTEM (AUTO)

System Diagram

INFOID:0000000000955384



System Description

INFOID:0000000000955385

OUTLINE

- Headlamp aiming control system is controlled by auto levelizer control unit.
- Auto levelizer control unit controls the headlamp light axis height appropriately depending on the vehicle rear height.
- Auto levelizer control unit detects the vehicle condition necessary for the aiming motor control with the following signals.

- Sensor lever signal (detected by the sensor lever)
- Tail lamp signal (inputted from IPDM E/R)
- Vehicle speed signal (8-pulse) (inputted from combination meter)

HEADLAMP AUTO AIMING OPERATION

- Auto levelizer control unit calculates vehicle pitch angle from sensor lever signal and determines the necessary correction to compensate the deviation from standard light axis position.
- Auto levelizer control unit outputs aiming motor drive signal when operating conditions are satisfied.

Operating condition

- Headlamp (LO) ON
- Tail lamp ON

- Auto levelizer control unit changes the aiming motor drive signal when any of the correcting condition is detected. Output is maintained if other condition is detected.

Correcting condition

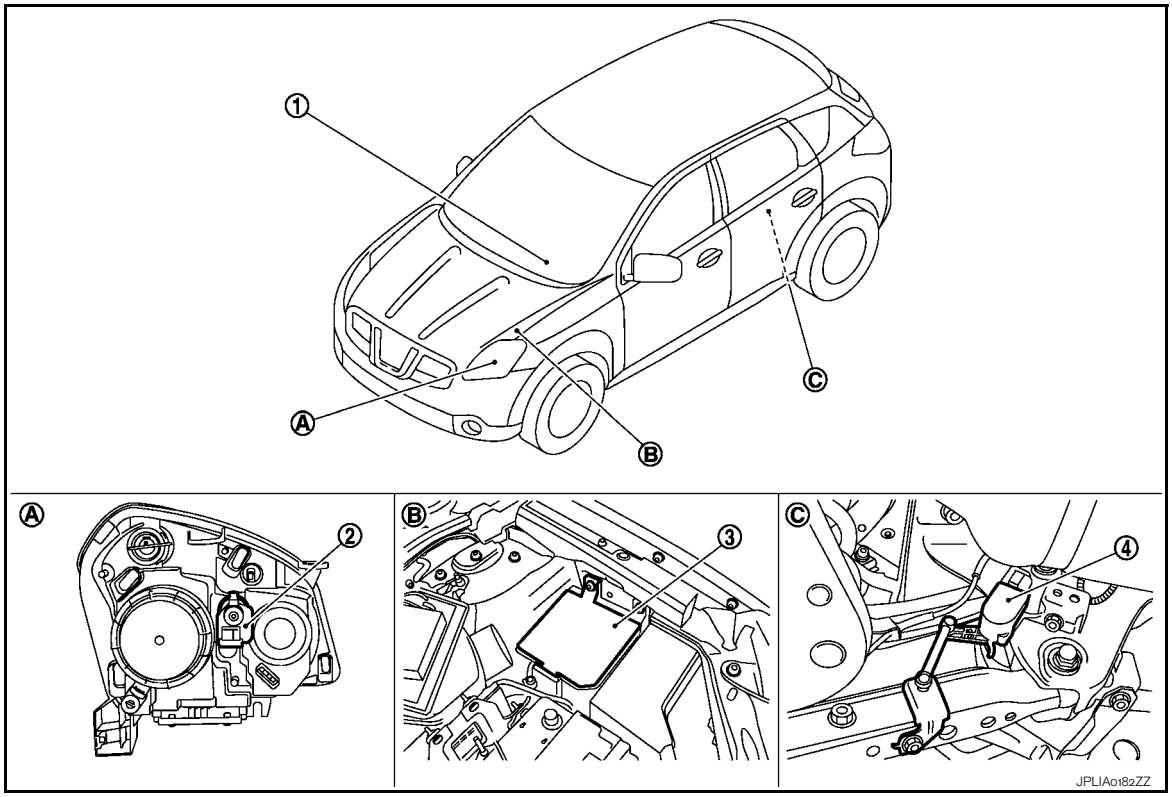
- Headlamp (LO) is turned ON.
- Vehicle posture becomes stable after the vehicle posture change is detected with the headlamp (LO) ON and the vehicle stopped.
- Vehicle speed is maintained with the headlamp (LO) ON and the vehicle driven.

CAUTION:

Adjusted axis position may differ from the preset position although the headlamp auto aiming activates properly when the suspension is replaced or worn.

Component Parts Location

INFOID:0000000000955386



1. Combination meter
2. Aiming motor
3. IPDM E/R
4. Auto levelizer control unit
A. Front combination lamp (back)
B. Engine room (left side)
C. Right rear suspension member

Component Description

INFOID:0000000000955387

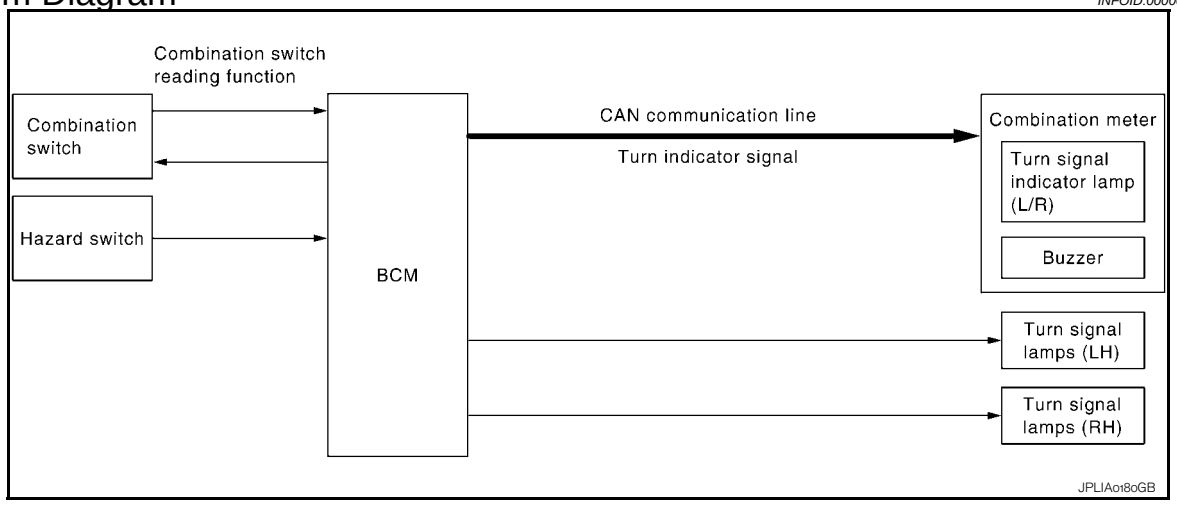
Part	Description
Auto levelizer control unit	Refer to EXL-36, "Description".
Headlamp aiming motor	Refer to EXL-59, "Description".
IPDM E/R	Outputs the tail lamp signal to auto levelizer control unit.
Combination meter	Outputs the vehicle speed signal (8-pulse) to auto levelizer control unit.

cardiagn.com

TURN SIGNAL AND HAZARD WARNING LAMP SYSTEM

System Diagram

INFOID:0000000000955388



System Description

INFOID:0000000000955389

OUTLINE

Turn signal lamp and the hazard warning lamp is controlled by combination switch reading function and the flasher control function of BCM.

TURN SIGNAL LAMP OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM supplies voltage to the right (left) turn signal lamp circuit when the ignition switch is turned ON and the turn signal switch is in the right (left) position. BCM blinks the turn signal lamp.

HAZARD WARNING LAMP OPERATION

BCM supplies voltage to both turn signal lamp circuit when the hazard switch is turned ON. BCM blinks the hazard warning lamp.

TURN SIGNAL INDICATOR LAMP AND TURN SIGNAL OPERATION

- BCM transmits the turn signal indicator lamp signal to the combination meter with CAN communication while the turn signal lamp and the hazard warning lamp are operating.
- Combination meter outputs the turn signal sound with the integrated buzzer while blinking the turn signal indicator lamp according to the turn signal indicator lamp signal.

3-TIME FLASHER FUNCTION

By a short touch of the turn signal lever, BCM flashes 3 times the turn signal lamps in the selected direction.

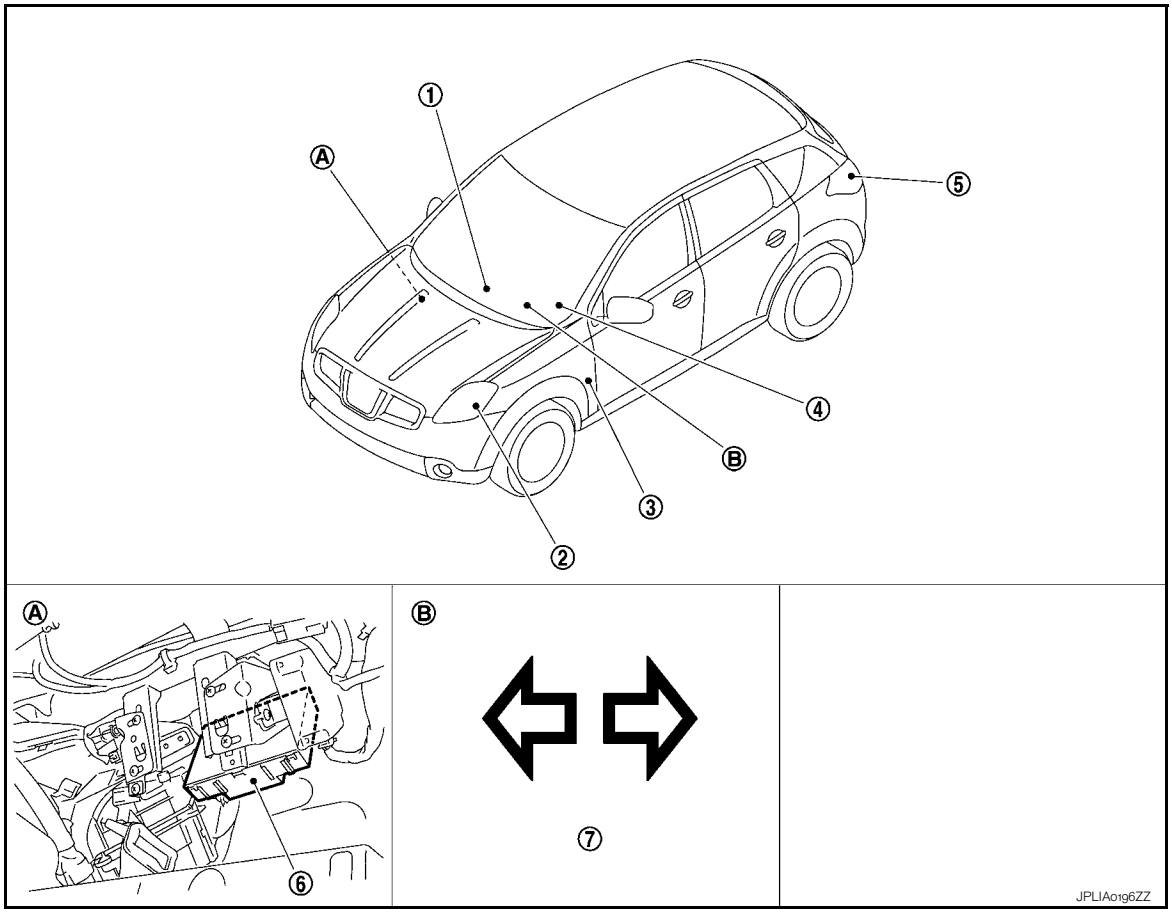
HIGH FLASHER OPERATION (FAIL-SAFE)

- BCM detects the turn signal lamp circuit status from the terminal voltage.
- BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while operating the hazard warning lamp.

Component Parts Location

INFOID:0000000000955390



1. Hazard switch
2. Front turn signal lamp
3. Side turn signal lamp
4. Combination switch
5. Rear turn signal lamp
6. BCM
7. Turn signal indicator lamp
A. Over the glove box
B. On the combination meter

Component Description

INFOID:0000000000955391

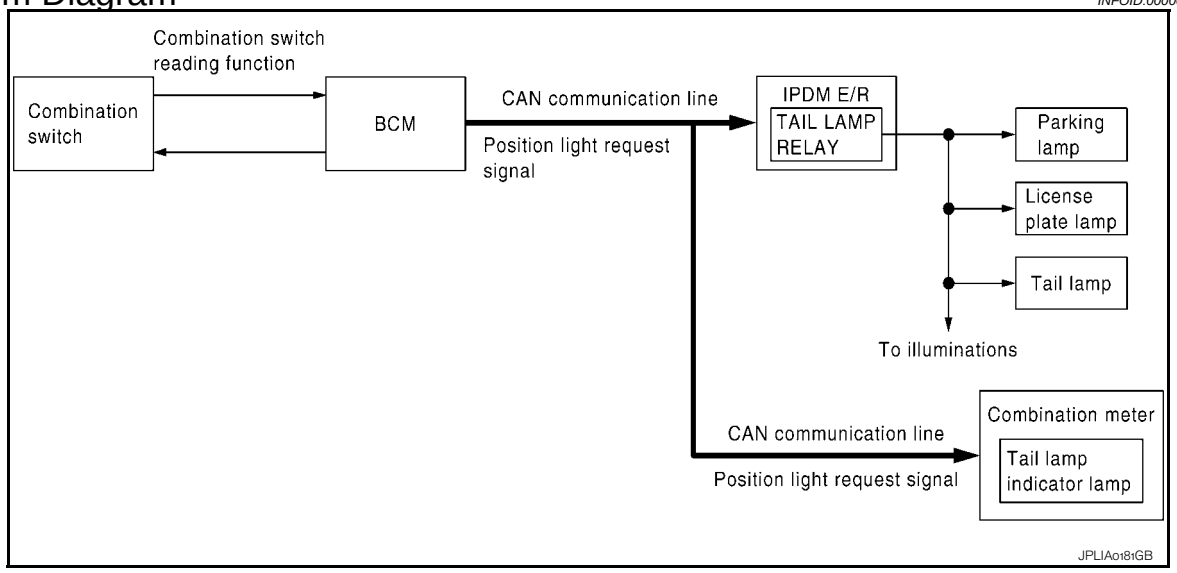
Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Judges the blinks of the turn signal lamp and the hazard warning lamp from each switch status. The applicable turn signal lamp blinks. • Requests the turn signal indicator lamp blink to the combination meter (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Hazard switch	Inputs the hazard switch ON/OFF signal to BCM.
Combination meter (Turn signal indicator lamp & buzzer)	Blinks the turn signal indicator lamp and outputs the turn signal operating sound with integrated buzzer according to the request from BCM (with CAN communication).

cardiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS SYSTEM

System Diagram

INFOID:0000000000955392



System Description

INFOID:0000000000955393

OUTLINE

Parking, license plate and tail lamps are controlled by combination switch reading function and headlamp control function of BCM, and relay control function of IPDM E/R.

PARKING, LICENSE PLATE AND TAIL LAMPS OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM transmits the position light request signal to IPDM E/R and the combination meter with CAN communication according to the ON/OFF condition of the parking, license plate and tail lamps.

Parking, license plate and tail lamps ON condition

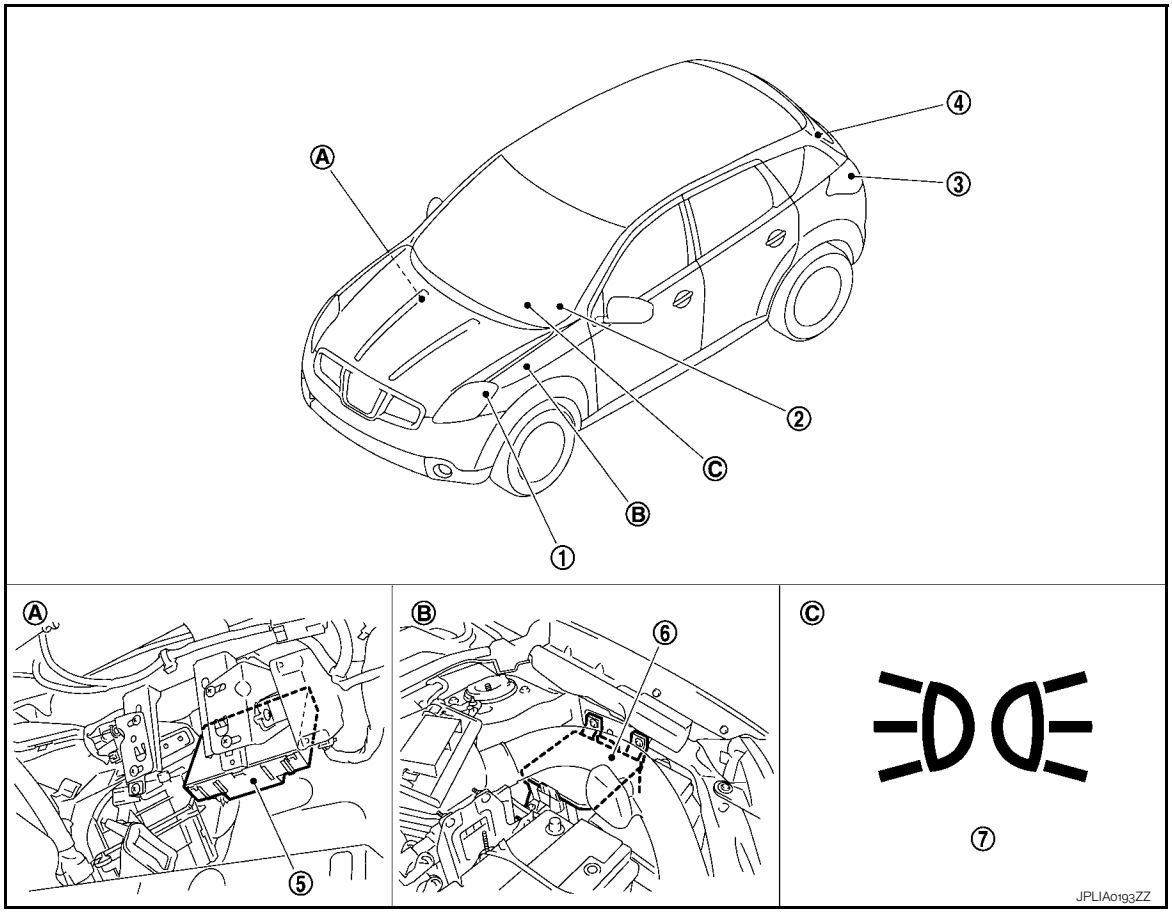
- Lighting switch 1ST
- Lighting switch 2ND
- Lighting switch AUTO, and the auto light function ON judgment (With auto light system)

- IPDM E/R turns the integrated tail lamp relay ON and turns the parking lamp, the license plate and tail lamps ON according to the position light request signal.
- Combination meter turns the tail lamp indicator lamp ON according to the position light request signal.

Component Parts Location

INFOID:0000000000955394

A B C D E F G H I J K EXL M N O P
cardiagn.com



1. Parking lamp
2. Combination switch
3. Tail lamp
4. License plate lamp
5. BCM
6. IPDM E/R
7. Tail lamp indicator lamp

A. Over the glove box
B. Engine room (left side)
C. On the combination meter

Component Description

INFOID:0000000000955395

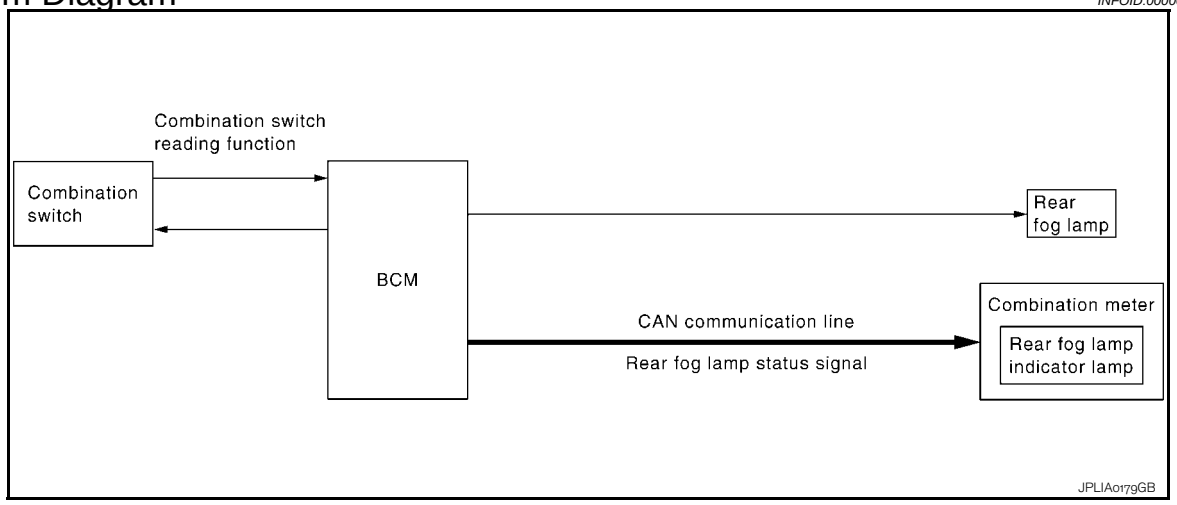
Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Judges the ON/OFF status of the parking, license plate and tail lamps according to the vehicle condition. - Requests the tail lamp relay ON to IPDM E/R (with CAN communication). - Requests the tail lamp indicator lamp ON to the combination meter (with CAN communication).
IPDM E/R	Controls the integrated relay and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Combination meter (Tail lamp indicator lamp)	Turns the tail lamp indicator lamp ON according to the request from BCM (with CAN communication).

cardiagn.com

REAR FOG LAMP SYSTEM

System Diagram

INFOID:0000000000955396



System Description

INFOID:0000000000955397

OUTLINE

Rear fog lamp is controlled with the combination switch reading function and the rear fog lamp control function of BCM.

REAR FOG LAMP OPERATION

- BCM detects the condition of the combination switch by the combination switch reading function.
- BCM supplies voltage to rear fog lamp according to the rear fog lamp ON condition.

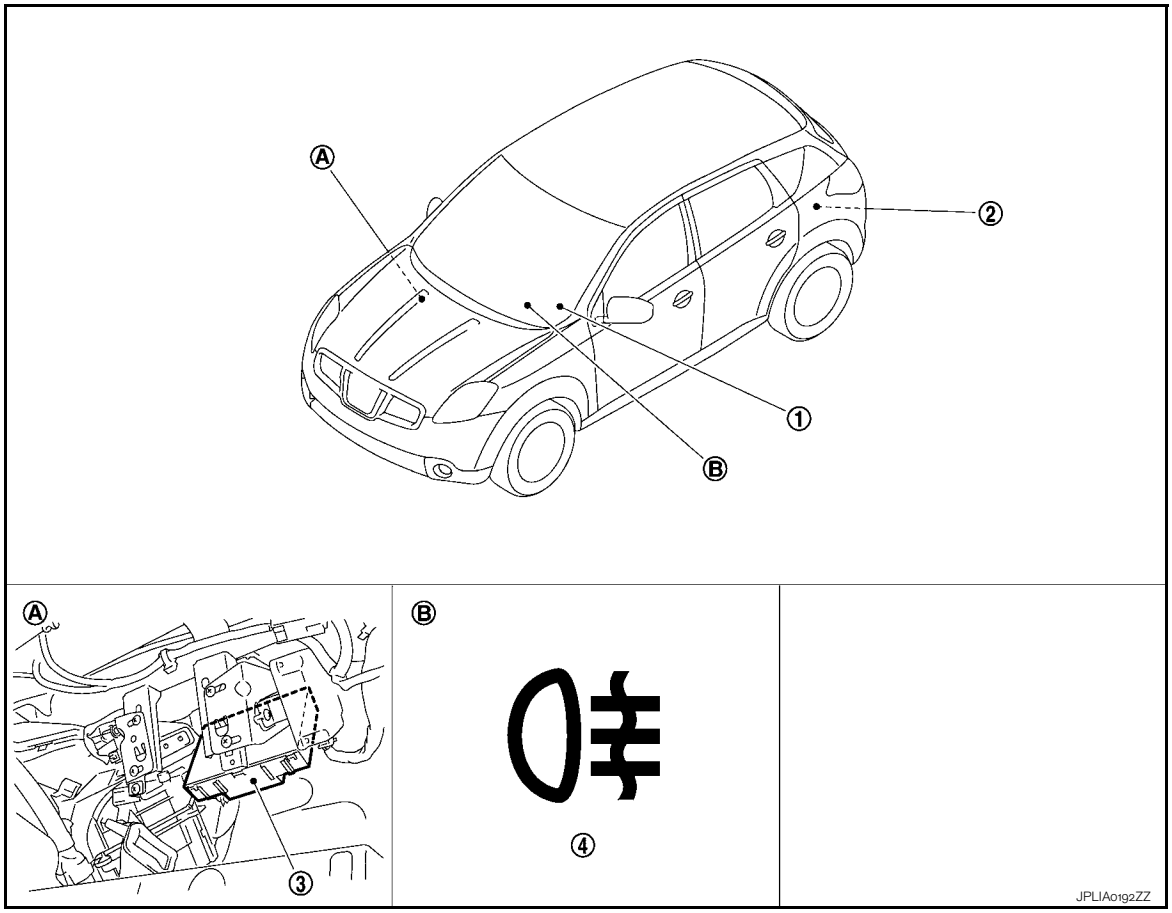
Rear fog lamp ON condition
- Rear fog lamp switch signal is input with front fog lamp ON and rear fog lamp OFF

Rear fog lamp OFF condition
- Rear fog lamp switch signal is input with rear fog lamp ON
- Front fog lamp OFF

- BCM transmits the rear fog lamp status signal to the combination meter with CAN communication.
- Combination meter turns the rear fog lamp indicator lamp ON according to the rear fog lamp status signal.

Component Parts Location

INFOID:0000000000955398



1. Combination switch
2. Rear fog lamp
3. BCM
4. Rear fog lamp indicator lamp
A. Over the glove box
B. On the combination meter

Component Description

INFOID:0000000000955399

Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Judges that the rear fog lamp is turned ON according to the vehicle status - Supplies voltage to the rear fog lamp - Requests the rear fog lamp indicator lamp ON to the combination meter (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Combination meter (Rear fog lamp indicator lamp)	Turns the rear fog lamp indicator lamp ON according to the request from BCM (with CAN communication).

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001116333

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

HEADLAMP

HEADLAMP : CONSULT-III Function (BCM - HEAD LAMP)

INFOID:0000000001026151

WORK SUPPORT

carDiagn.com

Service item	Setting item	Setting	
HEAD LIGHT TIMER	MODE 1	10 sec.	Sets follow me home function activating time.
	MODE 2*	30 sec.	

*: Initial setting

DATA MONITOR

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judged from IGN signal (ignition power supply)
ACC SW [ON/OFF]	Ignition switch (ACC) status judged from ACC signal (ACC power supply)
HI BEAM SW [ON/OFF]	Each switch status that BCM judges from the combination switch reading function
HEAD LAMP SW1 [ON/OFF]	
HEAD LAMP SW2 [ON/OFF]	
TAIL LAMP SW [ON/OFF]	
AUTO LIGHT SW [ON/OFF]	
PASSING SW [ON/OFF]	
FR FOG SW [ON/OFF]	
RR FOG SW [ON/OFF]	
DOOR SW-DR [ON/OFF]	The switch status input from front door switch (driver side)
DOOR SW-AS [ON/OFF]	The switch status input from front door switch (passenger side)
DOOR SW-RR [ON/OFF]	The switch status input from rear door switch RH
DOOR SW- RL [ON/OFF]	The switch status input from rear door switch LH
BACK DOOR SW [ON/OFF]	The switch status input from back door switch
TURN SIGNAL R [ON/OFF]	Each switch status that BCM judges from the combination switch reading function
TURN SIGNAL L [ON/OFF]	
ENGINE RUNNING [ON/OFF]	The engine status received from ECM with CAN communication
PUSH SW [ON/OFF]	Push switch status received from Intelligent Key unit by CAN communication
LIT-SEN FAIL [OK/NOTOK]	• The sensor status received from light & rain sensor with serial link • The serial link condition that BCM judges
AUT LIGHT SYS [ON/OFF]	Auto light system status that BCM judges from the vehicle condition

ACTIVE TEST

cardiagn.com

Test item	Operation	Description
TAIL LAMP	ON	Transmits the position light request signal to IPDM E/R with CAN communication to turn the tail lamp ON.
	OFF	Stops the tail lamp request signal transmission.
HEAD LAMP	HI	Transmits the high beam request signal with CAN communication to turn the headlamp (HI).
	LO	Transmits the low beam request signal with CAN communication to turn the headlamp (LO).
	OFF	Stops the high & low beam request signal transmission.
FR FOG LAMP	ON	Transmits the front fog lights request signal to IPDM E/R with CAN communication to turn the front fog lamp ON.
	OFF	Stops the front fog lights request signal transmission.
RR FOG LAMP	ON	• Outputs the voltage to turn the rear fog lamp ON. • Transmits the rear fog lamp status signal to the combination meter with CAN communication to turn the rear fog lamp indicator lamp ON.
	OFF	• Stops the voltage to turn the rear fog lamp OFF. • Stops the rear fog lamp status signal transmission.
DAYTIME RUNNING LIGHT	ON	Transmits the day time running light request signal to IPDM E/R with CAN communication to turn the each lamps ON.
	OFF	Stops the day time running light request signal transmission.

FLASHER

FLASHER : CONSULT-III Function (BCM - FLASHER)

INFOID:0000000001026153

DATA MONITOR

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judged from IGN signal (ignition power supply)
HAZARD SW [ON/OFF]	The switch status input from the hazard switch
TURN SIGNAL R [ON/OFF]	Each switch condition that BCM judges from the combination switch reading function
TURN SIGNAL L [ON/OFF]	

ACTIVE TEST

Test item	Operation	Description
FLASHER	RH	Outputs the voltage to turn the right side turn signal lamps ON.
	LH	Outputs the voltage to turn the left side turn signal lamps ON.
	OFF	Stops the voltage to turn the turn signal lamps OFF.

carDiag.com

DIAGNOSIS SYSTEM (IPDM E/R)

Diagnosis Description

INFOID:0000000001098948

Auto active test

Description

In auto active test mode, the IPDM E/R sends a drive signal to the following systems to check their operation.

- Oil pressure warning lamp
- Rear window defogger
- Front wiper (LO, HI)
- Parking lamps
- License plate lamps
- Tail lamps
- Front fog lamps
- Headlamps (LO, HI)
- A/C compressor (magnet clutch)
- Cooling fan (LO, HI)

Operation procedure

1. Close the hood and lift the wiper arms from the windshield. (Prevent windshield damage due to wiper operation)
   NOTE:
   When auto active test is performed with hood opened, sprinkle water on windshield beforehand.
2. Turn ignition switch OFF.
3. Turn the ignition switch ON, and within 20 seconds, press the driver door switch 10 times. Then turn the ignition switch OFF.
   CAUTION:
   Close passenger door.
4. Turn the ignition switch ON within 10 seconds. Then the horn sounds once and the auto active test starts.
5. The oil pressure warning lamp starts blinking when the auto active test starts.
6. After a series of the following operations is repeated 3 times, auto active test is completed.

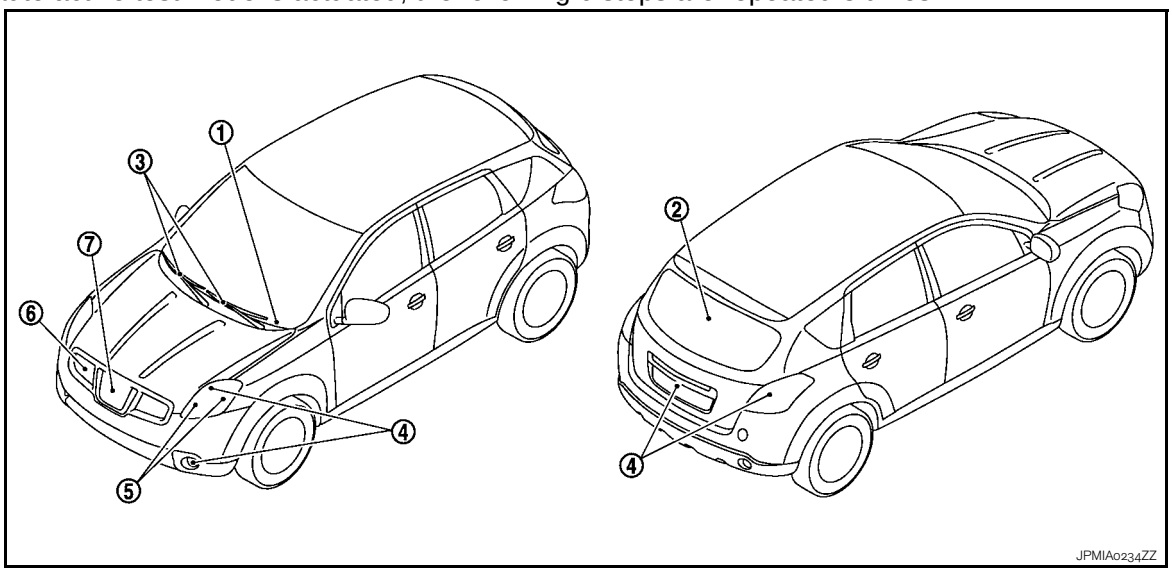
NOTE:
When auto active test mode has to be cancelled halfway through test, turn ignition switch OFF.

CAUTION:

- **If auto active test mode cannot be actuated, check door switch system.**
- **Never start the engine.**

Inspection in auto active test mode

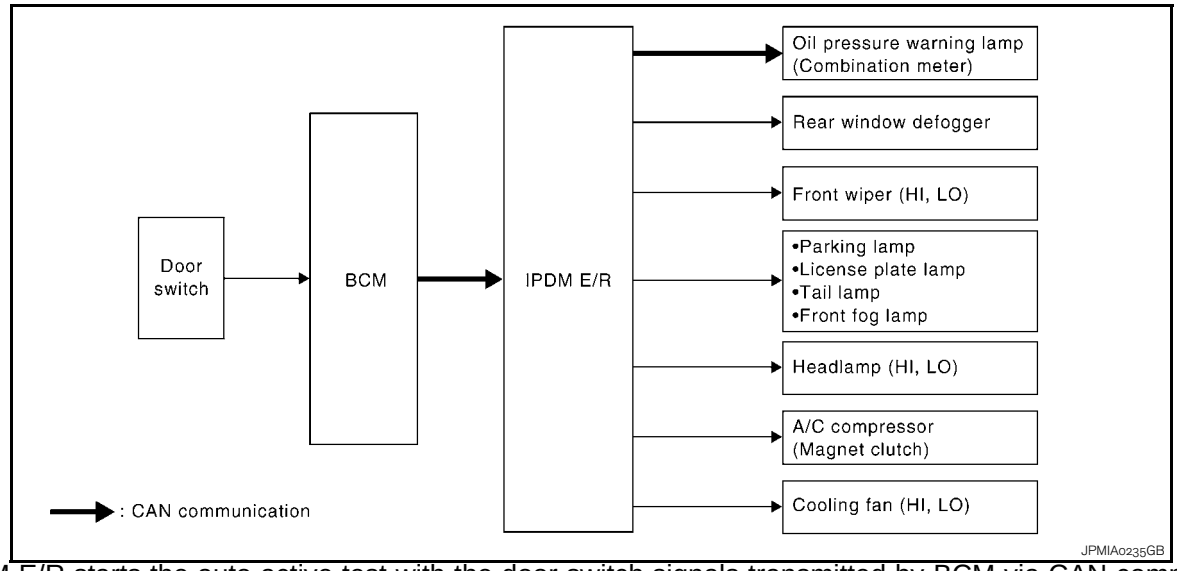
When auto active test mode is actuated, the following 6 steps are repeated 3 times.



cardiagn.com

Operation sequence	Inspection location	Operation
1	Oil pressure warning lamp	Blinks continuously during operation of auto active test.
2	Rear window defogger	10 seconds
3	Front wiper	LO for 5 seconds → HI for 5 seconds
4	• Parking lamps • License plate lamps • Tail lamps • Front fog lamps	10 seconds
5	Headlamps	LO ⇔ HI 5 times
6	A/C compressor (magnet clutch)	ON ⇔ OFF 5 times
7	Cooling fan	LO for 5 seconds → HI for 5 seconds

Concept of auto active test



- IPDM E/R starts the auto active test with the door switch signals transmitted by BCM via CAN communication. Therefore, the CAN communication line between IPDM E/R and BCM is considered normal if the auto active test starts successfully.
- The auto active test facilitates troubleshooting if any systems controlled by IPDM E/R cannot be operated.

Diagnosis chart in auto active test mode

Symptom	Inspection contents		Possible cause
Rear window defogger does not operate	Perform auto active test. Does the rear window defogger operate?	YES	BCM signal input circuit
		NO	• Rear window defogger • Rear window defogger ground circuit • Harness or connector between IPDM E/R and rear window defogger • IPDM E/R
Any of the following components do not operate • Parking lamps • License plate lamps • Tail lamps • Front fog lamps • Headlamp (HI, LO) • Front wiper (HI, LO)	Perform auto active test. Does the applicable system operate?	YES	BCM signal input circuit
		NO	• Lamp or motor • Lamp or motor ground circuit • Harness or connector between IPDM E/R and applicable system • IPDM E/R

cardiagn.com

Symptom	Inspection contents		Possible cause
A/C compressor does not operate	Perform auto active test. Does the magnet clutch operate?	YES	• Communication signal between BCM and auto amp. (with auto A/C) • Communication signal between BCM and heater control panel (without auto A/C, with manual A/C) • BCM • CAN communication signal between BCM and ECM • CAN communication signal between ECM and IPDM E/R
		NO	• Magnet clutch • Harness or connector between IPDM E/R and magnet clutch • IPDM E/R
Oil pressure warning lamp does not operate	Perform auto active test. Does the oil pressure warning lamp blink?	YES	• Harness or connector between IPDM E/R and oil pressure switch • Oil pressure switch • IPDM E/R
		NO	• CAN communication signal between IPDM E/R and BCM • CAN communication signal between BCM and combination meter • Combination meter
Cooling fan does not operate	Perform auto active test. Does the cooling fan operate?	YES	• ECM signal input circuit • CAN communication signal between ECM and IPDM E/R
		NO	• Cooling fan • Cooling fan ground circuit • Harness or connector between IPDM E/R and cooling fan • IPDM E/R • Cooling fan relay-3* • Harness or connector between IPDM E/R and cooling fan relay-3* • Harness or connector between cooling fan and cooling fan relay-3*

NOTE:

*: MR engine and K9K engine models

CONSULT - III Function (IPDM E/R)

INFOID:0000000001098949

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with IPDM E/R.

Diagnosis mode	Description
Ecu Identification	Allows confirmation of IPDM E/R part number.
Self Diagnostic Result	Displays the diagnosis results judged by IPDM E/R.
Data Monitor	Displays the real-time input/output data from IPDM E/R input/output data.
Active Test	IPDM E/R can provide a drive signal to electronic components to check their operations.
CAN Diag Support Monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF DIAGNOSTIC

Refer to EXL-148, "DTC Index".

DATA MONITOR

Monitor item

cardiagn.com

Monitor Item [Unit]	MAIN SIGNALS	Description
MOTOR FAN REQ [1 - 4]	×	Displays the value of the cooling fan speed signal received from ECM via CAN communication.
AC COMP REQ [Off/On]	×	Displays the status of the A/C compressor request signal received from ECM via CAN communication.
TAIL&CLR REQ [Off/On]	×	Displays the status of the position light request signal received from BCM via CAN communication.
HL LO REQ [Off/On]	×	Displays the status of the low beam request signal received from BCM via CAN communication.
HL HI REQ [Off/On]	×	Displays the status of the high beam request signal received from BCM via CAN communication.
FR FOG REQ [Off/On]	×	Displays the status of the front fog light request signal received from BCM via CAN communication.
HL WASHER REQ [Off/On]		Displays the status of the headlamp washer request signal received from BCM via CAN communication.
FR WIP REQ [Stop/1LOW/Low/Hi]	×	Displays the status of the front wiper request signal received from BCM via CAN communication.
WIP AUTO STOP [STOP P/ACT P]	×	Displays the status of the front wiper auto stop signal judged by IPDM E/R.
WIP PROT [Off/BLOCK]	×	Displays the status of the front wiper fail-safe operation judged by IPDM E/R.
ST RLY REQ [Off/On]		Displays the status of the ignition and starter request signal received from BCM via CAN communication.
IGN RLY [Off/On]	×	Displays the status of the ignition relay judged by IPDM E/R.
RR DEF REQ [Off/On]	×	Displays the status of the rear defogger request signal received from BCM via CAN communication.
OIL P SW [Open/Close]		Displays the status of the oil pressure switch judged by IPDM E/R.
REV SW [Off/On]		Displays the status of the reverse switch judged by IPDM E/R.
HOOD SW [Off/On]		Displays the status of the hood switch judged by IPDM E/R. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
THFT HRN REQ [Off/On]		Displays the status of the theft warning horn request signal received from BCM via CAN communication. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
HORN CHIRP [Off/On]		**NOTE:** This item is indicated, but not monitored.
IGN ON SW [Off/On]		Displays the status of the ignition switch judged by IPDM E/R.

ACTIVE TEST

Test item

Test item	Operation	Description
REAR DEFOGGER	Off	OFF
	On	Operates the rear window defogger relay.
FRONT WIPER	Off	OFF
	Lo	Operates the front wiper relay.
	Hi	Operates the front wiper relay and front wiper high relay.

A B C D E F G H I J K EXL M N O P
cardiagn.com

Test item	Operation	Description
MOTOR FAN	1	OFF
	2	Operates the cooling fan relay (low operation).
	3	Operates the cooling fan relay (high operation).
	4	
HEAD LAMP WASHER	On	Operates the headlamp washer relay for 1 second.
EXTERNAL LAMPS	Off	OFF
	TAIL	Operates the tail lamp relay.
	Lo	Operates the headlamp low relay.
	Hi	Operates the headlamp low relay and ON/OFF the headlamp high relay at 1 second intervals.
	Fog	Operates the front fog lamp relay.
HORN	On	Operates horn relay for 20 ms.

cardiagn.com

DIAGNOSIS SYSTEM (HEADLAMP LEVELIZER)

CONSULT-III Function (HEADLAMP LEVELIZER)

INFOID:0000000000955409

CAUTION:
Headlamp (LO) must be turned ON before connecting CONSULT-III. And then start the diagnosis of the headlamp aiming control system (auto).

APPLICATION ITEM

CONSULT-III performs the following functions via DDL2 communication line with auto levelizer control unit.

Diagnosis mode	Description
ECU IDENTIFICATION	Allows confirmation of auto levelizer control unit part number.
SELF DIAGNOSTIC RESULT	Displays the diagnosis results judged by auto levelizer control unit.
WORK SUPPORT	Performs settings on sensors.
DATA MONITOR	Displays input data for auto levelizer control unit in real time.
ACTIVE TEST	Transmits a drive signal to the load to check their operation.

WORK SUPPORT

Work item	Setting details
SENSOR INITIALIZE	Adjusts sensor lever signal output under unladen conditions.

DATA MONITOR

Monitor item [Unit]	Display item
INT SEN VALUE [%]	Displays the sensor lever angle corresponding to the maximum value of sensor lever angle that is recognized with auto levelizer control unit by ratio.
ACT OUTPUT [%]	Displays the control value of aiming motor drive signal that is calculated by auto levelizer control unit with the ratio corresponding to the control unit power supply.
ACT MEASURED [%]	Displays the measured value of aiming motor drive signal that is output from auto levelizer control unit with the ratio corresponding to the control unit power supply.
VEHICLE SPEED SIGNAL [km/h]	Displays the vehicle speed judged from vehicle speed signal (8-pulse) that is input to auto levelizer control unit.
LIGHT SIGNAL [V]	Displays the status judged from tail lamp signal that is input to auto levelizer control unit.
INT SEN VOLT [V]	Displays the control unit power supply status that is input to auto levelizer control unit.
EXT SEN VOLT [V]	**NOTE:** The item is indicated, but not monitored.
EXT SEN SIG [V]	**NOTE:** The item is indicated, but not monitored.

ACTIVE TEST

Test item	Operation item	Operation status
LAMP TEST	MIN	Moves the light axis to the lowest position.
	MID	Moves the light axis to the initial position.
	MAX	Moves the light axis to the highest position.

cardiagn.com

COMPONENT DIAGNOSIS

B2080 ECU TROUBLE

Description

INFOID:0000000001089008

- Auto levelizer control unit is installed in rear suspension arm.
- Auto levelizer control unit detects vehicle rear height.
- Auto levelizer control unit controls headlamp light axis appropriately depending on the vehicle height.

DTC Logic

INFOID:0000000001089009

DTC DETECTION LOGIC
[B2080] ECU TROUBLE

DTC detection condition	DTC erase conditions	Possible causes
Auto levelizer control unit internal malfunction.	Headlamp (LO) OFF	Auto levelizer control unit

Diagnosis Procedure

INFOID:0000000001089010

1.ERASE DTC

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Erase DTC memory of HEADLAMP LEVELIZER with self-diagnosis of CONSULT-III.

Is the memory erased?

YES >> INSPECTION END
NO >> Replace the auto levelizer control unit.

cardiagn.com

B2081 INITIAL NOT DONE

DTC Logic

INFOID:0000000001089011

DTC DETECTION LOGIC

[B2081] INITIAL NOT DONE

DTC detection condition	DTC erase conditions	Possible causes
Sensor initialization is not completed.	When sensor initialization is completed	Auto levelizer control unit

Diagnosis Procedure

INFOID:0000000001089012

1.SENSOR INITIALIZE

Perform the sensor initialize.

>> Refer to EXL-10, "SENSOR INITIALIZE : Special Repair Requirement".

carDiag.com

B2082 SENSOR OUT OF RANGE

DTC Logic

INFOID:0000000001089013

DTC DETECTION LOGIC

[B2082] SENSOR OUT OF RANGE

DTC detection condition	DTC erase conditions	Possible cause
Auto levelizer control unit detects the sensor lever angle 70° or more, or 0°, continually for 20 ms or more.	When sensor lever returns to normal range	Auto levelizer control unit

DTC CONFIRMATION PROCEDURE

1.ERASE DTC

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Erase DTC memory of HEADLAMP LEVELIZER with self-diagnosis of CONSULT-III.

>> GO TO 2.

2.DTC CONFIRMATION

Perform self-diagnosis of CONSULT-III.

Is B2082 detected?

YES >> Refer to EXL-38, "Diagnosis Procedure".
NO >> Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000001089014

1.CHECK SENSOR INITIALIZATION VALUE

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Select "INT SEN VALUE" of HEADLAMP LEVELIZER data monitor item.
4. Check the monitor status under unladen conditions.

Monitor item	Standard value (Approx.)
INT SEN VALUE	50 %*

*: Sensor initialize position (reference)

Is the measurement value normal?

YES >> Replace the auto levelizer control unit.
NO >> GO TO 2.

2.SENSOR INITIALIZATION

Perform the sensor initialize. Refer to EXL-10, "SENSOR INITIALIZE : Special Repair Requirement".

Is sensor initialize completed?

YES >> GO TO 3.
No >> Replace the auto levelizer control unit.

3.ERASE DTC

Erase DTC memory of headlamp levelizer with self-diagnosis of CONSULT-III.

Is the memory erased?

YES >> INSPECTION END
NO >> Replace the auto levelizer control unit.

cardiagn.com

B2083 SEN SIG NOT PLAUSIBLE

DTC Logic

INFOID:0000000001089015

DTC DETECTION LOGIC

[B2083] SEN SIG NOT PLAUSIBLE

DTC detection condition	DTC erase conditions	Possible causes
When vehicle speed is 5 km/h or more, the auto levelizer control unit cannot detect any changes of the sensor lever angle for 5 minutes or more.	Headlamp (LO) OFF	Auto levelizer control unit

DTC CONFIRMATION PROCEDURE

1.ERASE DTC

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Erase DTC memory of HEADLAMP LEVELIZER with self-diagnosis of CONSULT-III.

>> GO TO 2.

2.DTC CONFIRMATION

1. Start the engine.
2. Drive the vehicle for 5 minutes or more.
3. Perform self-diagnosis of CONSULT-III.

Is B2083 detected?

YES >> Refer to EXL-39, "Diagnosis Procedure".
NO >> Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000001089016

1.CHECK AUTO LEVELIZER CONTROL UNIT INSTALLATION CONDITION

Check the mounting part of auto levelizer control unit and its link for looseness and deformation.

Is it properly installed?

YES >> Replace the auto levelizer control unit.
NO >> Install auto levelizer control unit properly.

carDiagn.com

B2084 VOLTAGE UNDER LIMIT

DTC Logic

INFOID:0000000001089017

DTC DETECTION LOGIC

[B2084] VOLTAGE UNDER LIMIT

DTC detection condition	DTC erase conditions	Possible causes
The control unit power supply to auto levelizer control unit is 9 V or less for 1.5 seconds or more.	Headlamp (LO) OFF	• Harness or connector • Auto levelizer control unit

DTC CONFIRMATION PROCEDURE

1.ERASE DTC

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Erase DTC memory of HEADLAMP LEVELIZER with self-diagnosis of CONSULT-III.

>> GO TO 2.

2.DTC CONFIRMATION

Perform self-diagnosis of CONSULT-III.

Is B2084 detected?

YES >> Refer to EXL-40, "Diagnosis Procedure".
NO >> Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000001089018

1.CHECK POWER SUPPLY WITH CONSULT-III

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Select "INT SEN VOLT" of HEADLAMP LEVELIZER data monitor item.
4. Check the monitor status.

Monitor item	Standard value (Approx.)
INT SEN VOLT	Battery voltage

Is the measurement value normal?

YES >> Replace the auto levelizer control unit.
NO >> GO TO 2.

2.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check power supply and ground circuit of auto levelizer control unit. Refer to EXL-49, "AUTO LEVELIZER CONTROL UNIT : Diagnosis Procedure".

Is power supply and ground circuit normal?

YES >> Replace the auto levelizer control unit.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

B2085 LOWBEAM SIG OPEN LINE

Description

INFOID:0000000001089019

- Auto levelizer control unit inputs tail lamp signal from IPDM E/R.
- Auto levelizer control unit always outputs the voltage to detect the DTC.

DTC Logic

INFOID:0000000001089020

DTC DETECTION LOGIC

[B2085] LOWBEAM SIG OPEN LINE

DTC detection condition	DTC erase conditions	Possible causes
Tail lamp signal is 6 V or less with tail lamp ON, or 2 V or more with tail lamp OFF, for 1.5 seconds or more.	Headlamp (LO) OFF	• Harness or connector • IPDM E/R • Auto levelizer control unit

DTC CONFIRMATION PROCEDURE

1.ERASE DTC

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Erase DTC memory of HEADLAMP LEVELIZER with self-diagnosis of CONSULT-III.

>> GO TO 2.

2.DTC CONFIRMATION

Perform self-diagnosis of CONSULT-III.

Is B2085 detected?

YES >> Refer to EXL-41, "Diagnosis Procedure".
NO >> Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000001089021

1.CHECK TAIL LAMP SIGNAL INPUT WITH CONSULT-III

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Select "LIGHT SIGNAL" of HEADLAMP LEVELIZER data monitor item.
4. Check the monitor status.

Monitor item	Condition	Standard value (Approx.)
LIGHT SIGNAL	Headlamp (LO) ON	6 V or more

Is the measurement value normal?

YES >> Replace the auto levelizer control unit.
NO >> GO TO 2.

2.CHECK TAIL LAMP SIGNAL INPUT

1. Turn ignition switch OFF.
2. Disconnect the auto levelizer control unit connector.
3. Turn ignition switch ON.
4. With operating the lighting switch, check the voltage between the auto levelizer control unit harness connector and the ground.

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Auto levelizer control unit		Ground		
Connector	Terminal		Lighting switch	
B43	6		OFF	0 V
			1ST	Battery voltage

Is the measurement value normal?

YES >> Replace the auto levelizer control unit.
NO >> Repair the harnesses between auto levelizer control unit and IPDM E/R.

cardiagn.com

B2086 FRQ. OVER LIMIT

Description

INFOID:0000000001089022

Auto levelizer control unit inputs vehicle speed signal (8-pulse) from combination meter.

DTC Logic

INFOID:0000000001089023

DTC DETECTION LOGIC

[B2086] FRQ. OVER LIMIT

DTC detection condition	DTC erase conditions	Possible causes
The vehicle speed is 340 km/h or more for 1.5 seconds or more.	Headlamp (LO) OFF	• Harness or connector • Auto levelizer control unit

DTC CONFIRMATION PROCEDURE

1.ERASE DTC

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Erase DTC memory of HEADLAMP LEVELIZER with self-diagnosis of CONSULT-III.

>> GO TO 2.

2.DTC CONFIRMATION

1. Start the engine.
2. Drive the vehicle at 40 km/h.
3. Perform self-diagnosis of CONSULT-III.

Is B2086 detected?

YES >> Refer to EXL-43, "Diagnosis Procedure".
NO >> Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000001089024

1.CHECK VEHICLE SPEED SIGNAL INPUT WITH CONSULT-III

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Select "VEHICLE SPEED SIGNAL" of HEADLAMP LEVELIZER data monitor item.
4. While driving at 40 km/h, check the monitor status.

Monitor item	Condition	Standard value (Approx.)
VEHICLE SPEED SIGNAL	While driving at 40 km/h	40 km/h

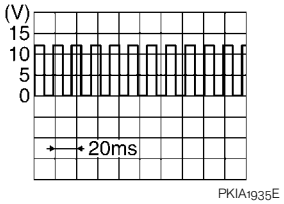
Is the measurement value normal?

YES >> Replace the auto levelizer control unit.
NO >> GO TO 2.

2.CHECK VEHICLE SPEED SIGNAL INPUT

1. Turn ignition switch OFF.
2. Disconnect the auto levelizer control unit connector.
3. Turn ignition switch ON.
4. While driving at 40 km/h, check the voltage between the auto levelizer control unit harness connector and the ground.

carDiagn.com

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Auto levelizer control unit				
Connector	Terminal			
B43	4	Ground	While driving at 40 km/h	

Is the measurement value normal?

YES >> Replace the auto levelizer control unit.
NO >> Repair the harnesses between auto levelizer control unit and combination meter.

cardiagn.com

B2087 SHORT TO GROUND

DTC Logic

INFOID:0000000001089025

DTC DETECTION LOGIC

[B2087] SHORT TO GROUND

DTC detection condition	DTC erase conditions	Possible causes
Headlamp levelizer circuit is shorted to the ground for 1.5 seconds or more.	Headlamp (LO) OFF	• Harness or connector • Auto levelizer control unit

DTC CONFIRMATION PROCEDURE

1.ERASE DTC

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Erase DTC memory of HEADLAMP LEVELIZER with self-diagnosis of CONSULT-III.

>> GO TO 2.

2.DTC CONFIRMATION

Perform self-diagnosis of CONSULT-III.

YES >> Refer to EXL-45, "Diagnosis Procedure".
NO >> Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000001089026

1.CHECK HEADLAMP LEVELIZER CIRCUIT OF CONSULT-III

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Select "ACT MEASURED" and "ACT OUTPUT" of HEADLAMP LEVELIZER data monitor item.
4. Check that ACT MEASURED value is within approximately ± 3% to ACT OUTPUT value.

NOTE:
ACT MEASURED value is approximately 0% when shorted to the ground.

Is the measurement value normal?

YES >> Replace the auto levelizer control unit.
NO >> GO TO 2.

2.HEADLAMP LEVELIZER CIRCUIT INSPECTION

Check the headlamp levelizer circuit for short to ground. Refer to EXL-59, "Component Function Check".

Is the headlamp levelizer circuit normal?

YES >> Replace the auto levelizer control unit.
NO >> Repair or replace the malfunctioning part.

B2088 SHORT TO BATTERY

DTC Logic

INFOID:0000000001089027

DTC DETECTION LOGIC

[B2088] SHORT TO BATTERY

DTC detection condition	DTC erase conditions	Possible causes
Headlamp levelizer circuit is shorted to the battery for 1.5 seconds or more.	Headlamp (LO) OFF	• Harness or connector • Auto levelizer control unit

DTC CONFIRMATION PROCEDURE

1.ERASE DTC

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Erase DTC memory of HEADLAMP LEVELIZER with self-diagnosis of CONSULT-III.

>> GO TO 2.

2.DTC CONFIRMATION

Perform self-diagnosis of CONSULT-III.

Is B2088 detected?

YES >> Refer to EXL-46, "Diagnosis Procedure".
NO >> Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000001089028

1.CHECK HEADLAMP LEVELIZER CIRCUIT OF CONSULT-III

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Select "ACT MEASURED" and "ACT OUTPUT" of HEADLAMP LEVELIZER data monitor item.
4. Check that ACT MEASURED value is within approximately ± 3% to ACT OUTPUT value.

NOTE:
ACT MEASURED value is approximately 100% when shorted to the battery.

Is the measurement value normal?

YES >> Replace the auto levelizer control unit.
NO >> GO TO 2.

2.HEADLAMP LEVELIZER CIRCUIT INSPECTION

Check the headlamp levelizer circuit for short to battery. Refer to EXL-59, "Component Function Check".

Is the headlamp levelizer circuit normal?

YES >> Replace the auto levelizer control unit.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

B2089 NO CAR TYPE SELECTED

DTC Logic

INFOID:0000000001089029

DTC DETECTION LOGIC

[B2089] NO CAR TYPE SELECTED

DTC detection condition	DTC erase conditions	Possible causes
Auto levelizer control unit data malfunction	—	Auto levelizer control unit

Diagnosis Procedure

INFOID:0000000001089030

1.ERASE DTC

1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Erase DTC memory of HEADLAMP LEVELIZER with self-diagnosis of CONSULT-III.

Is the memory erased?

YES >> INSPECTION END
NO >> Replace the auto levelizer control unit.

carDiag.com

POWER SUPPLY AND GROUND CIRCUIT
BCM (BODY CONTROL MODULE)

BCM (BODY CONTROL MODULE) : Diagnosis Procedure

INFOID:0000000001098950

1.CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not fusing.

Terminal No.	Signal name	Fuses and fusible link No.
41	Battery power supply	9
57		J
37	ACC power supply	5
38	Ignition power supply	4

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)			
BCM			OFF	ACC	ON
Connector	Terminal				
M65	37	Ground	Approx. 0 V	Battery voltage	Battery voltage
	38		Approx. 0 V	Approx. 0 V	Battery voltage
M66	41		Battery voltage	Battery voltage	Battery voltage
M67	57				

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) : Diagnosis Procedure

INFOID:0000000001098951

cardiagn.com

1.CHECK FUSIBLE LINK

Check that the following IPDM E/R fusible link is not blown.

Terminal No.	Signal name	Fusible link No.
1	Battery power supply	E
2		C
53		L (except HR engine models)
		M (HR engine models)

Is the fusible link fusing?

YES >> Replace the blown fusible link after repairing the affected circuit if a fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check voltage between IPDM E/R harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
IPDM E/R			
Connector	Terminal		
E9	1	Ground	Battery voltage
	2		
E14	53		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

1. Disconnect IPDM E/R connectors.
2. Check continuity between IPDM E/R harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E10	5		Exist
	6		

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

AUTO LEVELIZER CONTROL UNIT

AUTO LEVELIZER CONTROL UNIT : Diagnosis Procedure

INFOID:0000000000955436

1.CHECK FUSE

Check that the following fuse is fusing.

Signal name	Location	Fuse No.	Capacity
Control unit power supply [Headlamp (LO) signal]	IPDM E/R	#45	15A

Is the fuse fusing?

YES >> Repair the applicable circuit. And then replace the fuse.

cardiagn.com

NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect auto levelizer control unit connector.
3. Turn the headlamp (LO) ON.
4. Check voltage between auto levelizer control unit harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Auto levelizer control unit		Ground	
Connector	Terminal		
B43	2		Battery voltage

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair the harnesses or connectors.

3.CHECK GROUND CIRCUIT

Check for continuity between auto levelizer control unit harness connector and ground.

Auto levelizer control unit		Ground	Continuity
Connector	Terminal		
B43	1		Existed

Does continuity exist?

YES >> Power supply and ground circuit are normal.
NO >> Repair the harnesses or connectors.

cardiagn.com

EXTERIOR LAMP FUSE

Description

INFOID:0000000000955437

Fuse list

Unit		Location	Fuse No.	Capacity
Headlamp HI (LH)		IPDM E/R	#48	10 A
Headlamp HI (RH)		IPDM E/R	#47	10 A
Headlamp LO (LH)		IPDM E/R	#46	15 A
Headlamp LO (RH)		IPDM E/R	#45	15 A
Front fog lamp		IPDM E/R	#43	15 A
• Parking lamp • Tail lamp • License plate lamp • Each illumination		IPDM E/R	#49	10 A
Stop lamp		FUSE BLOCK (J/B)	#11	10 A
Back-up lamp	M/T models	IPDM E/R	#54	10 A
	CVT models	IPDM E/R	#55	10 A

Diagnosis Procedure

INFOID:0000000000955438

1.CHECK FUSE

Check that the following fuses are not fusing.

Unit		Location	Fuse No.	Capacity
Headlamp HI (LH)		IPDM E/R	#48	10 A
Headlamp HI (RH)		IPDM E/R	#47	10 A
Headlamp LO (LH)		IPDM E/R	#46	15 A
Headlamp LO (RH)		IPDM E/R	#45	15 A
Front fog lamp		IPDM E/R	#43	15 A
• Parking lamp • Tail lamp • License plate lamp • Each illumination		IPDM E/R	#49	10 A
Stop lamp		FUSE BLOCK (J/B)	#11	10 A
Back-up lamp	M/T models	IPDM E/R	#54	10 A
	CVT models	IPDM E/R	#55	10 A

Is the fuse fusing?

YES >> Repair the applicable circuit. And then replace the fuse.
NO >> The fuse is normal.

carDiagn.com

HEADLAMP (HI) CIRCUIT

Component Function Check

INFOID:0000000000955440

1.CHECK HEADLAMP (HI) OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Start IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the headlamp switches to the high beam.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the headlamp (HI) is turned ON.

HI : Headlamp (HI) ON
OFF : Headlamp (HI) OFF

NOTE:
ON/OFF is repeated 1 second each.

Is the headlamp (HI) turned ON?

YES >> Headlamp (HI) circuit is normal.
NO >> Refer to EXL-52, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955441

1.CHECK HEADLAMP (HI) OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Turn the ignition switch OFF.
2. Disconnect the front combination lamp connector.
3. Turn the ignition switch ON.
4. Select "EXTERNAL LAMP" of IPDM E/R active test item.
5. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals				Condition	Voltage (Approx.)
(+)			(–)		
IPDM E/R			Ground	External lamp	
Connector		Terminal			
RH	E13	45		HI	Battery voltage
LH		46		OFF	0 V

Is the measurement value normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEADLAMP (HI) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between the IPDM E/R harness connector and the front combination lamp harness connector.

IPDM E/R			Front combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	45	E45	2	Existed
LH		46	E26	2	

Does continuity exist?

cardiagn.com

YES >> Replace the front combination lamp.
NO >> Repair the harnesses or connectors.

3. CHECK HEADLAMP (HI) FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
Headlamp HI (LH)	IPDM E/R	#48	10 A
Headlamp HI (RH)	IPDM E/R	#47	10 A

Is the fuse fusing?

YES >> GO TO 4.
NO >> Replace IPDM E/R.

4. CHECK FRONT COMBINATION LAMP (HI) SHORT CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check continuity between the IPDM E/R harness connector terminal and the ground.

IPDM E/R			Ground	Continuity
Connector		Terminal		
RH	E13	45		Not existed
LH		46		

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if the fuse is fusing again.)

cardiagn.com

HEADLAMP (LO) CIRCUIT

Description

INFOID:0000000000955442

Headlamp (LO) circuit is connected to HID control unit integrated in the headlamp. Headlamp (LO) circuit turns xenon headlamp ON.
For the details of HID control unit and the xenon headlamp, refer to EXL-57, "Description".

Component Function Check

INFOID:0000000000955443

1.CHECK HEADLAMP (LO) OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Start IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the headlamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the headlamp (LO) is turned ON.

LO : Headlamp (LO) ON
OFF : Headlamp (LO) OFF

Is the headlamp (LO) turned ON?

YES >> Headlamp (LO) is normal.
NO >> Refer to EXL-54, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955444

1.CHECK HEADLAMP (LO) OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Turn the ignition switch OFF.
2. Disconnect the front combination lamp connector.
3. Turn the ignition switch ON.
4. Select "EXTERNAL LAMP" of IPDM E/R active test item.
5. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals				Test item	Voltage (Approx.)
(+)			(–)		
IPDM E/R			Ground	External lamp	
Connector		Terminal			
RH	E12	24		LO	Battery voltage
LH	E13	44		OFF	0 V

Is the measurement value normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEADLAMP (LO) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between the IPDM E/R harness connector and the front combination lamp harness connector.

IPDM E/R		Front combination lamp		Continuity
Connector	Terminal	Connector	Terminal	

cardiagn.com

RH	E12	24	E45	1	Existed
LH	E13	44	E26	1	

Does continuity exist?

YES >> Perform the xenon headlamp diagnosis. Refer to EXL-57, "Description".
NO >> Repair the harnesses or connectors.

3. CHECK HEADLAMP (LO) FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Lotion	Fuse No.	Capacity
Headlamp LO (LH)	IPDM E/R	#46	15 A
Headlamp LO (RH)	IPDM E/R	#45	15 A

Is the fuse fusing?

YES >> GO TO 4.
NO >> Replace IPDM E/R.

4. CHECK HEADLAMP (LO) SHORT CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check continuity between the IPDM E/R harness connector and the ground.

IPDM E/R			Ground	Continuity
Connector		Terminal		
RH	E12	24		Not existed
LH	E13	44		

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if the fuse is fusing again.)

carDiag.com

HEADLAMP GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000001096672

1.CHECK HEADLAMP GROUND OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect the front combination lamp connector.
3. Check continuity between the front combination lamp harness connector and the ground.

Front combination lamp			Ground	Continuity
Connector		Terminal		
RH	E45	4		Existed
LH	E26	4		

Does continuity exist?

YES >> Headlamp ground circuit is normal.
NO >> Repair the harnesses or connectors.

cardiagn.com

XENON HEADLAMP

Description

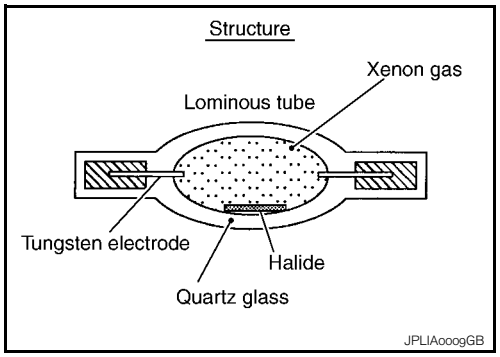
INFOID:0000000000955445

OUTLINE

- The lamp light source is by the arch discharge by applying high voltage into the xenon gas-filled bulb instead of the halogen bulb filament.
- Sight becomes more natural and brighter because the amount of light are gained adequately and the color of light is sunshine-like white.
- The xenon bulb drops the amount of light, repeats blinking, and illuminates in red if the bulb reaches the service life.

ILLUMINATION PRINCIPLE

1. Discharging starts in high voltage pulse between bulb electrodes.
2. Xenon gas is activated by current between electrodes. Pale light is emitted.
3. The luminous tube (bulb) temperature elevates. Evaporated halide is activated by discharge. The color of light changes into white.



NOTE:

- Brightness and the color of light may change slightly immediately after the headlamp turned ON until the xenon bulb becomes stable. This is not malfunction.
- Illumination time lag may occur between right and left. This is not malfunction.

PRECAUTIONS FOR TROUBLE DIAGNOSIS

Representative malfunction examples are; "Light does not turn ON", "Light blinks", and "Brightness is inadequate." The cause often be the xenon bulb. Such malfunctions, however, are occurred occasionally by HID control unit malfunction or lamp case malfunction. Specify the malfunctioning part with diagnosis procedure.

WARNING:

- **Never touch the harness, HID control unit, the inside and metal part of lamp when turning the headlamp ON or operating the light switch.**
- **Never work with wet hands.**

CAUTION:

- **Never perform HID control unit circuit diagnosis with a circuit tester or an equivalent.**
- **Temporarily install the headlamp on the vehicle. Connect the battery to the connector (vehicle side) when checking ON/OFF status.**
- **Disconnect the battery negative terminal before disconnecting the lamp socket connector or the harness connector.**
- **Check for fusing of the fusible link(s), open around connector, short, disconnection if the symptom is caused by electric error.**

NOTE:

- Turn the switch OFF once before turning ON, if the ON/OFF is inoperative.
- The xenon bulb drops the amount of light, repeats blinking, and illuminates in red if the bulb reaches the service life.

Diagnosis Procedure

INFOID:0000000000955446

1. CHECK XENON BULB

Install the normal bulb to the applicable headlamp. Check that the xenon bulb is turned ON.

Is the headlamp turned ON?

YES >> Replace the xenon bulb.
NO >> GO TO 2.

2. CHECK HID CONTROL UNIT

Install the normal HID control unit to the applicable headlamp. Check that the lamp is turned ON.

Is the headlamp turned ON?

cardiagn.com

YES >> Replace HID control unit.
NO >> GO TO 3.

3.CHECK XENON HEADLAMP HOUSING ASSEMBLY

Install the normal xenon headlamp housing assembly to the applicable headlamp. Check that the xenon headlamp is turned ON.

Is the headlamp turned ON?

YES >> Replace the front combination lamp. (Xenon headlamp housing voltage converter malfunctions.)
NO >> Xenon headlamp is normal.

cardiagn.com

HEADLAMP LEVELIZER CIRCUIT

Description

INFOID:0000000000955447

The headlamp levelizer adjusts the headlamp light axis upward and downward with the aiming motor integrated in the front combination lamp.

Component Function Check

INFOID:0000000000955448

1.CHECK HEADLAMP LEVELIZER OPERATION

CONSULT-III ACTIVE TEST
1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Start the engine.
4. Select “LAMP TEST” of HEADLAMP LEVELIZER active test item.
5. With operating the test item, check the light axis operation.

Test item	Light axis operation
LAMP TEST	
MIN	Moves the light axis to the lowest position.
MID	Moves the light axis to the initial position.
MAX	Moves the light axis to the highest position.

Is the operation normal?

YES >> Headlamp levelizer circuit is normal.
NO >> Refer to EXL-59, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955449

1.CHECK AIMING MOTOR DRIVE SIGNAL OUTPUT

CONSULT-III ACTIVE TEST
1. Turn the headlamp (LO) ON.
2. Connect the CONSULT-III.
3. Start the engine.
4. Select “LAMP TEST” of HEADLAMP LEVELIZER active test item.
5. With operating the test items, check the voltage between the auto levelizer control unit harness connector and the ground.

2WD models

Terminals			Test item	Voltage (Approx.)
(+)		(–)		
Auto levelizer control unit		Ground	LAMP TEST	
Connector	Terminal			
B43	7		MIN	1.9 V
			MID	6.3 V
			MAX	9.3 V

cardiagn.com

4WD models

Terminals			Test item	Voltage (Approx.)
(+)		(–)		
Auto levelizer control unit		Ground	LAMP TEST	
Connector	Terminal			
B43	7		MIN	1.9 V
			MID	6.3 V
			MAX	10.0 V

Is the measurement value normal?

YES >> GO TO 2.
Fixed at 0 V>>GO TO 3.
Fixed at battery voltage>>GO TO 4.

2.CHECK AIMING MOTOR DRIVE OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect auto levelizer control unit connector and headlamp aiming motor connector.
3. Check continuity between auto levelizer control unit harness connector and the headlamp aiming motor harness connector.

Auto levelizer control unit			headlamp aiming motor		Continuity
Connector		Terminal	Connector	Terminal	
RH	B43	7	E47	2	Existed
LH			E28	2	

Does continuity exist?

YES >> Replace the headlamp aiming motor.
NO >> Repair the harnesses and connectors.

3.CHECK AIMING MOTOR DRIVE SHORT CIRCUIT (SHORT TO GROUND)

1. Turn the ignition switch OFF.
2. Disconnect auto levelizer control unit connector and headlamp aiming motor connector.
3. Check continuity between auto levelizer control unit harness connector and ground.

Terminals			Continuity
(+)		(–)	
Auto levelizer control unit		Ground	
Connector	Terminal		
B43	7		Not existed

Does continuity exist?

YES >> Repair the harness and connectors.
NO >> Replace auto levelizer control unit.

4.CHECK AIMING MOTOR DRIVE SRORT CIRCUIT (SHORT TO BATTERY)

1. Turn the ignition switch OFF.
2. Disconnect auto levelizer control unit connector and headlamp aiming motor connector.
3. Check voltage between auto levelizer control unit harness connector and ground.

cardiagn.com

Terminals			Voltage (Approx.)
(+)		(−)	
Auto levelizer control unit		Ground	
Connector	Terminal		
B43	7		0 V

Is the measurement value normal?

YES >> Replace auto levelizer control unit.
NO >> Repair the harness and connectors.

carDiagn.com

FRONT FOG LAMP CIRCUIT

Component Function Check

INFOID:0000000000955450

1.CHECK FRONT FOG LAMP OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Activate IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the front fog lamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the front fog lamp is turned ON.

FOG : Front fog lamp ON
OFF : Front fog lamp OFF

Is the front fog lamp turned ON?

YES >> Front fog lamp circuit is normal.
NO >> Refer to EXL-62, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955451

1.CHECK FRONT FOG LAMP FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
Front fog lamp	IPDM E/R	#43	15 A

Is the fuse fusing?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK FRONT FOG LAMP SHORT CIRCUIT

1. Disconnect IPDM E/R connector and the front combination lamp connector.
2. Check continuity between the IPDM E/R harness connector and the ground.

IPDM E/R			Ground	Continuity
Connector		Terminal		
RH	E13	36		Not existed
LH		43		

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if the fuse is fusing again.)

3.CHECK FRONT FOG LAMP BULB

Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 4.
NO >> Replace the bulb.

4.CHECK FRONT FOG LAMP OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Disconnect the front combination lamp connector.
2. Turn the ignition switch ON.
3. Select "EXTERNAL LAMP" of IPDM E/R active test item.

cardiagn.com

4. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals				Test item	Voltage (Approx.)
(+)			(–)		
IPDM E/R			Ground	EXTERNAL LAMP	
Connector		Terminal			
RH	E13	36		FOG	Battery voltage
LH		43		OFF	0 V

Is the measurement value normal?

YES >> GO TO 5.
NO >> Replace IPDM E/R.

5. CHECK FRONT FOG LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between the IPDM E/R harness connector and the front combination lamp harness connector.

IPDM E/R			Front combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	36	E48	1	Existed
LH		43	E30	1	

Does continuity exist?

YES >> GO TO 6.
NO >> Repair the harnesses or connectors.

6. CHECK FRONT FOG LAMP GROUND CIRCUIT OPEN CIRCUIT

Check continuity between the front combination lamp harness connector and the ground.

Front combination lamp			Ground	Continuity
Connector		Terminal		
RH	E48	2		Existed
LH	E30	2		

Does continuity exist?

YES >> Replace the front fog lamp.
NO >> Repair the harnesses or connectors.

carDiag.com

PARKING LAMP CIRCUIT

Component Function Check

INFOID:0000000000955452

1.CHECK PARKING LAMP OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Activate IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the parking lamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the parking lamp is turned ON.

TAIL : Parking lamp ON
OFF : Parking lamp OFF

Is the parking lamp turned ON?

YES >> Parking lamp circuit is normal.
NO >> Refer to EXL-64, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955453

1.CHECK PARKING LAMP FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
Parking lamp	IPDM E/R	#49	10 A

Is the fuse fusing?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK PARKING LAMP SHORT CIRCUIT

1. Disconnect IPDM E/R connector and the front combination lamp connector.
2. Check continuity between the IPDM E/R harness connector and the ground.

IPDM E/R			Ground	Continuity
Connector		Terminal		
RH	E13	37		Not existed
LH		47		

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if fusing is found again.)

3.CHECK PARKING LAMP BULB

Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 4.
NO >> Replace the bulb.

4.CHECK PARKING LAMP OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Disconnect the front combination lamp connector.
2. Turn the ignition switch ON.
3. Select "EXTERNAL LAMP" of IPDM E/R active test item.

cardiagn.com

4. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals				Test item	Voltage (Approx.)
(+)			(–)		
IPDM E/R			Ground	EXTERNAL LAMP	
Connector		Terminal			
RH	E13	37		TAIL	Battery voltage
LH		47		OFF	0 V

Is the measurement value normal?

YES >> GO TO 5.
NO >> Replace IPDM E/R.

5. CHECK PARKING LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between the IPDM E/R harness connector and the front combination lamp harness connector.

IPDM E/R			Front combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	37	E43	1	Existed
LH		47	E24	1	

Does continuity exist?

YES >> GO TO 6.
NO >> Repair the harnesses or connectors.

6. CHECK PARKING LAMP GROUND OPEN CIRCUIT

Check continuity between the front combination lamp harness connector and the ground.

Front combination lamp			Ground	Continuity
Connector		Terminal		
RH	E43	2		Existed
LH	E24	2		

Does continuity exist?

YES >> Replace the front combination lamp.
NO >> Repair the harnesses or connectors.

cardiagn.com

TURN SIGNAL LAMP CIRCUIT

Description

INFOID:0000000000955454

BCM performs the high flasher operation (fail-safe) if any bulb or harness of the turn signal lamp circuit is open.

NOTE:

The turn signal lamp blinks at normal speed when using the hazard warning lamp.

Component Function Check

INFOID:0000000000955455

1.CHECK TURN SIGNAL LAMP

CONSULT-III ACTIVE TEST

1. Select "FLASHER" of BCM (FLASHER) active test item.
2. With operating the test items, check that the turn signal lamp is turned ON.

LH : Turn signal lamp (LH) ON
RH : Turn signal lamp (RH) OFF
OFF : The turn signal lamp OFF

Are the turn signal lamps turned ON?

YES >> Turn signal lamp circuit is normal.
NO >> Refer to EXL-66, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955456

1.CHECK TURN SIGNAL LAMP BULB

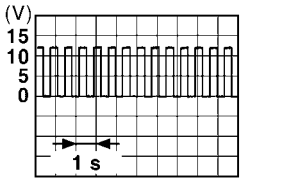
Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 2.
NO >> Replace the bulb.

2.CHECK TURN SIGNAL LAMP OUTPUT VOLTAGE

1. Turn the ignition switch OFF.
2. Disconnect the front combination lamp connector, side turn signal lamp connector, or the rear combination lamp connector.
3. Turn the ignition switch ON.
4. With operating the turn signal switch, check the voltage between the BCM harness connector and the ground.

Terminals				Condition	Voltage (Approx.)
(+)			(–)		
BCM				Turn signal switch	
Connector		Terminal			
RH	M66	48	Ground	LH or RH	
LH		47			
				OFF	0 V

Is the measurement value normal?

YES >> GO TO 3.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

cardiagn.com

3.CHECK TURN SIGNAL LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between the BCM harness connector and the front combination lamp, side turn signal lamp or the rear combination lamp harness connector.

Front turn signal lamp

BCM			Front combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	M66	48	E45	3	Existed
LH		47	E26		

Side turn signal lamp

BCM			Side turn signal lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	M66	48	E40	1	Existed
LH		47	E23		

Rear turn signal lamp

BCM			Rear combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	M66	48	B59	1	Existed
LH		47	B80		

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

4.CHECK TURN SIGNAL LAMP SHORT CIRCUIT

Check continuity between the BCM harness connector and the ground.

BCM			Ground	Continuity
Connector		Terminal		
RH	M66	48		Not existed
LH		47		

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> GO TO 5.

5.CHECK TURN SIGNAL LAMP GROUND OPEN CIRCUIT

Check continuity between the BCM harness connector and the front combination lamp, side turn signal lamp or the rear combination lamp and the ground.

Front turn signal lamp

Front combination lamp			Ground	Continuity
Connector		Terminal		
RH	E45	5		Existed
LH	E26			

Side turn signal lamp

Side turn signal lamp			Ground	Continuity
Connector		Terminal		
RH	E40	2		Existed
LH	E23			

carDiagn.com

Rear turn signal lamp

Rear combination lamp			Ground	Continuity
Connector		Terminal		
RH	B59	4		Existed
LH	B80			

Does continuity exist?

YES >> Replace the front combination lamp, the side turn signal lamp or the rear combination lamp.
NO >> Repair the harnesses or connectors.

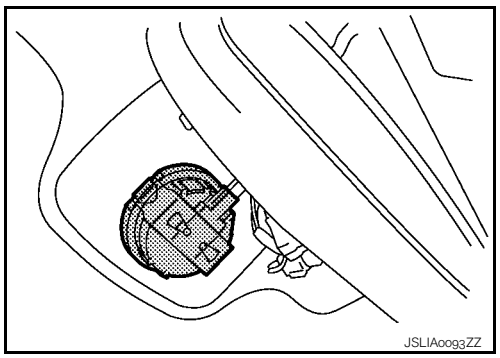
cardiagn.com

LIGHT & RAIN SENSOR

Description

INFOID:0000000000955457

- The light & rain sensor detects the outside brightness (lux), a raindrop and sensor conditions. And it transmits the signals to BCM by the light & rain sensor serial link.
- BCM controls each function depending on the signals. And it detects the light & rain sensor serial link error and the light & rain sensor malfunction.



Component Function Check

INFOID:0000000000955458

1.CHECK LIGHT & RAIN SENSOR BY CONSULT-III

CONSULT-III DATA MONITOR
1. Turn the ignition switch ON.
2. Select "LIT-SEN FAIL" of BCM (HEADLAMP) data monitor item.
3. Turn the lighting switch AUTO.
4. Start the engine.
5. Check the monitor status.

Monitor item	Condition	Status
LIT-SEN FAIL	Light & rain sensor is normal	OK
	• Light & rain sensor inside abnormality • Light & rain sensor serial link error	NOTOK

Is it displayed with "OK"?

YES >> Light & rain sensor is normal.
NO >> Refer to EXL-69, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955459

1.CHECK LIGHT & RAIN SENSOR POWER SUPPLY OUTPUT

1. Turn the ignition switch OFF.
2. Disconnect the light & rain sensor connector.
3. Check the voltage between the light & rain sensor harness connector and the ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Light & rain sensor		Ground	
Connector	Terminal		
R13	1		12 V

Is the measurement value normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK LIGHT & RAIN SENSOR SIGNAL OUTPUT

Check the voltage between the light & rain sensor harness connector and the ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Light & rain sensor		Ground	
Connector	Terminal		
R13	2		12 V

Is the measurement value normal?

YES >> GO TO 7.
NO >> GO TO 5.

3. CHECK LIGHT & RAIN SENSOR POWER SUPPLY OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between the light & rain sensor harness connector and the BCM harness connector.

Light & rain sensor		BCM		Continuity
Connector	Terminal	Connector	Terminal	
R13	1	M66	42	Existed

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

4. CHECK LIGHT & RAIN SENSOR POWER SUPPLY SHORT CIRCUIT

Check the continuity between the light & rain sensor harness connector and the ground.

Light & rain sensor		Ground	Continuity
Connector	Terminal		
R13	1		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5. CHECK LIGHT & RAIN SENSOR SIGNAL OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between the light & rain sensor harness connector and the BCM harness connector.

Light & rain sensor		BCM		Continuity
Connector	Terminal	Connector	Terminal	
R13	2	M66	17	Existed

Does continuity exist?

YES >> GO TO 6.
NO >> Repair the harnesses or connectors.

6. CHECK LIGHT & RAIN SENSOR SIGNAL SHORT CIRCUIT

Check the continuity between the light & rain sensor harness connector and the ground.

Light & rain sensor		Ground	Continuity
Connector	Terminal		
R13	2		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

cardiagn.com

7. CHECK LIGHT & RAIN SENSOR GROUND OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Check continuity between the light & rain sensor harness connector and the ground.

Light & rain sensor		Ground	Continuity
Connector	Terminal		
R13	3		Existed

Does continuity exist?

YES >> Replace the light & rain sensor.
NO >> Repair the harnesses or connectors.

A B C D E F G H I J K EXL M N O P
cardiagn.com

HAZARD SWITCH

Component Function Check

INFOID:0000000000955461

1.CHECK HAZARD SWITCH SIGNAL BY CONSULT-III

CONSULT-III DATA MONITOR
1. Turn the ignition switch ON.
2. Select "HAZARD SW" of BCM (FLASHER) data monitor item.
3. With operating the hazard switch, check the monitor status.

Monitor item	Condition		Monitor status
HAZARD SW	Hazard switch	ON	ON
		OFF	OFF

Is the item status normal?

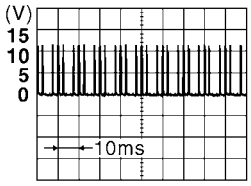
YES >> Hazard switch circuit is normal.
NO >> Refer to EXL-72, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955462

1.CHECK HAZARD SWITCH SIGNAL INPUT

With operating the hazard switch, check the voltage between the BCM harness connector and the ground.

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
BCM			Hazard switch	
Connector	Terminal			
M65	8	Ground	ON	0 V
			OFF	

JPMIA0154GB

Is the measurement value normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> GO TO 2.

2.CHECK HAZARD SWITCH SIGNAL OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect the hazard switch connector and BCM connector.
3. Check continuity between the hazard switch harness connector and the BCM harness connector.

Hazard switch		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M45	3	M65	8	Existed

Does continuity exist?

YES >> GO TO 3.
NO >> Repair the harnesses or connectors.

3.CHECK HAZARD SWITCH SIGNAL SHORT CIRCUIT

Check continuity between the hazard switch harness connector and the ground.

cardiagn.com

Hazard switch		Ground	Continuity
Connector	Terminal		
M45	3		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> GO TO 4.

4. CHECK HAZARD SWITCH GROUND OPEN CIRCUIT

Check continuity between the hazard switch harness connector and the ground.

Hazard switch		Ground	Continuity
Connector	Terminal		
M45	2		Existed

Does continuity exist?

YES >> Replace the hazard switch.
NO >> Repair the harnesses or connectors.

carDiag.com

TAIL LAMP CIRCUIT

Component Function Check

INFOID:0000000000955463

1.CHECK TAIL LAMP OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Activate IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the tail lamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the tail lamp is turned ON.

TAIL : Tail lamp ON
OFF : Tail lamp OFF

Is the tail lamp turned ON?

YES >> Tail lamp circuit is normal.
NO >> Refer to EXL-74, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955464

1.CHECK TAIL LAMP FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
• Tail lamp • License plate lamp	IPDM E/R	#49	10 A

Is the fuse fusing?

YES >> Repair the malfunctioning part before replacing the fuse.
NO >> GO TO 2.

2.CHECK TAIL LAMP OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Disconnect the rear combination lamp connector.
2. Turn the ignition switch ON.
3. Select "EXTERNAL LAMP" of IPDM E/R active test item.
4. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals			Test item	Voltage (Approx.)
(+)		(–)		
IPDM E/R		Ground	EXTERNAL LAMP	
Connector	Terminal			
E13	38		TAIL	Battery voltage
			OFF	0 V

Is the measurement value normal?

YES >> GO TO 3.
NO >> Replace IPDM E/R.

3.CHECK TAIL LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.

cardiagn.com

3. Check continuity between the IPDM E/R harness connector and the rear combination lamp harness connector.

IPDM E/R			Rear combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	38	B59	2	Existed
LH			B80	2	

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

4. CHECK TAIL LAMP GROUND OPEN CIRCUIT

Check continuity between the rear combination lamp harness connector and the ground.

Rear combination lamp			Ground	Continuity
Connector		Terminal		
RH	B59	4		Existed
LH	B80	4		

Does continuity exist?

YES >> Replace the rear combination lamp.
NO >> Repair the harnesses or connectors.

carDiag.com

LICENSE PLATE LAMP CIRCUIT

Component Function Check

INFOID:0000000000955465

NOTE:
Check the tail lamp circuit if the tail lamp and the license plate lamp are not turned ON.

1.CHECK LICENSE PLATE LAMP OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Activate IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the license plate lamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the lighting switch, check that the license plate lamp is turned ON.

TAIL : License plate lamp ON
OFF : License plate lamp OFF

Is the license plate lamp turned ON?

YES >> License plate lamp circuit is normal.
NO >> Refer to EXL-76, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955466

1.CHECK LICENSE PLATE LAMP BULB

Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 2.
NO >> Replace the bulb.

2.CHECK LICENSE PLATE LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector and the license plate lamp connector.
3. Check continuity between the IPDM E/R harness connector and the license plate lamp harness connector.

IPDM E/R			License plate lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	38	D185	1	Existed
LH			D184	1	

Does continuity exist?

YES >> GO TO 3.
NO >> Repair the harnesses or connectors.

3.CHECK LICENSE PLATE LAMP GROUND OPEN CIRCUIT

Check continuity between the license plate lamp harness connector and the ground.

License plate lamp			Ground	Continuity
Connector		Terminal		
RH	D185	2		Existed
LH	D184	2		

Does continuity exist?

YES >> Replace the license plate lamp.
NO >> Repair the harnesses or connectors.

cardiagn.com

REAR FOG LAMP CIRCUIT

Component Function Check

INFOID:0000000000955468

1.CHECK REAR FOG LAMP OPERATION

CONSULT-III ACTIVE TEST
1. Select "RR FOG LAMP" of BCM (HEAD LAMP) active test item.
2. With operating the test items, check that the rear fog lamp is turned ON.

ON : Rear fog lamp ON
OFF : Rear fog lamp OFF

Is rear fog lamp turned ON?

YES >> Rear fog lamp circuit is normal.
NO >> Refer to EXL-77, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955469

1.CHECK REAR FOG LAMP BULB

Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 2.
NO >> Replace the bulb.

2.CHECK REAR FOG LAMP OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Turn the ignition switch OFF.
2. Disconnect the rear fog lamp connector.
3. Turn the ignition switch ON.
4. Select "RR FOG LAMP" of BCM (HEAD LAMP) active test item.
5. With operating the test items, check voltage between BCM harness connector and ground.

Terminals			Test item	Voltage (approx.)
(+)		(–)		
BCM		Ground	RR FOG LAMP	
Connector	Terminal			
M66	49		ON	12 V
			OFF	0 V

Is the measurement value normal?

YES >> GO TO 3.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

3.CHECK REAR FOG LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector and rear fog lamp harness connector.

BCM		Rear fog lamp		Continuity
Connector	Terminal	Connector	Terminal	
M66	49	B90	1	Existed

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

carDiag.com

4.CHECK REAR FOG LAMP SHORT CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M66	49		Not existed

Does continuity exist?

YES >> GO TO 5.
NO >> Repair the harnesses or connectors.

5.CHECK REAR FOG LAMP GROUND OPEN CIRCUIT

Check continuity between rear fog lamp harness connector and ground.

Rear fog lamp		Ground	Continuity
Connector	Terminal		
B90	2		Existed

Does continuity exist?

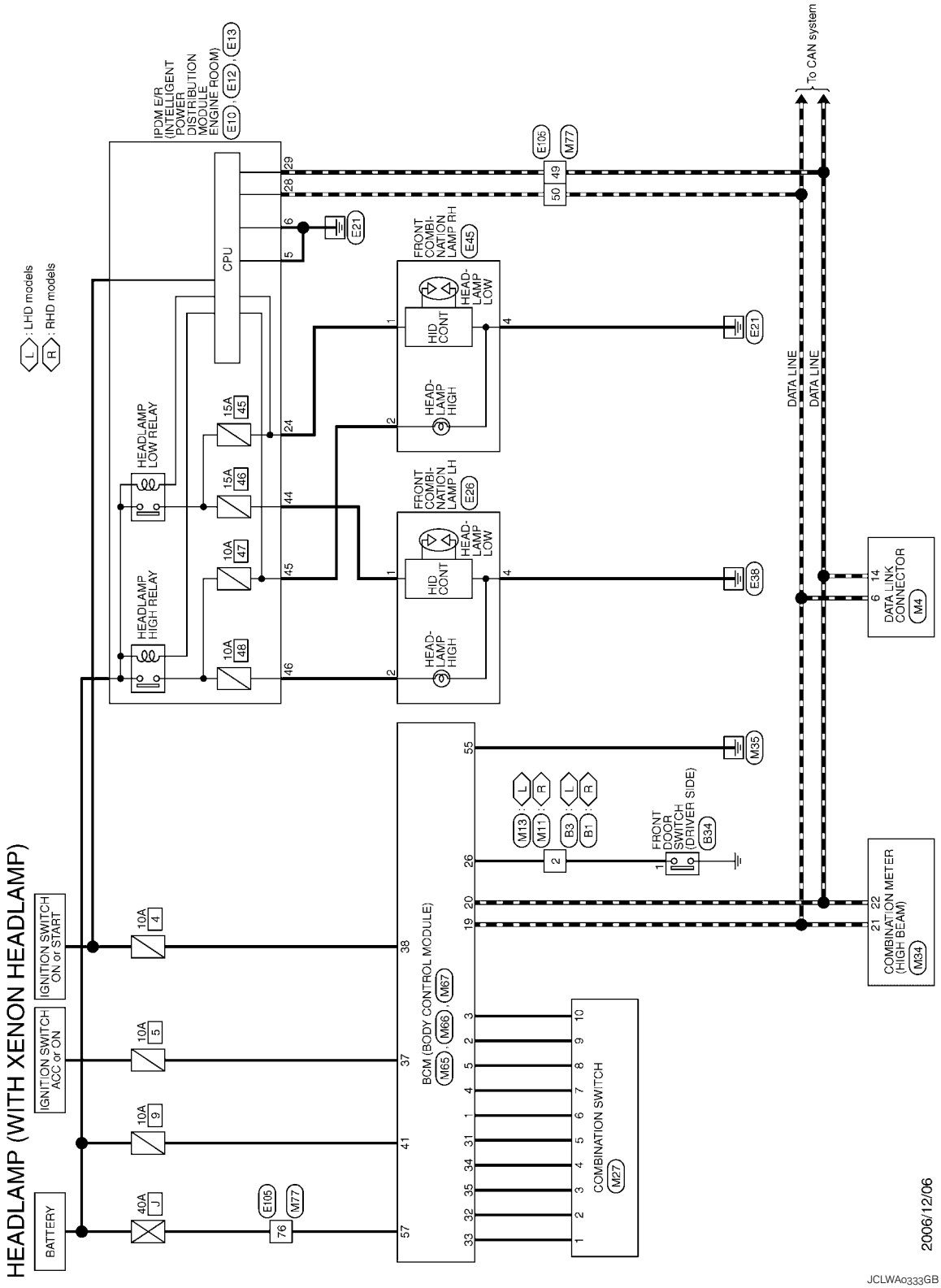
YES >> Replace the rear fog lamp.
NO >> Repair the harnesses or connectors.

cardiagn.com

HEADLAMP SYSTEM

Wiring Diagram - HEADLAMP -

INFOID:0000000000977443



carDiagn.com

HEADLAMP (WITH XENON HEADLAMP)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	–[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	–[LHD models]

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

5	4	3
8	7	6

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

25	24	23	22	21
32	31	30	29	28	27	26

Terminal No.	Color of Wire	Signal Name [Specification]
24	R/Y	–
28	L	–
29	P	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

39	38	37	36	35	34	33
48	47	46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name [Specification]
44	L	–
45	L/W	–
46	G	–

Connector No.	E26
Connector Name	FRONT COMBINATION LAMP LH
Connector Type	AMP 953600-1

H.S.

5	4	3	2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	G	–
4	B	–

Connector No.	E45
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	AMP 953600-1

H.S.

5	4	3	2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/Y	–
2	L/W	–
4	B	–

JCLWA0334GB

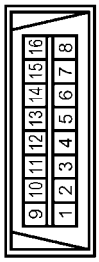
cardiagn.com

HEADLAMP (WITH XENON HEADLAMP)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

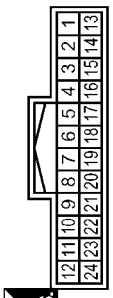
Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



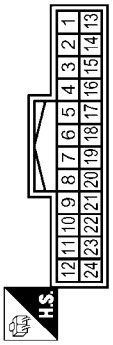
Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
2	R	–[RHD models]

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
2	R	–[LHD models]

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
26	R	DOOR SW (DR)
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

JCLWA0335GB

carsdiagn.com

HEADLAMP (WITH XENON HEADLAMP)

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

52	51	50	49	48	47	46	45	44	43	42	41

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

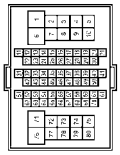
H.S.

60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

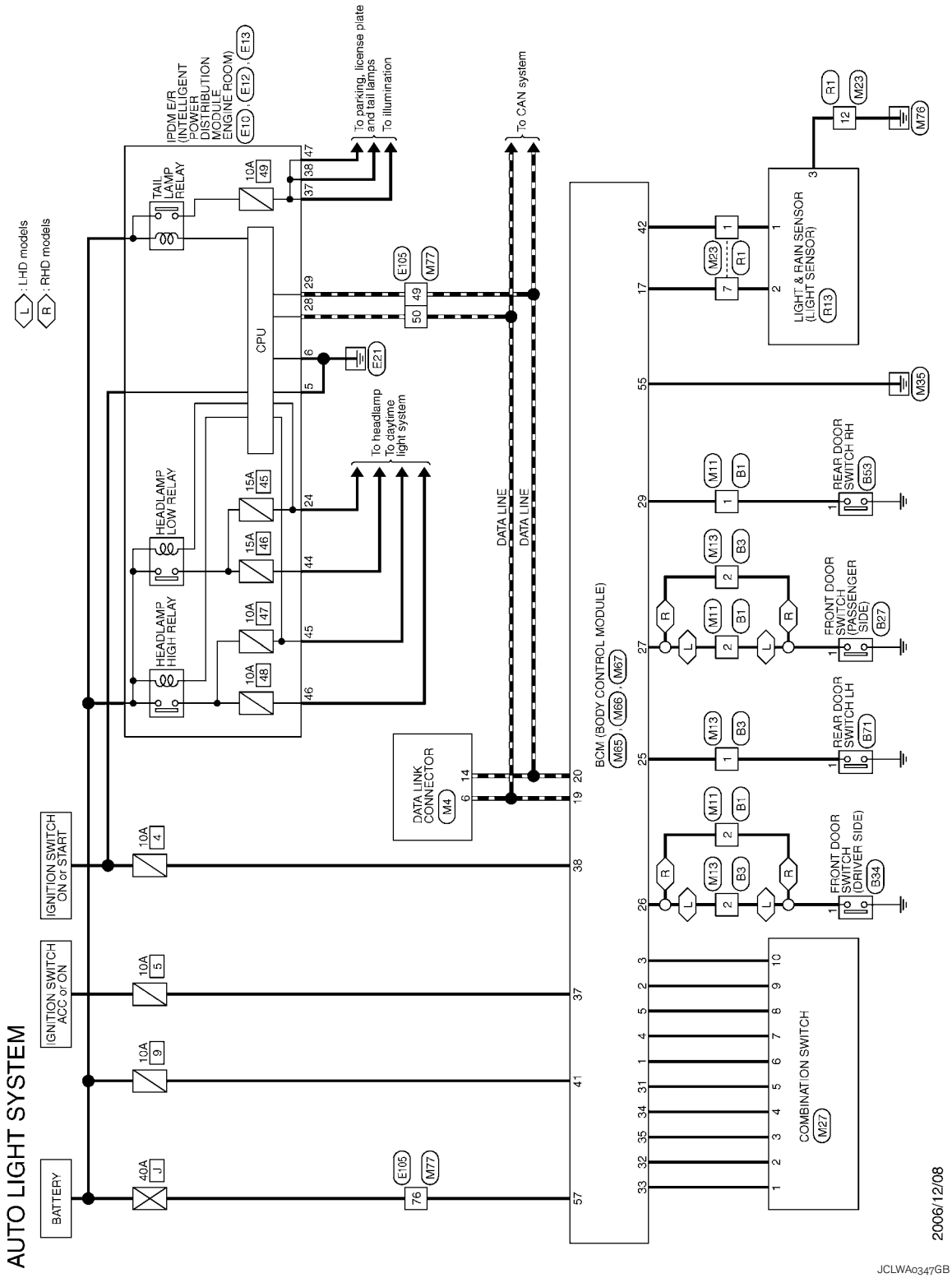
JCLWA0336GB

cardiagn.com

AUTO LIGHT SYSTEM

Wiring Diagram - AUTO LIGHT SYSTEM -

INFOID:0000000000977444

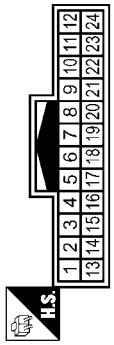


AUTO LIGHT SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]
2	R/W	–[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	R/W	–[LHD models]
2	BR	–[RHD models]

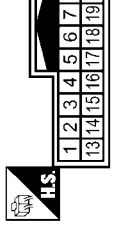
Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

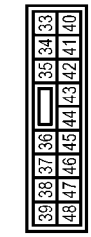
Terminal No.	Color of Wire	Signal Name [Specification]
24	R/Y	–
28	L	–
29	P	–

JCLWA0348GB

cardiagn.com

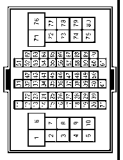
AUTO LIGHT SYSTEM

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS



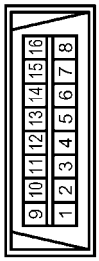
Terminal No.	Color of Wire	Signal Name [Specification]
37	R/W	–
38	R/L	–
44	L	–
45	L/W	–
46	G	–
47	R/L	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



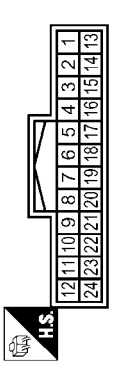
Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]
2	R	–[RHD models]

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	R	–[LHD models]
2	BR	–[RHD models]

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
7	BR	–
12	B	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

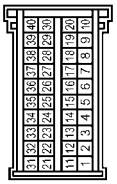
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

JCLWA0349GB

carDiagn.com

AUTO LIGHT SYSTEM

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



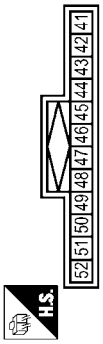
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
17	BR	LIGHT & RAIN SENS
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

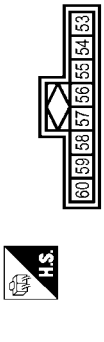
29	LG	DOOR SW (RR)
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



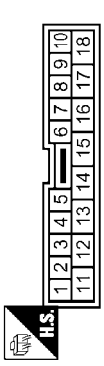
Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
42	V	ROOM LAMP POWER SUPPLY

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
7	BR	-
12	B	-

Connector No.	R13
Connector Name	LIGHT & RAIN SENSOR
Connector Type	AMP 968705-1

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	+IG
2	BR	SIG
3	B	GND

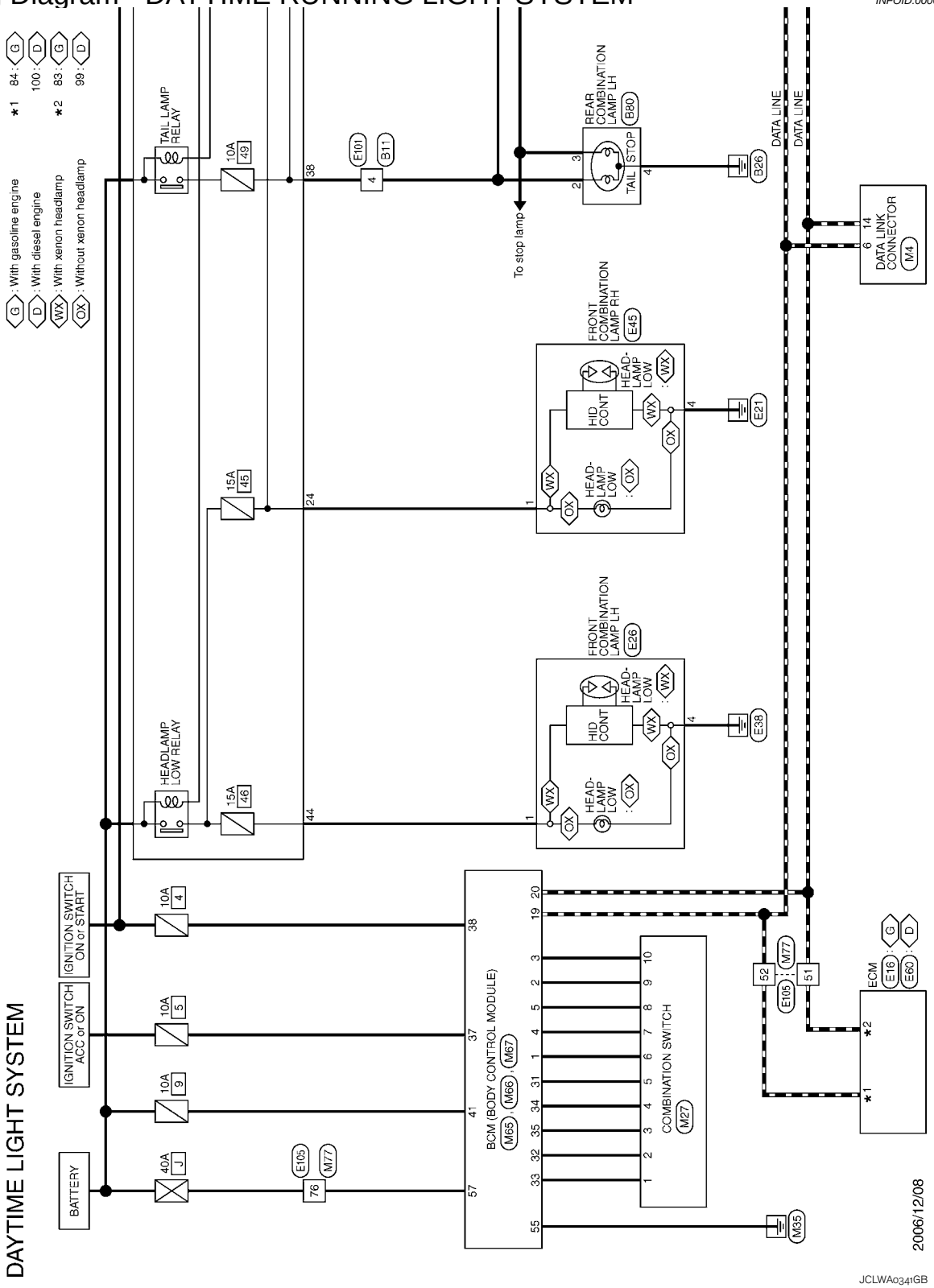
JCLWA0350GB

cardiagn.com

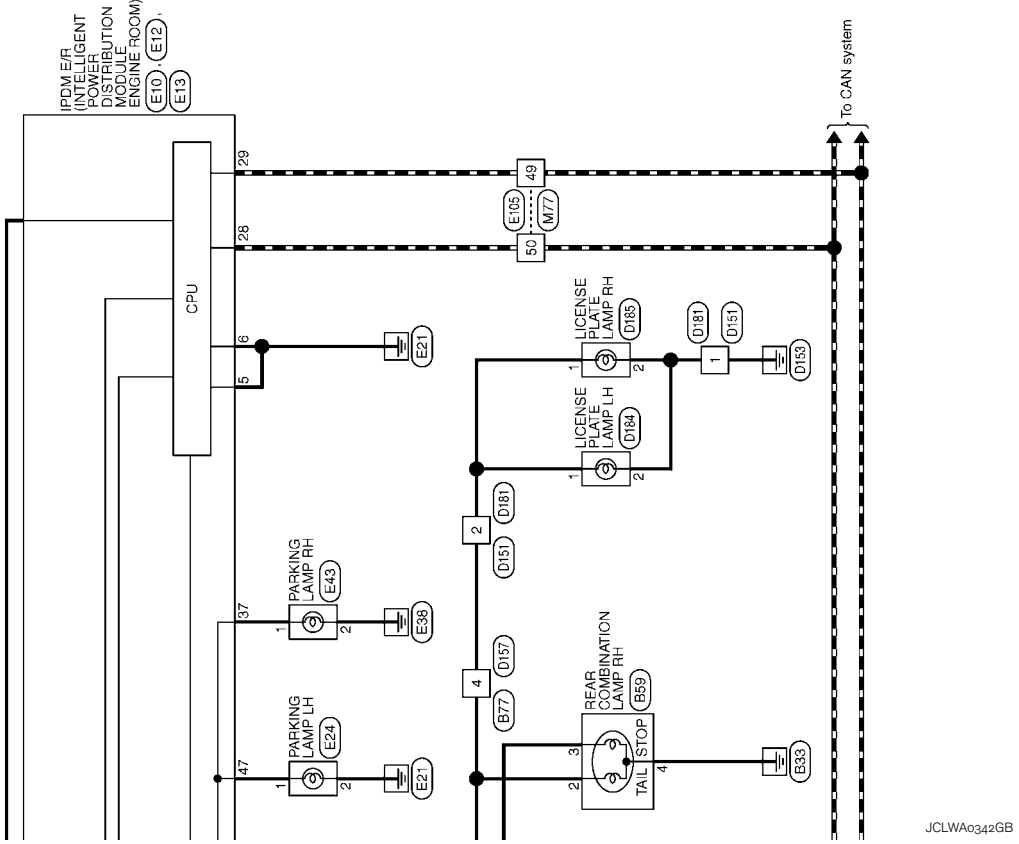
DAYTIME RUNNING LIGHT SYSTEM

Wiring Diagram - DAYTIME RUNNING LIGHT SYSTEM -

INFOID:0000000001125393



carDiagn.com



cardiagn.com

DAYTIME LIGHT SYSTEM

JCLWA0343GB

carDiagn.com

DAYTIME LIGHT SYSTEM

Connector No.	D185
Connector Name	LICENSE PLATE LAMP RH
Connector Type	TRW 3020423100D

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	–
2	B	–

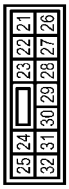
Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

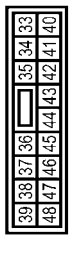
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
24	R/Y	–
28	L	–
29	P	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
37	R/W	–
38	R/L	–
44	L	–
47	R/L	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E24
Connector Name	PARKING LAMP LH
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	–
2	B	–

Connector No.	E26
Connector Name	FRONT COMBINATION LAMP LH
Connector Type	AMP 953600-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
4	B	–

Connector No.	E43
Connector Name	PARKING LAMP RH
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–
2	B	–

JCLWA0344GB

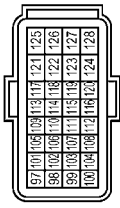
cardiagn.com

DAYTIME LIGHT SYSTEM

Connector No.	E45
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	AMP 953600-1

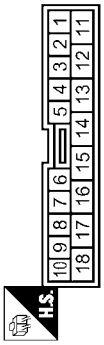
Terminal No.	Color of Wire	Signal Name [Specification]
1	R/Y	-
4	B	-

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



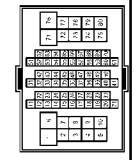
Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
51	P	-
52	L	-
76	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

JCLWA0345GB

cardiagn.com

DAYTIME LIGHT SYSTEM

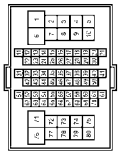
Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–
76	Y	–

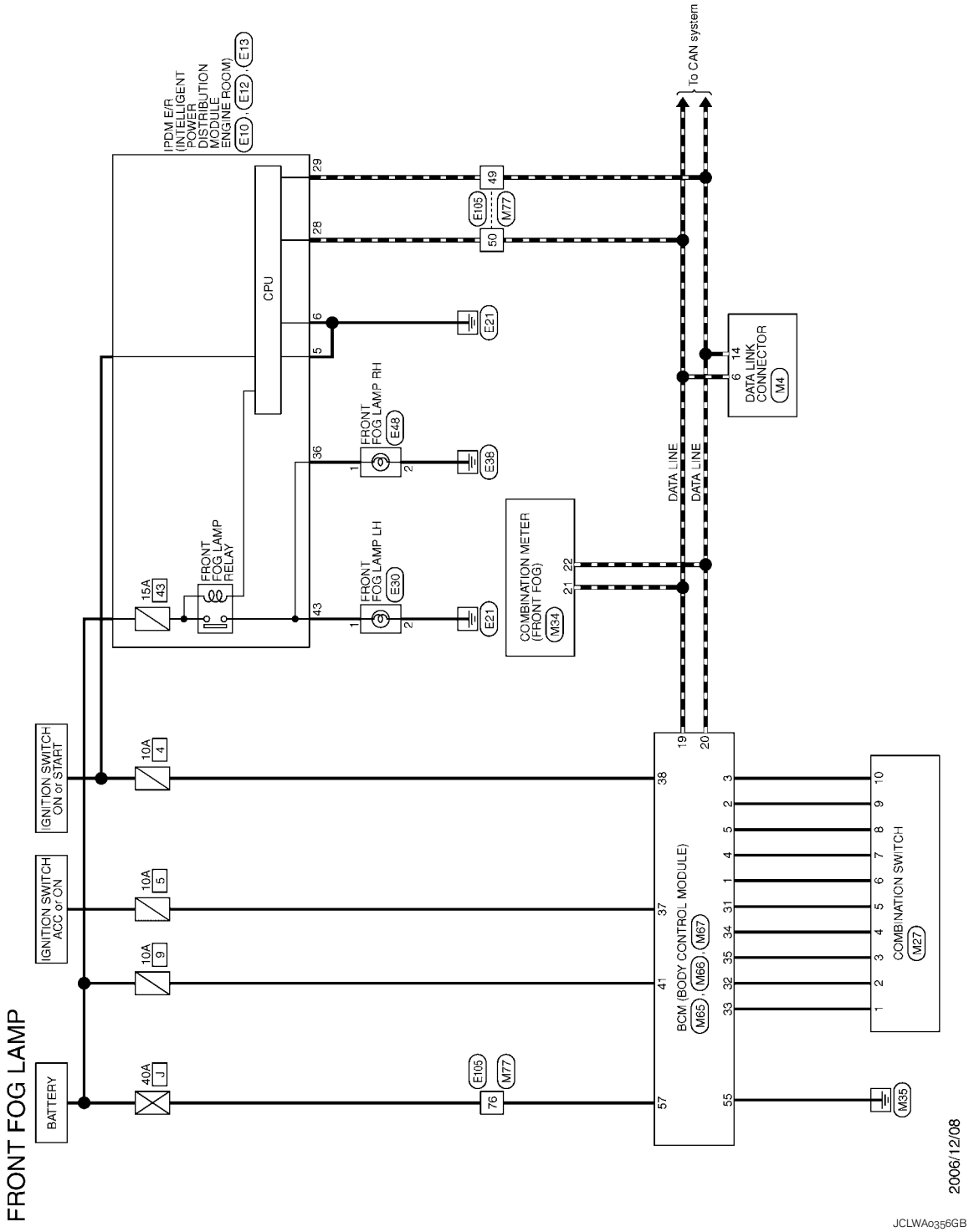
JCLWA0346GB

cardiagn.com

FRONT FOG LAMP SYSTEM

Wiring Diagram - FRONT FOG LAMP -

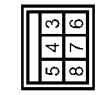
INFOID:0000000000977445



FRONT FOG LAMP

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E46
Connector Name	FRONT FOG LAMP RH
Connector Type	FCI 240PC023S4019

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	–
29	P	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
36	W	–
43	W/B	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	E30
Connector Name	FRONT FOG LAMP LH
Connector Type	FCI 240PC023S4019

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/B	–
2	B	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

JCLWA0357GB

cardiagn.com

FRONT FOG LAMP

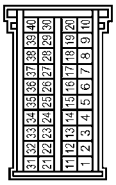
Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

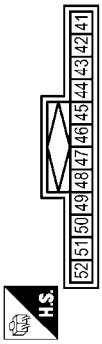


Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4

35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

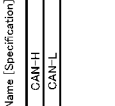
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC063S0017

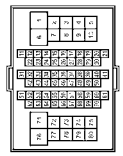
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

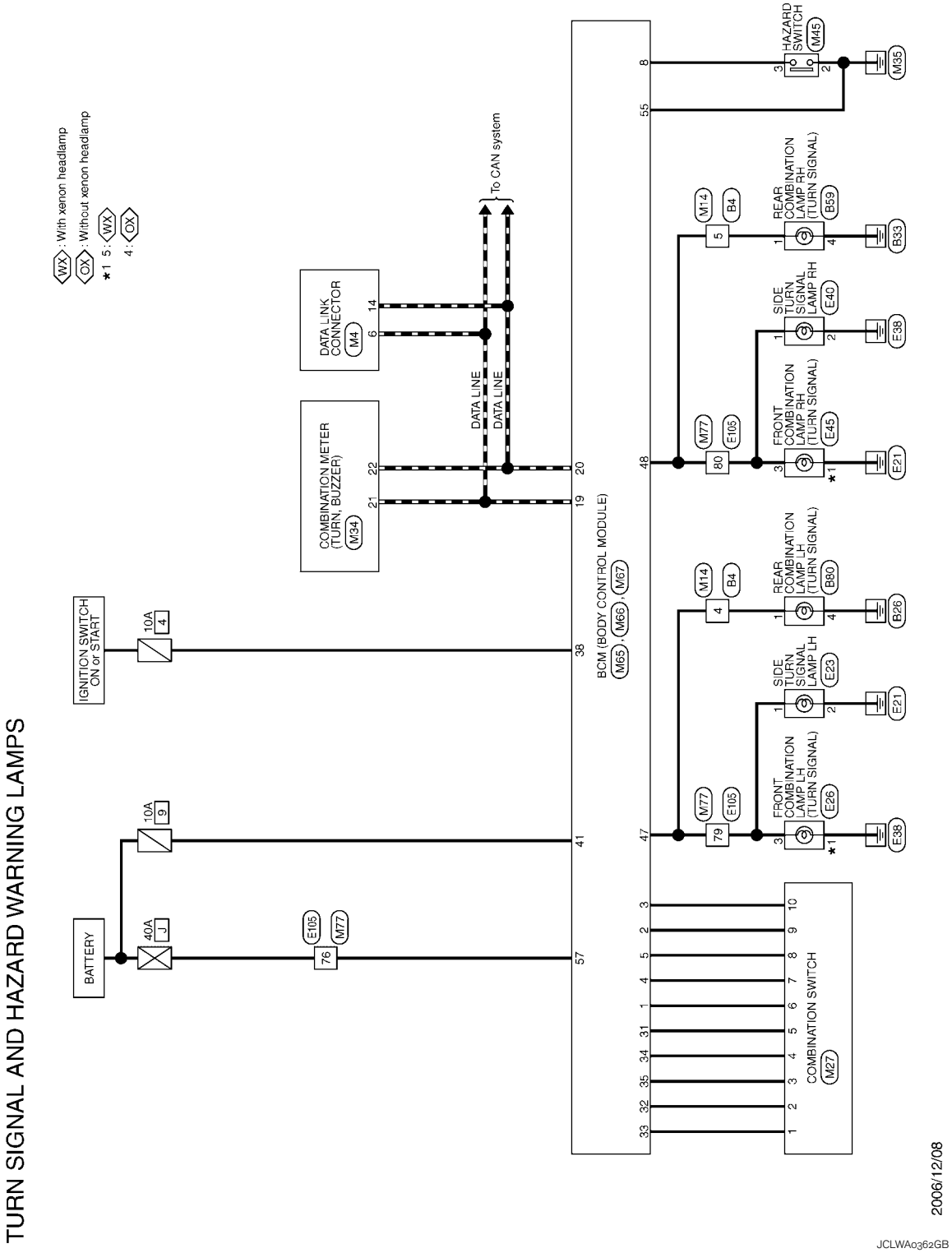
JCLWA0358GB

carDiagn.com

TURN SIGNAL AND HAZARD WARNING LAMP SYSTEM

Wiring Diagram - TURN AND HAZARD WARNING LAMPS -

INFOID:0000000000977446



cardiagn.com

TURN SIGNAL AND HAZARD WARNING LAMPS

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	BR	–
5	G/B	–

Connector No.	B59
Connector Name	REAR COMBINATION LAMP RH
Connector Type	FCI 211PC042S4021

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G/B	–
4	B	–

Connector No.	B80
Connector Name	REAR COMBINATION LAMP LH
Connector Type	FCI 211PC042S4021

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
4	B	–

Connector No.	E23
Connector Name	SIDE TURN SIGNAL LAMP LH
Connector Type	TRW 3020423100D

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G/Y	–
2	B	–

Connector No.	E26
Connector Name	FRONT COMBINATION LAMP LH
Connector Type	AMP 953600-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	G/Y	–
4	B	–
5	B	–

Connector No.	E40
Connector Name	SIDE TURN SIGNAL LAMP RH
Connector Type	TRW 3020423100D

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G/B	–
2	B	–

Connector No.	E45
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	AMP 953600-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	G/B	–
4	B	–
5	B	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.

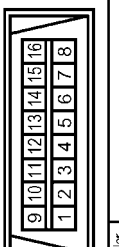
Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–
79	G/Y	–
80	G/B	–

JCLWA0363GB

cardiagn.com

TURN SIGNAL AND HAZARD WARNING LAMPS

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
4	BR	-
5	GR	-

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT6
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

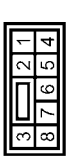
Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M45
Connector Name	HAZARD SWITCH
Connector Type	CINCH REF 49309EV4M9 (WHITE)

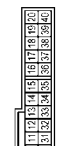
Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-
3	LG	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
8	LG	HAZARD SW
19	L	CAN-H
20	P	CAN-L
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
47	G/Y	FLASHER OUTPUT (LEFT)
48	G/B	FLASHER OUTPUT (RIGHT)

Terminal No.	Color of Wire	Signal Name [Specification]
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
38	W/L	IGN SW

JCLWA0364GB

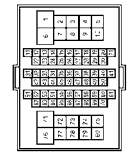
cardiagn.com

TURN SIGNAL AND HAZARD WARNING LAMPS

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–
79	BR	–
80	GR	–

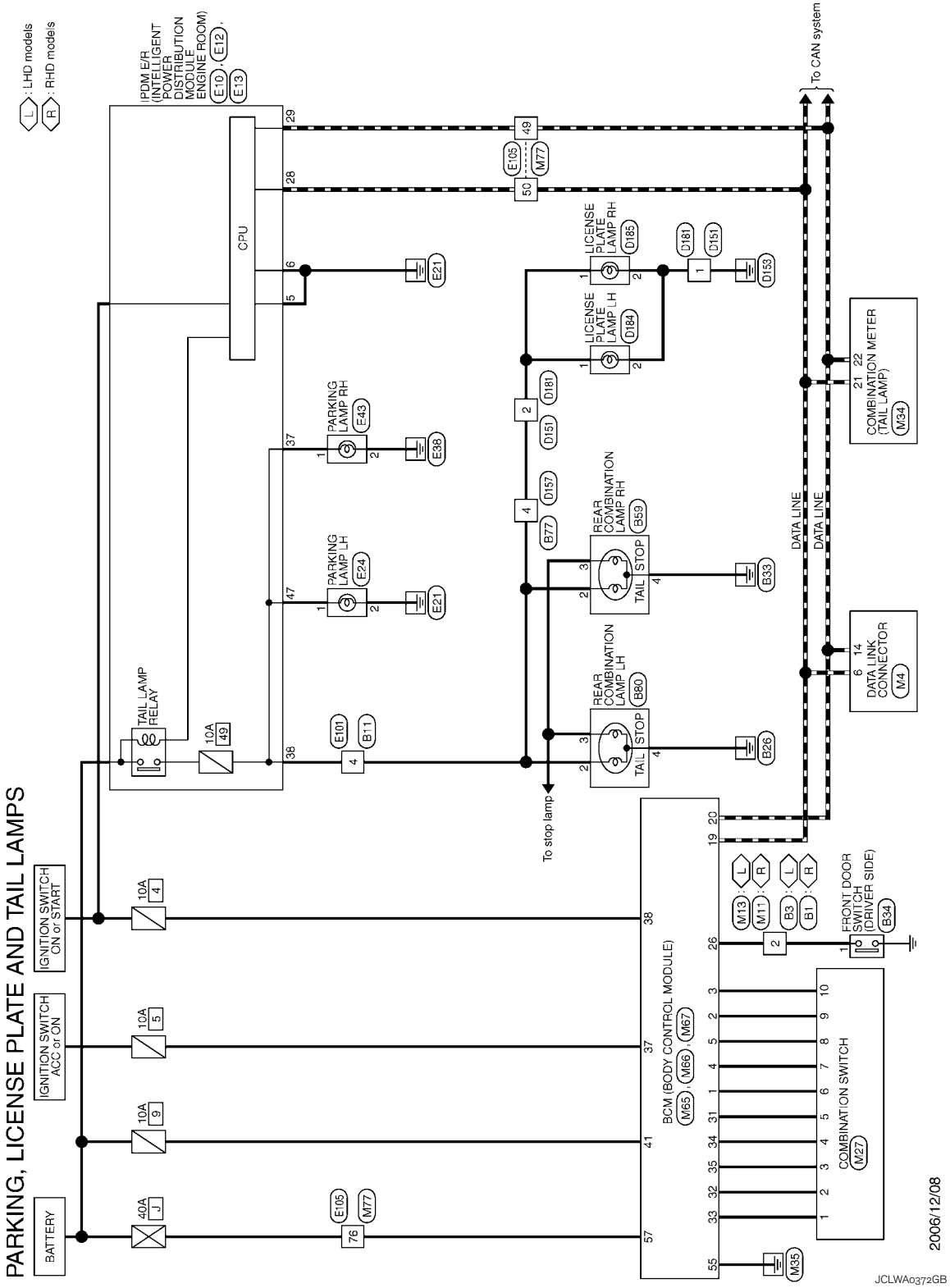
JCLWA0365GB

carDiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS SYSTEM

Wiring Diagram - PARKING, LICENSE PLATE AND TAIL LAMPS -

INFOID:0000000000977447



cardiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	-[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	-[LHD models]

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18		

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B59
Connector Name	REAR COMBINATION LAMP RH
Connector Type	FCI 211PC042S4021

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-
3	R/W	-
4	B	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	B80
Connector Name	REAR COMBINATION LAMP LH
Connector Type	FCI 211PC042S4021

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-
3	R/W	-
4	B	-

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

1	2	3	4
5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	R/L	-

JCLWA0373GB

carDiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS

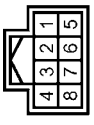
Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	R/L	-

Connector No.	D184
Connector Name	LICENSE PLATE LAMP LH
Connector Type	TRW 302042310OD

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	B	-

Connector No.	D185
Connector Name	LICENSE PLATE LAMP RH
Connector Type	TRW 302042310OD

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	-
29	P	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
37	R/W	-
38	R/L	-
47	R/L	-

Connector No.	E24
Connector Name	PARKING LAMP LH
Connector Type	RH02FB

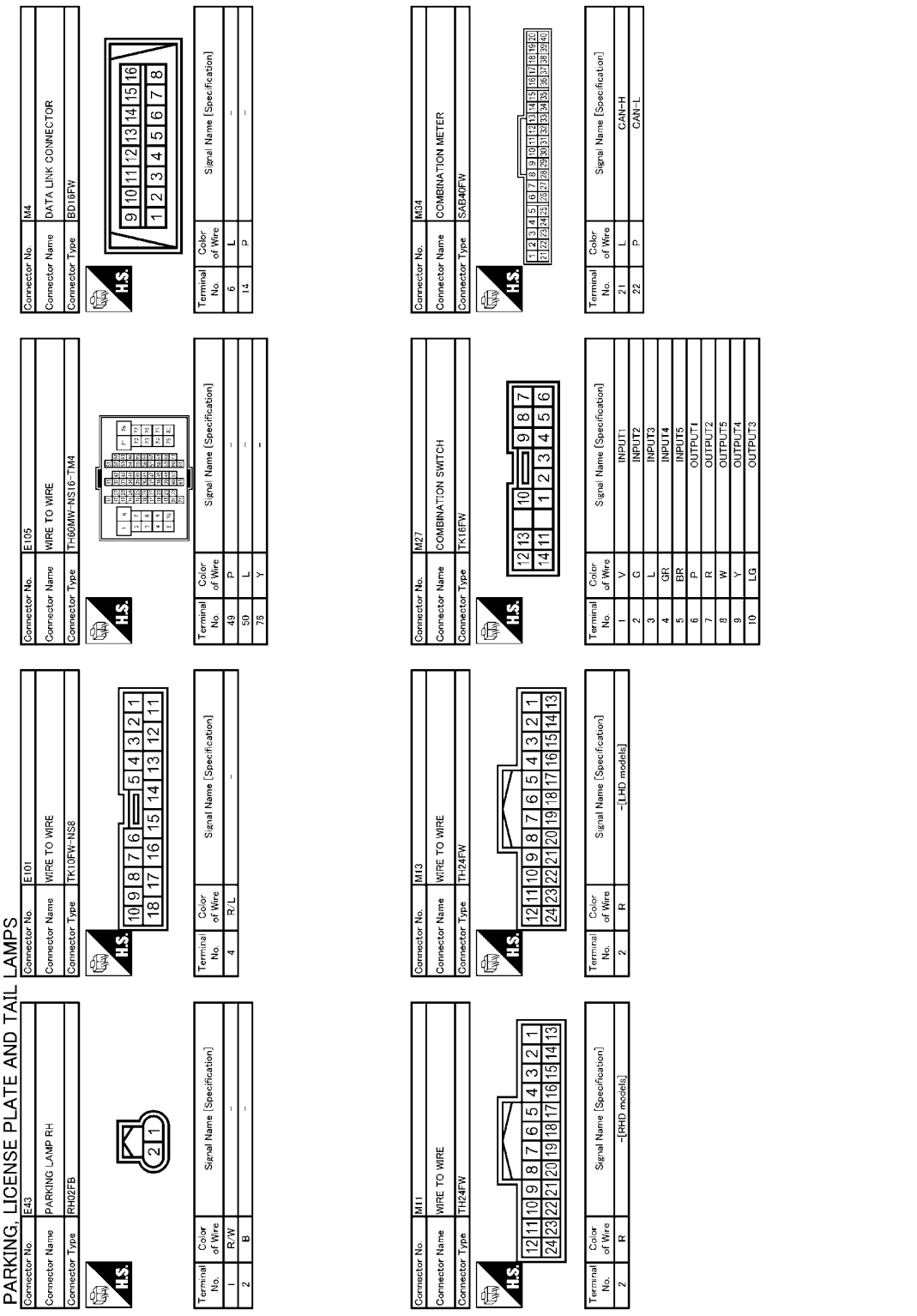
H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	B	-

JCLWA0374GB

cardiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS

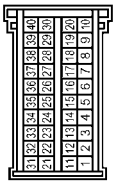


JCLWA0375GB

PARKING, LICENSE PLATE AND TAIL LAMPS

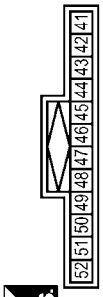
34	GR	COMBI SW INPUT 4	
35	L	COMBI SW INPUT 3	
37	R	ACC SW	
38	W/L	IGN SW	

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



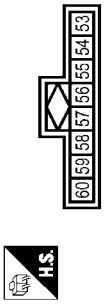
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
26	R	DOOR SW (DR)
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

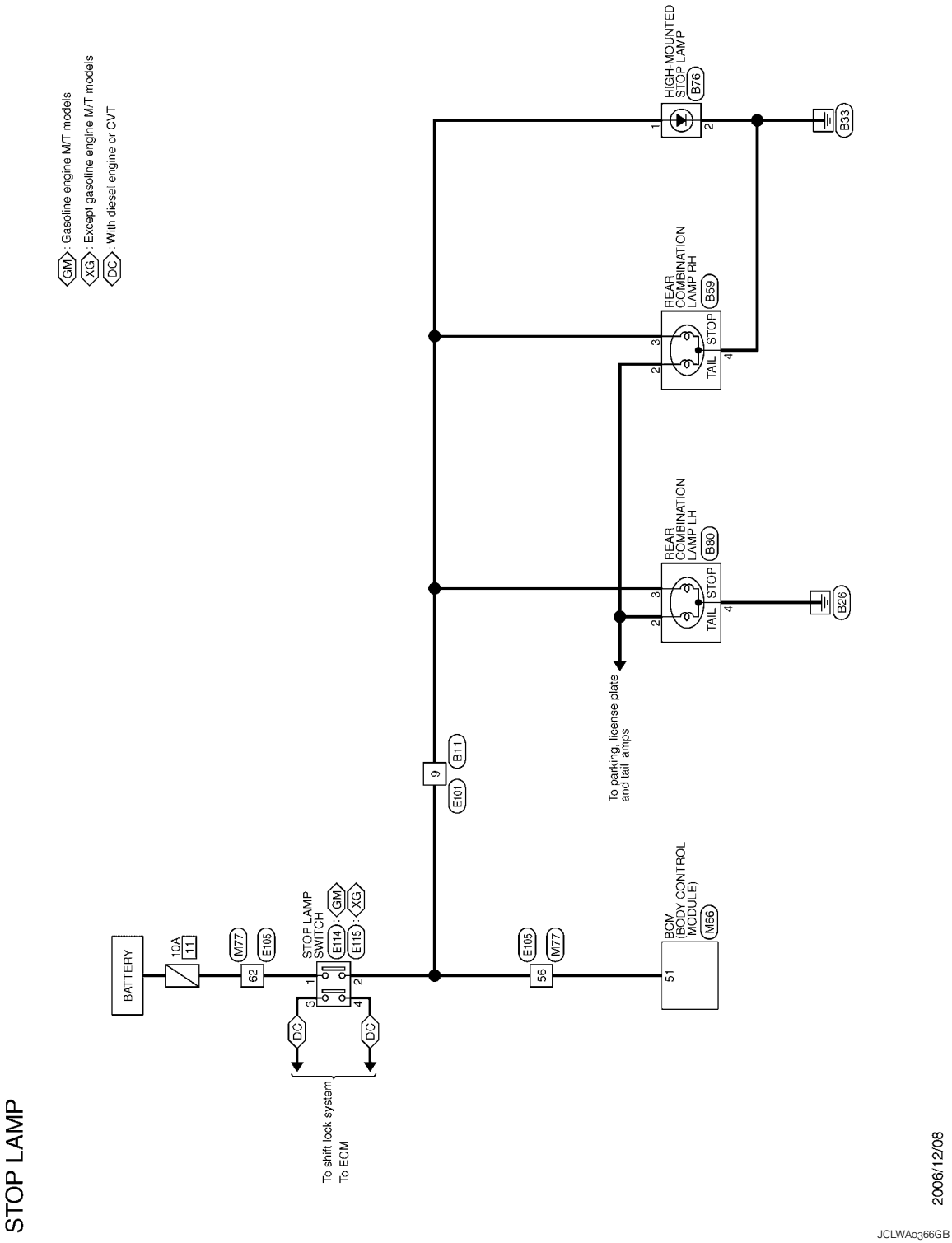
JCLWA0376GB

cardiagn.com

STOP LAMP

Wiring Diagram - STOP LAMP -

INFOID:0000000000977448



carDiagn.com

STOP LAMP

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
9	R/W	-

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
9	R/W	-

Connector No.	B59
Connector Name	REAR COMBINATION LAMP RH
Connector Type	FCI 211PC042S4021

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-
3	R/W	-
4	B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
56	R/W	-
62	V	-

Connector No.	B76
Connector Name	HIGH-MOUNTED STOP LAMP
Connector Type	SICMA 11 770297543

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-
2	B	-

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	R/W	-

Connector No.	B80
Connector Name	REAR COMBINATION LAMP LH
Connector Type	FCI 211PC042S4021

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-
3	R/W	-
4	B	-

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

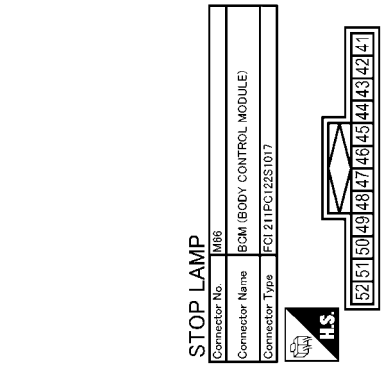
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	R/W	-
3	G	-[With CVT]
3	O	-[With diesel engine]
4	B	-[With CVT]
4	W/L	-[With diesel engine]

JCLWA0367GB

cardiagn.com

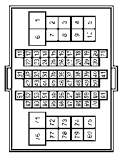
STOP LAMP

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
51	R/W	STOP LAMP SW [With Intelligent Key]
51	R	STOP LAMP SW [Without Intelligent Key]

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
56	R	- [Except RHD models with Intelligent Key]
56	R/W	- [RHD models with Intelligent Key]
62	V	-

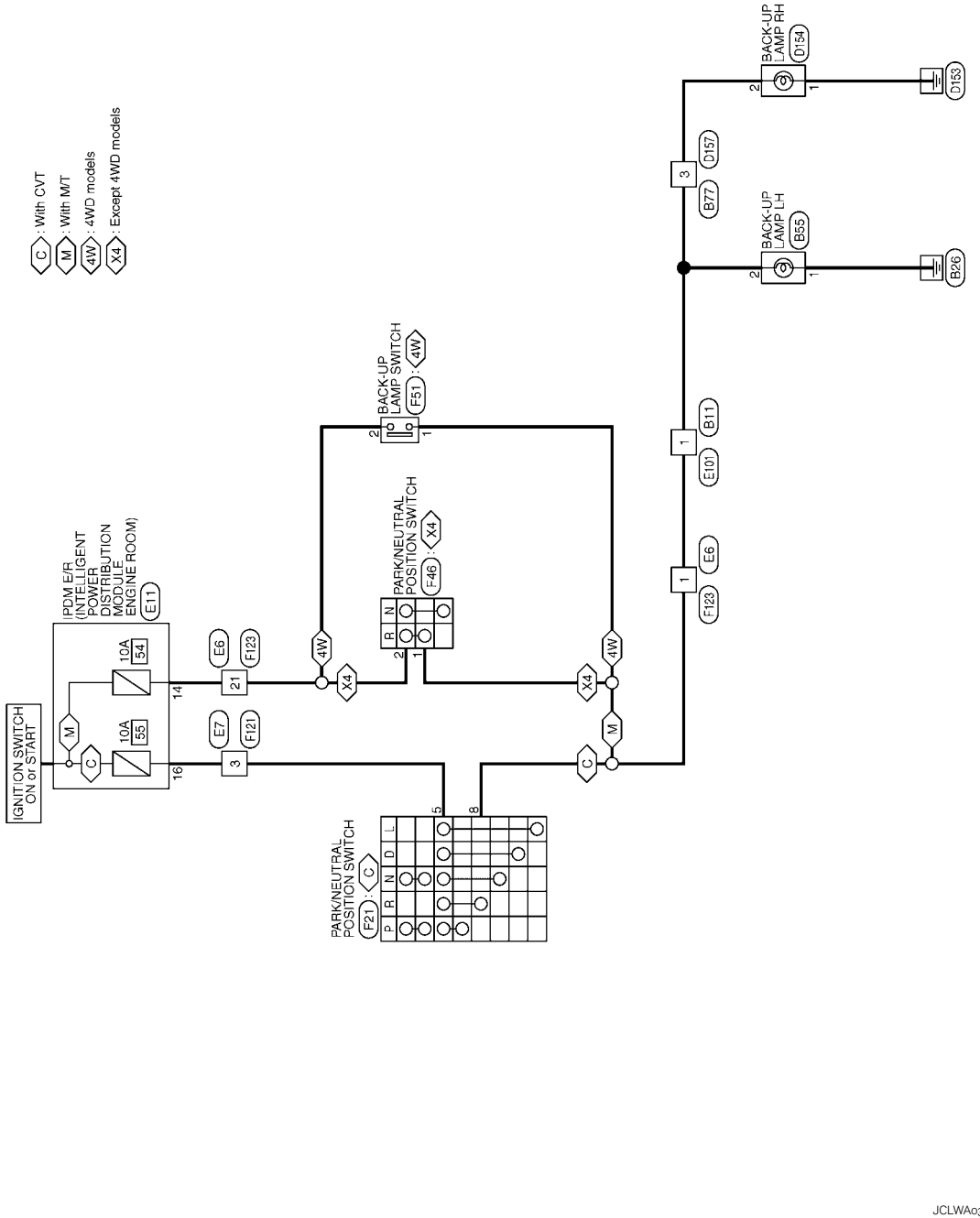
JCLWA0368GB

carDiagn.com

BACK-UP LAMP

Wiring Diagram - BACK-UP LAMP -

INFOID:0000000000977449



BACK-UP LAMP

2006/12/08

JCLWA0369GB

cardiagn.com

BACK−UP LAMP

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

Connector No.	B55
Connector Name	BACK−UP LAMP LH
Connector Type	FCI 211PC022S9049

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	Y/G	–

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/G	–

Connector No.	D154
Connector Name	BACK−UP LAMP RH
Connector Type	FCI 211PC022S9049

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	Y/G	–

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/G	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	–
16	Y/R	–

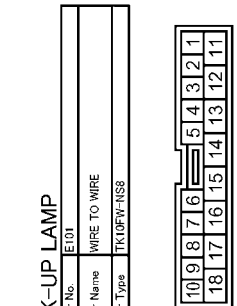
JCLWA0370GB

carsdiagn.com

BACK–UP LAMP

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	Y/R	–
8	Y/G	–

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
2	R/B	–

Connector No.	F51
Connector Name	BACK-UP LAMP SWITCH
Connector Type	RK02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
2	R/B	–

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

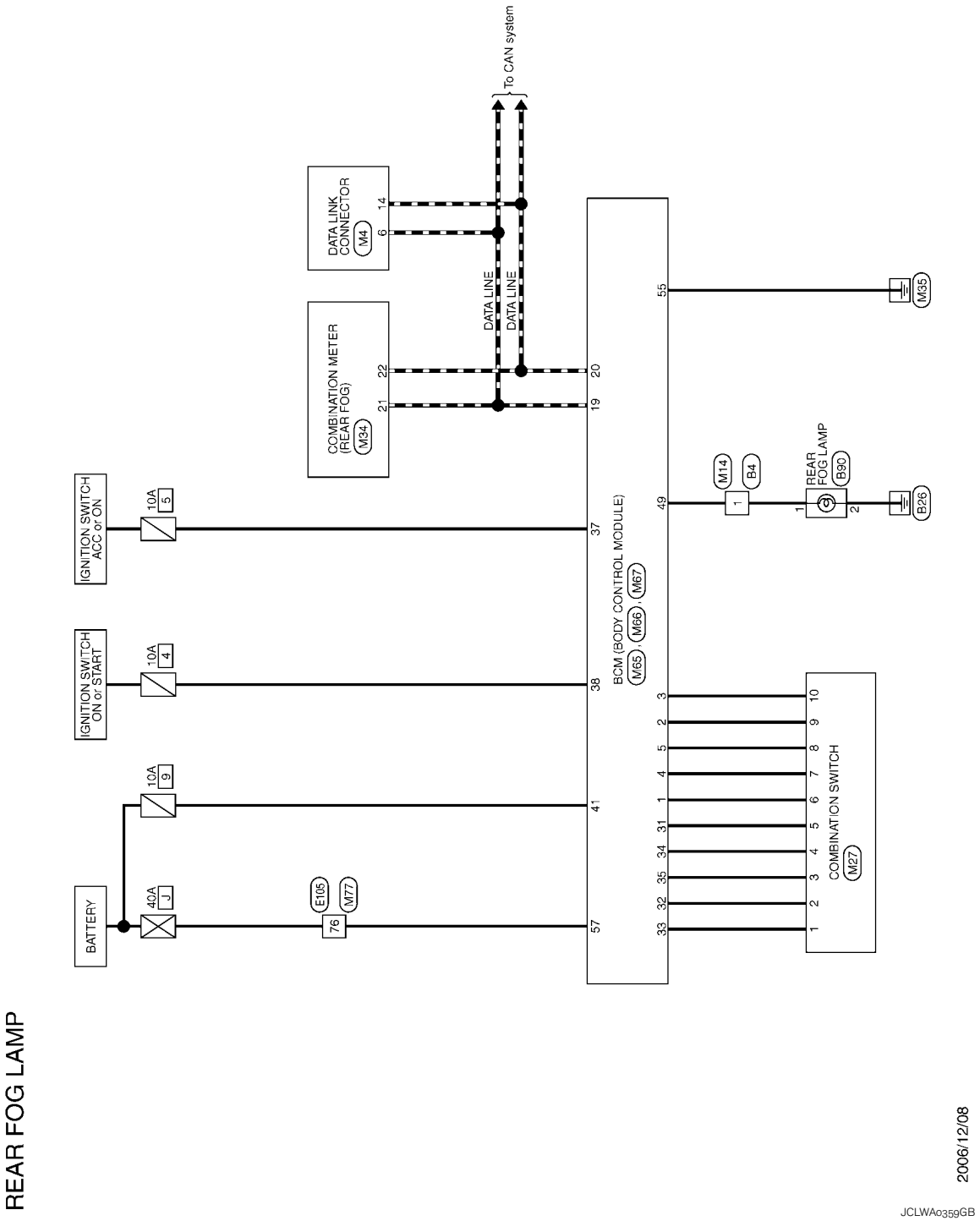
JCLWA0371GB

cardiagn.com

REAR FOG LAMP SYSTEM

Wiring Diagram - REAR FOG LAMP -

INFOID:0000000000977450



carDiagn.com

REAR FOG LAMP

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–

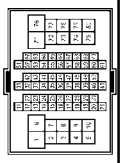
Connector No.	B90
Connector Name	REAR FOG LAMP
Connector Type	FEA02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	B	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH16MW-NS16-TM4

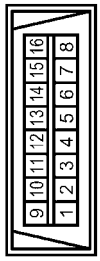
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

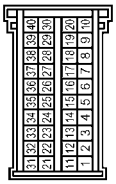
Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

JCLWA0360GB

cardiagn.com

REAR FOG LAMP

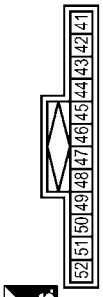
Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4

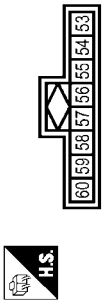
35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



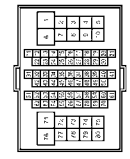
Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
49	Y	REAR FOG LAMP

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

JCLWA0361GB

carDiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001116323

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

carDiagn.com

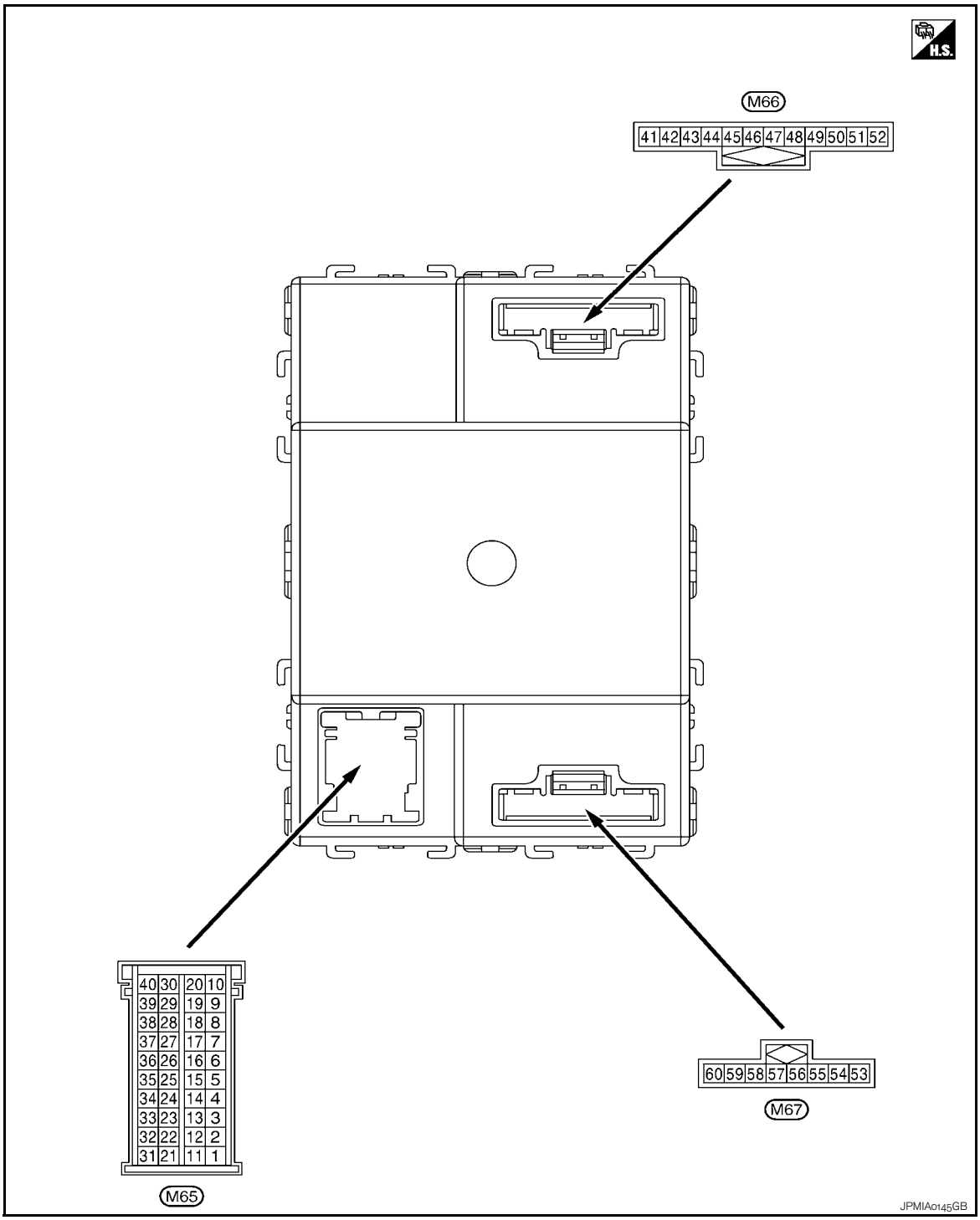
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

cardiagn.com

TERMINAL LAYOUT

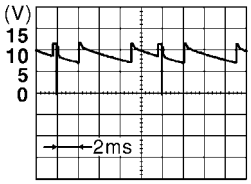
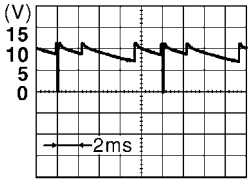
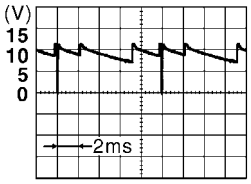
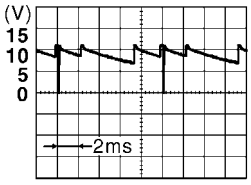


PHYSICAL VALUES

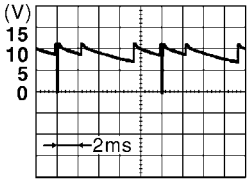
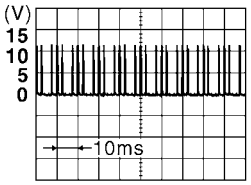
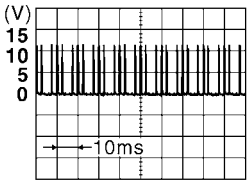
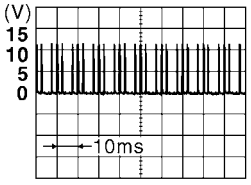
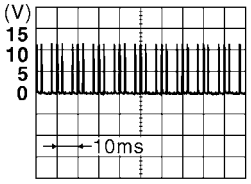
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

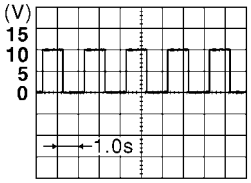
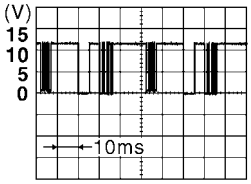
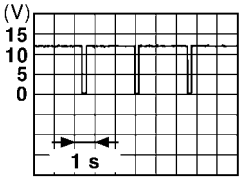
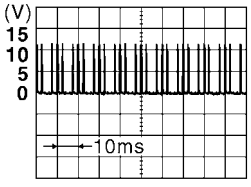
cardiagn.com

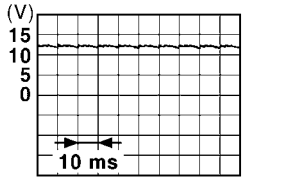
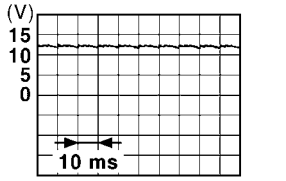
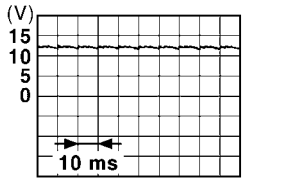
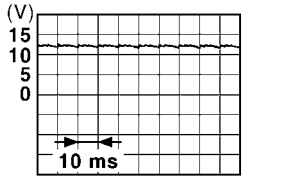
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

carDiag.com

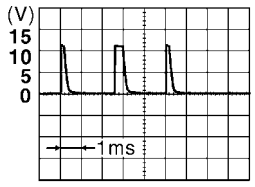
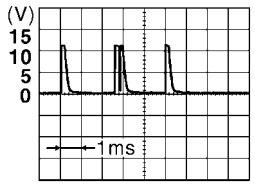
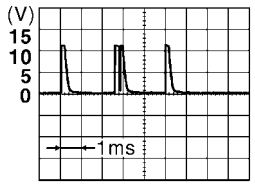
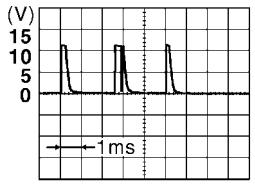
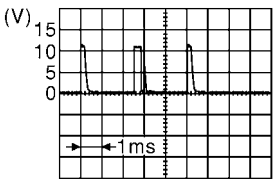
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

cardiagn.com

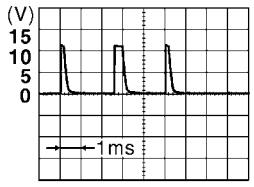
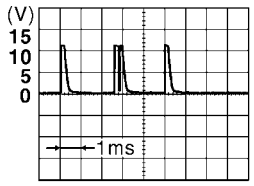
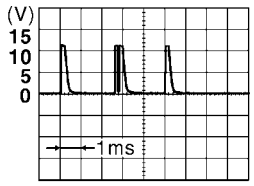
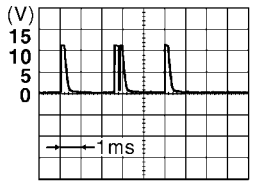
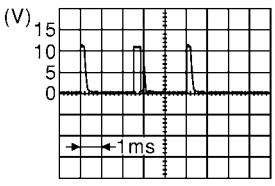
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIDo924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIDo924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIDo924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIDo924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

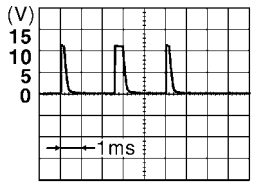
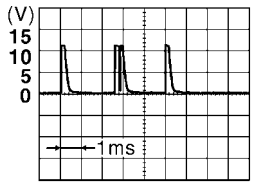
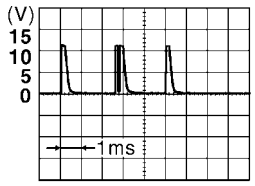
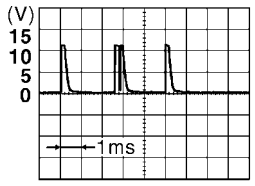
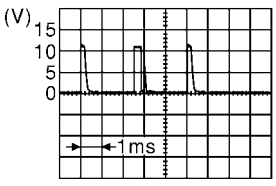
cardiagn.com

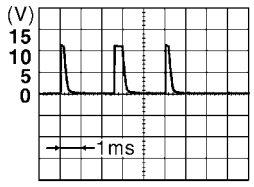
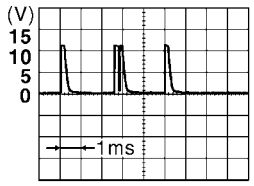
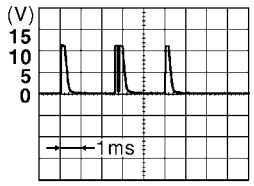
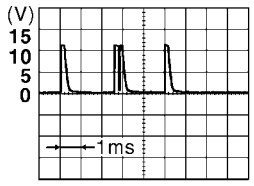
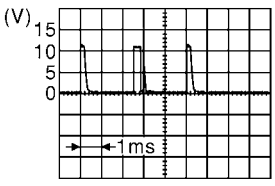
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

carDiagn.com

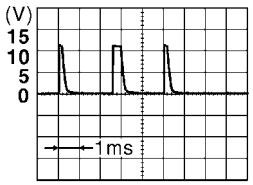
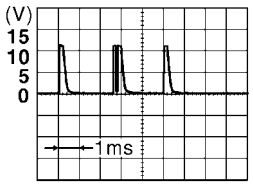
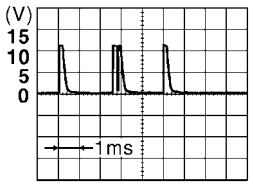
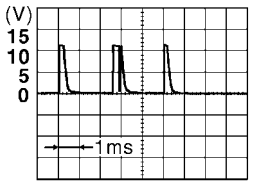
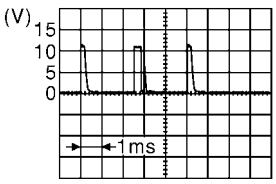
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

cardiagn.com

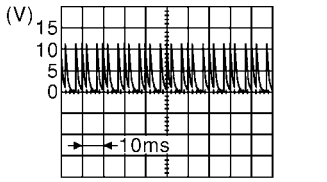
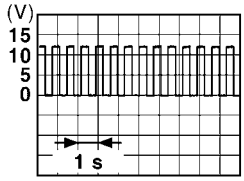
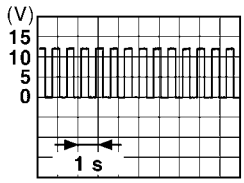
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

carDiag.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

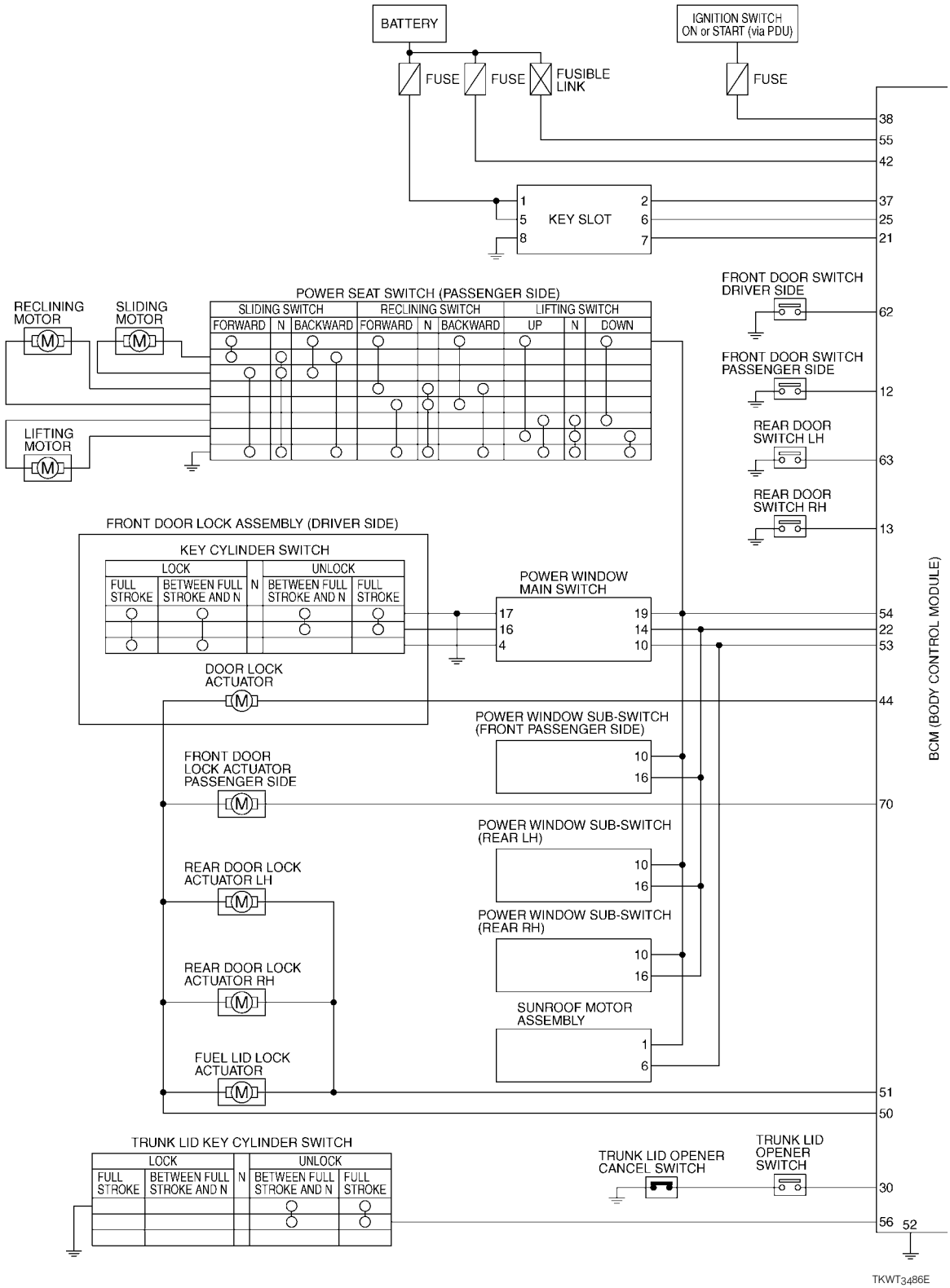
*1: With Intelligent Key system

*2: Without Intelligent Key system

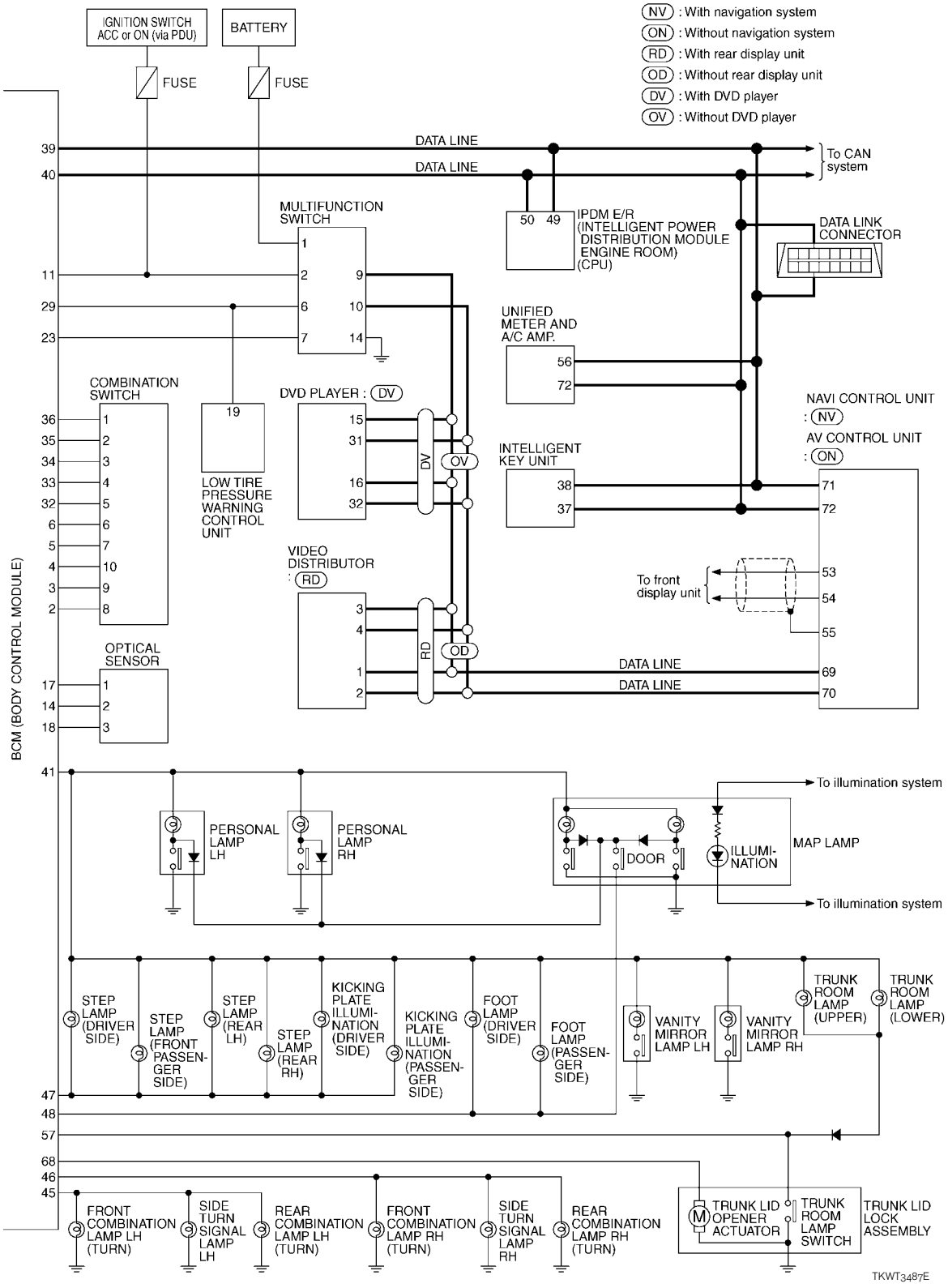
carDiag.com

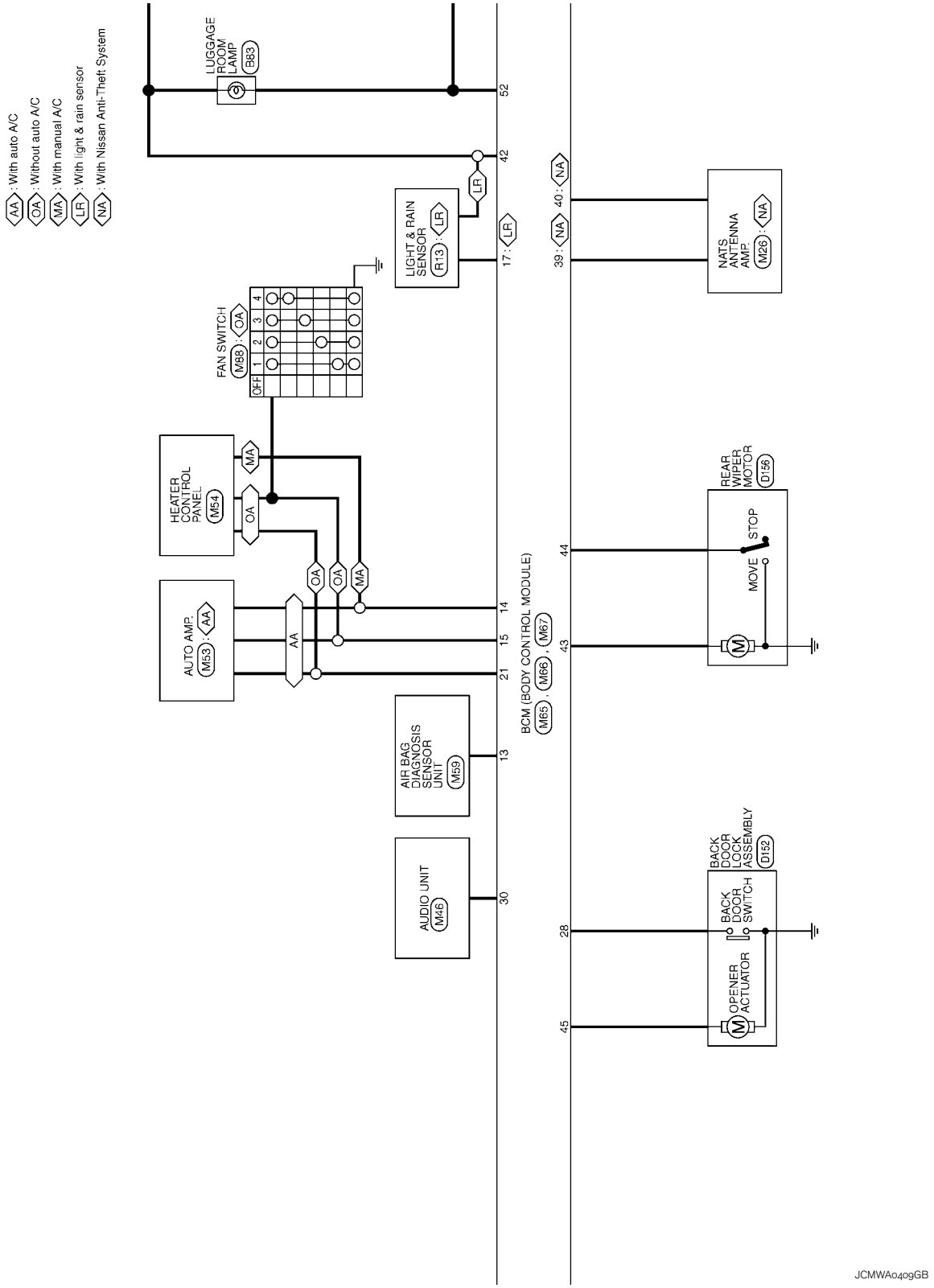
Wiring Diagram - BCM -

INFOID:0000000001116324

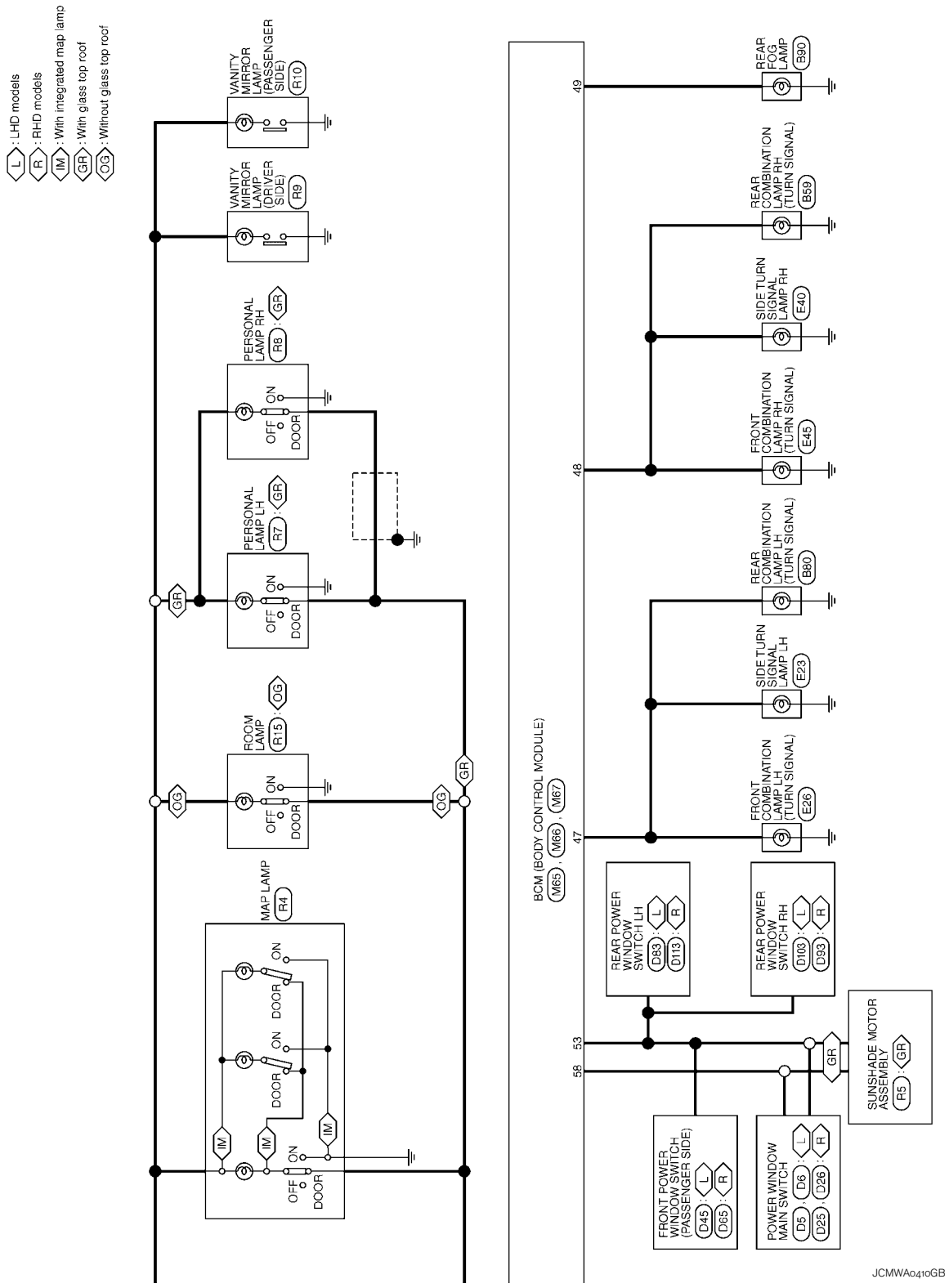


cardiagn.com

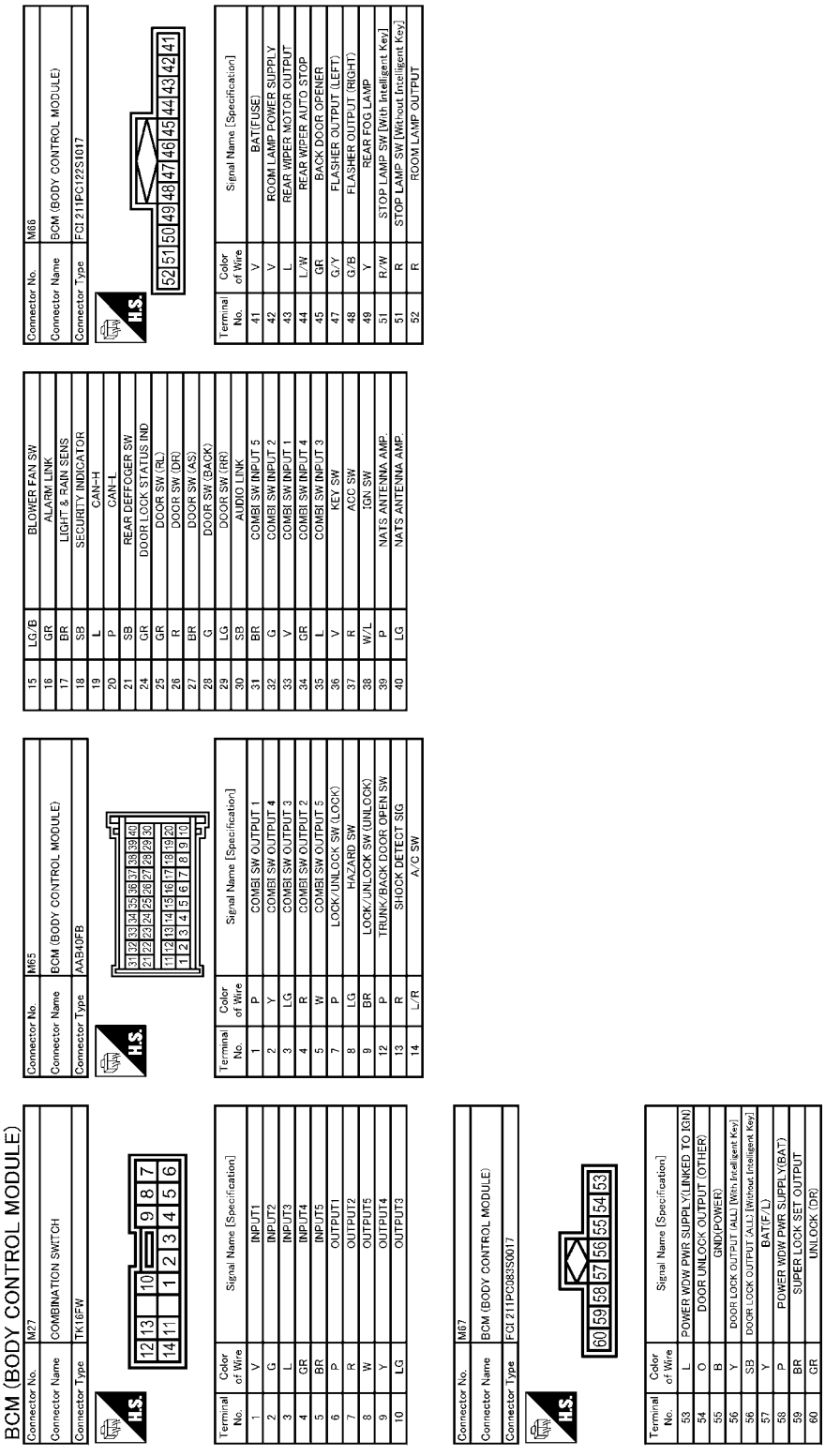

NV : With navigation system
ON : Without navigation system
RD : With rear display unit
OD : Without rear display unit
DV : With DVD player
OV : Without DVD player
IGNITION SWITCH ACC or ON (via PDU)
BATTERY
FUSE
FUSE
DATA LINE
DATA LINE
To CAN system
MULTIFUNCTION SWITCH
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) (CPU)
DATA LINK CONNECTOR
UNIFIED METER AND A/C AMP.
COMBINATION SWITCH
DVD PLAYER : DV
LOW TIRE PRESSURE WARNING CONTROL UNIT
INTELLIGENT KEY UNIT
NAVI CONTROL UNIT : NV
AV CONTROL UNIT : ON
VIDEO DISTRIBUTOR : RD
To front display unit
OPTICAL SENSOR
BCM (BODY CONTROL MODULE)
PERSONAL LAMP LH
PERSONAL LAMP RH
DOOR
ILLUMI-NATION
MAP LAMP
To illumination system
To illumination system
STEP LAMP (DRIVER SIDE)
STEP LAMP (FRONT PASSEN-GER SIDE)
STEP LAMP (REAR LH)
STEP LAMP (REAR RH)
KICKING PLATE ILLUMI-NATION (DRIVER SIDE)
KICKING PLATE ILLUMI-NATION (PASSEN-GER SIDE)
FOOT LAMP (DRIVER SIDE)
FOOT LAMP (PASSEN-GER SIDE)
VANITY MIRROR LAMP LH
VANITY MIRROR LAMP RH
TRUNK ROOM LAMP (UPPER)
TRUNK ROOM LAMP (LOWER)
FRONT COMBINATION LAMP LH (TURN)
SIDE TURN SIGNAL LAMP LH
REAR COMBINATION LAMP LH (TURN)
FRONT COMBINATION LAMP RH (TURN)
SIDE TURN SIGNAL LAMP RH
REAR COMBINATION LAMP RH (TURN)
TRUNK LID OPENER ACTUATOR
TRUNK ROOM LAMP SWITCH
TRUNK LID LOCK ASSEMBLY
TKWT3487E



cardiagn.com



carDiagn.com



JCMWA0411GB

Fail Safe

INFOID:0000000001116325

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001116326

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001116327

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Reference Value

INFOID:0000000001098957

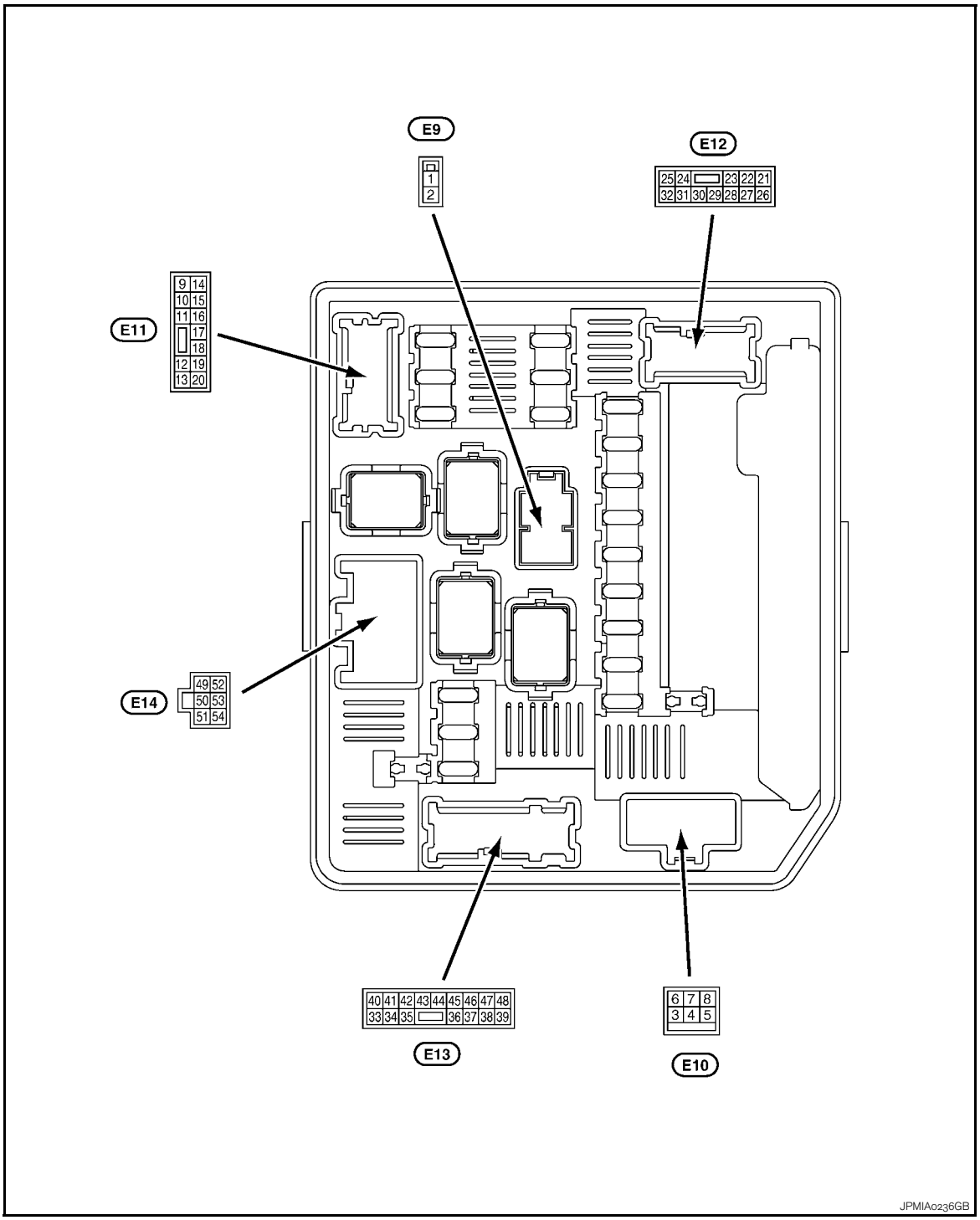
VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
MOTOR FAN REQ	Engine idle speed	Changes depending on engine coolant temperature, air conditioner operation status, vehicle speed, etc.	1 - 3
AC COMP REQ	Engine running	A/C switch OFF	Off
		A/C switch ON (Compressor is operating)	On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI (Light is illuminated)		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		Front fog lamp switch ON	On
HL WASHER REQ	Ignition switch ON, and low beam headlamp is ON	Front washer switch OFF	Off
		Front washer switch ON (When headlamp washer is operating)	On
FR WIP REQ	Ignition switch ON	Front wiper switch OFF	STOP
		Front wiper switch INT	1LOW
		Front wiper switch LO	Low
		Front wiper switch HI	Hi
WIP AUTO STOP	Ignition switch ON	Front wiper stop position	STOP P
		Any position other than front wiper stop position	ACT P
WIP PROT	Ignition switch ON	Front wiper operates normally	Off
		Front wiper stops at fail-safe operation	BLOCK
ST RLY REQ **NOTE:** Vehicle without Intelligent Key system indicates only “ON”, and it does not change.	When Intelligent Key is outside the vehicle, and the push switch is pushed		Off
	When Intelligent Key is inside the vehicle, and the push switch is pushed		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Ignition switch ON	Rear window defogger switch OFF	Off
		Rear window defogger switch ON (Rear window defogger is operating)	On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close

Monitor Item	Condition	Value/Status
REV SW	Except selector lever R position	Off
	Selector lever R position	On
HOOD SW **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Close the hood	Off
	Open the hood	On
THFT HRN REQ **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Not operation	Off
	Horn is activated with Vehicle Security (Theft Warning) system.	On
HORN CHIRP	**NOTE:** This item is indicated, but not monitored.	Off
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

cardiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
		Signal name	Input/ Output		
+	–				
1 (G)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
2 (R)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
5 (B)	Ground	Ground	—	Ignition switch ON	0 V

carDiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
6 (B)	Ground	Ground	—	Ignition switch ON		0 V
7 (Y)	Ground	Front wiper LO	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch LO	Battery voltage
8 (Y/R)	Ground	Front wiper HI	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch HI	Battery voltage
9 (G)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
10*1 (L/R)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
11*2 (O)	Ground	PTC heater 1 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
12*2 (G/Y)	Ground	PTC heater 2 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
14 (R/B)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
15 (Y/L)*1 (B/R)*2	Ground	ECM relay control	Input	• Engine running • Ignition switch OFF (For a few seconds after turning ignition switch OFF)		0 - 1.0 V*1
						0.6 V*2
				Ignition switch OFF or ACC (More than a few seconds after turning ignition switch OFF)		Battery voltage
16*3 (Y/R)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
19*1 (R/O)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
21*4 (GR)	Ground	Hood switch	Input	Close the hood		Battery voltage
				Open the hood		0 V
22 (Y/G)	Ground	Reverse switch	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON	• Selector lever “R” (Except M/T models) • M/T control lever “R” (M/T models)	Battery voltage
					• Selector lever in any position other than “R” (Except M/T models) • M/T control lever in any position other than “R” (M/T models)	0 V
23 (Y/B)	Ground	A/C relay power supply	Output	Engine stopped		0 V
				Engine running	A/C switch OFF	0 V
					A/C switch ON (A/C compressor is operating)	Battery voltage
24 (R/Y)	Ground	Headlamp LO (RH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
25*1 (G/L)	Ground	ETC relay control	Input	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		0 - 1.0 V
26 (O)	Ground	Front wiper auto stop	Input	Ignition switch ON	Front wiper stop position	0 V
					Any position other than front wiper stop position	Battery voltage
27 (W)	Ground	Oil pressure switch	Input	Engine stopped		0 V
				Engine running		Battery voltage
28 (L)	—	CAN-H	Input/ Output	—		—
29 (P)	—	CAN-L	Input/ Output	—		—
30*4 (L)	Ground	Horn relay control	Output	The horn is not activated		Battery voltage
				The horn is activated		0 V
31 (R)	Ground	Headlamp LO (sensor)	Output	Ignition switch ON	Lighting switch OFF	0 V
					Lighting switch 2ND	Battery voltage
32*1 (R/Y)	Ground	ETC relay power supply	Output	Ignition switch ON		Battery voltage
33*1 (B/O)	Ground	Fuel pump relay control	Input	• Engine running • Ignition switch ON (For 1 second after turning ignition switch ON)		0 - 1.0 V
				Ignition switch ON (More than 1 second after turning ignition switch ON)		Battery voltage
34 (R/B)	Ground	Starter relay power supply	Input	Ignition switch ON (Except M/T models)	Selector lever “P” or “N”	0 V
					Selector lever in any position other than “P” or “N”	Battery voltage
				Ignition switch ON (M/T models)		
35 (W/L)	Ground	Ignition switch ON	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
36 (W)	Ground	Front fog lamp (RH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
37 (R/W)	Ground	Parking lamp (RH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
38 (R/L)	Ground	Tail, license plate lamps and illuminations	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
39 (GR)	Ground	Headlamp washer relay control	Output	Ignition switch ON	When headlamp washer is operating	0 V
					When headlamp washer is not operating	Battery voltage
40*1 (BR/Y)*5 (SB)*6	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
41 (P)	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

carDiag.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
42*1 (B/Y)	Ground	Fuel pump relay power supply	Output	• Ignition switch OFF or ACC • Approximately 1 second or more after turning the ignition switch ON		0 V
				• Approximately 1 second after turning the ignition switch ON • Engine running		Battery voltage
43 (W/B)	Ground	Front fog lamp (LH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
44 (L)	Ground	Headlamp LO (LH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
45 (L/W)	Ground	Headlamp HI (RH)	Output	• Lighting switch 2ND and HI • lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
46 (G)	Ground	Headlamp HI (LH)	Output	• Lighting switch 2ND and HI • Lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
47 (R/L)	Ground	Parking lamp (LH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
48*7 (Y)	Ground	Cooling fan relay-3 control	Output	When cooling fan does HI operation		0 V
				When cooling fan does OFF or LO operation		Battery voltage
49 (B)	Ground	Rear window defogger relay power supply	Output	Ignition switch ON	Rear window defogger switch ON	Battery voltage
					Rear window defogger switch OFF	0 V
50 (B/R)	Ground	Starter relay power supply	Output	When engine is clanking		Battery voltage
				When engine is not clanking		0 V
51 (P)	Ground	Ignition switch START	Input	Ignition switch START		Battery voltage
				Ignition switch OFF, ACC or ON		0 V
52 (W)	Ground	Cooling fan relay-1 power supply	Output	When cooling fan does LO or HI operation		Battery voltage
				When cooling fan does OFF operation		0 V
53 (W/B)	Ground	Battery power supply (Cooling fan relay)	Input	Ignition switch OFF		Battery voltage
54*5 (R)	Ground	Cooling fan relay-2 power supply	Input	When cooling fan does HI operation		Battery voltage
				When cooling fan does OFF or LO operation		0 V

*1: HR engine and MR engine models

*2: K9K engine models

*3: Except M/T models only

*4: With vehicle security (theft warning) system

*5: HR engine models

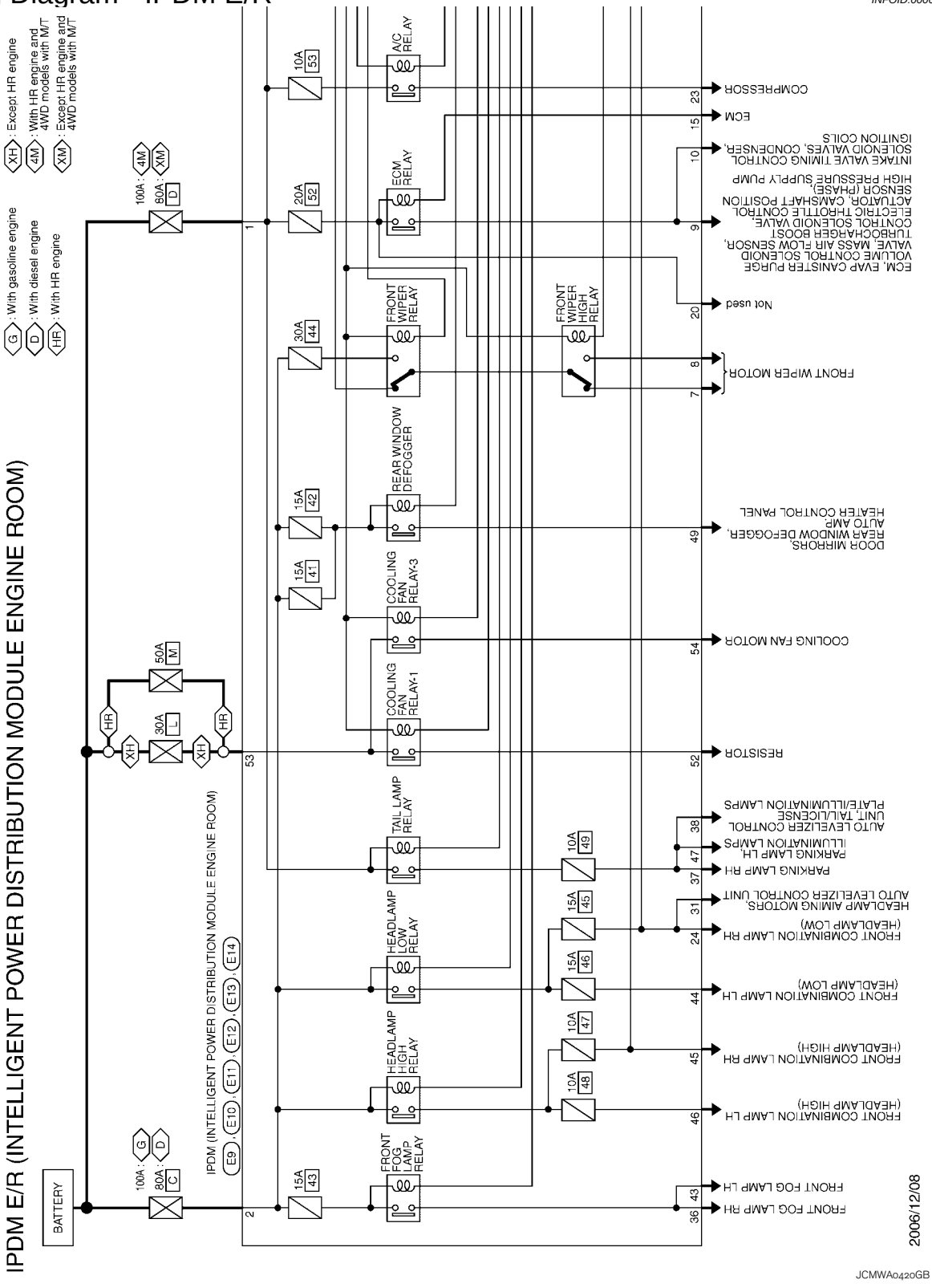
*6: MR engine models

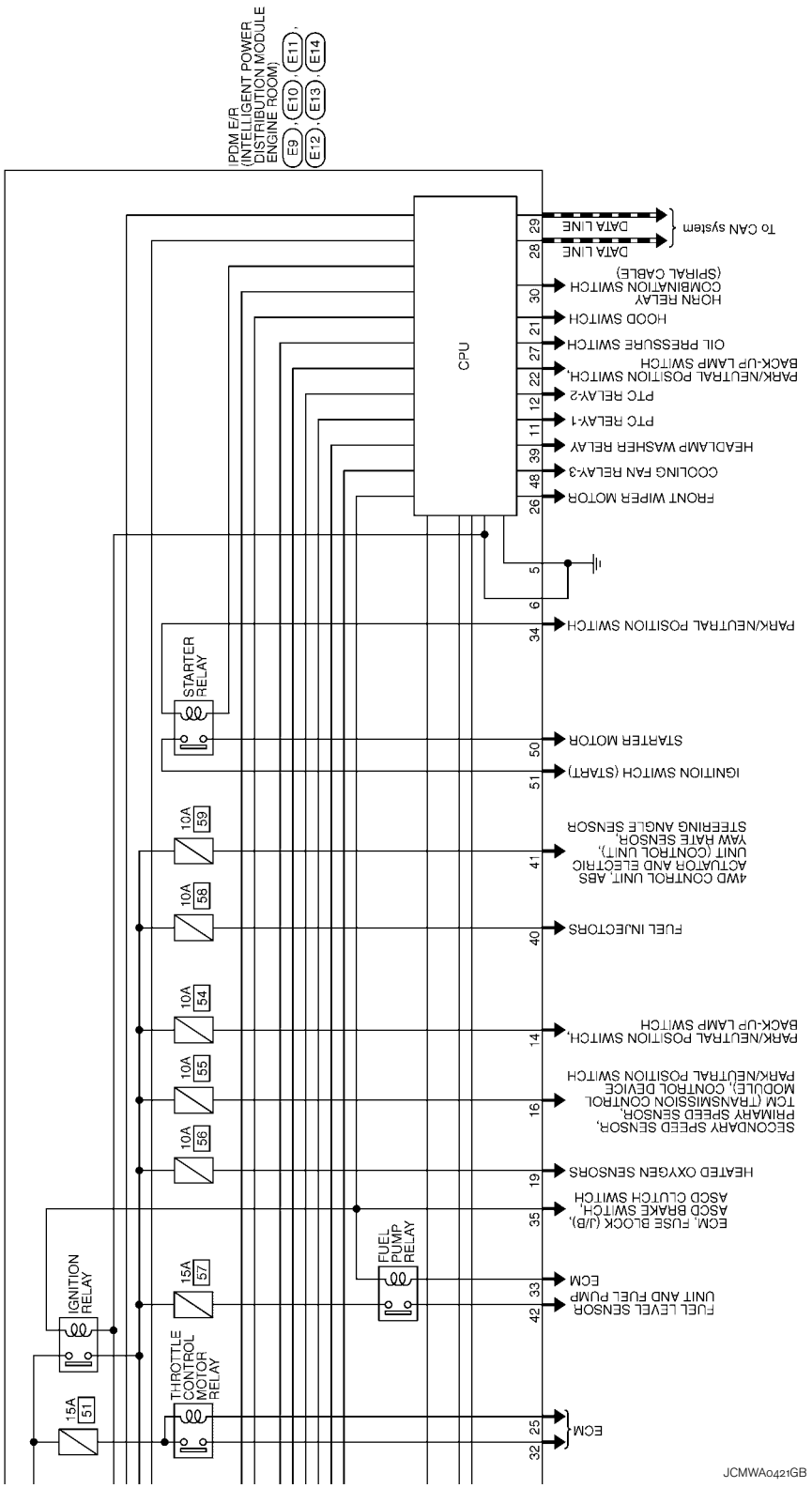
*7: MR engine and K9K engine models

cardiagn.com

Wiring Diagram - IPDM E/R -

INFOID:0000000001098958





cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E9
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	L02FB-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	R	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-
7	Y	-
8	V/R	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	G	-
10	L/R	-
11	O	-
12	G/Y	-
14	R/B	-
15	Y/L	-[With gasoline engine]
15	B/R	-[With diesel engine]
16	Y/R	-
19	R/O	-
20	-	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

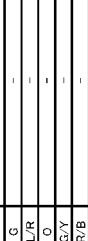
H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
21	GR	-
22	Y/G	-
23	Y/B	-
24	R/Y	-
25	G/L	-
26	O	-
27	W	-
28	L	-
29	P	-
30	L	-
31	R	-

Terminal No.	Color of Wire	Signal Name [Specification]
32	R/Y	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
33	B/O	-
34	R/B	-
35	W/L	-
36	W	-
37	R/W	-
38	R/L	-
39	GR	-
40	SB	-[With MR engine]
40	BR/Y	-[With HR engine]
41	P	-
42	B/Y	-
43	W/B	-
44	L	-
45	L/W	-
46	G	-
47	R/L	-
48	Y	-

JCMWA0422GB

carDiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	-
50	B/R	-
51	P	-
52	W	-
53	W/B	-
54	R	-

JCMWA0423GB

Fail Safe

INFOID:0000000001098959

CAN communication control

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If no CAN communication is available with ECM

cardiagn.com

Control part	Fail-safe in operation
Cooling fan	• The cooling fan relay-2*1 or the cooling fan relay-3*2 turns ON when the ignition switch is turned ON • Turns off the fan motor low relay when the ignition switch is turned OFF
A/C compressor	A/C relay OFF

*1: HR engine models

*2: MR engine and K9K engine models

If no CAN communication is available with BCM

Control part	Fail-safe in operation
Headlamp	• The headlamp low relay turns ON when the ignition switch is turned ON • The headlamp low relay turns OFF when the ignition switch is turned OFF • Headlamp high relay OFF
• Parking lamps • License plate lamps • Tail lamps • Illuminations	• The tail lamp relay turns ON when the ignition switch is turned ON • The tail lamp relay turns OFF when the ignition switch is turned OFF
Front wiper	• The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. • The front wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Front fog lamps	Front fog lamp relay OFF
Starter motor	Inhibit relay OFF
Rear window defogger	Rear window defogger relay OFF
Headlamp washer	Headlamp washer relay OFF
PTC heater	PTC heater relay OFF

Ignition relay malfunction detection function

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

DTC	Ignition switch	Ignition relay	Tail lamp relay
—	ON	ON	—
—	OFF	OFF	—
B2098: IGN RLY ON	OFF	ON	ON (10 minutes)
B2099: IGN RLY OFF	ON	OFF	—

NOTE:

The tail lamp relay is turned OFF when the ignition switch is turned ON.

Front wiper control

IPDM E/R detects the front wiper stop position with the front wiper auto stop signal.
When the front wiper auto stop signal is in the conditions listed below, IPDM E/R repeats a front wiper 10 seconds operation and 20 seconds stop five times.

Ignition switch	Front wiper switch	Front wiper auto stop signal
ON	OFF	The front wiper auto stop signal (stop position) cannot be input for 10 seconds.
	ON	The front wiper auto stop signal does not change for 10 seconds.

NOTE:

carDiagn.com

This operation status can be confirmed on the IPDM E/R “Data Monitor” that displays “BLOCK” for the item “WIP PROT” while the wiper is stopped.

DTC Index

INFOID:0000000001098960

CONSULT display	Fail-safe	Timing[NOTE]		Reference page
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	PAST	PCS-14
B2098: IGN RELAY ON	×	CRNT	PAST	PCS-15
B2099: IGN RELAY OFF	—	CRNT	PAST	PCS-16
B2100: EEPROM	—	CRNT	PAST	PCS-17

NOTE:

The details of time display are as follows.

- CRNT: The malfunctions that are detected now.
- PAST: The number is indicated when it is normal at present and a malfunction was detected in the past.

cardiagn.com

AUTO LEVELIZER CONTROL UNIT

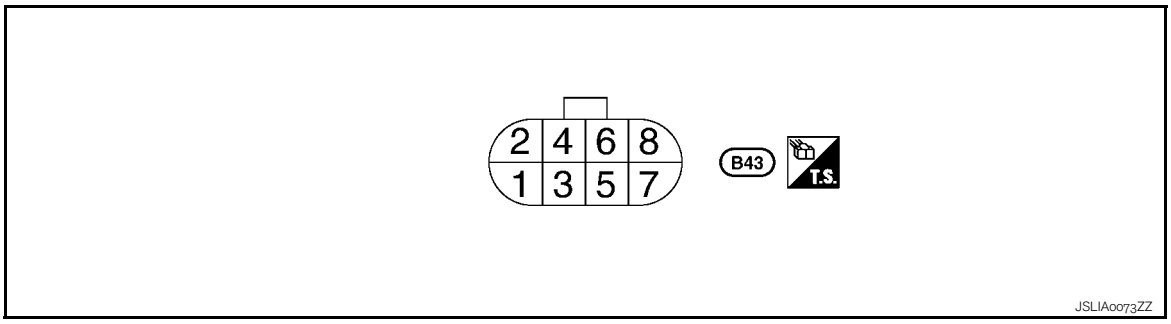
Reference Value

INFOID:0000000000955487

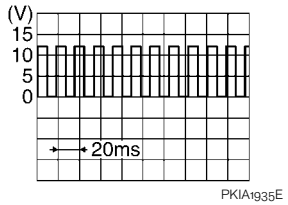
VALUES ON THE DIAGNOSIS TOOL

Monitor item	Operating condition		Display item (Approx.)
INT SEN VALUE	Rear vehicle height	Detection upper limit	0 %
		Detection lower limit	100 %
ACT OUTPUT	Headlamp light axis	Control upper limit	19.9 %
		Control lower limit	73.8 %
ACT MEASURED	Headlamp light axis	Detection upper limit	19.9 %
		Detection lower limit	73.8 %
VEHICLE SPEED SIGNAL	Vehicle running at approx. 40 km/h		40 km/h
LIGHT SIGNAL	Headlamp (LO) ON		Battery voltage
INT SEN VOLT	Headlamp (LO) ON		Battery voltage
EXT SEN VOLT	—		—
EXT SEN SIG	—		—

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Operating condition		Standard (Approx.)
+	–	Signal name	Input/ Output			
1 (B)	Ground	Ground	—	—		0 V
2 (R)	Ground	Control unit power supply [Headlamp (LO) signal]	Input	Headlamp (LO)	ON	Battery voltage
					OFF	0 V
4 (Y)	Ground	Vehicle speed signal (8-pulse)	Input	Vehicle running at approx. 40 km/h		
5 (O)	Ground	K-LINE	—	—		—
6 (R/L)	Ground	Tail lamp signal	Input	Headlamp (LO) and tail lamp ON		Battery voltage

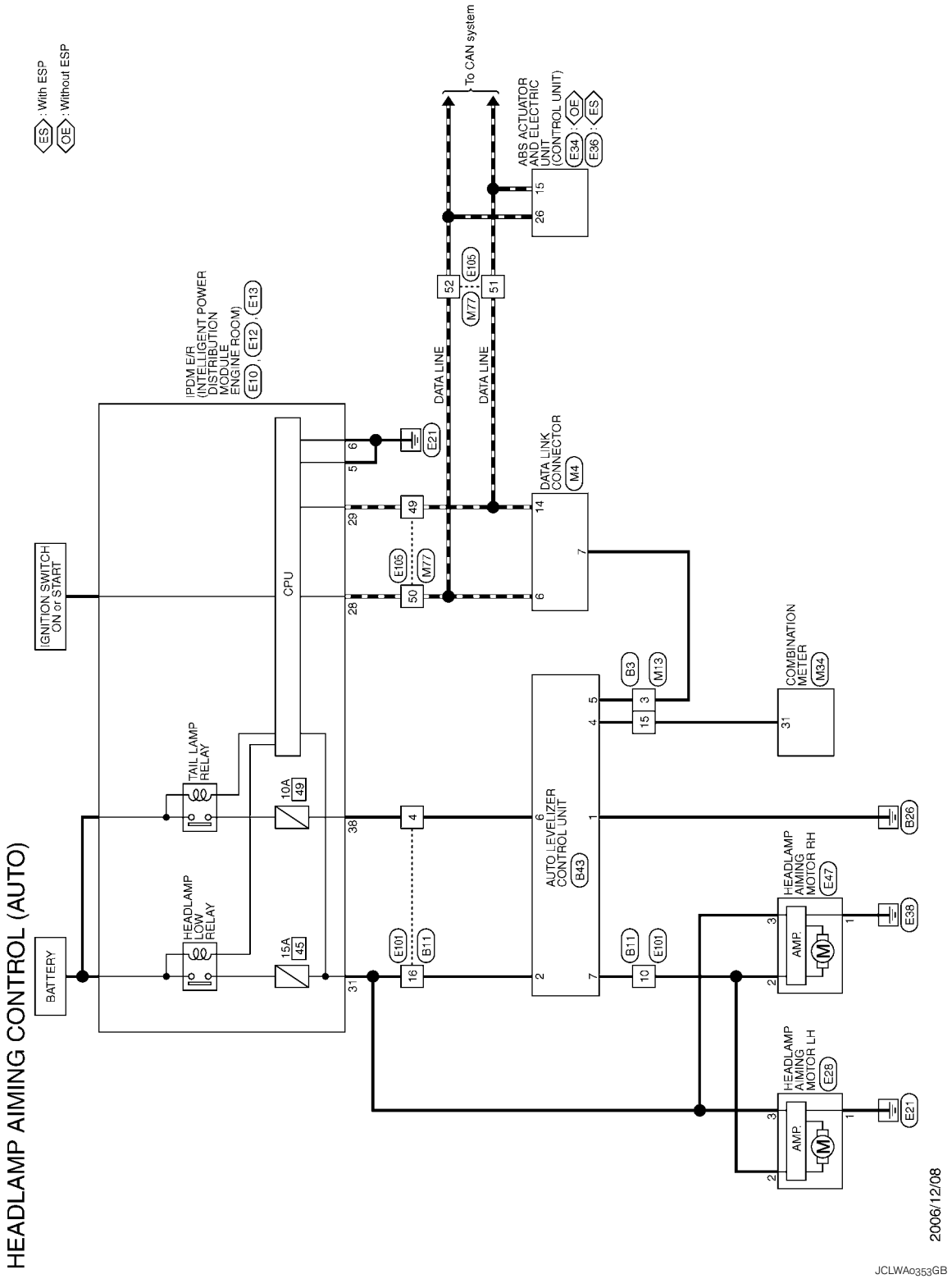
carDiagn.com

Terminal No. (Wire color)		Description		Operating condition		Standard (Approx.)
+	–	Signal name	Input/ Output			
7 (V)	Ground	Headlamp aiming motor drive signal	Output	Headlamp aiming	Under unladen conditions	2.5 V
					At aiming operation lower limit	9.2 V

cardiagn.com

Wiring Diagram - HEADLAMP AIMING CONTROL SYSTEM (AUTO) -

INFOID:0000000000955488



HEADLAMP AIMING CONTROL (AUTO)

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
3	O	-
15	Y	-

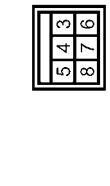
Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-
10	V	-
16	R	-

Connector No.	B43
Connector Name	AUTO LEVELIZER CONTROL UNIT
Connector Type	AMP 1394416-1

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND
2	R	USUP
4	Y	FIN(SP-dF)
5	O	K-LINE
6	R/L	A/D
7	V	PWM

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC



Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	-
29	P	-
31	R	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
38	R/L	-

Connector No.	E28
Connector Name	HEADLAMP AIMING MOTOR LH
Connector Type	FCI211PC033S0003

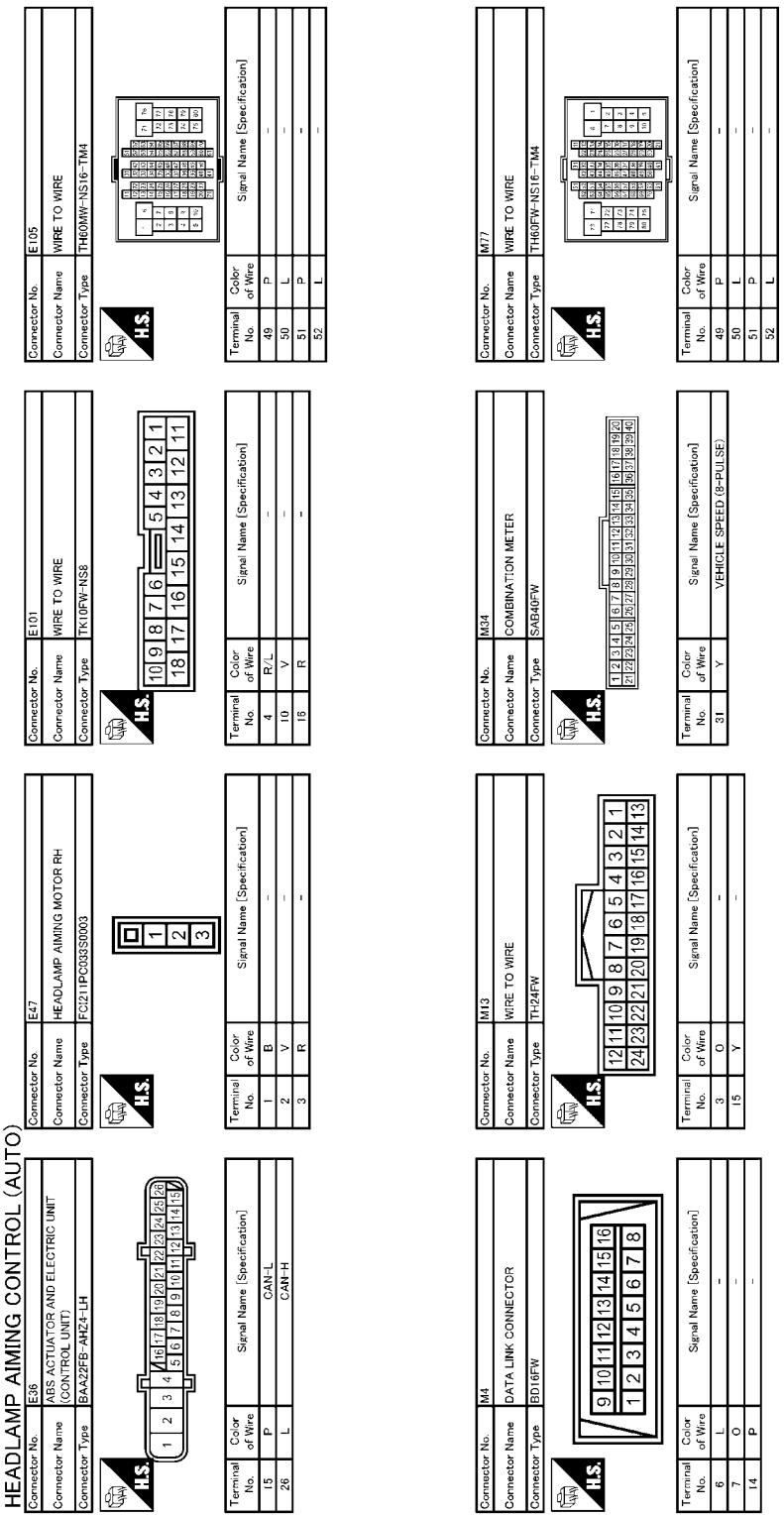
Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	V	-
3	R	-

Connector No.	E34
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH

Terminal No.	Color of Wire	Signal Name [Specification]
15	P	CAN-L
26	L	CAN-H

JCLWA0354GB

cardiagn.com



JCLWA0355GB

Fail Safe

INFOID:0000000000955489

DTC	Fail-safe	Cancellation
B2080: ECU TROUBLE	Fix aiming motor drive signal to approximately 0 V	Headlamp (LO) OFF
B2081: INITIAL NOT DONE	Fix with the light axis facing downward	When sensor initialization is completed

carDiagn.com

DTC	Fail-safe		Cancellation
B2082: SENSOR OUT OF RANGE	After engine start (Less than 5 seconds after ignition switch ON and vehicle speed less than 4 km/h)	Fix with the light axis facing downward	When sensor signal returns to normal range
	While driving (5 seconds or more after ignition switch ON or vehicle speed 4 km/h or more)	Maintain the light axis at the time of DTC detection	
B2083: SEN SIG NOT PLAUSIBLE	• Maintain the aiming motor drive signal output at the time of DTC detection • Maintain the light axis at the time of DTC detection		Headlamp (LO) OFF
B2084: VOLTAGE UNDER LIMIT	After engine start (Less than 5 seconds after ignition switch ON and vehicle speed less than 4 km/h)	Fix with the light axis facing downward	Headlamp (LO) OFF
	While driving (5 seconds or more after ignition switch ON or vehicle speed 4 km/h or more)	Maintain the light axis at the time of DTC detection	
B2085: LOWBEAM SIG OPEN LINE	After engine start (Less than 5 seconds after ignition switch ON and vehicle speed less than 4 km/h)	Fix with the light axis facing downward	Headlamp (LO) OFF
	While driving (5 seconds or more after ignition switch ON or vehicle speed 4 km/h or more)	Maintain the light axis at the time of DTC detection	
B2086: FRQ. OVER LIMIT	After engine start (Less than 5 seconds after ignition switch ON and vehicle speed less than 4 km/h)	Fix with the light axis facing downward	Headlamp (LO) OFF
	While driving (5 seconds or more after ignition switch ON or vehicle speed 4 km/h or more)	Maintain the light axis at the time of DTC detection	
B2087: SHORT TO GROUND	Maintain the light axis at the time of DTC detection		Headlamp (LO) OFF
B2088: SHORT TO BATTERY	Maintain the light axis at the time of DTC detection		Headlamp (LO) OFF
B2089: NO CAR TYPE SELECTED	Fix aiming motor drive signal output to approximately 0 V		When writing of sensor data is completed

DTC Inspection Priority Chart

INFOID:0000000001102042

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	DTC
1	• B2080: ECU TROUBLE • B2089: NO CAR TYPE SELECTED
2	• B2081: INITIAL NOT DONE
3	• B2082: SENSOR OUT OF RANGE • B2083: SEN SIG NOT PLAUSIBLE • B2084: VOLTAGE UNDER LIMIT • B2085: LOWBEAM SIG OPEN LINE • B2086: FRQ. OVER LIMIT • B2087: SHORT TO GROUND • B2088: SHORT TO BATTERY

DTC Index

INFOID:0000000000955491

cardiagn.com

DTC	Fail-safe	Reference
B2080: ECU TROUBLE	×	EXL-36, "Description"
B2081: INITIAL NOT DONE	×	EXL-37, "DTC Logic"
B2082: SENSOR OUT OF RANGE	×	EXL-38, "DTC Logic"
B2083: SEN SIG NOT PLAUSIBLE	×	EXL-39, "DTC Logic"
B2084: VOLTAGE UNDER LIMIT	×	EXL-40, "DTC Logic"
B2085: LOWBEAM SIG OPEN LINE	×	EXL-41, "Description"
B2086: FRQ. OVER LIMIT	×	EXL-43, "Description"
B2087: SHORT TO GROUND	×	EXL-45, "DTC Logic"
B2088: SHORT TO BATTERY	×	EXL-46, "DTC Logic"
B2089: NO CAR TYPE SELECTED	×	EXL-47, "DTC Logic"

cardiagn.com

SYMPTOM DIAGNOSIS

EXTERIOR LIGHTING SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000000955492

CAUTION:
Perform the self-diagnosis with CONSULT-III before the symptom diagnosis. Perform the trouble diagnosis if any DTC is detected.

Symptom		Possible cause	Inspection item
Headlamp (HI) is not turned ON.	One side	• Fuse • Halogen bulb (HI) • Harness between IPDM E/R and the front combination lamp • Front combination lamp (headlamp housing assembly) • IPDM E/R	Headlamp (HI) circuit Refer to EXL-52.
	Both sides	**Symptom diagnosis** "BOTH SIDE HEADLAMPS (HI) ARE NOT TURNED ON" Refer to EXL-160.	
Headlamp (HI) is not turned OFF.	When ignition switch is turned ON.		
	When ignition switch is turned OFF.	IPDM E/R	—
High beam indicator lamp is not turned ON. [The headlamp (HI) is turned ON.]		Combination meter	• Combination meter Data monitor "HI-BEAM IND" • BCM (HEAD LAMP) Active test "HEADLAMP"
Headlamp (LO) is not turned ON.	One side	• Fuse • Xenon bulb (LO) • Harness between IPDM E/R and the front combination lamp • Front combination lamp (xenon headlamp) • IPDM E/R	Headlamp (LO) circuit Refer to EXL-54.
	Both sides	**Symptom diagnosis** "BOTH SIDE HEADLAMPS (LO) ARE NOT TURNED ON" Refer to EXL-161.	
Headlamp (LO) is not turned OFF.	When ignition switch is turned ON.		
	When ignition switch is turned OFF.	IPDM E/R	—
Headlamp HI and LO are not turned ON.		• Harness between front combination lamp and the ground • Front combination lamp (headlamp housing assembly)	Headlamp ground circuit Refer to EXL-56.
Each lamps are not turned ON/OFF with the lighting switch AUTO.		• Combination switch • Harness between the combination switch and BCM • BCM	Combination switch Refer toBCS-63.
		• Light & rain sensor • Harness between the light & rain sensor and BCM • BCM	Light & rain sensor Refer to EXL-69.
Front fog lamp is not turned ON.	One side	• Front fog lamp bulb • Harness between IPDM E/R and the front fog lamp • Front fog lamp • IPDM E/R	Front fog lamp circuit Refer to EXL-62.
	Both sides	**Symptom diagnosis** "BOTH SIDE FRONT FOG LAMPS ARE NOT TURNED ON" Refer to EXL-163.	
Front fog lamp is not turned ON.			

cardiagn.com

Symptom		Possible cause	Inspection item
Front fog lamp indicator lamp is not turned ON. (Front fog lamp is turned ON.)		Combination meter	• Combination meter Data monitor "FR FOG IND" • BCM (HEAD LAMP) Active test "FR FOG LAMP"
Parking lamp is not turned ON.		• Parking lamp bulb • Harness between IPDM E/R and the front combination lamp • Front combination lamp • IPDM E/R	Parking lamp circuit Refer to EXL-64.
Tail lamp is not turned ON.		• Tail lamp bulb • Harness between IPDM E/R and the rear combination lamp • Rear combination lamp	Tail lamp circuit Refer to EXL-74.
License plate lamp is not turned ON.		• License plate lamp bulb • Harness between IPDM E/R and the license plate lamp • License plate lamp	License plate lamp circuit Refer to EXL-76.
Tail lamp and the license plate lamp are not turned ON.		• Fuse • Harness between IPDM E/R and the rear combination lamp • IPDM E/R	Tail lamp circuit Refer to EXL-74.
• Parking lamp, the tail lamp and the license plate lamp are not turned ON. • Parking lamp, the tail lamp and the license plate lamp are not turned OFF. (Each illumination is turned ON/OFF.)		**Symptom diagnosis** "PARKING, LICENSE PLATE AND TAIL LAMPS ARE NOT TURNED ON" Refer to EXL-162.	
Tail lamp indicator is not turned ON. (Parking/tail lamps are turned ON.)		Combination meter	• Combination meter Data monitor "LIGHT IND" • BCM (HEAD LAMP) Active test "TAIL LAMP"
Turn signal lamp does not blink.	Indicator lamp is normal. (Applicable side performs the high flasher activation.)	• Harness between BCM and each turn signal lamp • Turn signal lamp bulb	Turn signal circuit Refer to EXL-66.
	Indicator lamp is included.	• Combination switch • Harness between the combination switch and BCM • BCM	Combination switch Refer toBCS-63.
Turn signal indicator lamp does not blink. (Turn signal indicator lamp is normal.)	One side	Combination meter	—
	Both sides (Always)	• Turn signal indicator lamp signal - BCM • Combination meter	• Combination meter Data monitor "TURN IND" • BCM (FLASHER) Active test "FLASHER"
	Both sides (Only when activating hazard warning lamp with the ignition switch OFF)	• Combination meter power supply and the ground circuit • Combination meter	Combination meter Power supply and the ground circuit Refer to MWI-28.
• Hazard warning lamp does not activate. • Hazard warning lamp continues activating. (Turn signal is normal.)		• Hazard switch • Harness between the hazard switch and BCM • BCM	Hazard switch Refer to EXL-72.

Symptom		Possible cause	Inspection item
Rear fog lamp is not turned ON.	Rear fog lamp indicator lamp is normal.	• Harness between BCM and rear fog lamp • Rear fog lamp bulb • BCM	Rear fog lamp circuit Refer to EXL-77.
	Rear fog lamp indicator lamp is included.	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63.
Rear fog lamp indicator lamp does not turn on. (Rear fog lamp turns ON)		• Rear fog lamp status signal - BCM • Combination meter	• Combination meter Data monitor "REAR FOG IND" • BCM (HEAD LAMP) Active test "RR FOG LAMP"
Headlamp auto aiming does not activate.		• Harness between auto levelizer control unit and aiming motor. • Front combination lamp (Aiming motor) • Auto levelizer control unit	Aiming motor Refer to EXL-59.

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000000955493

XENON HEADLAMP

- Brightness and the color of light may change slightly immediately after turning the headlamp ON until the xenon bulb becomes stable. This is normal.
- Illumination time lag may occur between right and left. This is normal.

AUTO LIGHT SYSTEM

The headlamp may not be turned ON/OFF immediately after passing dark area or bright area (short tunnel, sky bridge, shadowed area etc.) while using the auto light system. This causes the control difference. This is normal.

cardiagn.com

BOTH SIDE HEADLAMPS (HI) ARE NOT TURNED ON

Description

INFOID:0000000000955494

Both side headlamps (HI) are not turned ON when setting to the lighting switch HI or PASS.

Diagnosis Procedure

INFOID:0000000000955495

1.COMBINATION SWITCH INSPECTION

Check the combination switch. Refer to BCS-63, "Symptom Table".

Is the combination switch normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning part.

2.CHECK HEADLAMP (HI) REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR
1. Select "HL HI REQ" of IPDM E/R data monitor item.
2. With operating the lighting switch, check the monitor status.

Monitor item	Condition		Monitor status
HL HI REQ	Lighting switch (2ND)	HI or PASS	ON
		LO	OFF

Is the item status normal?

YES >> GO TO 3.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

3.HEADLAMP (HI) CIRCUIT INSPECTION

Check the headlamp (HI) circuit. Refer to EXL-52, "Component Function Check".

Is the headlamp (HI) circuit normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

BOTH SIDE HEADLAMPS (LO) ARE NOT TURNED ON

Description

INFOID:0000000000955496

Both side headlamps (LO) are not turned ON in any condition.

Diagnosis Procedure

INFOID:0000000000955497

1.CHECK COMBINATION SWITCH

Check the combination switch. Refer to BCS-63, "Symptom Table".

Is the combination switch normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning part.

2.CHECK HEADLAMP (LO) REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR

1. Select "HL LO REQ" of IPDM E/R data monitor item.
2. With operating the lighting switch, check the monitor status.

Monitor item	Condition		Monitor status
HL LO REQ	Lighting switch	2ND	ON
		OFF	OFF

Is the item status normal?

YES >> GO TO 3.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

3.HEADLAMP (LO) CIRCUIT INSPECTION

Check the headlamp (LO) circuit. Refer to EXL-54, "Component Function Check".

Is the headlamp (LO) circuit normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS ARE NOT TURNED ON

Description

INFOID:0000000000955498

The parking, license plate, tail lamps and each illumination are not turned ON in any condition.

Diagnosis Procedure

INFOID:0000000000955499

1.CHECK FUSE

Check that the following fuse is fusing.

Unit	Location	Fuse No.	Capacity
• Parking lamp • Tail lamp • License plate lamp	IPDM E/R	#49	10 A

Is the fuse fusing?

YES >> Repair the applicable circuit. And then replace the fuse.
NO >> GO TO 2.

2.COMBINATION SWITCH INSPECTION

Check the combination switch. Refer to BCS-63, "Symptom Table".

Is the combination switch normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning part.

3.CHECK TAIL LAMP RELAY REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR

1. Select "TAIL & CLR REQ" of IPDM E/R data monitor item.
2. With operating the lighting switch, check the monitor status.

Monitor item	Condition		Monitor status
TAIL & CLR REQ	Lighting switch	1ST	ON
		OFF	OFF

Is the item status normal?

YES >> GO TO 4.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

4.TAIL LAMP CIRCUIT INSPECTION

Check the tail lamp circuit. Refer to EXL-74, "Component Function Check".

Is the tail lamp circuit normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

BOTH SIDE FRONT FOG LAMPS ARE NOT TURNED ON

Description

INFOID:0000000000955500

The front fog lamps are not turned ON in any condition.

Diagnosis Procedure

INFOID:0000000000955501

1.CHECK FUSE

Check that the following fuse is fusing.

Unit	Location	Fuse No.	Capacity
Front fog lamp	IPDM E/R	#43	15 A

Is the fuse fusing?

YES >> Repair the applicable circuit. And then replace the fuse.
NO >> GO TO 2.

2.COMBINATION SWITCH INSPECTION

Check the combination switch. Refer to BCS-63, "Symptom Table".

Is the combination switch normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning part.

3.CHECK FRONT FOG LAMP REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR

1. Select "FR FOG REQ" of IPDM E/R data monitor item.
2. With operating the front fog lamp switch, check the monitor status.

Monitor item	Condition		Monitor status
FR FOG REQ	Front fog lamp switch (With lighting switch 1ST)	ON	ON
		OFF	OFF

Is the item status normal?

YES >> GO TO 4.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

4.FRONT FOG LAMP CIRCUIT INSPECTION

Check the front fog lamp circuit. Refer to EXL-62, "Component Function Check".

Is the front fog lamp circuit normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace the malfunctioning part.

carDiag.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001078108

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions For Xenon Headlamp Service

INFOID:0000000001078109

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

cardiagn.com

ON-VEHICLE MAINTENANCE

HEADLAMP AIMING ADJUSTMENT

Description

INFOID:0000000000955508

PREPARATION BEFORE ADJUSTING

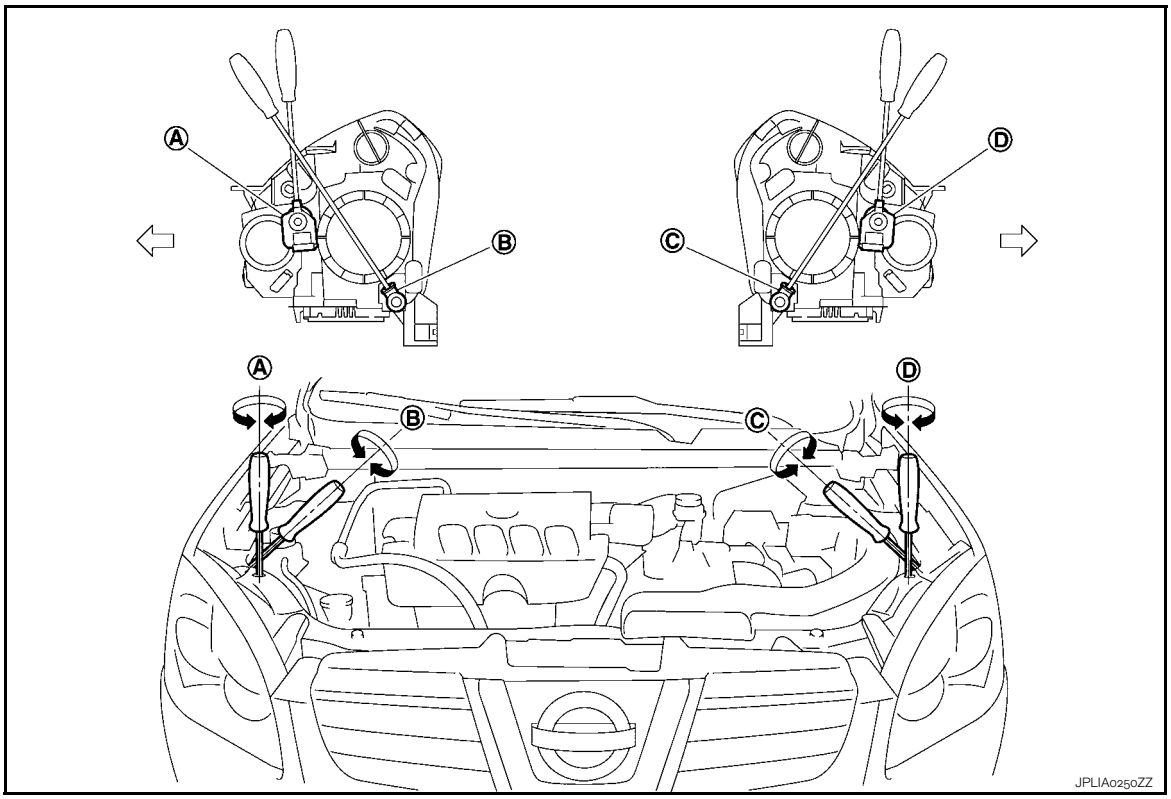
NOTE:

- For details, refer to the regulations in your own country.
- Perform aiming if the vehicle front body has been repaired and/or the headlamp assembly has been replaced.

Before performing aiming adjustment, check the following.

- Adjust the tire pressure to the specification.
- Fill with fuel, engine coolant and each oil.
- Maintain the unloaded vehicle condition. (Remove luggage from the passenger compartment and the luggage room.)
  NOTE:
  Do not remove the temporary tire, jack and on-vehicle tool.
- Wipe out dirt on the headlamp.
  CAUTION:
  Never use organic solvent (thinner, gasoline etc.)
- Ride alone on the driver seat.

AIMING ADJUSTMENT SCREW



A. Headlamp RH (UP/DOWN) adjustment screw
B. Headlamp RH (INSIDE/OUTSIDE) adjustment screw
C. Headlamp LH (INSIDE/OUTSIDE) adjustment screw
D. Headlamp LH (UP/DOWN) adjustment screw

⇦: Vehicle center

carDiagn.com

Adjustment screw		Screw driver rotation	Facing direction
A	Headlamp RH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN
B	Headlamp RH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
C	Headlamp LH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
D	Headlamp LH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN

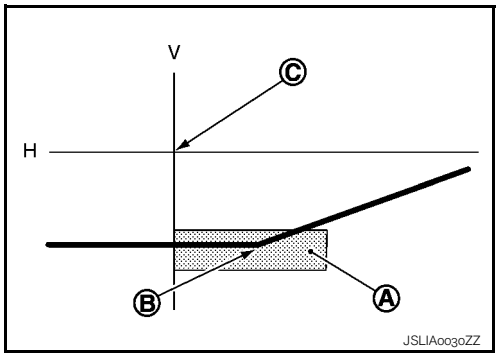
LHD

LHD : Aiming Adjustment Procedure

INFOID:0000000001102296

1. Place the screen.
   NOTE:
   - Stop the vehicle at the perpendicular angle to the wall.
   - Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the headlamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the headlamp (LO).
   NOTE:
   Block light from the headlamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.
   CAUTION:
   Never cover lens surface with tape, etc. because it is made from plastic.
4. Use the aiming adjustment screw to adjust the elbow point projected by the low beams on the screen, so that it is within the aiming adjustment area.

Low beam distribution on the screen

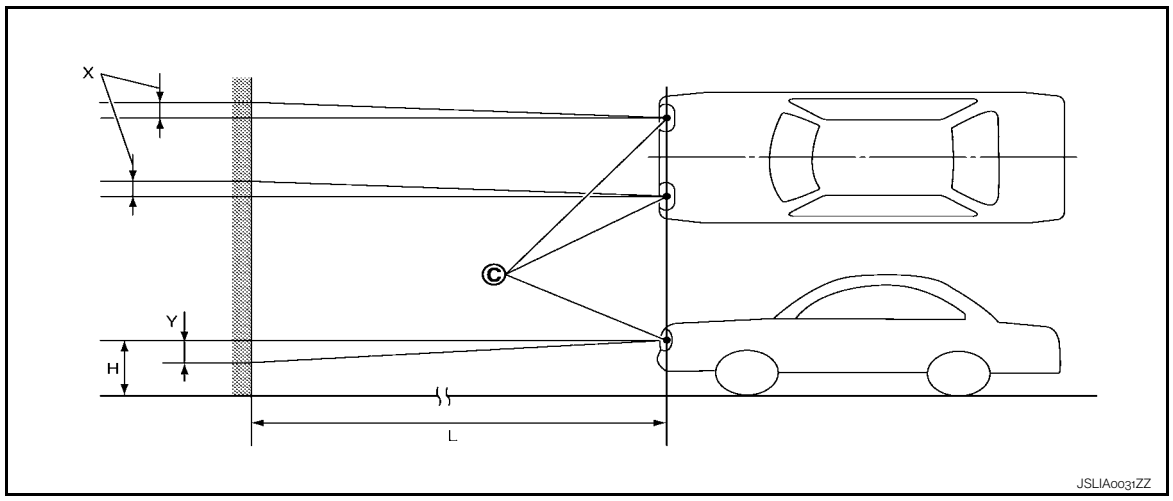


A. Aiming adjustment area
B. Elbow point
C. Headlamp center
H. Horizontal center line of headlamp
V. Vertical center line of headlamp

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y) (Lower side from headlamp center height)	Lateral direction (X) (Right side from headlamp centerline)
100 – 124 (3.94 – 4.88)	Within 120 (4.72)

cardiagn.com



C. Vertical center line of headlamp
H. Horizontal center line of headlamp
L. Distance from headlamp center to screen
X. Aiming adjustment area (lateral)
Y. Aiming adjustment area (Vertical)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

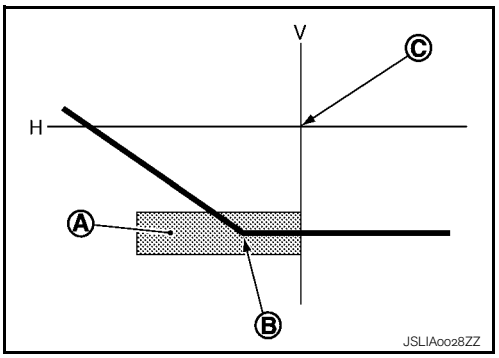
RHD

RHD : Aiming Adjustment Procedure

INFOID:0000000001102297

1. Place the screen.
   NOTE:
   • Stop the vehicle at the perpendicular angle to the wall.
   • Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the headlamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the headlamp (LO).
   NOTE:
   Block light from the headlamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.
   CAUTION:
   Never cover lens surface with tape, etc. because it is made from plastic.
4. Use the aiming adjustment screw to adjust the elbow point projected by the low beams on the screen, so that it is within the aiming adjustment area.

Low beam distribution on the screen



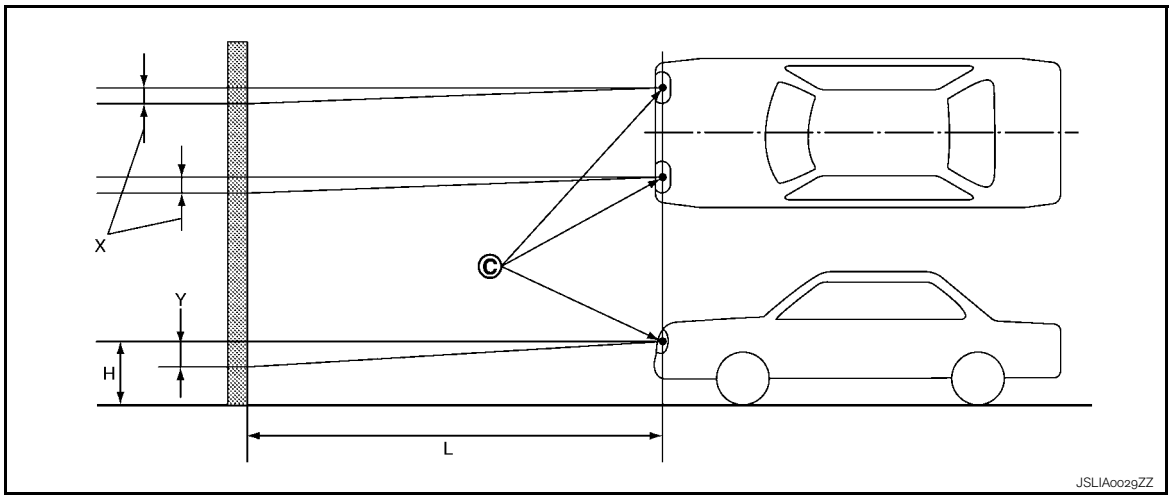
A. Aiming adjustment area
B. Elbow point
C. Headlamp center

carDiagn.com

H. Horizontal center line of headlamp
V. Vertical center line of headlamp

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y) (Lower side from headlamp center height)	Lateral direction (X) (Left side from headlamp centerline)
100 – 124 (3.94 – 4.88)	Within 120 (4.72)



C. Vertical center line of headlamp
H. Horizontal center line of headlamp
L. Distance from headlamp center to screen
X. Aiming adjustment area (lateral)
Y. Aiming adjustment area (Vertical)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

cardiagn.com

FRONT FOG LAMP AIMING ADJUSTMENT

Description

INFOID:0000000000978377

PREPARATION BEFORE ADJUSTING

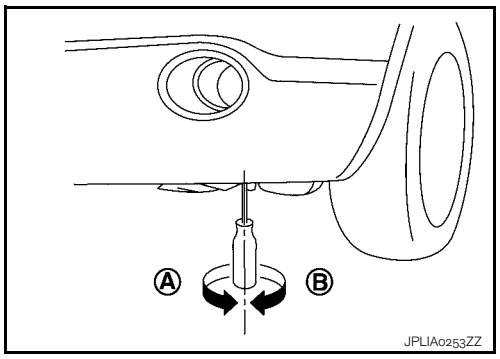
NOTE:
- For details, refer to the regulations in your own country.
- Perform aiming if the vehicle front body has been repaired and/or the headlamp assembly has been replaced.

Before performing aiming adjustment, check the following.
- Adjust the tire pressure to the specification.
- Fill with fuel, engine coolant and each oil.
- Maintain the unloaded vehicle condition. (Remove luggage from the passenger compartment and the luggage room.)
  NOTE:
  Do not remove the temporary tire, jack and on-vehicle tool.
- Wipe out dirt on the headlamp.
  CAUTION:
  Never use organic solvent (thinner, gasoline etc.)
- Ride alone on the driver seat.

AIMING ADJUSTMENT SCREW

- Turn the aiming adjusting screw for adjustment.
- For the position and direction of the adjusting screw, refer to the figure.
  NOTE:
  A screwdriver or hexagonal wrench (6 mm) can be used for adjustment.

A: UP
B: DOWN



Aiming Adjustment Procedure

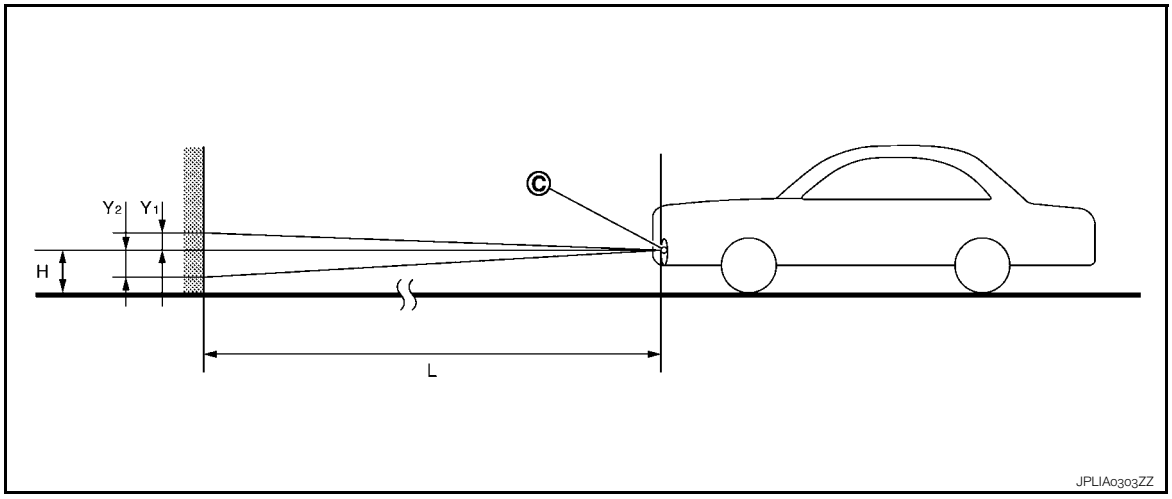
INFOID:0000000001102303

1. Place the screen.
   NOTE:
   - Stop the vehicle at the perpendicular angle to the wall.
   - Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the front fog lamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the front fog lamp.
   NOTE:
   Block light from the front fog lamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.
   CAUTION:
   Never cover lens surface with tape, etc. because it is made from plastic.
4. Use the aiming adjustment screw to adjust the elbow point projected by the front fog lights on the screen, so that it is within the aiming adjustment area.

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y_1) (Upper side from headlamp center height)	Vertical direction (Y_2) (Lower side from headlamp center height)
100 (3.94)	200 (7.87)

carDiagn.com



C. Vertical center line of front fog lamp
H. Horizontal center line of front fog lamp
L. Distance from front fog lamp center to screen
Y1. Aiming adjustment area (Upper)
Y2. Aiming adjustment area (Lower)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

cardiagn.com

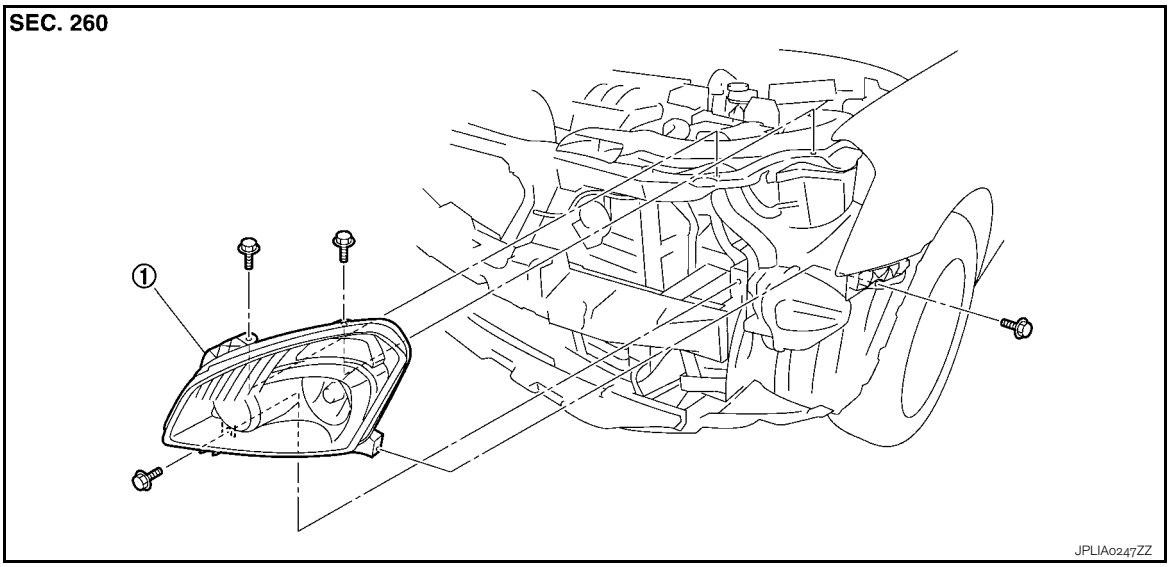
ON-VEHICLE REPAIR

FRONT COMBINATION LAMP

Exploded View

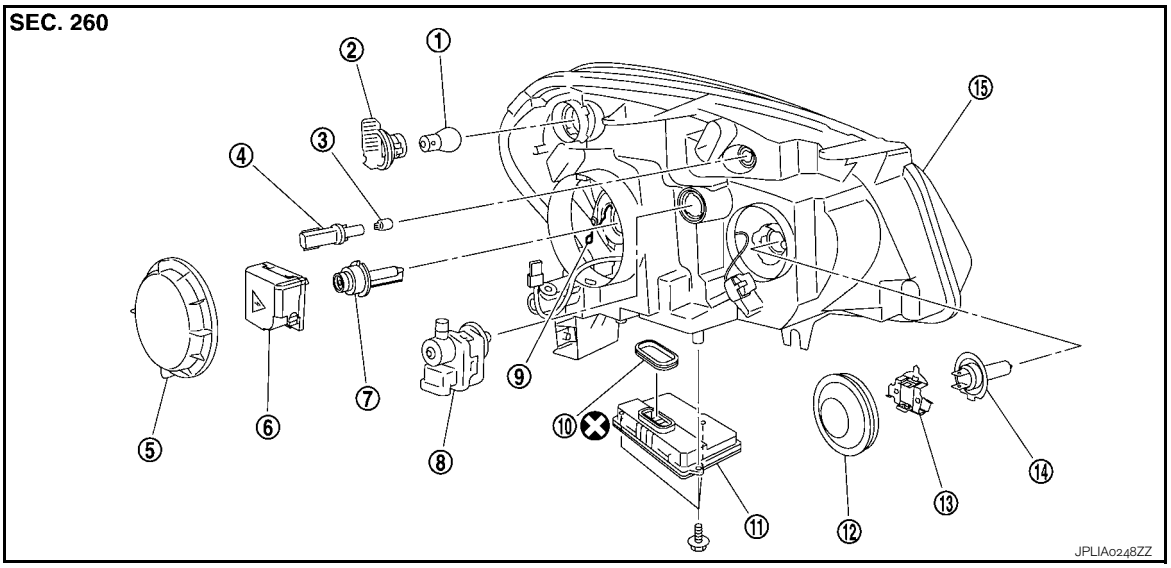
INFOID:0000000000955504

REMOVAL



1. Front combination lamp

DISASSEMBLY



1. Front turn signal lamp bulb
2. Front turn signal lamp bulb socket
3. Parking lamp bulb
4. Parking lamp bulb socket
5. Resin cap
6. Xenon bulb socket
7. Xenon bulb (LO)
8. Headlamp aiming motor
9. Retaining spring
10. Seal packing
11. HID control unit
12. Back cover
13. Retaining plate
14. Halogen bulb (HI)
15. Headlamp housing assembly

Refer to GI-4, "Components" for symbols not described above.

Removal and Installation

INFOID:0000000000955505

carDiagn.com

REMOVAL

CAUTION:

Disconnect the battery negative terminal or the fuse.

1. Remove front bumper fascia. Refer to EXT-11, "Exploded View".
2. Remove the headlamp mounting bolts.
3. Pull out the headlamp assembly forward the vehicle.
4. Disconnect the connector before removing the headlamp assembly.

INSTALLATION

Install in the reverse order of removal.

NOTE:

After installation, perform aiming adjustment. Refer to EXL-165, "Description".

Replacement

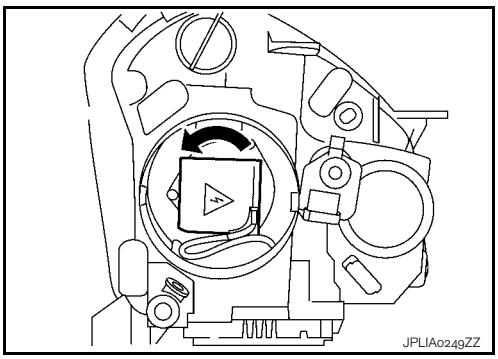
INFOID:0000000000955506

CAUTION:

- **Disconnect the battery negative terminal or the fuse.**
- **After installing the bulb, install the resin cap and the bulb socket securely for watertightness.**

HEADLAMP BULB (LO)

1. Remove the air duct (when replace a left). Keep a service area.
2. Rotate the resin cap counterclockwise and unlock it.
3. Rotate the bulb socket counterclockwise and unlock it.
4. Remove the retaining spring lock. Remove the bulb from the headlamp.
   CAUTION:
   Never break the xenon bulb ceramic tube when replacing the bulb.



HEADLAMP BULB (HI)

1. Remove the air duct (when replace a left). Keep a service area.
2. Rotate the back cover counterclockwise and unlock it.
3. Rotate the retaining plate counterclockwise and unlock it.
4. Remove the bulb from the headlamp.

PARKING LAMP BULB

1. Rotate the bulb socket clockwise and unlock it.
2. Remove the bulb from the bulb socket.

FRONT TURN SIGNAL LAMP BULB

1. Rotate the bulb socket counterclockwise and unlock it.
2. Remove the bulb from the bulb socket.

Disassembly and Assembly

INFOID:0000000000955507

DISASSEMBLY

1. Rotate the resin cap counterclockwise and unlock it.
2. Rotate the terminal which connect to a socket.
3. Rotate the xenon bulb socket counterclockwise and unlock it.
4. Remove the retaining spring lock. Remove the xenon bulb.
5. Remove the HID control unit installation screw.
6. Remove the screw. Disconnect the connector from HID control unit.

cardiagn.com

7. Rotate the back cover. Rotate the halogen bulb socket.
8. Remove the retaining plate counterclockwise and unlock it. Remove halogen bulb.
9. Rotate the parking lamp bulb socket clockwise and unlock it.
10. Remove the bulb from the parking lamp bulb socket.
11. Rotate the front turn signal lamp bulb socket counterclockwise and unlock it.
12. Remove the bulb from the front turn signal lamp bulb socket.

ASSEMBLY

Assemble in the reverse order of disassembly.

CAUTION:

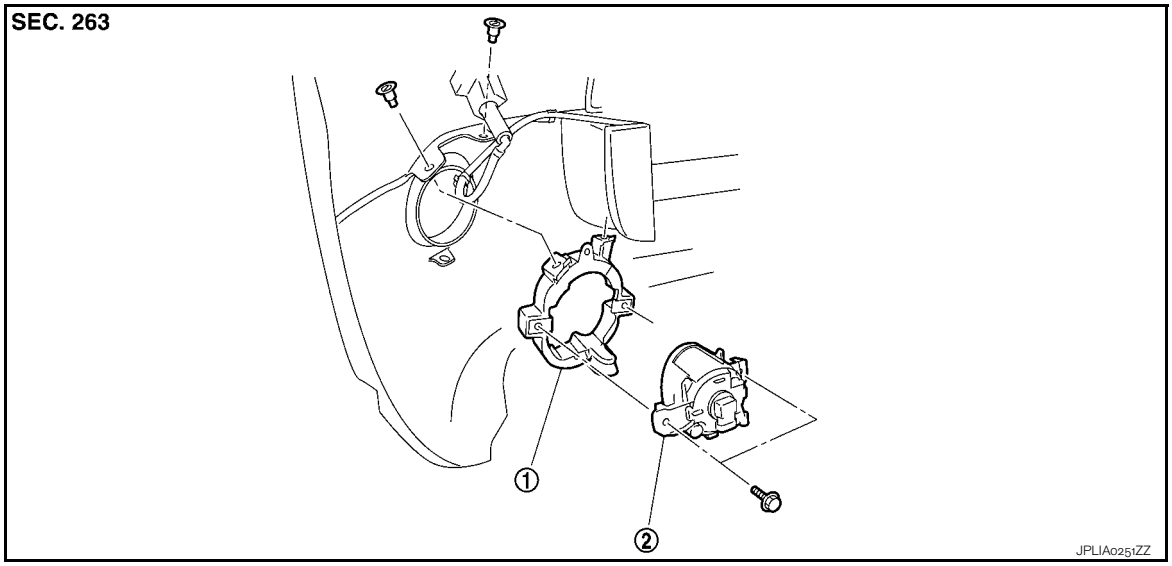
- **Install HID control unit securely.**
- **After installing the bulb, install the resin cap and the bulb socket securely for watertightness.**

carDiagn.com

FRONT FOG LAMP

Exploded View

INFOID:0000000000955509



1. Front fog lamp bracket
2. Front fog lamp

Removal and Installation

INFOID:0000000000978091

REMOVAL

1. Remove the inner fender protector. Keep a service area. Refer to EXT-21, "Exploded View".
2. Remove the front fog lamp connector.
3. Remove the screw. Remove the front fog lamp.
4. Remove the clip. Remove the front fog lamp bracket.

INSTALLATION

Installation is the reverse order of removal.

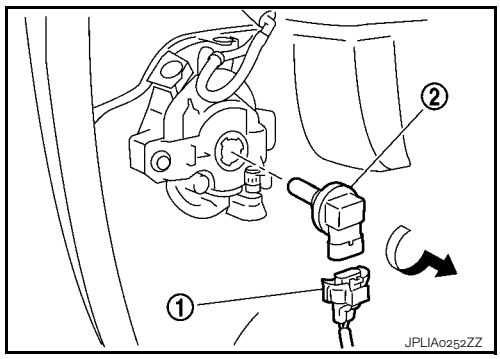
Replacement

INFOID:0000000000978092

CAUTION:

Disconnect the battery negative terminal or the fuse.

1. Remove the fender protector. Keep the service area.
2. Remove the front fog lamp bulb connector (1).
3. Rotate the bulb (2) counterclockwise and unlock it.



cardiagn.com

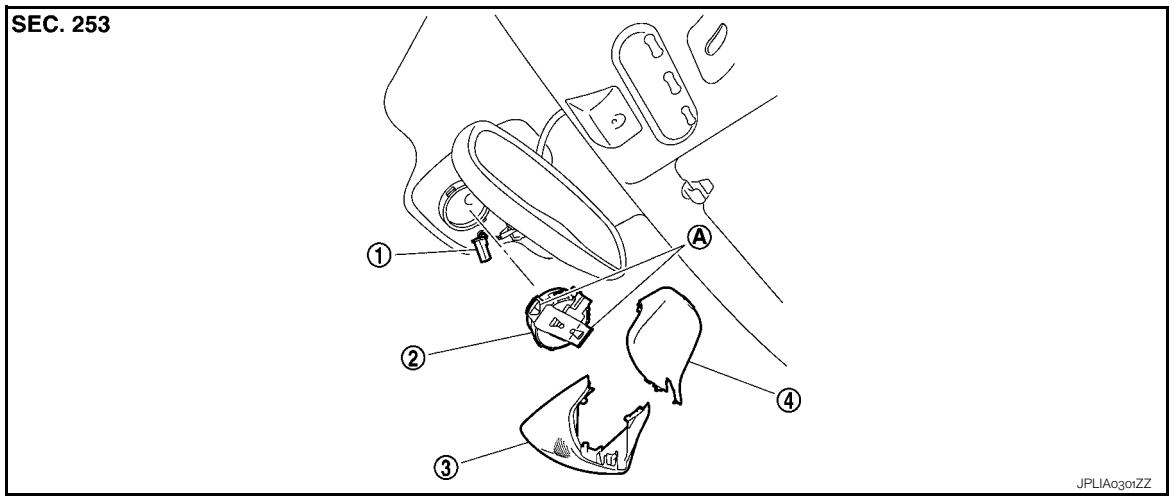
LIGHT & RAIN SENSOR

Exploded View

INFOID:0000000000955511

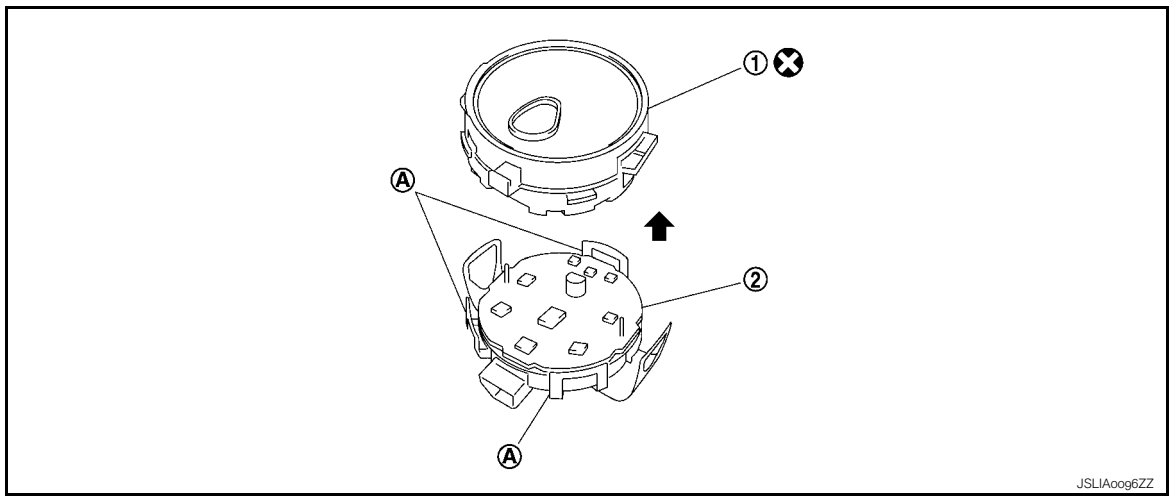
CAUTION:
- **When the light & rain sensor is removed from windshield, gel/adhesive part of housing should not be re-used.**
- **When re-using the light & rain sensor (i.e. after windshield replacement), replace the light & rain sensor housing.**

REMOVAL



1. Light & rain sensor connector
2. Light & rain senor
3. Inside mirror cover (lower)
4. Inside mirror cover (upper)
A. Metal spring clip

DISASSEMBLY



1. Light & rain senor housing
2. Light & rain senor
A. Pawl

Refer to GI-4, "Components" for symbols not described above.

CAUTION:
Never touch the electronic circuit board.

Removal and Installation

INFOID:0000000000955512

cardiagn.com

CAUTION:
- **When the light & rain sensor is removed from windshield, gel/adhesive part of housing should not be re-used.**
- **When re-using the light & rain sensor (i.e. after windshield replacement), replace the light & rain sensor housing.**

REMOVAL

1. Remove the inside mirror cover (upper and lower). Refer to MIR-37, "Exploded View".
2. Disengage the both sides of metal spring clips, and remove the light & rain sensor from the windshield.
3. Disconnect light & rain sensor connector.

NOTE:
When replacing the light & rain sensor housing;
Disengage the pawls, and remove the light & rain sensor housing from the light & rain sensor.

CAUTION:
Never touch the electronic circuit board.

INSTALLATION

Install in the reverse order of removal.

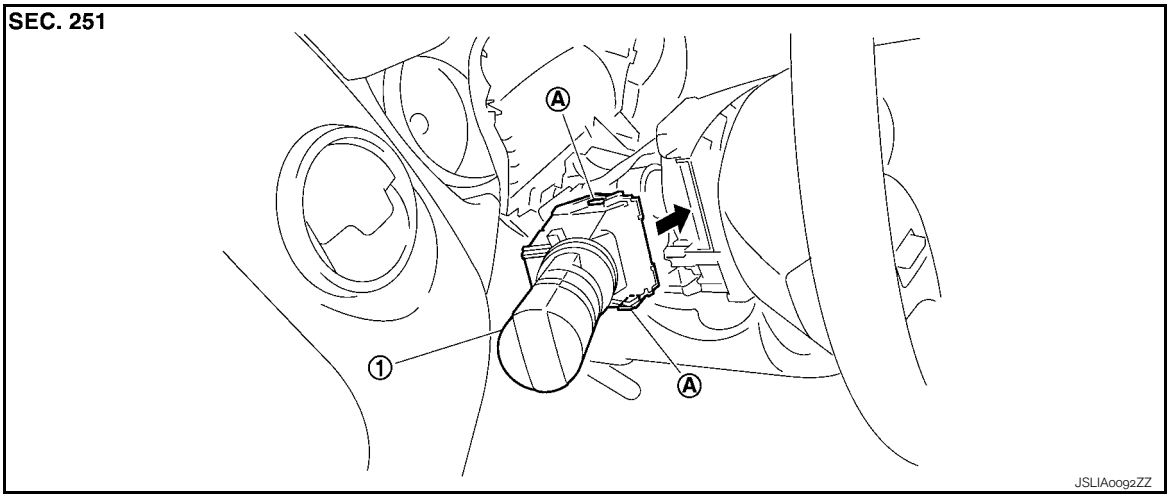
CAUTION:
- **Surface of windshield should be cleaned.**
- **Never touch gel/adhesive of new part.**

cardiagn.com

LIGHTING & TURN SIGNAL SWITCH

Exploded View

INFOID:0000000000955513



1. Light & turn signal switch
A. Pawl

Removal and Installation

INFOID:0000000001082266

REMOVAL

1. Remove steering column cover. Refer to IP-11, "Exploded View".
2. While pressing pawls, pull the light & turn signal switch. And disconnect from the switch base.

INSTALLATION

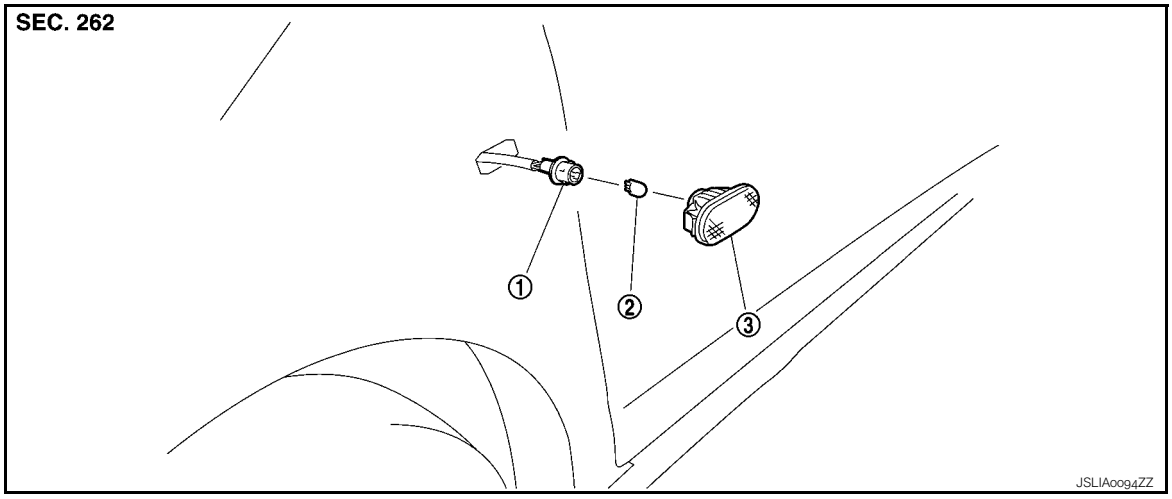
Installation is the reverse order of removal.

carDiagn.com

SIDE TURN SIGNAL LAMP

Exploded View

INFOID:0000000000955514



1. Side turn signal lamp bulb socket
2. Side turn signal lamp bulb
3. Side turn signal lamp housing

Removal and Installation

INFOID:0000000000955515

CAUTION:
Disconnect battery negative terminal or remove the fuse.

REMOVAL

1. Insert a spatula or the similar tool under the side turn signal lamp. While pushing the pawl of the lamp, pull off the lamp from the vehicle.
2. Disconnect side turn signal lamp connector.
   NOTE:
   Support side turn signal lamp harness with tape so that it won't fall into the front fender.

INSTALLATION

Install in the reverse order of removal.

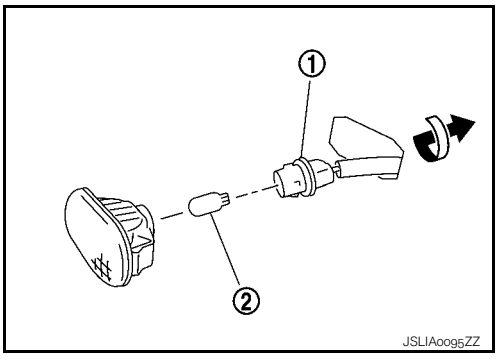
Replacement

INFOID:0000000000955516

CAUTION:
Disconnect battery negative terminal or remove the fuse.

SIDE TURN SIGNAL LAMP BULB

1. Remove the side turn signal lamp.
2. Rotate the bulb socket (1) counterclockwise and unlock it.
   NOTE:
   Support the vehicle-side harness of the side turn signal lamp with tape so that it does not drop inside the front fender.
3. Remove the bulb (2) from the bulb socket.

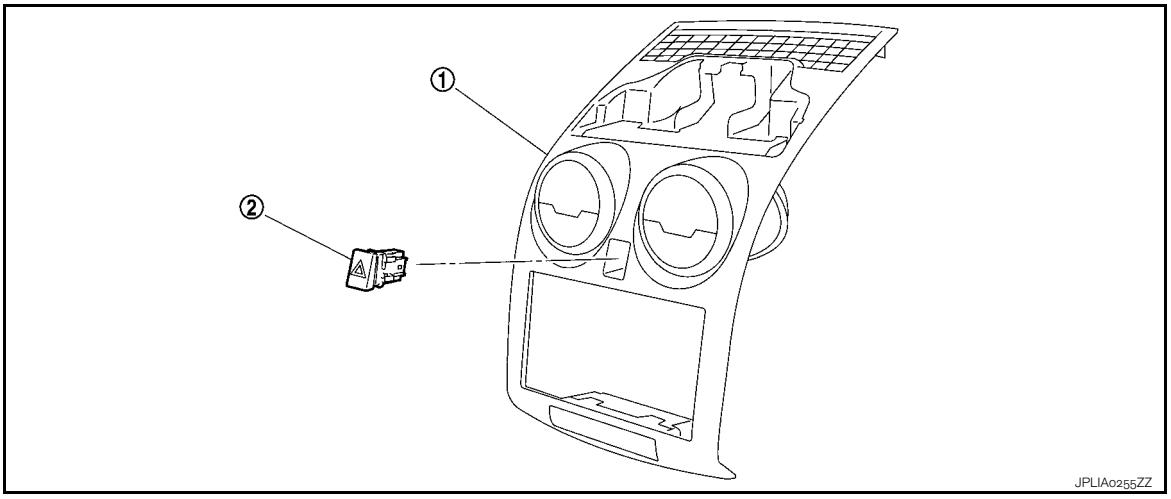


cardiagn.com

HAZARD SWITCH

Exploded View

INFOID:0000000000955517



1. Cluster lid C
2. Hazard switch

Removal and Installation

INFOID:0000000000978418

REMOVAL

1. Remove the cluster lid C. Refer to IP-11, "Exploded View".
2. Widen the pawl. Remove hazard switch.

INSTALLATION

Install in the reverse order of removal.

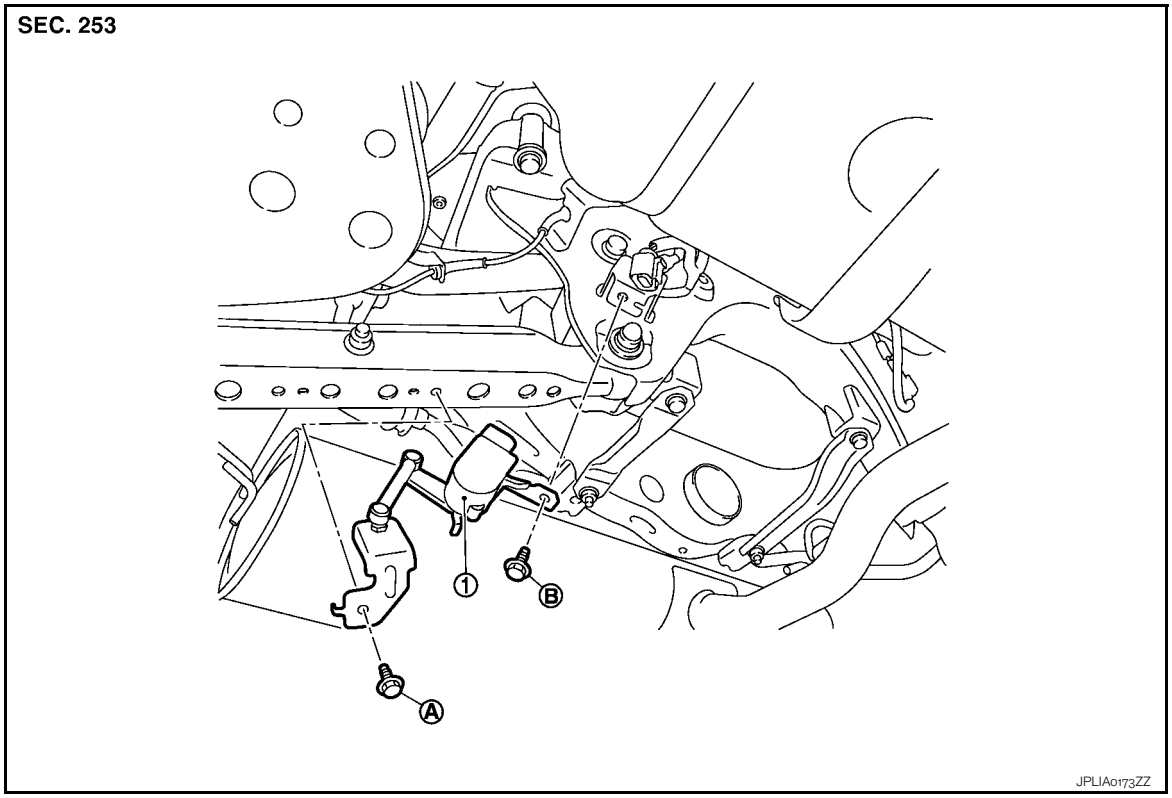
A B C D E F G H I J K EXL M N O P
cardiagn.com

AUTO LEVELIZER CONTROL UNIT

Exploded View

INFOID:0000000000955518

SEC. 253



1. Auto levelizer control unit

A. Sensor lever link bracket bolt B. Auto levelizer control unit mounting bolt

Removal and Installation

INFOID:0000000000955519

Removal

1. Remove auto levelizer control unit mounting bolt.
2. Remove sensor lever link bracket bolt.
3. Disconnect auto levelizer control unit connector.
4. Remove auto levelizer control unit.

Installation

Install in the reverse order of removal.

CAUTION:

Be sure to perform sensor initialization if auto levelizer control unit is removed. Refer to EXL-10, "SENSOR INITIALIZE : Special Repair Requirement".

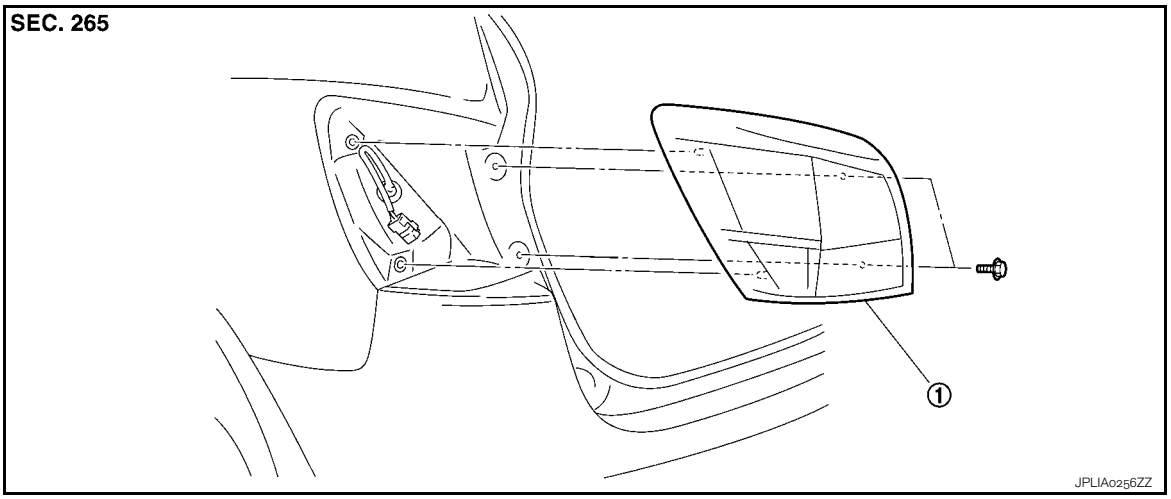
cardiagn.com

REAR COMBINATION LAMP

Exploded View

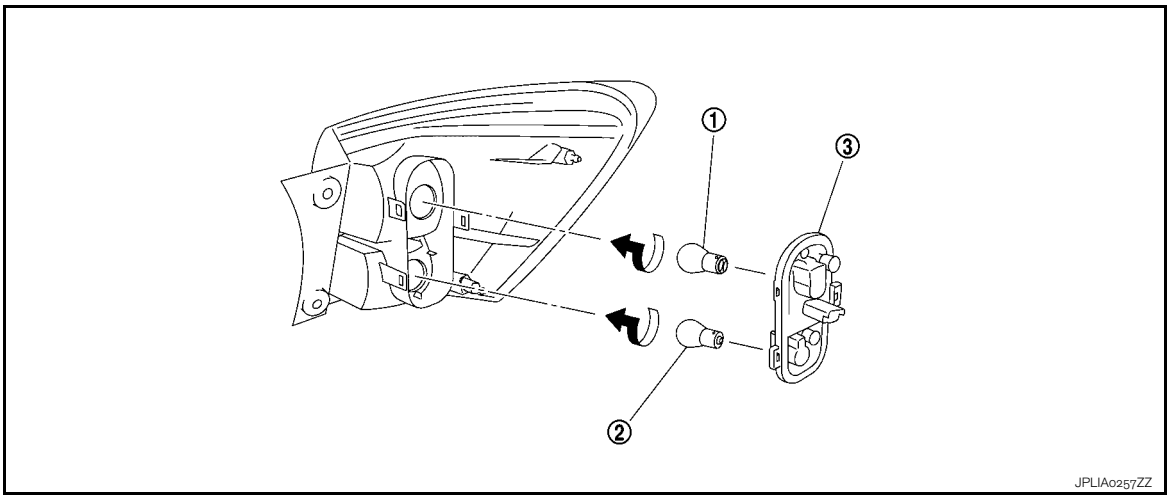
INFOID:0000000000955520

REMOVAL



1. Rear combination lamp

DISASSEMBLY



1. Tail lamp bulb
2. Rear turn signal lamp bulb
3. Bulb cover

Removal and Installation

INFOID:0000000000955521

CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. Remove rear combination lamp mounting bolts.
2. Pull the rear combination lamp toward rear of the vehicle. Remove the rear combination lamp.
3. Disconnect rear combination lamp connector.

INSTALLATION

Install in the reverse order of removal.

Replacement

INFOID:0000000000955522

carDiagn.com

CAUTION:
Disconnect the battery negative terminal or the fuse.

TAIL LAMP BULB

1. Remove the rear combination lamp.
2. Remove the bulb cover.
3. Turn the tail lamp bulb counterclockwise, and remove it.

REAR TURN SIGNAL LAMP BULB

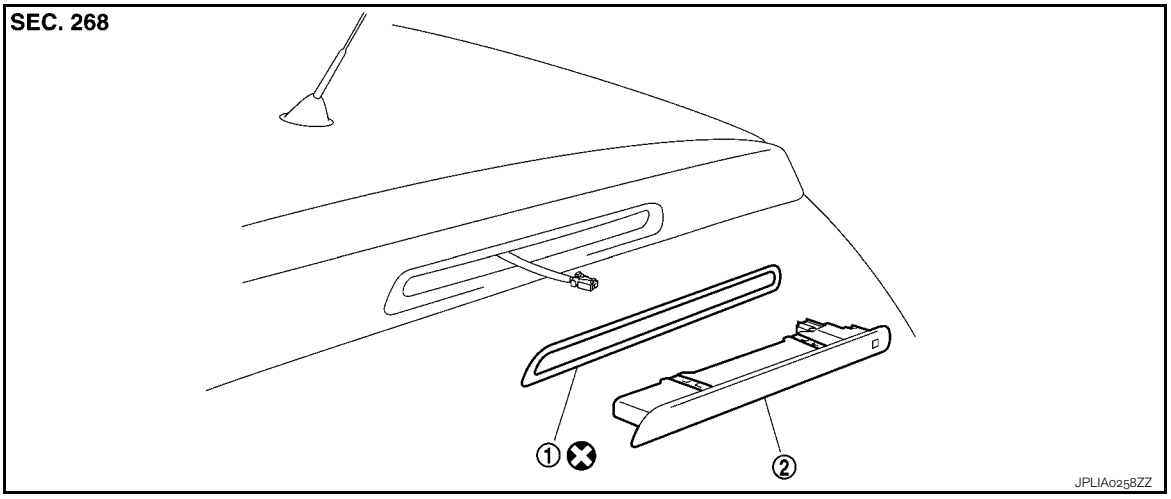
1. Remove the rear combination lamp.
2. Remove the bulb cover.
3. Turn the rear turn signal lamp bulb counterclockwise, and remove it.

cardiagn.com

HIGH-MOUNTED STOP LAMP

Exploded View

INFOID:0000000000955523



1. Seal packing
2. High-mounted stop lamp

Refer to GI-4, "Components" for symbols not described above.

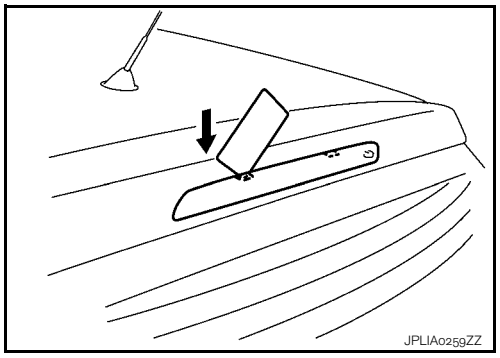
Removal and Installation

INFOID:0000000000955524

CAUTION:
Disconnect battery negative terminal or remove the fuse.

REMOVAL

1. Insert a cards upper the high-mounted stop lamp. While pushing the metal clip of the lamp, pull off the lamp from the vehicle.
2. Disconnect the high-mounted stop lamp connector.
3. Remove the rear washer tube.

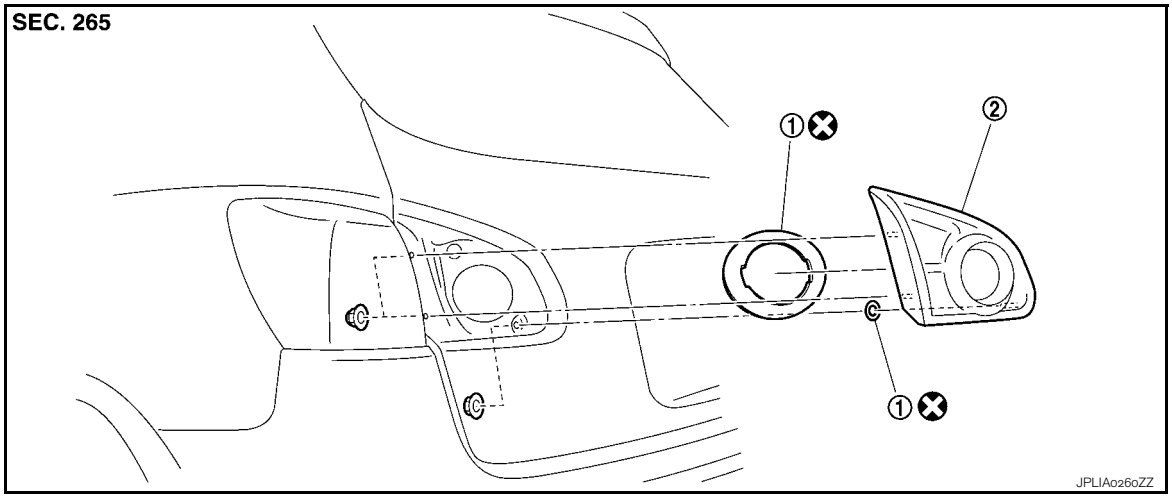


INSTALLATION
Install in the reverse order of removal.

BACK-UP LAMP

Exploded View

INFOID:0000000000955527



1. Seal packing
2. Back-up lamp

Refer to GI-4, "Components" for symbols not described above.

Removal and Installation

INFOID:0000000000955528

CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. Remove back door trim finisher lower. Refer to INT-26, "Exploded View".
2. Disconnect back-up lamp connector.
3. Remove back-up lamp mounting nuts. And then remove back-up lamp.

INSTALLATION

Install in the reverse order of removal.

CAUTION:
Seal packing cannot be reused.

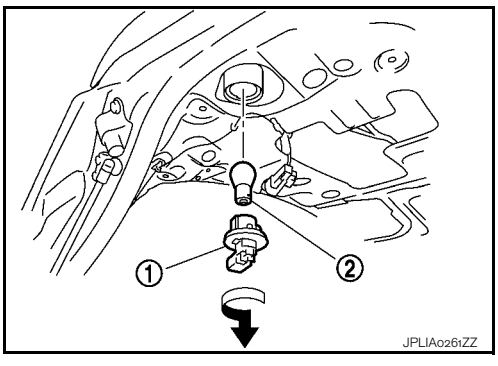
Replacement

INFOID:0000000000955529

CAUTION:
Disconnect the battery negative terminal or the fuse.

BACK-UP LAMP BULB

1. Remove back door trim finisher lower. Refer to INT-26, "Exploded View".
2. Disconnect the back-up lamp connector.
3. Turn the bulb socket (1) counterclockwise and unlock it.
4. Remove the bulb (2) from the socket.

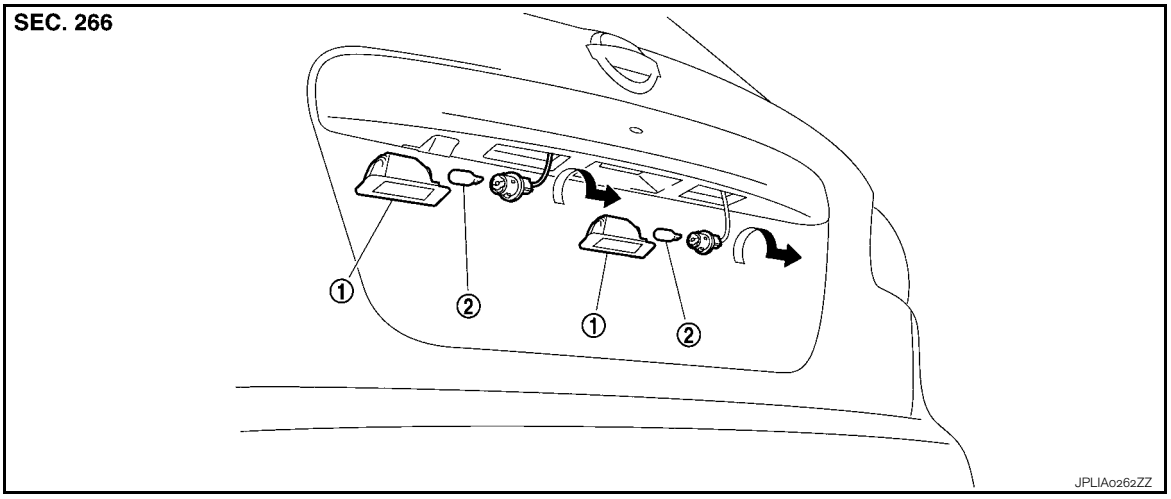


cardiagn.com

LICENSE PLATE LAMP

Exploded View

INFOID:0000000000955530



1. License plate lamp housing
2. License plate lamp bulb

Removal and Installation

INFOID:0000000000955531

CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. While pressing the license plate lamp to direction right side, pull it to direction outside and then remove it.
2. Disconnect the connector.

INSTALLATION

Install in the reverse order of removal.

Replacement

INFOID:0000000000955532

CAUTION:
Disconnect the battery negative terminal or the fuse.

LICENSE PLATE LAMP BULB

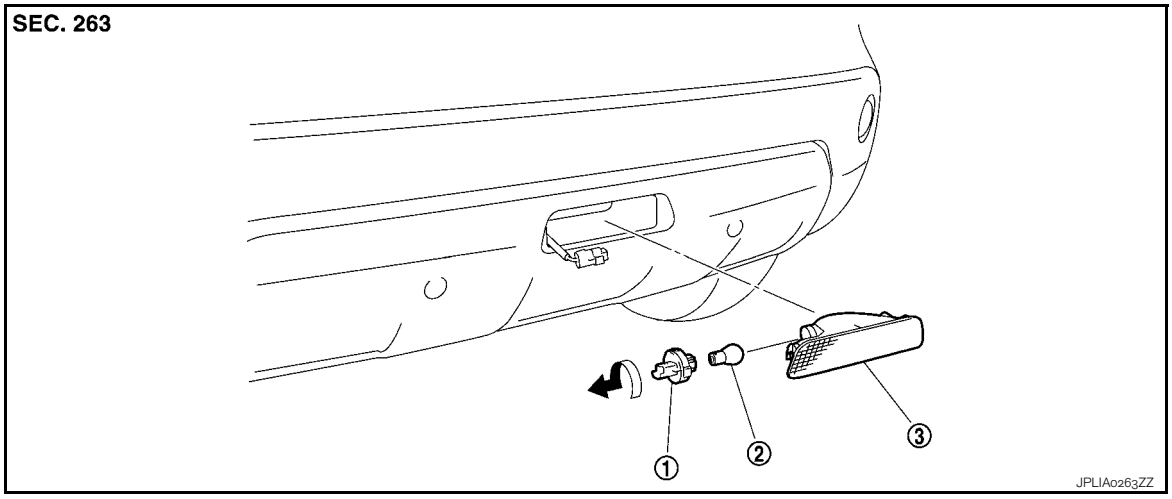
1. Remove license plate lamp.
2. Turn the bulb socket counterclockwise and unlock it.
3. Remove the bulb from the socket.

cardiagn.com

REAR FOG LAMP

Exploded View

INFOID:0000000000955533



1. Rear fog lamp bulb socket
2. Rear fog lamp bulb
3. Rear fog lamp housing

Removal and Installation

INFOID:0000000000955534

CAUTION:
Disconnect battery negative terminal or remove the fuse.

REMOVAL

1. Insert any appropriate tool into the gap between the rear fog lamp housing. And pull off the rear fog lamp from the vehicle.
2. Disconnect rear fog lamp connector.

INSTALLATION

Installation is the reverse order of removal.

Replacement

INFOID:0000000000955535

CAUTION:
Disconnect battery negative terminal or remove the fuse.

REAR FOG LAMP BULB

1. Remove the rear fog lamp.
2. Turn the bulb socket counterclockwise and unlock it.
3. Remove the bulb from its socket.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Bulb Specifications

INFOID:0000000000955536

Item		Type	Wattage (W)
Front combination lamp	Headlamp (LO)	D2R (XENON)	35
	Headlamp (HI)	H7	55
	Front turn signal lamp	WY21W (Amber)	21
	Parking lamp	W5W	5
Front fog lamp		HB4	51
Side turn signal lamp		W5W	5
Rear combination lamp	Stop lamp/Tail lamp	W21/5W	21/5
	Rear turn signal lamp	W21W	21
Back-up lamp		W16W	18
License plate lamp		W5W	5
High-mounted stop lamp		LED	—
Rear fog lamp		W21W	21

cardiagn.com

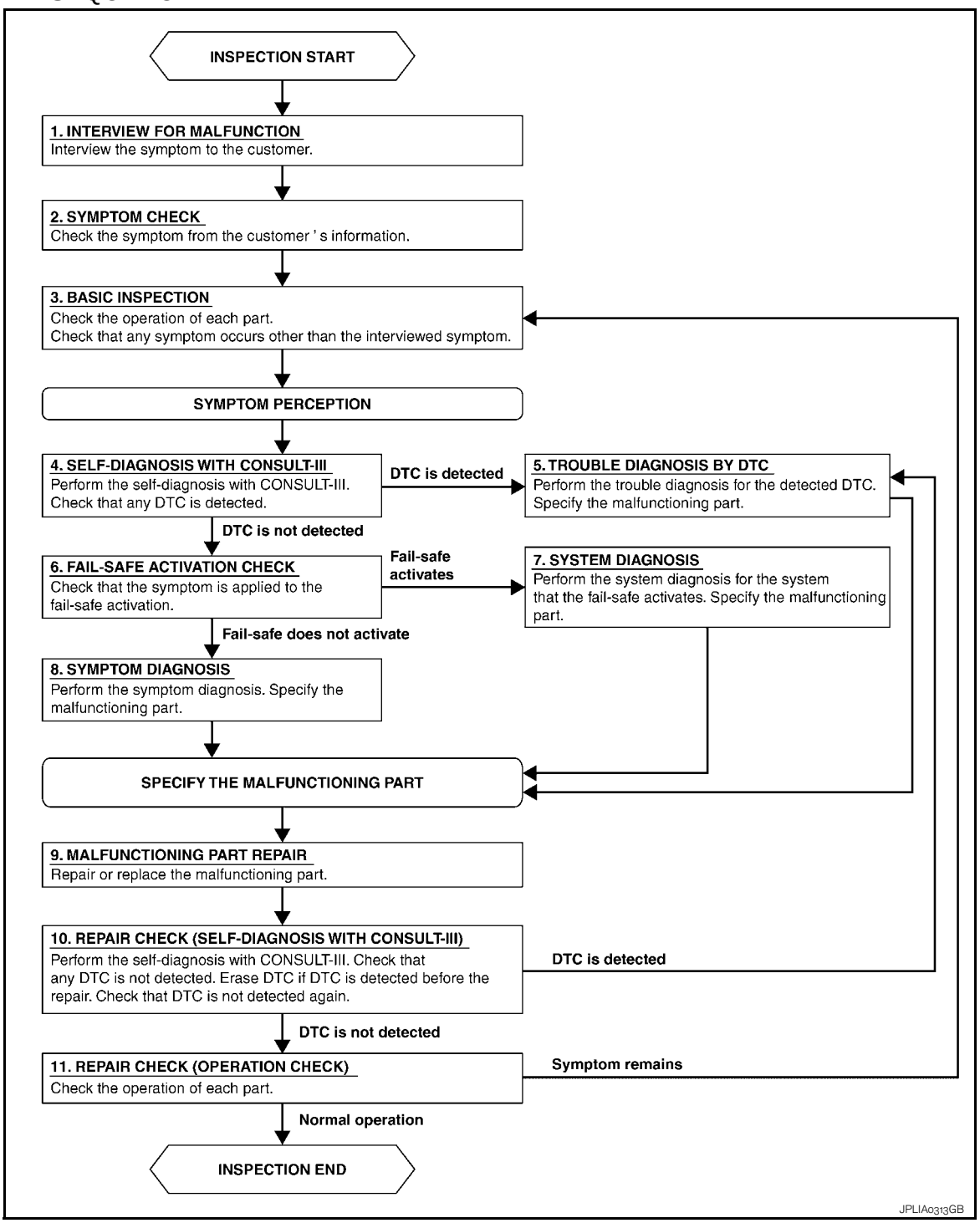
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001078333

OVERALL SEQUENCE



DETAILED FLOW

1.INTERVIEW FOR MALFUNCTION

Interview the symptom to the customer.

cardiagn.com

>> GO TO 2.

2.SYMPTOM CHECK

Check the symptom from the customer's information.

>> GO TO 3.

3.BASIC INSPECTION

Check the operation of each part. Check that any symptom occurs other than the interviewed symptom.

>> GO TO 4.

4.SELF-DIAGNOSIS WITH CONSULT-III

Perform the self-diagnosis with CONSULT-III. Check that any DTC is detected.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 6.

5.TROUBLE DIAGNOSIS BY DTC

Perform the trouble diagnosis for the detected DTC. Specify the malfunctioning part.

>> GO TO 9.

6.FAIL-SAFE ACTIVATION CHECK

Check that the symptom is applied to the fail-safe activation.

Does the fail-safe activate?

YES >> GO TO 7.
NO >> GO TO 8.

7.SYSTEM DIAGNOSIS

Perform the system diagnosis for the system that the fail-safe activates. Specify the malfunctioning part.

>> GO TO 9.

8.SYMPTOM DIAGNOSIS

Perform the symptom diagnosis. Specify the malfunctioning part.

>> GO TO 9.

9.MALFUNCTION PART REPAIR

Repair or replace the malfunctioning part.

>> GO TO 10.

10.REPAIR CHECK (SELF-DIAGNOSIS WITH CONSULT-III)

Perform the self-diagnosis with CONSULT-III. Check that any DTC is not detected. Erase DTC if DTC is detected before the repair. Check that DTC is not detected again.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 11.

11.REPAIR CHECK (OPERATION CHECK)

Check the operation of each part.

Does it operate normally?

YES >> INSPECTION END

carDiagn.com

NO >> GO TO 3.

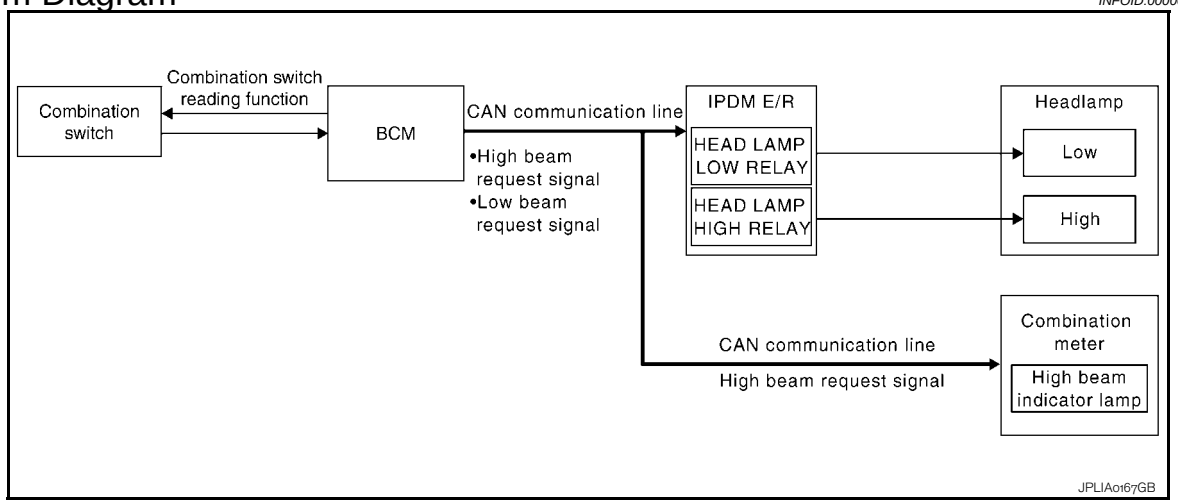
cardiagn.com

FUNCTION DIAGNOSIS

HEADLAMP SYSTEM

System Diagram

INFOID:0000000001026113



System Description

INFOID:0000000001089299

OUTLINE

Headlamp is controlled by combination switch reading function and headlamp control function of BCM, and relay control function of IPDM E/R.

HEADLAMP (LO) OPERATION

- BCM detects the combination switch condition with the combination switch reading function.
- BCM transmits the low beam request signal to IPDM E/R with CAN communication according to the headlamp (LO) ON condition.

Headlamp (LO) ON condition
- Lighting switch 2ND
- Lighting switch AUTO, and the auto light function ON judgment (With auto light system)
- Daytime running light ON judgment (With daytime running light system)

- IPDM E/R turns the integrated headlamp low relay ON, and turns the headlamp ON according to the low beam request signal.

HEADLAMP (HI) OPERATION

- BCM transmits the high beam request signal to IPDM E/R and the combination meter with CAN communication according to the headlamp (HI) ON condition.

Headlamp (HI) ON condition
- Lighting switch HI with the lighting switch 2ND or AUTO (auto light function ON judgment)
- Lighting switch PASS

- Combination meter turns the high beam indicator lamp ON according to the high beam request signal.
- IPDM E/R turns the integrated headlamp high relay ON, and turns the headlamp ON according to the high beam request signal.

FOLLOW ME HOME FUNCTION

When the driver is moving to the house entrance from the own vehicle, headlamp is kept still ON by the follow me home function of BCM.

- When BCM detects the input of lighting switch PASS with all of following condition, it transmits the low beam request signal for a period of time to IPDM E/R through CAN communication.
- IPDM E/R turns the integrated headlamp low relay ON, and turns the headlamp ON according to the low beam request signal.
- Ignition switch OFF
- Lighting switch OFF or AUTO

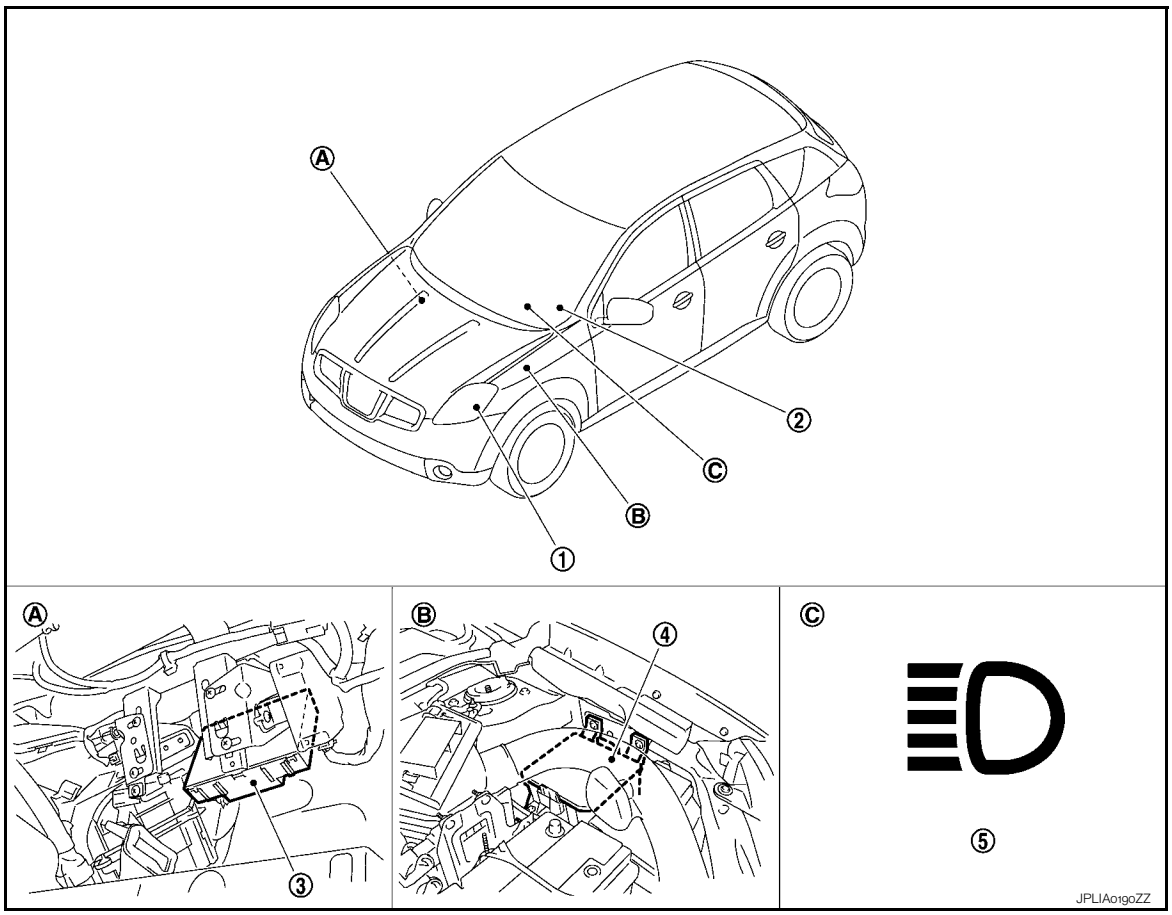
NOTE:

A B C D E F G H I J K EXL M N O P
cardiagn.com

Follow me home function activating time can be set by CONSULT-III. Refer to EXL-27, "HEADLAMP : CONSULT-III Function (BCM - HEAD LAMP)".

Component Parts Location

INFOID:0000000001060451



1. Headlamp
2. Combination switch
3. BCM
4. IPDM E/R
5. High beam indicator lamp
A. Over the glove box
B. Engine room (left side)
C. On the combination meter

Component Description

INFOID:0000000001026116

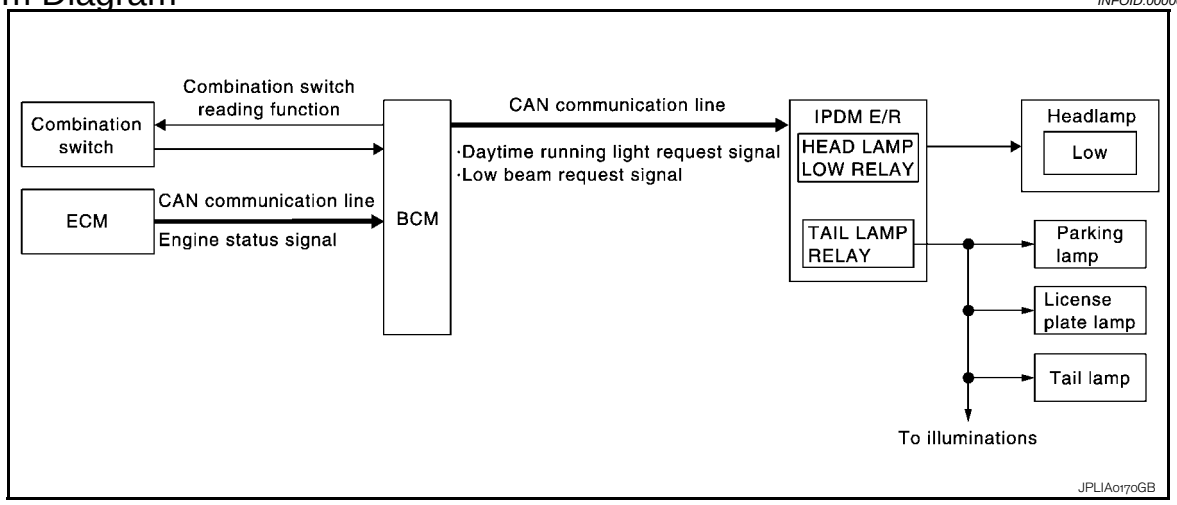
Part	Description
BCM	• Judges each switch condition by the combination switch reading function. • Judges that the headlamp is turned ON according to the vehicle condition. - Requests the headlamp relay (HI/LO) ON to IPDM E/R (with CAN communication). - Requests the high beam indicator lamp ON to the combination meter (with CAN communication).
IPDM E/R	Controls the integrated relay, and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Combination meter (High beam indicator lamp)	Turns the high beam indicator lamp ON according to the request from BCM (with CAN communication).

cardiagn.com

DAYTIME RUNNING LIGHT SYSTEM

System Diagram

INFOID:0000000001099320



System Description

INFOID:0000000001099321

OUTLINE

- Turns the following exterior lamps ON as the daytime running light.
- headlamp (LO)
- Tail lamp, parking lamp and license plate lamp
- Daytime running light is controlled by daytime running light control function and combination switch reading function of BCM, and relay control function of IPDM E/R.

DAYTIME RUNNING LIGHT OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM detects the engine condition by the engine status signal received from ECM with CAN communication.
- BCM transmits the daytime running light request signal and low beam request signal to IPDM E/R with CAN communication according to the daytime running light ON condition.

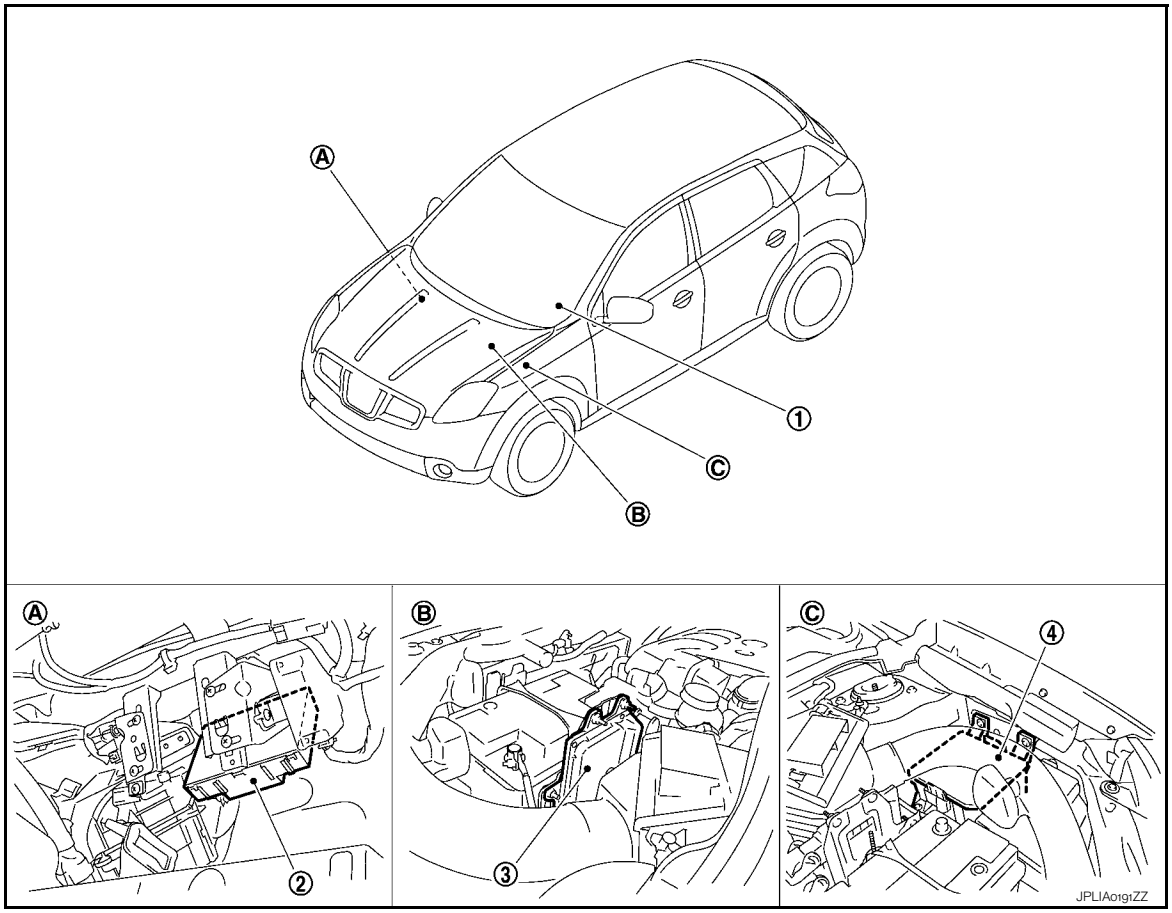
Daytime running light ON condition

- Engine running
- Lighting switch OFF or AUTO
- IPDM E/R turns the integrated headlamp low relay and tail lamp relay ON according to the daytime running light request signal and low beam request signal. And it turns each lamps ON.

Component Parts Location

INFOID:0000000001099322

carDiagn.com



1. Combination switch
2. BCM
3. ECM
4. IPDM E/R
A. Over the glove box
B. Engine room (left side)
C. Engine room (left side)

Component Description

INFOID:0000000001099323

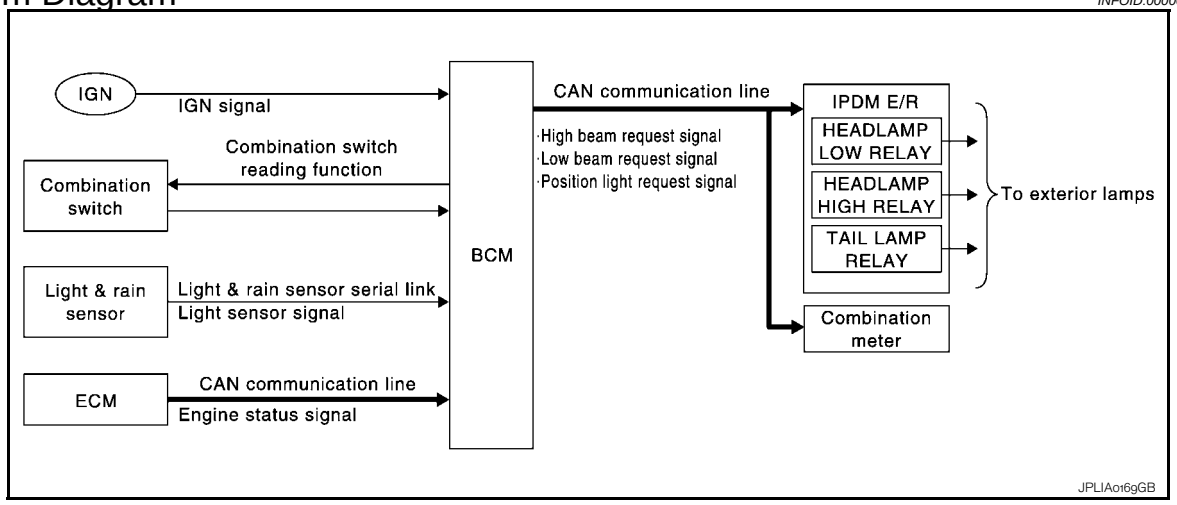
Part	Description
BCM	• Detects each switch condition with the combination switch reading function. • Judges each lamps ON/OFF condition according to the vehicle condition. Requests the each relay ON to IPDM E/R (with CAN communication).
IPDM E/R	Controls the integrated relay and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
ECM	Transmits the engine status signal to BCM with CAN communication.

cardiagn.com

AUTO LIGHT SYSTEM

System Diagram

INFOID:0000000001099324



System Description

INFOID:0000000001099325

OUTLINE

- Auto light system is controlled by each function of BCM and IPDM E/R.

Control by BCM
- Combination switch reading function
- Headlamp control function
- Auto light function

Control by IPDM E/R
- Relay control function
- Auto light function turns the exterior lamps* ON/OFF automatically according to the outside brightness.
  *: Headlamp (LO/HI), parking lamp, tail lamp (Headlamp HI depends on the combination switch condition.)

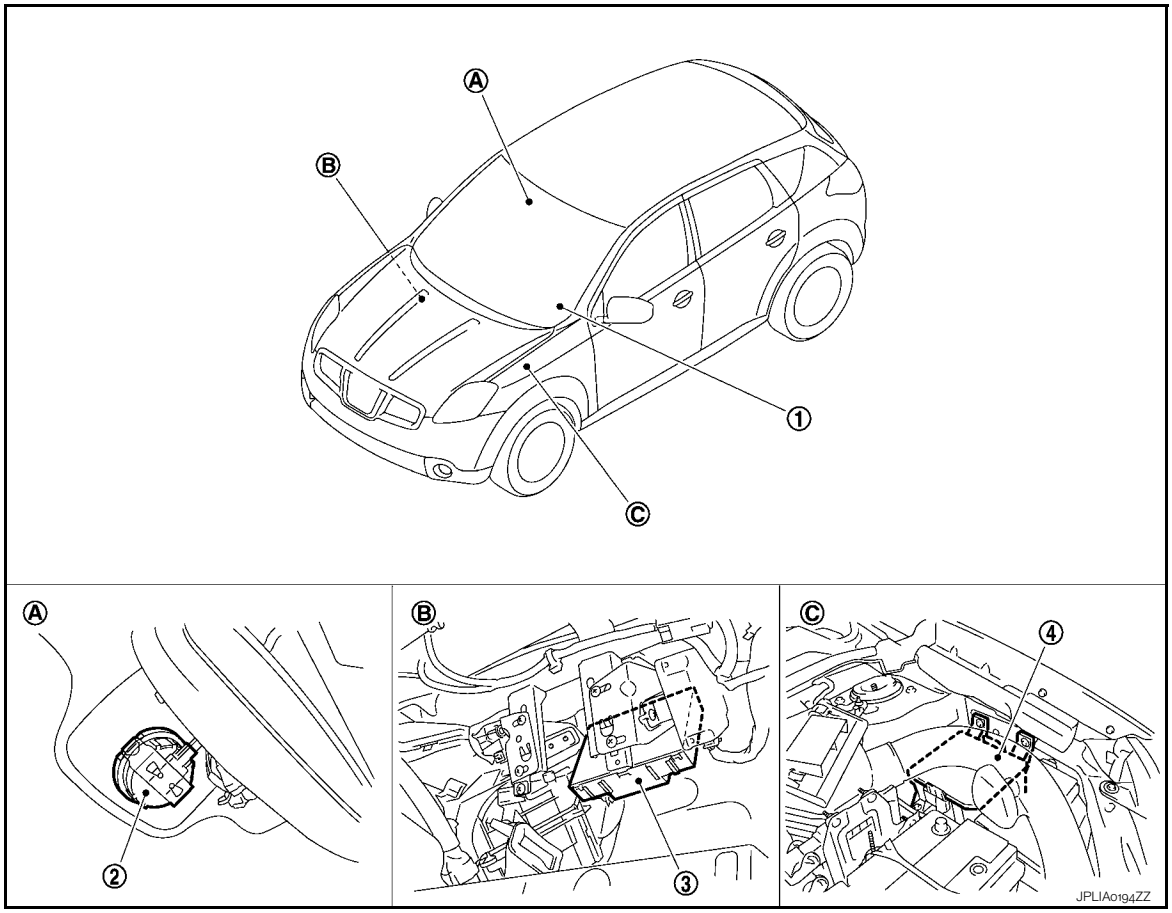
AUTO LIGHT FUNCTION

- BCM detects the combination switch condition with the combination switch reading function.
- BCM detects the engine condition by the engine status signal received from ECM with CAN communication.
- BCM receives the light sensor signal [outside brightness (lux) and the light & rain sensor condition] from light & rain sensor with the light & rain sensor serial link.
- BCM judges ON/OFF condition of the exterior lamps according to the outside brightness and the vehicle condition.
- BCM transmits each request signal to IPDM E/R with CAN communication according to ON/OFF condition by the auto light function.

Component Parts Location

INFOID:0000000001099326

A B C D E F G H I J K EXL M N O P
cardiagn.com



1. Combination switch
2. Light & rain sensor
3. BCM
4. IPDM E/R
A. Windshield upper
B. Over the glove box
C. Engine room (left side)

Component Description

INFOID:0000000001099327

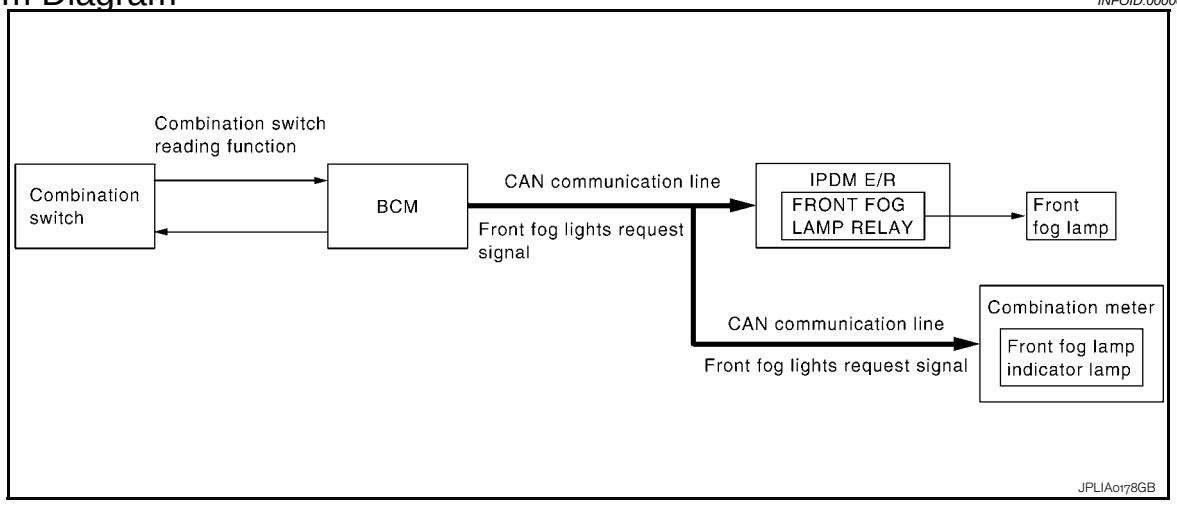
Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Detects the outside brightness from the light & rain sensor by light & rain sensor serial link. • Judges the ON/OFF status of the exterior lamp according to the outside brightness and the vehicle condition. • Requests ON/OFF of each relay to IPDM E/R (with CAN communication).
IPDM E/R	Controls the integrated relay, and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Light & rain sensor	Refer to EXL-228, "Description".

cardiagn.com

FRONT FOG LAMP SYSTEM

System Diagram

INFOID:0000000001099328



System Description

INFOID:0000000001099329

OUTLINE

Front fog lamp is controlled by combination switch reading function and front fog lamp control function of BCM, and relay control function of IPDM E/R.

FRONT FOG LAMP OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM transmits the front fog lights request signal to IPDM E/R and the combination meter with CAN communication according to the front fog lamp ON condition.

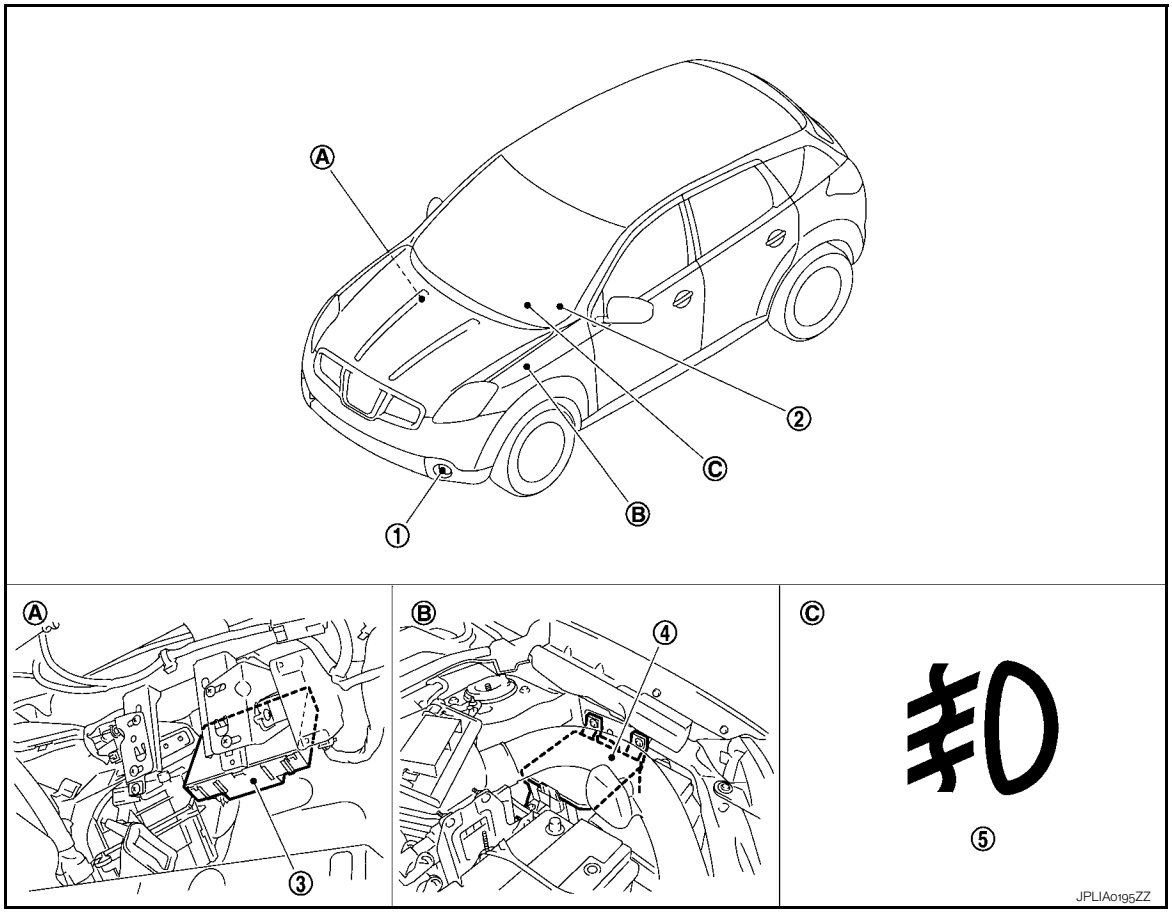
Front fog lamp ON condition
- Front fog lamp switch ON
- Lighting switch 1ST, 2ND, or AUTO (ignition switch ON)

- IPDM E/R turns the integrated front fog lamp relay ON, and turns the front fog lamp ON according to the front fog lights request signal.
- Combination meter turns the front fog lamp indicator lamp ON according to the front fog lights request signal.

Component Parts Location

INFOID:0000000001099330

carDiagn.com



1. Front fog lamp
2. Combination switch
3. BCM
4. IPDM E/R
5. Front fog lamp indicator lamp
A. Over the glove box
B. Engine room (left side)
C. On the combination meter

Component Description

INFOID:0000000001099331

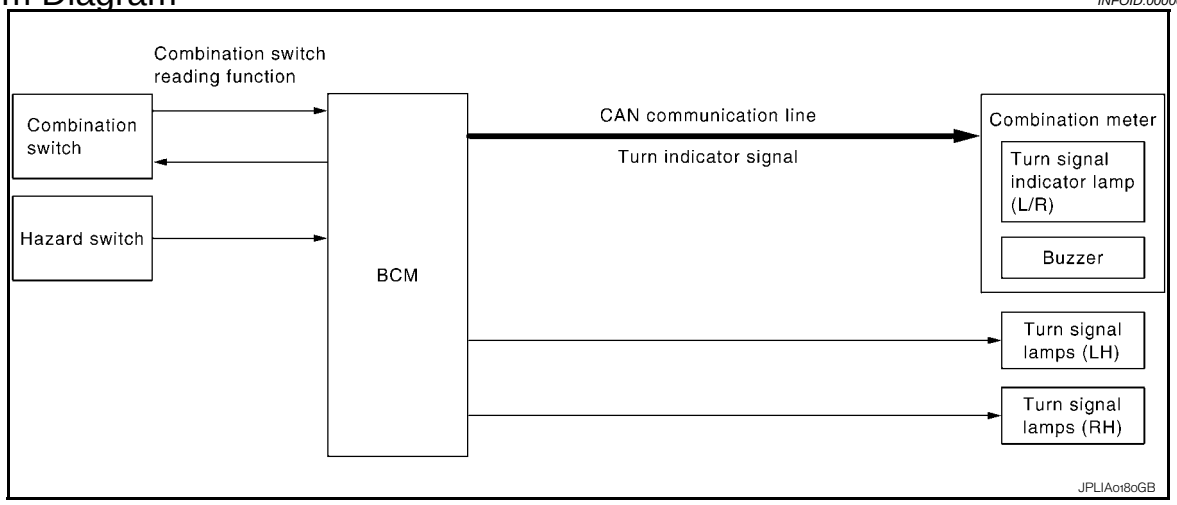
Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Judges the front fog lamp ON/OFF status according to the vehicle condition. - Requests the front fog lamp relay ON to IPDM E/R (with CAN communication). - Requests the front fog lamp indicator lamp ON to the combination meter (with CAN communication).
IPDM E/R	Controls the integrated relay and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Combination meter (Front fog lamp indicator lamp)	Turns the front fog lamp indicator lamp ON according to the request from BCM.

cardiagn.com

TURN SIGNAL AND HAZARD WARNING LAMP SYSTEM

System Diagram

INFOID:0000000001099332



System Description

INFOID:0000000001099333

OUTLINE

Turn signal lamp and the hazard warning lamp is controlled by combination switch reading function and the flasher control function of BCM.

TURN SIGNAL LAMP OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM supplies voltage to the right (left) turn signal lamp circuit when the ignition switch is turned ON and the turn signal switch is in the right (left) position. BCM blinks the turn signal lamp.

HAZARD WARNING LAMP OPERATION

BCM supplies voltage to both turn signal lamp circuit when the hazard switch is turned ON. BCM blinks the hazard warning lamp.

TURN SIGNAL INDICATOR LAMP AND TURN SIGNAL OPERATION

- BCM transmits the turn signal indicator lamp signal to the combination meter with CAN communication while the turn signal lamp and the hazard warning lamp are operating.
- Combination meter outputs the turn signal sound with the integrated buzzer while blinking the turn signal indicator lamp according to the turn signal indicator lamp signal.

3-TIME FLASHER FUNCTION

By a short touch of the turn signal lever, BCM flashes 3 times the turn signal lamps in the selected direction.

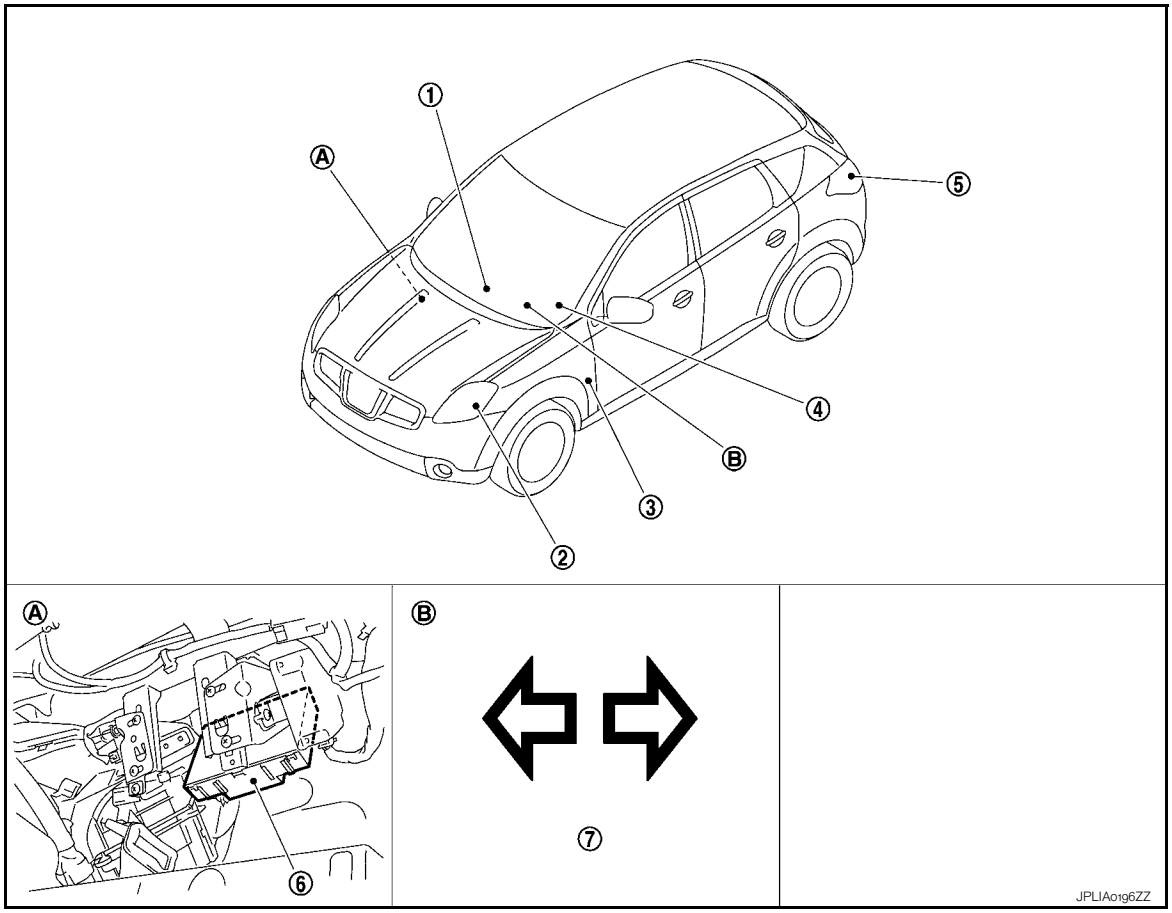
HIGH FLASHER OPERATION (FAIL-SAFE)

- BCM detects the turn signal lamp circuit status from the terminal voltage.
- BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while operating the hazard warning lamp.

Component Parts Location

INFOID:0000000001099334



1. Hazard switch
2. Front turn signal lamp
3. Side turn signal lamp
4. Combination switch
5. Rear turn signal lamp
6. BCM
7. Turn signal indicator lamp

A. Over the glove box
B. On the combination meter

Component Description

INFOID:0000000001099335

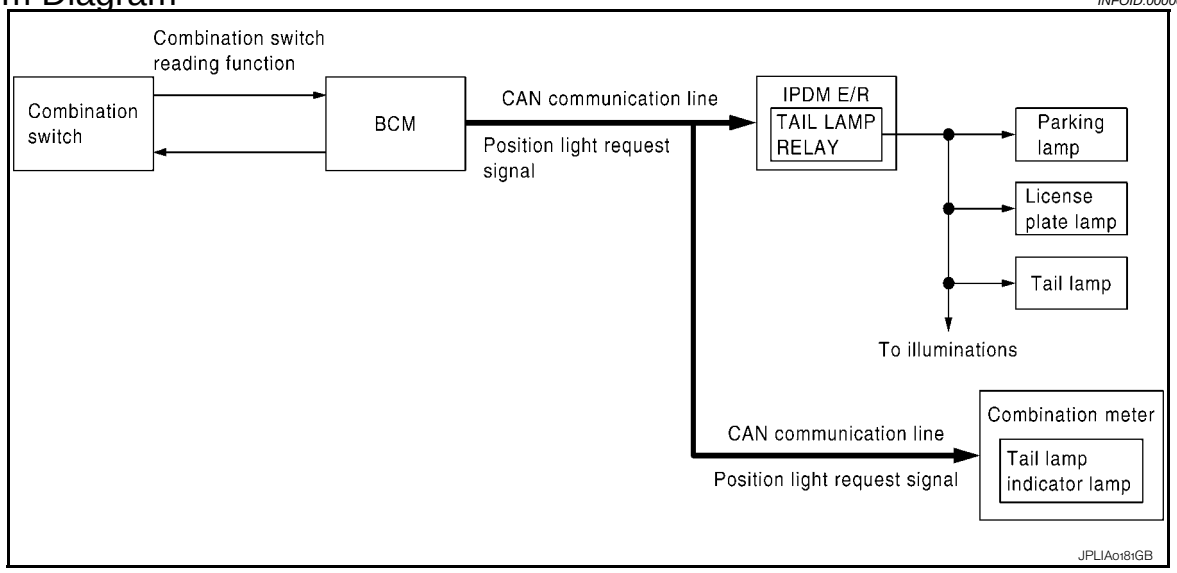
Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Judges the blinks of the turn signal lamp and the hazard warning lamp from each switch status. The applicable turn signal lamp blinks. • Requests the turn signal indicator lamp blink to the combination meter (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Hazard switch	Inputs the hazard switch ON/OFF signal to BCM.
Combination meter (Turn signal indicator lamp & buzzer)	Blinks the turn signal indicator lamp and outputs the turn signal operating sound with integrated buzzer according to the request from BCM (with CAN communication).

cardiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS SYSTEM

System Diagram

INFOID:0000000001099336



System Description

INFOID:0000000001099337

OUTLINE

Parking, license plate and tail lamps are controlled by combination switch reading function and headlamp control function of BCM, and relay control function of IPDM E/R.

PARKING, LICENSE PLATE AND TAIL LAMPS OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM transmits the position light request signal to IPDM E/R and the combination meter with CAN communication according to the ON/OFF condition of the parking, license plate and tail lamps.

Parking, license plate and tail lamps ON condition

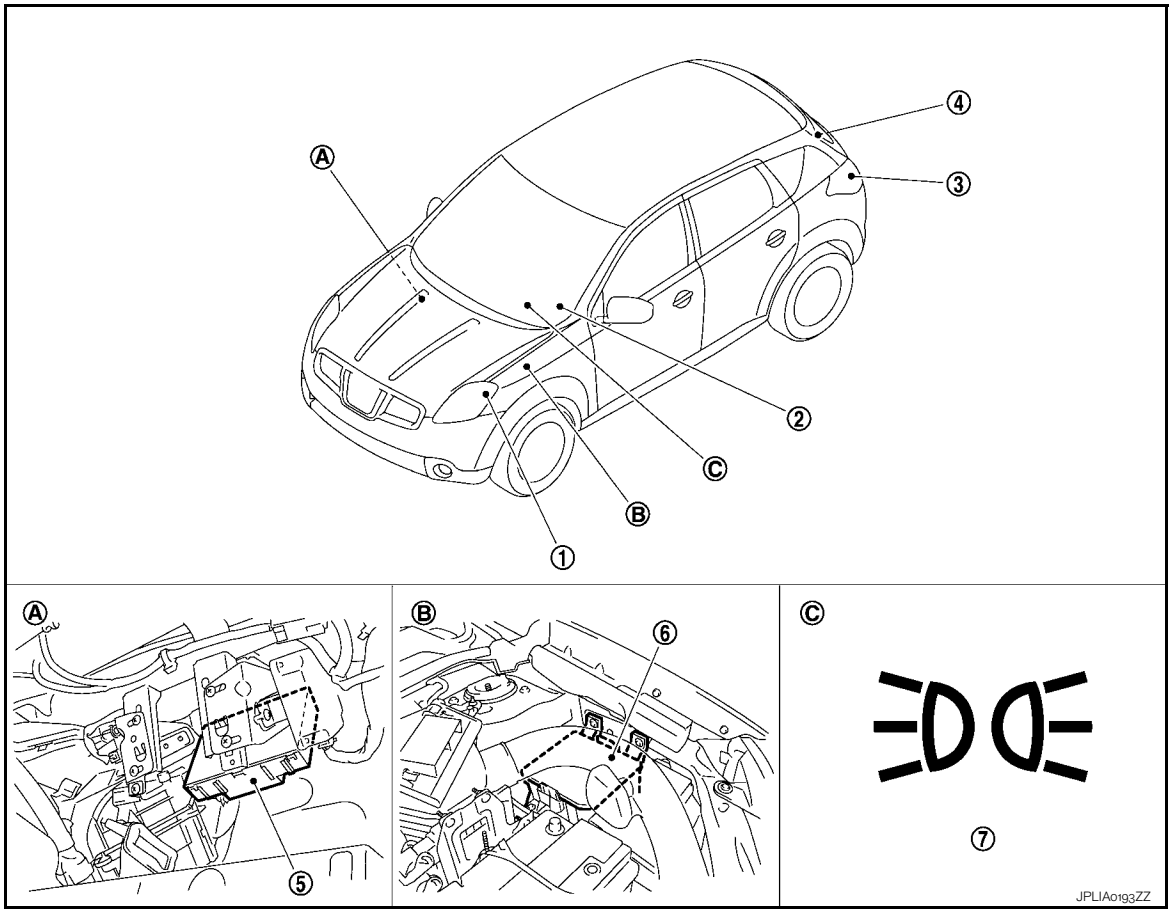
- Lighting switch 1ST
- Lighting switch 2ND
- Lighting switch AUTO, and the auto light function ON judgment (With auto light system)

- IPDM E/R turns the integrated tail lamp relay ON and turns the parking lamp, the license plate and tail lamps ON according to the position light request signal.
- Combination meter turns the tail lamp indicator lamp ON according to the position light request signal.

Component Parts Location

INFOID:0000000001099338

A B C D E F G H I J K EXL M N O P
cardiagn.com



1. Parking lamp
2. Combination switch
3. Tail lamp
4. License plate lamp
5. BCM
6. IPDM E/R
7. Tail lamp indicator lamp
A. Over the glove box
B. Engine room (left side)
C. On the combination meter

Component Description

INFOID:0000000001099339

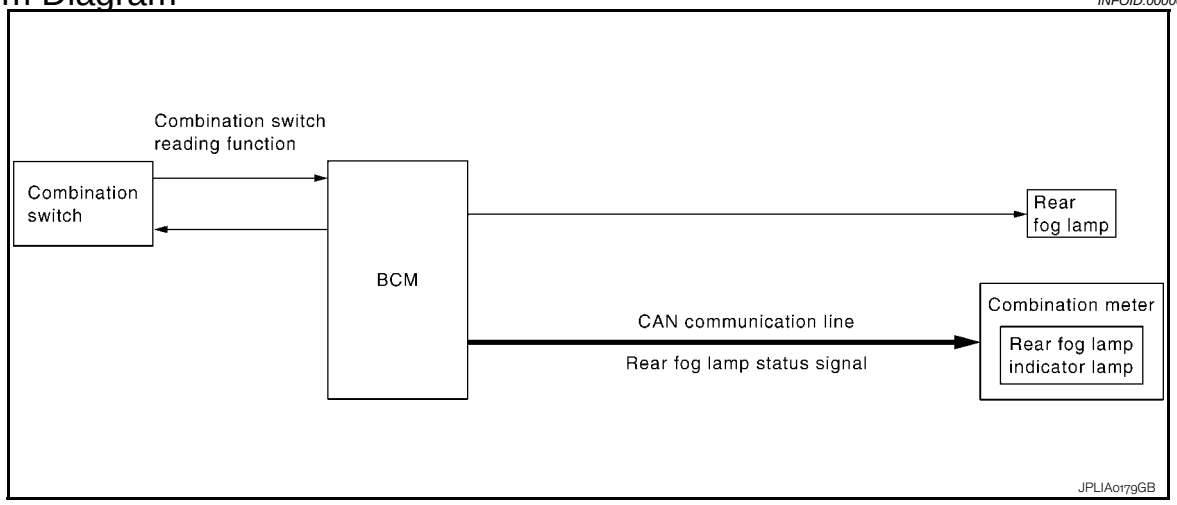
Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Judges the ON/OFF status of the parking, license plate and tail lamps according to the vehicle condition. - Requests the tail lamp relay ON to IPDM E/R (with CAN communication). - Requests the tail lamp indicator lamp ON to the combination meter (with CAN communication).
IPDM E/R	Controls the integrated relay and supplies voltage to the load according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Combination meter (Tail lamp indicator lamp)	Turns the tail lamp indicator lamp ON according to the request from BCM (with CAN communication).

cardiagn.com

REAR FOG LAMP SYSTEM

System Diagram

INFOID:0000000001099341



System Description

INFOID:0000000001099342

OUTLINE

Rear fog lamp is controlled with the combination switch reading function and the rear fog lamp control function of BCM.

REAR FOG LAMP OPERATION

- BCM detects the condition of the combination switch by the combination switch reading function.
- BCM supplies voltage to rear fog lamp according to the rear fog lamp ON condition.

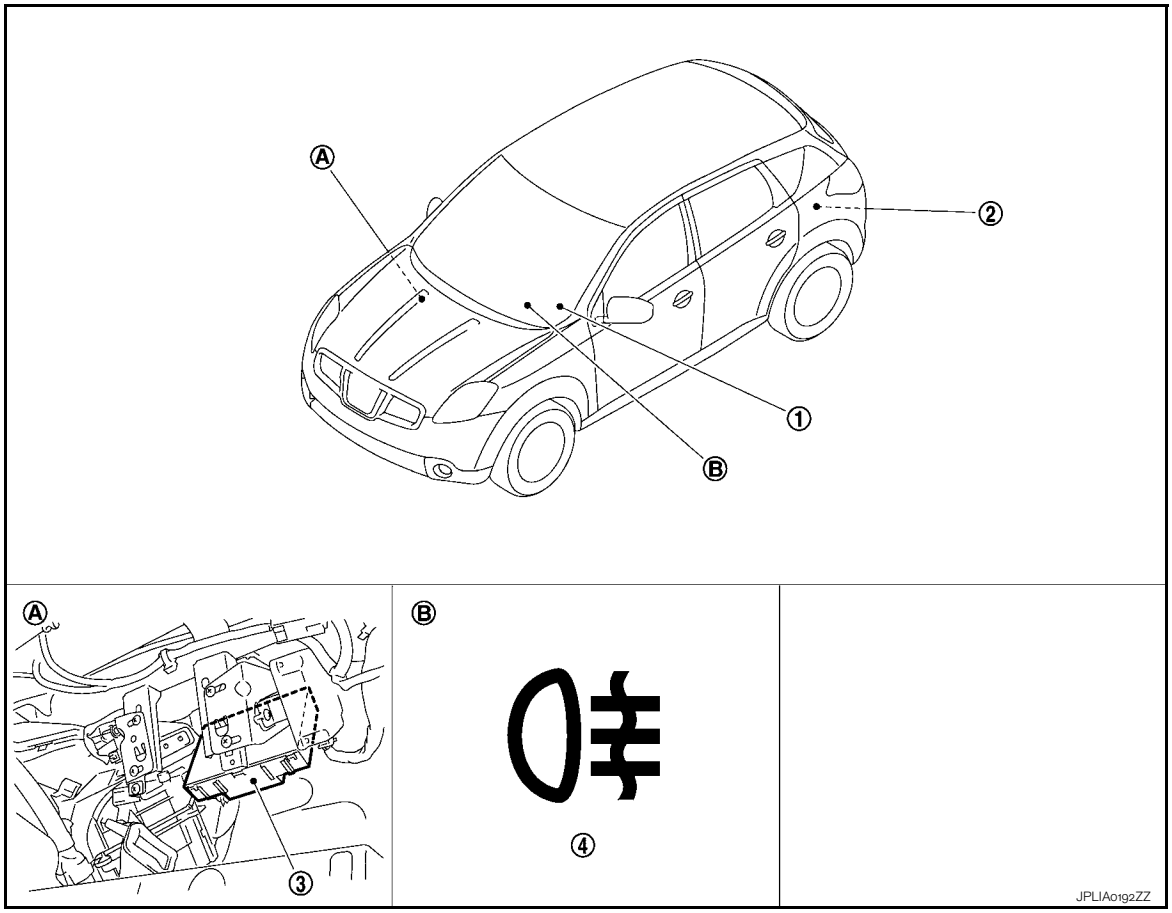
Rear fog lamp ON condition
- Rear fog lamp switch signal is input with front fog lamp ON and rear fog lamp OFF

Rear fog lamp OFF condition
- Rear fog lamp switch signal is input with rear fog lamp ON
- Front fog lamp OFF

- BCM transmits the rear fog lamp status signal to the combination meter with CAN communication.
- Combination meter turns the rear fog lamp indicator lamp ON according to the rear fog lamp status signal.

Component Parts Location

INFOID:0000000001099343



1. Combination switch
2. Rear fog lamp
3. BCM
4. Rear fog lamp indicator lamp
A. Over the glove box
B. On the combination meter

Component Description

INFOID:0000000001099344

Part	Description
BCM	• Detects each switch condition by the combination switch reading function. • Judges that the rear fog lamp is turned ON according to the vehicle status - Supplies voltage to the rear fog lamp - Requests the rear fog lamp indicator lamp ON to the combination meter (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".
Combination meter (Rear fog lamp indicator lamp)	Turns the rear fog lamp indicator lamp ON according to the request from BCM (with CAN communication).

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001116334

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

HEADLAMP

HEADLAMP : CONSULT-III Function (BCM - HEAD LAMP)

INFOID:0000000001099346

WORK SUPPORT

carDiag.com

Service item	Setting item	Setting	
HEAD LIGHT TIMER	MODE 1	10 sec.	Sets follow me home function activating time.
	MODE 2*	30 sec.	

*: Initial setting

DATA MONITOR

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judged from IGN signal (ignition power supply)
ACC SW [ON/OFF]	Ignition switch (ACC) status judged from ACC signal (ACC power supply)
HI BEAM SW [ON/OFF]	Each switch status that BCM judges from the combination switch reading function
HEAD LAMP SW1 [ON/OFF]	
HEAD LAMP SW2 [ON/OFF]	
TAIL LAMP SW [ON/OFF]	
AUTO LIGHT SW [ON/OFF]	
PASSING SW [ON/OFF]	
FR FOG SW [ON/OFF]	
RR FOG SW [ON/OFF]	
DOOR SW-DR [ON/OFF]	The switch status input from front door switch (driver side)
DOOR SW-AS [ON/OFF]	The switch status input from front door switch (passenger side)
DOOR SW-RR [ON/OFF]	The switch status input from rear door switch RH
DOOR SW- RL [ON/OFF]	The switch status input from rear door switch LH
BACK DOOR SW [ON/OFF]	The switch status input from back door switch
TURN SIGNAL R [ON/OFF]	Each switch status that BCM judges from the combination switch reading function
TURN SIGNAL L [ON/OFF]	
ENGINE RUNNING [ON/OFF]	The engine status received from ECM with CAN communication
PUSH SW [ON/OFF]	Push switch status received from Intelligent Key unit by CAN communication
LIT-SEN FAIL [OK/NOTOK]	• The sensor status received from light & rain sensor with serial link • The serial link condition that BCM judges
AUT LIGHT SYS [ON/OFF]	Auto light system status that BCM judges from the vehicle condition

ACTIVE TEST

cardiagn.com

Test item	Operation	Description
TAIL LAMP	ON	Transmits the position light request signal to IPDM E/R with CAN communication to turn the tail lamp ON.
	OFF	Stops the tail lamp request signal transmission.
HEAD LAMP	HI	Transmits the high beam request signal with CAN communication to turn the headlamp (HI).
	LO	Transmits the low beam request signal with CAN communication to turn the headlamp (LO).
	OFF	Stops the high & low beam request signal transmission.
FR FOG LAMP	ON	Transmits the front fog lights request signal to IPDM E/R with CAN communication to turn the front fog lamp ON.
	OFF	Stops the front fog lights request signal transmission.
RR FOG LAMP	ON	• Outputs the voltage to turn the rear fog lamp ON. • Transmits the rear fog lamp status signal to the combination meter with CAN communication to turn the rear fog lamp indicator lamp ON.
	OFF	• Stops the voltage to turn the rear fog lamp OFF. • Stops the rear fog lamp status signal transmission.
DAYTIME RUNNING LIGHT	ON	Transmits the day time running light request signal to IPDM E/R with CAN communication to turn the each lamps ON.
	OFF	Stops the day time running light request signal transmission.

FLASHER

FLASHER : CONSULT-III Function (BCM - FLASHER)

INFOID:0000000001099347

DATA MONITOR

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judged from IGN signal (ignition power supply)
HAZARD SW [ON/OFF]	The switch status input from the hazard switch
TURN SIGNAL R [ON/OFF]	Each switch condition that BCM judges from the combination switch reading function
TURN SIGNAL L [ON/OFF]	

ACTIVE TEST

Test item	Operation	Description
FLASHER	RH	Outputs the voltage to turn the right side turn signal lamps ON.
	LH	Outputs the voltage to turn the left side turn signal lamps ON.
	OFF	Stops the voltage to turn the turn signal lamps OFF.

DIAGNOSIS SYSTEM (IPDM E/R)

Diagnosis Description

INFOID:0000000001099348

Auto active test

Description

In auto active test mode, the IPDM E/R sends a drive signal to the following systems to check their operation.

- Oil pressure warning lamp
- Rear window defogger
- Front wiper (LO, HI)
- Parking lamps
- License plate lamps
- Tail lamps
- Front fog lamps
- Headlamps (LO, HI)
- A/C compressor (magnet clutch)
- Cooling fan (LO, HI)

Operation procedure

1. Close the hood and lift the wiper arms from the windshield. (Prevent windshield damage due to wiper operation)
   NOTE:
   When auto active test is performed with hood opened, sprinkle water on windshield beforehand.
2. Turn ignition switch OFF.
3. Turn the ignition switch ON, and within 20 seconds, press the driver door switch 10 times. Then turn the ignition switch OFF.
   CAUTION:
   Close passenger door.
4. Turn the ignition switch ON within 10 seconds. Then the horn sounds once and the auto active test starts.
5. The oil pressure warning lamp starts blinking when the auto active test starts.
6. After a series of the following operations is repeated 3 times, auto active test is completed.

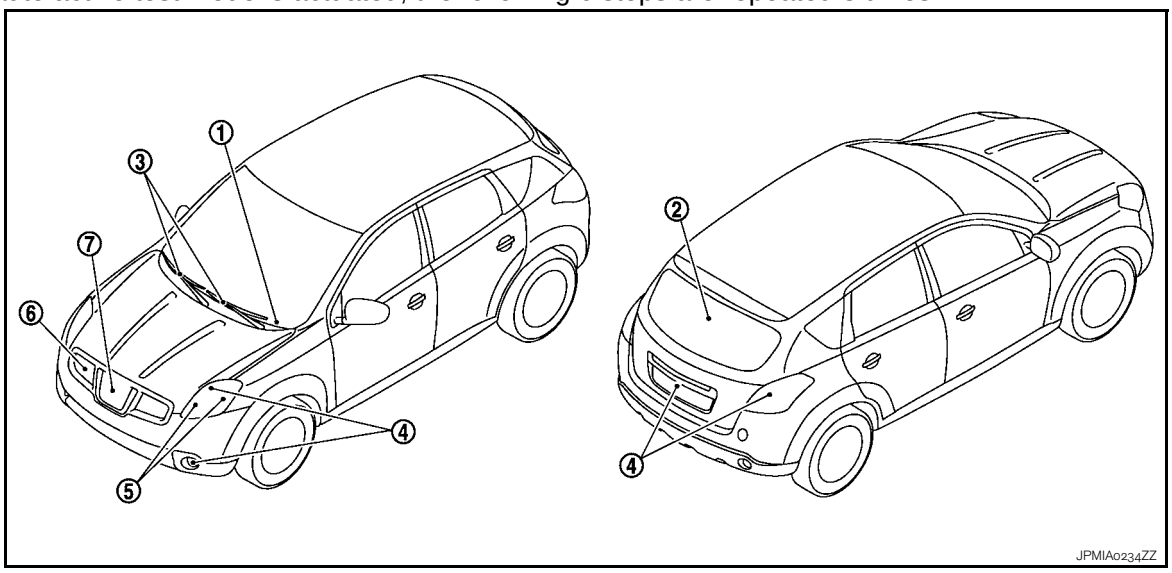
NOTE:
When auto active test mode has to be cancelled halfway through test, turn ignition switch OFF.

CAUTION:

- **If auto active test mode cannot be actuated, check door switch system.**
- **Never start the engine.**

Inspection in auto active test mode

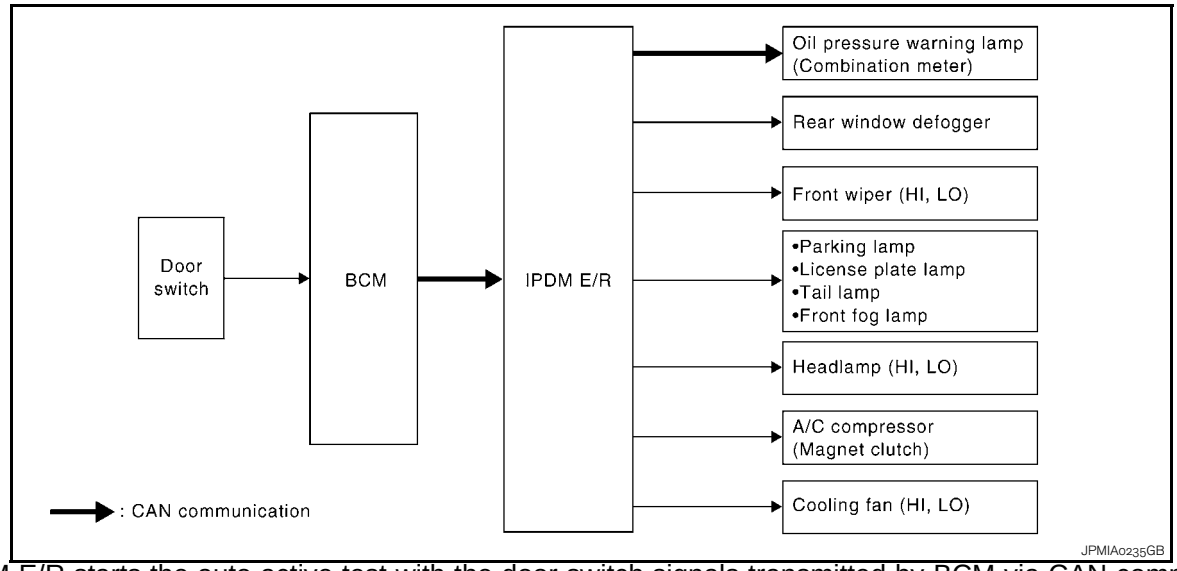
When auto active test mode is actuated, the following 6 steps are repeated 3 times.



cardiagn.com

Operation sequence	Inspection location	Operation
1	Oil pressure warning lamp	Blinks continuously during operation of auto active test.
2	Rear window defogger	10 seconds
3	Front wiper	LO for 5 seconds → HI for 5 seconds
4	• Parking lamps • License plate lamps • Tail lamps • Front fog lamps	10 seconds
5	Headlamps	LO ⇔ HI 5 times
6	A/C compressor (magnet clutch)	ON ⇔ OFF 5 times
7	Cooling fan	LO for 5 seconds → HI for 5 seconds

Concept of auto active test



- IPDM E/R starts the auto active test with the door switch signals transmitted by BCM via CAN communication. Therefore, the CAN communication line between IPDM E/R and BCM is considered normal if the auto active test starts successfully.
- The auto active test facilitates troubleshooting if any systems controlled by IPDM E/R cannot be operated.

Diagnosis chart in auto active test mode

Symptom	Inspection contents		Possible cause
Rear window defogger does not operate	Perform auto active test. Does the rear window defogger operate?	YES	BCM signal input circuit
		NO	• Rear window defogger • Rear window defogger ground circuit • Harness or connector between IPDM E/R and rear window defogger • IPDM E/R
Any of the following components do not operate • Parking lamps • License plate lamps • Tail lamps • Front fog lamps • Headlamp (HI, LO) • Front wiper (HI, LO)	Perform auto active test. Does the applicable system operate?	YES	BCM signal input circuit
		NO	• Lamp or motor • Lamp or motor ground circuit • Harness or connector between IPDM E/R and applicable system • IPDM E/R

cardiagn.com

Symptom	Inspection contents		Possible cause
A/C compressor does not operate	Perform auto active test. Does the magnet clutch operate?	YES	• Communication signal between BCM and auto amp. (with auto A/C) • Communication signal between BCM and heater control panel (without auto A/C, with manual A/C) • BCM • CAN communication signal between BCM and ECM • CAN communication signal between ECM and IPDM E/R
		NO	• Magnet clutch • Harness or connector between IPDM E/R and magnet clutch • IPDM E/R
Oil pressure warning lamp does not operate	Perform auto active test. Does the oil pressure warning lamp blink?	YES	• Harness or connector between IPDM E/R and oil pressure switch • Oil pressure switch • IPDM E/R
		NO	• CAN communication signal between IPDM E/R and BCM • CAN communication signal between BCM and combination meter • Combination meter
Cooling fan does not operate	Perform auto active test. Does the cooling fan operate?	YES	• ECM signal input circuit • CAN communication signal between ECM and IPDM E/R
		NO	• Cooling fan • Cooling fan ground circuit • Harness or connector between IPDM E/R and cooling fan • IPDM E/R • Cooling fan relay-3* • Harness or connector between IPDM E/R and cooling fan relay-3* • Harness or connector between cooling fan and cooling fan relay-3*

NOTE:

*: MR engine and K9K engine models

CONSULT - III Function (IPDM E/R)

INFOID:0000000001099349

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with IPDM E/R.

Diagnosis mode	Description
Ecu Identification	Allows confirmation of IPDM E/R part number.
Self Diagnostic Result	Displays the diagnosis results judged by IPDM E/R.
Data Monitor	Displays the real-time input/output data from IPDM E/R input/output data.
Active Test	IPDM E/R can provide a drive signal to electronic components to check their operations.
CAN Diag Support Monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF DIAGNOSTIC

Refer to EXL-310, "DTC Index".

DATA MONITOR

Monitor item

cardiagn.com

Monitor Item [Unit]	MAIN SIGNALS	Description
MOTOR FAN REQ [1 - 4]	×	Displays the value of the cooling fan speed signal received from ECM via CAN communication.
AC COMP REQ [Off/On]	×	Displays the status of the A/C compressor request signal received from ECM via CAN communication.
TAIL&CLR REQ [Off/On]	×	Displays the status of the position light request signal received from BCM via CAN communication.
HL LO REQ [Off/On]	×	Displays the status of the low beam request signal received from BCM via CAN communication.
HL HI REQ [Off/On]	×	Displays the status of the high beam request signal received from BCM via CAN communication.
FR FOG REQ [Off/On]	×	Displays the status of the front fog light request signal received from BCM via CAN communication.
HL WASHER REQ [Off/On]		Displays the status of the headlamp washer request signal received from BCM via CAN communication.
FR WIP REQ [Stop/1LOW/Low/Hi]	×	Displays the status of the front wiper request signal received from BCM via CAN communication.
WIP AUTO STOP [STOP P/ACT P]	×	Displays the status of the front wiper auto stop signal judged by IPDM E/R.
WIP PROT [Off/BLOCK]	×	Displays the status of the front wiper fail-safe operation judged by IPDM E/R.
ST RLY REQ [Off/On]		Displays the status of the ignition and starter request signal received from BCM via CAN communication.
IGN RLY [Off/On]	×	Displays the status of the ignition relay judged by IPDM E/R.
RR DEF REQ [Off/On]	×	Displays the status of the rear defogger request signal received from BCM via CAN communication.
OIL P SW [Open/Close]		Displays the status of the oil pressure switch judged by IPDM E/R.
REV SW [Off/On]		Displays the status of the reverse switch judged by IPDM E/R.
HOOD SW [Off/On]		Displays the status of the hood switch judged by IPDM E/R. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
THFT HRN REQ [Off/On]		Displays the status of the theft warning horn request signal received from BCM via CAN communication. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
HORN CHIRP [Off/On]		**NOTE:** This item is indicated, but not monitored.
IGN ON SW [Off/On]		Displays the status of the ignition switch judged by IPDM E/R.

ACTIVE TEST

Test item

Test item	Operation	Description
REAR DEFOGGER	Off	OFF
	On	Operates the rear window defogger relay.
FRONT WIPER	Off	OFF
	Lo	Operates the front wiper relay.
	Hi	Operates the front wiper relay and front wiper high relay.

carDiag.com

Test item	Operation	Description
MOTOR FAN	1	OFF
	2	Operates the cooling fan relay (low operation).
	3	Operates the cooling fan relay (high operation).
	4	
HEAD LAMP WASHER	On	Operates the headlamp washer relay for 1 second.
EXTERNAL LAMPS	Off	OFF
	TAIL	Operates the tail lamp relay.
	Lo	Operates the headlamp low relay.
	Hi	Operates the headlamp low relay and ON/OFF the headlamp high relay at 1 second intervals.
	Fog	Operates the front fog lamp relay.
HORN	On	Operates horn relay for 20 ms.

cardiagn.com

COMPONENT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

BCM (BODY CONTROL MODULE)

BCM (BODY CONTROL MODULE) : Diagnosis Procedure

INFOID:0000000001099350

1.CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not fusing.

Terminal No.	Signal name	Fuses and fusible link No.
41	Battery power supply	9
57		J
37	ACC power supply	5
38	Ignition power supply	4

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)			
BCM			OFF	ACC	ON
Connector	Terminal				
M65	37	Ground	Approx. 0 V	Battery voltage	Battery voltage
	38		Approx. 0 V	Approx. 0 V	Battery voltage
M66	41		Battery voltage	Battery voltage	Battery voltage
M67	57				

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) : Di-

carDiag.com

agnosis Procedure

INFOID:0000000001099351

1.CHECK FUSIBLE LINK

Check that the following IPDM E/R fusible link is not blown.

Terminal No.	Signal name	Fusible link No.
1	Battery power supply	E
2		C
53		L (except HR engine models)
		M (HR engine models)

Is the fusible link fusing?

YES >> Replace the blown fusible link after repairing the affected circuit if a fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check voltage between IPDM E/R harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
IPDM E/R			
Connector	Terminal	Ground	
E9	1		Battery voltage
	2		
E14	53		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

1. Disconnect IPDM E/R connectors.
2. Check continuity between IPDM E/R harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E10	5		Exist
	6		

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

cardiagn.com

EXTERIOR LAMP FUSE

Description

INFOID:0000000001099352

Fuse list

Unit		Location	Fuse No.	Capacity
Headlamp HI (LH)		IPDM E/R	#48	10 A
Headlamp HI (RH)		IPDM E/R	#47	10 A
Headlamp LO (LH)		IPDM E/R	#46	15 A
Headlamp LO (RH)		IPDM E/R	#45	15 A
Front fog lamp		IPDM E/R	#43	15 A
• Parking lamp • Tail lamp • License plate lamp • Each illumination		IPDM E/R	#49	10 A
Stop lamp		FUSE BLOCK (J/B)	#11	10 A
Back-up lamp	M/T models	IPDM E/R	#54	10 A
	CVT models	IPDM E/R	#55	10 A

Diagnosis Procedure

INFOID:0000000001099353

1.CHECK FUSE

Check that the following fuses are not fusing.

Unit		Location	Fuse No.	Capacity
Headlamp HI (LH)		IPDM E/R	#48	10 A
Headlamp HI (RH)		IPDM E/R	#47	10 A
Headlamp LO (LH)		IPDM E/R	#46	15 A
Headlamp LO (RH)		IPDM E/R	#45	15 A
Front fog lamp		IPDM E/R	#43	15 A
• Parking lamp • Tail lamp • License plate lamp • Each illumination		IPDM E/R	#49	10 A
Stop lamp		FUSE BLOCK (J/B)	#11	10 A
Back-up lamp	M/T models	IPDM E/R	#54	10 A
	CVT models	IPDM E/R	#55	10 A

Is the fuse fusing?

YES >> Repair the applicable circuit. And then replace the fuse.
NO >> The fuse is normal.

carDiagn.com

HEADLAMP (HI) CIRCUIT

Component Function Check

INFOID:0000000001099354

1.CHECK HEADLAMP (HI) OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Start IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the headlamp switches to the high beam.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the headlamp (HI) is turned ON.

HI : Headlamp (HI) ON
OFF : Headlamp (HI) OFF

NOTE:
ON/OFF is repeated 1 second each.

Is the headlamp (HI) turned ON?

YES >> Headlamp (HI) circuit is normal.
NO >> Refer to EXL-216, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099355

1.CHECK HEADLAMP (HI) OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Turn the ignition switch OFF.
2. Disconnect the front combination lamp connector.
3. Turn the ignition switch ON.
4. Select "EXTERNAL LAMP" of IPDM E/R active test item.
5. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals				Condition	Voltage (Approx.)
(+)			(–)		
IPDM E/R			Ground	External lamp	
Connector		Terminal			
RH	E13	45		HI	Battery voltage
LH		46		OFF	0 V

Is the measurement value normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEADLAMP (HI) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between the IPDM E/R harness connector and the front combination lamp harness connector.

IPDM E/R			Front combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	45	E45	2	Existed
LH		46	E26	2	

Does continuity exist?

cardiagn.com

YES >> Replace the front combination lamp.
NO >> Repair the harnesses or connectors.

3. CHECK HEADLAMP (HI) FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
Headlamp HI (LH)	IPDM E/R	#48	10 A
Headlamp HI (RH)	IPDM E/R	#47	10 A

Is the fuse fusing?

YES >> GO TO 4.
NO >> Replace IPDM E/R.

4. CHECK FRONT COMBINATION LAMP (HI) SHORT CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check continuity between the IPDM E/R harness connector terminal and the ground.

IPDM E/R			Ground	Continuity
Connector		Terminal		
RH	E13	45		Not existed
LH		46		

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if the fuse is fusing again.)

cardiagn.com

HEADLAMP (LO) CIRCUIT

Component Function Check

INFOID:0000000001099356

1.CHECK HEADLAMP (LO) OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Start IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the headlamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the headlamp (LO) is turned ON.

LO : Headlamp (LO) ON
OFF : Headlamp (LO) OFF

Is the headlamp (LO) turned ON?

YES >> Headlamp (LO) is normal.
NO >> Refer to EXL-218, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001097284

1.CHECK HEADLAMP (LO) OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Turn the ignition switch OFF.
2. Disconnect the front combination lamp connector.
3. Turn the ignition switch ON.
4. Select "EXTERNAL LAMP" of IPDM E/R active test item.
5. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals				Test item	Voltage (Approx.)
(+)			(–)		
IPDM E/R			Ground	External lamp	
Connector		Terminal			
RH	E12	24		LO	Battery voltage
LH	E13	44		OFF	0 V

Is the measurement value normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HEADLAMP (LO) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between the IPDM E/R harness connector and the front combination lamp harness connector.

IPDM E/R			Front combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E12	24	E45	1	Existed
LH	E13	44	E26	1	

Does continuity exist?

YES >> Replace the front combination lamp (headlamp housing assembly).
NO >> Repair the harnesses or connectors.

cardiagn.com

3.CHECK HEADLAMP (LO) FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Lotion	Fuse No.	Capacity
Headlamp LO (LH)	IPDM E/R	#45	15 A
Headlamp LO (RH)	IPDM E/R	#46	15 A

Is the fuse fusing?

YES >> GO TO 4.
NO >> Replace IPDM E/R.

4.CHECK HEADLAMP (LO) SHORT CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check continuity between the IPDM E/R harness connector and the ground.

IPDM E/R			Ground	Continuity
Connector		Terminal		
RH	E12	24		Not existed
LH	E13	44		

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if the fuse is fusing again.)

cardiagn.com

HEADLAMP GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000001099357

1.CHECK HEADLAMP GROUND OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect the front combination lamp connector.
3. Check continuity between the front combination lamp harness connector and the ground.

Front combination lamp			Ground	Continuity
Connector		Terminal		
RH	E45	4		Existed
LH	E26	4		

Does continuity exist?

YES >> Headlamp ground circuit is normal.
NO >> Repair the harnesses or connectors.

cardiagn.com

FRONT FOG LAMP CIRCUIT

Component Function Check

INFOID:0000000001099358

1.CHECK FRONT FOG LAMP OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Activate IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the front fog lamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the front fog lamp is turned ON.

FOG : Front fog lamp ON
OFF : Front fog lamp OFF

Is the front fog lamp turned ON?

YES >> Front fog lamp circuit is normal.
NO >> Refer to EXL-221, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099359

1.CHECK FRONT FOG LAMP FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
Front fog lamp	IPDM E/R	#43	15 A

Is the fuse fusing?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK FRONT FOG LAMP SHORT CIRCUIT

1. Disconnect IPDM E/R connector and the front combination lamp connector.
2. Check continuity between the IPDM E/R harness connector and the ground.

IPDM E/R			Ground	Continuity
Connector		Terminal		
RH	E13	36		Not existed
LH		43		

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if the fuse is fusing again.)

3.CHECK FRONT FOG LAMP BULB

Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 4.
NO >> Replace the bulb.

4.CHECK FRONT FOG LAMP OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Disconnect the front combination lamp connector.
2. Turn the ignition switch ON.
3. Select "EXTERNAL LAMP" of IPDM E/R active test item.

cardiagn.com

4. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals				Test item	Voltage (Approx.)
(+)			(–)		
IPDM E/R			Ground	EXTERNAL LAMP	
Connector		Terminal			
RH	E13	36		FOG	Battery voltage
LH		43		OFF	0 V

Is the measurement value normal?

YES >> GO TO 5.
NO >> Replace IPDM E/R.

5.CHECK FRONT FOG LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between the IPDM E/R harness connector and the front combination lamp harness connector.

IPDM E/R			Front combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	36	E48	1	Existed
LH		43	E30	1	

Does continuity exist?

YES >> GO TO 6.
NO >> Repair the harnesses or connectors.

6.CHECK FRONT FOG LAMP GROUND CIRCUIT OPEN CIRCUIT

Check continuity between the front combination lamp harness connector and the ground.

Front combination lamp			Ground	Continuity
Connector		Terminal		
RH	E48	2		Existed
LH	E30	2		

Does continuity exist?

YES >> Replace the front fog lamp.
NO >> Repair the harnesses or connectors.

cardiagn.com

PARKING LAMP CIRCUIT

Component Function Check

INFOID:0000000001099360

1.CHECK PARKING LAMP OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Activate IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the parking lamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the parking lamp is turned ON.

TAIL : Parking lamp ON
OFF : Parking lamp OFF

Is the parking lamp turned ON?

YES >> Parking lamp circuit is normal.
NO >> Refer to EXL-223, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099361

1.CHECK PARKING LAMP FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
Parking lamp	IPDM E/R	#49	10 A

Is the fuse fusing?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK PARKING LAMP SHORT CIRCUIT

1. Disconnect IPDM E/R connector and the front combination lamp connector.
2. Check continuity between the IPDM E/R harness connector and the ground.

IPDM E/R			Ground	Continuity
Connector		Terminal		
RH	E13	37		Not existed
LH		47		

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if fusing is found again.)

3.CHECK PARKING LAMP BULB

Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 4.
NO >> Replace the bulb.

4.CHECK PARKING LAMP OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Disconnect the front combination lamp connector.
2. Turn the ignition switch ON.
3. Select "EXTERNAL LAMP" of IPDM E/R active test item.

cardiagn.com

4. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals				Test item	Voltage (Approx.)
(+)			(–)		
IPDM E/R			Ground	EXTERNAL LAMP	
Connector		Terminal			
RH	E13	37		TAIL	Battery voltage
LH		47		OFF	0 V

Is the measurement value normal?

YES >> GO TO 5.
NO >> Replace IPDM E/R.

5.CHECK PARKING LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between the IPDM E/R harness connector and the front combination lamp harness connector.

IPDM E/R			Front combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	37	E43	1	Existed
LH		47	E24	1	

Does continuity exist?

YES >> GO TO 6.
NO >> Repair the harnesses or connectors.

6.CHECK PARKING LAMP GROUND OPEN CIRCUIT

Check continuity between the front combination lamp harness connector and the ground.

Front combination lamp			Ground	Continuity
Connector		Terminal		
RH	E43	2		Existed
LH	E24	2		

Does continuity exist?

YES >> Replace the front combination lamp.
NO >> Repair the harnesses or connectors.

cardiagn.com

TURN SIGNAL LAMP CIRCUIT

Description

INFOID:0000000001099362

BCM performs the high flasher operation (fail-safe) if any bulb or harness of the turn signal lamp circuit is open.

NOTE:
The turn signal lamp blinks at normal speed when using the hazard warning lamp.

Component Function Check

INFOID:0000000001099363

1.CHECK TURN SIGNAL LAMP

CONSULT-III ACTIVE TEST

1. Select "FLASHER" of BCM (FLASHER) active test item.
2. With operating the test items, check that the turn signal lamp is turned ON.

LH : Turn signal lamp (LH) ON
RH : Turn signal lamp (RH) OFF
OFF : The turn signal lamp OFF

Are the turn signal lamps turned ON?

YES >> Turn signal lamp circuit is normal.
NO >> Refer to EXL-225, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001089304

1.CHECK TURN SIGNAL LAMP BULB

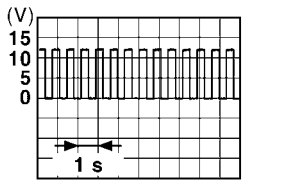
Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 2.
NO >> Replace the bulb.

2.CHECK TURN SIGNAL LAMP OUTPUT VOLTAGE

1. Turn the ignition switch OFF.
2. Disconnect the front combination lamp connector, side turn signal lamp connector, or the rear combination lamp connector.
3. Turn the ignition switch ON.
4. With operating the turn signal switch, check the voltage between the BCM harness connector and the ground.

Terminals				Condition	Voltage (Approx.)
(+)			(–)		
BCM				Turn signal switch	
Connector		Terminal			
RH	M66	48	Ground	LH or RH	
LH		47			
				OFF	0 V

Is the measurement value normal?

YES >> GO TO 3.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

carDiagn.com

3.CHECK TURN SIGNAL LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between the BCM harness connector and the front combination lamp, side turn signal lamp or the rear combination lamp harness connector.

Front turn signal lamp

BCM			Front combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	M66	48	E45	3	Existed
LH		47	E26		

Side turn signal lamp

BCM			Side turn signal lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	M66	48	E40	1	Existed
LH		47	E23		

Rear turn signal lamp

BCM			Rear combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	M66	48	B59	1	Existed
LH		47	B80		

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

4.CHECK TURN SIGNAL LAMP SHORT CIRCUIT

Check continuity between the BCM harness connector and the ground.

BCM			Ground	Continuity
Connector		Terminal		
RH	M66	48		Not existed
LH		47		

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> GO TO 5.

5.CHECK TURN SIGNAL LAMP GROUND OPEN CIRCUIT

Check continuity between the BCM harness connector and the front combination lamp, side turn signal lamp or the rear combination lamp and the ground.

Front turn signal lamp

Front combination lamp			Ground	Continuity
Connector		Terminal		
RH	E45	4		Existed
LH	E26			

Side turn signal lamp

Side turn signal lamp			Ground	Continuity
Connector		Terminal		
RH	E40	2		Existed
LH	E23			

cardiagn.com

Rear turn signal lamp

Rear combination lamp			Ground	Continuity
Connector		Terminal		
RH	B59	4		Existed
LH	B80			

Does continuity exist?

YES >> Replace the front combination lamp, the side turn signal lamp or the rear combination lamp.
NO >> Repair the harnesses or connectors.

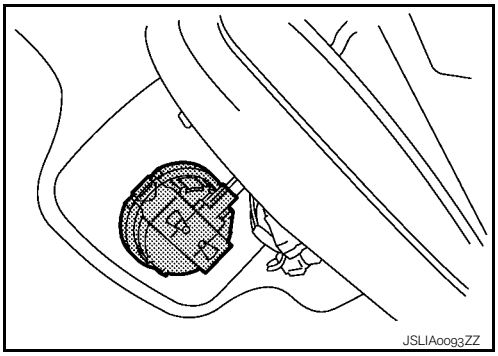
carDiagn.com

LIGHT & RAIN SENSOR

Description

INFOID:0000000001099364

- The light & rain sensor detects the outside brightness (lux), a rain-drop and sensor conditions. And it transmits the signals to BCM by the light & rain sensor serial link.
- BCM controls each function depending on the signals. And it detects the light & rain sensor serial link error and the light & rain sensor malfunction.



Component Function Check

INFOID:0000000001099365

1.CHECK LIGHT & RAIN SENSOR BY CONSULT-III

CONSULT-III DATA MONITOR
1. Turn the ignition switch ON.
2. Select "LIT-SEN FAIL" of BCM (HEADLAMP) data monitor item.
3. Turn the lighting switch AUTO.
4. Start the engine.
5. Check the monitor status.

Monitor item	Condition	Status
LIT-SEN FAIL	Light & rain sensor is normal	OK
	• Light & rain sensor inside abnormality • Light & rain sensor serial link error	NOTOK

Is it displayed with "OK"?

YES >> Light & rain sensor is normal.
NO >> Refer to EXL-228, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099366

1.CHECK LIGHT & RAIN SENSOR POWER SUPPLY OUTPUT

1. Turn the ignition switch OFF.
2. Disconnect the light & rain sensor connector.
3. Check the voltage between the light & rain sensor harness connector and the ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Light & rain sensor		Ground	
Connector	Terminal		
R13	1		12 V

Is the measurement value normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK LIGHT & RAIN SENSOR SIGNAL OUTPUT

Check the voltage between the light & rain sensor harness connector and the ground.

cardiagn.com

Terminals			Voltage (Approx.)
(+)		(–)	
Light & rain sensor		Ground	
Connector	Terminal		
R13	2		12 V

Is the measurement value normal?

YES >> GO TO 7.
NO >> GO TO 5.

3. CHECK LIGHT & RAIN SENSOR POWER SUPPLY OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between the light & rain sensor harness connector and the BCM harness connector.

Light & rain sensor		BCM		Continuity
Connector	Terminal	Connector	Terminal	
R13	1	M66	42	Existed

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

4. CHECK LIGHT & RAIN SENSOR POWER SUPPLY SHORT CIRCUIT

Check the continuity between the light & rain sensor harness connector and the ground.

Light & rain sensor		Ground	Continuity
Connector	Terminal		
R13	1		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5. CHECK LIGHT & RAIN SENSOR SIGNAL OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between the light & rain sensor harness connector and the BCM harness connector.

Light & rain sensor		BCM		Continuity
Connector	Terminal	Connector	Terminal	
R13	2	M66	17	Existed

Does continuity exist?

YES >> GO TO 6.
NO >> Repair the harnesses or connectors.

6. CHECK LIGHT & RAIN SENSOR SIGNAL SHORT CIRCUIT

Check the continuity between the light & rain sensor harness connector and the ground.

Light & rain sensor		Ground	Continuity
Connector	Terminal		
R13	2		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

cardiagn.com

7.CHECK LIGHT & RAIN SENSOR GROUND OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Check continuity between the light & rain sensor harness connector and the ground.

Light & rain sensor		Ground	Continuity
Connector	Terminal		
R13	3		Existed

Does continuity exist?

YES >> Replace the light & rain sensor.
NO >> Repair the harnesses or connectors.

cardiagn.com

HAZARD SWITCH

Component Function Check

INFOID:0000000001099367

1.CHECK HAZARD SWITCH SIGNAL BY CONSULT-III

CONSULT-III DATA MONITOR
1. Turn the ignition switch ON.
2. Select "HAZARD SW" of BCM (FLASHER) data monitor item.
3. With operating the hazard switch, check the monitor status.

Monitor item	Condition		Monitor status
HAZARD SW	Hazard switch	ON	ON
		OFF	OFF

Is the item status normal?

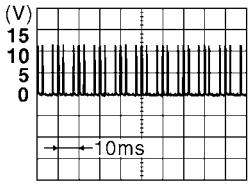
YES >> Hazard switch circuit is normal.
NO >> Refer to EXL-231, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099368

1.CHECK HAZARD SWITCH SIGNAL INPUT

With operating the hazard switch, check the voltage between the BCM harness connector and the ground.

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
BCM			Hazard switch	
Connector	Terminal			
M65	8	Ground	ON	0 V
			OFF	

JPMIA0154GB

Is the measurement value normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> GO TO 2.

2.CHECK HAZARD SWITCH SIGNAL OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect the hazard switch connector and BCM connector.
3. Check continuity between the hazard switch harness connector and the BCM harness connector.

Hazard switch		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M45	3	M65	8	Existed

Does continuity exist?

YES >> GO TO 3.
NO >> Repair the harnesses or connectors.

3.CHECK HAZARD SWITCH SIGNAL SHORT CIRCUIT

Check continuity between the hazard switch harness connector and the ground.

cardiagn.com

Hazard switch		Ground	Continuity
Connector	Terminal		
M45	3		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> GO TO 4.

4. CHECK HAZARD SWITCH GROUND OPEN CIRCUIT

Check continuity between the hazard switch harness connector and the ground.

Hazard switch		Ground	Continuity
Connector	Terminal		
M45	2		Existed

Does continuity exist?

YES >> Replace the hazard switch.
NO >> Repair the harnesses or connectors.

cardiagn.com

TAIL LAMP CIRCUIT

Component Function Check

INFOID:0000000001099369

1.CHECK TAIL LAMP OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Activate IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the tail lamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the test items, check that the tail lamp is turned ON.

TAIL : Tail lamp ON
OFF : Tail lamp OFF

Is the tail lamp turned ON?

YES >> Tail lamp circuit is normal.
NO >> Refer to EXL-233, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099370

1.CHECK TAIL LAMP FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
• Tail lamp • License plate lamp	IPDM E/R	#49	10 A

Is the fuse fusing?

YES >> Repair the malfunctioning part before replacing the fuse.
NO >> GO TO 2.

2.CHECK TAIL LAMP OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Disconnect the rear combination lamp connector.
2. Turn the ignition switch ON.
3. Select "EXTERNAL LAMP" of IPDM E/R active test item.
4. With operating the test items, check the voltage between the IPDM E/R harness connector and the ground.

Terminals			Test item	Voltage (Approx.)
(+)		(–)		
IPDM E/R		Ground	EXTERNAL LAMP	
Connector	Terminal			
E13	38		TAIL	Battery voltage
			OFF	0 V

Is the measurement value normal?

YES >> GO TO 3.
NO >> Replace IPDM E/R.

3.CHECK TAIL LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.

carDiag.com

3. Check continuity between the IPDM E/R harness connector and the rear combination lamp harness connector.

IPDM E/R			Rear combination lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	38	B59	2	Existed
LH			B80	2	

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

4. CHECK TAIL LAMP GROUND OPEN CIRCUIT

Check continuity between the rear combination lamp harness connector and the ground.

Rear combination lamp			Ground	Continuity
Connector		Terminal		
RH	B59	4		Existed
LH	B80	4		

Does continuity exist?

YES >> Replace the rear combination lamp.
NO >> Repair the harnesses or connectors.

cardiagn.com

LICENSE PLATE LAMP CIRCUIT

Component Function Check

INFOID:0000000001099371

NOTE:
Check the tail lamp circuit if the tail lamp and the license plate lamp are not turned ON.

1.CHECK LICENSE PLATE LAMP OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Activate IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the license plate lamp is turned ON.

CONSULT-III ACTIVE TEST
1. Select "EXTERNAL LAMP" of IPDM E/R active test item.
2. With operating the lighting switch, check that the license plate lamp is turned ON.

TAIL : License plate lamp ON
OFF : License plate lamp OFF

Is the license plate lamp turned ON?

YES >> License plate lamp circuit is normal.
NO >> Refer to EXL-235, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099372

1.CHECK LICENSE PLATE LAMP BULB

Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 2.
NO >> Replace the bulb.

2.CHECK LICENSE PLATE LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector and the license plate lamp connector.
3. Check continuity between the IPDM E/R harness connector and the license plate lamp harness connector.

IPDM E/R			License plate lamp		Continuity
Connector		Terminal	Connector	Terminal	
RH	E13	38	D185	1	Existed
LH			D184	1	

Does continuity exist?

YES >> GO TO 3.
NO >> Repair the harnesses or connectors.

3.CHECK LICENSE PLATE LAMP GROUND OPEN CIRCUIT

Check continuity between the license plate lamp harness connector and the ground.

License plate lamp			Ground	Continuity
Connector		Terminal		
RH	D185	2		Existed
LH	D184	2		

Does continuity exist?

YES >> Replace the license plate lamp.
NO >> Repair the harnesses or connectors.

carDiagn.com

REAR FOG LAMP CIRCUIT

Component Function Check

INFOID:0000000001099373

1.CHECK REAR FOG LAMP OPERATION

CONSULT-III ACTIVE TEST
1. Select "RR FOG LAMP" of BCM (HEAD LAMP) active test item.
2. With operating the test items, check that the rear fog lamp is turned ON.

ON : Rear fog lamp ON
OFF : Rear fog lamp OFF

Is rear fog lamp turned ON?

YES >> Rear fog lamp circuit is normal.
NO >> Refer to EXL-236, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001099374

1.CHECK REAR FOG LAMP BULB

Check the applicable lamp bulb.

Is the bulb normal?

YES >> GO TO 2.
NO >> Replace the bulb.

2.CHECK REAR FOG LAMP OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Turn the ignition switch OFF.
2. Disconnect the rear fog lamp connector.
3. Turn the ignition switch ON.
4. Select "RR FOG LAMP" of BCM (HEAD LAMP) active test item.
5. With operating the test items, check voltage between BCM harness connector and ground.

Terminals			Test item	Voltage (approx.)
(+)		(−)		
BCM		Ground	RR FOG LAMP	
Connector	Terminal			
M66	49		ON	12 V
			OFF	0 V

Is the measurement value normal?

YES >> GO TO 3.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

3.CHECK REAR FOG LAMP OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector and rear fog lamp harness connector.

BCM		Rear fog lamp		Continuity
Connector	Terminal	Connector	Terminal	
M66	49	B90	1	Existed

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

cardiagn.com

4.CHECK REAR FOG LAMP SHORT CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M66	49		Not existed

Does continuity exist?

YES >> GO TO 5.
NO >> Repair the harnesses or connectors.

5.CHECK REAR FOG LAMP GROUND OPEN CIRCUIT

Check continuity between rear fog lamp harness connector and ground.

Rear fog lamp		Ground	Continuity
Connector	Terminal		
B90	2		Existed

Does continuity exist?

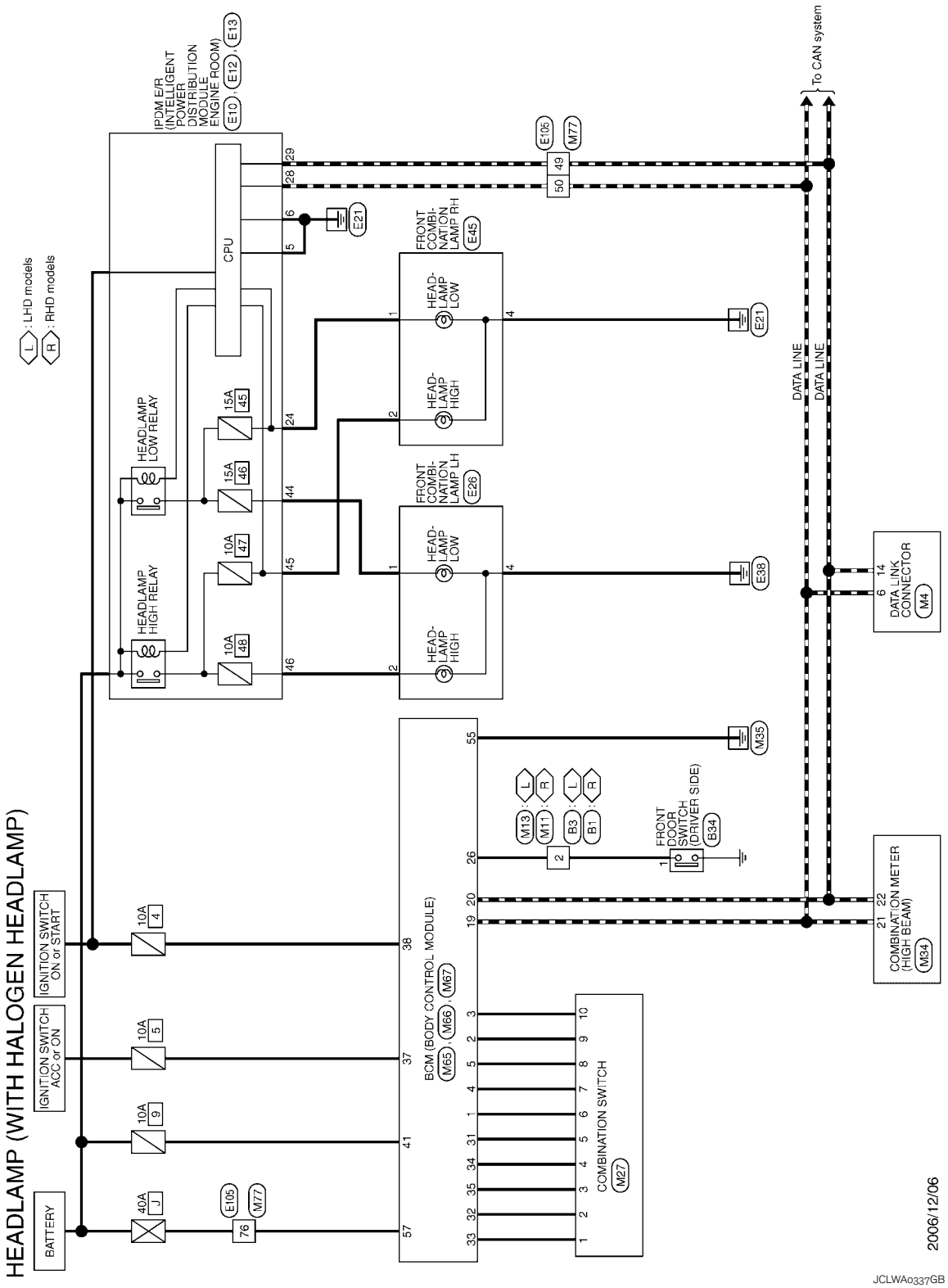
YES >> Replace the rear fog lamp.
NO >> Repair the harnesses or connectors.

carDiagn.com

HEADLAMP SYSTEM

Wiring Diagram - HEADLAMP -

INFOID:0000000001026223



cardiagn.com

HEADLAMP (WITH HALOGEN HEADLAMP)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	–[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	–[LHD models]

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

5	4	3
8	7	6

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

25	24	23	22	21
32	31	30	29	28	27	26

Terminal No.	Color of Wire	Signal Name [Specification]
24	R/Y	–
28	L	–
29	P	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

39	38	37	36	35	34	33
48	47	46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name [Specification]
44	L	–
45	L/W	–
46	G	–

Connector No.	E26
Connector Name	FRONT COMBINATION LAMP LH
Connector Type	AMP 953600-1

H.S.

5	4	3	2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	G	–
4	B	–

Connector No.	E45
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	AMP 953600-1

H.S.

5	4	3	2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/Y	–
2	L/W	–
4	B	–

JCLWA0338GB

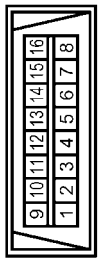
carDiagn.com

HEADLAMP (WITH HALOGEN HEADLAMP)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

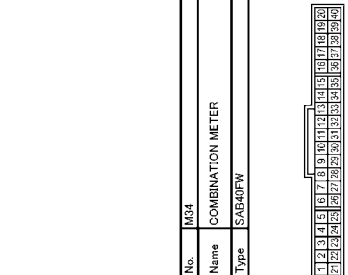


Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

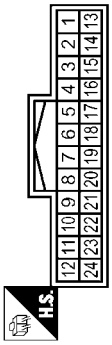
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



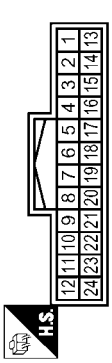
Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



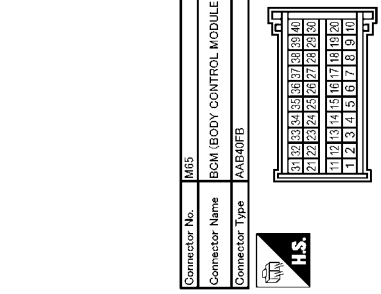
Terminal No.	Color of Wire	Signal Name [Specification]
2	R	–[RHD models]

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
2	R	–[LHD models]

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



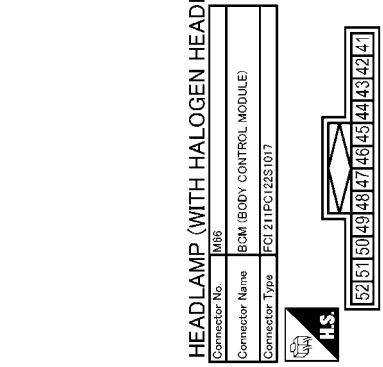
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
26	R	DOOR SW (DR)
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

JCLWA0339GB

cardiagn.com

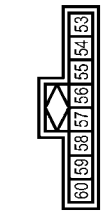
HEADLAMP (WITH HALOGEN HEADLAMP)

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



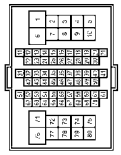
Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

JCLWA0340GB

carDiagn.com

HEADLAMP AIMING CONTROL SYSTEM (MANUAL)

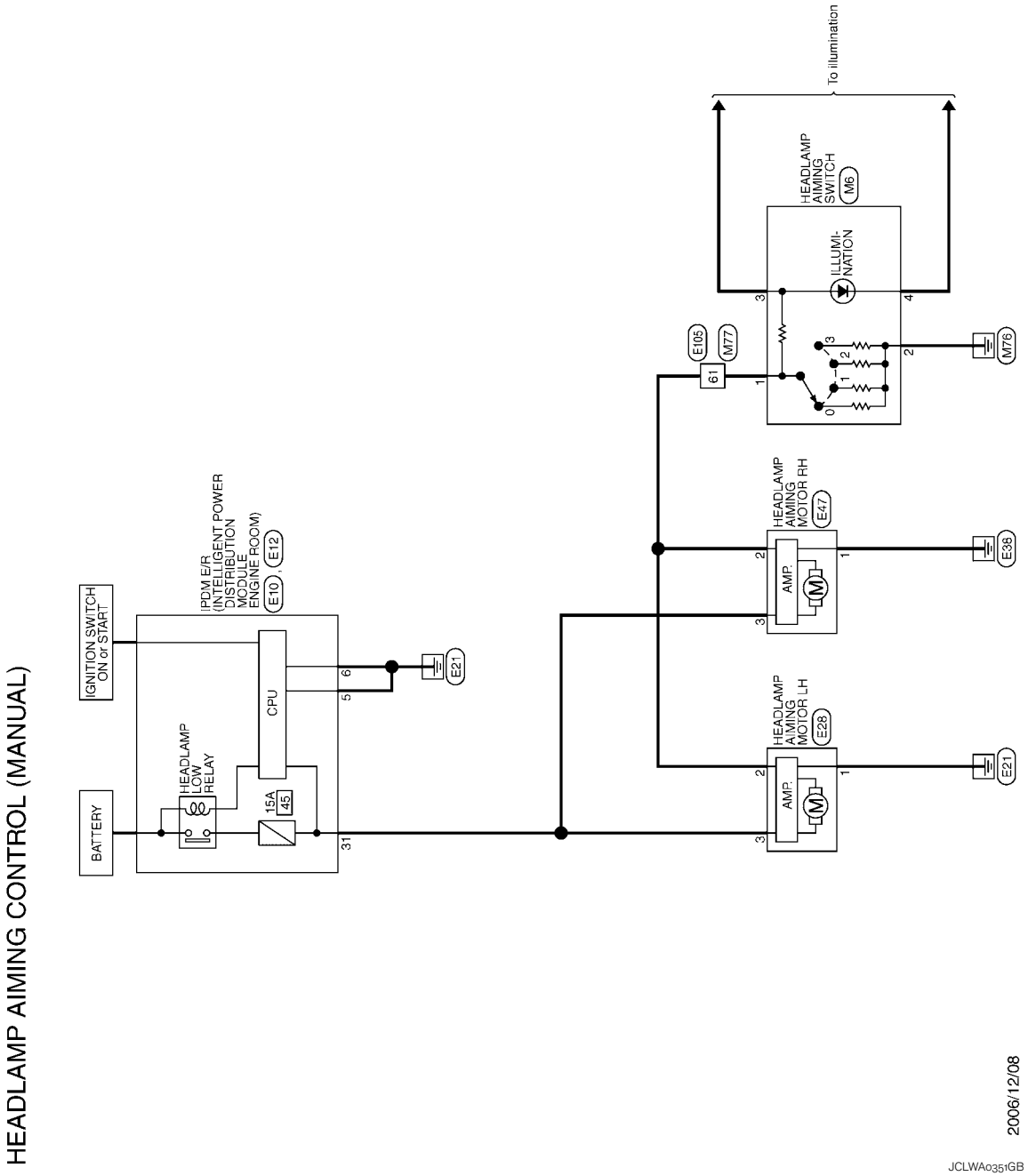
Description

INFOID:0000000001026199

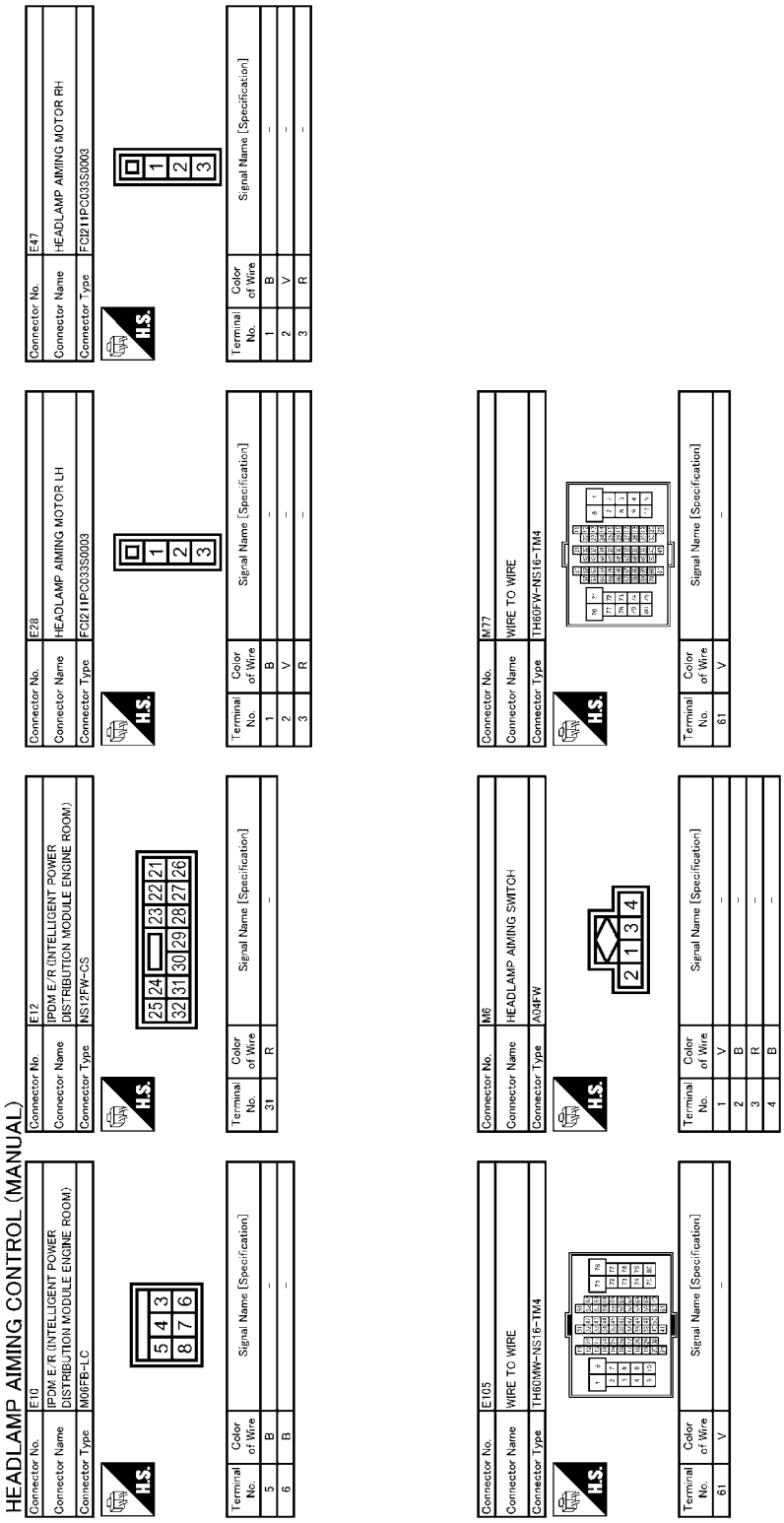
The headlamp levelizer adjusts the headlamp light axis upward and downward with the aiming motor integrated in the front combination lamp.

Wiring Diagram - HEADLAMP AIMING CONTROL SYSTEM (MANUAL) -

INFOID:0000000001078331



cardiagn.com



JCLWA0352GB

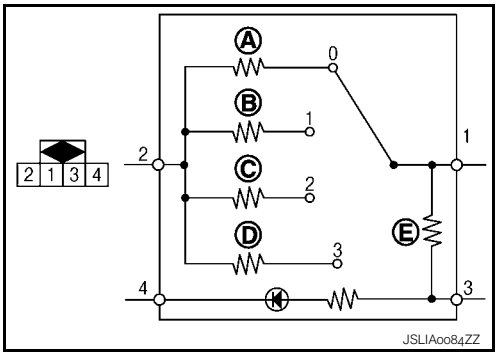
Component Inspection

INFOID:0000000001026664

1. CHECK HEADLAMP AIMING SWITCH

1. Remove the headlamp aiming switch.

2. Check the resistance among each headlamp aiming switch terminal.



Headlamp aiming switch		Condition	Resistance (Approx.)
Terminal		Switch position	
1	2	0	A: 160 Ω
		1	B: 374 Ω
		2	C: 576 Ω
		3	D: 931 Ω
	3	—	E: 390 Ω

Is the measurement value normal?

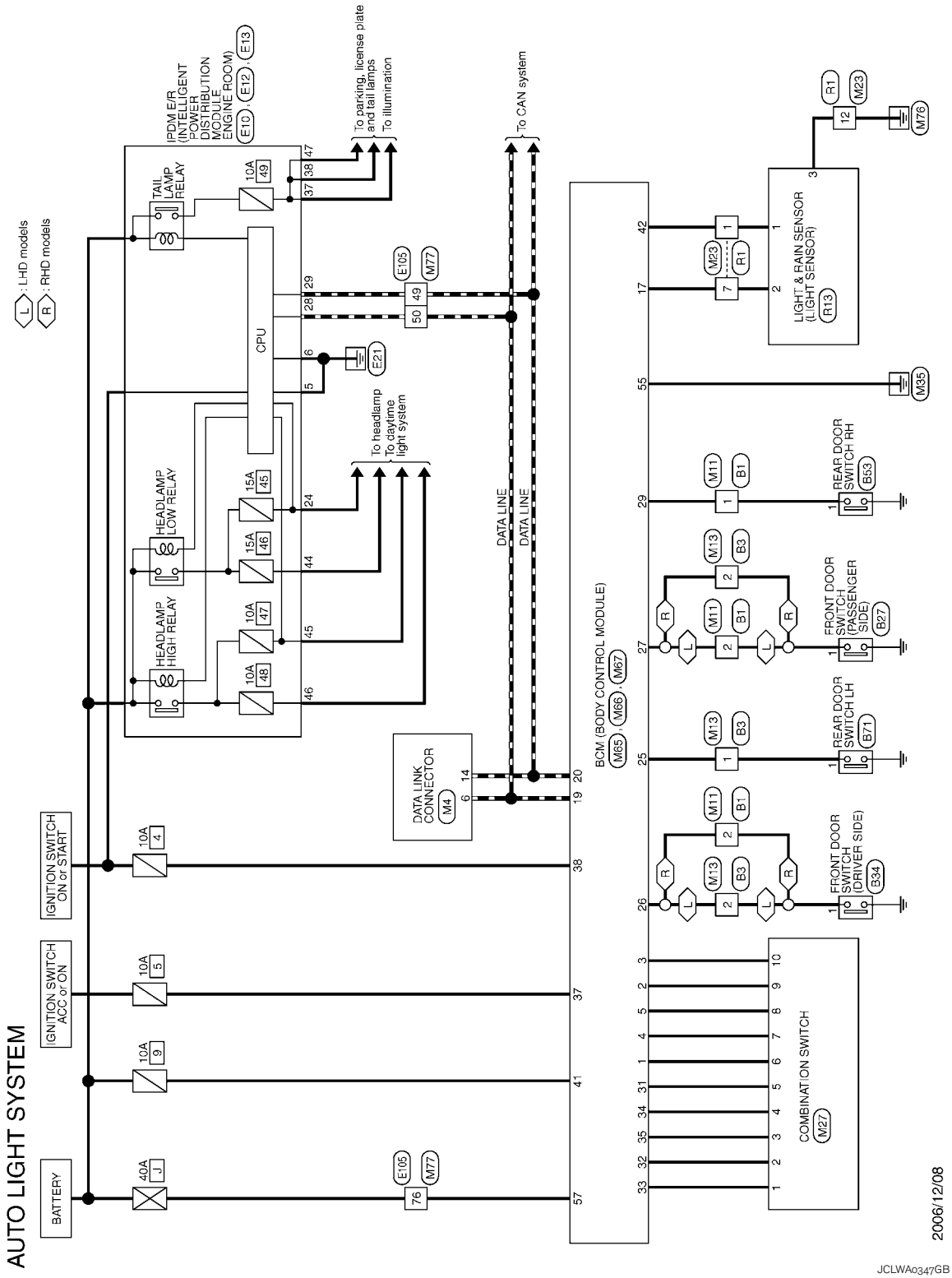
YES >> Headlamp aiming switch is normal.
NO >> Replace the headlamp aiming switch.

cardiagn.com

AUTO LIGHT SYSTEM

Wiring Diagram - AUTO LIGHT SYSTEM -

INFOID:0000000001089308



AUTO LIGHT SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	BR	-[LHD models]
2	R/W	-[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	R/W	-[LHD models]
2	BR	-[RHD models]

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

5	4	3
8	7	6

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

25	24		23	22	21
32	31	30	29	28	27	26

Terminal No.	Color of Wire	Signal Name [Specification]
24	R/Y	-
28	L	-
29	P	-

JCLWA0348GB

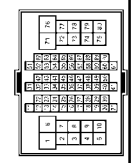
cardiagn.com

AUTO LIGHT SYSTEM

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

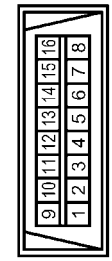
Terminal No.	Color of Wire	Signal Name [Specification]
37	R/W	–
38	R/L	–
44	L	–
45	L/W	–
46	G	–
47	R/L	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



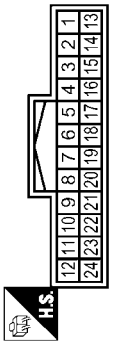
Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



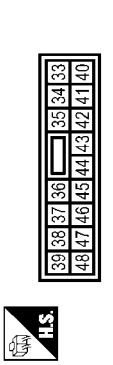
Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]
2	R	–[RHD models]

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	R	–[LHD models]
2	BR	–[RHD models]

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
7	BR	–
12	B	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

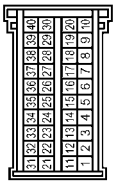
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

JCLWA0349GB

carsdiagn.com

AUTO LIGHT SYSTEM

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



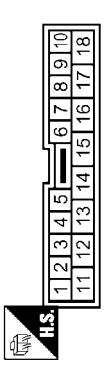
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
17	BR	LIGHT & RAIN SENS
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

29	LG	DOOR SW (RR)
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
7	BR	-
12	B	-

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
42	V	ROOM LAMP POWER SUPPLY

Connector No.	R13
Connector Name	LIGHT & RAIN SENSOR
Connector Type	AMP 968705-1

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	+IG
2	BR	SIG
3	B	GND

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

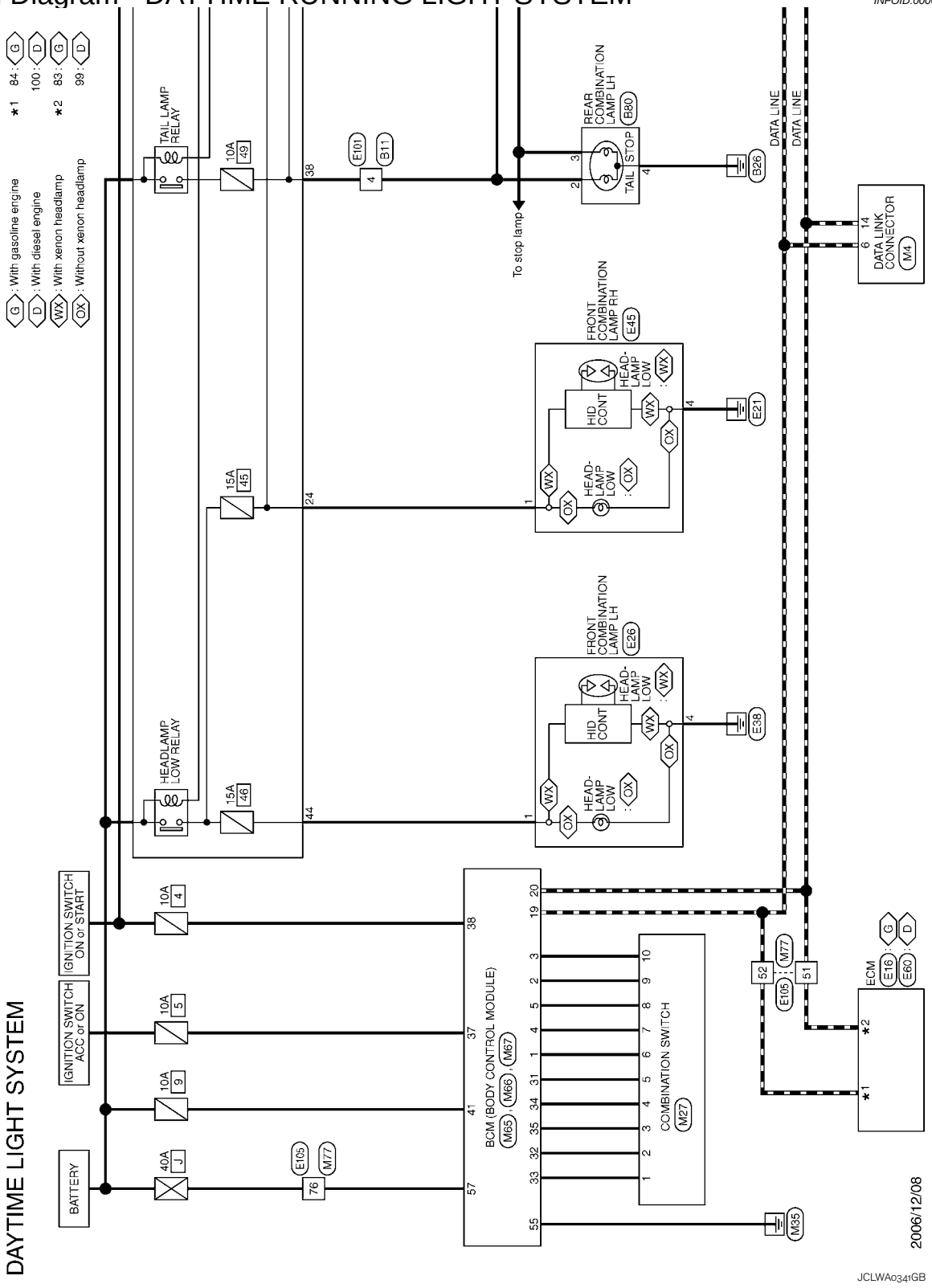
JCLWA0350GB

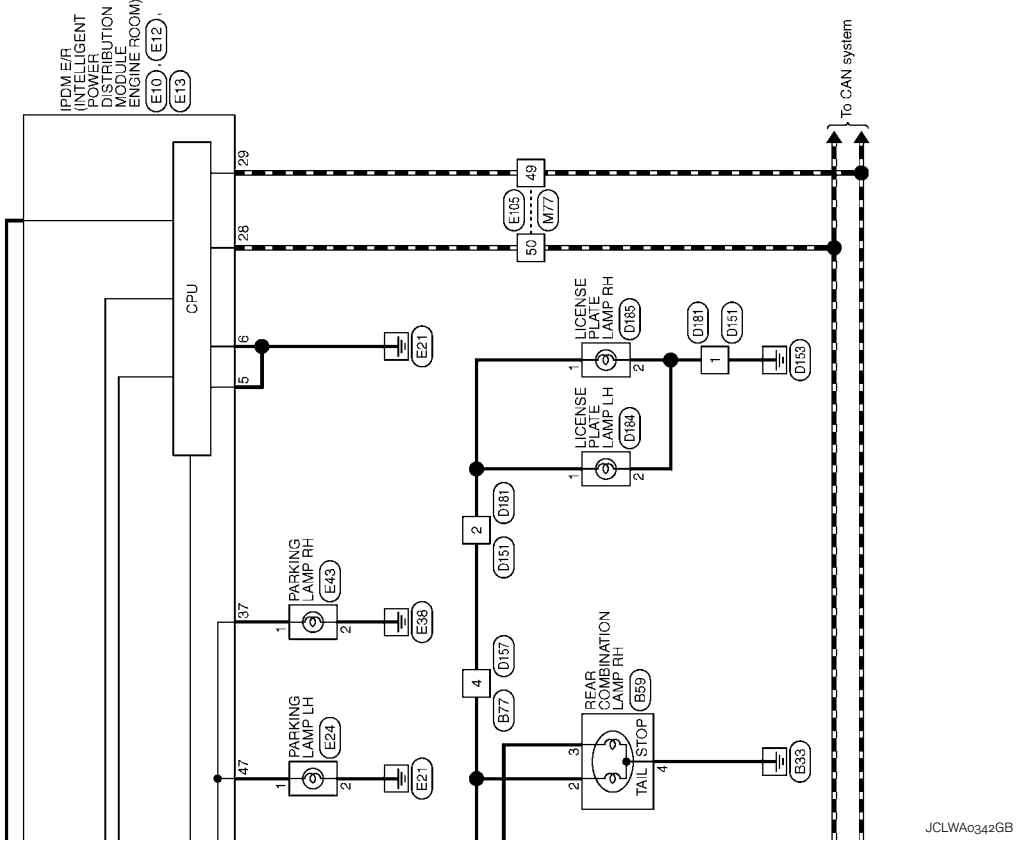
cardiagn.com

DAYTIME RUNNING LIGHT SYSTEM

Wiring Diagram - DAYTIME RUNNING LIGHT SYSTEM -

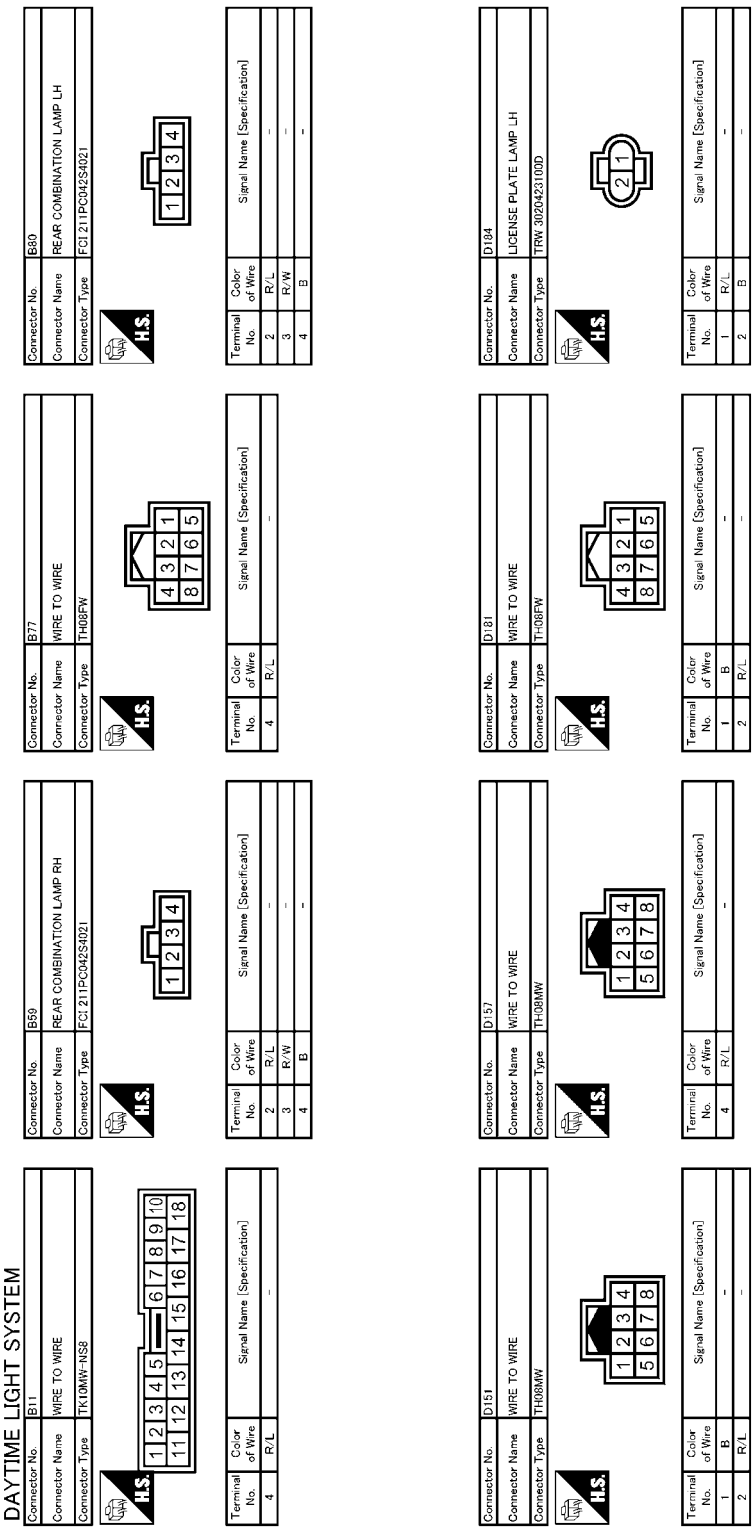
INFOID:0000000001125409





cardiagn.com

DAYTIME LIGHT SYSTEM



JCLWA0343GB

carDiagn.com

DAYTIME LIGHT SYSTEM

Connector No.	D185
Connector Name	LICENSE PLATE LAMP RH
Connector Type	TRW 3020423100D

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	–
2	B	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

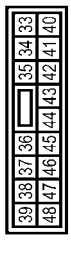
Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
24	R/Y	–
28	L	–
29	P	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
37	R/W	–
38	R/L	–
44	L	–
47	R/L	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L
84	L	CAN-H

Connector No.	E24
Connector Name	PARKING LAMP LH
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	–
2	B	–

Connector No.	E26
Connector Name	FRONT COMBINATION LAMP LH
Connector Type	AMP 953600-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
4	B	–

Connector No.	E43
Connector Name	PARKING LAMP RH
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–
2	B	–

JCLWA0344GB

cardiagn.com

DAYTIME LIGHT SYSTEM

Connector No.	E45
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	AMP 953600-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/Y	–
4	B	–

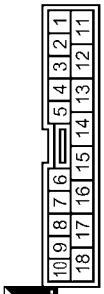
Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

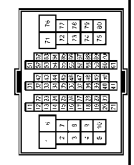
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

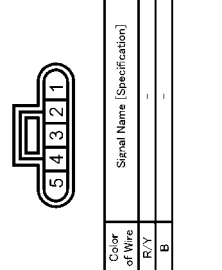
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

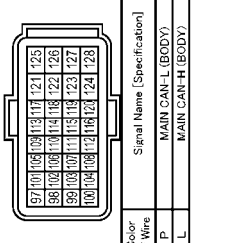
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

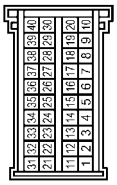
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

JCLWA0345GB

carcdiagn.com

DAYTIME LIGHT SYSTEM

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

52	51	50	49	48	47	46	45	44	43	42	41

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

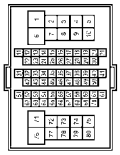
H.S.

60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–
76	Y	–

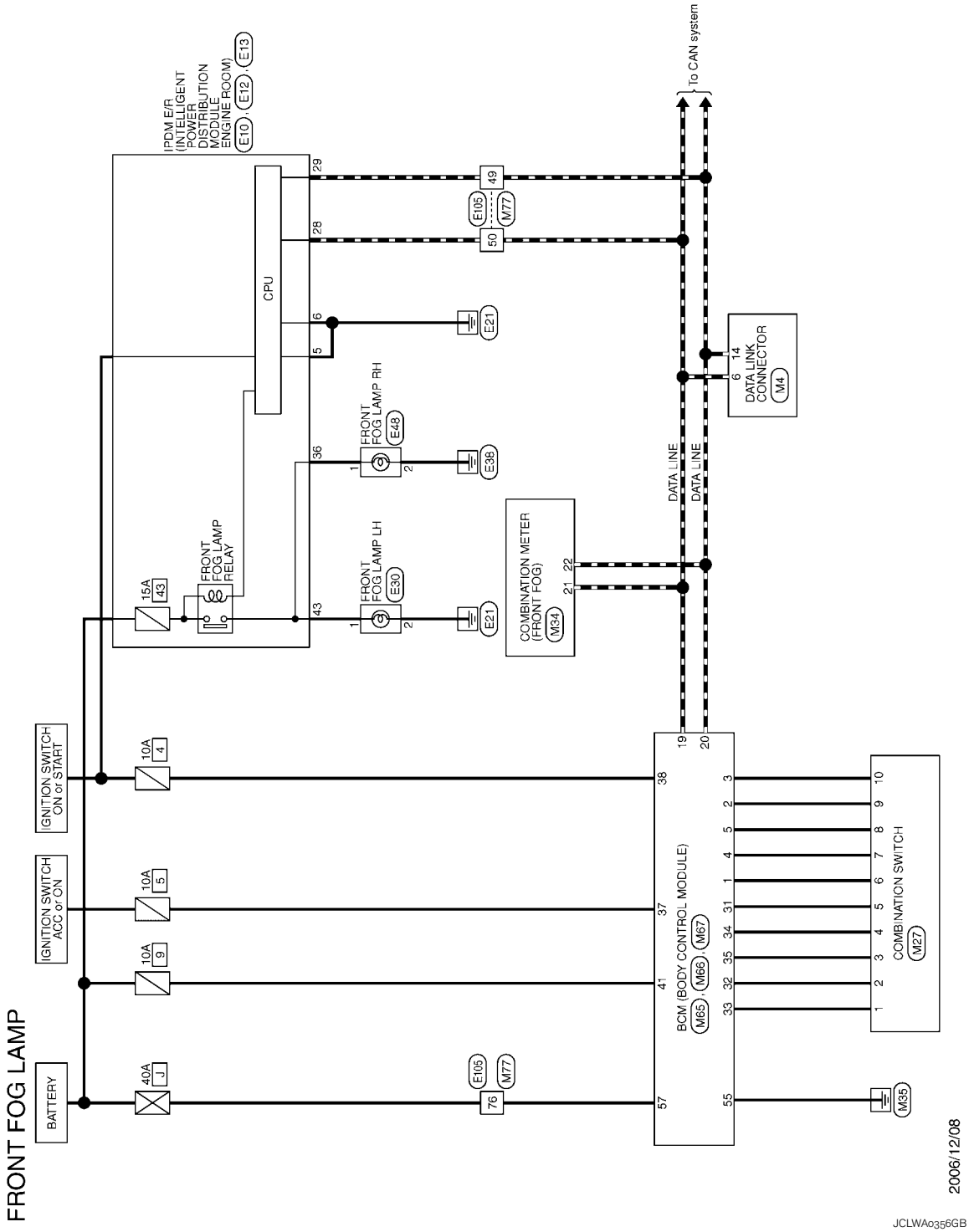
JCLWA0346GB

cardiagn.com

FRONT FOG LAMP SYSTEM

Wiring Diagram - FRONT FOG LAMP -

INFOID:0000000001089309



FRONT FOG LAMP

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E46
Connector Name	FRONT FOG LAMP RH
Connector Type	FCI 240PC023S4019

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–

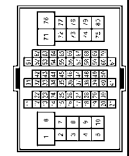
Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	–
29	P	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

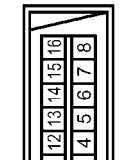
Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
36	W	–
43	W/B	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

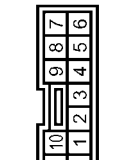
Connector No.	E30
Connector Name	FRONT FOG LAMP LH
Connector Type	FCI 240PC023S4019

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/B	–
2	B	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

H.S.



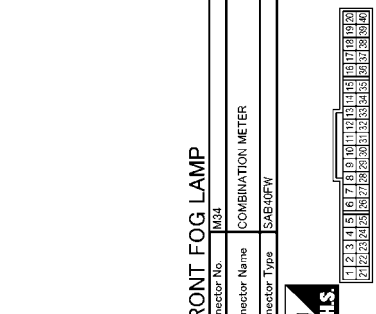
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

JCLWA0357GB

cardiagn.com

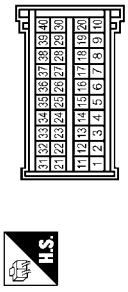
FRONT FOG LAMP

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

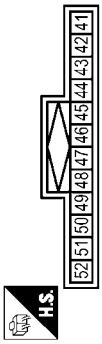
Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4

35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC063S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

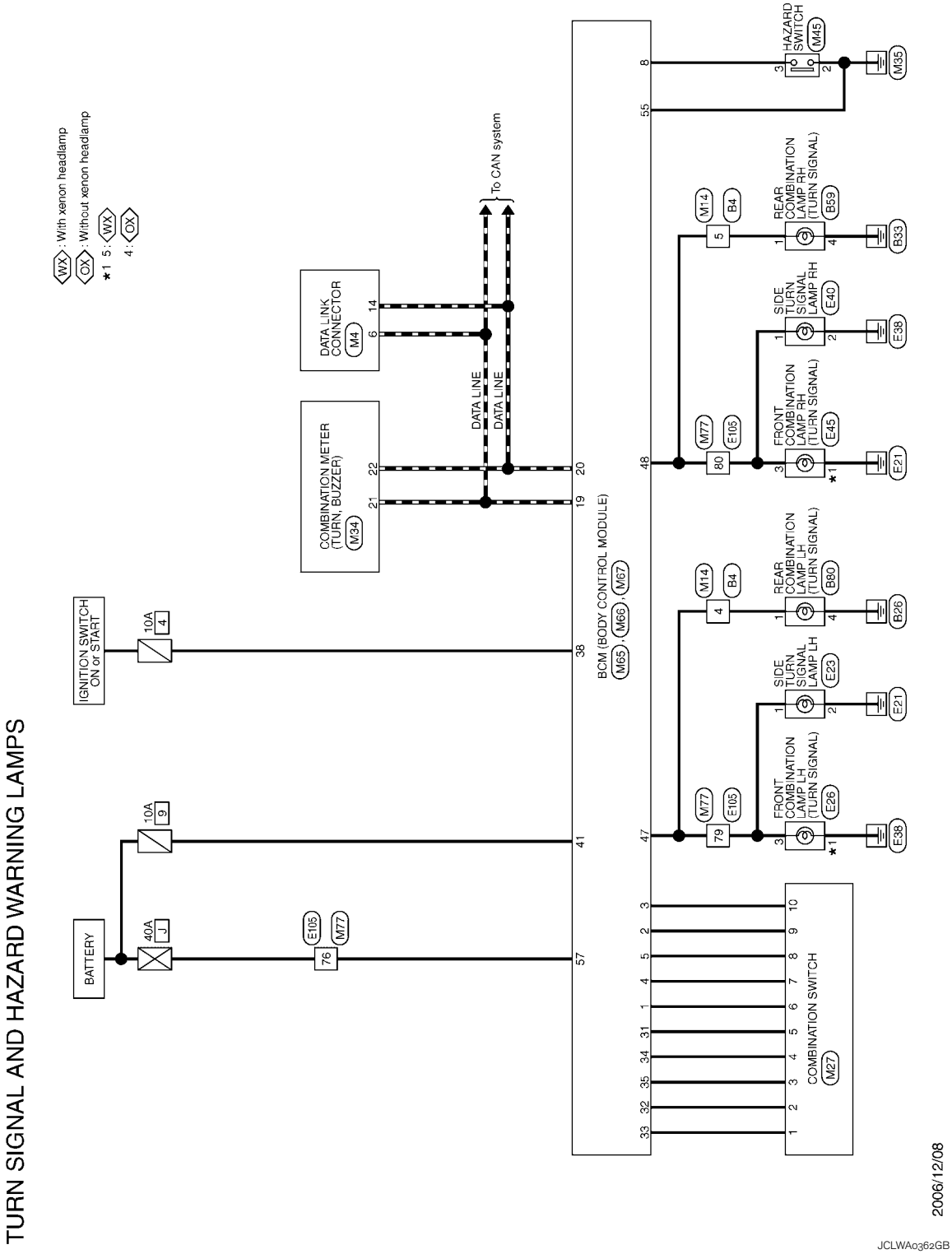
JCLWA0358GB

cardiagn.com

TURN SIGNAL AND HAZARD WARNING LAMP SYSTEM

Wiring Diagram - TURN AND HAZARD WARNING LAMPS -

INFOID:0000000001089310



cardiagn.com

TURN SIGNAL AND HAZARD WARNING LAMPS

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	BR	–
5	G/B	–

Connector No.	E26
Connector Name	FRONT COMBINATION LAMP LH
Connector Type	AMP 953600-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	G/Y	–
4	B	–
5	B	–

Connector No.	B59
Connector Name	REAR COMBINATION LAMP RH
Connector Type	FCI 211PC042S4021

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G/B	–
4	B	–

Connector No.	E40
Connector Name	SIDE TURN SIGNAL LAMP RH
Connector Type	TRW 3020423100D

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G/B	–
2	B	–

Connector No.	B80
Connector Name	REAR COMBINATION LAMP LH
Connector Type	FCI 211PC042S4021

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
4	B	–

Connector No.	E23
Connector Name	SIDE TURN SIGNAL LAMP LH
Connector Type	TRW 3020423100D

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G/Y	–
2	B	–

Connector No.	E45
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	AMP 953600-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	G/B	–
4	B	–
5	B	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.

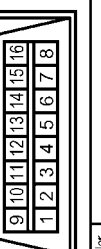
Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–
79	G/Y	–
80	G/B	–

JCLWA0363GB

cardiagn.com

TURN SIGNAL AND HAZARD WARNING LAMPS

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

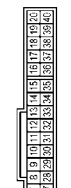
Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS06FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
4	BR	-
5	GR	-

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

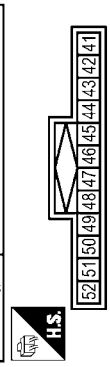
Connector No.	M45
Connector Name	HAZARD SWITCH
Connector Type	CINCH REF 49309EV4M9 (WHITE)

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-
3	LG	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
8	LG	HAZARD SW
19	L	CAN-H
20	P	CAN-L
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
47	G/Y	FLASHER OUTPUT (LEFT)
48	G/B	FLASHER OUTPUT (RIGHT)

JCLWA0364GB

cardiagn.com

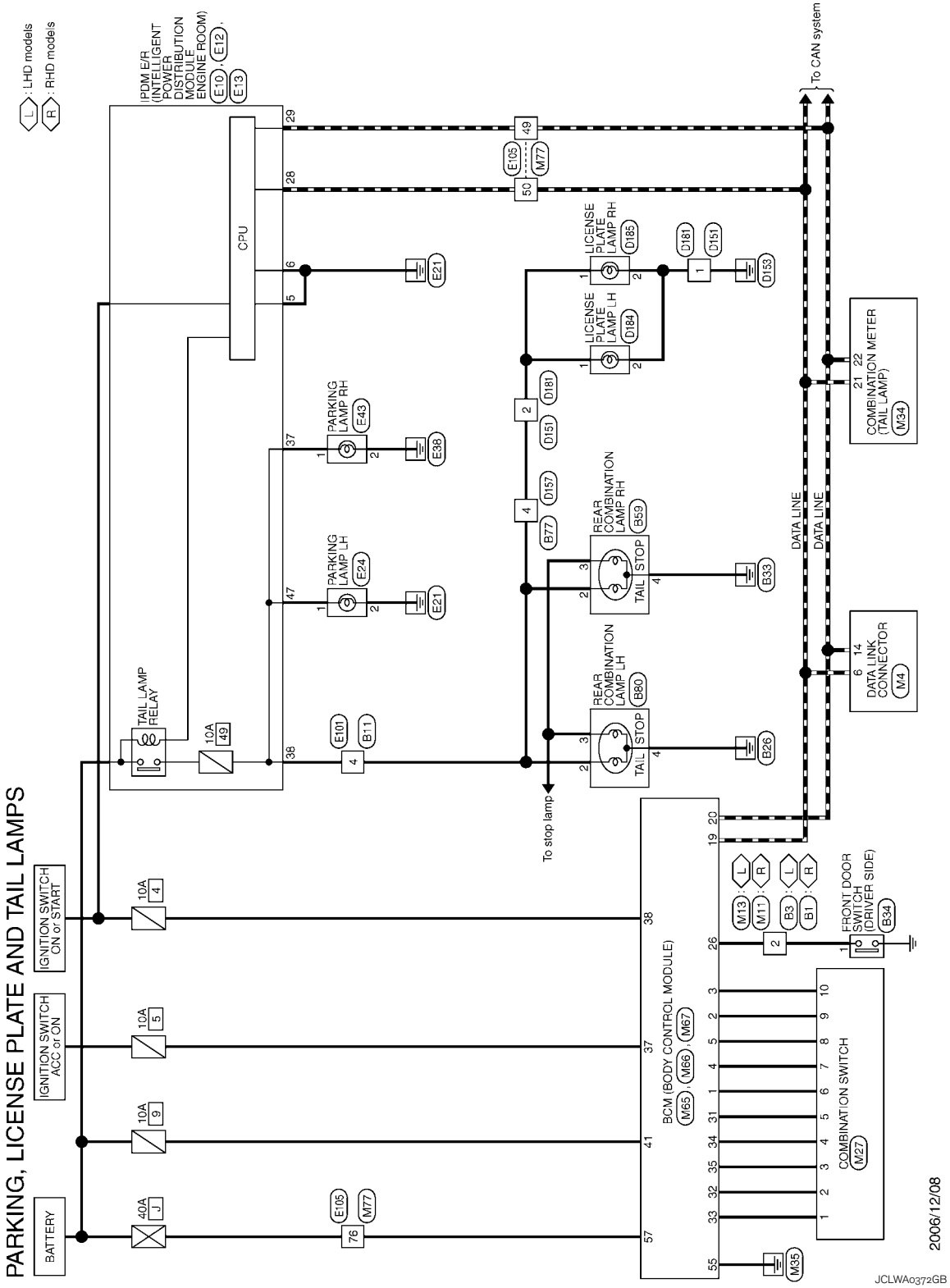
TURN SIGNAL AND HAZARD WARNING LAMPS

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

PARKING, LICENSE PLATE AND TAIL LAMPS SYSTEM

Wiring Diagram - PARKING, LICENSE PLATE AND TAIL LAMPS -

INFOID:0000000001026231



cardiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS

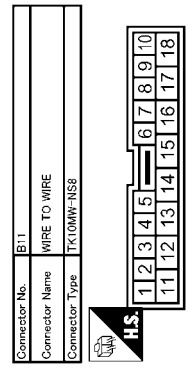
Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	–[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	–[LHD models]

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	–

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–

Connector No.	B59
Connector Name	REAR COMBINATION LAMP RH
Connector Type	FCI 211PC042S4021

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	–
3	R/W	–
4	B	–

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	–

Connector No.	B80
Connector Name	REAR COMBINATION LAMP LH
Connector Type	FCI 211PC042S4021

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	–
3	R/W	–
4	B	–

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	R/L	–

JCLWA0373GB

carDiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS

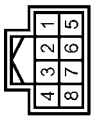
Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	R/L	-

Connector No.	D184
Connector Name	LICENSE PLATE LAMP LH
Connector Type	TRW 302042310OD

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	B	-

Connector No.	D185
Connector Name	LICENSE PLATE LAMP RH
Connector Type	TRW 302042310OD

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	-
29	P	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
37	R/W	-
38	R/L	-
47	R/L	-

Connector No.	E24
Connector Name	PARKING LAMP LH
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	B	-

JCLWA0374GB

cardiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS

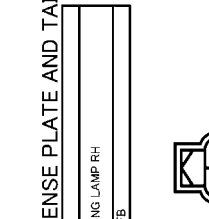
Connector No.	E43
Connector Name	PARKING LAMP RH
Connector Type	RH02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–
2	B	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

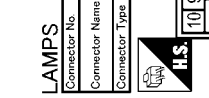
Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
2	R	–[RHD models]

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

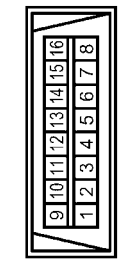


Terminal No.	Color of Wire	Signal Name [Specification]
2	R	–[LHD models]

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

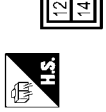


Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

JCLWA0375GB

carDiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
26	R	DOOR SW (DR)
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

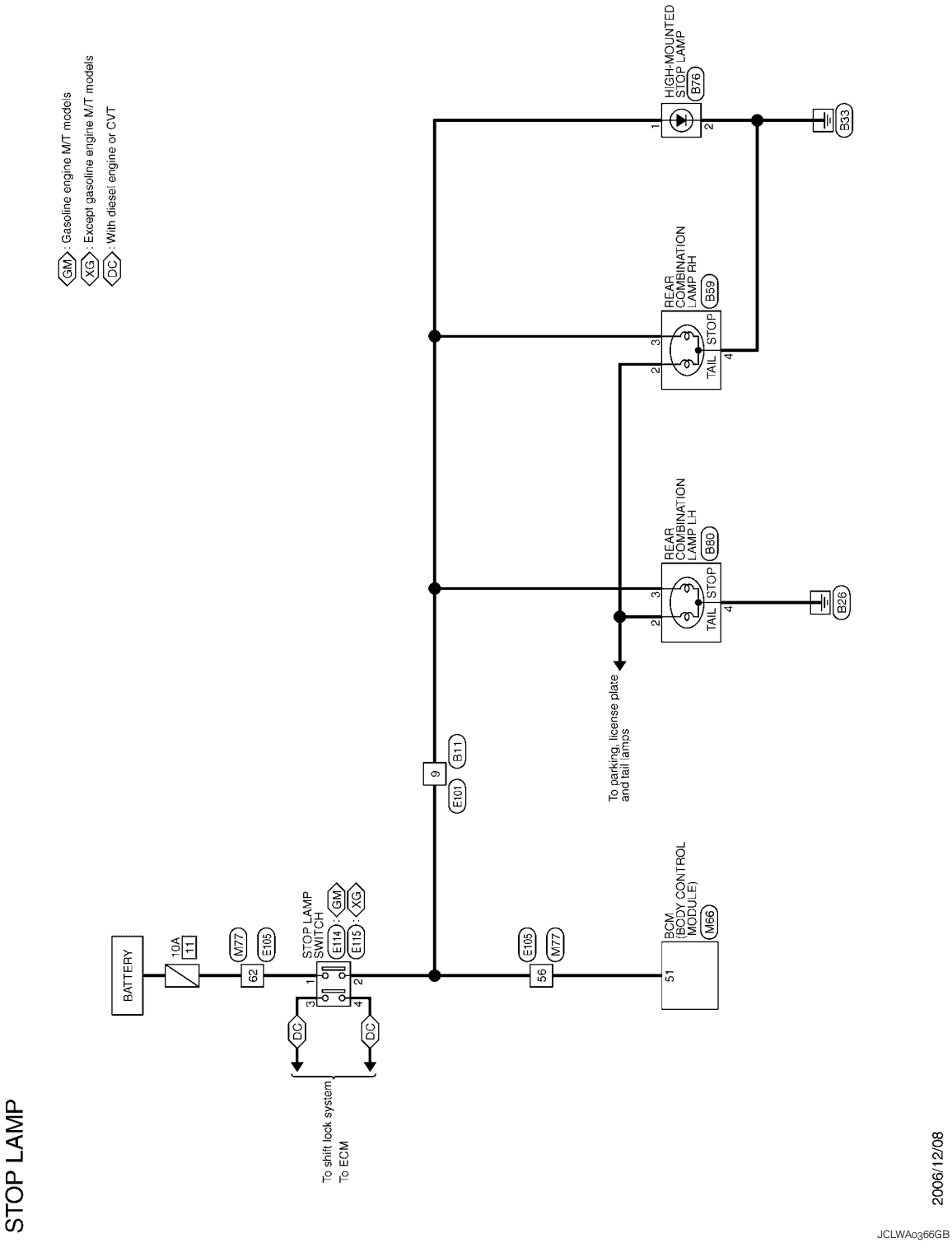
JCLWA0376GB

cardiagn.com

STOP LAMP

Wiring Diagram - STOP LAMP -

INFOID:0000000001026233



carDiagn.com

STOP LAMP

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	R/W	-

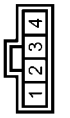
Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	R/W	-

Connector No.	B59
Connector Name	REAR COMBINATION LAMP RH
Connector Type	FCI 211PC042S4021

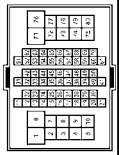
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-
3	R/W	-
4	B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
56	R/W	-
62	V	-

Connector No.	B76
Connector Name	HIGH-MOUNTED STOP LAMP
Connector Type	SICMA 11 770297543

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-
2	B	-

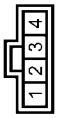
Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	R/W	-

Connector No.	B80
Connector Name	REAR COMBINATION LAMP LH
Connector Type	FCI 211PC042S4021

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-
3	R/W	-
4	B	-

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

H.S.

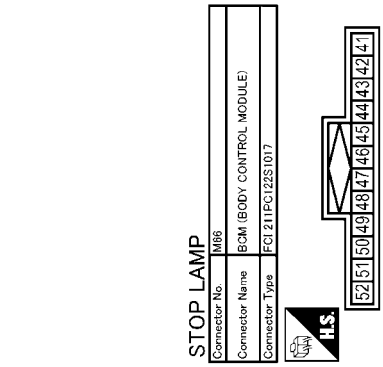
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	R/W	-
3	G	-[With CVT]
3	O	-[With diesel engine]
4	B	-[With CVT]
4	W/L	-[With diesel engine]

JCLWA0367GB

cardiagn.com

STOP LAMP

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
51	R/W	STOP LAMP SW [With Intelligent Key]
51	R	STOP LAMP SW [Without Intelligent Key]

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
56	R	- [Except RHD models with Intelligent Key]
56	R/W	- [RHD models with Intelligent Key]
62	V	-

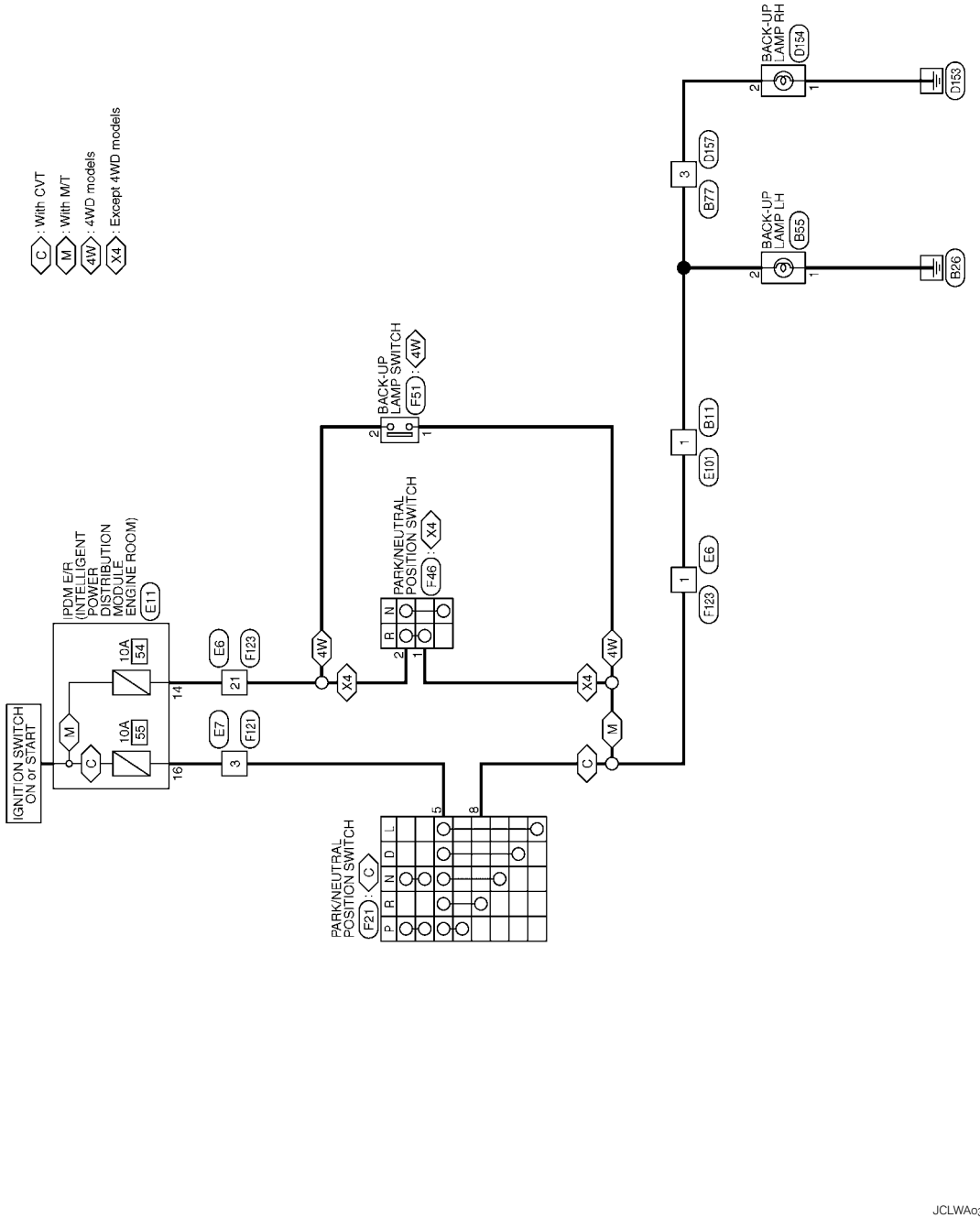
JCLWA0368GB

carsdiagn.com

BACK-UP LAMP

Wiring Diagram - BACK-UP LAMP -

INFOID:0000000001026235



BACK-UP LAMP

2006/12/08

JCLWA0369GB

cardiagn.com

BACK−UP LAMP

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

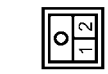
Connector No.	B55
Connector Name	BACK−UP LAMP LH
Connector Type	FCI 211PC022S9049

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	Y/G	–

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/G	–

Connector No.	D154
Connector Name	BACK−UP LAMP RH
Connector Type	FCI 211PC022S9049



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	Y/G	–

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/G	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

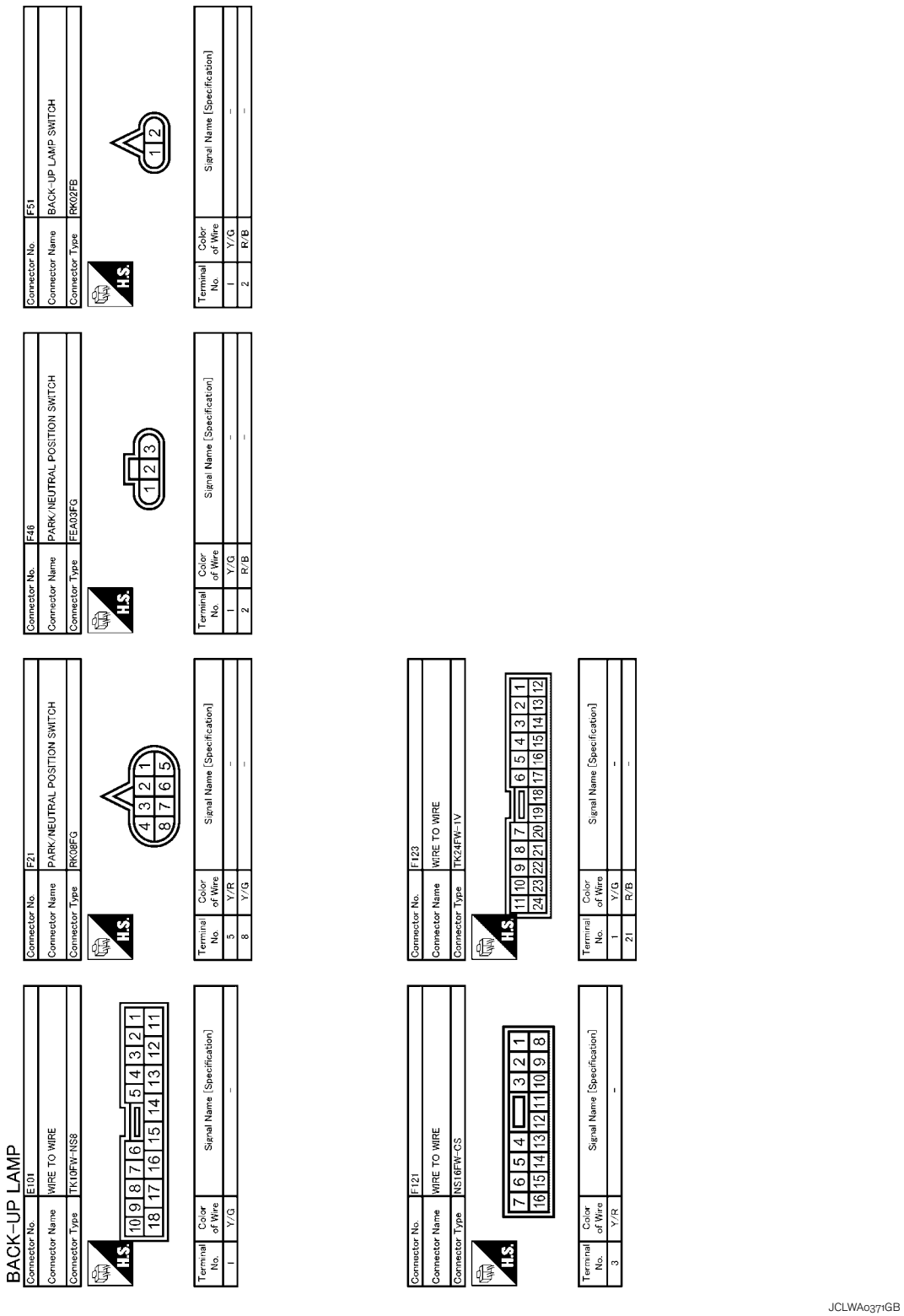
Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	–
16	Y/R	–

JCLWA0370GB

carsdiagn.com



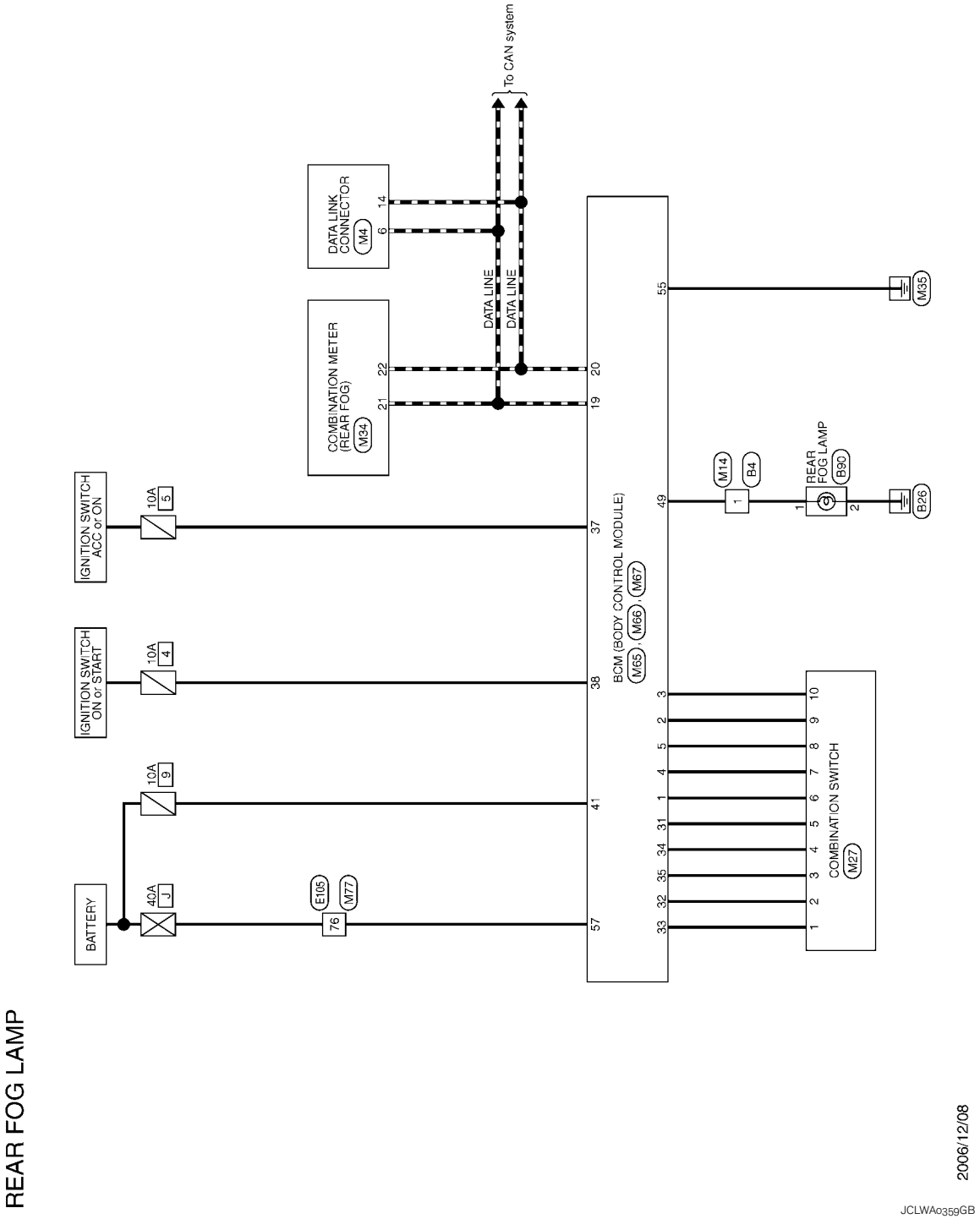
JCLWA0371GB

cardiagn.com

REAR FOG LAMP SYSTEM

Wiring Diagram - REAR FOG LAMP -

INFOID:0000000001026237



carDiagn.com

REAR FOG LAMP

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–

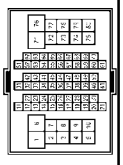
Connector No.	B90
Connector Name	REAR FOG LAMP
Connector Type	FEA02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	B	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH16MW-NS16-TM4

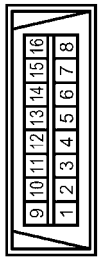
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

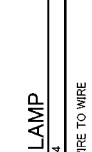
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

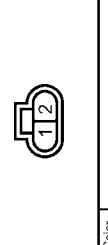
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

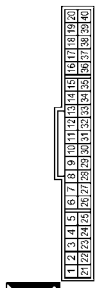
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

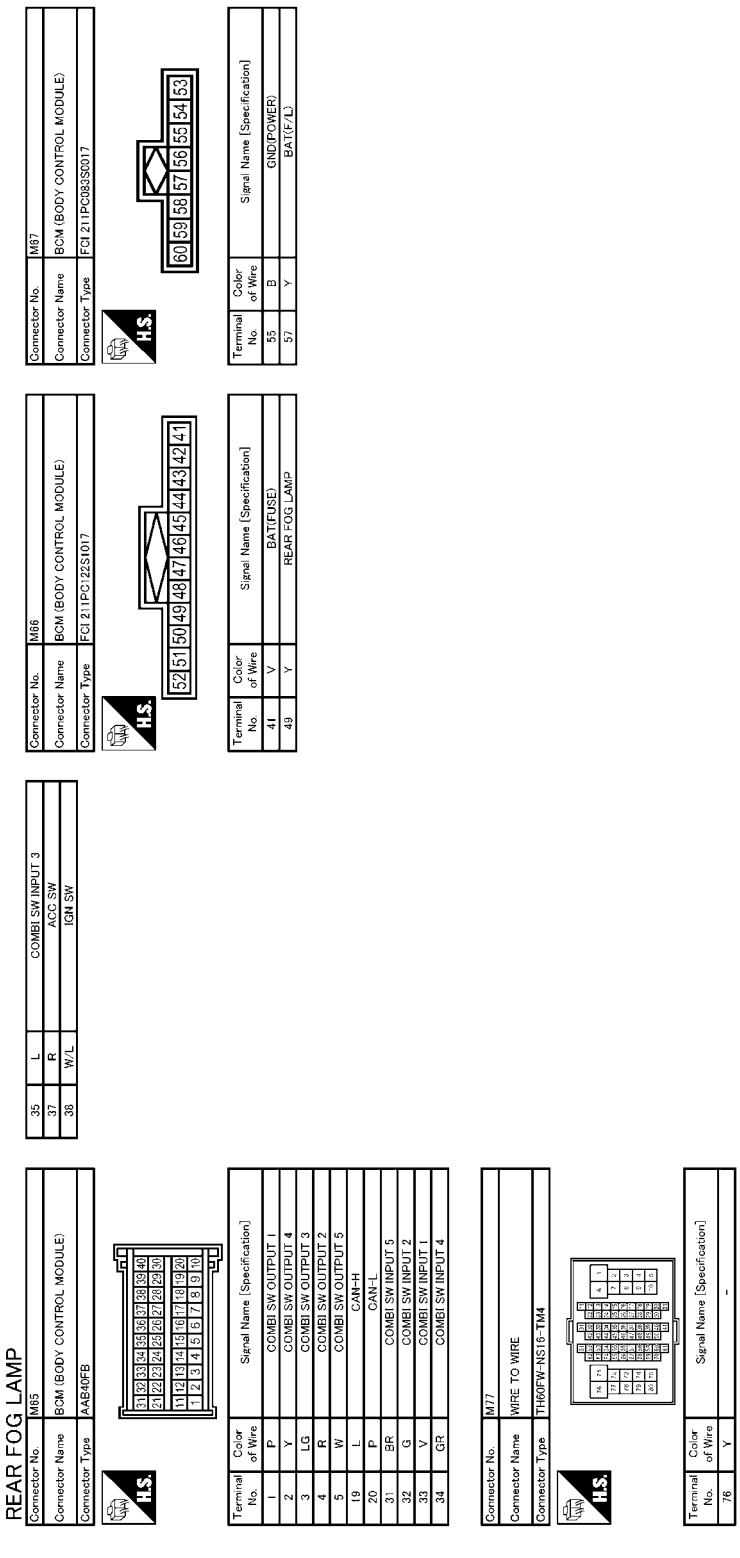
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

JCLWA0360GB

cardiagn.com



A B C D E F G H I J K EXL M N O P
carDiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001116328

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

carDiagn.com

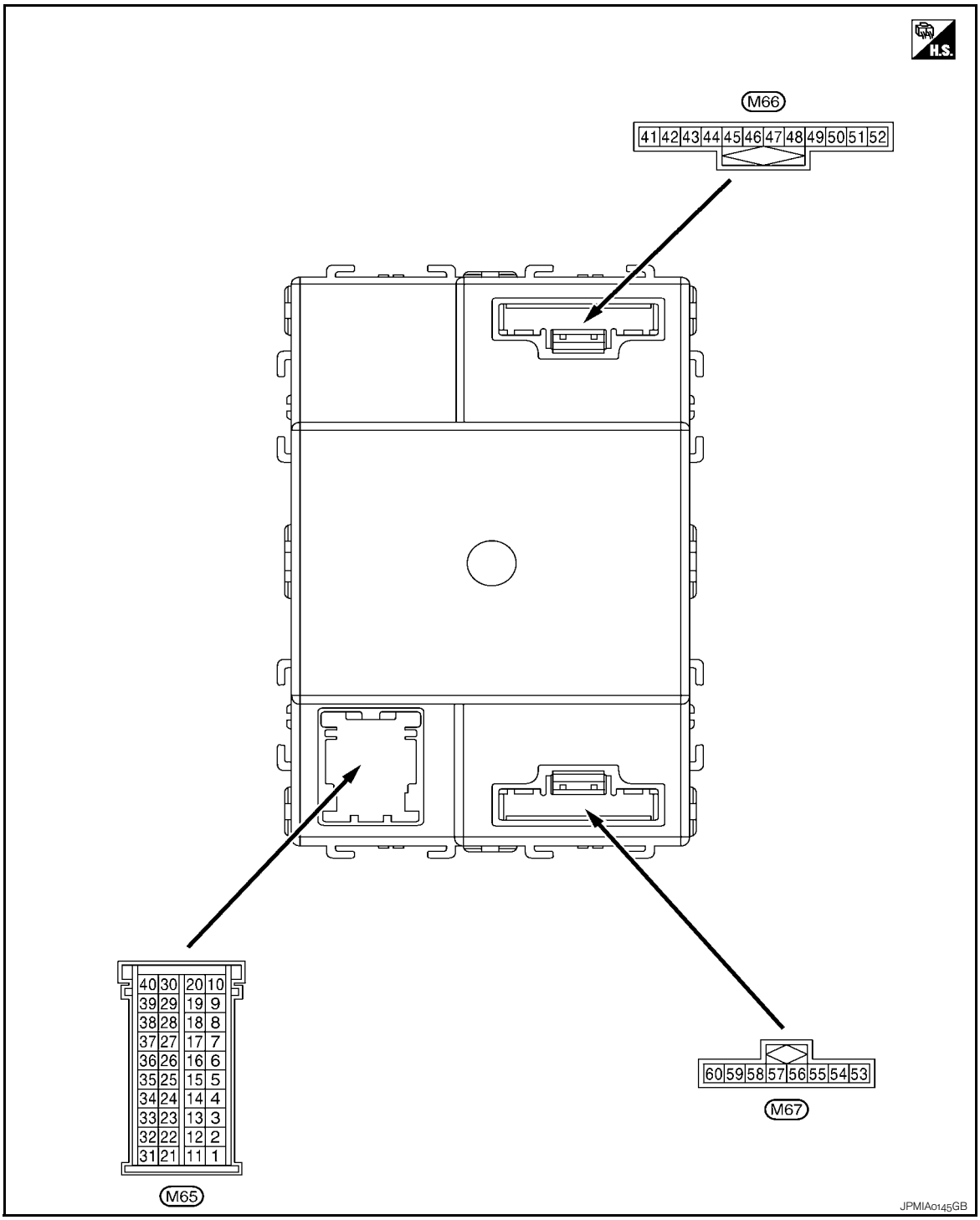
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

cardiagn.com

TERMINAL LAYOUT

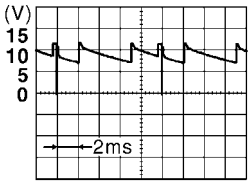
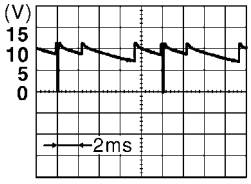
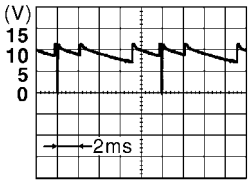
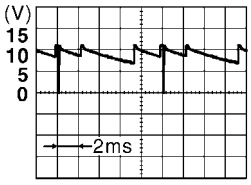


PHYSICAL VALUES

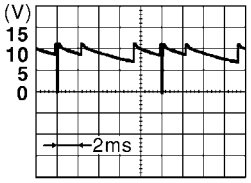
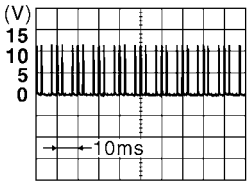
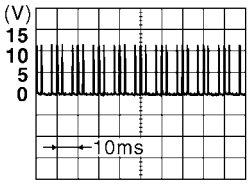
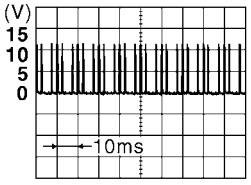
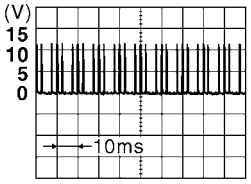
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

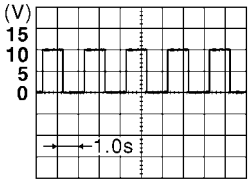
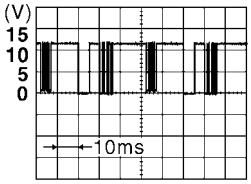
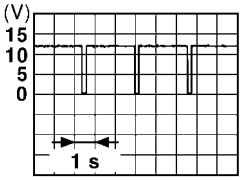
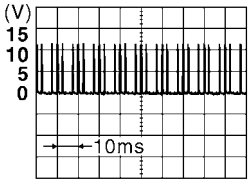
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

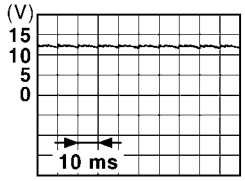
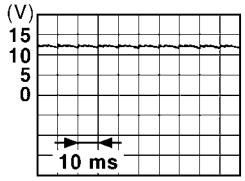
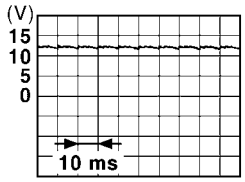
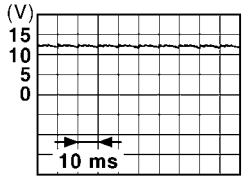
carDiag.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

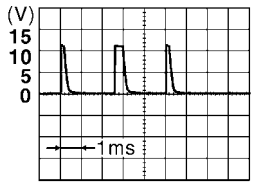
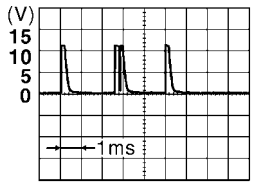
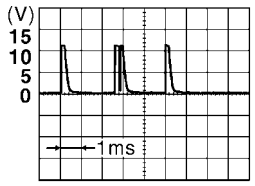
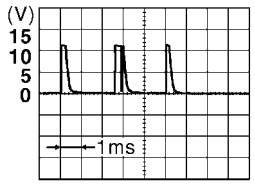
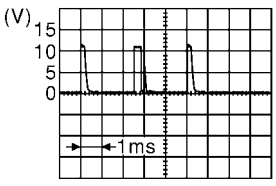
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

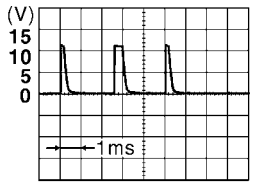
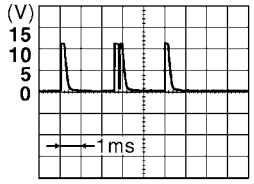
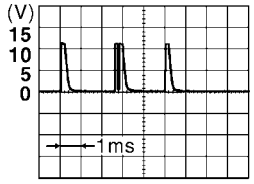
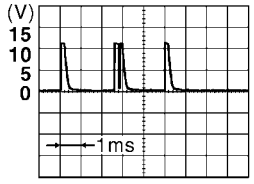
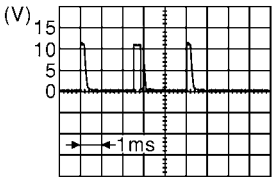
carDiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIDo924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIDo924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIDo924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIDo924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

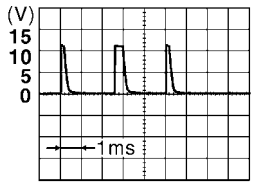
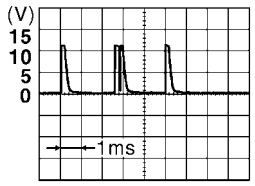
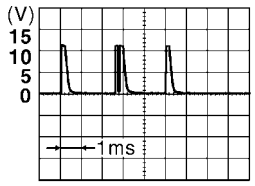
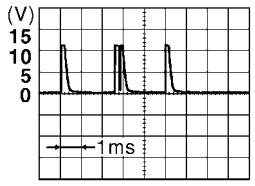
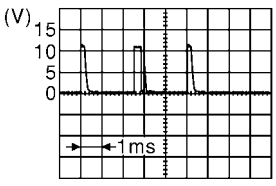
cardiagn.com

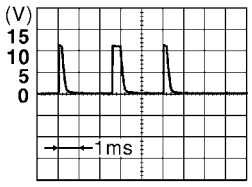
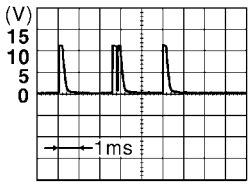
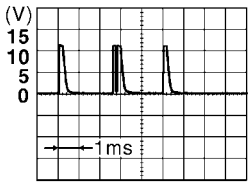
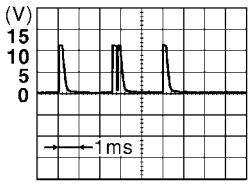
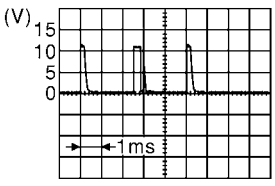
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

carDiagn.com

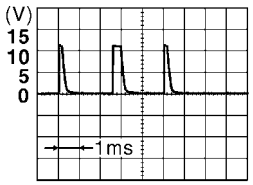
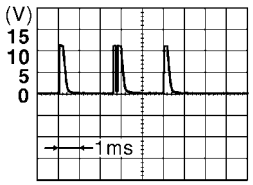
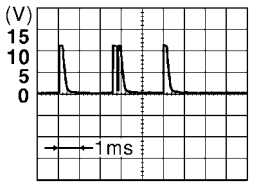
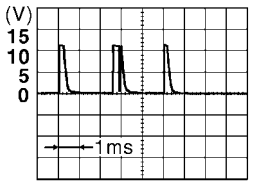
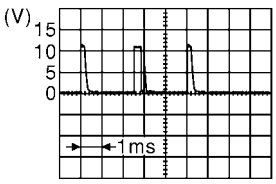
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

cardiagn.com

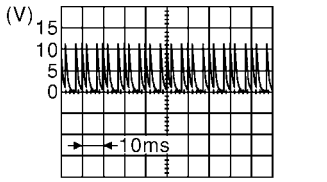
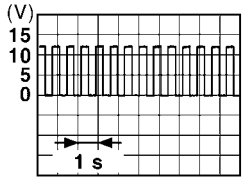
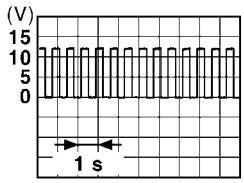
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

carDiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

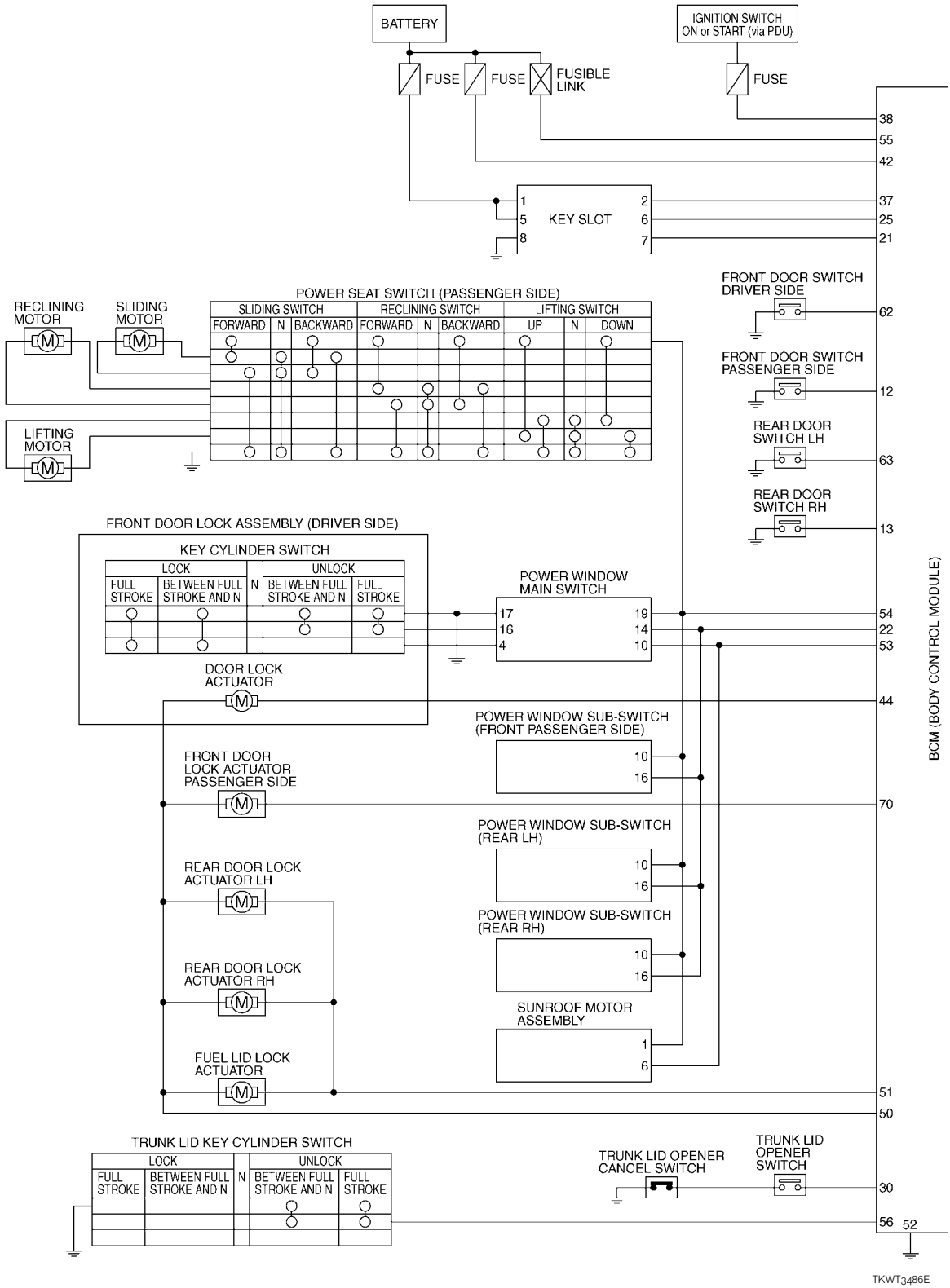
*1: With Intelligent Key system

*2: Without Intelligent Key system

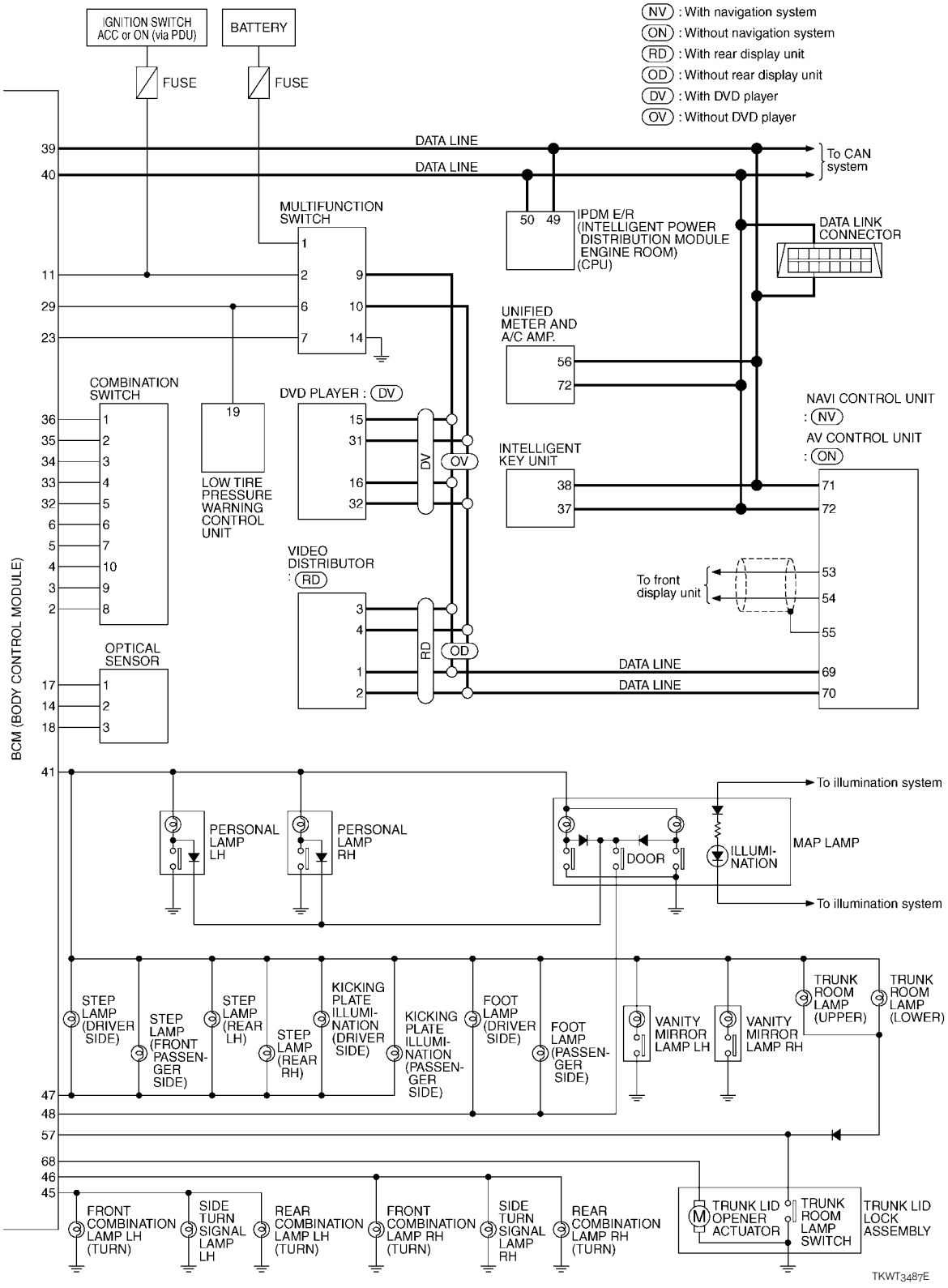
carDiag.com

Wiring Diagram - BCM -

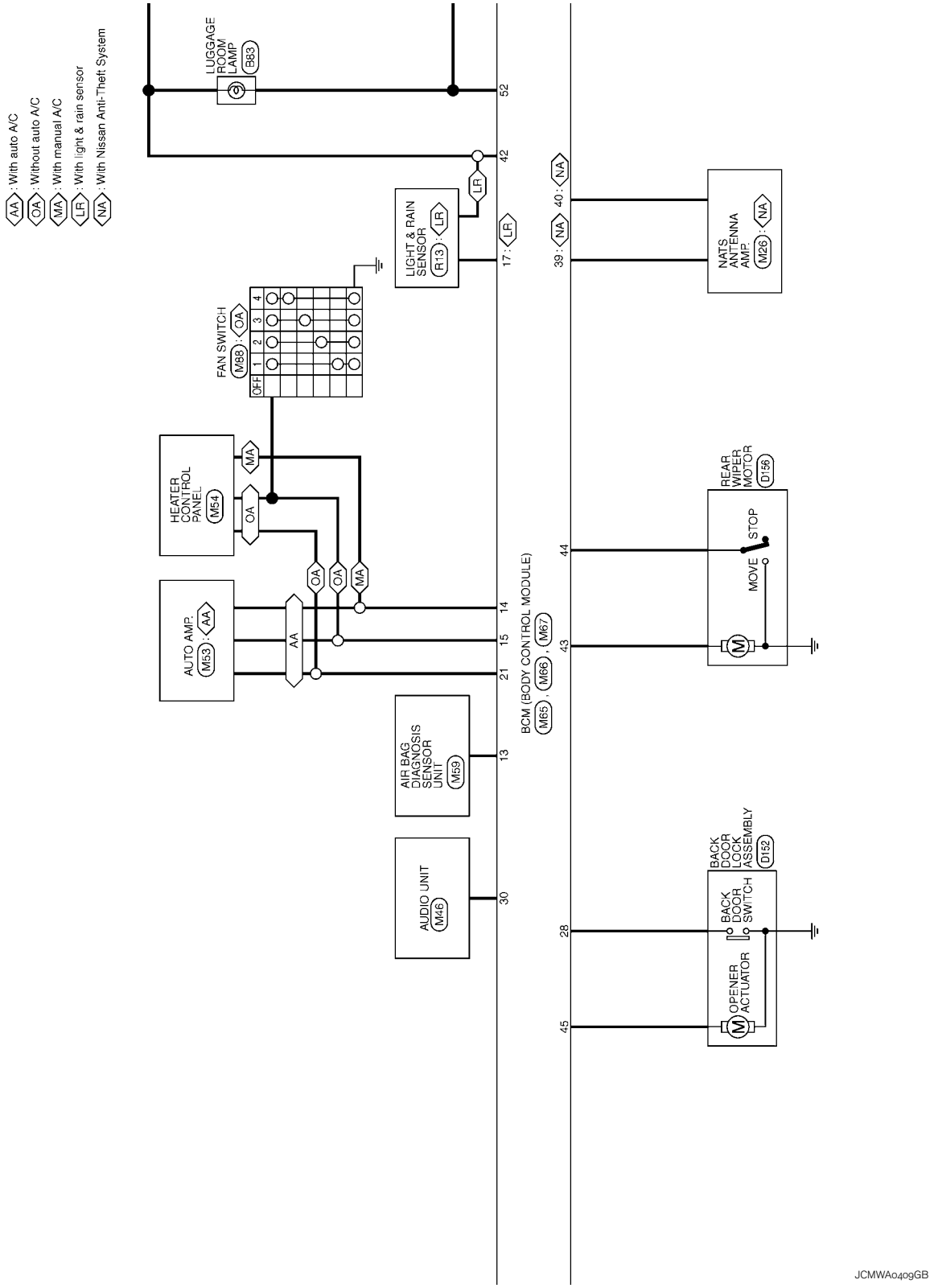
INFOID:0000000001116329



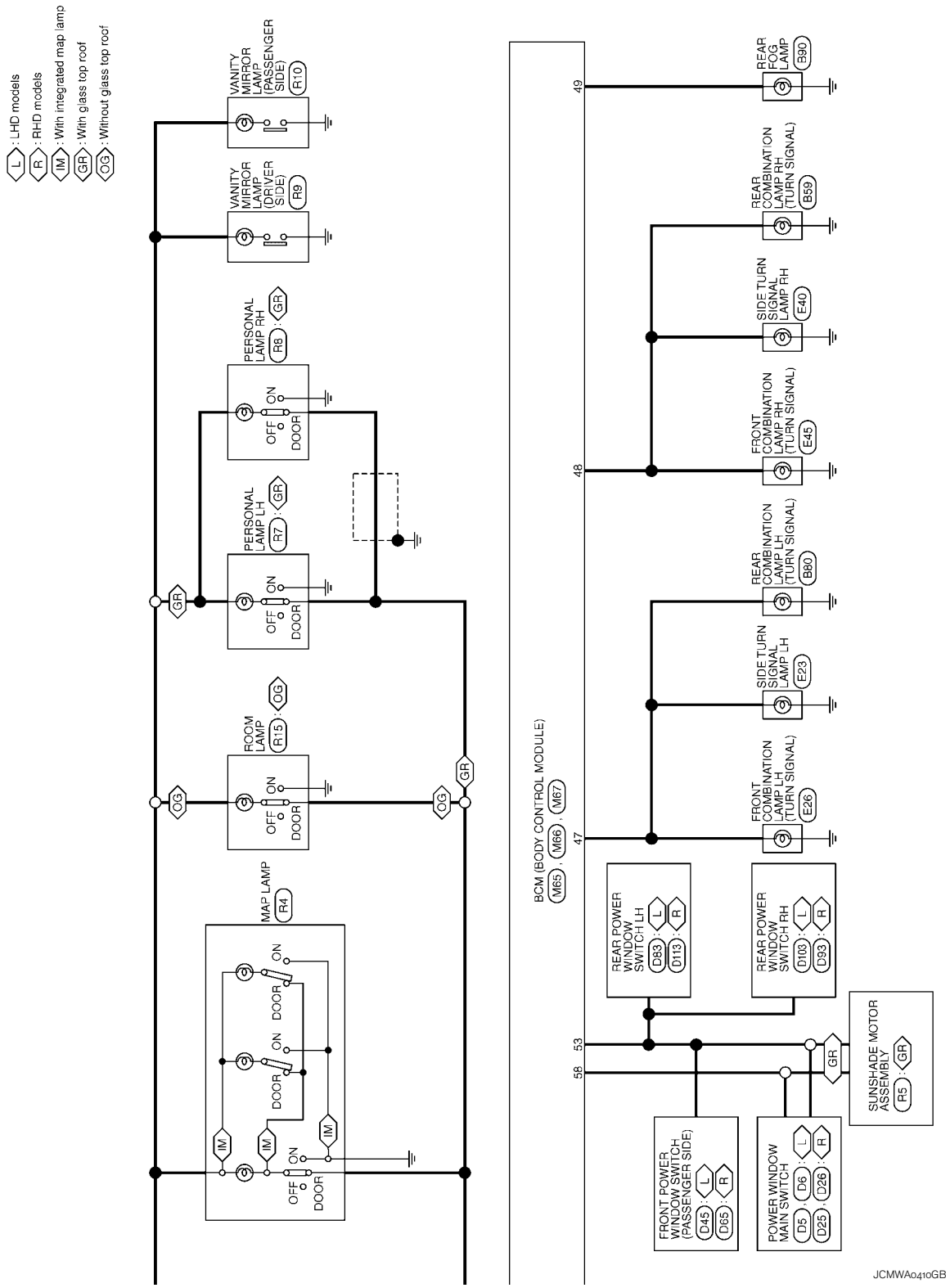
cardiagn.com

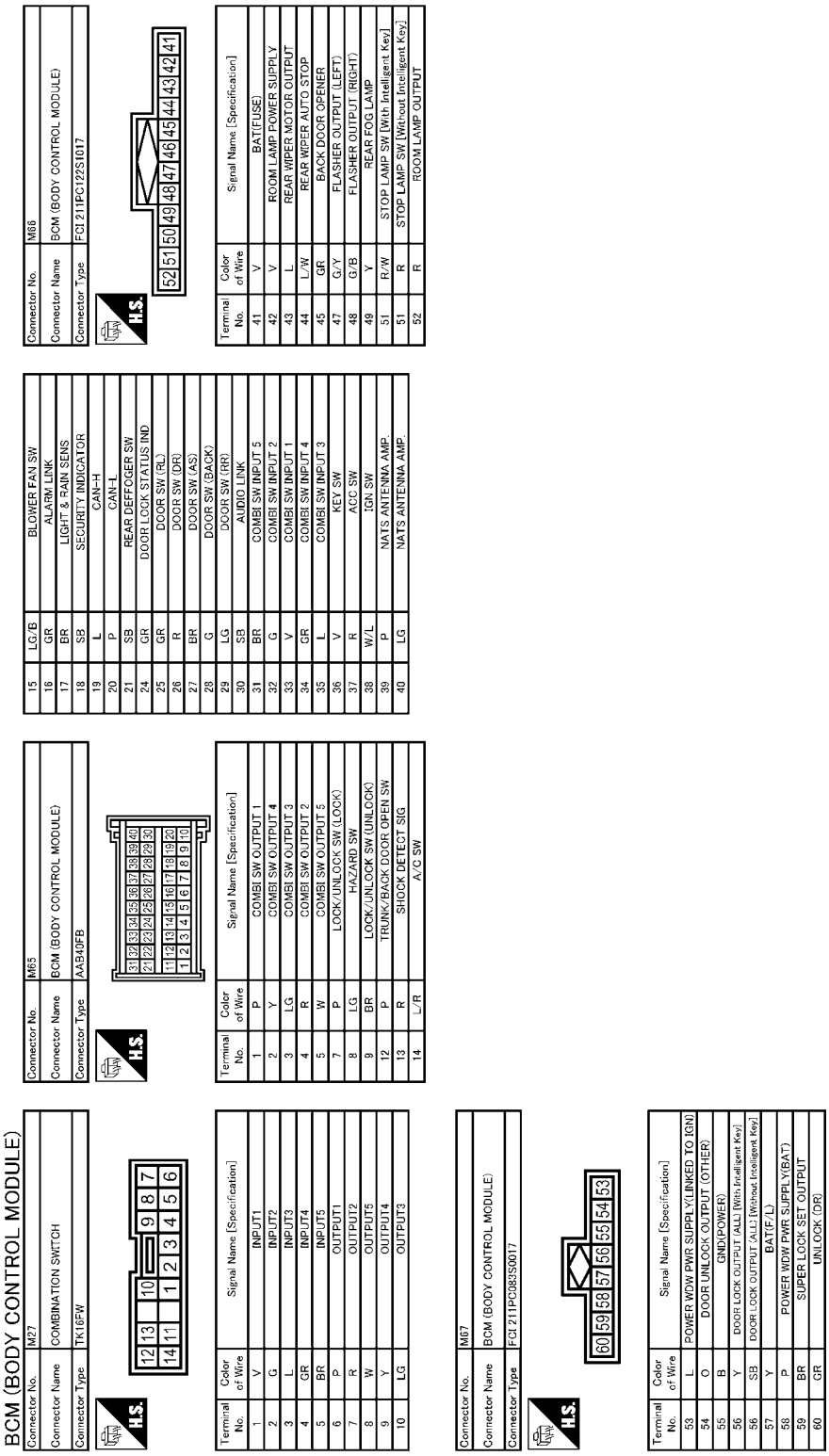


carDiagn.com



cardiagn.com


L : LHD models
R : RHD models
IM : With integrated map lamp
GR : With glass top roof
OG : Without glass top roof
VANITY MIRROR LAMP (PASSENGER SIDE) R10
VANITY MIRROR LAMP (DRIVER SIDE) R9
PERSONAL LAMP RH R8 : GR
PERSONAL LAMP LH R7 : GR
ROOM LAMP R15 : OG
MAP LAMP R4
OFF ON DOOR
BCM (BODY CONTROL MODULE) M65 M66 M67
49
48
47
53
58
REAR FOG LAMP B90
REAR COMBINATION LAMP RH (TURN SIGNAL) B59
SIDE TURN SIGNAL LAMP RH E40
FRONT COMBINATION LAMP RH (TURN SIGNAL) E45
REAR COMBINATION LAMP LH (TURN SIGNAL) B80
SIDE TURN SIGNAL LAMP LH E23
FRONT COMBINATION LAMP LH (TURN SIGNAL) E26
REAR POWER WINDOW SWITCH LH D83 : L D113 : R
REAR POWER WINDOW SWITCH RH D103 : L D93 : R
SUNSHADE MOTOR ASSEMBLY R5 : GR
FRONT POWER WINDOW SWITCH (PASSENGER SIDE) D45 : L D65 : R
POWER WINDOW MAIN SWITCH D5 D6 : L D25 D26 : R
JCMWA0410GB



JCMWA0411GB

Fail Safe

INFOID:0000000001116330

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001116331

carDiagn.com

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001116332

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Reference Value

INFOID:0000000001099380

VALUES ON THE DIAGNOSIS TOOL

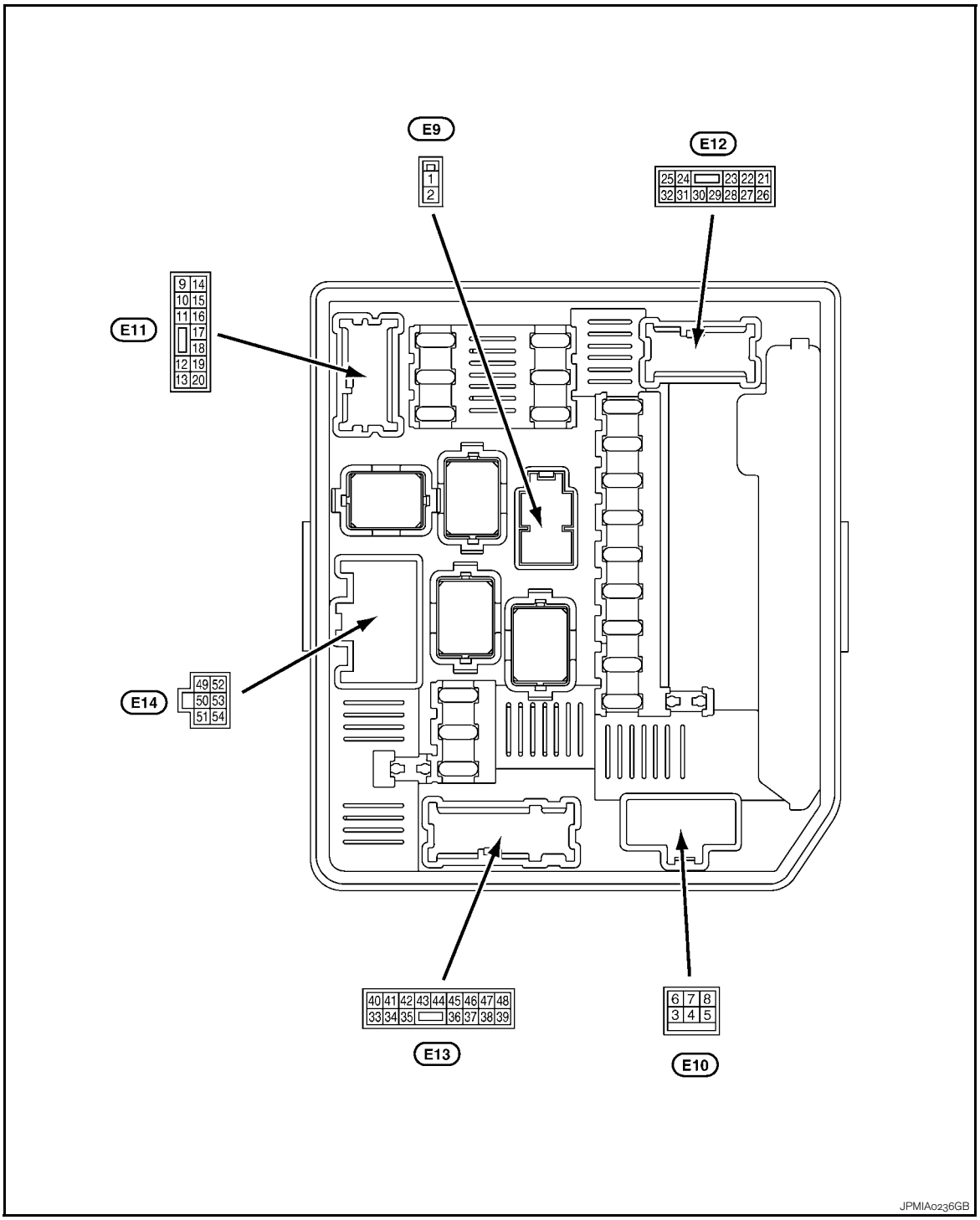
Monitor Item	Condition		Value/Status
MOTOR FAN REQ	Engine idle speed	Changes depending on engine coolant temperature, air conditioner operation status, vehicle speed, etc.	1 - 3
AC COMP REQ	Engine running	A/C switch OFF	Off
		A/C switch ON (Compressor is operating)	On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI (Light is illuminated)		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		Front fog lamp switch ON	On
HL WASHER REQ	Ignition switch ON, and low beam headlamp is ON	Front washer switch OFF	Off
		Front washer switch ON (When headlamp washer is operating)	On
FR WIP REQ	Ignition switch ON	Front wiper switch OFF	STOP
		Front wiper switch INT	1LOW
		Front wiper switch LO	Low
		Front wiper switch HI	Hi
WIP AUTO STOP	Ignition switch ON	Front wiper stop position	STOP P
		Any position other than front wiper stop position	ACT P
WIP PROT	Ignition switch ON	Front wiper operates normally	Off
		Front wiper stops at fail-safe operation	BLOCK
ST RLY REQ **NOTE:** Vehicle without Intelligent Key system indicates only “ON”, and it does not change.	When Intelligent Key is outside the vehicle, and the push switch is pushed		Off
	When Intelligent Key is inside the vehicle, and the push switch is pushed		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Ignition switch ON	Rear window defogger switch OFF	Off
		Rear window defogger switch ON (Rear window defogger is operating)	On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close

cardiagn.com

Monitor Item	Condition	Value/Status
REV SW	Except selector lever R position	Off
	Selector lever R position	On
HOOD SW **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Close the hood	Off
	Open the hood	On
THFT HRN REQ **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Not operation	Off
	Horn is activated with Vehicle Security (Theft Warning) system.	On
HORN CHIRP	**NOTE:** This item is indicated, but not monitored.	Off
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

cardiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
		Signal name	Input/ Output		
+	–				
1 (G)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
2 (R)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
5 (B)	Ground	Ground	—	Ignition switch ON	0 V

carDiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
6 (B)	Ground	Ground	—	Ignition switch ON		0 V
7 (Y)	Ground	Front wiper LO	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch LO	Battery voltage
8 (Y/R)	Ground	Front wiper HI	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch HI	Battery voltage
9 (G)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
10*1 (L/R)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
11*2 (O)	Ground	PTC heater 1 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
12*2 (G/Y)	Ground	PTC heater 2 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
14 (R/B)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
15 (Y/L)*1 (B/R)*2	Ground	ECM relay control	Input	• Engine running • Ignition switch OFF (For a few seconds after turning ignition switch OFF)		0 - 1.0 V*1
						0.6 V*2
				Ignition switch OFF or ACC (More than a few seconds after turning ignition switch OFF)		Battery voltage
16*3 (Y/R)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
19*1 (R/O)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
21*4 (GR)	Ground	Hood switch	Input	Close the hood		Battery voltage
				Open the hood		0 V
22 (Y/G)	Ground	Reverse switch	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON	• Selector lever “R” (Except M/T models) • M/T control lever “R” (M/T models)	Battery voltage
					• Selector lever in any position other than “R” (Except M/T models) • M/T control lever in any position other than “R” (M/T models)	0 V
23 (Y/B)	Ground	A/C relay power supply	Output	Engine stopped		0 V
				Engine running	A/C switch OFF	0 V
					A/C switch ON (A/C compressor is operating)	Battery voltage
24 (R/Y)	Ground	Headlamp LO (RH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
25*1 (G/L)	Ground	ETC relay control	Input	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		0 - 1.0 V
26 (O)	Ground	Front wiper auto stop	Input	Ignition switch ON	Front wiper stop position	0 V
					Any position other than front wiper stop position	Battery voltage
27 (W)	Ground	Oil pressure switch	Input	Engine stopped		0 V
				Engine running		Battery voltage
28 (L)	—	CAN-H	Input/ Output	—		—
29 (P)	—	CAN-L	Input/ Output	—		—
30*4 (L)	Ground	Horn relay control	Output	The horn is not activated		Battery voltage
				The horn is activated		0 V
31 (R)	Ground	Headlamp LO (sensor)	Output	Ignition switch ON	Lighting switch OFF	0 V
					Lighting switch 2ND	Battery voltage
32*1 (R/Y)	Ground	ETC relay power supply	Output	Ignition switch ON		Battery voltage
33*1 (B/O)	Ground	Fuel pump relay control	Input	• Engine running • Ignition switch ON (For 1 second after turning ignition switch ON)		0 - 1.0 V
				Ignition switch ON (More than 1 second after turning ignition switch ON)		Battery voltage
34 (R/B)	Ground	Starter relay power supply	Input	Ignition switch ON (Except M/T models)	Selector lever “P” or “N”	0 V
					Selector lever in any position other than “P” or “N”	Battery voltage
				Ignition switch ON (M/T models)		
35 (W/L)	Ground	Ignition switch ON	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
36 (W)	Ground	Front fog lamp (RH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
37 (R/W)	Ground	Parking lamp (RH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
38 (R/L)	Ground	Tail, license plate lamps and illuminations	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
39 (GR)	Ground	Headlamp washer relay control	Output	Ignition switch ON	When headlamp washer is operating	0 V
					When headlamp washer is not operating	Battery voltage
40*1 (BR/Y)*5 (SB)*6	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
41 (P)	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

carDiag.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
42*1 (B/Y)	Ground	Fuel pump relay power supply	Output	• Ignition switch OFF or ACC • Approximately 1 second or more after turning the ignition switch ON		0 V
				• Approximately 1 second after turning the ignition switch ON • Engine running		Battery voltage
43 (W/B)	Ground	Front fog lamp (LH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
44 (L)	Ground	Headlamp LO (LH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
45 (L/W)	Ground	Headlamp HI (RH)	Output	• Lighting switch 2ND and HI • lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
46 (G)	Ground	Headlamp HI (LH)	Output	• Lighting switch 2ND and HI • Lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
47 (R/L)	Ground	Parking lamp (LH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
48*7 (Y)	Ground	Cooling fan relay-3 control	Output	When cooling fan does HI operation		0 V
				When cooling fan does OFF or LO operation		Battery voltage
49 (B)	Ground	Rear window defogger relay power supply	Output	Ignition switch ON	Rear window defogger switch ON	Battery voltage
					Rear window defogger switch OFF	0 V
50 (B/R)	Ground	Starter relay power supply	Output	When engine is clanking		Battery voltage
				When engine is not clanking		0 V
51 (P)	Ground	Ignition switch START	Input	Ignition switch START		Battery voltage
				Ignition switch OFF, ACC or ON		0 V
52 (W)	Ground	Cooling fan relay-1 power supply	Output	When cooling fan does LO or HI operation		Battery voltage
				When cooling fan does OFF operation		0 V
53 (W/B)	Ground	Battery power supply (Cooling fan relay)	Input	Ignition switch OFF		Battery voltage
54*5 (R)	Ground	Cooling fan relay-2 power supply	Input	When cooling fan does HI operation		Battery voltage
				When cooling fan does OFF or LO operation		0 V

*1: HR engine and MR engine models

*2: K9K engine models

*3: Except M/T models only

*4: With vehicle security (theft warning) system

*5: HR engine models

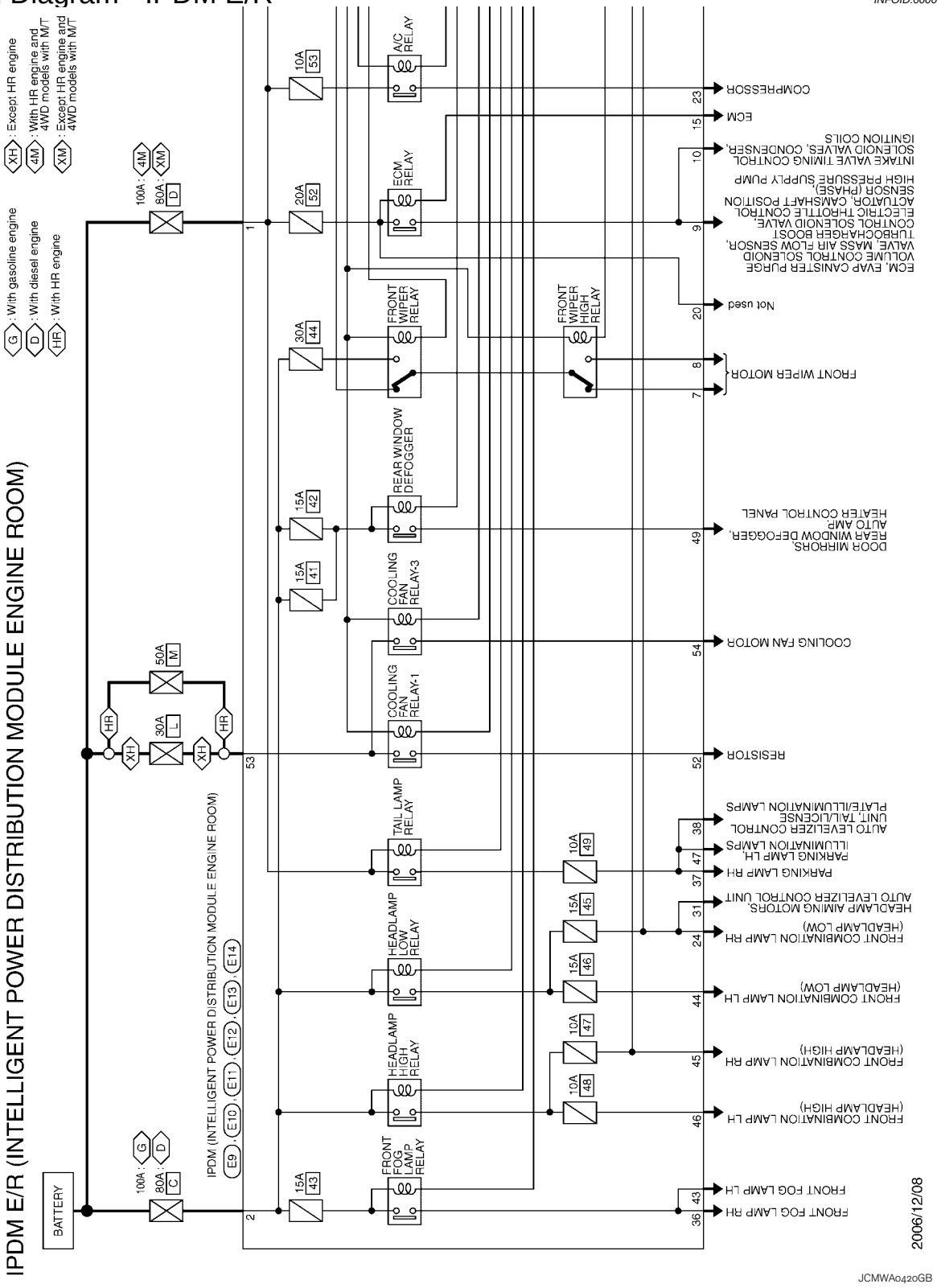
*6: MR engine models

*7: MR engine and K9K engine models

cardiagn.com

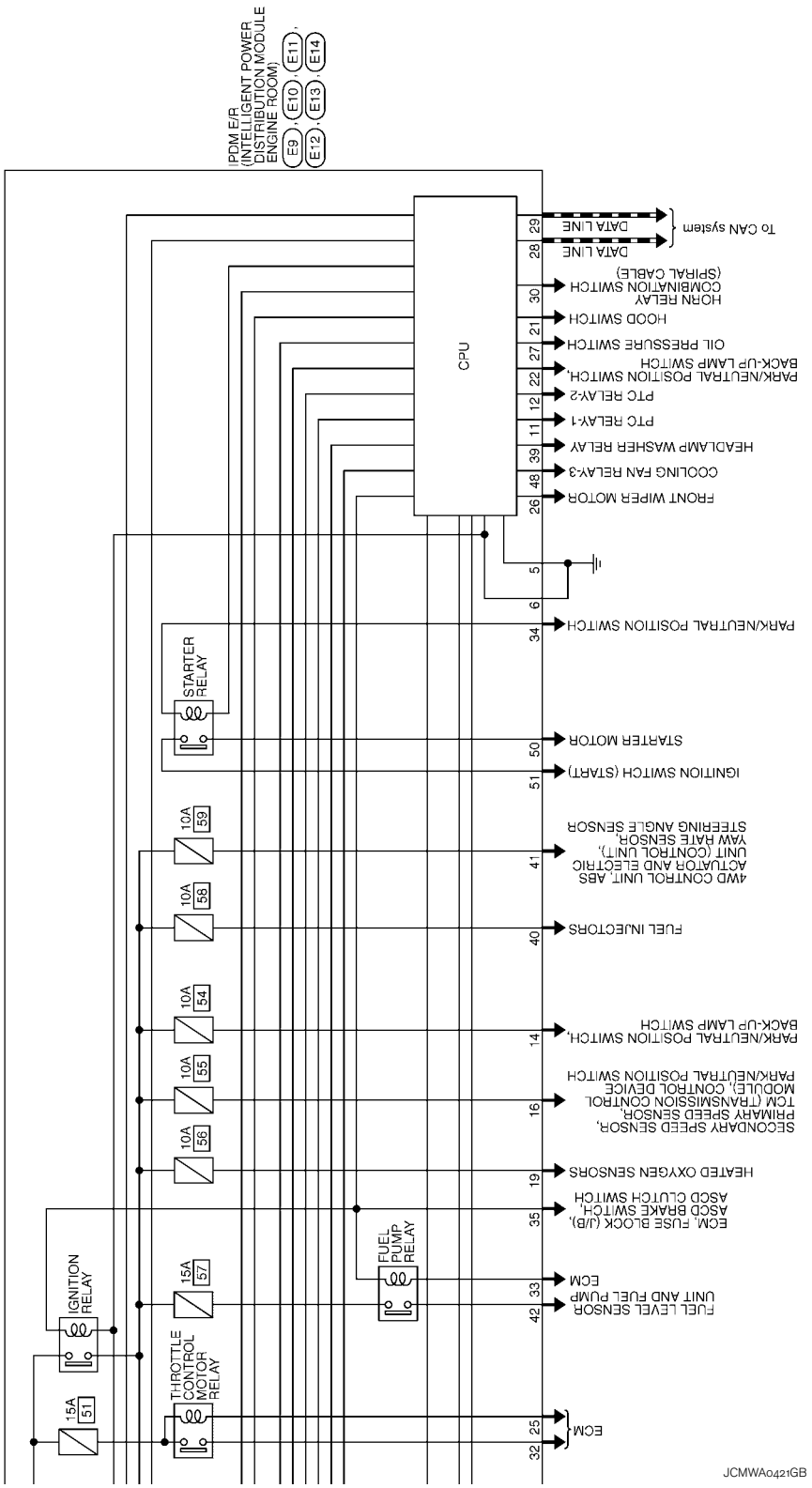
Wiring Diagram - IPDM E/R -

INFOID:0000000001099381

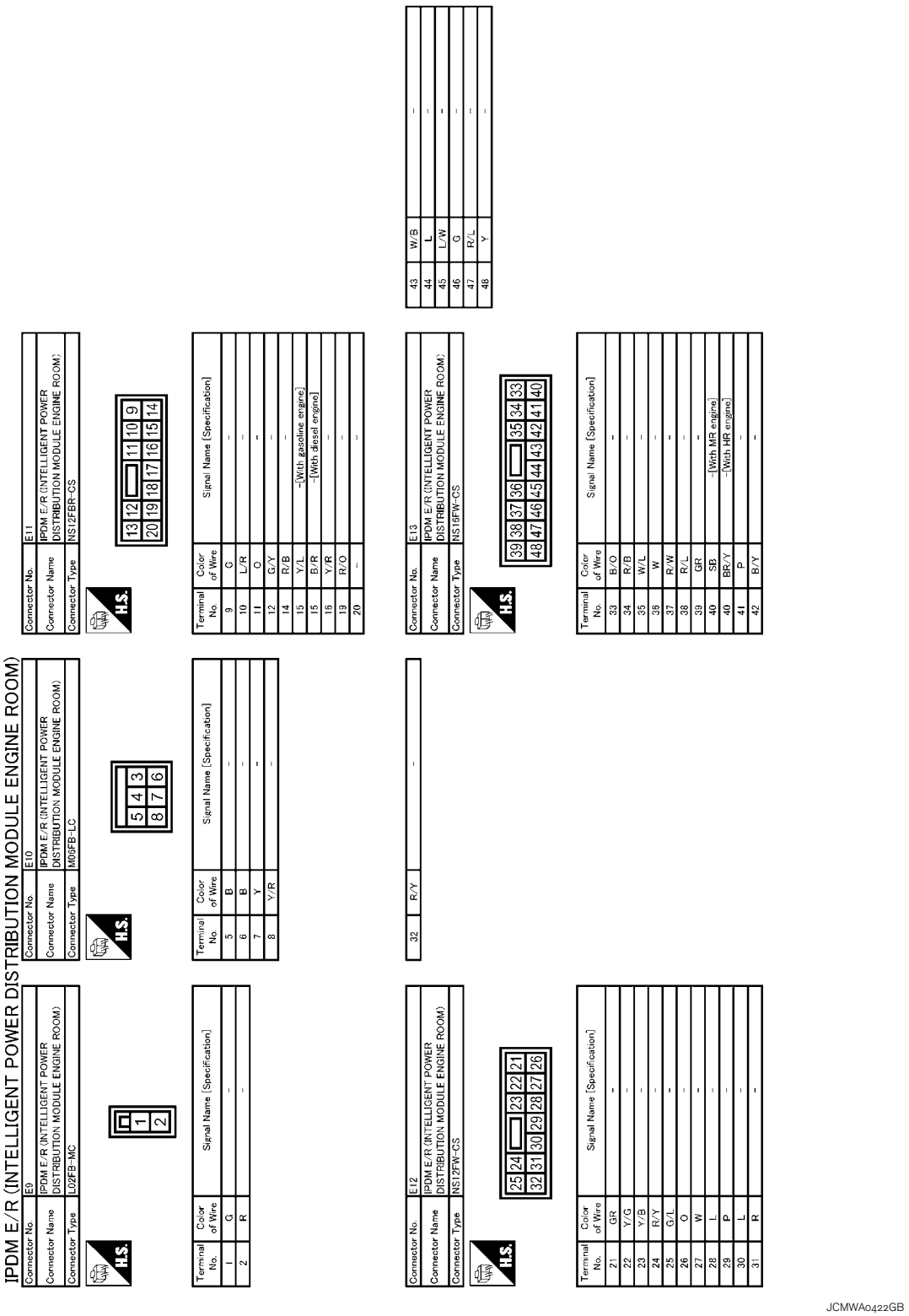


JCMWA0420GB

carDiagn.com



cardiagn.com



JCMWA0422GB

carDiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	-
50	B/R	-
51	P	-
52	W	-
53	W/B	-
54	R	-

JCMWA0423GB

Fail Safe

INFOID:0000000001099382

CAN communication control

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If no CAN communication is available with ECM

cardiagn.com

Control part	Fail-safe in operation
Cooling fan	• The cooling fan relay-2*1 or the cooling fan relay-3*2 turns ON when the ignition switch is turned ON • Turns off the fan motor low relay when the ignition switch is turned OFF
A/C compressor	A/C relay OFF

*1: HR engine models

*2: MR engine and K9K engine models

If no CAN communication is available with BCM

Control part	Fail-safe in operation
Headlamp	• The headlamp low relay turns ON when the ignition switch is turned ON • The headlamp low relay turns OFF when the ignition switch is turned OFF • Headlamp high relay OFF
• Parking lamps • License plate lamps • Tail lamps • Illuminations	• The tail lamp relay turns ON when the ignition switch is turned ON • The tail lamp relay turns OFF when the ignition switch is turned OFF
Front wiper	• The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. • The front wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Front fog lamps	Front fog lamp relay OFF
Starter motor	Inhibit relay OFF
Rear window defogger	Rear window defogger relay OFF
Headlamp washer	Headlamp washer relay OFF
PTC heater	PTC heater relay OFF

Ignition relay malfunction detection function

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

DTC	Ignition switch	Ignition relay	Tail lamp relay
—	ON	ON	—
—	OFF	OFF	—
B2098: IGN RLY ON	OFF	ON	ON (10 minutes)
B2099: IGN RLY OFF	ON	OFF	—

NOTE:

The tail lamp relay is turned OFF when the ignition switch is turned ON.

Front wiper control

IPDM E/R detects the front wiper stop position with the front wiper auto stop signal.
When the front wiper auto stop signal is in the conditions listed below, IPDM E/R repeats a front wiper 10 seconds operation and 20 seconds stop five times.

Ignition switch	Front wiper switch	Front wiper auto stop signal
ON	OFF	The front wiper auto stop signal (stop position) cannot be input for 10 seconds.
	ON	The front wiper auto stop signal does not change for 10 seconds.

NOTE:

carDiagn.com

This operation status can be confirmed on the IPDM E/R “Data Monitor” that displays “BLOCK” for the item “WIP PROT” while the wiper is stopped.

DTC Index

INFOID:0000000001099383

CONSULT display	Fail-safe	Timing[NOTE]		Reference page
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	PAST	PCS-14
B2098: IGN RELAY ON	×	CRNT	PAST	PCS-15
B2099: IGN RELAY OFF	—	CRNT	PAST	PCS-16
B2100: EEPROM	—	CRNT	PAST	PCS-17

NOTE:

The details of time display are as follows.

- CRNT: The malfunctions that are detected now.
- PAST: The number is indicated when it is normal at present and a malfunction was detected in the past.

cardiagn.com

SYMPTOM DIAGNOSIS

EXTERIOR LIGHTING SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000001089312

CAUTION:
Perform the self-diagnosis with CONSULT-III before the symptom diagnosis. Perform the trouble diagnosis if any DTC is detected.

Symptom		Possible cause	Inspection item
Headlamp (HI) is not turned ON.	One side	• Fuse • Halogen bulb (HI) • Harness between IPDM E/R and the front combination lamp • Front combination lamp (headlamp housing assembly) • IPDM E/R	Headlamp (HI) circuit Refer to EXL-216.
	Both sides	**Symptom diagnosis** "BOTH SIDE HEADLAMPS (HI) ARE NOT TURNED ON" Refer to EXL-315.	
Headlamp (HI) is not turned OFF.	When ignition switch is turned ON.		
	When ignition switch is turned OFF.	IPDM E/R	—
High beam indicator lamp is not turned ON. [The headlamp (HI) is turned ON.]		Combination meter	• Combination meter Data monitor "HI-BEAM IND" • BCM (HEAD LAMP) Active test "HEADLAMP"
Headlamp (LO) is not turned ON.	One side	• Fuse • Halogen bulb (LO) • Harness between IPDM E/R and the front combination lamp • Front combination lamp (headlamp housing assembly) • IPDM E/R	Headlamp (LO) circuit Refer to EXL-218.
	Both sides	**Symptom diagnosis** "BOTH SIDE HEADLAMPS (LO) ARE NOT TURNED ON" Refer to EXL-316.	
Headlamp (LO) is not turned OFF.	When ignition switch is turned ON.		
	When ignition switch is turned OFF.	IPDM E/R	—
Headlamp HI and LO are not turned ON.		• Harness between front combination lamp and the ground • Front combination lamp (headlamp housing assembly)	Headlamp ground circuit Refer to EXL-220.
Each lamps are not turned ON/OFF with the lighting switch AUTO.		• Combination switch • Harness between the combination switch and BCM • BCM	Combination switch Refer to BCS-63.
		• Light & rain sensor • Harness between the light & rain sensor and BCM • BCM	Light & rain sensor Refer to EXL-228.
Front fog lamp is not turned ON.	One side	• Front fog lamp bulb • Harness between IPDM E/R and the front fog lamp • Front fog lamp • IPDM E/R	Front fog lamp circuit Refer to EXL-221.
	Both sides	**Symptom diagnosis** "BOTH SIDE FRONT FOG LAMPS ARE NOT TURNED ON" Refer to EXL-318.	
Front fog lamp is not turned ON.			

carDiagn.com

Symptom		Possible cause	Inspection item
Front fog lamp indicator lamp is not turned ON. (Front fog lamp is turned ON.)		Combination meter	• Combination meter Data monitor "FR FOG IND" • BCM (HEAD LAMP) Active test "FR FOG LAMP"
Parking lamp is not turned ON.		• Parking lamp bulb • Harness between IPDM E/R and the front combination lamp • Front combination lamp • IPDM E/R	Parking lamp circuit Refer to EXL-223.
Tail lamp is not turned ON.		• Tail lamp bulb • Harness between IPDM E/R and the rear combination lamp • Rear combination lamp	Tail lamp circuit Refer to EXL-233.
License plate lamp is not turned ON.		• License plate lamp bulb • Harness between IPDM E/R and the license plate lamp • License plate lamp	License plate lamp circuit Refer to EXL-235.
Tail lamp and the license plate lamp are not turned ON.		• Fuse • Harness between IPDM E/R and the rear combination lamp • IPDM E/R	Tail lamp circuit Refer to EXL-233.
• Parking lamp, the tail lamp and the license plate lamp are not turned ON. • Parking lamp, the tail lamp and the license plate lamp are not turned OFF. (Each illumination is turned ON/OFF.)		**Symptom diagnosis** "PARKING, LICENSE PLATE AND TAIL LAMPS ARE NOT TURNED ON" Refer to EXL-317.	
Tail lamp indicator is not turned ON. (Parking/tail lamps are turned ON.)		Combination meter	• Combination meter Data monitor "LIGHT IND" • BCM (HEAD LAMP) Active test "TAIL LAMP"
Turn signal lamp does not blink.	Indicator lamp is normal. (Applicable side performs the high flasher activation.)	• Harness between BCM and each turn signal lamp • Turn signal lamp bulb	Turn signal circuit Refer to EXL-225.
	Indicator lamp is included.	• Combination switch • Harness between the combination switch and BCM • BCM	Combination switch Refer to BCS-63.
Turn signal indicator lamp does not blink. (Turn signal indicator lamp is normal.)	One side	Combination meter	—
	Both sides (Always)	• Turn signal indicator lamp signal - BCM • Combination meter	• Combination meter Data monitor "TURN IND" • BCM (FLASHER) Active test "FLASHER"
	Both sides (Only when activating hazard warning lamp with the ignition switch OFF)	• Combination meter power supply and the ground circuit • Combination meter	Combination meter Power supply and the ground circuit Refer to MWI-28.
• Hazard warning lamp does not activate. • Hazard warning lamp continues activating. (Turn signal is normal.)		• Hazard switch • Harness between the hazard switch and BCM • BCM	Hazard switch Refer to EXL-231.

cardiagn.com

Symptom		Possible cause	Inspection item
Rear fog lamp is not turned ON.	Rear fog lamp indicator lamp is normal.	• Harness between BCM and rear fog lamp • Rear fog lamp bulb • BCM	Rear fog lamp circuit Refer to EXL-236.
	Rear fog lamp indicator lamp is included.	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63.
Rear fog lamp indicator lamp does not turn on. (Rear fog lamp turns ON)		• Rear fog lamp status signal - BCM • Combination meter	• Combination meter Data monitor "REAR FOG IND" • BCM (HEAD LAMP) Active test "RR FOG LAMP"

cardiagn.com

NORMAL OPERATING CONDITION

Description

INFOID:0000000001026263

AUTO LIGHT SYSTEM

The headlamp may not be turned ON/OFF immediately after passing dark area or bright area (short tunnel, sky bridge, shadowed area etc.) while using the auto light system. This causes the control difference. This is normal.

cardiagn.com

BOTH SIDE HEADLAMPS (HI) ARE NOT TURNED ON

Description

INFOID:0000000001099384

Both side headlamps (HI) are not turned ON when setting to the lighting switch HI or PASS.

Diagnosis Procedure

INFOID:0000000001099385

1.COMBINATION SWITCH INSPECTION

Check the combination switch. Refer to BCS-63, "Symptom Table".

Is the combination switch normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning part.

2.CHECK HEADLAMP (HI) REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR

1. Select "HL HI REQ" of IPDM E/R data monitor item.
2. With operating the lighting switch, check the monitor status.

Monitor item	Condition		Monitor status
HL HI REQ	Lighting switch (2ND)	HI or PASS	ON
		LO	OFF

Is the item status normal?

YES >> GO TO 3.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

3.HEADLAMP (HI) CIRCUIT INSPECTION

Check the headlamp (HI) circuit. Refer to EXL-216, "Component Function Check".

Is the headlamp (HI) circuit normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

BOTH SIDE HEADLAMPS (LO) ARE NOT TURNED ON

Description

INFOID:0000000001099386

Both side headlamps (LO) are not turned ON in any condition.

Diagnosis Procedure

INFOID:0000000001099387

1.CHECK COMBINATION SWITCH

Check the combination switch. Refer to BCS-63, "Symptom Table".

Is the combination switch normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning part.

2.CHECK HEADLAMP (LO) REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR

1. Select "HL LO REQ" of IPDM E/R data monitor item.
2. With operating the lighting switch, check the monitor status.

Monitor item	Condition		Monitor status
HL LO REQ	Lighting switch	2ND	ON
		OFF	OFF

Is the item status normal?

YES >> GO TO 3.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

3.HEADLAMP (LO) CIRCUIT INSPECTION

Check the headlamp (LO) circuit. Refer to EXL-218, "Component Function Check".

Is the headlamp (LO) circuit normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

PARKING, LICENSE PLATE AND TAIL LAMPS ARE NOT TURNED ON

Description

INFOID:0000000001099388

The parking, license plate, tail lamps and each illumination are not turned ON in any condition.

Diagnosis Procedure

INFOID:0000000001099389

1.CHECK FUSE

Check that the following fuse is fusing.

Unit	Location	Fuse No.	Capacity
• Parking lamp • Tail lamp • License plate lamp	IPDM E/R	#49	10 A

Is the fuse fusing?

YES >> Repair the applicable circuit. And then replace the fuse.
NO >> GO TO 2.

2.COMBINATION SWITCH INSPECTION

Check the combination switch. Refer to BCS-63, "Symptom Table".

Is the combination switch normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning part.

3.CHECK TAIL LAMP RELAY REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR
1. Select "TAIL & CLR REQ" of IPDM E/R data monitor item.
2. With operating the lighting switch, check the monitor status.

Monitor item	Condition		Monitor status
TAIL & CLR REQ	Lighting switch	1ST	ON
		OFF	OFF

Is the item status normal?

YES >> GO TO 4.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

4.TAIL LAMP CIRCUIT INSPECTION

Check the tail lamp circuit. Refer to EXL-233, "Component Function Check".

Is the tail lamp circuit normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace the malfunctioning part.

BOTH SIDE FRONT FOG LAMPS ARE NOT TURNED ON

Description

INFOID:0000000001099390

The front fog lamps are not turned ON in any condition.

Diagnosis Procedure

INFOID:0000000001099391

1.CHECK FUSE

Check that the following fuse is fusing.

Unit	Location	Fuse No.	Capacity
Front fog lamp	IPDM E/R	#43	15 A

Is the fuse fusing?

YES >> Repair the applicable circuit. And then replace the fuse.
NO >> GO TO 2.

2.COMBINATION SWITCH INSPECTION

Check the combination switch. Refer to BCS-63, "Symptom Table".

Is the combination switch normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning part.

3.CHECK FRONT FOG LAMP REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR

1. Select "FR FOG REQ" of IPDM E/R data monitor item.
2. With operating the front fog lamp switch, check the monitor status.

Monitor item	Condition		Monitor status
FR FOG REQ	Front fog lamp switch (With lighting switch 1ST)	ON	ON
		OFF	OFF

Is the item status normal?

YES >> GO TO 4.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

4.FRONT FOG LAMP CIRCUIT INSPECTION

Check the front fog lamp circuit. Refer to EXL-221, "Component Function Check".

Is the front fog lamp circuit normal?

YES >> Replace IPDM E/R.
NO >> Repair or replace the malfunctioning part.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001078107

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

cardiagn.com

ON-VEHICLE MAINTENANCE

HEADLAMP AIMING ADJUSTMENT

Description

INFOID:0000000001026278

PREPARATION BEFORE ADJUSTING

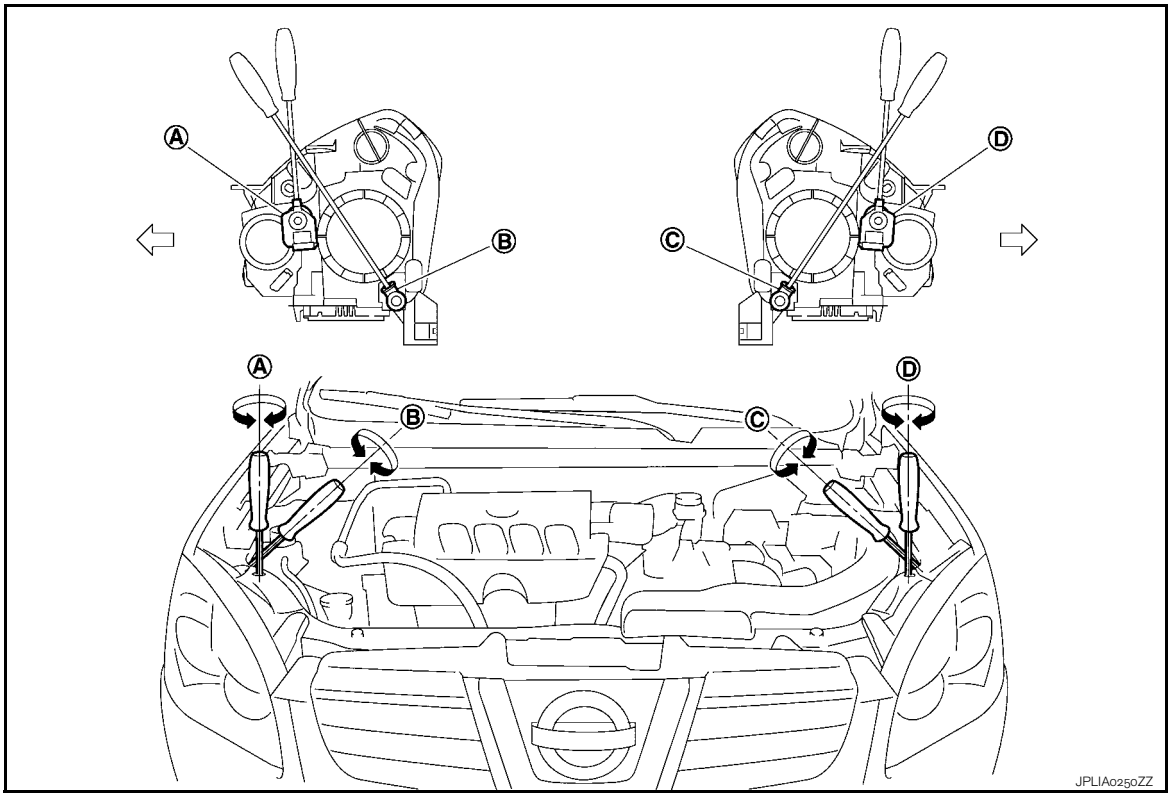
NOTE:

- For details, refer to the regulations in your own country.
- Perform aiming if the vehicle front body has been repaired and/or the headlamp assembly has been replaced.

Before performing aiming adjustment, check the following.

- Adjust the tire pressure to the specification.
- Fill with fuel, engine coolant and each oil.
- Maintain the unloaded vehicle condition. (Remove luggage from the passenger compartment and the luggage room.)
  NOTE:
  Do not remove the temporary tire, jack and on-vehicle tool.
- Wipe out dirt on the headlamp.
  CAUTION:
  Never use organic solvent (thinner, gasoline etc.)
- Ride alone on the driver seat.
- Headlamp aiming switch sets to “0”.

AIMING ADJUSTMENT SCREW



A. Headlamp RH (UP/DOWN) adjustment screw
B. Headlamp RH (INSIDE/OUTSIDE) adjustment screw
C. Headlamp LH (INSIDE/OUTSIDE) adjustment screw
D. Headlamp LH (UP/DOWN) adjustment screw
⇦: Vehicle center

cardiagn.com

Adjustment screw		Screw driver rotation	Facing direction
A	Headlamp RH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN
B	Headlamp RH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
C	Headlamp LH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
D	Headlamp LH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN

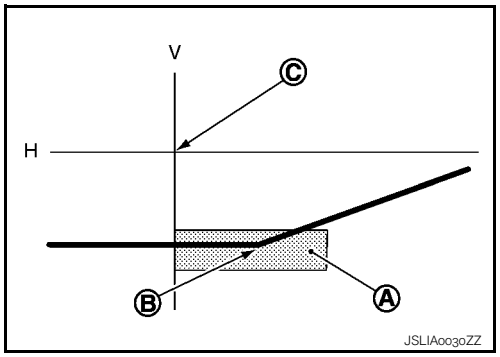
LHD

LHD : Aiming Adjustment Procedure

INFOID:0000000001102325

1. Place the screen.
   NOTE:
   - Stop the vehicle at the perpendicular angle to the wall.
   - Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the headlamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the headlamp (LO).
   NOTE:
   Block light from the headlamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.
   CAUTION:
   Never cover lens surface with tape, etc. because it is made from plastic.
4. Use the aiming adjustment screw to adjust the elbow point projected by the low beams on the screen, so that it is within the aiming adjustment area.

Low beam distribution on the screen

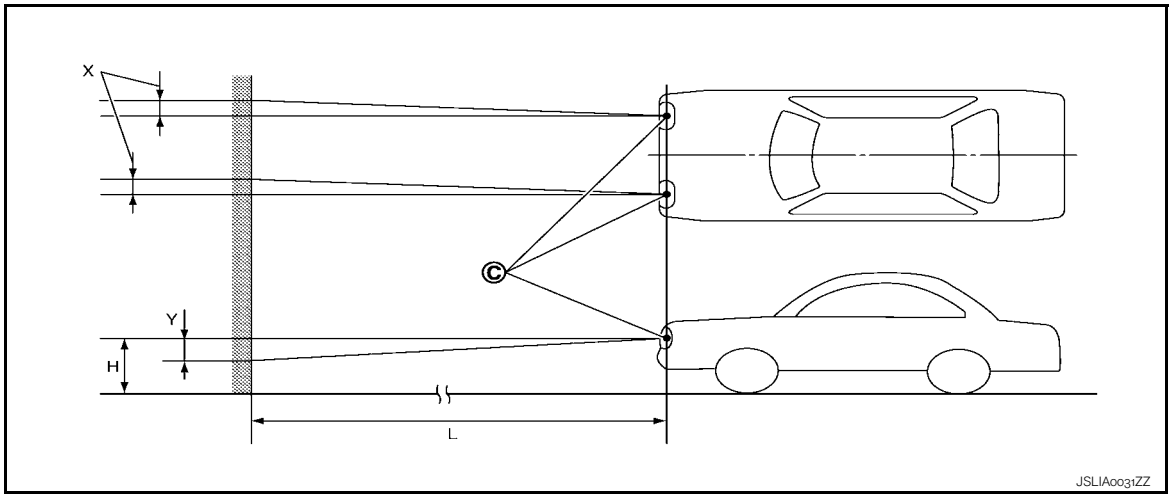


A. Aiming adjustment area
B. Elbow point
C. Headlamp center
H. Horizontal center line of headlamp
V. Vertical center line of headlamp

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y) (Lower side from headlamp center height)	Lateral direction (X) (Right side from headlamp centerline)
100 – 124 (3.94 – 4.88)	Within 120 (4.72)

carDiagn.com



C. Vertical center line of headlamp
H. Horizontal center line of headlamp
L. Distance from headlamp center to screen
X. Aiming adjustment area (lateral)
Y. Aiming adjustment area (Vertical)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

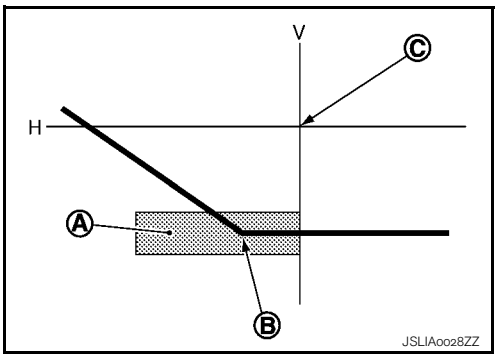
RHD

RHD : Aiming Adjustment Procedure

INFOID:0000000001102326

1. Place the screen.
   NOTE:
   • Stop the vehicle at the perpendicular angle to the wall.
   • Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the headlamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the headlamp (LO).
   NOTE:
   Block light from the headlamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.
   CAUTION:
   Never cover lens surface with tape, etc. because it is made from plastic.
4. Use the aiming adjustment screw to adjust the elbow point projected by the low beams on the screen, so that it is within the aiming adjustment area.

Low beam distribution on the screen



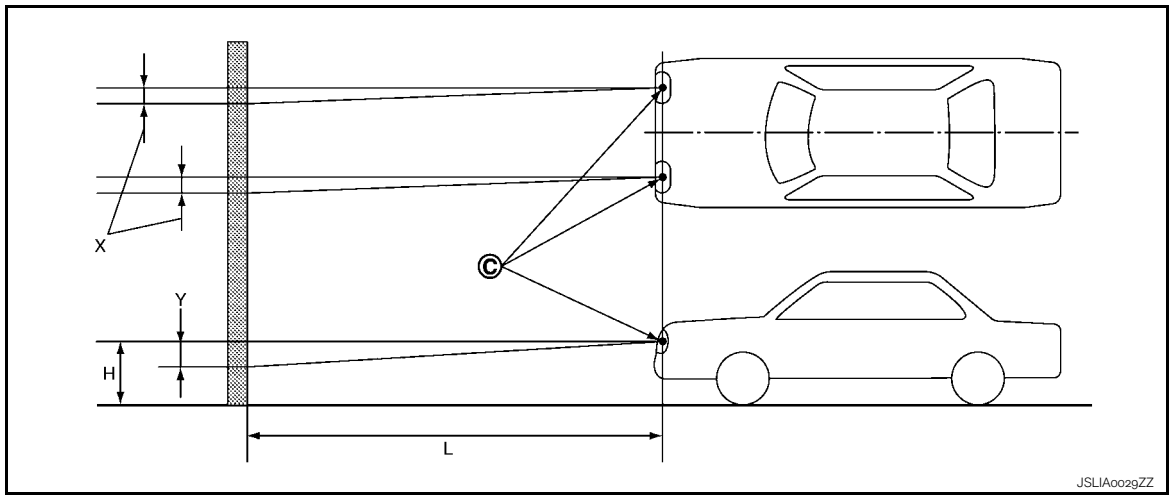
A. Aiming adjustment area
B. Elbow point
C. Headlamp center

cardiagn.com

H. Horizontal center line of headlamp
V. Vertical center line of headlamp

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y) (Lower side from headlamp center height)	Lateral direction (X) (Left side from headlamp centerline)
100 – 124 (3.94 – 4.88)	Within 120 (4.72)



C. Vertical center line of headlamp
H. Horizontal center line of headlamp
L. Distance from headlamp center to screen
X. Aiming adjustment area (lateral)
Y. Aiming adjustment area (Vertical)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

carDiagn.com

FRONT FOG LAMP AIMING ADJUSTMENT

Description

INFOID:0000000001102323

PREPARATION BEFORE ADJUSTING

NOTE:

- For details, refer to the regulations in your own country.
- Perform aiming if the vehicle front body has been repaired and/or the headlamp assembly has been replaced.

Before performing aiming adjustment, check the following.

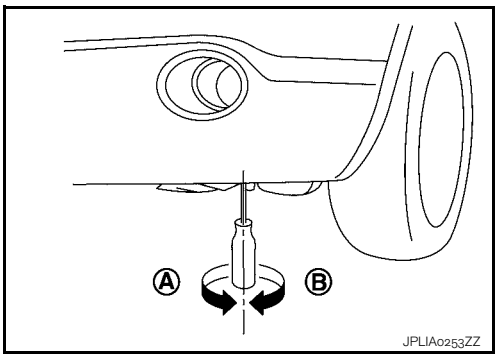
- Adjust the tire pressure to the specification.
- Fill with fuel, engine coolant and each oil.
- Maintain the unloaded vehicle condition. (Remove luggage from the passenger compartment and the luggage room.)
  NOTE:
  Do not remove the temporary tire, jack and on-vehicle tool.
- Wipe out dirt on the headlamp.
  CAUTION:
  Never use organic solvent (thinner, gasoline etc.)
- Ride alone on the driver seat.

AIMING ADJUSTMENT SCREW

- Turn the aiming adjusting screw for adjustment.
- For the position and direction of the adjusting screw, refer to the figure.
  NOTE:
  A screwdriver or hexagonal wrench (6 mm) can be used for adjustment.

A: UP

B: DOWN



Aiming Adjustment Procedure

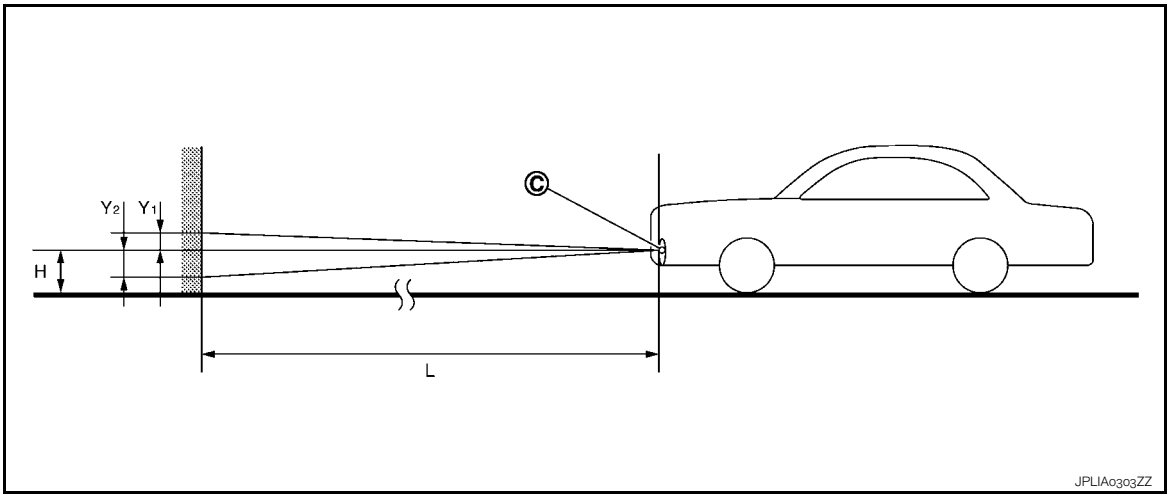
INFOID:0000000001102324

1. Place the screen.
   NOTE:
   - Stop the vehicle at the perpendicular angle to the wall.
   - Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the front fog lamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the front fog lamp.
   NOTE:
   Block light from the front fog lamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.
   CAUTION:
   Never cover lens surface with tape, etc. because it is made from plastic.
4. Use the aiming adjustment screw to adjust the elbow point projected by the front fog lights on the screen, so that it is within the aiming adjustment area.

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y_1) (Upper side from headlamp center height)	Vertical direction (Y_2) (Lower side from headlamp center height)
100 (3.94)	200 (7.87)

cardiagn.com



C. Vertical center line of front fog lamp
H. Horizontal center line of front fog lamp
L. Distance from front fog lamp center to screen
Y1. Aiming adjustment area (Upper)
Y2. Aiming adjustment area (Lower)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

carDiagn.com

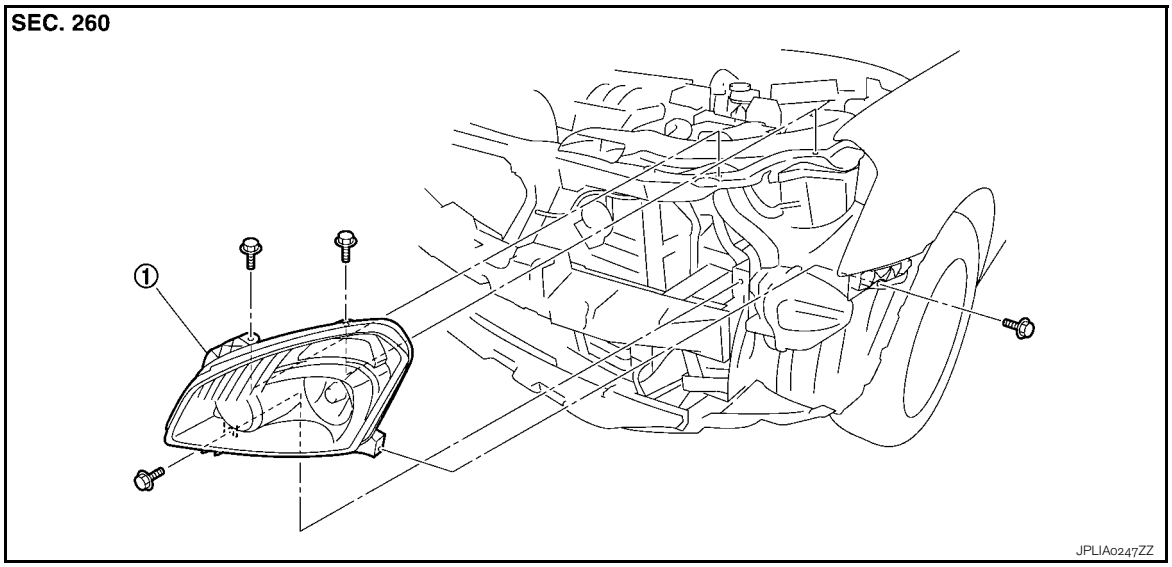
ON-VEHICLE REPAIR

FRONT COMBINATION LAMP

Exploded View

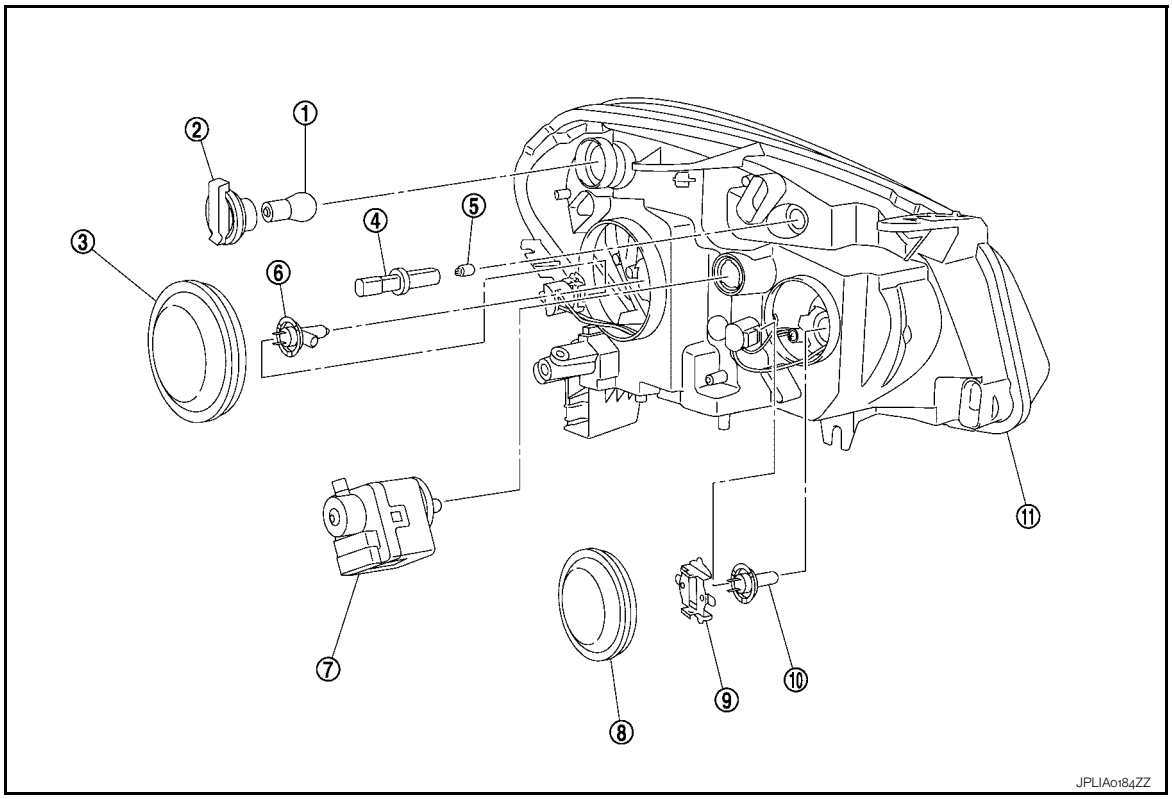
INFOID:0000000001026274

REMOVAL



1. Front combination lamp

DISASSEMBLY



1. Front turn signal lamp bulb
2. Front turn signal lamp bulb socket
3. Resin cap
4. Parking lamp bulb socket
5. Parking lamp bulb
6. Halogen bulb (LO)

cardiagn.com

7. Aiming motor
8. Back cover
9. Retaining plate
10. Halogen bulb (HI)
11. Headlamp housing assembly

Removal and Installation

INFOID:0000000001026275

REMOVAL

CAUTION:

Disconnect the battery negative terminal or the fuse.

1. Remove front bumper fascia. Refer to EXT-11, "Exploded View".
2. Remove the headlamp mounting bolts.
3. Pull out the headlamp assembly forward the vehicle.
4. Disconnect the connector before removing the headlamp assembly.

INSTALLATION

Install in the reverse order of removal.

NOTE:

After installation, perform aiming adjustment. Refer to EXL-320, "Description".

Replacement

INFOID:0000000001026276

CAUTION:

- **Disconnect the battery negative terminal or the fuse.**
- **After installing the bulb, install the resin cap and the bulb socket securely for watertightness.**

HEADLAMP BULB (LO)

1. Remove the air duct (when replace a left). Keep a service area.
2. Rotate the resin cap counterclockwise and unlock it.
3. Disconnect the bulb socket.
4. Remove the retaining spring lock. Remove the bulb from the headlamp.

HEADLAMP BULB (HI)

1. Remove the air duct (when replace a left). Keep a service area.
2. Rotate the back cover counterclockwise and unlock it.
3. Rotate the retaining plate counterclockwise and unlock it.
4. Remove the bulb from the headlamp.

PARKING LAMP BULB

1. Rotate the bulb socket clockwise and unlock it.
2. Remove the bulb from the bulb socket.

FRONT TURN SIGNAL LAMP BULB

1. Rotate the bulb socket counterclockwise and unlock it.
2. Remove the bulb from the bulb socket.

Disassembly and Assembly

INFOID:0000000001026277

DISASSEMBLY

1. Rotate the resin cap counterclockwise and unlock it.
2. Rotate the terminal which connect to a socket.
3. Rotate the halogen bulb (LO) socket.
4. Remove the retaining spring lock. Remove the halogen bulb (LO).
5. Rotate the back cover. Rotate the halogen bulb (HI) socket.
6. Remove the retaining plate counterclockwise and unlock it. Remove halogen bulb (HI).
7. Rotate the parking lamp bulb socket clockwise and unlock it.
8. Remove the bulb from the parking lamp bulb socket.
9. Rotate the front turn signal lamp bulb socket counterclockwise and unlock it.

cardiagn.com

10. Remove the bulb from the front turn signal lamp bulb socket.

ASSEMBLY

Assemble in the reverse order of disassembly.

CAUTION:

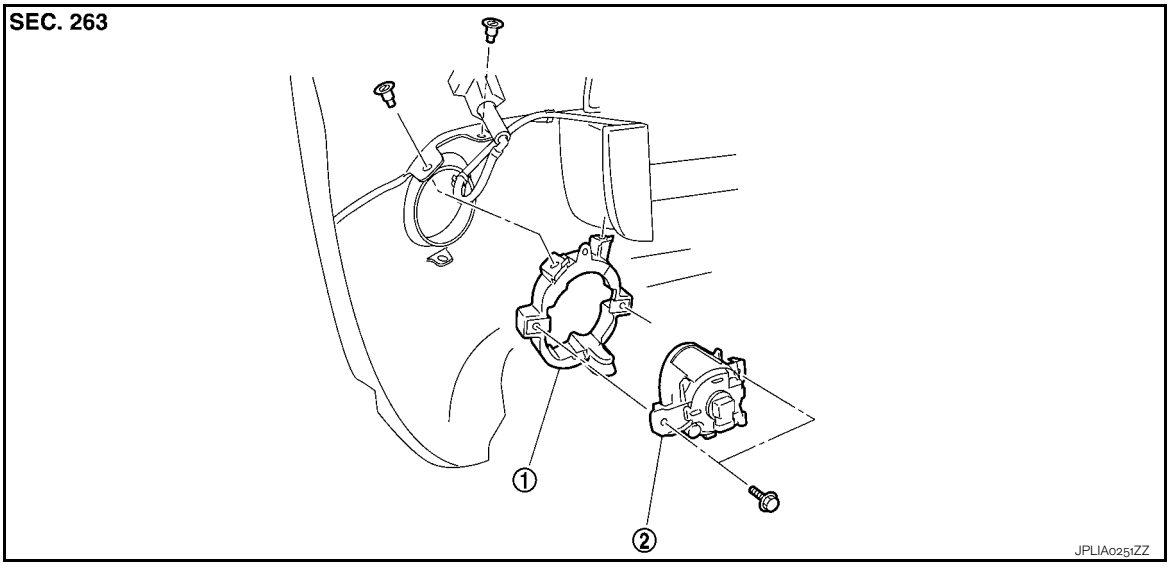
- **After installing the bulb, install the resin cap and the bulb socket securely for watertightness.**

cardiagn.com

FRONT FOG LAMP

Exploded View

INFOID:0000000001099392



1. Front fog lamp bracket
2. Front fog lamp

Removal and Installation

INFOID:0000000001099393

REMOVAL

1. Remove the inner fender protector. Keep a service area. Refer to EXT-21, "Exploded View".
2. Remove the front fog lamp connector.
3. Remove the screw. Remove the front fog lamp.
4. Remove the clip. Remove the front fog lamp bracket.

INSTALLATION

Installation is the reverse order of removal.

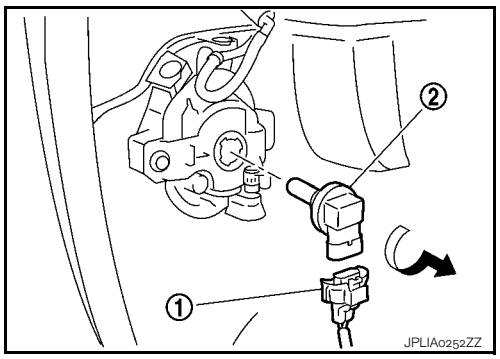
Replacement

INFOID:0000000001099394

CAUTION:

Disconnect the battery negative terminal or the fuse.

1. Remove the fender protector. Keep the service area.
2. Remove the front fog lamp bulb connector (1).
3. Rotate the bulb (2) counterclockwise and unlock it.



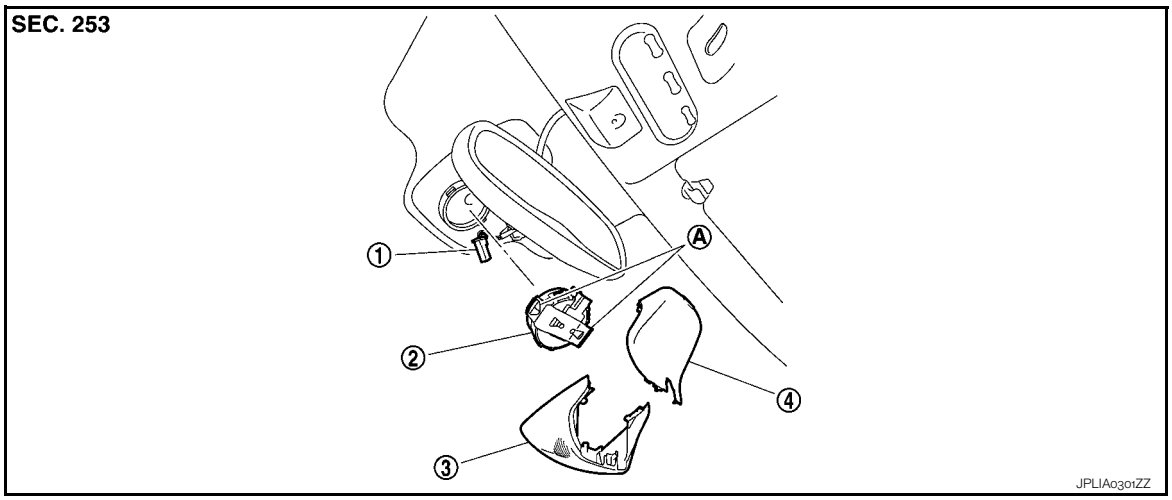
LIGHT & RAIN SENSOR

Exploded View

INFOID:0000000001099396

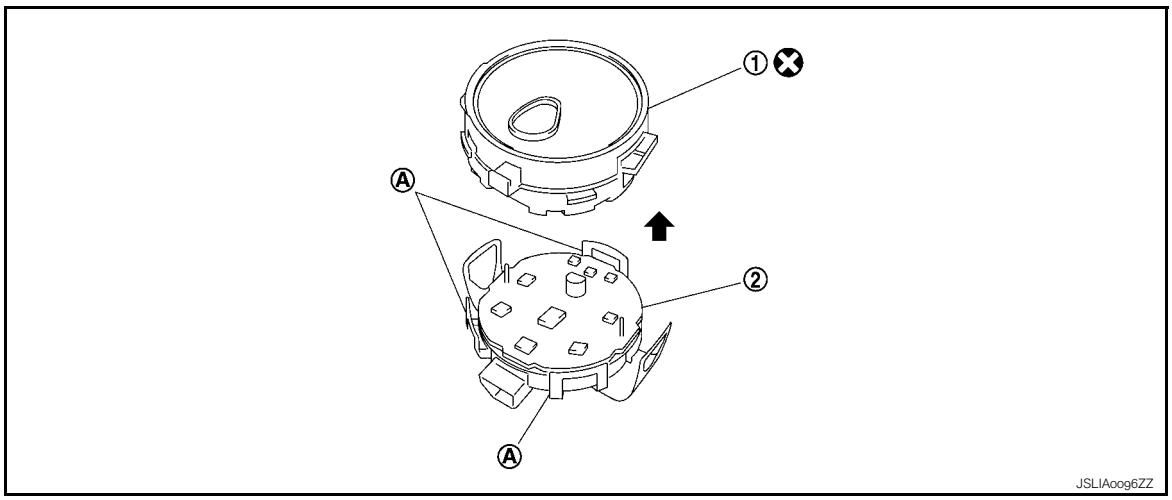
CAUTION:
- **When the light & rain sensor is removed from windshield, gel/adhesive part of housing should not be re-used.**
- **When re-using the light & rain sensor (i.e. after windshield replacement), replace the light & rain sensor housing.**

REMOVAL



1. Light & rain sensor connector
2. Light & rain senor
3. Inside mirror cover (lower)
4. Inside mirror cover (upper)
A. Metal spring clip

DISASSEMBLY



1. Light & rain senor housing
2. Light & rain senor
A. Pawl

Refer to GI-4, "Components" for symbols not described above.

CAUTION:
Never touch the electronic circuit board.

Removal and Installation

INFOID:0000000001099397

cardiagn.com

CAUTION:
- **When the light & rain sensor is removed from windshield, gel/adhesive part of housing should not be re-used.**
- **When re-using the light & rain sensor (i.e. after windshield replacement), replace the light & rain sensor housing.**

REMOVAL

1. Remove the inside mirror cover (upper and lower). Refer to MIR-37, "Exploded View".
2. Disengage the both sides of metal spring clips, and remove the light & rain sensor from the windshield.
3. Disconnect light & rain sensor connector.

NOTE:
When replacing the light & rain sensor housing;
Disengage the pawls, and remove the light & rain sensor housing from the light & rain sensor.

CAUTION:
Never touch the electronic circuit board.

INSTALLATION

Install in the reverse order of removal.

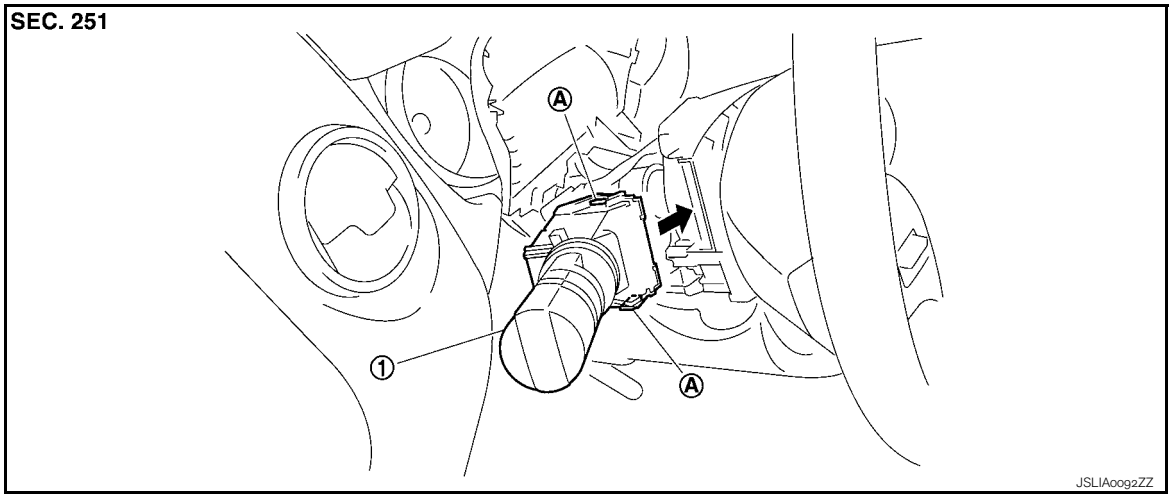
CAUTION:
- **Surface of windshield should be cleaned.**
- **Never touch gel/adhesive of new part.**

cardiagn.com

LIGHTING & TURN SIGNAL SWITCH

Exploded View

INFOID:0000000001099398



1. Light & turn signal switch
A. Pawl

Removal and Installation

INFOID:0000000001099399

REMOVAL

1. Remove steering column cover. Refer to IP-11, "Exploded View".
2. While pressing pawls, pull the light & turn signal switch. And disconnect from the switch base.

INSTALLATION

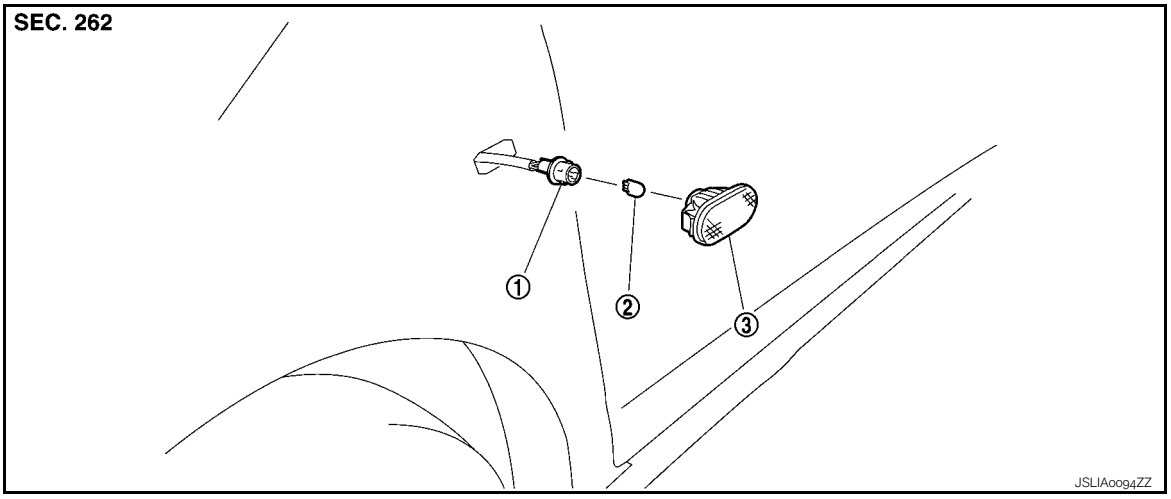
Installation is the reverse order of removal.

cardiagn.com

SIDE TURN SIGNAL LAMP

Exploded View

INFOID:0000000001099400



1. Side turn signal lamp bulb socket
2. Side turn signal lamp bulb
3. Side turn signal lamp housing

Removal and Installation

INFOID:0000000001099401

CAUTION:
Disconnect battery negative terminal or remove the fuse.

REMOVAL

1. Insert a spatula or the similar tool under the side turn signal lamp. While pushing the pawl of the lamp, pull off the lamp from the vehicle.
2. Disconnect side turn signal lamp connector.
   NOTE:
   Support side turn signal lamp harness with tape so that it won't fall into the front fender.

INSTALLATION

Install in the reverse order of removal.

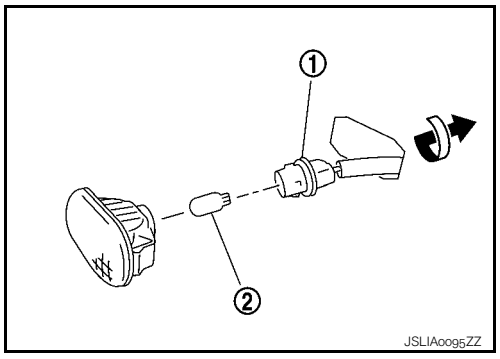
Replacement

INFOID:0000000001099402

CAUTION:
Disconnect battery negative terminal or remove the fuse.

SIDE TURN SIGNAL LAMP BULB

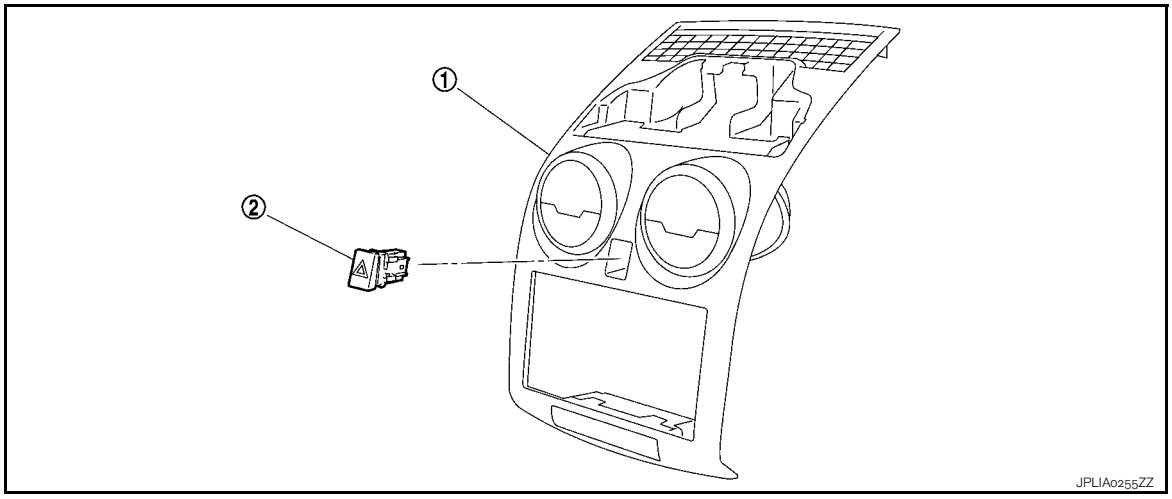
1. Remove the side turn signal lamp.
2. Rotate the bulb socket (1) counterclockwise and unlock it.
   NOTE:
   Support the vehicle-side harness of the side turn signal lamp with tape so that it does not drop inside the front fender.
3. Remove the bulb (2) from the bulb socket.



HAZARD SWITCH

Exploded View

INFOID:0000000001099403



1. Cluster lid C
2. Hazard switch

Removal and Installation

INFOID:0000000001099404

REMOVAL

1. Remove the cluster lid C. Refer to IP-11, "Exploded View".
2. Widen the pawl. Remove hazard switch.

INSTALLATION

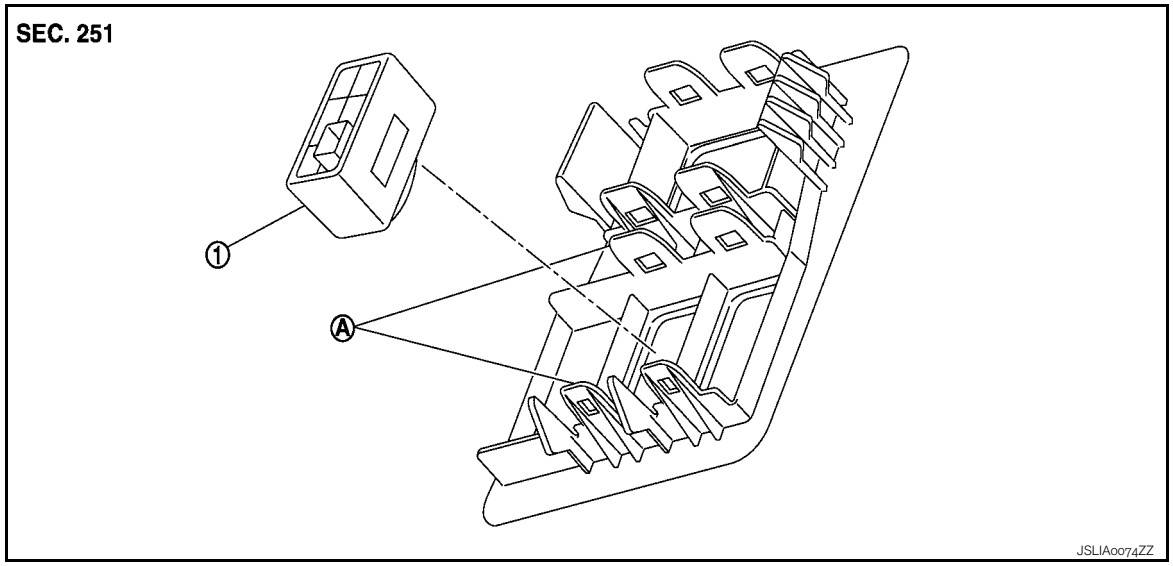
Install in the reverse order of removal.

cardiagn.com

HEADLAMP AIMING SWITCH

Exploded View

INFOID:0000000001026294



1. Headlamp aiming switch
A. Pawls

Removal and Installation

INFOID:0000000001026295

Removal

1. Remove the switch holder. Refer to IP-11, "Exploded View".
2. Widen the pawl. Remove headlamp aiming switch.

Installation

Install in the reverse order of removal.

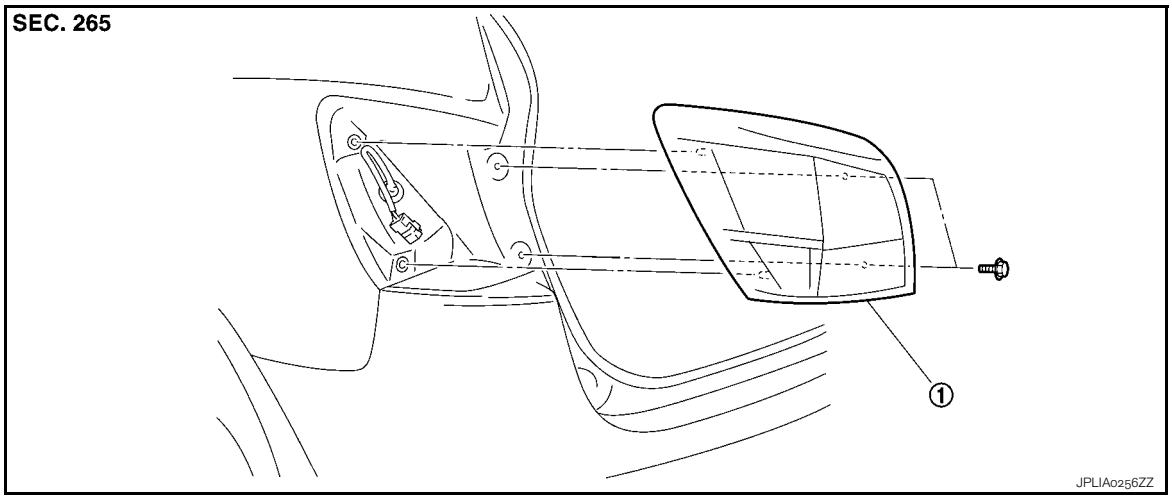
carDiagn.com

REAR COMBINATION LAMP

Exploded View

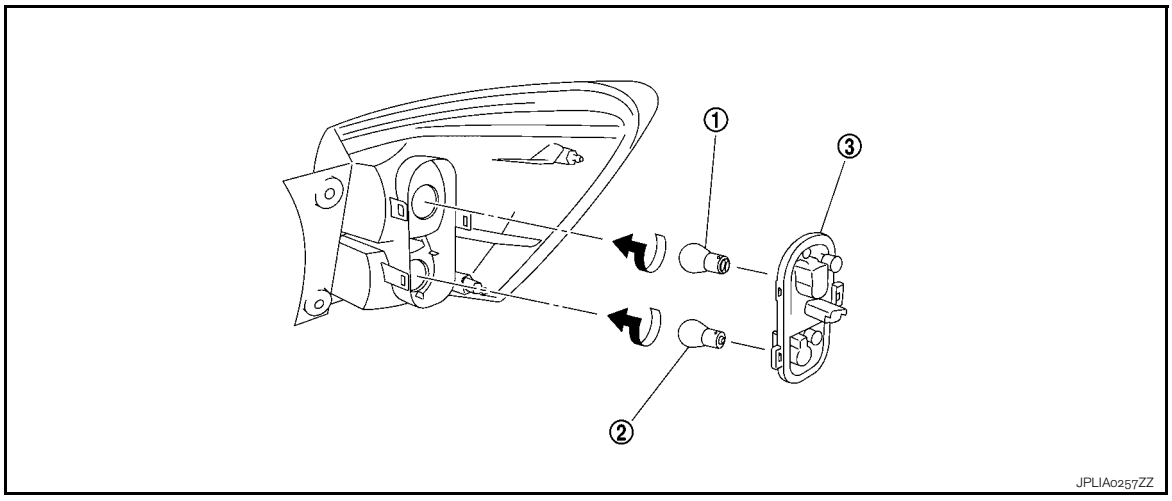
INFOID:0000000001099405

REMOVAL



1. Rear combination lamp

DISASSEMBLY



1. Tail lamp bulb
2. Rear turn signal lamp bulb
3. Bulb cover

Removal and Installation

INFOID:0000000001099406

CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. Remove rear combination lamp mounting bolts.
2. Pull the rear combination lamp toward rear of the vehicle. Remove the rear combination lamp.
3. Disconnect rear combination lamp connector.

INSTALLATION

Install in the reverse order of removal.

Replacement

INFOID:0000000001099407

cardiagn.com

CAUTION:
Disconnect the battery negative terminal or the fuse.

TAIL LAMP BULB

1. Remove the rear combination lamp.
2. Remove the bulb cover.
3. Turn the tail lamp bulb counterclockwise, and remove it.

REAR TURN SIGNAL LAMP BULB

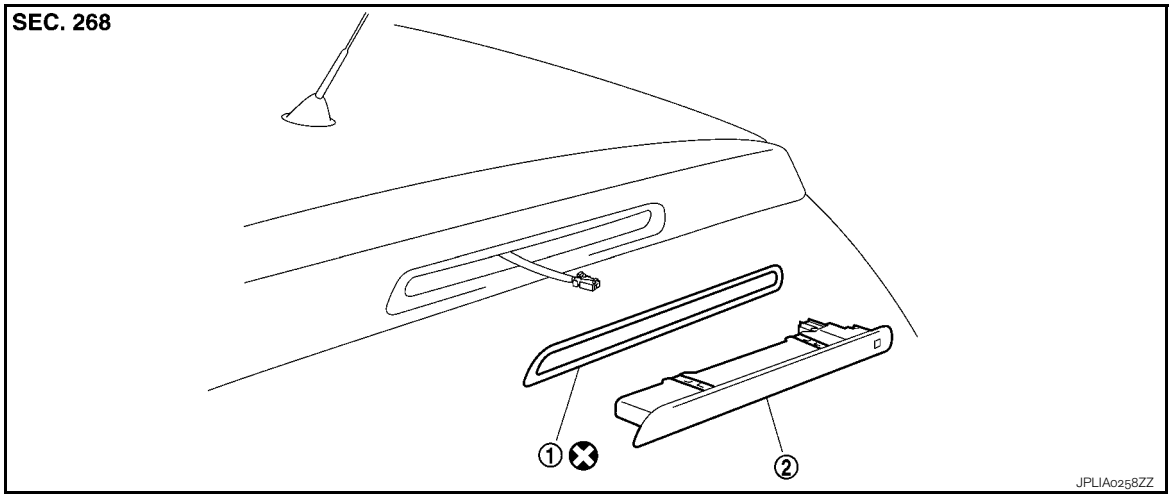
1. Remove the rear combination lamp.
2. Remove the bulb cover.
3. Turn the rear turn signal lamp bulb counterclockwise, and remove it.

carDiagn.com

HIGH-MOUNTED STOP LAMP

Exploded View

INFOID:0000000001099408



1. Seal packing
2. High-mounted stop lamp

Refer to GI-4, "Components" for symbols not described above.

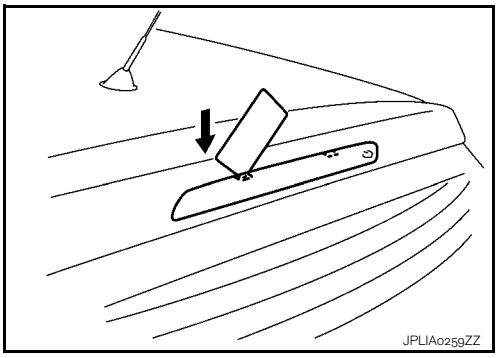
Removal and Installation

INFOID:0000000001099409

CAUTION:
Disconnect battery negative terminal or remove the fuse.

REMOVAL

1. Insert a cards upper the high-mounted stop lamp. While pushing the metal clip of the lamp, pull off the lamp from the vehicle.
2. Disconnect the high-mounted stop lamp connector.
3. Remove the rear washer tube.



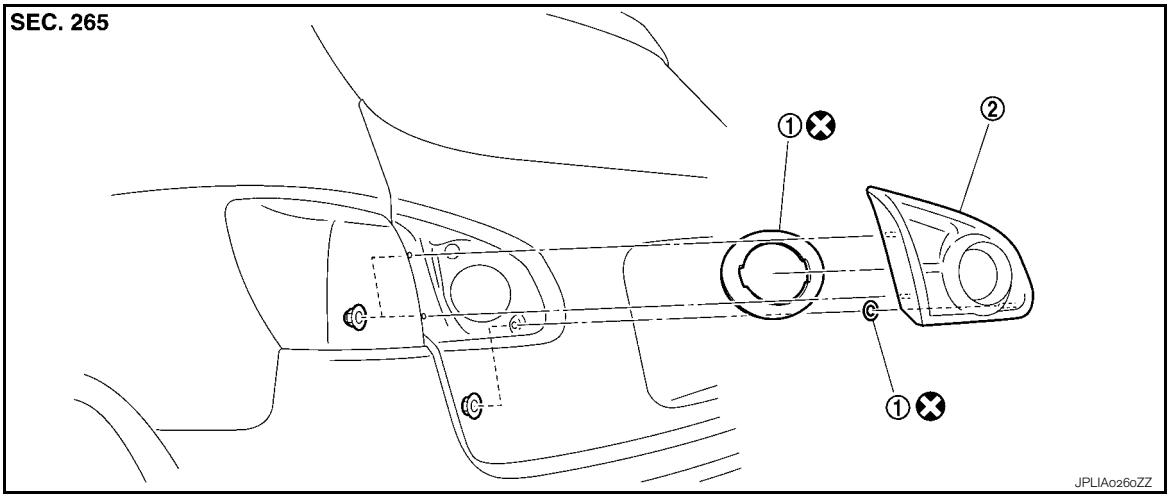
INSTALLATION
Install in the reverse order of removal.

cardiagn.com

BACK-UP LAMP

Exploded View

INFOID:0000000001099410



1. Seal packing
2. Back-up lamp

Refer to GI-4, "Components" for symbols not described above.

Removal and Installation

INFOID:0000000001099411

CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. Remove back door trim finisher lower. Refer to INT-26, "Exploded View".
2. Disconnect back-up lamp connector.
3. Remove back-up lamp mounting nuts. And then remove back-up lamp.

INSTALLATION

Install in the reverse order of removal.

CAUTION:
Seal packing cannot be reused.

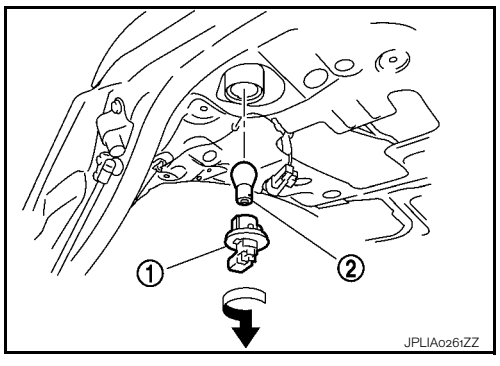
Replacement

INFOID:0000000001099412

CAUTION:
Disconnect the battery negative terminal or the fuse.

BACK-UP LAMP BULB

1. Remove back door trim finisher lower. Refer to INT-26, "Exploded View".
2. Disconnect the back-up lamp connector.
3. Turn the bulb socket (1) counterclockwise and unlock it.
4. Remove the bulb (2) from the socket.

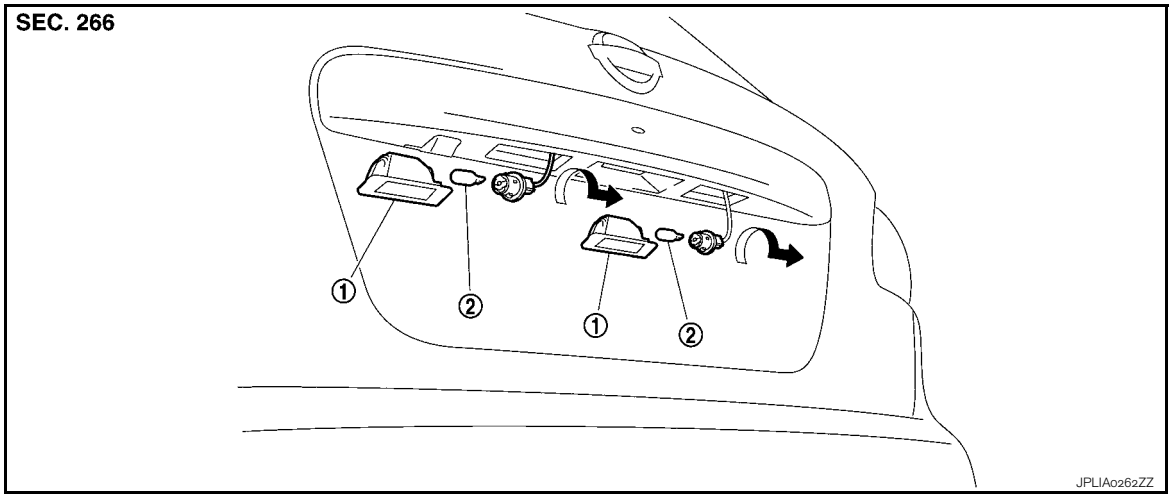


carDiagn.com

LICENSE PLATE LAMP

Exploded View

INFOID:0000000001099413



1. License plate lamp housing
2. License plate lamp bulb

Removal and Installation

INFOID:0000000001099414

CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. While pressing the license plate lamp to direction right side, pull it to direction outside and then remove it.
2. Disconnect the connector.

INSTALLATION

Install in the reverse order of removal.

Replacement

INFOID:0000000001099415

CAUTION:
Disconnect the battery negative terminal or the fuse.

LICENSE PLATE LAMP BULB

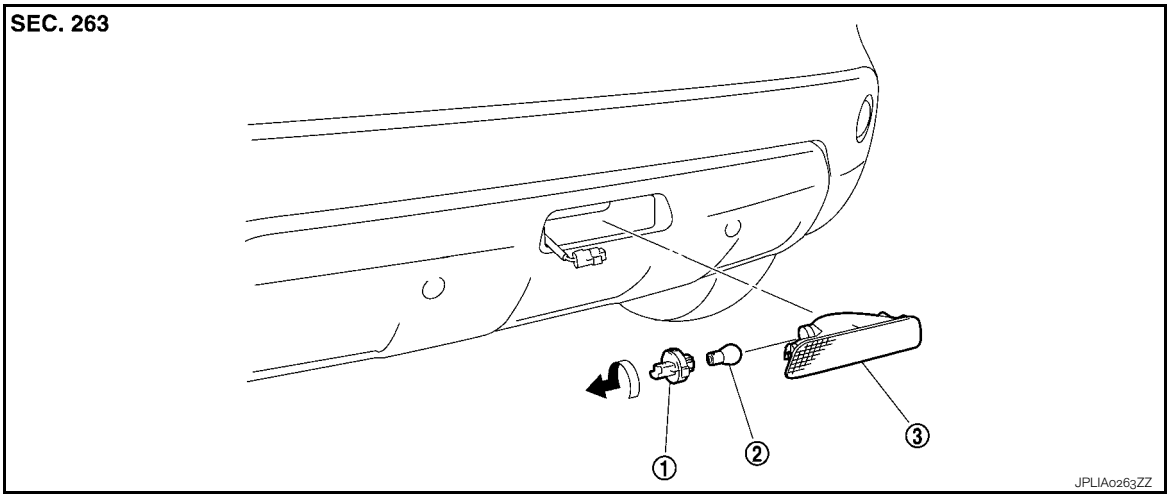
1. Remove license plate lamp.
2. Turn the bulb socket counterclockwise and unlock it.
3. Remove the bulb from the socket.

cardiagn.com

REAR FOG LAMP

Exploded View

INFOID:0000000001099416



1. Rear fog lamp bulb socket
2. Rear fog lamp bulb
3. Rear fog lamp housing

Removal and Installation

INFOID:0000000001099417

CAUTION:
Disconnect battery negative terminal or remove the fuse.

REMOVAL

1. Insert any appropriate tool into the gap between the rear fog lamp housing. And pull off the rear fog lamp from the vehicle.
2. Disconnect rear fog lamp connector.

INSTALLATION

Installation is the reverse order of removal.

Replacement

INFOID:0000000001099418

CAUTION:
Disconnect battery negative terminal or remove the fuse.

REAR FOG LAMP BULB

1. Remove the rear fog lamp.
2. Turn the bulb socket counterclockwise and unlock it.
3. Remove the bulb from its socket.

carDiag.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Bulb Specifications

INFOID:0000000001026312

Item		Type	Wattage (W)
Front combination lamp	Headlamp (LO)	H7	55
	Headlamp (HI)	H7	55
	Front turn signal lamp	WY21W (Amber)	21
	Parking lamp	W5W	5
Front fog lamp		HB4	51
Side turn signal lamp		W5W	5
Rear combination lamp	Stop lamp/Tail lamp	W21/5W	21/5
	Rear turn signal lamp	W21W	21
Back-up lamp		W16W	18
License plate lamp		W5W	5
High-mounted stop lamp		LED	—
Rear fog lamp		W21W	21

cardiagn.com

SECTION EXT
EXTERIOR

CONTENTS

SYMPTOM DIAGNOSIS 2

SQUEAK AND RATTLE TROUBLE DIAGNOSES 2
- Work Flow 2
- Inspection Procedure 4
- Diagnostic Worksheet 6

PRECAUTION 8

PRECAUTIONS 8
- Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 8
- Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 8
- Precaution for Procedure without Cowl Top Cover 8
- Precaution for Work 9

PREPARATION 10

PREPARATION 10
- Commercial Service Tools 10

ON-VEHICLE REPAIR 11

FRONT BUMPER 11
- Exploded View 11
- Removal and Installation 11

REAR BUMPER 14
- Exploded View 14
- Removal and Installation 15

FRONT GRILLE 17
- Exploded View 17
- Removal and Installation 17

COWL TOP 19
- Exploded View 19
- Removal and Installation 19

FENDER PROTECTOR 21
- Exploded View 21
- Removal and Installation 22

FILLET MOLDING 23
- Exploded View 23
- Removal and Installation 23

ROOF SIDE MOLDING 24
- Exploded View 24
- Removal and Installation 24

DOOR SASH MOLDING 25
- Exploded View 25
- Removal and Installation 25

DOOR OUTSIDE MOLDING 26
- Exploded View 26
- Removal and Installation 26

DOOR OUTSIDE LOWER MOLDING 28
- Exploded View 28
- Removal and Installation 28

DOOR PARTING SEAL 29
- Exploded View 29
- Removal and Installation 29

BACK DOOR FINISHER 31
- Exploded View 31
- Removal and Installation 31

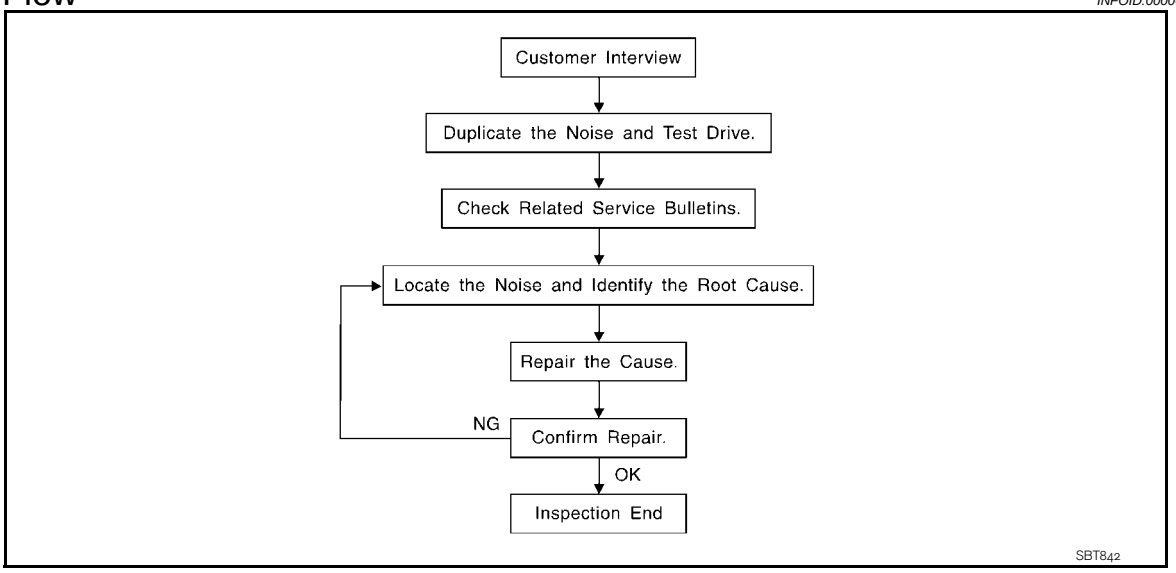
carsdiagn.com

SYMPTOM DIAGNOSIS

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000001115852



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to EXT-6, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

cardiagn.com

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:
1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to EXT-4, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.

cardiagn.com

- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001115853

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

cardiagn.com

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

ardiagn.com

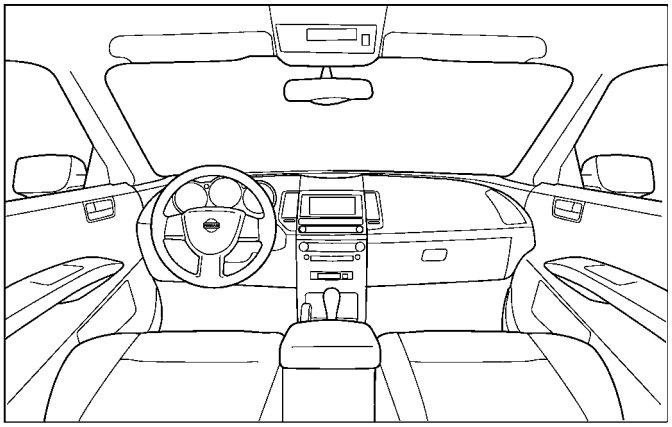
Diagnostic Worksheet

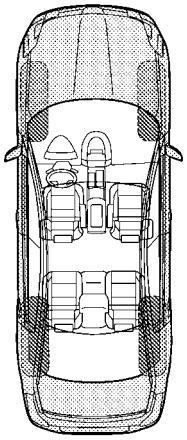
INFOID:0000000001115854

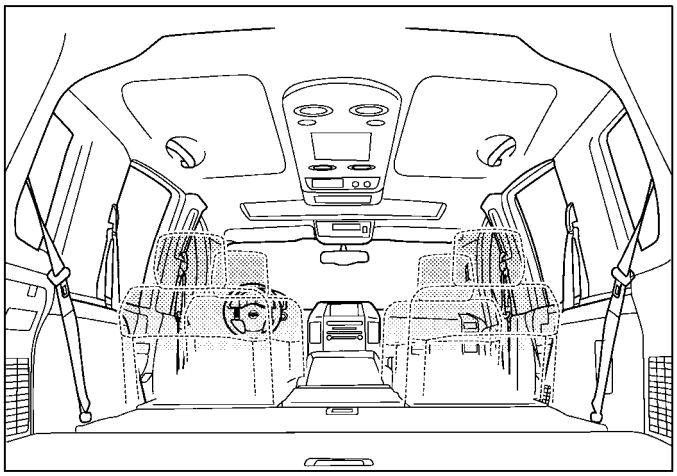
SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

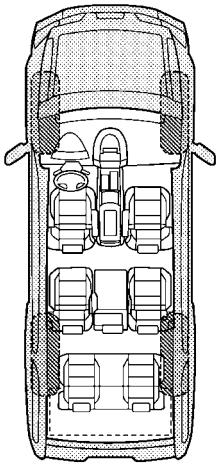
Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.









Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

cardiagn.com

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001114991

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001114992

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

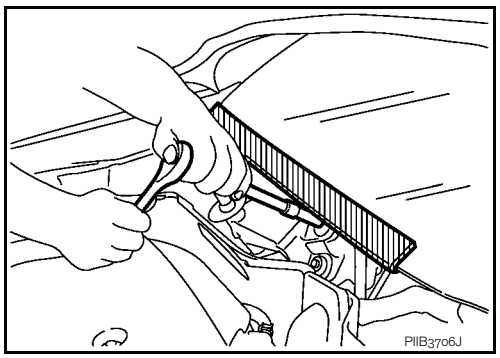
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001114993

cardiagn.com

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution for Work

INFOID:0000000001093641

- After removing and installing the opening/closing parts, be sure to carry out fitting adjustments to check their operation.
- Check the lubrication level, damage, and wear of each part. If necessary, grease or replace it.

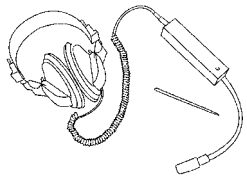
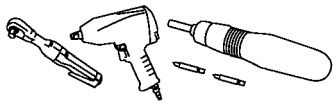
carsdiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000001093643

Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Power tool  PIIB1407E	
Clip remover E1KIA0055GB	Removing clips

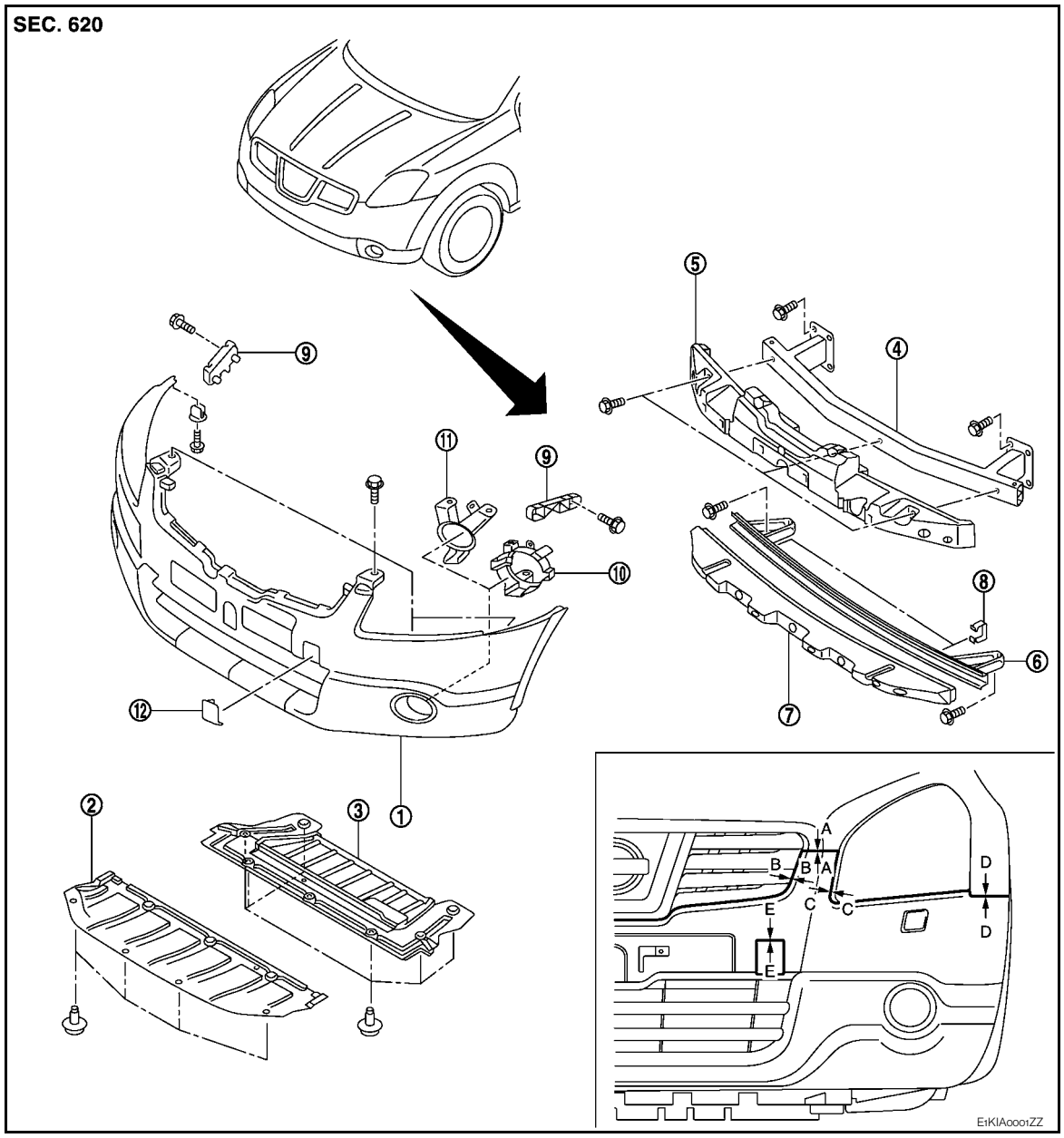
cardiagn.com

ON-VEHICLE REPAIR

FRONT BUMPER

Exploded View

INFOID:0000000001093644



1. Bumper fascia assembly	2. Radiator undercover	3. Engine undercover
4. Bumper reinforcement, upper	5. Energy absorber, upper	6. Bumper reinforcement, lower
7. Energy absorber, lower	8. Energy absorber metal fastener	9. Bumper side bracket
10. Front fog lamp bracket LH (if equipped)	11. Front bumper finisher LH	12. Bumper bracket cover assembly

Removal and Installation

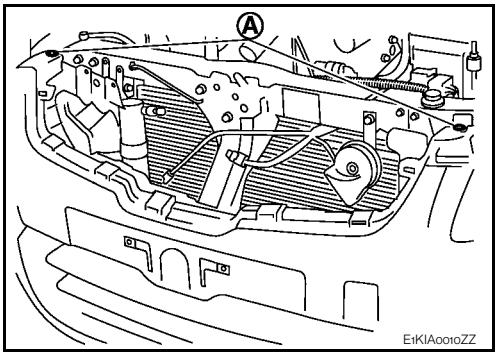
INFOID:0000000001093645

REMOVAL

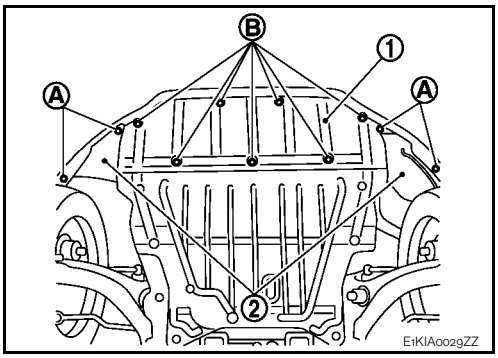
CAUTION:

Bumper fascia is made of resin. Do not apply strong force to it, and be careful to prevent contact with oil.

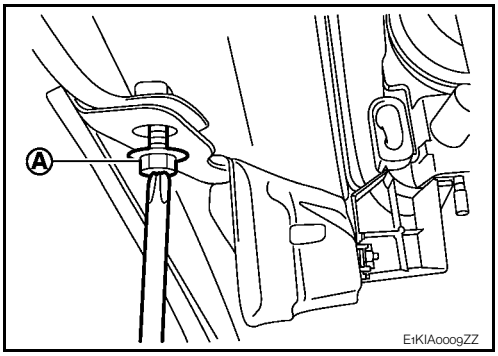
1. Fully open hood assembly.
2. Remove front grille. Refer to EXT-17, "Removal and Installation".
3. Remove front hoodledge splash guard. Refer to EXT-22, "Removal and Installation".
4. Remove front fender protector. Refer to EXT-22, "Removal and Installation".
5. Remove clips (A) of front bumper fascia upper side.



6. Remove fixing screws (A) and clips (B) of radiator undercover (1) and front fender protector (2).



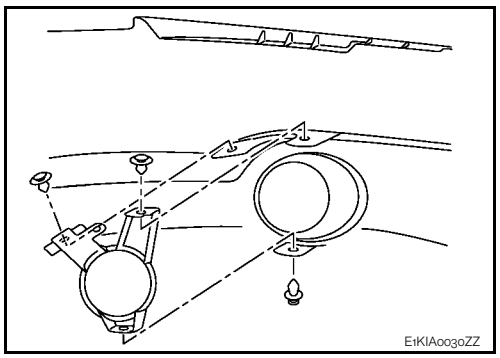
7. Disconnect front fog lamp harness connector (if equipped). Refer to EXL-174, "Removal and Installation".
8. Remove fixing screw (A) of bumper fascia (LH/RH).



9. Remove front bumper fascia.
   CAUTION:
   When removing bumper fascia, 2 workers are required so as to prevent it from dropping.
10. Remove the following parts after removing bumper fascia.
    - Hood seal assembly (front)
    - License plate bracket
    - Front bumper side bracket (LH/RH)
    - Front bumper finisher

cardiagn.com

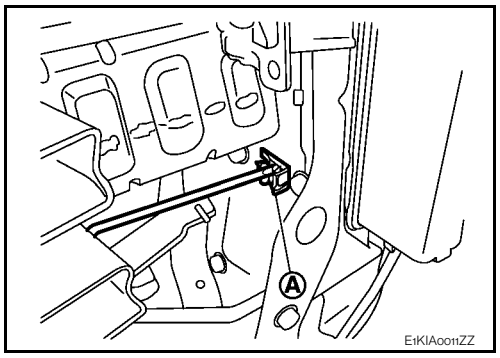
- Front fog lamp assembly



11. Remove front bumper upper energy absorber.
12. Remove front bumper lower energy absorber.
    - Release front bumper lower energy absorber metal fasteners (A).
    - Pull front bumper lower energy absorber to remove it.

    CAUTION:

    Always use a suitable tool to release front bumper energy absorber metal fasteners, to avoid damage to front bumper energy absorber.



13. Remove front bumper upper reinforcement metal retainer clip and mounting bolts, and then remove front bumper upper reinforcement.
14. Remove front bumper lower reinforcement.
    - Remove front bumper lower reinforcement fixing clips.
    - Remove front bumper lower reinforcement assembly.
    - Remove front air guide fixing clips, then remove front air guide.
    - Remove front bumper lower energy absorber metal clip fixing.

INSTALLATION

Install in the reverse order of removal.

NOTE:

After installing, perform fitting adjustment.

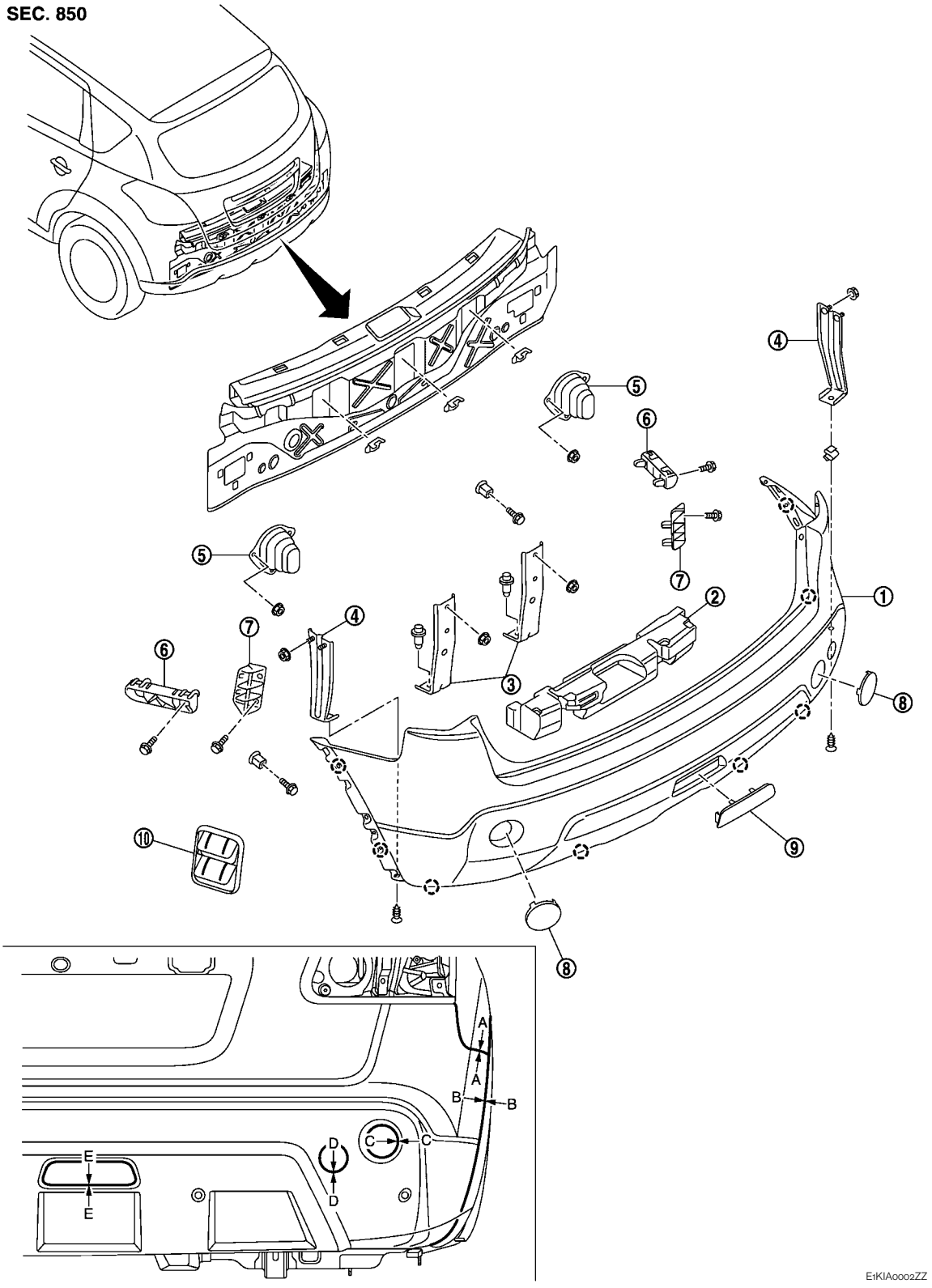
	Portion	Clearance
Front bumper – Hood assembly	**A – A**	**4.5 – 8.5 mm (0.177 – 0.335 in)**
Front bumper – Front grille	**B – B**	**0.7 – 4.3 mm (0.028 – 0.169 in)**
Front bumper – Headlamp	**C – C**	**3.5 – 6.5 mm (0.138 – 0.256 in)**
Front bumper – Front bumper finisher	**D – D**	**0.0 – 1.0 mm (0.000 – 0.039 in)**
Front bumper – Front fender	**E – E**	**1.5 – 3.5 mm (0.059 – 0.138 in)**

carsdiagn.com

REAR BUMPER

Exploded View

INFOID:0000000001093646



1. Rear bumper fascia assembly
2. Energy absorber
3. Rear bumper center retainer
4. Rear bumper side retainer
5. Rear bumper stay
6. Rear bumper side bracket A
7. Rear bumper side bracket B
8. Reflector
9. Rear bumper center molding

cardiagn.com

10. Rear air extractor

Clip

Removal and Installation

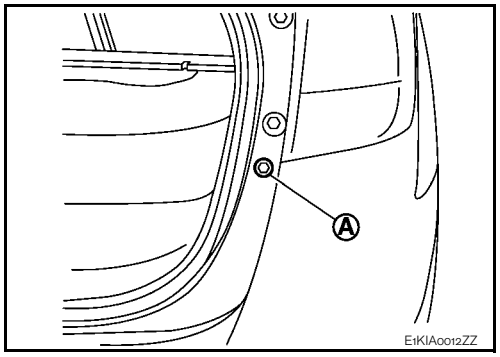
INFOID:0000000001093647

REMOVAL

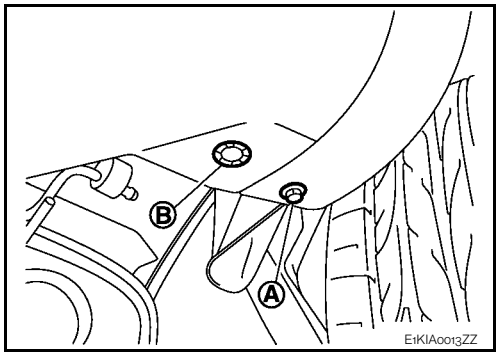
CAUTION:

Bumper fascia is made of resin. Do not apply strong force to it, and be careful to prevent contact with oil.

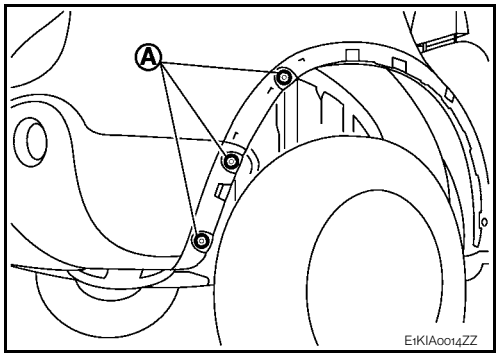
1. Fully open trunk lid assembly.
2. Remove rear bumper fixing screw (A) (LH/RH).



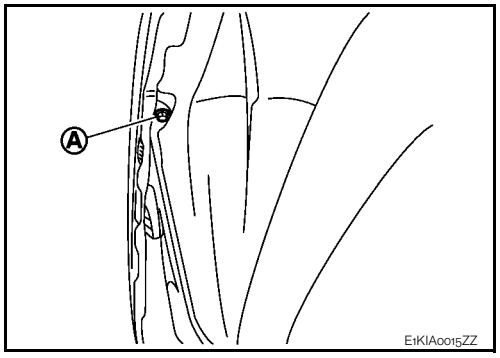
3. Remove rear bumper lower fixing screw (A) and clip (B) (LH/RH).



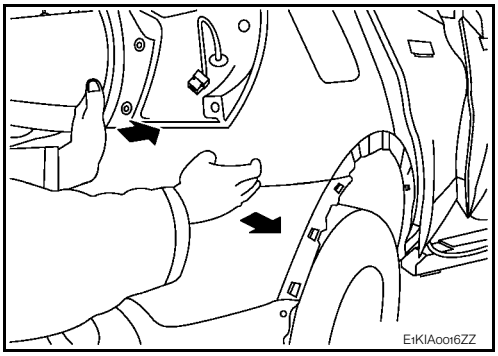
4. Remove rear fillet molding (LH/RH). Refer to EXT-23, "Removal and Installation".
5. Remove rear fender protector fixing clips (A) (LH/RH).



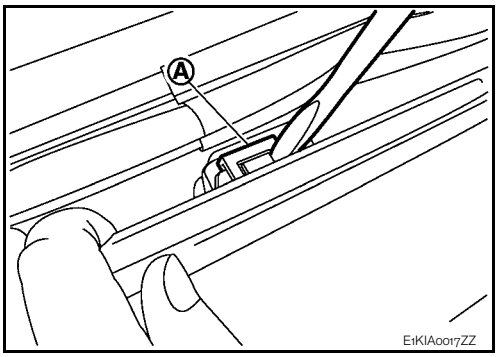
6. Remove rear bumper upper fixing screw (A) (LH/RH).



7. Remove license plate if necessary.
8. Push to release rear bumper from side bracket B.



9. Remove rear fog lamp, then remove rear fog lamp harness connector. Refer to EXL-186, "Removal and Installation".
10. Release rear bumper clips (A).



11. Remove rear bumper fascia assembly.
    CAUTION:
    When removing bumper fascia, 2 workers are required so as to prevent it from dropping.
12. Remove the following parts after removing rear bumper fascia.
    - Rear bumper energy absorber
    - Rear bumper center retainer (LH/RH)
    - Rear bumper side retainer (LH/RH)
    - Rear bumper clips
    - Rear bumper side bracket A (LH/RH)
    - Rear bumper side bracket B (LH/RH)
    - Rear bumper finisher assembly
    - Reflector assembly (LH/RH)

INSTALLATION

Install in the reverse order of removal.

NOTE:

After installing, perform fitting adjustment.

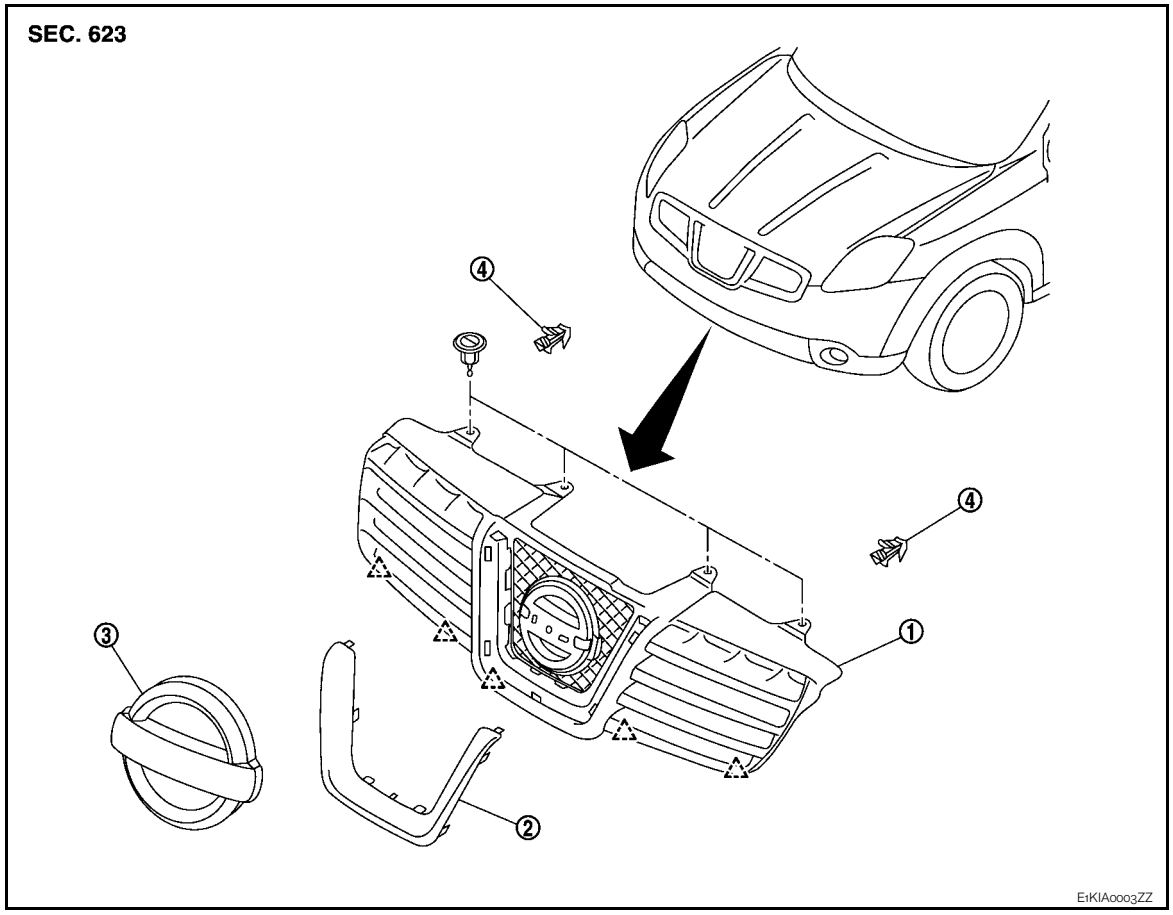
	Portion	Clearance
Rear bumper – Rear fender	**A – A**	**0.0 – 1.0 mm (0.000 – 0.039 in)**
Rear bumper – Rear fillet molding	**B – B**	**0.5 – 1.5 mm (0.020 – 0.059 in)**
Rear bumper – Reflector	**C – C**	**0.0 – 1.0 mm (0.000 – 0.039 in)**
Rear bumper – Tow hook cover	**D – D**	**0.2 – 1.2 mm (0.008 – 0.047 in)**
Rear bumper – Fog lamp blank cover	**E – E**	**0.2 – 1.2 mm (0.008 – 0.047 in)**

cardiagn.com

FRONT GRILLE

Exploded View

INFOID:0000000001093648



1. Front grille
2. Front grille molding
3. Front emblem
4. Fixing clip
- Pawl

Removal and Installation

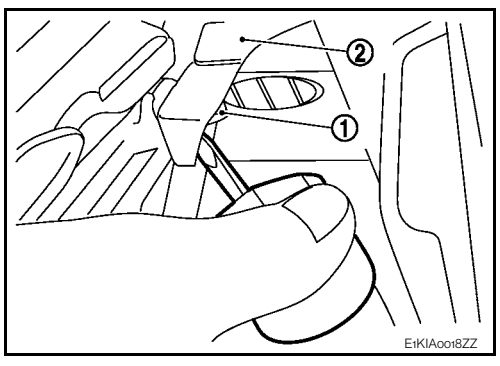
INFOID:0000000001093649

REMOVAL

CAUTION:

Apply protection tape around outer circumference of front grille (bumper fascia side).

1. Fully open hood assembly.
2. Remove front grille upper fixing clips.
3. Slowly pull front grille upper side, and using a flat screwdriver, remove clips (1) (LH/RH) from front bumper (2).



4. Release front grille lower pawls from front bumper.
5. Remove front grille assembly.
6. Remove the following parts after removing front grille.
   - Front grille molding
   - Front emblem

INSTALLATION

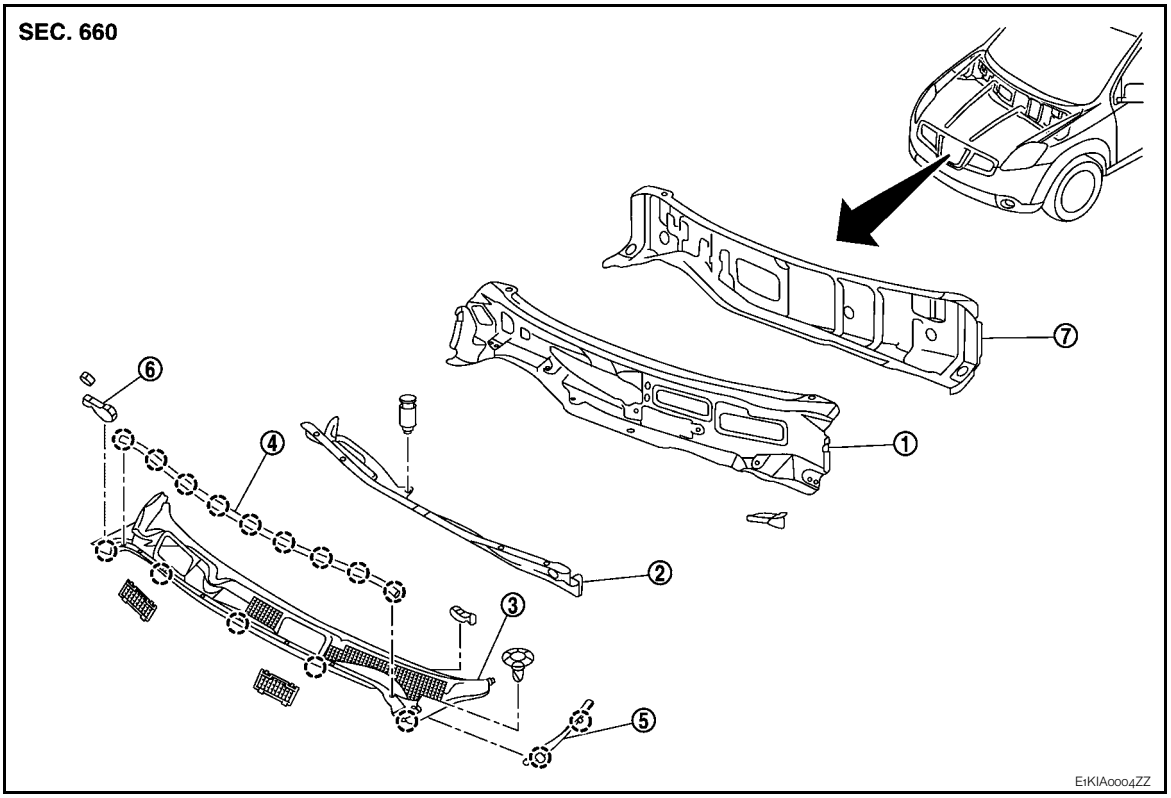
Install in the reverse order of removal.

cardiagn.com

COWL TOP

Exploded View

INFOID:0000000001093650



1. Cowl top assembly
2. Cowl top cover grille
3. Cowl top cover
4. Cowl top seal
5. Front fender cover
6. Cowl top foam insulator
7. Upper dash assembly

Clip

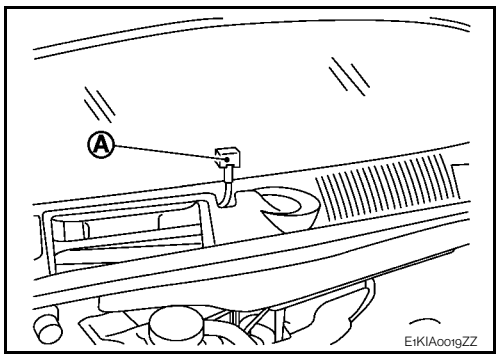
Removal and Installation

INFOID:0000000001093651

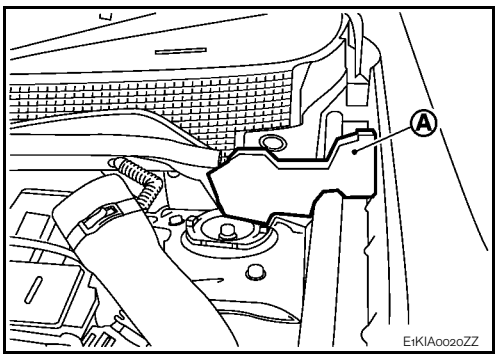
REMOVAL

1. Fully open hood assembly.
2. Remove front wiper arm (LH/RH) from vehicle. Refer to WW-104, "Removal and Installation".
3. Remove cowl top grilles (LH/RH).
4. Remove windscreen washer nozzle (LH/RH).
   - Pull nozzle upwards (A)
   - Disconnect washer nozzle tube.

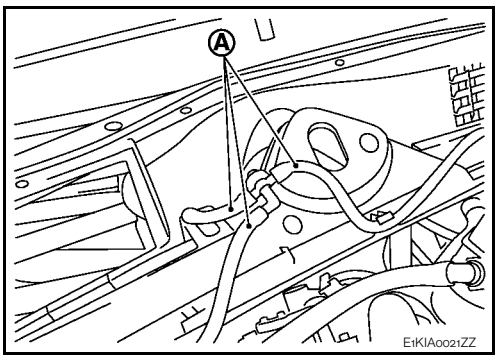
   CAUTION:
   Fit cap on washer nozzle tube to avoid spills and contamination.



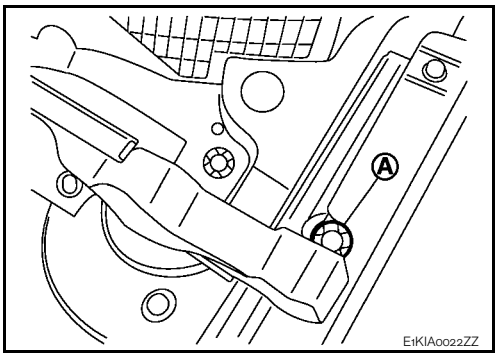
5. Release foam insulator (A) from front fender (LH/RH).



6. Remove cowl top cover fixing clips, then pull forward to release cowl top cover from windscreen.
7. Turn cowl top cover upside down to access main windscreen washer tubes (A).



8. Release main windscreen washer tubes. Remove main windscreen washer tubes.
   CAUTION:
   Fit cap on washer nozzle tube to avoid spills and contamination.
9. Remove cowl top cover.
   - Remove washer tube nozzles.
   - Remove cowl top seal.
10. Remove front fender cover fixing clip (A).
    - Push foam insulator to side to release front fender cover fixing tape.
    - Release front fender cover pawl from front pillar.



INSTALLATION
Install in the reverse order of removal.

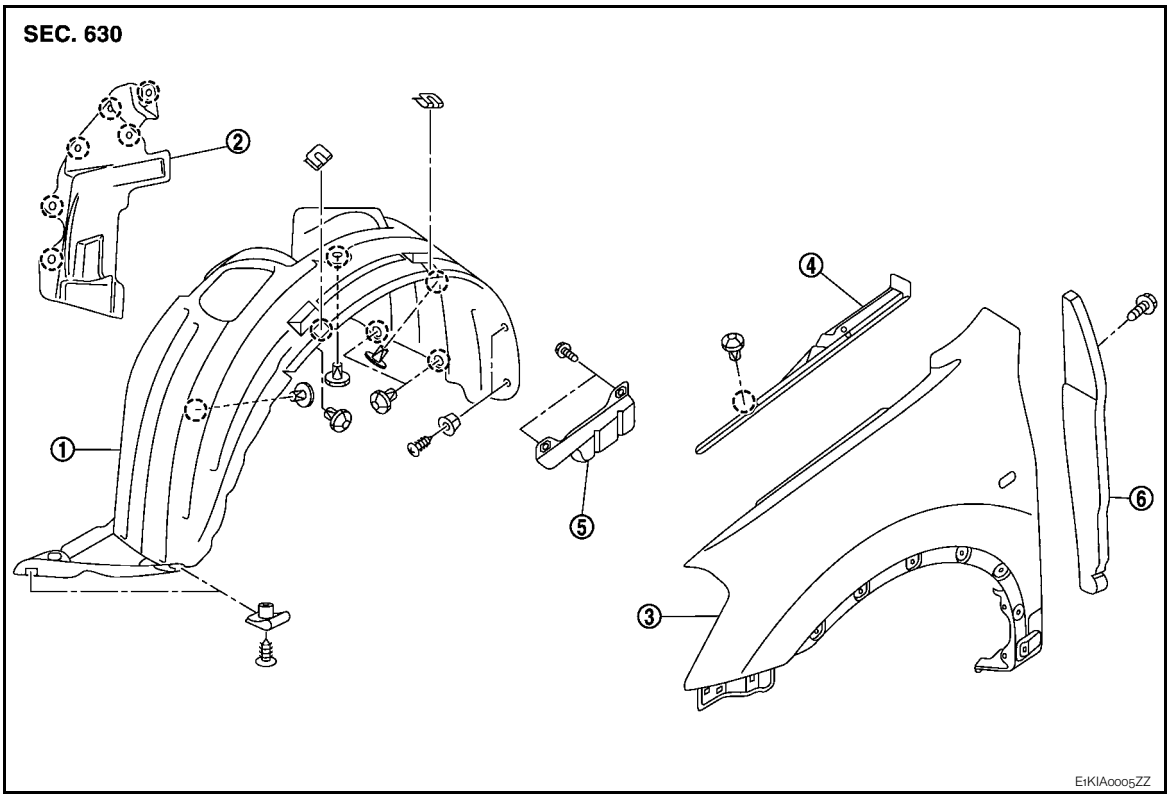
cardiagn.com

FENDER PROTECTOR

Exploded View

INFOID:0000000001093652

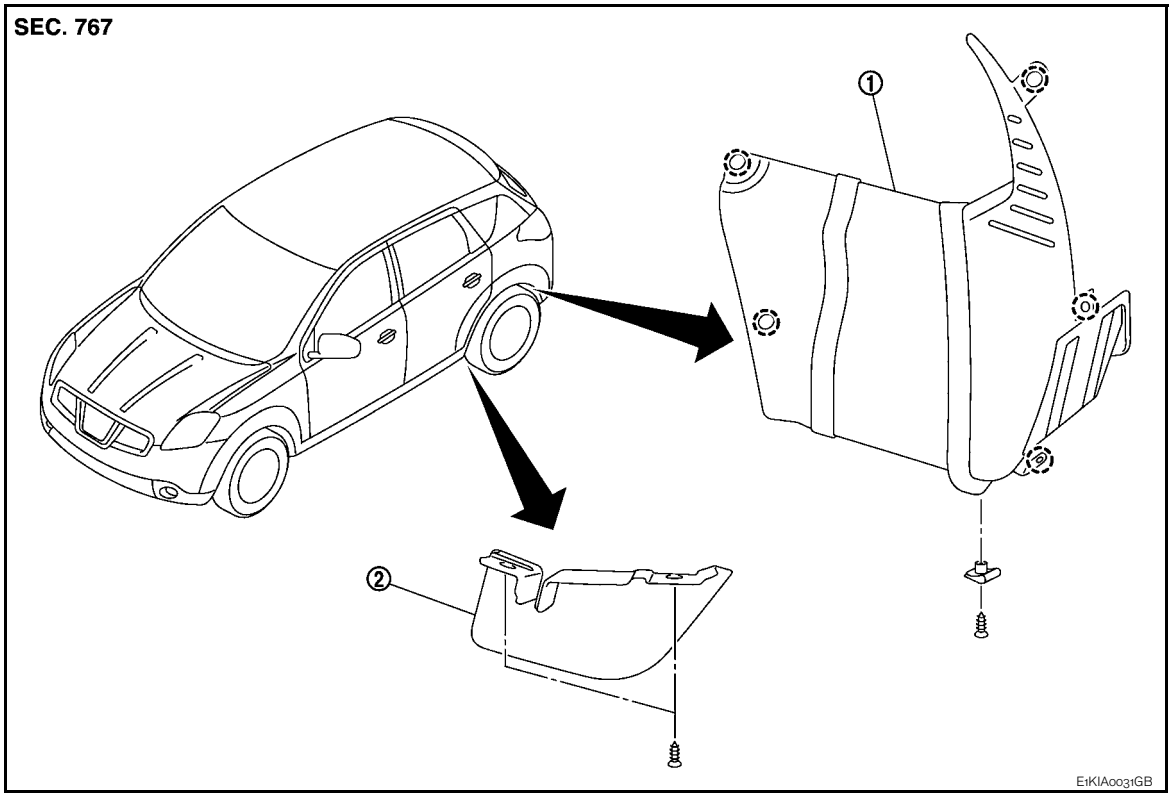
FENDER PROTECTOR



1. Front fender protector
2. Hoodledge splashguard
3. Front fender
4. Front fender cover
5. Front fender bracket
6. Front fender seal

Clip

REAR WHEEL HOUSE PROTECTOR



1. Rear fender protector
2. Wind deflector
◌ Clip

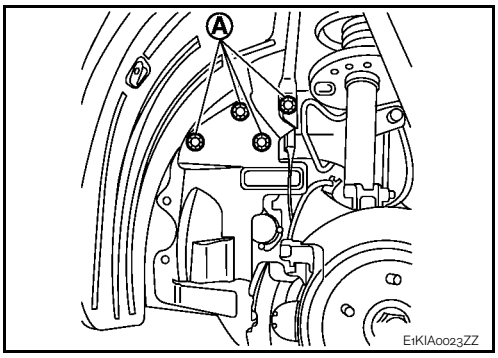
Removal and Installation

INFOID:0000000001093653

REMOVAL

FRONT FENDER PROTECTOR

1. Remove front fender protector fixing screw and fixing bolt.
2. Remove hoodledge splashguard fixing clips (A). Remove hoodledge splashguard.



3. Remove front fender protector fixing clips.
4. Remove front fender protector fixing screws.
5. Release front fender protector upper fixing clip from under, then remove front fender protector.

REAR WHEEL HOUSE PROTECTOR

1. Remove rear wheel house protector lower fixing screw.
2. Remove rear wheel house protector fixing clips.
3. Remove rear wheel house protector.

INSTALLATION

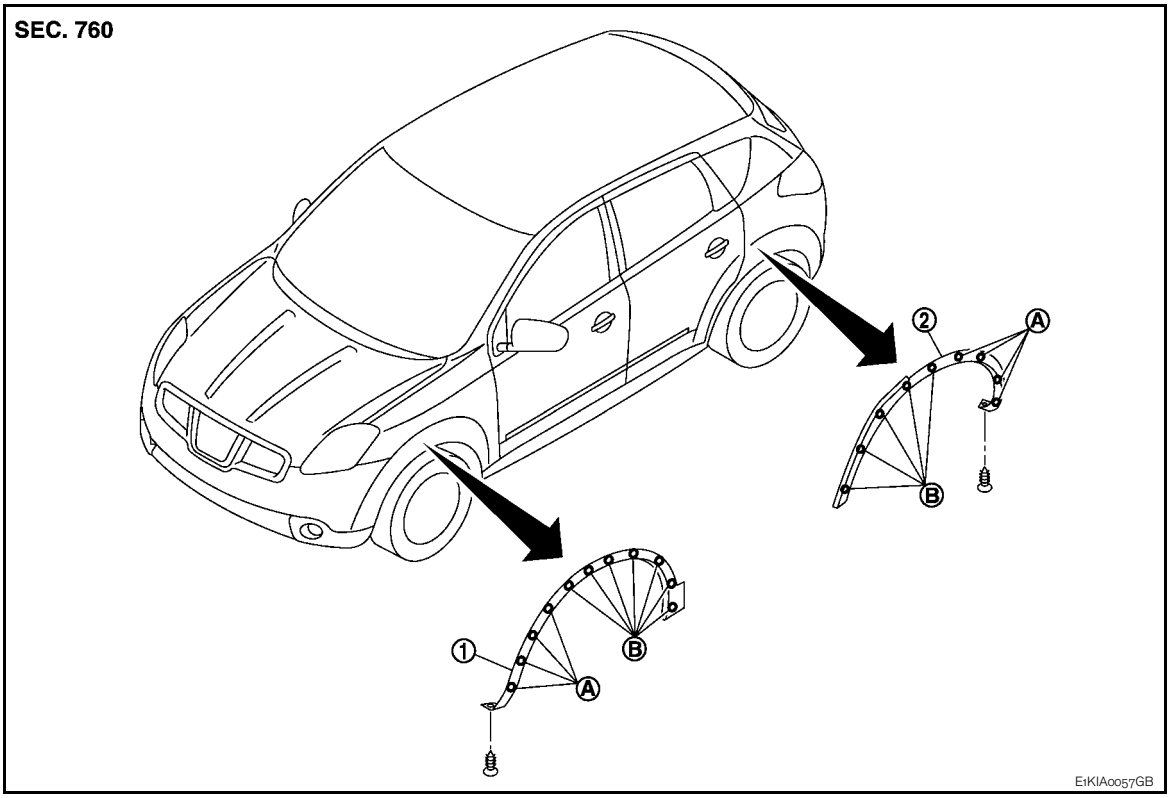
Install in the reverse order of removal.

cardiagn.com

FILLET MOLDING

Exploded View

INFOID:0000000001093656



1. Front fillet molding
2. Rear fillet molding
A. Clips A
B. Clips B

Removal and Installation

INFOID:0000000001093657

REMOVAL

FRONT FILLET MOLDING

1. Remove front fillet molding fixing screw.
2. Release front fillet molding clips A.
3. Pull front fillet molding forwards to release clips B.
4. Remove front fillet molding.

REAR FILLET MOLDING

1. Remove rear fillet molding fixing screw.
2. Release rear fillet molding clips A.
3. Pull rear fillet molding rearwards to release clips B.
4. Remove rear fillet molding.

INSTALLATION

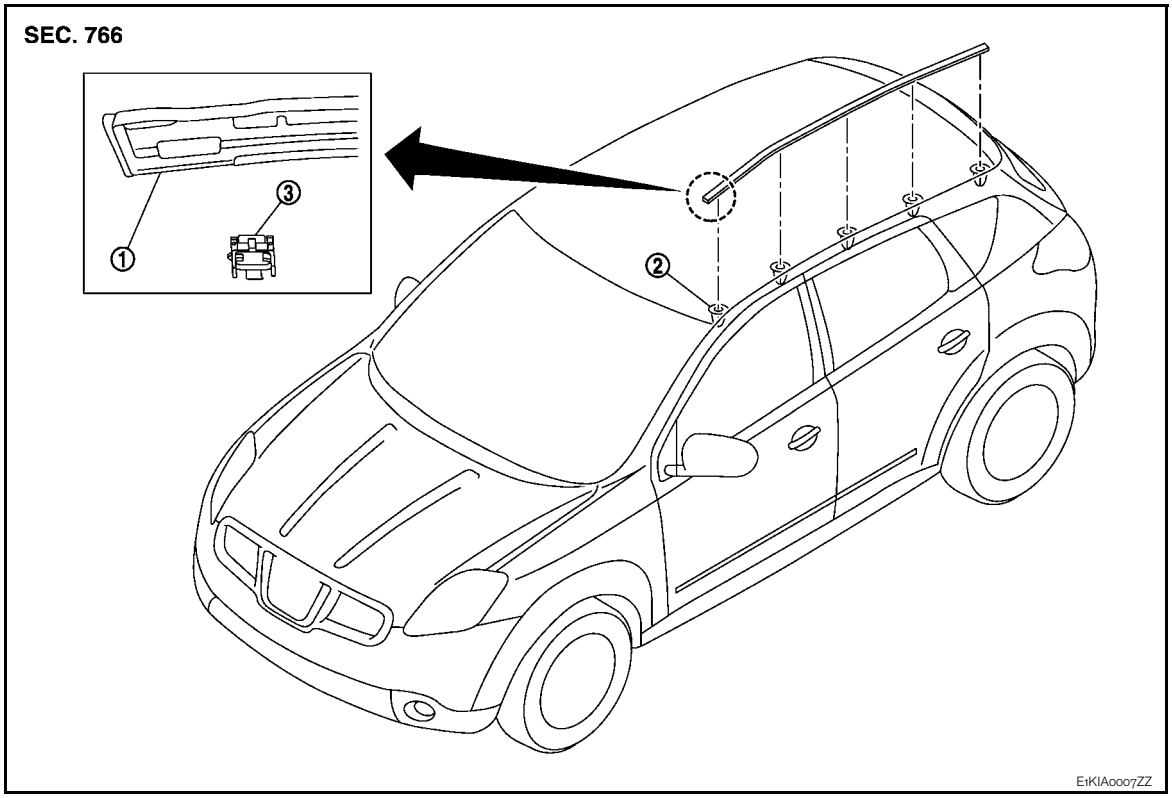
Install in the reverse order of removal.

carsdiagn.com

ROOF SIDE MOLDING

Exploded View

INFOID:0000000001093658



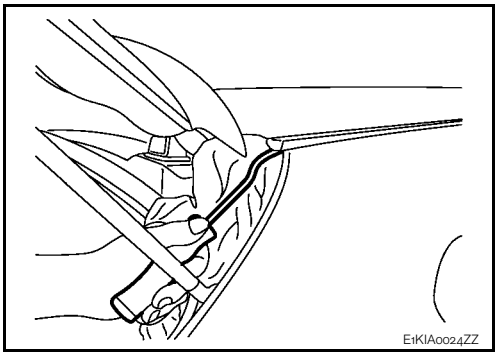
1. Roof side molding
2. Roof side molding clip
3. Roof side molding fastener

Removal and Installation

INFOID:0000000001093659

REMOVAL

1. Open trunk lid.
2. Using suitable tool, release roof side molding fixing clips from rear to front, then remove roof side molding.
   CAUTION:
   Always use shop cloth to avoid damaging the vehicle.



INSTALLATION

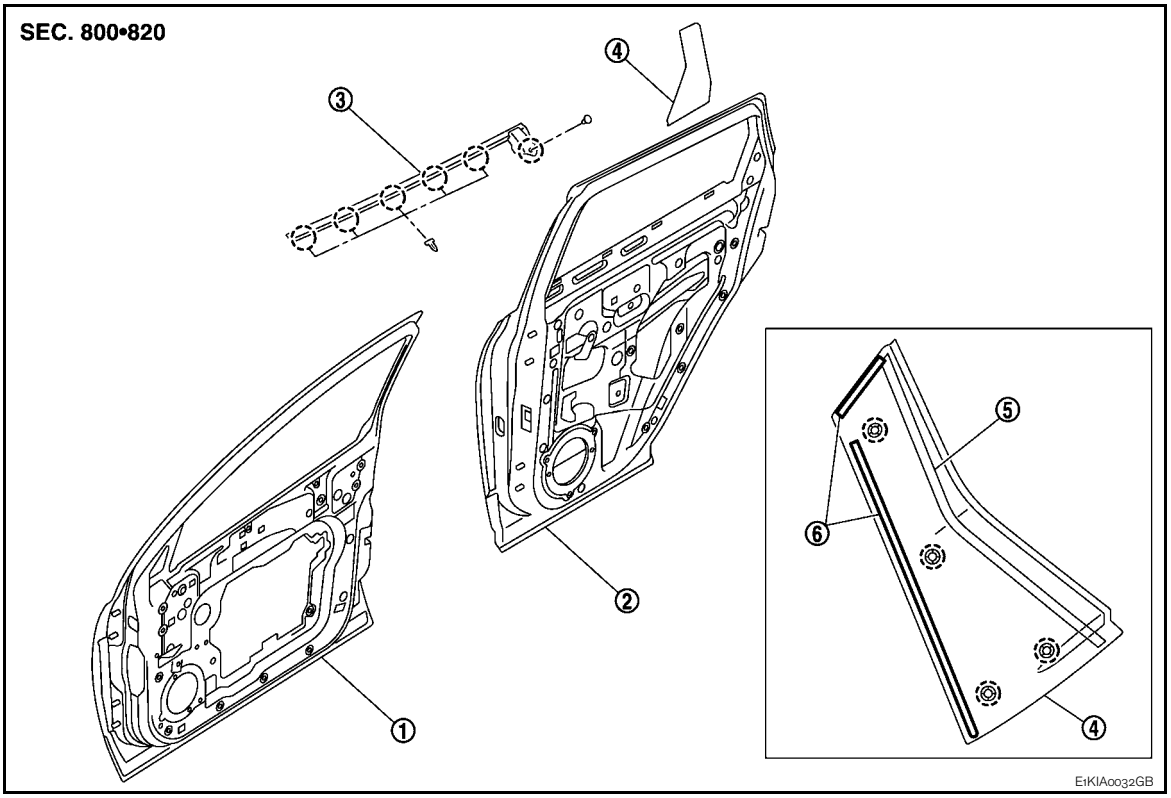
Install in the reverse order of removal.

cardiagn.com

DOOR SASH MOLDING

Exploded View

INFOID:0000000001093660



1. Front door panel
2. Rear door panel
3. Rear door side parting seal
4. Rear door sash molding
5. Rear door sash molding seal
6. Adhesive tape

Clip

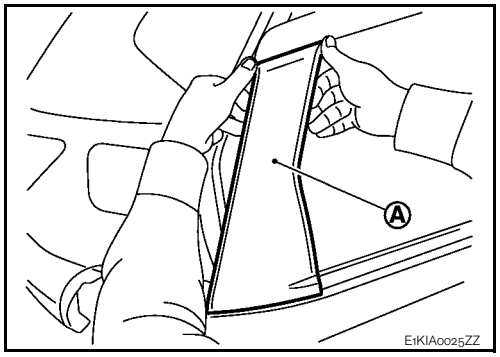
Removal and Installation

INFOID:0000000001093661

REMOVAL

REAR DOOR SASH MOLDING

1. Pull rear door sash molding (A) from upper side to lower side.
   NOTE:
   If necessary, use a flat screwdriver.
   CAUTION:
   Always use shop cloth to avoid damaging the vehicle.
2. Remove rear door sash molding.



INSTALLATION

Install in the reverse order of removal.

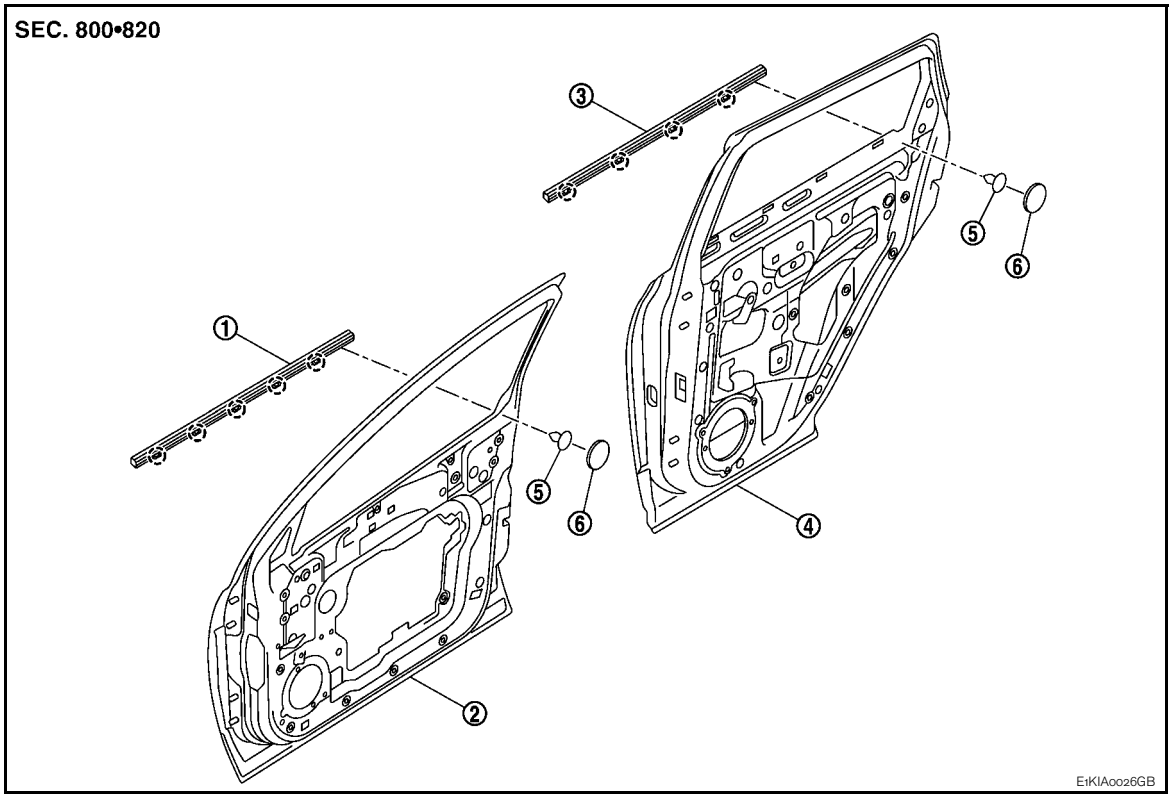
CAUTION:

Always clean body and parts before installation.

DOOR OUTSIDE MOLDING

Exploded View

INFOID:0000000001093662



1. Front door outside molding
2. Front door panel
3. Rear door outside molding
4. Rear door panel
5. Fixing screw
6. Fixing screw adhesive cover

Clip

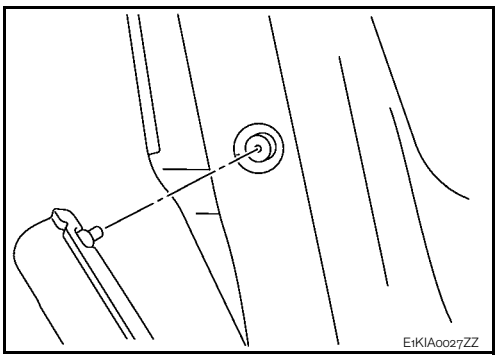
Removal and Installation

INFOID:0000000001093663

REMOVAL

FRONT DOOR OUTSIDE MOLDING

1. Remove door trim. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove door mirror assembly. Refer to MIR-39, "Removal and Installation".
3. Fit front door glass to lower position.
4. Remove front door lower weather strip upper end part fixing clip, then release front door lower weather strip rear upper end part.



5. Remove front door outside molding fixing screw adhesive cover.
6. Remove front door outside molding fixing screw.

CAUTION:

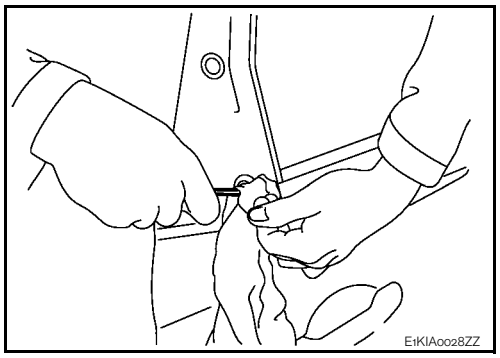
cardiagn.com

Attention, the screw might fall into the door.

7. Twist from rear to front and pull up to upper side, then remove front door outside molding.

REAR DOOR OUTSIDE MOLDING

1. Fit front door glass to lower position.
2. Remove rear door sash molding. Refer to EXT-25, "Removal and Installation".
3. Remove rear door outside molding fixing screw adhesive cover.
4. Remove rear door outside molding fixing screw.
   CAUTION:
   Attention, the screw might fall into the door.
5. Twist from rear to front and pull up to upper side, then remove front door outside molding.



INSTALLATION

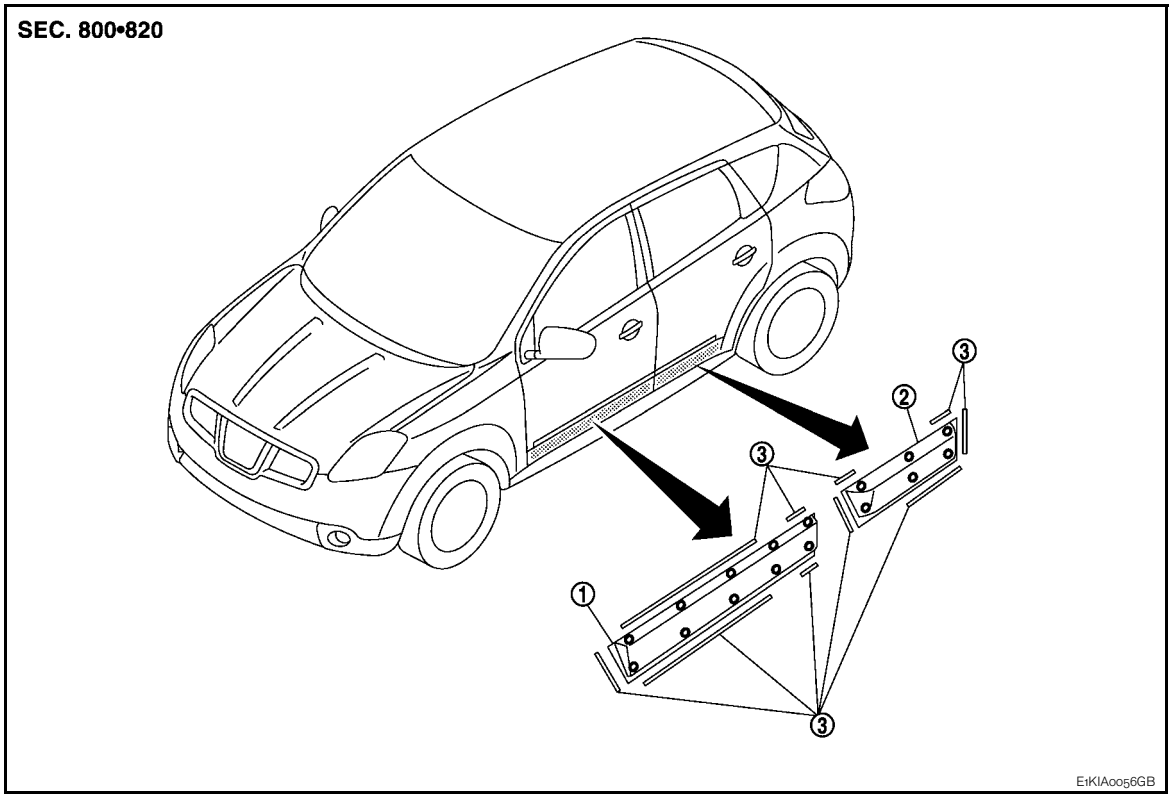
Install in the reverse order of removal.

carsdiagn.com

DOOR OUTSIDE LOWER MOLDING

Exploded View

INFOID:0000000001093654



1 Front door outside lower molding 2 Rear door outside lower molding 3 Adhesive tape

clip

Removal and Installation

INFOID:0000000001093655

REMOVAL

FRONT DOOR OUTSIDE LOWER MOLDING

1. Using suitable tool, release adhesive tape from front door.
2. Pull front door outside lower molding upper side outwards to release upper fixing clips.
3. Pull front door outside lower molding outwards to release lower fixing clips.
4. Remove front door outside lower molding.

REAR DOOR OUTSIDE LOWER MOLDING

1. Using suitable tool, release adhesive tape from rear door.
2. Pull rear door outside lower molding upper side outwards to release upper fixing clips.
3. Pull rear door outside lower molding outwards to release lower fixing clips.
4. Remove rear door outside lower molding.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

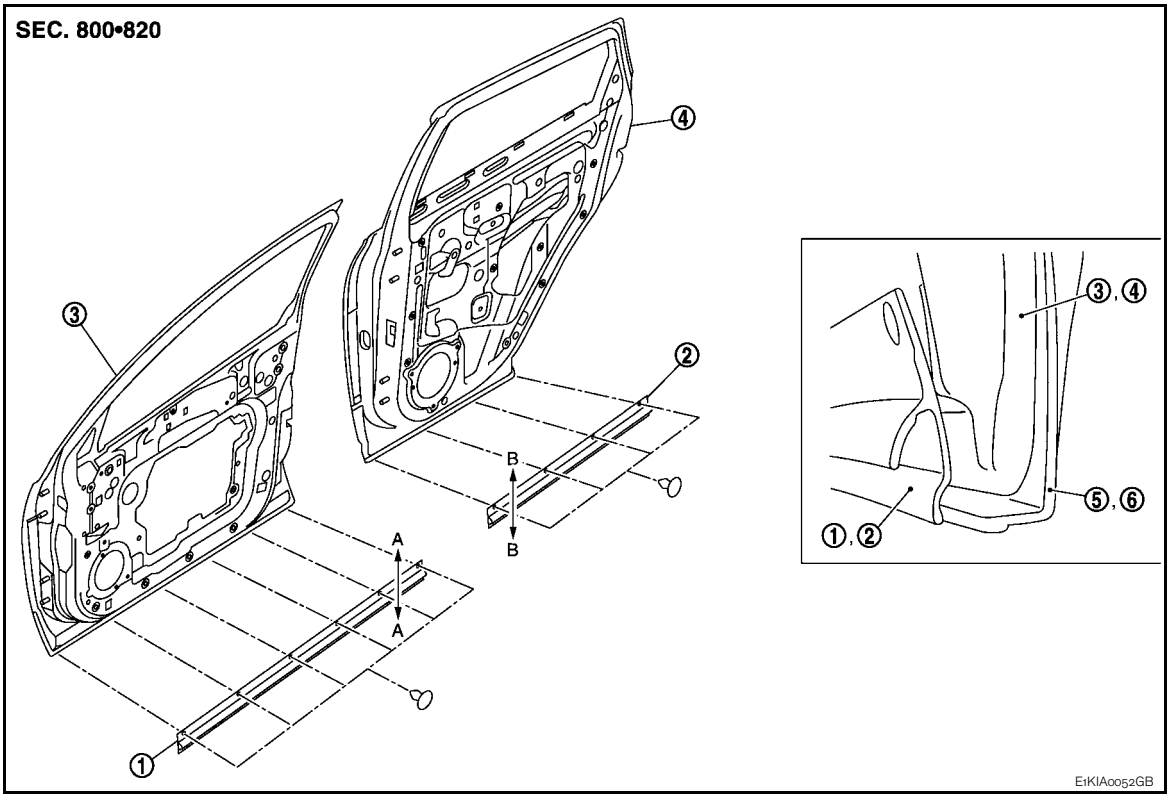
Always clean body and parts before installation.

cardiagn.com

DOOR PARTING SEAL

Exploded View

INFOID:0000000001093664



1. Front door parting seal
2. Rear door parting seal
3. Front door panel
4. Rear door panel
5. Front door outside lower molding
6 Rear door outside lower molding
7. Rear door side parting seal

Removal and Installation

INFOID:0000000001093665

REMOVAL

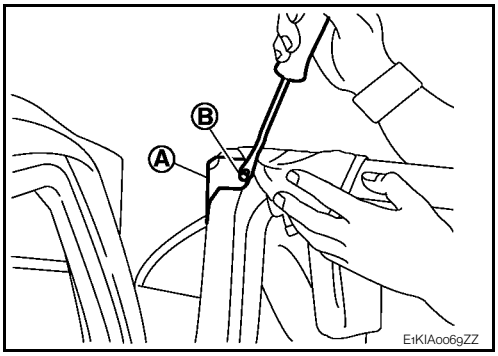
FRONT DOOR PARTING SEAL

1. Fully open front door.
2. Remove front door parting seal mounting plastic clips.
3. Remove front door parting seal.

REAR DOOR PARTING SEAL

1. Fully open rear door.
2. Remove rear door parting seal plastic mounting clips.
3. Remove rear door parting seal.

4. Using clip remover, remove rear door side parting seal (A) upper fixing clip (B).
5. Using clip remover, remove rear door side parting seal side fixing clips.
6. Remove rear door side parting seal.



INSTALLATION

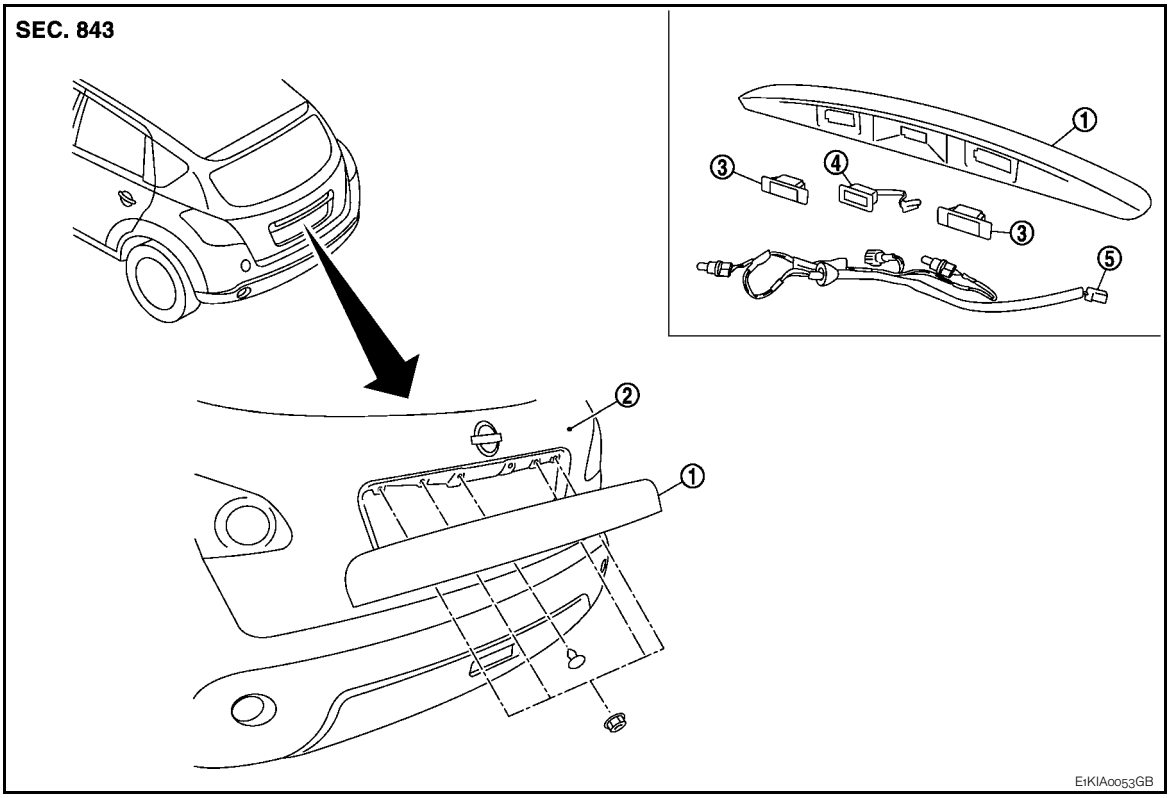
Install in the reverse order of removal.

cardiagn.com

BACK DOOR FINISHER

Exploded View

INFOID:0000000001093666



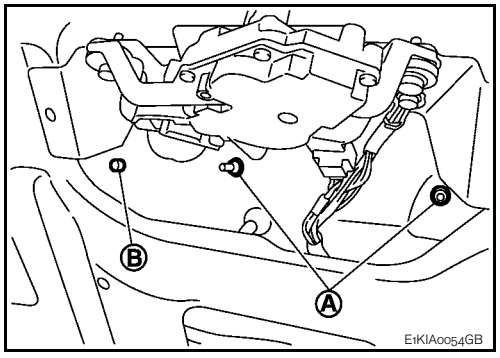
1. Back door finisher
2. Back door panel
3. License plate light
4. Back door opener switch assembly
5. Harness

Removal and Installation

INFOID:0000000001093667

REMOVAL

1. Fully open back door.
2. Remove back door trim. Refer to INT-26, "Removal and Installation".
3. Disconnect rear view camera harness connector (if equipped).
4. Disconnect back door opener request switch, and license plate light harness connector.
5. Remove back door finisher fixing nuts (A) and release back door finisher fixing clip (B).
6. Pull harness grommet outwards from back door to release it.
7. Pull back door finisher to remove it.
8. Remove the following parts after removing back door finisher.
   - License plate light. Refer to EXL-185, "Removal and Installation".
   - Opener request switch harness connector.
   - Opener request switch.
   - Bulb harness and opener switch connector.
   - Back door finisher fixing bolts.
   - Back door finisher fixing clip.



INSTALLATION

Install in the reverse order of removal.

SECTION FAX
FRONT AXLE

CONTENTS

2WD

SYMPTOM DIAGNOSIS 3

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 3
NVH Troubleshooting Chart 3

PRECAUTION 4

PRECAUTIONS 4
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 4
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 4
Precautions for Drive Shaft 4

PREPARATION 6

PREPARATION 6
Special Service Tool 6

ON-VEHICLE MAINTENANCE 7

FRONT WHEEL HUB AND KNUCKLE 7
Exploded View 7
Inspection 7

FRONT DRIVE SHAFT 8
Inspection 8

ON-VEHICLE REPAIR 9

FRONT WHEEL HUB AND KNUCKLE 9
Exploded View 9
Removal and Installation 9
Inspection 10

FRONT DRIVE SHAFT BOOT 11
Exploded View 11
Replacement 11

FRONT DRIVE SHAFT 15

HR16DE MODELS 15
HR16DE MODELS : Exploded View 15
HR16DE MODELS : Removal and Installation 17
HR16DE MODELS : Disassembly and Assembly 18
HR16DE MODELS : Inspection 22

MR20DE MODELS 22
MR20DE MODELS : Exploded View 22
MR20DE MODELS : Removal and Installation 25
MR20DE MODELS : Disassembly and Assembly 26
MR20DE MODELS : Inspection 30

K9K MODELS 31
K9K MODELS : Exploded View 31
K9K MODELS : Removal and Installation 33
K9K MODELS : Disassembly and Assembly 34
K9K MODELS : Inspection 38

SERVICE DATA AND SPECIFICATIONS (SDS) 40

SERVICE DATA AND SPECIFICATIONS (SDS) 40
Wheel Bearing 40
Drive Shaft 40

4WD

SYMPTOM DIAGNOSIS 43

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 43
NVH Troubleshooting Chart 43

PRECAUTION 44

PRECAUTIONS 44
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 44

cardiagn.com

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 44
Precautions for Drive Shaft 44

PREPARATION 46

PREPARATION 46
Special Service Tool 46

ON-VEHICLE MAINTENANCE 47

FRONT WHEEL HUB AND KNUCKLE 47
Exploded View 47
Inspection 47

FRONT DRIVE SHAFT 48
Inspection 48

ON-VEHICLE REPAIR 49

FRONT WHEEL HUB AND KNUCKLE 49
Exploded View 49
Removal and Installation 49
Inspection 50

FRONT DRIVE SHAFT BOOT 51
Exploded View 51
Replacement 51

FRONT DRIVE SHAFT 55
Exploded View 55
Removal and Installation 56
Disassembly and Assembly 58
Inspection 62

SERVICE DATA AND SPECIFICATIONS (SDS) 64

SERVICE DATA AND SPECIFICATIONS (SDS) 64
Wheel Bearing 64
Drive Shaft 64

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000970471

Use chart below to find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			—	FAX-22	—	FAX-9	—	FAX-7	NVH in FAX and FSU sections	Refer to Front axle in this chart	NVH in WT section	NVH in WT section	Refer to DRIVE SHAFT in this chart	NVH in BR section	NVH in ST section
Possible cause and SUSPECTED PARTS			Excessive joint angle	Joint sliding resistance	Imbalance	Improper installation, looseness	Parts interference	Wheel bearing damage	FRONT AXLE AND FRONT SUSPENSION	FRONT AXLE	TIRES	ROAD WHEELS	DRIVE SHAFT	BRAKES	STEERING
Symptom	DRIVE SHAFT	Noise	×	×				×	×	×	×	×		×	×
		Shake	×		×			×	×	×	×	×		×	×
	FRONT AXLE	Noise				×	×	×	×		×	×	×	×	×
		Shake				×	×	×	×		×	×	×	×	×
		Vibration				×	×	×	×		×		×		×
		Shimmy				×	×		×		×	×		×	×
		Judder				×			×		×	×		×	×
		Poor quality ride or handling				×	×		×		×	×			

×: Applicable

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000970472

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001099647

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precautions for Drive Shaft

INFOID:0000000000970475

CAUTION:

Note the following precautions when disassembling and assembling drive shaft.

- **Joint sub-assembly does not disassemble because it is non-overhaul parts.**

cardiagn.com

- **Perform work in a dust-free location.**
- **Before disassembling and assembling, clean the parts.**
- **Prevent the entry of foreign objects during disassembly of the service location.**
- **Disassembled parts must be carefully reassembled in the correct order. If work is interrupted, a clean cover must be placed over parts.**
- **Paper shop cloths must be used. Fabric shop cloths must not be used because of the danger of lint adhering to parts.**
- **Disassembled parts (except for rubber parts) should be cleaned with kerosene which shall be removed by blowing with air or wiping with paper shop cloths.**

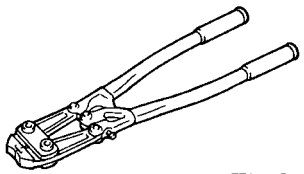
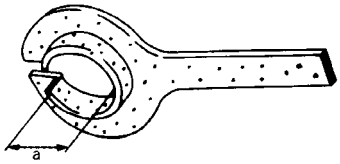
cardiagn.com

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000000970476

Tool number Tool name	Description
KV40107300 Boot band crimping tool  ZZA1229D	Installing boot band
KV40107500 Drive shaft attachment ZZA1230D	Removing drive shaft
KV38107900 Protector a: 32 mm (1.26 in) dia.  PDIA1183J	Installing drive shaft

cardiagn.com

ON-VEHICLE MAINTENANCE

FRONT WHEEL HUB AND KNUCKLE

Exploded View

INFOID:0000000000970478

Refer to FAX-9, "Exploded View".

Inspection

INFOID:0000000000970479

MOUNTING INSPECTION

Make sure that the mounting conditions (looseness, backlash) of each component and component conditions (wear, damage) are normal.

WHEEL BEARING INSPECTION

- Move wheel hub and bearing assembly in the axial direction by hand. Make sure there is no looseness of wheel bearing.

Standard

Axial end play : Refer to FAX-40, "Wheel Bearing".

- Rotate wheel hub and make sure there is no unusual noise or other irregular conditions. If there is any of irregular conditions, replace wheel hub and bearing assembly.

cardiagn.com

FRONT DRIVE SHAFT

Inspection

INFOID:0000000000970480

- Check drive shaft mounting point and joint for looseness and other damage.
- Check boot for cracks and other damage.

CAUTION:
Replace entire drive shaft assembly when noise or vibration occur from drive shaft.

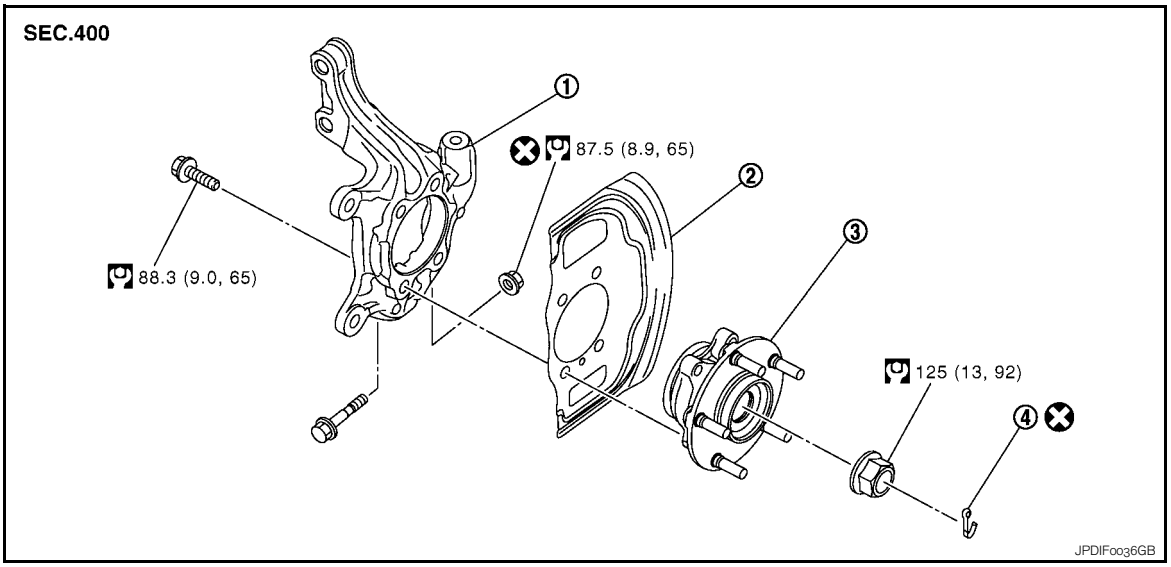
cardiagn.com

ON-VEHICLE REPAIR

FRONT WHEEL HUB AND KNUCKLE

Exploded View

INFOID:0000000000970481



1. Steering knuckle
2. Splash guard
3. Wheel hub and bearing assembly
4. Cotter pin

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000970482

REMOVAL

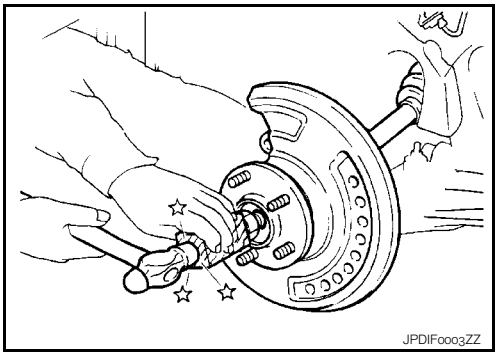
Wheel Hub and Bearing Assembly

1. Remove tires from vehicle.
2. Remove wheel sensor from steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "FRONT WHEEL SENSOR : Exploded View" (with ESP).
   CAUTION:
   Never pull on wheel sensor harness.
3. Remove lock plate from strut assembly. Refer to BR-19, "FRONT BRAKE (WITH ABS) : Exploded View" (LHD with ABS), BR-21, "FRONT BRAKE (WITH ESP) : Exploded View" (LHD with ESP), BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (RHD with ABS), BR-65, "FRONT BRAKE (WITH ESP) : Exploded View" (RHD with ESP).
4. Remove torque member mounting bolts. Hang torque member not to interfere with work. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-81, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depress brake pedal while brake caliper is removed.
5. Remove disc rotor.
6. Remove cotter pin, and then loosen hub lock nut.

cardiagn.com

7. Patch hub lock nut with a piece of wood. Hammer the wood to disengage wheel hub and bearing assembly from drive shaft. Remove the hub lock nut.
   CAUTION:
   - **Never place drive shaft joint at an extreme angle. Also be careful not to overextend slide joint.**
   - **Never allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and the other parts.**

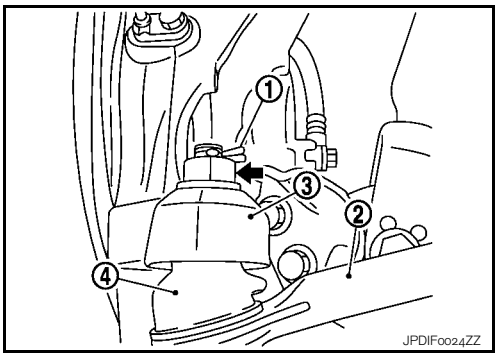
   NOTE:
   Use suitable puller, if wheel hub and bearing assembly and drive shaft cannot be separated even after performing the above procedure.



8. Remove wheel hub and bearing assembly.

Steering Knuckle

1. Remove wheel hub and bearing assembly, and then remove splash guard.
2. Remove cotter pin (1) of steering outer socket, and then loosen the nut.
3. Remove steering outer socket (2) from steering knuckle (3) using the ball joint remover so as not to damage ball joint boot (4).
   CAUTION:
   Temporarily tighten the nut to prevent damage to threads and to prevent the ball joint remover from suddenly coming off.
4. Remove transverse link from steering knuckle.
5. Remove steering knuckle from strut assembly.
6. Remove steering knuckle form vehicle.



INSTALLATION

Note the following, and install in the reverse order of the removal.

- Under unladen conditions perform the final tightening of each parts removed when removing wheel hub and bearing assembly and steering knuckle.

Inspection

INFOID:0000000000970483

INSPECTION AFTER REMOVAL

Check components for deformation, cracks, and other damage. Replace if there are.

Ball Joint Inspection

Check boots of transverse link and steering outer socket ball joint for breakage, axial play, and torque. Refer to FSU-6, "Inspection" and ST-16, "Inspection".

INSPECTION AFTER INSTALLATION

- Check the wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".
- Adjust neutral position of steering angle sensor after checking the wheel alignment. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).

cardiagn.com

FRONT DRIVE SHAFT BOOT

Exploded View

INFOID:0000000001078725

Refer to FAX-15, "HR16DE MODELS : Exploded View" (HR16DE models), FAX-22, "MR20DE MODELS : Exploded View" (MR20DE models), FAX-31, "K9K MODELS : Exploded View" (K9K models).

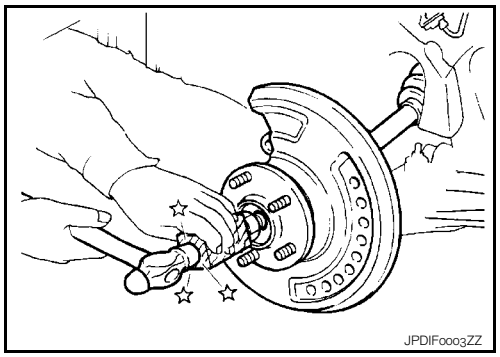
Replacement

INFOID:0000000000970485

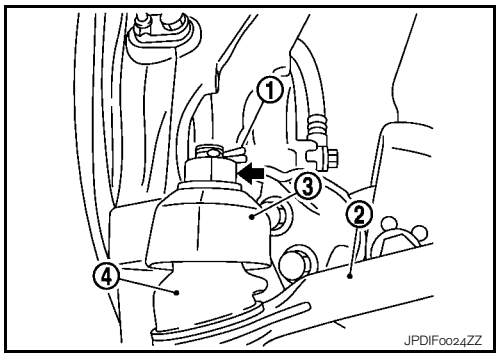
WHEEL SIDE

1. Remove tires from vehicle.
2. Remove wheel sensor from steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "FRONT WHEEL SENSOR : Exploded View" (with ESP).
   CAUTION:
   Never pull on wheel sensor harness.
3. Remove lock plate from strut assembly. Refer to BR-19, "FRONT BRAKE (WITH ABS) : Exploded View" (LHD with ABS), BR-21, "FRONT BRAKE (WITH ESP) : Exploded View" (LHD with ESP), BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (RHD with ABS), BR-65, "FRONT BRAKE (WITH ESP) : Exploded View" (RHD with ESP).
4. Remove torque member mounting bolts. Hang torque member not to interfere with work. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-81, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depress brake pedal while brake caliper is removed.
5. Remove disc rotor.
6. Remove cotter pin, and then loosen hub lock nut.
7. Patch hub lock nut with a piece of wood. Hammer the wood to disengage wheel hub and bearing assembly from drive shaft. Remove the hub lock nut.
   CAUTION:
   - **Never place drive shaft joint at an extreme angle. Also be careful not to overextend slide joint.**
   - **Never allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and the other parts.**

   NOTE:
   Use suitable puller if wheel hub and drive shaft cannot be separated even after performing the above procedure.

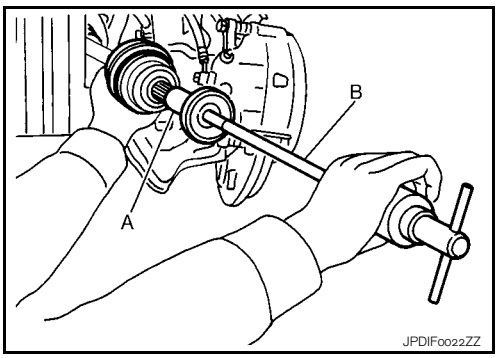


8. Remove cotter pin (1) of steering outer socket, and then loosen the nut.
9. Remove steering outer socket (2) from steering knuckle (3) so as not to damage ball joint boot (4) using the ball joint remover.
   CAUTION:
   Temporarily tighten the nut to prevent damage to threads and to prevent the ball joint remover from suddenly coming off.
10. Remove transverse link from steering knuckle.
11. Remove drive shaft from wheel hub and bearing assembly.
12. Remove boot bands, and then remove boot from joint sub-assembly.

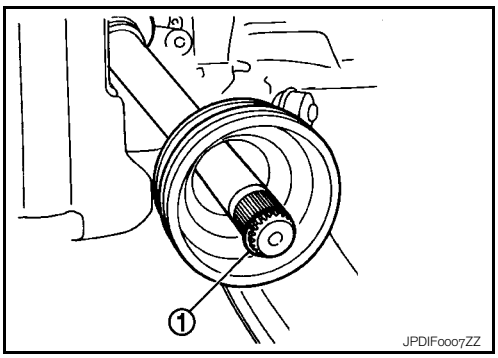


cardiagn.com

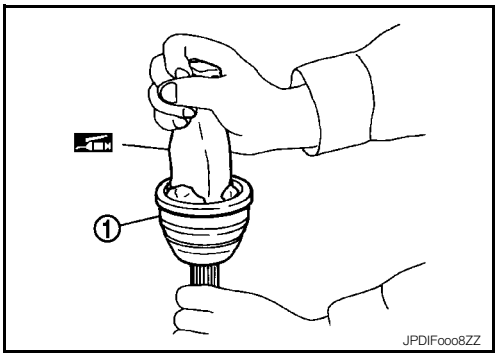
13. Screw a drive shaft puller (A) into joint sub-assembly screw part to a length of 30 mm (1.18 in) or more. Support drive shaft with one hand and pull out joint sub-assembly with a sliding hammer (B) from shaft.
CAUTION:
- **Align a sliding hammer and drive shaft and remove them by pulling firmly and uniformly.**
- **If joint sub-assembly cannot be pulled out, try after removing drive shaft from vehicle.**



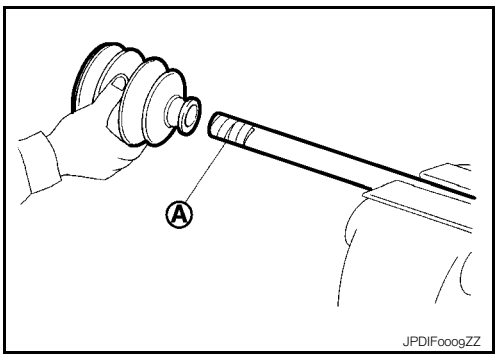
14. Remove circular clip (1) from shaft.
15. Remove boot from shaft.
16. Clean the old grease on joint sub-assembly with paper towels.



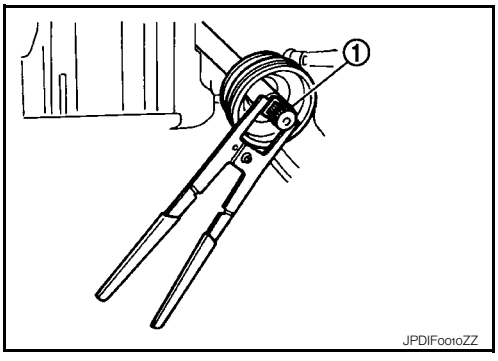
17. Fill serration slot joint sub-assembly (1) with NISSAN genuine grease or equivalent until the serration slot and ball groove become full to the brim.
CAUTION:
After applying grease, use a shop cloth to wipe off old grease that has oozed out.



18. Wrap serration on shaft with tape (A) to protect the boot from damage. Install boot and boot bands to shaft.
CAUTION:
Never reuse boot and boot band.
19. Remove the tape wrapped around the serration on shaft.

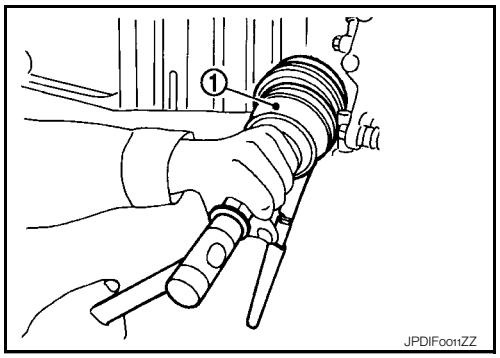


20. Position the circular clip (1) on groove at the shaft edge.
CAUTION:
Never reuse circular clip.
NOTE:
Drive joint inserter is recommended when installing circular clip.



cardiagn.com

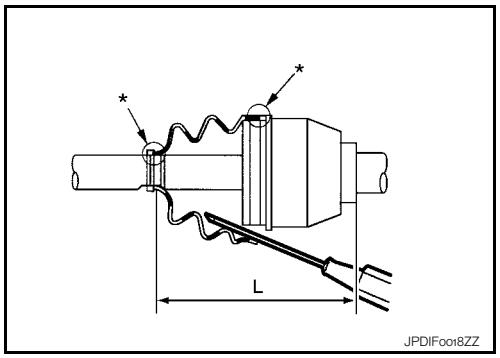
21. Align both center axles of the shaft edge and joint sub-assembly. Then assemble shaft with circular clip joint sub-assembly.
22. Install joint sub-assembly (1) to shaft using plastic hammer.
CAUTION:
Confirm that joint sub-assembly is correctly engaged while rotating drive shaft.
23. Apply the balance of the specified amount of grease into the boot inside from large diameter side of boot.



Standard

Grease amount	**: Refer to FAX-40, "Drive Shaft".**

24. Install the boot securely into grooves (indicated by "*" marks) shown in the figure.
CAUTION:
If grease adheres to the boot mounting surface (with "*" mark) on the shaft or joint sub-assembly, boot may be removed. Remove all grease from the surface.
25. To prevent from the deformation of the boot, adjust the boot installation length to the specified value shown below (L) by inserting the suitable tool into inside of the boot from the large diameter side of the boot and discharging the inside air.

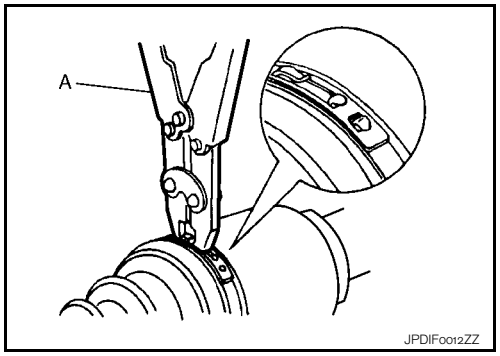


Standard

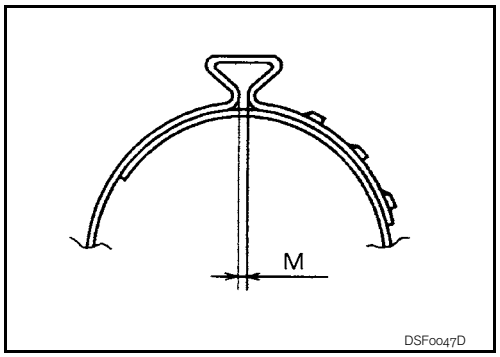
Boots installed length (L)	**: Refer to FAX-40, "Drive Shaft".**

CAUTION:
- **If the boot mounting length exceeds the standard, it may cause breakage in the boot.**
- **Be careful not to touch the inside of the boot with a tip of tool.**

26. Secure the large and small ends of the boot with boot bands using the boot band crimping tool (A) (SST: KV40107300).



NOTE:
Secure boot band so that dimension (M) meets the specification as shown in the figure.



Dimension "M" : 1.0 – 4.0 mm (0.039 – 0.157 in)

27. Secure joint sub-assembly and shaft, and then make sure that they are in the correct position when rotating boot. Install them with boot band when boot installation positions become incorrect.
28. Insert drive shaft to wheel hub and bearing assembly, and then temporarily tighten hub lock nut.
CAUTION:
The drive shaft is press-fit. When assembling the shaft, never press it, but pull it until fully seated by tightening the hub lock nut.

cardiagn.com

29. Install transverse to steering knuckle. Refer to FSU-12, "Exploded View".
30. Install steering outer socket to steering knuckle. Refer to ST-13, "Exploded View".
31. Install disc rotor.
32. Install torque member to steering knuckle. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-81, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
33. Install lock plate to strut assembly. Refer to BR-19, "FRONT BRAKE (WITH ABS) : Exploded View" (LHD with ABS), BR-21, "FRONT BRAKE (WITH ESP) : Exploded View" (LHD with ESP), BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (RHD with ABS), BR-65, "FRONT BRAKE (WITH ESP) : Exploded View" (RHD with ESP).
34. Install wheel sensor to steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "FRONT WHEEL SENSOR : Exploded View" (with ESP).
35. Tighten the hub lock nut to the specified torque. Refer to FAX-7, "Exploded View".
36. Install cotter pin.
    CAUTION:
    - **Never reuse cotter pin.**
    - **Bend cotter pin at the root sufficiently to prevent any looseness.**
37. Install tires to vehicle.

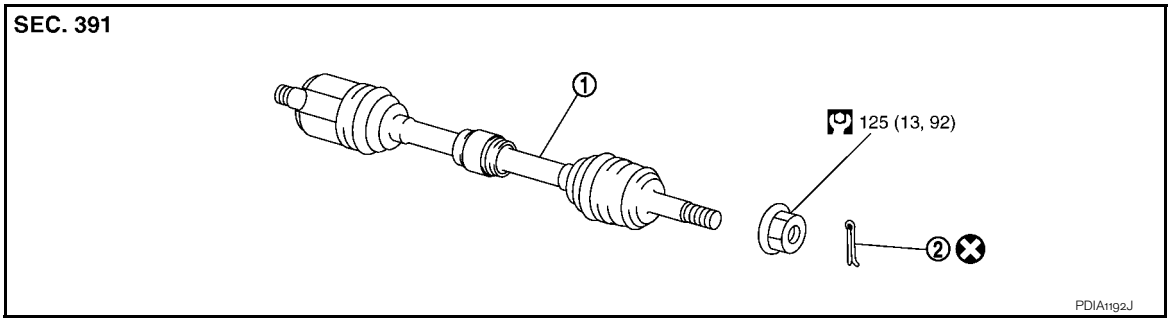
cardiagn.com

FRONT DRIVE SHAFT
HR16DE MODELS
HR16DE MODELS : Exploded View

INFOID:0000000000970486

REMOVAL

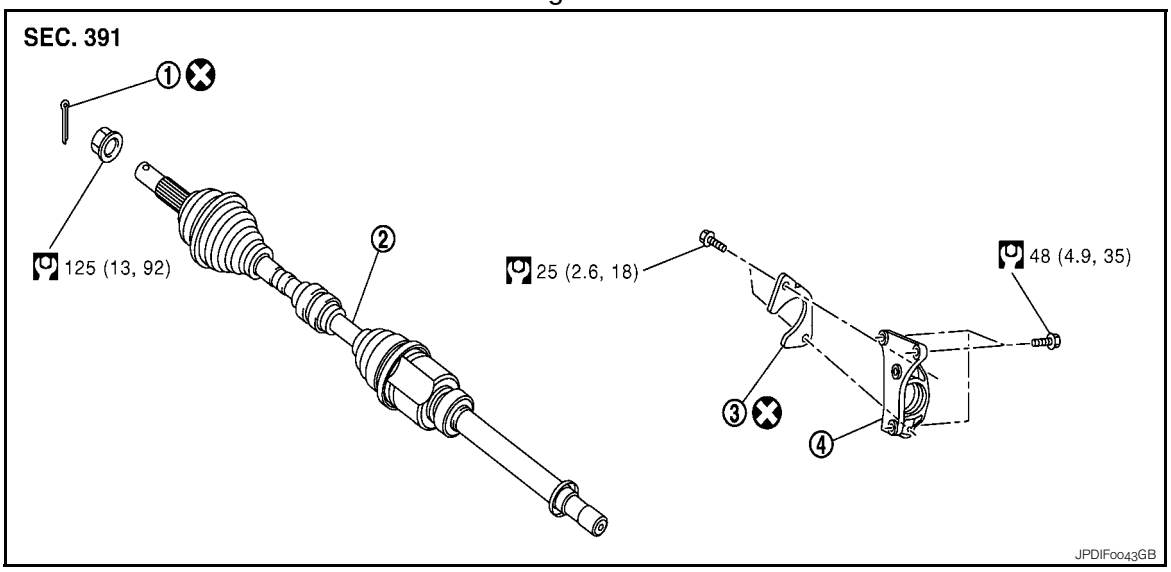
Left side



1. Drive shaft
2. Cotter pin

Refer to GI-4, "Components" for symbols in the figure.

Right side



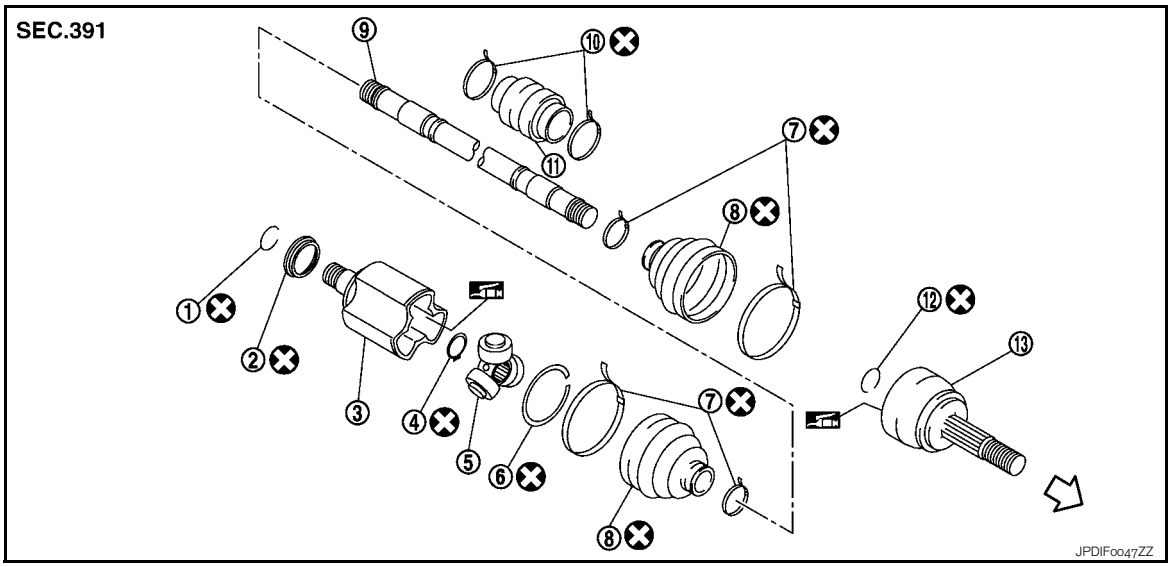
1. Cotter pin
2. Drive shaft
3. Plate
4. Support bearing bracket

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY

cardiagn.com

Left side



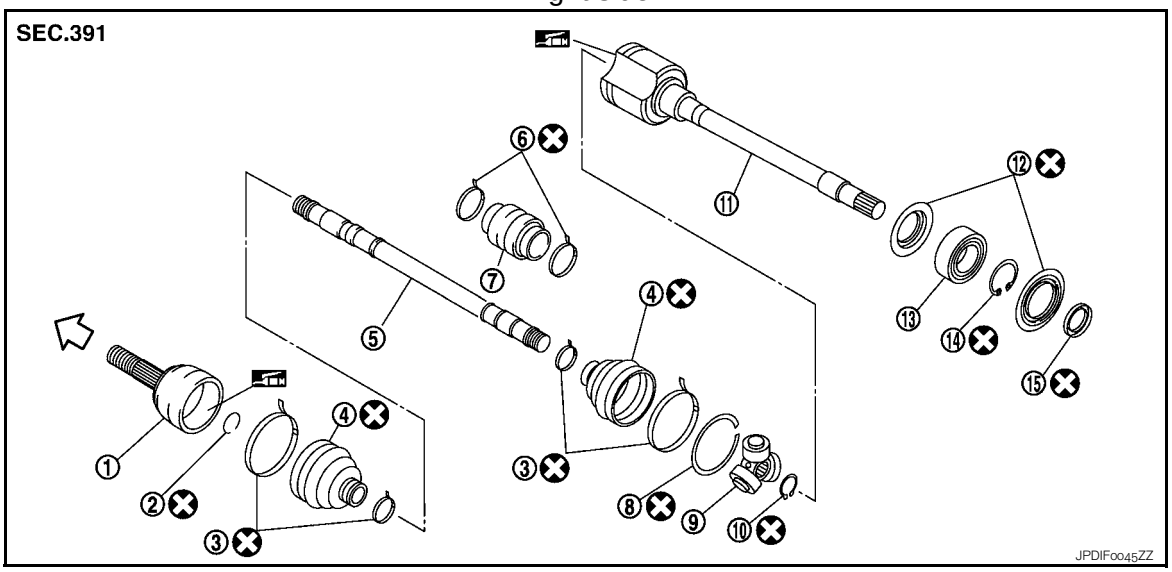
1. Circular clip
2. Dust shield
3. Housing
4. Snap ring
5. Spider assembly
6. Stopper ring
7. Boot band
8. Boot
9. Shaft
10. Damper band
11. Dynamic damper
12. Circular clip
13. Joint sub-assembly

⇦ : Wheel side

: Fill NISSAN Genuine grease or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

Right side



1. Joint sub-assembly
2. Circular clip
3. Boot band
4. Boot
5. Shaft
6. Damper band
7. Dynamic damper
8. Stopper ring
9. Spider assembly
10. Snap ring
11. Housing
12. Dust shield
13. Support bearing
14. Snap ring
15. Dust shield

⇦ : Wheel side

: Fill NISSAN Genuine grease or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

cardiagn.com

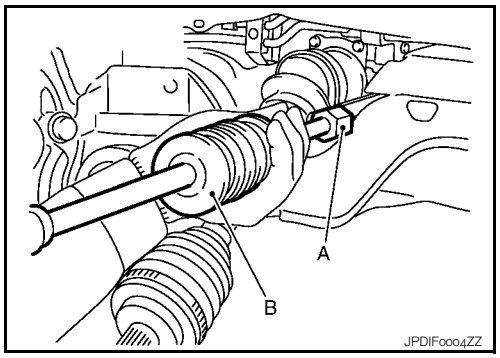
HR16DE MODELS : Removal and Installation

INFOID:0000000000970487

REMOVAL

Left Side

1. Refer to the procedure from 1 to 11 in FAX-11, "Replacement".
2. Remove drive shaft from transaxle assembly.
   - Use the drive shaft attachment (A) (SST:KV40107500) and a sliding hammer (B) while inserting tip of the drive shaft attachment between housing and transaxle assembly.
   CAUTION:
   Never place drive shaft joint at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.



Right Side

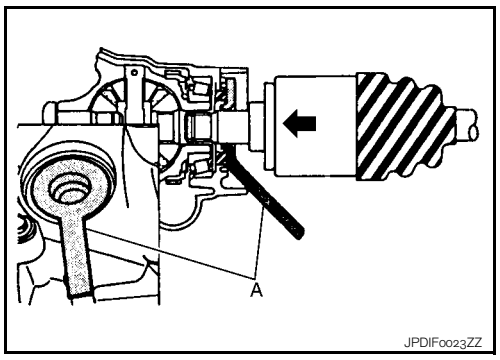
1. Refer to the procedure from 1 to 11 in FAX-11, "Replacement".
2. Remove plate bolts and plate.
3. If necessary, remove the support bearing bracket bolts and the support bearing bracket.
4. Remove drive shaft from transaxle assembly.
   - Use the drive shaft attachment (SST:KV40107500) and a sliding hammer while inserting tip of the drive shaft attachment between housing and transaxle assembly.
   CAUTION:
   Never place drive shaft joint at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.

INSTALLATION

Left Side

Note the following, and install in the reverse order of removal.

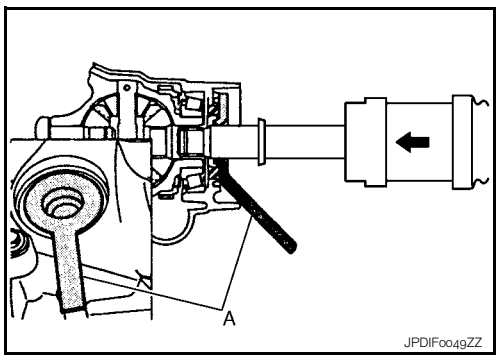
- Place the protector (A) (SST:KV38107900) onto transaxle assembly to prevent damage to the oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.
  CAUTION:
  Make sure that circular clip is completely engaged.



Right Side

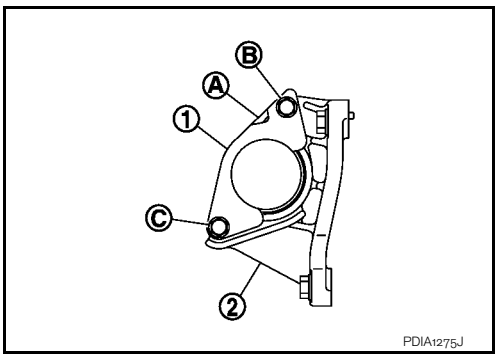
Note the following, and install in the reverse order of removal.

- Place the protector (A) (SST:KV38107900) onto transaxle assembly to prevent damage to the oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.



cardiagn.com

- When installing plate (1) to support bearing bracket (2), set plate so that notch (A) becomes upper side. Temporarily tighten mounting bolts in the order of (B), (C).
  CAUTION:
  Never reuse plate.



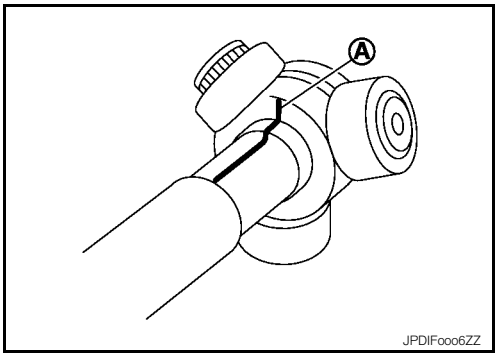
HR16DE MODELS : Disassembly and Assembly

INFOID:0000000000970488

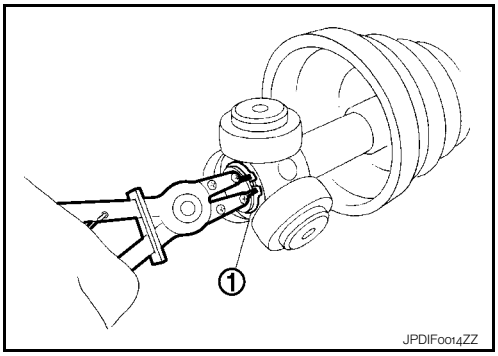
DISASSEMBLY

Transaxle Assembly Side

1. Fix shaft with a vise.
   CAUTION:
   Protect shaft using aluminum or copper plates when fixing with a vise.
2. Remove boot bands, and then remove boot from housing.
3. Remove stopper ring.
4. Put matching marks on housing and shaft, and then pull out housing from shaft.
   CAUTION:
   Use paint or an equivalent for matching marks. Never scratch the surfaces.
5. Put matching marks (A) on the spider assembly and shaft.
   CAUTION:
   Use paint or an equivalent for matching marks. Never scratch the surfaces.



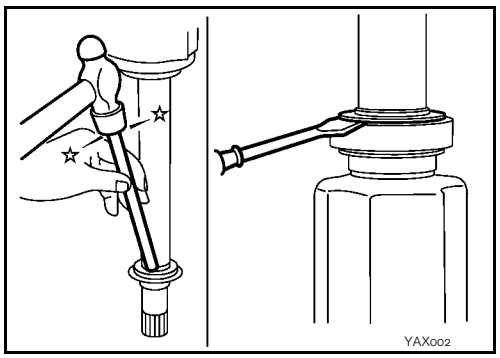
6. Remove snap ring (1), and then remove spider assembly from shaft.
7. Remove boot from shaft.
8. Remove circular clip from shaft (left side).
9. Remove dust shield from housing.
10. Clean old grease on housing with paper towels.



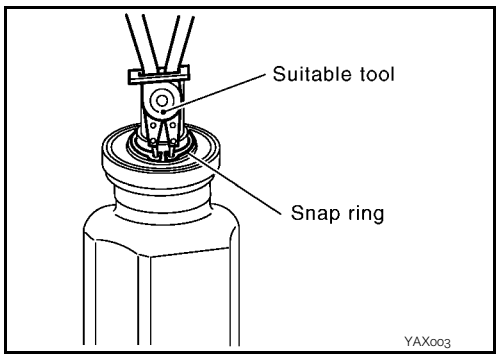
Support Bearing

cardiagn.com

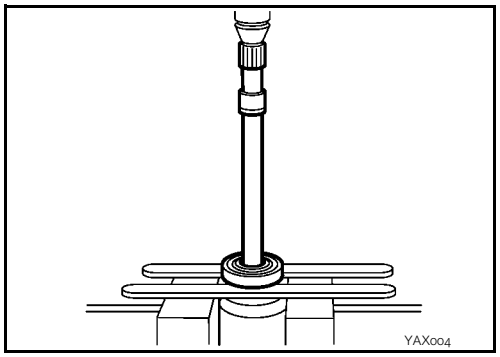
1. Remove dust shield from housing.



2. Remove snap ring.



3. Press out support bearing from housing.
4. Remove dust shield.

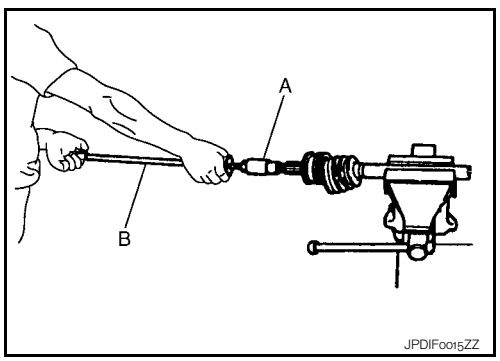


Dynamic Damper

Remove damper bands, then remove dynamic damper from shaft.

Wheel Side

1. Fix shaft with a vise.
   CAUTION:
   Protect shaft using aluminum or copper plates when fixing with a vise.
2. Remove boot bands, and then remove boot from joint sub-assembly.
3. Screw the drive shaft puller (A) 30 mm (1.18 in) or more into the thread of joint sub-assembly, and pull joint sub-assembly with a sliding hammer (B) from shaft.
   CAUTION:
   - **If joint sub-assembly cannot be removed after five or more unsuccessful attempts, replace shaft and joint sub assembly as a set.**
   - **Align sliding hammer and drive shaft and remove them by pulling directory.**
4. Remove circular clip from shaft.
5. Remove boot from shaft.
6. Clean old grease on joint sub-assembly with paper towels while rotating ball cage.

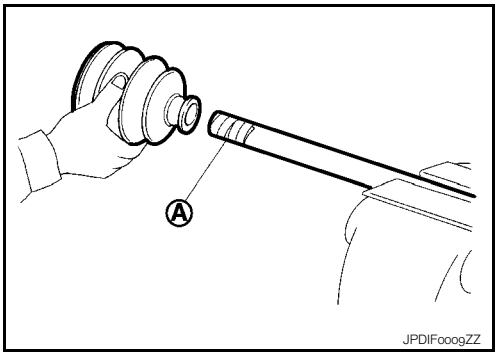


ASSEMBLY

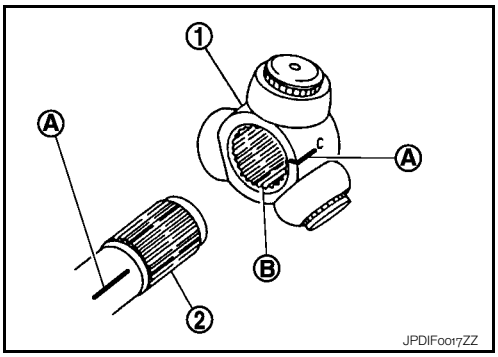
cardiagn.com

Transaxle Assembly Side

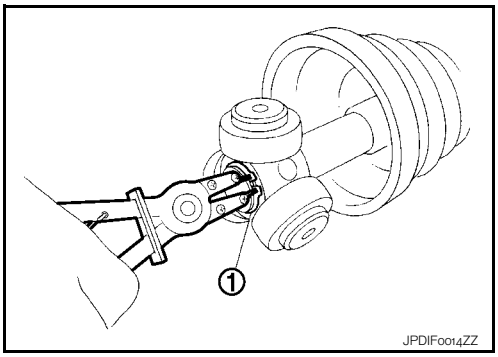
1. Wrap serration on shaft with tape (A) to protect boot from damage. Install new boot and boot bands to shaft.
   CAUTION:
   Never reuse boot and boot band.
2. Remove the tape wrapped around the serration on shaft.



3. To install the spider assembly (1), align it with the matching marks (A) on the shaft (2) during the removal, and direct the serration mounting surface (B) to the shaft.



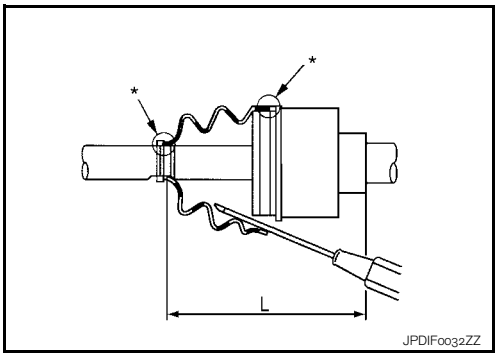
4. Secure spider assembly onto shaft with snap ring (1).
   CAUTION:
   Never reuse snap ring.
5. Apply the appropriate amount of grease to spider assembly and sliding surface.
6. Assemble the housing onto spider assembly, and apply the balance of the specified amount grease.



Standard

Grease amount **: Refer to FAX-40, "Drive Shaft".**

7. Align matching marks put during the removal of housing.
8. Install stopper ring.
   CAUTION:
   Never reuse stopper ring.
9. Install boot securely into grooves (indicated by “*” marks) shown in the figure.
   CAUTION:
   If grease adheres to the boot mounting surface (with “*” mark) on shaft or housing, boot may be removed. Remove all grease from the surface.
10. To prevent from deformation of the boot, adjust the boot installation length to the value shown below (L) by inserting the suitable tool into the inside of boot from the large diameter side of boot and discharging inside air.



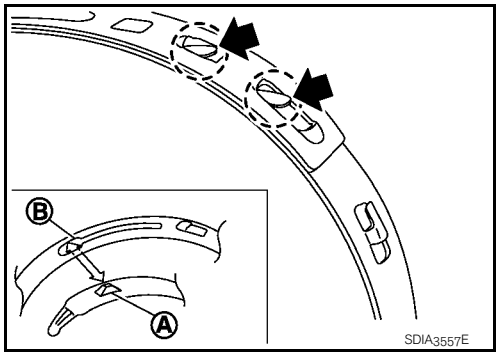
Standard

Boots installed length (L) **: Refer to FAX-40, "Drive Shaft".**

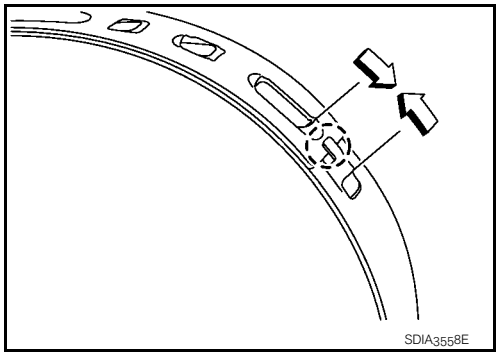
CAUTION:
- **If the boot installation length exceeds the standard, it may cause breakage in boot.**
- **Be careful not to touch the inside of the boot with the tip of tool.**

cardiagn.com

11. Install new larger and smaller boot bands securely.
CAUTION:
Never reuse boot band.
12. Put boot band in the groove on drive shaft boot. Then fit pawls (⬅) into holes to temporary installation.
NOTE:
For the large diameter side, fit projection (A) and guide slit (B) at first.

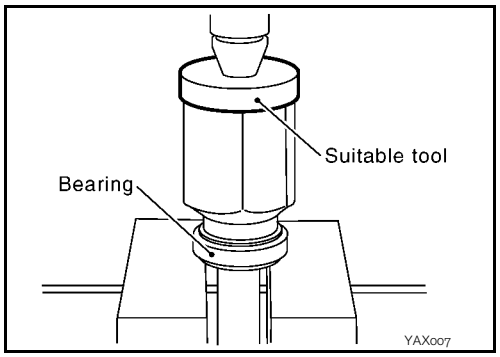


13. Pinch projection on the band with suitable pliers to tighten band.
14. Insert tip of band below end of the pawl.
15. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when the mounting positions become incorrect.
16. Install circular clip to shaft (left side).
CAUTION:
Never reuse circular clip.
17. Install dust shield (left side).
CAUTION:
Never reuse dust shield.

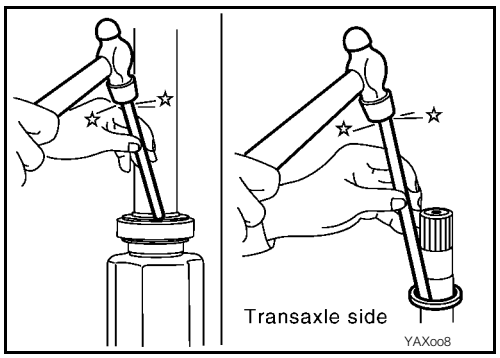


Support Bearing

1. Install dust shield on housing.
CAUTION:
Never reuse dust shield.
2. Press support bearing onto housing.



3. Install snap ring.
CAUTION:
Never reuse snap ring.
4. Install dust shields.
CAUTION:
Never reuse dust shields.



Dynamic Damper

cardiagn.com

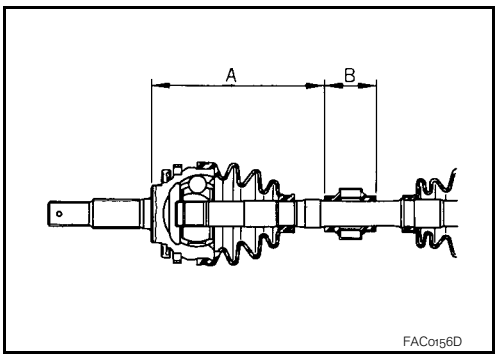
Secure dynamic damper with bands in the following specified position when removing.

CAUTION:

Never reuse bands.

Standard

Demission : **FAX-40, "Drive Shaft".**



Wheel Side

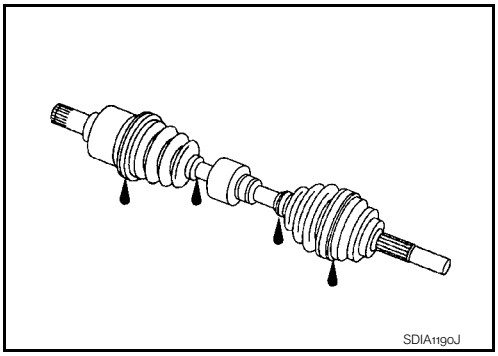
For further details, refer to the installation procedure of "FAX-11, "Replacement"" for the drive shaft boot.

HR16DE MODELS : Inspection

INFOID:0000000000970489

INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in the axial directions. Check for motion that is not smooth and for significant looseness.
- Check boot for cracks, damage, and leakage of grease.
- Disassemble drive shaft and exchange malfunctioning part if there is a non-standard condition.



INSPECTION AFTER DISASSEMBLY

Shaft

Check shaft for runout, cracks, or other damage. Replace if there are.

Dynamic Damper

Check damper for cracks or wear. Replace if necessary.

Joint Sub-Assembly (Wheel Side)

Check the following:

- Joint sub-assembly for rough rotation and excessive axial looseness
- The inside of the joint sub-assembly for entry of foreign material
- Joint sub-assembly for compression scars, cracks, and fractures inside of joint sub-assembly

Replace joint sub-assembly if there are any non-standard conditions of components.

Housing and Spider assembly (Transaxle Side)

Replace housing and spider assembly if there is scratching or wear of housing roller contact surface or spider roller contact surface.

NOTE:

Housing and spider assembly are used in a set.

Support Bearing (Right Side)

Make sure wheel bearing rolls freely and is free from noise, cracks, pitting or wear. Replace support bearing if there are any non-standard conditions.

Support Bearing Bracket (Right Side)

Check for bending, cracks, or damage. Replace support bearing bracket if there are any non-standard conditions.

MR20DE MODELS

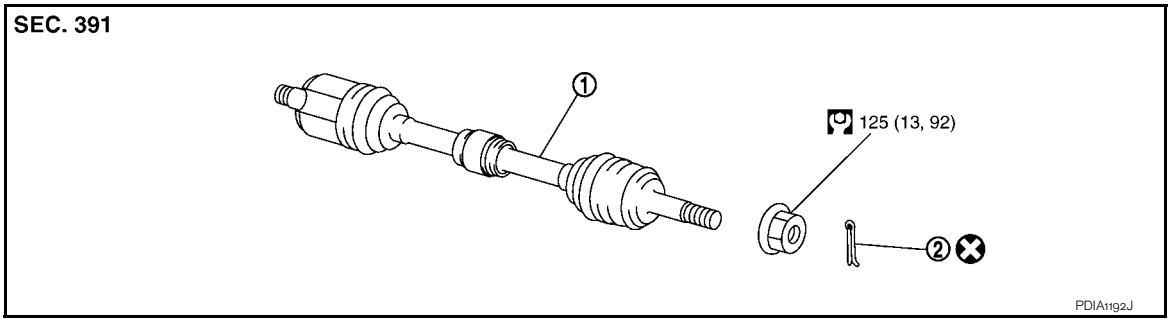
MR20DE MODELS : Exploded View

INFOID:0000000001080661

cardiagn.com

REMOVAL

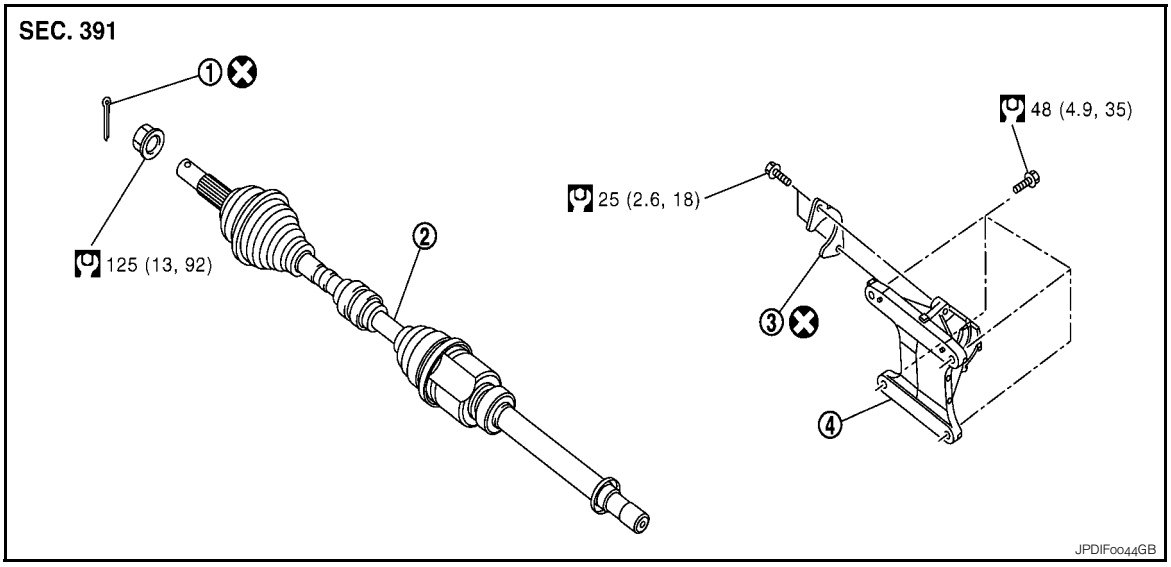
Left side



1. Drive shaft
2. Cotter pin

Refer to GI-4, "Components" for symbols in the figure.

Right side



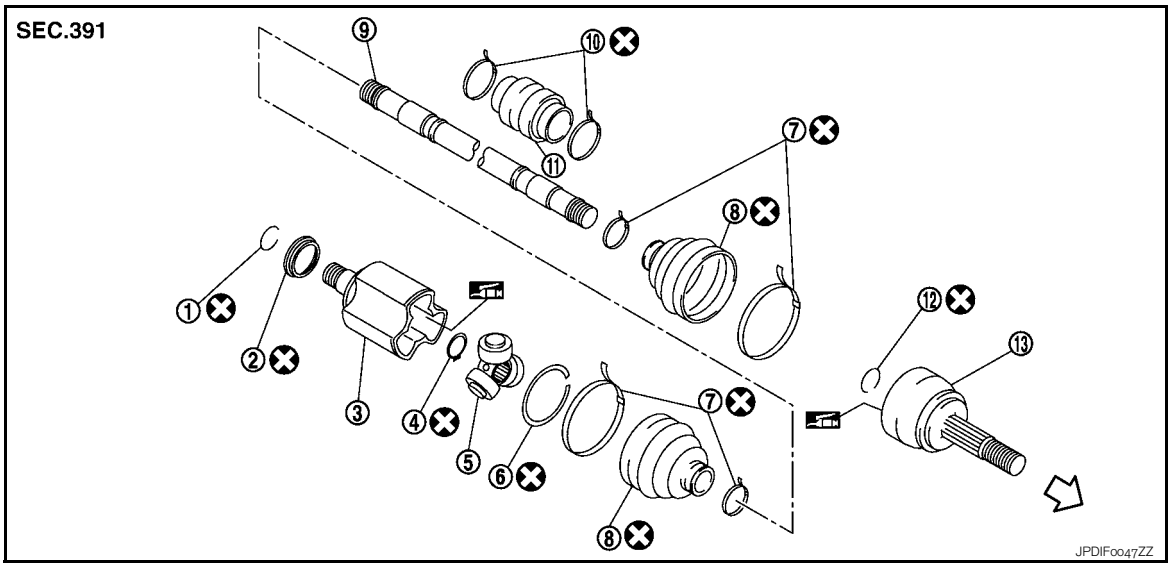
1. Cotter pin
2. Drive shaft
3. Plate
4. Support bearing bracket

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY

cardiagn.com

Left side



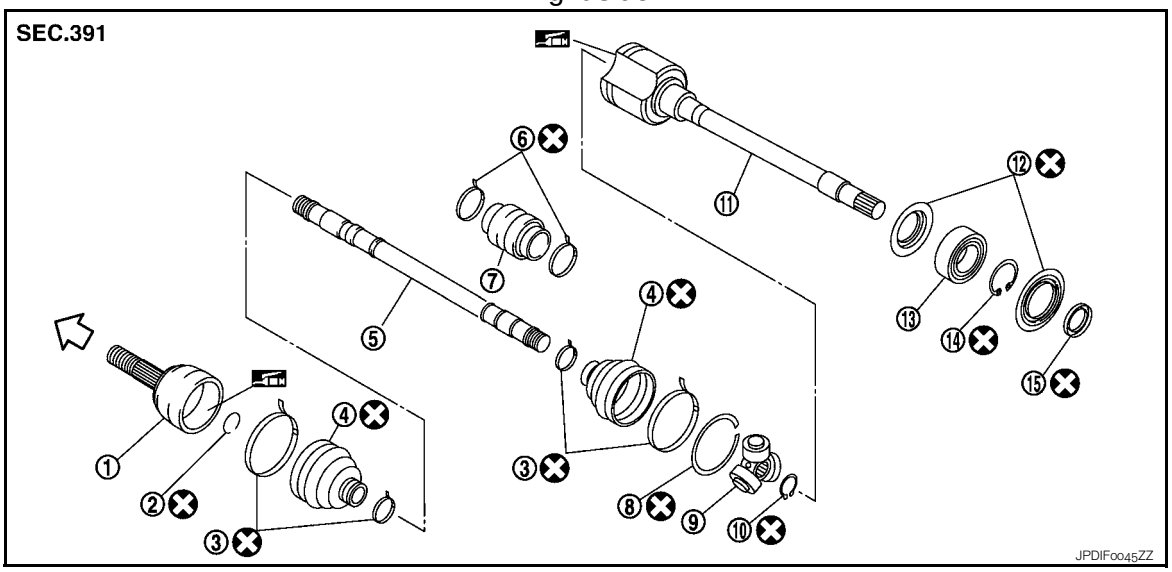
1. Circular clip
2. Dust shield
3. Housing
4. Snap ring
5. Spider assembly
6. Stopper ring
7. Boot band
8. Boot
9. Shaft
10. Damper band
11. Dynamic damper
12. Circular clip
13. Joint sub-assembly

⇦ : Wheel side

: Fill NISSAN Genuine grease or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

Right side



1. Joint sub-assembly
2. Circular clip
3. Boot band
4. Boot
5. Shaft
6. Damper band
7. Dynamic damper
8. Stopper ring
9. Spider assembly
10. Snap ring
11. Housing
12. Dust shield
13. Support bearing
14. Snap ring
15. Dust shield

⇦ : Wheel side

: Fill NISSAN Genuine grease or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

cardiagn.com

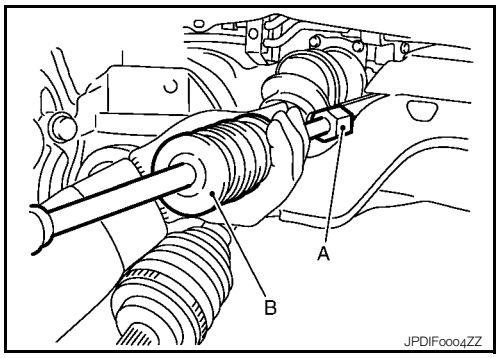
MR20DE MODELS : Removal and Installation

INFOID:0000000001070380

REMOVAL

Left Side

1. Refer to the procedure from 1 to 11 in FAX-11, "Replacement".
2. Remove drive shaft from transaxle assembly.
   - Use the drive shaft attachment (A) (SST:KV40107500) and a sliding hammer (B) while inserting tip of the drive shaft attachment between housing and transaxle assembly.
     CAUTION:
     Never place drive shaft joint at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.



Right Side

1. Refer to the procedure from 1 to 11 in FAX-11, "Replacement".
2. Remove plate bolts and plate.
3. If necessary, remove the support bearing bracket bolts and the support bearing bracket.
4. Remove drive shaft from transaxle assembly.
   - Use the drive shaft attachment (SST:KV40107500) and a sliding hammer while inserting tip of the drive shaft attachment between housing and transaxle assembly.
     CAUTION:
     Never place drive shaft joint at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.

INSTALLATION

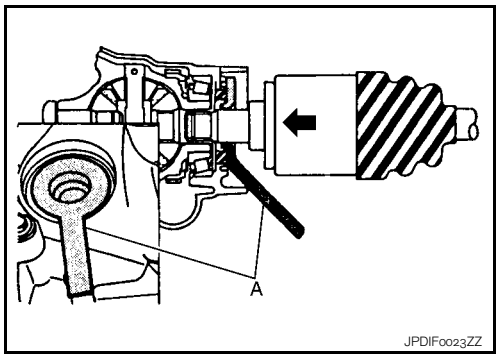
Left Side

Note the following, and install in the reverse order of removal.

CAUTION:

Always replace differential side oil seal with new one when installing drive shaft. Refer to TM-341, "2WD : Exploded View" (CVT).

- Place the protector (A) (SST:KV38107900) onto transaxle assembly to prevent damage to the oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.
  CAUTION:
  Make sure that circular clip is completely engaged.



Right Side

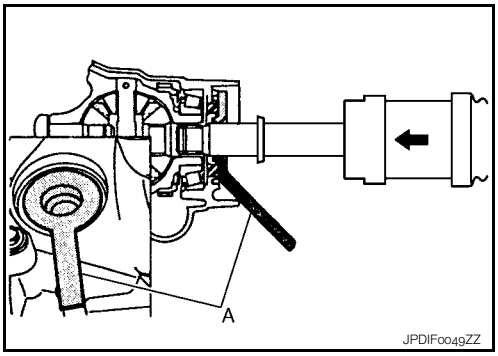
Note the following, and install in the reverse order of removal.

CAUTION:

Always replace differential side oil seal with new one when installing drive shaft. Refer to TM-341, "2WD : Exploded View" (CVT).

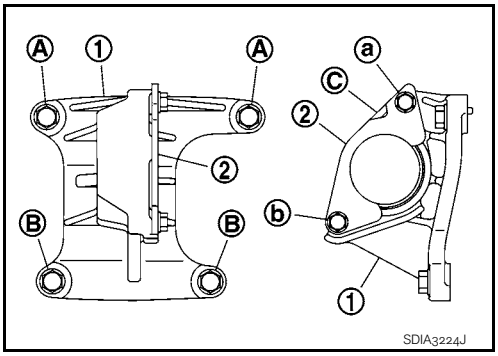
cardiagn.com

- Place the protector (A) (SST:KV38107900) onto transaxle assembly to prevent damage to the oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.



- When installing support bearing bracket (1).
- Temporarily tighten mounting bolts in the order of (A), (B).
- Set plate (2) so that notch (C) becomes upper side. (Temporarily) tighten mounting bolts in the order of (a), (b).

CAUTION:
Never reuse plate.



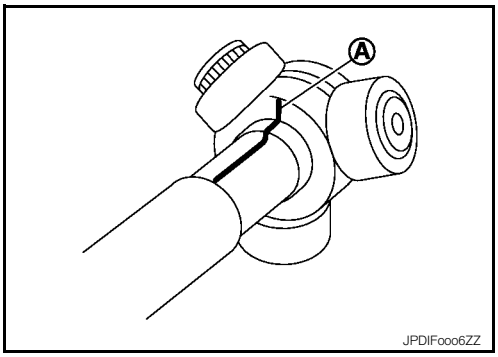
MR20DE MODELS : Disassembly and Assembly

INFOID:0000000001070381

DISASSEMBLY

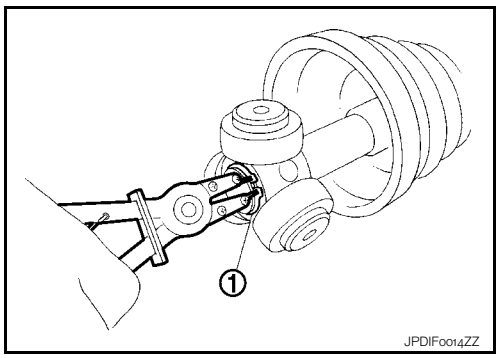
Transaxle Assembly Side

1. Fix shaft with a vise.
   CAUTION:
   Protect shaft using aluminum or copper plates when fixing with a vise.
2. Remove boot bands, and then remove boot from housing.
3. Remove stopper ring.
4. Put matching marks on housing and shaft, and then pull out housing from shaft.
   CAUTION:
   Use paint or an equivalent for matching marks. Never scratch the surfaces.
5. Put matching marks (A) on the spider assembly and shaft.
   CAUTION:
   Use paint or an equivalent for matching marks. Never scratch the surfaces.



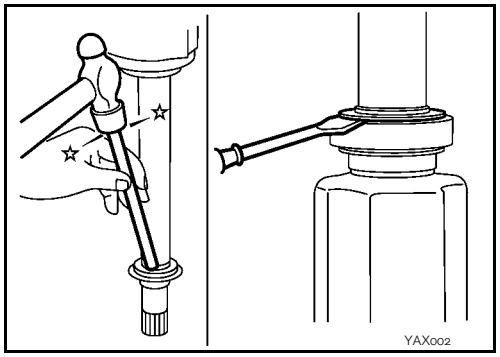
cardiagn.com

6. Remove snap ring (1), and then remove spider assembly from shaft.
7. Remove boot from shaft.
8. Remove circular clip from shaft (left side).
9. Remove dust shield from housing.
10. Clean old grease on housing with paper towels.

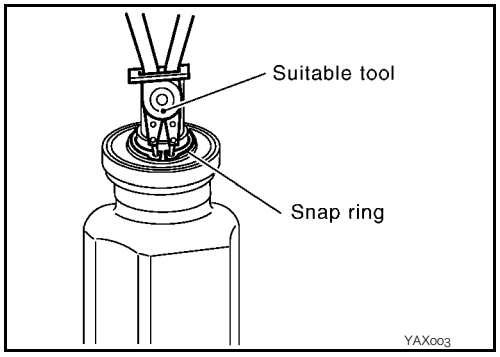


Support Bearing

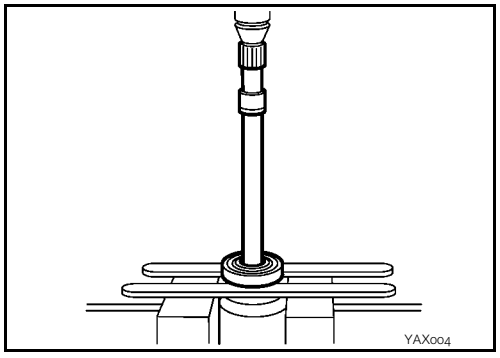
1. Remove dust shield from housing.



2. Remove snap ring.



3. Press out support bearing from housing.
4. Remove dust shield.



Dynamic Damper

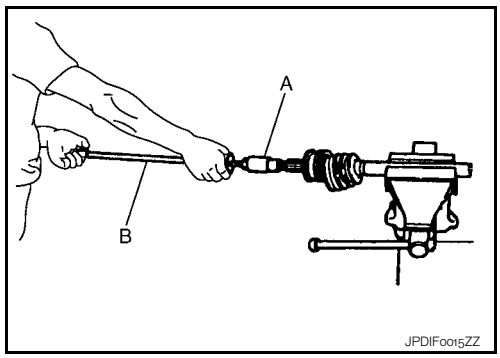
Remove damper bands, then remove dynamic damper from shaft.

Wheel Side

1. Fix shaft with a vise.
   CAUTION:
   Protect shaft using aluminum or copper plates when fixing with a vise.
2. Remove boot bands, and then remove boot from joint sub-assembly.

cardiagn.com

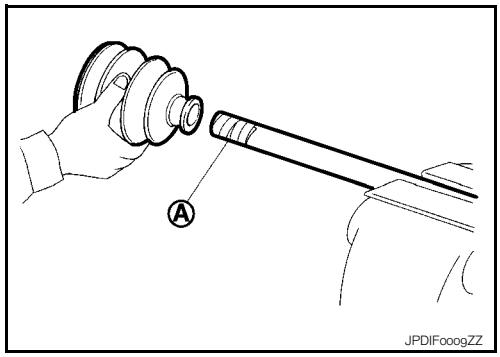
3. Screw the drive shaft puller (A) 30 mm (1.18 in) or more into the thread of joint sub-assembly, and pull joint sub-assembly with a sliding hammer (B) from shaft.
   CAUTION:
   - **If joint sub-assembly cannot be removed after five or more unsuccessful attempts, replace shaft and joint sub assembly as a set.**
   - **Align sliding hammer and drive shaft and remove them by pulling directory.**
4. Remove circular clip from shaft.
5. Remove boot from shaft.
6. Clean old grease on joint sub-assembly with paper towels while rotating ball cage.



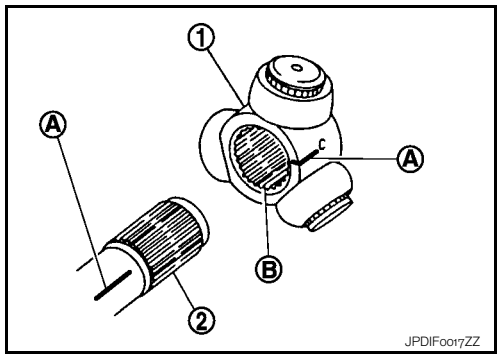
ASSEMBLY

Transaxle Assembly Side

1. Wrap serration on shaft with tape (A) to protect boot from damage. Install new boot and boot bands to shaft.
   CAUTION:
   Never reuse boot and boot band.
2. Remove the tape wrapped around the serration on shaft.



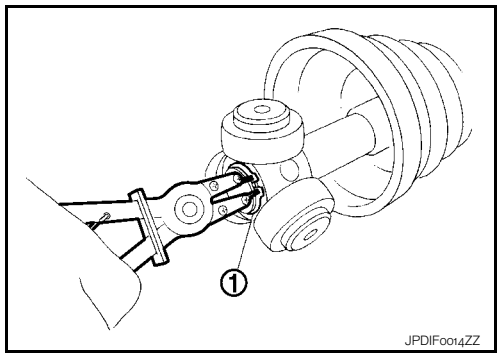
3. To install the spider assembly (1), align it with the matching marks (A) on the shaft (2) during the removal, and direct the serration mounting surface (B) to the shaft.



4. Secure spider assembly onto shaft with snap ring (1).
   CAUTION:
   Never reuse snap ring.
5. Apply the appropriate amount of grease to spider assembly and sliding surface.
6. Assemble the housing onto spider assembly, and apply the balance of the specified amount grease.

   Standard

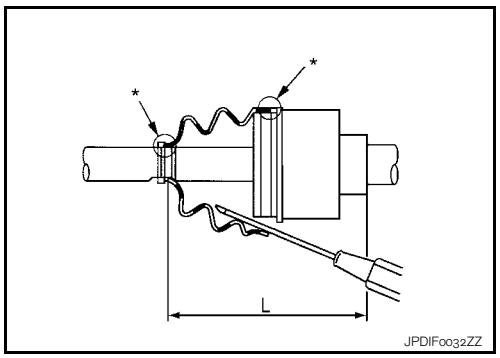
   Grease amount : Refer to FAX-40, "Drive Shaft".



7. Align matching marks put during the removal of housing.
8. Install stopper ring.
   CAUTION:
   Never reuse stopper ring.

cardiagn.com

9. Install boot securely into grooves (indicated by "*" marks) shown in the figure.
CAUTION:
If grease adheres to the boot mounting surface (with "*" mark) on shaft or housing, boot may be removed. Remove all grease from the surface.



10. To prevent from deformation of the boot, adjust the boot installation length to the value shown below (L) by inserting the suitable tool into the inside of boot from the large diameter side of boot and discharging inside air.

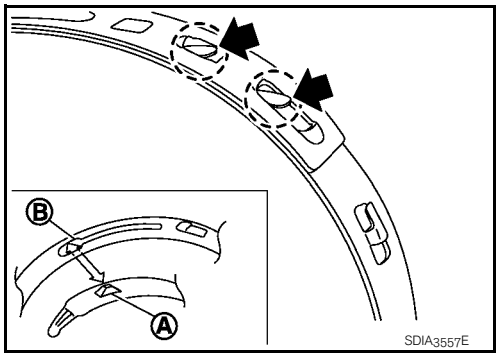
Standard

Boots installed length (L) **: Refer to FAX-40, "Drive Shaft".**

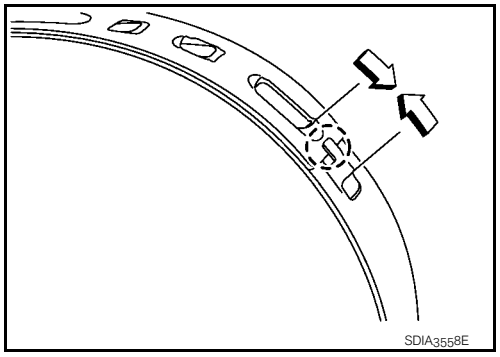
CAUTION:
- **If the boot installation length exceeds the standard, it may cause breakage in boot.**
- **Be careful not to touch the inside of the boot with the tip of tool.**

11. Install new larger and smaller boot bands securely.
CAUTION:
Never reuse boot band.

12. Put boot band in the groove on drive shaft boot. Then fit pawls (⬅) into holes to temporary installation.
NOTE:
For the large diameter side, fit projection (A) and guide slit (B) at first.



13. Pinch projection on the band with suitable pliers to tighten band.
14. Insert tip of band below end of the pawl.
15. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when the mounting positions become incorrect.
16. Install circular clip to shaft (left side).
CAUTION:
Never reuse circular clip.
17. Install dust shield (left side).
CAUTION:
Never reuse dust shield.

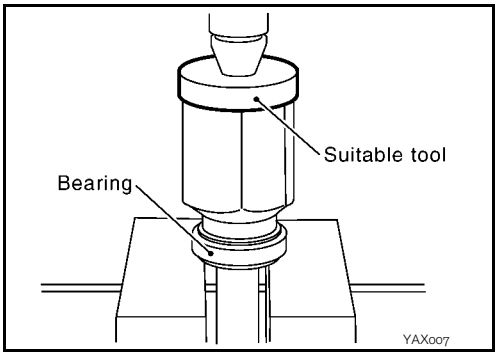


Support Bearing

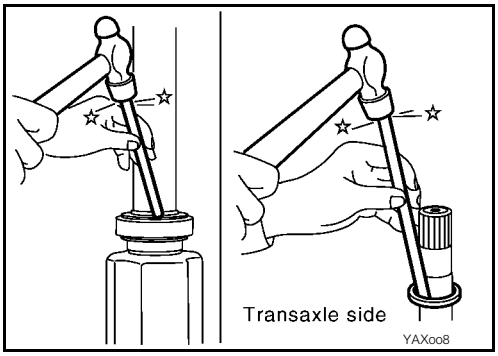
1. Install dust shield on housing.
CAUTION:
Never reuse dust shield.

cardiagn.com

2. Press support bearing onto housing.

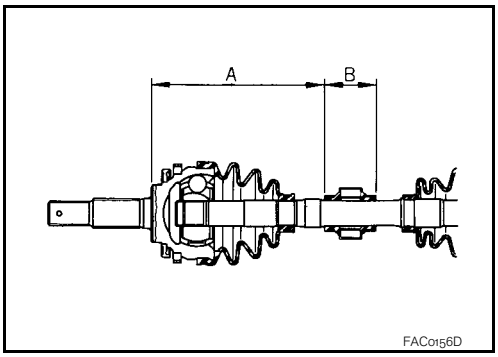


3. Install snap ring.
CAUTION:
Never reuse snap ring.
4. Install dust shields.
CAUTION:
Never reuse dust shields.



Dynamic Damper
Secure dynamic damper with bands in the following specified position when removing.
CAUTION:
Never reuse bands.

Standard
Demission : FAX-40, "Drive Shaft".



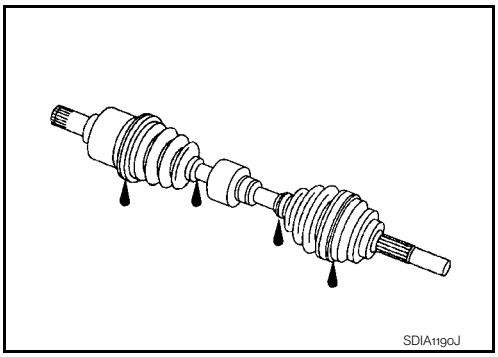
Wheel Side
For further details, refer to the installation procedure of "FAX-11, "Replacement"" for the drive shaft boot.

MR20DE MODELS : Inspection

INFOID:0000000001070382

INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in the axial directions. Check for motion that is not smooth and for significant looseness.
- Check boot for cracks, damage, and leakage of grease.
- Disassemble drive shaft and exchange malfunctioning part if there is a non-standard condition.



cardiagn.com

INSPECTION AFTER DISASSEMBLY

Shaft
Check shaft for runout, cracks, or other damage. Replace if there are.

Dynamic Damper
Check damper for cracks or wear. Replace if necessary.

Joint Sub-Assembly (Wheel Side)
Check the following:
- Joint sub-assembly for rough rotation and excessive axial looseness
- The inside of the joint sub-assembly for entry of foreign material
- Joint sub-assembly for compression scars, cracks, and fractures inside of joint sub-assembly

Replace joint sub-assembly if there are any non-standard conditions of components.

Housing and Spider assembly (Transaxle Side)
Replace housing and spider assembly if there is scratching or wear of housing roller contact surface or spider roller contact surface.
NOTE:
Housing and spider assembly are used in a set.

Support Bearing (Right Side)
Make sure wheel bearing rolls freely and is free from noise, cracks, pitting or wear. Replace support bearing if there are any non-standard conditions.

Support Bearing Bracket (Right Side)
Check for bending, cracks, or damage. Replace support bearing bracket if there are any non-standard conditions.

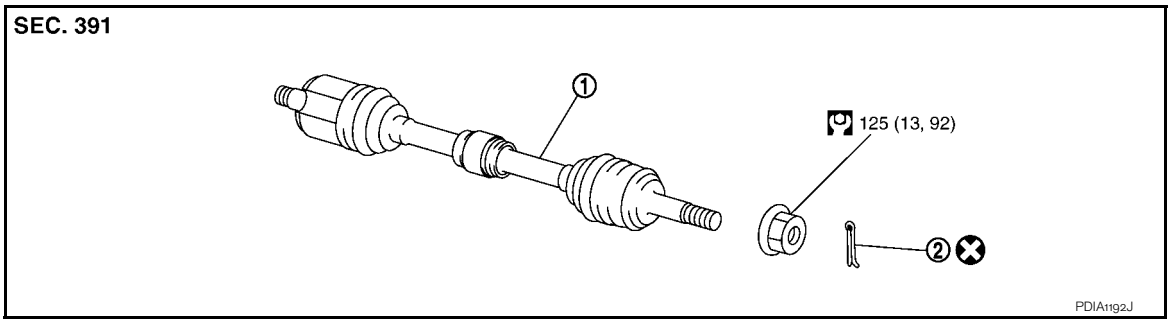
K9K MODELS

K9K MODELS : Exploded View

INFOID:0000000001070383

REMOVAL

Left side

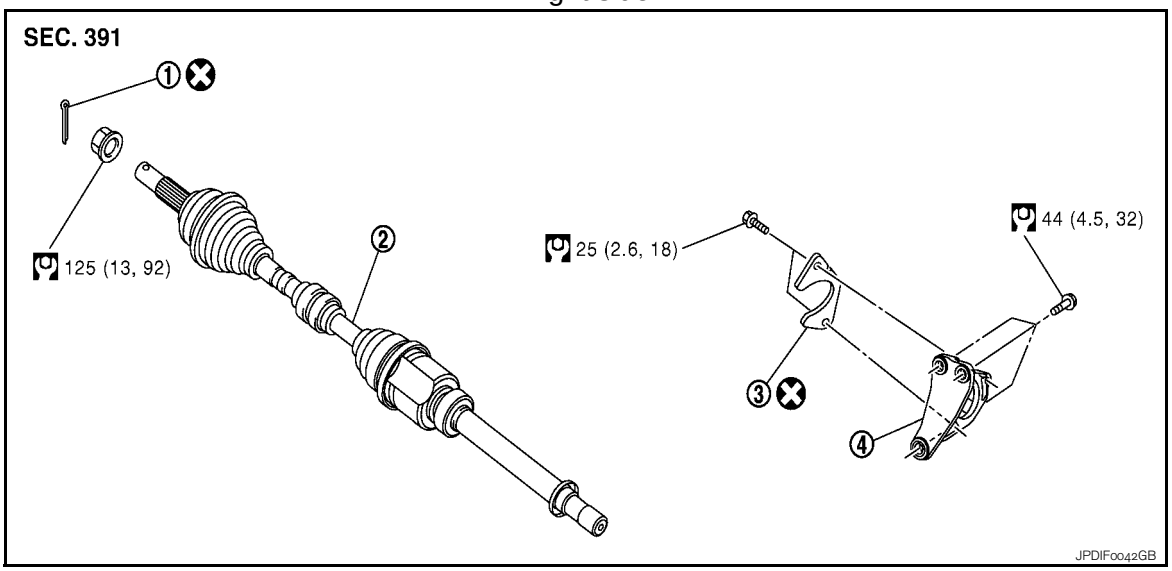


1. Drive shaft
2. Cotter pin

Refer to GI-4, "Components" for symbols in the figure.

cardiagn.com

Right side

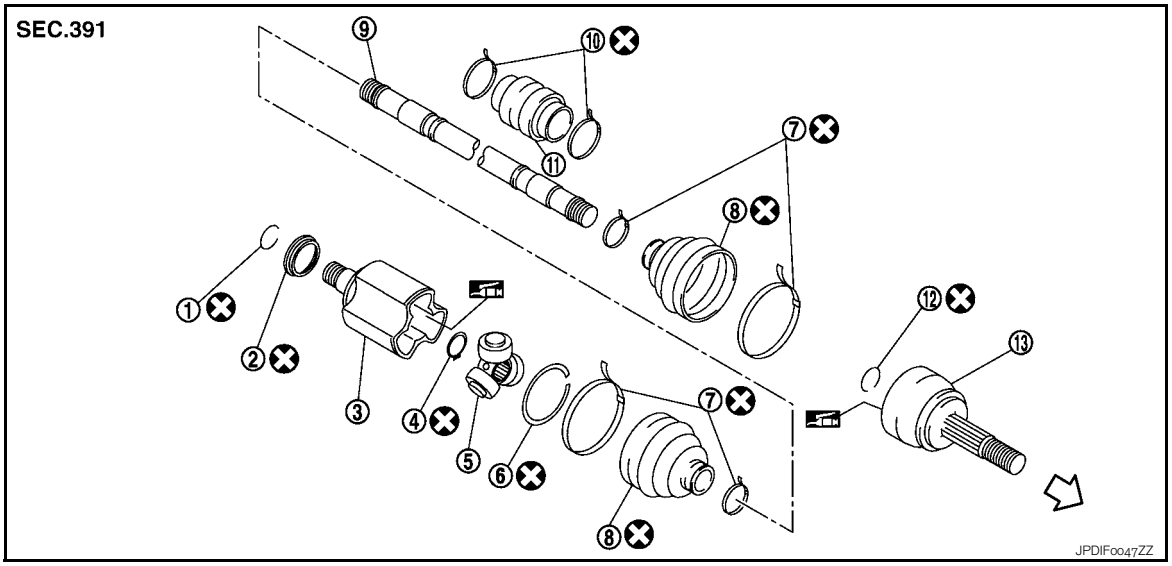


1. Cotter pin
2. Drive shaft
3. Plate
4. Support bearing bracket

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY

Left side



1. Circular clip
2. Dust shield
3. Housing
4. Snap ring
5. Spider assembly
6. Stopper ring
7. Boot band
8. Boot
9. Shaft
10. Damper band
11. Dynamic damper
12. Circular clip
13. Joint sub-assembly

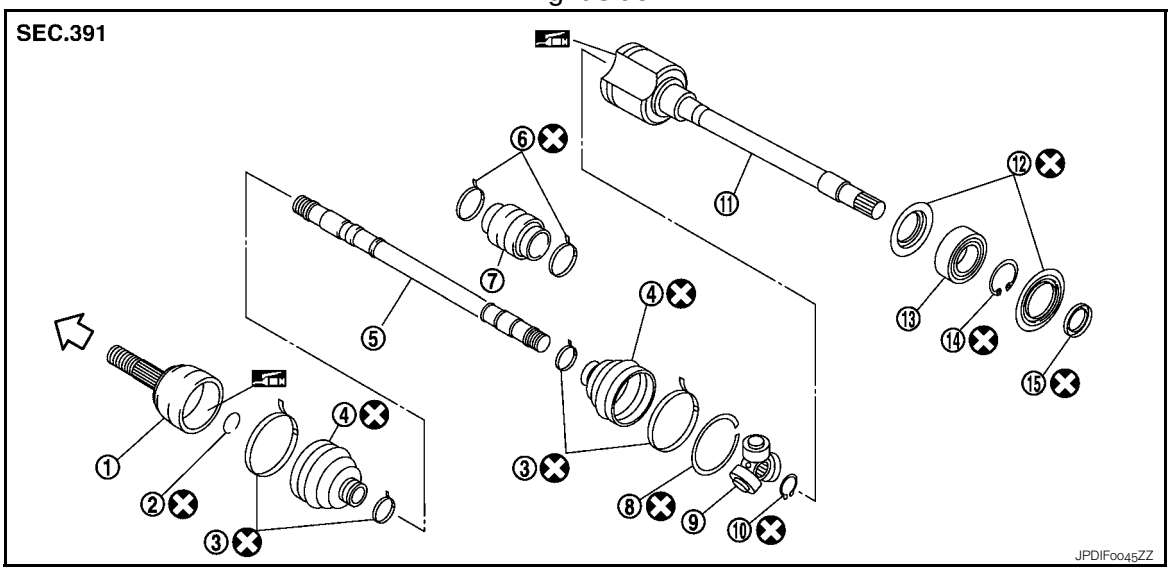
⇦ : Wheel side

: Fill NISSAN Genuine grease or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

cardiagn.com

Right side



1. Joint sub-assembly	2. Circular clip	3. Boot band
4. Boot	5. Shaft	6. Damper band
7. Dynamic damper	8. Stopper ring	9. Spider assembly
10. Snap ring	11. Housing	12. Dust shield
13. Support bearing	14. Snap ring	15. Dust shield

⇦ : Wheel side

: Fill NISSAN Genuine grease or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

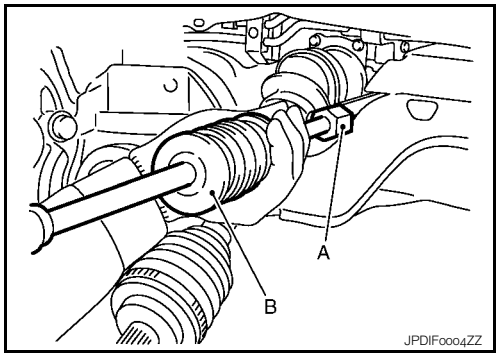
K9K MODELS : Removal and Installation

INFOID:0000000001070384

REMOVAL

Left Side

1. Refer to the procedure from 1 to 11 in FAX-11, "Replacement".
2. Remove drive shaft from transaxle assembly.
   - Use the drive shaft attachment (A) (SST:KV40107500) and a sliding hammer (B) while inserting tip of the drive shaft attachment between housing and transaxle assembly.
   CAUTION:
   Never place drive shaft joint at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.



Right Side

1. Refer to the procedure from 1 to 11 in FAX-11, "Replacement".
2. Remove plate bolts and plate.
3. If necessary, remove the support bearing bracket bolts and the support bearing bracket.
4. Remove drive shaft from transaxle assembly.
   - Use the drive shaft attachment (SST:KV40107500) and a sliding hammer while inserting tip of the drive shaft attachment between housing and transaxle assembly.
   CAUTION:
   Never place drive shaft joint at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.

cardiagn.com

INSTALLATION

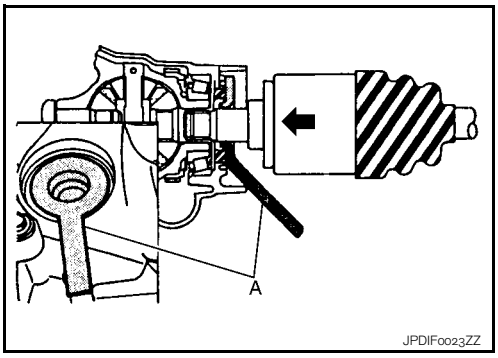
Left Side

Note the following, and install in the reverse order of removal.

- Place the protector (A) (SST:KV38107900) onto transaxle assembly to prevent damage to the oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.

  CAUTION:

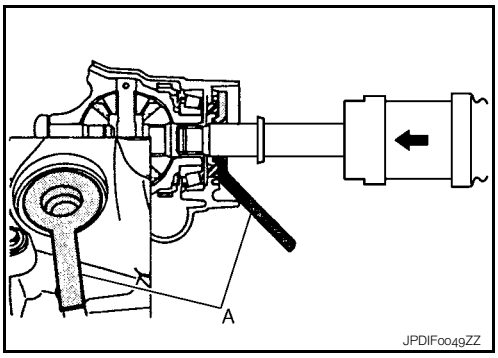
  Make sure that circular clip is completely engaged.



Right Side

Note the following, and install in the reverse order of removal.

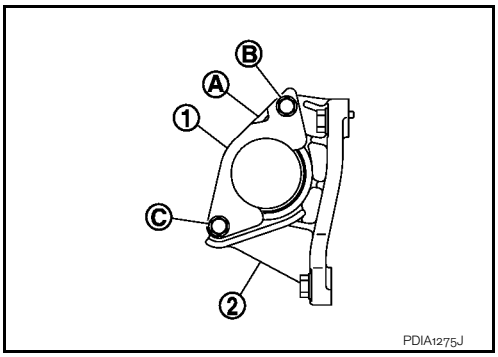
- Place the protector (A) (SST:KV38107900) onto transaxle assembly to prevent damage to the oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.



- When installing plate (1) to support bearing bracket (2), set plate so that notch (A) becomes upper side. Temporarily tighten mounting bolts in the order of (B), (C).

  CAUTION:

  Never reuse plate.



K9K MODELS : Disassembly and Assembly

INFOID:0000000001070385

DISASSEMBLY

Transaxle Assembly Side

1. Fix shaft with a vise.

   CAUTION:

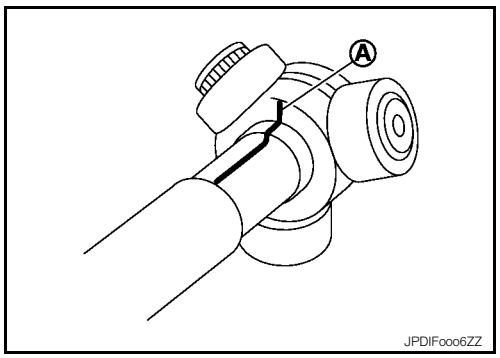
   Protect shaft using aluminum or copper plates when fixing with a vise.
2. Remove boot bands, and then remove boot from housing.
3. Remove stopper ring.
4. Put matching marks on housing and shaft, and then pull out housing from shaft.

   CAUTION:

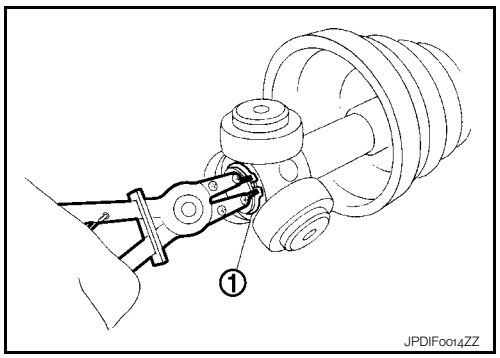
   Use paint or an equivalent for matching marks. Never scratch the surfaces.

cardiagn.com

5. Put matching marks (A) on the spider assembly and shaft.
CAUTION:
Use paint or an equivalent for matching marks. Never scratch the surfaces.

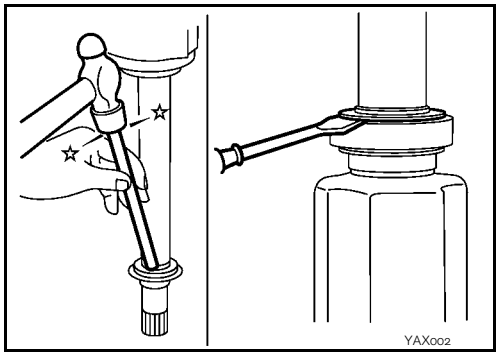


6. Remove snap ring (1), and then remove spider assembly from shaft.
7. Remove boot from shaft.
8. Remove circular clip from shaft (left side).
9. Remove dust shield from housing.
10. Clean old grease on housing with paper towels.

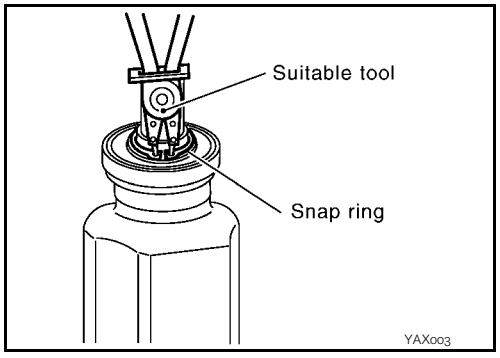


Support Bearing

1. Remove dust shield from housing.

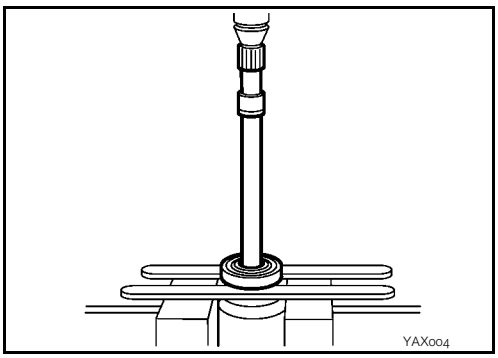


2. Remove snap ring.



cardiagn.com

3. Press out support bearing from housing.
4. Remove dust shield.

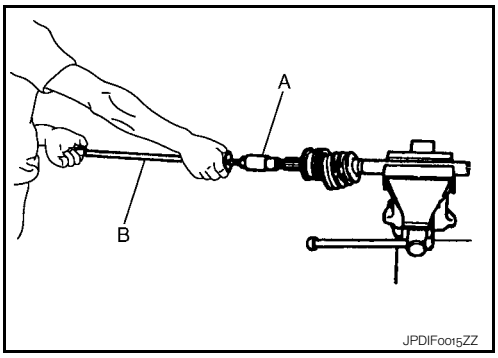


Dynamic Damper

Remove damper bands, then remove dynamic damper from shaft.

Wheel Side

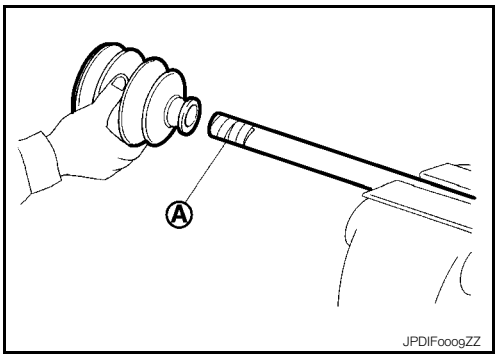
1. Fix shaft with a vise.
   CAUTION:
   Protect shaft using aluminum or copper plates when fixing with a vise.
2. Remove boot bands, and then remove boot from joint sub-assembly.
3. Screw the drive shaft puller (A) 30 mm (1.18 in) or more into the thread of joint sub-assembly, and pull joint sub-assembly with a sliding hammer (B) from shaft.
   CAUTION:
   - **If joint sub-assembly cannot be removed after five or more unsuccessful attempts, replace shaft and joint sub assembly as a set.**
   - **Align sliding hammer and drive shaft and remove them by pulling directory.**
4. Remove circular clip from shaft.
5. Remove boot from shaft.
6. Clean old grease on joint sub-assembly with paper towels while rotating ball cage.



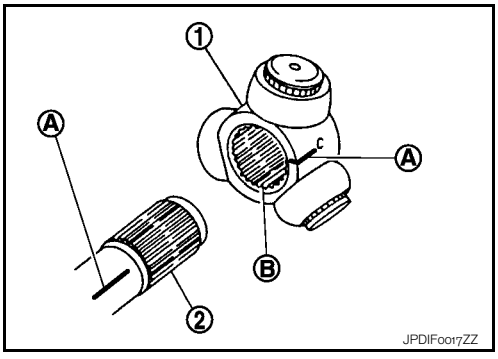
ASSEMBLY

Transaxle Assembly Side

1. Wrap serration on shaft with tape (A) to protect boot from damage. Install new boot and boot bands to shaft.
   CAUTION:
   Never reuse boot and boot band.
2. Remove the tape wrapped around the serration on shaft.

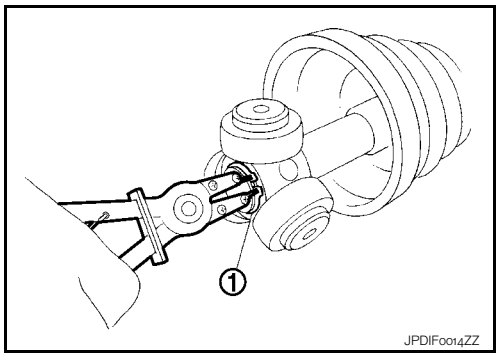


3. To install the spider assembly (1), align it with the matching marks (A) on the shaft (2) during the removal, and direct the serration mounting surface (B) to the shaft.



cardiagn.com

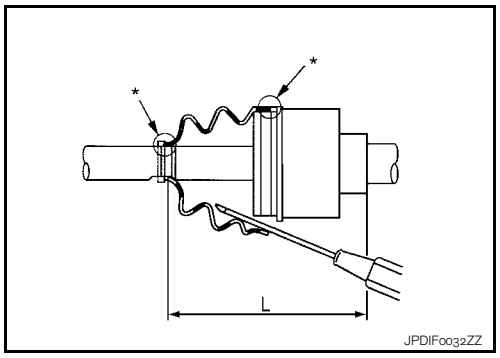
4. Secure spider assembly onto shaft with snap ring (1).
CAUTION:
Never reuse snap ring.
5. Apply the appropriate amount of grease to spider assembly and sliding surface.
6. Assemble the housing onto spider assembly, and apply the balance of the specified amount grease.



Standard

Grease amount **: Refer to FAX-40, "Drive Shaft".**

7. Align matching marks put during the removal of housing.
8. Install stopper ring.
CAUTION:
Never reuse stopper ring.
9. Install boot securely into grooves (indicated by "*" marks) shown in the figure.
CAUTION:
If grease adheres to the boot mounting surface (with "*" mark) on shaft or housing, boot may be removed. Remove all grease from the surface.
10. To prevent from deformation of the boot, adjust the boot installation length to the value shown below (L) by inserting the suitable tool into the inside of boot from the large diameter side of boot and discharging inside air.

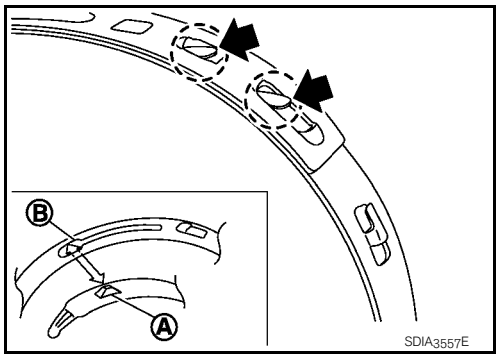


Standard

Boots installed length (L) **: Refer to FAX-40, "Drive Shaft".**

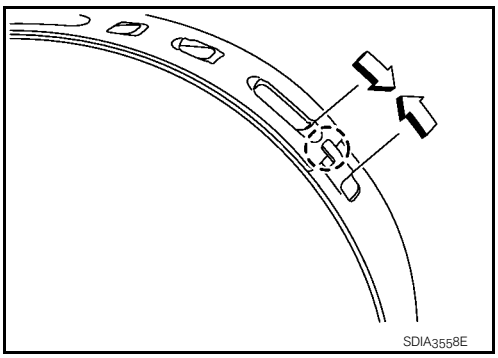
CAUTION:
- **If the boot installation length exceeds the standard, it may cause breakage in boot.**
- **Be careful not to touch the inside of the boot with the tip of tool.**

11. Install new larger and smaller boot bands securely.
CAUTION:
Never reuse boot band.
12. Put boot band in the groove on drive shaft boot. Then fit pawls (⬅) into holes to temporary installation.
NOTE:
For the large diameter side, fit projection (A) and guide slit (B) at first.



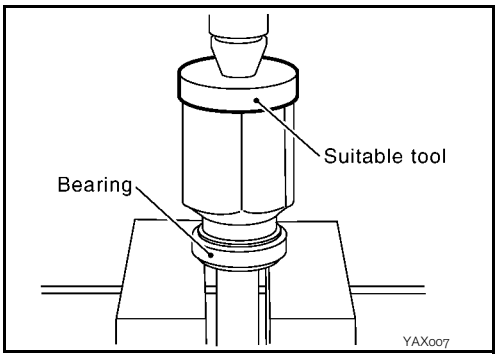
cardiagn.com

13. Pinch projection on the band with suitable pliers to tighten band.
14. Insert tip of band below end of the pawl.
15. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when the mounting positions become incorrect.
16. Install circular clip to shaft (left side).
    CAUTION:
    Never reuse circular clip.
17. Install dust shield (left side).
    CAUTION:
    Never reuse dust shield.

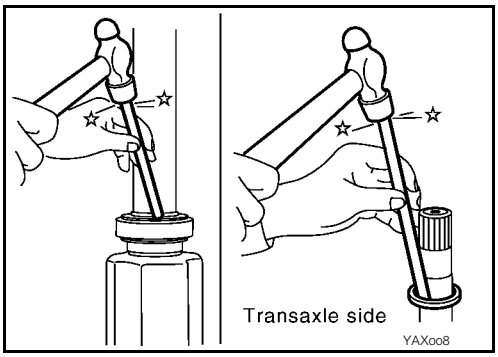


Support Bearing

1. Install dust shield on housing.
   CAUTION:
   Never reuse dust shield.
2. Press support bearing onto housing.



3. Install snap ring.
   CAUTION:
   Never reuse snap ring.
4. Install dust shields.
   CAUTION:
   Never reuse dust shields.



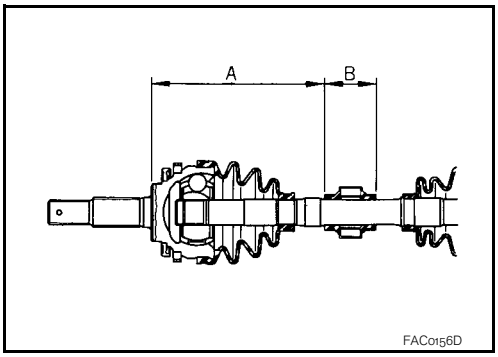
Dynamic Damper

Secure dynamic damper with bands in the following specified position when removing.

CAUTION:
Never reuse bands.

Standard

Demission : **FAX-40, "Drive Shaft"**.



Wheel Side

For further details, refer to the installation procedure of "FAX-11, "Replacement"" for the drive shaft boot.

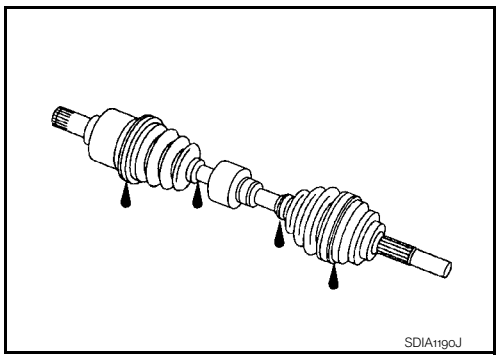
K9K MODELS : Inspection

INFOID:0000000001070386

cardiagn.com

INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in the axial directions. Check for motion that is not smooth and for significant looseness.
- Check boot for cracks, damage, and leakage of grease.
- Disassemble drive shaft and exchange malfunctioning part if there is a non-standard condition.



INSPECTION AFTER DISASSEMBLY

Shaft

Check shaft for runout, cracks, or other damage. Replace if there are.

Dynamic Damper

Check damper for cracks or wear. Replace if necessary.

Joint Sub-Assembly (Wheel Side)

Check the following:

- Joint sub-assembly for rough rotation and excessive axial looseness
- The inside of the joint sub-assembly for entry of foreign material
- Joint sub-assembly for compression scars, cracks, and fractures inside of joint sub-assembly

Replace joint sub-assembly if there are any non-standard conditions of components.

Housing and Spider assembly (Transaxle Side)

Replace housing and spider assembly if there is scratching or wear of housing roller contact surface or spider roller contact surface.

NOTE:

Housing and spider assembly are used in a set.

Support Bearing (Right Side)

Make sure wheel bearing rolls freely and is free from noise, cracks, pitting or wear. Replace support bearing if there are any non-standard conditions.

Support Bearing Bracket (Right Side)

Check for bending, cracks, or damage. Replace support bearing bracket if there are any non-standard conditions.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Bearing

INFOID:0000000000970490

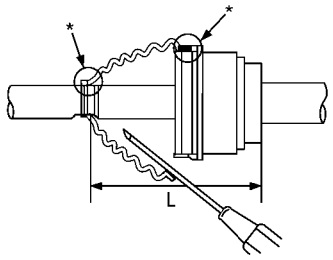
Axial end play	0.05 mm (0.002 in) or less

Drive Shaft

INFOID:0000000000970491

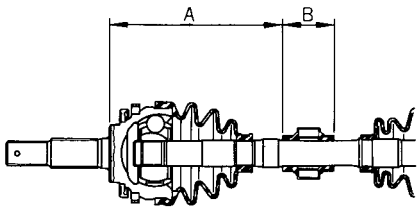
HR16DE

Joint		Wheel side	Transaxle assembly side
Grease quantity	Left side	100 – 120 g (3.53 – 4.23 oz)	155 – 175 g (5.47 – 6.17 oz)
	Right side		
Boots installed length (L)	Left side	131 mm (5.16 in)	172.4 mm (6.79 in)
	Right side		



JPDIF0031ZZ

Dynamic damper		A	B
Dimension	Left side	287 – 291 mm (11.30 – 11.46 in)	70 mm (2.76 in)
	Right side		



FAC0156D

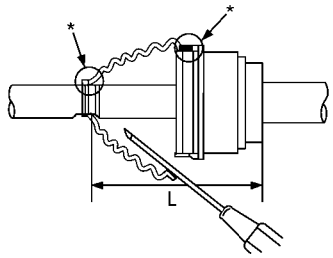
MR20DE

M/T models

Joint		Wheel side	Transaxle assembly side
Grease quantity	Left side	115 – 135 g (4.06 – 4.76 oz)	95 – 105 g (3.35 – 3.70 oz)
	Right side		113 – 123 g (3.99 – 4.34 oz)

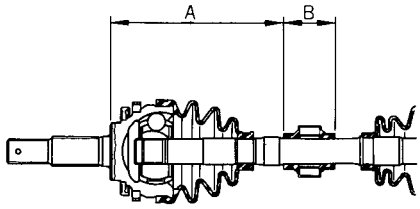
cardiagn.com

Boots installed length (L)	Left side	133.5 mm (5.26 in)	185.6 mm (7.31 in)
	Right side		177.6 mm (6.99 in)



JPDIF0031ZZ

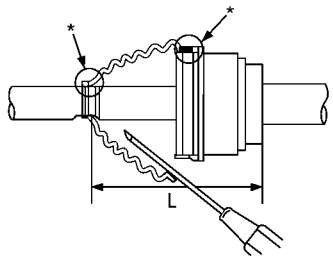
Dynamic damper		A	B
Dimension	Left side	269 – 273 mm (10.59 – 10.75 in)	70 mm (2.76 in)
	Right side		



FAC0156D

CVT models

Joint		Wheel side	Transaxle assembly side
Grease quantity	Left side	115 – 135 g (4.06 – 4.76 oz)	200 – 220 g (7.05 – 7.76 oz)
	Right side		
Boots installed length (L)	Left side	133.5 mm (5.26 in)	185.6 mm (7.31 in)
	Right side		177.6 mm (6.99 in)

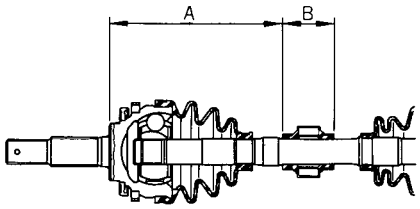


JPDIF0031ZZ

Dynamic damper	A	B

cardiagn.com

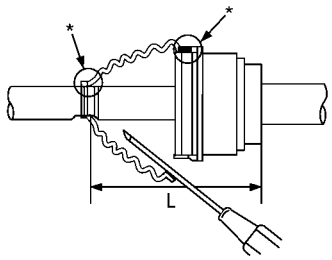
Dimension	Left side	282 – 286 mm (11.10 – 11.26 in)	70 mm (2.76 in)
	Right side		



FAC0156D

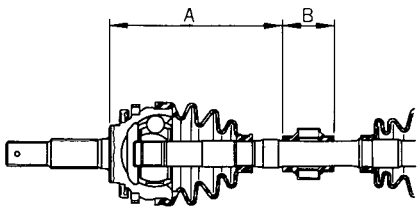
K9K

Joint		Wheel side	Transaxle assembly side
Grease quantity	Left side	115 – 135 g (4.06 – 4.76 oz)	215 – 235 g (7.58 – 8.29 oz)
	Right side		
Boots installed length (L)	Left side	133.5 mm (5.26 in)	186.3 mm (7.33 in)
	Right side		173.1 mm (6.81 in)



JPDIF0031ZZ

Dynamic damper		A	B
Dimension	Left side	281 – 285 mm (11.06 – 11.22 in)	70 mm (2.76 in)
	Right side		



FAC0156D

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001080607

Use chart below to find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			—	FAX-62	—	FAX-49	—	FAX-47	NVH in FAX and FSU sections	Refer to Front axle in this chart	NVH in WT section	NVH in WT section	Refer to DRIVE SHAFT in this chart	NVH in BR section	NVH in ST section
Possible cause and SUSPECTED PARTS			Excessive joint angle	Joint sliding resistance	Imbalance	Improper installation, looseness	Parts interference	Wheel bearing damage	FRONT AXLE AND FRONT SUSPENSION	FRONT AXLE	TIRES	ROAD WHEELS	DRIVE SHAFT	BRAKES	STEERING
Symptom	DRIVE SHAFT	Noise	×	×				×	×	×	×	×		×	×
		Shake	×		×			×	×	×	×	×		×	×
	FRONT AXLE	Noise				×	×	×	×		×	×	×	×	×
		Shake				×	×	×	×		×	×	×	×	×
		Vibration				×	×	×	×		×		×		×
		Shimmy				×	×		×		×	×		×	×
		Judder				×			×		×	×		×	×
		Poor quality ride or handling				×	×		×		×	×			

×: Applicable

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001080608

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001099698

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precautions for Drive Shaft

INFOID:0000000001117164

CAUTION:

Note the following precautions when disassembling and assembling drive shaft.

- **Joint sub-assembly does not disassemble because it is non-overhaul parts.**

cardiagn.com

- **Perform work in a dust-free location.**
- **Before disassembling and assembling, clean the parts.**
- **Prevent the entry of foreign objects during disassembly of the service location.**
- **Disassembled parts must be carefully reassembled in the correct order. If work is interrupted, a clean cover must be placed over parts.**
- **Paper shop cloths must be used. Fabric shop cloths must not be used because of the danger of lint adhering to parts.**
- **Disassembled parts (except for rubber parts) should be cleaned with kerosene which shall be removed by blowing with air or wiping with paper shop cloths.**

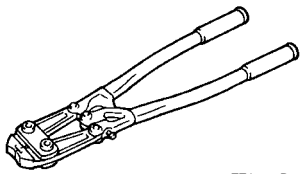
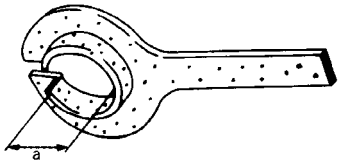
cardiagn.com

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000001080612

Tool number Tool name	Description
KV40107300 Boot band crimping tool  ZZA1229D	Installing boot band
KV40107500 Drive shaft attachment ZZA1230D	Removing drive shaft
KV38107900 Protector a: 32 mm (1.26 in) dia.  PDIA1183J	Installing drive shaft

cardiagn.com

ON-VEHICLE MAINTENANCE

FRONT WHEEL HUB AND KNUCKLE

Exploded View

INFOID:0000000001080613

Refer to FAX-49, "Exploded View".

Inspection

INFOID:0000000001080614

MOUNTING INSPECTION

Make sure that the mounting conditions (looseness, backlash) of each component and component conditions (wear, damage) are normal.

WHEEL BEARING INSPECTION

- Move wheel hub and bearing assembly in the axial direction by hand. Make sure there is no looseness of wheel bearing.

Standard

Axial end play : Refer to FAX-64, "Wheel Bearing".

- Rotate wheel hub and make sure there is no unusual noise or other irregular conditions. If there is any of irregular conditions, replace wheel hub and bearing assembly.

cardiagn.com

FRONT DRIVE SHAFT

Inspection

INFOID:0000000001110135

- Check drive shaft mounting point and joint for looseness and other damage.
- Check boot for cracks and other damage.

CAUTION:
Replace entire drive shaft assembly when noise or vibration occur from drive shaft.

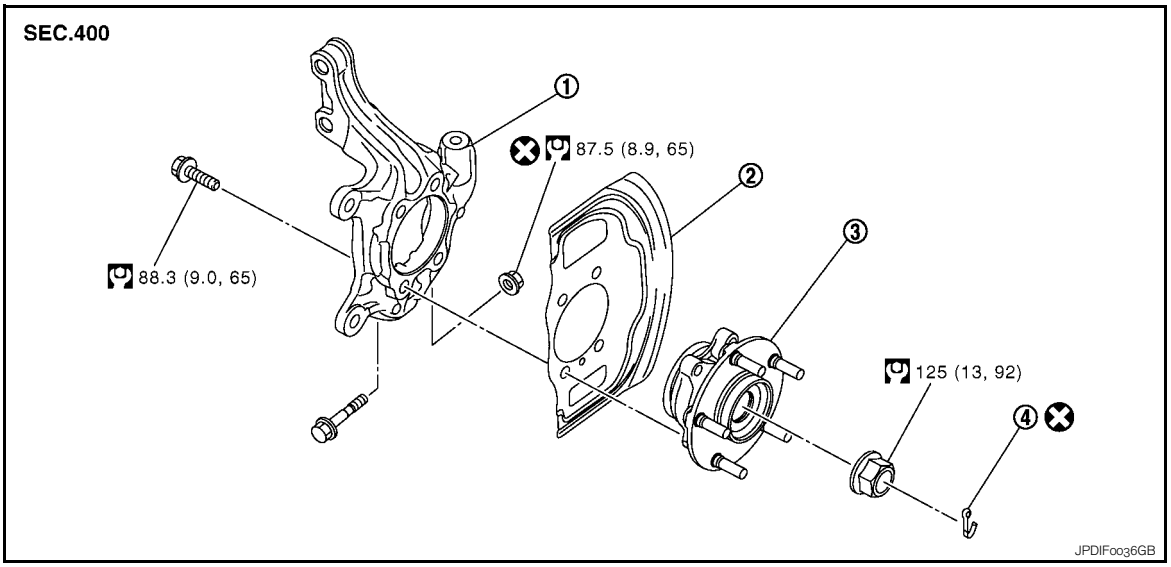
cardiagn.com

ON-VEHICLE REPAIR

FRONT WHEEL HUB AND KNUCKLE

Exploded View

INFOID:0000000001080616



1. Steering knuckle
2. Splash guard
3. Wheel hub and bearing assembly
4. Cotter pin

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001080660

REMOVAL

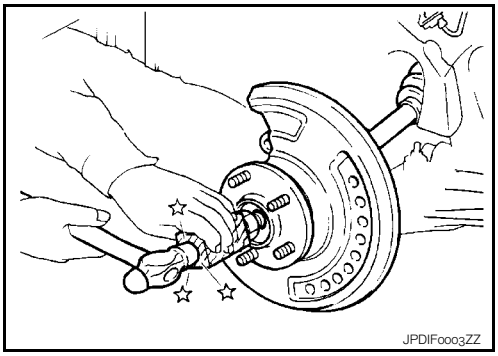
Wheel Hub and Bearing Assembly

1. Remove tires from vehicle.
2. Remove wheel sensor from steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "FRONT WHEEL SENSOR : Exploded View" (with ESP).
   CAUTION:
   Never pull on wheel sensor harness.
3. Remove lock plate from strut assembly. Refer to BR-19, "FRONT BRAKE (WITH ABS) : Exploded View" (LHD with ABS), BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (LHD with ESP), BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (RHD with ABS), BR-65, "FRONT BRAKE (WITH ESP) : Exploded View" (RHD with ESP).
4. Remove torque member mounting bolts. Hang torque member not to interfere with work. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-81, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depress brake pedal while brake caliper is removed.
5. Remove disc rotor.
6. Remove cotter pin, and then loosen hub lock nut.

cardiagn.com

7. Patch hub lock nut with a piece of wood. Hammer the wood to disengage wheel hub and bearing assembly from drive shaft. Remove the hub lock nut.
   CAUTION:
   - **Never place drive shaft joint at an extreme angle. Also be careful not to overextend slide joint.**
   - **Never allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and the other parts.**

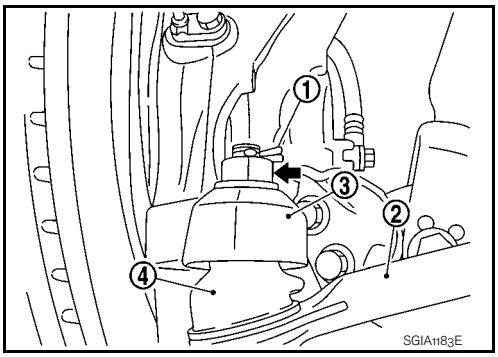
   NOTE:
   Use suitable puller, if wheel hub and bearing assembly and drive shaft cannot be separated even after performing the above procedure.



8. Remove wheel hub and bearing assembly.

Steering Knuckle

1. Remove wheel hub and bearing assembly, and then remove splash guard.
2. Remove cotter pin (1) of steering outer socket, and then loosen the nut.
3. Remove steering outer socket (2) from steering knuckle (3) using the ball joint remover so as not to damage ball joint boot (4).
   CAUTION:
   Temporarily tighten the nut to prevent damage to threads and to prevent the ball joint remover from suddenly coming off.
4. Remove transverse link from steering knuckle.
5. Remove steering knuckle from strut assembly.
6. Remove steering knuckle form vehicle.



INSTALLATION

Note the following, and install in the reverse order of the removal.

- Under unladen conditions perform the final tightening of each parts removed when removing wheel hub and bearing assembly and steering knuckle.

Inspection

INFOID:0000000001080618

INSPECTION AFTER REMOVAL

Check components for deformation, cracks, and other damage. Replace if there are.

Ball Joint Inspection

Check boots of transverse link and steering outer socket ball joint for breakage, axial play, and torque. Refer to FSU-6, "Inspection" and ST-16, "Inspection".

INSPECTION AFTER INSTALLATION

- Check the wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".
- Adjust neutral position of steering angle sensor after checking the wheel alignment. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).

cardiagn.com

FRONT DRIVE SHAFT BOOT

Exploded View

INFOID:0000000001080619

Refer to FAX-55, "Exploded View".

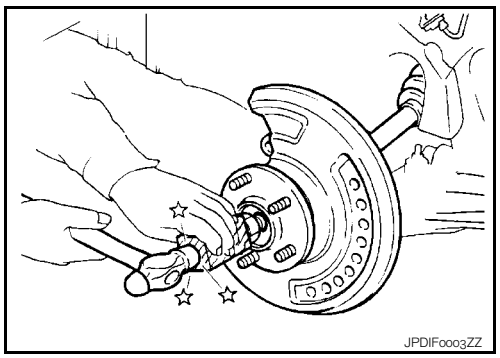
Replacement

INFOID:0000000001080620

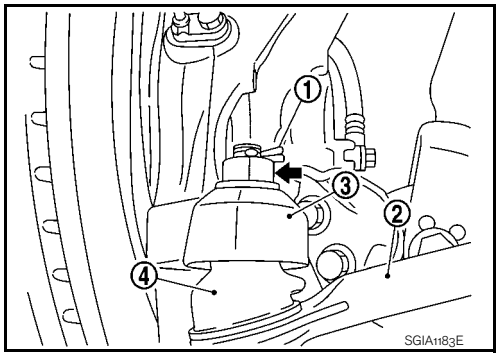
WHEEL SIDE

1. Remove tires from vehicle.
2. Remove wheel sensor from steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "FRONT WHEEL SENSOR : Exploded View" (with ESP).
   CAUTION:
   Never pull on wheel sensor harness.
3. Remove lock plate from strut assembly. Refer to BR-19, "FRONT BRAKE (WITH ABS) : Exploded View" (LHD with ABS), BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (LHD with ESP), BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (RHD with ABS), BR-65, "FRONT BRAKE (WITH ESP) : Exploded View" (RHD with ESP).
4. Remove torque member mounting bolts. Hang torque member not to interfere with work. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-81, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depress brake pedal while brake caliper is removed.
5. Remove disc rotor.
6. Remove cotter pin, and then loosen hub lock nut.
7. Patch hub lock nut with a piece of wood. Hammer the wood to disengage wheel hub and bearing assembly from drive shaft. Remove the hub lock nut.
   CAUTION:
   - **Never place drive shaft joint at an extreme angle. Also be careful not to overextend slide joint.**
   - **Never allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and the other parts.**

   NOTE:
   Use suitable puller if wheel hub and drive shaft cannot be separated even after performing the above procedure.

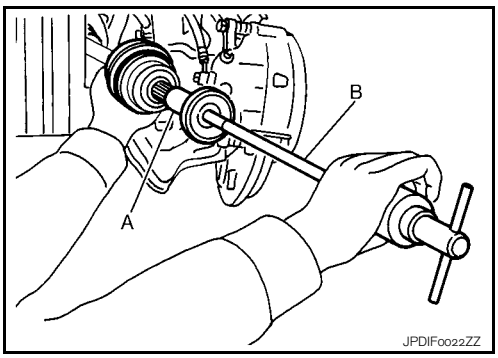


8. Remove cotter pin (1) of steering outer socket, and then loosen the nut.
9. Remove steering outer socket (2) from steering knuckle (3) so as not to damage ball joint boot (4) using the ball joint remover.
   CAUTION:
   Temporarily tighten the nut to prevent damage to threads and to prevent the ball joint remover from suddenly coming off.
10. Remove transverse link from steering knuckle.
11. Remove drive shaft from wheel hub and bearing assembly.
12. Remove boot bands, and then remove boot from joint sub-assembly.

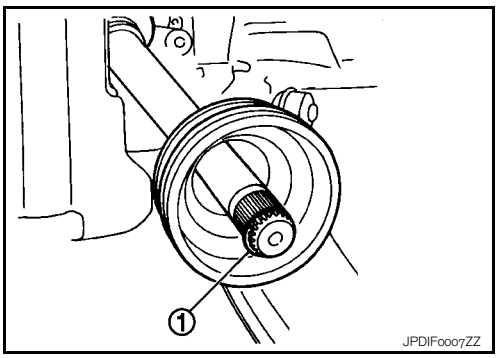


cardiagn.com

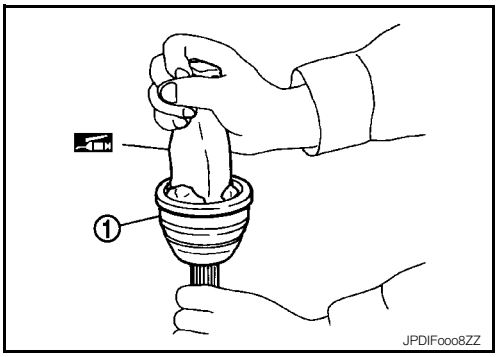
13. Screw a drive shaft puller (A) into joint sub-assembly screw part to a length of 30 mm (1.18 in) or more. Support drive shaft with one hand and pull out joint sub-assembly with a sliding hammer (B) from shaft.
CAUTION:
- **Align a sliding hammer and drive shaft and remove them by pulling firmly and uniformly.**
- **If joint sub-assembly cannot be pulled out, try after removing drive shaft from vehicle.**



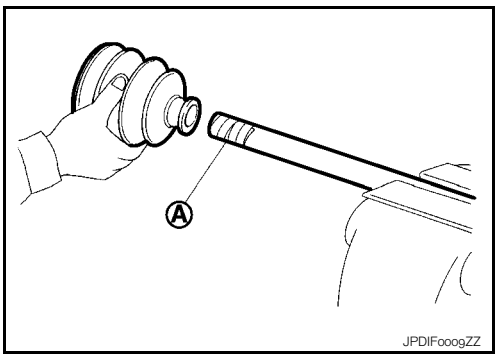
14. Remove circular clip (1) from shaft.
15. Remove boot from shaft.
16. Clean the old grease on joint sub-assembly with paper towels.



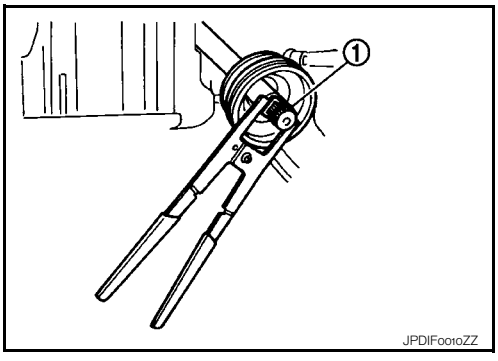
17. Fill serration slot joint sub-assembly (1) with NISSAN genuine grease or equivalent until the serration slot and ball groove become full to the brim.
CAUTION:
After applying grease, use a shop cloth to wipe off old grease that has oozed out.



18. Wrap serration on shaft with tape (A) to protect the boot from damage. Install boot and boot bands to shaft.
CAUTION:
Never reuse boot and boot band.
19. Remove the tape wrapped around the serration on shaft.

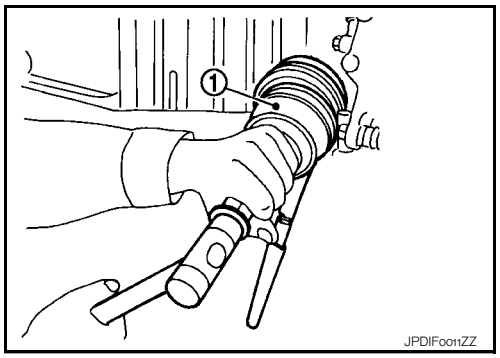


20. Position the circular clip (1) on groove at the shaft edge.
CAUTION:
Never reuse circular clip.
NOTE:
Drive joint inserter is recommended when installing circular clip.



cardiagn.com

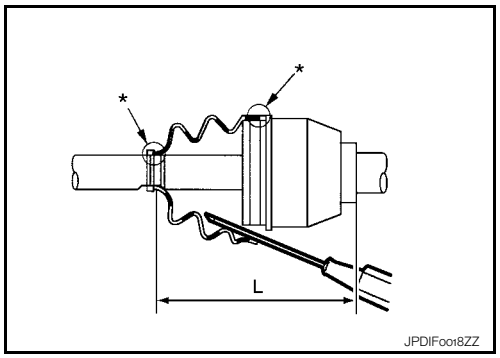
21. Align both center axles of the shaft edge and joint sub-assembly. Then assemble shaft with circular clip joint sub-assembly.
22. Install joint sub-assembly (1) to shaft using plastic hammer.
CAUTION:
Confirm that joint sub-assembly is correctly engaged while rotating drive shaft.
23. Apply the balance of the specified amount of grease into the boot inside from large diameter side of boot.



Standard

Grease amount	**: Refer to FAX-64, "Drive Shaft".**

24. Install the boot securely into grooves (indicated by "*" marks) shown in the figure.
CAUTION:
If grease adheres to the boot mounting surface (with "*" mark) on the shaft or joint sub-assembly, boot may be removed. Remove all grease from the surface.
25. To prevent from the deformation of the boot, adjust the boot installation length to the specified value shown below (L) by inserting the suitable tool into inside of the boot from the large diameter side of the boot and discharging the inside air.

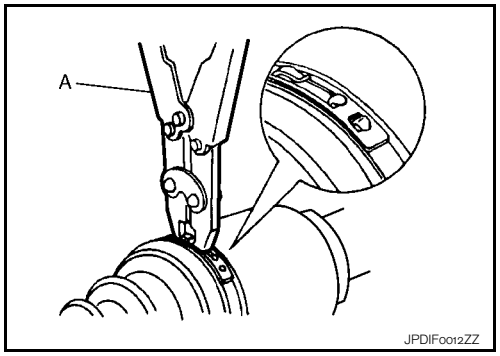


Standard

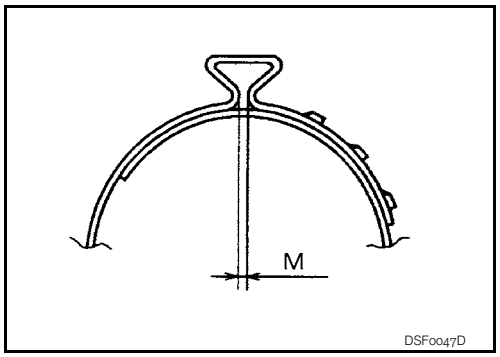
Boots installed length (L)	**: Refer to FAX-64, "Drive Shaft".**

CAUTION:
- **If the boot mounting length exceeds the standard, it may cause breakage in the boot.**
- **Be careful not to touch the inside of the boot with a tip of tool.**

26. Secure the large and small ends of the boot with boot bands using the boot band crimping tool (A) (SST: KV40107300).



NOTE:
Secure boot band so that dimension (M) meets the specification as shown in the figure.



Dimension "M" : 1.0 – 4.0 mm (0.039 – 0.157 in)

27. Secure joint sub-assembly and shaft, and then make sure that they are in the correct position when rotating boot. Install them with boot band when boot installation positions become incorrect.
28. Insert drive shaft to wheel hub and bearing assembly, and then temporarily tighten hub lock nut.
CAUTION:
The drive shaft is press-fit. When assembling the shaft, never press it, but pull it until fully seated by tightening the hub lock nut.

cardiagn.com

29. Install transverse to steering knuckle. Refer to FSU-12, "Exploded View".
30. Install steering outer socket to steering knuckle. Refer to ST-13, "Exploded View".
31. Install disc rotor.
32. Install torque member to steering knuckle. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-81, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
33. Install lock plate to strut assembly. Refer to BR-19, "FRONT BRAKE (WITH ABS) : Exploded View" (LHD with ABS), BR-21, "FRONT BRAKE (WITH ESP) : Exploded View" (LHD with ESP), BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (RHD with ABS), BR-65, "FRONT BRAKE (WITH ESP) : Exploded View" (RHD with ESP).
34. Install wheel sensor to steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "FRONT WHEEL SENSOR : Exploded View" (with ESP).
35. Tighten the hub lock nut to the specified torque. Refer to FAX-47, "Exploded View".
36. Install cotter pin.
    CAUTION:
    - **Never reuse cotter pin.**
    - **Bend cotter pin at the root sufficiently to prevent any looseness.**
37. Install tires to vehicle.

cardiagn.com

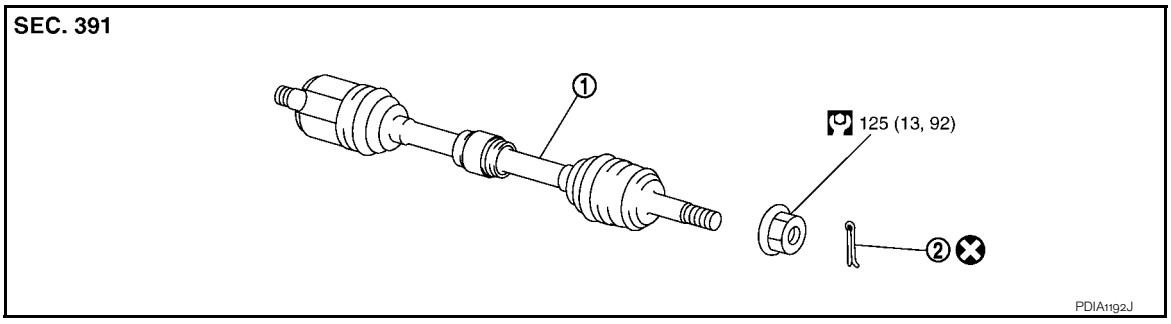
FRONT DRIVE SHAFT

Exploded View

INFOID:0000000001080625

REMOVAL

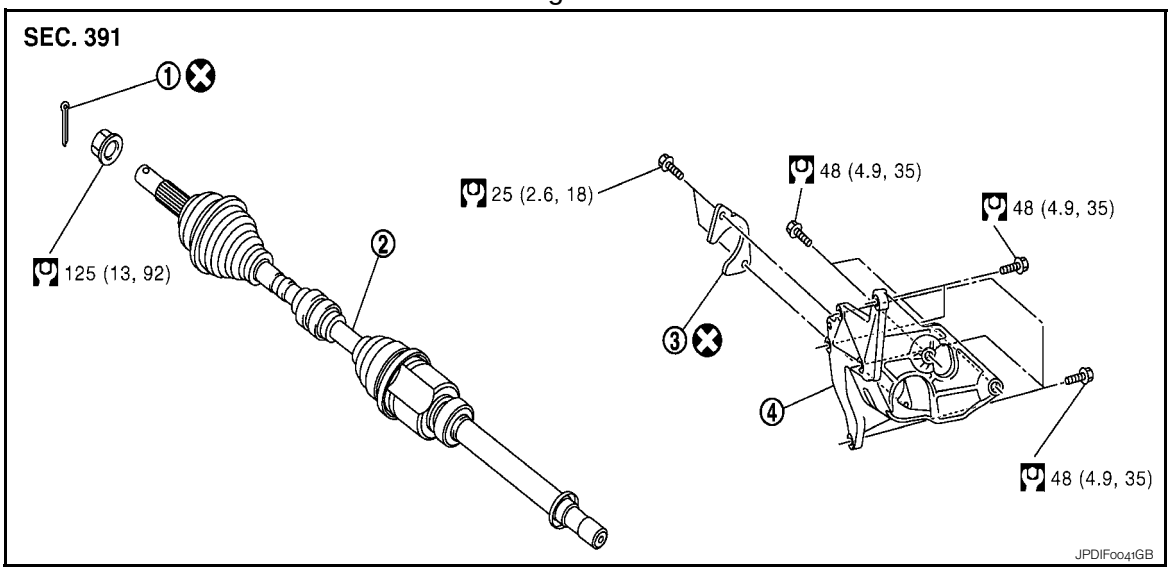
Left side



1. Drive shaft
2. Cotter pin

Refer to GI-4, "Components" for symbols in the figure.

Right side



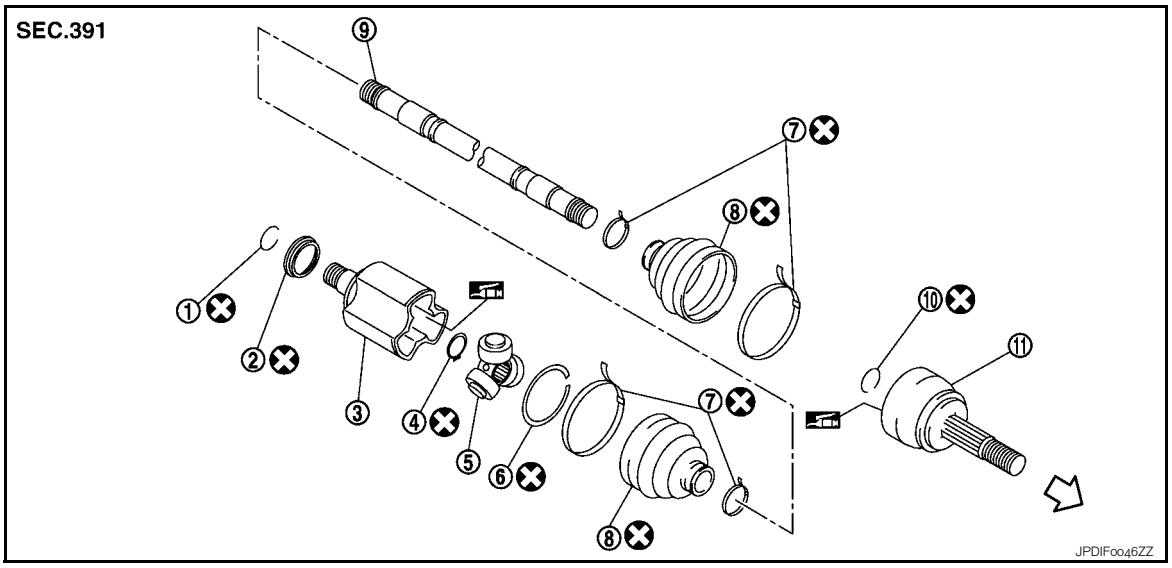
1. Cotter pin
2. Drive shaft
3. Plate
4. Support bearing bracket

Refer to GI-4, "Components" symbols in the figure.

DISASSEMBLY

cardiagn.com

Left side



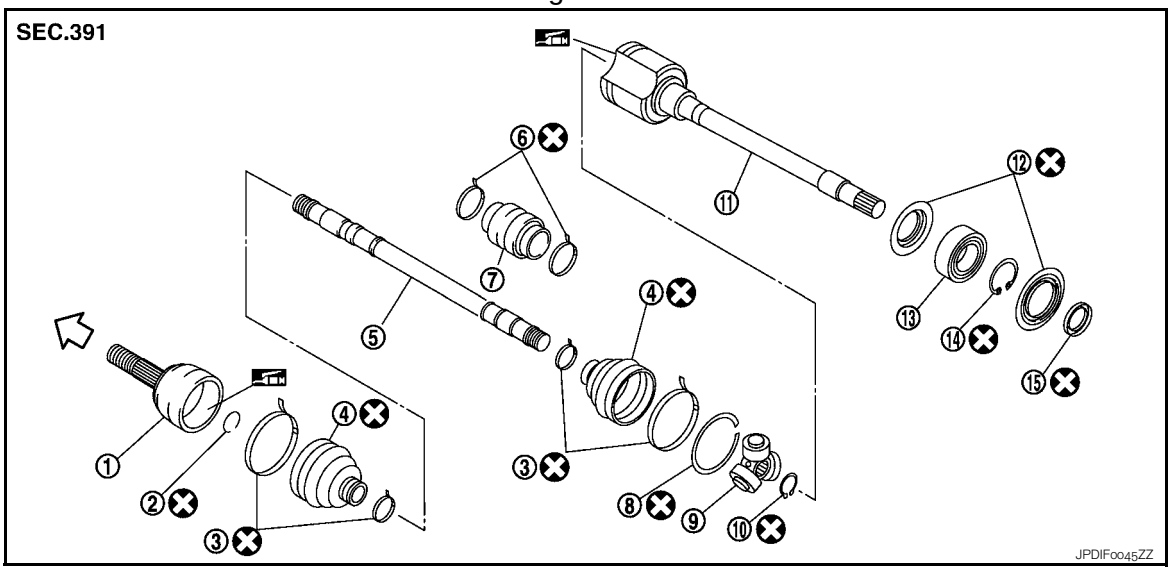
1. Circular clip
2. Dust shield
3. Housing
4. Snap ring
5. Spider assembly
6. Stopper ring
7. Boot band
8. Boot
9. Shaft
10. Circular clip
11. Joint sub-assembly

⇦ : Wheel side

: Fill NISSAN Genuine grease or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

Right side



1. Joint sub-assembly
2. Circular clip
3. Boot band
4. Boot
5. Shaft
6. Damper band
7. Dynamic damper
8. Stopper ring
9. Spider assembly
10. Snap ring
11. Housing
12. Dust shield
13. Support bearing
14. Snap ring
15. Dust shield

⇦ : Wheel side

: Fill NISSAN Genuine grease or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001080679

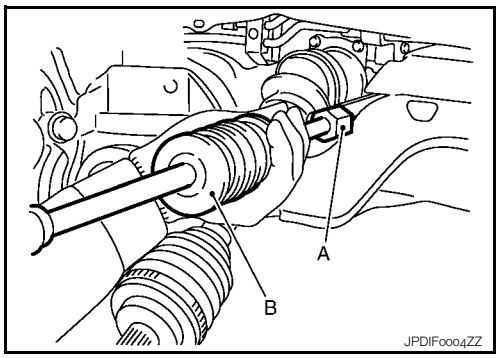
cardiagn.com

REMOVAL

Left Side

1. Refer to the procedure from 1 to 11 in FAX-11, "Replacement".
2. Remove drive shaft from transaxle assembly.
   - Use the drive shaft attachment (A) (SST:KV40107500) and a sliding hammer (B) while inserting tip of the drive shaft attachment between housing and transaxle assembly.

   CAUTION:
   Never place drive shaft joint at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.



Right Side

1. Refer to the procedure from 1 to 11 in FAX-11, "Replacement".
2. Remove plate bolts and plate.
3. If necessary, remove the support bearing bracket bolts and the support bearing bracket.
4. Remove drive shaft from transaxle assembly.
   - Use the drive shaft attachment (SST:KV40107500) and a sliding hammer while inserting tip of the drive shaft attachment between housing and transaxle assembly.

   CAUTION:
   Never place drive shaft joint at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.

INSTALLATION

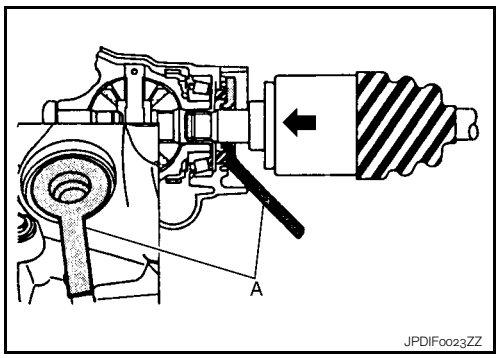
Left Side

Note the following, and install in the reverse order of removal.

CAUTION:
Always replace differential side oil seal with new one when installing drive shaft. Refer to TM-342, "4WD : Exploded View" (CVT).

- Place the protector (A) (SST:KV38107900) onto transaxle assembly to prevent damage to the oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.

  CAUTION:
  Make sure that circular clip is completely engaged.



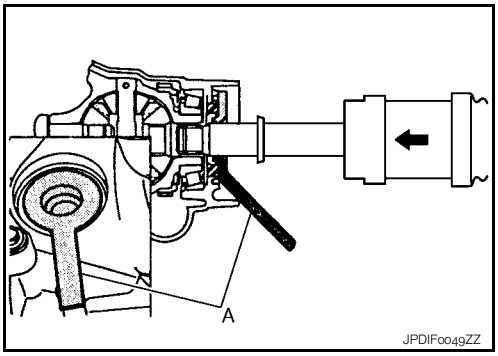
Right Side

Note the following, and install in the reverse order of removal.

CAUTION:
Always replace differential side oil seal with new one when installing drive shaft. Refer to TM-342, "4WD : Exploded View" (CVT).

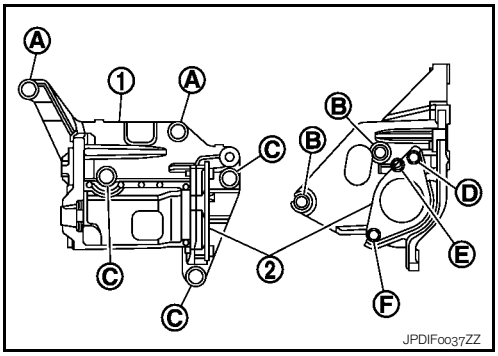
cardiagn.com

- Place the protector (A) (SST:KV38107900) onto transaxle assembly to prevent damage to the oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.



- When installing support bearing bracket (1).
- Temporarily tighten mounting bolts from (A to C) in the order shown below.
- Set plate (2) so that notch (E) becomes upper side. (Temporarily) tighten mounting bolts in the order of (D), (F).

CAUTION:
Never reuse plate.



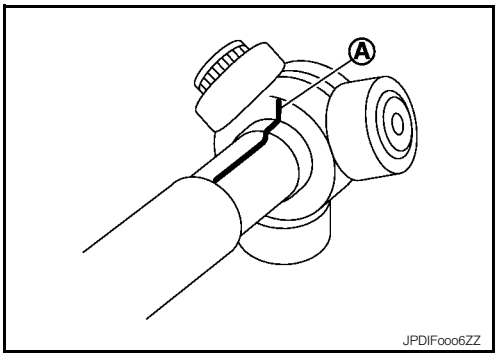
Disassembly and Assembly

INFOID:0000000001080627

DISASSEMBLY

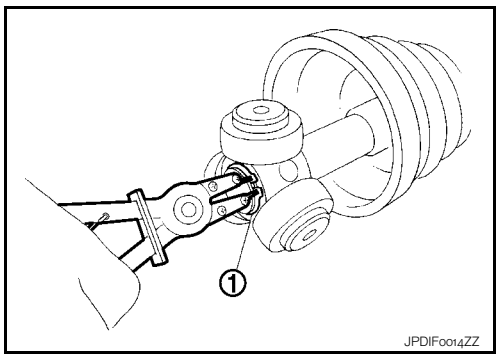
Transaxle Assembly Side

1. Fix shaft with a vise.
   CAUTION:
   Protect shaft using aluminum or copper plates when fixing with a vise.
2. Remove boot bands, and then remove boot from housing.
3. Remove stopper ring.
4. Put matching marks on housing and shaft, and then pull out housing from shaft.
   CAUTION:
   Use paint or an equivalent for matching marks. Never scratch the surfaces.
5. Put matching marks (A) on the spider assembly and shaft.
   CAUTION:
   Use paint or an equivalent for matching marks. Never scratch the surfaces.



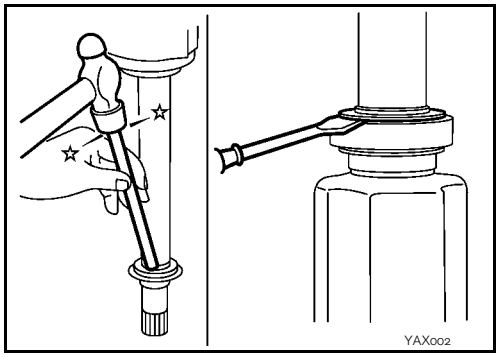
cardiagn.com

6. Remove snap ring (1), and then remove spider assembly from shaft.
7. Remove boot from shaft.
8. Remove circular clip from shaft (left side).
9. Remove dust shield from housing.
10. Clean old grease on housing with paper towels.

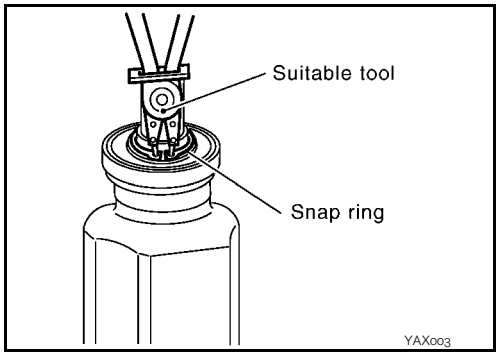


Support Bearing

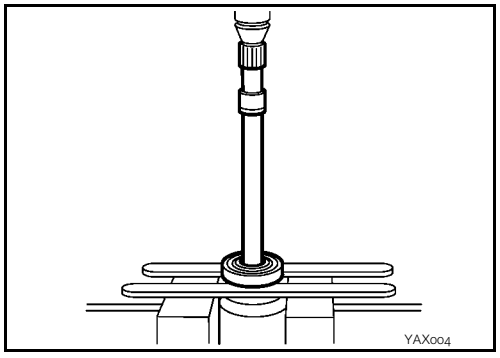
1. Remove dust shield from housing.



2. Remove snap ring.



3. Press out support bearing from housing.
4. Remove dust shield.



Dynamic Damper

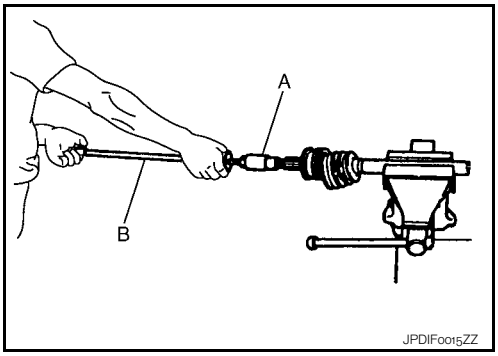
Remove damper bands, then remove dynamic damper from shaft.

Wheel Side

1. Fix shaft with a vise.
   CAUTION:
   Protect shaft using aluminum or copper plates when fixing with a vise.
2. Remove boot bands, and then remove boot from joint sub-assembly.

cardiagn.com

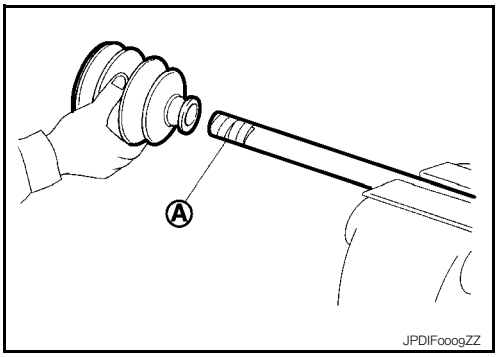
3. Screw the drive shaft puller (A) 30 mm (1.18 in) or more into the thread of joint sub-assembly, and pull joint sub-assembly with a sliding hammer (B) from shaft.
   CAUTION:
   - **If joint sub-assembly cannot be removed after five or more unsuccessful attempts, replace shaft and joint sub assembly as a set.**
   - **Align sliding hammer and drive shaft and remove them by pulling directory.**
4. Remove circular clip from shaft.
5. Remove boot from shaft.
6. Clean old grease on joint sub-assembly with paper towels while rotating ball cage.



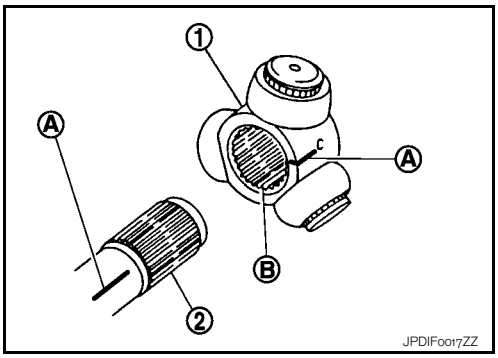
ASSEMBLY

Transaxle Assembly Side

1. Wrap serration on shaft with tape (A) to protect boot from damage. Install new boot and boot bands to shaft.
   CAUTION:
   Never reuse boot and boot band.
2. Remove the tape wrapped around the serration on shaft.



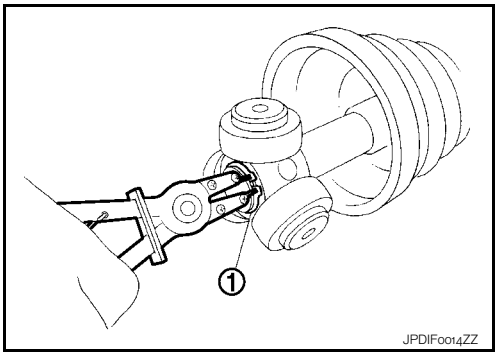
3. To install the spider assembly (1), align it with the matching marks (A) on the shaft (2) during the removal, and direct the serration mounting surface (B) to the shaft.



4. Secure spider assembly onto shaft with snap ring (1).
   CAUTION:
   Never reuse snap ring.
5. Apply the appropriate amount of grease to spider assembly and sliding surface.
6. Assemble the housing onto spider assembly, and apply the balance of the specified amount grease.

   Standard

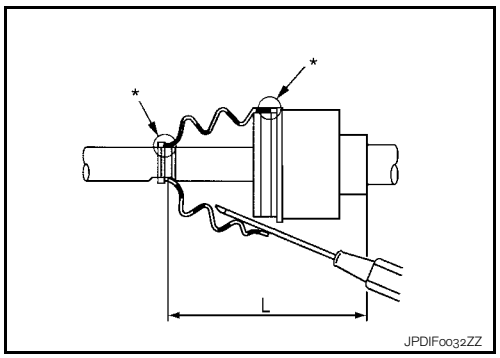
   Grease amount : Refer to FAX-64, "Drive Shaft".



7. Align matching marks put during the removal of housing.
8. Install stopper ring.
   CAUTION:
   Never reuse stopper ring.

cardiagn.com

9. Install boot securely into grooves (indicated by "*" marks) shown in the figure.
CAUTION:
If grease adheres to the boot mounting surface (with "*" mark) on shaft or housing, boot may be removed. Remove all grease from the surface.



10. To prevent from deformation of the boot, adjust the boot installation length to the value shown below (L) by inserting the suitable tool into the inside of boot from the large diameter side of boot and discharging inside air.

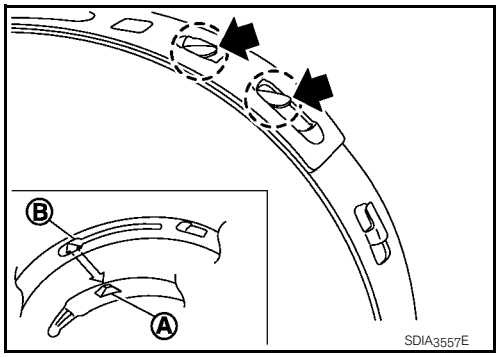
Standard

Boots installed length (L) **: Refer to FAX-64, "Drive Shaft".**

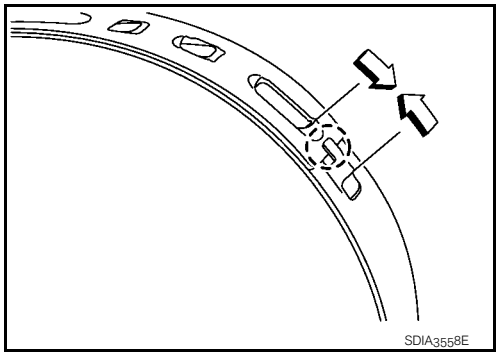
CAUTION:
- **If the boot installation length exceeds the standard, it may cause breakage in boot.**
- **Be careful not to touch the inside of the boot with the tip of tool.**

11. Install new larger and smaller boot bands securely.
CAUTION:
Never reuse boot band.

12. Put boot band in the groove on drive shaft boot. Then fit pawls (⬅) into holes to temporary installation.
NOTE:
For the large diameter side, fit projection (A) and guide slit (B) at first.



13. Pinch projection on the band with suitable pliers to tighten band.
14. Insert tip of band below end of the pawl.
15. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when the mounting positions become incorrect.
16. Install circular clip to shaft (left side).
CAUTION:
Never reuse circular clip.
17. Install dust shield (left side).
CAUTION:
Never reuse dust shield.

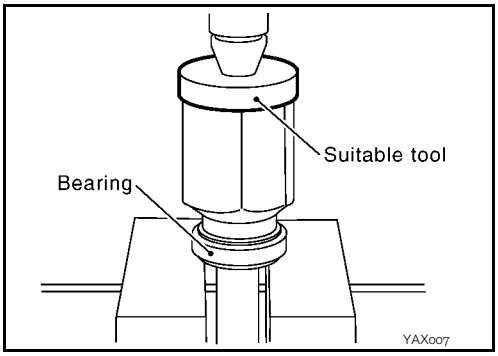


Support Bearing

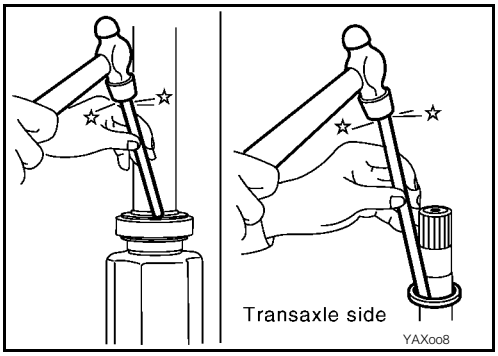
1. Install dust shield on housing.
CAUTION:
Never reuse dust shield.

cardiagn.com

2. Press support bearing onto housing.

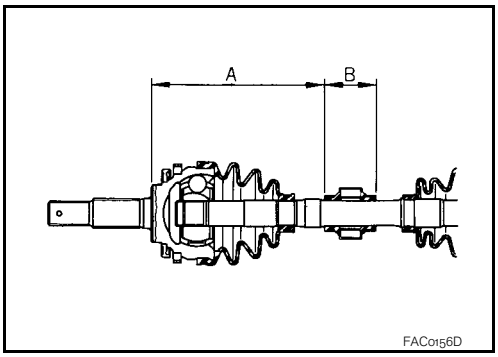


3. Install snap ring.
CAUTION:
Never reuse snap ring.
4. Install dust shields.
CAUTION:
Never reuse dust shields.



Dynamic Damper
Secure dynamic damper with bands in the following specified position when removing.
CAUTION:
Never reuse bands.

Standard
Demission : FAX-64, "Drive Shaft".



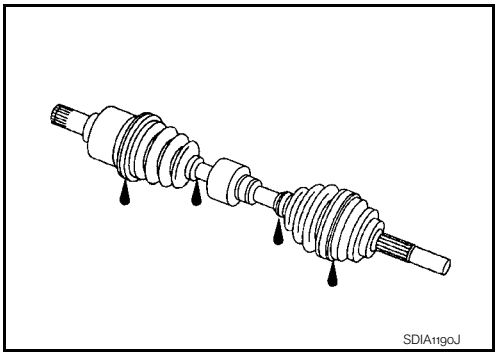
Wheel Side
For further details, refer to the installation procedure of "FAX-51, "Replacement"" for the drive shaft boot.

Inspection

INFOID:0000000001080628

INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in the axial directions. Check for motion that is not smooth and for significant looseness.
- Check boot for cracks, damage, and leakage of grease.
- Disassemble drive shaft and exchange malfunctioning part if there is a non-standard condition.



cardiagn.com

INSPECTION AFTER DISASSEMBLY

Shaft

Check shaft for runout, cracks, or other damage. Replace if there are.

Joint Sub-Assembly (Wheel Side)

Check the following:

- Joint sub-assembly for rough rotation and excessive axial looseness
- The inside of the joint sub-assembly for entry of foreign material
- Joint sub-assembly for compression scars, cracks, and fractures inside of joint sub-assembly

Replace joint sub-assembly if there are any non-standard conditions of components.

Housing and Spider assembly (Transaxle Side)

Replace housing and spider assembly if there is scratching or wear of housing roller contact surface or spider roller contact surface.

NOTE:

Housing and spider assembly are used in a set.

Dynamic Damper (Right Side)

Check damper for cracks or wear. Replace as necessary.

Support Bearing (Right Side)

Make sure wheel bearing rolls freely and is free from noise, cracks, pitting or wear. Replace support bearing if there are any non-standard conditions.

Support Bearing Bracket (Right Side)

Check for bending, cracks, or damage. Replace support bearing bracket if there are any non-standard conditions.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Bearing

INFOID:0000000001080633

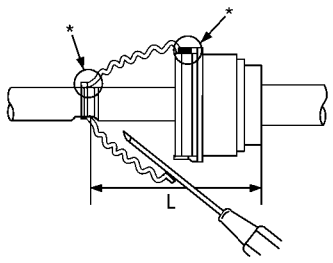
Axial end play	0.05 mm (0.002 in) or less

Drive Shaft

INFOID:0000000001080634

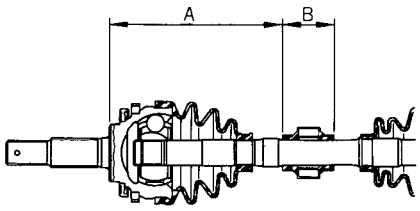
M/T MODELS

Joint		Wheel side	Transaxle assembly side
Grease quantity	Left side	115 – 135 g (4.06 – 4.76 oz)	200 – 220 g (7.05 – 7.76 oz)
	Right side		
Boots installed length (L)	Left side	133.5 mm (5.26 in)	189.6 mm (7.46 in)
	Right side		177.6 mm (6.99 in)



JPDIF0031ZZ

Dynamic damper		A	B
Dimension	Right side	219 – 223 mm (8.62 – 8.78 in)	70 mm (2.76 in)



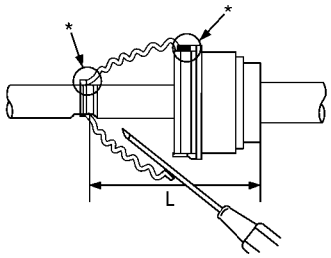
FAC0156D

CVT MODELS

Joint		Wheel side	Transaxle assembly side
Grease quantity	Left side	115 – 135 g (4.06 – 4.76 oz)	200 – 220 g (7.05 – 7.76 oz)
	Right side		

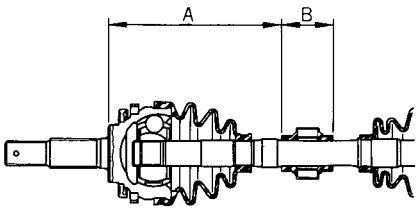
cardiagn.com

Boots installed length (L)	Left side	133.5 mm (5.26 in)	185.6 mm (7.31 in)
	Right side		177.6 mm (6.99 in)



JPDIF0031ZZ

Dynamic damper		A	B
Dimension	Right side	239 – 242 mm (9.41 – 9.53 in)	70 mm (2.76 in)



FAC0156D

cardiagn.com

SECTION FSU
FRONT SUSPENSION

CONTENTS

SYMPTOM DIAGNOSIS 2

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 2
NVH Troubleshooting Chart 2

PRECAUTION 3

PRECAUTIONS 3
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 3
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 3
Precaution for Procedure without Cowl Top Cover 3
Precautions for Suspension 4

PREPARATION 5

PREPARATION 5
Special Service Tool 5
Commercial Service Tool 5

ON-VEHICLE MAINTENANCE 6

FRONT SUSPENSION ASSEMBLY 6
Inspection 6

WHEEL ALIGNMENT 7
Wheel Alignment Inspection 7

ON-VEHICLE REPAIR 9

FRONT COIL SPRING AND STRUT 9
Exploded View 9
Removal and Installation 9
Disassembly and Assembly 9
Inspection 10

TRANSVERSE LINK 12
Exploded View 12
Removal and Installation 12
Inspection 12

FRONT STABILIZER 14
Exploded View 14
Removal and Installation 14
Inspection 14

FRONT SUSPENSION MEMBER 15
Exploded View 15
Removal and Installation 15
Inspection 15

REMOVAL AND INSTALLATION 16

FRONT SUSPENSION ASSEMBLY 16
Exploded View 16
Removal and Installation 17
Inspection 17

SERVICE DATA AND SPECIFICATIONS (SDS) 18

SERVICE DATA AND SPECIFICATIONS (SDS) 18
Wheel Alignment 18
Ball Joint 18
Wheel Height 18

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000970521

Use chart below to find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			FSU-16	FSU-10	—	—	—	FSU-16	FSU-18	FSU-14	NVH in DLN section	NVH in DLN section	NVH in FAX and FSU sections	NVH in WT section	NVH in WT section	NVH in FAX section	NVH in BR section	NVH in ST section
Possible cause and SUSPECTED PARTS			Improper installation, looseness	Shock absorber deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	PROPELLER SHAFT (4WD)	DIFFERENTIAL (4WD)	FRONT AXLE AND FRONT SUSPENSION	TIRES	ROAD WHEELS	DRIVE SHAFT	BRAKES	STEERING
Symptom	FRONT SUSPENSION	Noise	×	×	×	×	×	×			×	×	×	×	×	×	×	×
		Shake	×	×	×	×		×			×		×	×	×	×	×	×
		Vibration	×	×	×	×	×				×		×	×		×		×
		Shimmy	×	×	×	×			×				×	×	×		×	×
		Judder	×	×	×								×	×	×		×	×
		Poor quality ride or handling	×	×	×	×	×		×	×			×	×	×			

×: Applicable

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000970522

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001116344

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

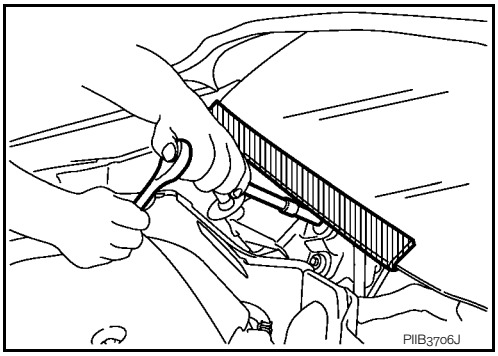
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000000970524

cardiagn.com

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions for Suspension

INFOID:0000000000970525

CAUTION:

- **When installing rubber bushings, the final tightening must be carried out under unladen conditions with tires on ground. Oil might shorten the life of rubber bushings. Be sure to wipe off any spilled oil.**
- **Unladen conditions mean that fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.**
- **After servicing suspension parts, be sure to check wheel alignment.**
- **Self-lock nuts are not reusable. Always use new ones when installing. Since new self-lock nuts are pre-oiled, tighten as they are.**

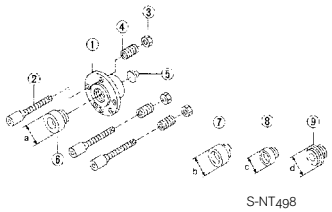
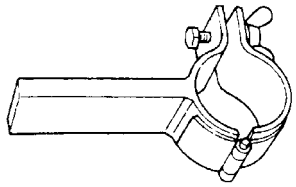
cardiagn.com

PREPARATION

PREPARATION

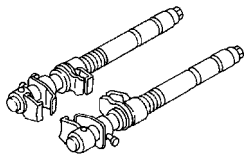
Special Service Tool

INFOID:0000000000970526

Tool number Tool name	Description
KV991040S0 CCK gauge attachment 1. Plate 2. Guide bolt 3. Nut 4. Spring 5. Center plate 6. KV99104020 Adapter A a: 72 mm (2.83 in) dia. 7. KV99104030 Adapter B b: 65 mm (2.56 in) dia. 8. KV99104040 Adapter C c: 57 mm (2.24 in) dia. 9. KV99104050 Adapter D d: 53.4 mm (2.102 in) dia.  S-NT498	Measuring wheel alignment
ST35652000 Strut attachment  ZZA0807D	Disassembling and assembling strut

Commercial Service Tool

INFOID:0000000001116345

Tool name	Description
Spring compressor  S-NT717	Removing and installing coil spring

cardiagn.com

ON-VEHICLE MAINTENANCE

FRONT SUSPENSION ASSEMBLY

Inspection

INFOID:0000000000970528

MOUNTING INSPECTION

Make sure the mounting conditions (looseness, backlash) of each component and component conditions (wear, damage) are normal.

BALL JOINT AXIAL END PLAY

1. Set front wheels in a straight-ahead position.
   CAUTION:
   Never depress brake pedal.
2. Place an iron bar or equivalent between transverse link and steering knuckle.
3. Measure axial end play by prying it up and down.

Standard

End play : **Refer to FSU-18, "Ball Joint".**

CAUTION:
Be careful not to damage ball joint boot. Never damage the installation position by applying excessive force.

STRUT ASSEMBLY

Check for oil leakage and damage, and replace if malfunction is detected.

cardiagn.com

WHEEL ALIGNMENT

Wheel Alignment Inspection

INFOID:0000000000970529

INSPECTION

Description

CAUTION:

- **Camber, caster, kingpin inclination angles cannot be adjusted.**
- **If camber, caster, or kingpin inclination angle exceeds the standard value, check front suspension parts for wear and damage. Replace suspect parts if a malfunction is detected.**
- **Kingpin inclination angle is reference value, no inspection is required.**

Measure wheel alignment under unladen conditions.

NOTE:

“Unladen conditions” means that fuel, engine coolant, and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

Preliminary Check

Check the following:

- Tires for improper air pressure and wear
- Road wheels for runout: Refer to WT-3, "Adjustment".
- Wheel bearing axial end play: Refer to FAX-7, "Inspection" (2WD), FAX-47, "Inspection" (4WD).
- Transverse link ball joint axial end play: Refer to FSU-6, "Inspection".
- Strut operation.
- Each mounting part of axle and suspension for looseness and deformation
- Each of suspension member and transverse link for cracks, deformation and other damage
- Vehicle height (posture)

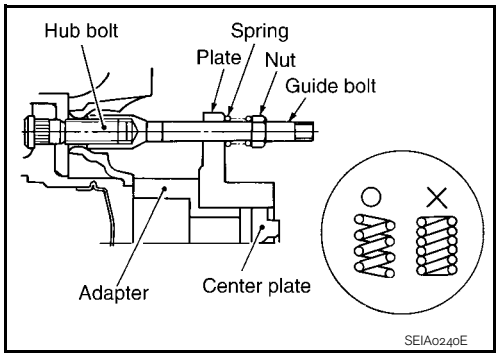
CAMBER, CASTER, AND KINGPIN INCLINATION ANGLES

- Camber, caster, kingpin inclination angles cannot be adjusted.
- Before inspection, mount front wheels onto turning radius gauge. Mount rear wheels onto a stand at the same height so that vehicle remains horizontal.

Using a CCK Gauge

Install the CCK gauge attachment (SST: KV991040S0) with the following procedure on wheel, then measure wheel alignment.

1. Remove three wheel to nuts, and install the guide bolts to hub bolt.
2. Screw the adapter into the plate until it contacts the plate tightly.
3. Screw the center plate into the plate.
4. Insert the plate assembly on the guide bolt. Put the spring in, and then evenly screw the three guide bolt nuts. When fastening the guide nuts, do not completely compress the spring.

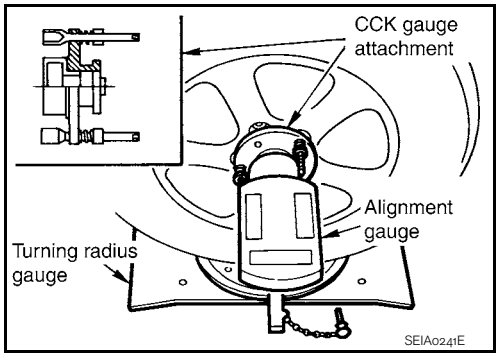


5. Place the dent of alignment gauge onto the projection of the center plate and tightly contact them to measure.

Camber, caster, kingpin inclination angles **: Refer to FSU-18, "Wheel Alignment".**

CAUTION:

- **If camber, caster, or kingpin inclination angle exceeds the standard value, check front suspension parts for wear and damage. Replace suspect parts if a malfunction is detected.**
- **Kingpin inclination angle is reference value, no inspection is required.**



cardiagn.com

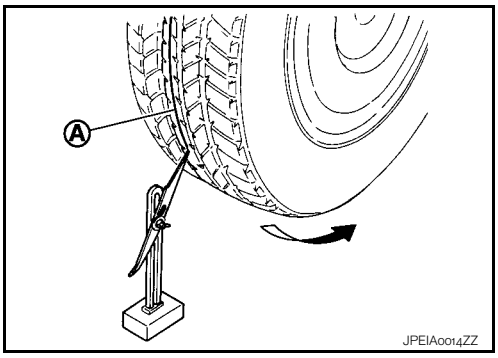
Toe-In

Measure toe-in by the following procedure.

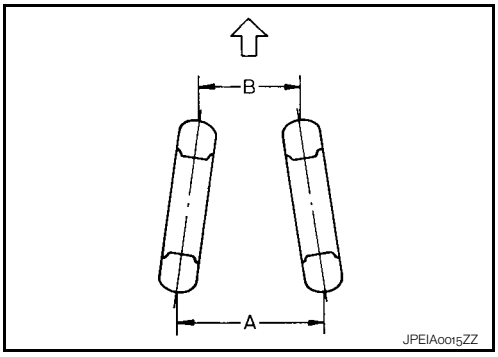
WARNING:

- **Always perform the following procedure on a flat surface.**
- **Make sure that no person is in front of vehicle before pushing it.**

1. Bounce front of vehicle up and down to stabilize the vehicle height (posture).
2. Push vehicle straight ahead about 5 m (16 ft).
3. Put matching mark (A) on base line of the tread (rear side) of both tires at the same height of hub center. These are measuring points.



4. Measure distance (A) (rear side).
5. Push vehicle slowly ahead to rotate wheels 180 degrees (1/2 turn).
   NOTE:
   If the wheels rotates more than 180 degrees (1/2 turn), start this procedure again from the beginning. Do not push the vehicle backward.
6. Measure distance (B) (front side).



Total toe-in = A – B

Total toe-in : Refer to FSU-18, "Wheel Alignment".

- If toe-in exceeds the standard value, adjust toe-in by varying the length of between steering outer socket and inner socket.

cardiagn.com

ON-VEHICLE REPAIR

FRONT COIL SPRING AND STRUT

Exploded View

INFOID:0000000000970530

Refer to FSU-16, "Exploded View".

Removal and Installation

INFOID:0000000000970531

REMOVAL

1. Remove tires from vehicle.
2. Remove lock plat. BR-19, "FRONT BRAKE (WITH ABS) : Exploded View" (LHD with ABS), BR-21, "FRONT BRAKE (WITH ESP) : Exploded View" (LHD with ESP), BR-63, "FRONT BRAKE (WITH ABS) : Exploded View" (RHD with ABS), BR-65, "FRONT BRAKE (WITH ESP) : Exploded View" (RHD with ESP).
3. Remove cap and mounting nut on the upper side of stabilizer connecting rod, and then remove stabilizer connecting rod from strut assembly.
4. Separate steering knuckle from strut assembly.
5. Remove mounting bolts of strut mounting insulator, and then remove strut assembly.

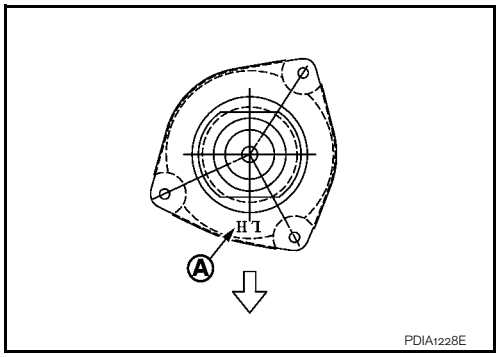
INSTALLATION

Note the following, and install in the reverse order of removal.

- Make sure the identification mark (A) on strut mounting insulator as shown in the figure.

  ⇦ : Vehicle front

- Perform final tightening of bolts and nuts, under unladen conditions with tires on level ground.



Disassembly and Assembly

INFOID:0000000000970532

DISASSEMBLY

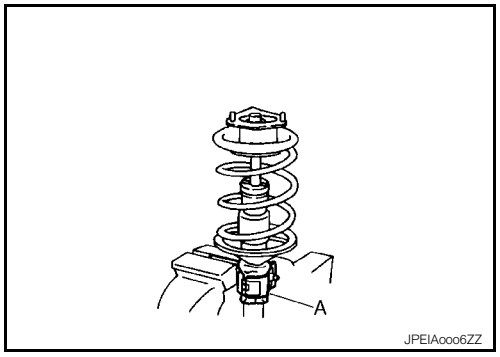
CAUTION:

Never damage strut assembly piston rod when removing components from strut assembly.

1. Install strut attachment (A) (SST: ST35652000) to strut assembly and secure it in a vise.

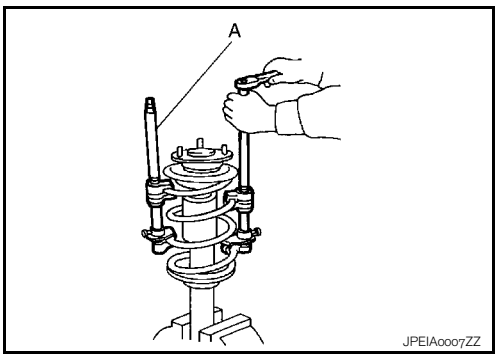
   CAUTION:

   When installing the strut attachment to strut assembly, wrap a shop cloth around strut to protect from damage.



cardiagn.com

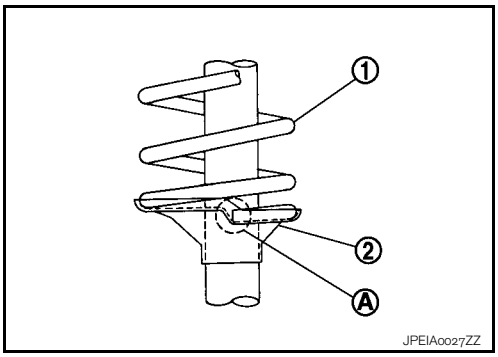
2. Using a spring compressor (A) (commercial service tool), compress coil spring between strut mounting bearing and lower rubber seat (on strut assembly) until coil spring with a spring compressor is free.
CAUTION:
Be sure a spring compressor is securely attached to coil spring. Compress coil spring.



3. Make sure coil spring with a spring compressor between strut mounting bearing and lower rubber seat (strut assembly) is free. And then remove piston rod lock nut while securing the piston rod tip so that piston rod does not turn.
4. Remove strut mounting insulator and strut mounting bearing, and bound bumper from strut.
5. After remove coil spring with a spring compressor, and then gradually release a spring compressor.
CAUTION:
Loosen while making sure coil spring attachment position does not move.
6. Remove lower rubber seat from strut.
7. Remove the strut attachment (SST: ST35652000) from strut.

ASSEMBLY

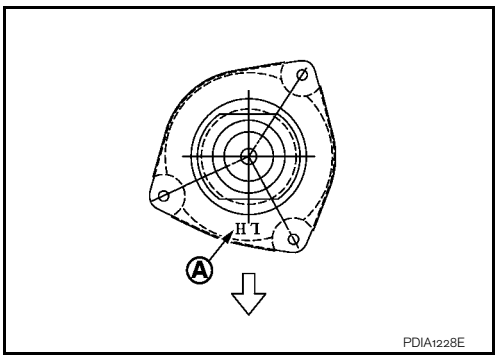
1. Install strut attachment (SST: ST35652000) to strut and secure it in a vise.
CAUTION:
When installing the strut attachment to strut assembly, wrap a shop cloth around strut to protect from damage.
2. Install lower rubber seat.
3. Install bound bumper.
4. Compress coil spring using a spring compressor (commercial service tool), and install it onto strut assembly.
CAUTION:
- **Face tube side of coil spring (1) downward. Align the lower end (A) to lower rubber seat (2).**
- **Be sure a spring compress is securely attached to coil spring. Compress coil spring.**



5. Install strut mounting bearing and strut mounting insulator to strut.
- Installation position of strut mounting insulator as shown in the figure.

A : Identification mark

⇦ : Vehicle front



6. Secure piston rod tip so that piston rod does not turn, then tighten piston rod lock nut with specified torque.
CAUTION:
Never reuse piston rod lock nut.
7. Gradually release a spring compressor, and remove coil spring.
CAUTION:
Loosen while making sure coil spring attachment position does not move.
8. Remove the strut attachment from strut assembly.

Inspection

INFOID:0000000000970533

cardiagn.com

INSPECTION AFTER INSTALLATION

1. Adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".

INSPECTION AFTER DISASSEMBLY

Strut

Check the following items, and replace the parts if necessary.

- Strut for deformation, cracks or damage
- Piston rod for damage, uneven wear or distortion
- For oil leakage

Strut Mounting Insulator and Rubber Parts Inspection

Check strut mounting insulator for cracks and rubber parts for wear. Replace it if necessary.

Coil Spring

Check coil spring for cracks, wear or damage. Replace it if necessary.

cardiagn.com

TRANSVERSE LINK

Exploded View

INFOID:0000000000970534

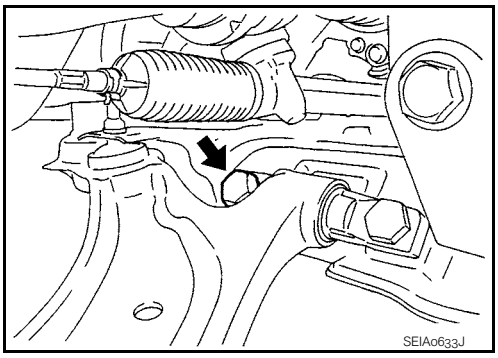
Refer to FSU-16, "Exploded View".

Removal and Installation

INFOID:0000000000970535

REMOVAL

1. Remove tires from vehicle.
2. Remove transverse link from steering knuckle.
3. Remove transverse link from suspension member.
   NOTE:
   Transverse link cannot be pulled out because the mounting bolt (⬅) of transverse link at the rear of the mounting area located on the front side of vehicle hits against the stabilizer bar. Therefore, get stabilizer bar out of the way to remove the transverse link.



INSTALLATION

Note the following, and install in the reverse order of removal.

- Perform final tightening of bolts and nuts at the front suspension member, under unladen conditions with tires on level ground.

Inspection

INFOID:0000000000970536

INSPECTION AFTER REMOVAL

Visual Inspection

Check the following:

- Transverse link and bushing for deformation, cracks or damage. Replace it if necessary.
- Ball joint boot for cracks or other damage, and also for grease leakage. Replace it if necessary.

Ball Joint Inspection

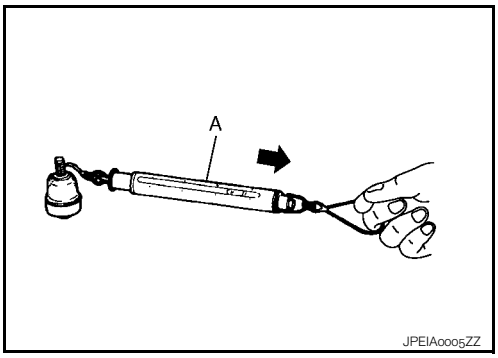
Manually move ball stud to confirm it moves smoothly with no binding.

Swing Torque Inspection

NOTE:

Before measurement, move ball stud at least ten times by hand to check for smooth movement.

- Hook a spring balance (A) at cotter pin mounting hole. Confirm spring balance measurement value is within specifications when ball stud begins moving.



Standard	
Swing torque	**:Refer to FSU-18, "Ball Joint".**
Spring balance measurement	**:Refer to FSU-18, "Ball Joint".**

- If swing torque exceeds standard range, replace transverse link assembly.

Axial End Play Inspection

- Move tip of ball stud in axial direction to check for looseness.

cardiagn.com

Standard

Axial end play **:Refer to FSU-18, "Ball Joint".**

- If axial end play exceeds the standard value, replace transverse link assembly.

INSPECTION AFTER INSTALLATION

1. Adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".

cardiagn.com

FRONT STABILIZER

Exploded View

INFOID:0000000000970540

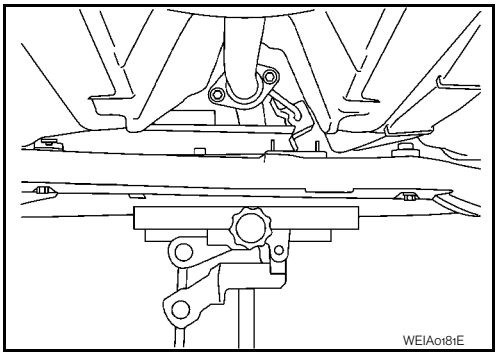
Refer to FSU-16, "Exploded View".

Removal and Installation

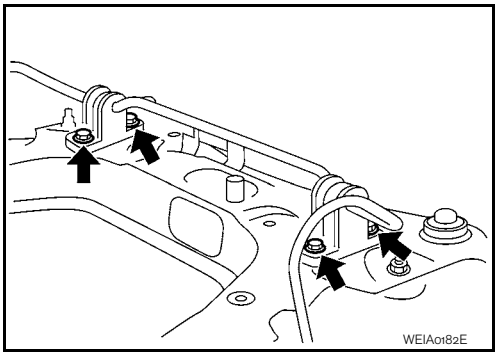
INFOID:0000000000970541

REMOVAL

1. Remove tires from vehicle.
2. Remove steering outer socket from steering knuckle. Refer to ST-13, "Exploded View".
3. Remove stabilizer connecting rod. Refer to FSU-16, "Exploded View".
4. Remove under cover from vehicle.
5. Remove front suspension member stay from vehicle. Refer to FSU-16, "Exploded View".
6. Remove rear torque rod. Refer to EM-83, "Exploded View" (HR16DE), EM-194, "M/T : Exploded View" (MR20DE M/T models), EM-198, "CVT : Exploded View" (MR20DE CVT models), EM-298, "Exploded View" (K9K).
7. Separate intermediate shaft from steering gear. Refer to ST-10, "Exploded View".
8. Set suitable jack front suspension member.
9. Gradually lower jack front suspension member in order to remove stabilizer mounting bolts.



10. Remove mounting bolts (⬅) of stabilizer clamp, and then remove stabilizer clamp and stabilizer bushing from front suspension member.
11. Remove stabilizer bar.



INSTALLATION

Install in the reverse order of removal.

Inspection

INFOID:0000000000970542

INSPECTION AFTER REMOVAL

Check stabilizer bar, stabilizer connecting rod, stabilizer bushing and stabilizer clamp for deformation, cracks or damage. Replace it if necessary.

cardiagn.com

FRONT SUSPENSION MEMBER

Exploded View

INFOID:0000000000970543

Refer to FSU-16, "Exploded View".

Removal and Installation

INFOID:0000000000970544

REMOVAL

1. Remove tires from vehicle.
2. Remove under cover from vehicle.
3. Remove front suspension member stay from vehicle. Refer to FSU-16, "Exploded View".
4. Remove wheel sensor from steering knuckle. Refer to BRC-67, "FRONT WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "FRONT WHEEL SENSOR : Exploded View" (with ESP).
5. Remove upper side of stabilizer connecting rod from strut assembly. Refer to FSU-16, "Exploded View".
6. Remove steering outer socket from steering knuckle. Refer to ST-13, "Exploded View".
7. Separate intermediate shaft from steering gear. Refer to ST-10, "Exploded View".
8. Remove transverse link from steering knuckle. Refer to FSU-12, "Exploded View".
9. Remove rear torque rod. Refer to EM-83, "Exploded View" (HR16DE), EM-194, "M/T : Exploded View" (MR20DE M/T models), EM-198, "CVT : Exploded View" (MR20DE CVT models), EM-298, "Exploded View" (K9K).
10. Set suitable jack front suspension member.
11. Remove mounting bolts and nuts of front suspension member.
12. Gradually lower jack to remove front suspension assembly from vehicle.
    CAUTION:
    Secure suspension assembly to suitable jack while removing it.
13. Remove mounting bolts and nuts, and then remove transverse link, stabilizer bar from front suspension member.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Perform final tightening of installation position between front suspension member and transverse links (rubber bushing) under unladen condition with tires on level ground.

Inspection

INFOID:0000000001116390

INSPECTION AFTER REMOVAL

Check the front suspension member for significant deformation, cracks, or damages. Replace it if necessary.

INSPECTION AFTER INSTALLATION

1. Adjust the neutral position of the steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".

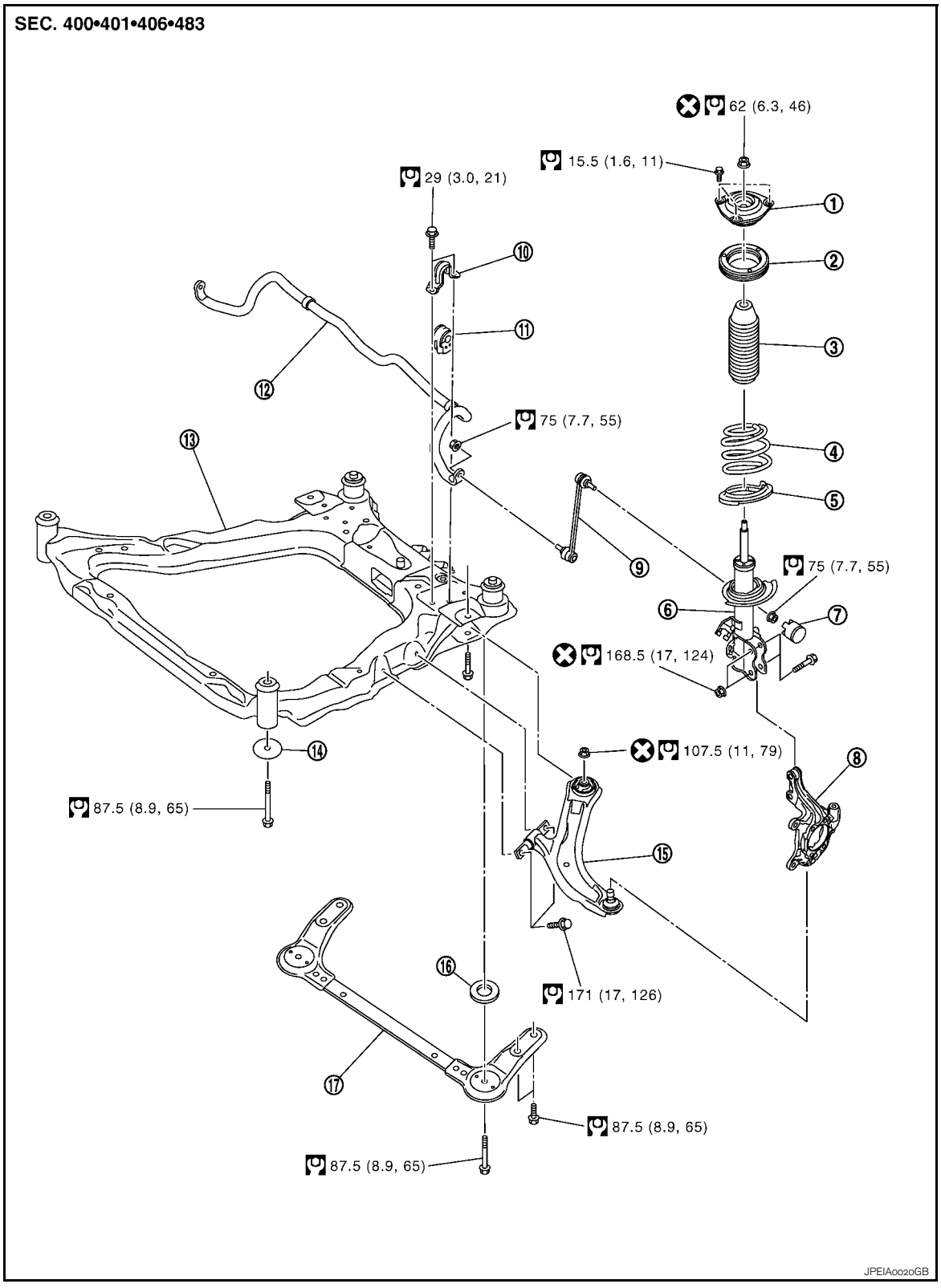
cardiagn.com

REMOVAL AND INSTALLATION

FRONT SUSPENSION ASSEMBLY

Exploded View

INFOID:0000000000970546



cardiagn.com

1. Strut mounting insulator
2. Strut mounting bearing
3. Bound bumper
4. Coil spring
5. Lower rubber seat
6. Strut
7. Cap
8. Steering knuckle
9. Stabilizer connecting rod
10. Stabilizer clamp
11. Stabilizer bushing
12. Stabilizer bar
13. Front suspension member
14. Rebound stopper insulator
15. Transverse link
16. Rebound stopper
17. Front suspension member stay

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000970547

REMOVAL

Refer to the procedure from 1 to 13 in FSU-15, "Removal and Installation".

INSTALLATION

Note the following, and install in the reverse order of removal.

- Perform final tightening of bolts and nuts at the vehicle installation position (rubber bushing), under unladen conditions with tires on level ground.

Inspection

INFOID:0000000000970548

INSPECTION AFTER REMOVAL

Check the front suspension member for significant deformation, cracks, or damages. Replace it if necessary.

INSPECTION AFTER INSTALLATION

1. Adjust the neutral position of the steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Alignment

INFOID:0000000000970549

Camber Degree minute (Decimal degree)		Minimum	–1° 10′ (–1.17°)
		Nominal	–0° 25′ (–0.42°)
		Maximum	0° 20′ (0.33°)
		Left and right difference	0° 33′ (0.55°) or less
Caster Degree minute (Decimal degree)		Minimum	3° 55′ (3.92°)
		Nominal	4° 40′ (4.67°)
		Maximum	5° 25′ (5.42°)
		Left and right difference	0° 45′ (0.75°) or less
Kingpin inclination Degree minute (Decimal degree)		Minimum	9° 40′ (6.67°)
		Nominal	10° 25′ (10.42°)
		Maximum	11° 10′ (11.17°)
Total toe-in	Distance	Minimum	1 mm (0.04 in)
		Nominal	2 mm (0.08 in)
		Maximum	3 mm (0.12 in)
	Angle (left wheel or right wheel) Degree minute (Decimal degree)	Minimum	0° 02′ 30″ (0.04°)
		Nominal	0° 05′ (0.08°)
		Maximum	0° 07′ 30″ (0.13°)

Measure value under unladen* conditions.

*Fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

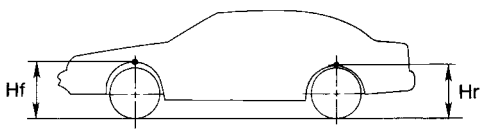
Ball Joint

INFOID:0000000000970550

Swing torque	Transverse link	0.5 – 3.4 N·m (0.06 – 0.34 kg-m, 5 – 30 in-lb)
Measurement on spring balance	Transverse link	13.5 – 91.9 N (1.4 – 9.4 kg, 3 – 21 lb)
Axial end play		0 mm (0 in)

Wheel Height

INFOID:0000000000970551



SFA818A

Tire	215/65R16	215/60R17
Front (Hf)	762 mm (30.00 in)	763 mm (30.04 in)

Measure value under unladen* conditions.

*: Fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

cardiagn.com

SECTION FL
FUEL SYSTEM

CONTENTS

HR16DE, MR20DE

PRECAUTION 3

PRECAUTIONS 3
General Precautions 3

PREPARATION 4

PREPARATION 4
Commercial Service Tools 4

ON-VEHICLE MAINTENANCE 5

FUEL SYSTEM 5
Inspection 5
Quick Connector 5

ON-VEHICLE REPAIR 6

FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY 6

2WD 6
2WD : Exploded View 6
2WD : Removal and Installation 7
2WD : Disassembly and Assembly 9
2WD : Inspection 10

4WD 10
4WD : Exploded View 10
4WD : Removal and Installation 11
4WD : Disassembly and Assembly 14
4WD : Inspection 14

FUEL TANK 15

2WD 15
2WD : Exploded View 15
2WD : Removal and Installation 15
2WD : Inspection 16

4WD 17
4WD : Exploded View 17
4WD : Removal and Installation 17
4WD : Inspection 19

SERVICE DATA AND SPECIFICATIONS (SDS) 20

SERVICE DATA AND SPECIFICATIONS (SDS) 20
Fuel Tank 20

K9K

PREPARATION 21

PREPARATION 21
Special Service Tools 21

ON-VEHICLE MAINTENANCE 22

FUEL SYSTEM 22
Inspection 22

FUEL FILTER 23
Exploded View 23
Replacement 23
Water Draining 23
Air Bleeding 23
Inspection 24

ON-VEHICLE REPAIR 25

FUEL LEVEL SENSOR UNIT 25
Exploded View 25
Removal and Installation 25

FUEL TANK 27
Exploded View 27
Removal and Installation 27
Inspection 29

SERVICE DATA AND SPECIFICATIONS (SDS) 30

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS) 30
Fuel Tank 30

cardiagn.com

PRECAUTION

PRECAUTIONS

General Precautions

INFOID:0000000000905647

WARNING:

When replacing fuel line parts, be sure to observe the following.

- **Put a “CAUTION: FLAMMABLE” sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Never smoke while servicing fuel system. Keep open flames and sparks away from the work area.**

CAUTION:

- **Use gasoline required by the regulations for octane number. Refer to GI-32, "FUEL : Unleaded Premium Gasoline".**
- **Before removing fuel line parts, perform out the following procedures:**
- **Put drained fuel in an explosion-proof container and put the lid on securely. Keep the container in safe area.**
- **Release fuel pressure from the fuel lines. Refer to EC-357, "Inspection" (HR16DE) or EC-978, "Inspection" (MR20DE).**
- **Disconnect the battery cable from the negative terminal.**
- **Always replace O-ring and clamps with new ones.**
- **Never kink or twist tubes when they are being installed.**
- **Never tighten hose clamps excessively to avoid damaging hoses.**
- **After installing tubes, make sure there is no fuel leakage at connections in the following steps.**
- **Apply fuel pressure to fuel lines with turning ignition switch “ON” (with engine stopped). Then check for fuel leaks at connections.**
- **Start engine and rev it up and check for fuel leaks at connections.**
- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the “MI” may come on.**
- **For servicing “Evaporative Emission System” parts. Refer to EC-74, "System Diagram" (HR16DE) or EC-692, "System Diagram" (MR20DE).**
- **For servicing “On Board Refueling Vapor Recovery (ORVR)” parts. Refer to EC-87, "Diagnosis Description" (HR16DE) or EC-706, "Diagnosis Description" (MR20DE).**

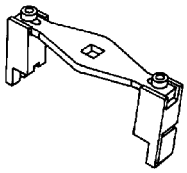
cardiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000000905648

Tool name	Description
Lock ring wrench  ZZA0122D	Removing and Installing lock ring

cardiagn.com

ON-VEHICLE MAINTENANCE

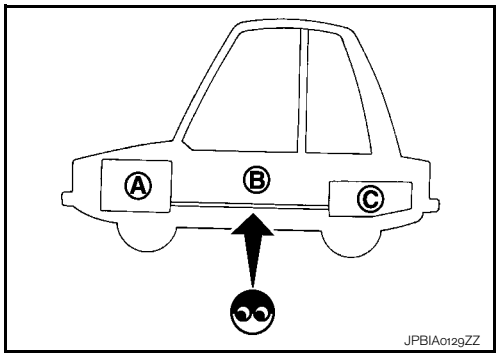
FUEL SYSTEM

Inspection

INFOID:0000000000905649

Inspect fuel lines, fuel filler cap and fuel tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration.
If necessary, repair or replace damaged parts.

A : Engine
B : Fuel line
C : Fuel tank



Quick Connector

INFOID:0000000000905650

CAUTION:
- **After connecting fuel tube quick connectors, make sure quick connectors are secure.**
- **Ensure that connector and resin tube do not contact any adjacent parts.**

cardiagn.com

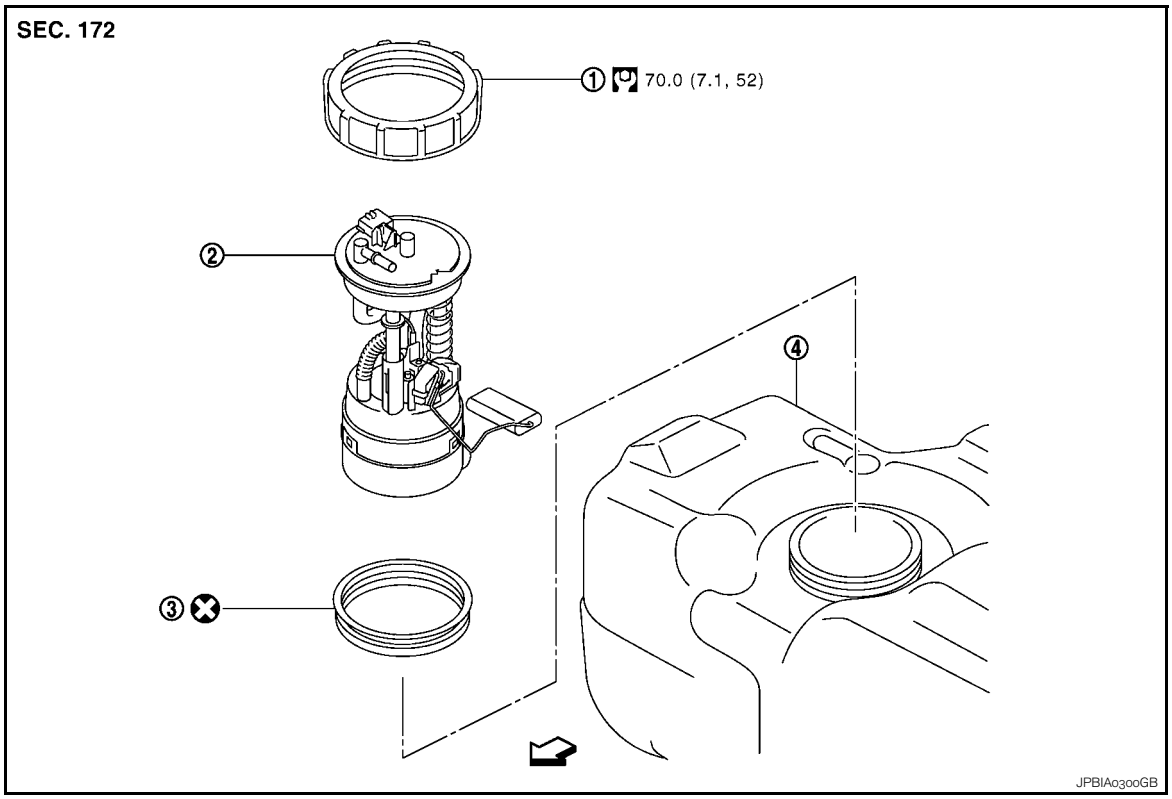
ON-VEHICLE REPAIR

FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY 2WD

2WD : Exploded View

INFOID:0000000000905651

Removal and Installation



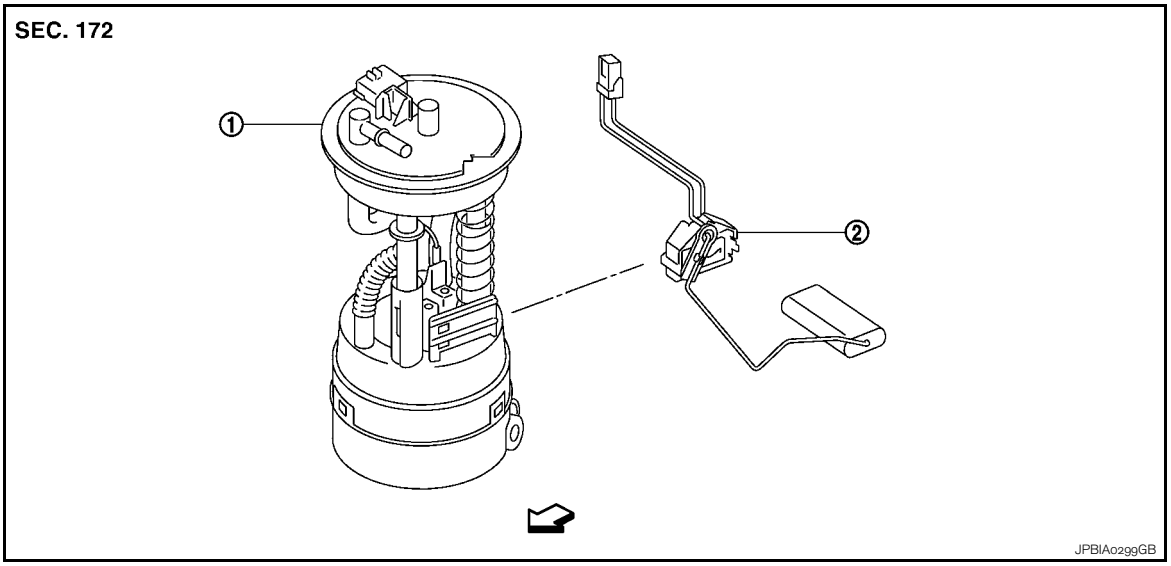
1. Lock ring
2. Fuel level sensor unit, fuel filter and fuel pump assembly
3. O-ring
4. Fuel tank

⇦ : Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

Disassembly and Assembly

cardiagn.com



1. Fuel filter and fuel pump assembly 2. Fuel level sensor unit

⇦ :Vehicle front

CAUTION:
Never remove or disassemble parts unless instructed as shown in the figure.

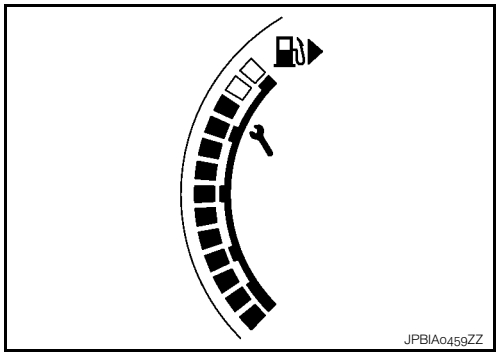
2WD : Removal and Installation

INFOID:0000000000905652

REMOVAL

WARNING:
Be sure to read “General Precautions” before working on the fuel system. Refer to FL-3, "General Precautions".

1. Check fuel level on fuel gauge. If fuel gauge indicates more than the level as shown in the figure (full or almost full), drain fuel from fuel tank until fuel gauge indicates level as shown in the figure or below.
   NOTE:
   Because fuel will be spilled when removing fuel level sensor unit, fuel filter and fuel pump assembly for the top of the fuel is above the fuel level sensor units installation surface.
   - As a guide, fuel level becomes the position as shown in the figure or below when approximately 15 ℓ (3- 1/4 Imp gal) of fuel are drained from fuel tank.
   - In case fuel pump does not operate, perform the following procedure.

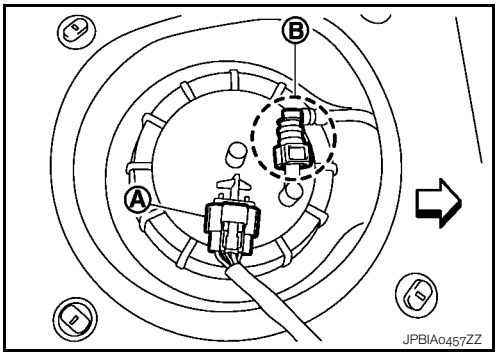


a. Insert hose of less than 20 mm (0.79 in) in diameter into fuel filler tube through fuel filler opening to draw fuel from fuel filler tube.
b. Disconnect fuel filler hose from fuel filler tube. Refer to FL-15, "2WD : Exploded View".
c. Insert hose into fuel tank through fuel filler hose to draw fuel from fuel tank.
2. Release the fuel pressure from the fuel lines. Refer to EC-357, "Inspection" (HR16DE) or EC-978, "Inspection" (MR20DE).
3. Open fuel filler lid.
4. Open fuel filler cap and release the pressure inside the fuel tank.
5. Remove rear seat cushion. Refer to SE-30, "Exploded View".
6. Remove inspection hole cover.
   - Using a screwdriver, remove it by turning clips clockwise by 90 degrees.

cardiagn.com

7. Disconnect harness connector (A) and quick connector (B).

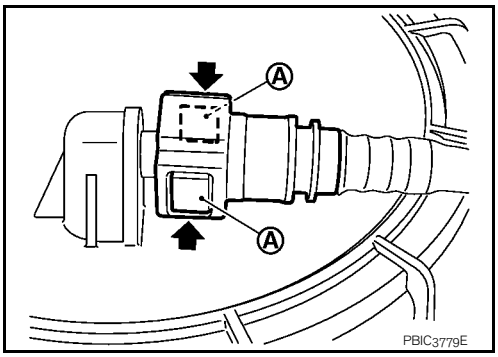
⇦ : Vehicle front

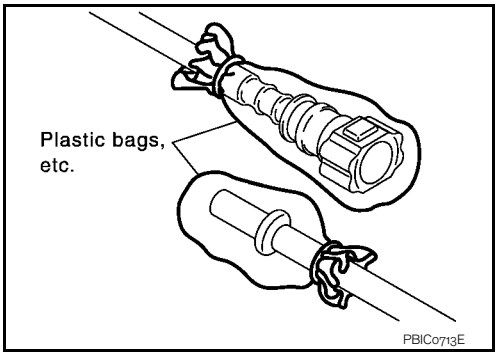


- Remove quick connector in the following procedures.
- Pinch quick connector square-part (A) with your fingers, and pull out the quick connector by hand.
- If quick connector and tube on sender unit are stuck, push and pull several times until they move, and pull out.

CAUTION:

- **Quick connector can be removed when the tabs are completely depressed. Never twist it more than necessary.**
- **Never use any tools to disconnect quick connector.**
- **Keep resin tube away from heat. Be especially careful when welding near the resin tube.**
- **Prevent acid liquid such as battery electrolyte, etc. from getting on resin tube.**
- **Never bend or twist resin tube during installation and disconnection.**
- **To keep the connecting portion clean and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.**
- **Never insert plug, preventing damage on o-ring in quick connector.**

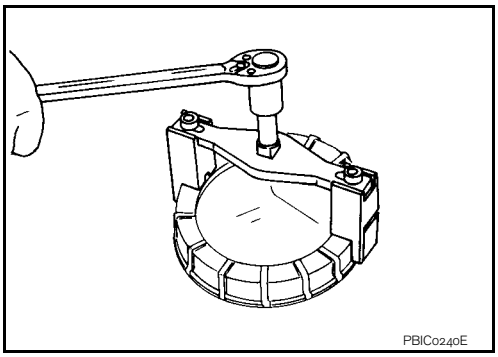




8. Using lock ring wrench (commercial service tool), remove lock ring.

NOTE:

For reference when installing, put a matching mark on lock ring, fuel pump assembly and fuel tank.



9. Remove fuel level sensor unit, fuel filter and fuel pump assembly.

CAUTION:

- **Never bend float arm during removal.**
- **Avoid polluting the inside by residue fuel. Draw out with avoiding inclination by supporting with a cloth.**
- **Avoid impacts such as falling when handling components.**

INSTALLATION

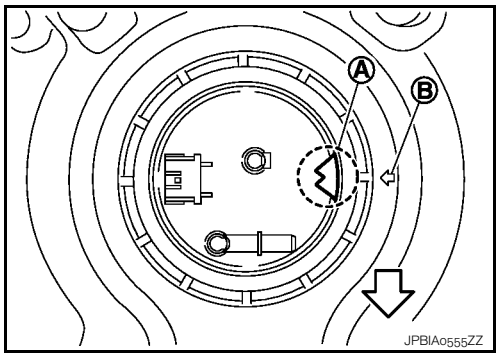
Note the following, and install in the reverse order of removal.

cardiagn.com

Fuel Level Sensor Unit, Fuel Filter and Fuel Pump Assembly

1. Install O-ring to fuel tank without any twist.
2. Install fuel level sensor unit with aligning matching mark (A) on fuel level sensor unit and (B) on fuel tank as shown in the figure.

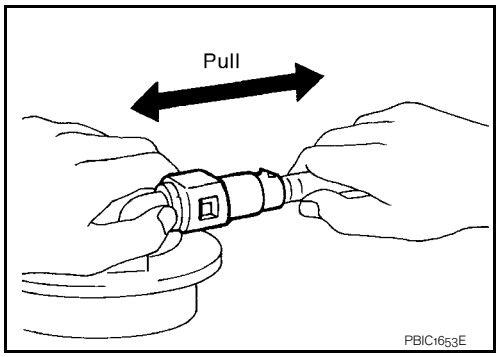
⇦ : Vehicle front



Quick Connector

Connect quick connector of fuel feed tube in the following procedures.

1. Check the connection for damage or any foreign materials.
2. Align the connector with the tube, then insert the connector straight into the tube until a “click” sound is heard.
3. After connecting, make sure that the connection is secure by following procedures.
   - Visually confirm that the two tabs are connected to the connector.
   - Pull the tube and the connector to make sure they are securely connected.



4. Connect harness connector.

Inspection Hole Cover

- Before installing inspection hole cover, check that the connecting part has no fuel leaks. Refer to FL-10, "2WD : Inspection".

1. Install inspection hole covers with the front mark (arrow) facing front of vehicle.
2. Lock clips by turning counterclockwise.

2WD : Disassembly and Assembly

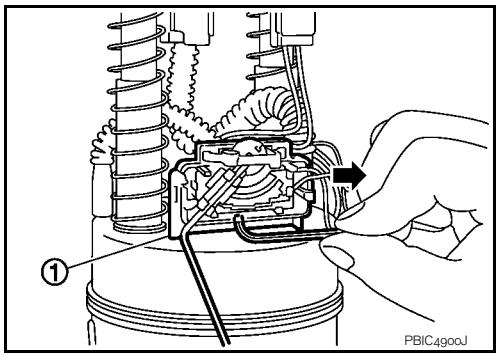
INFOID:0000000000905664

DISASSEMBLY

1. Disconnect harness connector.
2. Remove fuel level sensor unit (1) in the following procedures.

a. Push the pawl of fuel level sensor unit mounting area with an L-shaped iron rod or an equivalent to unlock.
CAUTION:
Be careful not to damage fuel level sensor unit.

b. With the fuel level sensor unit unlocked, slide it in the direction shown by the arrow (⬅).



ASSEMBLY

cardiagn.com

Install fuel level sensor unit according to the following procedure.
- Insert until you hear a “click” sound and actually feel the engagement.
- After inserting, apply force in reverse direction (removal direction) to ensure it cannot be pulled out.

2WD : Inspection

INFOID:0000000000905653

INSPECTION AFTER INSTALLATION

Use the following procedure to check for fuel leaks.

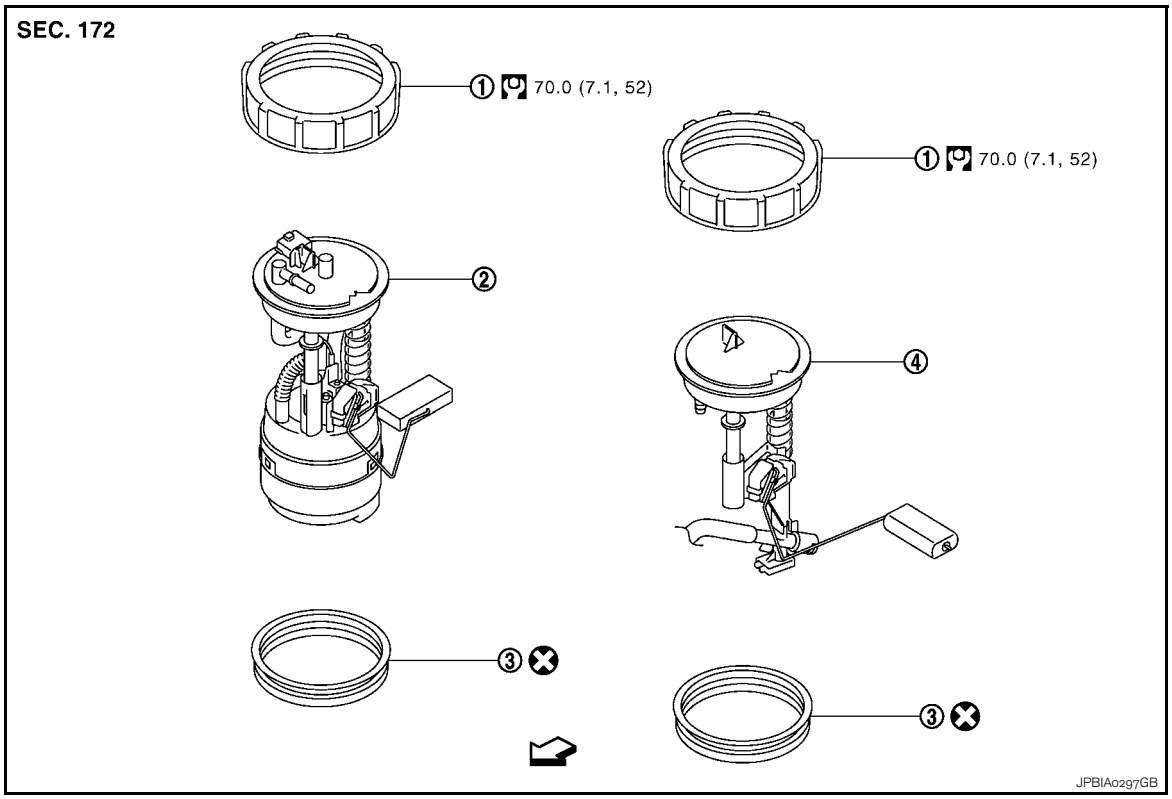
1. Turn ignition switch “ON” (with engine stopped), then check connections for leaks by applying fuel pressure to fuel piping.
2. Start engine and let it idle and make sure there are no fuel leaks at the fuel system connections.

4WD

4WD : Exploded View

INFOID:0000000001078679

Removal and Installation



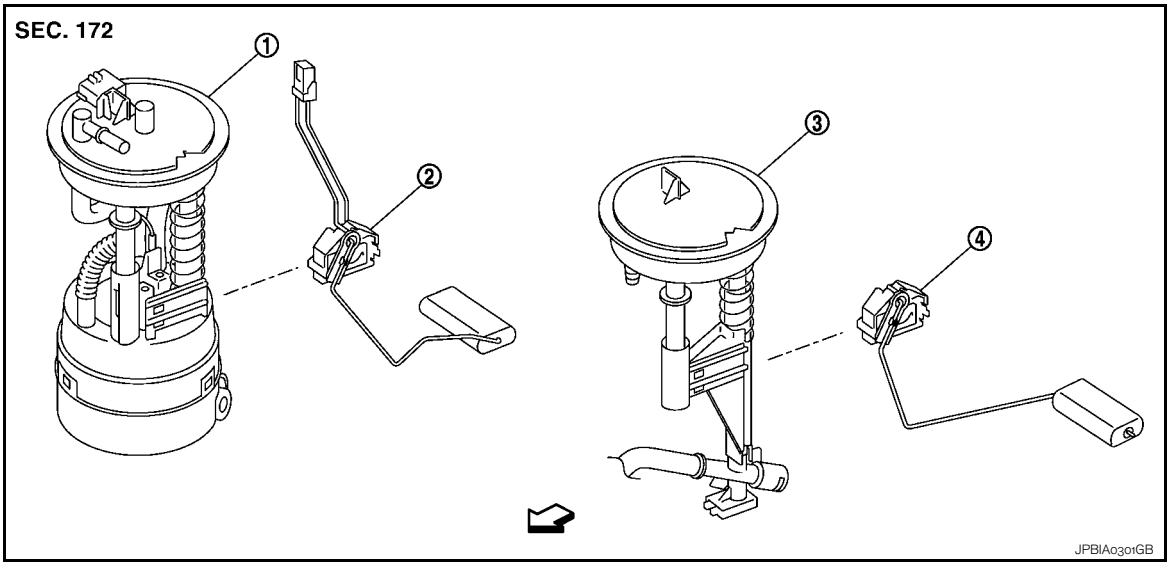
1. Lock ring
2. Fuel level sensor unit, fuel filter and fuel pump assembly
3. O-ring
4. Sub fuel level sensor assembly

⇦ :Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

Disassembly and Assembly

cardiagn.com



1. Fuel filter and fuel pump assembly
2. Fuel level sensor unit
3. Sub fuel level sensor base
4. Sub fuel level sensor unit

⇦ : Vehicle front

CAUTION:
Never remove or disassemble parts unless instructed as shown in the figure.

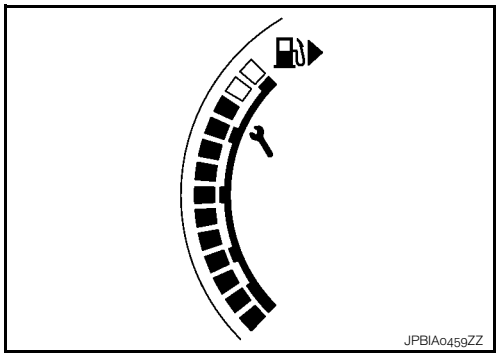
4WD : Removal and Installation

INFOID:0000000001078680

REMOVAL

WARNING:
Be sure to read “General Precautions” before working on the fuel system. Refer to FL-3, "General Precautions".

1. Check fuel level on fuel gauge. If fuel gauge indicates more than the level as shown in the figure (full or almost full), drain fuel from fuel tank until fuel gauge indicates level as shown in the figure or below.
   NOTE:
   Because fuel will be spilled when removing fuel level sensor unit, fuel filter and fuel pump assembly for the top of the fuel is above the fuel level sensor units installation surface.
   - As a guide, fuel level becomes the position as shown in the figure or below when approximately 15 ℓ (3- 1/4 Imp gal) of fuel are drained from fuel tank.
   - In case fuel pump does not operate, perform the following procedure.

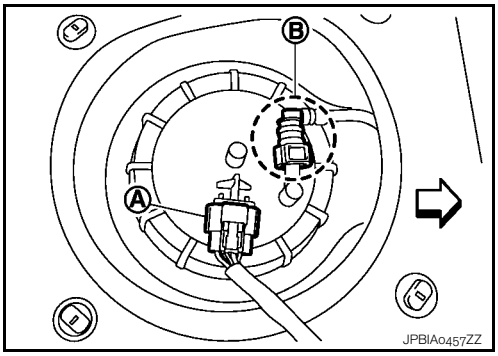


a. Insert hose of less than 20 mm (0.79 in) in diameter into fuel filler tube through fuel filler opening to draw fuel from fuel filler tube.
b. Disconnect fuel filler hose from fuel filler tube. Refer to FL-17, "4WD : Exploded View".
c. Insert hose into fuel tank through fuel filler hose to draw fuel from fuel tank.
2. Release the fuel pressure from the fuel lines. Refer to EC-978, "Inspection".
3. Open fuel filler lid.
4. Open fuel filler cap and release the pressure inside the fuel tank.
5. Remove rear seat cushion. Refer to SE-30, "Exploded View".
6. Remove inspection hole cover.
   - Using a screwdriver, remove it by turning clips clockwise by 90 degrees.

cardiagn.com

7. Disconnect harness connector (A) and quick connector (B).

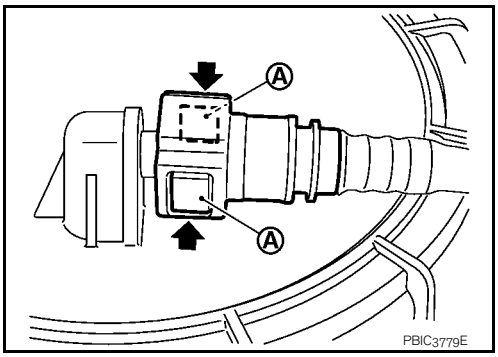
⇦ : Vehicle front

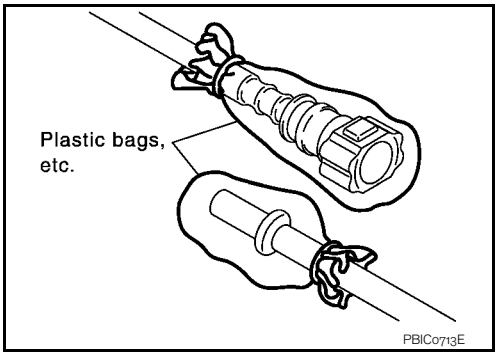


- Remove quick connector in the following procedures.
- Pinch quick connector square-part (A) with your fingers, and pull out the quick connector by hand.
- If quick connector and tube on sender unit are stuck, push and pull several times until they move, and pull out.

CAUTION:

- **Quick connector can be removed when the tabs are completely depressed. Never twist it more than necessary.**
- **Never use any tools to disconnect quick connector.**
- **Keep resin tube away from heat. Be especially careful when welding near the resin tube.**
- **Prevent acid liquid such as battery electrolyte, etc. from getting on resin tube.**
- **Never bend or twist resin tube during installation and disconnection.**
- **To keep the connecting portion clean and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.**
- **Never insert plug, preventing damage on o-ring in quick connector.**

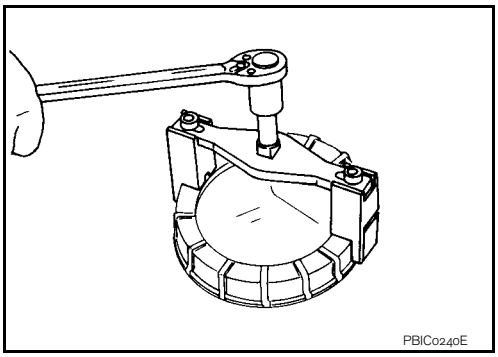




8. Using lock ring wrench (commercial service tool), remove lock ring.

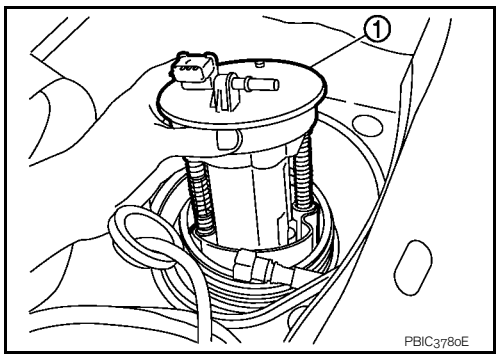
NOTE:

For reference when installing, put a matching mark on lock ring, fuel pump assembly and fuel tank.



cardiagn.com

9. Raise fuel level sensor unit, fuel filter and fuel pump assembly (1), and disconnect fuel tube and harness connector.



CAUTION:
- **Never bend float arm during removal.**
- **Avoid polluting the inside by residue fuel. Draw out with avoiding inclination by supporting with a cloth.**
- **Avoid impacts such as falling when handling components.**

10. Raise sub fuel level sensor assembly.

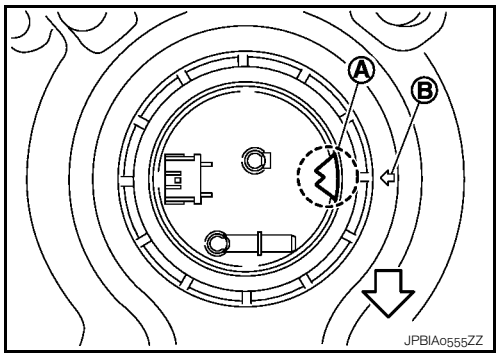
CAUTION:
- **Never disassembly a fuel tube from sub fuel sensor assembly.**
- **Never bend float arm during removal.**
- **Avoid polluting the inside by residue fuel. Draw out with avoiding inclination by supporting with a cloth.**
- **Avoid impacts such as falling when handling components.**

INSTALLATION

Note the following, and install in the reverse order of removal.

Fuel Level Sensor Unit, Fuel Filter and Fuel Pump Assembly and Sub Fuel Level Sensor Assembly

1. Install O-ring to fuel tank without any twist.
2. Install fuel level sensor unit with aligning mating marks (A) on fuel level sensor unit and (B) on fuel tank as shown in the figure.



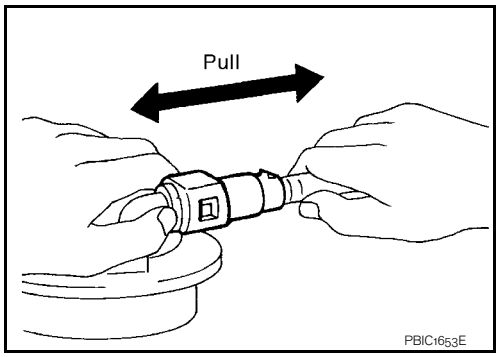
⇦ : Vehicle front

NOTE:
Figure shows fuel level sensor unit, fuel filter and fuel pump assembly side of fuel tank.

Quick Connector

Connect quick connector of fuel feed tube in the following procedures.

1. Check the connection for damage or any foreign materials.
2. Align the connector with the tube, then insert the connector straight into the tube until a “click” sound is heard.
3. After connecting, make sure that the connection is secure by following procedures.
   - Visually confirm that the two tabs are connected to the connector.
   - Pull the tube and the connector to make sure they are securely connected.



4. Connect harness connector.

Inspection Hole Cover

cardiagn.com

- Before installing inspection hole cover, check that the connecting part has no fuel leaks. Refer to FL-14, "4WD : Inspection".

1. Install inspection hole covers with the front mark (arrow) facing front of vehicle.
2. Lock clips by turning counterclockwise.

4WD : Disassembly and Assembly

INFOID:0000000001078681

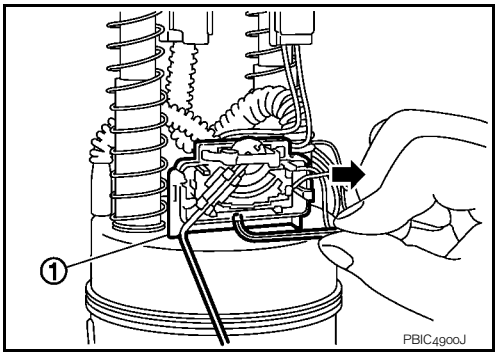
DISASSEMBLY

Fuel level sensor unit, fuel filter and fuel pump assembly side

1. Disconnect harness connector.
2. Remove fuel level sensor unit (1) in the following procedures.

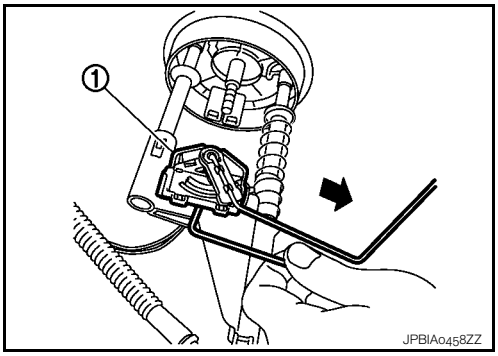
a. Push the pawl of fuel level sensor unit mounting area with an L-shaped iron rod or an equivalent to unlock.
CAUTION:
Be careful not to damage fuel level sensor unit.

b. With the fuel level sensor unit unlocked, slide it in the direction shown by the arrow (⬅).



Sub fuel level sensor unit assembly side

- Remove fuel level sensor unit (1) in the following procedures.
- Push the pawl of sub fuel level sensor unit mounting area with an L-shaped iron rod or an equivalent to unlock.
CAUTION:
Be careful not to damage sub fuel level sensor unit.
- With the sub fuel level sensor unit unlocked, slide it in the direction shown by the arrow (⬅).



ASSEMBLY

Install fuel level sensor unit according to the following procedure.

- Insert until you hear a “click” sound and actually feel the engagement.
- After inserting, apply force in reverse direction (removal direction) to ensure it cannot be pulled out.

4WD : Inspection

INFOID:0000000001078682

INSPECTION AFTER INSTALLATION

Use the following procedure to check for fuel leaks.

1. Turn ignition switch “ON” (with engine stopped), then check connections for leaks by applying fuel pressure to fuel piping.
2. Start engine and let it idle and make sure there are no fuel leaks at the fuel system connections.

cardiagn.com

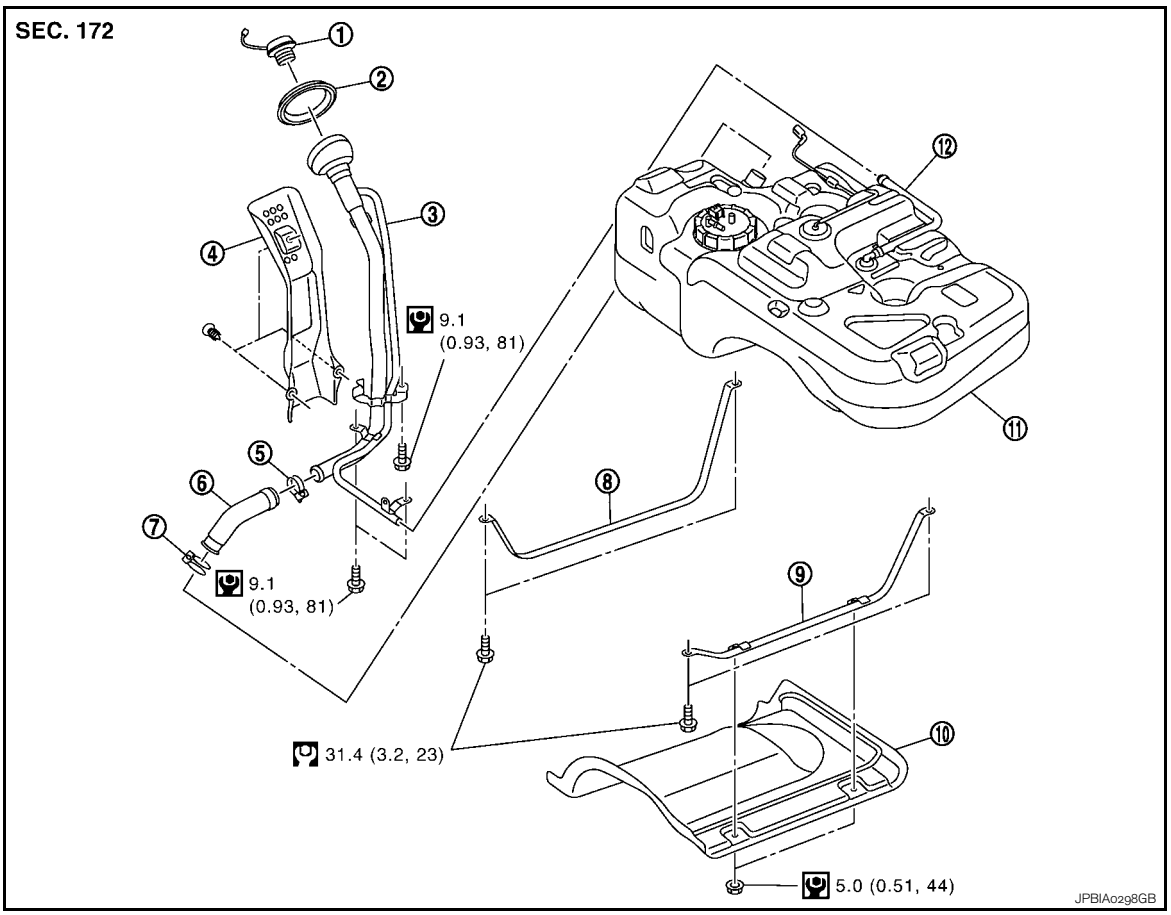
FUEL TANK

2WD

2WD : Exploded View

INFOID:0000000000905654

2WD



1. Fuel filler cap	2. Grommet	3. Fuel filler tube
4. Cover	5. Clamp	6. Fuel filler hose
7. Clamp	8. Fuel tank band (RH)	9. Fuel tank band (LH)
10. Protector	11. Fuel tank	12. Vent hose

Refer to GI-4, "Components" for to symbols in the figure.

2WD : Removal and Installation

INFOID:0000000000905655

REMOVAL

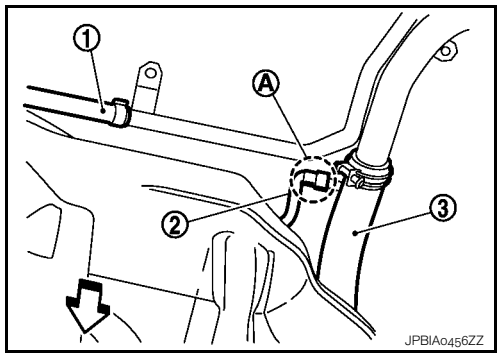
WARNING:

Be sure to read “General Precautions” when working on the fuel system. Refer to FL-3, "General Precautions".

1. Perform the steps 2 to 7 of “REMOVAL” in “ FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY”. Refer to FL-7, "2WD : Removal and Installation".
2. Drain fuel from fuel tank if necessary. Refer to FL-7, "2WD : Removal and Installation".
   CAUTION:
   - **Because fuel tank forwardly inclines and becomes unstable when installing/removing, fuel should be drained if found the remaining quantity.**
   - **Situate vehicle on a flat and solid surface.**
3. Remove main muffler. Refer to EX-5, "Exploded View" (HR16DE) or EX-10, "Exploded View" (MR20DE).

cardiagn.com

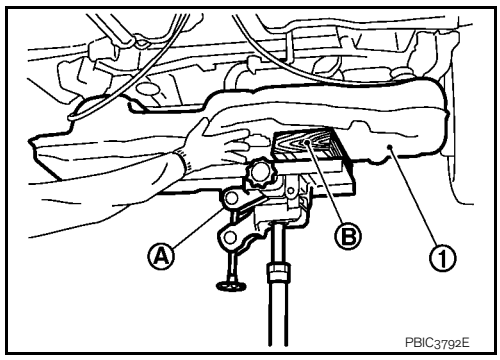
4. Remove protector from fuel tank.
5. Remove vent hose (1) at rear side of fuel tank.



⇦: Vehicle front

6. Disconnect EVAP tube (2) at rear side of fuel tank.
   • Instruction for quick connector (A) of EVAP tube. Refer to FL-6, "2WD : Exploded View"
7. Remove fuel filler hose (3) at fuel filler tube side.

8. Support center of fuel tank (1) with transmission jack (A).
   CAUTION:
   Securely support the fuel tank with a piece of wood (B).



9. Remove fuel tank band (RH and LH).
10. Lower transmission jack carefully to remove fuel tank while holding it by hand.
    CAUTION:
    Fuel tank may be in an unstable condition because of the shape of fuel tank bottom. Never rely on jack too much. Be sure to hold tank securely.

INSTALLATION

Note the following, and install in the reverse order of removal.

Fuel Filler Hose

• Insert fuel filler hose to the length below.

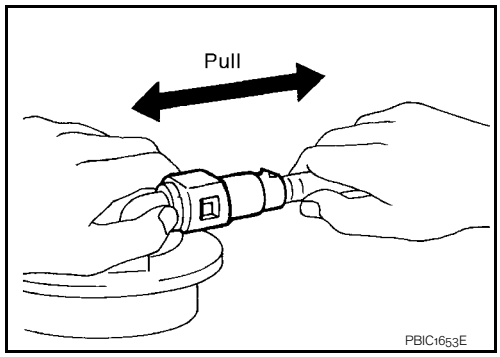
: 35 mm (1.38 in)

• Be sure hose clamp is not placed on swelled area of fuel filler tube.
• Tighten fuel filler hose clamp so that the remaining length of screw thread becomes to the following.

Fuel filler tube side : 7 - 11 mm (0.28 - 0.43 in)
Fuel tank side : 5 - 9 mm (0.20 - 0.35 in)

EVAP Hose

1. Check connections for damage or foreign material.
2. Align the matching side connection part with the center of shaft, and insert connector straight until it clicks.
3. After connecting, pull out quick connector and centralized under-floor piping by hand. Make sure connections are secure.



2WD : Inspection

INFOID:0000000000905656

cardiagn.com

INSPECTION AFTER INSTALLATION

Use the following procedure to check for fuel leaks.

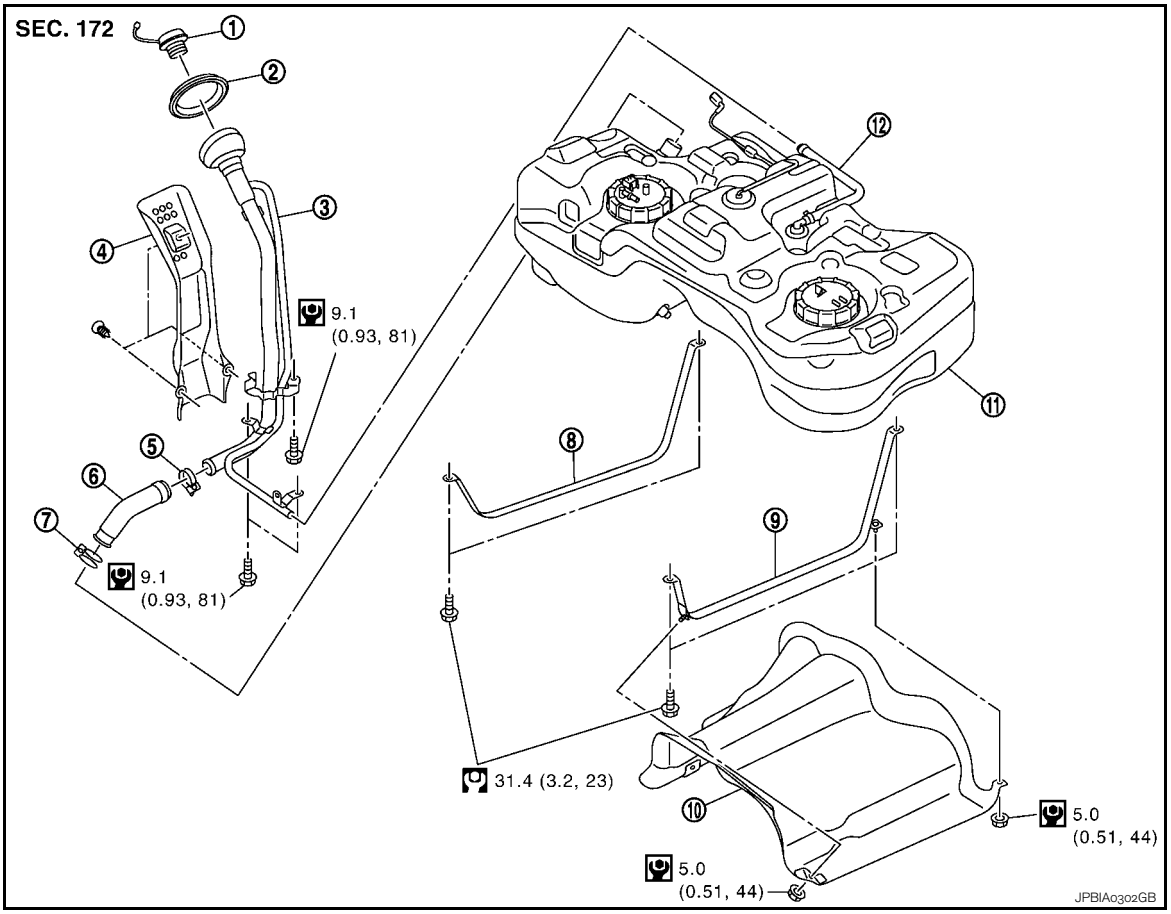
1. Turn ignition switch “ON” (with engine stopped), and check connections for leakage by applying fuel pressure to fuel piping.
2. Start engine and rev it up and make sure there are no fuel leaks at the fuel system tube and hose connections.

4WD

4WD : Exploded View

INFOID:0000000001078683

4WD



1. Fuel filler cap	2. Grommet	3. Fuel filler tube
4. Cover	5. Clamp	6. Fuel filler hose
7. Clamp	8. Fuel tank band (RH)	9. Fuel tank band (LH)
10. Protector	11. Fuel tank	12. Vent hose

Refer to GI-4, "Components" for to symbols in the figure.

4WD : Removal and Installation

INFOID:0000000001078684

REMOVAL

WARNING:

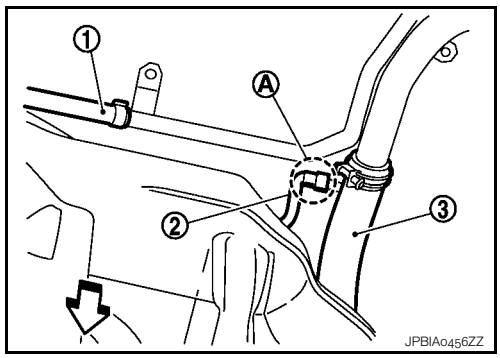
Be sure to read “General Precautions” when working on the fuel system. Refer to FL-3, "General Precautions".

1. Perform the steps 2 to 7 of “REMOVAL” in “ FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY”. Refer to FL-11, "4WD : Removal and Installation".
2. Drain fuel from fuel tank if necessary. Refer to FL-11, "4WD : Removal and Installation".

cardiagn.com

CAUTION:
- **Because fuel tank forwardly inclines and becomes unstable when installing/removing, fuel should be drained if found the remaining quantity.**
- **Situate vehicle on a flat and solid surface.**

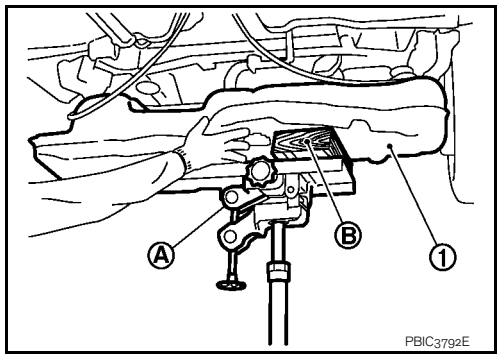
3. Remove propeller shaft. Refer to DLN-110, "Exploded View".
4. Remove main muffler. Refer to EX-10, "Exploded View".
5. Remove protector from fuel tank.
6. Remove vent hose (1) at rear side of fuel tank.



⇦: Vehicle front

7. Disconnect EVAP tube (2) at rear side of fuel tank.
   - Instruction for quick connector (A) of EVAP tube. Refer to FL-10, "4WD : Exploded View"
8. Remove fuel filler hose (3) at fuel filler tube side.

9. Support center of fuel tank (1) with transmission jack (A).
   CAUTION:
   Securely support the fuel tank with a piece of wood (B).



10. Remove fuel tank band (RH and LH).
11. Lower transmission jack carefully to remove fuel tank while holding it by hand.
    CAUTION:
    Fuel tank may be in an unstable condition because of the shape of fuel tank bottom. Never rely on jack too much. Be sure to hold tank securely.

INSTALLATION

Note the following, and install in the reverse order of removal.

Fuel Filler Hose
- Insert fuel filler hose to the length below.

: 35 mm (1.38 in)

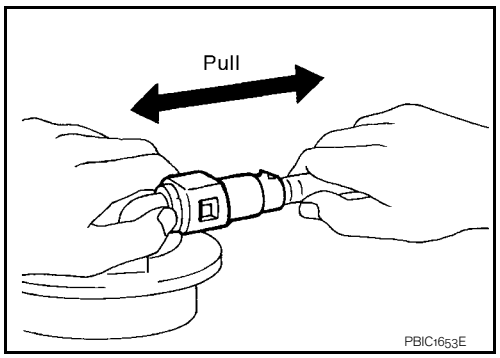
- Be sure hose clamp is not placed on swelled area of fuel filler tube.
- Tighten fuel filler hose clamp so that the remaining length of screw thread becomes to the following.

Fuel filler tube side : 7 - 11 mm (0.28 - 0.43 in)
Fuel tank side : 5 - 9 mm (0.20 - 0.35 in)

EVAP Hose

cardiagn.com

1. Check connections for damage or foreign material.
2. Align the matching side connection part with the center of shaft, and insert connector straight until it clicks.
3. After connecting, pull out quick connector and centralized underfloor piping by hand. Make sure connections are secure.



4WD : Inspection

INFOID:0000000001078685

INSPECTION AFTER INSTALLATION

Use the following procedure to check for fuel leaks.

1. Turn ignition switch “ON” (with engine stopped), and check connections for leakage by applying fuel pressure to fuel piping.
2. Start engine and rev it up and make sure there are no fuel leaks at the fuel system tube and hose connections.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Tank

INFOID:0000000000905660

Standard and Limit

Fuel tank capacity	Approximate 65 ℓ (14-1/2 Imp gal)
Fuel recommendation	Refer to GI-32

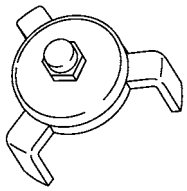
cardiagn.com

PREPARATION

PREPARATION

Special Service Tools

INFOID:0000000001062547

Tool number (RENAULT tool number) Tool name	Description
KV993G0010 (Mot. 1397) Lock ring wrench  PBIC1627E	Removing and Installing lock ring

cardiagn.com

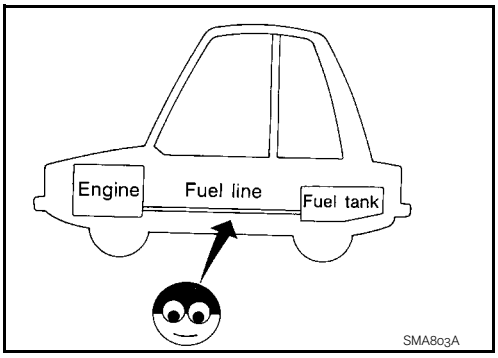
ON-VEHICLE MAINTENANCE

FUEL SYSTEM

Inspection

INFOID:0000000001062535

Inspect fuel lines and tank for improper attachment, leaks, cracks, damage, chafing and deterioration.If necessary, repair or replace.

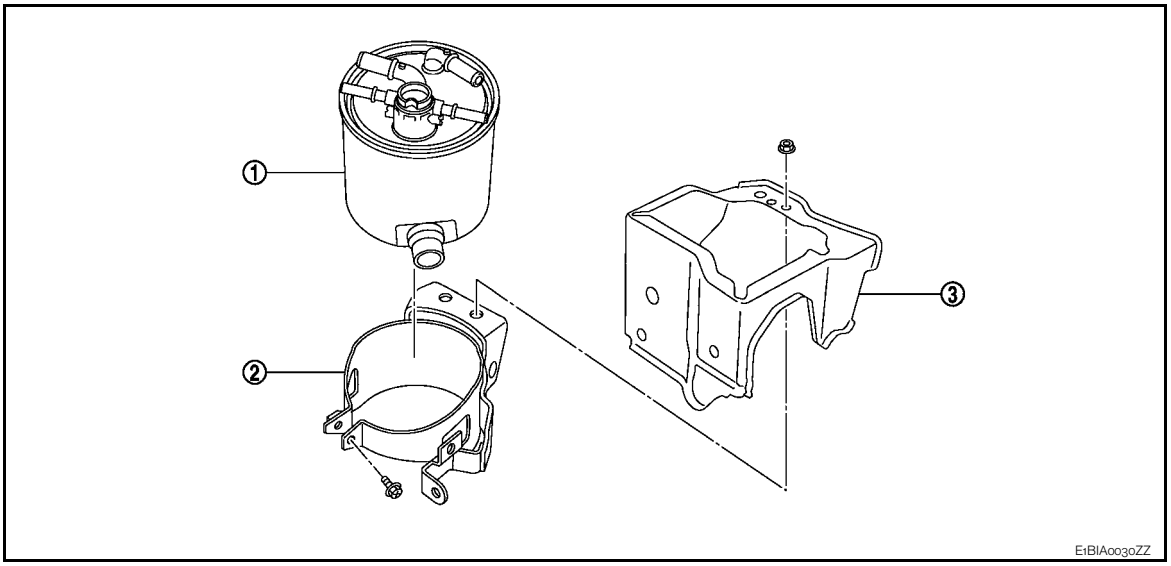


cardiagn.com

FUEL FILTER

Exploded View

INFOID:0000000001062549



1. Fuel filter
2. Fuel filter bracket
3. Fuel filter protector

Replacement

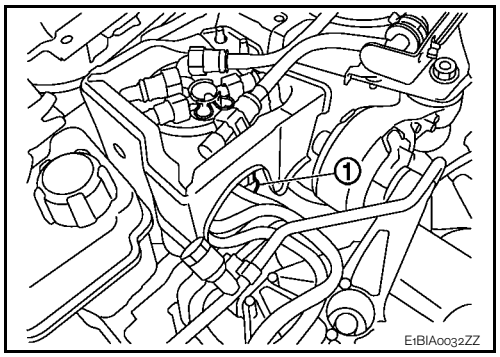
INFOID:0000000001062550

1. Remove priming bulb from priming bulb bracket.
2. Remove fuel filter from fuel filter bracket.
3. Remove quick connectors as above.
   CAUTION:
   Put a shop cloth under the drain valve, to avoid the water and fuel spill on ABS actuator. Be especially careful to prevent any damage.
4. Install in the reverse order of removal.
   - After installation, operate the priming bulb vertically, if it is possible, to perform air bleeding. Refer to FL-23, "Air Bleeding".
     CAUTION:
     Do not bend or twist the tube during installation and removal.

Water Draining

INFOID:0000000001062551

Open drain valve (1) at the bottom of fuel filter.
CAUTION:
Put a shop cloth under the drain valve, to avoid the water and fuel spill on ABS actuator.

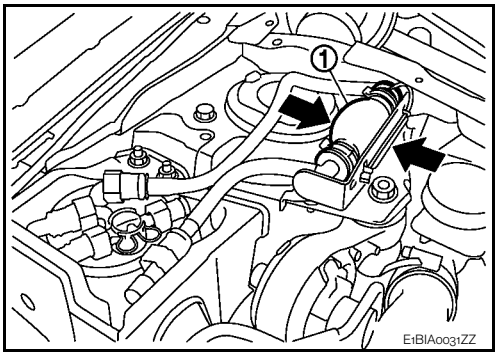


Air Bleeding

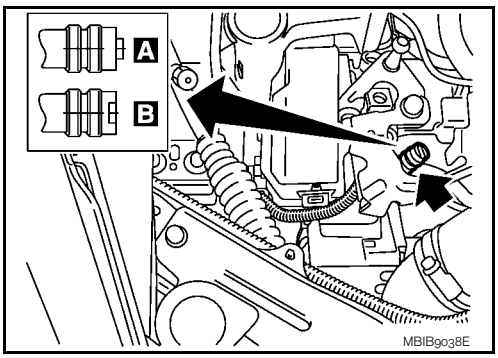
INFOID:0000000001062552

cardiagn.com

1. Prime the circuit using the priming bulb (1).
2. Perform engine cranking with repeating several times until engine starting.



3. If the engine does not start, use a flat bladed screwdriver to lift up the button on the fuel return pipe and perform engine cranking.
4. When the bleeding is completed, push the button, and check absence of leakage.
   A : Bleeding position
   B : Normal position



Inspection

INFOID:0000000001062561

INSPECTION AFTER REPLACEMENT

Check fuel filter for fuel leakage, damage and other abnormal signs.

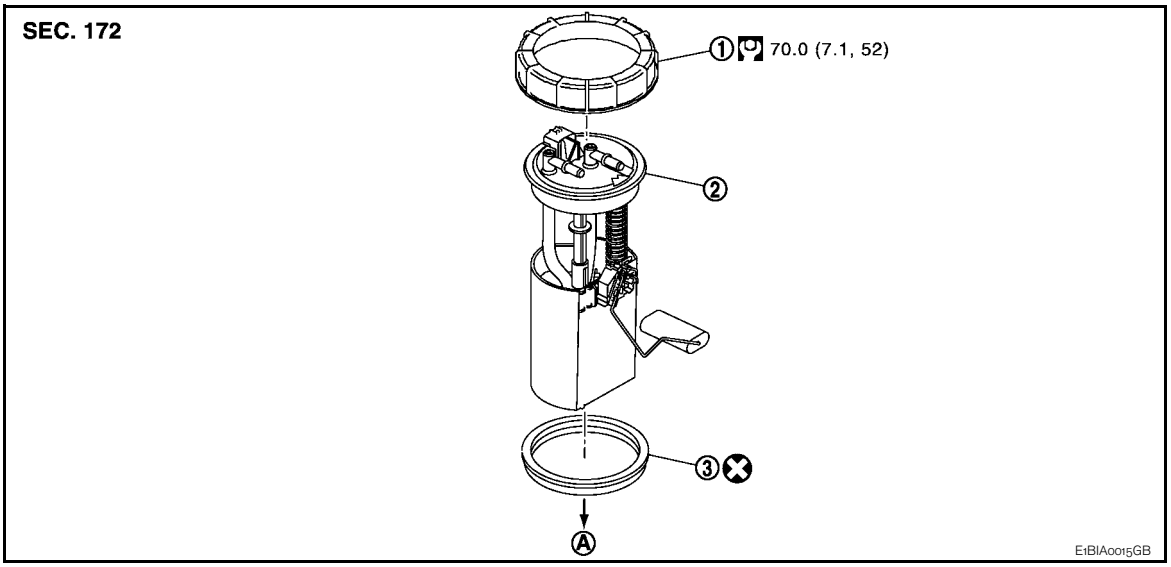
cardiagn.com

ON-VEHICLE REPAIR

FUEL LEVEL SENSOR UNIT

Exploded View

INFOID:0000000001062537



1. Rock ring
2. Fuel level sensor unit
3. Seal packing

A. To fuel tank

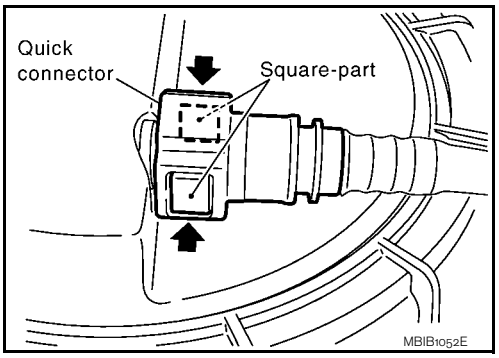
Refer to GI-4, "Components" for symbols not described on the above.

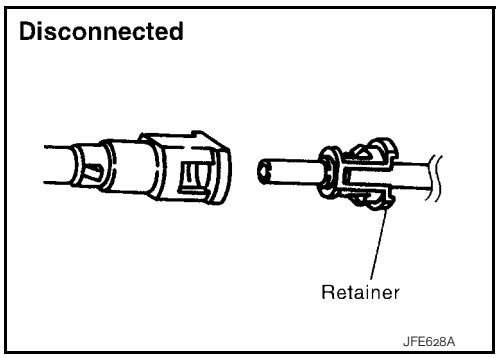
Removal and Installation

INFOID:0000000001062569

REMOVAL

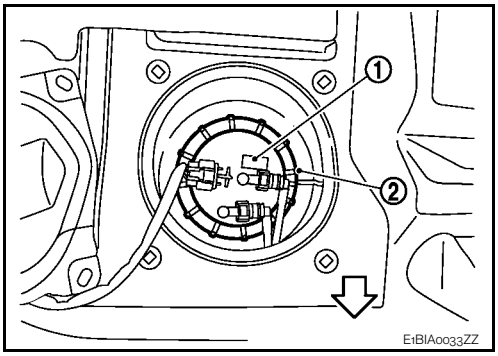
1. Disconnect battery ground cable.
2. Open fuel filler lid and filler cap to release the pressure inside the fuel tank.
3. Remove rear seat cushion. Refer to SE-31, "Removal and Installation".
4. Remove inspection hole cover under the rear seat.
5. Disconnect electrical connector.
6. Disconnect the quick connectors.
   - Hold the connector while pushing in tabs, and pull out the tube.





CAUTION:
- **The tube can be removed when the tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to remove the quick connector.**
- **Keep the resin tube away from heat. Be especially careful when welding near the tube.**
- **Prevent acid liquid such as battery electrolyte etc. from getting on the resin tube.**
- **Do not bend or twist the tube during installation and removal.**
- **Only when the tube is replaced, remove the remaining retainer.**
- **When the tube is replaced, also replace the retainer with a new one.**

7. Using lock ring wrench [SST: KV993G0010], remove lock ring (2).
   CAUTION:
   Rotate SST while pressing fuel level sensor unit as spring reaction force is applied from fuel tank inside to up ward.
8. Remove fuel level sensor unit(1).
   CAUTION:
   - **Be careful not to bend the float arm when removing.**
   - **Handle them carefully without subjecting them to impacts such as dropping.**



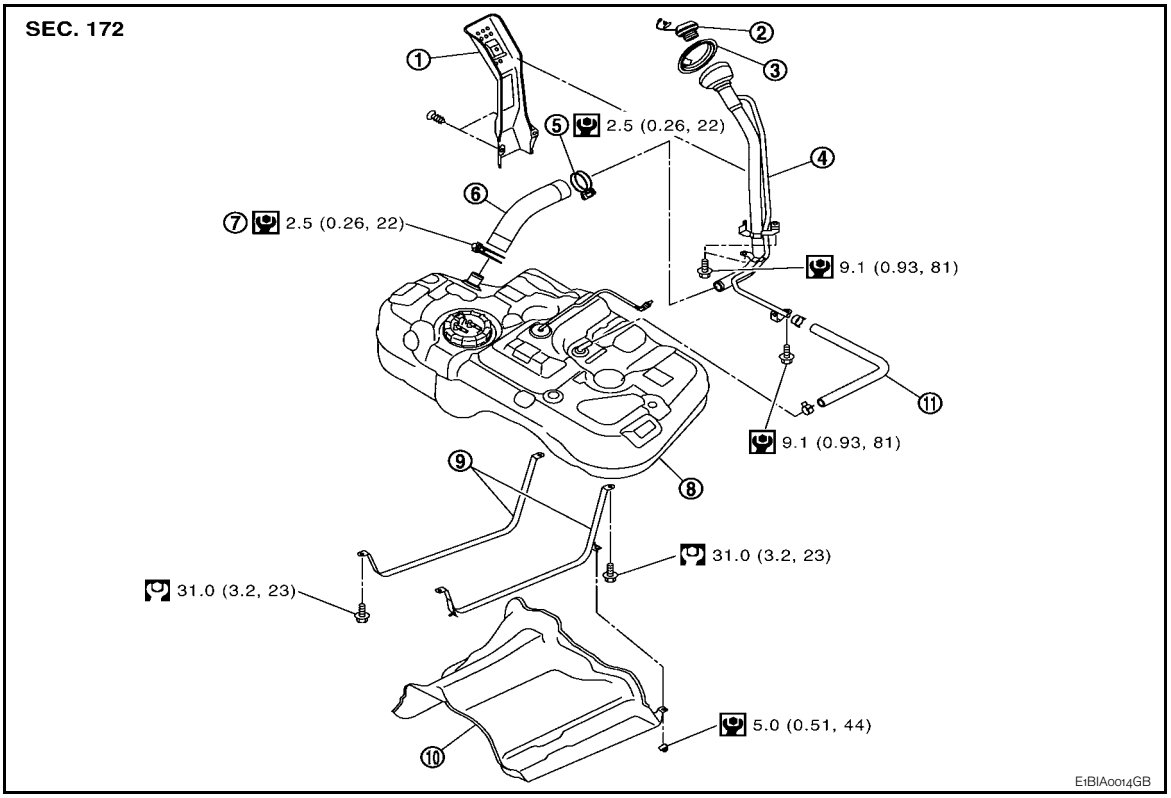
INSTALLATION
Install in the reverse order of removal.

cardiagn.com

FUEL TANK

Exploded View

INFOID:0000000001062540



1. Fuel filler tube protector
2. Fuel filler cap
3. Fuel filler cap protector
4. Fuel filler tube
5. Clamp
6. Fuel filler hose
7. Clamp
8. Fuel tank
9. Fuel tank mounting band
10. Fuel tank protector
11. Vent hose

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

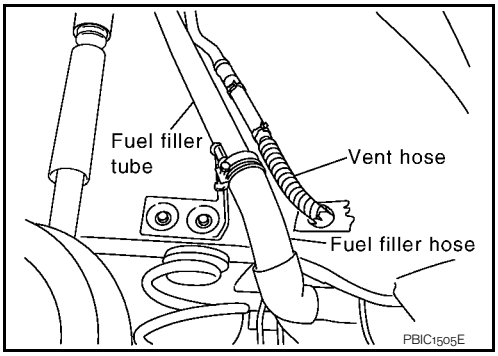
INFOID:0000000001062571

REMOVAL

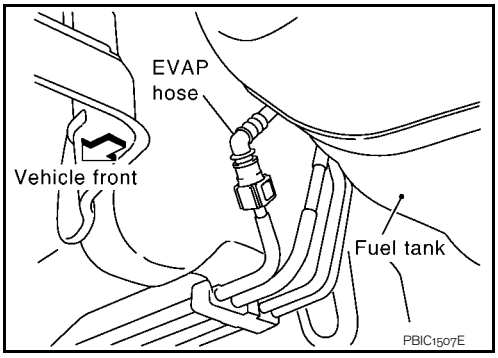
1. Remove RH rear wheel.
2. Remove fuel level sensor unit. Refer to FL-25, "Removal and Installation".
   CAUTION:
   If fuel tank bottom face is not level, and remaining fuel level is high, tank position becomes unstable, causing a danger. Drain fuel further than that in step 1 of the referenced procedure until tank can be held by hand even if the balance is lost.
3. Remove muffler. Refer to EX-15, "Removal and Installation".
4. Remove vehicle side insulator on upper center muffler and main muffler.
5. Move parking brake cable from the lower face of fuel tank. Then remove clips for parking brake cable.

cardiagn.com

6. Disconnect fuel filler hose on fuel tank side.
CAUTION:
Do not remove fuel filler hose at fuel filler tube side, preventing to interfere with suspension due to dislocation when installing. When removing at fuel filler tube side necessarily, put mating marks, and remove.

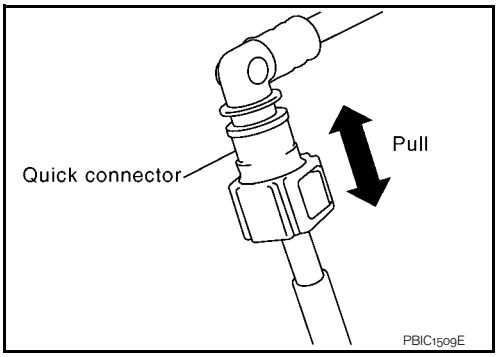


7. Remove vent hose at RH rear wheelwell side.
8. Remove EVAP hose at front side of fuel tank.



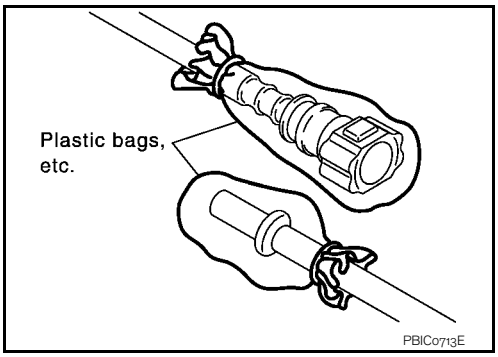
- Remove quick connector in the following procedures.
- Pinch quick connector square-parts with your fingers, and pull out the quick connector by hand.
- If quick connector and tube on vehicle are stuck, push and pull several times until they move, and pull out.

CAUTION:
- **The tube can be removed when the tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to remove the quick connector.**
- **Keep the resin tube away from heat. Be especially careful when welding near the tube.**
- **Prevent acid liquid such as battery electrolyte etc. from getting on the resin tube.**
- **Do not bend or twist the tube during installation and removal.**



- To keep clean the connecting portion and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.

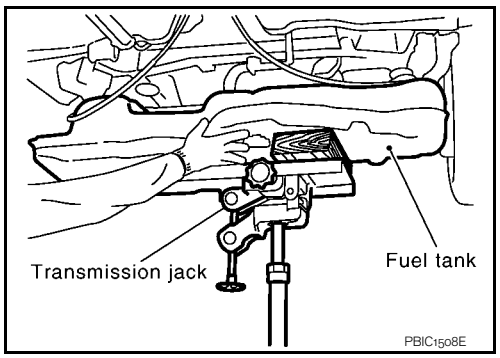
CAUTION:
Do not insert plug, preventing damage on O-ring in quick connector.



cardiagn.com

9. Support center of fuel tank with suitable transmission jack.
   CAUTION:
   Securely support the fuel tank with a piece of wood.
10. Remove RH/LH mounting band.
11. Lower suitable transmission jack carefully to remove fuel tank while holding it by hand. Perform the following works at the same time.
    - Pull out vent hose from through hole of vehicle.
    - Avoid interference with tank by pulling parking brake cable by hand.

    CAUTION:
    Tank may be in an unstable condition because of the shape of fuel tank bottom. Do not rely on jack too much. Be sure to hold tank securely.



INSTALLATION

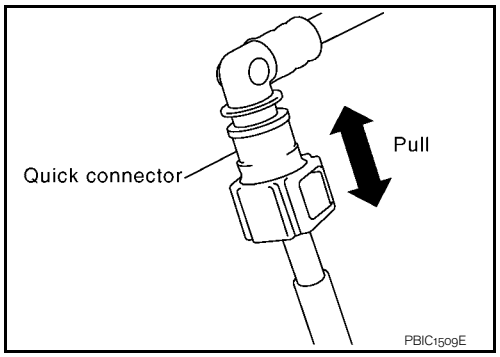
Install in the reverse order of removal which being careful of the following.

Installation of Fuel Tank Mounting Band
- Install it by referring to the identification stamp mark “R” and “L” on the end.

Installation of fuel Filler Hose
- Insert filler hose into mating side part by 35 mm (1.38 in), and secure it with clamp.
- When installing clamp, do not allow clamp to contact the bulge (bump) part of the tube.
- Tighten the clamp of filler hose to a torque of 2.5 N·m (0.26 kg-m, 22 in-lb).

Installation of EVAP Hose
- Connect quick connector in the following procedures.

1. Check connections for damage or foreign material.
2. Align the mating side connection part with the center of shaft, and insert connector straight until it clicks.
3. After connecting, pull out quick connector by hand. Make sure connections are secure.



Installation of Vent Hose
- Push vent hose into through hole of vehicle.
- Insert vent hose into vent rubber hose, and secure it with clamp.

Inspection

INFOID:0000000001062542

INSPECTION AFTER INSTALLATION

Make sure there is no fuel leakage at connections in the following procedure.
- Start engine, rev it up and make sure there is no fuel leakage at connections.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Tank

INFOID:0000000001062546

Fuel tank capacity	Approx. 65 ℓ (14-1/4 Imp gal)

cardiagn.com

SECTION GI
GENERAL INFORMATION

CONTENTS

HOW TO USE THIS MANUAL 3

HOW TO USE THIS MANUAL 3
- Description 3
- Terms 3
- Units 3
- Contents 3
- Relation between Illustrations and Descriptions 3
- Components 4

HOW TO FOLLOW TROUBLE DIAGNOSES 6
- Description 6
- How to Follow Test Groups in Trouble Diagnosis 6
- Key to Symbols Signifying Measurements or Procedures 7

HOW TO READ WIRING DIAGRAMS 9
- Connector symbols 9
- Sample/wiring diagram -example- 9
- Description 10

ABBREVIATIONS 13
- Abbreviation List 13

TIGHTENING TORQUE OF STANDARD BOLTS 14
- Description 14
- Tightening Torque Table (New Standard Included) 14

TERMINOLOGY 17
- SAE J1930 Terminology List 17

FEATURES OF NEW MODEL 21

IDENTIFICATION INFORMATION 21
- Model Variation 21
- Information About Identification or Model Code 22
- Dimensions 25
- Wheels&Tires 26

PRECAUTION 27

PRECAUTIONS 27
- Description 27
- Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 27
- Precautions For Xenon Headlamp Service 27
- Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 27
- Procedures without Cowl Top Cover 28
- General Precautions 28
- Three Way Catalyst 30
- Multiport Fuel Injection System or Engine Control System 30
- Turbocharger (If Equipped) 30
- Hoses 30
- Engine Oils 31
- Air Conditioning 32

FUEL 32
- FUEL : Unleaded Premium Gasoline 32
- FUEL : Diesel Engine Fuel 32

LIFTING POINT 33
- Commercial Service Tools 33
- Garage Jack and Safety Stand and 2-Pole Lift 33
- Board-On Lift 34

TOW TRUCK TOWING 35
- Tow Truck Towing 35
- Vehicle Recovery (Freeing a Stuck Vehicle) 36

BASIC INSPECTION 38

SERVICE INFORMATION FOR ELECTRICAL INCIDENT 38
- Work Flow 38
- Control Units and Electrical Parts 38
- Intermittent Incident 39
- Circuit Inspection 41

CONSULT-III/GST CHECKING SYSTEM 47
- Description 47
- CONSULT-III Function and System Application 47

cardiagn.com

CONSULT-III Data Link Connector (DLC) Circuit... 48
Wiring Diagram - CONSULT-III/GST CHECKING SYSTEM - .....

cardiagn.com

HOW TO USE THIS MANUAL

HOW TO USE THIS MANUAL

Description

INFOID:0000000001095944

This volume explains “Removal, Disassembly, Installation, Inspection and Adjustment” and “Trouble Diagnoses”.

Terms

INFOID:0000000001095945

- The captions **WARNING** and **CAUTION** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.
  WARNING indicates the possibility of personal injury if instructions are not followed.
  CAUTION indicates the possibility of component damage if instructions are not followed.
  BOLD TYPED STATEMENTS except **WARNING** and **CAUTION** give you helpful information.
  Standard value: Tolerance at inspection and adjustment.
  Limit value: The maximum or minimum limit value that should not be exceeded at inspection and adjustment.

Units

INFOID:0000000001095946

- The **UNITS** given in this manual are primarily expressed as the SI UNIT (International System of Unit), and alternatively expressed in the metric system and in the yard/pound system.
  Also with regard to tightening torque of bolts and nuts, there are descriptions both about range and about the standard tightening torque.

“Example”
Range

Outer Socket Lock Nut : 59 - 78 N·m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)

Standard

Drive Shaft Installation Bolt : 44.3 N·m (4.5 kg-m, 33 ft-lb)

Contents

INFOID:0000000001095947

- **ALPHABETICAL INDEX** is provided at the end of this manual so that you can rapidly find the item and page you are searching for.
- **A QUICK REFERENCE INDEX**, a black tab (e.g. BR) is provided on the first page. You can quickly find the first page of each section by matching it to the section's black tab.
- **THE CONTENTS** are listed on the first page of each section.
- **THE TITLE** is indicated on the upper portion of each page and shows the part or system.
- **THE PAGE NUMBER** of each section consists of two or three letters which designate the particular section and a number (e.g. “BR-5”).
- **THE SMALL ILLUSTRATIONS** show the important steps such as inspection, use of special tools, knacks of work and hidden or tricky steps which are not shown in the previous large illustrations.
  Assembly, inspection and adjustment procedures for the complicated units such as the automatic transaxle or transmission, etc. are presented in a step-by-step format where necessary.

Relation between Illustrations and Descriptions

INFOID:0000000001095948

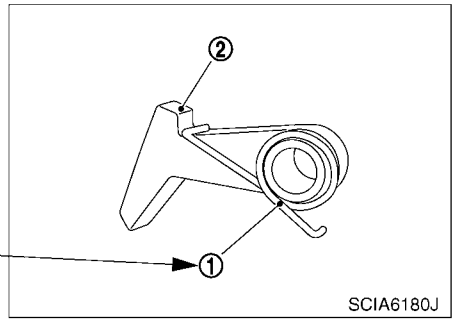
cardiagn.com

The following sample explains the relationship between the part description in an illustration, the part name in the text and the service procedures.

< Example 1 >

1. Remove return spring (1) from parking pawl (2).

The identifier number of the part name in the text is consistent with the identifier part number in the illustration.

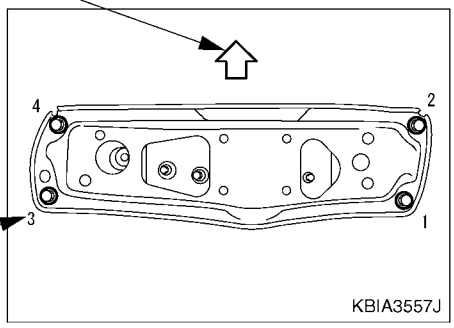


Direction mark

< Example 2 >

- : Vehicle front
- Tighten rear member mounting bolts following the numerical order shown in the illustration.
- Note : View upward

The numbers in the illustration are consistent with the service operation instructions.

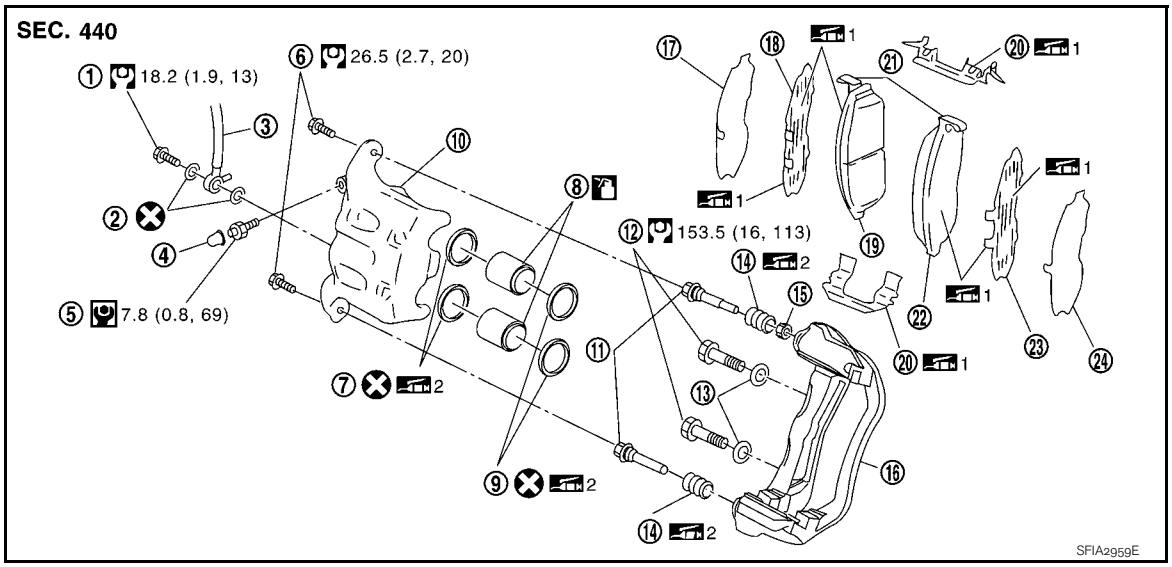


SAIA0519E

Components

INFOID:0000000001095949

- **THE LARGE ILLUSTRATIONS** are exploded views (see the following) and contain tightening torques, lubrication points, section number of the **PARTS CATALOG** (e.g. SEC. 440) and other information necessary to perform repairs.
  The illustrations should be used in reference to service matters only. When ordering parts, refer to the appropriate **PARTS CATALOG**.
  Components shown in an illustration may be identified by a circled number. When this style of illustration is used, the text description of the components will follow the illustration.



cardiagn.com

1. Union bolt
2. Copper washer
3. Brake hose
4. Cap
5. Bleed valve
6. Sliding pin bolt
7. Piston seal
8. Piston
9. Piston boot
10. Cylinder body
11. Sliding pin
12. Torque member mounting bolt
13. Washer
14. Sliding pin boot
15. Bushing
16. Torque member
17. Inner shim cover
18. Inner shim
19. Inner pad
20. Pad retainer
21. Pad wear sensor
22. Outer pad
23. Outer shim
24. Outer shim cover

1: PBC (Poly Butyl Cuprysil) grease or silicone-based grease
2: Rubber grease
: Brake fluid

Refer to GI section for additional symbol definitions.

SYMBOLS

SYMBOL	DESCRIPTION		SYMBOL	DESCRIPTION
	Tightening torque The tightening torque specifications of bolts and nuts may be presented as either a range or a standard tightening torque.	: N•m (kg-m, ft-lb)		Always replace after every disassembly.
		: N•m (kg-m, in-lb)		Apply petroleum jelly.
	Should be lubricated with grease. Unless otherwise indicated, use recommended multi-purpose grease.			Apply molybdenum added petroleum jelly.
	Should be lubricated with oil.		ATF	Apply ATF.
	Sealing point		★	Select with proper thickness.
	Sealing point with locking sealant.		☆	Adjustment is required.
	Checking point			

SAIA0749E

cardiagn.com

HOW TO FOLLOW TROUBLE DIAGNOSES

Description

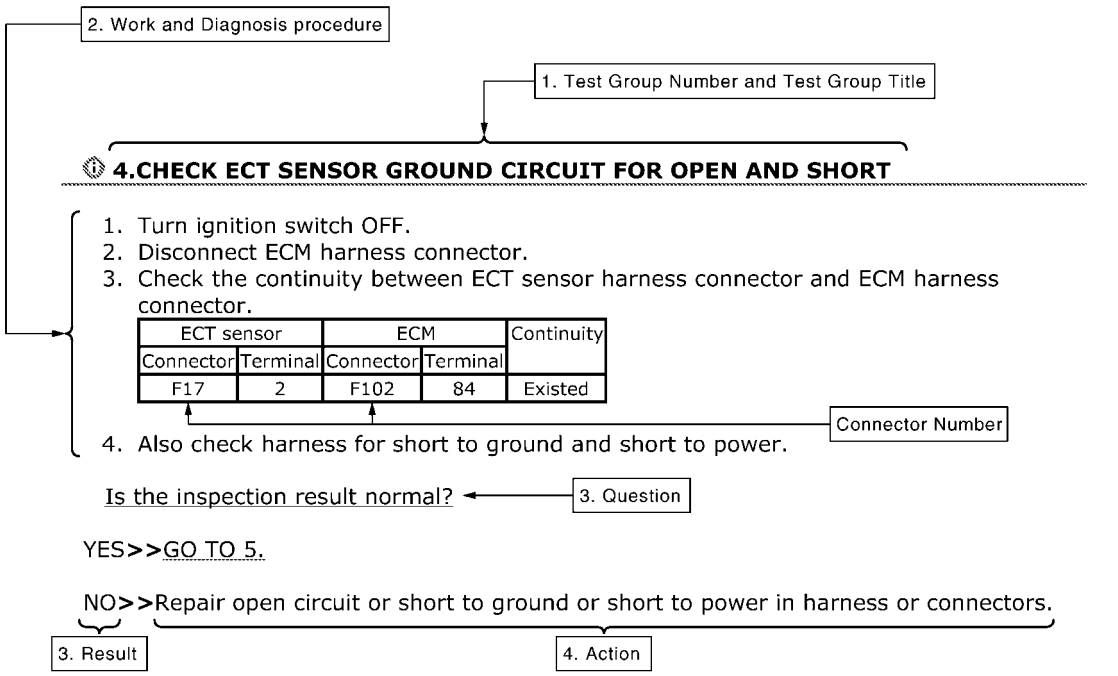
INFOID:0000000001095950

NOTICE:
Trouble diagnoses indicate work procedures required to diagnose problems effectively. Observe the following instructions before diagnosing.

- Before performing trouble diagnoses, read the “Work Flow” in each section.
- After repairs, re-check that the problem has been completely eliminated.
- Refer to Component Parts and Harness Connector Location for the Systems described in each section for identification/location of components and harness connectors.
- When checking circuit continuity, ignition switch should be OFF.
- Refer to the Circuit Diagram for quick pinpoint check.
  If you need to check circuit continuity between harness connectors in more detail, such as when a sub-harness is used, refer to Wiring Diagram in each individual section and Harness Layout in PG section for identification of harness connectors.
- Before checking voltage at connectors, check battery voltage.
- After accomplishing the Diagnosis Procedures and Electrical Components Inspection, make sure that all harness connectors are reconnected as they were.

How to Follow Test Groups in Trouble Diagnosis

INFOID:0000000001095951



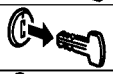
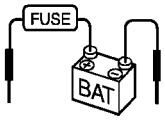
JPAIA0021GB

1. Test group number and test group title
   - Test group number and test group title are shown in the upper portion of each test group.
2. Work and diagnosis procedure
   - Start to diagnose a problem using procedures indicated in enclosed test groups.
3. Questions and results
   - Questions and required results are indicated in test group.
4. Action
   - Next action for each test group is indicated based on result of each question.

cardiagn.com

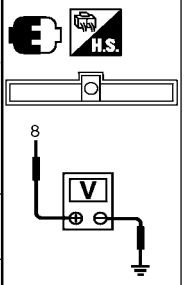
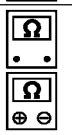
Key to Symbols Signifying Measurements or Procedures

INFOID:0000000001095952

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Check after disconnecting the connector to be measured.		Procedure with Generic Scan Tool. (GST, OBD-II scan tool)
	Check after connecting the connector to be measured.		Procedure without CONSULT-II, CONSULT-III or GST
	Insert key into ignition switch.		A/C switch is "OFF".
	Remove key from ignition switch.		A/C switch is "ON".
	Insert and remove key repeatedly.		REC switch is "ON".
	Turn ignition switch to "OFF" position.		REC switch is "OFF".
	Turn ignition switch to "ACC" position.		Fan switch is "ON". (At any position except for "OFF" position)
	Turn ignition switch to "ON" position.		Fan switch is "OFF".
	Turn ignition switch to "START" position.	FUSE	Apply fuse.
	Turn ignition switch from "OFF" to "ACC" position.		Apply positive voltage from battery with fuse directly to components.
	Turn ignition switch from "ACC" to "ON" position.		
	Turn ignition switch from "ACC" to "OFF" position.		

SAIA1539E

cardiagn.com

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Turn ignition switch from "OFF" to "ON" position.		Drive vehicle.
	Turn ignition switch from "ON" to "OFF" position.		
	Do not start engine, or check with engine stopped.		Disconnect battery negative cable.
	Start engine, or check with engine running.		Depress brake pedal.
	Apply parking brake.		Release brake pedal.
	Release parking brake.		Depress accelerator pedal.
	Check after engine is warmed up sufficiently.		Release accelerator pedal.
	Votage should be measured with a voltmeter.		Pin terminal check for SMJ type ECM or TCM connectors. **For details regarding the terminal arrangement, refer to the "ELECTRICAL UNITS" electrical reference page at the end of the manual.**
	Circuit resistance should be measured with an ohmmeter.		
	Current should be measured with an ammeter.		
	Pulse signal should be checked with an oscilloscope.		
	Procedure with CONSULT-III		
	Procedure without CONSULT-III		
	Place selector lever in "P" position.		
	Place selector lever in "N" position.		
	Jack up front portion.		
	Jack up rear portion.		
	Inspect under engine room.		
	Inspect under floor.		
	Inspect rear under floor.		

SAIA1540E

cardiagn.com

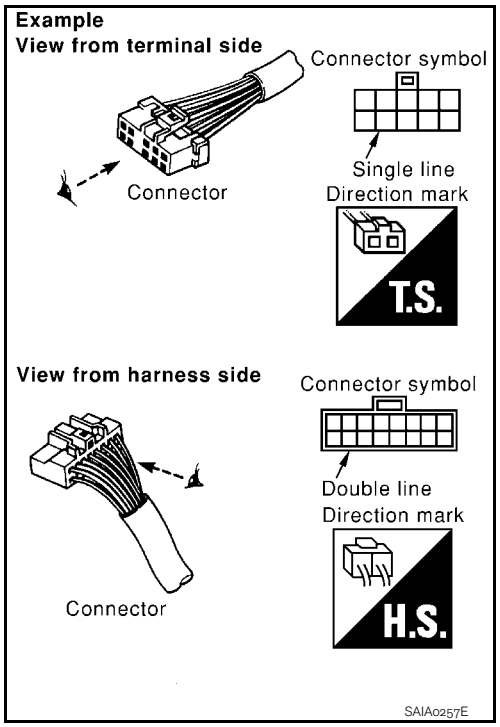
HOW TO READ WIRING DIAGRAMS

Connector symbols

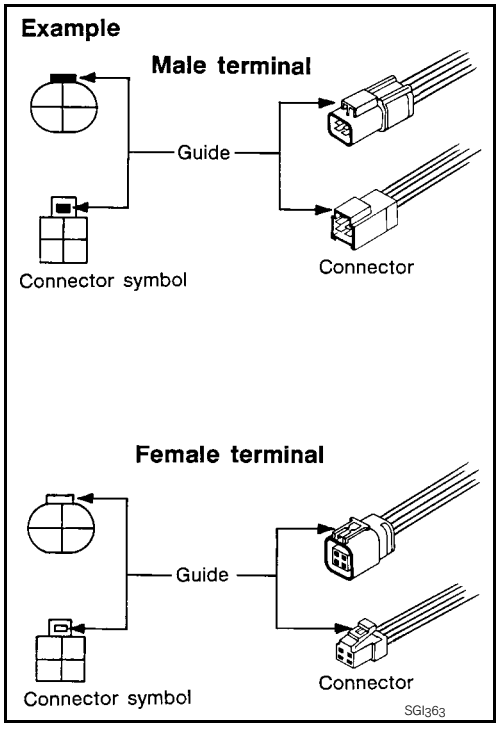
INFOID:0000000001095953

Most of connector symbols in wiring diagrams are shown from the terminal side.

- Connector symbols shown from the terminal side are enclosed by a single line and followed by the direction mark.
- Connector symbols shown from the harness side are enclosed by a double line and followed by the direction mark.
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG section, “Description”, “HARNESS CONNECTOR”.



- Male and female terminals
  Connector guides for male terminals are shown in black and female terminals in white in wiring diagrams.



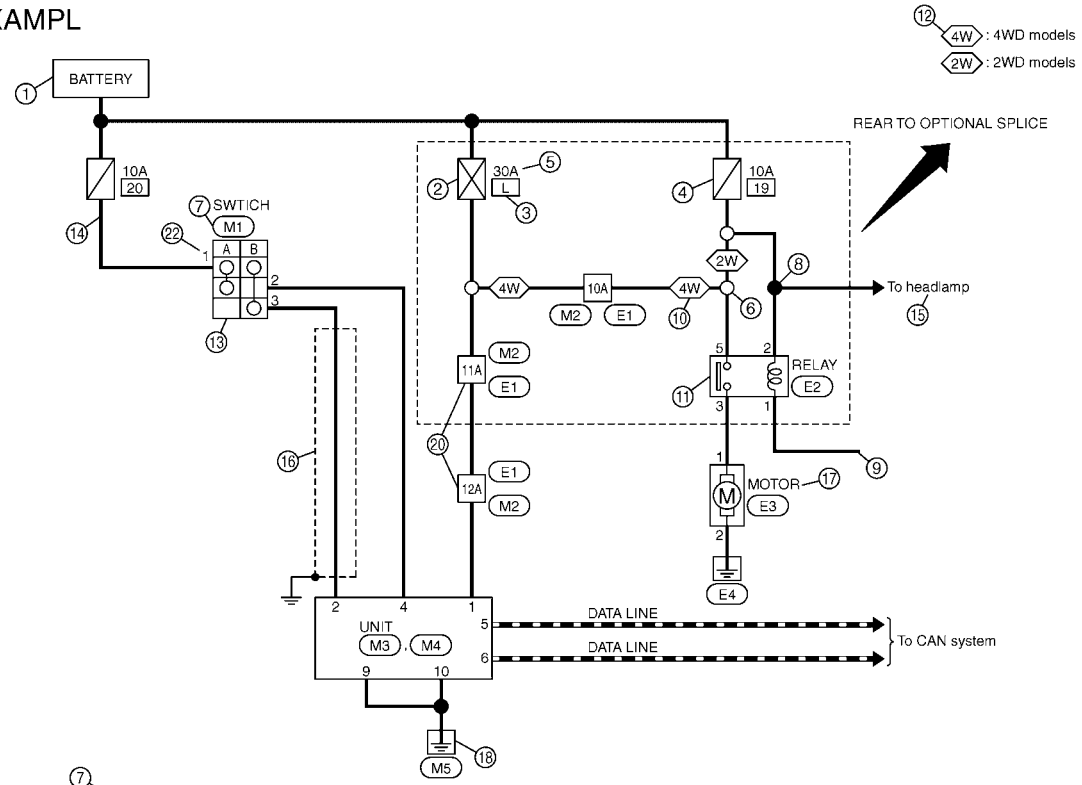
Sample/wiring diagram -example-

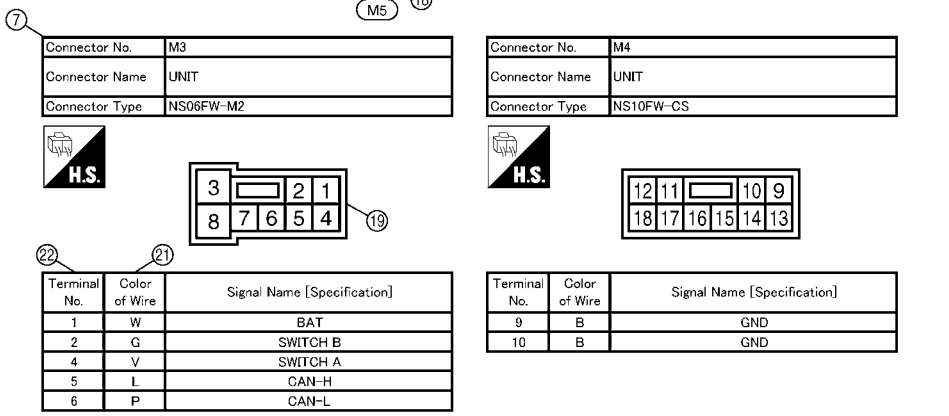
INFOID:0000000001095954

cardiagn.com

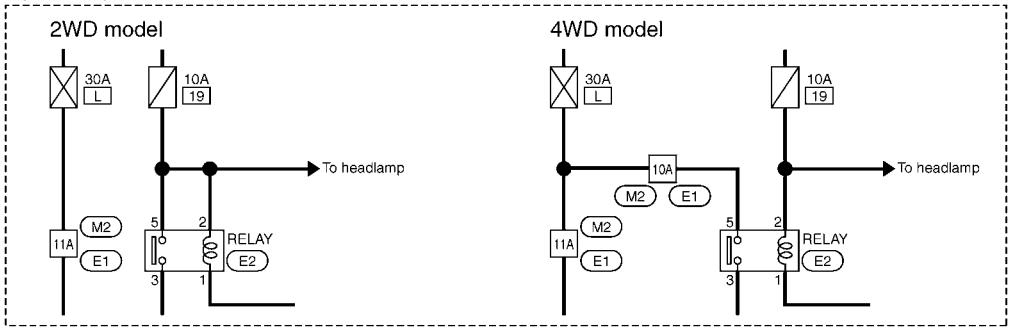
- For detail, refer to following GI-10, "Description".

EXAMPL





Optional splice



JCAWA0005GB

Description

INFOID:0000000001095955

Number	Item	Description
1	Power supply	• This means the power supply of fusible link or fuse.
2	Fusible link	• “X” means the fusible link.

cardiagn.com

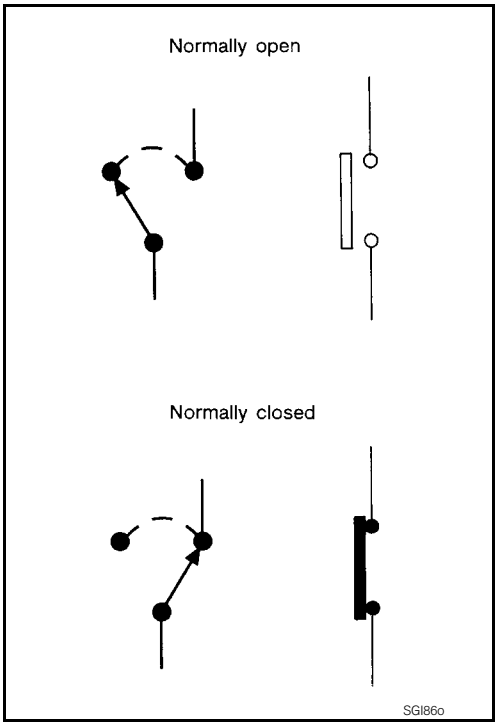
Number	Item	Description
3	Number of fusible link/ fuse	• This means the number of fusible link or fuse location.
4	Fuse	• "/" means the fuse.
5	Current rating of fusible link/fuse	• This means the current rating of the fusible link or fuse.
6	Optional splice	• The open circle shows that the splice is optional depending on vehicle application.
7	Connector number	• The letter shows which harness the connector is located in. • Example "M": main harness. For detail and to locate the connector, refer to PG-73, "LHD : How To Read Harness Layout", PG-75, "LHD : Main Harness".
8	Splice	• The shaded circle "●" means the splice.
9	Page crossing	• This circuit continues to an adjacent page.
10	Option abbreviation	• This means the vehicle specifications which layouts the circuit between "○".
11	Relay	• This shows an internal representation of the relay.
12	Option description	• This shows a description of the option abbreviation used on the page.
13	Switch	• This shows that continuity exists between terminals 1 and 2 when the switch is in the A position. Continuity exists between terminals 1 and 3 when the switch is in the B position.
14	Circuit (Wiring)	• This means the wiring.
15	System branch	• This shows that the circuit is branched to other systems.
16	Shielded line	• The line enclosed by broken line circle shows shield wire.
17	Component name	• This shows the name of a component.
18	Ground (GND)	• This shows the ground connection.
19	Connector	• This means the connector information. • This unit-side is described by the connector symbols.
20	Connectors	• This means that a transmission line bypasses two connectors or more.
21	Wire color	• This shows a code for the color of the wire. B = Black W = White R = Red G = Green L = Blue Y = Yellow LG = Light Green BR = Brown OR or O = Orange P = Pink PU or V (Violet) = Purple GY or GR = Gray SB = Sky Blue CH = Dark Brown DG = Dark Green • When the wire color is striped, the base color is given first, followed by the stripe color as shown below: Example: L/W = Blue with White Stripe
22	Terminal number	• This means the terminal number of a connector.

SWITCH POSITIONS

Switches are shown in wiring diagrams as if the vehicle is in the "normal" condition.
A vehicle is in the "normal" condition when:

cardiagn.com

- ignition switch is “OFF”,
- doors, hood and trunk lid/back door are closed,
- pedals are not depressed, and
- parking brake is released.



MULTIPLE SWITCH

The continuity of multiple switch is described in two ways as shown below.

- The switch chart is used in schematic diagrams.
- The switch diagram is used in wiring diagrams.

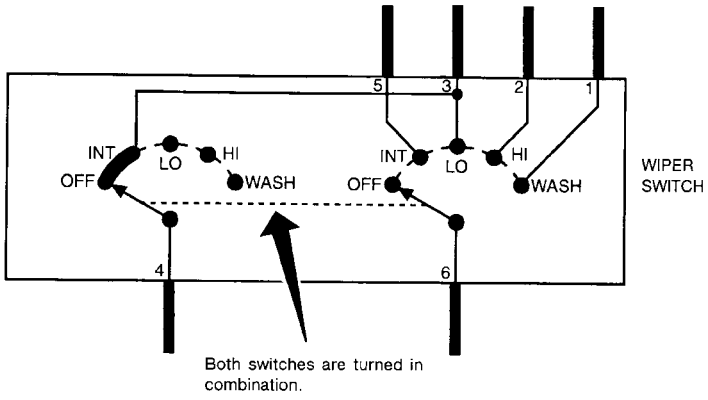
Example

(SWITCH CHART)

WIPER SWITCH

	OFF	INT	LO	HI	WASH
1					○
2				○	
3	○	○	○		
4	○	○			
5		○			
6		○	○	○	○

(SWITCH DIAGRAM)



Continuity circuit of wiper switch

SWITCH POSITION	CONTINUITY CIRCUIT
OFF	3 - 4
INT	3 - 4, 5 - 6
LO	3 - 6
HI	2 - 6
WASH	1 - 6

JSAIA0017GB

cardiagn.com

ABBREVIATIONS

Abbreviation List

INFOID:0000000001095956

The following **ABBREVIATIONS** are used:

ABBREVIATION	DESCRIPTION
A/C	Air Conditioner
A/T	Automatic Transaxle/Transmission
ATF	Automatic Transmission Fluid
D_1	Drive range 1st gear
D_2	Drive range 2nd gear
D_3	Drive range 3rd gear
D_4	Drive range 4th gear
FR, RR	Front, Rear
LH, RH	Left-Hand, Right-Hand
M/T	Manual Transaxle/Transmission
OD	Overdrive
P/S	Power Steering
SAE	Society of Automotive Engineers, Inc.
SDS	Service Data and Specifications
SST	Special Service Tools
2WD	2-Wheel Drive
2_2	2nd range 2nd gear
2_1	2nd range 1st gear
1_2	1st range 2nd gear
1_1	1st range 1st gear

cardiagn.com

TIGHTENING TORQUE OF STANDARD BOLTS

Description

INFOID:0000000001095988

This vehicle has both new standard based on ISO* and previous standard bolts/nuts. There are some differences between these two types of bolts/ nuts; shape of the head, grade of strength, hexagonal width across flats and the standard tightening torque.

- For guidance in discriminating, refer to GI-14, "Tightening Torque Table (New Standard Included)".
- The new standard machine screws and tapping screws have a head of ISO standard torx recess.
- If the tightening torque is not described in the description or figure, refer to GI-14, "Tightening Torque Table (New Standard Included)".

*ISO: International Organization for Standardization

Tightening Torque Table (New Standard Included)

INFOID:0000000001095957

CAUTION:

- **The special parts are excluded.**
- **The bolts/nuts in these tables have a strength (discrimination) number/symbol assigned to the head or the like. As to the relation between the strength grade in these tables and the strength (discrimination) number/symbol, refer to “DISCRIMINATION OF BOLTS AND NUTS”.**

PREVIOUS STANDARD

Grade (Strength grade)	Bolt size	Bolt diameter mm	Hexagonal width across flats mm	Pitch mm	Tightening torque (Without lubricant)							
					Hexagon head bolt				Hexagon flange bolt			
					N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4T	M6	6.0	10	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	12	1.25	13.5	1.4	10	—	17	1.7	13	—
				1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	14	1.5	28	2.9	21	—	35	3.6	26	—
				1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	17	1.75	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	19	1.5	80	8.2	59	—	100	10	74	—
7T	M6	6.0	10	1.0	9	0.92	7	80	11	1.1	8	97
	M8	8.0	12	1.25	22	2.2	16	—	28	2.9	21	—
				1.0	22	2.2	16	—	28	2.9	21	—
	M10	10.0	14	1.5	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	55	5.6	41	—
	M12	12.0	17	1.75	80	8.2	59	—	100	10	74	—
				1.25	80	8.2	59	—	100	10	74	—
	M14	14.0	19	1.5	130	13	96	—	170	17	125	—
9T	M6	6.0	10	1.0	11	1.1	8	—	13.5	1.4	10	—
	M8	8.0	12	1.25	28	2.9	21	—	35	3.6	26	—
				1.0	28	2.9	21	—	35	3.6	26	—
	M10	10.0	14	1.5	55	5.6	41	—	80	8.2	59	—
				1.25	55	5.6	41	—	80	8.2	59	—
	M12	12.0	17	1.75	100	10	74	—	130	13	96	—
				1.25	100	10	74	—	130	13	96	—
	M14	14.0	19	1.5	170	17	125	—	210	21	155	—

CAUTION:

cardiagn.com

TIGHTENING TORQUE OF STANDARD BOLTS

The parts with aluminum or the cast iron washer surface/screw surface are excluded.

NEW STANDARD BASED ON ISO

Grade (Strength grade)	Bolt size	Bolt diameter mm	Hexagonal width across flats mm	Pitch mm	Tightening torque							
					Hexagon head bolt				Hexagon flange bolt			
					N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4.8 (Without lubricant)	M6	6.0	10	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	13	1.25	13.5	1.4	10	—	17	1.7	13	—
				1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	16	1.5	28	2.9	21	—	35	3.6	26	—
				1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	18	1.75	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	21	1.5	80	8.2	59	—	100	10	74	—
4.8 (With lubricant)	M6	6.0	10	1.0	4	0.41	3	35	5.5	0.56	4	49
	M8	8.0	13	1.25	11	1.1	8	—	13.5	1.4	10	—
				1.0	11	1.1	8	—	13.5	1.4	10	—
	M10	10.0	16	1.5	22	2.2	16	—	28	2.9	21	—
				1.25	22	2.2	16	—	28	2.9	21	—
	M12	12.0	18	1.75	35	3.6	26	—	45	4.6	33	—
				1.25	35	3.6	26	—	45	4.6	33	—
	M14	14.0	21	1.5	65	6.6	48	—	80	8.2	59	—
8.8 (With lubricant)	M6	6.0	10	1.0	8	0.82	6	71	10	1.0	7	89
	M8	8.0	13	1.25	21	2.1	15	—	25	2.6	18	—
				1.0	21	2.1	15	—	25	2.6	18	—
	M10	10.0	16	1.5	40	4.1	30	—	50	5.1	37	—
				1.25	40	4.1	30	—	50	5.1	37	—
	M12	12.0	18	1.75	70	7.1	52	—	85	8.7	63	—
				1.25	70	7.1	52	—	85	8.7	63	—
	M14	14.0	21	1.5	120	12	89	—	140	14	103	—
10.9 (With lubricant)	M6	6.0	10	1.0	10	1.0	7	89	12	1.2	9	106
	M8	8.0	13	1.25	27	2.8	20	—	32	3.3	24	—
				1.0	27	2.8	20	—	32	3.3	24	—
	M10	10.0	16	1.5	55	5.6	41	—	62	6.3	46	—
				1.25	55	5.6	41	—	62	6.3	46	—
	M12	12.0	18	1.75	95	9.7	70	—	105	11	77	—
				1.25	95	9.7	70	—	105	11	77	—
	M14	14.0	21	1.5	160	16	118	—	180	18	133	—

CAUTION:

1. **Use tightening torque with lubricant for the new standard bolts/nuts in principle. Friction coefficient stabilizer is applied to the new standard bolts/nuts.**
2. **However, use tightening torque without lubricant for the following cases. Friction coefficient stabilizer is not applied to the following bolts/nuts.**

- **Grade 4.8, M6 size bolt, Conical spring washer installed**
- **Paint removing nut (Size M6 and M8) for fixing with weld bolt**

cardiagn.com

DISCRIMINATION OF BOLTS AND NUTS

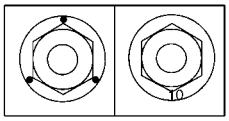
BOLTS

	Grade (Strength)	Discrimination	
Previous standard	4T ($392N/mm^2$)	4	(No number/ symbol)
	7T ($686N/mm^2$)	7	
	9T ($883N/mm^2$)	9	
New Standard	4.8 ($420N/mm^2$)	4.8	(No number/ symbol)
	8.8 ($800N/mm^2$)	8.8	
	10.9 ($1040N/mm^2$)	10.9	

NUTS

	Grade (Proof load stress)	Discrimination		
Previous standard	7N ($686N/mm^2$)	(No number/ symbol)		
	9N ($883N/mm^2$)	9		
New Standard	8 ($800N/mm^2$)	8		(No number/ symbol)
	10 ($1040N/mm^2$)	10		

NOTICE:
- A number is assigned on the side of the nuts in some cases.
- A number or symbol is assigned on the upper surface of the flange for the nut with flange.



MACHINE SCREWS AND TAPPING SCREWS

Shape of the head :
Cross recess for the previous standard
Torx recess for the new standard

Screw size	Screw diameter	Torx size
M4	4.0	T20
M5	5.0	T20
M6	6.0	T30

NOTICE:
Use torx size T20 (united with M4 screw) for M5 screw although ISO standard specifies T25.

SAIAo453E

cardiagn.com

TERMINOLOGY

SAE J1930 Terminology List

INFOID:0000000001095958

All emission related terms used in this publication in accordance with SAE J1930 are listed. Accordingly, new terms, new acronyms/abbreviations and old terms are listed in the following chart.

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Air cleaner	ACL	Air cleaner
Barometric pressure	BARO	***
Barometric pressure sensor-BCDD	BAROS-BCDD	BCDD
Camshaft position	CMP	***
Camshaft position sensor	CMPS	Crank angle sensor
Canister	***	Canister
Carburetor	CARB	Carburetor
Charge air cooler	CAC	Intercooler
Closed loop	CL	Closed loop
Closed throttle position switch	CTP switch	Idle switch
Clutch pedal position switch	CPP switch	Clutch switch
Continuous fuel injection system	CFI system	***
Continuous trap oxidizer system	CTOX system	***
Crankshaft position	CKP	***
Crankshaft position sensor	CKPS	***
Data link connector	DLC	***
Diagnostic test mode	DTM	Diagnostic mode
Diagnostic test mode selector	DTM selector	Diagnostic mode selector
Diagnostic test mode I	DTM I	Mode I
Diagnostic test mode II	DTM II	Mode II
Diagnostic trouble code	DTC	Malfunction code
Direct fuel injection system	DFI system	***
Distributor ignition system	DI system	Ignition timing control
Early fuel evaporation-mixture heater	EFE-mixture heater	Mixture heater
Early fuel evaporation system	EFE system	Mixture heater control
Electrically erasable programmable read only memory	EEPROM	***
Electronic ignition system	EI system	Ignition timing control
Engine control	EC	***
Engine control module	ECM	ECCS control unit
Engine coolant temperature	ECT	Engine temperature
Engine coolant temperature sensor	ECTS	Engine temperature sensor
Engine modification	EM	***
Engine speed	RPM	Engine speed
Erasable programmable read only memory	EPROM	***
Evaporative emission canister	EVAP canister	Canister
Evaporative emission system	EVAP system	Canister control solenoid valve
Exhaust gas recirculation valve	EGR valve	EGR valve

cardiagn.com

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Exhaust gas recirculation control-BPT valve	EGRC-BPT valve	BPT valve
Exhaust gas recirculation control-solenoid valve	EGRC-solenoid valve	EGR control solenoid valve
Exhaust gas recirculation temperature sensor	EGRT sensor	Exhaust gas temperature sensor
EGR temperature sensor		
Flash electrically erasable programmable read only memory	FEEPROM	***
Flash erasable programmable read only memory	FEPROM	***
Flexible fuel sensor	FFS	***
Flexible fuel system	FF system	***
Fuel pressure regulator	***	Pressure regulator
Fuel pressure regulator control solenoid valve	***	PRVR control solenoid valve
Fuel trim	FT	***
Heated Oxygen sensor	HO2S	Exhaust gas sensor
Idle air control system	IAC system	Idle speed control
Idle air control valve-air regulator	IACV-air regulator	Air regulator
Idle air control valve-auxiliary air control valve	IACV-AAC valve	Auxiliary air control (AAC) valve
Idle air control valve-FICD solenoid valve	IACV-FICD solenoid valve	FICD solenoid valve
Idle air control valve-idle up control solenoid valve	IACV-idle up control solenoid valve	Idle up control solenoid valve
Idle speed control-FI pot	ISC-FI pot	FI pot
Idle speed control system	ISC system	***
Ignition control	IC	***
Ignition control module	ICM	***
Indirect fuel injection system	IFI system	***
Intake air	IA	Air
Intake air temperature sensor	IAT sensor	Air temperature sensor
Knock	***	Detonation
Knock sensor	KS	Detonation sensor
Malfunction indicator lamp	MIL	Check engine light
Manifold absolute pressure	MAP	***
Manifold absolute pressure sensor	MAPS	***
Manifold differential pressure	MDP	***
Manifold differential pressure sensor	MDPS	***
Manifold surface temperature	MST	***
Manifold surface temperature sensor	MSTS	***
Manifold vacuum zone	MVZ	***
Manifold vacuum zone sensor	MVZS	***
Mass air flow sensor	MAFS	Air flow meter
Mixture control solenoid valve	MC solenoid valve	Air-fuel ratio control solenoid valve
Multiport fuel injection System	MFI system	Fuel injection control

cardiagn.com

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Nonvolatile random access memory	NVRAM	***
On board diagnostic system	OBD system	Self-diagnosis
Open loop	OL	Open loop
Oxidation catalyst	OC	Catalyst
Oxidation catalytic converter system	OC system	***
Oxygen sensor	O2S	Exhaust gas sensor
Park position switch	***	Park switch
Park/neutral position switch	PNP switch	Park/neutral switch Inhibitor switch Neutral position switch
Periodic trap oxidizer system	PTOX system	***
Positive crankcase ventilation	PCV	Positive crankcase ventilation
Positive crankcase ventilation valve	PCV valve	PCV valve
Powertrain control module	PCM	***
Programmable read only memory	PROM	***
Pulsed secondary air injection control solenoid valve	PAIRC solenoid valve	AIV control solenoid valve
Pulsed secondary air injection system	PAIR system	Air induction valve (AIV) control
Pulsed secondary air injection valve	PAIR valve	Air induction valve
Random access memory	RAM	***
Read only memory	ROM	***
Scan tool	ST	***
Secondary air injection pump	AIR pump	***
Secondary air injection system	AIR system	***
Sequential multiport fuel injection system	SFI system	Sequential fuel injection
Service reminder indicator	SRI	***
Simultaneous multiport fuel injection system	***	Simultaneous fuel injection
Smoke puff limiter system	SPL system	***
Supercharger	SC	***
Supercharger bypass	SCB	***
System readiness test	SRT	***
Thermal vacuum valve	TVV	Thermal vacuum valve
Three way catalyst	TWC	Catalyst
Three way catalytic converter system	TWC system	***
Three way + oxidation catalyst	TWC + OC	Catalyst
Three way + oxidation catalytic converter system	TWC + OC system	***
Throttle body	TB	Throttle chamber SPI body
Throttle body fuel injection system	TBI system	Fuel injection control
Throttle position	TP	Throttle position
Throttle position sensor	TPS	Throttle sensor
Throttle position switch	TP switch	Throttle switch
Torque converter clutch solenoid valve	TCC solenoid valve	Lock-up cancel solenoid Lock-up solenoid

cardiagn.com

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Transmission control module	TCM	A/T control unit
Turbocharger	TC	Turbocharger
Vehicle speed sensor	VSS	Vehicle speed sensor
Volume air flow sensor	VAFS	Air flow meter
Warm up oxidation catalyst	WU-OC	Catalyst
Warm up oxidation catalytic converter system	WU-OC system	***
Warm up three way catalyst	WU-TWC	Catalyst
Warm up three way catalytic converter system	WU-TWC system	***
Wide open throttle position switch	WOTP switch	Full switch

***: Not applicable

cardiagn.com

FEATURES OF NEW MODEL

IDENTIFICATION INFORMATION

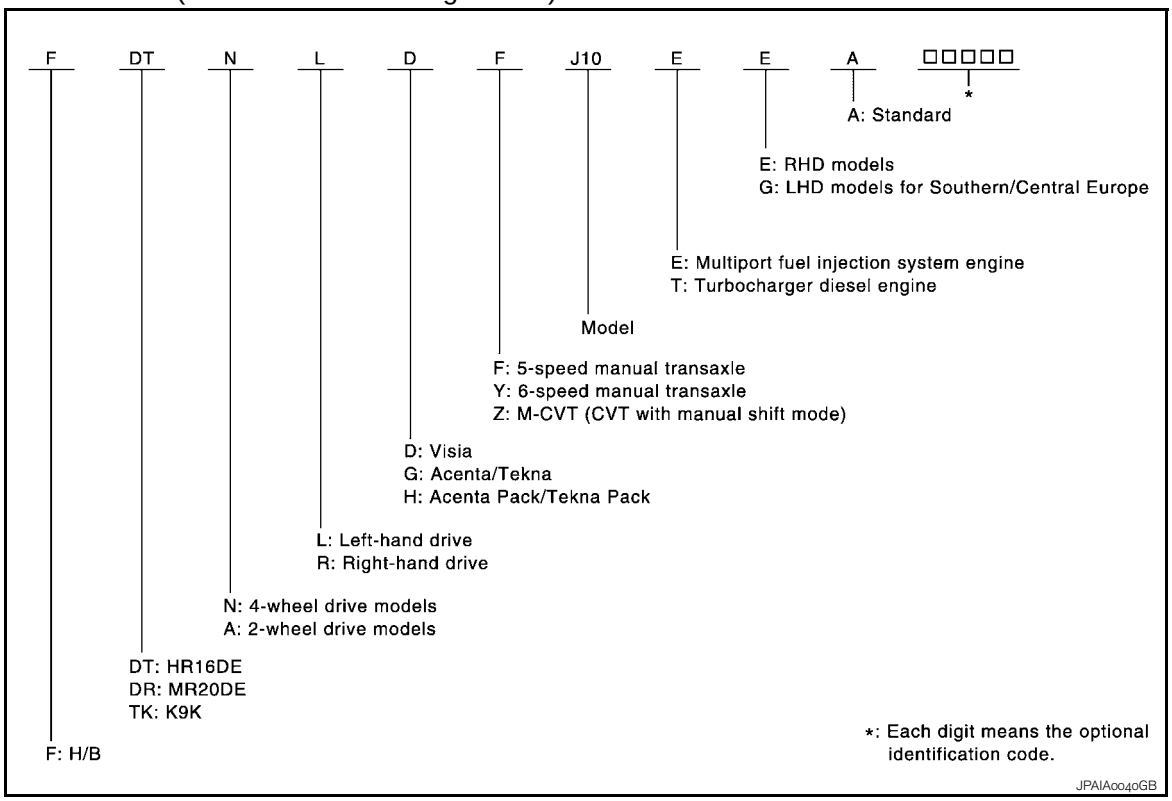
Model Variation

INFOID:0000000001095959

Body	Axle	Engine	Transaxle	Grade	Destination	
					RHD for Europe	LHD for Southern/Central Europe
H/B	2WD	HR16	5MT	Visia	FDTARDF-EEA	FDTALDF-EGA
				Acenta/Tekna	FDTARGF-EEA	FDTALGF-EGA
				Acenta Pack/ Tekna Pack	FDTARHF-EEA	FDTALHF-EGA
		MR20	6MT	Visia	FDRARDY-EEA	FDRALDY-EGA
				Acenta/Tekna	FDRARGY-EEA	FDRALGY-EGA
				Acenta Pack/ Tekna Pack	FDRARHY-EEA	FDRALHY-EGA
			CVT	Visia	FDRARDZ-EEA	FDRALDZ-EGA
				Acenta/Tekna	FDRARGZ-EEA	FDRALGZ-EGA
				Acenta Pack/ Tekna Pack	FDRARHZ-EEA	FDRALHZ-EGA
		K9K	6MT	Visia	FTKARDY-TEA	FTKALDY-TGA
				Acenta/Tekna	FTKARGY-TEA	FTKALGY-TGA
				Acenta Pack/ Tekna Pack	FTKARHY-TEA	FTKALHY-TGA
	4WD	MR20	6MT	Visia	FDRNRDY-EEA	FDRNLDY-EGA
				Acenta/Tekna	FDRNRGY-EEA	FDRNLGY-EGA
				Acenta Pack/ Tekna Pack	FDRNRHY-EEA	FDRNLHY-EGA
			CVT	Visia	FDRNRDZ-EEA	FDRNLDZ-EGA
				Acenta/Tekna	FDRNRGZ-EEA	FDRNLGZ-EGA
				Acenta Pack/ Tekna Pack	FDRNRHZ-EEA	FDRNLHZ-EGA

cardiagn.com

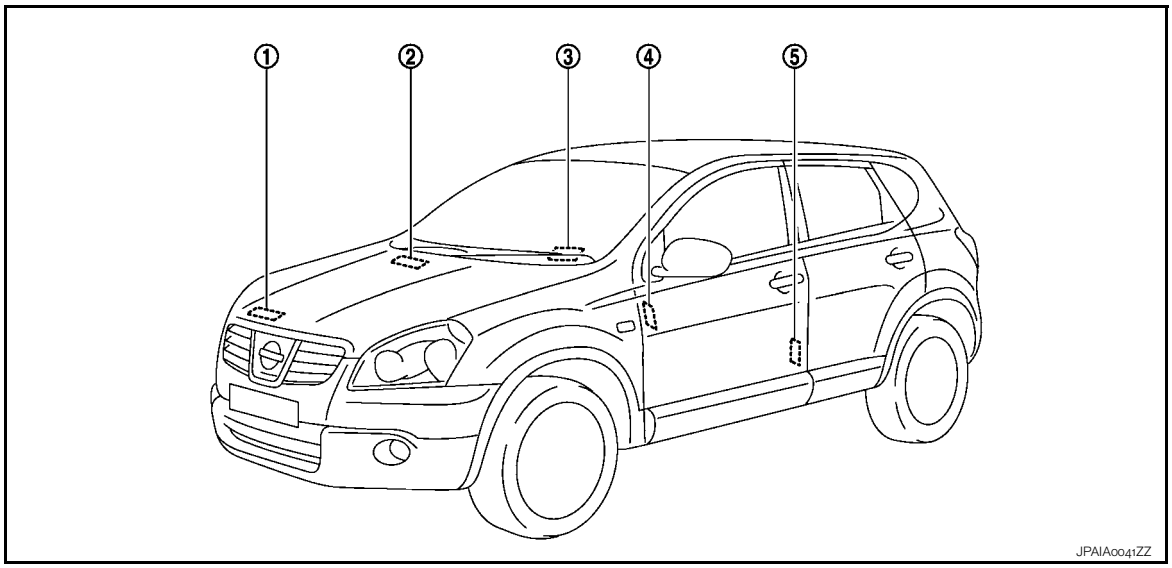
Model variation code (Prefix and suffix designations) :



Information About Identification or Model Code

INFOID:0000000001095960

IDENTIFICATION NUMBER

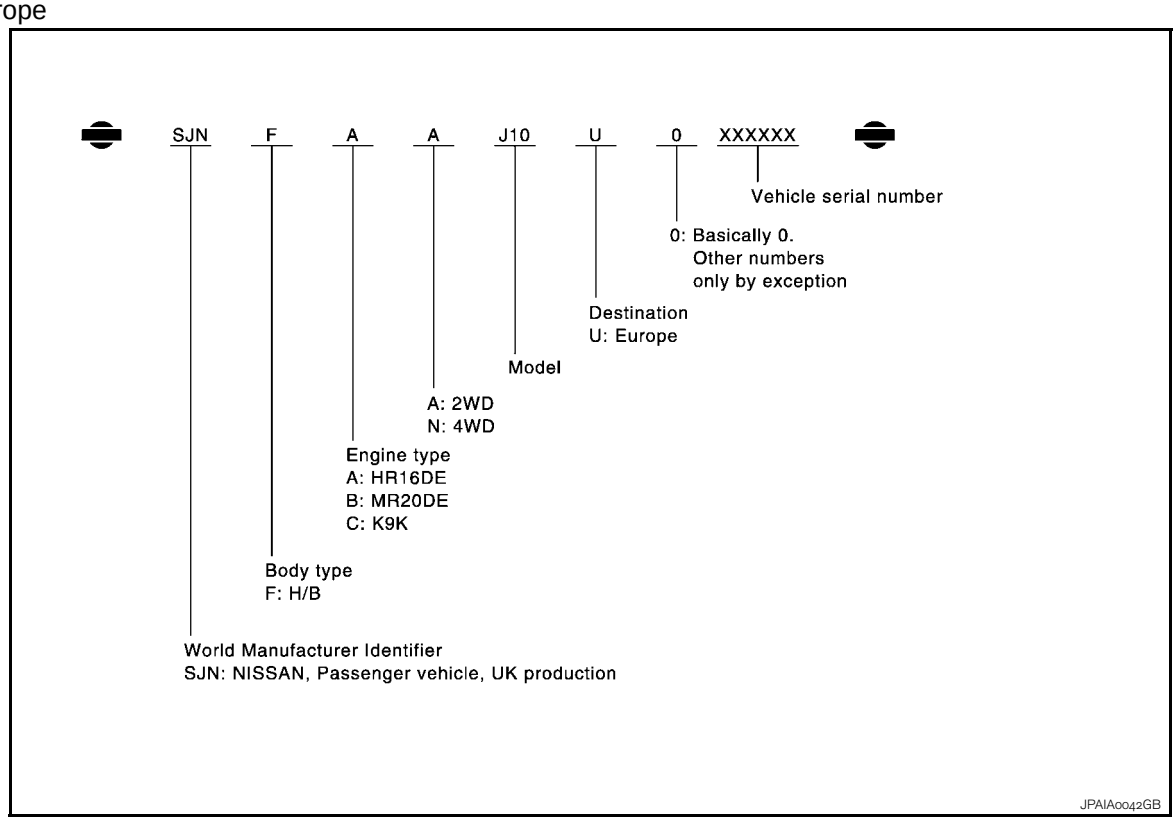


1. Air conditioner specification label
2. Vehicle identification number (Chassis number)
3. Vehicle identification number plate
4. Vehicle identification plate (lower position of RH side center pillar)
5. Tire placard

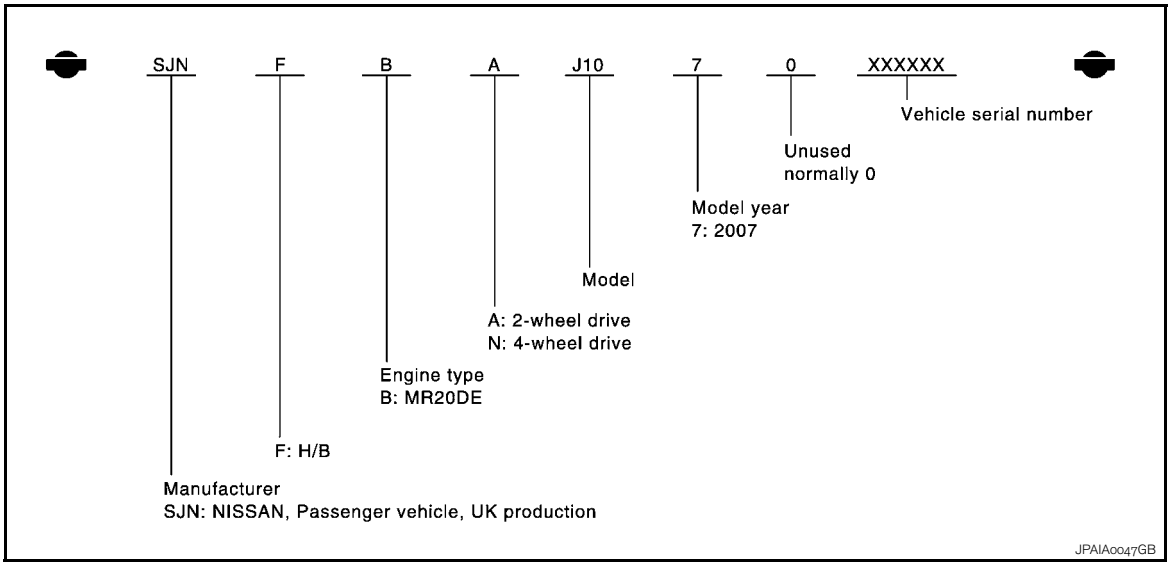
VEHICLE Identification Number ARRANGEMENT

cardiagn.com

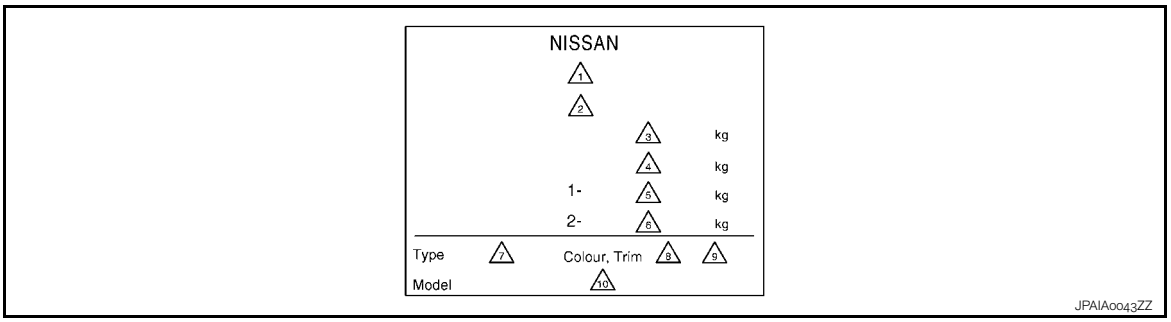
For Europe



For Israel



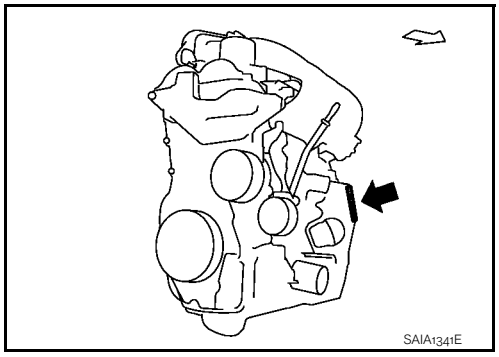
IDENTIFICATION PLATE



cardiagn.com

1.	Type approval number (Models for Europe with Euro-OBD system) Blank (Models for Europe without Euro-OBD system)	2.	Vehicle identification number (Chassis number)	3.	Gross vehicle weight
4.	Gross combination weight Gross vehicle weight + Gross trailing capacity (Weight)	5.	Gross axle weight (Front)	6.	Gross axle weight (Rear)
7.	Vehicle type	8.	Body color code	9.	Trim color code
10.	Model variation code				

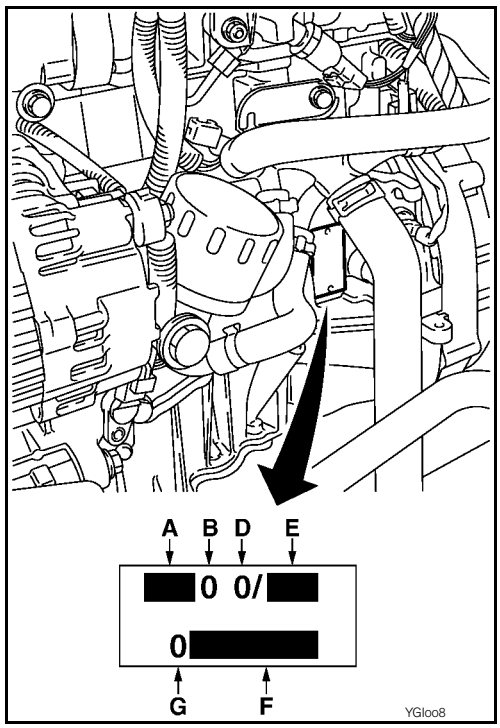
ENGINE SERIAL NUMBER (HR and MR ENGINE)



ENGINE IDENTIFICATION (K9K ENGINE)

Identification is engravFD on the cylinder block which carries:

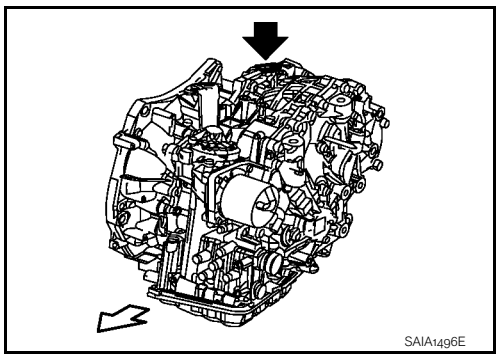
- A: engine type,
- B: engine type approval letter,
- D: Renault code,
- E: engine suffix,
- F: engine fabrication number,
- G: engine assembly plant.



AUTOMATIC TRANSAXLE NUMBER

cardiagn.com

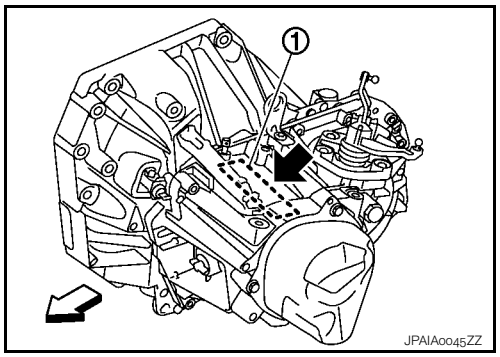
CVT Unit (RE0F10A)



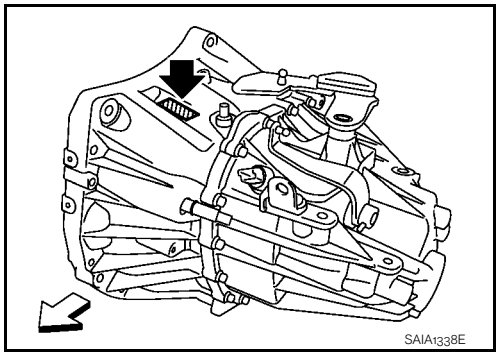
MANUAL TRANSAXLE NUMBER

5MT (RS5F92R)

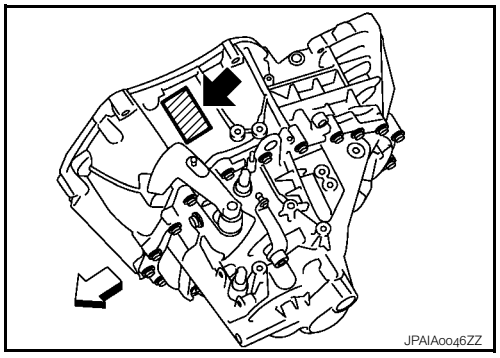
1 : Serial number (bottom side of transaxle)



6MT (RS6F94R)



6MT (RS6F52A)



Dimensions

INFOID:0000000001095961

Unit: mm (in)

Overall length	4,315 (169.9)
Overall width	1,780 (70.1)
Overall height	1,605 (63.2)

cardiagn.com

Front tread	1,540 (60.6)
Rear tread	1,545 (60.8)
Wheelbase	2,630 (103.5)

Wheels&Tires

INFOID:0000000001095962

		Conventional	Spare
Road wheel/offset	mm (in)	16 × 6 1/2 JJ Aluminum/40 (1.57) 16 × 6 1/2 JJ Steel /40 (1.57) 17 × 6 1/2 JJ Aluminum/40 (1.57)	16 × 4T Steel/40 (1.57)
Tire size		215/65R16 98H 215/60R17 96H	T145/90D16 106M

cardiagn.com

PRECAUTION

PRECAUTIONS

Description

INFOID:0000000001095963

Observe the following precautions to ensure safe and proper servicing. These precautions are not described in each individual section.

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001095964

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions For Xenon Headlamp Service

INFOID:0000000001095965

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001115955

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

cardiagn.com

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

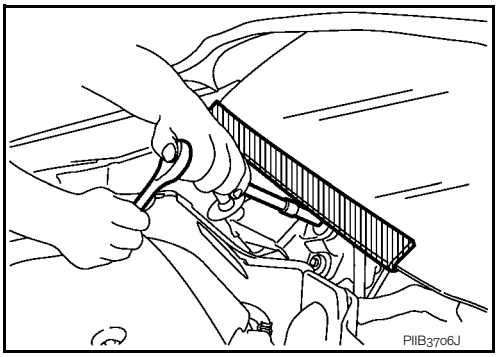
OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Procedures without Cowl Top Cover

INFOID:0000000001095967

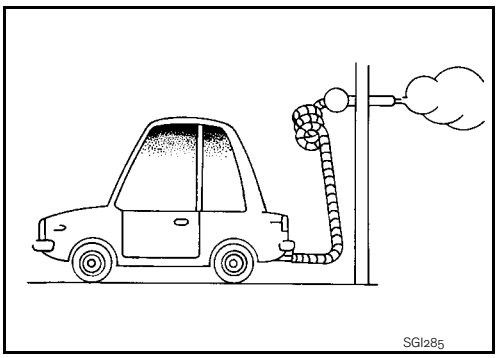
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



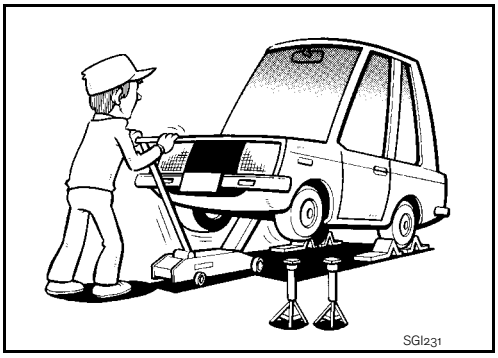
General Precautions

INFOID:0000000001095968

- Do not operate the engine for an extended period of time without proper exhaust ventilation.
  Keep the work area well ventilated and free of any inflammable materials. Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc. When working in a pit or other enclosed area, be sure to properly ventilate the area before working with hazardous materials.
  Do not smoke while working on the vehicle.

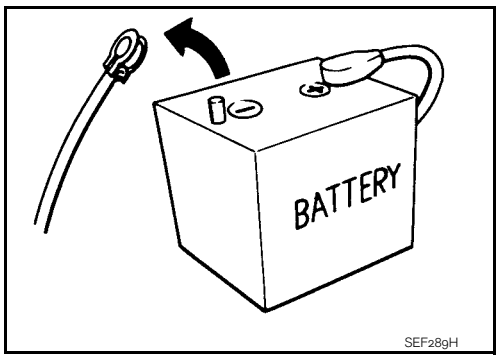


- Before jacking up the vehicle, apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving. After jacking up the vehicle, support the vehicle weight with safety stands at the points designated for proper lifting before working on the vehicle.
  These operations should be done on a level surface.
- When removing a heavy component such as the engine or transaxle/transmission, be careful not to lose your balance and drop them. Also, do not allow them to strike adjacent parts, especially the brake tubes and master cylinder.

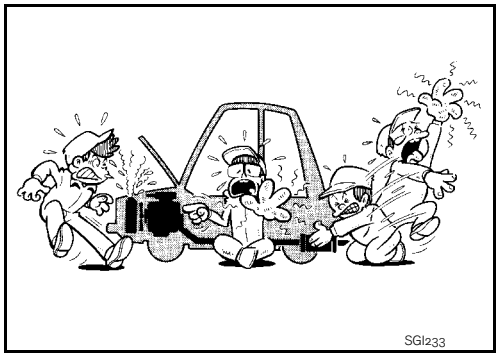


cardiagn.com

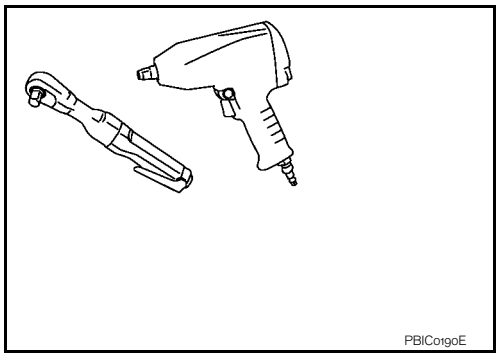
- Before starting repairs which do not require battery power:
  Turn off ignition switch.
  Disconnect the negative battery terminal.
- If the battery terminals are disconnected, recorded memory of radio and each control unit is erased.



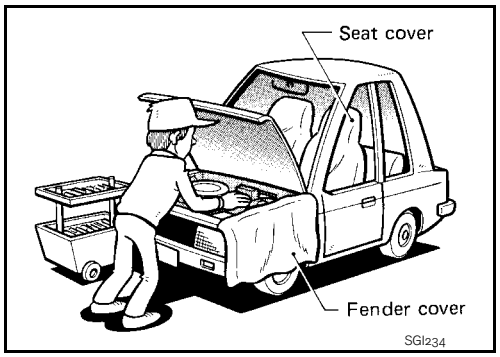
- To prevent serious burns:
  Avoid contact with hot metal parts.
  Do not remove the radiator cap when the engine is hot.
- Dispose of drained oil or the solvent used for cleaning parts in an appropriate manner.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically.
  Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.
- Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.
- Replace oil seals, gaskets, packings, O-rings, locking washers, cotter pins, self-locking nuts, etc. with new ones.



- Replace inner and outer races of tapered roller bearings and needle bearings as a set.
- Arrange the disassembled parts in accordance with their assembled locations and sequence.
- Do not touch the terminals of electrical components which use microcomputers (such as ECM).
  Static electricity may damage internal electronic components.
- After disconnecting vacuum or air hoses, attach a tag to indicate the proper connection.
- Use only the fluids and lubricants specified in this manual.
- Use approved bonding agent, sealants or their equivalents when required.
- Use hand tools, power tools (disassembly only) and recommended special tools where specified for safe and efficient service repairs.
- When repairing the fuel, oil, water, vacuum or exhaust systems, check all affected lines for leaks.



- Before servicing the vehicle:
  Protect fenders, upholstery and carpeting with appropriate covers.
  Take caution that keys, buckles or buttons do not scratch paint.



WARNING:

cardiagn.com

To prevent ECM from storing the diagnostic trouble codes, do not carelessly disconnect the harness connectors which are related to the engine control system and TCM (transmission control module) system. The connectors should be disconnected only when working according to the WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.

Three Way Catalyst

INFOID:0000000001095969

If a large amount of unburned fuel flows into the catalyst, the catalyst temperature will be excessively high. To prevent this, follow the instructions.

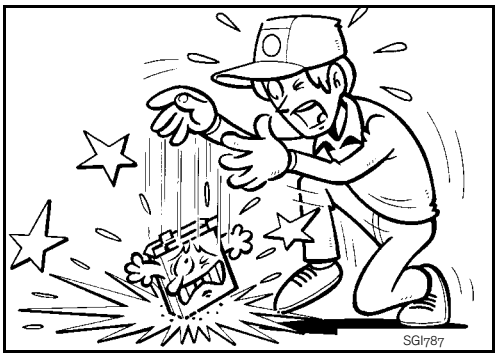
- Use unleaded gasoline only. Leaded gasoline will seriously damage the three way catalyst.
- When checking for ignition spark or measuring engine compression, make tests quickly and only when necessary.
- Do not run engine when the fuel tank level is low, otherwise the engine may misfire, causing damage to the catalyst.

Do not place the vehicle on flammable material. Keep flammable material off the exhaust pipe and the three way catalyst.

Multiport Fuel Injection System or Engine Control System

INFOID:0000000001095970

- Before connecting or disconnecting any harness connector for the multiport fuel injection system or ECM:
  Turn ignition switch to “OFF” position.
  Disconnect negative battery terminal.
  Otherwise, there may be damage to ECM.
- Before disconnecting pressurized fuel line from fuel pump to injectors, be sure to release fuel pressure.
- Be careful not to jar components such as ECM and mass air flow sensor.

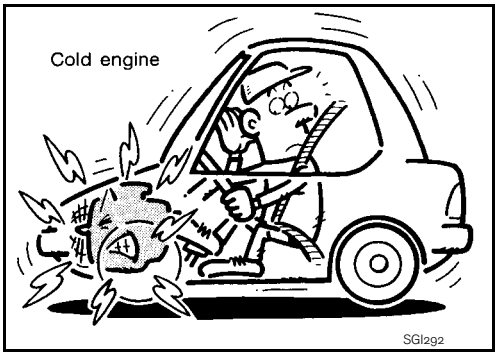


Turbocharger (If Equipped)

INFOID:0000000001095991

The turbocharger turbine revolves at extremely high speeds and becomes very hot. Therefore, it is essential to maintain a clean supply of oil flowing through the turbocharger and to follow all required maintenance instructions and operating procedures.

- Always use the recommended oil. Follow the instructions for proper time to change the oil and proper oil level.
- Avoid accelerating engine to a high rpm immediately after starting.
- If engine had been operating at high rpm for an extended period of time, let it idle for a few minutes prior to shutting if off.

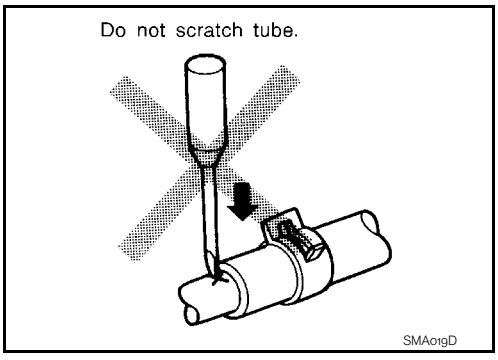


Hoses

INFOID:0000000001095971

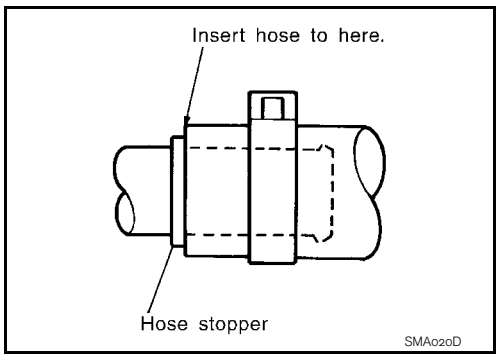
HOSE REMOVAL AND INSTALLATION

- To prevent damage to rubber hose, do not pry off rubber hose with tapered tool or screwdriver.



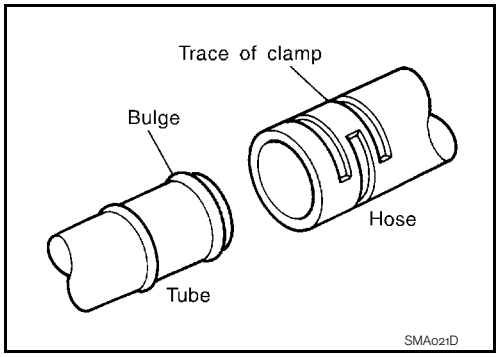
cardiagn.com

- To reinstall the rubber hose securely, make sure that hose insertion length and orientation is correct. (If tube is equipped with hose stopper, insert rubber hose into tube until it butts up against hose stopper.)

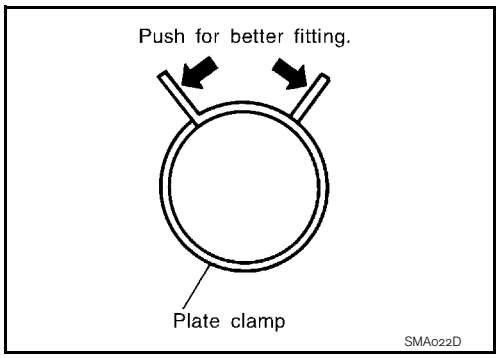


HOSE CLAMPING

- If old rubber hose is re-used, install hose clamp in its original position (at the indentation where the old clamp was). If there is a trace of tube bulging left on the old rubber hose, align rubber hose at that position.
- Discard old clamps; replace with new ones.



- After installing plate clamps, apply force to them in the direction of the arrow, tightening rubber hose equally all around.



Engine Oils

INFOID:0000000001095972

Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used oil.
If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.

HEALTH PROTECTION PRECAUTIONS

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Avoid contaminating clothes, particularly underpants, with oil.
- Heavily soiled clothing and oil-impregnated footwear should not be worn. Overalls must be cleaned regularly.
- First aid treatment should be obtained immediately for open cuts and wounds.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
- Do not use gasoline, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practical, degrease components prior to handling.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.

ENVIRONMENTAL PROTECTION PRECAUTIONS

cardiagn.com

Dispose of used oil and used oil filters through authorized waste disposal contractors to licensed waste disposal sites, or to the waste oil reclamation trade. If in doubt, contact the local authority for advice on disposal facilities.
It is illegal to pour used oil on to the ground, down sewers or drains, or into water sources.
The regulations concerning pollution vary between regions.

Air Conditioning

INFOID:0000000001095973

Use an approved refrigerant recovery unit any time the air conditioning system must be discharged. Refer to HA section “REFRIGERATION SYSTEM” for specific instructions.

FUEL

FUEL : Unleaded Premium Gasoline

INFOID:0000000001095974

Use premium unleaded gasoline with an octane rating of at least 95 RON (research octane number). If premium unleaded gasoline is not available, regular unleaded gasoline with an octane rating of at least 91 RON (research octane number) can be used. However, for maximum vehicle performance, the use of premium unleaded gasoline is recommended.

CAUTION:

Do not use leaded gasoline. Using leaded gasoline will damage the three way catalyst. Using a fuel other than that specified could adversely affect the emission control devices and systems, and could also affect the warranty coverage validity.

FUEL : Diesel Engine Fuel

INFOID:0000000001095992

Diesel fuel of at least 51 cetane.
If two types of diesel fuel are available, use summer or winter fuel properly according to the following temperature conditions.

- Above −7°C...Summer type diesel fuel.
- Below −7°C...Winter type diesel fuel.

CAUTION:

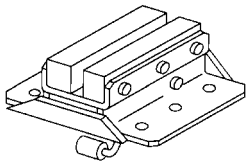
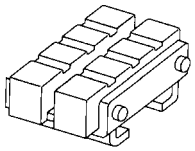
- **Do not use home heating oil, gasoline or other alternate fuels in your diesel engine. The use of those can cause engine damage.**
- **Do not use summer fuel at temperatures below −7°C (20°F). The cold temperatures will cause wax to form in the fuel. As a result, it may prevent the engine from running smoothly.**
- **Do not add gasoline or other alternate fuels to diesel fuel.**

cardiagn.com

LIFTING POINT

Commercial Service Tools

INFOID:0000000001095975

Tool name	Description
Board on attachment	 S-NT001
Safety stand attachment	 S-NT002

CAUTION:

- **Every time the vehicle is lifted up, maintain the complete vehicle curb condition.**
- **Since the vehicle's center of gravity changes when removing main parts on the front side (engine, transmission, suspension etc.), support a jack up point on the rear side garage jack with a mission jack or equivalent.**
- **Since the vehicle's center of gravity changes when removing main parts on the rear side (rear axle, suspension, etc.), support a jack up point on the front side garage jack with a mission jack or equivalent.**
- **Be careful not to smash or do not do anything that would affect piping parts.**

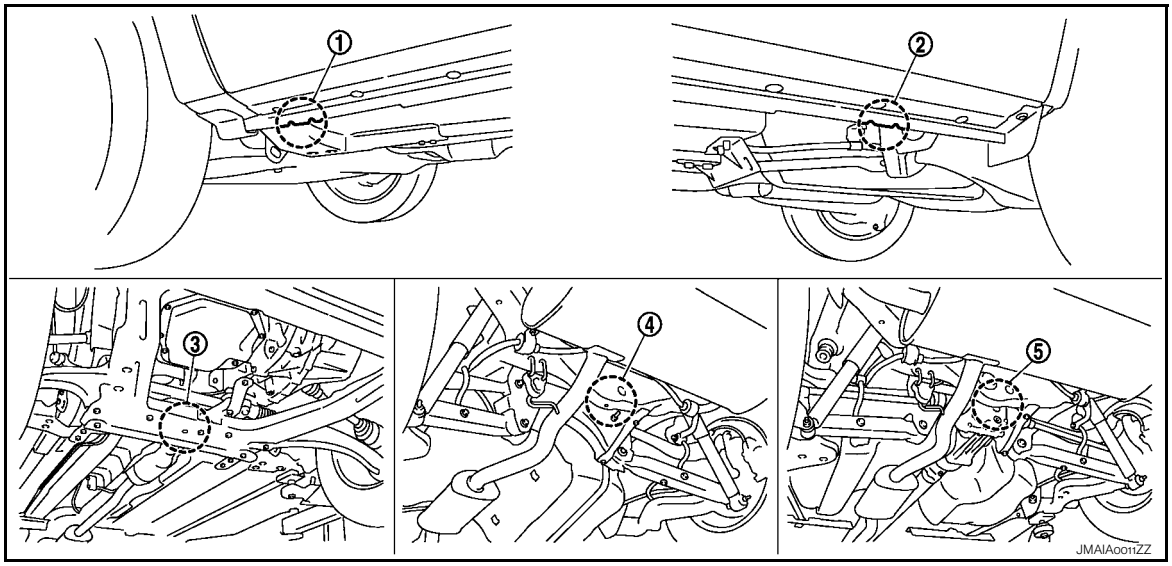
Garage Jack and Safety Stand and 2-Pole Lift

INFOID:0000000001095976

WARNING:

- **Park the vehicle on a level surface when using the jack. Make sure to avoid damaging pipes, tubes, etc. under the vehicle.**
- **Never get under the vehicle while it is supported only by the jack. Always use safety stands when you have to get under the vehicle.**
- **Place wheel chocks at both front and back of the wheels on the ground.**
- **When lifting the vehicle, open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.**
- **When setting the lift arm, do not allow the arm to contact the brake tubes, brake cable, fuel lines and sill spoiler.**

cardiagn.com



1. Safety stand point and lift up point (front)
2. Safety stand point and lift up point (rear)
3. Garage jack point (front)
4. Garage jack point (rear) (2WD)
5. Garage jack point (rear) (4WD)

CAUTION:
There is canister just behind Garage jack point rear. Jack up be carefully.

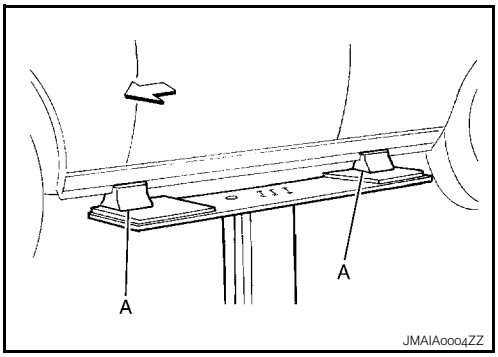
Board-On Lift

INFOID:0000000001095977

CAUTION:
Make sure vehicle is empty when lifting.

- **The board-on lift attachment (A) set at front end of vehicle should be set on the front of the sill under the front door opening.**
- **Position attachments at front and rear ends of board-on lift.**

⇦ : Vehicle front



cardiagn.com

TOW TRUCK TOWING

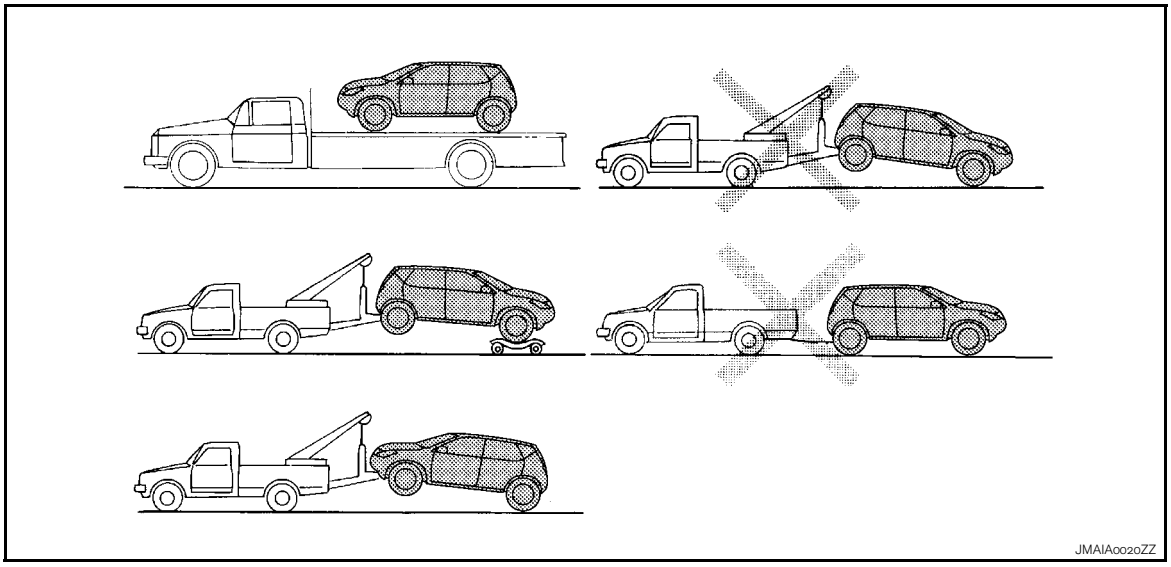
Tow Truck Towing

INFOID:0000000001095978

CAUTION:

- **All applicable local laws regarding the towing operation must be obeyed.**
- **It is necessary to use proper towing equipment to avoid possible damage to the vehicle during towing operation. Towing is in accordance with Towing Procedure Manual at dealer.**
- **Always attach safety chains before towing.**
- **When towing, make sure that the transmission, steering system and powertrain are in good order. If any unit is damaged, dollies must be used.**
- **Never tow an automatic transmission model from the rear (that is backward) with four wheels on the ground. This may cause serious and expensive damage to the transmission.**

2WD MODELS



JMAIA0020ZZ

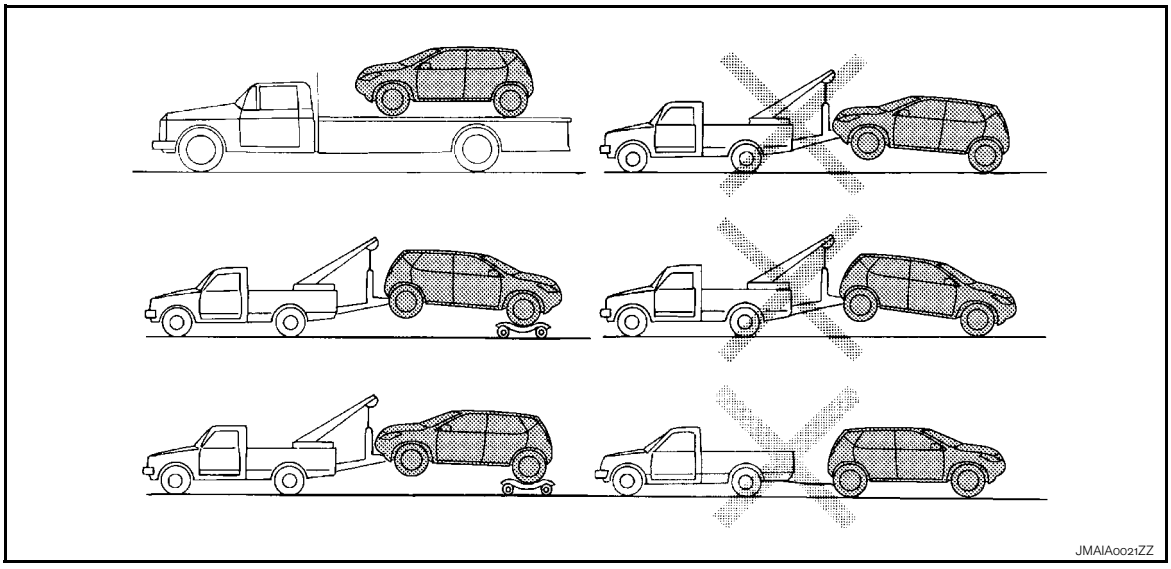
NISSAN recommends that vehicle be towed with the driving (front) wheels off the ground or that a dolly be used as illustrated.

CAUTION:

- **Never tow CVT models with the front wheels on the ground or four wheels on the ground (forward or backward), as this may cause serious and expensive damage to the transmission.**
  If it is necessary to tow the vehicle with the rear wheels raised, always use towing dollies under the front wheels.
- **When towing CVT models with the front wheels on towing dollies:**
- **Turn the ignition key to the OFF position, and secure the steering wheel in a straight ahead position with a rope or similar device.Never secure the steering wheel by turning the ignition key to the LOCK position. This may damage the steering lock mechanism.**
- **Move the selector lever to the N (Neutral) position.**
- **When towing two wheel drive CVT model with the rear wheels on the ground (if you do not use towing dollies): Always release the parking brake.**

cardiagn.com

AWD MODELS



NISSAN recommends that a dolly be used as illustrated when towing AWD models.

CAUTION:

Never tow AWD models with any of the wheels on the ground as this may cause serious and expensive damage to the drive train.

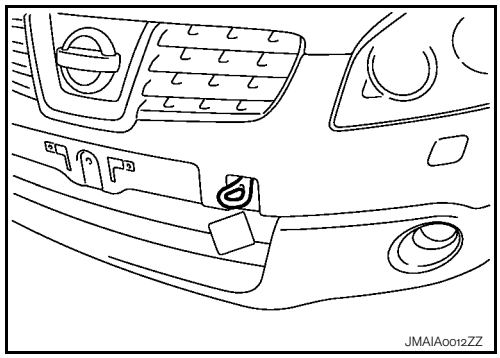
Vehicle Recovery (Freeing a Stuck Vehicle)

INFOID:0000000001095979

FRONT

1. Remove the hook cover from the bumper using a remover tool.
2. Securely install the vehicle recovery hook stored with jacking tools.

Make sure that the hook is properly secured in the stored place after use.



WARNING:

- **Stand clear of a stuck vehicle.**
- **Do not spin your tires at high speed. This could cause them to explode and result in serious injury. Parts of your vehicle could also overheat and be damaged.**

CAUTION:

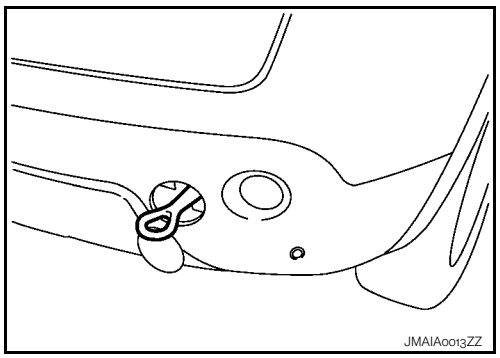
- **Tow chains or cables must be attached only to the vehicle recovery hooks or main structural members of the vehicle. Otherwise, the vehicle body will be damaged.**
- **Do not use the vehicle tie downs to free a vehicle stuck in sand, snow, mud, etc. Never tow the vehicle using the vehicle tie downs or recovery hooks.**
- **Always pull the cable straight out from the front of the vehicle. Never pull on the hook at an angle.**
- **Pulling devices should be routed so they do not touch any part of the suspension, steering, brake or cooling systems.**
- **Pulling devices such as ropes or canvas straps are not recommended for use in vehicle towing or recovery.**

REAR

WARNING:

cardiagn.com

- **Rear hook is not available.**



cardiagn.com

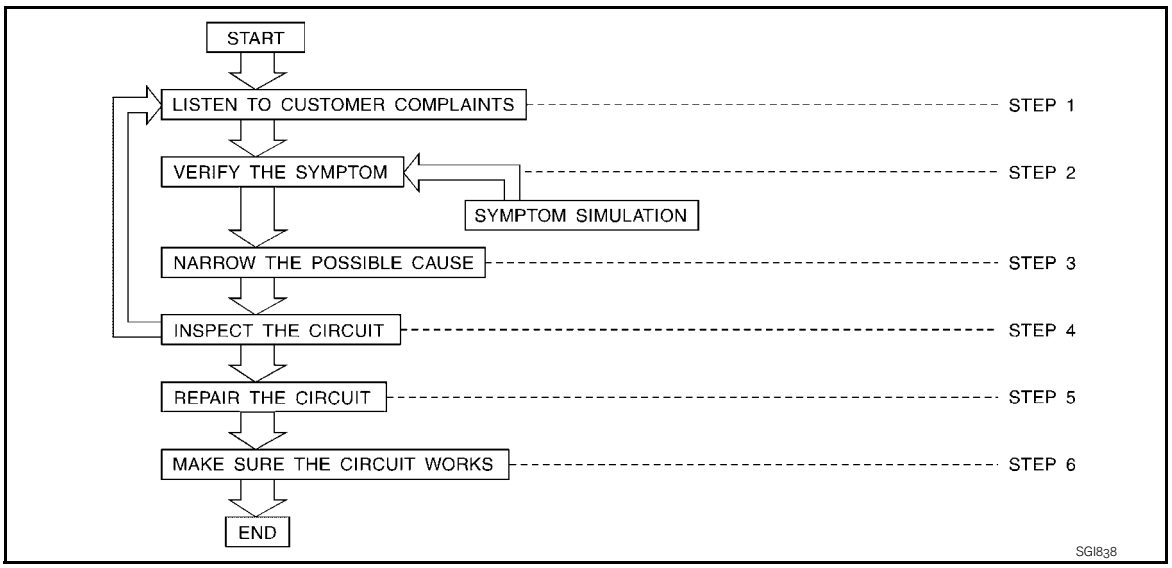
BASIC INSPECTION

SERVICE INFORMATION FOR ELECTRICAL INCIDENT

Work Flow

INFOID:0000000001095980

WORK FLOW



STEP	DESCRIPTION	
STEP 1	Get detailed information about the conditions and the environment when the incident occurred. The following are key pieces of information required to make a good analysis:	
	WHAT	Vehicle Model, Engine, Transmission/Transaxle and the System (i.e. Radio).
	WHEN	Date, Time of Day, Weather Conditions, Frequency.
	WHERE	Road Conditions, Altitude and Traffic Situation.
	HOW	System Symptoms, Operating Conditions (Other Components Interaction). Service History and if any After Market Accessories have been installed.
STEP 2	Operate the system, road test if necessary. Verify the parameter of the incident. If the problem cannot be duplicated, refer to “Incident Simulation Tests”.	
STEP 3	Get the proper diagnosis materials together including: • Power Supply Routing • System Operation Descriptions • Applicable Service Manual Sections • Check for any Service Bulletins Identify where to begin diagnosis based upon your knowledge of the system operation and the customer comments.	
STEP 4	Inspect the system for mechanical binding, loose connectors or wiring damage. Determine which circuits and components are involved and diagnose using the Power Supply Routing and Harness Layouts.	
STEP 5	Repair or replace the incident circuit or component.	
STEP 6	Operate the system in all modes. Verify the system works properly under all conditions. Make sure you have not inadvertently created a new incident during your diagnosis or repair steps.	

Control Units and Electrical Parts

INFOID:0000000001095981

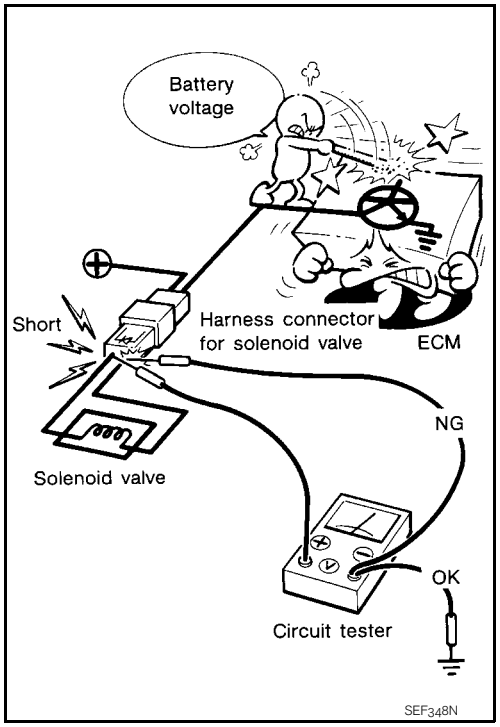
PRECAUTIONS

- Never reverse polarity of battery terminals.
- Install only parts specified for a vehicle.
- Before replacing the control unit, check the input and output and functions of the component parts.
- Do not apply excessive force when disconnecting a connector.

cardiagn.com

- Do not apply excessive shock to the control unit by dropping or hitting it.
- Be careful to prevent condensation in the control unit due to rapid temperature changes and do not let water or rain get on it. If water is found in the control unit, dry it fully and then install it in the vehicle.
- Be careful not to let oil to get on the control unit connector.
- Avoid cleaning the control unit with volatile oil.
- Do not disassemble the control unit, and do not remove the upper and lower covers.

- When using a DMM, be careful not to let test probes get close to each other to prevent the power transistor in the control unit from damaging battery voltage because of short circuiting.
- When checking input and output signals of the control unit, use the specified check adapter.



Intermittent Incident

INFOID:0000000001095982

DESCRIPTION

Sometimes the symptom is not present when the vehicle is brought in for service. If possible, re-create the conditions present at the time of the incident. Doing so may help avoid a No Trouble Found Diagnosis. The following section illustrates ways to simulate the conditions/environment under which the owner experiences an electrical incident.

The section is broken into the six following topics:

- Vehicle vibration
- Heat sensitive
- Freezing
- Water intrusion
- Electrical load
- Cold or hot start up

Get a thorough description of the incident from the customer. It is important for simulating the conditions of the problem.

VEHICLE VIBRATION

The problem may occur or become worse while driving on a rough road or when engine is vibrating (idle with A/C on). In such a case, you will want to check for a vibration related condition. Refer to the following illustration.

Connector & Harness

cardiagn.com

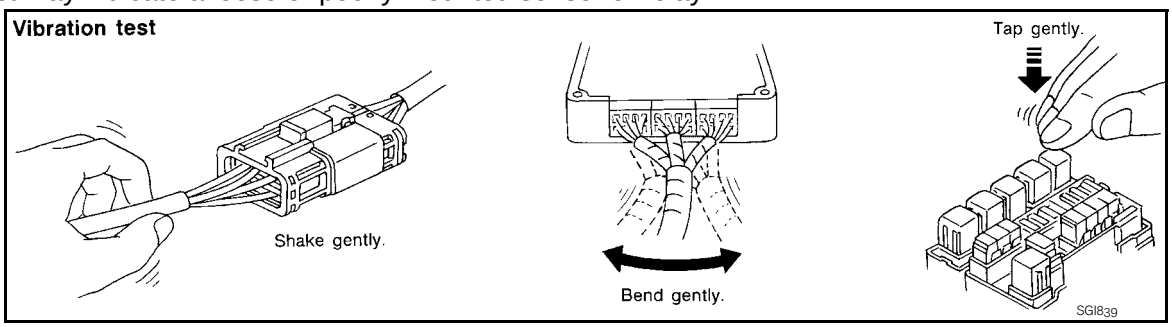
Determine which connectors and wiring harness would affect the electrical system you are inspecting. Gently shake each connector and harness while monitoring the system for the incident you are trying to duplicate. This test may indicate a loose or poor electrical connection.

Hint

Connectors can be exposed to moisture. It is possible to get a thin film of corrosion on the connector terminals. A visual inspection may not reveal this without disconnecting the connector. If the problem occurs intermittently, perhaps the problem is caused by corrosion. It is a good idea to disconnect, inspect and clean the terminals on related connectors in the system.

Sensor & Relay

Gently apply a slight vibration to sensors and relays in the system you are inspecting.
This test may indicate a loose or poorly mounted sensor or relay.



Engine Compartment

There are several reasons a vehicle or engine vibration could cause an electrical complaint. Some of the things to check for are:

- Connectors not fully seated.
- Wiring harness not long enough and is being stressed due to engine vibrations or rocking.
- Wires laying across brackets or moving components.
- Loose, dirty or corroded ground wires.
- Wires routed too close to hot components.

To inspect components under the hood, start by verifying the integrity of ground connections. (Refer to Ground Inspection described later.) First check that the system is properly grounded. Then check for loose connection by gently shaking the wiring or components as previously explained. Using the wiring diagrams inspect the wiring for continuity.

Behind the Instrument Panel

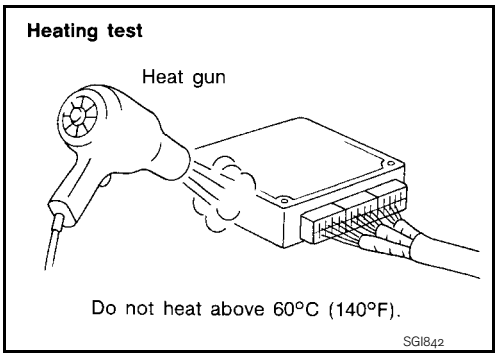
An improperly routed or improperly clamped harness can become pinched during accessory installation. Vehicle vibration can aggravate a harness which is routed along a bracket or near a screw.

Under Seating Areas

An unclamped or loose harness can cause wiring to be pinched by seat components (such as slide guides) during vehicle vibration. If the wiring runs under seating areas, inspect wire routing for possible damage or pinching.

HEAT SENSITIVE

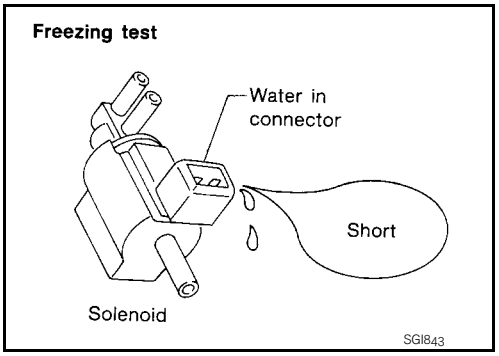
- The customer's concern may occur during hot weather or after car has sat for a short time. In such cases you will want to check for a heat sensitive condition.
- To determine if an electrical component is heat sensitive, heat the component with a heat gun or equivalent.
  CAUTION:
  Do not heat components above 60°C (140°).
- If incident occurs while heating the unit, either replace or properly insulate the component.



FREEZING

cardiagn.com

- The customer may indicate the incident goes away after the car warms up (winter time). The cause could be related to water freezing somewhere in the wiring/electrical system.
- There are two methods to check for this. The first is to arrange for the owner to leave his car overnight. Make sure it will get cold enough to demonstrate his complaint. Leave the car parked outside overnight. In the morning, do a quick and thorough diagnosis of those electrical components which could be affected.
- The second method is to put the suspect component into a freezer long enough for any water to freeze. Reinstall the part into the car and check for the reoccurrence of the incident. If it occurs, repair or replace the component.

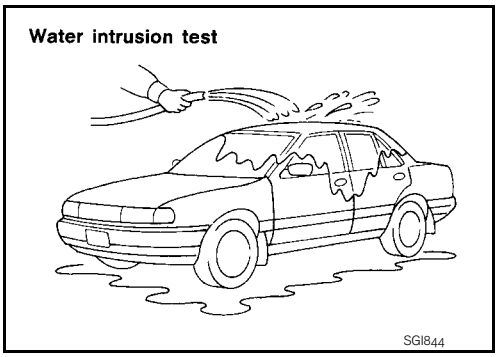


WATER INTRUSION

The incident may occur only during high humidity or in rainy/snowy weather. In such cases the incident could be caused by water intrusion on an electrical part. This can be simulated by soaking the car or running it through a car wash.

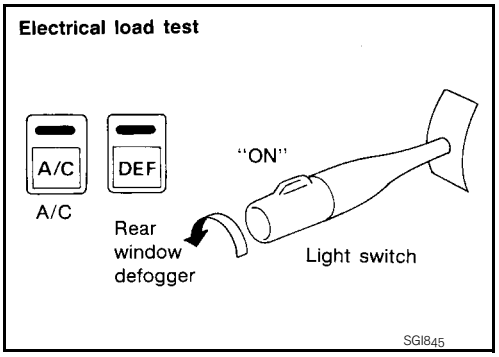
CAUTION:

Do not spray water directly on any electrical components.



ELECTRICAL LOAD

The incident may be electrical load sensitive. Perform diagnosis with all accessories (including A/C, rear window defogger, radio, fog lamps) turned on.



COLD OR HOT START UP

On some occasions an electrical incident may occur only when the car is started cold, or it may occur when the car is restarted hot shortly after being turned off. In these cases you may have to keep the car overnight to make a proper diagnosis.

Circuit Inspection

INFOID:0000000001095983

DESCRIPTION

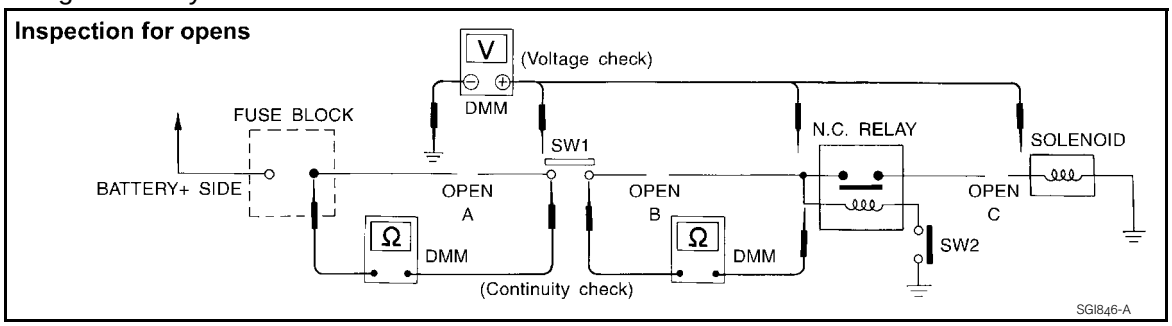
- In general, testing electrical circuits is an easy task if it is approached in a logical and organized method. Before beginning it is important to have all available information on the system to be tested. Also, get a thorough understanding of system operation. Then you will be able to use the appropriate equipment and follow the correct test procedure.
- You may have to simulate vehicle vibrations while testing electrical components. Gently shake the wiring harness or electrical component to do this.

OPEN	A circuit is open when there is no continuity through a section of the circuit.	
SHORT	There are two types of shorts.	
	• SHORT CIRCUIT	When a circuit contacts another circuit and causes the normal resistance to change.
	• SHORT TO GROUND	When a circuit contacts a ground source and grounds the circuit.

cardiagn.com

TESTING FOR “OPENS” IN THE CIRCUIT

Before you begin to diagnose and test the system, you should rough sketch a schematic of the system. This will help you to logically walk through the diagnosis process. Drawing the sketch will also reinforce your working knowledge of the system.



Continuity Check Method

The continuity check is used to find an open in the circuit. The digital multimeter (DMM) set on the resistance function will indicate an open circuit as over limit (no beep tone or no ohms symbol). Make sure to always start with the DMM at the highest resistance level.

To help in understanding the diagnosis of open circuits, please refer to the previous schematic.

- Disconnect the battery negative cable.
- Start at one end of the circuit and work your way to the other end. (At the fuse block in this example)
- Connect one probe of the DMM to the fuse block terminal on the load side.
- Connect the other probe to the fuse block (power) side of SW1. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point A)
- Connect the probes between SW1 and the relay. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point B)
- Connect the probes between the relay and the solenoid. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point C)

Any circuit can be diagnosed using the approach in the previous example.

Voltage Check Method

To help in understanding the diagnosis of open circuits please refer to the previous schematic.

In any powered circuit, an open can be found by methodically checking the system for the presence of voltage. This is done by switching the DMM to the voltage function.

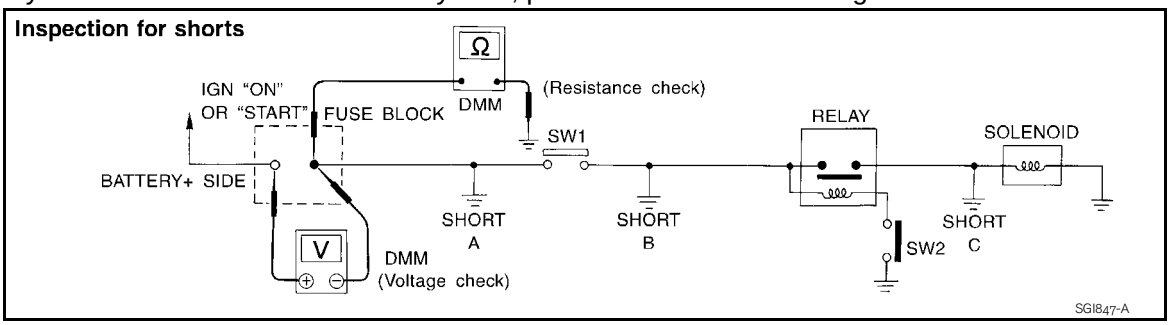
- Connect one probe of the DMM to a known good ground.
- Begin probing at one end of the circuit and work your way to the other end.
- With SW1 open, probe at SW1 to check for voltage.
  voltage; open is further down the circuit than SW1.
  no voltage; open is between fuse block and SW1 (point A).
- Close SW1 and probe at relay.
  voltage; open is further down the circuit than the relay.
  no voltage; open is between SW1 and relay (point B).
- Close the relay and probe at the solenoid.
  voltage; open is further down the circuit than the solenoid.
  no voltage; open is between relay and solenoid (point C).

Any powered circuit can be diagnosed using the approach in the previous example.

TESTING FOR “SHORTS” IN THE CIRCUIT

cardiagn.com

To simplify the discussion of shorts in the system, please refer to the following schematic.



Resistance Check Method

- Disconnect the battery negative cable and remove the blown fuse.
- Disconnect all loads (SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Connect one probe of the DMM to the load side of the fuse terminal. Connect the other probe to a known good ground.
- With SW1 open, check for continuity.
  continuity; short is between fuse terminal and SW1 (point A).
  no continuity; short is further down the circuit than SW1.
- Close SW1 and disconnect the relay. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity; short is between SW1 and the relay (point B).
  no continuity; short is further down the circuit than the relay.
- Close SW1 and jump the relay contacts with jumper wire. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity; short is between relay and solenoid (point C).
  no continuity; check solenoid, retrace steps.

Voltage Check Method

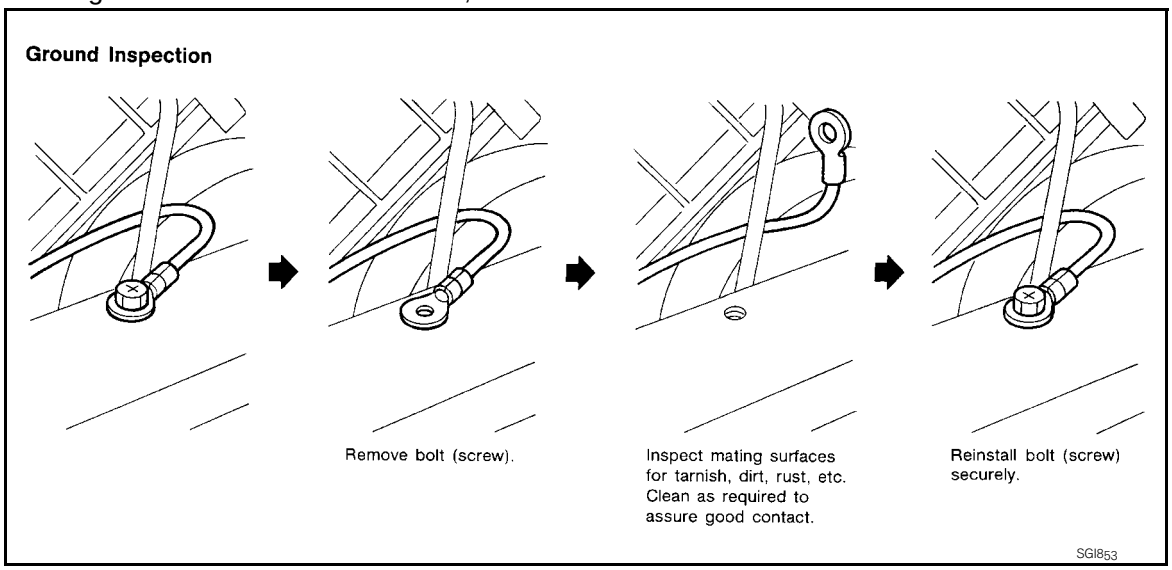
- Remove the blown fuse and disconnect all loads (i.e. SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Turn the ignition key to the ON or START position. Verify battery voltage at the battery + side of the fuse terminal (one lead on the battery + terminal side of the fuse block and one lead on a known good ground).
- With SW1 open and the DMM leads across both fuse terminals, check for voltage.
  voltage; short is between fuse block and SW1 (point A).
  no voltage; short is further down the circuit than SW1.
- With SW1 closed, relay and solenoid disconnected and the DMM leads across both fuse terminals, check for voltage.
  voltage; short is between SW1 and the relay (point B).
  no voltage; short is further down the circuit than the relay.
- With SW1 closed, relay contacts jumped with fused jumper wire check for voltage.
  voltage; short is down the circuit of the relay or between the relay and the disconnected solenoid (point C).
  no voltage; retrace steps and check power to fuse block.

GROUND INSPECTION

- Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.
- Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.
- When inspecting a ground connection follow these rules:
- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for "add-on" accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Make sure all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet make sure no ground wires have excess wire insulation.

cardiagn.com

- For detailed ground distribution information, refer to “Ground Distribution” in PG section.



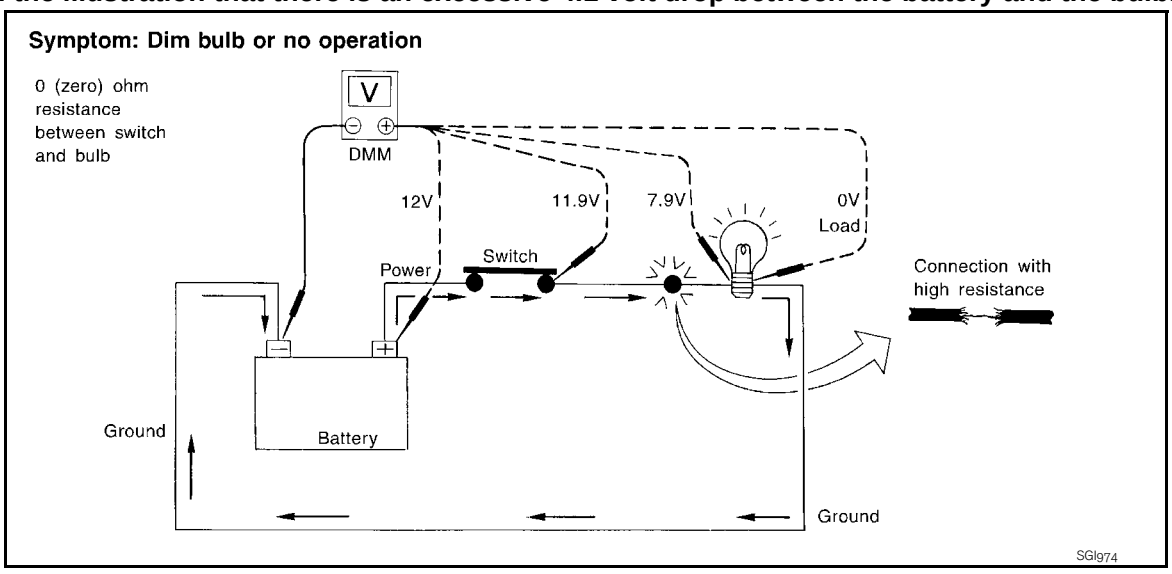
VOLTAGE DROP TESTS

- Voltage drop tests are often used to find components or circuits which have excessive resistance. A voltage drop in a circuit is caused by a resistance when the circuit is in operation.
- Check the wire in the illustration. When measuring resistance with DMM, contact by a single strand of wire will give reading of 0 ohms. This would indicate a good circuit. When the circuit operates, this single strand of wire is not able to carry the current. The single strand will have a high resistance to the current. This will be picked up as a slight voltage drop.
- Unwanted resistance can be caused by many situations as follows:
- Undersized wiring (single strand example)
- Corrosion on switch contacts
- Loose wire connections or splices.
- If repairs are needed always use wire that is of the same or larger gauge.

Measuring Voltage Drop — Accumulated Method

- Connect the DMM across the connector or part of the circuit you want to check. The positive lead of the DMM should be closer to power and the negative lead closer to ground.
- Operate the circuit.
- The DMM will indicate how many volts are being used to “push” current through that part of the circuit.

Note in the illustration that there is an excessive 4.1 volt drop between the battery and the bulb.

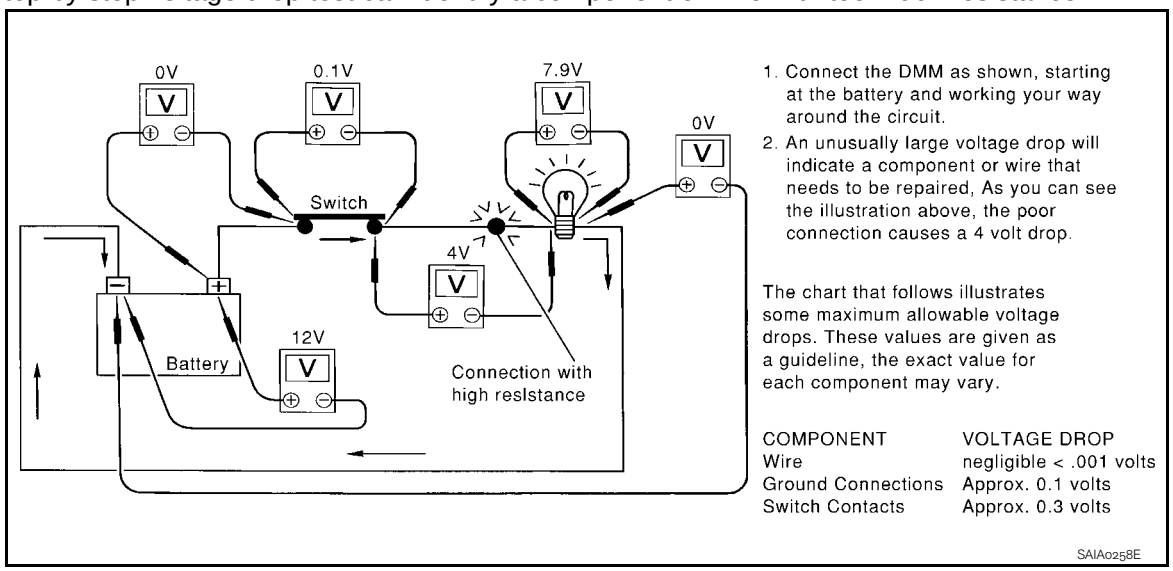


Measuring Voltage Drop — Steb-by-Step

- The step-by-step method is most useful for isolating excessive drops in low voltage systems (such as those in “Computer Controlled Systems”).
- Circuits in the “Computer Controlled System” operate on very low amperage.

cardiagn.com

- The (Computer Controlled) system operations can be adversely affected by any variation in resistance in the system. Such resistance variation may be caused by poor connection, improper installation, improper wire gauge or corrosion.
- The step by step voltage drop test can identify a component or wire with too much resistance.

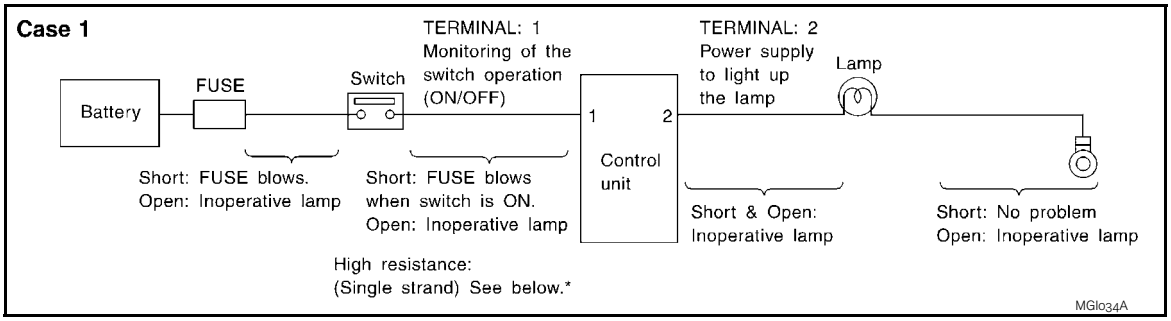


CONTROL UNIT CIRCUIT TEST

System Description

- When the switch is ON, the control unit lights up the lamp.

CASE 1



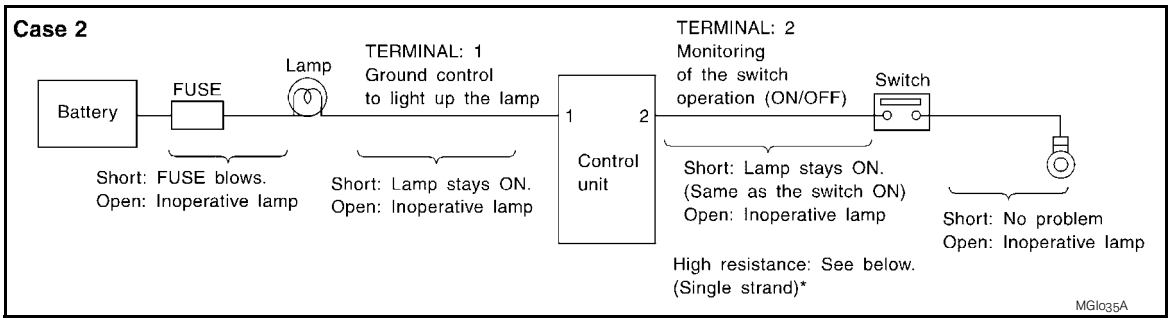
INPUT-OUTPUT VOLTAGE CHART

Terminal No.		Description		Condition	Value (Approx.)	In case of high resistance such as single strand (V) *
+	–	Signal name	Input/ Output			
1	Body ground	Switch	Input	Switch ON	Battery voltage	Lower than battery voltage Approx. 8 (Example)
				Switch OFF	0 V	Approx. 0
2	Body ground	Lamp	Output	Switch ON	Battery voltage	Approx. 0 (Inoperative lamp)
				Switch OFF	0 V	Approx. 0

- The voltage value is based on the body ground.
- *: If high resistance exists in the switch side circuit (caused by a single strand), terminal 1 does not detect battery voltage. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not supply power to light up the lamp.

cardiagn.com

CASE 2



INPUT-OUTPUT VOLTAGE CHART

Terminal No.		Description		Condition	Value (Approx.)	In case of high resistance such as single strand (V) *
+	–	Signal name	Input/ Output			
1	Body ground	Lamp	Output	Switch ON	0V	Battery voltage (Inoperative lamp)
				Switch OFF	Battery voltage	Battery voltage
2	Body ground	Switch	Input	Switch ON	0 V	Higher than 0 Approx. 4 (Example)
				Switch OFF	5 V	Approx. 5

- The voltage value is based on the body ground.
- *: If high resistance exists in the switch side circuit (caused by a single strand), terminal 2 does not detect approx. 0V. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not control ground to light up the lamp.

cardiagn.com

CONSULT-III/GST CHECKING SYSTEM

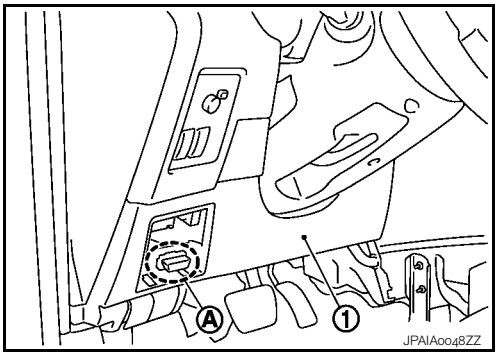
Description

INFOID:0000000001095984

- When CONSULT-III/GST is connected with a data link connector (A) equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests.

  1 : Instrument driver lower panel

- Refer to CONSULT-III Operation Manual for more information.



CONSULT-III Function and System Application

INFOID:0000000001095985

Diagnostic test mode	Function	ENGINE	TRANSMISSION	AIR BAG	METER/M&A	BCM	ABS	ABS (Including ESP)	IPDM E/R	ALL MODE AWD/4WD	HEAD LAMP LEVELIZER	MULTI AV	REAR VIEW CAMERA	EPS	INTELLIGENT KEY
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-III.	x	x	-	-	x	-	x	-	-	x	-	x	-	x
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	x	x	x	x	x	x	x	x	x	x	x	-	x	x
Trouble diagnostic record	Current self-diagnostic results and all trouble diagnostic records previously stored can be read.	-	-	x	-	-	-	-	-	-	-	-	-	-	-
Data monitor	Input/Output data in the ECU can be read.	x	x	-	x	x	x	x	x	x	x	x	x	x	x
CAN diagnosis	The condition of CAN communication line can be indicated by a topology.	x	x	-	x	x	x	x	x	x	-	x	-	x	x
CAN diagnosis support monitor	The condition of CAN communication line can be read.	x	x	-	x	x	x	x	x	x	-	x	-	x	x
Active test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECUs and also shifts some parameters in a specified range.	x	-	-	-	x	x	x	x	x	x	-	-	-	x
DTC & SRT confirmation	The results of SRT (System Readiness Test) and the self-diagnosis status/result can be confirmed.	x*	-	-	-	-	-	-	-	-	-	-	-	-	-
DTC work support	This mode enables a technician to monitor the status/results of self-diagnosis performed by the ECU.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECU (ECM/TCM) part number	ECU (ECM/TCM) part number can be read.	x	x	-	-	x	x	x	x	x	-	x	x	x	x
ECU discriminated No.	Classification number of a replacement ECU can be read to prevent an incorrect ECU from being installed.	-	-	x	-	-	-	-	-	-	x	-	-	-	-

cardiagn.com

Diagnostic test mode	Function	ENGINE	TRANSMISSION	AIR BAG	METER/M&A	BCM	ABS	ABS (Including ESP)	IPDM E/R	ALL MODE AWD/4WD	HEAD LAMP LEVELIZER	MULTI AV	REAR VIEW CAMERA	EPS	INTELLIGENT KEY
Function test	This mode can show results of self-diagnosis of ECU with either 'OK' or 'NG'. For engines, more practical tests regarding sensors/ switches and/or actuators are available.	x*	x	x	-	-	x	x	-	-	-	-	-	-	-
Configration	Function to READ/WRITE vehicle configuration on BCM.	-	-	-	-	x	-	-	-	-	-	-	-	-	-
AV COMM monitor	The condition of AV communication can be indicated.	-	-	-	-	-	-	-	-	-	-	x	-	-	-
CALIB data	Characteristic information for TCM and CVT assembly can be read.	-	x	-	-	-	-	-	-	-	-	-	-	-	-

x: Applicable

* : Petrol engine models

CONSULT-III Data Link Connector (DLC) Circuit

INFOID:0000000001095986

INSPECTION PROCEDURE

If the CONSULT-III cannot diagnose the system properly, check the following items.

Symptom	Check item
CONSULT-III cannot access any system.	• CONSULT-III DLC power supply circuit (Terminal 8) and ground circuit (Terminal 4)
CONSULT-III cannot access individual system. (Other systems can be accessed.)	• Power supply and ground circuit for the control unit of the system (For detailed circuit, refer to wiring diagram for each system.) • Open or short circuit between the system and CONSULT-III DLC (For detailed circuit, refer to wiring diagram for each system.) • Open or short circuit CAN communication line. Refer to LAN-46, "Trouble Diagnosis Flow Chart".

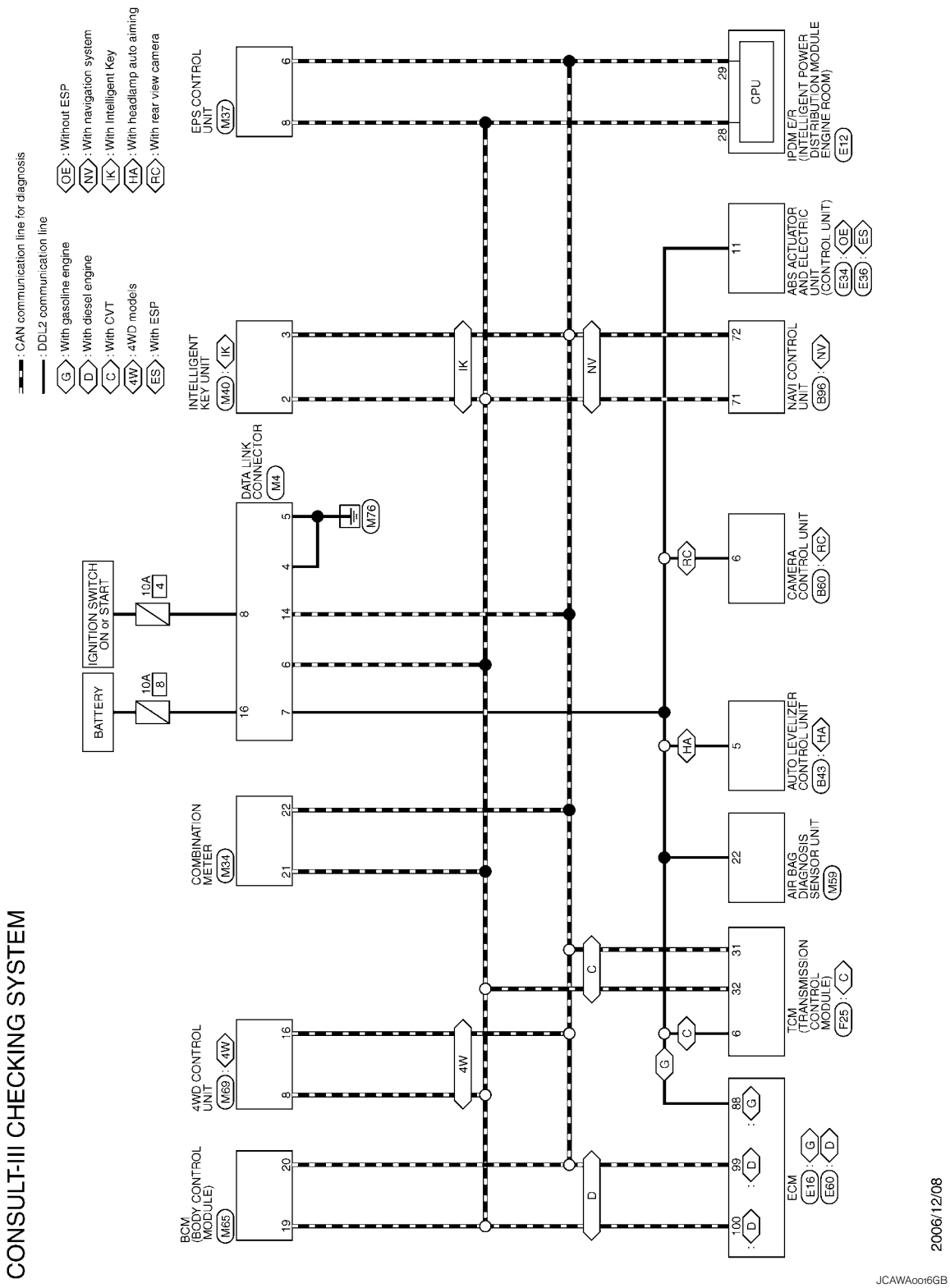
NOTE:

The DDL1 and DDL2 circuits from DLC pins 12, 13, 14 and 15 may be connected to more than one system. A short in a DDL circuit connected to a control unit in one system may affect CONSULT-III access to other systems.

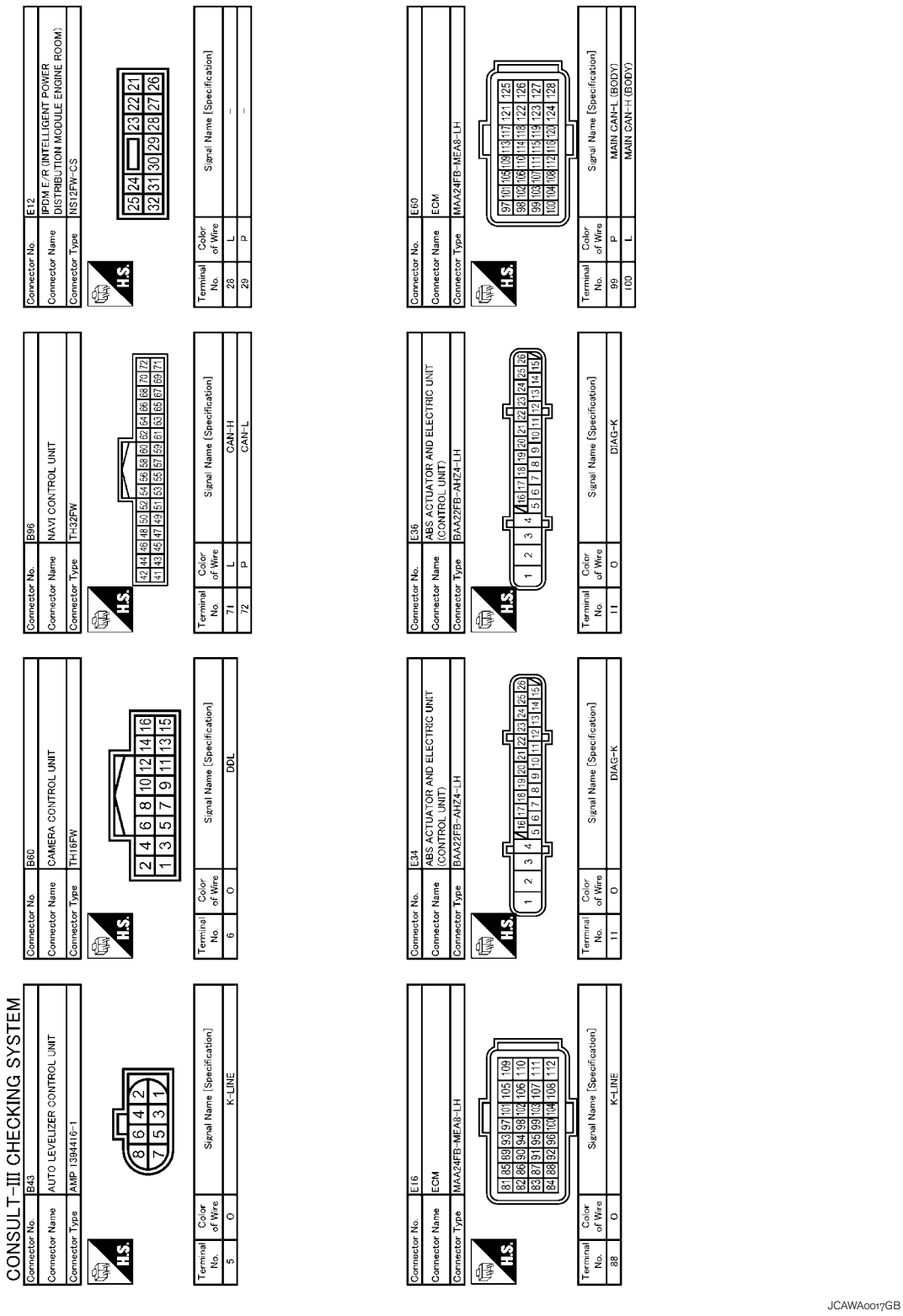
cardiagn.com

Wiring Diagram - CONSULT-III/GST CHECKING SYSTEM -

INFOID:0000000001095987



cardiagn.com



JCAWA0017GB

cardiagn.com

CONSULT−III CHECKING SYSTEM

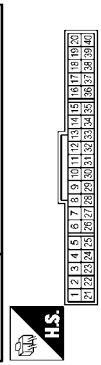
Connector No.	F25
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	MOLEX 500994-4111

Terminal No.	Color of Wire	Signal Name [Specification]
6	O	K-LINE
31	P	CAN-L
32	L	CAN-H

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

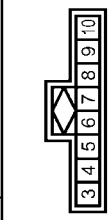
Terminal No.	Color of Wire	Signal Name [Specification]
4	B	–
5	B	–
6	L	–
7	O	–
8	W	–
14	P	–
16	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M37
Connector Name	EPS CONTROL UNIT
Connector Type	Molex 985-45-0001



Terminal No.	Color of Wire	Signal Name [Specification]
6	P	–
8	L	–

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

Terminal No.	Color of Wire	Signal Name [Specification]
22	O	K-LINE

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L

Connector No.	M69
Connector Name	4WD CONTROL UNIT
Connector Type	TH16FW

Terminal No.	Color of Wire	Signal Name [Specification]
8	L	CAN-H
16	P	CAN-L

JCAWA0018GB

cardiagn.com

SECTION GW
GLASS & WINDOW SYSTEM

CONTENTS

SYMPTOM DIAGNOSIS 2

SQUEAK AND RATTLE TROUBLE DIAGNOSES 2
- Work Flow 2
- Inspection Procedure 4
- Diagnostic Worksheet 6

PRECAUTION 8

PRECAUTIONS 8
- Precaution for Procedure without Cowl Top Cover 8
- Handling for Adhesive and Primer 8

PREPARATION 9

PREPARATION 9
- Commercial Service Tools 9

ON-VEHICLE REPAIR 10

WINDSHIELD GLASS 10
- Exploded View 10
- Removal and Installation 11
- Inspection 12

SUNROOF 13
- Exploded View 13
- Removal and Installation 14

SIDE WINDOW GLASS 15
- Exploded View 15
- Removal and Installation 15

BACK DOOR WINDOW GLASS 17
- Exploded View 17
- Removal and Installation 17
- Inspection 18

FRONT DOOR GLASS 19
- Exploded View 19
- Removal and Installation 19
- Inspection and Adjustment 20

FRONT REGULATOR 22
- Exploded View 22
- Removal and Installation 22
- Inspection and Installation 23

REAR DOOR GLASS 25
- Exploded View 25
- Removal and Installation 25
- Inspection and Adjustment 26

REAR REGULATOR 28
- Exploded View 28
- Removal and Installation 28
- Inspection and Adjustment 29

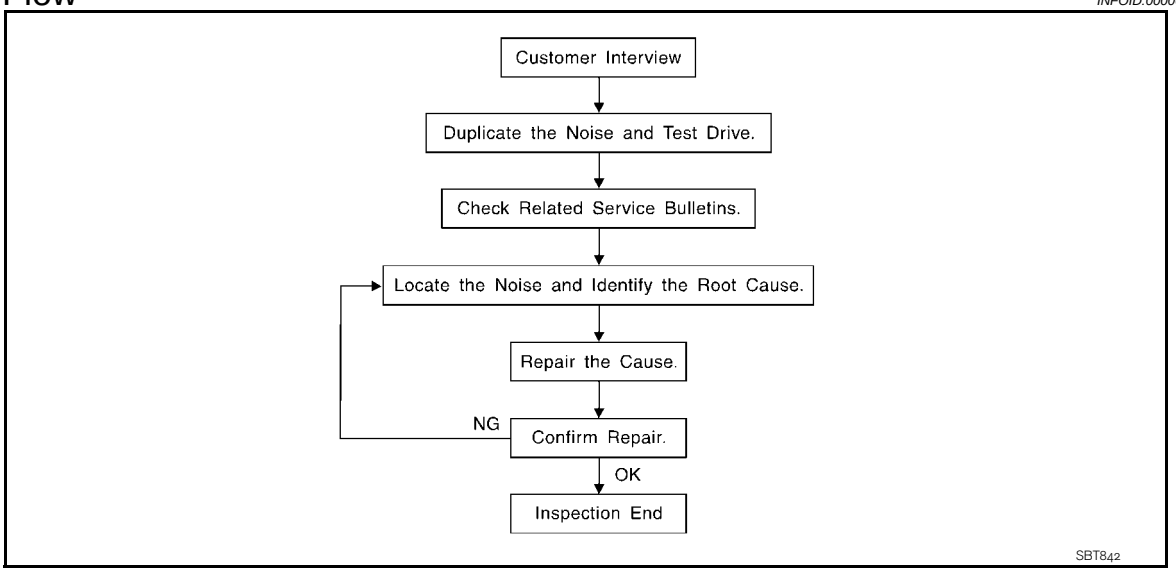
carsdiagn.com

SYMPTOM DIAGNOSIS

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000001115867



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to GW-6, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

cardiagn.com

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:
1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to GW-4, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.

A
B
C
D
E
F
G
H
I
J
GW
L
M
N
O
P
cardiagn.com

- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001115868

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

cardiagn.com

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

g-diagn.com

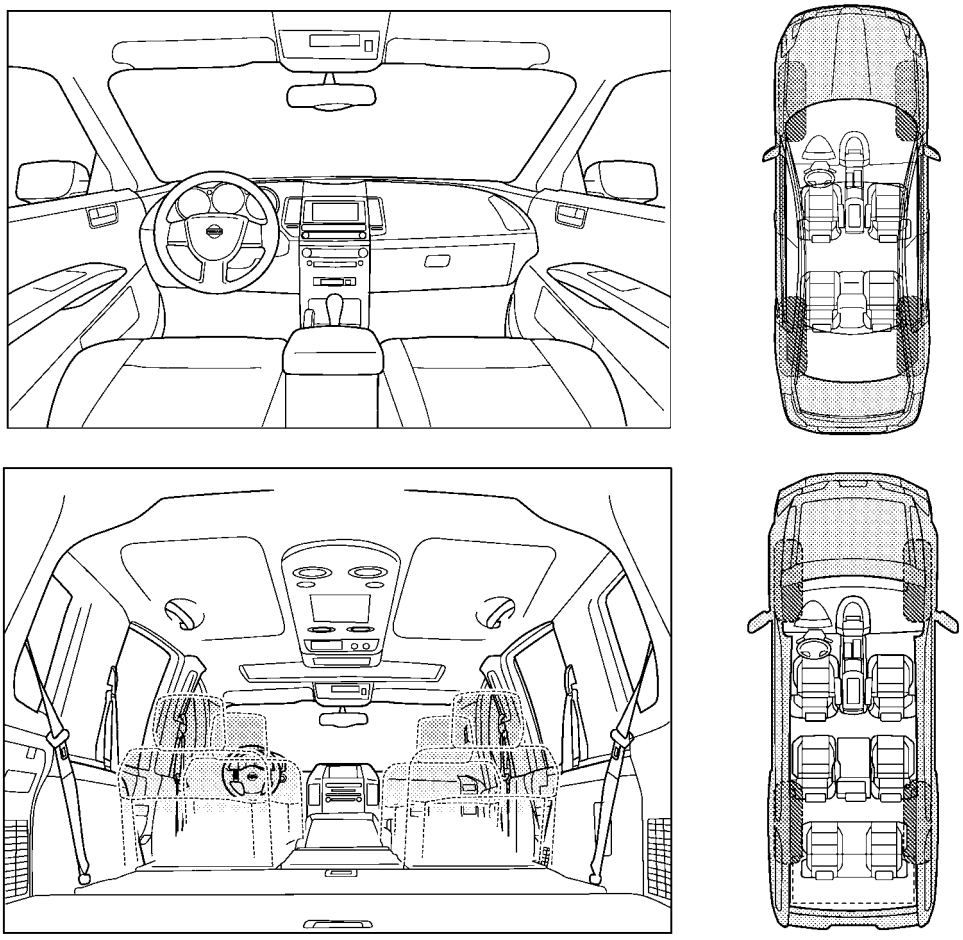
Diagnostic Worksheet

INFOID:0000000001115869

SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

cardiagn.com

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

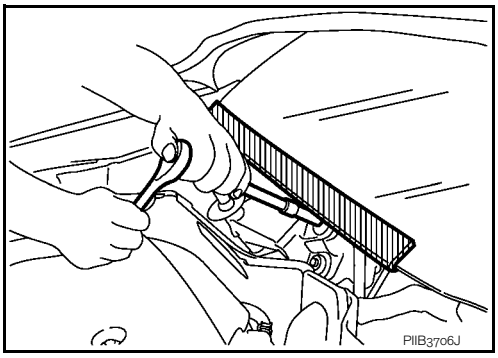
PRECAUTION

PRECAUTIONS

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001103986

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Handling for Adhesive and Primer

INFOID:0000000001093971

- Do not use an adhesive which is past its usable date. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.
- Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.
- Open the seal of the primer and adhesive just before application. Discard the remainder.
- Before application, be sure to shake the primer container to stir the contents. If any floating material is found, do not use it.
- If any primer or adhesive contacts the skin, wipe it off with gasoline or equivalent and wash the skin with soap.
- When using primer and adhesive, always observe the precautions in the instruction manual.

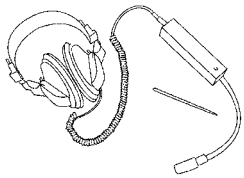
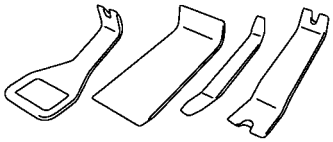
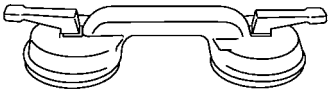
cardiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000001093973

Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Remover tool  PIIB7923J	Remove the clip and pawl and metal clip
Suction lifter  PIIB1805J	Holding the door glass

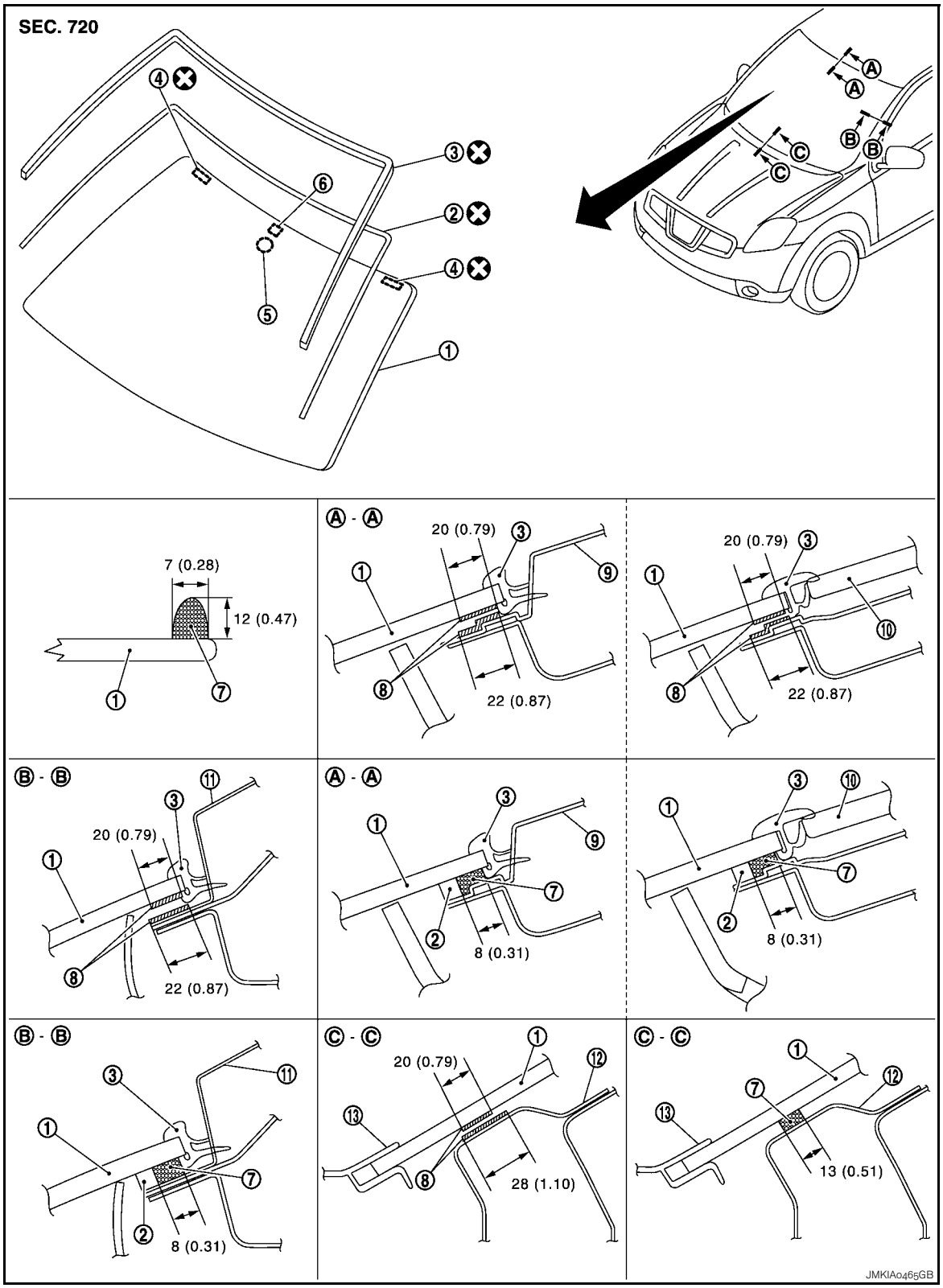
carsdiagn.com

ON-VEHICLE REPAIR

WINDSHIELD GLASS

Exploded View

INFOID:0000000001093974



cardiagn.com

1. Windshield glass
2. Dam rubber
3. Windshield molding
4. Spacer
5. Rain sensor bracket
6. Mirror base
7. Adhesive
8. Primer
9. Roof panel
10. Roof glass
11. Body side outer panel
12. Cowl top
13. Cowl top cover

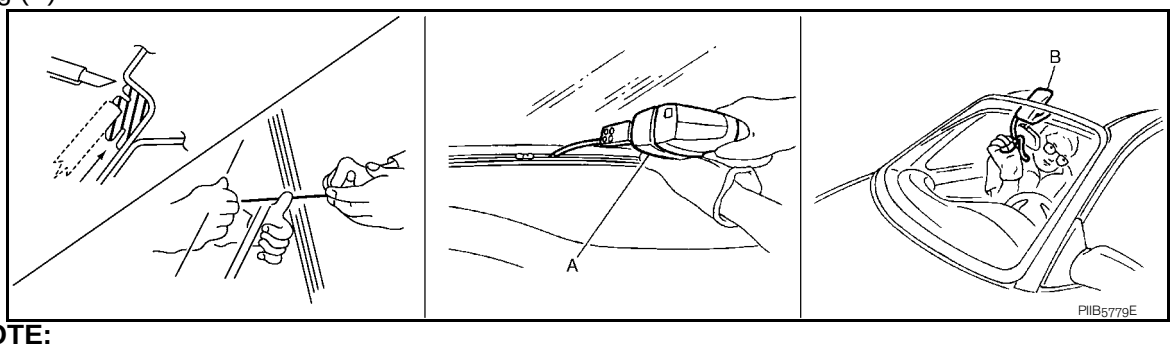
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001093975

REMOVAL

1. Remove the front pillar garnish. Refer to INT-14, "Removal and Installation".
2. Partially remove the headlining (front edge). Refer to INT-21, "Removal and Installation".
3. Remove the cowl top cover. Refer to EXT-19, "Removal and Installation".
4. Remove the roof side molding. Refer to EXT-24, "Removal and Installation".
5. Apply protective tape around the windshield glass and sunroof glass to protect the painted surface from damage.
6. After removing moldings, remove glass using piano wire or power cutting tool (A) and an inflatable pump bag (B).



NOTE:
If a windshield glass is to be reused, mark the body and the glass with matching marks.

WARNING:
When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.

CAUTION:
- **When a glass is to be reused, do not use a cutting knife or power cutting tool.**
- **Do not scratch the glass when removing.**
- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**

INSTALLATION

- The dam rubber and insulator should be installed in position.
- Use a genuine Nissan Urethane Adhesive Kit (if available) or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger room air pressure when a door is closed.
- The molding must be installed securely so that it is in position and leaves no gap.
- Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:
- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the windshield in case of an accident.**

CAUTION:
- **Perform adjustment of front wiper stop location. Refer to WW-105, "Adjustment".**

carsdiagn.com

- **Do not use an adhesive which is past its usable term. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidity. The curing time will increase under lower temperature and lower humidity.**

Inspection

INFOID:0000000001093976

Repairing Water Leakage for Windshield

Leakage can be repaired without removing and reinstalling glass.
If water is leaking between the urethane adhesive material and body or glass, determine the extent of leakage. This can be done by applying water to the windshield area while pushing glass outward.
To stop the leakage, apply primer (if necessary) and then urethane adhesive to the leakage point.

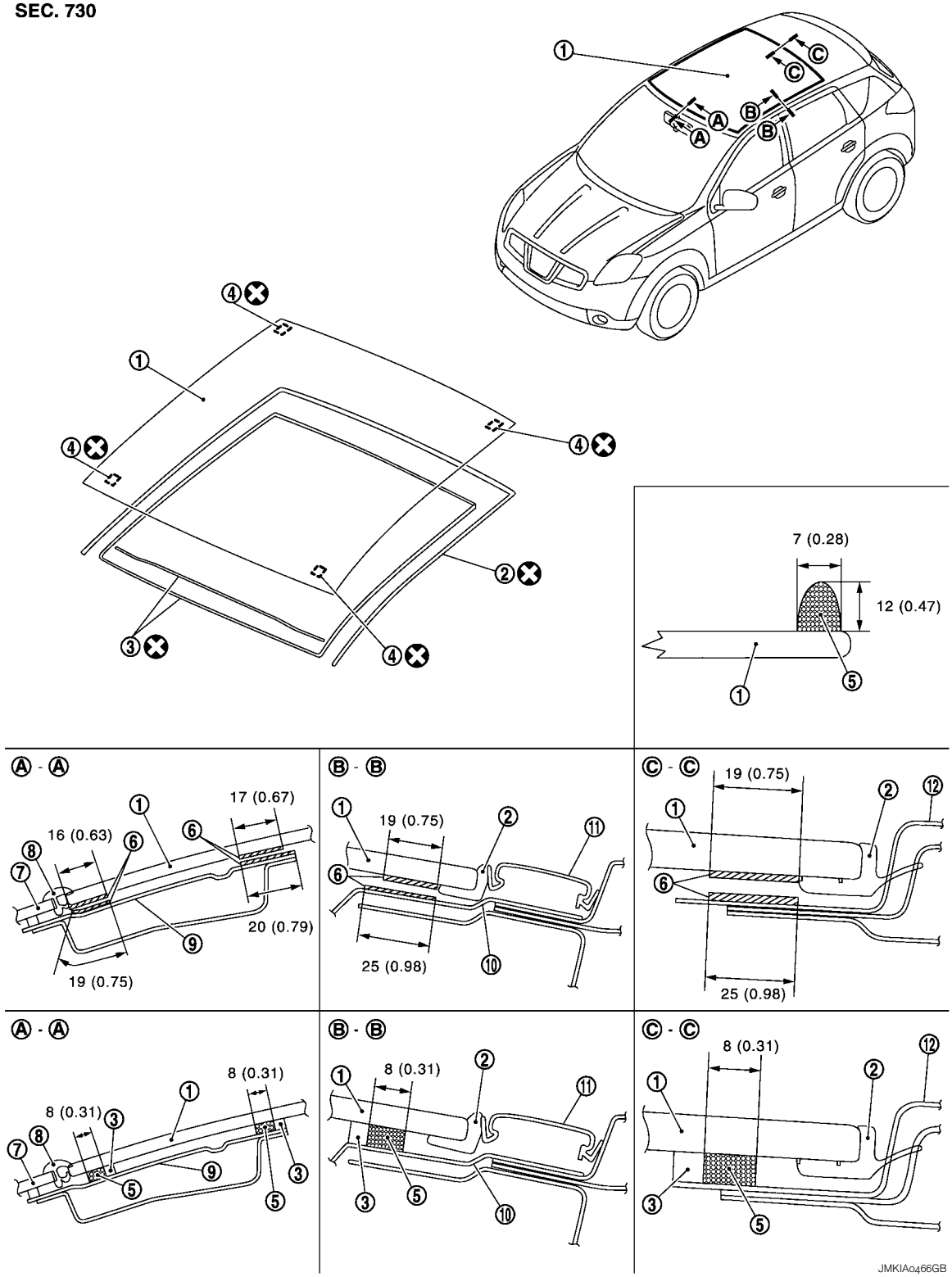
cardiagn.com

SUNROOF

Exploded View

INFOID:0000000001094000

SEC. 730



1. Sunroof glass
2. Sunroof molding
3. Dam rubber
4. Spacer
5. Adhesive
6. Primer
7. Windshield glass
8. Windshield molding
9. Front roof rail upper

10. Body side outer panel
11. Roof side molding
12. Roof panel

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001094004

REMOVAL

1. Remove the headlining.Refer to INT-21, "Removal and Installation".
2. Remove the sunshade unit assembly. Refer to RF-53, "SUNSHADE UNIT ASSEMBLY : Removal and Installation".
3. Remove the clips on sunroof inner finisher, and remove the sunroof inner finisher.
4. Remove the roof side molding. Refer to EXT-24, "Removal and Installation".
5. Remove the windshield molding. Refer to GW-11, "Removal and Installation".
6. Apply protective tape around the sunroof glass and windshield glass and panel to protect from damage.
7. Cut the sunroof moldings with the cutting knife.
8. Remove the sunroof moldings using pliers, remove sunroof glass using piano wire or power cutting tool and an inflatable pump bag.
   NOTE:
   If a glass is to be reused, mark the body and the glass with matching marks.
   WARNING:
   When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.
   CAUTION:
   - **When a glass is to be reused, do not use a cutting knife or power cutting tool.**
   - **Do not scratch the glass when removing.**
   - **Do not set or stand the glass on its edge. Small chips may develop into cracks.**

INSTALLATION

- The dam rubber and insulator should be installed in position.
- Use a genuine Nissan Urethane Adhesive Kit (if available) or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger room air pressure when a door is closed.
- The molding must be installed securely so that it is in position and leaves no gap.
- Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:

- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the windshield in case of an accident.**

CAUTION:

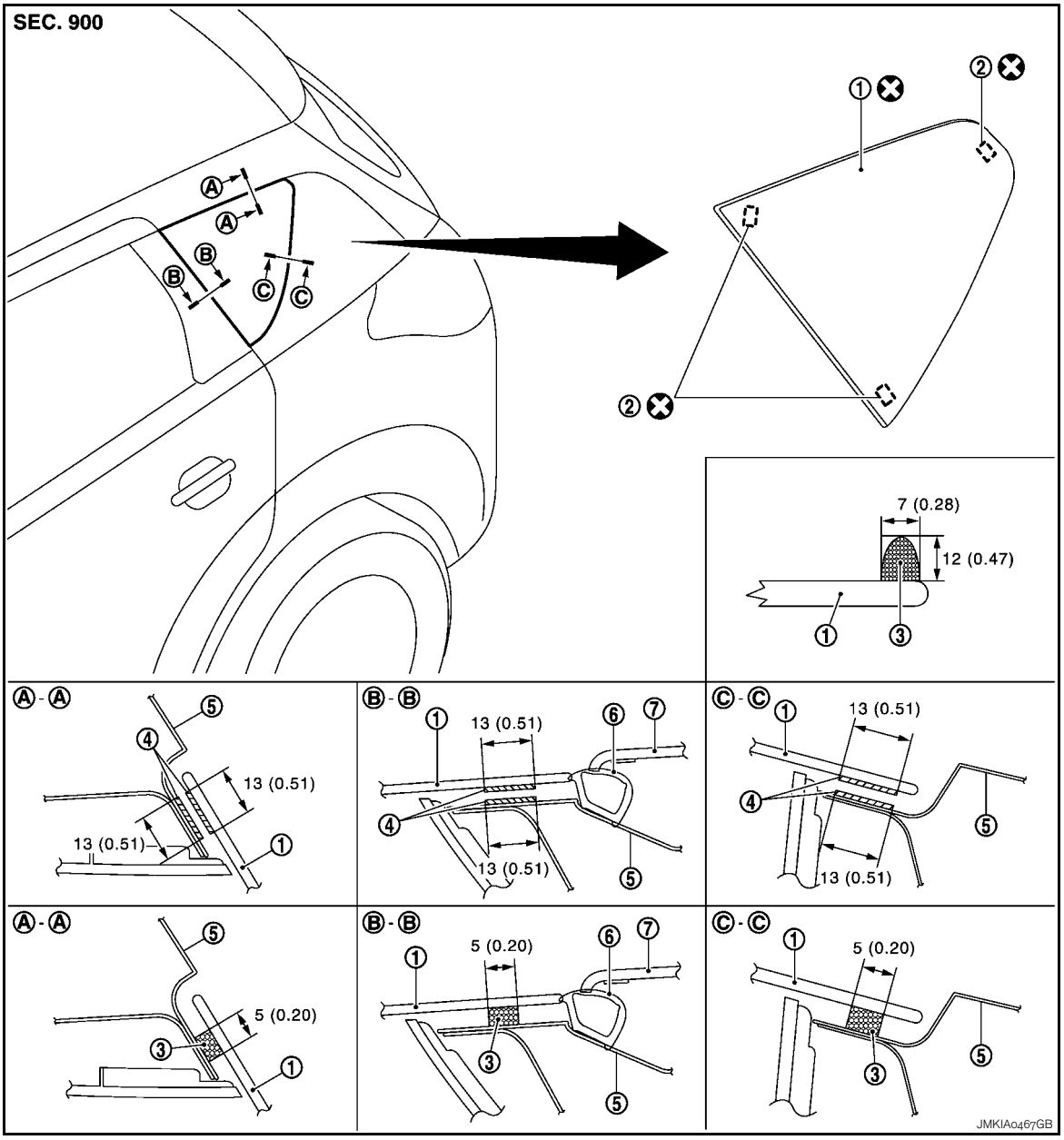
- **Do not use an adhesive which is past its usable term. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidity. The curing time will increase under lower temperature and lower humidity.**

cardiagn.com

SIDE WINDOW GLASS

Exploded View

INFOID:0000000001094008



1. Side window glass
2. Spacer
3. Adhesive
4. Primer
5. Body side outer panel
6. Rear door weather strip
7. Rear door outer panel

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001096058

REMOVAL

1. Remove the rear pillar finisher. Refer to INT-14, "Removal and Installation".
2. Remove the headlining. Refer to INT-21, "Removal and Installation".
3. Apply protective tape around the side window to protect the painted surface from damage.
4. Remove the side window glass using piano wire or power cutting tool and an inflatable pump bag.

WARNING:
When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.
CAUTION:
- **Be careful not to scratch the glass when removing.**
- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**

INSTALLATION
- Use a genuine Nissan Urethane Adhesive Kit (if available) or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger room air pressure when a door is closed.
- The molding must be installed securely so that it is in position and leaves no gap.
- Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:
- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the side window in case of an accident.**

CAUTION:
- **Do not use an adhesive which is past its usable term. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidity. The curing time will increase under lower temperature and lower humidity.**

Repairing Water Leaks

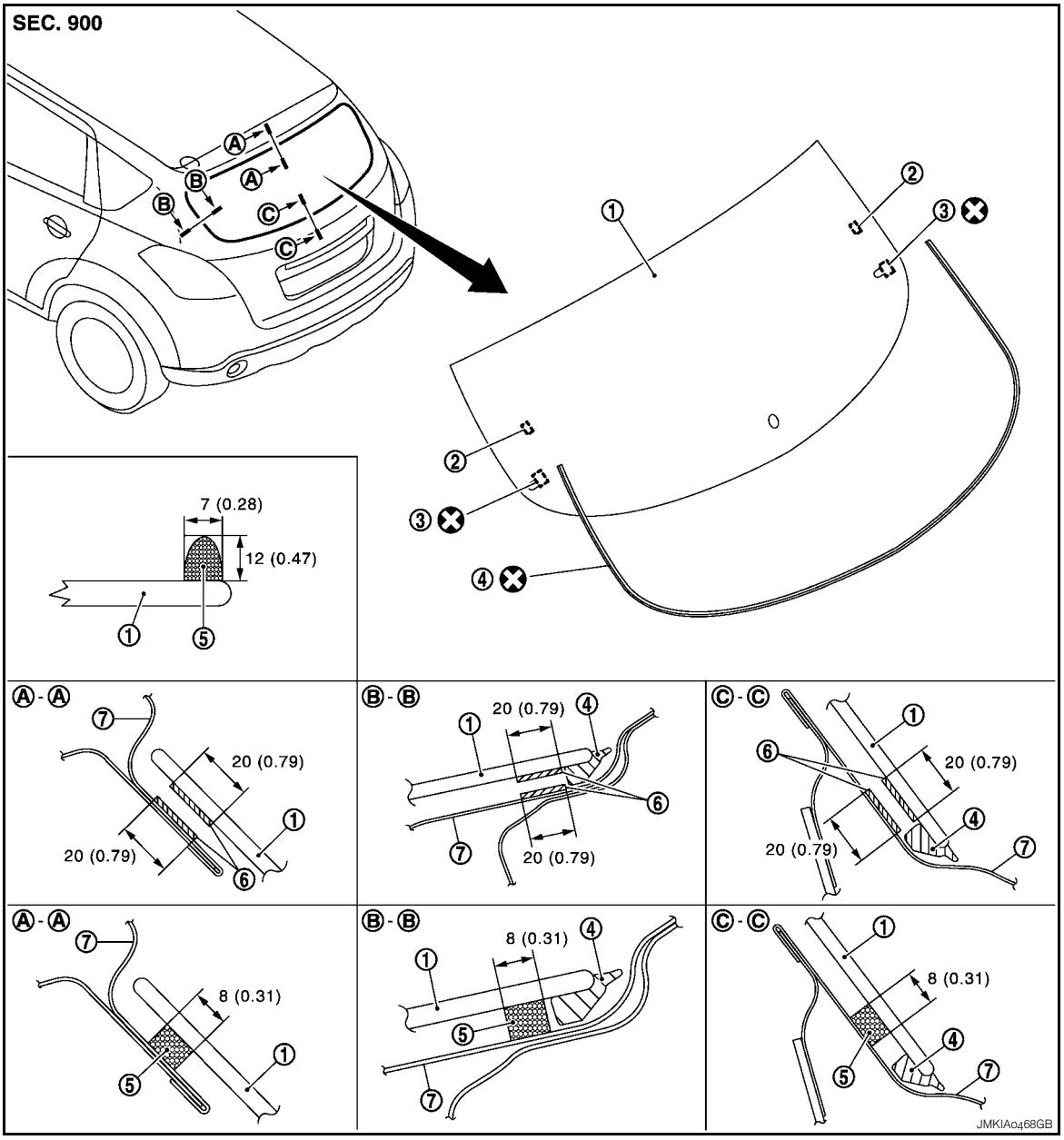
Leaks can be repaired without removing and reinstalling glass.
If water is leaking between the urethane adhesive material and body or glass, determine the extent of leakage. This can be done by applying water to the side window area while pushing glass outward.
To stop the leak, apply primer (if necessary) and then urethane adhesive to the leak point.

cardiagn.com

BACK DOOR WINDOW GLASS

Exploded View

INFOID:0000000001093977



1. Back door window glass
2. Terminal
3. Back door glass holder
4. Back door molding
5. Adhesive
6. Primer
7. Back door outer panel

Refer to GI-4, "Components" for symbols in the figure.

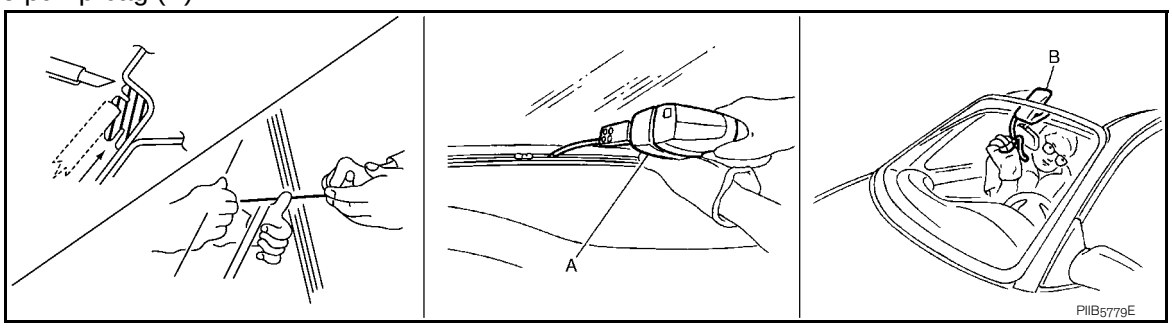
Removal and Installation

INFOID:0000000001093978

REMOVAL

1. Remove the back door trim finisher upper and lower. Refer to INT-26, "Removal and Installation"
2. Remove the connectors and grounds for the back door window defogger and printed antenna.
3. Remove the rear wiper arm and moter.Refer to WW-112, "Removal and Installation".

4. After removing molding using pliers, remove glass using piano wire or power cutting tool (A) and an inflatable pump bag (B).



5. If a rear window glass is reused, mark the body and the glass with matching marks.

WARNING:
When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.
CAUTION:
- **When a window glass is reused, do not use a cutting knife or power cutting tool.**
- **Do not scratch the glass when removing.**
- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**

INSTALLATION
- The dam rubber should be installed in position.
- Use a genuine Nissan Urethane Adhesive Kit (if available) or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger compartment air pressure when a door is closed.
- The molding must be installed securely so that it is in position and leaves no gap.
- Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:
- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the rear window in case of an accident.**

CAUTION:
- **Perform adjustment of front wiper stop location. Refer to WW-113, "Adjustment".**
- **Do not use an adhesive which is past its usable term. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidity. The curing time will increase under lower temperature and lower humidity.**

Inspection

INFOID:0000000001093979

REPAIRING WATER LEAKAGE

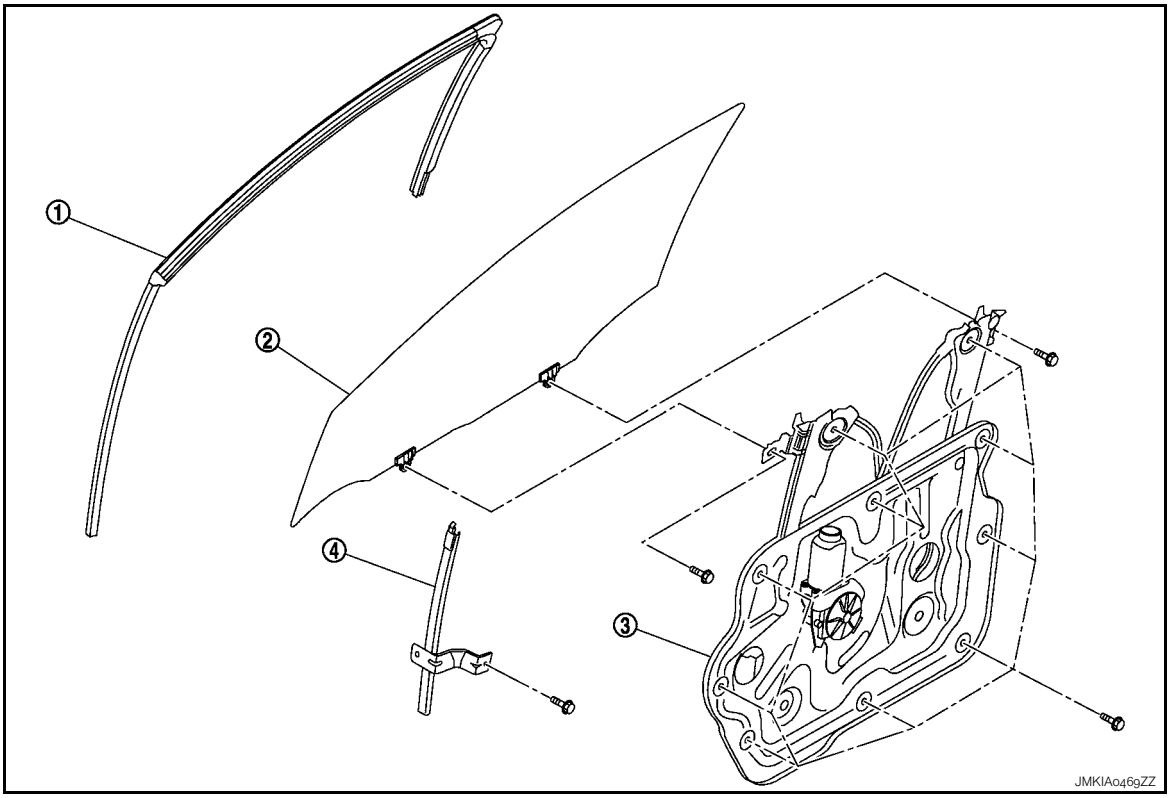
Leakage can be repaired without removing and reinstalling glass.
If water is leaking between the urethane adhesive material and body or glass, determine the extent of leakage. This can be done by applying water to the side window area while pushing glass outward.
To stop the leakage, apply primer (if necessary) and then urethane adhesive to the leakage point.

cardiagn.com

FRONT DOOR GLASS

Exploded View

INFOID:0000000001093980



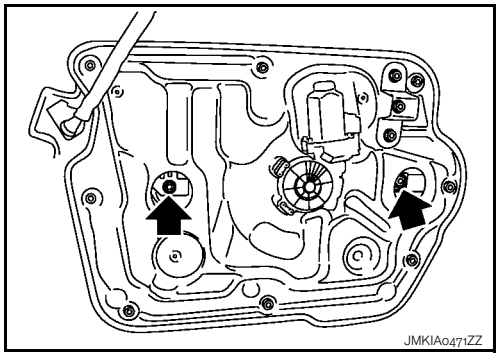
1. Door glass run
2. Door glass
3. Module assembly
4. Front door sash

Removal and Installation

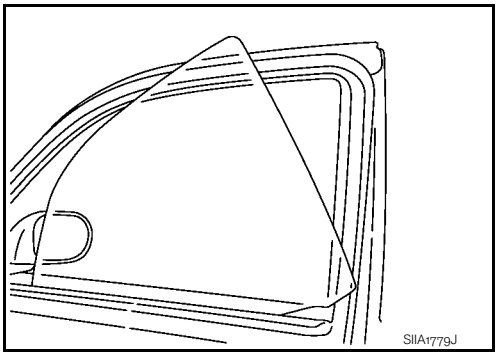
INFOID:0000000001093981

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the corner cover.
3. Operate the power window main switch to raise/lower the door glass until the glass mounting bolts can be seen.
4. Remove the door glass mounting bolts.



5. While holding the door glass, raise it at the rear end to pull the glass out of the sash toward the inside of the door.



6. Remove the door glass run.
7. Remove the front door sash mounting bolt, and remobe the front door sash.

INSTALLATION

Install in the reverse order of removal.

Inspection and Adjustment

INFOID:0000000001093982

SYSTEM INITIALIZATION

If any of the following work has been done, initialize the system.

- Electric power supply to power window switch or motor is interrupted by blown fuse or disconnecting battery cable, etc.
- Removal and installation of the regulator assembly.
- Removal and installation of the motor from the regulator assembly.
- Removal and installation of the harness connector of the power window switch.
- Operation of the regulator assembly as a unit.
- Removal and installation of the door glass.
- Removal and installation of the door glass run.

Initialization

After installing each component to the vehicle, follow the steps below.

1. Disconnect the minus terminal of battery or disconnect power window switch harness connector temporarily, then reconnect after at least 1 minute.
2. Turn ignition switch ON.
3. Operate power window switch to make over a half of the window area open.
4. Fully draw the power window switch in the up direction (auto close position) and hold, keep holding the switch even when window is completely closed and then release after 2 seconds have passed.
5. Inspect the anti-pinch system function.
   NOTE:
   Initialization may be cancelled with continuous opening and closing operation. In this case, initialize the system.

INSPECT THE FUNCTION OF THE ANTI-PINCH SYSTEM

1. Fully open the door glass.
2. Place a wooden piece (wooden hammer handle, etc.) at near fully closed position.
3. Perform fully closing operation with auto up switch.

- Check that the glass reverses without pinching the wooden piece, is lowered approximately 150 mm (5.91 in) or for 2 seconds and then stops.
- The glass should not be raised with power window main switch operated while it is reversing or lowering.

CAUTION:

- **Do not inspect by pinching a part of worker's body, a hand, etc. Be careful not to be pinched.**
- **Check that the auto up function is normal before inspection following the system initialization.**

FITTING INSPECTION

- Check that the glass is securely fit into the glass run groove.

cardiagn.com

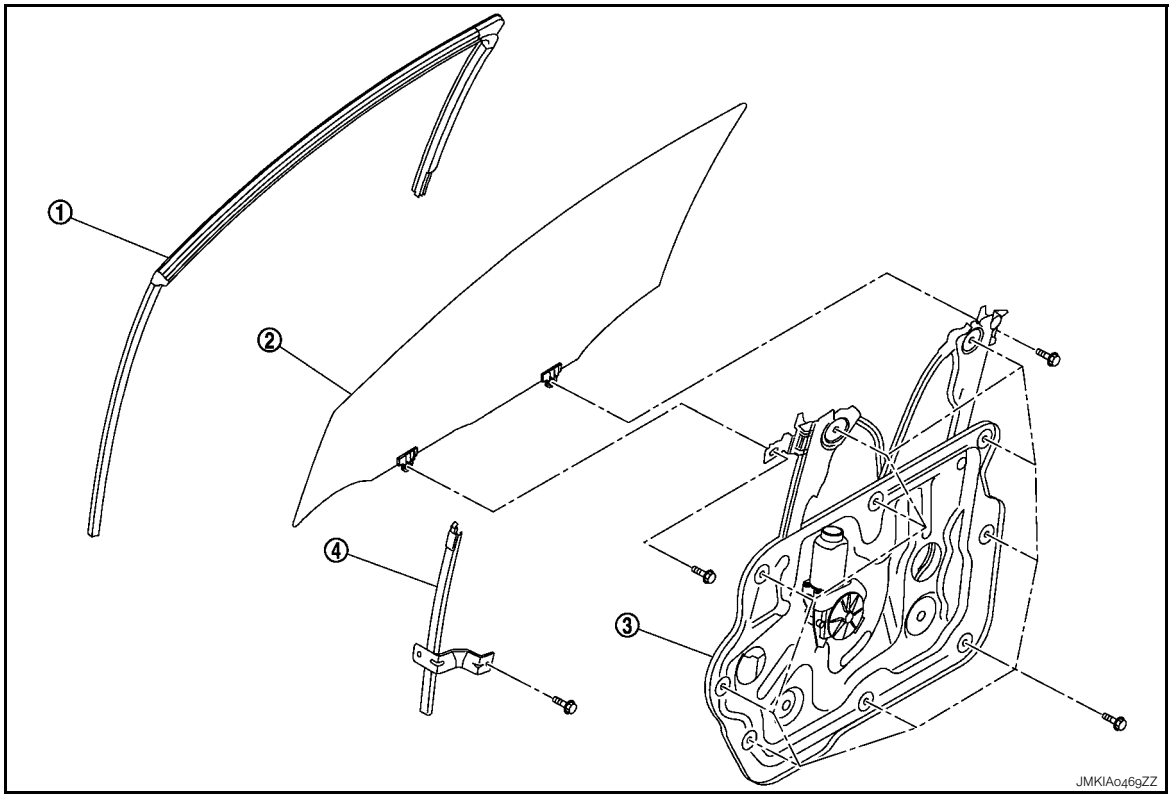
- Lower the glass slightly [approximately 10 to 20 mm (0.39 to 0.79 in)] and check that the clearance to the sash is parallel. If the clearance between the glass and sash is not parallel, loosen the regulator mounting bolts, guide rail mounting bolts, and glass and guide rail mounting bolts to correct the glass position.

ardiagn.com

FRONT REGULATOR

Exploded View

INFOID:0000000001093983



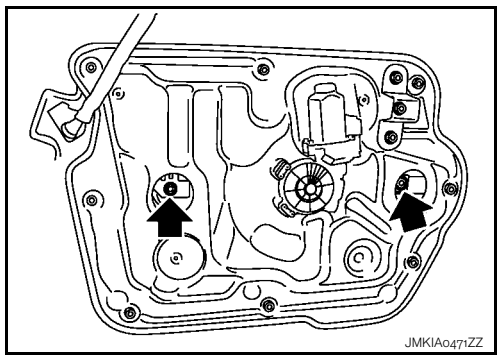
1. Door glass run
2. Door glass
3. Regulator assembly

Removal and Installation

INFOID:0000000001093984

REMOVAL

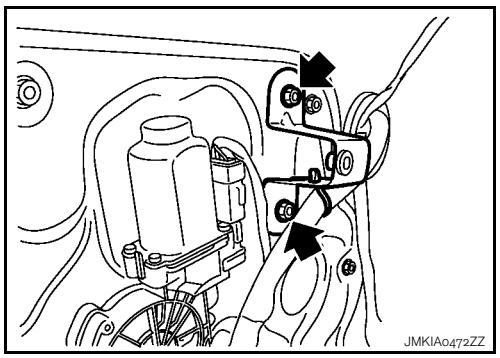
1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the corner cover.
3. Operate the power window main switch to raise/lower the door glass until the glass mounting bolts can be seen.
4. Remove the door glass mounting bolts.



5. Raise up the door glass and hold with a suction lifter.
6. Disconnect the harness connector for the regulator assembly, and remove the harness clip.

cardiagn.com

7. Remove the harness clip from front door inner bracket, and remove the front door inner bracket.



8. Remove the bolt from inside handle.
9. Remove the regulator assembly mounting bolts.
10. Remove the regulator assembly.

INSTALLATION

Install in the reverse order of removal.

Inspection and Installation

INFOID:0000000001093986

Inspection after Removal

Check the regulator assembly for the following items. If a malfunction is detected, replace or grease it.
- Wire wear
- Regulator deformation
- Grease condition for each sliding part

The arrows in the figure show the application points of the multi-purpose grease.

SYSTEM INITIALIZATION

If any of the following work has been done, initialize the system.
- Electric power supply to power window switch or motor is interrupted by blown fuse or disconnecting battery cable, etc.
- Removal and installation of the regulator assembly.
- Removal and installation of the motor from the regulator assembly.
- Removal and installation of the harness connector of the power window switch.
- Operation of the regulator assembly as a unit.
- Removal and installation of the door glass.
- Removal and installation of the door glass run.

Initialization

After installing each component to the vehicle, follow the steps below.

1. Disconnect the minus terminal of battery or disconnect power window switch harness connector temporarily, then reconnect after at least 1 minute.
2. Turn ignition switch ON.
3. Operate power window switch to make over a half of the window area open.
4. Fully draw the power window switch in the up direction (auto close position) and hold, keep holding the switch even when window is completely closed and then release after 3 seconds have passed.
5. Inspection of the anti-pinch system function.
   NOTE:
   Initialization may be cancelled with continuous opening and closing operation. In this case, initialize the system.

INSPECT THE FUNCTION OF THE ANTI-PINCH SYSTEM

1. Fully open the door glass.
2. Place a wooden piece (wooden hammer handle, etc.) at near fully closed position.
3. Perform fully closing operation with auto up switch.

- Check that the glass reverses without pinching the wooden piece, is lowered approximately 150 mm (5.91 in) or for 2 seconds and then stops.
- The glass should not be raised with power window main switch operated while it is reversing or lowering.

carsdiagn.com

CAUTION:
- **Do not inspect by pinching a part of worker's body, a hand etc. Be careful not to be pinched.**
- **Check that the auto up function is normal before inspection following the system initialization.**

FITTING INSPECTION

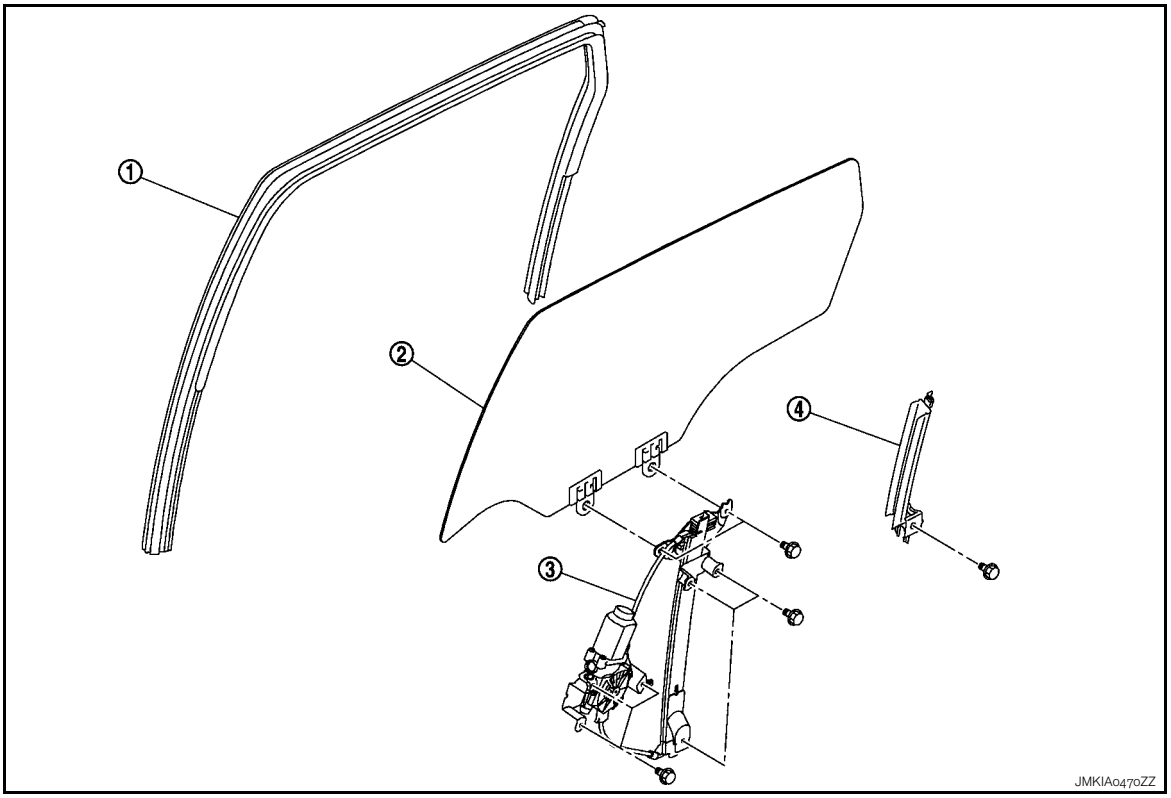
- Check that the glass is securely fit into the glass run groove.
- Lower the glass slightly [approximately 10 to 20 mm (0.39 to 0.79 in)] and check that the clearance to the sash is parallel. If the clearance between the glass and sash is not parallel, loosen the regulator mounting bolts, guide rail mounting bolts, and glass and guide rail mounting bolts to correct the glass position.

cardiagn.com

REAR DOOR GLASS

Exploded View

INFOID:0000000001093987



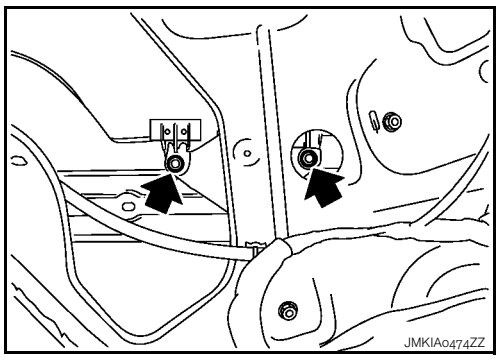
1. Door glass run
2. Door glass
3. Regulator assembly
4. Rear door sash

Removal and Installation

INFOID:0000000001093988

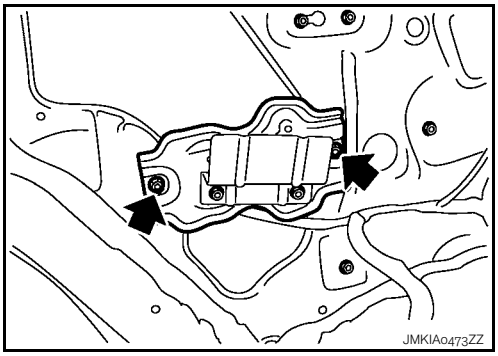
REMOVAL

1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Disconnect the rear door speaker connector.
3. Remove the rear door inner bracket.



4. Remove the sealing screen.
5. Remove the cover rear door inner. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
6. Remove the seal assembly rear door inside. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
7. Remove the door glass run.

8. Operate the power window switch to raise/lower the door window until the glass mounting bolts can be seen.
9. Remove the glass mounting bolts.



10. Remove the door glass from the inside of door panel.
11. Remove the rear door sash mounting bolts, and remove the rear door sash.

INSTALLATION

Install in the reverse order of removal.

Inspection and Adjustment

INFOID:0000000001093989

SYSTEM INITIALIZATION OF ANTI-PINCH SYSTEM

If any of the following work has been done, initialize the system.

- Electric power sauce to power window switch or motor is interrupted by broken fuse or disconnecting battery cable, etc.
- Removal and installation of the regulator assembly.
- Removal and installation of the motor from the regulator assembly.
- Removal and installation of the harness connector of the power window switch.
- Operation of the regulator assembly as a unit.
- Removal and installation of the door glass.
- Removal and installation of the door glass run.

Initialization

After installing each component to the vehicle, follow the steps below.

1. Disconnect the minus terminal of battery or disconnect power window switch harness connector temporarily, then reconnect after at least 1 minute.
2. Turn ignition switch ON.
3. Open the window to its full width by operating the power window switch. (Exclude this procedure if the window is already fully opened)
4. Fully draw the power window switch in the up direction (auto close position) and hold, continue holding the switch even when window is completely closed and then release after 3 seconds have passed.
5. Inspection of the anti-pinch system function.
   NOTE:
   Initialization may be cancelled with continuous opening and closing operation. In this case, initialize the system.

INSPECT THE FUNCTION OF THE ANTI-PINCH SYSTEM

1. Fully open the door glass.
2. Place a wooden piece (wooden hammer handle, etc.) at near fully closed position.
3. Perform fully closing operation with auto up switch.

- Check that the glass reverses without pinching the wooden piece, is lowered approximately 150 mm (5.91 in) or for 2 seconds and then stops.
- The glass should not be raised with power window main switch operated while it is reversing or lowering.

CAUTION:

- **Do not inspect by pinching a part of worker's body, a hand, etc. Be careful not to be pinched.**
- **Check that the auto up function is normal before inspection following the system initialization.**

FITTING INSPECTION

- Check that the glass is securely fit into the glass run groove.

cardiagn.com

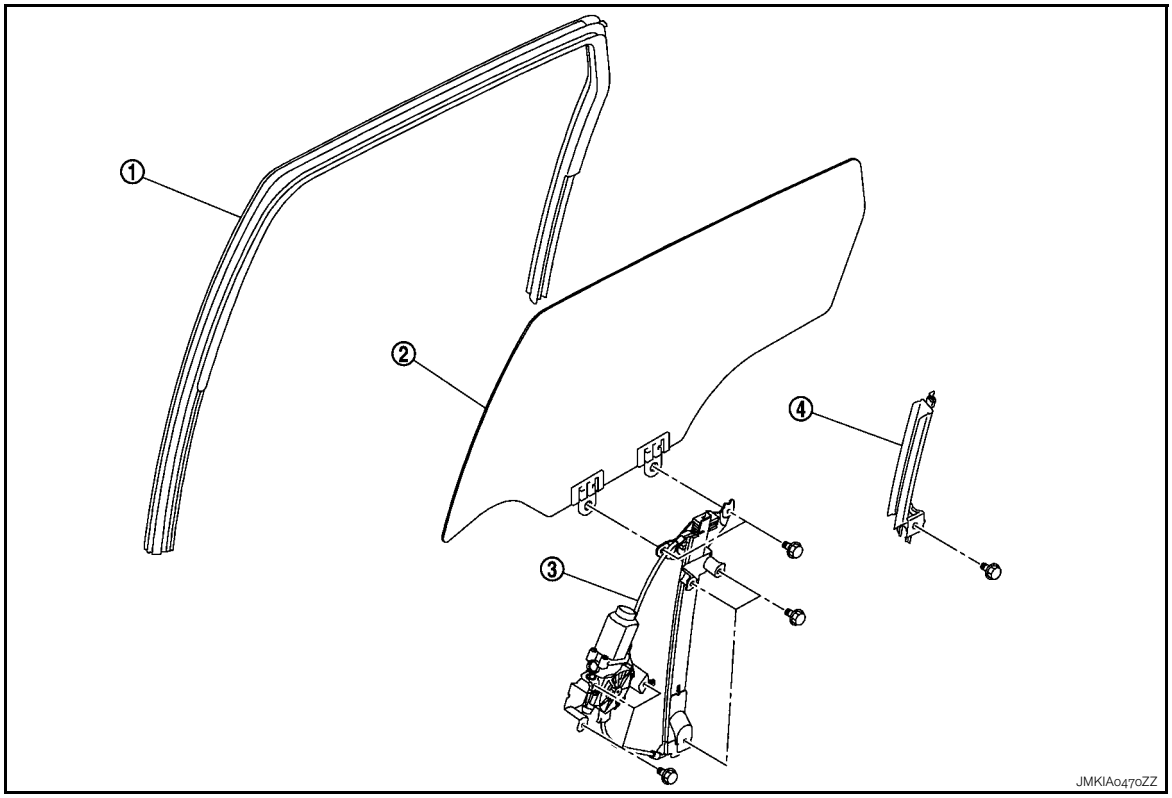
- Lower the glass slightly [approximately 10 to 20 mm (0.39 to 0.79 in)], and check that the clearance to the sash is parallel. If the clearance between the glass and sash is not parallel, loosen the regulator mounting bolts, guide rail mounting bolts, and glass and carrier plate mounting bolts to correct the glass position.

cardiagn.com

REAR REGULATOR

Exploded View

INFOID:0000000001093990



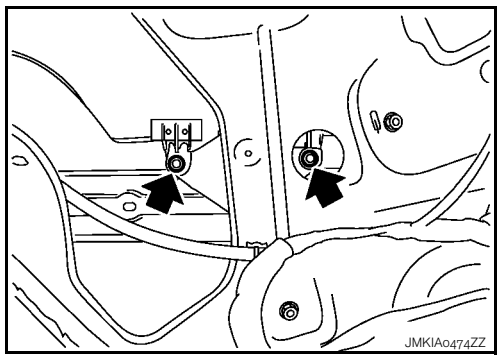
1. Door glass run
2. Door glass
3. Regulator assembly
4. Rear sash

Removal and Installation

INFOID:0000000001093991

REMOVAL

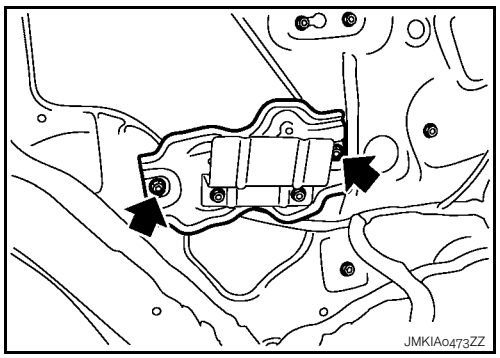
1. Remove the rear door finisher. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
2. Disconnect the rear door speaker connector.
3. Remove the rear door inner bracket.



4. Remove the sealing screen.
5. Remove the cover rear door inner. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
6. Remove the seal assembly rear door inside. Refer to INT-13, "REAR DOOR FINISHER : Removal and Installation".
7. Remove the door glass run.

cardiagn.com

8. Operate the power window switch to raise/lower the door window until the glass mounting bolts can be seen.
9. Remove the glass mounting bolts.



10. Raise up the door glass and hold with a suction lifter.
11. Disconnect the connector for the regulator assembly.
12. Remove the regulator assembly mounting bolts, and remove the regulator assembly from the door panel.

INSTALLATION

Install in the reverse order of removal.

Inspection and Adjustment

INFOID:0000000001093993

Inspection after Removal

Check the regulator assembly for the following items. If a malfunction is detected, replace or grease it.

- Gear wear
- Regulator deformation
- Grease condition for each sliding part

The arrows in the figure show the application points of the multi-purpose grease.

SYSTEM INITIALIZATION OF THE ANTI-PINCH SYSTEM

If any of the following work has been done, initialize the system.

- Electric power sauce to power window switch or motor is interrupted by broken fuse or disconnecting battery cable, etc.
- Removal and installation of the regulator assembly.
- Removal and installation of the motor from the regulator assembly.
- Removal and installation of the harness connector of the power window switch.
- Operation of the regulator assembly as a unit.
- Removal and installation of the door glass.
- Removal and installation of the door glass run.

Initialization

After installing each component to the vehicle, follow the steps below.

1. Disconnect the minus terminal of battery or disconnect power window switch harness connector temporarily, then reconnect after at least 1 minute.
2. Turn ignition switch ON.
3. Open the window to its full width by operating the power window switch. (Exclude this procedure if the window is already fully opened)
4. Fully draw the power window switch in the up direction (auto close position) and hold, continue holding the switch even when window is completely closed and then release after 3 seconds have passed.
5. Inspection of the anti-pinch system function.
   NOTE:
   Initialization may be cancelled with continuous opening and closing operation. In this case, initialize the system.

INSPECT THE FUNCTION OF THE ANTI-PINCH SYSTEM

1. Fully open the door glass.
2. Place a wooden piece (wooden hammer handle, etc.) at near fully closed position.
3. Perform out fully closing operation with auto up switch.

- Check that the glass reverses without pinching the wooden piece, is lowered approximately 150 mm (5.91 in) or for 2 seconds and then stops.

A B C D E F G H I J GW L M N O P
carsdiagn.com

- The glass should not be raised with power window main switch operated while it is reversing or lowering.

CAUTION:

- **Do not inspect by pinching a part of worker's body, a hand, etc. Be careful not to be pinched.**
- **Check that the auto up function is normal before inspection following the system initialization.**

FITTING INSPECTION

- Check that the glass is securely fit into the glass run groove.
- Lower the glass slightly [approximately 10 to 20 mm (0.39 to 0.79 in)], and check that the clearance to the sash is parallel. If the clearance between the glass and sash is not parallel, loosen the regulator mounting bolts, guide rail mounting bolts, and glass and carrier plate mounting bolts to correct the glass position.

cardiagn.com

SECTION HAC

HEATER & AIR CONDITIONING CONTROL SYSTEM

CONTENTS

AUTOMATIC AIR CONDITIONER

BASIC INSPECTION 5

DIAGNOSIS AND REPAIR WORKFLOW 5
Work Flow 5

INSPECTION AND ADJUSTMENT 6
Description & Inspection 6

FUNCTION DIAGNOSIS 10

COMPRESSOR CONTROL FUNCTION 10
Description 10
Component Part Location 10
Component's role 13

AUTOMATIC AIR CONDITIONER SYSTEM 15
System Diagram 15
System Description 15
Component Part Location 21
Component Description 24

CAN COMMUNICATION SYSTEM 26
System Description 26

DIAGNOSIS SYSTEM (AUTO AMP.) 27
Diagnosis Description 27
CONSULT-III Function 31

DIAGNOSIS SYSTEM (BCM) 33

COMMON ITEM 33
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 33

AIR CONDITIONER 33
AIR CONDITIONER : CONSULT-III Function (BCM - AUTO AIR CONDITIONER) 33

PTC HEATER 34
PTC HEATER : CONSULT-III Function (BCM - PTC HEATER) 34

MODE DOOR CONTROL SYSTEM 35
Description 35

HIGH-LEVEL VENTILATOR DOOR CONTROL SYSTEM 37
Description 37

AIR MIX DOOR CONTROL SYSTEM 39
Description 39

INTAKE DOOR CONTROL SYSTEM 41
Description 41

BLOWER MOTOR CONTROL SYSTEM 43
Description 43

MAGNET CLUTCH CONTROL SYSTEM 45
Description 45

PTC HEATER CONTROL SYSTEM 46
Description 46

COMPONENT DIAGNOSIS 47

MODE DOOR MOTOR 47
Description 47
Component Function Check 47
Diagnosis Procedure 47

HIGH-LEVEL VENTILATOR DOOR MOTOR 50
Description 50
Component Function Check 50
Diagnosis Procedure 50
Component Inspection 52

AIR MIX DOOR MOTOR 54
Description 54
Component Function Check 54
Diagnosis Procedure 54

INTAKE DOOR MOTOR 59
Description 59
Component Function Check 59

Diagnosis Procedure 59

BLOWER MOTOR 62
Description 62
Component Function Check 62
Diagnosis Procedure 62
Component Inspection 65

MAGNET CLUTCH 66
Description 66
Component Function Check 66
Diagnosis Procedure 66
Component Inspection 70

PTC HEATER 71
Description 71
Component Function Check 71
Diagnosis Procedure 71
Component Inspection 76

OAT SENSOR 77
Description 77
Component Function Check 77
Diagnosis Procedure 77
Component Inspection 78

IN-VEHICLE SENSOR 80
Description 80
Component Function Check 80
Diagnosis Procedure 81
Component Inspection 82

SUNLOAD SENSOR 83
Description 83
Component Function Check 83
Diagnosis Procedure 83
Component Inspection 84

INTAKE SENSOR 86
Description 86
Component Function Check 86
Diagnosis Procedure 86
Component Inspection 87

POWER SUPPLY AND GROUND CIRCUIT FOR AUTO AMP. 89
Description 89
Component Function Check 89
Diagnosis Procedure 89

ECU DIAGNOSIS 91

ECM 91

HR16DE 91
HR16DE : Reference Value 91

MR20DE 91
MR20DE : Reference Value 92

K9K 92
K9K : Reference Value 92

BCM (BODY CONTROL MODULE) 94
Reference Value 94

AUTO AMP. 97
Reference Value 97
Wiring Diagram — AIR CONDITIONER CONTROL SYSTEM — 100

SYMPTOM DIAGNOSIS 108

AIR CONDITIONER CONTROL 108
Diagnosis Chart By Symptom 108

INSUFFICIENT COOLING 109
Description 109
Inspection procedure 109

INSUFFICIENT HEATING 111
Description 111
Inspection procedure 111

NOISE 113
Description 113
Inspection procedure 113

SELF-DIAGNOSIS CANNOT BE PERFORMED 115
Description 115
Inspection procedure 115

MEMORY FUNCTION DOES NOT OPERATE. 116
Description 116
Inspection procedure 116

PRECAUTION 117

PRECAUTIONS 117
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 117
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 117
Precaution for Procedure without Cowl Top Cover. 117
Working with HFC-134a (R-134a) 118
General Refrigerant Precaution 118
Refrigerant Connection 118
Service Equipment 121

COMPRESSOR 123
General Precautions 123

FLUORESCENT LEAK DETECTOR 124
General Precautions 124

MANUAL AIR CONDITIONER

BASIC INSPECTION 125

DIAGNOSIS AND REPAIR WORKFLOW 125
Work Flow 125

INSPECTION AND ADJUSTMENT 126
Description & Inspection 126

cardiagn.com

FUNCTION DIAGNOSIS 128

COMPRESSOR CONTROL FUNCTION 128
Description 128
Component Part Location 128
Component's role 131

MANUAL AIR CONDITIONER SYSTEM 133
System Description 133
Component Part Location 135
Component Description 138

DIAGNOSIS SYSTEM (BCM) 140

COMMON ITEM 140
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 140

AIR CONDITIONER 140
AIR CONDITIONER : CONSULT-III Function (BCM - MANUAL AIR CONDITIONER) 140

PTC HEATER 141
PTC HEATER : CONSULT-III Function (BCM - PTC HEATER) 141

HIGH-LEVEL VENTILATOR DOOR CONTROL SYSTEM 142
Description 142

INTAKE DOOR CONTROL SYSTEM 143
Description 143

BLOWER MOTOR CONTROL SYSTEM 144
Description 144

MAGNET CLUTCH CONTROL SYSTEM 145
Description 145

PTC HEATER CONTROL SYSTEM 146
Description 146

COMPONENT DIAGNOSIS 147

HIGH-LEVEL VENTILATOR DOOR MOTOR .. 147
Description 147
Component Function Check 147
Diagnosis Procedure 147
Component Inspection 149

INTAKE DOOR MOTOR 150
Description 150
Component Function Check 150
Diagnosis Procedure 150

BLOWER MOTOR 153
Description 153
Component Function Check 153
Diagnosis Procedure 153
Component Inspection 155

MAGNET CLUTCH 157
Description 157
Component Function Check 157
Diagnosis Procedure 157
Component Inspection 161

PTC HEATER 162
Description 162
Component Function Check 162
Diagnosis Procedure 162
Component Inspection 167

POWER SUPPLY AND GROUND CIRCUIT FOR HEATER CONTROL PANEL 169
Description 169
Component Function Check 169
Diagnosis Procedure 169

MANUAL AIR CONDITIONER SYSTEM 171
Wiring Diagram — AIR CONDITIONER CONTROL SYSTEM — 171

ECU DIAGNOSIS 181

ECM 181

HR16DE 181
HR16DE : Reference Value 181

MR20DE 181
MR20DE : Reference Value 182

K9K 182
K9K : Reference Value 182

BCM (BODY CONTROL MODULE) 184
Reference Value 184

SYMPTOM DIAGNOSIS 187

AIR CONDITIONER CONTROL 187
Diagnosis Chart By Symptom 187

INSUFFICIENT COOLING 188
Description 188
Inspection procedure 188

INSUFFICIENT HEATING 189
Description 189
Inspection procedure 189

NOISE 191
Description 191
Inspection procedure 191

PRECAUTION 193

PRECAUTIONS 193
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 193
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 193
Precaution for Procedure without Cowl Top Cover. 193
Working with HFC-134a (R-134a) 194

cardiagn.com

General Refrigerant Precaution 194
Refrigerant Connection 194
Service Equipment 197

COMPRESSOR 199

General Precautions 199

FLUORESCENT LEAK DETECTOR 200

General Precautions 200

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000954626

DETAILED FLOW

1.LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. (Get detailed information about the conditions and environment when the symptom occurs.)

>> GO TO 2.

2.VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-6, "Description & Inspection".

>> GO TO 3.

3.GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis (Refer to HAC-108, "Diagnosis Chart By Symptom" below).

>> GO TO 4.

4.REPAIR OR REPLACE

Repair or replace the specific parts.

>> GO TO 5.

5.FINAL CHECK

Final check.

Is the inspection result normal?

YES >> CHECK OUT
NO >> GO TO 3.

cardiagn.com

INSPECTION AND ADJUSTMENT

Description & Inspection

INFOID:0000000000954627

DESCRIPTION

The purpose of the operational check is to check if the individual system operates properly.

Conditions : Engine running at normal operating temperature

INSPECTION PROCEDURE

Memory Function

1. Turn temperature control dial (driver side) clockwise until 30.0°C is displayed.
2. Press ON/OFF switch.
3. Turn ignition switch OFF.
4. Turn ignition switch ON.
5. Press AUTO switch.
6. Confirm that the set temperature remains at previous temperature.
7. Press ON/OFF switch.

If NG, go to trouble diagnosis procedure for HAC-116, "Inspection procedure".
If OK, continue the check.

Blower

1. Turn fan control dial clockwise. Blower should operate on low speed.
2. Turn fan control dial clockwise again, and continue checking blower speed until all speeds are checked.
3. Leave blower on max. speed.

If NG, go to trouble diagnosis procedure for HAC-62, "Diagnosis Procedure".
If OK, continue the check.

Discharge Air (MODE switch and DEF switch)

1. Press MODE switches and DEF switch.
2. Each position indicator should illuminate.
3. Confirm that discharge air comes out according to the air distribution table. Refer to HAC-15, "System Description".

Discharge air flow					
Mode door position	Condition	Air outlet/distribution			
		VENT	FOOT		DEF
			Front	Rear	
	DUAL SW: OFF High-level ventilator door : SHUT	100%	—	—	—
		60%	24%	16%	—
		15%	39%	26%	20%
		10%	27%	18%	45%
		10%	—	—	90%

JPIIAoo82GB

If NG, go to trouble diagnosis procedure for HAC-47, "Diagnosis Procedure".
If OK, continue the check.

NOTE:
Confirm that the magnet clutch is engaged (sound or visual inspection) and intake door position is at FRE when the D/F or DEF is selected.

Discharge Air (High-level ventilator switch)

1. Press high-level ventilator switch. High-level ventilator switch indicator should illuminate.

cardiagn.com

2. Confirm that discharge air comes out.
3. Press high-level ventilator switch again. High-level ventilator indicator should not illuminate.

If NG, go to trouble diagnosis procedure for HAC-50, "Diagnosis Procedure".
If OK, continue the check.

Intake Air

1. Press recirculation (REC) switch. Recirculation indicator should illuminate.
2. Press fresh (FRE) switch. Fresh indicator should illuminate.
3. Listen for intake door position change. (Slight change of blower sound can be heard.)

If NG, go to trouble diagnosis procedure for HAC-59, "Diagnosis Procedure".
If OK, continue the check.

NOTE:
Confirm that the magnet clutch is engaged (sound or visual inspection) and intake door position is at FRE when the D/F or DEF is selected.

Temperature Decrease

1. Turn temperature control dial (driver side) counterclockwise until 16.0°C is displayed.
2. Check for cold air at discharge air outlets.

If NG, go to trouble diagnosis procedure for HAC-109, "Inspection procedure".
If OK, continue the check.

Temperature Increase

1. Turn temperature control dial (driver side) clockwise until 30.0°C is displayed.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for HAC-111, "Inspection procedure".
If OK, continue the check.

A/C Switch

1. Press AUTO switch and A/C switch.
2. A/C switch indicator will turn ON.
   - Confirm that the magnet clutch engages (sound or visual inspection).

Auto Mode

1. Press AUTO switch and A/C switch.
2. AUTO switch indicator will turn ON.
   - Confirm that discharge air and blower speed will depend on ambient, in-vehicle, and set temperatures.

If NG, go to trouble diagnosis procedure for HAC-89, "Diagnosis Procedure", then if necessary, trouble diagnosis procedure for HAC-66, "Diagnosis Procedure".
If all operational checks are OK (symptom cannot be duplicated), go to Incident Simulation Tests in GI-38, "Work Flow" and perform tests as outlined to simulate driving conditions environment. If symptom appears, refer to HAC-108, "Diagnosis Chart By Symptom" and perform applicable trouble diagnosis procedures.

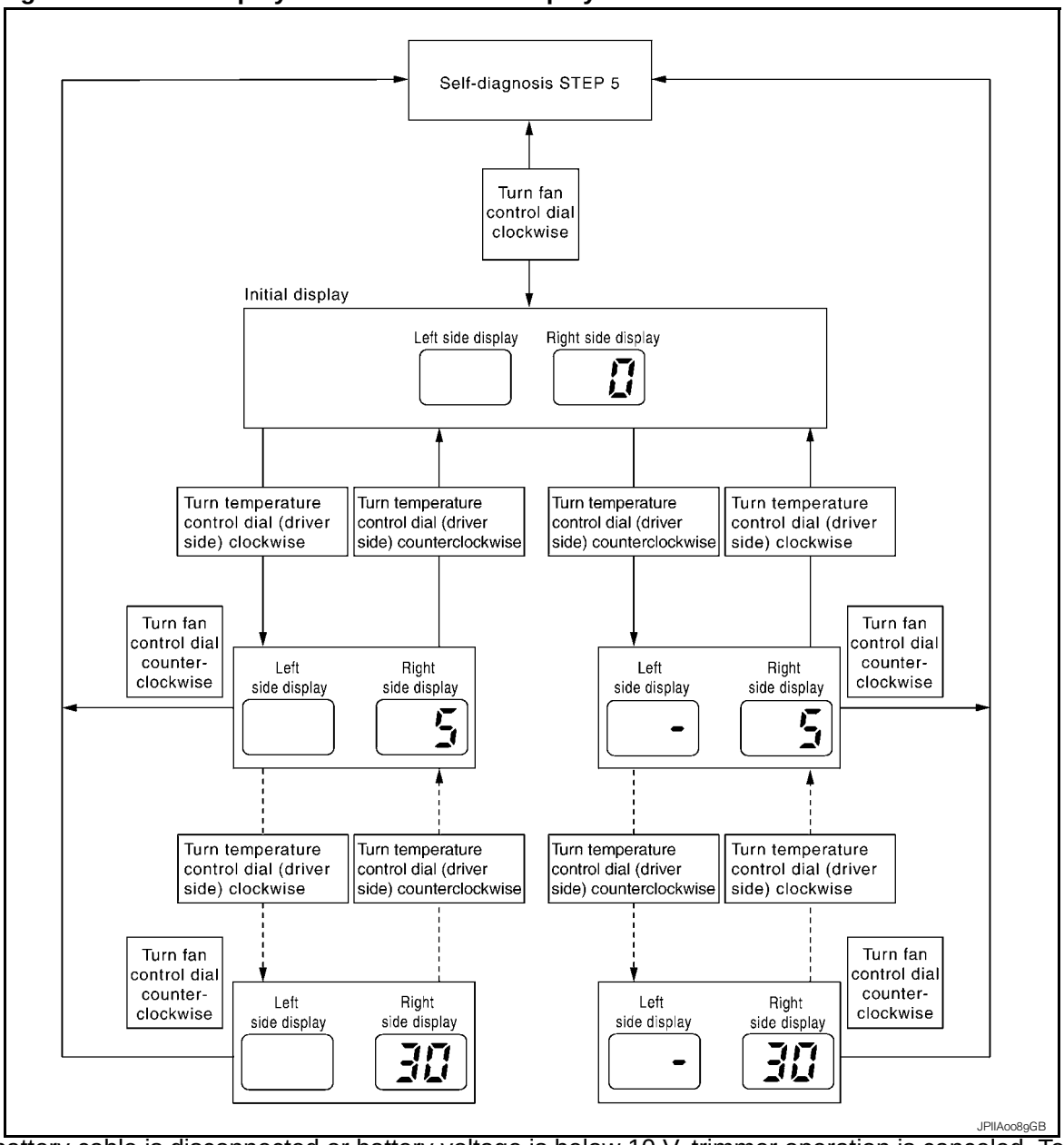
AUXILIARY MECHANISM

Temperature Setting Trimmer
The trimmer compensates for differences in range of ±3°C between temperature setting (displayed digitally) and temperature felt by customer.

Operating procedures for this trimmer are as follows:
1. Begin self-diagnosis STEP-5 mode. Refer to HAC-27, "Diagnosis Description".
2. Turn fan control dial clockwise to set system in auxiliary mode.
3. Display shows “61” in auxiliary mechanism. It takes approximately 3 seconds to enable setting operation.
4. Turn temperature control dial (driver side) as desired. Temperature will change at a rate of 0.5°C each time a dial is turned.

   CAUTION:
   - **A decimal point is not indicated on the display.**

- **Negative value is displayed on the left side display.**



When battery cable is disconnected or battery voltage is below 10 V, trimmer operation is canceled. Temperature set becomes that of initial condition, i.e. 0°C.

Foot Position Setting Trimmer
Wind distribution ratio in FOOT mode can be set.

Operating procedures for this trimmer are as follows:
1. Begin self-diagnosis STEP-5 mode. Refer to HAC-27, "Diagnosis Description".
2. Turn fan control dial clockwise to set system in auxiliary mode.
3. Press ON/OFF switch as desired.

cardiagn.com

Fan speed display	Discharge air flow							
	Automatically controls the mode door				Manually controls the mode door			
	VENT	FOOT		DEF	VENT	FOOT		DEF
		Front	Rear			Front	Rear	
1st speed (Initial setting)	15%	39%	26%	20%	19%	49%	32%	–
2nd speed	15%	39%	26%	20%	15%	39%	26%	20%
3rd speed	19%	49%	32%	–	15%	39%	26%	20%
4th speed	19%	49%	32%	–	19%	49%	32%	–

JPIIA0105GB

When battery cable is disconnected or battery voltage is below 10 V, trimmer operation is canceled. Wind distribution ratio set becomes that of initial condition.

Inlet Port Memory Function

When ignition switch is turned from OFF to ON, inlet port can be set to AUTO or manual.

Operating procedures for this trimmer are as follows:

1. Begin self-diagnosis STEP-5 mode. Refer to HAC-27, "Diagnosis Description".
2. Turn fan control dial clockwise to set system in auxiliary mode.
3. Press recirculation (REC) and fresh (FRE) switch as desired.

Switch	LED status of REC/FRE switch	Setting status	Setting changeover method
REC	ON	Manual REC status is memorized. (Initial setting)	REC SW: ON
	OFF	AUTO control	
FRE	ON	Manual FRE status is memorized.	FRE SW: ON
	OFF	AUTO control (Initial setting)	

When battery cable is disconnected or battery voltage is below 10 V, memory function is canceled. Memory function set becomes that of initial condition.

FUNCTION DIAGNOSIS

COMPRESSOR CONTROL FUNCTION

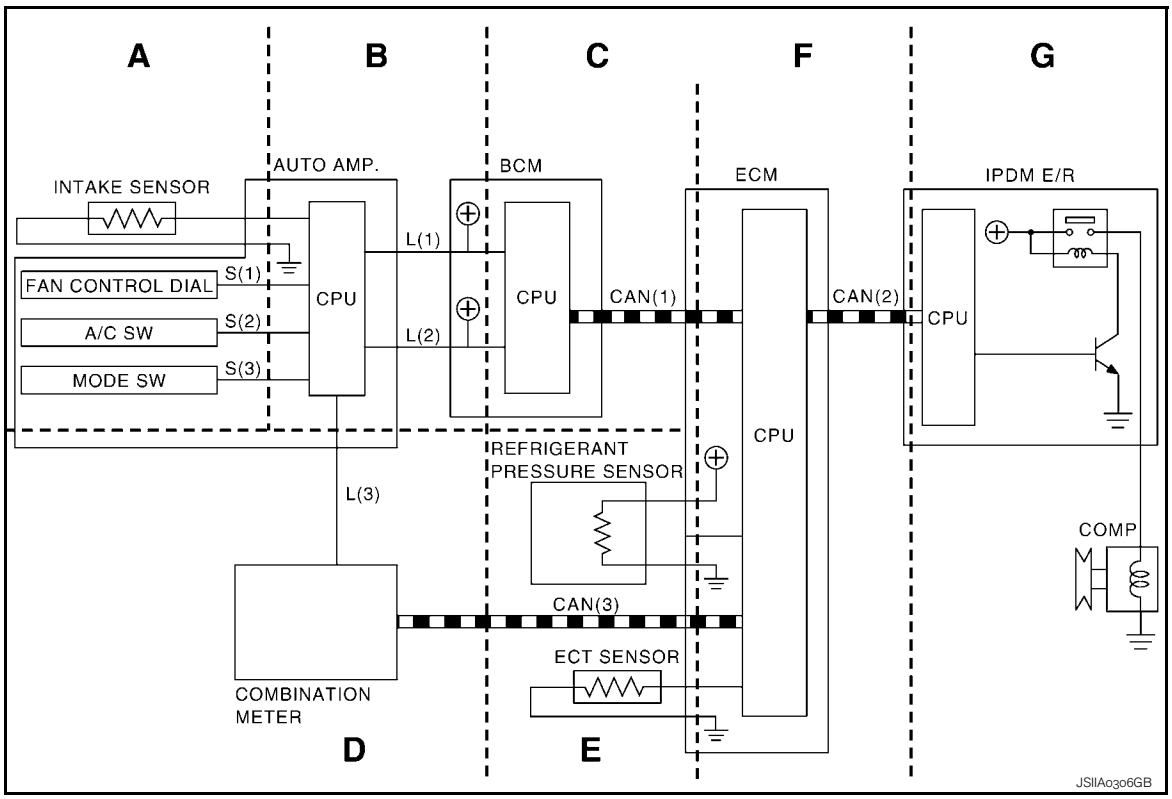
Description

INFOID:0000000000954628

PRINCIPLE OF OPERATION

Compressor is not activated.

Functional circuit diagram



L (1)	: Fan SW signal	S (3)	: Defogger signal
L (2)	: A/C SW signal	CAN (1)	: A/C signal
L (3)	: Engine coolant temperature signal	CAN (2)	: Compressor request signal
S (1)	: Fan ON signal	CAN (3)	: Engine coolant temperature signal
S (2)	: A/C SW signal		

Functional initial inspection chart

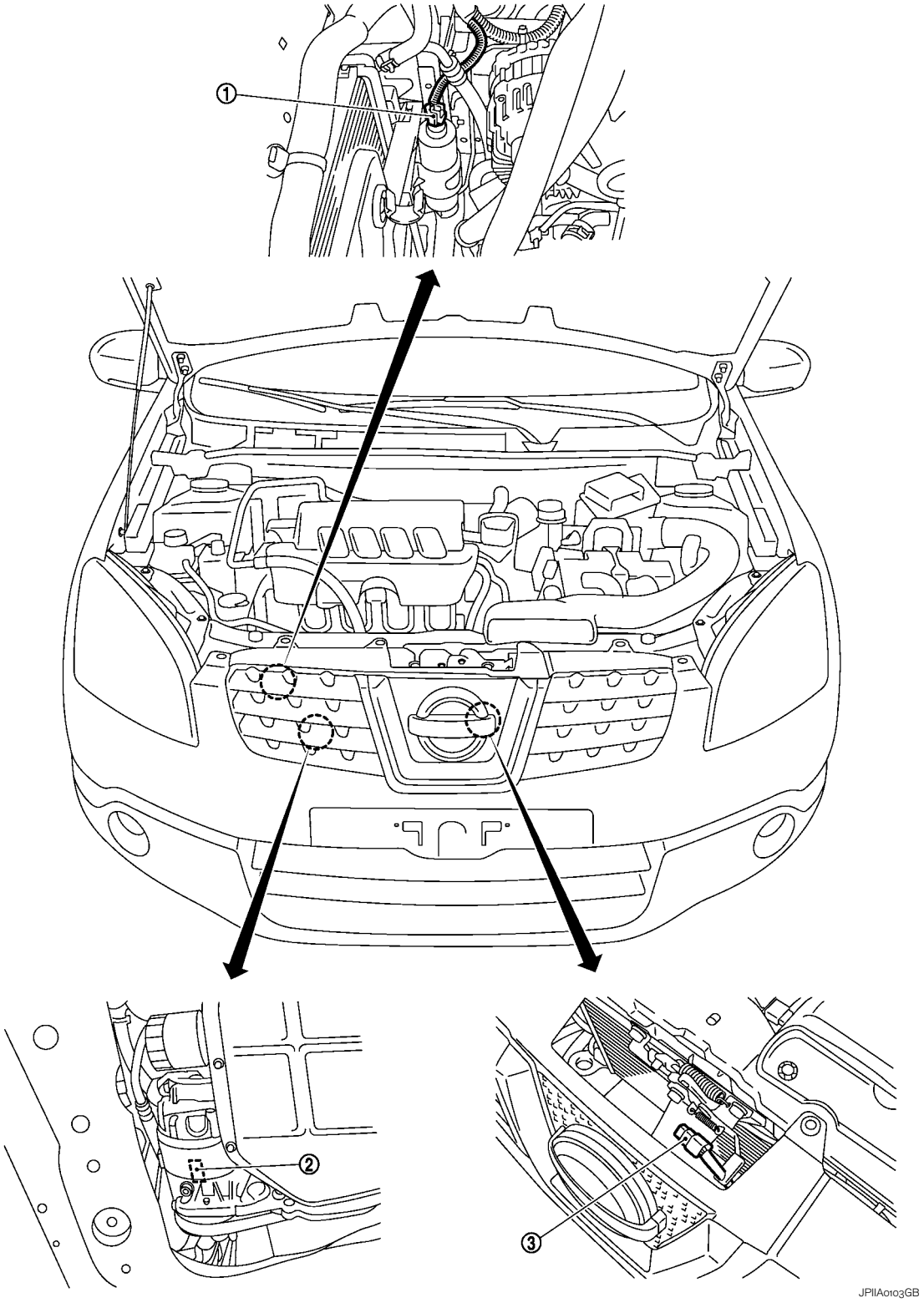
Location		A	B	C	D	E	F	G
CONSULT-III	ECM DATA MONITOR			Yes		Yes	Yes	
	BCM DATA MONITOR		Yes					
	IPDM E/R DATA MONITOR						Yes	
	COMBINATION METER DATA MONITOR				Yes			
AUTO ACTIVE TEST								Yes
Self-diagnosis function (except CAN diagnosis)		Yes	Yes					

Component Part Location

INFOID:0000000001070367

ENGINE COMPARTMENT

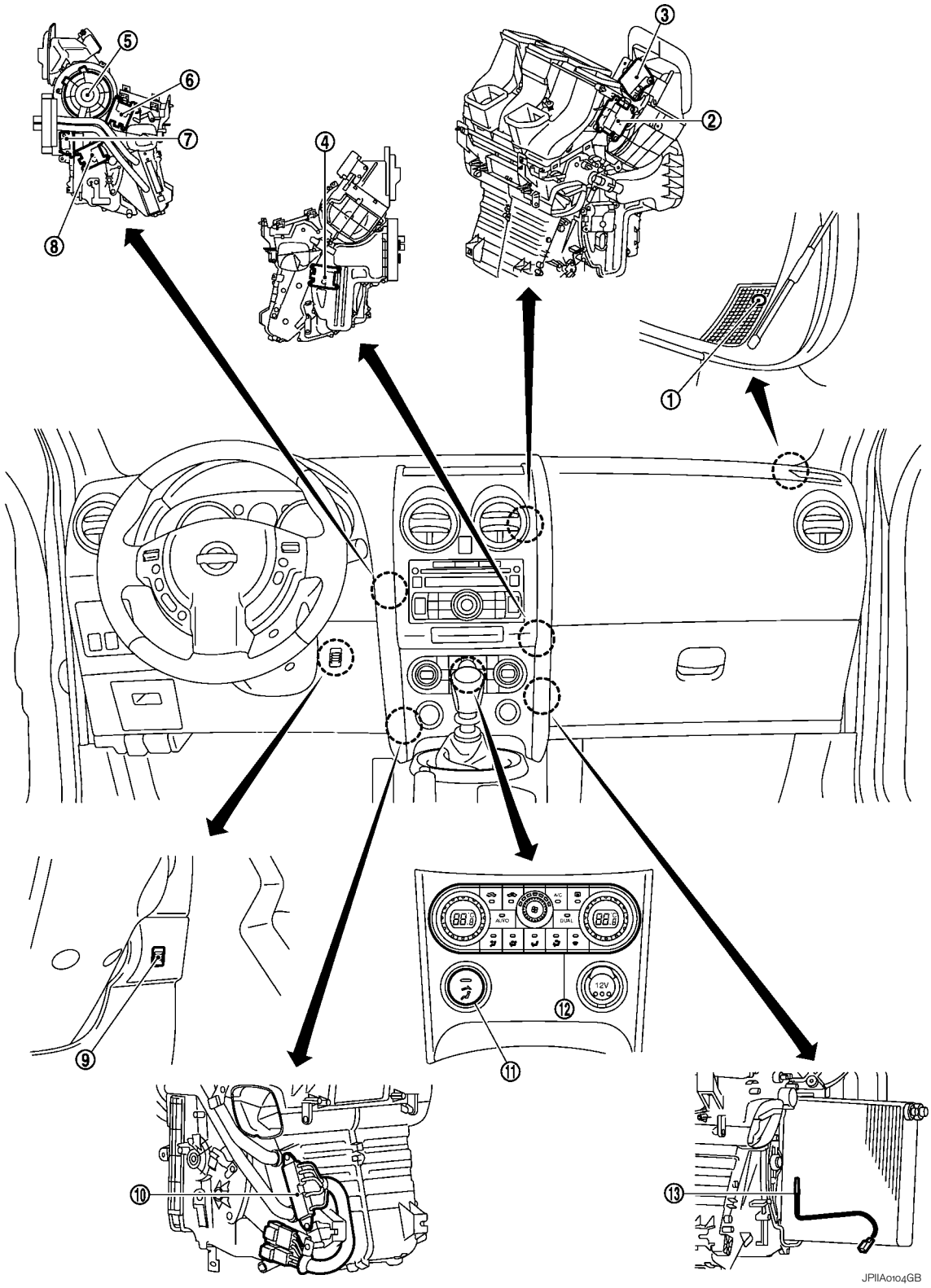
cardiagn.com



1. Refrigerant pressure sensor 2. Compressor 3. OAT sensor

PASSENGER COMPARTMENT

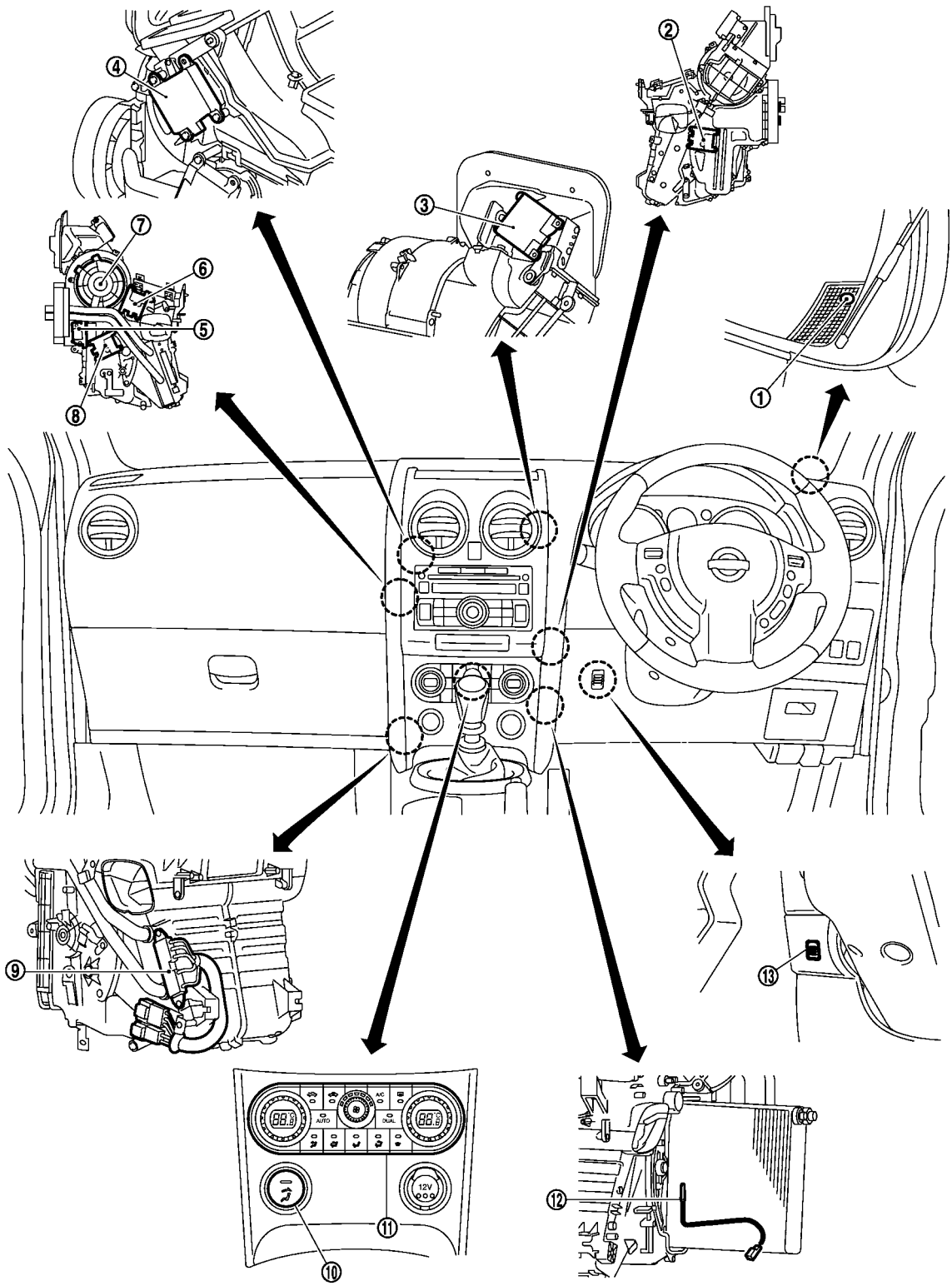
LHD Models



1. Sunload sensor
2. High-level ventilator door motor
3. Intake door motor
4. Air mix door motor (passenger side)
5. Blower motor
6. Mode door motor
7. Fan control amp.
8. Air mix door motor (driver side)
9. In-vehicle sensor
10. PTC heater
11. High-level ventilator switch
12. Auto amp.
13. Intake sensor

RHD Models

cardiagn.com



1. Sunload sensor
2. Air mix door motor (driver side)
3. Intake door motor
4. High-level ventilator door motor
5. Fan control amp.
6. Mode door motor
7. Blower motor
8. Air mix door motor (passenger side)
9. PTC heater
10. High-level ventilator switch
11. Auto amp.
12. Intake sensor
13. In-vehicle sensor

Component's role

INFOID:0000000000954630

Component	Reference
Air mix door motor	HAC-54, "Description"
Auto amp.	HAC-89, "Description"
Blower motor	HAC-62, "Description"
Compressor	HAC-66, "Description"
Fan control amp.	HAC-65, "Component Inspection"
High-level ventilator door motor	HAC-50, "Description"
High-level ventilator switch	HAC-52, "Component Inspection"
Intake door motor	HAC-59, "Description"
Intake sensor	HAC-86, "Description"
In-vehicle sensor	HAC-80, "Description"
Mode door motor	HAC-47, "Description"
OAT sensor	HAC-77, "Description"
PTC heater	HAC-76, "Component Inspection"
Refrigerant pressure sensor	HAC-70, "Component Inspection"
Sunload sensor	HAC-83, "Description"

cardiagn.com

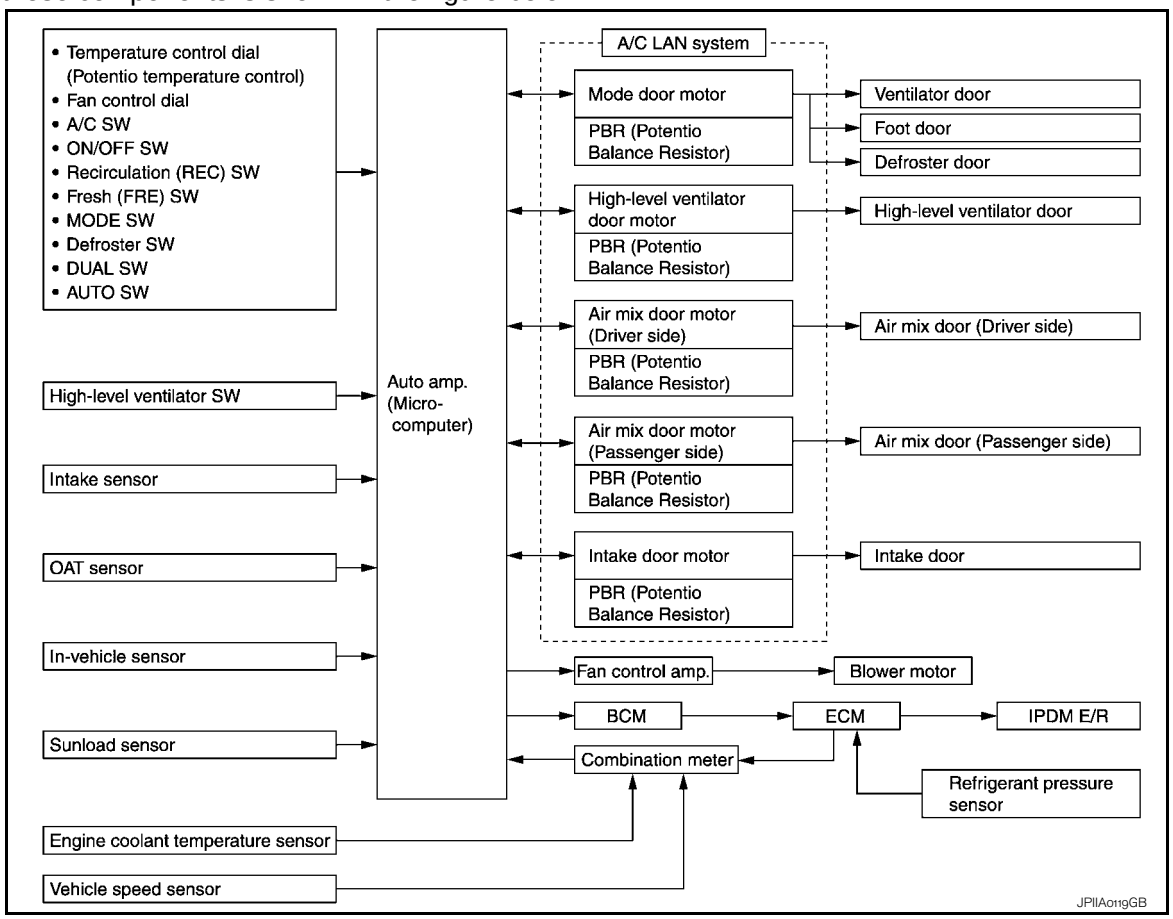
AUTOMATIC AIR CONDITIONER SYSTEM

System Diagram

INFOID:0000000000954631

CONTROL SYSTEM

The control system consists of input sensors, switches, auto amp. (microcomputer) and outputs. The relationship of these components is shown in the figure below:

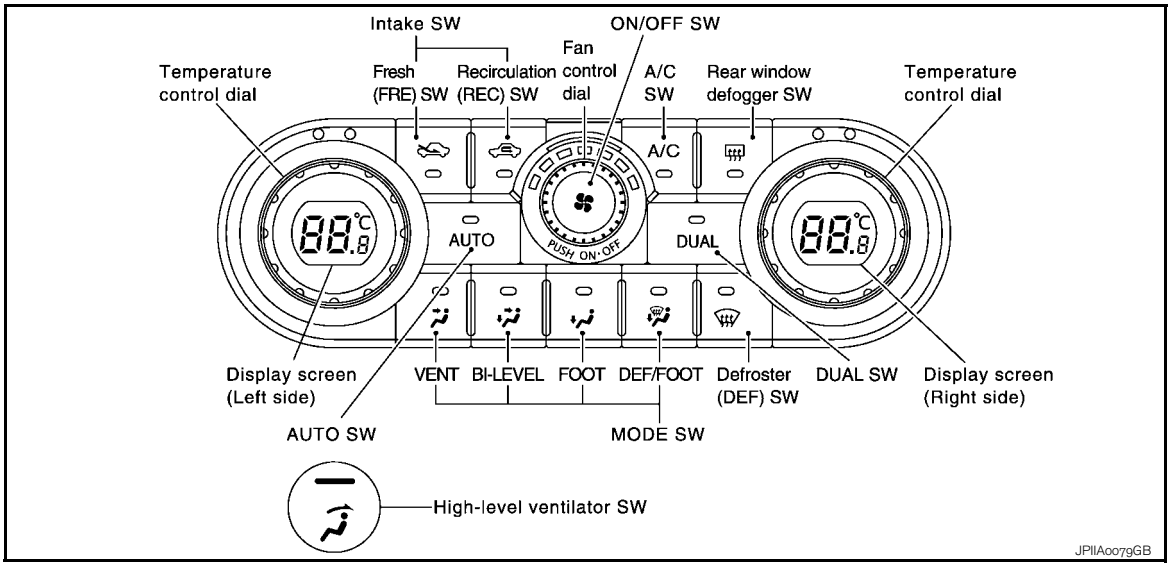


System Description

INFOID:0000000000954632

CONTROL OPERATION

Controller



MODE Switch
The air discharge outlets is controlled with there switches.

Temperature Control Dial [Potentio Temperature Control (Driver Side)]
The set temperature is increased or decreased with this dial.

Temperature Control Dial [Potentio Temperature Control (Passenger Side)]
- The set temperature is increased or decreased with this dial.
- When the temperature control dial is turned, the DUAL switch indicator will automatically illuminate.

AUTO Switch
- The compressor, intake door, air mix doors, mode doors and blower speed are automatically controlled so that the in-vehicle temperature will reach, and be maintained at the set temperature selected by the operator.
- When pressing AUTO switch, air inlet, air outlet, fan speed, and discharge air temperature are automatically controlled.

Defroster (DEF) Switch
Mode doors are set to the defrost position with this switch. Also, intake door is set to the outside air position, and compressor turns ON.

A/C Switch
Compressor is ON or OFF with this switch.
(Pressing the A/C switch when the A/C switch is ON will turn OFF the A/C switch and compressor.)

Fan Control Dial
The blower speed is manually controlled with this dial. Seven speeds are available for manual control (as shown on the LEDs).

ON/OFF Switch
Compressor and blower are OFF, mode door is set to the foot position, and intake door is automatically controlled.

Rear Window Defogger Switch
When illumination is ON, rear window is defogged.

Recirculation (REC) Switch
- When recirculation (REC) switch is ON, REC LED turns ON, and air inlet is fixed to REC.
- When press recirculation (REC) switch again, REC LED turns OFF, and then, automatic control mode is entered.
- When REC LED is turned OFF, shifting mode position to D/F or DEF, or when compressor is turned from ON to OFF, intake switch is automatically turned OFF (fixed to automatic control mode). REC mode can be re-entered by pressing intake switch again, and then compressor is turned ON. (Except D/F or DEF position)

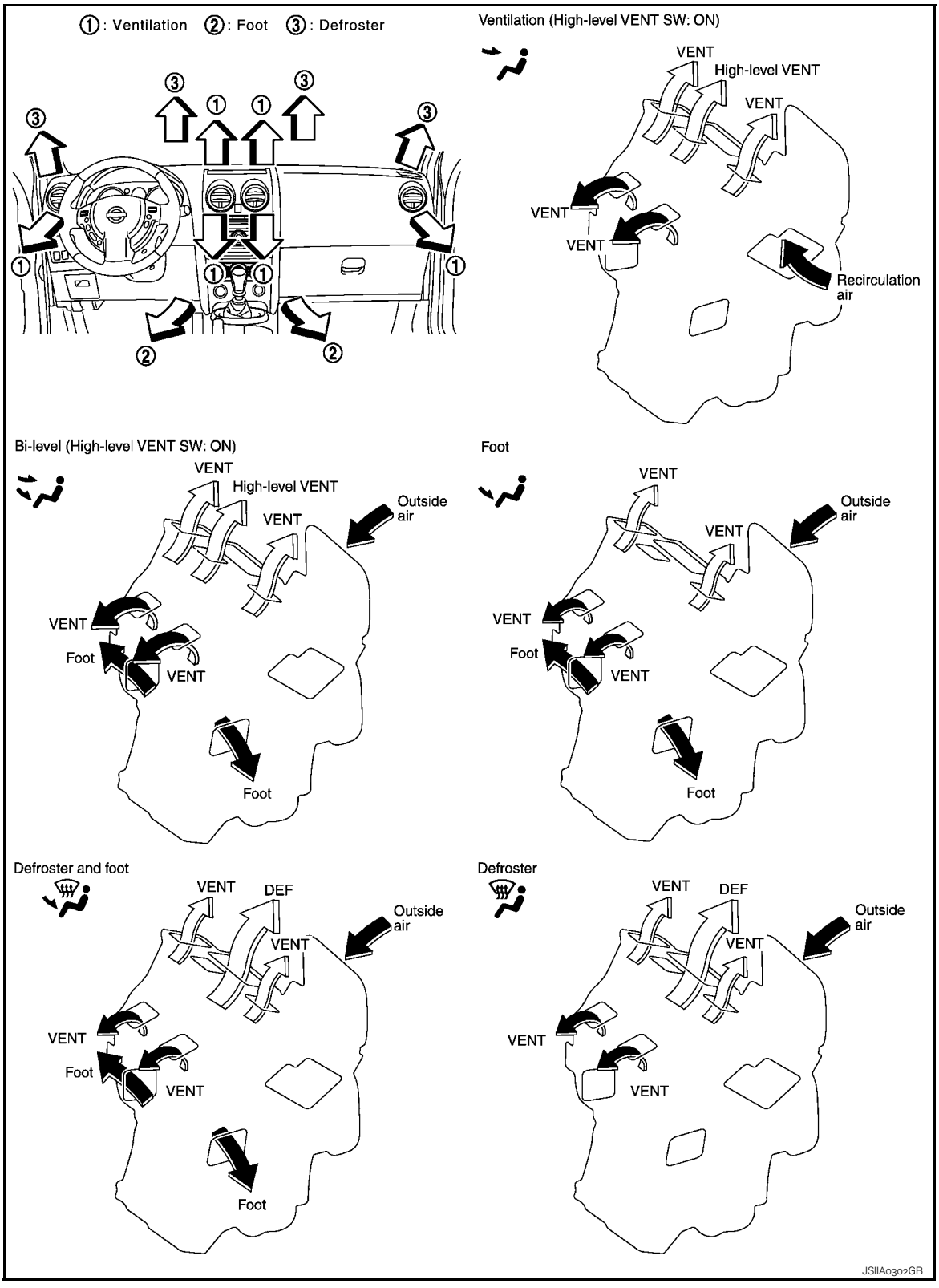
Fresh (FRE) Switch
- When fresh (FRE) switch is ON, FRE LED turns ON, and air inlet is fixed to FRE.
- When press fresh (FRE) switch again, FRE LED turns OFF, and then, automatic control mode is entered.

DUAL Switch
- When the DUAL switch LED is turned ON, the driver side and passenger side, temperature can each be set independently.
- When the DUAL switch LED is not turned OFF, the driver side outlet and setting temperature is applied to both sides.

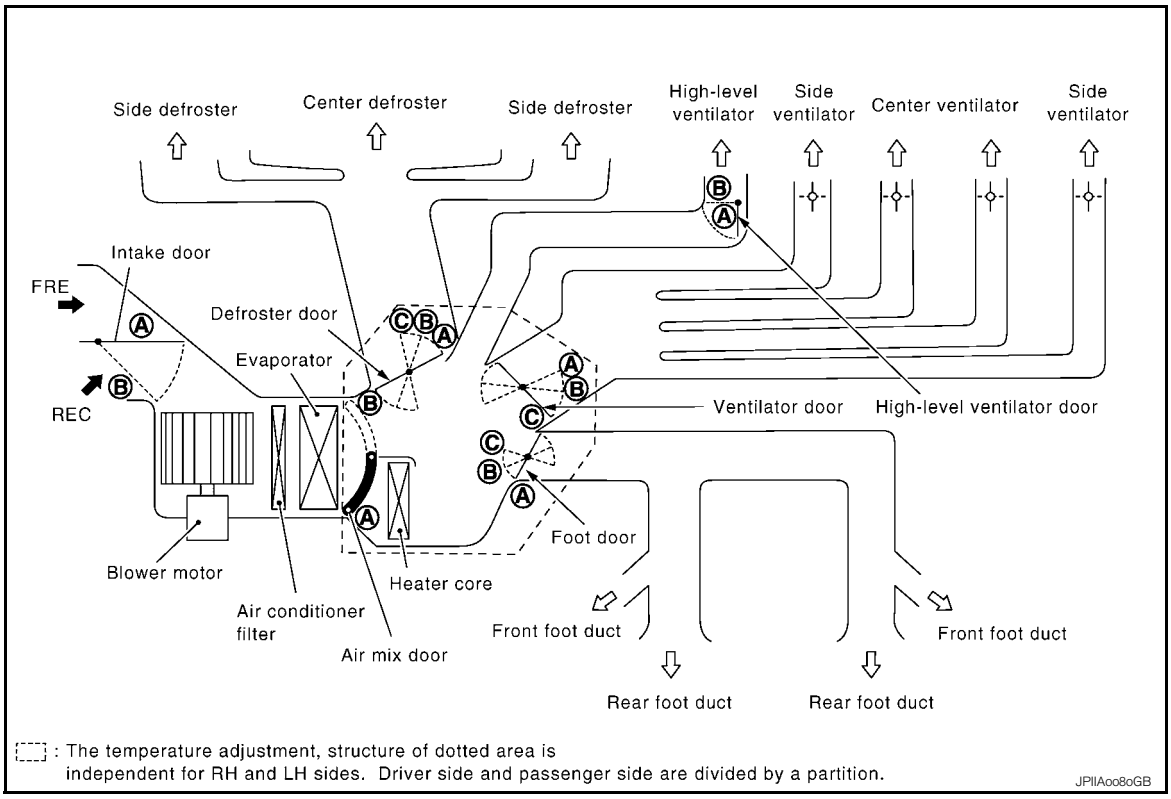
High-level Ventilator Switch
When high-level ventilator switch is ON, high-level ventilator switch indicator turn ON, and high-level ventilator door is opened.

cardiagn.com

DISCHARGE AIR FLOW



SWITCHES AND THEIR CONTROL FUNCTION



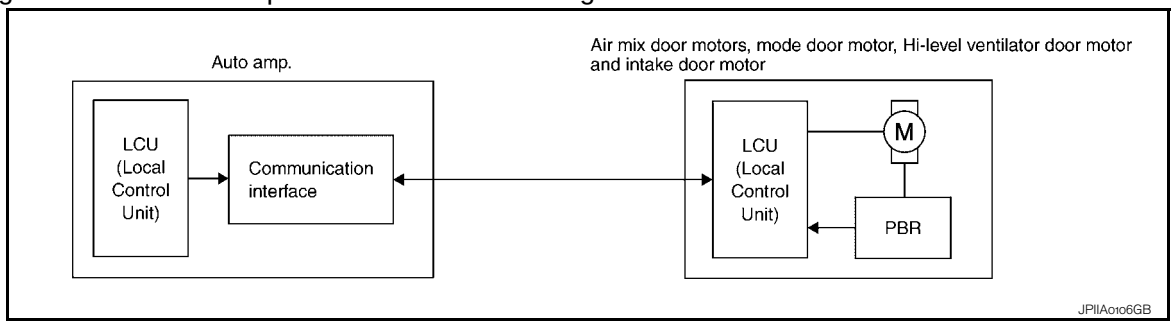
Position or Switch / Door	DUAL SW		MODE SW				DEF SW		High-level ventilator SW		AUTO SW	Intake SW		Temperature control dial (Driver side)			Temperature control dial (Passenger side)			ON/OFF SW
	ON	OFF	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF		FRE SW	REC SW							
	DUAL										AUTO									
														16°C	⇔	30°C	16°C	⇔	30°C	OFF
Ventilator door	—		Ⓐ	Ⓑ	Ⓒ	Ⓒ	Ⓒ													Ⓒ
Defroster door	—		Ⓐ	Ⓐ	Ⓐ,Ⓑ*1	Ⓒ	Ⓐ		—	—	AUTO	—	—							Ⓐ,Ⓑ*1
Foot door	—		Ⓐ	Ⓑ	Ⓒ	Ⓑ	Ⓒ							—			—			Ⓒ
High-level ventilator door	—		—	—	—	—	—		Ⓐ	Ⓑ	—									—
Intake door	—		—			Ⓑ	Ⓑ				—	Ⓑ*2	Ⓐ*2							AUTO
Air mix door (Driver side)	—		—				—					—		Ⓐ	AUTO	Ⓑ	—			
Air mix door (Passenger side)	ON		—				—		—	—	AUTO	—		—			Ⓐ	AUTO	Ⓑ	—
	OFF		—				—					—		Ⓐ	AUTO	Ⓑ	—			

* 1 This position is selected only when the mode door is automatic controlled.
* 2 Inlet status is displayed under the automatic control.

JPIIAoo81GB

AIR CONDITIONER LAN CONTROL SYSTEM

The LAN (Local Area Network) system consists of auto amp., mode door motor, high-level ventilator door motor, air mix door motors and intake door motor.
A configuration of these components is shown in the figure below.

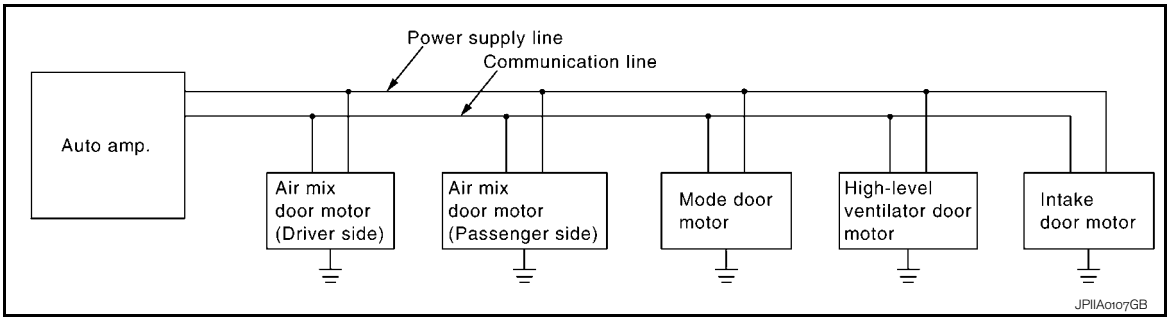


cardiagn.com

SYSTEM CONSTRUCTION

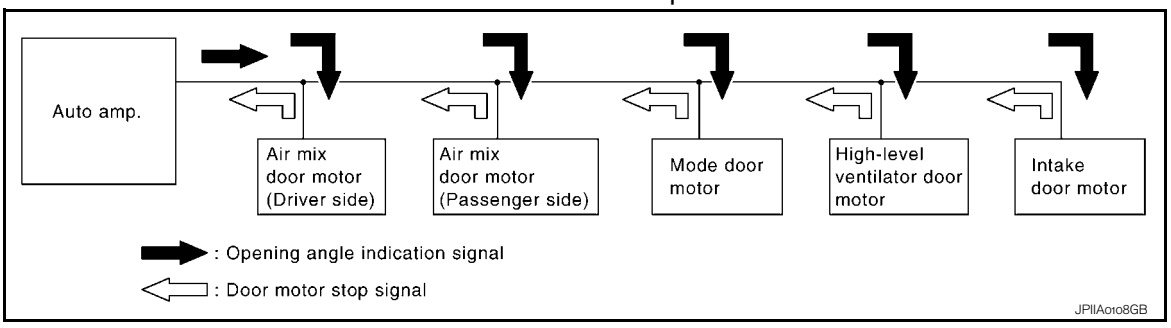
A small network is constructed between the auto amp., mode door motor, high-level ventilator door motor, air mix door motors and intake door motor. The auto amp. and motors are connected by data transmission lines and motor power supply lines. The LAN network is built through the ground circuits of each door motor.
Addresses, motor opening angle signals, motor stop signals and error checking messages are all transmitted through the data transmission lines connecting the auto amp. and each door motor.
The following functions are contained in LCUs built into the mode door motor, the high-level ventilator door motor, the air mix door motors and the intake door motor.

- Address
- Motor opening angle signals
- Data transmission
- Motor stop and drive decision
- Opening angle sensor (PBR function)
- Comparison
- Decision (Auto amp. indicated value and motor opening angle comparison)



Operation

The auto amp. receives data from each of the sensors. The auto amp. sends mode door, high-level ventilator door, air mix door and intake door opening angle data to the mode door motor LCU, high-level ventilator door motor LCU, air mix door motor LCUs and intake door motor LCU.
The mode door motor, high-level ventilator door motor, air mix door motors and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors is compared by the LCUs in each door motor with the existing decision and opening angles. Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data is returned to the auto amp.



Transmission Data and Transmission Order

Auto amp. data is transmitted consecutively to each of the doors motor following the form shown in the figure below.

START:

- Initial compulsory signal is sent to each of the door motors.

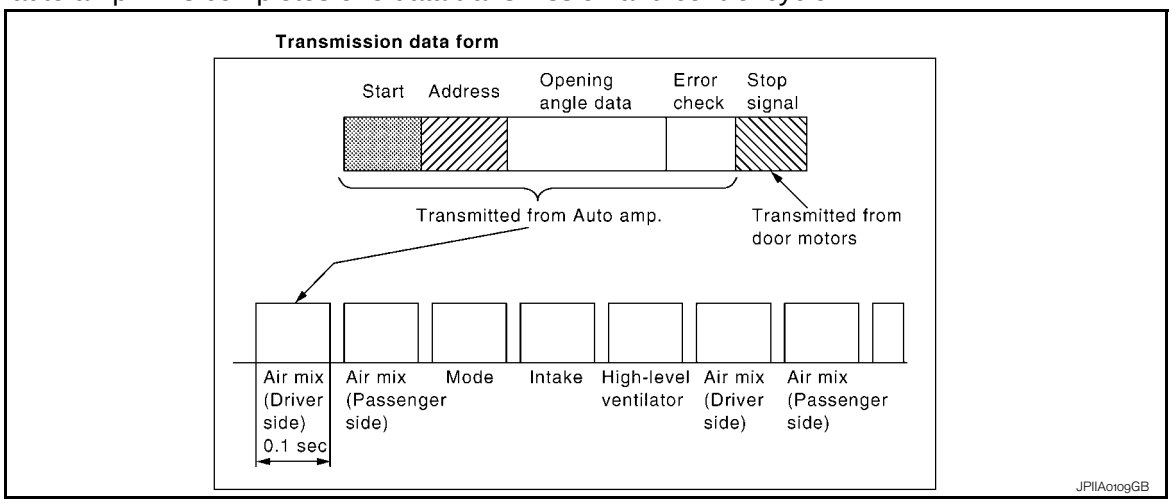
ADDRESS:

- Data sent from the auto amp. are selected according to data-based decisions made by the mode door motor, high-level ventilator door motor, air mix door motors and intake door motor.
- If the addresses are identical, the opening angle data and error check signals are received by the door motor LCUs. The LCUs then make the appropriate error decision. If the opening angle data have no error, door control begins.
- If an error exists, the received data are rejected and corrected data received. Finally, door control is based upon the corrected opening angle data.

OPENING ANGLE:
- Data that shows the indicated door opening angle of each door motor.

ERROR CHECK:
- In this procedure, transmitted and received data is checked for errors. Error data are then compiled. The error check prevents corrupted data from being used by the mode door motor, the high-level ventilator door motor, the air mix door motors and the intake door motor. Error data can be related to the following symptoms.
- Malfunction of electrical frequency
- Poor electrical connections
- Signal leakage from transmission lines
- Signal level fluctuation

STOP SIGNAL:
- At the end of each transmission, a stop operation, in-operation, or internal malfunction message is delivered to the auto amp. This completes one data transmission and control cycle.



AIR MIX DOOR CONTROL (AUTOMATIC TEMPERATURE CONTROL)

The air mix doors are automatically controlled so that in-vehicle temperature is maintained at a predetermined value by the temperature setting, ambient temperature, in-vehicle temperature and amount of sunload.

FAN SPEED CONTROL

Blower speed is automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and air mix door position.
With pressing AUTO switch, the blower motor starts to gradually increase air flow volume.
When engine coolant temperature is low, the blower motor operation is delayed to prevent cool air from flowing.

INTAKE DOOR CONTROL

The intake doors are automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and ON/OFF operation of the compressor.

MODE DOOR CONTROL

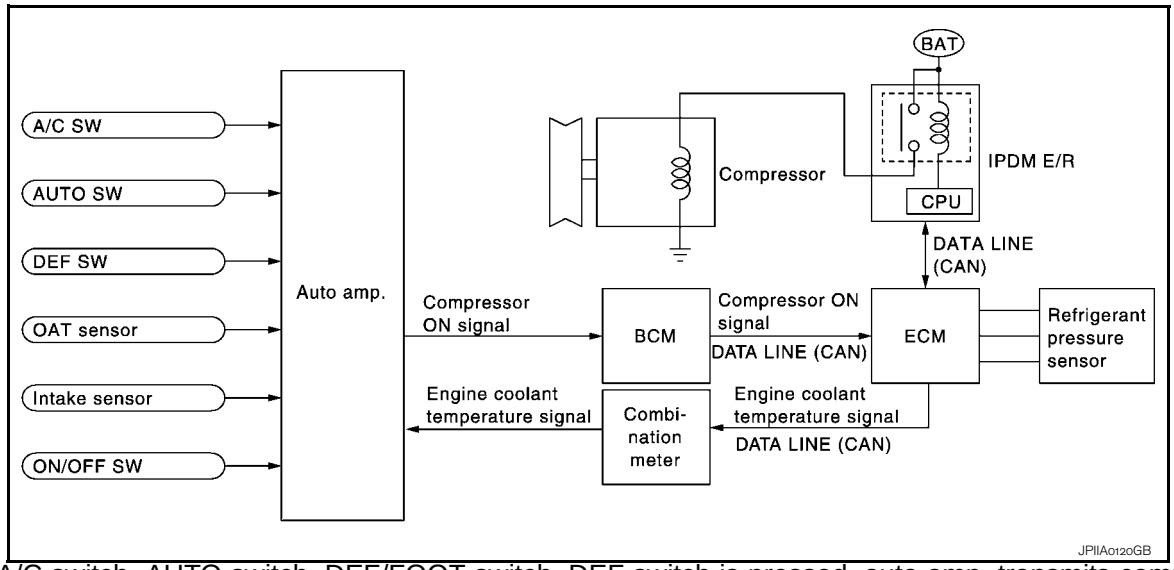
The mode door is automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature and amount of sunload.

HIGH-LEVEL VENTILATOR DOOR CONTROL

The high-level ventilator door is controlled by high-level ventilator door switch.

cardiagn.com

MAGNET CLUTCH CONTROL

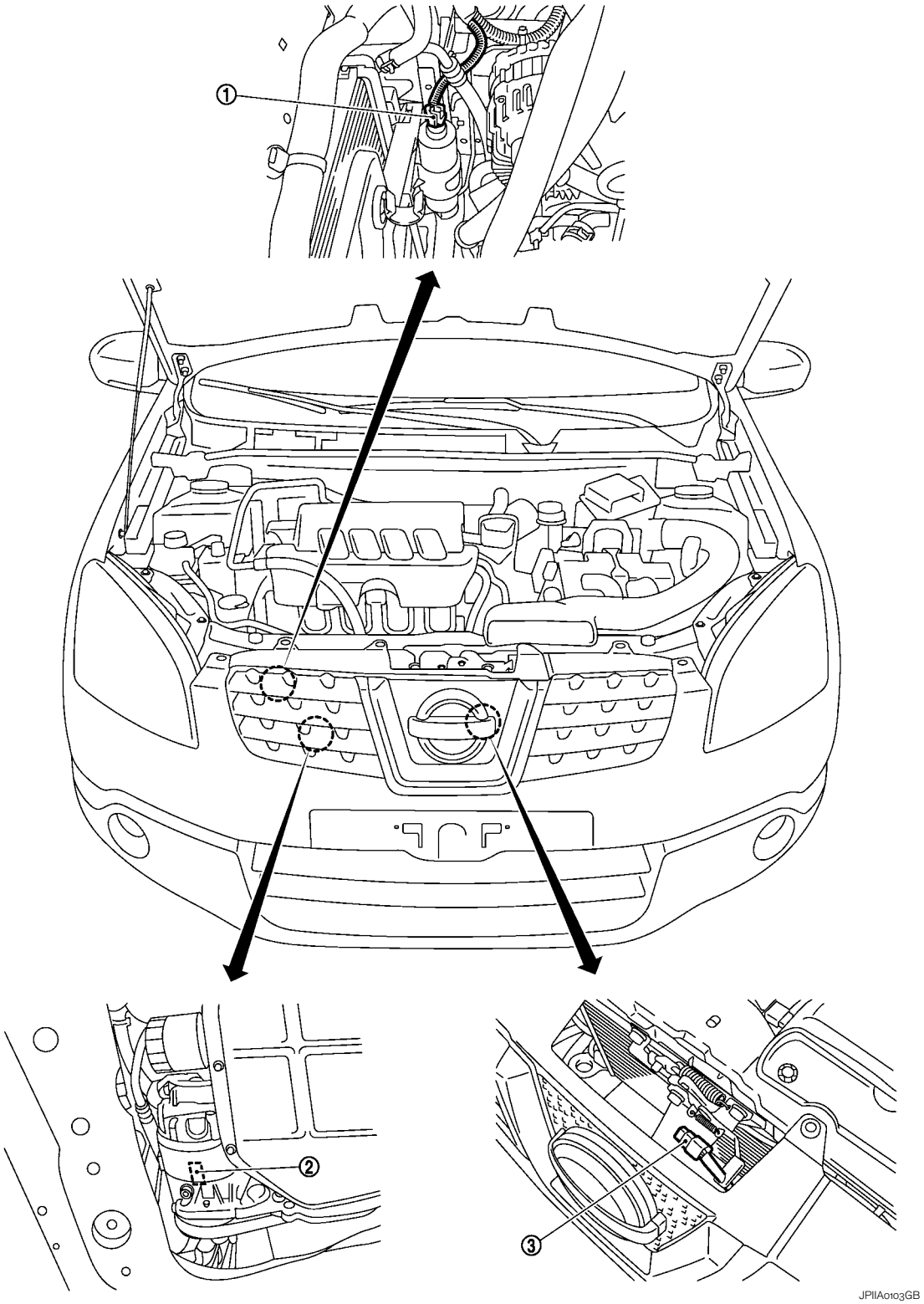


When A/C switch, AUTO switch, DEF/FOOT switch, DEF switch is pressed, auto amp. transmits compressor ON signal to BCM.
BCM sends compressor ON signal to ECM, via CAN communication.
ECM judges whether compressor can be turned ON, based on each sensor status (refrigerant-pressure sensor signal, throttle angle, etc.). If it judges compressor can be turned ON, it sends compressor ON signal to IPDM E/R, via CAN communication.
Upon receipt of compressor ON signal from ECM, IPDM E/R turns air conditioner relay ON to operate compressor.
When sending compressor ON signal to IPDM E/R via CAN communication, ECM simultaneously sends compressor feedback signal to combination meter via CAN communication.
Combination meter sends compressor feedback signal to auto amp., then, uses input compressor feedback signal to control air inlet.

Component Part Location

INFOID:0000000001070366

ENGINE COMPARTMENT

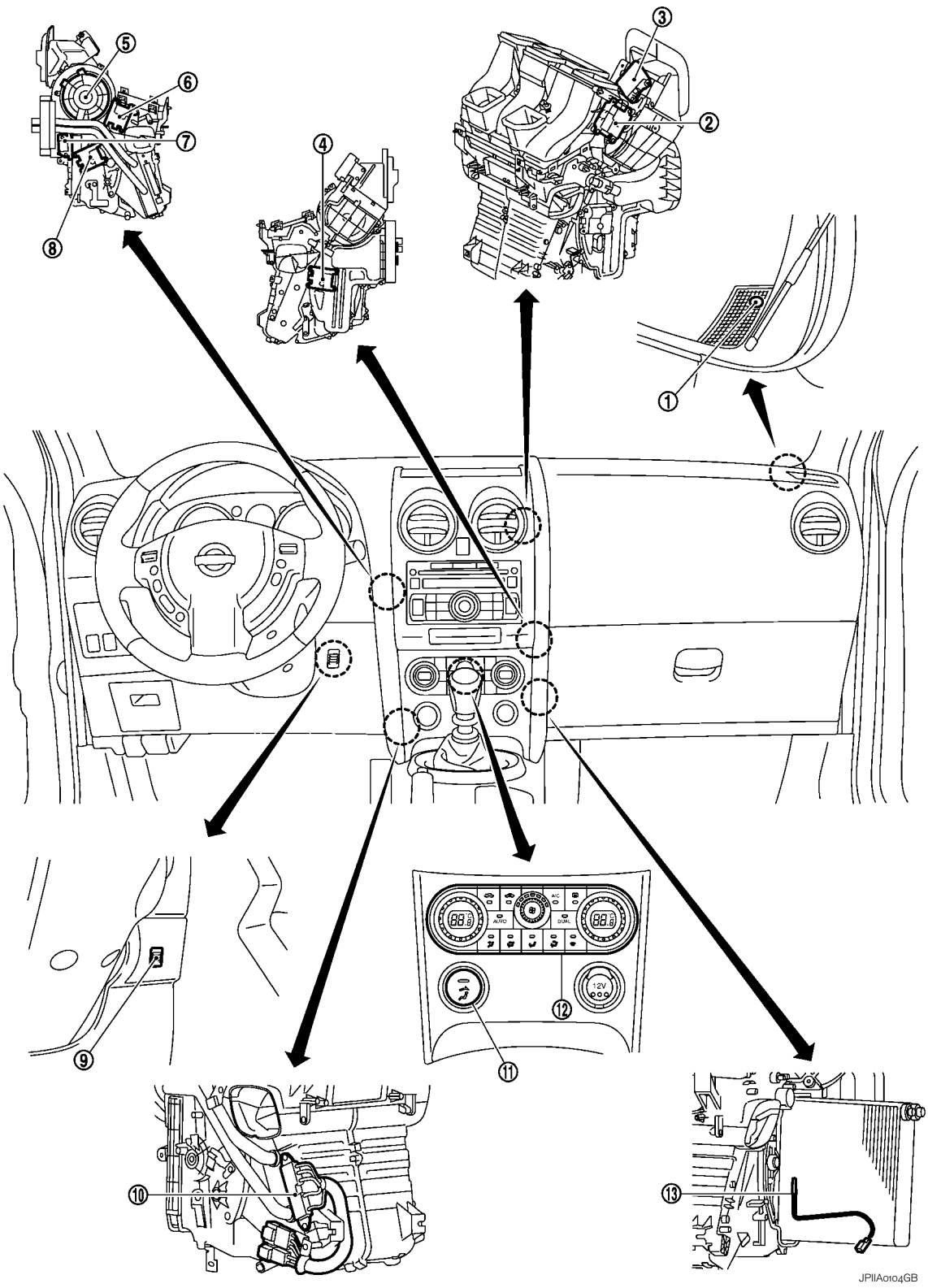


1. Refrigerant pressure sensor
2. Compressor
3. OAT sensor

PASSENGER COMPARTMENT

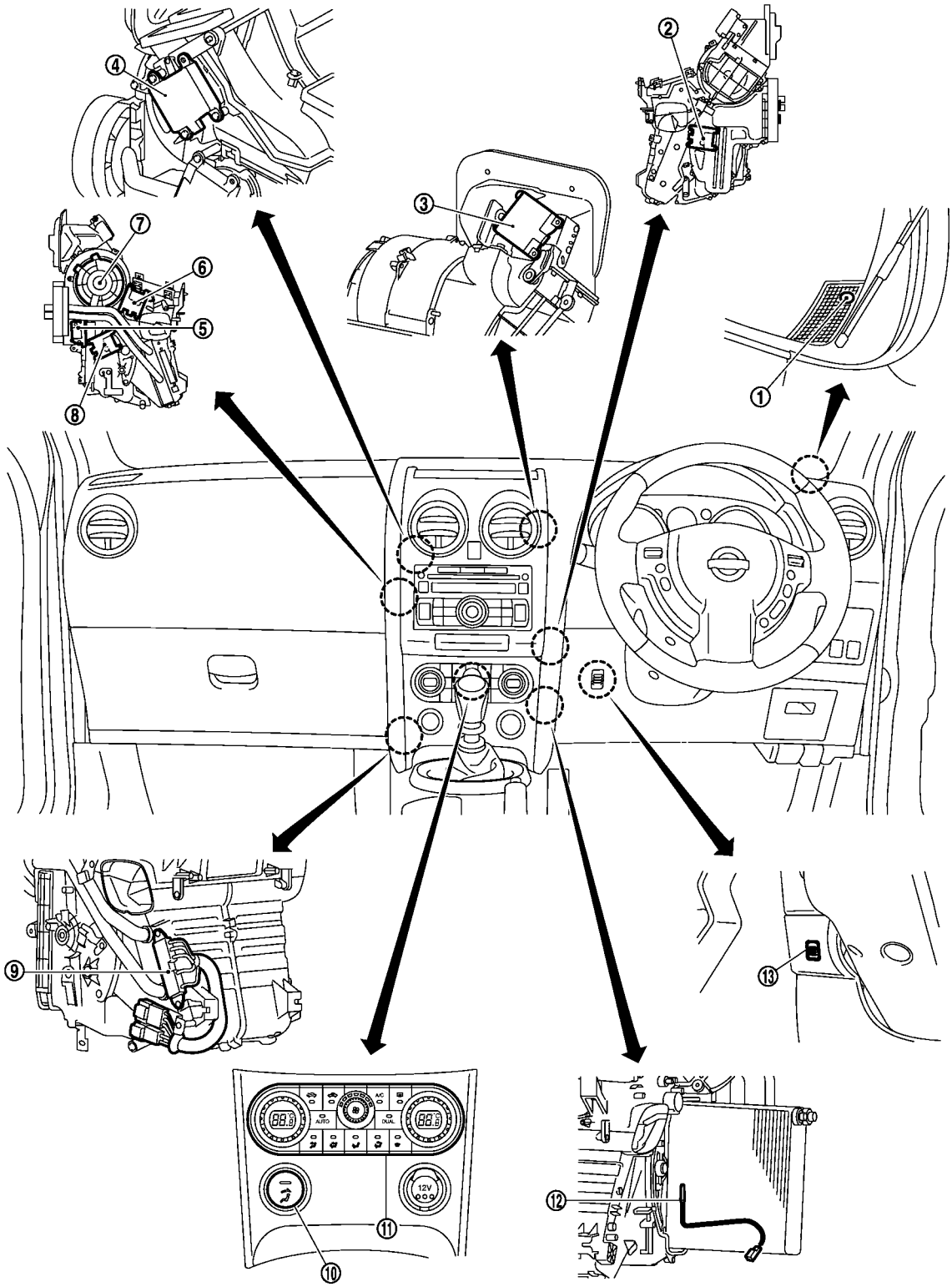
LHD Models

cardiagn.com



1. Sunload sensor
2. High-level ventilator door motor
3. Intake door motor
4. Air mix door motor (passenger side)
5. Blower motor
6. Mode door motor
7. Fan control amp.
8. Air mix door motor (driver side)
9. In-vehicle sensor
10. PTC heater
11. High-level ventilator switch
12. Auto amp.
13. Intake sensor

RHD Models



1. Sunload sensor
2. Air mix door motor (driver side)
3. Intake door motor
4. High-level ventilator door motor
5. Fan control amp.
6. Mode door motor
7. Blower motor
8. Air mix door motor (passenger side)
9. PTC heater
10. High-level ventilator switch
11. Auto amp.
12. Intake sensor
13. In-vehicle sensor

Component Description

INFOID:0000000001116806

cardiagn.com

Component	Reference
Air mix door motor	HAC-54, "Description"
Auto amp.	HAC-89, "Description"
Blower motor	HAC-62, "Description"
Compressor	HAC-66, "Description"
Fan control amp.	HAC-65, "Component Inspection"
High-level ventilator door motor	HAC-50, "Description"
High-level ventilator switch	HAC-52, "Component Inspection"
Intake door motor	HAC-59, "Description"
Intake sensor	HAC-86, "Description"
In-vehicle sensor	HAC-80, "Description"
Mode door motor	HAC-47, "Description"
OAT sensor	HAC-77, "Description"
PTC heater	HAC-76, "Component Inspection"
Refrigerant pressure sensor	HAC-70, "Component Inspection"
Sunload sensor	HAC-83, "Description"

cardiagn.com

CAN COMMUNICATION SYSTEM

System Description

INFOID:0000000000954635

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. For details, refer to LAN-55, "CAN System Specification Chart".

cardiagn.com

DIAGNOSIS SYSTEM (AUTO AMP.)

Diagnosis Description

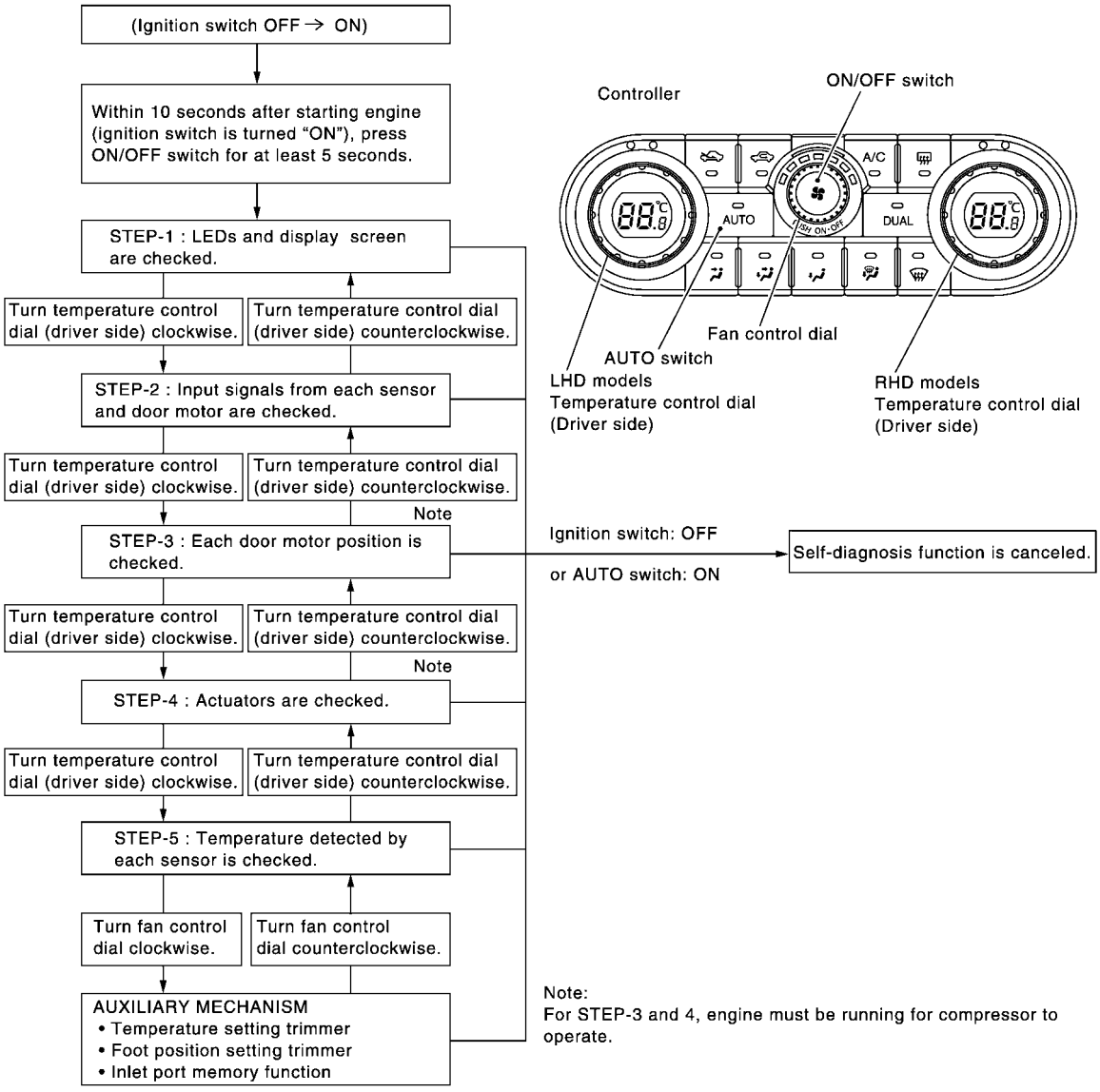
INFOID:0000000000954636

SELF-DIAGNOSIS SYSTEM

The self-diagnosis system is built into the auto amp. to quickly locate the cause of malfunctions.

SELF-DIAGNOSIS FUNCTION

The self-diagnosis system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnosis system is accomplished by starting the engine (turning the ignition switch ON) and pressing ON/OFF switch for at least 5 seconds. The ON/OFF switch must be pressed within 10 seconds after starting the engine (ignition switch is turned ON). This system will be canceled by either pressing AUTO switch or turning the ignition switch OFF. Shifting from one step is accomplished by means of turning temperature control dial (driver side), as required.
Shifting from STEP-5 to AUXILIARY MECHANISM is accomplished by means of pressing fan control dial clockwise.



JPIIA0121GB

CONFORMATION METHOD

1. SET IN SELF-DIAGNOSIS MODE

1. Turn ignition switch ON.
2. Set in self-diagnosis mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press ON/OFF switch for at least 5 seconds.

NOTE:
If battery voltage drops below 12 V during diagnosis STEP-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is normal. To avoid this, start engine before performing this diagnosis.

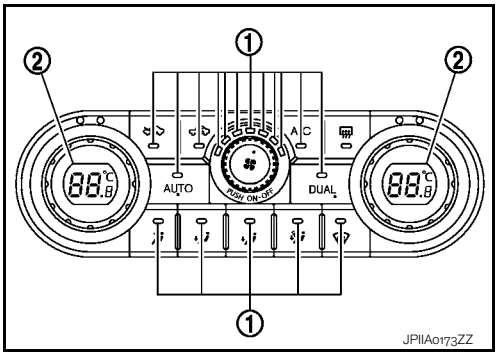
>> GO TO 2.

2. STEP-1: LEDS AND DISPLAY ARE CHECKED

Check LEDs (1) illumination and display screen (2).

Is this inspection result normal?

YES >> GO TO 3.
NO >> Malfunctioning ON/OFF switch or auto amp. Refer to HAC-115, "Inspection procedure".

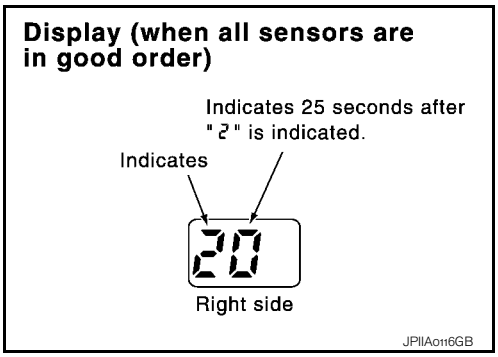


3. STEP-2: SENSOR AND DOOR MOTOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT

Turn temperature control dial (driver side) clockwise.

Does code No. 20 appear on the display?

YES >> GO TO 4.
NO >> GO TO 11.

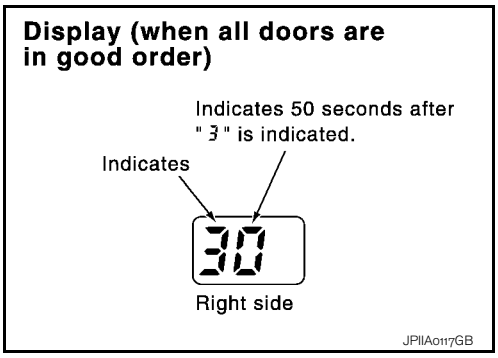


4. STEP-3: MODE DOOR, HIGH-LEVEL VENTILATOR DOOR AND INTAKE DOOR POSITIONS ARE CHECKED

Turn temperature control dial (driver side) clockwise.

Does code No. 30 appear on the display?

YES >> GO TO 5.
NO >> GO TO 12.

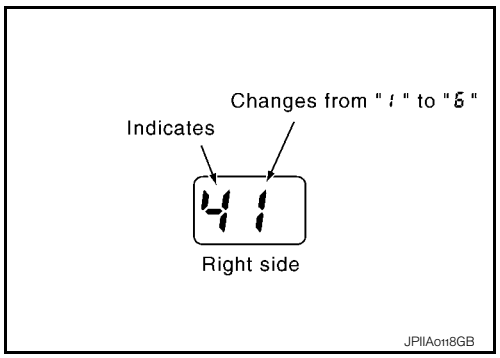


5. STEP-4: OPERATION OF EACH DOOR MOTOR IS CHECKED

cardiagn.com

1. Turn temperature control dial (driver side) clockwise.
2. Press (DEF) switch. Code No. of each door motor test is indicated on the display.

>> GO TO 6.



6. CHECK ACTUATORS

Refer to the following chart and check discharge air flow, air temperature, blower motor voltage and compressor operation.

Discharge air flow					
Mode door position	Condition	Air outlet/distribution			
		VENT	FOOT		DEF
			Front	Rear	
	DUAL SW: OFF High-level ventilator door : SHUT	100%	—	—	—
		60%	24%	16%	—
		15%	39%	26%	20%
		10%	27%	18%	45%
		10%	—	—	90%

JPIIA0082GB

Code No.	41	42	43	44	45	46
Mode door position	VENT	B/L 1	B/L 2	FOOT*1	D/F	DEF
Intake door position	REC	REC	20% FRE	FRE	FRE	FRE
Air mix door position	FULL COOL	FULL COOL	FULL HOT	FULL HOT	FULL HOT	FULL HOT
Blower motor voltage	5 V	11.75 V	8.5 V	8.5 V	8.5 V	11.75 V
Compressor	ON	ON	OFF	OFF	ON	ON
High-level ventilator door position	OPEN	OPEN	OPEN	OPEN	SHUT	SHUT

Checks must be made visually, by listening the sound, or by touching air outlets with hand, etc. for improper operation.
*1: FOOT position during automatic control. Refer to HAC-6, "Description & Inspection".

Is this inspection result normal?

YES >> GO TO 7.
NO-1 >> Air outlet does not change. Go to Mode Door Motor Circuit. Refer to HAC-47, "Diagnosis Procedure".
NO-2 >> Intake door does not change. Go to Intake Door Motor Circuit. Refer to HAC-59, "Diagnosis Procedure".
NO-3 >> Discharge air temperature does not change. Go to Air Mix Door Motor Circuit. Refer to HAC-54, "Diagnosis Procedure".
NO-4 >> Blower motor operation is malfunctioning. Go to Blower Motor Circuit. Refer to HAC-62, "Diagnosis Procedure".
NO-5 >> Magnet clutch does not engage. Go to Magnet Clutch Circuit. Refer to HAC-66, "Diagnosis Procedure".
NO-6 >> High-level ventilator door does not change. Go to High-level Ventilator Door Motor Circuit. Refer to HAC-50, "Diagnosis Procedure".

7. STEP-5: TEMPERATURE OF EACH SENSOR IS CHECKED

1. Turn temperature control dial (driver side) clockwise.
2. Code No. 51 appears on the display.

>> GO TO 8.

8. CHECK OAT SENSOR

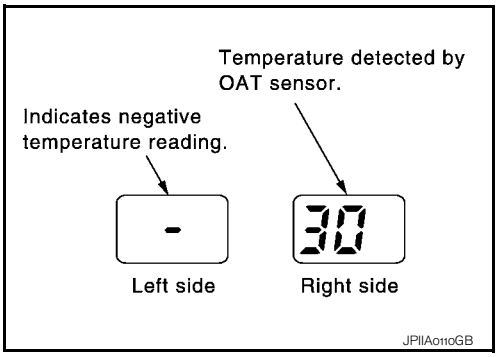
Press (DEF) switch one time. Temperature detected by OAT sensor is indicated on the display.

NOTE:

If the temperature indicated on the display greatly differs from the actual temperature, check sensor circuit first, and then check sensor.

Is this inspection result normal?

YES >> GO TO 9.
NO >> Go to OAT Sensor Circuit. Refer to HAC-77, "Diagnosis Procedure".



9. CHECK IN-VEHICLE SENSOR

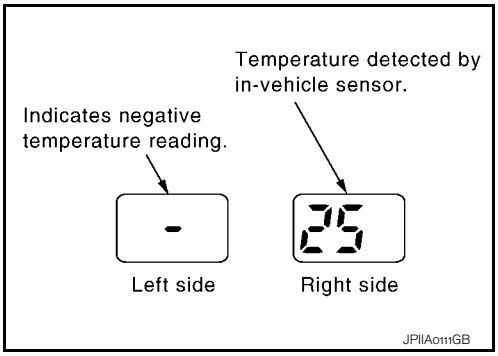
Press (DEF) switch for the one time. Temperature detected by in-vehicle sensor is indicated on the display.

NOTE:

If the temperature indicated on the display greatly differs from the actual temperature, check sensor circuit first, and then check sensor.

Is this inspection result normal?

YES >> GO TO 10.
NO >> Go to In-vehicle Sensor Circuit. Refer to HAC-81, "Diagnosis Procedure".



10. CHECK INTAKE SENSOR

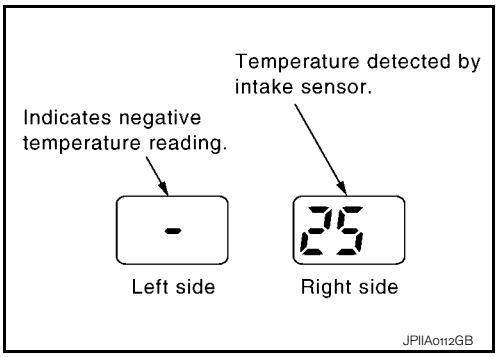
Press (DEF) switch for the one time. Temperature detected by intake sensor is indicated on the display.

NOTE:

If the temperature indicated on the display greatly differs from the actual temperature, check sensor circuit first, and then check sensor.

Is this inspection result normal?

YES >> GO TO 11.
NO >> Go to Intake Sensor Circuit. Refer to HAC-86, "Diagnosis Procedure".



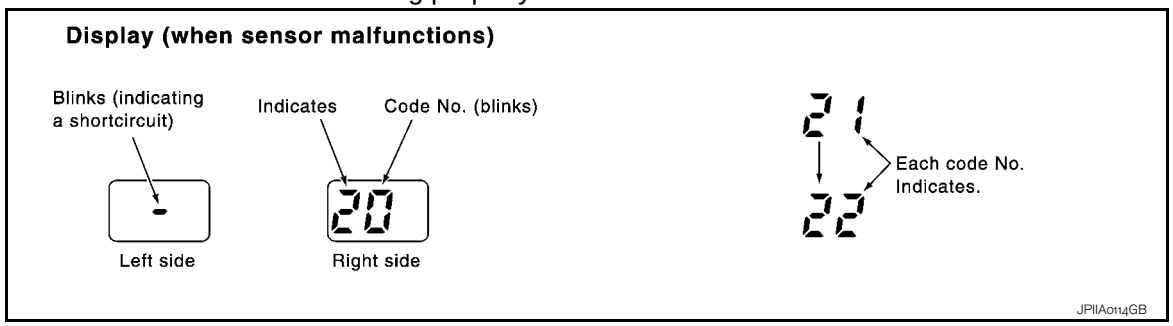
11. CHECK MALFUNCTIONING SENSOR AND DOOR MOTOR

Refer to the following chart for malfunctioning code No.
(If two or more sensors and door motors malfunction, corresponding code Nos. indicates 1 second each.)

Code No.	Malfunctioning sensor and door motor (Including circuits)	Reference
21 / –21	OAT sensor	HAC-77, "Diagnosis Procedure"
22 / –22	In-vehicle sensor	HAC-81, "Diagnosis Procedure"
24 / –24	Intake sensor	HAC-86, "Diagnosis Procedure"
25 / –25	Sunload sensor *	HAC-83, "Diagnosis Procedure"
26 / –26	Air mix door motor PBR (Driver side)	HAC-54, "Diagnosis Procedure"
27 / –27	Air mix door motor PBR (Passenger side)	

cardiagn.com

*: Perform self-diagnosis STEP-2 under sunshine.
When performing indoors, aim a light (more than 60 W) at sunload sensor, otherwise code No. 25 will indicate despite that sunload sensor is functioning properly.



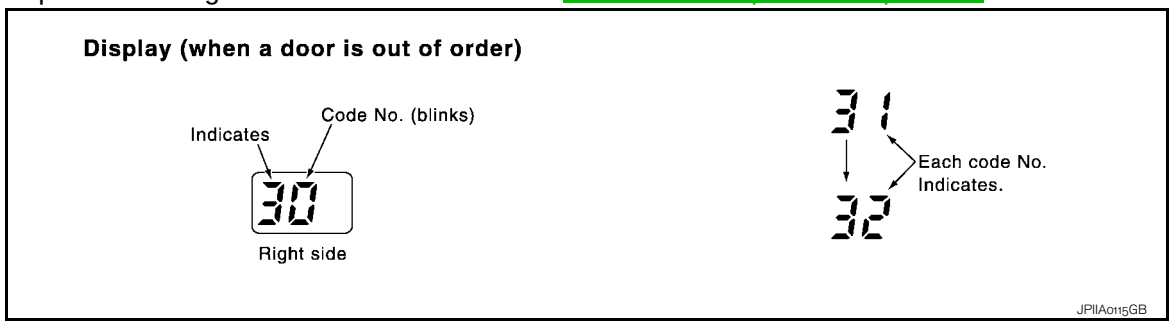
>> INSPECTION END

12. CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH

Mode, high-level ventilator and/or intake door motor PBR(s) is/are malfunctioning.

Code No. *1 *2 *3	Mode, high-level ventilator or intake door position		Reference
31	High-level ventilator door open	High-level ventilator door motor	HAC-50, "Diagnosis Procedure"
32	High-level ventilator door shut		
33	VENT	Mode door motor	HAC-47, "Diagnosis Procedure"
34	D/F 1*4		
35	D/F 2		
36	DEF		
37	FRE	Intake door motor	HAC-59, "Diagnosis Procedure"
38	20% FRE		
39	REC		

(If two or more door motors are malfunctioning, corresponding code Nos. indicates 1 second each.)
*1: If high-level ventilator door motor harness connector is disconnected, the following display pattern will appear.
31→32→ to 31
*2: If mode door motor harness connector is disconnected, the following display pattern will appear.
33→34→35→36→Return to 33
*3: If intake door motor harness connector is disconnected, the following display pattern will appear.
37→38→39→Return to 37
*4: FOOT position during automatic control. Refer to HAC-6, "Description & Inspection".



>> INSPECTION END

CONSULT-III Function

INFOID:0000000000954637

CONSULT-III APPLICATION ITEMS

CONSULT-III can display each diagnosis item using the diagnosis test modes shown following.

System part	Check item, diagnosis mode	Description
ECM	Data monitor	Displays ECM input data in real time.
BCM	Data monitor	Displays BCM input data in real time.

DATA MONITOR

Display Item List (ECM)
With Gasoline Engine

Monitor Item	Condition	Value/Status
AC PRESS SEN	• Engine is running • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates.)	1.0 - 4.0 V

With Diesel Engine

Monitor Item	Condition	Value/Status
RFRGERNT PRSS	• Engine is running • Warm-up condition • Air conditioner switch: OFF • Shift lever: Neutral position • No load	Approximately 5.7 bar

Display Item List (BCM)

Monitor Item	Condition		Value/Status
IGN ON SW	Ignition switch OFF → ON		Off → On
FAN ON SIG	Ignition switch ON	Blower fan motor switch ON	On
		Blower fan motor switch OFF	Off
AIR COND SW	Ignition switch ON	Compressor ON	On
		Compressor OFF	Off

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001096692

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

AIR CONDITIONER

AIR CONDITIONER : CONSULT-III Function (BCM - AUTO AIR CONDITIONER)

INFOID:0000000001096693

DATA MONITOR

Display Item List

cardiagn.com

Monitor Item [Unit]		Contents
IGN SW	[On/Off]	Display [ignition switch position (On)/(Off), ACC position (Off)] status as judged form ignition switch signal.
FAN ON SIG	[On/Off]	Display [FAN (On)/FAN (Off)] status as judged form blower fan motor switch signal.
AIR COND SW	[On/Off]	Display [COMP (On)/COMP (Off)] status as judged form air conditioner switch signal.

PTC HEATER

PTC HEATER : CONSULT-III Function (BCM - PTC HEATER)

INFOID:0000000001096694

DATA MONITOR

Display Item List

Monitor Item [Unit]	Description
ELEC PWR CUT [OFF/FREEZ/INHBT]	Indicate [OFF/FREEZ/INHBT] condition of the PTC heater states.
FAN ON SIG [On/Off]	Displays [FAN (ON)/FAN (OFF)] status as judged from blower fan motor signal.
ENGINE STATUS [STOP/STAL/RUN/CRA]	Indicate [STOP/STALL/RUN/CRA] condition of the engine states.
ENG COOLNT T [°C]	The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.
BATTERY VOLT [V]	The power supply voltage of BCM is displayed.
ENGINE RPM [rpm]	Indicates the engine speed computed from the signal of the crankshaft position sensor.
OUTSIDE TEMP [°C]	The outside air temperature (determined by the signal voltage of the OAT sensor) is displayed.

ACTIVE TEST

Test item

Test Item	Operation	Description
PTC HEATER	OFF PTC 1 PTC 2 PTC 3	This test is able to check PTC heater operation.

cardiagn.com

MODE DOOR CONTROL SYSTEM

Description

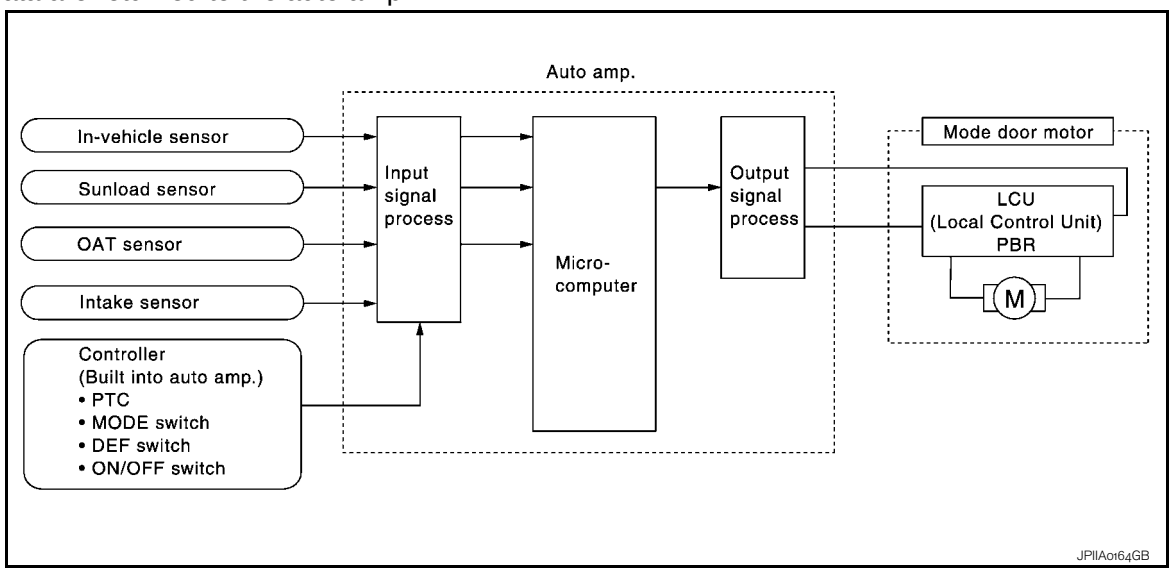
INFOID:0000000000954638

SYSTEM DESCRIPTION

Component Parts

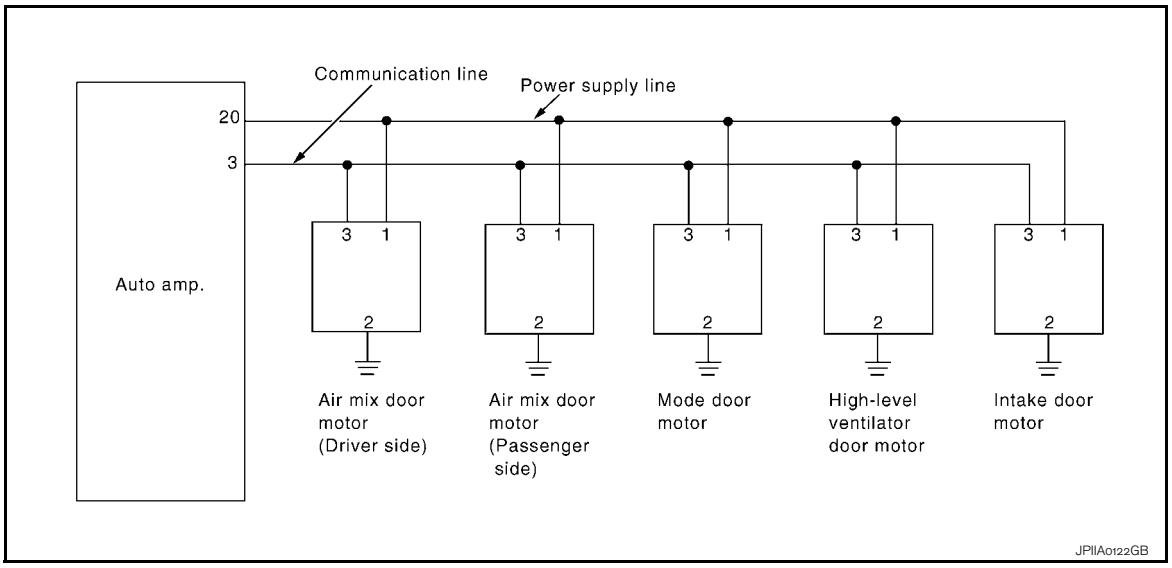
Mode door control system components are:
- Auto amp.
- Mode door motor (LCU)
- A/C LAN system (PBR built-in mode door motor, high-level ventilator door motor, air mix door motor and intake door motor)
- In-vehicle sensor
- OAT sensor
- Sunload sensor
- Intake sensor

System Operation
- The auto amp. receives data from each of the sensors.
- The auto amp. sends air mix door, mode door, high-level ventilator door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU, high-level ventilator door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor, high-level ventilator door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles.
- Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data are returned to the auto amp.



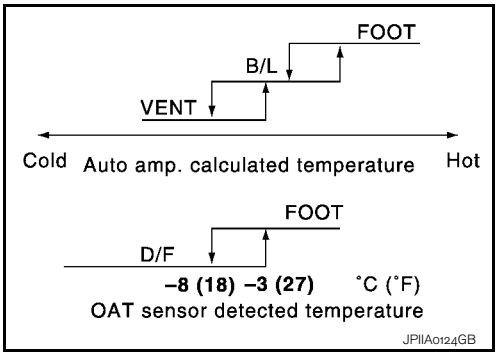
cardiagn.com

LAN System Circuit



Mode Door Control Specification

Mode position can be selected manually by pressing MODE switch or DEF switch of the controller. This enables to fix a mode position. Automatic control by auto amp. Pressing AUTO switch allows automatic control by auto amp. During the automatic control of mode position, a mode door position (VENT, B/L, FOOT, or D/F) is selected based on a target air mix door opening angle and sunload depending on a temperature calculated by auto amp. In addition, D/F is selected to prevent windshield fogging only when ambient temperature is extremely low with mode position FOOT.



cardiagn.com

HIGH-LEVEL VENTILATOR DOOR CONTROL SYSTEM

Description

INFOID:0000000000955084

SYSTEM DESCRIPTION

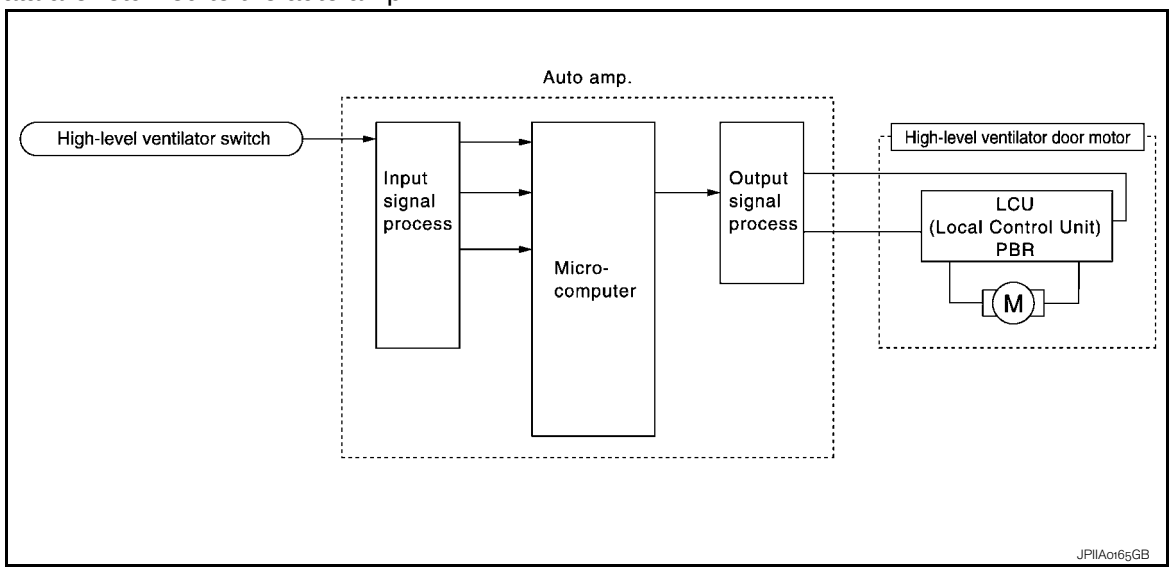
Component Parts

Hi-level ventilator door control system components are:

- Auto amp.
- High-level ventilator door motor (LCU)
- A/C LAN system (PBR built-in mode door motor, high-level ventilator door motor, air mix door motor and intake door motor)
- High-level ventilator switch

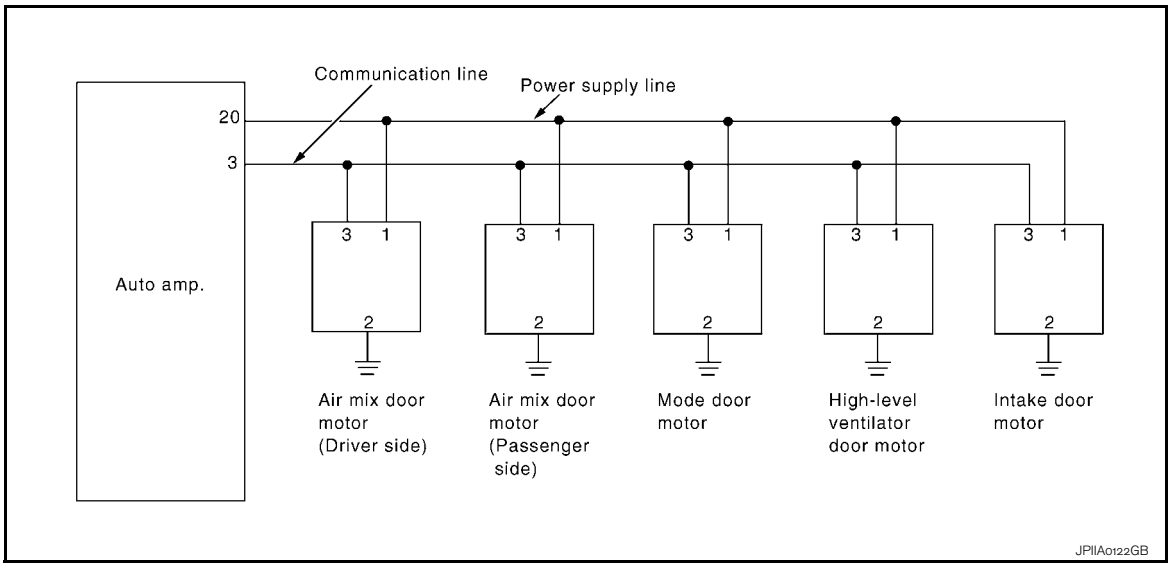
System Operation

- The auto amp. sends air mix door, mode door, high-level ventilator door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU, high-level ventilator door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor, high-level ventilator door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles.
- Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data are returned to the auto amp.



cardiagn.com

LAN System Circuit



cardiagn.com

AIR MIX DOOR CONTROL SYSTEM

Description

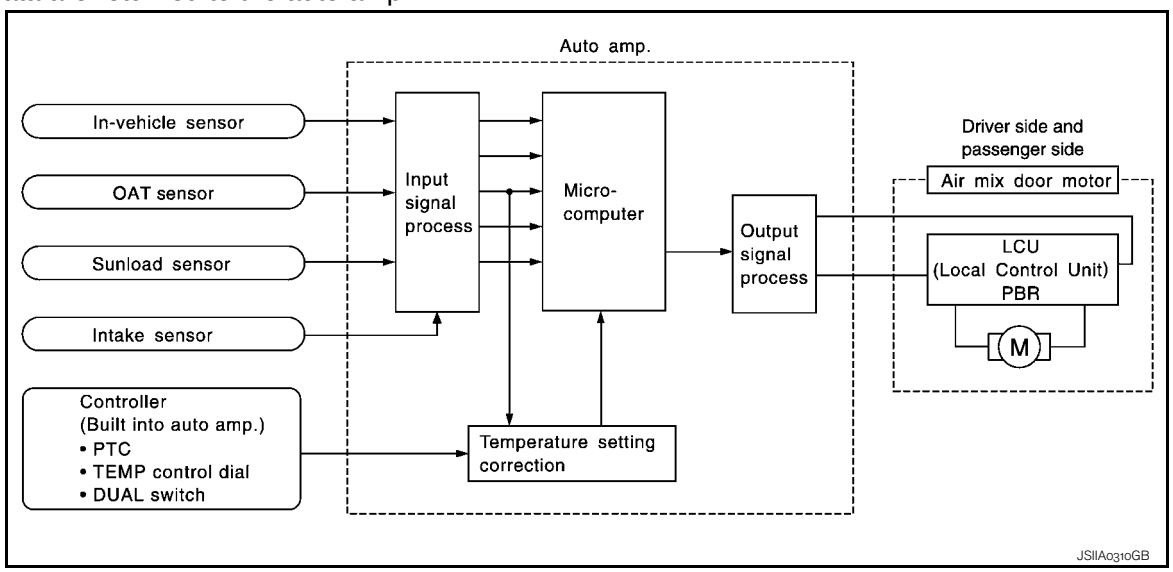
INFOID:0000000000954639

SYSTEM DESCRIPTION

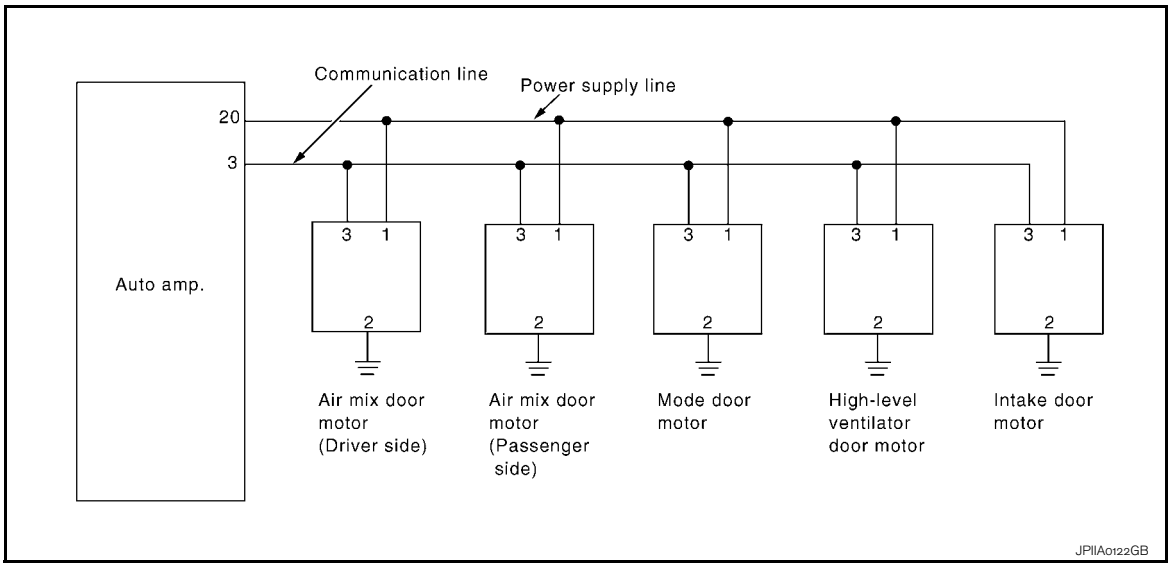
Component Parts

Air mix door control system components are:
- Auto amp.
- Air mix door motor (LCU)
- A/C LAN system (PBR built-in mode door motor, high-level ventilator door motor, air mix door motor and intake door motor)
- In-vehicle sensor
- OAT sensor
- Sunload sensor
- Intake sensor

System Operation
- The auto amp. receives data from each of the sensors.
- The auto amp. sends air mix doors, mode door, high-level ventilator door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU, high-level ventilator door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor, high-level ventilator door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles.
- Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data are returned to the auto amp.

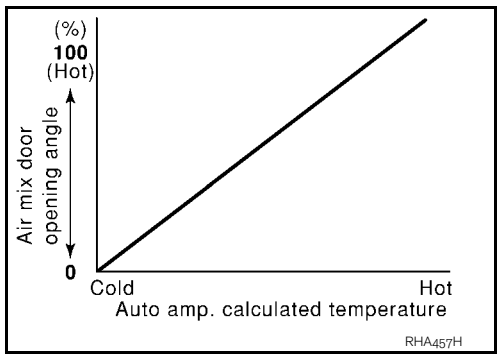


LAN System Circuit



Air Mix Door Control Specification

When ignition switch is ON, auto amp. continuously and automatically controls temperatures regardless of air conditioner operational condition. When setting a target temperature with temperature control dial, auto amp. corrects the set temperature and decides a target air mix door opening angle. Auto amp. controls air mix door according to the target air mix door opening angle and current air mix door opening angle in order to keep an optimum air mix door opening angle. When a temperature is set at 16.0°C, air mix door is fixed at full cold, and when a temperature is set at 30.0°C, it is set at full hot.



cardiagn.com

INTAKE DOOR CONTROL SYSTEM

Description

INFOID:0000000000954640

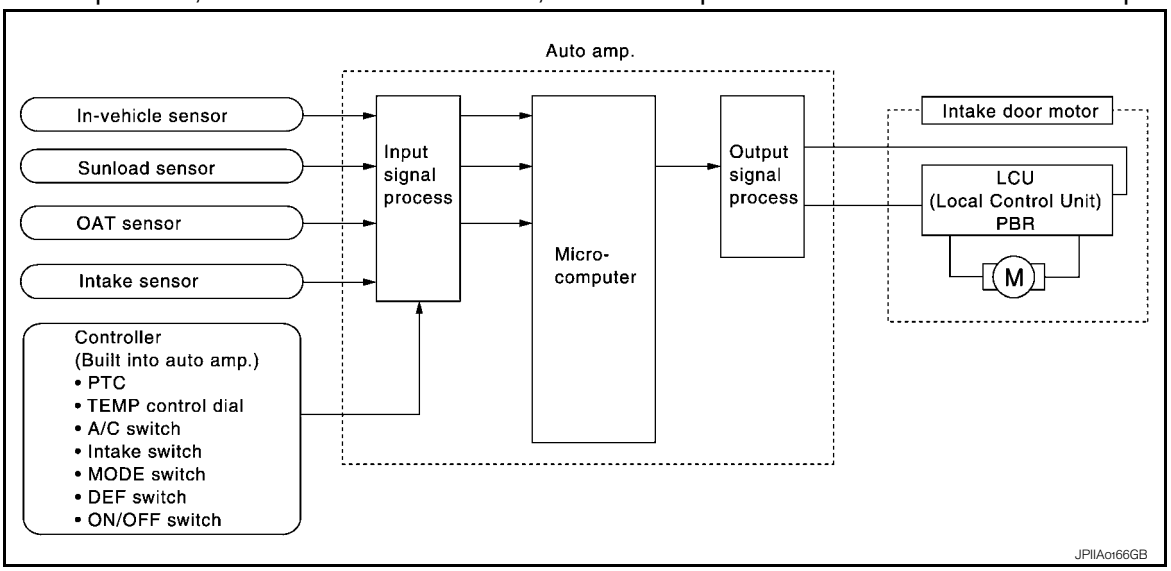
SYSTEM DESCRIPTION

Component Parts

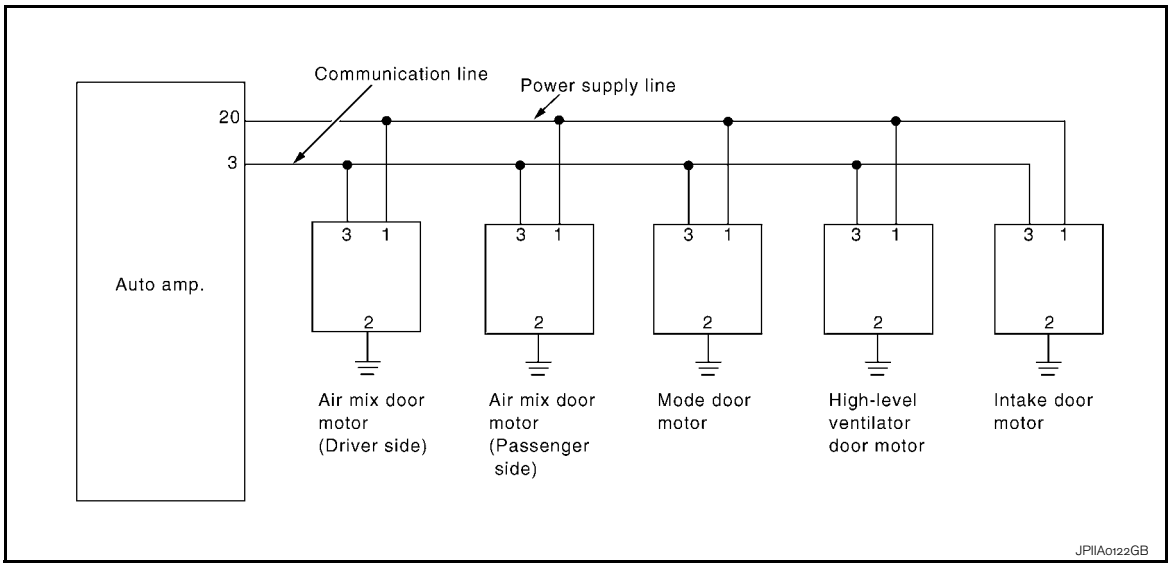
Intake door control system components are:
- Auto amp.
- Intake door motor (LCU)
- A/C LAN system (PBR built-in mode door motor, high-level ventilator door motor, air mix door motor and intake door motor)
- In-vehicle sensor
- OAT sensor
- Sunload sensor
- Intake sensor

System Operation

- The auto amp. receives data from each of the sensors.
- The auto amp. sends air mix doors, mode door, high-level ventilator door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU, high-level ventilator door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor, high-level ventilator door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles.
- Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data are returned to the auto amp.
- The intake door control determines intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When shifting mode position D/F, when the DEF or OFF switches are pressed, or when A/C switch is OFF, the auto amp. sets the intake door at the FRE position.



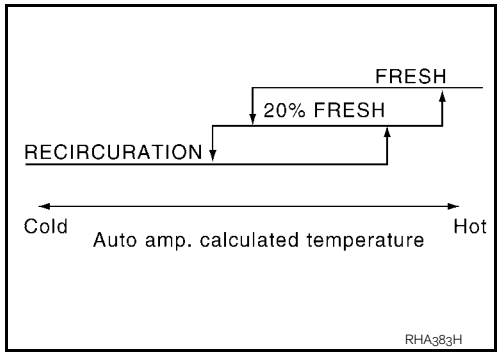
LAN System Circuit



Intake Door Control Specification

Intake door position is basically fixed at FRE when FRE indicator lamps of DEF switch and intake switch turn ON, and fixed at REC when REC indicator lamp of intake switch turns ON.

Intake door automatic control selects FRE, 20%FRE, or REC depending on a target air mix door opening angle, based on in-vehicle temperature, ambient temperature, and sunload.



cardiagn.com

BLOWER MOTOR CONTROL SYSTEM

Description

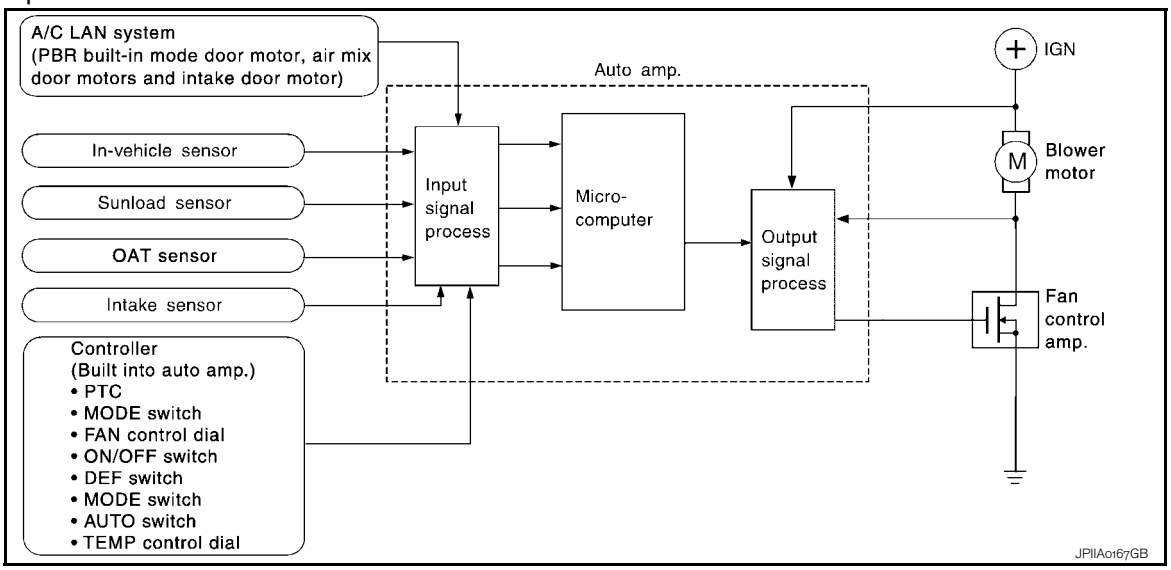
INFOID:0000000000954641

SYSTEM DESCRIPTION

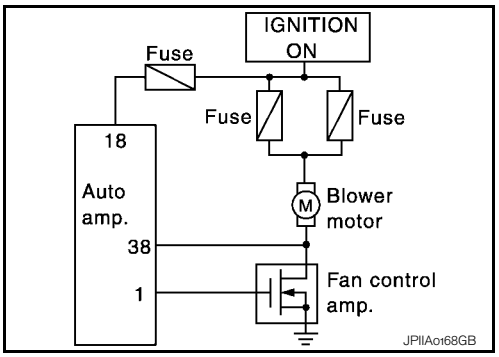
Component Parts

Fan speed control system components are:
- Auto amp.
- A/C LAN system (PBR built-in mode door motor, air mix door motors and intake door motor)
- In-vehicle sensor
- OAT sensor
- Sunload sensor
- Intake sensor

System Operation



Blower motor circuit



Automatic Mode

In the automatic mode, the blower motor speed is calculated by the auto amp. based on the input from the PBR, in-vehicle sensor, sunload sensor, intake sensor and OAT sensor.
The blower motor applied voltage ranges from approximately 4 V (lowest speed) to 12 V (highest speed).
The control blower speed (in the range of 4 to 12 V), auto amp. supplies a gate voltage to the fan control amp. Based on this voltage, fan control amp. control voltage supplied to the blower motor.

Starting Fan Speed Control

Start up from COLD SOAK Condition (Automatic mode)
In a cold start up condition where the engine coolant temperature is below 56°C (133°F), the blower will not operate for a short period of time (up to 150 seconds). The exact start delay time varies depending on the ambient and engine coolant temperature.

In the most extreme case (very low ambient temperature) the blower starting delay will be 150 seconds as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 56°C (133°F), and then the blower speed will increase to the objective speed.

Start up from usual or HOT SOAK Condition (Automatic mode)

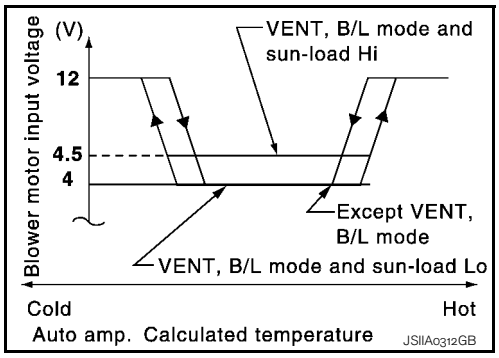
The blower will begin operation momentarily after the AUTO switch is pressed. The blower speed will gradually rise to the objective speed over a time period of 3 seconds or less (actual time depends on the objective blower speed).

Blower Speed Compensation

Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. The low speed will vary depending on the sunload. During conditions of low or no sunload, the blower speed is low (approx. 4 V). During high sunload conditions, the auto amp. raise the blower speed (approx. 4.5 V).

Fan Speed Control Specification



cardiagn.com

MAGNET CLUTCH CONTROL SYSTEM

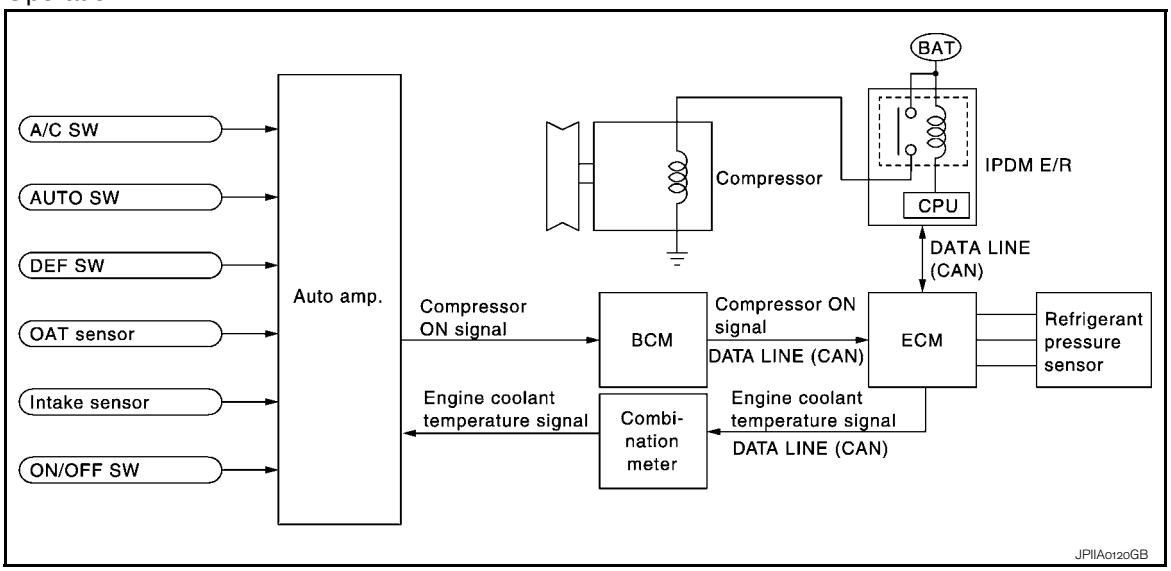
Description

INFOID:0000000000954642

SYSTEM DESCRIPTION

Auto amp. controls compressor operation by ambient temperature, intake air temperature and signal from ECM.

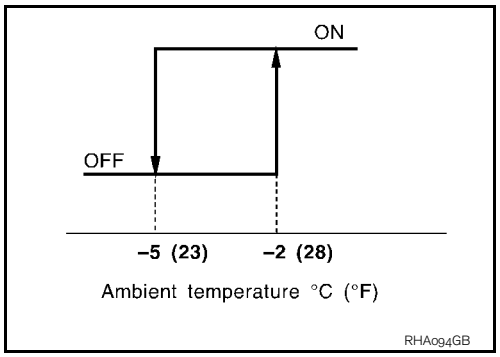
System Operation



Low Temperature Protection Control

Auto amp. will turn compressor ON or OFF as determined by a signal detected by OAT sensor and intake sensor.

When ambient temperature is higher than –2°C (23°F), the compressor turns ON. The compressor turns OFF when ambient temperature is lower than –5°C (28°F).



PTC HEATER CONTROL SYSTEM

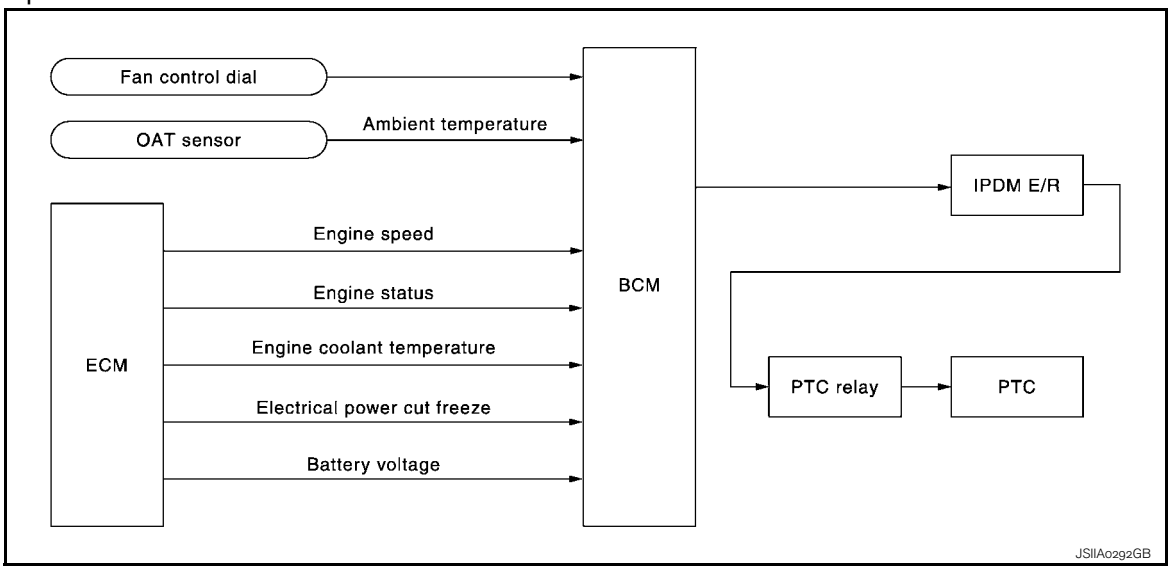
Description

INFOID:0000000001026642

SYSTEM DESCRIPTION

BCM controls PTC (Positive Temperature Coefficient) heater correspond to fan ON signal, ambient temperature, engine coolant temperature, engine speed, engine status, electrical power cut freeze signal and battery voltage.
BCM sends PTC ON signal to IPDM E/R, via CAN communication.
BCM judges whether PTC can be turned ON, based on each sensor status (ambient temperature, engine speed, engine coolant temperature, etc.). If it judges PTC can be turned ON, it send PTC heater relay ON signal to IPDM E/R via CAN communication.

System Operation



cardiagn.com

COMPONENT DIAGNOSIS

MODE DOOR MOTOR

Description

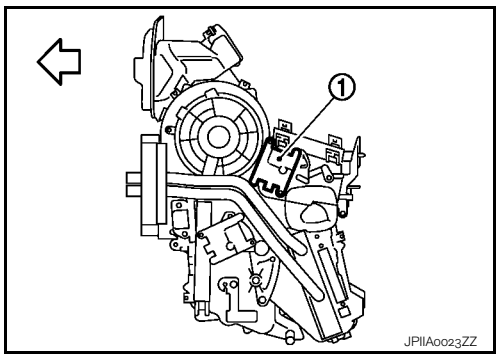
INFOID:0000000000954643

COMPONENT DESCRIPTION

Mode Door Motor

The mode door motor (1) are attached to the A/C unit assembly. It rotates so that air is discharged from the outlet set by the auto amp. Motor rotation is conveyed to a link which activates the mode door.

⇦: Vehicle front



Component Function Check

INFOID:0000000000954644

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press MODE switches and DEF switch.
2. Each position indicator should illuminate.
3. Confirm that discharge air comes out according to the air distribution table at below. Refer to HAC-15, "System Description".

NOTE:

Confirm that the magnet clutch is engaged (Sound or visual inspection) and intake door position is at FRE when DEF or D/F is selected.

Is the inspection result normal?

YES >> END.
NO >> Go to diagnosis procedure. Refer to HAC-47, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000954645

1.PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 3.

Does code No. 20 appear on the display?

YES >> GO TO 2.
NO >> Go to appropriate malfunctioning sensor circuit. Refer to HAC-27, "Diagnosis Description", see No. 11.

2.PERFORM SELF-DIAGNOSIS STEP-3

Perform self-diagnosis STEP-3. Refer to HAC-27, "Diagnosis Description", see No. 1 to 4.

Does code No. 30 appear on the display?

YES >> GO TO 8.
NO-1 >> Code No. 33, 34, 35 or 36 appear on the display: GO TO 3.
NO-2 >> Code No. 37, 38 or 39 appear on the display: Go to Intake Door Motor Circuit. Refer to HAC-59, "Diagnosis Procedure".
NO-3 >> Code No. 31 or 32 appear on the display: Go to High-level Ventilator Door Motor Circuit. Refer to HAC-50, "Diagnosis Procedure".

3.CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

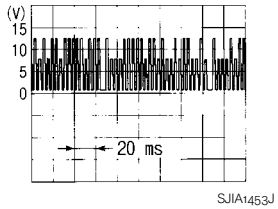
(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace auto amp.

4. CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	

SJIA1453J

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace auto amp.

5. CHECK POWER SUPPLY FOR MODE DOOR MOTOR

Check voltage between mode door motor harness connector M310 terminal 1 and ground.

(+)		(–)	Voltage
Mode door motor		—	
Connector	Terminal		
M310	1	Ground	Battery voltage

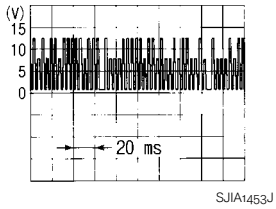
Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connector.

6. CHECK SIGNAL FOR MODE DOOR MOTOR

Confirm A/C LAN signal between mode door motor harness connector M310 terminal 3 and ground using an oscilloscope.

cardiagn.com

(+)		(–)	Voltage
Mode door motor		—	
Connector	Terminal		
M310	3	Ground	

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair harness or connector.

7. CHECK MODE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector.
3. Check continuity between mode door motor harness connector M310 terminal 2 and ground.

Mode door motor		—	Continuity
Connector	Terminal		
M310	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace mode door motor.
NO >> Repair harness or connector.

8. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to HAC-27, "Diagnosis Description", see No. 1 to 6.

Is it operated normally?

YES >> END.
NO >> GO TO 9.

9. CHECK MODE DOOR CONTROL LINKAGE

Check mode door control linkage.

Is it installed normally?

YES >> Refer to VTL-35, "Exploded View".
NO >> Repair or adjust control linkage.

HIGH-LEVEL VENTILATOR DOOR MOTOR

Description

INFOID:0000000000955128

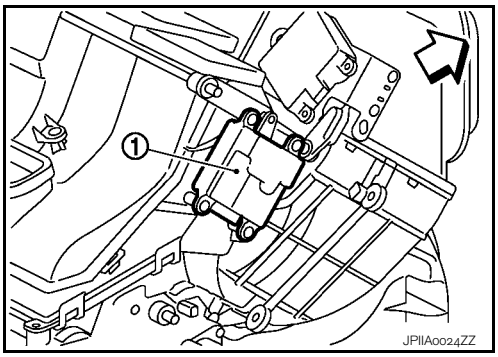
COMPONENT DESCRIPTION

High-level Ventilator Door Motor

The high-level ventilator door motor (1) are attached to the A/C unit assembly. It rotates so that air is discharged from the outlet set by the auto amp. Motor rotation is conveyed to a link which activates the high-level ventilator door.

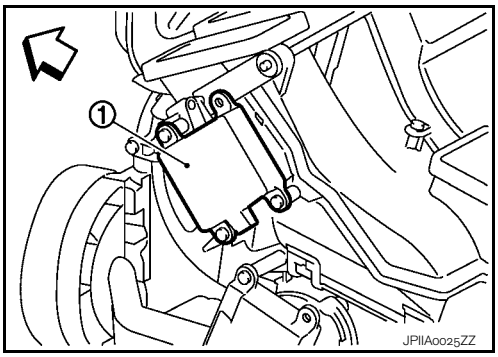
LHD models

⇦: Vehicle front



RHD models

⇦: Vehicle front



Component Function Check

INFOID:0000000000955129

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press high-level ventilator switch.
2. High-level ventilator switch indicator turn ON.
3. Confirm that discharge air comes out high-level ventilator.

Is the inspection result normal?

YES >> END.
NO >> Go to diagnosis procedure. Refer to HAC-50, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000955130

1.PERFORM SELF-DIAGNOSIS STEP-3

Perform self-diagnosis STEP-3. Refer to HAC-27, "Diagnosis Description", see No. 1 to 4.

Does code No. 30 appear on the display?

YES >> GO TO 7.
NO-1 >> Code No. 33, 34, 35 or 36 appear on the display: Go to mode door motor circuit. Refer to HAC-47, "Diagnosis Procedure".
NO-2 >> Code No. 37, 38 or 39 appear on the display: Go to Intake Door Motor Circuit. Refer to HAC-59, "Diagnosis Procedure".
NO-3 >> Code No. 31 or 32 appear on the display: GO TO 2.

2.CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.

cardiagn.com

2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

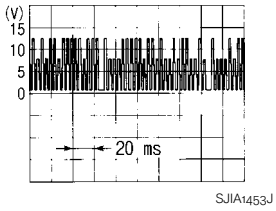
(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace auto amp.

3. CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	

SJIA1453J

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace auto amp.

4. CHECK POWER SUPPLY FOR HIGH-LEVEL VENTILATOR DOOR MOTOR

Check voltage between high-level ventilator door motor harness connector M44 terminal 1 and ground.

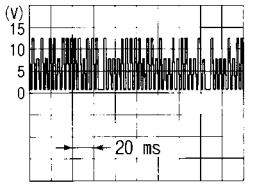
(+)		(–)	Voltage
High-level VENT door motor		—	
Connector	Terminal		
M44	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

5. CHECK SIGNAL FOR HIGH-LEVEL VENTILATOR DOOR MOTOR

Confirm A/C LAN signal between high-level ventilator door motor harness connector M44 terminal 3 and ground using an oscilloscope.

(+)		(–)	Voltage
High-level VENT door motor		—	
Connector	Terminal		
M44	3	Ground	

SJIA1453J

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connector.

6. CHECK HIGH-LEVEL VENTILATOR DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect high-level ventilator door motor connector.
3. Check continuity between high-level ventilator door motor harness connector M44 terminal 2 and ground.

High-level VENT door motor		—	Continuity
Connector	Terminal		
M44	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace high-level ventilator door motor.
NO >> Repair harness or connector.

7. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to HAC-27, "Diagnosis Description", see No. 1 to 6.

Is it operated normally?

YES >> END.
NO >> GO TO 8.

8. CHECK HIGH-LEVEL VENTILATOR DOOR CONTROL LINKAGE

Check high-level ventilator door control linkage.

Is it installed normally?

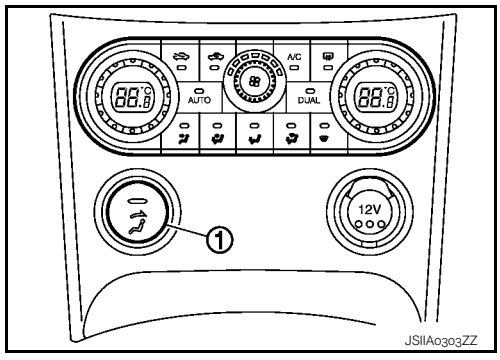
YES >> Refer to VTL-37, "Exploded View".
NO >> Repair or adjust control linkage.

Component Inspection

INFOID:0000000001117101

HIGH-LEVEL VENTILATOR SWITCH

Check continuity between high-level ventilator switch (1) M52 terminal 2 and 3.



JSIIA0303ZZ

cardiagn.com

High-level ventilator switch				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M52	2	M52	3	High-level VENT SW: OFF	Continuity should not exist
				High-level VENT SW: ON	Continuity should exist

cardiagn.com

AIR MIX DOOR MOTOR

Description

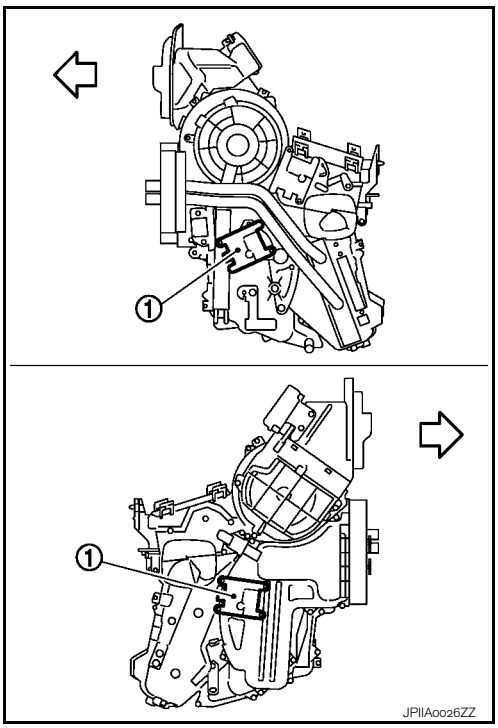
INFOID:0000000000954646

COMPONENT DESCRIPTION

Air Mix Door Motor

The air mix door motors (1) are attached to the A/C unit assembly. It rotates so that the air mix door is opened or closed to a position set by the auto amp. Motor rotation is then conveyed through a shaft and the air mix door position feedback is then sent to the auto amp. by PBR built-in air mix door motor.

⇦: Vehicle front



Component Function Check

INFOID:0000000000954647

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn temperature control dial (driver side) clockwise until 30.0°C is displayed.
2. Check for hot air at discharge air outlets.
3. Turn temperature control dial (driver side) counterclockwise until 16.0°C is displayed.
4. Check for cold air at discharge air outlets.

Is the inspection result normal?

YES >> END.
NO >> Go to diagnosis procedure. Refer to HAC-54, "Diagnosis Procedure"

Diagnosis Procedure

INFOID:0000000000954648

1.PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 3.

Does code No. 20 appear on the display?

YES >> GO TO 2.
NO >> Go to appropriate malfunctioning sensor circuit. Refer to HAC-27, "Diagnosis Description", see No. 11.

2.PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to HAC-27, "Diagnosis Description", see No.1 to 6.

Is it operated normally?

YES >> END.

cardiagn.com

NO-1 >> Malfunction is detected on left side. GO TO 3.
NO-2 >> Malfunction is detected on right side. GO TO 9.

3.CHECK AIR MIX DOOR MOTOR (LEFT SIDE)

Check air mix door motor (left side). Refer to VTL-39, "Exploded View".

Is it installed normally?

YES >> GO TO 4.
NO >> Replace air mix door motor (left side).

4.CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

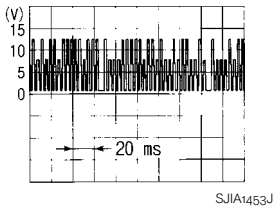
(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace auto amp.

5.CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace auto amp.

6.CHECK POWER SUPPLY FOR AIR MIX DOOR MOTOR (LEFT SIDE)

Check voltage between air mix door motor (left side) harness connector M306 terminal 1 and ground.

(+)		(–)	Voltage
Air mix door motor (left side)		—	
Connector	Terminal		
M306	1	Ground	Battery voltage

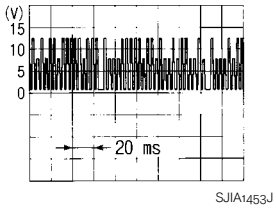
Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair harness or connector.

7.CHECK SIGNAL FOR AIR MIX DOOR MOTOR (LEFT SIDE)

Confirm A/C LAN signal between air mix door motor (left side) harness connector M306 terminal 3 and ground using an oscilloscope.

cardiagn.com

(+)		(–)	Voltage
Air mix door motor (left side)		—	
Connector	Terminal		
M306	3	Ground	

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair harness or connector.

8. CHECK AIR MIX DOOR MOTOR (LEFT SIDE) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor (left side) connector.
3. Check continuity between air mix door motor (left side) harness connector M306 terminal 2 and ground.

Air mix door motor (left side)		—	Continuity
Connector	Terminal		
M306	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace air mix door motor (left side).
NO >> Repair harness or connector.

9. CHECK AIR MIX DOOR MOTOR (RIGHT SIDE)

Check air mix door motor (right side). Refer to VTL-39, "Exploded View".

Is it installed normally?

YES >> GO TO 10.
NO >> Replace air mix door motor (right side).

10. CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

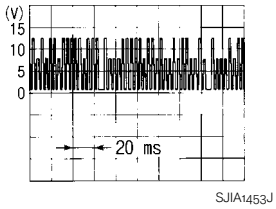
Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace auto amp.

11. CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

cardiagn.com

(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	

SJIA1453J

Is the inspection result normal?

YES >> GO TO 12.
NO >> Replace auto amp.

12. CHECK POWER SUPPLY FOR AIR MIX DOOR MOTOR (RIGHT SIDE)

Check voltage between air mix door motor (right side) harness connector M307 terminal 1 and ground.

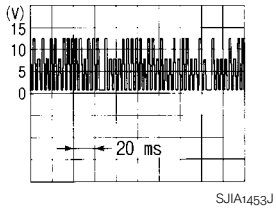
(+)		(–)	Voltage
Air mix door motor (right side)		—	
Connector	Terminal		
M307	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair harness or connector.

13. CHECK SIGNAL FOR AIR MIX DOOR MOTOR (RIGHT SIDE)

Confirm A/C LAN signal between air mix door motor (right side) harness connector M307 terminal 3 and ground using an oscilloscope.

(+)		(–)	Voltage
Air mix door motor (right side)		—	
Connector	Terminal		
M307	3	Ground	

SJIA1453J

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair harness or connector.

14. CHECK AIR MIX DOOR MOTOR (RIGHT SIDE) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor (right side) connector.
3. Check continuity between air mix door motor (right side) harness connector M307 terminal 2 and ground.

Air mix door motor (right side)		—	Continuity
Connector	Terminal		
M307	2	Ground	Continuity should exist

cardiagn.com

Is the inspection result normal?

YES >> Replace air mix door motor (right side).
NO >> Repair harness or connector.

cardiagn.com

INTAKE DOOR MOTOR

Description

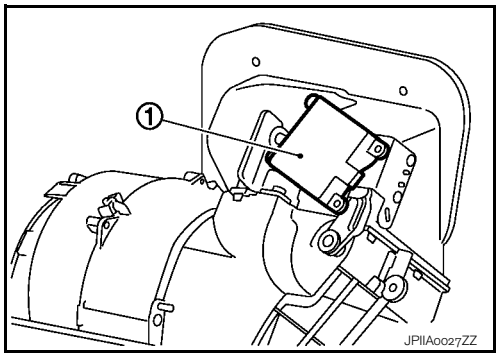
INFOID:0000000000954649

COMPONENT DESCRIPTION

Intake Door Motor

The intake door motor (1) is attached to the A/C unit. It rotates so that air is drawn from inlets set by the auto amp. Motor rotation is conveyed to a lever which activates the intake door.

⇦: Vehicle front



Component Function Check

INFOID:0000000000954650

1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press recirculation (REC) switch.
2. REC indicator should illuminate.
3. Listen for intake door position change. (Slight change of blower sound can be heard.)
4. Press fresh (FRE) switch.
5. FRE indicator should illuminate.

Is the inspection result normal?

YES >> END.
NO >> Go to diagnosis procedure. Refer to HAC-59, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000954651

1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 3.

Does code No. 20 appear on the display?

YES >> GO TO 2.
NO >> Go to appropriate malfunctioning sensor circuit. Refer to HAC-27, "Diagnosis Description", see No. 11.

2. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to HAC-27, "Diagnosis Description", see No. 1 to 6.

Is it operated normally?

YES >> END.
NO >> GO TO 3.

3. CHECK INTAKE DOOR CONTROL LINKAGE

Check intake door control linkage.

Is it installed normally?

YES >> GO TO 4.
NO >> Repair or adjust control linkage.

4. CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

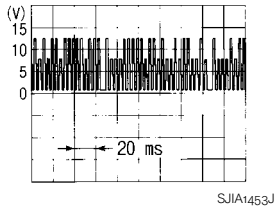
(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace auto amp.

5.CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	 SJIA1453J

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace auto amp.

6.CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR

Check voltage between intake door motor harness connector M304 terminal 1 and ground.

(+)		(–)	Voltage
Intake door motor		—	
Connector	Terminal		
M304	1	Ground	Battery voltage

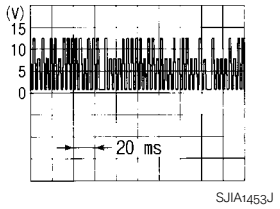
Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair harness or connector.

7.CHECK SIGNAL FOR INTAKE DOOR MOTOR

Confirm A/C LAN signal between intake door motor harness connector M304 terminal 3 and ground using an oscilloscope.

cardiagn.com

(+)		(–)	Voltage
Intake door motor		—	
Connector	Terminal		
M304	3	Ground	

SJIA1453J

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair harness or connector.

8. CHECK INTAKE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector.
3. Check continuity between intake door motor harness connector M304 terminal 2 and ground.

Intake door motor		—	Continuity
Connector	Terminal		
M304	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace intake door motor.
NO >> Repair harness or connector.

BLOWER MOTOR

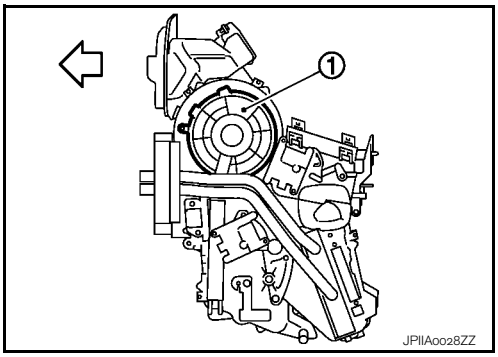
Description

INFOID:0000000000954652

COMPONENT DESCRIPTION

The blower motor (1) utilizes a brush motor with a sirocco fan type.

⇦: Vehicle front



Component Function Check

INFOID:0000000000954653

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn fan control dial clockwise. Blower should operate on low speed.
2. Turn fan control dial clockwise, and continue checking blower speed and fan LEDs until all speeds checked.

Is the inspection result normal?

YES >> END.
NO >> Go to diagnosis procedure. Refer to HAC-62, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000954654

1.PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 3.

Is there any malfunction displayed?

YES >> Go to appropriate malfunctioning sensor circuit. Refer to HAC-27, "Diagnosis Description", see to No. 11.
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to HAC-27, "Diagnosis Description", see No. 1 to 6.

Code No.	41	42	43	44	45	46
Blower motor voltage	5 V	11.75 V	8.5 V			11.75 V

Does blower motor speed change according to each code No.?

YES >> GO TO 3.
NO >> GO TO 5.

3.CHECK ENGINE COOLANT TEMPERATURE

Check engine coolant temperature.

Is engine coolant temperature below 56°C (133°F)?

YES >> GO TO 4.
NO >> Blower motor operation is normal.

4.CHECK BLOWER MOTOR OPERATING

Check blower motor operating.

Is blower motor operation under starting blower speed control?

YES >> END.
NO >> GO TO 5.

cardiagn.com

5.CHECK POWER SUPPLY FOR BLOWER MOTOR

1. Disconnect blower motor connector.
2. Turn ignition switch ON.
3. Check voltage between blower motor harness connector M312 terminal 1 and ground.

(+)		(–)	Voltage
Blower motor		—	
Connector	Terminal		
M312	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 10.

6.CHECK POWER SUPPLY FOR FAN CONTROL AMP.

1. Disconnect fan control amp. connector.
2. Check voltage between fan control amp. harness connector M311 terminal 1 and ground.

(+)		(–)	Voltage
Fan control amp.		—	
Connector	Terminal		
M311	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 14.

7.CHECK BLOWER MOTOR CONTROL SIGNAL

1. Reconnect blower motor connector and fan control amp. connector.
2. Turn ignition switch ON.
3. Press VENT switch.
4. Turn fan control dial to 1st speed.
5. Check voltage between fan control amp. harness connector M311 terminal 2 and ground.

(+)		(–)	Voltage
Fan control amp.		—	
Connector	Terminal		
M311	2	Ground	Approx. 2.5

Is the inspection result normal?

YES >> GO TO 8.
NO-1 >> In the case of less than approx. 2.5 V: GO TO 15.
NO-2 >> In the case of more than approx. 9 V: Replace auto amp.

8.CHECK FAN CONTROL AMP. GROUND CIRCUIT

1. Disconnect fan control amp. connector.
2. Check continuity between fan control amp. harness connector M311 terminal 3 and ground.

Fan control amp.		—	Continuity
Connector	Terminal		
M311	3	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair harness or connector.

9.CHECK BLOWER MOTOR FEEDBACK SIGNAL

1. Reconnect fan control amp. connector.
2. Turn ignition switch ON.
3. Turn fan control dial to 1st speed.
4. Check voltage between auto amp. harness connector M53 terminal 18 and ground.

(+)		(–)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	18	Ground	Battery voltage

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Repair harness or connector.

10.CHECK POWER VOLTAGE OF BLOWER RELAY

1. Turn ignition switch OFF.
2. Remove blower relay. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".
3. Turn ignition switch ON.
4. Check voltage between blower relay fuse block terminals 1, 3 and body ground. Refer to PG-108, "Description" for relay terminal assignment.

(+)	(–)	Voltage
Blower relay	—	
1	Ground	Battery voltage
3		

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 11.

11.CHECK IGNITION SWITCH CIRCUIT

Check ignition switch circuit. Refer to DLK-91, "Diagnosis Procedure" (WITH I-KEY, WITHOUT SUPER LOCK), DLK-355, "Diagnosis Procedure" (WITH I-KEY & SUPER LOCK), DLK-597, "Diagnosis Procedure" (WITHOUT I-KEY, WITHOUT SUPER LOCK) or DLK-757, "Diagnosis Procedure" (WITHOUT I-KEY & SUPER LOCK).

Is the inspection result normal?

YES >> Repair harness or connector.
NG >> Replace malfunctioning parts.

12.CHECK BLOWER RELAY

1. Turn ignition switch OFF.
2. Install blower elay. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".
3. Check operation sound of the blower relay after switching ignition switch ON.

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace blower relay.

13.CHECK FUSE

Check 15A fuse [Nos 15 and 16, located in the fuse block (J/B)]. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NG >> Replace fuse.

14.CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND FAN CONTROL AMP.

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect fan control amp. connector.
3. Check continuity between blower motor harness connector M312 terminal 2 and fan control amp. harness connector M311 terminal 1.

Blower motor		Fan control amp.		Continuity
Connector	Terminal	Connector	Terminal	
M312	2	M311	1	Continuity should exist

Is the inspection result normal?

YES >> Replace blower motor.
NO >> Repair harness or connector.

15. CHECK CIRCUIT FAN CONTROL AMP.

Check continuity between fan control amp. harness connector M311 terminal 3 and 2.

Fan control amp.				Continuity
Connector	Terminal	Connector	Terminal	
M311	3	M311	2	Continuity should exist

Is the inspection result normal?

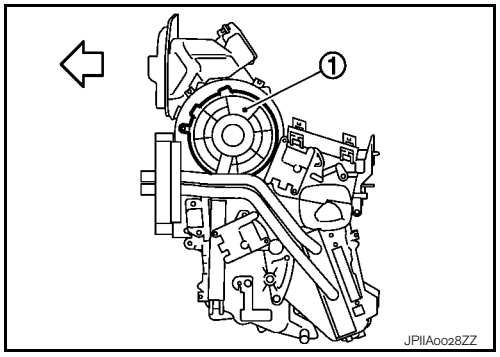
YES >> Replace auto amp.
NO >> Replace fan control amp.

Component Inspection

INFOID:0000000000954655

Confirm smooth rotation of the blower motor (1).

⇦: Vehicle front



MAGNET CLUTCH

Description

INFOID:0000000000954656

Magnet clutch drives a compressor, by a signal of IPDM E/R.

Component Function Check

INFOID:0000000000954657

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press AUTO switch and A/C switch.
2. AUTO switch indicator will turn ON. Confirm that the magnet clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

Does the magnet clutch operate?

YES >> END.
NO >> Go to Diagnosis Procedure. Refer to HAC-66, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000954658

1.PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 3.

Is there any malfunction displayed?

YES >> Go to appropriate malfunctioning sensor circuit. Refer to HAC-27, "Diagnosis Description", see to No. 11.
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to HAC-27, "Diagnosis Description", see No. 1 to 6.

Is it operated normally?

YES >> END.
NO >> GO TO 3.

3.PERFORM AUTO ACTIVE TEST

Perform “AUTO ACTIVE TEST”. Refer to PCS-9, "Diagnosis Description".

Does the magnet clutch operate?

YES >> • WITH CONSULT-III: GO TO 7.
• WITHOUT CONSULT-III: GO TO 8.
NO >> Check 10A fuse (No. 53, located in IPDM E/R), and GO TO 4.

4.CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and compressor connector.
3. Check continuity between IPDM E/R harness connector E12 terminal 23 and compressor harness connector F17 (With Gasoline Engine) or F18 (With Diesel Engine) terminal 1.

With Gasoline Engine

IPDM E/R		Compressor		Continuity
Connector	Terminal	Connector	Terminal	
E12	23	F17	1	Continuity should exist

With Diesel Engine

IPDM E/R		Compressor		Continuity
Connector	Terminal	Connector	Terminal	
E12	23	F18	1	Continuity should exist

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

cardiagn.com

5.CHECK CIRCUIT CONTINUITY BETWEEN COMPRESSOR GROUND

Check continuity between compressor harness connector F17 (With Gasoline Engine) or F18 (With Diesel Engine) terminal 2 and ground.

With Gasoline Engine

Compressor		—	Continuity
Connector	Terminal		
F17	2	Ground	Continuity should exist

With Diesel Engine

Compressor		—	Continuity
Connector	Terminal		
F18	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connector.

6.CHECK MAGNET CLUTCH CIRCUIT

Check for operation sound when applying battery voltage direct current to terminal.

Is the inspection result normal?

YES >> 1. Replace IPDM E/R.
2. Refer to self-diagnosis procedure HAC-27, "Diagnosis Description" and perform self-diagnosis STEP-4. Confirm that magnet clutch operation normal.

NO >> 1. Replace compressor.
2. Refer to self-diagnosis procedure HAC-27, "Diagnosis Description" and perform self-diagnosis STEP-4. Confirm that magnet clutch operation normal.

7.CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal in “DATA MONITOR”. Refer to HAC-31, "CONSULT-III Function".

A/C SW ON : AIR COND SW ON
A/C SW OFF : AIR COND SW OFF

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 8.

8.CHECK CIRCUIT CONTINUITY BETWEEN BCM AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect BCM harness connector and auto amp. harness connector.
3. Check continuity between BCM harness connector M65 terminal 14 and auto amp. harness connector M53 terminal 5.

BCM		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M65	14	M53	5	Continuity should exist

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair harness or connector.

9.CHECK BCM

1. Connect BCM harness connector.
2. Turn ignition switch ON.
3. Check voltage between BCM harness connector M65 terminal 14 and ground.

BCM		—	Voltage
Connector	Terminal		
M65	14	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

10. CHECK COMPRESSOR ON SIGNAL

1. Turn ignition switch OFF.
2. Connect auto amp. harness connector.
3. Turn ignition switch ON.
4. Check voltage between auto amp. harness connector M53 terminal 5 and ground.

(+)		(–)	Condition	Voltage
Auto amp.		—		
Connector	Terminal			
M53	5	Ground	A/C switch: ON (Blower motor operates.)	Approx. 0

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace auto amp.

11. CHECK REFRIGERANT PRESSURE SENSOR

WITH CONSULT-III
1. Start the engine.
2. Check voltage of refrigerant pressure sensor in “DATA MONITOR”. Refer to HAC-91, "HR16DE : Reference Value" (HR16DE), HAC-92, "MR20DE : Reference Value" (MR20DE), HAC-92, "K9K : Reference Value" (K9K).

WITHOUT CONSULT-III
1. Start the engine.
2. Check voltage between ECM harness connector F8 terminal 41 (With Gasoline Engine) or F68 terminal 78 (With Diesel Engine) and ground.

With Gasoline Engine

(+)		(–)	Condition	Voltage
ECM		—		
Connector	Terminal			
F8	41	Ground	A/C switch: ON (Blower motor operates.)	Approx. 1.0 - 4.0

With Diesel Engine

(+)		(–)	Condition	Voltage
ECM		—		
Connector	Terminal			
F68	78	Ground	A/C switch: ON (Blower motor operates.)	Approx. 2.3

Is the inspection result normal?

YES >> • WITH CONSULT-III: GO TO 12.
• WITHOUT CONSULT-III: GO TO 13.
NO >> Refer to EC-316, "Diagnosis Procedure" [HR16DE (WITH EURO-OBD)], EC-595, "Diagnosis Procedure" [HR16DE (WITHOUT EURO-OBD)], EC-936, "Diagnosis Procedure" [MR20DE (WITH EURO-OBD)], EC-1215, "Diagnosis Procedure" [MR20DE (WITHOUT EURO-OBD)], or EC-1380, "Diagnosis Procedure" (K9K).

cardiagn.com

12. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal in “DATA MONITOR”. Refer to HAC-31, "CONSULT-III Function".

FAN CONTROL DIAL ON : FAN ON SIG ON
FAN CONTROL DIAL OFF : FAN ON SIG OFF

Is the inspection result normal?

YES >> GO TO 16.
NO >> GO TO 13.

13. CHECK CIRCUIT CONTINUITY BETWEEN BCM AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect BCM connector and auto amp. connector.
3. Check continuity between BCM harness connector M65 terminal 15 and auto amp. harness connector M53 terminal 24.

BCM		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M65	15	M53	24	Continuity should exist

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair harness or connector.

14. CHECK BCM

1. Connect BCM harness connector.
2. Turn ignition switch ON.
3. Check voltage between BCM harness connector M65 terminal 15 and ground.

BCM		—	Voltage
Connector	Terminal		
M65	15	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 15.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

15. CHECK FAN ON SIGNAL

1. Turn ignition switch OFF.
2. Connect auto amp. connector.
3. Turn ignition switch ON.
4. Check voltage between auto amp. harness connector M53 terminal 24 and ground.

(+)		(–)	Condition	Voltage
Auto amp.		—		
Connector	Terminal			
M53	24	Ground	Fan control dial: ON	Approx. 0

Is the inspection result normal?

YES >> GO TO 16.
NO >> Replace auto amp.

16. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-59, "CAN Communication Signal Chart".
- ECM – IPDM E/R
- ECM – BCM

Is the inspection result normal?

cardiagn.com

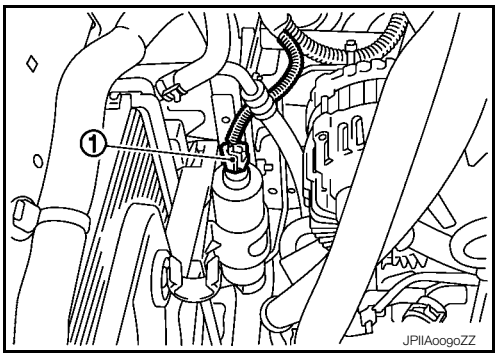
YES >> Replace ECM.
NO >> Repair or replace malfunctioning part(s).

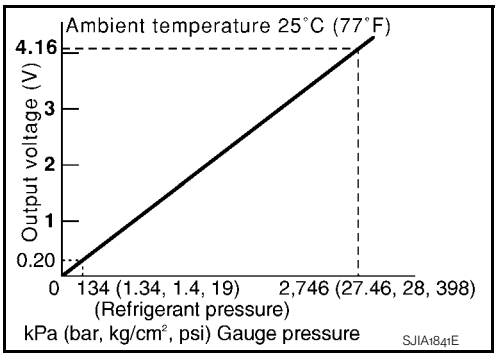
Component Inspection

INFOID:0000000000954659

Refrigerant Pressure Sensor

The refrigerant pressure sensor (1) is attached to the liquid tank.
Make sure that the A/C refrigerant pressure and the sensor output voltage are within the specified range as shown in the A/C operating condition figure. Refer to EC-316, "Description" [HR16DE (WITH EURO-OBD)], EC-595, "Description" [HR16DE (WITHOUT EURO-OBD)], EC-936, "Description" [MR20DE (WITH EURO-OBD)], EC-1215, "Description" [MR20DE (WITHOUT EURO-OBD)], or EC-1380, "Description" (K9K).





cardiagn.com

PTC HEATER

Description

INFOID:0000000001026736

IPDM E/R operate a PTC heater, by a signal of BCM.

Component Function Check

INFOID:0000000001026738

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

CONSULT-III ACTIVE TEST

1. Start engine.
2. Select “PTC HEATER” of BCM active test item.
   CAUTION:
   - **Engine must be cold.**
   - **Battery must be charged.**
3. Turn fan control dial clockwise.
4. Turn temperature control dial to full hot position.
5. With operating the test item, check that PTC heater operation.
6. Check for warm air at discharge air outlet.

PTC 3	**: PTC heater HI operation**
PTC 2	**: PTC heater MID operation**
PTC 1	**: PTC heater LO operation**
OFF	**: Stop the PTC heater operation**

Does the PTC heater operate?

YES >> END.
NO >> Go to Diagnosis Procedure. Refer to HAC-71, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001026739

1.CHECK PTC HEATER-1 OPERATION

CONSULT -III ACTIVE TEST

1. Disconnect PTC heater connector.
2. Start engine.
3. Select “PTC HEATER” of BCM active test item.
4. With operating the item, check voltage between PTC heater harness connector E117 terminal 3 and ground.

(+)		(–)	Test item	Voltage
PTC heater		—	PTC HEATER	
Connector	Terminal			
E117	3	Ground	OFF	Approx. 0
			PTC 1	Battery voltage
			PTC 2	Approx. 0
			PTC 3	Battery voltage

In the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 5.

2.CHECK GROUND CIRCUIT FOR PTC HEATER-1

1. Turn ignition switch OFF.
2. Check continuity between PTC heater harness connector E116 terminal 1 and ground.

PTC heater		—	Continuity
Connector	Terminal		
E116	1	Ground	Continuity should exist.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK PTC HEATER-2 OPERATION

1. Start engine.
2. Select “PTC HEATER” of BCM active test item.
3. With operating the item, check voltage between PTC heater harness connector E117 terminal 4 and ground.

(+)		(–)	Test item	Voltage
PTC heater		—	PTC HEATER	
Connector	Terminal			
E117	4	Ground	OFF	Approx. 0
			PTC 1	Approx. 0
			PTC 2	Battery voltage
			PTC 3	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 12.

4.CHECK GROUND CIRCUIT FOR PTC HEATER-2

1. Turn ignition switch OFF.
2. Check continuity between PTC heater harness connector E116 terminal 2 and ground.

PTC heater		—	Continuity
Connector	Terminal		
E116	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace PTC heater.
NO >> Repair harness or connector.

5.CHECK VOLTAGE FOR PTC RELAY-1

1. Turn ignition switch OFF.
2. Disconnect PTC relay-1.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-1 harness connector E53 terminal 3 and ground.

(+)		(–)	Voltage
PTC relay-1		—	
Connector	Terminal		
E53	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.CHECK FUSE

cardiagn.com

Check 30A fuse (Nos 37, located in the fuse, fusible link and relay box). Refer to PG-111, "Fuse and Fusible Link Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

7. CHECK PTC RELAY-1

Check PTC relay-1. Refer to HAC-76, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace PTC relay-1.

8. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC HEATER

Check continuity between PTC relay-1 harness connector E53 terminal 5 and PTC heater harness connector E117 terminal 3.

PTC relay-1		PTC heater		Continuity
Connector	Terminal	Connector	Terminal	
E53	5	E117	3	Continuity should exist

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair harness or connector.

9. CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch ON.
2. Check voltage between PTC relay-1 harness connector E53 terminal 1 and ground.

(+)		(–)	Voltage
PTC relay-1		—	
Connector	Terminal		
E53	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10. CHECK FUSE

Check 10A fuse [Nos 17, located in the fuse block (J/B)]. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

11. CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-1 AND IPDM E/R

Check continuity between PTC relay-1 harness connector E53 terminal 2 and IPDM E/R harness connector E11 terminal 11.

PTC relay-1		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E53	2	E11	11	Continuity should exist

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair harness or connector.

12. CHECK VOLTAGE FOR PTC RELAY-2

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect PTC relay-2.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-2 harness connector E54 terminal 3 and ground.

(+)		(–)	Voltage
PTC relay-2		—	
Connector	Terminal		
E54	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 14.
NO >> GO TO 13.

13. CHECK FUSE

Check 30A fuse (Nos 35, located in the fuse, fusible link and relay box). Refer to PG-111, "Fuse and Fusible Link Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

14. CHECK PTC RELAY-2

Check PTC relay-2. Refer to HAC-76, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Replace PTC relay-2.

15. CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-2 AND PTC HEATER

Check continuity between PTC relay-2 harness connector E54 terminal 5 and PTC heater harness connector E117 terminal 4.

PTC relay-2		PTC heater		Continuity
Connector	Terminal	Connector	Terminal	
E54	5	E117	4	Continuity should exist.

Is the inspection result normal?

YES >> GO TO 16.
NO >> Repair harness or connector.

16. CHECK POWER SUPPLY FOR PTC RELAY-2

1. Turn ignition switch ON.
2. Check voltage between PTC relay-2 harness connector E54 terminal 1 and ground.

(+)		(–)	Voltage
PTC relay-2		—	
Connector	Terminal		
E54	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 17.
NO >> GO TO 10.

17. CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-2 AND IPDM E/R

Check continuity between PTC relay-2 harness connector E54 terminal 2 and IPDM E/R harness connector E11 terminal 12.

cardiagn.com

PTC relay-1		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E54	2	E11	12	Continuity should exist.

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair harness or connector.

18. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal in “DATA MONITOR”. Refer to HAC-31, "CONSULT-III Function".

FAN CONTROL DIAL ON : FAN ON SIG ON
FAN CONTROL DIAL OFF : FAN ON SIG OFF

Is the inspection result normal?

YES >> GO TO 21.
NO >> GO TO 19.

19. CHECK FAN ON SIGNAL

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 24 and ground.

(+)		(–)	Condition	Voltage
Auto amp.		—		
Connector	Terminal			
M53	24	Ground	Fan control dial: OFF	Approx. 12

3. Turn fan control dial clockwise.
4. Check voltage between auto amp. harness connector M53 terminal 24 and ground.

(+)		(–)	Condition	Voltage
Auto amp.		—		
Connector	Terminal			
M53	24	Ground	Fan control dial: ON (Blower motor operates.)	Approx. 0

Is the inspection result normal?

YES >> GO TO 20.
NO >> Replace auto amp.

20. CHECK CIRCUIT CONTINUITY BETWEEN BCM AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect BCM harness connector.
3. Check continuity between BCM harness connector M65 terminal 15 and auto amp. harness connector M53 terminal 24.

BCM		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M65	15	M53	24	Continuity should exist

Is the inspection result normal?

YES >> GO TO 21.
NO >> Repair harness or connector.

21. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-59, "CAN Communication Signal Chart".

cardiagn.com

- BCM – IPDM E/R
- BCM – ECM

Is the inspection result normal?

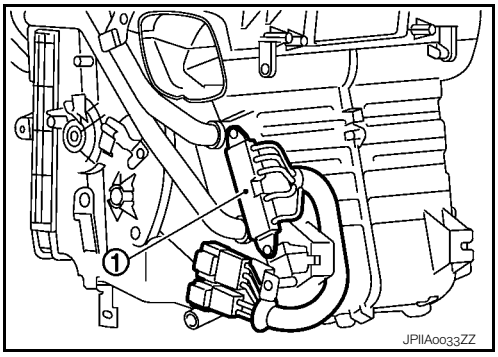
YES >> Replace IPDM E/R.
NO >> Repair or replace malfunctioning part(s).

Component Inspection

INFOID:0000000001026740

PTC HEATER

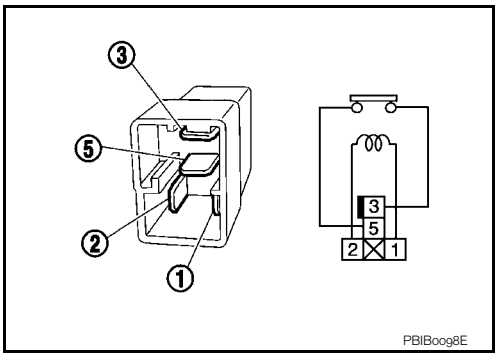
The PTC heater (1) is attached to the A/C unit assembly.
It generates heat electrically.



PTC RELAY

Check continuity between terminal 3 and 5.

Terminal	Condition	Continuity
3 and 5	12V direct current supply between terminal 1 and 2	Exist
	No current supply	Not exist



cardiagn.com

OAT SENSOR

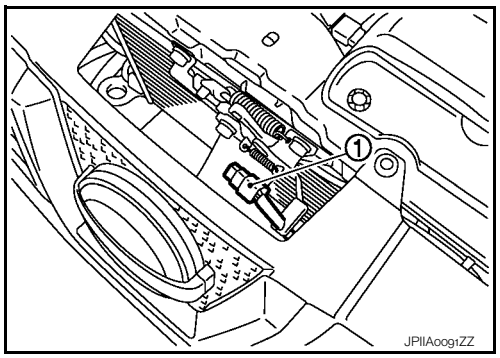
Description

INFOID:0000000000954660

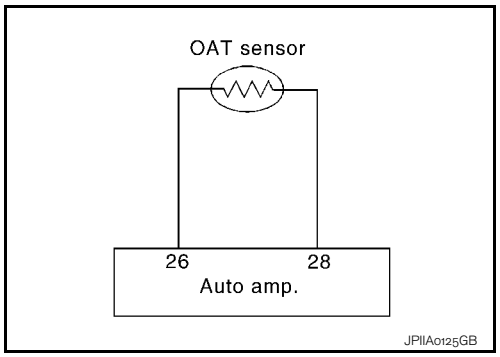
COMPONENT DESCRIPTION

OAT (Outside Air Temperature) Sensor

The OAT sensor (1) is attached on the radiator core support. It detects ambient temperature and converts it into a resistance value which is then input into the auto amp.



OAT Sensor Circuit



AMBIENT TEMPERATURE INPUT PROCESS

The auto amp. includes a processing circuit for the OAT sensor input. However, when the temperature detected by the OAT sensor increases quickly, the processing circuit retards the auto amp. function. It only allows the auto amp. to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds.
As an example, consider stopping for a few minutes after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the OAT sensor will increase. This is because the heat from the engine compartment can radiate to the front bumper area, location of the OAT sensor.

Component Function Check

INFOID:0000000000954661

1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 3.

21 or –21 is displayed.

YES >> Go to Diagnosis Procedure. Refer to HAC-77, "Diagnosis Procedure".
NO >> END.

Diagnosis Procedure

INFOID:0000000000954662

1. CHECK VOLTAGE BETWEEN OAT SENSOR AND GROUND

1. Disconnect OAT sensor connector.
2. Turn ignition switch ON.
3. Check voltage between OAT sensor harness connector E52 terminal 4 and ground.

(+)		(–)	Voltage
OAT sensor		—	
Connector	Terminal		
E52	4	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK CIRCUIT CONTINUITY BETWEEN OAT SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between OAT sensor harness connector E52 terminal 3 and auto amp. harness connector M53 terminal 26.

OAT sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
E52	3	M53	26	Continuity should exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK OAT SENSOR

Refer to HAC-78, "Component Inspection".

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Replace OAT sensor.

4.CHECK CIRCUIT CONTINUITY BETWEEN OAT SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between OAT sensor harness connector E52 terminal 4 and auto amp. harness connector M53 terminal 28.

OAT sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
E52	4	M53	28	Continuity should exist

4. Check continuity between OAT sensor harness connector E52 terminal 4 and ground.

OAT sensor		—	Continuity
Connector	Terminal		
E52	4	Ground	Continuity should not exist

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Repair harness or connector.

Component Inspection

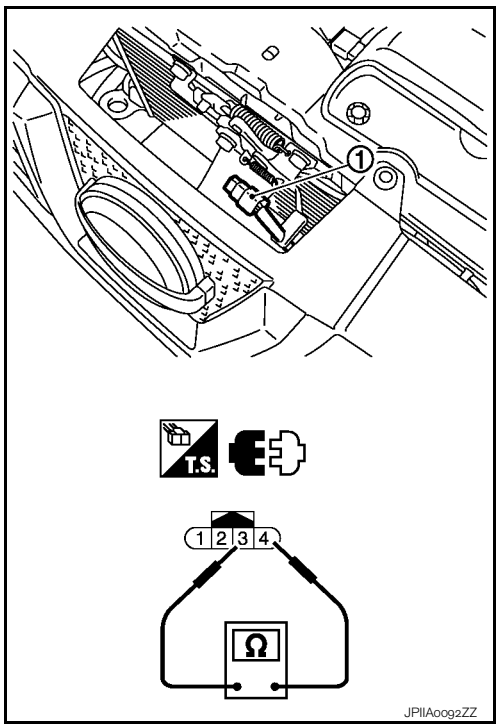
INFOID:0000000000954663

cardiagn.com

After disconnecting OAT sensor (1) connector E52, measure resistance between terminals 3 and 4 at sensor side. Refer to table below.

Temperature °C (°F)	Resistance kΩ
–30 (–22)	13.33
–20 (–4)	7.89
–10 (14)	4.80
0 (32)	6.19
5 (41)	1.81
10 (50)	1.16
20 (68)	0.77
30 (86)	0.52
40 (104)	0.36

If NG, replace OAT sensor.



cardiagn.com

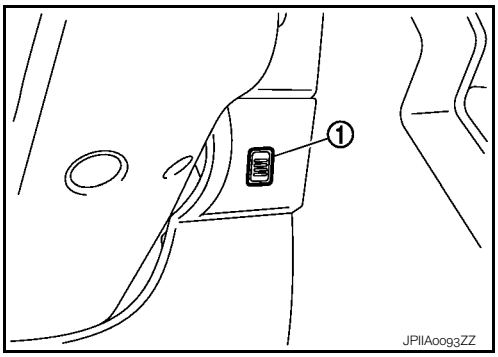
IN-VEHICLE SENSOR

Description

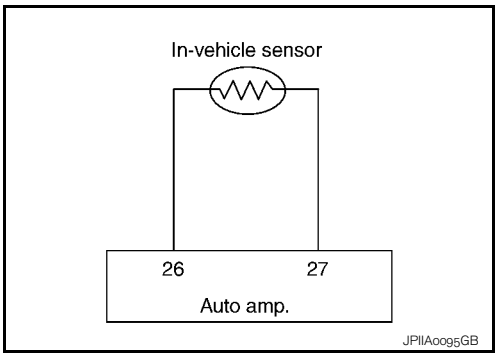
INFOID:0000000000954664

In-vehicle Sensor

The in-vehicle sensor (1) is located on lower instrument panel, driver side. It converts variations in temperature of compartment air drawn from the aspirator into a resistance value. It is then input into the auto amp.



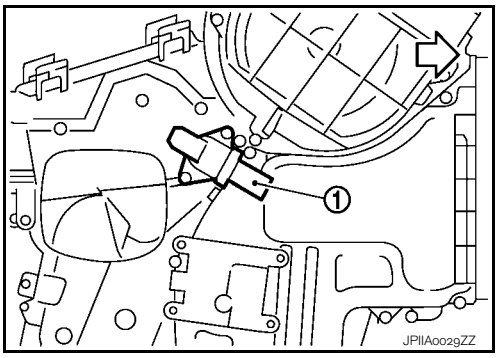
In-vehicle Sensor Circuit

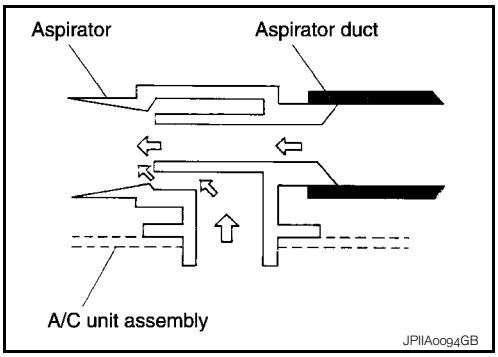


Aspirator

The aspirator (1) is located on driver's side of A/C unit assembly. It produces vacuum pressure due to air discharged from the A/C unit assembly, continuously taking compartment air in the aspirator.

⇦: Vehicle front





Component Function Check

INFOID:0000000000954665

1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 3.

cardiagn.com

22 or –22 is displayed.

YES >> Go to Diagnosis Procedure. Refer to HAC-81, "Diagnosis Procedure".
NO >> END.

Diagnosis Procedure

INFOID:0000000000954666

1. CHECK VOLTAGE BETWEEN IN-VEHICLE SENSOR AND GROUND

1. Disconnect in-vehicle sensor connector.
2. Turn ignition switch ON.
3. Check voltage between in-vehicle sensor harness connector M41 terminal 1 and ground.

(+)		(–)	Voltage
In-vehicle sensor		—	
Connector	Terminal		
M41	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between in-vehicle sensor harness connector M41 terminal 2 and auto amp. harness connector M53 terminal 26.

In-vehicle sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M41	2	M53	26	Continuity should exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3. CHECK IN-VEHICLE SENSOR

Refer to HAC-82, "Component Inspection".

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Replace in-vehicle sensor.

4. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between in-vehicle sensor harness connector M41 terminal 1 and auto amp. harness connector M53 terminal 27.

In-vehicle sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M41	1	M53	27	Continuity should exist

4. Check continuity between in-vehicle sensor harness connector M41 terminal 1 and ground.

In-vehicle sensor		—	Continuity
Connector	Terminal		
M41	1	Ground	Continuity should not exist

Is the inspection result normal?

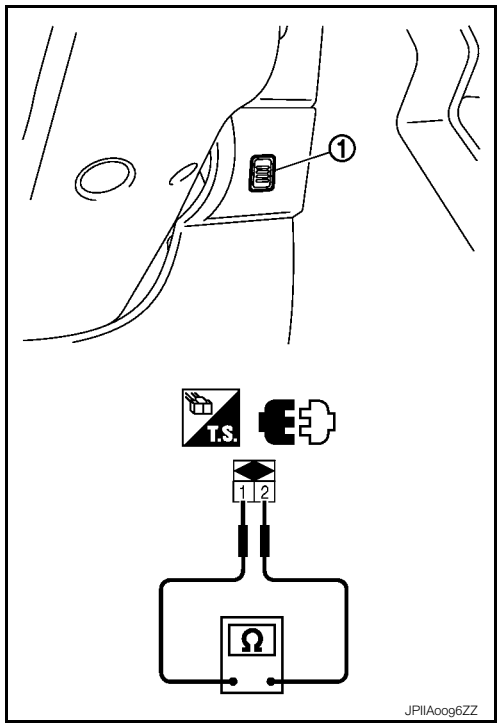
cardiagn.com

YES >> Replace auto amp.
NO >> Repair harness or connector.

Component Inspection

INFOID:0000000000954667

After disconnecting in-vehicle sensor (1) connector M41, measure resistance between terminals 1 and 2 at sensor side. Refer to table below.



Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace in-vehicle sensor.

cardiagn.com

SUNLOAD SENSOR

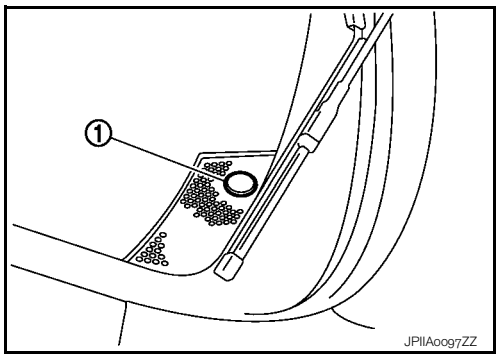
Description

INFOID:0000000000954668

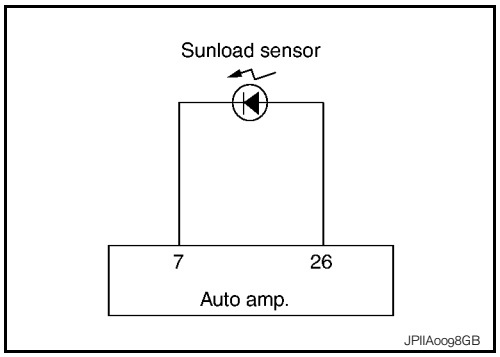
COMPONENT DESCRIPTION

Sunload Sensor

The sunload sensor (1) is located on the tweeter grille (RH). It detects sunload entering through windshield by means of a photo diode. The sensor converts the sunload into a current value which is then input into the auto amp.



Sunload Sensor Circuit



SUNLOAD INPUT PROCESS

The auto amp. also includes a processing circuit which averages the variations in detected sunload over a period of time. This prevents drastic swings in the HAC system operation due to small or quick variations in detected sunload.

For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the trees momentarily obstructing the sunlight does not cause any change in the HAC system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.

Component Function Check

INFOID:0000000000954669

1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 3.

25 or −25 is displayed.

YES >> Go to Diagnosis Procedure. Refer to HAC-83, "Diagnosis Procedure".
NO >> END.

Diagnosis Procedure

INFOID:0000000000954670

1. CHECK VOLTAGE BETWEEN SUNLOAD SENSOR AND GROUND

1. Disconnect sunload sensor connector.
2. Turn ignition switch ON.
3. Check voltage between sunload sensor harness connector M74 terminal 1 and ground.

(+)		(–)	Voltage
Sunload sensor		—	
Connector	Terminal		
M74	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between sunload sensor harness connector M74 terminal 2 and auto amp. harness connector M53 terminal 26.

Sunload sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M74	2	M53	26	Continuity should exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK SUNLOAD SENSOR

1. Reconnect sunload sensor connector and auto amp. connector.
2. Refer to HAC-84, "Component Inspection".

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Replace sunload sensor.

4.CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between sunload sensor harness connector M74 terminal 1 and auto amp. harness connector M53 terminal 7.

Sunload sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M74	1	M53	7	Continuity should exist

4. Check continuity between sunload sensor harness connector M74 terminal 1 and ground.

Sunload sensor		—	Continuity
Connector	Terminal		
M74	1	Ground	Continuity should not exist

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Repair harness or connector.

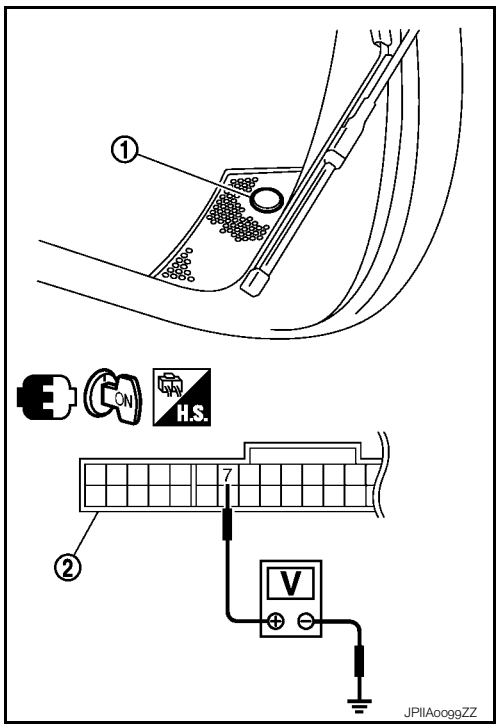
Component Inspection

INFOID:0000000000954671

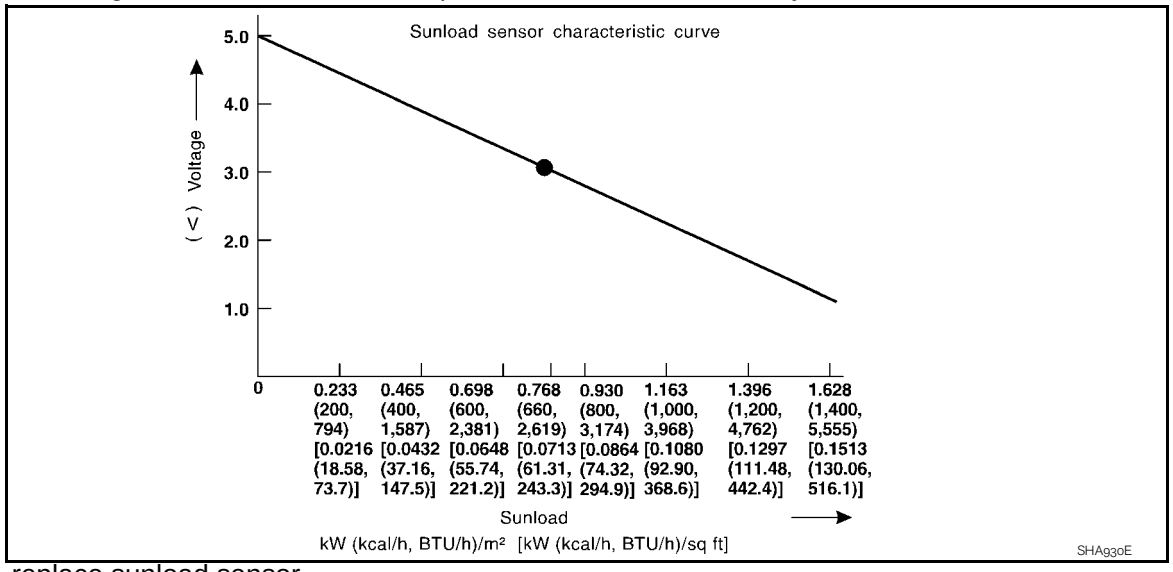
cardiagn.com

Measure voltage between auto amp. harness connector (2) M53 terminal 7 and ground.

1. Sunload sensor



- When checking sunload sensor, select a place where sunshine directly on it.



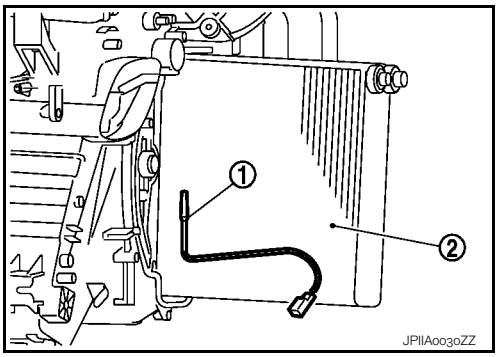
If NG, replace sunload sensor.

INTAKE SENSOR

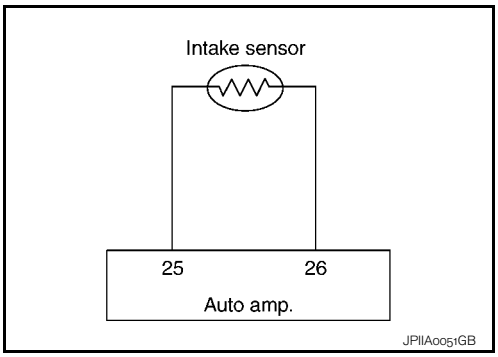
Description

INFOID:0000000000954672

Intake Sensor
The intake sensor (1) is located on the A/C unit assembly. It converts temperature of air after it passes through the evaporator (2) into a resistance value which is then input to the auto amp.



Intake Sensor Circuit



Component Function Check

INFOID:0000000000954673

1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 3.
24 or –24 is displayed.

YES >> Go to Diagnosis Procedure. Refer to HAC-86, "Diagnosis Procedure".
NO >> END.

Diagnosis Procedure

INFOID:0000000000954674

1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

1. Disconnect intake sensor connector.
2. Turn ignition switch ON.
3. Check voltage between intake sensor harness connector M42 terminal 1 and ground.

(+)		(–)	Voltage
Intake sensor		—	
Connector	Terminal		
M42	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.

cardiagn.com

3. Check continuity between intake sensor harness connector M42 terminal 2 and auto amp. harness connector M53 terminal 26.

Intake sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M42	2	M53	26	Continuity should exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INTAKE SENSOR

Refer to HAC-87, "Component Inspection".

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Replace intake sensor.

4.CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between intake sensor harness connector M42 terminal 1 and auto amp. harness connector M53 terminal 25.

Intake sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M42	1	M53	25	Continuity should exist

4. Check continuity between intake sensor harness connector M42 terminal 1 and ground.

Intake sensor		—	Continuity
Connector	Terminal		
M42	1	Ground	Continuity should not exist

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Repair harness or connector.

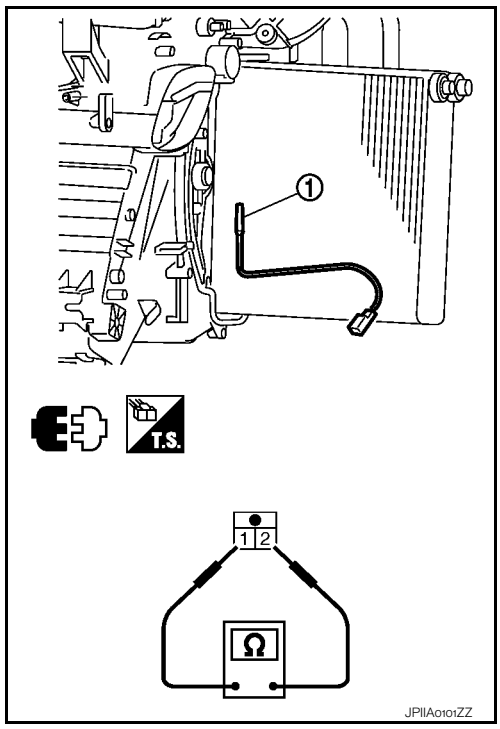
Component Inspection

INFOID:0000000000954675

After disconnecting intake sensor (1) connector M42, measure resistance between terminals 1 and 2 at sensor side. Refer to table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.34
–10 (14)	9.62
–5 (23)	7.56
0 (32)	6.00
5 (41)	4.80
10 (50)	3.87
15 (59)	3.15
20 (68)	2.57
25 (77)	2.12
30 (86)	1.76
35 (95)	1.47
40 (104)	1.23
45 (113)	1.04

If NG, replace intake sensor.



cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT FOR AUTO AMP.

Description

INFOID:0000000000954676

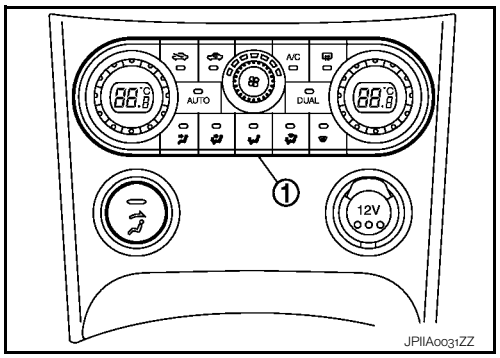
COMPONENT DESCRIPTION

Auto Amp. (Automatic Amplifier)

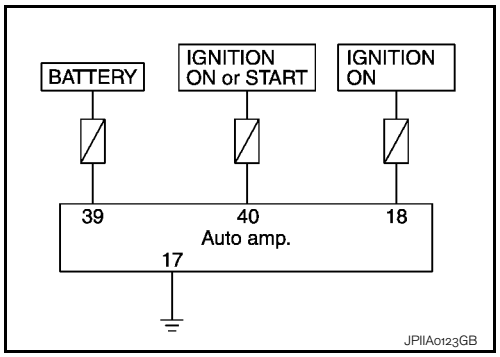
The auto amp. (1) has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motors, mode door motor, intake door motor, blower motor and compressor are then controlled.

The auto amp. is unitized with control mechanisms. Signal from various switches and potentio temperature control (PTC) are directly entered into auto amp.

Self-diagnosis functions are also built into auto amp. to provide quick check of malfunctions in the auto air conditioner system.

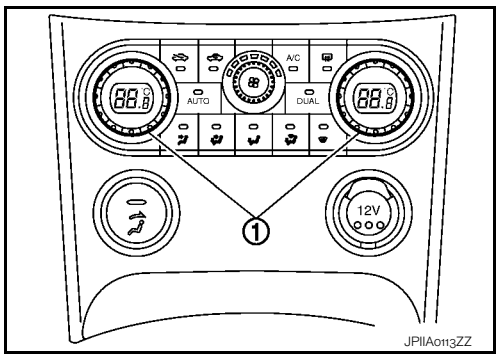


Power Supply and Ground Circuit for Auto Amp.



Potentio Temperature Control (PTC)

The PTC (1) is built into the auto amp. It can be set at an interval of 0.5°C in the 16.0°C to 30.0°C temperature range by turning temperature control dial. The set temperature is displayed.



Component Function Check

INFOID:0000000000954677

1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press AUTO switch and A/C switch.
2. AUTO switch indicator will turn ON. Confirm that the magnet clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

Does magnet clutch engaged?

YES >> END.
NO >> Go to Diagnosis Procedure. Refer to HAC-89, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000954678

1. CHECK POWER SUPPLY CIRCUIT FOR AUTO AMP.

1. Disconnect auto amp. connector.

2. Check voltage between auto amp. harness connector M53 terminals 18, 39 and 40 and ground.

(+)		(-)	Ignition switch position		
Auto amp.		—	OFF	ACC	ON
Connector	Terminal				
M53	18	Ground	Approx. 0 V	Approx. 0 V	Battery voltage
	39		Battery voltage	Battery voltage	Battery voltage
	40		Approx. 0 V	Approx. 0 V	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FUSE

Check 10A fuses [Nos. 4, 8 and 17, located in the fuse block (J/B)]. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> Check harness for open circuit. Repair or replace if necessary.
NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

3.CHECK GROUND CIRCUIT FOR AUTO AMP.

1. Turn ignition switch OFF.
2. Check continuity between auto amp. harness connector M53 terminal 17 and ground.

Auto amp.		—	Continuity
Connector	Terminal		
M53	17	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Repair harness or connector.

cardiagn.com

ECU DIAGNOSIS

ECM

HR16DE

HR16DE : Reference Value

INFOID:0000000001116978

VALUES ON THE DIAGNOSIS TOOL

Remarks:

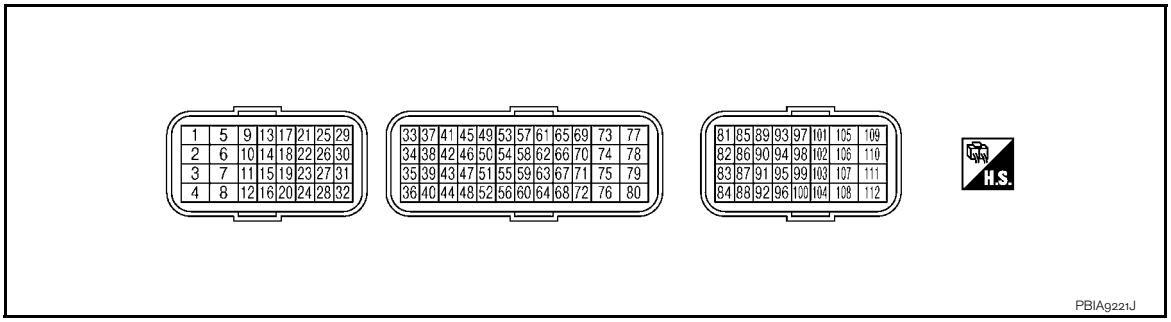
- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

*Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Values/Status
AC PRESS SEN	• Engine: Idle • Both A/C switch and blower fan switch: ON (Compressor operates)	1.0 - 4.0 V

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- ECM is located in the engine room left side near battery.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	−		Signal name	Input/ Output		
41	Ground	G/P	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0 V
48	Ground	R/L	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0 V
74	Ground	Y/W	Sensor power supply (Refrigerant pressure sensor)	—	[Ignition switch: ON]	5 V

MR20DE

cardiagn.com

MR20DE : Reference Value

INFOID:0000000001116979

VALUES ON THE DIAGNOSIS TOOL

Remarks:

l Specification data are reference values.

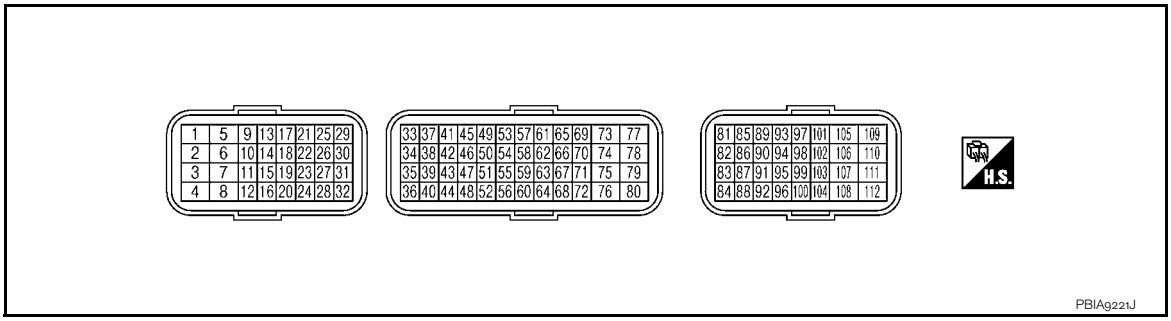
l Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Values/Status
AC PRESS SEN	• Engine: Idle • Both A/C switch and blower fan switch: ON (Compressor operates)	1.0 - 4.0 V

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	-–		Signal name	Input/ Output		
41	Ground	G	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0 V
48	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0 V
74	Ground	L	Sensor power supply (Refrigerant pressure sensor)	Input	[Ignition switch: ON]	5 V

K9K

K9K : Reference Value

INFOID:0000000001116980

VALUE ON THE DIAGNOSIS TOOL

Remarks:

l Specification data are reference values.

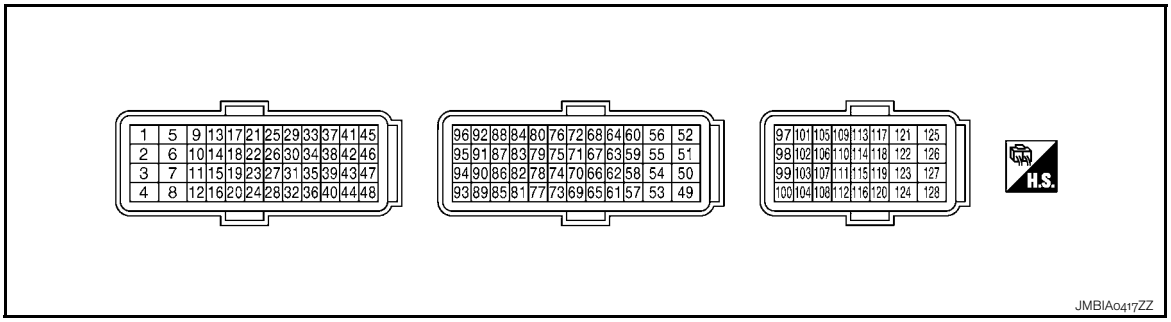
l Specification data are output/input values which are detected or supplied by the ECM at the connector.

cardiagn.com

* Specification data may not be directly related to their components signals/values/operations.

MONITOR ITEM	CONDITION		SPECIFICATION
RFRGERNT PRSS	• Engine: After warming up • Air conditioner switch: OFF • Shift lever: Neutral position • No load	Idle	Approximately 5.7 bar

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:
- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
74	Ground	R/L	Sensor power supply (Refrigerant pressure sensor)	—	**[Ignition switch: ON]**	Approximately 5.0 V
78	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	G/P	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0.3 V
89	Ground	Y/W	Refrigerant pressure sensor	Input	**[Engine is running]** • **Warm-up condition** • Both A/C switch and blower fan switch: ON (Compressor operates)	Approximately2.3 V

BCM (BODY CONTROL MODULE)

Reference Value

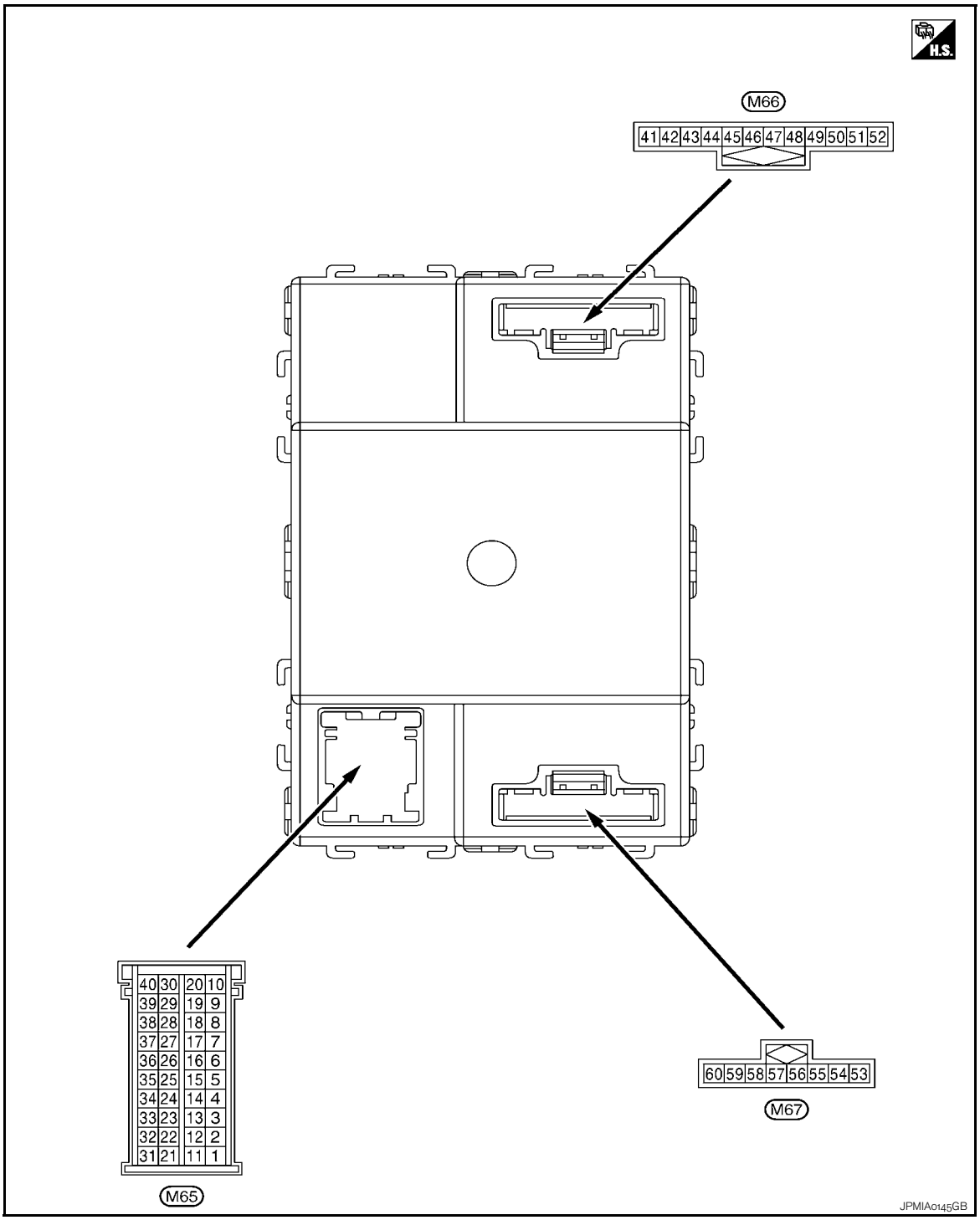
INFOID:0000000001116981

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition	Value/Status
AIR COND SW	A/C switch OFF	Off
	A/C switch ON	On
FAN ON SIG	Fan switch OFF	Off
	Fan switch ON	On
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

cardiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10ms internal normally. Refer to BCS-7, "System Description".**

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V

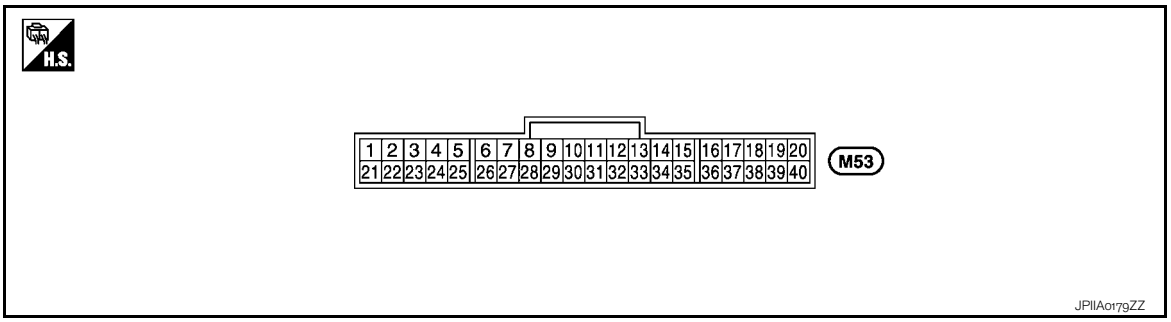
cardiagn.com

AUTO AMP.

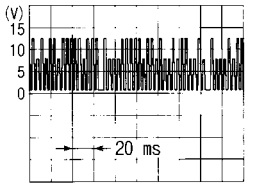
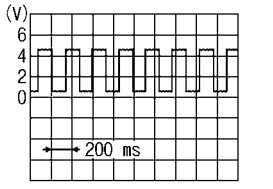
Reference Value

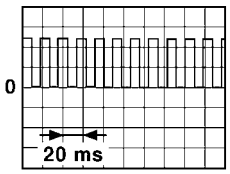
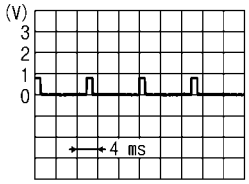
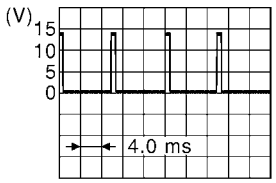
INFOID:0000000000954679

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
1 (L)	Ground	Blower motor control signal	Output	• Ignition switch ON • Blower speed: 1st- 6th speed (manual)		2.5 V
				• Ignition switch ON • Blower speed: 7th speed (manual)		9.0 V
3 (V)	Ground	A/C LAN signal	Input/ Output	Ignition switch ON		 SJIA1453J
5 (L)	Ground	A/C switch signal	Output	A/C switch	Not pressed	12 V
					Pressed	0 V
7 (O)	Ground	Sunload sensor	Input	—		—
9 (O)	Ground	Engine coolant temperature signal	Input	At idle [after warming up, approx. 80°C (176°F)] NOTE: The wave forms vary depending on coolant temperature.		 SJIA1438J

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
14 (Y)	Ground	Speed sensor (8-pulse)	Input	Speed meter operated (When vehicle speed is approx. 40 km/h)	NOTE: Maximum voltage may be 5 V due to specifications (connected units)  JSNIA0012GB
16 (R)	Ground	Illumination signal	Input	Ignition switch ON	12 V
				Ignition switch OFF	0 V
17 (B)	Ground	Ground	—	Ignition switch ON	0 V
18 (Y)	Ground	Power supply from IGN 2	—	Ignition switch ON	Battery voltage
20 (W)	Ground	Power supply for each door motor	Input	Ignition switch ON	Battery voltage
21 (R)	Ground	A/C PD cut	Input	Ignition switch ON	0 V
22 (R)	Ground	Rear window defogger feed-back signal	Input	Rear window defogger: OFF	0 V
				Rear window defogger: ON	12 V
23 (SB)	Ground	Rear window defogger ON signal	Input	When rear window defogger switch is depressed.	 ZJIA1036J
				When rear window defogger switch is released.	 JPIIA0013GB
24 (LG)	Ground	Blower motor ON signal	Input	AUTO SW: ON (Blower motor operate.)	0 V
				AUTO SW: OFF	12 V
25 (P)	Ground	Intake sensor	Input	—	—
26 (GR)	Ground	Sensor Ground	—	Ignition switch ON	0 V
27 (BR)	Ground	In-vehicle sensor	Input	—	—
28 (G)	Ground	OAT sensor	Input	—	—
34 (O)	Ground	High-level VENT SW signal	Input	High-level VENT SW: OFF	12 V
				High-level VENT SW: ON	0 V

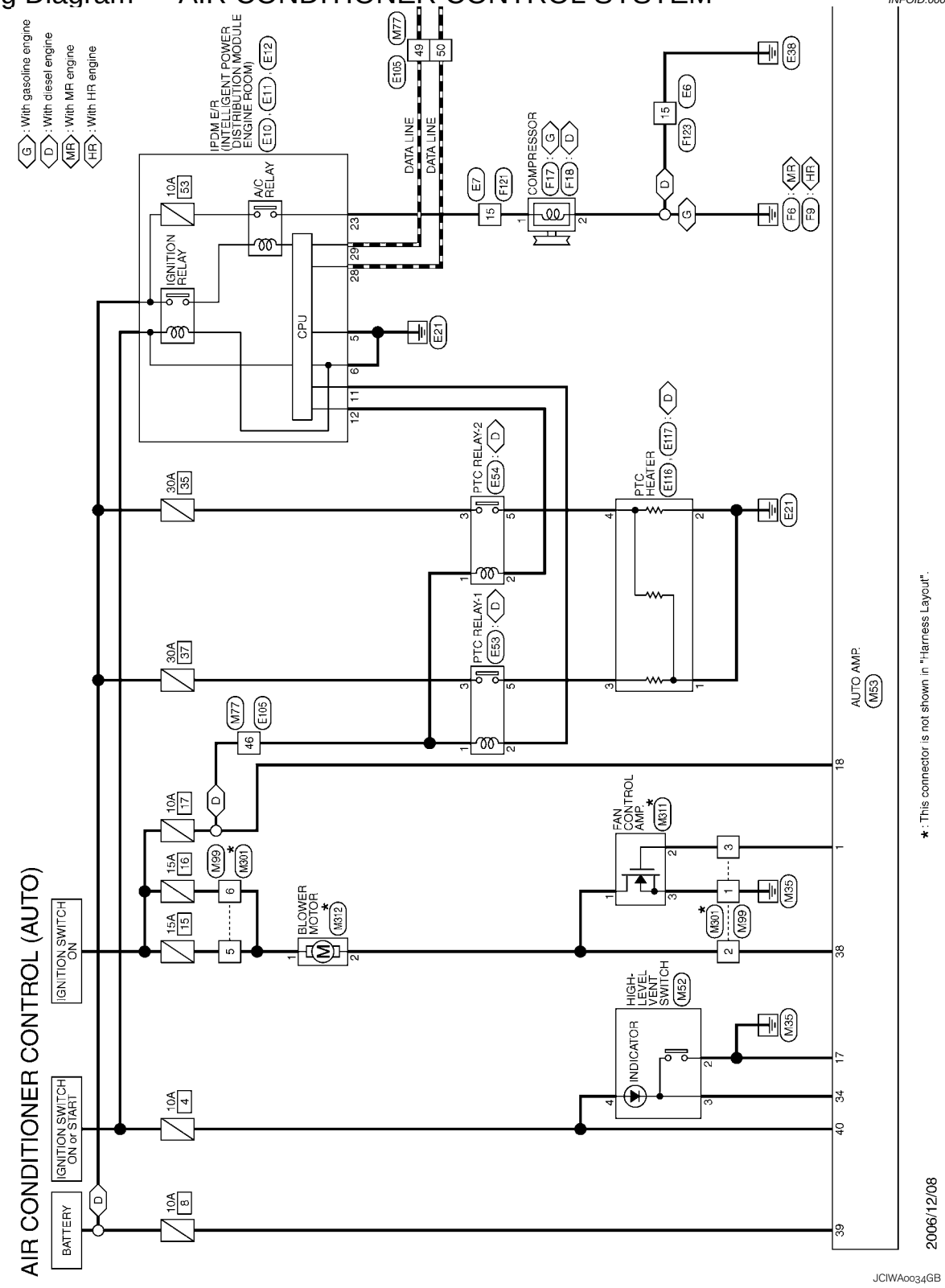
cardiagn.com

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
36 (B)	Ground	Illumination ground	—	Ignition switch ON	0 V
38 (R)	Ground	Blower motor feedback signal	Input	Blower speed: 1st	10 V
39 (Y)	Ground	Power supply from BATT	—	Ignition switch OFF	Battery voltage
40 (GR)	Ground	Power supply from IGN	—	Ignition switch ON	Battery voltage

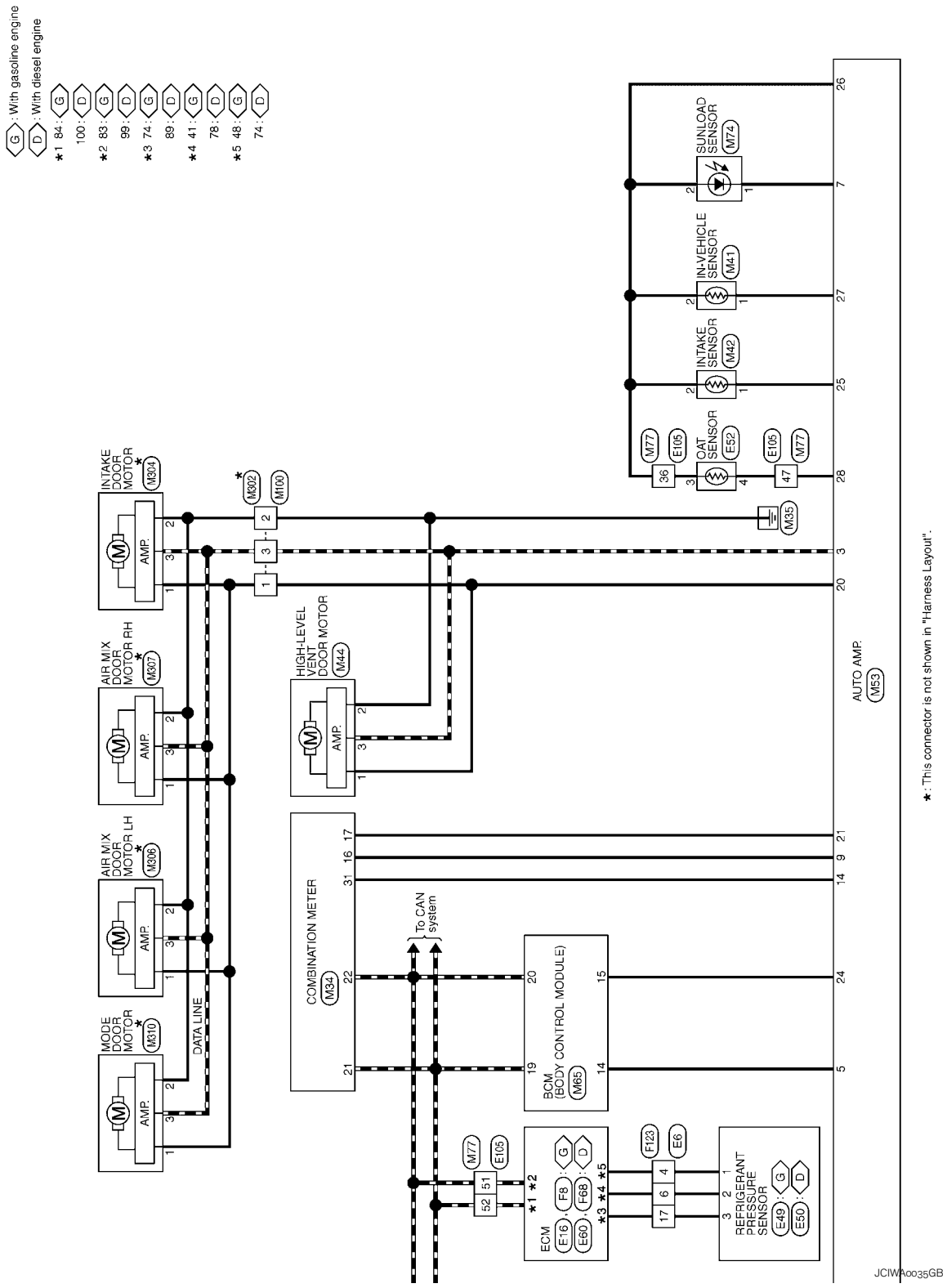
cardiagn.com

Wiring Diagram — AIR CONDITIONER CONTROL SYSTEM —

INFOID:0000000000954680



cardiagn.com


G : With gasoline engine
D : With diesel engine
*1 84 : G
100 : D
*2 83 : G
99 : D
*3 74 : G
89 : D
*4 41 : G
78 : D
*5 48 : G
74 : D
INTAKE DOOR MOTOR M304
AIR MIX DOOR MOTOR RH M307
AIR MIX DOOR MOTOR LH M306
MODE DOOR MOTOR M310
AMP.
DATA LINE
M302
M100
HIGH-LEVEL VENT DOOR MOTOR M44
COMBINATION METER M34
To CAN system
BCM (BODY CONTROL MODULE) M65
ECM E16 E60 F8 F68
REFRIGERANT PRESSURE SENSOR E49 E50
F123
E6
M77
E105
SUNLOAD SENSOR M74
IN-VEHICLE SENSOR M41
INTAKE SENSOR M42
OAT SENSOR E52
M35
AUTO AMP. M53
*: This connector is not shown in "Harness Layout".
JCIWA0035GB

AIR CONDITIONER CONTROL (AUTO)

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-
6	G/P	-
15	B	-
17	Y/W	-

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
15	Y/B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

Terminal No.	Color of Wire	Signal Name [Specification]
11	O	-
12	G/Y	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
23	Y/B	-
28	L	-
29	P	-

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	G/P	-
3	Y/W	-

Connector No.	E50
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	D4000997F

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	G/P	-
3	Y/W	-

JCIWA0036GB

cardiagn.com

AIR CONDITIONER CONTROL (AUTO)

Connector No.	E52
Connector Name	OAT SENSOR
Connector Type	RH04FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B/Y	-
4	W/G	-

Connector No.	E53
Connector Name	PTC RELAY-1
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	O	-
3	G	-
5	Y	-

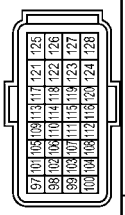
Connector No.	E54
Connector Name	PTC RELAY-2
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	G/Y	-
3	R	-
5	L	-

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

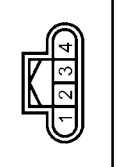
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
36	B/Y	-
46	Y	-
47	W/G	-
49	P	-
50	L	-
51	P	-
52	L	-

Connector No.	E116
Connector Name	PTC HEATER
Connector Type	YAZ-7282-3020

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	B	-

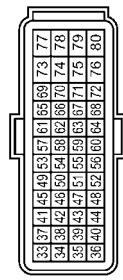
Connector No.	E117
Connector Name	PTC HEATER
Connector Type	YAZ-7282-3030

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y	-
4	L	-

Connector No.	F6
Connector Name	ECM
Connector Type	MAA40FBR-MEA8-LH

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
41	G/P	PDPRESS
48	R/L	GND-A(PDPRES)
74	Y/W	AVCC(PDPRES)

JCIWA0037GB

AIR CONDITIONER CONTROL (AUTO)

Connector No.	F17
Connector Name	COMPRESSOR
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	–
2	B	–

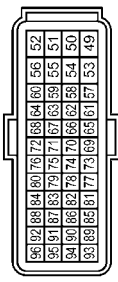
Connector No.	F18
Connector Name	COMPRESSOR
Connector Type	DELPHI12162017

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	–
2	B	–

Connector No.	F68
Connector Name	ECM
Connector Type	MAA40FBR-MEA8-LH

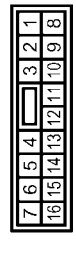
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
74	R/L	FREON PRESS GND
78	G/P	FREON PRESS SENS
89	Y/W	FREON PRESURE +V

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
15	Y/B	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	–
6	G/P	–
15	B	–
17	Y/W	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
16	O	WATER TEMP
17	R/L	AC PD CUT
21	L	CAN-H
22	P	CAN-L
31	Y	VEHICLE SPEED (8-PULSE)

Connector No.	M41
Connector Name	IN-VEHICLE SENSOR
Connector Type	A02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	GR	–

Connector No.	M42
Connector Name	INTAKE SENSOR
Connector Type	C02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	GR	–

JCIWA0038GB

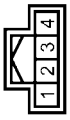
cardiagn.com

AIR CONDITIONER CONTROL (AUTO)

Connector No.	M44
Connector Name	HIGH-LEVEL VENT DOOR MOTOR
Connector Type	A03FW

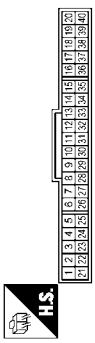
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–
3	V	–

Connector No.	M52
Connector Name	HIGH-LEVEL VENT SWITCH
Connector Type	CINCH 49305EV4M5



Terminal No.	Color of Wire	Signal Name [Specification]
2	B	–
3	O	–
4	GR	–

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	FAN OUT
3	V	ACTR SIGNAL
5	L	A/C SIG
7	O	SUN SEN
9	O	W/T SEN
14	Y	VSP
17	B	GND
18	Y	IGN-2
20	W	ACTR POWER
21	R	ACPDOUT
24	LG	FAN ON
25	P	INT SENS
26	GR	SENS GND
27	BR	INCAR SENS
28	G	OAT SENS
34	O	SW OUTPUT
38	R	ILL-
39	Y	BAT
40	GR	IGN

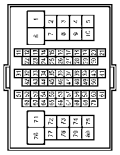
Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
14	L/R	A/C SW
15	LG/B	BLOWER FAN SW
19	L	CAN-H
20	P	CAN-L

Connector No.	M74
Connector Name	SUNLOAD SENSOR
Connector Type	K02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	GR	–

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH16FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
36	GR	–
46	Y	–
47	G	–
49	P	–
50	L	–
51	P	–
52	L	–

Connector No.	M89
Connector Name	WIRE TO WIRE
Connector Type	M06FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–[With auto A/C]
2	R	–[With auto A/C]
3	L	–[With auto A/C]
5	Y	–
6	Y	–

JCIWA0039GB

AIR CONDITIONER CONTROL (AUTO)

Connector No.	M100
Connector Name	WIRE TO WIRE
Connector Type	A03FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M301
Connector Name	WIRE TO WIRE
Connector Type	M06MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-[With auto A/C]
2	R	-[With auto A/C]
3	L	-[With auto A/C]
5	Y	-
6	Y	-

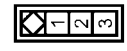
Connector No.	M302
Connector Name	WIRE TO WIRE
Connector Type	A03MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M304
Connector Name	INTAKE DOOR MOTOR
Connector Type	A03FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M306
Connector Name	AIR MIX DOOR MOTOR LH
Connector Type	A03FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M307
Connector Name	AIR MIX DOOR MOTOR RH
Connector Type	A03FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M310
Connector Name	MODE DOOR MOTOR
Connector Type	A03FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M311
Connector Name	FAN CONTROL AMP.
Connector Type	M04FW-LC

H.S.

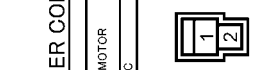
Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	B	-

JCIWA0040GB

cardiagn.com

AIR CONDITIONER CONTROL (AUTO)

Connector No.	M312
Connector Name	BLOWER MOTOR
Connector Type	M02FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	R	-

JCIWA0041GB

cardiagn.com

SYMPTOM DIAGNOSIS

AIR CONDITIONER CONTROL

Diagnosis Chart By Symptom

INFOID:0000000000954681

Symptom	Reference	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-89, "Diagnosis Procedure"
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor. (LAN)	HAC-47, "Diagnosis Procedure"
Mode door motor does not operate normally.		
High-level ventilator door motor does not operate normally.	Go to Trouble Diagnosis Procedure for High-level Ventilator Door Motor. (LAN)	HAC-50, "Diagnosis Procedure"
High-level ventilator door does not change.		
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor. (LAN)	HAC-54, "Diagnosis Procedure"
Air mix door motor does not operate normally.		
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor. (LAN)	HAC-59, "Diagnosis Procedure"
Intake door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	HAC-62, "Diagnosis Procedure"
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-66, "Diagnosis Procedure"
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-109, "Inspection procedure"
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-111, "Inspection procedure"
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-113, "Inspection procedure"
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	HAC-115, "Inspection procedure"
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	HAC-116, "Inspection procedure"

cardiagn.com

INSUFFICIENT COOLING

Description

INFOID:0000000000954682

Symptom
- Insufficient cooling
- No cold air comes out. (Air flow volume is normal.)

Inspection procedure

INFOID:0000000000954683

1.CHECK WITH A GAUGE OF ACR4

Connect the ACR4 to the vehicle and perform the pressure inspection with the gauge.

Is there refrigerant?

YES >> GO TO 2.
NO-1 >> Check for refrigerant leakages with the refrigerant leakage detecting fluorescent leak detector. Refer to HA-32, "Inspection"(HR16DE/MR20DE) or HA-83, "Inspection" (K9K).
NO-2 >> GO TO 2 after repairing or replacing the parts according to the inspection results.

2.CHECK CHARGED REFRIGERANT AMOUNT

1. Connect ACR4 to the vehicle and discharge the refrigerant.
2. Recharge with the proper amount of refrigerant and perform the inspection with the refrigerant leakage detecting fluorescent leak detector. Refer to HA-32, "Inspection" (HR16DE/MR20DE) or HA-83, "Inspection" (K9K).

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refill the refrigerant and repair or replace the parts according to the inspection results.

3.CHECK REFRIGERANT CYCLE PRESSURE

Connect ACR4 to the vehicle and perform the performance test. Refer to HA-12, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (HR16DE/MR20DE) or HA-63, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (K9K).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Perform the diagnosis with the gauge pressure. Refer to HA-12, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (HR16DE/MR20DE) or HA-63, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (K9K).

4.CHECK SETTING OF TEMPERATURE SETTING TRIMMER

Check the setting of temperature setting trimmer. Refer to HAC-6, "Description & Inspection".

1. Check that the temperature setting trimmer is set to “+ direction”.
   NOTE:
   The control temperature can be set with the setting of temperature setting trimmer.
2. Set temperature control dial to “0”.

Are the symptoms solved?

YES >> Perform the setting separately if necessary. END.
NO >> GO TO 5.

5.PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 2.

Does code No. 20 appear on the display?

YES >> GO TO 6.
NO >> Go to appropriate malfunctioning sensor circuit. Refer to HAC-27, "Diagnosis Description", see No. 11.

6.PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to HAC-27, "Diagnosis Description", see No.1 to 5.

Is it operated normally?

YES >> GO TO 7.
NO >> Perform the diagnosis applicable to each output device.

7. PERFORM SELF-DIAGNOSIS STEP-5

Perform self-diagnosis STEP-5. Refer to HAC-27, "Diagnosis Description", see No.1 to 10.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Go to appropriate malfunctioning sensor circuit. Refer to HAC-27, "Diagnosis Description".

8. CHECK A/C COMPRESSOR BELT

Check the A/C compressor belt. Refer to EM-15, "Checking" (HR16DE), EM-134, "Checking" (MR20DE) or EM-259, "Inspection and Adjustment" (K9K).

Is the inspection result normal?

YES >> GO TO 9.
NO >> Adjust or replace the A/C compressor belt.

9. CHECK AIR LEAKAGE FROM DUCT

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

YES >> Perform the setting separately if necessary. GO TO 4.
NO >> Repair or replace parts according to the inspection results.

cardiagn.com

INSUFFICIENT HEATING

Description

INFOID:0000000000954684

Symptom
- Insufficient heating
- No warm air comes out. (Air flow volume is normal.)

Inspection procedure

INFOID:0000000000954685

1.CHECK COOLING SYSTEM

1. Check engine coolant level and check for leakage. Refer to CO-9, "Inspection" (HR16DE), CO-30, "Inspection" (MR20DE) or CO-52, "Inspection" (K9K).
2. Check radiator cap. Refer to CO-12, "RESERVOIR TANK CAP : Inspection" (HR16DE), CO-33, "RESERVOIR TANK CAP : Inspection" (MR20DE) or CO-55, "RADIATOR CAP : Inspection" (K9K).
3. Check water flow sounds of engine coolant. Refer to CO-9, "Refilling" (HR16DE), CO-30, "Refilling" (MR20DE) or CO-52, "Refilling" (K9K).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refill the engine coolant and repair or replace the parts according to the inspection results.

2.CHECK SETTING OF TEMPERATURE SETTING TRIMMER

1. Check the setting of temperature setting trimmer. Refer to HAC-6, "Description & Inspection".
2. Check that the temperature setting trimmer is set to “– direction”.
   NOTE:
   The control temperature can be set with the setting of temperature setting trimmer.
3. Set temperature control dial to “0”.

Are the symptoms solved?

YES >> Perform the setting separately if necessary. END.
NO >>
- WITH DIESEL ENGINE: GO TO 3.
- WITH GASOLINE ENGINE: GO TO 4.

3.CHECK PTC HEATER OPERATION

Check PTC heater. Refer to HAC-71, "Component Function Check".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning part(s).

4.CHECK OPERATION

1. Turn temperature control dial (driver side) and raise temperature setting to 30.0°C after warming up the engine.
2. Check that warm air blows from outlets.

Is the inspection result normal?

YES >> END.
NO >> GO TO 5.

5.PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-27, "Diagnosis Description", see No. 1 to 2.

Does code No. 20 appear on the display?

YES >> GO TO 6.
NO >> Go to appropriate malfunctioning sensor circuit. Refer to HAC-27, "Diagnosis Description", see No. 11.

6.PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to HAC-27, "Diagnosis Description", see No. 1 to 5.

Is it installed normally?

YES >> GO TO 7.

NO >> Perform the diagnosis applicable to each output device.

7. PERFORM SELF-DIAGNOSIS STEP-5

Perform self-diagnosis STEP-5. Refer to HAC-27, "Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Go to appropriate malfunctioning sensor circuit. Refer to HAC-27, "Diagnosis Description".

8. CHECK AIR LEAKAGE FROM DUCT

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace parts according to the inspection results.

9. CHECK HEATER HOSE INSTALLATION CONDITION

Check the heater hose installation condition visually (for twist, crush, etc.).

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace parts according to the inspection results.

10. CHECK TEMPERATURE OF HEATER HOSE

1. Check the temperature of inlet hose and outlet hose of heater core.
2. Check that the inlet side of heater core is hot and the outlet side is slightly lower than/almost equal to the inlet side.
   CAUTION:
   The temperature inspection should be performed in a short time because the engine coolant temperature is too hot.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace the heater core after performing the procedures after the cooling system inspection again. GO TO 1.

11. REPLACE HEATER CORE

Replace the heater core. Refer to VTL-41, "Exploded View".

Are the symptoms solved?

YES >> END.
NO >> Perform the procedures after the cooling system inspection again. GO TO 1.

cardiagn.com

NOISE

Description

INFOID:0000000000954686

Symptom
- Noise
- Noise is heard when the A/C system operates.

Inspection procedure

INFOID:0000000000954687

1.CHECK OPERATION

1. Operate the A/C system and check the operation. Refer to HAC-6, "Description & Inspection".
2. Check the parts where noise is occurring.

Can the parts where noise is occurring be checked?

YES-1 >> Noise from blower fan motor: GO TO 2.
YES-2 >> Noise from compressor: GO TO 3.
YES-3 >> Noise from expansion valve: GO TO 4.
YES-4 >> Noise from A/C piping (pipe, flexible hose): GO TO 6.
YES-5 >> Noise from A/C compressor belt: GO TO 7.
NO >> END

2.CHECK BLOWER FAN MOTOR

1. Remove blower fan motor.
2. Remove foreign materials that are in the blower unit.
3. Check the noise from blower fan motor again.

Is the inspection result normal?

YES >> END.
NO >> Replace blower fan motor.

3.REPLACE COMPRESSOR

1. Correct the refrigerant with ACR4.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from compressor again.

Is the inspection result normal?

YES >> END.
NO >> Replace compressor.

4.CHECK WITH GAUGE PRESSURE

Perform the diagnosis with the gauge pressure. Refer to HA-12, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (HR16DE/MR20DE) or HA-63, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (K9K).

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace malfunctioning part(s).

5.REPLACE EXPANSION VALVE

1. Correct the refrigerant with ACR4.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from expansion valve again.

Are the symptoms solved?

YES >> END.
NO >> Replace expansion valve.

6.CHECK A/C PIPING (PIPE, FLEXIBLE HOSE)

1. Check A/C piping [pipe, flexible hose (for deformation and damage, etc.)].
2. Check the installation condition of clips and brackets, etc. of A/C piping (pipe, flexible hose).

Is the inspection result normal?

YES >> Fix the line with rubber or come vibration absorbing material.
NO >> Repair or replace parts according to the inspection results.

7. CHECK A/C COMPRESSOR BELT

Check tension of the A/C compressor belt. Refer to EM-15, "Checking" (HR16DE), EM-134, "Checking" (MR20DE) or EM-259, "Inspection and Adjustment" (K9K).

Is the inspection result normal?

YES >> Check the noise from compressor: GO TO 3.
NO >> Adjust or replace the A/C compressor belt according to the inspection results.

cardiagn.com

SELF-DIAGNOSIS CANNOT BE PERFORMED

Description

INFOID:0000000000954688

Symptom: Self-diagnosis function does not operate normally.

Inspection procedure

INFOID:0000000000954689

1. CHECK SELF-DIAGNOSIS FUNCTION

1. Turn ignition switch ON.
2. Set in self-diagnosis mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press ON/OFF switch for at least 5 seconds.

NOTE:
If battery voltage drops below 12 V during diagnosis STEP-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is normal. To avoid this, start engine before performing this diagnosis.

Does self-diagnosis function operate?

YES >> END.
NO >> GO TO 2.

2. CHECK POWER SUPPLY AND GROUND CIRCUIT OF AUTO AMP

Check power supply and ground circuit of auto amp. Refer to HAC-89, "Component Function Check".

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Repair or replace malfunctioning part(s).

MEMORY FUNCTION DOES NOT OPERATE

Description

INFOID:0000000000954690

Symptom
- Memory function does not operate normally.
- The setting is not maintained. (It returns to the initial condition.)

Inspection procedure

INFOID:0000000000954691

1.CHECK OPERATION

1. Set temperature control dial to 30.0°C.
2. Press ON/OFF switch.
3. Turn ignition switch OFF.
4. Turn ignition switch ON.
5. Press AUTO switch or ON/OFF switch.
6. Check that the set temperature is maintained.

Is the inspection result normal?

YES >> END.
NO >> GO TO 2.

2.CHECK POWER SUPPLY AND GROUND CIRCUIT OF AUTO AMP

Check power supply and ground circuit of auto amp. Refer to HAC-89, "Component Function Check".

Is the inspection result normal?

YES >> Replace auto amp.
NO >> Repair or replace malfunctioning part(s).

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001109280

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001109281

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

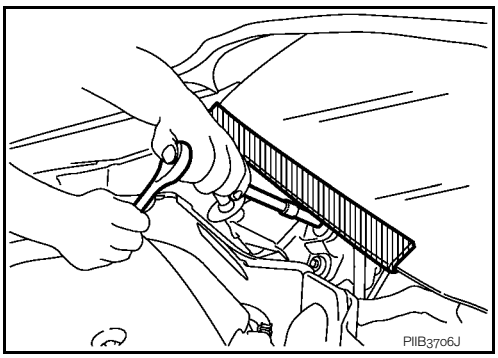
OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001109282

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Working with HFC-134a (R-134a)

INFOID:0000000001116718

CAUTION:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed and compressor malfunction is likely occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.**

General Refrigerant Precaution

INFOID:0000000001116719

WARNING:

- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
- **Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Never store or heat refrigerant containers above 52°C (126°F).**
- **Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Never intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Refrigerant Connection

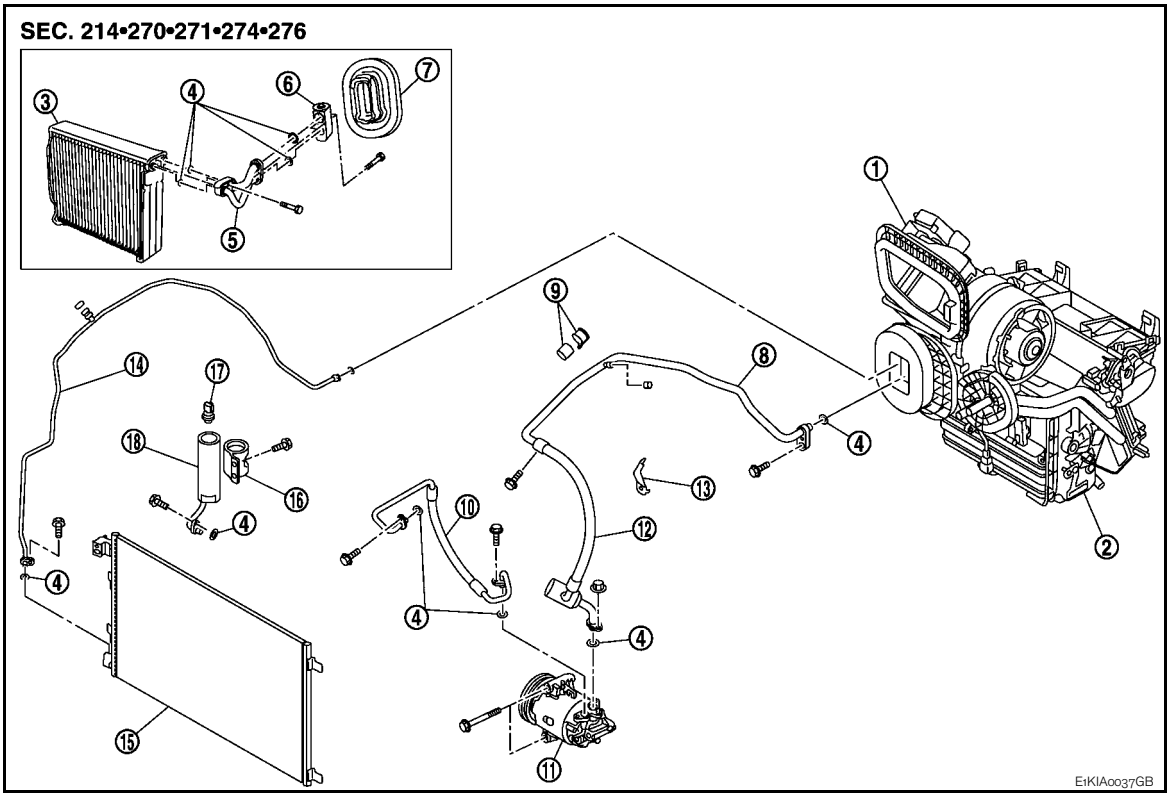
INFOID:0000000001116720

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

cardiagn.com

O-RING AND REFRIGERANT CONNECTION



1. Heater sealing	2. Expansion valve	3. O-ring
4. Evaporator	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Connector pipe fixing bolt
7. High pressure pipe 1	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Pipe fixing bolt
16. Low pressure flexible hose	17. Low & high pipe bracket support	18. Low pressure flexible hose and pipe 2
19. Pipes fixing clip	20. Low pressure pipe 2 fixing clamp assembly	21. Liquid tank fixing screw
22. Liquid tank fixing bracket	23. High pressure flexible hose	

CAUTION:

The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure pipe 2 assembly to expansion valve	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure pipe 2 assembly to evaporator	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		92474 N8210	2	19
	Compressor to high pressure flexible hose		92474 N8210	2	12
	Liquid tank to condenser		92473 N8210	1	16

WARNING:

Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

When replacing or cleaning refrigerant cycle components, observe the following.

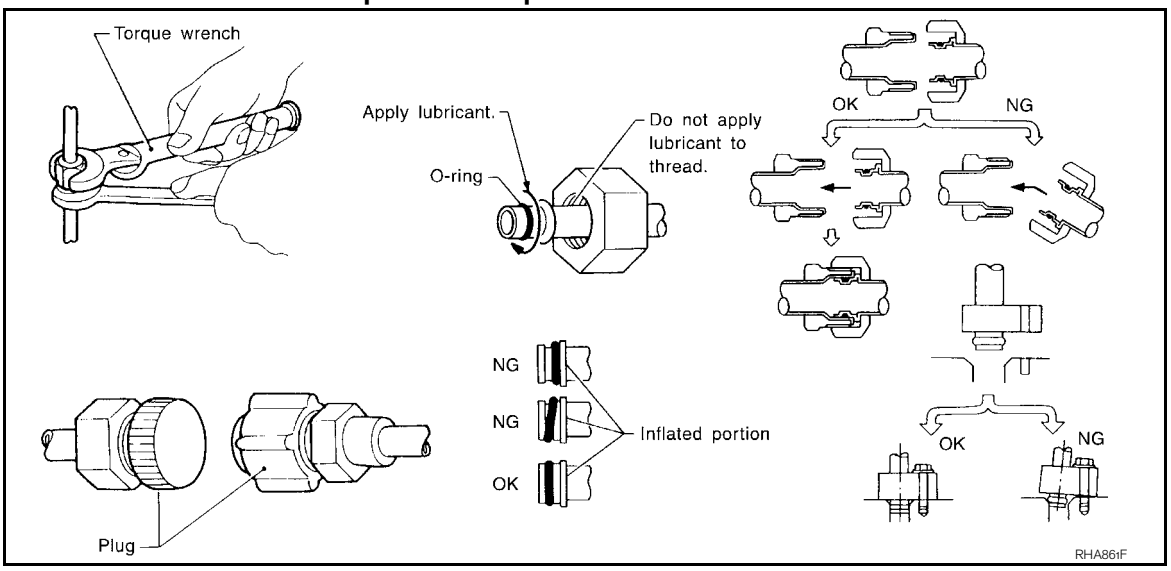
- **When the compressor is removed, store it in the same way at it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Name : Nissan A/C System Oil Type S

- **O-ring must be closely attached to the groove portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.**

cardiagn.com

- **After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Service Equipment

INFOID:0000000001116721

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRICAL LEAK DETECTOR

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

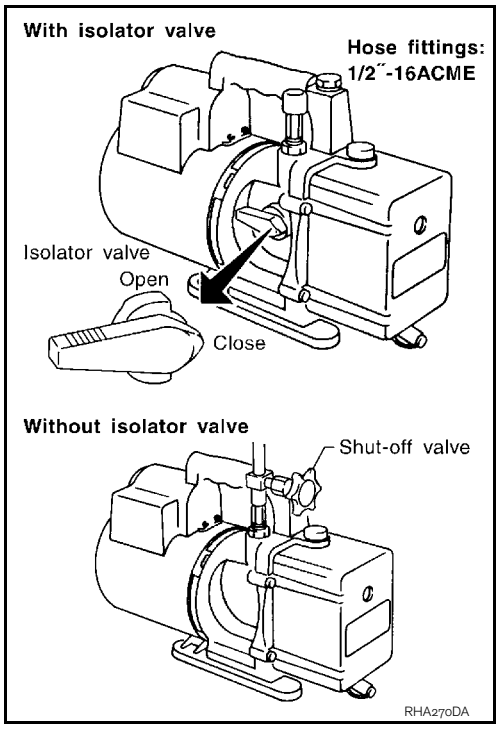
VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

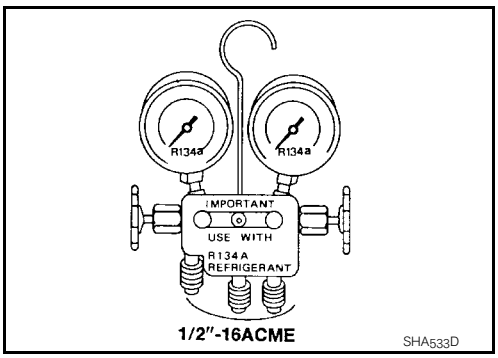
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



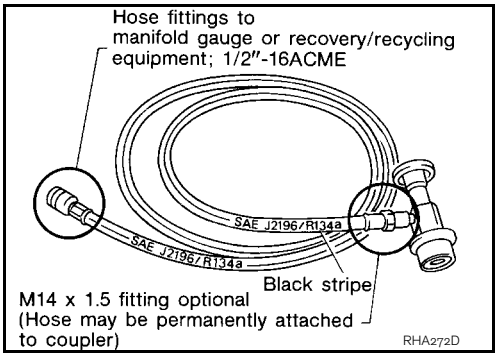
MANIFOLD GAUGE SET

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

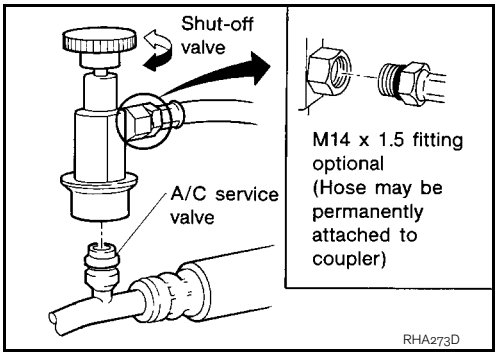
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

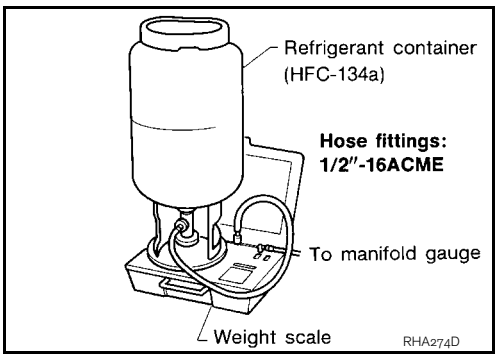
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

cardiagn.com

COMPRESSOR

General Precautions

INFOID:0000000001116722

CAUTION:

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same way at it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to HA-27, "Adjustment" (HR16DE/MR20DE) or HA-78, "Adjustment" (K9K).**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

cardiagn.com

FLUORESCENT LEAK DETECTOR

General Precautions

INFOID:0000000001116723

CAUTION:

- **The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.**
- **Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.**
- **The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST: J-41995) to pin-point refrigerant leaks.**
- **For the purpose of safety and customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.**
- **A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electrical leak detector (SST: J-41995).**
- **Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.**
- **Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.**
- **Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).**
- **Never use more than one refrigerant dye bottle (1/4 ounce /7.4 cc) per A/C system.**
- **Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Never use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.**
- **The fluorescent properties of the dye will remain for three years or a little over unless a compressor malfunction occurs.**

IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have the identification label on the front side of hood.

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001069925

DETAILED FLOW

1.LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. (Get detailed information about the conditions and environment when the symptom occurs.)

>> GO TO 2.

2.VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-126, "Description & Inspection".

>> GO TO 3.

3.GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis (Refer to HAC-187, "Diagnosis Chart By Symptom" below).

>> GO TO 4.

4.REPAIR OR REPLACE

Repair or replace the specific parts

>> GO TO 5.

5.FINAL CHECK

Final check.

Is the inspection result normal?

YES >> CHECK OUT
NO >> GO TO 3.

INSPECTION AND ADJUSTMENT

Description & Inspection

INFOID:0000000001069926

DESCRIPTION

The purpose of the operational check is to check if the individual system operates properly.

Conditions : Engine running at normal operating temperature

INSPECTION PROCEDURE

Blower

1. Turn fan control dial to 1-speed. Blower should operate on low speed.
2. Then fan control dial to 2-speed, and continue checking blower speed until all speeds are checked.
3. Leave blower on max. speed.

If NG, go to trouble diagnosis procedure for HAC-153, "Diagnosis Procedure".
If OK, continue the check.

Discharge Air (Mode control dial)

1. Turn mode control dial to each position.
2. Confirm that discharge air comes out according to the air distribution table. Refer to HAC-133, "System Description".

Discharge air flow					
Mode door position	Condition	Air outlet/distribution			
		VENT	FOOT		DEF
			Front	Rear	
	High-level ventilator door : SHUT	100%	—	—	—
		60%	24%	16%	—
		15%	39%	26%	20%
		10%	27%	18%	45%
		10%	—	—	90%

JSIIA0311GB

If NG, go to mode door cable adjustment. Refer to VTL-65, "Adjustment".
If OK, continue the check.

Discharge Air (High-level ventilator switch)

1. Press high-level ventilator switch. High-level ventilator switch indicator should illuminate.
2. Press high-level ventilator switch again. High-level ventilator indicator should not illuminate.
3. Confirm that discharge air comes out.

If NG, go to trouble diagnosis procedure for HAC-147, "Diagnosis Procedure".
If OK, continue the check.

Intake Air

1. Press REC switch. Recirculation indicator should illuminate.
2. Press REC switch again. Recirculation indicator should not illuminate.
3. Listen for intake door position change. (Slight change of blower sound can be heard.)

If NG, go to trouble diagnosis procedure for HAC-150, "Diagnosis Procedure".
If OK, continue the check.

Temperature Decrease

1. Turn temperature control dial counterclockwise until full cold position.
2. Check for cold air at discharge air outlets.

cardiagn.com

If NG, go to trouble diagnosis procedure for HAC-188, "Inspection procedure".
If OK, continue the check.

Temperature Increase

1. Turn temperature control dial clockwise until full hot position.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for HAC-189, "Inspection procedure".
If OK, continue the check.

A/C Switch

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Press A/C switch.
3. A/C switch indicator will turn ON.
   - Confirm that the compressor clutch engages (sound or visual inspection).

cardiagn.com

FUNCTION DIAGNOSIS

COMPRESSOR CONTROL FUNCTION

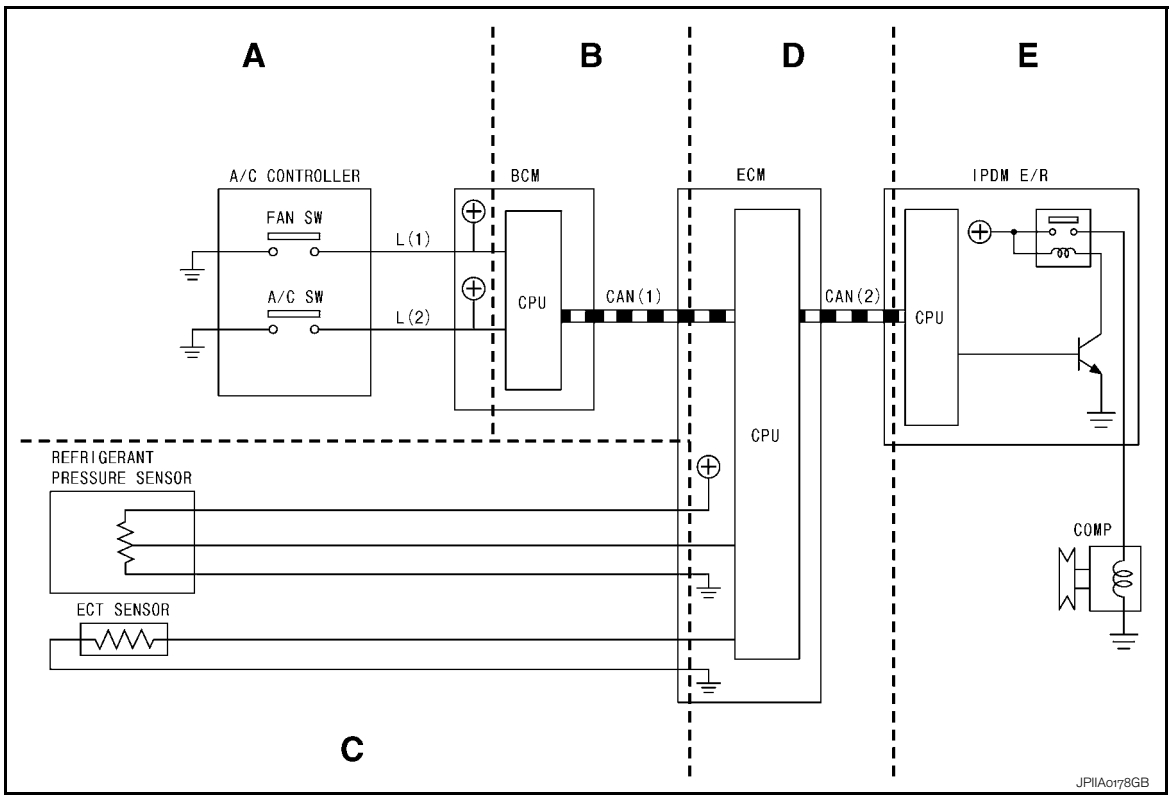
Description

INFOID:0000000001069928

PRINCIPLE OF OPERATION

Compressor is not activated.

Functional circuit diagram



L (1) : FAN ON SIG
L (2) : AIR COND SW
CAN (1) : AIR COND SIG
CAN (2) : AC COMP REQ

Functional initial inspection chart

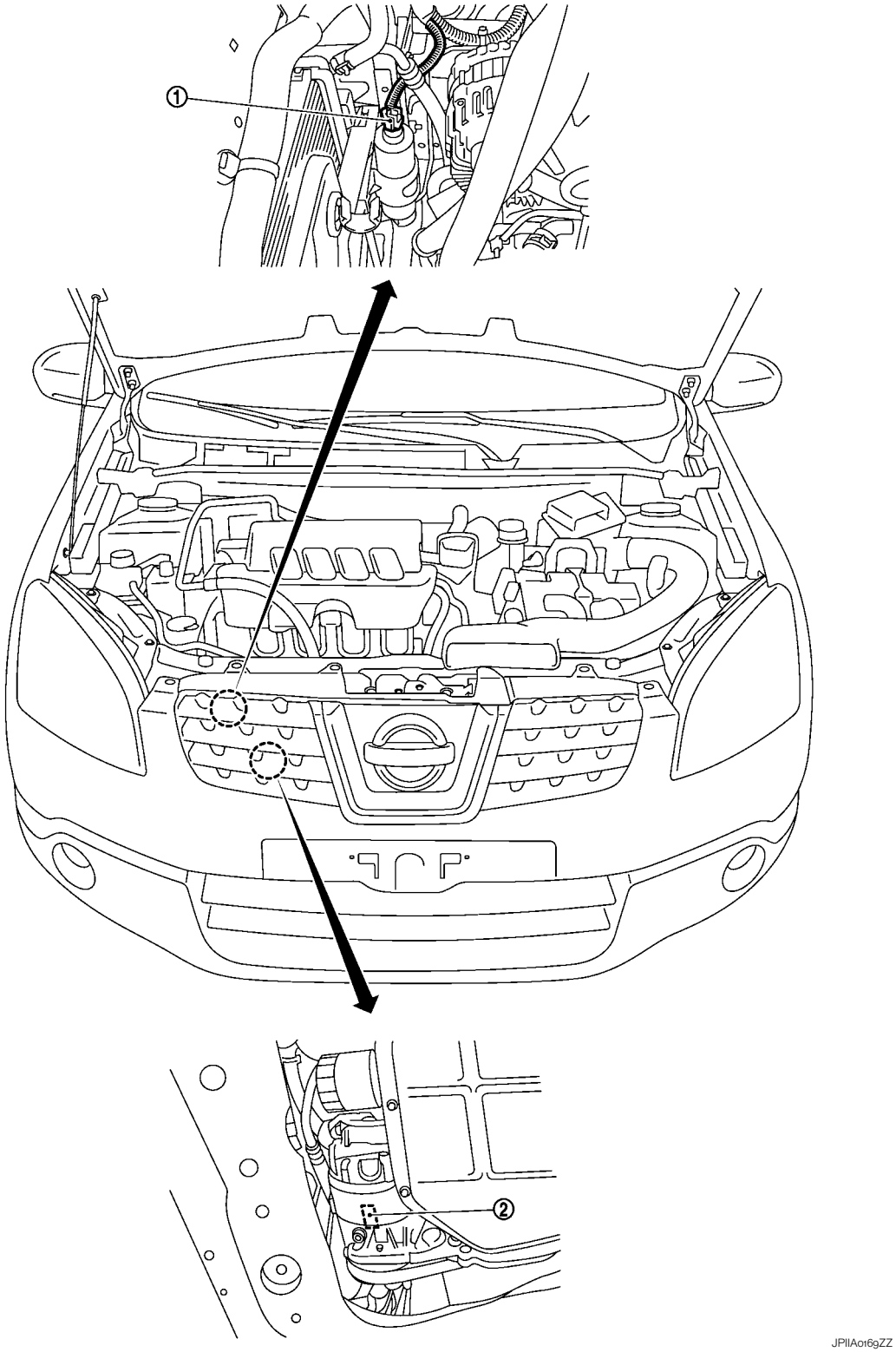
Location		A	B	C	D	E
CONSULT-III	BCM DATA MONITOR		Yes			
	ECM DATA MONITOR			Yes	Yes	
	IPDM E/R DATA MONITOR				Yes	
AUTO ACTIVE TEST						Yes

Component Part Location

INFOID:0000000001069930

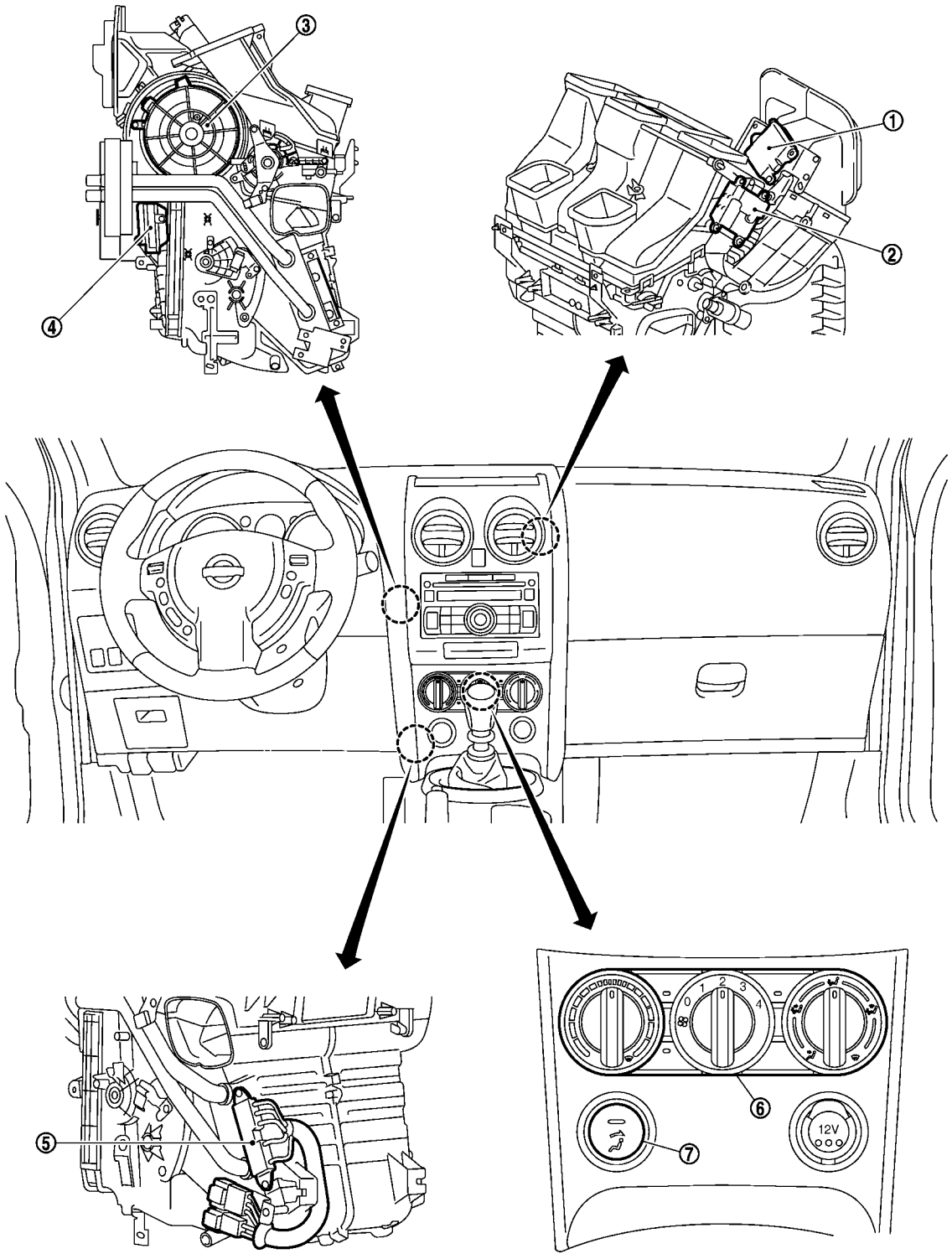
ENGINE COMPARTMENT

cardiagn.com



1. Refrigerant pressure sensor 2. Compressor

PASSENGER COMPARTMENT
LHD Models

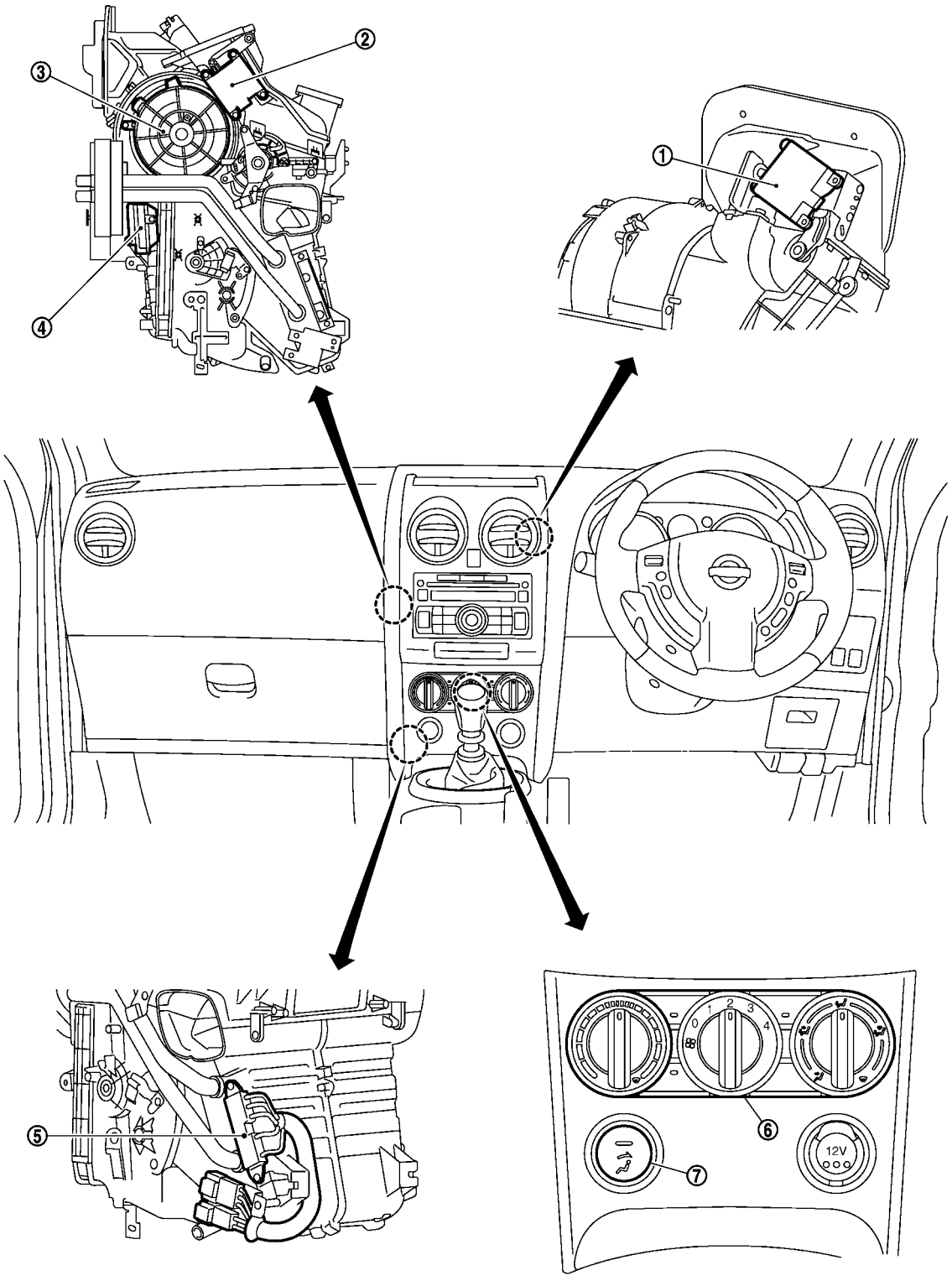


JPIIA0171ZZ

1. Intake door motor
2. High-level ventilator door motor
3. Blower motor
4. Blower fan resistor
5. PTC heater
6. Heater control panel
7. High-level ventilator switch

RHD Models

cardiagn.com



JPIIA0172ZZ

1. Intake door motor
2. High-level ventilator door motor
3. Blower motor
4. Blower fan resistor
5. PTC heater
6. Heater control panel
7. High-level ventilator switch

Component's role

INFOID:0000000001069931

Component	Reference
Blower fan resistor	HAC-155, "Component Inspection"
Blower motor	HAC-153, "Description"
Compressor	HAC-157, "Description"
Heater control panel	HAC-169, "Description"
High-level ventilator door motor	HAC-147, "Description"
High-level ventilator switch	HAC-52, "Component Inspection"
intake door motor	HAC-150, "Description"
PTC heater	HAC-167, "Component Inspection"
Refrigerant pressure sensor	HAC-161, "Component Inspection"

cardiagn.com

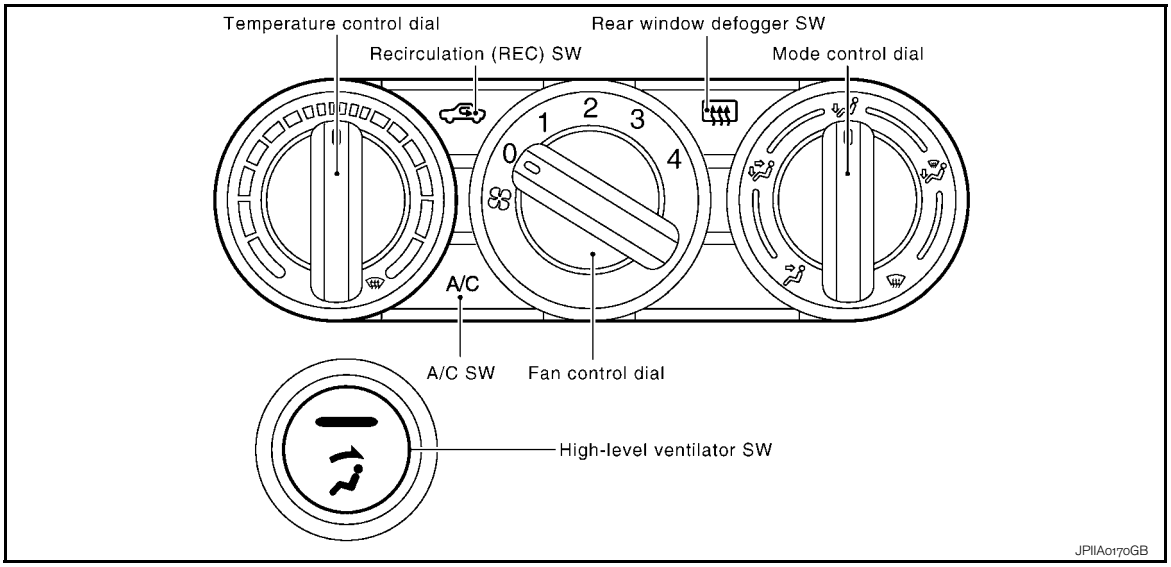
MANUAL AIR CONDITIONER SYSTEM

System Description

INFOID:0000000001069937

CONTROL OPERATION

Controller



Fan control dial
This dial turns the fan ON and OFF, and controls fan speed.

Temperature control dial
This dial is to adjust the temperature of the discharge air.

Mode control dial
This dial controls the outlet air flow.

A/C switch
Compressor is ON or OFF with this switch.
(Pressing the A/C switch when the A/C switch is ON will turn OFF the A/C switch and compressor.)

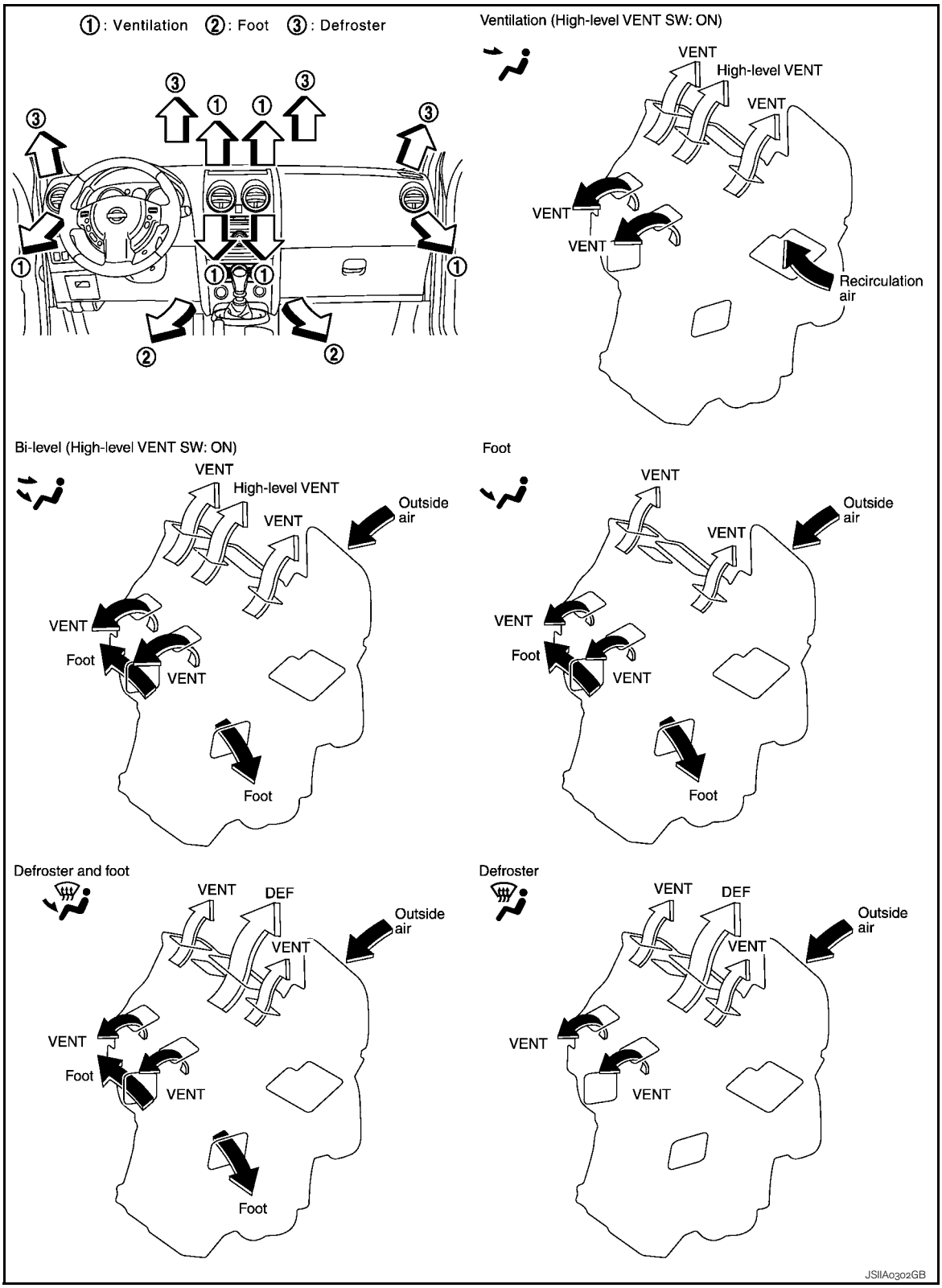
Rear window defogger switch
When illumination is ON, rear window is defogged.

Recirculation (REC) switch
- Recirculation (REC) position: Interior air is recirculated inside the vehicle. (The indicator lamp will light.)
- Fresh (FRE) position: Outlet air is drawn into the passenger compartment. (The indicator lamp will not light.)

High-level ventilator switch
When high-level ventilator switch is ON, high-level ventilator switch indicator turn ON, and high-level ventilator door is opened.

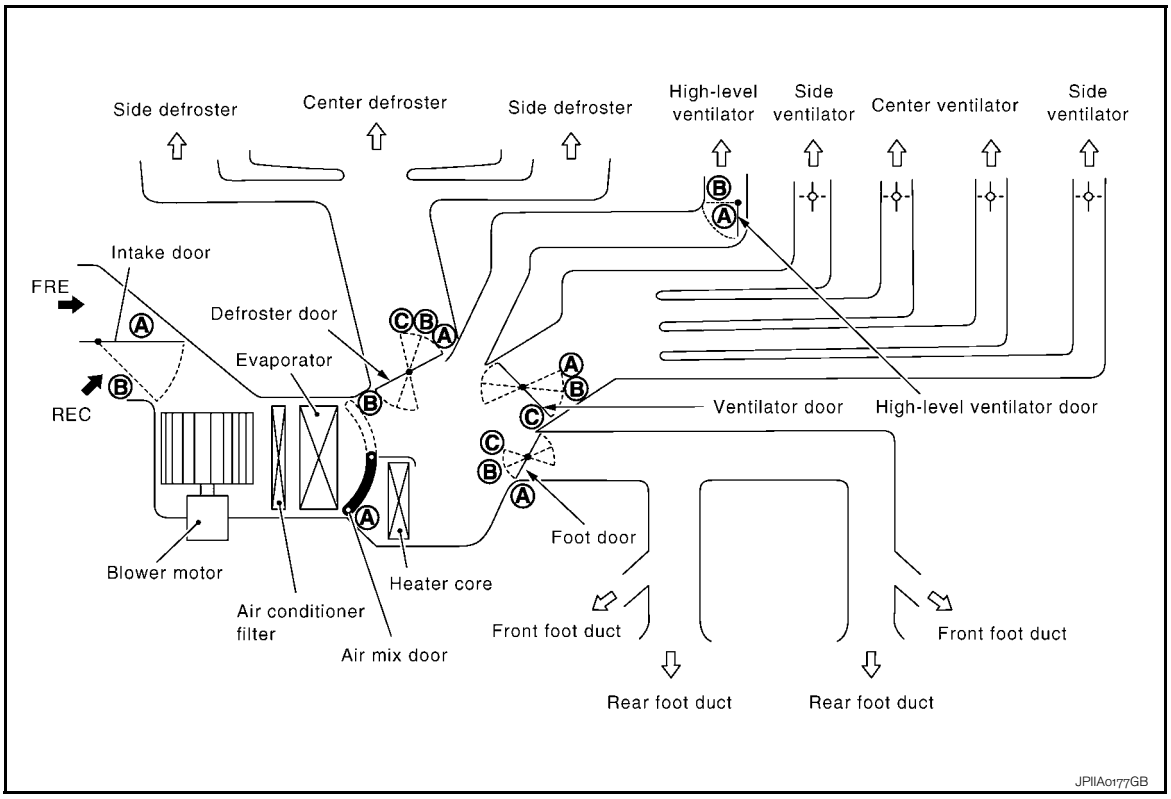
cardiagn.com

DISCHARGE AIR FLOW



cardiagn.com

SWITCHES AND THEIR CONTROL FUNCTION



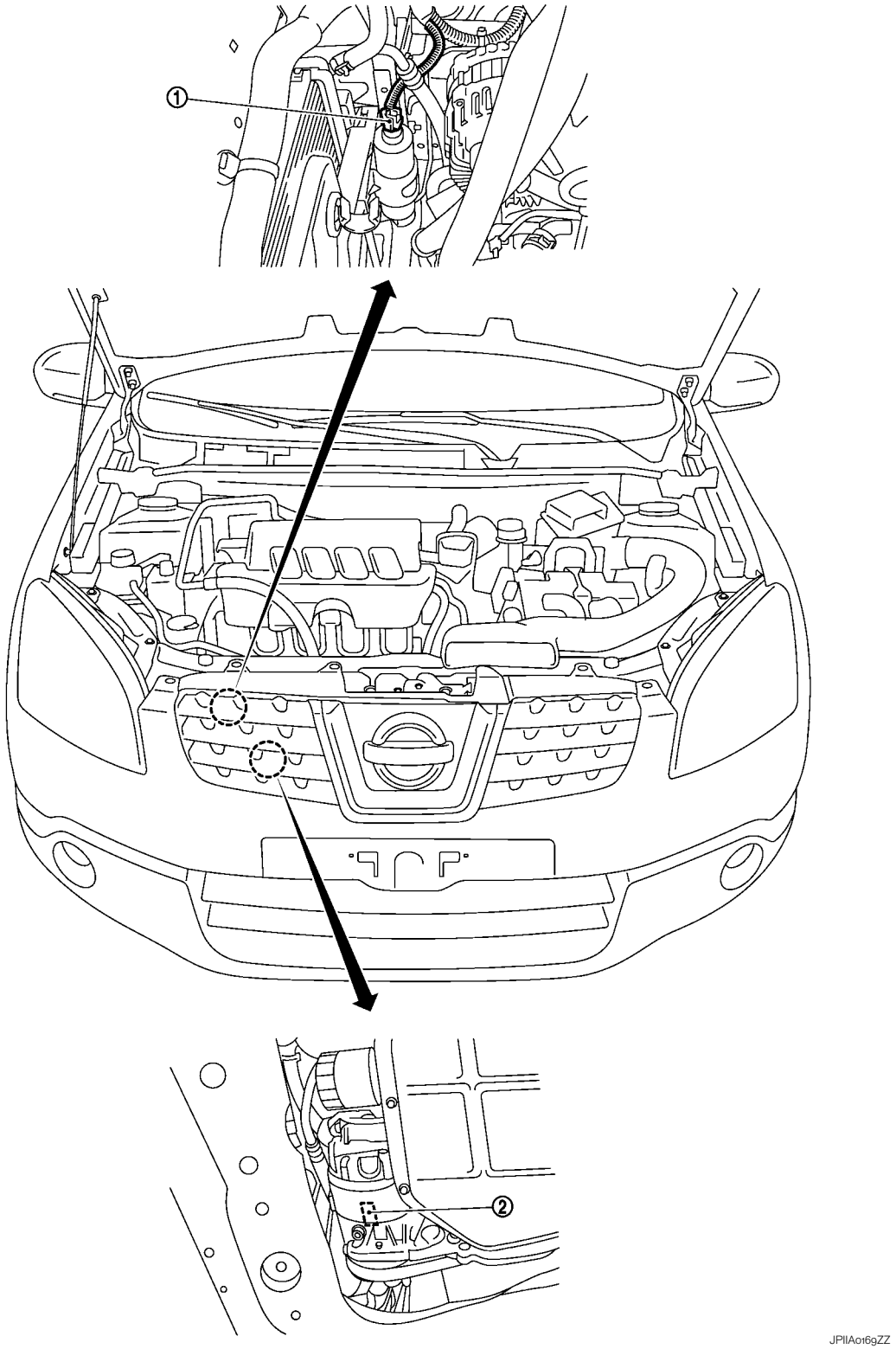
DOOR \ Mode control dial	MODE position					High-level ventilator SW		REC SW		Temperature control dial		
	VENT	B/L	FOOT	D/F	DEF	ON	OFF	FRE	REC	Full cold	⇔	Full hot
Ventilator door	Ⓐ	Ⓑ	Ⓒ	Ⓒ	Ⓒ	–		–		–		
Defroster door	Ⓐ	Ⓐ	Ⓐ	Ⓑ	Ⓒ	–		–		–		
Foot door	Ⓐ	Ⓑ	Ⓒ	Ⓑ	Ⓐ	–		–		–		
High-level ventilator door	–	–	–	–	–	Ⓐ	Ⓑ	–		–		
Intake door	–					–		Ⓑ	Ⓐ	–		
Air mix door	–					–		–		Ⓐ	⇔	Ⓑ

JPIIA0174GB

Component Part Location

INFOID:0000000001070210

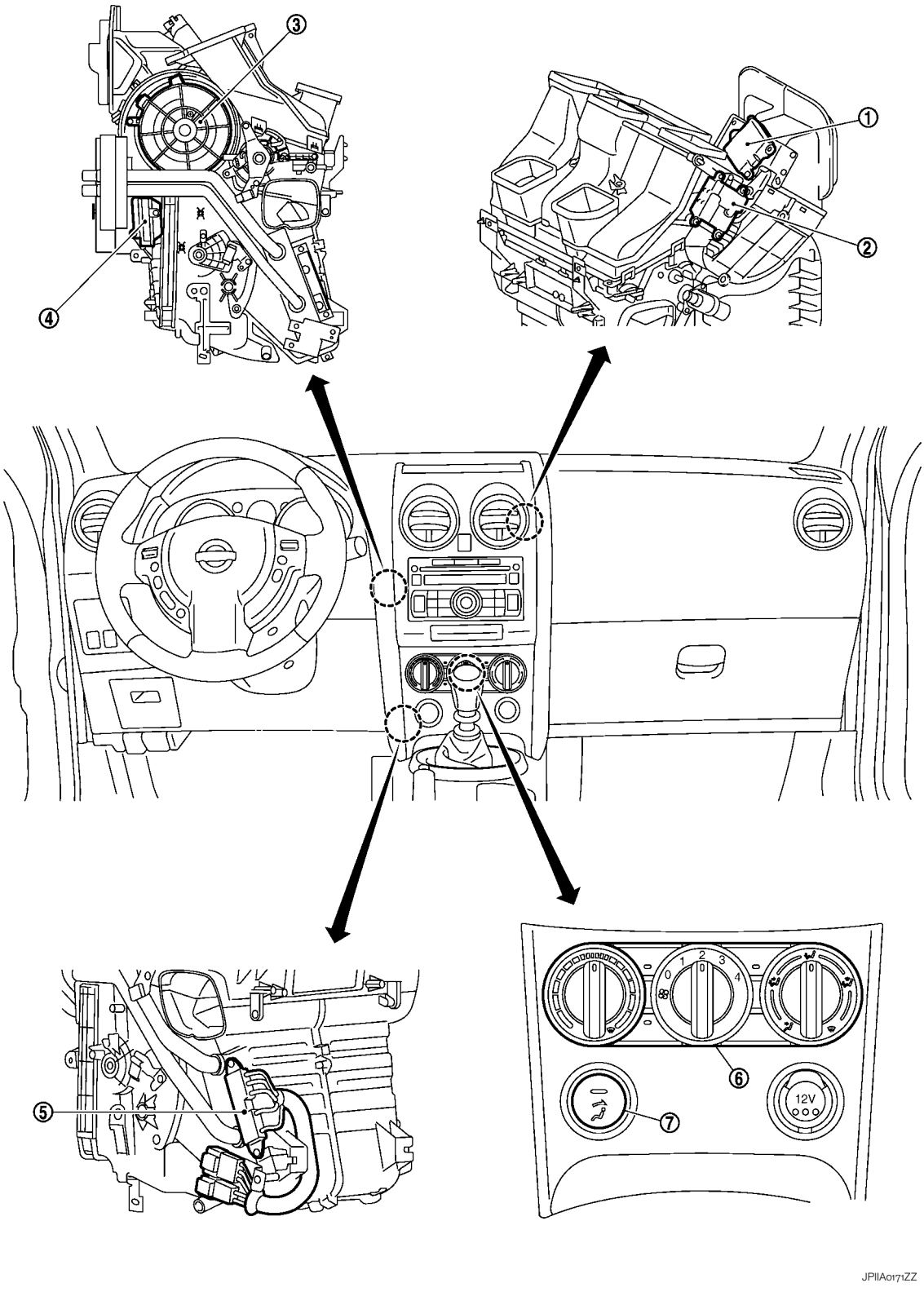
ENGINE COMPARTMENT



1. Refrigerant pressure sensor 2. Compressor

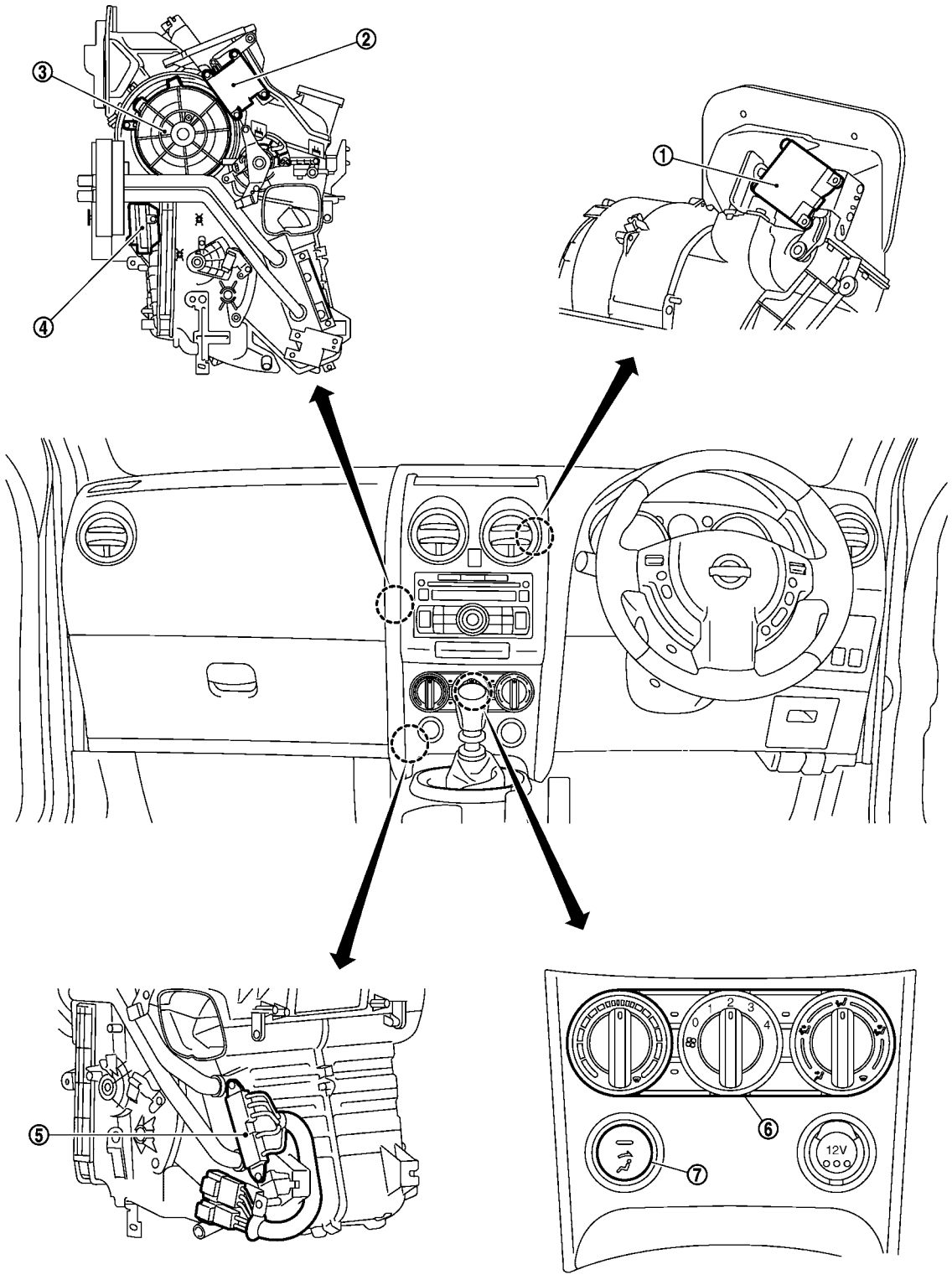
PASSENGER COMPARTMENT
LHD Models

cardiagn.com



1. Intake door motor
2. High-level ventilator door motor
3. Blower motor
4. Blower fan resistor
5. PTC heater
6. Heater control panel
7. High-level ventilator switch

RHD Models



JPIIA0172ZZ

1. Intake door motor
2. High-level ventilator door motor
3. Blower motor
4. Blower fan resistor
5. PTC heater
6. Heater control panel
7. High-level ventilator switch

Component Description

INFOID:0000000001069939

cardiagn.com

Component	Reference
Blower fan resistor	HAC-155, "Component Inspection"
Blower motor	HAC-153, "Description"
Compressor	HAC-157, "Description"
Heater control panel	HAC-169, "Description"
High-level ventilator door motor	HAC-147, "Description"
High-level ventilator switch	HAC-149, "Component Inspection"
intake door motor	HAC-150, "Description"
PTC heater	HAC-167, "Component Inspection"
Refrigerant pressure sensor	HAC-161, "Component Inspection"

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001096703

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

AIR CONDITIONER

AIR CONDITIONER : CONSULT-III Function (BCM - MANUAL AIR CONDITIONER)

INFOID:0000000001096704

DATA MONITOR

cardiagn.com

Display item list

Monitor item [unit]		Contents
IGN ON SW	“On/Off”	Displays “IGN position (On)/OFF, ACC position (Off)” status as judged from ignition switch signal.
FAN ON SIG	“On/Off”	Displays “FAN (On)/FAN (Off)” status as judged from blower fan motor switch signal.
AIR COND SW	“On/Off”	Displays “COMP (On)/COMP (Off)” status as judged from A/C switch signal.

PTC HEATER

PTC HEATER : CONSULT-III Function (BCM - PTC HEATER)

INFOID:0000000001114917

DATA MONITOR

Display Item List

Monitor Item [Unit]	Description
ELEC PWR CUT [OFF/FREEZ/INHBT]	Indicate [OFF/FREEZ/INHBT] condition of the PTC heater states.
FAN ON SIG [On/Off]	Displays [FAN (ON)/FAN (OFF)] status as judged from blower fan motor signal.
ENGINE STATUS [STOP/STAL/RUN/CRA]	Indicate [STOP/STALL/RUN/CRA] condition of the engine states.
ENG COOLNT T [°C]	The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.
BATTERY VOLT [V]	The power supply voltage of BCM is displayed.
ENGINE RPM [rpm]	Indicates the engine speed computed from the signal of the crankshaft position sensor.
OUTSIDE TEMP [°C]	The outside air temperature (determined by the signal voltage of the OAT sensor) is displayed.

ACTIVE TEST

Test item

Test Item	Operation	Description
PTC HEATER	OFF PTC 1 PTC 2 PTC 3	This test is able to check PTC heater operation.

cardiagn.com

HIGH-LEVEL VENTILATOR DOOR CONTROL SYSTEM

Description

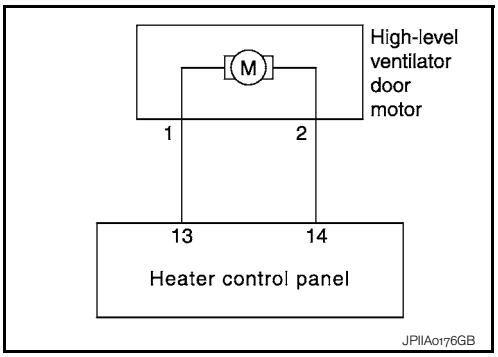
INFOID:0000000001069949

SYSTEM DESCRIPTION

Component Parts

High-level ventilator door control system components are:
- Heater control panel (High-level ventilator switch)
- High-level ventilator door motor

High-level ventilator door motor circuit



cardiagn.com

INTAKE DOOR CONTROL SYSTEM

Description

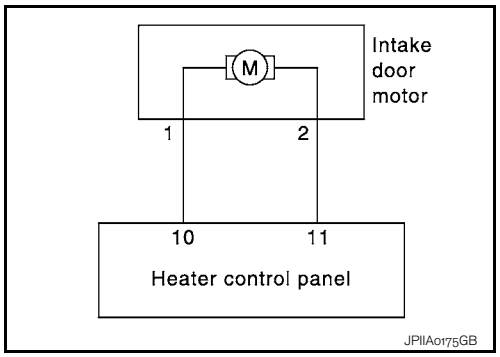
INFOID:0000000001069952

SYSTEM DESCRIPTION

Component Parts

Intake door control system components are:
- Heater control panel (REC switch)
- Intake door motor

Intake door motor circuit



cardiagn.com

BLOWER MOTOR CONTROL SYSTEM

Description

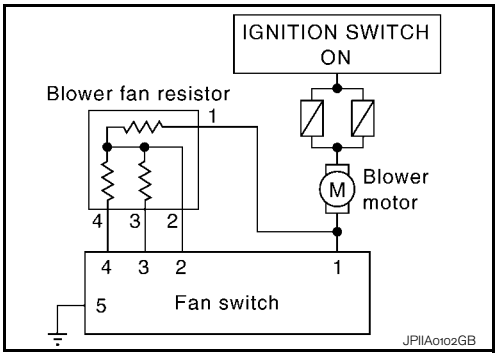
INFOID:0000000001069953

SYSTEM DESCRIPTION

Component Parts

Blower motor control system components are:
- Blower motor
- Blower fan resistor
- Heater control panel (Fan switch)

Blower motor circuit
The blower speed is selected manually (1st – 4th) by the fan switch.



cardiagn.com

MAGNET CLUTCH CONTROL SYSTEM

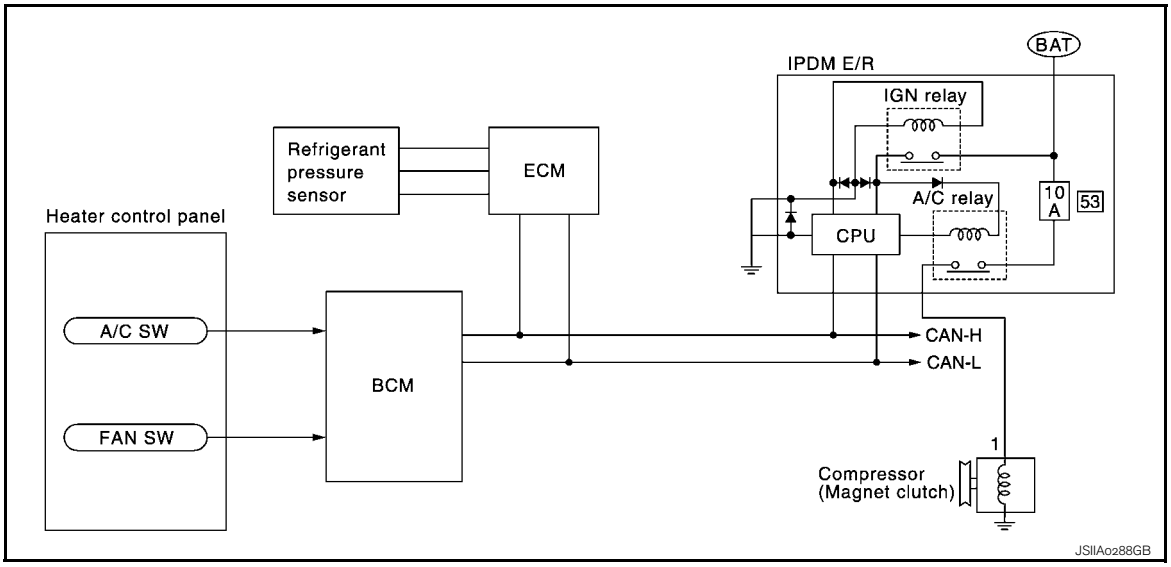
Description

INFOID:0000000001069955

SYSTEM DISCRIPTION

- When A/C switch of the heater control panel is turned ON, the compressor ON signal is input to BCM.
- BCM transmits the compressor ON signal to ECM via CAN communication.
- ECM judges the condition of each sensor (Refrigerant pressure sensor signal, accelerator position signal, etc.), and transmits the compressor ON signal to IPDM E/R via CAN communication.
- IPDM E/R receives the compressor ON signal from ECM, turns the A/C relay ON, and activates the compressor.

Magnet Clutch Circuit



COMPRESSOR PROTECTION CONTROL

When the high-pressure side detected by the refrigerant pressure sensor is either approx. 2.7 MPa (approx. 27.5 kg/cm^2·G) or more, or approx. 0.14 MPa (approx. 1.4 kg/cm^2·G) or less, ECM turns the A/C relay OFF and stops the compressor.

PTC HEATER CONTROL SYSTEM

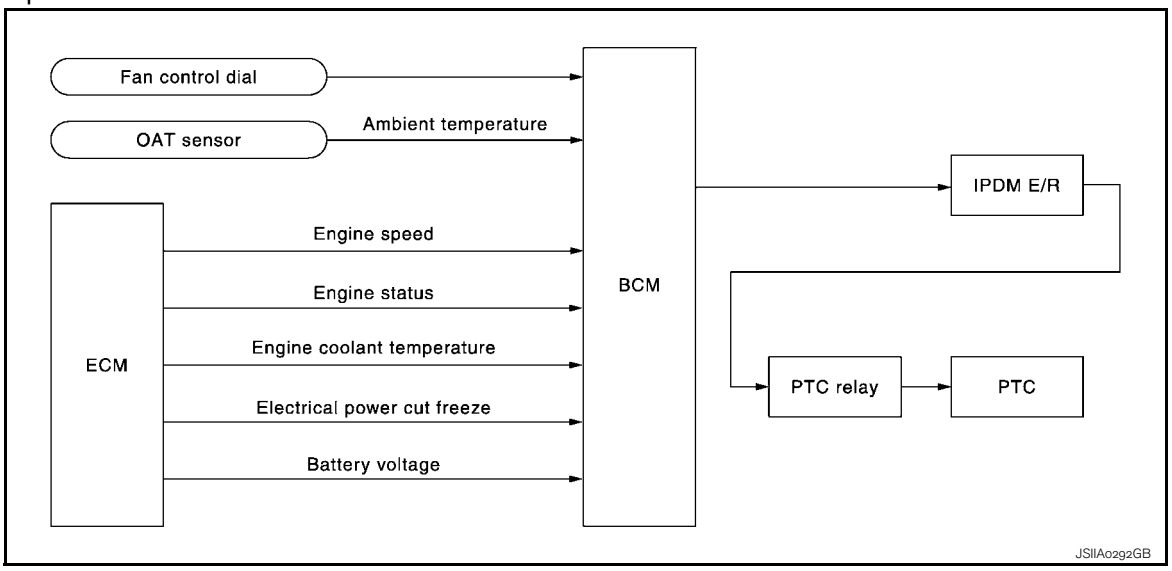
Description

INFOID:0000000001117103

SYSTEM DESCRIPTION

BCM controls PTC (Positive Temperature Coefficient) heater correspond to fan ON signal, ambient temperature, engine coolant temperature, engine speed, engine status, electrical power cut freeze signal and battery voltage.
BCM sends PTC ON signal to IPDM E/R, via CAN communication.
BCM judges whether PTC can be turned ON, based on each sensor status (ambient temperature, engine speed, engine coolant temperature, etc.). If it judges PTC can be turned ON, it send PTC heater relay ON signal to IPDM E/R via CAN communication.

System Operation



cardiagn.com

COMPONENT DIAGNOSIS

HIGH-LEVEL VENTILATOR DOOR MOTOR

Description

INFOID:0000000001070082

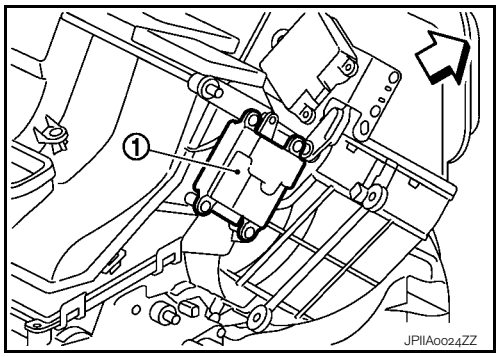
COMPONENT DESCRIPTION

High-level Ventilator Door Motor

The high-level ventilator door motor (1) are attached to the A/C unit assembly. It rotates so that air is discharged from the outlet set by the high-level ventilator switch. Motor rotation is conveyed to a link which activates the high-level ventilator door.

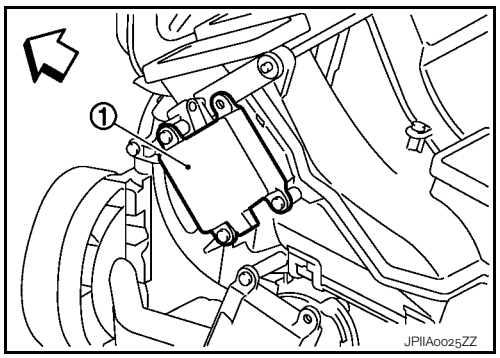
LHD models

⇦: Vehicle front



RHD models

⇦: Vehicle front



Component Function Check

INFOID:0000000001070083

1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press high-level ventilator switch. High-level ventilator switch indicator should illuminate.
2. Press high-level ventilator switch again. High-level ventilator indicator should not illuminate.
3. Confirm that discharge air comes out.

Is the inspection result normal?

YES >> END.
NO >> Go to diagnosis procedure. Refer to HAC-147, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001070084

1. CHECK HIGH-LEVEL VENTILATOR DOOR CONTROL LINKAGE

Check high-level ventilator door control linkage.

Is it installed normally?

YES >> GO TO 2.
NO >> Repair or adjust control linkage.

2. CHECK POWER SUPPLY FOR HEATER CONTROL PANEL

1. Disconnect heater control panel connector.

cardiagn.com

2. Turn ignition switch ON.
3. Check voltage between heater control panel harness connector M54 terminal 1 and ground.

(+)		(–)	Voltage
Heater control panel		—	
Connector	Terminal		
M54	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 6.

3.CHECK GROUND CIRCUIT FOR HEATER CONTROL PANEL

1. Turn ignition switch OFF.
2. Check continuity between heater control panel harness connector M54 terminal 20 and ground.

Heater control panel		—	Continuity
Connector	Terminal		
M54	20	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair harness or connector.

4.CHECK POWER SUPPLY FOR HIGH-LEVEL VENTILATOR DOOR MOTOR

1. Reconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between high-level ventilator door motor harness connector M43 terminal 1 and 2.

(+)		(–)		Condition	Voltage
High-level ventilator door motor					
Connector	Terminal	Connector	Terminal		
M43	1	M43	2	High-level ventilator SW: ON	Approx. 12
	2		1	High-level ventilator SW: OFF	

Is the inspection result normal?

YES >> Replace high-level ventilator door motor.
NO >> GO TO 5.

5.CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND HIGH-LEVEL VENTILATOR DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector and high-level ventilator door motor connector.
3. Check continuity between heater control panel harness connector M54 terminal 13 and high-level ventilator door motor harness connector M43 terminal 1.
4. Check continuity between heater control panel harness connector M54 terminal 14 and high-level ventilator door motor harness connector M43 terminal 2.

Heater control panel		High-level ventilator door motor		Continuity
Connector	Terminal	Connector	Terminal	
M54	13	M43	1	Continuity should exist
	14		2	

Is the inspection result normal?

YES >> Replace heater control panel.

cardiagn.com

NO >> Repair harness or connector.

6.CHECK FUSE

Check 10A fuse [No.4 located in the fuse block (J/B)]. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

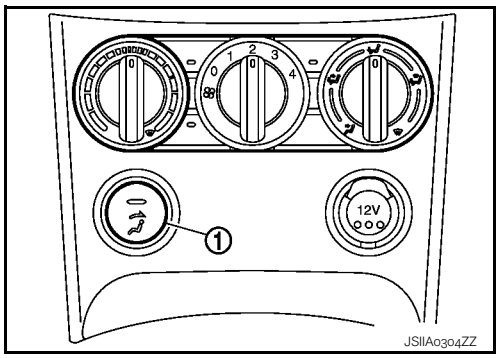
YES >> Repair harness or connector.
NO >> Replace fuse.

Component Inspection

INFOID:0000000001117102

HIGH-LEVEL VENTILATOR SWITCH

Check continuity between high-level ventilator switch (1) M52 terminal 2and 3.



High-level ventilator switch				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M52	2	M52	3	High-level VENT SW: OFF	Continuity should not exist
				High-level VENT SW: ON	Continuity should exist

INTAKE DOOR MOTOR

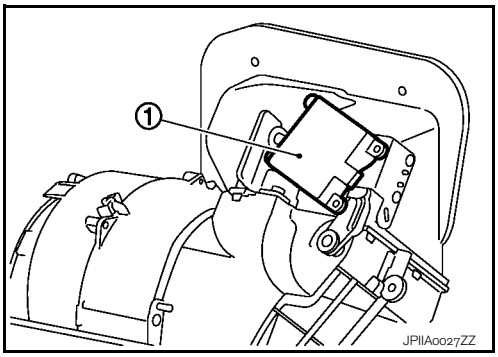
Description

INFOID:0000000001069965

COMPONENT DESCRIPTION

Intake Door Motor

The intake door motor (1) is attached to the A/C unit assembly. It rotates so that air is drawn from inlets set by the heater control panel. Motor rotation is conveyed to a lever which activates the intake door.



Component Function Check

INFOID:0000000001069966

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press REC switch.
2. REC indicator should illuminate.
3. Listen for intake door position change. (Slight change of blower sound can be heard.)
4. Press REC switch again.
5. REC indicator should not illuminate.

Is the inspection result normal?

YES >> END.
NO >> Go to diagnosis procedure. Refer to HAC-150, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001069967

1.CHECK INTAKE DOOR CONTROL LINKAGE

Check intake door control linkage.

Is it installed normally?

YES >> GO TO 2.
NO >> Repair or adjust control linkage.

2.CHECK POWER SUPPLY FOR HEATER CONTROL PANEL

1. Disconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between heater control panel harness connector M54 terminal 1 and ground.

(+)		(–)	Voltage
Heater control panel		—	
Connector	Terminal		
M54	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 6.

3.CHECK GROUND CIRCUIT FOR HEATER CONTROL PANEL

1. Turn ignition switch OFF.
2. Check continuity between heater control panel harness connector M54 terminal 20 and ground.

cardiagn.com

Heater control panel		—	Continuity
Connector	Terminal		
M54	20	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair harness or connector.

4. CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR

1. Reconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between intake door motor harness connector M68 (LHD models) or M303 (RHD models) terminal 1 and 2.

LHD models

(+)		(–)		Condition	Voltage
Intake door motor					
Connector	Terminal	Connector	Terminal		
M68	2	M68	1	REC SW: ON	Approx. 12
	1		2	REC SW: OFF	

RHD models

(+)		(–)		Condition	Voltage
Intake door motor					
Connector	Terminal	Connector	Terminal		
M303	2	M303	1	REC SW: ON	Approx. 12
	1		2	REC SW: OFF	

Is the inspection result normal?

YES >> Replace intake door motor.
NO >> GO TO 5.

5. CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND INTAKE DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector and intake door motor connector.
3. Check continuity between heater control panel harness connector M54 terminal 10 and intake door motor harness connector M68 terminal 1 (LHD models) or M303 terminal 1 (RHD models).
4. Check continuity between heater control panel harness connector M54 terminal 11 and intake door motor harness connector M68 terminal 2 (LHD models) or M303 terminal 2 (RHD models).

LHD models

Heater control panel		Intake door motor		Continuity
Connector	Terminal	Connector	Terminal	
M54	10	M68	1	Continuity should exist
	11		2	

RHD models

Heater control panel		Intake door motor		Continuity
Connector	Terminal	Connector	Terminal	
M54	10	M303	1	Continuity should exist
	11		2	

Is the inspection result normal?

YES >> Replace heater control panel.
NO >> Repair harness or connector.

cardiagn.com

6.CHECK FUSE

Check 10A fuse [No.4, located in the fuse block (J/B)]. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NO >> Replace fuse.

cardiagn.com

BLOWER MOTOR

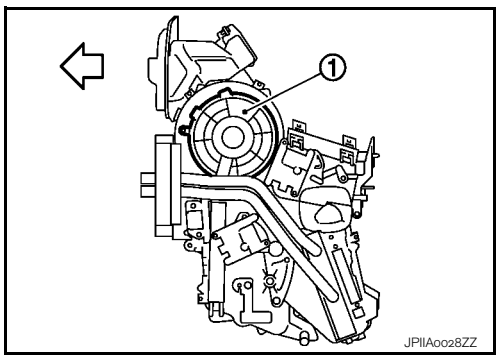
Description

INFOID:0000000001069968

COMPONENT DESCRIPTION

The blower motor (1) utilizes a brush motor with a sirocco fan type.

⇦: Vehicle front



Component Function Check

INFOID:0000000001069969

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn fan control dial clockwise. Blower should operate on low speed.
2. Turn fan control dial clockwise, and continue checking blower speed until all speeds checked.

Is the inspection result normal?

YES >> END.
NO >> Go to diagnosis procedure. Refer to HAC-153, "Diagnosis Procedure"

Diagnosis Procedure

INFOID:0000000001069970

1.CHECK BLOWER MOTOR OPERATING

Check blower motor operating.

Is blower motor operation under starting blower speed control?

YES >> END.
NO >> Blower motor dose not operate: GO TO 2.

2.CHECK POWER SUPPLY FOR BLOWER MOTOR

1. Turn ignition switch OFF.
2. Disconnect blower motor connector.
3. Turn ignition switch ON.
4. Check voltage between blower motor harness connector M312 terminal 1 and ground.

(+)		(–)	Voltage
Blower motor		—	
Connector	Terminal		
M312	1	Ground	Battery voltage

Is the inspection result normal?

OK >> GO TO 3.
NG >> GO TO 4.

3.CHECK BLOWER MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Turn fan control dial clockwise to 4th.
3. Check continuity between blower motor harness connector M312 terminal 2 and ground.

Blower motor		—	Condition	Continuity
Connector	Terminal			
M312	2	Ground	Fan control dial: 4th	Continuity should exist

Is the inspection result normal?

YES >> Replace blower motor.
NO >> GO TO 10.

4. CHECK POWER VOLTAGE OF BLOWER RELAY

1. Turn ignition switch OFF.
2. Remove blower relay. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".
3. Turn ignition switch ON.
4. Check the voltage between blower relay fuse block terminals 1, 3 and body ground. Refer to PG-108, "Description" for relay terminal assignment.

(+)	(–)	Voltage
Blower relay	—	
1	Ground	Battery voltage
3		

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 7.

5. CHECK BLOWER RELAY

1. Turn ignition switch OFF.
2. Install blower relay. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".
3. Turn ignition switch ON.
4. Check operation sound of the blower relay after switching ignition switch ON.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace blower relay.

6. CHECK FUSE

Check 15A fuses [No. 15 and 16, located in the fuse block (J/B)]. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NG >> Replace fuse.

7. CHECK IGNITION SWITCH CIRCUIT

Check ignition switch circuit. Refer to DLK-91, "Diagnosis Procedure" (WITH I-KEY, WITHOUT SUPER LOCK), DLK-355, "Diagnosis Procedure" (WITH I-KEY & SUPER LOCK), DLK-597, "Diagnosis Procedure" (WITHOUT I-KEY, WITHOUT SUPER LOCK) or DLK-757, "Diagnosis Procedure" (WITHOUT I-KEY & SUPER LOCK).

Is the inspection result normal?

YES >> Repair harness or connector.
NG >> Replace malfunctioning parts.

8. CHECK CIRCUIT CONTINUITY BETWEEN BLOWER FAN RESISTOR.

1. Turn ignition switch OFF.
2. Disconnect blower fan resistor connector.
3. Check continuity between blower fan resistor harness connector M305 terminal 1 and 2, 3, 4. Refer to HAC-155, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.

cardiagn.com

NO >> Replace blower fan resistor.

9. CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND BLOWER FAN RESISTOR

1. Disconnect blower motor connector.
2. Check continuity between blower motor harness connector M312 terminal 2 and blower fan resistor M305 terminal 1.

Blower motor		Blower fan resistor		Continuity
Connector	Terminal	Connector	Terminal	
M312	2	M305	1	Continuity should exist

Is the inspection result normal?

OK >> GO TO 10.
NG >> Repair harness or connector.

10. CHECK CIRCUIT CINTINUITY BETWEEN BLOWER MOTOR RESISTOR AND FAN SWITCH

1. Disconnect fan switch connector.
2. Check continuity between blower motor resistor harness connector M305 terminal 2, 3, 4 and fan switch M88 terminal 2, 3, 4.

Blower fan resistor		Fan SW		Continuity
Connector	Terminal	Connector	Terminal	
M305	2	M88	2	Continuity should exist
	3		3	
	4		4	

Is the inspection result normal?

OK >> GO TO 11.
NG >> Repair harness or connector.

11. CHECK FAN SWITCH

Check continuity between fan switch harness connector M88 terminal 5 and 1, 2, 3, 4, 6.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	5	M88	6	Fan control dial: except OFF	Continuity should exist
			4	Fan control dial: 1st	
			3	Fan control dial: 2nd	
			2	Fan control dial: 3rd	
			1	Fan control dial: 4th	

Is the inspection result normal?

YES >> Repair fan switch ground harness or connector.
NO >> Replace fan switch.

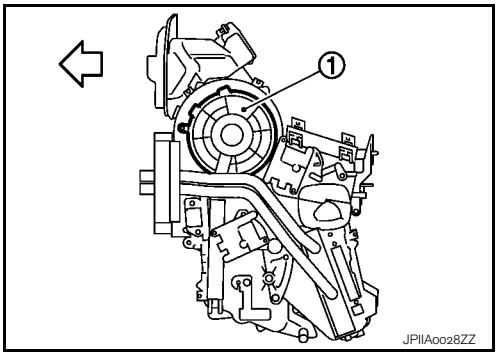
Component Inspection

INFOID:0000000001069971

BLOWER MOTOR

Confirm smooth rotation of the blower motor (1).

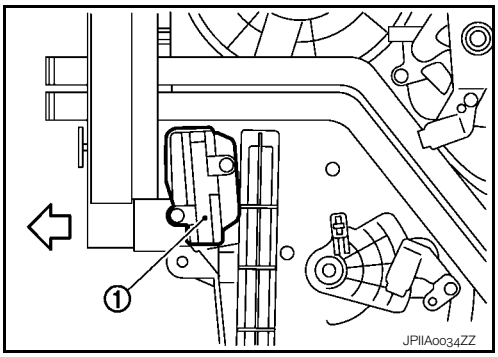
⇦: Vehicle front



BLOWER FAN RESISTOR

Check continuity between blower fan resistor connector (1) M305 terminal 1 and 2, 3, 4.

⇦: Vehicle front



Blower fan resistor				Resistance (Ω)
Connector	Terminal	Connector	Terminal	
M305	1	M305	2	Approx. 0.3
			3	Approx. 0.9
			4	Approx. 2.0

cardiagn.com

MAGNET CLUTCH

Description

INFOID:0000000001069976

Magnet clutch drives a compressor, by a signal of IPDM E/R.

Component Function Check

INFOID:0000000001069977

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Press A/C switch.
3. A/C switch indicator will turn ON. Confirm that the magnet clutch engages (sound or visual inspection).

Does the magnet clutch operate?

YES >> END.
NO >> Go to Diagnosis Procedure. Refer to HAC-157, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001069978

1.PERFORM AUTO ACTIVE TEST

Perform “AUTO ACTIVE TEST”. Refer to PCS-9, "Diagnosis Description".

Does the magnet clutch operate?

YES >> • WITH CONSULT-III: GO TO 5.
• WITHOUT CONSULT-III: GO TO 6.
NO >> Check 10A fuse (No. 53, located in IPDM E/R), and GO TO 2.

2.CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and compressor connector.
3. Check continuity between IPDM E/R harness connector E12 terminal 23 and compressor harness connector F17 (With Gasoline Engine) or F18 (With Diesel Engine) terminal 1.

With Gasoline Engine

IPDM E/R		Compressor		Continuity
Connector	Terminal	Connector	Terminal	
E12	23	F17	1	Continuity should exist

With Diesel Engine

IPDM E/R		Compressor		Continuity
Connector	Terminal	Connector	Terminal	
E12	23	F18	1	Continuity should exist

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK CIRCUIT CONTINUITY BETWEEN COMPRESSOR GROUND

1. Turn ignition switch OFF.
2. Check continuity between compressor harness connector F17 (With Gasoline Engine) or F18 (With Diesel Engine) terminal 2 and ground.

With Gasoline Engine

Compressor		—	Continuity
Connector	Terminal		
F17	2	Ground	Continuity should exist

With Diesel Engine

Compressor		—	Continuity
Connector	Terminal		
F18	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair harness or connector.

4. CHECK MAGNET CLUTCH CIRCUIT

Check for operation sound when applying battery voltage direct current to terminal.

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Replace compressor.

5. CHECK BCM INPUT (AIR COND SW) SIGNAL

Check compressor ON/OFF signal in “DATA MONITOR”. Refer to HAC-140, "AIR CONDITIONER : CONSULT-III Function (BCM - MANUAL AIR CONDITIONER)".

A/C SW ON : AIR COND SW ON
A/C SW OFF : AIR COND SW OFF

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 6.

6. CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND BCM

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector and BCM harness connector.
3. Check continuity between heater control panel harness connector M54 terminal 7 and BCM harness connector M65 terminal 14.

Heater control panel		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M54	7	M65	14	Continuity should exist

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair harness or connector.

7. CHECK A/C SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector.
3. Turn ignition switch ON.
4. Check voltage between heater control panel harness connector M54 terminal 7 and ground.

(+)		(–)	Voltage
Heater control panel		—	
Connector	Terminal		
M54	7	Ground	Battery voltage

5. Reonnect heater control panel connector.
6. Press A/C switch and turn fan control dial except OFF position.
7. Check voltage between heater control panel harness connector M54 terminal 7 and ground.

cardiagn.com

(+)		(–)	Condition	Voltage
Heater control panel		—		
Connector	Terminal			
M54	7	Ground	A/C SW: ON FAN SW: ON	Approx. 0

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace heater control panel.

8. CHECK REFRIGERANT PRESSURE SENSOR

WITH CONSULT-III
1. Start the engine.
2. Check voltage of refrigerant pressure sensor in “DATA MONITOR”. Refer to HAC-181, "HR16DE : Reference Value" (HR16DE), HAC-182, "MR20DE : Reference Value" (MR20DE), HAC-182, "K9K : Reference Value" (K9K).

WITHOUT CONSULT-III
1. Start the engine.
2. Check voltage between ECM harness connector F8 terminal 41 (With Gasoline Engine) F68 terminal 78 (With Diesel Engine) and ground.

With Gasoline Engine

(+)		(–)	Condition	Voltage
ECM		—		
Connector	Terminal			
F8	41	Ground	A/C SW: ON (Blower motor operates.)	Approx. 1.0 - 4.0

With Diesel Engine

(+)		(–)	Condition	Voltage
ECM		—		
Connector	Terminal			
F68	78	Ground	A/C SW: ON (Blower motor operates.)	Approx. 2.3

Is the inspection result normal?

YES >> • WITH CONSULT-III: GO TO 9.
• WITHOUT CONSULT-III: GO TO 10.
NO >> Refer to EC-316, "Diagnosis Procedure" [HR16DE (WITH EURO-OBD)], EC-595, "Diagnosis Procedure" [HR16DE (WITHOUT EURO-OBD)], EC-936, "Diagnosis Procedure" [MR20DE (WITH EURO-OBD)], EC-1215, "Diagnosis Procedure" [MR20DE (WITHOUT EURO-OBD)], or EC-1380, "Diagnosis Procedure" (K9K).

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal in “DATA MONITOR”. Refer to HAC-140, "AIR CONDITIONER : CONSULT-III Function (BCM - MANUAL AIR CONDITIONER)".

FAN SW ON : FAN ON SIG ON
FAN SW OFF : FAN ON SIG OFF

Is the inspection result normal?

YES >> GO TO 14.
NO >> GO TO 10.

10. CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND BCM

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector and BCM harness connector.

3. Check continuity between heater control panel harness connector M54 terminal 8 and BCM harness connector M65 terminal 15.

Heater control panel		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M54	8	M65	15	Continuity should exist

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair harness or connector.

11. CHECK FAN ON SIGNAL

1. Reconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between heater control panel harness connector M54 terminal 8 and ground.

(+)		(–)	Voltage
Heater control panel		—	
Connector	Terminal		
M54	8	Ground	Battery voltage

4. Turn fan control dial clockwise
5. Check voltage between heater control panel harness connector M54 terminal 8 and ground.

(+)		(–)	Condition	Voltage
Heater control panel		—		
Connector	Terminal			
M54	8	Ground	Fan control dial: except OFF	Approx. 0

Is the inspection result normal?

YES >> GO TO 14.
NO >> GO TO 12.

12. CHECK CIRCUIT CONTINUITY BETWEEN FAN SWITCH

1. Turn ignition switch OFF.
2. Disconnect fan switch connector.
3. Check continuity between fan switch harness connector M88 terminal 6 and 5.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	6	M88	5	Fan control dial: OFF	Continuity should not exist

4. Turn fan control dial clockwise.
5. Check continuity between fan switch harness connector M88 terminal 6 and 5.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	6	M88	5	Fan control dial: except OFF	Continuity should exist

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace heater control panel.

13. CHECK GROUND CIRCUIT FOR FAN SWITCH

Check continuity between fan switch harness connector M88 terminal 5 and ground.

cardiagn.com

FAN SW		—	Continuity
Connector	Terminal		
M88	5	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair harness or connector.

14. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-59, "CAN Communication Signal Chart".
- ECM – BCM
- ECM – IPDM E/R

Is the inspection result normal?

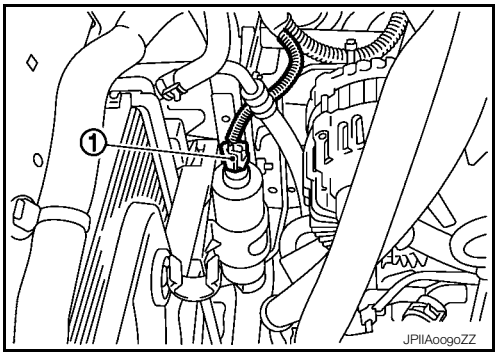
YES >> Replace ECM.
NO >> Repair or replace malfunctioning part(s).

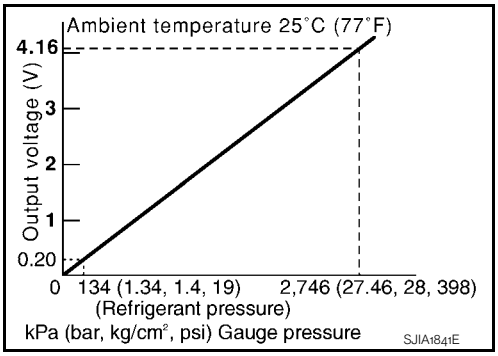
Component Inspection

INFOID:0000000001069979

REFRIGERANT PRESSURE SENSOR

The refrigerant pressure sensor (1) is attached to the liquid tank.
Make sure that the A/C refrigerant pressure and the sensor output voltage are within the specified range as shown in the A/C operating condition figure. Refer to EC-316, "Description" [HR16DE (WITH EURO-OBD)], EC-595, "Description" [HR16DE (WITHOUT EURO-OBD)], EC-936, "Description" [MR20DE (WITH EURO-OBD)], EC-1215, "Description" [MR20DE (WITHOUT EURO-OBD)], or EC-1380, "Description" (K9K).





PTC HEATER

Description

INFOID:0000000001096707

IPDM E/R operate a PTC heater, by a signal of BCM.

Component Function Check

INFOID:0000000001096708

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

CONSULT-III ACTIVE TEST
1. Start engine.
2. Select “PTC HEATER” of BCM active test item.
   CAUTION:
   - **Engine must be cold.**
   - **Battery must be charged.**
3. Turn fan control dial clockwise.
4. Turn temperature control dial to full hot position.
5. With operating the test item, check that PTC heater operation.
6. Check for warm air at discharge air outlet.

PTC 3	**: PTC heater HI operation**
PTC 2	**: PTC heater MID operation**
PTC 1	**: PTC heater LO operation**
OFF	**: Stop the PTC heater operation**

Does the PTC heater operate?

YES >> END.
NO >> Go to Diagnosis Procedure. Refer to HAC-162, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096709

1.CHECK PTC HEATER-1 OPERATION

CONSULT -III ACTIVE TEST
1. Disconnect PTC heater connector.
2. Start engine.
3. Select “PTC HEATER” of BCM active test item.
4. With operating the item, check voltage between PTC heater harness connector E117 terminal 3 and ground.

(+)		(–)	Test item	Voltage
PTC heater		—	PTC HEATER	
Connector	Terminal			
E117	3	Ground	OFF	Approx. 0
			PTC 1	Battery voltage
			PTC 2	Approx. 0
			PTC 3	Battery voltage

In the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 5.

2.CHECK GROUND CIRCUIT FOR PTC HEATER-1

1. Turn ignition switch OFF.
2. Check continuity between PTC heater harness connector E116 terminal 1 and ground.

cardiagn.com

PTC heater		—	Continuity
Connector	Terminal		
E116	1	Ground	Continuity should exist.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK PTC HEATER-2 OPERATION

1. Start engine.
2. Select “PTC HEATER” of BCM active test item.
3. With operating the item, check voltage between PTC heater harness connector E117 terminal 4 and ground.

(+)		(–)	Test item	Voltage
PTC heater		—	PTC HEATER	
Connector	Terminal			
E117	4	Ground	OFF	Approx. 0
			PTC 1	Approx. 0
			PTC 2	Battery voltage
			PTC 3	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 12.

4.CHECK GROUND CIRCUIT FOR PTC HEATER-2

1. Turn ignition switch OFF.
2. Check continuity between PTC heater harness connector E116 terminal 2 and ground.

PTC heater		—	Continuity
Connector	Terminal		
E116	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace PTC heater.
NO >> Repair harness or connector.

5.CHECK VOLTAGE FOR PTC RELAY-1

1. Turn ignition switch OFF.
2. Disconnect PTC relay-1.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-1 harness connector E53 terminal 3 and ground.

(+)		(–)	Voltage
PTC relay-1		—	
Connector	Terminal		
E53	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.CHECK FUSE

Check 30A fuse (Nos 37, located in the fuse, fusible link and relay box). Refer to PG-111, "Fuse and Fusible Link Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NO >> Replace fuse.

7.CHECK PTC RELAY-1

Check PTC relay-1. Refer to HAC-76, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace PTC relay-1.

8.CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC HEATER

Check continuity between PTC relay-1 harness connector E53 terminal 5 and PTC heater harness connector E117 terminal 3.

PTC relay-1		PTC heater		Continuity
Connector	Terminal	Connector	Terminal	
E53	5	E117	3	Continuity should exist

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair harness or connector.

9.CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch ON.
2. Check voltage between PTC relay-1 harness connector E53 terminal 1 and ground.

(+)		(–)	Voltage
PTC relay-1		—	
Connector	Terminal		
E53	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10.CHECK FUSE

Check 10A fuse [Nos 17, located in the fuse block (J/B)]. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NO >> Replace fuse.

11.CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-1 AND IPDM E/R

Check continuity between PTC relay-1 harness connector E53 terminal 2 and IPDM E/R harness connector E11 terminal 11.

PTC relay-1		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E53	2	E11	11	Continuity should exist

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair harness or connector.

12.CHECK VOLTAGE FOR PTC RELAY-2

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect PTC relay-2.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-2 harness connector E54 terminal 3 and ground.

(+)		(–)	Voltage
PTC relay-2		—	
Connector	Terminal		
E54	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 14.
NO >> GO TO 13.

13. CHECK FUSE

Check 30A fuse (Nos 35, located in the fuse, fusible link and relay box). Refer to PG-111, "Fuse and Fusible Link Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NO >> Replace fuse.

14. CHECK PTC RELAY-2

Check PTC relay-2. Refer to HAC-76, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Replace PTC relay-2.

15. CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-2 AND PTC HEATER

Check continuity between PTC relay-2 harness connector E54 terminal 5 and PTC heater harness connector E117 terminal 4.

PTC relay-2		PTC heater		Continuity
Connector	Terminal	Connector	Terminal	
E54	5	E117	4	Continuity should exist.

Is the inspection result normal?

YES >> GO TO 16.
NO >> Repair harness or connector.

16. CHECK POWER SUPPLY FOR PTC RELAY-2

1. Turn ignition switch ON.
2. Check voltage between PTC relay-2 harness connector E54 terminal 1 and ground.

(+)		(–)	Voltage
PTC relay-2		—	
Connector	Terminal		
E54	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 17.
NO >> GO TO 10.

17. CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-2 AND IPDM E/R

Check continuity between PTC relay-2 harness connector E54 terminal 2 and IPDM E/R harness connector E11 terminal 12.

PTC relay-1		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E54	2	E11	12	Continuity should exist.

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair harness or connector.

18. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal in “DATA MONITOR”. Refer to HAC-140, "AIR CONDITIONER : CONSULT-III Function (BCM - MANUAL AIR CONDITIONER)".

FAN SW ON : FAN ON SIG ON
FAN SW OFF : FAN ON SIG OFF

Is the inspection result normal?

YES >> GO TO 21.
NO >> GO TO 19.

19. CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND BCM

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector and BCM harness connector.
3. Check continuity between heater control panel harness connector M54 terminal 8 and BCM harness connector M65 terminal 15.

Heater control panel		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M54	8	M65	15	Continuity should exist

Is the inspection result normal?

YES >> GO TO 20.
NO >> Repair harness or connector.

20. CHECK FAN ON SIGNAL

1. Reconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between heater control panel harness connector M54 terminal 8 and ground.

(+)		(–)	Voltage
Heater control panel		—	
Connector	Terminal		
M54	8	Ground	Battery voltage

4. Turn fan control dial clockwise
5. Check voltage between heater control panel harness connector M54 terminal 8 and ground.

(+)		(–)	Condition	Voltage
Heater control panel		—		
Connector	Terminal			
M54	8	Ground	Fan control dial: except OFF	Approx. 0

Is the inspection result normal?

YES >> GO TO 21.
NO >> Replace heater control panel.

cardiagn.com

21. CHECK CIRCUIT CONTINUITY BETWEEN FAN SWITCH

1. Turn ignition switch OFF.
2. Disconnect fan switch connector.
3. Check continuity between fan switch harness connector M88 terminal 6 and 5.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	6	M88	5	Fan control dial: OFF	Continuity should not exist

4. Turn fan control dial clockwise.
5. Check continuity between fan switch harness connector M88 terminal 6 and 5.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	6	M88	5	Fan control dial: except OFF	Continuity should exist

Is the inspection result normal?

YES >> GO TO 22.
NO >> Replace heater control panel.

22. CHECK GROUND CIRCUIT FOR FAN SWITCH

Check continuity between fan switch harness connector M88 terminal 5 and ground.

FAN SW		—	Continuity
Connector	Terminal		
M88	5	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 23.
NO >> Repair harness or connector.

23. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-59, "CAN Communication Signal Chart".
- BCM – IPDM E/R
- BCM – ECM

Is the inspection result normal?

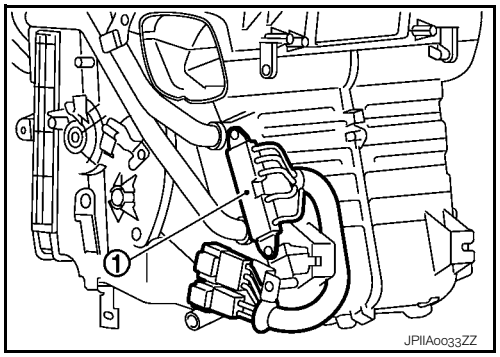
YES >> Replace IPDM E/R.
NO >> Repair or replace malfunctioning part(s).

Component Inspection

INFOID:0000000001096710

PTC HEATER

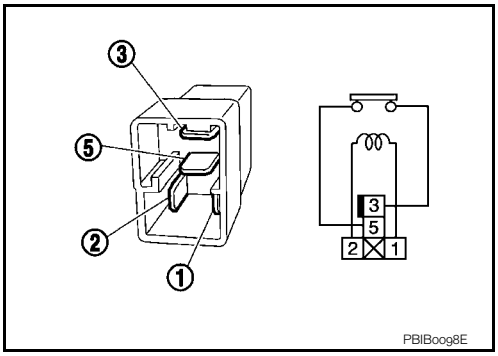
The PTC heater (1) is attached to the A/C unit assembly.
It generates heat electrically.



PTC RELAY

Check continuity between terminal 3 and 5.

Terminal	Condition	Continuity
3 and 5	12V direct current supply between terminal 1 and 2	Exist
	No current supply	Not exist



cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT FOR HEATER CONTROL PANEL

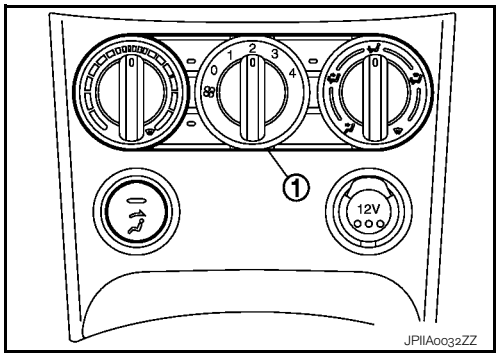
Description

INFOID:0000000001115374

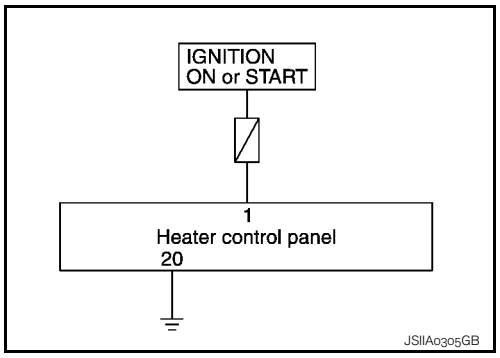
COMPONENT DESCRIPTION

Heater Control Panel

1. Heater control panel



Power Supply and Ground Circuit for Heater Control Panel



Component Function Check

INFOID:0000000001115375

1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Press A/C switch.
3. A/C switch indicator will turn ON. Confirm that the magnet clutch engages (sound or visual inspection).

Does magnet clutch engaged?

YES >> END.
NO >> Go to Diagnosis Procedure. Refer to HAC-169, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001115376

1.CHECK POWER SUPPLY CIRCUIT FOR HEATER CONTROL PANEL

1. Disconnect heater control panel connector.
2. Check voltage between heater control panel harness connector M54 terminals 1 and ground.

(+)		(-)	Ignition switch position		
Heater control panel		—	OFF	ACC	ON
Connector	Terminal				
M54	1	Ground	Approx. 0 V	Approx. 0 V	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FUSE

Check 10A fuses [Nos. 4, located in the fuse block (J/B)]. Refer to PG-110, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> Check harness for open circuit. Repair or replace if necessary.
NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

3.CHECK GROUND CIRCUIT FOR HEATER CONTROL PANEL

1. Turn ignition switch OFF.
2. Check continuity between heater control panel harness connector M54 terminal 20 and ground.

Heater control panel		—	Continuity
Connector	Terminal		
M54	20	Ground	Continuity should exist

Is the inspection result normal?

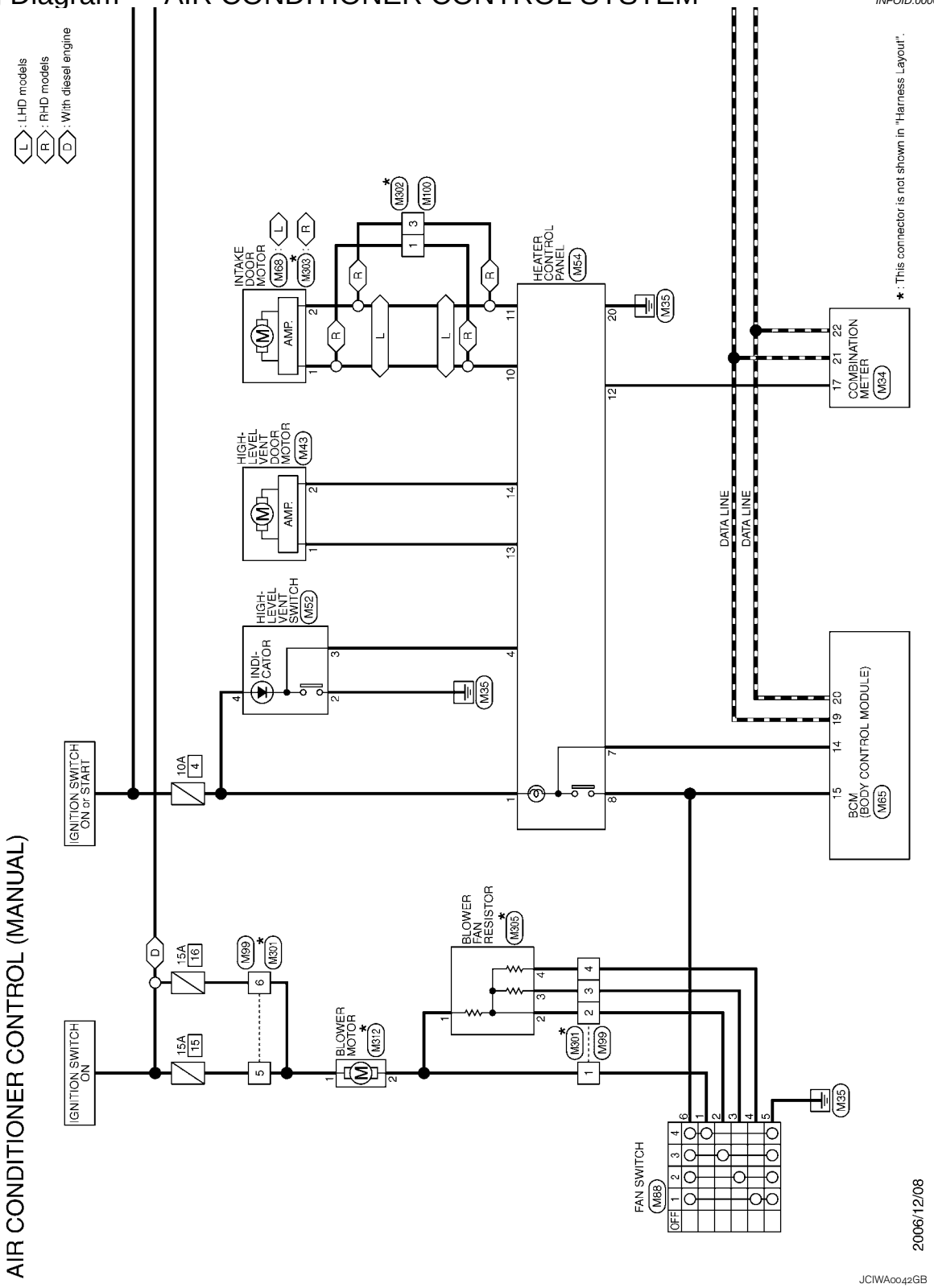
YES >> Replace heater control panel.
NO >> Repair harness or connector.

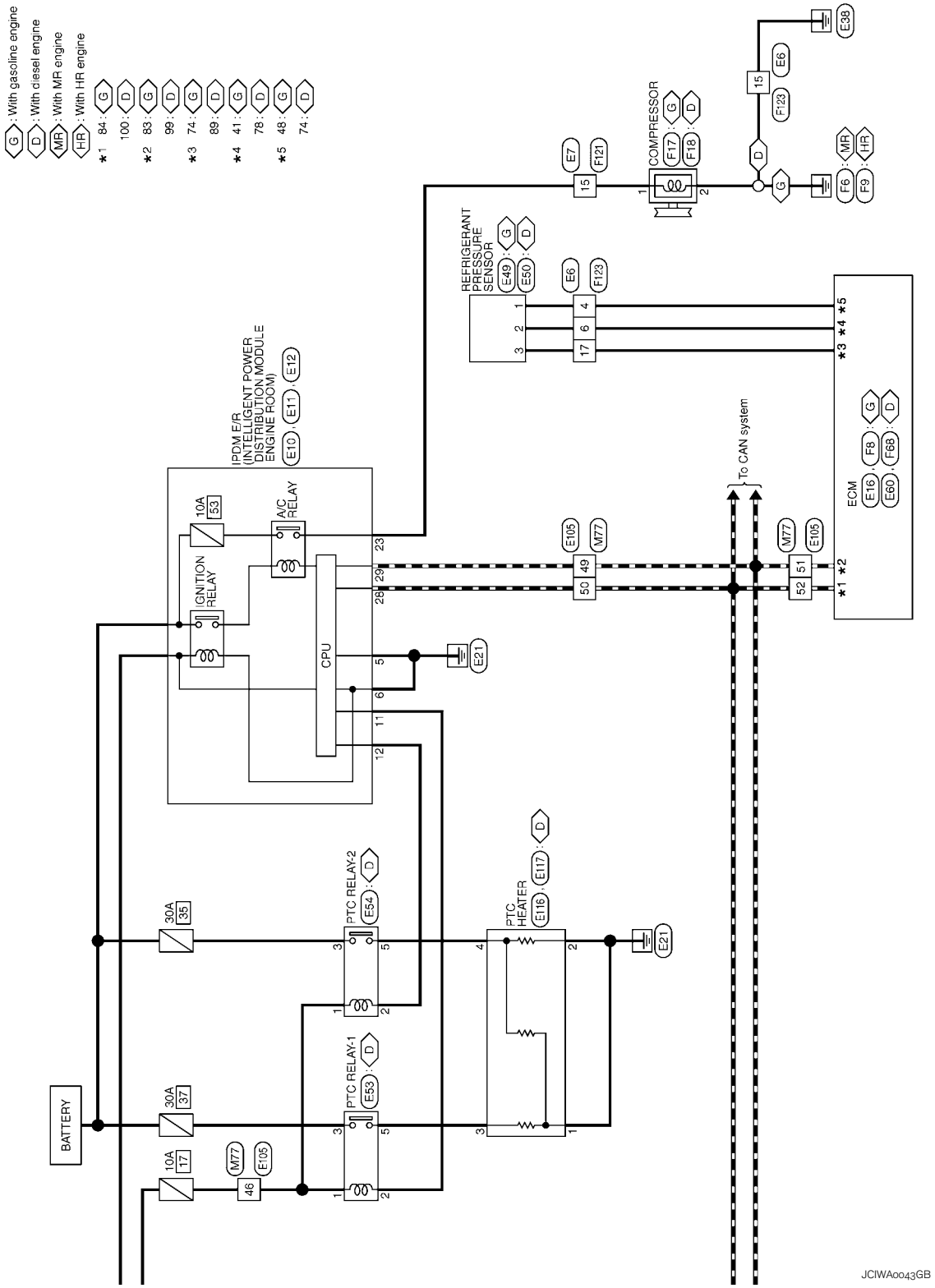
cardiagn.com

MANUAL AIR CONDITIONER SYSTEM

Wiring Diagram — AIR CONDITIONER CONTROL SYSTEM —

INFOID:0000000001109245





cardiagn.com

AIR CONDITIONER CONTROL (MANUAL)

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1Y

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-
6	G/P	-
15	B	-
17	Y/W	-

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
15	Y/B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
11	O	-
12	G/Y	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
23	Y/B	-
28	L	-
29	P	-

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	G/P	-
3	Y/W	-

Connector No.	E50
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	D4000997F

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	G/P	-
3	Y/W	-

JCIWA0044GB

AIR CONDITIONER CONTROL (MANUAL)

Connector No.	E53
Connector Name	PTC RELAY-1
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	O	–
3	G	–
5	Y	–

Connector No.	E54
Connector Name	PTC RELAY-2
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	G/Y	–
3	R	–
5	L	–

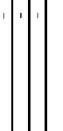
Connector No.	E116
Connector Name	PTC HEATER
Connector Type	YAZ-7282-3020

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	B	–

Connector No.	E117
Connector Name	PTC HEATER
Connector Type	YAZ-7282-3030

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	Y	–
4	L	–

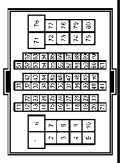
Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

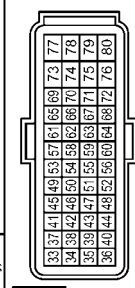
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
46	Y	–
49	P	–
50	L	–
51	P	–
52	L	–

Connector No.	F8
Connector Name	ECM
Connector Type	MAA40FBR-MEA8-LH

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
41	G/P	PDPRESS
48	R/L	GND-A(PDPRES)
74	Y/W	AVCC(PDPRES)

Connector No.	F17
Connector Name	COMPRESSOR
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	–
2	B	–

JCIWA0045GB

cardiagn.com

AIR CONDITIONER CONTROL (MANUAL)

Connector No.	F18
Connector Name	COMPRESSOR
Connector Type	DELPHI:12162017

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	–
2	B	–

Connector No.	F58
Connector Name	ECM
Connector Type	MAA40FBR-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
74	R/L	FREON PRESS GND
78	G/P	FREON PRESS SENS
89	Y/W	FREON PRESURE +V

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
15	Y/B	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1Y

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	–
6	G/P	–
15	B	–
17	Y/W	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAE40FW

Terminal No.	Color of Wire	Signal Name [Specification]
17	R/L	AC PD OUT
21	L	CAN-H
22	P	CAN-L

Connector No.	M43
Connector Name	HIGH-LEVEL VENT DOOR MOTOR
Connector Type	C06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–[With manual A/C]
2	V	–[With manual A/C]

Connector No.	M52
Connector Name	HIGH-LEVEL VENT SWITCH
Connector Type	CINCH 49305EV4M5

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	–
3	O	–
4	GR	–

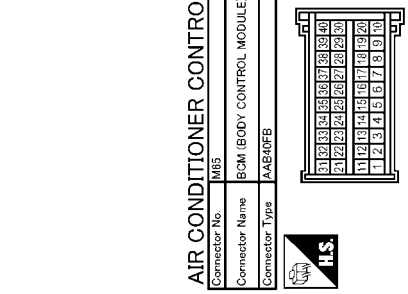
Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
4	O	SW OUTPUT
7	L	–
8	LG	–
10	W	INTAKE ACTR
11	V	INTAKE ACTR
12	R	ACPDOUT
13	W	COOL HEAD ACTR
14	V	COOL HEAD ACTR
20	B	GND

JCIWA0046GB

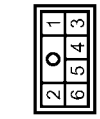
AIR CONDITIONER CONTROL (MANUAL)

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
14	L/R	A/C SW
15	LG/B	BLOWER FAN SW
19	L	CAN-H
20	P	CAN-L

Connector No.	M88
Connector Name	INTAKE DOOR MOTOR
Connector Type	C06FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-[With manual A/C]
2	V	-[With manual A/C]

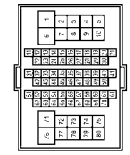
Connector No.	M99
Connector Name	WIRE TO WIRE
Connector Type	M06FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-[Without auto A/C]
2	L	-[Without auto A/C]
3	Y	-[Without auto A/C]
4	W	-
5	Y	-
6	Y	-

Connector No.	M100
Connector Name	WIRE TO WIRE
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
3	V	-

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
46	Y	-
49	P	-
50	L	-
51	P	-
52	L	-

Connector No.	M301
Connector Name	WIRE TO WIRE
Connector Type	M06MW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-[Without auto A/C]
2	L	-[Without auto A/C]
3	Y	-[Without auto A/C]
4	W	-
5	Y	-
6	Y	-

Connector No.	M88
Connector Name	FAN SWITCH
Connector Type	SUMITOMO 6098-0214

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	Y	-
4	W	-
5	B	-
6	LG	-

Connector No.	M302
Connector Name	WIRE TO WIRE
Connector Type	A03MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
3	V	-

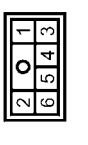
JCIWA0047GB

cardiagn.com

AIR CONDITIONER CONTROL (MANUAL)

Connector No.	M303
Connector Name	INTAKE DOOR MOTOR
Connector Type	C06FB

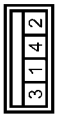
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-[With manual A/C]
2	V	-[With manual A/C]

Connector No.	M305
Connector Name	BLOWER FAN RESISTOR
Connector Type	M04FBR-LC

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	Y	-
4	W	-

Connector No.	M312
Connector Name	BLOWER MOTOR
Connector Type	M02FW-LC

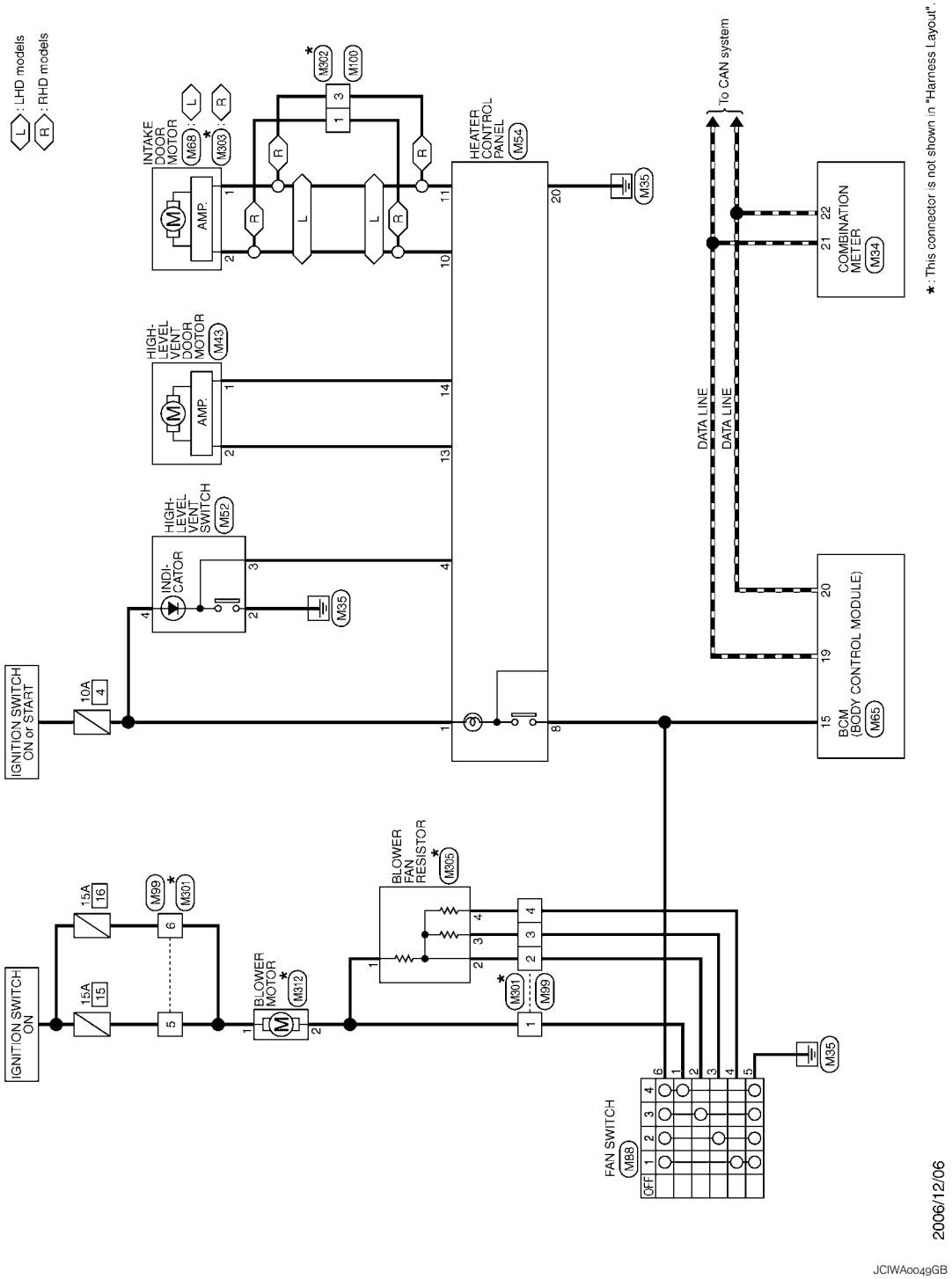
H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	R	-

JCIWA0048GB

cardiagn.com

HEATER CONTROL



★: This connector is not shown in "Harness Layout".

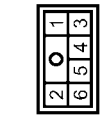
cardiagn.com

HEATER CONTROL

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

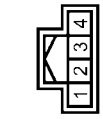
Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M43
Connector Name	HIGH-LEVEL VENT DOOR MOTOR
Connector Type	C06FB



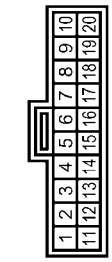
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	– [With manual A/C]
2	V	– [With manual A/C]

Connector No.	M52
Connector Name	HIGH-LEVEL VENT SWITCH
Connector Type	CINCH 49305EV4M5



Terminal No.	Color of Wire	Signal Name [Specification]
2	B	–
3	O	–
4	GR	–

Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
4	O	SW OUTPUT
8	LG	–
10	W	INTAKE ACTR
11	V	INTAKE ACTR
13	W	COOL HEAD ACTR
14	V	COOL HEAD ACTR
20	B	GND

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
15	LG/B	BLOWER FAN SW
19	L	CAN-H
20	P	CAN-L

Connector No.	M68
Connector Name	INTAKE DOOR MOTOR
Connector Type	C06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	– [With manual A/C]
2	V	– [With manual A/C]

Connector No.	M88
Connector Name	FAN SWITCH
Connector Type	SUMITOMO 6098-0214

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	L	–
3	Y	–
4	W	–
5	B	–
6	LG	–

Connector No.	M89
Connector Name	WIRE TO WIRE
Connector Type	M06FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	– [Without auto A/C]
2	L	– [Without auto A/C]
3	Y	– [Without auto A/C]
4	W	–
5	Y	–
6	V	–

JCIWA0050GB

HEATER CONTROL

Connector No.	M100
Connector Name	WIRE TO WIRE
Connector Type	A03FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
3	V	-

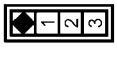
Connector No.	M301
Connector Name	WIRE TO WIRE
Connector Type	M06MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-[Without auto A/C]
2	L	-[Without auto A/C]
3	Y	-[Without auto A/C]
4	W	-
5	Y	-
6	Y	-

Connector No.	M302
Connector Name	WIRE TO WIRE
Connector Type	A03MW

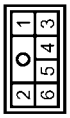
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
3	V	-

Connector No.	M303
Connector Name	INTAKE DOOR MOTOR
Connector Type	C06FB

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-[With manual A/C]
2	V	-[With manual A/C]

Connector No.	M305
Connector Name	BLOWER FAN RESISTOR
Connector Type	M04FBR-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	Y	-
4	W	-

Connector No.	M312
Connector Name	BLOWER MOTOR
Connector Type	M02FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	R	-

JCIWA0051GB

cardiagn.com

ECU DIAGNOSIS

ECM

HR16DE

HR16DE : Reference Value

INFOID:0000000001117186

VALUES ON THE DIAGNOSIS TOOL

Remarks:

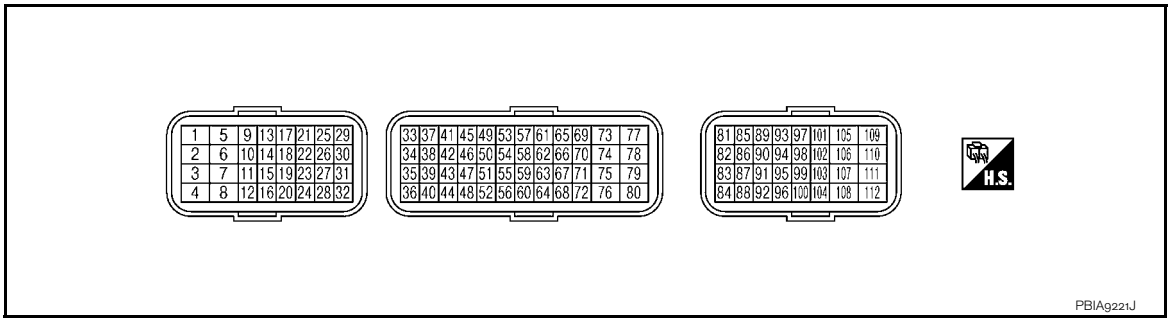
- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

*Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Values/Status
AC PRESS SEN	• Engine: Idle • Both A/C switch and blower fan switch: ON (Compressor operates)	1.0 - 4.0 V

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- ECM is located in the engine room left side near battery.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	−		Signal name	Input/ Output		
41	Ground	G/P	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0 V
48	Ground	R/L	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0 V
74	Ground	Y/W	Sensor power supply (Refrigerant pressure sensor)	—	[Ignition switch: ON]	5 V

MR20DE

cardiagn.com

MR20DE : Reference Value

INFOID:0000000001117187

VALUES ON THE DIAGNOSIS TOOL

Remarks:

l Specification data are reference values.

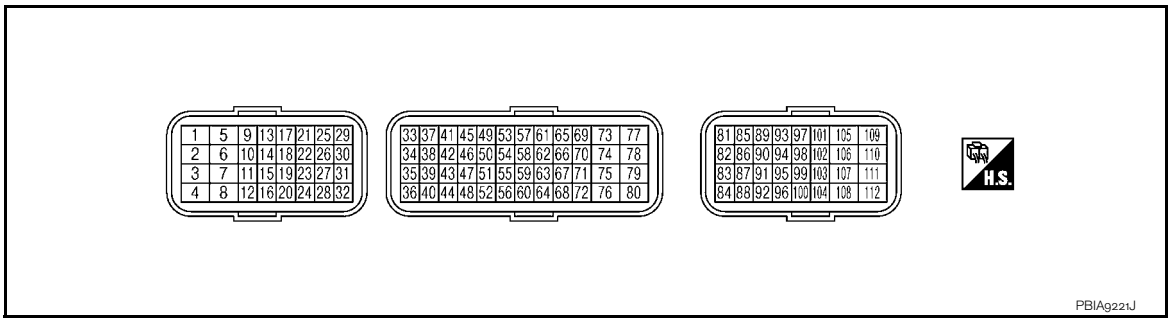
l Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Values/Status
AC PRESS SEN	• Engine: Idle • Both A/C switch and blower fan switch: ON (Compressor operates)	1.0 - 4.0 V

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	-—		Signal name	Input/ Output		
41	Ground	G	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0 V
48	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0 V
74	Ground	L	Sensor power supply (Refrigerant pressure sensor)	Input	[Ignition switch: ON]	5 V

K9K

K9K : Reference Value

INFOID:0000000001117188

VALUE ON THE DIAGNOSIS TOOL

Remarks:

l Specification data are reference values.

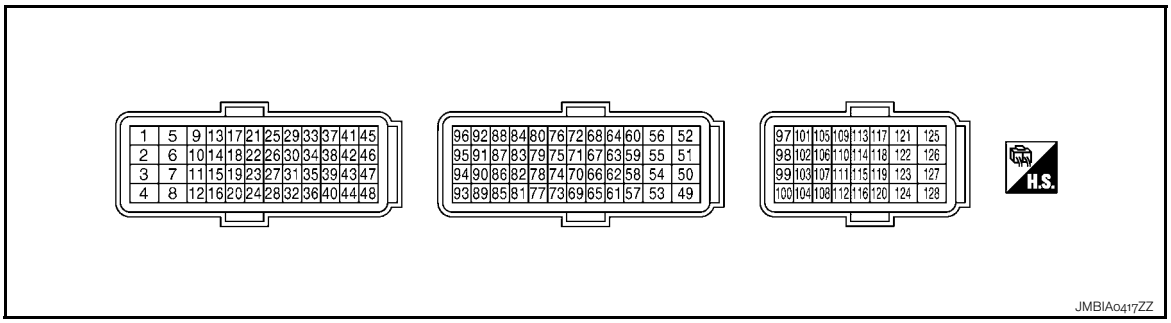
l Specification data are output/input values which are detected or supplied by the ECM at the connector.

cardiagn.com

* Specification data may not be directly related to their components signals/values/operations.

MONITOR ITEM	CONDITION		SPECIFICATION
RFRGERNT PRSS	• Engine: After warming up • Air conditioner switch: OFF • Shift lever: Neutral position • No load	Idle	Approximately 5.7 bar

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:
- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	–		Signal name	Input/ Output		
74	Ground	R/L	Sensor power supply (Refrigerant pressure sensor)	—	**[Ignition switch: ON]**	Approximately 5.0 V
78	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	G/P	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0.3 V
89	Ground	Y/W	Refrigerant pressure sensor	Input	**[Engine is running]** • **Warm-up condition** • Both A/C switch and blower fan switch: ON (Compressor operates)	Approximately2.3 V

BCM (BODY CONTROL MODULE)

Reference Value

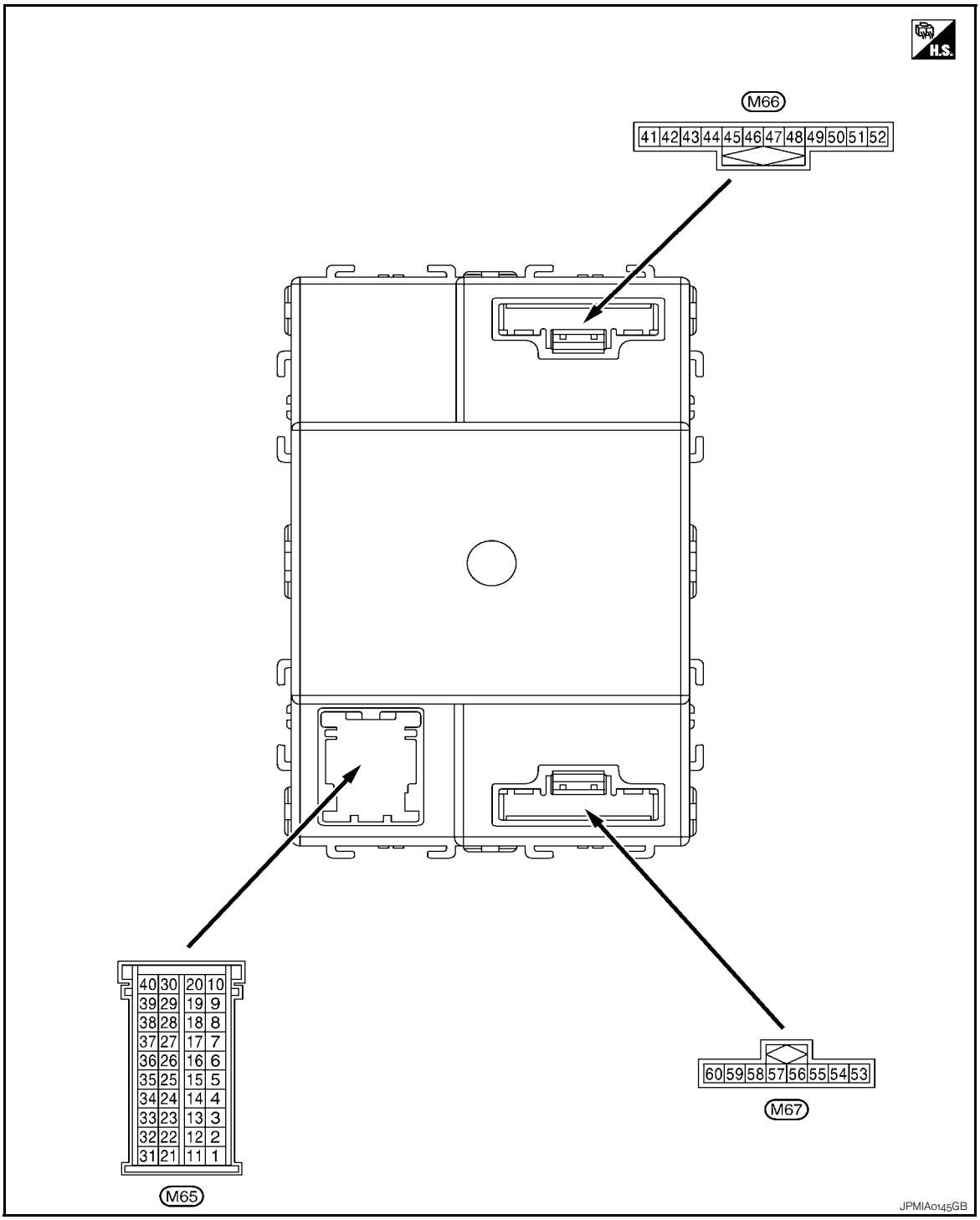
INFOID:0000000001117189

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition	Value/Status
AIR COND SW	A/C switch OFF	Off
	A/C switch ON	On
FAN ON SIG	Fan switch OFF	Off
	Fan switch ON	On
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

cardiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10ms internal normally. Refer to BCS-7, "System Description".**

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	OFF	Battery voltage
					EXCEPT OFF	0 V

cardiagn.com

SYMPTOM DIAGNOSIS

AIR CONDITIONER CONTROL

Diagnosis Chart By Symptom

INFOID:0000000001070002

Symptom	Reference	
Air outlet does not change.	Go to Adjustment for Mode Door.	VTL-65, "Exploded View"
Discharge air temperature does not change.	Go to Adjustment for Air Mix Door.	VTL-67, "Exploded View"
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	HAC-150, "Diagnosis Procedure"
Intake door motor does not operate normally.		
High-level ventilator door does not change.	Go to Trouble Diagnosis Procedure for High-level Ventilator Door Motor.	HAC-147, "Diagnosis Procedure"
High-level ventilator door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	HAC-153, "Diagnosis Procedure"
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-157, "Diagnosis Procedure"
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-188, "Inspection procedure"
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-189, "Inspection procedure"
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-191, "Inspection procedure"

cardiag.com

INSUFFICIENT COOLING

Description

INFOID:0000000001070003

Symptom
- Insufficient cooling
- No cold air comes out. (Air flow volume is normal.)

Inspection procedure

INFOID:0000000001070004

1.CHECK WITH A GAUGE OF ACR4

Connect ACR4 to the vehicle and perform the pressure inspection with the gauge.

Is there refrigerant?

YES >> GO TO 2.
NO-1 >> Check for refrigerant leakages with the refrigerant leakage detecting fluorescent leak detector. Refer to HA-134, "Inspection" (HR16DE/MR20DE) or HA-185, "Inspection" (K9K).
NO-2 >> GO TO 2 after repairing or replacing the parts according to the inspection results.

2.CHECK CHARGED REFRIGERANT AMOUNT

1. Connect ACR4 to the vehicle and discharge the refrigerant.
2. Recharge with the proper amount of refrigerant and perform the inspection with the refrigerant leakage detecting fluorescent leak detector. Refer to HA-134, "Inspection" (HR16DE/MR20DE) or HA-185, "Inspection" (K9K).

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refill the refrigerant and repair or replace the parts according to the inspection results.

3.CHECK REFRIGERANT CYCLE PRESSURE

Connect ACR4 to the vehicle and perform the performance test. Refer to HA-114, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (HR16DE/MR18DE) or HA-165, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (K9K).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Perform the diagnosis with the gauge pressure. Refer to HA-114, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (HR16DE/MR20DE) or HA-165, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (K9K).

4.CHECK A/C COMPRESSOR BELT

Check the A/C compressor belt. Refer to EM-15, "Checking" (HR16DE), EM-134, "Checking" (MR20DE) or EM-259, "Inspection and Adjustment" (K9K).

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust or replace the A/C compressor belt.

5.CHECK AIR MIX DOOR CABLE

Check the air mix door cable. Refer to HAC-126, "Description & Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Adjust or replace the air mix door cable.

6.CHECK AIR LEAKAGE FROM DUCT

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

YES >> END.
NO >> Repair or replace parts according to the inspection results.

cardiagn.com

INSUFFICIENT HEATING

Description

INFOID:0000000001070005

Symptom
- Insufficient heating
- No warm air comes out. (Air flow volume is normal.)

Inspection procedure

INFOID:0000000001070006

1.CHECK COOLING SYSTEM

1. Check engine coolant level and check for leakage. Refer to CO-9, "Inspection" (HR16DE), CO-30, "Inspection" (MR20DE) or CO-52, "Inspection" (K9K).
2. Check radiator cap. Refer to CO-12, "RESERVOIR TANK CAP : Inspection" (HR16DE), CO-33, "RESERVOIR TANK CAP : Inspection" (MR20DE) or CO-55, "RADIATOR CAP : Inspection" (K9K).
3. Check water flow sounds of engine coolant. Refer to CO-9, "Refilling" (HR16DE), CO-30, "Refilling" (MR20DE) or CO-52, "Refilling" (K9K).

Is the inspection result normal?

YES >> • WITH DIESEL ENGINE: GO TO 2.
• WITH GASOLINE ENGINE: GO TO 3.
NO >> Refill the engine coolant and repair or replace the parts according to the inspection results.

2.CHECK PTC HEATER OPERATION

Check PTC heater. Refer to HAC-162, "Component Function Check".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning part(s).

3.CHECK OPERATION

1. Turn temperature control dial to full hot after warming up the engine.
2. Check that warm air blows from outlets.

Is the inspection result normal?

YES >> END.
NO >> GO TO 4.

4.CHECK AIR MIX DOOR CABLE

Check the air mix door cable. Refer to HAC-126, "Description & Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust or replace the air mix door cable.

5.CHECK AIR LEAKAGE FROM DUCT

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace parts according to the inspection results.

6.CHECK HEATER HOSE INSTALLATION CONDITION

Check the heater hose installation condition visually (for twist, crush, etc.).

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace parts according to the inspection results.

7.CHECK TEMPERATURE OF HEATER HOSE

1. Check the temperature of inlet hose and outlet hose of heater core.
2. Check that the inlet side of heater core is hot and the outlet side is slightly lower than/almost equal to the inlet side.

cardiagn.com

CAUTION:
The temperature inspection should be performed in a short time because the engine coolant temperature is too hot.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace the heater core after performing the procedures after the cooling system inspection again. GO TO 1.

8. REPLACE HEATER CORE

Replace the heater core. Refer to VTL-87, "Exploded View".

Are the symptoms solved?

YES >> END.
NO >> Perform the procedures after the cooling system inspection again. GO TO 1.

cardiagn.com

NOISE

Description

INFOID:0000000001070007

Symptom
- Noise
- Noise is heard when the A/C system operates.

Inspection procedure

INFOID:0000000001070008

1.CHECK OPERATION

1. Operate the A/C system and check the operation. Refer to HAC-126, "Description & Inspection".
2. Check the parts where noise is occurring.

Can the parts where noise is occurring be checked?

YES-1 >> Noise from blower fan motor: GO TO 2.
YES-2 >> Noise from compressor: GO TO 3.
YES-3 >> Noise from expansion valve: GO TO 4.
YES-4 >> Noise from A/C piping (pipe, flexible hose): GO TO 6.
YES-5 >> Noise from A/C compressor belt: GO TO 7.
NO >> END

2.CHECK BLOWER FAN MOTOR

1. Remove blower fan motor.
2. Remove air conditioner filter.
3. Remove foreign materials that are in the blower unit.
4. Check the noise from blower fan motor again.

Is the inspection result normal?

YES >> END.
NO >> Replace blower fan motor.

3.REPLACE COMPRESSOR

1. Correct the refrigerant with ACR4.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from compressor again.

Is the inspection result normal?

YES >> END.
NO >> Replace compressor.

4.CHECK WITH GAUGE PRESSURE

Perform the diagnosis with the gauge pressure. Refer to HA-114, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (HR16DE/MR20DE) or HA-165, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure" (K9K).

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace malfunctioning part(s).

5.REPLACE EXPANSION VALVE

1. Correct the refrigerant with ACR4.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from expansion valve again.

Are the symptoms solved?

YES >> END.
NO >> Replace expansion valve.

6.CHECK A/C PIPING (PIPE, FLEXIBLE HOSE)

1. Check A/C piping [pipe, flexible hose (for deformation and damage, etc.)].
2. Check the installation condition of clips and brackets, etc. of A/C piping (pipe, flexible hose).

Is the inspection result normal?

YES >> Fix the line with rubber or come vibration absorbing material.
NO >> Repair or replace parts according to the inspection results.

7. CHECK A/C COMPRESSOR BELT

Check tension of the A/C compressor belt. Refer to EM-15, "Checking" (HR16DE), EM-134, "Checking" (MR20DE) or EM-259, "Inspection and Adjustment" (K9K).

Is the inspection result normal?

YES >> Check the noise from compressor: GO TO 3.
NO >> Adjust or replace the A/C compressor belt according to the inspection results.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001109270

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001109269

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

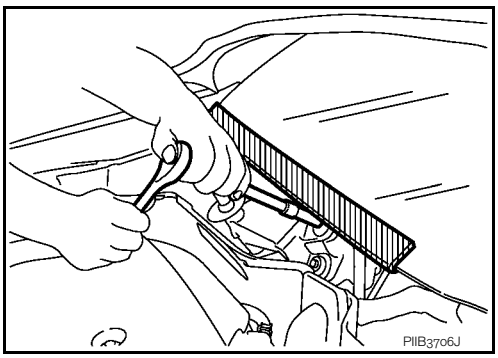
OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001109275

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Working with HFC-134a (R-134a)

INFOID:0000000001117172

CAUTION:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed and compressor malfunction is likely occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.**

General Refrigerant Precaution

INFOID:0000000001117174

WARNING:

- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
- **Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Never store or heat refrigerant containers above 52°C (126°F).**
- **Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Never intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Refrigerant Connection

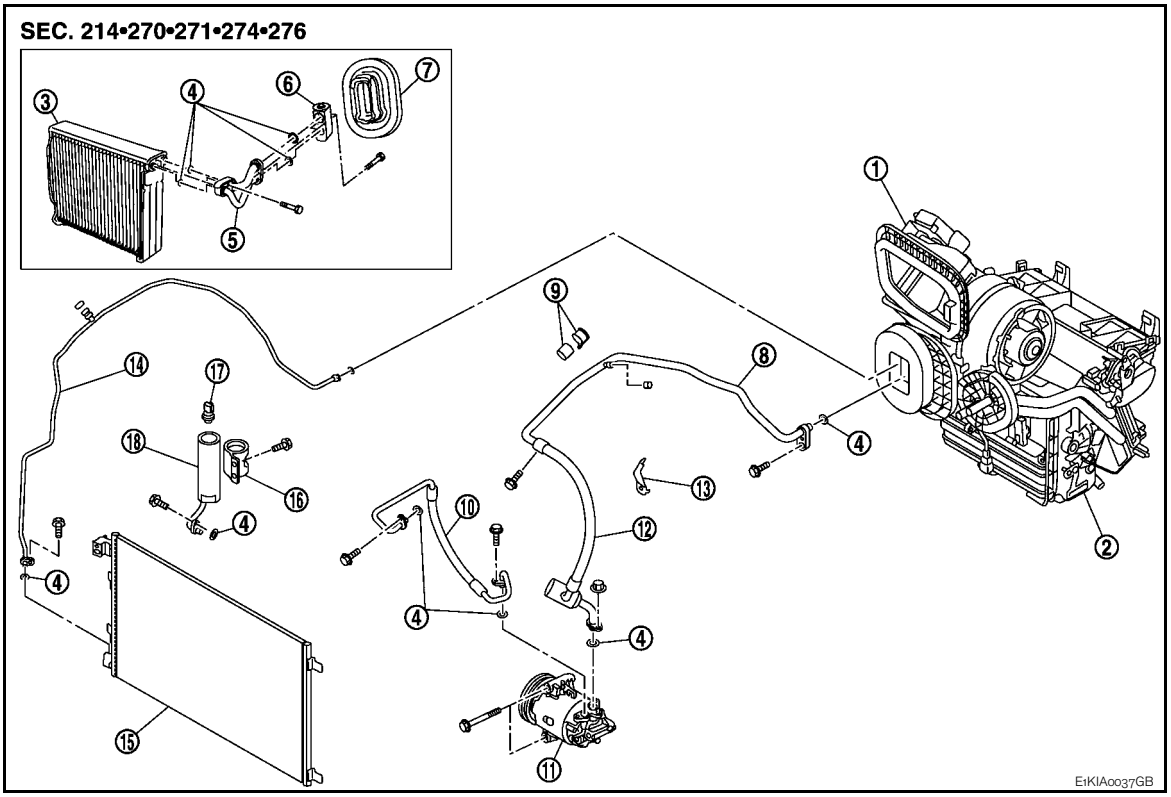
INFOID:0000000001117175

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

cardiagn.com

O-RING AND REFRIGERANT CONNECTION



1. Heater sealing	2. Expansion valve	3. O-ring
4. Evaporator	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Connector pipe fixing bolt
7. High pressure pipe 1	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Pipe fixing bolt
16. Low pressure flexible hose	17. Low & high pipe bracket support	18. Low pressure flexible hose and pipe 2
19. Pipes fixing clip	20. Low pressure pipe 2 fixing clamp assembly	21. Liquid tank fixing screw
22. Liquid tank fixing bracket	23. High pressure flexible hose	

CAUTION:

The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure pipe 2 assembly to expansion valve	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure pipe 2 assembly to evaporator	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		92474 N8210	2	19
	Compressor to high pressure flexible hose		92474 N8210	2	12
	Liquid tank to condenser		92473 N8210	1	16

WARNING:

Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

When replacing or cleaning refrigerant cycle components, observe the following.

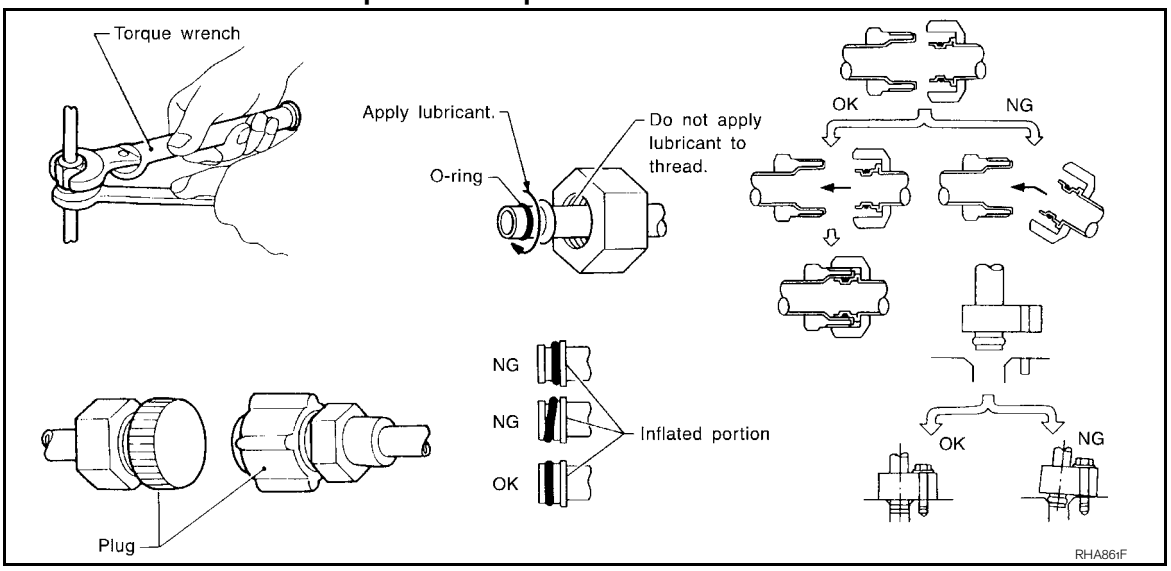
- **When the compressor is removed, store it in the same way at it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Name : Nissan A/C System Oil Type S

- **O-ring must be closely attached to the groove portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.**

cardiagn.com

- **After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Service Equipment

INFOID:0000000001117176

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRICAL LEAK DETECTOR

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

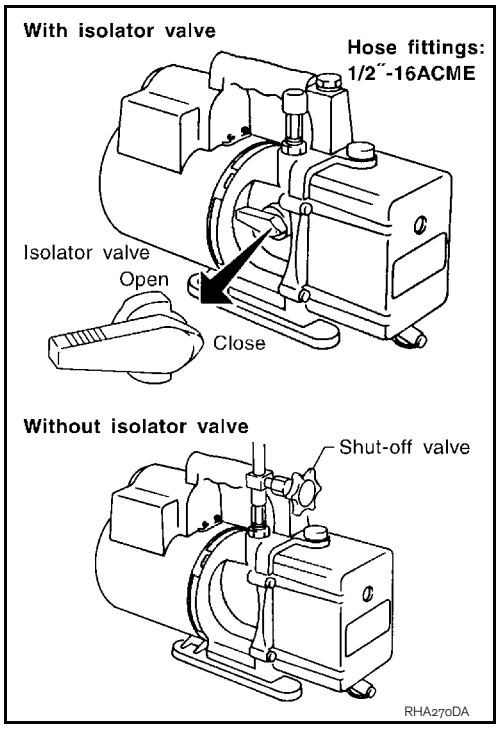
VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

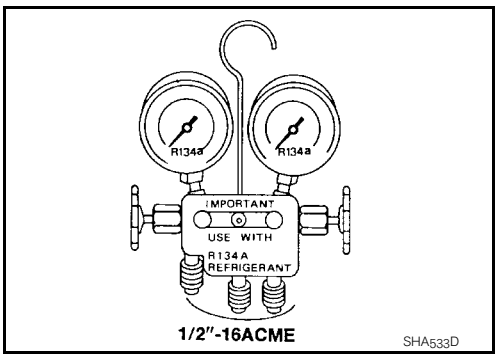
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



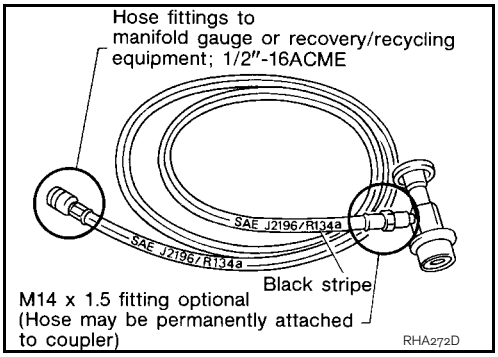
MANIFOLD GAUGE SET

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

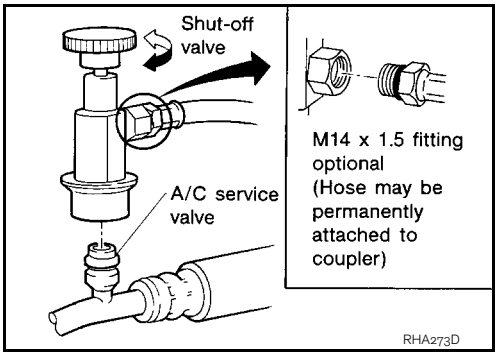
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

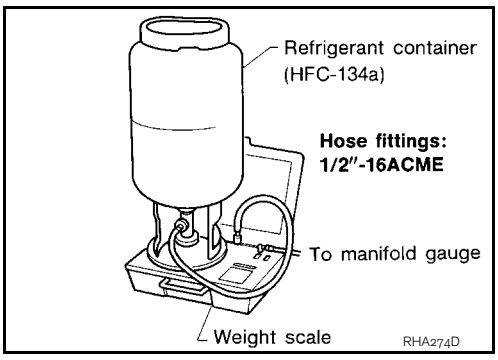
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

cardiagn.com

COMPRESSOR

General Precautions

INFOID:0000000001070021

CAUTION:

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same way at it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to HA-129, "Adjustment" (HR16DE/MR20DE) or HA-180, "Adjustment" (K9K).**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

cardiagn.com

FLUORESCENT LEAK DETECTOR

General Precautions

INFOID:0000000001070022

CAUTION:

- **The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.**
- **Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.**
- **The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST) to pinpoint refrigerant leaks.**
- **For the purpose of safety and customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.**
- **A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electrical leak detector (SST).**
- **Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.**
- **Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.**
- **Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).**
- **Never use more than one refrigerant dye bottle (1/4 ounce /7.4 cc) per A/C system.**
- **Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Never use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.**
- **The fluorescent properties of the dye will remain for three years or a little over unless a compressor malfunction occurs.**

IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have the identification label on the front side of hood.

cardiagn.com

SECTION HA

HEATER & AIR CONDITIONING SYSTEM

CONTENTS

AUTOMATIC AIR CONDITIONER (HR/MR)

BASIC INSPECTION 7

DIAGNOSIS AND REPAIR WORKFLOW 7
Work Flow 7

FUNCTION DIAGNOSIS 8

REFRIGERATION SYSTEM 8
System Diagram 8
System Description 8
Component Parts Location 9
Component Description 11

SYMPTOM DIAGNOSIS 12

REFRIGERATION SYSTEM SYMPTOMS 12

SYMPTOM DIAGNOSIS PROCEDURE 12
SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure 12

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH 12
BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table 12

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW 12
HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table 12

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH 13
HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table 13

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW 13
BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table 13

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE 14
LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table 14

LOW-PRESSURE SIDE BECOMES NEGATIVE 14
LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table 15

PRECAUTION 16

PRECAUTIONS 16
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 16
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 16
Precaution for Procedure without Cowl Top Cover 16
Precautions For Xenon Headlamp Service 17
Working with HFC-134a (R-134a) 17
General Refrigerant Precaution 17
Refrigerant Connection 18
Service Equipment 20

COMPRESSOR 22
General Precautions 22

LEAK DETECTION DYE 23
General Precautions 23

PREPARATION 24

PREPARATION 24
HFC-134a (R-134a) Service Tools and Equipment 24
Sealant or/and Lubricant 26

ON-VEHICLE MAINTENANCE 27

LUBRICANT 27

cardiagn.com

Adjustment 27

REFRIGERATION SYSTEM 29
Inspection 29
Refrigerant Leaks 30

FLUORESCENT LEAK DETECTOR 32
Inspection 32

ELECTRICAL LEAK DETECTOR 33
Inspection 33

ON-VEHICLE REPAIR 36

REFRIGERATION SYSTEM 36
Exploded View 36
Inspection After Installation 36

COMPRESSOR 39
Exploded View 39
Removal and Installation 39

LOW-PRESSURE FLEXIBLE HOSE AND PIPE 2 41
Exploded View 41
Removal and Installation 41

HIGH-PRESSURE FLEXIBLE HOSE 43
Exploded View 43
Removal and Installation 43

HIGH-PRESSURE PIPE 1 (ENGINE COMPARTMENT) 45
Exploded View 45
Removal and Installation 45

LOW-PRESSURE PIPE 1 AND HIGH-PRESSURE PIPE 2 47
Exploded View 47
Removal and Installation 47

CONDENSER 49
Exploded View 49
Removal and Installation 49

LIQUID TANK 51
Exploded View 51
Removal and Installation 51

REFRIGERANT PRESSURE SENSOR 52
Exploded View 52
Removal and Installation 52

EVAPORATOR 53
Exploded View 53
Removal and Installation 53

EXPANSION VALVE 55
Exploded View 55
Removal and Installation 55

SERVICE DATA AND SPECIFICATIONS (SDS) 57

SERVICE DATA AND SPECIFICATIONS (SDS) 57
Compressor 57
Lubricant 57
Refrigerant 57
Engine Idling Speed 57
Belt Tension 57

AUTOMATIC AIR CONDITIONER (K9K)

BASIC INSPECTION 58

DIAGNOSIS AND REPAIR WORKFLOW 58
Work Flow 58

FUNCTION DIAGNOSIS 59

REFRIGERATION SYSTEM 59
System Diagram 59
System Description 59
Component Parts Location 60
Component Description 62

SYMPTOM DIAGNOSIS 63

REFRIGERATION SYSTEM SYMPTOMS 63

SYMPTOM DIAGNOSIS PROCEDURE 63
SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure 63

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH 63
BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table 63

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW 63
HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table 63

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH 64
HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table 64

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW 64
BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table 64

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE 65
LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table 65

LOW-PRESSURE SIDE BECOMES NEGATIVE 65

cardiagn.com

LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table 66

PRECAUTION 67

PRECAUTIONS 67
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 67
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 67
Precaution for Procedure without Cowl Top Cover...67
Precautions For Xenon Headlamp Service 68
Working with HFC-134a (R-134a) 68
General Refrigerant Precaution 68
Refrigerant Connection 69
Service Equipment 71

COMPRESSOR 73
General Precautions 73

LEAK DETECTION DYE 74
General Precautions 74

PREPARATION 75

PREPARATION 75
HFC-134a (R-134a) Service Tools and Equipment 75
Sealant or/and Lubricant 76

ON-VEHICLE MAINTENANCE 78

LUBRICANT 78
Adjustment 78

REFRIGERATION SYSTEM 80
Inspection 80
Refrigerant Leaks 81

FLUORESCENT LEAK DETECTOR 83
Inspection 83

ELECTRICAL LEAK DETECTOR 84
Inspection 84

ON-VEHICLE REPAIR 87

REFRIGERATION SYSTEM 87
Exploded View 87
Inspection After Installation 87

COMPRESSOR 90
Exploded View 90
Removal and Installation 90

LOW-PRESSURE FLEXIBLE HOSE AND PIPE 2 92
Exploded View 92
Removal and Installation 92

HIGH-PRESSURE FLEXIBLE HOSE 94
Exploded View 94
Removal and Installation 94

HIGH-PRESSURE PIPE 1 (ENGINE COMPARTMENT) 96
Exploded View 96
Removal and Installation 96

LOW-PRESSURE PIPE 1 AND HIGH-PRESSURE PIPE 2 98
Exploded View 98
Removal and Installation 98

CONDENSER 100
Exploded View 100
Removal and Installation 100

LIQUID TANK 102
Exploded View 102
Removal and Installation 102

REFRIGERANT PRESSURE SENSOR 103
Exploded View 103
Removal and Installation 103

EVAPORATOR 104
Exploded View 104
Removal and Installation 104

EXPANSION VALVE 106
Exploded View 106
Removal and Installation 106

SERVICE DATA AND SPECIFICATIONS (SDS) 108

SERVICE DATA AND SPECIFICATIONS (SDS) 108
Compressor 108
Lubricant 108
Refrigerant 108
Engine Idling Speed 108
Belt Tension 108

MANUAL AIR CONDITIONER (HR/MR)

BASIC INSPECTION 109

DIAGNOSIS AND REPAIR WORKFLOW 109
Work Flow 109

FUNCTION DIAGNOSIS 110

REFRIGERATION SYSTEM 110
System Diagram 110
System Description 110
Component Parts Location 111
Component Description 113

SYMPTOM DIAGNOSIS 114

REFRIGERATION SYSTEM SYMPTOMS 114

cardiagn.com

SYMPTOM DIAGNOSIS PROCEDURE 114
SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure 114

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH 114
BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table 114

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW 114
HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table 114

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH 115
HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table 115

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW 115
BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table 115

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE 116
LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table 116

LOW-PRESSURE SIDE BECOMES NEGATIVE ...116
LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table 116

PRECAUTION 118

PRECAUTIONS 118
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 118
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 118
Precaution for Procedure without Cowl Top Cover..118
Precautions For Xenon Headlamp Service 119
Working with HFC-134a (R-134a) 119
General Refrigerant Precaution 119
Refrigerant Connection 120
Service Equipment 122

COMPRESSOR 124
General Precautions 124

LEAK DETECTION DYE 125
General Precautions 125

PREPARATION 126

PREPARATION 126
HFC-134a (R-134a) Service Tools and Equipment ..126
Sealant or/and Lubricant 128

ON-VEHICLE MAINTENANCE 129

LUBRICANT 129
Adjustment 129

REFRIGERATION SYSTEM 131
Inspection 131
Refrigerant Leaks 132

FLUORESCENT LEAK DETECTOR 134
Inspection 134

ELECTRICAL LEAK DETECTOR 135
Inspection 135

ON-VEHICLE REPAIR 138

REFRIGERATION SYSTEM 138
Exploded View 138
Inspection After Installation 138

COMPRESSOR 141
Exploded View 141
Removal and Installation 141

LOW-PRESSURE FLEXIBLE HOSE AND PIPE 2 143
Exploded View 143
Removal and Installation 143

HIGH-PRESSURE FLEXIBLE HOSE 145
Exploded View 145
Removal and Installation 145

HIGH-PRESSURE PIPE 1 (ENGINE COMPARTMENT) 147
Exploded View 147
Removal and Installation 147

LOW-PRESSURE PIPE 1 AND HIGH-PRESSURE PIPE 2 149
Exploded View 149
Removal and Installation 149

CONDENSER 151
Exploded View 151
Removal and Installation 151

LIQUID TANK 153
Exploded View 153
Removal and Installation 153

REFRIGERANT PRESSURE SENSOR 154
Exploded View 154
Removal and Installation 154

EVAPORATOR 155
Exploded View 155
Removal and Installation 155

EXPANSION VALVE 157
Exploded View 157

cardiagn.com

Removal and Installation 157

SERVICE DATA AND SPECIFICATIONS (SDS) 159

SERVICE DATA AND SPECIFICATIONS (SDS) 159
Compressor 159
Lubricant 159
Refrigerant 159
Engine Idling Speed 159
Belt Tension 159

MANUAL AIR CONDITIONER (K9K)

BASIC INSPECTION 160

DIAGNOSIS AND REPAIR WORKFLOW 160
Work Flow 160

FUNCTION DIAGNOSIS 161

REFRIGERATION SYSTEM 161
System Diagram 161
System Description 161
Component Parts Location 162
Component Description 164

SYMPTOM DIAGNOSIS 165

REFRIGERATION SYSTEM SYMPTOMS 165

SYMPTOM DIAGNOSIS PROCEDURE 165
SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure 165

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH 165
BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table 165

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW 165
HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table 165

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH 166
HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table 166

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW 166
BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table 166

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE 167
LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table 167

LOW-PRESSURE SIDE BECOMES NEGATIVE 167
LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table 167

PRECAUTION 169

PRECAUTIONS 169
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 169
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 169
Precaution for Procedure without Cowl Top Cover 169
Precautions For Xenon Headlamp Service 170
Working with HFC-134a (R-134a) 170
General Refrigerant Precaution 170
Refrigerant Connection 171
Service Equipment 173

COMPRESSOR 175
General Precautions 175

LEAK DETECTION DYE 176
General Precautions 176

PREPARATION 177

PREPARATION 177
HFC-134a (R-134a) Service Tools and Equipment 177
Sealant or/and Lubricant 179

ON-VEHICLE MAINTENANCE 180

LUBRICANT 180
Adjustment 180

REFRIGERATION SYSTEM 182
Inspection 182
Refrigerant Leaks 183

FLUORESCENT LEAK DETECTOR 185
Inspection 185

ELECTRICAL LEAK DETECTOR 186
Inspection 186

ON-VEHICLE REPAIR 189

REFRIGERATION SYSTEM 189
Exploded View 189
Inspection After Installation 189

COMPRESSOR 192
Exploded View 192
Removal and Installation 192

LOW-PRESSURE FLEXIBLE HOSE AND PIPE 2 194
Exploded View 194
Removal and Installation 194

cardiagn.com

HIGH-PRESSURE FLEXIBLE HOSE 196
Exploded View 196
Removal and Installation 196

HIGH-PRESSURE PIPE 1 (ENGINE COMPARTMENT) 198
Exploded View 198
Removal and Installation 198

LOW-PRESSURE PIPE 1 AND HIGH-PRESSURE PIPE 2 200
Exploded View 200
Removal and Installation 200

CONDENSER 202
Exploded View 202
Removal and Installation 202

LIQUID TANK 204
Exploded View 204
Removal and Installation 204

REFRIGERANT PRESSURE SENSOR 205
Exploded View 205
Removal and Installation 205

EVAPORATOR 206
Exploded View 206
Removal and Installation 206

EXPANSION VALVE 208
Exploded View 208
Removal and Installation 208

SERVICE DATA AND SPECIFICATIONS (SDS) 210

SERVICE DATA AND SPECIFICATIONS (SDS) 210
Compressor 210
Lubricant 210
Refrigerant 210
Engine Idling Speed 210
Belt Tension 210

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001093748

DETAILED FLOW

1. LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. (Get detailed information about the conditions and environment when the symptom occurs.)

>> GO TO 2.

2. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-6, "Description & Inspection".

>> GO TO 3.

3. GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis (Refer to HAC-108, "Diagnosis Chart By Symptom").

>> GO TO 4.

4. REPAIR OR REPLACE

Repair or replace the specific parts

>> GO TO 5.

5. FINAL CHECK

Final check.

Is the inspection result normal?

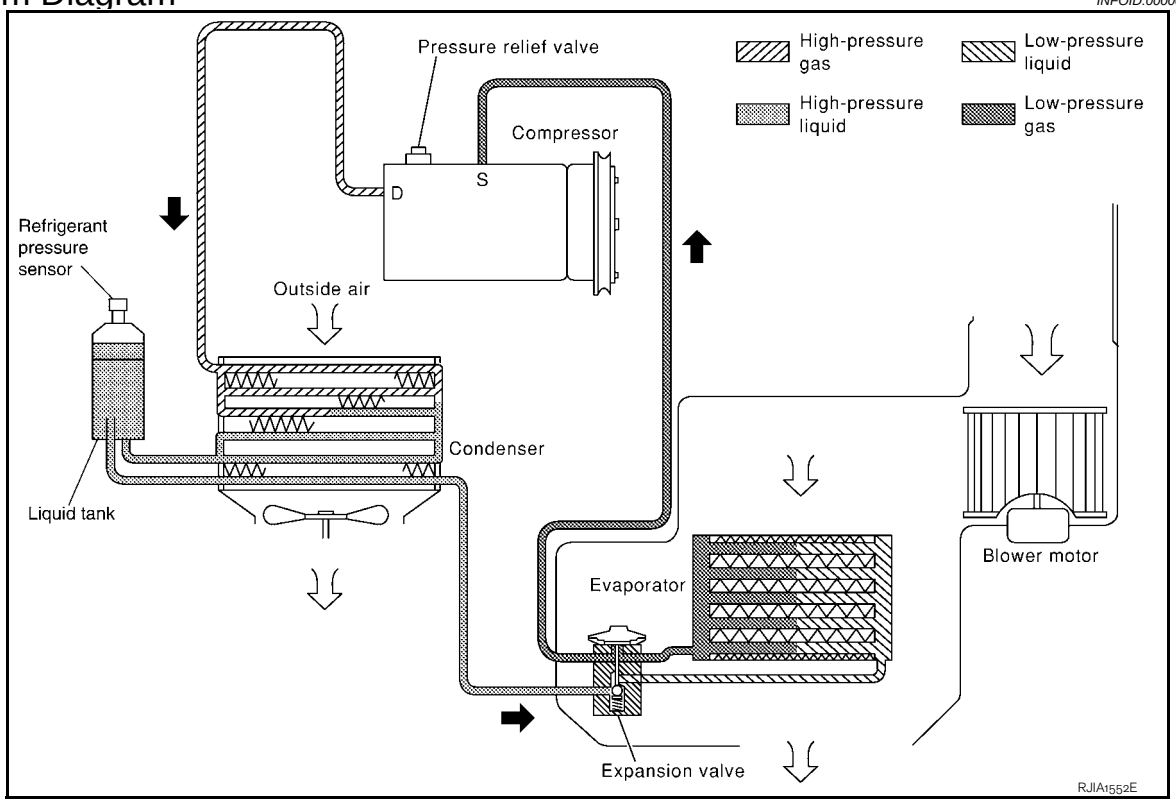
YES >> CHECK OUT
NO >> GO TO 3.

FUNCTION DIAGNOSIS

REFRIGERATION SYSTEM

System Diagram

INFOID:0000000001093749



System Description

INFOID:0000000001093750

REFRIGERANT CYCLE

Refrigerant Flow

The refrigerant flows from the compressor, through the condenser with liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation in the evaporator is controlled by an externally equalized expansion valve, located inside the evaporator case.

Freeze Protection

To prevent evaporator frozen up, the evaporator air temperature is monitored, and the voltage signal to the display and A/C auto amp. will make the A/C relay go OFF and stop the compressor.

REFRIGERANT SYSTEM PROTECTION

Refrigerant Pressure Sensor

The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high-pressure side detected by refrigerant pressure sensor is over about 3,119 kPa (31.8 kg/cm^2, 452 psi), or below about 118 kPa (1.2 kg/cm^2, 17 psi).

Pressure Relief Valve

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an unusual level [more than 3,628 kPa (37 kg/cm^2, 526 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.

LUBRICANT

cardiagn.com

Maintenance of Lubricant Quantity in Compressor

The lubricant in the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large refrigerant leakage occurred. It is important to maintain the specified amount.

If lubricant quantity is not maintained properly, the following malfunctions may result:

- Lack of lubricant: May lead to a seized compressor.
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

Lubricant

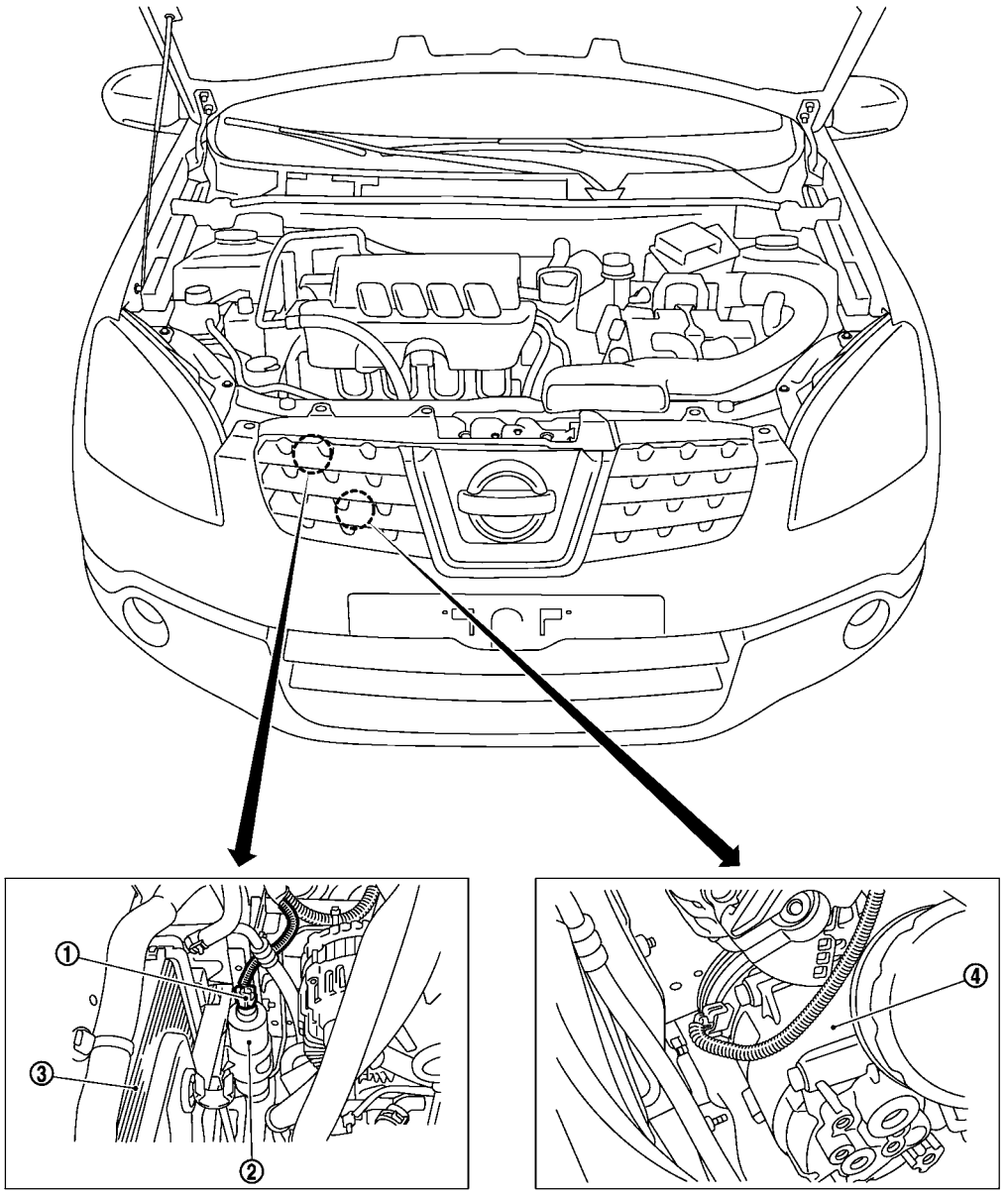
Name : Nissan A/C System Oil Type S

Component Parts Location

INFOID:0000000001093751

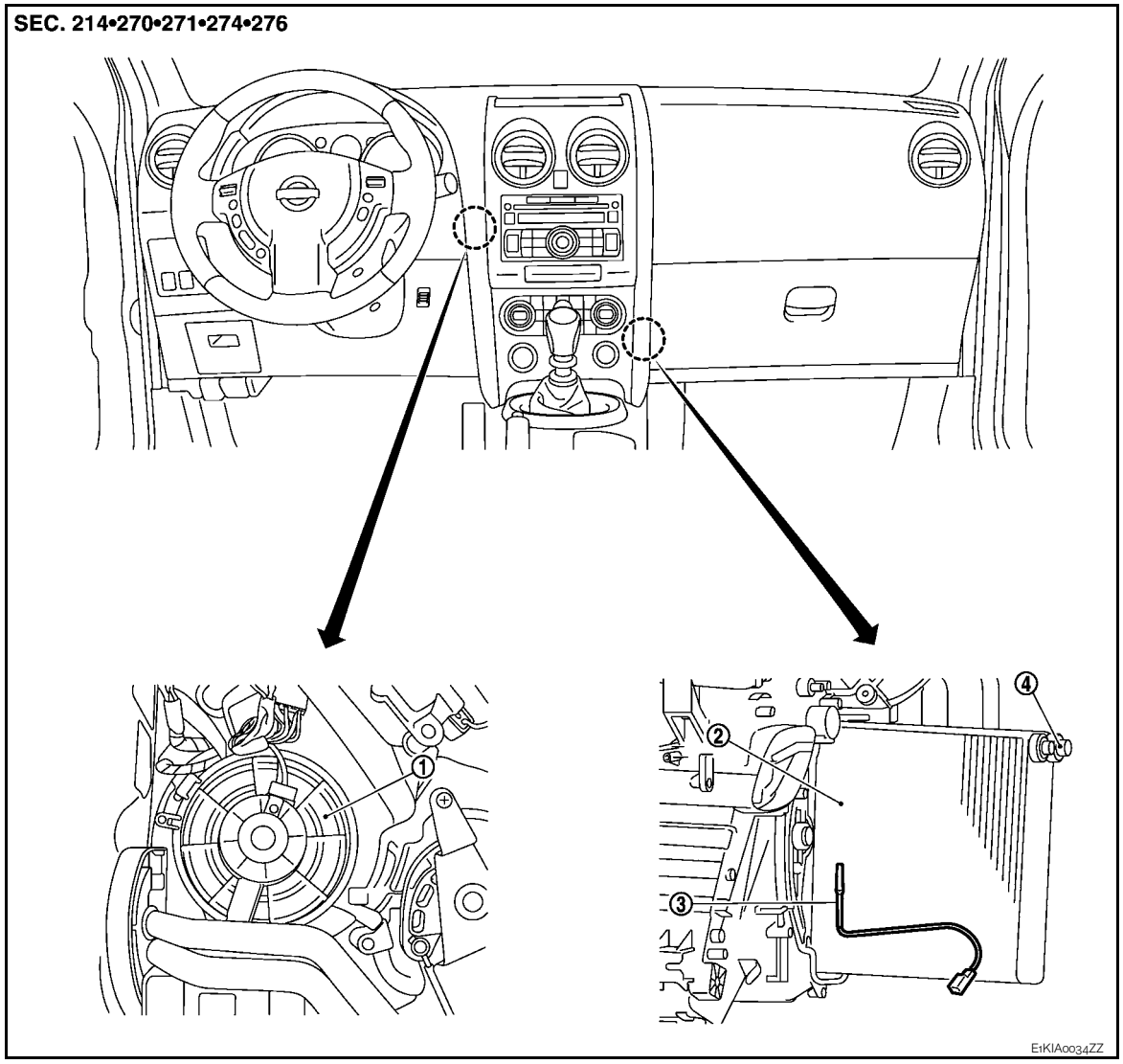
cardiagn.com

SEC. 214•270•271•274•276



1. Refrigerant pressure sensor
2. Liquid tank
3. Radiator
4. Compressor

cardiagn.com



1. Blower motor assembly
2. Evaporator
3. Intake sensor (AT only)
4. Expansion valve

Component Description

INFOID:0000000001093752

Component	Description
Compressor	Intakes, compresses, and discharges refrigerant, then conveys it to condenser.
Condenser	Condenses refrigerant, and then conveys it to liquid tank.
Liquid tank	Drives moisture out of refrigerant, eliminates foreign matter, then conveys refrigerant to expansion valve.
Refrigerant pressure sensor	Refer to HAC-70, "Component Inspection".
Expansion valve	Vaporizes refrigerant, controls the amount of flow, then conveys refrigerant to evaporator.
Evaporator	Cools passing air, and then conveys it to compressor.
Blower motor	Takes in air in the vehicle or fresh outside air, and then adjusts room temperature by air conditioning.

SYMPTOM DIAGNOSIS

REFRIGERATION SYSTEM SYMPTOMS

SYMPTOM DIAGNOSIS PROCEDURE

SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure

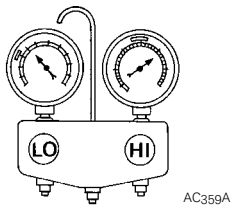
INFOID:0000000001093755

Whenever system's high and/or low side pressure(s) is/are unusual, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table

INFOID:0000000001093756

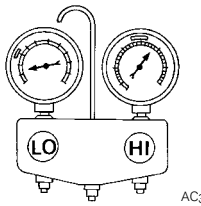
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	The pressure returns to normal is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle.	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance. ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan.	• Clean condenser. • Check and repair cooling fan as necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.). ↓ Air in refrigeration cycle.	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Low-pressure pipe is sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side. • Excessive refrigerant discharge flow. • Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment.	Replace expansion valve.

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table

INFOID:0000000001093757

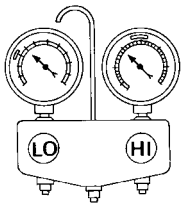
cardiagn.com

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check lubricant for contamination.

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table

INFOID:0000000001093758

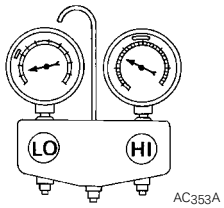
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table

INFOID:0000000001093759

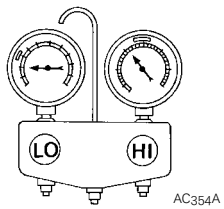
cardiagn.com

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	• There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	• Replace liquid tank. • Check lubricant for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet is frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Expansion valve and liquid tank are warm or slightly cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components.	Check refrigerant for leaks. Refer to HA-30, "Refrigerant Leaks".
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Replace expansion valve. • Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	• Check intake sensor circuit. Refer to HAC-59, "Diagnosis Procedure". • Replace compressor. • Repair evaporator fins. • Replace evaporator. • Refer to HAC-62, "Diagnosis Procedure".

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table

INFOID:0000000001093760

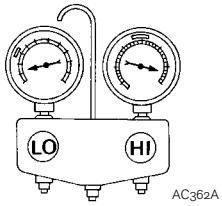
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

LOW-PRESSURE SIDE BECOMES NEGATIVE

cardiagn.com

LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table

INFOID:0000000001093761

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or wet with dew.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the malfunction, replace expansion valve. • Replace liquid tank. • Check lubricant for contamination.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001115386

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001115391

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

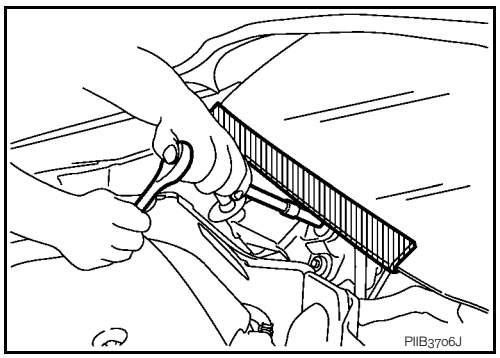
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001115394

cardiagn.com

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:0000000001115398

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

Working with HFC-134a (R-134a)

INFOID:0000000001093766

CAUTION:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed and compressor malfunction is likely occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**

- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.**

General Refrigerant Precaution

INFOID:0000000001093767

WARNING:

- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**

cardiagn.com

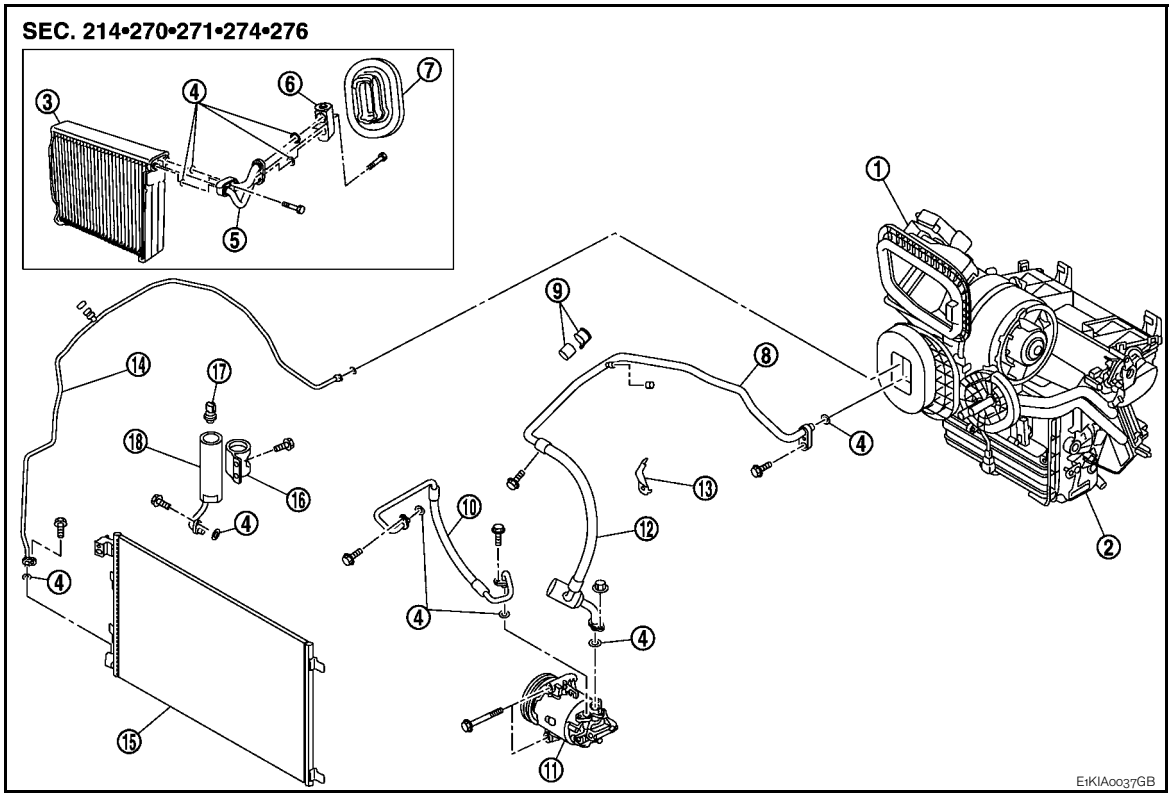
- **Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Never store or heat refrigerant containers above 52°C (126°F).**
- **Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Never intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Refrigerant Connection

INFOID:0000000001093768

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.
- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

O-RING AND REFRIGERANT CONNECTION



1. Heater sealing	2. Expansion valve	3. O-ring
4. Evaporator	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Connector pipe fixing bolt
7. High pressure pipe 1	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Pipe fixing bolt
16. Low pressure flexible hose	17. Low & high pipe bracket support	18. Low pressure flexible hose and pipe 2

cardiagn.com

19. Pipes fixing clip
20. Low pressure pipe 2 fixing clamp assembly
21. Liquid tank fixing screw
22. Liquid tank fixing bracket
23. High pressure flexible hose

CAUTION:
The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

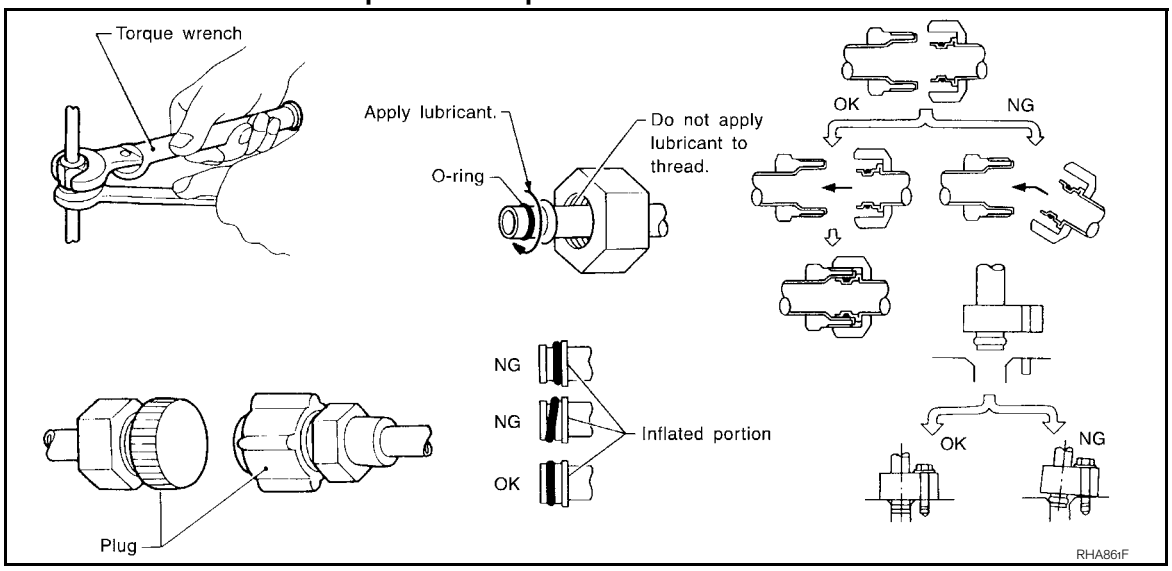
Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure pipe 2 assembly to expansion valve	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure pipe 2 assembly to evaporator	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		92474 N8210	2	19
	Compressor to high pressure flexible hose		92474 N8210	2	12
	Liquid tank to condenser		92473 N8210	1	16

WARNING:
Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.
CAUTION:
When replacing or cleaning refrigerant cycle components, observe the following.
- **When the compressor is removed, store it in the same way at it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Name : Nissan A/C System Oil Type S

- **O-ring must be closely attached to the groove portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.**

- **After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Service Equipment

INFOID:0000000001093769

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRICAL LEAK DETECTOR

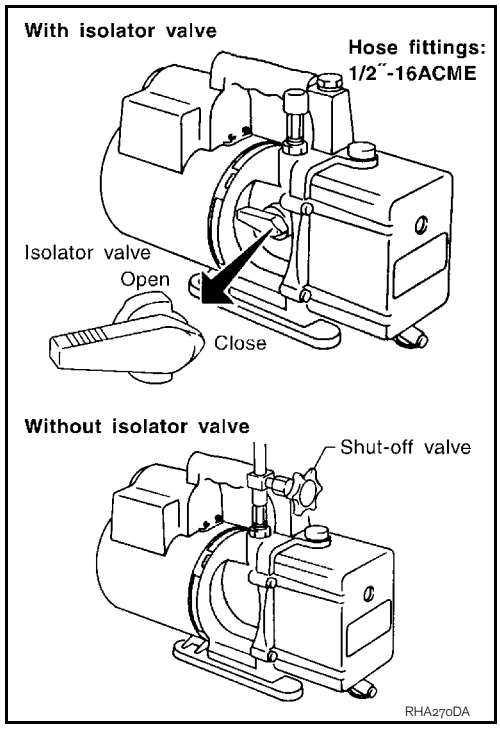
Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.
To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

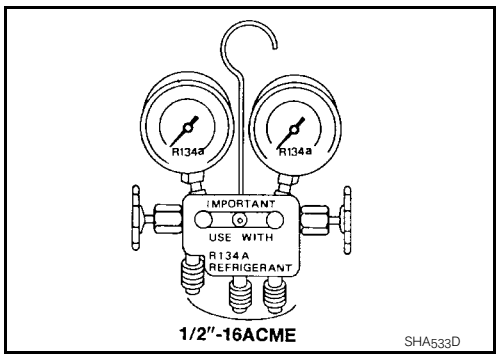
Some one-way valves open when vacuum is applied and close under no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



MANIFOLD GAUGE SET

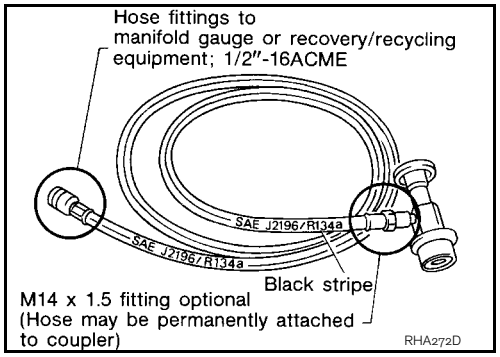
cardiagn.com

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

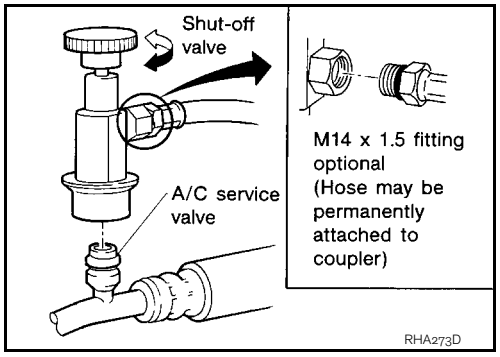
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

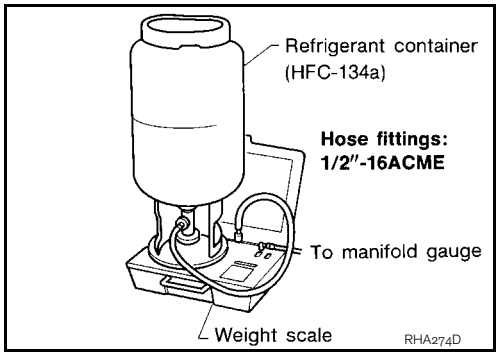
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

COMPRESSOR

General Precautions

INFOID:0000000001093770

CAUTION:

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same way at it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to HA-27, "Adjustment".**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

cardiagn.com

LEAK DETECTION DYE

General Precautions

INFOID:0000000001093771

CAUTION:

- **The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.**
- **Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.**
- **The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST: J-41995) to pin-point refrigerant leaks.**
- **For the purpose of safety and customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.**
- **A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electrical leak detector (SST: J-41995).**
- **Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.**
- **Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.**
- **Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).**
- **Never use more than one refrigerant dye bottle (1/4 ounce /7.4 cc) per A/C system.**
- **Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Never use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.**
- **The fluorescent properties of the dye will remain for three years or a little over unless a compressor malfunction occurs.**

IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have the identification label on the front side of hood.

cardiagn.com

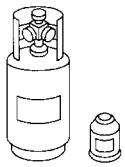
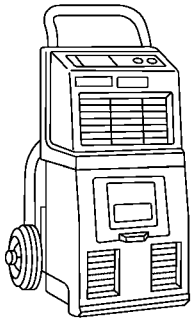
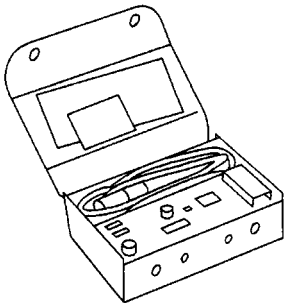
PREPARATION

PREPARATION

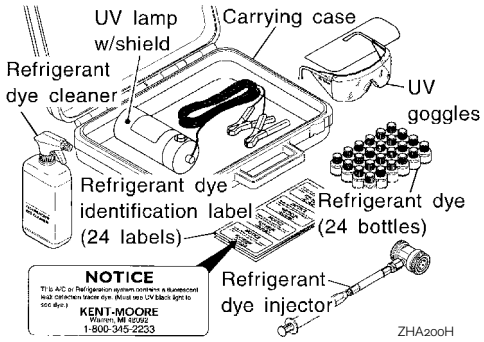
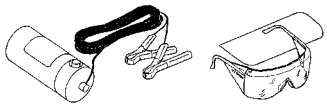
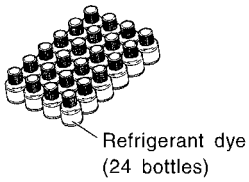
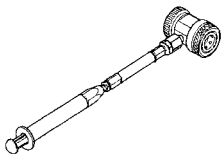
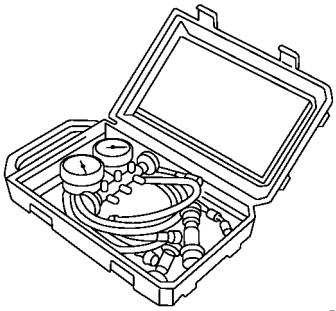
HFC-134a (R-134a) Service Tools and Equipment

INFOID:0000000001093772

Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

Tool number Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
KLH00-PAGS0 Nissan A/C System Oil Type S (DH-PS)	S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) wobble (swash) plate compressors (Nissan only) Lubricity: 40 m ℓ (1.4 Imp fl oz.)
Recovery/Recycling/ Recharging equipment (ACR4)	 RJIA0195E	Function: Refrigerant recovery and recycling and recharging
Electrical leak detector	 A/C leak detector SHA705EB	Power supply: DC 12V (Cigarette lighter)

cardiagn.com

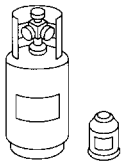
Tool number Tool name		Description
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner		Power supply: DC 12V (Battery terminal)
(J-42220) UV lamp and UV safety goggles		Power supply: DC 12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
(J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)		Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle		For injecting 1/4 ounce of fluorescent leak detection dye into A/C system.
(J-43872) Refrigerant dye cleaner		For cleaning dye spills.
Manifold gauge set (with hoses and couplers)		Identification: • The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size • 1/2″ -16 ACME

Sealant or/and Lubricant

INFOID:0000000001093774

HFC-134a (R-134a) Service Tool and Equipment

- Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
- Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
- Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
- Never use adapters that convert one size fitting to another: refrigerant/lubricant contamination occurs and compressor malfunction may result.

Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
Nissan A/C System Oil Type S (DH-PS)	S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) swash plate compressors (Nissan only) Capacity: 40 m ℓ (1.4 US fl oz., 1.4 Imp fl oz.)

cardiagn.com

ON-VEHICLE MAINTENANCE

LUBRICANT

Adjustment

INFOID:0000000001093775

LUBRICANT RETURN OPERATION

Adjust the lubricant quantity according to the test group shown below.

1. CHECK LUBRICANT RETURN OPERATION

Can lubricant return operation be performed?
- A/C system works properly.
- There is no evidence of a large amount of lubricant leakage.

CAUTION:
If excessive lubricant leakage is noted, never perform the lubricant return operation.

Is it successful?

YES >> GO TO 2.
NO >> GO TO 3.

2. PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS

1. Start the engine, and set to the following conditions:
- Engine speed: Idling to 1,200 rpm
- A/C switch: ON
- Blower speed: Max. position
- Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).]
- Intake position: Recirculation (REC)
2. Perform lubricant return operation for about 10 minutes.
3. Stop the engine.

>> GO TO 3.

3. CHECK REPLACEMENT PART

Should the compressor be replaced?

YES >> Refer to "LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT".
NO >> Refer to "LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR".

LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR

After replacing any of the following major components, add the correct amount of lubricant to the system.
Amount of lubricant to be added:

Part replaced	Lubricant to be added to system	Remarks
	Amount of lubricant mℓ (US fl oz., Imp fl oz.)	
Evaporator	75 (2.5, 2.6)	—
Condenser	35 (1.2, 1.2)	—
Liquid tank	10 (0.3, 0.4)	—
In case of refrigerant leak	30 (1.0, 1.1)	Large leak
	—	Small leak *1

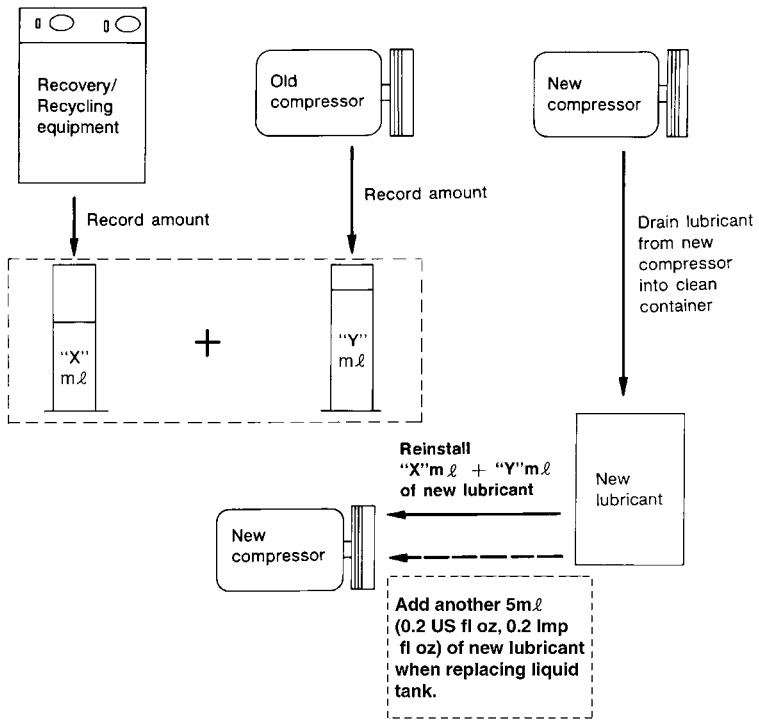
*1: If the refrigerant leak is small, no addition of lubricant is needed.

LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT

cardiagn.com

1. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect recovery/recycling recharging equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to HA-17, "Working with HFC-134a (R-134a)".
3. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to HA-17, "Working with HFC-134a (R-134a)".
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
5. Drain the lubricant from the old (removed) compressor into a graduated container and recover the amount of lubricant drained.
6. Drain the lubricant from the new compressor into a separate, clean container.
7. Measure an amount of new lubricant installed equal to amount drained from old compressor. Add this lubricant to new compressor through the suction port opening.
8. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to new compressor through the suction port opening.
9. If the liquid tank also needs to be replaced, add another 5 mℓ (0.2 US fl oz., 0.2 Imp fl oz.) of lubricant at this time.
   Do not add this 5 mℓ (0.2 US fl oz., 0.2 Imp fl oz.) of lubricant when replaces the compressor only.

Lubricant adjusting procedure for compressor replacement



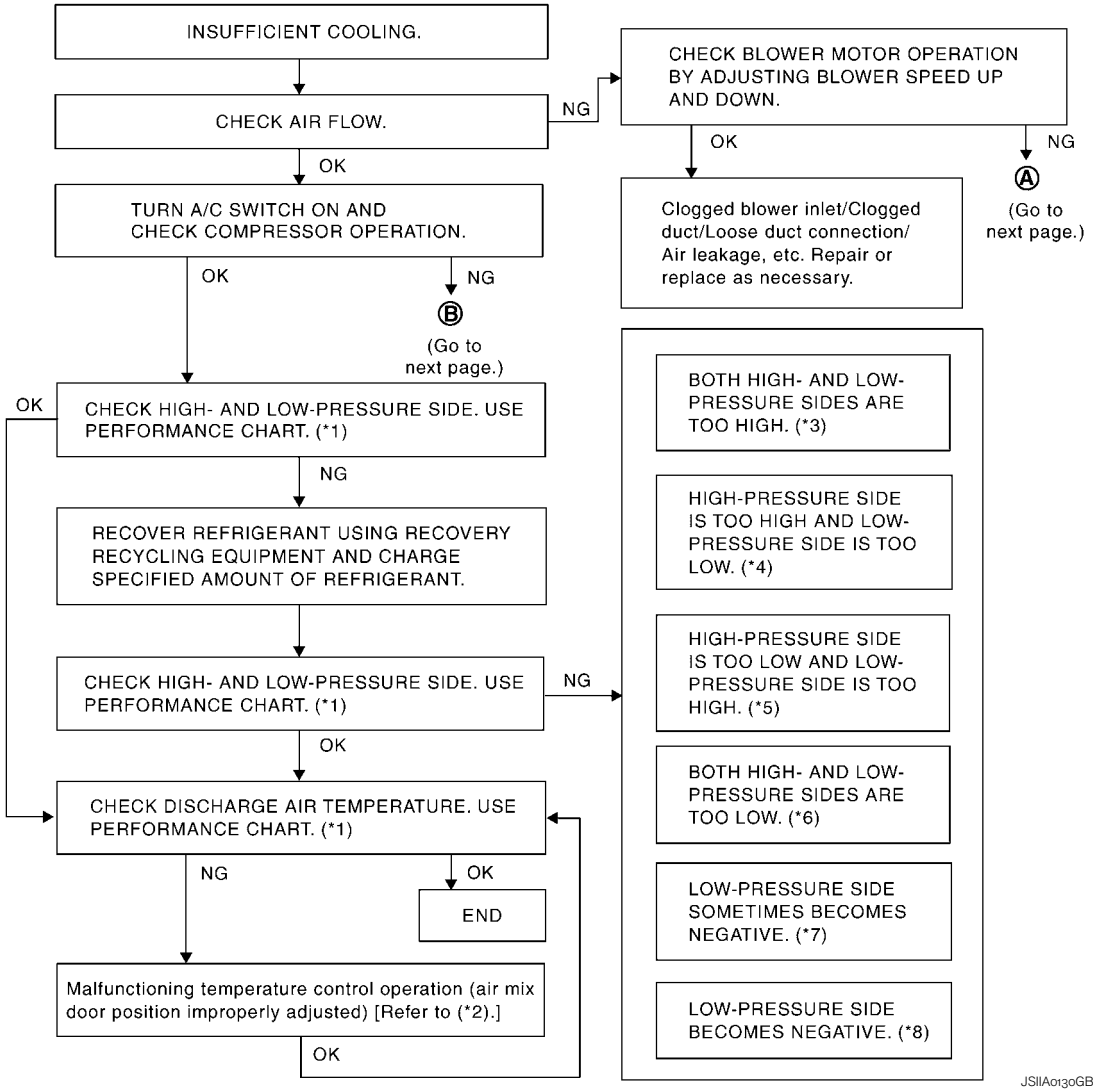
cardiagn.com

REFRIGERATION SYSTEM

Inspection

INFOID:0000000001093776

PERFORMANCE TEST DIAGNOSIS



*2 HAC-54, "Diagnosis Procedure"

*3 HA-12, "BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table"

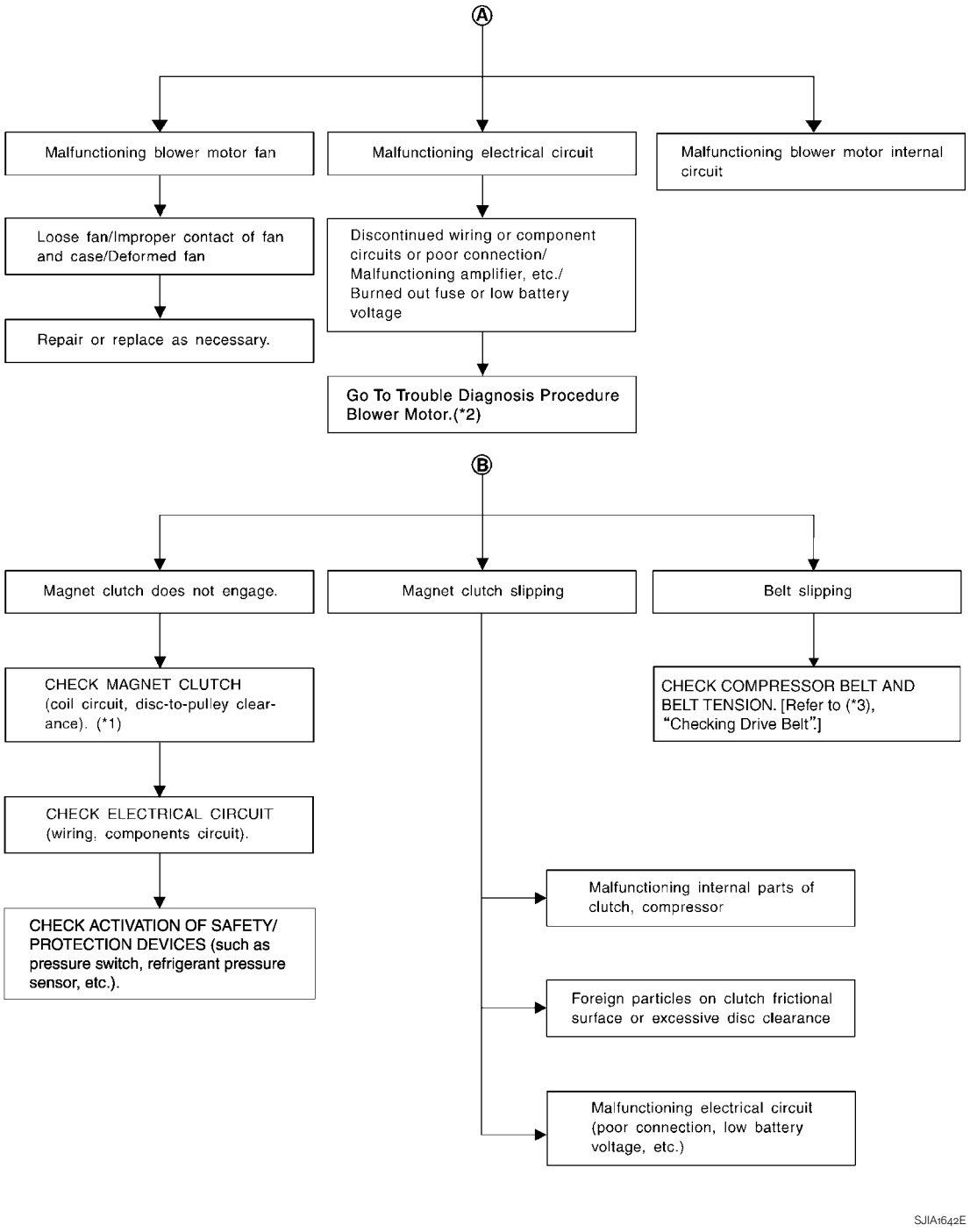
*4 HA-12, "HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table"

*5 HA-13, "HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table"

*6 HA-13, "BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table"

*7 HA-14, "LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table"

*8 HA-15, "LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table"



SJIA1642E

*2 HAC-62, "Diagnosis Procedure"

*3 EM-15, "Checking" (HR engine models) or EM-134, "Checking" (MR engine models)

Refrigerant Leaks

INFOID:0000000001093778

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C lubricant leakage, damage and corrosion. A/C lubricant leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using either an electrical leak detector or fluorescent dye leak detector (SST: J-42220).
If dye is observed, confirm the leak with an electrical leak detector. It is possible a prior leak was repaired and not properly cleaned.

cardiagn.com

When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.
When searching for refrigerant leaks using an electrical leak detector, move the probe along the suspected leak area at 1 to 2 inches per second and no further than 1/4 inch from the component.

CAUTION:

Moving the electrical leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

cardiagn.com

FLUORESCENT LEAK DETECTOR

Inspection

INFOID:0000000001093779

CHECKING SYSTEM FOR LEAKS USING THE FLUORESCENT LEAK DETECTOR

1. Check A/C system for leaks using the UV lamp and safety goggles (SST: J-42220) in a low sunlight area (area without windows preferable). Illuminate all components, fittings and lines. The dye will appear as a bright green/yellow area at the point of leakage. Fluorescent dye observed at the evaporator drain opening indicates an evaporator core assembly (tubes, core or expansion valve) leak.
2. If the suspected area is difficult to see, use an adjustable mirror or wipe the area with a clean shop rag or cloth, with the UV lamp for dye residue.
3. After the leak is repaired, remove any residual dye using dye cleaner (SST: J-43872) to prevent future misdiagnosis.
4. Perform a system performance check and verify the leak repair with an approved electrical leak detector.

NOTE:
Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and lubricants, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean.
Clean with a dry cloth or blow off with shop air.
Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

DYE INJECTION

(This procedure is only necessary when recharging the system or when the compressor has seized and was replaced.)

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.52 kg/cm^2, 50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool (SST: J-41459).
3. Connect the injector tool to the A/C low-pressure side service valve.
4. Start the engine and switch A/C ON.
5. When the A/C operating (compressor running), inject one bottle (1/4 ounce / 7.4 cc) of fluorescent dye through the low-pressure service valve using dye injector tool (SST: J-41459) (refer to the manufacture's operating instructions).
6. With the engine still running, disconnect the injector tool from the service valve.
   CAUTION:
   Be careful the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.
7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.
8. Attach a blue label as necessary.

cardiagn.com

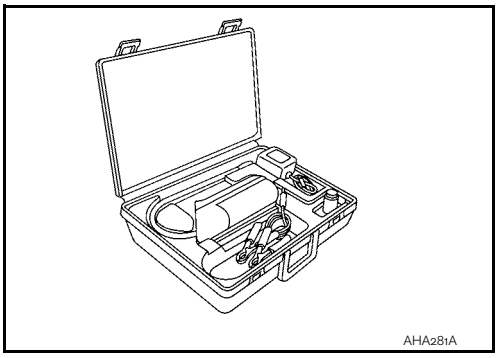
ELECTRICAL LEAK DETECTOR

Inspection

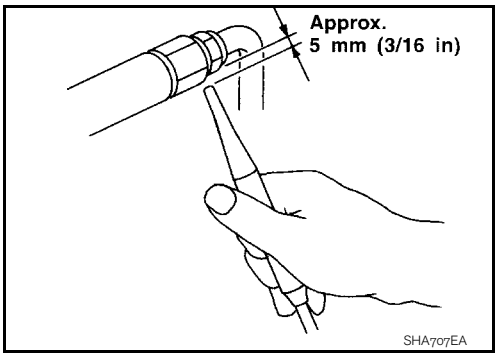
INFOID:0000000001093780

PRECAUTIONS FOR HANDLING LEAK DETECTOR

When performing a refrigerant leak check, use an electrical leak detector (SST: J-41995) or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.

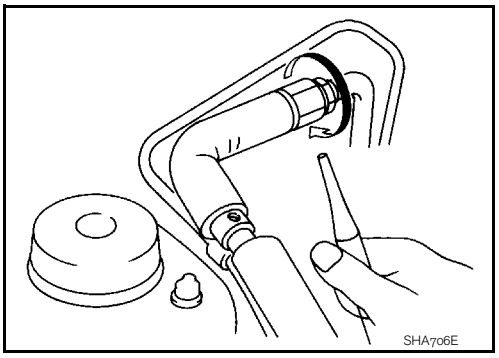

AHA281A

1. Position probe approximately 5 mm (3/16 in) away from point to be checked.

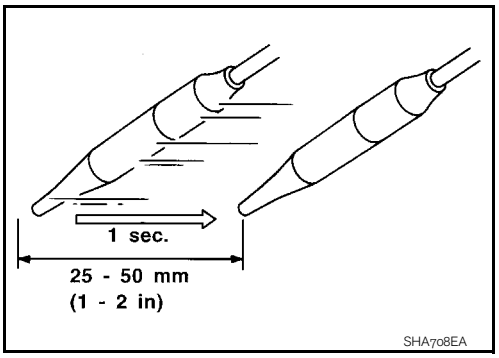


SHA707EA

2. When testing, circle each fitting completely with probe.


SHA706E

3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.



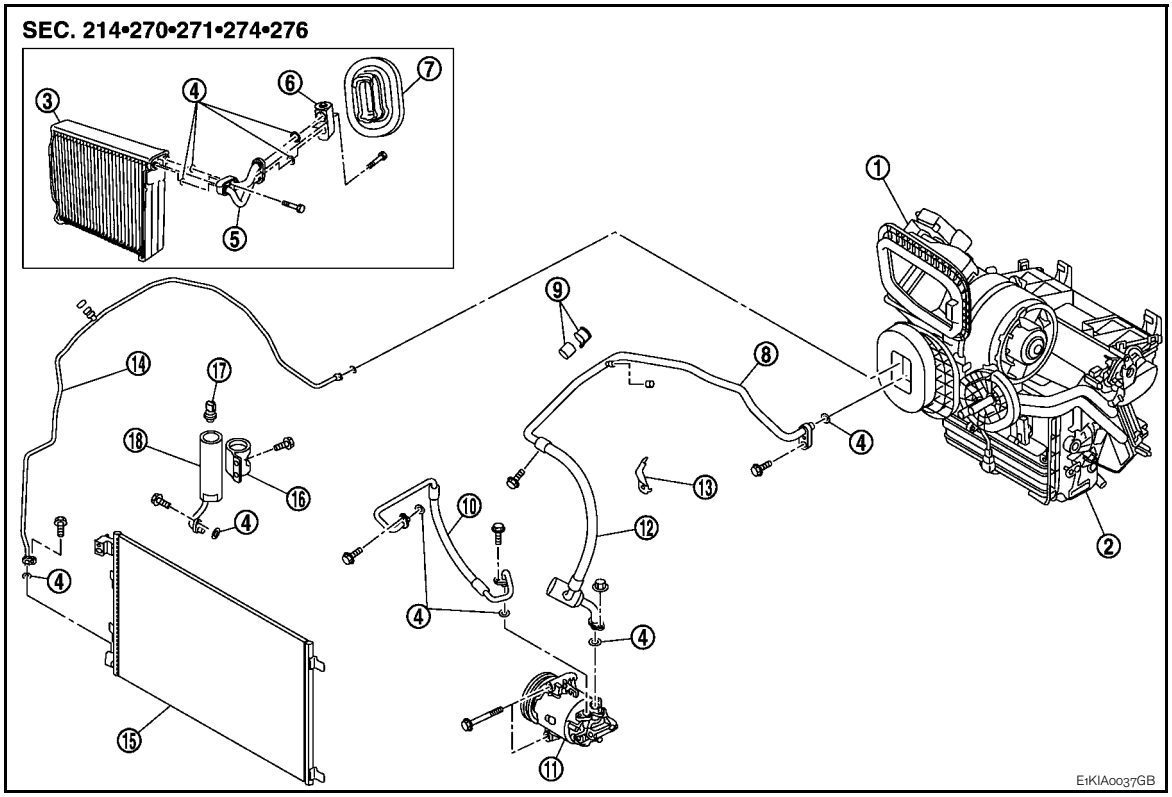
SHA708EA

CHECKING PROCEDURE

To prevent inaccurate or false readings, make sure there is no refrigerant vapor, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Stop the engine.

2. Connect a suitable A/C manifold gauge set (SST: J-39183) to the A/C service valves.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm^2, 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.
   NOTE:
   At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm^2, 50 psi).
4. Perform the leak test from the high-pressure side (compressor discharge a to evaporator inlet j) to the low-pressure side (evaporator drain hose k to shaft seal p). Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detected probe completely around the connection/component.



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

Compressor
Check the fitting of high- and low-pressure flexible hoses, relief valve and shaft seal.
Condenser
Check the fitting of condenser pipe assembly, high-pressure flexible hose and pipe.
Liquid tank
Check the fitting of radiator & condenser assembly and refrigerant pressure sensor.
Service valves
Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).
NOTE:
After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.
Cooling unit (Evaporator)

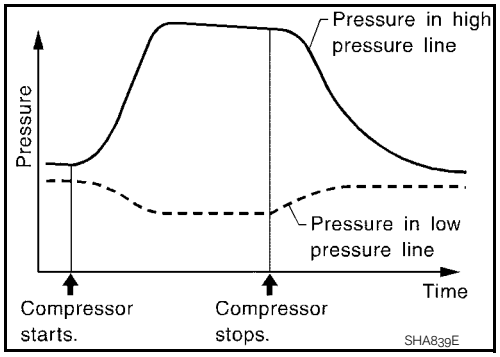
cardiagn.com

With engine OFF, turn blower fan on “High” for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer’s recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.
Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components.
If no leaks are found, perform steps 7 - 10.
7. Start the engine.
8. Set the A/C control as follows;

a. A/C switch: ON
b. MODE door position: VENT (Ventilation)
c. Intake door position: Recirculation
d. Temperature setting: Max. cold
e. Fan speed: High

9. Run engine at 1,500 rpm for at least 2 minutes.
10. Stop the engine and perform leak check again following steps 4 through 6 above.
Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector at the compressor. The pressure on the high-pressure side will gradually drop after refrigerant circulation stops and pressure on the low-pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.



11. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines and then check refrigerant purity.
12. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier.
13. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier.
14. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component if necessary.
15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
16. Perform A/C performance test to ensure system works properly.

cardiagn.com

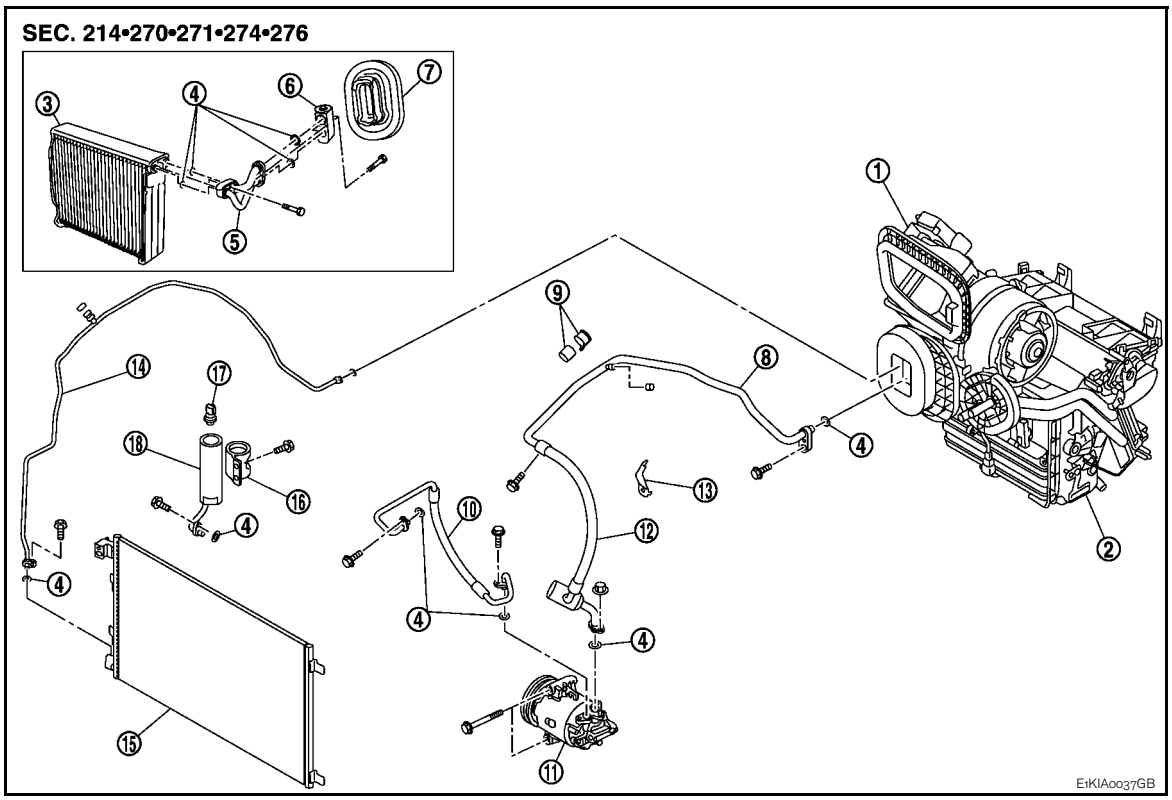
ON-VEHICLE REPAIR

REFRIGERATION SYSTEM

Exploded View

INFOID:0000000001093781

Refer to HA-18, "Refrigerant Connection".



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

Inspection After Installation

INFOID:0000000001093782

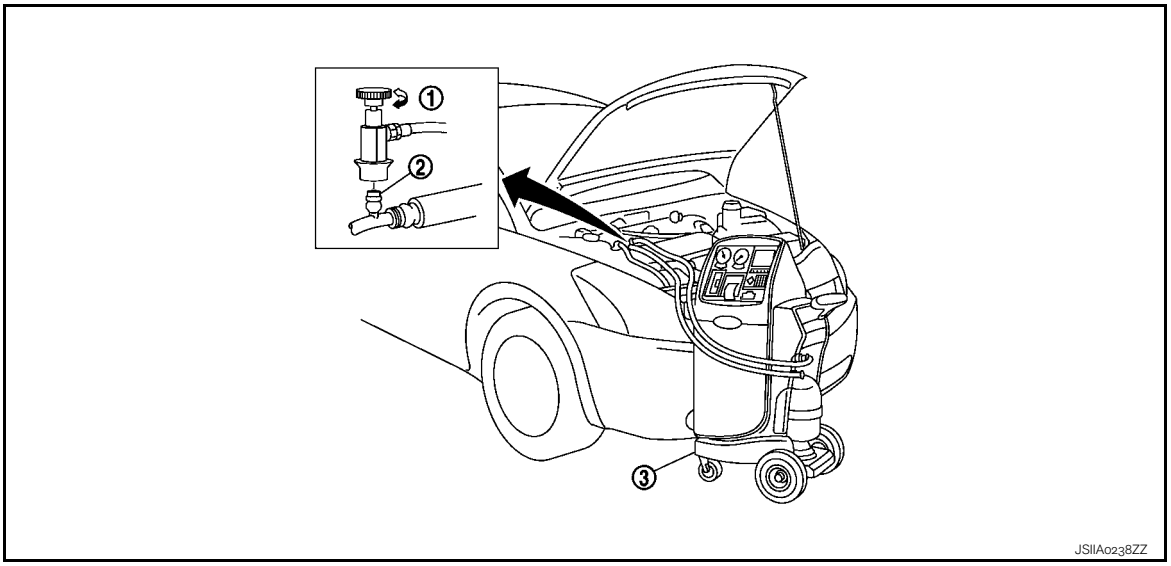
SETTING OF SERVICE TOOLS AND EQUIPMENT

Discharging Refrigerant

WARNING:

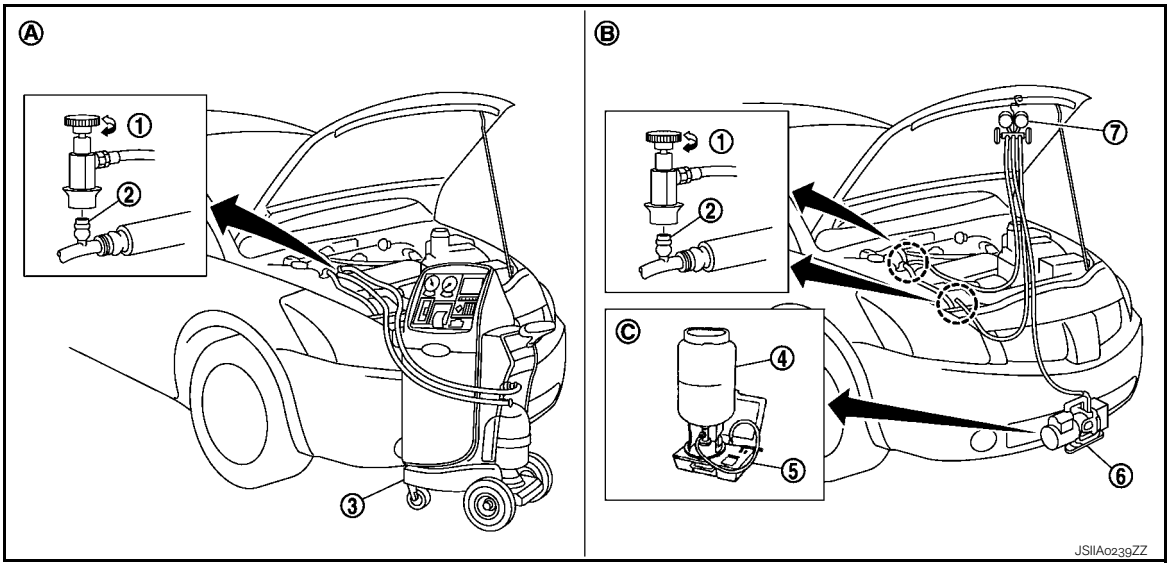
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment] or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.

cardiagn.com



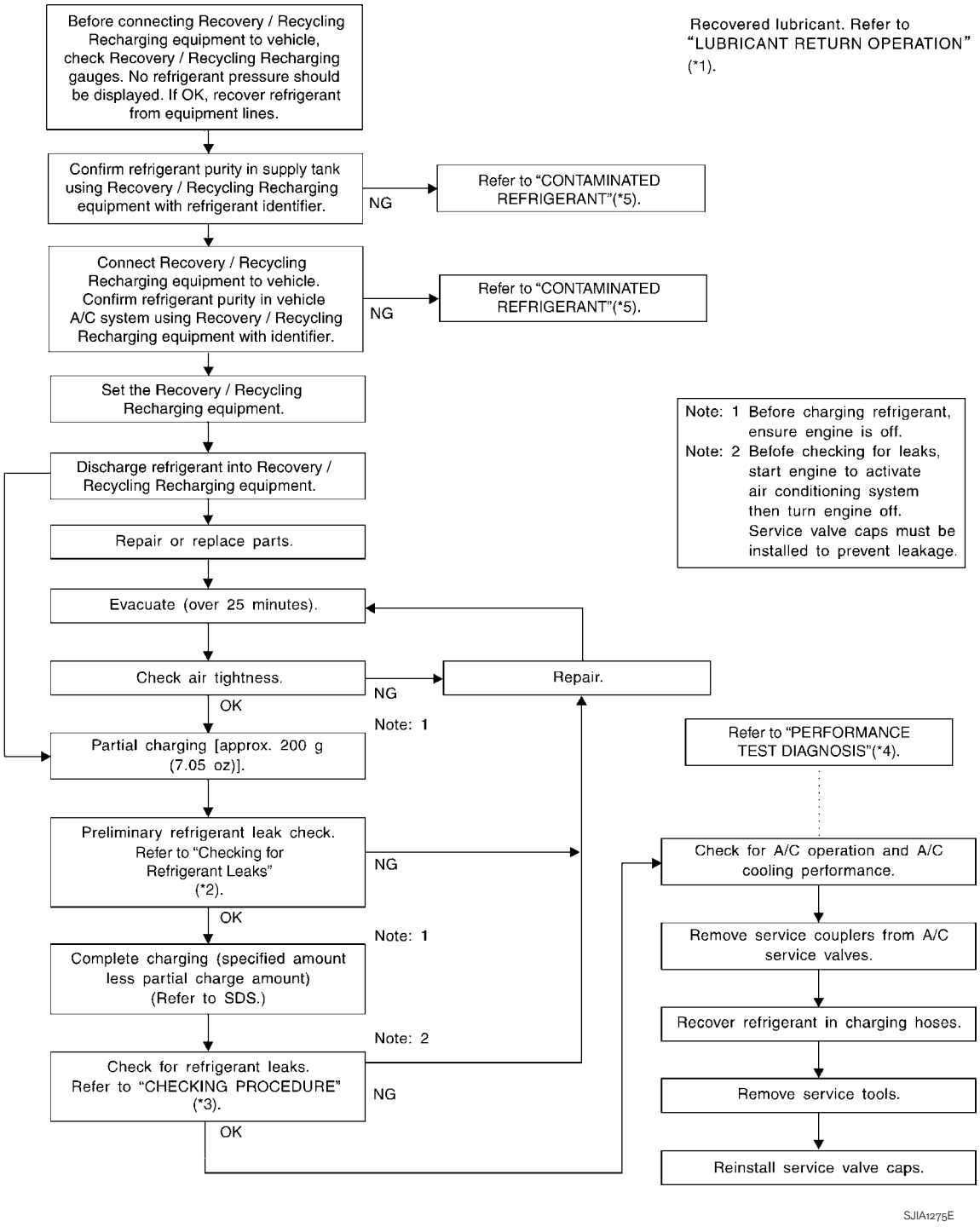
1. Shut-off valve
2. A/C service valve
3. Recovery/Recycling/Recharging equipment

Evacuating System and Charging Refrigerant



1. Shut-off valve
2. A/C service valve
3. Recovery/Recycling/Recharging equipment
4. Refrigerant container (HFC-134a)
5. Weight scale (J-39650)
6. Vacuum pump (J-39649)
7. Manifold gauge set (J-39183)

A. Preferred (best) method
B. Alternative method
C. For charging



*1 HA-27, "Adjustment"

*2 "REFRIGERANT LEAKS" in HA-30, "Refrigerant Leaks".

*3 "CHECKING PROCEDURE" in HA-29, "Inspection".

*4 "PERFORMANCE TEST DIAGNOSIS" in HA-29, "Inspection".

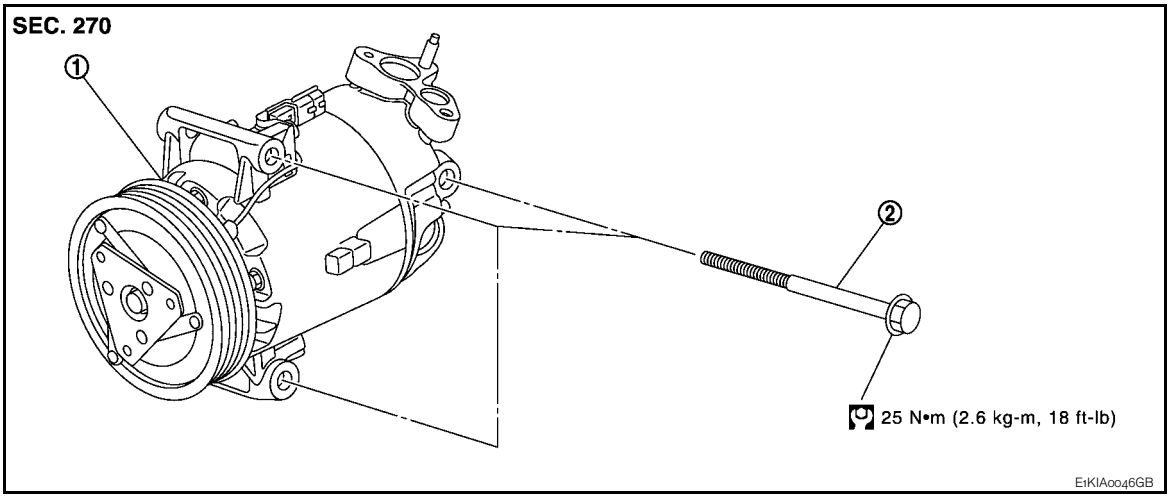
*5 "CONTAMINATED REFRIGERANT" in HAC-118, "Working with HFC-134a (R-134a)".

cardiagn.com

COMPRESSOR

Exploded View

INFOID:0000000001093783



1. Compressor
2. Compressor fixing bolt

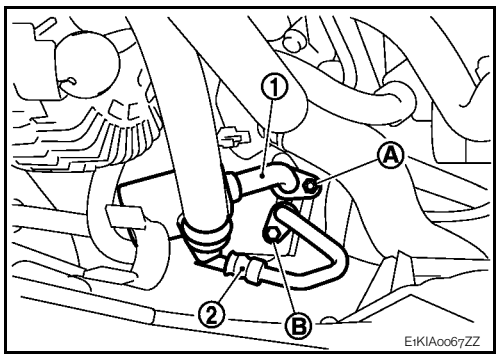
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001093784

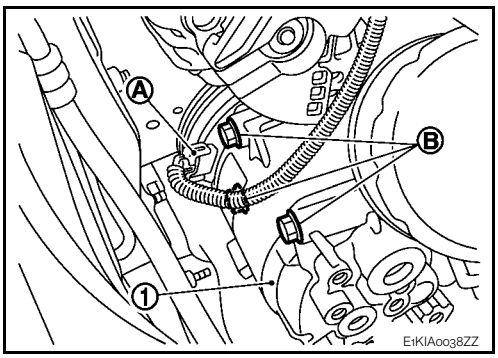
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament.
3. Remove air intake hoses (RH) and air duct (LH). Refer to EM-27, "Removal and Installation" (HR engine models) or EM-144, "Removal and Installation" (MR engine models).
4. Remove engine undercover, using power tools.
5. Drain engine coolant from radiator. Refer to CO-9, "Draining" (HR engine models) or CO-30, "Draining" (MR engine models).
6. Remove drive belt. Refer to EM-16, "Removal and Installation" (HR engine models) or EM-134, "Removal and Installation" (MR engine models).
7. Remove lower radiator hose from engine. Refer to CO-13, "Exploded View" (HR engine models) or CO-34, "Exploded View" (MR engine models).
8. Remove mounting nuts (A) from low-pressure flexible hose (1) and mounting bolt (B) from high-pressure flexible hose (2).
9. Remove low-pressure flexible hose, and, high-pressure flexible hose from compressor.



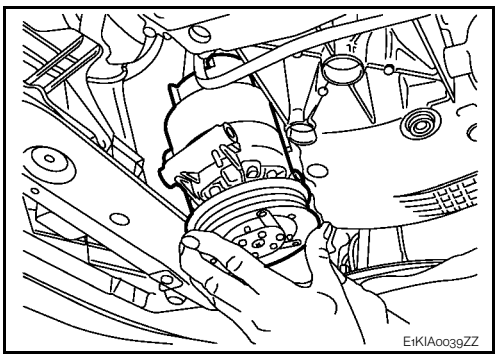
CAUTION:
Cap or wrap the joint of compressor, low-pressure flexible hose and high-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.

10. Remove compressor harness connector (A), then remove mounting bolts (B) from compressor (1), using power tools.



11. Remove the compressor from the vehicle.

Compressor fixing bolt to engine
: 25 N·m (2.6 kg-m, 18.5 ft-lb)



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and high-pressure flexible hose with new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

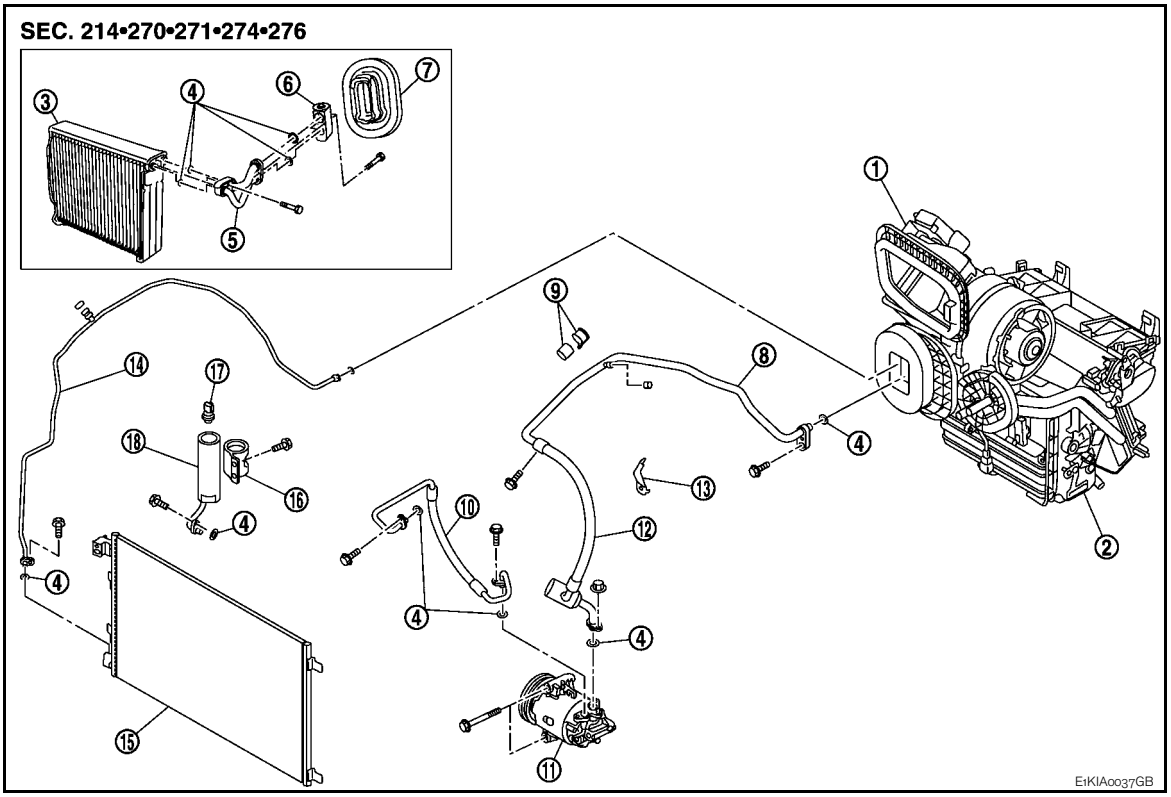
cardiagn.com

LOW-PRESSURE FLEXIBLE HOSE AND PIPE 2

Exploded View

INFOID:0000000001093786

Refer to HA-18, "Refrigerant Connection".



1. Heater & blower unit assembly
2. Heater & cooling unit assembly
3. Evaporator
4. O-ring
5. Low pressure pipe 1 and high pressure pipe 2 assembly
6. Expansion valve
7. Heater sealing
8. Low pressure flexible hose and pipe 2
9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose
11. Compressor
12. Low pressure flexible hose
13. Low & high pipe bracket support
14. High pressure pipe 1
15. Condenser assembly
16. Liquid tank fixing bracket
17. Refrigerant pressure sensor
18. Liquid tank

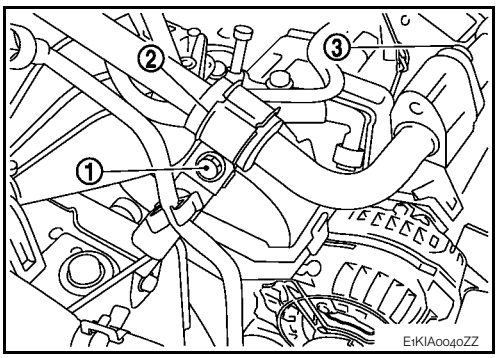
Removal and Installation

INFOID:0000000001093787

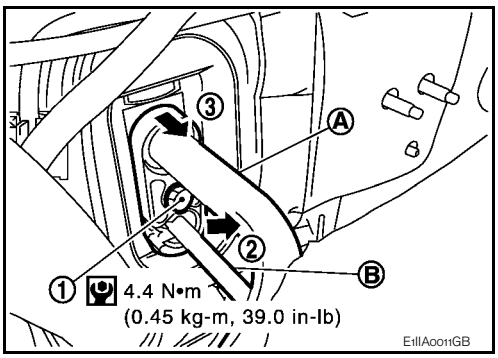
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove air intake hose (RH side), and air duct (LH). Refer to EM-35, "Removal and Installation" (HR engine), EM-155, "Removal and Installation" (ER engine).

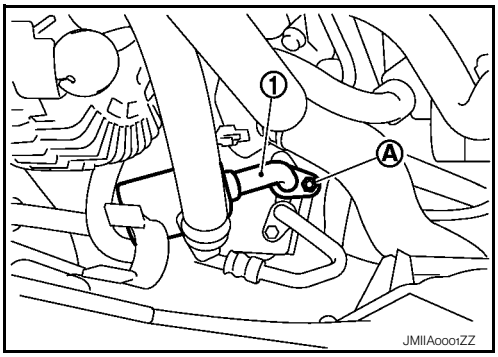
3. Remove mounting bolt (1) and clamp (2), from low pressure pipe bracket support.
4. Remove low and high-pressure maintaining clip, from both pipes, then remove fixing bolt (3).
5. Remove engine room insulator fixing clip from cowl top.



6. Pull engine room insulator, then remove pipes bracket fixing bolt (1), from expansion valve, and release pipes fixing bracket, as shown in order (1) to (3), from high pressure pipe (B), to remove low pressure flexible hose and pipe2 (A) from expansion valve.
CAUTION:
Cap or wrap the joint of the low pressure flexible hose and pipe 2, and expansion valve exit with suitable material such as vinyl tape to avoid the entry of air.



7. Remove low pressure flexible hose fixing nut (A), from air conditioner compressor, and remove low pressure flexible hose (1).
CAUTION:
Cap or wrap the joint of low-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and low-pressure pipe 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

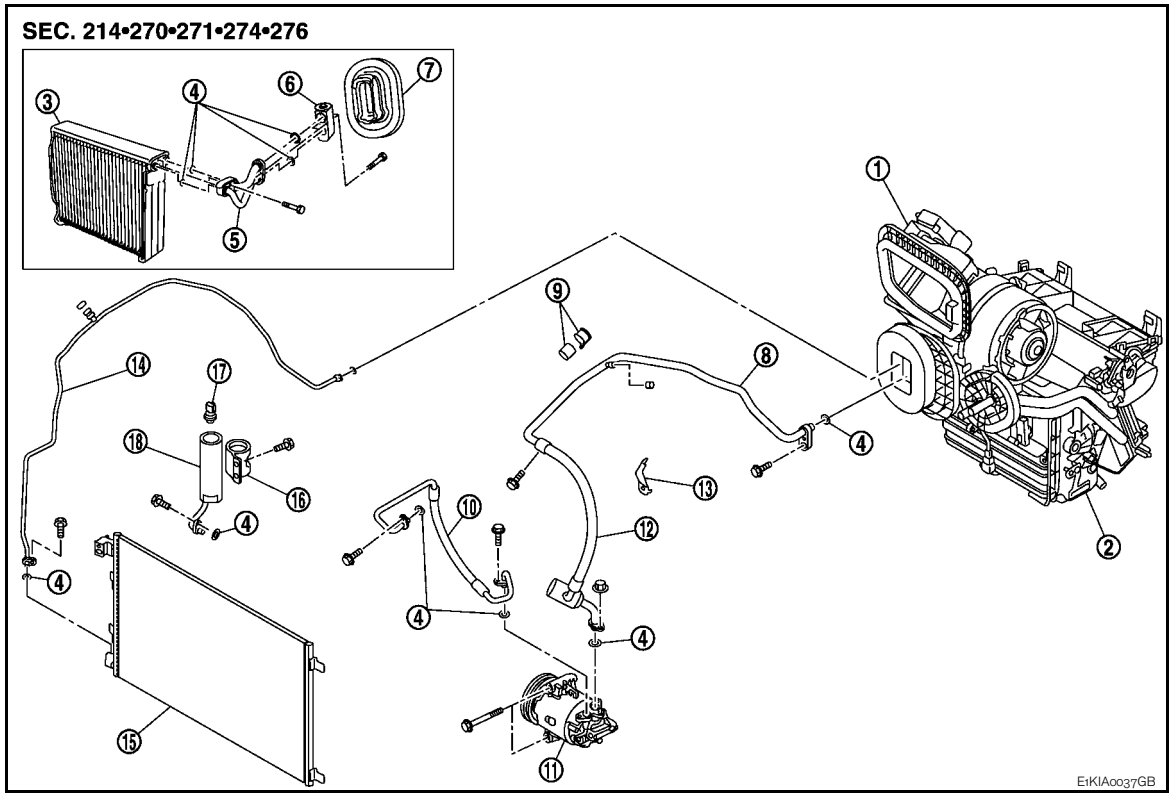
cardiagn.com

HIGH-PRESSURE FLEXIBLE HOSE

Exploded View

INFOID:0000000001093788

Refer to HA-18, "Refrigerant Connection".



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

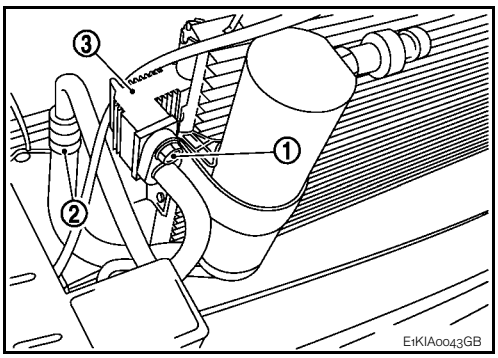
Removal and Installation

INFOID:0000000001093789

REMOVAL

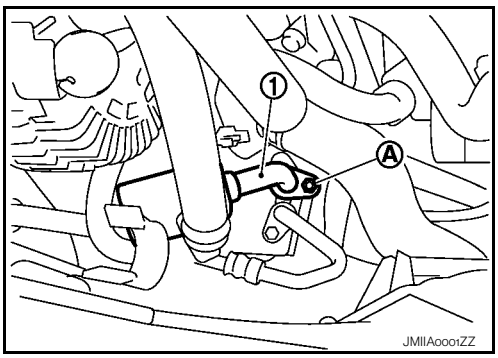
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-146, "Exploded View" (MR engine models).
3. Remove air intake hose (RH) and air duct (LH). Refer to EM-27, "Exploded View" (HR engine models) or EM-144, "Exploded View" (MR engine models).
4. Remove front grille. Refer to EXT-17, "Removal and Installation".

5. Remove high pressure flexible hose fixing bolt (1) from condenser (3), then pull high pressure flexible hose (2) to remove it from condenser.



CAUTION:
Cap or wrap the joint of high-pressure flexible hose and condenser assembly with suitable material such as vinyl tape to avoid the entry of air.

6. Remove high pressure flexible hose fixing bolt (A) from compressor, then pull high pressure flexible hose (1) to remove it from compressor. Remove high pressure flexible hose.



CAUTION:
Cap or wrap the joint of compressor and high-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.

High pressure fixing bolt to condenser
: 4.4 N·m (0.45 kg-m, 39 in-lb)
High pressure fixing bolt to compressor
: 4.4 N·m (0.45 kg-m, 39 in-lb)

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:
- **Replace O-rings of high-pressure flexible hose with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

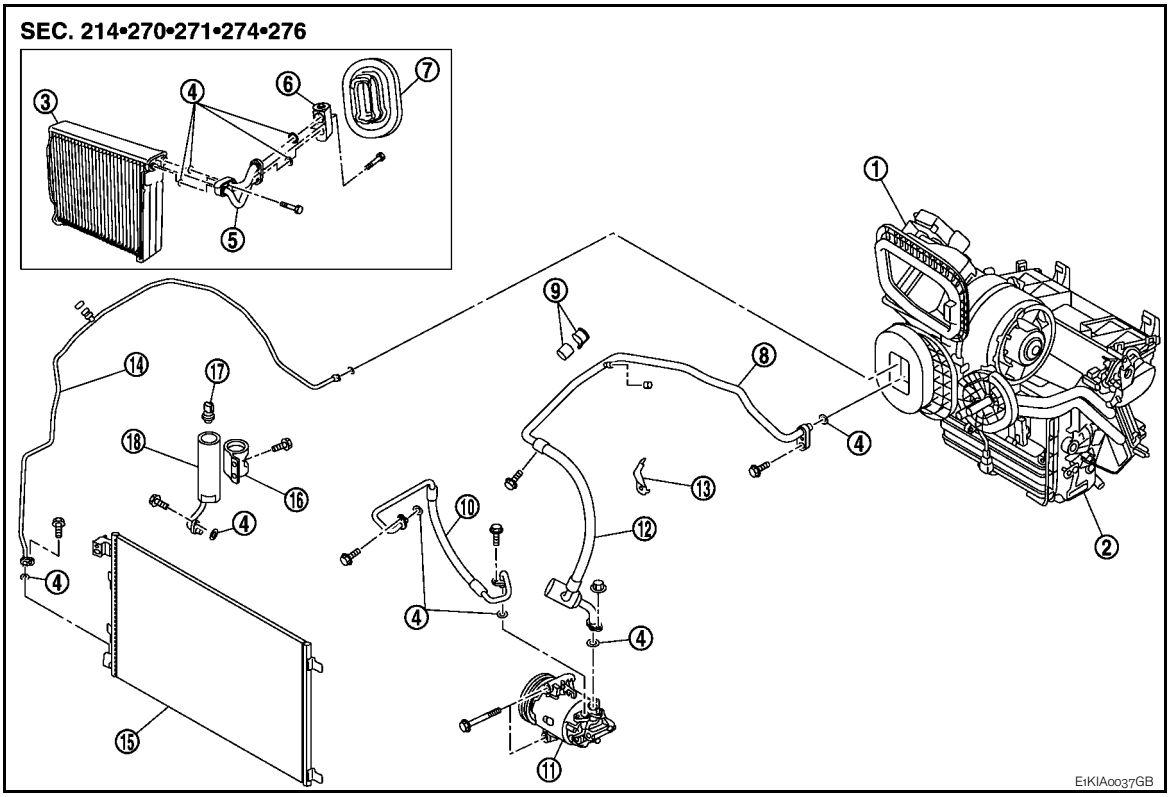
cardiagn.com

HIGH-PRESSURE PIPE 1 (ENGINE COMPARTMENT)

Exploded View

INFOID:0000000001093790

Refer to HA-18, "Refrigerant Connection".



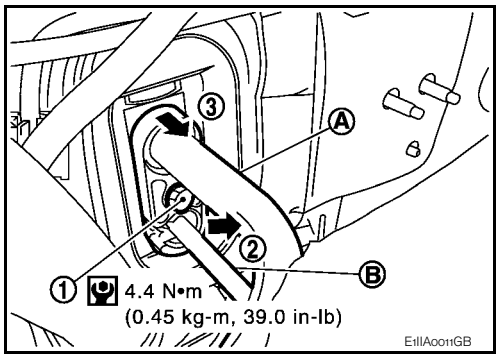
1. Heater & blower unit assembly
2. Heater & cooling unit assembly
3. Evaporator
4. O-ring
5. Low pressure pipe 1 and high pressure pipe 2 assembly
6. Expansion valve
7. Heater sealing
8. Low pressure flexible hose and pipe 2
9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose
11. Compressor
12. Low pressure flexible hose
13. Low & high pipe bracket support
14. High pressure pipe 1
15. Condenser assembly
16. Liquid tank fixing bracket
17. Refrigerant pressure sensor
18. Liquid tank

Removal and Installation

INFOID:0000000001093791

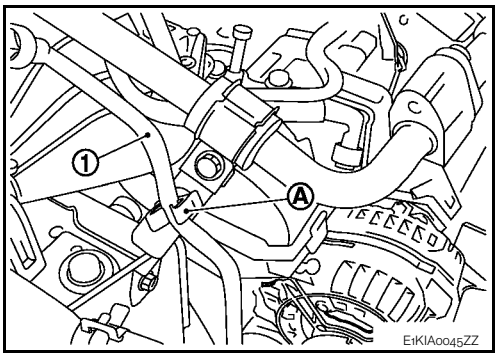
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove intake hose (RH) and air duct (LH). Refer to EM-35, "Removal and Installation""EM-155, "Removal and Installation" (MR engine).
3. Pull engine room insulator, then remove pipes bracket fixing bolt (1), from expansion valve, then release pipe fixing bracket as shown in order (1) to (3) from high pressure pipe 1 (B), to disconnect it from expansion valve.



CAUTION:
Cap or wrap the joint of the high pressure pipe 1, and expansion valve in, with suitable material such as vinyl tape to avoid the entry of air.

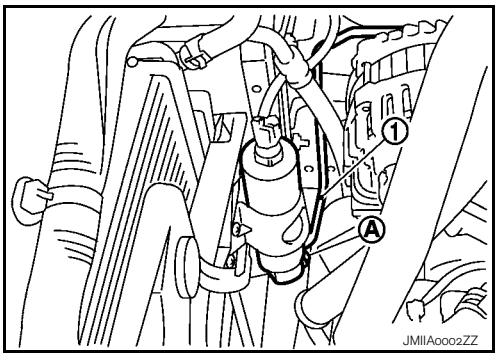
4. Remove high pressure pipe 1 (1) from clip (A).



Remove high-pressure pipe 1 mounting bolt (A) from liquid tank, then remove high-pressure pipe 1 (1).

CAUTION:

Cap or wrap the joint of the high pressure pipe 1, and liquid tank, with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of high-pressure pipe 1 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

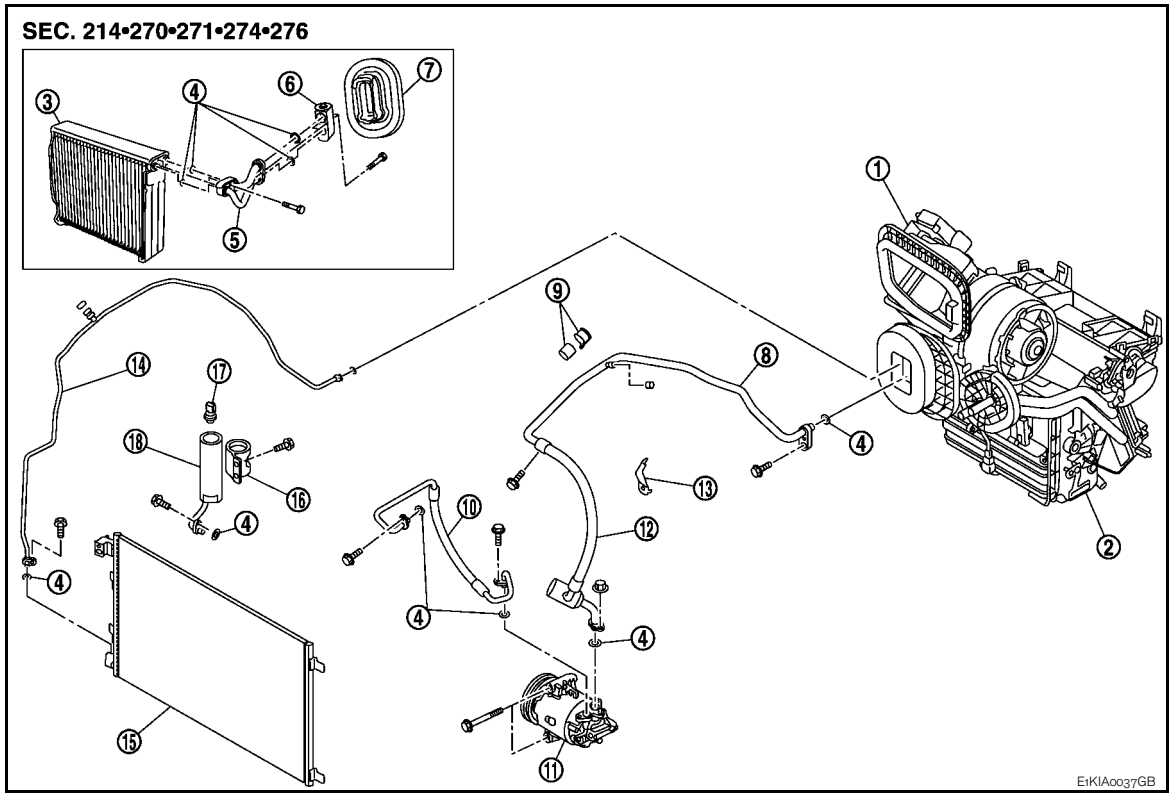
cardiagn.com

LOW-PRESSURE PIPE 1 AND HIGH-PRESSURE PIPE 2

Exploded View

INFOID:0000000001093792

Refer to HA-18, "Refrigerant Connection".



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

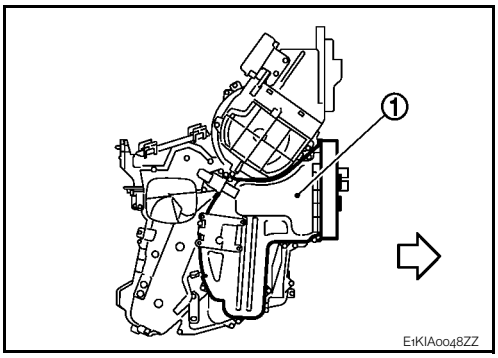
Removal and Installation

INFOID:0000000001093793

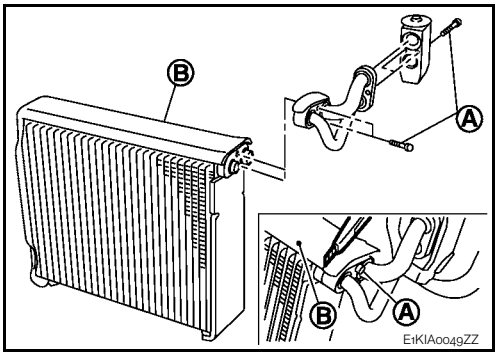
REMOVAL

1. Set the temperature at 18°C (60°F), and then disconnect the battery cable from the negative terminal.
2. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
3. Remove high-pressure pipe 1 and low pressure pipe 2 from expansion valve. Refer to HA-45, "Removal and Installation" and HA-41, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of the, high-pressure pipe 1, low-pressure pipe 2, and the expansion valve with suitable material such as vinyl tape to avoid the entry of air.
4. Remove heater cooling fixing clamp, and heater hoses. Refer to CO-13, "Exploded View" (HR engine models) or CO-34, "Exploded View" (MR engine models).
5. Remove instrument panel.Refer to IP-12, "Removal and Installation".
6. Remove foot duct (RH / LH). Refer to VTL-48, "FOOT DUCTS : Removal and Installation".
7. Remove steering column. Refer to ST-10, "Removal and Installation".
8. Disconnect Heater and cooling unit harness connectors from steering member main harness.

9. Remove steering member. Refer to ST-15, "Removal and Installation".
10. Remove heater and cooling assembly. Refer to VTL-32, "Removal and Installation".
11. Remove mounting screws, and then remove evaporator cover (1).



12. Using a thin cutter, cut the evaporator insulator (B), and then remove fixing bolt (A), and low-pressure pipe 1 and high-pressure pipe 2 assembly.
    CAUTION:
    Cap or wrap the joint of expansion valve, high-pressure pipe 2 and low-pressure pipe 1 with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

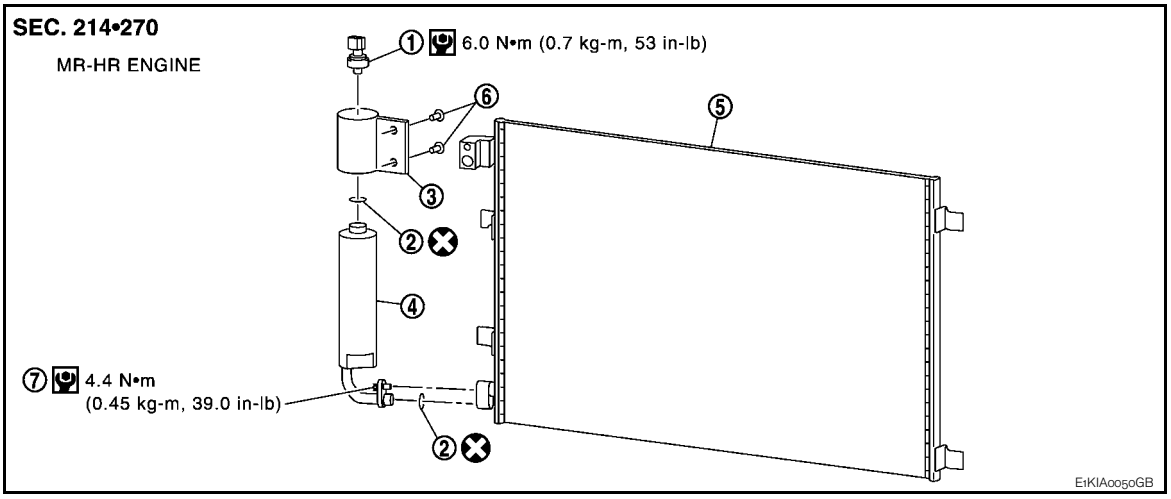
- **Replace O-rings of high-pressure pipe 1, 2 and low-pressure pipe 1, 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

CONDENSER

Exploded View

INFOID:0000000001093794



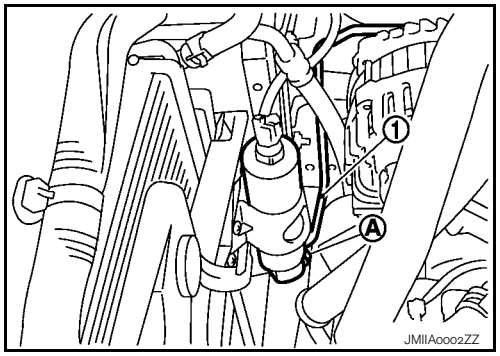
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condenser
6. Liquid tank fixing screw
7. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001093795

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-146, "Exploded View" (MR engine models).
3. Remove front grille. Refer to EXT-17, "Removal and Installation".
4. Remove radiator hose, and drain coolant. Refer to CO-9, "Draining" (HR engine models) or CO-30, "Draining" (MR engine models).
5. Remove upper radiator fixing bracket. Refer to CO-13, "Exploded View" (HR engine models) or CO-34, "Exploded View" (MR engine models).
6. Remove radiator air-guide duct (RH). Refer to Refer to CO-13, "Exploded View" (HR engine models) or CO-34, "Exploded View" (MR engine models).
7. Remove high-pressure pipe 1 (1) fixing bolt (A) and high pressure pipe from liquid tank. Refer to HA-47, "Removal and Installation".



8. Remove high-pressure flexible pipe 1 from condenser. Refer to HA-43, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of low and high-pressure pipe 1 and condenser with suitable material such as vinyl tape to avoid the entry of air.
9. Remove harness connector from refrigerant pressure sensor.
10. Remove liquid tank pipes and liquid tank from condenser and radiator. Refer to HA-51, "Removal and Installation", Refer to CO-13, "Removal and Installation" (HR engine models) or CO-35, "Removal and Installation" (MR engine models).
    CAUTION:
    Cap or wrap the joint of liquid tank pipes and condenser with suitable material such as vinyl tape to avoid the entry of air.
11. Remove radiator fixing brackets. Refer to CO-13, "Exploded View" (HR engine models) or CO-34, "Exploded View" (MR engine models).

12. Release radiator maintaining pawls, then pull-up the condenser assembly to release it from radiator. Refer to CO-13, "Removal and Installation" (HR engine models) or CO-35, "Removal and Installation" (MR engine models).
13. Maintain radiator pushing back.
14. Pull upward to remove condenser.
    CAUTION:
    Take care do not damaged condenser or radiator.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

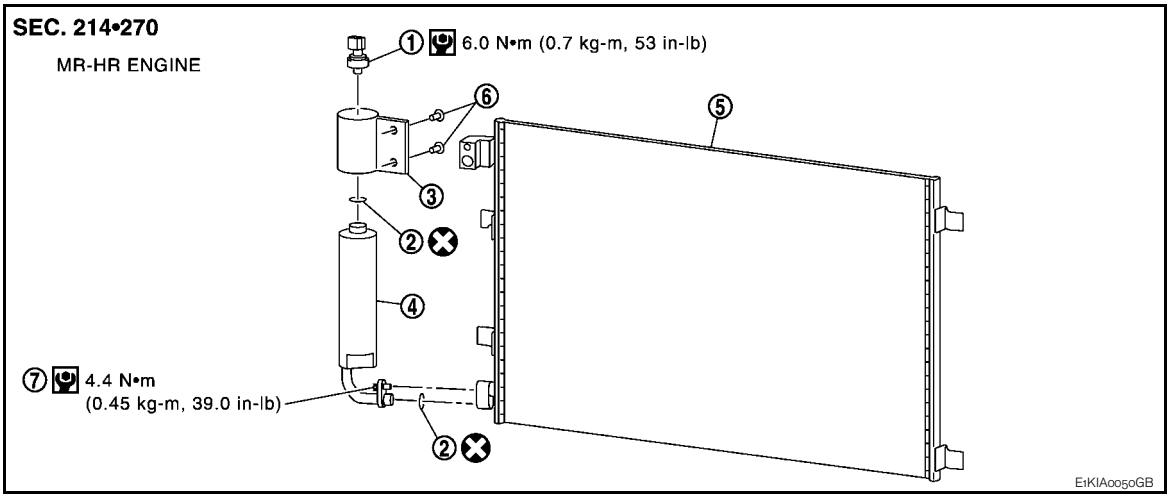
- **Replace O-rings of high-pressure flexible hose and high-pressure pipe 1 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

LIQUID TANK

Exploded View

INFOID:0000000001093798



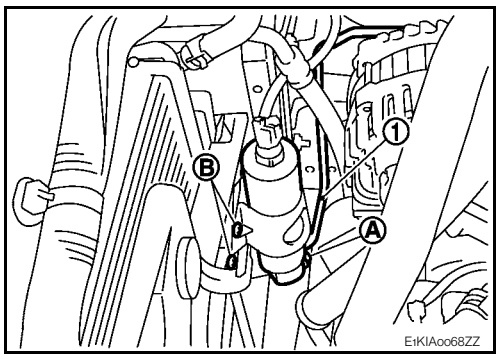
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condenser
6. Liquid tank fixing screw
7. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001093799

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-146, "Exploded View" (MR engine models).
3. Clean liquid tank and its surrounding area, and remove dust and rust from liquid tank.
   CAUTION:
   Be sure to clean carefully.
4. Disconnect refrigerant sensor harness connector. Refer to HA-52, "Removal and Installation".
5. Remove liquid tank bracket support mounting screws (B).
6. Remove high pressure pipe 1 (1) mounting bolt (A) from liquid tank. Refer to HA-45, "Removal and Installation".
7. Remove liquid tank high pressure pipe mounting bolt (A) from condenser.
8. Remove liquid tank pipe bracket fixing screw.
   CAUTION:
   Cap or wrap the joint of high pressure pipe, liquid tank pipes and condenser with suitable material such as vinyl tape to avoid the entry of air.
9. Remove liquid tank assembly.



INSTALLATION

Install liquid tank, and then install liquid tank bracket on condenser.

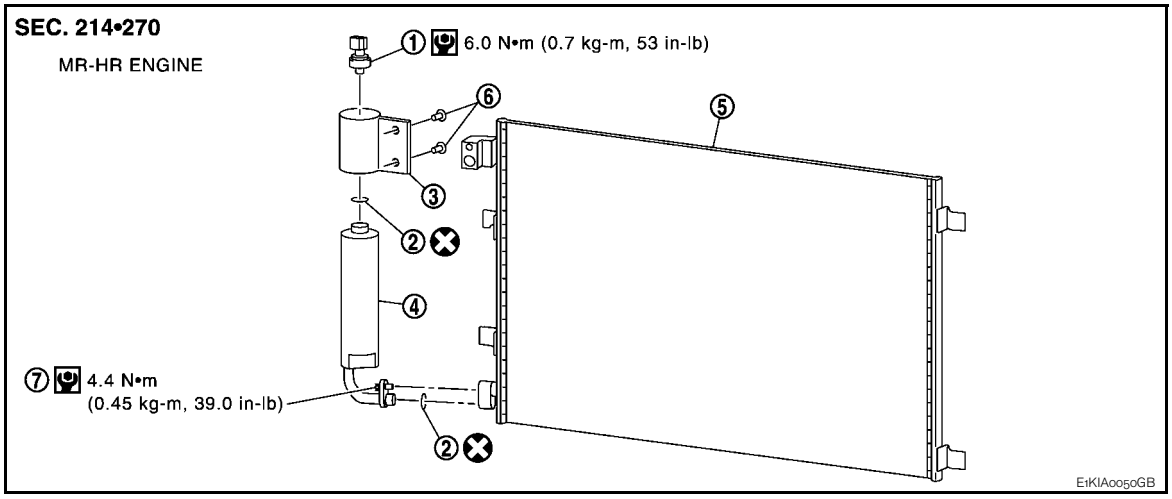
CAUTION:

- **Make sure liquid tank bracket is securely installed at protrusion of condenser. (Make sure liquid tank bracket does not move to a position below center of liquid tank.)**
- **Replace O-rings of A/C piping with new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

REFRIGERANT PRESSURE SENSOR

Exploded View

INFOID:0000000001093800



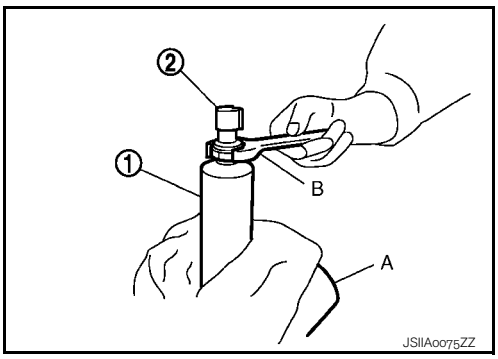
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condenser
6. Liquid tank fixing screw
7. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001093801

REMOVAL

1. Remove liquid tank. Refer to HA-51, "Exploded View".
2. Fix the liquid tank (1) with a vise (A). Remove the refrigerant pressure sensor (2) with a wrench (B).
   CAUTION:
   Be careful not to damage liquid tank.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

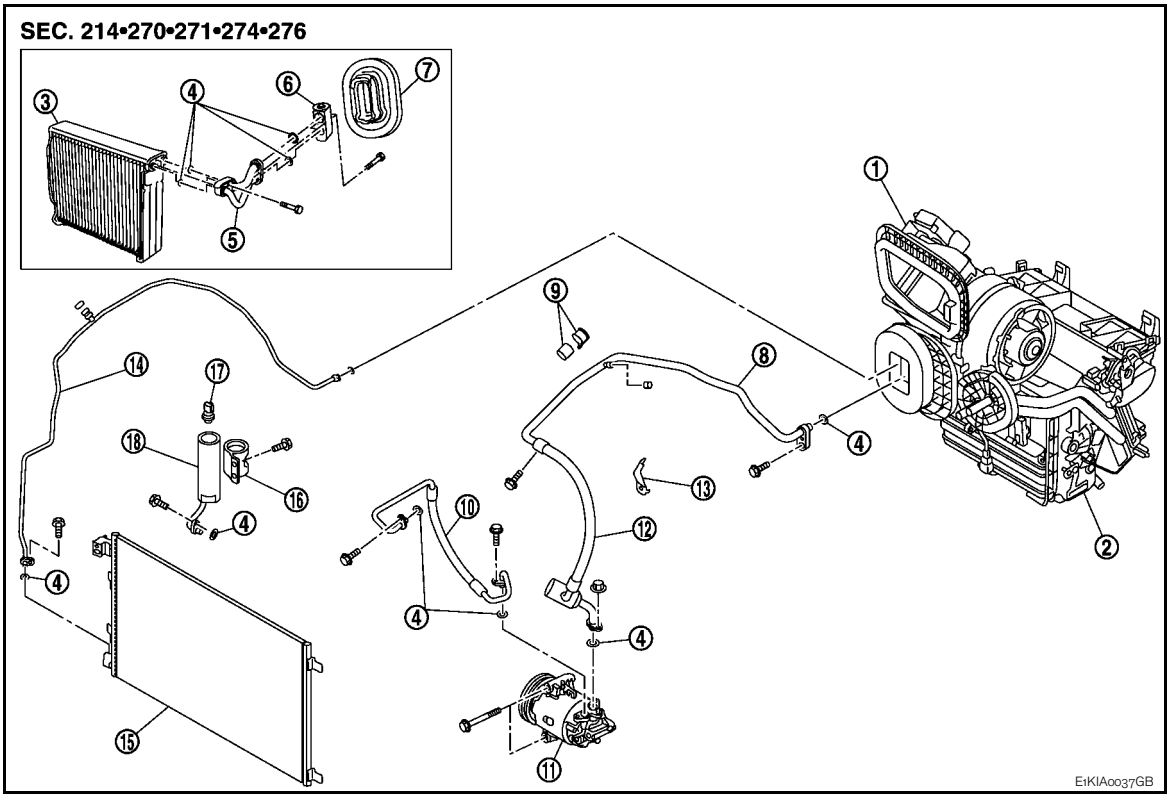
- **Apply compressor oil to O-ring of refrigerant pressure sensor when installing it.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

EVAPORATOR

Exploded View

INFOID:0000000001093802



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

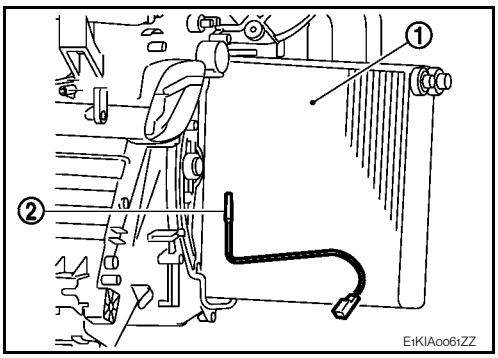
Removal and Installation

INFOID:0000000001093803

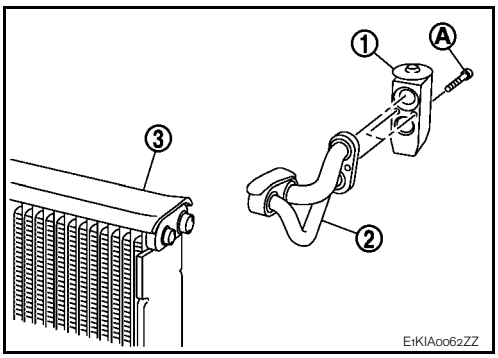
REMOVAL

1. Remove low-pressure pipe 2 and high-pressure pipe 1 from expansion valve. Refer to HA-41, "Removal and Installation". Refer to HA-45, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of expansion valve, low-pressure pipe 2 and high-pressure pipe 1 with suitable material such as vinyl tape to avoid the entry of air.
2. Remove heater and cooling fixing clamp and hoses. Refer to VTL-32, "Removal and Installation", Refer to CO-13, "Removal and Installation" (HR engine models) or CO-35, "Removal and Installation" (MR engine models).
3. Remove heater and cooling unit assembly. Refer to VTL-32, "Removal and Installation".
4. Remove evaporator cover fixing screws and cover. Refer to HA-53, "Removal and Installation".

5. Slide evaporator (1) and intake sensor (2) from heater and cooling unit assembly.
6. Remove evaporator assembly.



7. Cut upper insulator (3) and remove mounting bolt (A), expansion valve (1) and pressure pipe assembly(2), from evaporator.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

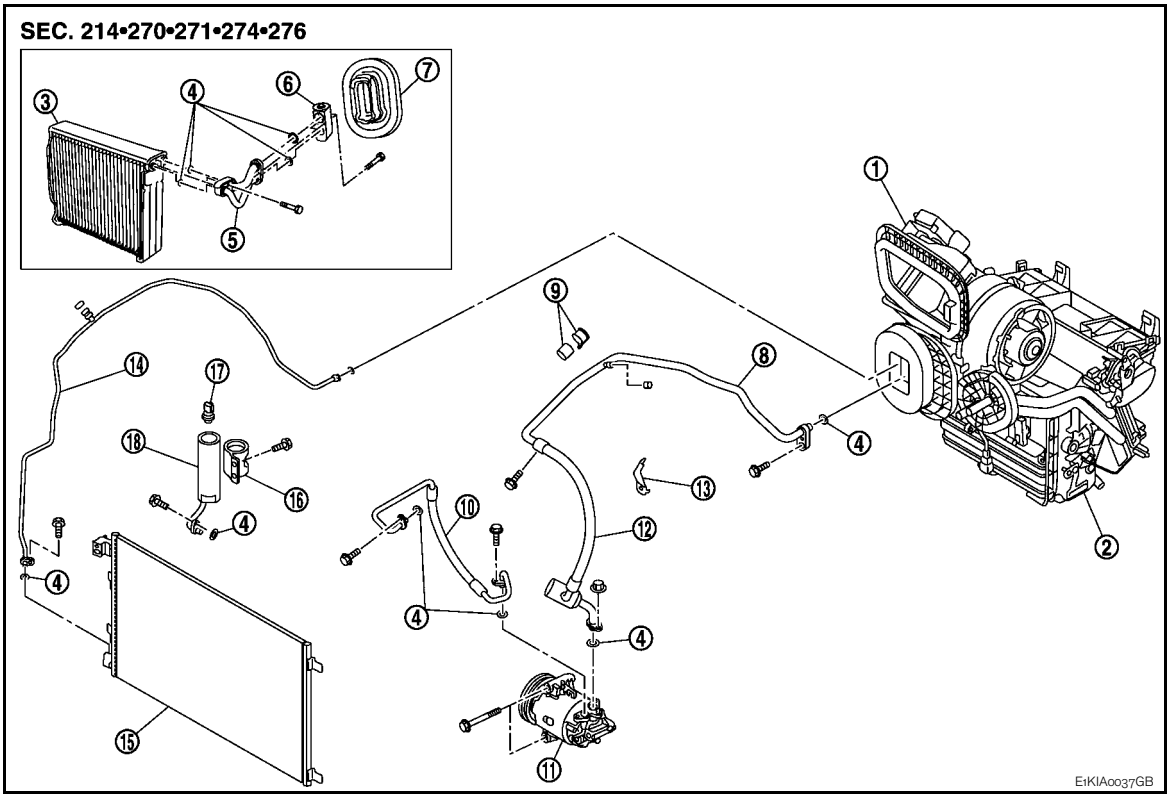
- **Replace O-rings of low-pressure pipe 1 and high-pressure pipe 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **O-rings are different from low-pressure flexible hose (high-pressure pipe 1) and low-pressure pipe 1 (high-pressure pipe 2).**
- **Mark the mounting position of intake sensor bracket prior to removal so that the reinstalled sensor can be located in the same position.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

EXPANSION VALVE

Exploded View

INFOID:0000000001093804



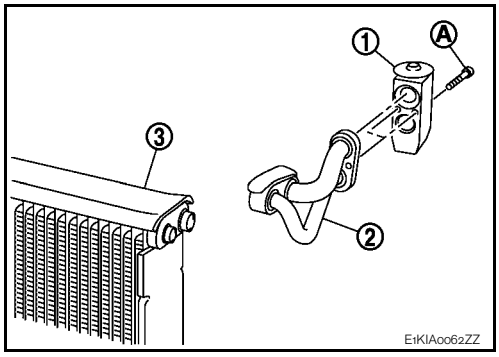
1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

Removal and Installation

INFOID:0000000001093805

REMOVAL

1. Remove evaporator. Refer to HA-53, "Removal and Installation".
2. Remove low pressure pipe 1 and high pressure pipe 2 assembly (2). Refer to HA-47, "Removal and Installation".
3. Remove mounting bolts (A), and then remove expansion valve (1) from low and high, pressure pipe assembly (2).
   CAUTION:
   Cap or wrap the joint of expansion valve, low and high pressure pipe assembly, evaporator and expansion valve with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of evaporator with new ones, and then apply compressor oil to it when installing it.**
- **O-rings are different from low-pressure pipe 1 (high-pressure pipe 1) and low-pressure pipe 2 (high-pressure pipe 2).**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Compressor

INFOID:0000000001093806

Model		CALSONICKANSEI
Type		Variable displacement swash plate
Displacement cm^3 (cu in)/rev	Max.	120 (7.32)
	Min.	6 (0.37)
Cylinder bore × stroke (Max.) mm (in.)		32 × 29 (1.26 × 1.14)
Direction of rotation		Clockwise (viewed from clutch)
Drive belt		Poly V 7 groove (HR engine), Poly V 6 groove (MR engine)

Lubricant

INFOID:0000000001093807

Model		CALSONICKANSEI
Name		Nissan A/C System Oil Type S (DH-PS)
Capacity m ℓ (US fl oz, Imp fl oz)	Total in system	150 (5.03, 5.3)
	Compressor (Service part) charging amount	150 (5.03, 5.3)

Refrigerant

INFOID:0000000001093808

Type	HFC-134a (R-134a)
Capacity kg (lb)	—

Engine Idling Speed

INFOID:0000000001093809

Refer to EC-360, "Idle Speed" (HR engine models with EURO-OBD), EC-637, "Idle Speed" (HR engine models without EURO-OBD), EC-981, "Idle Speed" (MR engine models with EURO-OBD) or EC-1257, "Idle Speed" (MR engine models without EURO-OBD).

Belt Tension

INFOID:0000000001093810

Refer to EM-15, "Tension Adjustment" (HR engine models) or EM-134, "Tension Adjustment" (MR engine models).

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001093876

DETAILED FLOW

1. LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. (Get detailed information about the conditions and environment when the symptom occurs.)

>> GO TO 2.

2. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-6, "Description & Inspection".

>> GO TO 3.

3. GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis (Refer to HAC-108, "Diagnosis Chart By Symptom").

>> GO TO 4.

4. REPAIR OR REPLACE

Repair or replace the specific parts

>> GO TO 5.

5. FINAL CHECK

Final check.

Is the inspection result normal?

YES >> CHECK OUT
NO >> GO TO 3.

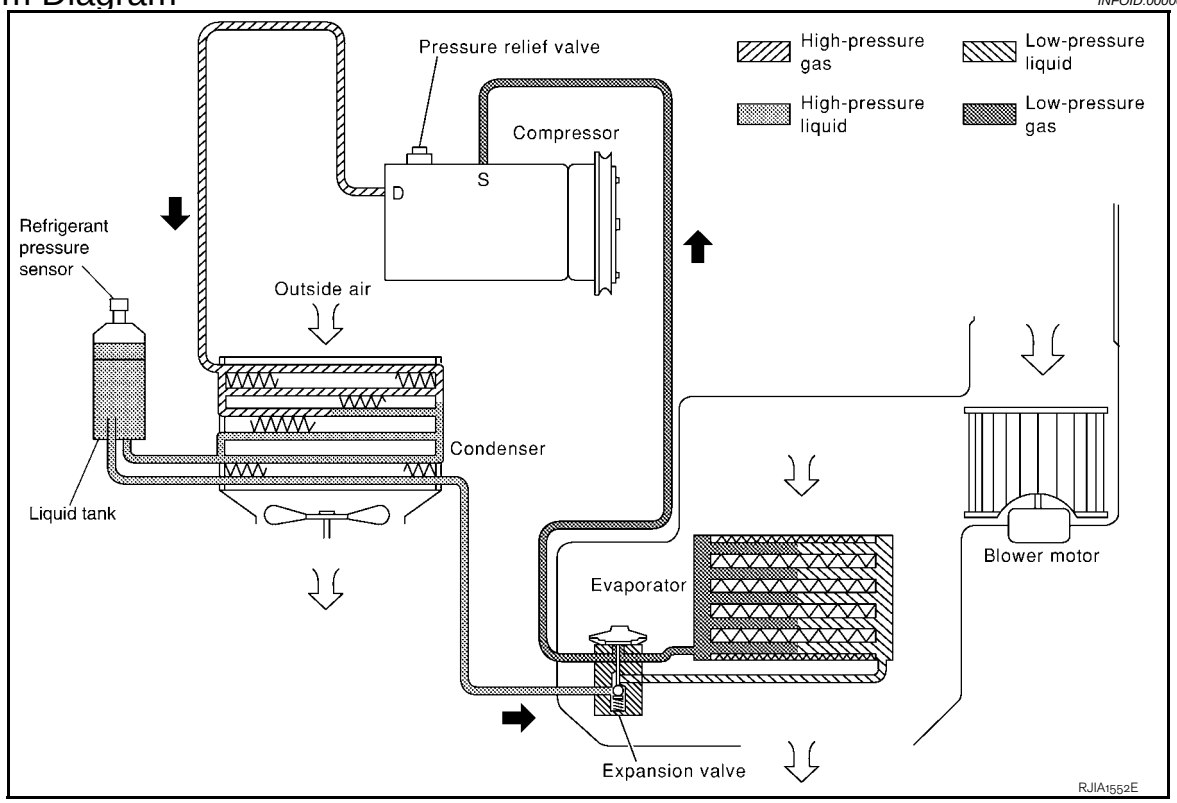
cardiagn.com

FUNCTION DIAGNOSIS

REFRIGERATION SYSTEM

System Diagram

INFOID:0000000001093877



System Description

INFOID:0000000001093878

REFRIGERANT CYCLE

Refrigerant Flow

The refrigerant flows from the compressor, through the condenser with liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation in the evaporator is controlled by an externally equalized expansion valve, located inside the evaporator case.

Freeze Protection

To prevent evaporator frozen up, the evaporator air temperature is monitored, and the voltage signal to the display and A/C auto amp. will make the A/C relay go OFF and stop the compressor.

REFRIGERANT SYSTEM PROTECTION

Refrigerant Pressure Sensor

The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high-pressure side detected by refrigerant pressure sensor is over about 3,119 kPa (31.8 kg/cm^2, 452 psi), or below about 118 kPa (1.2 kg/cm^2, 17 psi).

Pressure Relief Valve

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an unusual level [more than 3,628 kPa (37 kg/cm^2, 526 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.

LUBRICANT

Maintenance of Lubricant Quantity in Compressor

The lubricant in the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large refrigerant leakage occurred. It is important to maintain the specified amount.

If lubricant quantity is not maintained properly, the following malfunctions may result:

- Lack of lubricant: May lead to a seized compressor.
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

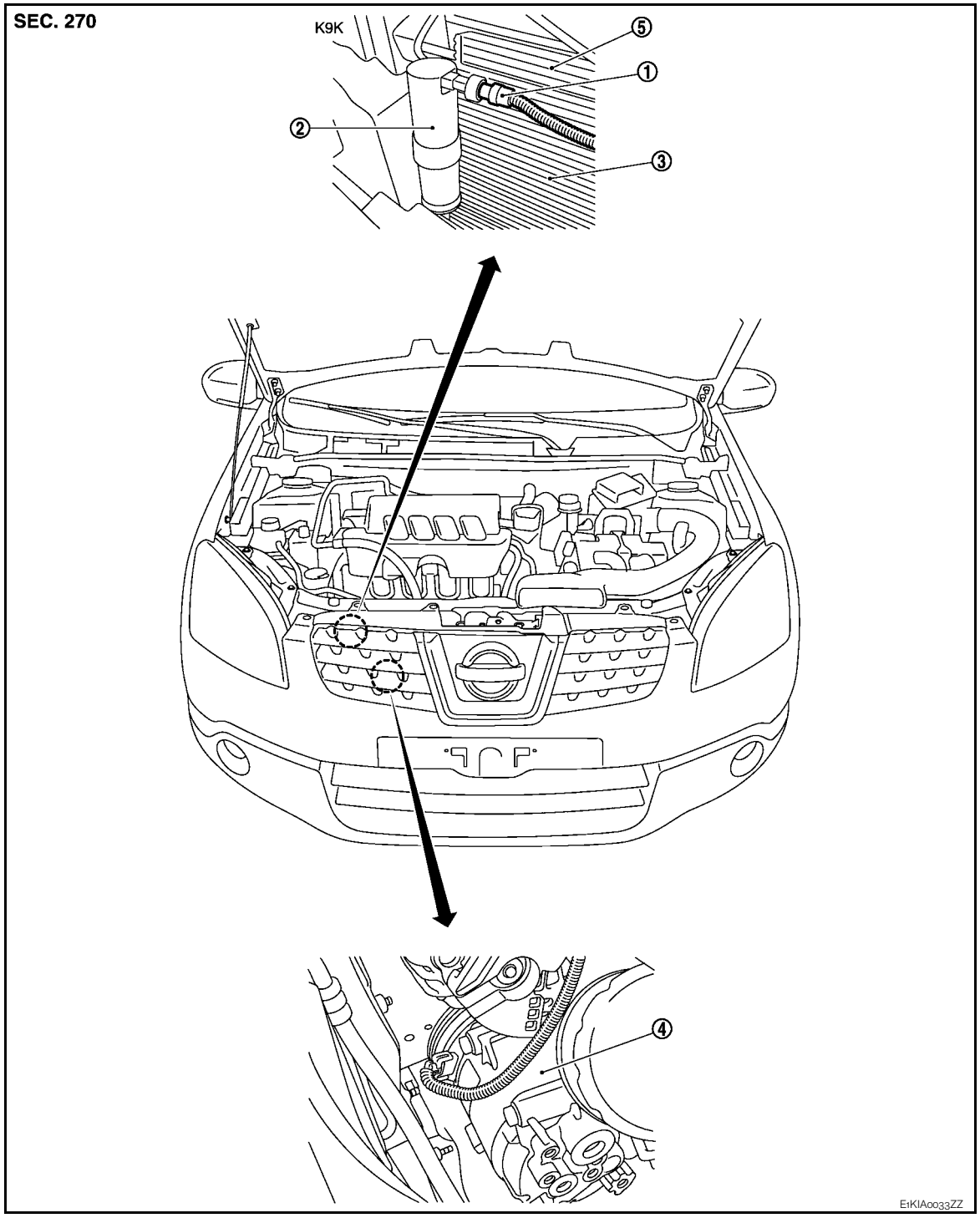
Lubricant

Name : Nissan A/C System Oil Type S

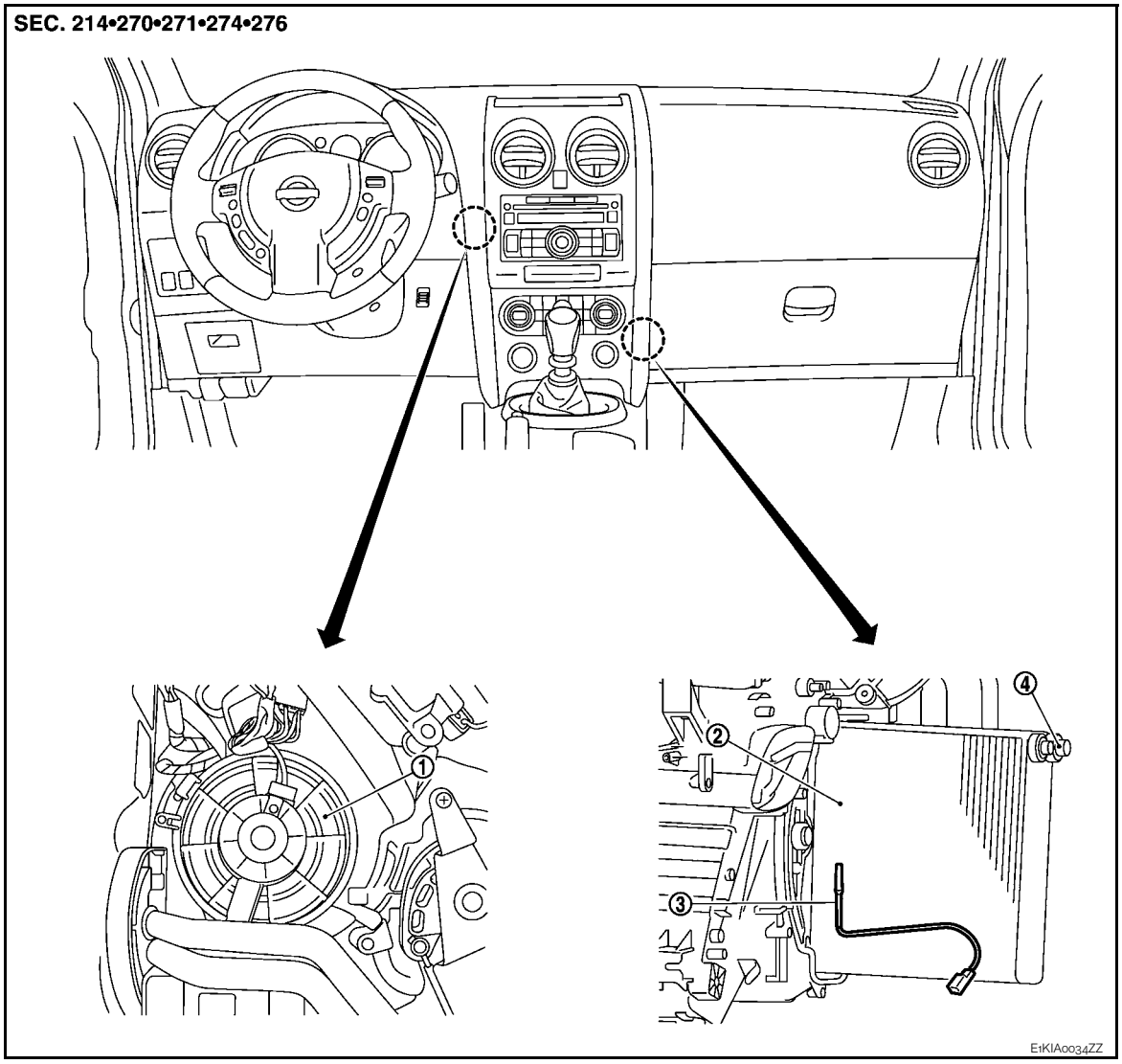
Component Parts Location

INFOID:0000000001093879

cardiagn.com



1. Refrigerant pressure sensor
2. Liquid tank
3. Condenser
4. Compressor
5. Radiator



1. Blower motor assembly
2. Evaporator
3. Intake sensor (AT only)
4. Expansion valve

Component Description

INFOID:0000000001093880

Component	Description
Compressor	Intakes, compresses, and discharges refrigerant, then conveys it to condenser.
Condenser	Condenses refrigerant, and then conveys it to liquid tank.
Liquid tank	Drives moisture out of refrigerant, eliminates foreign matter, then conveys refrigerant to expansion valve.
Refrigerant pressure sensor	Refer to HAC-70, "Component Inspection".
Expansion valve	Vaporizes refrigerant, controls the amount of flow, then conveys refrigerant to evaporator.
Evaporator	Cools passing air, and then conveys it to compressor.
Blower motor	Takes in air in the vehicle or fresh outside air, and then adjusts room temperature by air conditioning.

cardiagn.com

SYMPTOM DIAGNOSIS

REFRIGERATION SYSTEM SYMPTOMS

SYMPTOM DIAGNOSIS PROCEDURE

SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure

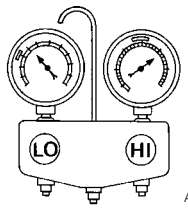
INFOID:0000000001093883

Whenever system's high and/or low side pressure(s) is/are unusual, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table

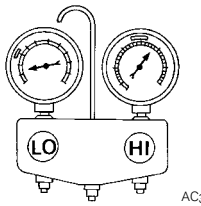
INFOID:0000000001093884

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	The pressure returns to normal is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle.	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance. ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan.	• Clean condenser. • Check and repair cooling fan as necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.). ↓ Air in refrigeration cycle.	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Low-pressure pipe is sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side. • Excessive refrigerant discharge flow. • Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment.	Replace expansion valve.

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table

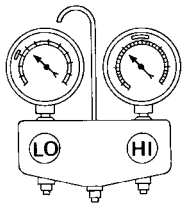
INFOID:0000000001093885

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check lubricant for contamination.

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table

INFOID:0000000001093886

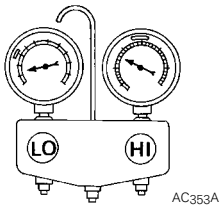
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table

INFOID:0000000001093887

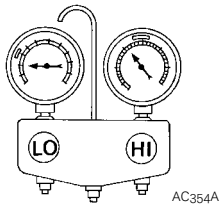
cardiagn.com

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	• There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	• Replace liquid tank. • Check lubricant for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet is frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Expansion valve and liquid tank are warm or slightly cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components.	Check refrigerant for leaks. Refer to HA-81, "Refrigerant Leaks".
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Replace expansion valve. • Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	• Check intake sensor circuit. Refer to HAC-86, "Diagnosis Procedure". • Replace compressor. • Repair evaporator fins. • Replace evaporator. • Refer to HAC-62, "Diagnosis Procedure".

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table

INFOID:0000000001093888

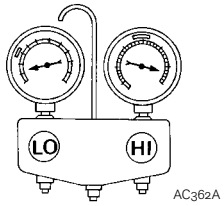
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

LOW-PRESSURE SIDE BECOMES NEGATIVE

cardiag.com

LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table

INFOID:0000000001093889

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or wet with dew.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the malfunction, replace expansion valve. • Replace liquid tank. • Check lubricant for contamination.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001115387

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001115390

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

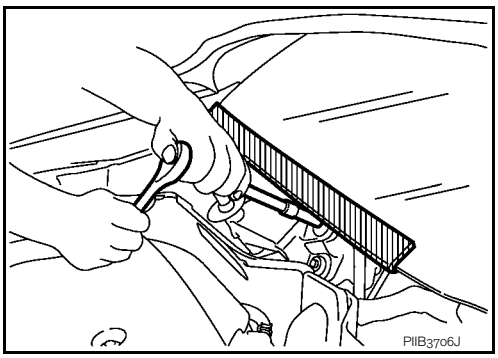
OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001115395

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:0000000001115399

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

Working with HFC-134a (R-134a)

INFOID:0000000001093894

CAUTION:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed and compressor malfunction is likely occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**

- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.**

General Refrigerant Precaution

INFOID:0000000001093895

WARNING:

- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**

cardiagn.com

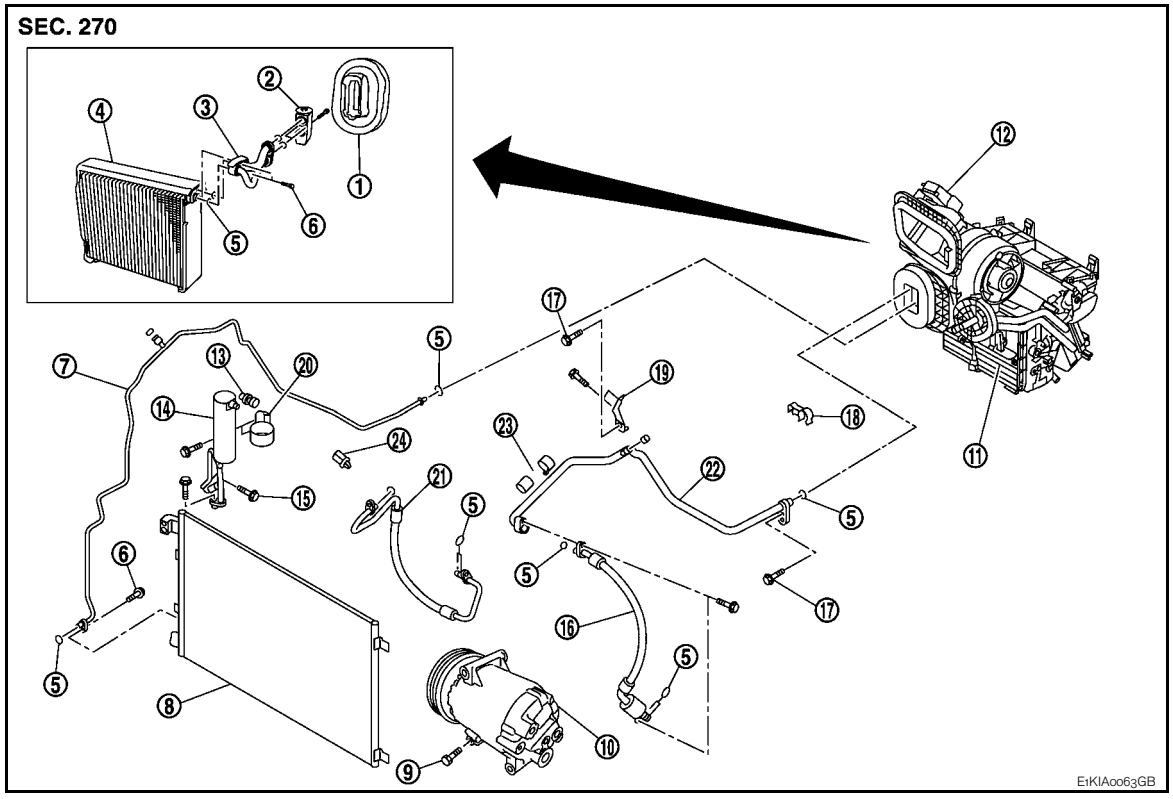
- **Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Never store or heat refrigerant containers above 52°C (126°F).**
- **Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Never intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Refrigerant Connection

INFOID:0000000001093896

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.
- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

O-RING AND REFRIGERANT CONNECTION



1. Heater sealing	2. Expansion valve	3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator	5. O-ring	6. Connector pipe fixing bolt
7. High pressure pipe 1	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Liquid tank fixing screw
16. Low pressure flexible hose	17. Fixing bolt	18. Pipes fixing clip

19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

CAUTION:
The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure flexible hose to Low pressure pipe 2		92473 N8210	1	16
	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure pipe 2 assembly to expansion valve	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure pipe 2 assembly to evaporator	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		01-57-112	2	19
	Compressor to high pressure flexible hose		01-57-112	2	12
	Liquid tank to condenser		92473 N8210	2	16

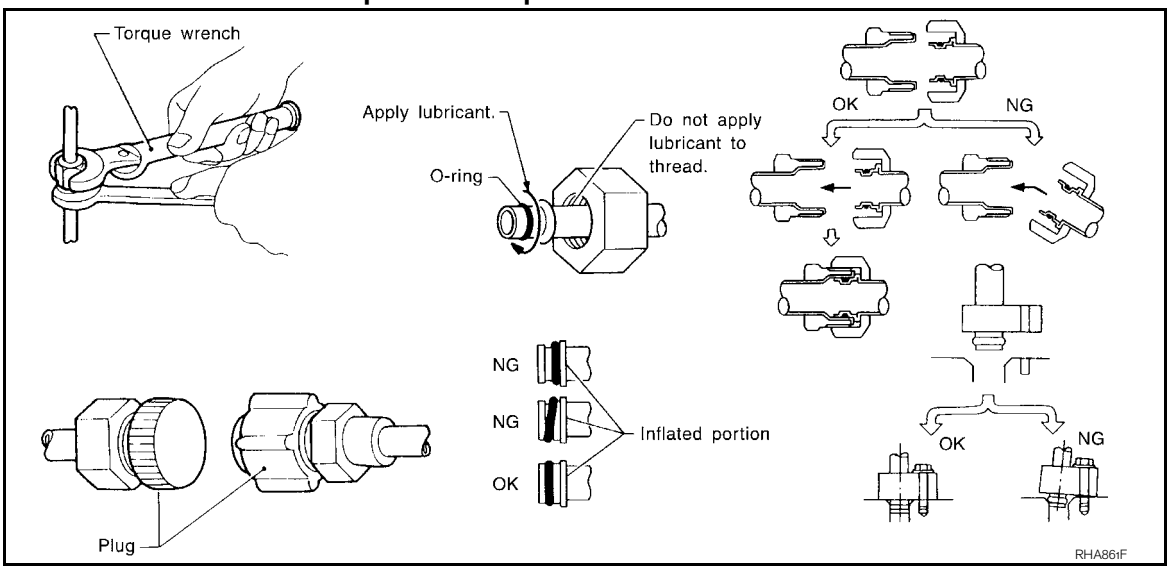
WARNING:
Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.
CAUTION:
When replacing or cleaning refrigerant cycle components, observe the following.
- **When the compressor is removed, store it in the same way at it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Name : Nissan A/C System Oil Type S

- **O-ring must be closely attached to the groove portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.**

cardiagn.com

- **After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Service Equipment

INFOID:0000000001093897

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRICAL LEAK DETECTOR

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

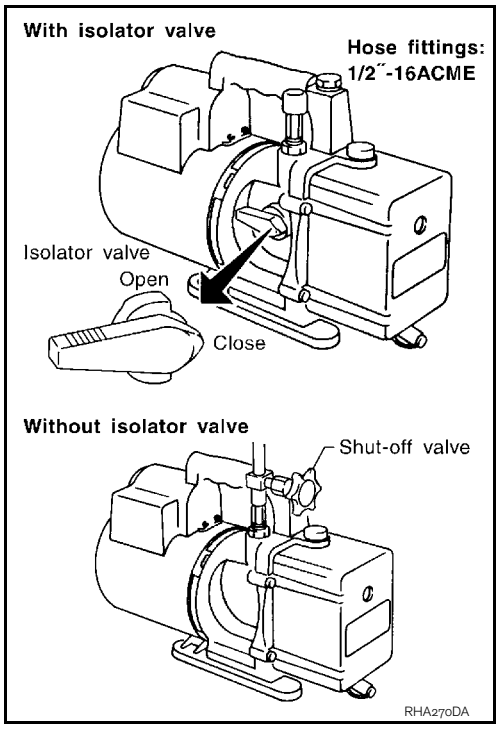
VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

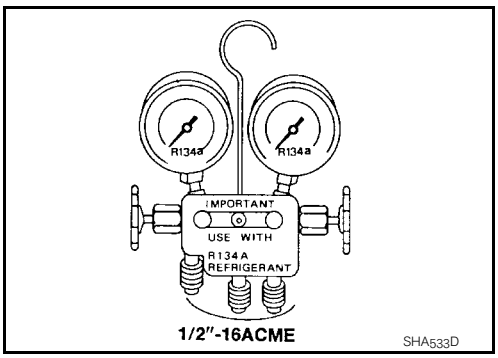
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



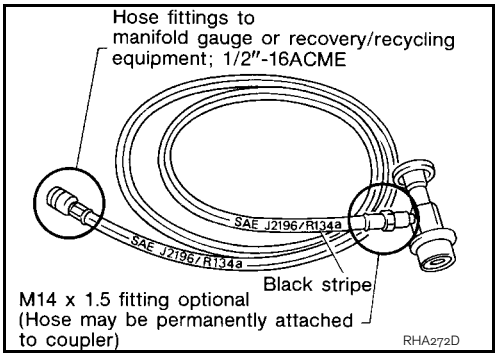
MANIFOLD GAUGE SET

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

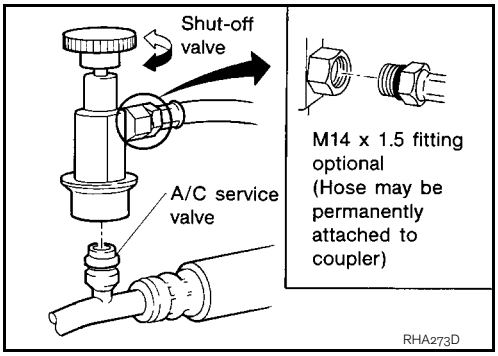
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

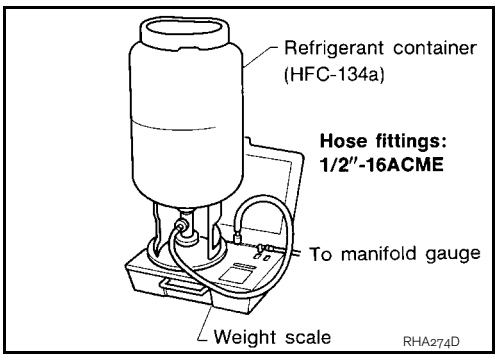
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

cardiagn.com

COMPRESSOR

General Precautions

INFOID:0000000001093898

CAUTION:

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same way at it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to HA-78, "Adjustment".**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

cardiagn.com

LEAK DETECTION DYE

General Precautions

INFOID:0000000001093899

CAUTION:

- **The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.**
- **Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.**
- **The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST: J-41995) to pin-point refrigerant leaks.**
- **For the purpose of safety and customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.**
- **A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electrical leak detector (SST: J-41995).**
- **Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.**
- **Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.**
- **Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).**
- **Never use more than one refrigerant dye bottle (1/4 ounce /7.4 cc) per A/C system.**
- **Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Never use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.**
- **The fluorescent properties of the dye will remain for three years or a little over unless a compressor malfunction occurs.**

IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have the identification label on the front side of hood.

cardiagn.com

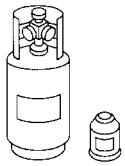
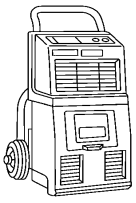
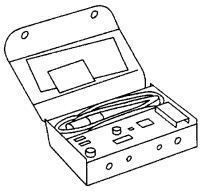
PREPARATION

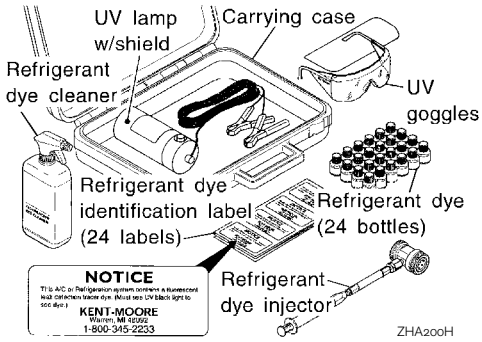
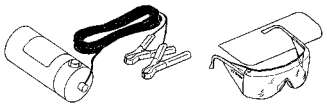
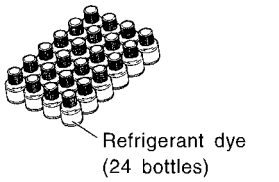
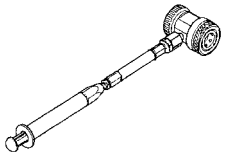
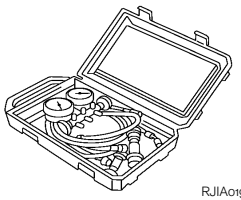
PREPARATION

HFC-134a (R-134a) Service Tools and Equipment

INFOID:0000000001093900

Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/ or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

Tool number Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2 ″ -16 ACME
KLH00-PAGS0 Nissan A/C System Oil Type S(DH-PS)	S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) wobble (swash) plate compressors (Nissan only) Lubricity: 40 m ℓ (1.4 Imp fl oz.)
Recovery/Recycling/ Recharging equipment (ACR4)	 RJIA0195E	Function: Refrigerant recovery and recycling and recharging
Electrical leak detector	 A/C leak detector SHA705EB	Power supply: DC 12V (Cigarette lighter)

Tool number Tool name		Description
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a)dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner		Power supply: DC 12V (Battery terminal)
(J-42220) UV lamp and UV safety goggles		Power supply: DC 12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
(J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)		Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle		For injecting 1/4 ounce of fluorescent leak detection dye into A/C system.
(J-43872) Refrigerant dye cleaner		For cleaning dye spills.
Manifold gauge set (with hoses and couplers)		Identification: • The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size • 1/2″-16 ACME

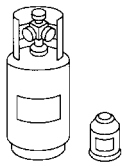
Sealant or/and Lubricant

INFOID:0000000001093902

cardiagn.com

HFC-134a (R-134a) Service Tool and Equipment

- Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
- Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
- Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
- Never use adapters that convert one size fitting to another: refrigerant/lubricant contamination occurs and compressor malfunction may result.

Tool name	Description
HFC-134a (R-134a) refrigerant  S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
Nissan A/C System Oil Type S (DH-PS) S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) swash plate compressors (Nissan only) Capacity: 40 m ℓ (1.4 US fl oz., 1.4 Imp fl oz.)

ON-VEHICLE MAINTENANCE

LUBRICANT

Adjustment

INFOID:0000000001093903

LUBRICANT RETURN OPERATION

Adjust the lubricant quantity according to the test group shown below.

1.CHECK LUBRICANT RETURN OPERATION

Can lubricant return operation be performed?

- A/C system works properly.
- There is no evidence of a large amount of lubricant leakage.

CAUTION:

If excessive lubricant leakage is noted, never perform the lubricant return operation.

Is it successful?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS

1. Start the engine, and set to the following conditions:
- Engine speed: Idling to 1,200 rpm
- A/C switch: ON
- Blower speed: Max. position
- Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).]
- Intake position: Recirculation (REC)
2. Perform lubricant return operation for about 10 minutes.
3. Stop the engine.

>> GO TO 3.

3.CHECK REPLACEMENT PART

Should the compressor be replaced?

YES >> Refer to "LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT".
NO >> Refer to "LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR".

LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR

After replacing any of the following major components, add the correct amount of lubricant to the system.
Amount of lubricant to be added:

Part replaced	Lubricant to be added to system	Remarks
	Amount of lubricant mℓ (US fl oz., Imp fl oz.)	
Evaporator	75 (2.5, 2.6)	—
Condenser	35 (1.2, 1.2)	—
Liquid tank	10 (0.3, 0.4)	—
In case of refrigerant leak	30 (1.0, 1.1)	Large leak
	—	Small leak *1

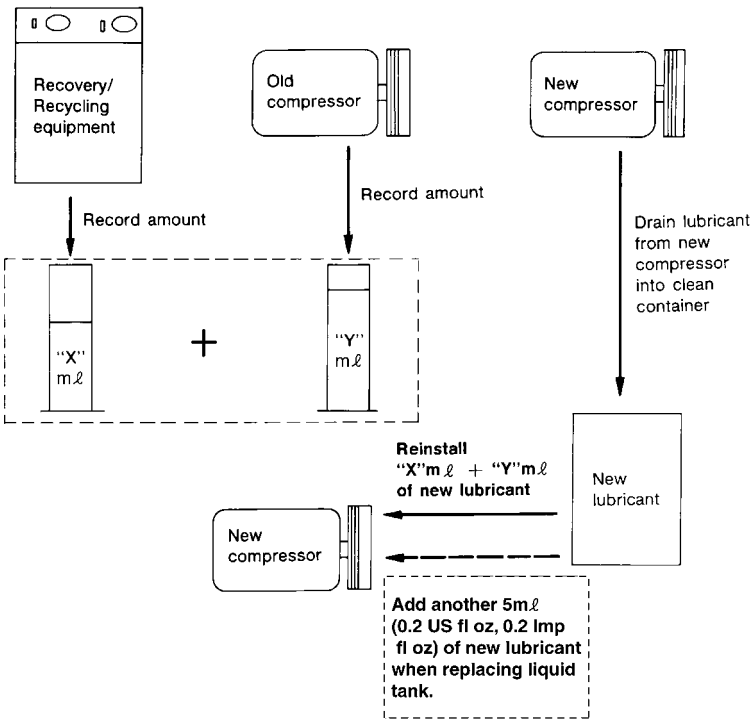
*1: If the refrigerant leak is small, no addition of lubricant is needed.

LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT

cardiagn.com

1. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect recovery/recycling recharging equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to HA-68, "Working with HFC-134a (R-134a)".
3. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to HA-68, "Working with HFC-134a (R-134a)".
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
5. Drain the lubricant from the old (removed) compressor into a graduated container and recover the amount of lubricant drained.
6. Drain the lubricant from the new compressor into a separate, clean container.
7. Measure an amount of new lubricant installed equal to amount drained from old compressor. Add this lubricant to new compressor through the suction port opening.
8. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to new compressor through the suction port opening.
9. If the liquid tank also needs to be replaced, add another 5 m ℓ (0.2 US fl oz., 0.2 Imp fl oz.) of lubricant at this time.
   Do not add this 5 m ℓ (0.2 US fl oz., 0.2 Imp fl oz.) of lubricant when replaces the compressor only.

Lubricant adjusting procedure for compressor replacement

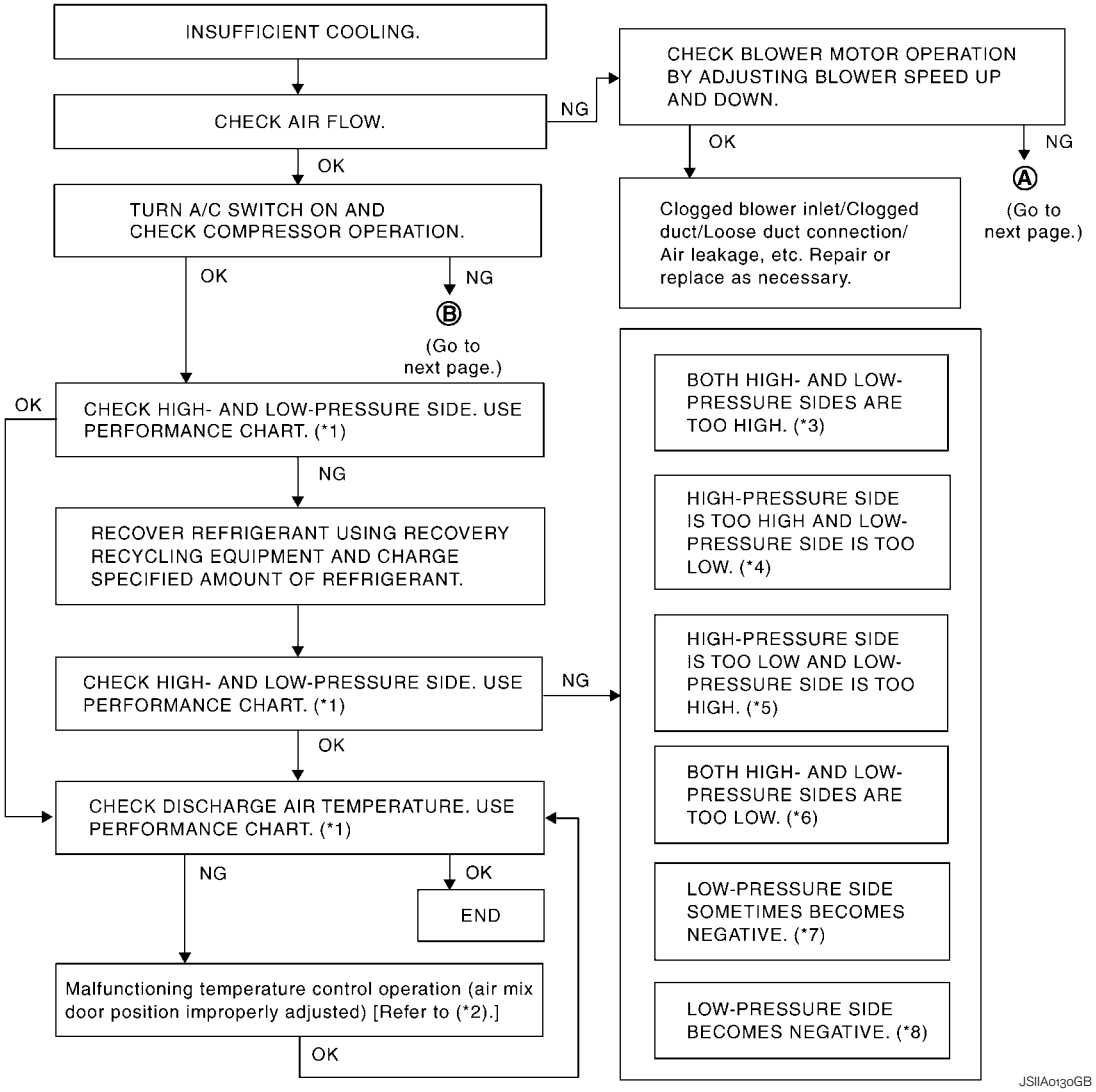


REFRIGERATION SYSTEM

Inspection

INFOID:0000000001093904

PERFORMANCE TEST DIAGNOSIS



*2 HAC-54, "Diagnosis Procedure"

*3 HA-63, "BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table"

*4 HA-63, "HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table"

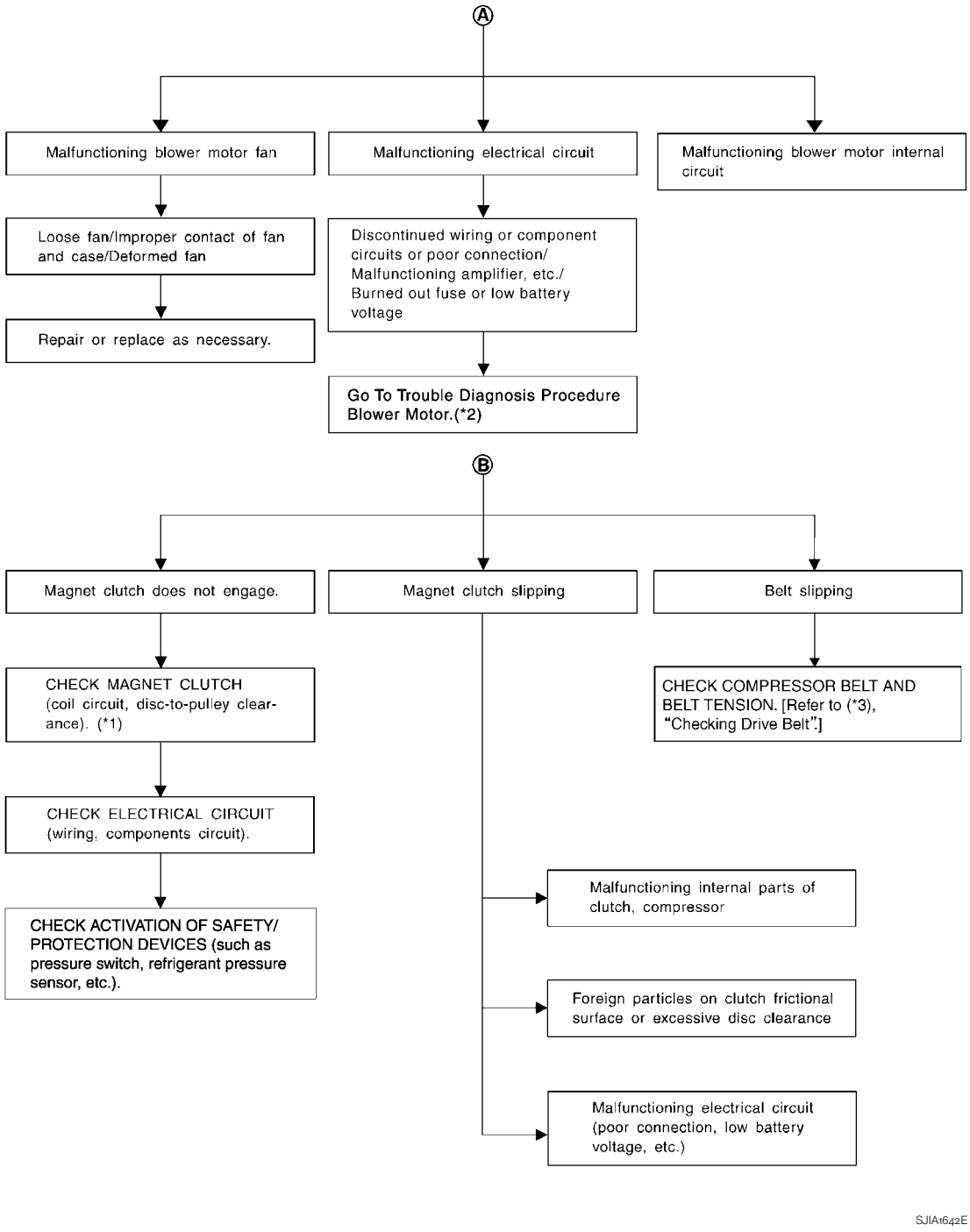
*5 HA-64, "HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table"

*6 HA-64, "BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table"

*7 HA-65, "LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table"

*8 HA-66, "LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table"

cardiagn.com



SJIA1642E

*2 HAC-62, "Diagnosis Procedure" *3 EM-259, "Inspection and Adjustment"

Refrigerant Leaks

INFOID:0000000001093906

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C lubricant leakage, damage and corrosion. A/C lubricant leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using either an electrical leak detector or fluorescent dye leak detector (SST: J-42220).
If dye is observed, confirm the leak with an electrical leak detector. It is possible a prior leak was repaired and not properly cleaned.

When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.
When searching for refrigerant leaks using an electrical leak detector, move the probe along the suspected leak area at 1 to 2 inches per second and no further than 1/4 inch from the component.

CAUTION:

Moving the electrical leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

cardiagn.com

FLUORESCENT LEAK DETECTOR

Inspection

INFOID:0000000001093907

CHECKING SYSTEM FOR LEAKS USING THE FLUORESCENT LEAK DETECTOR

1. Check A/C system for leaks using the UV lamp and safety goggles (SST: J-42220) in a low sunlight area (area without windows preferable). Illuminate all components, fittings and lines. The dye will appear as a bright green/yellow area at the point of leakage. Fluorescent dye observed at the evaporator drain opening indicates an evaporator core assembly (tubes, core or expansion valve) leak.
2. If the suspected area is difficult to see, use an adjustable mirror or wipe the area with a clean shop rag or cloth, with the UV lamp for dye residue.
3. After the leak is repaired, remove any residual dye using dye cleaner (SST: J-43872) to prevent future misdiagnosis.
4. Perform a system performance check and verify the leak repair with an approved electrical leak detector.

NOTE:
Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and lubricants, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean.
Clean with a dry cloth or blow off with shop air.
Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

DYE INJECTION

(This procedure is only necessary when recharging the system or when the compressor has seized and was replaced.)

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.52 kg/cm^2, 50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool (SST: J-41459).
3. Connect the injector tool to the A/C low-pressure side service valve.
4. Start the engine and switch A/C ON.
5. When the A/C operating (compressor running), inject one bottle (1/4 ounce / 7.4 cc) of fluorescent dye through the low-pressure service valve using dye injector tool (SST: J-41459) (refer to the manufacture's operating instructions).
6. With the engine still running, disconnect the injector tool from the service valve.
   CAUTION:
   Be careful the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.
7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.
8. Attach a blue label as necessary.

cardiagn.com

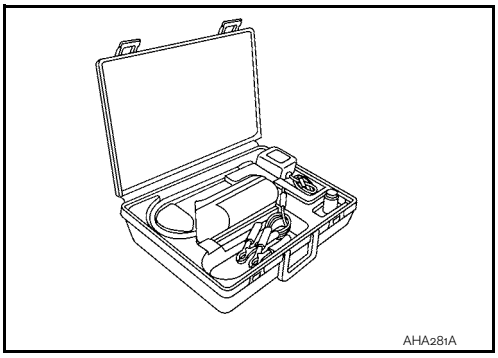
ELECTRICAL LEAK DETECTOR

Inspection

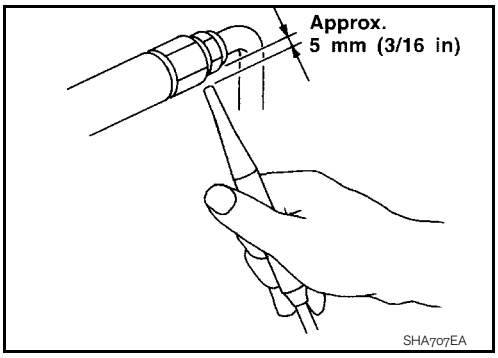
INFOID:0000000001093908

PRECAUTIONS FOR HANDLING LEAK DETECTOR

When performing a refrigerant leak check, use an electrical leak detector (SST: J-41995) or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.

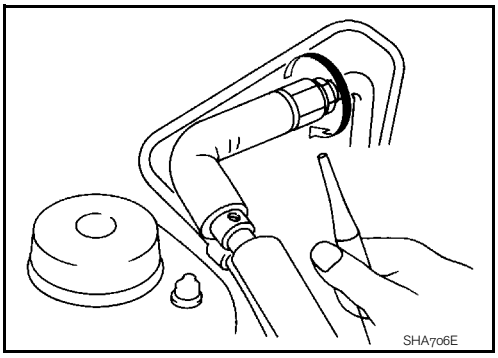

AHA281A

1. Position probe approximately 5 mm (3/16 in) away from point to be checked.

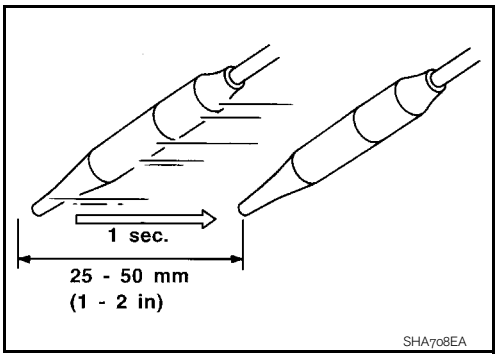


SHA707EA

2. When testing, circle each fitting completely with probe.


SHA706E

3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.



SHA708EA

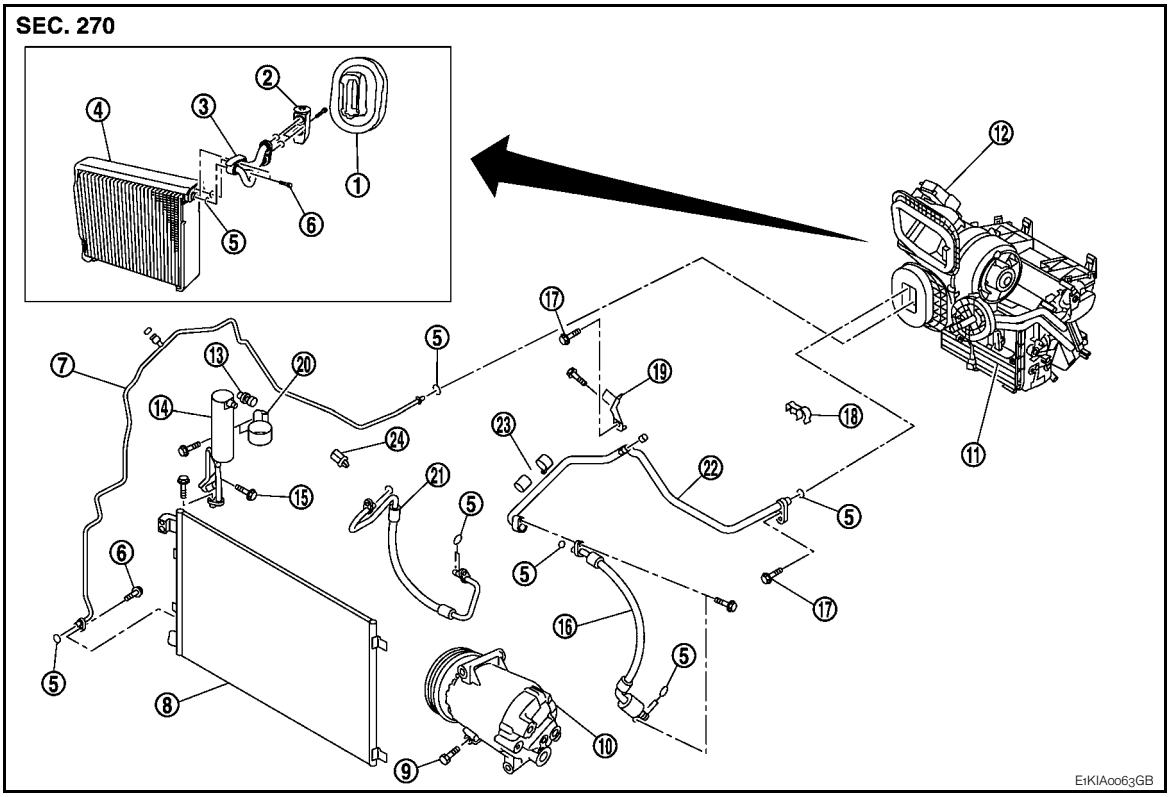
CHECKING PROCEDURE

To prevent inaccurate or false readings, make sure there is no refrigerant vapor, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Stop the engine.

cardiagn.com

2. Connect a suitable A/C manifold gauge set (SST: J-39183) to the A/C service valves.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm^2, 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.
NOTE:
At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm^2, 50 psi).
4. Perform the leak test from the high-pressure side (compressor discharge a to evaporator inlet j) to the low-pressure side (evaporator drain hose k to shaft seal p). Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detected probe completely around the connection/component.



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Compressor
Check the fitting of high- and low-pressure flexible hoses, relief valve and shaft seal.
Condenser
Check the fitting of condenser pipe assembly, high-pressure flexible hose and pipe.
Liquid tank
Check the fitting of radiator & condenser assembly and refrigerant pressure sensor.
Service valves
Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).
NOTE:

After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.

Cooling unit (Evaporator)

With engine OFF, turn blower fan on “High” for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer’s recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.

Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components. If no leaks are found, perform steps 7 - 10.
7. Start the engine.
8. Set the A/C control as follows;

a. A/C switch: ON

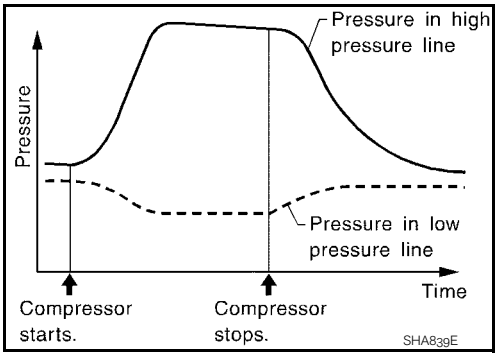
b. MODE door position: VENT (Ventilation)

c. Intake door position: Recirculation

d. Temperature setting: Max. cold

e. Fan speed: High

9. Run engine at 1,500 rpm for at least 2 minutes.
10. Stop the engine and perform leak check again following steps 4 through 6 above.
    Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector at the compressor. The pressure on the high-pressure side will gradually drop after refrigerant circulation stops and pressure on the low-pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.



11. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines and then check refrigerant purity.
12. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier.
13. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier.
14. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component if necessary.
15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
16. Perform A/C performance test to ensure system works properly.

cardiagn.com

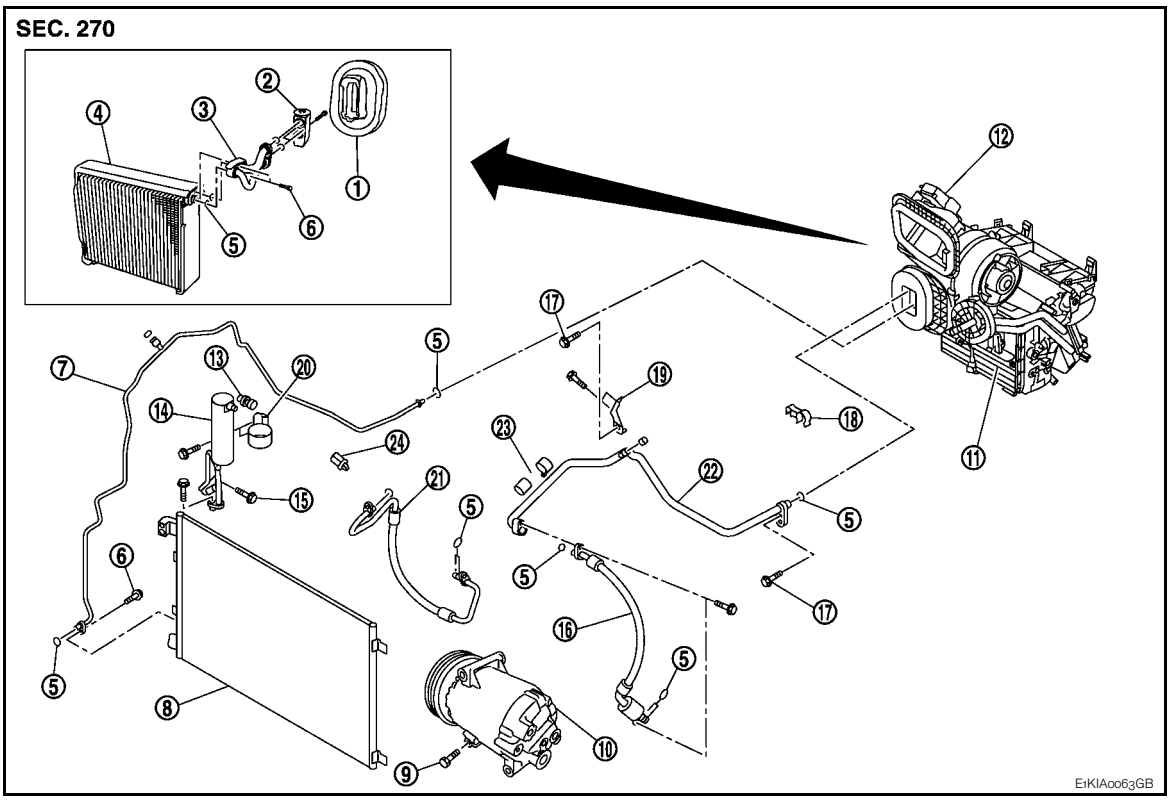
ON-VEHICLE REPAIR

REFRIGERATION SYSTEM

Exploded View

INFOID:0000000001093909

Refer to HA-69, "Refrigerant Connection".



1. Heater sealing	2. Expansion valve	3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator	5. O-ring	6. Connector pipe fixing bolt
7. High pressure pipe 1	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Liquid tank fixing screw
16. Low pressure flexible hose	17. Fixing bolt	18. Pipes fixing clip
19. Low & high pressure pipe bracket	20. Liquid tank fixing bracket	21. High pressure flexible hose
22. Low pressure pipe 2	23. Low pressure pipe fixing clamp assembly	24. Pipe mantening clip

Inspection After Installation

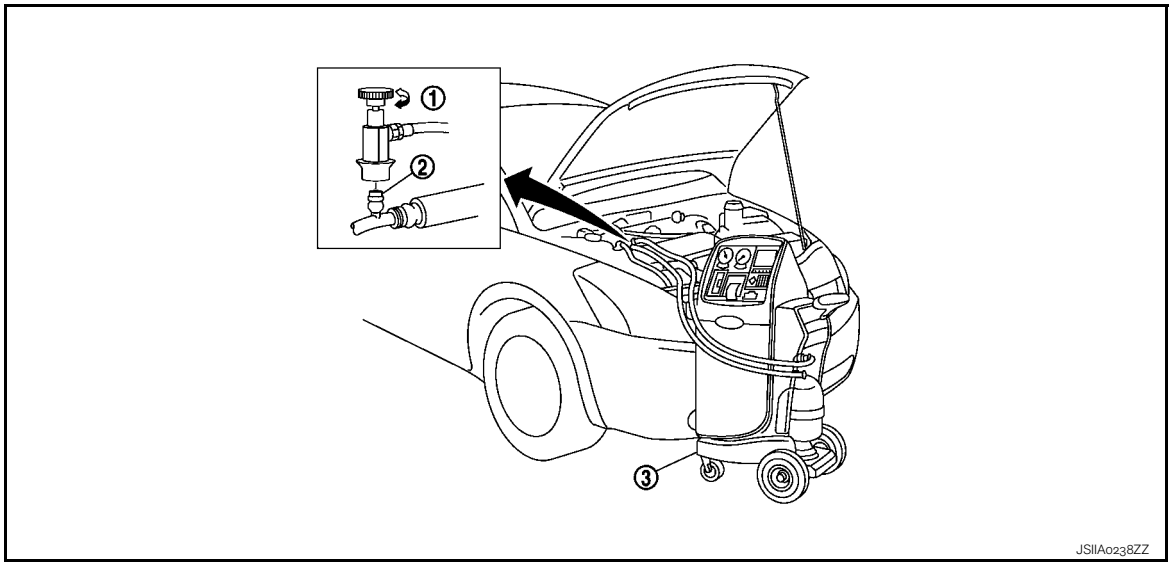
INFOID:0000000001093910

SETTING OF SERVICE TOOLS AND EQUIPMENT

Discharging Refrigerant

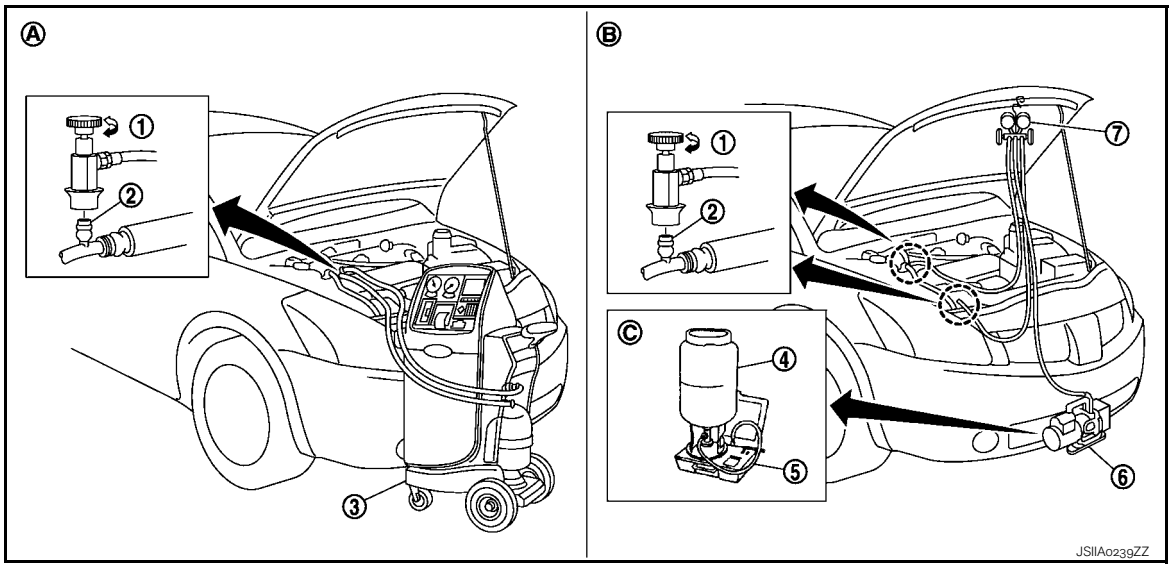
WARNING:

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment] or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.



1. Shut-off valve
2. A/C service valve
3. Recovery/Recycling/Recharging equipment

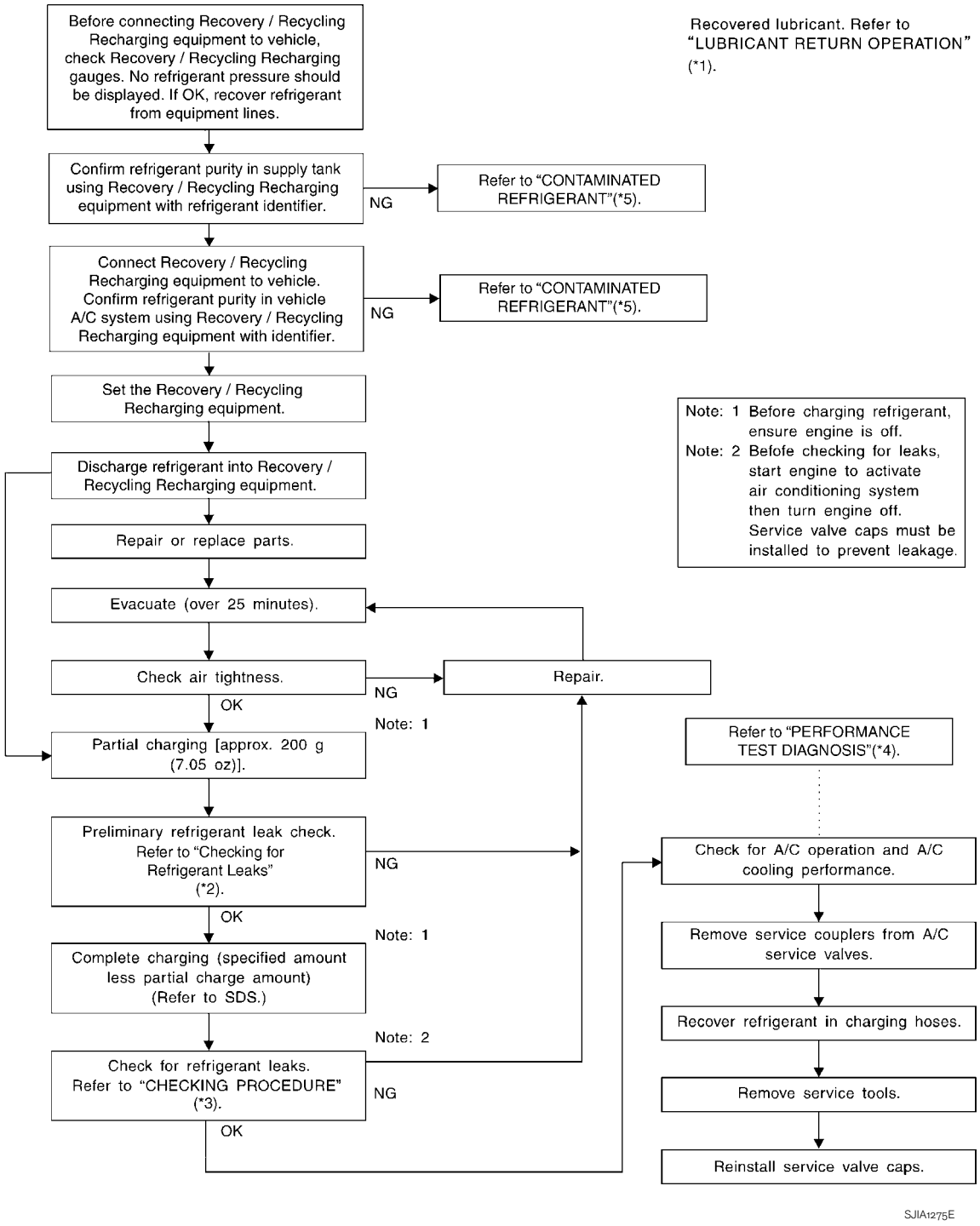
Evacuating System and Charging Refrigerant



1. Shut-off valve
2. A/C service valve
3. Recovery/Recycling/Recharging equipment
4. Refrigerant container (HFC-134a)
5. Weight scale (J-39650)
6. Vacuum pump (J-39649)
7. Manifold gauge set (J-39183)

A. Preferred (best) method
B. Alternative method
C. For charging

cardiagn.com



*1 HA-78, "Adjustment"

*2 "REFRIGERANT LEAKS" in HA-81, "Refrigerant Leaks".

*3 "CHECKING PROCEDURE" in HA-80, "Inspection".

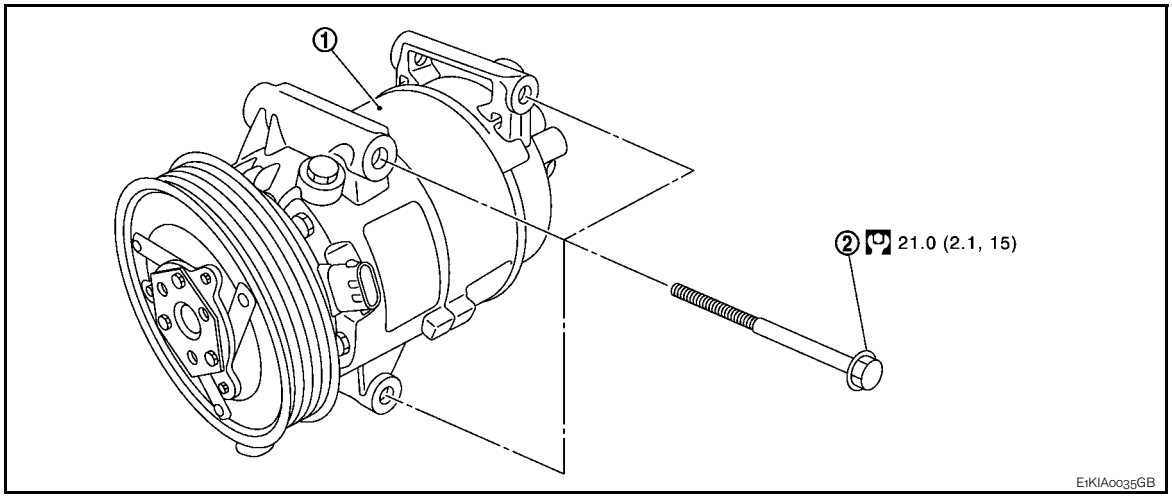
*4 "PERFORMANCE TEST DIAGNOSIS" in HA-80, "Inspection".

*5 "CONTAMINATED REFRIGERANT" in HAC-118, "Working with HFC-134a (R-134a)".

COMPRESSOR

Exploded View

INFOID:0000000001093911



1. Compressor
2. Compressor fixing bolt

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

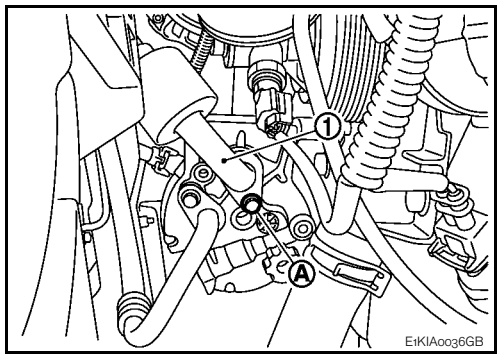
INFOID:0000000001093912

REMOVAL

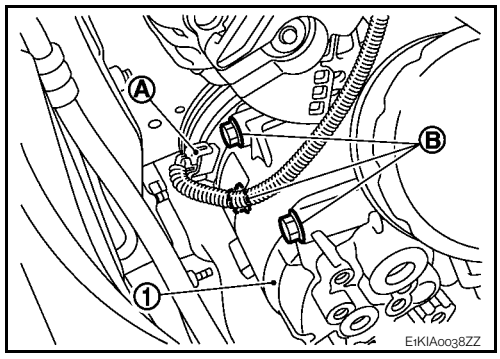
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament.
3. Remove air intake hoses (RH) and air duct (LH). Refer to EM-265, "Exploded View".
4. Remove engine undercover, using power tools.
5. Drain engine coolant from radiator. Refer to CO-52, "Draining".
6. Remove drive belt. Refer to EM-259, "Removal and Installation".
7. Remove lower radiator hose from engine. Refer to CO-56, "Exploded View".
8. Remove compressor fixing bolt (B) from low-pressure flexible hose (1) and compressor fixing bolt (A) from high-pressure flexible hose (2).
9. Remove low-pressure flexible hose, and, high-pressure flexible hose from compressor.

   CAUTION:

   Cap or wrap the joint of compressor, low-pressure flexible hose and high-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.



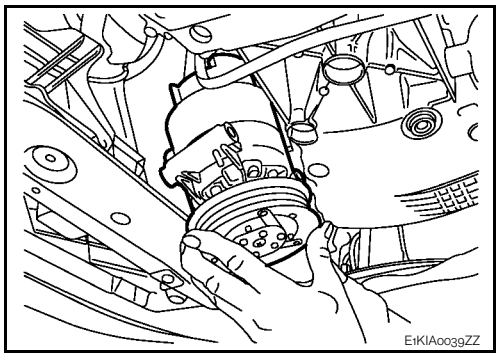
10. Remove compressor harness connector (A), then remove mounting bolts (B) from compressor (1), using power tools.



cardiagn.com

11. Remove the compressor from the vehicle.

Compressor fixing bolt to engine : 21 N·m (2.2 kg-m, 15.5 ft-lb)



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and high-pressure flexible hose with new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

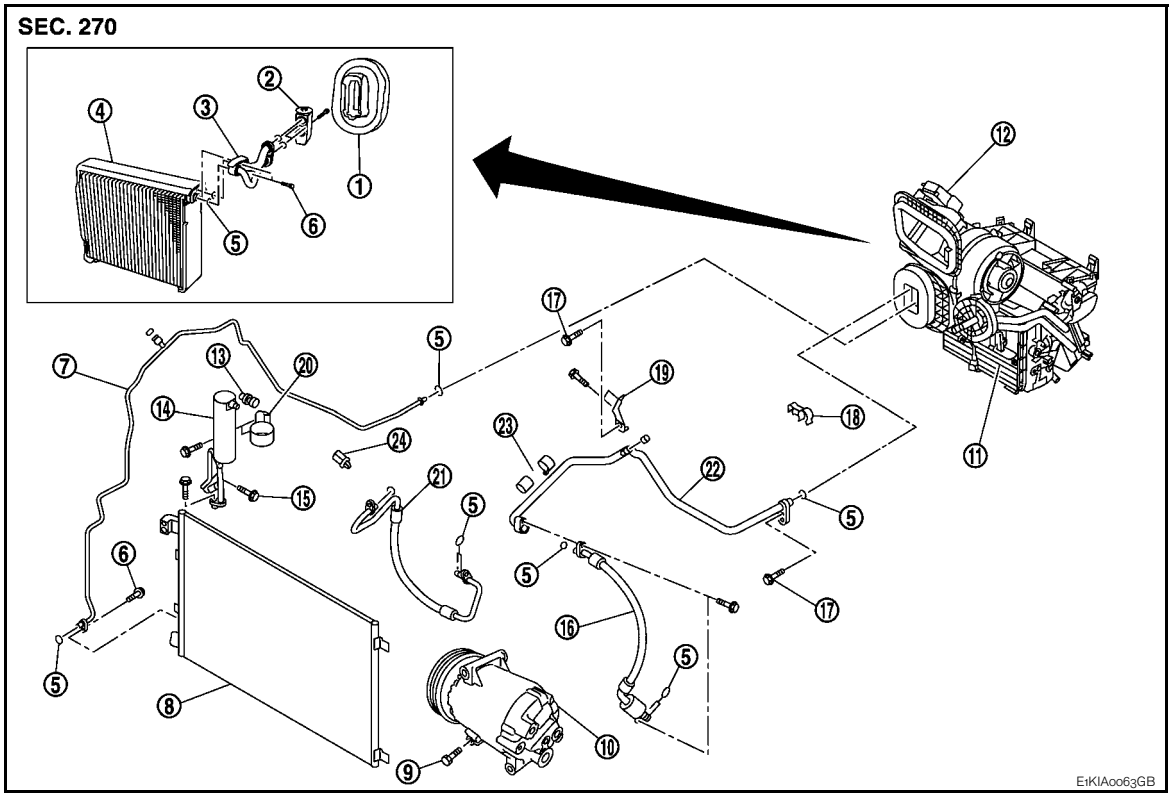
cardiagn.com

LOW-PRESSURE FLEXIBLE HOSE AND PIPE 2

Exploded View

INFOID:0000000001093914

Refer to HA-69, "Refrigerant Connection".



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

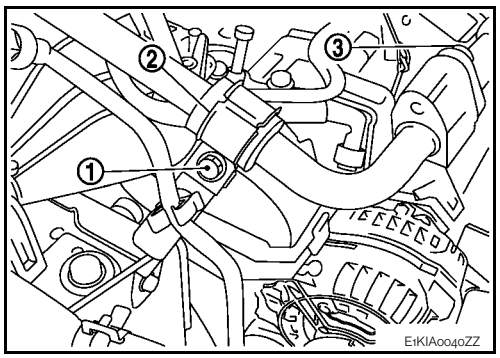
INFOID:0000000001093915

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove upper engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove air intake hose (RH side), and air duct (LH). Refer to EM-265, "Removal and Installation".

cardiagn.com

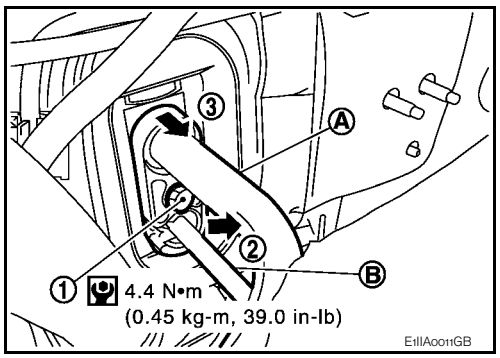
4. Remove mounting bolt (1) and clamp (2), from low pressure pipe bracket support.
5. Remove low and high-pressure maintaining clip, from both pipes, then remove fixing bolt (3) from low-pressure flexible hose and low-pressure pipe 2.
6. Remove engine room insulator fixing clip from cowl top.



7. Pull engine room insulator, then remove pipes bracket fixing bolt (1), from expansion valve, and release pipes fixing bracket, as shown in order (1) to (3), from high pressure pipe 1 (B), to remove low pressure pipe 2 (A) from expansion valve.

CAUTION:

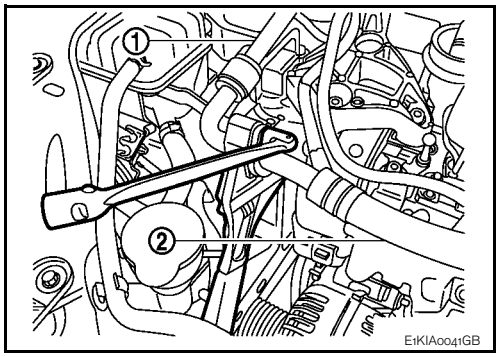
Cap or wrap the joint of the low-pressure flexible hose and pipe 2, and expansion valve exit with suitable material such as vinyl tape to avoid the entry of air.



8. Remove low pressure pipe 2 (1) connector fixing bolt, with suitable tools, then remove low pressure pipe 2 from low pressure flexible hose.

CAUTION:

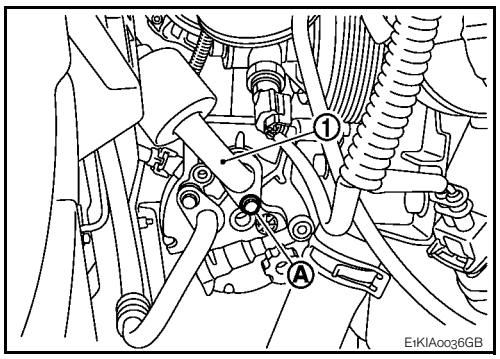
Cap or wrap the joint of the low pressure pipe 2 connector, and low pressure flexible hose, with suitable material such as vinyl tape to avoid the entry of air.



9. Remove low pressure flexible hose fixing bolt (A), from air conditioner compressor, and remove low pressure flexible hose (1).

CAUTION:

Cap or wrap the joint of low-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.



Pipe bracket fixing bolt to expansion valve : **4.4 N·m (0.45 kg-m, 39.0 in-lb)**

Low pressure flexible pipe fixing bolt to compressor : **8.0 N·m (0.9 kg-m, 70.8 in-lb)**

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and low-pressure pipe 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

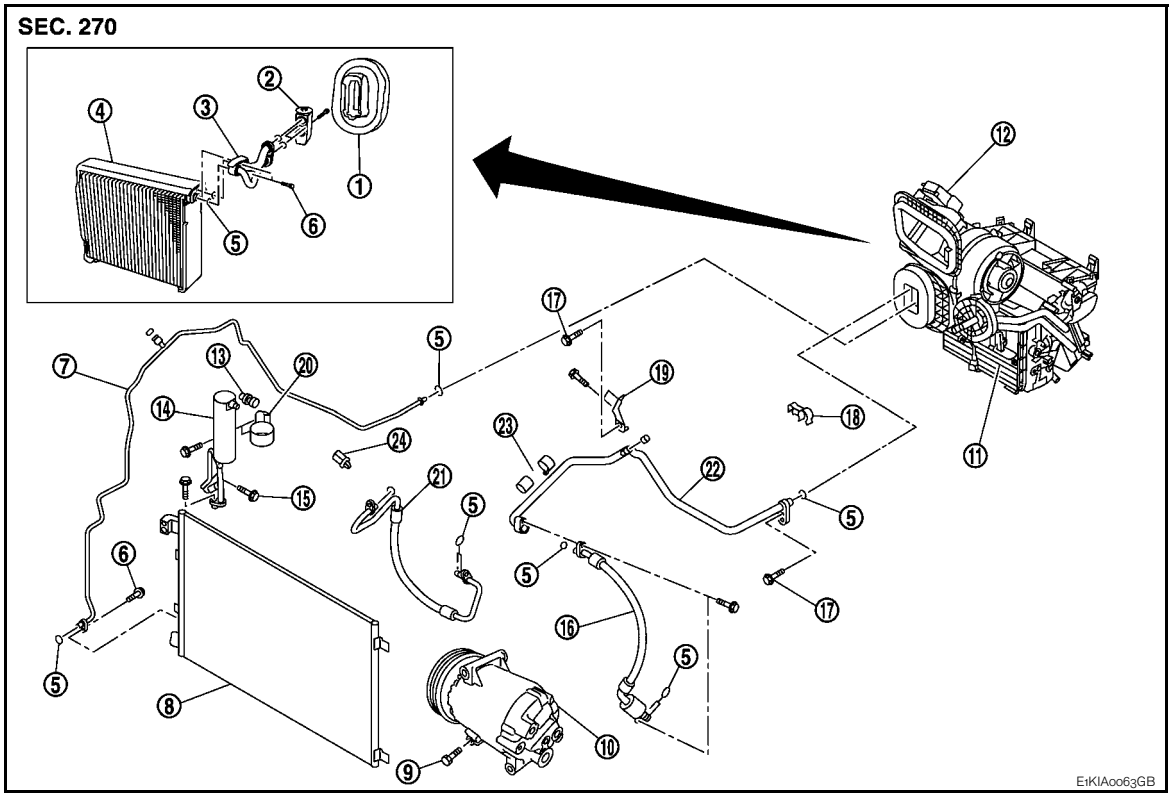
cardiagn.com

HIGH-PRESSURE FLEXIBLE HOSE

Exploded View

INFOID:0000000001093916

Refer to HA-69, "Refrigerant Connection".



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

INFOID:0000000001093917

REMOVAL

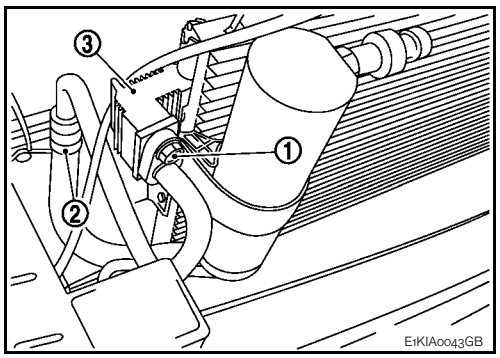
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove air intake hose (RH) and air duct (LH). Refer to EM-265, "Exploded View".
4. Remove front grille. Refer to EXT-17, "Removal and Installation".
5. Remove radiator air guide (RH). Refer to CO-56, "Removal and Installation".

cardiagn.com

6. Remove high pressure flexible hose fixing bolt (1) from condenser (3), then pull high pressure flexible hose (2) to remove it from condenser.

CAUTION:

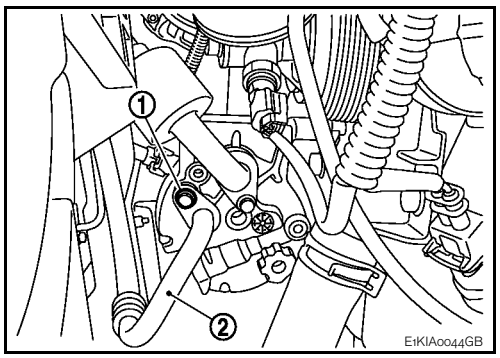
Cap or wrap the joint of high-pressure flexible hose and condenser assembly with suitable material such as vinyl tape to avoid the entry of air.



7. Remove high pressure flexible hose fixing bolt (1) from compressor, then pull high pressure flexible hose (2) to remove it from compressor.Remove high pressure flexible hose.

CAUTION:

Cap or wrap the joint of compressor and high-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.



High pressure fixing bolt to condenser

: 4.4 N·m (0.45 kg-m, 39 in-lb)

High pressure fixing bolt to compressor

: 8 N·m (0.8 kg-m, 71 in-lb)

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of high-pressure flexible hose with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

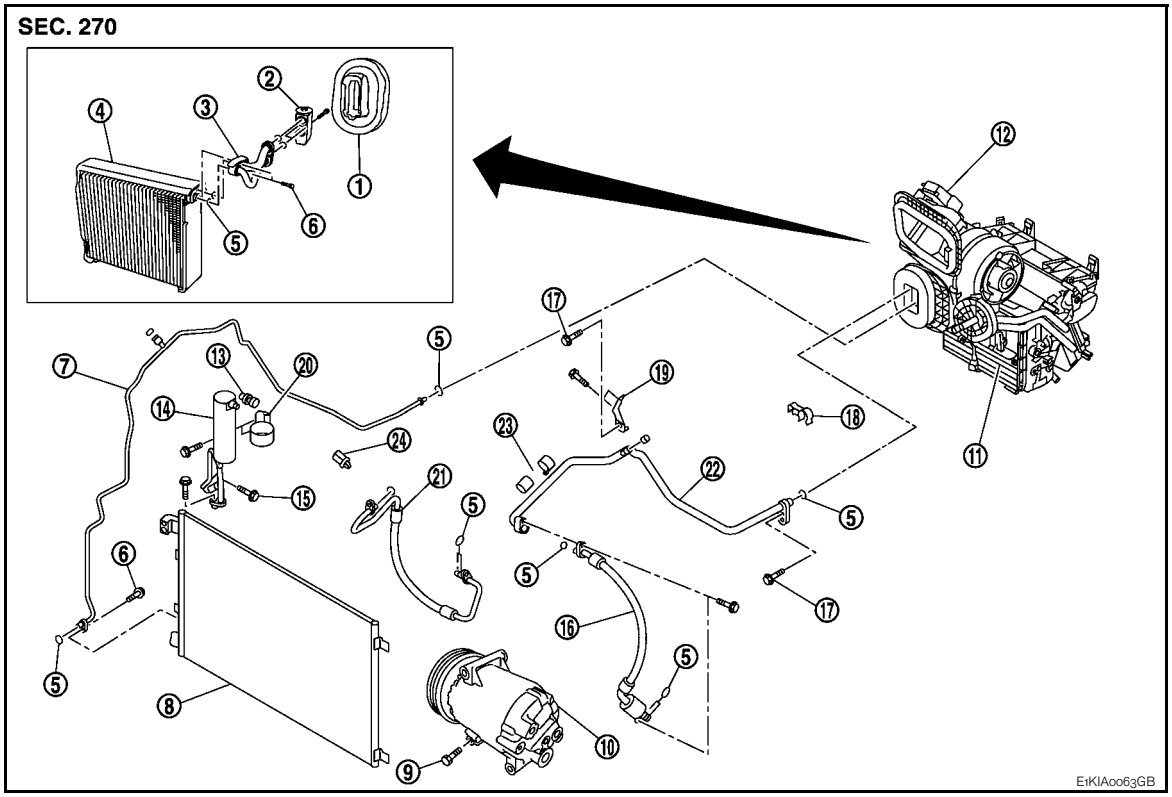
cardiagn.com

HIGH-PRESSURE PIPE 1 (ENGINE COMPARTMENT)

Exploded View

INFOID:0000000001093918

Refer to HA-69, "Refrigerant Connection".



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

INFOID:0000000001093919

REMOVAL

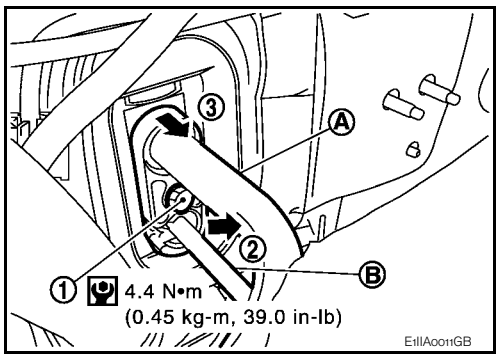
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove intake hose (RH) and air duct (LH). Refer to EM-265, "Removal and Installation".

cardiagn.com

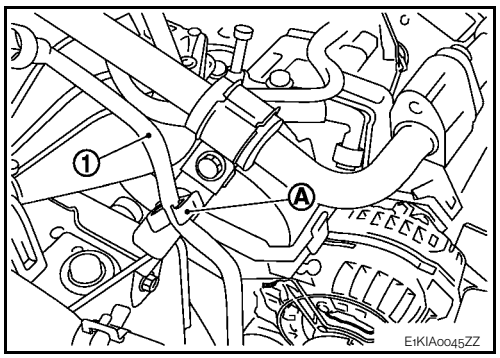
4. Pull engine room insulator, then remove pipes bracket fixing bolt (1), from expansion valve, then release pipe fixing bracket from high pressure pipe 1 (B), as shown in order (1) to (3), to disconnect it from expansion valve.

CAUTION:

Cap or wrap the joint of the high pressure pipe 1, and expansion valve in, with suitable material such as vinyl tape to avoid the entry of air.



5. Remove high pressure pipe 1 (1) from clip (A).

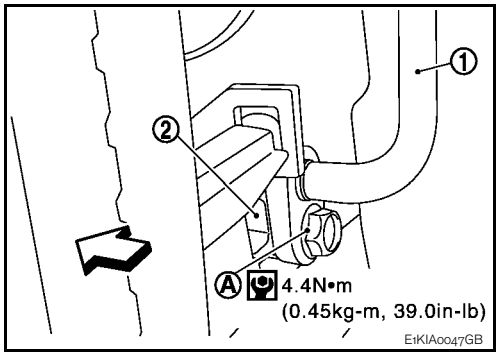


Remove high-pressure pipe 1 mounting bolt (A) from condenser (2).

CAUTION:

Cap or wrap the joint of the high pressure pipe 1, and condenser, with suitable material such as vinyl tape to avoid the entry of air.

Remove high pressure pipe 1 (1).



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

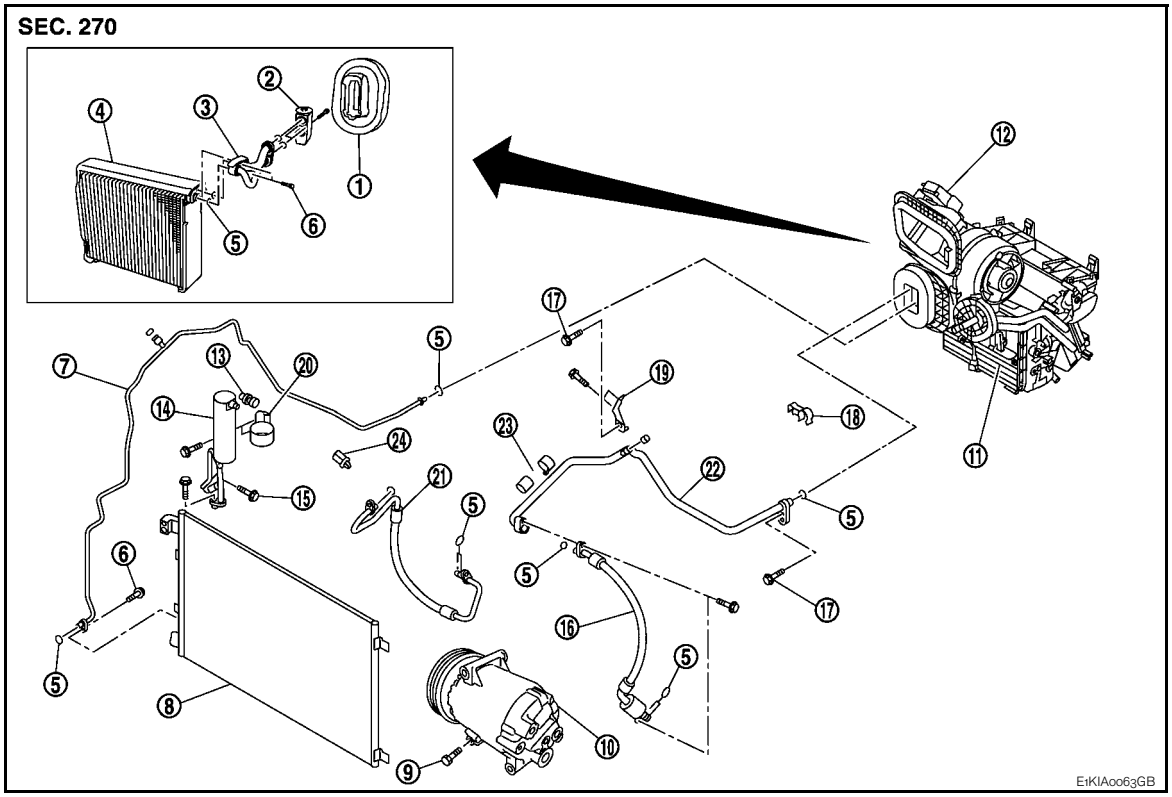
- **Replace O-rings of high-pressure pipe 1 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

LOW-PRESSURE PIPE 1 AND HIGH-PRESSURE PIPE 2

Exploded View

INFOID:0000000001093920

Refer to HA-69, "Refrigerant Connection".



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

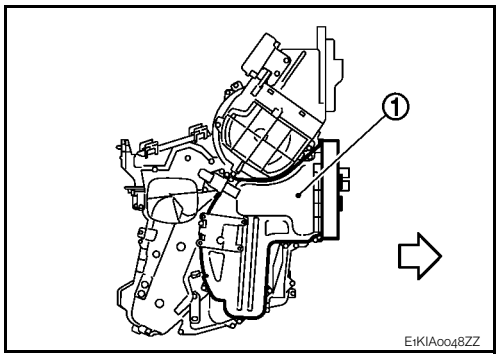
INFOID:0000000001093921

REMOVAL

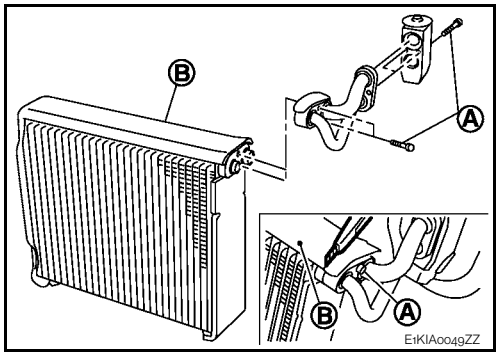
1. Set the temperature at 18°C (60°F), and then disconnect the battery cable from the negative terminal.
2. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
3. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
4. Remove high-pressure pipe 1 and low pressure pipe 2 from expansion valve. Refer to HA-92, "Removal and Installation" and HA-96, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of the, high-pressure pipe 1, low-pressure pipe 2, and the expansion valve with suitable material such as vinyl tape to avoid the entry of air.
5. Remove instrument panel. Refer to IP-12, "Removal and Installation".
6. Remove foot duct (RH / LH). Refer to VTL-48, "FOOT DUCTS : Removal and Installation".
7. Remove steering column. Refer to ST-10, "Removal and Installation".

cardiagn.com

8. Remove steering member. Refer to ST-15, "Removal and Installation".
9. Remove heater and cooling assembly. Refer to VTL-32, "Removal and Installation".
10. Remove mounting screws, and then remove evaporator cover (1).



11. Using a thin cutter, cut the evaporator insulator (B), and remove fixing bolt (A) then remove low-pressure pipe 1 and high-pressure pipe 2 assembly.
CAUTION:
Cap or wrap the joint of expansion valve, high-pressure pipe 2 and low-pressure pipe 1 with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

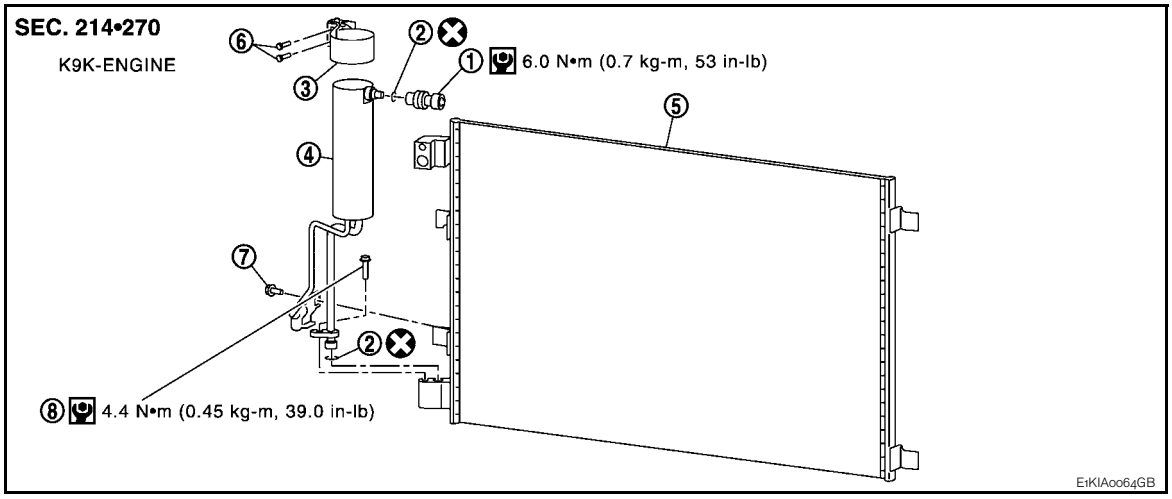
- **Replace O-rings of high-pressure pipe 1, 2 and low-pressure pipe 1, 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

CONDENSER

Exploded View

INFOID:0000000001093922



1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condensor
6. Liquid tank fixing screw
7. Liquid tank pipe fixing screw
8. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001093923

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove front grille. Refer to EXT-17, "Removal and Installation".
4. Remove radiator hose, and drain coolant. Refer to CO-56, "Removal and Installation".
5. Remove upper radiator fixing bracket. Refer to CO-56, "Removal and Installation".
6. Remove radiator air-guide duct (RH). Refer to CO-56, "Removal and Installation".
7. Remove high-pressure pipe 1 from condenser. Refer to HA-96, "Removal and Installation".
8. Remove high-pressure flexible pipe 1 from condenser. Refer to HA-94, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of low and high-pressure pipe 1 and condenser with suitable material such as vinyl tape to avoid the entry of air.
9. Remove harness connector from refrigerant pressure sensor.
10. Remove liquid tank pipes and liquid tank from condenser and radiator. Refer to HA-102, "Removal and Installation", Refer to CO-56, "Removal and Installation".
    CAUTION:
    Cap or wrap the joint of liquid tank pipes and condenser with suitable material such as vinyl tape to avoid the entry of air.
11. Remove radiator fixing brackets. Refer to CO-56, "Removal and Installation".
12. Release radiator maintaining pawls, then pull-up the condenser assembly to release it from radiator. Refer to CO-56, "Removal and Installation".
13. Maintain radiator pushing back.
14. Pull upward to remove condenser.
    CAUTION:
    Take care do not damaged condenser or radiator.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

cardiagn.com

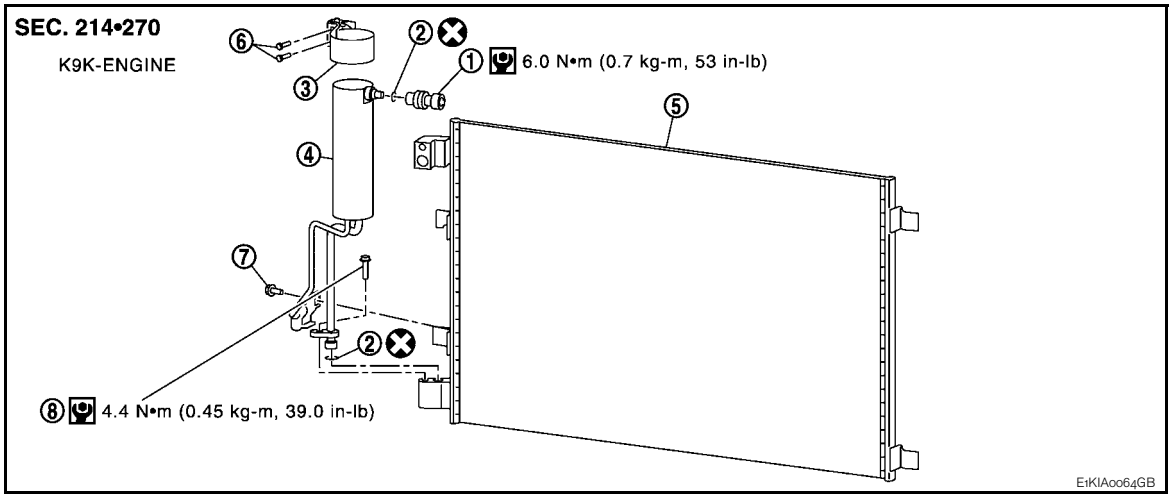
- **Replace O-rings of high-pressure flexible hose and high-pressure pipe 1 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

LIQUID TANK

Exploded View

INFOID:0000000001093926



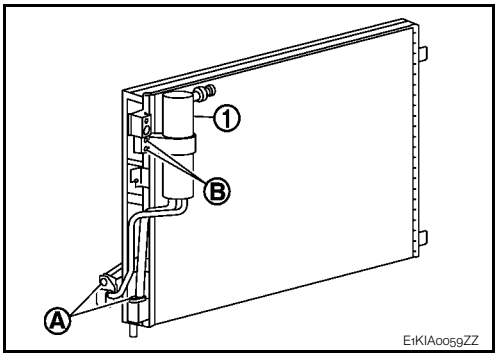
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condensor
6. Liquid tank fixing screw
7. Liquid tank pipe fixing screw
8. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001093927

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove front grille. Refer to EXT-17, "Removal and Installation".
4. Clean liquid tank and its surrounding area, and remove dust and rust from liquid tank.
   CAUTION:
   Be sure to clean carefully.
5. Disconnect refrigerant sensor harness connector. Refer to HA-103, "Removal and Installation".
6. Remove air inlet tube and hose from change air cooler. Refer to EM-266, "Removal and Installation".
7. Remove radiator air-guide duct (RH) fixing clip to move air-guide duct. Refer to CO-56, "Removal and Installation".
8. Remove liquid tank bracket support mounting screws (B).
9. Remove high pressure pipe 1 mounting bolt (A). Refer to HA-96, "Removal and Installation".
10. Remove liquid tank high pressure pipe mounting bolt (A).
11. Remove liquid tank pipe bracket fixing screw (B).
    CAUTION:
    Cap or wrap the joint of high pressure pipe, liquid tank pipes and condenser with suitable material such as vinyl tape to avoid the entry of air.
12. Remove liquid tank assembly (1).



INSTALLATION

Install liquid tank, and then install liquid tank bracket on condenser.

CAUTION:

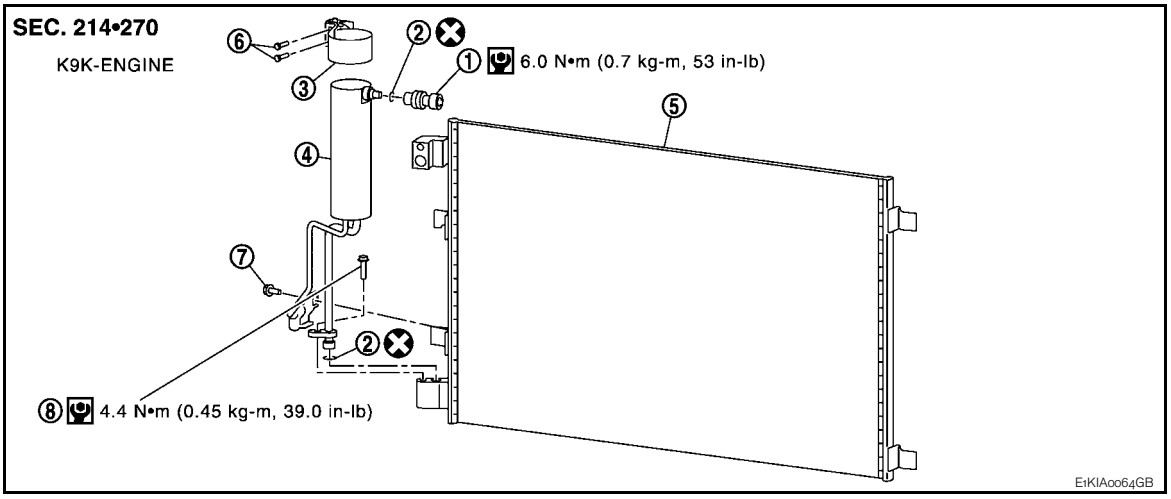
- **Make sure liquid tank bracket is securely installed at protrusion of condenser. (Make sure liquid tank bracket does not move to a position below center of liquid tank.)**
- **Replace O-rings of A/C piping with new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

REFRIGERANT PRESSURE SENSOR

Exploded View

INFOID:0000000001093928



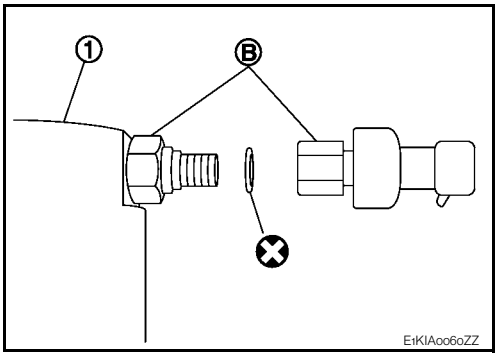
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condensor
6. Liquid tank fixing screw
7. Liquid tank pipe fixing screw
8. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001093929

REMOVAL

1. Remove liquid tank. Refer to HA-204, "Exploded View".
2. Fix the liquid tank (1) with a vise. Remove the refrigerant pressure sensor from liquid tank adaptator (B) with a wrench.
   CAUTION:
   Be careful not to damage liquid tank.



INSTALLATION

Installation is basically the reverse order of removal.

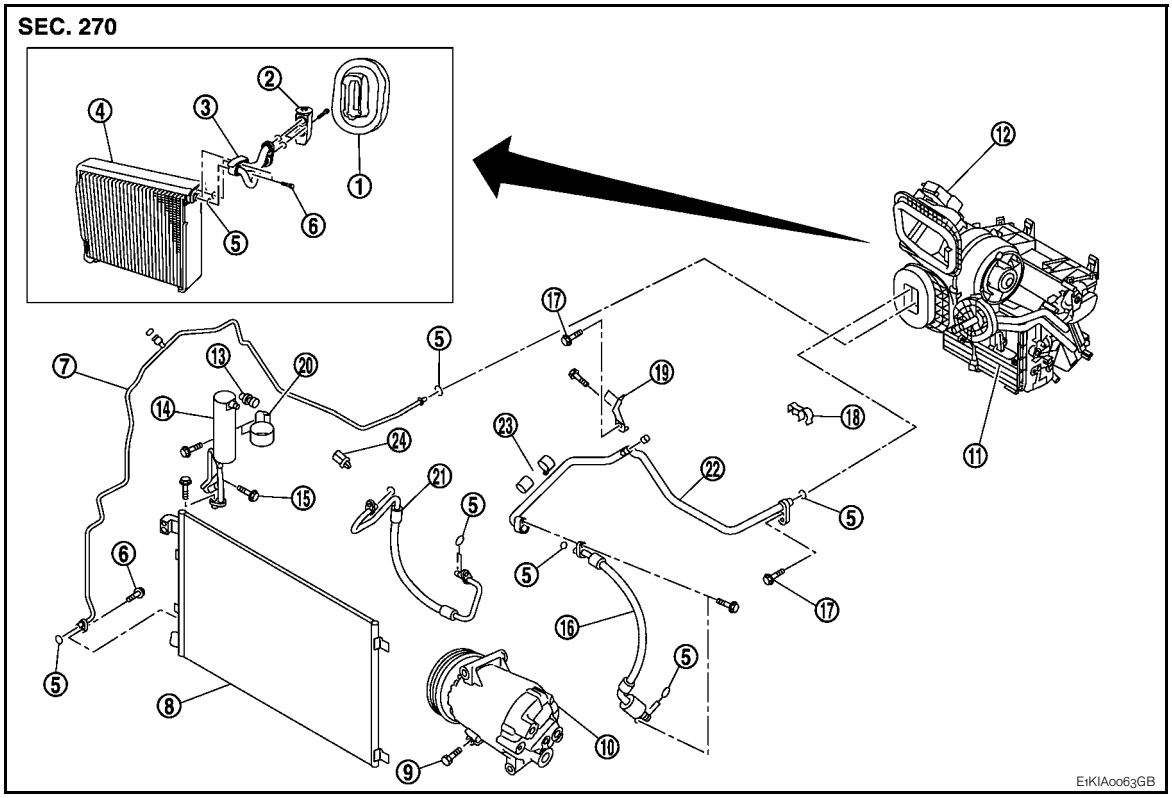
CAUTION:

- **Apply compressor oil to O-ring of refrigerant pressure sensor when installing it.**
- **When recharging refrigerant, check for leaks.**

EVAPORATOR

Exploded View

INFOID:0000000001093930



1. Heater sealing	2. Expansion valve	3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator	5. O-ring	6. Connector pipe fixing bolt
7. High pressure pipe 1	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Liquid tank fixing screw
16. Low pressure flexible hose	17. Fixing bolt	18. Pipes fixing clip
19. Low & high pressure pipe bracket	20. Liquid tank fixing bracket	21. High pressure flexible hose
22. Low pressure pipe 2	23. Low pressure pipe fixing clamp assembly	24. Pipe mantening clip

Removal and Installation

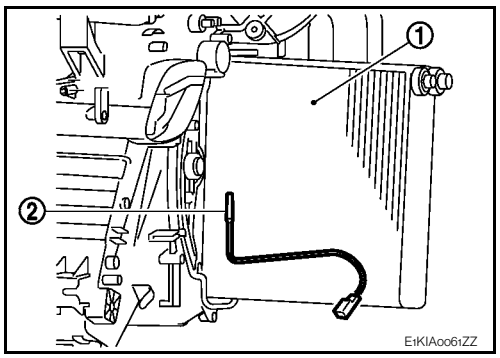
INFOID:0000000001093931

REMOVAL

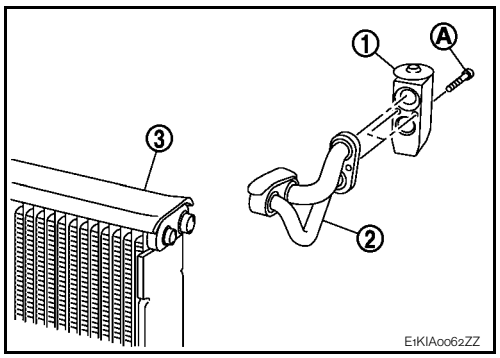
1. Remove low-pressure pipe 2 and high-pressure pipe 1 from expansion valve. Refer to HA-92, "Removal and Installation", Refer to HA-96, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of expansion valve, low-pressure pipe 2 and high-pressure pipe 1 with suitable material such as vinyl tape to avoid the entry of air.
2. Remove heater and cooling unit assembly.
3. Remove evaporator cover fixing screws and cover.

cardiagn.com

4. Slide evaporator (1), and intake sensor (2) from heater and cooling unit assembly.



5. Cut upper insulator (3) and remove mounting bolt (A) and pressure pipe assembly(2) and expansion valve (1), from evaporator.
6. Remove evaporator.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

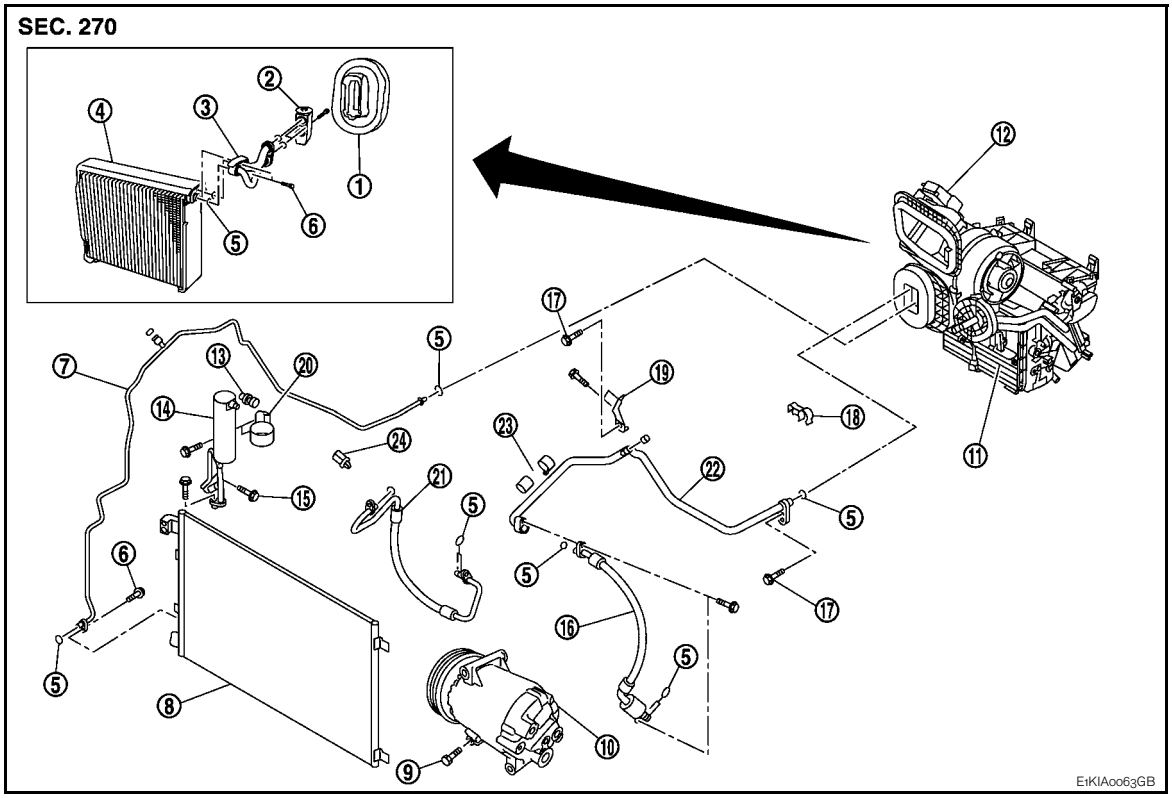
- **Replace O-rings of low-pressure pipe 1 and high-pressure pipe 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **O-rings are different from low-pressure flexible hose (high-pressure pipe 1) and low-pressure pipe 1 (high-pressure pipe 2).**
- **Mark the mounting position of intake sensor bracket prior to removal so that the reinstalled sensor can be located in the same position.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

EXPANSION VALVE

Exploded View

INFOID:0000000001093932



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

INFOID:0000000001093933

REMOVAL

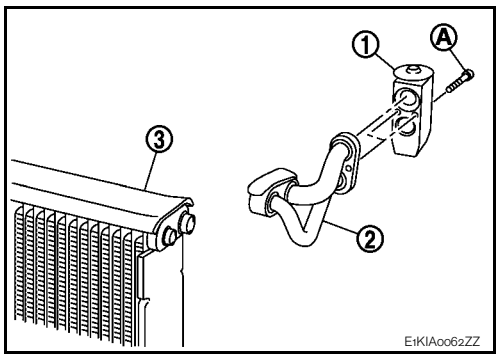
1. Remove evaporator (3). Refer to HA-98, "Removal and Installation".
2. Remove low pressure pipe 1 and high pressure pipe 2 assembly (2). Refer to HA-98, "Removal and Installation".

cardiagn.com

3. Remove mounting bolts (A), and then remove expansion valve (1) from low and high pressure pipe assembly (2).

CAUTION:

Cap or wrap the joint of expansion valve, low and high pressure pipe assembly, evaporator and expansion valve with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of evaporator with new ones, and then apply compressor oil to it when installing it.**
- **O-rings are different from low-pressure pipe 1 (high-pressure pipe 1) and low-pressure pipe 2 (high-pressure pipe 2).**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Compressor

INFOID:0000000001093934

Model		DELPHI THERMAL HUNGARY make 5CVC
Type		Variable displacement swash plate
Displacement cm^3 (cu in)/rev	Max.	120 (7.32)
Cylinder bore × stroke (Max.) mm (in.)		–
Direction of rotation		Clockwise (viewed from clutch)
Drive belt		Poly V
Disc to pulley clearance	Standard	–

Lubricant

INFOID:0000000001093935

Model		DELPHI THERMAL HUNGARY make 5 CVC
Name		Nissan A/C System Oil Type S (DH-PS)
Capacity m ℓ (US fl oz, Imp fl oz)	Total in system	150 (5.03, 5.3)
	Compressor (Service part) charging amount	150 (5.03, 5.3)

Refrigerant

INFOID:0000000001093936

Type	HFC-134a (R-134a)
Capacity kg (lb)	—

Engine Idling Speed

INFOID:0000000001093937

Refer to EC-1483, "Idle Speed".

Belt Tension

INFOID:0000000001093938

Refer to EM-259, "Inspection and Adjustment".

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001098128

DETAILED FLOW

1. LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. (Get detailed information about the conditions and environment when the symptom occurs.)

>> GO TO 2.

2. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-126, "Description & Inspection".

>> GO TO 3.

3. GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis (Refer to HAC-187, "Diagnosis Chart By Symptom" below).

>> GO TO 4.

4. REPAIR OR REPLACE

Repair or replace the specific parts

>> GO TO 5.

5. FINAL CHECK

Final check.

Is the inspection result normal?

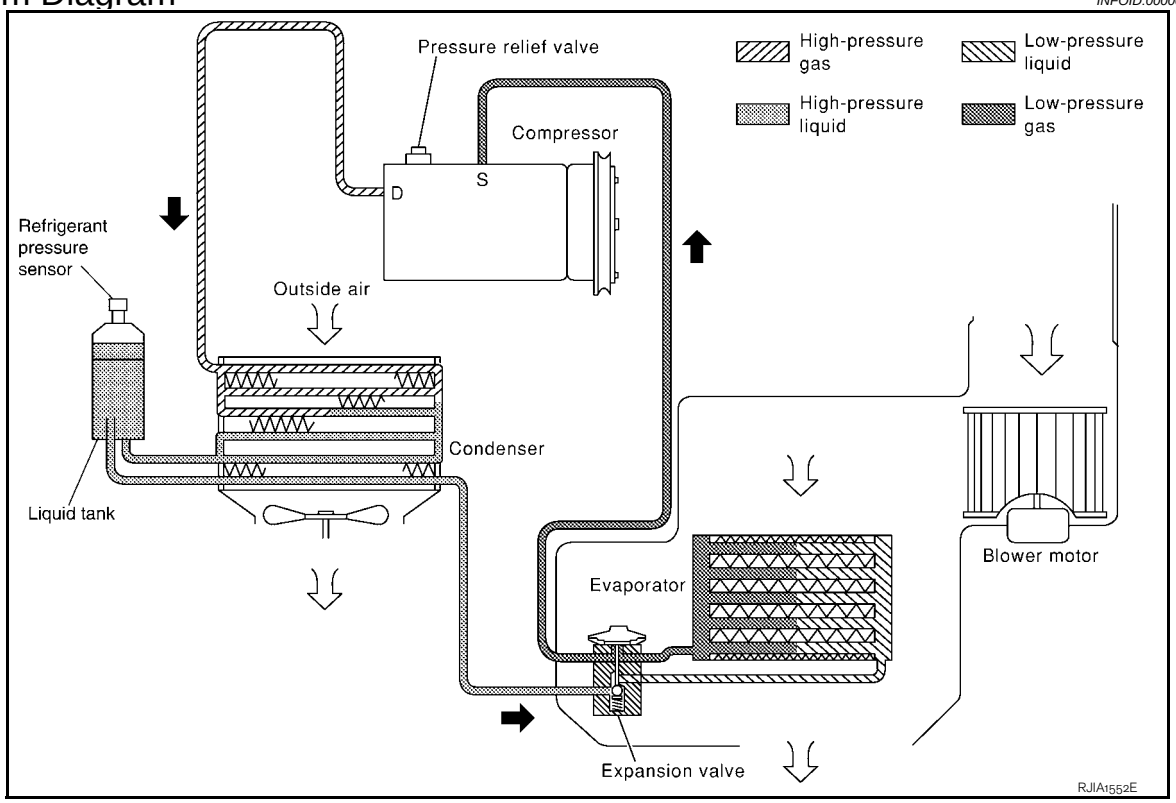
YES >> CHECK OUT
NO >> GO TO 3.

FUNCTION DIAGNOSIS

REFRIGERATION SYSTEM

System Diagram

INFOID:0000000001098129



System Description

INFOID:0000000001098130

REFRIGERANT CYCLE

Refrigerant Flow

The refrigerant flows from the compressor, through the condenser with liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation in the evaporator is controlled by an externally equalized expansion valve, located inside the evaporator case.

Freeze Protection

To prevent evaporator frozen up, the evaporator air temperature is monitored, and the voltage signal to the display and A/C auto amp. will make the A/C relay go OFF and stop the compressor.

REFRIGERANT SYSTEM PROTECTION

Refrigerant Pressure Sensor

The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high-pressure side detected by refrigerant pressure sensor is over about 3,119 kPa (31.8 kg/cm^2, 452 psi), or below about 118 kPa (1.2 kg/cm^2, 17 psi).

Pressure Relief Valve

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an unusual level [more than 3,628 kPa (37 kg/cm^2, 526 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.

LUBRICANT

cardiagn.com

Maintenance of Lubricant Quantity in Compressor

The lubricant in the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large refrigerant leakage occurred. It is important to maintain the specified amount.

If lubricant quantity is not maintained properly, the following malfunctions may result:

- Lack of lubricant: May lead to a seized compressor.
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

Lubricant

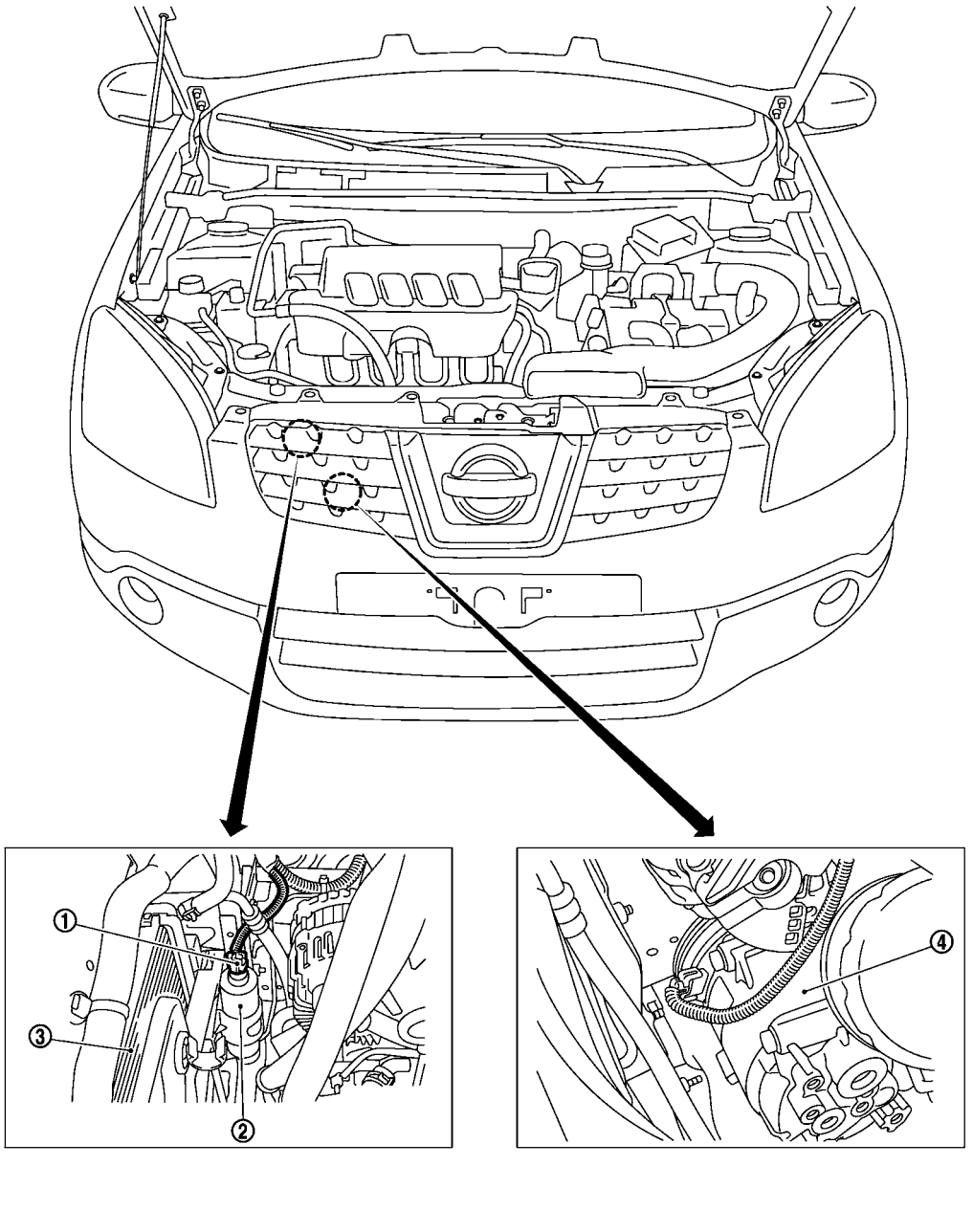
Name : Nissan A/C System Oil Type S

Component Parts Location

INFOID:0000000001098131

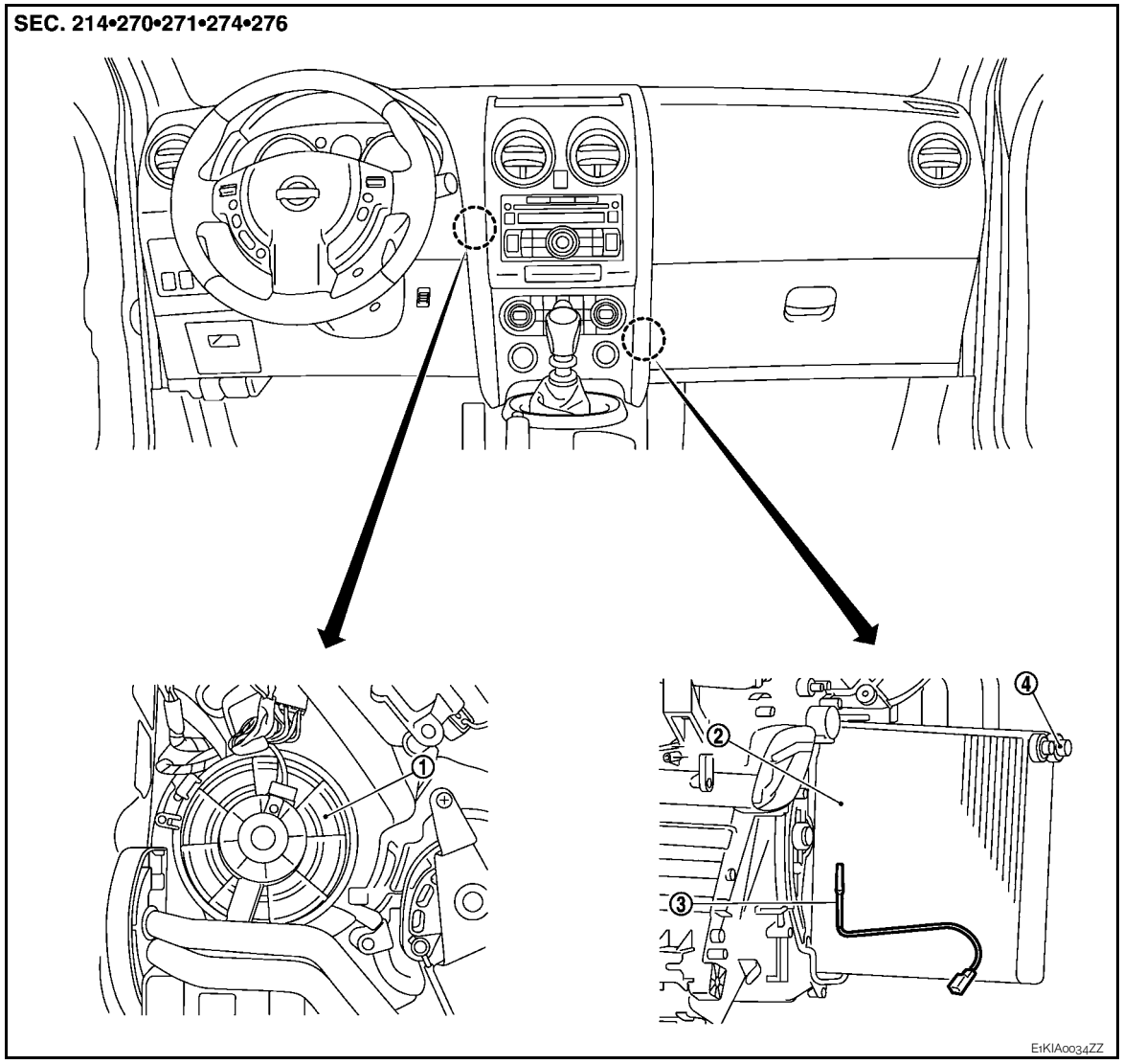
cardiagn.com

SEC. 214•270•271•274•276



1. Refrigerant pressure sensor
2. Liquid tank
3. Radiator
4. Compressor

cardiagn.com



1. Blower motor assembly
2. Evaporator
3. Intake sensor (AT only)
4. Expansion valve

Component Description

INFOID:0000000001098132

Component	Description
Compressor	Intakes, compresses, and discharges refrigerant, then conveys it to condenser.
Condenser	Condenses refrigerant, and then conveys it to liquid tank.
Liquid tank	Drives moisture out of refrigerant, eliminates foreign matter, then conveys refrigerant to expansion valve.
Refrigerant pressure sensor	Refer to HAC-161, "Component Inspection".
Expansion valve	Vaporizes refrigerant, controls the amount of flow, then conveys refrigerant to evaporator.
Evaporator	Cools passing air, and then conveys it to compressor.
Blower motor	Takes in air in the vehicle or fresh outside air, and then adjusts room temperature by air conditioning.

SYMPTOM DIAGNOSIS

REFRIGERATION SYSTEM SYMPTOMS

SYMPTOM DIAGNOSIS PROCEDURE

SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure

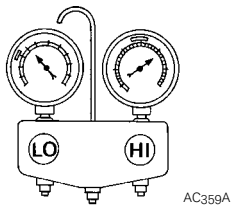
INFOID:0000000001098135

Whenever system's high and/or low side pressure(s) is/are unusual, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table

INFOID:0000000001098136

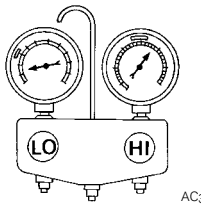
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	The pressure returns to normal is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle.	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance. ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan.	• Clean condenser. • Check and repair cooling fan as necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.). ↓ Air in refrigeration cycle.	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Low-pressure pipe is sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side. • Excessive refrigerant discharge flow. • Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment.	Replace expansion valve.

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table

INFOID:0000000001098137

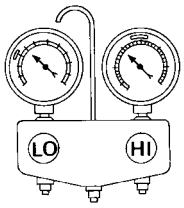
cardiagn.com

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check lubricant for contamination.

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table

INFOID:0000000001098138

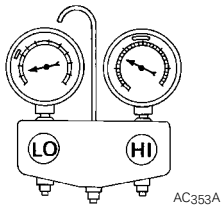
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table

INFOID:0000000001098139

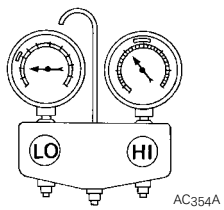
cardiagn.com

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	• There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	• Replace liquid tank. • Check lubricant for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet is frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Expansion valve and liquid tank are warm or slightly cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components.	Check refrigerant for leaks. Refer to HA-132, "Refrigerant Leaks" (HR/MR), HA-183, "Refrigerant Leaks" (K9K).
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Replace expansion valve. • Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	• Replace compressor. • Repair evaporator fins. • Replace evaporator. • Refer to HAC-153, "Diagnosis Procedure".

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table

INFOID:0000000001098140

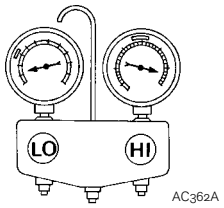
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

LOW-PRESSURE SIDE BECOMES NEGATIVE

LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table

INFOID:0000000001098141

cardiagn.com

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or wet with dew.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the malfunction, replace expansion valve. • Replace liquid tank. • Check lubricant for contamination.

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001115388

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001115392

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

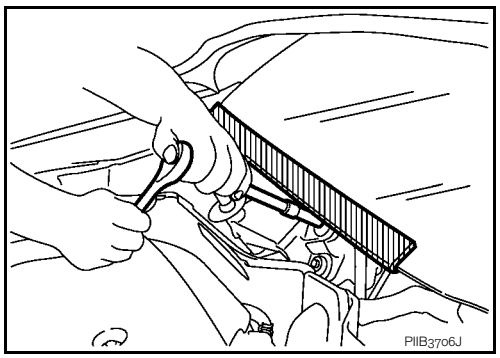
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001115396

cardiagn.com

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:0000000001115400

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

Working with HFC-134a (R-134a)

INFOID:0000000001098146

CAUTION:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed and compressor malfunction is likely occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**

- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.**

General Refrigerant Precaution

INFOID:0000000001098147

WARNING:

- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**

cardiagn.com

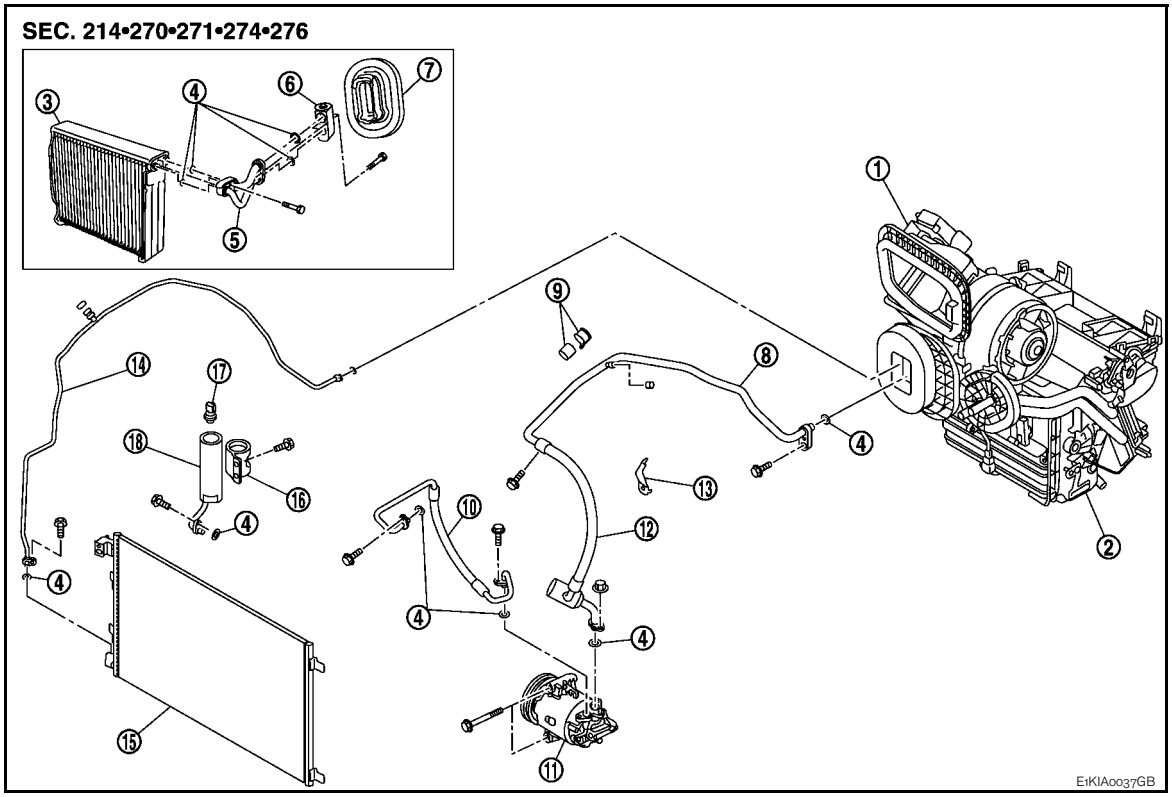
- **Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Never store or heat refrigerant containers above 52°C (126°F).**
- **Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Never intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Refrigerant Connection

INFOID:0000000001098148

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.
- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

O-RING AND REFRIGERANT CONNECTION



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

CAUTION:

cardiagn.com

The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure pipe 2 assembly to expansion valve	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure pipe 2 assembly to evaporator	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		92474 N8210	2	19
	Compressor to high pressure flexible hose		92474 N8210	2	12
	Liquid tank to condenser		92473 N8210	1	16

WARNING:

Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

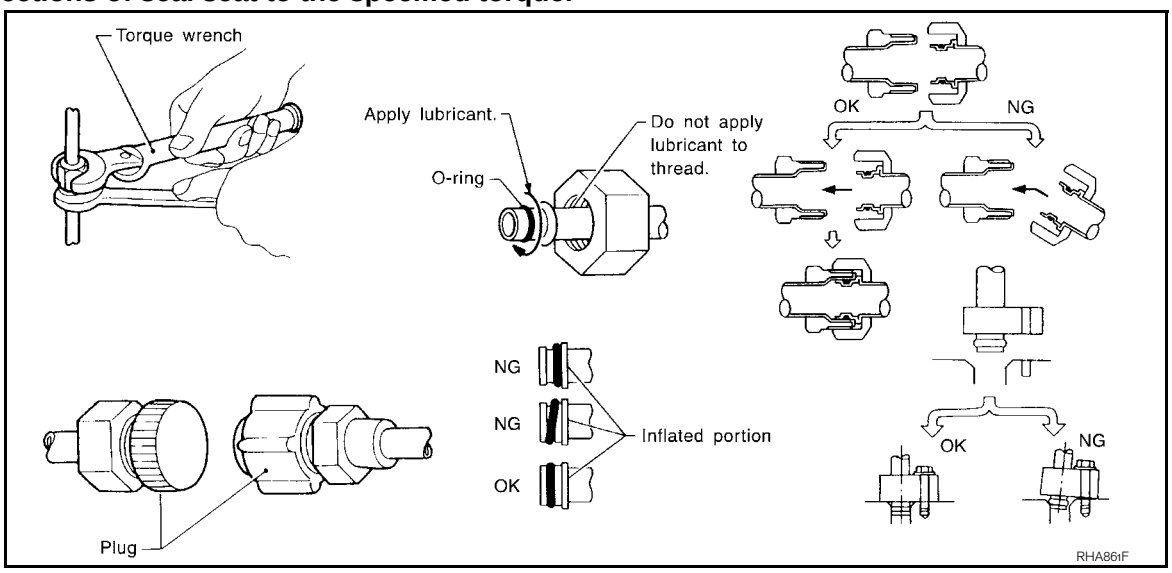
When replacing or cleaning refrigerant cycle components, observe the following.

- **When the compressor is removed, store it in the same way at it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Name : Nissan A/C System Oil Type S

- **O-ring must be closely attached to the groove portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.**

- **After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Service Equipment

INFOID:0000000001098149

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRICAL LEAK DETECTOR

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

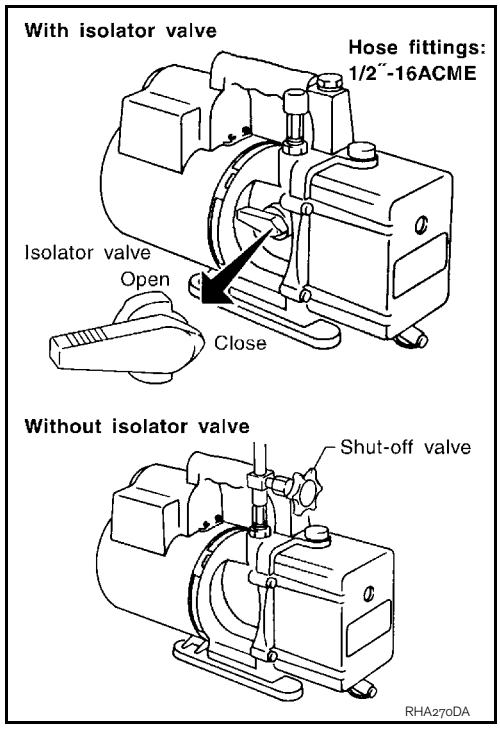
VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

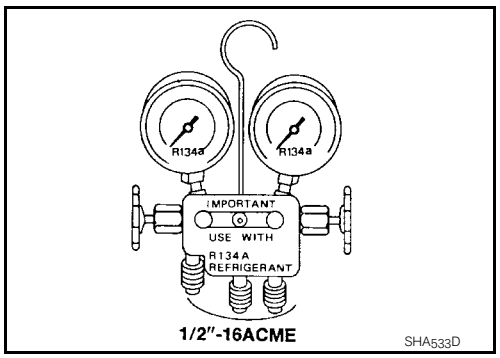
Some one-way valves open when vacuum is applied and close under no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



MANIFOLD GAUGE SET

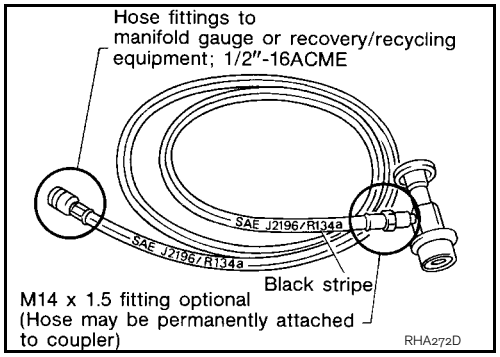
cardiagn.com

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

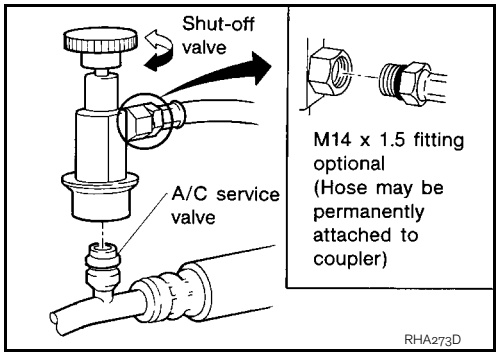
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

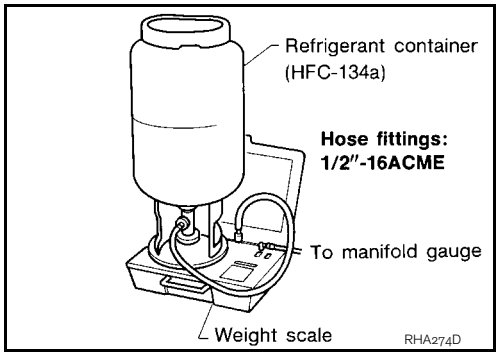
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

COMPRESSOR

General Precautions

INFOID:0000000001098150

CAUTION:

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same way at it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to HA-180, "Adjustment".**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

cardiagn.com

LEAK DETECTION DYE

General Precautions

INFOID:0000000001098151

CAUTION:

- **The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.**
- **Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.**
- **The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST: J-41995) to pin-point refrigerant leaks.**
- **For the purpose of safety and customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.**
- **A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electrical leak detector (SST: J-41995).**
- **Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.**
- **Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.**
- **Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).**
- **Never use more than one refrigerant dye bottle (1/4 ounce /7.4 cc) per A/C system.**
- **Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Never use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.**
- **The fluorescent properties of the dye will remain for three years or a little over unless a compressor malfunction occurs.**

IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have the identification label on the front side of hood.

cardiagn.com

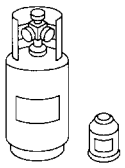
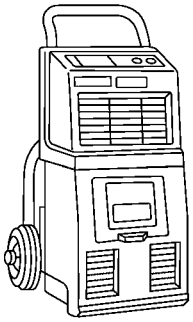
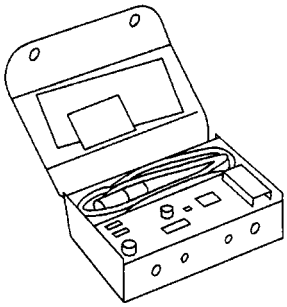
PREPARATION

PREPARATION

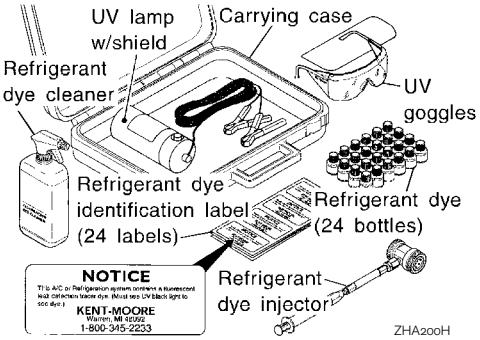
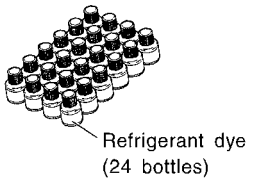
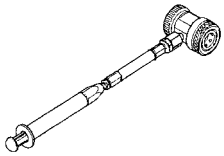
HFC-134a (R-134a) Service Tools and Equipment

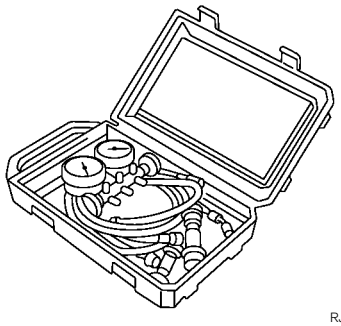
INFOID:0000000001098152

Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

Tool number Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
KLH00-PAGS0 Nissan A/C System Oil Type S (DH-PS)	S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) wobble (swash) plate compressors (Nissan only) Lubricity: 40 m ℓ (1.4 Imp fl oz.)
Recovery/Recycling/ Recharging equipment (ACR4)	 RJIA0195E	Function: Refrigerant recovery and recycling and recharging
Electrical leak detector	 A/C leak detector SHA705EB	Power supply: DC 12V (Cigarette lighter)

cardiagn.com

Tool number Tool name		Description
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner		Power supply: DC 12 V (Battery terminal)
(J-42220) UV lamp and UV safety goggles		Power supply: DC 12 V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
(J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)		Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle		For injecting 1/4 ounce of fluorescent leak detection dye into A/C system

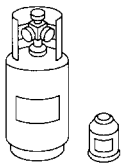
Tool number Tool name		Description
(J-43872) Refrigerant dye cleaner	 SHA441F	For cleaning dye spills
(J-39183) Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: • The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size • 1/2″-16 ACME

Sealant or/and Lubricant

INFOID:0000000001098154

HFC-134a (R-134a) Service Tool and Equipment

- Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
- Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
- Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
- Never use adapters that convert one size fitting to another: refrigerant/lubricant contamination occurs and compressor malfunction may result.

Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
Nissan A/C System Oil Type S (DH-PS)	 S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) swash plate compressors (Nissan only) Capacity: 40 m ℓ (1.4 US fl oz., 1.4 Imp fl oz.)

cardiagn.com

ON-VEHICLE MAINTENANCE

LUBRICANT

Adjustment

INFOID:0000000001098155

LUBRICANT RETURN OPERATION

Adjust the lubricant quantity according to the test group shown below.

1. CHECK LUBRICANT RETURN OPERATION

Can lubricant return operation be performed?
- A/C system works properly.
- There is no evidence of a large amount of lubricant leakage.

CAUTION:
If excessive lubricant leakage is noted, never perform the lubricant return operation.

Is it successful?

YES >> GO TO 2.
NO >> GO TO 3.

2. PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS

1. Start the engine, and set to the following conditions:
- Engine speed: Idling to 1,200 rpm
- A/C switch: ON
- Blower speed: Max. position
- Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).]
- Intake position: Recirculation (REC)
2. Perform lubricant return operation for about 10 minutes.
3. Stop the engine.

>> GO TO 3.

3. CHECK REPLACEMENT PART

Should the compressor be replaced?

YES >> Refer to "LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT".
NO >> Refer to "LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR".

LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR

After replacing any of the following major components, add the correct amount of lubricant to the system.
Amount of lubricant to be added:

Part replaced	Lubricant to be added to system	Remarks
	Amount of lubricant mℓ (US fl oz., Imp fl oz.)	
Evaporator	75 (2.5, 2.6)	—
Condenser	35 (1.2, 1.2)	—
Liquid tank	10 (0.3, 0.4)	—
In case of refrigerant leak	30 (1.0, 1.1)	Large leak
	—	Small leak *1

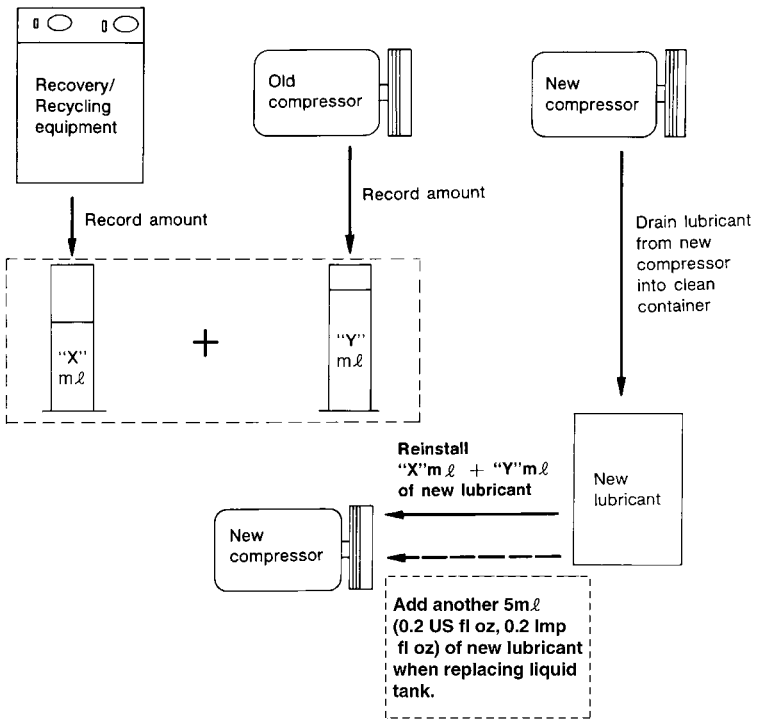
*1: If the refrigerant leak is small, no addition of lubricant is needed.

LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT

cardiagn.com

1. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect recovery/recycling recharging equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to HA-170, "Working with HFC-134a (R-134a)".
3. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to HA-170, "Working with HFC-134a (R-134a)".
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
5. Drain the lubricant from the old (removed) compressor into a graduated container and recover the amount of lubricant drained.
6. Drain the lubricant from the new compressor into a separate, clean container.
7. Measure an amount of new lubricant installed equal to amount drained from old compressor. Add this lubricant to new compressor through the suction port opening.
8. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to new compressor through the suction port opening.
9. If the liquid tank also needs to be replaced, add another 5 mℓ (0.2 US fl oz., 0.2 Imp fl oz.) of lubricant at this time.
   Do not add this 5 mℓ (0.2 US fl oz., 0.2 Imp fl oz.) of lubricant when replaces the compressor only.

Lubricant adjusting procedure for compressor replacement



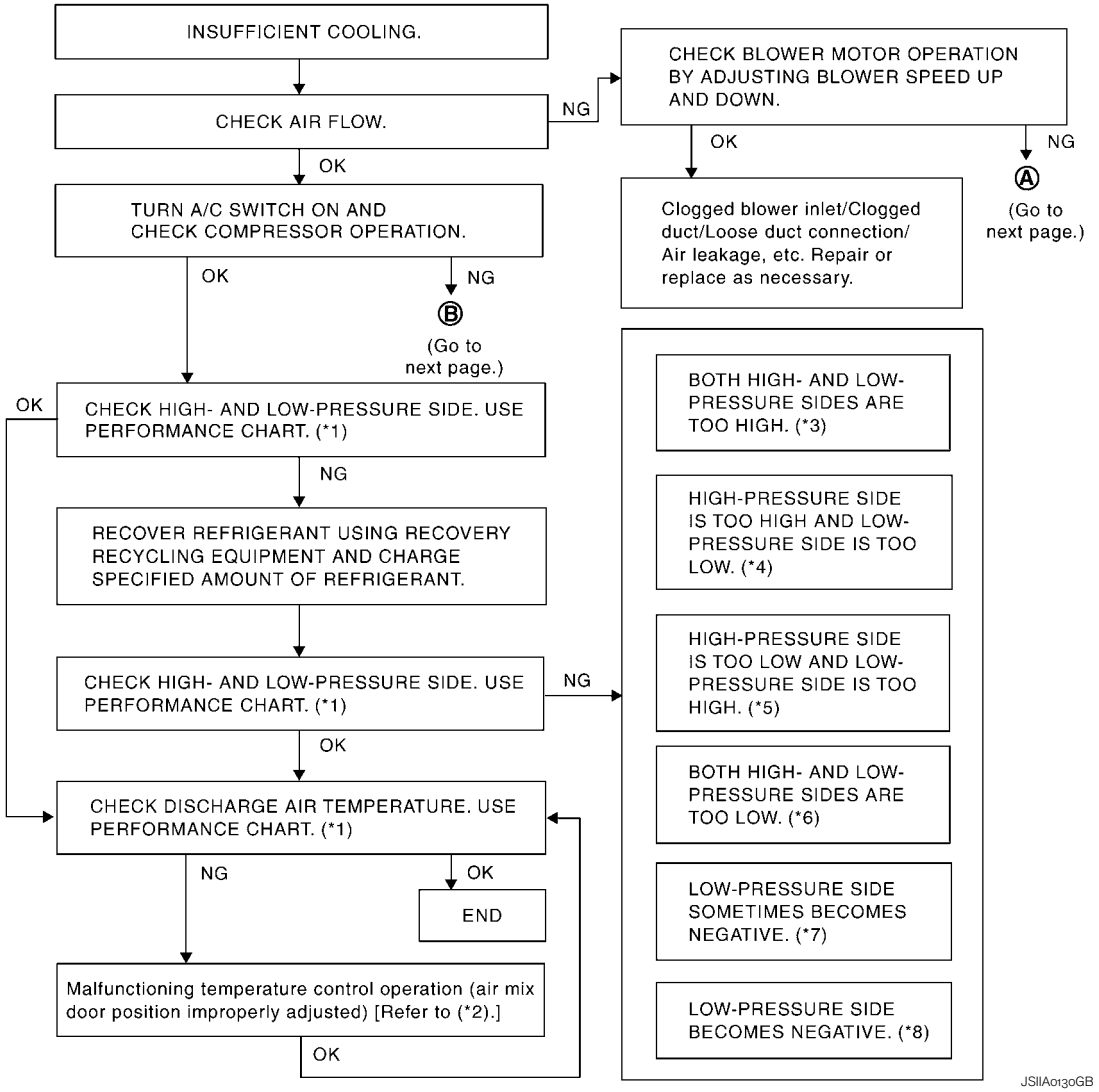
cardiagn.com

REFRIGERATION SYSTEM

Inspection

INFOID:0000000001098156

PERFORMANCE TEST DIAGNOSIS



*2 HAC-187, "Diagnosis Chart By Symptom"

*3 HA-165, "BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table"

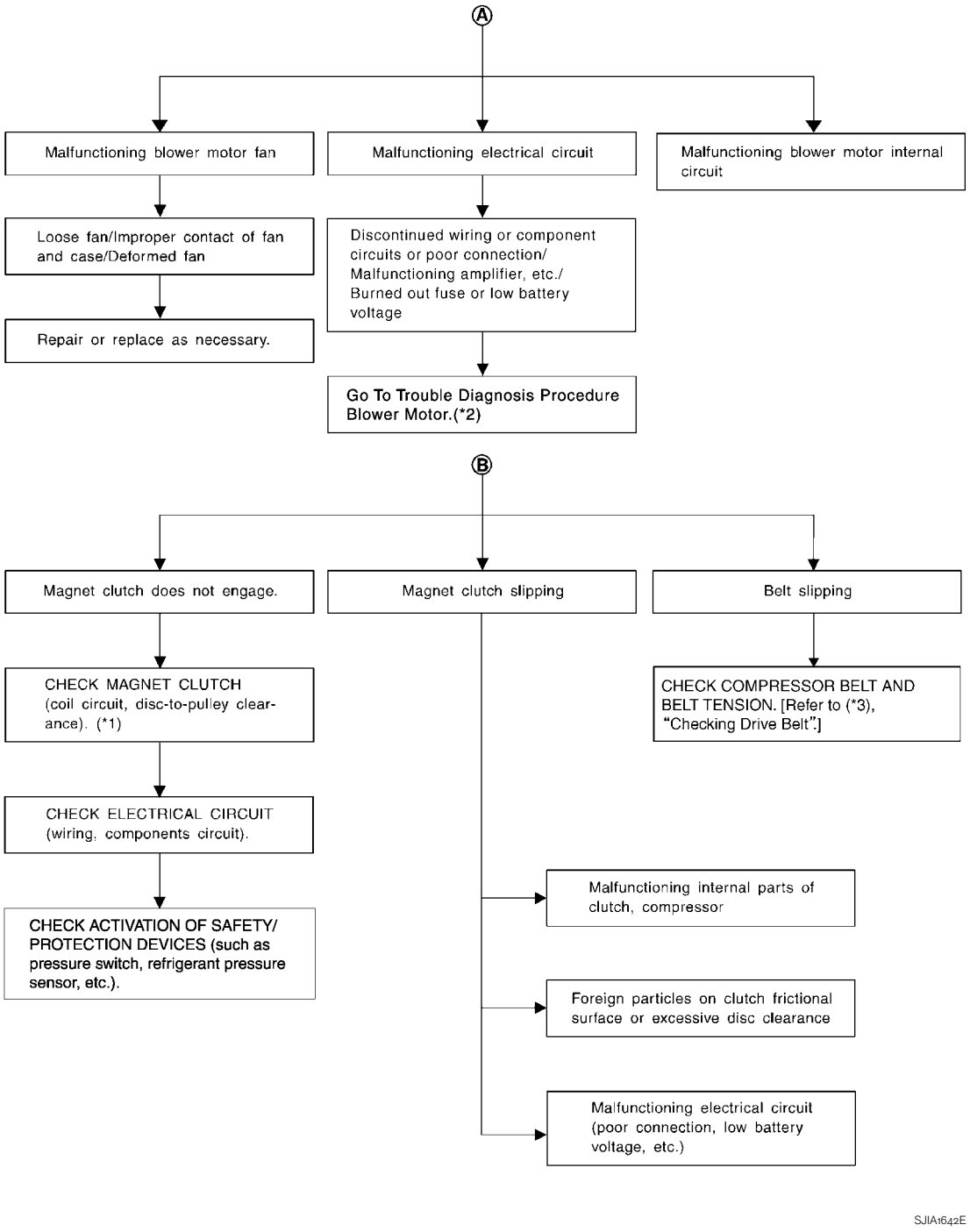
*4 HA-165, "HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table"

*5 HA-166, "HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table"

*6 HA-166, "BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table"

*7 HA-167, "LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table"

*8 HA-167, "LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table"



SJIA1642E

*2 HAC-187, "Diagnosis Chart By Symptom"

*3 EM-15, "Checking" (HR), EM-134, "Checking" (MR)

Refrigerant Leaks

INFOID:0000000001098158

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C lubricant leakage, damage and corrosion. A/C lubricant leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using either an electrical leak detector or fluorescent dye leak detector (SST: J-42220).
If dye is observed, confirm the leak with an electrical leak detector. It is possible a prior leak was repaired and not properly cleaned.

cardiagn.com

When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.
When searching for refrigerant leaks using an electrical leak detector, move the probe along the suspected leak area at 1 to 2 inches per second and no further than 1/4 inch from the component.

CAUTION:

Moving the electrical leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

cardiagn.com

FLUORESCENT LEAK DETECTOR

Inspection

INFOID:0000000001098159

CHECKING SYSTEM FOR LEAKS USING THE FLUORESCENT LEAK DETECTOR

1. Check A/C system for leaks using the UV lamp and safety goggles (SST: J-42220) in a low sunlight area (area without windows preferable). Illuminate all components, fittings and lines. The dye will appear as a bright green/yellow area at the point of leakage. Fluorescent dye observed at the evaporator drain opening indicates an evaporator core assembly (tubes, core or expansion valve) leak.
2. If the suspected area is difficult to see, use an adjustable mirror or wipe the area with a clean shop rag or cloth, with the UV lamp for dye residue.
3. After the leak is repaired, remove any residual dye using dye cleaner (SST: J-43872) to prevent future misdiagnosis.
4. Perform a system performance check and verify the leak repair with an approved electrical leak detector.

NOTE:
Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and lubricants, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean.
Clean with a dry cloth or blow off with shop air.
Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

DYE INJECTION

(This procedure is only necessary when recharging the system or when the compressor has seized and was replaced.)

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.52 kg/cm^2, 50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool (SST: J-41459).
3. Connect the injector tool to the A/C low-pressure side service valve.
4. Start the engine and switch A/C ON.
5. When the A/C operating (compressor running), inject one bottle (1/4 ounce / 7.4 cc) of fluorescent dye through the low-pressure service valve using dye injector tool (SST: J-41459) (refer to the manufacture's operating instructions).
6. With the engine still running, disconnect the injector tool from the service valve.
   CAUTION:
   Be careful the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.
7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.
8. Attach a blue label as necessary.

cardiagn.com

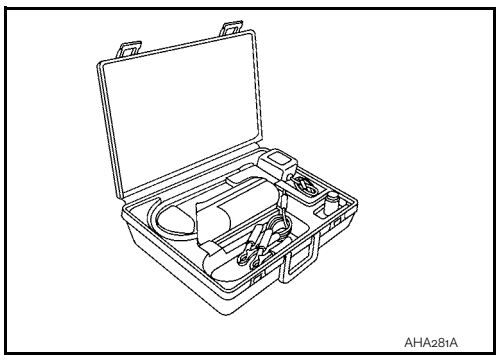
ELECTRICAL LEAK DETECTOR

Inspection

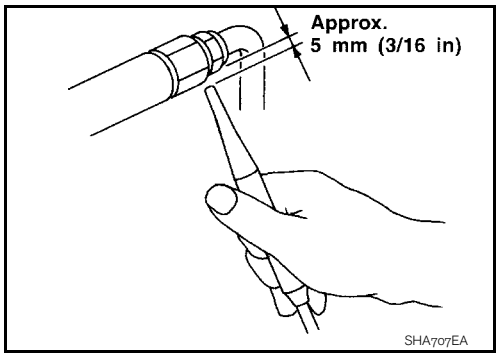
INFOID:0000000001098160

PRECAUTIONS FOR HANDLING LEAK DETECTOR

When performing a refrigerant leak check, use an electrical leak detector (SST: J-41995) or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.

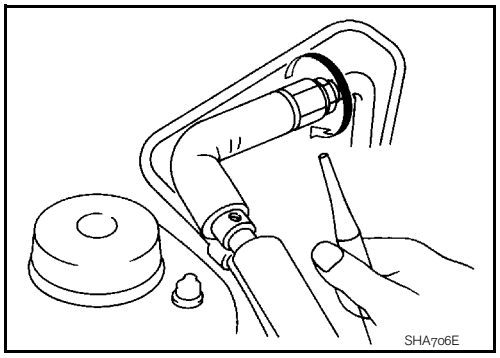

AHA281A

1. Position probe approximately 5 mm (3/16 in) away from point to be checked.

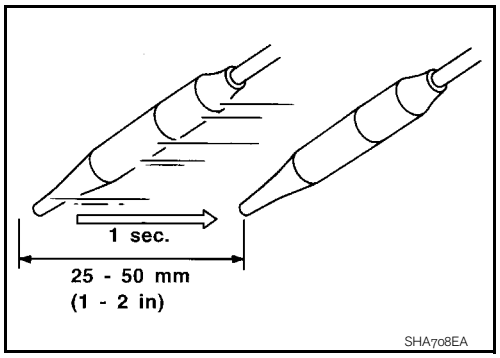


SHA707EA

2. When testing, circle each fitting completely with probe.


SHA706E

3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.



SHA708EA

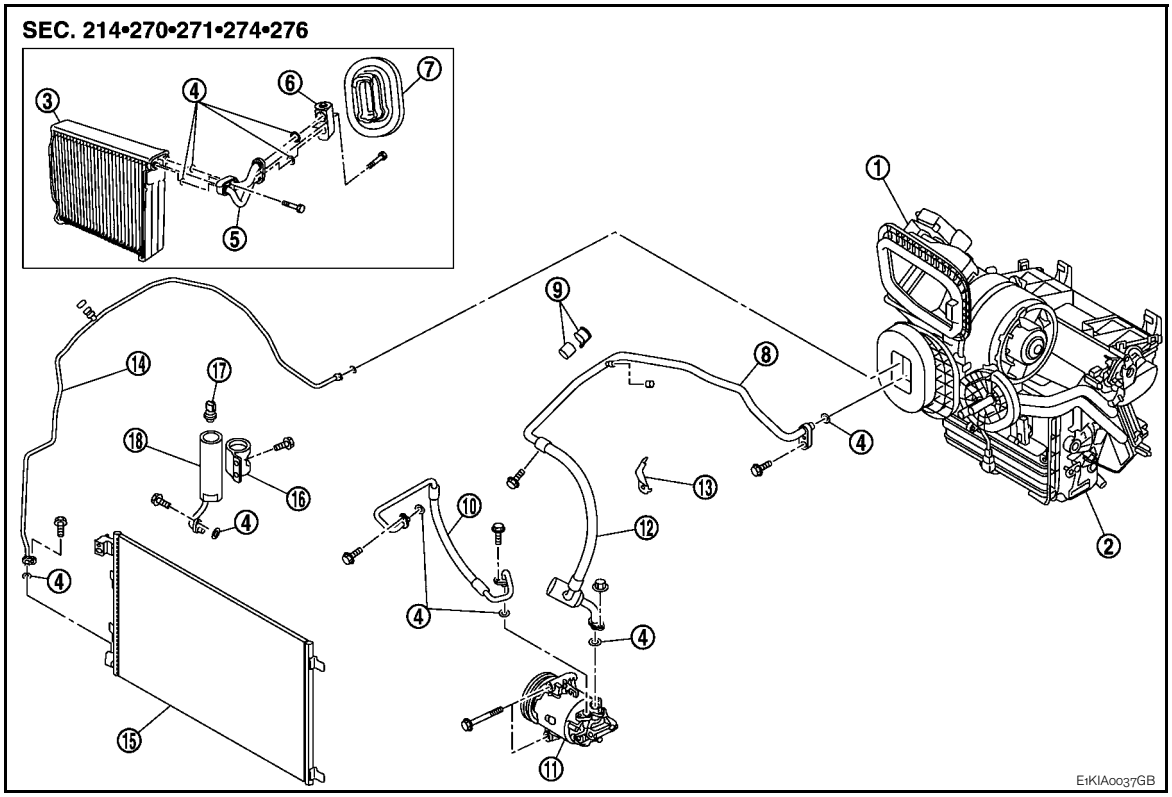
CHECKING PROCEDURE

To prevent inaccurate or false readings, make sure there is no refrigerant vapor, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Stop the engine.

cardiagn.com

2. Connect a suitable A/C manifold gauge set (SST: J-39183) to the A/C service valves.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm^2, 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.
NOTE:
At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm^2, 50 psi).
4. Perform the leak test from the high-pressure side (compressor discharge a to evaporator inlet j) to the low-pressure side (evaporator drain hose k to shaft seal p). Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detected probe completely around the connection/component.



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

Compressor
Check the fitting of high- and low-pressure flexible hoses, relief valve and shaft seal.
Condenser
Check the fitting of condenser pipe assembly, high-pressure flexible hose and pipe.
Liquid tank
Check the fitting of radiator & condenser assembly and refrigerant pressure sensor.
Service valves
Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).
NOTE:
After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.
Cooling unit (Evaporator)

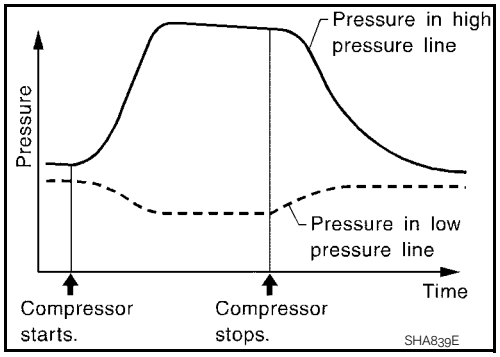
cardiagn.com

With engine OFF, turn blower fan on “High” for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer’s recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.
Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components.
If no leaks are found, perform steps 7 - 10.
7. Start the engine.
8. Set the A/C control as follows;

a. A/C switch: ON
b. MODE door position: VENT (Ventilation)
c. Intake door position: Recirculation
d. Temperature setting: Max. cold
e. Fan speed: High

9. Run engine at 1,500 rpm for at least 2 minutes.
10. Stop the engine and perform leak check again following steps 4 through 6 above.
Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector at the compressor. The pressure on the high-pressure side will gradually drop after refrigerant circulation stops and pressure on the low-pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.



11. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines and then check refrigerant purity.
12. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier.
13. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier.
14. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component if necessary.
15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
16. Perform A/C performance test to ensure system works properly.

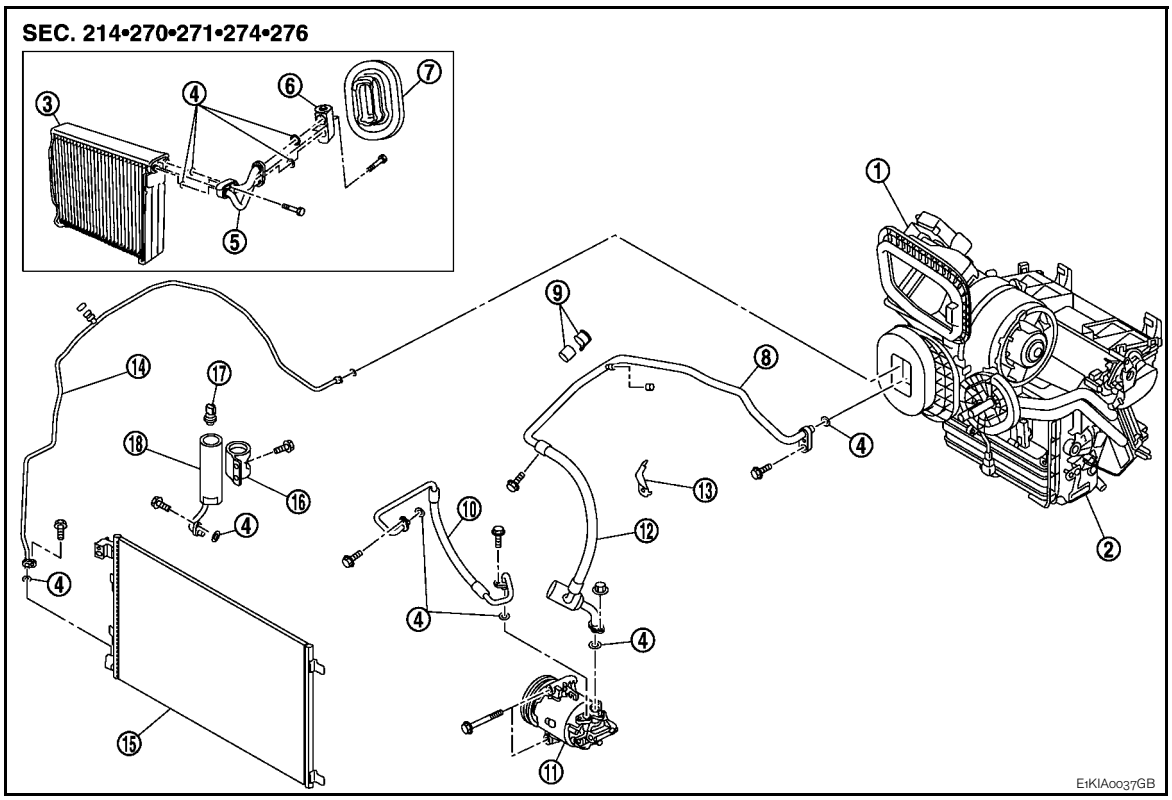
ON-VEHICLE REPAIR

REFRIGERATION SYSTEM

Exploded View

INFOID:0000000001098161

Refer to HA-171, "Refrigerant Connection".



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

Inspection After Installation

INFOID:0000000001098162

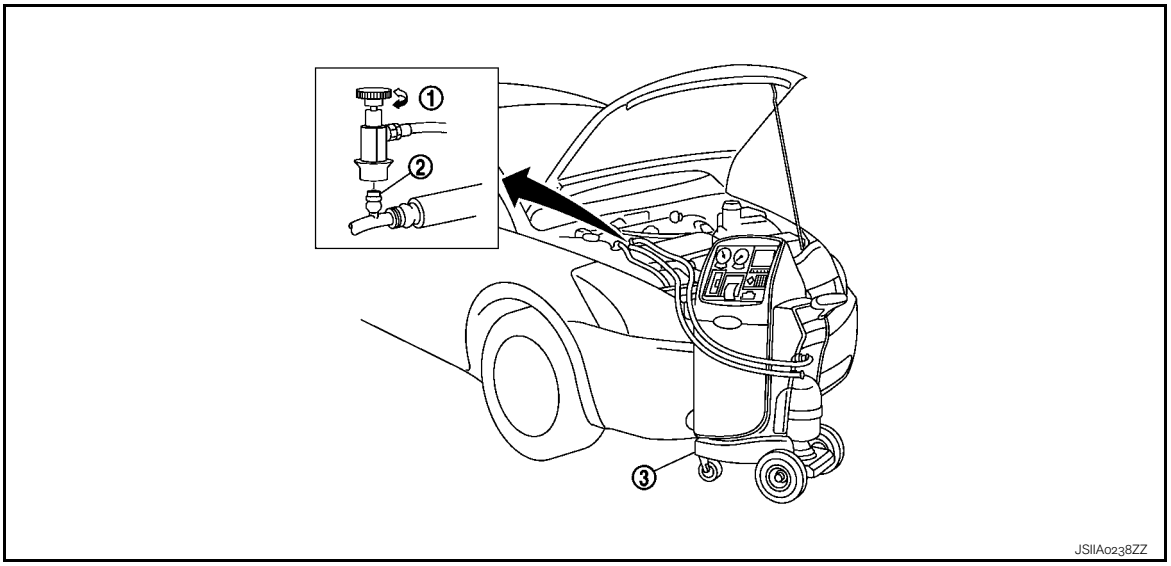
SETTING OF SERVICE TOOLS AND EQUIPMENT

Discharging Refrigerant

WARNING:

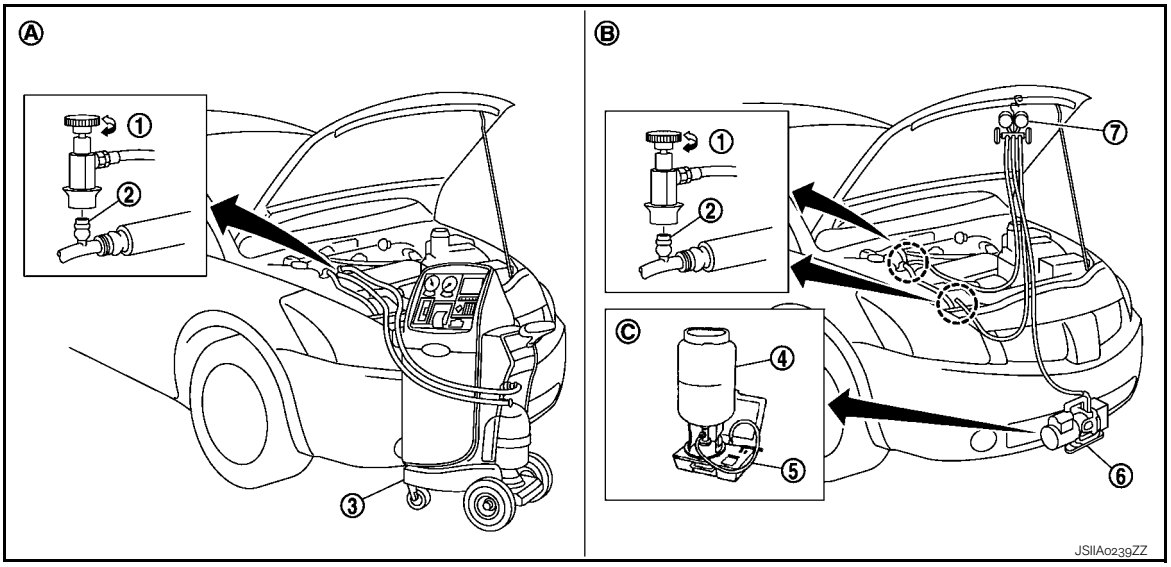
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment] or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.

cardiagn.com



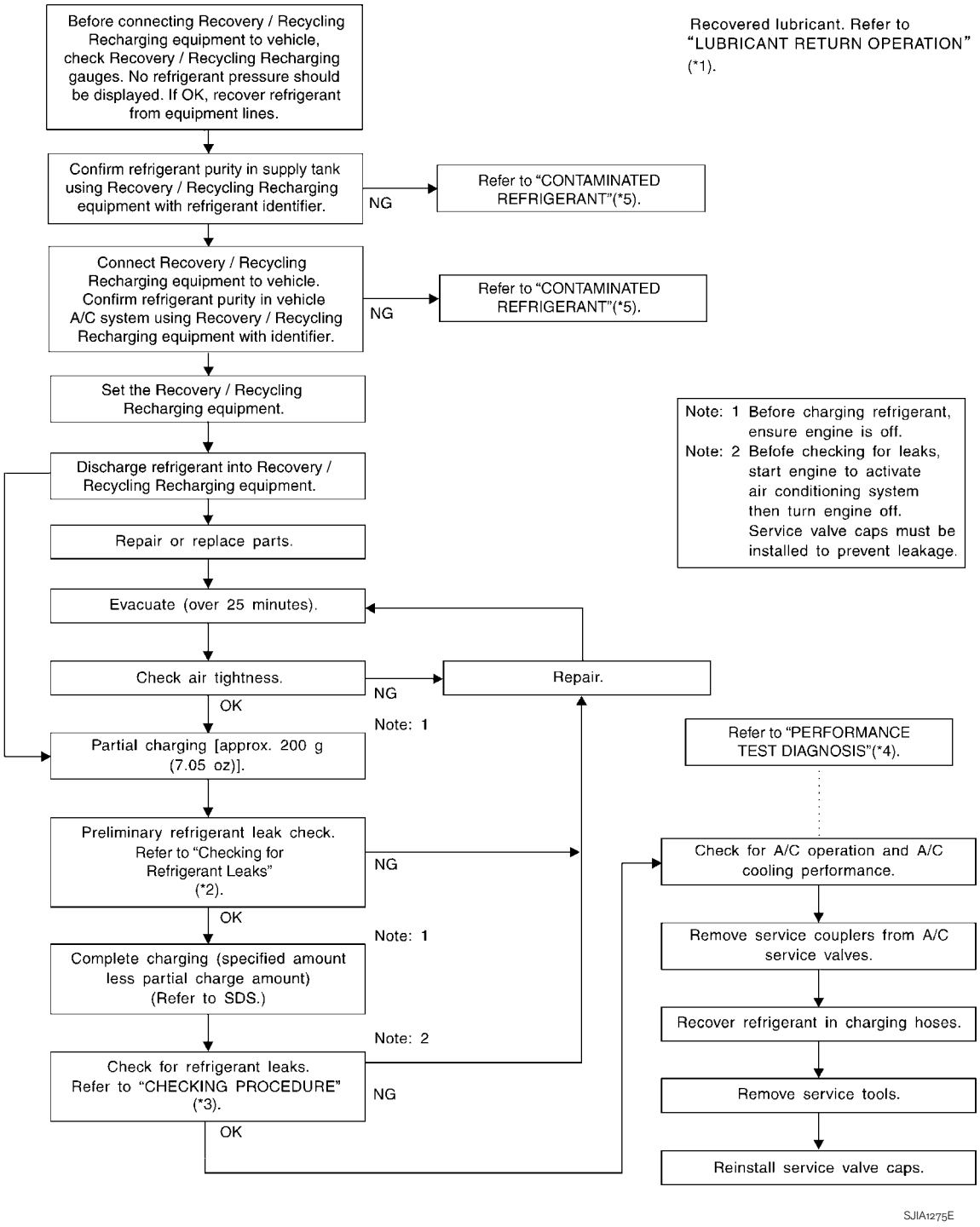
1. Shut-off valve
2. A/C service valve
3. Recovery/Recycling/Recharging equipment

Evacuating System and Charging Refrigerant



1. Shut-off valve
2. A/C service valve
3. Recovery/Recycling/Recharging equipment
4. Refrigerant container (HFC-134a)
5. Weight scale (J-39650)
6. Vacuum pump (J-39649)
7. Manifold gauge set (J-39183)

A. Preferred (best) method
B. Alternative method
C. For charging



*1 HA-180, "Adjustment"

*2 "REFRIGERANT LEAKS" in HA-132, "Refrigerant Leaks" (HR/MR), HA-183, "Refrigerant Leaks" (K9K).

*3 "CHECKING PROCEDURE" in HA-182, "Inspection".

*4 "PERFORMANCE TEST DIAGNOSIS" in HA-182, "Inspection".

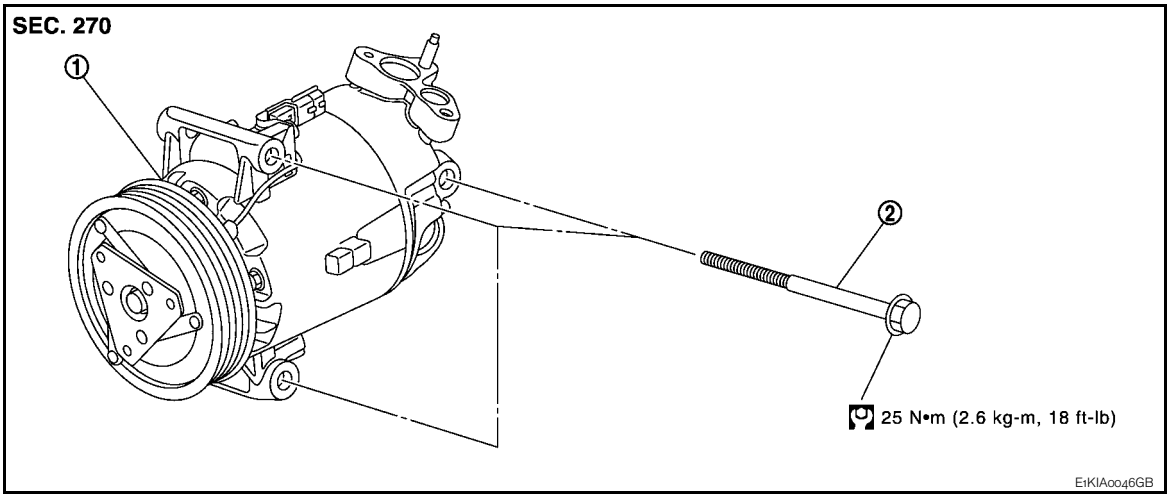
*5 "CONTAMINATED REFRIGERANT" in HA-170, "Working with HFC-134a (R-134a)".

cardiagn.com

COMPRESSOR

Exploded View

INFOID:0000000001098163



1. Compressor
2. Bolt

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

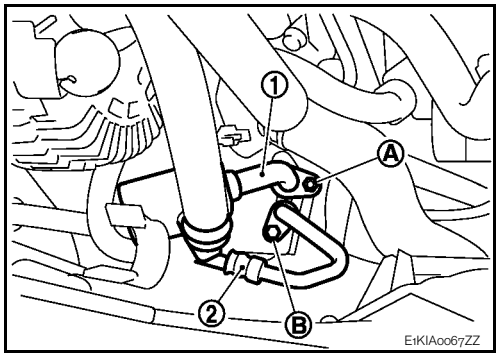
INFOID:0000000001098164

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament.
3. Remove air intake hoses (RH) and air duct (LH). Refer to EM-27, "Exploded View" (HR), EM-144, "Removal and Installation" (MR).
4. Remove engine undercover, using power tools.
5. Drain engine coolant from radiator. Refer to CO-9, "Draining" (HR), CO-30, "Draining" (MR).
6. Remove drive belt. Refer to EM-16, "Removal and Installation" (HR), EM-134, "Removal and Installation" (MR).
7. Remove lower radiator hose from engine. Refer to CO-13, "Exploded View" (HR), CO-34, "Exploded View" (MR).
8. Remove mounting nuts (A) from low-pressure flexible hose (1) and mounting bolt (B) from high-pressure flexible hose (2).
9. Remove low-pressure flexible hose and high-pressure flexible hose from compressor.

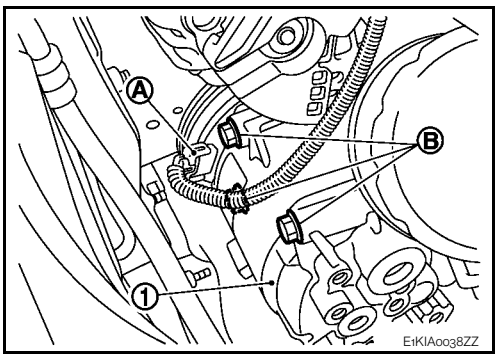
   CAUTION:

   Cap or wrap the joint of compressor, low-pressure flexible hose and high-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.



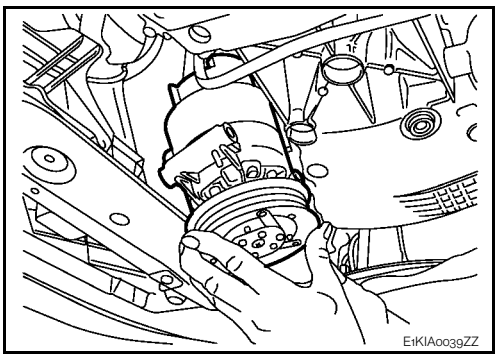
10. Disconnect harness connector from compressor.

11. Remove compressor harness connector (A), then remove mounting bolts (B) from compressor (1), using power tools.



12. Remove the compressor from the vehicle.

Compressor fixing bolt to engine
: 25 N·m (2.6 kg-m, 18.5 ft-lb)



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and high-pressure flexible hose with new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

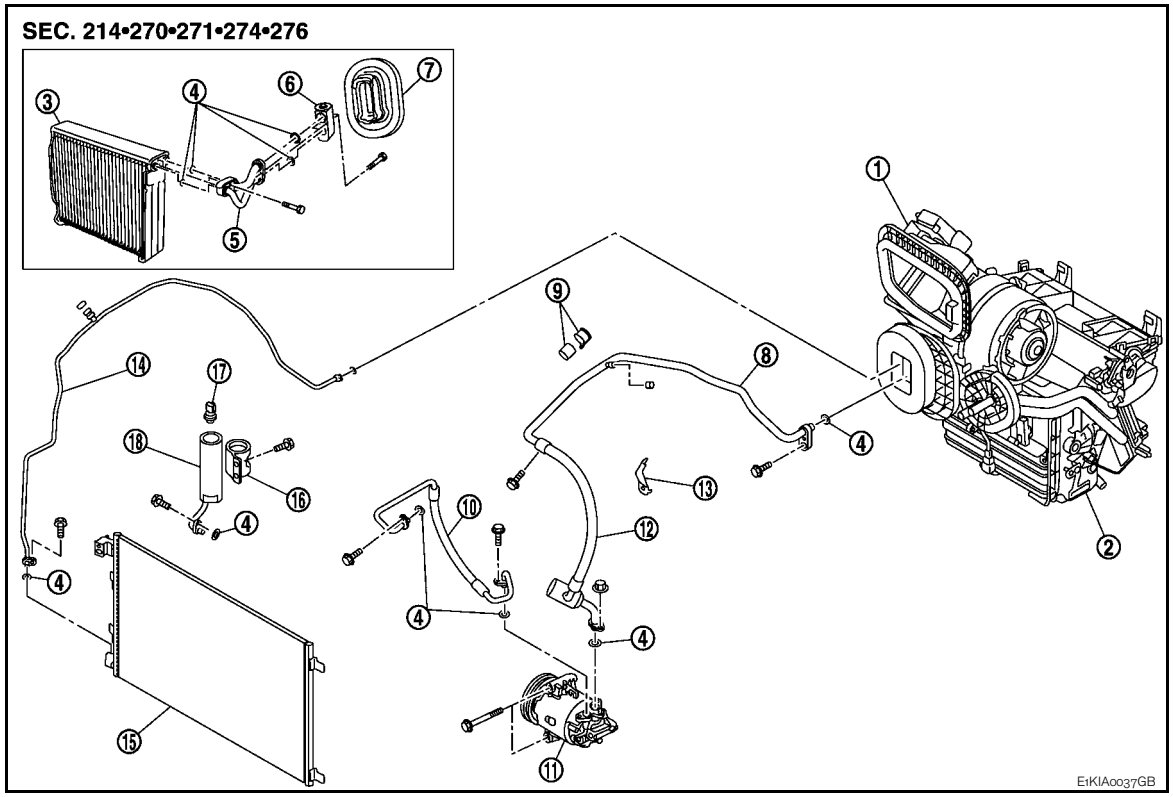
cardiagn.com

LOW-PRESSURE FLEXIBLE HOSE AND PIPE 2

Exploded View

INFOID:0000000001098166

Refer to HA-171, "Refrigerant Connection".



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

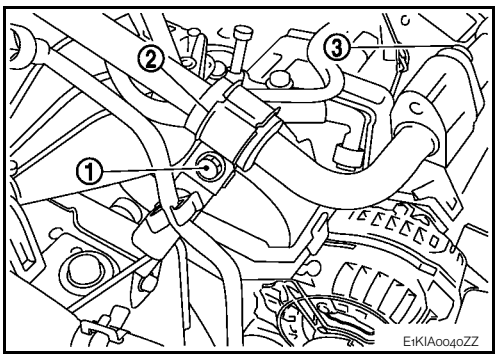
Removal and Installation

INFOID:0000000001098167

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove upper engine cover ornament. Refer to EM-146, "Exploded View" (MR).
3. Remove air intake hose (RH side), and air duct (LH). Refer to EM-27, "Exploded View" (HR), EM-144, "Exploded View" (MR).

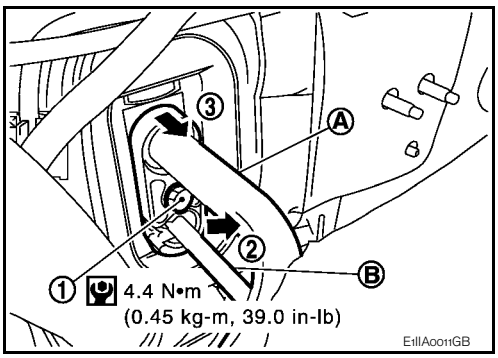
4. Remove mounting bolt (1) and clamp (2), from low pressure pipe bracket support.
5. Remove low and high-pressure maintaining clip, from both pipes then remove fixing bolt (3).
6. Remove engine room insulator fixing clip from cowl top.



7. Pull engine room insulator, then remove pipes bracket fixing bolt (1), from expansion valve, and release pipes fixing bracket as shown in order (1) to (3) from high pressure pipe 1 (B), to remove low pressure flexible hose and pipe 2 (A) from expansion valve.

CAUTION:

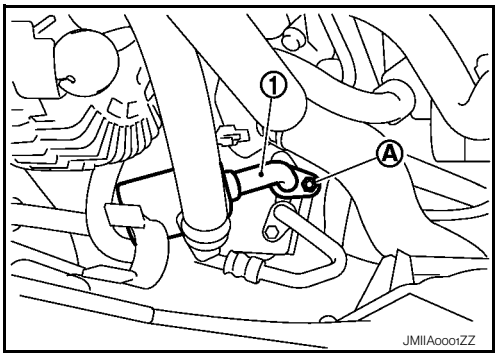
Cap or wrap the joint of the low pressure then remove fixing bolt (3) pipe 2, and expansion valve exit with suitable material such as vinyl tape to avoid the entry of air.



8. Remove low pressure flexible hose fixing nut (A), from air conditioner compressor, and remove low pressure flexible hose (1).

CAUTION:

Cap or wrap the joint of low-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and low-pressure pipe 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

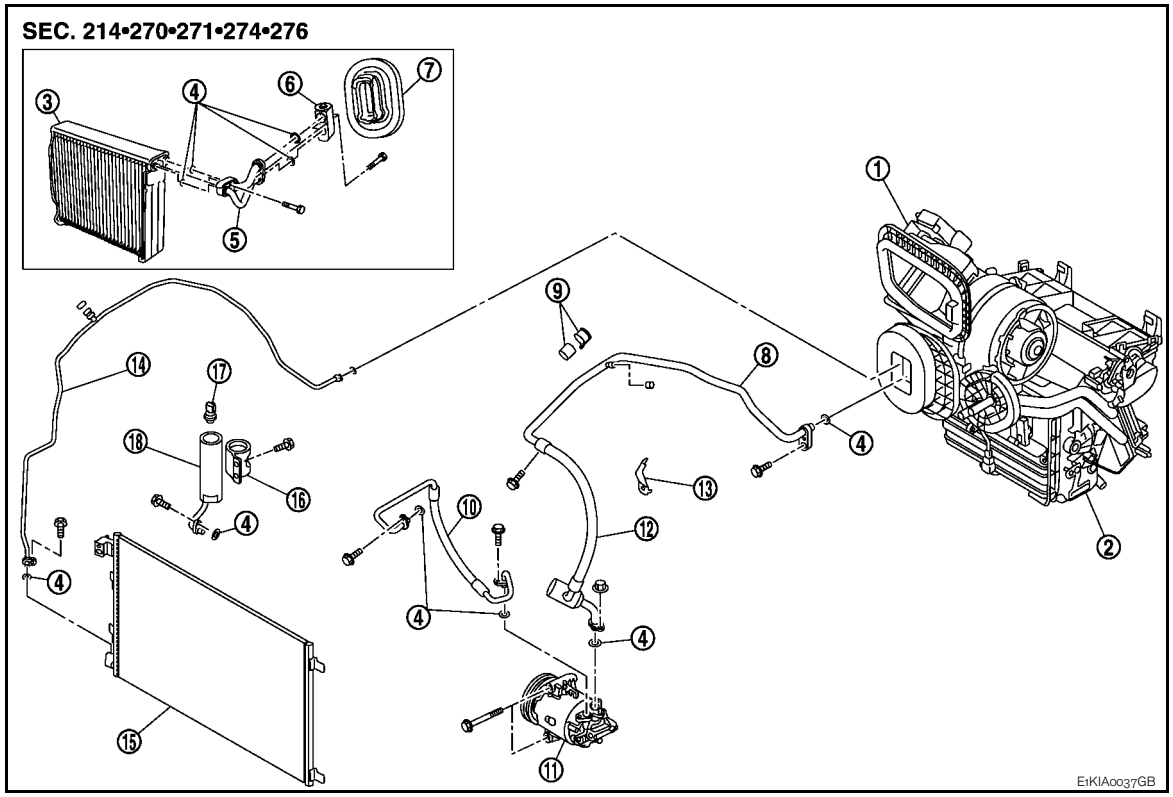
cardiagn.com

HIGH-PRESSURE FLEXIBLE HOSE

Exploded View

INFOID:0000000001098168

Refer to HA-171, "Refrigerant Connection".



1. Heater & blower unit assembly
2. Heater & cooling unit assembly
3. Evaporator
4. O-ring
5. Low pressure pipe 1 and high pressure pipe 2 assembly
6. Expansion valve
7. Heater sealing
8. Low pressure flexible hose and pipe 2
9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose
11. Compressor
12. Low pressure flexible hose
13. Low & high pipe bracket support
14. High pressure pipe 1
15. Condenser assembly
16. Liquid tank fixing bracket
17. Refrigerant pressure sensor
18. Liquid tank

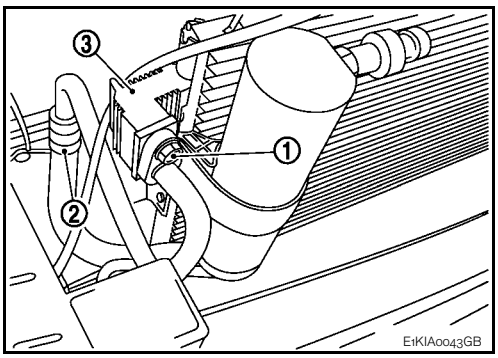
Removal and Installation

INFOID:0000000001098169

REMOVAL

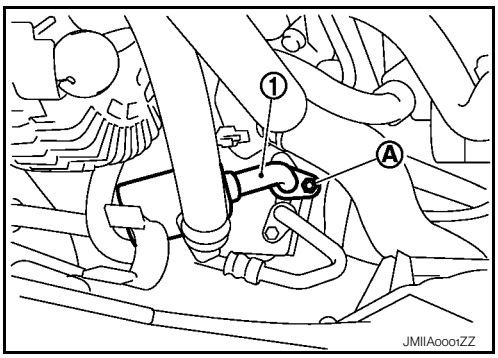
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-146, "Exploded View" (MR).
3. Remove air intake hose (RH) and air duct (LH). Refer to EM-27, "Exploded View" (HR), EM-144, "Exploded View" (MR).
4. Remove front grille. Refer to EXT-17, "Exploded View".
5. Remove radiator air guide (RH). Refer to CO-13, "Exploded View" (HR), CO-34, "Exploded View" (MR).

6. Remove high pressure flexible hose fixing bolt (1) from condenser (3), then pull high pressure flexible hose (2) to remove it from condenser.



CAUTION:
Cap or wrap the joint of high-pressure flexible hose and condenser assembly with suitable material such as vinyl tape to avoid the entry of air.

7. Remove high pressure flexible hose fixing nut (A) from compressor, then pull high pressure flexible hose (1) to remove it from compressor. Remove high pressure flexible hose.



CAUTION:
Cap or wrap the joint of compressor and high-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.

High pressure fixing bolt to condenser
: 4.4 N·m (0.45 kg-m, 39 in-lb)
High pressure fixing bolt to compressor
: 4.4 N·m (0.45 kg-m, 39 in-lb)

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:
- **Replace O-rings of high-pressure flexible hose with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

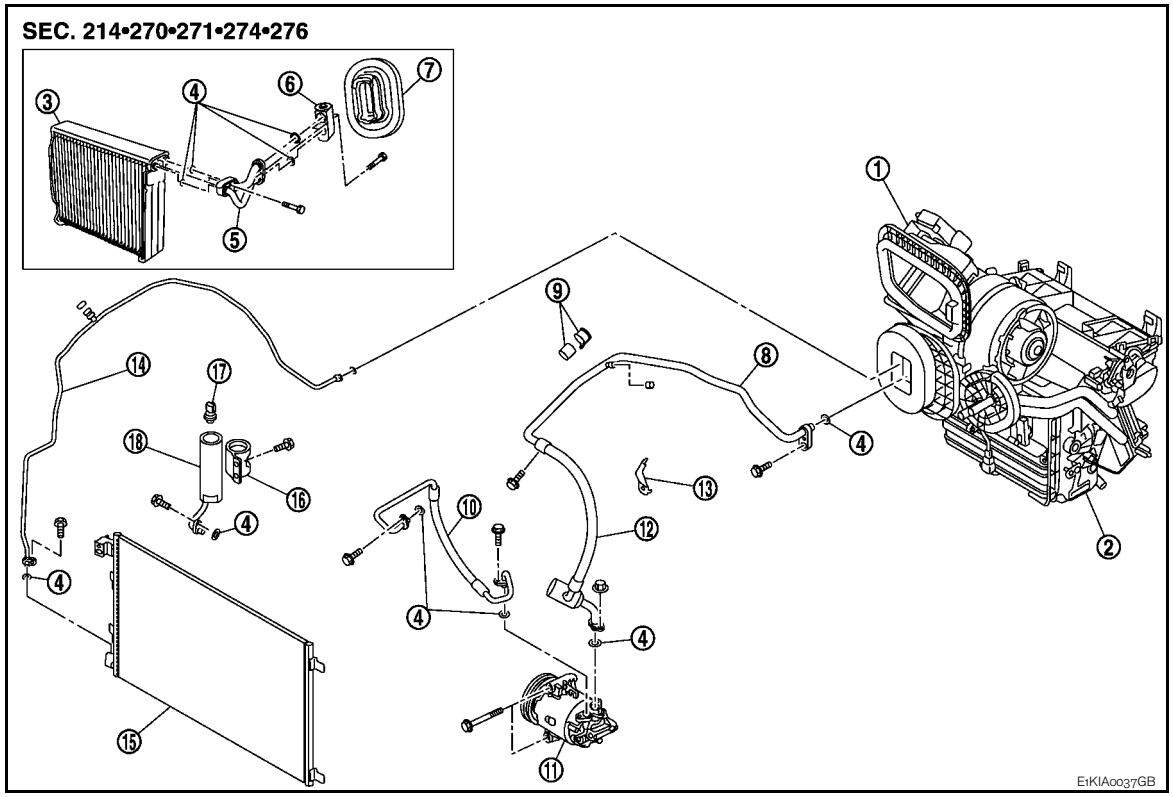
cardiagn.com

HIGH-PRESSURE PIPE 1 (ENGINE COMPARTMENT)

Exploded View

INFOID:0000000001098170

Refer to HA-171, "Refrigerant Connection".



1. Heater & blower unit assembly
2. Heater & cooling unit assembly
3. Evaporator
4. O-ring
5. Low pressure pipe 1 and high pressure pipe 2 assembly
6. Expansion valve
7. Heater sealing
8. Low pressure flexible hose and pipe 2
9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose
11. Compressor
12. Low pressure flexible hose
13. Low & high pipe bracket support
14. High pressure pipe 1
15. Condenser assembly
16. Liquid tank fixing bracket
17. Refrigerant pressure sensor
18. Liquid tank

Removal and Installation

INFOID:0000000001098171

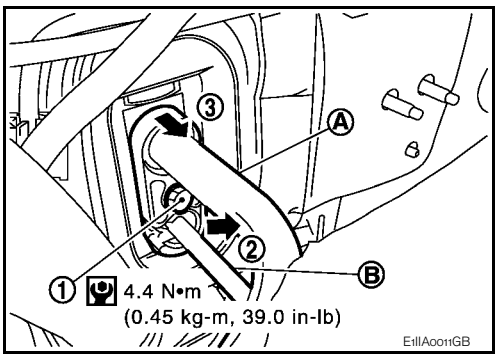
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament.
3. Remove intake hose (RH) and air duct (LH). Refer to EM-27, "Removal and Installation", EM-144, "Removal and Installation", EM-265, "Removal and Installation".

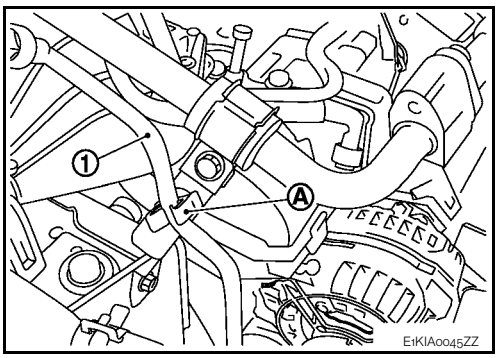
4. Pull engine room insulator, then remove pipes bracket fixing bolt (1), from expansion valve, then release pipe fixing bracket as shown from (1) to (3) from high pressure pipe 1 (B), to disconnect it from expansion valve.

CAUTION:

Cap or wrap the joint of the high pressure pipe 1, and expansion valve in, with suitable material such as vinyl tape to avoid the entry of air.



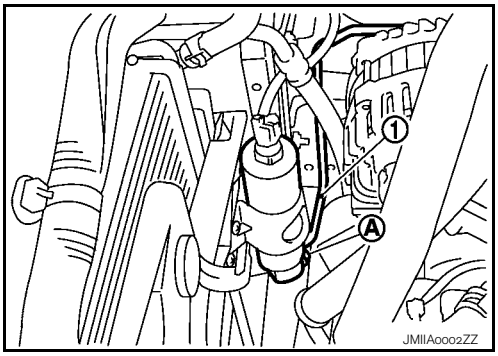
5. Remove high pressure pipe 1 (1) from clip (A).



Remove high-pressure pipe 1 mounting bolt (A) from liquid tank, then remove high-pressure pipe 1 (1).

CAUTION:

Cap or wrap the joint of the high pressure pipe 1, and liquid tank, with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of high-pressure pipe 1 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

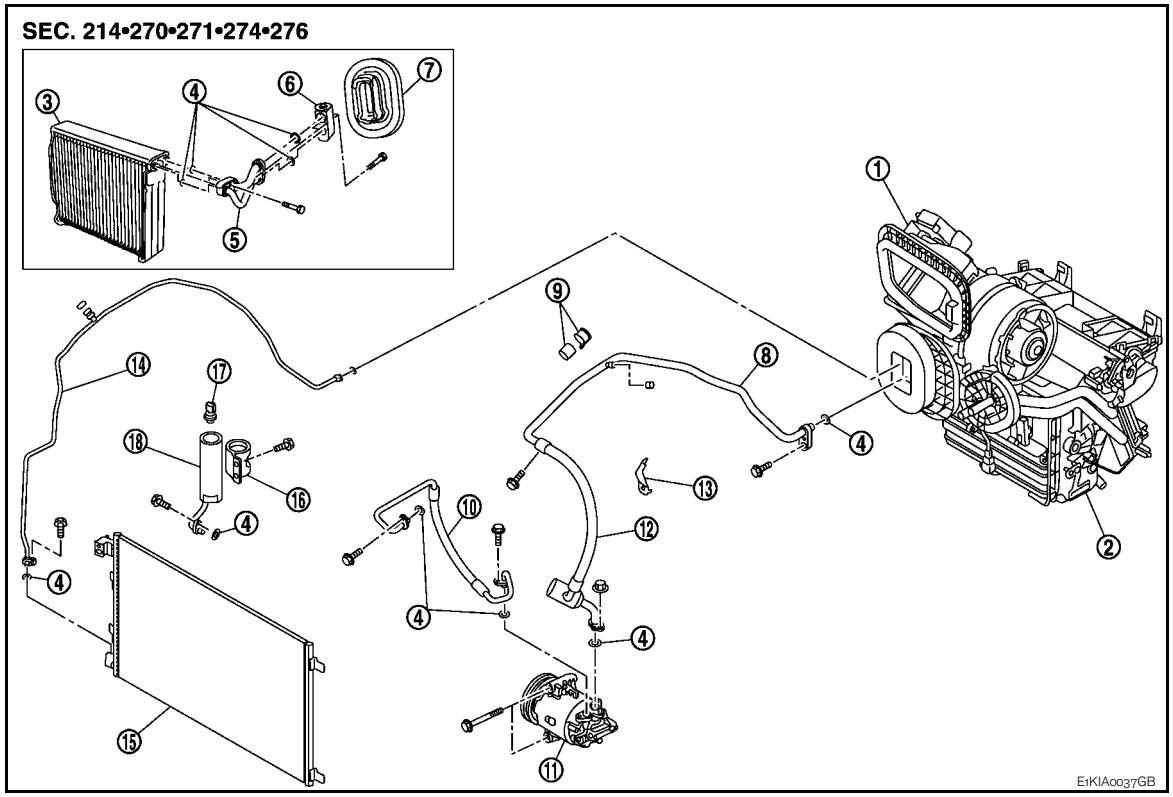
cardiagn.com

LOW-PRESSURE PIPE 1 AND HIGH-PRESSURE PIPE 2

Exploded View

INFOID:0000000001098172

Refer to HA-171, "Refrigerant Connection".



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

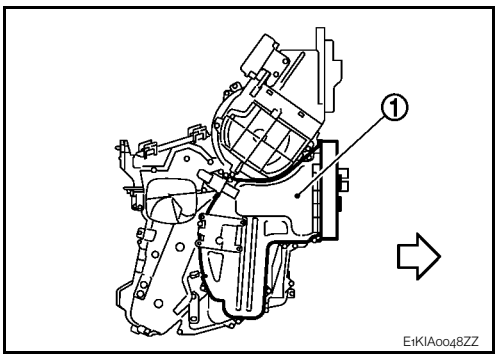
Removal and Installation

INFOID:0000000001098173

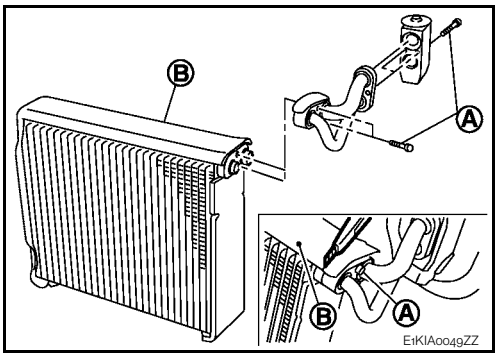
REMOVAL

1. Set the temperature at 18°C (60°F), and then disconnect the battery cable from the negative terminal.
2. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
3. Remove engine cover ornament. Refer to EM-27, "Removal and Installation".
4. Remove high-pressure pipe 1 and low pressure pipe 2 from expansion valve. Refer to HA-147, "Removal and Installation", HA-143, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of the, high-pressure pipe 1, low-pressure pipe 2, and the expansion valve with suitable material such as vinyl tape to avoid the entry of air.
5. Remove heater cooling fixing clamp, and heater hoses. Refer to CO-21, "Removal and Installation", CO-44, "Removal and Installation".
6. Remove instrument panel.Refer to IP-12, "Removal and Installation".
7. Remove foot duct (RH / LH). Refer to VTL-46, "SIDE DEFROSTER DUCTS : Removal and Installation".
8. Remove steering column. Refer to ST-10, "Removal and Installation".

9. Disconnect Heater and cooling unit harness connectors from steering member main harness.
10. Remove steering member.
11. Remove heater and cooling assembly. Refer to VTL-32, "Removal and Installation".
12. Remove mounting screws, and then remove evaporator cover (1).



13. Using a thin cutter, cut the evaporator insulator (B), and then remove fixing bolt (A) and low-pressure pipe 1 and high-pressure pipe 2 assembly.
    CAUTION:
    Cap or wrap the joint of expansion valve, high-pressure pipe 2 and low-pressure pipe 1 with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

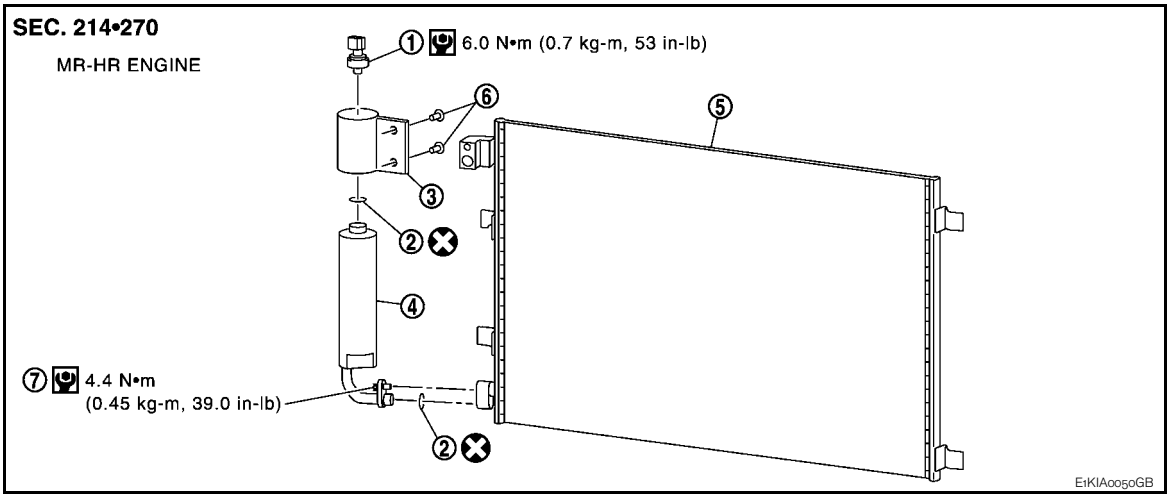
- **Replace O-rings of high-pressure pipe 1, 2 and low-pressure pipe 1, 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

CONDENSER

Exploded View

INFOID:0000000001098174



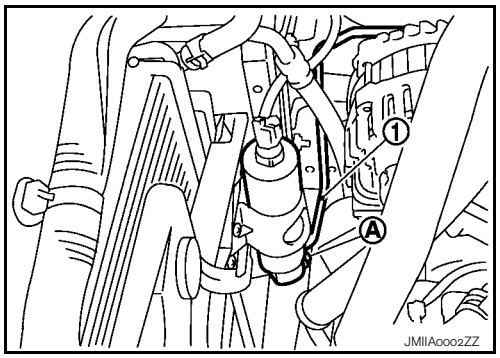
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condenser
6. Liquid tank fixing screw
7. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001098175

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-27, "Removal and Installation", EM-144, "Removal and Installation".
3. Remove front grille. Refer to EXT-17, "Removal and Installation".
4. Remove radiator hose, and drain coolant. Refer to CO-13, "Exploded View" (HR), CO-34, "Exploded View" (MR).
5. Remove upper radiator fixing bracket. Refer to CO-13, "Exploded View" (HR), CO-34, "Exploded View" (MR).
6. Remove radiator air-guide duct (RH). Refer to CO-13, "Exploded View" (HR), CO-34, "Exploded View" (MR).
7. Remove high-pressure pipe 1 fixing bolt (A) and high pressure pipe (1) from liquid tank. Refer to HA-147, "Removal and Installation".



8. Remove high-pressure flexible pipe 1 from condenser. Refer to HA-145, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of low and high-pressure pipe 1 and condenser with suitable material such as vinyl tape to avoid the entry of air.
9. Remove harness connector from refrigerant pressure sensor.
10. Remove liquid tank pipes and liquid tank from condenser and radiator. Refer to HA-153, "Removal and Installation".
    CAUTION:
    Cap or wrap the joint of liquid tank pipes and condenser with suitable material such as vinyl tape to avoid the entry of air.
11. Remove radiator fixing brackets. Refer to CO-13, "Exploded View" (HR), CO-34, "Exploded View" (MR).
12. Release radiator maintaining pawls, then pull-up the condenser assembly to release it from radiator. Refer to CO-13, "Removal and Installation" (HR), CO-35, "Removal and Installation" (MR).

13. Maintain radiator pushing back.
14. Pull upward to remove condenser.
    CAUTION:
    Take care do not damaged condenser or radiator.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

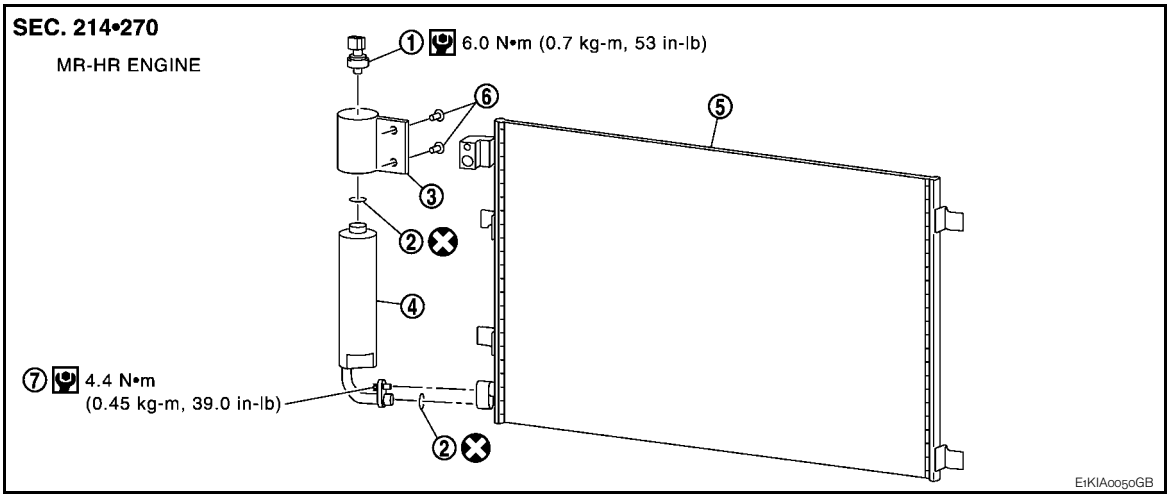
- **Replace O-rings of high-pressure flexible hose and high-pressure pipe 1 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

LIQUID TANK

Exploded View

INFOID:0000000001098178



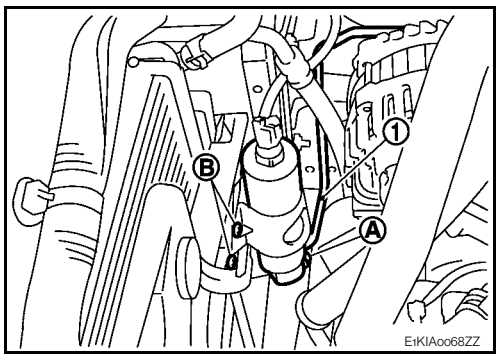
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condenser
6. Liquid tank fixing screw
7. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001098179

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-146, "Exploded View" (MR).
3. Clean liquid tank and its surrounding area, and remove dust and rust from liquid tank.
   CAUTION:
   Be sure to clean carefully.
4. Disconnect refrigerant sensor harness connector. Refer to HA-154, "Removal and Installation".
5. Remove liquid tank bracket support mounting screws (B).
6. Remove high pressure pipe 1 (1) mounting bolt (A) from liquid tank. Refer to HA-147, "Removal and Installation".
7. Remove liquid tank high pressure pipe mounting bolt (A) from condenser.
8. Remove liquid tank pipe bracket fixing screw.
   CAUTION:
   Cap or wrap the joint of high pressure pipe, liquid tank pipes and condenser with suitable material such as vinyl tape to avoid the entry of air.
9. Remove liquid tank assembly.



INSTALLATION

Install liquid tank, and then install liquid tank bracket on condenser.

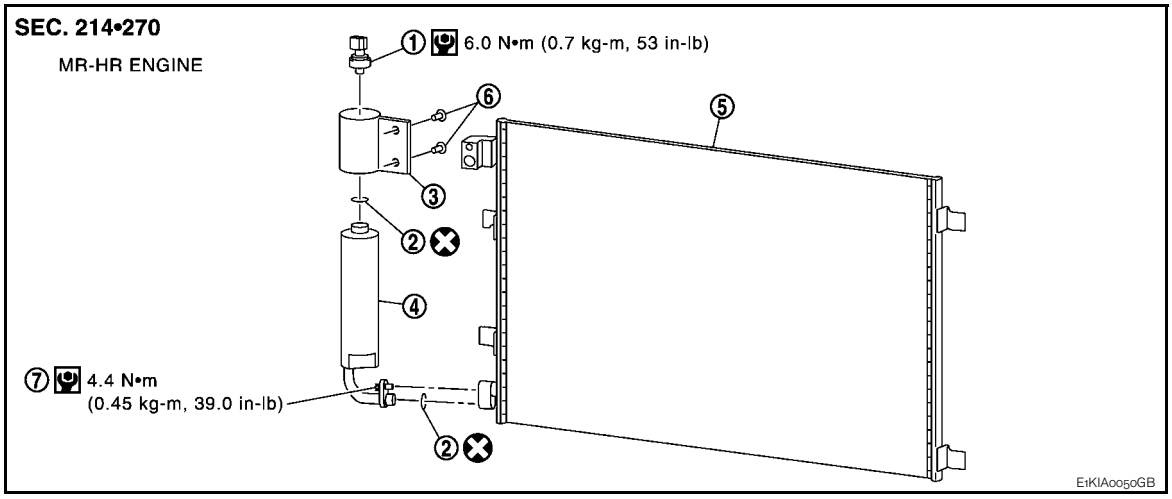
CAUTION:

- **Make sure liquid tank bracket is securely installed at protrusion of condenser. (Make sure liquid tank bracket does not move to a position below center of liquid tank.)**
- **Replace O-rings of A/C piping with new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

REFRIGERANT PRESSURE SENSOR

Exploded View

INFOID:0000000001098180



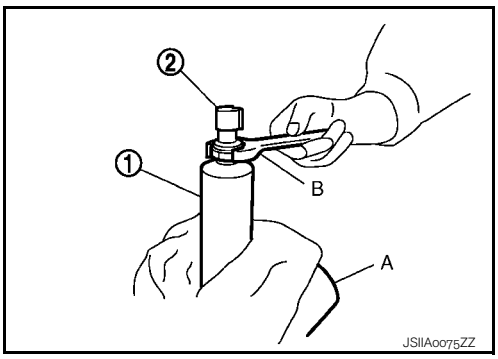
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condenser
6. Liquid tank fixing screw
7. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001098181

REMOVAL

1. Remove liquid tank. Refer to HA-153, "Exploded View".
2. Fix the liquid tank (1) with a vise (A). Remove the refrigerant pressure sensor (2) with a wrench (B).
   CAUTION:
   Be careful not to damage liquid tank.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

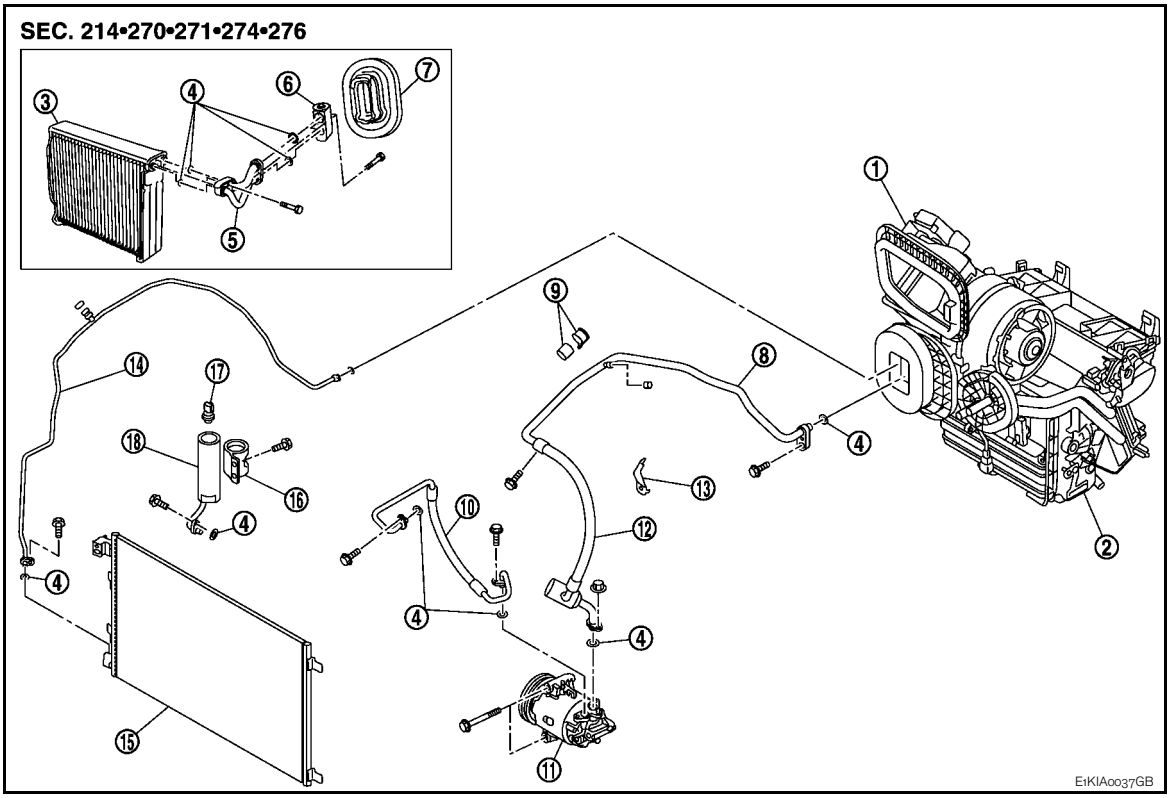
- **Apply compressor oil to O-ring of refrigerant pressure sensor when installing it.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

EVAPORATOR

Exploded View

INFOID:0000000001098182



1. Heater & blower unit assembly	2. Heater & cooling unit assembly	3. Evaporator
4. O-ring	5. Low pressure pipe 1 and high pressure pipe 2 assembly	6. Expansion valve
7. Heater sealing	8. Low pressure flexible hose and pipe 2	9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose	11. Compressor	12. Low pressure flexible hose
13. Low & high pipe bracket support	14. High pressure pipe 1	15. Condenser assembly
16. Liquid tank fixing bracket	17. Refrigerant pressure sensor	18. Liquid tank

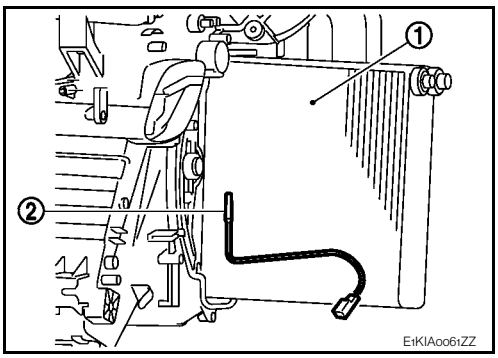
Removal and Installation

INFOID:0000000001098183

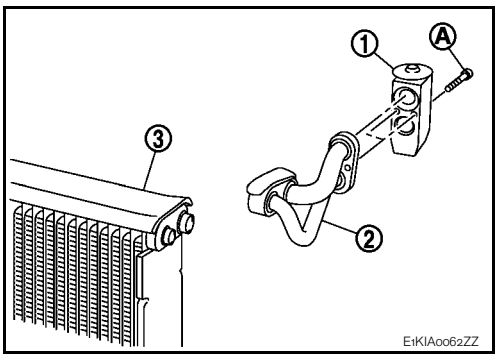
REMOVAL

1. Remove low-pressure pipe 2 and high-pressure pipe 1 from expansion valve. Refer to HA-143, "Removal and Installation", HA-147, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of expansion valve, low-pressure pipe 2 and high-pressure pipe 1 with suitable material such as vinyl tape to avoid the entry of air.
2. Remove heater and cooling fixing clamp and hoses. Refer to VTL-82, "Removal and Installation".
3. Remove heater and cooling unit assembly. Refer to VTL-82, "Removal and Installation".
4. Remove evaporator cover fixing screws and cover. Refer to HA-155, "Exploded View".

5. Slide evaporator (1) and intake sensor (2) from heater and cooling unit assembly.
6. Remove evaporator assembly.



7. Cut upper insulator (3) and remove mounting bolt (A), expansion valve and pressure pipe assembly(2), from evaporator.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

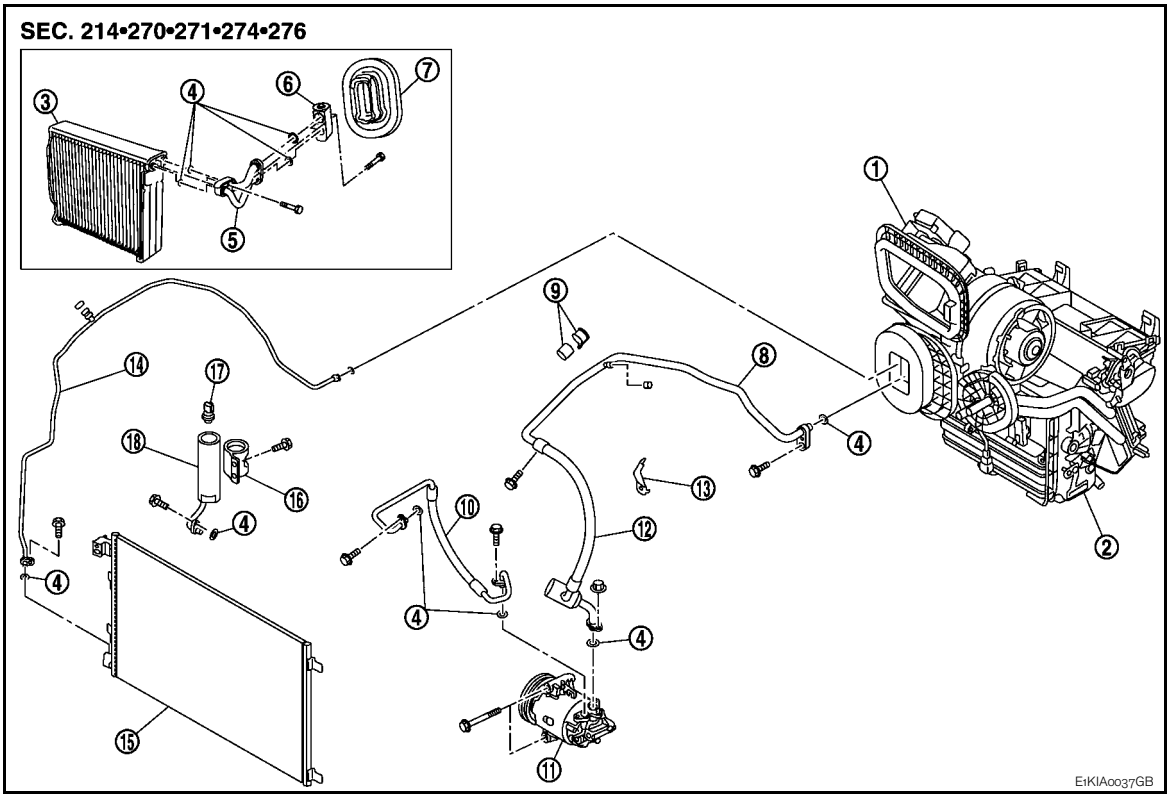
- **Replace O-rings of low-pressure pipe 1 and high-pressure pipe 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **O-rings are different from low-pressure flexible hose (high-pressure pipe 1) and low-pressure pipe 1 (high-pressure pipe 2).**
- **Mark the mounting position of intake sensor bracket prior to removal so that the reinstalled sensor can be located in the same position.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

EXPANSION VALVE

Exploded View

INFOID:0000000001098184



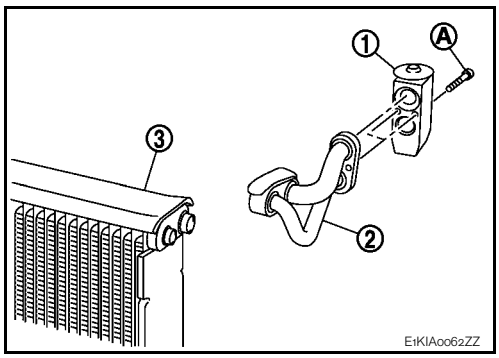
1. Heater & blower unit assembly
2. Heater & cooling unit assembly
3. Evaporator
4. O-ring
5. Low pressure pipe 1 and high pressure pipe 2 assembly
6. Expansion valve
7. Heater sealing
8. Low pressure flexible hose and pipe 2
9. Low pressure pipe 2 fixing clamp assembly
10. High pressure flexible hose
11. Compressor
12. Low pressure flexible hose
13. Low & high pipe bracket support
14. High pressure pipe 1
15. Condenser assembly
16. Liquid tank fixing bracket
17. Refrigerant pressure sensor
18. Liquid tank

Removal and Installation

INFOID:0000000001098185

REMOVAL

1. Remove evaporator (3). Refer to HA-155, "Exploded View".
2. Remove low pressure pipe 1 and high pressure pipe 2 assembly (2). Refer to HA-149, "Removal and Installation".
3. Remove mounting bolts (A), and then remove expansion valve (1) from low and high pressure pipe assembly (2).
   CAUTION:
   Cap or wrap the joint of expansion valve, low and high pressure pipe assembly, evaporator and expansion valve with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of evaporator with new ones, and then apply compressor oil to it when installing it.**

- **O-rings are different from low-pressure pipe 1 (high-pressure pipe 1) and low-pressure pipe 2 (high-pressure pipe 2).**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Compressor

INFOID:0000000001098186

Model		CALSONICKANSEI
Type		Variable displacement swash plate
Displacement cm^3 (cu in)/rev	Max.	120 (7.32)
	Min.	6 (0.37)
Cylinder bore × stroke (Max.) mm (in.)		32 × 29 (1.26 × 1.14)
Direction of rotation		Clockwise (viewed from clutch)
Drive belt		Poly V 7 groove (HR engine), Poly V 6 groove (MR engine)

Lubricant

INFOID:0000000001098187

Model		CALSONICKANSEI
Name		Nissan A/C System Oil Type S (DH-PS)
Capacity m ℓ (US fl oz, Imp fl oz)	Total in system	150 (5.03, 5.3)
	Compressor (Service part) charging amount	150 (5.03, 5.3)

Refrigerant

INFOID:0000000001098188

Type	HFC-134a (R-134a)
Capacity kg (lb)	—

Engine Idling Speed

INFOID:0000000001098189

Refer to EC-29, "IDLE SPEED : Description" (HR with EURO-OBD), EC-368, "IDLE SPEED : Description" (HR without EURO-OBD), EC-646, "IDLE SPEED : Description" (MR with OBD), EC-990, "IDLE SPEED : Description" (MR without EURO-OBD).

Belt Tension

INFOID:0000000001098190

Refer to EM-15, "Tension Adjustment" (HR), EM-134, "Tension Adjustment" (MR).

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001098254

DETAILED FLOW

1. LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. (Get detailed information about the conditions and environment when the symptom occurs.)

>> GO TO 2.

2. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-126, "Description & Inspection".

>> GO TO 3.

3. GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis (Refer to HAC-187, "Diagnosis Chart By Symptom").

>> GO TO 4.

4. REPAIR OR REPLACE

Repair or replace the specific parts

>> GO TO 5.

5. FINAL CHECK

Final check.

Is the inspection result normal?

YES >> CHECK OUT
NO >> GO TO 3.

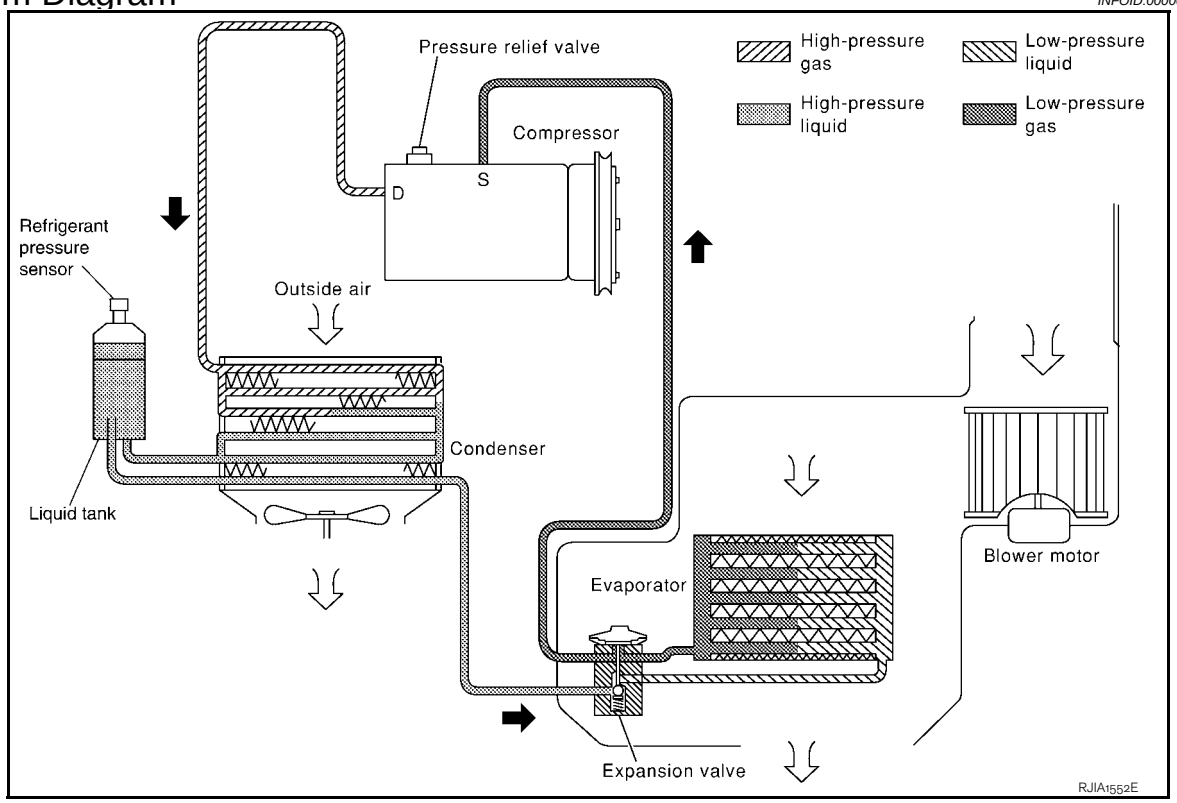
cardiagn.com

FUNCTION DIAGNOSIS

REFRIGERATION SYSTEM

System Diagram

INFOID:0000000001098255



System Description

INFOID:0000000001098256

REFRIGERANT CYCLE

Refrigerant Flow

The refrigerant flows from the compressor, through the condenser with liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation in the evaporator is controlled by an externally equalized expansion valve, located inside the evaporator case.

Freeze Protection

To prevent evaporator frozen up, the evaporator air temperature is monitored, and the voltage signal to the display and A/C auto amp. will make the A/C relay go OFF and stop the compressor.

REFRIGERANT SYSTEM PROTECTION

Refrigerant Pressure Sensor

The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high-pressure side detected by refrigerant pressure sensor is over about 3,119 kPa (31.8 kg/cm^2, 452 psi), or below about 118 kPa (1.2 kg/cm^2, 17 psi).

Pressure Relief Valve

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an unusual level [more than 3,628 kPa (37 kg/cm^2, 526 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.

LUBRICANT

Maintenance of Lubricant Quantity in Compressor

The lubricant in the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large refrigerant leakage occurred. It is important to maintain the specified amount.

If lubricant quantity is not maintained properly, the following malfunctions may result:

- Lack of lubricant: May lead to a seized compressor.
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

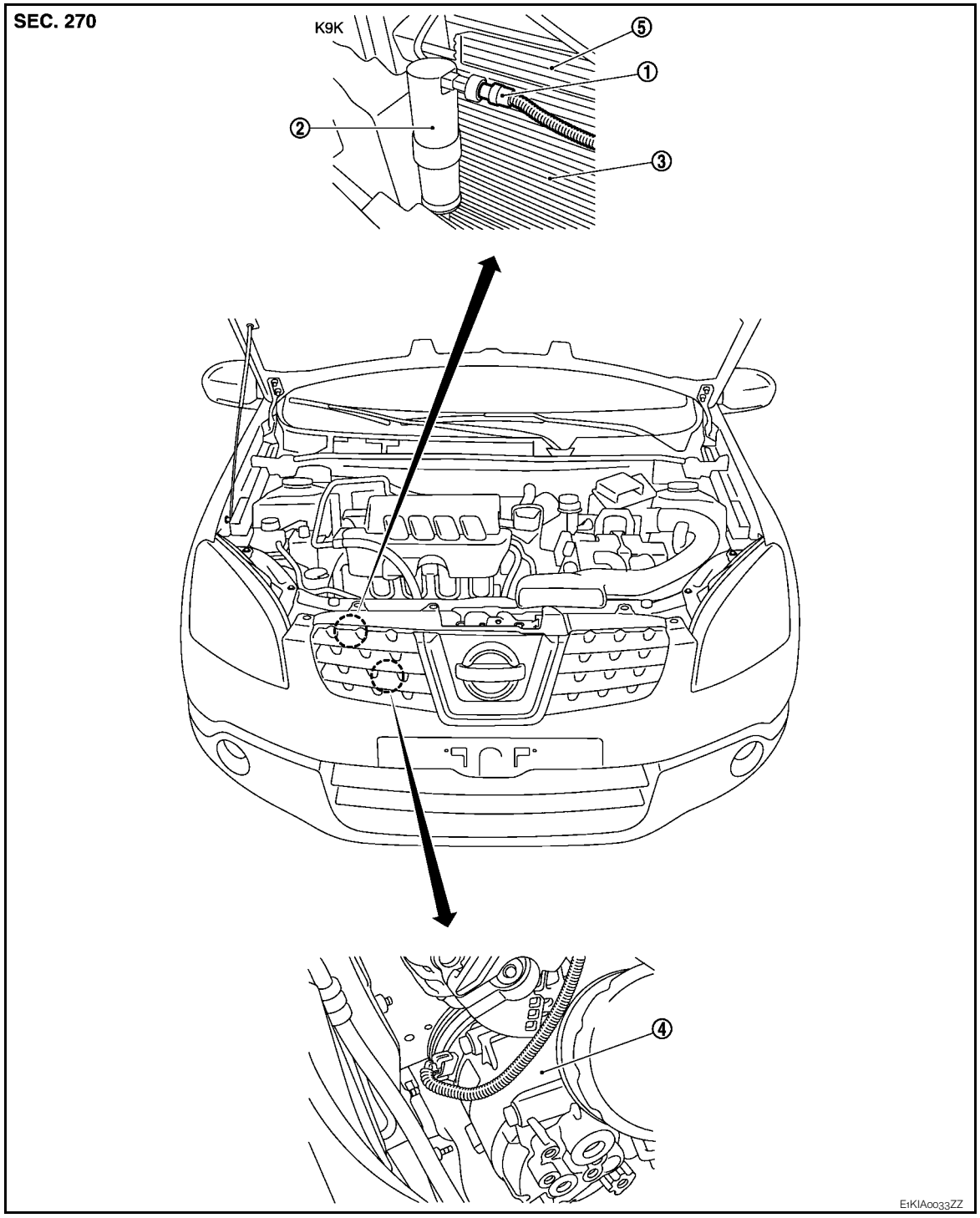
Lubricant

Name : Nissan A/C System Oil Type S

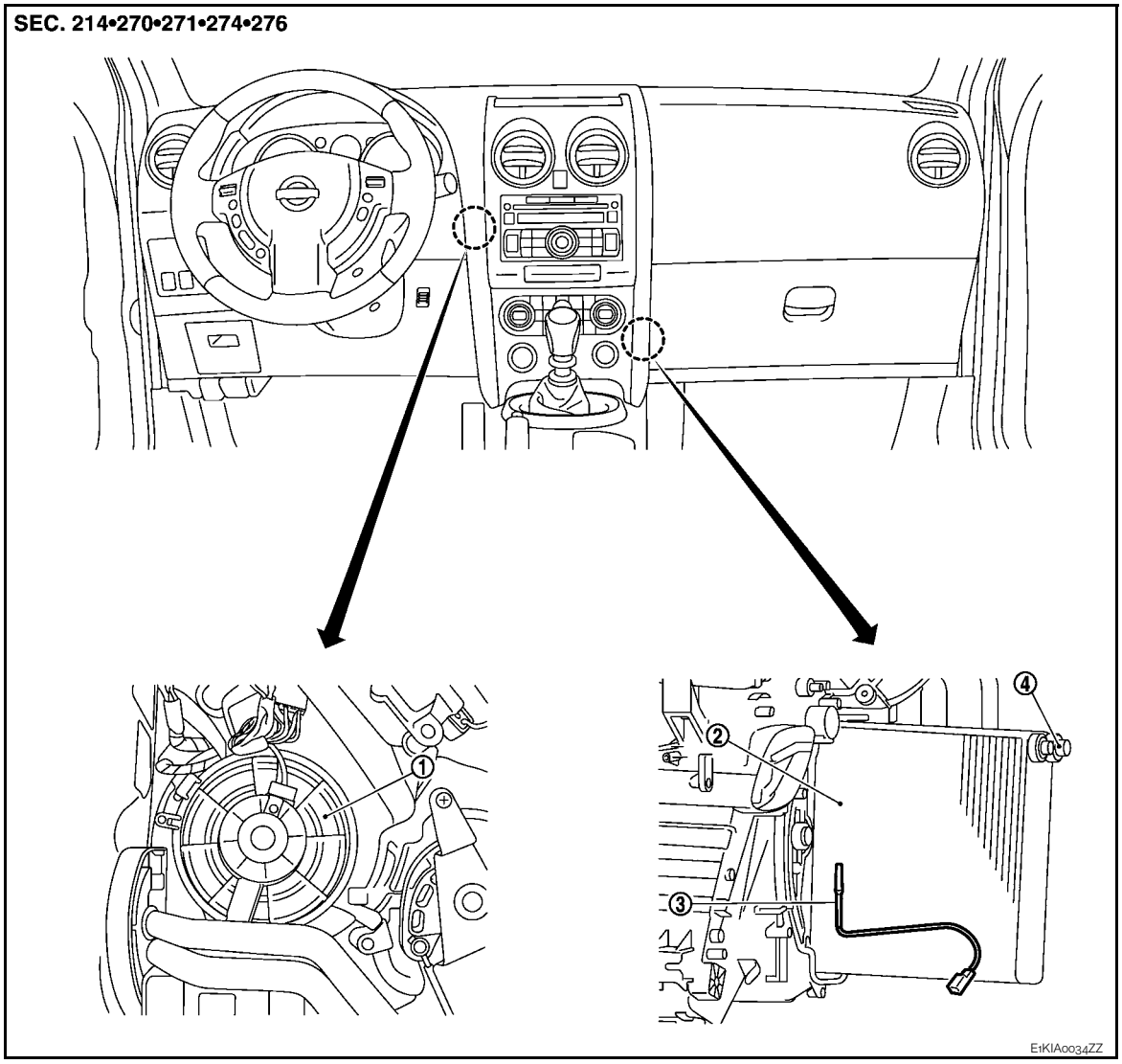
Component Parts Location

INFOID:0000000001098257

cardiagn.com



1. Refrigerant pressure sensor
2. Liquid tank
3. Condenser
4. Compressor
5. Radiator



1. Blower motor assembly
2. Evaporator
3. Intake sensor (AT only)
4. Expansion valve

Component Description

INFOID:0000000001098258

Component	Description
Compressor	Intakes, compresses, and discharges refrigerant, then conveys it to condenser.
Condenser	Condenses refrigerant, and then conveys it to liquid tank.
Liquid tank	Drives moisture out of refrigerant, eliminates foreign matter, then conveys refrigerant to expansion valve.
Refrigerant pressure sensor	Refer to HAC-161, "Component Inspection".
Expansion valve	Vaporizes refrigerant, controls the amount of flow, then conveys refrigerant to evaporator.
Evaporator	Cools passing air, and then conveys it to compressor.
Blower motor	Takes in air in the vehicle or fresh outside air, and then adjusts room temperature by air conditioning.

cardiagn.com

SYMPTOM DIAGNOSIS

REFRIGERATION SYSTEM SYMPTOMS

SYMPTOM DIAGNOSIS PROCEDURE

SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure

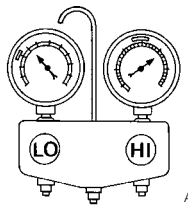
INFOID:0000000001098261

Whenever system's high and/or low side pressure(s) is/are unusual, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table

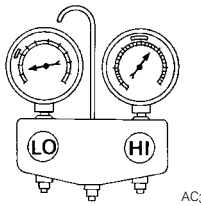
INFOID:0000000001098262

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	The pressure returns to normal is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle.	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance. ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan.	• Clean condenser. • Check and repair cooling fan as necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.). ↓ Air in refrigeration cycle.	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Low-pressure pipe is sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side. • Excessive refrigerant discharge flow. • Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment.	Replace expansion valve.

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW

HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table

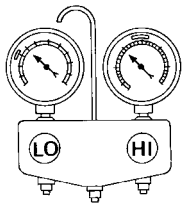
INFOID:0000000001098263

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check lubricant for contamination.

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH

HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table

INFOID:0000000001098264

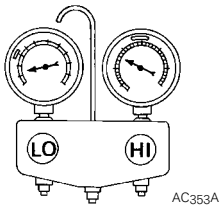
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW

BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table

INFOID:0000000001098265

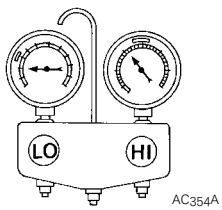
cardiagn.com

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	• There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	• Replace liquid tank. • Check lubricant for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet is frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Expansion valve and liquid tank are warm or slightly cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components.	Check refrigerant for leaks. Refer to HA-183, "Refrigerant Leaks".
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Replace expansion valve. • Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	• Replace compressor. • Repair evaporator fins. • Replace evaporator. • Refer to HAC-153, "Diagnosis Procedure".

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE

LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table

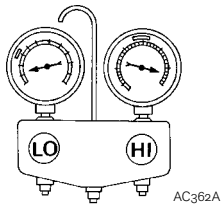
INFOID:0000000001098266

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

LOW-PRESSURE SIDE BECOMES NEGATIVE

LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table

INFOID:0000000001098267

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or wet with dew.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the malfunction, replace expansion valve. • Replace liquid tank. • Check lubricant for contamination.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001115389

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001115393

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

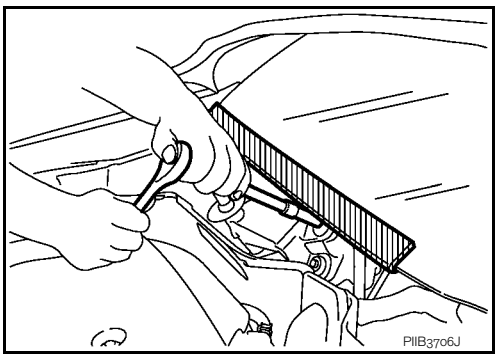
OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001115397

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:0000000001115401

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

Working with HFC-134a (R-134a)

INFOID:0000000001098272

CAUTION:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed and compressor malfunction is likely occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**

- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.**

General Refrigerant Precaution

INFOID:0000000001098273

WARNING:

- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**

cardiagn.com

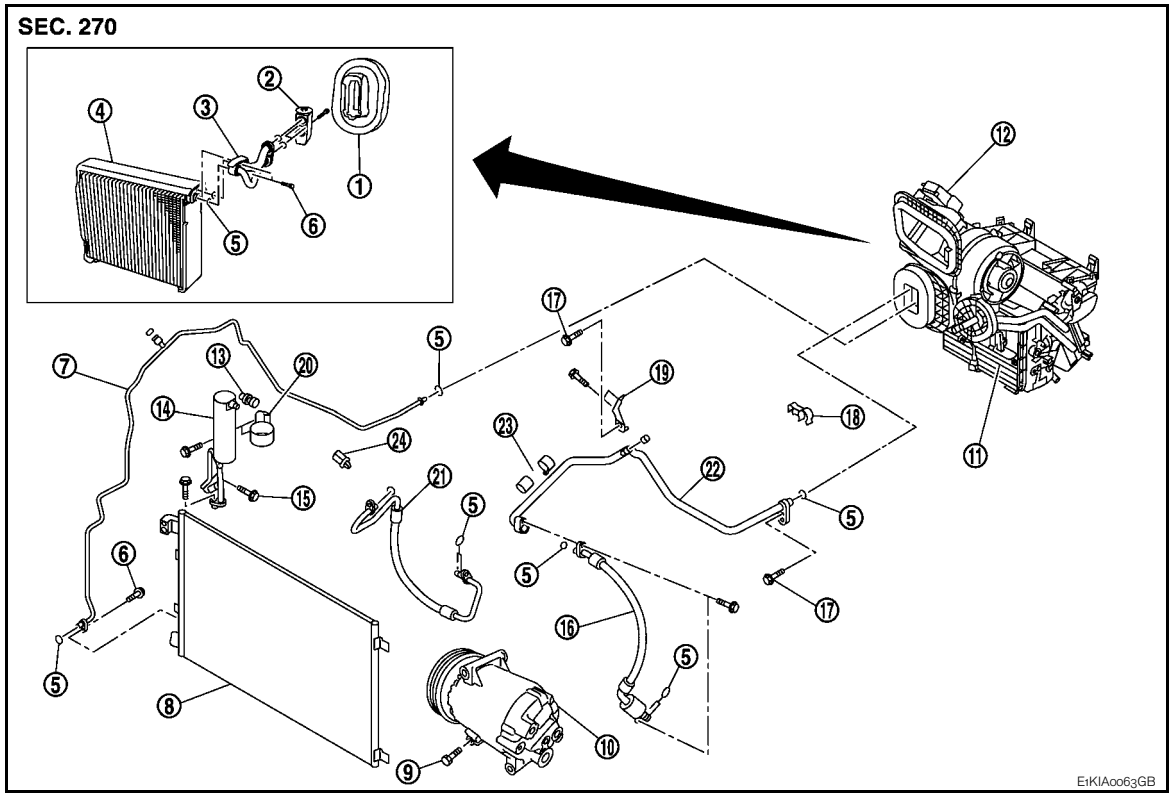
- **Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Never store or heat refrigerant containers above 52°C (126°F).**
- **Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Never intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Refrigerant Connection

INFOID:0000000001098274

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.
- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

O-RING AND REFRIGERANT CONNECTION



1. Heater sealing	2. Expansion valve	3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator	5. O-ring	6. Connector pipe fixing bolt
7. High pressure pipe 1	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Liquid tank fixing screw
16. Low pressure flexible hose	17. Fixing bolt	18. Pipes fixing clip

19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

CAUTION:
The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure flexible hose to Low pressure pipe 2		92473 N8210	1	16
	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure pipe 2 assembly to expansion valve	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure pipe 2 assembly to evaporator	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		01-57-112	2	19
	Compressor to high pressure flexible hose		01-57-112	2	12
	Liquid tank to condenser		92473 N8210	2	16

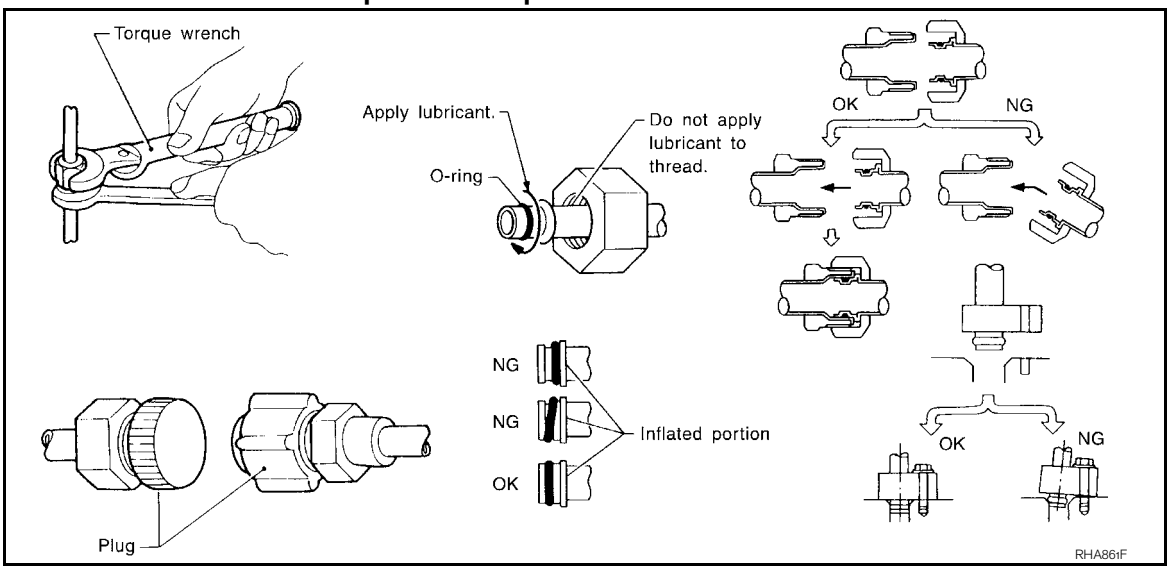
WARNING:
Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.
CAUTION:
When replacing or cleaning refrigerant cycle components, observe the following.
- **When the compressor is removed, store it in the same way at it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Name : Nissan A/C System Oil Type S

- **O-ring must be closely attached to the groove portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.**

cardiagn.com

- **After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Service Equipment

INFOID:0000000001098275

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRICAL LEAK DETECTOR

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

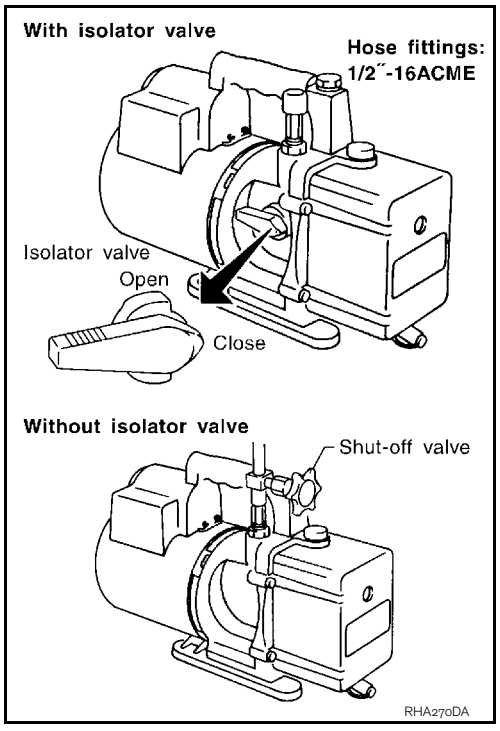
VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

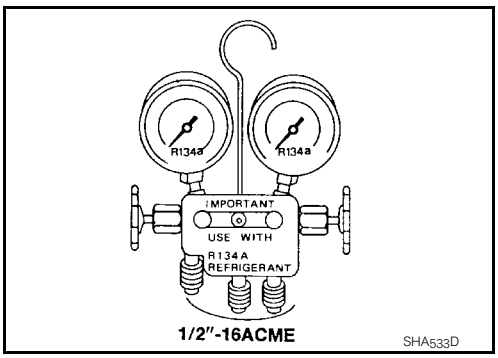
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



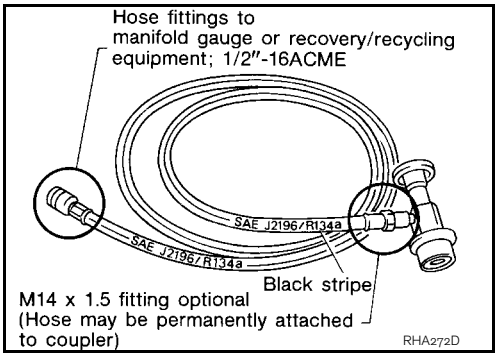
MANIFOLD GAUGE SET

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

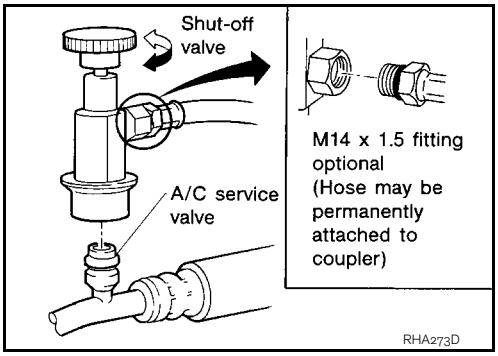
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

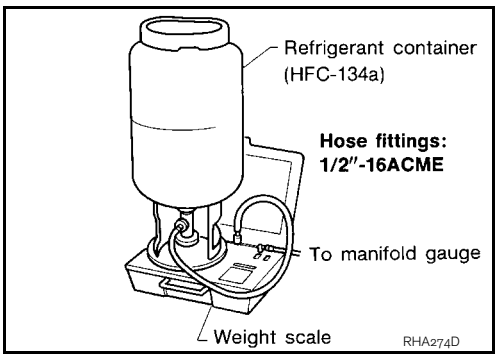
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

cardiagn.com

COMPRESSOR

General Precautions

INFOID:0000000001098276

CAUTION:

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same way at it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to HA-180, "Adjustment".**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

cardiagn.com

LEAK DETECTION DYE

General Precautions

INFOID:0000000001098277

CAUTION:

- **The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.**
- **Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.**
- **The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST: J-41995) to pin-point refrigerant leaks.**
- **For the purpose of safety and customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.**
- **A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electrical leak detector (SST: J-41995).**
- **Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.**
- **Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.**
- **Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).**
- **Never use more than one refrigerant dye bottle (1/4 ounce /7.4 cc) per A/C system.**
- **Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Never use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.**
- **The fluorescent properties of the dye will remain for three years or a little over unless a compressor malfunction occurs.**

IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have the identification label on the front side of hood.

cardiagn.com

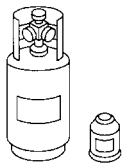
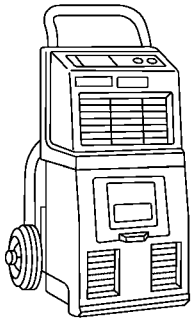
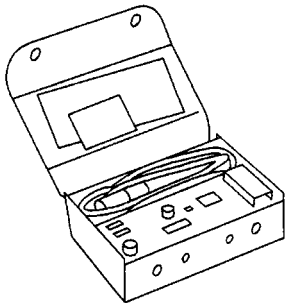
PREPARATION

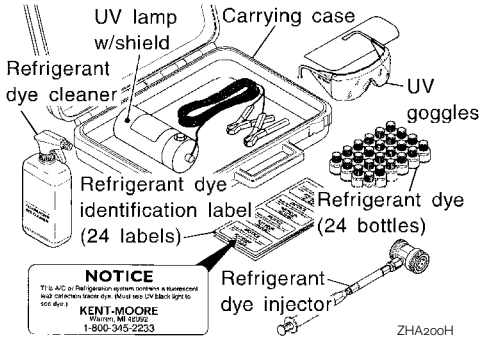
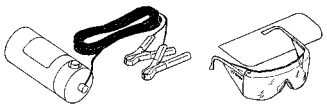
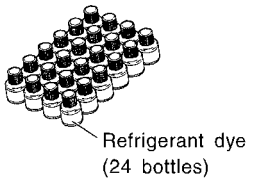
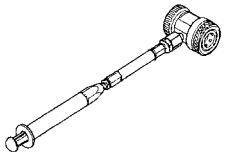
PREPARATION

HFC-134a (R-134a) Service Tools and Equipment

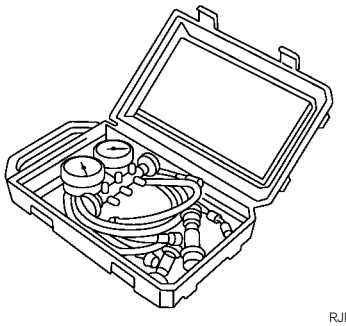
INFOID:0000000001116273

Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

Tool number Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
KLH00-PAGS0 Nissan A/C System Oil Type S (DH-PS)	S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) wobble (swash) plate compressors (Nissan only) Lubricity: 40 m ℓ (1.4 Imp fl oz.)
Recovery/Recycling/ Recharging equipment (ACR4)	 RJIA0195E	Function: Refrigerant recovery and recycling and recharging
Electrical leak detector	 A/C leak detector SHA705EB	Power supply: DC 12V (Cigarette lighter)

Tool number Tool name		Description
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner		Power supply: DC 12 V (Battery terminal)
(J-42220) UV lamp and UV safety goggles		Power supply: DC 12 V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
(J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)		Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle		For injecting 1/4 ounce of fluorescent leak detection dye into A/C system

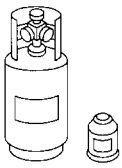
cardiagn.com

Tool number Tool name		Description
(J-43872) Refrigerant dye cleaner	 SHA441F	For cleaning dye spills
(J-39183) Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: • The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size • 1/2″-16 ACME

Sealant or/and Lubricant

INFOID:0000000001098280

HFC-134a (R-134a) Service Tool and Equipment
- Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
- Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
- Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
- Never use adapters that convert one size fitting to another: refrigerant/lubricant contamination occurs and compressor malfunction may result.

Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
Nissan A/C System Oil Type S (DH-PS)	 S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) swash plate compressors (Nissan only) Capacity: 40 m ℓ (1.4 US fl oz., 1.4 Imp fl oz.)

ON-VEHICLE MAINTENANCE

LUBRICANT

Adjustment

INFOID:0000000001098281

LUBRICANT RETURN OPERATION

Adjust the lubricant quantity according to the test group shown below.

1.CHECK LUBRICANT RETURN OPERATION

Can lubricant return operation be performed?

- A/C system works properly.
- There is no evidence of a large amount of lubricant leakage.

CAUTION:

If excessive lubricant leakage is noted, never perform the lubricant return operation.

Is it successful?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS

1. Start the engine, and set to the following conditions:
- Engine speed: Idling to 1,200 rpm
- A/C switch: ON
- Blower speed: Max. position
- Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).]
- Intake position: Recirculation (REC)
2. Perform lubricant return operation for about 10 minutes.
3. Stop the engine.

>> GO TO 3.

3.CHECK REPLACEMENT PART

Should the compressor be replaced?

YES >> Refer to "LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT".
NO >> Refer to "LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR".

LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR

After replacing any of the following major components, add the correct amount of lubricant to the system.
Amount of lubricant to be added:

Part replaced	Lubricant to be added to system	Remarks
	Amount of lubricant mℓ (US fl oz., Imp fl oz.)	
Evaporator	75 (2.5, 2.6)	—
Condenser	35 (1.2, 1.2)	—
Liquid tank	10 (0.3, 0.4)	—
In case of refrigerant leak	30 (1.0, 1.1)	Large leak
	—	Small leak *1

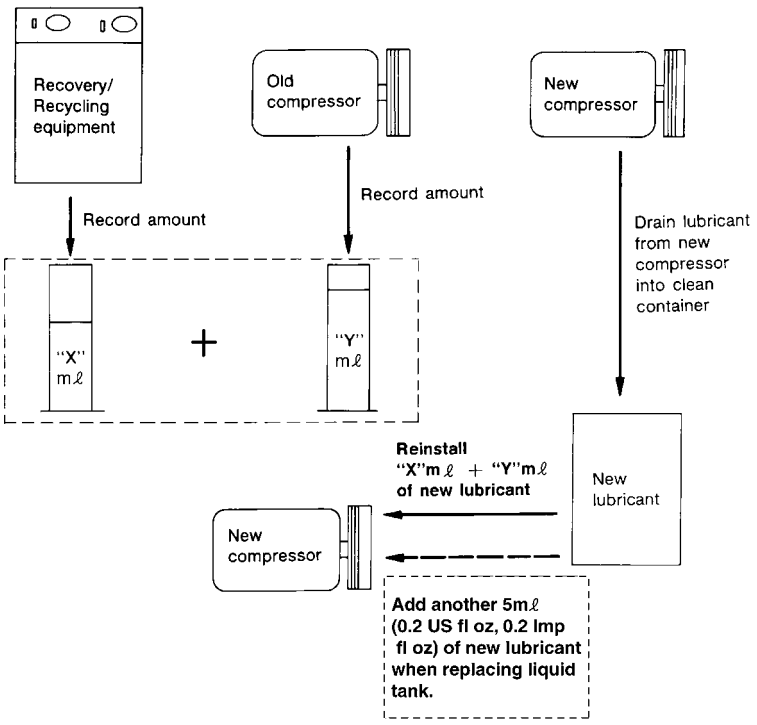
*1: If the refrigerant leak is small, no addition of lubricant is needed.

LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT

cardiagn.com

1. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect recovery/recycling recharging equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to HA-170, "Working with HFC-134a (R-134a)".
3. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to HA-170, "Working with HFC-134a (R-134a)".
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
5. Drain the lubricant from the old (removed) compressor into a graduated container and recover the amount of lubricant drained.
6. Drain the lubricant from the new compressor into a separate, clean container.
7. Measure an amount of new lubricant installed equal to amount drained from old compressor. Add this lubricant to new compressor through the suction port opening.
8. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to new compressor through the suction port opening.
9. If the liquid tank also needs to be replaced, add another 5 m ℓ (0.2 US fl oz., 0.2 Imp fl oz.) of lubricant at this time.
   Do not add this 5 m ℓ (0.2 US fl oz., 0.2 Imp fl oz.) of lubricant when replaces the compressor only.

Lubricant adjusting procedure for compressor replacement

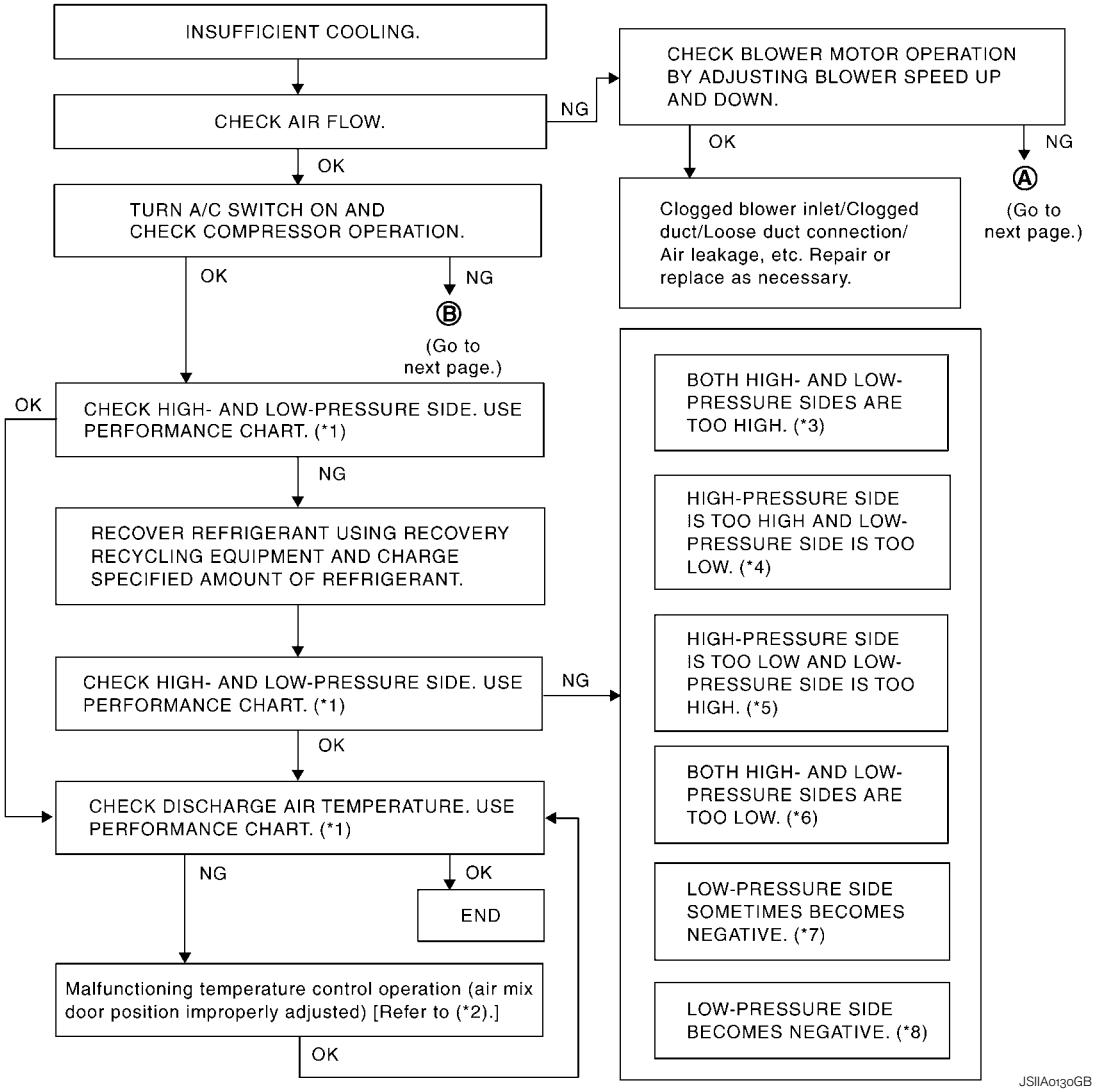


REFRIGERATION SYSTEM

Inspection

INFOID:0000000001098282

PERFORMANCE TEST DIAGNOSIS



*2 HAC-187, "Diagnosis Chart By Symptom"

*3 HA-165, "BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO HIGH : Symptom Table"

*4 HA-165, "HIGH-PRESSURE SIDE IS TOO HIGH AND LOW-PRESSURE SIDE IS TOO LOW : Symptom Table"

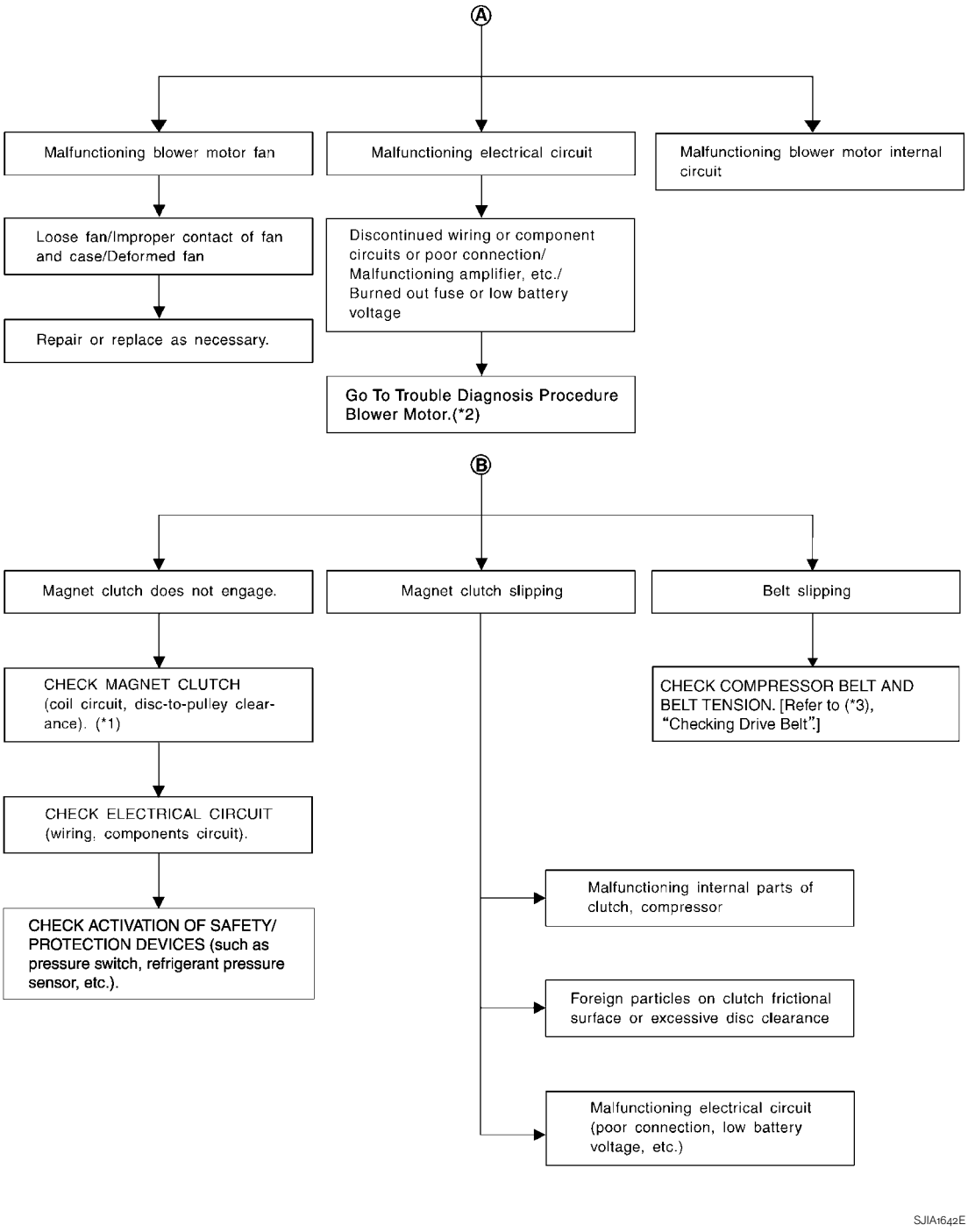
*5 HA-166, "HIGH-PRESSURE SIDE IS TOO LOW AND LOW-PRESSURE SIDE IS TOO HIGH : Symptom Table"

*6 HA-166, "BOTH HIGH- AND LOW-PRESSURE SIDES ARE TOO LOW : Symptom Table"

*7 HA-167, "LOW-PRESSURE SIDE SOMETIMES BECOMES NEGATIVE : Symptom Table"

*8 HA-167, "LOW-PRESSURE SIDE BECOMES NEGATIVE : Symptom Table"

cardiagn.com



SJIA1642E

*2 HAC-153, "Diagnosis Procedure" *3 EM-259, "Inspection and Adjustment"

Refrigerant Leaks

INFOID:0000000001098284

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C lubricant leakage, damage and corrosion. A/C lubricant leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using either an electrical leak detector or fluorescent dye leak detector (SST: J-42220).
If dye is observed, confirm the leak with an electrical leak detector. It is possible a prior leak was repaired and not properly cleaned.

When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.
When searching for refrigerant leaks using an electrical leak detector, move the probe along the suspected leak area at 1 to 2 inches per second and no further than 1/4 inch from the component.

CAUTION:

Moving the electrical leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

cardiagn.com

FLUORESCENT LEAK DETECTOR

Inspection

INFOID:0000000001098285

CHECKING SYSTEM FOR LEAKS USING THE FLUORESCENT LEAK DETECTOR

1. Check A/C system for leaks using the UV lamp and safety goggles (SST: J-42220) in a low sunlight area (area without windows preferable). Illuminate all components, fittings and lines. The dye will appear as a bright green/yellow area at the point of leakage. Fluorescent dye observed at the evaporator drain opening indicates an evaporator core assembly (tubes, core or expansion valve) leak.
2. If the suspected area is difficult to see, use an adjustable mirror or wipe the area with a clean shop rag or cloth, with the UV lamp for dye residue.
3. After the leak is repaired, remove any residual dye using dye cleaner (SST: J-43872) to prevent future misdiagnosis.
4. Perform a system performance check and verify the leak repair with an approved electrical leak detector.

NOTE:
Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and lubricants, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean.
Clean with a dry cloth or blow off with shop air.
Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

DYE INJECTION

(This procedure is only necessary when recharging the system or when the compressor has seized and was replaced.)

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.52 kg/cm^2, 50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool (SST: J-41459).
3. Connect the injector tool to the A/C low-pressure side service valve.
4. Start the engine and switch A/C ON.
5. When the A/C operating (compressor running), inject one bottle (1/4 ounce / 7.4 cc) of fluorescent dye through the low-pressure service valve using dye injector tool (SST: J-41459) (refer to the manufacture's operating instructions).
6. With the engine still running, disconnect the injector tool from the service valve.
   CAUTION:
   Be careful the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.
7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.
8. Attach a blue label as necessary.

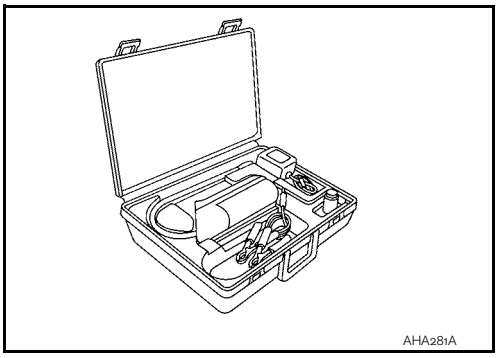
ELECTRICAL LEAK DETECTOR

Inspection

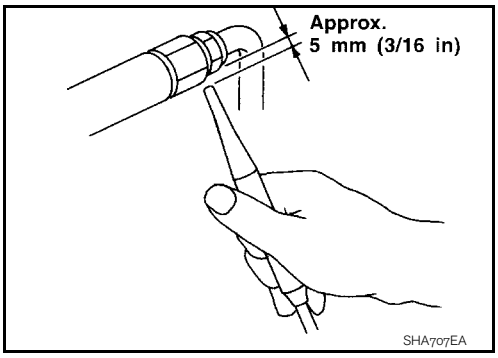
INFOID:0000000001098286

PRECAUTIONS FOR HANDLING LEAK DETECTOR

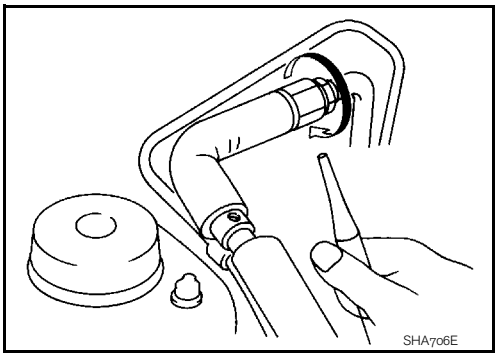
When performing a refrigerant leak check, use an electrical leak detector (SST: J-41995) or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.



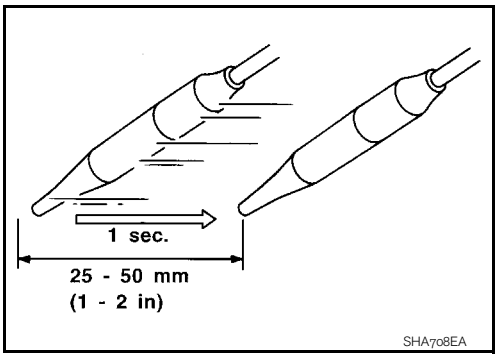
1. Position probe approximately 5 mm (3/16 in) away from point to be checked.



2. When testing, circle each fitting completely with probe.



3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.



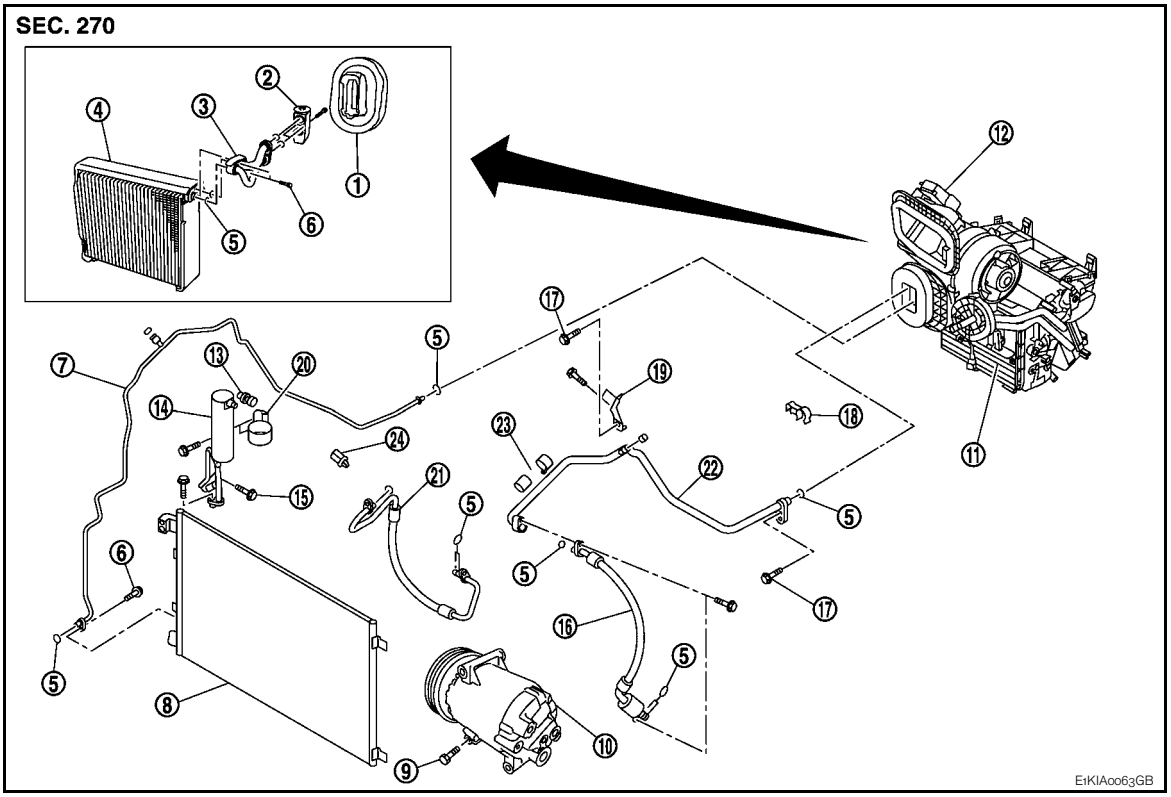
CHECKING PROCEDURE

To prevent inaccurate or false readings, make sure there is no refrigerant vapor, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Stop the engine.

cardiagn.com

2. Connect a suitable A/C manifold gauge set (SST: J-39183) to the A/C service valves.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm^2, 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.
NOTE:
At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm^2, 50 psi).
4. Perform the leak test from the high-pressure side (compressor discharge a to evaporator inlet j) to the low-pressure side (evaporator drain hose k to shaft seal p). Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detected probe completely around the connection/component.



1. Heater sealing	2. Expansion valve	3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator	5. O-ring	6. Connector pipe fixing bolt
7. High pressure pipe 1	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Liquid tank fixing screw
16. Low pressure flexible hose	17. Fixing bolt	18. Pipes fixing clip
19. Low & high pressure pipe bracket	20. Liquid tank fixing bracket	21. High pressure flexible hose
22. Low pressure pipe 2	23. Low pressure pipe fixing clamp assembly	24. Pipe mantening clip

Compressor
Check the fitting of high- and low-pressure flexible hoses, relief valve and shaft seal.
Condenser
Check the fitting of condenser pipe assembly, high-pressure flexible hose and pipe.
Liquid tank
Check the fitting of radiator & condenser assembly and refrigerant pressure sensor.
Service valves
Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).
NOTE:

After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.

Cooling unit (Evaporator)

With engine OFF, turn blower fan on “High” for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer’s recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.

Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components. If no leaks are found, perform steps 7 - 10.
7. Start the engine.
8. Set the A/C control as follows;

a. A/C switch: ON

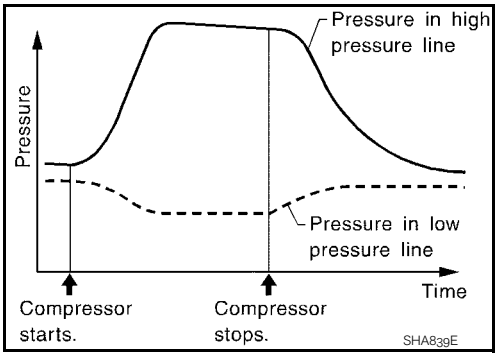
b. MODE door position: VENT (Ventilation)

c. Intake door position: Recirculation

d. Temperature setting: Max. cold

e. Fan speed: High

9. Run engine at 1,500 rpm for at least 2 minutes.
10. Stop the engine and perform leak check again following steps 4 through 6 above.
    Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector at the compressor. The pressure on the high-pressure side will gradually drop after refrigerant circulation stops and pressure on the low-pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.



11. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines and then check refrigerant purity.
12. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier.
13. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier.
14. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component if necessary.
15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
16. Perform A/C performance test to ensure system works properly.

cardiagn.com

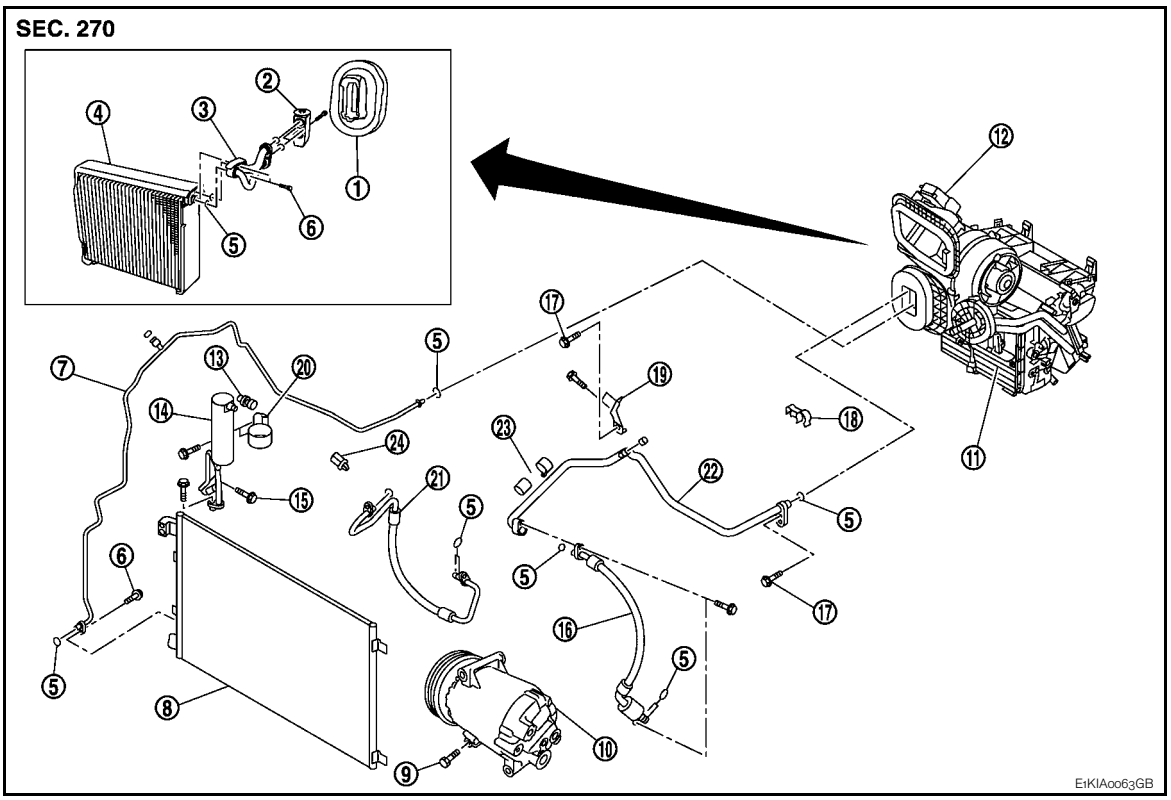
ON-VEHICLE REPAIR

REFRIGERATION SYSTEM

Exploded View

INFOID:0000000001098287

Refer to HA-171, "Refrigerant Connection".



1. Heater sealing	2. Expansion valve	3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator	5. O-ring	6. Connector pipe fixing bolt
7. High pressure pipe 1	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Liquid tank fixing screw
16. Low pressure flexible hose	17. Fixing bolt	18. Pipes fixing clip
19. Low & high pressure pipe bracket	20. Liquid tank fixing bracket	21. High pressure flexible hose
22. Low pressure pipe 2	23. Low pressure pipe fixing clamp assembly	24. Pipe mantening clip

Inspection After Installation

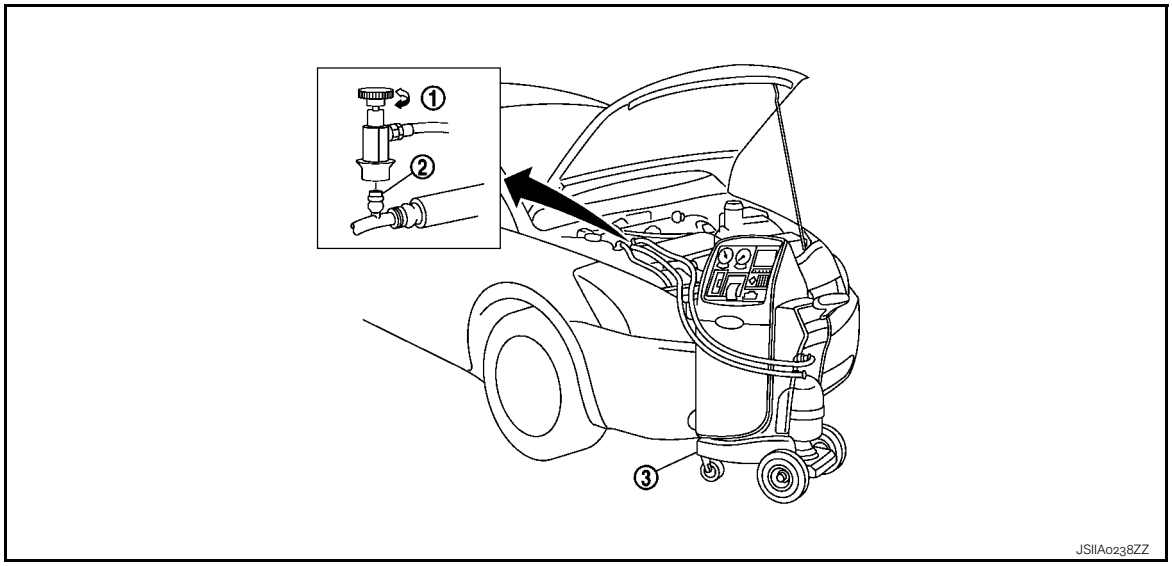
INFOID:0000000001098288

SETTING OF SERVICE TOOLS AND EQUIPMENT

Discharging Refrigerant

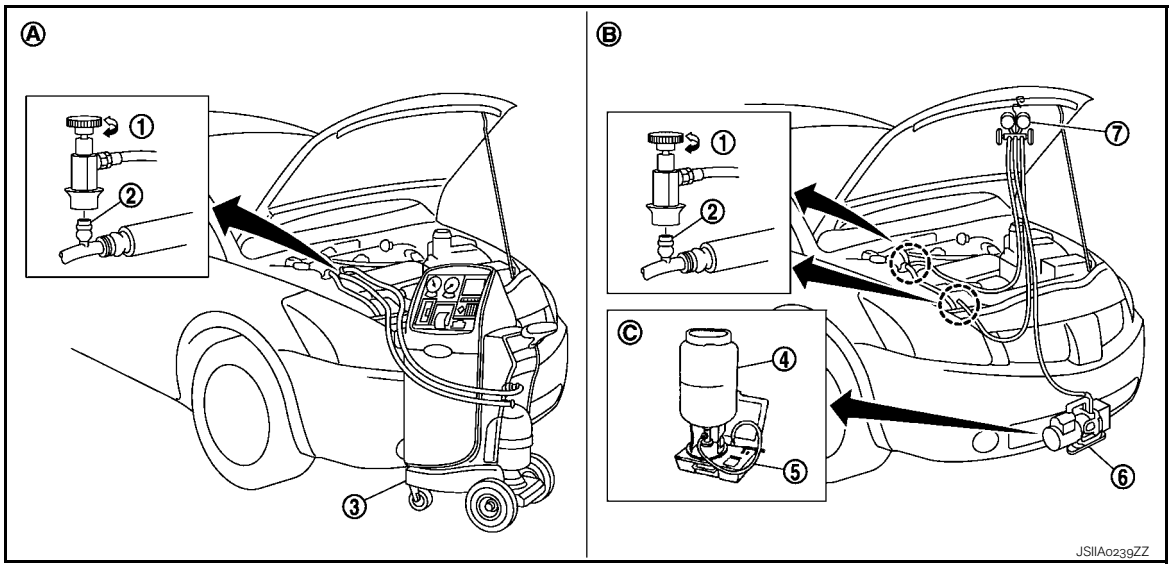
WARNING:

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment] or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.



1. Shut-off valve
2. A/C service valve
3. Recovery/Recycling/Recharging equipment

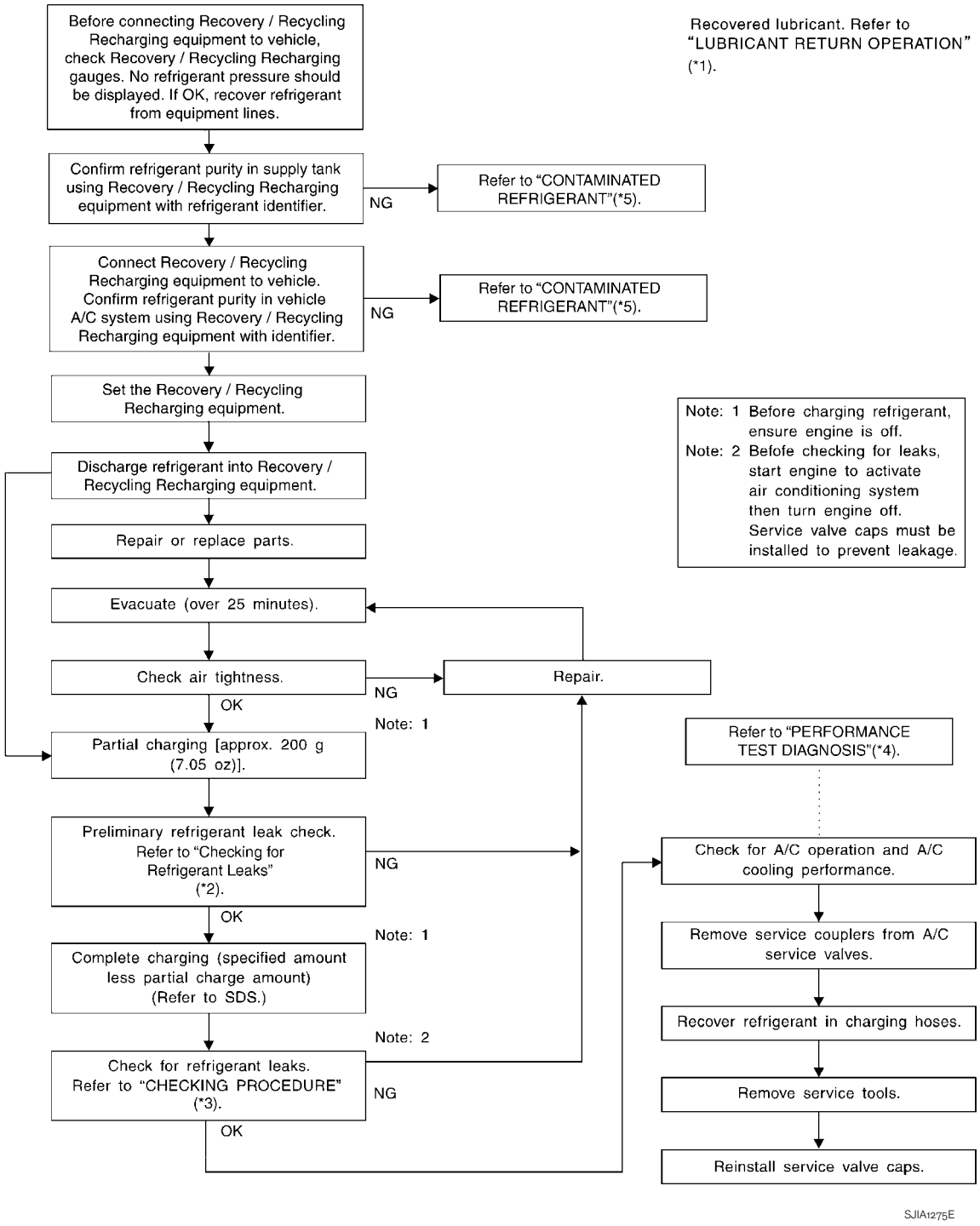
Evacuating System and Charging Refrigerant



1. Shut-off valve
2. A/C service valve
3. Recovery/Recycling/Recharging equipment
4. Refrigerant container (HFC-134a)
5. Weight scale (J-39650)
6. Vacuum pump (J-39649)
7. Manifold gauge set (J-39183)

A. Preferred (best) method
B. Alternative method
C. For charging

cardiagn.com



*1 HA-180, "Adjustment"

*2 "REFRIGERANT LEAKS" in HA-183, "Refrigerant Leaks".

*3 "CHECKING PROCEDURE" in HA-182, "Inspection".

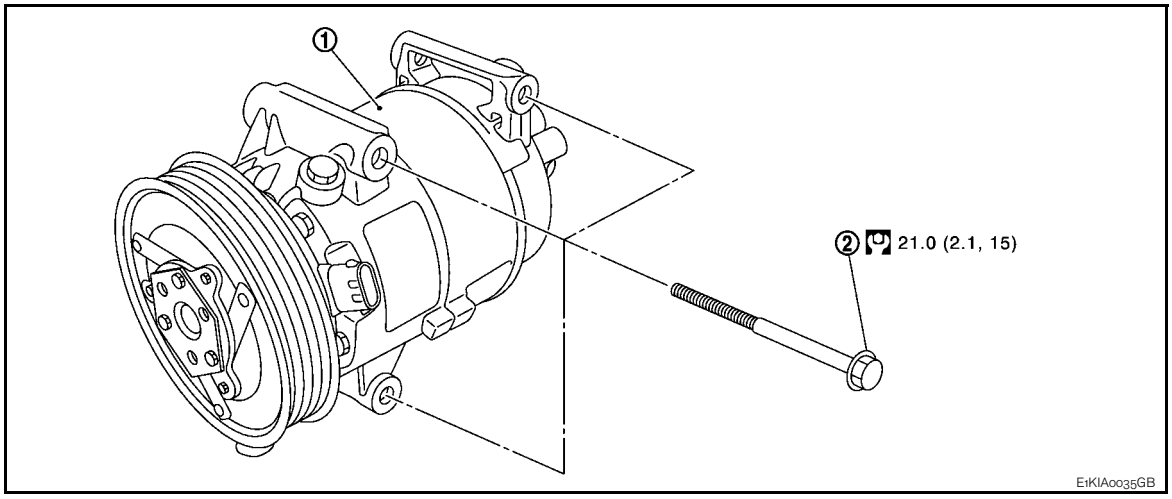
*4 "PERFORMANCE TEST DIAGNOSIS" in HA-182, "Inspection".

*5 "CONTAMINATED REFRIGERANT" in HA-170, "Working with HFC-134a (R-134a)".

COMPRESSOR

Exploded View

INFOID:0000000001098289



1. Compressor
2. Compressor fixing bolt

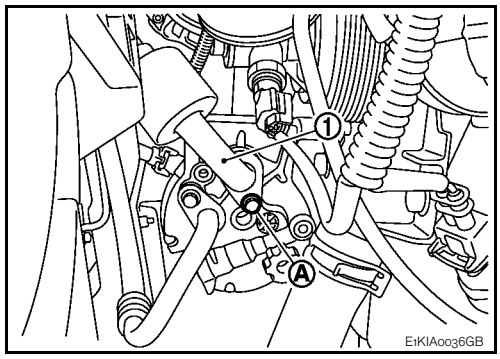
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001098290

REMOVAL

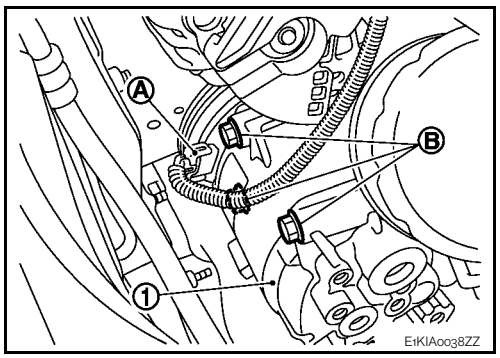
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament.
3. Remove air intake hoses (RH) and air duct (LH). Refer to EM-265, "Removal and Installation".
4. Remove engine undercover, using power tools.
5. Drain engine coolant from radiator. Refer to CO-52, "Draining".
6. Remove drive belt. Refer to EM-259, "Removal and Installation".
7. Remove lower radiator hose from engine. Refer to CO-56, "Removal and Installation".
8. Remove fixing bolts (A) and (B) from low-pressure flexible hose (1) and high-pressure flexible hose (2).
9. Remove low-pressure flexible hose and high-pressure flexible hose from compressor.
   CAUTION:
   Cap or wrap the joint of compressor, low-pressure flexible hose and high-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.



10. Disconnect harness connector from compressor.

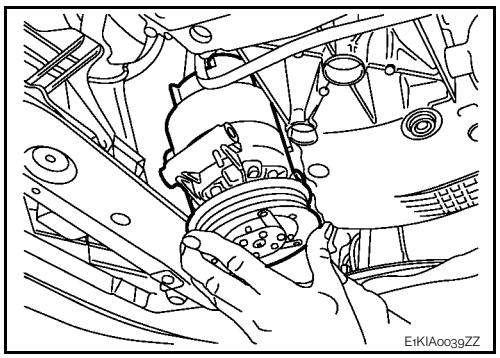
cardiagn.com

11. Remove compressor harness connector (A), then remove mounting bolts (B) from compressor (1), using power tools.



12. Remove the compressor from the vehicle.

Compressor fixing bolt to engine
: 21 N·m (2.2 kg-m, 15.5 ft-lb)



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and high-pressure flexible hose with new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

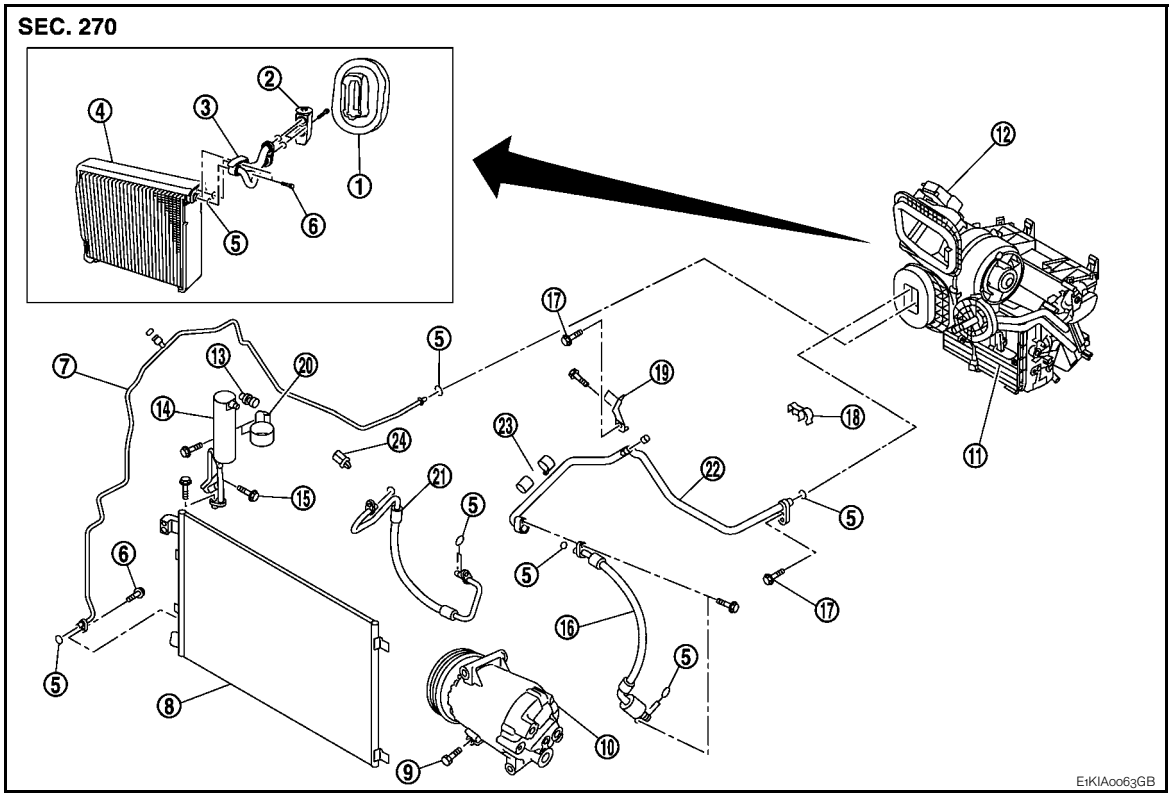
cardiagn.com

LOW-PRESSURE FLEXIBLE HOSE AND PIPE 2

Exploded View

INFOID:0000000001098292

Refer to HA-171, "Refrigerant Connection".



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

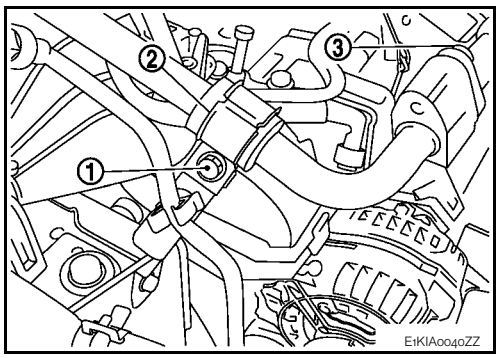
INFOID:0000000001098293

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove upper engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove air intake hose (RH side), and air duct (LH). Refer to EM-265, "Removal and Installation".

cardiagn.com

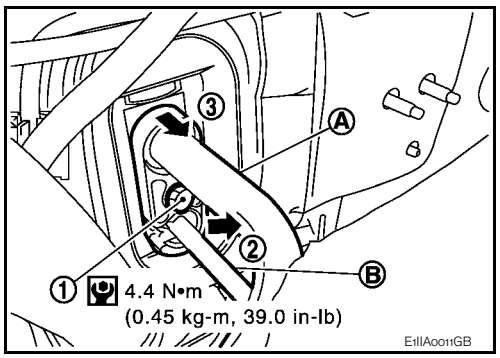
4. Remove mounting bolt (1) and clamp (2), from low pressure pipe bracket support.
5. Remove low and high-pressure maintaining clip, from both pipes, then remove fixing bolt (3) from low-pressure flexible hose and low-pressure pipe 2.
6. Remove engine room insulator fixing clip from cowl top.



7. Pull engine room insulator, then remove pipes bracket fixing bolt (1), from expansion valve, and release pipes fixing bracket, as shown in order (1) to (3), from high pressure pipe 1 (B), to remove low pressure flexible hose and pipe 2 (A) from expansion valve.

CAUTION:

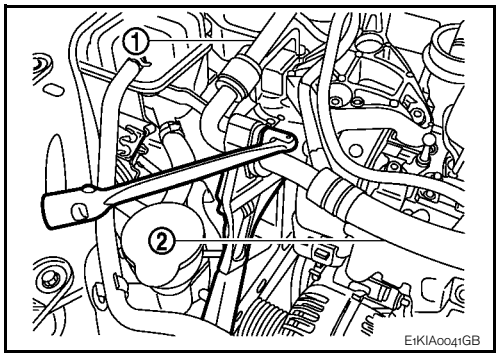
Cap or wrap the joint of the low pressure then remove fixing bolt (3) pipe 2, and expansion valve exit with suitable material such as vinyl tape to avoid the entry of air.



8. Remove low pressure pipe 2 connector fixing nut, with suitable tools, then remove low pressure pipe 2 (1) from low pressure flexible hose (2).

CAUTION:

Cap or wrap the joint of the low pressure pipe 2 connector, and low pressure flexible hose, with suitable material such as vinyl tape to avoid the entry of air.



9. Remove low pressure flexible hose fixing bolt (A), from air conditioner compressor, and remove low pressure flexible hose (1).

CAUTION:

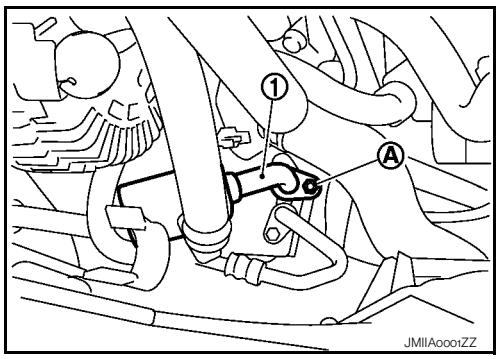
Cap or wrap the joint of low-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.

Pipe bracket fixing bolt to expansion valve

: 4.4 N·m (0.45 kg-m, 39 in-lb)

Low pressure flexible pipe fixing bolt to compressor

: 8.0 N·m (0.8 kg-m, 71 in-lb)



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and low-pressure pipe 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

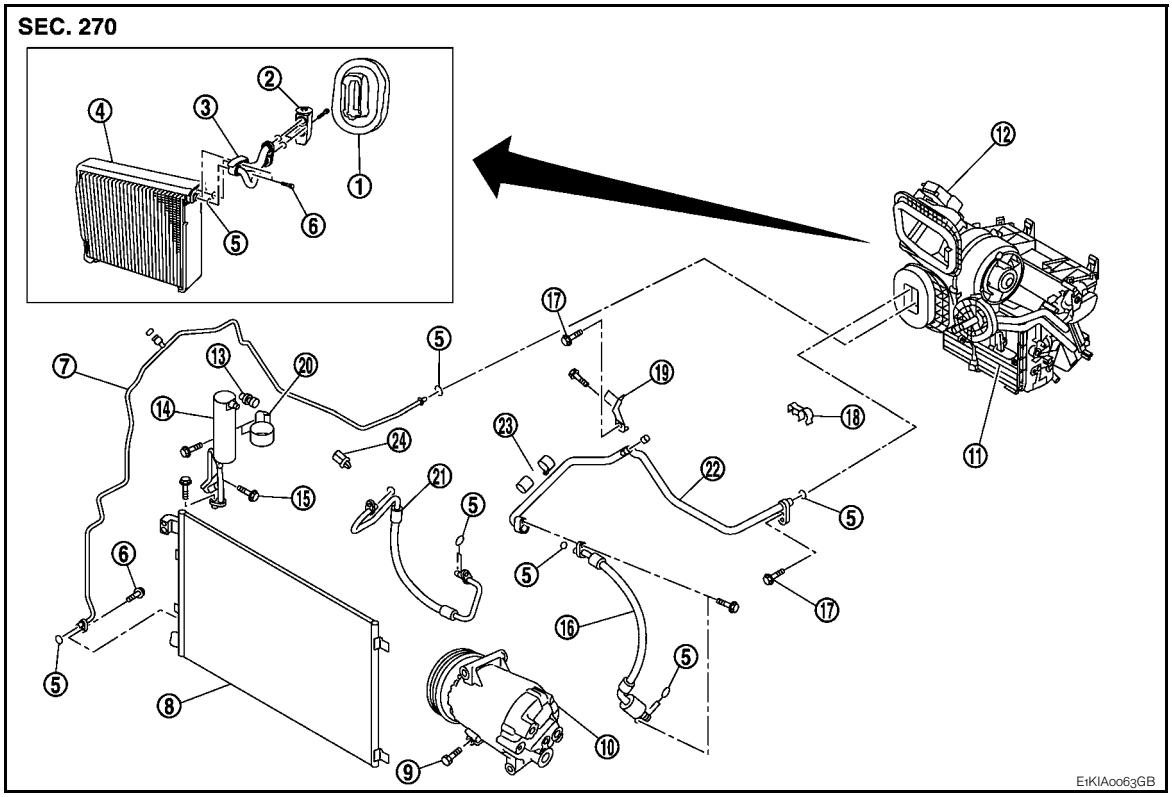
cardiagn.com

HIGH-PRESSURE FLEXIBLE HOSE

Exploded View

INFOID:0000000001098294

Refer to HA-171, "Refrigerant Connection".



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

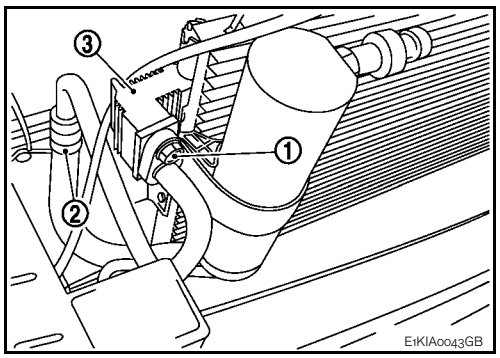
INFOID:0000000001098295

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove air intake hose (RH) and air duct (LH). Refer to EM-265, "Removal and Installation".
4. Remove front grille. Refer to EXT-17, "Removal and Installation".
5. Remove radiator air guide (RH). Refer to CO-56, "Removal and Installation".

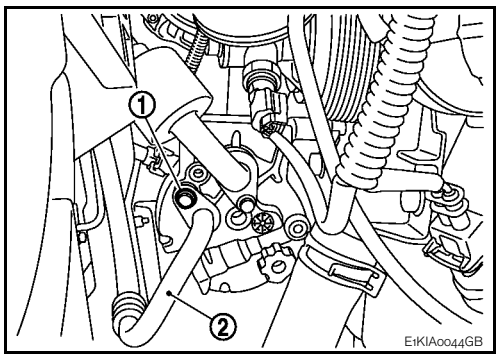
cardiagn.com

6. Remove high pressure flexible hose fixing bolt (1) from condenser (3), then pull high pressure flexible hose (2) to remove it from condenser.



CAUTION:
Cap or wrap the joint of high-pressure flexible hose and condenser assembly with suitable material such as vinyl tape to avoid the entry of air.

7. Remove high pressure flexible hose fixing bolt (1) from compressor, then pull high pressure flexible hose (2) to remove it from compressor.Remove high pressure flexible hose.



CAUTION:
Cap or wrap the joint of compressor and high-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.

High pressure fixing bolt to condensor
: 4.4 N·m (0.45 kg-m, 39 in-lb)
High pressure fixing bolt to compressor
: 8 N·m (0.8 kg-m, 71 in-lb)

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:
- **Replace O-rings of high-pressure flexible hose with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

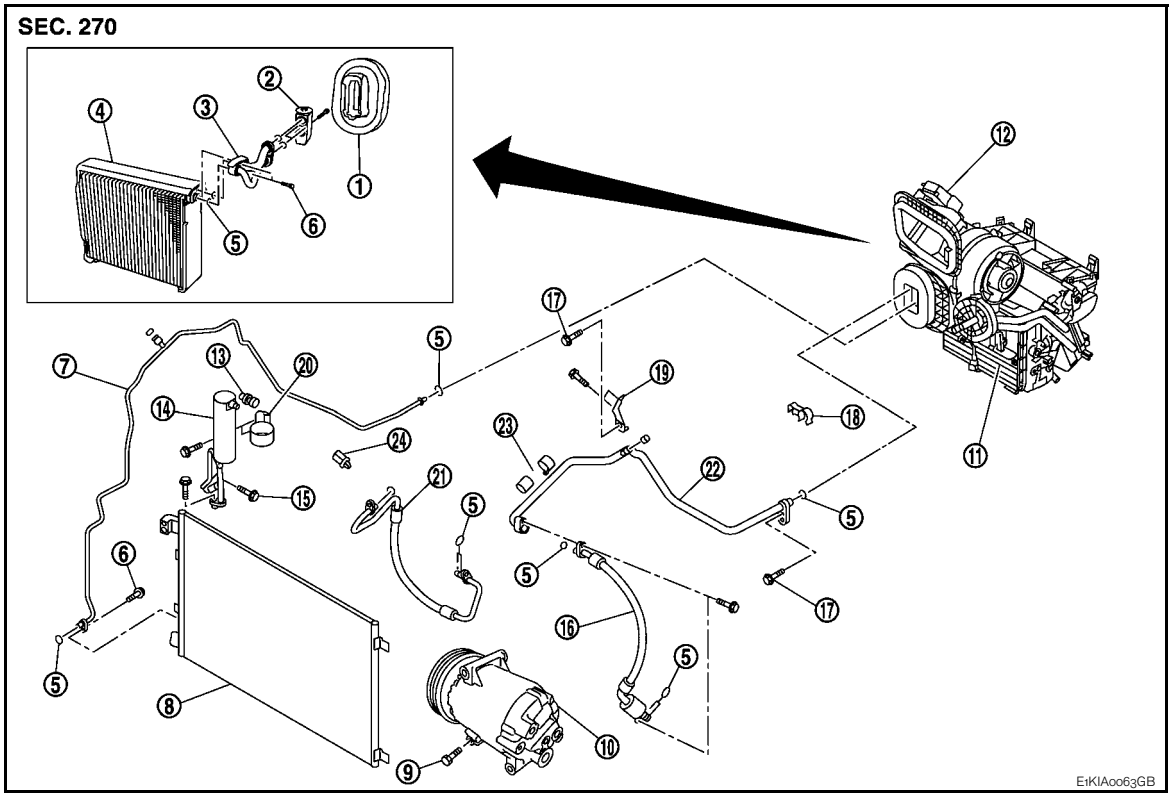
cardiagn.com

HIGH-PRESSURE PIPE 1 (ENGINE COMPARTMENT)

Exploded View

INFOID:0000000001098296

Refer to HA-171, "Refrigerant Connection".



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

INFOID:0000000001098297

REMOVAL

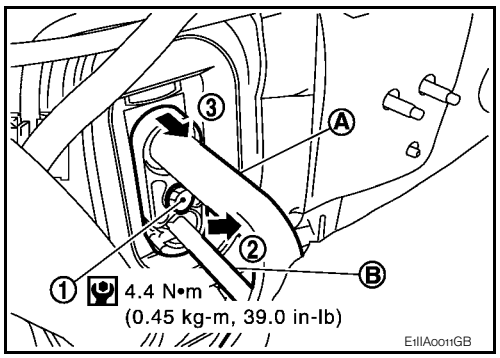
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove intake hose (RH) and air duct (LH). Refer to EM-265, "Removal and Installation".

cardiagn.com

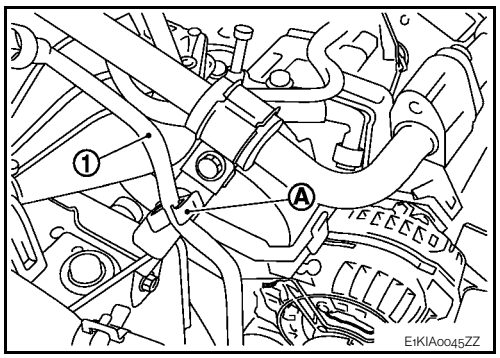
4. Pull engine room insulator, then remove pipes bracket fixing bolt, from expansion valve, then release pipe fixing bracket from high pressure pipe 1, to disconnect it from expansion valve.

CAUTION:

Cap or wrap the joint of the high pressure pipe 1, and expansion valve in, with suitable material such as vinyl tape to avoid the entry of air.



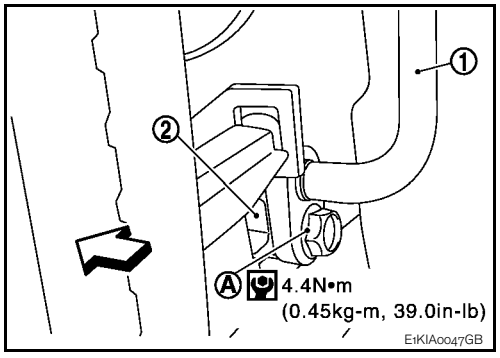
5. Remove high pressure pipe 1 (1) from clip (A).



- Remove high-pressure pipe 1 mounting bolt (A) from condenser (2).
- Remove high pressure pipe 1 (1).

CAUTION:

Cap or wrap the joint of the high pressure pipe 1, and condenser, with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of high-pressure pipe 1 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

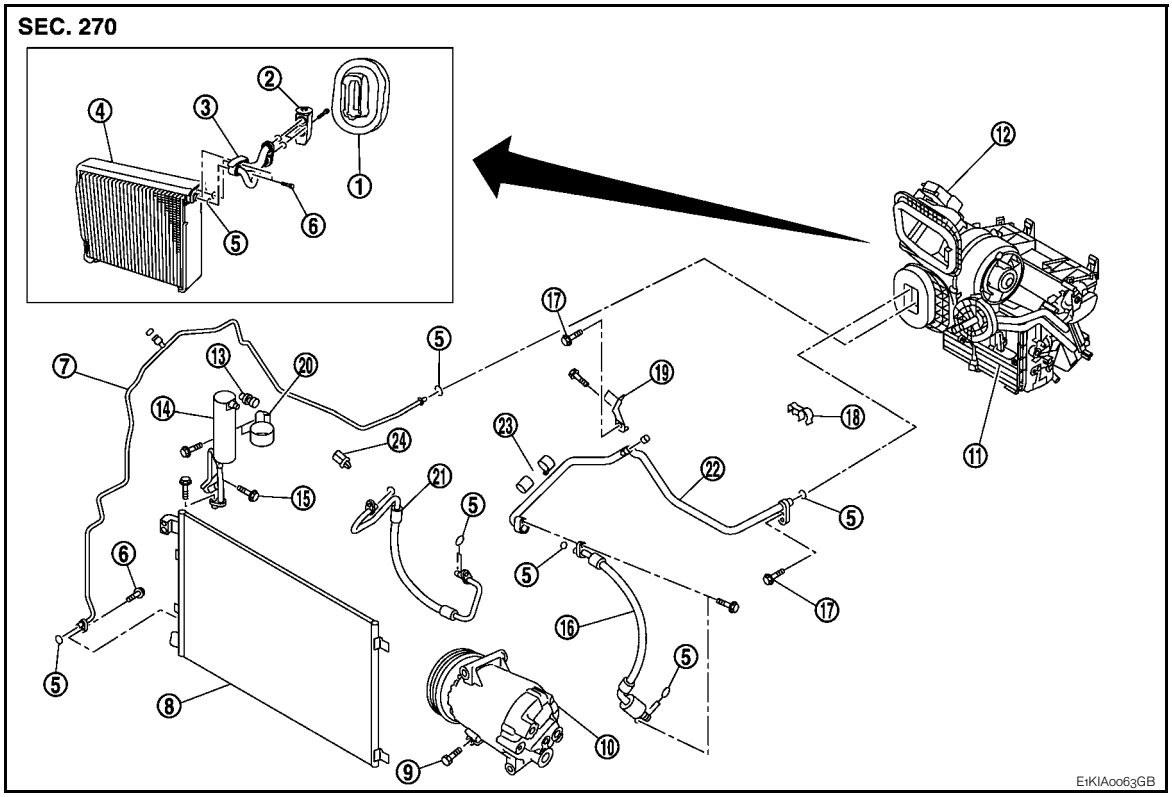
cardiagn.com

LOW-PRESSURE PIPE 1 AND HIGH-PRESSURE PIPE 2

Exploded View

INFOID:0000000001098298

Refer to HA-171, "Refrigerant Connection".



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

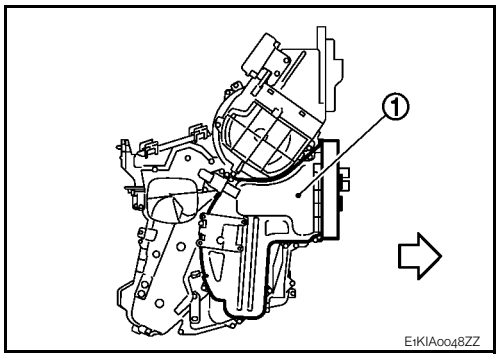
INFOID:0000000001098299

REMOVAL

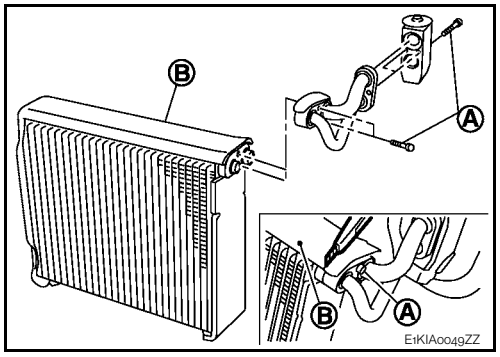
1. Set the temperature at 18°C (60°F), and then disconnect the battery cable from the negative terminal.
2. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
3. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
4. Remove high-pressure pipe 1 and low pressure pipe 2 from expansion valve. Refer to HA-194, "Removal and Installation" and HA-198, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of the, high-pressure pipe 1, low-pressure pipe 2, and the expansion valve with suitable material such as vinyl tape to avoid the entry of air.
5. Remove instrument panel.Refer to IP-12, "Removal and Installation".
6. Remove foot duct (RH / LH). Refer to VTL-95, "FLOOR DUCTS : Removal and Installation".
7. Remove steering column. Refer to ST-10, "Removal and Installation".

cardiagn.com

8. Remove steering member. Refer to ST-15, "Removal and Installation".
9. Remove heater and cooling assembly. Refer to VTL-82, "Removal and Installation".
10. Remove mounting screws, and then remove evaporator cover (1).



11. Using a thin cutter, cut the evaporator insulator (B), and remove fixing bolt (A) then remove low-pressure pipe 1 and high-pressure pipe 2 assembly.
CAUTION:
Cap or wrap the joint of expansion valve, high-pressure pipe 2 and low-pressure pipe 1 with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

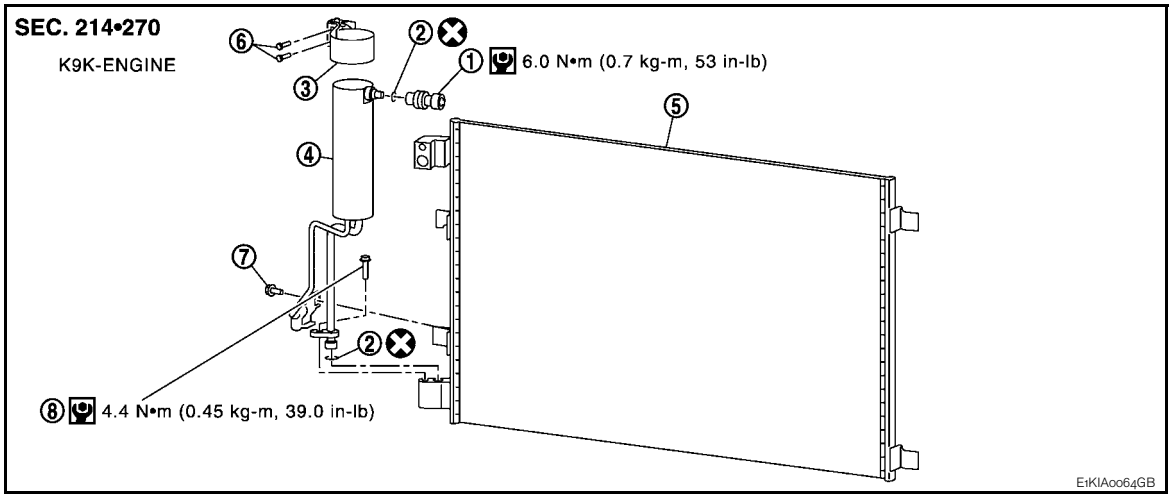
CAUTION:

- **Replace O-rings of high-pressure pipe 1, 2 and low-pressure pipe 1, 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

CONDENSER

Exploded View

INFOID:0000000001098300



1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condensor
6. Liquid tank fixing screw
7. Liquid tank pipe fixing screw
8. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001098301

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove front grille. Refer to EXT-17, "Removal and Installation".
4. Remove radiator hose, and drain coolant. Refer to CO-56, "Removal and Installation".
5. Remove upper radiator fixing bracket. Refer to CO-56, "Removal and Installation".
6. Remove radiator air-guide duct (RH). Refer to CO-56, "Removal and Installation".
7. Remove high-pressure pipe 1 from condenser. Refer to HA-198, "Removal and Installation".
8. Remove high-pressure flexible pipe 1 from condenser. Refer to HA-196, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of low and high-pressure pipe 1 and condenser with suitable material such as vinyl tape to avoid the entry of air.
9. Remove harness connector from refrigerant pressure sensor.
10. Remove liquid tank pipes and liquid tank from condenser and radiator. Refer to HA-204, "Removal and Installation", Refer to CO-56, "Removal and Installation".
    CAUTION:
    Cap or wrap the joint of liquid tank pipes and condenser with suitable material such as vinyl tape to avoid the entry of air.
11. Remove radiator fixing brackets. Refer to CO-56, "Removal and Installation".
12. Release radiator maintaining pawls, then pull-up the condenser assembly to release it from radiator. Refer to CO-56, "Removal and Installation".
13. Maintain radiator pushing back.
14. Pull upward to remove condenser.
    CAUTION:
    Take care do not damaged condenser or radiator.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

cardiagn.com

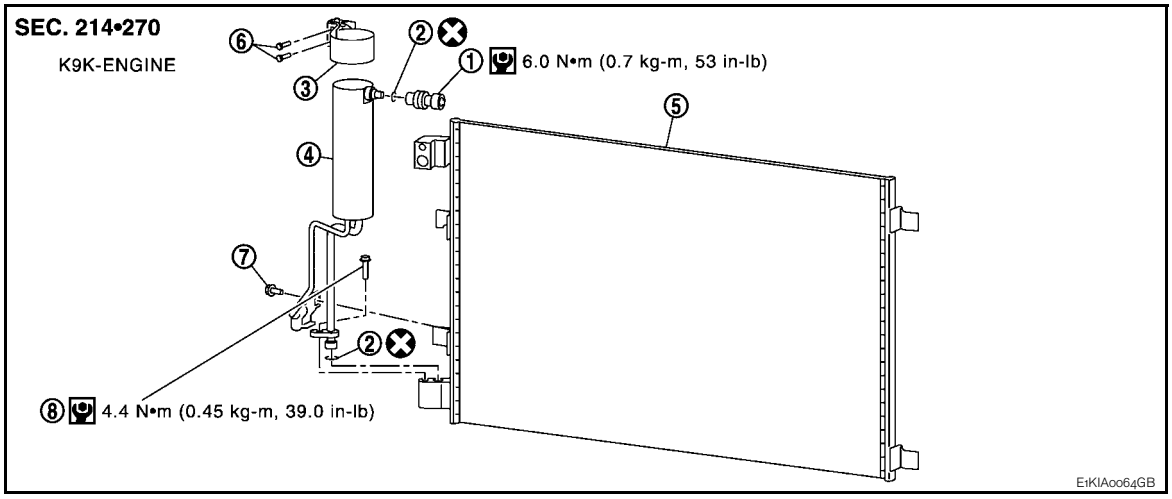
- **Replace O-rings of high-pressure flexible hose and high-pressure pipe 1 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

LIQUID TANK

Exploded View

INFOID:0000000001098304



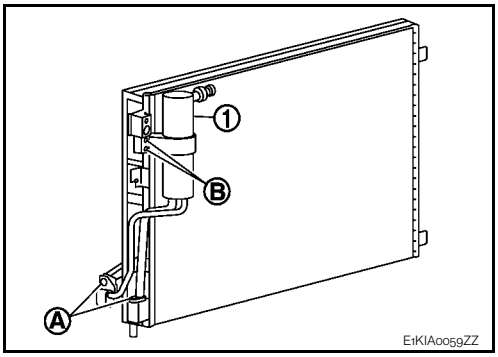
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condensor
6. Liquid tank fixing screw
7. Liquid tank pipe fixing screw
8. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001098305

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine cover ornament. Refer to EM-266, "Removal and Installation".
3. Remove front grille. Refer to EXT-17, "Removal and Installation".
4. Clean liquid tank and its surrounding area, and remove dust and rust from liquid tank.
   CAUTION:
   Be sure to clean carefully.
5. Disconnect refrigerant sensor harness connector. Refer to HA-205, "Removal and Installation".
6. Remove air inlet tube and hose from change air cooler. Refer to EM-266, "Removal and Installation".
7. Remove radiator air-guide duct (RH) fixing clip to move air-guide duct. Refer to CO-56, "Removal and Installation".
8. Remove liquid tank bracket support mounting screws (B).
9. Remove high pressure pipe 1 mounting bolt (A). Refer to HA-198, "Removal and Installation".
10. Remove liquid tank high pressure pipe mounting bolt (A).
11. Remove liquid tank pipe bracket fixing screw (B).
    CAUTION:
    Cap or wrap the joint of high pressure pipe, liquid tank pipes and condenser with suitable material such as vinyl tape to avoid the entry of air.
12. Remove liquid tank assembly (1).



INSTALLATION

Install liquid tank, and then install liquid tank bracket on condenser.

CAUTION:

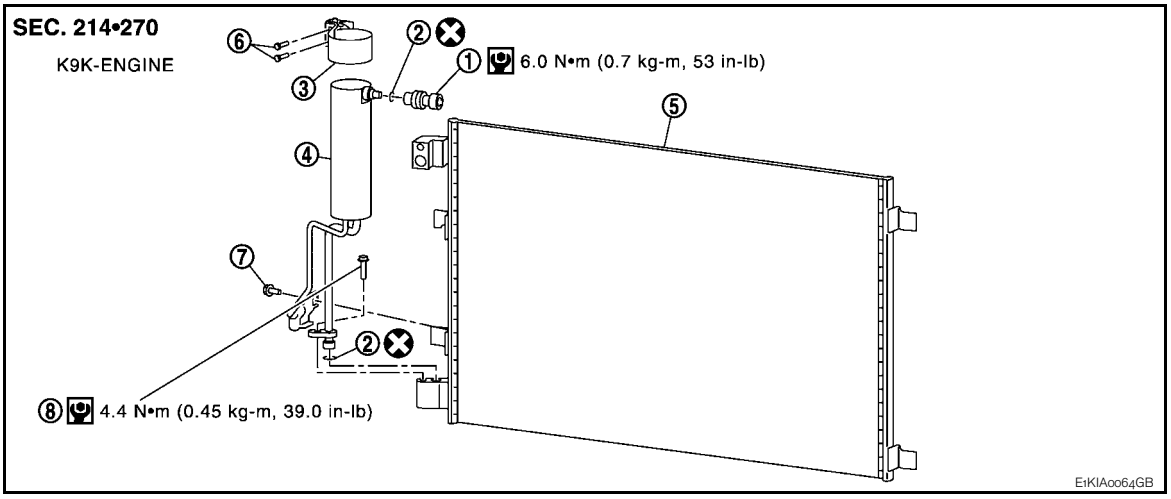
- **Make sure liquid tank bracket is securely installed at protrusion of condenser. (Make sure liquid tank bracket does not move to a position below center of liquid tank.)**
- **Replace O-rings of A/C piping with new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

REFRIGERANT PRESSURE SENSOR

Exploded View

INFOID:0000000001098306



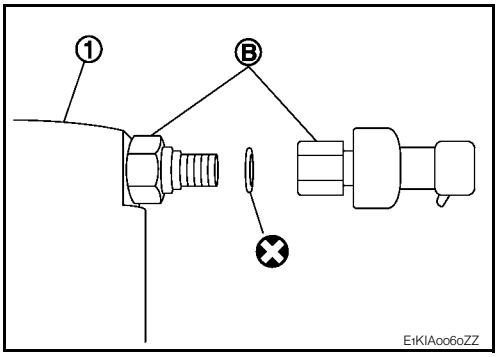
1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Condensor
6. Liquid tank fixing screw
7. Liquid tank pipe fixing screw
8. Liquid tank pipe fixing bolt

Removal and Installation

INFOID:0000000001098307

REMOVAL

1. Remove liquid tank. Refer to HA-204, "Exploded View".
2. Fix the liquid tank (1) with a vise. Remove the refrigerant pressure sensor from liquid tank adaptator with a wrench (B).
   CAUTION:
   Be careful not to damage liquid tank.



INSTALLATION

Installation is basically the reverse order of removal.

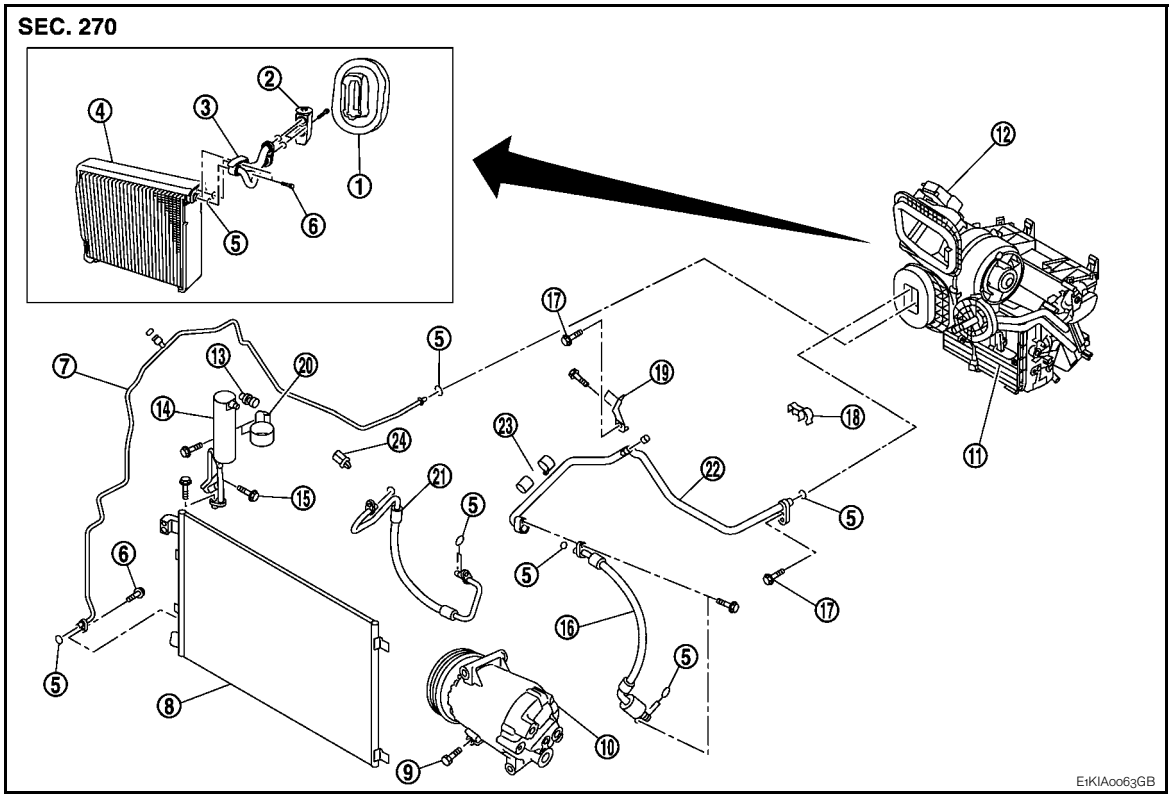
CAUTION:

- **Apply compressor oil to O-ring of refrigerant pressure sensor when installing it.**
- **When recharging refrigerant, check for leaks.**

EVAPORATOR

Exploded View

INFOID:0000000001098308



1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

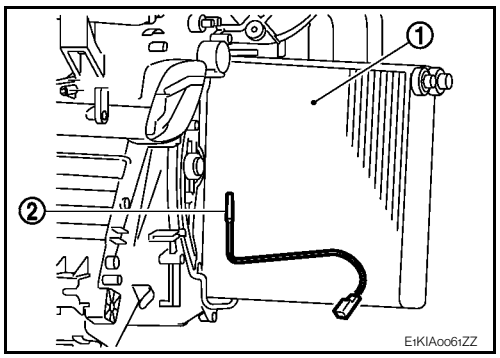
INFOID:0000000001098309

REMOVAL

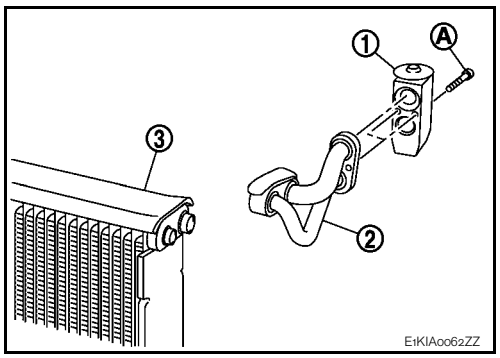
1. Remove low-pressure pipe 2 and high-pressure pipe 1 from expansion valve. Refer to HA-194, "Removal and Installation". Refer to HA-198, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of expansion valve, low-pressure pipe 2 and high-pressure pipe 1 with suitable material such as vinyl tape to avoid the entry of air.
2. Remove heater and cooling unit assembly. Refer to VTL-82, "Removal and Installation".
3. Remove evaporator cover fixing screws and cover. Refer to HA-206, "Removal and Installation".

cardiagn.com

4. Slide evaporator (1) from heater and cooling unit assembly.



5. Cut upper insulator (3) and remove mounting bolt (A), (1) expansion valve and pressure pipe assembly (2), from evaporator.
6. Remove evaporator.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

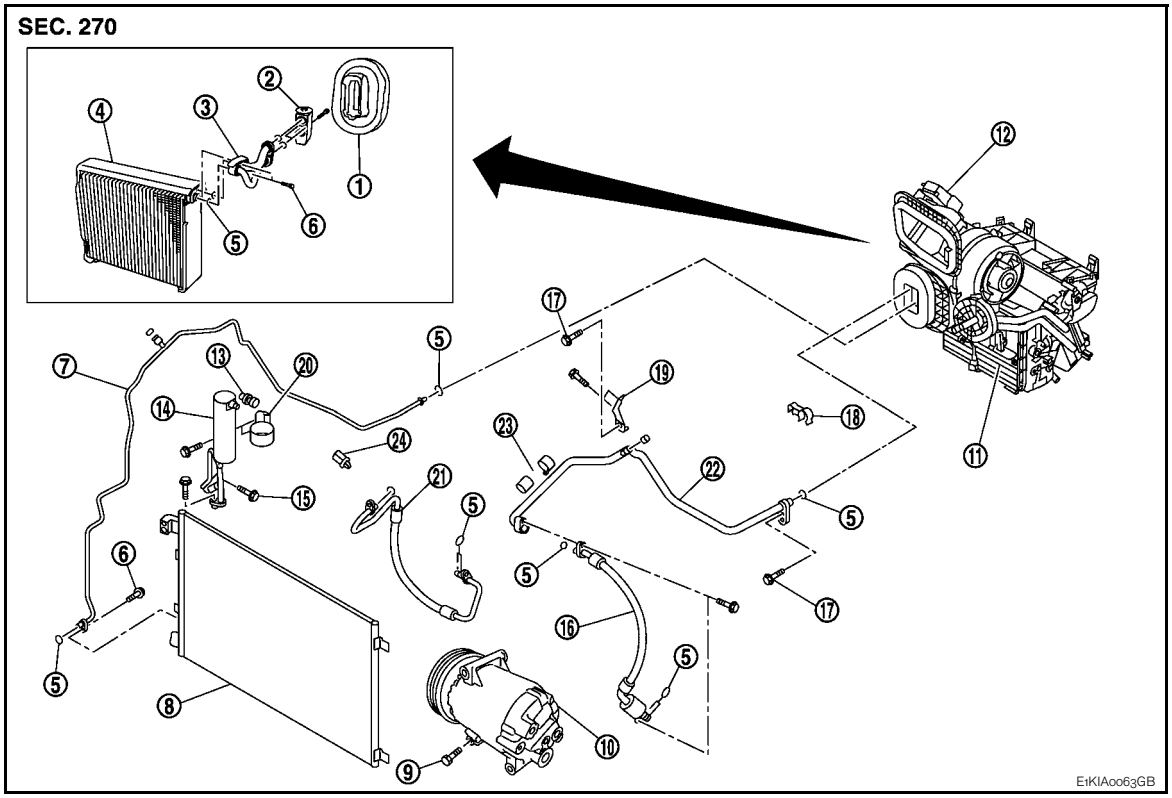
- **Replace O-rings of low-pressure pipe 1 and high-pressure pipe 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **O-rings are different from low-pressure flexible hose (high-pressure pipe 1) and low-pressure pipe 1 (high-pressure pipe 2).**
- **Mark the mounting position of intake sensor bracket prior to removal so that the reinstalled sensor can be located in the same position.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

EXPANSION VALVE

Exploded View

INFOID:0000000001098310



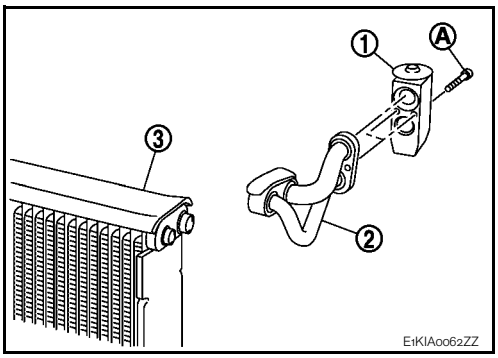
1. Heater sealing
2. Expansion valve
3. Low pressure pipe 1 and high pressure pipe 2 assembly
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe 1
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip
19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe 2
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

Removal and Installation

INFOID:0000000001098311

REMOVAL

1. Remove evaporator (3). Refer to HA-206, "Removal and Installation".
2. Remove low pressure pipe 1 and high pressure pipe 2 assembly (2). Refer to HA-200, "Removal and Installation".
3. Remove mounting bolts (A), and then remove expansion valve (1) from low and high pressure pipe assembly (2).
   CAUTION:
   Cap or wrap the joint of expansion valve, low and high pressure pipe assembly, evaporator and expansion valve with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

cardiagn.com

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of evaporator with new ones, and then apply compressor oil to it when installing it.**
- **O-rings are different from low-pressure pipe 1 (high-pressure pipe 1) and low-pressure pipe 2 (high-pressure pipe 2).**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Compressor

INFOID:0000000001098312

Model		DELPHI THERMAL HUNGARY make 5 CVC
Type		Variable displacement swash plate
Displacement cm^3 (cu in)/rev	Max.	120 (7.32)
Cylinder bore × stroke (Max.) mm (in.)		-
Direction of rotation		Clockwise (viewed from clutch)
Drive belt		Poly V
Disc to pulley clearance	Standard	-

Lubricant

INFOID:0000000001098313

Model		DELPHI THERMAL HUNGARY make 5 CVC
Name		Nissan A/C System Oil Type S (DH-PS)
Capacity m ℓ (US fl oz, Imp fl oz)	Total in system	150 (5.03, 5.3)
	Compressor (Service part) charging amount	150 (5.03, 5.3)

Refrigerant

INFOID:0000000001098314

Type	HFC-134a (R-134a)
Capacity kg (lb)	—

Engine Idling Speed

INFOID:0000000001098315

Refer to EC-1483, "Idle Speed".

Belt Tension

INFOID:0000000001098316

Refer to EM-259, "Inspection and Adjustment".

cardiagn.com

SECTION HRN
HORN

CONTENTS

COMPONENT DIAGNOSIS 2

HORN 2
Wiring Diagram - HORN - 2

PRECAUTION 4

PRECAUTIONS 4
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 4

ON-VEHICLE REPAIR 5

HORN 5
Exploded View 5
Removal and Installation 5

A
B
C
D
E
F
G
H
I
J
K
HRN
M
N
O
P

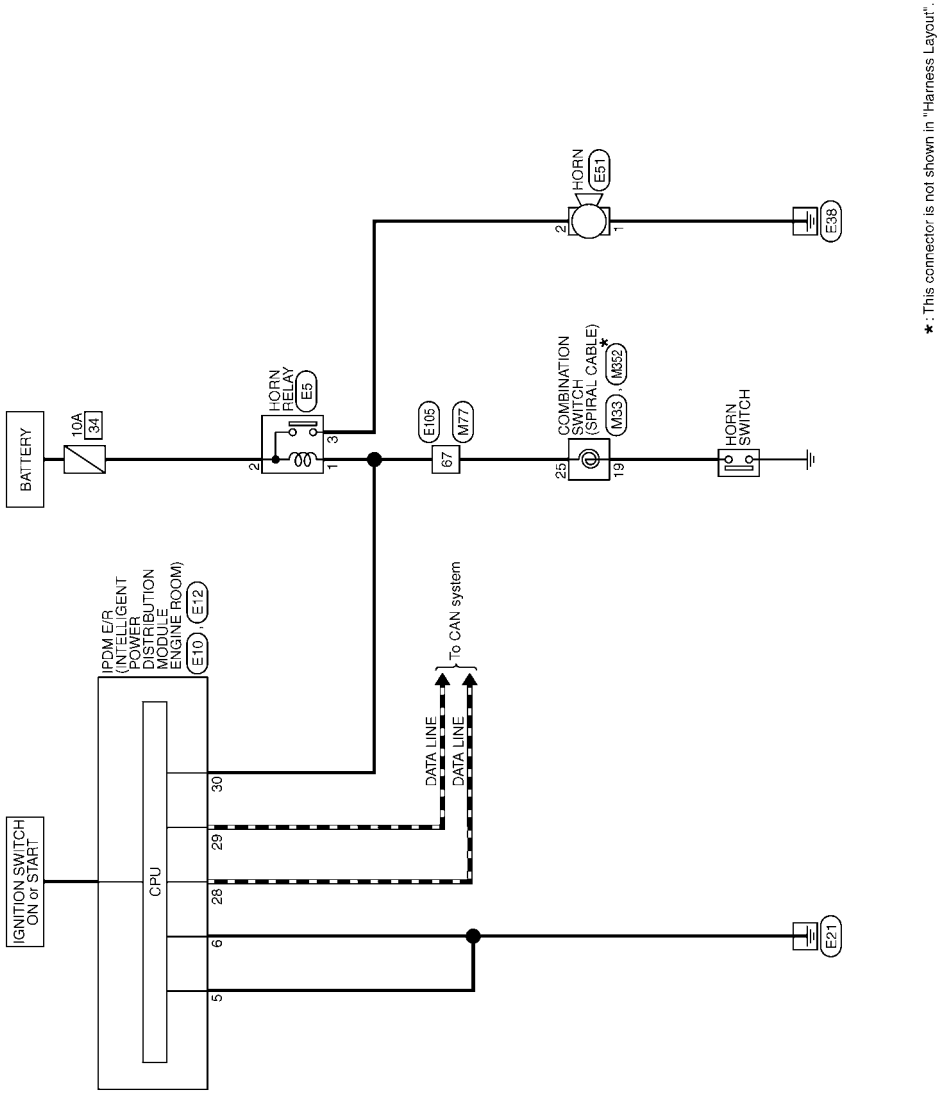
cardiagn.com

COMPONENT DIAGNOSIS

HORN

Wiring Diagram - HORN -

INFOID:0000000000924475



HORN

2006/12/06

JCLWA0412GB

cardiagn.com

HORN

Connector No.	E5
Connector Name	HORN RELAY
Connector Type	–

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	GR/L	–
3	G	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	–
29	P	–
30	L	–

Connector No.	E51
Connector Name	HORN
Connector Type	DELPHI 15419715

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
67	L	–

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

Terminal No.	Color of Wire	Signal Name [Specification]
25	L	–

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
67	L	–

Connector No.	M352
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08MGY-X

Terminal No.	Color of Wire	Signal Name [Specification]
19	–	–

JCLWA0413GB

carsdiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001102415

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

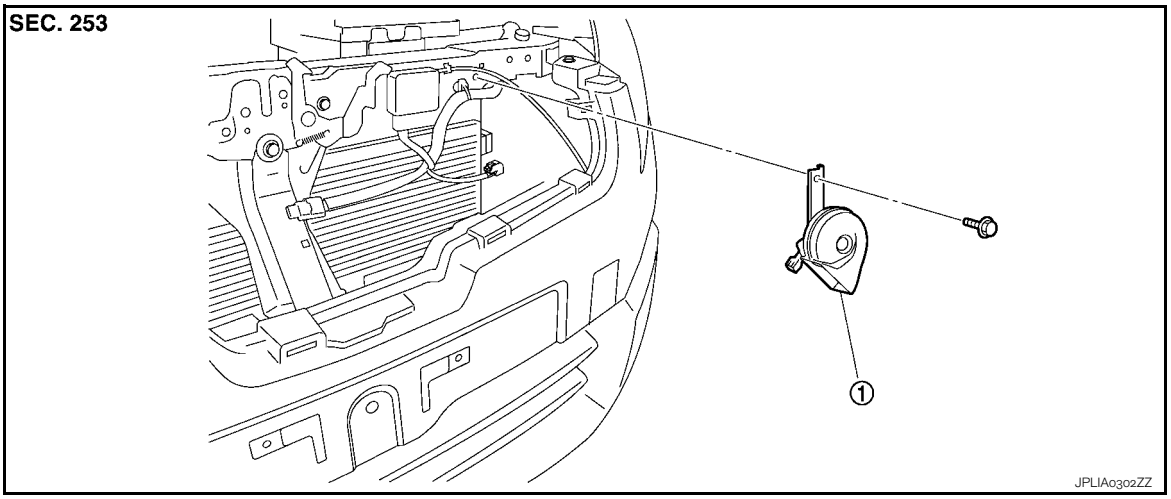
cardiagn.com

ON-VEHICLE REPAIR

HORN

Exploded View

INFOID:0000000000924476



1. Horn

Removal and Installation

INFOID:0000000000924477

REMOVAL

1. Remove the front grille. Refer to EXT-17, "Exploded View".
2. Disconnect the horn connector.
3. Remove the horn mounting bolt, and remove the horn from the vehicle.

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

SECTION IP
INSTRUMENT PANEL

CONTENTS

SYMPTOM DIAGNOSIS 2

SQUEAK AND RATTLE TROUBLE DIAGNOSES 2
- Work Flow 2
- Inspection Procedure 4
- Diagnostic Worksheet 6

PRECAUTION 8

PRECAUTIONS 8
- Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 8
- Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 8
- Precaution 8

PREPARATION 10

PREPARATION 10
- Commercial Service Tools 10

ON-VEHICLE REPAIR 11

INSTRUMENT PANEL ASSEMBLY 11
- Exploded View 11
- Removal and Installation 12

CENTER CONSOLE ASSEMBLY 18
- Exploded View 18
- Removal and Installation 18
- Disassembly and Assembly 19

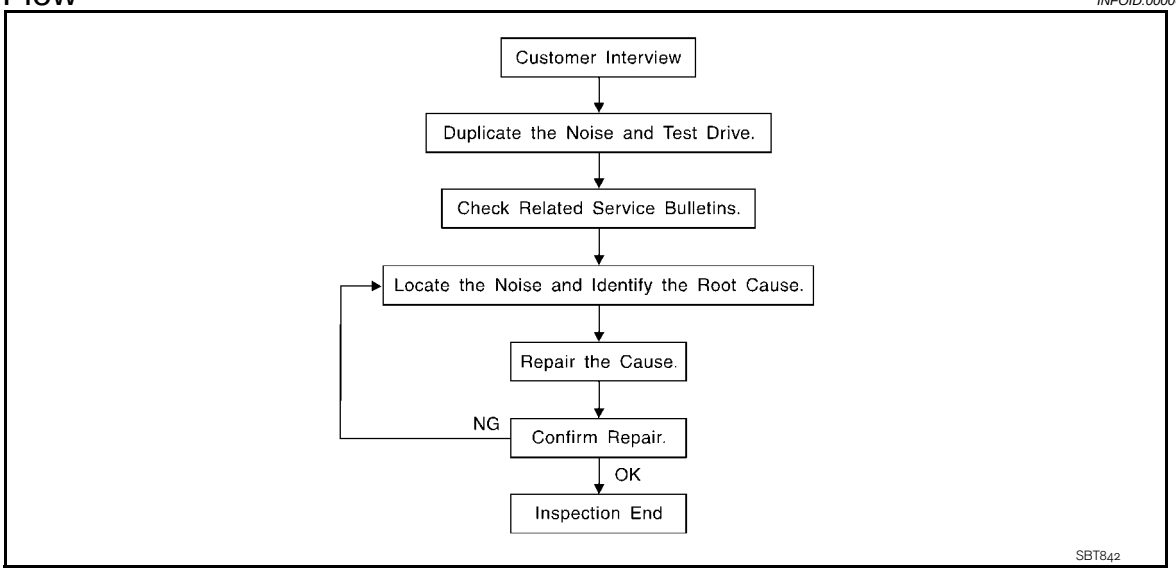
carmanualsgn.com

SYMPTOM DIAGNOSIS

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000001115849



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to IP-6, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

cardiagn.com

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:
1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to IP-4, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.

- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001115850

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

cardiagn.com

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

carsign.com

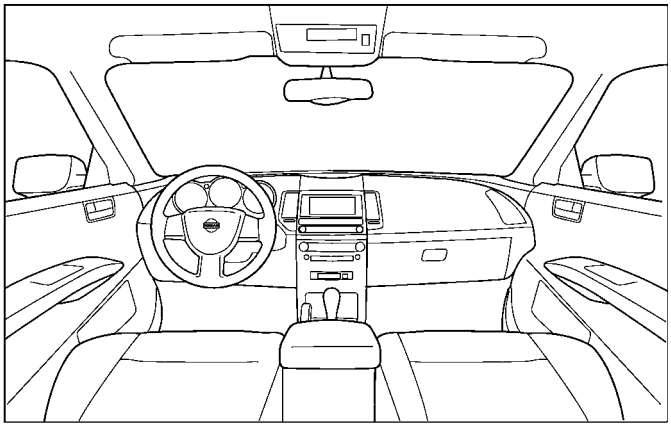
Diagnostic Worksheet

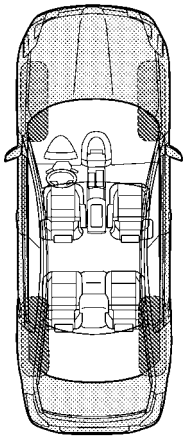
INFOID:0000000001115851

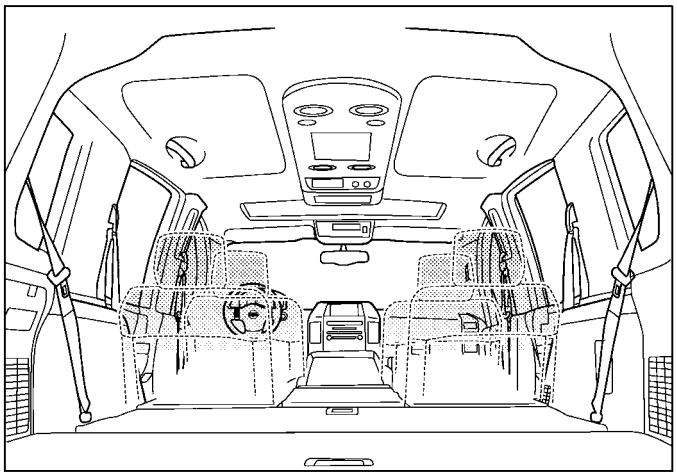
SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

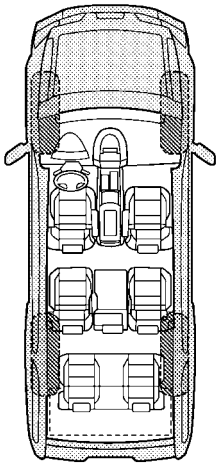
Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.









Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

cardiagn.com

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001114987

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001114990

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution

INFOID:0000000001093675

- Disconnect both battery cables in advance.
- Disconnect air bag system line in advance.
- Never tamper with or force air bag lid open, as this may adversely affect air bag performance.

cardiagn.com

- Be careful not to scratch pad and other parts.
- When removing or disassembling any part, be careful not to damage or deform it. Protect parts, which may get in the way with cloth.
- When removing parts with a screwdriver or other tool, protect parts by wrapping them with vinyl or tape.
- Keep removed parts protected with cloth.
- If a clip is deformed or damaged, replace it.
- If an unreusable part is removed, replace it with a new one.
- Tighten bolts and nuts firmly to the specified torque.
- After re-assembly has been completed, make sure each part functions correctly.
- Remove stains in the following way.

Water-soluble stains:
Dip a soft cloth in warm water, and then squeeze it tightly. After wiping the stain, wipe with a soft dry cloth.
Oil stain:
Dissolve a synthetic detergent in warm water (density of 2 to 3% or less), dip the cloth, then clean off the stain with the cloth. Next, dip the cloth in fresh water and squeeze it tightly. Then clean off the detergent completely. Then wipe the area with a soft dry cloth.

- Do not use any organic solvent, such as thinner or benzine.

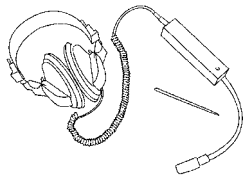
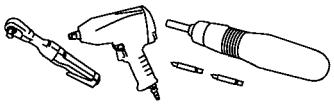
carmanualsign.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000001093677

Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Power tool  PIIB1407E	
Clip remover E1KIA0055GB	Removing clips

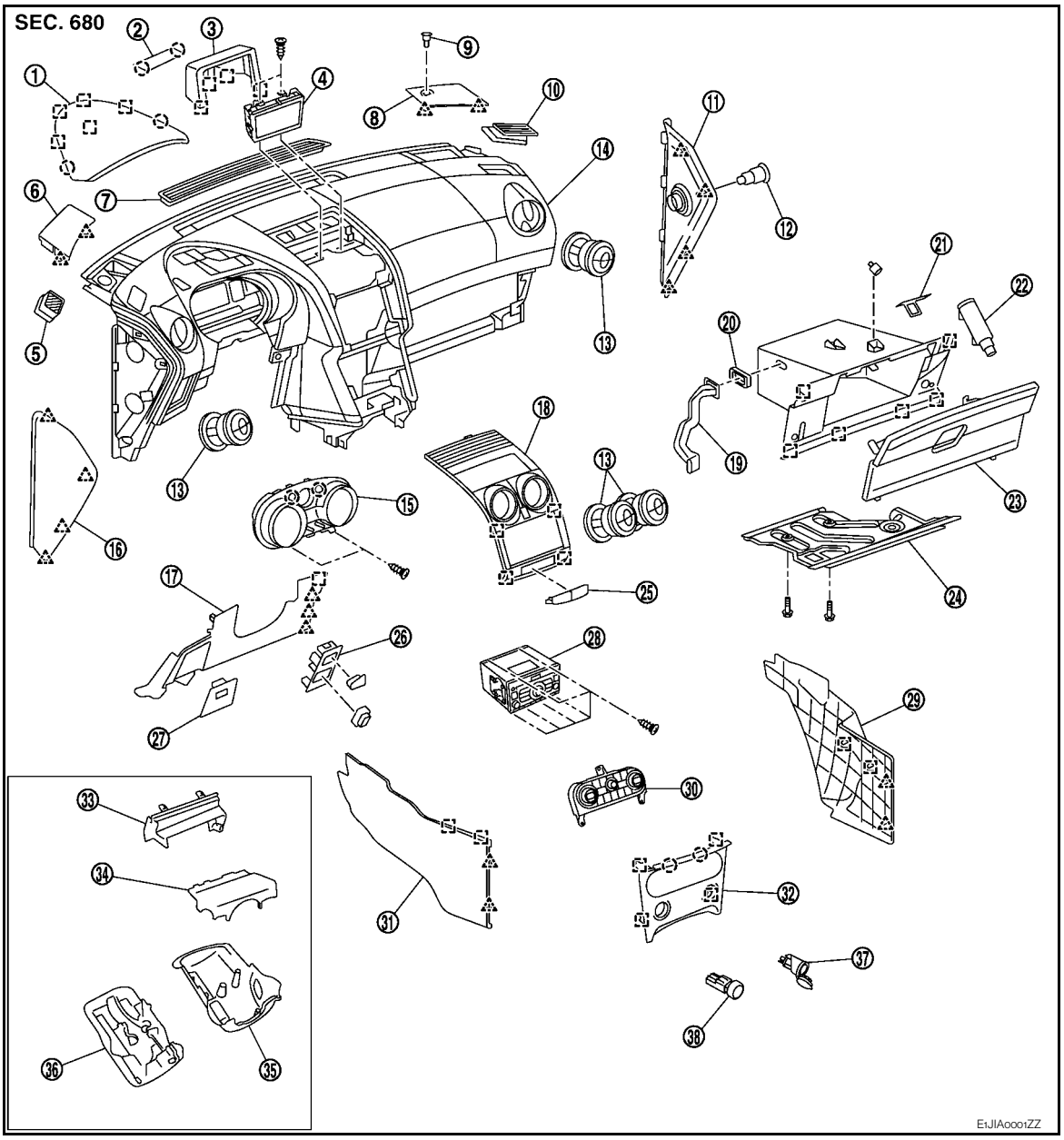
cardiagn.com

ON-VEHICLE REPAIR

INSTRUMENT PANEL ASSEMBLY

Exploded View

INFOID:0000000001093678



1. Cluster lid A
2. Display unit cover finisher
3. Display unit cover
4. Display unit
5. Defroster grille (LH)
6. Tweeter grille (LH)
7. Front defroster grille, center
8. Tweeter grille (RH)
9. Sunload sensor (if equipped)
10. Defroster grille (RH)
11. Instrument side finisher, passenger side
12. Passenger airbag cut-off switch assembly
13. Ventilation grille
14. Instrument panel assembly
15. Combimeter assembly
16. Instrument side finisher, driver side
17. Lower instrument panel, driver side
18. Cluster lid C
19. Glove box air duct
20. Glove box air duct opener
21. Glove box latch
22. Glove box door damper
23. Glove box door
24. Lower instrument panel, passenger side
25. SRS information display
26. Mirror/ESP switch holder
27. Fuse box lid

28. AV/navigation unit assembly
29. Lower instrument cover, RH
30. Air conditioner controller
31. Lower instrument cover, LH
32. Cluster lid D
33. Steering column upper soft cover
34. Steering column upper cover
35. Steering column lower cover
36. Steering column protector
37. Power socket
38. Ventilation button

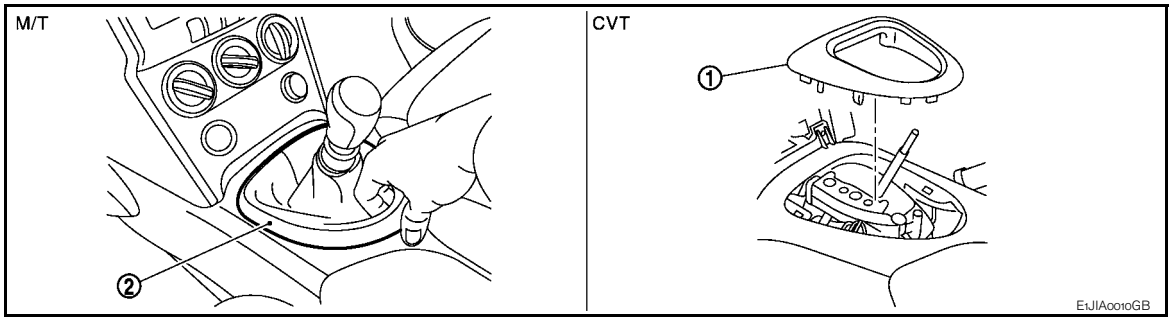
Clip | Pawl | Metal clip

Removal and Installation

INFOID:0000000001093679

REMOVAL

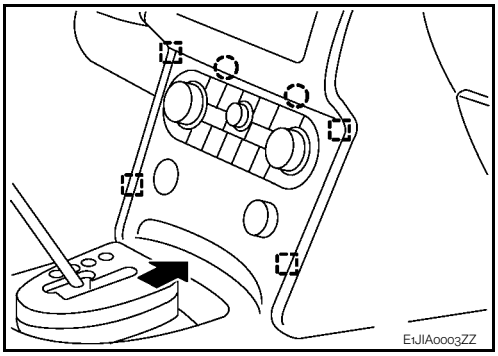
1. Put selector lever in drive position. (CVT Models only)
2. Remove front console finisher.



1. Front console finisher (CVT models) 2. Front console finisher (MT models)

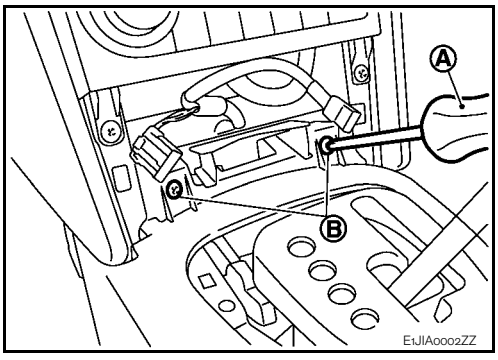
- Remove clips from rear of console finisher, and then remove pawl of front. Pull front console finisher upward to disengage from center console.
- Disconnect harness connectors.

3. Remove selector lever knob. (CVT Models only)
   - Refer to TM-326, "Removal and Installation".
4. Remove shift lever knob. (M/T Models only). Refer to TM-19, "Exploded View" (5MT), TM-63, "Exploded View" (6MT: RS6F94R), TM-118, "Exploded View" (6MT: RS6F52A).
5. Remove Cluster lid D.
   - Using clip remover or other suitable tool, release cluster lid metal clips, from lower to upper, from Instrument Panel.
   - Release harness connector.



: Pawl
: Metal clip

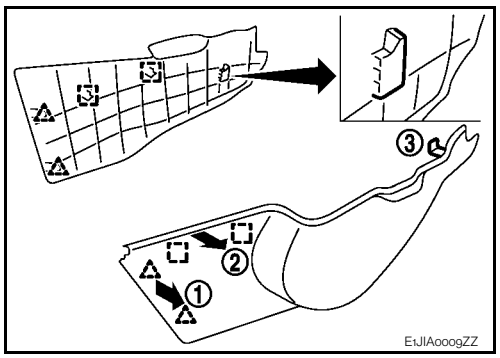
6. Remove screws (B) of center console front side with screw driver (A).



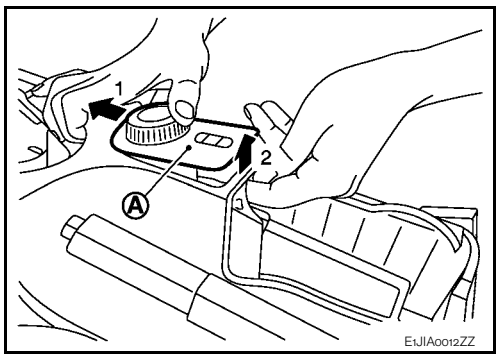
cardiagn.com

7. Remove lower instrument panel covers. (RH / LH)
   - Pull from the rear of lower instrument panel cover to release rear pawls (1) and clips (2), use flat screwdriver or other suitable tool to release upper metal clip (3).
   - Pull backward to release lower instrument panel cover from instrument panel.

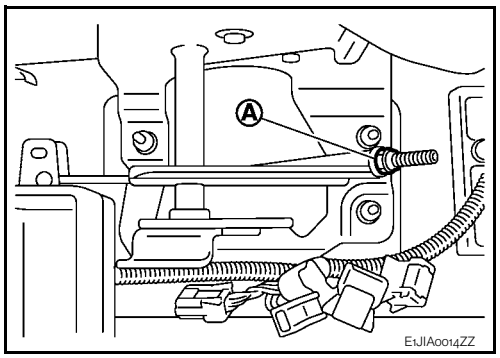
   CAUTION:
   To avoid damaging parts, it is important to take care for removal of this part.



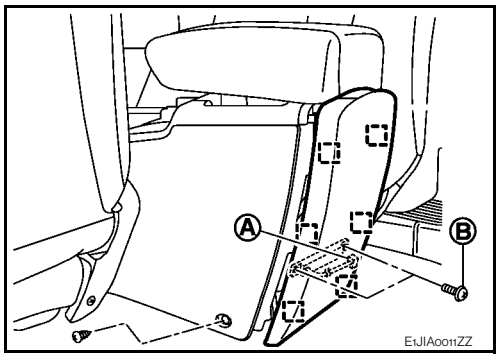
8. Remove center console front fixing screws and clip.
9. Remove cup holder.
   - Pull upward to release cup holder pawls from center console.
10. Remove panel door lock and 4/2WD switch console (A) as shown.
    - Push panel switch console assembly from inner center console.
    - Disconnect harness connectors. Refer to DLK-280, "Exploded View".



11. Remove hand brake cable adjusting nut (A) to loosen cable sufficiently. Refer to PB-5, "Exploded View".



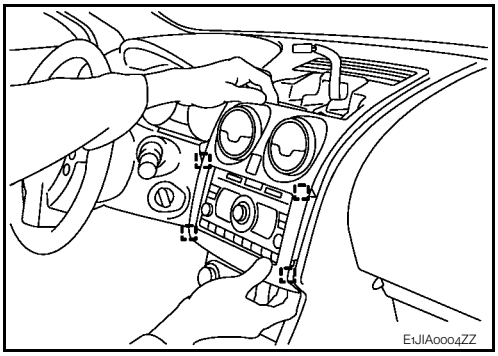
12. Remove center console rear finisher.
    - Pull back release metal clip from center console.
    - Remove inside key antenna and connector (A).
    - Disconnect harness connector fixing clip.
    - Remove key antenna fixing screw (B).



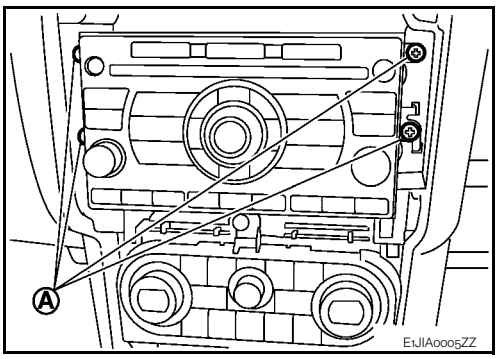
13. Remove center console rear fixing screws, move forward front seats if necessary. For electrical seat refer to IP-8, "Precaution".
14. Remove center console assembly. Refer to IP-18, "Exploded View".

    CAUTION:
    Always move center console with caution to avoid damaging seats, or other part.
15. Remove display unit. Refer to AV-203, "Exploded View".

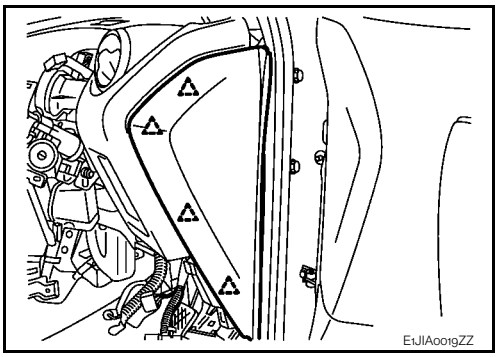
16. Remove cluster lid C.
    - Using flat screwdriver or other suitable tool, and shop cloth, release front metal clip.
    - Pull back cluster lid C from lower to upper part.
    - Disconnect harness connectors.
    - Remove hazard switch. Refer to EXL-179, "Exploded View".
    - Remove seat belt warning unit. Refer to SBC-36, "Removal and Installation".
    - Remove center air grille assembly. Refer to VTL-43, "CENTER VENTILATOR GRILLES : Exploded View" (Automatic air conditioner), VTL-89, "CENTER VENTILATOR GRILLES : Exploded View" (Manual air conditioner).



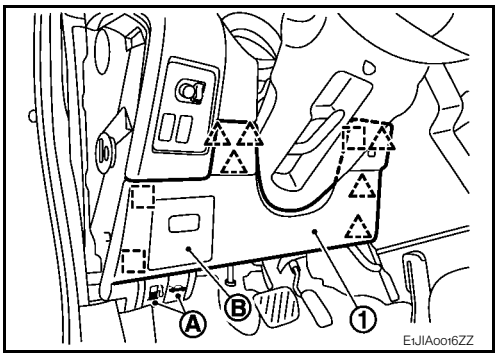
17. Remove AC controller fixing screws (A), then release AC controller from instrument panel.
18. Remove CD changer unit (if equipped).
    - Remove fixing screws.
    - Disconnect harness connector.
19. Disconnect inside key antenna connector and clip located under audio unit (if equipped).
20. Remove audio unit (if equipped). Refer to AV-33, "Exploded View" (without navigation), AV-202, "Exploded View" (with navigation).
21. Remove front side of body side welt LH. Refer to INT-14, "Exploded View".



22. Remove front pillar garnish (LH and RH). Refer to INT-14, "Removal and Installation".
23. Remove driver side instrument side finisher.
    - Insert a remover tool into lower space.
    - Pull the instrument side finisher crosswise.



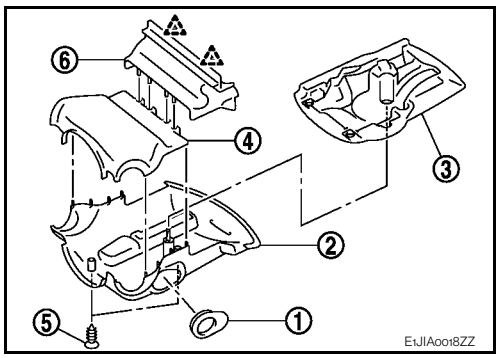
24. Remove lower instrument panel, driver side.
    - Remove hood opener (A) mounting bolts. Refer to DLK-227, "HOOD LOCK CONTROL : Exploded View".
    - Remove fuse box lid (B).
    - Remove data link connector.
    - Pull back lower instrument panel (1), driver side.
    - Disconnect harness connectors.
    - Remove AC sensor.
    - Release date link connector (pawl) then remove it from lower instrument panel, driver side.



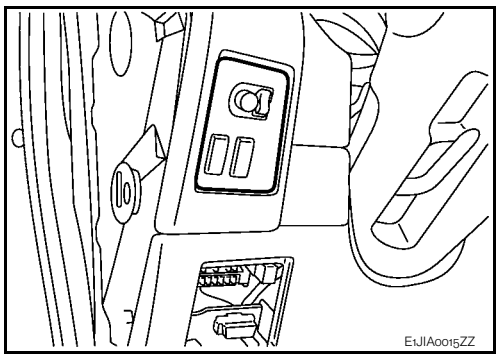
25. Remove steering wheel. Refer to ST-9, "Removal and Installation".

cardiagn.com

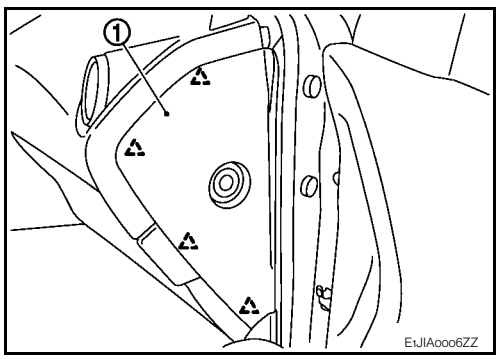
26. Remove steering column covers.
    - Release steering column handle.
    - Remove steering column escutcheon (1).
    - Remove steering column front lower cover (2) fixing screw (5), then remove it.
    - Remove steering column front lower protector (3) (if equipped).
    - Pull steering column cover upper (4).
    - Release fixing clip from steering column finisher (6), then remove steering column upper.
    - Disconnect ADP steering switch connector (with automatic drive position).



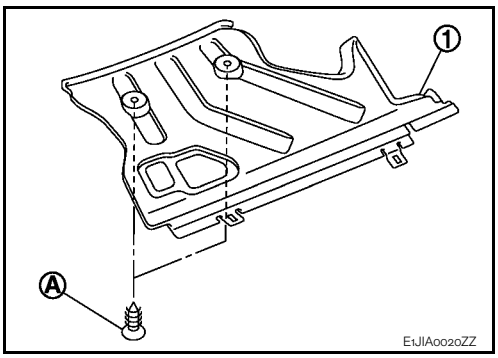
27. Remove spiral cable. Refer to SR-6, "Removal and Installation".
28. Remove combination switch. Refer to EXL-175, "Exploded View".
29. Remove paddle ESP and mirror switch LH/RH.



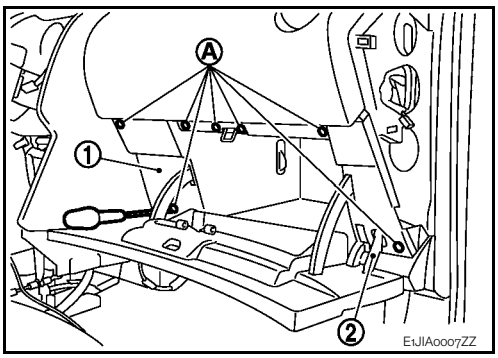
30. Remove cluster lid A.
31. Remove combimeter.
    - Remove combimeter fixing screws.
    - Pull combimeter.
    - Disconnect harness connectors.
32. Remove defroster grille LH. Refer to VTL-46, "SIDE DEFROSTER DUCTS : Exploded View" (Automatic air conditioner), VTL-91, "SIDE DEFROSTER DUCTS : Exploded View" (Manual air conditioner).
    - Pull upward, disengage pawls.
    - Disconnect harness connector.
33. Remove defroster grille RH. Refer to VTL-46, "SIDE DEFROSTER DUCTS : Exploded View" (Automatic air conditioner), VTL-91, "SIDE DEFROSTER DUCTS : Exploded View" (Manual air conditioner).
    - Pull upward, disengage pawls.
    - Disconnect harness connector (if equipped).
34. Remove key antenna. Refer to DLK-273, "INSTRUMENT CENTER : Removal and Installation".
35. Remove front part of body side welt RH. Refer to INT-14, "Exploded View".
36. Remove front pillar garnish RH. Refer to INT-14, "Removal and Installation".
37. Remove passenger side instrument side finisher (1).
    - Insert a remover tool into lower space.
    - Pull the instrument side finisher crosswise.



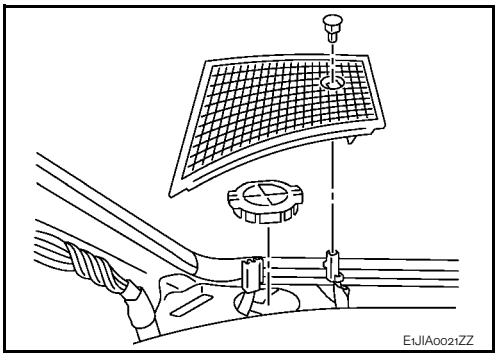
38. Remove lower instrument panel passenger side.
    - Remove rear fixing clip (A).
    - Pull downward to disengage pawls.
    - Pull back instrument passenger lower cover (1).



39. Remove glove box assembly.
    - Open the glove box.
    - Remove fixing screws (A).
    - Pull up glove box assembly (1).
    - Remove glove box bulb assembly.
    - Remove damper pin (2) of outer side.
    - Remove glove box door.
    - Remove latch.

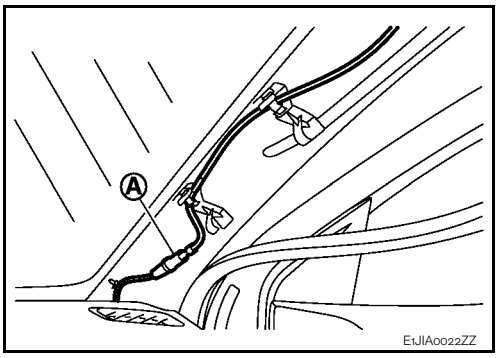


40. Remove tweeter grille RH.
    - Disconnect tweeter harness connector.
    - Disconnect sun load sensor (if equipped).



41. Remove lower instrument panel passenger side.
    - Remove lower instrument panel passenger mounting screws.
    - Disconnect harness connector.
    - Pull back lower instrument panel.
    - Disconnect harness connector sensor.
    - Remove ambient sensor.
42. Disconnect passenger airbag module connector. Refer to SR-8, "Removal and Installation".
43. Remove passenger airbag module fixing bolt. Refer to SR-8, "Exploded View".
44. Remove passenger airbag. Refer to SR-8, "Removal and Installation".

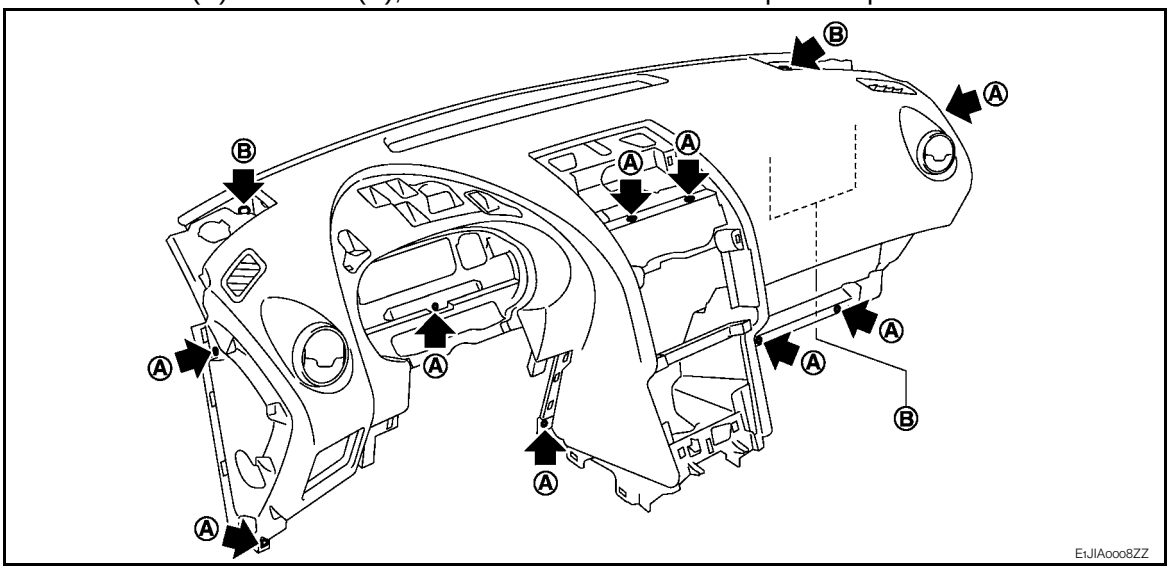
45. Disconnect antenna harness connectors (A), then remove harness clips, from front pillar.
    - Release lower passenger side insulator from lower instrument panel.
    - Release harness clip from instrument panel.



46. Remove instrument panel & pad.

cardiagn.com

- Remove screws (A) and bolts (B), and then remove instrument panel & pad.



CAUTION:
When removing instrument panel, 2 workers are required so as to prevent it from dropping.

47. Remove the following parts after removing instrument panel & pad.
    - Side ventilator grilles
    - Center ventilator grilles
    - Side defroster grilles
    - Side defroster nozzles
    - Side ventilator ducts

INSTALLATION

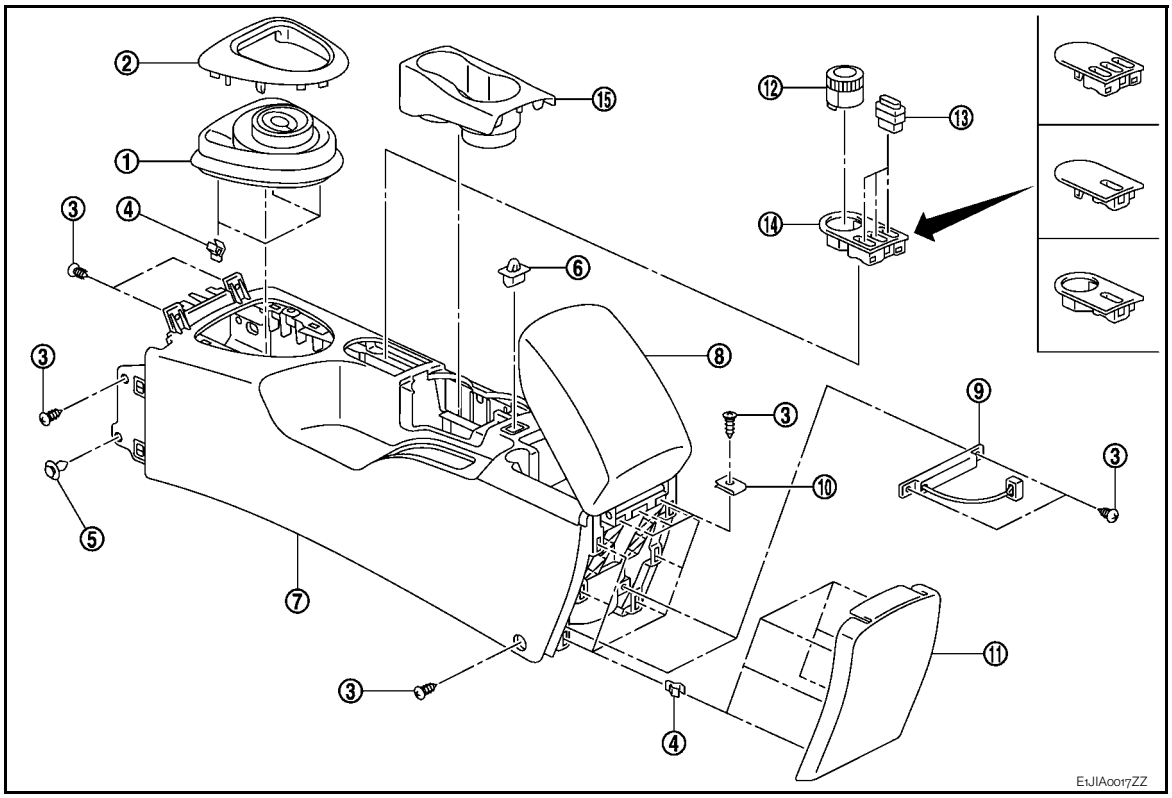
Install in the reverse order of removal.

CENTER CONSOLE ASSEMBLY

Exploded View

INFOID:0000000001093680

CENTER CONSOLE



1. Console finisher assembly (M/T models)	2. Console finisher assembly (CVT models)	3. Center console fixing screw
4. Center console boot assembly fixing clip	5. Center console fixing clip	6. Center console lid latch assembly
7. Center console assembly	8. Center console lid	9. Antenna
10. U-nut	11. Center console rear finisher assembly	12. 4WD switch assembly
13. Switch (hazard, door lock, heated seat)	14. Switch panel	15. Cup holder
Clip	Pawl	Metal clip

Removal and Installation

INFOID:0000000001093681

REMOVAL

1. Put selector lever in drive position. (CVT Models only)
2. Remove selector lever knob. (CVT Models only)
   - Refer to TM-326, "Removal and Installation".
3. Remove shift lever knob. (M/T Models only) Refer to TM-19, "Exploded View" (5MT), TM-63, "Exploded View" (6MT: RS6F94R), TM-118, "Exploded View" (6MT: RS6F52A).
4. Remove console finisher.
5. Disconnect antenna harness connector.
6. Remove antenna fixing screws.
7. Remove antenna harness fixing clip.
8. Remove center console.

INSTALLATION

cardiagn.com

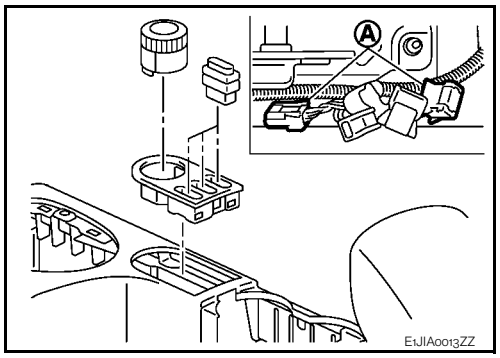
Install in the reverse order of removal.

Disassembly and Assembly

INFOID:0000000001093682

Disassembly

1. Pull upwards and then remove console rear finisher assembly.
2. Remove GPS antenna and connector (models with Navigation). Refer to AV-40, "Harness Layout".
3. Remove cup holder.
4. Remove 4WD switch assembly and switches, then disconnect connector (A) and remove switch panel.
5. Remove console mask.
6. Remove console lid.
7. Remove metal clip and remove console rear finisher.



Assembly

Assemble in the reverse order of disassembly.

carsign.com

SECTION INL
INTERIOR LIGHTING SYSTEM

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
Work Flow 3

FUNCTION DIAGNOSIS 6

INTERIOR ROOM LAMP CONTROL SYSTEM 6
System Diagram 6
System Description 6
Component Parts Location 7
Component Description 8

INTERIOR ROOM LAMP BATTERY SAVER SYSTEM 10
System Diagram 10
System Description 10
Component Parts Location 10
Component Description 11

ILLUMINATION CONTROL SYSTEM 13
System Diagram 13
System Description 13
Component Parts Location 13
Component Description 14

DIAGNOSIS SYSTEM (BCM) 15

COMMON ITEM 15
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 15

INT LAMP 15
INT LAMP : CONSULT-III Function (BCM - INT LAMP) 15

BATTERY SAVER 17
BATTERY SAVER : CONSULT-III Function (BCM - BATTERY SAVER) 17

COMPONENT DIAGNOSIS 19

POWER SUPPLY AND GROUND CIRCUIT 19

BCM 19
BCM : Diagnosis Procedure 19

INTERIOR ROOM LAMP POWER SUPPLY CIRCUIT 20
Description 20
Component Function Check 20
Diagnosis Procedure 20

INTERIOR ROOM LAMP CONTROL CIRCUIT 22
Description 22
Component Function Check 22
Diagnosis Procedure 22

INTERIOR ROOM LAMP CONTROL SYSTEM 24
Wiring Diagram - INTERIOR ROOM LAMP - 24

ILLUMINATION 31
Wiring Diagram - ILLUMINATION - 31

ECU DIAGNOSIS 39

BCM (BODY CONTROL MODULE) 39
Reference Value 39
Wiring Diagram - BCM - 55
Fail Safe 59
DTC Inspection Priority Chart 60
DTC Index 61

SYMPTOM DIAGNOSIS 62

INTERIOR LIGHTING SYSTEM SYMPTOMS 62
Symptom Table 62

PRECAUTION 63

PRECAUTIONS 63

cardiagn.com

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 63

ON-VEHICLE REPAIR 64

MAP LAMP 64
Exploded View 64
Removal and Installation 64
Replacement 65

VANITY MIRROR LAMP 66
Exploded View 66
Replacement 66

GLOVE BOX LAMP 67
Exploded View 67
Replacement 67

ROOM LAMP 68
Exploded View 68
Removal and Installation 68
Replacement 68

PERSONAL LAMP 70
Exploded View 70
Removal and Installation 70
Replacement 70

LUGGAGE ROOM LAMP 71
Exploded View 71
Removal and Installation 71
Replacement 71

SERVICE DATA AND SPECIFICATIONS (SDS) 72

SERVICE DATA AND SPECIFICATIONS (SDS) 72
Bulb Specifications 72

cardiagn.com

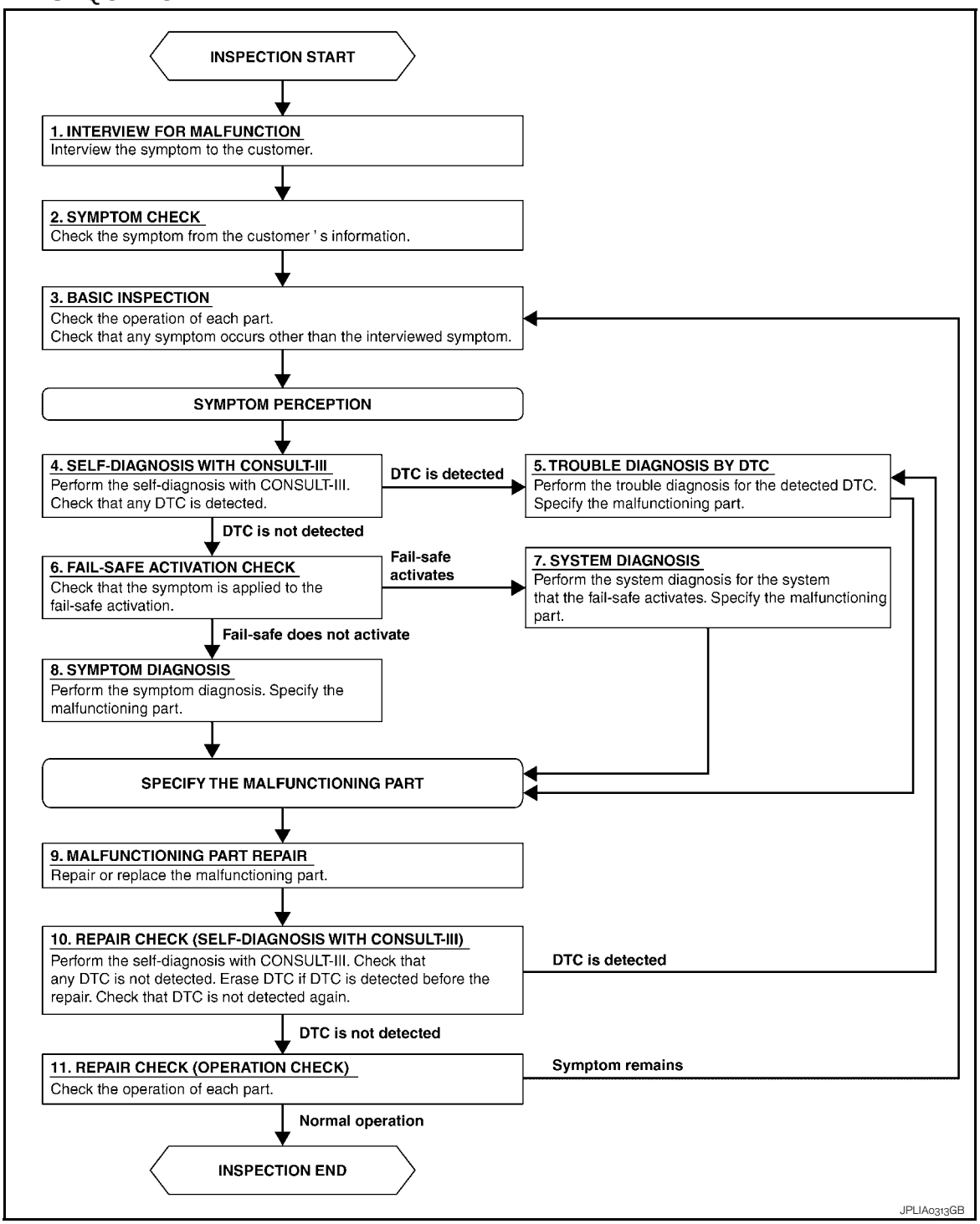
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001078335

OVERALL SEQUENCE



DETAILED FLOW

1. INTERVIEW FOR MALFUNCTION

Interview the symptom to the customer.

>> GO TO 2.

2.SYMPTOM CHECK

Check the symptom from the customer's information.

>> GO TO 3.

3.BASIC INSPECTION

Check the operation of each part. Check that any symptom occurs other than the interviewed symptom.

>> GO TO 4.

4.SELF-DIAGNOSIS WITH CONSULT-III

Perform the self-diagnosis with CONSULT-III. Check that any DTC is detected.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 6.

5.TROUBLE DIAGNOSIS BY DTC

Perform the trouble diagnosis for the detected DTC. Specify the malfunctioning part.

>> GO TO 9.

6.FAIL-SAFE ACTIVATION CHECK

Check that the symptom is applied to the fail-safe activation.

Does the fail-safe activate?

YES >> GO TO 7.
NO >> GO TO 8.

7.SYSTEM DIAGNOSIS

Perform the system diagnosis for the system that the fail-safe activates. Specify the malfunctioning part.

>> GO TO 9.

8.SYMPTOM DIAGNOSIS

Perform the symptom diagnosis. Specify the malfunctioning part.

>> GO TO 9.

9.MALFUNCTION PART REPAIR

Repair or replace the malfunctioning part.

>> GO TO 10.

10.REPAIR CHECK (SELF-DIAGNOSIS WITH CONSULT-III)

Perform the self-diagnosis with CONSULT-III. Check that any DTC is not detected. Erase DTC if DTC is detected before the repair. Check that DTC is not detected again.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 11.

11.REPAIR CHECK (OPERATION CHECK)

Check the operation of each part.

Does it operate normally?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 3.

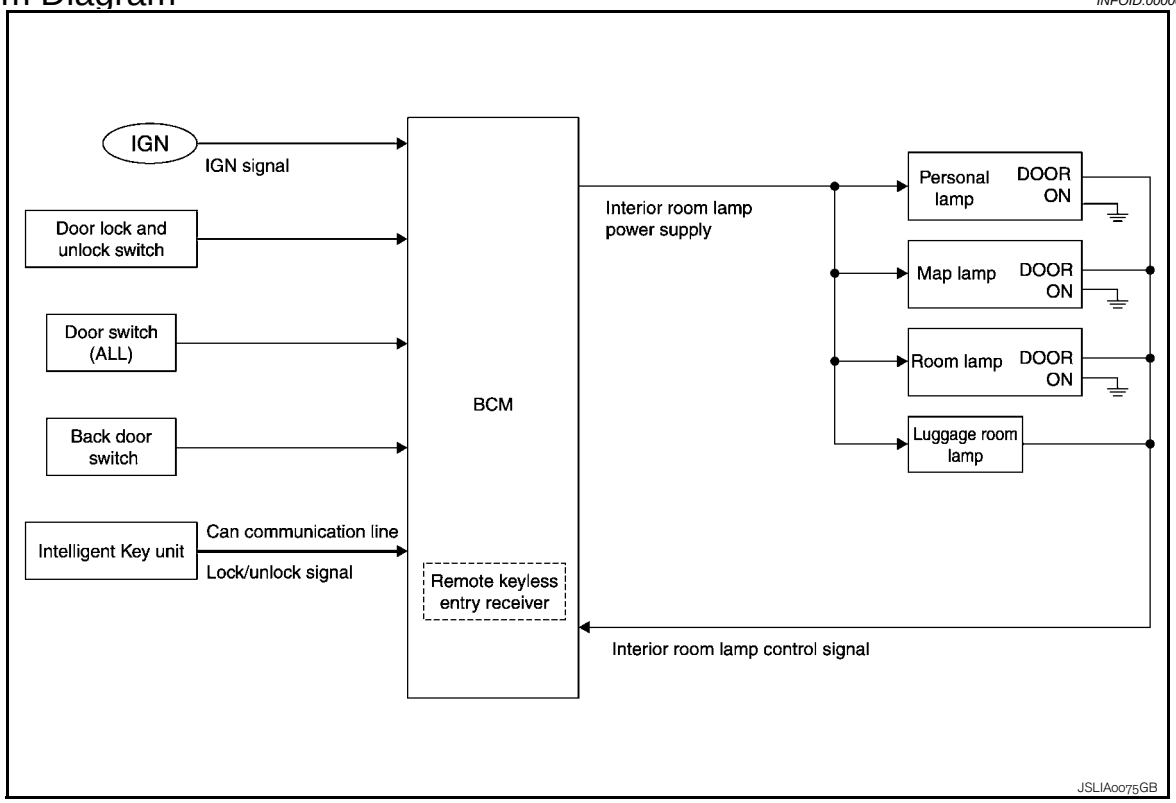
cardiagn.com

FUNCTION DIAGNOSIS

INTERIOR ROOM LAMP CONTROL SYSTEM

System Diagram

INFOID:0000000001033359



System Description

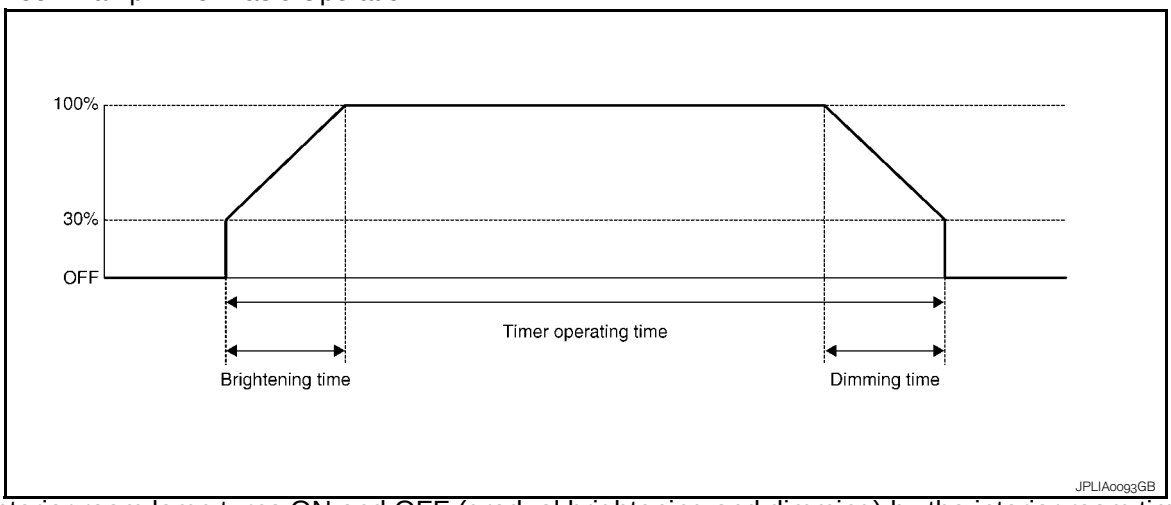
INFOID:0000000001033360

OUTLINE

Interior room lamps* are controlled by interior room lamp timer control function of BCM.
*: Map lamp, room lamp, personal lamp and luggage room lamp (when applicable lamp switch is in DOOR position).

INTERIOR ROOM LAMP TIMER CONTROL

Interior Room Lamp Timer Basic Operation



- The interior room lamp turns ON and OFF (gradual brightening and dimming) by the interior room timer.
- BCM judges the vehicle condition with the following items. It activates the interior room lamp timer.

- Ignition switch status

cardiagn.com

- Door switch signal (ALL)
- Door lock/unlock signal (Remote keyless entry receiver, each request switch, door lock and unlock switch)

NOTE:
Each function of interior room lamp timer can be set by CONSULT-III. Refer to INL-15, "INT LAMP : CONSULT-III Function (BCM - INT LAMP)".

Interior Room Lamp ON Operation

- BCM always turns the interior room lamp ON when any door opens.
- BCM activates the interior room timer in any of the following conditions to turn the interior room lamp ON for a period of time.
  - Any door opens before all doors close.
  - Ignition switch is turned ON → OFF.
  - Any door unlock signal is detected when all doors close with ignition switch OFF.

NOTE:
Restart the timer if new condition is input during the timer operating time.

Interior Room Lamp OFF Operation

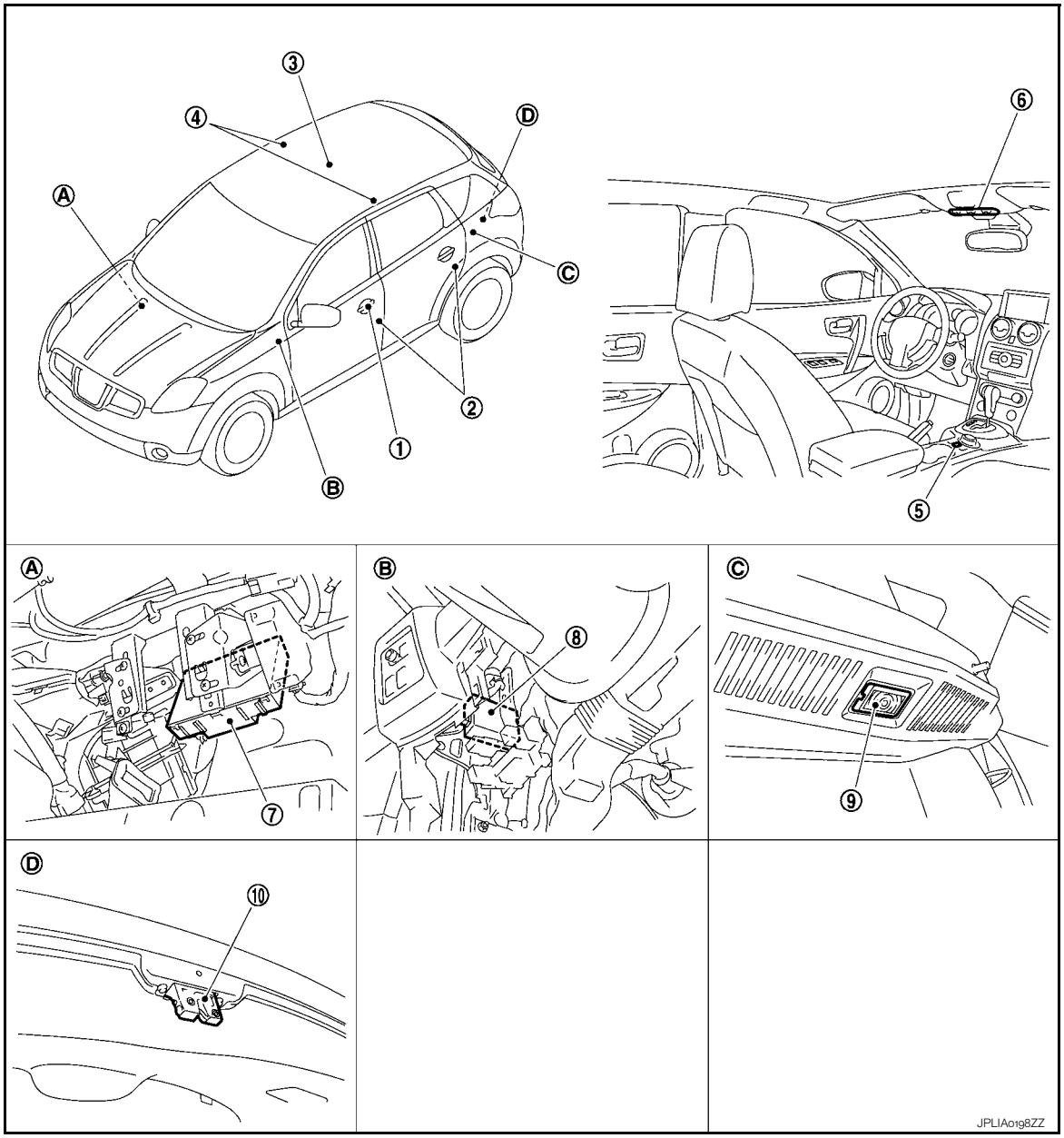
BCM stops the timer in any of the following conditions to turns the interior room lamp OFF.

- The timer operating time is expired.
- Ignition switch position is other than OFF with all doors close.
- Any door lock operation is detected with all doors close.

Component Parts Location

INFOID:0000000001033361

carDiagn.com



1. Request switch
2. Door switch
3. Room lamp (Without glass top roof)
4. Personal lamp (With glass top roof)
5. Door lock and unlock switch
6. Map lamp
7. BCM
8. Intelligent Key unit
9. Luggage room lamp
10. Back door switch
A. Over the glove box
B. Over the instrument lower panel (driver side)
C. Luggage room upward
D. Back door lock assembly

Component Description

INFOID:0000000001033362

cardiagn.com

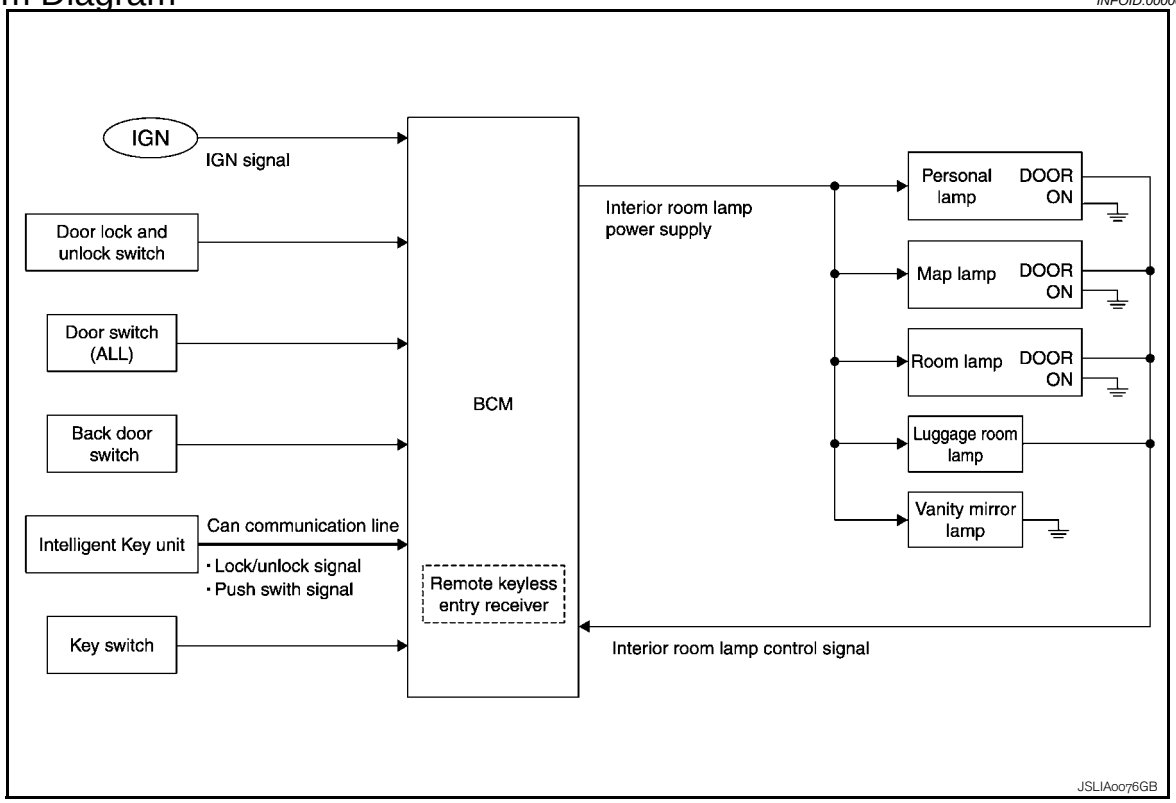
Part	Description
BCM	Activates the interior room lamp timer depending on the vehicle condition to turn the interior room lamps ON/OFF.
Remote keyless entry receiver (integrated in the BCM)	Receives the lock/unlock signal from Keyfob.
Intelligent Key unit	Transmits the lock/unlock signal to BCM with CAN communication.
Door lock and unlock switch	Inputs the lock/unlock signal to BCM.
• Door switch • Back door switch	Inputs the door switch signal to BCM.

carDiagn.com

INTERIOR ROOM LAMP BATTERY SAVER SYSTEM

System Diagram

INFOID:0000000001033363



System Description

INFOID:0000000001033364

OUTLINE

- Interior room lamp battery saver is controlled by BCM.
- BCM turns applicable lamps OFF depending on the vehicle condition. This function prevents the battery from over-discharging if the driver neglect turning OFF the any lamps.

Applicable lamps

- Map lamp
- Personal lamp
- Room lamp
- Luggage room lamp
- Vanity mirror lamp

INTERIOR ROOM LAMP BATTERY SAVER FUNCTION

- When the ignition switch is turned OFF, BCM operates the timer for a period of time to cut the interior room lamp power supply.
- BCM restart the timer when any of the following signals changes while operating the timer.

- Ignition switch status
- Door switch signal (ALL)
- Door lock/unlock signal (Remote keyless entry receiver, each request switch, door lock and unlock switch)
- Key switch signal
- Push switch signal

- BCM provides the interior room lamp power supply continuously when the ignition switch position is other than OFF.

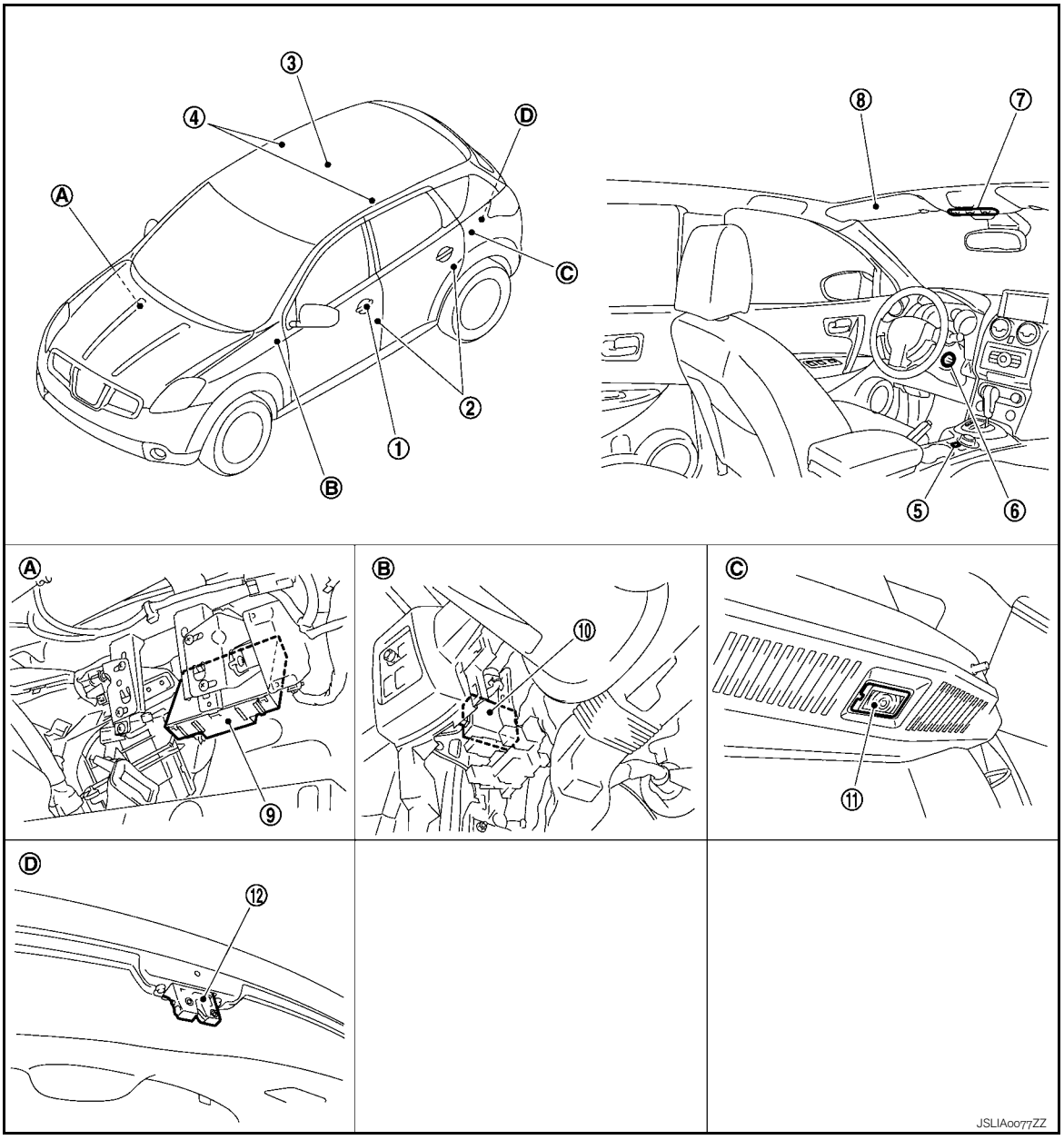
NOTE:

Each function of interior room lamp battery saver can be set by CONSULT-III. Refer to INL-17, "BATTERY SAVER : CONSULT-III Function (BCM - BATTERY SAVER)".

Component Parts Location

INFOID:0000000001033365

cardiagn.com



1. Request switch
2. Door switch
3. Room lamp (Without glass top roof)
4. Personal lamp (With glass top roof)
5. Door lock and unlock switch
6. • Key switch • Push switch (With Intelligent Key)
7. Map lamp
8. Vanity mirror lamp
9. BCM
10. Intelligent Key unit
11. Luggage room lamp
12. Back door switch
A. Over the glove box
B. Over the instrument lower panel (driver side)
C. Luggage room upward
D. Back door lock assembly

Component Description

INFOID:0000000001033366

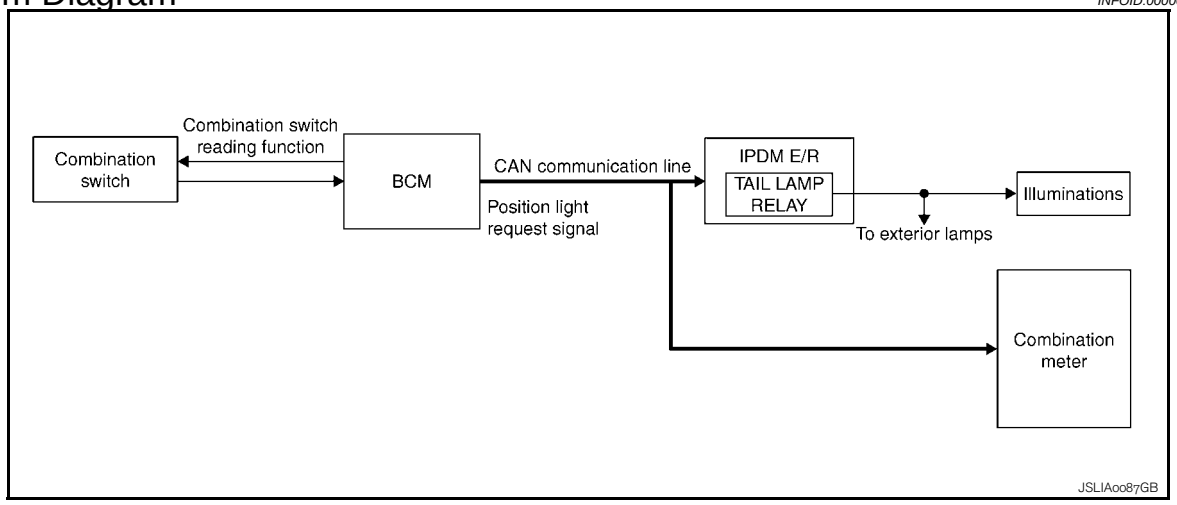
Part	Description
BCM	Operates the interior room lamp battery saver depending on the vehicle condition to cut the interior room lamp power supply.
Remote keyless entry receiver (integrated in the BCM)	Receives the lock/unlock signal from Keyfob.
Intelligent Key unit	Transmits the lock/unlock signal and push switch signal to BCM with CAN communication.
Door lock and unlock switch	Inputs the lock/unlock signal to BCM.
• Door switch • Back door switch	Inputs the door switch signal to BCM.
Key switch	Inputs the key switch signal to BCM.

cardiagn.com

ILLUMINATION CONTROL SYSTEM

System Diagram

INFOID:0000000001033367



System Description

INFOID:0000000001033368

OUTLINE

Each illumination lamp is controlled by each function of BCM and IPDM E/R.

Control by BCM
- Combination switch reading function
- Headlamp control function

Control by IPDM E/R
- Relay control function

ILLUMINATION CONTROL

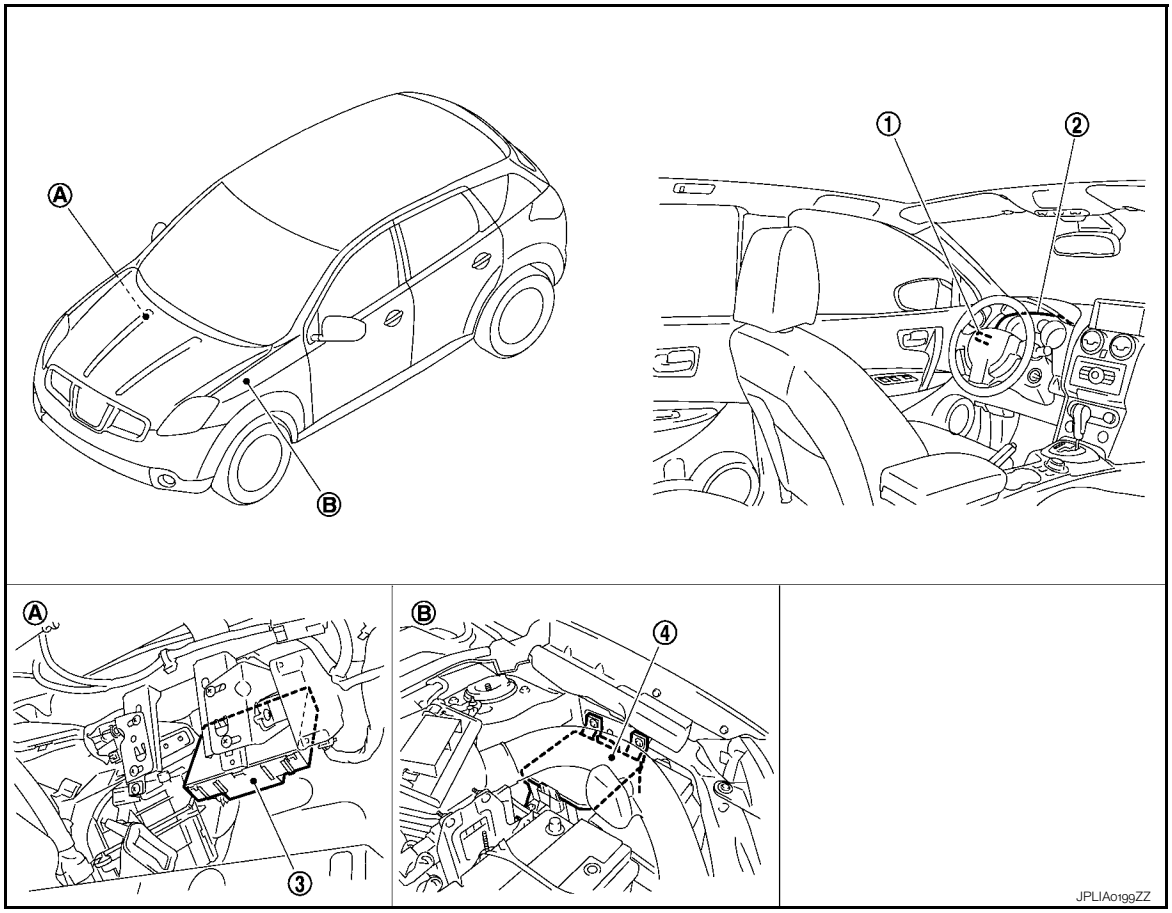
- BCM detects the combination switch condition by the combination switch reading function.
- BCM transmits position light request signal to IPDM E/R and combination meter according to tail lamp ON condition.

Tail lamp ON condition
- Lighting switch 1ST
- Lighting switch 2ND
- Lighting switch AUTO, and the auto light function ON judgment (With auto light system)

- IPDM E/R turns the integrated tail lamp relay ON according to position light request signal. It provides the power supply to each illumination lamp.
- Combination meter illuminates the meter illumination according to position light request signal.

Component Parts Location

INFOID:0000000001033369



1. Combination switch
2. Combination meter
3. BCM
4. IPDM E/R

A Over the glove box
B. Engine room (left side)

Component Description

INFOID:0000000001033370

Part	Description
BCM	• Judges each switch condition by the combination switch reading function. • Judges the illumination lamp ON/OFF status depending on the vehicle condition. And then it transmits position light request signal to IPDM E/R and combination meter (with CAN communication).
IPDM E/R	Controls the integrated relay according to the request from BCM (with CAN communication).
COMBINATION METER	Illuminates the meter illumination according to the request from BCM (with CAN communication).
Combination switch (Lighting & turn signal switch)	Refer to BCS-9, "System Diagram".

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001116335

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

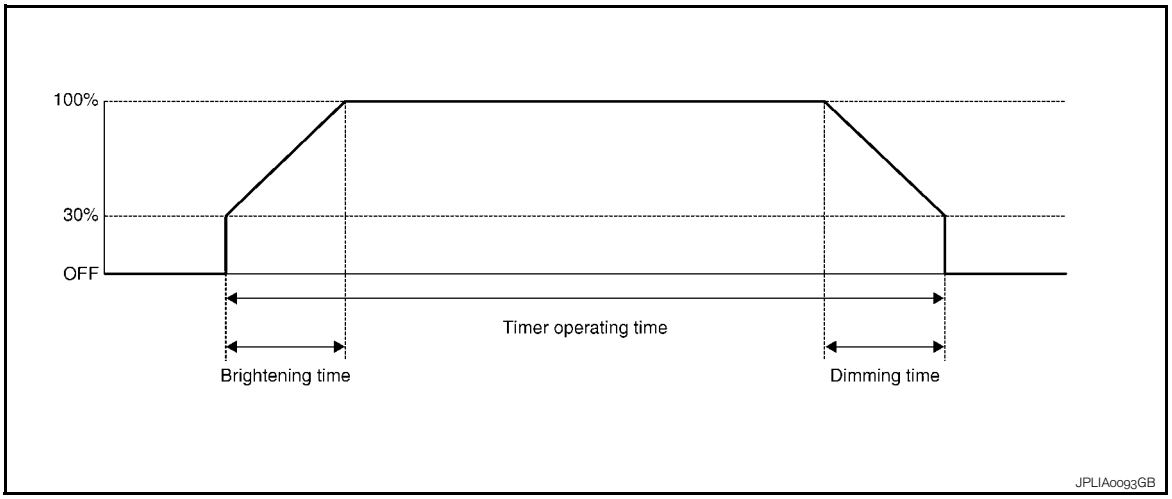
INT LAMP

INT LAMP : CONSULT-III Function (BCM - INT LAMP)

INFOID:0000000001033372

carDiag.com

WORK SUPPORT



Service item	Setting item	Setting	
ROOM LAMP TIMER SET	MODE 1	0 sec.	Sets the interior room lamp ON time. (Timer operating time)
	MODE 2	7.5 sec.	
	MODE 3*	15 sec.	
	MODE 4	30 sec.	
SET I/L D-UNLCK INTCON	ON*	With the interior room lamp timer function	
	OFF	Without the interior room lamp timer function	
ROOM LAMP ON TIME SET	MODE 1	0.5 sec.	Sets the interior room lamp gradual brightening time.
	MODE 2*	1 sec.	
	MODE 3	2 sec.	
	MODE 4	3 sec.	
	MODE 5	4 sec.	
	MODE 6	5 sec.	
	MODE 7	0 sec.	
ROOM LAMP OFF TIME SET	MODE 1	0.5 sec.	Sets the interior room lamp gradual dimming time.
	MODE 2*	1 sec.	
	MODE 3	2 sec.	
	MODE 4	3 sec.	
	MODE 5	4 sec.	
	MODE 6	5 sec.	
	MODE 7	0 sec.	
R LAMP TIMER LOGIC SET	MODE 1*	Interior room lamp timer activates with synchronizing all doors.	
	MODE 2	Interior room lamp timer activates with synchronizing the driver door only.	

*: Initial setting

DATA MONITOR

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judges from IGN signal (ignition power supply)
ACC SW [ON/OFF]	Ignition switch (ACC) status judges from ACC signal (ACC power supply)

cardiagn.com

Monitor item [Unit]	Description
KEY ON SW [ON/OFF]	The switch status input from key switch
PUSH SW [ON/OFF]	Push switch status received from Intelligent Key unit by CAN communication
DOOR SW-DR [ON/OFF]	The switch status input from front door switch (driver side)
DOOR SW-AS [ON/OFF]	The switch status input from front door switch (passenger side)
DOOR SW-RR [ON/OFF]	The switch status input from rear door switch RH
DOOR SW- RL [ON/OFF]	The switch status input from rear door switch LH
BACK DOOR SW [ON/OFF]	The switch status input from back door switch
CDL LOCK SW [ON/OFF]	Lock switch status input from door lock and unlock switch
CDL UNLOCK SW [ON/OFF]	Unlock switch status input from door lock and unlock switch
I-KEY LOCK [ON/OFF]	Lock signal status received from Intelligent Key unit by CAN communication
I-KEY UNLOCK [ON/OFF]	Unlock signal status received from Intelligent Key unit by CAN communication
KEYLESS LOCK [ON/OFF]	Lock signal status received from remote keyless entry receiver (integrated in the BCM)
KEYLESS UNLOCK [ON/OFF]	Unlock signal status received from remote keyless entry receiver (integrated in the BCM)

ACTIVE TEST

Test item	Operation	Description
INT LAMP	ON	Outputs the interior room lamp control signal to turn the interior room lamps ON. [Map lamp, personal lamp, room lamp, luggage room lamp (when applicable lamps switch is in DOOR position.)]
	OFF	Stops the interior room lamp control signal to turn the interior room lamps.

BATTERY SAVER

BATTERY SAVER : CONSULT-III Function (BCM - BATTERY SAVER)

INFOID:0000000001033373

WORK SUPPORT

Service item	Setting item	Setting	
ROOM LAMP TIMER SET	MODE 1*	30 min.	Sets the interior room lamp battery saver timer operating time.
	MODE 2	60 min.	

*: Initial setting

DATA MONITOR

carDiag.com

Monitor item [Unit]	Description
IGN ON SW [ON/OFF]	Ignition switch (ON) status judges from IGN signal (ignition power supply)
ACC SW [ON/OFF]	Ignition switch (ACC) status judges from ACC signal (ACC power supply)
KEY ON SW [ON/OFF]	The switch status input from key switch
PUSH SW [ON/OFF]	Push switch status received from Intelligent Key unit by CAN communication
DOOR SW-DR [ON/OFF]	The switch status input from front door switch (driver side)
DOOR SW-AS [ON/OFF]	The switch status input from front door switch (passenger side)
DOOR SW-RR [ON/OFF]	The switch status input from rear door switch RH
DOOR SW- RL [ON/OFF]	The switch status input from rear door switch LH
BACK DOOR SW [ON/OFF]	The switch status input from back door switch
CDL LOCK SW [ON/OFF]	Lock switch status input from door lock and unlock switch
CDL UNLOCK SW [ON/OFF]	Unlock switch status input from door lock and unlock switch
I-KEY LOCK [ON/OFF]	Lock signal status received from Intelligent Key unit by CAN communication
I-KEY UNLOCK [ON/OFF]	Unlock signal status received from Intelligent Key unit by CAN communication
KEYLESS LOCK [ON/OFF]	Lock signal status received from remote keyless entry receiver (integrated in the BCM)
KEYLESS UNLOCK [ON/OFF]	Unlock signal status received from remote keyless entry receiver (integrated in the BCM)

ACTIVE TEST

Test item	Operation	Description
BATTERY SAVER	OFF	Cuts the interior room lamp power supply to turn interior room lamps OFF.
	ON	Outputs the interior room lamp power supply to turn interior room lamps ON.*

*: Each lamp switch is in ON position.

cardiagn.com

COMPONENT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

BCM

BCM : Diagnosis Procedure

INFOID:0000000001099291

1.CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not fusing.

Terminal No.	Signal name	Fuses and fusible link No.
41	Battery power supply	9
57		J
37	ACC power supply	5
38	Ignition power supply	4

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)			
BCM			OFF	ACC	ON
Connector	Terminal				
M65	37	Ground	Approx. 0 V	Battery voltage	Battery voltage
	38		Approx. 0 V	Approx. 0 V	Battery voltage
M66	41		Battery voltage	Battery voltage	Battery voltage
M67	57				

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

carDiag.com

INTERIOR ROOM LAMP POWER SUPPLY CIRCUIT

Description

INFOID:0000000001033375

Provides the interior room lamp power supply. Also cuts the power supply when the interior room lamp battery saver activating.

Component Function Check

INFOID:0000000001033376

1.CHECK INTERIOR ROOM LAMP POWER SUPPLY FUNCTION

CONSULT-III ACTIVE TEST
1. Turn ignition switch ON.
2. Turn each interior room lamp ON.
- Map lamp
- Room lamp
- Personal lamp
- Vanity mirror lamp
- Luggage room lamp
3. Select "BATTERY SAVER" of BCM (BATTERY SAVER) active test item.
4. With operating the test items, check that each interior room lamp is turned ON/OFF.

OFF : Interior room lamp OFF
ON : Interior room lamp ON

Is the interior room lamp turned ON/OFF?

YES >> Interior room lamp power supply circuit is normal.
NO >> Refer to INL-20, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001033377

1.CHECK INTERIOR ROOM LAMP POWER SUPPLY OUTPUT

CONSULT-III ACTIVE TEST
1. Turn ignition switch ON.
2. Select “BATTERY SAVER” of BCM (BATTERY SAVER) active test item.
3. With operating the test item, check voltage between BCM harness connector and ground.

Terminals			Test item	Voltage (Approx.)
(+)		(–)		
BCM		Ground	BATTERY SAVER	
Connector	Terminal			
M66	42		OFF	0 V
			ON	Battery voltage

Is the measurement value normal?

YES >> GO TO 2.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

2.CHECK INTERIOR ROOM LAMP POWER SUPPLY OPEN CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the following connectors.
- Map lamp
- Room lamp
- Personal lamp (RH)
- Personal lamp (LH)
- Vanity mirror lamp (driver side)
- Vanity mirror lamp (passenger side)
- Luggage room lamp

cardiagn.com

3. Check continuity between BCM harness connector and each interior room lamp harness connector.

BCM		Each interior room lamp			Continuity
Connector	Terminal	Connector		Terminal	
M66	42	Map lamp	R4	4	Existed
		Room lamp	R15	4	
		Personal lamp (RH)	R8	2	
		Personal lamp (LH)	R7	2	
		Vanity mirror lamp (passenger side)	R10	1	
		Vanity mirror lamp (driver side)	R9	1	
		Luggage room lamp	B83	1	

Does continuity exist?

YES >> GO TO 3.
NO >> Repair the harnesses or connectors.

3. CHECK INTERIOR ROOM LAMP POWER SUPPLY SHORT CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M66	42		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Check that each interior room lamp has no internal short circuit.

carDiagn.com

INTERIOR ROOM LAMP CONTROL CIRCUIT

Description

INFOID:0000000001033378

Controls each interior room lamp (ground side) by PWM signal.
NOTE:
PWM signal control period is approximately 250 Hz (in the gradual brightening/dimming).

Component Function Check

INFOID:0000000001033379

CAUTION:
Before the diagnosis, check that the following items are normal.
- **Interior room lamp power supply**
- **Map lamp bulb**
- **Room lamp bulb**
- **Personal lamp bulb**
- **Luggage room lamp bulb**

1.CHECK INTERIOR ROOM LAMP CONTROL FUNCTION

CONSULT-III ACTIVE TEST
1. Switch the map lamp switch to DOOR.
2. Turn ignition switch ON.
3. Select “INT LAMP” of BCM (INT LAMP) active test item.
4. With operating the test items, check that each interior room lamp turns ON/OFF (gradual brightening/dimming).

ON : Interior room lamp gradual brightening
OFF : Interior room lamp gradual dimming

Does the interior room lamp turns ON/OFF (gradual brightening/dimming)?

YES >> Interior room lamp control circuit is normal.
NO >> Refer to INL-22, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001033380

1.CHECK INTERIOR ROOM LAMP CONTROL OUTPUT

CONSULT-III ACTIVE TEST
1. Turn ignition switch OFF.
2. Remove all the bulbs of following lamps.
- Map lamp
- Room lamp
- Personal lamp (RH)
- Personal lamp (LH)
- Luggage room lamp
3. Select “INT LAMP” of BCM (INT LAMP) active test item.
4. With operating the test item, check continuity between BCM harness connector and ground.

BCM		Ground	Test item	Continuity
Connector	Terminal		INT LAMP	
M66	52		ON	Existed
			OFF	Not existed

Is the measurement value normal?

YES >> GO TO 2.
Fixed ON>>GO TO 3.
Fixed OFF>>Replace BCM. Refer to BCS-64, "Exploded View".

cardiagn.com

2.CHECK INTERIOR ROOM LAMP CONTROL OPEN CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the following connectors.
- Map lamp
- Room lamp
- Personal lamp (RH)
- Personal lamp (LH)
- Luggage room lamp
3. Check continuity between BCM harness connector, map lamp harness connector, and personal lamp harness connector.

BCM		Map lamp/personal lamp			Continuity
Connector	Terminal	Connector		Terminal	
M66	52	Map lamp	R4	2	Existed
		Room lamp	R15	2	
		Personal lamp (RH)	R8	3	
		Personal lamp (LH)	R7	3	
		Luggage room lamp	B83	4	

Does continuity exist?

YES >> Replace the map lamp or the personal lamp.
NO >> Repair the harnesses or connectors.

3.CHECK INTERIOR ROOM LAMP CONTROL SHORT CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector, map lamp connector and personal lamp connector.
3. Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M66	52		Not existed

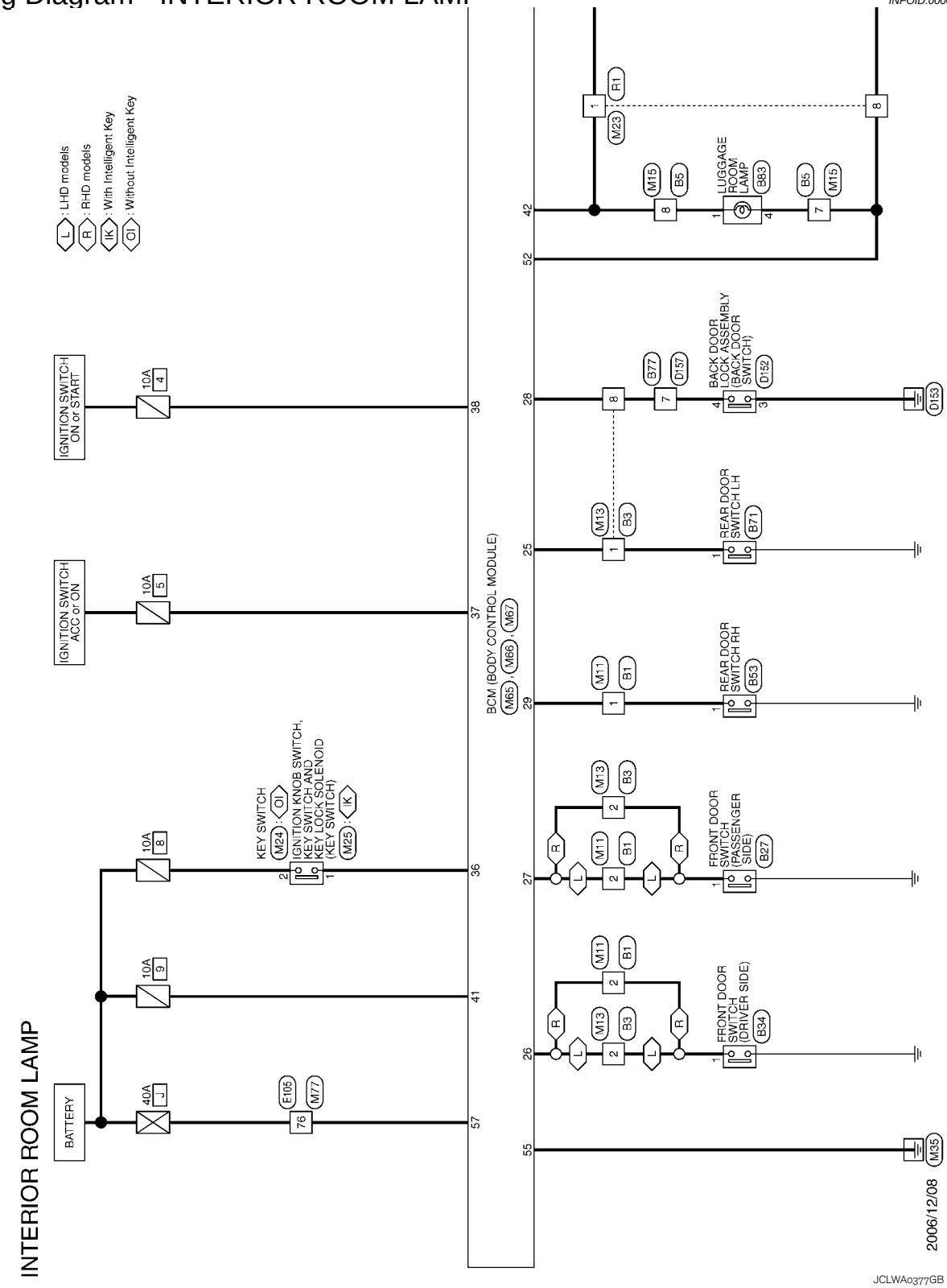
Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

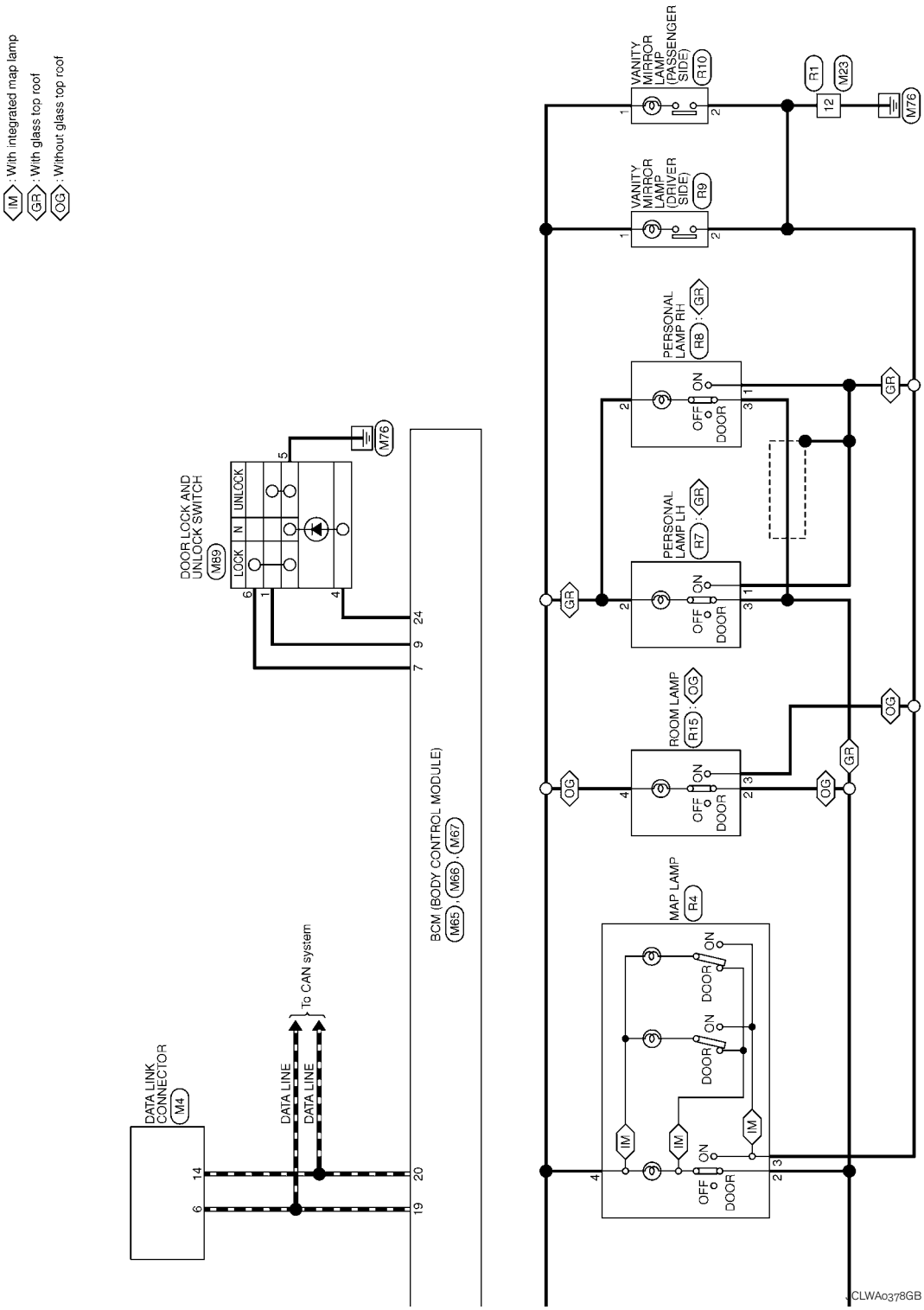
INTERIOR ROOM LAMP CONTROL SYSTEM

Wiring Diagram - INTERIOR ROOM LAMP -

INFOID:0000000001033390



cardiagn.com



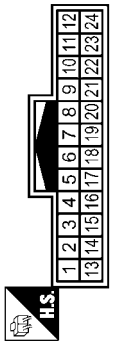
carDiagn.com

INTERIOR ROOM LAMP

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

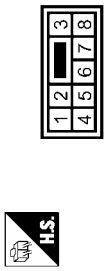
Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]
2	R/W	–[RHD models]

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW



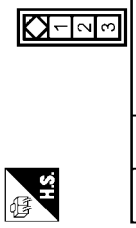
Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	R/W	–[LHD models]
2	BR	–[RHD models]
8	G	–

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
7	R	–
8	V	–

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

JCLWA0379GB

cardiagn.com

INTERIOR ROOM LAMP

Connector No.	B83
Connector Name	LUGGAGE ROOM LAMP
Connector Type	TH04FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
4	R	–

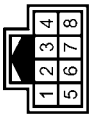
Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	GINGH-4S309-EV-4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	–
4	G	–

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

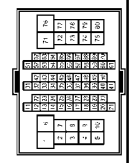
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

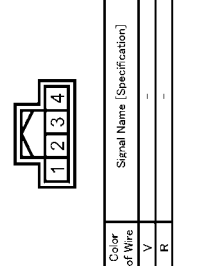
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

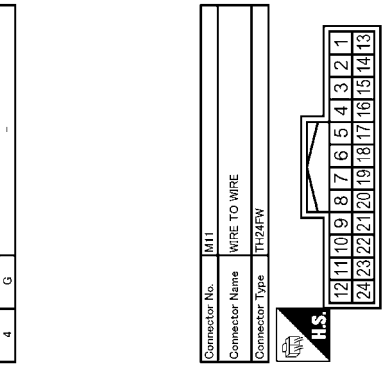
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

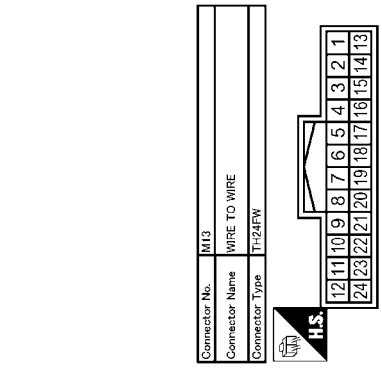
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	BR	–[LHD models]
2	R	–[RHD models]

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	R	–[LHD models]
2	BR	–[RHD models]
8	G	–

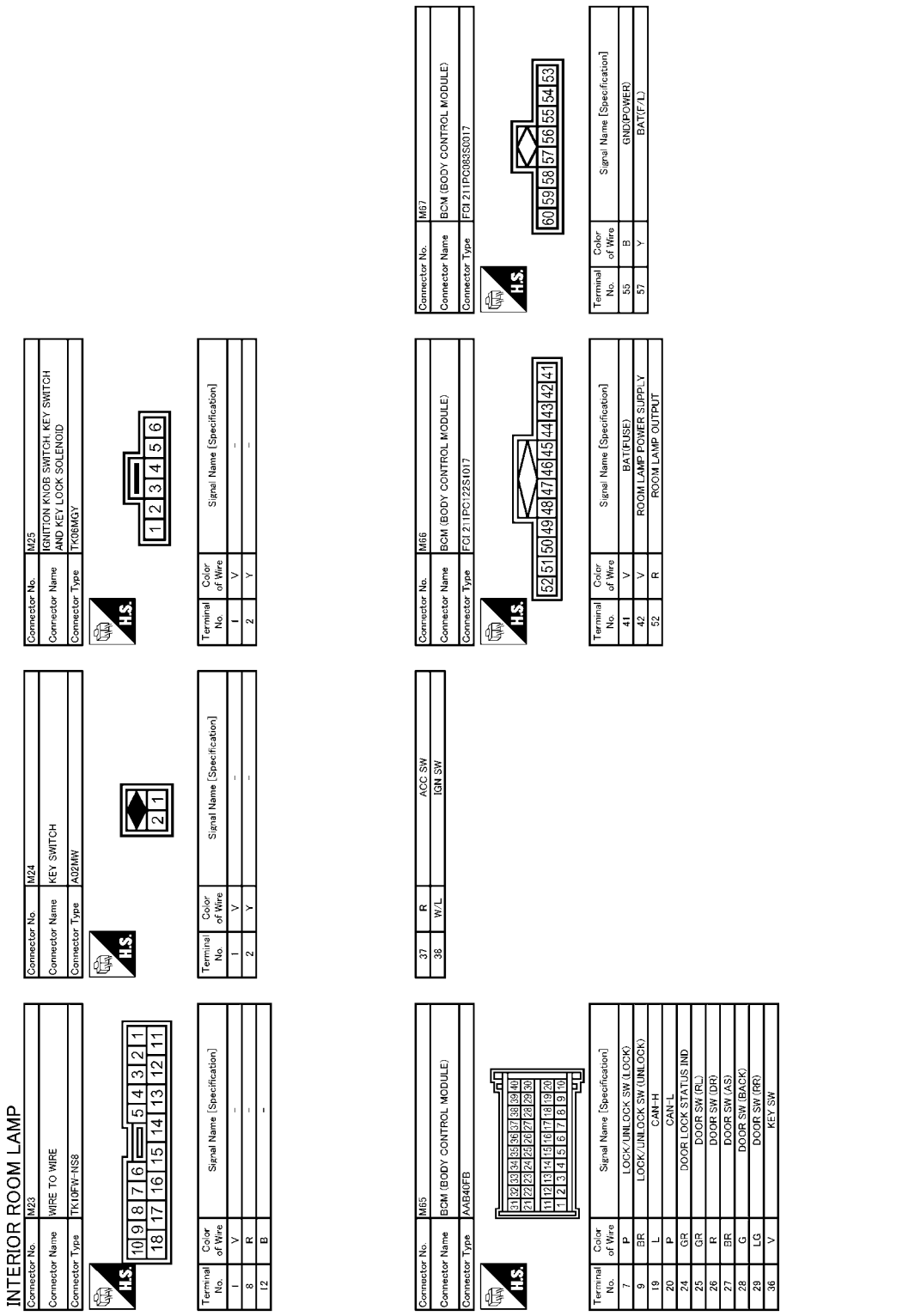
Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	R	–
8	V	–

JCLWA0380GB

carDiagn.com



JCLWA0381GB

cardiagn.com

INTERIOR ROOM LAMP

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M89
Connector Name	DOOR LOCK AND UNLOCK SWITCH
Connector Type	7703197674

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
4	GR	–
5	B	–
6	P	–

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
8	G	–[With glass top roof]
8	R	–[Without glass top roof]
12	B	–

Connector No.	R4
Connector Name	MAP LAMP
Connector Type	G&H 13423-601-501

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	–[With glass top roof]
2	R	–[Without glass top roof]
3	B	–
4	V	–

Connector No.	R7
Connector Name	PERSONAL LAMP LH
Connector Type	TK03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	V	–
3	G	–[With glass top roof]

Connector No.	R8
Connector Name	PERSONAL LAMP RH
Connector Type	TK03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	V	–
3	G	–[With glass top roof]

Connector No.	R9
Connector Name	VANITY MIRROR LAMP (DRIVER SIDE)
Connector Type	K02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	B	–

Connector No.	R10
Connector Name	VANITY MIRROR LAMP (PASSENGER SIDE)
Connector Type	K02FB

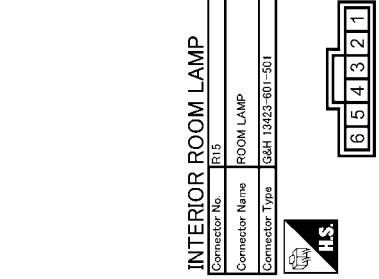
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	B	–

JCLWA0382GB

carDiagn.com

INTERIOR ROOM LAMP

Connector No.	R15
Connector Name	ROOM LAMP
Connector Type	G&H 13423-601-501



Terminal No.	Color of Wire	Signal Name [Specification]
2	R	-
3	B	-
4	V	-

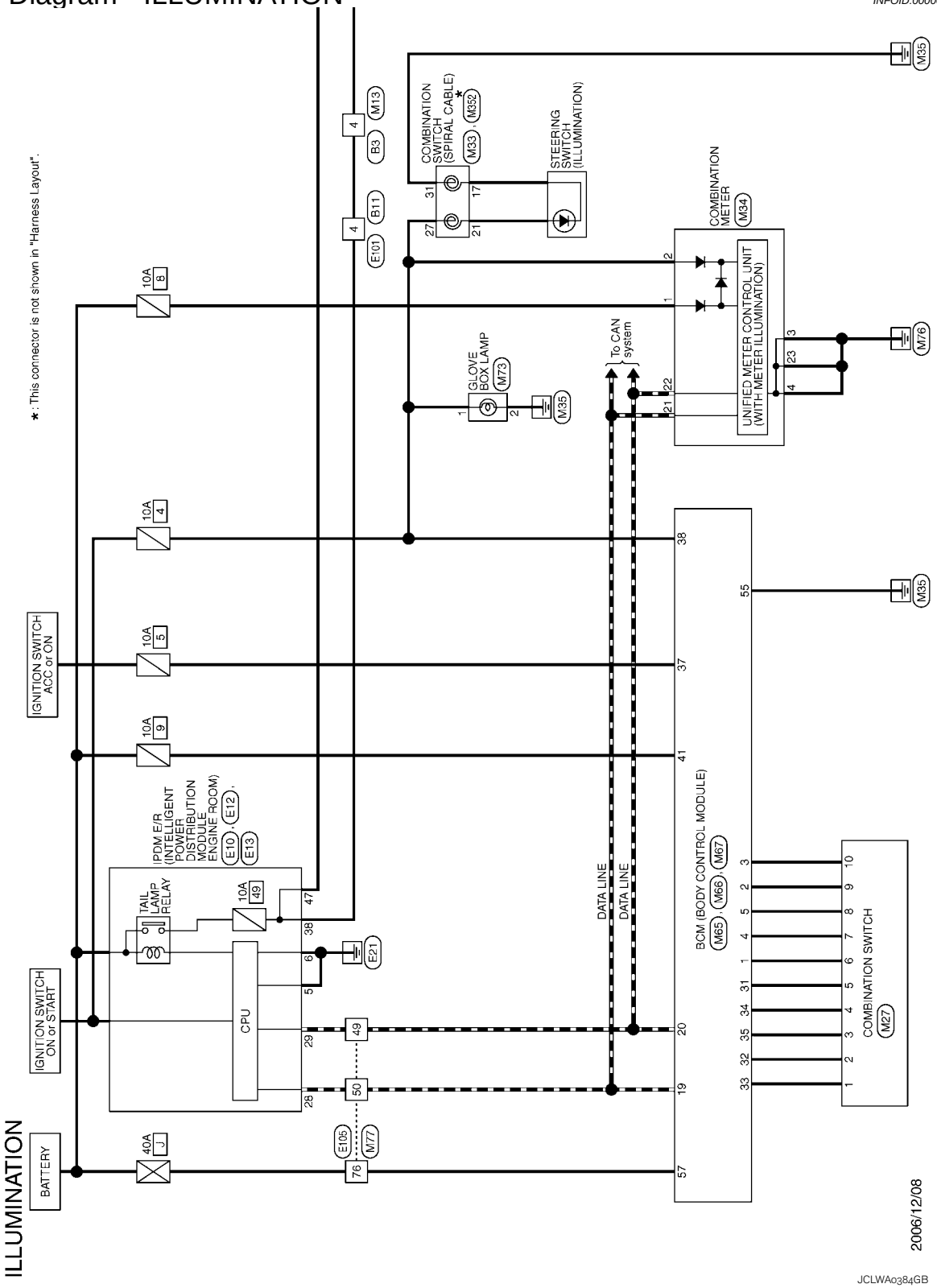
JCLWA0383GB

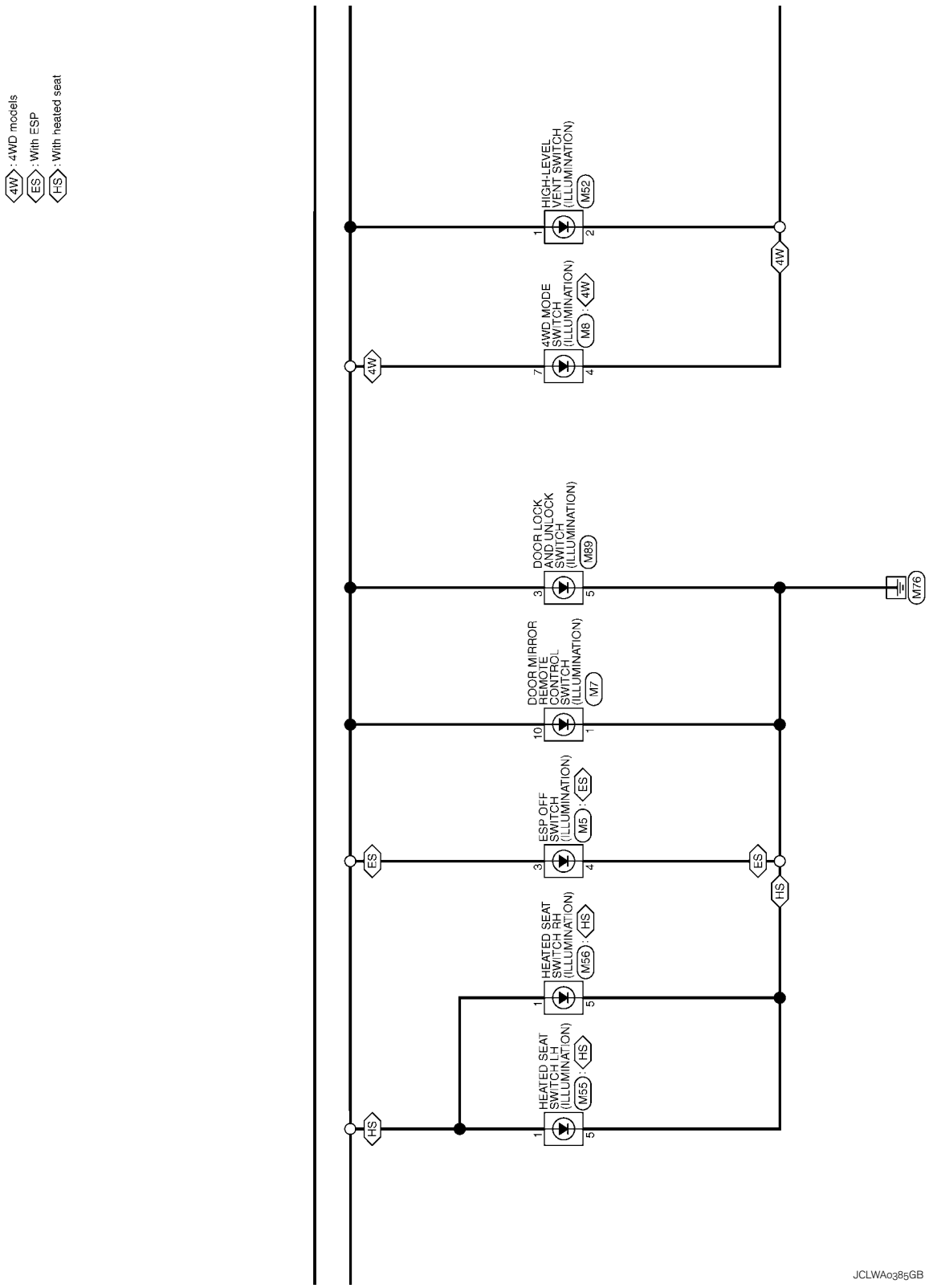
cardiagn.com

ILLUMINATION

Wiring Diagram - ILLUMINATION -

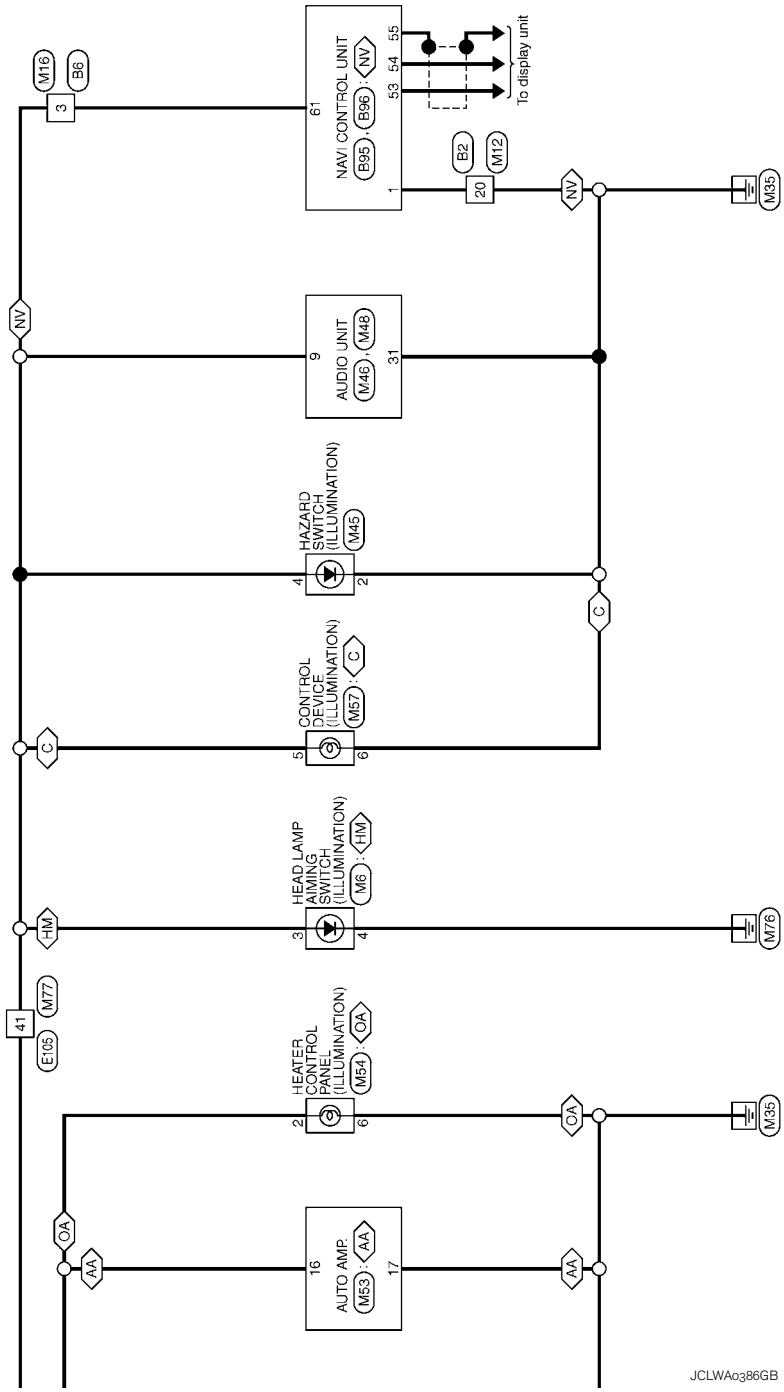
INFOID:0000000001033391



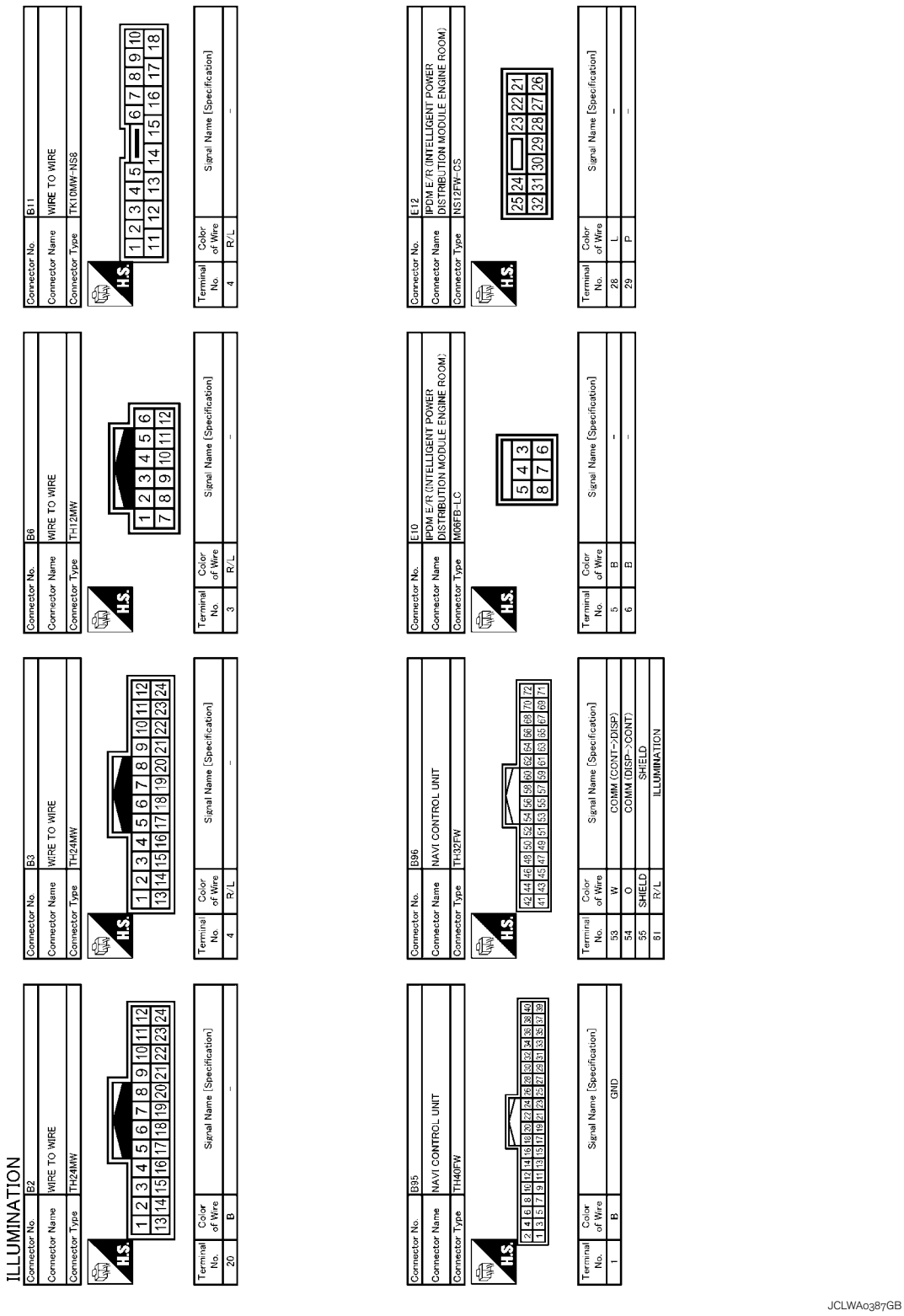


cardiagn.com

C : With CVT
AA : With auto A/C
OA : Without auto A/C
HM : With headlamp manual aiming
NV : With navigation system



carDiagn.com



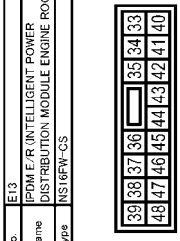
JCLWA0387GB

cardiagn.com

ILLUMINATION

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

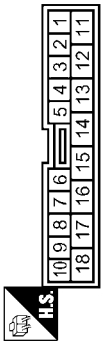
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
38	R/L	–
47	R/L	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

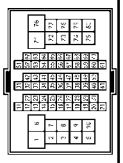
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
41	R/L	–
49	P	–
50	L	–
76	Y	–

Connector No.	M5
Connector Name	ESP OFF SWITCH
Connector Type	TK06FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	–
4	B	–

Connector No.	M6
Connector Name	HEADLAMP AIMING SWITCH
Connector Type	A04FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	–
4	B	–

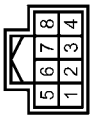
Connector No.	M7
Connector Name	DOOR MIRROR REMOTE CONTROL SWITCH
Connector Type	NS10FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
10	R	–

Connector No.	M8
Connector Name	4WD MODE SWITCH
Connector Type	TH08FW

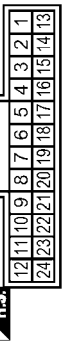
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
4	B	–
7	R	–

Connector No.	M12
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
20	B	–

JCLWA0388GB

carDiagn.com

ILLUMINATION

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
4	R	-

Connector No.	M16
Connector Name	WIRE TO WIRE
Connector Type	TH12FW

H.S.

6	5	4	3	2	1
12	11	10	9	8	7

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

H.S.

12	13	10	9	8	7
14	11	1	2	3	4	5	6

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

H.S.

24	25	26	27
31	32	33	34

Terminal No.	Color of Wire	Signal Name [Specification]
27	W/L	-
31	B	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
2	GR	IGN
3	B	GND
4	B	GND(ILLUM)
21	L	CAN-H
22	P	CAN-L
23	B	GND

Connector No.	M45
Connector Name	HAZARD SWITCH
Connector Type	CINCH REF 40309EV4M9 (WHITE)

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-
4	R	-

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH16FW-CS2

H.S.

1	2	3	4	5	6	7	8	9
19	10	11	12	13	14	15	16	17	18	20

Terminal No.	Color of Wire	Signal Name [Specification]
9	R	ILLUMINATION

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH12FW

H.S.

29	30	31	32	33	34
35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
31	O	TEL VOICE SIGNAL -[With navigation system]
31	B	CONTROL SIGNAL [Without navigation system]

JCLWA038gGB

cardiagn.com

ILLUMINATION

Connector No.	M52
Connector Name	HIGH-LEVEL VENT SWITCH
Connector Type	CINCH 49305EV4M5

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	B	–

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
16	R	ILL+
17	B	GND

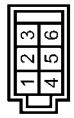
Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R	–
6	B	–

Connector No.	M55
Connector Name	HEATED SEAT SWITCH LH
Connector Type	MOLEX 98172-1005 (BROWN)

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
5	B	–

Connector No.	M56
Connector Name	HEATED SEAT SWITCH RH
Connector Type	MOLEX 98172-1002 (BLACK)

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
5	B	–

Connector No.	M57
Connector Name	CONTROL DEVICE
Connector Type	TH16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	R	–
6	B	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
37	R	ACC SW
38	W/L	IGN SW

JCLWA0390GB

carDiagn.com

ILLUMINATION

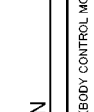
Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M89
Connector Name	DOOR LOCK AND UNLOCK SWITCH
Connector Type	7703197674

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-
5	B	-

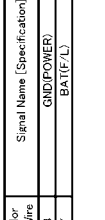
Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M352
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08MGY-X

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
17	-	-
21	-	-

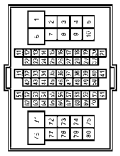
Connector No.	M73
Connector Name	GLOVE BOX LAMP
Connector Type	WBS-1006N

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
41	R	-
49	P	-
50	L	-
76	Y	-

JCLWA0391GB

cardiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001116336

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

cardiagn.com

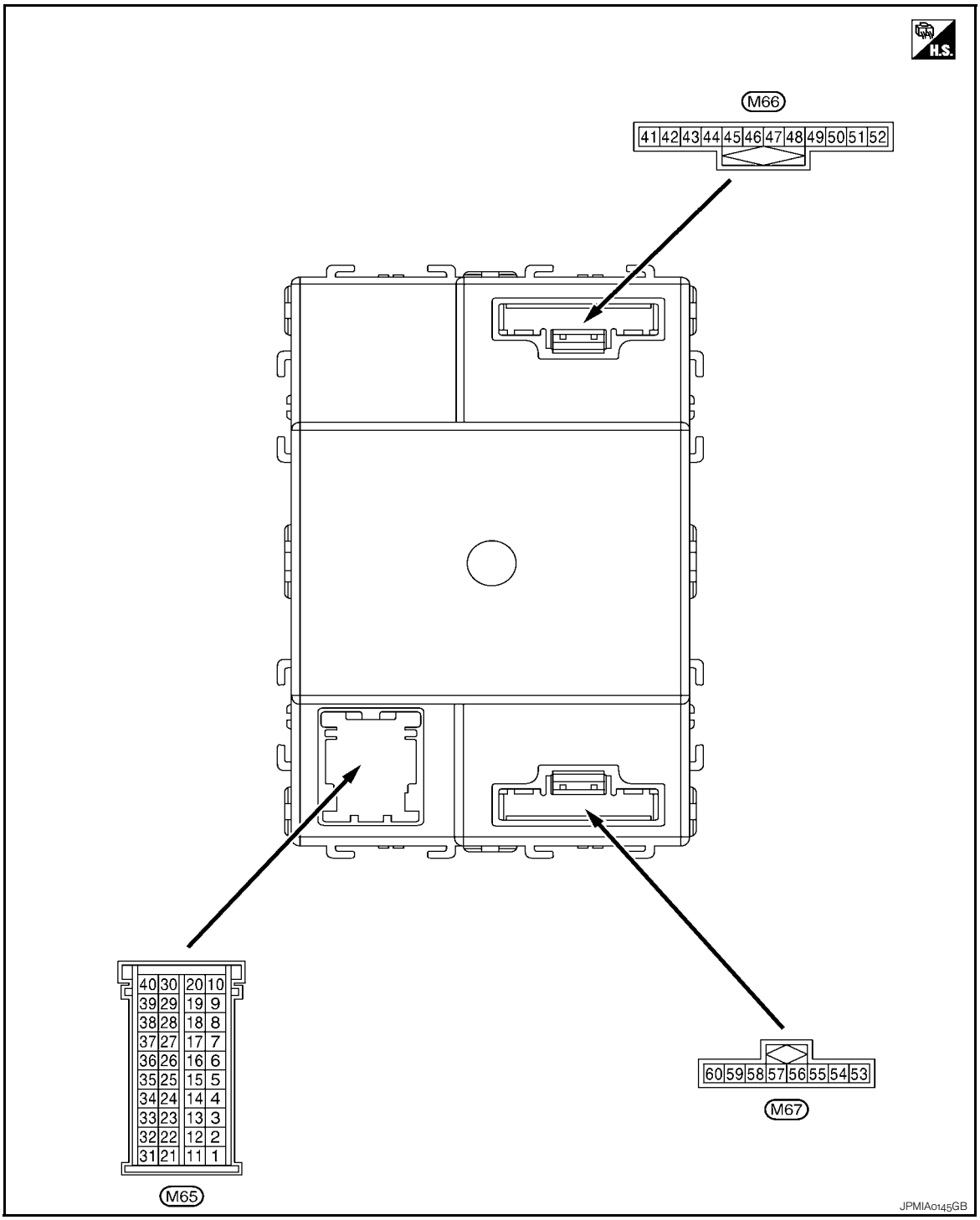
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

carDiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

cardiagn.com

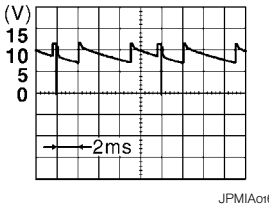
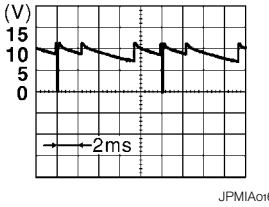
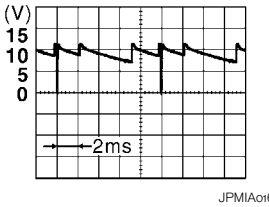
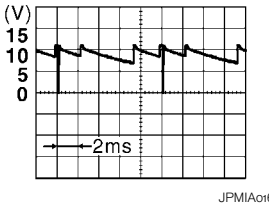
TERMINAL LAYOUT



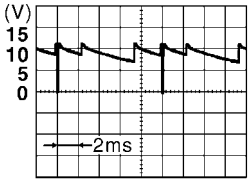
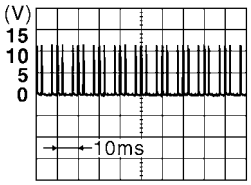
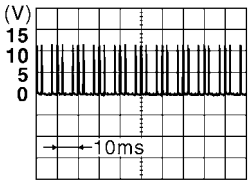
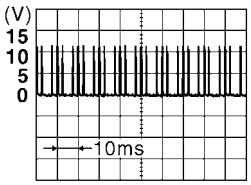
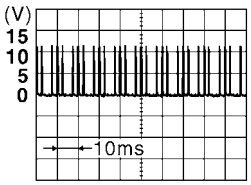
PHYSICAL VALUES

CAUTION:

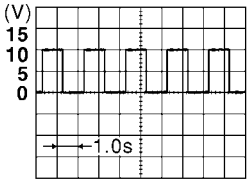
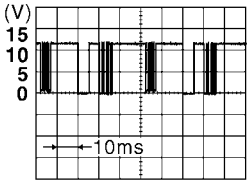
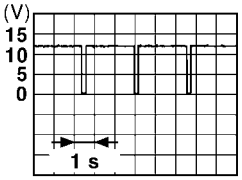
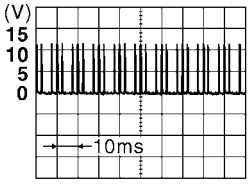
- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

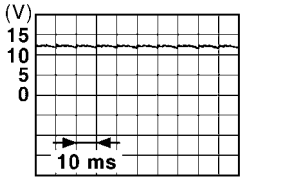
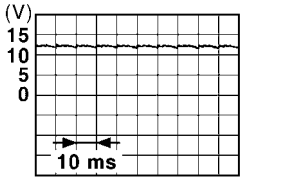
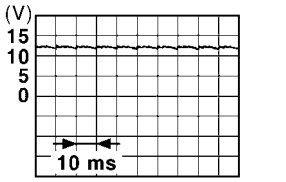
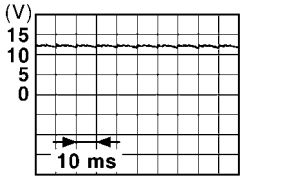
cardiagn.com

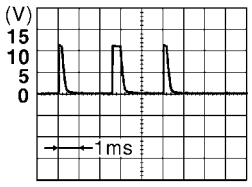
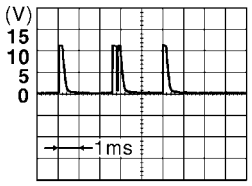
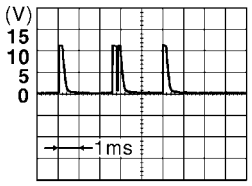
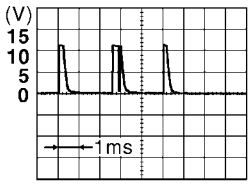
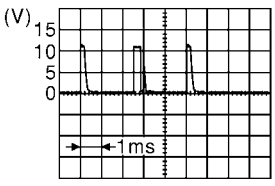
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

carDiagn.com

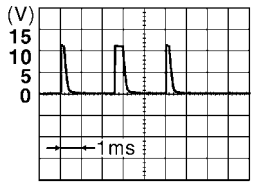
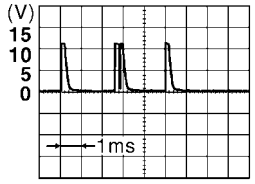
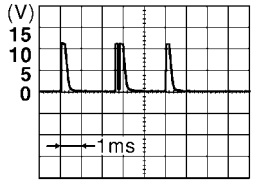
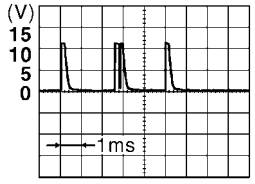
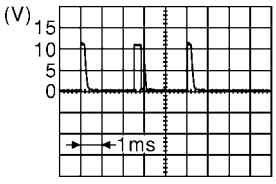
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

cardiagn.com

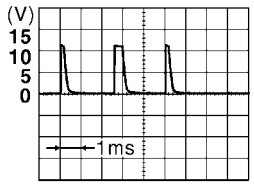
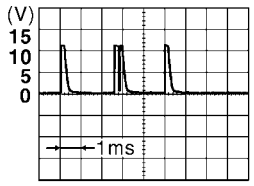
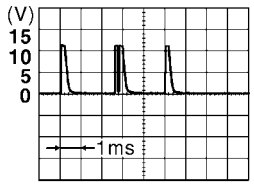
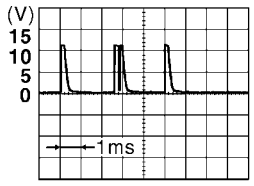
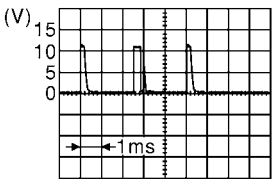
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIB0924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIB0924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIB0924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIB0924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

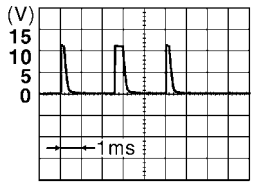
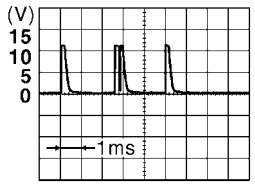
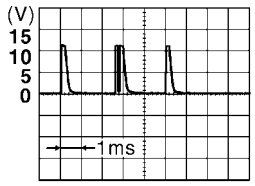
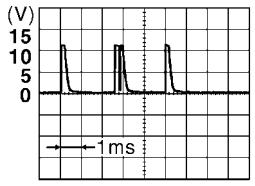
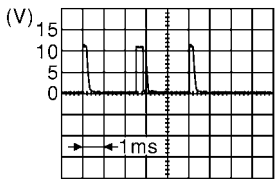
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

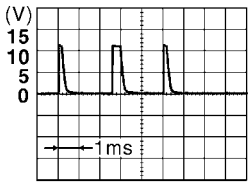
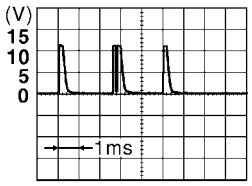
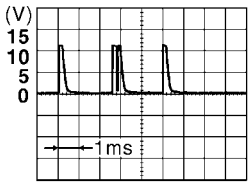
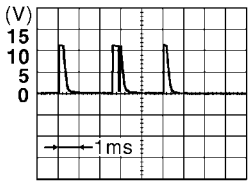
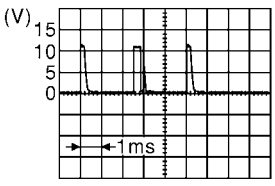
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

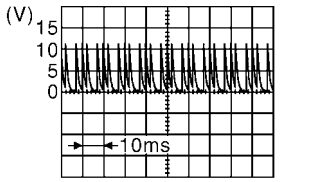
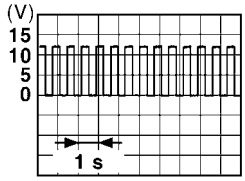
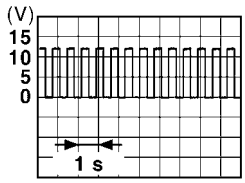
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

carDiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

carDiag.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

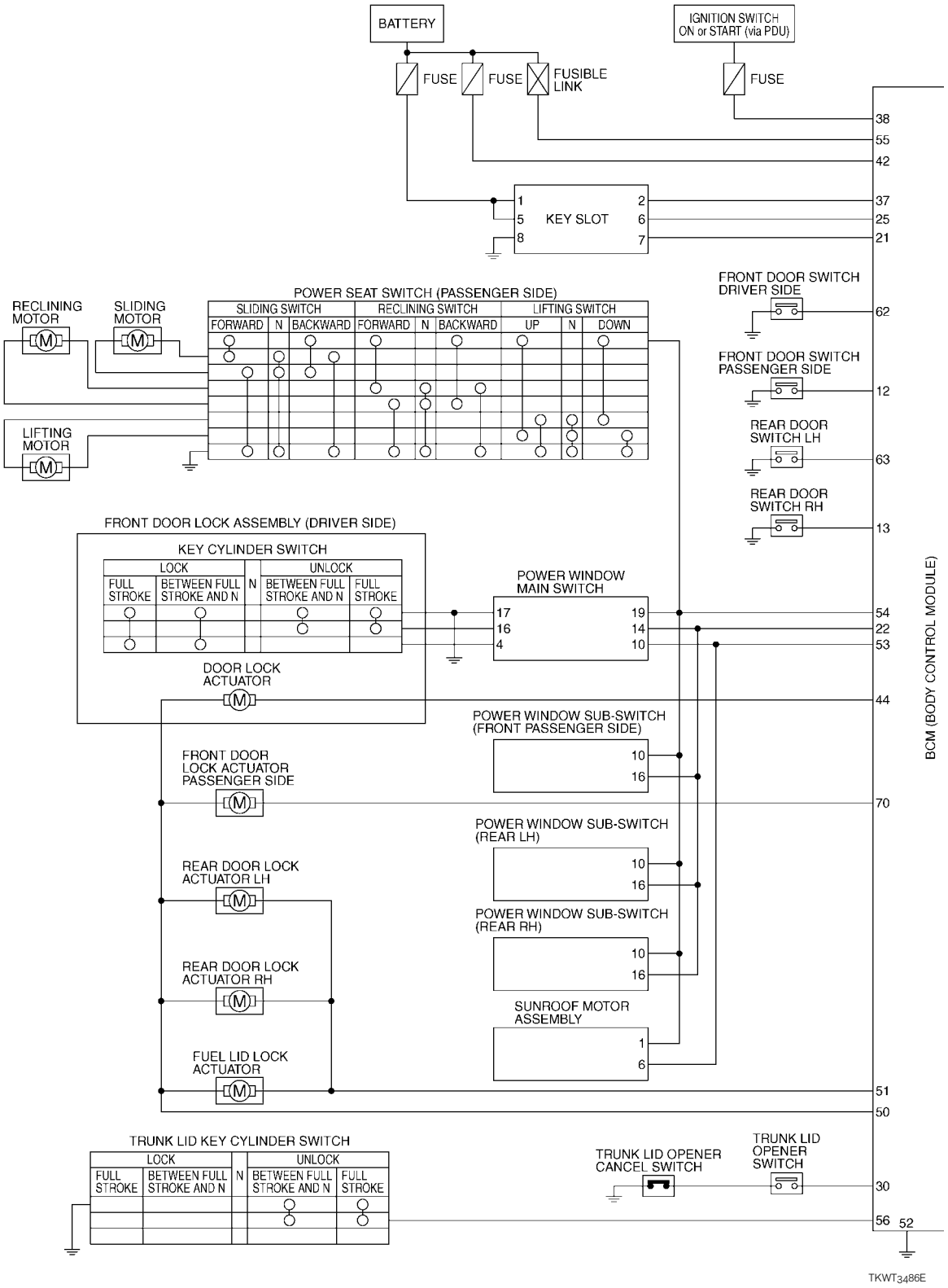
*1: With Intelligent Key system

*2: Without Intelligent Key system

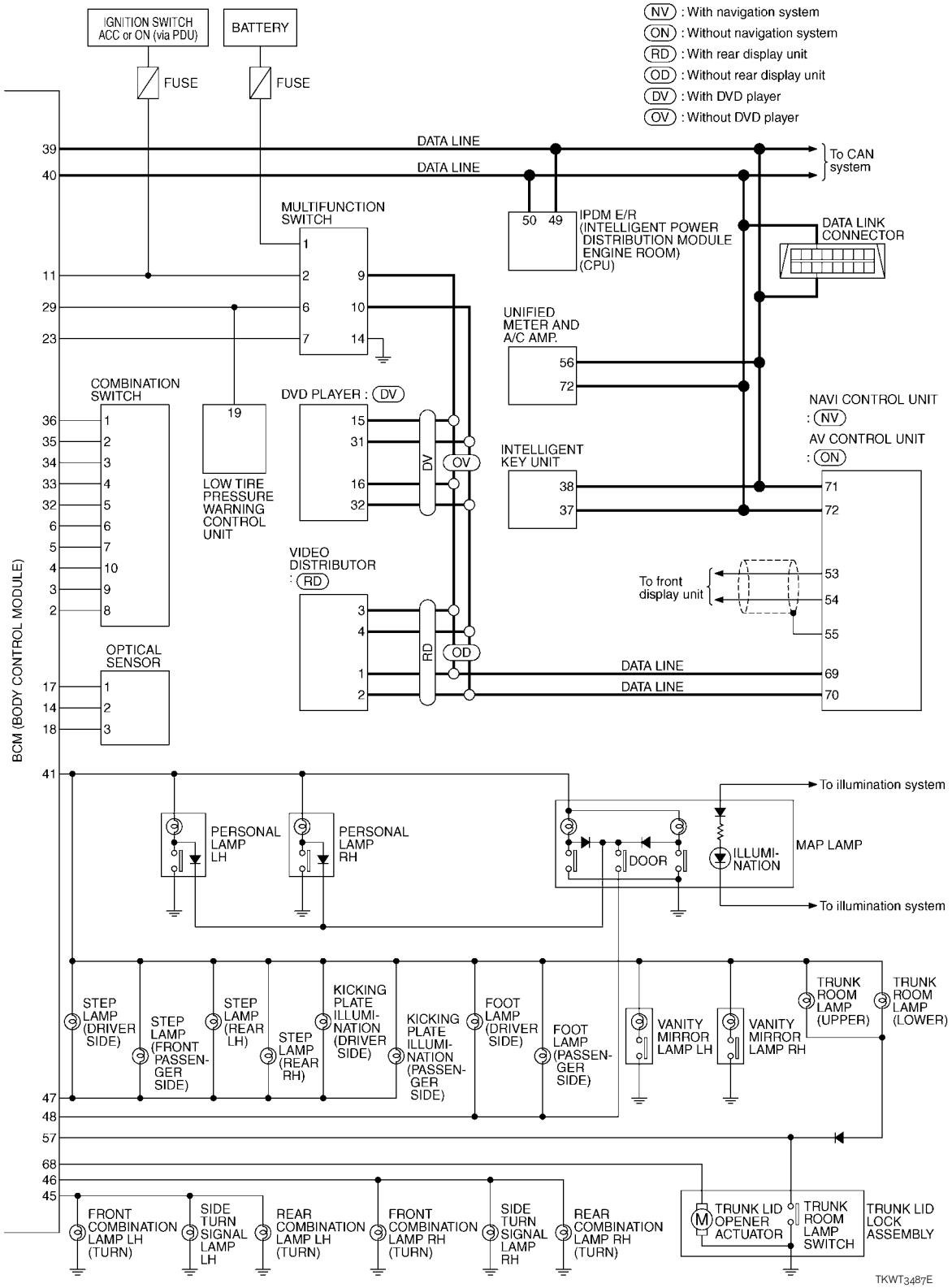
cardiagn.com

Wiring Diagram - BCM -

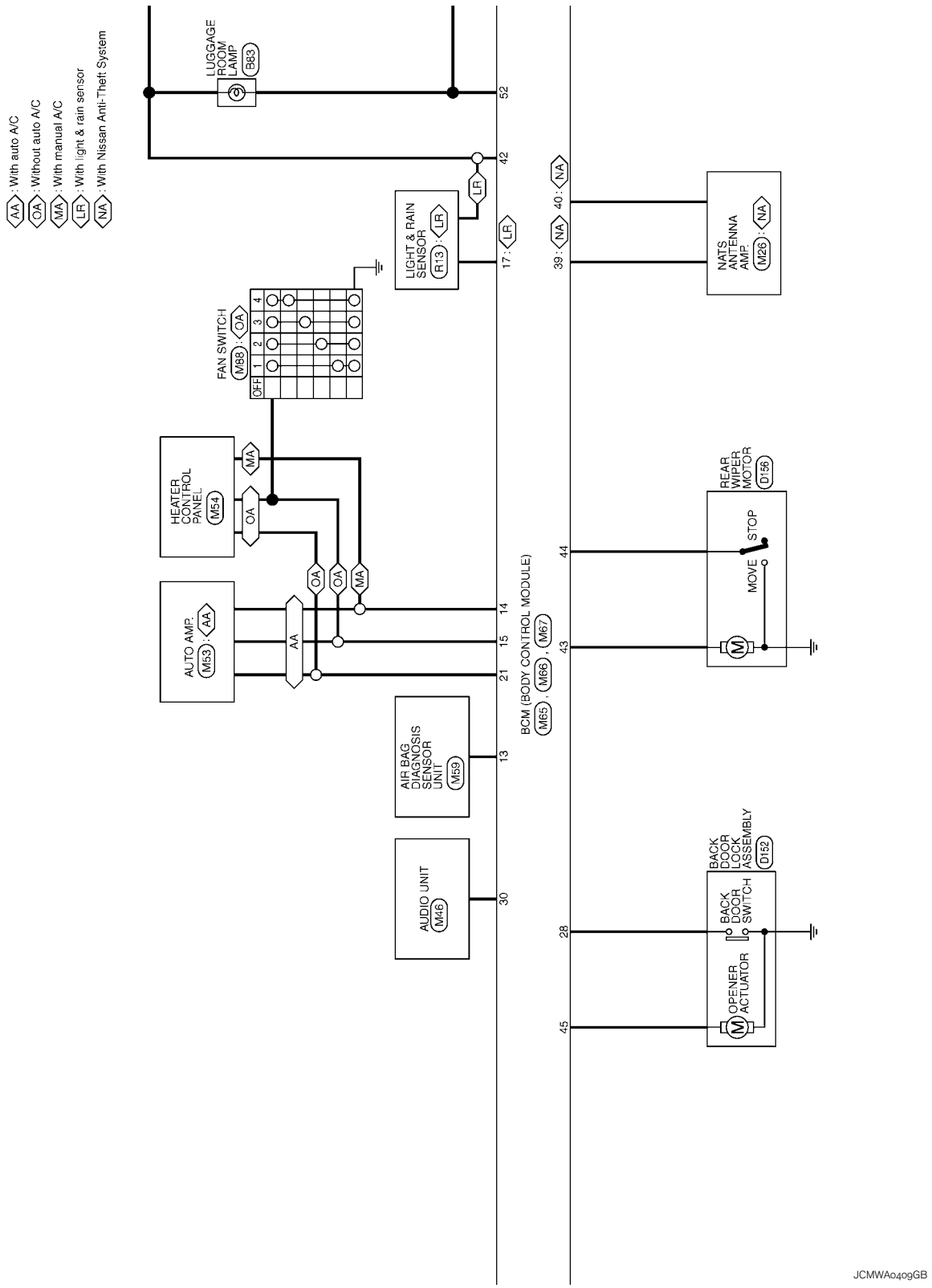
INFOID:0000000001116337



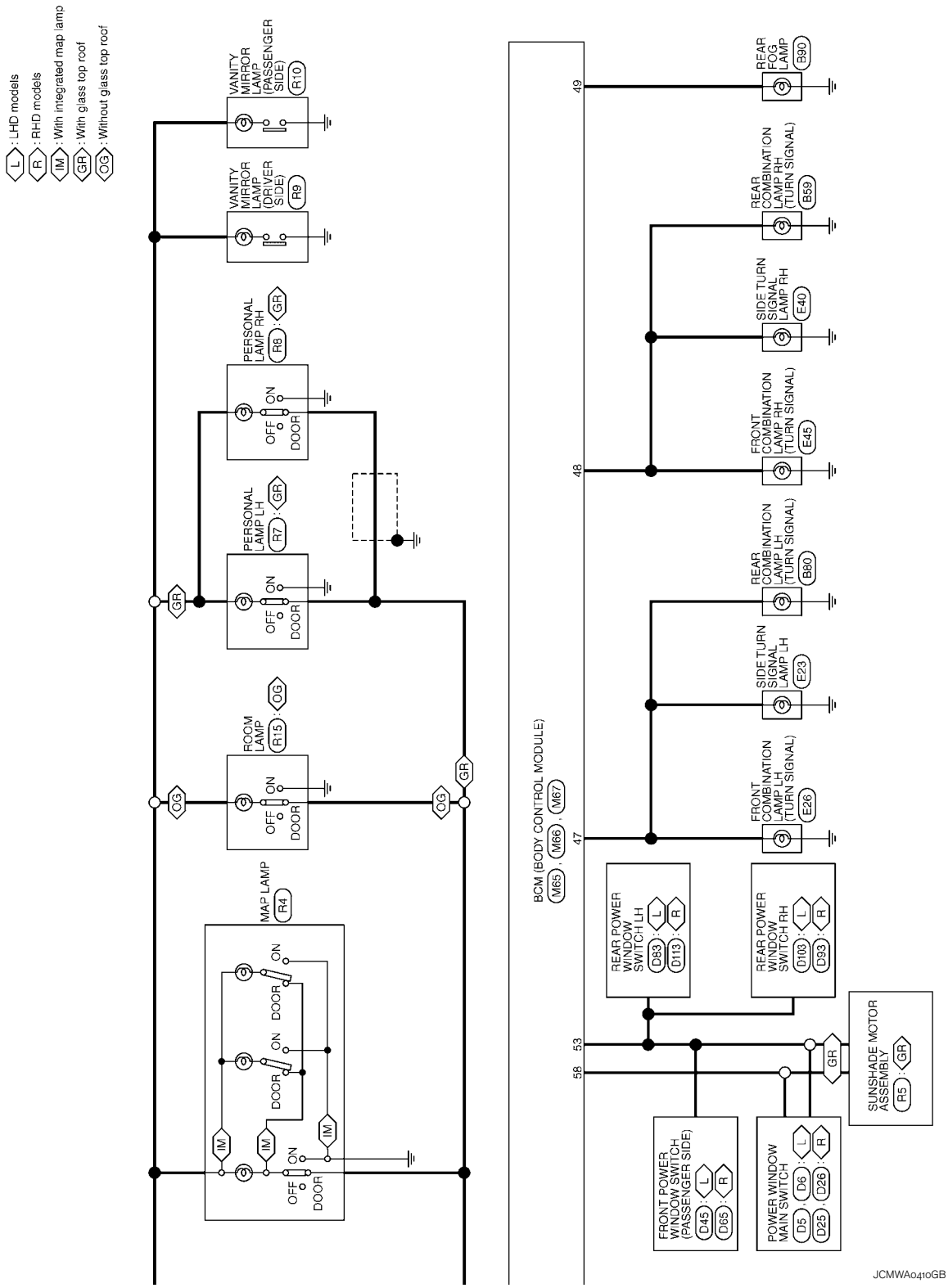
carDiagn.com



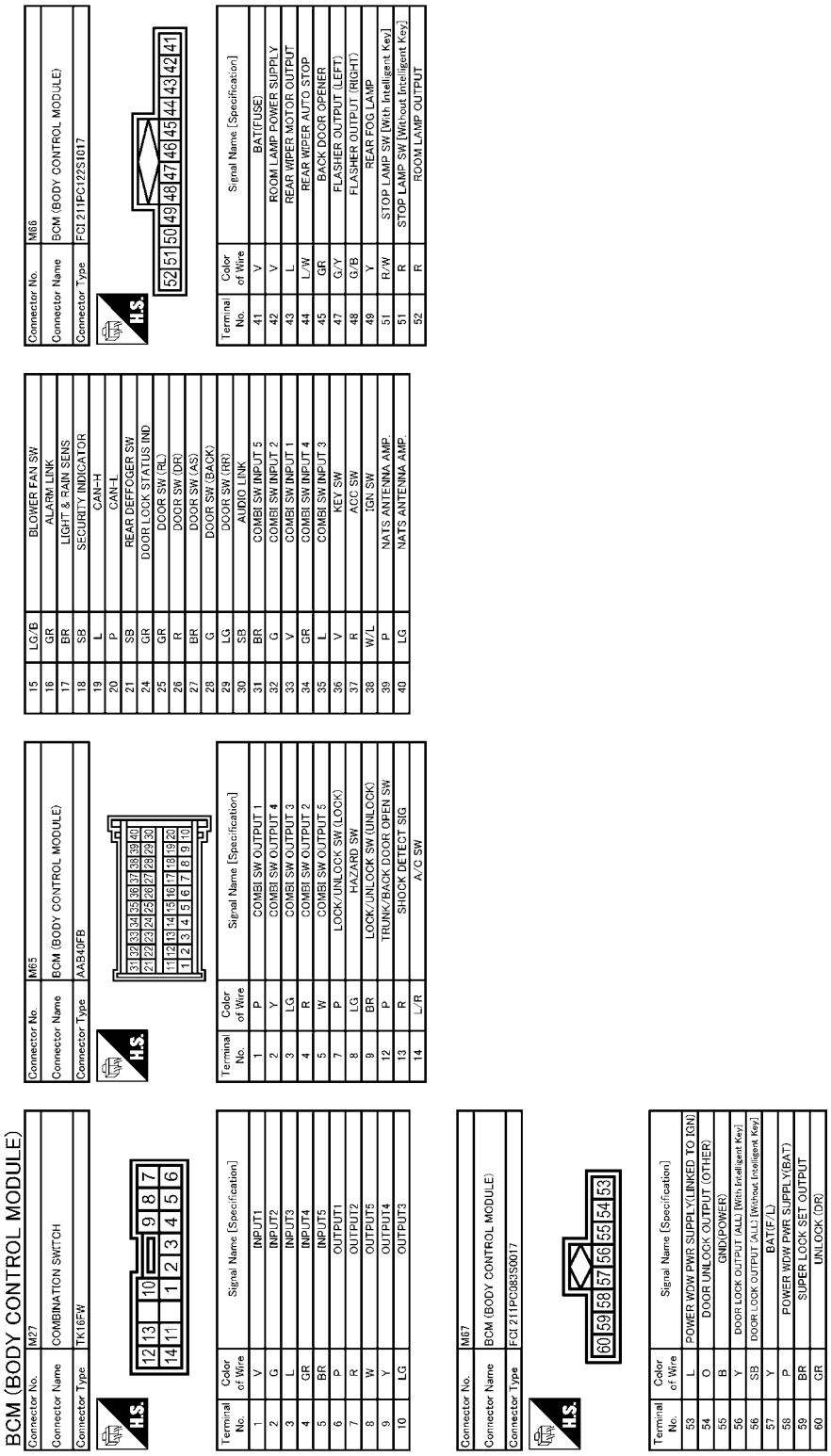
cardiagn.com



cardiagn.com



cardiagn.com



JCMWA0411GB

Fail Safe

INFOID:0000000001116338

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001116339

cardiagn.com

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001116340

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

SYMPTOM DIAGNOSIS

INTERIOR LIGHTING SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000001033401

CAUTION:
Perform the self-diagnosis with CONSULT-III before the symptom diagnosis. Perform the trouble diagnosis if any DTC is detected.

Symptom	Possible cause	Inspection item
All the following lamps do not turn ON. • Map lamp • Room lamp • Personal lamp • Luggage room lamp • Vanity mirror lamp	• Harness between BCM and each interior room lamp • BCM	Interior room lamp power supply circuit Refer to INL-20.
• Interior room lamp does not turn ON even though the door is open. (It turns ON when turning the interior room lamp ON.) • Interior room lamp does not turn OFF even though the door is closed.	• Harness between BCM and each door switch • Harness between BCM and each interior room lamp • BCM	Door switch circuit Refer to the following. WITH I-KEY, WITHOUT SUPER LOCK • Driver side: DLK-83 • Passenger side: DLK-84 • Rear LH: DLK-86 • Rear RH: DLK-87 • Back door: DLK-89 WITH I-KEY & SUPER LOCK • Driver side: DLK-347 • Passenger side: DLK-348 • Rear LH: DLK-350 • Rear RH: DLK-351 • Back door: DLK-353 WITHOUT I-KEY & SUPER LOCK • Driver side: DLK-589 • Passenger side: DLK-590 • Rear LH: DLK-592 • Rear RH: DLK-593 • Back door: DLK-595 WITHOUT I-KEY, WITH SUPER LOCK • Driver side: DLK-749 • Passenger side: DLK-750 • Rear LH: DLK-752 • Rear RH: DLK-753 • Back door: DLK-755
		Interior room lamp control circuit Refer to INL-22.
Interior room lamp timer does not activate. (It turns ON/ OFF when the door opens/closes.)	—	Check the interior room lamp setting. Refer to INL-15.
Interior room lamp battery saver does not activate.	—	Check the interior room lamp battery saver setting. Refer to INL-17.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001078350

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

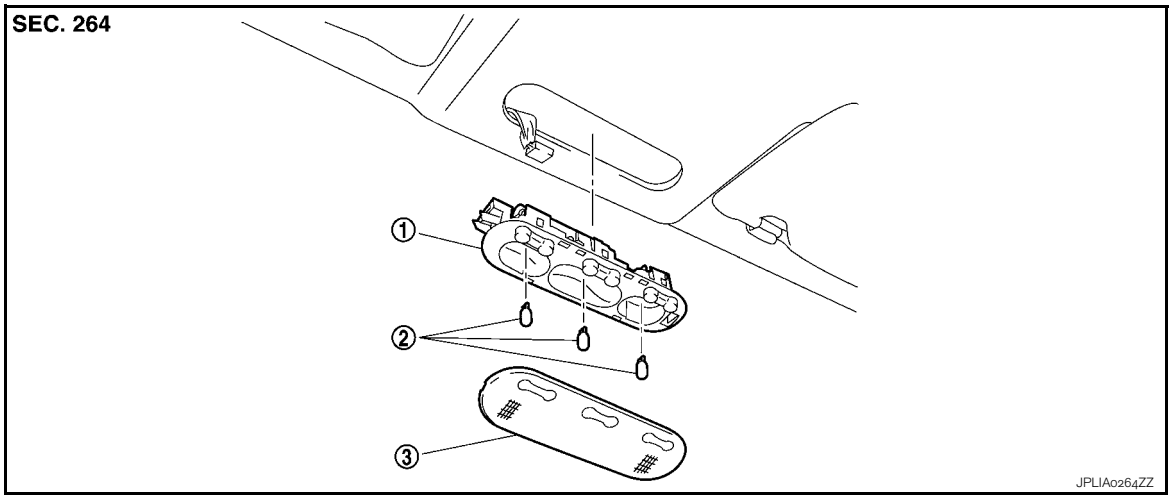
cardiagn.com

ON-VEHICLE REPAIR

MAP LAMP

Exploded View

INFOID:0000000001033403



1. Map lamp bulb housing
2. Bulb
3. Lens

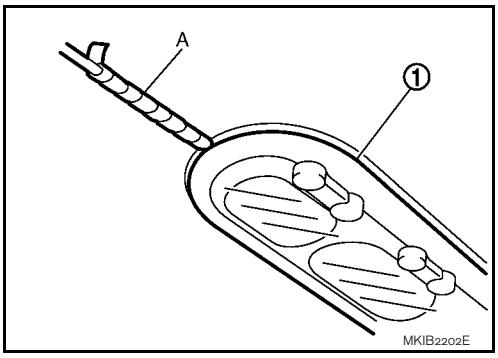
Removal and Installation

INFOID:0000000001080056

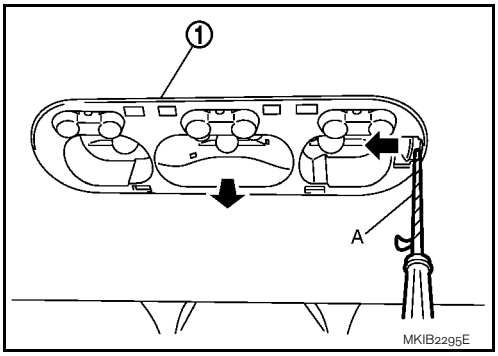
CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. Insert any appropriate tool (A) into the gap between the lens (1) and then remove the lens.



2. Press the pawl to the arrow direction (⬅) with any appropriate tool (A). And then pull the map lamp bulb housing (1) to the arrow direction (⬅).
3. Disconnect the connector, and remove the map lamp bulb housing.



INSTALLATION
Install in the reverse order of removal.

cardiagn.com

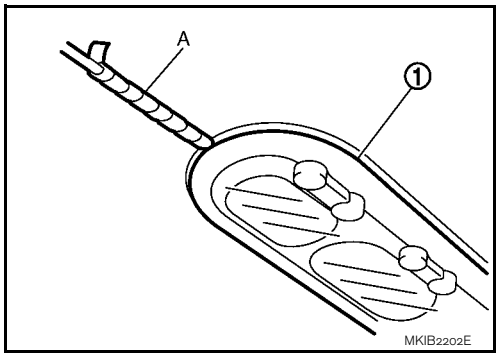
Replacement

INFOID:0000000001033405

CAUTION:
Disconnect the battery negative terminal or the fuse.

MAP LAMP BULB

1. Insert any appropriate tool (A) into the gap between the lens (1) and then remove the lens.
2. Remove the bulb.

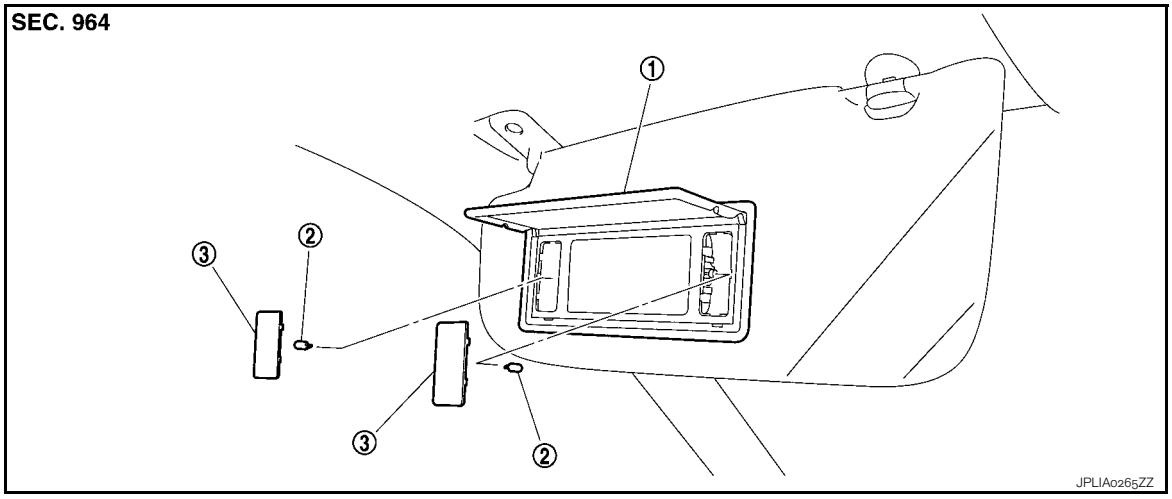


cardiagn.com

VANITY MIRROR LAMP

Exploded View

INFOID:0000000001033406



1. Vanity mirror assembly
2. Bulb
3. Lens

Replacement

INFOID:0000000001033407

CAUTION:
Disconnect the battery negative terminal or the fuse.

VANITY MIRROR LAMP BULB

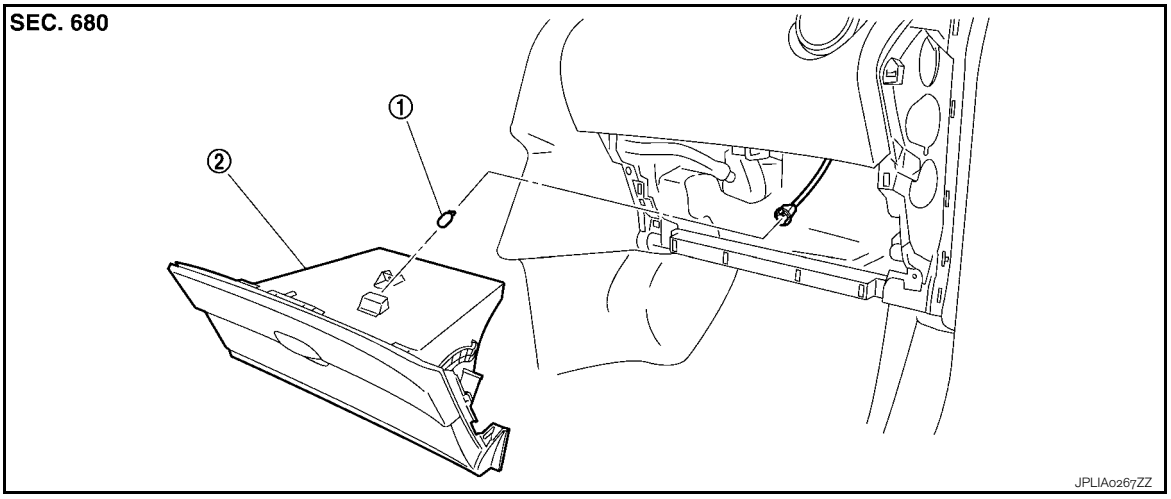
1. Insert any appropriate tool into the gap between the lens. Remove the lens.
2. Remove the bulb.

cardiagn.com

GLOVE BOX LAMP

Exploded View

INFOID:0000000001033410



1. Bulb
2. Glove box

Replacement

INFOID:0000000001033411

CAUTION:
Disconnect the battery negative terminal or the fuse.

GLOVE BOX LAMP BULB

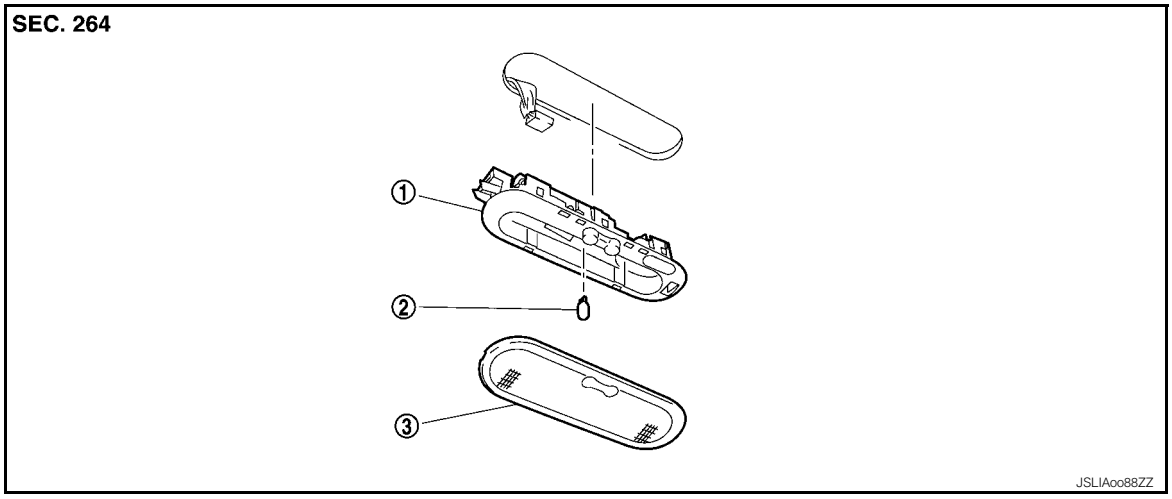
1. Remove the glove box assembly. Refer to IP-11, "Exploded View".
2. Rotate the bulb socket counterclockwise and unlock it.
3. Remove the bulb.

cardiagn.com

ROOM LAMP

Exploded View

INFOID:0000000001080084



1. Room lamp bulb housing
2. Bulb
3. Lens

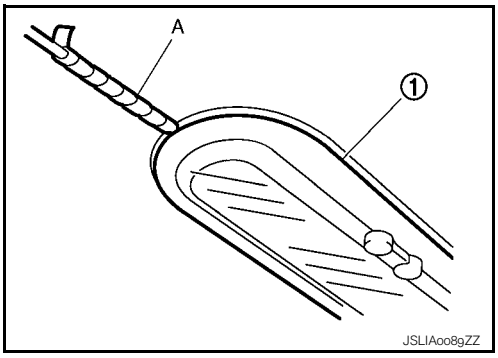
Removal and Installation

INFOID:0000000001080085

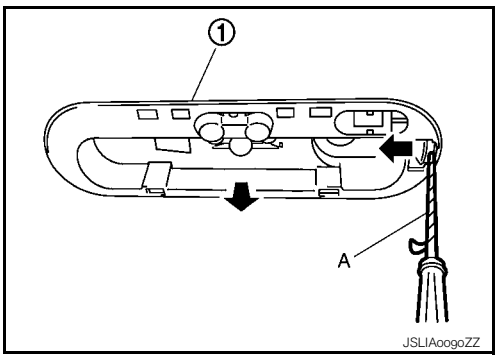
CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. Insert any appropriate tool (A) into the gap between the lens (1) and then remove the lens.



2. Press the pawl to the arrow direction (⬅) with any appropriate tool (A). And then pull the room lamp bulb housing (1) to the arrow direction (⬅).
3. Disconnect the connector, and remove the room lamp bulb housing.



INSTALLATION

Install in the reverse order of removal.

Replacement

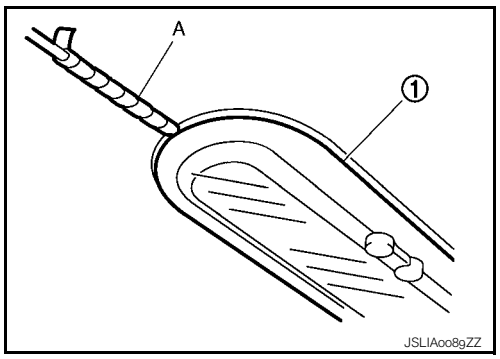
INFOID:0000000001080086

cardiagn.com

CAUTION:
Disconnect the battery negative terminal or the fuse.

ROOM LAMP BULB

1. Insert any appropriate tool (A) into the gap between the lens (1) and then remove the lens.
2. Remove the bulb.

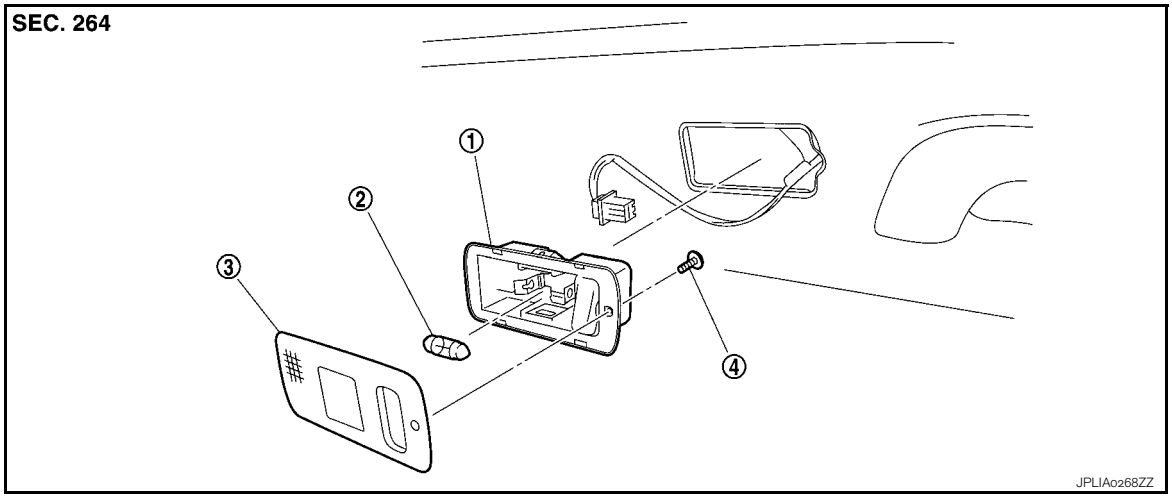


carDiagn.com

PERSONAL LAMP

Exploded View

INFOID:0000000001033415



1. Personal lamp housing
2. Bulb
3. Lens
4. Screw

Removal and Installation

INFOID:0000000001033416

CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. Insert any appropriate tool into the gap between the personal lamp. Remove the personal lamp.
2. Disconnect the connector.

INSTALLATION

Install in the reverse order of removal.

Replacement

INFOID:0000000001033417

CAUTION:
Disconnect the battery negative terminal or the fuse.

PERSONAL LAMP BULB

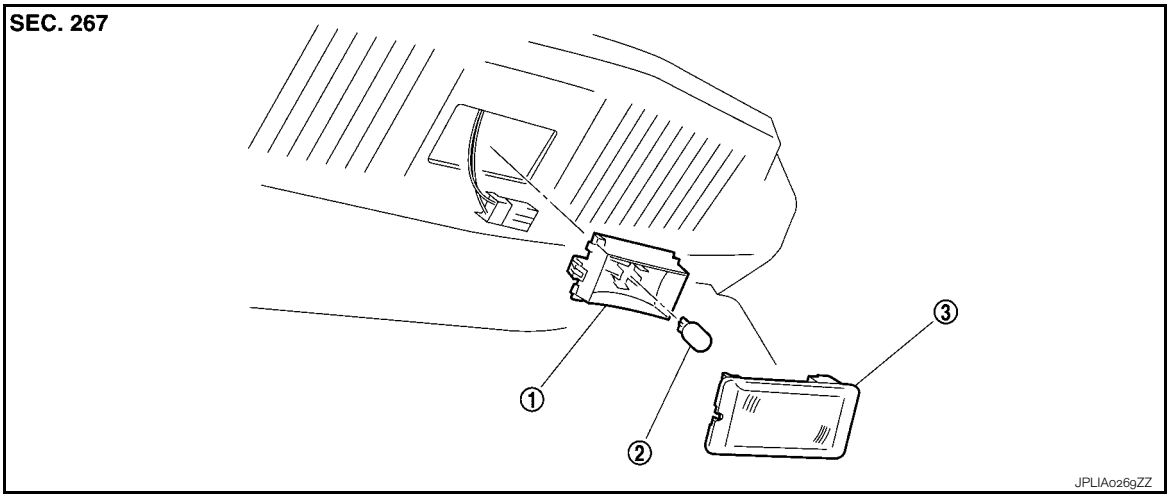
1. Remove the personal lamp.
2. Remove the screw, and remove the lens.
3. Remove the bulb.

cardiagn.com

LUGGAGE ROOM LAMP

Exploded View

INFOID:0000000001033418



1. Luggage room lamp housing
2. Bulb
3. Lens

Removal and Installation

INFOID:0000000001033419

CAUTION:
Disconnect the battery negative terminal or the fuse.

REMOVAL

1. Insert any appropriate tool into the gap between the luggage room lamp. Remove the luggage room lamp.
2. Disconnect the connector.

INSTALLATION

Install in the reverse order of removal.

Replacement

INFOID:0000000001033420

CAUTION:
Disconnect the battery negative terminal or the fuse.

LUGGAGE ROOM LAMP BULB

1. Remove the luggage room lamp.
2. Insert any appropriate tool into the gap between the lens. Remove the lens.
3. Remove the bulb.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Bulb Specifications

INFOID:0000000001033421

Item	Type	Wattage (W)
Map lamp	Wedge	5
Vanity mirror lamp	Wedge	1.2
Glove box lamp	Wedge	5
Room lamp (Without glass top roof)	Wedge	5
Personal lamp (With glass top roof)	—	8
Luggage room lamp	Wedge	8

cardiagn.com

SECTION INT
INTERIOR

CONTENTS

SYMPTOM DIAGNOSIS 2

SQUEAK AND RATTLE TROUBLE DIAGNOSES 2
- Work Flow 2
- Inspection Procedure 4
- Diagnostic Worksheet 6

PRECAUTION 8

PRECAUTIONS 8
- Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 8
- Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 8
- Precaution for Work 8

PREPARATION 9

PREPARATION 9
- Commercial Service Tools 9

ON-VEHICLE REPAIR 10

DOOR FINISHER 10

FRONT DOOR FINISHER 10
- FRONT DOOR FINISHER : Exploded View 10
- FRONT DOOR FINISHER : Removal and Installation 10

REAR DOOR FINISHER 12
- REAR DOOR FINISHER : Exploded View 12
- REAR DOOR FINISHER : Removal and Installation 13

BODY SIDE TRIM 14
- Exploded View 14
- Removal and Installation 14

FLOOR TRIM 18
- Exploded View 18
- Removal and Installation 18

HEADLINING 20
- Exploded View 20
- Removal and Installation 21

LUGGAGE FLOOR TRIM 24
- Exploded View 24
- Removal and Installation 24

BACK DOOR TRIM 26
- Exploded View 26
- Removal and Installation 26

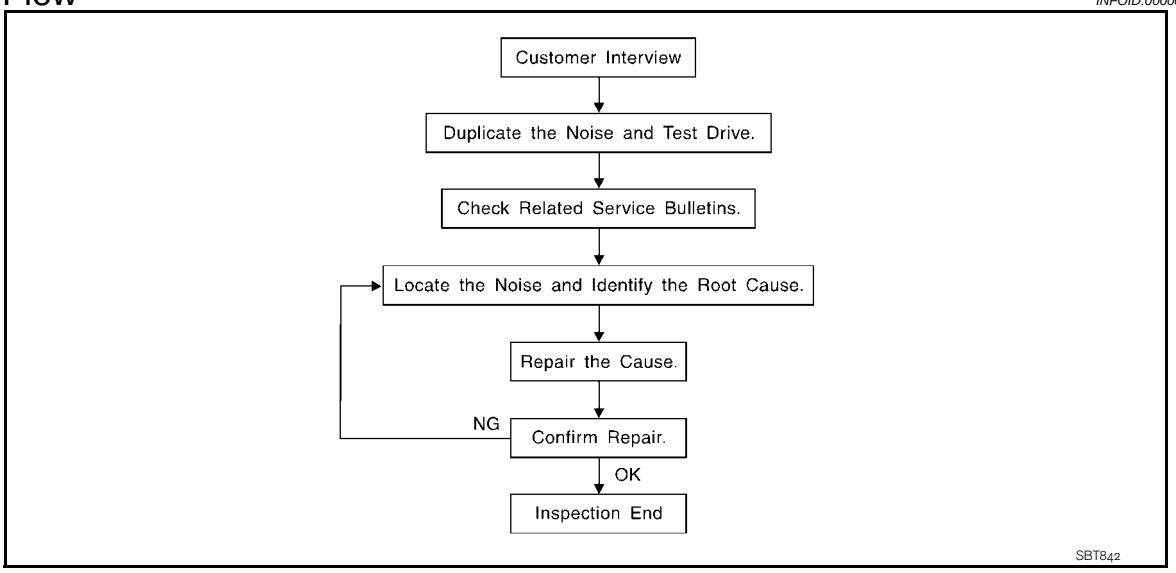
carmanualsonline.info

SYMPTOM DIAGNOSIS

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000001109191



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to INT-6, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

cardiagn.com

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:
1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to INT-4, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.

carsign.com

- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001109192

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

cardiagn.com

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

carsign.com

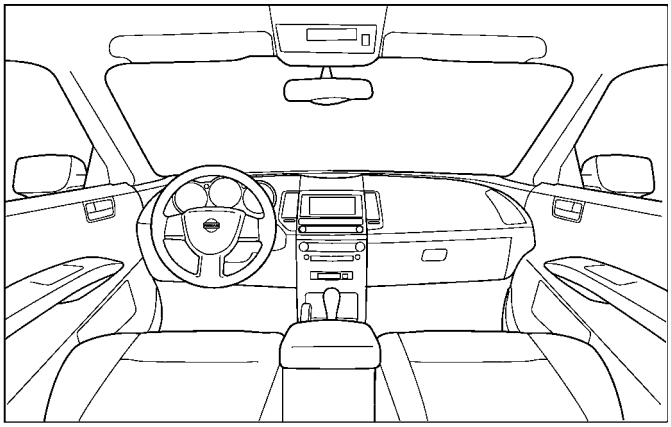
Diagnostic Worksheet

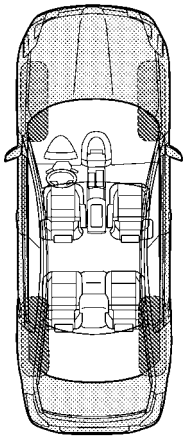
INFOID:0000000001082280

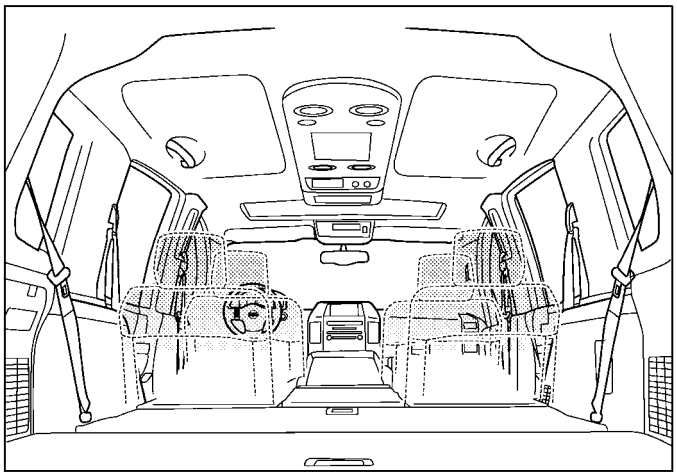
SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

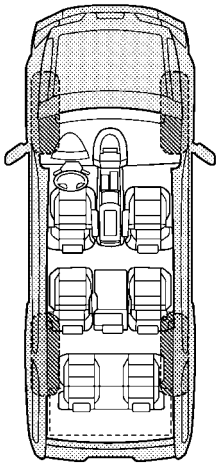
Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.









Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

cardiagn.com

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001096528

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001096529

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Work

INFOID:0000000001083078

- After removing and installing the opening/closing parts, be sure to carry out fitting adjustments to check their operation.
- Check the lubrication level, damage, and wear of each part. If necessary, grease or replace it.

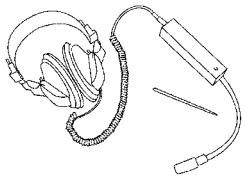
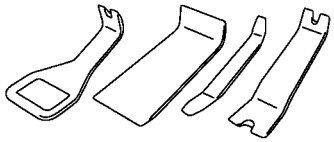
cardiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000001082289

Tool name	Description
Engine ear  SIIA0995E	Location the noise
Remover tool  PIIB7923J	Remove the clips, pawls and metal clips

carmanualsonline.com

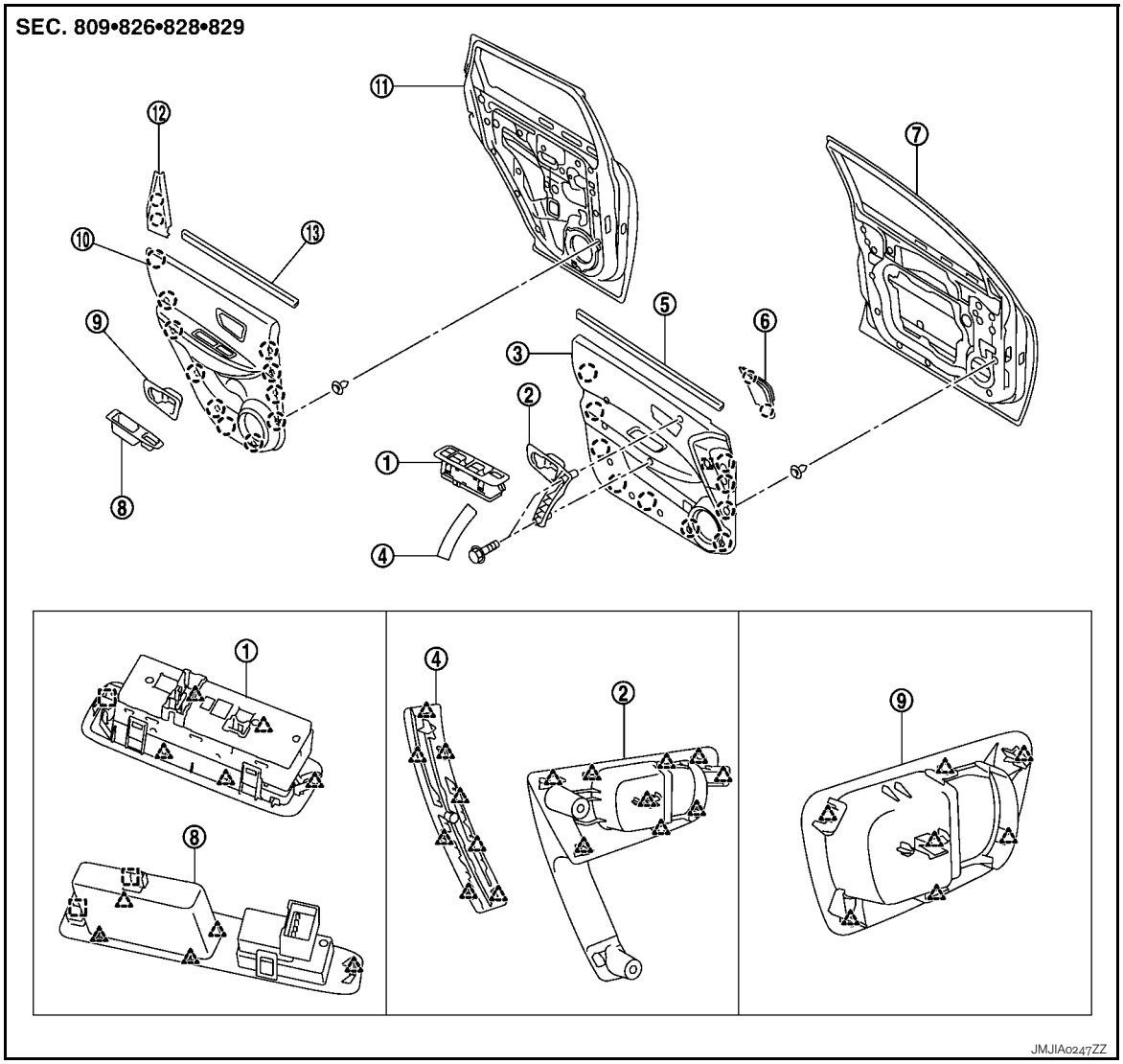
ON-VEHICLE REPAIR

DOOR FINISHER

FRONT DOOR FINISHER

FRONT DOOR FINISHER : Exploded View

INFOID:0000000000892098



1. Power window switch front (Driver)
2. Front door grip
3. Front door finisher (LH)
4. Cap-Front door grip (LH)
5. Seal assembly front door inside (LH)
6. Cover front door inner (LH)
7. Front door panel
8. Power window switch rear (LH)
9. Inside handle escutcheon (rear LH)
10. Rear door finisher (LH)
11. Rear door panel
12. Cover rear door inner (LH)
13. Seal assembly rear door inside (LH)

: Clip

: Pawl

: Metal clip

FRONT DOOR FINISHER : Removal and Installation

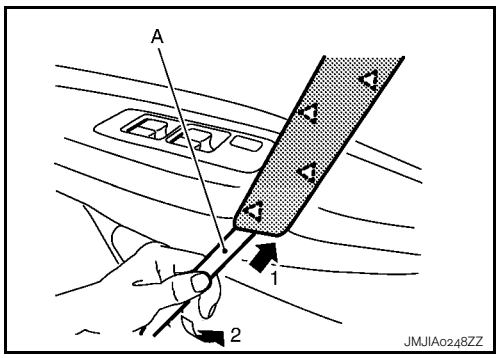
INFOID:0000000000892099

REMOVAL

1. Fully open door window.

cardiagn.com

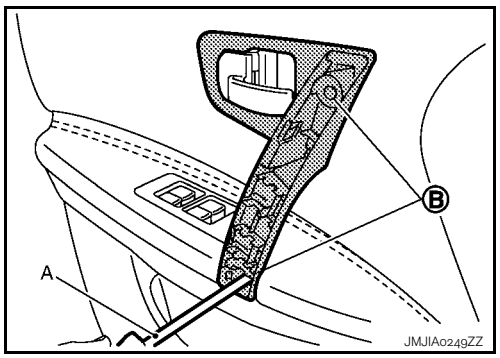
2. Insert remover tool (A) at the bottom edge of cap-front door grip to unclip the cap.



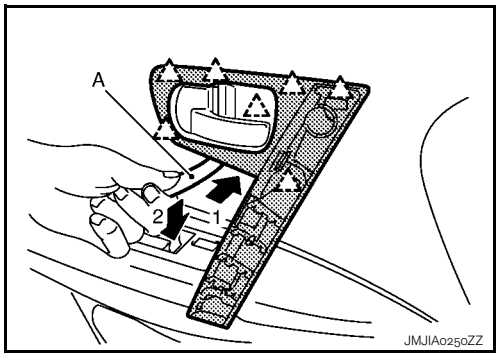
: Pawl

3. Remove inside handle escutcheon cap.

4. Remove screws (B) holding front door grip in place using screwdriver (A).



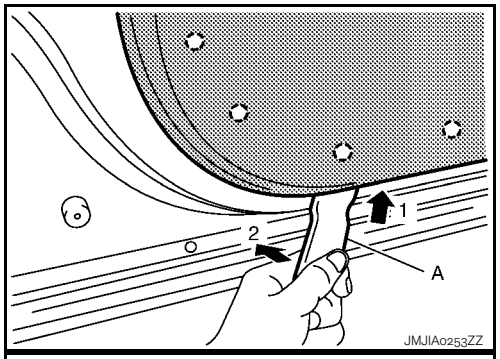
5. Hold front door grip in fully rotated position.Insert remover tool (A) between front door grip and door finisher to disengage the escutcheon retaining pawls to the door finisher.



: Pawl

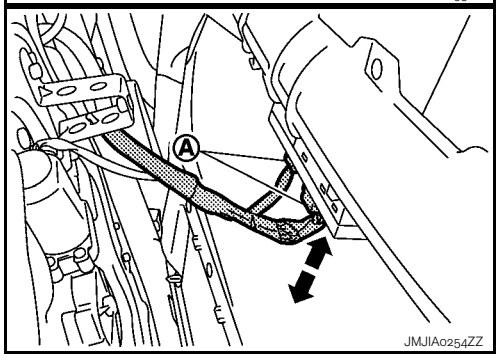
6. Remove inside handle escutcheon.

7. Insert remover tool (A) between door finisher and door panel to disengage door finisher mounting clips, starting from the bottom and working to the top.



: Clip

8. Disconnect harness connectors (A) for power window switch front.



9. Remove front door finisher.
10. Remove the following parts after removing door finisher.
    - Power window switch front. Refer to PWC-83, "Removal and Installation".
    - Seal assembly front door inside.

INSTALLATION

Install in the reverse order of removal.

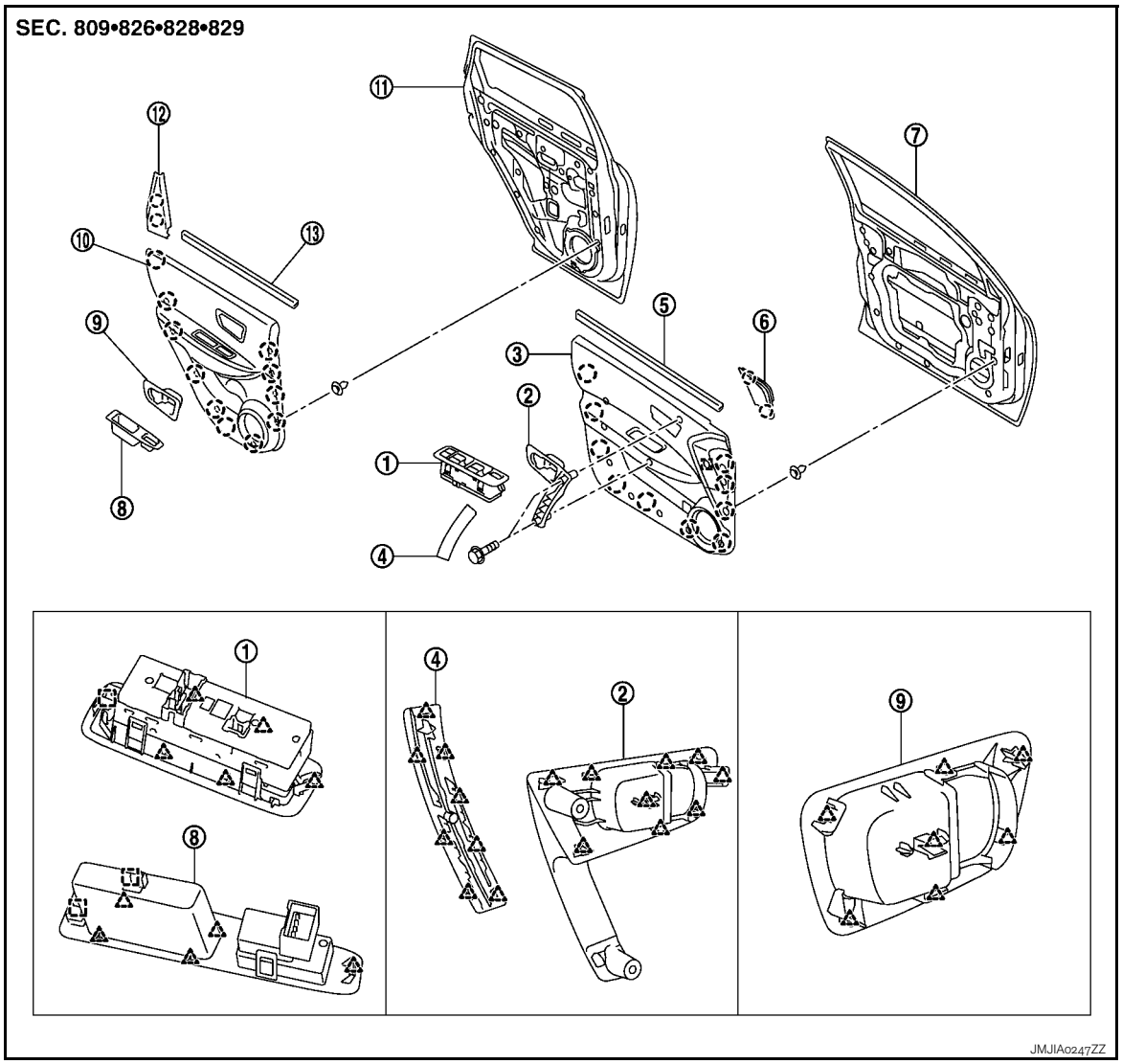
CAUTION:

When installing door finisher, check that clips are securely fitted in panel holes on body, and then press them in.

REAR DOOR FINISHER

REAR DOOR FINISHER : Exploded View

INFOID:0000000001051075



1. Power window switch front (Driver)
2. Front door grip
3. Front door finisher (LH)
4. Cap-Front door grip (LH)
5. Seal assembly front door inside (LH)
6. Cover front door inner (LH)
7. Front door panel
8. Power window switch rear (LH)
9. Inside handle escutcheon (rear LH)
10. Rear door finisher (LH)
11. Rear door panel
12. Cover rear door inner (LH)
13. Seal assembly rear door inside (LH)

◌ : Clip

cardiagn.com

: Pawl

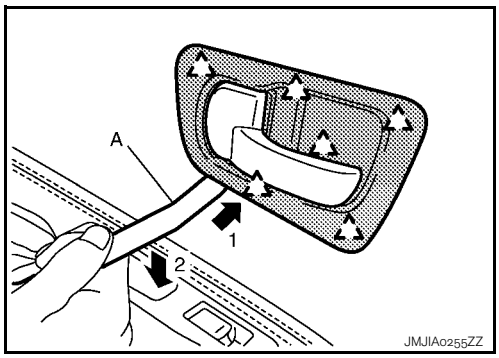
: Metal clip

REAR DOOR FINISHER : Removal and Installation

INFOID:0000000001051076

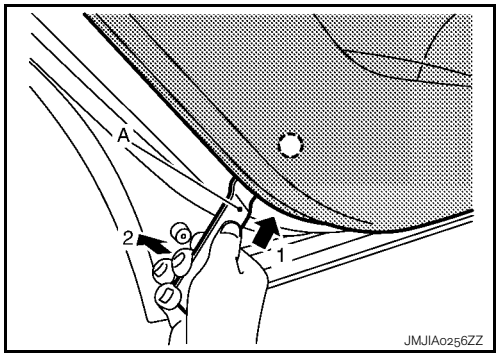
REMOVAL

1. Fully open door window.
2. Insert remover tool (A) between door finisher and inside handle escutcheon (rear LH) to disengage the escutcheon retaining pawls to door finisher.



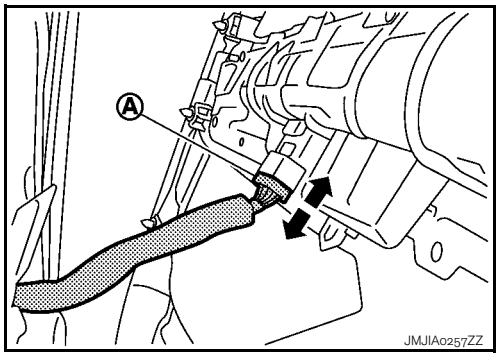
: Pawl

3. Remove inside handle escutcheon.
4. Insert remover tool (A) between door finisher and door panel to disengage door finisher mounting clips, starting from the bottom and working to the top.



: Clip

5. Disconnect harness connector (A) for power window switch rear.



6. Remove rear door finisher.
7. Remove the following parts after removing door finisher.
   - Power window switch rear. Refer to PWC-83, "Removal and Installation".
   - Seal assembly rear door inside.

INSTALLATION

Install in the reverse order of removal.

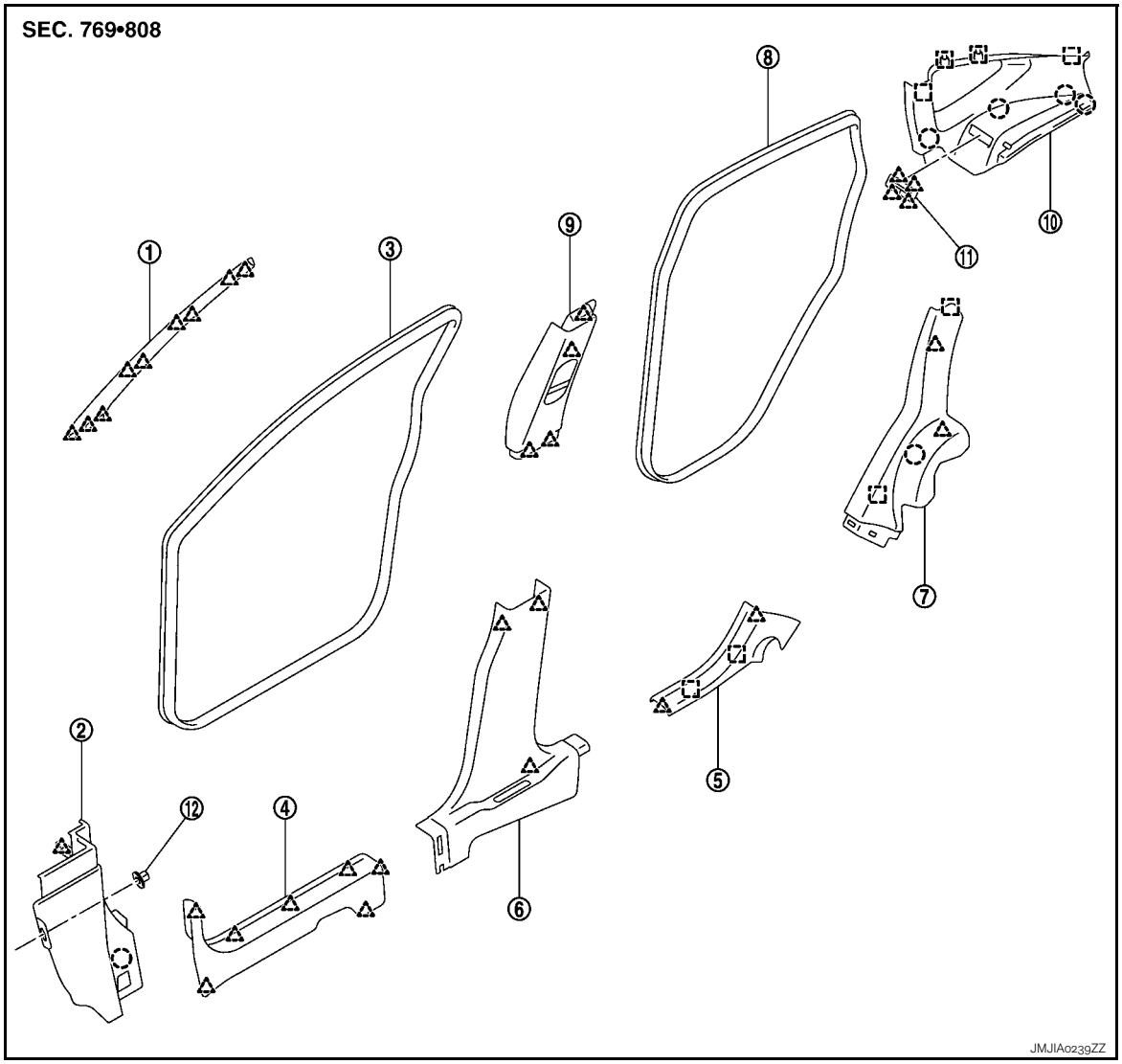
CAUTION:

When installing door finisher, check that clips are securely fitted in panel holes on body, and then press them in.

BODY SIDE TRIM

Exploded View

INFOID:0000000000892100



1. Front pillar garnish
2. Dash side finisher
3. Welt body side front (RH)
4. Front kicking plate inner
5. Rear kicking plate inner
6. Center pillar lower garnish
7. Luggage side lower finisher (front)
8. Welt body side rear (RH)
9. Center pillar upper garnish
10. Rear pillar finisher (RH)
11. Rear seat belt escutcheon
12. Clip-trim

: Clip

: Pawl

: Metal clip

Removal and Installation

INFOID:0000000000892101

CAUTION:

Wrap the tip of flat-bladed screwdriver with a cloth when removing metal clips from garnishes.

REMOVAL

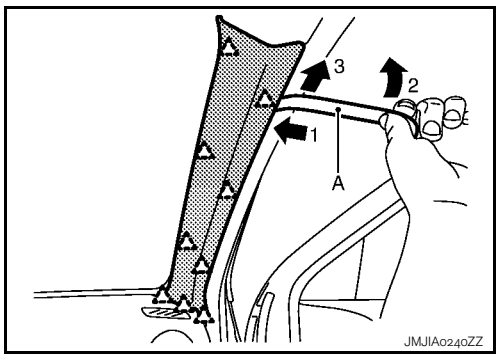
FRONT PILLAR GARNISH

1. Remove welt body side front (RH).

cardiagn.com

2. Disengage front pillar garnish mounting pawls using remover tool (A).

: Pawl

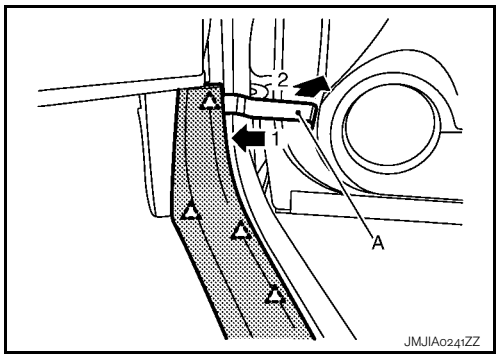


3. Once free, pull front pillar garnish upwards to disengage the lower locating tab from instrument panel.
4. Remove front pillar garnish.

FRONT KICKING PLATE INNER

1. Disengage front kicking plate inner mounting pawls using remover tool (A).

: Pawl

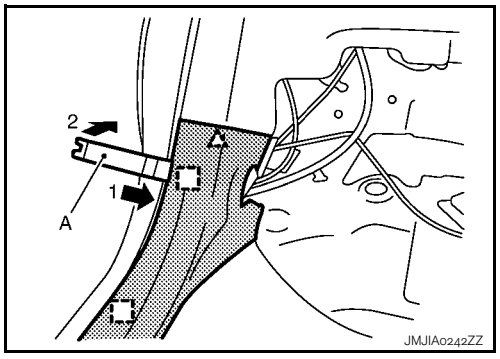


2. Pull upwards and rearwards to disengage the clips from body, dash side finisher and center pillar lower garnish.
3. Remove front kicking plate inner.

REAR KICKING PLATE INNER

1. Insert remover tool (A) between rear kicking plate inner and body side panel to disengage pawls.

: Pawl



2. Pull upwards to disengage the pawls from the body, center pillar lower garnish and luggage side lower finisher (front).
3. Remove rear kicking plate inner.

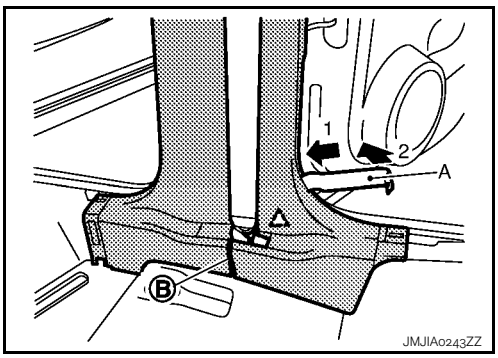
CENTER PILLAR LOWER GARNISH

1. Remove front and rear kicking plate.

carmanualsonline.com

2. Remove front seat belt through slit (B).
3. Insert remover tool (A) between center pillar lower garnish and body side panel to disengage pawls.

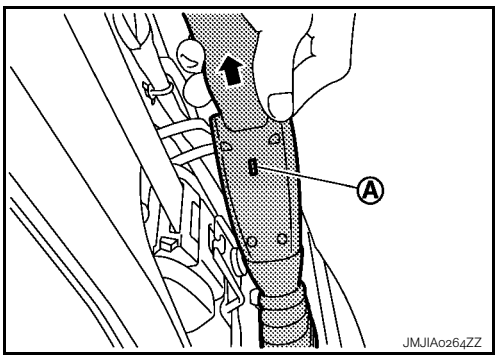
: Pawl



4. Remove center pillar lower garnish.

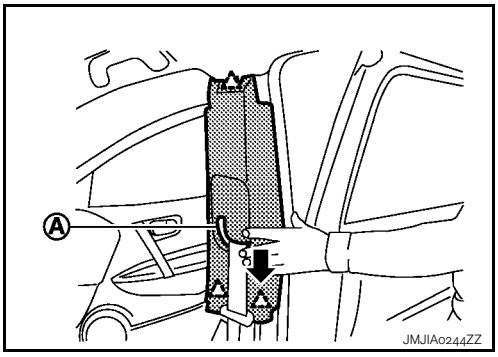
CENTER PILLAR UPPER GARNISH

1. Remove center pillar lower garnish.
2. Remove front seat belt floor anchor bolt (passenger side).Refer to SB-8, "SEAT BELT BUCKLE : Removal and Installation".
3. Remove seat belt (driver side) by inserting a flat bladed screw-driver into hole (A), press while pulling upwards the seat belt as shown by the arrow in the figure beside.



4. Slide center pillar upper garnish downwards to release hook from emboss in rail roof.
5. Remove seat belt tongue through slit (A) and then remove center pillar upper garnish.

: Pawl

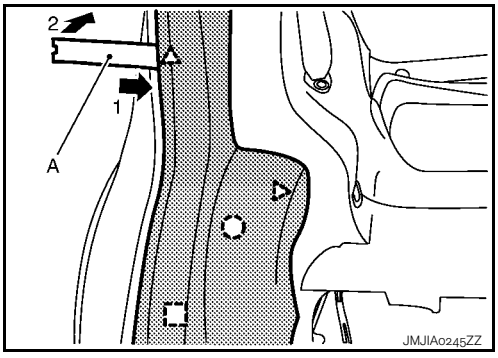


LUGGAGE SIDE LOWER FINISHER (FRONT)

1. Remove rear kicking plate inner.
2. Remove rear seats. Refer to SE-31, "Removal and Installation".
3. Remove rear body side welt.
4. Insert remover tool (A) between luggage side lower finisher (front) and body side panel to disengage clips and pawls.

: Clip

: Pawl



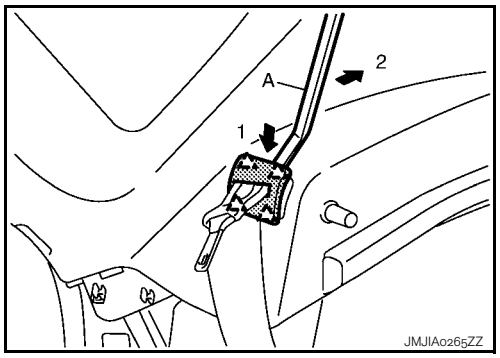
cardiagn.com

5. Pull upwards and forwards to remove clips and pawls from body and rear pillar finisher.
6. Remove luggage side lower finisher (front).

REAR PILLAR FINISHER

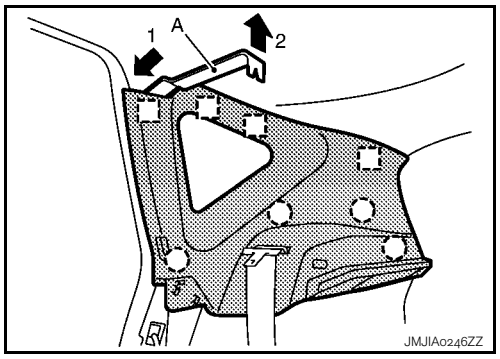
1. Remove rear body side and back door welts.
2. Remove luggage side lower finisher (front).
3. Remove rear seats.
4. Disconnect the rear outer seat belt anchor.
5. Remove the rear seat belt escutcheon from rear pillar finisher using remover tool (A).

: Pawl



6. Disengage clips using remover tool (A).

: Clip
: Metal clip



7. Remove rear seat belt through the hole in rear pillar finisher.
8. Carefully pull rear pillar finisher backwards and disconnect harness connector for luggage room lamp (LH).
9. Remove rear pillar finisher (LH/RH).

CAUTION:
Be careful not to damage the body while removing side trim.

INSTALLATION

Install in the reverse order of removal.

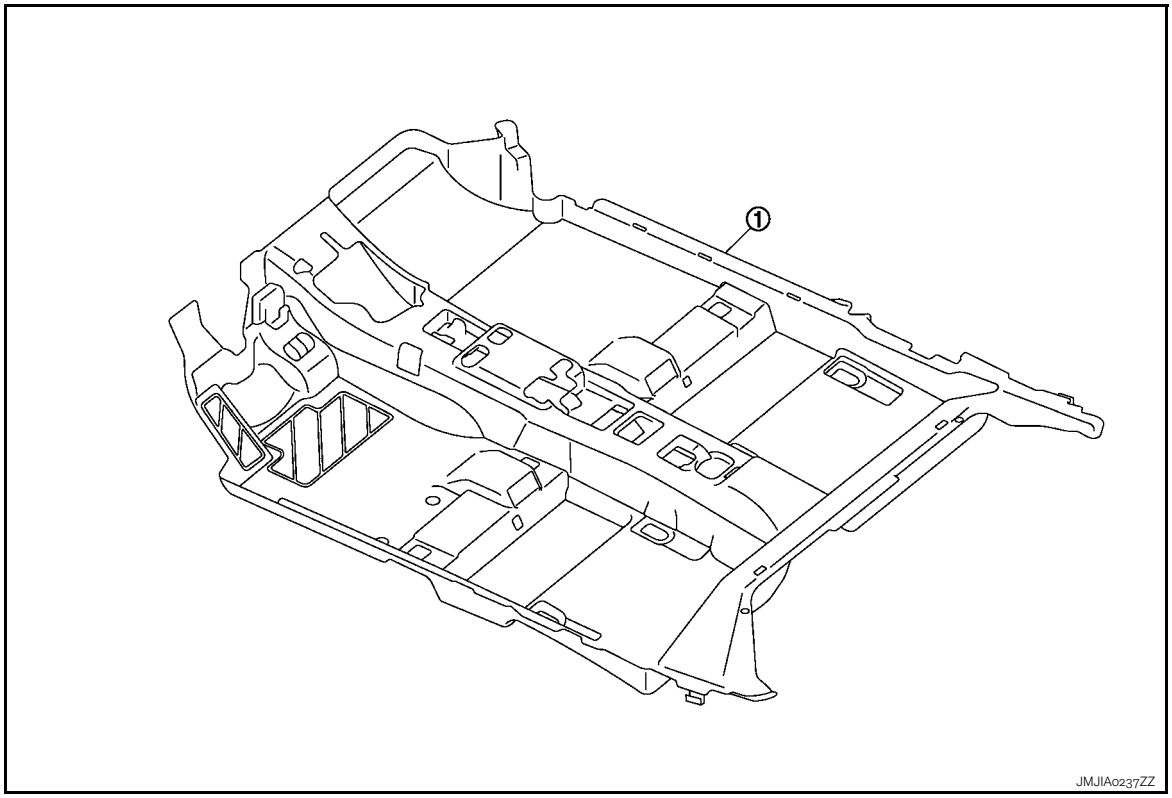
CAUTION:
Check that clips are securely fitted in panel holes on body when installing, and then press them in.

carmagn.com

FLOOR TRIM

Exploded View

INFOID:0000000000892102



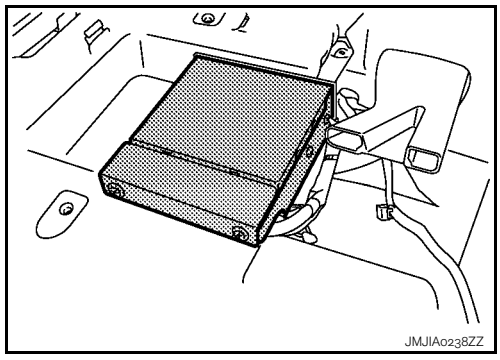
1. Carpet assy floor

Removal and Installation

INFOID:0000000000892103

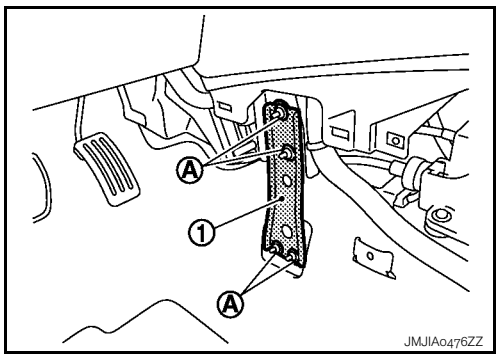
REMOVAL

1. Remove front seat (LH/RH) and rear seat cushion.
   - Front seat assembly. Refer to SE-24, "Removal and Installation".
   - Rear seat assembly. Refer to SE-31, "Removal and Installation".
2. Remove accelerator pedal assembly. Refer to ACC-3, "Removal and Installation".
3. Remove center console assembly. Refer to IP-18, "Removal and Installation".
4. Remove dash side finisher (LH/RH), front kicking plate inner (LH/RH), center pillar lower garnish (LH/RH), and rear kicking plate inner. Refer to INT-14, "Removal and Installation".
5. Remove navigation control unit.
   Refer to AV-201, "Removal and Installation".

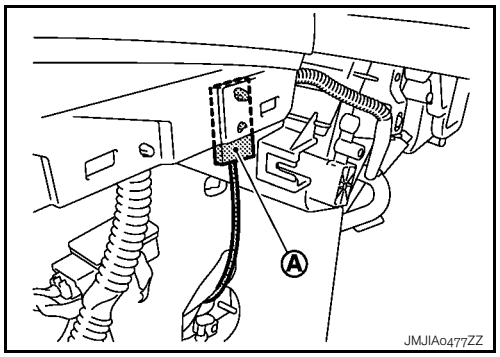


cardiagn.com

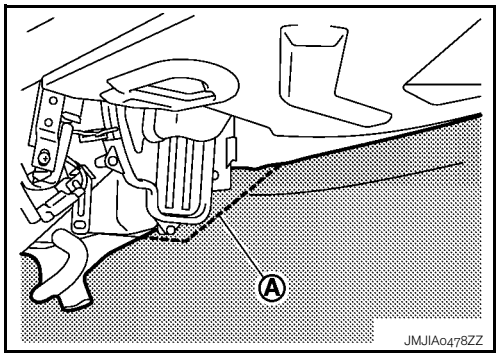
6. Remove console bracket mounting nuts (A), and then remove console bracket(1).



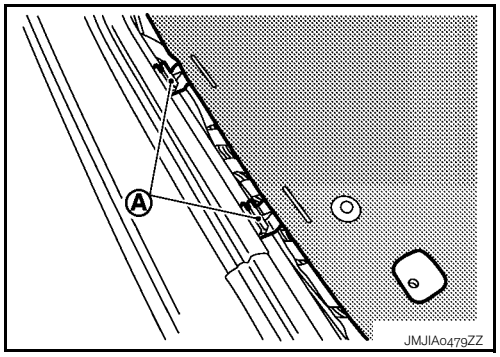
7. Remove A/T control device assembly. Refer to TM-326, "Removal and Installation".
8. Remove parking brake control device assembly. Refer to PB-5, "Removal and Installation".
9. Remove diagnosis sensor unit. Refer to SR-16, "Removal and Installation".
10. Disconnect GPS antenna cable connector (A). (with NAVI)



11. Cut floor carpet front side (Portion A) using cutter knife.



12. Remove floor carpet from fixing clips (A).



13. Remove floor carpet.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

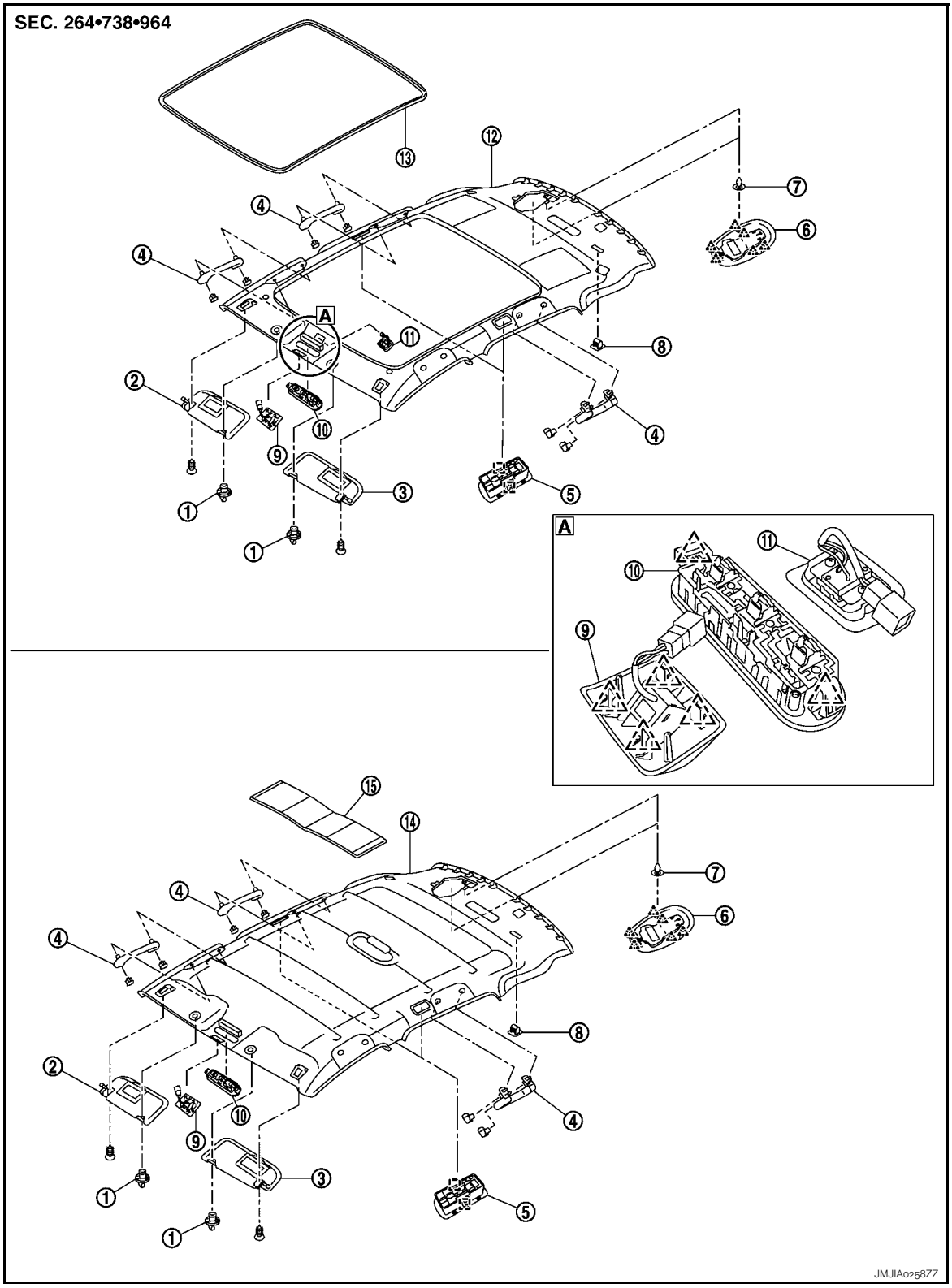
- **When replacing the floor carpet with a new one, install by cutting the front end like the old one. After that, ensure matching quality between floor trim and instrument lower cover, etc. by tucking.**
- **Joints both new floor carpet and old front carpet ends by using a tucker.**

carmagn.com

HEADLINING

Exploded View

INFOID:0000000000892104



1. Sun-visor holder
2. Sun-visor (RH)
3. Sun-visor (LH)
4. Assist grip
5. Personal lamp
6. Rear seat belt cover
7. Headlining clip
8. Headlining clip
9. Sunroof switch finisher

cardiagn.com

10. Room lamp
11. Microphone finisher
12. Headlining assembly (with sunroof glass)
13. Sunroof welt
14. Headlining assembly (without sunroof glass)
15. Roof insulator

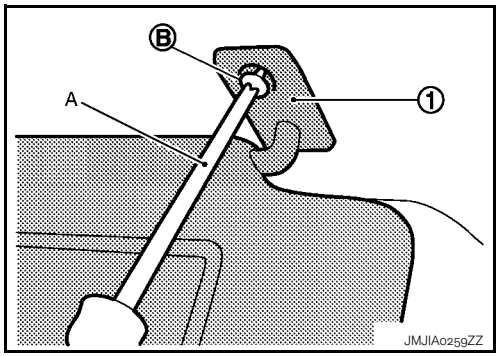
: Clip
: Pawl
: Metal clip

Removal and Installation

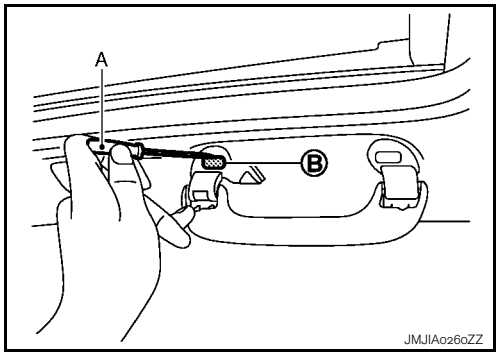
INFOID:0000000000892105

REMOVAL

1. Remove front pillar garnish (LH/RH). Refer to INT-14, "Removal and Installation".
2. Remove rear seat cushion and seat back. Refer to SE-31, "Removal and Installation".
3. Remove rear seat belt anchor bolt.Refer to SB-17, "SEAT BELT BUCKLE : Removal and Installation".
4. Remove front kicking plate inner (LH/RH), center pillar lower garnish (LH/RH), center pillar upper garnish (LH/RH), rear kicking plate inner (LH/RH), luggage side lower finisher (front), rear pillar finisher (LH/RH). Refer to INT-14, "Removal and Installation".
5. Disconnect harness connectors for luggage room lamp after removing rear pillar finisher (LH/RH).
6. Using screwdriver (A), remove screws (B) from sun-visor assembly (1).



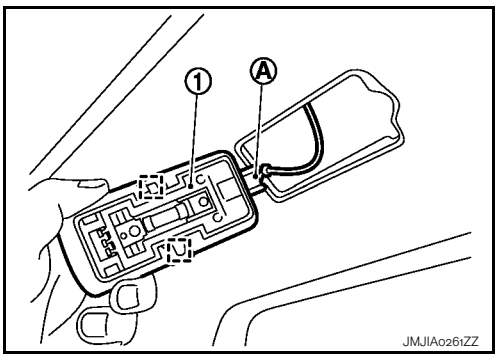
7. Unhook the sun-visor bracket from the rear.
8. Disconnect vanity mirror illumination harness connectors and then remove sun-visor (LH/RH).
9. Disengage pawls on room lamp, microphone finisher and sunroof switch finisher using remover tool.
10. Disconnect harness connectors for room lamp, microphone finisher and sunroof switch finisher.
11. Remove room lamp, microphone finisher and sunroof switch finisher.
12. Using a flat bladed screwdriver (A), ease out locking pins (B) of front assistance grip (RH) and rear assistance grip (LH/RH).



13. Pull assistance grips to disengage clips from the fixing holes in the roof metal and remove assistance grip.
14. Disengage pawls of personal lamps (LH/RH) using remover tool.

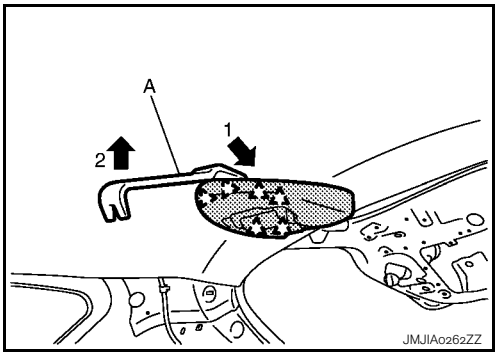
15. Disconnect harness connectors (A) for personal lamps (LH/RH) and remove personal lamps (1).

: Metal clip

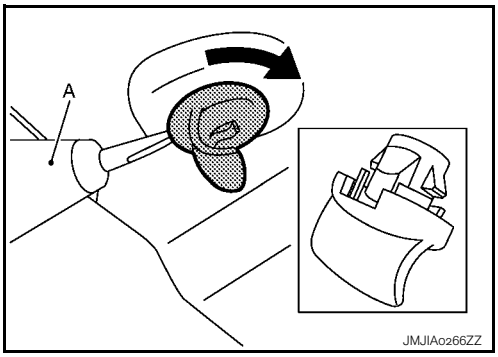


16. Remove rear seat belt cover using remover tool (A).

: Pawl



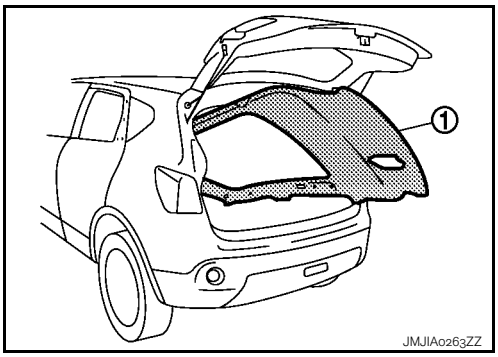
17. Remove sunroof welt.
18. Using remover tool, remove body side headlining clip at the rear side of headlining.
19. Insert flat-bladed screwdriver (A) into the sun-visor holder cut-out, press and hold while rotating 90 degrees to remove sun-visor holder (LH/RH).



20. Recline front seat back to facilitate the headlining removal.
21. Remove headlining (1) from back door.

CAUTION:

- **When removing, 2 workers are required. (1 for each front and rear of headlining)**
- **Cover center console finisher upper surface with a shop cloth so as to prevent it from being damaged.**
- **Do not bend headlining when removing.**
- **Be careful not to scratch or damage any part of the body while taking out the headlining.**



22. Remove the Insulator roof (normal roof only) after removing headlining.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Adjust headlining to the roof frame.**

cardiagn.com

- **As for guide, install sun-visor holder (LH/RH) then both body side mounting headlining clips at the rear side of headlining.**
- **Do not bend headlining when installing.**
- **When installing the sunroof welt, it must be free from visible waviness around full aperture.**
- **The joint of sunroof welt is to be positioned forward of the rear corner radius on the LH side of the vehicle.**

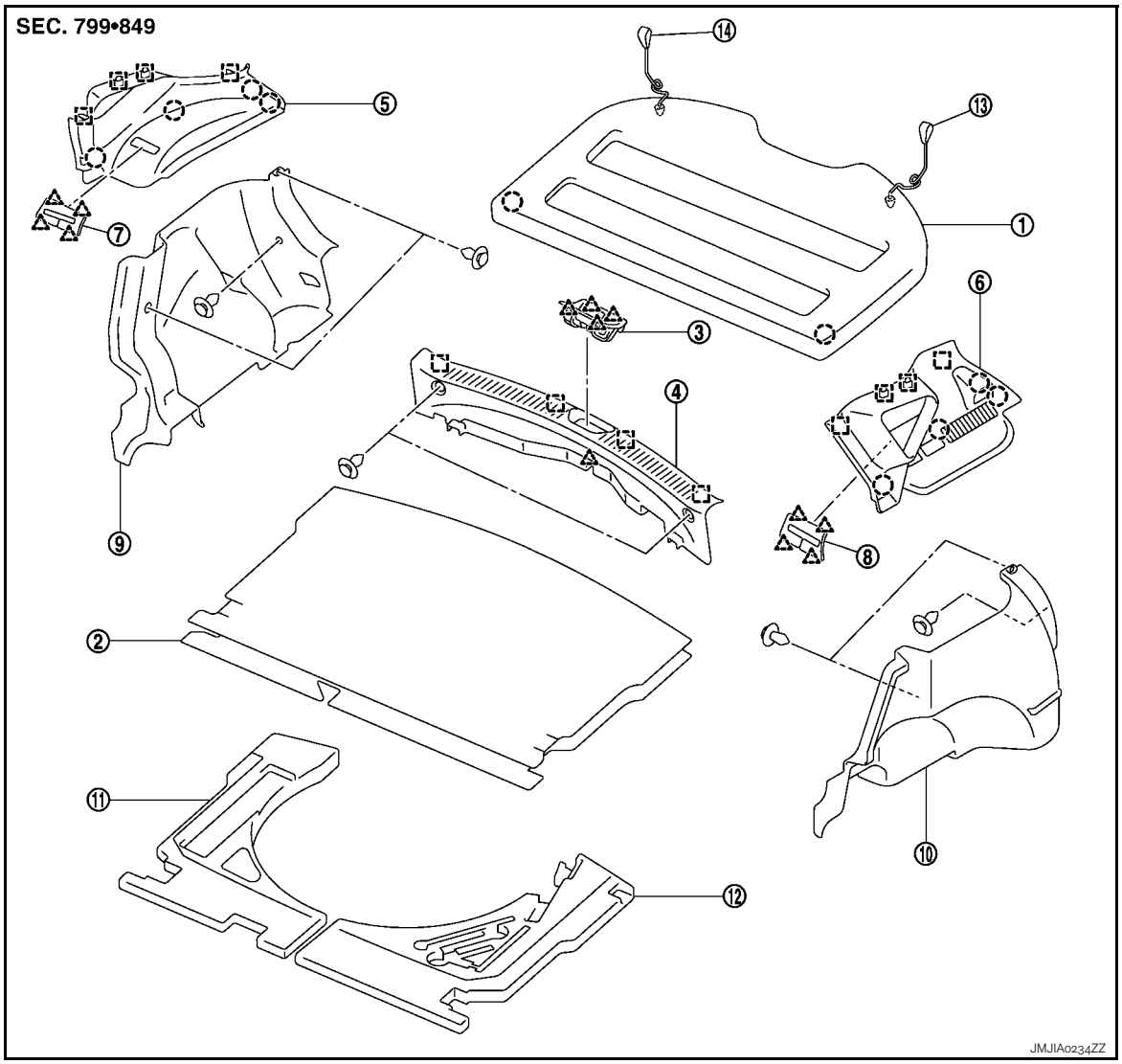
carmagn.com

LUGGAGE FLOOR TRIM

Exploded View

INFOID:0000000000892106

TRUNK ROOM TRIM



1. Parcel shelf
2. Luggage floor carpet
3. Luggage rear plate cap
4. Luggage rear plate
5. Rear pillar finisher (RH)
6. Rear pillar finisher (LH)
7. Rear seat belt escutcheon (RH)
8. Rear seat belt escutcheon (LH)
9. Luggage side lower finisher (RH)
10. Luggage side lower finisher (LH)
11. Luggage floor spacer (RH)
12. Luggage floor spacer (LH)
13. Hook rope (LH)
14. Hook rope (RH)

: Clip

: Metal

: Metal clip

Removal and Installation

INFOID:0000000000892107

REMOVAL

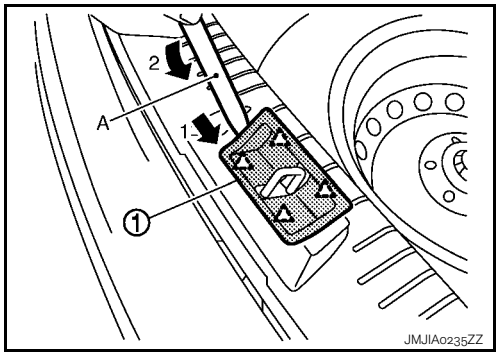
LUGGAGE REAR PLATE

1. Fully open back door.

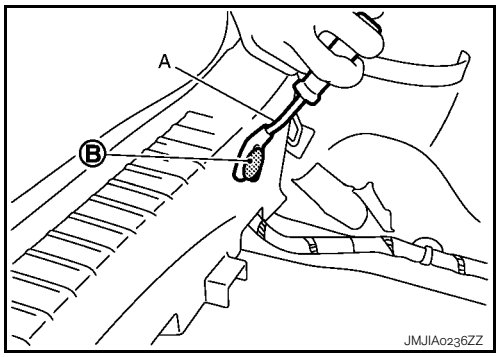
cardiagn.com

2. Remove parcel shelf.
3. Remove luggage floor carpet.
4. Remove back door welt.
5. Remove rear pillar finisher (LH/RH).Refer to INT-14, "Removal and Installation".
6. Insert remover tool (A) between luggage rear plate and luggage rear plate cap (1) to disengage pawls and then remove luggage rear plate cap.

: Pawl



7. Remove both clips (B) on luggage rear plate using a remover tool (A).
8. Hold both sides of rear plate, pull upwards to remove.



REAR PILLAR FINISHER

Refer to body side trim INT-14, "Removal and Installation".

LUGGAGE SIDE LOWER FINISHER

1. Remove luggage rear plate.Refer to INT-24, "Removal and Installation".
2. Remove luggage floor carpet.
3. Remove rear pillar finisher.Refer to INT-14, "Removal and Installation".
4. Remove clips on luggage side lower finisher (LH/RH) by using remover tool.
5. Remove luggage side lower finisher (left/right).

INSTALLATION

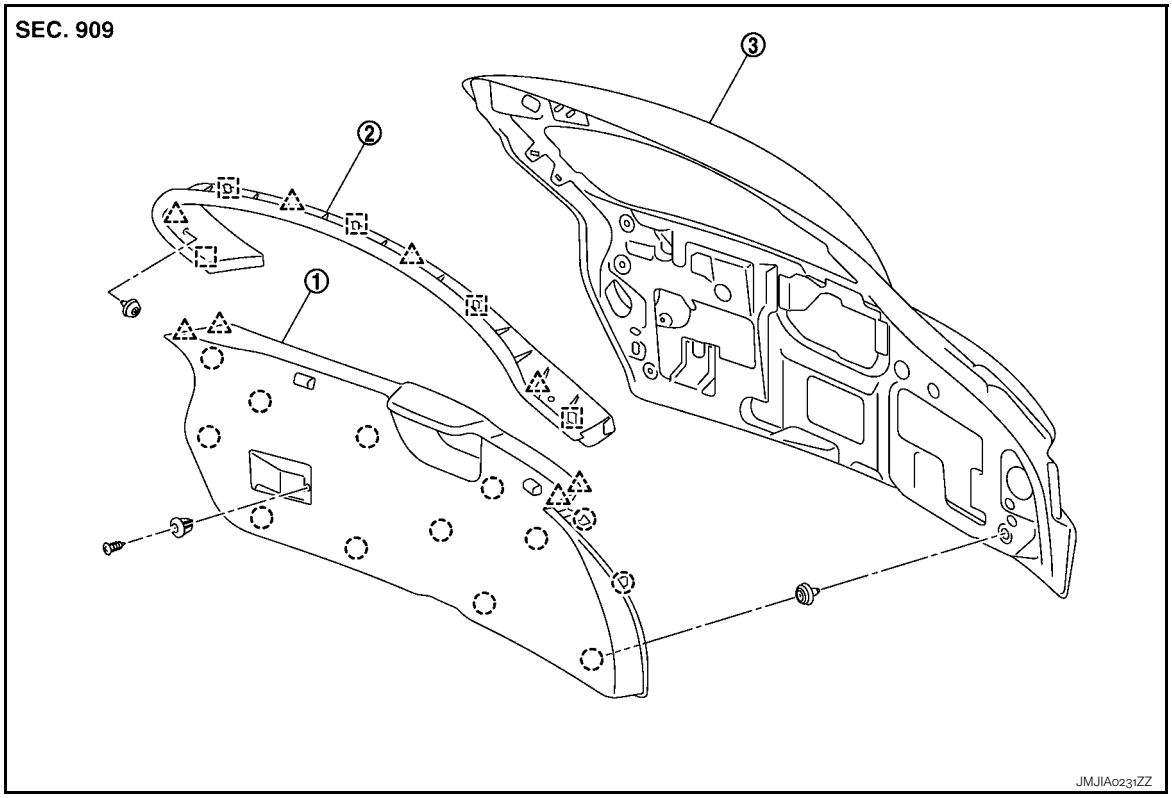
Install in the reverse order of removal.

carmagn.com

BACK DOOR TRIM

Exploded View

INFOID:0000000000892108



1. Back door trim finisher lower
2. Back door trim finisher upper
3. Back door assembly

: Clip

: Pawl

: Metal clip

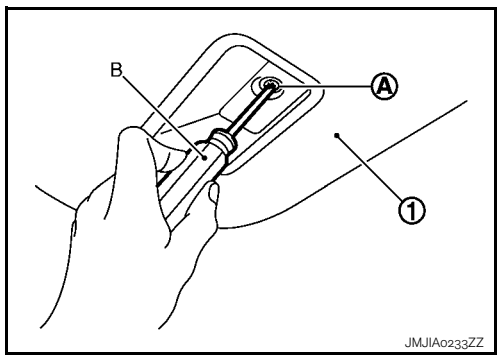
Removal and Installation

INFOID:0000000000892109

REMOVAL

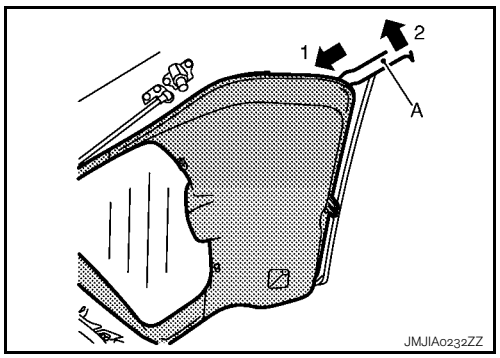
BACK DOOR TRIM

1. Fully open back door.
2. Remove screw tap (A) located in back door trim finisher lower (1) with screwdriver (B).



cardiagn.com

3. Insert remover tool (A) between back door trim finisher lower and back door panel to disengage clips.Starting by the lower downwards and works around the edges and up to the sides.



4. Pull downwards carefully the back trim finisher to disengage center clips and remove back door trim finisher.
5. Remove back door trim finisher upper.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

When installing door finisher, check that clips are securely fitted in panel holes on body, and then press them in.

carmanualsonline.com

SECTION LAN

LAN SYSTEM

CONTENTS

CAN FUNDAMENTAL

PRECAUTION 36

PRECAUTIONS 36
Precautions for Trouble Diagnosis 36
Precautions for Harness Repair 36

FUNCTION DIAGNOSIS 37

CAN COMMUNICATION SYSTEM 37
System Description 37
System Diagram 37
CAN Communication Control Circuit 38

DIAG ON CAN 39
Description 39
System Diagram 39

TROUBLE DIAGNOSIS 40
Condition of Error Detection 40
Symptom When Error Occurs in CAN Communication System 40
CAN Diagnosis with CONSULT-III 43
Self-Diagnosis 43
CAN Diagnostic Support Monitor 43
How to Use CAN Communication Signal Chart 45

BASIC INSPECTION 46

DIAGNOSIS AND REPAIR WORKFLOW 46
Trouble Diagnosis Flow Chart 46
Trouble Diagnosis Procedure 46

CAN

HOW TO USE THIS MANUAL 51

HOW TO USE THIS SECTION 51
Caution 51
Abbreviation List 51

PRECAUTION 52

PRECAUTIONS 52
Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 52
Precautions for Trouble Diagnosis 52
Precautions for Harness Repair 52

BASIC INSPECTION 54

DIAGNOSIS AND REPAIR WORKFLOW 54
Interview Sheet 54

FUNCTION DIAGNOSIS 55

CAN COMMUNICATION SYSTEM 55
CAN System Specification Chart 55
CAN Communication Signal Chart 59

COMPONENT DIAGNOSIS 62

CAN COMMUNICATION SYSTEM 62
Component Parts Location 62
Wiring Diagram - CAN SYSTEM (LHD MODELS) - 64
Wiring Diagram - CAN SYSTEM (RHD MODELS) - 68

MALFUNCTION AREA CHART 72
Main Line 72
Branch Line 72
Short Circuit 72

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 73
Diagnosis Procedure 73

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 74
Diagnosis Procedure 74

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 75
Diagnosis Procedure 75

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 76
Diagnosis Procedure 76

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 77
Diagnosis Procedure 77

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 78
Diagnosis Procedure 78

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 79
Diagnosis Procedure 79

ECM BRANCH LINE CIRCUIT 80
Diagnosis Procedure 80

ABS BRANCH LINE CIRCUIT 81
Diagnosis Procedure 81

TCM BRANCH LINE CIRCUIT 82
Diagnosis Procedure 82

4WD BRANCH LINE CIRCUIT 83
Diagnosis Procedure 83

BCM BRANCH LINE CIRCUIT 84
Diagnosis Procedure 84

M&A BRANCH LINE CIRCUIT 85
Diagnosis Procedure 85

AV BRANCH LINE CIRCUIT 86
Diagnosis Procedure 86

DLC BRANCH LINE CIRCUIT 87
Diagnosis Procedure 87

EPS BRANCH LINE CIRCUIT 88
Diagnosis Procedure 88

I-KEY BRANCH LINE CIRCUIT 89
Diagnosis Procedure 89

STRG BRANCH LINE CIRCUIT 90
Diagnosis Procedure 90

IPDM-E BRANCH LINE CIRCUIT 91
Diagnosis Procedure 91

CAN COMMUNICATION CIRCUIT 92
Diagnosis Procedure 92

CAN SYSTEM (TYPE 1)

COMPONENT DIAGNOSIS 94

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 94
Diagnosis Procedure 94

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 95
Diagnosis Procedure 95

ECM BRANCH LINE CIRCUIT 96
Diagnosis Procedure 96

ABS BRANCH LINE CIRCUIT 97
Diagnosis Procedure 97

BCM BRANCH LINE CIRCUIT 98
Diagnosis Procedure 98

M&A BRANCH LINE CIRCUIT 99
Diagnosis Procedure 99

DLC BRANCH LINE CIRCUIT 100
Diagnosis Procedure 100

EPS BRANCH LINE CIRCUIT 101
Diagnosis Procedure 101

IPDM-E BRANCH LINE CIRCUIT 102
Diagnosis Procedure 102

CAN COMMUNICATION CIRCUIT 103
Diagnosis Procedure 103

CAN SYSTEM (TYPE 2)

COMPONENT DIAGNOSIS 105

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 105
Diagnosis Procedure 105

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 106
Diagnosis Procedure 106

ECM BRANCH LINE CIRCUIT 107
Diagnosis Procedure 107

ABS BRANCH LINE CIRCUIT 108
Diagnosis Procedure 108

BCM BRANCH LINE CIRCUIT 109
Diagnosis Procedure 109

M&A BRANCH LINE CIRCUIT 110
Diagnosis Procedure 110

AV BRANCH LINE CIRCUIT 111
Diagnosis Procedure 111

DLC BRANCH LINE CIRCUIT 112
Diagnosis Procedure 112

EPS BRANCH LINE CIRCUIT 113
Diagnosis Procedure 113

IPDM-E BRANCH LINE CIRCUIT 114
Diagnosis Procedure 114

cardiagn.com

CAN COMMUNICATION CIRCUIT 115
Diagnosis Procedure 115

CAN SYSTEM (TYPE 3)

COMPONENT DIAGNOSIS 117

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 117
Diagnosis Procedure 117

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 118
Diagnosis Procedure 118

ECM BRANCH LINE CIRCUIT 119
Diagnosis Procedure 119

ABS BRANCH LINE CIRCUIT 120
Diagnosis Procedure 120

BCM BRANCH LINE CIRCUIT 121
Diagnosis Procedure 121

M&A BRANCH LINE CIRCUIT 122
Diagnosis Procedure 122

DLC BRANCH LINE CIRCUIT 123
Diagnosis Procedure 123

EPS BRANCH LINE CIRCUIT 124
Diagnosis Procedure 124

I-KEY BRANCH LINE CIRCUIT 125
Diagnosis Procedure 125

IPDM-E BRANCH LINE CIRCUIT 126
Diagnosis Procedure 126

CAN COMMUNICATION CIRCUIT 127
Diagnosis Procedure 127

CAN SYSTEM (TYPE 4)

COMPONENT DIAGNOSIS 129

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 129
Diagnosis Procedure 129

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 130
Diagnosis Procedure 130

ECM BRANCH LINE CIRCUIT 131
Diagnosis Procedure 131

ABS BRANCH LINE CIRCUIT 132
Diagnosis Procedure 132

BCM BRANCH LINE CIRCUIT 133
Diagnosis Procedure 133

M&A BRANCH LINE CIRCUIT 134
Diagnosis Procedure 134

AV BRANCH LINE CIRCUIT 135
Diagnosis Procedure 135

DLC BRANCH LINE CIRCUIT 136
Diagnosis Procedure 136

EPS BRANCH LINE CIRCUIT 137
Diagnosis Procedure 137

I-KEY BRANCH LINE CIRCUIT 138
Diagnosis Procedure 138

IPDM-E BRANCH LINE CIRCUIT 139
Diagnosis Procedure 139

CAN COMMUNICATION CIRCUIT 140
Diagnosis Procedure 140

CAN SYSTEM (TYPE 5)

COMPONENT DIAGNOSIS 142

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 142
Diagnosis Procedure 142

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 143
Diagnosis Procedure 143

ECM BRANCH LINE CIRCUIT 144
Diagnosis Procedure 144

ABS BRANCH LINE CIRCUIT 145
Diagnosis Procedure 145

BCM BRANCH LINE CIRCUIT 146
Diagnosis Procedure 146

M&A BRANCH LINE CIRCUIT 147
Diagnosis Procedure 147

DLC BRANCH LINE CIRCUIT 148
Diagnosis Procedure 148

EPS BRANCH LINE CIRCUIT 149
Diagnosis Procedure 149

STRG BRANCH LINE CIRCUIT 150
Diagnosis Procedure 150

IPDM-E BRANCH LINE CIRCUIT 151
Diagnosis Procedure 151

CAN COMMUNICATION CIRCUIT 152
Diagnosis Procedure 152

CAN SYSTEM (TYPE 6)

COMPONENT DIAGNOSIS 154

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 154
Diagnosis Procedure 154

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 155
Diagnosis Procedure 155

ECM BRANCH LINE CIRCUIT 156
Diagnosis Procedure 156

ABS BRANCH LINE CIRCUIT 157
Diagnosis Procedure 157

BCM BRANCH LINE CIRCUIT 158
Diagnosis Procedure 158

M&A BRANCH LINE CIRCUIT 159
Diagnosis Procedure 159

AV BRANCH LINE CIRCUIT 160
Diagnosis Procedure 160

DLC BRANCH LINE CIRCUIT 161
Diagnosis Procedure 161

EPS BRANCH LINE CIRCUIT 162
Diagnosis Procedure 162

STRG BRANCH LINE CIRCUIT 163
Diagnosis Procedure 163

IPDM-E BRANCH LINE CIRCUIT 164
Diagnosis Procedure 164

CAN COMMUNICATION CIRCUIT 165
Diagnosis Procedure 165

CAN SYSTEM (TYPE 7)

COMPONENT DIAGNOSIS 167

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 167
Diagnosis Procedure 167

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 168
Diagnosis Procedure 168

ECM BRANCH LINE CIRCUIT 169
Diagnosis Procedure 169

ABS BRANCH LINE CIRCUIT 170
Diagnosis Procedure 170

BCM BRANCH LINE CIRCUIT 171
Diagnosis Procedure 171

M&A BRANCH LINE CIRCUIT 172
Diagnosis Procedure 172

DLC BRANCH LINE CIRCUIT 173
Diagnosis Procedure 173

EPS BRANCH LINE CIRCUIT 174
Diagnosis Procedure 174

I-KEY BRANCH LINE CIRCUIT 175
Diagnosis Procedure 175

STRG BRANCH LINE CIRCUIT 176
Diagnosis Procedure 176

IPDM-E BRANCH LINE CIRCUIT 177
Diagnosis Procedure 177

CAN COMMUNICATION CIRCUIT 178
Diagnosis Procedure 178

CAN SYSTEM (TYPE 8)

COMPONENT DIAGNOSIS 180

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 180
Diagnosis Procedure 180

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 181
Diagnosis Procedure 181

ECM BRANCH LINE CIRCUIT 182
Diagnosis Procedure 182

ABS BRANCH LINE CIRCUIT 183
Diagnosis Procedure 183

BCM BRANCH LINE CIRCUIT 184
Diagnosis Procedure 184

M&A BRANCH LINE CIRCUIT 185
Diagnosis Procedure 185

AV BRANCH LINE CIRCUIT 186
Diagnosis Procedure 186

DLC BRANCH LINE CIRCUIT 187
Diagnosis Procedure 187

EPS BRANCH LINE CIRCUIT 188
Diagnosis Procedure 188

I-KEY BRANCH LINE CIRCUIT 189
Diagnosis Procedure 189

STRG BRANCH LINE CIRCUIT 190
Diagnosis Procedure 190

IPDM-E BRANCH LINE CIRCUIT 191
Diagnosis Procedure 191

CAN COMMUNICATION CIRCUIT 192
Diagnosis Procedure 192

CAN SYSTEM (TYPE 9)

COMPONENT DIAGNOSIS 194

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 194
Diagnosis Procedure 194

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 195
Diagnosis Procedure 195

ECM BRANCH LINE CIRCUIT 196
Diagnosis Procedure 196

ABS BRANCH LINE CIRCUIT 197
Diagnosis Procedure 197

BCM BRANCH LINE CIRCUIT 198
Diagnosis Procedure 198

M&A BRANCH LINE CIRCUIT 199
Diagnosis Procedure 199

DLC BRANCH LINE CIRCUIT 200
Diagnosis Procedure 200

EPS BRANCH LINE CIRCUIT 201
Diagnosis Procedure 201

IPDM-E BRANCH LINE CIRCUIT 202
Diagnosis Procedure 202

CAN COMMUNICATION CIRCUIT 203
Diagnosis Procedure 203

CAN SYSTEM (TYPE 10)

COMPONENT DIAGNOSIS 205

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 205
Diagnosis Procedure 205

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 206
Diagnosis Procedure 206

ECM BRANCH LINE CIRCUIT 207
Diagnosis Procedure 207

ABS BRANCH LINE CIRCUIT 208
Diagnosis Procedure 208

BCM BRANCH LINE CIRCUIT 209
Diagnosis Procedure 209

M&A BRANCH LINE CIRCUIT 210
Diagnosis Procedure 210

AV BRANCH LINE CIRCUIT 211
Diagnosis Procedure 211

DLC BRANCH LINE CIRCUIT 212
Diagnosis Procedure 212

EPS BRANCH LINE CIRCUIT 213
Diagnosis Procedure 213

IPDM-E BRANCH LINE CIRCUIT 214
Diagnosis Procedure 214

CAN COMMUNICATION CIRCUIT 215
Diagnosis Procedure 215

CAN SYSTEM (TYPE 11)

COMPONENT DIAGNOSIS 217

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 217
Diagnosis Procedure 217

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 218
Diagnosis Procedure 218

ECM BRANCH LINE CIRCUIT 219
Diagnosis Procedure 219

ABS BRANCH LINE CIRCUIT 220
Diagnosis Procedure 220

BCM BRANCH LINE CIRCUIT 221
Diagnosis Procedure 221

M&A BRANCH LINE CIRCUIT 222
Diagnosis Procedure 222

DLC BRANCH LINE CIRCUIT 223
Diagnosis Procedure 223

EPS BRANCH LINE CIRCUIT 224
Diagnosis Procedure 224

I-KEY BRANCH LINE CIRCUIT 225
Diagnosis Procedure 225

IPDM-E BRANCH LINE CIRCUIT 226
Diagnosis Procedure 226

CAN COMMUNICATION CIRCUIT 227
Diagnosis Procedure 227

CAN SYSTEM (TYPE 12)

COMPONENT DIAGNOSIS 229

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 229
Diagnosis Procedure 229

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 230
Diagnosis Procedure 230

ECM BRANCH LINE CIRCUIT 231
Diagnosis Procedure 231

ABS BRANCH LINE CIRCUIT 232
Diagnosis Procedure 232

BCM BRANCH LINE CIRCUIT 233
Diagnosis Procedure 233

M&A BRANCH LINE CIRCUIT 234
Diagnosis Procedure 234

cardiagn.com

AV BRANCH LINE CIRCUIT 235
Diagnosis Procedure 235

DLC BRANCH LINE CIRCUIT 236
Diagnosis Procedure 236

EPS BRANCH LINE CIRCUIT 237
Diagnosis Procedure 237

I-KEY BRANCH LINE CIRCUIT 238
Diagnosis Procedure 238

IPDM-E BRANCH LINE CIRCUIT 239
Diagnosis Procedure 239

CAN COMMUNICATION CIRCUIT 240
Diagnosis Procedure 240

CAN SYSTEM (TYPE 13)

COMPONENT DIAGNOSIS 242

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 242
Diagnosis Procedure 242

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 243
Diagnosis Procedure 243

ECM BRANCH LINE CIRCUIT 244
Diagnosis Procedure 244

ABS BRANCH LINE CIRCUIT 245
Diagnosis Procedure 245

BCM BRANCH LINE CIRCUIT 246
Diagnosis Procedure 246

M&A BRANCH LINE CIRCUIT 247
Diagnosis Procedure 247

DLC BRANCH LINE CIRCUIT 248
Diagnosis Procedure 248

EPS BRANCH LINE CIRCUIT 249
Diagnosis Procedure 249

STRG BRANCH LINE CIRCUIT 250
Diagnosis Procedure 250

IPDM-E BRANCH LINE CIRCUIT 251
Diagnosis Procedure 251

CAN COMMUNICATION CIRCUIT 252
Diagnosis Procedure 252

CAN SYSTEM (TYPE 14)

COMPONENT DIAGNOSIS 254

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 254
Diagnosis Procedure 254

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 255
Diagnosis Procedure 255

ECM BRANCH LINE CIRCUIT 256
Diagnosis Procedure 256

ABS BRANCH LINE CIRCUIT 257
Diagnosis Procedure 257

BCM BRANCH LINE CIRCUIT 258
Diagnosis Procedure 258

M&A BRANCH LINE CIRCUIT 259
Diagnosis Procedure 259

AV BRANCH LINE CIRCUIT 260
Diagnosis Procedure 260

DLC BRANCH LINE CIRCUIT 261
Diagnosis Procedure 261

EPS BRANCH LINE CIRCUIT 262
Diagnosis Procedure 262

STRG BRANCH LINE CIRCUIT 263
Diagnosis Procedure 263

IPDM-E BRANCH LINE CIRCUIT 264
Diagnosis Procedure 264

CAN COMMUNICATION CIRCUIT 265
Diagnosis Procedure 265

CAN SYSTEM (TYPE 15)

COMPONENT DIAGNOSIS 267

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 267
Diagnosis Procedure 267

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 268
Diagnosis Procedure 268

ECM BRANCH LINE CIRCUIT 269
Diagnosis Procedure 269

ABS BRANCH LINE CIRCUIT 270
Diagnosis Procedure 270

BCM BRANCH LINE CIRCUIT 271
Diagnosis Procedure 271

M&A BRANCH LINE CIRCUIT 272
Diagnosis Procedure 272

DLC BRANCH LINE CIRCUIT 273
Diagnosis Procedure 273

EPS BRANCH LINE CIRCUIT 274
Diagnosis Procedure 274

cardiagn.com

I-KEY BRANCH LINE CIRCUIT 275
Diagnosis Procedure 275

STRG BRANCH LINE CIRCUIT 276
Diagnosis Procedure 276

IPDM-E BRANCH LINE CIRCUIT 277
Diagnosis Procedure 277

CAN COMMUNICATION CIRCUIT 278
Diagnosis Procedure 278

CAN SYSTEM (TYPE 16)

COMPONENT DIAGNOSIS 280

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 280
Diagnosis Procedure 280

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 281
Diagnosis Procedure 281

ECM BRANCH LINE CIRCUIT 282
Diagnosis Procedure 282

ABS BRANCH LINE CIRCUIT 283
Diagnosis Procedure 283

BCM BRANCH LINE CIRCUIT 284
Diagnosis Procedure 284

M&A BRANCH LINE CIRCUIT 285
Diagnosis Procedure 285

AV BRANCH LINE CIRCUIT 286
Diagnosis Procedure 286

DLC BRANCH LINE CIRCUIT 287
Diagnosis Procedure 287

EPS BRANCH LINE CIRCUIT 288
Diagnosis Procedure 288

I-KEY BRANCH LINE CIRCUIT 289
Diagnosis Procedure 289

STRG BRANCH LINE CIRCUIT 290
Diagnosis Procedure 290

IPDM-E BRANCH LINE CIRCUIT 291
Diagnosis Procedure 291

CAN COMMUNICATION CIRCUIT 292
Diagnosis Procedure 292

CAN SYSTEM (TYPE 17)

COMPONENT DIAGNOSIS 294

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 294
Diagnosis Procedure 294

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 295
Diagnosis Procedure 295

ECM BRANCH LINE CIRCUIT 296
Diagnosis Procedure 296

ABS BRANCH LINE CIRCUIT 297
Diagnosis Procedure 297

BCM BRANCH LINE CIRCUIT 298
Diagnosis Procedure 298

M&A BRANCH LINE CIRCUIT 299
Diagnosis Procedure 299

DLC BRANCH LINE CIRCUIT 300
Diagnosis Procedure 300

EPS BRANCH LINE CIRCUIT 301
Diagnosis Procedure 301

IPDM-E BRANCH LINE CIRCUIT 302
Diagnosis Procedure 302

CAN COMMUNICATION CIRCUIT 303
Diagnosis Procedure 303

CAN SYSTEM (TYPE 18)

COMPONENT DIAGNOSIS 305

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 305
Diagnosis Procedure 305

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 306
Diagnosis Procedure 306

ECM BRANCH LINE CIRCUIT 307
Diagnosis Procedure 307

ABS BRANCH LINE CIRCUIT 308
Diagnosis Procedure 308

BCM BRANCH LINE CIRCUIT 309
Diagnosis Procedure 309

M&A BRANCH LINE CIRCUIT 310
Diagnosis Procedure 310

AV BRANCH LINE CIRCUIT 311
Diagnosis Procedure 311

DLC BRANCH LINE CIRCUIT 312
Diagnosis Procedure 312

EPS BRANCH LINE CIRCUIT 313
Diagnosis Procedure 313

IPDM-E BRANCH LINE CIRCUIT 314
Diagnosis Procedure 314

cardiagn.com

CAN COMMUNICATION CIRCUIT 315
Diagnosis Procedure 315

CAN SYSTEM (TYPE 19)

COMPONENT DIAGNOSIS 317

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 317
Diagnosis Procedure 317

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 318
Diagnosis Procedure 318

ECM BRANCH LINE CIRCUIT 319
Diagnosis Procedure 319

ABS BRANCH LINE CIRCUIT 320
Diagnosis Procedure 320

BCM BRANCH LINE CIRCUIT 321
Diagnosis Procedure 321

M&A BRANCH LINE CIRCUIT 322
Diagnosis Procedure 322

DLC BRANCH LINE CIRCUIT 323
Diagnosis Procedure 323

EPS BRANCH LINE CIRCUIT 324
Diagnosis Procedure 324

I-KEY BRANCH LINE CIRCUIT 325
Diagnosis Procedure 325

IPDM-E BRANCH LINE CIRCUIT 326
Diagnosis Procedure 326

CAN COMMUNICATION CIRCUIT 327
Diagnosis Procedure 327

CAN SYSTEM (TYPE 20)

COMPONENT DIAGNOSIS 329

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 329
Diagnosis Procedure 329

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 330
Diagnosis Procedure 330

ECM BRANCH LINE CIRCUIT 331
Diagnosis Procedure 331

ABS BRANCH LINE CIRCUIT 332
Diagnosis Procedure 332

BCM BRANCH LINE CIRCUIT 333
Diagnosis Procedure 333

M&A BRANCH LINE CIRCUIT 334
Diagnosis Procedure 334

AV BRANCH LINE CIRCUIT 335
Diagnosis Procedure 335

DLC BRANCH LINE CIRCUIT 336
Diagnosis Procedure 336

EPS BRANCH LINE CIRCUIT 337
Diagnosis Procedure 337

I-KEY BRANCH LINE CIRCUIT 338
Diagnosis Procedure 338

IPDM-E BRANCH LINE CIRCUIT 339
Diagnosis Procedure 339

CAN COMMUNICATION CIRCUIT 340
Diagnosis Procedure 340

CAN SYSTEM (TYPE 21)

COMPONENT DIAGNOSIS 342

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 342
Diagnosis Procedure 342

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 343
Diagnosis Procedure 343

ECM BRANCH LINE CIRCUIT 344
Diagnosis Procedure 344

ABS BRANCH LINE CIRCUIT 345
Diagnosis Procedure 345

BCM BRANCH LINE CIRCUIT 346
Diagnosis Procedure 346

M&A BRANCH LINE CIRCUIT 347
Diagnosis Procedure 347

DLC BRANCH LINE CIRCUIT 348
Diagnosis Procedure 348

EPS BRANCH LINE CIRCUIT 349
Diagnosis Procedure 349

STRG BRANCH LINE CIRCUIT 350
Diagnosis Procedure 350

IPDM-E BRANCH LINE CIRCUIT 351
Diagnosis Procedure 351

CAN COMMUNICATION CIRCUIT 352
Diagnosis Procedure 352

CAN SYSTEM (TYPE 22)

COMPONENT DIAGNOSIS 354

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 354
Diagnosis Procedure 354

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 355
Diagnosis Procedure 355

ECM BRANCH LINE CIRCUIT 356
Diagnosis Procedure 356

ABS BRANCH LINE CIRCUIT 357
Diagnosis Procedure 357

BCM BRANCH LINE CIRCUIT 358
Diagnosis Procedure 358

M&A BRANCH LINE CIRCUIT 359
Diagnosis Procedure 359

AV BRANCH LINE CIRCUIT 360
Diagnosis Procedure 360

DLC BRANCH LINE CIRCUIT 361
Diagnosis Procedure 361

EPS BRANCH LINE CIRCUIT 362
Diagnosis Procedure 362

STRG BRANCH LINE CIRCUIT 363
Diagnosis Procedure 363

IPDM-E BRANCH LINE CIRCUIT 364
Diagnosis Procedure 364

CAN COMMUNICATION CIRCUIT 365
Diagnosis Procedure 365

CAN SYSTEM (TYPE 23)

COMPONENT DIAGNOSIS 367

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 367
Diagnosis Procedure 367

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 368
Diagnosis Procedure 368

ECM BRANCH LINE CIRCUIT 369
Diagnosis Procedure 369

ABS BRANCH LINE CIRCUIT 370
Diagnosis Procedure 370

BCM BRANCH LINE CIRCUIT 371
Diagnosis Procedure 371

M&A BRANCH LINE CIRCUIT 372
Diagnosis Procedure 372

DLC BRANCH LINE CIRCUIT 373
Diagnosis Procedure 373

EPS BRANCH LINE CIRCUIT 374
Diagnosis Procedure 374

I-KEY BRANCH LINE CIRCUIT 375
Diagnosis Procedure 375

STRG BRANCH LINE CIRCUIT 376
Diagnosis Procedure 376

IPDM-E BRANCH LINE CIRCUIT 377
Diagnosis Procedure 377

CAN COMMUNICATION CIRCUIT 378
Diagnosis Procedure 378

CAN SYSTEM (TYPE 24)

COMPONENT DIAGNOSIS 380

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 380
Diagnosis Procedure 380

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 381
Diagnosis Procedure 381

ECM BRANCH LINE CIRCUIT 382
Diagnosis Procedure 382

ABS BRANCH LINE CIRCUIT 383
Diagnosis Procedure 383

BCM BRANCH LINE CIRCUIT 384
Diagnosis Procedure 384

M&A BRANCH LINE CIRCUIT 385
Diagnosis Procedure 385

AV BRANCH LINE CIRCUIT 386
Diagnosis Procedure 386

DLC BRANCH LINE CIRCUIT 387
Diagnosis Procedure 387

EPS BRANCH LINE CIRCUIT 388
Diagnosis Procedure 388

I-KEY BRANCH LINE CIRCUIT 389
Diagnosis Procedure 389

STRG BRANCH LINE CIRCUIT 390
Diagnosis Procedure 390

IPDM-E BRANCH LINE CIRCUIT 391
Diagnosis Procedure 391

CAN COMMUNICATION CIRCUIT 392
Diagnosis Procedure 392

CAN SYSTEM (TYPE 25)

COMPONENT DIAGNOSIS 394

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 394
Diagnosis Procedure 394

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 395
Diagnosis Procedure 395

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 396
Diagnosis Procedure 396

ECM BRANCH LINE CIRCUIT 397
Diagnosis Procedure 397

ABS BRANCH LINE CIRCUIT 398
Diagnosis Procedure 398

TCM BRANCH LINE CIRCUIT 399
Diagnosis Procedure 399

BCM BRANCH LINE CIRCUIT 400
Diagnosis Procedure 400

M&A BRANCH LINE CIRCUIT 401
Diagnosis Procedure 401

DLC BRANCH LINE CIRCUIT 402
Diagnosis Procedure 402

EPS BRANCH LINE CIRCUIT 403
Diagnosis Procedure 403

IPDM-E BRANCH LINE CIRCUIT 404
Diagnosis Procedure 404

CAN COMMUNICATION CIRCUIT 405
Diagnosis Procedure 405

CAN SYSTEM (TYPE 26)

COMPONENT DIAGNOSIS 407

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 407
Diagnosis Procedure 407

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 408
Diagnosis Procedure 408

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 409
Diagnosis Procedure 409

ECM BRANCH LINE CIRCUIT 410
Diagnosis Procedure 410

ABS BRANCH LINE CIRCUIT 411
Diagnosis Procedure 411

TCM BRANCH LINE CIRCUIT 412
Diagnosis Procedure 412

BCM BRANCH LINE CIRCUIT 413
Diagnosis Procedure 413

M&A BRANCH LINE CIRCUIT 414
Diagnosis Procedure 414

AV BRANCH LINE CIRCUIT 415
Diagnosis Procedure 415

DLC BRANCH LINE CIRCUIT 416
Diagnosis Procedure 416

EPS BRANCH LINE CIRCUIT 417
Diagnosis Procedure 417

IPDM-E BRANCH LINE CIRCUIT 418
Diagnosis Procedure 418

CAN COMMUNICATION CIRCUIT 419
Diagnosis Procedure 419

CAN SYSTEM (TYPE 27)

COMPONENT DIAGNOSIS 421

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 421
Diagnosis Procedure 421

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 422
Diagnosis Procedure 422

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 423
Diagnosis Procedure 423

ECM BRANCH LINE CIRCUIT 424
Diagnosis Procedure 424

ABS BRANCH LINE CIRCUIT 425
Diagnosis Procedure 425

TCM BRANCH LINE CIRCUIT 426
Diagnosis Procedure 426

BCM BRANCH LINE CIRCUIT 427
Diagnosis Procedure 427

M&A BRANCH LINE CIRCUIT 428
Diagnosis Procedure 428

DLC BRANCH LINE CIRCUIT 429
Diagnosis Procedure 429

EPS BRANCH LINE CIRCUIT 430
Diagnosis Procedure 430

I-KEY BRANCH LINE CIRCUIT 431
Diagnosis Procedure 431

IPDM-E BRANCH LINE CIRCUIT 432
Diagnosis Procedure 432

CAN COMMUNICATION CIRCUIT 433
Diagnosis Procedure 433

CAN SYSTEM (TYPE 28)

cardiagn.com

COMPONENT DIAGNOSIS 435

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 435
Diagnosis Procedure 435

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 436
Diagnosis Procedure 436

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 437
Diagnosis Procedure 437

ECM BRANCH LINE CIRCUIT 438
Diagnosis Procedure 438

ABS BRANCH LINE CIRCUIT 439
Diagnosis Procedure 439

TCM BRANCH LINE CIRCUIT 440
Diagnosis Procedure 440

BCM BRANCH LINE CIRCUIT 441
Diagnosis Procedure 441

M&A BRANCH LINE CIRCUIT 442
Diagnosis Procedure 442

AV BRANCH LINE CIRCUIT 443
Diagnosis Procedure 443

DLC BRANCH LINE CIRCUIT 444
Diagnosis Procedure 444

EPS BRANCH LINE CIRCUIT 445
Diagnosis Procedure 445

I-KEY BRANCH LINE CIRCUIT 446
Diagnosis Procedure 446

IPDM-E BRANCH LINE CIRCUIT 447
Diagnosis Procedure 447

CAN COMMUNICATION CIRCUIT 448
Diagnosis Procedure 448

CAN SYSTEM (TYPE 29)

COMPONENT DIAGNOSIS 450

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 450
Diagnosis Procedure 450

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 451
Diagnosis Procedure 451

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 452
Diagnosis Procedure 452

ECM BRANCH LINE CIRCUIT 453
Diagnosis Procedure 453

ABS BRANCH LINE CIRCUIT 454
Diagnosis Procedure 454

TCM BRANCH LINE CIRCUIT 455
Diagnosis Procedure 455

BCM BRANCH LINE CIRCUIT 456
Diagnosis Procedure 456

M&A BRANCH LINE CIRCUIT 457
Diagnosis Procedure 457

DLC BRANCH LINE CIRCUIT 458
Diagnosis Procedure 458

EPS BRANCH LINE CIRCUIT 459
Diagnosis Procedure 459

STRG BRANCH LINE CIRCUIT 460
Diagnosis Procedure 460

IPDM-E BRANCH LINE CIRCUIT 461
Diagnosis Procedure 461

CAN COMMUNICATION CIRCUIT 462
Diagnosis Procedure 462

CAN SYSTEM (TYPE 30)

COMPONENT DIAGNOSIS 464

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 464
Diagnosis Procedure 464

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 465
Diagnosis Procedure 465

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 466
Diagnosis Procedure 466

ECM BRANCH LINE CIRCUIT 467
Diagnosis Procedure 467

ABS BRANCH LINE CIRCUIT 468
Diagnosis Procedure 468

TCM BRANCH LINE CIRCUIT 469
Diagnosis Procedure 469

BCM BRANCH LINE CIRCUIT 470
Diagnosis Procedure 470

M&A BRANCH LINE CIRCUIT 471
Diagnosis Procedure 471

AV BRANCH LINE CIRCUIT 472
Diagnosis Procedure 472

DLC BRANCH LINE CIRCUIT 473

cardiagn.com

Diagnosis Procedure 473

EPS BRANCH LINE CIRCUIT 474
Diagnosis Procedure 474

STRG BRANCH LINE CIRCUIT 475
Diagnosis Procedure 475

IPDM-E BRANCH LINE CIRCUIT 476
Diagnosis Procedure 476

CAN COMMUNICATION CIRCUIT 477
Diagnosis Procedure 477

CAN SYSTEM (TYPE 31)

COMPONENT DIAGNOSIS 479

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 479
Diagnosis Procedure 479

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 480
Diagnosis Procedure 480

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 481
Diagnosis Procedure 481

ECM BRANCH LINE CIRCUIT 482
Diagnosis Procedure 482

ABS BRANCH LINE CIRCUIT 483
Diagnosis Procedure 483

TCM BRANCH LINE CIRCUIT 484
Diagnosis Procedure 484

BCM BRANCH LINE CIRCUIT 485
Diagnosis Procedure 485

M&A BRANCH LINE CIRCUIT 486
Diagnosis Procedure 486

DLC BRANCH LINE CIRCUIT 487
Diagnosis Procedure 487

EPS BRANCH LINE CIRCUIT 488
Diagnosis Procedure 488

I-KEY BRANCH LINE CIRCUIT 489
Diagnosis Procedure 489

STRG BRANCH LINE CIRCUIT 490
Diagnosis Procedure 490

IPDM-E BRANCH LINE CIRCUIT 491
Diagnosis Procedure 491

CAN COMMUNICATION CIRCUIT 492
Diagnosis Procedure 492

CAN SYSTEM (TYPE 32)

COMPONENT DIAGNOSIS 494

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 494
Diagnosis Procedure 494

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 495
Diagnosis Procedure 495

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 496
Diagnosis Procedure 496

ECM BRANCH LINE CIRCUIT 497
Diagnosis Procedure 497

ABS BRANCH LINE CIRCUIT 498
Diagnosis Procedure 498

TCM BRANCH LINE CIRCUIT 499
Diagnosis Procedure 499

BCM BRANCH LINE CIRCUIT 500
Diagnosis Procedure 500

M&A BRANCH LINE CIRCUIT 501
Diagnosis Procedure 501

AV BRANCH LINE CIRCUIT 502
Diagnosis Procedure 502

DLC BRANCH LINE CIRCUIT 503
Diagnosis Procedure 503

EPS BRANCH LINE CIRCUIT 504
Diagnosis Procedure 504

I-KEY BRANCH LINE CIRCUIT 505
Diagnosis Procedure 505

STRG BRANCH LINE CIRCUIT 506
Diagnosis Procedure 506

IPDM-E BRANCH LINE CIRCUIT 507
Diagnosis Procedure 507

CAN COMMUNICATION CIRCUIT 508
Diagnosis Procedure 508

CAN SYSTEM (TYPE 33)

COMPONENT DIAGNOSIS 510

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 510
Diagnosis Procedure 510

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 511
Diagnosis Procedure 511

ECM BRANCH LINE CIRCUIT 512
Diagnosis Procedure 512

cardiagn.com

ABS BRANCH LINE CIRCUIT 513
Diagnosis Procedure 513

4WD BRANCH LINE CIRCUIT 514
Diagnosis Procedure 514

BCM BRANCH LINE CIRCUIT 515
Diagnosis Procedure 515

M&A BRANCH LINE CIRCUIT 516
Diagnosis Procedure 516

DLC BRANCH LINE CIRCUIT 517
Diagnosis Procedure 517

EPS BRANCH LINE CIRCUIT 518
Diagnosis Procedure 518

IPDM-E BRANCH LINE CIRCUIT 519
Diagnosis Procedure 519

CAN COMMUNICATION CIRCUIT 520
Diagnosis Procedure 520

CAN SYSTEM (TYPE 34)

COMPONENT DIAGNOSIS 522

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 522
Diagnosis Procedure 522

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 523
Diagnosis Procedure 523

ECM BRANCH LINE CIRCUIT 524
Diagnosis Procedure 524

ABS BRANCH LINE CIRCUIT 525
Diagnosis Procedure 525

4WD BRANCH LINE CIRCUIT 526
Diagnosis Procedure 526

BCM BRANCH LINE CIRCUIT 527
Diagnosis Procedure 527

M&A BRANCH LINE CIRCUIT 528
Diagnosis Procedure 528

AV BRANCH LINE CIRCUIT 529
Diagnosis Procedure 529

DLC BRANCH LINE CIRCUIT 530
Diagnosis Procedure 530

EPS BRANCH LINE CIRCUIT 531
Diagnosis Procedure 531

IPDM-E BRANCH LINE CIRCUIT 532
Diagnosis Procedure 532

CAN COMMUNICATION CIRCUIT 533
Diagnosis Procedure 533

CAN SYSTEM (TYPE 35)

COMPONENT DIAGNOSIS 535

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 535
Diagnosis Procedure 535

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 536
Diagnosis Procedure 536

ECM BRANCH LINE CIRCUIT 537
Diagnosis Procedure 537

ABS BRANCH LINE CIRCUIT 538
Diagnosis Procedure 538

4WD BRANCH LINE CIRCUIT 539
Diagnosis Procedure 539

BCM BRANCH LINE CIRCUIT 540
Diagnosis Procedure 540

M&A BRANCH LINE CIRCUIT 541
Diagnosis Procedure 541

DLC BRANCH LINE CIRCUIT 542
Diagnosis Procedure 542

EPS BRANCH LINE CIRCUIT 543
Diagnosis Procedure 543

I-KEY BRANCH LINE CIRCUIT 544
Diagnosis Procedure 544

IPDM-E BRANCH LINE CIRCUIT 545
Diagnosis Procedure 545

CAN COMMUNICATION CIRCUIT 546
Diagnosis Procedure 546

CAN SYSTEM (TYPE 36)

COMPONENT DIAGNOSIS 548

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 548
Diagnosis Procedure 548

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 549
Diagnosis Procedure 549

ECM BRANCH LINE CIRCUIT 550
Diagnosis Procedure 550

ABS BRANCH LINE CIRCUIT 551
Diagnosis Procedure 551

4WD BRANCH LINE CIRCUIT 552
Diagnosis Procedure 552

cardiagn.com

BCM BRANCH LINE CIRCUIT 553
Diagnosis Procedure 553

M&A BRANCH LINE CIRCUIT 554
Diagnosis Procedure 554

AV BRANCH LINE CIRCUIT 555
Diagnosis Procedure 555

DLC BRANCH LINE CIRCUIT 556
Diagnosis Procedure 556

EPS BRANCH LINE CIRCUIT 557
Diagnosis Procedure 557

I-KEY BRANCH LINE CIRCUIT 558
Diagnosis Procedure 558

IPDM-E BRANCH LINE CIRCUIT 559
Diagnosis Procedure 559

CAN COMMUNICATION CIRCUIT 560
Diagnosis Procedure 560

CAN SYSTEM (TYPE 37)

COMPONENT DIAGNOSIS 562

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 562
Diagnosis Procedure 562

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 563
Diagnosis Procedure 563

ECM BRANCH LINE CIRCUIT 564
Diagnosis Procedure 564

ABS BRANCH LINE CIRCUIT 565
Diagnosis Procedure 565

4WD BRANCH LINE CIRCUIT 566
Diagnosis Procedure 566

BCM BRANCH LINE CIRCUIT 567
Diagnosis Procedure 567

M&A BRANCH LINE CIRCUIT 568
Diagnosis Procedure 568

DLC BRANCH LINE CIRCUIT 569
Diagnosis Procedure 569

EPS BRANCH LINE CIRCUIT 570
Diagnosis Procedure 570

STRG BRANCH LINE CIRCUIT 571
Diagnosis Procedure 571

IPDM-E BRANCH LINE CIRCUIT 572
Diagnosis Procedure 572

CAN COMMUNICATION CIRCUIT 573
Diagnosis Procedure 573

CAN SYSTEM (TYPE 38)

COMPONENT DIAGNOSIS 575

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 575
Diagnosis Procedure 575

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 576
Diagnosis Procedure 576

ECM BRANCH LINE CIRCUIT 577
Diagnosis Procedure 577

ABS BRANCH LINE CIRCUIT 578
Diagnosis Procedure 578

4WD BRANCH LINE CIRCUIT 579
Diagnosis Procedure 579

BCM BRANCH LINE CIRCUIT 580
Diagnosis Procedure 580

M&A BRANCH LINE CIRCUIT 581
Diagnosis Procedure 581

AV BRANCH LINE CIRCUIT 582
Diagnosis Procedure 582

DLC BRANCH LINE CIRCUIT 583
Diagnosis Procedure 583

EPS BRANCH LINE CIRCUIT 584
Diagnosis Procedure 584

STRG BRANCH LINE CIRCUIT 585
Diagnosis Procedure 585

IPDM-E BRANCH LINE CIRCUIT 586
Diagnosis Procedure 586

CAN COMMUNICATION CIRCUIT 587
Diagnosis Procedure 587

CAN SYSTEM (TYPE 39)

COMPONENT DIAGNOSIS 589

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 589
Diagnosis Procedure 589

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 590
Diagnosis Procedure 590

ECM BRANCH LINE CIRCUIT 591
Diagnosis Procedure 591

ABS BRANCH LINE CIRCUIT 592
Diagnosis Procedure 592

cardiagn.com

4WD BRANCH LINE CIRCUIT 593
Diagnosis Procedure 593

BCM BRANCH LINE CIRCUIT 594
Diagnosis Procedure 594

M&A BRANCH LINE CIRCUIT 595
Diagnosis Procedure 595

DLC BRANCH LINE CIRCUIT 596
Diagnosis Procedure 596

EPS BRANCH LINE CIRCUIT 597
Diagnosis Procedure 597

I-KEY BRANCH LINE CIRCUIT 598
Diagnosis Procedure 598

STRG BRANCH LINE CIRCUIT 599
Diagnosis Procedure 599

IPDM-E BRANCH LINE CIRCUIT 600
Diagnosis Procedure 600

CAN COMMUNICATION CIRCUIT 601
Diagnosis Procedure 601

CAN SYSTEM (TYPE 40)

COMPONENT DIAGNOSIS 603

MAIN LINE BETWEEN ABS AND DLC CIRCUIT 603
Diagnosis Procedure 603

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 604
Diagnosis Procedure 604

ECM BRANCH LINE CIRCUIT 605
Diagnosis Procedure 605

ABS BRANCH LINE CIRCUIT 606
Diagnosis Procedure 606

4WD BRANCH LINE CIRCUIT 607
Diagnosis Procedure 607

BCM BRANCH LINE CIRCUIT 608
Diagnosis Procedure 608

M&A BRANCH LINE CIRCUIT 609
Diagnosis Procedure 609

AV BRANCH LINE CIRCUIT 610
Diagnosis Procedure 610

DLC BRANCH LINE CIRCUIT 611
Diagnosis Procedure 611

EPS BRANCH LINE CIRCUIT 612
Diagnosis Procedure 612

I-KEY BRANCH LINE CIRCUIT 613
Diagnosis Procedure 613

STRG BRANCH LINE CIRCUIT 614
Diagnosis Procedure 614

IPDM-E BRANCH LINE CIRCUIT 615
Diagnosis Procedure 615

CAN COMMUNICATION CIRCUIT 616
Diagnosis Procedure 616

CAN SYSTEM (TYPE 41)

COMPONENT DIAGNOSIS 618

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 618
Diagnosis Procedure 618

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 619
Diagnosis Procedure 619

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 620
Diagnosis Procedure 620

ECM BRANCH LINE CIRCUIT 621
Diagnosis Procedure 621

ABS BRANCH LINE CIRCUIT 622
Diagnosis Procedure 622

TCM BRANCH LINE CIRCUIT 623
Diagnosis Procedure 623

4WD BRANCH LINE CIRCUIT 624
Diagnosis Procedure 624

BCM BRANCH LINE CIRCUIT 625
Diagnosis Procedure 625

M&A BRANCH LINE CIRCUIT 626
Diagnosis Procedure 626

DLC BRANCH LINE CIRCUIT 627
Diagnosis Procedure 627

EPS BRANCH LINE CIRCUIT 628
Diagnosis Procedure 628

IPDM-E BRANCH LINE CIRCUIT 629
Diagnosis Procedure 629

CAN COMMUNICATION CIRCUIT 630
Diagnosis Procedure 630

CAN SYSTEM (TYPE 42)

COMPONENT DIAGNOSIS 632

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 632
Diagnosis Procedure 632

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 633
Diagnosis Procedure 633

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 634
Diagnosis Procedure 634

ECM BRANCH LINE CIRCUIT 635
Diagnosis Procedure 635

ABS BRANCH LINE CIRCUIT 636
Diagnosis Procedure 636

TCM BRANCH LINE CIRCUIT 637
Diagnosis Procedure 637

4WD BRANCH LINE CIRCUIT 638
Diagnosis Procedure 638

BCM BRANCH LINE CIRCUIT 639
Diagnosis Procedure 639

M&A BRANCH LINE CIRCUIT 640
Diagnosis Procedure 640

AV BRANCH LINE CIRCUIT 641
Diagnosis Procedure 641

DLC BRANCH LINE CIRCUIT 642
Diagnosis Procedure 642

EPS BRANCH LINE CIRCUIT 643
Diagnosis Procedure 643

IPDM-E BRANCH LINE CIRCUIT 644
Diagnosis Procedure 644

CAN COMMUNICATION CIRCUIT 645
Diagnosis Procedure 645

CAN SYSTEM (TYPE 43)

COMPONENT DIAGNOSIS 647

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 647
Diagnosis Procedure 647

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 648
Diagnosis Procedure 648

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 649
Diagnosis Procedure 649

ECM BRANCH LINE CIRCUIT 650
Diagnosis Procedure 650

ABS BRANCH LINE CIRCUIT 651
Diagnosis Procedure 651

TCM BRANCH LINE CIRCUIT 652
Diagnosis Procedure 652

4WD BRANCH LINE CIRCUIT 653
Diagnosis Procedure 653

BCM BRANCH LINE CIRCUIT 654
Diagnosis Procedure 654

M&A BRANCH LINE CIRCUIT 655
Diagnosis Procedure 655

DLC BRANCH LINE CIRCUIT 656
Diagnosis Procedure 656

EPS BRANCH LINE CIRCUIT 657
Diagnosis Procedure 657

I-KEY BRANCH LINE CIRCUIT 658
Diagnosis Procedure 658

IPDM-E BRANCH LINE CIRCUIT 659
Diagnosis Procedure 659

CAN COMMUNICATION CIRCUIT 660
Diagnosis Procedure 660

CAN SYSTEM (TYPE 44)

COMPONENT DIAGNOSIS 662

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 662
Diagnosis Procedure 662

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 663
Diagnosis Procedure 663

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 664
Diagnosis Procedure 664

ECM BRANCH LINE CIRCUIT 665
Diagnosis Procedure 665

ABS BRANCH LINE CIRCUIT 666
Diagnosis Procedure 666

TCM BRANCH LINE CIRCUIT 667
Diagnosis Procedure 667

4WD BRANCH LINE CIRCUIT 668
Diagnosis Procedure 668

BCM BRANCH LINE CIRCUIT 669
Diagnosis Procedure 669

M&A BRANCH LINE CIRCUIT 670
Diagnosis Procedure 670

AV BRANCH LINE CIRCUIT 671
Diagnosis Procedure 671

DLC BRANCH LINE CIRCUIT 672

cardiagn.com

Diagnosis Procedure 672

EPS BRANCH LINE CIRCUIT 673
Diagnosis Procedure 673

I-KEY BRANCH LINE CIRCUIT 674
Diagnosis Procedure 674

IPDM-E BRANCH LINE CIRCUIT 675
Diagnosis Procedure 675

CAN COMMUNICATION CIRCUIT 676
Diagnosis Procedure 676

CAN SYSTEM (TYPE 45)

COMPONENT DIAGNOSIS 678

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 678
Diagnosis Procedure 678

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 679
Diagnosis Procedure 679

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 680
Diagnosis Procedure 680

ECM BRANCH LINE CIRCUIT 681
Diagnosis Procedure 681

ABS BRANCH LINE CIRCUIT 682
Diagnosis Procedure 682

TCM BRANCH LINE CIRCUIT 683
Diagnosis Procedure 683

4WD BRANCH LINE CIRCUIT 684
Diagnosis Procedure 684

BCM BRANCH LINE CIRCUIT 685
Diagnosis Procedure 685

M&A BRANCH LINE CIRCUIT 686
Diagnosis Procedure 686

DLC BRANCH LINE CIRCUIT 687
Diagnosis Procedure 687

EPS BRANCH LINE CIRCUIT 688
Diagnosis Procedure 688

STRG BRANCH LINE CIRCUIT 689
Diagnosis Procedure 689

IPDM-E BRANCH LINE CIRCUIT 690
Diagnosis Procedure 690

CAN COMMUNICATION CIRCUIT 691
Diagnosis Procedure 691

CAN SYSTEM (TYPE 46)

COMPONENT DIAGNOSIS 693

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 693
Diagnosis Procedure 693

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 694
Diagnosis Procedure 694

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 695
Diagnosis Procedure 695

ECM BRANCH LINE CIRCUIT 696
Diagnosis Procedure 696

ABS BRANCH LINE CIRCUIT 697
Diagnosis Procedure 697

TCM BRANCH LINE CIRCUIT 698
Diagnosis Procedure 698

4WD BRANCH LINE CIRCUIT 699
Diagnosis Procedure 699

BCM BRANCH LINE CIRCUIT 700
Diagnosis Procedure 700

M&A BRANCH LINE CIRCUIT 701
Diagnosis Procedure 701

AV BRANCH LINE CIRCUIT 702
Diagnosis Procedure 702

DLC BRANCH LINE CIRCUIT 703
Diagnosis Procedure 703

EPS BRANCH LINE CIRCUIT 704
Diagnosis Procedure 704

STRG BRANCH LINE CIRCUIT 705
Diagnosis Procedure 705

IPDM-E BRANCH LINE CIRCUIT 706
Diagnosis Procedure 706

CAN COMMUNICATION CIRCUIT 707
Diagnosis Procedure 707

CAN SYSTEM (TYPE 47)

COMPONENT DIAGNOSIS 709

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 709
Diagnosis Procedure 709

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 710
Diagnosis Procedure 710

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 711

cardiagn.com

Diagnosis Procedure 711

ECM BRANCH LINE CIRCUIT 712
Diagnosis Procedure 712

ABS BRANCH LINE CIRCUIT 713
Diagnosis Procedure 713

TCM BRANCH LINE CIRCUIT 714
Diagnosis Procedure 714

4WD BRANCH LINE CIRCUIT 715
Diagnosis Procedure 715

BCM BRANCH LINE CIRCUIT 716
Diagnosis Procedure 716

M&A BRANCH LINE CIRCUIT 717
Diagnosis Procedure 717

DLC BRANCH LINE CIRCUIT 718
Diagnosis Procedure 718

EPS BRANCH LINE CIRCUIT 719
Diagnosis Procedure 719

I-KEY BRANCH LINE CIRCUIT 720
Diagnosis Procedure 720

STRG BRANCH LINE CIRCUIT 721
Diagnosis Procedure 721

IPDM-E BRANCH LINE CIRCUIT 722
Diagnosis Procedure 722

CAN COMMUNICATION CIRCUIT 723
Diagnosis Procedure 723

CAN SYSTEM (TYPE 48)

COMPONENT DIAGNOSIS 725

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 725
Diagnosis Procedure 725

MAIN LINE BETWEEN TCM AND DLC CIRCUIT 726
Diagnosis Procedure 726

MAIN LINE BETWEEN DLC AND BCM CIRCUIT 727
Diagnosis Procedure 727

ECM BRANCH LINE CIRCUIT 728
Diagnosis Procedure 728

ABS BRANCH LINE CIRCUIT 729
Diagnosis Procedure 729

TCM BRANCH LINE CIRCUIT 730
Diagnosis Procedure 730

4WD BRANCH LINE CIRCUIT 731
Diagnosis Procedure 731

BCM BRANCH LINE CIRCUIT 732
Diagnosis Procedure 732

M&A BRANCH LINE CIRCUIT 733
Diagnosis Procedure 733

AV BRANCH LINE CIRCUIT 734
Diagnosis Procedure 734

DLC BRANCH LINE CIRCUIT 735
Diagnosis Procedure 735

EPS BRANCH LINE CIRCUIT 736
Diagnosis Procedure 736

I-KEY BRANCH LINE CIRCUIT 737
Diagnosis Procedure 737

STRG BRANCH LINE CIRCUIT 738
Diagnosis Procedure 738

IPDM-E BRANCH LINE CIRCUIT 739
Diagnosis Procedure 739

CAN COMMUNICATION CIRCUIT 740
Diagnosis Procedure 740

CAN SYSTEM (TYPE 49)

COMPONENT DIAGNOSIS 742

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 742
Diagnosis Procedure 742

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 744
Diagnosis Procedure 744

ECM BRANCH LINE CIRCUIT 745
Diagnosis Procedure 745

ABS BRANCH LINE CIRCUIT 746
Diagnosis Procedure 746

BCM BRANCH LINE CIRCUIT 747
Diagnosis Procedure 747

M&A BRANCH LINE CIRCUIT 748
Diagnosis Procedure 748

DLC BRANCH LINE CIRCUIT 749
Diagnosis Procedure 749

EPS BRANCH LINE CIRCUIT 750
Diagnosis Procedure 750

IPDM-E BRANCH LINE CIRCUIT 751
Diagnosis Procedure 751

CAN COMMUNICATION CIRCUIT 752
Diagnosis Procedure 752

cardiagn.com

CAN SYSTEM (TYPE 50)

COMPONENT DIAGNOSIS 754

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 754
Diagnosis Procedure 754

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 756
Diagnosis Procedure 756

ECM BRANCH LINE CIRCUIT 757
Diagnosis Procedure 757

ABS BRANCH LINE CIRCUIT 758
Diagnosis Procedure 758

BCM BRANCH LINE CIRCUIT 759
Diagnosis Procedure 759

M&A BRANCH LINE CIRCUIT 760
Diagnosis Procedure 760

AV BRANCH LINE CIRCUIT 761
Diagnosis Procedure 761

DLC BRANCH LINE CIRCUIT 762
Diagnosis Procedure 762

EPS BRANCH LINE CIRCUIT 763
Diagnosis Procedure 763

IPDM-E BRANCH LINE CIRCUIT 764
Diagnosis Procedure 764

CAN COMMUNICATION CIRCUIT 765
Diagnosis Procedure 765

CAN SYSTEM (TYPE 51)

COMPONENT DIAGNOSIS 767

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 767
Diagnosis Procedure 767

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 769
Diagnosis Procedure 769

ECM BRANCH LINE CIRCUIT 770
Diagnosis Procedure 770

ABS BRANCH LINE CIRCUIT 771
Diagnosis Procedure 771

BCM BRANCH LINE CIRCUIT 772
Diagnosis Procedure 772

M&A BRANCH LINE CIRCUIT 773
Diagnosis Procedure 773

DLC BRANCH LINE CIRCUIT 774
Diagnosis Procedure 774

EPS BRANCH LINE CIRCUIT 775
Diagnosis Procedure 775

I-KEY BRANCH LINE CIRCUIT 776
Diagnosis Procedure 776

IPDM-E BRANCH LINE CIRCUIT 777
Diagnosis Procedure 777

CAN COMMUNICATION CIRCUIT 778
Diagnosis Procedure 778

CAN SYSTEM (TYPE 52)

COMPONENT DIAGNOSIS 780

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 780
Diagnosis Procedure 780

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 782
Diagnosis Procedure 782

ECM BRANCH LINE CIRCUIT 783
Diagnosis Procedure 783

ABS BRANCH LINE CIRCUIT 784
Diagnosis Procedure 784

BCM BRANCH LINE CIRCUIT 785
Diagnosis Procedure 785

M&A BRANCH LINE CIRCUIT 786
Diagnosis Procedure 786

AV BRANCH LINE CIRCUIT 787
Diagnosis Procedure 787

DLC BRANCH LINE CIRCUIT 788
Diagnosis Procedure 788

EPS BRANCH LINE CIRCUIT 789
Diagnosis Procedure 789

I-KEY BRANCH LINE CIRCUIT 790
Diagnosis Procedure 790

IPDM-E BRANCH LINE CIRCUIT 791
Diagnosis Procedure 791

CAN COMMUNICATION CIRCUIT 792
Diagnosis Procedure 792

CAN SYSTEM (TYPE 53)

COMPONENT DIAGNOSIS 794

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 794
Diagnosis Procedure 794

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 796
Diagnosis Procedure 796

ECM BRANCH LINE CIRCUIT 797
Diagnosis Procedure 797

ABS BRANCH LINE CIRCUIT 798
Diagnosis Procedure 798

BCM BRANCH LINE CIRCUIT 799
Diagnosis Procedure 799

M&A BRANCH LINE CIRCUIT 800
Diagnosis Procedure 800

DLC BRANCH LINE CIRCUIT 801
Diagnosis Procedure 801

EPS BRANCH LINE CIRCUIT 802
Diagnosis Procedure 802

STRG BRANCH LINE CIRCUIT 803
Diagnosis Procedure 803

IPDM-E BRANCH LINE CIRCUIT 804
Diagnosis Procedure 804

CAN COMMUNICATION CIRCUIT 805
Diagnosis Procedure 805

CAN SYSTEM (TYPE 54)

COMPONENT DIAGNOSIS 807

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 807
Diagnosis Procedure 807

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 809
Diagnosis Procedure 809

ECM BRANCH LINE CIRCUIT 810
Diagnosis Procedure 810

ABS BRANCH LINE CIRCUIT 811
Diagnosis Procedure 811

BCM BRANCH LINE CIRCUIT 812
Diagnosis Procedure 812

M&A BRANCH LINE CIRCUIT 813
Diagnosis Procedure 813

AV BRANCH LINE CIRCUIT 814
Diagnosis Procedure 814

DLC BRANCH LINE CIRCUIT 815
Diagnosis Procedure 815

EPS BRANCH LINE CIRCUIT 816
Diagnosis Procedure 816

STRG BRANCH LINE CIRCUIT 817
Diagnosis Procedure 817

IPDM-E BRANCH LINE CIRCUIT 818
Diagnosis Procedure 818

CAN COMMUNICATION CIRCUIT 819
Diagnosis Procedure 819

CAN SYSTEM (TYPE 55)

COMPONENT DIAGNOSIS 821

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 821
Diagnosis Procedure 821

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 823
Diagnosis Procedure 823

ECM BRANCH LINE CIRCUIT 824
Diagnosis Procedure 824

ABS BRANCH LINE CIRCUIT 825
Diagnosis Procedure 825

BCM BRANCH LINE CIRCUIT 826
Diagnosis Procedure 826

M&A BRANCH LINE CIRCUIT 827
Diagnosis Procedure 827

DLC BRANCH LINE CIRCUIT 828
Diagnosis Procedure 828

EPS BRANCH LINE CIRCUIT 829
Diagnosis Procedure 829

I-KEY BRANCH LINE CIRCUIT 830
Diagnosis Procedure 830

STRG BRANCH LINE CIRCUIT 831
Diagnosis Procedure 831

IPDM-E BRANCH LINE CIRCUIT 832
Diagnosis Procedure 832

CAN COMMUNICATION CIRCUIT 833
Diagnosis Procedure 833

CAN SYSTEM (TYPE 56)

COMPONENT DIAGNOSIS 835

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 835
Diagnosis Procedure 835

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 837
Diagnosis Procedure 837

ECM BRANCH LINE CIRCUIT 838
Diagnosis Procedure 838

cardiagn.com

ABS BRANCH LINE CIRCUIT 839
Diagnosis Procedure 839

BCM BRANCH LINE CIRCUIT 840
Diagnosis Procedure 840

M&A BRANCH LINE CIRCUIT 841
Diagnosis Procedure 841

AV BRANCH LINE CIRCUIT 842
Diagnosis Procedure 842

DLC BRANCH LINE CIRCUIT 843
Diagnosis Procedure 843

EPS BRANCH LINE CIRCUIT 844
Diagnosis Procedure 844

I-KEY BRANCH LINE CIRCUIT 845
Diagnosis Procedure 845

STRG BRANCH LINE CIRCUIT 846
Diagnosis Procedure 846

IPDM-E BRANCH LINE CIRCUIT 847
Diagnosis Procedure 847

CAN COMMUNICATION CIRCUIT 848
Diagnosis Procedure 848

CAN SYSTEM (TYPE 57)

COMPONENT DIAGNOSIS 850

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 850
Diagnosis Procedure 850

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 852
Diagnosis Procedure 852

ECM BRANCH LINE CIRCUIT 853
Diagnosis Procedure 853

ABS BRANCH LINE CIRCUIT 854
Diagnosis Procedure 854

BCM BRANCH LINE CIRCUIT 855
Diagnosis Procedure 855

M&A BRANCH LINE CIRCUIT 856
Diagnosis Procedure 856

DLC BRANCH LINE CIRCUIT 857
Diagnosis Procedure 857

EPS BRANCH LINE CIRCUIT 858
Diagnosis Procedure 858

IPDM-E BRANCH LINE CIRCUIT 859
Diagnosis Procedure 859

CAN COMMUNICATION CIRCUIT 860
Diagnosis Procedure 860

CAN SYSTEM (TYPE 58)

COMPONENT DIAGNOSIS 862

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 862
Diagnosis Procedure 862

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 864
Diagnosis Procedure 864

ECM BRANCH LINE CIRCUIT 865
Diagnosis Procedure 865

ABS BRANCH LINE CIRCUIT 866
Diagnosis Procedure 866

BCM BRANCH LINE CIRCUIT 867
Diagnosis Procedure 867

M&A BRANCH LINE CIRCUIT 868
Diagnosis Procedure 868

AV BRANCH LINE CIRCUIT 869
Diagnosis Procedure 869

DLC BRANCH LINE CIRCUIT 870
Diagnosis Procedure 870

EPS BRANCH LINE CIRCUIT 871
Diagnosis Procedure 871

IPDM-E BRANCH LINE CIRCUIT 872
Diagnosis Procedure 872

CAN COMMUNICATION CIRCUIT 873
Diagnosis Procedure 873

CAN SYSTEM (TYPE 59)

COMPONENT DIAGNOSIS 875

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 875
Diagnosis Procedure 875

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 877
Diagnosis Procedure 877

ECM BRANCH LINE CIRCUIT 878
Diagnosis Procedure 878

ABS BRANCH LINE CIRCUIT 879
Diagnosis Procedure 879

BCM BRANCH LINE CIRCUIT 880
Diagnosis Procedure 880

M&A BRANCH LINE CIRCUIT 881
Diagnosis Procedure 881

cardiagn.com

DLC BRANCH LINE CIRCUIT 882
Diagnosis Procedure 882

EPS BRANCH LINE CIRCUIT 883
Diagnosis Procedure 883

I-KEY BRANCH LINE CIRCUIT 884
Diagnosis Procedure 884

IPDM-E BRANCH LINE CIRCUIT 885
Diagnosis Procedure 885

CAN COMMUNICATION CIRCUIT 886
Diagnosis Procedure 886

CAN SYSTEM (TYPE 60)

COMPONENT DIAGNOSIS 888

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 888
Diagnosis Procedure 888

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 890
Diagnosis Procedure 890

ECM BRANCH LINE CIRCUIT 891
Diagnosis Procedure 891

ABS BRANCH LINE CIRCUIT 892
Diagnosis Procedure 892

BCM BRANCH LINE CIRCUIT 893
Diagnosis Procedure 893

M&A BRANCH LINE CIRCUIT 894
Diagnosis Procedure 894

AV BRANCH LINE CIRCUIT 895
Diagnosis Procedure 895

DLC BRANCH LINE CIRCUIT 896
Diagnosis Procedure 896

EPS BRANCH LINE CIRCUIT 897
Diagnosis Procedure 897

I-KEY BRANCH LINE CIRCUIT 898
Diagnosis Procedure 898

IPDM-E BRANCH LINE CIRCUIT 899
Diagnosis Procedure 899

CAN COMMUNICATION CIRCUIT 900
Diagnosis Procedure 900

CAN SYSTEM (TYPE 61)

COMPONENT DIAGNOSIS 902

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 902
Diagnosis Procedure 902

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 904
Diagnosis Procedure 904

ECM BRANCH LINE CIRCUIT 905
Diagnosis Procedure 905

ABS BRANCH LINE CIRCUIT 906
Diagnosis Procedure 906

BCM BRANCH LINE CIRCUIT 907
Diagnosis Procedure 907

M&A BRANCH LINE CIRCUIT 908
Diagnosis Procedure 908

DLC BRANCH LINE CIRCUIT 909
Diagnosis Procedure 909

EPS BRANCH LINE CIRCUIT 910
Diagnosis Procedure 910

STRG BRANCH LINE CIRCUIT 911
Diagnosis Procedure 911

IPDM-E BRANCH LINE CIRCUIT 912
Diagnosis Procedure 912

CAN COMMUNICATION CIRCUIT 913
Diagnosis Procedure 913

CAN SYSTEM (TYPE 62)

COMPONENT DIAGNOSIS 915

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 915
Diagnosis Procedure 915

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 917
Diagnosis Procedure 917

ECM BRANCH LINE CIRCUIT 918
Diagnosis Procedure 918

ABS BRANCH LINE CIRCUIT 919
Diagnosis Procedure 919

BCM BRANCH LINE CIRCUIT 920
Diagnosis Procedure 920

M&A BRANCH LINE CIRCUIT 921
Diagnosis Procedure 921

AV BRANCH LINE CIRCUIT 922
Diagnosis Procedure 922

DLC BRANCH LINE CIRCUIT 923
Diagnosis Procedure 923

EPS BRANCH LINE CIRCUIT 924
Diagnosis Procedure 924

cardiagn.com

STRG BRANCH LINE CIRCUIT 925
Diagnosis Procedure 925

IPDM-E BRANCH LINE CIRCUIT 926
Diagnosis Procedure 926

CAN COMMUNICATION CIRCUIT 927
Diagnosis Procedure 927

CAN SYSTEM (TYPE 63)

COMPONENT DIAGNOSIS 929

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 929
Diagnosis Procedure 929

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 931
Diagnosis Procedure 931

ECM BRANCH LINE CIRCUIT 932
Diagnosis Procedure 932

ABS BRANCH LINE CIRCUIT 933
Diagnosis Procedure 933

BCM BRANCH LINE CIRCUIT 934
Diagnosis Procedure 934

M&A BRANCH LINE CIRCUIT 935
Diagnosis Procedure 935

DLC BRANCH LINE CIRCUIT 936
Diagnosis Procedure 936

EPS BRANCH LINE CIRCUIT 937
Diagnosis Procedure 937

I-KEY BRANCH LINE CIRCUIT 938
Diagnosis Procedure 938

STRG BRANCH LINE CIRCUIT 939
Diagnosis Procedure 939

IPDM-E BRANCH LINE CIRCUIT 940
Diagnosis Procedure 940

CAN COMMUNICATION CIRCUIT 941
Diagnosis Procedure 941

CAN SYSTEM (TYPE 64)

COMPONENT DIAGNOSIS 943

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 943
Diagnosis Procedure 943

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 945
Diagnosis Procedure 945

ECM BRANCH LINE CIRCUIT 946
Diagnosis Procedure 946

ABS BRANCH LINE CIRCUIT 947
Diagnosis Procedure 947

BCM BRANCH LINE CIRCUIT 948
Diagnosis Procedure 948

M&A BRANCH LINE CIRCUIT 949
Diagnosis Procedure 949

AV BRANCH LINE CIRCUIT 950
Diagnosis Procedure 950

DLC BRANCH LINE CIRCUIT 951
Diagnosis Procedure 951

EPS BRANCH LINE CIRCUIT 952
Diagnosis Procedure 952

I-KEY BRANCH LINE CIRCUIT 953
Diagnosis Procedure 953

STRG BRANCH LINE CIRCUIT 954
Diagnosis Procedure 954

IPDM-E BRANCH LINE CIRCUIT 955
Diagnosis Procedure 955

CAN COMMUNICATION CIRCUIT 956
Diagnosis Procedure 956

CAN SYSTEM (TYPE 65)

COMPONENT DIAGNOSIS 958

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 958
Diagnosis Procedure 958

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 960
Diagnosis Procedure 960

ECM BRANCH LINE CIRCUIT 961
Diagnosis Procedure 961

ABS BRANCH LINE CIRCUIT 962
Diagnosis Procedure 962

BCM BRANCH LINE CIRCUIT 963
Diagnosis Procedure 963

M&A BRANCH LINE CIRCUIT 964
Diagnosis Procedure 964

DLC BRANCH LINE CIRCUIT 965
Diagnosis Procedure 965

EPS BRANCH LINE CIRCUIT 966
Diagnosis Procedure 966

IPDM-E BRANCH LINE CIRCUIT 967
Diagnosis Procedure 967

CAN COMMUNICATION CIRCUIT 968

cardiagn.com

Diagnosis Procedure 968

CAN SYSTEM (TYPE 66)

COMPONENT DIAGNOSIS 970

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 970
Diagnosis Procedure 970

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 972
Diagnosis Procedure 972

ECM BRANCH LINE CIRCUIT 973
Diagnosis Procedure 973

ABS BRANCH LINE CIRCUIT 974
Diagnosis Procedure 974

BCM BRANCH LINE CIRCUIT 975
Diagnosis Procedure 975

M&A BRANCH LINE CIRCUIT 976
Diagnosis Procedure 976

AV BRANCH LINE CIRCUIT 977
Diagnosis Procedure 977

DLC BRANCH LINE CIRCUIT 978
Diagnosis Procedure 978

EPS BRANCH LINE CIRCUIT 979
Diagnosis Procedure 979

IPDM-E BRANCH LINE CIRCUIT 980
Diagnosis Procedure 980

CAN COMMUNICATION CIRCUIT 981
Diagnosis Procedure 981

CAN SYSTEM (TYPE 67)

COMPONENT DIAGNOSIS 983

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 983
Diagnosis Procedure 983

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 985
Diagnosis Procedure 985

ECM BRANCH LINE CIRCUIT 986
Diagnosis Procedure 986

ABS BRANCH LINE CIRCUIT 987
Diagnosis Procedure 987

BCM BRANCH LINE CIRCUIT 988
Diagnosis Procedure 988

M&A BRANCH LINE CIRCUIT 989
Diagnosis Procedure 989

DLC BRANCH LINE CIRCUIT 990
Diagnosis Procedure 990

EPS BRANCH LINE CIRCUIT 991
Diagnosis Procedure 991

I-KEY BRANCH LINE CIRCUIT 992
Diagnosis Procedure 992

IPDM-E BRANCH LINE CIRCUIT 993
Diagnosis Procedure 993

CAN COMMUNICATION CIRCUIT 994
Diagnosis Procedure 994

CAN SYSTEM (TYPE 68)

COMPONENT DIAGNOSIS 996

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 996
Diagnosis Procedure 996

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 998
Diagnosis Procedure 998

ECM BRANCH LINE CIRCUIT 999
Diagnosis Procedure 999

ABS BRANCH LINE CIRCUIT 1000
Diagnosis Procedure 1000

BCM BRANCH LINE CIRCUIT 1001
Diagnosis Procedure 1001

M&A BRANCH LINE CIRCUIT 1002
Diagnosis Procedure 1002

AV BRANCH LINE CIRCUIT 1003
Diagnosis Procedure 1003

DLC BRANCH LINE CIRCUIT 1004
Diagnosis Procedure 1004

EPS BRANCH LINE CIRCUIT 1005
Diagnosis Procedure 1005

I-KEY BRANCH LINE CIRCUIT 1006
Diagnosis Procedure 1006

IPDM-E BRANCH LINE CIRCUIT 1007
Diagnosis Procedure 1007

CAN COMMUNICATION CIRCUIT 1008
Diagnosis Procedure 1008

CAN SYSTEM (TYPE 69)

COMPONENT DIAGNOSIS 1010

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1010
Diagnosis Procedure 1010

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1012
Diagnosis Procedure 1012

ECM BRANCH LINE CIRCUIT 1013
Diagnosis Procedure 1013

ABS BRANCH LINE CIRCUIT 1014
Diagnosis Procedure 1014

BCM BRANCH LINE CIRCUIT 1015
Diagnosis Procedure 1015

M&A BRANCH LINE CIRCUIT 1016
Diagnosis Procedure 1016

DLC BRANCH LINE CIRCUIT 1017
Diagnosis Procedure 1017

EPS BRANCH LINE CIRCUIT 1018
Diagnosis Procedure 1018

STRG BRANCH LINE CIRCUIT 1019
Diagnosis Procedure 1019

IPDM-E BRANCH LINE CIRCUIT 1020
Diagnosis Procedure 1020

CAN COMMUNICATION CIRCUIT 1021
Diagnosis Procedure 1021

CAN SYSTEM (TYPE 70)

COMPONENT DIAGNOSIS 1023

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1023
Diagnosis Procedure 1023

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1025
Diagnosis Procedure 1025

ECM BRANCH LINE CIRCUIT 1026
Diagnosis Procedure 1026

ABS BRANCH LINE CIRCUIT 1027
Diagnosis Procedure 1027

BCM BRANCH LINE CIRCUIT 1028
Diagnosis Procedure 1028

M&A BRANCH LINE CIRCUIT 1029
Diagnosis Procedure 1029

AV BRANCH LINE CIRCUIT 1030
Diagnosis Procedure 1030

DLC BRANCH LINE CIRCUIT 1031
Diagnosis Procedure 1031

EPS BRANCH LINE CIRCUIT 1032
Diagnosis Procedure 1032

STRG BRANCH LINE CIRCUIT 1033
Diagnosis Procedure 1033

IPDM-E BRANCH LINE CIRCUIT 1034
Diagnosis Procedure 1034

CAN COMMUNICATION CIRCUIT 1035
Diagnosis Procedure 1035

CAN SYSTEM (TYPE 71)

COMPONENT DIAGNOSIS 1037

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1037
Diagnosis Procedure 1037

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1039
Diagnosis Procedure 1039

ECM BRANCH LINE CIRCUIT 1040
Diagnosis Procedure 1040

ABS BRANCH LINE CIRCUIT 1041
Diagnosis Procedure 1041

BCM BRANCH LINE CIRCUIT 1042
Diagnosis Procedure 1042

M&A BRANCH LINE CIRCUIT 1043
Diagnosis Procedure 1043

DLC BRANCH LINE CIRCUIT 1044
Diagnosis Procedure 1044

EPS BRANCH LINE CIRCUIT 1045
Diagnosis Procedure 1045

I-KEY BRANCH LINE CIRCUIT 1046
Diagnosis Procedure 1046

STRG BRANCH LINE CIRCUIT 1047
Diagnosis Procedure 1047

IPDM-E BRANCH LINE CIRCUIT 1048
Diagnosis Procedure 1048

CAN COMMUNICATION CIRCUIT 1049
Diagnosis Procedure 1049

CAN SYSTEM (TYPE 72)

COMPONENT DIAGNOSIS 1051

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1051
Diagnosis Procedure 1051

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1053
Diagnosis Procedure 1053

ECM BRANCH LINE CIRCUIT 1054
Diagnosis Procedure 1054

cardiagn.com

ABS BRANCH LINE CIRCUIT 1055
Diagnosis Procedure 1055

BCM BRANCH LINE CIRCUIT 1056
Diagnosis Procedure 1056

M&A BRANCH LINE CIRCUIT 1057
Diagnosis Procedure 1057

AV BRANCH LINE CIRCUIT 1058
Diagnosis Procedure 1058

DLC BRANCH LINE CIRCUIT 1059
Diagnosis Procedure 1059

EPS BRANCH LINE CIRCUIT 1060
Diagnosis Procedure 1060

I-KEY BRANCH LINE CIRCUIT 1061
Diagnosis Procedure 1061

STRG BRANCH LINE CIRCUIT 1062
Diagnosis Procedure 1062

IPDM-E BRANCH LINE CIRCUIT 1063
Diagnosis Procedure 1063

CAN COMMUNICATION CIRCUIT 1064
Diagnosis Procedure 1064

CAN SYSTEM (TYPE 73)

COMPONENT DIAGNOSIS 1066

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1066
Diagnosis Procedure 1066

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1067
Diagnosis Procedure 1067

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1068
Diagnosis Procedure 1068

ECM BRANCH LINE CIRCUIT 1069
Diagnosis Procedure 1069

ABS BRANCH LINE CIRCUIT 1070
Diagnosis Procedure 1070

TCM BRANCH LINE CIRCUIT 1071
Diagnosis Procedure 1071

BCM BRANCH LINE CIRCUIT 1072
Diagnosis Procedure 1072

M&A BRANCH LINE CIRCUIT 1073
Diagnosis Procedure 1073

DLC BRANCH LINE CIRCUIT 1074
Diagnosis Procedure 1074

EPS BRANCH LINE CIRCUIT 1075
Diagnosis Procedure 1075

IPDM-E BRANCH LINE CIRCUIT 1076
Diagnosis Procedure 1076

CAN COMMUNICATION CIRCUIT 1077
Diagnosis Procedure 1077

CAN SYSTEM (TYPE 74)

COMPONENT DIAGNOSIS 1079

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1079
Diagnosis Procedure 1079

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1080
Diagnosis Procedure 1080

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1081
Diagnosis Procedure 1081

ECM BRANCH LINE CIRCUIT 1082
Diagnosis Procedure 1082

ABS BRANCH LINE CIRCUIT 1083
Diagnosis Procedure 1083

TCM BRANCH LINE CIRCUIT 1084
Diagnosis Procedure 1084

BCM BRANCH LINE CIRCUIT 1085
Diagnosis Procedure 1085

M&A BRANCH LINE CIRCUIT 1086
Diagnosis Procedure 1086

AV BRANCH LINE CIRCUIT 1087
Diagnosis Procedure 1087

DLC BRANCH LINE CIRCUIT 1088
Diagnosis Procedure 1088

EPS BRANCH LINE CIRCUIT 1089
Diagnosis Procedure 1089

IPDM-E BRANCH LINE CIRCUIT 1090
Diagnosis Procedure 1090

CAN COMMUNICATION CIRCUIT 1091
Diagnosis Procedure 1091

CAN SYSTEM (TYPE 75)

COMPONENT DIAGNOSIS 1093

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1093
Diagnosis Procedure 1093

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1094
Diagnosis Procedure 1094

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1095
Diagnosis Procedure 1095

ECM BRANCH LINE CIRCUIT 1096
Diagnosis Procedure 1096

ABS BRANCH LINE CIRCUIT 1097
Diagnosis Procedure 1097

TCM BRANCH LINE CIRCUIT 1098
Diagnosis Procedure 1098

BCM BRANCH LINE CIRCUIT 1099
Diagnosis Procedure 1099

M&A BRANCH LINE CIRCUIT 1100
Diagnosis Procedure 1100

DLC BRANCH LINE CIRCUIT 1101
Diagnosis Procedure 1101

EPS BRANCH LINE CIRCUIT 1102
Diagnosis Procedure 1102

I-KEY BRANCH LINE CIRCUIT 1103
Diagnosis Procedure 1103

IPDM-E BRANCH LINE CIRCUIT 1104
Diagnosis Procedure 1104

CAN COMMUNICATION CIRCUIT 1105
Diagnosis Procedure 1105

CAN SYSTEM (TYPE 76)

COMPONENT DIAGNOSIS 1107

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1107
Diagnosis Procedure 1107

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1108
Diagnosis Procedure 1108

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1109
Diagnosis Procedure 1109

ECM BRANCH LINE CIRCUIT 1110
Diagnosis Procedure 1110

ABS BRANCH LINE CIRCUIT 1111
Diagnosis Procedure 1111

TCM BRANCH LINE CIRCUIT 1112
Diagnosis Procedure 1112

BCM BRANCH LINE CIRCUIT 1113
Diagnosis Procedure 1113

M&A BRANCH LINE CIRCUIT 1114
Diagnosis Procedure 1114

AV BRANCH LINE CIRCUIT 1115
Diagnosis Procedure 1115

DLC BRANCH LINE CIRCUIT 1116
Diagnosis Procedure 1116

EPS BRANCH LINE CIRCUIT 1117
Diagnosis Procedure 1117

I-KEY BRANCH LINE CIRCUIT 1118
Diagnosis Procedure 1118

IPDM-E BRANCH LINE CIRCUIT 1119
Diagnosis Procedure 1119

CAN COMMUNICATION CIRCUIT 1120
Diagnosis Procedure 1120

CAN SYSTEM (TYPE 77)

COMPONENT DIAGNOSIS 1122

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1122
Diagnosis Procedure 1122

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1123
Diagnosis Procedure 1123

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1124
Diagnosis Procedure 1124

ECM BRANCH LINE CIRCUIT 1125
Diagnosis Procedure 1125

ABS BRANCH LINE CIRCUIT 1126
Diagnosis Procedure 1126

TCM BRANCH LINE CIRCUIT 1127
Diagnosis Procedure 1127

BCM BRANCH LINE CIRCUIT 1128
Diagnosis Procedure 1128

M&A BRANCH LINE CIRCUIT 1129
Diagnosis Procedure 1129

DLC BRANCH LINE CIRCUIT 1130
Diagnosis Procedure 1130

EPS BRANCH LINE CIRCUIT 1131
Diagnosis Procedure 1131

STRG BRANCH LINE CIRCUIT 1132
Diagnosis Procedure 1132

IPDM-E BRANCH LINE CIRCUIT 1133

cardiagn.com

Diagnosis Procedure 1133

CAN COMMUNICATION CIRCUIT 1134
Diagnosis Procedure 1134

CAN SYSTEM (TYPE 78)

COMPONENT DIAGNOSIS 1136

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1136
Diagnosis Procedure 1136

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1137
Diagnosis Procedure 1137

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1138
Diagnosis Procedure 1138

ECM BRANCH LINE CIRCUIT 1139
Diagnosis Procedure 1139

ABS BRANCH LINE CIRCUIT 1140
Diagnosis Procedure 1140

TCM BRANCH LINE CIRCUIT 1141
Diagnosis Procedure 1141

BCM BRANCH LINE CIRCUIT 1142
Diagnosis Procedure 1142

M&A BRANCH LINE CIRCUIT 1143
Diagnosis Procedure 1143

AV BRANCH LINE CIRCUIT 1144
Diagnosis Procedure 1144

DLC BRANCH LINE CIRCUIT 1145
Diagnosis Procedure 1145

EPS BRANCH LINE CIRCUIT 1146
Diagnosis Procedure 1146

STRG BRANCH LINE CIRCUIT 1147
Diagnosis Procedure 1147

IPDM-E BRANCH LINE CIRCUIT 1148
Diagnosis Procedure 1148

CAN COMMUNICATION CIRCUIT 1149
Diagnosis Procedure 1149

CAN SYSTEM (TYPE 79)

COMPONENT DIAGNOSIS 1151

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1151
Diagnosis Procedure 1151

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1152
Diagnosis Procedure 1152

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1153
Diagnosis Procedure 1153

ECM BRANCH LINE CIRCUIT 1154
Diagnosis Procedure 1154

ABS BRANCH LINE CIRCUIT 1155
Diagnosis Procedure 1155

TCM BRANCH LINE CIRCUIT 1156
Diagnosis Procedure 1156

BCM BRANCH LINE CIRCUIT 1157
Diagnosis Procedure 1157

M&A BRANCH LINE CIRCUIT 1158
Diagnosis Procedure 1158

DLC BRANCH LINE CIRCUIT 1159
Diagnosis Procedure 1159

EPS BRANCH LINE CIRCUIT 1160
Diagnosis Procedure 1160

I-KEY BRANCH LINE CIRCUIT 1161
Diagnosis Procedure 1161

STRG BRANCH LINE CIRCUIT 1162
Diagnosis Procedure 1162

IPDM-E BRANCH LINE CIRCUIT 1163
Diagnosis Procedure 1163

CAN COMMUNICATION CIRCUIT 1164
Diagnosis Procedure 1164

CAN SYSTEM (TYPE 80)

COMPONENT DIAGNOSIS 1166

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1166
Diagnosis Procedure 1166

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1167
Diagnosis Procedure 1167

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1168
Diagnosis Procedure 1168

ECM BRANCH LINE CIRCUIT 1169
Diagnosis Procedure 1169

ABS BRANCH LINE CIRCUIT 1170
Diagnosis Procedure 1170

TCM BRANCH LINE CIRCUIT 1171
Diagnosis Procedure 1171

BCM BRANCH LINE CIRCUIT 1172
Diagnosis Procedure 1172

cardiagn.com

M&A BRANCH LINE CIRCUIT 1173
Diagnosis Procedure 1173

AV BRANCH LINE CIRCUIT 1174
Diagnosis Procedure 1174

DLC BRANCH LINE CIRCUIT 1175
Diagnosis Procedure 1175

EPS BRANCH LINE CIRCUIT 1176
Diagnosis Procedure 1176

I-KEY BRANCH LINE CIRCUIT 1177
Diagnosis Procedure 1177

STRG BRANCH LINE CIRCUIT 1178
Diagnosis Procedure 1178

IPDM-E BRANCH LINE CIRCUIT 1179
Diagnosis Procedure 1179

CAN COMMUNICATION CIRCUIT 1180
Diagnosis Procedure 1180

CAN SYSTEM (TYPE 81)

COMPONENT DIAGNOSIS 1182

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1182
Diagnosis Procedure 1182

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1184
Diagnosis Procedure 1184

ECM BRANCH LINE CIRCUIT 1185
Diagnosis Procedure 1185

ABS BRANCH LINE CIRCUIT 1186
Diagnosis Procedure 1186

4WD BRANCH LINE CIRCUIT 1187
Diagnosis Procedure 1187

BCM BRANCH LINE CIRCUIT 1188
Diagnosis Procedure 1188

M&A BRANCH LINE CIRCUIT 1189
Diagnosis Procedure 1189

DLC BRANCH LINE CIRCUIT 1190
Diagnosis Procedure 1190

EPS BRANCH LINE CIRCUIT 1191
Diagnosis Procedure 1191

IPDM-E BRANCH LINE CIRCUIT 1192
Diagnosis Procedure 1192

CAN COMMUNICATION CIRCUIT 1193
Diagnosis Procedure 1193

CAN SYSTEM (TYPE 82)

COMPONENT DIAGNOSIS 1195

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1195
Diagnosis Procedure 1195

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1197
Diagnosis Procedure 1197

ECM BRANCH LINE CIRCUIT 1198
Diagnosis Procedure 1198

ABS BRANCH LINE CIRCUIT 1199
Diagnosis Procedure 1199

4WD BRANCH LINE CIRCUIT 1200
Diagnosis Procedure 1200

BCM BRANCH LINE CIRCUIT 1201
Diagnosis Procedure 1201

M&A BRANCH LINE CIRCUIT 1202
Diagnosis Procedure 1202

AV BRANCH LINE CIRCUIT 1203
Diagnosis Procedure 1203

DLC BRANCH LINE CIRCUIT 1204
Diagnosis Procedure 1204

EPS BRANCH LINE CIRCUIT 1205
Diagnosis Procedure 1205

IPDM-E BRANCH LINE CIRCUIT 1206
Diagnosis Procedure 1206

CAN COMMUNICATION CIRCUIT 1207
Diagnosis Procedure 1207

CAN SYSTEM (TYPE 83)

COMPONENT DIAGNOSIS 1209

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1209
Diagnosis Procedure 1209

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1211
Diagnosis Procedure 1211

ECM BRANCH LINE CIRCUIT 1212
Diagnosis Procedure 1212

ABS BRANCH LINE CIRCUIT 1213
Diagnosis Procedure 1213

4WD BRANCH LINE CIRCUIT 1214
Diagnosis Procedure 1214

BCM BRANCH LINE CIRCUIT 1215
Diagnosis Procedure 1215

cardiagn.com

M&A BRANCH LINE CIRCUIT 1216
Diagnosis Procedure 1216

DLC BRANCH LINE CIRCUIT 1217
Diagnosis Procedure 1217

EPS BRANCH LINE CIRCUIT 1218
Diagnosis Procedure 1218

I-KEY BRANCH LINE CIRCUIT 1219
Diagnosis Procedure 1219

IPDM-E BRANCH LINE CIRCUIT 1220
Diagnosis Procedure 1220

CAN COMMUNICATION CIRCUIT 1221
Diagnosis Procedure 1221

CAN SYSTEM (TYPE 84)

COMPONENT DIAGNOSIS 1223

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1223
Diagnosis Procedure 1223

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1225
Diagnosis Procedure 1225

ECM BRANCH LINE CIRCUIT 1226
Diagnosis Procedure 1226

ABS BRANCH LINE CIRCUIT 1227
Diagnosis Procedure 1227

4WD BRANCH LINE CIRCUIT 1228
Diagnosis Procedure 1228

BCM BRANCH LINE CIRCUIT 1229
Diagnosis Procedure 1229

M&A BRANCH LINE CIRCUIT 1230
Diagnosis Procedure 1230

AV BRANCH LINE CIRCUIT 1231
Diagnosis Procedure 1231

DLC BRANCH LINE CIRCUIT 1232
Diagnosis Procedure 1232

EPS BRANCH LINE CIRCUIT 1233
Diagnosis Procedure 1233

I-KEY BRANCH LINE CIRCUIT 1234
Diagnosis Procedure 1234

IPDM-E BRANCH LINE CIRCUIT 1235
Diagnosis Procedure 1235

CAN COMMUNICATION CIRCUIT 1236
Diagnosis Procedure 1236

CAN SYSTEM (TYPE 85)

COMPONENT DIAGNOSIS 1238

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1238
Diagnosis Procedure 1238

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1240
Diagnosis Procedure 1240

ECM BRANCH LINE CIRCUIT 1241
Diagnosis Procedure 1241

ABS BRANCH LINE CIRCUIT 1242
Diagnosis Procedure 1242

4WD BRANCH LINE CIRCUIT 1243
Diagnosis Procedure 1243

BCM BRANCH LINE CIRCUIT 1244
Diagnosis Procedure 1244

M&A BRANCH LINE CIRCUIT 1245
Diagnosis Procedure 1245

DLC BRANCH LINE CIRCUIT 1246
Diagnosis Procedure 1246

EPS BRANCH LINE CIRCUIT 1247
Diagnosis Procedure 1247

STRG BRANCH LINE CIRCUIT 1248
Diagnosis Procedure 1248

IPDM-E BRANCH LINE CIRCUIT 1249
Diagnosis Procedure 1249

CAN COMMUNICATION CIRCUIT 1250
Diagnosis Procedure 1250

CAN SYSTEM (TYPE 86)

COMPONENT DIAGNOSIS 1252

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1252
Diagnosis Procedure 1252

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1254
Diagnosis Procedure 1254

ECM BRANCH LINE CIRCUIT 1255
Diagnosis Procedure 1255

ABS BRANCH LINE CIRCUIT 1256
Diagnosis Procedure 1256

4WD BRANCH LINE CIRCUIT 1257
Diagnosis Procedure 1257

BCM BRANCH LINE CIRCUIT 1258
Diagnosis Procedure 1258

cardiagn.com

M&A BRANCH LINE CIRCUIT 1259
Diagnosis Procedure 1259

AV BRANCH LINE CIRCUIT 1260
Diagnosis Procedure 1260

DLC BRANCH LINE CIRCUIT 1261
Diagnosis Procedure 1261

EPS BRANCH LINE CIRCUIT 1262
Diagnosis Procedure 1262

STRG BRANCH LINE CIRCUIT 1263
Diagnosis Procedure 1263

IPDM-E BRANCH LINE CIRCUIT 1264
Diagnosis Procedure 1264

CAN COMMUNICATION CIRCUIT 1265
Diagnosis Procedure 1265

CAN SYSTEM (TYPE 87)

COMPONENT DIAGNOSIS 1267

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1267
Diagnosis Procedure 1267

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1269
Diagnosis Procedure 1269

ECM BRANCH LINE CIRCUIT 1270
Diagnosis Procedure 1270

ABS BRANCH LINE CIRCUIT 1271
Diagnosis Procedure 1271

4WD BRANCH LINE CIRCUIT 1272
Diagnosis Procedure 1272

BCM BRANCH LINE CIRCUIT 1273
Diagnosis Procedure 1273

M&A BRANCH LINE CIRCUIT 1274
Diagnosis Procedure 1274

DLC BRANCH LINE CIRCUIT 1275
Diagnosis Procedure 1275

EPS BRANCH LINE CIRCUIT 1276
Diagnosis Procedure 1276

I-KEY BRANCH LINE CIRCUIT 1277
Diagnosis Procedure 1277

STRG BRANCH LINE CIRCUIT 1278
Diagnosis Procedure 1278

IPDM-E BRANCH LINE CIRCUIT 1279
Diagnosis Procedure 1279

CAN COMMUNICATION CIRCUIT 1280
Diagnosis Procedure 1280

CAN SYSTEM (TYPE 88)

COMPONENT DIAGNOSIS 1282

MAIN LINE BETWEEN ABS AND BCM CIRCUIT 1282
Diagnosis Procedure 1282

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1284
Diagnosis Procedure 1284

ECM BRANCH LINE CIRCUIT 1285
Diagnosis Procedure 1285

ABS BRANCH LINE CIRCUIT 1286
Diagnosis Procedure 1286

4WD BRANCH LINE CIRCUIT 1287
Diagnosis Procedure 1287

BCM BRANCH LINE CIRCUIT 1288
Diagnosis Procedure 1288

M&A BRANCH LINE CIRCUIT 1289
Diagnosis Procedure 1289

AV BRANCH LINE CIRCUIT 1290
Diagnosis Procedure 1290

DLC BRANCH LINE CIRCUIT 1291
Diagnosis Procedure 1291

EPS BRANCH LINE CIRCUIT 1292
Diagnosis Procedure 1292

I-KEY BRANCH LINE CIRCUIT 1293
Diagnosis Procedure 1293

STRG BRANCH LINE CIRCUIT 1294
Diagnosis Procedure 1294

IPDM-E BRANCH LINE CIRCUIT 1295
Diagnosis Procedure 1295

CAN COMMUNICATION CIRCUIT 1296
Diagnosis Procedure 1296

CAN SYSTEM (TYPE 89)

COMPONENT DIAGNOSIS 1298

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1298
Diagnosis Procedure 1298

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1299
Diagnosis Procedure 1299

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1300
Diagnosis Procedure 1300

cardiagn.com

ECM BRANCH LINE CIRCUIT 1301
Diagnosis Procedure 1301

ABS BRANCH LINE CIRCUIT 1302
Diagnosis Procedure 1302

TCM BRANCH LINE CIRCUIT 1303
Diagnosis Procedure 1303

4WD BRANCH LINE CIRCUIT 1304
Diagnosis Procedure 1304

BCM BRANCH LINE CIRCUIT 1305
Diagnosis Procedure 1305

M&A BRANCH LINE CIRCUIT 1306
Diagnosis Procedure 1306

DLC BRANCH LINE CIRCUIT 1307
Diagnosis Procedure 1307

EPS BRANCH LINE CIRCUIT 1308
Diagnosis Procedure 1308

IPDM-E BRANCH LINE CIRCUIT 1309
Diagnosis Procedure 1309

CAN COMMUNICATION CIRCUIT 1310
Diagnosis Procedure 1310

CAN SYSTEM (TYPE 90)

COMPONENT DIAGNOSIS 1312

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1312
Diagnosis Procedure 1312

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1313
Diagnosis Procedure 1313

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1314
Diagnosis Procedure 1314

ECM BRANCH LINE CIRCUIT 1315
Diagnosis Procedure 1315

ABS BRANCH LINE CIRCUIT 1316
Diagnosis Procedure 1316

TCM BRANCH LINE CIRCUIT 1317
Diagnosis Procedure 1317

4WD BRANCH LINE CIRCUIT 1318
Diagnosis Procedure 1318

BCM BRANCH LINE CIRCUIT 1319
Diagnosis Procedure 1319

M&A BRANCH LINE CIRCUIT 1320
Diagnosis Procedure 1320

AV BRANCH LINE CIRCUIT 1321
Diagnosis Procedure 1321

DLC BRANCH LINE CIRCUIT 1322
Diagnosis Procedure 1322

EPS BRANCH LINE CIRCUIT 1323
Diagnosis Procedure 1323

IPDM-E BRANCH LINE CIRCUIT 1324
Diagnosis Procedure 1324

CAN COMMUNICATION CIRCUIT 1325
Diagnosis Procedure 1325

CAN SYSTEM (TYPE 91)

COMPONENT DIAGNOSIS 1327

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1327
Diagnosis Procedure 1327

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1328
Diagnosis Procedure 1328

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1329
Diagnosis Procedure 1329

ECM BRANCH LINE CIRCUIT 1330
Diagnosis Procedure 1330

ABS BRANCH LINE CIRCUIT 1331
Diagnosis Procedure 1331

TCM BRANCH LINE CIRCUIT 1332
Diagnosis Procedure 1332

4WD BRANCH LINE CIRCUIT 1333
Diagnosis Procedure 1333

BCM BRANCH LINE CIRCUIT 1334
Diagnosis Procedure 1334

M&A BRANCH LINE CIRCUIT 1335
Diagnosis Procedure 1335

DLC BRANCH LINE CIRCUIT 1336
Diagnosis Procedure 1336

EPS BRANCH LINE CIRCUIT 1337
Diagnosis Procedure 1337

I-KEY BRANCH LINE CIRCUIT 1338
Diagnosis Procedure 1338

IPDM-E BRANCH LINE CIRCUIT 1339
Diagnosis Procedure 1339

CAN COMMUNICATION CIRCUIT 1340
Diagnosis Procedure 1340

CAN SYSTEM (TYPE 92)

cardiagn.com

COMPONENT DIAGNOSIS 1342

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1342
Diagnosis Procedure 1342

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1343
Diagnosis Procedure 1343

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1344
Diagnosis Procedure 1344

ECM BRANCH LINE CIRCUIT 1345
Diagnosis Procedure 1345

ABS BRANCH LINE CIRCUIT 1346
Diagnosis Procedure 1346

TCM BRANCH LINE CIRCUIT 1347
Diagnosis Procedure 1347

4WD BRANCH LINE CIRCUIT 1348
Diagnosis Procedure 1348

BCM BRANCH LINE CIRCUIT 1349
Diagnosis Procedure 1349

M&A BRANCH LINE CIRCUIT 1350
Diagnosis Procedure 1350

AV BRANCH LINE CIRCUIT 1351
Diagnosis Procedure 1351

DLC BRANCH LINE CIRCUIT 1352
Diagnosis Procedure 1352

EPS BRANCH LINE CIRCUIT 1353
Diagnosis Procedure 1353

I-KEY BRANCH LINE CIRCUIT 1354
Diagnosis Procedure 1354

IPDM-E BRANCH LINE CIRCUIT 1355
Diagnosis Procedure 1355

CAN COMMUNICATION CIRCUIT 1356
Diagnosis Procedure 1356

CAN SYSTEM (TYPE 93)

COMPONENT DIAGNOSIS 1358

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1358
Diagnosis Procedure 1358

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1359
Diagnosis Procedure 1359

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1360
Diagnosis Procedure 1360

ECM BRANCH LINE CIRCUIT 1361
Diagnosis Procedure 1361

ABS BRANCH LINE CIRCUIT 1362
Diagnosis Procedure 1362

TCM BRANCH LINE CIRCUIT 1363
Diagnosis Procedure 1363

4WD BRANCH LINE CIRCUIT 1364
Diagnosis Procedure 1364

BCM BRANCH LINE CIRCUIT 1365
Diagnosis Procedure 1365

M&A BRANCH LINE CIRCUIT 1366
Diagnosis Procedure 1366

DLC BRANCH LINE CIRCUIT 1367
Diagnosis Procedure 1367

EPS BRANCH LINE CIRCUIT 1368
Diagnosis Procedure 1368

STRG BRANCH LINE CIRCUIT 1369
Diagnosis Procedure 1369

IPDM-E BRANCH LINE CIRCUIT 1370
Diagnosis Procedure 1370

CAN COMMUNICATION CIRCUIT 1371
Diagnosis Procedure 1371

CAN SYSTEM (TYPE 94)

COMPONENT DIAGNOSIS 1373

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1373
Diagnosis Procedure 1373

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1374
Diagnosis Procedure 1374

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1375
Diagnosis Procedure 1375

ECM BRANCH LINE CIRCUIT 1376
Diagnosis Procedure 1376

ABS BRANCH LINE CIRCUIT 1377
Diagnosis Procedure 1377

TCM BRANCH LINE CIRCUIT 1378
Diagnosis Procedure 1378

4WD BRANCH LINE CIRCUIT 1379
Diagnosis Procedure 1379

BCM BRANCH LINE CIRCUIT 1380

cardiagn.com

Diagnosis Procedure 1380

M&A BRANCH LINE CIRCUIT 1381
Diagnosis Procedure 1381

AV BRANCH LINE CIRCUIT 1382
Diagnosis Procedure 1382

DLC BRANCH LINE CIRCUIT 1383
Diagnosis Procedure 1383

EPS BRANCH LINE CIRCUIT 1384
Diagnosis Procedure 1384

STRG BRANCH LINE CIRCUIT 1385
Diagnosis Procedure 1385

IPDM-E BRANCH LINE CIRCUIT 1386
Diagnosis Procedure 1386

CAN COMMUNICATION CIRCUIT 1387
Diagnosis Procedure 1387

CAN SYSTEM (TYPE 95)

COMPONENT DIAGNOSIS 1389

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1389
Diagnosis Procedure 1389

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1390
Diagnosis Procedure 1390

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1391
Diagnosis Procedure 1391

ECM BRANCH LINE CIRCUIT 1392
Diagnosis Procedure 1392

ABS BRANCH LINE CIRCUIT 1393
Diagnosis Procedure 1393

TCM BRANCH LINE CIRCUIT 1394
Diagnosis Procedure 1394

4WD BRANCH LINE CIRCUIT 1395
Diagnosis Procedure 1395

BCM BRANCH LINE CIRCUIT 1396
Diagnosis Procedure 1396

M&A BRANCH LINE CIRCUIT 1397
Diagnosis Procedure 1397

DLC BRANCH LINE CIRCUIT 1398
Diagnosis Procedure 1398

EPS BRANCH LINE CIRCUIT 1399
Diagnosis Procedure 1399

I-KEY BRANCH LINE CIRCUIT 1400
Diagnosis Procedure 1400

STRG BRANCH LINE CIRCUIT 1401
Diagnosis Procedure 1401

IPDM-E BRANCH LINE CIRCUIT 1402
Diagnosis Procedure 1402

CAN COMMUNICATION CIRCUIT 1403
Diagnosis Procedure 1403

CAN SYSTEM (TYPE 96)

COMPONENT DIAGNOSIS 1405

MAIN LINE BETWEEN ABS AND TCM CIRCUIT 1405
Diagnosis Procedure 1405

MAIN LINE BETWEEN TCM AND BCM CIRCUIT 1406
Diagnosis Procedure 1406

MAIN LINE BETWEEN BCM AND DLC CIRCUIT 1407
Diagnosis Procedure 1407

ECM BRANCH LINE CIRCUIT 1408
Diagnosis Procedure 1408

ABS BRANCH LINE CIRCUIT 1409
Diagnosis Procedure 1409

TCM BRANCH LINE CIRCUIT 1410
Diagnosis Procedure 1410

4WD BRANCH LINE CIRCUIT 1411
Diagnosis Procedure 1411

BCM BRANCH LINE CIRCUIT 1412
Diagnosis Procedure 1412

M&A BRANCH LINE CIRCUIT 1413
Diagnosis Procedure 1413

AV BRANCH LINE CIRCUIT 1414
Diagnosis Procedure 1414

DLC BRANCH LINE CIRCUIT 1415
Diagnosis Procedure 1415

EPS BRANCH LINE CIRCUIT 1416
Diagnosis Procedure 1416

I-KEY BRANCH LINE CIRCUIT 1417
Diagnosis Procedure 1417

STRG BRANCH LINE CIRCUIT 1418
Diagnosis Procedure 1418

IPDM-E BRANCH LINE CIRCUIT 1419
Diagnosis Procedure 1419

CAN COMMUNICATION CIRCUIT 1420

cardiagn.com

Diagnosis Procedure 1420

cardiagn.com

PRECAUTION

PRECAUTIONS

Precautions for Trouble Diagnosis

INFOID:0000000000892176

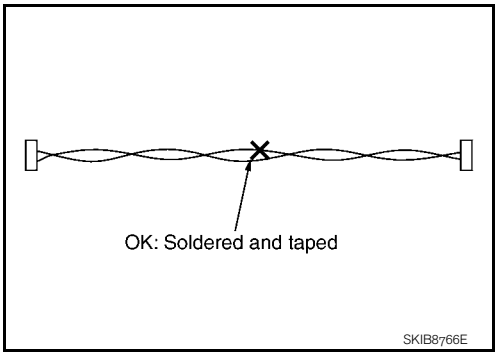
CAUTION:

- **Never apply 7.0 V or more to the measurement terminal.**
- **Use a tester with open terminal voltage of 7.0 V or less.**
- **Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness.**

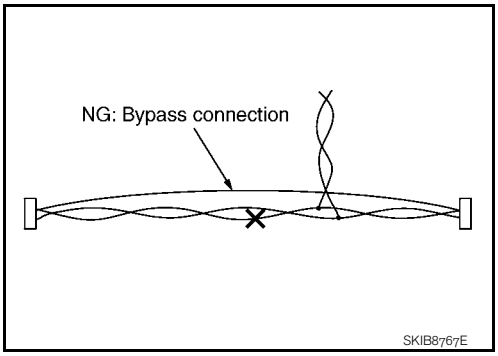
Precautions for Harness Repair

INFOID:0000000000892177

- Solder the repaired area and wrap tape around the soldered area.
  NOTE:
  A fray of twisted lines must be within 110 mm (4.33 in).



- Bypass connection is never allowed at the repaired area.
  NOTE:
  Bypass connection may cause CAN communication error. The spliced wire becomes separated and the characteristics of twisted line are lost.



- Replace the applicable harness as an assembly if error is detected on the shield lines of CAN communication line.

cardiagn.com

FUNCTION DIAGNOSIS

CAN COMMUNICATION SYSTEM

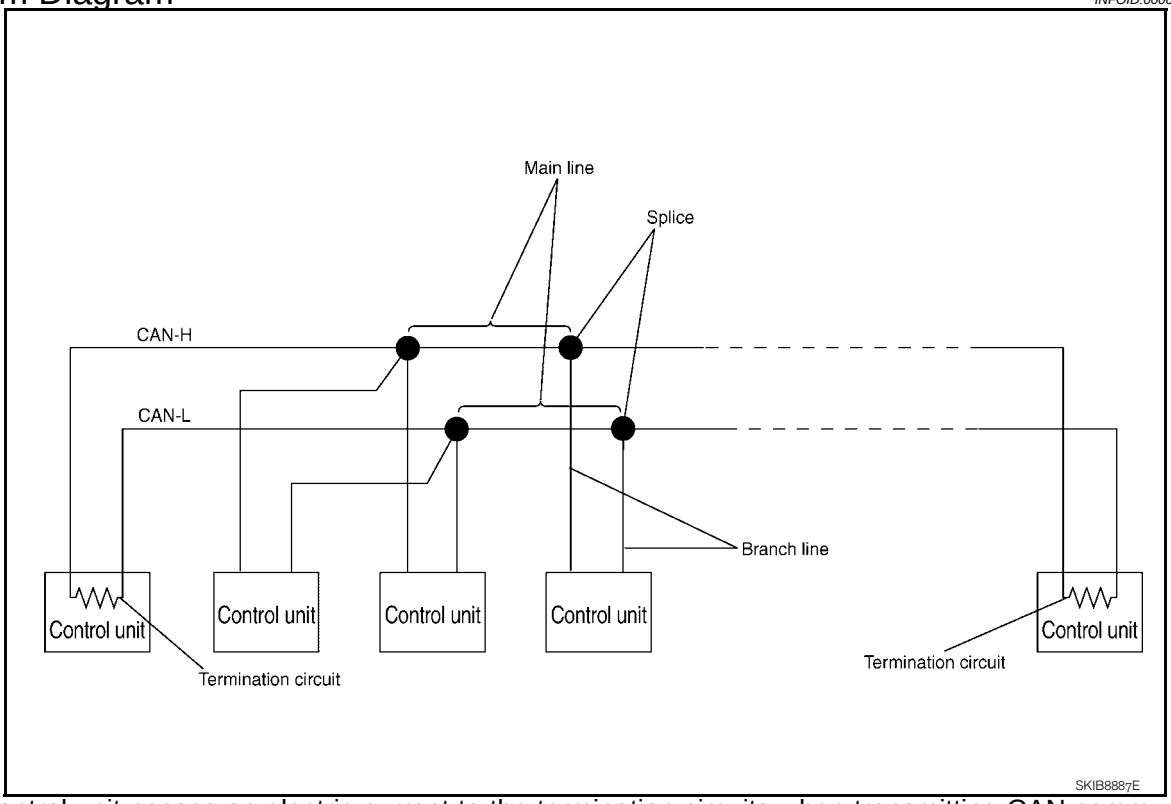
System Description

INFOID:0000000000892178

- CAN communication is a multiplex communication system. This enables the system to transmit and receive large quantities of data at high speed by connecting control units with two communication lines (CAN-H and CAN-L).
- Control units on the CAN network transmit signals using the CAN communication control circuit. They receive only necessary signals from other control units to operate various functions.
- CAN communication lines adopt twisted-pair line style (two lines twisted) for noise immunity.

System Diagram

INFOID:0000000000892179



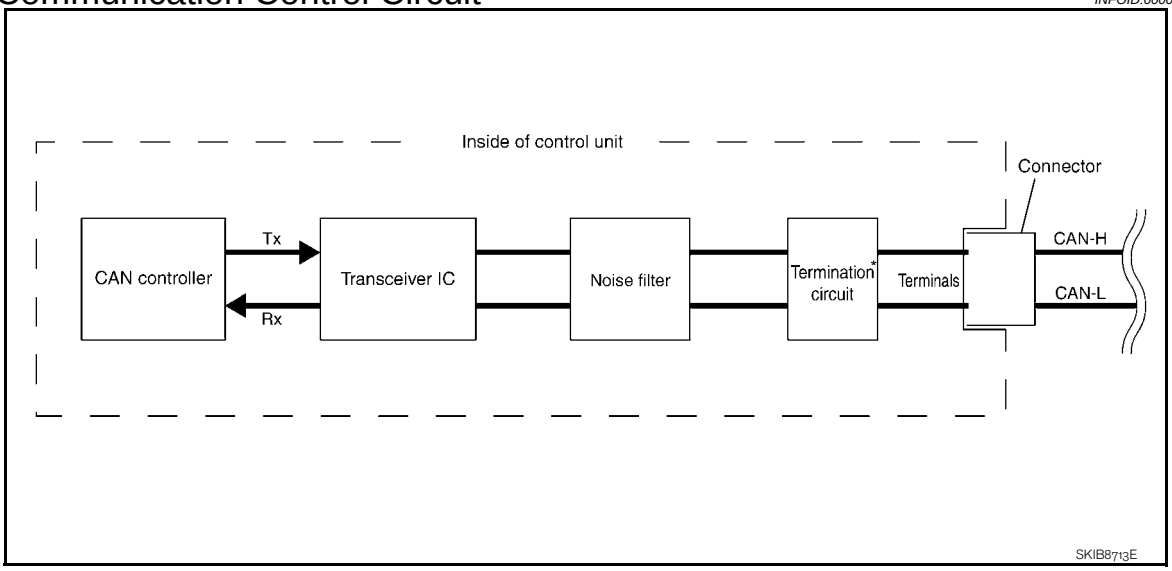
Each control unit passes an electric current to the termination circuits when transmitting CAN communication signal. The termination circuits produce an electrical potential difference between CAN-H and CAN-L. CAN communication system transmits and receives CAN communication signals by the potential difference.

Component	Description
Main line	CAN communication line between splices
Branch line	CAN communication line between splice and a control unit
Splice	A point connecting a branch line with a main line
Termination circuit	Refer to LAN-38, "CAN Communication Control Circuit".

cardiagn.com

CAN Communication Control Circuit

INFOID:0000000000892180



Component	System description
CAN controller	It controls CAN communication signal transmission and reception, error detection, etc.
Transceiver IC	It converts digital signal into CAN communication signal, and CAN communication signal into digital signal.
Noise filter	It eliminates noise of CAN communication signal.
Termination circuit* (Resistance of approx. 120 Ω)	It produces potential difference.

*: These are the only control units wired with both ends of CAN communication system.

cardiagn.com

DIAG ON CAN

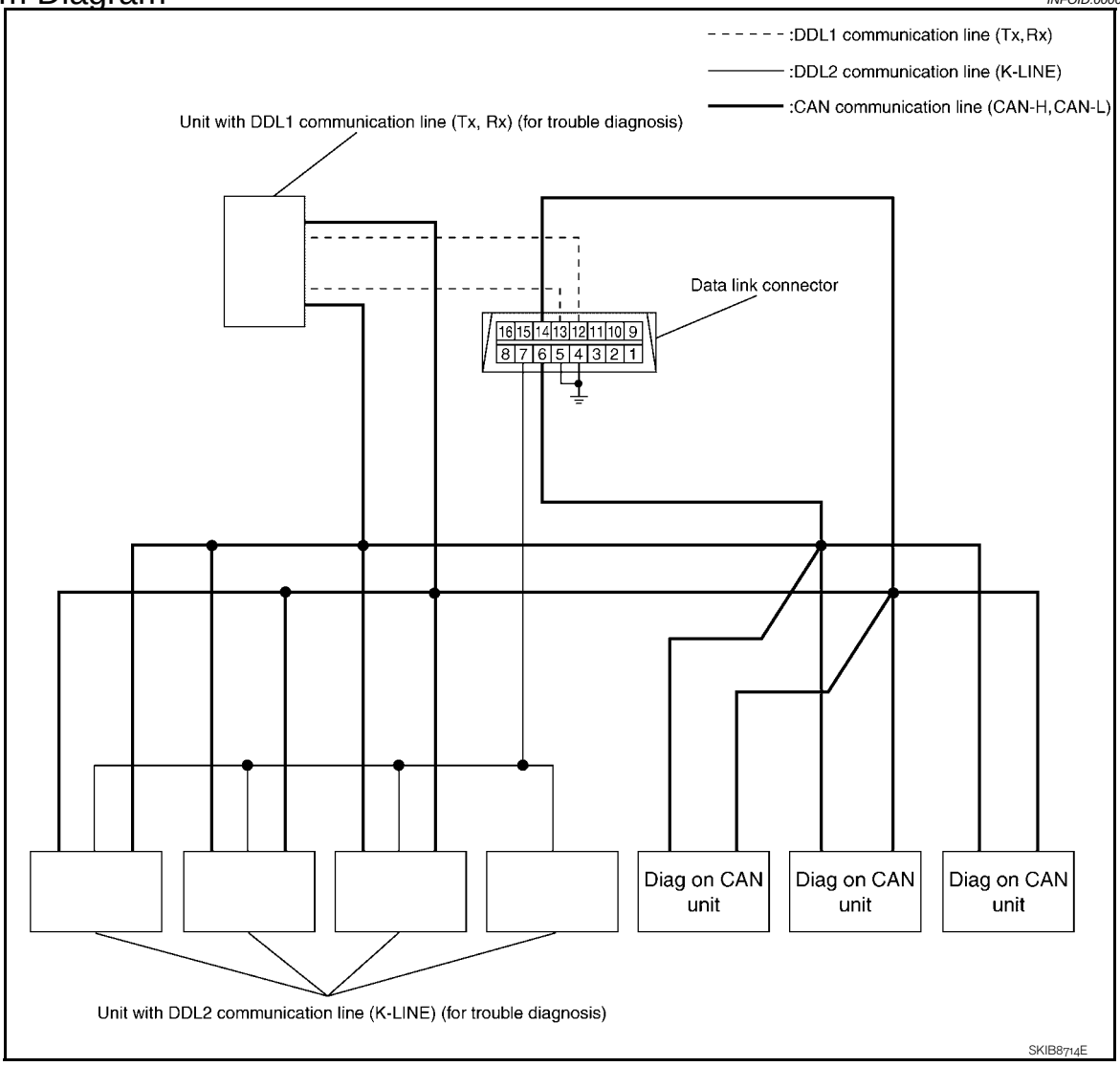
Description

INFOID:0000000000892181

"Diag on CAN" is a diagnosis using CAN communication instead of previous DDL1 and DDL2 communication lines, between control units and diagnosis unit.

System Diagram

INFOID:0000000000892182



Name	Harness	Description
DDL1	Tx Rx	It is used for trouble diagnosis. (CAN-H and CAN-L are used for controlling)
DDL2	K-LINE	It is used for trouble diagnosis. (CAN-H and CAN-L are used for controlling)
Diag on CAN	CAN-H CAN-L	It is used for trouble diagnosis and control.

cardiagn.com

TROUBLE DIAGNOSIS

Condition of Error Detection

INFOID:0000000000892183

"U1000" or "U1001" is indicated on SELF-DIAG RESULTS on CONSULT-III if CAN communication signal is not transmitted or received between units for 2 seconds or more.

CAN COMMUNICATION SYSTEM ERROR

- CAN communication line open (CAN-H, CAN-L, or both)
- CAN communication line short (ground, between CAN communication lines, other harnesses)
- Error of CAN communication control circuit of the unit connected to CAN communication line

WHEN "U1000" OR "U1001" IS INDICATED EVEN THOUGH CAN COMMUNICATION SYSTEM IS NORMAL

- Removal/installation of parts: Error may be detected when removing and installing CAN communication unit and related parts while turning the ignition switch ON. (A DTC except for CAN communication may be detected.)
- Fuse blown out (removed): CAN communication of the unit may cease.
- Voltage drop: Error may be detected if voltage drops due to discharged battery when turning the ignition switch ON (Depending on the control unit which carries out CAN communication).
- Error may be detected if the power supply circuit of the control unit, which carries out CAN communication, malfunctions (Depending on the control unit which carries out CAN communication).
- Error may be detected if reprogramming is not completed normally.

NOTE:

CAN communication system is normal if "U1000" or "U1001" is indicated on SELF-DIAG RESULTS of CONSULT-III under the above conditions. Erase the memory of the self-diagnosis of each unit.

Symptom When Error Occurs in CAN Communication System

INFOID:0000000000892184

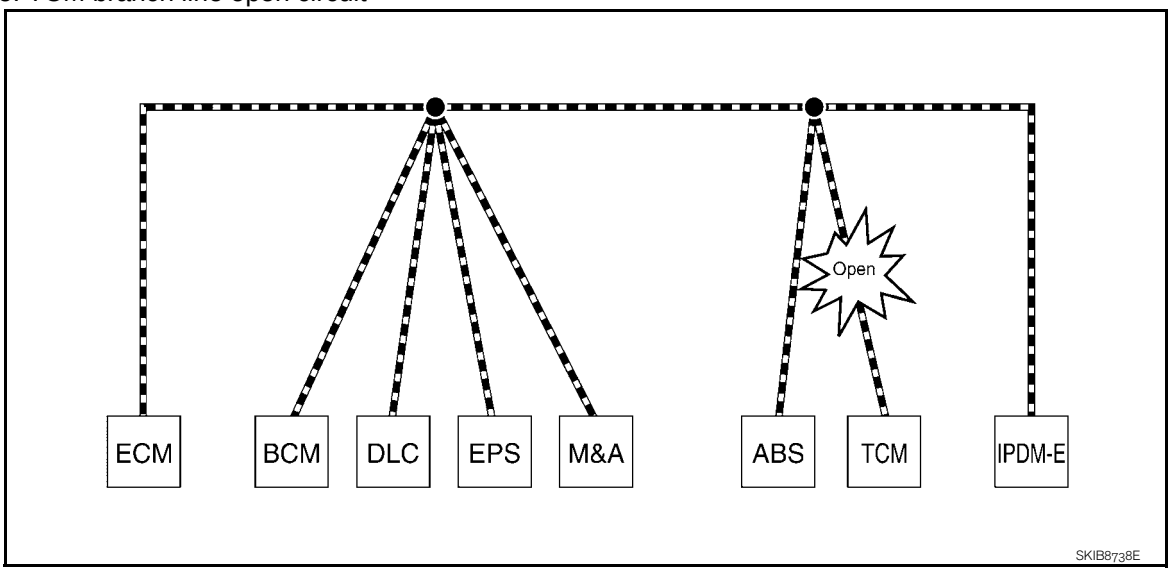
In CAN communication system, multiple units mutually transmit and receive signals. Each unit cannot transmit and receive signals if any error occurs on CAN communication line. Under this condition, multiple control units related to the root cause malfunction or go into fail-safe mode.

ERROR EXAMPLE

NOTE:

- Each vehicle differs in symptom of each unit under fail-safe mode and CAN communication line wiring.
- Refer to LAN-51, "Abbreviation List" for the unit abbreviation.

Example: TCM branch line open circuit

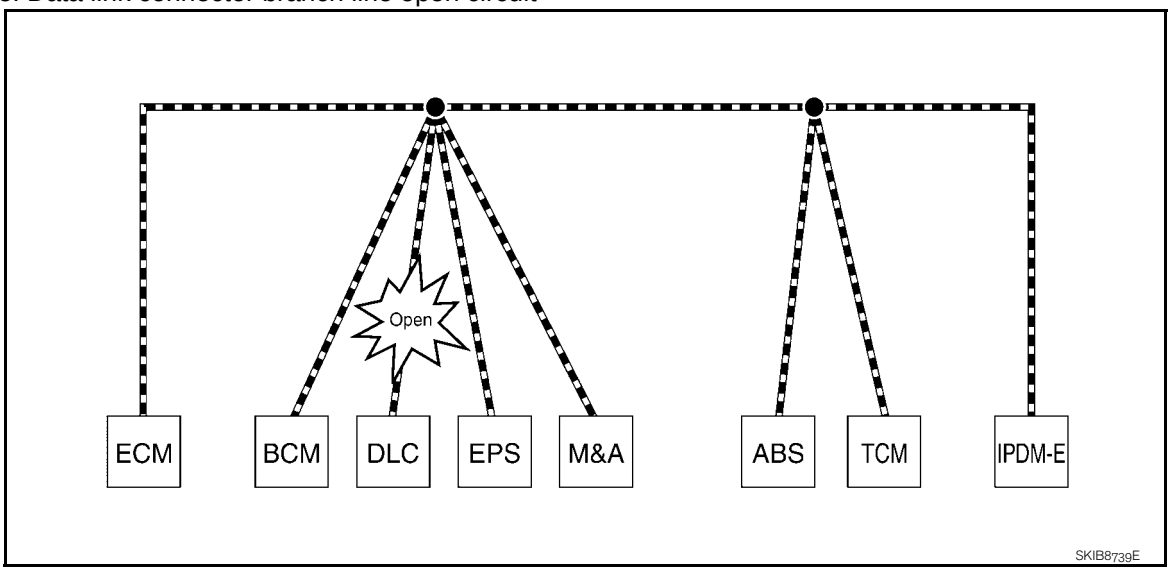


Unit name	Symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	Reverse warning chime does not sound.

cardiagn.com

Unit name	Symptom
EPS control unit	Normal operation.
Combination meter	• Shift position indicator and OD OFF indicator turn OFF. • Warning lamps turn ON.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	Normal operation.

Example: Data link connector branch line open circuit



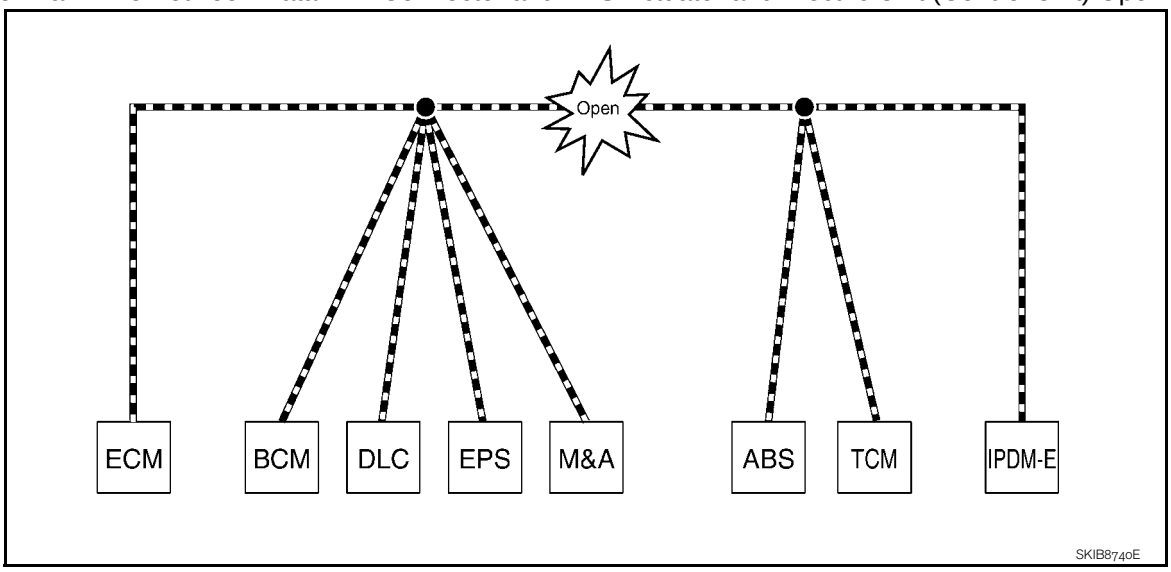
Unit name	Symptom
ECM	Normal operation.
BCM	
EPS control unit	
Combination meter	
ABS actuator and electric unit (control unit)	
TCM	
IPDM E/R	

NOTE:
- When data link connector branch line is open, transmission and reception of CAN communication signals are not affected. Therefore, no symptoms occur. However, be sure to repair malfunctioning circuit.
- The model (all units on CAN communication system are Diag on CAN) cannot perform CAN diagnosis with CONSULT-III if the following error occurs. The error is judged by the symptom.

Error	Difference of symptom
Data link connector branch line open circuit	Normal operation.
CAN-H, CAN-L harness short-circuit	Most of the units which are connected to the CAN communication system enter fail-safe mode or are deactivated.

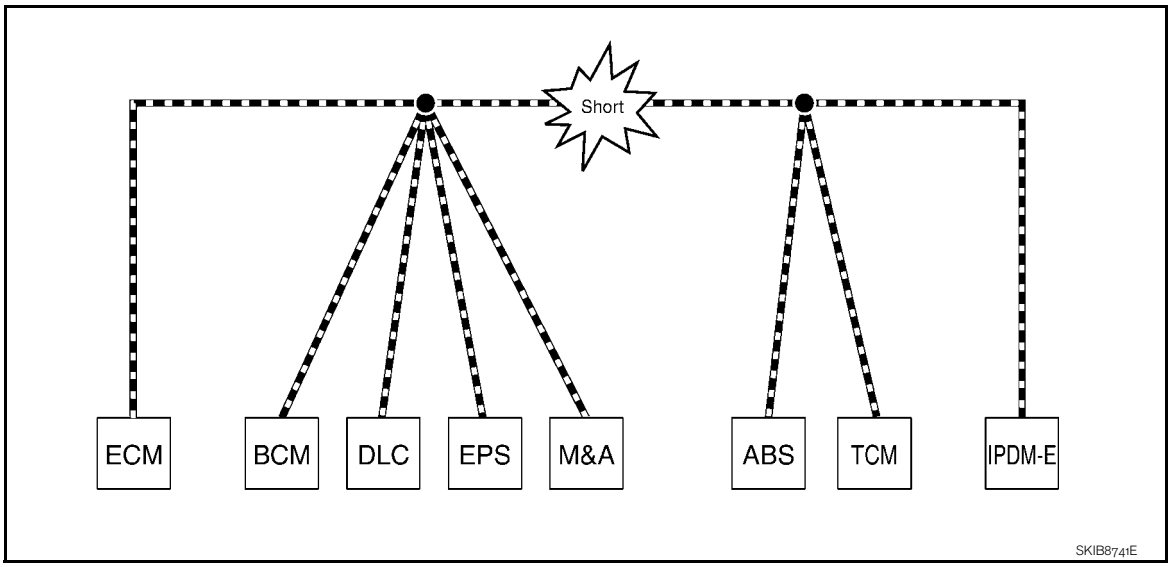
cardiagn.com

Example: Main Line Between Data Link Connector and ABS Actuator and Electric Unit (Control Unit) Open Circuit



Unit name	Symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	• Reverse warning chime does not sound. • The front wiper moves under continuous operation mode even though the front wiper switch being in the intermittent position.
EPS control unit	The steering effort increases.
Combination meter	• The shift position indicator and OD OFF indicator turn OFF. • The speedometer is inoperative. • The odo/trip meter stops.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	When the ignition switch is ON, • The headlamps (Lo) turn ON. • The cooling fan continues to rotate.

Example: CAN-H, CAN-L Harness Short Circuit



cardiagn.com

Unit name	Symptom
ECM	• Engine torque limiting is affected, and shift harshness increases. • Engine speed drops.
BCM	• Reverse warning chime does not sound. • The front wiper moves under continuous operation mode even though the front wiper switch being in the intermittent position. • The room lamp does not turn ON. • The engine does not start (if an error or malfunction occurs while turning the ignition switch OFF.) • The steering lock does not release (if an error or malfunction occurs while turning the ignition switch OFF.)
EPS control unit	The steering effort increases.
Combination meter	• The tachometer and the speedometer do not move. • Warning lamps turn ON. • Indicator lamps do not turn ON.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	When the ignition switch is ON, • The headlamps (Lo) turn ON. • The cooling fan continues to rotate.

CAN Diagnosis with CONSULT-III

INFOID:0000000000892185

CAN diagnosis on CONSULT-III extracts the root cause by receiving the following information.
- Response to the system call
- Control unit diagnosis information
- Self-diagnosis
- CAN diagnostic support monitor

Self-Diagnosis

INFOID:0000000000892186

DTC	Self-diagnosis item (CONSULT-III indication)	DTC detection condition	Inspection/Action
U1000	CAN COMM CIRCUIT	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) for 2 seconds or more.	Start the inspection. Refer to the applicable section of the indicated control unit.
		When a control unit (except for ECM) is not transmitting or receiving CAN communication signal for 2 seconds or more.	
U1001	CAN COMM CIRCUIT	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission-related diagnosis) for 2 seconds or more.	
U1002	SYSTEM COMM	When a control unit is not transmitting or receiving CAN communication signal for 2 seconds or less.	
U1010	CONTROL UNIT [CAN]	When an error is detected during the initial diagnosis for CAN controller of each control unit.	Replace the control unit indicating “U1010”.

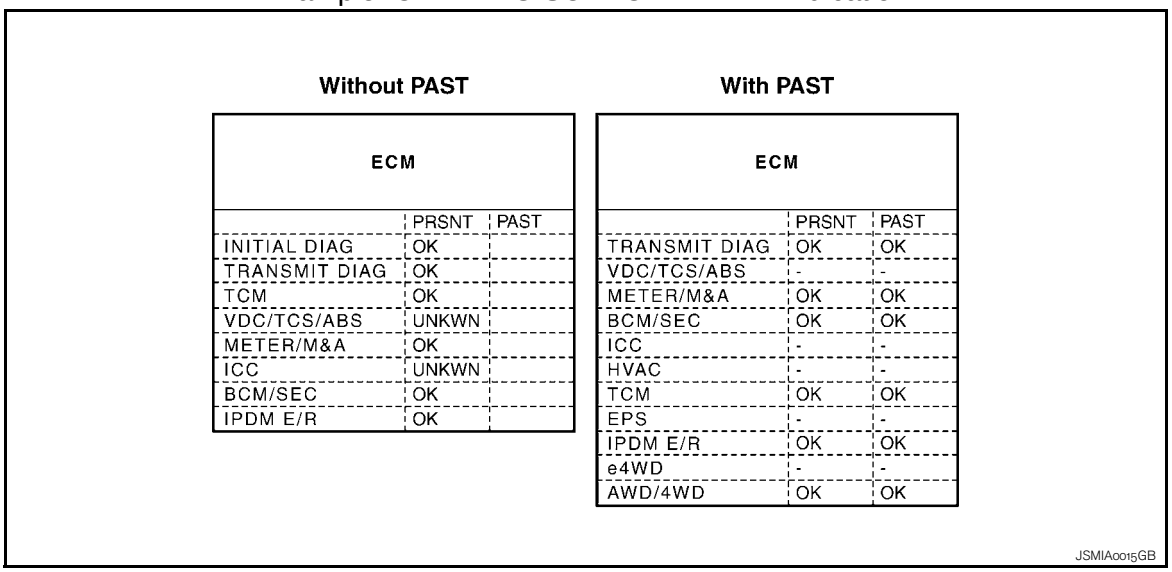
CAN Diagnostic Support Monitor

INFOID:0000000000892187

MONITOR ITEM (CONSULT-III)

cardiagn.com

Example: CAN DIAG SUPPORT MNTR indication



Without PAST

Item	PRSNT	Description
Initial diagnosis	OK	Normal at present
	NG	Control unit error (Except for some control units)
Transmission diagnosis	OK	Normal at present
	UNKWN	Unable to transmit signals for 2 seconds or more.
		Diagnosis not performed
Control unit name (Reception diagnosis)	OK	Normal at present
	UNKWN	Unable to receive signals for 2 seconds or more.
		Diagnosis not performed
		No control unit for receiving signals. (No applicable optional parts)

With PAST

Item	PRSNT	PAST	Description
Transmission diagnosis	OK	OK	Normal at present and in the past
		1 – 39	Normal at present, but unable to transmit signals for 2 seconds or more in the past. (The number indicates the number of ignition switch cycles from OFF to ON.)
	UNKWN	0	Unable to transmit signals for 2 seconds or more at present.
Control unit name (Reception diagnosis)	OK	OK	Normal at present and in the past
		1 – 39	Normal at present, but unable to receive signals for 2 seconds or more in the past. (The number indicates the number of ignition switch cycles from OFF to ON.)
	UNKWN	0	Unable to receive signals for 2 seconds or more at present.
	–	–	Diagnosis not performed.
			No control unit for receiving signals. (No applicable optional parts)

MONITOR ITEM (ON-BOARD DIAGNOSIS)

NOTE:

For some models, CAN communication diagnosis result is received from the vehicle monitor.

cardiagn.com

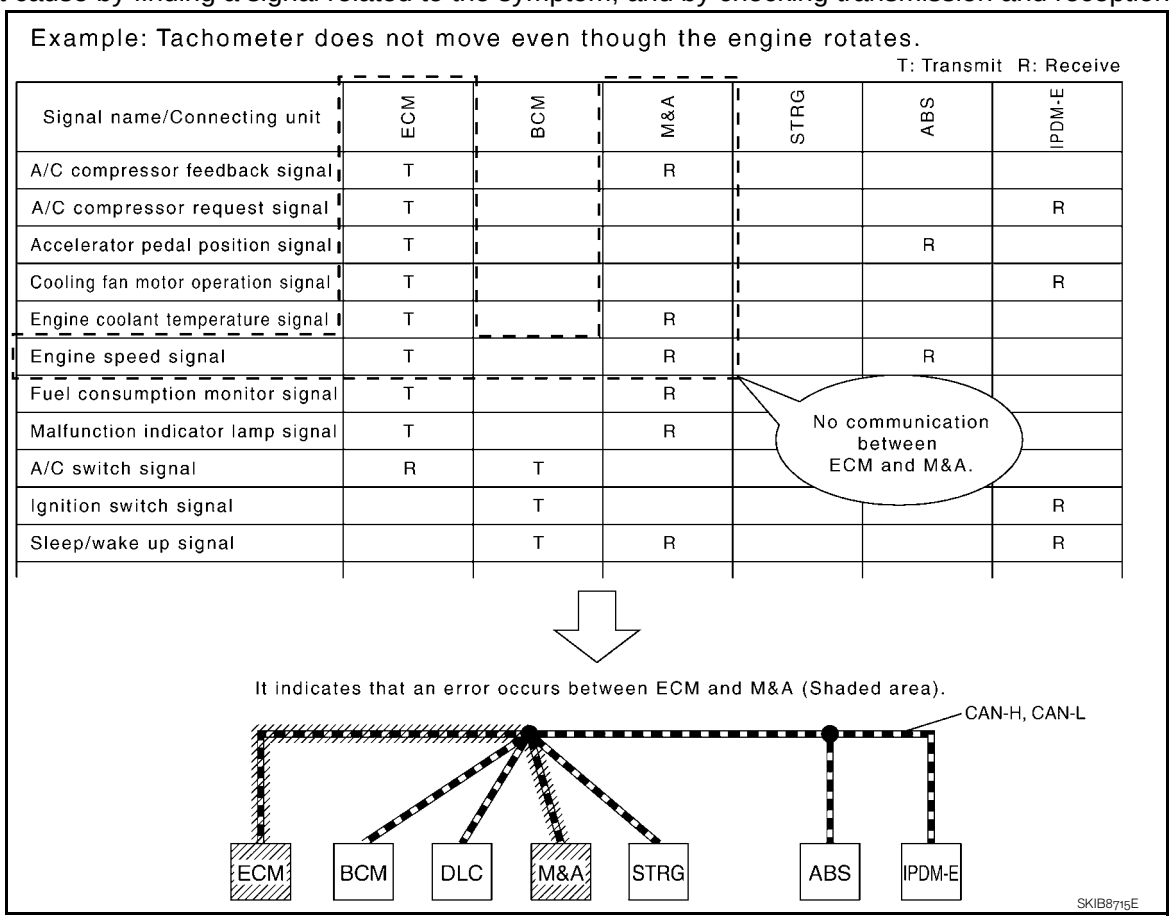
Example: Vehicle Display

Item	Result indicated	Error counter	Description
CAN_COMM (Initial diagnosis)	OK	0	Normal at present
	NG	1 – 50	Control unit error (The number indicates how many times diagnosis has been run.)
CAN_CIRC_1 (Transmission diagnosis)	OK	0	Normal at present
	UNKWN	1 – 50	Unable to transmit for 2 seconds or more at present. (The number indicates how many times diagnosis has been run.)
CAN_CIRC_2 – 9 (Reception diagnosis of each unit)	OK	0	Normal at present
	UNKWN	1 – 50	Unable to transmit for 2 seconds or more at present. (The number indicates how many times diagnosis has been run.)
			Diagnosis not performed.
			No control unit for receiving signals. (No applicable optional parts)

How to Use CAN Communication Signal Chart

INFOID:0000000000892188

The CAN communication signal chart lists the signals needed for trouble diagnosis. It is useful for detecting the root cause by finding a signal related to the symptom, and by checking transmission and reception unit.



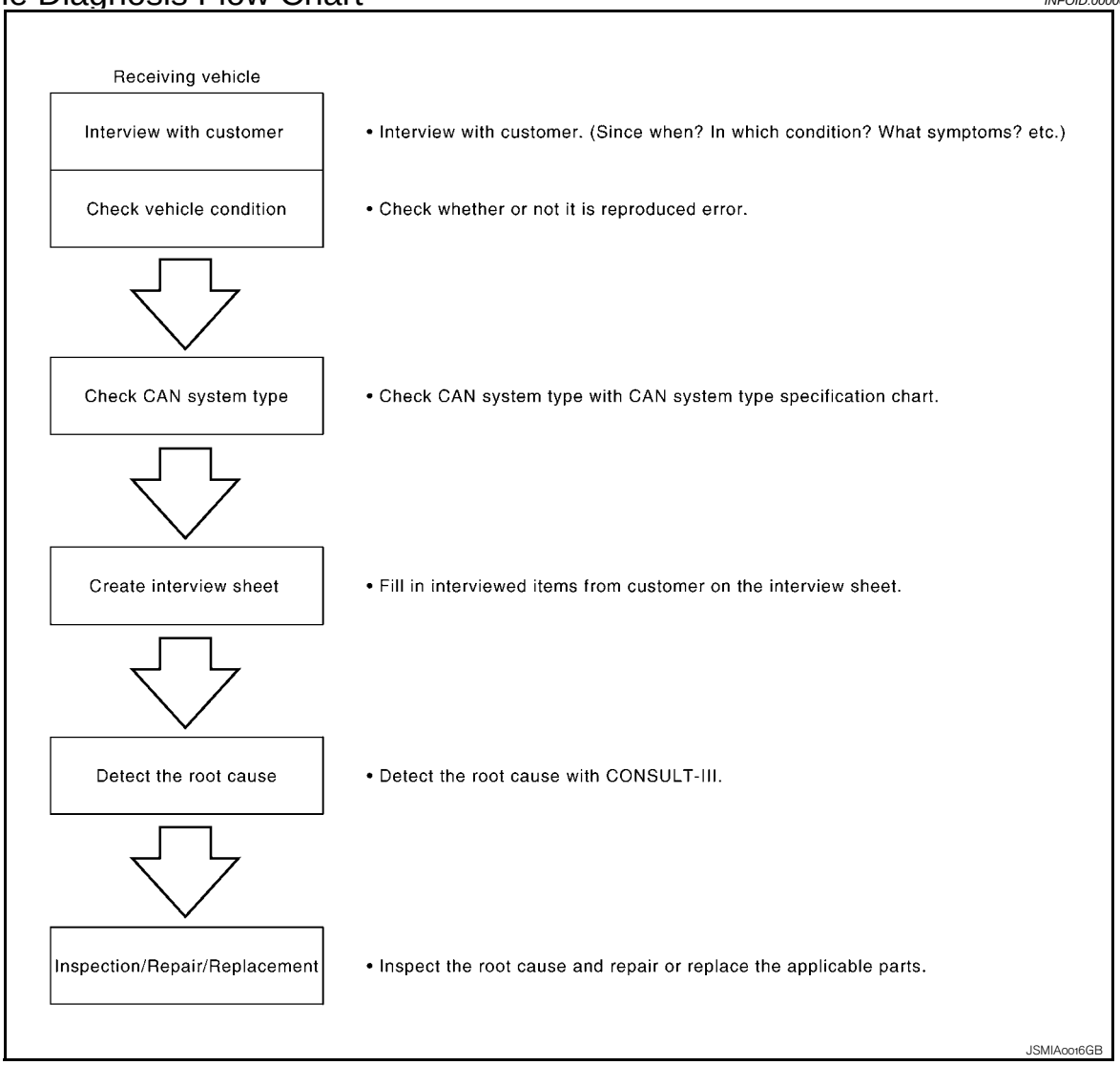
cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Trouble Diagnosis Flow Chart

INFOID:0000000000892189



Trouble Diagnosis Procedure

INFOID:0000000000892190

INTERVIEW WITH CUSTOMER

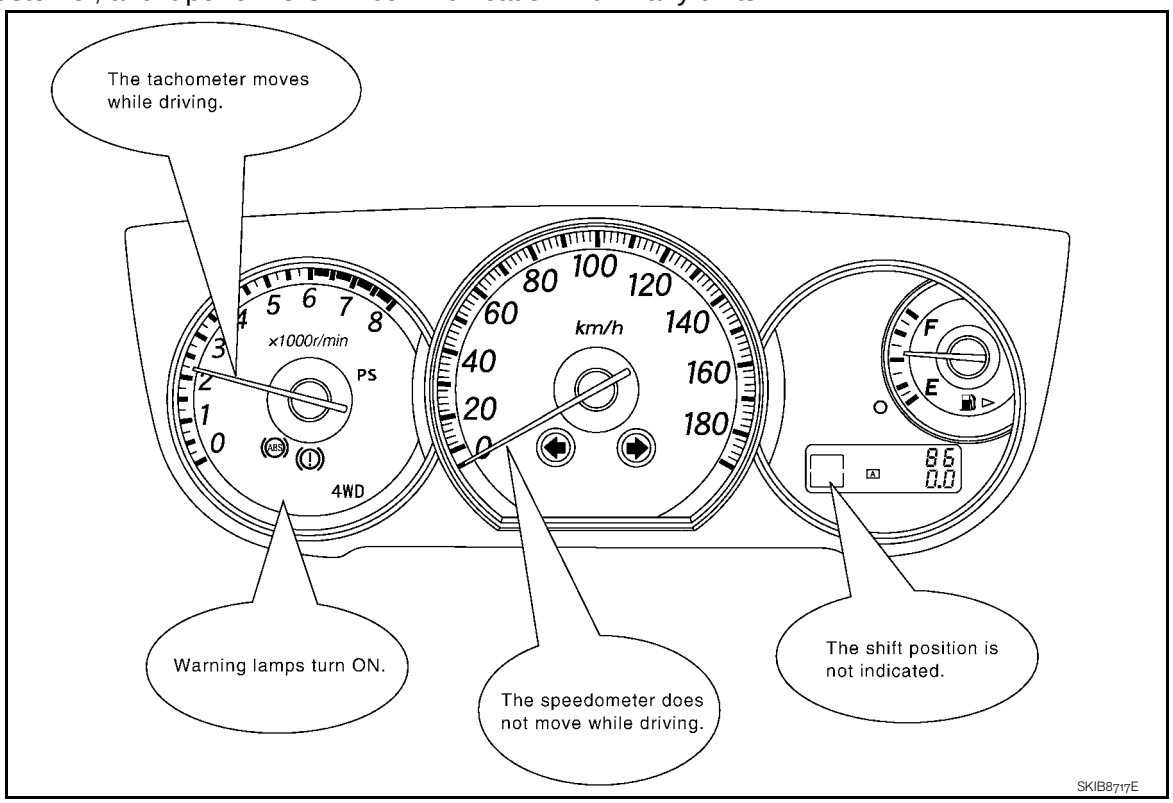
Interview with the customer is important to detect the root cause of CAN communication system errors and to understand vehicle condition and symptoms for proper trouble diagnosis.

Points in interview
- What: Parts name, system name
- When: Date, Frequency
- Where: Road condition, Place
- In what condition: Driving condition/environment
- Result: Symptom

NOTE:
- Check normal units as well as error symptoms.
- Example: Circuit between ECM and the combination meter is judged normal if the customer indicates tachometer functions normally.
- When a CAN communication system error is present, multiple control units may malfunction or go into fail-safe mode.

cardiagn.com

- Indication of the combination meter is important to detect the root cause because it is the most obvious to the customer, and it performs CAN communication with many units.



INSPECTION OF VEHICLE CONDITION

Check whether the symptom is reproduced or not.

NOTE:

Do not turn the ignition switch OFF or disconnect the battery cable while reproducing the error. The error may temporarily correct itself, making it difficult to determine the root cause.

CHECK OF CAN SYSTEM TYPE (HOW TO USE CAN SYSTEM TYPE SPECIFICATION CHART)

Determine CAN system type based on vehicle equipment.

NOTE:

- This chart is used if CONSULT-III does not automatically recognize CAN system type.
- There are two styles for CAN system type specification charts. Depending on the number of available system types, either style A or style B may be used.

CAN System Type Specification Chart (Style A)

NOTE:

cardiagn.com

CAN system type is easily checked with the vehicle equipment identification information shown in the chart.

Example:
Vehicle is equipped as follows: Wagon, AWD, VQ35DE, CVT, VDC, and Intelligent Key system. ( ) shows an example of CAN system type.)

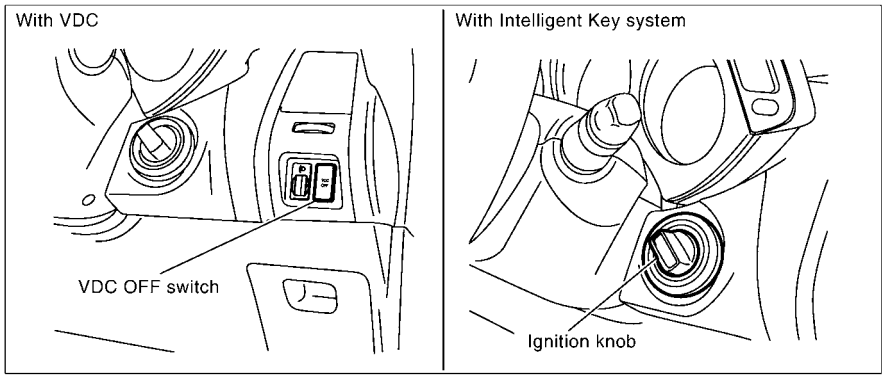
CAN System Specification Chart
Determine CAN system type from the following specification chart.

Body type	Wagon					
Axle	2WD				AWD	
Engine	QR25DE		VQ35DE			
Transmission	A/T		CVT			
Brake control	ABS				VDC	
Intelligent Key system		×		×		×
CAN system type	1	2	3	4	5	6
CAN communication signal chart	XX-XX. "TYPE 1/TYPE 2"		XX-XX. "TYPE 3/TYPE 4"		XX-XX. "TYPE 5/TYPE 6"	

Check the vehicle equipment with the vehicle identification number plate.
Check the vehicle equipment.
The number indicates the CAN system type of the vehicle.

×: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION
NOTE:
Check CAN system type from the vehicle shape and equipment.



In the above example,
- Checking VDC OFF switch leads to judge whether or not VDC is equipped.
- Checking the ignition knob leads to judge whether or not Intelligent Key system is equipped.

For the above case, CAN system type is "6".

JSMIA0017GB

CAN System Type Specification Chart (Style B)
NOTE:

cardiagn.com

CAN system type is easily checked with the vehicle equipment identification information shown in the chart.

Example:
Vehicle is equipped as follows: Sedan, 2WD, MR20DE, CVT, ABS, Active AFS, Intelligent Key system, Navigation system and Automatic drive positioner. ( ) shows an example of CAN system type.)

CAN System Specification Chart
Refer to the specification as shown in the chart.

Body type	Sedan		
Axle	2WD		AWD
Engine	HR15DE	MR20DE	HR15DE
Transmission	A/T	CVT	A/T
Brake control	ABS		
Specification chart	XX.XX. SPECIFICATION CHART A	XX.XX. SPECIFICATION CHART B	XX.XX. SPECIFICATION CHART C

x: Applicable

Check the vehicle equipment with the vehicle identification number plate.
Check the vehicle equipment.
Select the applicable vehicle equipment. Refer to the specification chart.

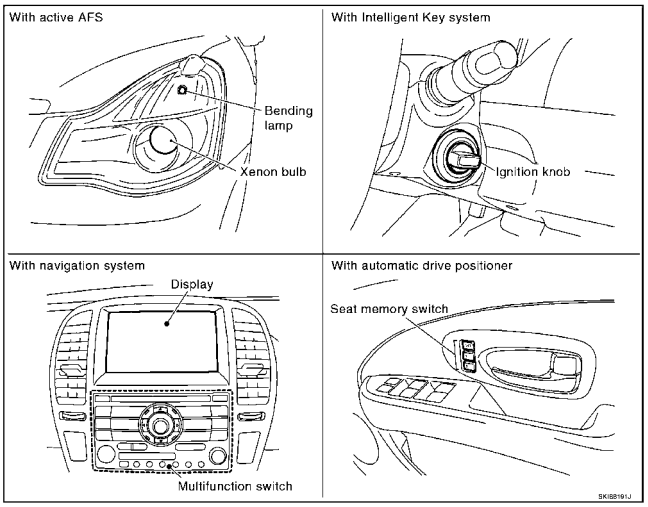
SPECIFICATION CHART B
Determine CAN system type from the following specification chart.

Body type	Sedan										
Axle	2WD										
Engine	MR20DE										
Transmission	CVT										
Brake control	ABS										
Active AFS		×			×	×			×	×		×
Intelligent Key system			×		×		×	×	×	×	×	×
Navigation system				×		×	×		×		×	×
Automatic drive positioner								×		×	×	×
CAN system type	9	10	11	12	13	14	15	16	17	18	19	20
CAN communication signal chart	XX.XX. SYSTEM WIRING DIAGRAM [CAN SYSTEM TYPE 20] XX.XX. SYSTEM WIRING DIAGRAM [CAN SYSTEM TYPE OTHER THAN TYPE 20]											

x: Applicable

Check the vehicle equipment.
The number indicates the CAN system type of the vehicle.

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION
NOTE:
Check CAN system type from the vehicle shape and equipment.



In the above example,
- Checking Xenon bulb and bending lamp lead to judge whether or not Active AFS is equipped.
- Checking the ignition knob leads to judge whether or not Intelligent Key system is equipped.
- Checking display and multifunction switch lead to judge whether or not Navigation system is equipped.
- Checking seat memory switch leads to judge whether or not Automatic drive positioner is equipped.

For the above case, CAN system type is "20".

JSMIA0018GB

CREATE INTERVIEW SHEET

Fill out the symptom described by the customer, vehicle condition, and CAN system type on the interview sheet.

cardiagn.com

Interview Sheet (Example)

CAN Communication System Diagnosis Interview Sheet

Date received: 3, Feb. 2006

Type: DBA-KG11

VIN No.: KG11-005040

Model: BDRARGZ397EDA-E-J-

First registration: 10, Jan. 2001

Mileage: 62,140

CAN system type: Type 19

Symptom (Results from interview with customer)

- Headlamps suddenly turn ON while driving the vehicle.
- The engine does not restart after stopping the vehicle and turning the ignition switch OFF.
- The cooling fan continues rotating while turning the ignition switch ON.

Condition at inspection

Error Symptom: (Present) / Past

The engine does not start.
While turning the ignition switch ON,
- The headlamps (Lo) turn ON, and the cooling fan continues rotating.
- The interior lamp does not turn ON.

JSMIA0019GB

DETECT THE ROOT CAUSE

CAN diagnosis function of CONSULT-III detects the root cause.

cardiagn.com

HOW TO USE THIS MANUAL

HOW TO USE THIS SECTION

Caution

INFOID:0000000000892191

- This section describes information peculiar to a vehicle and inspection procedures.
- For trouble diagnosis procedure, refer to LAN-46, "Trouble Diagnosis Procedure".

Abbreviation List

INFOID:0000000000892192

Unit name abbreviations in CONSULT-III CAN diagnosis and in this section are as per the following list.

Abbreviation	Unit name
4WD	4WD control unit
ABS	ABS actuator and electric unit (control unit)
AV	NAVI control unit
BCM	BCM
DLC	Data link connector
ECM	ECM
EPS	EPS control unit
I-KEY	Intelligent Key unit
IPDM-E	IPDM E/R
M&A	Combination meter
STRG	Steering angle sensor
TCM	TCM

cardiagn.com

PRECAUTION

PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000892193

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for Trouble Diagnosis

INFOID:0000000000892194

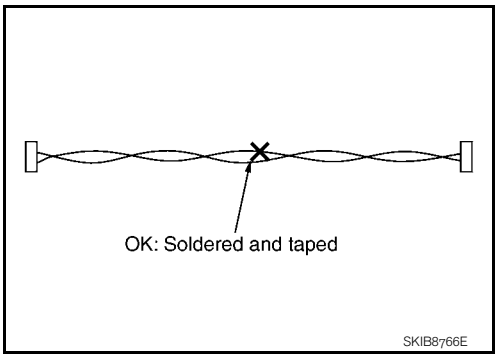
CAUTION:

- **Never apply 7.0 V or more to the measurement terminal.**
- **Use a tester with open terminal voltage of 7.0 V or less.**
- **Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness.**

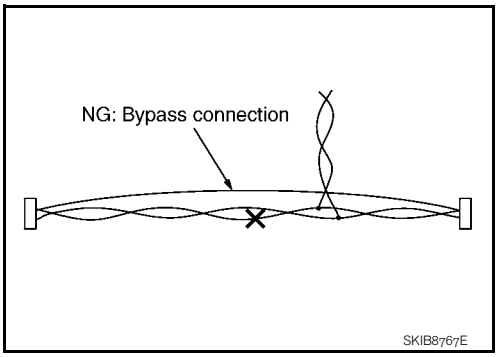
Precautions for Harness Repair

INFOID:0000000000892195

- Solder the repaired area and wrap tape around the soldered area.
  NOTE:
  A fray of twisted lines must be within 110 mm (4.33 in).



- Bypass connection is never allowed at the repaired area.
  NOTE:
  Bypass connection may cause CAN communication error. The spliced wire becomes separated and the characteristics of twisted line are lost.



cardiagn.com

- Replace the applicable harness as an assembly if error is detected on the shield lines of CAN communication line.

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Interview Sheet

INFOID:0000000000892196

CAN Communication System Diagnosis Interview Sheet

Date received:

Type: VIN No.:

Model:

First registration: Mileage:

CAN system type:

Symptom (Results from interview with customer)

Condition at inspection

Error symptom : Present / Past

SKIB8899E

cardiagn.com

FUNCTION DIAGNOSIS

CAN COMMUNICATION SYSTEM

CAN System Specification Chart

INFOID:0000000000892197

NOTE:
Refer to LAN-46, "Trouble Diagnosis Procedure" for how to use CAN system specification chart.
Refer to the specification as shown in the chart.

Body type	Hatchback					
Axle	2WD				4WD	
Engine	K9K	HR16DE	MR20DE		MR20DE	
Transmission	M/T		M/T	CVT	M/T	CVT
Brake control	ABS/ESP					
Specification chart	SPECIFICATION CHART A	SPECIFICATION CHART B	SPECIFICATION CHART C		SPECIFICATION CHART D	

SPECIFICATION CHART A

Determine CAN system type from the following specification chart.

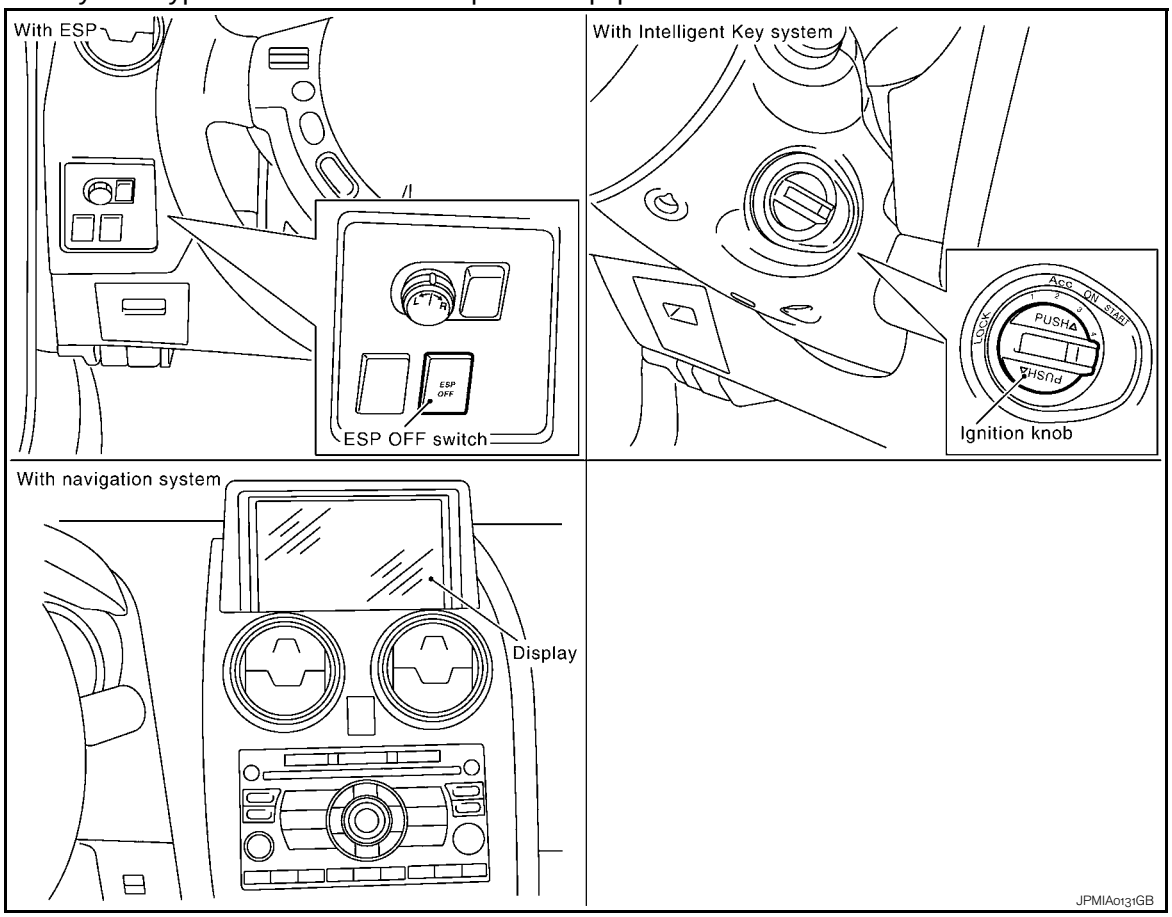
Body type		Hatchback							
Axle		2WD							
Engine		K9K							
Transmission		M/T							
Brake control		ABS				ESP			
Intelligent Key system				×	×			×	×
Navigation system			×		×		×		×
CAN system type	RHD	1	2	3	4	5	6	7	8
	LHD	49	50	51	52	53	54	55	56
Start CAN Diagnosis (CONSULT-III)	RHD	1	2	3	4	5	6	7	8
	LHD	49	50	51	52	53	54	55	56

×: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION
NOTE:

cardiagn.com

Check CAN system type from the vehicle shape and equipment.



SPECIFICATION CHART B

Determine CAN system type from the following specification chart.

Body type		Hatchback							
Axle		2WD							
Engine		HR16DE							
Transmission		M/T							
Brake control		ABS				ESP			
Intelligent Key system				×	×			×	×
Navigation system			×		×		×		×
CAN system type	RHD	9	10	11	12	13	14	15	16
	LHD	57	58	59	60	61	62	63	64
Start CAN Diagnosis (CONSULT-III)	RHD	9	10	11	12	13	14	15	16
	LHD	57	58	59	60	61	62	63	64

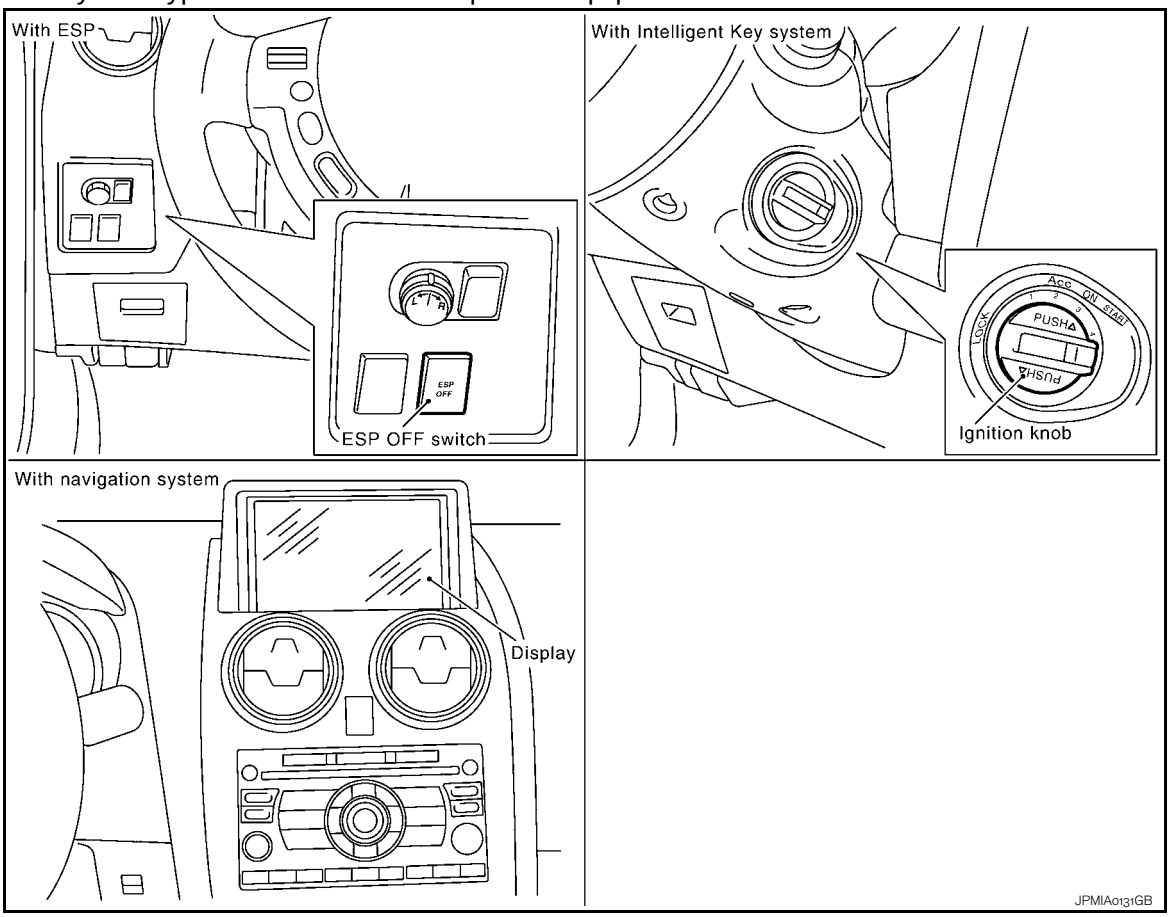
×: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION

NOTE:

cardiagn.com

Check CAN system type from the vehicle shape and equipment.



SPECIFICATION CHART C

Determine CAN system type from the following specification chart.

Body type		Hatchback															
Axle		2WD															
Engine		MR20DE															
Transmission		M/T								CVT							
Brake control		ABS				ESP				ABS				ESP			
Intelligent Key system				×	×			×	×			×	×			×	×
Navigation system			×		×		×		×		×		×		×		×
CAN system type	RHD	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	LHD	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Start CAN Diagnosis (CONSULT-III)	RHD	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	LHD	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

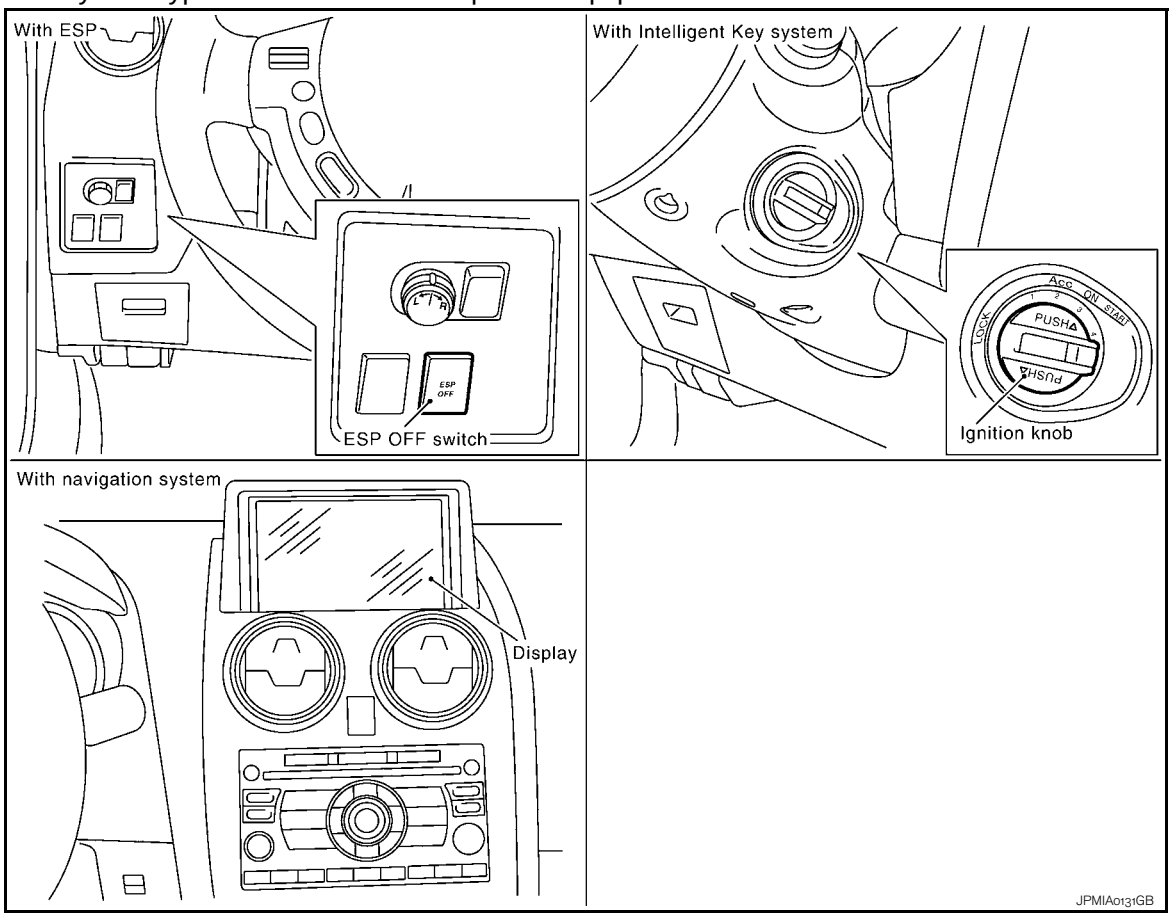
×: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION

NOTE:

cardiagn.com

Check CAN system type from the vehicle shape and equipment.



SPECIFICATION CHART D

Determine CAN system type from the following specification chart.

Body type		Hatchback															
Axle		2WD															
Engine		MR20DE															
Transmission		M/T								CVT							
Brake control		ABS				ESP				ABS				ESP			
Intelligent Key system				×	×			×	×			×	×			×	×
Navigation system			×		×		×		×		×		×		×		×
CAN system type	RHD	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	LHD	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
Start CAN Diagnosis (CONSULT-III)	RHD	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	LHD	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96

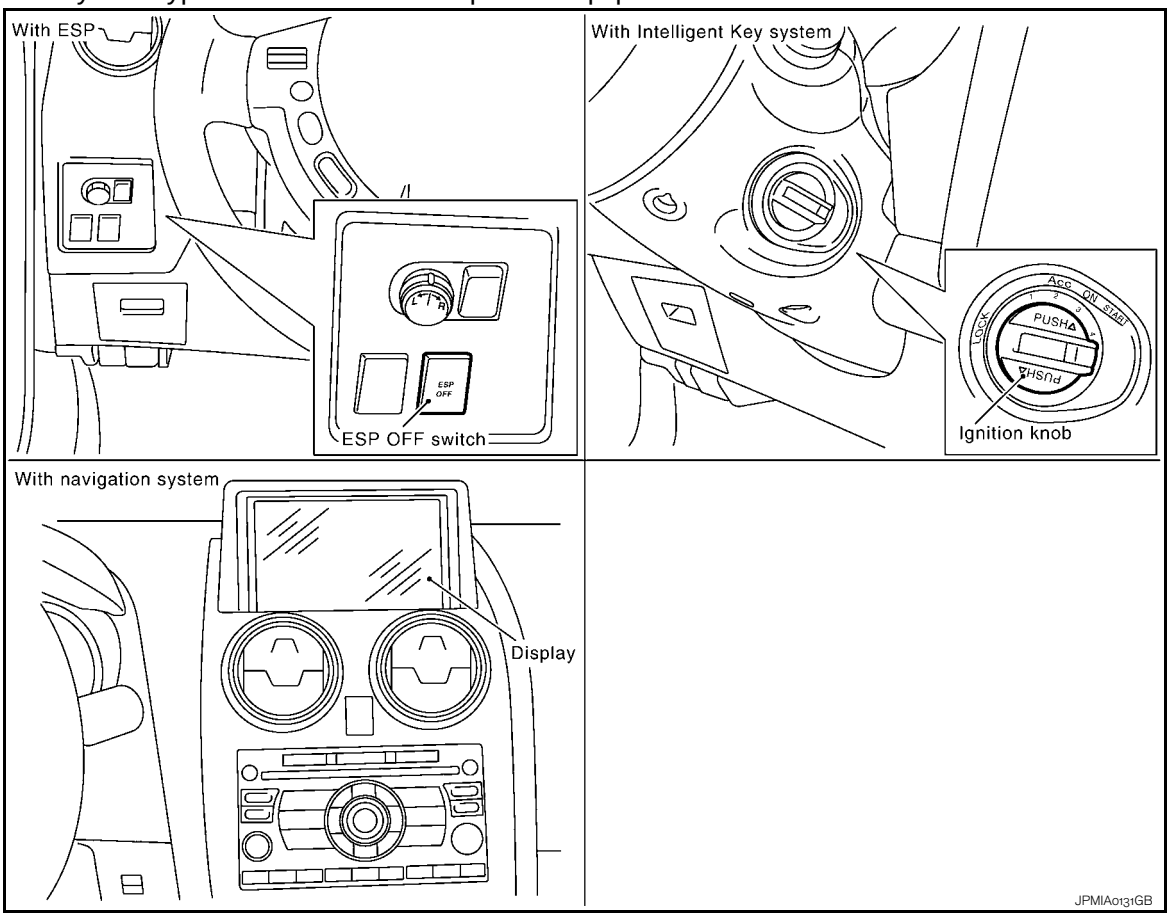
×: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION

NOTE:

cardiagn.com

Check CAN system type from the vehicle shape and equipment.



CAN Communication Signal Chart

INFOID:0000000000892198

Refer to LAN-45, "How to Use CAN Communication Signal Chart" for how to use CAN communication signal chart.

NOTE:

Refer to LAN-51, "Abbreviation List" for the abbreviations of the connecting units.

T: Transmit R: Receive

Signal name/Connecting unit	ECM	ABS	TCM	AV	EPS	I-KEY	STRG	4WD	BCM	M&A	IPDM-E
A/C compressor request signal	T										R
Accelerator pedal position signal	T	R	R					R			
ASCD status signal	T									R	
Closed throttle position signal	T		R								
Cooling fan speed request signal	T										R
Engine and CVT integrated control signal	T		R								
	R		T								
Engine coolant temperature signal	T								R*1	R	
Engine speed signal	T	R	R		R			R	R*1	R	
Engine status signal	T			R	R				R		
Fuel consumption monitor signal	T			R						R	
Glow indicator signal*1	T									R	
Malfunctioning indicator lamp signal	T									R	
Snow mode switch signal	T	R									

cardiagn.com

Signal name/Connecting unit	ECM	ABS	TCM	AV	EPS	I-KEY	STRG	4WD	BCM	M&A	IPDM-E
ABS warning lamp signal		T								R	
SLIP indicator lamp signal		T								R	
ESP OFF indicator lamp signal		T								R	
Vehicle speed signal	R		R	R	R				R	T	
	R	T			R			R		R	
CVT self-diagnosis signal*2	R		T								
Current gear position signal		R	T								
Input shaft revolution signal	R		T								
Manual mode indicator signal			T							R	
Output shaft revolution signal	R		T								
Shift position signal		R	T							R	
EPS operation signal	R				T						
EPS warning lamp signal					T					R	
Anti-Hijack request signal						T			R		
Buzzer output signal						T			R	R	
									T	R	
Door lock/unlock trunk open request signal						T			R		
Hazard request signal						T			R		
Key warning lamp signal						T				R	
LOCK warning lamp signal						T				R	
Super lock release signal						T			R		
Sleep-ready signal						T			R	T	T
Wake up signal						T			R	T	T
Steering angle sensor signal		R					T	R			
4WD signal		R						T			
4WD warning lamp signal								T		R	
A/C switch signal	R								T		
Blower fan motor switch signal	R								T		
Day time running light request signal									T		R
Door lock/unlock signal						R			T		
Door switch signal						R			T	R	
Front fog light request signal									T	R	R
Front wiper request signal									T		R
Headlamp washer request signal									T		R
High beam request signal									T	R	R
Horn request signal									T		R
Ignition switch ON signal									T		R
Ignition switch signal						R			T		
Low beam request signal									T		R
Oil pressure switch signal									T	R	
									R		T
Position light request signal									T	R	R

cardiagn.com

Signal name/Connecting unit	ECM	ABS	TCM	AV	EPS	I-KEY	STRG	4WD	BCM	M&A	IPDM-E
PTC RLY request*1									T		R
Rear fog lamp status signal									T	R	
Rear window defogger switch signal									T		R
Sleep wake up signal						R			T	R	R
Stop lamp switch signal			R						T		
Turn indicator signal									T	R	
Distance to empty signal				R						T	
Fuel level low warning signal				R						T	
Manual mode shift down signal			R							T	
Manual mode shift up signal			R							T	
Manual mode signal			R							T	
Not manual mode signal			R							T	
Outside air temperature signal*1									R	T	
Parking brake switch signal								R		T	
Stop lamp switch signal								R		T	
Front wiper stop position signal									R		T
High beam status signal	R										T
Hood switch signal									R		T
Low beam status signal	R										T
Rear window defogger control signal	R										T
Reverse switch signal	R*1								R		T

*1: Diesel engine models only

*2: MR engine models only

cardiagn.com

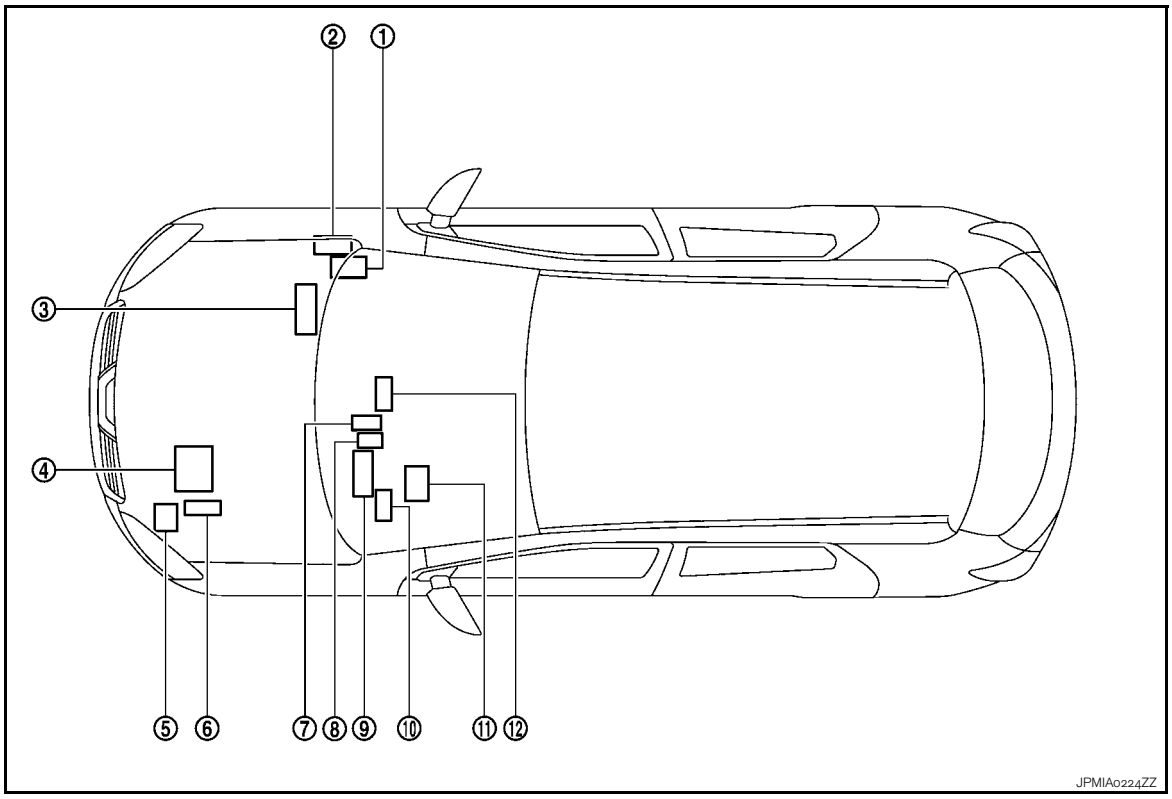
COMPONENT DIAGNOSIS

CAN COMMUNICATION SYSTEM

Component Parts Location

INFOID:0000000000972797

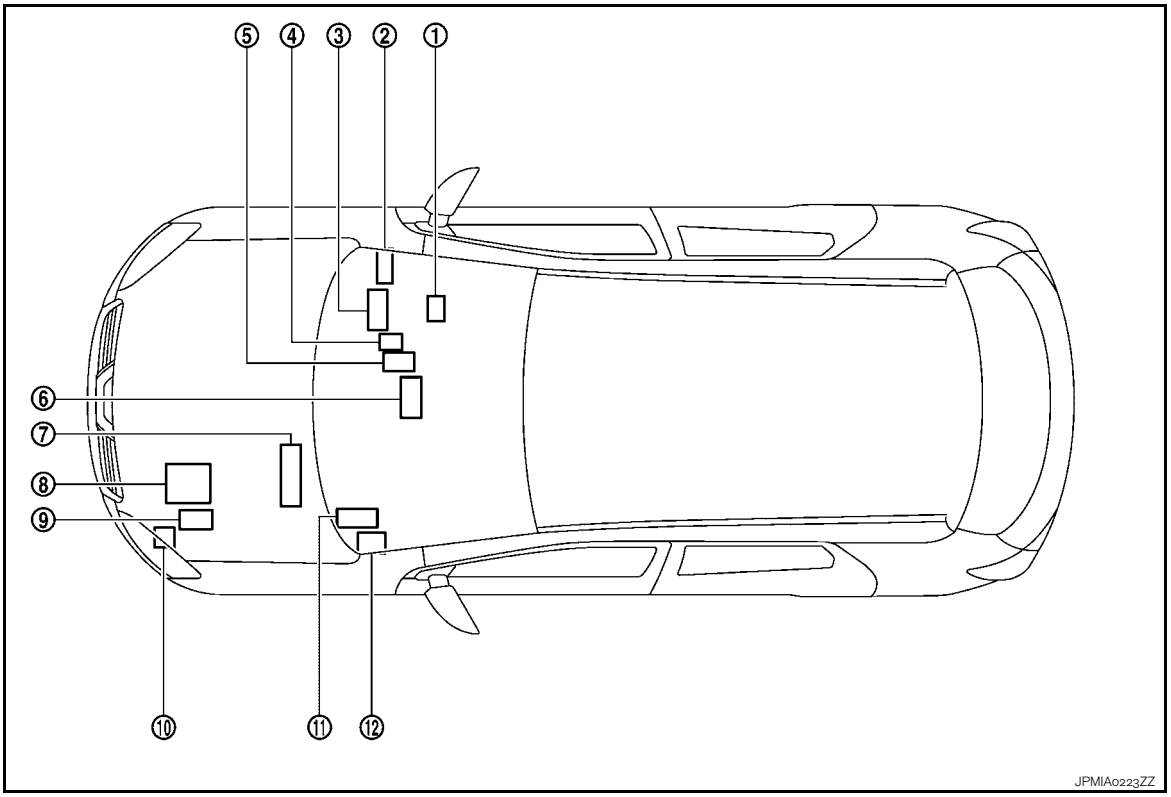
LHD MODELS



1. BCM M65
2. 4WD control unit M69
3. ABS actuator and electric unit (control unit)
   E34: With ABS
   E36: With ESP
4. TCM F25
5. IPDM E/R E12
6. ECM
   E16: HR engine/MR engine models
   E60: K9K engine models
7. Intelligent Key unit M40
8. EPS control unit M37
9. Combination meter M34
10. Data link connector M4
11. Steering angle sensor M30
12. NAVI control unit B96

RHD MODELS

cardiagn.com

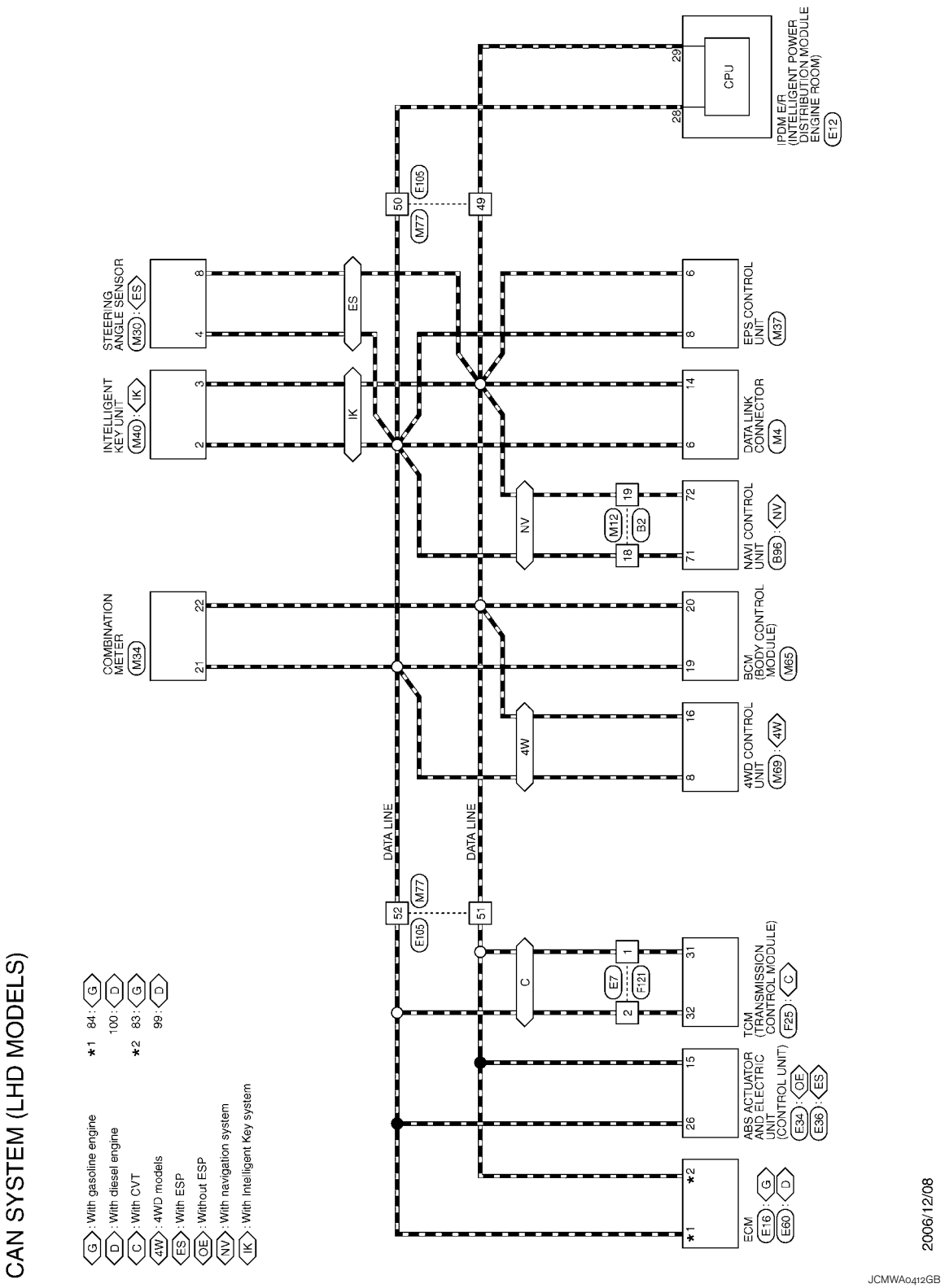


1. Steering angle sensor M30
2. Data link connector M4
3. Combination meter M34
4. EPS control unit M37
5. Intelligent Key unit M40
6. NAVI control unit B96
7. ABS actuator and electric unit (control unit)
   E34: With ABS
   E36: With ESP
8. TCM F25
9. ECM
   E16: HR engine/MR engine models
   E60: K9K engine models
10. IPDM E/R E12
11. 4WD control unit M69
12. BCM M65

cardiagn.com

Wiring Diagram - CAN SYSTEM (LHD MODELS) -

INFOID:0000000000972798



cardiagn.com

CAN SYSTEM (LHD MODELS)

Connector No.	B2
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
18	L	–
19	P	–

Connector No.	B96
Connector Name	NAVI CONTROL UNIT
Connector Type	TH32FW

H.S.

42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72
41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71

Terminal No.	Color of Wire	Signal Name [Specification]
71	L	CAN-H
72	P	CAN-L

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	L	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

25	24				23	22	21
32	31	30	29	28	27	26	

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	–
29	P	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

81	85	89	93	97	101	105	109
82	86	90	94	98	102	106	110
83	87	91	95	99	103	107	111
84	88	92	96	100	104	108	112

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E34
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH

H.S.

1	2	3	4	16	17	18	19	20	21	22	23	24	25	26
				5	6	7	8	9	10	11	12	13	14	15

Terminal No.	Color of Wire	Signal Name [Specification]
15	P	CAN-L
26	L	CAN-H

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH

H.S.

1	2	3	4	16	17	18	19	20	21	22	23	24	25	26
				5	6	7	8	9	10	11	12	13	14	15

Terminal No.	Color of Wire	Signal Name [Specification]
15	P	CAN-L
26	L	CAN-H

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

97	101	105	109	113	117	121	125
98	102	106	110	114	118	122	126
99	103	107	111	115	119	123	127
100	104	108	112	116	120	124	128

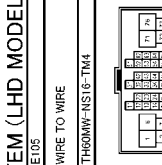
Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

JCMWA0413GB

cardiagn.com

CAN SYSTEM (LHD MODELS)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–

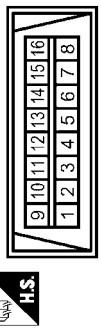
Connector No.	F25
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	MOLEX 500984-4111

Terminal No.	Color of Wire	Signal Name [Specification]
31	P	CAN-L
32	L	CAN-H

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	L	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M12
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
18	L	–
19	P	–

Connector No.	M20
Connector Name	STEERING ANGLE SENSOR
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
4	L	CAN-H
8	P	CAN-L

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M37
Connector Name	EPS CONTROL UNIT
Connector Type	Molex 98545-0001

Terminal No.	Color of Wire	Signal Name [Specification]
6	P	–
8	L	–

JCMWA0414GB

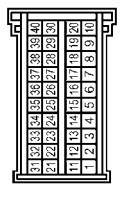
cardiagn.com

CAN SYSTEM (LHD MODELS)

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

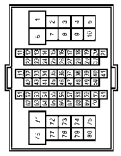


Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L

Connector No.	M69
Connector Name	4WD CONTROL UNIT
Connector Type	TH16FW

Terminal No.	Color of Wire	Signal Name [Specification]
8	L	CAN-H
16	P	CAN-L

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



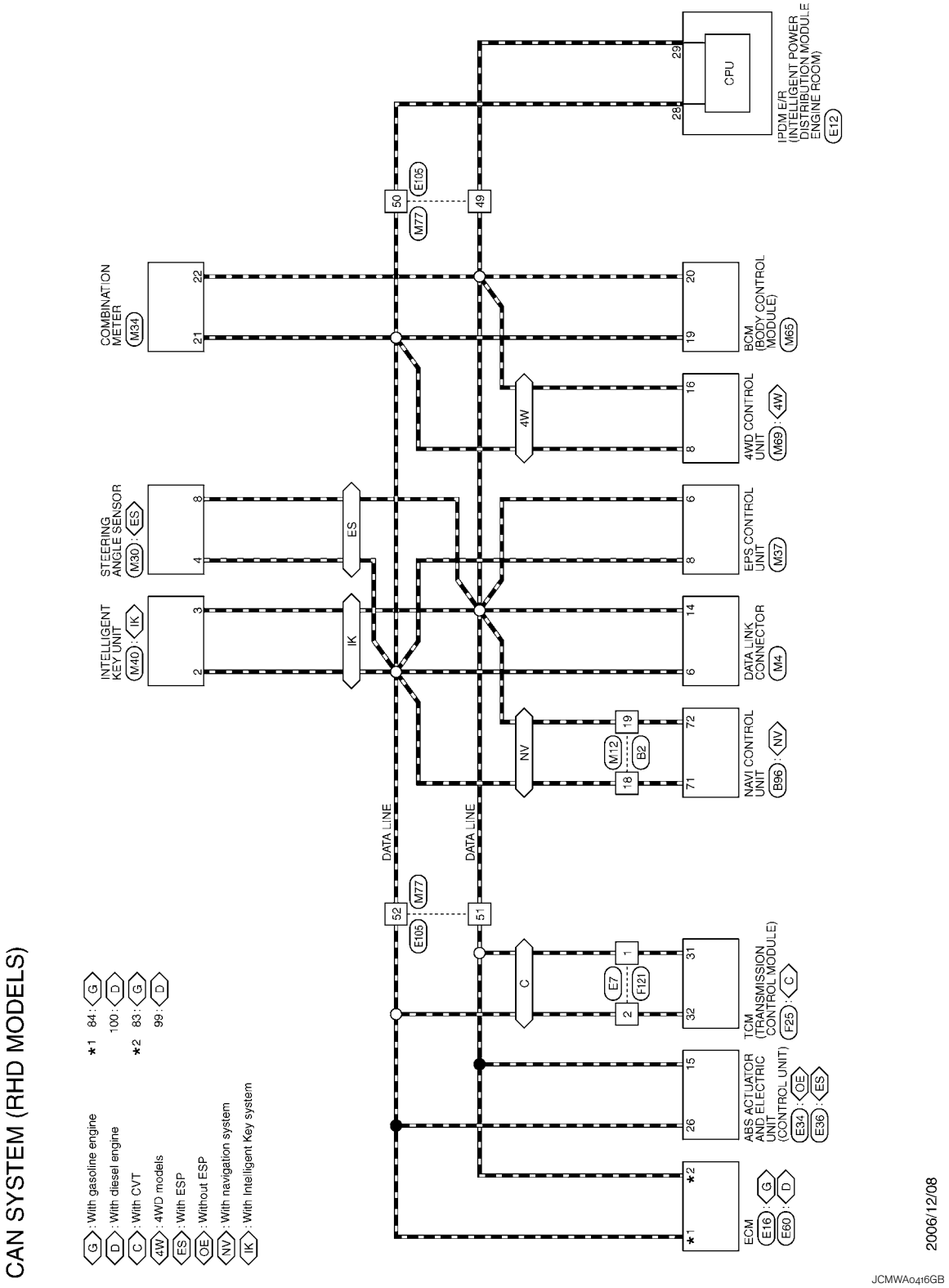
Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–

JCMWA0415GB

cardiagn.com

Wiring Diagram - CAN SYSTEM (RHD MODELS) -

INFOID:0000000001125398



cardiagn.com

CAN SYSTEM (RHD MODELS)

Connector No.	B2
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
18	L	–
19	P	–

Connector No.	B96
Connector Name	NAVI CONTROL UNIT
Connector Type	TH32FW

H.S.

42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72
41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71

Terminal No.	Color of Wire	Signal Name [Specification]
71	L	CAN-H
72	P	CAN-L

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	L	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

25	24				23	22	21
32	31	30	29	28	27	26	

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	–
29	P	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

81	85	89	93	97	101	105	109
82	86	90	94	98	102	106	110
83	87	91	95	99	103	107	111
84	88	92	96	100	104	108	112

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E34
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH

H.S.

1	2	3	4	16	17	18	19	20	21	22	23	24	25	26
				5	6	7	8	9	10	11	12	13	14	15

Terminal No.	Color of Wire	Signal Name [Specification]
15	P	CAN-L
26	L	CAN-H

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH

H.S.

1	2	3	4	16	17	18	19	20	21	22	23	24	25	26
				5	6	7	8	9	10	11	12	13	14	15

Terminal No.	Color of Wire	Signal Name [Specification]
15	P	CAN-L
26	L	CAN-H

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

97	101	105	109	113	117	121	125
98	102	106	110	114	118	122	126
99	103	107	111	115	119	123	127
100	104	108	112	116	120	124	128

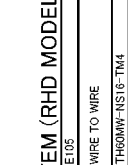
Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

JCMWA0417GB

cardiagn.com

CAN SYSTEM (RHD MODELS)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–

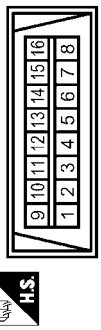
Connector No.	F25
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	MOLEX 500984-4111

Terminal No.	Color of Wire	Signal Name [Specification]
31	P	CAN-L
32	L	CAN-H

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

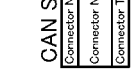
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	L	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M12
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
18	L	–
19	P	–

Connector No.	M20
Connector Name	STEERING ANGLE SENSOR
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
4	L	CAN-H
8	P	CAN-L

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M37
Connector Name	EPS CONTROL UNIT
Connector Type	Molex 98545-0001

Terminal No.	Color of Wire	Signal Name [Specification]
6	P	–
8	L	–

JCMWA0418GB

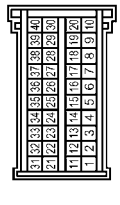
cardiagn.com

CAN SYSTEM (RHD MODELS)

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

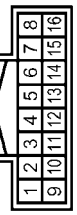
Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



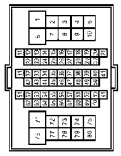
Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L

Connector No.	M69
Connector Name	4WD CONTROL UNIT
Connector Type	TH16FW



Terminal No.	Color of Wire	Signal Name [Specification]
8	L	CAN-H
16	P	CAN-L

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–

JCMWA0419GB

cardiagn.com

MALFUNCTION AREA CHART

Main Line

INFOID:0000000000977605

Malfunction Area	Reference
Main line between ABS actuator and electric unit (control unit) and BCM	LAN-73, "Diagnosis Procedure"
Main line between ABS actuator and electric unit (control unit) and TCM	LAN-74, "Diagnosis Procedure"
Main line between TCM and BCM	LAN-75, "Diagnosis Procedure"
Main line between BCM and data link connector	LAN-76, "Diagnosis Procedure"
Main line between ABS actuator and electric unit (control unit) and data link connector	LAN-77, "Diagnosis Procedure"
Main line between TCM and data link connector	LAN-78, "Diagnosis Procedure"
Main line between data link connector and BCM	LAN-79, "Diagnosis Procedure"

Branch Line

INFOID:0000000000977606

Malfunction Area	Reference
ECM branch line circuit	LAN-80, "Diagnosis Procedure"
ABS actuator and electric unit (control unit) branch line circuit	LAN-81, "Diagnosis Procedure"
TCM branch line circuit	LAN-82, "Diagnosis Procedure"
4WD control unit branch line circuit	LAN-83, "Diagnosis Procedure"
BCM branch line circuit	LAN-84, "Diagnosis Procedure"
Combination meter branch line circuit	LAN-85, "Diagnosis Procedure"
NAVI control unit branch line circuit	LAN-86, "Diagnosis Procedure"
Data link connector branch line circuit	LAN-87, "Diagnosis Procedure"
EPS control unit branch line circuit	LAN-88, "Diagnosis Procedure"
Intelligent Key unit branch line circuit	LAN-89, "Diagnosis Procedure"
Steering angle sensor branch line circuit	LAN-90, "Diagnosis Procedure"
IPDM E/R branch line circuit	LAN-91, "Diagnosis Procedure"

Short Circuit

INFOID:0000000000977607

Malfunction Area	Reference
CAN communication circuit	LAN-92, "Diagnosis Procedure"

cardiagn.com

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000000977599

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000000968770

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000000968771

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000000968772

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000000977601

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000000968773

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000000968774

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968775

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968776

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968777

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968778

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968779

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968780

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968781

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968782

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968783

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968784

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968785

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000000968786

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000000968787

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

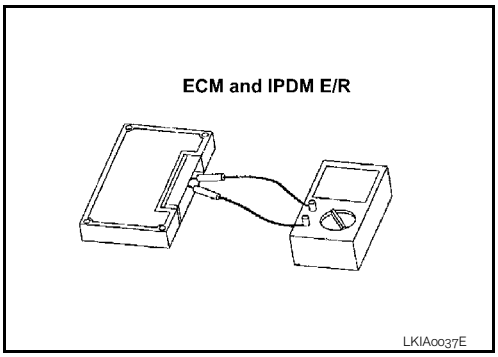
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5. CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6. CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101848

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101850

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101851

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101852

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101855

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101856

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101858

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101859

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101862

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101863

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

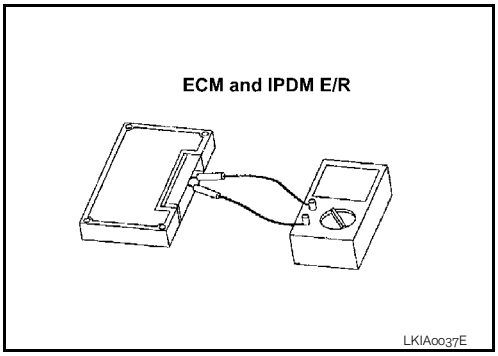
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101798

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101800

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101801

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101802

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101805

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101806

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101807

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101808

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101809

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101812

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101813

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

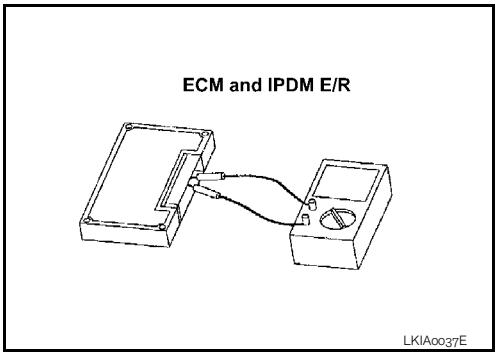
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101748

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101750

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101751

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101752

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101755

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101756

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101758

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101759

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101760

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101762

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101763

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

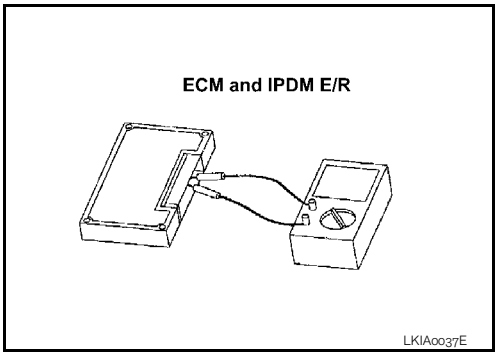
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101698

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101700

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101701

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101702

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101705

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101706

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101707

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101708

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101709

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101710

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101712

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101713

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

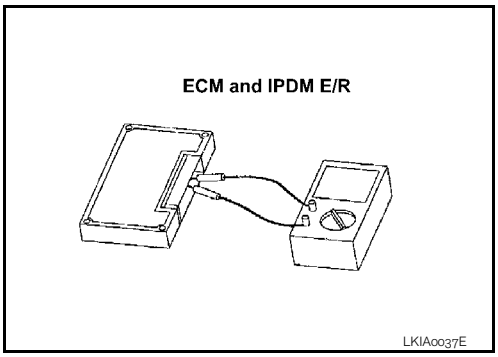
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5. CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6. CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101648

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101650

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101651

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101652

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101655

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101656

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101658

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101659

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101661

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101662

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101663

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

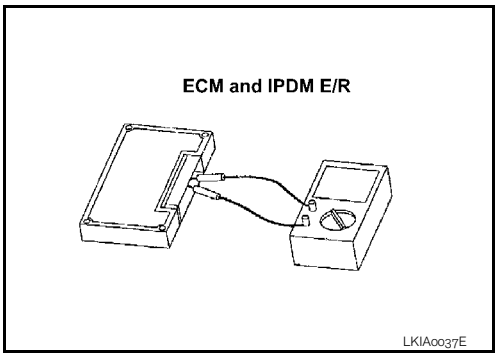
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5. CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6. CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101598

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101600

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101601

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101602

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101605

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101606

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101607

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101608

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101609

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101611

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101612

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101613

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

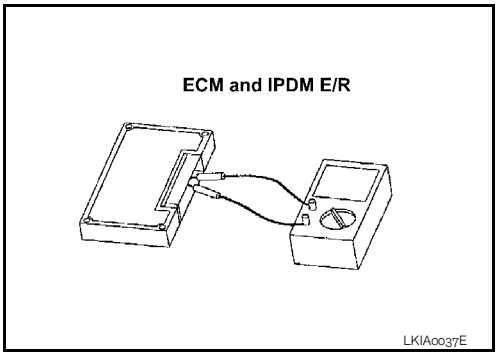
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101548

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101550

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101551

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101552

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101555

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101556

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101558

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101559

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101560

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101561

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101562

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101563

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

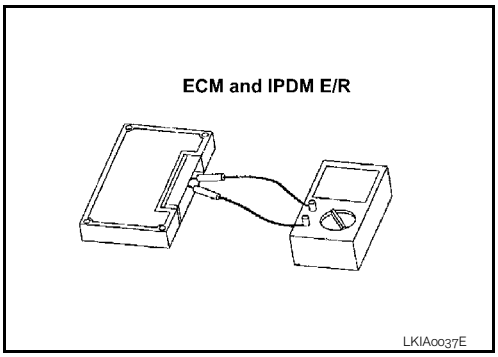
1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132



3. Check the resistance between the IPDM E/R terminals.

cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5. CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6. CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101498

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101500

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101501

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101502

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101505

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101506

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101507

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101508

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101509

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101510

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101511

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101512

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101513

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

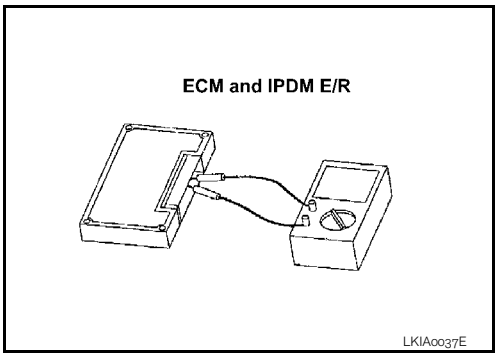
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101448

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101450

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101451

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101452

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101455

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101456

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101458

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101459

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101462

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101463

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

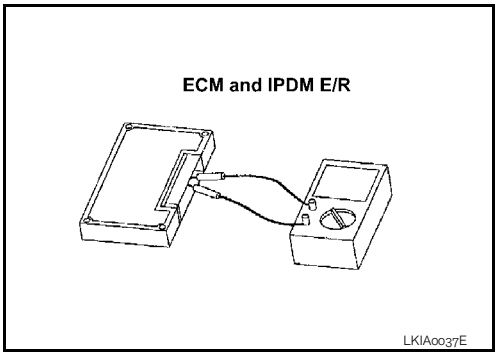
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101398

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101400

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101401

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101402

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101405

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101406

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101407

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101408

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101409

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101412

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101413

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

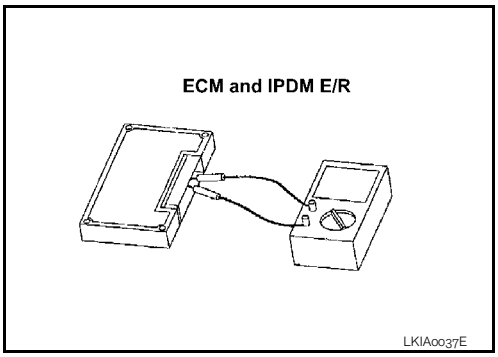
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101348

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101350

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101351

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101352

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101355

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101356

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101358

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101359

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101360

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101362

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101363

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

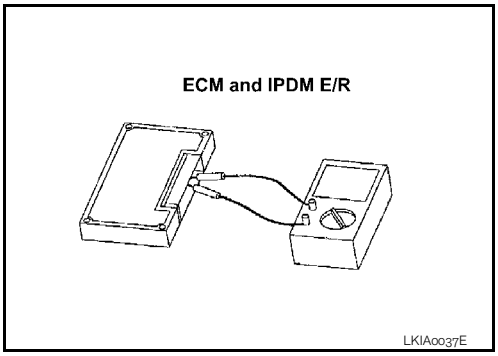
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101298

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101300

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101301

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101302

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101305

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101306

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101307

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101308

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101309

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101310

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101312

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101313

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

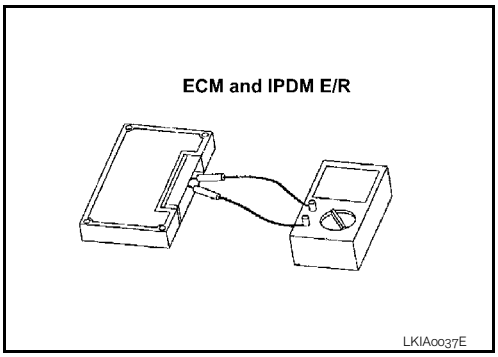
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5. CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6. CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101248

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101250

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101251

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101252

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101255

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101256

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101258

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101259

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101261

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101262

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101263

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

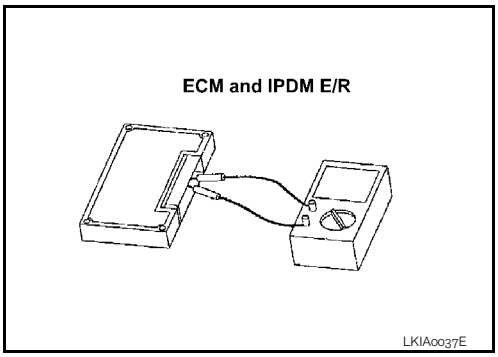
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101198

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101200

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101201

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101202

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101205

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101206

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101207

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101208

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101209

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101211

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101212

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101213

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

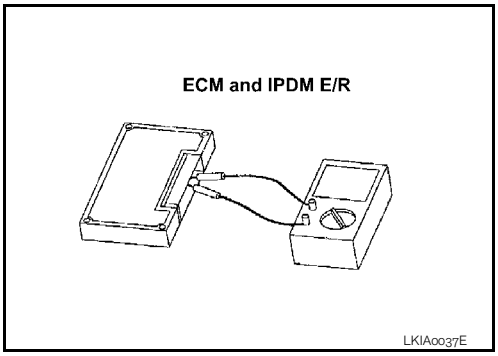
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101148

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101150

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101151

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101152

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101155

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101156

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101158

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101159

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101160

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101161

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101162

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101163

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

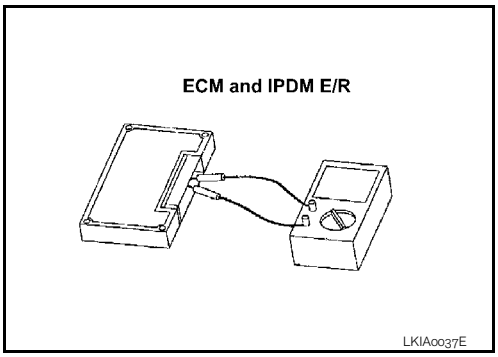
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101098

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101100

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101101

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101102

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101105

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101106

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101107

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101108

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101109

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101110

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101111

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101112

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101113

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

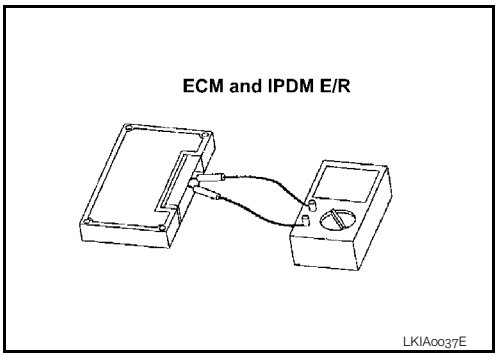
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001101048

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101050

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101051

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101052

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101055

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101056

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101058

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101059

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101062

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101063

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

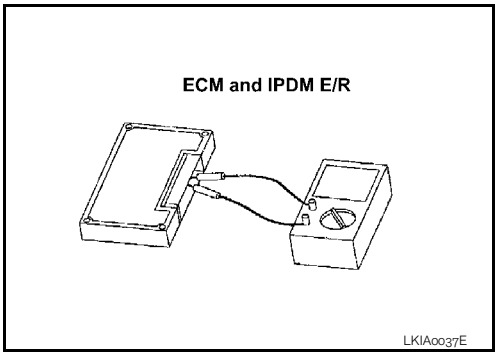
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100998

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001101000

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101001

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101002

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101005

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101006

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101007

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101008

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101009

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001101012

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001101013

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

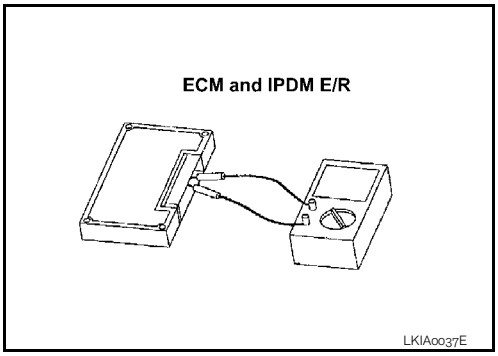
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100948

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100950

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100951

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100952

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100955

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100956

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100958

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100959

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100960

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100962

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100963

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

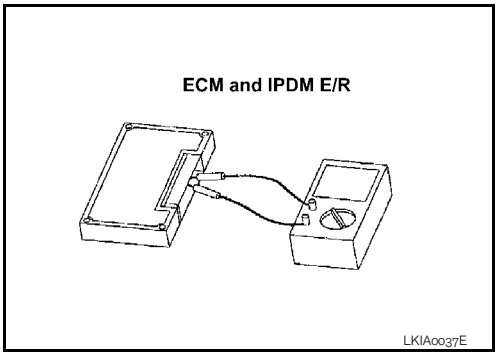
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100898

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100900

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100901

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100902

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100905

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100906

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100907

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100908

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100909

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100910

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100912

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100913

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

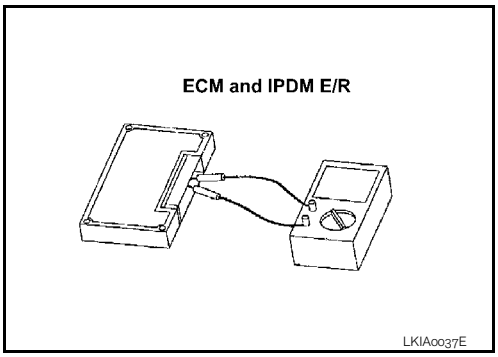
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100848

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100850

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100851

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100852

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100855

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100856

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100858

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100859

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100861

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100862

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100863

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

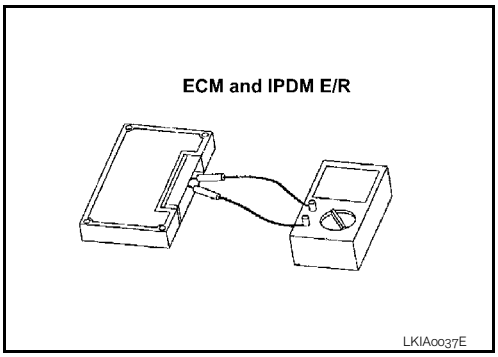
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100798

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100800

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100801

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100802

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100805

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100806

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100807

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100808

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100809

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100811

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100812

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100813

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

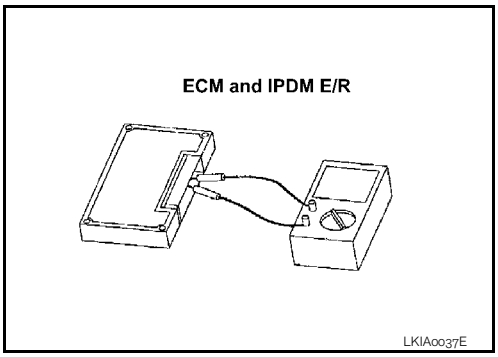
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100748

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100750

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100751

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100752

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100755

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100756

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100758

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100759

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100760

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100761

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100762

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100763

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

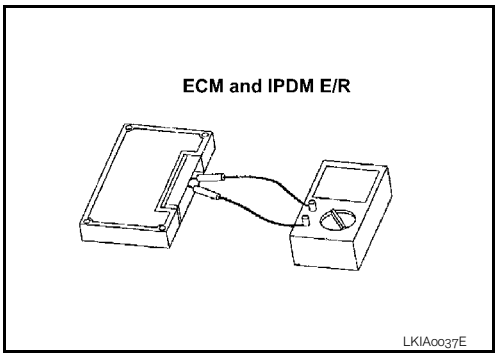
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100697

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100699

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100700

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100701

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100704

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100705

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100706

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100707

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100708

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100709

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100710

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100711

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100712

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

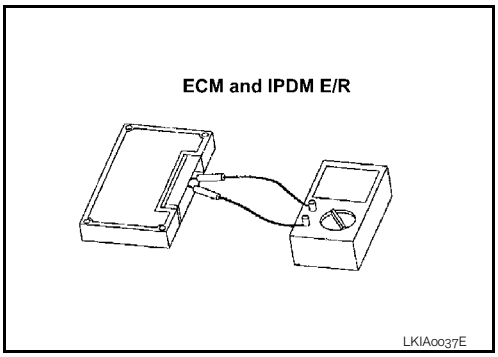
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100644

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100648

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100649

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100650

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100651

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100652

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100654

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100655

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100657

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100658

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100661

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100662

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

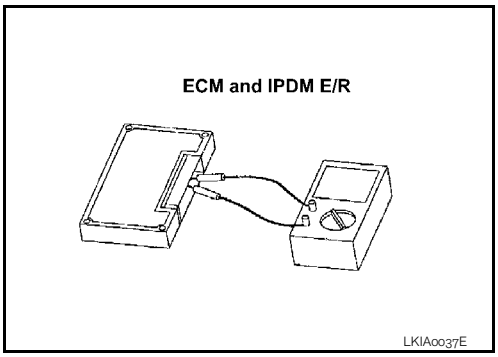
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100594

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100598

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100599

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100600

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100601

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100602

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100604

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100605

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100606

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100607

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100608

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100611

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100612

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

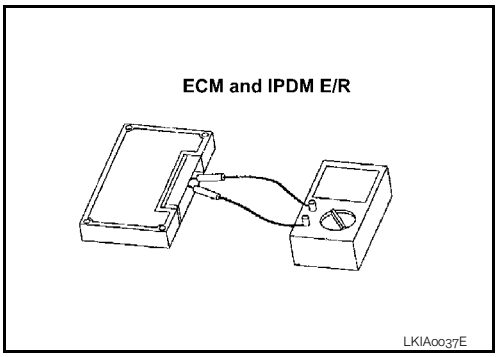
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100544

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100548

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100549

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100550

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100551

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100552

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100554

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100555

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100557

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100558

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001102290

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100561

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100562

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

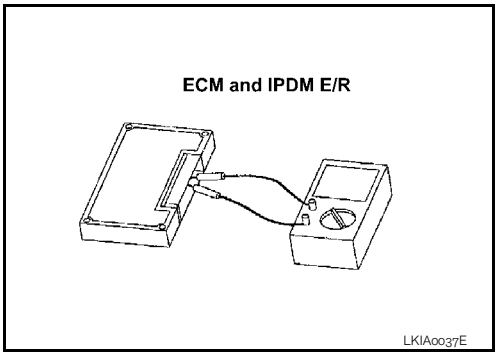
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100494

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100498

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100499

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100500

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100501

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100502

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100504

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100505

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100506

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100507

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100508

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100509

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100511

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100512

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

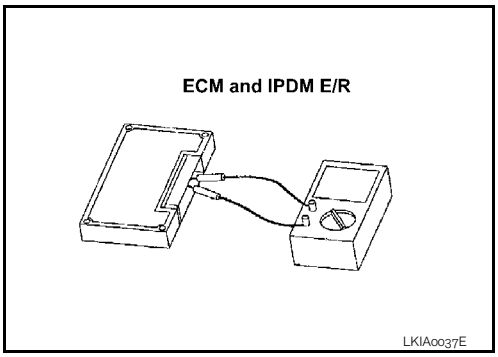
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100432

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100436

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100437

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100438

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100439

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100440

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100442

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100443

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100445

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100446

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100448

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100449

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100450

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

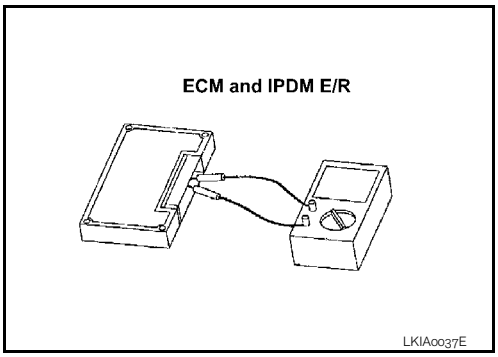
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100382

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100386

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100387

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100388

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100389

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100390

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100392

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100393

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100394

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100395

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100396

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100398

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100399

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100400

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

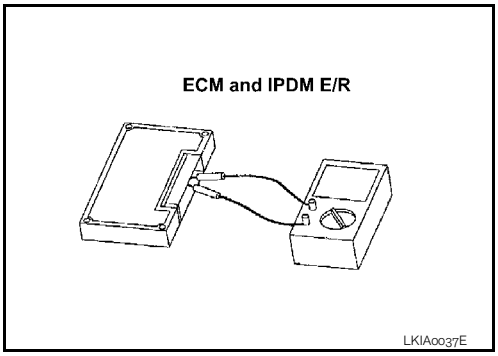
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100332

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100336

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100337

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100338

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100339

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100340

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100342

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100343

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100345

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100346

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100347

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100348

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100349

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100350

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

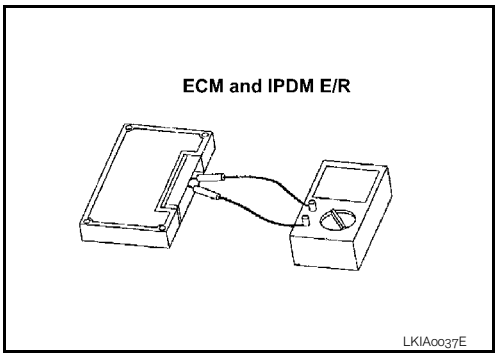
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100282

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100286

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100287

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100288

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100289

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100290

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100292

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100293

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100294

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100295

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100296

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100297

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100298

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100299

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100300

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

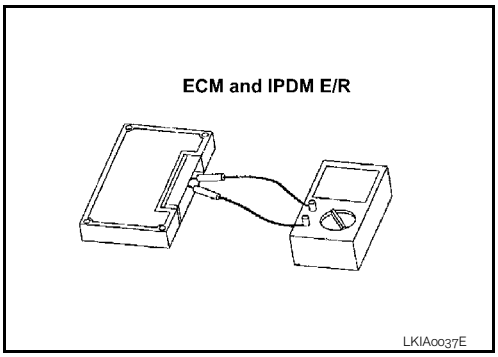
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100235

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100237

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100238

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100239

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100241

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100242

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100243

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100245

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100246

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100249

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100250

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

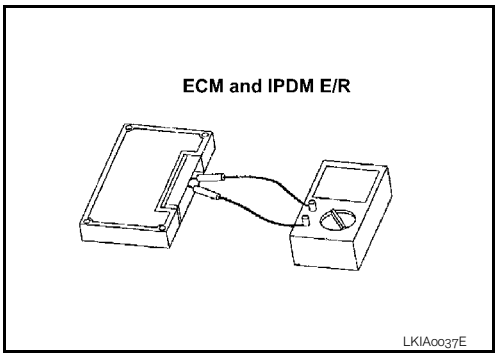
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100185

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100187

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100188

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100189

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100191

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100192

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100193

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100194

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100195

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100196

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100199

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100200

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

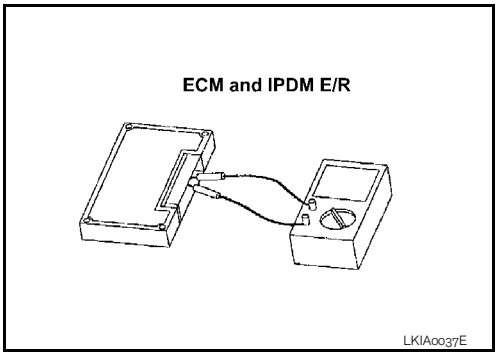
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100135

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100137

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100138

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100139

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100141

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100142

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100143

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100145

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100146

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100147

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100149

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100150

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

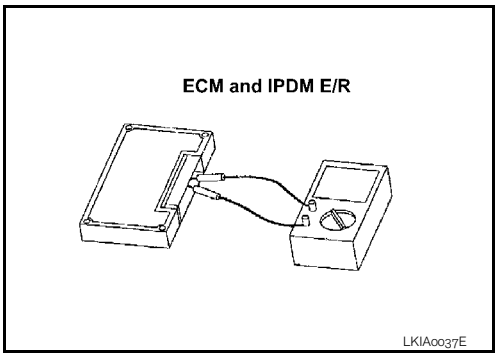
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100085

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100087

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100088

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100089

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100091

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100092

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100093

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100094

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100095

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100096

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100097

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100099

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100100

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

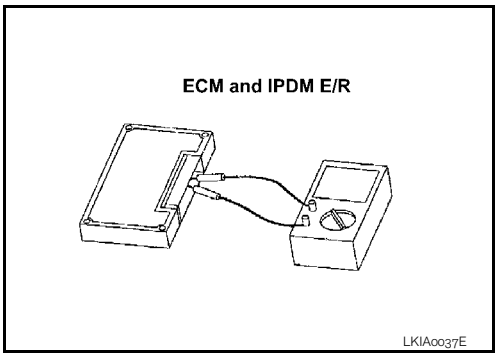
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001100035

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001100037

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100038

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100039

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100041

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100042

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100043

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100045

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100046

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100048

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001100049

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100050

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

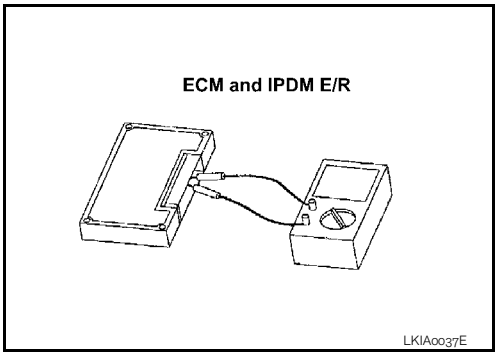
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099985

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099987

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099988

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099989

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099991

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099992

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099993

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099994

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099995

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099996

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099998

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099999

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001100000

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

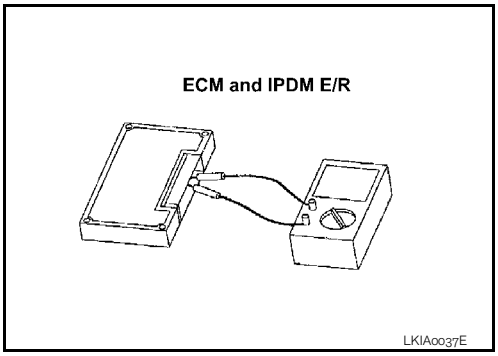
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099935

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099937

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099938

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099939

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099941

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099942

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099943

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099945

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099946

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099947

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099948

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099949

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099950

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

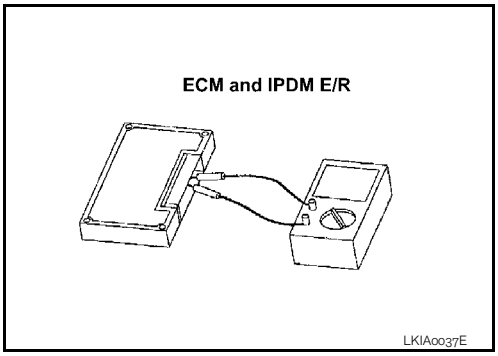
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099885

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099887

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099888

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099889

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099891

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099892

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099893

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099894

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099895

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099896

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099897

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099898

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099899

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099900

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

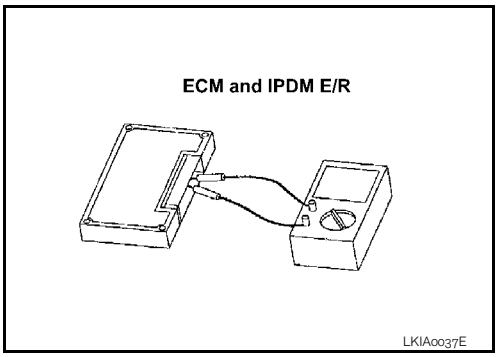
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099831

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099835

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099836

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099837

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099838

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099839

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099840

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099841

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099842

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099844

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099845

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099848

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099849

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

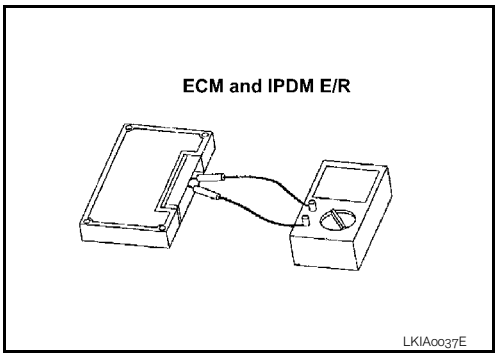
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099781

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099785

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099786

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099787

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099788

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099789

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099790

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099791

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099792

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099793

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099794

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099795

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099798

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099799

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

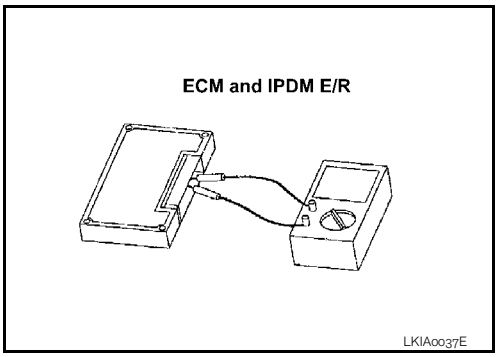
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099731

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099735

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099736

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099737

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099738

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099739

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099740

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099741

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099742

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099744

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099745

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099746

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099748

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099749

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

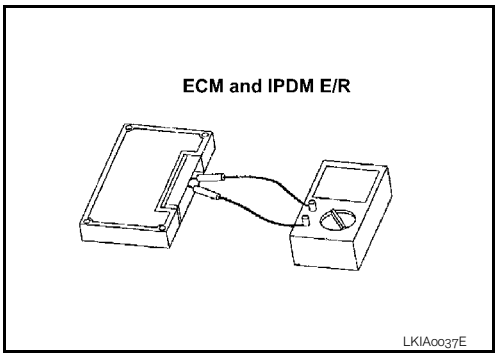
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099679

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099683

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099684

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099685

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099686

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099687

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099688

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099689

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099690

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099691

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099692

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099693

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099694

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099696

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099697

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

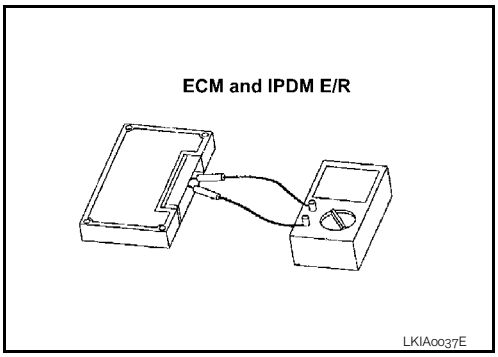
1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132



3. Check the resistance between the IPDM E/R terminals.

cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099628

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099632

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099633

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099634

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099635

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099636

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099637

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099638

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099639

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099641

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099642

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099644

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099645

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099646

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

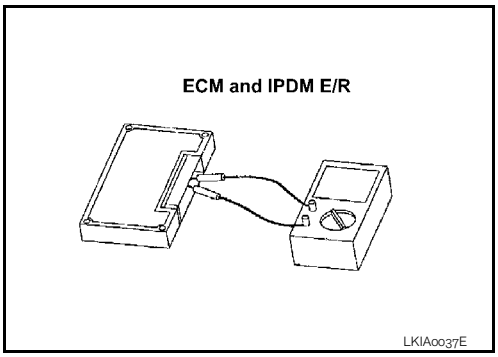
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099578

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099582

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099583

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099584

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099585

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099586

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099587

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099588

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099589

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099590

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099591

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099592

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099594

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099595

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099596

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

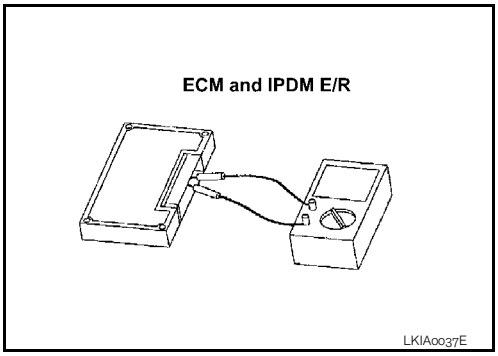
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099528

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099532

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099533

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099534

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099535

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099536

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099537

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099538

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099539

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099541

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099542

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099543

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099544

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099545

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099546

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

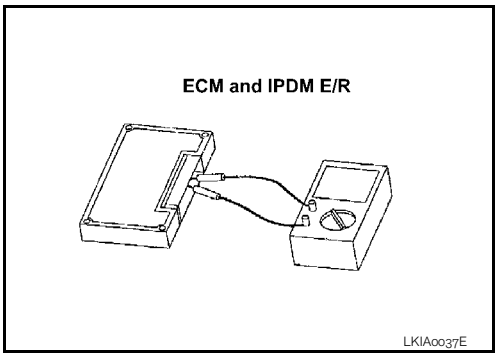
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099478

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001099482

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connectors F121 and E7
- Harness connectors E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connector E7 and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check the continuity between the harness connector and the data link connector.

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M4	6	Existed
	51		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

cardiagn.com

MAIN LINE BETWEEN DLC AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001099483

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the data link connector and the BCM harness connector.

Data link connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M4	6	M65	19	Existed
	14		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the BCM.
NO >> Repair the main line between the data link connector and the BCM.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099484

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099485

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099486

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099487

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099488

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099489

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099490

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099491

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099492

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099493

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099494

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001099495

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001099496

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

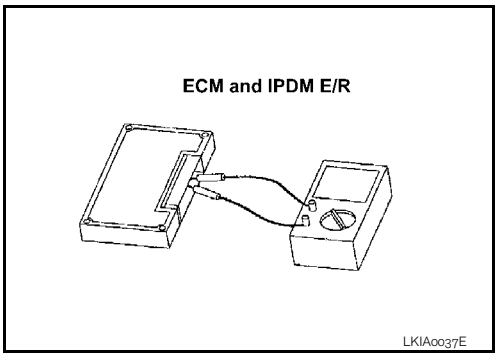
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001056707

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

A
B
C
D
E
F
G
H
I
J
K
L
LAN
N
O
P

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001056710

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056714

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056715

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056718

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056719

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056721

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056722

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056725

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001056726

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

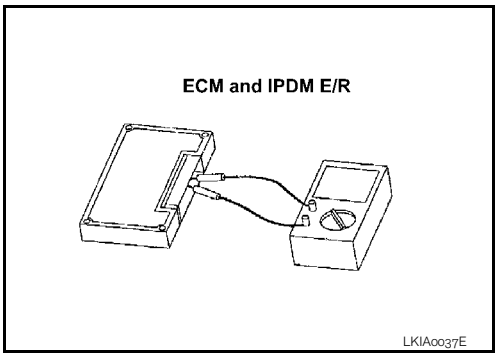
1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132



3. Check the resistance between the IPDM E/R terminals.

cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001056769

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001056772

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056776

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056777

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056780

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056781

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056782

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056783

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056784

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056787

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001056788

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

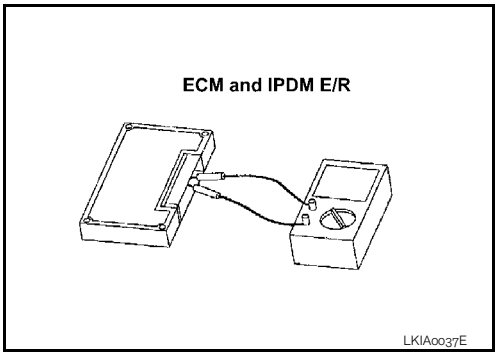
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001056919

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001056922

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056926

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056927

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056930

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056931

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056933

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056934

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056935

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056937

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001056938

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

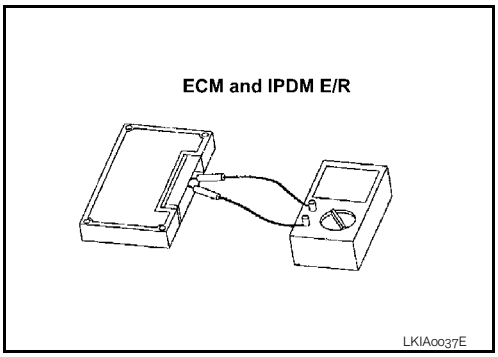
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001056969

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

A
B
C
D
E
F
G
H
I
J
K
L
LAN
N
O
P

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001056972

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056976

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056977

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056980

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056981

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056982

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056983

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056984

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056985

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056987

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001056988

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

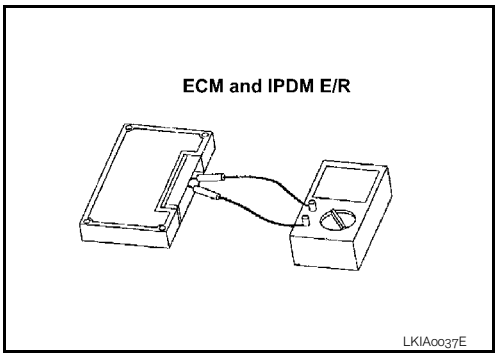
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057019

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057022

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057026

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057027

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057030

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057031

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057033

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057034

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057036

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057037

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057038

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

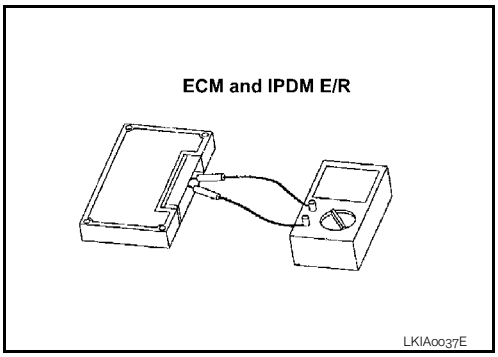
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057069

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057072

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057076

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057077

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057080

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057081

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057082

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057083

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057084

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057086

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057087

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057088

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

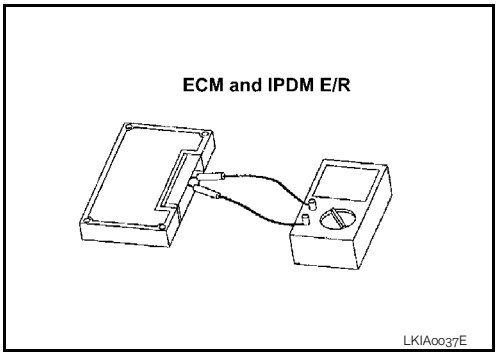
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057119

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057122

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057126

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057127

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057130

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057131

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057133

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057134

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057135

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057136

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057137

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057138

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

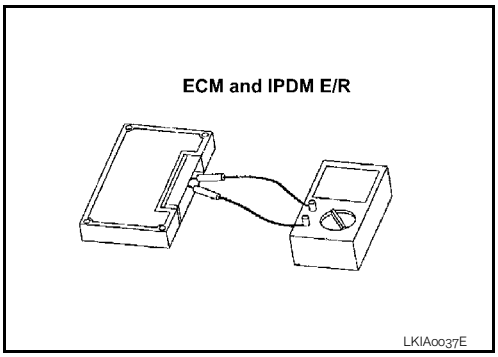
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057169

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057172

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057176

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057177

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057180

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057181

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057182

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057183

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057184

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057185

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057186

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057187

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057188

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

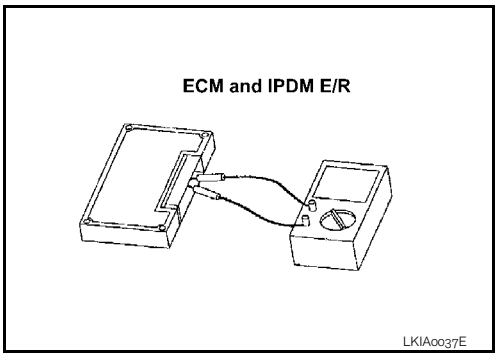
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057219

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

A
B
C
D
E
F
G
H
I
J
K
L
LAN
N
O
P

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057222

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057226

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057227

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057230

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057231

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057233

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057234

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057237

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057238

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

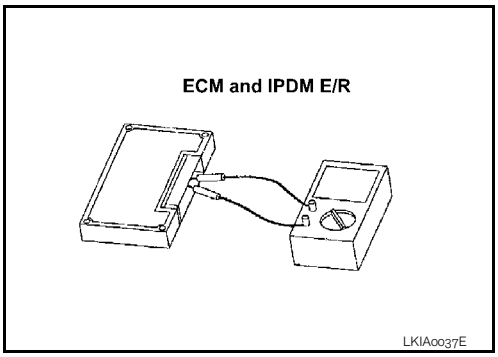
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057269

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057272

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057276

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057277

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057280

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057281

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057282

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057283

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057284

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057287

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057288

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

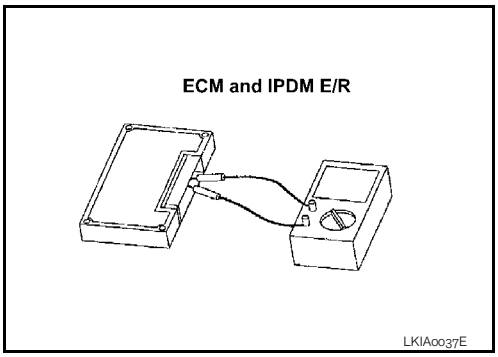
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057319

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057322

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057326

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057327

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057330

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057331

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057333

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057334

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057335

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057337

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057338

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

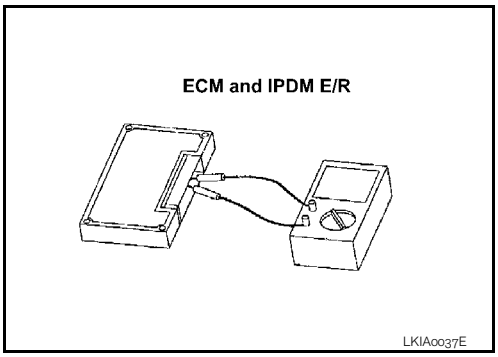
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057369

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057372

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057376

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057377

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057380

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057381

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057382

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057383

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057384

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057385

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057387

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057388

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

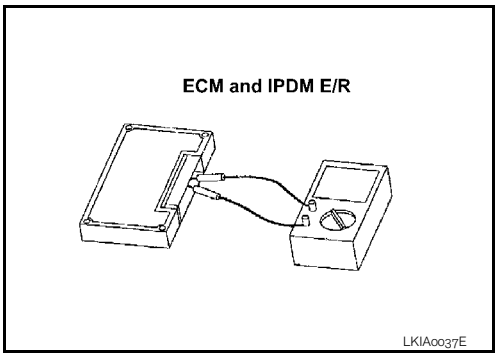
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057419

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057422

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057426

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057427

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057430

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057431

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057433

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057434

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057436

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057437

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057438

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

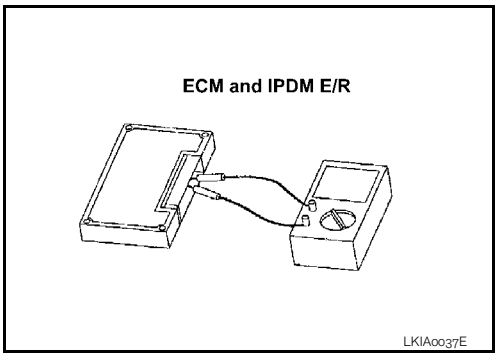
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057469

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057472

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057476

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057477

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057480

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057481

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057482

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057483

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057484

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057486

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057487

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057488

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

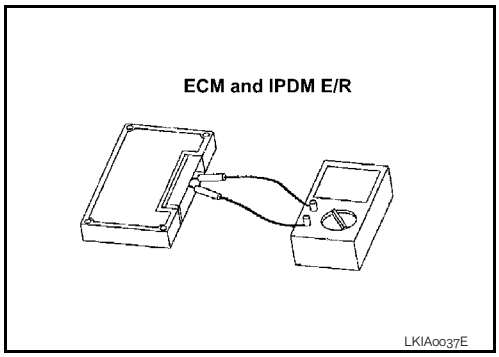
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057519

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057522

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057526

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057527

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057530

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057531

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057533

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057534

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057535

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057536

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057537

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057538

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

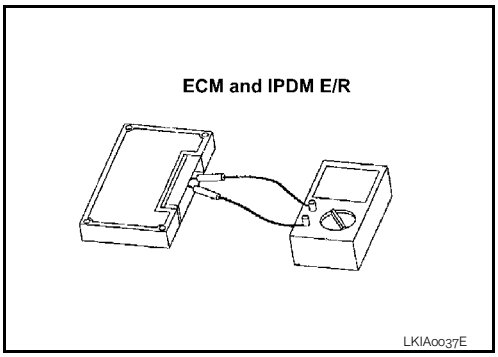
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057569

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057572

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057576

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057577

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057580

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057581

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057582

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057583

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057584

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057585

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057586

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057587

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057588

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

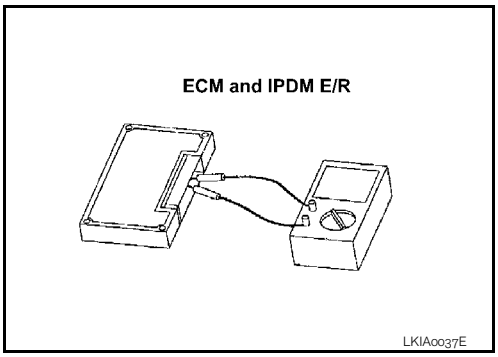
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057619

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

A
B
C
D
E
F
G
H
I
J
K
L
LAN
N
O
P

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057622

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057626

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057627

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057630

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057631

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057633

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057634

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057637

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057638

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

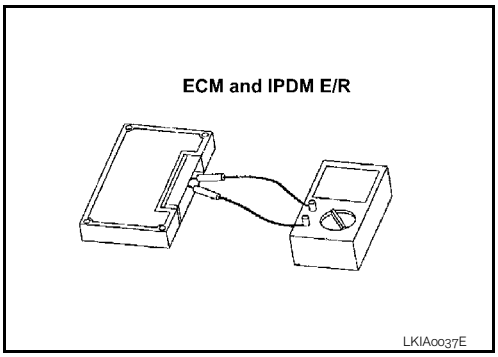
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057669

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057672

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057676

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057677

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057680

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057681

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057682

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057683

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057684

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057687

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057688

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

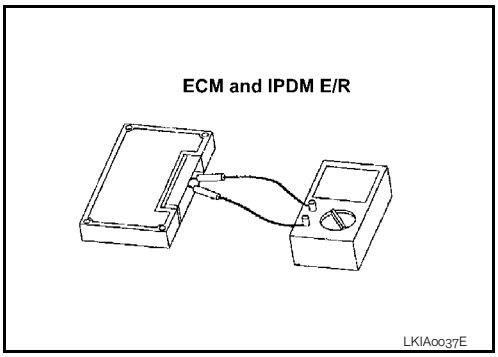
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057719

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057722

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057726

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057727

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057730

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057731

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057733

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057734

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057735

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057737

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057738

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

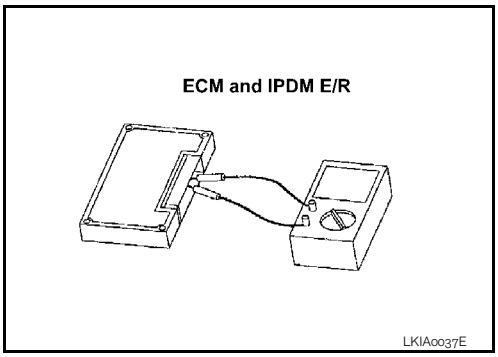
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057769

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057772

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057776

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057777

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057780

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057781

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057782

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057783

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057784

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057785

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057787

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057788

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

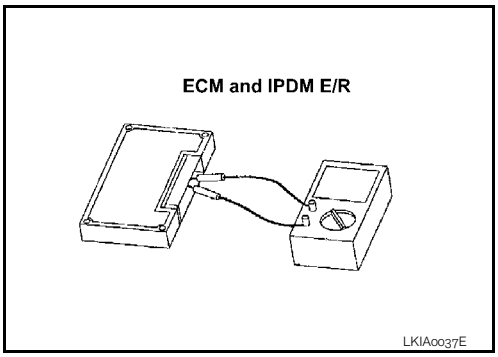
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057819

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

A
B
C
D
E
F
G
H
I
J
K
L
LAN
N
O
P

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057822

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057826

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057827

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057830

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057831

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057833

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057834

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057836

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057837

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057838

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

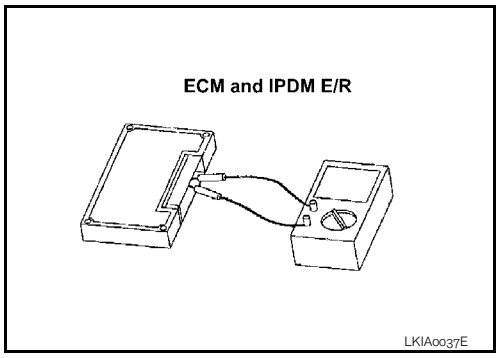
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057869

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057872

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057876

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057877

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057880

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057881

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057882

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057883

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057884

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057886

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057887

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057888

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

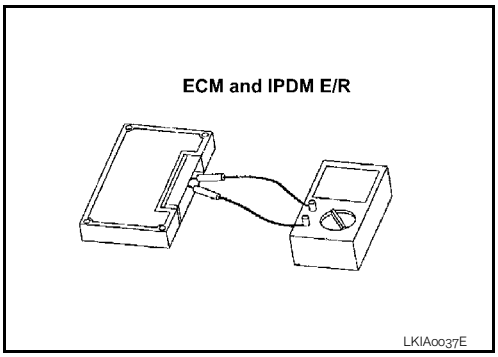
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057919

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057922

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057926

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057927

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057930

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057931

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057933

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057934

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057935

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057936

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057937

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057938

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

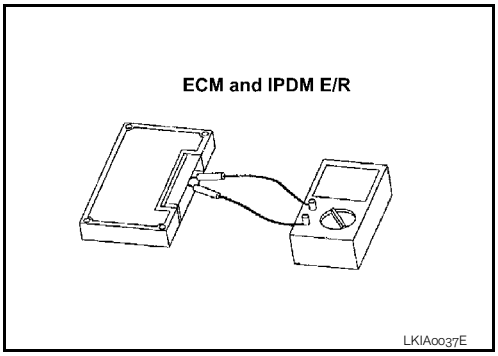
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001057969

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001057972

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057976

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057977

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057980

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057981

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057982

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057983

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057984

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057985

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057986

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001057987

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001057988

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

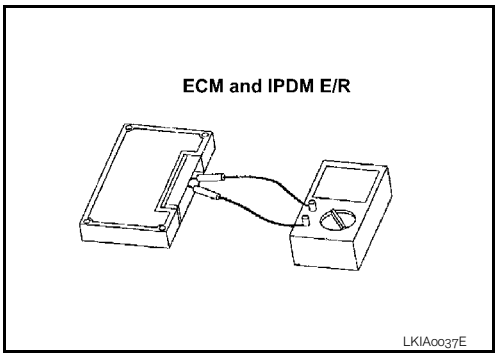
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058020

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058021

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058022

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058026

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058027

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058028

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058030

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058031

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058033

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058034

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058037

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058038

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

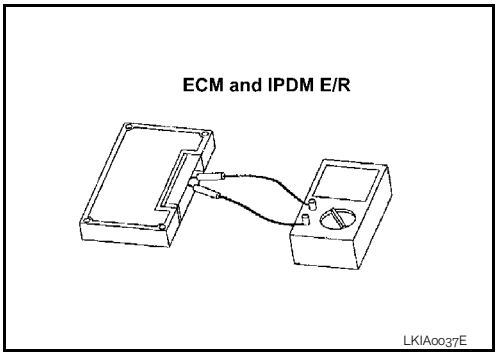
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001056820

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001056821

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001056822

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056826

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056827

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056828

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056830

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056831

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056832

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056833

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056834

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001056837

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001056838

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

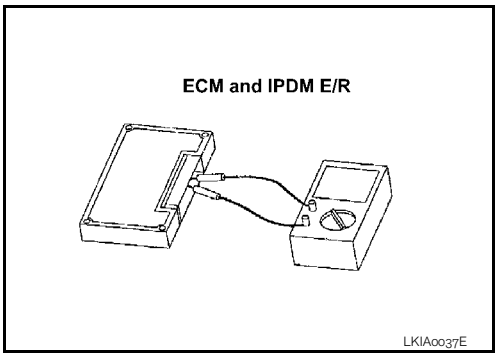
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058079

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058080

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058081

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058085

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058086

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058087

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058089

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058090

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058092

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058093

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058094

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058096

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058097

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

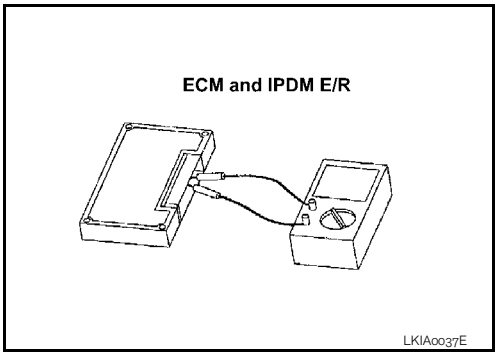
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058129

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058130

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058131

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058135

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058136

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058137

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058139

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058140

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058141

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058142

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058143

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058144

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058146

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058147

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

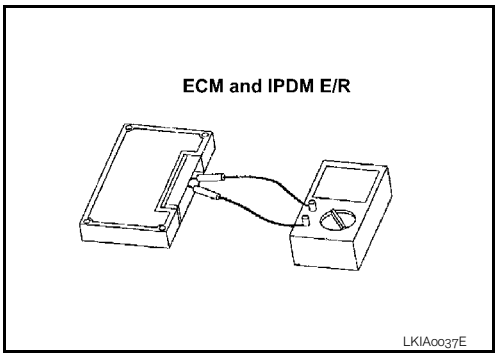
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058179

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058180

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058181

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058185

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058186

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058187

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058189

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058190

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058192

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058193

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058195

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058196

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058197

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

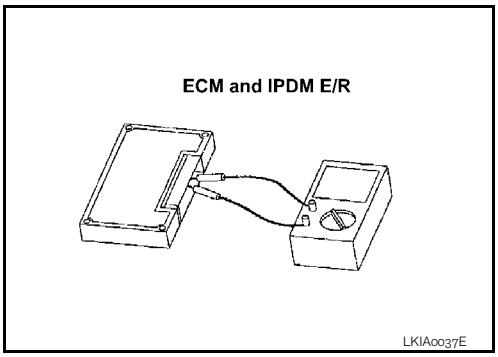
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5. CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6. CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058229

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058230

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058231

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058235

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058236

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058237

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058239

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058240

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058241

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058242

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058243

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058245

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058246

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058247

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

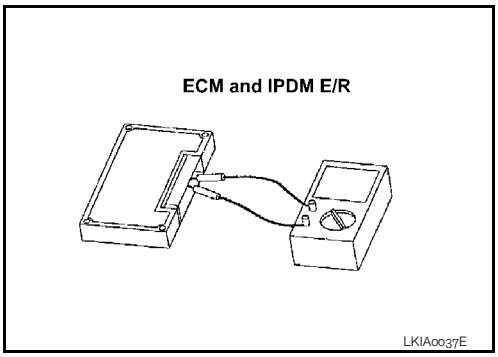
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058279

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058280

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058281

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058285

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058286

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058287

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058289

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058290

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058292

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058293

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058294

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058295

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058296

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058297

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

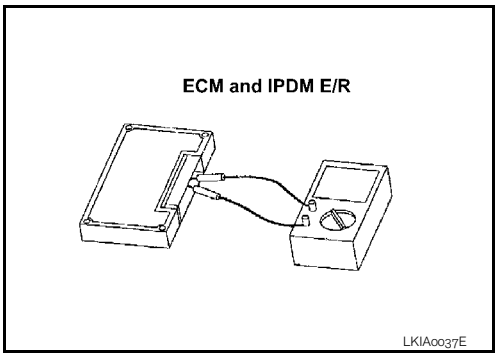
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058329

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058330

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058331

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058335

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058336

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058337

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058339

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058340

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058341

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058342

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058343

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058344

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058345

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058346

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058347

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

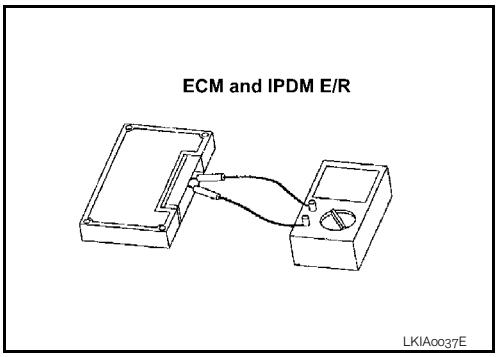
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058378

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

A
B
C
D
E
F
G
H
I
J
K
L
LAN
N
O
P

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058381

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058385

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058386

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058388

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058389

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058390

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058392

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058393

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058396

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058397

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

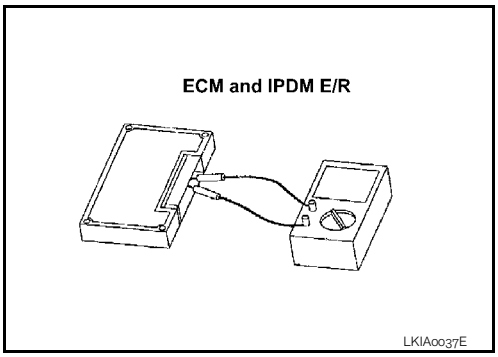
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058428

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058431

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058435

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058436

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058438

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058439

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058440

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058441

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058442

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058443

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058446

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058447

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

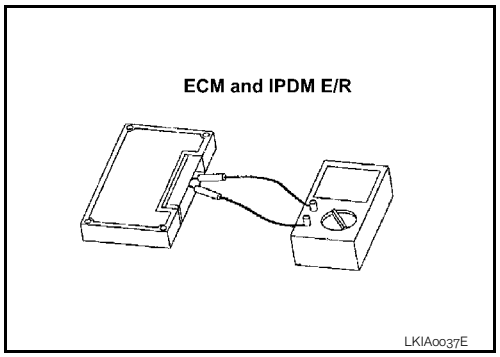
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058478

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058481

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058485

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058486

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058488

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058489

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058490

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058492

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058493

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058494

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058496

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058497

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

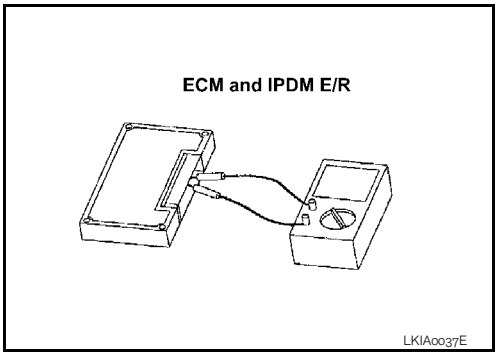
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058528

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058531

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058535

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058536

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058538

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058539

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058540

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058541

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058542

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058543

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058544

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058546

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058547

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

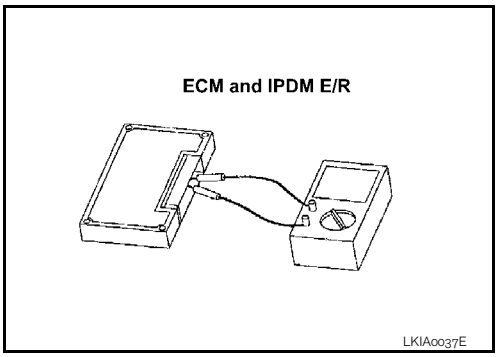
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058636

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058639

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058643

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058644

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058646

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058647

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058648

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058650

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058651

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058653

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058654

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058655

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

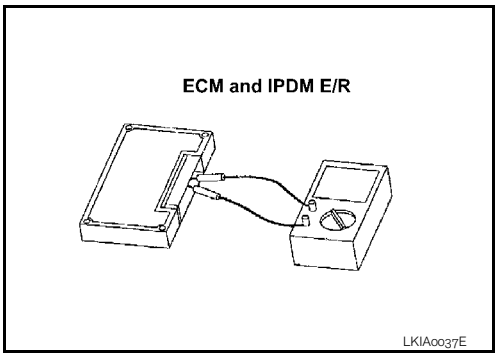
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5. CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6. CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058686

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058689

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058693

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058694

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058696

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058697

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058698

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058699

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058700

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058701

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058703

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058704

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058705

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

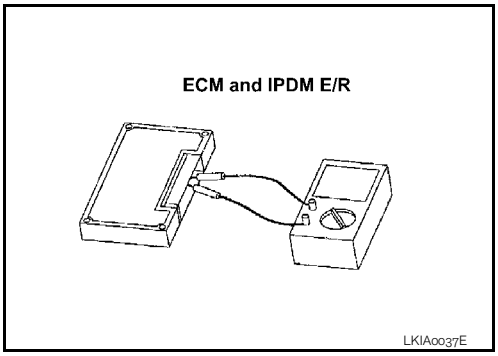
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058736

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058739

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058743

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058744

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058746

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058747

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058748

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058750

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058751

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058752

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058753

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058754

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058755

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

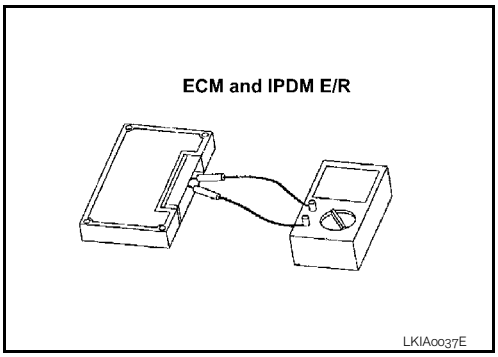
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058786

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- ABS actuator and electric unit (control unit)
- Harness connectors E105 and M77

2. Check the continuity between the ABS actuator and electric unit (control unit) and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E105	52	Existed
	15		51	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E105	52	Existed
	15		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) harness connector and the harness connector E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the BCM.

cardiagn.com

NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058789

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058793

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058794

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058796

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058797

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058798

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058799

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058800

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058801

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058802

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058803

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058804

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058805

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

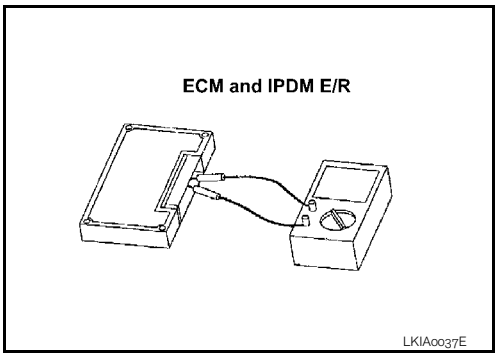
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058837

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058838

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058839

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058843

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058844

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058845

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058846

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058847

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058848

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058850

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058851

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058854

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058855

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

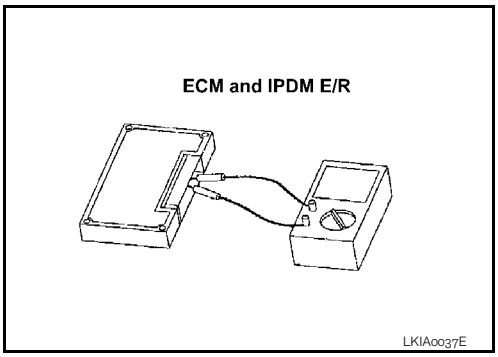
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5. CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6. CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058887

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058888

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058889

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058893

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058894

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058895

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058896

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058897

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058898

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058899

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058900

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058901

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058904

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058905

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

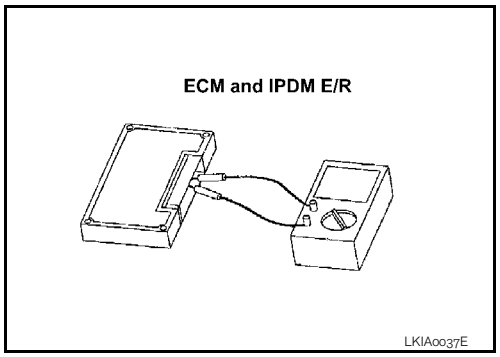
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058937

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058938

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058939

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058943

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058944

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058945

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058946

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058947

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058948

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058950

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058951

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058952

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058954

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001058955

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

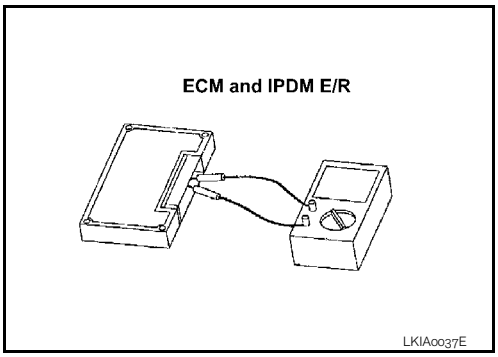
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058987

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001058988

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001058989

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058993

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058994

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058995

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058996

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058997

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058998

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001058999

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059000

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059001

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059002

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059004

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001059005

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

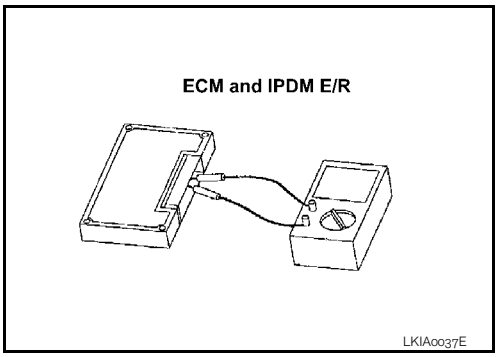
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001059037

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001059038

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001059039

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059043

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059044

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059045

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059046

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059047

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059048

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059050

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059051

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059053

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059054

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001059055

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

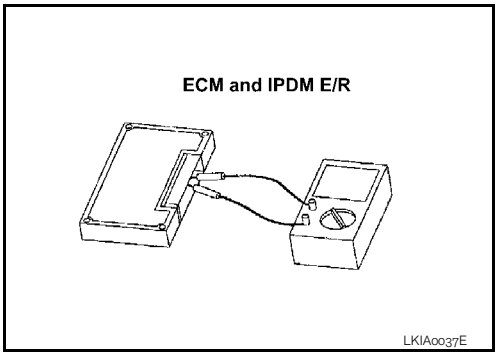
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001059087

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001059088

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001059089

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059093

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059094

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059095

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059096

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059097

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059098

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059099

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059100

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059101

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059103

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059104

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001059105

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

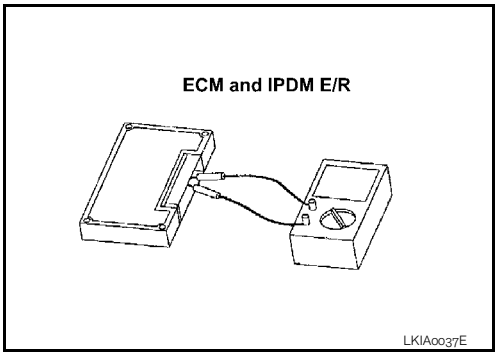
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001059137

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001059138

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001059139

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.
- ECM
- BCM
4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059143

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059144

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059145

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059146

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059147

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059148

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059150

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059151

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059152

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059153

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059154

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001059155

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

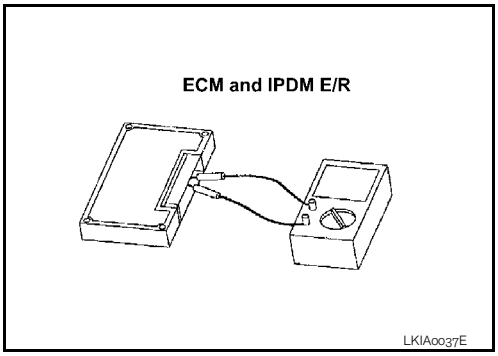
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

COMPONENT DIAGNOSIS

MAIN LINE BETWEEN ABS AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001059187

INSPECTION PROCEDURE

1. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- ABS actuator and electric unit (control unit)
- Harness connectors E7 and F121

4. Check the continuity between the ABS actuator and electric unit (control unit) harness connector and the harness connector.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E36	26	E7	2	Existed
	15		1	Existed

- Models with ABS

ABS actuator and electric unit (control unit) harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E34	26	E7	2	Existed
	15		1	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the ABS actuator and electric unit (control unit) and the harness connector E7.
NO >> Repair the main line between the ABS actuator and electric unit (control unit) and the TCM.

cardiagn.com

MAIN LINE BETWEEN TCM AND BCM CIRCUIT

Diagnosis Procedure

INFOID:0000000001059188

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Harness connector F121 and E7
- Harness connector E105 and M77

2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	2	E105	52	Existed
	1		51	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the harness connectors E7 and E105.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of BCM.
2. Check the continuity between the harness connector and the BCM harness connector.

Harness connector		BCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	52	M65	19	Existed
	51		20	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the TCM and the BCM.
NO >> Repair the main line between the harness connector M77 and the BCM.

cardiagn.com

MAIN LINE BETWEEN BCM AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000001059189

INSPECTION PROCEDURE

1.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect the following harness connectors.

- ECM
- BCM

4. Check the continuity between the BCM harness connector and the data link connector.

BCM harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M65	19	M4	6	Existed
	20		14	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the BCM and the data link connector.
NO >> Repair the main line between the BCM and the data link connector.

cardiagn.com

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059193

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ECM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

- HR engine/MR engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

- K9K engine models

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E60	100	99	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to the following.

- HR16DE (With EURO-OBD): EC-117, "Diagnosis Procedure"
- HR16DE (Without EURO-OBD): EC-446, "Diagnosis Procedure"
- MR20DE (With EURO-OBD): EC-736, "Diagnosis Procedure"
- MR20DE (Without EURO-OBD): EC-1069, "Diagnosis Procedure"
- K9K: EC-1317, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ECM. Refer to the following.
- HR16DE (With EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16DE (Without EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (With EURO-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20DE (Without EURO-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059194

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

- Models with ESP

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E36	26	15	Approx. 54 – 66

- Models with ABS

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to the following.

- ABS models: BRC-26, "Diagnosis Procedure"
- ESP models: BRC-106, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>•Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Exploded View".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059195

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- TCM
- Harness connector F121
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F25	32	31	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to TM-265, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to TM-325, "Exploded View".
YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

4WD BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059196

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the 4WD control unit connector for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of 4WD control unit.
2. Check the resistance between the 4WD control unit harness connector terminals.

4WD control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M69	8	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the 4WD control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the 4WD control unit. Refer to DLN-26, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>•Replace the 4WD control unit. Refer to the following.
- RHD models: DLN-56, "RHD : Exploded View"
- LHD models: DLN-56, "LHD : Exploded View"

YES (Past error)>>Error was detected in the 4WD control unit branch line.
NG >> Repair the power supply and the ground circuit.

cardiagn.com

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059197

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M65	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-64, "Exploded View".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059198

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M34	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-72, "Exploded View".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059199

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- NAVI control unit
- Harness connector B2
- Harness connector M12

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of NAVI control unit.
2. Check the resistance between the NAVI control unit harness connector terminals.

NAVI control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B96	71	72	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the NAVI control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the NAVI control unit. Refer to AV-100, "NAVI CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the NAVI control unit. Refer to AV-201, "Exploded View".
YES (Past error)>>Error was detected in the NAVI control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059200

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check the CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

cardiagn.com

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059201

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	8	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to ST-10, "Exploded View".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059202

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M40	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to DLK-71, "INTELLIGENT KEY UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to SEC-11, "Component Parts Location".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059203

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M30	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-155, "Wiring Diagram - BRAKE CONTROL SYSTEM -".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-179, "Exploded View".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000001059204

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- IPDM E/R connector
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E12	28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PCS-18, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-32, "Exploded View".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

cardiagn.com

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000001059205

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

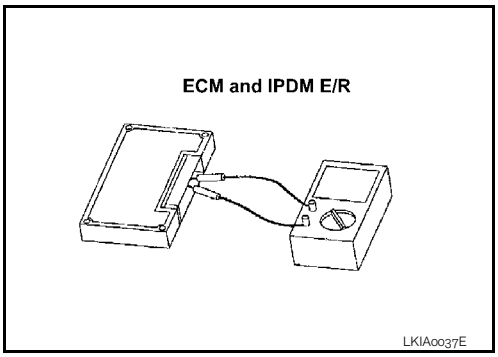
- HR engine/MR engine models

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

- K9K engine models

ECM		Resistance (Ω)
Terminal No.		
100	99	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.



cardiagn.com

IPDM E/R		Resistance (Ω)
Terminal No.		
28	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

cardiagn.com

SECTION MA
MAINTENANCE

CONTENTS

PREPARATION 4

PREPARATION 4
Special Service Tool 4
Commercial Service Tool 4
Pre-Delivery Inspection Item 4

ON-VEHICLE MAINTENANCE 6

GENERAL MAINTENANCE 6
General Maintenance 6

PERIODIC MAINTENANCE 7
Periodic Maintenance 7

RECOMMENDED FLUIDS AND LUBRICANTS 21
Fluids and Lubricants 21
SAE Viscosity Number 21
Engine Coolant Mixture Ratio 22

ENGINE MAINTENANCE (HR16DE) 24

DRIVE BELTS 24
DRIVE BELTS : Checking 24
DRIVE BELTS : Tension Adjustment 24

ENGINE COOLANT 25
ENGINE COOLANT : Inspection 25
ENGINE COOLANT : Draining 25
ENGINE COOLANT : Refilling 26
ENGINE COOLANT : Flushing 27

RADIATOR CAP 27
RADIATOR CAP : Inspection 27

RADIATOR 27
RADIATOR : Inspection 27

FUEL LINES 28
FUEL LINES : Inspection 28

AIR CLEANER FILTER 28
AIR CLEANER FILTER : Removal and Installation 28

ENGINE OIL 28
ENGINE OIL : Draining 28
ENGINE OIL : Refilling 29

OIL FILTER 29
OIL FILTER : Removal and Installation 29
OIL FILTER : Inspection 30

SPARK PLUG 30
SPARK PLUG : Removal and Installation 30
SPARK PLUG : Inspection 30

EVAP VAPOR LINES 31
EVAP VAPOR LINES : Inspection 31

ENGINE MAINTENANCE (MR20DE) 32

DRIVE BELTS 32
DRIVE BELTS : Exploded View 32
DRIVE BELTS : Checking 32
DRIVE BELTS : Tension Adjustment 32

ENGINE COOLANT 32
ENGINE COOLANT : Inspection 32
ENGINE COOLANT : Draining 33
ENGINE COOLANT : Refilling 33
ENGINE COOLANT : Flushing 34

RADIATOR CAP 35
RADIATOR CAP : Inspection 35

RADIATOR 35
RADIATOR : Inspection 35

FUEL LINES 35
FUEL LINES : Inspection 35

AIR CLEANER FILTER 35
AIR CLEANER FILTER : Removal and Installation 35

cardiagn.com

ENGINE OIL 36
ENGINE OIL : Draining 36
ENGINE OIL : Refilling 36

OIL FILTER 37
OIL FILTER : Removal and Installation 37
OIL FILTER : Inspection 37

SPARK PLUG 37
SPARK PLUG : Removal and Installation 38
SPARK PLUG : Inspection 38

EVAP VAPOR LINES 38
EVAP VAPOR LINES : Inspection 38

ENGINE MAINTENANCE (K9K) 39

DRIVE BELTS 39
DRIVE BELTS : Exploded View 39
DRIVE BELTS : Inspection and Adjustment 39

ENGINE COOLANT 39
ENGINE COOLANT : Inspection 39
ENGINE COOLANT : Draining 40
ENGINE COOLANT : Refilling 40
ENGINE COOLANT : Flushing 41

RADIATOR CAP 41
RADIATOR CAP : Inspection 41

RADIATOR 42
RADIATOR : Inspection 42

FUEL LINES 42
FUEL LINES : Inspection 42

AIR CLEANER FILTER 42
AIR CLEANER FILTER : Removal and Installation ... 42

ENGINE OIL 43
ENGINE OIL : Draining 43
ENGINE OIL : Refilling 43

OIL FILTER 43
OIL FILTER : Replacement 43

CHASSIS MAINTENANCE 45

HEADLAMP AIMING ADJUSTMENT (XENON TYPE - LHD) 45
HEADLAMP AIMING ADJUSTMENT (XENON TYPE - LHD) : Description 45
HEADLAMP AIMING ADJUSTMENT (XENON TYPE - LHD) : Aiming Adjustment Procedure 46

HEADLAMP AIMING ADJUSTMENT (XENON TYPE - RHD) 47
HEADLAMP AIMING ADJUSTMENT (XENON TYPE - RHD) : Description 47
HEADLAMP AIMING ADJUSTMENT (XENON TYPE - RHD) : Aiming Adjustment Procedure 48

HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - LHD) 49
HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - LHD) : Description 49
HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - LHD) : Aiming Adjustment Procedure 51

HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - RHD) 52
HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - RHD) : Description 52
HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - RHD) : Aiming Adjustment Procedure 53

EXHAUST SYSTEM 54
EXHAUST SYSTEM : Inspection 54

CVT FLUID 55
CVT FLUID : Inspection 55
CVT FLUID : Changing 56

GEAR OIL: RS5F92R 57
GEAR OIL: RS5F92R : Inspection 57
GEAR OIL: RS5F92R : Draining 57
GEAR OIL: RS5F92R : Refilling 57

GEAR OIL: RS6F94R 57
GEAR OIL: RS6F94R : Inspection 57
GEAR OIL: RS6F94R : Draining 58
GEAR OIL: RS6F94R : Refilling 58

GEAR OIL: RS6F52A 58
GEAR OIL: RS6F52A : Inspection 58
GEAR OIL: RS6F52A : Draining 59
GEAR OIL: RS6F52A : Refilling 59

CLUTCH FLUID 59
CLUTCH FLUID : Inspection 59

TRANSFER OIL 60
TRANSFER OIL : Inspection 60
TRANSFER OIL : Draining 60
TRANSFER OIL : Refilling 60

REAR PROPELLER SHAFT 61
REAR PROPELLER SHAFT : Inspection 61

REAR DIFFERENTIAL GEAR OIL 61
REAR DIFFERENTIAL GEAR OIL : Inspection 61
REAR DIFFERENTIAL GEAR OIL : Draining 62
REAR DIFFERENTIAL GEAR OIL : Refilling 62

WHEELS (BONDING WEIGHT TYPE) 62
WHEELS (BONDING WEIGHT TYPE) : Adjustment 62

BRAKE FLUID LEVEL AND LEAKS 63
BRAKE FLUID LEVEL AND LEAKS : Inspection ... 63

BRAKE LINES AND CABLES 63
BRAKE LINES AND CABLES : Inspection 63

BRAKE FLUID .....

cardiagn.com

BRAKE FLUID : Changing 63

DISC BRAKE 63
DISC BRAKE : Inspection 63
DISC BRAKE : Front Disc Brake 64
DISC BRAKE : Rear Disc Brake 64

STEERING GEAR AND LINKAGE 64
STEERING GEAR AND LINKAGE : Inspection 64

AXLE AND SUSPENSION PARTS 65
AXLE AND SUSPENSION PARTS : Inspection 65

DRIVE SHAFT 65
DRIVE SHAFT : Inspection 65

BODY MAINTENANCE 66

LOCKS, HINGES AND HOOD LATCH 66
LOCKS, HINGES AND HOOD LATCH : Lubricating 66

SEAT BELT, BUCKLES, RETRACTORS, ANCHORS AND ADJUSTERS 66
SEAT BELT, BUCKLES, RETRACTORS, ANCHORS AND ADJUSTERS : Inspection 66

BODY CORROSION 66
BODY CORROSION : Checking Body Corrosion 66

SERVICE DATA AND SPECIFICATIONS (SDS) 68

SERVICE DATA AND SPECIFICATIONS (SDS) 68

DRIVE BELTS (HR16DE) 68
DRIVE BELTS (HR16DE) : Drive Belts 68

DRIVE BELTS (MR20DE) 68
DRIVE BELTS (MR20DE) : Drive Belt 68

DRIVE BELTS (K9K) 68
DRIVE BELTS (K9K) : Drive Belt 68

ENGINE COOLANT (HR16DE) 68
ENGINE COOLANT (HR16DE) : Periodical Maintenance Specification 68

ENGINE COOLANT (MR20DE) 69
ENGINE COOLANT (MR20DE) : Periodical Maintenance Specification 69

ENGINE COOLANT (K9K) 69
ENGINE COOLANT (K9K) : Periodical Maintenance Specification 69

ENGINE OIL (HR16DE) 69
ENGINE OIL (HR16DE) : Periodical Maintenance Specification 69

ENGINE OIL (MR20DE) 69
ENGINE OIL (MR20DE) : Periodical Maintenance Specification 69

ENGINE OIL (K9K) 69
ENGINE OIL (K9K) : Periodical Maintenance Specification 69

SPARK PLUG (HR16DE) 69
SPARK PLUG (HR16DE) : Spark Plug 69

SPARK PLUG (MR20DE) 70
SPARK PLUG (MR20DE) : Spark Plug 70

ROAD WHEEL 70
ROAD WHEEL : Road Wheel 70

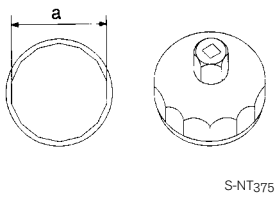
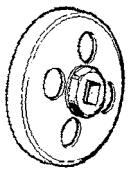
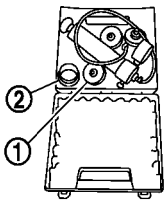
cardiagn.com

PREPARATION

PREPARATION

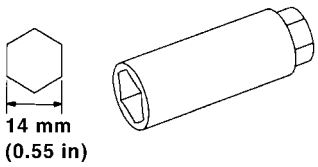
Special Service Tool

INFOID:0000000001080771

Tool number (RENAULT Tool number) Tool name	Description
KV10115801 (—) Oil filter wrench  S-NT375	Removing and installing oil filter (HR16DE and MR20DE engine models) **a: 64.3 mm (2.531 in)**
KV113C0010 (Mot.1329) Oil filter wrench  MBIB0369E	Removing and installing oil filter (K9K engine models)
— (M.S. 554-07) Reservoir tank cap tester 1. Adapter A — (M.S. 554-01) 2. Adapter B — (M.S. 554-06)  E1BIA0058ZZ	Leak checking Checking reservoir tank cap

Commercial Service Tool

INFOID:0000000001080772

Tool name	Description
Spark plug wrench  PBIC3874E	Removing and installing spark plug (HR16DE and MR20DE engine models)

Pre-Delivery Inspection Item

INFOID:0000000001080773

Shown below are Pre-delivery Inspection Items required for the new vehicle. It is recommended that necessary items other than those listed here be added, paying due regard to the conditions in each country.

cardiagn.com

Perform applicable items on each model. Consult text of this section for specifications.

NEW CAR **PRE-DELIVERY INSPECTION**

Customer name:	Model:
Address:	VIN:
	Engine code & no.:
	Registration number: Delivery date:
Dealer name:	Key no.:
Code:	Radio code:

No.	☑	Operation
1	☐	Install vehicle protection kit
Where applicable:		
2	☐	Fit all accessories ordered (e.g. towbar, audio, navigation, air conditioner, styling kit)
UNDER HOOD		
3	☐	Check coolant level and cooling system for leaks
4	☐	Charge battery and check terminals for condition
5	☐	Check drive belts tension
6	☐	Check fuel filter for water or dust (diesel only) and fuel system for leaks
7	☐	Check engine oil level and for oil leaks
8	☐	Check brake and clutch fluid levels and fluid lines for leaks
9	☐	Check and top up washer reservoirs
Where applicable:		
10	☐	Check power steering fluid level and fluid lines for leaks
11	☐	Check air conditioning system for gas leaks
INSIDE AND OUTSIDE		
12	☐	Install transit fuse if removed for vehicle storage and perform initialization of disabled electrical systems
13	☐	Check instruments, gauges, lamps, horn and accessories for operation
14	☐	Check wipers and washers for operation and adjustment
15	☐	Check interior and door mirrors and sun visors for operation
16	☐	Set radio code and set clock
17	☐	Check parking brake adjustment
18	☐	Check clutch pedal adjustment
19	☐	Check steering lock operation
20	☐	Check seat adjusters and seat belts for operation
21	☐	Check electric window operation and alignment, including 1 touch up and down (if applicable). Perform initialization if required
22	☐	Check mouldings, trim and fittings for fit and alignment
23	☐	Check weatherstrips for fit and adhesion
24	☐	Check hood, trunk lid, door panels and fuel lid for fit and alignment
25	☐	Check latches, keys, remote key, door locks and remote trunk lid and fuel lid release for operation. Ensure child locks are off
26	☐	Check wheel nut torques
27	☐	Check tire pressure (incl. spare tire)
28	☐	Check tool kit and jack for operation
29	☐	Remove towing eye from bumper (if applicable)
Where applicable:		
30	☐	Check automatic transmission starter inhibitor
31	☐	Check sunroof for operation and alignment
32	☐	Set up Trip Computer service reminder
UNDER VEHICLE		
33	☐	Check manual transmission/ transaxle, differential and transfer box for oil level and oil leaks
34	☐	Tighten bolts and nuts steering linkage and gear box, axle/suspension parts, propeller shaft and exhaust system
35	☐	Check brake and clutch lines, and oil/fluid reservoirs for leaks
Where applicable:		
36	☐	Remove front suspension spacer blocks
37	☐	Check body mountings torque

No.	☑	Operation
ROAD TEST		
38	☐	Check clutch operation
39	☐	Check foot brake operation
40	☐	Check parking brake operation
41	☐	Check steering operation, self-centering and steering wheel alignment
42	☐	Check engine performance
43	☐	Check for squeeks, rattles and noise from interior, suspension and brakes
44	☐	Check heating, ventilation and air conditioning operation
45	☐	Check Audio and Navigation system operation
46	☐	Check odometer and trip meter operation and cancelling
47	☐	Check instruments for operation
Where applicable:		
48	☐	Check automatic transmission/ transaxle/ CVT shift pattern and kickdown operation
49	☐	Check cruise control and navigation system operation
WITH ENGINE AT OPERATING TEMPERATURE		
50	☐	Check idle speed
Where applicable:		
51	☐	Check automatic transmission/ transaxle/ CVT oil level
FINAL INSPECTION - TECHNICIAN		
52	☐	Remove vehicle protection kit
53	☐	Fit interior mats and wheel covers
54	☐	Check for interior and exterior metal and paint damage
55	☐	Wash, clean interior and exterior

The above checks have been completed, any faults found have been corrected as necessary and the vehicle passed fit for delivery

Date: _____ Job no.: _____

Technician's signature:

FINAL INSPECTION - SALES EXECUTIVE

56	☐	Confirm all accessories ordered have been fitted
57	☐	Check content of vehicle owner's manuals pack, operation manuals for accessories and Quick Reference Guide (if applicable)
58	☐	Complete warranty booklet record

I confirm that I am satisfied with the condition of the vehicle and it is ready for delivery to the customer

Date: _____

Sales executive signature:

SAIA1597E

cardiagn.com

ON-VEHICLE MAINTENANCE

GENERAL MAINTENANCE

General Maintenance

INFOID:0000000001080774

General maintenance includes those items which should be checked during the normal day-to-day operation of the vehicle. They are essential if the vehicle is to continue operating properly. The owners can perform the checks and inspections themselves or they can have their NISSAN dealers do them for a nominal charge.

OUTSIDE THE VEHICLE

The maintenance items listed here should be performed from time to time, unless otherwise specified.

Item		Reference page
Tires	Check the pressure with a gauge periodically when at a service station, including the spare, and adjust to the specified pressure if necessary. Check carefully for damage, cuts or excessive wear.	—
Windshield wiper blades	Check for cracks or wear if not functioning correctly.	—
Doors and engine hood	Check that all doors, the engine hood, the trunk lid and back door operate properly. Also ensure that all latches lock securely. Lubricate if necessary. Make sure that the secondary latch keeps the hood from opening when the primary latch is released. When driving in areas using road salt or other corrosive materials, check for lubrication frequently.	MA-66
Tire rotation	Tires should be rotated every 10,000 km (6,000 miles) for 2WD models and every 5,000 km (3,000 miles) for 4WD models.	MA-62

INSIDE THE VEHICLE

The maintenance items listed here should be checked on a regular basis, such as when performing periodic maintenance, cleaning the vehicle, etc.

Item		Reference page
Lamps	Make sure that the headlamps, stop lamps, tail lamps, turn signal lamps, and other lamps are all operating properly and installed securely. Also check headlamp aim.	—
Warning lamps and chimes	Make sure that all warning lamps and buzzers/chimes are operating properly.	—
Steering wheel	Check that it has the specified play. Check for changes in the steering conditions, such as excessive free play, hard steering or strange noises. **Free play: Less than 35 mm (1.38 in)**	—
Seat belts	Check that all parts of the seat belt system (e.g. buckles, anchors, adjusters and retractors) operate properly and smoothly, and are installed securely. Check the belt webbing for cuts, fraying, wear or damage.	MA-66

UNDER THE HOOD AND VEHICLE

The maintenance items listed here should be checked periodically e.g. each time you check the engine oil or refuel.

Item		Reference page
Windshield washer fluid	Check that there is adequate fluid in the tank.	—
Engine coolant level	Check the coolant level when the engine is cold.	MA-25 (HR)
		MA-32 (MR)
		MA-39 (K9K)
Engine oil level	Check the level after parking the vehicle on a level spot and turning off the engine.	LU-6 (HR)
		LU-14 (MR)
		LU-23 (K9K)
Brake and clutch fluid levels	Make sure that the brake and clutch fluid levels are between the “MAX” and “MIN” lines on the reservoir.	MA-63, MA-59
Battery	Check the fluid level in each cell. It should be between the “MAX” and “MIN” lines.	—

cardiagn.com

PERIODIC MAINTENANCE

Periodic Maintenance

INFOID:0000000001080775

The following tables show the normal maintenance schedule. Depending upon weather and atmospheric conditions, varying road surfaces, individual driving habits and vehicle usage, additional or more frequent maintenance may be required.

Periodic maintenance beyond the last period shown on the tables requires similar maintenance.

ENGINE AND EMISSION CONTROL MAINTENANCE (HR16DE PETROL ENGINE)

(Annual Mileage <30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, [ ] = At the specified mileage only.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Reference page
Perform on a kilometer basis, but on an annual basis when driving less than 30,000 km (18,000 miles) per 2 years.	km x 1,000 (Miles x 1,000) Months	30 (18) 24	60 (36) 48	90 (54) 72	120 (72) 96	
Engine compartment and under vehicle						
Intake and exhaust valve clearance	See NOTE (1)					EM-21
Drive belt	See NOTE (2)	I	I	I	I	MA-24
Engine oil (Use recommended oil.)★		R	R	R	R	MA-28
Engine oil filter (Use genuine NISSAN part or equivalent)★		R	R	R	R	MA-29
Engine coolant (Use genuine NISSAN Engine Coolant or equivalent in its quality.)	See NOTE (3)	I	I	R	I	MA-25
Cooling system		I	I	I	I	MA-25, MA-27, MA-27
Fuel and EVAP vapor lines		I	I	I	I	MA-28, MA-31
Air cleaner filter★			R		R	MA-28
Fuel filter (In-tank type)	See NOTE (4)					—
Spark plugs (Platinum-tipped type)	See NOTE (5)	[R]*1	[R]*1	[R]	[R]*1	MA-30
Heated oxygen sensor 1	See NOTE (6)					EC-573

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1)Periodic maintenance is not required. However, if valve noise increases, check valve clearance.**
- **(2) Replace the drive belt if found damaged.**
- **(3) First replace at 90,000 Km (54,000 miles)/60 months, then every 60,000 km (36,000 miles)/48 months. Perform "I" (Checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) Fuel filter is maintenance-free. For service procedures, refer to FL section.**
- **(5) Intervals marked with "*1" are for Russia and Ukraine only.**
- **(6) Perform only according to "Maintenance Under Severe Driving conditions" for models without Euro-OBD system. For models with Euro-OBD system, periodic maintenance is not required.**

CHASSIS AND BODY MAINTENANCE (HR16DE PETROL ENGINE)

(Annual Mileage <30,000 Km/year)

cardiagn.com

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Reference page
Perform on a kilometer basis, but on an annual basis when driving less than 30,000 km (18,000 miles) per 2 years.	km x 1,000 (Miles x 1,000) Months	30 (18) 24	60 (36) 48	90 (54) 72	120 (72) 96	
Underhood and under vehicle						
Headlamp aiming		I	I	I	I	MA-45, MA-47, MA-49, MA-52
Brake & clutch, systems and fluid (For level & leaks)		I	I	I	I	MA-63, MA-63
Brake fluid★		R	R	R	R	MA-63
Brake booster vacuum hoses, connections & check valve		I	I	I	I	BR-14, BR-58
Manual transaxle gear oil (For level & leaks)		I	I	I	I	MA-57
Steering gear & linkage, axle & suspension parts, front drive shafts & exhaust system★		I	I	I	I	MA-64, MA-65, MA-65, MA-54
Wheel alignment (If necessary, rotate & balance wheels)		I	I	I	I	FSU-7, RSU-5, MA-62
Brake pads, rotors & other brake components★		I	I	I	I	MA-63, BR-15, BR-59, BR-16, BR-60
Foot brake, parking brake & clutch (For free play, stroke & operation)		I	I	I	I	BR-8, BR-52, PB-2, CL-5
Air conditioner filter★		R	R	R	R	VTL-18, VTL-69
Body corrosion	See NOTE (1)					MA-66

NOTE:

- **(1) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

ENGINE AND EMISSION CONTROL MAINTENANCE (MR20DE PETROL ENGINE)
(Annual Mileage <30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, [ ] = At the specified mileage only.

MAINTENANCE OPERATION			MAINTENANCE INTERVAL							Reference page
Perform on a kilometer basis, but on an annual basis when driving less than 15,000 km (9,000 miles) per year.	km x 1,000 (Miles x 1,000) Months	15 (9) 12	30 (18) 24	45 (27) 36	60 (36) 48	75 (45) 60	90 (54) 72	105 (63) 84	120 (72) 96	
Engine compartment and under vehicle										
Intake and exhaust valve clearance	See NOTE (1)									EM-139

cardiagn.com

MAINTENANCE OPERATION			MAINTENANCE INTERVAL							Reference page
Perform on a kilometer basis, but on an annual basis when driving less than 15,000 km (9,000 miles) per year.	km x 1,000 (Miles x 1,000) Months	15 (9) 12	30 (18) 24	45 (27) 36	60 (36) 48	75 (45) 60	90 (54) 72	105 (63) 84	120 (72) 96	
Drive belt	See NOTE (2)		I		I		I		I	MA-32
Engine oil (Use recommended oil.)★			R		R		R		R	MA-36
Engine oil filter (Use genuine NISSAN part or equivalent)★			R		R		R		R	MA-37
Engine coolant (Use genuine NISSAN Engine Coolant or equivalent in its quality.)	See NOTE (3)		I		I		R		I	MA-33
Cooling system			I		I		I		I	MA-32, MA-35, MA-35
Fuel and EVAP vapor lines			I		I		I		I	MA-35, MA-38
Air cleaner filter★					R				R	MA-35
Fuel filter (In-tank type)	See NOTE (4)									—
Spark plugs (Platinum-tipped type)	See NOTE (5)		[R]*1		[R]*1		[R]		[R]*1	MA-38
Heated oxygen sensor 1	See NOTE (6)									EC-1193

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1)Periodic maintenance is not required. However, if valve noise increases, check valve clearance.**
- **(2) Replace the drive belt if found damaged or if the auto belt tensioner reading reaches the maximum limit.**
- **(3) First replace at 90,000 Km (54,000 miles)/60 months, then every 60,000 km (36,000 miles)/48 months. Perform "I" (Checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) Fuel filter is maintenance-free. For service procedures, refer to FL section.**
- **(5) Intervals marked with "*1" are for Russia and Ukraine only.**
- **(6) Perform only according to "Maintenance Under Severe Driving conditions" for models without Euro-OBD system. For models with Euro-OBD system, periodic maintenance is not required.**

CHASSIS AND BODY MAINTENANCE (MR20DE PETROL ENGINE)

(Annual Mileage <30,000 Km/year)

cardiagn.com

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform on a kilometer basis, but on an annual basis when driving less than 15,000 km (9,000 miles) per 2 years.	km x 1,000 (Miles x 1,000) Months	15 (9) 12	30 (18) 24	45 (27) 36	60 (36) 48	75 (45) 60	90 (54) 72	105 (63) 84	120 (72) 96	
Underhood and under vehicle										
Headlamp aiming			I		I		I		I	MA-45, MA-47, MA-49, MA-52
Brake & clutch, systems and fluid (For level & leaks)			I		I		I		I	MA-63, MA-63
Brake fluid★			R		R		R		R	MA-63
Brake booster vacuum hoses, connections & check valve			I		I		I		I	BR-14, BR-58
CVT fluid (For level & leaks)	See NOTE (1)		I		I		I		I	MA-55, MA-56
Manual transaxle gear oil (For level & leaks)			I		I		I		I	MA-57 (2WD) MA-58 (4WD)
Transfer oil (For level & leaks)		I	I	I	I	I	I	I	I	MA-60
Differential gear oil (For level & leaks or erplace★			I		I		I		I	MA-61
Steering gear & linkage, axle & suspension parts, propeller shaft, drive shafts & exhaust system★	See NOTE (2)	I*1	I	I*1	I	I*1	I	I*1	I	MA-64, MA-65, MA-65, MA-54
Wheel alignment (If necessary, rotate & balance wheels)			I		I		I		I	FSU-7, RSU-5, MA-62
Brake pads, rotors & other brake components★			I		I		I		I	MA-63, BR-15, BR-59, BR-16, BR-60
Foot brake, parking brake & clutch (For free play, stroke & operation)			I		I		I		I	BR-8, BR-52, PB-2, CL-5
Air conditioner filter★			R		R		R		R	VTL-18, VTL-69
Body corrosion	See NOTE (3)									MA-66

NOTE:

- **(1) If towing a trailer, using a camper or a car-top carrier, or driving on rough or muddy roads, inspect CVT fluid deterioration with Consult-III every 90,000 km (54,000 miles), then change CVT fluid NS-2 if necessary. And if Consult-III is not available, change (do not just inspect) CVT fluid NS-2 every 90,000 km (54,000 miles). Using transmission fluid other than Genuine NISSAN CVT fluid NS-2 will damage the CVT, which is not covered by the warranty.**
- **(2) Intervals marked with "*1" are only for drive shaft inspection for 4WD models.**
- **(3) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

ENGINE AND EMISSION CONTROL MAINTENANCE (K9K DIESEL ENGINE)

cardiagn.com

(Annual Mileage <30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, D = Check filter and drain water

MAINTENANCE OPERATION		MAINTENANCE INTERVAL						Reference page
Perform on a kilometer basis, but on an annual basis when driving less than 20,000 km (12,000 miles) per year	km x 1,000 (Miles x 1,000) Months	20 (12) 12	40 (24) 24	60 (36) 36	80 (48) 48	100 (60) 60	120 (72) 72	
Engine compartment and under vehicle								
Engine oil (Use recommended oil.)★		R	R	R	R	R	R	MA-43
Engine oil filter (Use recommended oil filter)★		R	R	R	R	R	R	MA-43
Timing belt★	See NOTE (1)	Replace every 120,000 km/60 months						EM-287
Drive belt	See NOTE (2)	I	I	I	I	I	R	MA-39
Cooling system		I	I	I	I	I	I	MA-39, MA-41, MA-42
Engine coolant (Use genuine Nissan Engine Coolant or equivalent in its quality.)	See NOTE (3)		I			R		MA-40
Air cleaner filter ★			R		R		R	MA-42
Intake & exhaust valve clearance	See NOTE (4)	Inspect every 100,000 km						EM-262
Fuel lines		I	I	I	I	I	I	MA-42
Fuel filter★	See NOTE (5)	D	R	D	R	D	R	FL-23, FL-23

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1) The replacement interval for the timing belt is the maximum lifespan which should not be exceeded. Replace the timing belt if it comes into contact with fuel. The frequency of replacement should be adapted depending on vehicle usage. See "Maintenance Under Severe Driving Conditions".**
- **(2) Replace every 120,000 km/maximum 60 months. Replace drive belt if it comes into contact with fuel or damage is found during inspection.**
- **(3) First replace at 100,000 Km (60,000 miles)/60 months, then every 60,000Km (36,000 miles)/36 months. After first replacement, perform "I" (checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) If valve noise increases, check valve clearance.**
- **(5) Replace every 40,000 km/48 months.**

CHASSIS AND BODY MAINTENANCE (K9K DIESEL ENGINE)

(Annual Mileage <30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL						Reference page
Perform on a kilometer basis, but on an annual basis when driving less than 20,000 km (12,000 miles) per year	km x 1,000 (Miles x 1,000) Months	20 (12) 12	40 (24) 24	60 (36) 36	80 (48) 48	100 (60) 60	120 (72) 72	
Underhood and under vehicle								
Headlamp aiming		I	I	I	I	I	I	MA-45, MA-47, MA-49, MA-52
Brake & clutch, systems and fluid (For level & leaks)		I	I	I	I	I	I	MA-63, MA-63

cardiagn.com

MAINTENANCE OPERATION		MAINTENANCE INTERVAL						Reference page
Perform on a kilometer basis, but on an annual basis when driving less than 20,000 km (12,000 miles) per year	km x 1,000 (Miles x 1,000) Months	20 (12) 12	40 (24) 24	60 (36) 36	80 (48) 48	100 (60) 60	120 (72) 72	
Brake fluid★			R		R		R	MA-63
Brake booster vacuum hoses, connections & check valve			I		I		I	BR-14, BR-58
Manual transaxle gear oil (For leaks)		I	I	I	I	I	I	MA-57
Steering gear & linkage, axle & suspension parts, front drive shafts & exhaust system★			I		I		I	MA-64, MA-65, MA-65, MA-54
Wheel alignment (If necessary, rotate & balance wheels)		I	I	I	I	I	I	FSU-7, RSU-5, MA-62
Brake pads, rotors & other brake components★		I	I	I	I	I	I	MA-63, BR-15, BR-59, BR-16, BR-60
Foot brake, parking brake & clutch (For free play, stroke & operation)		I	I	I	I	I	I	BR-8, BR-52, PB-2, CL-5
Air conditioner filter★		R	R	R	R	R	R	VTL-18, VTL-69
Body corrosion	See NOTE (1)							MA-66

NOTE:

- **(1) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

MAINTENANCE UNDER SEVERE DRIVING CONDITIONS

(Annual Mileage <30,000 Km/year)

The maintenance intervals shown on the preceding pages are for normal operating conditions. If the vehicle is mainly operated under severe driving conditions as shown below, more frequent maintenance must be performed on the following items as shown in the table.

Severe driving conditions

A — Driving in dusty conditions
B — Driving repeatedly short distances or door to door driving
C — Towing a trailer or caravan
D — Extensive idling or urban driving
E — Driving in extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high
F — Driving in high humidity areas or in mountainous areas
G — Driving in areas using salt or other corrosive materials
H — Driving on rough and/or muddy roads or in the desert
I — Driving with frequent use of braking or in mountainous areas
J — Frequent off road use or driving in water
K —Sustained high speed driving
L — For models without Euro-OBD system (For petrol engine models)
L — Repeated short journeys, cold engine at low temperature (For K9K diesel engine models)

cardiagn.com

Maintenance operation: Check = Check and correct or replace as necessary.

Driving condition												Maintenance item			Maintenance operation	Maintenance interval	Reference page
A	.	.	.	.	.	.	.	.	.	.	.	Air cleaner filter	Petrol models	HR	Replace	Every 30,000 km (18,000 miles) or 24 months	MA-28
														MR			MA-35
													Diesel models	K9K			MA-42
A	B	C	D	.	.	.	.	.	.	.	.	Engine oil & engine oil filter	Petrol models	HR	Replace	Every 15,000 km (9,000 miles) or 12 months	MA-28, MA-29
														MR			MA-36, MA-37
													Diesel models	K9K		Every 10,000 km (6,000 miles) or 6 months	MA-43, MA-43
.	.	C	.	.	.	.	H	.	.	.	.	Fuel filter	Diesel models	K9K	Check & drain water	Every 15,000 km (9,000 miles) or 12 months	FL-23,
															Replace	Every 30,000 km (18,000 miles) or 24 months	FL-23
.	.	.	.	.	.	.	.	.	.	.	L	Heated oxgen sensor 1	Petrol models	HR	Inspect	Every 30,000 km (18,000 miles) or 24 months	EC-573 EC-1193
														MR			
A	B	.	D	.	.	.	H	.	.	.	L	Timing belt	Diesel models	K9K	Replace	More frequently	EM-287
.	.	.	.	.	F	.	.	.	.	.	.	Brake fluid	Petrol models	HR	Replace	Every 15,000 km (9,000 miles) or 12 months	MA-63
														MR			
													Diesel models	K9K		Every 20,000 km (12,000 miles) or 12 months	
.	.	C	.	.	.	.	H	.	.	.	.	Differential gear oil	Petrol models	MR	Replace	Every 30,000 km (18,000 miles) or 24 months	MA-62
.	.	.	.	.	.	G	H	.	.	.	.	Steering gear & linkage, axle & suspension parts, front drive shafts*1 & exhaust system	Petrol models	HR	Inspect	Every 15,000km (9,000miles) or 12 months	MA-64 MA-65 MA-65 MA-54
														MR			
													Diesel models	K9K			
.	.	.	.	.	.	G	H	.	.	.	.	Drive shaft for 4WD models	Petrol models	MR	Inspect	Every 7,500 km (4,500 miles) or 6 months	MA-65
A	.	C	.	.	.	G	H	I	.	.	.	Brake pads, rotors & other brake components	Petrol models	HR	Inspect	Every 15,000km (9,000miles) or 12 months	MA-63 BR-15 BR-16 BR-59 BR-60
														MR			
													Diesel models	K9K			
A	.	.	.	.	.	.	.	.	.	.	.	Air conditioner filter	Petrol models	HR	Replace	Every 15,000 km (9,000 miles) or 12 months	VTL-18, VTL-69
														MR			
													Diesel models	K9K		Every 10,000 km (6,000 miles) or 6 months	

*1: Except for 4WD models

cardiagn.com

ENGINE AND EMISSION CONTROL MAINTENANCE (HR16DE PETROL ENGINE)

(Annual Mileage >30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace,.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Refer-ence page
Perform at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	30 (18)	60 (36)	90 (54)	120 (72)	
Engine compartment and under vehicle						
Intake and exhaust valve clearance	See NOTE (1)					EM-21
Drive belt	See NOTE (2)	I	I	I	I	MA-24
Engine oil (Use recommended oil.)★		R	R	R	R	MA-28
Engine oil filter (Use genuine NISSAN part or equivalent)★		R	R	R	R	MA-29
Engine coolant (Use genuine NISSAN Engine Coolant or equivalent in its quality.)	See NOTE (3)	I	I	R	I	MA-25
Cooling system		I	I	I	I	MA-25, MA-27, MA-27
Fuel and EVAP vapor lines			I		I	MA-28, MA-31
Air cleaner filter★			R		R	MA-28
Fuel filter (In-tank type)	See NOTE (4)					—
Spark-plugs (Platinum-tipped type)	See NOTE (5)	R*1	R*1	R*1	R*1	MA-30
Heated oxygen sensor 1	See NOTE (6)					EC-573

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1)Periodic maintenance is not required. However, if valve noise increases, check valve clearance.**
- **(2) Replace the drive belt if found damaged or if the auto belt tensioner reading reaches the maximum limit.**
- **(3) First replace at 90,000 Km (54,000 miles), then every 60,000 km (36,000 miles). Perform "I" (Checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) Fuel filter is maintenance-free. For service procedures, refer to FL section.**
- **(5) Intervals marked with "*1" are for Russia and Ukraine only.**
- **(6) Perform only according to "Maintenance Under Severe Driving conditions" for models without Euro-OBD system. For models with Euro-OBD system, periodic maintenance is not required.**

CHASSIS AND BODY MAINTENANCE (HR16DE PETROL ENGINE)

(Annual Mileage >30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Reference page
Perform at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	30 (18)	60 (36)	90 (54)	120 (72)	
Underhood and under vehicle						
Headlamp aiming		I	I	I	I	MA-45, MA-47, MA-49, MA-52
Brake & clutch, systems and fluid (For level & leaks)		I	I	I	I	MA-63, MA-63

cardiagn.com

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Reference page
Perform at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	30 (18)	60 (36)	90 (54)	120 (72)	
Brake fluid★			R		R	MA-63
Brake booster vacuum hoses, connections & check valve			I		I	BR-14, BR-58
Manual transaxle gear oil (For level &leaks)		I	I	I	I	MA-57
Steering gear & linkage, axle & suspension parts, propeller shaft, front drive shafts & exhaust system★		I	I	I	I	MA-64, MA-65, MA-65, MA-54
Wheel alignment (If necessary, rotate & balance wheels)		I	I	I	I	FSU-7, RSU-5, MA-62
Brake pads, rotors & other brake components★		I	I	I	I	MA-63, BR-15, BR-59, BR-16, BR-60
Foot brake, parking brake & clutch (For free play, stroke & operation)		I	I	I	I	BR-8, BR-52, PB-2, CL-5
Air conditioner filter★		R	R	R	R	VTL-18, VTL-69
Body corrosion	See NOTE (1)					MA-66

NOTE:

- **(1) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

ENGINE AND EMISSION CONTROL MAINTENANCE (MR20DE PETROL ENGINE)

(Annual Mileage >30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace,.

MAINTENANCE OPERATION			MAINTENANCE INTERVAL							Reference page
Perform at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	15 (9)	30 (18)	45 (27)	60 (36)	75 (45)	90 (54)	105 (63)	120 (72)	
Engine compartment and under vehicle										
Intake and exhaust valve clearance	See NOTE (1)									EM-139
Drive belt	See NOTE (2)		I		I		I		I	MA-32
Engine oil (Use recommended oil.)★			R		R		R		R	MA-36
Engine oil filter (Use genuine NISSAN part or equivalent)★			R		R		R		R	MA-37
Engine coolant (Use genuine NISSAN Engine Coolant or equivalent in its quality.)	See NOTE (3)		I		I		R		I	MA-33
Cooling system			I		I		I		I	MA-32, MA-35, MA-35
Fuel and EVAP vapor lines					I				I	MA-35, MA-38

cardiagn.com

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Refer-ence page
Perform at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	15 (9)	30 (18)	45 (27)	60 (36)	75 (45)	90 (54)	105 (63)	120 (72)	
Air cleaner filter★					R				R	MA-35
Fuel filter (In-tank type)	See NOTE (4)									—
Spark-plugs (Platinum-tipped type)	See NOTE (5)		R*1		R*1		R		R*1	MA-38
Heated oxygen sensor 1	See NOTE (6)									EC-1193

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1)Periodic maintenance is not required. However, if valve noise increases, check valve clearance.**
- **(2) Replace the drive belt if found damaged or if the auto belt tensioner reading reaches the maximum limit.**
- **(3) First replace at 90,000 Km (54,000 miles), then every 60,000 km (36,000 miles). Perform "I" (Checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) Fuel filter is maintenance-free. For service procedures, refer to FL section.**
- **(5) Intervals marked with "*1" are for Russia and Ukraine only.**
- **(6) Perform only according to "Maintenance Under Severe Driving conditions" for models without Euro-OBD system. For models with Euro-OBD system, periodic maintenance is not required.**

CHASSIS AND BODY MAINTENANCE (MR20DE PETROL ENGINE)

(Annual Mileage >30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	15 (9)	30 (18)	45 (27)	60 (36)	75 (45)	90 (54)	105 (63)	120 (72)	
Underhood and under vehicle										
Headlamp aiming			I		I		I		I	MA-45, MA-47, MA-49, MA-52
Brake, systems and fluid (For level & leaks)			I		I		I		I	MA-63, MA-63
Brake fluid★					R				R	MA-63
Brake booster vacuum hoses, connections & check valve					I				I	BR-14, BR-58
CVT fluid (For level & leaks)	See NOTE (1)									MA-55, MA-56
Manual transaxle gear oil (For level &leaks)			I		I		I		I	MA-57 (2WD) MA-58 (4WD)
Transfer gear oil (For level & leaks)			I		I		I		I	MA-60
Differeantial gear oil (For level & leak or replace)★			I		I		I		I	MA-61
Steering gear & linkage, axle & suspension parts, propeller shaft, drive shafts & exhaust system★	See NOTE (2)	I*1	I	I*1	I	I*1	I	I*1	I	MA-64, MA-65, MA-65, MA-54

cardiagn.com

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	15 (9)	30 (18)	45 (27)	60 (36)	75 (45)	90 (54)	105 (63)	120 (72)	
Wheel alignment (If necessary, rotate & balance wheels)			I		I		I		I	FSU-7, RSU-5, MA-62
Brake pads, rotors & other brake components★			I		I		I		I	MA-63, BR-15, BR-59, BR-16, BR-60
Foot brake, parking brake & clutch (For free play, stroke & operation)			I		I		I		I	BR-8, BR-52, PB-2, CL-5
Air conditioner filter★			R		R		R		R	VTL-18, VTL-69
Body corrosion	See NOTE (3)									MA-66

NOTE:

- **(1) If towing a trailer, using a camper or a car-top carrier, or driving on rough or muddy roads, inspect CVT fluid deterioration with Consult-III every 90,000 km (54,000 miles), then change CVT fluid NS-2 if necessary. And if Consult-III is not available, change (do not just inspect) CVT fluid NS-2 every 90,000 km (54,000 miles). Using transmission fluid other than Genuine NISSAN CVT Fluid NS-2 will damage the CVT, which is not covered by the warranty.**
- **(2) Intervals marked with "*1" are only for drive shaft inspection for 4WD models.**
- **(3) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

ENGINE AND EMISSION CONTROL MAINTENANCE (K9K DIESEL ENGINE)

(Annual Mileage >30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, D = Check filter and drain water

MAINTENANCE OPERATION		MAINTENANCE INTERVAL						Reference page
Perform at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	20 (12)	40 (24)	60 (36)	80 (48)	100 (60)	120 (72)	
Engine compartment and under vehicle								
Engine oil (Use recommended oil.)★		R	R	R	R	R	R	MA-43
Engine oil filter (Use recommended oil filter)★		R	R	R	R	R	R	MA-43
Timing belt★	See NOTE (1)	Replace every 120,000 km						EM-287
Drive belt	See NOTE (2)	I	I	I	I	I	R	MA-39
Cooling system		I	I	I	I	I	I	MA-39, MA-41, MA-42
Engine anti-freeze coolant (Use genuine NISSAN Engine Coolant or equivalent in its quality.)	See NOTE (3)		I			R		MA-40
Air cleaner filter ★			R		R		R	MA-42
Intake & exhaust valve clearance	See NOTE (4)	Inspect every 100,000 km						EM-262
Fuel lines		I	I	I	I	I	I	MA-42
Fuel filter★	See NOTE (5)	D	R	D	R	D	R	FL-23, FL-23

cardiagn.com

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1) The replacement interval for the timing belt is the maximum lifespan which should not be exceeded. Replace the timing belt if it comes into contact with fuel. The frequency of replacement should be adapted depending on vehicle usage. See "Maintenance Under Severe Driving Conditions".**
- **(2) Replace every 120,000 km. Replace drive belt if it comes into contact with fuel or damage is found during inspection.**
- **(3) First replace at 100,000 Km (60,000 miles), then every 60,000Km (36,000 miles). After first replacement, perform "I" (checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) If valve noise increases, check valve clearance.**
- **(5) Replace every 40,000 km.**

CHASSIS AND BODY MAINTENANCE (K9K DIESEL ENGINE)
(Annual Mileage >30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL						Reference page
Perform at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	20 (12)	40 (24)	60 (36)	80 (48)	100 (60)	120 (72)	
Underhood and under vehicle								
Headlamp aiming			I		I		I	MA-45, MA-47, MA-49, MA-52
Brake & clutch, systems and fluid (For level & leaks)		I	I	I	I	I	I	MA-63, MA-63
Brake fluid★				R			R	MA-63
Brake booster vacuum hoses, connections & check valve				I			I	BR-14, BR-58
Manual transaxle gear oil (For leaks)		I	I	I	I	I	I	MA-57
Steering gear & linkage, axle & suspension parts, front drive shafts & exhaust system★				I			I	MA-64, MA-65, MA-65, MA-54
Wheel alignment (If necessary, rotate & balance wheels)		I	I	I	I	I	I	FSU-7, RSU-5, MA-62
Brake pads, rotors & other brake components★		I	I	I	I	I	I	MA-63, BR-15, BR-59, BR-16, BR-60
Foot brake, parking brake & clutch (For free play, stroke & operation)		I	I	I	I	I	I	BR-8, BR-52, PB-2, CL-5
Air conditioner filter★		R	R	R	R	R	R	VTL-18, VTL-69
Body corrosion	See NOTE (1)							MA-66

NOTE:

- **(1) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

MAINTENANCE UNDER SEVERE DRIVING CONDITIONS
(Annual Mileage >30,000 Km/year)

cardiagn.com

The maintenance intervals shown on the preceding pages are for normal operating conditions. If the vehicle is mainly operated under severe driving conditions as shown below, more frequent maintenance must be performed on the following items as shown in the table.

Severe driving conditions

A — Driving in dusty conditions
B — Driving repeatedly short distances or door to door driving
C — Towing a trailer or caravan
D — Extensive idling or urban driving
E — Driving in extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high
F — Driving in high humidity areas or in mountainous areas
G — Driving in areas using salt or other corrosive materials
H — Driving on rough and/or muddy roads or in the desert
I — Driving with frequent use of braking or in mountainous areas
J — Frequent off road use or driving in water
K —Sustained high speed driving
L — For models without Euro-OBD system (For petrol engine models)
L — Repeated short journeys, cold engine at low temperature (for K9K diesel engine models)

Maintenance operation: Check = Check and correct or replace as necessary.

Driving condition												Maintenance item			Maintenance operation	Maintenance interval	Reference page
A	.	.	.	.	.	.	.	.	.	.	.	Air cleaner filter	Petrol models	HR	Replace	Every 30,000 km (18,000 miles)	MA-28
														MR			MA-35
													Diesel models	K9K			MA-42
A	B	C	D	.	.	.	.	.	.	.	.	Engine oil & engine oil filter	Petrol models	HR	Replace	Every 15,000 km (9,000 miles)	MA-28, MA-29
														MR			MA-36, MA-37
													Diesel models	K9K		Every 10,000 km (6,000 miles)	MA-43, MA-43
A	.	.	.	E	.	.	.	.	.	.	.	Fuel filter	Diesel models	K9K	Check & drain water	Every 15,000 km (9,000 miles)	FL-23,
															Replace	Every 30,000 km (18,000 miles)	FL-23
.	.	.	.	.	.	.	.	.	.	.	L	Heated oxgen sensor 1	Petrol models	HR	inspect	Every 60,000 km (36,000 miles)	EC-573 EC-1193
														MR			
A	B	.	D	.	.	.	H	.	.	.	L	Timing belt	Diesel models	K9K	Replace	More frequently	EM-287
.	.	.	.	.	F	.	.	.	.	.	.	Brake fluid	Petrol models	HR	Replace	Every 30,000 km (18,000 miles)	MA-63
														MR			
													Diesel models	K9K			
.	.	C	.	.	.	.	H	.	.	.	.	Differential gear oil	Petrol models	MR	Replace	Every 30,000 km (18,000 miles)	MA-62
.	.	.	.	.	.	G	H	.	.	.	.	Steering gear & linkage, axle & suspension parts, front drive shafts*1 & exhaust system	Petrol models	HR	Inspect	Every 15,000 km (9,000 miles)	MA-64 MA-65 MA-65 MA-54
														MR			
													Diesel models	K9K		Every 30,000 km (18,000 miles)	

cardiagn.com

Driving condition												Maintenance item			Maintenance operation	Maintenance interval	Reference page
.	.	.	.	.	.	G	H	.	.	.	.	Drive shaft for 4WD models	Petrol models	MR	Inspect	Every 75,000 km (4,500 miles)	MA-65
A	.	C	.	.	.	G	H	I	.	.	.	Brake pads, rotors & other brake components	Petrol models	HR	Inspect	Every 15,000 km (9,000 miles)	MA-63 BR-15 BR-16 BR-59 BR-60
														MR			
													Diesel models	K9K			
A	.	.	.	.	.	.	.	.	.	.	.	Air conditioner filter	Petrol models	HR	Replace	Every 15,000 km (9,000 miles)	VTL-18, VTL-69
														MR			
													Diesel models	K9K			

*1: Except for 4WD models

cardiagn.com

RECOMMENDED FLUIDS AND LUBRICANTS

Fluids and Lubricants

INFOID:0000000001080776

				Capacity (Approximate)		Recommended Fluids/Lubricants
				Liter	Imp measure	
Engine oil Drain and refill	With oil filter change	HR16DE		4.3	3-3/4 qt	• Gasoline engine Genuine NISSAN engine oil*1 API SL or SM*1 ILSAC grade GF-3 or GF-4*1 ACEA A1/B1, A3/B3, A3/B4, A5/B5, C2 or C3*1 • Diesel engine Genuine NISSAN engine oil *1 ACEA A1-B1*1
		MR20DE		4.4	3-7/8 qt	
		K9K		4.55	4 qt	
	Without oil filter change	HR16DE		4.1	3-5/8 qt	
		MR20DE		4.2	3-3/4 qt	
		K9K		4.39	3-7/8 qt	
Dry engine (engine overhaul)		HR16DE		4.8	4-1/4 qt	
		MR20DE		5.2	4-5/8 qt	
		K9K		4.71	4-1/8 qt	
Cooling system (with reservoir)		HR16DE		5.9	5-1/4 qt	Genuine NISSAN Engine Coolant or equivalent in its quality*2
		MR20DE	M/T models	7.6	6-5/8 qt	
			CVT models	8.9	7-7/8 qt	
		K9K		7.3	6-3/8 qt	
Reservoir tank		HR16DE		0.78	5/8 qt	
		MR20DE		0.78	5/8 qt	
		K9K		0.279	1/4 qt	
Manual transaxle gear oil		HR16DE		2.3	4 pt	Genuine NISSAN gear oil or API GL-4, Viscosity SAE 75W-80
		MR20DE K9K	2WD	2.0	3-1/2 qt	
		MR20DE	4WD	2.0	3-1/2 qt	Genuine NISSAN gear oil or API GL-4, Viscosity SAE 75W-85
Transfer gear oil			M/T models	0.38	5/8 pt	Genuine NISSAN Differential oil Hypoid Super GL-5 80W-90 or API GL-5, Viscosity SAE 80W-90
			CVT models	0.36	5/8 pt	
Differential gear oil				0.55	1 pt	Genuine NISSAN Differential oil Hypoid Super GL-5 80W-90 or API GL-5, Viscosity SAE 80W-90
CVT fluid				8.3	7-1/4 qt	Genuine NISSAN CVT Fluid NS-2*3
Brake and clutch fluid				—	—	Genuine NISSAN brake fluid or equivalent DOT 4 (US FMVSS No. 116)
Multi-purpose grease				—	—	NLGI No. 2 (Lithium soap base)

*1: For further details, see “SAE Viscosity Number”.

*2: Use Genuine NISSAN Engine Coolant or equivalent in its quality, in order to avoid possible aluminum corrosion within the engine cooling system caused by the use of non-genuine engine coolant.

Note that any repairs for the incidents within the engine cooling system while using non-genuine engine coolant may not be covered by the warranty even if such incidents occurred during the warranty period.

***3: Using transmission fluid other than Genuine NISSAN CVT fluid NS-2 will damage the CVT, which is not covered by the warranty.**

SAE Viscosity Number

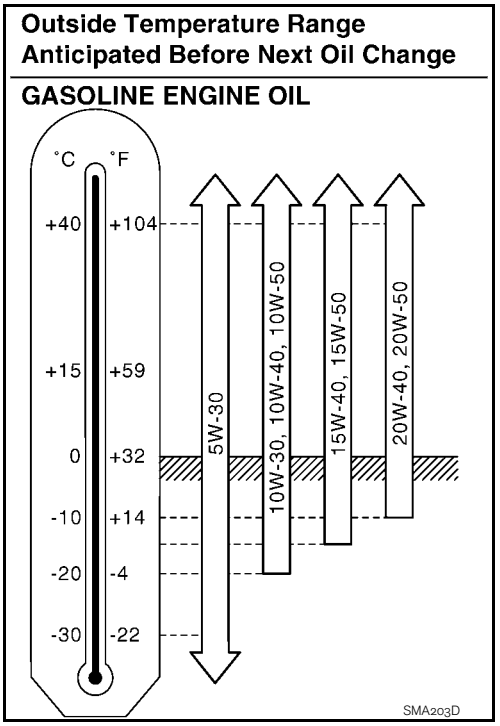
INFOID:0000000001080777

GASOLINE ENGINE

- 5W-30 is preferable.

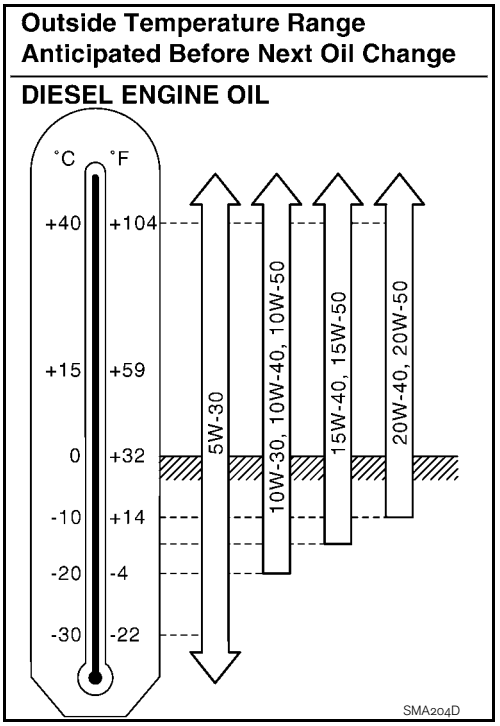
cardiagn.com

If 5W-30 is not available, select the viscosity, from the chart, that is suitable for the outside temperature range.



DIESEL ENGINE

- 5W-30 is preferable.
  If 5W-30 is not available, select the viscosity, from the chart, that is suitable for the outside temperature range.



Engine Coolant Mixture Ratio

INFOID:0000000001080778

cardiagn.com

The engine cooling system is filled at the factory with a high-quality, year-round and extended life engine coolant. The high quality engine coolant contains the specific solutions effective for the anti-corrosion and the anti-freeze function. Therefore, additional cooling system additives are not necessary.

Outside temperature down to		Composition	
°C	°F	Engine coolant (Concentrated)	Demineralized water or distilled water
–15	5	30%	70%
–35	–30	50%	50%

SMAo89D

CAUTION:

- **When adding or replacing coolant, be sure to use only Genuine NISSAN Engine Coolant or equivalent in its quality. Genuine NISSAN Engine Coolant is premixed (mixture ratio 50%) type coolant.**

The use of other types of engine coolant may damage your cooling system.

- When checking the engine coolant mixture ratio by the coolant hydrometer, use the chart below to correct your hydrometer reading (specific gravity) according to coolant temperature.

Mixed coolant specific gravity

Unit: specific gravity

Engine coolant mixture ratio	Coolant temperature °C (°F)			
	15 (59)	25 (77)	35 (95)	45 (113)
30%	1.046 - 1.050	1.042 - 1.046	1.038 - 1.042	1.033 - 1.038
50%	1.076 - 1.080	1.070 - 1.076	1.065 - 1.071	1.059 - 1.065

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator. Wait until the engine and radiator cool down.

cardiagn.com

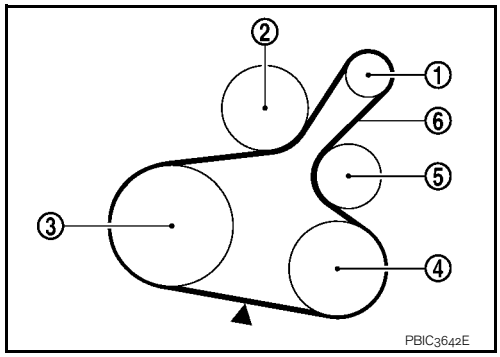
ENGINE MAINTENANCE (HR16DE)
DRIVE BELTS

DRIVE BELTS : Checking

INFOID:0000000001095237

- Inspection should be done only when engine is cold or over 30 minutes after the engine is stopped.

1 : Alternator
2 : Water pump
3 : Crankshaft pulley
4 : A/C compressor (with A/C models)
: Idler pulley (without A/C models)
5 : Idler pulley
6 : Drive belt



- Visually check belts for wear, damage, and cracks on inside and edges.
- Turn crankshaft pulley two time clockwise, and make sure tension on all pulleys is equal before doing the test.
- When measuring deflection, apply 98 N (10 kg, 22 lb) at the (▼) marked point.
- Measure the belt tension and frequency with acoustic tension gauge (commercial service tool) at the (▼) marked point.

CAUTION:
- **When the tension and frequency are measured, the acoustic tension gauge should be used.**
- **When checking immediately after installation, first adjust it to the specified value. Then, after turning crankshaft two turns or more, re-adjust to the specified value to avoid variation in deflection between pulleys.**

Belt Deflection / Belt Tension and Frequency:

Refer to EM-115, "Drive Belts".

DRIVE BELTS : Tension Adjustment

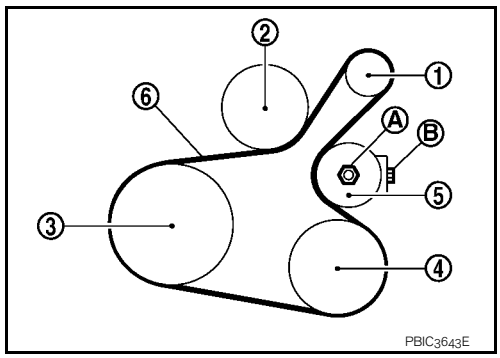
INFOID:0000000001095238

Location	Location of adjuster and tightening method
Drive belt	Adjusting bolt on idler pulley

CAUTION:
- **When belt is replaced with new one, adjust belt tension to the value for “New belt”, because new belt will not fully seat in the pulley groove.**
- **When tension of the belt being used exceeds “Limit”, adjust it to the value for “After adjusted”.**
- **When installing a belt, make sure it is correctly engaged with the pulley groove.**
- **Never allow oil or engine coolant to get on the belt.**
- **Never twist or bend the belt strongly.**

1. Remove front fender protector (RH). Refer to EXT-21, "Exploded View".
2. Loosen the idler pulley lock nut (A) from the tightening position with the specified torque by 45 degrees.

1 : Alternator
2 : Water pump
3 : Crankshaft pulley
4 : A/C compressor (with A/C models)
: Idler pulley (without A/C models)
5 : Idler pulley
6 : Drive belt
B : Adjusting bolt



cardiagn.com

CAUTION:
- **When the lock nut is loosened excessively, the idler pulley tilts and the correct tension adjustment cannot be performed. Never loosen it excessively (more than 45 degrees).**
- **Put a matching mark on the lock nut, and check turning angle with a protractor. Never visually check the tightening angle.**

3. Adjust the belt tension by turning the adjusting bolt.

CAUTION:
- **When checking immediately after installation, first adjust it to the specified value. Then, after turning crankshaft two turns or more, re-adjust to the specified value to avoid variation in deflection between pulleys.**
- **When the tension adjustment is performed, the lock nut should be in the condition at step“2”. If the tension adjustment is performed when the lock nut is loosened more than the standard, the idler pulley tilts and the correct tension adjustment cannot be performed.**

4. Tighten the lock nut.

: 34.8 N·m (3.5 kg-m, 26 ft-lb)

ENGINE COOLANT

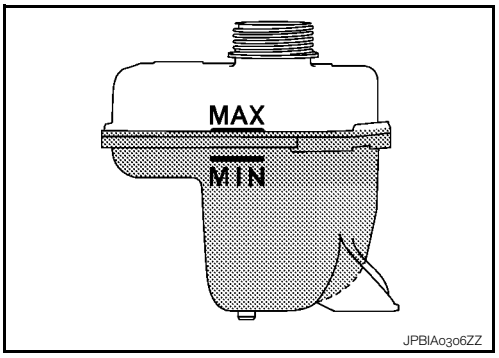
ENGINE COOLANT : Inspection

INFOID:0000000001095240

LEVEL

- Check if the reservoir tank engine coolant level is within the “MIN” to “MAX” when the engine is cool.
- Adjust the engine coolant level as necessary.
- Check that the reservoir tank cap is tightened.

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.

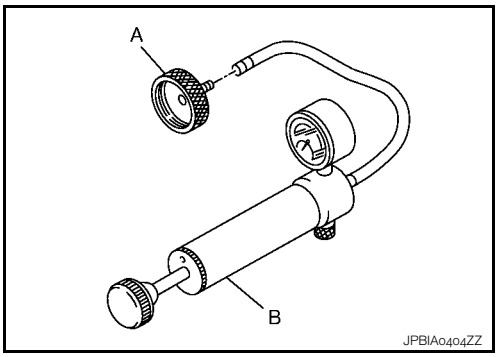


LEAKAGE

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.

Testing pressure: Refer to CO-23, "Radiator".

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.
CAUTION:
Higher test pressure than specified may cause radiator damage.



- If anything is found, repair or replace damaged parts.

ENGINE COOLANT : Draining

INFOID:0000000001095241

WARNING:
- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around the reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Disconnect radiator hose (lower) and reservoir tank cap.
When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to EM-93, "Exploded View".

cardiagn.com

CAUTION:
- **Perform this step when engine is cold.**
- **Never spill engine coolant on drive belt.**

2. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing. Refer to CO-13, "Exploded View".
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to MA-27, "RADIATOR : Inspection".

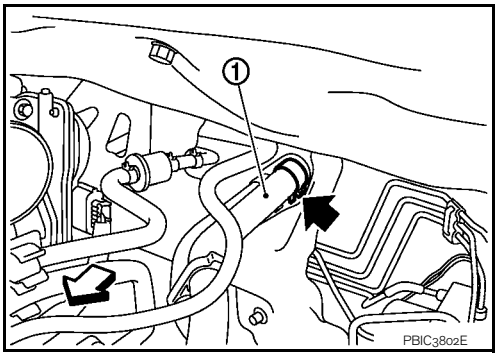
ENGINE COOLANT : Refilling

INFOID:0000000001095242

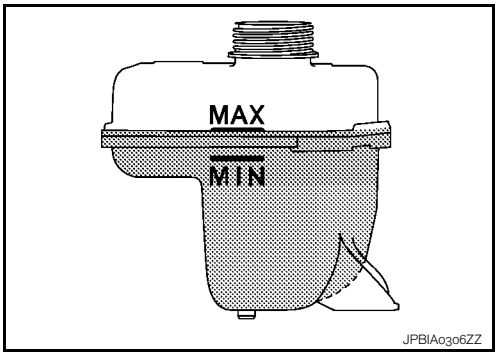
1. Install reservoir tank if removed.
2. Connect radiator hose (lower).
   - If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-74, "Exploded View".
3. Make sure that each hose clamp has been firmly tightened.
4. Disconnect heater hose (1) at position (⇦) in the figure.

   ⇦ : Vehicle front

   - Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.



5. Fill reservoir tank to specified level.
   - **Pour coolant slowly of less than 2 (1-3/4 lmp qt) a minute to allow air in system to escape.**
   - **When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.**
   - **Start engine without closing reservoir tank cap.**
   - **Keep engine racing at 1,500 rpm for about 2-3 minutes, filling reservoir tank up to MAX. Level, if necessary.**
   - **Use Genuine Nissan Engine Coolant or equivalent mixed with water (distilled or demineralized). Refer to MA-21, "Fluids and Lubricants".**



Engine coolant capacity
(With reservoir tank at “MAX” level)
Refer to CO-23, "Periodical Maintenance Specification".

Reservoir tank engine coolant capacity
(At “MAX” level)
Refer to: CO-23, "Periodical Maintenance Specification".

6. Install reservoir tank cap.
7. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 2,000 - 2,500 rpm.
   - Make sure thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

CAUTION:
Watch water temperature gauge so as not to overheat engine.

8. Stop the engine and cool down to less than approximately 50°C (122°F).
   - Cool down using fan to reduce the time.
9. Refill reservoir tank to “MAX” level line with engine coolant, if necessary.

cardiagn.com

10. Repeat steps 6 through 9 two or more times with reservoir tank cap installed until reservoir tank level no longer drops.
11. Check cooling system for leaks with engine running.
12. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between “COOL” and “WARM”.
    • Sound may be noticeable at heater unit.
13. Repeat step 12 three times.
14. If sound is heard, bleed air from cooling system by repeating step 6 through 9 until reservoir tank level no longer drops.
15. Check that the reservoir tank cap is tightened.

ENGINE COOLANT : Flushing

INFOID:0000000001095243

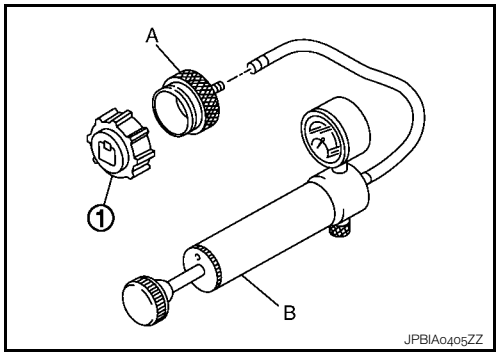
1. Install reservoir tank if removed.
2. Disconnect radiator hose (lower) and reservoir tank cap.
   If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-83, "Exploded View".
3. Fill reservoir tank with water and reinstall reservoir tank cap.
4. Run the engine and warm it up to normal operating temperature.
5. Rev the engine two or three times under no-load.
6. Stop the engine and wait until it cools down.
7. Drain water from the system. Refer to CO-9, "Draining".
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.
9. Check that the reservoir tank cap is tightened.

RADIATOR CAP

RADIATOR CAP : Inspection

INFOID:0000000001095369

- Fit the adapter to the reservoir tank cap tester [SST: — (M.S. 554-07)] (A) as shown.
- When connecting the reservoir tank cap to the reservoir tank cap tester, apply water or LLC to the reservoir tank cap seal part.
- Check reservoir tank cap relief pressure.



Standard and limit : Refer to CO-23, "Radiator".

- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.

CAUTION:
When installing reservoir tank cap, thoroughly wipe out the reservoir tank filler neck to remove any waxy residue or foreign material.

RADIATOR

RADIATOR : Inspection

INFOID:0000000001095495

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:
- **Be careful not to bend or damage radiator fins.**
- **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and connectors to prevent water from entering.**

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.
4. Blow air into the back side of radiator core vertically downward.
   • Use compressed air lower than 490 kPa (5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.8 in).

cardiagn.com

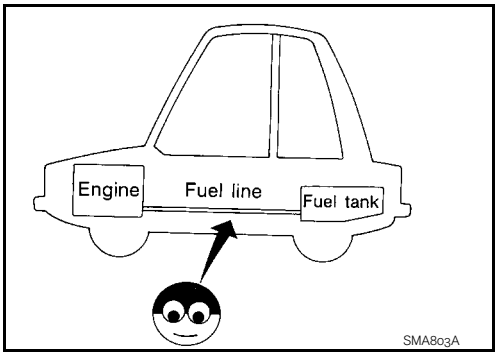
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

FUEL LINES

FUEL LINES : Inspection

INFOID:0000000001095723

Inspect fuel lines, filler cap and tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration.
If necessary, repair or replace damaged parts.



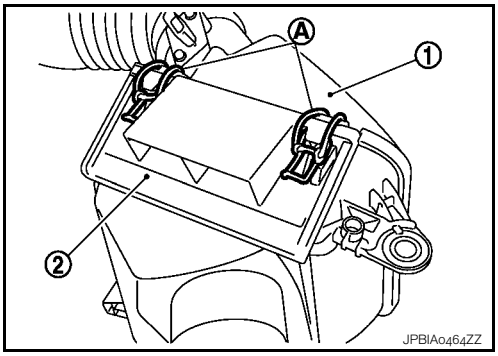
AIR CLEANER FILTER

AIR CLEANER FILTER : Removal and Installation

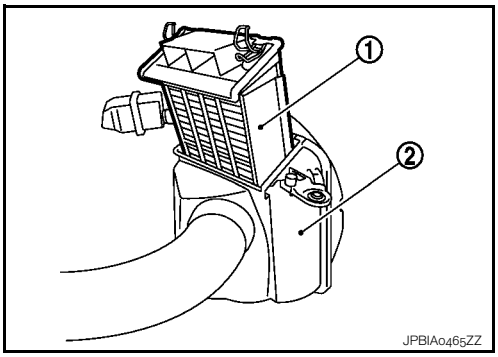
INFOID:0000000001095621

REMOVAL

1. Unhook clips (A) and remove holder (2) from air cleaner case (1).



2. Remove air cleaner filter (1) from air cleaner case (2).



INSTALLATION

Note the following, and install in the reverse order of removal.

- Install the air cleaner filter by aligning the seal with the notch of air cleaner case.

ENGINE OIL

ENGINE OIL : Draining

INFOID:0000000001095630

WARNING:

- **Be careful not to get burned, as engine oil may be hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used engine oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

cardiagn.com

1. Warm up the engine, and check for engine oil leakage from engine components. Refer to LU-6, "Inspection".
2. Stop the engine and wait for 10 minutes.
3. Loosen oil filler cap.
4. Remove drain plug and then drain engine oil.

ENGINE OIL : Refilling

INFOID:0000000001095631

1. Install drain plug with new washer. Refer to EM-40, "Exploded View".
   CAUTION:
   Be sure to clean drain plug and install with new washer.

   Tightening torque : Refer to EM-40, "Exploded View".
2. Refill with new engine oil.
   Engine oil specification and viscosity: Refer to MA-21, "Fluids and Lubricants".

   Engine oil capacity : Refer to LU-10, "Periodical Maintenance Specification".

   CAUTION:
   - **The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.**
   - **Always use oil level gauge to determine the proper amount of engine oil in the engine.**
3. Warm up engine and check area around drain plug and oil filter for engine oil leakage.
4. Stop engine and wait for 10 minutes.
5. Check the engine oil level. Refer to LU-6, "Inspection".

OIL FILTER

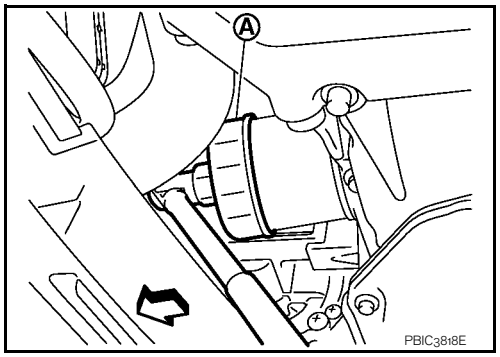
OIL FILTER : Removal and Installation

INFOID:0000000001095632

REMOVAL

- Using oil filter wrench [SST: KV10115801] (A), remove oil filter.

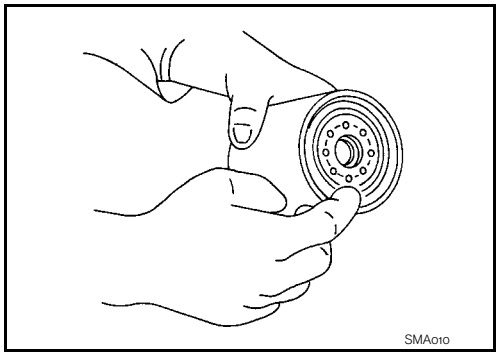
⇦ : Vehicle font



CAUTION:
- **Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.**
- **Be careful not to get burned when engine and engine oil may be hot.**
- **When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Completely wipe off any engine oil that adheres to engine and vehicle.**

INSTALLATION

1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.

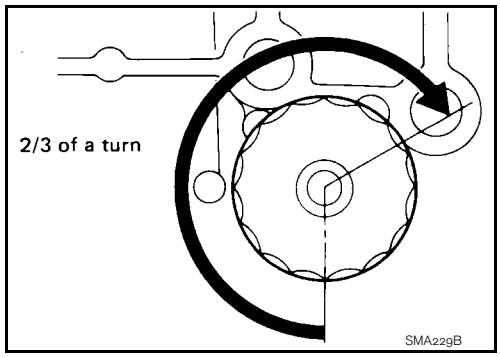


cardiagn.com

3. Screw oil filter manually until it touches the installation surface, then tighten it by 2/3 turn. Or tighten to specification.

Oil filter:

: 17.7 N·m (1.8 kg-m, 13 ft-lb)



OIL FILTER : Inspection

INFOID:0000000001095633

INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to LU-6, "Inspection".
2. Start the engine, and check there is no leak of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level, and adjust the level. Refer to LU-6, "Inspection".

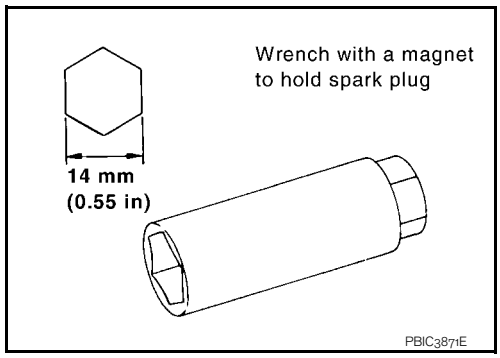
SPARK PLUG

SPARK PLUG : Removal and Installation

INFOID:0000000001095634

REMOVAL

1. Remove intake manifold. Refer to EM-29, "Removal and Installation".
2. Remove ignition coil. Refer to EM-43, "Removal and Installation".
3. Remove spark plug with a spark plug wrench (commercial service tool).



INSTALLATION

Installation is the reverse order of removal.

SPARK PLUG : Inspection

INFOID:0000000001095635

INSPECTION AFTER REMOVAL

Use the standard type spark plug for normal condition.

Spark plug (Standard type): Refer to EM-116, "Spark Plug".

CAUTION:

cardiagn.com

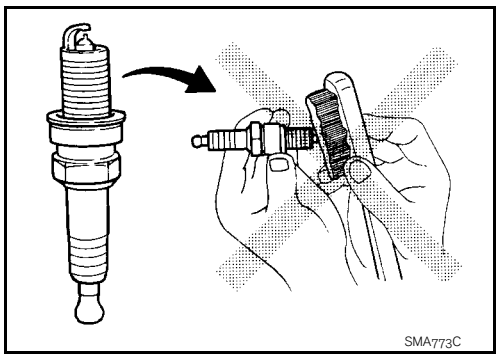
- **Never drop or shock spark plug.**
- **Never use a wire brush for cleaning.**
- **If plug tip is covered with carbon, spark plug cleaner may be used.**

Cleaner air pressure:

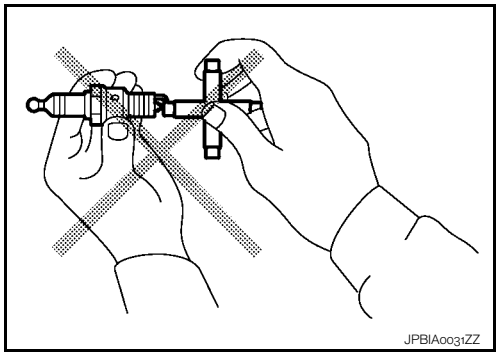
Less than 588 kPa (6 kg/cm^2, 85 psi)

Cleaning time:

Less than 20 seconds



- **Checking and adjusting plug gap is not required between change intervals.**



EVAP VAPOR LINES

EVAP VAPOR LINES : Inspection

INFOID:0000000001109392

Refer to EC-359, "Inspection" (WITH EURO-OBD), EC-636, "Inspection"(WITHOUT EURO-OBD).

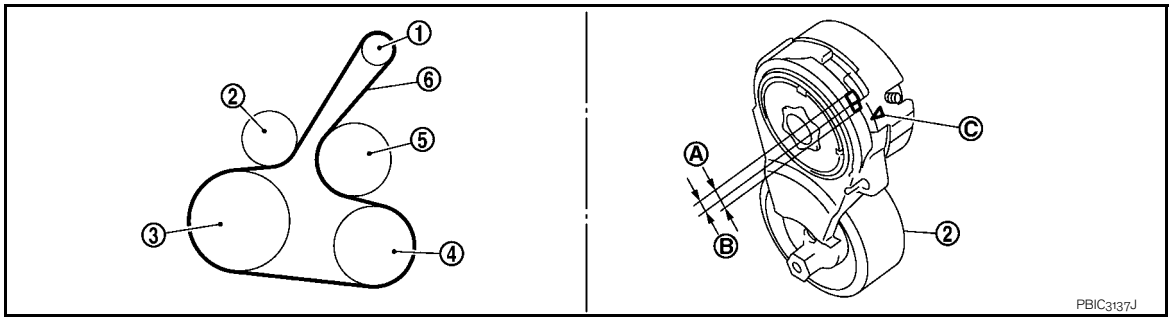
cardiagn.com

ENGINE MAINTENANCE (MR20DE)

DRIVE BELTS

DRIVE BELTS : Exploded View

INFOID:0000000001116076



1.	Alternator	2.	Drive belt auto-tensioner	3.	Crankshaft pulley
4.	A/C compressor (with A/C models) Idler pulley (without A/C models)	5.	Water pump	6.	Drive belt
A.	Possible use range	B.	Range when new drive belt is installed	C.	Indicator

DRIVE BELTS : Checking

INFOID:0000000001095645

WARNING:

Perform this step when engine is stopped.

- Make sure that the indicator (notch on fixed side) of drive belt auto-tensioner is within the possible use range (A) in the figure.

  NOTE:

  - Check the drive belt auto-tensioner indication when the engine is cold.
  - When new drive belt is installed, the indicator (notch on fixed side) should be within the range (B) in the figure.
- Visually check entire drive belt for wear, damage or cracks.
- If the indicator (notch on fixed side) is out of the possible use range or belt is damaged, replace drive belt.

DRIVE BELTS : Tension Adjustment

INFOID:0000000001095646

Refer to : EM-236, "Drive Belt".

Belt tension is not necessary, as it is automatically adjusted by drive belt auto-tensioner.

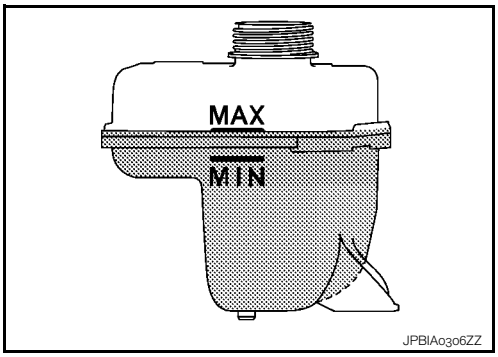
ENGINE COOLANT

ENGINE COOLANT : Inspection

INFOID:0000000001095647

LEVEL

- Check if the reservoir tank engine coolant level is within the “MIN” to “MAX” when the engine is cool.
- Adjust the engine coolant level as necessary.
- Check that the reservoir tank cap is tightened.



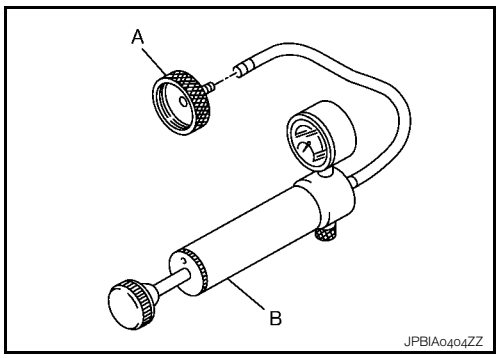
WARNING:

Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.

LEAKAGE

cardiagn.com

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.



Testing pressure: Refer to CO-46, "Radiator".

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.
CAUTION:
Higher test pressure than specified may cause radiator damage.

- If anything is found, repair or replace damaged parts.

ENGINE COOLANT : Draining

INFOID:0000000001095648

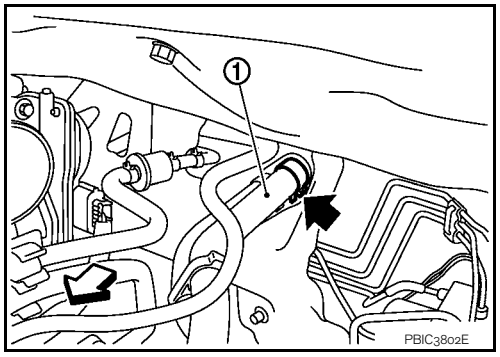
WARNING:
- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around the reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Disconnect radiator hose (lower) and reservoir tank cap.
   When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to EM-210, "Exploded View".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing.
   - Remove of engine mounting insulator (RH) is necessary. Refer to EM-194, "M/T : Exploded View" (M/T models) or EM-198, "CVT : Exploded View" (CVT models).
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to MA-35, "RADIATOR : Inspection".

ENGINE COOLANT : Refilling

INFOID:0000000001095649

1. Install reservoir tank if removed.
2. Connect radiator hose (lower).
   If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-210, "Exploded View".
3. Make sure that each hose clamp has been firmly tightened.
4. Disconnect heater hose (1) at position (⇦) in the figure.

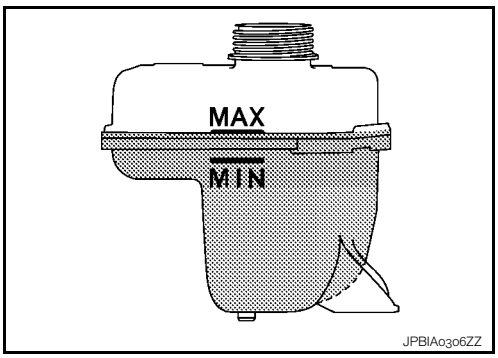


⇦ : Vehicle front

- Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.

cardiagn.com

5. Fill reservoir tank to specified level.
   - **Pour coolant slowly of less than 2 (1-3/4 lmp qt) a minute to allow air in system to escape.**
   - **When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.**
   - **Start engine without closing reservoir tank cap.**
   - **Keep engine racing at 1,500 rpm for about 2-3 minutes, filling reservoir tank up to MAX. Level, if necessary.**
   - **Use Genuine Nissan Engine Coolant or equivalent mixed with water (distilled or demineralized). Refer to MA-21, "Fluids and Lubricants".**



Engine coolant capacity
(With reservoir tank at "MAX" level)
Refer to :CO-46, "Periodical Maintenance Specification"

Reservoir tank engine coolant capacity
(At "MAX" level)
Refer to CO-46, "Periodical Maintenance Specification".

6. Install reservoir tank cap.
7. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 2,000 - 2,500 rpm.
   - Make sure thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

   CAUTION:
   Watch water temperature gauge so as not to overheat engine.
8. Stop the engine and cool down to less than approximately 50°C (122°F).
   - Cool down using fan to reduce the time.
9. Refill reservoir tank to "MAX" level line with engine coolant, if necessary.
10. Repeat steps 6 through 9 two or more times with reservoir tank cap installed until reservoir tank level no longer drops.
11. Check cooling system for leaks with engine running.
12. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
    - Sound may be noticeable at heater unit.
13. Repeat step 12 three times.
14. If sound is heard, bleed air from cooling system by repeating step 6 through 9 until reservoir tank level no longer drops.
15. Check that the reservoir tank cap is tightened.

ENGINE COOLANT : Flushing

INFOID:0000000001095650

1. Install reservoir tank if removed.
2. Disconnect radiator hose (lower) and reservoir tank cap.
   If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-210, "Exploded View".
3. Fill reservoir tank with water and reinstall reservoir tank cap.
4. Run the engine and warm it up to normal operating temperature.
5. Rev the engine two or three times under no-load.
6. Stop the engine and wait until it cools down.
7. Drain water from the system. Refer to CO-30, "Draining".
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.
9. Check that the reservoir tank cap is tightened.

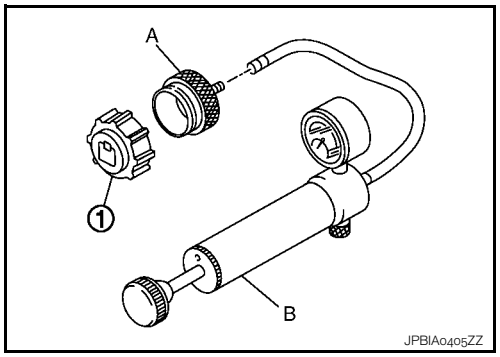
cardiagn.com

RADIATOR CAP

RADIATOR CAP : Inspection

INFOID:0000000001095651

- Fit the adapter to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.
- When connecting the reservoir tank cap to the reservoir tank cap tester, apply water or LLC to the reservoir tank cap seal part.
- Check reservoir tank cap relief pressure.



Standard and limit: Refer to CO-46, "Radiator".

- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.

CAUTION:

When installing reservoir tank cap, thoroughly wipe out the reservoir tank filler neck to remove any waxy residue or foreign material.

RADIATOR

RADIATOR : Inspection

INFOID:0000000001095652

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:

- **Be careful not to bend or damage radiator fins.**
- **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and connectors to prevent water from entering.**

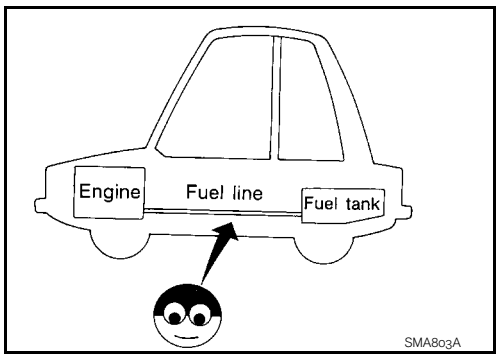
1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

FUEL LINES

FUEL LINES : Inspection

INFOID:0000000001095721

Inspect fuel lines, filler cap and tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration.
If necessary, repair or replace damaged parts.



AIR CLEANER FILTER

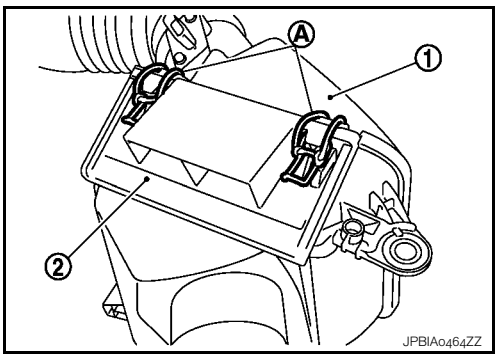
AIR CLEANER FILTER : Removal and Installation

INFOID:0000000001095661

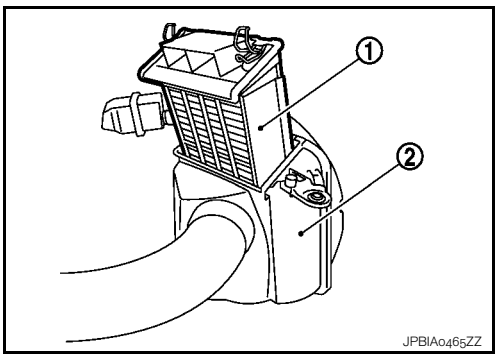
REMOVAL

cardiagn.com

1. Unhook clips (A) and remove holder (2) from air cleaner case (1).



2. Remove air cleaner filter (1) from air cleaner case (2).



INSTALLATION

Note the following, and install in the reverse order of removal.

- Install the air cleaner filter by aligning the seal with the notch of air cleaner case.

ENGINE OIL

ENGINE OIL : Draining

INFOID:0000000001095670

WARNING:

- **Be careful not to get burned, as engine oil may be hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used engine oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up the engine, and check for engine oil leakage from engine components. Refer to LU-14, "Inspection".
2. Stop the engine and wait for 10 minutes.
3. Loosen oil filler cap.
4. Remove drain plug and then drain engine oil.

ENGINE OIL : Refilling

INFOID:0000000001095671

1. Install drain plug with new washer. Refer to EM-152, "Exploded View".
   CAUTION:
   Be sure to clean drain plug and install with new washer.

   Tightening torque : Refer to EM-152, "Exploded View".

2. Refill with new engine oil.
   Engine oil specification and viscosity: Refer to MA-21, "Fluids and Lubricants".

   Engine oil capacity : Refer to LU-20, "Periodical Maintenance Specification".

   CAUTION:
   - **The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.**

cardiagn.com

- **Always use oil level gauge to determine the proper amount of engine oil in the engine.**

3. Warm up engine and check area around drain plug and oil filter for engine oil leakage.
4. Stop engine and wait for 10 minutes.
5. Check the engine oil level. Refer to LU-14, "Inspection".

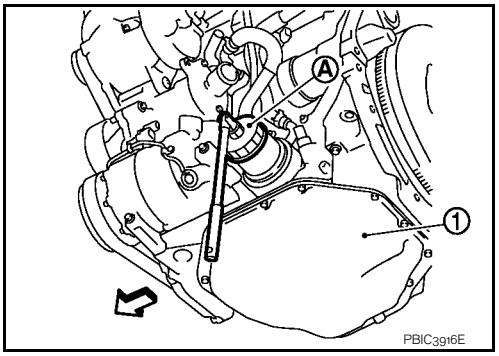
OIL FILTER

OIL FILTER : Removal and Installation

INFOID:0000000001116098

REMOVAL

- Using oil filter wrench [SST: KV10115801] (A), remove oil filter.



1 : Oil pan (lower)

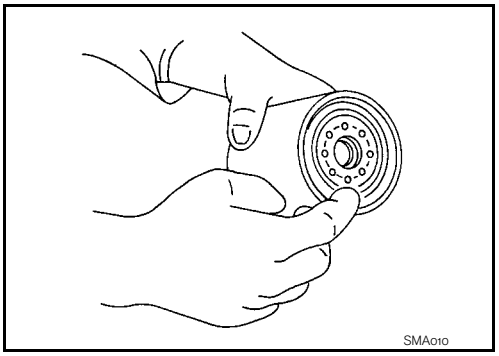
⇦ : Vehicle front

CAUTION:

- **Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.**
- **Be careful not to get burned when engine and engine oil may be hot.**
- **When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Completely wipe off any engine oil that adheres to engine and vehicle.**

INSTALLATION

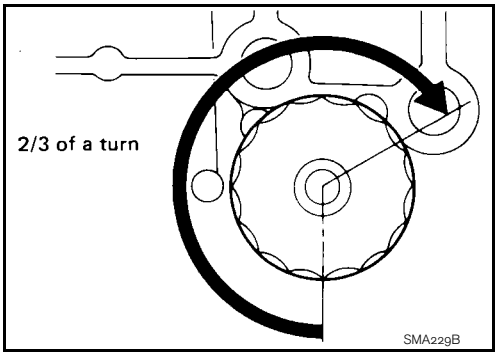
1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.



3. Screw oil filter manually until it touches the installation surface, then tighten it by 2/3 turn. Or tighten to specification.

Oil filter:

: 17.7 N·m (1.8 kg-m, 13 ft-lb)



OIL FILTER : Inspection

INFOID:0000000001095673

INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to LU-14, "Inspection".
2. Start the engine, and check there is no leak of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level, and adjust the level. Refer to LU-14, "Inspection".

SPARK PLUG

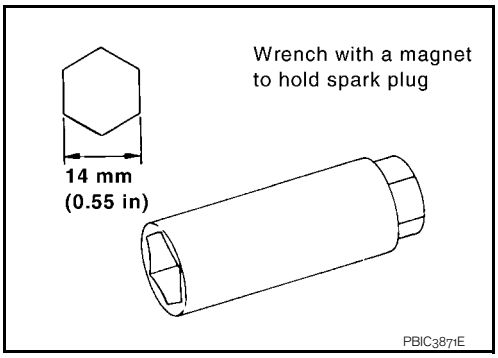
cardiagn.com

SPARK PLUG : Removal and Installation

INFOID:0000000001095674

REMOVAL

1. Remove ignition coil. Refer to EM-160, "Exploded View".
2. Remove spark plug with a spark plug wrench (commercial service tool).



INSTALLATION

Installation is the reverse order of removal.

SPARK PLUG : Inspection

INFOID:0000000001095675

INSPECTION AFTER REMOVAL

Use the standard type spark plug for normal condition.

Spark plug (standard) : Refer to EM-236, "Spark Plug".

CAUTION:

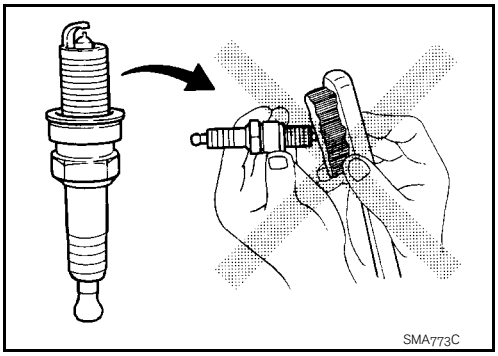
- **Never drop or shock spark plug.**
- **Never use a wire brush for cleaning.**
- **If plug tip is covered with carbon, spark plug cleaner may be used.**

Cleaner air pressure:

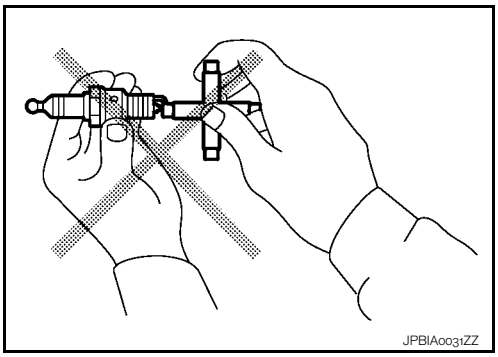
Less than 588 kPa (6 kg/cm^2, 85 psi)

Cleaning time:

Less than 20 seconds



- **Checking and adjusting plug gap is not required between change intervals.**



EVAP VAPOR LINES

EVAP VAPOR LINES : Inspection

INFOID:0000000001109408

Refer to EC-980, "Inspection"(WITH EURO-OBD), EC-1256, "Inspection"(WITHOUT EURO-OBD).

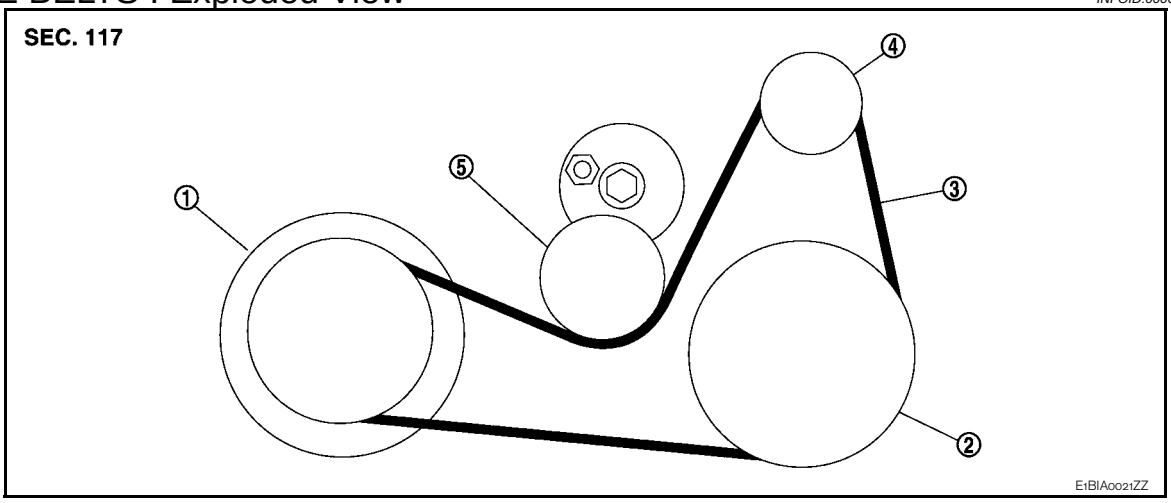
cardiagn.com

ENGINE MAINTENANCE (K9K)

DRIVE BELTS

DRIVE BELTS : Exploded View

INFOID:0000000001116090



1. Crankshaft pulley
2. A/C compressor
3. Drive belt
4. Alternator
5. Drive belt auto-tensioner

DRIVE BELTS : Inspection and Adjustment

INFOID:0000000001095677

INSPECTION

WARNING:

Be sure to perform when the engine is stopped.

1. Inspect belts for cracks, fraying, wear and oil. If necessary, replace.
2. Evaluate manually if the belt is enough tensioned (tension cannot be measured by way of frequency meter).
3. When drive belt is considered as not enough tensioned, replace it.
   CAUTION:
   Auto-tensioner must be replaced with a new one when the belt is replaced.

ADJUSTMENT

Refer to EM-329, "Drive Belt".

Belt tensioning is not necessary, as it is automatically adjusted by auto-tensioner.

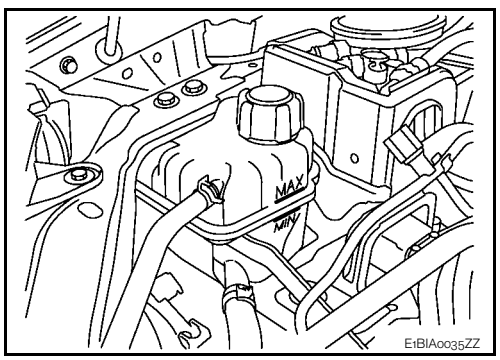
ENGINE COOLANT

ENGINE COOLANT : Inspection

INFOID:0000000001095678

LEVEL

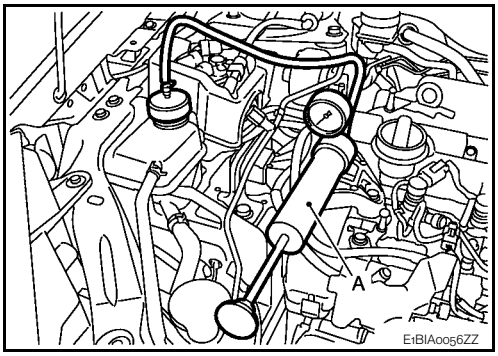
1. Check if the reservoir tank coolant level is within MIN to MAX when engine is cool.
2. Adjust coolant if too much or too little.



LEAKAGE

cardiagn.com

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the tester [SST: — (M.S. 554-07)] (A) as shown.
- Warm up the engine and turn it off.
- To check for leaks, apply pressure to the cooling system with the radiator cap tester and radiator reservoir cap tester adapter.



Testing pressure : Refer to CO-64, "Radiator".

- If the pressure drops, look for leakage.
- Unscrew slowly the adapter from the reservoir tank to reduce the pressure in cooling system, and install the reservoir tank cap.

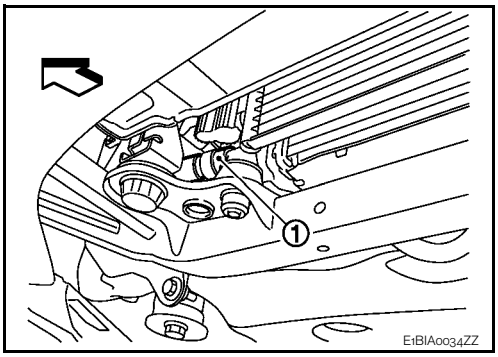
WARNING:
Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure engine coolant escaping from the radiator.
CAUTION:
Higher pressure than specified may cause radiator damage.

ENGINE COOLANT : Draining

INFOID:0000000001095679

WARNING:
- **To avoid being scalded, never change the coolant when the engine is hot.**
- **Wrap a thick cloth around cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

1. Remove engine undercover.
2. Disconnect reservoir tank hose (lower) (1) from radiator and remove reservoir tank cap.
3. Remove air relief plug from water outlet. Refer to CO-62, "Exploded View".
4. Remove reservoir tank, then clean reservoir tank.
5. Check drained coolant for contaminants such as rust, corrosion or discoloration.
   If contaminated, flush engine cooling system. Refer to CO-53, "Flushing".

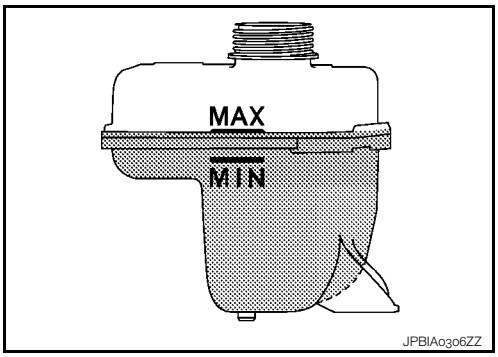


ENGINE COOLANT : Refilling

INFOID:0000000001095680

- **Before start working, turn off the automatic air conditioner and the blower motor.**

1. Install reservoir tank, lower radiator hose and air relief plug.
2. Fill reservoir tank slowly with coolant until coolant spills from the air relief hole. Refer to CO-62, "Exploded View".
   - **Put a cloth under the air relief plug to prevent engine coolant to dampen the crankshaft position sensor.**
   - Pour coolant to the MAX level line of the reservoir tank at a rate of 2 liter (1-3/4 lmp qt)/min or lower.
3. Close the air relief plug.
   CAUTION:
   If the filling rate is too fast, this could lead to air being mixed in the coolant. Be sure to fill the coolant slowly according to the rate indicated above.
   Use Nissan Genuine Coolant L250 or equivalent mixed with water (distilled or demineralised). Refer to MA-22, "Engine Coolant Mixture Ratio".



cardiagn.com

Engine coolant capacity (With reservoir tank)	**: Refer to CO-64, "Periodical Maintenance Specification".**
Reservoir tank capacity	**: Refer to CO-64, "Periodical Maintenance Specification".**

4. Start engine without closing reservoir tank cap and keep engine racing at 1,500 rpm for about 2-3 minutes. If neccesary, pour engine coolant up to MAX level.
   - **If coolant overflows reservoir tank hole, install filler cap.**
   - **Watch engine coolant temperature gauge so as not overheat the engine during all of the operation.**

   WARNING:
   - **Be careful not be scaled with hot engine coolant or vacuum pump when operating.**
   - **Radiator fan blade can start at any time and make personal injuries.**
5. Turn off the engine and loose air relief plug until coolant spills from air relief hole.
6. Close the air relief plug and run the engine at 2,000 rpm until the upper hose comes hot and radiator fan operates. Let the engine running approximately 5 minutes at idle speed and check for sound of coolant flow while running engine from idle up to 3,000 rpm.
   - Sound may be noticeable at heater water cock.
7. If sound is heard, bleed air from cooling system by repeating steps 4 to 6 until coolant lever no longer drops.
   - Check the radiator lower hose for any signs of leakage.
8. Turn off the engine and let it cool down.
   - Cool down using a fan to reduce the time.
9. After cooling period, loose the air relief plug and check if coolant spills from the air relief hole. In other case, remove the air relief plug until the coolant spills, and then close the relief air plug. Bleed air from cooling system by repeating steps 6 to 10 until the coolant spills immediately.
10. Check the engine coolant level when engine is cool and refill to MAX level line if the level is lower.
    - Clean excess coolant from engine.
11. Check that the reservoir tank cap is tightened.

ENGINE COOLANT : Flushing

INFOID:0000000001095681

1. Fill reservoir tank with water until water spills from the air relief hole, then close air relief plug. Reinstall reservoir tank cap.
2. Run engine and warm it up to normal operating temperature.
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water.
6. Repeat steps 1 through 5 until clear water begins to drain from radiator.
7. Blow compressed air into cooling circuit through the reservoir tank valve hole to drain all the water.

RADIATOR CAP

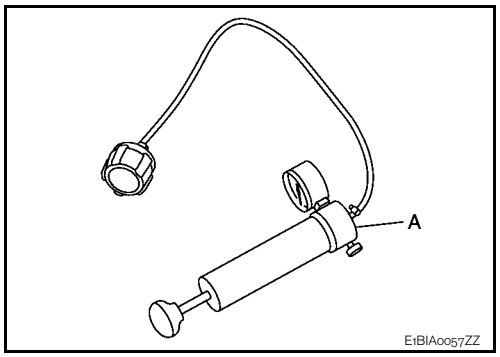
RADIATOR CAP : Inspection

INFOID:0000000001095682

- Fit the adapter to the tester as shown.
- When connecting the reservoir tank cap to the tester [SST: — (M.S. 554-07)] (A), apply water or LLC to the cap seal part.
- Check reservoir tank cap relief pressure.

Standard : Refer to CO-64, "Radiator".

- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.



cardiagn.com

RADIATOR

RADIATOR : Inspection

INFOID:0000000001095683

Check radiator for mud or clogging. If necessary, clean radiator as follows.
- Be careful not to bend or damage the radiator fins.
- When radiator is cleaned without removal, remove all surrounding parts such as radiator fan, radiator shroud and horns. Then tape the harness and connectors to prevent water from entering.

1. Apply water by hose to the back side of the radiator core vertically downwards.
2. Apply water again to all radiator core surface once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downwards.

- Use compressed air lower than 490 kPa (4.9 bar 5 kg/cm^2, 71psi) and keep distance more than 30 cm (11.8 in).

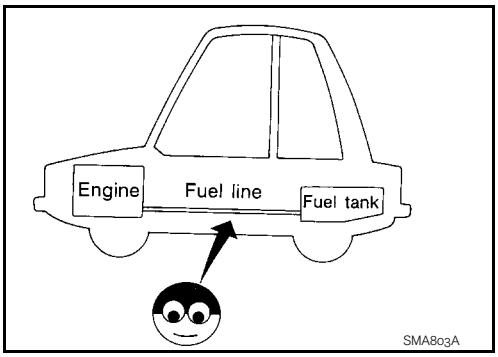
5. Blow air again into all the radiator core surface once per minute until no water sprays out.

FUEL LINES

FUEL LINES : Inspection

INFOID:0000000001095719

Inspect fuel lines, filler cap and tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration.
If necessary, repair or replace damaged parts.



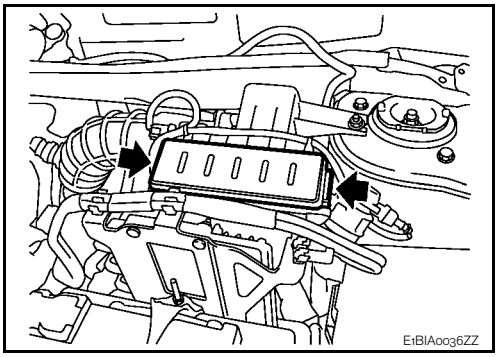
AIR CLEANER FILTER

AIR CLEANER FILTER : Removal and Installation

INFOID:0000000001095684

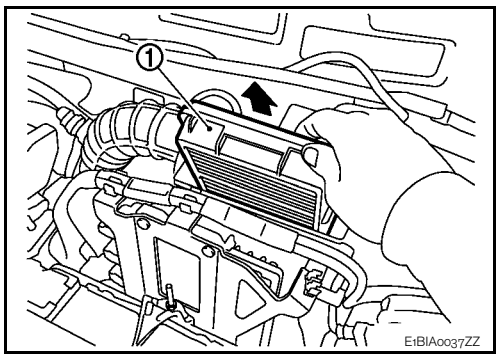
REMOVAL

1. Open air cleaner case.



cardiagn.com

2. Remove air cleaner filter (1).



INSTALLATION

Install in the reverse order of removal.

ENGINE OIL

ENGINE OIL : Draining

INFOID:0000000001095685

WARNING:

- **Be careful not to burn yourself, as the engine oil is hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer: try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Put vehicle horizontally.
2. Warm up engine, and check for oil leakage from engine components.
3. Stop engine and wait for 10 minutes.
4. Loosen oil filler cap.
5. Remove drain plug and then drain engine oil.

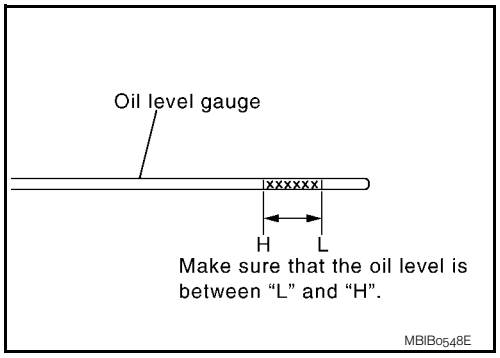
ENGINE OIL : Refilling

INFOID:0000000001095686

1. Refill with new engine oil.
   - Refer to MA-21, "Fluids and Lubricants".

Oil capacity (Approximate)

: Refer to LU-30, "Periodical Maintenance Specification".



- The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.
  Always use the dipstick to the determine when the proper amount of oil is in the engine.

CAUTION:

- **Be sure to clean drain plug and install with new washer.**
- **The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.**
  Always use the dipstick to the determine when the proper amount of oil is in the engine.

2. Warm up engine and check area around drain plug and oil filter for oil leakage.
3. Stop engine and wait for 10 minutes.
4. Check oil level.

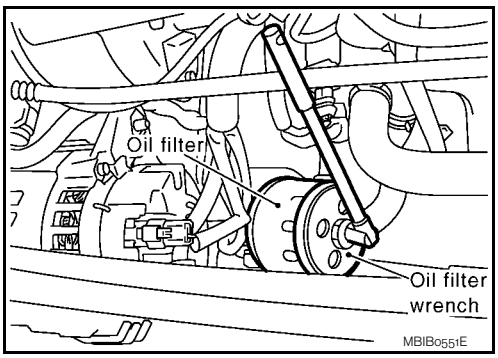
OIL FILTER

OIL FILTER : Replacement

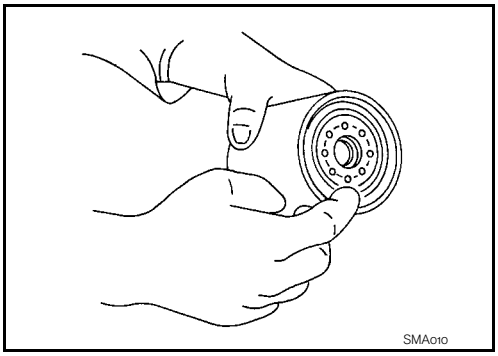
INFOID:0000000001095718

cardiagn.com

1. Using an oil filter wrench [SST: KV113C0010 (Mot. 1329)], remove oil filter.
   CAUTION:
   - **Be careful not to get burned when the engine and engine oil are hot.**
   - **When removing, prepare a shop cloth to absorb any oil leakage or spillage.**
   - **Do not allow engine oil to adhere to the drive belts.**
   - **Completely wipe off any oil that adhere to the engine and the vehicle.**



2. Remove foreign materials adhering to the oil filter installation surface.
3. Install oil filter bracket to oil cooler.
   CAUTION:
   Install oil filter bracket, positioning lug in the hole of oil cooler.
4. Apply engine oil to the oil seal contact surface of the new oil filter.
5. Install the oil filter until it comes into contact with the oil seal on the engine bracket.
6. Using an oil filter wrench [SST: KV113C0010 (Mot. 1329)], tighten oil filter.



   : 14 N·m (1.4 kg-m, 10 ft-lb)
7. After warming up the engine, check for engine oil leakage.
8. Check oil level and add engine oil. Refer to LU-23.

cardiagn.com

CHASSIS MAINTENANCE

HEADLAMP AIMING ADJUSTMENT (XENON TYPE - LHD)

HEADLAMP AIMING ADJUSTMENT (XENON TYPE - LHD) : Description

INFOID:0000000001116100

PREPARATION BEFORE ADJUSTING

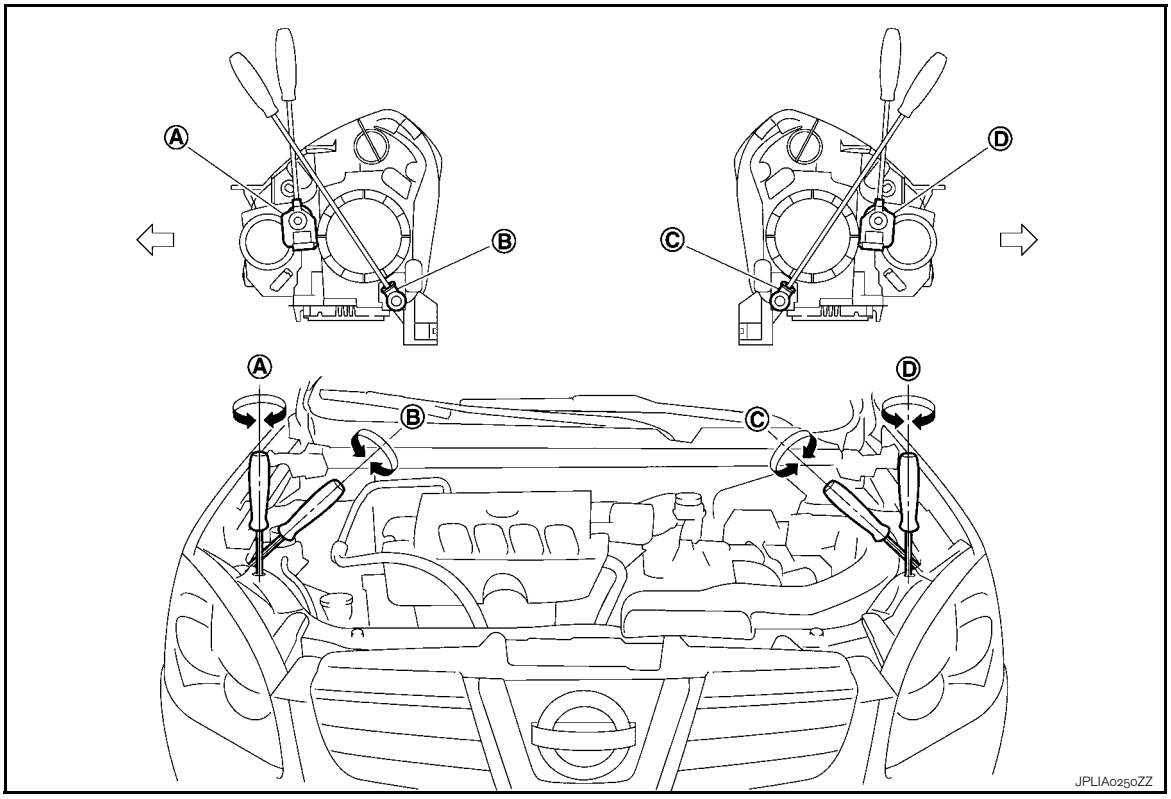
NOTE:

- For details, refer to the regulations in your own country.
- Perform aiming if the vehicle front body has been repaired and/or the headlamp assembly has been replaced.

Before performing aiming adjustment, check the following.

- Adjust the tire pressure to the specification.
- Fill with fuel, engine coolant and each oil.
- Maintain the unloaded vehicle condition. (Remove luggage from the passenger compartment and the luggage room.)
  NOTE:
  Do not remove the temporary tire, jack and on-vehicle tool.
- Wipe out dirt on the headlamp.
  CAUTION:
  Never use organic solvent (thinner, gasoline etc.)
- Ride alone on the driver seat.

AIMING ADJUSTMENT SCREW



A. Headlamp RH (UP/DOWN) adjustment screw
B. Headlamp RH (INSIDE/OUTSIDE) adjustment screw
C. Headlamp LH (INSIDE/OUTSIDE) adjustment screw
D. Headlamp LH (UP/DOWN) adjustment screw

⇦: Vehicle center

cardiagn.com

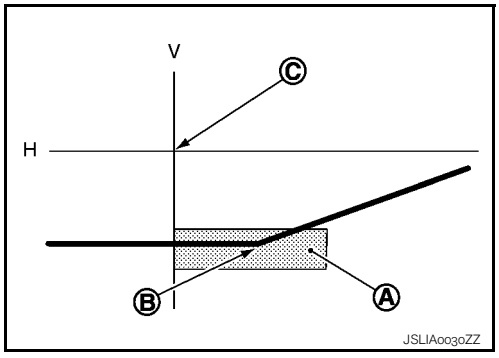
Adjustment screw		Screw driver rotation	Facing direction
A	Headlamp RH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN
B	Headlamp RH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
C	Headlamp LH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
D	Headlamp LH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN

HEADLAMP AIMING ADJUSTMENT (XENON TYPE - LHD) : Aiming Adjustment Procedure

INFOID:0000000001116101

1. Place the screen.
   NOTE:
   - Stop the vehicle at the perpendicular angle to the wall.
   - Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the headlamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the headlamp (LO).
   NOTE:
   Block light from the headlamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.
   CAUTION:
   Never cover lens surface with tape, etc. because it is made from plastic.
4. Use the aiming adjustment screw to adjust the elbow point projected by the low beams on the screen, so that it is within the aiming adjustment area.

Low beam distribution on the screen

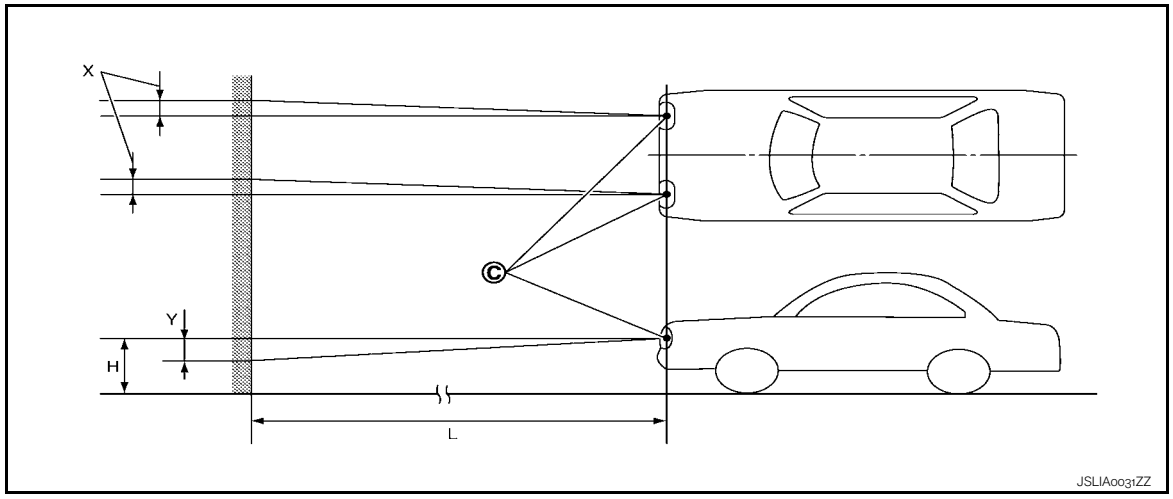


A. Aiming adjustment area
B. Elbow point
C. Headlamp center
H. Horizontal center line of headlamp
V. Vertical center line of headlamp

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y) (Lower side from headlamp center height)	Lateral direction (X) (Right side from headlamp centerline)
100 – 124 (3.94 – 4.88)	Within 120 (4.72)

cardiagn.com



C. Vertical center line of headlamp
H. Horizontal center line of headlamp
L. Distance from headlamp center to screen
X. Aiming adjustment area (lateral)
Y. Aiming adjustment area (Vertical)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

HEADLAMP AIMING ADJUSTMENT (XENON TYPE - RHD)

HEADLAMP AIMING ADJUSTMENT (XENON TYPE - RHD) : Description

INFOID:0000000001116102

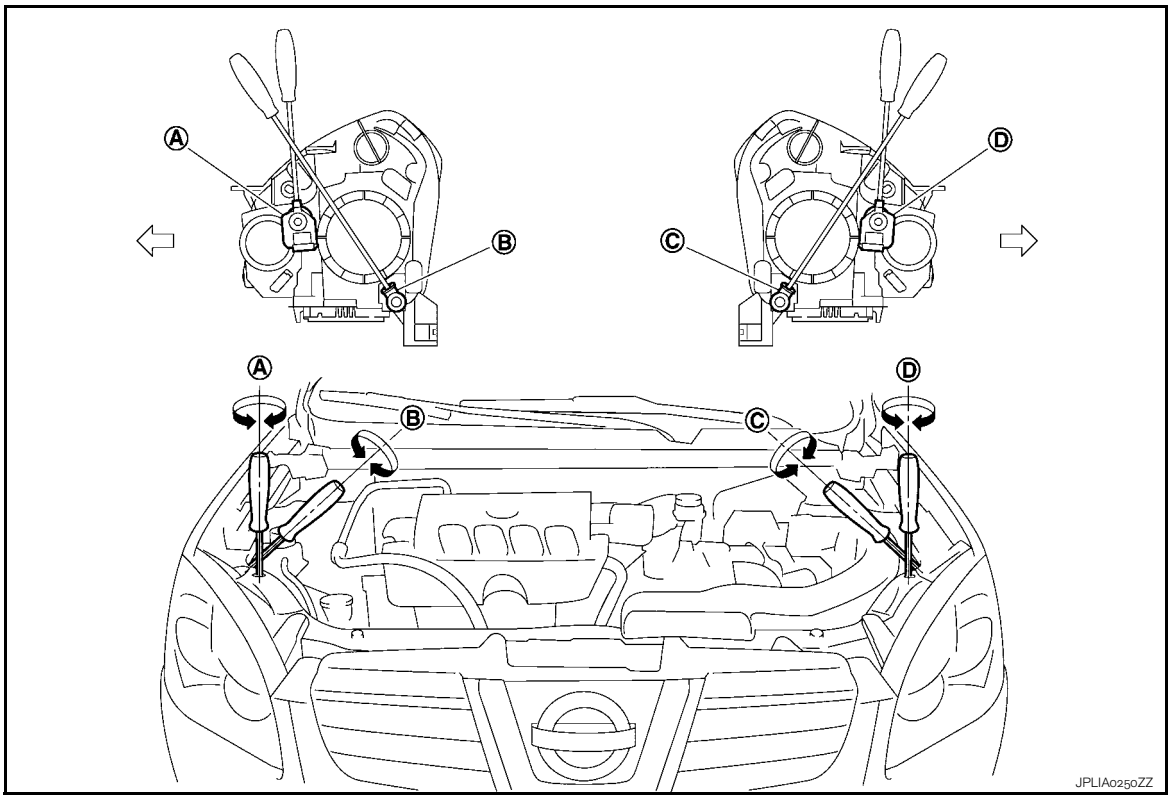
PREPARATION BEFORE ADJUSTING

NOTE:
- For details, refer to the regulations in your own country.
- Perform aiming if the vehicle front body has been repaired and/or the headlamp assembly has been replaced.

Before performing aiming adjustment, check the following.
- Adjust the tire pressure to the specification.
- Fill with fuel, engine coolant and each oil.
- Maintain the unloaded vehicle condition. (Remove luggage from the passenger compartment and the luggage room.)
  NOTE:
  Do not remove the temporary tire, jack and on-vehicle tool.
- Wipe out dirt on the headlamp.
  CAUTION:
  Never use organic solvent (thinner, gasoline etc.)
- Ride alone on the driver seat.

AIMING ADJUSTMENT SCREW

cardiagn.com



A. Headlamp RH (UP/DOWN) adjustment screw
B. Headlamp RH (INSIDE/OUTSIDE) adjustment screw
C. Headlamp LH (INSIDE/OUTSIDE) adjustment screw
D. Headlamp LH (UP/DOWN) adjustment screw

⇦: Vehicle center

Adjustment screw		Screw driver rotation	Facing direction
A	Headlamp RH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN
B	Headlamp RH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
C	Headlamp LH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
D	Headlamp LH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN

HEADLAMP AIMING ADJUSTMENT (XENON TYPE - RHD) : Aiming Adjustment Procedure

INFOID:0000000001116103

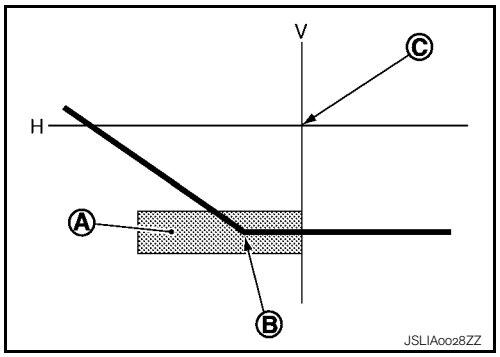
1. Place the screen.
   NOTE:
   • Stop the vehicle at the perpendicular angle to the wall.
   • Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the headlamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the headlamp (LO).
   NOTE:
   Block light from the headlamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.

cardiagn.com

CAUTION:
Never cover lens surface with tape, etc. because it is made from plastic.

4. Use the aiming adjustment screw to adjust the elbow point projected by the low beams on the screen, so that it is within the aiming adjustment area.

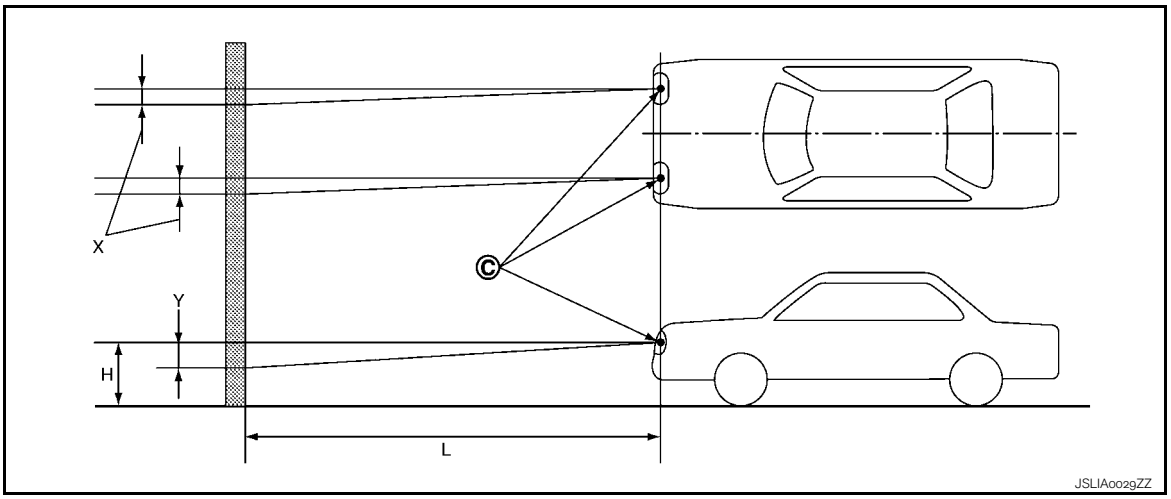
Low beam distribution on the screen



A. Aiming adjustment area
B. Elbow point
C. Headlamp center
H. Horizontal center line of headlamp
V. Vertical center line of headlamp

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y) (Lower side from headlamp center height)	Lateral direction (X) (Left side from headlamp centerline)
100 – 124 (3.94 – 4.88)	Within 120 (4.72)



C. Vertical center line of headlamp
H. Horizontal center line of headlamp
L. Distance from headlamp center to screen
X. Aiming adjustment area (lateral)
Y. Aiming adjustment area (Vertical)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - LHD)

HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - LHD) : Description

INFOID:0000000001116172

PREPARATION BEFORE ADJUSTING
NOTE:

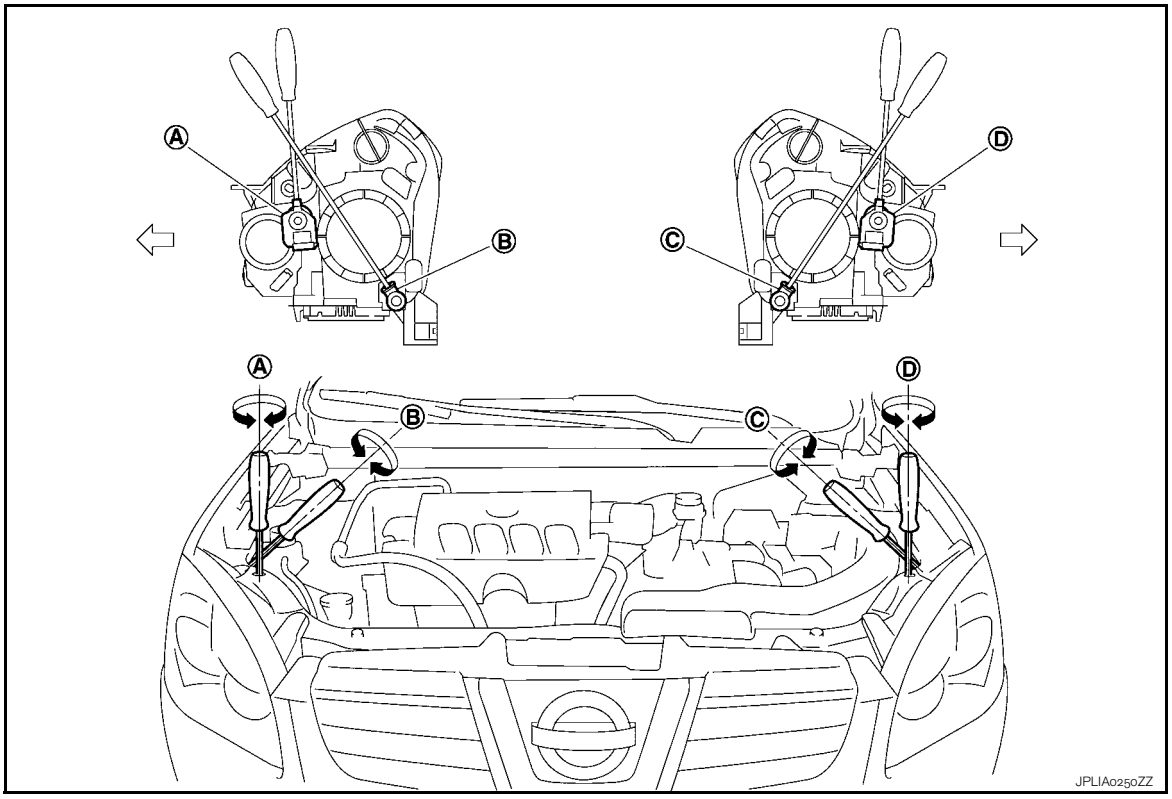
cardiagn.com

- For details, refer to the regulations in your own country.
- Perform aiming if the vehicle front body has been repaired and/or the headlamp assembly has been replaced.

Before performing aiming adjustment, check the following.

- Adjust the tire pressure to the specification.
- Fill with fuel, engine coolant and each oil.
- Maintain the unloaded vehicle condition. (Remove luggage from the passenger compartment and the luggage room.)
  NOTE:
  Do not remove the temporary tire, jack and on-vehicle tool.
- Wipe out dirt on the headlamp.
  CAUTION:
  Never use organic solvent (thinner, gasoline etc.)
- Ride alone on the driver seat.
- Headlamp aiming switch sets to “0”.

AIMING ADJUSTMENT SCREW



A. Headlamp RH (UP/DOWN) adjustment screw
B. Headlamp RH (INSIDE/OUTSIDE) adjustment screw
C. Headlamp LH (INSIDE/OUTSIDE) adjustment screw
D. Headlamp LH (UP/DOWN) adjustment screw

⇦: Vehicle center

Adjustment screw		Screw driver rotation	Facing direction
A	Headlamp RH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN
B	Headlamp RH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE

cardiagn.com

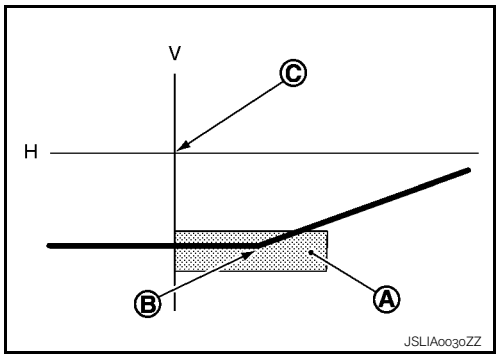
Adjustment screw		Screw driver rotation	Facing direction
C	Headlamp LH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
D	Headlamp LH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN

HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - LHD) : Aiming Adjustment Procedure

INFOID:0000000001116173

1. Place the screen.
   NOTE:
   - Stop the vehicle at the perpendicular angle to the wall.
   - Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the headlamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the headlamp (LO).
   NOTE:
   Block light from the headlamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.
   CAUTION:
   Never cover lens surface with tape, etc. because it is made from plastic.
4. Use the aiming adjustment screw to adjust the elbow point projected by the low beams on the screen, so that it is within the aiming adjustment area.

Low beam distribution on the screen

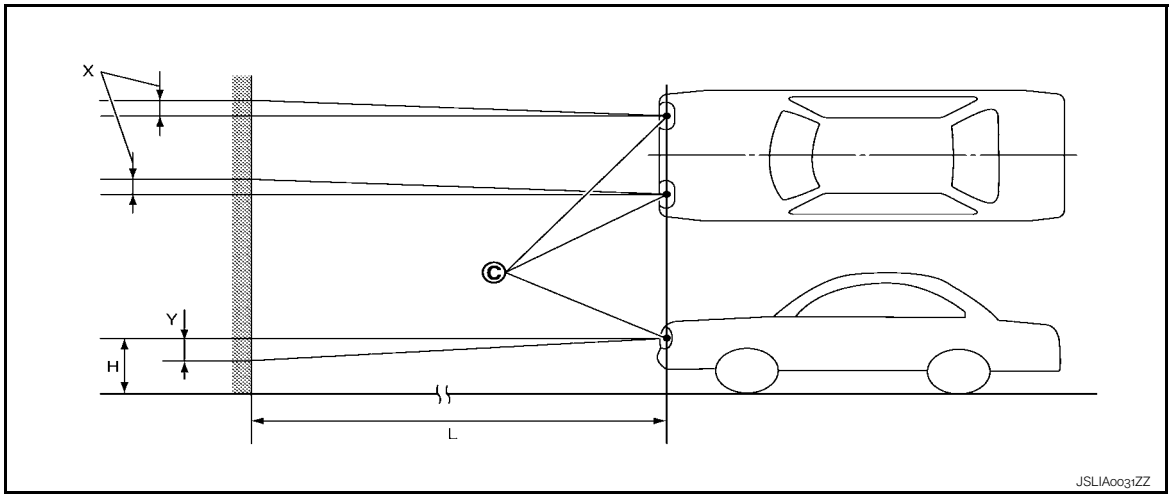


A. Aiming adjustment area
B. Elbow point
C. Headlamp center
H. Horizontal center line of headlamp
V. Vertical center line of headlamp

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y) (Lower side from headlamp center height)	Lateral direction (X) (Right side from headlamp centerline)
100 – 124 (3.94 – 4.88)	Within 120 (4.72)

cardiagn.com



C. Vertical center line of headlamp
H. Horizontal center line of headlamp
L. Distance from headlamp center to screen
X. Aiming adjustment area (lateral)
Y. Aiming adjustment area (Vertical)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - RHD)

HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - RHD) : Description

INFOID:0000000001116242

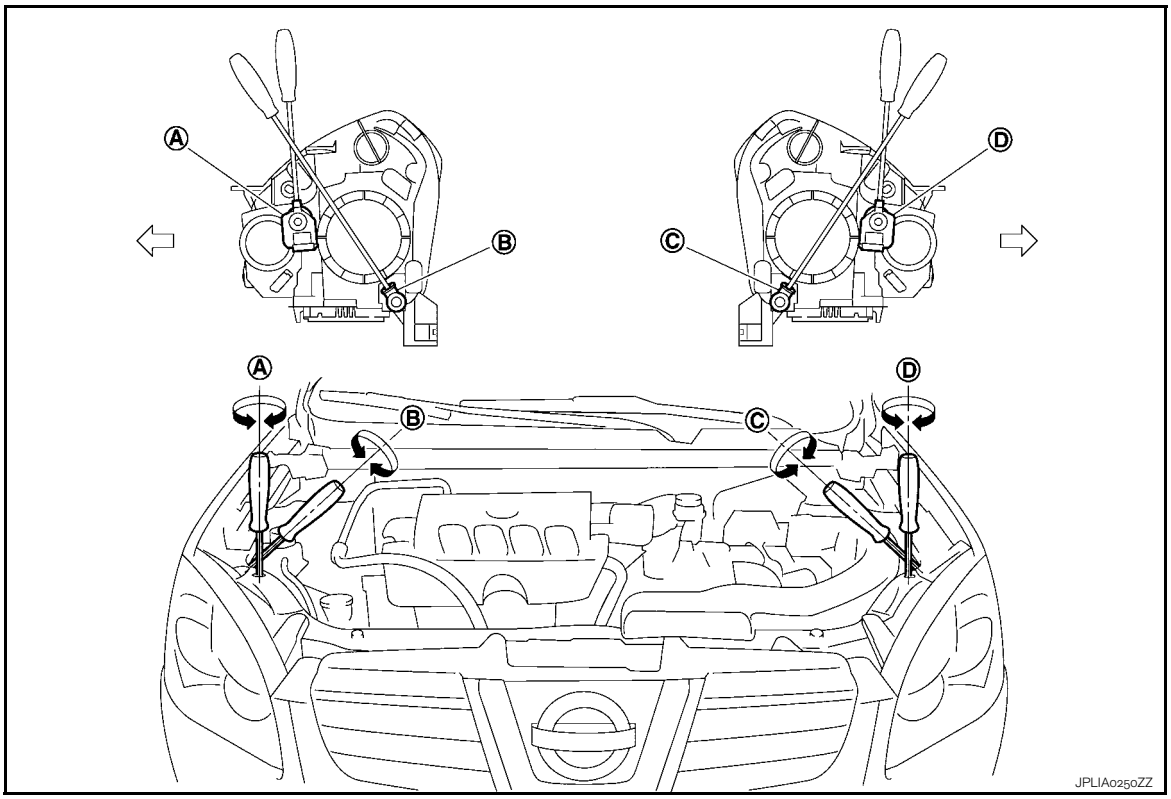
PREPARATION BEFORE ADJUSTING

NOTE:
- For details, refer to the regulations in your own country.
- Perform aiming if the vehicle front body has been repaired and/or the headlamp assembly has been replaced.

Before performing aiming adjustment, check the following.
- Adjust the tire pressure to the specification.
- Fill with fuel, engine coolant and each oil.
- Maintain the unloaded vehicle condition. (Remove luggage from the passenger compartment and the luggage room.)
  NOTE:
  Do not remove the temporary tire, jack and on-vehicle tool.
- Wipe out dirt on the headlamp.
  CAUTION:
  Never use organic solvent (thinner, gasoline etc.)
- Ride alone on the driver seat.
- Headlamp aiming switch sets to “0”.

AIMING ADJUSTMENT SCREW

cardiagn.com



A. Headlamp RH (UP/DOWN) adjustment screw
B. Headlamp RH (INSIDE/OUTSIDE) adjustment screw
C. Headlamp LH (INSIDE/OUTSIDE) adjustment screw
D. Headlamp LH (UP/DOWN) adjustment screw

⇦: Vehicle center

Adjustment screw		Screw driver rotation	Facing direction
A	Headlamp RH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN
B	Headlamp RH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
C	Headlamp LH (INSIDE/OUTSIDE)	Clockwise	INSIDE
		Counterclockwise	OUTSIDE
D	Headlamp LH (UP/DOWN)	Clockwise	UP
		Counterclockwise	DOWN

HEADLAMP AIMING ADJUSTMENT (HALOGEN TYPE - RHD) : Aiming Adjustment Procedure

INFOID:0000000001116243

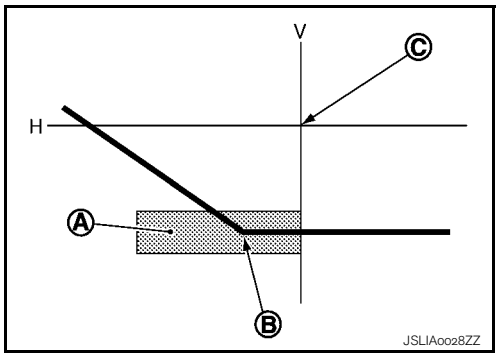
1. Place the screen.
   NOTE:
   • Stop the vehicle at the perpendicular angle to the wall.
   • Set the screen perpendicularly to the ground.
2. Face the vehicle squarely toward the screen and make the distance between the headlamp center and the screen 10 m (32.8 ft).
3. Start the engine and illuminate the headlamp (LO).
   NOTE:
   Block light from the headlamp that is not being adjusted with a thick fabric or another object, so that it does not reach the adjustment screen.

cardiagn.com

CAUTION:
Never cover lens surface with tape, etc. because it is made from plastic.

4. Use the aiming adjustment screw to adjust the elbow point projected by the low beams on the screen, so that it is within the aiming adjustment area.

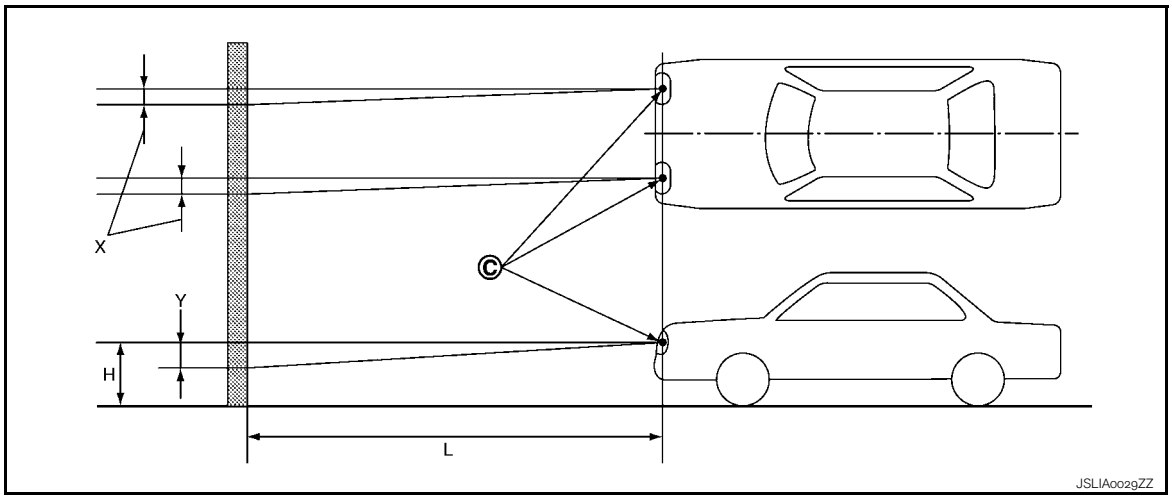
Low beam distribution on the screen



A. Aiming adjustment area
B. Elbow point
C. Headlamp center
H. Horizontal center line of headlamp
V. Vertical center line of headlamp

Unit: mm (in)

Aiming adjustment area	
Vertical direction (Y) (Lower side from headlamp center height)	Lateral direction (X) (Left side from headlamp centerline)
100 – 124 (3.94 – 4.88)	Within 120 (4.72)



C. Vertical center line of headlamp
H. Horizontal center line of headlamp
L. Distance from headlamp center to screen
X. Aiming adjustment area (lateral)
Y. Aiming adjustment area (Vertical)

Distance from headlamp center to screen (L) : 10 m (32.8 ft)

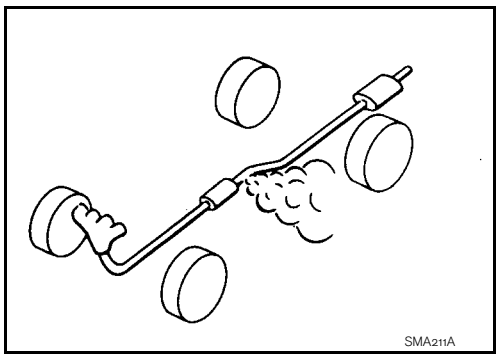
EXHAUST SYSTEM

EXHAUST SYSTEM : Inspection

INFOID:0000000001088650

cardiagn.com

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage, chafing or deterioration.
- If anything is found, repair or replace damaged parts.



CVT FLUID

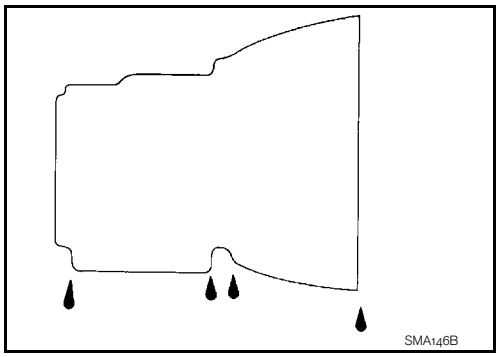
CVT FLUID : Inspection

INFOID:0000000001115874

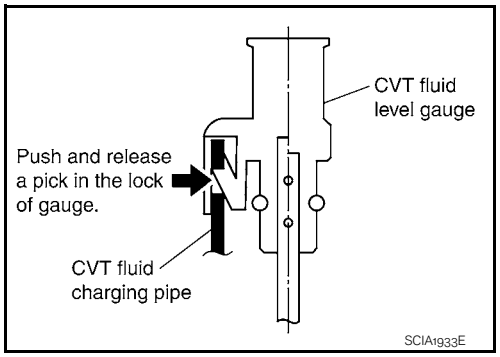
CHECKING CVT FLUID

Fluid level should be checked with the fluid warmed up to 50 to 80°C (122 to 176°F). The fluid level check procedure is as follows:

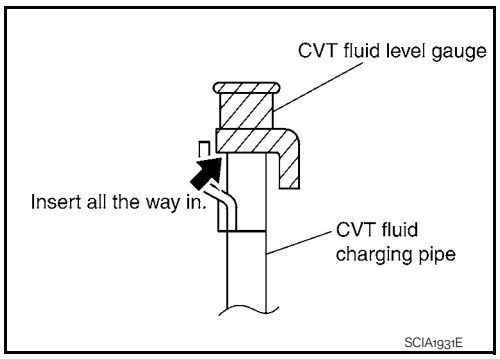
1. Check for fluid leakage.
2. With the engine warmed up, drive the vehicle in an urban area. When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50 to 80°C (122 to 176°F).
3. Park the vehicle on a level surface.
4. Apply parking brake firmly.
5. With engine at idle, while depressing brake pedal, move shift selector throughout the entire shift range.



6. Pull out the CVT fluid level gauge from the CVT fluid charging pipe after pressing the tab on the CVT fluid level gauge to release the lock.

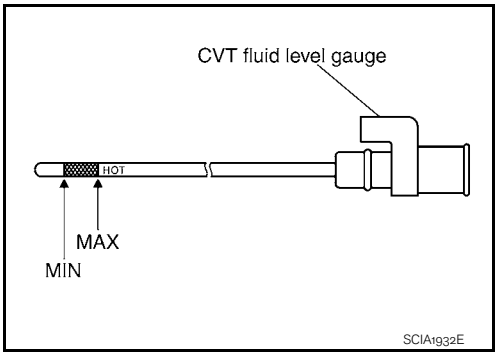


7. Wipe fluid off the CVT fluid level gauge. Insert the CVT fluid level gauge rotating 180° from the originally installed position, then securely push the CVT fluid level gauge until it meets the top end of the CVT fluid charging pipe.
   CAUTION:
   When wiping away the CVT fluid level gauge, always use lint-free paper, not a cloth rag.



cardiagn.com

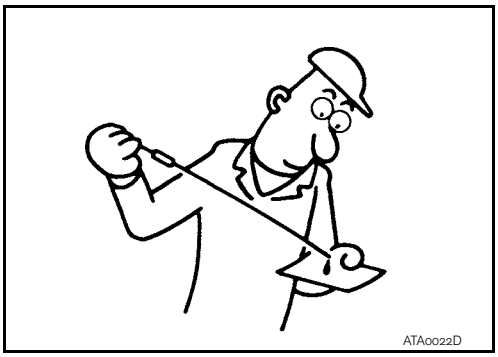
8. Place the selector lever in “P” or “N” and make sure the fluid level is within the specified range.
   CAUTION:
   When reinstalling CVT fluid level gauge, insert it into the CVT fluid charging pipe and rotate it to the original installation position until securely locked.



CVT FLUID CONDITION

Check CVT fluid condition.

- If CVT fluid is very dark or smells burned, check operation of CVT. Flush cooling system after repair of CVT.
- If CVT fluid contains frictional material (clutches, brakes, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of CVT. Refer to CO-34, "Exploded View".



Fluid status	Conceivable cause	Required operation
Varnished (viscous varnish state)	CVT fluid become degraded due to high temperatures.	Replace the CVT fluid and check the CVT main unit and the vehicle for malfunctions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the CVT fluid and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within CVT	Replace the CVT fluid and check for improper operation of the CVT.

CVT FLUID : Changing

INFOID:0000000001115875

1. Remove drain plug, and then drain CVT fluid from oil pan.
2. Install drain plug to oil pan.
   CAUTION:
   Never reuse drain plug gasket.

Drain plug – tightening torque : Refer to TM-335, "Exploded View".

3. Fill CVT fluid from CVT fluid charging pipe to the specified level.
4. With the engine warmed up, drive the vehicle in an urban area. When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50 to 80°C (122 to 176°F).
5. Check CVT fluid level and condition.
6. Repeat steps 1 to 5 if CVT fluid has been contaminated.

CVT fluid : Refer to TM-361, "General Specification".

Fluid capacity : Refer to TM-361, "General Specification".

CAUTION:

- **Use only Genuine NISSAN CVT Fluid NS-2. Never mix with other fluid.**
- **Using CVT fluid other than Genuine NISSAN CVT Fluid NS-2 will deteriorate in driveability and CVT durability, and may damage the CVT, which is not covered by the warranty.**
- **When filling CVT fluid, take care not to scatter heat generating parts such as exhaust.**
- **Sufficiently shake the container of CVT fluid before using.**

cardiagn.com

• **Delete CVT fluid deterioration date with CONSULT-III after changing CVT fluid.**

GEAR OIL: RS5F92R

GEAR OIL: RS5F92R : Inspection

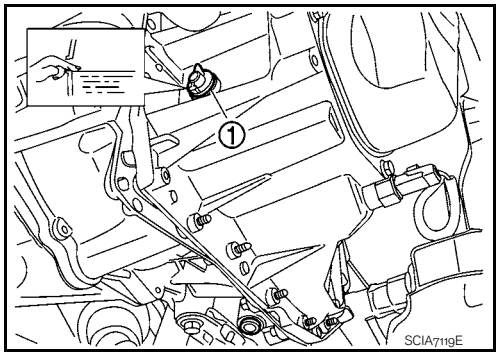
INFOID:0000000001095729

LEAKAGE

Make sure that gear oil is not leaking from transaxle or around it.

LEVEL

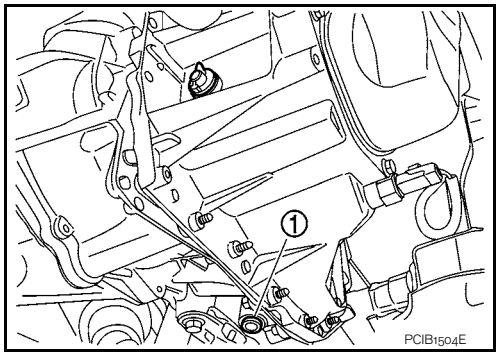
1. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Never start engine while checking oil level.
2. Set a new gasket on filler plug and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
3. Tighten filler plug to the specified torque.



GEAR OIL: RS5F92R : Draining

INFOID:0000000001095727

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and then drain gear oil.
3. Set a new gasket on drain plug and install it to clutch housing. Tighten drain plug to the specified torque.
   CAUTION:
   Never reuse gasket.



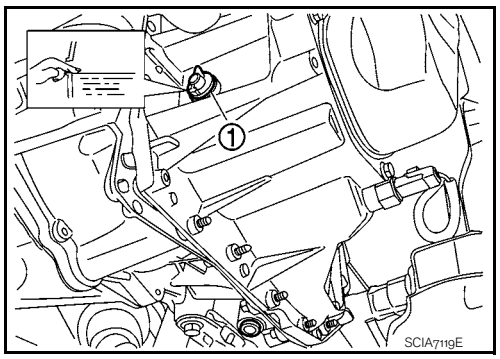
GEAR OIL: RS5F92R : Refilling

INFOID:0000000001095728

1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified limit at filler plug hole as shown.

Oil grade and viscosity	**: Refer to MA-21, "Fluids and Lubricants".**
Oil capacity	**: Refer to TM-50, "General Specification".**

2. After refilling gear oil, check oil level. Refer to TM-17, "Inspection".
3. Set a new gasket on filler plug and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
4. Tighten filler plug to the specified torque.



GEAR OIL: RS6F94R

GEAR OIL: RS6F94R : Inspection

INFOID:0000000001095732

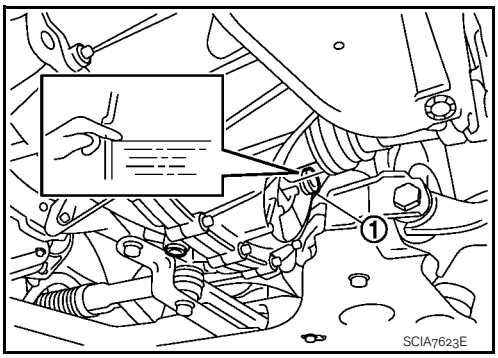
LEAKAGE

cardiagn.com

Make sure that gear oil is not leaking from transaxle or around it.

LEVEL

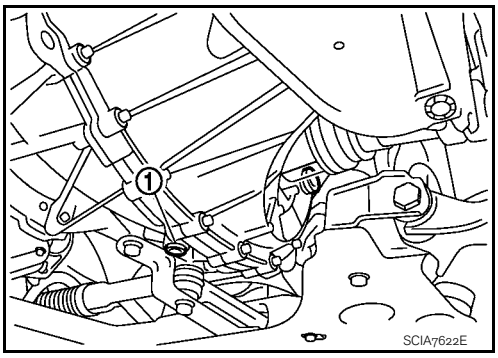
1. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Never start engine while checking oil level.
2. Set a new gasket on filler plug (1) and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
3. Tighten filler plug to the specified torque.



GEAR OIL: RS6F94R : Draining

INFOID:0000000001095730

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and then drain gear oil.
3. Set a new gasket on drain plug (1) and install it to clutch housing. Tighten drain plug to the specified torque.
   CAUTION:
   Never reuse gasket.



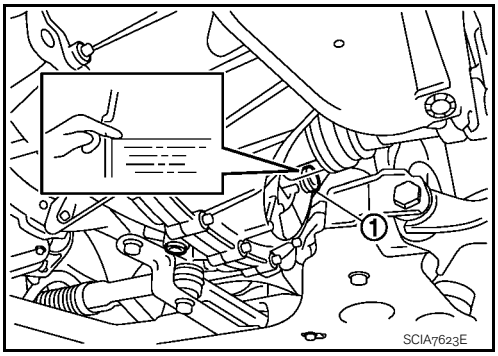
GEAR OIL: RS6F94R : Refilling

INFOID:0000000001095731

1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified limit at filler plug hole as shown.

Oil grade and viscosity	**: Refer to MA-21, "Fluids and Lubricants".**
Oil capacity	**: Refer to TM-103, "General Specification".**

2. After refilling gear oil, check oil level. Refer to TM-61, "Inspection".
3. Set a new gasket on filler plug (1) and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
4. Tighten filler plug to the specified torque.



GEAR OIL: RS6F52A

GEAR OIL: RS6F52A : Inspection

INFOID:0000000001095739

LEAKAGE

Make sure that gear oil is not leaking from transaxle or around it.

LEVEL

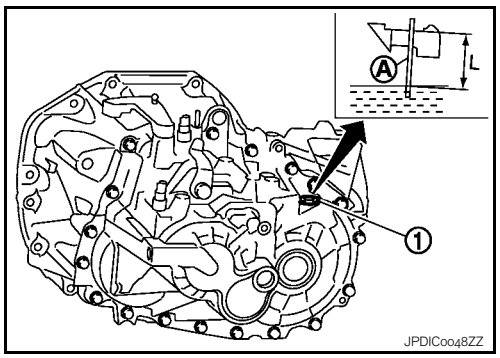
cardiagn.com

1. Remove filler plug (1).
2. Measure oil level using a suitable gauge (A) as shown in the figure and then check if it is within the specifications.

Oil level "L" **: Refer to TM-183, "General Specifications".**

CAUTION:
Never start engine while checking oil level.

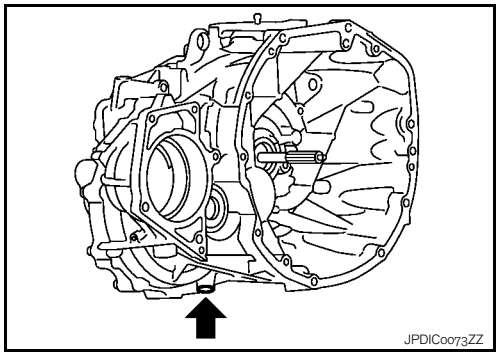
3. Set a new gasket on filler plug (1) and then install it to transaxle case.
CAUTION:
Never reuse gasket.
4. Tighten filler plug to the specified torque.



GEAR OIL: RS6F52A : Draining

INFOID:0000000001095737

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug and then drain gear oil.
3. Set a new gasket on drain plug and install it to clutch housing. Tighten drain plug to the specified torque.
CAUTION:
Never reuse gasket.



GEAR OIL: RS6F52A : Refilling

INFOID:0000000001095738

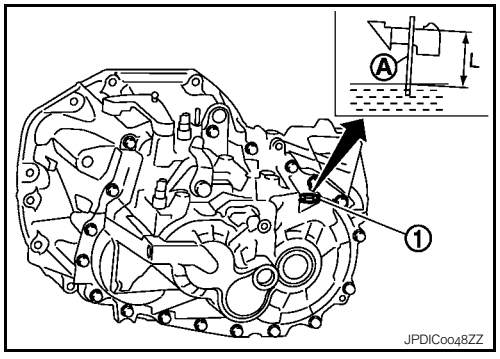
1. Remove filler plug (1). Fill with new gear oil to transaxle.

A : Suitable gauge

Oil grade and viscosity **: Refer to MA-21, "Fluids and Lubricants".**

Oil capacity (reference) **: Refer to TM-183, "General Specifications".**

2. After refilling gear oil, check oil level. Refer to TM-115, "Inspection".
3. Set a new gasket on filler plug and then install it to transaxle case.
CAUTION:
Never reuse gasket.
4. Tighten filler plug to the specified torque.



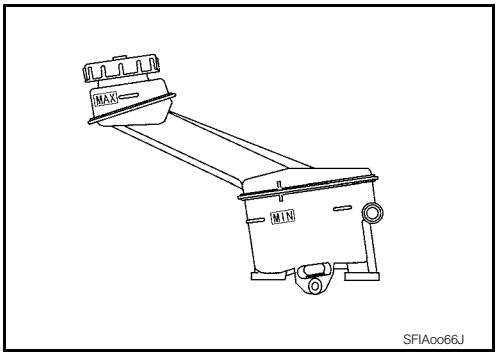
CLUTCH FLUID

CLUTCH FLUID : Inspection

INFOID:0000000001088915

cardiagn.com

If fluid level is extremely low, check clutch/brake system for leaks.



TRANSFER OIL

TRANSFER OIL : Inspection

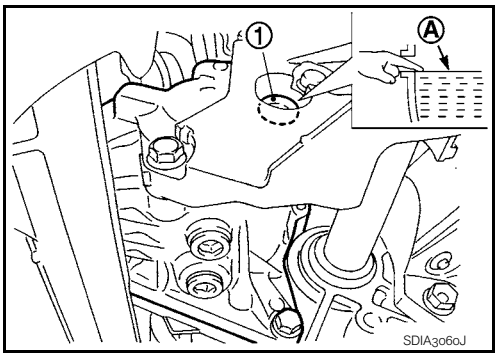
INFOID:0000000001115876

OIL LEAKAGE

Check transfer surrounding area (oil seal, drain plug, filler plug, and transfer case, etc.) for oil leakage.

OIL LEVEL

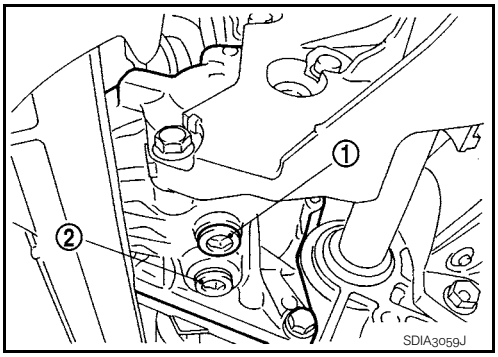
1. Remove filler plug (1) and gasket. Then check that oil is filled up (A) from mounting hole for the filler plug.
2. Before installing filler plug, set a new gasket. Install filler plug on transfer and tighten to the specified torque. Refer to DLN-61, "M/T : Exploded View" (M/T models), DLN-63, "CVT : Exploded View" (CVT models).
   CAUTION:
   Never reuse gaskets.



TRANSFER OIL : Draining

INFOID:0000000001115877

1. Run the vehicle to warm up the transfer unit sufficiently.
2. Stop the engine and remove drain plug (1) and gaskets to drain the transfer oil.
   CAUTION:
   Never remove tooth contact test hole plug (2).
3. Before installing drain plug, set a new gasket. Install drain plug on transfer and tighten to the specified torque. Refer to DLN-61, "M/T : Exploded View" (M/T models), DLN-63, "CVT : Exploded View" (CVT models).
   CAUTION:
   Never reuse gaskets.



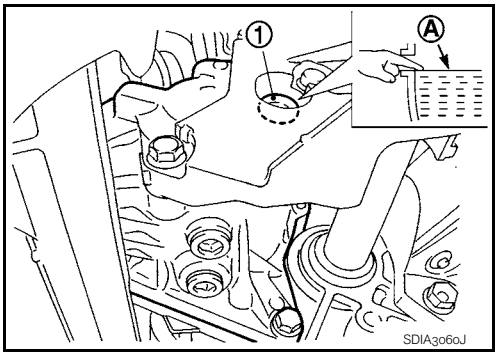
TRANSFER OIL : Refilling

INFOID:0000000001115878

1. Remove filler plug (1) and gasket. Then fill oil up to mounting hole (A) for the filler plug.

Oil grade and Viscosity	**: Refer to MA-21, "Fluids and Lubricants".**
Oil capacity	**: Refer to DLN-107, "General Specifications".**

   CAUTION:
   Carefully fill the oil. (Fill up for approximately 3 minutes.)
2. Leave the vehicle for 3 minutes. Then check oil level again.



cardiagn.com

3. Before installing filler plug, set a new gasket. Install filler plug on transfer and tighten to the specified torque. Refer to DLN-61, "M/T : Exploded View" (M/T models), DLN-63, "CVT : Exploded View" (CVT models).
   CAUTION:
   Never reuse gasket.

REAR PROPELLER SHAFT

REAR PROPELLER SHAFT : Inspection

INFOID:0000000001095800

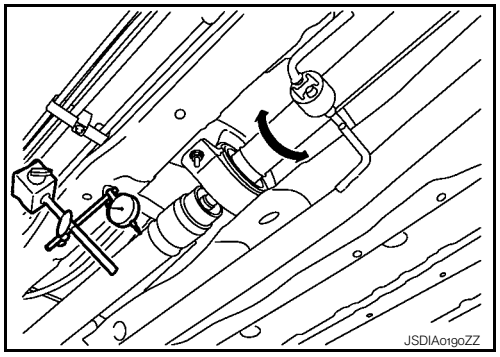
NOISE

- Check the propeller shaft tube surface for dents or cracks. If damaged, replace propeller shaft assembly.
- If center bearing is noisy or damaged, replace propeller shaft assembly.

VIBRATION

If vibration is present at high speed, inspect propeller shaft runout first.

1. Measure propeller shaft runout at runout measuring points by rotating final drive companion flange with hands.



Limit

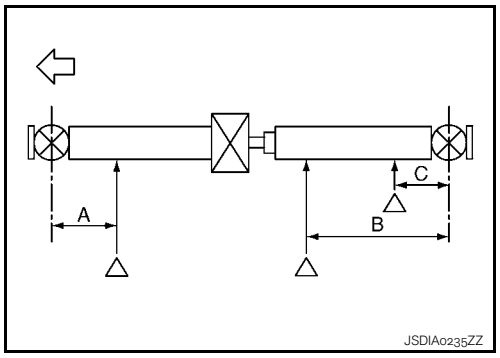
Propeller shaft runout **: Refer to DLN-113, "Propeller Shaft Runout".**

2. If runout still exceeds specifications, separate propeller shaft at final drive companion flange or transfer companion flange; then rotate companion flange 90, 180, 270 degrees and install propeller shaft.
3. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
4. Check the vibration by driving vehicle.

RUNOUT MEASURING POINT

Propeller shaft runout measuring point (Point "△").

⇦ : Vehicle front



Dimension

A: 200 mm (7.87 in)
B: 639 mm (25.16 in)
C: 159 mm (6.26 in)

REAR DIFFERENTIAL GEAR OIL

REAR DIFFERENTIAL GEAR OIL : Inspection

INFOID:0000000001115879

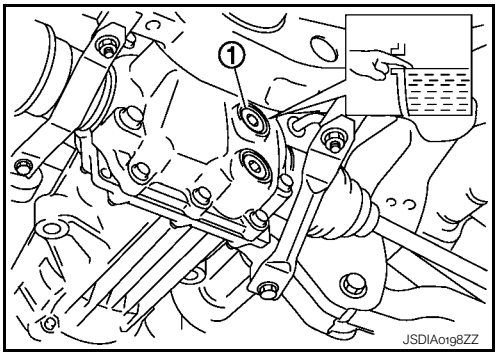
OIL LEAKEGE

Make sure that oil is not leaking from final drive assembly or around it.

OIL LEVEL

cardiagn.com

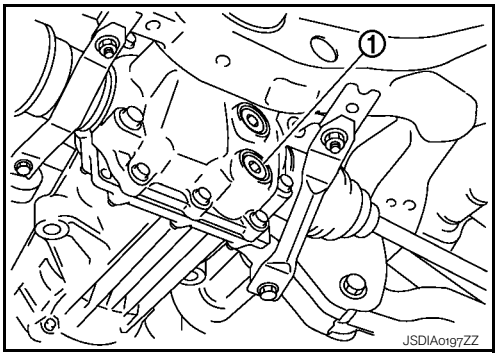
- Remove filler plug (1) and check oil level from filler plug mounting hole as shown in the figure.
  CAUTION:
  Never start engine while checking oil level.
- Set a new gasket on filler plug and install it on final drive assembly. Refer to DLN-130, "Exploded View".
  CAUTION:
  Never reuse gasket.



REAR DIFFERENTIAL GEAR OIL : Draining

INFOID:0000000001115880

1. Stop engine.
2. Remove drain plug (1) and drain gear oil.
3. Set a new gasket on drain plug and install it to final drive assembly and tighten to the specified torque. Refer to DLN-130, "Exploded View".
   CAUTION:
   Never reuse gasket.



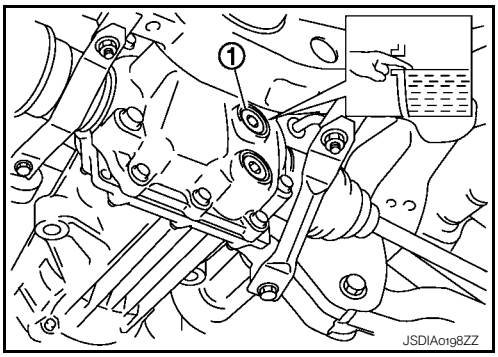
REAR DIFFERENTIAL GEAR OIL : Refilling

INFOID:0000000001115881

1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified level near filler plug mounting hole.

Oil grade and Viscosity	**: Refer to MA-21, "Fluids and Lubricants".**
Oil capacity	**: Refer to DLN-151, "General Specification".**

2. After refilling oil, check oil level. Set a new gasket to filler plug, then install it to final drive assembly. Refer to DLN-130, "Exploded View".
   CAUTION:
   Never reuse gasket.



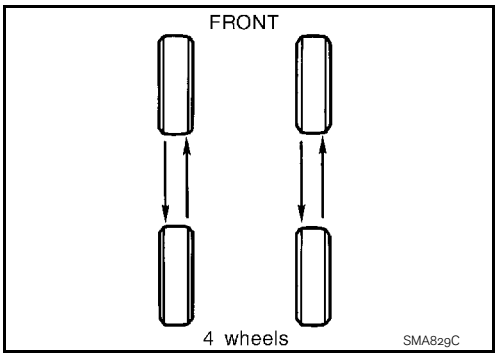
WHEELS (BONDING WEIGHT TYPE)

WHEELS (BONDING WEIGHT TYPE) : Adjustment

INFOID:0000000001115882

TIRE RORATION

1. Follow the maintenance schedule for tire rotation service intervals. Refer to MA-6, "General Maintenance".
2. Do not include the T-type spare tire when rotating the tires.
3. When installing the wheel, tighten wheel nuts to the specified torque.
   CAUTION:
   - **When installing wheels, tighten them diagonally by dividing the work two to three times in order to prevent the wheels from developing any distortion.**
   - **Be careful not to tighten wheel nut at torque exceeding the criteria for preventing strain of disc rotor.**
   - **Use NISSAN genuine wheel nuts for aluminum wheels.**



cardiagn.com

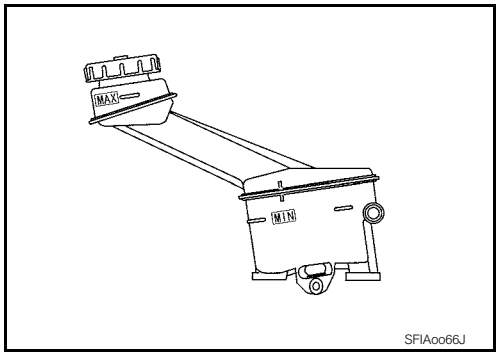
Wheel nuts tightening torque: **Refer to WT-4, "Road Wheel".**

BRAKE FLUID LEVEL AND LEAKS

BRAKE FLUID LEVEL AND LEAKS : Inspection

INFOID:0000000001088925

- If fluid level is extremely low, check brake/clutch system for leaks.



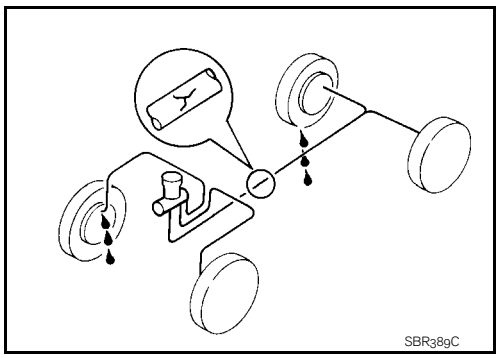
SFIAoo66J

BRAKE LINES AND CABLES

BRAKE LINES AND CABLES : Inspection

INFOID:0000000001088935

- Check brake/clutch fluid lines and parking brake cables for improper attachment, leaks, chafing, abrasions, deterioration, etc.

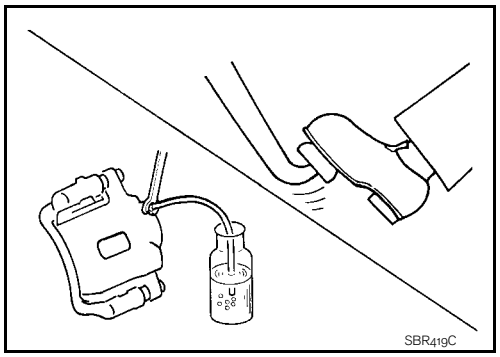

SBR389C

BRAKE FLUID

BRAKE FLUID : Changing

INFOID:0000000001088936

1. Drain brake fluid from each bleed valve.
2. Refill until new brake fluid comes out from each bleed valve.
   Use same procedure as in bleeding hydraulic system to refill brake fluid.
   Refer to BR-12, "Bleeding Brake System" (LHD), BR-56, "Bleeding Brake System" (RHD).
   - Refill with recommended brake fluid.
     Refer to MA-21, "Fluids and Lubricants".
   - Never reuse drained brake fluid.
   - Be careful not to splash brake fluid on painted areas.


SBR419C

DISC BRAKE

DISC BRAKE : Inspection

INFOID:0000000001088943

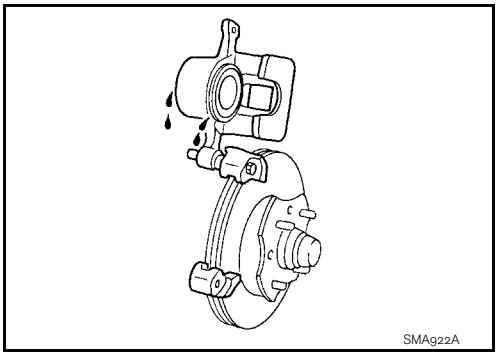
DISC ROTOR

Check condition, wear, and damage.

CALIPER

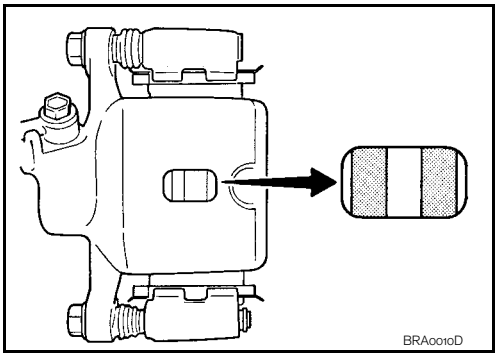
cardiagn.com

- Check for leakage.



BRAKE PAD

- Check for wear or damage.



DISC BRAKE : Front Disc Brake

INFOID:0000000001095941

Unit: mm (in.)

Brake pad	Standard thickness	11.0 (0.433)
	Wear limit thickness	2.0 (0.079)
Disc rotor	Standard thickness	26.0 (1.024)
	Wear limit thickness	24.0 (0.945)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	0.035 (0.0014)

DISC BRAKE : Rear Disc Brake

INFOID:0000000001095942

Unit: mm (in.)

Brake pad	Standard thickness	8.5 (0.335)
	Wear limit thickness	2.0 (0.079)
Disc rotor	Standard thickness	9.0 (0.354)
	Wear limit thickness	8.0 (0.315)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	—

STEERING GEAR AND LINKAGE

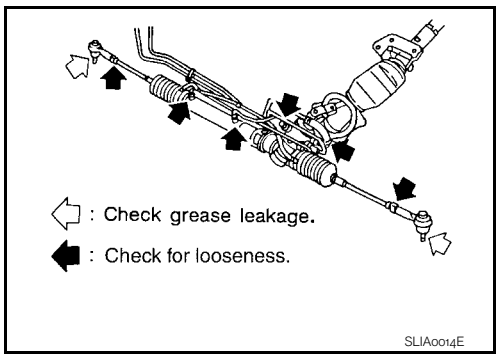
STEERING GEAR AND LINKAGE : Inspection

INFOID:0000000001088947

STEERING GEAR

cardiagn.com

- Check gear housing and boots for looseness, damage and grease leakage.
- Check connection with steering column for looseness.



STEERING LINKAGE

Check ball joint, dust cover and other component parts for looseness, wear, damage and grease leakage.

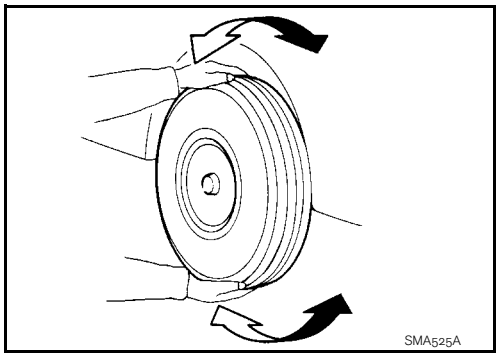
AXLE AND SUSPENSION PARTS

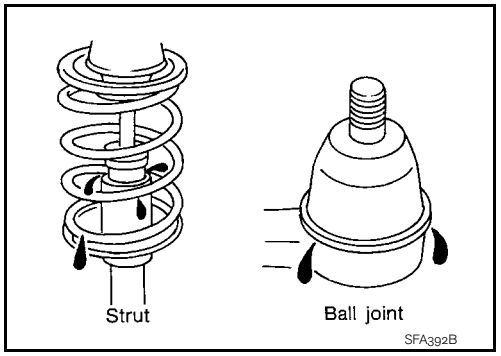
AXLE AND SUSPENSION PARTS : Inspection

INFOID:0000000001088949

Check front and rear axle and suspension parts for excessive play, cracks, wear or other damage.

- Shake each wheel to check for excessive play.
- Check wheel bearings for smooth operation.
- Check axle and suspension nuts and bolts for looseness.
- Check strut (shock absorber) for oil leakage or other damage.
- Check suspension ball joint for grease leakage and ball joint dust cover for cracks or other damage.



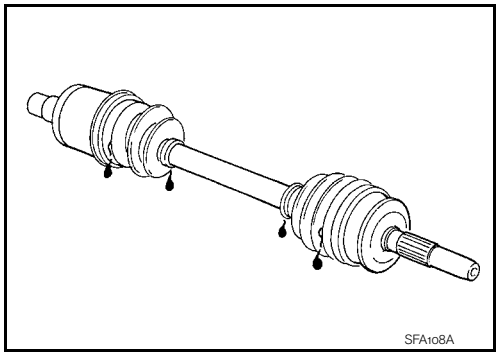


DRIVE SHAFT

DRIVE SHAFT : Inspection

INFOID:0000000001088951

- Check boot and drive shaft for cracks, wear, damage and grease leakage.



cardiagn.com

BODY MAINTENANCE

LOCKS, HINGES AND HOOD LATCH

LOCKS, HINGES AND HOOD LATCH : Lubricating

INFOID:0000000001088898

For hood and hood lock illustration.
- Hood: Refer to DLK-223, "HOOD ASSEMBLY : Exploded View".
- Hood lock control: Refer to DLK-227, "HOOD LOCK CONTROL : Exploded View".

For door and door lock illustration.
- Front door: Refer to DLK-235, "DOOR ASSEMBLY : Exploded View".
- Front door lock: Refer to DLK-255, "DOOR LOCK : Exploded View".
- Rear door: Refer to DLK-241, "DOOR ASSEMBLY : Exploded View".
- Rear door lock: Refer to DLK-262, "DOOR LOCK : Exploded View".

For back door and back door lock illustration.
- Back door: Refer to DLK-247, "BACK DOOR ASSEMBLY : Exploded View".
- Back door lock: Refer to DLK-268, "DOOR LOCK : Exploded View".

SEAT BELT, BUCKLES, RETRACTORS, ANCHORS AND ADJUSTERS

SEAT BELT, BUCKLES, RETRACTORS, ANCHORS AND ADJUSTERS : Inspection

INFOID:0000000001088899

For front seat belt illustration. Refer to SB-5, "SEAT BELT RETRACTOR : Exploded View".
For rear seat belt illustration. Refer to SB-11, "OUTER SEAT BELT RETRACTOR : Exploded View".

CAUTION:
- **After any collision, inspect all seat belt assemblies, including retractors and other attached hardwares (I.e. anchor bolt, guide rail set). Nissan recommends to replace all seat belt assemblies in use during a collision, unless not damaged and properly operating after minor collision.**
  Also inspect seat belt assemblies not in use during a collision, and replace if damaged or improperly operating.
  Seat belt pre-tensioner should be replaced even if the seat belts are not in use during a frontal collision where the driver and passenger air bags are deployed.
- **If any component of seat belt assembly is questionable, do not repair.**
  Replace as seat belt assembly.
- **If webbing is cut, frayed, or damaged, replace belt assembly.**
- **Never oil tongue and buckle.**
- **Use a genuine NISSAN seat belt assembly.**

For details, refer to SB-3, "SEAT BELT RETRACTOR : Inspection" , SB-10, "OUTER SEAT BELT RETRACTOR : Inspection" in SB section.
- Check anchors for loose mounting
- Check belts for damage
- Check retractor for smooth operation
- Check function of buckles and tongues when buckled and released

BODY CORROSION

BODY CORROSION : Checking Body Corrosion

INFOID:0000000001088905

Visually check body panels for collision damage (scratches, chipping, rubbing, etc.) or damage to the anti-corrosion materials. In particular, check the following locations.

HEMMED PANELS
Hood front end, door lower end, trunk lid rear end, etc.

PANEL JOINT
Side sill of rear fender and center pillar, rear wheel housing of rear fender, around strut tower in engine compartment, etc.

PANEL EDGE
Trunk lid opening, sunroof opening, fender wheel-arch flange, fuel filler lid flange, around holes in panel, etc.

PARTS CONTACT
Waist moulding, windshield moulding, bumper, etc.

cardiagn.com

PROTECTORS

Damage or condition of mudguard, fender protector, chipping protector, etc.

ANTI-CORROSION MATERIALS

Damage or separation of anti-corrosion materials under the body.

DRAIN HOLES

Condition of drain holes at door and side sill. When repairing corroded areas, refer to the Corrosion Repair Manual.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

DRIVE BELTS (HR16DE)

DRIVE BELTS (HR16DE) : Drive Belts

INFOID:0000000001095805

BELT DEFLECTION:

Location		Deflection adjustment *		Unit: mm (in)
		Used belt		New belt
		Limit	After adjusted	
Drive belt	With A/C models	7.9 (0.31)	4.8 - 5.3 (0.19 - 0.21)	4.2 - 4.5 (0.17 - 0.18)
	Without A/C models	7.1 (0.28)	4.3 - 4.7 (0.17 - 0.19)	3.6 - 3.9 (0.14 - 0.15)
Applied pushing force		98 N (10 kg, 22 lb)		

*: When engine is cold.

BELT TENSION AND FREQUENCY:

Location		Tension adjustment *		Unit: N (kg, lb)	Frequency adjustment *		Unit: Hz
		Used belt		New belt	Used belt		New belt
		Limit	After adjusted		Limit	After adjusted	
Drive belt	With A/C models	500 (51.0, 112)	876 - 964 (89.4 - 98.3, 197 - 217)	1064 - 1152 (108.5 - 117.5, 239 - 259)	163	216 - 225	238 - 246
	Without A/C models	500 (51.0, 112)	876 - 964 (89.4 - 98.3, 197 - 217)	1064 - 1152 (108.5 - 117.5, 239 - 259)	183	242 - 252	266 - 276

*: When engine is cold.

DRIVE BELTS (MR20DE)

DRIVE BELTS (MR20DE) : Drive Belt

INFOID:0000000001095807

DRIVE BELT

Tension of drive belt	Auto adjustment by auto-tensioner

DRIVE BELTS (K9K)

DRIVE BELTS (K9K) : Drive Belt

INFOID:0000000001095809

DRIVE BELT

Tension of drive belt	Auto adjustment by auto-tensioner

ENGINE COOLANT (HR16DE)

ENGINE COOLANT (HR16DE) : Periodical Maintenance Specification

INFOID:0000000001095810

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity [With reservoir tank (“MAX” level)]	5.9 (5-1/4)
Reservoir tank engine coolant capacity (At “MAX” level)	0.78 (5/8)

cardiagn.com

ENGINE COOLANT (MR20DE)

ENGINE COOLANT (MR20DE) : Periodical Maintenance Specification

INFOID:0000000001095811

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity (With reservoir tank at “MAX” level)	M/T models	7.6 (6-5/8)
	CVT models	8.9 (7-7/8)
Reservoir tank engine coolant capacity (At “MAX” level)		0.78 (5/8)

ENGINE COOLANT (K9K)

ENGINE COOLANT (K9K) : Periodical Maintenance Specification

INFOID:0000000001095812

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity [With reservoir tank (“MAX” level)]	7.0 (6-1/8)
Reservoir tank engine coolant capacity (At “MAX” level)	0.8 (3/4)

ENGINE OIL (HR16DE)

ENGINE OIL (HR16DE) : Periodical Maintenance Specification

INFOID:0000000001095861

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	4.3 (3-3/4)
	Without oil filter change	4.1 (3-5/8)
Dry engine (Overhaul)		4.8 (4-1/4)

ENGINE OIL (MR20DE)

ENGINE OIL (MR20DE) : Periodical Maintenance Specification

INFOID:0000000001095862

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	4.4 (3-7/8)
	Without oil filter change	4.2 (3-3/4)
Dry engine (Overhaul)		5.2 (4-5/8)

ENGINE OIL (K9K)

ENGINE OIL (K9K) : Periodical Maintenance Specification

INFOID:0000000001095863

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

With oil filter change	4.55 (4)
Without oil filter change	4.39 (3-7/8)
Dry engine (overhaul)	4.71 (4-1/8)

SPARK PLUG (HR16DE)

SPARK PLUG (HR16DE) : Spark Plug

INFOID:0000000001095806

SPARK PLUG (PLATINUM-TIPPED TYPE)

cardiagn.com

Unit: mm (in)

Make	NGK
Standard type	PLZKAR6A-11
Gap (Nominal)	1.1 (0.043)

SPARK PLUG (MR20DE)

SPARK PLUG (MR20DE) : Spark Plug

INFOID:0000000001095808

SPARK PLUG

Unit: mm (in)

Make	NGK
Standard type	PLZKAR6A-11
Gap (Nominal)	1.1 (0.043)

ROAD WHEEL

ROAD WHEEL : Road Wheel

INFOID:0000000001095913

Kind of wheel		Aluminum	Steel	
			Conventional	For temporary use
Maximum radial runout limit	Lateral deflection	Less than 0.3 mm (0.012 in)	Less than 0.8 mm (0.031 in)	Less than 1.2 mm (0.047 in)
	Vertical deflection		Less than 0.7 mm (0.028 in)	Less than 1.3 mm (0.051 in)
Maximum allowable unbalance limit	Dynamic (At flange)	Less than 10 g (0.35 oz) (one side)		
	Static (At flange)	Less than 20 g (0.71 oz)		
Wheel nuts tightening torque		112.6 N·m (11 kg–m, 83 ft–lb)		

cardiagn.com

SECTION MWI
METER, WARNING LAMP & INDICATOR

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
Work Flow 3

FUNCTION DIAGNOSIS 4

METER SYSTEM 4

METER SYSTEM 4
METER SYSTEM : System Diagram 4
METER SYSTEM : System Description 4
METER SYSTEM : Component Parts Location 6
METER SYSTEM : Component Description 7
METER SYSTEM : Operation Description 7

SPEEDOMETER 8
SPEEDOMETER : System Diagram 8
SPEEDOMETER : System Description 8
SPEEDOMETER : Component Parts Location 9
SPEEDOMETER : Component Description 9

TACHOMETER 9
TACHOMETER : System Diagram 9
TACHOMETER : System Description 9
TACHOMETER : Component Parts Location 10
TACHOMETER : Component Description 10

ENGINE COOLANT TEMPERATURE GAUGE 10
ENGINE COOLANT TEMPERATURE GAUGE : System Diagram 10
ENGINE COOLANT TEMPERATURE GAUGE : System Description 10
ENGINE COOLANT TEMPERATURE GAUGE : Component Parts Location 11
ENGINE COOLANT TEMPERATURE GAUGE : Component Description 11

FUEL GAUGE 11
FUEL GAUGE : System Diagram 11
FUEL GAUGE : System Description 11
FUEL GAUGE : Component Parts Location 12
FUEL GAUGE : Component Description 12

ODO/TRIP METER 12
ODO/TRIP METER : System Diagram 12
ODO/TRIP METER : System Description 13
ODO/TRIP METER : Component Parts Location 13
ODO/TRIP METER : Component Description 13

SHIFT POSITION INDICATOR 13
SHIFT POSITION INDICATOR : System Diagram 14
SHIFT POSITION INDICATOR : System Description 14
SHIFT POSITION INDICATOR : Component Parts Location 15
SHIFT POSITION INDICATOR : Component Description 15

WARNING LAMPS/INDICATOR LAMPS 15
WARNING LAMPS/INDICATOR LAMPS : System Diagram 15
WARNING LAMPS/INDICATOR LAMPS : System Description 15
WARNING LAMPS/INDICATOR LAMPS : Component Parts Location 16
WARNING LAMPS/INDICATOR LAMPS : Component Description 16

METER ILLUMINATION CONTROL 16
METER ILLUMINATION CONTROL : System Diagram 17
METER ILLUMINATION CONTROL : System Description 17
METER ILLUMINATION CONTROL : Component Parts Location 17
METER ILLUMINATION CONTROL : Component Description 17

INFORMATION DISPLAY 17
INFORMATION DISPLAY : System Diagram 18
INFORMATION DISPLAY : System Description 18
INFORMATION DISPLAY : Component Parts Location 19
INFORMATION DISPLAY : Component Description 20

cardiagn.com

DIAGNOSIS SYSTEM (METER) 21
Diagnosis Description 21
CONSULT-III Function (METER/M&A) 23

COMPONENT DIAGNOSIS 26

U1000 CAN COMM CIRCUIT 26
Description 26
DTC Logic 26
Diagnosis Procedure 26

B2205 VEHICLE SPEED 27
Description 27
DTC Logic 27
Diagnosis Procedure 27

POWER SUPPLY AND GROUND CIRCUIT 28

COMBINATION METER 28
COMBINATION METER : Diagnosis Procedure ... 28

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 28
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) : Diagnosis Procedure 28

FUEL LEVEL SENSOR SIGNAL CIRCUIT 30

2WD 30
2WD : Description 30
2WD : Component Function Check 30
2WD : Diagnosis Procedure 30
2WD : Component Inspection [Fuel Level Sensor Unit (Main)] 31

4WD 31
4WD : Description 31
4WD : Component Function Check 31
4WD : Diagnosis Procedure 32
4WD : Component Inspection [Fuel Level Sensor Unit (Main)] 32
4WD : Component Inspection [Fuel Level Sensor Unit (Sub)] 33

OIL LEVEL SENSOR SIGNAL CIRCUIT 34
Description 34
Diagnosis Procedure 34
Component Inspection 34

OIL PRESSURE SWITCH SIGNAL CIRCUIT ... 36
Description 36
Component Function Check 36
Diagnosis Procedure 36
Component Inspection 36

OAT SENSOR SIGNAL CIRCUIT 37
Description 37
Diagnosis Procedure 37
Component Inspection 37

ECU DIAGNOSIS 38

COMBINATION METER 38
Reference Value 38
Wiring Diagram - METER - 43
Fail Safe 50
DTC Index 51

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 52
Reference Value 52
Wiring Diagram - IPDM E/R - 58
Fail Safe 61
DTC Index 63

SYMPTOM DIAGNOSIS 64

THE FUEL GAUGE POINTER DOES NOT MOVE 64

2WD 64
2WD : Description 64
2WD : Diagnosis Procedure 64

4WD 64
4WD : Description 64
4WD : Diagnosis Procedure 64

THE OIL PRESSURE SWITCH DOES NOT TURN ON 66
Description 66
Diagnosis Procedure 66

THE OIL PRESSURE SWITCH DOES NOT TURN OFF 67
Description 67
Diagnosis Procedure 67

THE AMBIENT TEMPERATURE DISPLAY IS INCORRECT 68
Description 68
Diagnosis Procedure 68

THE OIL LEVEL DISPLAY IS INCORRECT 69
Description 69
Diagnosis Procedure 69

NORMAL OPERATING CONDITION 70

INFORMATION DISPLAY 70
INFORMATION DISPLAY : Description 70

PRECAUTION 71

PRECAUTIONS 71
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 71

ON-VEHICLE REPAIR 72

COMBINATION METER 72
Exploded View 72
Removal and Installation 72

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000892243

DETAILED FLOW

1.OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain as much information as possible about the conditions and environment under which the malfunction occurred.

>> GO TO 2.

2.CHECK SYMPTOM

- Check the symptom based on the information obtained from the customer.
- Check if any other malfunctions are present.

>> GO TO 3.

3.CHECK ON BOARD DIAGNOSIS OPERATION

Check that the on board diagnosis function operates. Refer to MWI-21, "Diagnosis Description".

Does the on board diagnosis function operate normally?

YES >> GO TO 4.
NO >> Repair or replace the malfunctioning part and go to 6.

4.CHECK CONSULTIII SELF-DIAGNOSIS RESULTS

Connect CONSULT-III and perform self-diagnosis. Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Are self-diagnosis results normal?

YES >> GO TO 5.
NO >> Repair or replace the malfunctioning part and go to 6.

5.NARROW DOWN THE MALFUNCTIONING PART BY SYMPTOM DIAGNOSIS

Perform symptom diagnosis and repair or replace the identified malfunctioning parts.

>> GO TO 6.

6.FINAL CHECK

Check that the combination meter operates normally.

Does it operate normally?

YES >> INSPECTION END
NO >> GO TO 1.

cardiagn.com

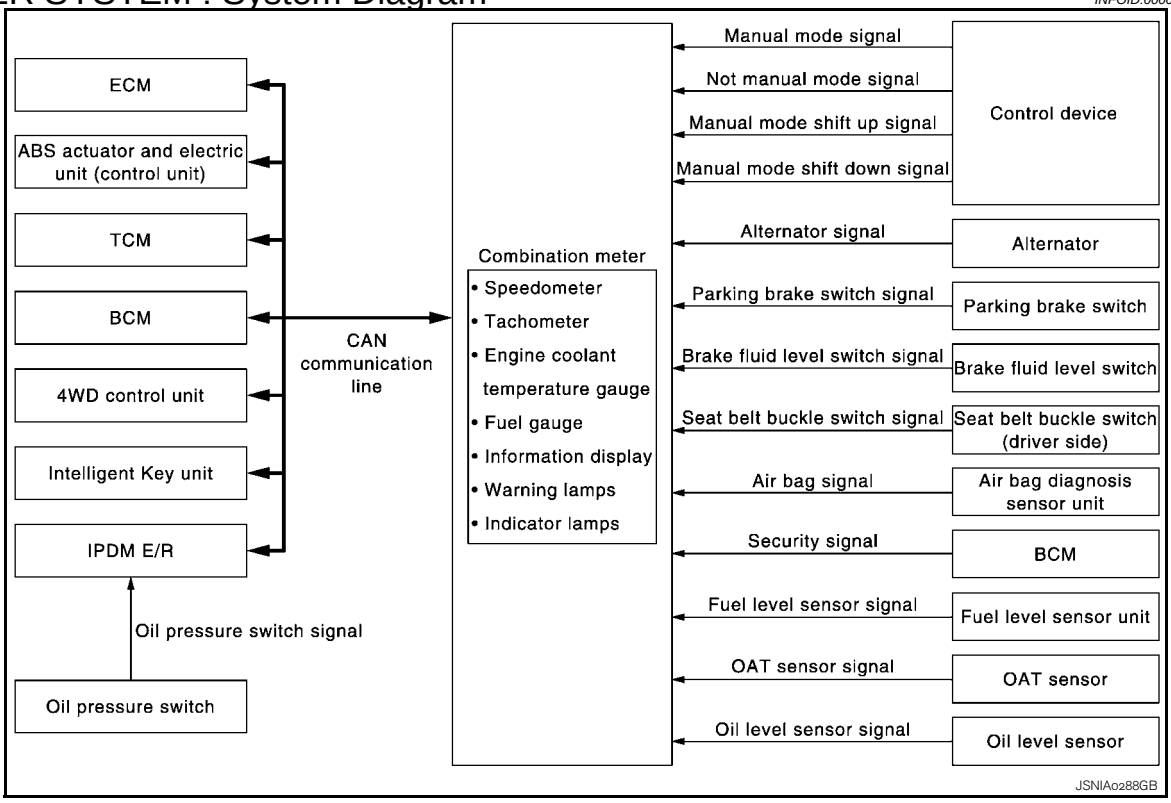
FUNCTION DIAGNOSIS

METER SYSTEM

METER SYSTEM

METER SYSTEM : System Diagram

INFOID:0000000000892244



METER SYSTEM : System Description

INFOID:0000000000892245

COMBINATION METER

- The combination meter receives the information required to control the operation of each gauge, indicator/ warning lamp, and information display via CAN communication from each unit, each switch, and sensor.
- The combination meter incorporates a trip computer that displays messages on the information display according to the information received from various units.
- The combination meter incorporates a buzzer function that sounds an audible alarm with the integrated buzzer device. Refer to WCS-4, "WARNING CHIME SYSTEM : System Description" for further details.
- The combination meter integrates the meter circuit check function and the segment check function that checks the information display operation.

IPDM E/R

- IPDM E/R reads the ON/OFF signals of the oil pressure switch and transmits the oil pressure switch signal to the combination meter via BCM with CAN communication.
- IPDM E/R is equipped with the diagnosis function. It can perform the operation check of oil pressure warning lamp with the auto active test and the diagnosis with CONSULT-III.

METER CONTROL FUNCTION LIST

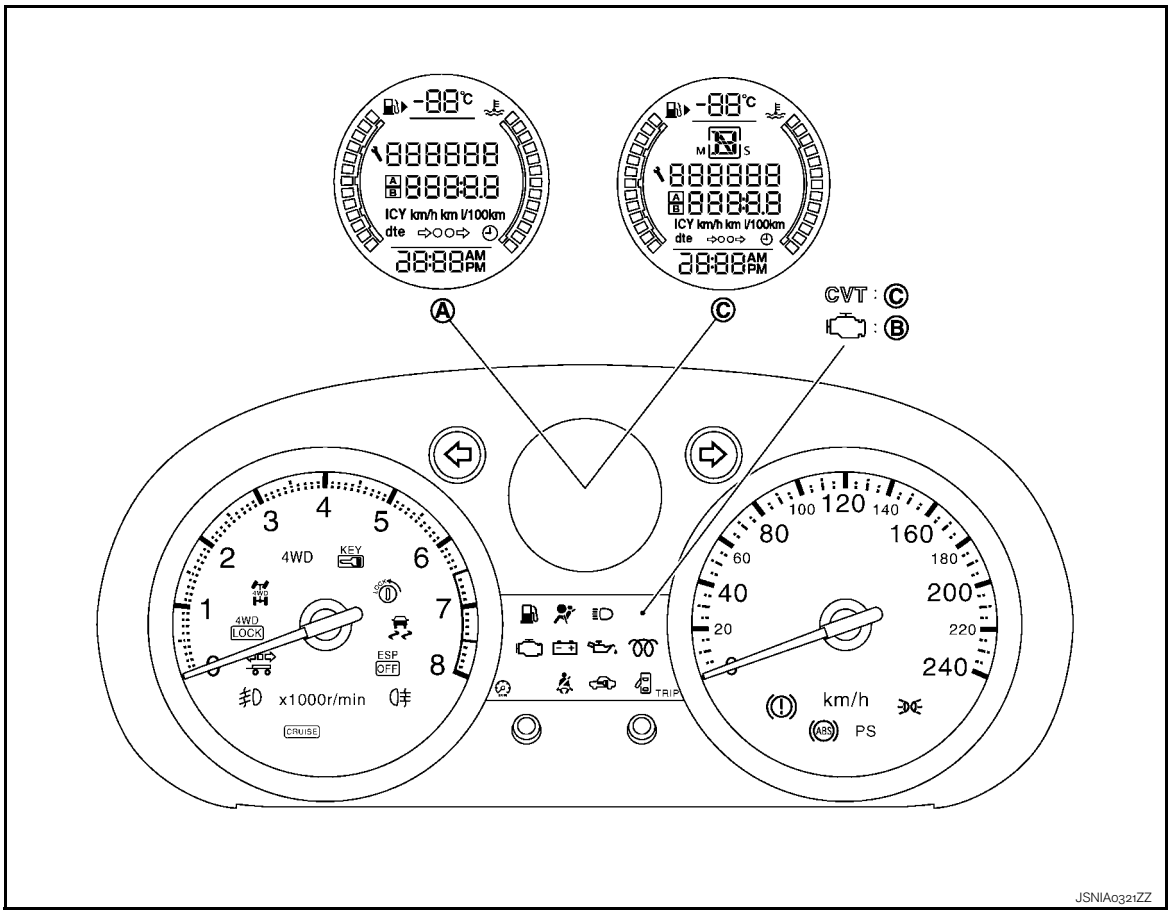
System		Description	Signal source
Meter	Speedometer	Receives vehicle speed signal and indicates vehicle speed.	ABS actuator and electric unit (control unit)
	Tachometer	Receives engine speed signal and indicates engine speed.	ECM

cardiagn.com

System		Description	Signal source
Warning lamp	Oil pressure warning lamp	Receives oil pressure warning lamp signal and illuminates warning lamp.	IPDM E/R
Information display	Fuel gauge	Receives fuel level sensor signal and indicates fuel level.	Fuel level sensor unit
	Engine coolant temperature gauge	Receives engine coolant temperature signal and indicates coolant temperature.	ECM
	Maintenance	The remaining distance from the set distance is displayed for 5 seconds after the ignition switch is turned ON.	ABS actuator and electric unit (control unit)
	Oil level	The oil level is displayed according to the oil level sensor signal for 5 seconds after the maintenance display.	Oil level sensor
	Possible driving distance	Calculates possible driving distance based on received fuel consumption monitor signal, vehicle speed signals and fuel level sensor signal and displays it.	ECM
			ABS actuator and electric unit (control unit)
			Fuel level sensor unit
	Average fuel consumption	Calculates average fuel consumption in a reset-to-reset interval based on received vehicle speed signals and fuel consumption monitor signal and displays it.	ECM
			ABS actuator and electric unit (control unit)
	Average vehicle speed	Calculates average vehicle speed in a reset-to-reset interval based on received vehicle speed signals and displays it.	ABS actuator and electric unit (control unit)
	Travel time	Displays accumulated key switch ON time from reset to reset.	—
	Odo/trip meter	Calculates accumulated travel distance based on received vehicle speed signals and displays it.	ABS actuator and electric unit (control unit)
	Ambient air temperature	Corrects ambient temperature value based on received OAT sensor signals and displays it.	OAT sensor
	Clock	Time is displayed.	—

cardiagn.com

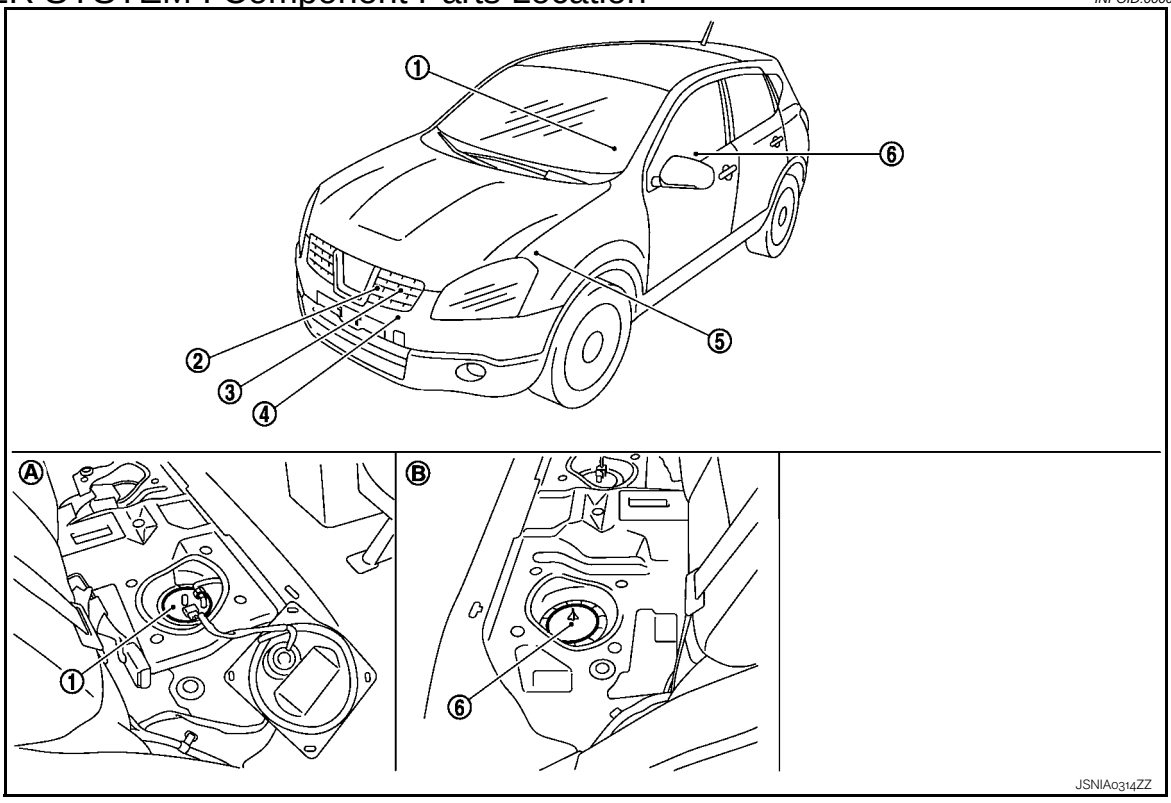
ARRANGEMENT OF COMBINATION METER



A. M/T models B. Diesel engine models C. CVT models

METER SYSTEM : Component Parts Location

INFOID:0000000000892246



cardiagn.com

1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch
4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

METER SYSTEM : Component Description

INFOID:0000000000892247

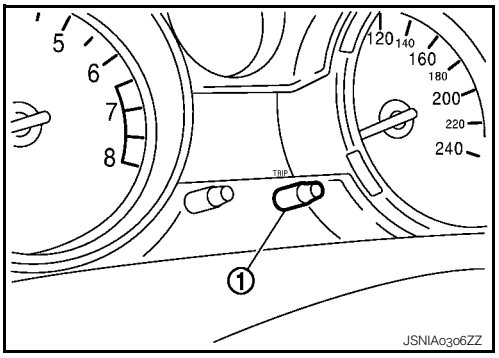
Unit	Description
Combination meter	Controls the following with the signals received from each unit via CAN communication and the signals from switches and sensors. • Speedometer • Tachometer • Warning lamps • Indicator lamps • Information display • Warning chime
IPDM E/R	Reads the ON/OFF signals of the oil pressure switch and transmits the oil pressure switch signal to the combination meter via BCM with CAN communication line.
Fuel level sensor unit	Refer to MWI-30, "2WD : Description" (2WD) or MWI-31, "4WD : Description" (4WD).
Oil pressure switch	Refer to MWI-36, "Description".
ECM	Transmits the following signals to the combination meter with CAN communication line. • Engine speed signal • Engine coolant temperature signal • Fuel consumption monitor signal
ABS actuator and electric unit (control unit)	Transmits the vehicle speed signal to the combination meter with CAN communication line.
BCM	Transmits signals provided by various units to the combination meter with CAN communication line.
Control device	Transmits the following signals to the combination meter. • Manual mode signal • Not manual mode signal • Manual mode shift up signal • Manual mode shift down signal
TCM	Transmits shift position signal to the combination meter.
Brake fluid level switch	Transmits the brake fluid level switch signal to the combination meter.
Parking brake switch	Refer to WCS-23, "Description".

METER SYSTEM : Operation Description

INFOID:0000000000903726

TRIP COMPUTER

- The display switches in the following order when pressing the trip switch (1) of the combination meter.
- Trip A → Trip B → Possible driving distance → Average fuel consumption → Average vehicle speed → Travel time → Trip A.
- The items other than “odo meter” and “possible driving distance” can be reset when pressing and holding the trip switch for 1 second or more.
- All items other than “odo meter” and “possible driving distance” can be reset when pressing and holding the trip switch for 3 seconds or more.

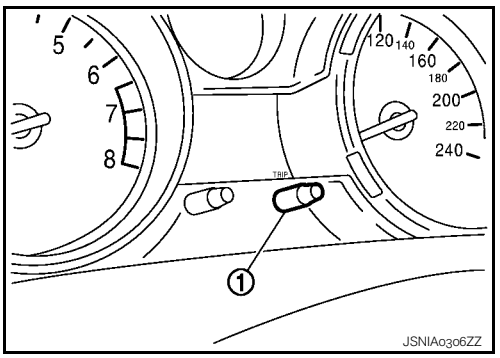


MAINTENANCE

1. Turn ignition switch ON from OFF.

cardiagn.com

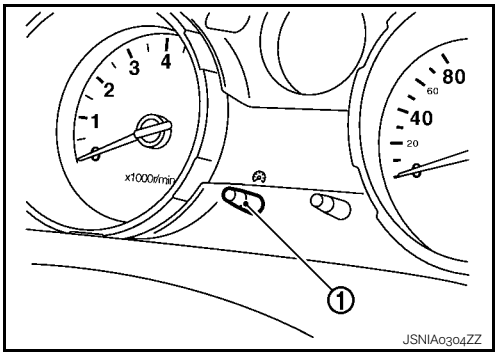
2. Press and hold the trip switch (1) for 3 seconds or more while displaying the maintenance information to the information display (for approximately 5 seconds after the ignition switch is turned ON).
3. The maintenance information is flashed and the system enters in the set/reset mode.
4. The set/reset can be performed with the following operation during flashing.



Trip switch	
Pressed	: Reset
Turn right	: Increase the set distance
Turn left	: Decrease the set distance

CLOCK

- The display switches between 12-hour time display mode and 24-hour time display mode with pressing the switch (1) of the combination meter.
- The “hour” display of clock is flashed when pressing and holding the switch for 3 seconds or more, and then the clock switches to the time adjustment mode.

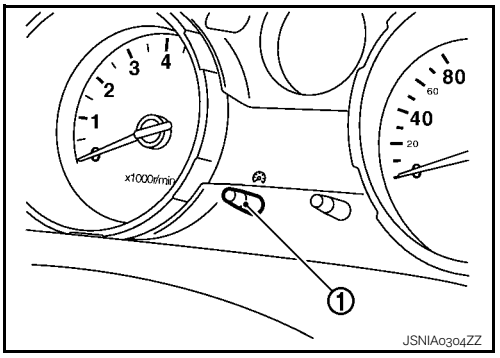


switch	
Pressed	: Changing adjustment “hour” and “minute”
Turn right	: Go
Turn left	: Back

METER ILLUMINATION CONTROL

Nighttime Mode

The meter illumination is adjusted to 22 steps by turning the switch (1). (Daytime mode cannot be adjusted.)

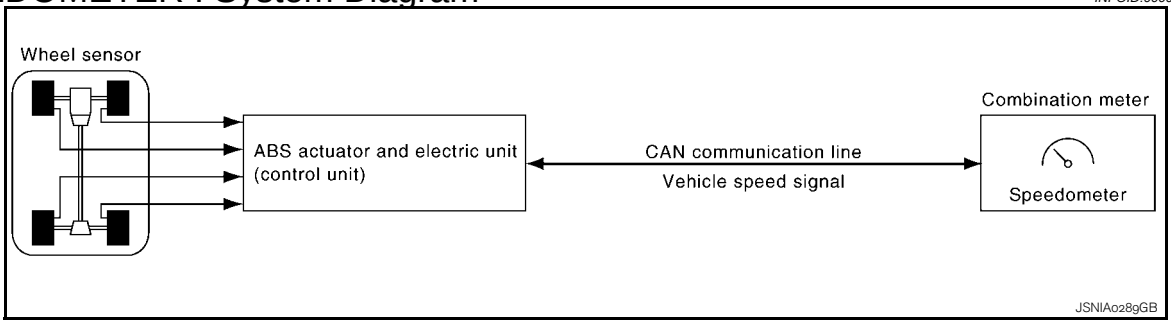


switch	
Turn right	: Lightening
Turn left	: Darkening

SPEEDOMETER

SPEEDOMETER : System Diagram

INFOID:0000000000892248



SPEEDOMETER : System Description

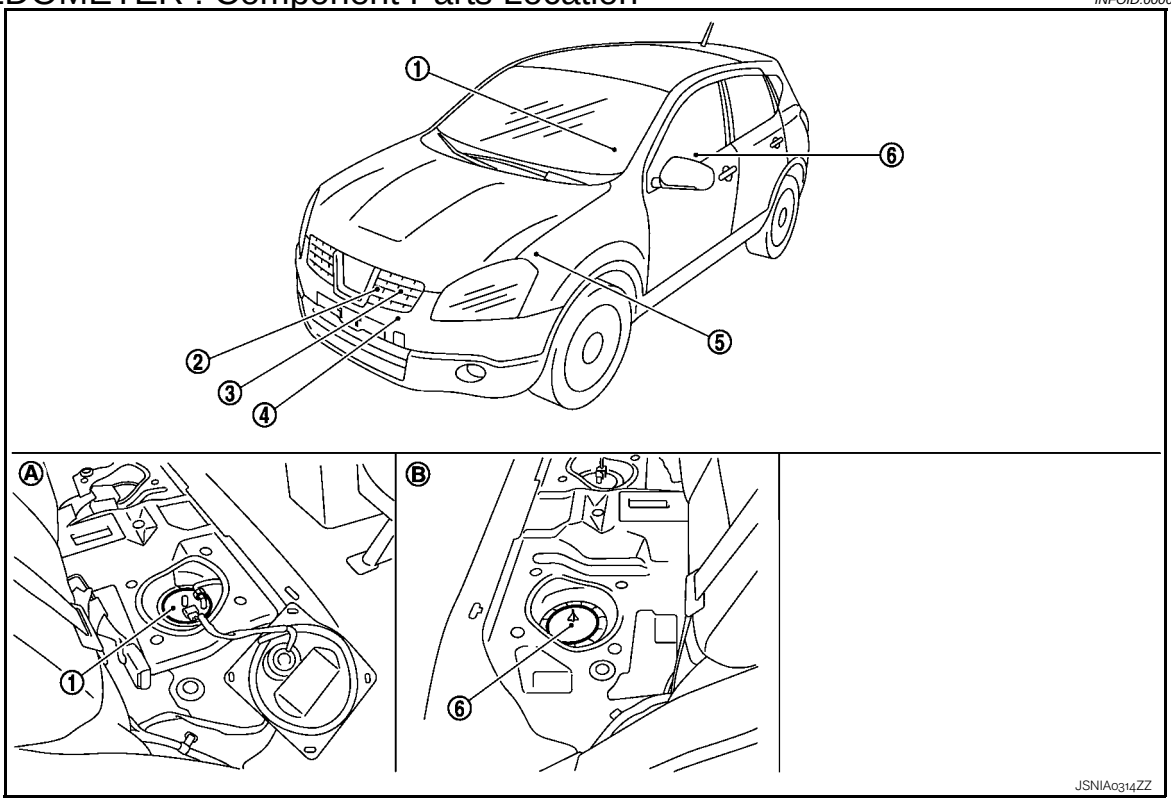
INFOID:0000000000892249

cardiagn.com

- The ABS actuator and electric unit (control unit) converts the rectangular wave signal provided by the wheel sensor to a vehicle speed signal and transmits it to the combination meter via CAN communication.
- The combination meter indicates the vehicle speed to the speedometer according to the vehicle speed signal received via CAN communication.

SPEEDOMETER : Component Parts Location

INFOID:0000000000897197



1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch
4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

SPEEDOMETER : Component Description

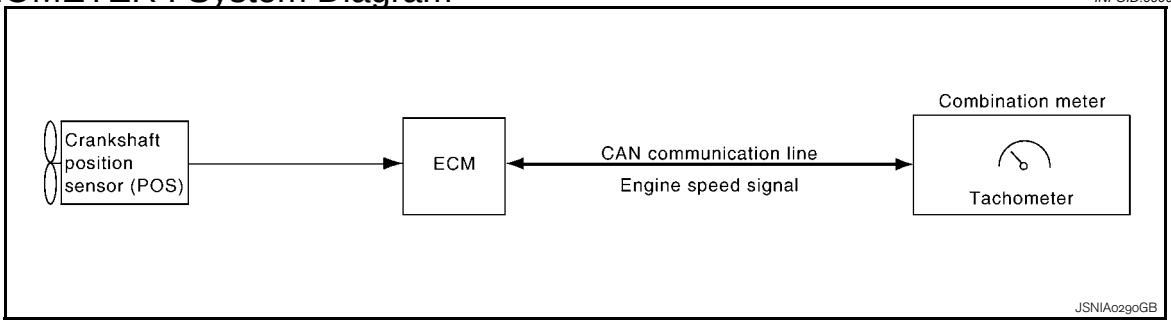
INFOID:0000000000892251

Unit	Description
Combination meter	Indicates the vehicle speed to the speedometer according to the vehicle speed signal received from ABS actuator and electric unit (control unit) via CAN communication.
ABS actuator and electric unit (control unit)	Transmits the vehicle speed signal to the combination meter with CAN communication line.

TACHOMETER

TACHOMETER : System Diagram

INFOID:0000000000892252



TACHOMETER : System Description

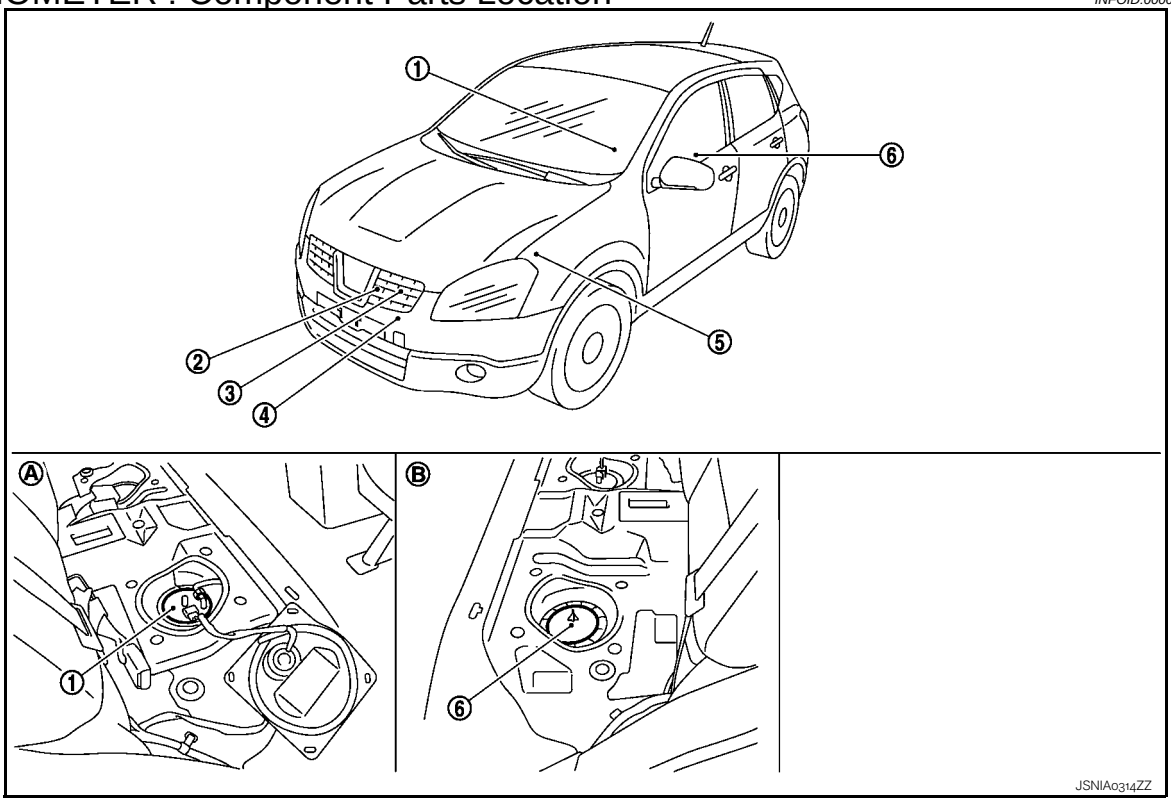
INFOID:0000000000892253

cardiagn.com

- ECM converts the pulse signal provided by the crankshaft position sensor to an engine speed signal and transmits it to the combination meter with CAN communication line.
- The combination meter indicates the engine speed to the tachometer according to the engine speed signal received via CAN communication.

TACHOMETER : Component Parts Location

INFOID:0000000000897198



1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch
4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

TACHOMETER : Component Description

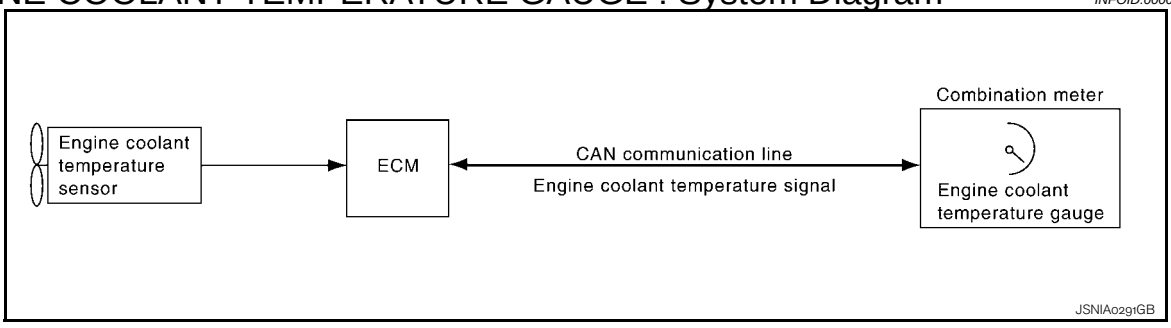
INFOID:0000000000892255

Unit	Description
Combination meter	Indicates the engine speed to the tachometer according to the engine speed signal received from ECM via CAN communication.
ECM	Transmits the engine speed signal to the combination meter with CAN communication line.

ENGINE COOLANT TEMPERATURE GAUGE

ENGINE COOLANT TEMPERATURE GAUGE : System Diagram

INFOID:0000000000892256



ENGINE COOLANT TEMPERATURE GAUGE : System Description

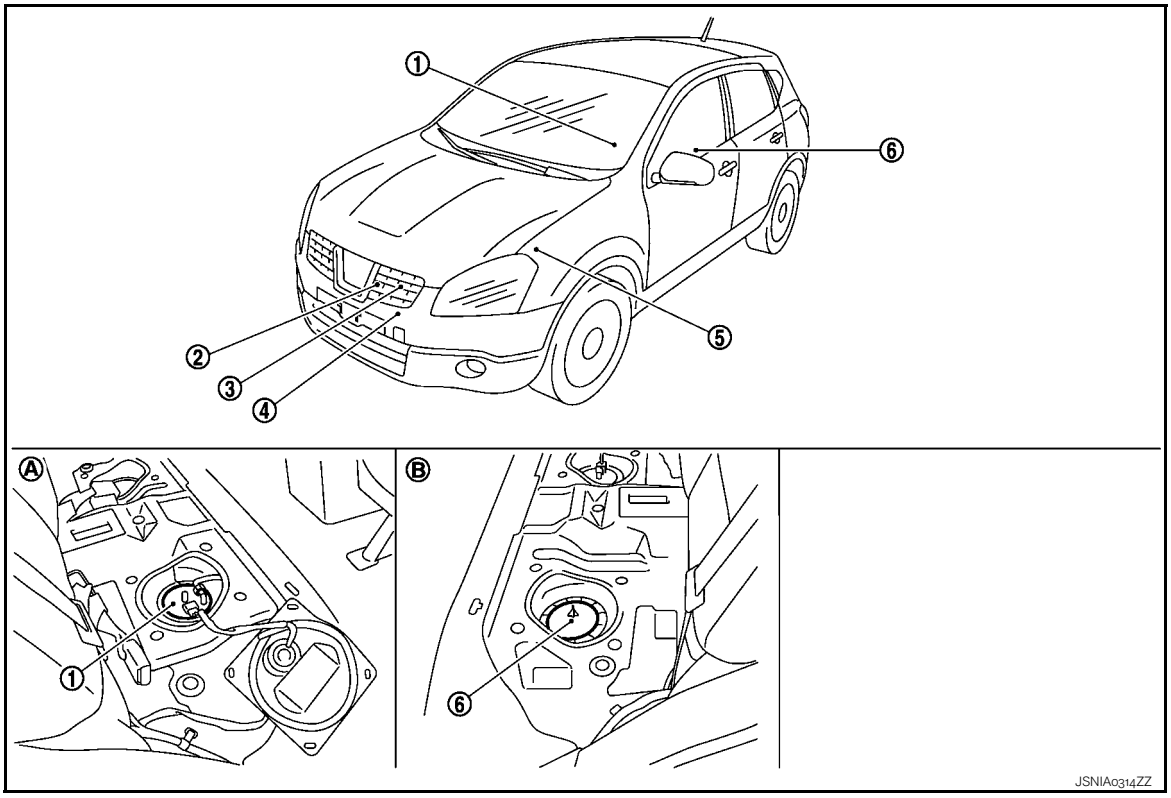
INFOID:0000000000892257

cardiagn.com

- ECM reads the engine coolant temperature signal from the engine coolant temperature sensor and transmits the signal to the combination meter via CAN communication.
- The combination meter indicates the engine coolant temperature to the water temperature gauge according to the engine coolant temperature signal received via CAN communication.

ENGINE COOLANT TEMPERATURE GAUGE : Component Parts Location

INFOID:0000000000897199



1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch
4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

ENGINE COOLANT TEMPERATURE GAUGE : Component Description

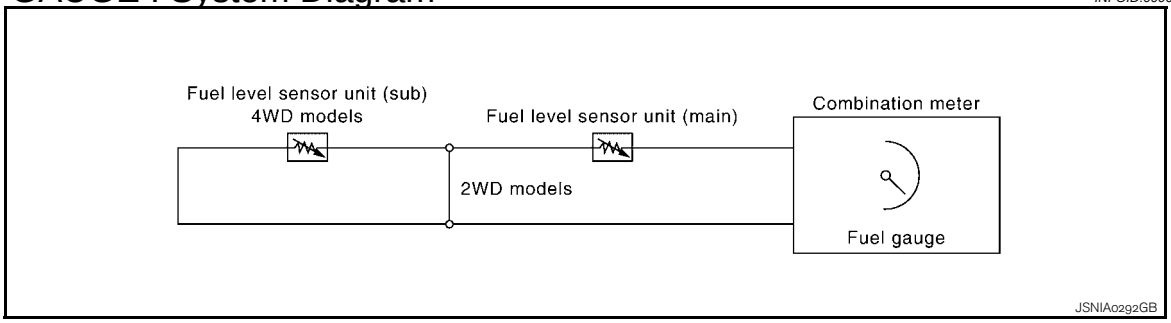
INFOID:0000000000892259

Unit	Description
Combination meter	Indicates the engine coolant temperature to the water temperature gauge according to the engine coolant temperature signal received from ECM via CAN communication.
ECM	Transmits the engine coolant temperature signal to the combination meter via CAN communication.

FUEL GAUGE

FUEL GAUGE : System Diagram

INFOID:0000000000892260



FUEL GAUGE : System Description

INFOID:0000000000892261

cardiagn.com

CONTROL OUTLINE

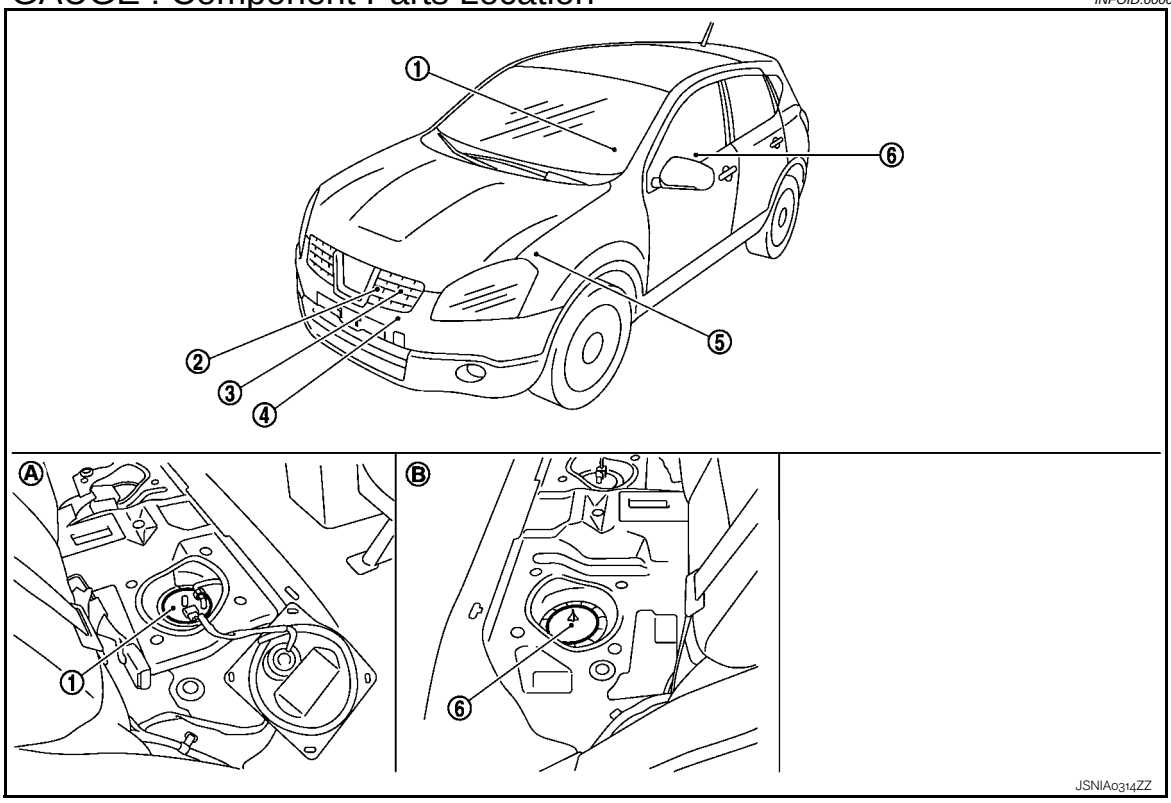
The combination meter reads the fuel level sensor signal from the fuel level sensor unit and indicates the fuel level to the fuel gauge.

REFUEL CONTROL

The unit judges that the driver is refueling the vehicle and accelerates the fuel gauge needle movement if the fuel level changes by 4 ℓ or more.

FUEL GAUGE : Component Parts Location

INFOID:0000000000897200



1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch
4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

FUEL GAUGE : Component Description

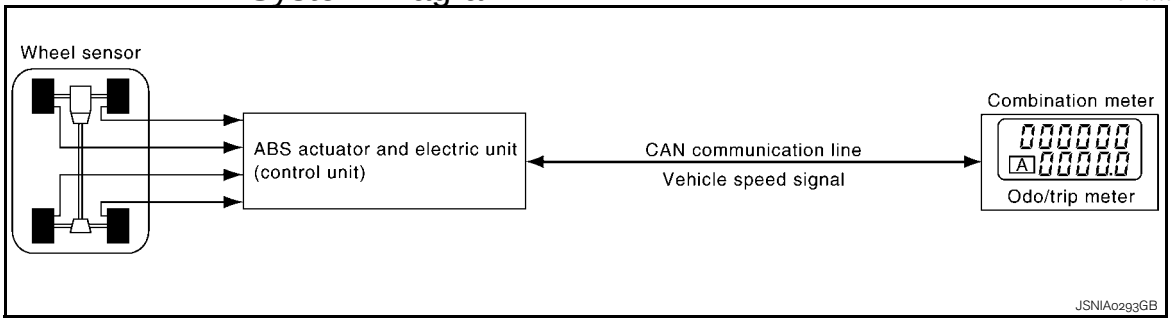
INFOID:0000000000892263

Unit	Description
Combination meter	Indicates the fuel gauge according to the fuel level sensor signal received from the fuel level sensor unit.
Fuel level sensor unit	Refer to MWI-30, "2WD : Description" (2WD) or MWI-31, "4WD : Description" (4WD).

ODO/TRIP METER

ODO/TRIP METER : System Diagram

INFOID:0000000000892264



cardiagn.com

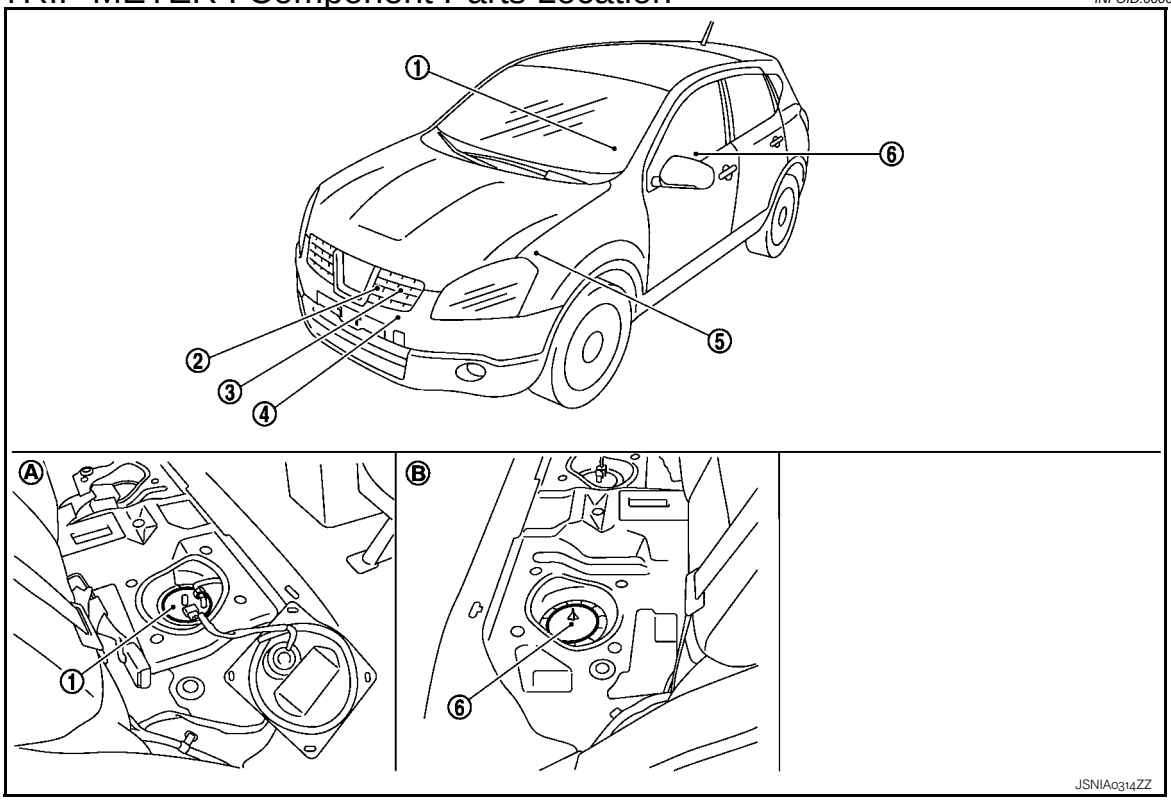
ODO/TRIP METER : System Description

INFOID:0000000000892265

- The ABS actuator and electric unit (control unit) reads the rectangular wave signal provided by the wheel sensor and transmits the vehicle speed signal to the combination meter via CAN communication.
- The combination meter converts the vehicle speed signal received via CAN communication to mileage, and it displays the accumulated mileage to the odo/trip meter.

ODO/TRIP METER : Component Parts Location

INFOID:0000000000897201



1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch
4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

ODO/TRIP METER : Component Description

INFOID:0000000000892267

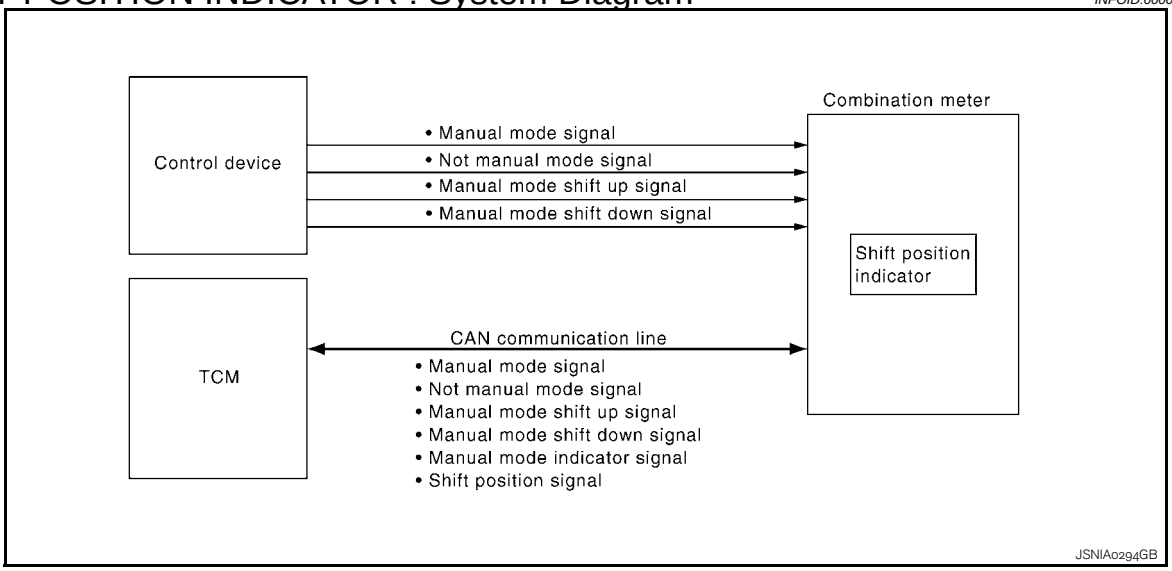
Unit	Description
Combination meter	Converts the vehicle speed signal received from the ABS actuator and electric unit (control unit) via CAN communication to mileage, and it displays the accumulated mileage to the odo/trip meter.
ABS actuator and electric unit (control unit)	Transmits the vehicle speed signal to the combination meter via CAN communication.

SHIFT POSITION INDICATOR

cardiagn.com

SHIFT POSITION INDICATOR : System Diagram

INFOID:0000000000892268



SHIFT POSITION INDICATOR : System Description

INFOID:0000000000892269

Shift position is displayed in the information display LCD in the combination meter.

MANUAL MODE

- The combination meter receives the manual mode signal, manual mode shift up signal, and manual mode shift down signal from control device and transmits them to TCM via CAN communication.
- TCM recognizes the manual mode operation status according to the manual mode signal, manual mode shift up signal, and manual mode shift down signal received via CAN communication and transmits the manual mode indicator signal to the combination meter via CAN communication.
- The combination meter indicates CVT position according to the manual mode indicator signal received via CAN communication.

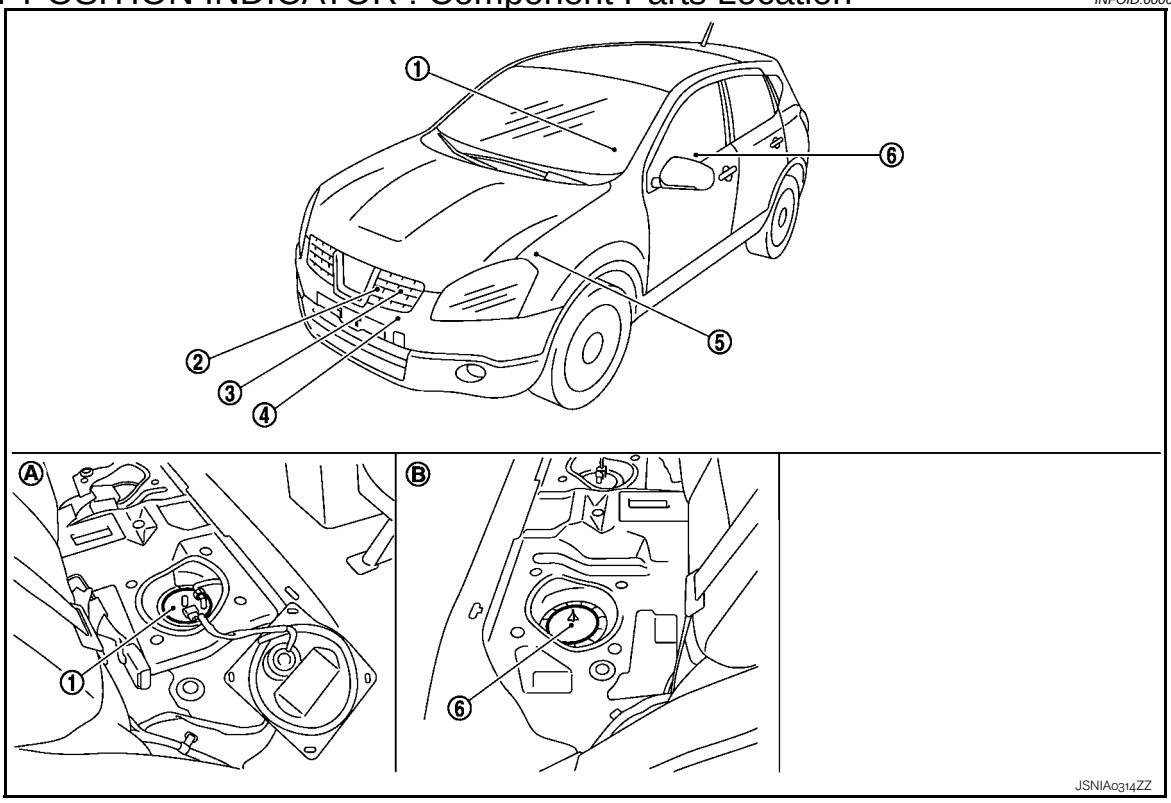
NOT MANUAL MODE (AUTO MODE)

- TCM transmits the shift position signal to the combination meter via CAN communication.
- The combination meter indicates CVT position according to the shift position signal received via CAN communication.

cardiagn.com

SHIFT POSITION INDICATOR : Component Parts Location

INFOID:0000000000897202



1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch
4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

SHIFT POSITION INDICATOR : Component Description

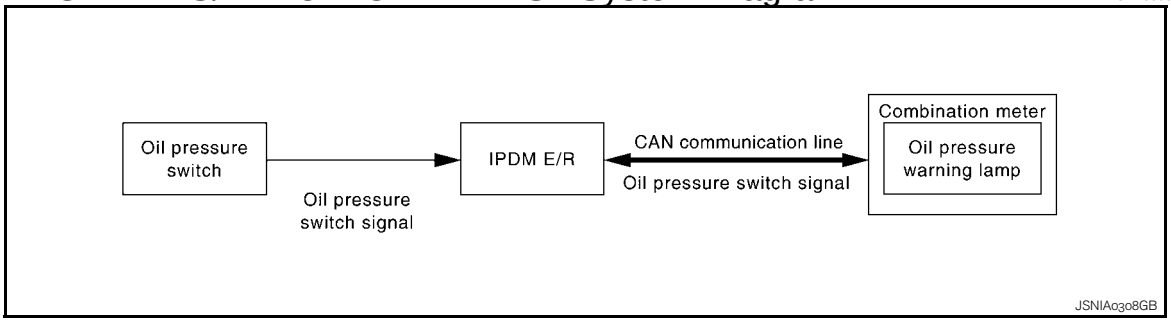
INFOID:0000000000892271

Unit	Description
Combination meter	Displays the shift position on the information display with shift position signal and manual mode indicator signal received from TCM.
Control device	Transmits the following signals to the combination meter. • Manual mode signal • Not manual mode signal • Manual mode shift up signal • Manual mode shift down signal
TCM	Transmits the shift position signal and the manual mode indicator signal to the combination meter via CAN communication.

WARNING LAMPS/INDICATOR LAMPS

WARNING LAMPS/INDICATOR LAMPS : System Diagram

INFOID:0000000000892272



WARNING LAMPS/INDICATOR LAMPS : System Description

INFOID:0000000000892273

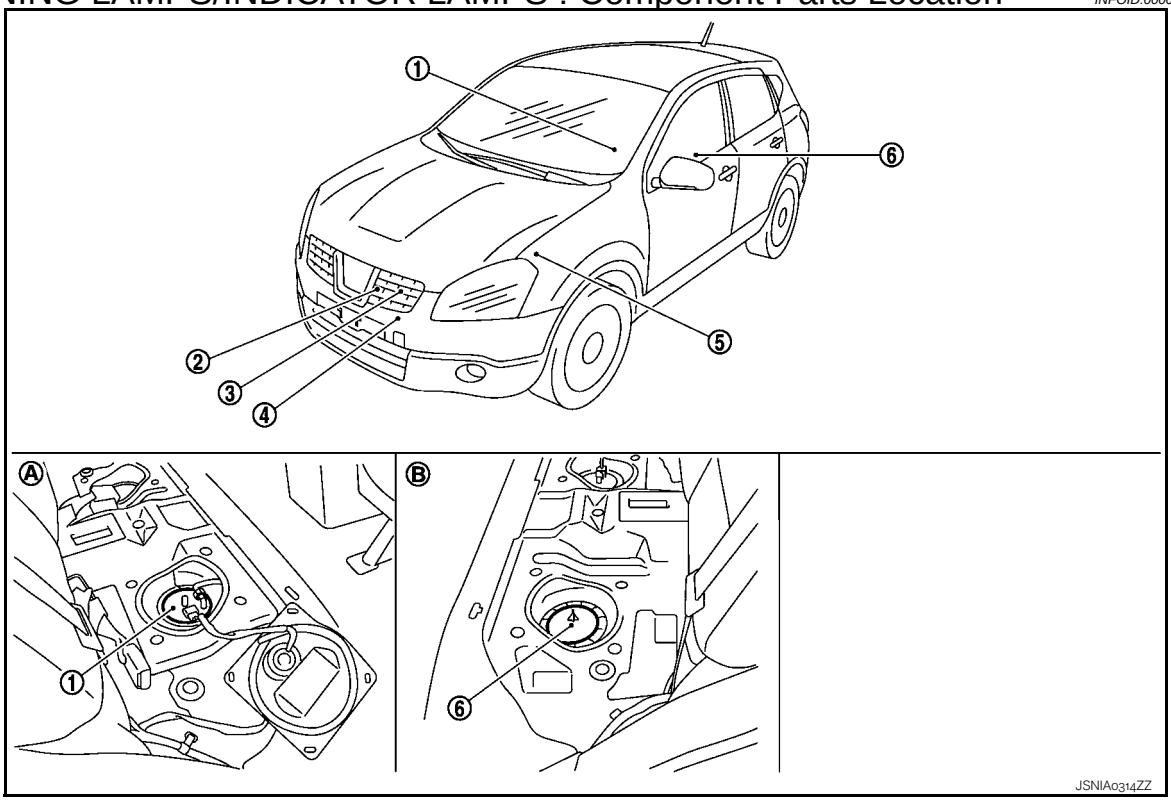
cardiagn.com

OIL PRESSURE WARNING LAMP

- IPDM E/R reads the ON/OFF signals from the oil pressure switch and transmits the oil pressure switch signal to the combination meter via BCM with the CAN communication line.
- The combination meter turns the oil pressure warning lamp ON/OFF according to the oil pressure switch signal received via CAN communication.

WARNING LAMPS/INDICATOR LAMPS : Component Parts Location

INFOID:0000000000897203



1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch
4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

WARNING LAMPS/INDICATOR LAMPS : Component Description

INFOID:0000000000892275

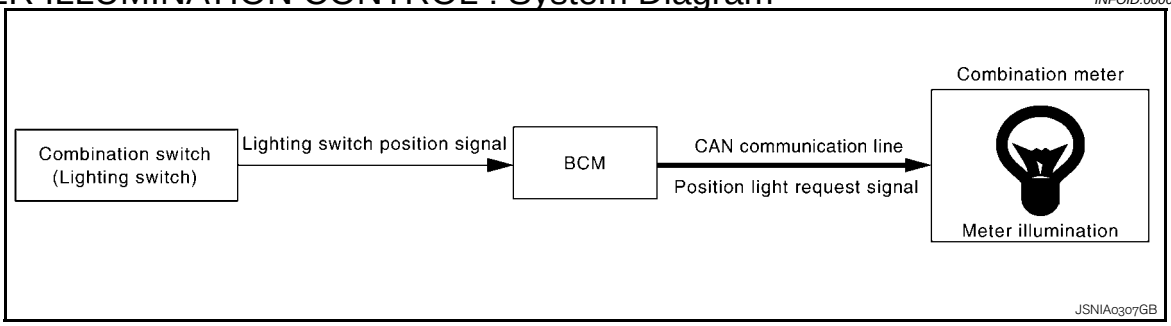
Unit	Description
Combination meter	Turns the oil pressure warning lamp ON/OFF according to the oil pressure switch signal received from BCM by means of communication.
IPDM E/R	Reads the ON/OFF signals from the oil pressure switch and transmits the oil pressure switch signal to the combination meter via BCM with the CAN communication line.
Oil pressure switch	Refer to MWI-36, "Description".
BCM	Transmits the oil pressure switch signal received from IPDM E/R via CAN communication to the combination meter via CAN communication.

METER ILLUMINATION CONTROL

cardiagn.com

METER ILLUMINATION CONTROL : System Diagram

INFOID:0000000000892276



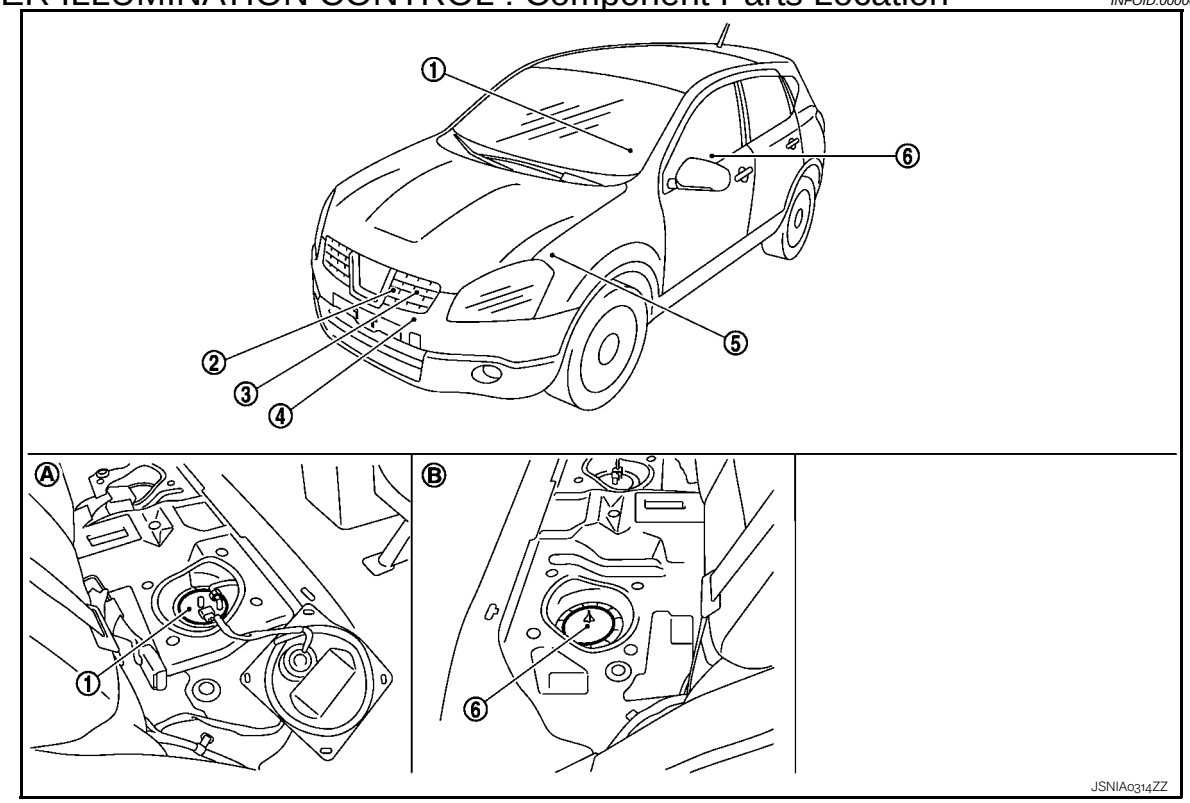
METER ILLUMINATION CONTROL : System Description

INFOID:0000000000892277

The combination meter controls the meter illumination according to the position light request signal transmitted from BCM via CAN communication and the signal from switch joined with the combination meter.

METER ILLUMINATION CONTROL : Component Parts Location

INFOID:0000000000897204



1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch
4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

METER ILLUMINATION CONTROL : Component Description

INFOID:0000000000892279

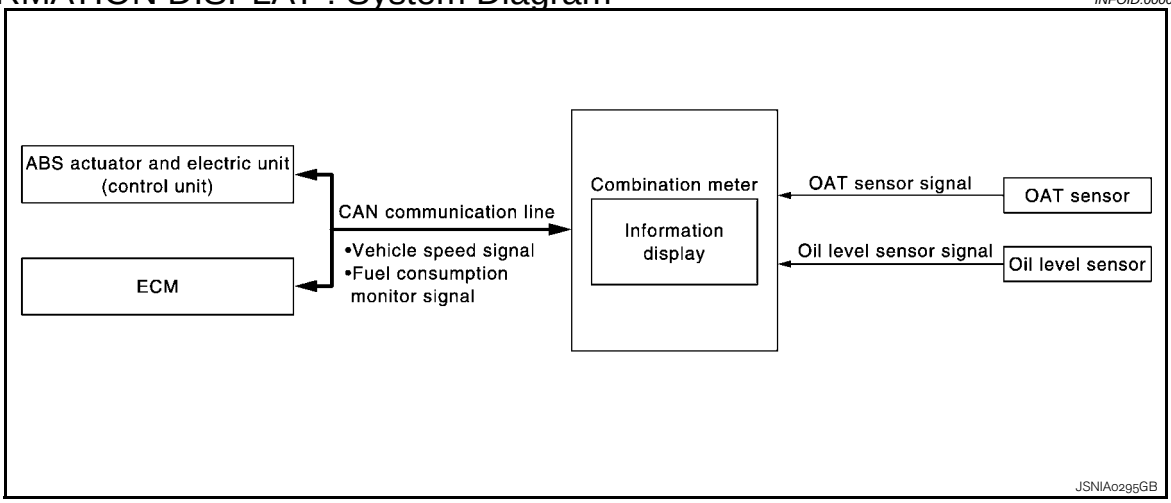
Unit	Description
Combination meter	Controls the meter illumination according to the position light request signal transmitted from BCM via CAN communication and the signal from switch integrated with the combination meter.
BCM	Transmits the position light request signal to the combination meter via CAN communication.

INFORMATION DISPLAY

cardiagn.com

INFORMATION DISPLAY : System Diagram

INFOID:0000000000892280



INFORMATION DISPLAY : System Description

INFOID:0000000000892281

DESCRIPTION

- The combination meter retrieves the information required for controlling the operations of the information display from BCM with the CAN communication lines.
- The combination meter incorporates a trip computer that displays the information according to the signal received from various units.

MAINTENANCE

The remaining distance from the set maintenance distance is displayed.

Items	Setting range	Setting unit	Description
Maintenance	0– 63000 km (0 – 31500 miles)	1000 km (500 miles)	The remaining distance from the set distance is displayed for 5 seconds after the ignition switch is turned ON.

OIL LEVEL

The combination meter displays it judged with the oil level signal received from the oil level sensor.

CLOCK

Clock displays the time measured in the combination meter.

AVERAGE FUEL CONSUMPTION

Control Outline

- The combination meter receives the fuel consumption monitor signal from ECM and the vehicle speed signal from the ABS actuator and electric unit (control unit) via CAN communication.
- The combination meter indicates the average fuel consumption calculated by the signal received.
- The average fuel consumption displayed on the information display is uploaded at approximately 30-second intervals.

AVERAGE VEHICLE SPEED

- The combination meter receives the vehicle speed signal from the ABS actuator and electric unit (control unit) with the CAN communication line.
- The combination meter indicates the average vehicle speed according to the vehicle speed signal received and the time measured in the combination meter.
- The average vehicle speed displayed on the information display is uploaded at approximately 30-second intervals.

TRAVEL TIME

Control Outline

Measures the driving time (ignition switch ON time) in the combination meter and displays it.

ODO/TRIP METER

cardiagn.com

Control Outline

- The combination meter receives the vehicle speed signal from the ABS actuator and electric unit (control unit) with the CAN communication line.
- The combination meter indicates the travel distance calculated by the vehicle speed signal received.

POSSIBLE DRIVING DISTANCE

- Combination meter receives the fuel consumption signals from ECM and the vehicle speed signals from ABS actuator and electric unit (control unit) with the CAN communication line.
- Combination meter calculates the possible driving distance from the signals through CAN communication line and the fuel level signals from the fuel level sensor to display.

AMBIENT AIR TEMPERATURE

- The combination meter indicates the ambient temperature calculated by the OAT sensor signal received from the OAT sensor.
- The indicated temperature is corrected by the ignition switch signal, the OAT sensor detection temperature, and the vehicle speed signal. It does not increase if the vehicle speed is less than 20 km/h (12.4 MPH).
- It switches the ambient temperature to the blinking display when the ambient temperature 3°C (37°F) or less continues for 20 seconds or more (road ice warning).

Correction Process (Ignition Switch OFF → ON)

The OAT sensor detection temperature is not displayed in real time if all of the following conditions are fulfilled. The indicated temperature before the ignition switch OFF is displayed.

- The ignition switch OFF time is less than 3.5 hours.
- The OAT sensor detection temperature is higher than the indicated temperature before the ignition switch OFF.

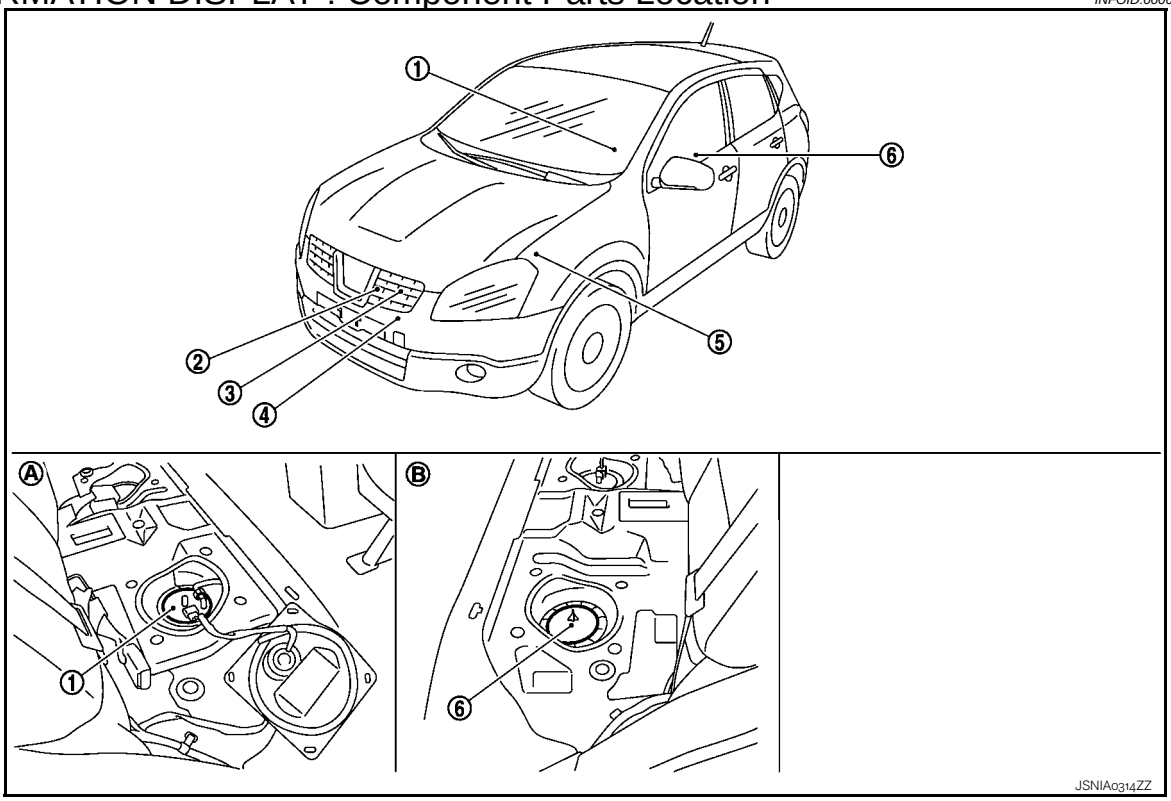
Correction Process (Ignition Switch ON)

Perform the following correction if the OAT sensor detection temperature is higher than the indicated temperature when the vehicle speed is 20 km/h (12.4 MPH) or more.

- Shorten the update time of the indicated temperature according to the increase of the vehicle speed.

INFORMATION DISPLAY : Component Parts Location

INFOID:0000000000897205



1. Fuel level sensor unit (main)
2. OAT sensor
3. Oil pressure switch

cardiagn.com

4. Oil level sensor
5. IPDM E/R
6. Fuel level sensor unit (sub)

A. Lower right side of rear seat
B. Lower left side of rear seat (4WD models)

INFORMATION DISPLAY : Component Description

INFOID:0000000000892283

Unit	Description
Combination meter	Controls the information display according to the signal received from each unit.
Fuel level sensor unit	Refer to MWI-30, "2WD : Description" (2WD) or MWI-31, "4WD : Description" (4WD).
ECM	Transmits the following signals to the combination meter via CAN communication line. • Engine speed signal • Engine coolant temperature signal • Fuel consumption monitor signal
ABS actuator and electric unit (control unit)	Transmits the vehicle speed signal to the combination meter via CAN communication line.
BCM	Transmits signals provided by various units to the combination meter via CAN communication line.
OAT sensor	Detects the ambient temperature and transmits the OAT sensor signal to the combination meter.

cardiagn.com

DIAGNOSIS SYSTEM (METER)

Diagnosis Description

INFOID:0000000000892285

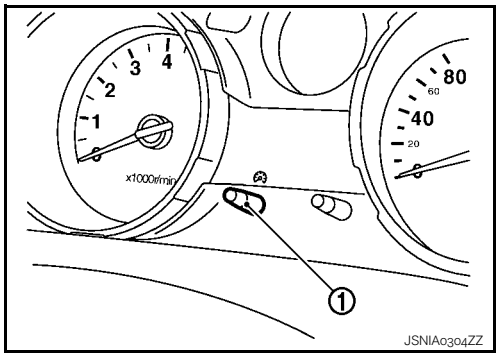
ON BOARD DIAGNOSIS

The combination meter can be checked on the following items with the on board diagnosis function.

- Check the segment of information display
- Check the operations of speedometer and tachometer
- Check error code
- Check the warning lamp/indicator lamp for illumination

START-UP PROCEDURE OF ON BOARD DIAGNOSIS

1. Turn the ignition switch ON.
2. Turn the ignition switch OFF after setting the display to trip A or B with the switch (1).
3. Turn the ignition switch to ON while pressing the switch.
4. Press the switch at least 3 times (within 7 seconds after the ignition switch is turned ON).



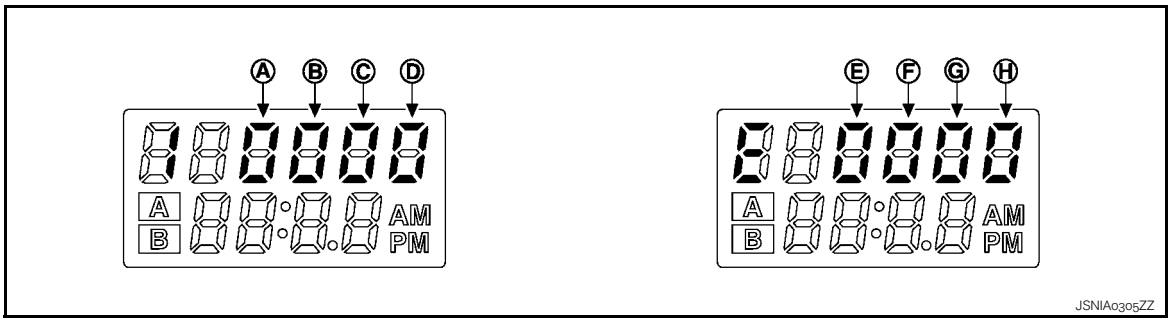
5. The combination meter self-diagnosis mode starts.
6. Press the switch to go to the next step.
   NOTE:
   Check the combination meter power supply and the ground circuit if the on board diagnosis does not start. Refer to MWI-28, "COMBINATION METER : Diagnosis Procedure".

Diagnosis item

Step	Diagnosis item	Description
1	Segment check	Illuminates all segments in the information display. **NOTE:** Replace the combination meter if any segment is not illuminated.
2	Work instruction code	This information is not used for service. Skip this step.
3	Software code	This information is not used for service. Skip this step.
4	EEPROM code	This information is not used for service. Skip this step.
5	Hardware code	This information is not used for service. Skip this step.
6	P.C.D code	This information is not used for service. Skip this step.
7	Pointer operation check	Can check the pointer operation of speedometer and tachometer. **NOTE:** Replace the combination meter if any pointer does not move.
8	Error code 1	Displays error code.
9	Error code 2	Displays error code.
10	Warning lamp/Indicator lamp illumination check	Illuminates the warning lamp/indicator lamp. **NOTE:** If any of lamps controlled by combination meter is not illuminated, replace combination meter.

cardiagn.com

ERROR CODE



	Items	Code	Description	Action/Reference
(A)	Engine coolant temperature gauge	0	No malfunction detected	—
		1	If the engine coolant temperature signal cannot be received from ECM for 2 seconds or more	Perform ECM self-diagnosis.
(B)	Fuel gauge	0	No malfunction detected	—
		1	If it is judged that the fuel level sensor unit signal circuit is short-circuited for 120 seconds or more	Refer to MWI-30, "2WD : Diagnosis Procedure" (2WD models) or MWI-32, "4WD : Diagnosis Procedure" (4WD models).
		2	If it is judged that the fuel level sensor unit signal circuit is open-circuited for 120 seconds or more	Refer to MWI-30, "2WD : Diagnosis Procedure" (2WD models) or MWI-32, "4WD : Diagnosis Procedure" (4WD models).
(C)	Tachometer	0	No malfunction detected	—
		1	If the engine speed signal cannot be received from ECM for 2 seconds or more	Perform ECM self-diagnosis.
(D)	Speedometer	0	No malfunction detected	—
		1	If the vehicle speed signal cannot be received from the ABS actuator and electric unit (control unit) for 2 seconds or more	Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".
		2	If the abnormal vehicle speed signal is input from ABS actuator and electric unit (control unit) for 2 seconds or more	Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".
(E)	—	0	“0” is always displayed	—
(F)	—	0	“0” is always displayed	—
(G)	Ambient air temperature	0	No malfunction detected	—
		1	If it is judged that the OAT sensor signal circuit is short-circuited for 4 seconds or more	Refer to HAC-77, "Diagnosis Procedure".
		2	If it is judged that the OAT sensor signal circuit is open-circuited for 4 seconds or more	Refer to HAC-77, "Diagnosis Procedure".
(H)	• switch • Trip switch	0	No malfunction detected	—
		1	If it is judged that the switch signal circuit is short-circuited for 5 minutes or more	Replace the combination meter.
		2	If it is judged that the trip switch signal circuit is short-circuited for 5 minutes or more	Replace the combination meter.
		3	If it is judged that the switch and trip switch signal circuits are short-circuited	Replace the combination meter.

cardiagn.com

CONSULT-III Function (METER/M&A)

INFOID:0000000000892286

CONSULT-III FUNCTION (METER/M&A)

System	Diagnosis mode	Description
METER/M&A	Self Diagnostic Result	Combination meter checks the conditions and displays memorized error.
	Data Monitor	Displays combination meter input/output data in real time.

SELF DIAG RESULT

Refer to MWI-51, "DTC Index".

DATA MONITOR

Display Item List

X: Applicable

Display item [Unit]	MAIN SIGNALS	Description
SPEED METER [km/h]	X	Value of vehicle speed signal received from ABS actuator and electric unit (control unit) with CAN communication line. **NOTE:** 655.35 is displayed when the malfunction signal is received.
SPEED OUTPUT [km/h]	X	Vehicle speed signal value transmitted to other units with CAN communication line. **NOTE:** 655.35 is displayed when the malfunction signal is received.
TACHO METER [rpm]	X	Value of the engine speed signal received from ECM with CAN communication line. **NOTE:** 8191.875 is displayed when the malfunction signal is received.
W TEMP METER [°C]	X	Value of engine coolant temperature signal received from ECM with CAN communication line. **NOTE:** 215 is displayed when the malfunction signal is input.
FUEL METER [lit.]	X	Fuel level indicated on combination meter.
DISTANCE [km]	X	Value of possible driving distance calculated by combination meter.
FUEL W/L [On/Off]	X	Low-fuel warning status judged by the identified fuel level.
MIL [On/Off]		Status of malfunction indicator lamp judged from malfunctioning indicator lamp signal received from ECM with CAN communication line.
SEAT BELT W/L [On/Off]		Status of front seat belt buckle switch (driver side).
BUZZER [On/Off]	X	Buzzer status (in the combination meter) judged with the buzzer output signal received from BCM via CAN communication and the warning output condition of the combination meter.
C -ENG2 W/L [On/Off]		Status of malfunction indicator lamp 2 judged from malfunctioning indicator lamp signal received from ECM with CAN communication line.
GLOW IND [On/Off]		Glow indicator lamp status judged from glow indicator lamp signal received from ECM with the CAN communication line.
DOOR W/L [On/Off]		Status of door warning judged from door switch signal received from BCM with CAN communication line.
HI -BEAM IND [On/Off]		Status of high beam indicator lamp judged from high beam request signal received from BCM with CAN communication line.
TURN IND [On/Off]		Status of turn indicator lamp judged from turn indicator signal received from BCM with CAN communication line.

cardiagn.com

Display item [Unit]	MAIN SIGNALS	Description
FR FOG IND [On/Off]		Status of front fog light indicator lamp judged from front fog light request signal received from BCM with CAN communication line.
RR FOG IND [On/Off]		Status of rear fog light indicator lamp judged from rear fog light request signal received from BCM with CAN communication line.
OIL W/L [On/Off]		Status of oil pressure warning lamp judged from oil pressure switch signal received from IPDM E/R with CAN communication line.
LIGHT IND [On/Off]		Status of light indicator lamp judged from position light request signal received from BCM with CAN communication line.
DPF W/L [On/Off]		DPF warning lamp status judged by the DPF warning lamp signal received from ECM with the CAN communication line.
VDC/TCS IND [On/Off]		Status of VDC indicator lamp judged from VDC OFF indicator lamp signal received from ABS actuator and electric unit (control unit) with CAN communication line.
ABS W/L [On/Off]		Status of ABS warning lamp judged from ABS warning lamp signal received from ABS actuator and electric unit (control unit) with CAN communication line.
SLIP IND [On/Off]		Status of slip indicator lamp judged from slip indicator lamp signal received from ABS actuator and electric unit (control unit) with CAN communication line.
BRAKE W/L [On/Off]		Status of brake warning lamp judged from brake warning lamp signal received from ABS actuator and electric unit (control unit) with CAN communication line. **NOTE:** Displays “Off” if the brake warning lamp is illuminated when the valve check starts, the parking brake switch is turned ON or the brake fluid level switch is turned ON.
OIL LEVEL IND [LEVEL1, 2, 3, 4, 5/CR NG/On]		Oil level status judged by the oil level sensor signal from the oil level sensor.
KEY G W/L [On/Off]		Status of key warning lamp (G) judged from key warning signal received from BCM with CAN communication line.
KEY R W/L [On/Off]		Status of key warning lamp (R) judged from key warning signal received from BCM with CAN communication line.
KEY KNOB W/L [On/Off]		Key knob switch status received from Intelligent Key unit with the CAN communication line.
M RANGE SW [On/Off]	X	Status of mode select switch (manual).
NM RANGE SW [On/Off]	X	Status of mode select switch (auto).
AT SFT UP SW [On/Off]	X	Status of position select switch (up).
AT SFT DWN SW [On/Off]	X	Status of position select switch (down).
P RANGE IND [On/Off]	X	Status of shift position indicator judged from shift position signal and manual mode indicator signal received from TCM with CAN communication line.
R RANGE IND [On/Off]	X	
N RANGE IND [On/Off]	X	
D RANGE IND [On/Off]	X	
4 RANGE IND [On/Off]	X	
3 RANGE IND [On/Off]	X	
2 RANGE IND [On/Off]	X	

cardiagn.com

Display item [Unit]	MAIN SIGNALS	Description
AT CHECK W/L [On/Off]		A/T check warning lamp status judged by the A/T CHECK indicator lamp signal received from TCM with the CAN communication line.
CVT IND [On/Off]		CVT indicator lamp status judged from CVT CHECK indicator lamp signal received from TMC with the CAN communication line.
CRUISE IND [On/Off]		Status of CRUISE indicator judged from ASCD CRUISE lamp signal received from ECM with CAN communication line.
SET IND [On/Off]		Status of set indicator judged from ASCD SET indicator signal received from ECM with CAN communication line.
4WD LOCK SW [On/Off]		4WD lock switch status judged by the 4WD signal received from 4WD control unit with the CAN communication line.
4WD LOCK IND [On/Off]		4WD lock indicator status judged by the 4WD signal received from 4WD control unit with the CAN communication line.
4WD W/L [On/Off]		Status of 4WD warning lamp judged from 4WD warning lamp signal received from 4WD control unit with CAN communication line.

NOTE:

Some items are not available according to vehicle specification.

cardiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000000892293

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
Refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000000892294

DTC DETECTION LOGIC

DTC	Display contents of CONSULT-III	Diagnostic item is detected when ...	Probable malfunction location
U1000	CAN COMM CIRCUIT	When combination meter is not transmitting or receiving CAN communication signal for 2 seconds or more.	CAN communication system

Diagnosis Procedure

INFOID:0000000000892295

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check “Self Diagnostic Result” of “METER/M&A”.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

B2205 VEHICLE SPEED

Description

INFOID:0000000000892306

Vehicle speed signal is transmitted from ABS actuator and electric unit (control unit) via CAN communication line to combination meter.

DTC Logic

INFOID:0000000000892307

DTC DETECTION LOGIC

DTC	Display contents of CONSULT-III	Diagnostic item is detected when ...	Probable malfunction location
B2205	VEHICLE SPEED	The abnormal vehicle speed signal is input from ABS actuator and electric unit (control unit) for 2 seconds or more.	ABS actuator and electric unit (control unit)

Diagnosis Procedure

INFOID:0000000000892308

1.PERFORM SELF DIAGNOSIS OF ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform “Self Diagnosis Result” of ABS actuator and electric unit (control unit), and repair or replace malfunctioning parts.

>> Refer to BRC-17, "CONSULT-III Function (ABS)".

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT
COMBINATION METER

COMBINATION METER : Diagnosis Procedure

INFOID:0000000000892315

1.CHECK FUSE

Check for blown fuses.

Battery power supply	: 8
Ignition signal	: 4

Is the inspection result normal?

YES >> GO TO 2.
NO >> Be sure to eliminate cause of malfunction before installing new fuse.

2.CHECK POWER SUPPLY CIRCUIT

Check voltage between combination meter harness connector terminals 1, 2 and ground.

Terminal No.	Signal name	Ignition switch position	Value (Approx.)
1	Battery power supply	OFF	Battery voltage
2	Ignition signal	ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness between combination meter and fuse.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector.
3. Check continuity between combination meter harness connector terminals 3, 23 and ground.

3, 23 – Ground	: Continuity should exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) : Diagnosis Procedure

INFOID:0000000001098977

1.CHECK FUSIBLE LINK

Check that the following IPDM E/R fusible link is not blown.

Terminal No.	Signal name	Fusible link No.
1	Battery power supply	E
2		C
53		L (except HR engine models)
		M (HR engine models)

Is the fusible link fusing?

YES >> Replace the blown fusible link after repairing the affected circuit if a fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.

cardiagn.com

3. Check voltage between IPDM E/R harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
IPDM E/R			
Connector	Terminal	Ground	Battery voltage
E9	1		
	2		
E14	53		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

1. Disconnect IPDM E/R connectors.
2. Check continuity between IPDM E/R harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E10	5		Exist
	6		

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

cardiagn.com

FUEL LEVEL SENSOR SIGNAL CIRCUIT

2WD

2WD : Description

INFOID:0000000001110136

The fuel level sensor (main) detect the fuel level in the fuel tank and transmit the fuel level sensor signal to the combination meter.

2WD : Component Function Check

INFOID:0000000001110137

1.CHECK COMBINATION METER INPUT SIGNAL

Select the “Data Monitor” for the “METER/M&A” and compare the “FUEL METER” monitor value with the fuel gauge reading on the combination meter.

Fuel gauge indication position (segment illumination position)	Monitor value [lit]
13/13	Approx. 64
10/13	Approx. 53
7/13	Approx. 41
4/13	Approx. 19
0/13	Approx. 2

Does monitor value match fuel gauge reading?

YES >> INSPECTION END
NO >> Replace combination meter.

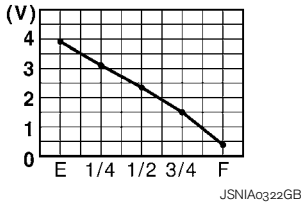
2WD : Diagnosis Procedure

INFOID:0000000001110138

1.CHECK COMBINATION METER INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between combination meter harness connector terminal 34 and ground.

34 – Ground :



JSNIA0322GB

Does it match fuel gauge reading?

YES >> GO TO 2.
NO >> Replace the combination meter.

2.CHECK FUEL LEVEL SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and fuel level sensor unit (main) connector.
3. Check continuity between combination meter harness connector terminal 34 and fuel level sensor unit (main) harness connector terminal 4.

34 – 4	: Continuity should exist.

4. Check continuity between combination meter harness connector terminal 34 and ground.

34 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 3.

cardiagn.com

NO >> Repair harness or connector.

3.CHECK FUEL LEVEL SENSOR GROUND CIRCUIT

Check continuity between fuel level sensor unit (main) harness connector terminal 2 and combination meter harness connector terminal 24.

2 – 24	: Continuity should exist

Is the inspection result normal?

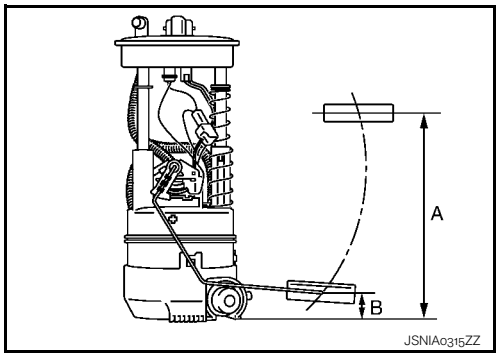
YES >> INSPECTION END
NO >> Repair harness or connector.

2WD : Component Inspection [Fuel Level Sensor Unit (Main)]

INFOID:0000000001110139

1.CHECK FUEL LEVEL SENSOR UNIT (MAIN)

Check the resistance between fuel level sensor unit (main).



2 – 4	
Full	: Approx. 5 Ω
Empty	: Approx. 82 Ω

Standard float position

Full (A)	: Approx. 208 mm
Empty (B)	: Approx. 15 mm

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace fuel level sensor unit (main).

4WD

4WD : Description

INFOID:0000000001110735

The fuel level sensor (main) and the fuel level sensor (sub) detect the fuel level in the fuel tank and transmit the fuel level sensor signal to the combination meter.

4WD : Component Function Check

INFOID:0000000001110736

1.CHECK COMBINATION METER INPUT SIGNAL

Select the “Data Monitor” for the “METER/M&A” and compare the “FUEL METER” monitor value with the fuel gauge reading on the combination meter.

Fuel gauge indication position (segment illumination position)	Monitor value [lit]
13/13	Approx. 64
10/13	Approx. 53
7/13	Approx. 41
4/13	Approx. 19
0/13	Approx. 2

Does monitor value match fuel gauge reading?

YES >> INSPECTION END
NO >> Replace combination meter.

cardiagn.com

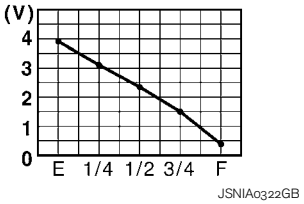
4WD : Diagnosis Procedure

INFOID:0000000001110737

1.CHECK COMBINATION METER INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between combination meter harness connector terminal 34 and ground.

34 – Ground :



JSNIA0322GB

Does it match fuel gauge reading?

YES >> GO TO 2.
NO >> Replace the combination meter.

2.CHECK FUEL LEVEL SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and fuel level sensor unit (main) connector.
3. Check continuity between combination meter harness connector terminal 34 and fuel level sensor unit (main) harness connector terminal 4.

34 – 4	: Continuity should exist.

4. Check continuity between combination meter harness connector terminal 34 and ground.

34 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK FUEL LEVEL SENSOR GROUND CIRCUIT

Check continuity between fuel level sensor unit (main) harness connector terminal 2 and combination meter harness connector terminal 24.

2 – 24	: Continuity should exist

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

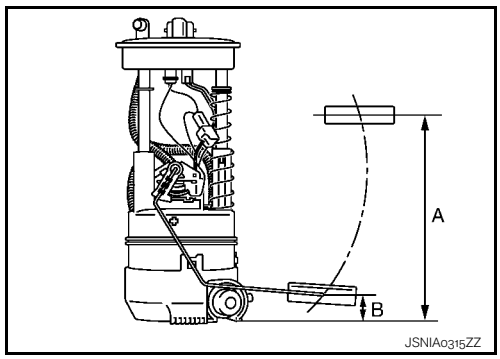
4WD : Component Inspection [Fuel Level Sensor Unit (Main)]

INFOID:0000000001110738

1.CHECK FUEL LEVEL SENSOR UNIT (MAIN)

Check the resistance between fuel level sensor unit (main).

2 – 5	
Full	: Approx. 2.5 Ω
Empty	: Approx. 82 Ω



JSNIA0315ZZ

cardiagn.com

Standard float position

Full (A)	: Approx. 190 mm
Empty (B)	: Approx. 25 mm

Is inspection result OK?

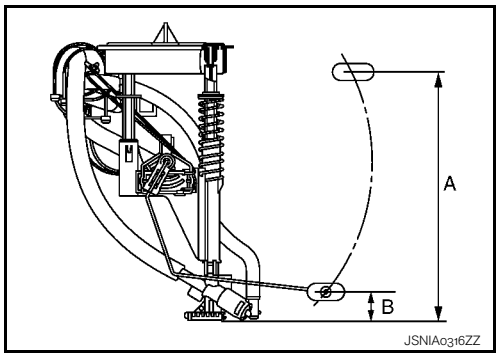
YES >> INSPECTION END
NO >> Replace fuel level sensor unit (main).

4WD : Component Inspection [Fuel Level Sensor Unit (Sub)]

INFOID:0000000001110739

1. CHECK FUEL LEVEL SENSOR UNIT (SUB)

Inspect the resistance of fuel level sensor unit (sub).



5 – 6	
Full	: Approx. 2.5 Ω
Empty	: Approx. 37.5 Ω

Standard float position

Full (A)	: Approx. 222 mm
Empty (B)	: Approx. 25 mm

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace fuel level sensor unit (sub).

cardiagn.com

OIL LEVEL SENSOR SIGNAL CIRCUIT

Description

INFOID:0000000000892331

Transmits the oil level sensor signal to the combination meter.

Diagnosis Procedure

INFOID:0000000000892332

HR16DE ENGINE MODELS

1.CHECK OIL LEVEL SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and oil level sensor unit connector.
3. Check continuity between combination meter harness connector terminal 32, 33 and oil level sensor unit harness connector terminal 1, 3.

32 – 1	: Continuity should exist.
33 – 3	: Continuity should exist.

4. Check continuity between combination meter harness connector terminal 32 and ground.

32 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

EXCEPT HR16DE ENGINE MODELS

1.CHECK OIL LEVEL SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and oil level sensor unit connector.
3. Check continuity between combination meter harness connector terminal 32, 33 and oil level sensor unit harness connector terminal 1, 2.

32 – 1	: Continuity should exist.
33 – 2	: Continuity should exist.

4. Check continuity between combination meter harness connector terminal 32 and ground.

32 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

Component Inspection

INFOID:0000000000892333

HR16DE ENGINE MODELS

1.CHECK OIL LEVEL SENSOR UNIT

1. Turn ignition switch OFF.
2. Disconnect oil level sensor connector.
3. Check resistance between oil level sensor terminals 1 and 3.

1 – 3	: 3 – 20 Ω

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace oil level sensor.

EXCEPT HR16DE ENGINE MODELS

cardiagn.com

1.CHECK OIL LEVEL SENSOR UNIT

1. Turn ignition switch OFF.
2. Disconnect oil level sensor connector.
3. Check resistance between oil level sensor terminals 1 and 2.

1 – 2 : 3 – 20 Ω

Is inspection result OK?

YES >> INSPECTION END
NO >> Replace oil level sensor.

cardiagn.com

OIL PRESSURE SWITCH SIGNAL CIRCUIT

Description

INFOID:0000000000892334

Detects the engine oil pressure and transmits the oil pressure switch signal to IPDM E/R.

Component Function Check

INFOID:0000000000892335

1.CHECK COMBINATION METER INPUT SIGNAL

Select the “Data Monitor” for the “METER/M&A” and check the “OIL W/L” monitor value.

OIL W/L	
Ignition switch ON	: On
Engine running	: Off

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000000892336

1.CHECK OIL PRESSURE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and oil pressure switch connector.
3. Check continuity between IPDM E/R harness connector terminal 27 and oil pressure switch harness connector terminal 1.

27 – 1	: Continuity should exist.

4. Check continuity between IPDM E/R harness connector terminal 27 and ground.

27 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

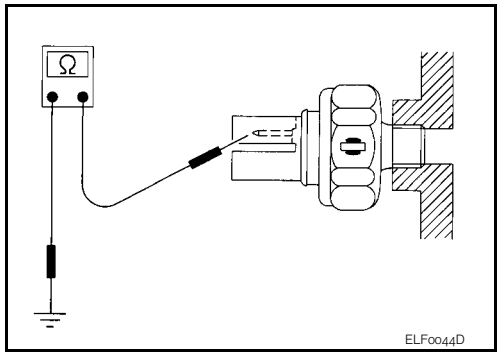
Component Inspection

INFOID:0000000000892337

1.CHECK OIL PRESSURE SWITCH UNIT

Check continuity between oil pressure switch and ground

Condition	Oil pressure kPa (bar, kg/cm^2, psi)	Continuity
Engine stopped	Less than 29 (0.3, 0.3, 4)	Yes
Engine running	More than 29 (0.3, 0.3, 4)	No



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the oil pressure switch.

cardiagn.com

OAT SENSOR SIGNAL CIRCUIT

Description

INFOID:0000000001078082

The OAT sensor is attached on the radiator core support (left side). It detects ambient temperature and converts it into a resistance value which is then input into the combination meter.

Diagnosis Procedure

INFOID:0000000001078083

1.CHECK OAT SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and OAT sensor connector.
3. Check continuity between combination meter harness connector terminal 20 and oil level sensor harness connector terminal 1.

20 – 1	: Continuity should exist.

4. Check continuity between combination meter harness connector terminal 20 and ground.

20 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK OAT SENSOR GROUND CIRCUIT

1. Check continuity between combination meter harness connector terminal 19 and OAT sensor harness connector terminal 2.

19 – 2	: Continuity should exist.

2. Check continuity between combination meter harness connector terminal 19 and ground.

19 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

Component Inspection

INFOID:0000000001078084

Refer to HAC-78, "Component Inspection".

cardiagn.com

ECU DIAGNOSIS

COMBINATION METER

Reference Value

INFOID:0000000000892342

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
SPEED METER [km/h]	Ignition switch ON	While driving	Equivalent to speedometer reading **NOTE:** 655.35 is displayed when the malfunction signal is received
SPEED OUTPUT [km/h]	Ignition switch ON	While driving	Equivalent to speedometer reading **NOTE:** 655.35 is displayed when the malfunction signal is received
TACHO METER [rpm]	Ignition switch ON	While driving	Equivalent to tachometer reading **NOTE:** 8191.875 is displayed when the malfunction signal is received
W TEMP METER [°C]	Ignition switch ON	—	Values according to engine coolant temperature **NOTE:** 215 is displayed when the malfunction signal is input
FUEL METER [lit]	Ignition switch ON	—	Values according to fuel level
DISTANCE [km]	Ignition switch ON	—	Possible driving distance calculated by combination meter
FUEL W/L	Ignition switch ON	Low-fuel warning lamp ON	On
		Low-fuel warning lamp OFF	Off
MIL	Ignition switch ON	Malfunction indicator lamp ON	On
		Malfunction indicator lamp OFF	Off
SEAT BELT W/L	Ignition switch ON	Seat belt warning lamp ON	On
		Seat belt warning lamp OFF	Off
BUZZER	Ignition switch ON	Buzzer ON	On
		Buzzer OFF	Off
C-ENG 2 W/L	Ignition switch ON	Malfunction indicator lamp 2 ON	On
		Malfunction indicator lamp 2 OFF	Off
GLOW IND	Ignition switch ON	Glow indicator lamp ON	On
		Glow indicator lamp OFF	Off
DOOR W/L	Ignition switch ON	Door warning lamp ON	On
		Door warning lamp OFF	Off
HI-BEAM IND	Ignition switch ON	High-beam indicator lamp ON	On
		High-beam indicator lamp OFF	Off
TURN IND	Ignition switch ON	Turn signal indicator lamp ON	On
		Turn signal indicator lamp OFF	Off
FR FOG IND	Ignition switch ON	Front fog lamp indicator lamp ON	On
		Front fog lamp indicator lamp OFF	Off
RR FOG IND	Ignition switch ON	Rear fog lamp indicator lamp ON	On
		Rear fog lamp indicator lamp OFF	Off

cardiagn.com

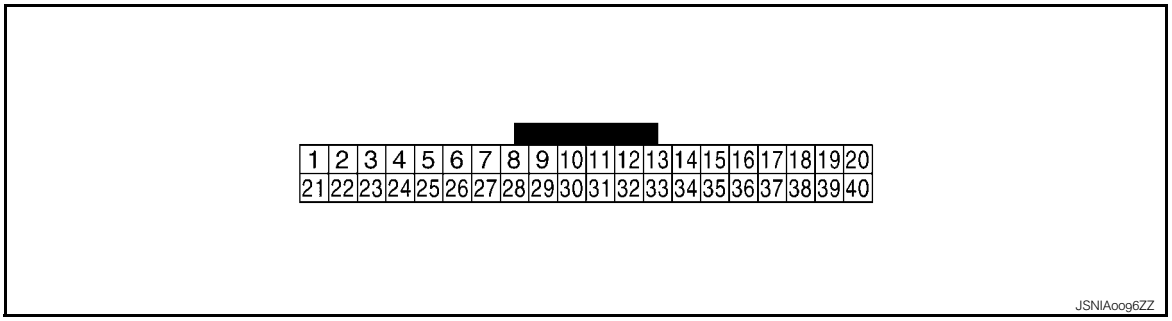
Monitor Item	Condition		Value/Status
OIL W/L	Ignition switch ON	Oil pressure warning lamp ON	On
		Oil pressure warning lamp OFF	Off
LIGHT IND	Ignition switch ON	Tail lamp indicator lamp ON	On
		Tail lamp indicator lamp OFF	Off
DPF W/L	Ignition switch ON	DPF warning lamp ON	On
		DPF warning lamp OFF	Off
VDC/TCS IND	Ignition switch ON	VDC OFF indicator lamp ON	On
		VDC OFF indicator lamp OFF	Off
ABS W/L	Ignition switch ON	ABS warning lamp ON	On
		ABS warning lamp OFF	Off
SLIP IND	Ignition switch ON	SLIP Indicator lamp ON	On
		SLIP indicator lamp OFF	Off
BRAKE W/L	Ignition switch ON	Brake warning lamp ON	On
		Brake warning lamp OFF	Off
OIL LEVEL IND	Ignition switch ON	Oil level 1 is detected	LEVEL1
		Oil level 2 is detected	LEVEL2
		Oil level 3 is detected	LEVEL3
		Oil level 4 is detected	LEVEL4
		Oil level 5 is detected	LEVEL5
		OIL LOW is detected	On
		Oil level is not detected	CR NG
KEY G W/L	Ignition switch ON	KEY warning lamp (green) ON	On
		KEY warning lamp (green) OFF	Off
KEY R W/L	Ignition switch ON	KEY warning lamp (red) ON	On
		KEY warning lamp (red) OFF	Off
KEY KNOB IND	Ignition switch ON	LOCK warning lamp ON	On
		LOCK warning lamp OFF	Off
M RANGE SW	Ignition switch ON	MANUAL MODE	On
		Other than the above	Off
NM RANGE SW	Ignition switch ON	MANUAL MODE	Off
		Other than the above	On
AT SFT UP SW	Ignition switch ON	Selector lever (+) position	On
		Other than the above	Off
AT SFT DWN SW	Ignition switch ON	Selector lever (–) position	On
		Other than the above	Off
P RANGE IND	Ignition switch ON	Selector lever in P position	On
		Other than the above	Off
R RANGE IND	Ignition switch ON	Selector lever in R position	On
		Other than the above	Off
N RANGE IND	Ignition switch ON	Selector lever in N position	On
		Other than the above	Off
D RANGE IND	Ignition switch ON	Selector lever in D position	On
		Other than the above	Off

cardiagn.com

Monitor Item	Condition		Value/Status
4 RANGE IND	Ignition switch ON	Shift indicator 4 is displayed	On
		Other than the above	Off
3 RANGE IND	Ignition switch ON	Shift indicator 3 is displayed	On
		Other than the above	Off
2 RANGE IND	Ignition switch ON	Shift indicator 2 is displayed	On
		Other than the above	Off
AT CHECK-W/L	Ignition switch ON	TCM electronic control system warning lamp ON	On
		TCM electronic control system warning lamp OFF	Off
CVT IND	Ignition switch ON	CVT warning lamp ON	On
		CVT warning lamp OFF	Off
CRUISE IND	Ignition switch ON	Cruise indicator lamp ON	On
		Cruise indicator lamp OFF	Off
SET IND	Ignition switch ON	SET indicator lamp ON	On
		SET indicator lamp OFF	Off
4WD LOCK SW	Ignition switch ON	4WD LOCK switch ON	On
		4WD LOCK switch OFF	Off
4WD LOCK IND	Ignition switch ON	4WD LOCK indicator lamp ON	On
		4WD LOCK indicator lamp OFF	Off
4WD W/L	Ignition switch ON	4WD warning lamp ON	On
		4WD warning lamp OFF	Off

NOTE:
Some items are not available according to vehicle specification.

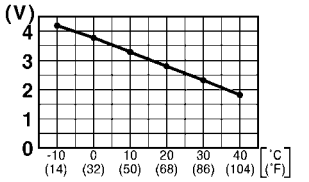
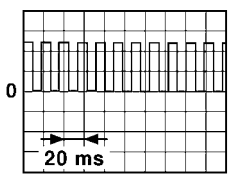
TERMINAL LAYOUT

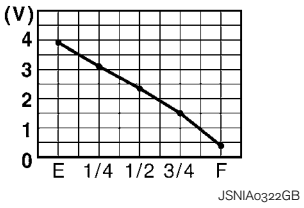


PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
1 (Y)	Ground	Battery power supply	Input	Ignition switch OFF	—	Battery voltage
2 (GR)	Ground	IGN signal	Input	Ignition switch ON	—	Battery voltage
3 (B)	Ground	Ground	—	Ignition switch ON	—	0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
11 (B)*1 (R)*2	Ground	Steering switch (trip computer) signal	Input	Ignition switch ON	Press the steering switch (trip computer)	0 V
					Other than the above	5 V
15 (W)	Ground	Air bag signal	Input	Ignition switch ON	Air bag warning lamp ON	4 V
					Air bag warning lamp OFF	0 V
19 (V)	Ground	OAT sensor signal	Input	Ignition switch ON	—	 JSNIA0014GB
20 (SB)	Ground	OAT sensor ground	—	Ignition switch ON	—	0 V
21 (L)	—	CAN-H	—	—	—	—
22 (P)	—	CAN-L	—	—	—	—
23 (B)	Ground	Ground	—	Ignition switch ON	—	0 V
24 (G)	Ground	Fuel level sensor signal ground	—	Ignition switch ON	—	0 V
25 (L)	Ground	Alternator signal	Input	Ignition switch ON	Charge warning lamp ON	0 V
					Charge warning lamp OFF	12 V
26 (V)	Ground	Parking brake switch signal	Input	Ignition switch ON	Parking brake ON	0 V
					Parking brake OFF	5 V
27 (BR)	Ground	Brake fluid level switch signal	Input	Ignition switch ON	Brake fluid level is normal	5 V
					Brake fluid level is less than LOW level	0 V
28 (SB)	Ground	Security signal	Input	Ignition switch ON	Security warning lamp ON	0 V
					Security warning lamp OFF	12 V
31 (Y)	Ground	Vehicle speed signal (8 pulse)	Output	Ignition switch ON	Vehicle speed is approximately 40 km/h (24.9 MPH)	**NOTE:** The maximum voltage varies depending on the specification (destination unit).  JSNIA0012GB

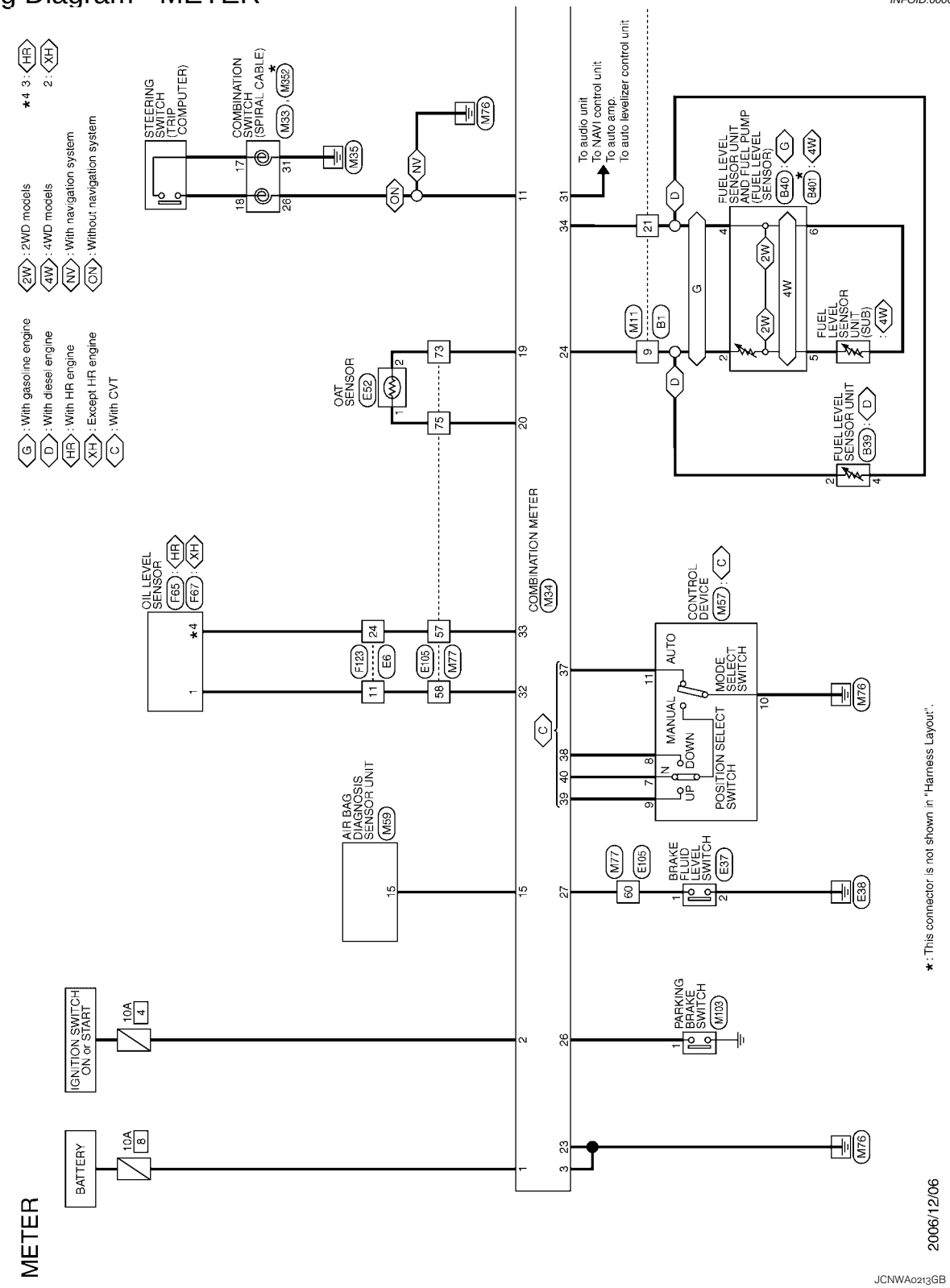
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (Y)	Ground	Oil level sensor signal	Input	Ignition switch ON	—	Refer to MWI-34, "Component Inspection". **NOTE:** The measurement cannot be performed because the signal is input for a moment with the ignition switch ON.
33 (P)	Ground	Oil level sensor signal ground	—	Ignition switch ON	—	0 V
34 (B)	Ground	Fuel level sensor signal	Input	Ignition switch ON	—	 JSNIA0322GB
35 (O)	Ground	Seat belt buckle switch signal (driver side)	Input	Ignition switch ON	When driver seat belt is fastened	5 V
					When driver seat belt is unfastened	0 V
36 (GR)	Ground	Seat belt buckle switch signal (passenger side)	Input	Ignition switch ON	• When getting in the passenger seat • When passenger seat belt is fastened	12 V
					• When getting in the passenger seat • When passenger seat belt is not fastened	0 V
37 (R/Y)	Ground	Not manual mode signal	Input	Ignition switch ON	Manual mode	12 V
					Other than the above	0 V
38 (LG)	Ground	Manual mode shift down signal	Input	Ignition switch ON	Selector lever down operation	0 V
					Other than the above	12 V
39 (G/W)	Ground	Manual mode shift up signal	Input	Ignition switch ON	Selector lever up operation	0 V
					Other than the above	12 V
40 (L)	Ground	Manual mode signal	Input	Ignition switch ON	Manual mode	0 V
					Other than the above	12 V

*1 : With NAVI
*2 : Without NAVI

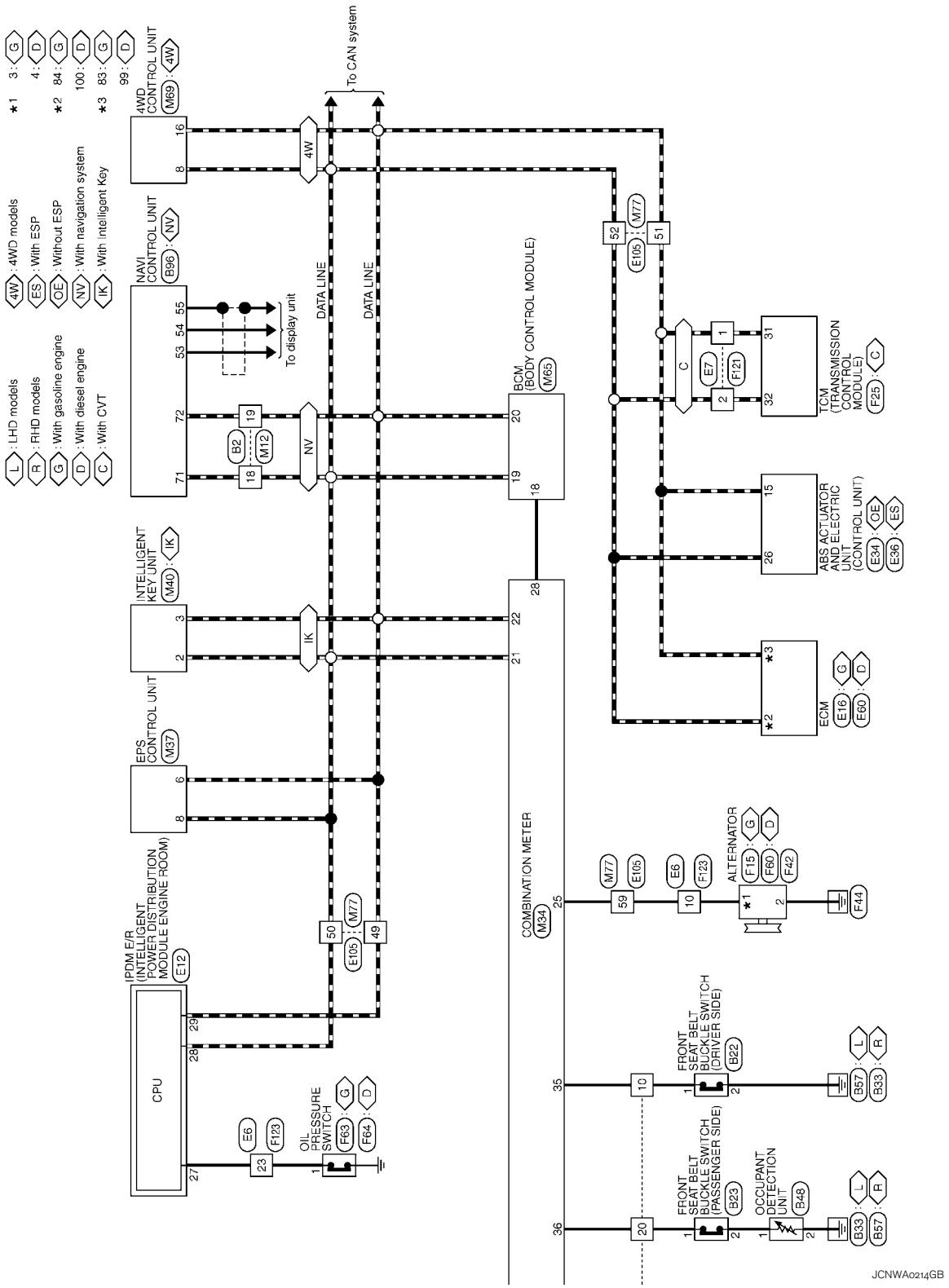
cardiagn.com

Wiring Diagram - METER -

INFOID:0000000000892343



cardiagn.com

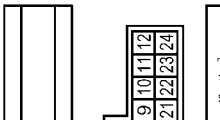


cardiagn.com

METER

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

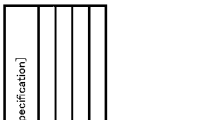
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
9	G	-
10	O	-
20	GR	-
21	B	-

Connector No.	B2
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

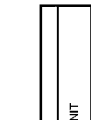
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
18	L	-
19	P	-

Connector No.	B22
Connector Name	FRONT SEAT BELT BUCKLE SWITCH (DRIVER SIDE)
Connector Type	C02FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	B	-

Connector No.	B23
Connector Name	FRONT SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)
Connector Type	C02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	LG	-

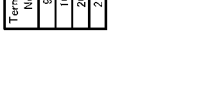
Connector No.	B39
Connector Name	FUEL LEVEL SENSOR UNIT
Connector Type	E04FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-
4	B	-

Connector No.	B40
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	E04FGY-RS

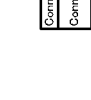
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-
4	B	-

Connector No.	B48
Connector Name	OCCUPANT DETECTION UNIT
Connector Type	S02FW

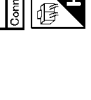
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	B	-

Connector No.	B96
Connector Name	NAVI CONTROL UNIT
Connector Type	TH32FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
53	W	COMM (CONT->DISP)
54	O	COMM (DISP->CONT)
55	SHIELD	SHIELD
71	L	CAN-H
72	P	CAN-L

JCNWA0215GB

cardiagn.com

METER

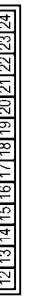
Connector No.	B401
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	–	–
6	–	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
10	L	–
11	Y	–
23	W	–
24	P	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	L	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
27	W	–
28	L	–
29	P	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E34
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
15	P	CAN-L
26	L	CAN-H

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
15	P	CAN-L
26	L	CAN-H

Connector No.	E37
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Type	YV02FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/B	–
2	B	–

JCNWA0216GB

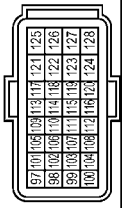
cardiagn.com

METER

Connector No.	E52
Connector Name	OAT SENSOR
Connector Type	RH04FB

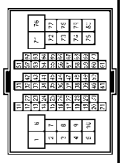
Terminal No.	Color of Wire	Signal Name [Specification]
1	L/O	–
2	V	–

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



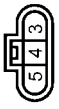
Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–
57	P	–
58	Y	–
59	L	–
60	R/B	–
73	V	–
75	L/O	–

Connector No.	F15
Connector Name	ALTERNATOR
Connector Type	HS03FB



Terminal No.	Color of Wire	Signal Name [Specification]
3	L	L

Connector No.	F25
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	MOLEX 500994-4111

Terminal No.	Color of Wire	Signal Name [Specification]
31	P	CAN-L
32	L	CAN-H

Connector No.	F42
Connector Name	ALTERNATOR
Connector Type	–

Terminal No.	Color of Wire	Signal Name [Specification]
2	–	GND

Connector No.	F60
Connector Name	ALTERNATOR
Connector Type	FEA02FB

Terminal No.	Color of Wire	Signal Name [Specification]
4	L	S

Connector No.	F63
Connector Name	OIL PRESSURE SWITCH
Connector Type	E01FGY-RS-AR

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–

JCNWA0217GB

cardiagn.com

METER

Connector No.	F64
Connector Name	OIL PRESSURE SWITCH
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-

Connector No.	F65
Connector Name	OIL LEVEL SENSOR
Connector Type	RS03FSB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	+
3	P	-

Connector No.	F67
Connector Name	OIL LEVEL SENSOR
Connector Type	BS02FB-AHY-S

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	+
2	P	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	L	-

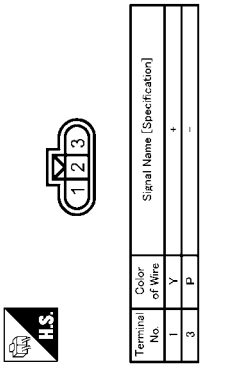
Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
10	L	-
11	Y	-
23	W	-
24	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

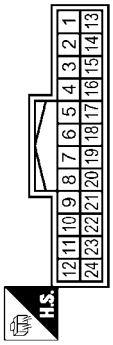
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
9	G	-
10	O	-
20	GR	-
21	B	-

Connector No.	M12
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

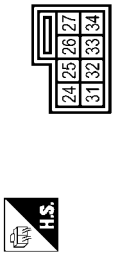
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
18	L	-
19	P	-

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
26	R	-
31	B	-

JCNWA0218GB

cardiagn.com

METER

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
2	GR	IGN
3	B	GND
11	R	STEERING SW[Without navigation system]
15	W	AIR BAG
19	V	OAT SENS
20	SB	OAT SENS GND
21	L	CAN-H
22	P	CAN-L
23	B	GND
24	G	FUEL LEVEL SENS GND

Connector No.	M57
Connector Name	CONTROL DEVICE
Connector Type	TH16FW

H.S.

8	7	6	5	4	3	2	1
16	15	14	13	12	11	10	9

Terminal No.	Color of Wire	Signal Name [Specification]
7	L	-
8	LG	-
9	W	-
10	B	-
11	R	-

25	L	ALTERNATOR
26	V	PARKING BRAKE SW
27	BR	BRAKE FLUID LEVEL SW
28	SB	SECURITY
31	Y	VEHICLE SPEED (8-PULSE)
32	Y	OIL LEVEL SENS
33	P	OIL LEVEL SENS GND
34	B	FUEL LEVEL SENS
35	O	SEAT BELT BUCKLE SW (DRIVER SIDE)
36	GR	SEAT BELT BUCKLE SW (PASSENGER SIDE)
37	R/Y	NOT MANUAL MODE
38	LG	SHIFT DOWN
39	G/W	SHIFT UP
40	L	MANUAL MODE

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

H.S.

20	21	17							24	49	1
22	11	46	48	47	45	13	3	4	6	5	
16	12	19	15	14	51	23	50	18	52	2	

Terminal No.	Color of Wire	Signal Name [Specification]
15	W	WARNING LAMP

Connector No.	M37
Connector Name	EPS CONTROL UNIT
Connector Type	Molex 98545-0601

H.S.

3	4	5	6	7	8	9	10

Terminal No.	Color of Wire	Signal Name [Specification]
6	P	-
8	L	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Terminal No.	Color of Wire	Signal Name [Specification]
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L

Connector No.	M69
Connector Name	4WD CONTROL UNIT
Connector Type	TH16FW

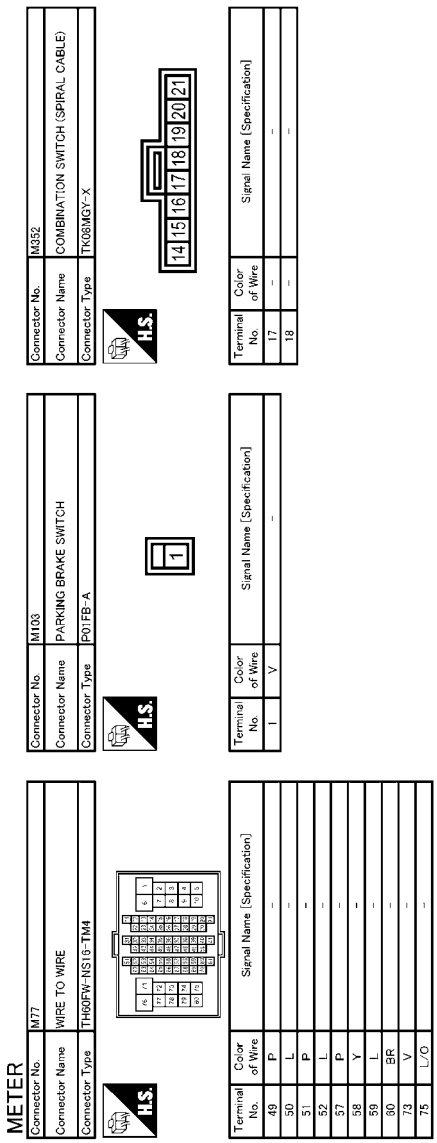
H.S.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
8	L	CAN-H
16	P	CAN-L

JCNWA0219GB

cardiagn.com



JCNWA0220GB

Fail Safe

INFOID:0000000000892344

The combination meter activates the fail-safe control if the CAN communication lines between each unit are malfunctioning.

cardiagn.com

Function		Specifications
Speedometer		Reset to zero by suspending communication.
Tachometer		
Meter illumination control		Changed to nighttime mode.
Buzzer		Turned off by suspending communication.
Warning lamp/indicator lamp	ABS warning lamp	Turned on by suspending communication.
	Brake warning lamp	
	EPS OFF indicator lamp	
	VDC OFF indicator lamp	
	SLIP indicator lamp	
	CVT warning lamp	Turned off by suspending communication.
	Oil pressure warning lamp	
	Door warning lamp	
	Malfunction indicator lamp	
	CRUISE indicator lamp	
	Tail lamp indicator	
	Front fog indicator lamp	
	Rear fog indicator lamp	
	Glow indicator lamp	
	Malfunction indicator lamp 2	
	Trailer indicator lamp	
	Key R/G warning lamp	
	KEY LOCK warning lamp	
	High beam indicator lamp	
	Turn signal indicator lamp	

DTC Index

INFOID:0000000000892345

Display contents of CONSULT-III	Time	Diagnostic item is detected when ...	Refer to
CAN COMM CIRCUIT [U1000]	CRNT, 1 - 39	Combination meter is not transmitting or receiving CAN communication signal for 2 seconds or more.	MWI-26
VEHICLE SPEED [B2205]	CRNT, 1 - 39	The abnormal vehicle speed signal is input from ABS actuator and electric unit (control unit) for 2 seconds or more.	MWI-27

cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Reference Value

INFOID:0000000001102063

VALUES ON THE DIAGNOSIS TOOL

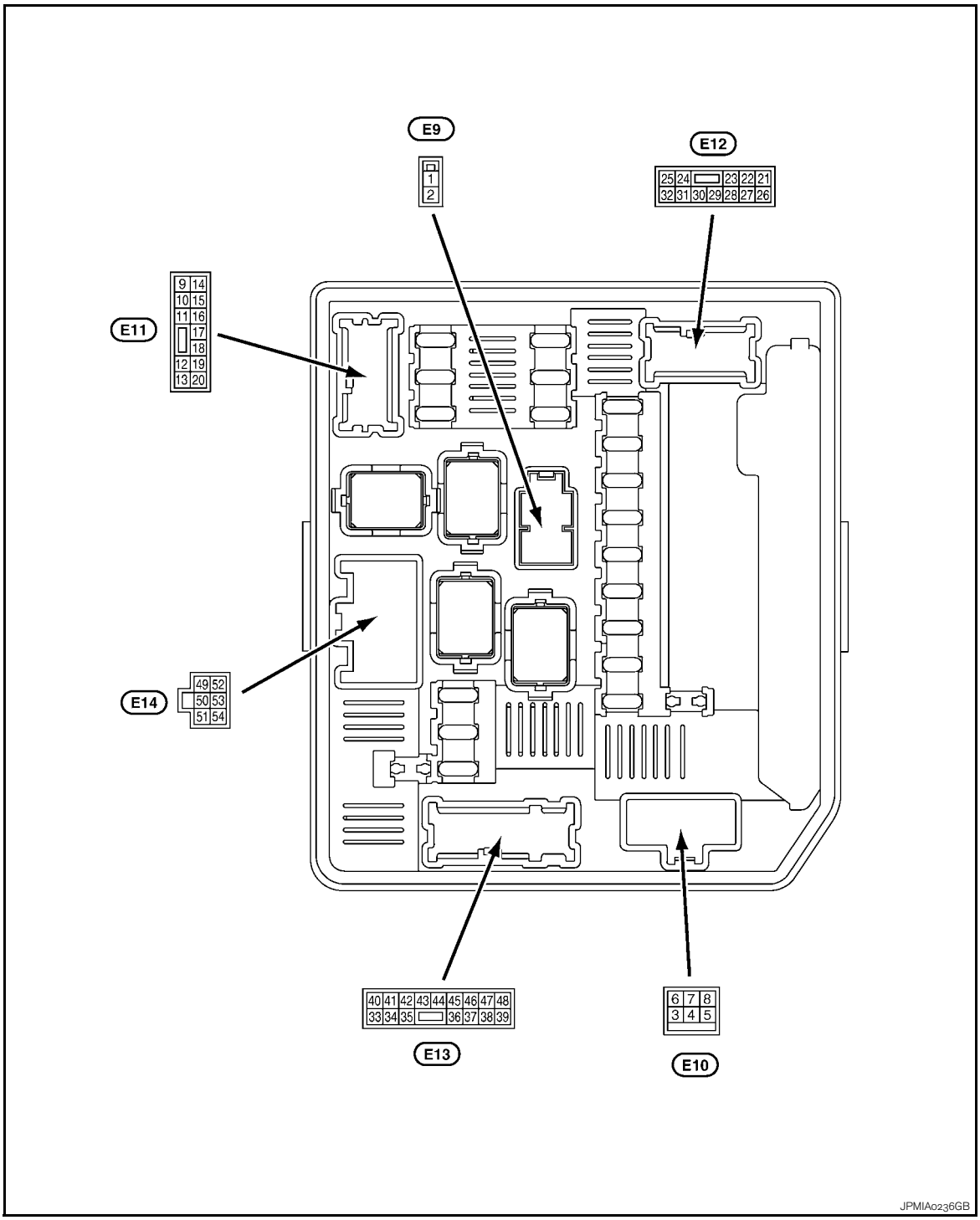
Monitor Item	Condition		Value/Status
MOTOR FAN REQ	Engine idle speed	Changes depending on engine coolant temperature, air conditioner operation status, vehicle speed, etc.	1 - 3
AC COMP REQ	Engine running	A/C switch OFF	Off
		A/C switch ON (Compressor is operating)	On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI (Light is illuminated)		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		Front fog lamp switch ON	On
HL WASHER REQ	Ignition switch ON, and low beam headlamp is ON	Front washer switch OFF	Off
		Front washer switch ON (When headlamp washer is operating)	On
FR WIP REQ	Ignition switch ON	Front wiper switch OFF	STOP
		Front wiper switch INT	1LOW
		Front wiper switch LO	Low
		Front wiper switch HI	Hi
WIP AUTO STOP	Ignition switch ON	Front wiper stop position	STOP P
		Any position other than front wiper stop position	ACT P
WIP PROT	Ignition switch ON	Front wiper operates normally	Off
		Front wiper stops at fail-safe operation	BLOCK
ST RLY REQ **NOTE:** Vehicle without Intelligent Key system indicates only “ON”, and it does not change.	When Intelligent Key is outside the vehicle, and the push switch is pushed		Off
	When Intelligent Key is inside the vehicle, and the push switch is pushed		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Ignition switch ON	Rear window defogger switch OFF	Off
		Rear window defogger switch ON (Rear window defogger is operating)	On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close

cardiagn.com

Monitor Item	Condition	Value/Status
REV SW	Except selector lever R position	Off
	Selector lever R position	On
HOOD SW **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Close the hood	Off
	Open the hood	On
THFT HRN REQ **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Not operation	Off
	Horn is activated with Vehicle Security (Theft Warning) system.	On
HORN CHIRP	**NOTE:** This item is indicated, but not monitored.	Off
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

cardiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
		Signal name	Input/ Output		
+	–				
1 (G)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
2 (R)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
5 (B)	Ground	Ground	—	Ignition switch ON	0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
6 (B)	Ground	Ground	—	Ignition switch ON		0 V
7 (Y)	Ground	Front wiper LO	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch LO	Battery voltage
8 (Y/R)	Ground	Front wiper HI	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch HI	Battery voltage
9 (G)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
10*1 (L/R)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
11*2 (O)	Ground	PTC heater 1 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
12*2 (G/Y)	Ground	PTC heater 2 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
14 (R/B)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
15 (Y/L)*1 (B/R)*2	Ground	ECM relay control	Input	• Engine running • Ignition switch OFF (For a few seconds after turning ignition switch OFF)		0 - 1.0 V*1
						0.6 V*2
				Ignition switch OFF or ACC (More than a few seconds after turning ignition switch OFF)		Battery voltage
16*3 (Y/R)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
19*1 (R/O)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
21*4 (GR)	Ground	Hood switch	Input	Close the hood		Battery voltage
				Open the hood		0 V
22 (Y/G)	Ground	Reverse switch	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON	• Selector lever “R” (Except M/T models) • M/T control lever “R” (M/T models)	Battery voltage
					• Selector lever in any position other than “R” (Except M/T models) • M/T control lever in any position other than “R” (M/T models)	0 V
23 (Y/B)	Ground	A/C relay power supply	Output	Engine stopped		0 V
				Engine running	A/C switch OFF	0 V
					A/C switch ON (A/C compressor is operating)	Battery voltage
24 (R/Y)	Ground	Headlamp LO (RH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
25*1 (G/L)	Ground	ETC relay control	Input	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		0 - 1.0 V
26 (O)	Ground	Front wiper auto stop	Input	Ignition switch ON	Front wiper stop position	0 V
					Any position other than front wiper stop position	Battery voltage
27 (W)	Ground	Oil pressure switch	Input	Engine stopped		0 V
				Engine running		Battery voltage
28 (L)	—	CAN-H	Input/ Output	—		—
29 (P)	—	CAN-L	Input/ Output	—		—
30*4 (L)	Ground	Horn relay control	Output	The horn is not activated		Battery voltage
				The horn is activated		0 V
31 (R)	Ground	Headlamp LO (sensor)	Output	Ignition switch ON	Lighting switch OFF	0 V
					Lighting switch 2ND	Battery voltage
32*1 (R/Y)	Ground	ETC relay power supply	Output	Ignition switch ON		Battery voltage
33*1 (B/O)	Ground	Fuel pump relay control	Input	• Engine running • Ignition switch ON (For 1 second after turning ignition switch ON)		0 - 1.0 V
				Ignition switch ON (More than 1 second after turning ignition switch ON)		Battery voltage
34 (R/B)	Ground	Starter relay power supply	Input	Ignition switch ON (Except M/T models)	Selector lever “P” or “N”	0 V
					Selector lever in any position other than “P” or “N”	Battery voltage
				Ignition switch ON (M/T models)		
35 (W/L)	Ground	Ignition switch ON	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
36 (W)	Ground	Front fog lamp (RH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
37 (R/W)	Ground	Parking lamp (RH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
38 (R/L)	Ground	Tail, license plate lamps and illuminations	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
39 (GR)	Ground	Headlamp washer relay control	Output	Ignition switch ON	When headlamp washer is operating	0 V
					When headlamp washer is not operating	Battery voltage
40*1 (BR/Y)*5 (SB)*6	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
41 (P)	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
42*1 (B/Y)	Ground	Fuel pump relay power supply	Output	• Ignition switch OFF or ACC • Approximately 1 second or more after turning the ignition switch ON		0 V
				• Approximately 1 second after turning the ignition switch ON • Engine running		Battery voltage
43 (W/B)	Ground	Front fog lamp (LH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
44 (L)	Ground	Headlamp LO (LH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
45 (L/W)	Ground	Headlamp HI (RH)	Output	• Lighting switch 2ND and HI • lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
46 (G)	Ground	Headlamp HI (LH)	Output	• Lighting switch 2ND and HI • Lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
47 (R/L)	Ground	Parking lamp (LH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
48*7 (Y)	Ground	Cooling fan relay-3 control	Output	When cooling fan does HI operation		0 V
				When cooling fan does OFF or LO operation		Battery voltage
49 (B)	Ground	Rear window defogger relay power supply	Output	Ignition switch ON	Rear window defogger switch ON	Battery voltage
					Rear window defogger switch OFF	0 V
50 (B/R)	Ground	Starter relay power supply	Output	When engine is clanking		Battery voltage
				When engine is not clanking		0 V
51 (P)	Ground	Ignition switch START	Input	Ignition switch START		Battery voltage
				Ignition switch OFF, ACC or ON		0 V
52 (W)	Ground	Cooling fan relay-1 power supply	Output	When cooling fan does LO or HI operation		Battery voltage
				When cooling fan does OFF operation		0 V
53 (W/B)	Ground	Battery power supply (Cooling fan relay)	Input	Ignition switch OFF		Battery voltage
54*5 (R)	Ground	Cooling fan relay-2 power supply	Input	When cooling fan does HI operation		Battery voltage
				When cooling fan does OFF or LO operation		0 V

*1: HR engine and MR engine models

*2: K9K engine models

*3: Except M/T models only

*4: With vehicle security (theft warning) system

*5: HR engine models

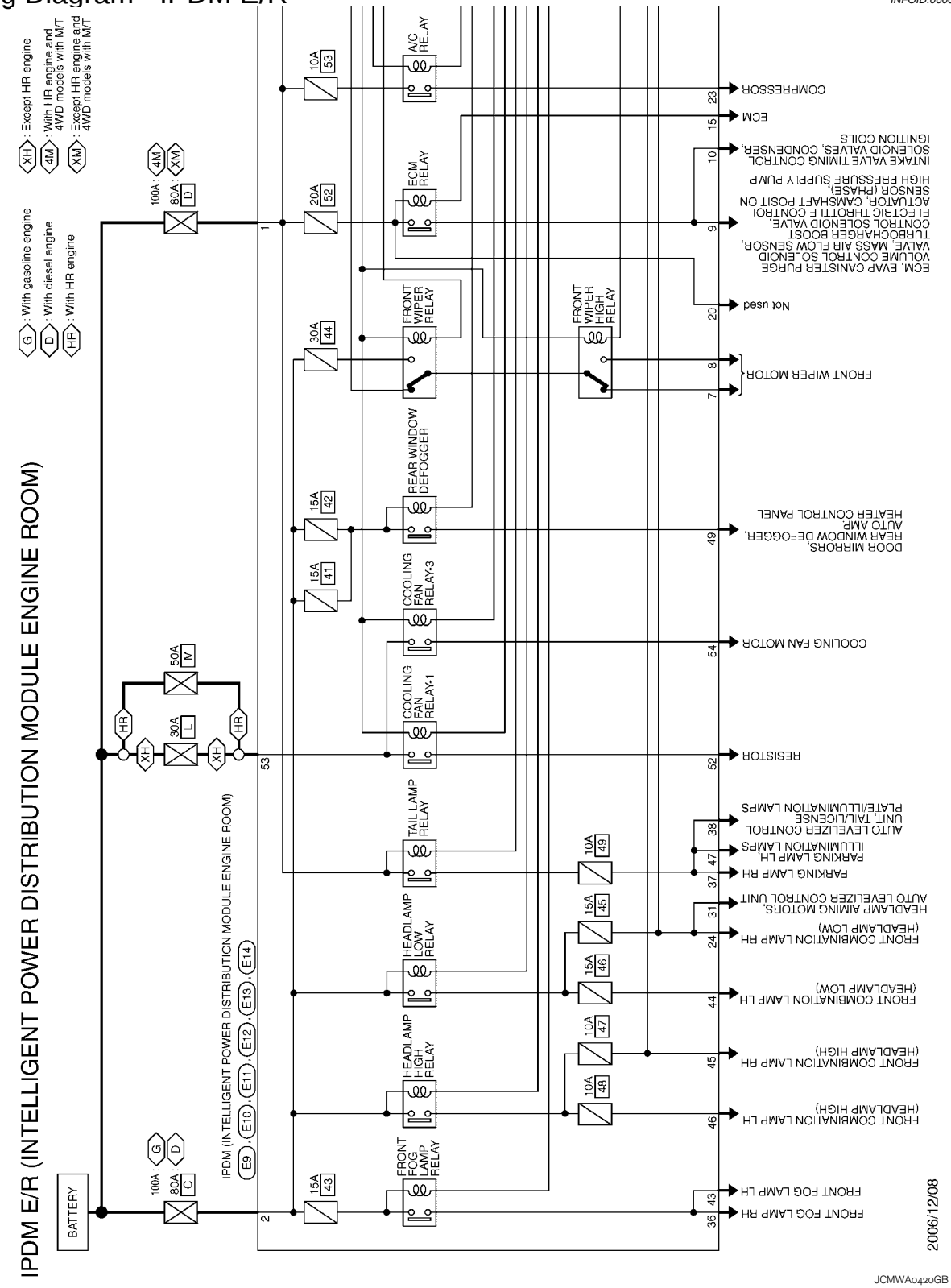
*6: MR engine models

*7: MR engine and K9K engine models

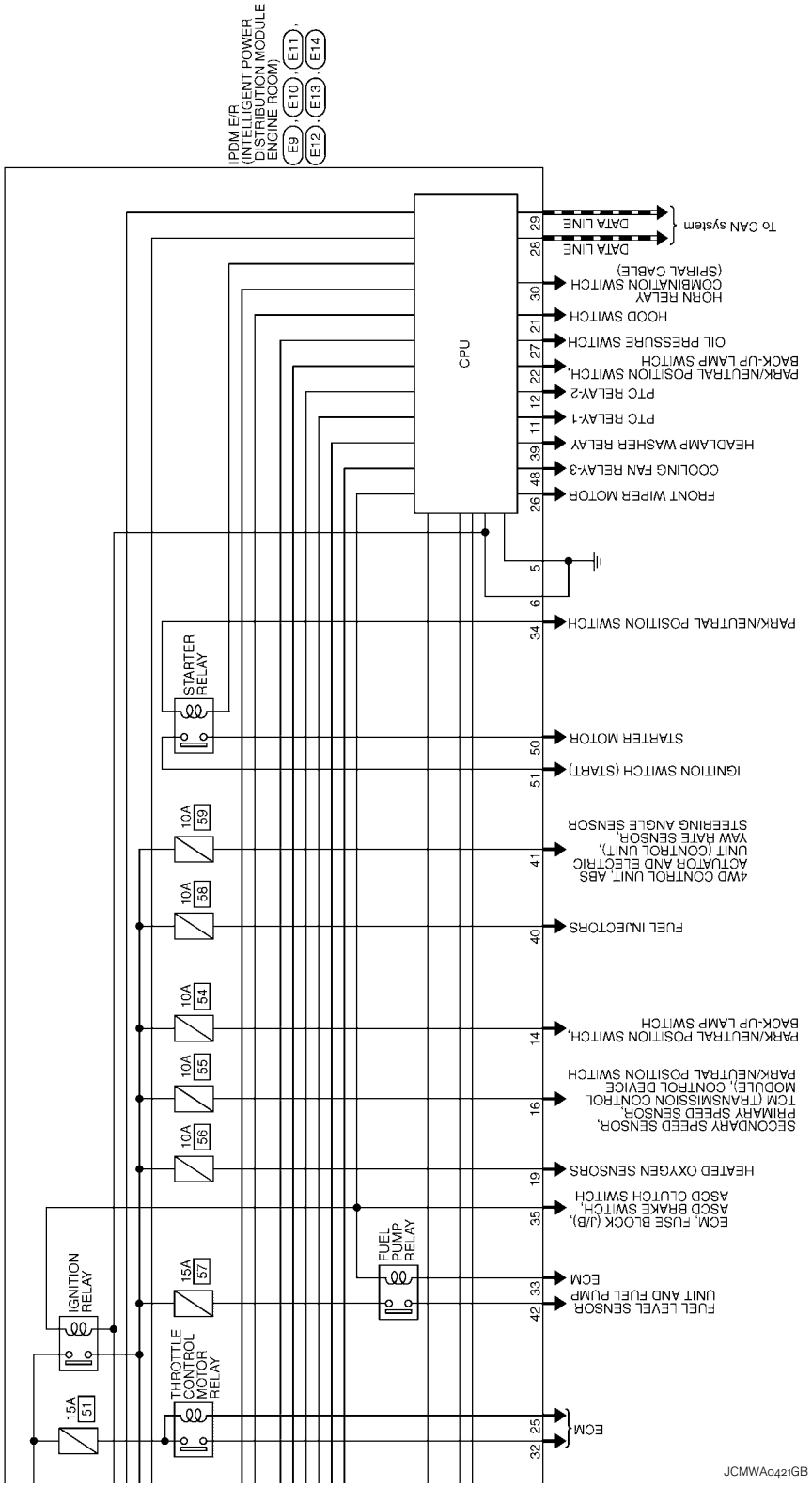
cardiagn.com

Wiring Diagram - IPDM E/R -

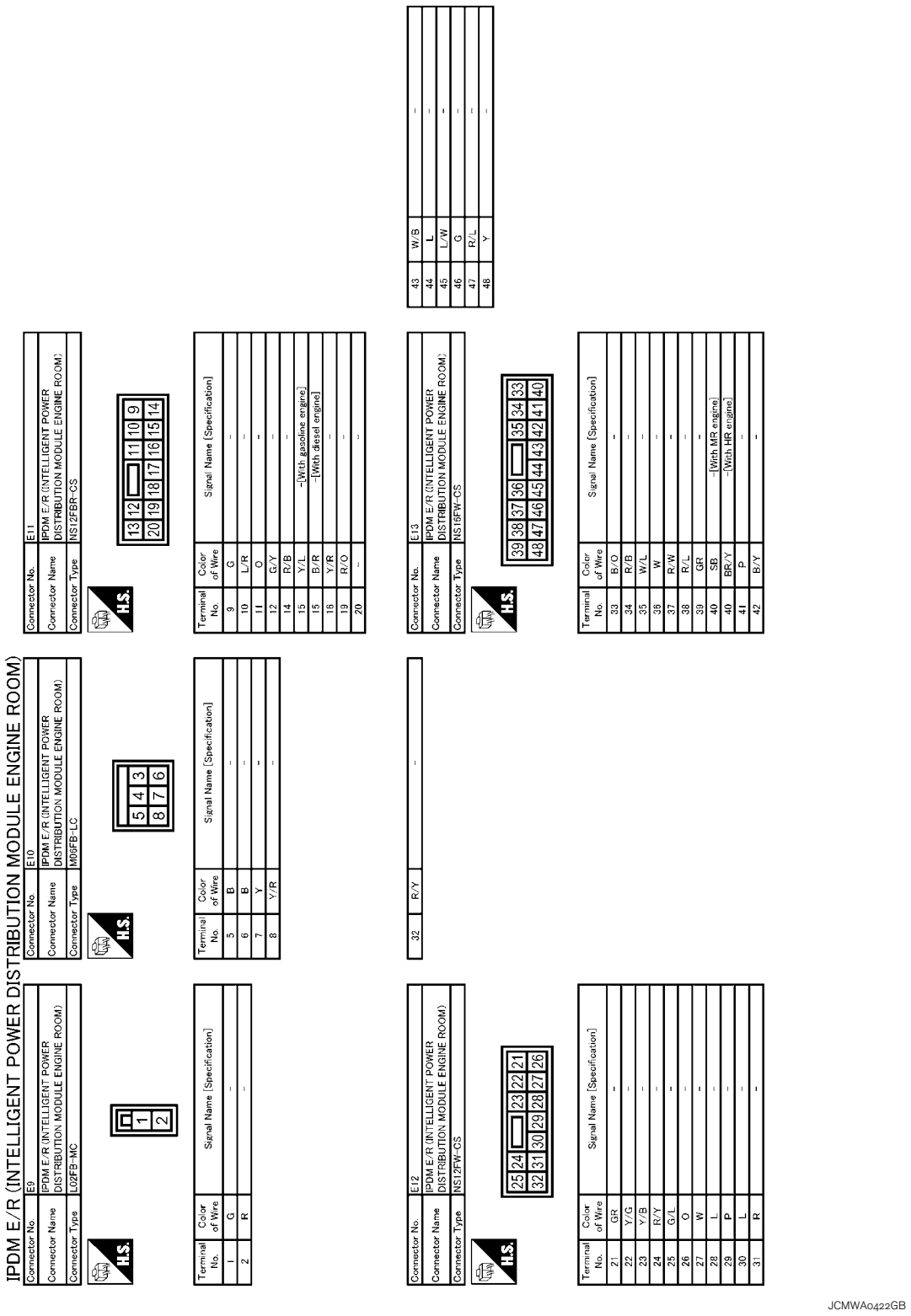
INFOID:0000000001102064



cardiagn.com



cardiagn.com



JCMWA0422GB

cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	-
50	B/R	-
51	P	-
52	W	-
53	W/B	-
54	R	-

JCMWA0423GB

Fail Safe

INFOID:0000000001102065

CAN communication control

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If no CAN communication is available with ECM

cardiagn.com

Control part	Fail-safe in operation
Cooling fan	• The cooling fan relay-2*1 or the cooling fan relay-3*2 turns ON when the ignition switch is turned ON • Turns off the fan motor low relay when the ignition switch is turned OFF
A/C compressor	A/C relay OFF

*1: HR engine models

*2: MR engine and K9K engine models

If no CAN communication is available with BCM

Control part	Fail-safe in operation
Headlamp	• The headlamp low relay turns ON when the ignition switch is turned ON • The headlamp low relay turns OFF when the ignition switch is turned OFF • Headlamp high relay OFF
• Parking lamps • License plate lamps • Tail lamps • Illuminations	• The tail lamp relay turns ON when the ignition switch is turned ON • The tail lamp relay turns OFF when the ignition switch is turned OFF
Front wiper	• The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. • The front wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Front fog lamps	Front fog lamp relay OFF
Starter motor	Inhibit relay OFF
Rear window defogger	Rear window defogger relay OFF
Headlamp washer	Headlamp washer relay OFF
PTC heater	PTC heater relay OFF

Ignition relay malfunction detection function

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

DTC	Ignition switch	Ignition relay	Tail lamp relay
—	ON	ON	—
—	OFF	OFF	—
B2098: IGN RLY ON	OFF	ON	ON (10 minutes)
B2099: IGN RLY OFF	ON	OFF	—

NOTE:

The tail lamp relay is turned OFF when the ignition switch is turned ON.

Front wiper control

IPDM E/R detects the front wiper stop position with the front wiper auto stop signal.
When the front wiper auto stop signal is in the conditions listed below, IPDM E/R repeats a front wiper 10 seconds operation and 20 seconds stop five times.

Ignition switch	Front wiper switch	Front wiper auto stop signal
ON	OFF	The front wiper auto stop signal (stop position) cannot be input for 10 seconds.
	ON	The front wiper auto stop signal does not change for 10 seconds.

NOTE:

cardiagn.com

This operation status can be confirmed on the IPDM E/R “Data Monitor” that displays “BLOCK” for the item “WIP PROT” while the wiper is stopped.

DTC Index

INFOID:0000000001102066

CONSULT display	Fail-safe	Timing[NOTE]		Reference page
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	PAST	PCS-14
B2098: IGN RELAY ON	×	CRNT	PAST	PCS-15
B2099: IGN RELAY OFF	—	CRNT	PAST	PCS-16
B2100: EEPROM	—	CRNT	PAST	PCS-17

NOTE:

The details of time display are as follows.

- CRNT: The malfunctions that are detected now.
- PAST: The number is indicated when it is normal at present and a malfunction was detected in the past.

cardiagn.com

SYMPTOM DIAGNOSIS

THE FUEL GAUGE POINTER DOES NOT MOVE

2WD

2WD : Description

INFOID:0000000001110917

Fuel gauge needle does not move from a certain position.

2WD : Diagnosis Procedure

INFOID:0000000001110918

1. CHECK COMBINATION METER INPUT SIGNAL

Connect CONSULT-III and inspect the combination meter input signal. Refer to MWI-30, "2WD : Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace combination meter.

2. CHECK FUEL LEVEL SENSOR SIGNAL CIRCUIT

Inspect the fuel level sensor signal circuit. Refer to MWI-30, "2WD : Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3. CHECK FUEL LEVEL SENSOR UNIT (MAIN)

Perform a unit inspection for the fuel level sensor unit (main). Refer to MWI-31, "2WD : Component Inspection [Fuel Level Sensor Unit (Main)]".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace fuel level sensor unit (main). Refer to FL-7, "2WD : Removal and Installation" (HR16DE/MR20DE) or FL-25, "Removal and Installation" (K9K).

4. CHECK FLOAT INTERFERENCE

Check that the float arm interferes with or binds to other components in the fuel tank.

Is the inspection result normal?

YES >> Replace combination meter.
NO >> Repair or replace malfunctioning parts.

4WD

4WD : Description

INFOID:0000000001110920

Fuel gauge needle does not move from a certain position.

4WD : Diagnosis Procedure

INFOID:0000000001110919

1. CHECK COMBINATION METER INPUT SIGNAL

Connect CONSULT-III and inspect the combination meter input signal. Refer to MWI-31, "4WD : Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace combination meter.

2. CHECK FUEL LEVEL SENSOR SIGNAL CIRCUIT

Inspect the fuel level sensor signal circuit. Refer to MWI-32, "4WD : Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

cardiagn.com

3.CHECK FUEL LEVEL SENSOR UNIT (MAIN)

Perform a unit inspection for the fuel level sensor unit (main). Refer to MWI-32, "4WD : Component Inspection [Fuel Level Sensor Unit (Main)]".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace fuel level sensor unit (main). Refer to FL-11, "4WD : Removal and Installation".

4.CHECK FUEL LEVEL SENSOR UNIT (SUB)

Perform a unit inspection for the fuel level sensor unit (sub). Refer to MWI-33, "4WD : Component Inspection [Fuel Level Sensor Unit (Sub)]".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace fuel level sensor unit (sub). Refer to FL-11, "4WD : Removal and Installation".

5.CHECK FLOAT INTERFERENCE

Check that the float arm interferes with or binds to other components in the fuel tank.

Is the inspection result normal?

YES >> Replace combination meter.
NO >> Repair or replace malfunctioning parts.

cardiagn.com

THE OIL PRESSURE SWITCH DOES NOT TURN ON

Description

INFOID:0000000000892368

The oil pressure warning lamp stays off when the ignition switch is turned ON.

Diagnosis Procedure

INFOID:0000000000892369

1.CHECK OIL PRESSURE WARNING LAMP

Perform auto active test. Refer to PCS-9, "Diagnosis Description".

Is oil pressure warning lamp illuminated?

YES >> GO TO 2.
NO >> Replace combination meter.

2.CHECK OIL PRESSURE SWITCH SIGNAL CIRCUIT

Inspect the oil pressure switch signal circuit. Refer to MWI-36, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK OIL PRESSURE SWITCH UNIT

Perform a unit inspection for the oil pressure switch. Refer to MWI-36, "Component Inspection".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".
NO >> Replace oil pressure switch.

cardiagn.com

THE OIL PRESSURE SWITCH DOES NOT TURN OFF

Description

INFOID:0000000000892370

The oil pressure warning lamp remains illuminated while the engine is running (normal oil pressure).

Diagnosis Procedure

INFOID:0000000000892371

1.CHECK OIL PRESSURE WARNING LAMP

Perform auto active test. Refer to PCS-9, "Diagnosis Description".

Is oil pressure warning lamp illuminated?

YES >> GO TO 2.
NO >> Replace combination meter.

2.CHECK IPDM E/R OUTPUT VOLTAGE

1. Turn ignition switch OFF.
2. Disconnect the oil pressure switch connector.
3. Turn ignition switch ON.
4. Check voltage between the oil pressure switch harness connector terminal 1 and ground.

1 – Ground	: Approx. 12 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK OIL PRESSURE SWITCH UNIT

Perform a unit inspection for the oil pressure switch. Refer to MWI-36, "Component Inspection".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".
NO >> Replace oil pressure switch.

4.CHECK OIL PRESSURE SWITCH SIGNAL CIRCUIT

Inspect the oil pressure switch signal circuit. Refer to MWI-36, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".
NO >> Repair harness or connector.

cardiagn.com

THE AMBIENT TEMPERATURE DISPLAY IS INCORRECT

Description

INFOID:0000000000892378

- The ambient temperature display flashes and the ambient temperature is not displayed.
- The displayed ambient temperature is higher than the actual temperature.
- The displayed ambient temperature is lower than the actual temperature.

Diagnosis Procedure

INFOID:0000000000892379

NOTE:
Check that the symptom is not applicable to the normal operating condition before starting diagnosis. Refer to MWI-70, "INFORMATION DISPLAY : Description".

1.CHECK OAT SENSOR SIGNAL CIRCUIT

Inspect the OAT sensor signal circuit. Refer to MWI-37, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK OAT SENSOR UNIT

Perform a unit inspection for the OAT sensor. Refer to MWI-37, "Component Inspection".

Is the inspection result normal?

YES >> Replace combination meter.
NO >> Replace OAT sensor. Refer to VTL-22, "Removal and Installation".

cardiagn.com

THE OIL LEVEL DISPLAY IS INCORRECT

Description

INFOID:0000000000907663

"Low oil" is displayed on the information display (engine oil amount is normal).

Diagnosis Procedure

INFOID:0000000000907664

1.CHECK OIL LEVEL SENSOR SIGNAL CIRCUIT

Inspect the oil level sensor signal circuit. Refer to MWI-34, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK OIL LEVEL SENSOR UNIT

Perform a unit inspection for the oil level sensor. Refer to MWI-34, "Component Inspection".

Is the inspection result normal?

YES >> Replace combination meter.
NO >> Replace oil level sensor.

cardiagn.com

NORMAL OPERATING CONDITION
INFORMATION DISPLAY

INFORMATION DISPLAY : Description

INFOID:0000000000892380

AMBIENT AIR TEMPERATURE

The displayed ambient temperature on the information display may differ from the actual temperature because it is a corrected value calculated from the OAT sensor signal by the combination meter. Refer to MWI-18, "INFORMATION DISPLAY : System Description" for details on the correction process.

POSSIBLE DRIVING DISTANCE

The calculated possible driving distance may differ from the actual distance to empty if the refueling amount is approximately 4 ℓ or less. This is because the refuel control (moves the fuel gauge needle quicker than normal judging that the driver is refueling the vehicle) is not performed in such a case.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001078351

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

cardiagn.com

ON-VEHICLE REPAIR

COMBINATION METER

Exploded View

INFOID:0000000000892381

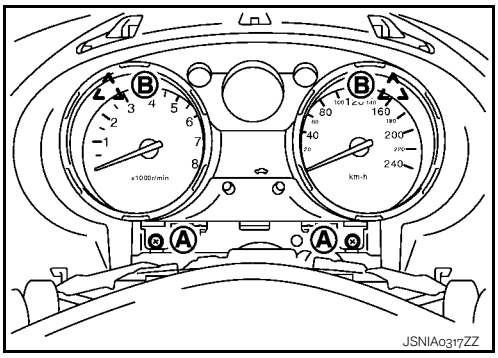
Refer to IP-11, "Exploded View".

Removal and Installation

INFOID:0000000000892382

Removal

1. Remove the cluster lid A. Refer to IP-12, "Removal and Installation".
2. Remove steering column cover. Refer to IP-12, "Removal and Installation".
3. Remove screw (A) and connector, and then remove combination meter.



B : Clip

Installation

Install in the reverse order of removal.

cardiagn.com

SECTION MIR
MIRRORS

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
Work Flow 3

FUNCTION DIAGNOSIS 4

DOOR MIRROR SYSTEM 4
Component Description 4

INSIDE MIRROR SYSTEM 5
System Description 5
Component Description 5

COMPONENT DIAGNOSIS 6

DOOR MIRROR REMOTE CONTROL SWITCH 6

MIRROR SWITCH/CHANGEOVER SWITCH 6
MIRROR SWITCH/CHANGEOVER SWITCH : Description 6
MIRROR SWITCH/CHANGEOVER SWITCH : Component Function Check 6
MIRROR SWITCH/CHANGEOVER SWITCH : Diagnosis Procedure 6
MIRROR SWITCH/CHANGEOVER SWITCH : Component Inspection 8

OPEN/CLOSE SWITCH 10
OPEN/CLOSE SWITCH : Description 10
OPEN/CLOSE SWITCH : Component Function Check 10
OPEN/CLOSE SWITCH : Diagnosis Procedure 10
OPEN/CLOSE SWITCH : Component Inspection 11

DOOR MIRROR MOTOR 12
Description 12
Component Function Check 12
Diagnosis Procedure 12
Component Inspection 14

FOLDING MOTOR 15
Description 15
Component Function Check 15
Diagnosis Procedure 15
Component Inspection 16

AUTO ANTI-DAZZLING INSIDE MIRROR CIRCUIT 17
Description 17
Component Function Check 17
Diagnosis Procedure 17

DOOR MIRROR 18
Wiring Diagram - DOOR MIRROR SYSTEM (LHD MODELS) - 18
Wiring Diagram - DOOR MIRROR SYSTEM (RHD MODELS) - 20

AUTO ANTI-DAZZLING INSIDE MIRROR SYSTEM 22
Wiring Diagram - INSIDE MIRROR SYSTEM - 22

SYMPTOM DIAGNOSIS 24

NONE OF THE DOOR MIRROR CAN BE OPERATED USING ANY SWITCH 24
Diagnosis Procedure 24

DOOR MIRROR DOES NOT OPERATE 25
Diagnosis Procedure 25

ELECTRIC FOLDABLE DOOR MIRROR DOES NOT OPERATE 26
Diagnosis Procedure 26

AUTO ANTI-DAZZLING INSIDE MIRROR DOES NOT OPERATE 27
Diagnosis Procedure 27

SQUEAK AND RATTLE TROUBLE DIAGNOSIS 28
Work Flow 28
Generic Squeak and Rattle Troubleshooting 30

cardiagn.com

Diagnostic Worksheet 32

PRECAUTION 34

PRECAUTIONS 34
Supplemental Restraint System (SRS) "AIR B AG" and "SEAT BELT PRE-TENSIONER" 34

PREPARATION 35

PREPARATION 35
Commercial Service Tools 35

ON-VEHICLE MAINTENANCE 36

PRE-INSPECTION FOR DIAGNOSTIC 36
Basic Inspection 36

ON-VEHICLE REPAIR 37

INSIDE MIRROR 37
Exploded View 37
Removal and Installation 37

DOOR MIRROR 38
Exploded View 38
Removal and Installation 39
Disassembly and Assembly 39

DOOR MIRROR REMOTE CONTROL SWITCH 41
Exploded View 41
Removal and Installation 41

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000951511

DETAILED FLOW

1.OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings the vehicle in.

>> GO TO 2.

2.REPRODUCE THE MALFUNCTION INFORMATION

Check the malfunction on the vehicle that the customer describes.
Inspect the relation of the symptoms and the condition when the symptoms occur.

>> GO TO 3.

3.PERFORM “BASIC INSPECTION”

Perform the basic inspection.Refer to MIR-36, "Basic Inspection".

>> GO TO 4.

4.IDENTIFY THE MALFUNCTIONING SYSTEM WITH “SYMPTOM DIAGNOSIS”

Use “Symptom diagnosis” from the symptom inspection result in step 2. Then identify where to start performing the diagnosis based on possible causes and symptoms.

>> GO TO 5.

5.IDENTIFY MALFUNCTIONING PARTS WITH “COMPONENT DIAGNOSIS”

Perform the diagnosis with “Component diagnosis” of the applicable system.

>> GO TO 6.

6.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 7.

7.FINAL CHECK

Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 2.

Is the malfunctioning part repaired or replaced?

YES >> Trouble diagnosis is completed.
NO >> GO TO 3.

cardiagn.com

FUNCTION DIAGNOSIS

DOOR MIRROR SYSTEM

Component Description

INFOID:0000000000951513

Component	Function
Door mirror remote control switch (mirror switch・change over switch)	It supplies power to mirror motor by operating mirror switch and change over switch.
Door mirror remote control switch (open/close switch)	It supplies power to folding motor by operating open/close switch.
Door mirror motor	It makes mirror face operate from side to side and up and down with the mirror control switch operation.
Folding motor	It makes mirror folding with the mirror control switch operation.

cardiagn.com

INSIDE MIRROR SYSTEM

System Description

INFOID:0000000000951514

It senses the brightness of the headlight of the vehicle from the rear with the sensor integrated into the mirror. It automatically changes the light transmittance according to the sensed brightness of the light from the headlight.

Component Description

INFOID:0000000000951515

Component	Function
Auto anti-dazzling inside mirror	It automatically changes the light transmittance according to the brightness of the light at the headlight of the vehicle from the rear.

carDiagn.com

COMPONENT DIAGNOSIS

DOOR MIRROR REMOTE CONTROL SWITCH

MIRROR SWITCH/CHANGEOVER SWITCH

MIRROR SWITCH/CHANGEOVER SWITCH : Description

INFOID:0000000000951516

- Mirror switch and changeover switch is integrated into door mirror remote control switch.
- It supplies electric power to mirror motor by mirror switch and changeover switch.

MIRROR SWITCH/CHANGEOVER SWITCH : Component Function Check

INFOID:0000000000951517

1.CHECK DOOR MIRROR REMOTE CONTROL SWITCH(MIRROR SWITCH・CHANGEOVER SWITCH) FUNCTION

Check that door mirror can operate by door mirror remote control switch (mirror switch・changeover switch) operation.

Is the inspection result normal?

YES >> Mirror switch・changeover switch function is OK.
NO >> Refer to MIR-6, "MIRROR SWITCH/CHANGEOVER SWITCH : Diagnosis Procedure".

MIRROR SWITCH/CHANGEOVER SWITCH : Diagnosis Procedure

INFOID:0000000000951518

1.CHECK DOOR MIRROR REMOTE CONTROL SWITCH OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between mirror control switch connector and ground.

LHD models

[Door mirror driver side]

Terminals			Mirror switch condition	Voltage (V) (Approx.)
(+)		(-)		
Door mirror remote control switch connector	Terminal			
M7	2	Ground	DOWN / RIGHT	Battery voltage
			Other than above	0
	6		LEFT	Battery voltage
			Other than above	0
	7		UP	Battery voltage
			Other than above	0

[Door mirror passenger side]

Terminals			Mirror switch condition	Voltage (V) (Approx.)
(+)		(-)		
Door mirror remote control switch connector	Terminal			
M7	2	Ground	DOWN / RIGHT	Battery voltage
			Other than above	0
	4		LEFT	Battery voltage
			Other than above	0
	5		UP	Battery voltage
			Other than above	0

RHD models

cardiagn.com

[Door mirror driver side]

Terminals			Mirror switch condition	Voltage (V) (Approx.)
(+)		(-)		
Door mirror remote control switch connector	Terminal			
M7	2	Ground	DOWN / RIGHT	Battery voltage
			Other than above	0
	4		LEFT	Battery voltage
			Other than above	0
	5		UP	Battery voltage
			Other than above	0

[Door mirror passenger side]

Terminals			Mirror switch condition	Voltage (V) (Approx.)
(+)		(-)		
Door mirror remote control switch connector	Terminal			
M7	2	Ground	DOWN / RIGHT	Battery voltage
			Other than above	0
	6		LEFT	Battery voltage
			Other than above	0
	7		UP	Battery voltage
			Other than above	0

Is the inspection result normal?

YES >> Door mirror remote control switch is OK.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between door remote control switch and ground.

Terminals			Voltage (V) (Approx.)
(+)		(-)	
Door mirror remote control switch connector	Terminal		
M7	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door mirror remote control switch connector.
3. Check continuity between mirror control switch connector and ground.

Door mirror remote control switch connector	Terminal	Ground	Continuity
M7	1		Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK DOOR MIRROR REMOTE CONTROL SWITCH

Check door mirror remote control switch.

carDiagn.com

Refer to MIR-8, "MIRROR SWITCH/CHANGEOVER SWITCH : Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Replace door mirror remote control switch. Refer to MIR-41, "Removal and Installation".

MIRROR SWITCH/CHANGEOVER SWITCH : Component Inspection

INFOID:0000000000951519

1. CHECK DOOR MIRROR REMOTE CONTROL SWITCH

Check door mirror remote control switch.

LHD models
Power supply

[Door mirror driver side]

Terminal		Mirror switch condition	Continuity
Door mirror remote control switch			
2	3	RIGHT / DOWN	Existed
		Other than above	Not existed
6		LEFT	Existed
		Other than above	Not existed
7		UP	Existed
		Other than above	Not existed

Door mirror passenger side]

Terminal		Mirror switch condition	Continuity
Door mirror remote control switch			
2	3	RIGHT / DOWN	Existed
		Other than above	Not existed
4		LEFT	Existed
		Other than above	Not existed
5		UP	Existed
		Other than above	Not existed

Ground

[Door mirror driver side]

Terminal		Mirror switch condition	Continuity
Door mirror remote control switch			
2	1	LEFT / UP	Existed
		Other than above	Not existed
6		RIGHT	Existed
		Other than above	Not existed
7		DOWN	Existed
		Other than above	Not existed

Door mirror passenger side]

Terminal	Mirror switch condition	Continuity
Door mirror remote control switch		

cardiagn.com

2	1	LEFT / UP	Existed
		Other than above	Not existed
4		RIGHT	Existed
		Other than above	Not existed
5		DOWN	Existed
		Other than above	Not existed

RHD models
Power supply

[Door mirror driver side]

Terminal		Mirror switch condition	Continuity
Door mirror remote control switch			
2	3	RIGHT / DOWN	Existed
		Other than above	Not existed
4		LEFT	Existed
		Other than above	Not existed
5		UP	Existed
		Other than above	Not existed

Door mirror passenger side]

Terminal		Mirror switch condition	Continuity
Door mirror remote control switch			
2	3	RIGHT / DOWN	Existed
		Other than above	Not existed
6		LEFT	Existed
		Other than above	Not existed
7		UP	Existed
		Other than above	Not existed

Ground

[Door mirror driver side]

Terminal		Mirror switch condition	Continuity
Door mirror remote control switch			
2	1	LEFT / UP	Existed
		Other than above	Not existed
4		RIGHT	Existed
		Other than above	Not existed
5		DOWN	Existed
		Other than above	Not existed

Door mirror passenger side]

Terminal		Mirror switch condition	Continuity
Door mirror remote control switch			
2	1	LEFT / UP	Existed
		Other than above	Not existed
6		RIGHT	Existed
		Other than above	Not existed
7		DOWN	Existed
		Other than above	Not existed

cardiagn.com

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace door mirror remote control switch. Refer to MIR-41, "Removal and Installation".

OPEN/CLOSE SWITCH

OPEN/CLOSE SWITCH : Description

INFOID:0000000000951524

- Open/close switch is interacted into door mirror control switch.
- Power is supplied to folding motor located inside the door mirror to operate the mirror.

OPEN/CLOSE SWITCH : Component Function Check

INFOID:0000000000951525

1.CHECK OPEN/CLOSE SWITCH FUNCTION

Check that door mirror can operate by door mirror remote control switch (open/close switch) operation.

Is the inspection result normal?

YES >> Open / close switch function is OK.
NO >> Refer to MIR-10, "OPEN/CLOSE SWITCH : Diagnosis Procedure"

OPEN/CLOSE SWITCH : Diagnosis Procedure

INFOID:0000000000951526

1.CHECK OPEN / CLOSE SWITCH OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between door mirror remote control switch and ground.

(+)		(-)	Open / close switch condition	Voltage (V) (Approx.)
Door mirror remote control switch connector	Terminal			
M7	8	Ground	CLOSE	Battery voltage
			Other than above	0
	9		OPEN	Battery voltage
			Other than above	0

Is the inspection result normal?

YES >> Open/close switch function is OK.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between door mirror remote control switch and ground.

(+)		(-)	Voltage (V) (Approx.)
Door mirror remote control switch connector	Terminal		
M7	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door mirror remote control switch connector.
3. Check continuity between door mirror remote control switch connector and ground.

Door mirror remote control switch connector	Terminal	Ground	Continuity
M7	1		Existed

Is the inspection result normal?

cardiagn.com

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK OPEN/CLOSE SWITCH

Check open/close switch.
Refer to MIR-11, "OPEN/CLOSE SWITCH : Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident"
NO >> Replace door mirror remote control switch. Refer to MIR-41, "Removal and Installation".

OPEN/CLOSE SWITCH : Component Inspection

INFOID:0000000000951527

1.CHECK OPEN/CLOSE SWITCH

Check door mirror remote control switch.

Power supply

Terminal		Open/close switch condition	Continuity
Door mirror remote control switch			
8	3	CLOSE	Existed
		Other than above	Not existed
9		OPEN	Existed
		Other than above	Not existed

Ground

Terminal		Open/close switch condition	Continuity
Door mirror remote control switch			
8	1	OPEN	Existed
		Other than above	Not existed
9		CLOSE	Existed
		Other than above	Not existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace door mirror remote control switch. Refer to MIR-41, "Removal and Installation".

cardiagn.com

DOOR MIRROR MOTOR

Description

INFOID:0000000000951520

It supplies electric power to door mirror motor with mirror switch and changeover switch.

Component Function Check

INFOID:0000000000951521

1.CHECK DOOR MIRROR MOTOR FUNCTION

Does motor operate normally during mirror switch operation.

Is the inspection result normal?

YES >> Door mirror motor function is OK.
NO >> Refer to MIR-12, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000951522

1.CHECK DOOR MIRROR MOTOR INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between door mirror connector and ground.

Terminals			Mirror switch Condition	Voltage (V) (Approx.)
(+)		(–)		
Door mirror connector	Terminal			
LHD models D3 (Driver side) / D43 (Passenger side) RHD models D23 (Driver side) / D63 (Passenger side)	2	Ground	LEFT	Battery voltage
			Other than above	0
	3		UP	Battery voltage
			Other than above	0
	4		DOWN / RIGHT	Battery voltage
			Other than above	0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect door mirror remote control switch connector and door mirror connector.
3. Check continuity between door mirror remote control switch connector and door mirror connector.

LHD models

[Door mirror driver side]

Door mirror remote control switch connector	Terminal	Door mirror connector	Terminal	Continuity
M7	2	D3	4	Existed
	6		2	
	7		3	

[Door mirror passenger side]

Door mirror remote control switch connector	Terminal	Door mirror connector	Terminal	Continuity
M7	2	D43	4	Existed
	4		2	
	5		3	

cardiagn.com

RHD models

[Door mirror driver side]

Door mirror remote control switch connector	Terminal	Door mirror connector	Terminal	Continuity
M7	2	D23	4	Existed
	4		2	
	5		3	

[Door mirror passenger side]

Door mirror remote control switch connector	Terminal	Door mirror connector	Terminal	Continuity
M7	2	D63	4	Existed
	6		2	
	7		3	

4. Check continuity between automatic drive positioner control unit connector and ground.

LHD models

[Door mirror driver side]

Door mirror remote control switch connector	Terminal	Ground	Continuity
M7	2		Not existed
	6		
	7		

[Door mirror passenger side]

Door mirror remote control switch connector	Terminal	Ground	Continuity
M7	2		Not existed
	4		
	5		

RHD models

[Door mirror driver side]

Door mirror remote control switch connector	Terminal	Ground	Continuity
M7	2		Not existed
	4		
	5		

[Door mirror passenger side]

Door mirror remote control switch connector	Terminal	Ground	Continuity
M7	2		Not existed
	6		
	7		

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3. CHECK DOOR MIRROR MOTOR

Check door mirror motor.
Refer to MIR-14, "Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".

A B C D E F G H I J K MIR M N O P
cardiagn.com

NO >> Replace door mirror. Refer to MIR-39, "Removal and Installation".

Component Inspection

INFOID:0000000000951523

1. CHECK DOOR MIRROR MOTOR-I

Check that door mirror motor does not trap foreign objects and does not have any damage.
Refer to MIR-38, "Exploded View".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace door mirror. Refer to MIR-39, "Removal and Installation".

2. CHECK DOOR MIRROR MOTOR-II

1. Turn ignition switch OFF.
2. Disconnect door mirror connector.
3. Apply 12V to each power supply terminal of door mirror motor.

Door mirror connector	Terminal		Operational direction
	(+)	(–)	
LHD models D3 (Driver side) / D43 (Passenger side) RHD models D23 (Driver side) / D63 (Passenger side)	4	2	RIGHT
	2	4	LEFT
	3	4	UP
	4	3	DOWN

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace door mirror. Refer to MIR-39, "Removal and Installation".

cardiagn.com

FOLDING MOTOR

Description

INFOID:0000000000951528

Power is supplied to the door mirror when pressing on door mirror remote control switch (open/close switch) and door mirror is operated.

Component Function Check

INFOID:0000000000951529

1.CHECK FOLDING MOTOR FUNCTION

Check that door mirror operates when open/close switch is pressed.

Is the inspection result normal?

YES >> Folding motor function is OK.
NO >> Refer to MIR-15, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000951530

1.CHECK FOLDING MOTOR INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between door mirror connector and ground.

(+)		(–)	Open / close switch condition	Voltage (V) (Approx.)
Door mirror connector	Terminal			
LHD models D3 (Driver side) / D43 (Passenger side)	5	Ground	CLOSE	Battery voltage
			Other than above	0
RHD models D23 (Driver side) / D63 (Passenger side)	6		OPEN	Battery voltage
			Other than above	0

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect door mirror remote control switch connector and door mirror connector.
3. Check continuity between door mirror remote control switch connector and door mirror connector.

Door mirror remote control switch connector	Terminal	Door mirror connector	Terminal	Continuity
M7	8	LHD models D3 (Driver side) / D43 (Passenger side) RHD models D23 (Driver side) / D63 (Passenger side)	5	Existed
	9		6	

4. Check continuity between door mirror remote control switch connector and ground.

Door mirror remote control switch connector	Terminal	Ground	Continuity
M7	8		Not existed
	9		

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

3.CHECK FOLDING MOTOR

Check folding motor.
Refer to MIR-16, "Component Inspection"

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".

carDiagn.com

NO >> Replace door mirror. Refer to MIR-39, "Removal and Installation".

Component Inspection

INFOID:0000000000951531

1. CHECK FOLDING MOTOR-I

Check that folding motor does not trap foreign objects and does not have any damage.
Refer to MIR-38, "Exploded View"

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace door mirror. Refer to MIR-39, "Removal and Installation".

2. CHECK FOLDING MOTOR-II

1. Turn ignition switch OFF.
2. Disconnect door mirror connector.
3. Apply 12V to each power supply terminal of door mirror motor.

Door mirror connector	Terminal		Open/close switch condition
	(+)	(–)	
LHD models D3 (Driver side) / D43 (Passenger side) RHD models D23 (Driver side) / D63 (Passenger side)	5	6	CLOSE
	6	5	OPEN

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace door mirror. Refer to MIR-39, "Removal and Installation".

cardiagn.com

AUTO ANTI-DAZZLING INSIDE MIRROR CIRCUIT

Description

INFOID:0000000000951532

It automatically changes according to the brightness of the light that is reflected from the headlight of the vehicle at the rear.

Component Function Check

INFOID:0000000000951533

1.CHECK AUTO ANTI-DAZZLING INSIDE MIRROR FUNCTION

Check that auto anti-dazzling inside mirror can operate when mirror sensor is illuminated.

Is the inspection result normal?

YES >> Auto anti-dazzling inside mirror function is OK.
NO >> Refer to MIR-17, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000951534

1.CHECK POWER SUPPLY CIRCUIT

Check voltage between auto anti-dazzling inside mirror connector and ground.

(+)		(-)	Condition of ignition switch	Voltage (V) (Approx.)
Auto anti-dazzling inside mirror connector	Terminal	Ground		
R6	1		ACC or ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness.

2.CHECK GROUND CIRCUIT

1. Disconnect auto anti-dazzling inside mirror connector.
2. Check continuity between auto anti-dazzling inside mirror connector and ground.

Auto anti-dazzling inside mirror connector	Terminal	Ground	Continuity
R6	2		Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK INTERMITTENT INCIDENT

Check intermittent incident.
Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

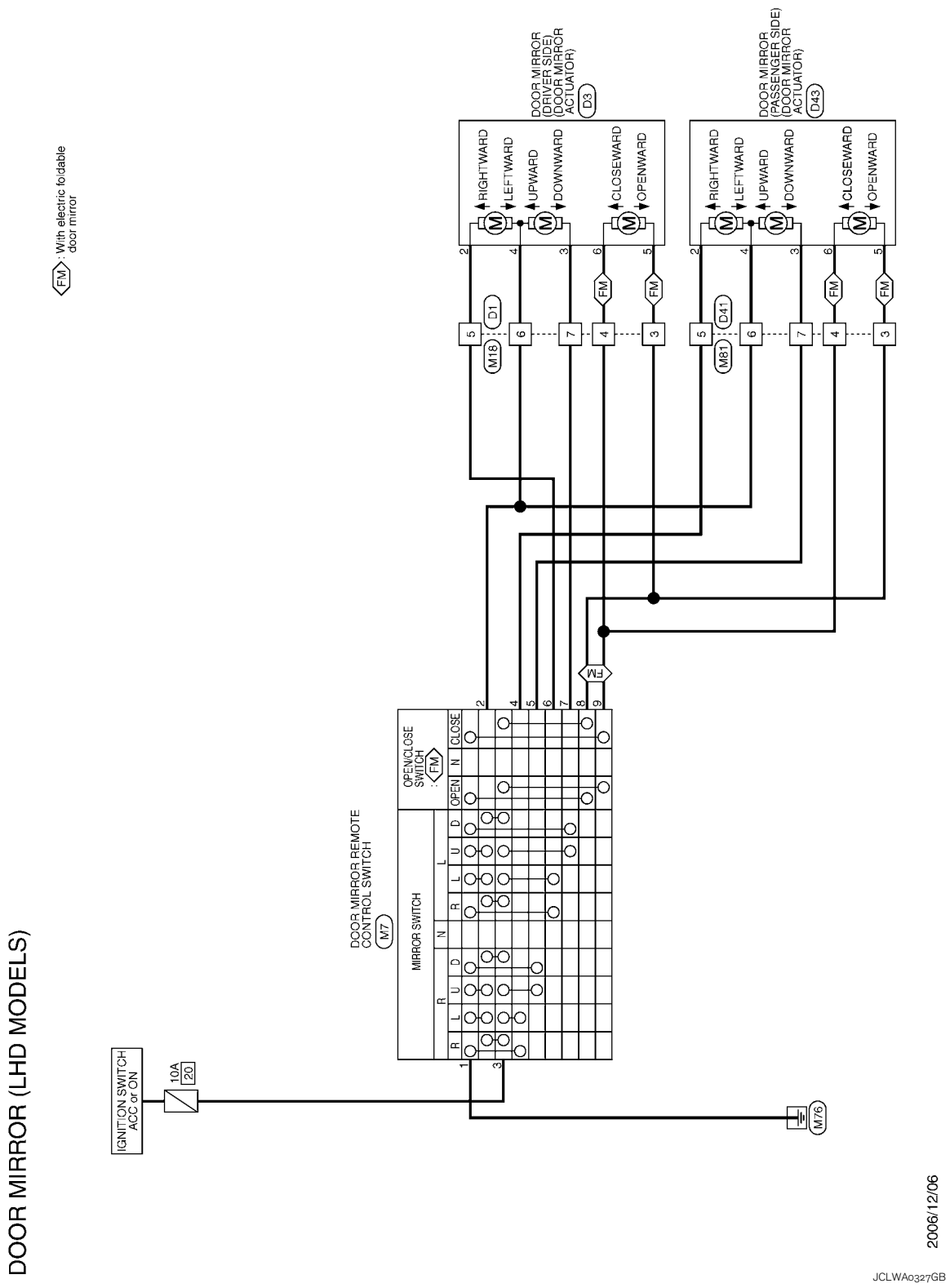
YES >> Replace auto anti-dazzling inside mirror. Refer to MIR-37, "Removal and Installation".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

DOOR MIRROR

Wiring Diagram - DOOR MIRROR SYSTEM (LHD MODELS) -

INFOID:0000000000951535



cardiagn.com

DOOR MIRROR (LHD MODELS)

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	O	–
4	SB	–
5	V	–
6	W	–
7	P	–

Connector No.	D3
Connector Name	DOOR MIRROR (DRIVER SIDE)
Connector Type	TK08MGY

Terminal No.	Color of Wire	Signal Name [Specification]
2	V	–
3	P	–
4	W	–
5	O	–
6	SB	–

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	O	–
4	SB	–
5	L	–
6	W	–
7	LG	–

Connector No.	D43
Connector Name	DOOR MIRROR (PASSENGER SIDE)
Connector Type	TK08MGY

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	–
3	LG	–
4	W	–
5	O	–
6	SB	–

Connector No.	M7
Connector Name	DOOR MIRROR REMOTE CONTROL SWITCH
Connector Type	NS10FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	W	–
3	R	–
4	L	–
5	LG	–
6	V	–
7	P	–
8	O	–
9	SB	–

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
3	O	–
4	SB	–
5	V	–
6	W	–
7	P	–

Connector No.	M81
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

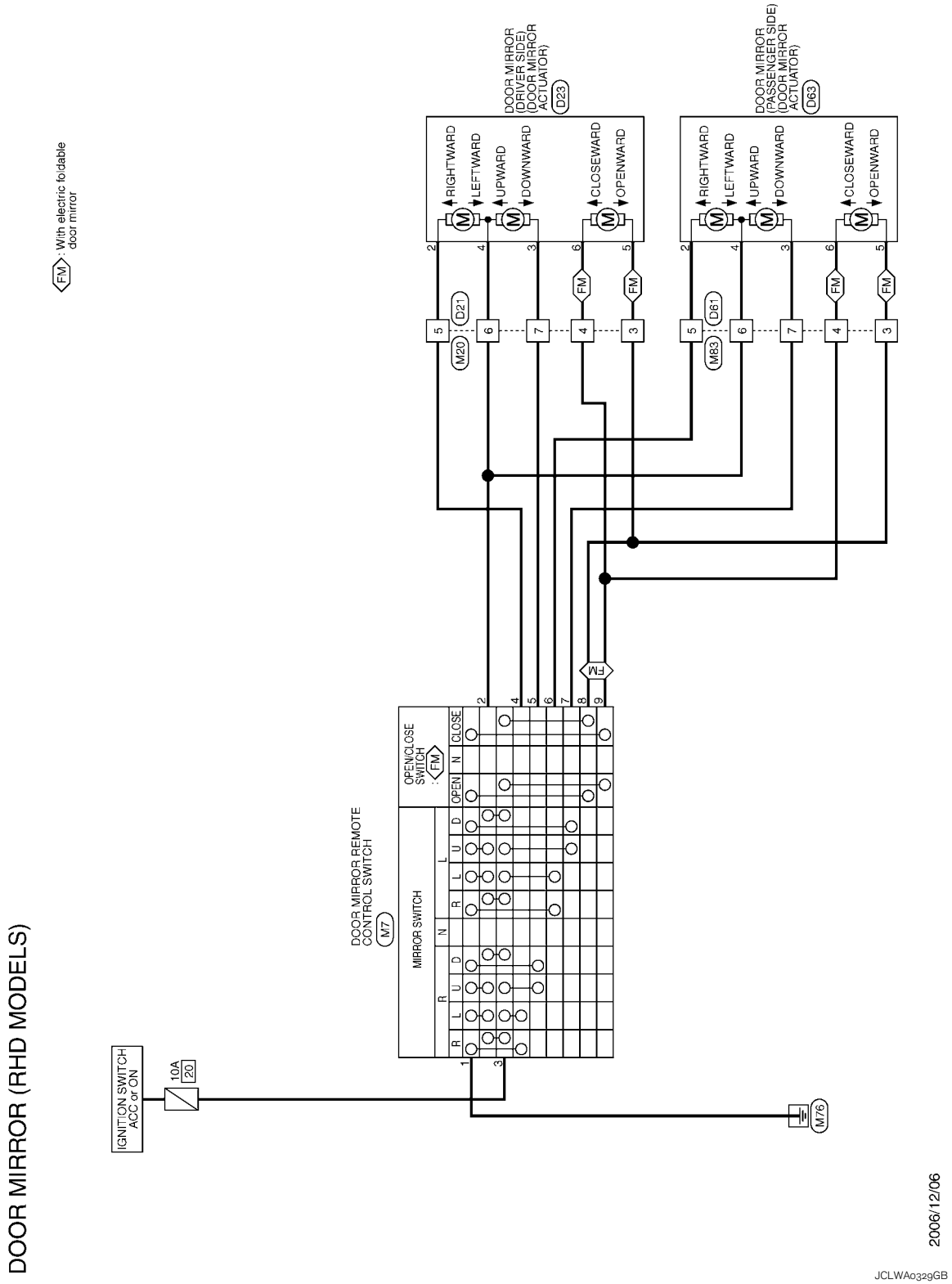
Terminal No.	Color of Wire	Signal Name [Specification]
3	O	–
4	SB	–
5	L	–
6	W	–
7	LG	–

JCLWA0328GB

cardiagn.com

Wiring Diagram - DOOR MIRROR SYSTEM (RHD MODELS) -

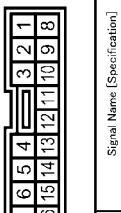
INFOID:0000000001125399



cardiagn.com

DOOR MIRROR (RHD MODELS)

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

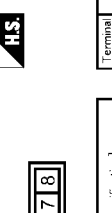


Terminal No.	Color of Wire	Signal Name [Specification]
3	O	–
4	SB	–
5	L	–
6	W	–
7	LG	–

Connector No.	D23
Connector Name	DOOR MIRROR (DRIVER SIDE)
Connector Type	TK08MGY

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	–
3	LG	–
4	W	–
5	O	–
6	SB	–

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

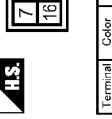


Terminal No.	Color of Wire	Signal Name [Specification]
3	O	–
4	SB	–
5	V	–
6	W	–
7	P	–

Connector No.	D63
Connector Name	DOOR MIRROR (PASSENGER SIDE)
Connector Type	TK08MGY

Terminal No.	Color of Wire	Signal Name [Specification]
2	V	–
3	P	–
4	W	–
5	O	–
6	SB	–

Connector No.	M7
Connector Name	DOOR MIRROR REMOTE CONTROL SWITCH
Connector Type	NS10FW-CS

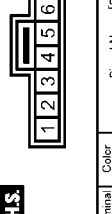


Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	W	–
3	R	–
4	L	–
5	LG	–
6	V	–
7	P	–
8	O	–
9	SB	–

Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

Terminal No.	Color of Wire	Signal Name [Specification]
3	O	–
4	SB	–
5	L	–
6	W	–
7	LG	–

Connector No.	M83
Connector Name	WIRE TO WIRE
Connector Type	TK16MW



Terminal No.	Color of Wire	Signal Name [Specification]
3	O	–
4	SB	–
5	V	–
6	W	–
7	P	–

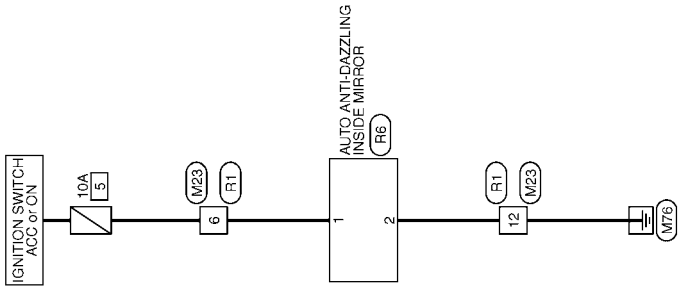
JCLWA0330GB

carDiagn.com

AUTO ANTI-DAZZLING INSIDE MIRROR SYSTEM

Wiring Diagram - INSIDE MIRROR SYSTEM -

INFOID:0000000000951536



INSIDE MIRROR

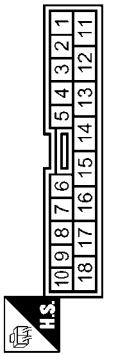
2006/12/06

JCLWA0331GB

cardiagn.com

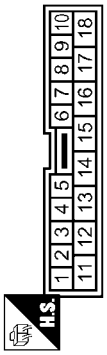
INSIDE MIRROR

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
6	R	–
12	B	–

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
6	R	–
12	B	–

Connector No.	R6
Connector Name	AUTO ANTI-DAZZLING INSIDE MIRROR
Connector Type	CINCH 49008228

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	B	–

JCLWA0332GB

carDiagn.com

SYMPTOM DIAGNOSIS

NONE OF THE DOOR MIRROR CAN BE OPERATED USING ANY SWITCH

Diagnosis Procedure

INFOID:0000000000951537

1.CHECK DOOR MIRROR REMOTE CONTROL SWITCH (MIRROR SWITCH・CHANGEOVER SWITCH)

Check door mirror remote control switch (mirror switch・changeover switch).
Refer to MIR-6, "MIRROR SWITCH/CHANGEOVER SWITCH : Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK DOOR MIRROR REMOTE CONTROL SWITCH (OPEN/CLOSE SWITCH)

Check door mirror remote control switch (open/close switch).
Refer to MIR-10, "OPEN/CLOSE SWITCH : Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

DOOR MIRROR DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000951538

1.CHECK DOOR MIRROR REMOTE CONTROL SWITCH (MIRROR SWITCH・CHANGEOVER SWITCH)

Check door mirror remote control switch (mirror switch・changeover switch).
Refer to MIR-6, "MIRROR SWITCH/CHANGEOVER SWITCH : Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK DOOR MIRROR MOTOR

Check the door mirror motor operation.
Refer to MIR-12, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

ELECTRIC FOLDABLE DOOR MIRROR DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000951539

1.CHECK DOOR MIRROR CONTROL SWITCH (OPEN / CLOSE SWITCH)

Check door mirror control switch (open / close switch).
Refer to MIR-10, "OPEN/CLOSE SWITCH : Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK FOLDING MOTOR

Check folding motor.
Refer to MIR-15, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

AUTO ANTI-DAZZLING INSIDE MIRROR DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000951540

1.CHECK AUTO ANTI-DAZZLING INSIDE MIRROR

Check auto anti-dazzling inside mirror.
Refer to MIR-17, "Component Function Check".

Is the inspection result normal?

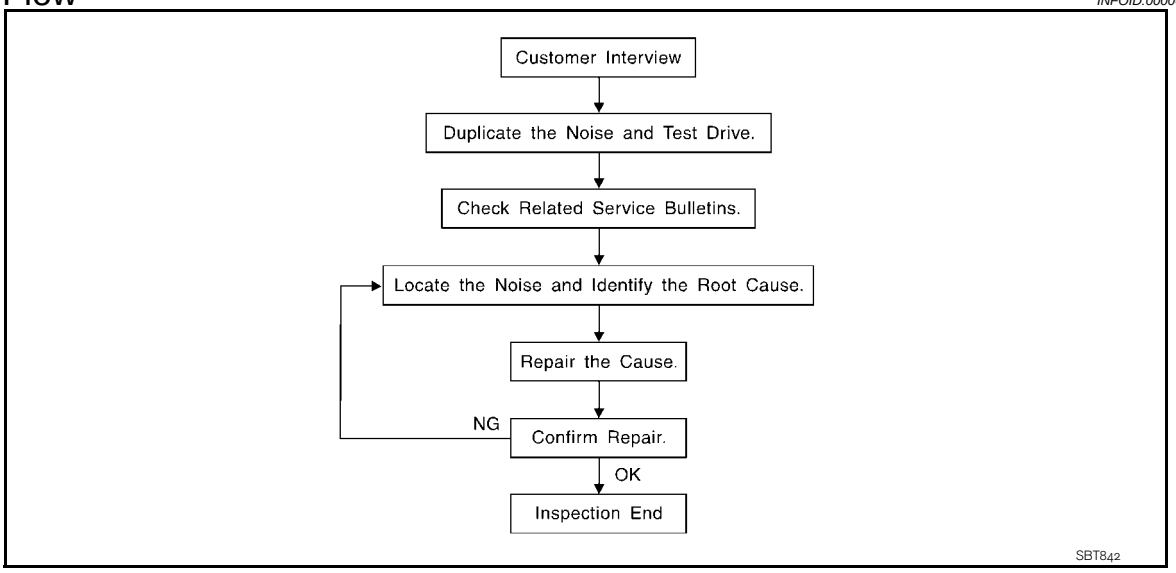
YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

carDiagn.com

SQUEAK AND RATTLE TROUBLE DIAGNOSIS

Work Flow

INFOID:0000000001115857



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to INT-6, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

cardiagn.com

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to MIR-30, "Generic Squeak and Rattle Troubleshooting".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.
- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

cardiagn.com

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

INFOID:0000000001115256

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

cardiagn.com

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.

Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.

Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

cardiagn.com

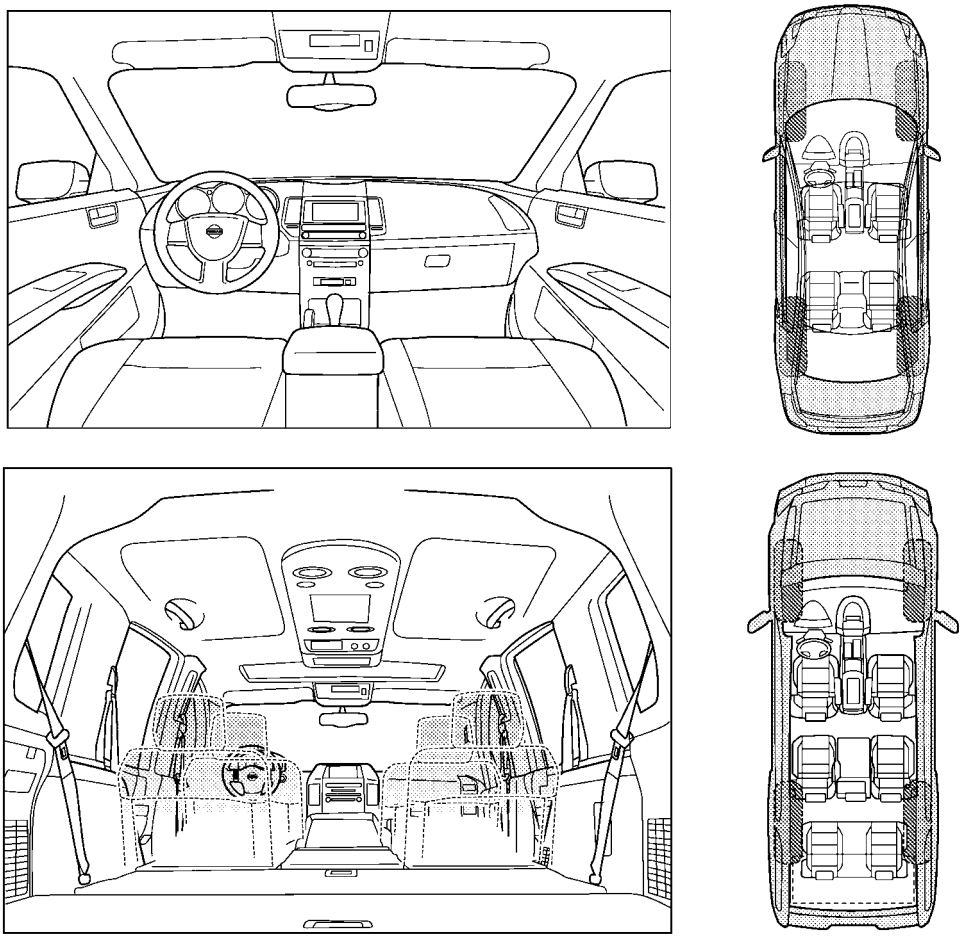
Diagnostic Worksheet

INFOID:0000000001115257

SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

cardiagn.com

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

cardiagn.com

PRECAUTION

PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000951544

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

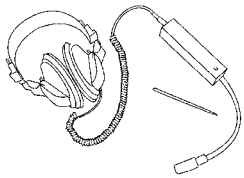
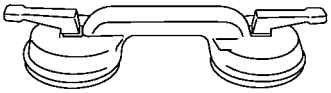
cardiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000000951545

Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Suction lifter  PIIB1805J	Holding the door glass

carsdiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000000977987

BASIC INSPECTION

1. INSPECTION START

1. Check the service history.
2. Check the following parts.

- Fuse/circuit breaker blown.
- Poor connection, open or short circuit of harness connector.
- Battery voltage.

Is the inspection result normal?

YES >> Inspection end.
NO >> Repair or replace the malfunctioning parts.

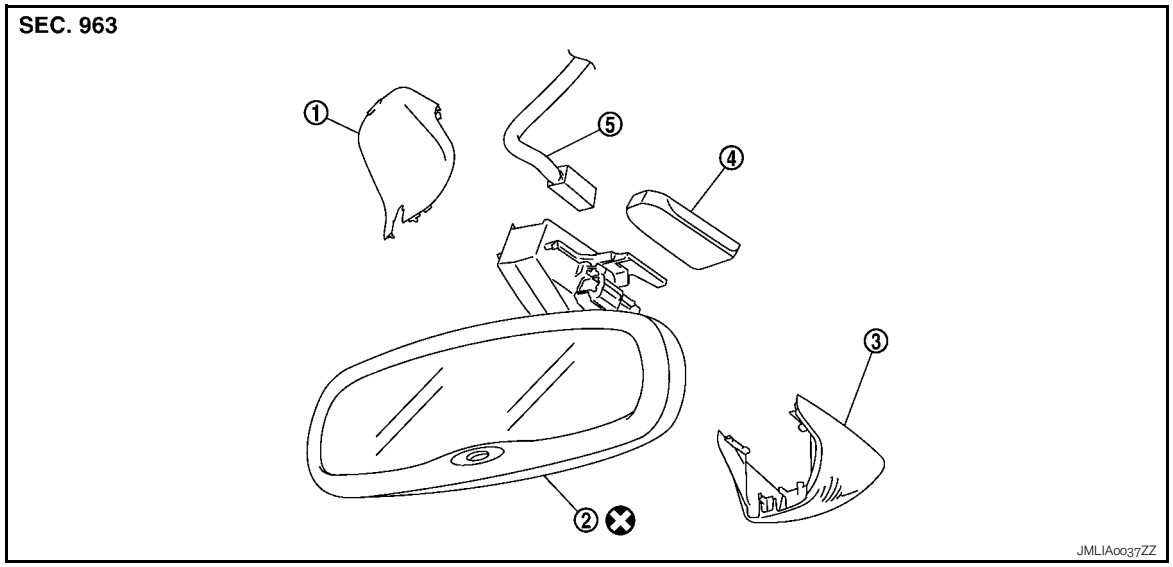
cardiagn.com

ON-VEHICLE REPAIR

INSIDE MIRROR

Exploded View

INFOID:0000000001093107



1. Inside mirror cover (upper)
2. Inside mirror
3. Inside mirror cover (lower)
4. Mirror base
5. Connector

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001093108

REMOVAL

1. Remove the inside mirror finisher (upper and lower).
2. Slide the mirror upward to remove.
3. Disconnect the connector.

INSTALLATION

Install in the reverse order of removal.

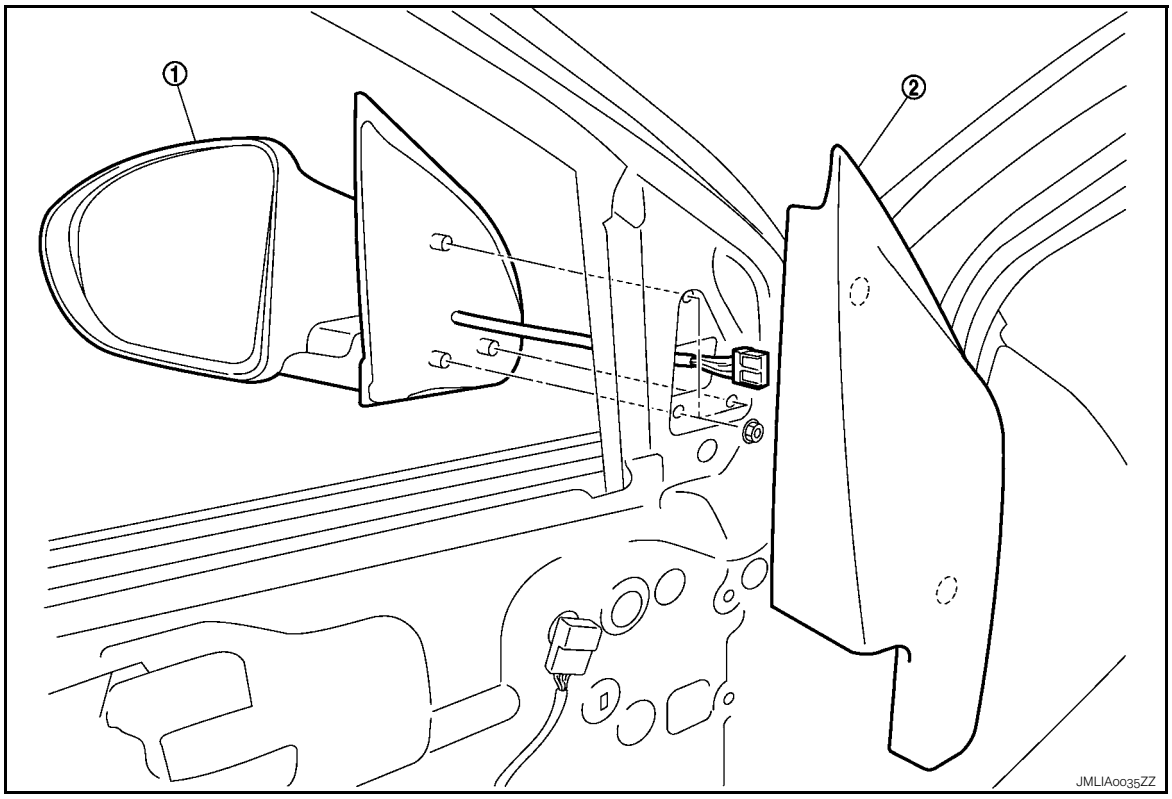
cardiagn.com

DOOR MIRROR

Exploded View

INFOID:0000000001093102

REMOVAL

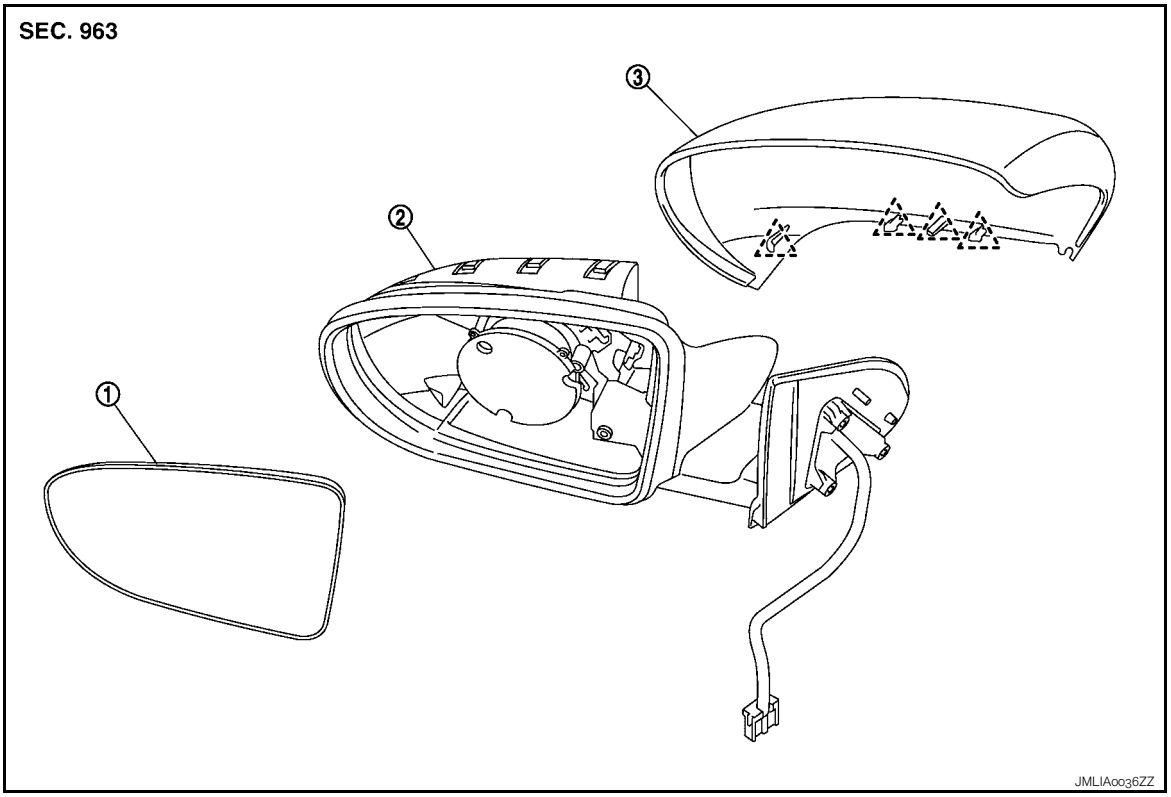


1. Door mirror assembly
2. Corner cover

:Clip

DISASSEMBLY

cardiagn.com



1. Mirror (mirror holder)
2. Mirror assembly
3. Mirror cover

Pawl

Removal and Installation

INFOID:0000000001093103

REMOVAL

1. Remove the front door finisher. Refer to INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Remove the corner cover.
3. Disconnect the door mirror harness connector.
4. Remove the door mirror mounting nuts, and remove the door mirror assembly.

CAUTION:
Do not damage the mirror bodies.

INSTALLATION

Install in the reverse order of removal.

CAUTION:
Do not damage the mirror bodies.

Disassembly and Assembly

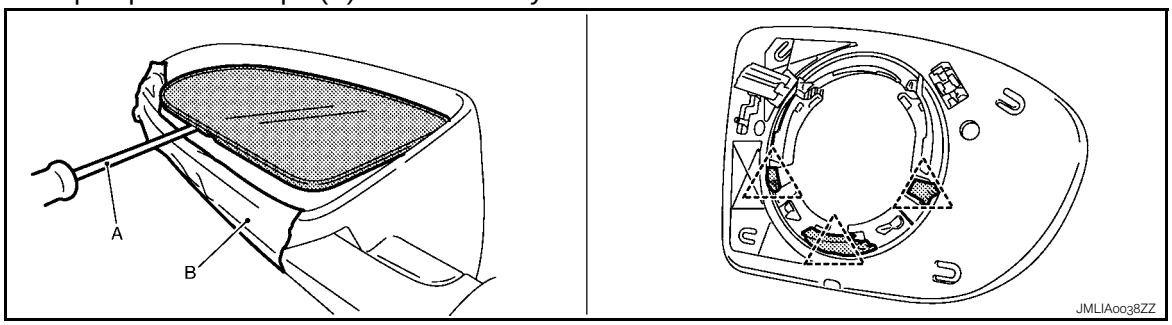
INFOID:0000000001093104

DISASSEMBLY

1. Remove the clips and mirror cover from the housing.
2. Place the mirror body with mirror glass upward.

cardiagn.com

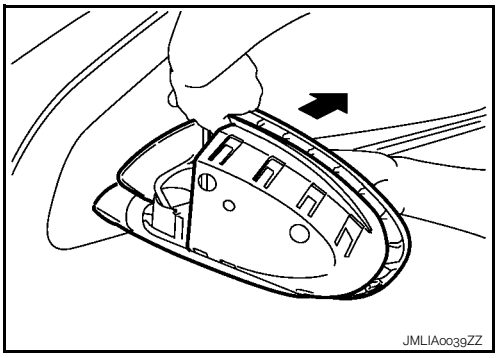
3. Put a strip of protective tape (B) on mirror body.



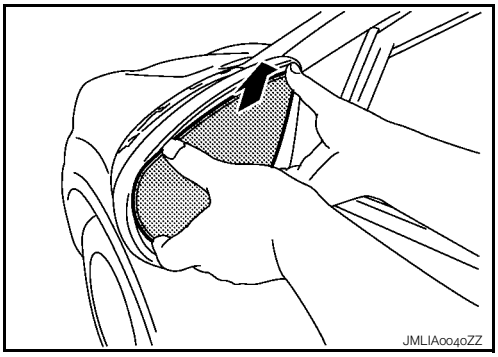
: Pawl

4. Insert a small flatted driver (A) between the mirror assembly and the mirror glass, and remove the pawl located under the mirror glass from mirror assembly.
NOTE:
when removing the pawl under the mirror glass, the left and right side pawls are simultaneously removed.

5. From the mirror assembly side, hold and push the mirror glass downward.
CAUTION:
Avoid dropping the mirror glass by holding it securely.



6. Slide the mirror glass upward as shown by the arrow and remove it from the mirror assembly.



7. Remove two terminals of mirror heater attachment.

ASSEMBLY

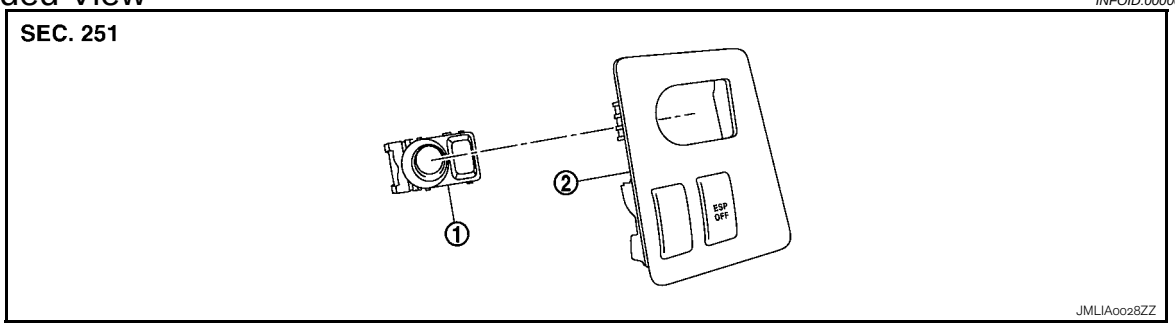
Install in the reverse order of removal.
NOTE:
After installation, visually check that pawls are securely engaged.

cardiagn.com

DOOR MIRROR REMOTE CONTROL SWITCH

Exploded View

INFOID:0000000000951550



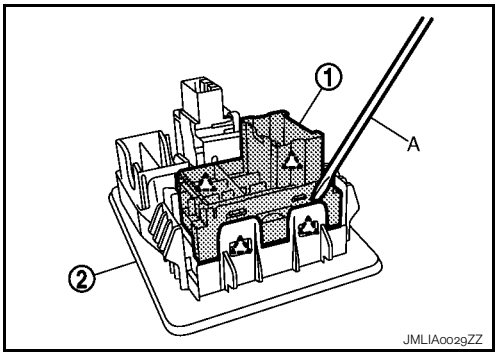
1. Door mirror remote control switch
2. Mirror switch finsher

Removal and Installation

INFOID:0000000000951551

REMOVAL

1. Remove the mirror switch finisher (2).
   Refer to IP-12, "Removal and Installation"
2. Remove door mirror remote control switch (1) from mirror switch finisher (2) using screw driver (A).



: **Pawl**

INSTALLATION

Install in the reverse order of removal.

SECTION PB
PARKING BRAKE SYSTEM

CONTENTS

ON-VEHICLE MAINTENANCE 2

PARKING BRAKE SYSTEM 2
Inspection and Adjustment 2

PARKING BRAKE SHOE 4
Inspection 4

ON-VEHICLE REPAIR 5

PARKING BRAKE CONTROL 5
Exploded View 5
Removal and Installation 5
Adjustment 5

PARKING BRAKE SHOE 7
Exploded View 7
Removal and Installation 7
Inspection and Adjustment 8

SERVICE DATA AND SPECIFICATIONS (SDS) 10

SERVICE DATA AND SPECIFICATIONS (SDS) 10
Parking Drum Brake 10
Parking Brake Control 10

cardiagn.com

ON-VEHICLE MAINTENANCE

PARKING BRAKE SYSTEM

Inspection and Adjustment

INFOID:0000000000925852

INSPECTION

Lever Stroke

- Operate the parking brake lever with a force of 196 N (20 kg, 44 lb). Check that the lever stroke is within the specified number of notches. (Check it by listening to the clicks of the ratchet.)

Standard

Number of notches **: Refer to PB-10, "Parking Brake Control".**

- When parking brake warning lamp turns ON, check that the lever stroke is within the specified number of notches. (Check it by listening to the clicks of the ratchet.)

Standard

Number of notches **: Refer to PB-10, "Parking Brake Control".**

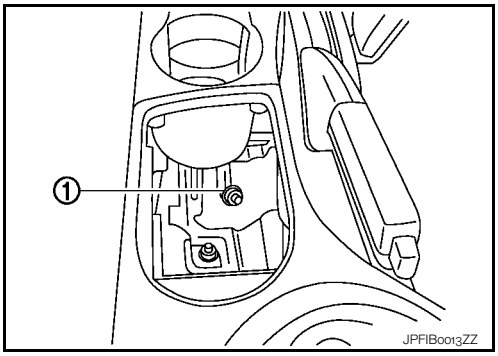
Inspect Components

- Check each component for installation condition such as looseness.
- Check the device assembly for bend, damage and cracks. Replace if necessary.
- Check the cables for wear, damage and cracks. Replace if necessary.
- Check the parking brake switch, and replace it if necessary. Refer to BRC-47, "Component Inspection" (with ABS), BRC-145, "Component Inspection" (with ESP).

ADJUSTMENT

- To perform adjustment operations, remove rear tires.

1. Fix the disc rotor using wheel nuts.
2. Remove the switch cover from center console.
3. Release the parking brake lever by turning the adjusting nut (1) with a deep socket wrench and loosening the cable.



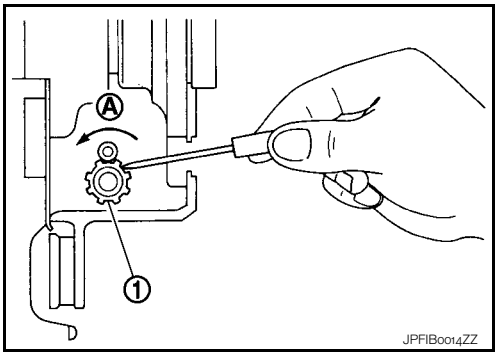
4. Remove the adjusting hole plug from the disc rotor. Turn the adjuster (1) in the direction (A) as shown in the figure using a suitable tool until the disc rotor is locked.
5. Turn back the adjuster 7 notches from the locked position.
6. Rotate the disc rotor to check that there is no drag. Install the adjusting hole plug.
7. Adjust the cable with the following procedure.

a. Operate the parking brake lever with a force of 294 N (30 kg, 66 lb) for 10 strokes or more.

b. Adjust the parking brake lever stroke by turning the adjusting nut with a deep socket wrench.

CAUTION:

Never reuse the adjusting nut if the nut is removed.



cardiagn.com

c. Operate the parking brake lever with a force of 196 N (20 kg, 44 lb). Check that the lever stroke is within the specified number of notches. (Check it by listening to the clicks of the ratchet.)

Standard

Number of notches : Refer to PB-10, "Parking Brake Control".

d. Rotate the disc rotor with the parking brake lever released and check that there is no drag.

cardiagn.com

PARKING BRAKE SHOE

Inspection

INFOID:0000000000925853

Rotate the disc rotor and check for any drag.

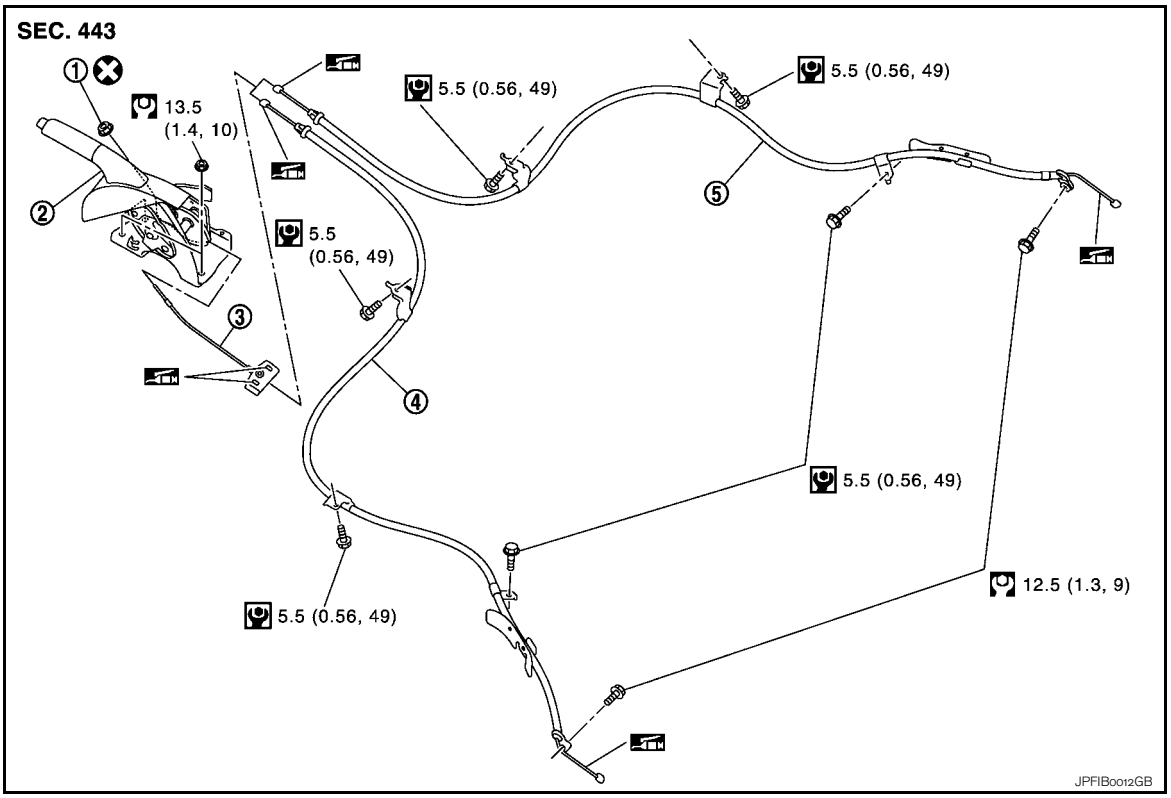
cardiagn.com

ON-VEHICLE REPAIR

PARKING BRAKE CONTROL

Exploded View

INFOID:0000000000925857



1. Adjusting nut
2. Device assembly
3. Front cable
4. Rear cable (LH)
5. Rear cable (RH)

: Apply multi-purpose grease.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000925858

REMOVAL

1. Remove rear tires.
2. Remove center console. Refer to IP-18, "Exploded View".
3. Disconnect parking brake switch harness connector.
4. Remove adjusting nut and loosen front cable.
5. Remove device assembly.
6. Remove the heat insulator and center muffler. Refer to EX-5, "Exploded View" (HR16DE engine models), EX-10, "Exploded View" (MR20DE engine models), EX-15, "Exploded View" (K9K engine models).
7. Separate front cable from rear cable, and remove front cable.
8. Remove parking brake shoe, and remove rear cable from toggle lever. Refer to PB-7, "Exploded View".
9. Remove rear cable mounting bolts pull out rear cable from vehicle.

INSTALLATION

Install in the reverse order of the removal.

Adjustment

INFOID:0000000000925859

cardiagn.com

ADJUSTMENT AFTER INSTALLATION

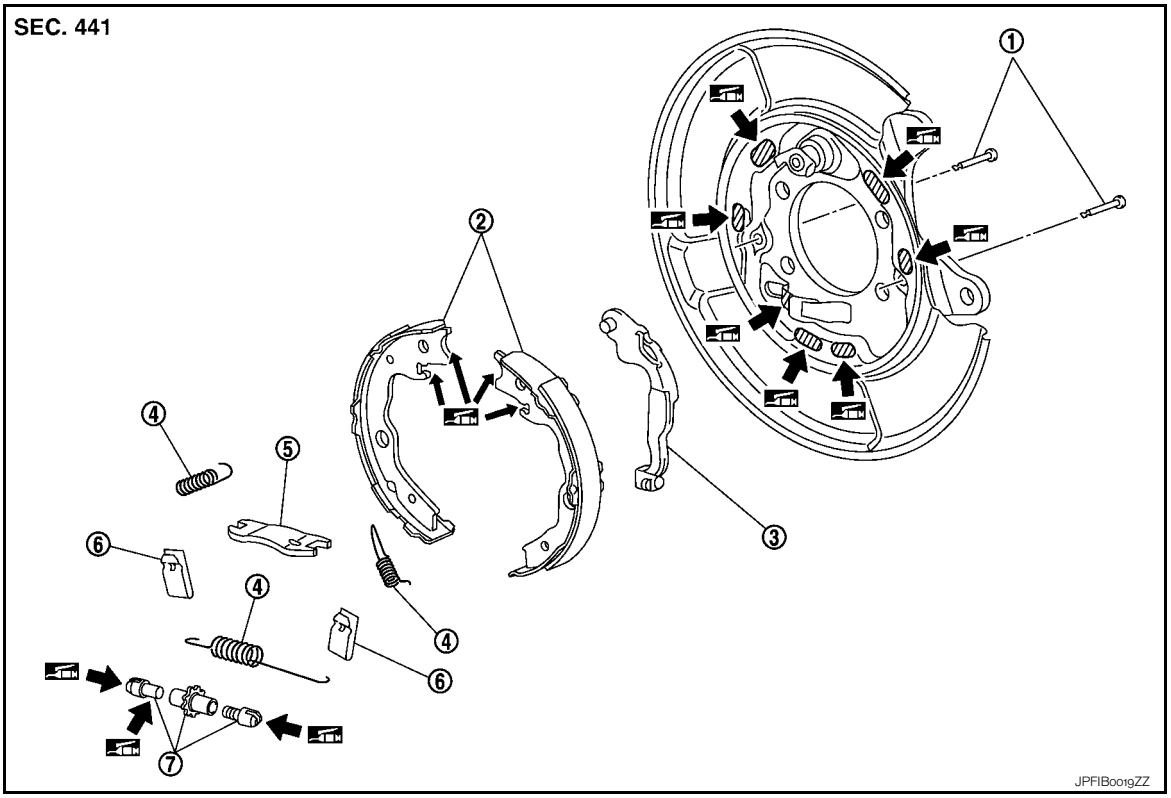
Adjust the parking brake lever stroke. Refer to PB-2, "Inspection and Adjustment".

cardiagn.com

PARKING BRAKE SHOE

Exploded View

INFOID:0000000000925860



1. Anti-rattle pin
2. Parking brake shoe
3. Toggle lever
4. Return spring
5. Brake strut
6. Spring
7. Adjuster

: Apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease.

Removal and Installation

INFOID:0000000000925861

REMOVAL

WARNING:

Clean any dust from the parking brake shoes and brake plates with a vacuum dust collector. Never blow with compressed air.

1. Remove rear tires.
2. Remove disc rotor with parking brake completely in the released position. Refer to BR-43, "BRAKE CALIPER ASSEMBLY : Removal and Installation" (LHD), BR-87, "BRAKE CALIPER ASSEMBLY : Removal and Installation" (RHD).

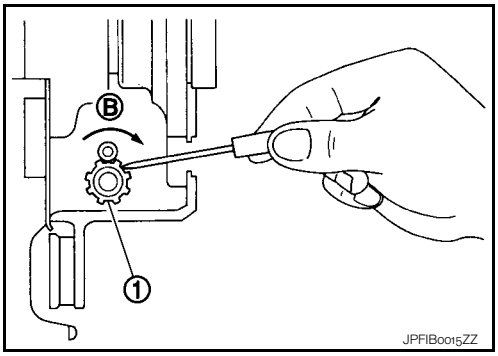
   CAUTION:

   - **Put matching marks on the disc rotor and the wheel hub and bearing assembly when reusing the disc rotor.**
   - **Never drop disc rotor.**
3. If disc rotor cannot be removed, remove as follows:

a. Fix the disc rotor with wheel nuts and remove the adjusting hole plug.

cardiagn.com

b. Using suitable tool, rotate adjuster (1) in direction (B) to retract and loosen brake shoe.

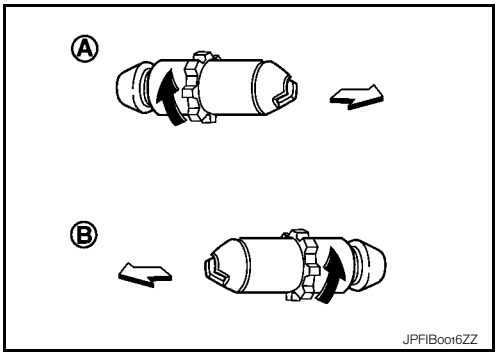


4. Remove anti-rattle pins, springs, and return springs.
   CAUTION:
   Never drop the removed parts.
5. Remove brake strut, adjuster, parking brake shoes and toggle lever.
   CAUTION:
   - **The parking brake shoes for the front side are made of different materials from those for the rear side. Never misidentify them when removing.**
   - **Never drop the removed parts.**
6. For the removal of back plate, refer to RAX-4, "Exploded View" (2WD), RAX-11, "Exploded View" (4WD).

INSTALLATION

Install in the reverse order of removal.

- Apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease to the back plate and brake shoe.
  CAUTION:
  The parking brake shoes for the front side are made of different materials from those for the rear side. Never misidentify them when removing and replacing.
- Assemble adjusters so that threaded part is expanded when rotating it in the direction shown by arrow.



A: For RH brake
B: For LH brake
⇦: Vehicle front
⬅: Adjuster expands

- Shorten adjuster by rotating it.
- When disassembling after, apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease to threads.
- Check parking brake shoe sliding surface and drum inner surface for grease. Wipe it off if it adhere on the surfaces.

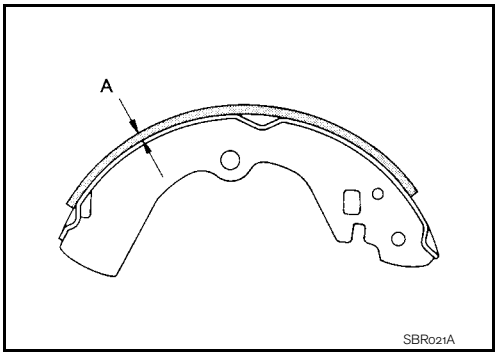
Inspection and Adjustment

INFOID:0000000000925862

INSPECTION AFTER REMOVAL

Brake Lining Thickness Inspection

- Check thickness (A) of brake lining.



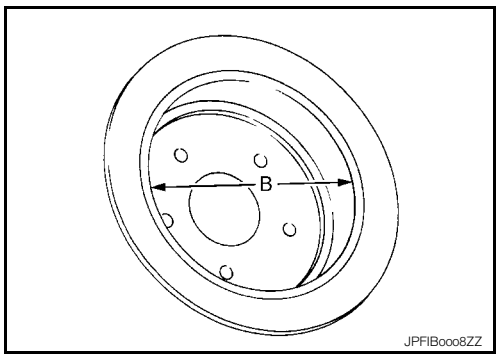
Standard thickness	**: Refer to PB-10, "Parking Drum Brake".**
Wear limit	**: Refer to PB-10, "Parking Drum Brake".**

Drum Inner Diameter Inspection

cardiagn.com

- Check inner diameter (B) of drum.

Standard inner diameter	**: Refer to PB-10, "Parking Drum Brake".**
Wear limit of inner diameter	**: Refer to PB-10, "Parking Drum Brake".**



Other Inspections

- Check the brake lining for excessive wear, damage, and peeling. Replace if necessary.
- Check the parking brake shoe sliding surface for excessive wear and damage. Replace if necessary.
- Check the anti-rattle pin for excessive wear, damage and rust. Replace if necessary.
- Check the spring and return springs for settling, excessive wear, damage, and rust. Replace if necessary.
- Check the brake strut for excessive wear, damage and rust. Replace if necessary.
- Check the adjuster for smoothness. Replace if necessary.
- Check the toggle lever for excessive wear, damage and rust. Replace if necessary.
- Visually check inside of the drum for excessive wear, cracks, and damage with a pair of vernier calipers. Replace if necessary.

ADJUSTMENT AFTER INSTALLATION

- Adjust the parking brake lever stroke. Refer to PB-2, "Inspection and Adjustment".
- Perform break-in operation as follows after replacing parking brake shoe and/or disc rotor, or if brakes do not function well.

1. Adjust lever stroke to the specified amount. Refer to PB-2, "Inspection and Adjustment".
2. Perform parking brake break-in (drag on) operation by driving vehicle under the following conditions:

Drive forward

· Vehicle speed	: Approx. 40 km/h (25 MPH) set (constant and forward)
· Parking brake operating force	: Approx. 100 N (10.2 kg, 22 lb) set constant
· time	: Approx. 5 sec.

CAUTION:
To prevent lining from getting too hot, allow a cool off period of approximately 5 minutes after every break-in operation.

3. After the break-in procedure, check lever stroke of parking brake. If it is out of the specification, adjust again. Refer to PB-2, "Inspection and Adjustment".

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Parking Drum Brake

INFOID:0000000000925863

Unit: mm (in.)

Brake lining	Standard thickness	3.2 (0.126)
	Wear limit	1.5 (0.059)
Drum (disc)	Standard inner diameter	172 (6.77) dia.
	Wear limit of inner diameter	173 (6.81) dia.

Parking Brake Control

INFOID:0000000000925864

Number of notches [under force of 196 N (20 kg, 44 lb)]	7 – 8 notches
Number of notches when parking brake warning lamp turns ON	1 notch

cardiagn.com

SECTION PCS
POWER CONTROL SYSTEM

CONTENTS

IPDM E/R

FUNCTION DIAGNOSIS 2

RELAY CONTROL SYSTEM 2
System Diagram 2
System Description 2
Component Parts Location 3

SIGNAL BUFFER SYSTEM 5
System Diagram 5
System Description 5
Component Parts Location 5

POWER CONSUMPTION CONTROL SYSTEM 7
System Diagram 7
System Description 7
Component Parts Location 7

DIAGNOSIS SYSTEM (IPDM E/R) 9
Diagnosis Description 9
CONSULT - III Function (IPDM E/R) 11

COMPONENT DIAGNOSIS 14

U1000 CAN COMM CIRCUIT 14
Description 14
DTC Logic 14
Diagnosis Procedure 14

B2098 IGNITION RELAY ON STUCK 15
Description 15
DTC Logic 15
Diagnosis Procedure 15

B2099 IGNITION RELAY OFF STUCK 16
Description 16
DTC Logic 16
Diagnosis Procedure 16

B2100 EEPROM 17
DTC Logic 17
Diagnosis Procedure 17

POWER SUPPLY AND GROUND CIRCUIT 18
Diagnosis Procedure 18

ECU DIAGNOSIS 19

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 19
Reference Value 19
Wiring Diagram - IPDM E/R - 25
Fail Safe 28
DTC Index 30

PRECAUTION 31

PRECAUTIONS 31
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 31

ON-VEHICLE REPAIR 32

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 32
Exploded View 32
Removal and Installation 32

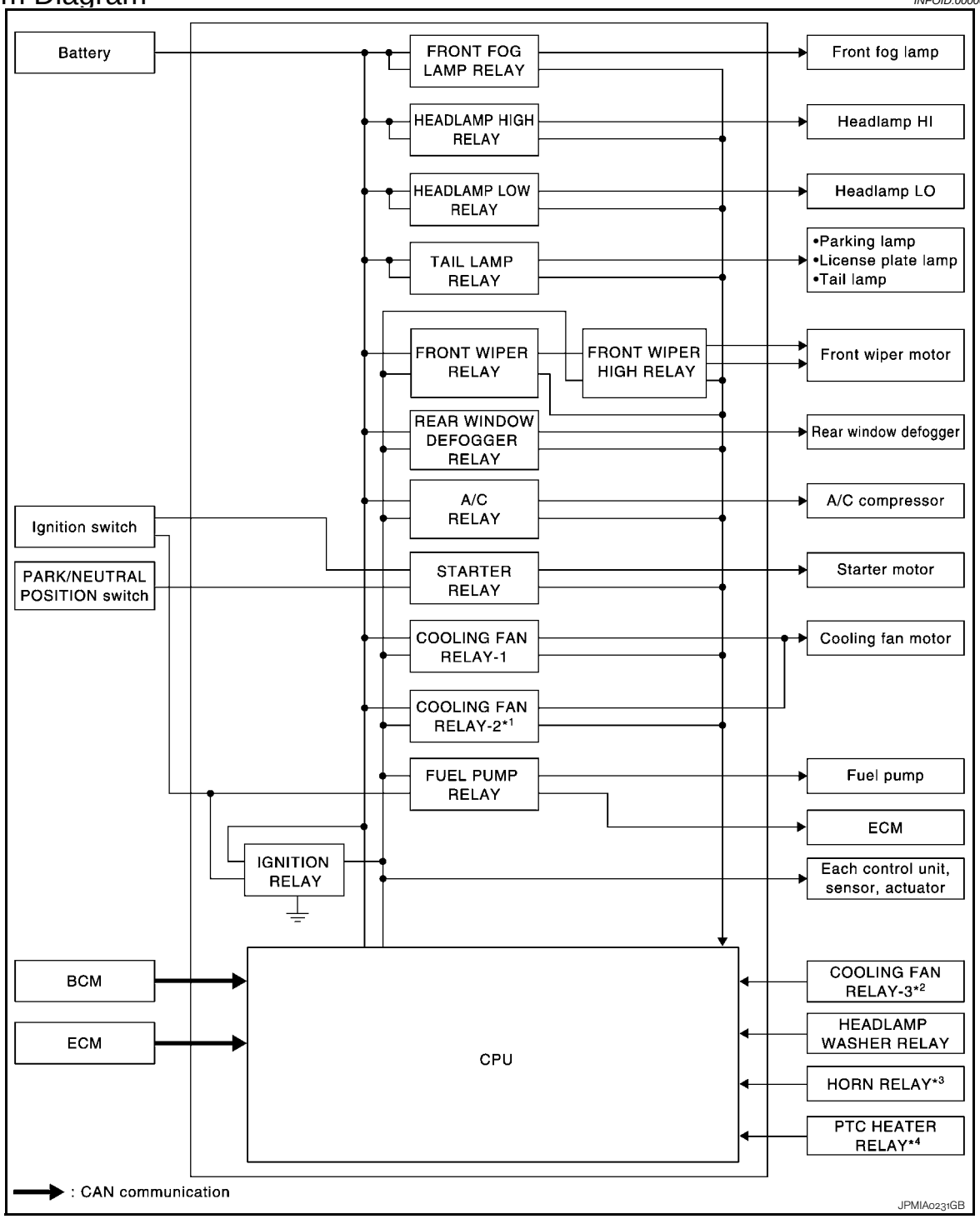
cardiagn.com

FUNCTION DIAGNOSIS

RELAY CONTROL SYSTEM

System Diagram

INFOID:0000000000926979



NOTE:

- *1: HR engine models
- *2: MR engine and K9K engine models
- *3: With vehicle security (theft warning) system
- *4: K9K engine models

System Description

INFOID:0000000000926980

cardiagn.com

IPDM E/R activates the internal control circuit to perform the relay ON-OFF control according to the input signals from various sensors and the request signals received from control units via CAN communication.

CAUTION:

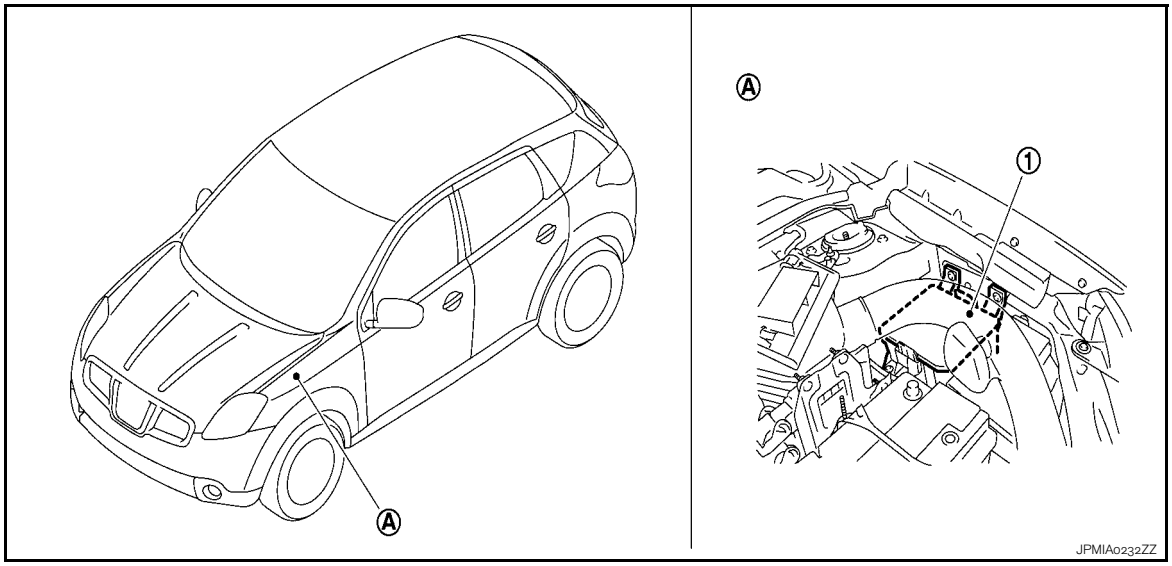
IPDM E/R integrated relays cannot be removed.

Control relay	Input/output	Transmit unit	Control part	Reference page
• Headlamp low relay • Headlamp high relay	• Low beam request signal • High beam request signal	BCM (CAN)	• Headlamp low • Headlamp high	• EXL-11 (xenon headlamp) • EXL-191 (halogen headlamp)
Front fog lamp relay	Front fog light request signal	BCM (CAN)	Front fog lamp	• EXL-17 (xenon headlamp) • EXL-197 (halogen headlamp)
Tail lamp relay	Position light request signal	BCM (CAN)	• Parking lamp • License plate lamp • Tail lamp	• EXL-23 (xenon type headlamp) • EXL-201 (halogen type headlamp)
			Illuminations	INL-13
• Front wiper relay • Front wiper high relay	Front wiper request signal	BCM (CAN)	Front wiper	WW-6
	Front wiper auto stop signal	Front wiper motor		
Rear window defogger relay	Rear window defogger switch signal	BCM (CAN)	Rear window defogger	DEF-4
Starter relay	Ignition and starter request signal	BCM (CAN)	Starter motor	• SEC-9 (with INTELLIGENT KEY) • SEC-161 (without INTELLIGENT KEY)
• Cooling fan relay-1 • Cooling fan relay-2 • Cooling fan relay-3	Cooling fan speed request signal	ECM (CAN)	Cooling fan	• EC-68 [HR16DE (with EURO-OBD)] • EC-407 [HR16DE (without EURO-OBD)] • EC-685 [MR20DE (with EURO-OBD)] • EC-1029 [MR20DE (without EURO-OBD)] • EC-1309 (K9K)
A/C relay	A/C compressor request signal	ECM (CAN)	A/C compressor (magnet clutch)	• HAC-45 (automatic air conditioner) • HAC-145 (manual air conditioner)
Ignition relay	Ignition switch ON signal	Ignition switch	Ignition relay	PCS-15
Headlamp washer relay	Headlamp washer request signal	BCM (CAN)	Headlamp washer	WW-15
Horn relay	Theft warning horn request signal	BCM (CAN)	Horn	• SEC-19 (with INTELLIGENT KEY) • SEC-165 (without INTELLIGENT KEY)
• PTC heater relay 1 • PTC heater relay 2	PTC relay request signal	BCM (CAN)	PTC heater	• HAC-46 (automatic air conditioner) • HAC-146 (manual air conditioner)

Component Parts Location

INFOID:0000000000926981

cardiagn.com



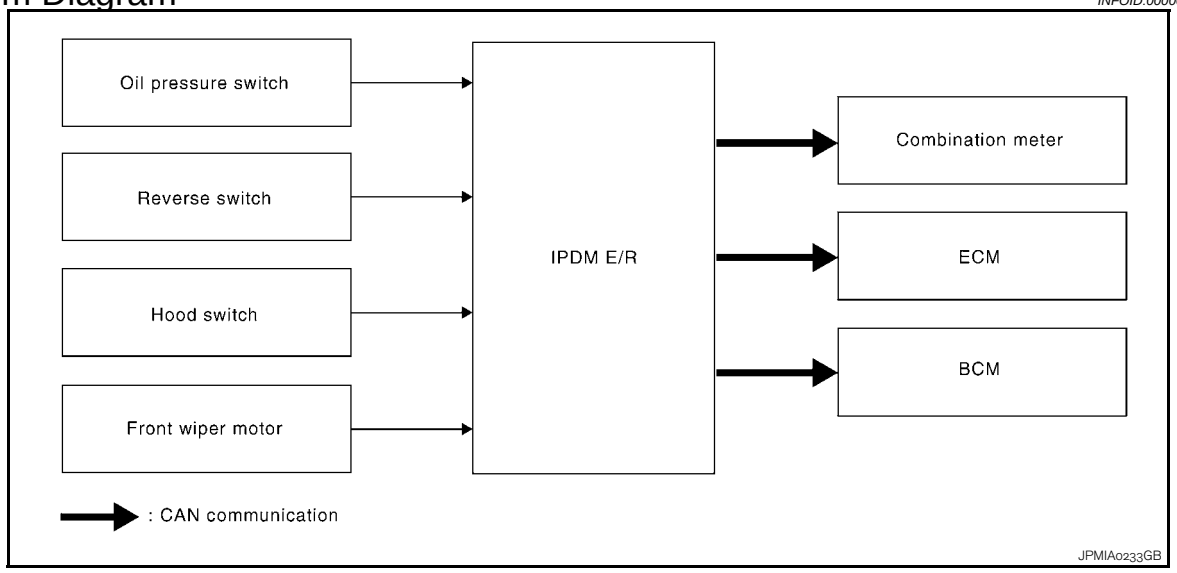
1. IPDM E/R
A. Engine room (left side)

cardiagn.com

SIGNAL BUFFER SYSTEM

System Diagram

INFOID:0000000000926985



System Description

INFOID:0000000000926986

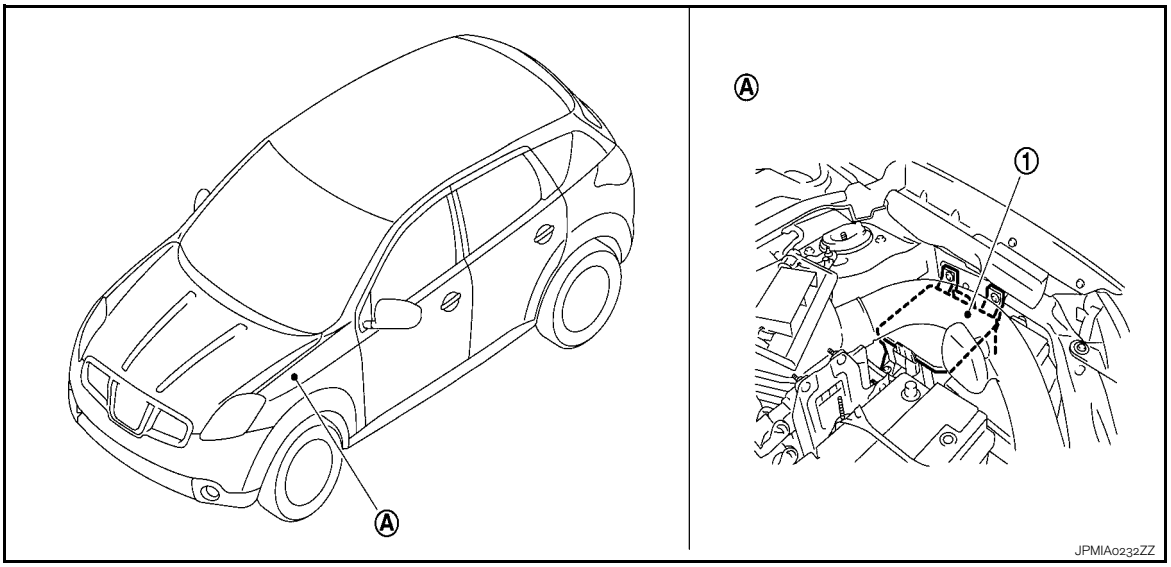
- IPDM E/R reads the status of the oil pressure switch and transmits the oil pressure switch signal to BCM and ECM*1 via CAN communication. Refer to MWI-15, "WARNING LAMPS/INDICATOR LAMPS : System Diagram".
- IPDM E/R reads the status of the reverse switch and transmits the reverse switch signal to BCM and ECM*2 via CAN communication. Refer to EC-1399, "DTC Logic".
- IPDM E/R reads the status of the hood switch and transmits the hood switch signal to BCM via CAN communication. Refer to SEC-19, "System Diagram" (with INTELLIGENT KEY system), SEC-165, "System Diagram" (without INTELLIGENT KEY system).
- IPDM E/R receives the front wiper auto stop signal status from front wiper motor and transmits the front wiper auto stop signal to BCM via CAN communication. Refer to WW-6, "System Diagram".

NOTE:

- *1: HR engine and MR engine models
- *2: K9K engine models

Component Parts Location

INFOID:0000000000984483



cardiagn.com

1. IPDM E/R

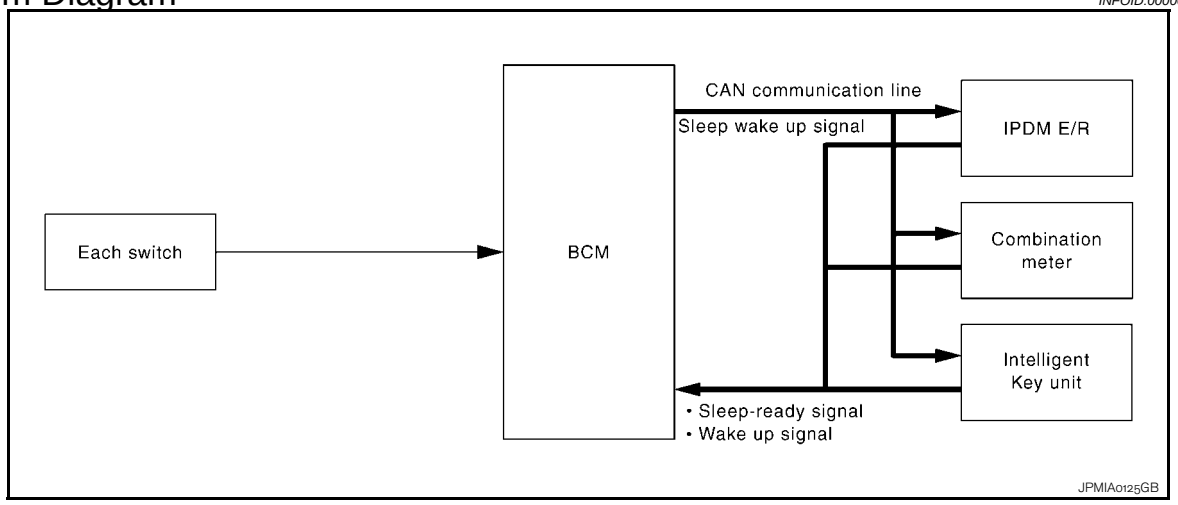
A. Engine room (left side)

cardiagn.com

POWER CONSUMPTION CONTROL SYSTEM

System Diagram

INFOID:0000000001109153



System Description

INFOID:0000000000926989

OUTLINE

- IPDM E/R incorporates a power consumption control function that reduces the power consumption according to the vehicle status.
- IPDM E/R changes its status (control mode) with the sleep wake up signal received from BCM via CAN communication.

Normal mode (wake-up)
- CAN communication is normally performed with other control units.
- Individual unit control by IPDM E/R is normally performed.

Low power consumption mode (sleep)
- Low power consumption control is active.
- CAN transmission is stopped.

Sleep mode activation

- IPDM E/R judges that the sleep-ready conditions are fulfilled when the ignition switch is OFF and none of the conditions below are present. Then it transmits a sleep-ready signal (ready) to BCM via CAN communication.
- Front wiper fail-safe operation
- Ignition relay ON or OFF stuck detection
- Outputting signals to actuators
- Switches or relays operating
- Auto active test is starting
- Communicating with CONSULT-III
- Hood switch status is changed
- Output requests are being received from control units via CAN communication.
- IPDM E/R stops CAN communication and enters the low power consumption mode when it receives a sleep wake up signal (sleep) from BCM and the sleep-ready conditions are fulfilled.

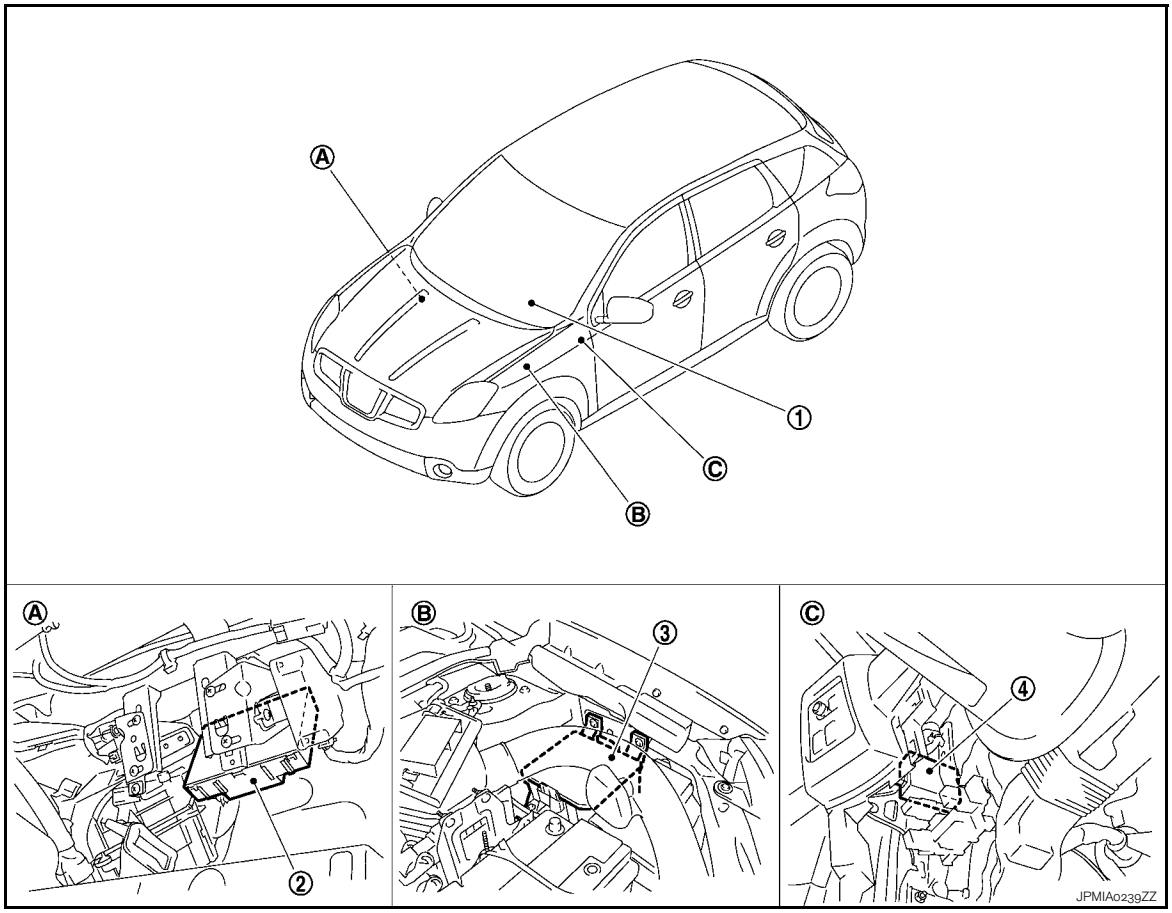
Wake-up operation

- IPDM E/R changes from the low power consumption mode to the normal mode when it receives a sleep wake-up signal (wake up) from BCM or any of the following conditions is fulfilled. In addition, it transmits a sleep-ready signal (not-ready) to BCM via CAN communication to report the CAN communication start.
- Ignition switch ON
- The hood switch status changes.
- An output request is received from a control unit via CAN communication.

Component Parts Location

INFOID:0000000001109154

cardiagn.com



1. Combination meter
2. BCM
3. IPDM E/R
4. Intelligent Key unit

A. Over the glove box
B. Engine room (left side)
C. Over the instrument lower panel (driver side)

cardiagn.com

DIAGNOSIS SYSTEM (IPDM E/R)

Diagnosis Description

INFOID:0000000000926991

Auto active test

Description

In auto active test mode, the IPDM E/R sends a drive signal to the following systems to check their operation.

- Oil pressure warning lamp
- Rear window defogger
- Front wiper (LO, HI)
- Parking lamps
- License plate lamps
- Tail lamps
- Front fog lamps
- Headlamps (LO, HI)
- A/C compressor (magnet clutch)
- Cooling fan (LO, HI)

Operation procedure

1. Close the hood and lift the wiper arms from the windshield. (Prevent windshield damage due to wiper operation)
   NOTE:
   When auto active test is performed with hood opened, sprinkle water on windshield beforehand.
2. Turn ignition switch OFF.
3. Turn the ignition switch ON, and within 20 seconds, press the driver door switch 10 times. Then turn the ignition switch OFF.
   CAUTION:
   Close passenger door.
4. Turn the ignition switch ON within 10 seconds. Then the horn sounds once and the auto active test starts.
5. The oil pressure warning lamp starts blinking when the auto active test starts.
6. After a series of the following operations is repeated 3 times, auto active test is completed.

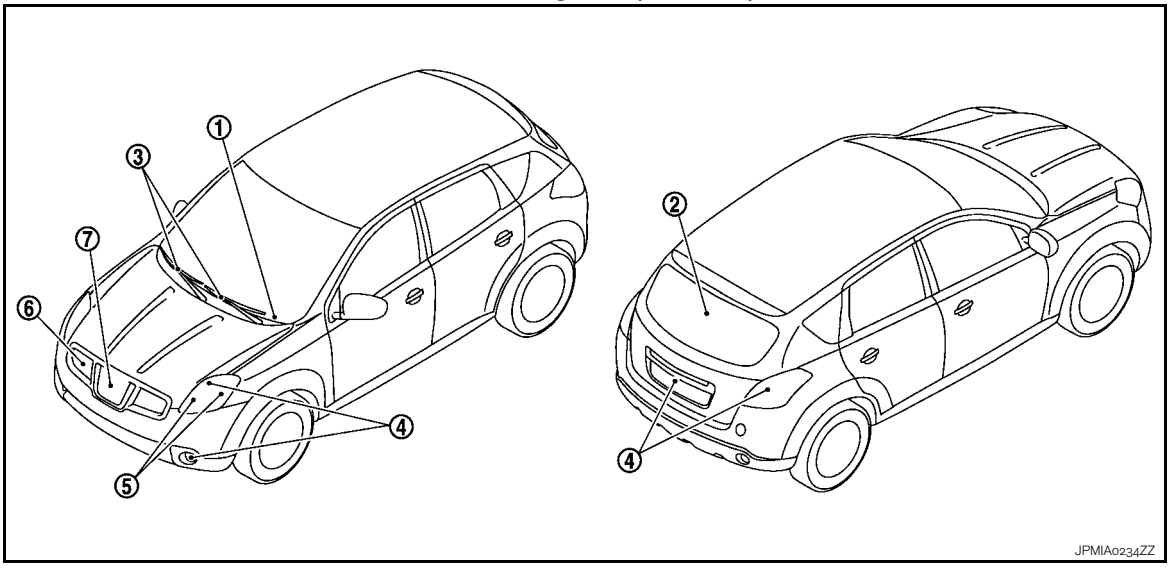
NOTE:
When auto active test mode has to be cancelled halfway through test, turn ignition switch OFF.

CAUTION:

- **If auto active test mode cannot be actuated, check door switch system.**
- **Never start the engine.**

Inspection in auto active test mode

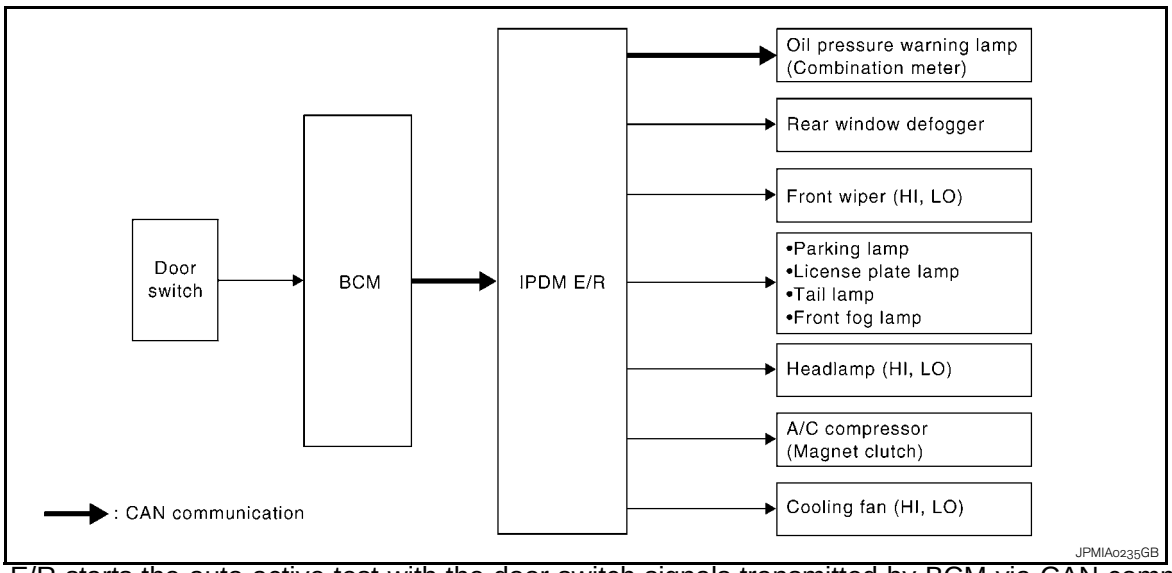
When auto active test mode is actuated, the following 6 steps are repeated 3 times.



cardiagn.com

Operation sequence	Inspection location	Operation
1	Oil pressure warning lamp	Blinks continuously during operation of auto active test.
2	Rear window defogger	10 seconds
3	Front wiper	LO for 5 seconds → HI for 5 seconds
4	• Parking lamps • License plate lamps • Tail lamps • Front fog lamps	10 seconds
5	Headlamps	LO ⇔ HI 5 times
6	A/C compressor (magnet clutch)	ON ⇔ OFF 5 times
7	Cooling fan	LO for 5 seconds → HI for 5 seconds

Concept of auto active test



- IPDM E/R starts the auto active test with the door switch signals transmitted by BCM via CAN communication. Therefore, the CAN communication line between IPDM E/R and BCM is considered normal if the auto active test starts successfully.
- The auto active test facilitates troubleshooting if any systems controlled by IPDM E/R cannot be operated.

Diagnosis chart in auto active test mode

Symptom	Inspection contents		Possible cause
Rear window defogger does not operate	Perform auto active test. Does the rear window defogger operate?	YES	BCM signal input circuit
		NO	• Rear window defogger • Rear window defogger ground circuit • Harness or connector between IPDM E/R and rear window defogger • IPDM E/R
Any of the following components do not operate • Parking lamps • License plate lamps • Tail lamps • Front fog lamps • Headlamp (HI, LO) • Front wiper (HI, LO)	Perform auto active test. Does the applicable system operate?	YES	BCM signal input circuit
		NO	• Lamp or motor • Lamp or motor ground circuit • Harness or connector between IPDM E/R and applicable system • IPDM E/R

cardiagn.com

Symptom	Inspection contents		Possible cause
A/C compressor does not operate	Perform auto active test. Does the magnet clutch operate?	YES	• Communication signal between BCM and auto amp. (with auto A/C) • Communication signal between BCM and heater control panel (without auto A/C, with manual A/C) • BCM • CAN communication signal between BCM and ECM • CAN communication signal between ECM and IPDM E/R
		NO	• Magnet clutch • Harness or connector between IPDM E/R and magnet clutch • IPDM E/R
Oil pressure warning lamp does not operate	Perform auto active test. Does the oil pressure warning lamp blink?	YES	• Harness or connector between IPDM E/R and oil pressure switch • Oil pressure switch • IPDM E/R
		NO	• CAN communication signal between IPDM E/R and BCM • CAN communication signal between BCM and combination meter • Combination meter
Cooling fan does not operate	Perform auto active test. Does the cooling fan operate?	YES	• ECM signal input circuit • CAN communication signal between ECM and IPDM E/R
		NO	• Cooling fan • Cooling fan ground circuit • Harness or connector between IPDM E/R and cooling fan • IPDM E/R • Cooling fan relay-3* • Harness or connector between IPDM E/R and cooling fan relay-3* • Harness or connector between cooling fan and cooling fan relay-3*

NOTE:

*: MR engine and K9K engine models

CONSULT - III Function (IPDM E/R)

INFOID:0000000000926992

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with IPDM E/R.

Diagnosis mode	Description
Ecu Identification	Allows confirmation of IPDM E/R part number.
Self Diagnostic Result	Displays the diagnosis results judged by IPDM E/R.
Data Monitor	Displays the real-time input/output data from IPDM E/R input/output data.
Active Test	IPDM E/R can provide a drive signal to electronic components to check their operations.
CAN Diag Support Monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF DIAGNOSTIC

Refer to PCS-30, "DTC Index".

DATA MONITOR

Monitor item

cardiagn.com

Monitor Item [Unit]	MAIN SIGNALS	Description
MOTOR FAN REQ [1 - 4]	×	Displays the value of the cooling fan speed signal received from ECM via CAN communication.
AC COMP REQ [Off/On]	×	Displays the status of the A/C compressor request signal received from ECM via CAN communication.
TAIL&CLR REQ [Off/On]	×	Displays the status of the position light request signal received from BCM via CAN communication.
HL LO REQ [Off/On]	×	Displays the status of the low beam request signal received from BCM via CAN communication.
HL HI REQ [Off/On]	×	Displays the status of the high beam request signal received from BCM via CAN communication.
FR FOG REQ [Off/On]	×	Displays the status of the front fog light request signal received from BCM via CAN communication.
HL WASHER REQ [Off/On]		Displays the status of the headlamp washer request signal received from BCM via CAN communication.
FR WIP REQ [Stop/1LOW/Low/Hi]	×	Displays the status of the front wiper request signal received from BCM via CAN communication.
WIP AUTO STOP [STOP P/ACT P]	×	Displays the status of the front wiper auto stop signal judged by IPDM E/R.
WIP PROT [Off/BLOCK]	×	Displays the status of the front wiper fail-safe operation judged by IPDM E/R.
ST RLY REQ [Off/On]		Displays the status of the ignition and starter request signal received from BCM via CAN communication.
IGN RLY [Off/On]	×	Displays the status of the ignition relay judged by IPDM E/R.
RR DEF REQ [Off/On]	×	Displays the status of the rear defogger request signal received from BCM via CAN communication.
OIL P SW [Open/Close]		Displays the status of the oil pressure switch judged by IPDM E/R.
REV SW [Off/On]		Displays the status of the reverse switch judged by IPDM E/R.
HOOD SW [Off/On]		Displays the status of the hood switch judged by IPDM E/R. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
THFT HRN REQ [Off/On]		Displays the status of the theft warning horn request signal received from BCM via CAN communication. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
HORN CHIRP [Off/On]		**NOTE:** This item is indicated, but not monitored.
IGN ON SW [Off/On]		Displays the status of the ignition switch judged by IPDM E/R.

ACTIVE TEST

Test item

Test item	Operation	Description
REAR DEFOGGER	Off	OFF
	On	Operates the rear window defogger relay.
FRONT WIPER	Off	OFF
	Lo	Operates the front wiper relay.
	Hi	Operates the front wiper relay and front wiper high relay.

cardiagn.com

Test item	Operation	Description
MOTOR FAN	1	OFF
	2	Operates the cooling fan relay (low operation).
	3	Operates the cooling fan relay (high operation).
	4	
HEAD LAMP WASHER	On	Operates the headlamp washer relay for 1 second.
EXTERNAL LAMPS	Off	OFF
	TAIL	Operates the tail lamp relay.
	Lo	Operates the headlamp low relay.
	Hi	Operates the headlamp low relay and ON/OFF the headlamp high relay at 1 second intervals.
	Fog	Operates the front fog lamp relay.
HORN	On	Operates horn relay for 20 ms.

cardiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000000926993

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H, CAN-L) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart. Refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000000926994

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1000	CAN COMM CIRCUIT	When IPDM E/R cannot communicate CAN communication signal continuously for 2 seconds or more.	Any item (or items) of the following listed below is malfunctioning in CAN communication system. • Transmission • Receiving (ECM) • Receiving (BCM)

Diagnosis Procedure

INFOID:0000000000926995

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 second or more.
2. Check “Self Diagnostic Result”.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

B2098 IGNITION RELAY ON STUCK

Description

INFOID:0000000000926996

The ignition relay integrated in IPDM E/R is operated with ignition switch ON signal from the ignition switch.

DTC Logic

INFOID:0000000000926997

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible causes
B2098	IGN RELAY ON	The ignition relay ON is detected for 1 second at ignition switch OFF (CPU monitors the status at the contact and excitation coil circuits of the ignition relay inside it)	Ignition relay

Diagnosis Procedure

INFOID:0000000000926998

1.PERFORM SELF DIAGNOSIS

1. Turn the ignition switch ON.
2. Select “Self Diagnostic Result” of “IPDM E/R”. Erase “SELF-DIAG RESULT”.
3. Turn ignition switch OFF, and wait for 1 second or more.
4. Turn the ignition switch ON. Check “SELF-DIAG RESULT” again.

Is “IGN RLY ON” displayed?

YES >> Replace IPDM E/R.
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

B2099 IGNITION RELAY OFF STUCK

Description

INFOID:0000000000927026

The ignition relay integrated in IPDM E/R is operated with ignition switch ON signal from the ignition switch.

DTC Logic

INFOID:0000000000927000

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible causes
B2099	IGN RELAY OFF	The ignition relay OFF is detected for 1 second at ignition switch ON (CPU monitors the status at the contact and excitation coil circuits of the ignition relay inside it)	Ignition relay

Diagnosis Procedure

INFOID:0000000000927001

1. PERFORM SELF DIAGNOSIS

1. Turn the ignition switch ON.
2. Select “Self Diagnostic Result” of “IPDM E/R”. Erase “SELF-DIAG RESULT”.
3. Turn ignition switch OFF.
4. Turn the ignition switch ON. Check “SELF-DIAG RESULT” again.

Is “IGN RLY OFF” displayed?

YES >> Replace IPDM E/R.
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

B2100 EEPROM

DTC Logic

INFOID:0000000001102443

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
B2100	EEPROM	IPDM E/R detected CPU malfunction.	IPDM E/R

Diagnosis Procedure

INFOID:0000000001102444

1.REPLACE IPDM E/R

When DTC [B2100] is detected, replace IPDM E/R.

>> Replace IPDM E/R.

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000000927002

1.CHECK FUSIBLE LINK

Check that the following IPDM E/R fusible link is not blown.

Terminal No.	Signal name	Fusible link No.
1	Battery power supply	E
2		C
53		L (except HR engine models)
		M (HR engine models)

Is the fusible link fusing?

YES >> Replace the blown fusible link after repairing the affected circuit if a fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check voltage between IPDM E/R harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
IPDM E/R			
Connector	Terminal	Ground	Battery voltage
E9	1		
	2		
E14	53		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

1. Disconnect IPDM E/R connectors.
2. Check continuity between IPDM E/R harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E10	5		Exist
	6		

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

cardiagn.com

ECU DIAGNOSIS

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Reference Value

INFOID:0000000000927020

VALUES ON THE DIAGNOSIS TOOL

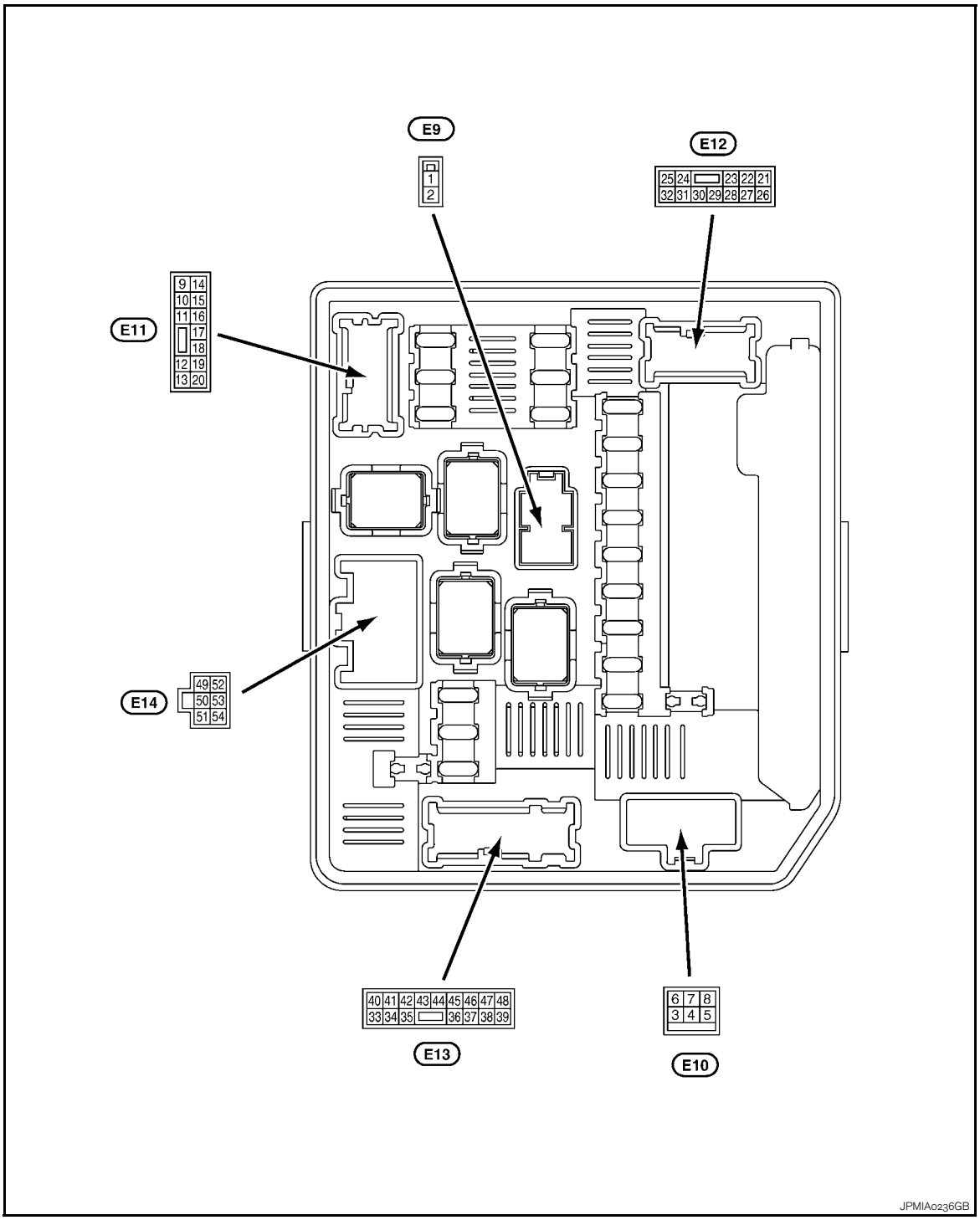
Monitor Item	Condition		Value/Status
MOTOR FAN REQ	Engine idle speed	Changes depending on engine coolant temperature, air conditioner operation status, vehicle speed, etc.	1 - 3
AC COMP REQ	Engine running	A/C switch OFF	Off
		A/C switch ON (Compressor is operating)	On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI (Light is illuminated)		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		Front fog lamp switch ON	On
HL WASHER REQ	Ignition switch ON, and low beam headlamp is ON	Front washer switch OFF	Off
		Front washer switch ON (When headlamp washer is operating)	On
FR WIP REQ	Ignition switch ON	Front wiper switch OFF	STOP
		Front wiper switch INT	1LOW
		Front wiper switch LO	Low
		Front wiper switch HI	Hi
WIP AUTO STOP	Ignition switch ON	Front wiper stop position	STOP P
		Any position other than front wiper stop position	ACT P
WIP PROT	Ignition switch ON	Front wiper operates normally	Off
		Front wiper stops at fail-safe operation	BLOCK
ST RLY REQ **NOTE:** Vehicle without Intelligent Key system indicates only “ON”, and it does not change.	When Intelligent Key is outside the vehicle, and the push switch is pushed		Off
	When Intelligent Key is inside the vehicle, and the push switch is pushed		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Ignition switch ON	Rear window defogger switch OFF	Off
		Rear window defogger switch ON (Rear window defogger is operating)	On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close

cardiagn.com

Monitor Item	Condition	Value/Status
REV SW	Except selector lever R position	Off
	Selector lever R position	On
HOOD SW **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Close the hood	Off
	Open the hood	On
THFT HRN REQ **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Not operation	Off
	Horn is activated with Vehicle Security (Theft Warning) system.	On
HORN CHIRP	**NOTE:** This item is indicated, but not monitored.	Off
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

cardiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
		Signal name	Input/ Output		
+	–				
1 (G)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
2 (R)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
5 (B)	Ground	Ground	—	Ignition switch ON	0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
6 (B)	Ground	Ground	—	Ignition switch ON		0 V
7 (Y)	Ground	Front wiper LO	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch LO	Battery voltage
8 (Y/R)	Ground	Front wiper HI	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch HI	Battery voltage
9 (G)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
10*1 (L/R)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
11*2 (O)	Ground	PTC heater 1 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
12*2 (G/Y)	Ground	PTC heater 2 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
14 (R/B)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
15 (Y/L)*1 (B/R)*2	Ground	ECM relay control	Input	• Engine running • Ignition switch OFF (For a few seconds after turning ignition switch OFF)		0 - 1.0 V*1
						0.6 V*2
				Ignition switch OFF or ACC (More than a few seconds after turning ignition switch OFF)		Battery voltage
16*3 (Y/R)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
19*1 (R/O)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
21*4 (GR)	Ground	Hood switch	Input	Close the hood		Battery voltage
				Open the hood		0 V
22 (Y/G)	Ground	Reverse switch	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON	• Selector lever “R” (Except M/T models) • M/T control lever “R” (M/T models)	Battery voltage
					• Selector lever in any position other than “R” (Except M/T models) • M/T control lever in any position other than “R” (M/T models)	0 V
23 (Y/B)	Ground	A/C relay power supply	Output	Engine stopped		0 V
				Engine running	A/C switch OFF	0 V
					A/C switch ON (A/C compressor is operating)	Battery voltage
24 (R/Y)	Ground	Headlamp LO (RH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
25*1 (G/L)	Ground	ETC relay control	Input	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		0 - 1.0 V
26 (O)	Ground	Front wiper auto stop	Input	Ignition switch ON	Front wiper stop position	0 V
					Any position other than front wiper stop position	Battery voltage
27 (W)	Ground	Oil pressure switch	Input	Engine stopped		0 V
				Engine running		Battery voltage
28 (L)	—	CAN-H	Input/ Output	—		—
29 (P)	—	CAN-L	Input/ Output	—		—
30*4 (L)	Ground	Horn relay control	Output	The horn is not activated		Battery voltage
				The horn is activated		0 V
31 (R)	Ground	Headlamp LO (sensor)	Output	Ignition switch ON	Lighting switch OFF	0 V
					Lighting switch 2ND	Battery voltage
32*1 (R/Y)	Ground	ETC relay power supply	Output	Ignition switch ON		Battery voltage
33*1 (B/O)	Ground	Fuel pump relay control	Input	• Engine running • Ignition switch ON (For 1 second after turning ignition switch ON)		0 - 1.0 V
				Ignition switch ON (More than 1 second after turning ignition switch ON)		Battery voltage
34 (R/B)	Ground	Starter relay power supply	Input	Ignition switch ON (Except M/T models)	Selector lever “P” or “N”	0 V
					Selector lever in any position other than “P” or “N”	Battery voltage
				Ignition switch ON (M/T models)		
35 (W/L)	Ground	Ignition switch ON	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
36 (W)	Ground	Front fog lamp (RH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
37 (R/W)	Ground	Parking lamp (RH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
38 (R/L)	Ground	Tail, license plate lamps and illuminations	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
39 (GR)	Ground	Headlamp washer relay control	Output	Ignition switch ON	When headlamp washer is operating	0 V
					When headlamp washer is not operating	Battery voltage
40*1 (BR/Y)*5 (SB)*6	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
41 (P)	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
42*1 (B/Y)	Ground	Fuel pump relay power supply	Output	• Ignition switch OFF or ACC • Approximately 1 second or more after turning the ignition switch ON		0 V
				• Approximately 1 second after turning the ignition switch ON • Engine running		Battery voltage
43 (W/B)	Ground	Front fog lamp (LH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
44 (L)	Ground	Headlamp LO (LH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
45 (L/W)	Ground	Headlamp HI (RH)	Output	• Lighting switch 2ND and HI • lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
46 (G)	Ground	Headlamp HI (LH)	Output	• Lighting switch 2ND and HI • Lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
47 (R/L)	Ground	Parking lamp (LH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
48*7 (Y)	Ground	Cooling fan relay-3 control	Output	When cooling fan does HI operation		0 V
				When cooling fan does OFF or LO operation		Battery voltage
49 (B)	Ground	Rear window defogger relay power supply	Output	Ignition switch ON	Rear window defogger switch ON	Battery voltage
					Rear window defogger switch OFF	0 V
50 (B/R)	Ground	Starter relay power supply	Output	When engine is clanking		Battery voltage
				When engine is not clanking		0 V
51 (P)	Ground	Ignition switch START	Input	Ignition switch START		Battery voltage
				Ignition switch OFF, ACC or ON		0 V
52 (W)	Ground	Cooling fan relay-1 power supply	Output	When cooling fan does LO or HI operation		Battery voltage
				When cooling fan does OFF operation		0 V
53 (W/B)	Ground	Battery power supply (Cooling fan relay)	Input	Ignition switch OFF		Battery voltage
54*5 (R)	Ground	Cooling fan relay-2 power supply	Input	When cooling fan does HI operation		Battery voltage
				When cooling fan does OFF or LO operation		0 V

*1: HR engine and MR engine models

*2: K9K engine models

*3: Except M/T models only

*4: With vehicle security (theft warning) system

*5: HR engine models

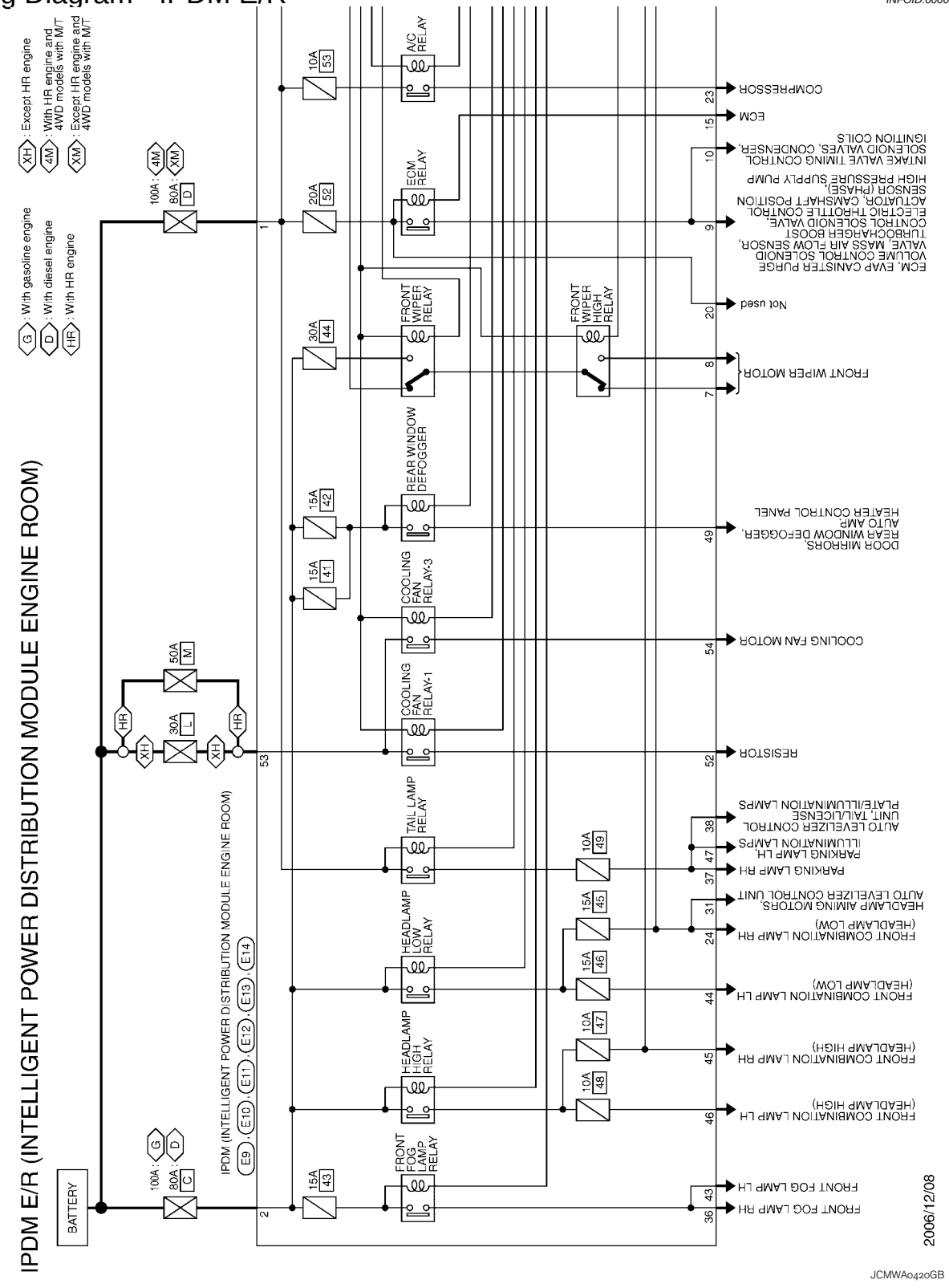
*6: MR engine models

*7: MR engine and K9K engine models

cardiagn.com

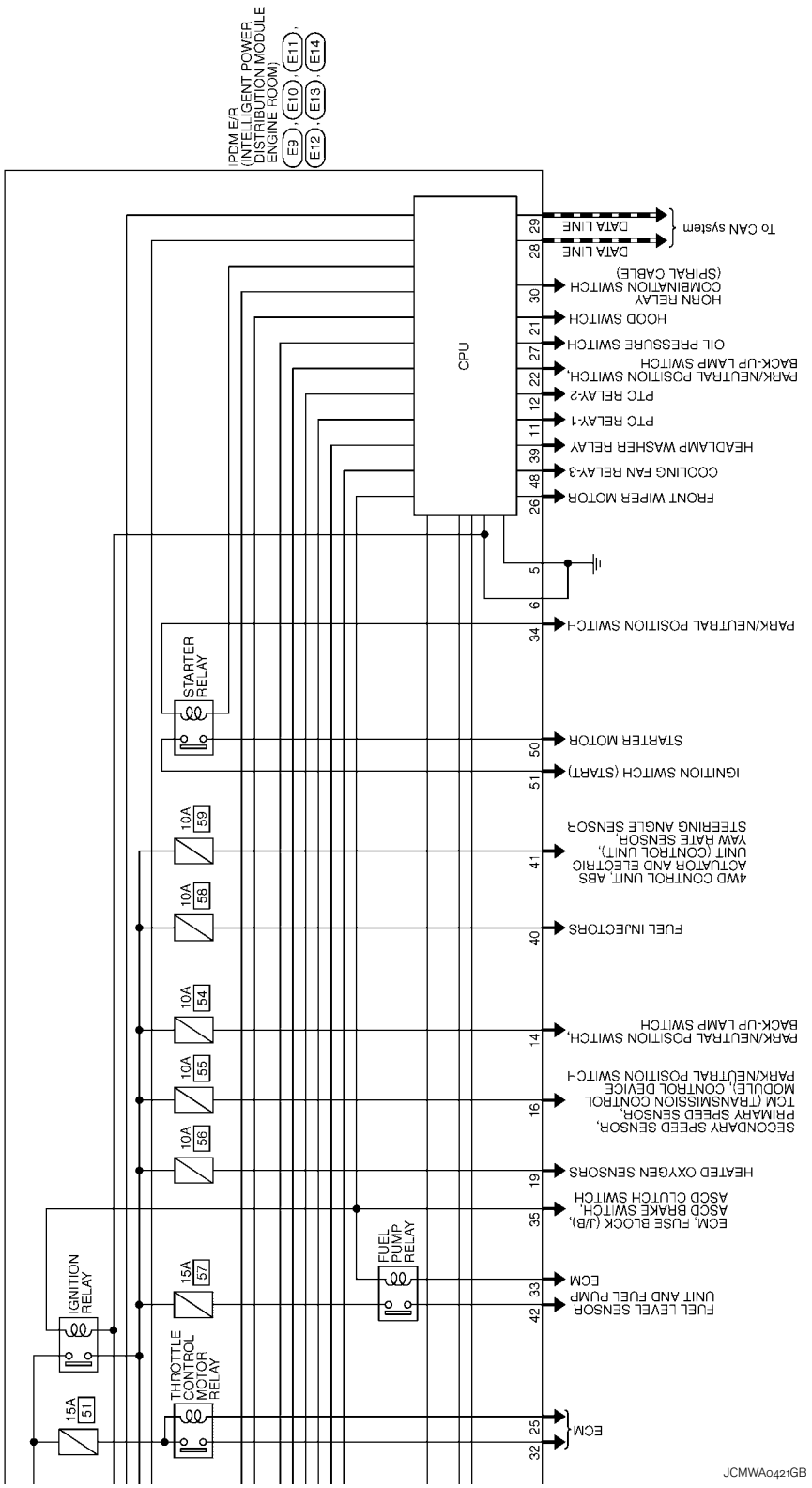
Wiring Diagram - IPDM E/R -

INFOID:0000000000927004



JCMWA0420GB

cardiagn.com



cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E9
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	L02FB-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	R	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-
7	Y	-
8	V/R	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	G	-
10	L/R	-
11	O	-
12	G/Y	-
14	R/B	-
15	Y/L	-[With gasoline engine]
15	B/R	-[With diesel engine]
16	Y/R	-
19	R/O	-
20	-	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
21	GR	-
22	Y/G	-
23	Y/B	-
24	R/Y	-
25	G/L	-
26	O	-
27	W	-
28	L	-
29	P	-
30	L	-
31	R	-

Terminal No.	Color of Wire	Signal Name [Specification]
32	R/Y	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
33	B/O	-
34	R/B	-
35	W/L	-
36	W	-
37	R/W	-
38	R/L	-
39	GR	-
40	SB	-[With MR engine]
40	BR/Y	-[With HR engine]
41	P	-
42	B/Y	-
43	W/B	-
44	L	-
45	L/W	-
46	G	-
47	R/L	-
48	Y	-

JCMWA0422GB

cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	-
50	B/R	-
51	P	-
52	W	-
53	W/B	-
54	R	-

JCMWA0423GB

Fail Safe

INFOID:0000000000927005

CAN communication control

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If no CAN communication is available with ECM

cardiagn.com

Control part	Fail-safe in operation
Cooling fan	• The cooling fan relay-2*1 or the cooling fan relay-3*2 turns ON when the ignition switch is turned ON • Turns off the fan motor low relay when the ignition switch is turned OFF
A/C compressor	A/C relay OFF

*1: HR engine models

*2: MR engine and K9K engine models

If no CAN communication is available with BCM

Control part	Fail-safe in operation
Headlamp	• The headlamp low relay turns ON when the ignition switch is turned ON • The headlamp low relay turns OFF when the ignition switch is turned OFF • Headlamp high relay OFF
• Parking lamps • License plate lamps • Tail lamps • Illuminations	• The tail lamp relay turns ON when the ignition switch is turned ON • The tail lamp relay turns OFF when the ignition switch is turned OFF
Front wiper	• The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. • The front wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Front fog lamps	Front fog lamp relay OFF
Starter motor	Inhibit relay OFF
Rear window defogger	Rear window defogger relay OFF
Headlamp washer	Headlamp washer relay OFF
PTC heater	PTC heater relay OFF

Ignition relay malfunction detection function

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

DTC	Ignition switch	Ignition relay	Tail lamp relay
—	ON	ON	—
—	OFF	OFF	—
B2098: IGN RLY ON	OFF	ON	ON (10 minutes)
B2099: IGN RLY OFF	ON	OFF	—

NOTE:

The tail lamp relay is turned OFF when the ignition switch is turned ON.

Front wiper control

IPDM E/R detects the front wiper stop position with the front wiper auto stop signal.
When the front wiper auto stop signal is in the conditions listed below, IPDM E/R repeats a front wiper 10 seconds operation and 20 seconds stop five times.

Ignition switch	Front wiper switch	Front wiper auto stop signal
ON	OFF	The front wiper auto stop signal (stop position) cannot be input for 10 seconds.
	ON	The front wiper auto stop signal does not change for 10 seconds.

NOTE:

cardiagn.com

This operation status can be confirmed on the IPDM E/R “Data Monitor” that displays “BLOCK” for the item “WIP PROT” while the wiper is stopped.

DTC Index

INFOID:0000000000927006

CONSULT display	Fail-safe	Timing[NOTE]		Reference page
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	PAST	PCS-14
B2098: IGN RELAY ON	×	CRNT	PAST	PCS-15
B2099: IGN RELAY OFF	—	CRNT	PAST	PCS-16
B2100: EEPROM	—	CRNT	PAST	PCS-17

NOTE:

The details of time display are as follows.

- CRNT: The malfunctions that are detected now.
- PAST: The number is indicated when it is normal at present and a malfunction was detected in the past.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001109155

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

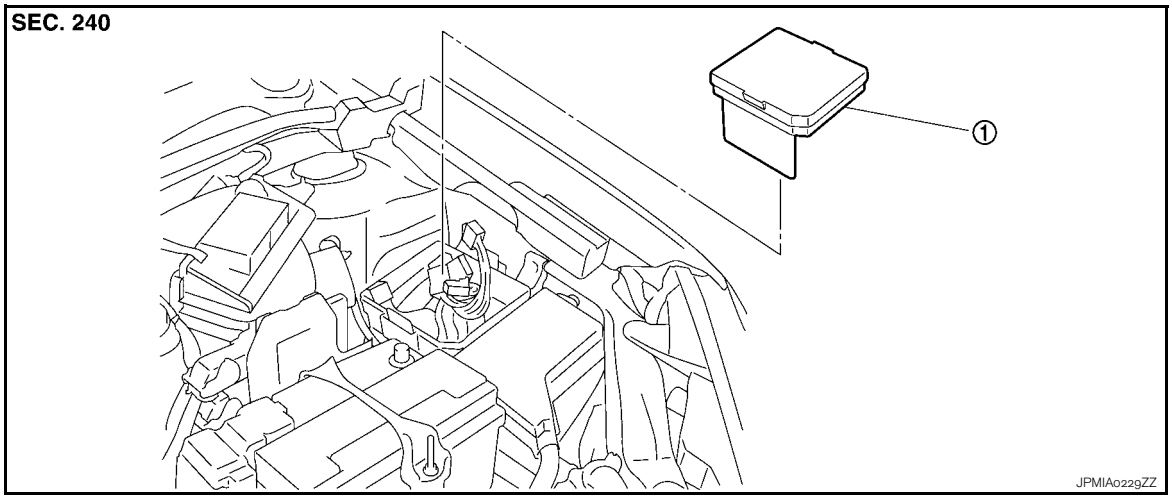
cardiagn.com

ON-VEHICLE REPAIR

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Exploded View

INFOID:0000000000927010



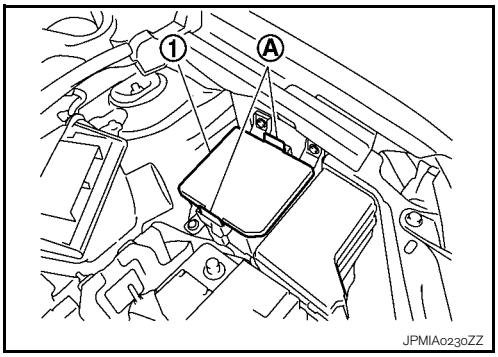
1. IPDM E/R

Removal and Installation

INFOID:0000000000927011

REMOVAL

1. Remove air duct (inlet). Refer to EM-27, "Exploded View" (HR16DE), EM-144, "Exploded View" (MR20DE), EM-265, "Exploded View" (K9K).
2. Remove the IPDM E/R (1) while pushing and opening pawls (A).
3. Disconnect connectors from IPDM E/R.



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

SECTION PWO
POWER OUTLET

CONTENTS

COMPONENT DIAGNOSIS 2

POWER SOCKET 2
Wiring Diagram - POWER SOCKET - 2

PRECAUTION 4

PRECAUTIONS 4
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 4

ON-VEHICLE REPAIR 5

POWER SOCKET 5
Exploded View 5
Removal and Installation 5

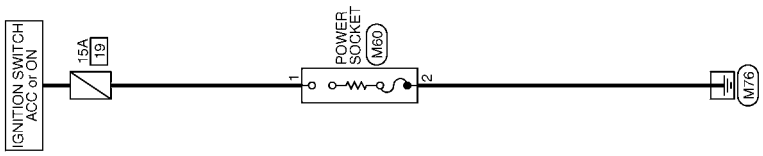
cardiagn.com

COMPONENT DIAGNOSIS

POWER SOCKET

Wiring Diagram - POWER SOCKET -

INFOID:0000000000945610



POWER SOCKET

2006/12/06

JCMWA0405GB

cardiagn.com

POWER SOCKET

Connector No.	M80
Connector Name	POWER SOCKET
Connector Type	P02FB-Z

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	B	-

JCMWA0406GB

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001125421

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

cardiagn.com

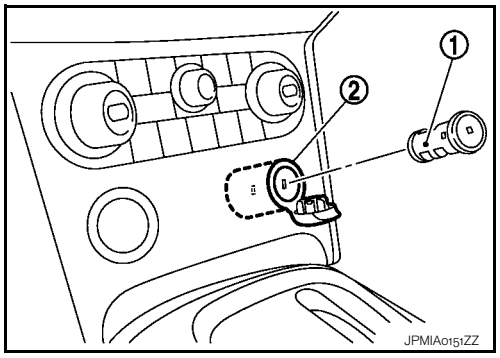
ON-VEHICLE REPAIR

POWER SOCKET

Exploded View

INFOID:0000000000945613

1 : Ring
2 : Inner socket

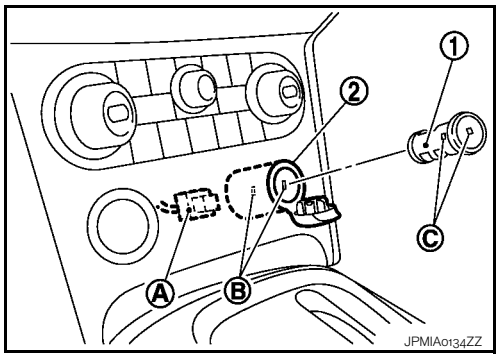


Removal and Installation

INFOID:0000000000945614

REMOVAL

1. Remove console finisher. Refer to IP-12, "Removal and Installation".
2. Disconnect power socket connector (A).
3. Pull out the inner socket (2) by pushing the ring pawl (B) from the inner socket hole (square) (C).
4. Remove ring (1) from console finisher while pressing pawls.



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

SECTION PG

POWER SUPPLY, GROUND & CIRCUIT ELEMENTS

CONTENTS

POWER SUPPLY & GROUND CIRCUIT

BASIC INSPECTION 3

BATTERY 3
How to Handle Battery 3
Work Flow 4

COMPONENT DIAGNOSIS 10

POWER SUPPLY ROUTING CIRCUIT 10
Wiring Diagram - BATTERY POWER SUPPLY - 10
Wiring Diagram - ACCESSORY POWER SUPPLY - 41
Wiring Diagram - IGNITION POWER SUPPLY - 47
Fuse 71
Fusible Link 72
Circuit Breaker 72

HARNESS LAYOUT 73

LHD 73
LHD : How To Read Harness Layout 73
LHD : Outline 74
LHD : Main Harness 75
LHD : Engine Room Harness 75
LHD : Engine Control Harness 77
LHD : Body Harness 80
LHD : Room Lamp Harness 83
LHD : Front Door Harness 83
LHD : Rear Door Harness 85
LHD : Back Door Harness 88

RHD 88
RHD : How To Read Harness Layout 88
RHD : Outline 90
RHD : Main Harness 91
RHD : Engine Room Harness 91
RHD : Engine Control Harness 93
RHD : Body Harness 96
RHD : Room Lamp Harness 99
RHD : Front Door Harness 99
RHD : Rear Door Harness 101
RHD : Back Door Harness 104

HARNESS CONNECTOR 105
Description 105

STANDARDIZED RELAY 108
Description 108

FUSE BLOCK - JUNCTION BOX (J/B) 110
Fuse, Connector and Terminal Arrangement 110

FUSE, FUSIBLE LINK AND RELAY BOX 111
Fuse and Fusible Link Arrangement 111

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 112
Fuse, Connector and Terminal Arrangement 112

PRECAUTION 113

PRECAUTIONS 113
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 113

ON-VEHICLE MAINTENANCE 114

BATTERY CHARGING CHART 114
Slow Charge 114
Standard Charge 115
Quick Charge 116

ON-VEHICLE REPAIR 118

BATTERY 118
Exploded View 118
Removal and Installation 118

BATTERY TERMINAL WITH FUSIBLE LINK . 119
Exploded View 119
Removal and Installation 119

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS) 120

SERVICE DATA AND SPECIFICATIONS (SDS) 120
Battery 120

cardiagn.com

BASIC INSPECTION

BATTERY

How to Handle Battery

INFOID:0000000001026781

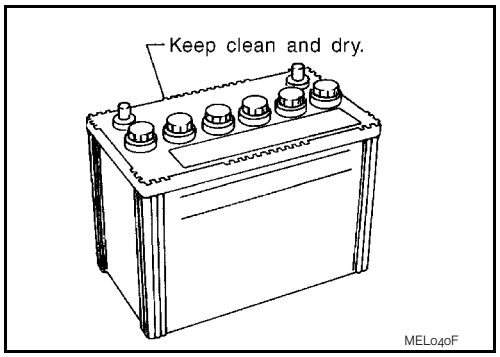
CAUTION:

- **If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.**
- **After connecting battery cables, ensure that they are tightly clamped to battery terminals for good contact.**
- **Never add distilled water through the hole used to check specific gravity.**

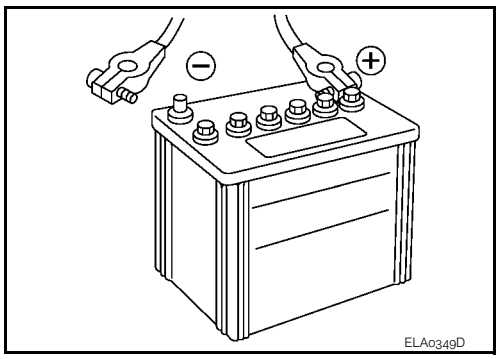
METHODS OF PREVENTING OVER-DISCHARGE

The following precautions must be taken to prevent over-discharging a battery.

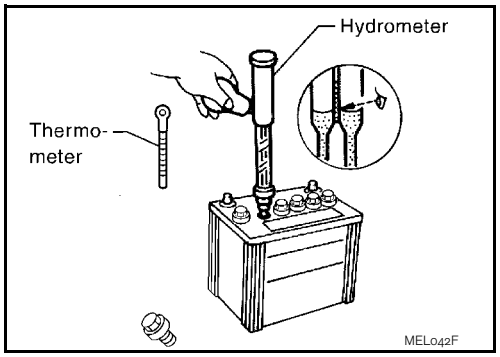
- The battery surface (particularly its top) should always be kept clean and dry.
- The terminal connections should be clean and tight.
- At every routine maintenance, check the electrolyte level.
  This also applies to batteries designated as “low maintenance” and “maintenance-free”.



- When the vehicle is not going to be used over a long period of time, disconnect the battery cable from the negative terminal. (If the vehicle has an extended storage switch, turn it off.)



- Check the charge condition of the battery.
  Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.



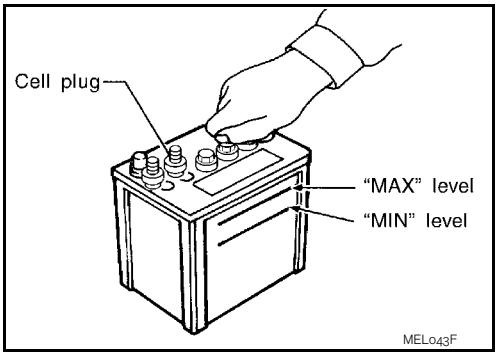
CHECKING ELECTROLYTE LEVEL

WARNING:

Never allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, never touch or rub your eyes until you have thoroughly washed your hands. If acid contacts eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

cardiagn.com

- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.

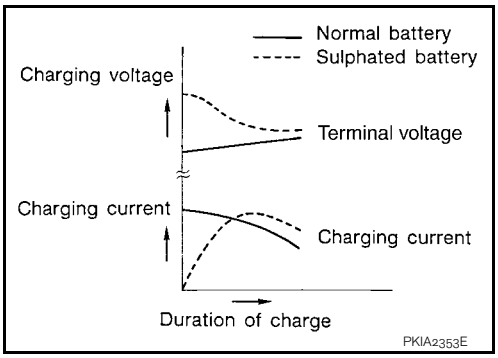


Sulphation

A battery will be completely discharged if it is left unattended for a long time and the specific gravity will become less than 1.100. This may result in sulphation on the cell plates.

To determine if a battery has been "sulphated", note its voltage and current when charging it. As shown in the figure, less current and higher voltage are observed in the initial stage of charging sulphated batteries.

A sulphated battery may sometimes be brought back into service by means of a long, slow charge, 12 hours or more, followed by a battery capacity test.

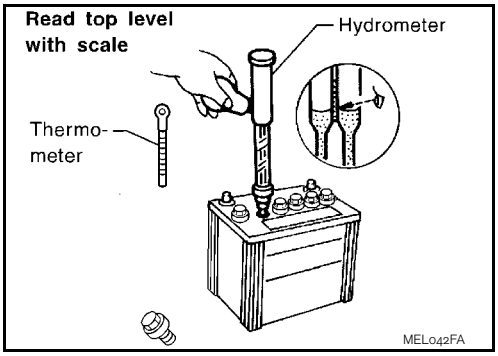


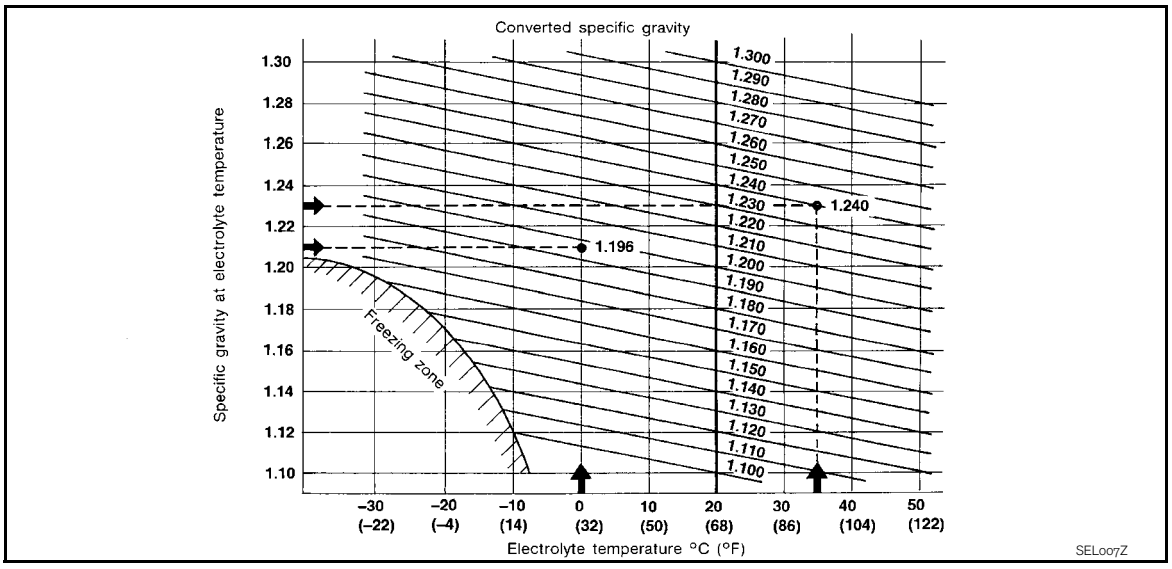
SPECIFIC GRAVITY CHECK

1. Read hydrometer and thermometer indications at eye level.
2. Convert into specific gravity at 20°C (68°F).

Example:

- When electrolyte temperature is 35°C (95°F) and specific gravity of electrolyte is 1.230, converted specific gravity at 20°C (68°F) is 1.240.
- When electrolyte temperature is 0°C (32°F) and specific gravity of electrolyte is 1.210, converted specific gravity at 20°C (68°F) is 1.196.



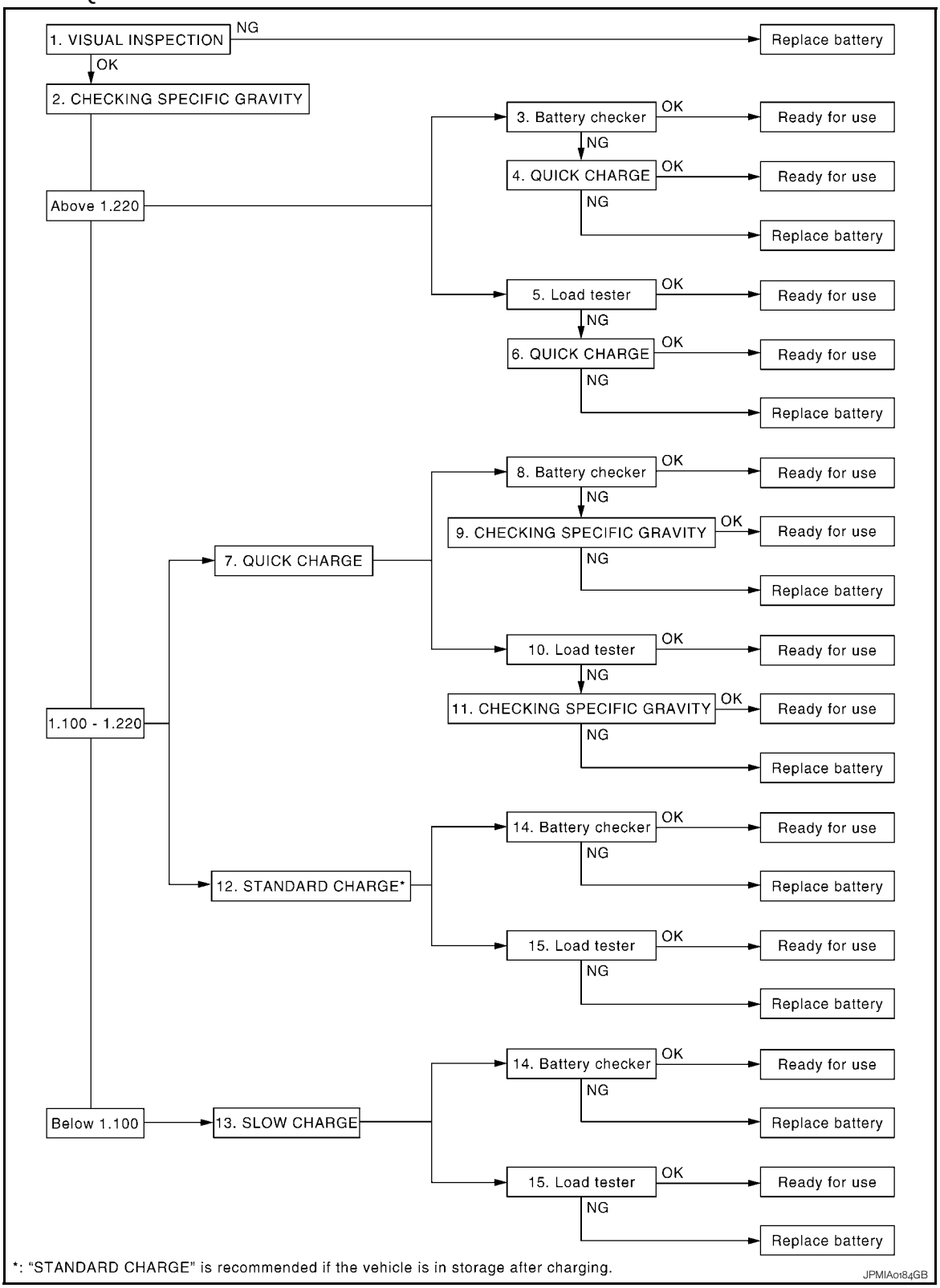


Work Flow

INFOID:0000000000978143

cardiagn.com

OVERALL SEQUENCE



DETAILED FLOW

1. VISUAL INSPECTION

1. Check battery case for cracks or bends.
2. Check battery terminals for damage.
3. If the difference between the max. and min. electrolyte level in cells is within 10 mm (0.39 in), it is OK.

Are these inspection results normal?

cardiagn.com

YES >> GO TO 2.
NO >> Replace battery.

2. CHECKING SPECIFIC GRAVITY

Check specific gravity. Refer to PG-3, "How to Handle Battery".

Inspection results

Above 1.220 (Test using battery checker)>>GO TO 3.
Above 1.220 (Test using load tester)>>GO TO 5.
1.100 - 1.220 (When performing quick charge)>>GO TO 7.
1.100 - 1.220 (When performing standard charge)>>GO TO 12.
Below 1.100>>GO TO 13.

3. CAPACITY TEST

Test using battery checker.

Is the battery usable, according to the manufacturer's instructions?

YES >> Ready for use. Mount battery again and check loose terminals. Also check other related circuits.
NO >> GO TO 4.

4. QUICK CHARGE

1. Perform quick charge. Time required: 45 min. Refer to PG-116, "Quick Charge".
2. Test using battery checker.

Is the battery usable, according to the manufacturer's instructions?

YES >> Ready for use.
NO >> Replace battery.

5. CAPACITY TEST

1. Test using load tester.
2. Check battery type and determine the specified current using the table.

Discharging Current (Load Tester)

Type	Current (A)
28B19R(L)	90
34B19R(L)	99
46B24R(L)	135
55B24R(L)	
50D23R(L)	150
55D23R(L)	180
80D23R(L)	195
65D26R(L)	
80D26R(L)	
75D31R(L)	210
95D31R(L)	240
115D31R(L)	
025 [YUASA type code]	
027 [YUASA type code]	285
110D26R(L)	300
95E41R(L)	
067 [YUASA type code]	325
130E41R(L)	330
096 [YUASA type code]	375
LB1 (330)	—
LB1+ (420)	—

cardiagn.com

Type	Current (A)
LB2 (510)	—
LB2+ (600)	—
LB3 (720)	—
L3 (720)	—

3. Read load tester voltage when specified discharging current flows through battery for 15 seconds.

Is the voltage 9.6 V or more?

YES >> Ready for use.
NO >> GO TO 6.

6. QUICK CHARGE

1. Perform quick charge. Time required: 45 min. Refer to PG-116, "Quick Charge".
2. Test using load tester.

Is the voltage 9.6 V or more?

YES >> Ready for use.
NO >> Replace battery.

7. QUICK CHARGE

1. Perform quick charge. Refer to PG-116, "Quick Charge".
2. Perform capacity test.

Test using battery checker.>>GO TO 8.
Test using load tester.>>GO TO 10.

8. CAPACITY TEST

Test using battery checker.

Is the battery usable, according to the manufacturer's instructions?

YES >> Ready for use.
NO >> GO TO 9.

9. CHECKING SPECIFIC GRAVITY

1. Check specific gravity. Refer to PG-3, "How to Handle Battery".
2. Perform recharge. Refer to PG-116, "Quick Charge".
   NOTE:
   If battery temperature rises above 55°C (131°F), stop charging. Always charge battery when its temperature is below 55°C (131°F).
3. Test using battery checker.

Is the battery usable, according to the manufacturer's instructions?

YES >> Ready for use.
NO >> Replace battery.

10. CAPACITY TEST

1. Test using load tester.
2. Check battery type and determine the specified current using the table.

Discharging Current (Load Tester)

Type	Current (A)
28B19R(L)	90
34B19R(L)	99
46B24R(L)	135
55B24R(L)	
50D23R(L)	150
55D23R(L)	180

cardiagn.com

Type	Current (A)
80D23R(L)	195
65D26R(L)	
80D26R(L)	
75D31R(L)	210
95D31R(L)	240
115D31R(L)	
025 [YUASA type code]	
027 [YUASA type code]	285
110D26R(L)	300
95E41R(L)	
067 [YUASA type code]	325
130E41R(L)	330
096 [YUASA type code]	375
LB1 (330)	—
LB1+ (420)	—
LB2 (510)	—
LB2+ (600)	—
LB3 (720)	—
L3 (720)	—

3. Read load tester voltage when specified discharging current flows through battery for 15 seconds.

Is the voltage 9.6 V or more?

YES >> Ready for use.
NO >> GO TO 11.

11. CHECKING SPECIFIC GRAVITY

1. Check specific gravity. Refer to PG-3, "How to Handle Battery".
2. Perform recharge. Refer to PG-116, "Quick Charge".
   NOTE:
   If battery temperature rises above 55°C (131°F), stop charging. Always charge battery when its temperature is below 55°C (131°F).
3. Test using load tester.

Is the voltage 9.6 V or more?

YES >> Ready for use.
NO >> Replace battery.

12. STANDARD CHARGE

NOTE:
“STANDARD CHARGE” is recommended if the vehicle is in storage after charging.

1. Perform standard charge. Refer to PG-115, "Standard Charge".
2. Perform capacity test.

Test using battery checker.>>GO TO 14.
Test using load tester.>>GO TO 15.

13. SLOW CHARGE

1. Perform slow charge. Refer to PG-114, "Slow Charge".
2. Perform capacity test.

Test using battery checker.>>GO TO 14.
Test using load tester.>>GO TO 15.

cardiagn.com

14. CAPACITY TEST

Test using battery checker.

Is the battery usable, according to the manufacturer's instructions?

YES >> Ready for use.
NO >> Replace battery.

15. CAPACITY TEST

1. Test using load tester.
2. Check battery type and determine the specified current using the table.

Discharging Current (Load Tester)

Type	Current (A)
28B19R(L)	90
34B19R(L)	99
46B24R(L)	135
55B24R(L)	
50D23R(L)	150
55D23R(L)	180
80D23R(L)	195
65D26R(L)	
80D26R(L)	
75D31R(L)	210
95D31R(L)	240
115D31R(L)	
025 [YUASA type code]	
027 [YUASA type code]	285
110D26R(L)	300
95E41R(L)	
067 [YUASA type code]	325
130E41R(L)	330
096 [YUASA type code]	375
LB1 (330)	—
LB1+ (420)	—
LB2 (510)	—
LB2+ (600)	—
LB3 (720)	—
L3 (720)	—

3. Read load tester voltage when specified discharging current flows through battery for 15 seconds.

Is the voltage 9.6 V or more?

YES >> Ready for use.
NO >> Replace battery.

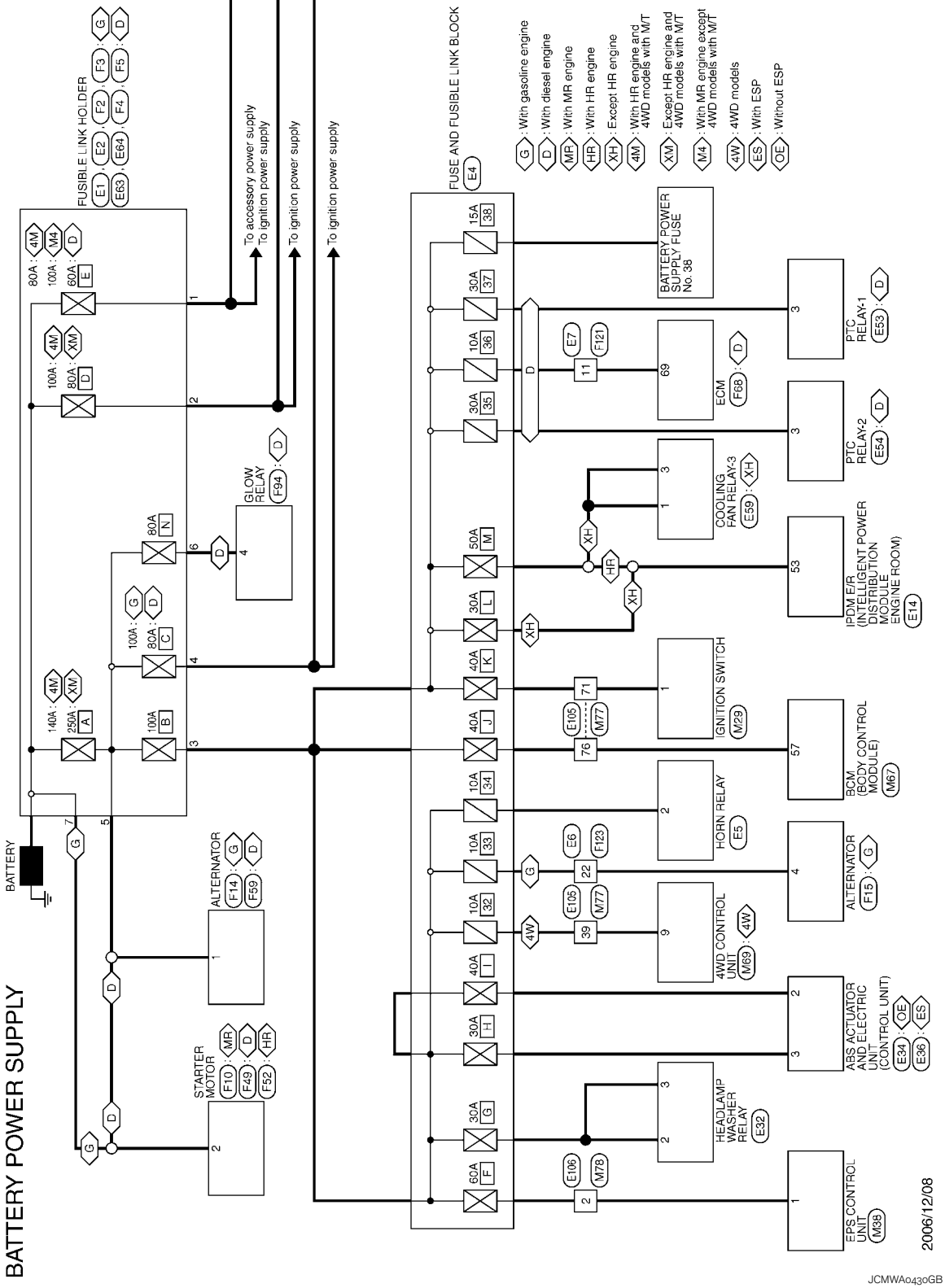
cardiagn.com

COMPONENT DIAGNOSIS

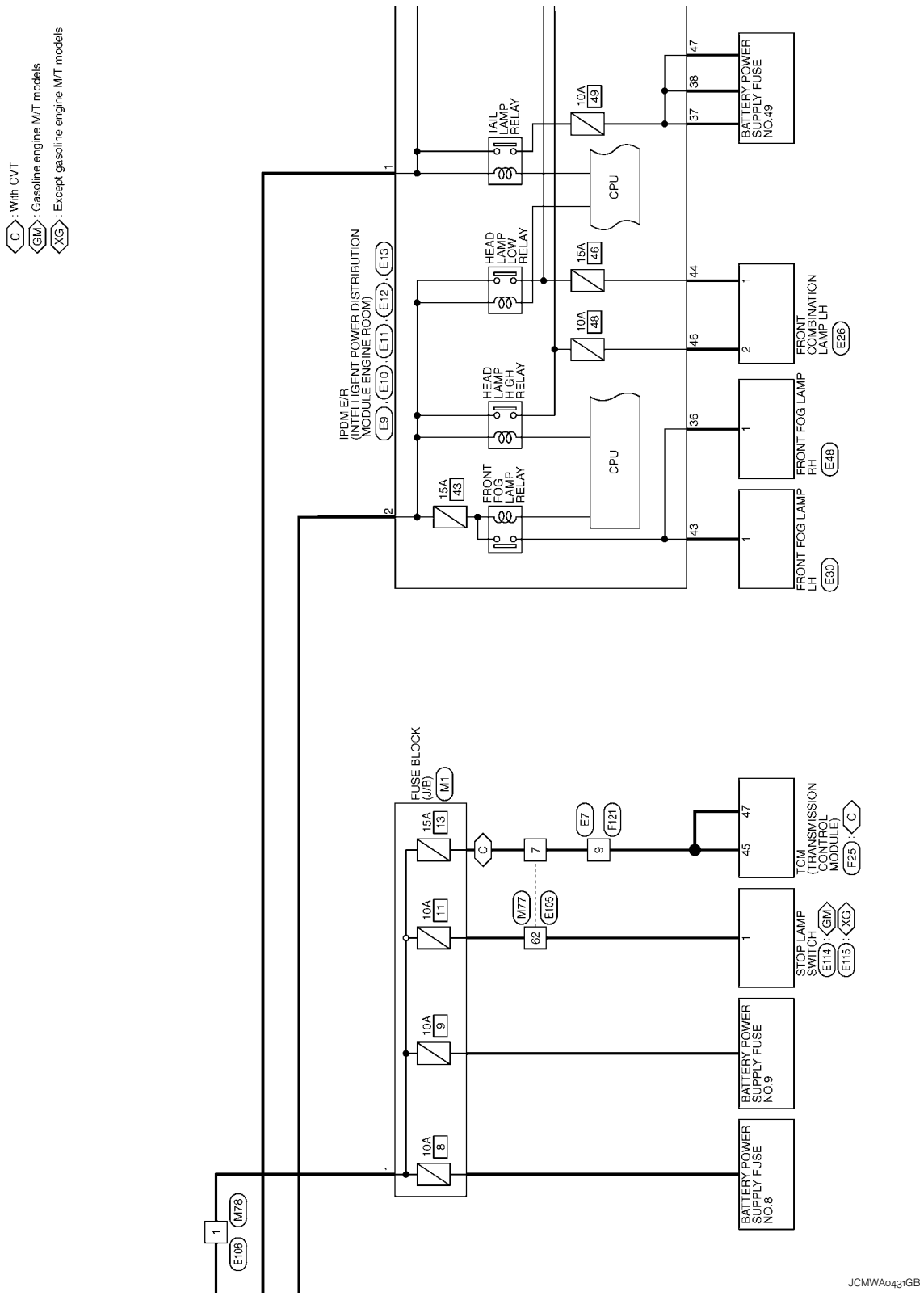
POWER SUPPLY ROUTING CIRCUIT

Wiring Diagram - BATTERY POWER SUPPLY -

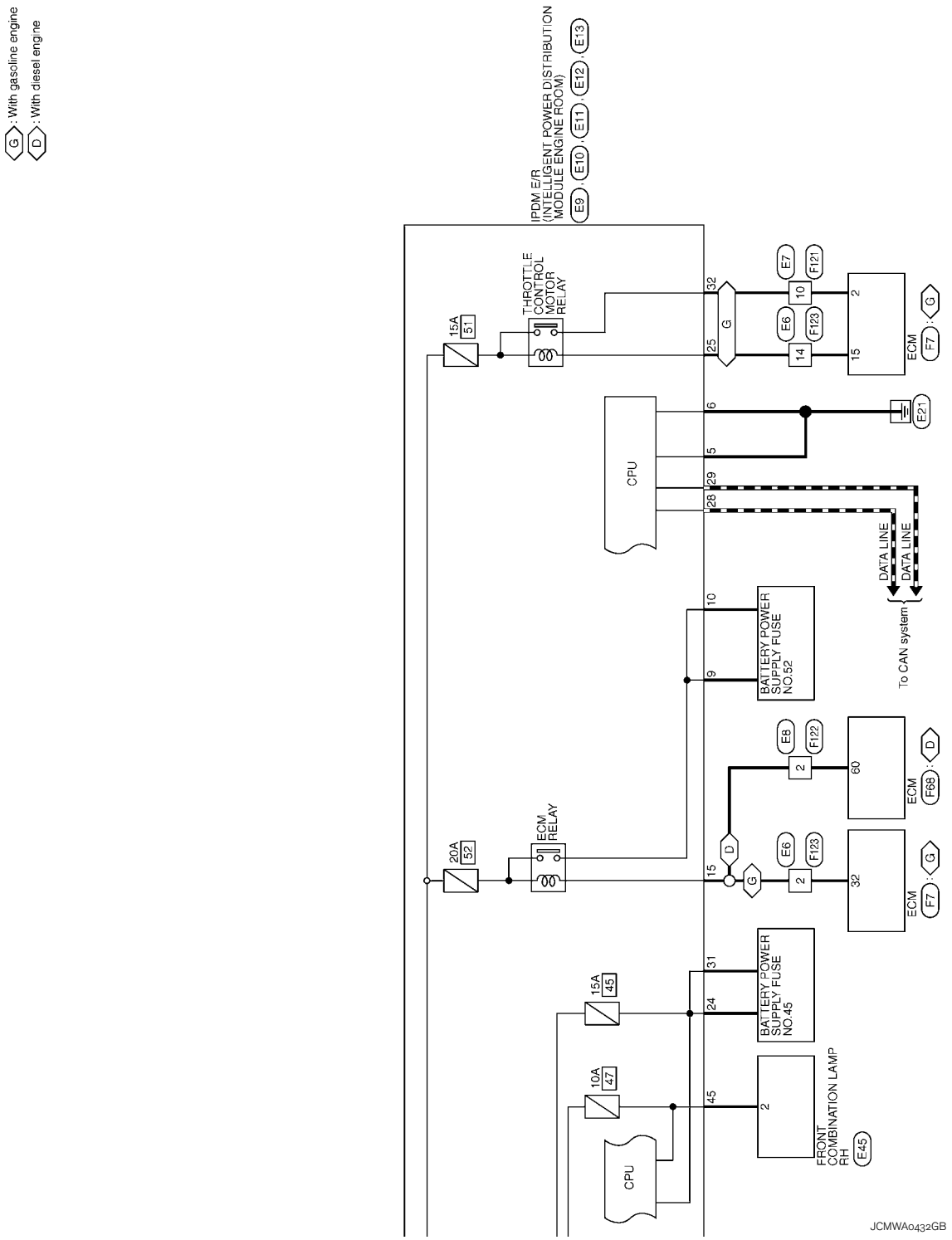
INFOID:0000000000956063



cardiagn.com



cardiagn.com



cardiagn.com

BATTERY POWER SUPPLY

Connector No.	E1
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FGY-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	G	–

Connector No.	E2
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FBR-MC-B

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	W	–
4	R	–

Connector No.	E5
Connector Name	HORN RELAY
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR/L	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	Y/L	–
14	G/L	–
22	Y/R	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	R/B	–
10	R/Y	–[With gasoline engine]
11	L/B	–[With diesel engine]

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B/R	–

Connector No.	E9
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	L02FB-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	R	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

JCMWA0433GB

cardiagn.com

BATTERY POWER SUPPLY

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

Terminal No.	Color of Wire	Signal Name [Specification]
9	G	-
10	L/R	-
15	Y/L	-[With gasoline engine]
15	B/R	-[With diesel engine]

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
24	R/Y	-
25	G/L	-
28	L	-
29	P	-
31	R	-
32	R/Y	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
36	W	-
37	R/W	-
38	R/L	-
43	W/B	-
44	L	-
45	L/W	-
46	G	-
47	R/L	-

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
53	W/B	-

Connector No.	E26
Connector Name	FRONT COMBINATION LAMP LH
Connector Type	AMP 953600-1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	G	-

Connector No.	E30
Connector Name	FRONT FOG LAMP LH
Connector Type	FCI 240PC02334019

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/B	-

Connector No.	E32
Connector Name	HEADLAMP WASHER RELAY
Connector Type	MS02FL-M2

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-
3	G	-

Connector No.	E34
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AH24-LH

Terminal No.	Color of Wire	Signal Name [Specification]
2	Y	+B(MTR)
3	W/R	+B(SOL)

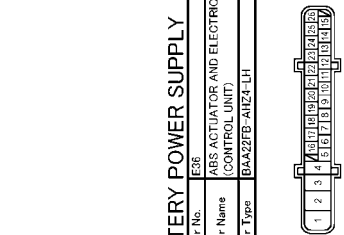
JCMWA0434GB

cardiagn.com

BATTERY POWER SUPPLY

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AIZ4-LH

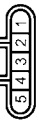
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	Y	+B(MTR)
3	W/R	+B(SOL)

Connector No.	E45
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	AMP 953600-1

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	L/W	-

Connector No.	E48
Connector Name	FRONT FOG LAMP RH
Connector Type	FCI 240FC023S4019

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-

Connector No.	E53
Connector Name	PTC RELAY-1
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	G	-

Connector No.	E54
Connector Name	PTC RELAY-2
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-

Connector No.	E59
Connector Name	COOLING FAN RELAY-3
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/B	-
3	W/B	-

Connector No.	E63
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FGY-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	G	-

Connector No.	E64
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FBR-MC-B

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	W	-
4	R	-

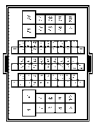
JCMWA0435GB

cardiagn.com

BATTERY POWER SUPPLY

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	R/B	-
39	G/R	-
62	V	-
71	L	-
76	Y	-

Connector No.	E106
Connector Name	WIRE TO WIRE
Connector Type	L02MB-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	W	-

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-

Connector No.	F2
Connector Name	FUSIBLE LINK HOLDER
Connector Type	24340 79907

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	B/Y	-

Connector No.	F3
Connector Name	FUSIBLE LINK HOLDER
Connector Type	24340 79906

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B/Y	-

Connector No.	F4
Connector Name	FUSIBLE LINK HOLDER
Connector Type	24348 51E09

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B/Y	-

Connector No.	F5
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L01FB-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	-

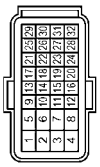
JCMWA0436GB

cardiagn.com

BATTERY POWER SUPPLY

Connector No.	F7
Connector Name	ECM
Connector Type	MAA24FGY-MEA8-RH

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	R/Y	VMOT
15	G/L	MOTRLY
32	Y/L	SSOFF

Connector No.	F10
Connector Name	STARTER MOTOR
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	–	–

Connector No.	F14
Connector Name	ALTERNATOR
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	B

Connector No.	F15
Connector Name	ALTERNATOR
Connector Type	HS03FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	Y/R	S

Connector No.	F25
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	MOLEX 500394-4111

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
45	R/B	BATT
47	R/B	BATT

Connector No.	F49
Connector Name	STARTER MOTOR
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B/Y	–

Connector No.	F52
Connector Name	STARTER MOTOR
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B/Y	–

Connector No.	F58
Connector Name	ALTERNATOR
Connector Type	–

H.S.

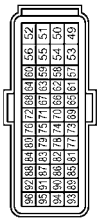
Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	L

JCMWA0437GB

cardiagn.com

BATTERY POWER SUPPLY

Connector No.	F68
Connector Name	ECM
Connector Type	MAA40FBR-MEA8-LH

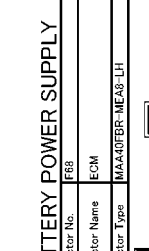


Terminal No.	Color of Wire	Signal Name [Specification]
60	B/R	CU RELAY DRIVE
68	L/B	VBD (DIRECT/VBATT)

Connector No.	F94
Connector Name	GLOW RELAY
Connector Type	FCI 240PC089S0015

Terminal No.	Color of Wire	Signal Name [Specification]
4	W	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V



Terminal No.	Color of Wire	Signal Name [Specification]
2	Y/L	–
14	G/L	–
22	Y/R	–

Connector No.	M1
Connector Name	FUSE BLOCK
Connector Type	–

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
9	R/B	–
10	R/Y	– [With gasoline engine]
11	L/B	– [With diesel engine]

Connector No.	M28
Connector Name	IGNITION SWITCH
Connector Type	M06FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–

Connector No.	F122
Connector Name	WIRE TO WIRE
Connector Type	MD2FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
2	B/R	–

Connector No.	M38
Connector Name	EPS CONTROL UNIT
Connector Type	TYCO 0-1544567-1

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–

JCMWA0438GB

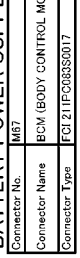
cardiagn.com

BATTERY POWER SUPPLY

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211FC083S017

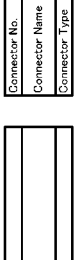
Terminal No.	Color of Wire	Signal Name [Specification]
57	Y	BAT(F/L)

Connector No.	M69
Connector Name	4WD CONTROL UNIT
Connector Type	TH16FW



Terminal No.	Color of Wire	Signal Name [Specification]
9	G	SOL BATT

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH16FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
7	R/B	-
39	G	-
62	V	-
71	L	-
76	Y	-

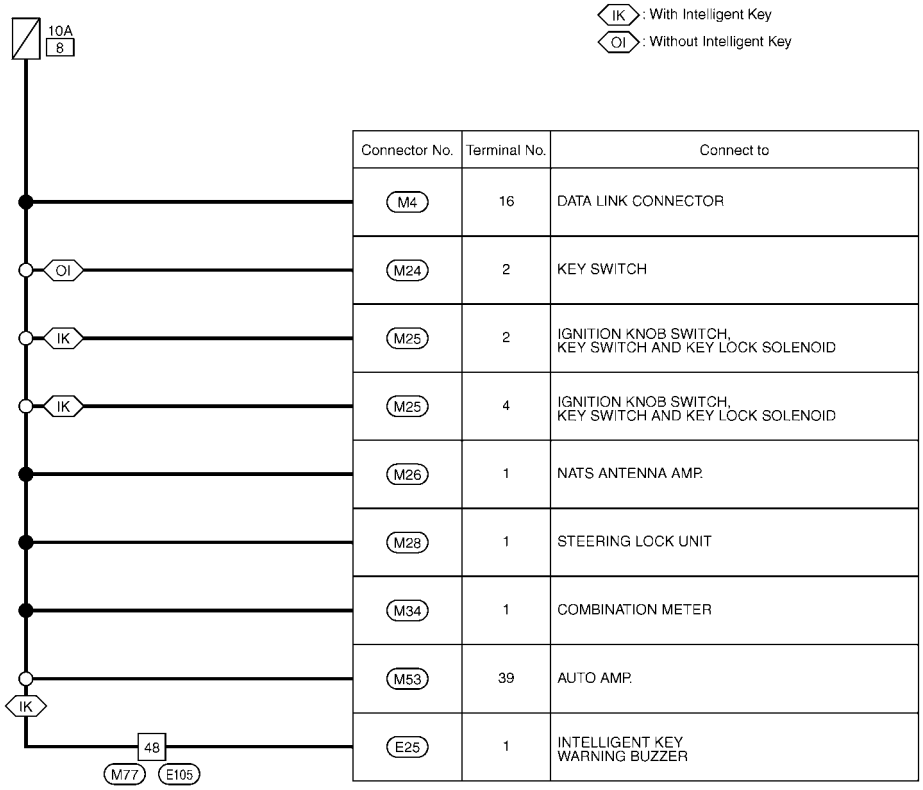
Connector No.	M78
Connector Name	WIRE TO WIRE
Connector Type	L02FB-MC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	W	-

JCMWA0439GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.8



Connector No.	Terminal No.	Connect to
M4	16	DATA LINK CONNECTOR
M24	2	KEY SWITCH
M25	2	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
M25	4	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
M26	1	NATS ANTENNA AMP.
M28	1	STEERING LOCK UNIT
M34	1	COMBINATION METER
M53	39	AUTO AMP.
E25	1	INTELLIGENT KEY WARNING BUZZER

2006/12/08

JCMWA0440GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.8

Connector No.	E25
Connector Name	INTELLIGENT KEY WARNING BUZZER
Connector Type	RKG3FBA-DGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH160MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
48	Y	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y	-

Connector No.	M24
Connector Name	KEY SWITCH
Connector Type	A02MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	Y	-

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	Y	-
4	Y	-

Connector No.	M26
Connector Name	NATS ANTENNA AMP.
Connector Type	TH04FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-

Connector No.	M28
Connector Name	STEERING LOCK UNIT
Connector Type	TK04FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

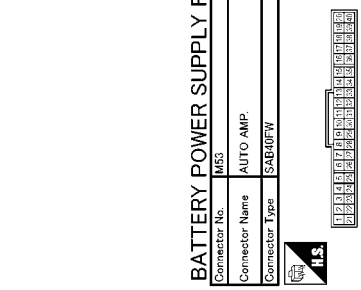
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT

JCMWA0441GB

cardiagn.com

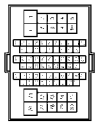
BATTERY POWER SUPPLY FUSE NO.8

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
39	Y	BAT

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

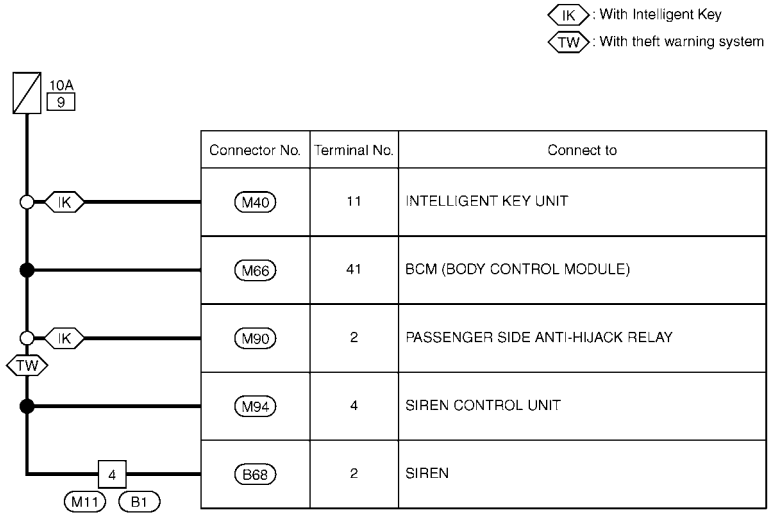


Terminal No.	Color of Wire	Signal Name [Specification]
48	Y	–

JCMWA0442GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.9



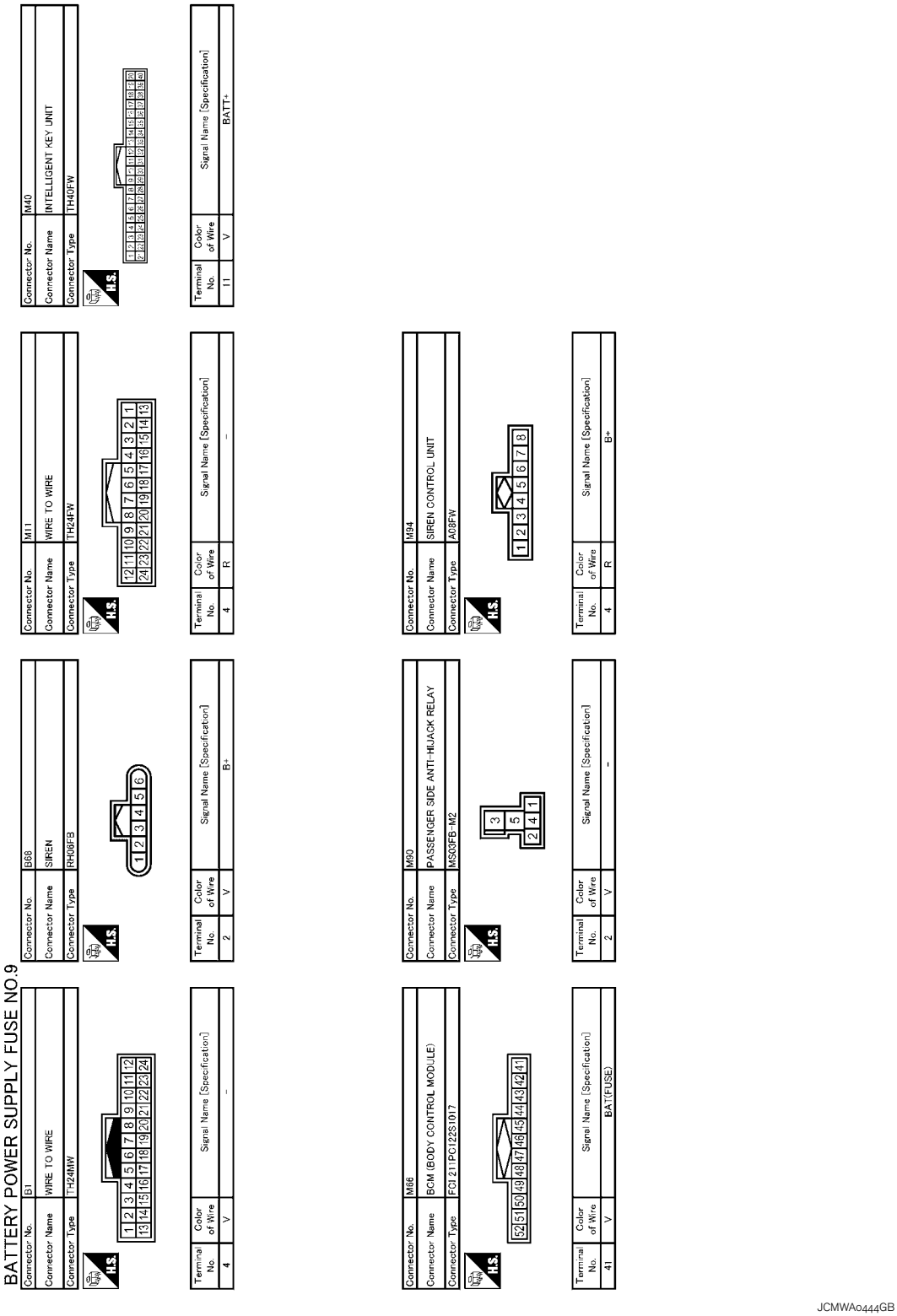
Connector No.	Terminal No.	Connect to
M40	11	INTELLIGENT KEY UNIT
M66	41	BCM (BODY CONTROL MODULE)
M90	2	PASSENGER SIDE ANTI-HIJACK RELAY
M94	4	SIREN CONTROL UNIT
B68	2	SIREN

2006/12/08

JCMWA0443GB

cardiagn.com

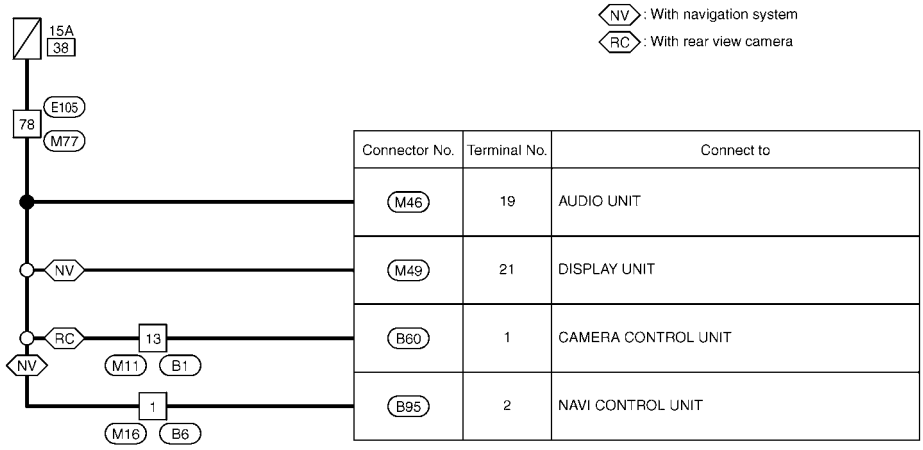
BATTERY POWER SUPPLY FUSE NO.9



JCMWA0444GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.38



Connector No.	Terminal No.	Connect to
M46	19	AUDIO UNIT
M49	21	DISPLAY UNIT
B60	1	CAMERA CONTROL UNIT
B95	2	NAVI CONTROL UNIT

2006/12/08

JCMWA0445GB

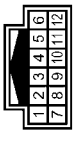
cardiagn.com

BATTERY POWER SUPPLY FUSE NO.38

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

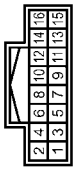
Terminal No.	Color of Wire	Signal Name [Specification]
13	LG	–

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Type	TH12MW



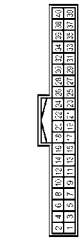
Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–

Connector No.	B60
Connector Name	CAMERA CONTROL UNIT
Connector Type	TH16FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	BATTERY

Connector No.	B95
Connector Name	NAVI CONTROL UNIT
Connector Type	TH40FW



Terminal No.	Color of Wire	Signal Name [Specification]
2	LG	BATTERY

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
78	LG	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
13	LG	–

Connector No.	M16
Connector Name	WIRE TO WIRE
Connector Type	TH12FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

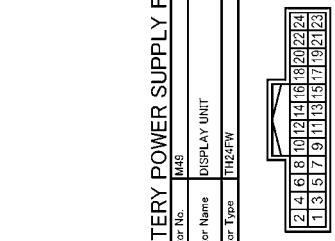
Terminal No.	Color of Wire	Signal Name [Specification]
19	LG	BATTERY

JCMWA0446GB

cardiagn.com

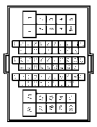
BATTERY POWER SUPPLY FUSE NO.38

Connector No.	M49
Connector Name	DISPLAY UNIT
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
21	LG	BATTERY

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	T160FW-NS16-TM4

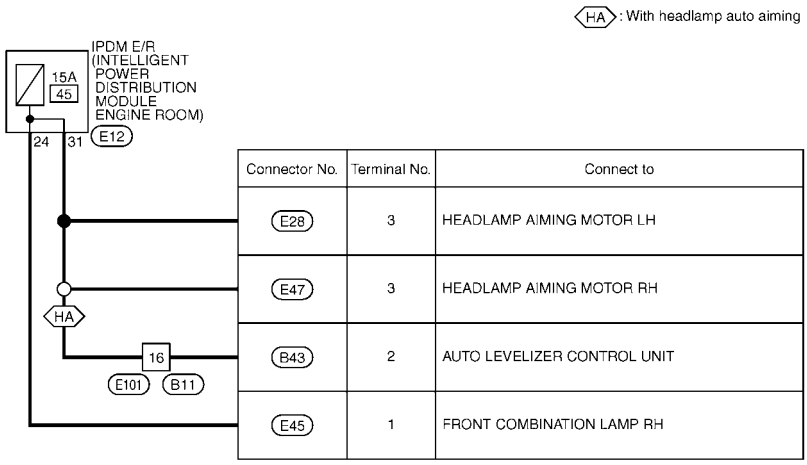


Terminal No.	Color of Wire	Signal Name [Specification]
78	LG	-

JCMWA0447GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.45



Connector No.	Terminal No.	Connect to
E28	3	HEADLAMP AIMING MOTOR LH
E47	3	HEADLAMP AIMING MOTOR RH
B43	2	AUTO LEVELIZER CONTROL UNIT
E45	1	FRONT COMBINATION LAMP RH

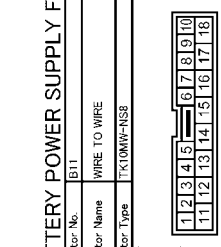
2006/12/08

JCMWA0448GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.45

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

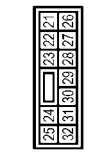


Terminal No.	Color of Wire	Signal Name [Specification]
16	R	-

Connector No.	B43
Connector Name	AUTO LEVELIZER CONTROL UNIT
Connector Type	AMP 1394416-1

Terminal No.	Color of Wire	Signal Name [Specification]
2	R	USUP

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
24	R/Y	-
31	R	-

Connector No.	E28
Connector Name	HEADLAMP AIMING MOTOR LH
Connector Type	FCI211PC033S0003

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-

Connector No.	E45
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	AMP 953600-1

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/Y	-

Connector No.	E47
Connector Name	HEADLAMP AIMING MOTOR RH
Connector Type	FCI211PC033S0003

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

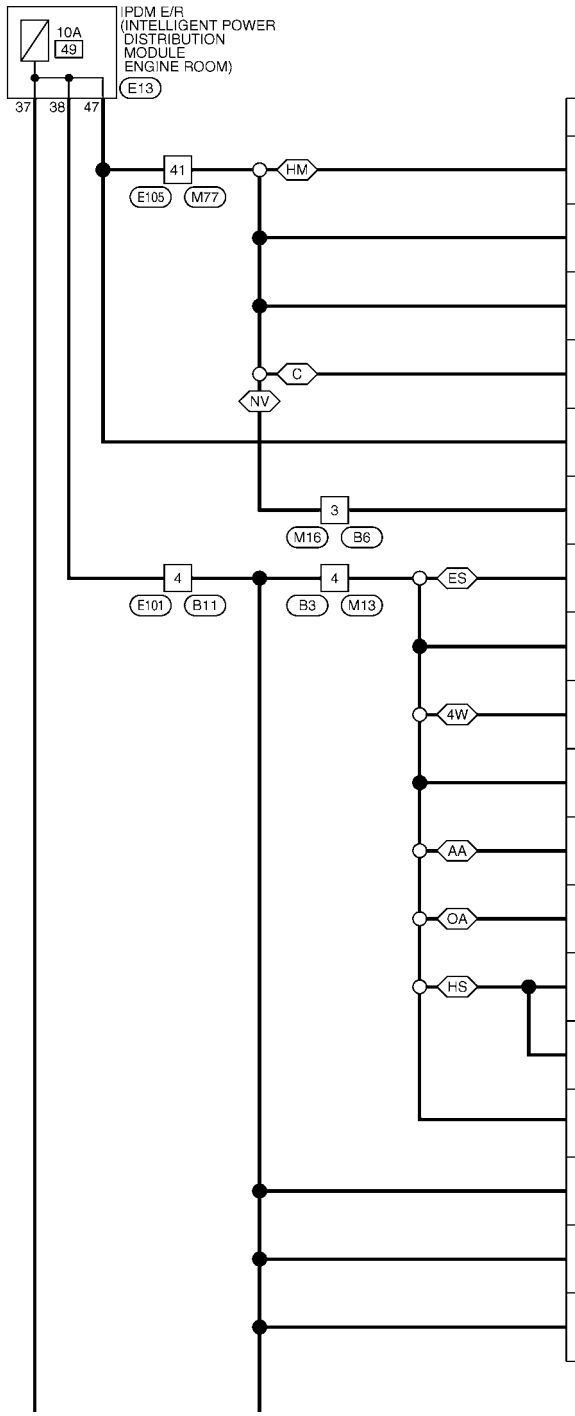
Terminal No.	Color of Wire	Signal Name [Specification]
16	R	-

JCMWA0449GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.49

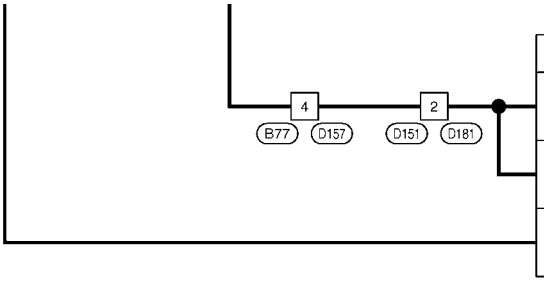
C : With CVT
4W : 4WD models
ES : With ESP
NV : With navigation system
AA : With auto A/C
OA : Without auto A/C
HM : With headlamp manual aiming
HS : With heated seat



Connector No.	Terminal No.	Connect to
M6	3	HEAD LAMP AIMING SWITCH
M45	4	HAZARD SWITCH
M46	9	AUDIO UNIT
M57	5	CONTROL DEVICE
E24	1	PARKING LAMP LH
B96	61	NAVI CONTROL UNIT
M5	3	ESP OFF SWITCH
M7	10	DOOR MIRROR REMOTE CONTROL SWITCH
M8	7	4WD MODE SWITCH
M52	1	HIGH-LEVEL VENT SWITCH
M53	16	AUTO AMP.
M54	2	HEATER CONTROL PANEL
M55	1	HEATED SEAT SWITCH LH
M56	1	HEATED SEAT SWITCH RH
M89	3	DOOR LOCK AND UNLOCK SWITCH
B43	6	AUTO LEVELIZER CONTROL UNIT
B59	2	REAR COMBINATION LAMP RH
B80	2	REAR COMBINATION LAMP LH

JCMWA0450GB

cardiagn.com



Connector No.	Terminal No.	Connect to
D184	1	LICENSE PLATE LAMP LH
D185	1	LICENSE PLATE LAMP RH
E43	1	PARKING LAMP RH

2006/12/08

JCMWA0451GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.49

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Type	TH12MW

H.S.

1	2	3	4	5	6
7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name [Specification]
3	R/L	-

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.

1	2	3	4	5		6	7	8	9	10
11	12	13	14	15		16	17	18		

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	B43
Connector Name	AUTO LEVELIZER CONTROL UNIT
Connector Type	AMP 1394416-1

H.S.

8	6	4	2
7	5	3	1

Terminal No.	Color of Wire	Signal Name [Specification]
6	R/L	A/D

Connector No.	B59
Connector Name	REAR COMBINATION LAMP RH
Connector Type	FCI 211PC042S4021

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	B80
Connector Name	REAR COMBINATION LAMP LH
Connector Type	FCI 211PC042S4021

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-

Connector No.	B86
Connector Name	NAVI CONTROL UNIT
Connector Type	TH32FW

H.S.

42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72
41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71

Terminal No.	Color of Wire	Signal Name [Specification]
61	R/L	ILLUMINATION

JCMWA0452GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.49

Connector No.	D151
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	D181
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/L	-

Connector No.	D184
Connector Name	LICENSE PLATE LAMP LH
Connector Type	TRW 3020423100D

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-

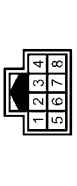
Connector No.	D185
Connector Name	LICENSE PLATE LAMP RH
Connector Type	TRW 3020423100D

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
37	R/W	-
38	R/L	-
47	R/L	-

Connector No.	E24
Connector Name	PARKING LAMP LH
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-

Connector No.	E43
Connector Name	PARKING LAMP RH
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

JCMWA0453GB

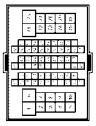
cardiagn.com

BATTERY POWER SUPPLY FUSE NO.49

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
41	R/L	-

Connector No.	M5
Connector Name	ESP OFF SWITCH
Connector Type	TK06FGY

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-

Connector No.	M6
Connector Name	HEADLAMP AIMING SWITCH
Connector Type	AG4FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-

Connector No.	M7
Connector Name	DOOR MIRROR REMOTE CONTROL SWITCH
Connector Type	NS10FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
10	R	-

Connector No.	M8
Connector Name	4WD MODE SWITCH
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	R	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
4	R	-

Connector No.	M16
Connector Name	WIRE TO WIRE
Connector Type	TH12FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-

JCMWA0454GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.49

Connector No.	M45
Connector Name	HAZARD SWITCH
Connector Type	CINCH REF 49308EV4M9 (WHITE)

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	R	-

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH16FW-CS2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	R	ILLUMINATION

Connector No.	M52
Connector Name	HIGH-LEVEL VENT SWITCH
Connector Type	CINCH 49305EV4M5

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
16	R	ILL+

Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R	-

Connector No.	M55
Connector Name	HEATED SEAT SWITCH LH
Connector Type	MOLEX 98172-1005 (BROWN)

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-

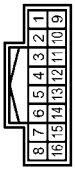
Connector No.	M56
Connector Name	HEATED SEAT SWITCH RH
Connector Type	MOLEX 98172-1002 (BLACK)

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-

Connector No.	M57
Connector Name	CONTROL DEVICE
Connector Type	TH16FW

H.S.



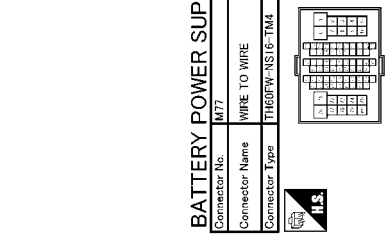
Terminal No.	Color of Wire	Signal Name [Specification]
5	R	-

JCMWA0455GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.49

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
41	R	-

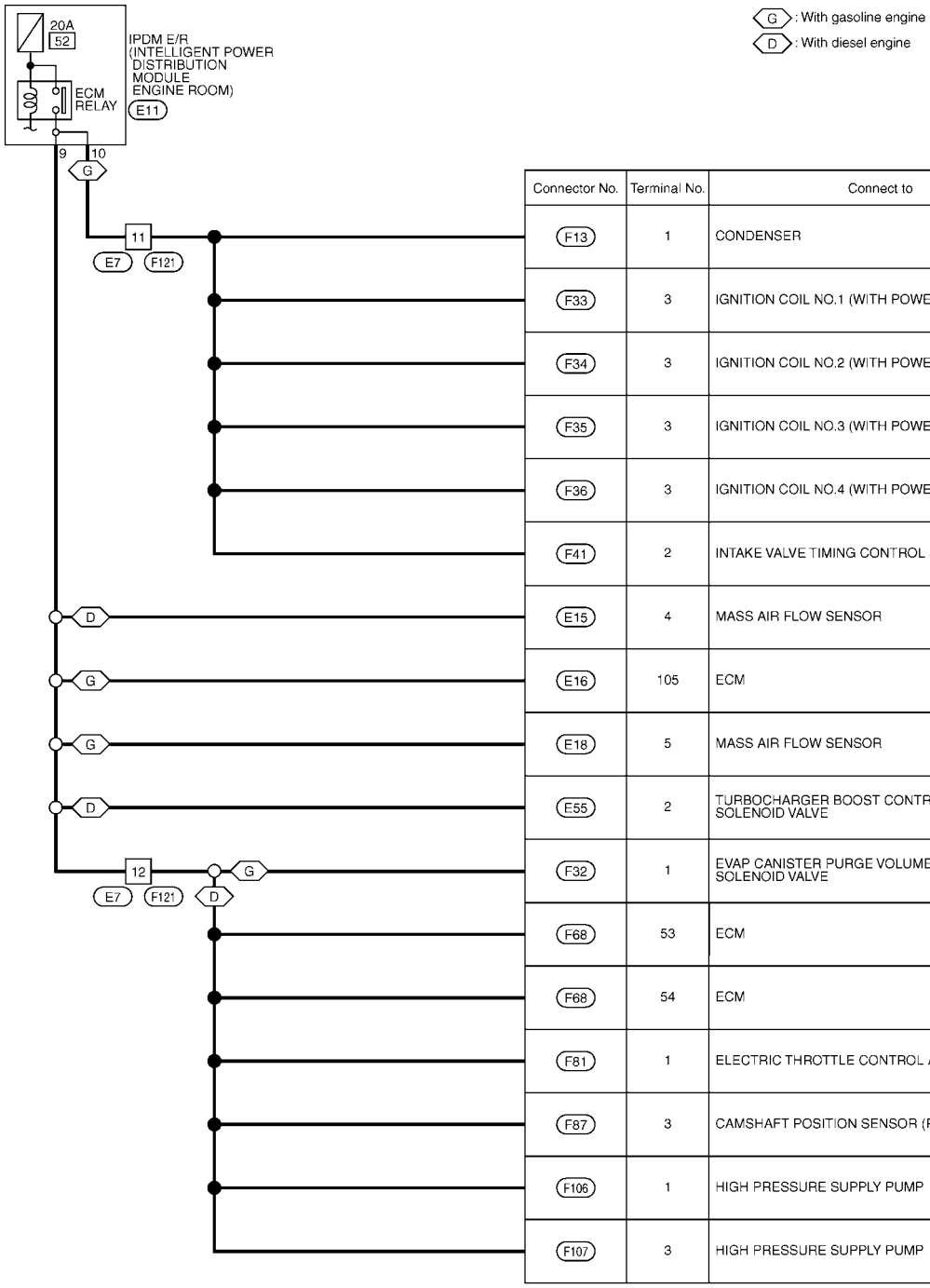
Connector No.	M89
Connector Name	DOOR LOCK AND UNLOCK SWITCH
Connector Type	7703197674

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-

JCMWA0456GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.52



Connector No.	Terminal No.	Connect to
F13	1	CONDENSER
F33	3	IGNITION COIL NO.1 (WITH POWER TRANSISTOR)
F34	3	IGNITION COIL NO.2 (WITH POWER TRANSISTOR)
F35	3	IGNITION COIL NO.3 (WITH POWER TRANSISTOR)
F36	3	IGNITION COIL NO.4 (WITH POWER TRANSISTOR)
F41	2	INTAKE VALVE TIMING CONTROL SOLENOID VALVE
E15	4	MASS AIR FLOW SENSOR
E16	105	ECM
E18	5	MASS AIR FLOW SENSOR
E55	2	TURBOCHARGER BOOST CONTROL SOLENOID VALVE
F32	1	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
F68	53	ECM
F68	54	ECM
F81	1	ELECTRIC THROTTLE CONTROL ACTUATOR
F87	3	CAMSHAFT POSITION SENSOR (PHASE)
F106	1	HIGH PRESSURE SUPPLY PUMP
F107	3	HIGH PRESSURE SUPPLY PUMP

2006/12/08

JCMWA0457GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.52

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
11	L/R	–[With gasoline engine]
12	G	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

13	12		11	10	9
20	19	18	17	16	15	14

Terminal No.	Color of Wire	Signal Name [Specification]
9	G	–
10	L/R	–

Connector No.	E15
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH06FB

H.S.

6	5	4	3	2	1

Terminal No.	Color of Wire	Signal Name [Specification]
4	G	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

81	85	89	93	97	101	105	109
82	86	90	94	98	102	106	110
83	87	91	95	99	103	107	111
84	88	92	96	100	104	108	112

Terminal No.	Color of Wire	Signal Name [Specification]
105	G	VBR

Connector No.	E18
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH05FB

H.S.

1	2	3	4	5	6

Terminal No.	Color of Wire	Signal Name [Specification]
5	G	–

Connector No.	E55
Connector Name	TURBOCHARGER BOOST CONTROL SOLENOID VALVE
Connector Type	SUPPLIRE REF 282788-1

H.S.

2	1

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	–

Connector No.	F13
Connector Name	CONDENSER
Connector Type	M02FW-GY-LC

H.S.

1
2

Terminal No.	Color of Wire	Signal Name [Specification]
1	L/R	–

Connector No.	F32
Connector Name	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
Connector Type	E02FL-RS-LGY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–

JCMWA0458GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.52

Connector No.	F33
Connector Name	IGNITION COIL No.1 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	L/R	-

Connector No.	F34
Connector Name	IGNITION COIL No.2 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	L/R	-

Connector No.	F35
Connector Name	IGNITION COIL No.3 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	L/R	-

Connector No.	F36
Connector Name	IGNITION COIL No.4 (WITH POWER TRANSISTOR)
Connector Type	E03FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	L/R	-

Connector No.	F41
Connector Name	INTAKE VALVE TIMING CONTROL SOLENOID VALVE
Connector Type	E02FG-RS-LGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	L/R	-

Connector No.	F58
Connector Name	ECM
Connector Type	MAA40FBR-MEA8-LH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
53	G	VBATT
54	G	VBATT

Connector No.	F81
Connector Name	ELECTRIC THROTTLE CONTROL ACTUATOR
Connector Type	FEP 4212200

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-

Connector No.	F87
Connector Name	CAMSHAFT POSITION SENSOR (PHASE)
Connector Type	FEA03FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	G	-

JCMWA0459GB

cardiagn.com

BATTERY POWER SUPPLY FUSE NO.52

Connector No.	F106
Connector Name	HIGH PRESSURE SUPPLY PUMP
Connector Type	FEA02FO

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-

Connector No.	F107
Connector Name	HIGH PRESSURE SUPPLY PUMP
Connector Type	FEA02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	G	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.

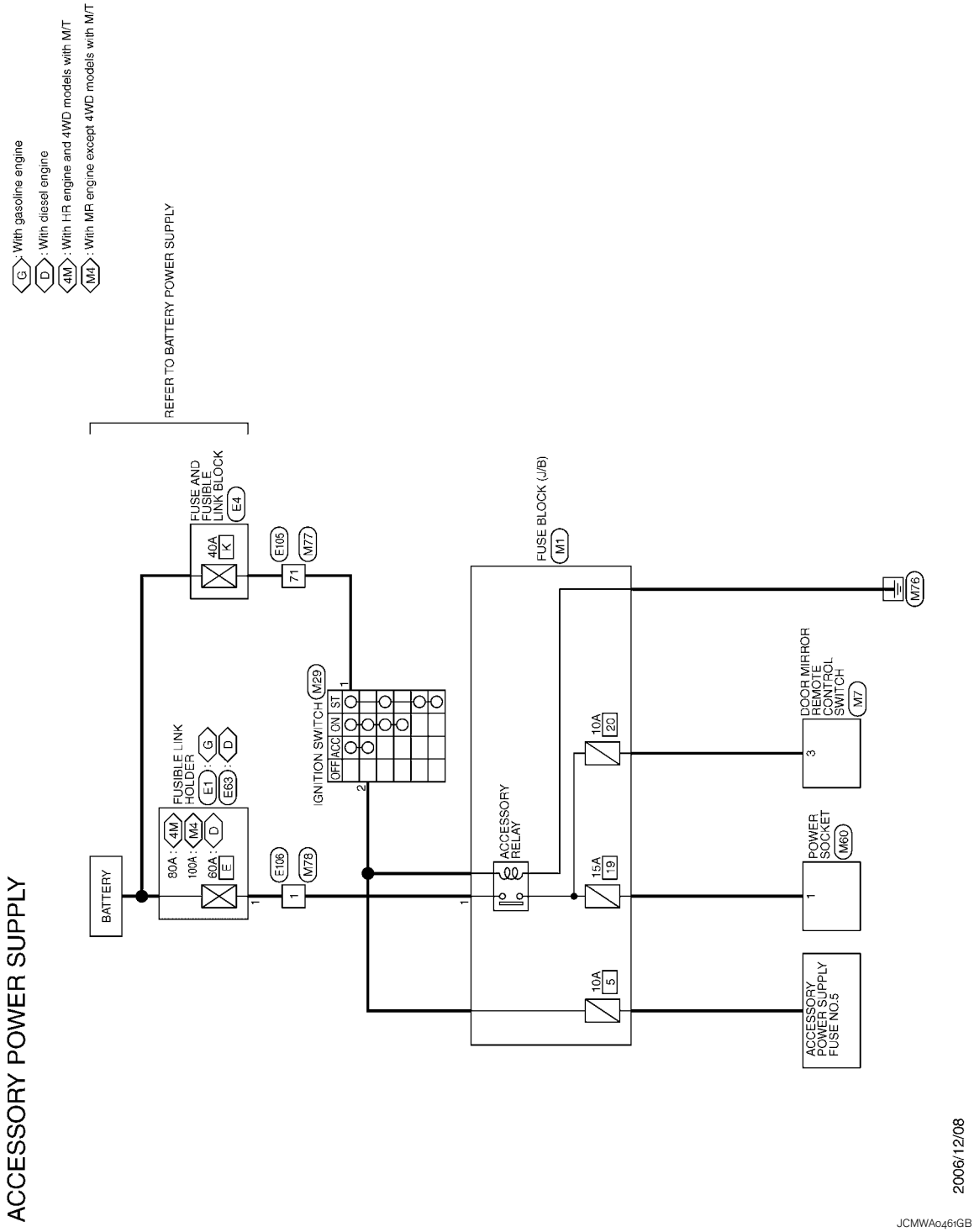
Terminal No.	Color of Wire	Signal Name [Specification]
11	L/R	-[With gasoline engine]
12	G	-

JCMWA0460GB

cardiagn.com

Wiring Diagram - ACCESSORY POWER SUPPLY -

INFOID:0000000000956064



cardiagn.com

ACCESSORY POWER SUPPLY

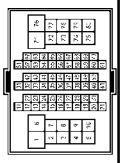
Connector No.	E1
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FGY-MC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2		

Connector No.	E63
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FGY-MC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2		

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
71	L	-

Connector No.	E106
Connector Name	WIRE TO WIRE
Connector Type	L02MB-MC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2		

Connector No.	M1
Connector Name	FUSE BLOCK
Connector Type	-

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-

Connector No.	M7
Connector Name	DOOR MIRROR REMOTE CONTROL SWITCH
Connector Type	NS10FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
3	R	-

Connector No.	M29
Connector Name	IGNITION SWITCH
Connector Type	M06FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	BR	-

Connector No.	M60
Connector Name	POWER SOCKET
Connector Type	P02FB-Z

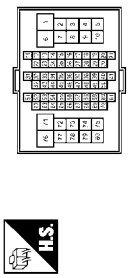
Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

JCMWA0462GB

cardiagn.com

ACCESSORY POWER SUPPLY

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
71	L	–

Connector No.	M78
Connector Name	WIRE TO WIRE
Connector Type	L02FB-MC

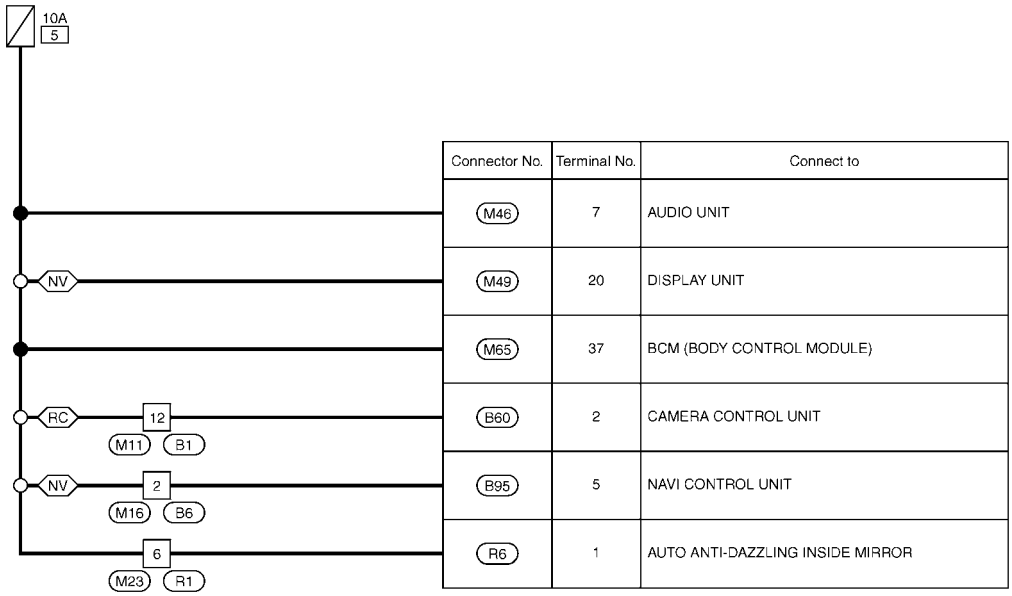
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–

JCMWA0463GB

cardiagn.com

ACCESSORY POWER SUPPLY FUSE NO.5

NV : With navigation system
RC : With rear view camera



Connector No.	Terminal No.	Connect to
M46	7	AUDIO UNIT
M49	20	DISPLAY UNIT
M65	37	BCM (BODY CONTROL MODULE)
B60	2	CAMERA CONTROL UNIT
B95	5	NAVI CONTROL UNIT
R6	1	AUTO ANTI-DAZZLING INSIDE MIRROR

2006/12/08

JCMWA0464GB

cardiagn.com

ACCESSORY POWER SUPPLY FUSE NO.5

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
12	R	-

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Type	TH12MW

H.S.

1	2	3	4	5	6
7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name [Specification]
2	R	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
12	R	-

Connector No.	M16
Connector Name	WIRE TO WIRE
Connector Type	TH12FW

H.S.

6	5	4	3	2	1
12	11	10	9	8	7

Terminal No.	Color of Wire	Signal Name [Specification]
2	R	-

Connector No.	B60
Connector Name	CAMERA CONTROL UNIT
Connector Type	TH16FW

H.S.

2	4	6	8	10	12	14	16
1	3	5	7	9	11	13	15

Terminal No.	Color of Wire	Signal Name [Specification]
2	R	ACC

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

10	9	8	7	6		5	4	3	2	1
18	17	16	15	14	13	12	11			

Terminal No.	Color of Wire	Signal Name [Specification]
6	R	-

Connector No.	B95
Connector Name	NAVI CONTROL UNIT
Connector Type	TH40FW

H.S.

2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39

Terminal No.	Color of Wire	Signal Name [Specification]
5	R	ACC

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

H.S.

	1	2	3	4	5	6	7	8	9	
19		10	11	12	13	14	15	16	17	18	20

Terminal No.	Color of Wire	Signal Name [Specification]
7	R	ACC

JCMWA0465GB

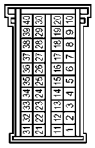
cardiagn.com

ACCESSORY POWER SUPPLY FUSE NO.5

Connector No.	M48
Connector Name	DISPLAY UNIT
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
20	R	ACC

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
37	R	ACC SW

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
6	R	-

Connector No.	R6
Connector Name	AUTO ANTI-DAZZLING INSIDE MIRROR
Connector Type	CINCH 49908228

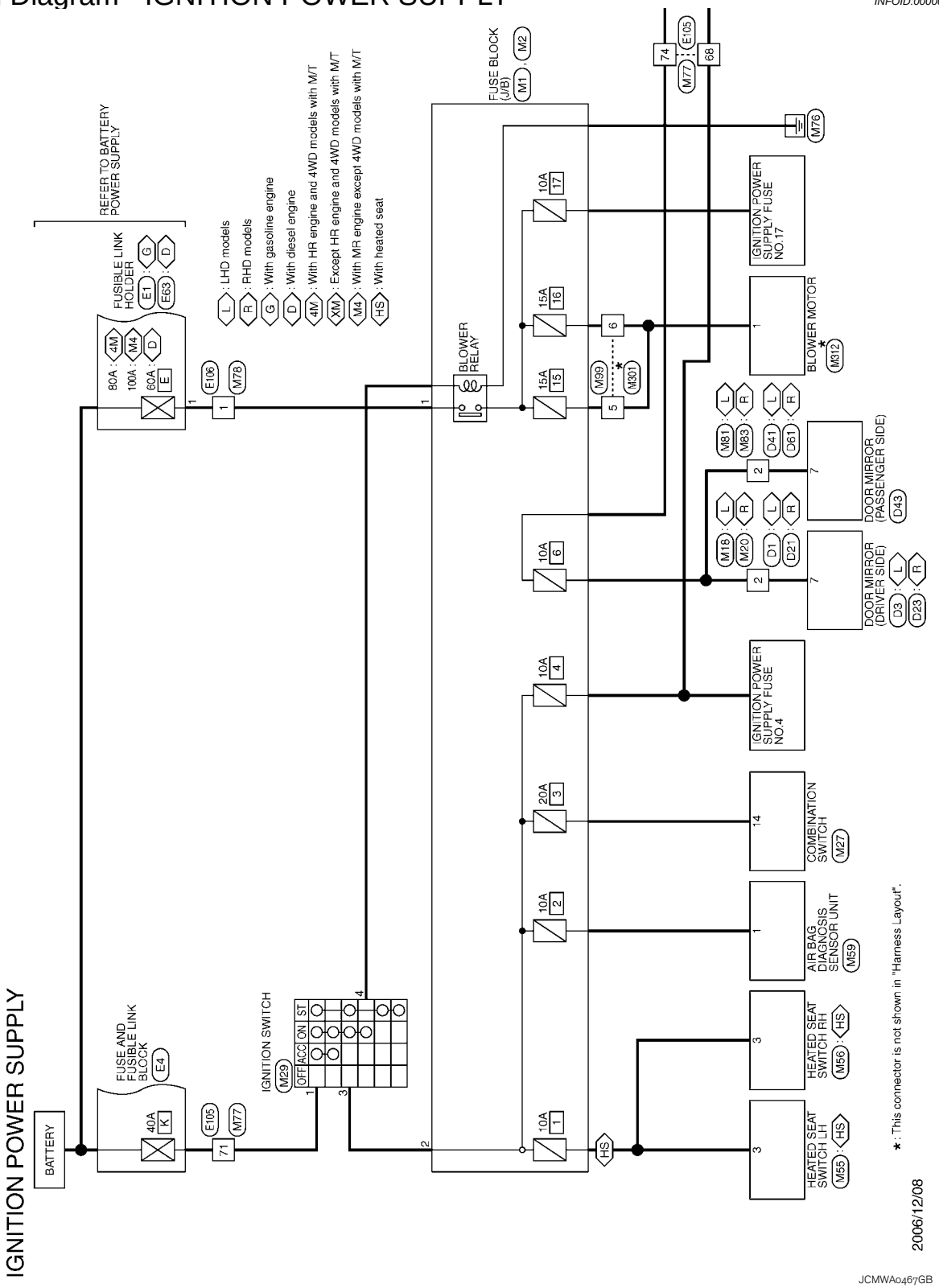
Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-

JCMWA0466GB

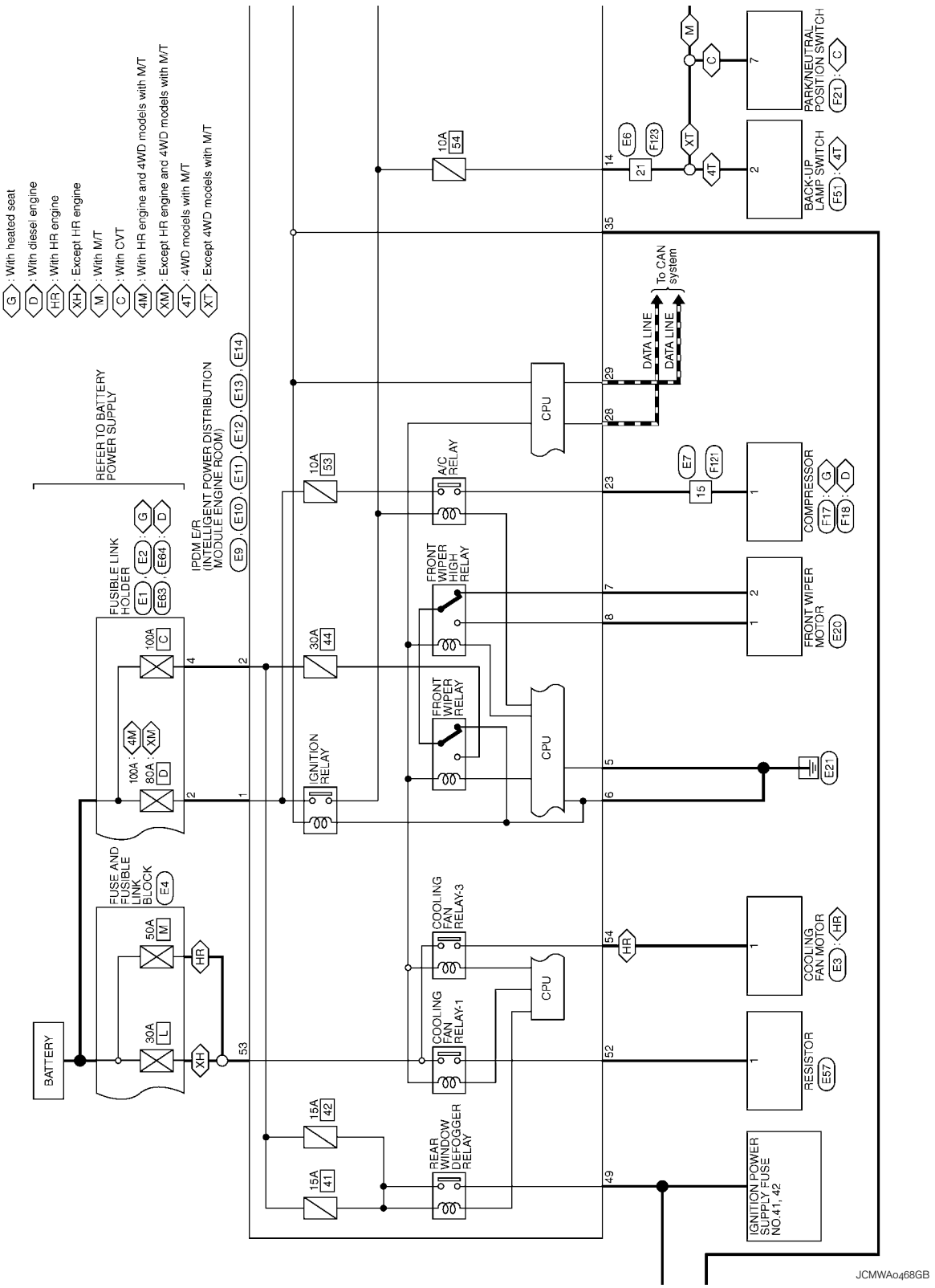
cardiagn.com

Wiring Diagram - IGNITION POWER SUPPLY -

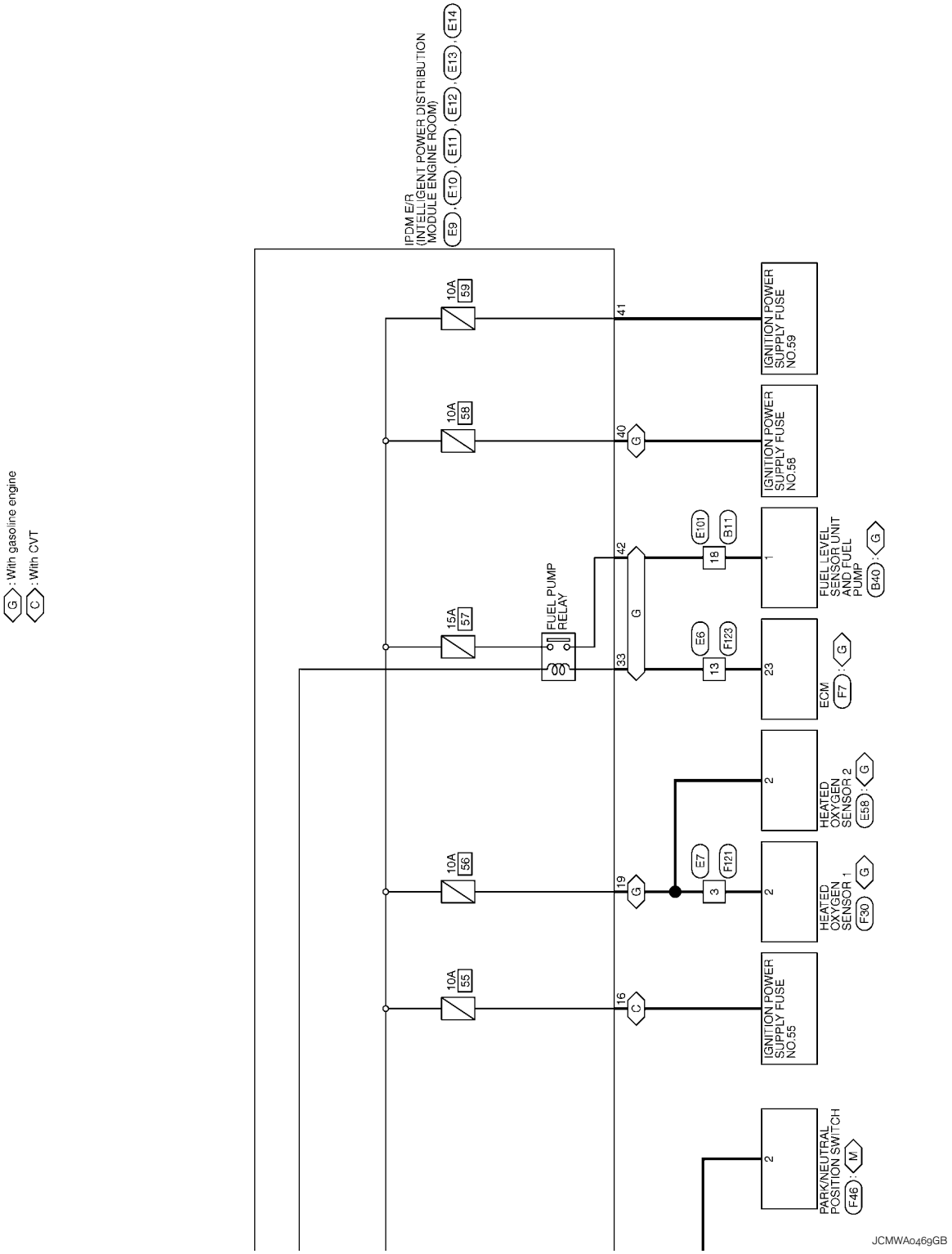
INFOID:0000000000956065



cardiagn.com



cardiagn.com

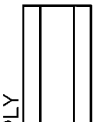


cardiagn.com

IGNITION POWER SUPPLY

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
18	B/Y	-

Connector No.	B40
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	E04FGY-RS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	-

Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-

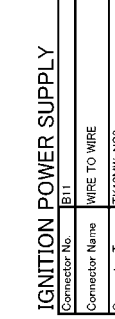
Connector No.	D3
Connector Name	DOOR MIRROR (DRIVER SIDE)
Connector Type	TK08MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	D21
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	P	-

Connector No.	D23
Connector Name	DOOR MIRROR (DRIVER SIDE)
Connector Type	TK08MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	D41
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	-

Connector No.	D43
Connector Name	DOOR MIRROR (PASSENGER SIDE)
Connector Type	TK08MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

JCMWA0470GB

cardiagn.com

IGNITION POWER SUPPLY

Connector No.	D61
Connector Name	WIRE TO WIRE
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-

Connector No.	E1
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FGY-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	G	-

Connector No.	E2
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FBR-MC-B

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	R	-

Connector No.	E3
Connector Name	COOLING FAN MOTOR
Connector Type	P80103895160Z

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-

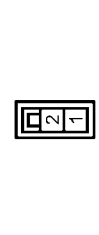
Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1Y

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
13	B/O	-
21	R/B	-

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	-
15	Y/B	-

Connector No.	E9
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	L02FB-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	R	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-
7	Y	-
8	Y/R	-

JCMWA0471GB

cardiagn.com

IGNITION POWER SUPPLY

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

13 12 11 10 9
20 19 18 17 16 15 14

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	-
16	Y/R	-
19	R/O	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

25 24 23 22 21
32 31 30 29 28 27 26

Terminal No.	Color of Wire	Signal Name [Specification]
23	Y/B	-
26	L	-
29	P	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

39 38 37 36 35 34 33
48 47 46 45 44 43 42 41 40

Terminal No.	Color of Wire	Signal Name [Specification]
33	B/O	-
35	W/L	-
40	SB	-[With MR engine]
41	P	-
42	B/Y	-

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5991-40-F

H.S.

51 50 49
54 53 52

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	-
52	W	-
53	W/B	-
54	R	-

Connector No.	E20
Connector Name	FRONT WIPER MOTOR
Connector Type	AMP 353600-1

H.S.

5 4 3 2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/R	-
2	Y	-

Connector No.	E57
Connector Name	RESISTOR
Connector Type	P8010388151602

H.S.

1 2

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-

Connector No.	E58
Connector Name	HEATED OXYGEN SENSOR 2
Connector Type	AFZ04FB

H.S.

1 2
3 4

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/O	-

Connector No.	E63
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FGY-MC

H.S.

1
2

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	G	-

JCMWA0472GB

cardiagn.com

IGNITION POWER SUPPLY

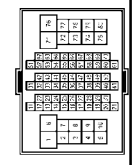
Connector No.	E64
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FBR-MC-B

Terminal No.	Color of Wire	Signal Name [Specification]
4	R	-

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
18	B/Y	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
68	W/L	-
71	L	-
74	G	-

Connector No.	E106
Connector Name	WIRE TO WIRE
Connector Type	L02MB-MC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-

Connector No.	F7
Connector Name	ECM
Connector Type	MAA24FGY-MEA8-RH

Terminal No.	Color of Wire	Signal Name [Specification]
23	B/O	FPR

Connector No.	F17
Connector Name	COMPRESSOR
Connector Type	RH02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	-

Connector No.	F18
Connector Name	COMPRESSOR
Connector Type	DELPHI12162017

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	-

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
7	R/B	-

JCMWA0473GB

cardiagn.com

IGNITION POWER SUPPLY

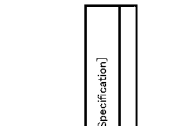
Connector No.	F30
Connector Name	HEATED OXYGEN SENSOR 1
Connector Type	AFZ04FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/O	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

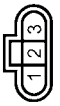
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
13	B/O	-
21	R/B	-

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	R/B	-

Connector No.	M1
Connector Name	FUSE BLOCK
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-

Connector No.	F51
Connector Name	BACK-UP LAMP SWITCH
Connector Type	RK02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/B	-

Connector No.	M2
Connector Name	FUSE BLOCK
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	-
15	Y/B	-

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-

JCMWA0474GB

cardiagn.com

IGNITION POWER SUPPLY

Connector No.	M20
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	GR	IGN

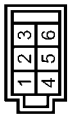
Connector No.	M29
Connector Name	IGNITION SWITCH
Connector Type	M06FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
3	G	-
4	Y	-

Connector No.	M55
Connector Name	HEATED SEAT SWITCH LH
Connector Type	MOLEX 98172-1005 (BROWN)

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	G	-

Connector No.	M56
Connector Name	HEATED SEAT SWITCH RH
Connector Type	MOLEX 98172-1002 (BLACK)

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	G	-

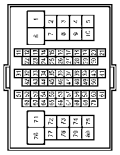
Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	IGN

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
68	W	-
71	L	-
74	R	-

Connector No.	M78
Connector Name	WIRE TO WIRE
Connector Type	L02FB-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-

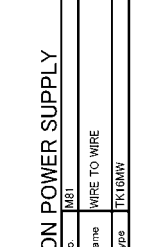
JCMWA0475GB

cardiagn.com

IGNITION POWER SUPPLY

Connector No.	M81
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	G	–

Connector No.	M83
Connector Name	WIRE TO WIRE
Connector Type	TK16MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	–

Connector No.	M99
Connector Name	WIRE TO WIRE
Connector Type	M06FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	Y	–
6	Y	–

Connector No.	M301
Connector Name	WIRE TO WIRE
Connector Type	M06MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	Y	–
6	Y	–

Connector No.	M312
Connector Name	BLOWER MOTOR
Connector Type	M02FW-LC

H.S.

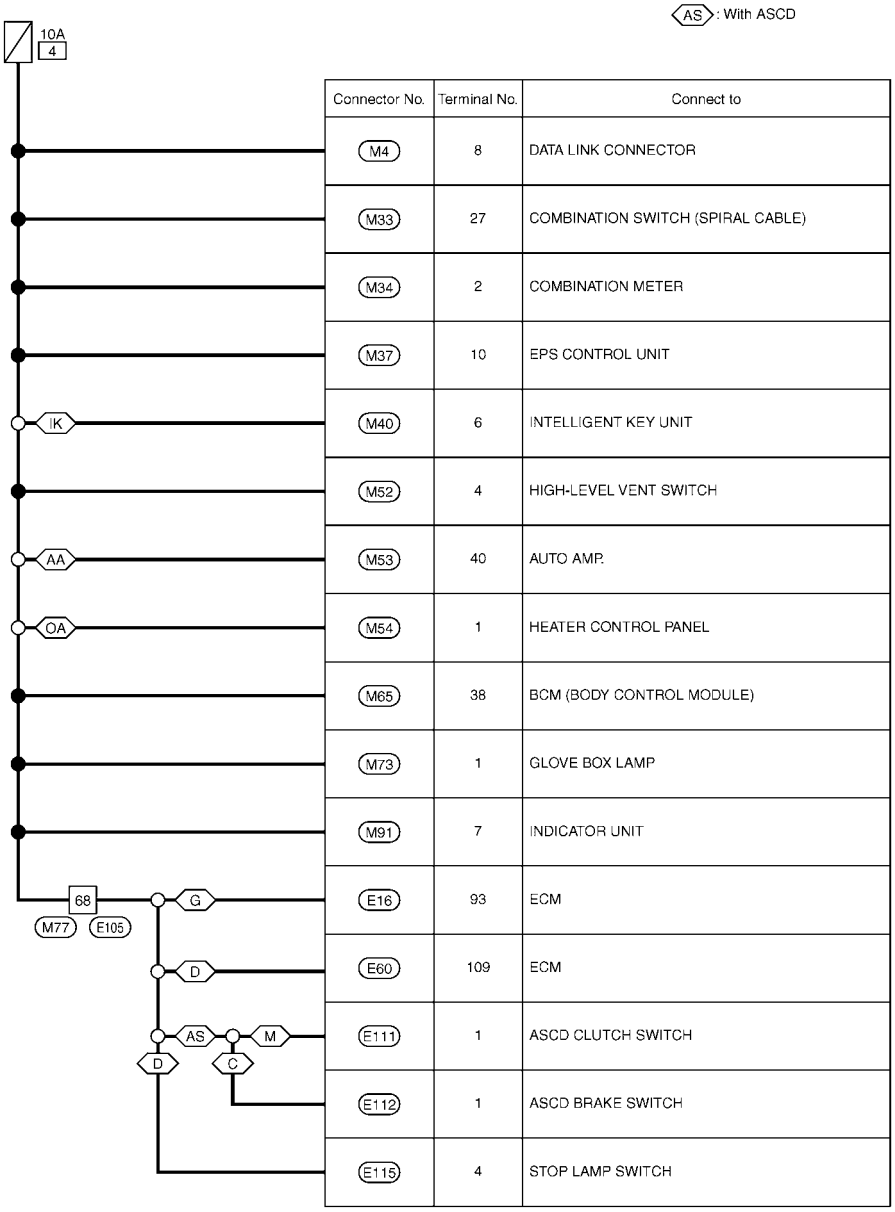
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–

JCMWA0476GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.4

G : With gasoline engine
D : With diesel engine
M : With M/T
C : With CVT
IK : With Intelligent Key
AA : With auto A/C
OA : Without auto A/C
AS : With ASCD



Connector No.	Terminal No.	Connect to
M4	8	DATA LINK CONNECTOR
M33	27	COMBINATION SWITCH (SPIRAL CABLE)
M34	2	COMBINATION METER
M37	10	EPS CONTROL UNIT
M40	6	INTELLIGENT KEY UNIT
M52	4	HIGH-LEVEL VENT SWITCH
M53	40	AUTO AMP.
M54	1	HEATER CONTROL PANEL
M65	38	BCM (BODY CONTROL MODULE)
M73	1	GLOVE BOX LAMP
M91	7	INDICATOR UNIT
E16	93	ECM
E60	109	ECM
E111	1	ASCD CLUTCH SWITCH
E112	1	ASCD BRAKE SWITCH
E115	4	STOP LAMP SWITCH

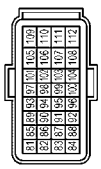
2006/12/08

JCMWA0477GB

cardiagn.com

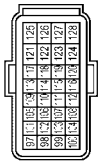
IGNITION POWER SUPPLY FUSE NO.4

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



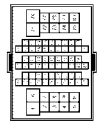
Terminal No.	Color of Wire	Signal Name [Specification]
93	W/L	IGN SW

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
109	W/L	IGN

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH16MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
68	W/L	-

Connector No.	E111
Connector Name	ASCD CLUTCH SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/L	-[With gasoline engine]

Connector No.	E112
Connector Name	ASCD BRAKE SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/L	-[With CVT]

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
4	W/L	-[With diesel engine]

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
8	W	-

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

Terminal No.	Color of Wire	Signal Name [Specification]
27	W/L	-

JCMWA0478GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.4

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	IGN

Connector No.	M37
Connector Name	EPS CONTROL UNIT
Connector Type	Molex 36545-0001

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
10	O	-

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	IGN SW

Connector No.	M52
Connector Name	HIGH-LEVEL VENT SWITCH
Connector Type	CINCH 49305EV4M5

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	GR	-

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
40	GR	IGN

Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
38	W/L	IGN SW

Connector No.	M73
Connector Name	GLOVE BOX LAMP
Connector Type	WBS-1006N

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-

JCMWA0479GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.4

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH16FW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
68	W	-

Connector No.	M81
Connector Name	INDICATOR UNIT
Connector Type	TH08FW-1V

H.S.

1 2 3 4 5 6 7 8

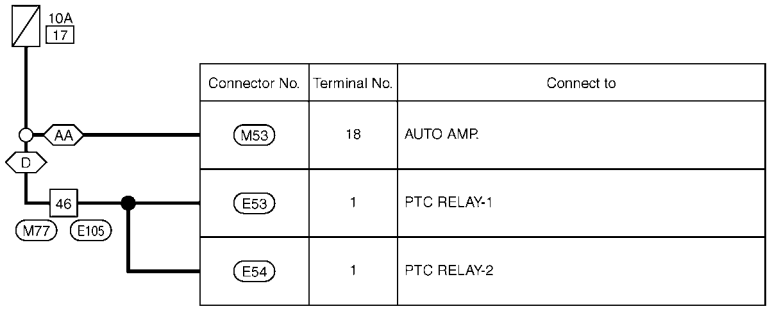
Terminal No.	Color of Wire	Signal Name [Specification]
7	W/L	-

JCMWA0480GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.17

D : With diesel engine
AA : With auto A/C



Connector No.	Terminal No.	Connect to
M53	18	AUTO AMP.
E53	1	PTC RELAY-1
E54	1	PTC RELAY-2

2006/12/08

JCMWA0481GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.17

Connector No.	E53
Connector Name	PTC RELAY-1
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-

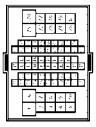
Connector No.	E54
Connector Name	PTC RELAY-2
Connector Type	24347 9F900

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

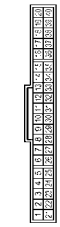
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
46	Y	-

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW

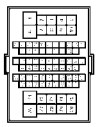
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
18	Y	IGN-2

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

H.S.

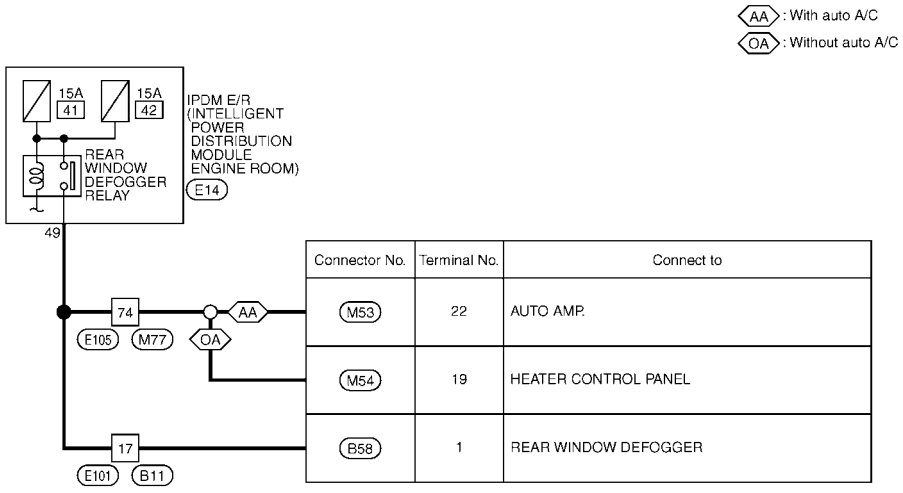


Terminal No.	Color of Wire	Signal Name [Specification]
46	Y	-

JCMWA0482GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.41,42



Connector No.	Terminal No.	Connect to
M53	22	AUTO AMP.
M54	19	HEATER CONTROL PANEL
B58	1	REAR WINDOW DEFOGGER

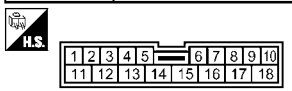
2006/12/08

JCMWA0483GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.41,42

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
17	B	–

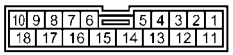
Connector No.	B58
Connector Name	REAR WINDOW DEFOGGER
Connector Type	P01FB-A

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	YZK 7283-5591-40-F

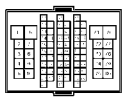
Terminal No.	Color of Wire	Signal Name [Specification]
49	B	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
17	G	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

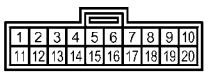


Terminal No.	Color of Wire	Signal Name [Specification]
74	G	–

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW

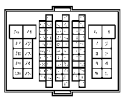
Terminal No.	Color of Wire	Signal Name [Specification]
22	R	RR/DEF F/B

Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY



Terminal No.	Color of Wire	Signal Name [Specification]
19	R	RR DEF F/B

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



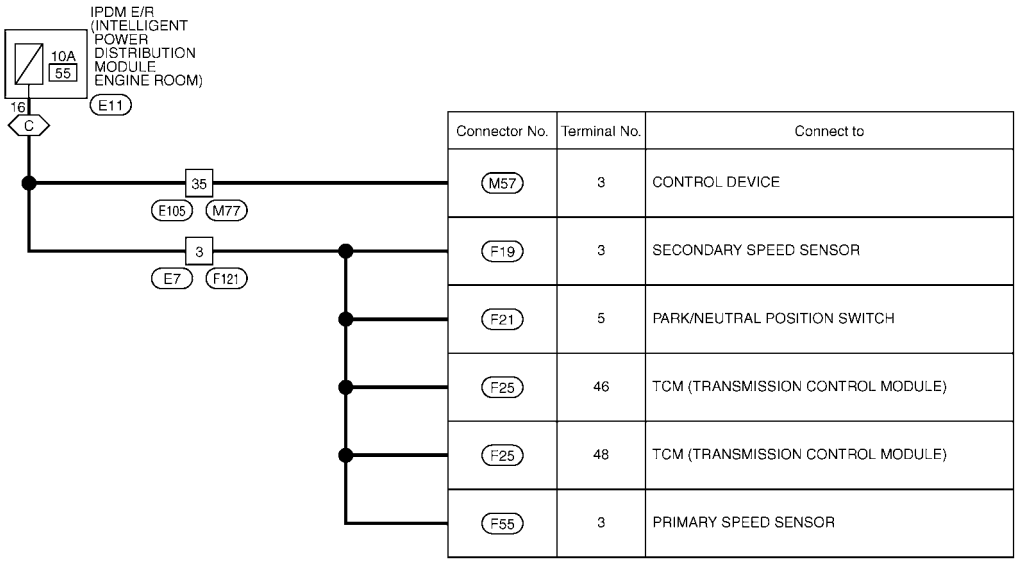
Terminal No.	Color of Wire	Signal Name [Specification]
74	R	–

JCMWA0q84GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.55

C : With CVT



Connector No.	Terminal No.	Connect to
M57	3	CONTROL DEVICE
F19	3	SECONDARY SPEED SENSOR
F21	5	PARK/NEUTRAL POSITION SWITCH
F25	46	TCM (TRANSMISSION CONTROL MODULE)
F25	48	TCM (TRANSMISSION CONTROL MODULE)
F55	3	PRIMARY SPEED SENSOR

2006/12/08

JCMWA0485GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.55

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

Terminal No.	Color of Wire	Signal Name [Specification]
16	Y/R	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH16MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
35	Y/R	-

Connector No.	F18
Connector Name	SECONDARY SPEED SENSOR
Connector Type	RV03FB

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y	-

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
5	Y/R	-

Connector No.	F25
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	MOLEX 500994-4111

Terminal No.	Color of Wire	Signal Name [Specification]
46	Y/R	VIGN
48	Y/R	VIGN

Connector No.	F55
Connector Name	PRIMARY SPEED SENSOR
Connector Type	RV03FB

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

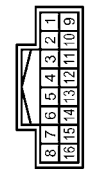
Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	-

JCMWA0486GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.55

Connector No.	M57
Connector Name	CONTROL DEVICE
Connector Type	TH16FW



Terminal No.	Color of Wire	Signal Name [Specification]
3	Y	-

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	T160FW-NS16-TM4

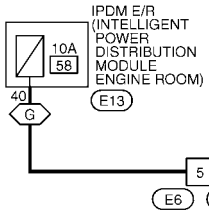
Terminal No.	Color of Wire	Signal Name [Specification]
35	Y	-

JCMWA0487GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.58

G : With gasoline engine



Connector No.	Terminal No.	Connect to
F37	1	FUEL INJECTOR NO.1
F38	1	FUEL INJECTOR NO.2
F39	1	FUEL INJECTOR NO.3
F40	1	FUEL INJECTOR NO.4

2006/12/08

JCMWA0488GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.58

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

H.S.

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24
---	---	---	---	---	---	---	---	---	---	---	---	---

Terminal No.	Color of Wire	Signal Name [Specification]
5	SB	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

39	38	37	36		35	34	33
48	47	46	45	44	43	42	41	40
---	---	---	---	---	---	---	---	---

Terminal No.	Color of Wire	Signal Name [Specification]
40	SB	-[With MR engine]
40	BR/Y	-[With HR engine]

Connector No.	F37
Connector Name	FUEL INJECTOR No.1
Connector Type	HS02FGY

H.S.

1 2

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-

Connector No.	F38
Connector Name	FUEL INJECTOR No.2
Connector Type	HS02FGY

H.S.

1 2

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-

Connector No.	F39
Connector Name	FUEL INJECTOR No.3
Connector Type	HS02FGY

H.S.

1 2

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-

Connector No.	F40
Connector Name	FUEL INJECTOR No.4
Connector Type	HS02FGY

H.S.

1 2

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

H.S.

11	10	9	8	7		6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13	12
---	---	---	---	---	---	---	---	---	---	---	---	---

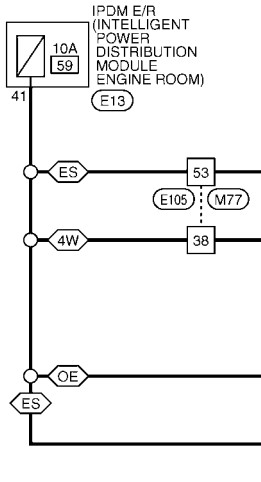
Terminal No.	Color of Wire	Signal Name [Specification]
5	SB	-

JCMWA0489GB

cardiagn.com

IGNITION POWER SUPPLY FUSE NO.59

4W : 4WD models
ES : With ESP
OE : Without ESP



Connector No.	Terminal No.	Connect to
M30	1	STEERING ANGLE SENSOR
M69	7	4WD CONTROL UNIT
M72	4	YAW RATE SENSOR
E34	18	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E36	18	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

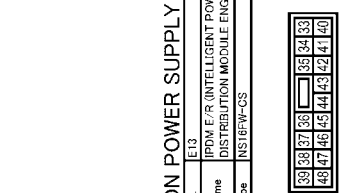
2006/12/08

JCMWA0490GB

cardiagn.com

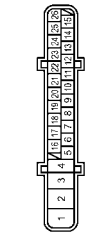
IGNITION POWER SUPPLY FUSE NO.59

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS



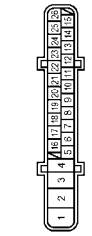
Terminal No.	Color of Wire	Signal Name [Specification]
41	P	–

Connector No.	E34
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH



Terminal No.	Color of Wire	Signal Name [Specification]
18	P	IGN

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BAA22FB-AHZ4-LH



Terminal No.	Color of Wire	Signal Name [Specification]
18	P	IGN

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
38	P	–
53	P	–
59	L	–

Connector No.	M30
Connector Name	STEERING ANGLE SENSOR
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/L	IGN SAS

Connector No.	M69
Connector Name	4WD CONTROL UNIT
Connector Type	TH16FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	P	IGN

Connector No.	M72
Connector Name	YAW RATE SENSOR
Connector Type	AAZ04FB

Terminal No.	Color of Wire	Signal Name [Specification]
4	P	IGN(YRS)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
38	P	–
53	P	–
59	L	–

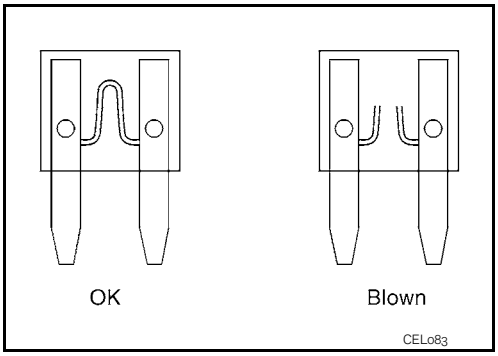
JCMWA0491GB

Fuse

INFOID:0000000000956066

cardiagn.com

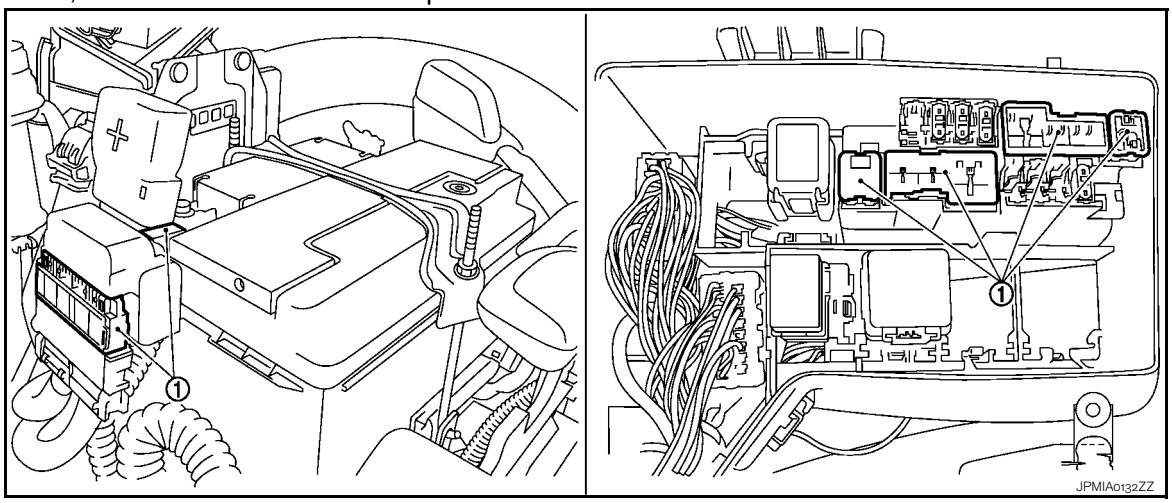
- If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.
- Use fuse of specified rating. Never use fuse of more than specified rating.
- Do not partially install fuse; always insert it into fuse holder properly.
- Remove fuse for “ELECTRICAL PARTS (BAT)” if vehicle is not used for a long period of time.



Fusible Link

INFOID:0000000000956067

A melted fusible link can be detected either by visual inspection or by feeling with finger tip. If its condition is questionable, use circuit tester or test lamp.



1 : Fusible link

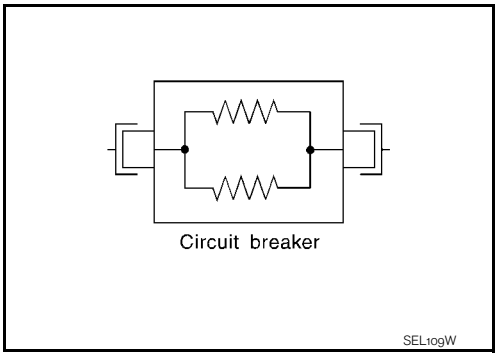
CAUTION:

- **If fusible link should melt, it is possible that critical circuit (power supply or large current carrying circuit) is shorted. In such a case, carefully check and eliminate cause of malfunction.**
- **Never wrap outside of fusible link with vinyl tape. Important: Never let fusible link touch any other wiring harness, vinyl or rubber parts.**

Circuit Breaker

INFOID:0000000000956068

The PTC thermistor generates heat in response to current flow. The temperature (and resistance) of the thermistor element varies with current flow. Excessive current flow will cause the element's temperature to rise. When the temperature reaches a specified level, the electrical resistance will rise sharply to control the circuit current.
Reduced current flow will cause the element to cool. Resistance falls accordingly and normal circuit current flow is allowed to resume.



cardiagn.com

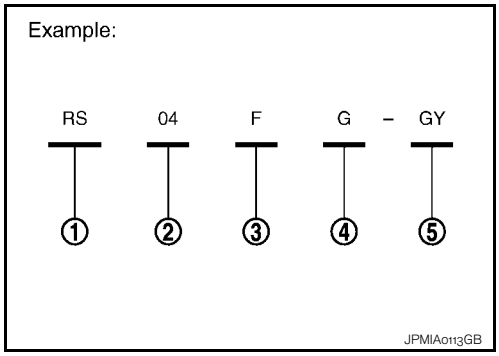
HARNESS LAYOUT

LHD

LHD : How To Read Harness Layout

INFOID:0000000000956069

1 : Connector model
2 : Cavity
3 : Male (M) and female (F) terminals
4 : Connector color
5 : Special type



CONNECTOR SYMBOL

Main symbols of connector (in Harness Layout) are indicated in the below.

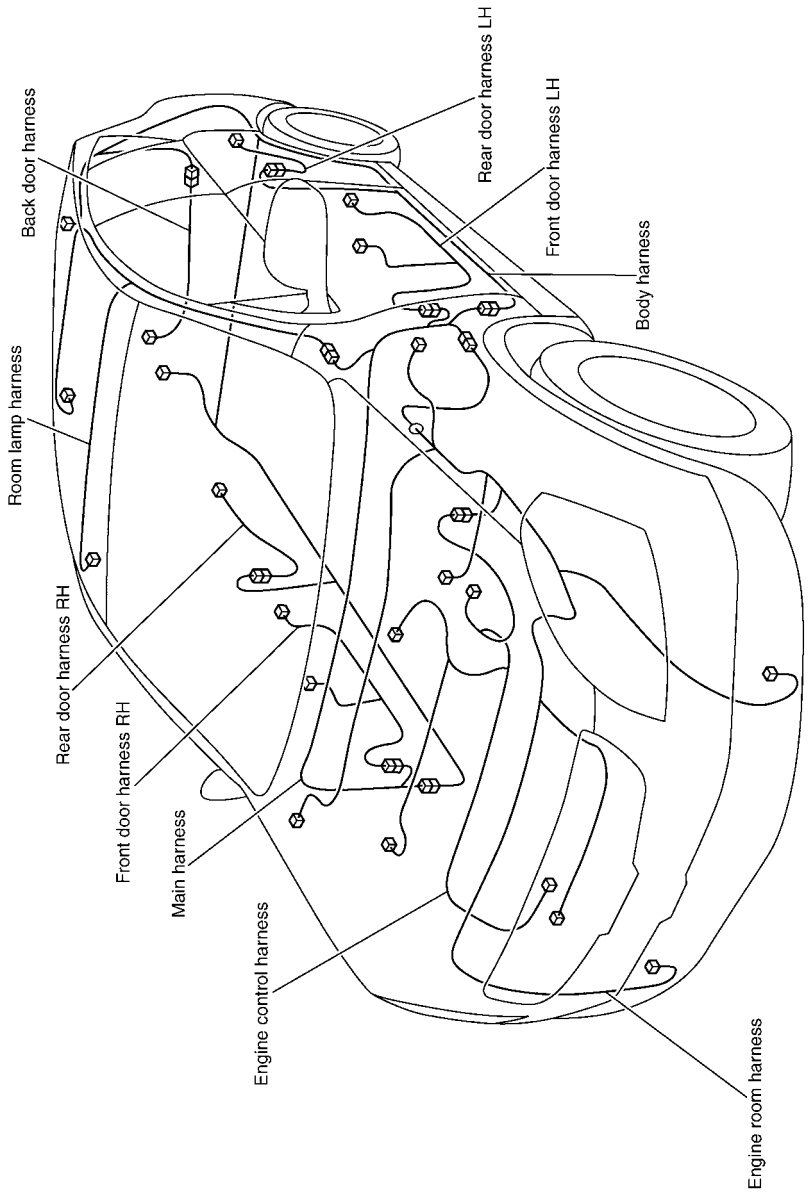
Connector type	Water proof type		Standard type	
	Male	Female	Male	Female
Connector symbol				
Ground terminal etc.	—			

JPMIA0114GB

cardiagn.com

LHD : Outline

INFOID:0000000000956070



Outline

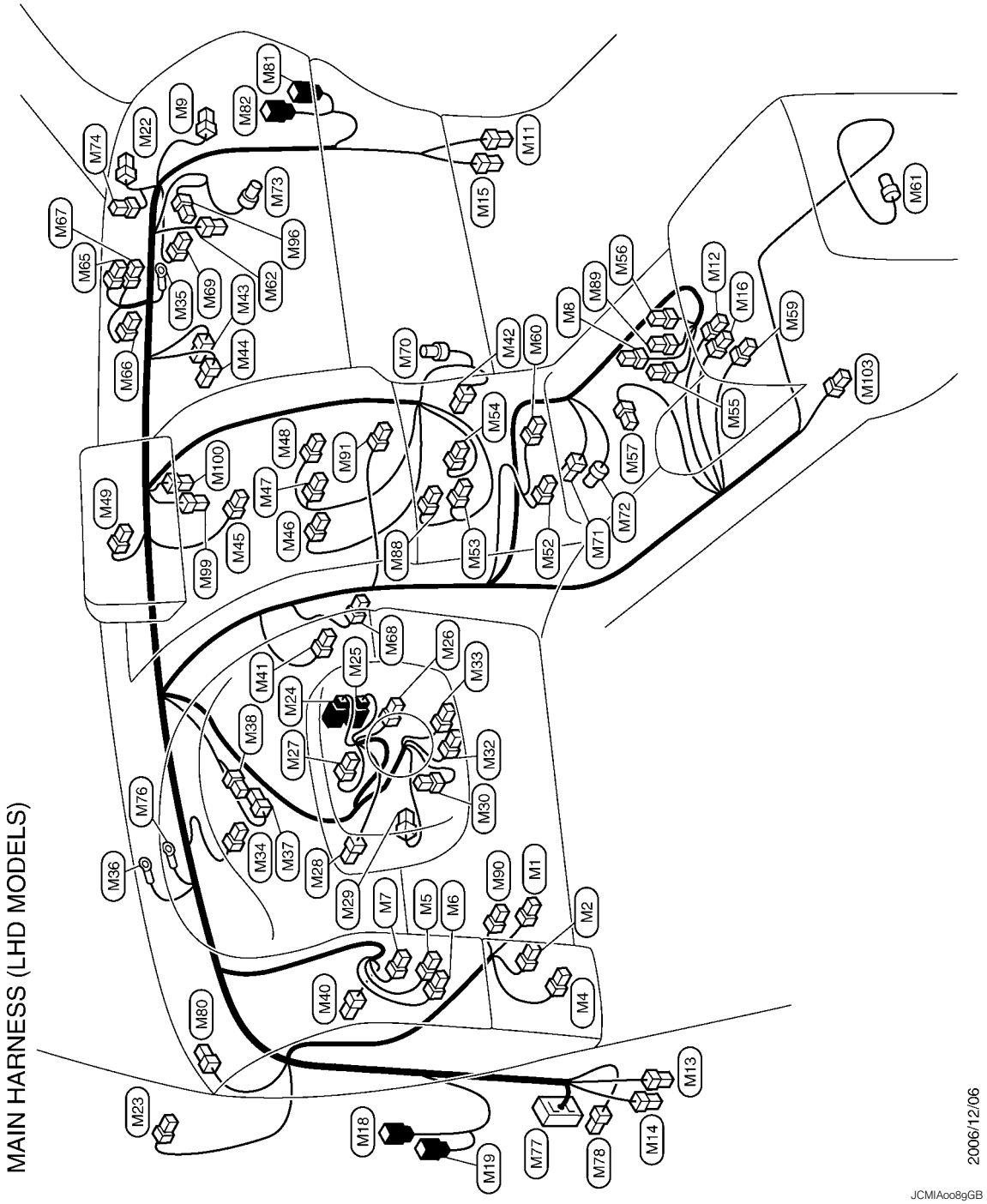
2006/12/06

JCMIAoo88GB

cardiagn.com

LHD : Main Harness

INFOID:0000000000956071

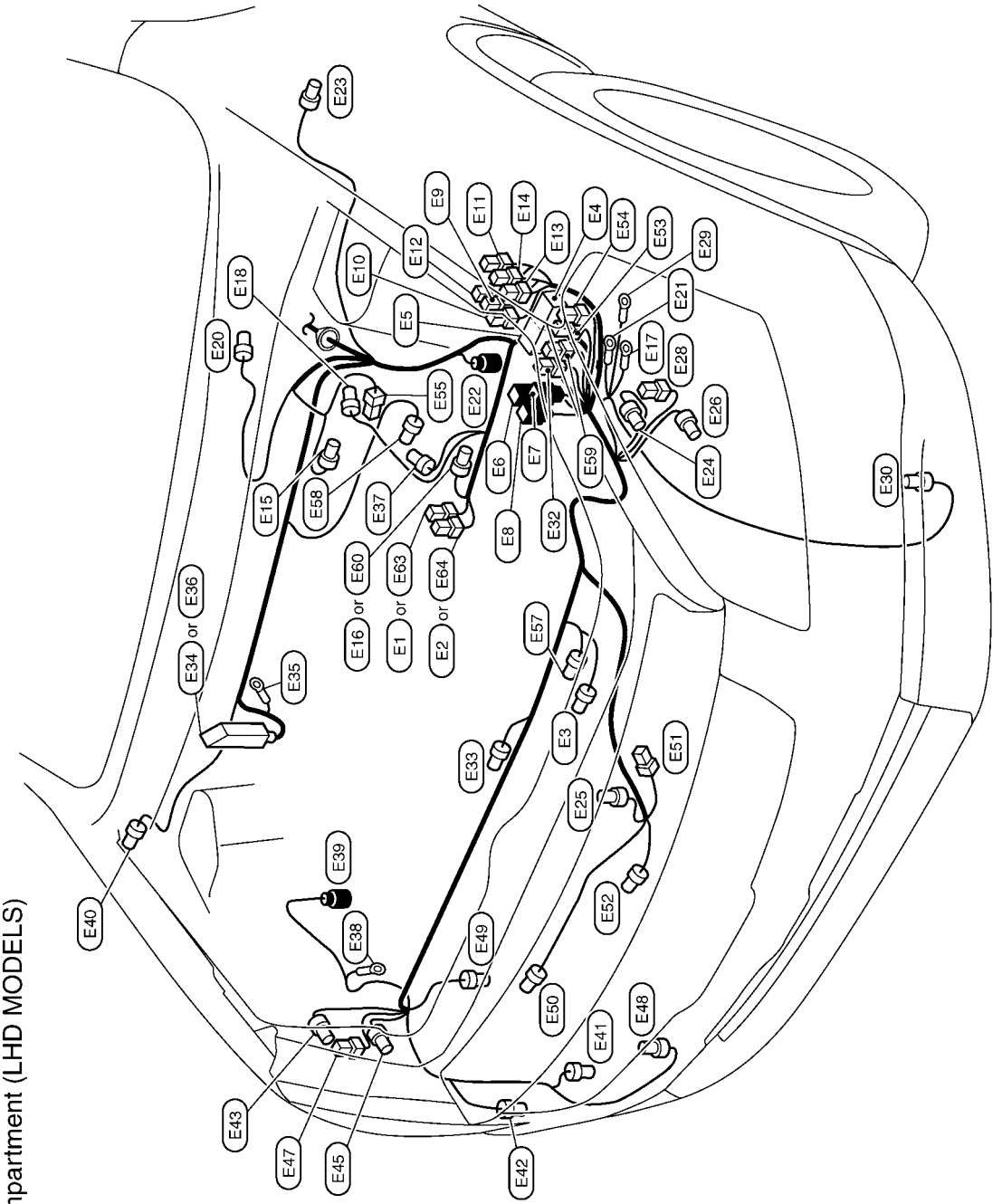


LHD : Engine Room Harness

INFOID:0000000000956072

cardiagn.com

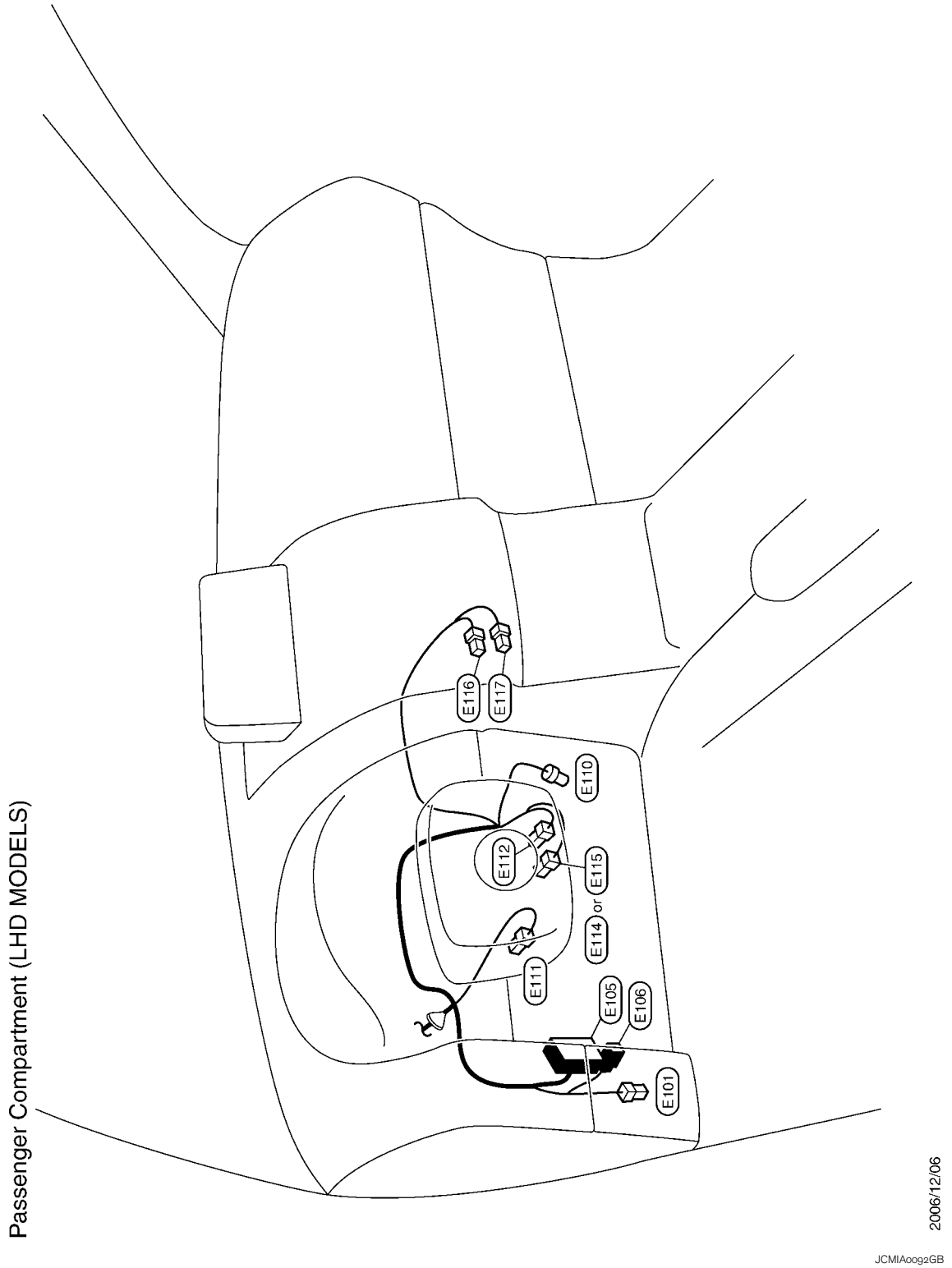
ENGINE ROOM HARNESS/
Engine Compartment (LHD MODELS)



2006/12/06

JCMIA0091GB

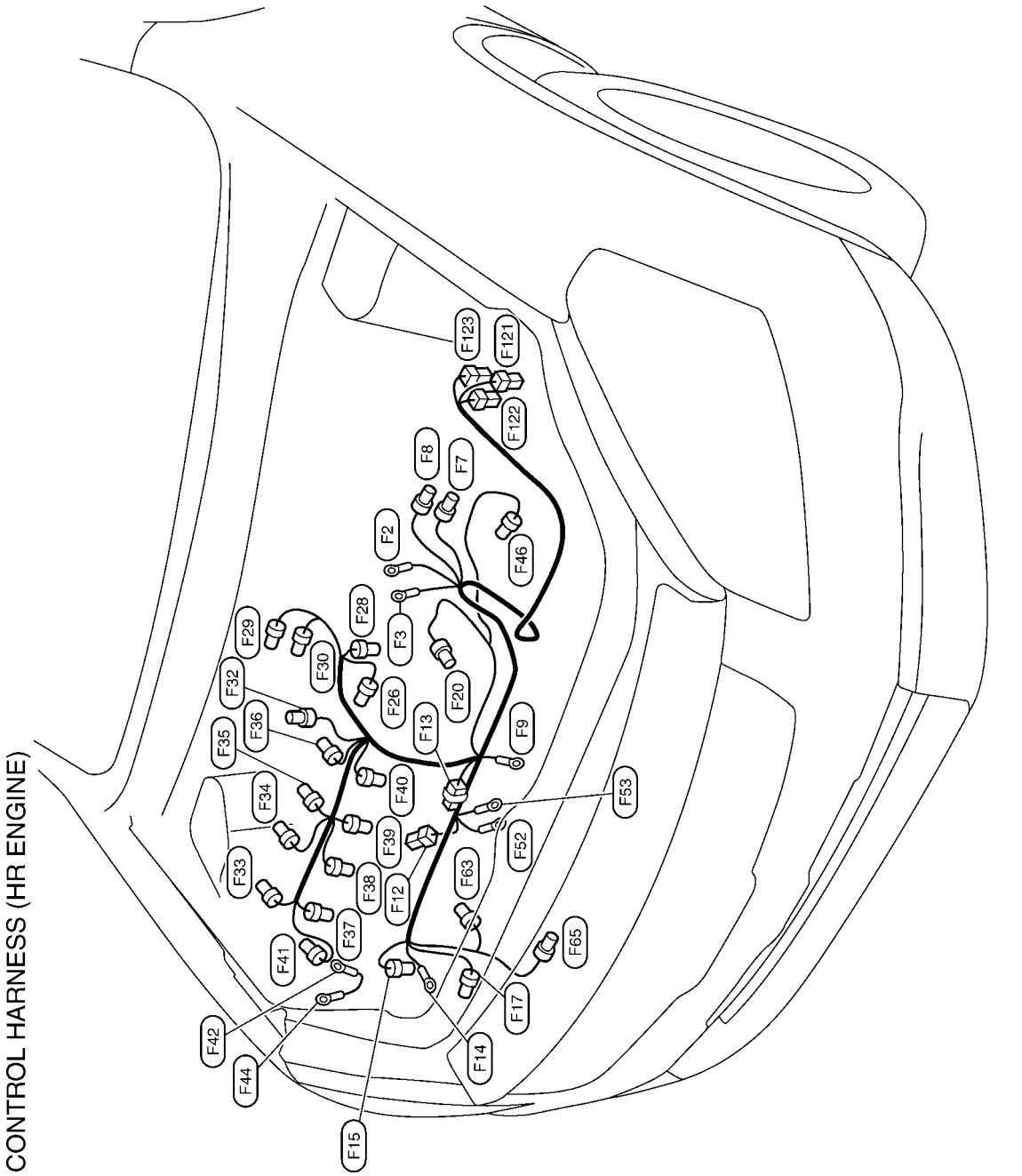
cardiagn.com



LHD : Engine Control Harness

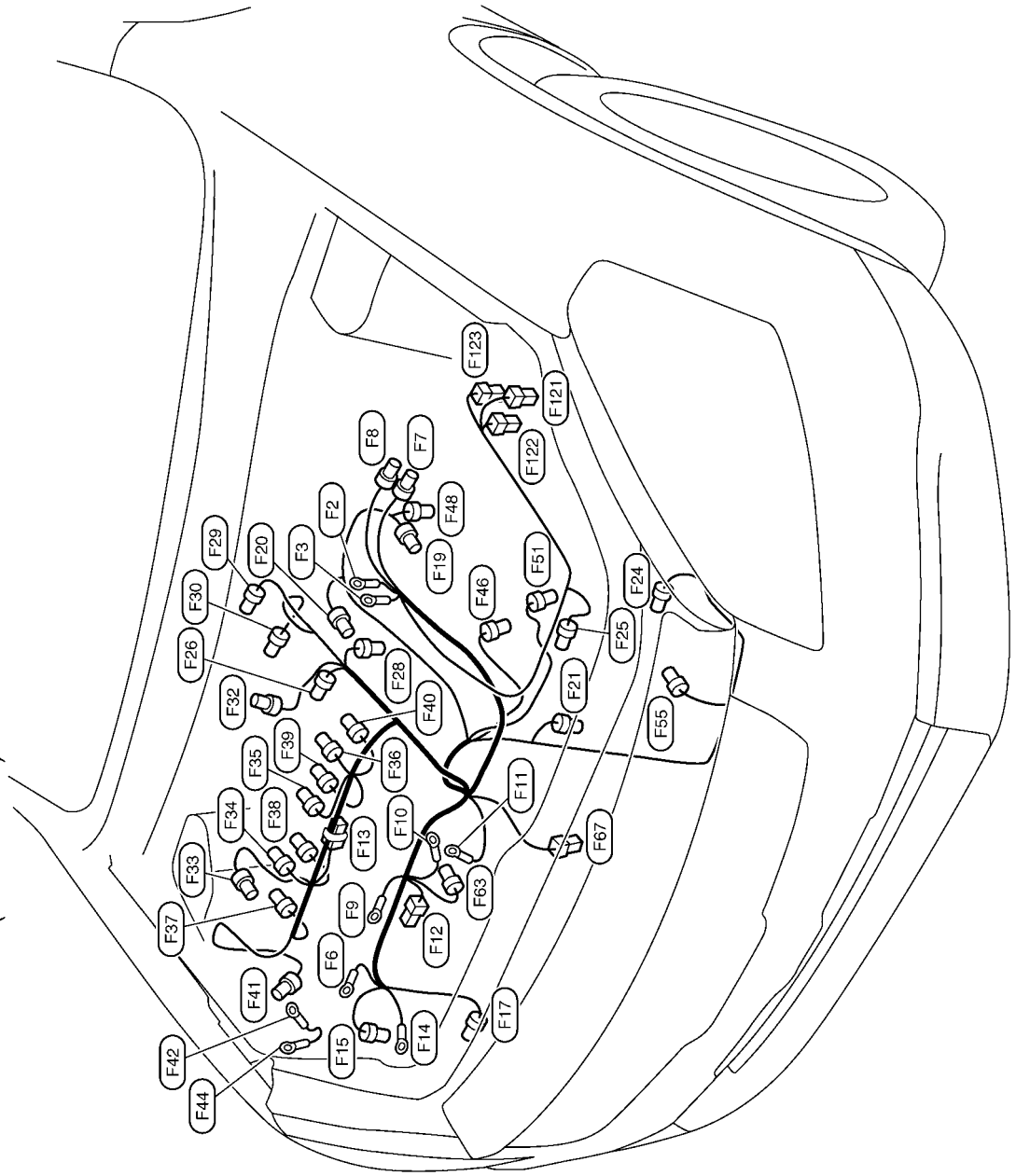
INFOID:0000000000956073

cardiagn.com



cardiagn.com

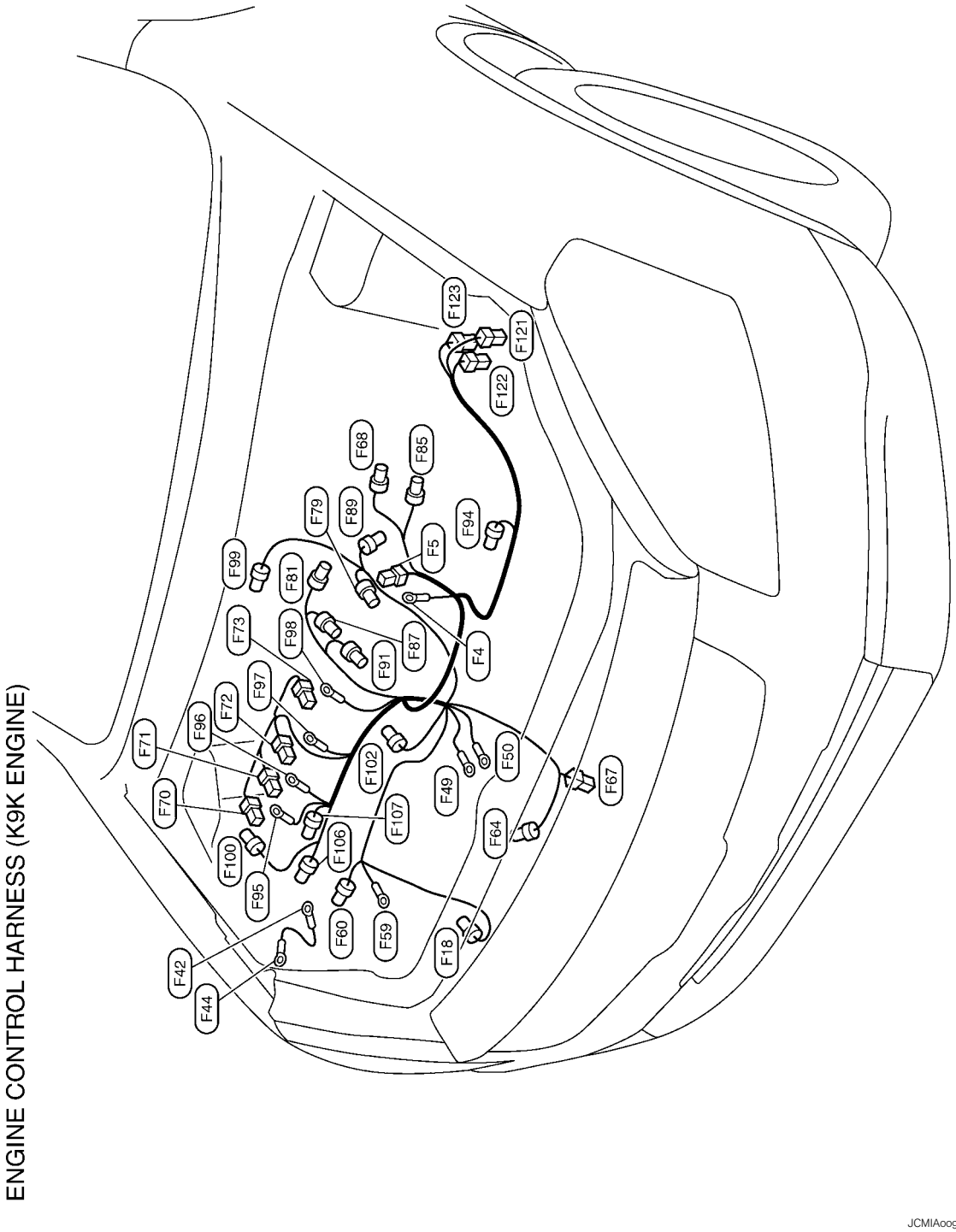
ENGINE CONTROL HARNESS (MR ENGINE)



2006/12/06

JCMIAoog6GB

cardiagn.com



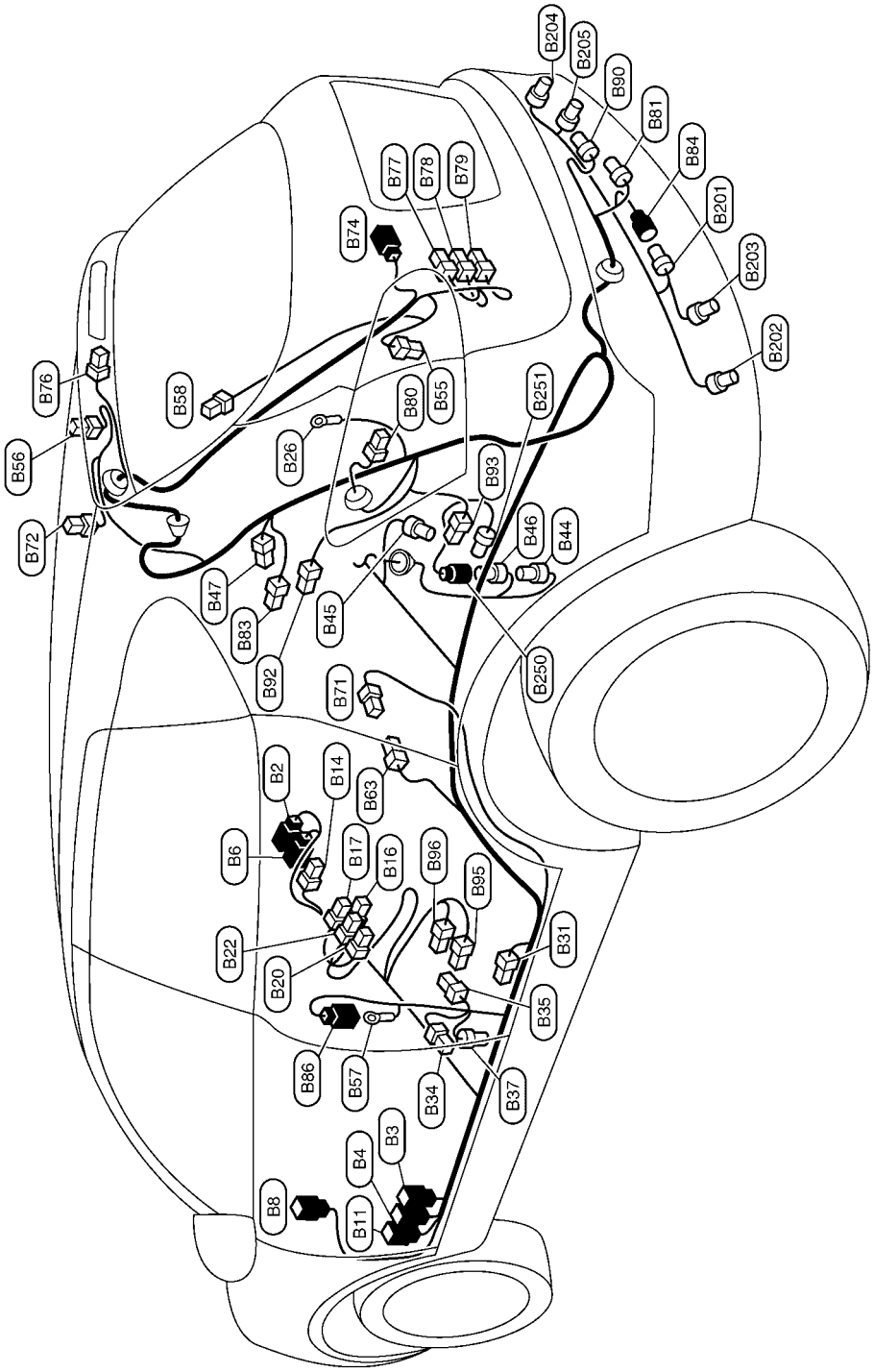
LHD : Body Harness

INFOID:0000000000956074

cardiagn.com

LH SIDE

BODY HARNESS LH (LHD MODELS)



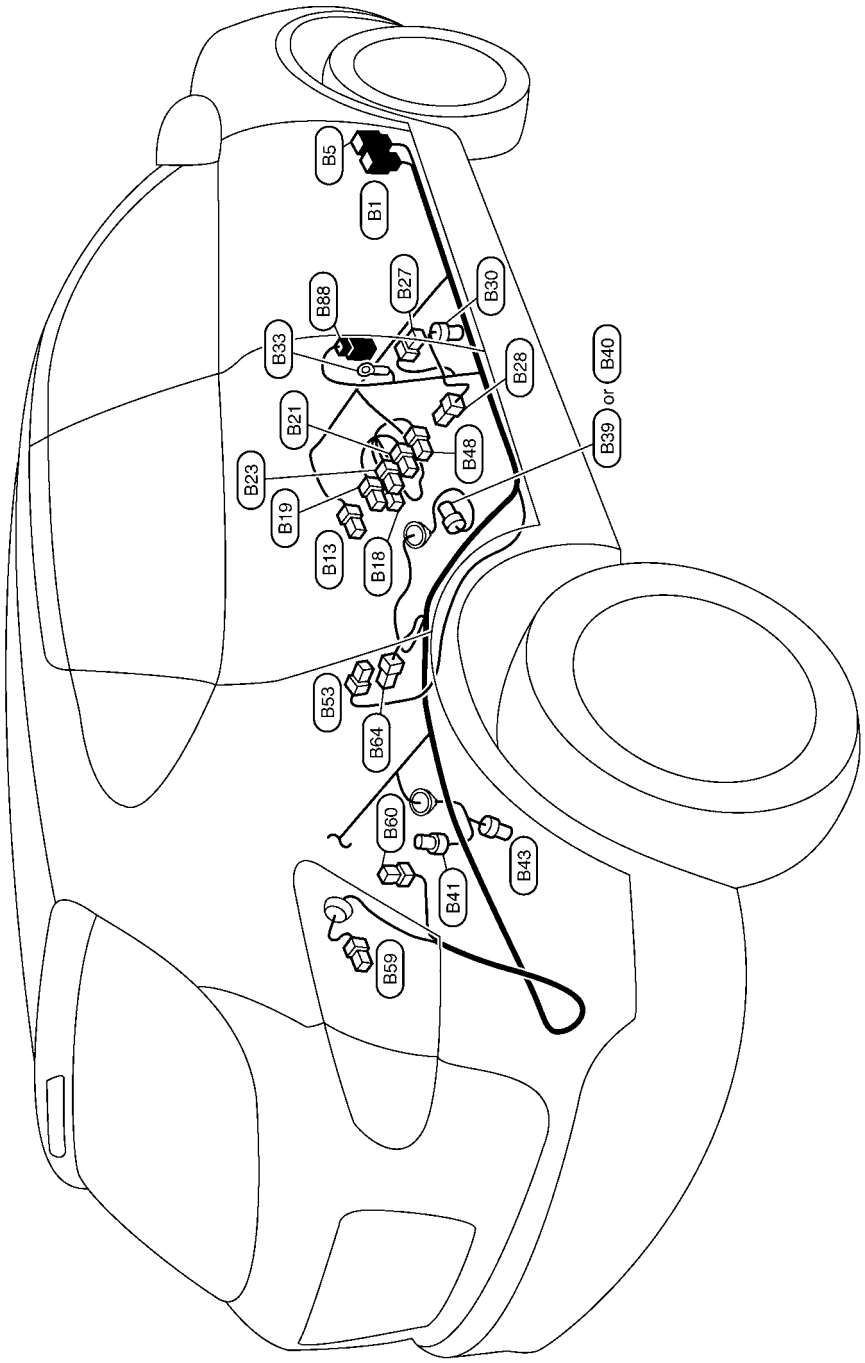
2006/12/06

JCMIAoog8GB

cardiagn.com

RH SIDE

BODY HARNESS RH (LHD MODELS)



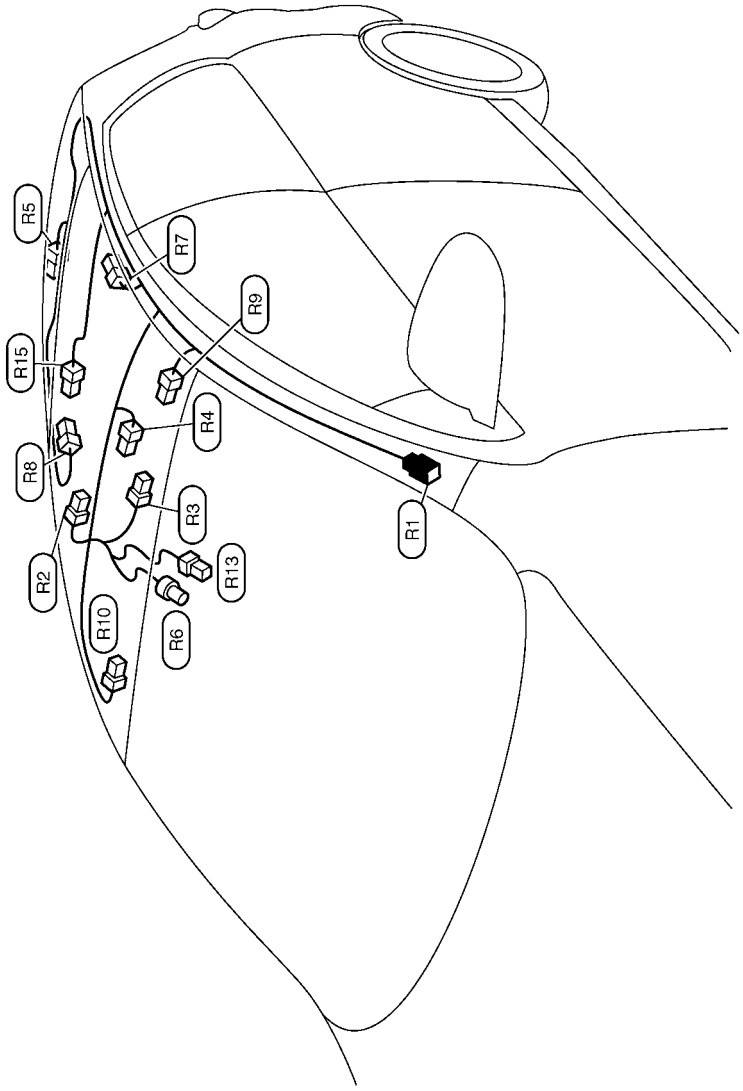
2006/12/06

JCMIA0100GB

cardiagn.com

LHD : Room Lamp Harness

INFOID:0000000000956076



ROOM LAMP HARNESS (LHD MODELS)

2006/12/06

JCMIA0102GB

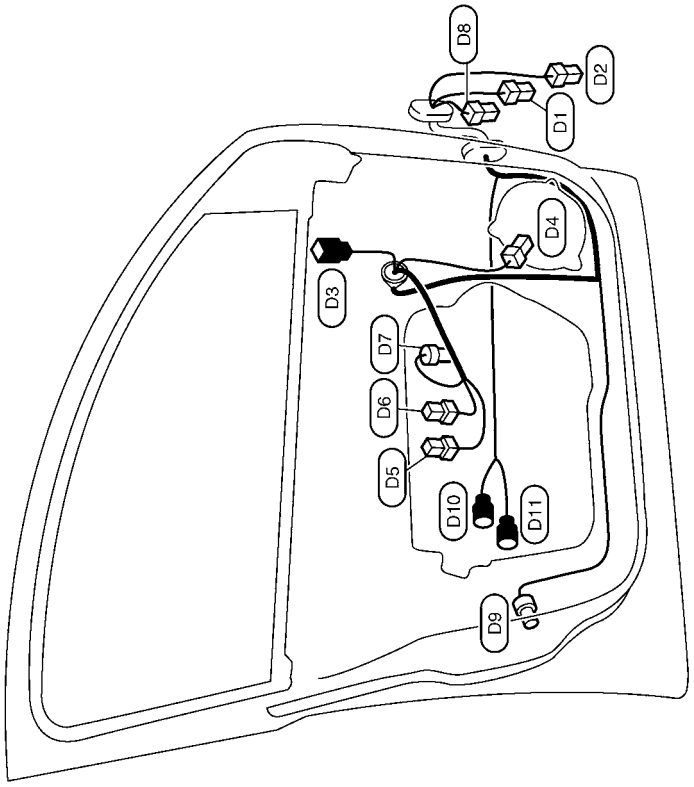
LHD : Front Door Harness

INFOID:0000000000956077

cardiagn.com

LH SIDE

FRONT DOOR HARNESS LH (LHD MODELS)



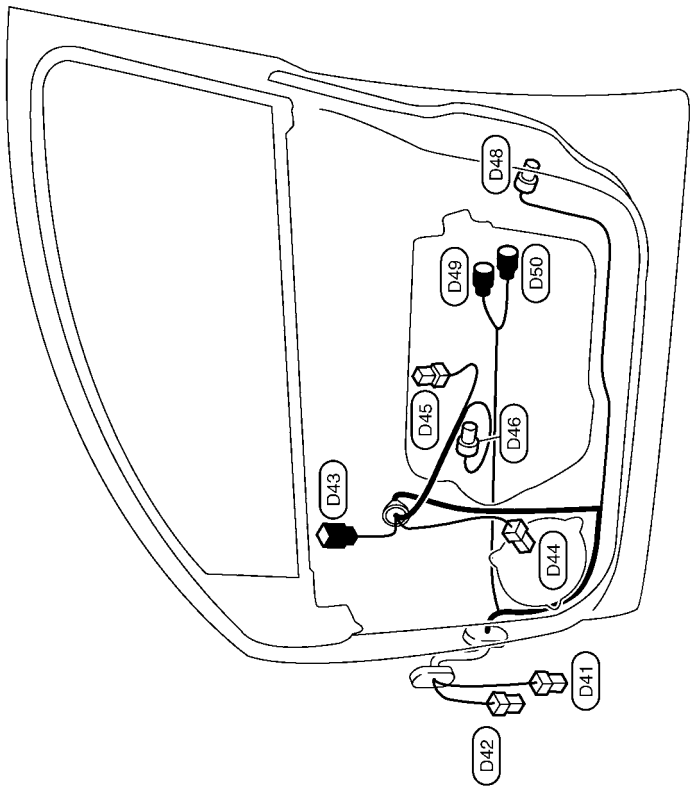
2006/12/06

JCMIA0104GB

cardiagn.com

RH SIDE

FRONT DOOR HARNESS RH (LHD MODELS)



2006/12/06

JCMIA0105GB

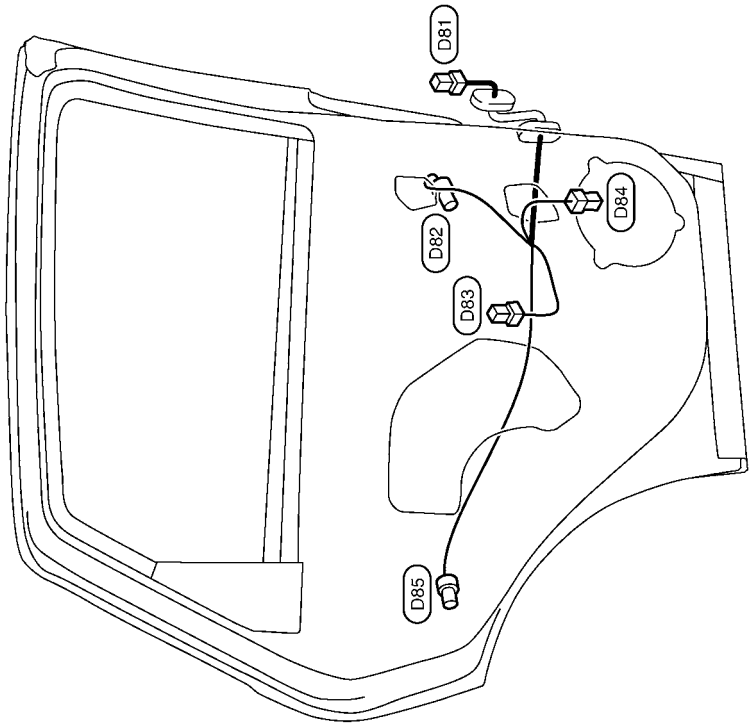
LHD : Rear Door Harness

INFOID:0000000000956078

cardiagn.com

LH SIDE

REAR DOOR HARNESS LH (LHD MODELS)



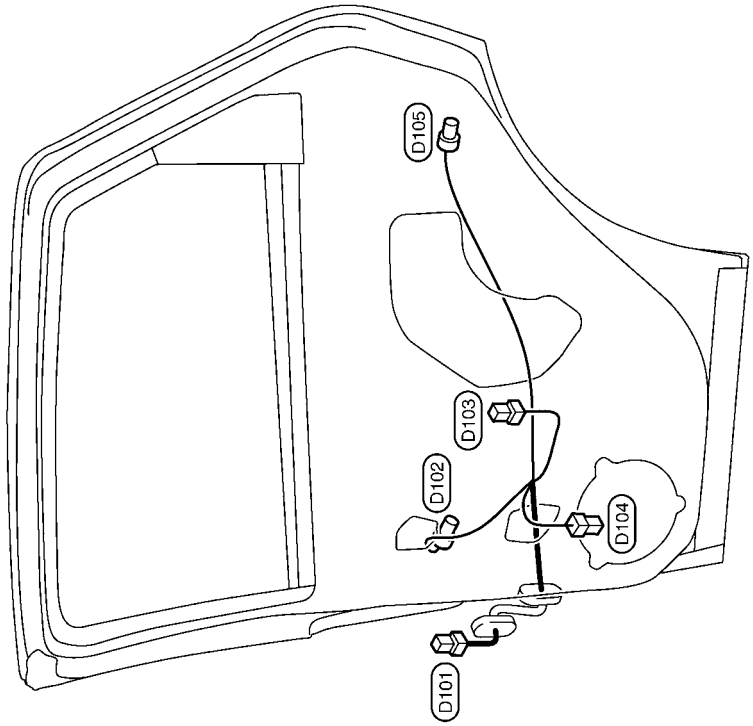
2006/12/06

JCMIA0108GB

cardiagn.com

RH SIDE

REAR DOOR HARNESS RH (LHD MODELS)



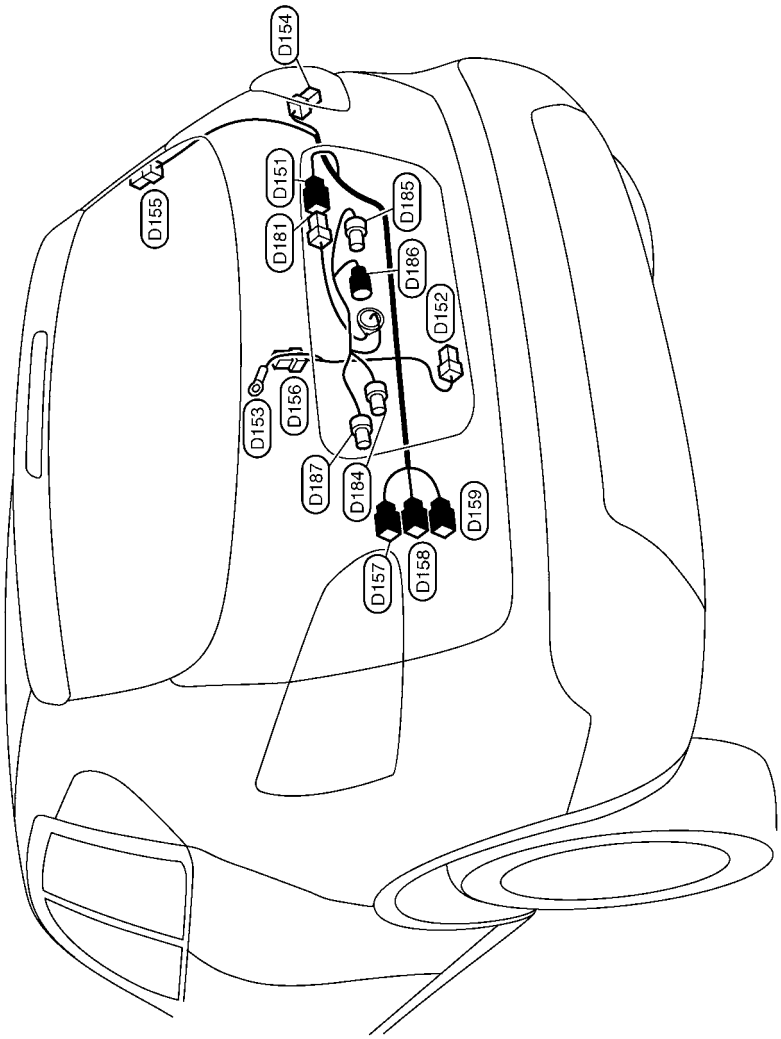
2006/12/06

JCMIA0109GB

cardiagn.com

LHD : Back Door Harness

INFOID:0000000001125410



BACK DOOR HARNESS (LHD MODELS)

2006/12/06

JCMIA0112GB

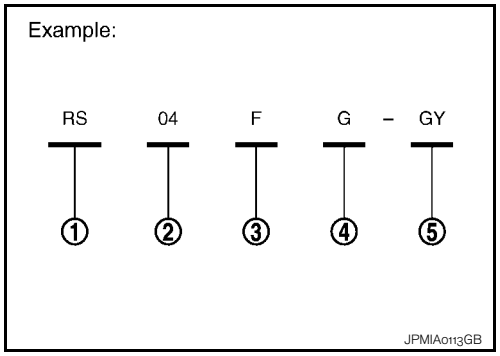
RHD

RHD : How To Read Harness Layout

INFOID:0000000000987917

cardiagn.com

1 : Connector model
2 : Cavity
3 : Male (M) and female (F) terminals
4 : Connector color
5 : Special type



CONNECTOR SYMBOL

Main symbols of connector (in Harness Layout) are indicated in the below.

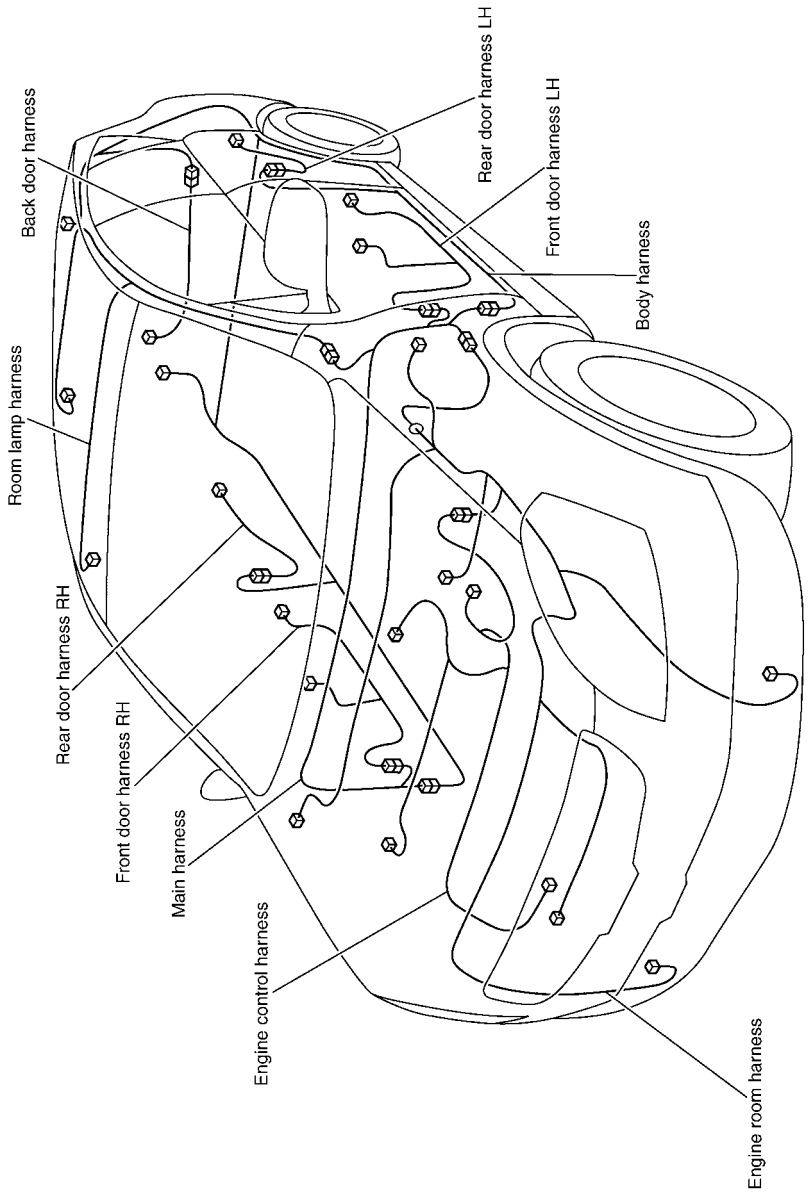
Connector type	Water proof type		Standard type	
	Male	Female	Male	Female
Connector symbol				
Ground terminal etc.	—			

JPMIA0114GB

cardiagn.com

RHD : Outline

INFOID:0000000000987918



Outline

2006/12/06

JCMIAoo88GB

cardiagn.com

RHD : Main Harness

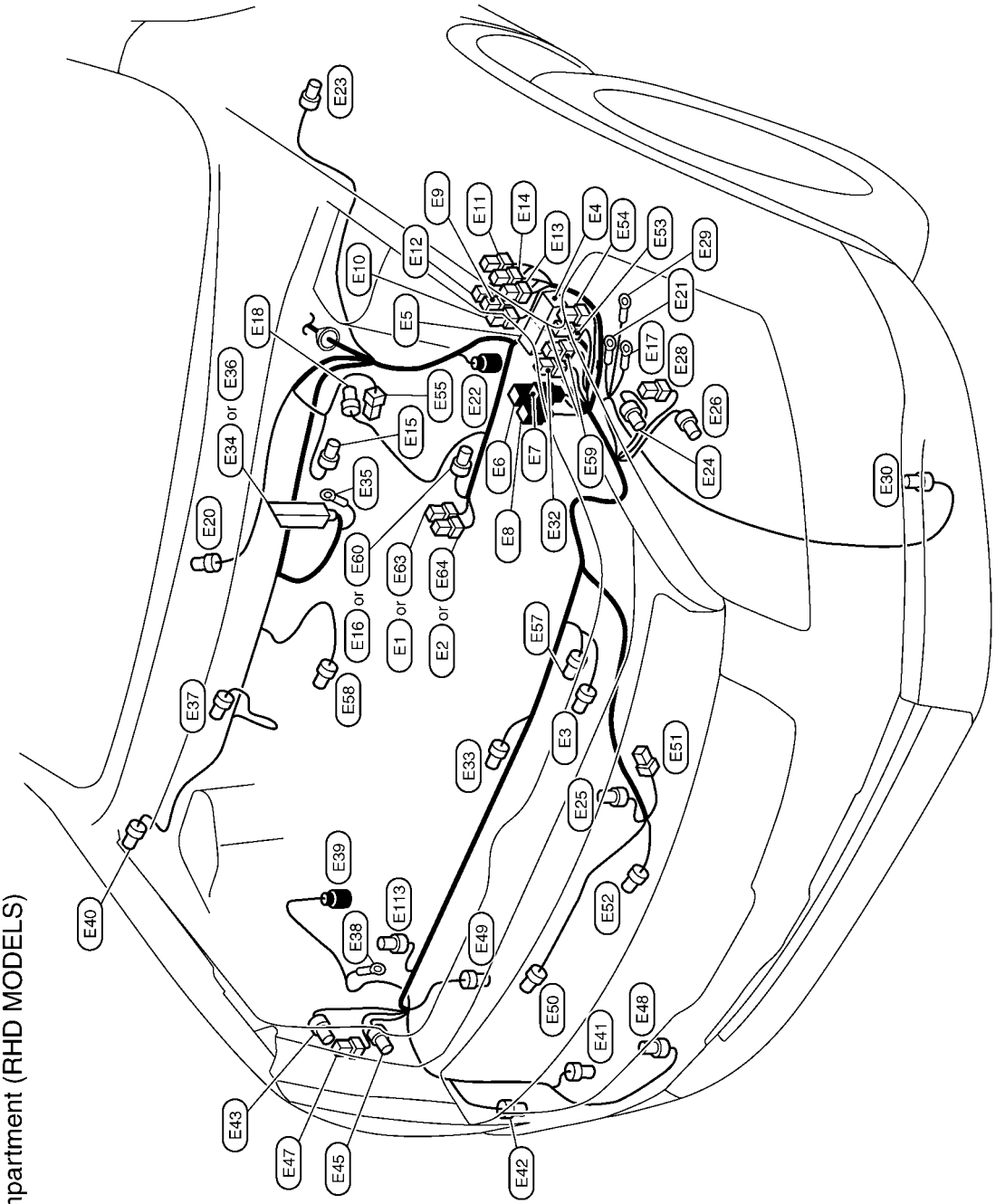
INFOID:0000000000987926

RHD : Engine Room Harness

INFOID:0000000000987920

cardiagn.com

ENGINE ROOM HARNESS/
Engine Compartment (RHD MODELS)

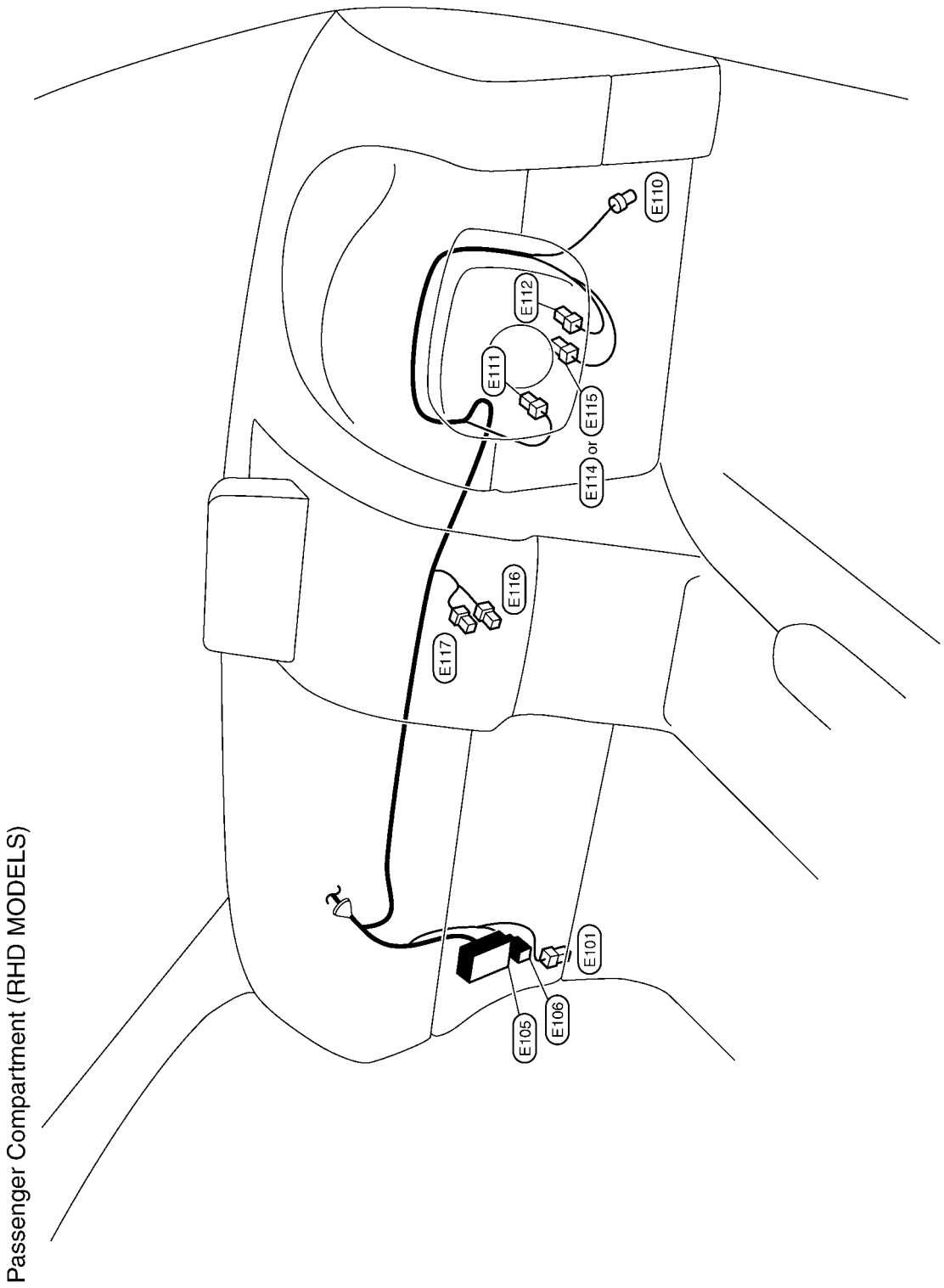


2006/12/06

JCMIA0093GB

cardiagn.com

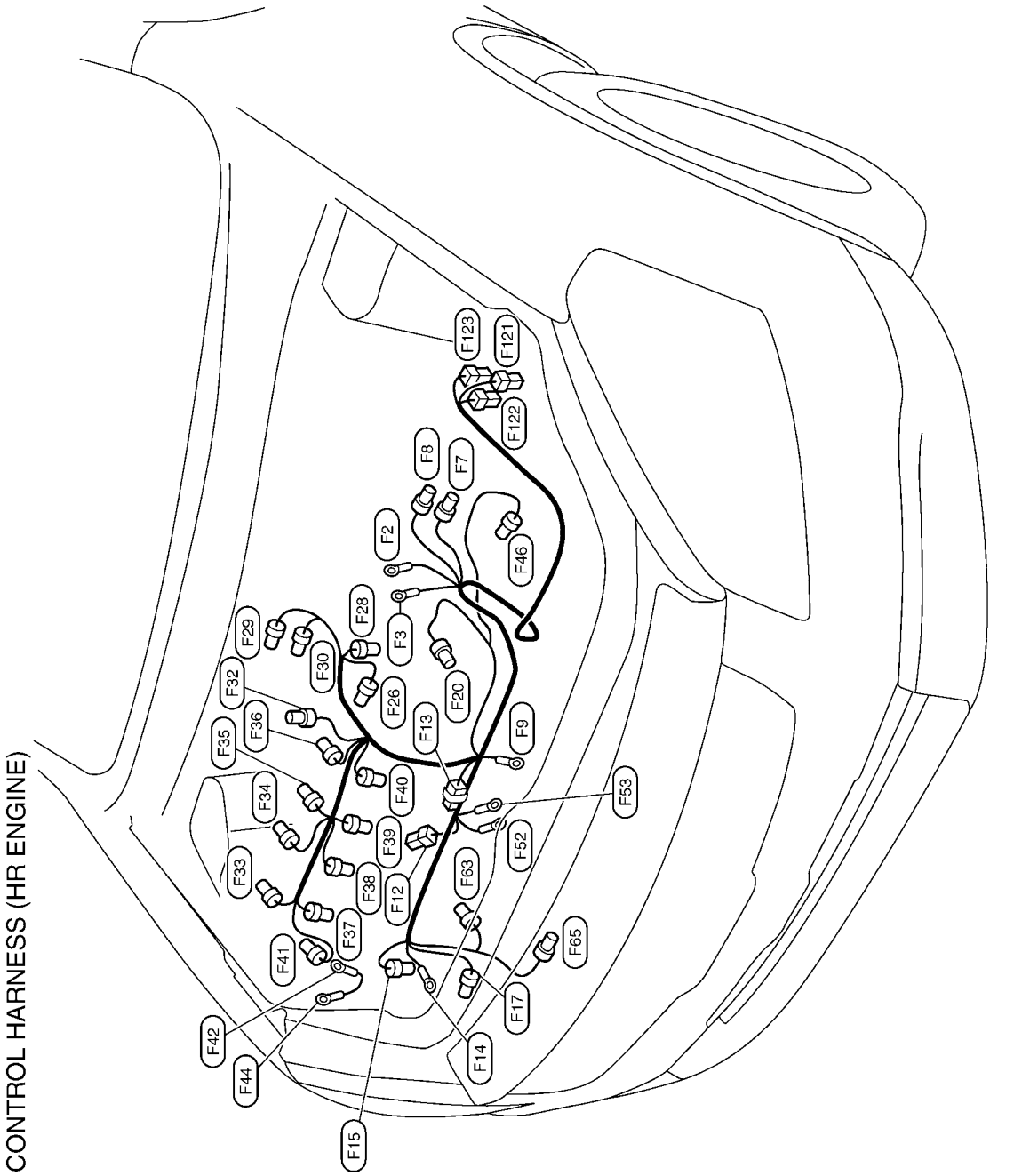
PASSENGER COMPARTMENT



RHD : Engine Control Harness

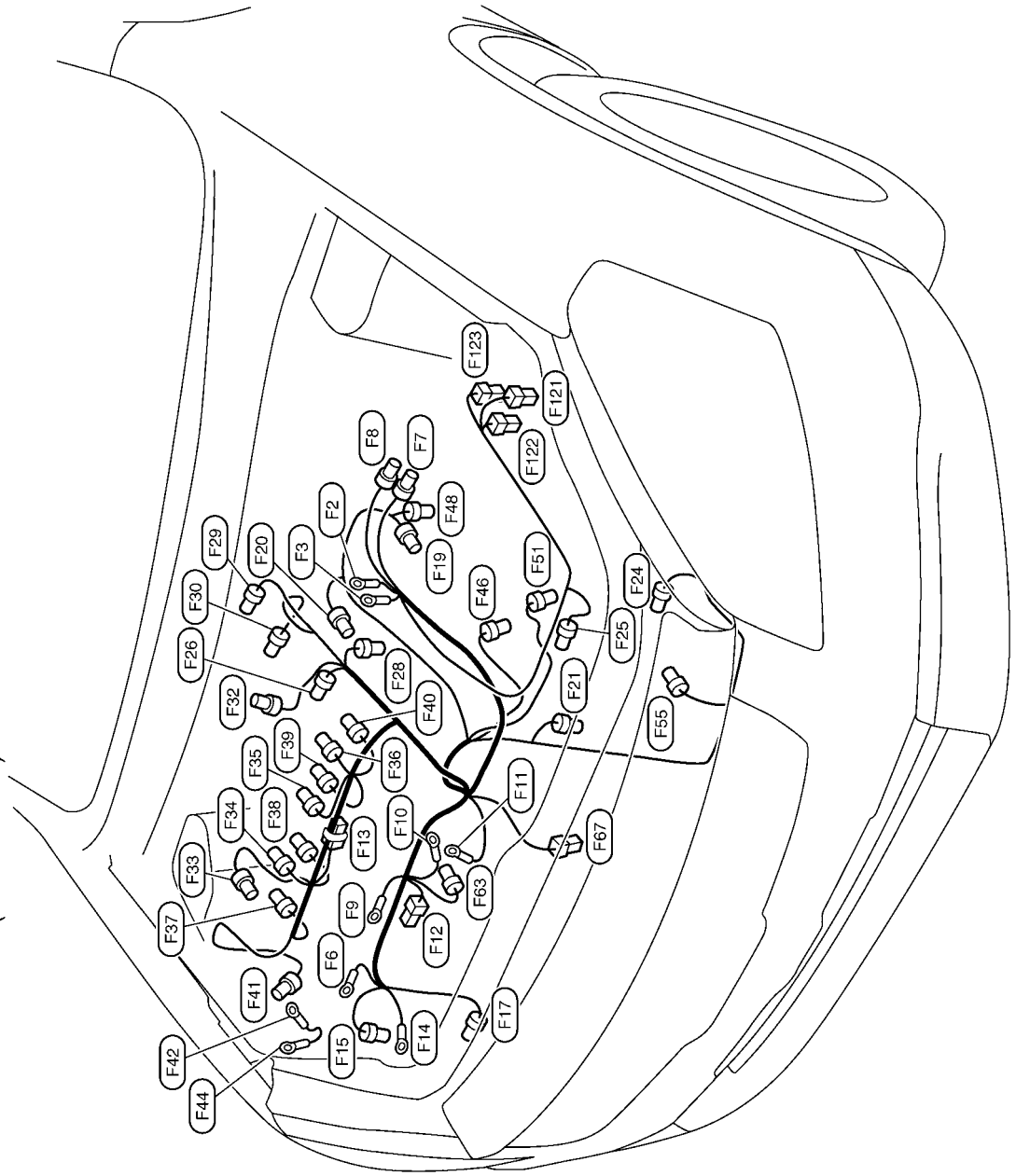
INFOID:0000000000987921

cardiagn.com



cardiagn.com

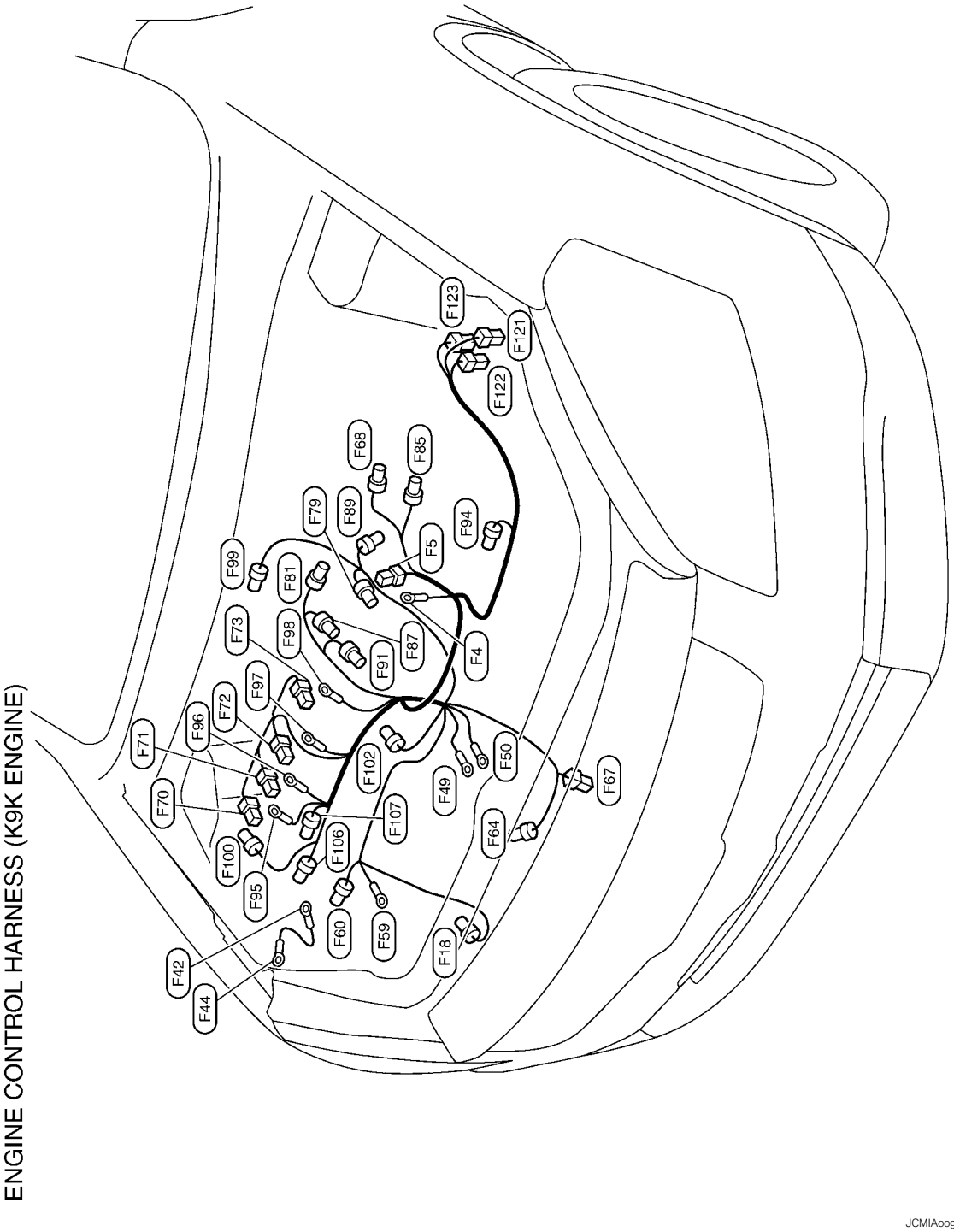
ENGINE CONTROL HARNESS (MR ENGINE)



2006/12/06

JCMIAoog6GB

cardiagn.com



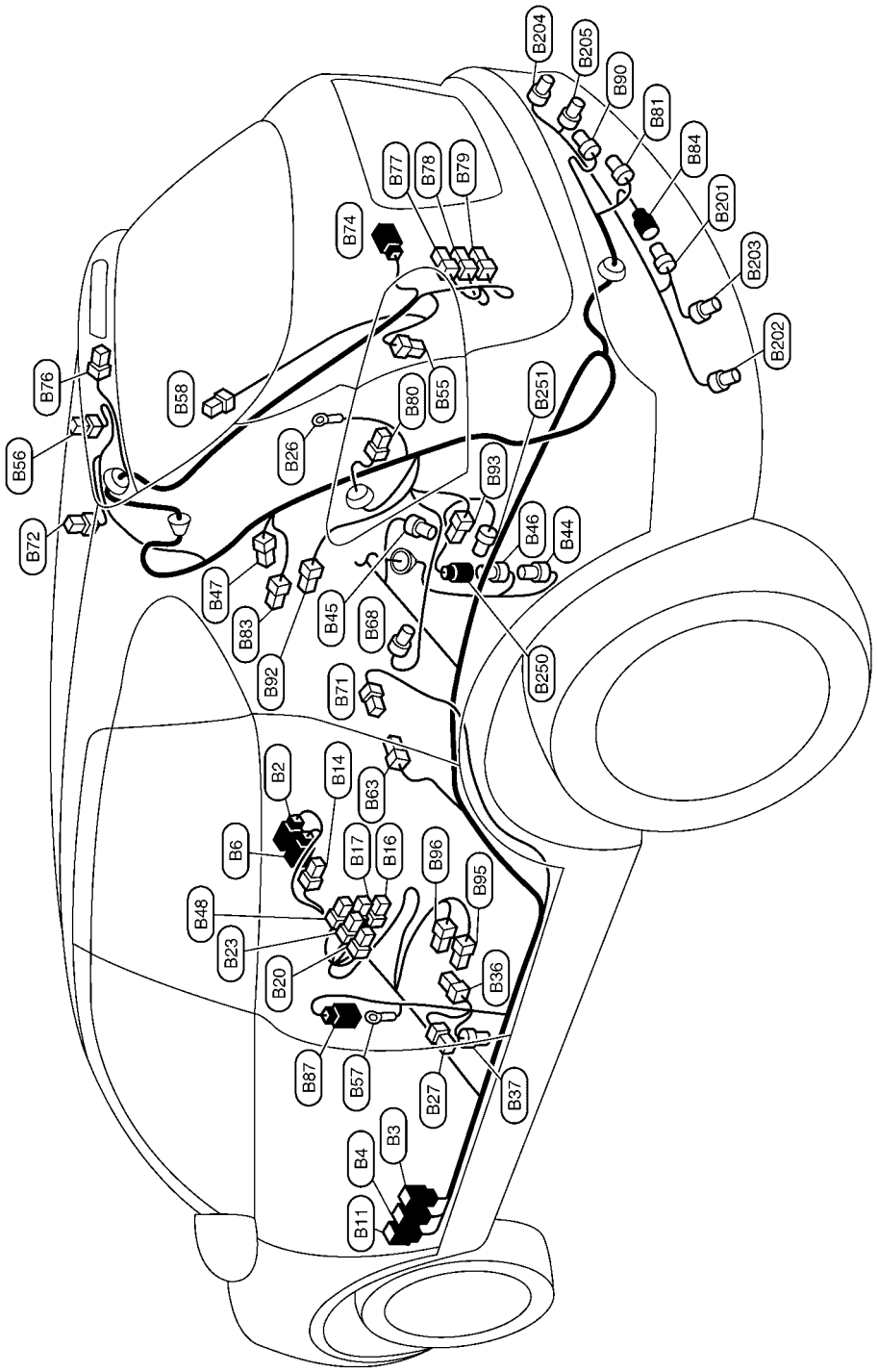
RHD : Body Harness

INFOID:0000000000987922

cardiagn.com

LH SIDE

BODY HARNESS LH (RHD MODELS)



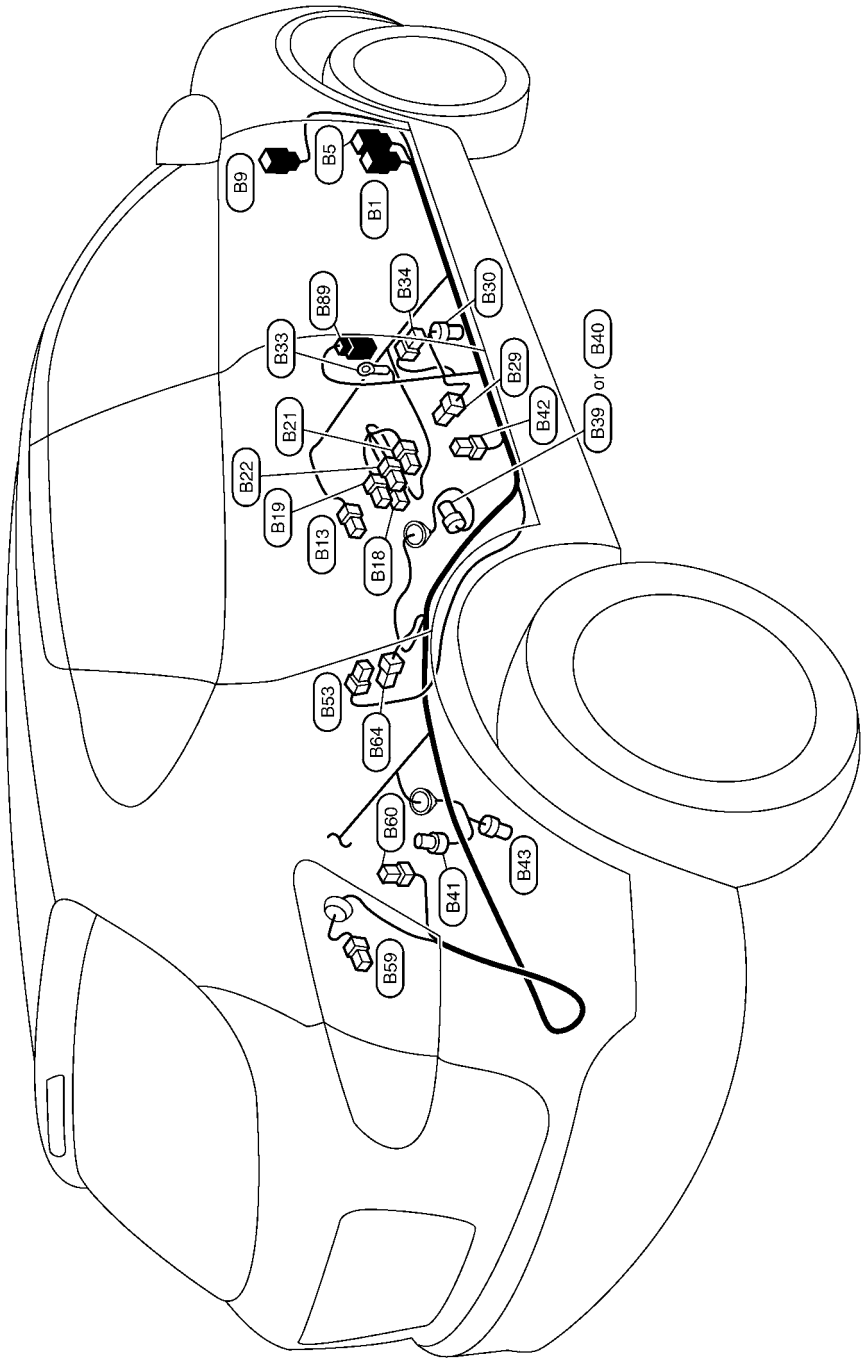
2006/12/06

JCMIA0099GB

cardiagn.com

RH SIDE

BODY HARNESS RH (RHD MODELS)



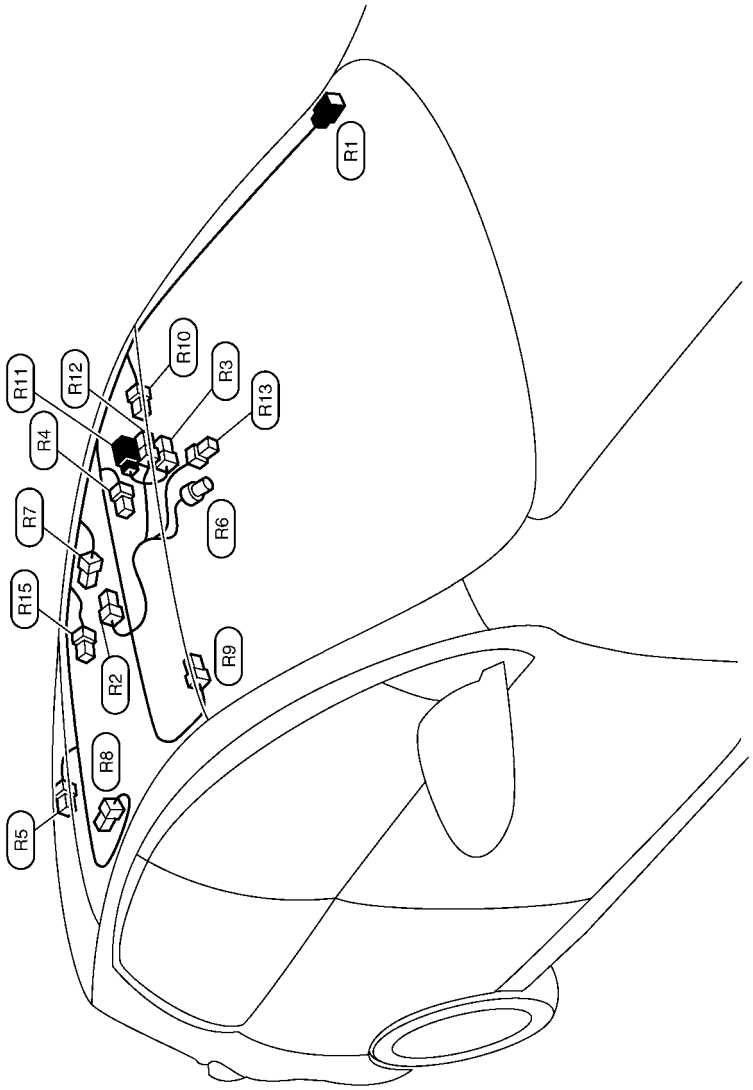
2006/12/06

JCMIA0101GB

cardiagn.com

RHD : Room Lamp Harness

INFOID:0000000000987923



ROOM LAMP HARNESS (RHD MODELS)

2006/12/06

JCMIA0103GB

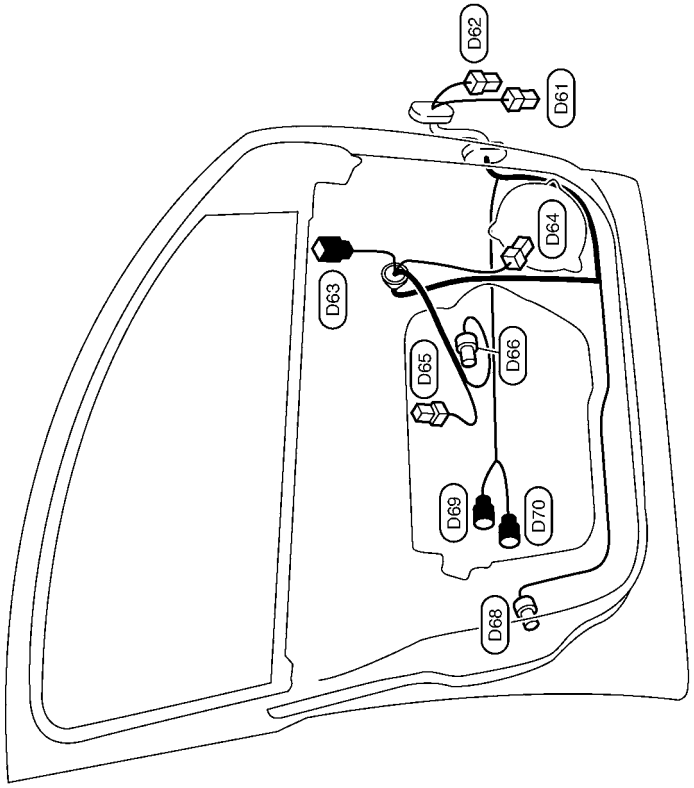
RHD : Front Door Harness

INFOID:0000000000987924

cardiagn.com

LH SIDE

FRONT DOOR HARNESS LH (RHD MODELS)



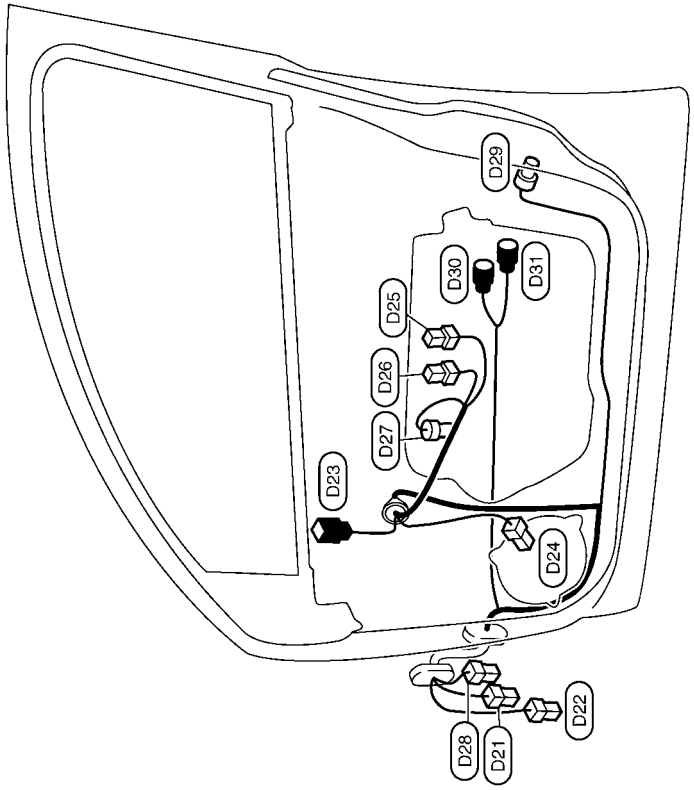
2006/12/06

JCMIA0106GB

cardiagn.com

RH SIDE

FRONT DOOR HARNESS RH (RHD MODELS)



2006/12/06

JCMIA0107GB

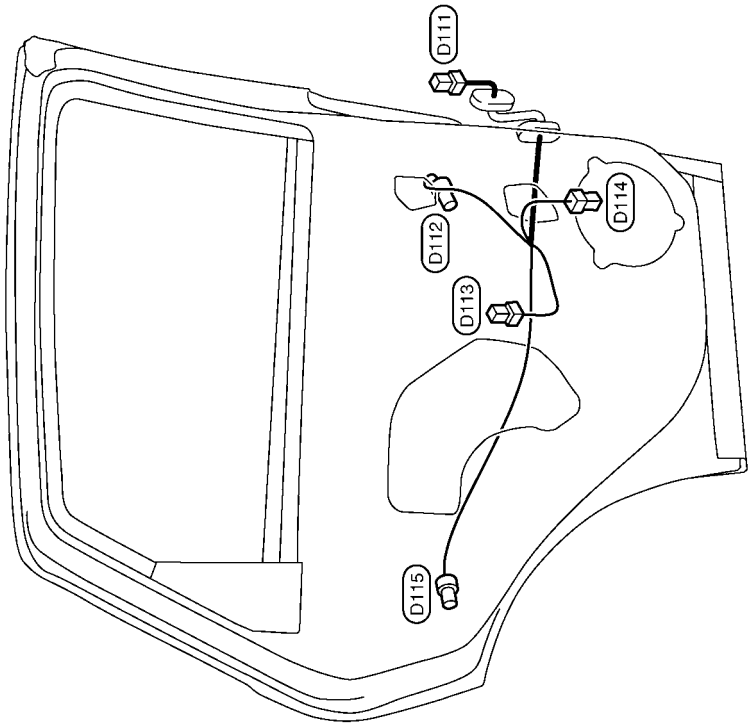
RHD : Rear Door Harness

INFOID:0000000000987925

cardiagn.com

LH SIDE

REAR DOOR HARNESS LH (RHD MODELS)



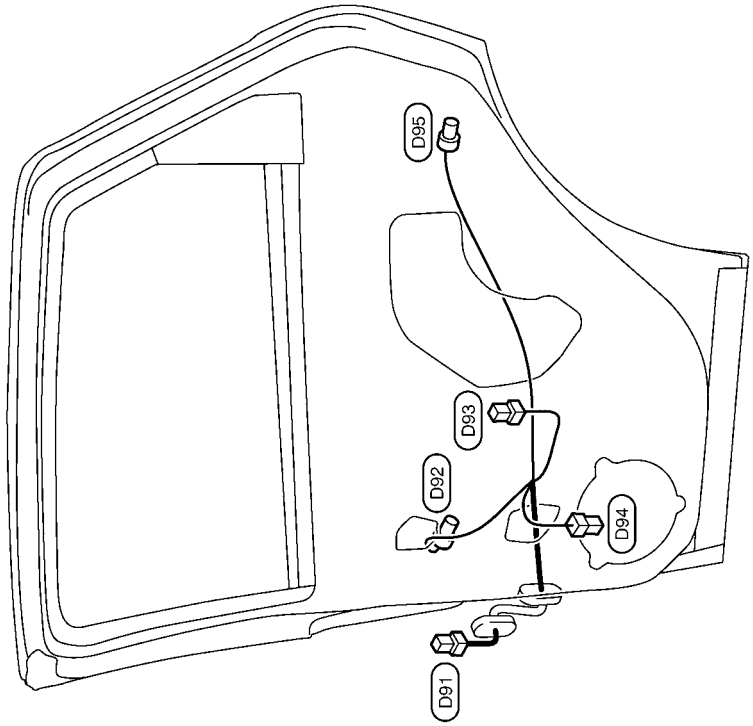
2006/12/06

JCMIA0110GB

cardiagn.com

RH SIDE

REAR DOOR HARNESS RH (RHD MODELS)



2006/12/06

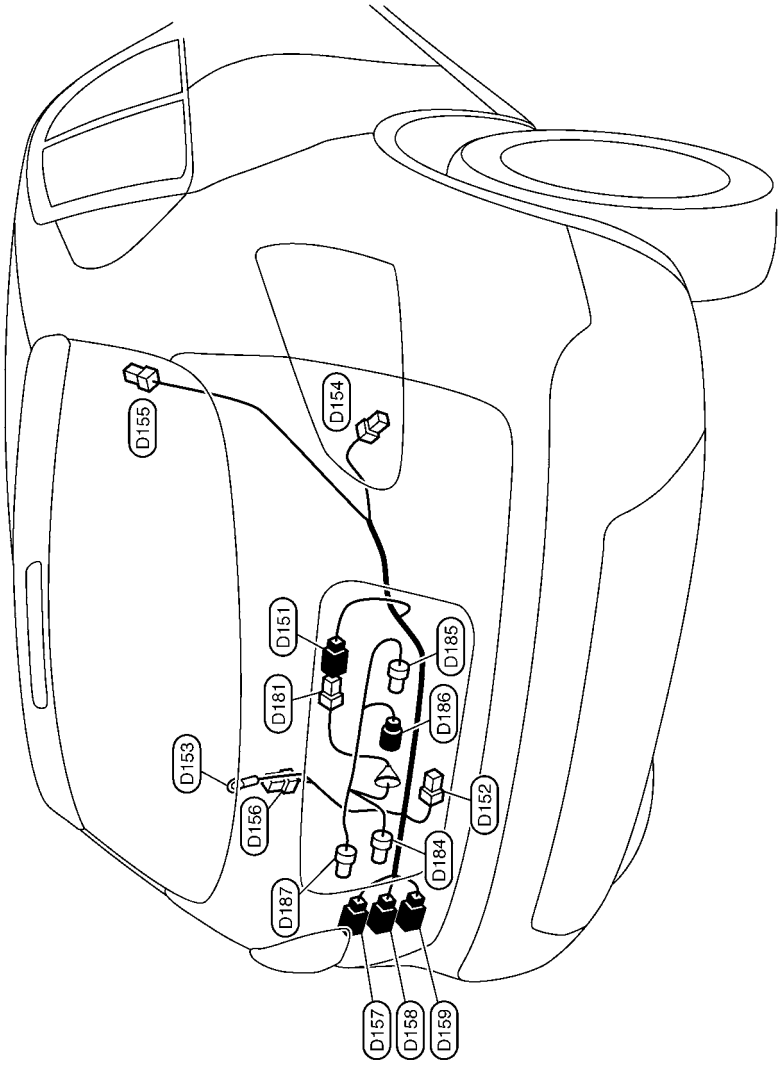
JCMIA0111GB

cardiagn.com

RHD : Back Door Harness

INFOID:0000000001125414

BACK DOOR HARNESS (RHD MODELS)



2006/12/06

JCMIA0113GB

cardiagn.com

HARNESS CONNECTOR

Description

INFOID:0000000000956079

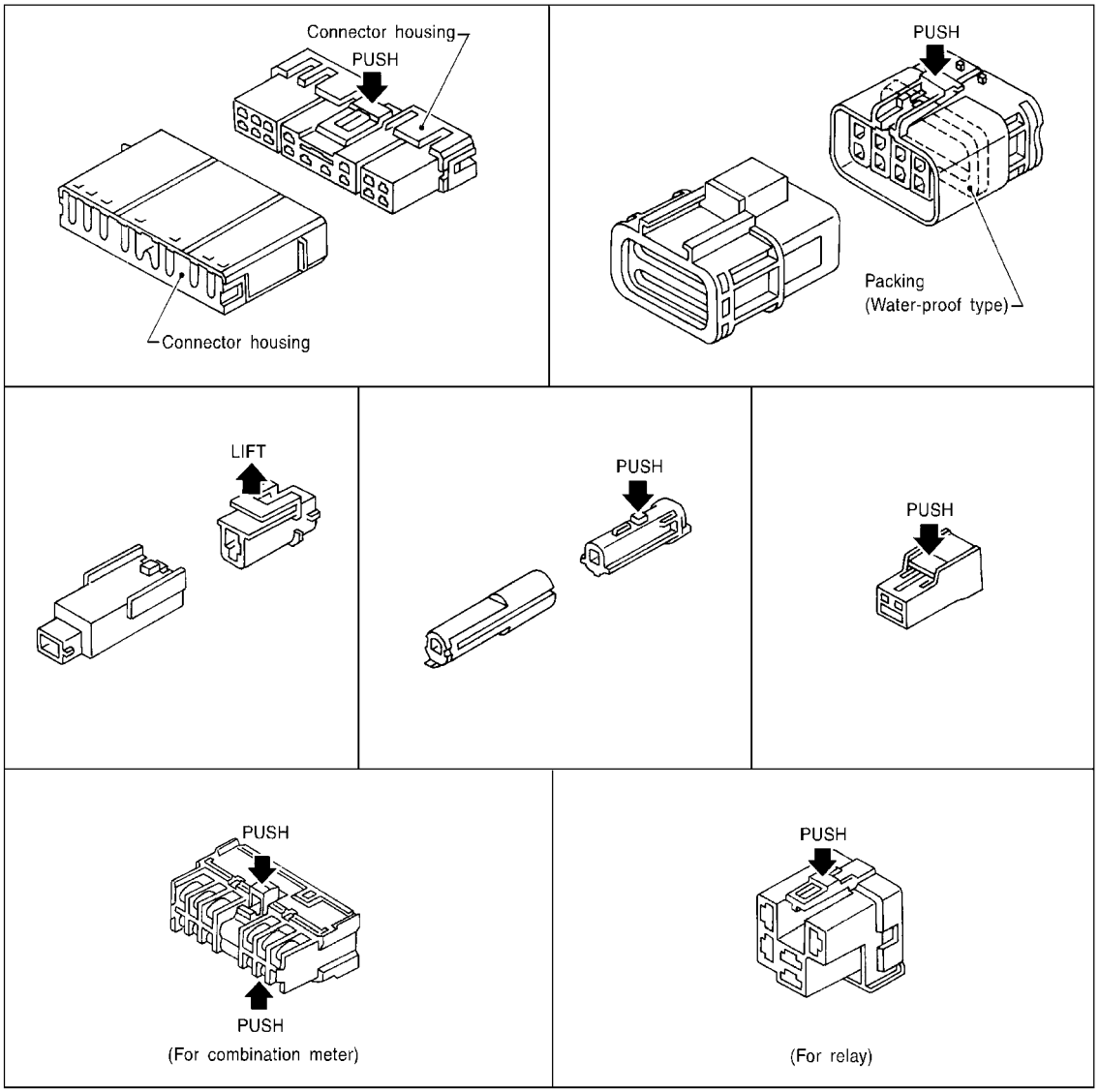
HARNESS CONNECTOR (TAB-LOCKING TYPE)

- The tab-locking type connectors help prevent accidental looseness or disconnection.
- The tab-locking type connectors are disconnected by pushing or lifting the locking tab(s). Refer to the figure below.

CAUTION:

Never pull the harness or wires when disconnecting the connector.

[Example]



SEL769DA

HARNESS CONNECTOR (SLIDE-LOCKING TYPE)

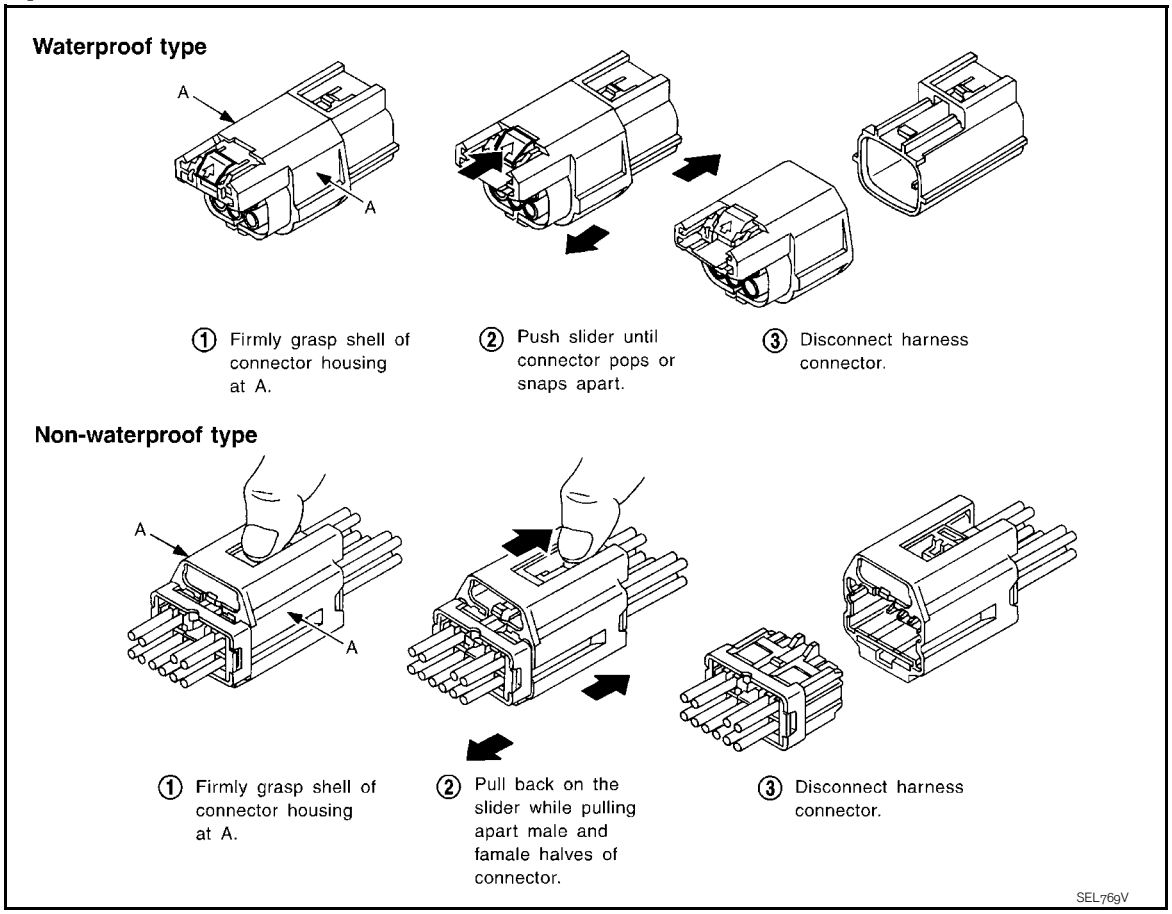
- A new style slide-locking type connector is used on certain systems and components, especially those related to OBD.
- The slide-locking type connectors help prevent incomplete locking and accidental looseness or disconnection.
- The slide-locking type connectors are disconnected by pushing or pulling the slider. Refer to the figure below.

cardiagn.com

CAUTION:

- **Never pull the harness or wires when disconnecting the connector.**
- **Be careful not to damage the connector support bracket when disconnecting the connector.**

[Example]



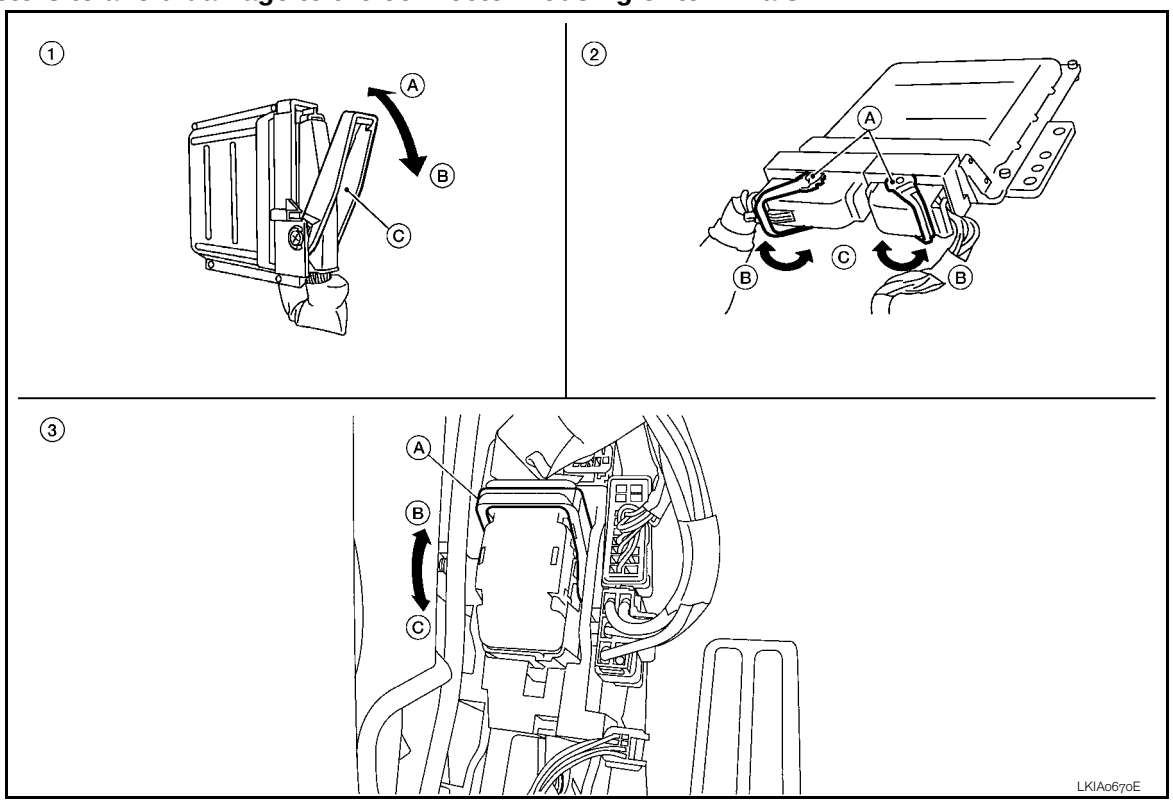
HARNESS CONNECTOR (LEVER LOCKING TYPE)

- Lever locking type harness connectors are used on certain control units and control modules such as ECM, ABS actuator and electric unit (control unit), etc.
- Lever locking type harness connectors are also used on super multiple junction (SMJ) connectors.
- Always confirm the lever is fully locked in place by moving the lever as far as it will go to ensure full connection.

CAUTION:

cardiagn.com

Always confirm the lever is fully released (loosened) before attempting to disconnect or connect these connectors to avoid damage to the connector housing or terminals.



1. Control unit with single lever
   A. Fasten
   B. Loosen
   C. Lever
2. Control unit with dual levers
   A. Levers
   B. Fasten
   C. Loosen
3. SMJ connector
   A. Lever
   B. Fasten
   C. Loosen

cardiagn.com

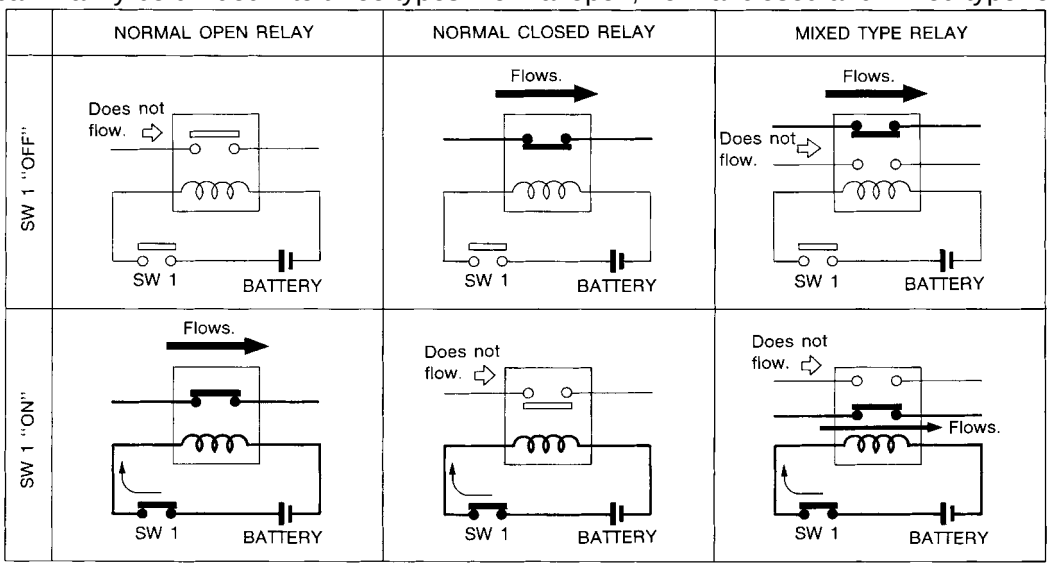
STANDARDIZED RELAY

Description

INFOID:0000000000956080

NORMAL OPEN, NORMAL CLOSED AND MIXED TYPE RELAYS

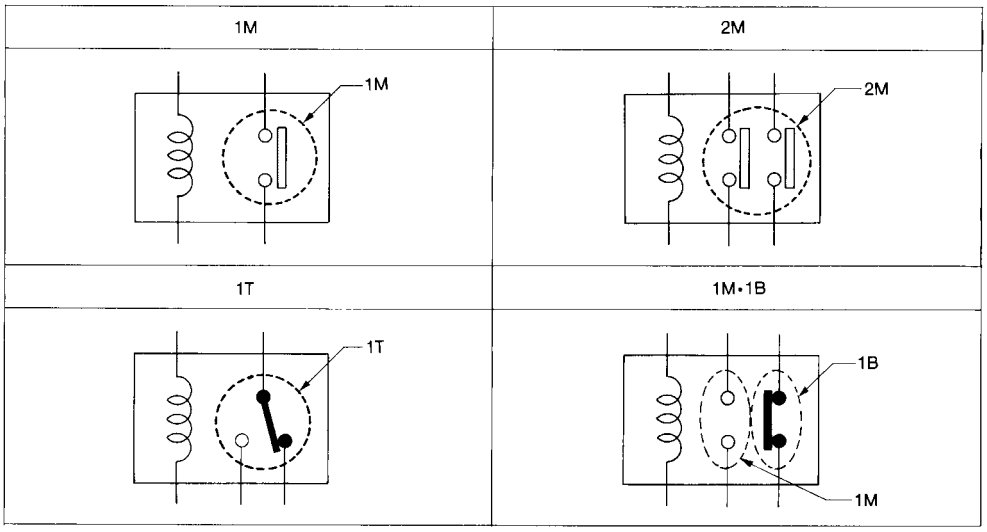
Relays can mainly be divided into three types: normal open, normal closed and mixed type relays.



SEL881H

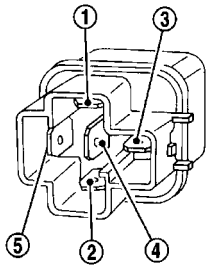
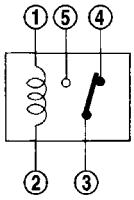
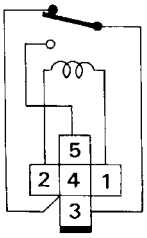
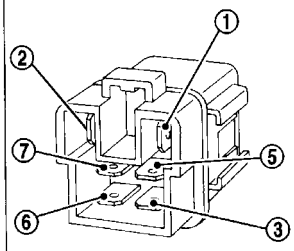
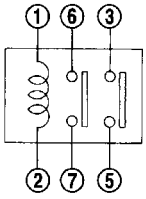
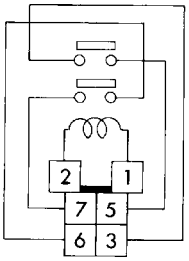
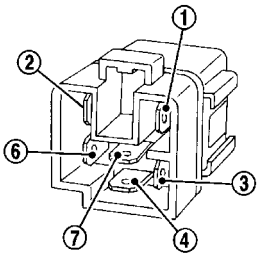
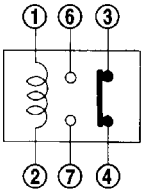
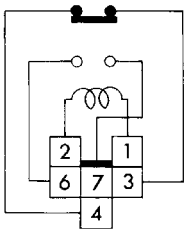
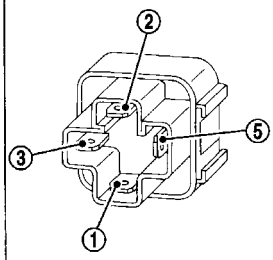
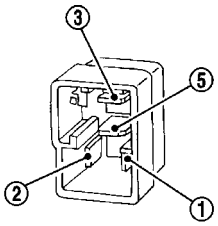
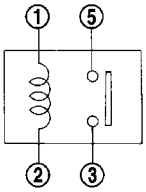
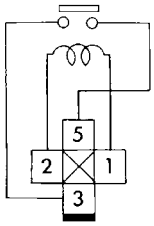
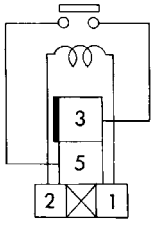
TYPE OF STANDARDIZED RELAYS

1M ..... 1 Make
2M ..... 2 Make
1T ..... 1 Transfer
1M·1B ..... 1 Make 1 Break



SEL882H

cardiagn.com

Type	Outer view	Circuit	Connector symbol and connection	Case color
1T				BLACK
2M				BROWN
1M•1B				GRAY
1M	 		 	BLUE

The arrangement of terminal numbers on the actual relays may differ from those shown above.

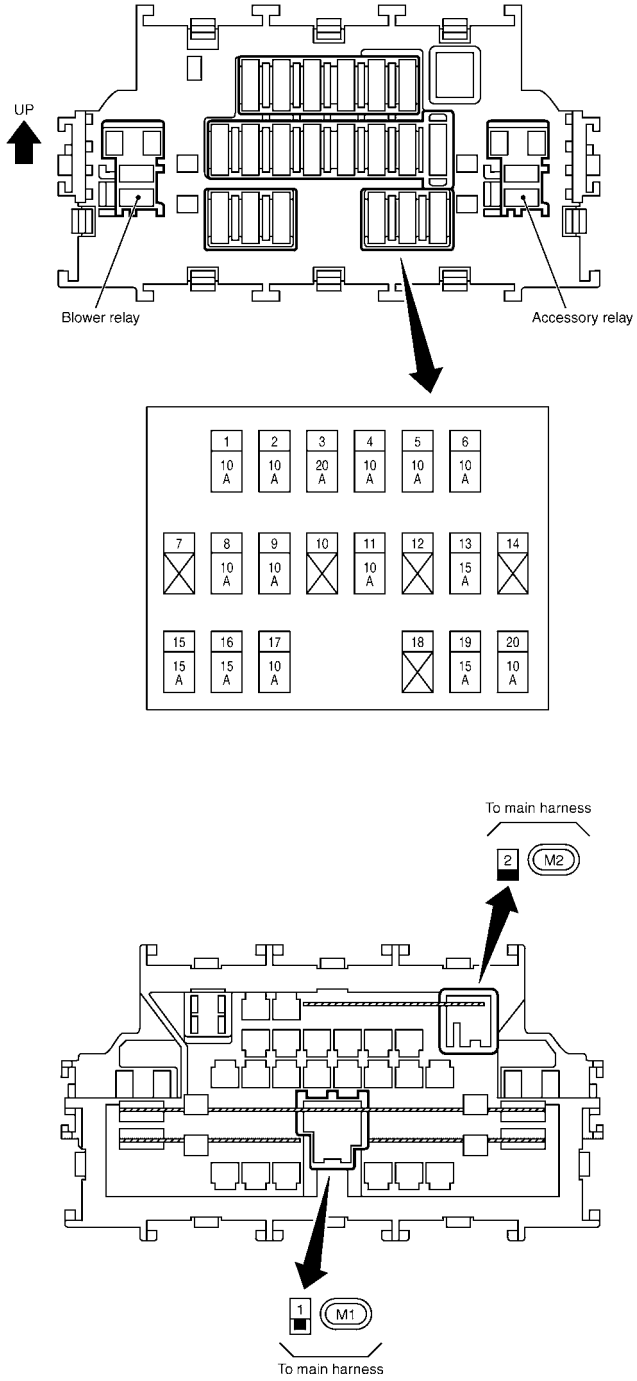
SEL188W

cardiagn.com

FUSE BLOCK - JUNCTION BOX (J/B)

Fuse, Connector and Terminal Arrangement

INFOID:0000000000956081



2006/12/08

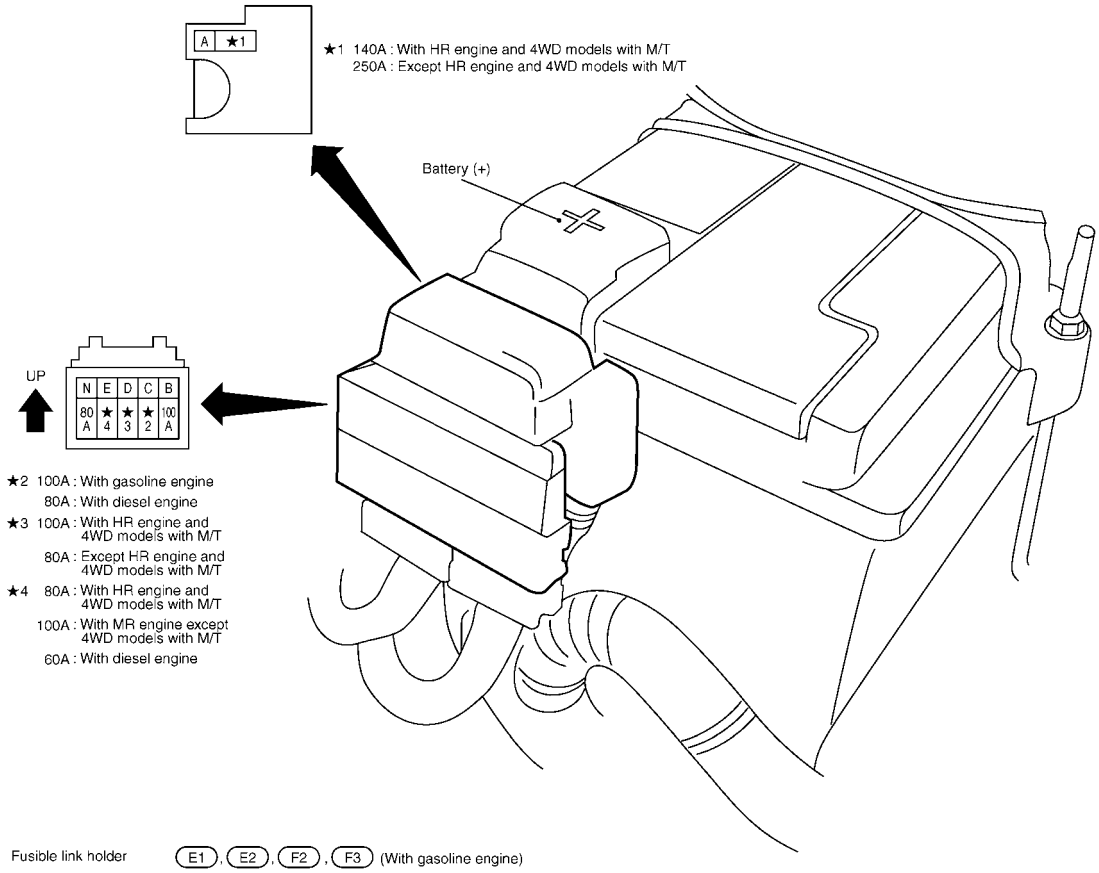
JCMWA0492GB

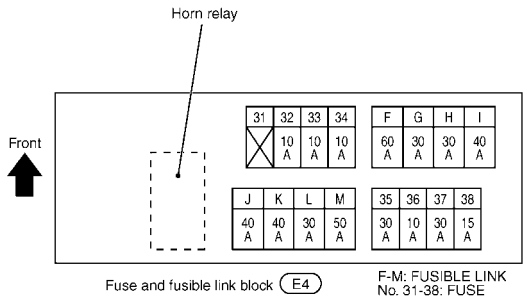
cardiagn.com

FUSE, FUSIBLE LINK AND RELAY BOX

Fuse and Fusible Link Arrangement

INFOID:0000000000956082





2006/12/06

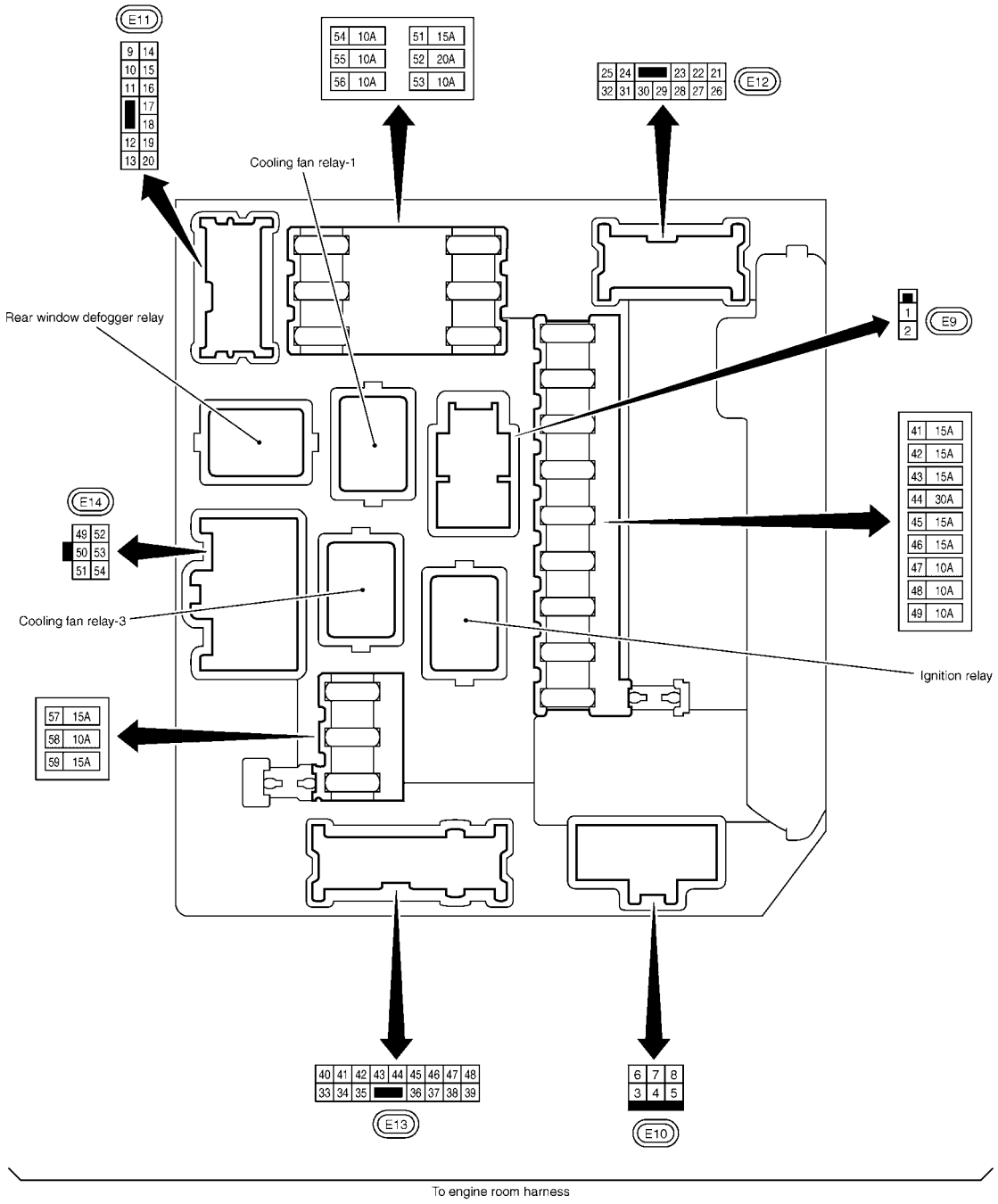
JCMWA0493GB

cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Fuse, Connector and Terminal Arrangement

INFOID:0000000000956083



2006/12/06

JCMWA0494GB

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001125420

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

cardiagn.com

ON-VEHICLE MAINTENANCE

BATTERY CHARGING CHART

Slow Charge

INFOID:0000000000978183

1.DETERMINE INITIAL CHARGING CURRENT

1. Determine initial charging current from specific gravity.
2. Check battery type and determine the specified current using the table.

NOTE:
After starting charging, adjustment of charging current is not necessary.

Initial Charging Current Setting (Slow Charge)

CONVERTED SPECIFIC GRAVITY	BATTERY TYPE																							
	28B19R(L)	34B19R(L)	46B24R(L)	55B24R(L)	50D23R(L)	55D23R(L)	025 [YUASA type code]	027 [YUASA type code]	80D23R(L)	65D26R(L)	80D26R(L)	067 [YUASA type code]	096 [YUASA type code]	75D31R(L)	95D31R(L)	115D31R(L)	110D26R(L)	95E41R(L)	130E41R(L)	LB1 (330)	LB1+ (420)	LB2 (510)	LB2+ (600)	LB3 (720)	L3 (720)
Below 1.100	4.0 (A)		5.0 (A)		7.0 (A)				8.0 (A)				8.5 (A)	9.0 (A)	10.0 (A)				14.0 (A)	—	—	—	—	—	—

>> GO TO 2.

2.CHARGE BATTERY

1. Charge battery.
2. Check charge voltage 30 minutes after starting the battery charge.

Is the voltage between 12 V and 15 V?

YES >> GO TO 3.
NO >> Replace battery.

3.CHARGE BATTERY

Continue to charge for 12 hours.

>> GO TO 4.

4.CHECKING SPECIFIC GRAVITY

Check specific gravity. Refer to PG-3, "How to Handle Battery".

Is the specific gravity 1.240 or more?

YES >> Complete slow charge. Perform “CAPACITY TEST”. Refer to PG-4, "Work Flow".
NO >> GO TO 5.

5.CONDUCT ADDITIONAL CHARGE

Add charging time depending on specific gravity.

Additional Charge (Slow Charge)

SPECIFIC GRAVITY	CHARGING TIME (h)
Below 1.150	5
1.150 - 1.200	4
1.200 - 1.240	2

>> Complete slow charge. Perform “CAPACITY TEST”. Refer to PG-4, "Work Flow".

CAUTION:

cardiagn.com

- **Set charging current to value specified in "Initial Charging Current Setting (Slow Charge)". If charger is not capable of producing specified current value, set its charging current as close to that value as possible.**
- **Keep battery away from open flame while it is being charged.**
- **When connecting charger, connect leads first, then turn on charger. Never turn on charger first, as this may cause a spark.**
- **If battery temperature rises above 55°C (131°F), stop charging. Always charge battery when its temperature is below 55°C (131°F).**

Standard Charge

INFOID:0000000000978184

1. DETERMINE INITIAL CHARGING CURRENT

1. Determine initial charging current from specific gravity.
2. Check battery type and determine the specified current using the table.

NOTE:
After starting charging, adjustment of charging current is not necessary.

Initial Charging Current Setting (Standard Charge)

CONVERTED SPECIFIC GRAVITY	BATTERY TYPE																							
	28B19R(L)	34B19R(L)	46B24R(L)	55B24R(L)	50D23R(L)	55D23R(L)	025 [YUASA type code]	027 [YUASA type code]	80D23R(L)	65D26R(L)	80D26R(L)	067 [YUASA type code]	096 [YUASA type code]	75D31R(L)	95D31R(L)	115D31R(L)	110D26R(L)	95E41R(L)	130E41R(L)	LB1 (330)	LB1+ (420)	LB2 (510)	LB2+ (600)	LB3 (720)	L3 (720)
1.100 - 1.130	4.0 (A)		5.0 (A)		6.0 (A)				7.0 (A)					8.0 (A)	9.0 (A)				13.0 (A)	—	—	—	—	—	—
1.130 - 1.160	3.0 (A)		4.0 (A)		5.0 (A)				6.0 (A)					7.0 (A)	8.0 (A)				11.0 (A)	—	—	—	—	—	—
1.160 - 1.190	2.0 (A)		3.0 (A)		4.0 (A)				5.0 (A)					6.0 (A)	7.0 (A)				9.0 (A)	—	—	—	—	—	—
1.190 - 1.220	2.0 (A)		2.0 (A)		3.0 (A)				4.0 (A)					5.0 (A)	5.0 (A)				7.0 (A)	—	—	—	—	—	—

>> GO TO 2.

2. CHARGE BATTERY

Charge battery for 8 hours.

>> GO TO 3.

3. CHECKING SPECIFIC GRAVITY

Check specific gravity. Refer to PG-3, "How to Handle Battery".

Is the specific gravity 1.240 or more?

YES >> Complete standard charge. Perform "CAPACITY TEST". Refer to PG-4, "Work Flow".
NO >> GO TO 4.

4. CONDUCT ADDITIONAL CHARGE

Add charging time depending on specific gravity.

Additional Charge (Standard Charge)

SPECIFIC GRAVITY	CHARGING TIME (h)
Below 1.150	3.5
1.150 - 1.200	2.5
1.200 - 1.240	1.5

cardiagn.com

>> Complete standard charge. Perform “CAPACITY TEST”. Refer to PG-4, "Work Flow".

CAUTION:

- **Never use standard charge method on a battery whose specific gravity is less than 1.100.**
- **Set charging current to value specified in “Initial Charging Current Setting (Standard Charge)”. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.**
- **Keep battery away from open flame while it is being charged.**
- **When connecting charger, connect leads first, then turn on charger. Never turn on charger first, as this may cause a spark.**
- **If battery temperature rises above 55°C (131°F), stop charging. Always charge battery when its temperature is below 55°C (131°F).**

Quick Charge

INFOID:0000000000978185

1. DETERMINE INITIAL CHARGING CURRENT

1. Determine initial charging current setting and charging time from specific gravity.
2. Check battery type and determine the specified current using the table.

NOTE:

After starting charging, adjustment of charging current is not necessary.

Initial Charging Current Setting and Charging Time (Quick Charge)

BATTERY TYPE		28B19R(L)	34B19R(L)	46B24R(L)	55B24R(L)	50D23R(L)	55D23R(L)	80D23R(L)	65D26R(L)	80D26R(L)	025 [YUASA type code]	027 [YUASA type code]	067 [YUASA type code]	096 [YUASA type code]	75D31R(L)	95D31R(L)	115D31R(L)	110D26R(L)	95E41R(L)	130E41R(L)	LB1 (330)	LB1+ (420)	LB2 (510)	LB2+ (600)	LB3 (720)	L3 (720)
CURRENT [A]		10		15			20						25		30					40	—	—	—	—	—	—
CONVERTED SPECIFIC GRAVITY	1.100 - 1.130	2.5 hours																								
	1.130 - 1.160	2.0 hours																								
	1.160 - 1.190	1.5 hours																								
	1.190 - 1.220	1.0 hour																								
	Above 1.220	0.75 hour (45 min.)																								

CAUTION:

- **Never use quick charge method on a battery whose specific gravity is less than 1.100.**
- **Set initial charging current to value specified in “Initial Charging Current Setting and Charging Time (Quick Time)”. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.**
- **Keep battery away from open flame while it is being charged.**
- **When connecting charger, connect leads first, then turn on charger. Never turn on charger first, as this may cause a spark.**
- **Be careful of a rise in battery temperature because a large current flow is required during quick-charge operation.**
  If battery temperature rises above 55°C (131°F), stop charging. Always charge battery when its temperature is below 55°C (131°F).
- **Never exceed the charging time specified in “Initial Charging Current Setting and Charging Time (Quick Charge)”, because charging battery over the charging time can cause deterioration of the battery.**

cardiagn.com

>> GO TO 2.

2. CHARGE BATTERY

Charge battery.

>> Complete quick charge. Perform “CAPACITY TEST”. Refer to PG-4, "Work Flow".

cardiagn.com

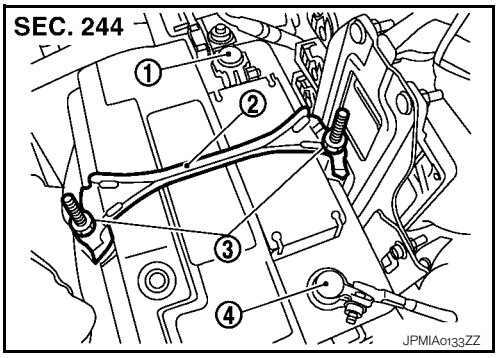
ON-VEHICLE REPAIR

BATTERY

Exploded View

INFOID:0000000000956086

1 : Battery terminal (+)
2 : Battery fix frame
3 : Battery fix frame mounting nuts
4 : Battery terminal (-)

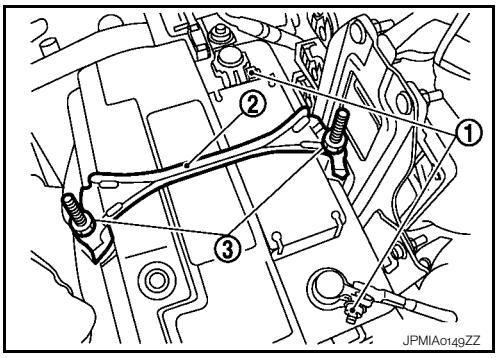


Removal and Installation

INFOID:0000000000956087

REMOVAL

1. Loosen battery terminal nuts (1), and disconnect both battery cables from battery terminals.
   CAUTION:
   When disconnecting, disconnect the battery cable from the negative terminal first.
2. Remove battery fix frame mounting nuts (3) to remove battery fix frame (2).
3. Remove battery.



INSTALLATION

Install in the reverse order of removal.

CAUTION:
When connecting, connect the battery cable to the positive terminal first.

Battery fix frame mounting nut

: 5.4 N·m (0.55 kg-m, 48 in-lb)

Battery terminal nut

: 5.4 N·m (0.55 kg-m, 48 in-lb)

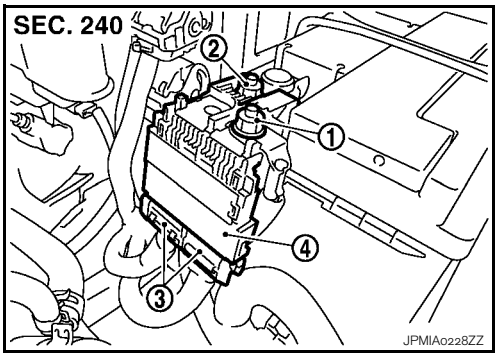
cardiagn.com

BATTERY TERMINAL WITH FUSIBLE LINK

Exploded View

INFOID:0000000000956088

1 : Harness mounting nut
2 : Fusible link holder mounting nut
3 : Harness connector
4 : Battery terminal with fusible link

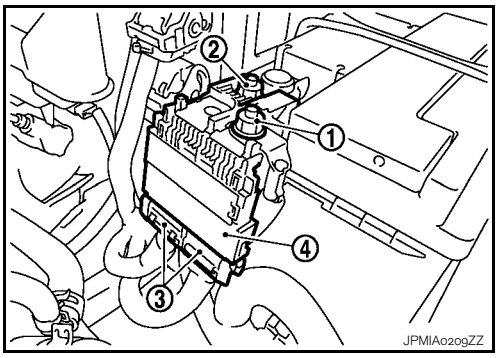


Removal and Installation

INFOID:0000000000956089

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove cover of battery positive terminal.
3. Remove harness mounting nut (1) to disconnect harness connector (3).
4. Remove fusible link holder mounting nut (2) to remove battery terminal with fusible link (4).



INSTALLATION

Install in the reverse order of removal.

Harness mounting nut

: 10.3 N·m (1.1 kg-m, 8 ft-lb)

Fusible link holder mounting nut

: 10.3 N·m (1.1 kg-m, 8 ft-lb)

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Battery

INFOID:0000000000956090

Type		L1	L2	L3
20 hour rate capacity	[V - Ah]	12 - 50	12 - 60	12 - 70
Cold cranking current (For reference value)	[A]	420	600	720

cardiagn.com

SECTION PWC

POWER WINDOW CONTROL SYSTEM

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
WorkFlow 3

INSPECTION AND ADJUSTMENT 4

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL 4
ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description 4
ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Special Repair Requirement 4

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 4
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 4
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement 4

FUNCTION DIAGNOSIS 6

POWER WINDOW SYSTEM 6
System Diagram 6
System Description 6
Component Parts Location 7
Component Description 8

DIAGNOSIS SYSTEM (BCM) 9

COMMON ITEM 9
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 9

COMPONENT DIAGNOSIS 10

POWER SUPPLY AND GROUND CIRCUIT 10

POWER WINDOW MAIN SWITCH 10
POWER WINDOW MAIN SWITCH : Description 10
POWER WINDOW MAIN SWITCH : Component Function Check 10
POWER WINDOW MAIN SWITCH : Diagnosis Procedure 10
POWER WINDOW MAIN SWITCH : Component Inspection 14
POWER WINDOW MAIN SWITCH : Special Repair Requirement 15

FRONT POWER WINDOW SWITCH 15
FRONT POWER WINDOW SWITCH : Description 15
FRONT POWER WINDOW SWITCH : Component Function Check 15
FRONT POWER WINDOW SWITCH : Diagnosis Procedure 16
FRONT POWER WINDOW SWITCH : Component Inspection 17

REAR POWER WINDOW SWITCH 17
REAR POWER WINDOW SWITCH : Description 17
REAR POWER WINDOW SWITCH : Component Function Check 17
REAR POWER WINDOW SWITCH : Diagnosis Procedure 18
REAR POWER WINDOW SWITCH : Component Inspection 19

POWER WINDOW MOTOR CIRCUIT 21

DRIVER SIDE 21
DRIVER SIDE : Description 21
DRIVER SIDE : Component Function Check 21
DRIVER SIDE : Diagnosis Procedure 21
DRIVER SIDE : Component Inspection 22
DRIVER SIDE : Special Repair Requirement 22

PASSENGER SIDE 22
PASSENGER SIDE : Description 22
PASSENGER SIDE : Component Function Check 22
PASSENGER SIDE : Diagnosis Procedure 23

carsdiagn.com

PASSENGER SIDE : Component Inspection 24

REAR LH 24
REAR LH : Description 24
REAR LH : Component Function Check 24
REAR LH : Diagnosis Procedure 24
REAR LH : Component Inspection 25

REAR RH 26
REAR RH : Description 26
REAR RH : Component Function Check 26
REAR RH : Diagnosis Procedure 26
REAR RH : Component Inspection 27

ENCODER CIRCUIT 28

DRIVER SIDE 28
DRIVER SIDE : Description 28
DRIVER SIDE : Component Function Check 28
DRIVER SIDE : Diagnosis Procedure 28

POWER WINDOW LOCK SWITCH 31
Description 31
Component Function Check 31
Special Repair Requirement 31

ECU DIAGNOSIS 32

BCM (BODY CONTROL MODULE) 32
Reference Value 32
Wiring Diagram - POWER WINDOW CONTROL SYSTEM (LHD MODELS) - 47
Wiring Diagram - POWER WINDOW CONTROL SYSTEM (RHD MODELS) - 52
Fail Safe 57
DTC Inspection Priority Chart 58
DTC Index 59

POWER WINDOW MAIN SWITCH 60
Reference Value 60
Wiring Diagram - POWER WINDOW CONTROL SYSTEM (LHD MODELS) - 61
Wiring Diagram - POWER WINDOW CONTROL SYSTEM (RHD MODELS) - 66
Fail Safe 71

SYMPTOM DIAGNOSIS 73

NONE OF THE POWER WINDOWS CAN BE OPERATED USING ANY SWITCH 73
Diagnosis Procedure 73

DRIVER SIDE POWER WINDOW ALONE DOES NOT OPERATE 74
Diagnosis Procedure 74

FRONT PASSENGER SIDE POWER WINDOW ALONE DOES NOT OPERATE 75
Diagnosis Procedure 75

REAR LH SIDE POWER WINDOW ALONE DOES NOT OPERATE 76
Diagnosis Procedure 76

REAR RH SIDE POWER WINDOW ALONE DOES NOT OPERATE 77
Diagnosis Procedure 77

ANTI-PINCH SYSTEM DOES NOT OPERATE NORMALLY (DRIVER SIDE) 78
Diagnosis Procedure 78

AUTO OPERATION DOES NOT OPERATE BUT MANUAL OPERATE NORMALLY (DRIVER SIDE) 79
Diagnosis Procedure 79

POWER WINDOW LOCK SWITCH DOES NOT FUNCTION 80
Diagnosis Procedure 80

PRECAUTION 81

PRECAUTIONS 81
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 81

ON-VEHICLE MAINTENANCE 82

PRE-INSPECTION FOR DIAGNOSTIC 82
Basic Inspection 82

ON-VEHICLE REPAIR 83

POWER WINDOW MAIN SWITCH 83
Exploded View 83
Removal and Installation 83

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

WorkFlow

INFOID:0000000000990477

DETAILED FLOW

1.OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings the vehicle in.

>> GO TO 2.

2.REPRODUCE THE MALFUNCTION INFORMATION

Check the malfunction on the vehicle that the customer describes.
Inspect the relation of the symptoms and the condition when the symptoms occur.

>> GO TO 3.

3.PERFORM "BASIC INSPECTION"

Perform the basic inspection.
Refer to PWC-82, "Basic Inspection".

>> GO TO 4.

4.IDENTIFY THE MALFUNCTIONING SYSTEM WITH “SYMPTOM DIAGNOSIS”

Use “Symptom diagnosis” from the symptom inspection result in step 2. Then identify where to start performing the diagnosis based on possible causes and symptoms.

>> GO TO 5.

5.IDENTIFY MALFUNCTIONING PARTS WITH “COMPONENT DIAGNOSIS”

Perform the diagnosis with “Component diagnosis” of the applicable system.

>> GO TO 6.

6.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 7.

7.FINAL CHECK

Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 2.

Is the malfunctioning part repaired or replaced?

YES >> Trouble diagnosis is completed.
NO >> GO TO 3.

carsdiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description

INFOID:0000000000990478

Initial setting is necessary.
- When the power supply to the power window main switch or power window motor is cut off by the removal of battery terminal or the battery fuse is blown.
- Disconnection and connection of power window main switch harness connector.
- Removal and installation of motor from regulator assembly.
- Operation of regulator assembly as an independent unit.
- Removal and installation of glass.
- Removal and installation of door glass run.

NOTE:
The following specified operations are not performed under the non-initialized condition.
- Auto-up operation
- Anti-pinch function

Refer to PWC-4, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Special Repair Requirement".

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Special Repair Requirement

INFOID:0000000000990479

INITIALIZATION PROCEDURE
1. Disconnect battery minus terminal or power window main switch connector. Reconnect it after a minute or more.
2. Turn ignition switch ON.
3. Operate power window switch to fully open the window. (This operation is unnecessary if the window is already fully open)
4. Continue pulling the power window switch UP (AUTO-UP operation). Even after glass stops at fully closed position, keep pulling the switch for 5 seconds or more.
5. Inspect anti-pinch function.

CHECK ANTI-PINCH FUNCTION
1. Fully open the door window.
2. Place a piece of wood near fully closed position.
3. Close door glass completely with AUTO-UP.

- Check that glass lowers for approximately 150mm or 2 seconds without pinching piece of wood and stops.
- Check that glass does not rise when operating the power window main switch while lowering.

CAUTION:
- **Perform initial setting when auto-up operation or anti-pinch function does not operate normally.**
- **Check that AUTO-UP operates before inspection when system initialization is performed.**
- **Do not check with hands and other body parts because they may be pinched. Do not get pinched.**
- **It may switch to fail-safe mode if open/close operation is performed continuously. Perform initial setting in that situation. Refer to PWC-71, "Fail Safe".**
- **Finish initial setting. Otherwise, next operation cannot be done.**

1. **Auto-up operation**
2. **Anti-pinch function**

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000000990480

Refer to PWC-4, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description".

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000000990481

cardiagn.com

Refer to PWC-4, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Special Repair Requirement" for initialization procedure and check anti-pinch function.

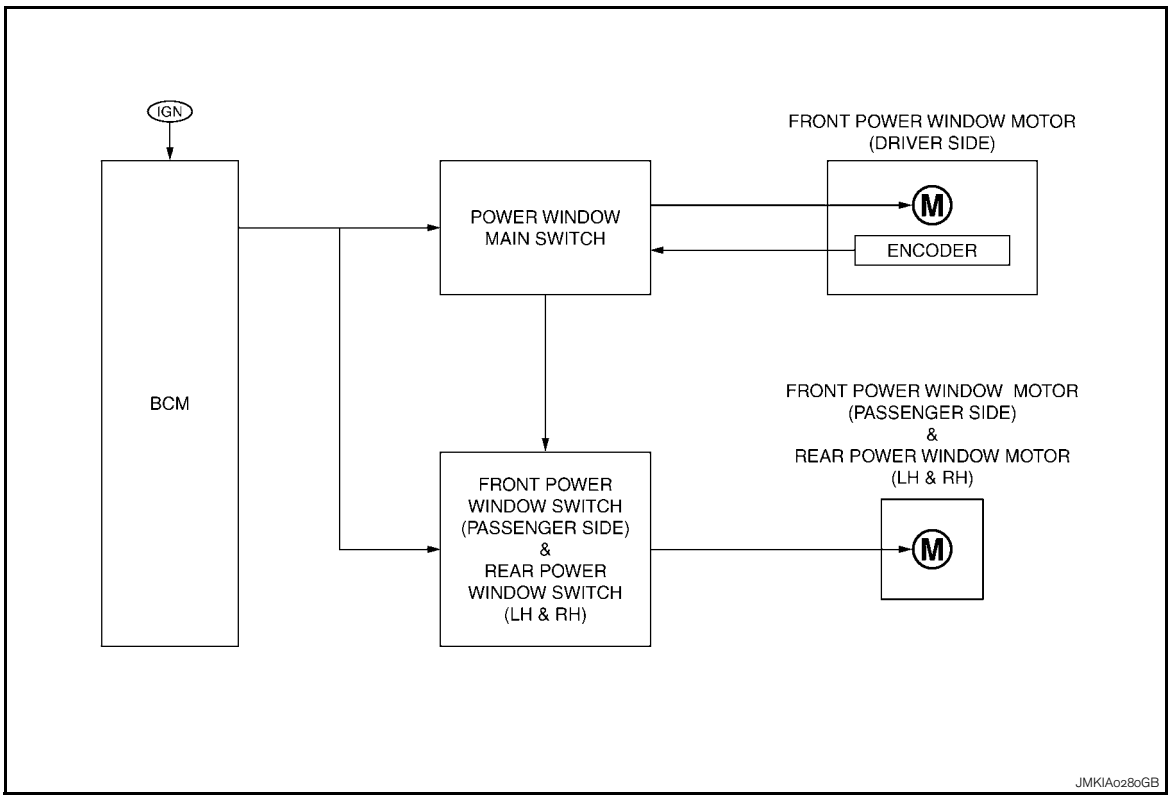
carsdiagn.com

FUNCTION DIAGNOSIS

POWER WINDOW SYSTEM

System Diagram

INFOID:0000000000990482



System Description

INFOID:0000000000990483

POWER WINDOW MAIN SWITCH

INPUT/OUTPUT SIGNAL CHART

Item	Input signal to power window main switch	Power window main switch function	Actuator
Encoder	Encoder pulse signal	Power window control	Front power window motor (driver side)
Power window main switch	Front power window motor (driver side) UP/DOWN signal		
Front power window switch (passenger side)	Front power window motor (passenger side) UP/DOWN signal		Front power window motor (passenger side)
Rear power window switch	Rear power window motor UP/DOWN signal		Rear power window motor (LH & RH)

FRONT POWER WINDOW SWITCH (PASSENGER SIDE) & REAR POWER WINDOW SWITCH (LH & RH)

INPUT/OUTPUT SIGNAL CHART

cardiagn.com

Item	Input signal to front power window switch (passenger side) & rear power window switch (LH & RH)	Front power window switch (passenger side) & rear power window switch (LH & RH) function	Actuator
Front power window switch (passenger side)	Front power window motor (passenger side) UP/DOWN signal	Power window control	Front power window motor (passenger side)
Rear power window switch (LH & RH)	Rear power window motor (LH & RH) UP/DOWN signal		Rear power window motor (LH & RH)

POWER WINDOW OPERATION

- Power window main switch (driver side) can open/close all windows.
- Front & rear power window switch can open/close the corresponding windows.

POWER WINDOW AUTO-OPERATION (FRONT DRIVER SIDE)

- AUTO UP/DOWN operation can be performed when power window main switch turns to AUTO.
- Encoder continues detecting the movement of power window motor and transmits to power window switch as the encoder pulse signal while power window motor is operating.
- Power window switch reads the changes of encoder signal and stops AUTO operation when door glass is at fully opened/closed position.
- Power window motor is operable in case encoder is malfunctioning.

POWER WINDOW LOCK

Ground circuit inside power window main switch shuts off when power window lock switch is ON. This inhibits power window switch operation except with the power window main switch.

ANTI-PINCH OPERATION (FRONT DRIVER SIDE)

- Pinch foreign material in the door glass during AUTO-UP operation, and it is the anti-pinch function that lowers the door glass 150mm or 2 seconds when detected.
- Encoder continues detecting the movement of front power window motor (driver side) and transmits to power window main switch as the encoder pulse signal while front power window motor (driver side) is operating.
- Resistance is applied to the front power window motor (driver side) rotation that changes the frequency of encoder pulse signal if foreign material is trapped in the door glass.
- Power window main switch controls to lower the window glass for 150mm or 2 seconds after it detects encoder pulse signal frequency change.

OPERATION CONDITION

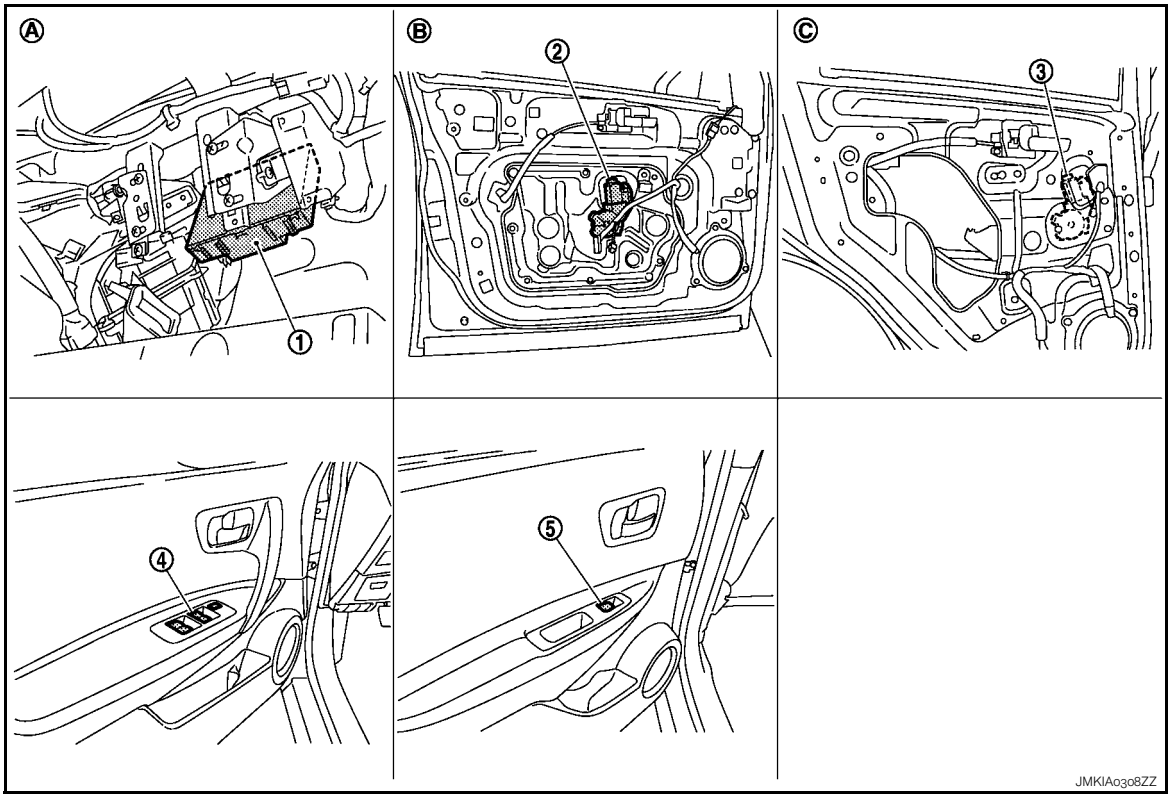
- When front door glass (driver side) AUTO-UP operation is performed (anti-pinch function does not operate just before the door glass closes and is fully closed)

NOTE:

Depending on environment and driving conditions, if a similar impact or load is applied to the door glass, it may lower.

Component Parts Location

INFOID:0000000000990484



1. BCM
   M65, M66, M67
2. Front power window motor (driver side)
   LHD:D7
   RHD:D27
3. Rear power window motor LH
   LHD:D82
   RHD:D112
4. Power window main switch
   LHD:D5 , D6
   RHD:D25 , D26
5. Rear power window switch LH
   LHD:D83
   RHD:D113

A. View with dash side lower (passenger side)
B. View with front door finisher removed
C. View with rear door finisher removed

Component Description

INFOID:0000000000990485

Component	Function
BCM	• Supplies power supply to power window switch. • Controls retained power.
Power window main switch	• Directly controls all power window motor of all doors. • Controls anti-pinch operation of power window.
Front power window switch	Controls power window motor of front passenger side door.
Rear power window switch (LH & RH)	Controls power window motor of rear right and left doors.
Front power window motor (driver side)	• Integrates the encoder and power window motor. • Starts operating with signals from power window main switch. • Transmits front power window motor (driver side) rotation as a pulse signal to power window main switch.
Front door window motor (passenger side)	Starts operating with signals from power window main switch & front power window switch (passenger side).
Rear power window motor (LH & RH)	Starts operating with signals from power window main switch & rear power window switch (LH & RH).

cardiagn.com

DIAGNOSIS SYSTEM (BCM)
COMMON ITEM
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001116527

APPLICATION ITEM
CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION
BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

carsdiagn.com

COMPONENT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

POWER WINDOW MAIN SWITCH

POWER WINDOW MAIN SWITCH : Description

INFOID:0000000000990487

- BCM supplies power.
- It operates each power window motor via corresponding power window switch and makes window move up/down when power window main switch is operated.

POWER WINDOW MAIN SWITCH : Component Function Check

INFOID:0000000000990488

Power Window Main Switch

1. CHECK POWER WINDOW MAIN SWITCH FUNCTION

Does power window motor operate with power window main switch operation?

Is the inspection result normal?

YES >> Power window main switch power supply and ground circuit are OK.
NO >> Refer to PWC-10, "POWER WINDOW MAIN SWITCH : Diagnosis Procedure".

POWER WINDOW MAIN SWITCH : Diagnosis Procedure

INFOID:0000000000990489

Power Window Main Switch Power Supply Circuit Check

1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between power window main switch connector and ground.

Terminal			Voltage (V) (Approx.)
(+)		(–)	
Power window main switch connector	Terminal		
D5 (D25)	10	Ground	Battery voltage
D6 (D26)	19		

():RHD models

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM connector and power window main switch connector.
3. Check continuity between BCM connector and power window main switch connector.

BCM connector	Terminal	Power window main switch connector	Terminal	Continuity
M67	53	D5 (D25)	10	Existed
	58	D6 (D26)	19	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	53		Not existed
	58		

():RHD models

cardiagn.com

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window main switch connector.
3. Check continuity between power window main switch connector and ground.

Power window main switch connector	Terminal	Ground	Continuity
D6 (D26)	17		Existed

():RHD models

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Turn ignition switch ON.
3. Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M67	53	Ground	Battery voltage
	58		

Is the inspection result normal?

YES >> Check power window main switch output signal (front power window switch driver side) GO TO 5.
YES >> Check power window main switch output signal (front power window switch passenger side) GO TO 6.
YES >> Check power window main switch output signal (rear power window switch LH) GO TO 7.
YES >> Check power window main switch output signal (rear power window switch RH) GO TO 8.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL (FRONT POWER WINDOW SWITCH DRIVER SIDE)

1. Turn ignition switch ON.
2. Check voltage between power window main switch and ground.

Terminal			Window condition	Voltage (V) (Approx.)
(+)		(–)		
Power window main switch connector	Terminal			
D5 (D25)	16	Ground	UP	Battery voltage
			DOWN	0
	12		UP	0
			DOWN	Battery voltage

():RHD models

Is the inspection result normal?

YES >> Power window main switch is OK.
NO >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

6. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL (FRONT POWER WINDOW SWITCH PAS-

A B C D E F G H I J PWC L M N O P
carsdiagn.com

SENGER SIDE)

1. Turn ignition switch ON.
2. Check voltage between power window main switch and ground.

Terminal			Window condition	Voltage (V) (Approx.)
(+)		(–)		
Power window main switch connector	Terminal			
D5 (D25)	8	Ground	UP	Battery voltage
			DOWN	0
	11		UP	0
			DOWN	Battery voltage

():RHD models

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

7. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL (REAR POWER WINDOW SWITCH LH)

1. Turn ignition switch ON.
2. Check voltage between power window main switch and ground.

Terminal			Window condition	Voltage (V) (Approx.)
(+)		(–)		
Power window main switch connector	Terminal			
D5 (D25)	1	Ground	UP	Battery voltage
			DOWN	0
	3		UP	0
			DOWN	Battery voltage

():RHD models

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

8. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL (REAR POWER WINDOW SWITCH RH)

1. Turn ignition switch ON.
2. Check voltage between power window main switch and ground.

Terminal			Window condition	Voltage (V) (Approx.)
(+)		(–)		
Power window main switch connector	Terminal			
D5 (D25)	7	Ground	UP	Battery voltage
			DOWN	0
	5		UP	0
			DOWN	Battery voltage

():RHD models

Is the inspection result normal?

YES >> GO TO 11.

cardiagn.com

NO >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

9. CHECK HARNESS CONTINUITY (FRONT POWER WINDOW SWITCH PASSENGER SIDE)

1. Turn ignition switch OFF.
2. Disconnect rear power window switch LH connector.
3. Check continuity between power window main switch connector and rear power window switch LH connector.

Power window main switch connector	Terminal	Front power window switch (passenger side) connector	Terminal	Continuity
D5 (D25)	8	D45 (D65)	2	Existed
	11		3	

4. Check continuity between power window main switch connector and ground.

Power window main switch connector	Terminal	Ground	Continuity
D5 (D25)	8		Not existed
	11		

():RHD models

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair or replace harness.

10. CHECK HARNESS CONTINUITY (REAR POWER WINDOW SWITCH LH)

1. Turn ignition switch OFF.
2. Disconnect rear power window switch LH connector.
3. Check continuity between power window main switch connector and rear power window switch LH connector.

Power window main switch connector	Terminal	Rear power window switch LH connector	Terminal	Continuity
D5 (D25)	1	D83 (D113)	2	Existed
	3		3	

4. Check continuity between power window main switch connector and ground.

Power window main switch connector	Terminal	Ground	Continuity
D5 (D25)	1		Not existed
	3		

():RHD models

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair or replace harness.

11. CHECK HARNESS CONTINUITY (REAR POWER WINDOW SWITCH RH)

1. Turn ignition switch OFF.
2. Disconnect rear power window switch RH connector.
3. Check continuity between power window main switch connector and rear power window switch RH connector.

Power window main switch connector	Terminal	Rear power window switch RH connector	Terminal	Continuity
D5 (D25)	5	D103 (D93)	3	Existed
	7		2	

4. Check continuity between power window main switch connector and ground.

carsdiagn.com

Power window main switch connector	Terminal		Continuity
D5 (D25)	5	Ground	Not existed
	7		

():RHD models

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair or replace harness.

12.CHECK POWER WINDOW MAIN SWITCH

Check power window main switch.
Refer to PWC-14, "POWER WINDOW MAIN SWITCH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

POWER WINDOW MAIN SWITCH : Component Inspection

INFOID:0000000000990490

1.CHECK POWER WINDOW MAIN SWITCH

1. Check power window main switch.

Power window main switch	Terminal		Power window main switch condition		Continuity
D5 (D25)	10	8	Passenger side	UP	Existed
	10	1	LH		
	10	7	RH		
	8	11	Passenger side	NEUTRAL	
	1	3	LH		
	5	7	RH		
	10	11	Passenger side	DOWN	
	10	3	LH		
	10	5	RH		

2. Check continuity power window main switch (power window lock switch). (Lock operation).

Power window main switch	Terminal		Power window main switch condition		Continuity
D5 (D25) D6 (D26)	11	17	Passenger side	UP	Not existed
	3		LH		
	5		RH		
	8		Passenger side	NEUTRAL	
	11				
	1		LH		
	3				
	5		RH		
	7				
	8		Passenger side	DOWN	
	1		LH		
	7		RH		

3. Check continuity power window main switch (power window lock switch). (Unlock operation).

cardiagn.com

Power window main switch	Terminal		Power window main switch condition		Continuity
D5 (D25) D6 (D26)	11	17	Passenger side	UP	Existed
	3		LH		
	5		RH		
	8		Passenger side	NEUTRAL	
	11				
	1		LH		
	3				
	5		RH		
	7				
	8		Passenger side	DOWN	
	1		LH		
	7		RH		

():RHD models

Is the inspection result normal?

YES >> Power window main switch is OK.
NO >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

POWER WINDOW MAIN SWITCH : Special Repair Requirement

INFOID:0000000000990491

1.PERFORM INITIALIZATION PROCEDURE

Perform initialization procedure.
Refer to PWC-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

2.CHECK ANTI-PINCH OPERATION

Check anti-pinch operation.
Refer to PWC-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

Is the inspection result normal?

YES >> Inspection end.
NO >> Refer to PWC-28, "DRIVER SIDE : Component Function Check"

FRONT POWER WINDOW SWITCH

FRONT POWER WINDOW SWITCH : Description

INFOID:0000000000990492

- BCM supplies power.
- Front power window motor (passenger side) will be operated if front power window switch (passenger side) is operated.

FRONT POWER WINDOW SWITCH : Component Function Check

INFOID:0000000000990493

Front Power Window Switch

1. CHECK POWER WINDOW MOTOR FUNCTION

Does front power window motor (passenger side) operate with front power window switch (passenger side) operation?

Is the inspection result normal?

YES >> Front power window switch power supply and ground circuit are OK.

carsdiagn.com

NO >> Refer to PWC-16, "FRONT POWER WINDOW SWITCH : Diagnosis Procedure".

FRONT POWER WINDOW SWITCH : Diagnosis Procedure

INFOID:0000000000990494

Front Power Window Switch Power Supply Circuit Check

1.CHECK POWER SUPPLY CIRCUIT

Check voltage between front power window switch (passenger side) connector and ground.

Terminal			Condition	Voltage (V) (Approx.)
(+)		(–)		
Front power window switch (passenger side) connector	Terminal			
D45 (D65)	1	Ground	Ignition switch ON	Battery voltage

():RHD models

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK HARNESS CONTINUITY (FRONT POWER WINDOW SWITCH)(PASSENGER SIDE)

1. Turn ignition switch OFF.
2. Disconnect power window main switch connector and front power window switch (passenger side) connector.
3. Check continuity between power window main switch connector and front power window switch (passenger side) connector.

Power window main switch connector	Terminal	Front power window switch (passenger side) connector	Terminal	Continuity
D5 (D25)	8	D45 (D65)	2	Existed
	11		3	

4. Check continuity between power window main switch connector and ground.

Power window main switch connector	Terminal	Ground	Continuity
D5 (D25)	8		Not existed
	11		

():RHD models

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

3.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM connector and front power window switch (passenger side) connector.
3. Check continuity between BCM connector and front power window switch (passenger side) connector.

BCM connector	Terminal	Front power window switch (passenger side) connector	Terminal	Continuity
M67	53	D45 (D65)	1	Existed

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	53		Not existed

():RHD models

cardiagn.com

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Turn ignition switch ON.
3. Check voltage between BCM connector and ground.

BCM connector	Terminal	Ground	Voltage (V) (Approx.)
M67	53		Battery voltage

():RHD models

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5. CHECK FRONT POWER WINDOW SWITCH (PASSENGER SIDE)

Check front power window switch (passenger side).
Refer to PWC-17, "FRONT POWER WINDOW SWITCH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace front power window switch (passenger side). Refer to PWC-83, "Exploded View".

FRONT POWER WINDOW SWITCH : Component Inspection

INFOID:0000000000990495

COMPONENT INSPECTION

1. CHECK FRONT POWER WINDOW SWITCH (PASSENGER SIDE)

Check front power window switch (passenger side).

Front power window switch (passenger side)	Terminal		Power window switch condition	Continuity
D45 (D65)	1	5	UP	Existed
	3	4		
	3	4	NEUTRAL	
	5	2		
	1	4	DOWN	
	5	2		

():RHD models

Is the inspection result normal?

YES >> Front power window switch (passenger side) is OK.
NO >> Replace front power window switch (passenger side). Refer to PWC-83, "Exploded View".

REAR POWER WINDOW SWITCH

REAR POWER WINDOW SWITCH : Description

INFOID:0000000000990496

- BCM supplies power.
- Rear power window motor will be operated if rear power window switch is operated.

REAR POWER WINDOW SWITCH : Component Function Check

INFOID:0000000000990497

Rear Power Window Switch

1. CHECK REAR POWER WINDOW MOTOR FUNCTION

Does rear power window motor operate with rear power window switch operation?

Is the inspection result normal?

YES >> Rear power window switch power supply and ground circuit are OK.
NO >> Refer to PWC-18, "REAR POWER WINDOW SWITCH : Diagnosis Procedure".

REAR POWER WINDOW SWITCH : Diagnosis Procedure

INFOID:0000000000990498

Rear Power Window Switch Power Supply Circuit Check

1.CHECK POWER SUPPLY CIRCUIT

Check voltage between rear power window switch connector and ground.

Terminal				Condition	Voltage (V) (Approx.)
(+)			(–)		
Rear power window switch connector		Terminal			
LH	D83 (D113)	1	Ground	Ignition switch ON	Battery voltage
RH	D103 (D93)				

():RHD models

Is the measurement value within the specification?

YES >> GO TO 2. (Rear power window switch LH)
YES >> GO TO 3. (Rear power window switch RH)
NO >> GO TO 4.

2.CHECK HARNESS CONTINUITY (REAR POWER WINDOW SWITCH LH)

1. Turn ignition switch OFF.
2. Disconnect power window main switch connector and rear power window switch LH connector.
3. Check continuity between power window main switch connector and rear power window switch LH connector.

Power window main switch connector	Terminal	Rear power window switch LH connector	Terminal	Continuity
D5 (D25)	1	D83 (D113)	2	Existed
	3		3	

4. Check continuity between power window main switch connector and ground.

Power window main switch connector	Terminal	Ground	Continuity
D5 (D25)	1		Not existed
	3		

():RHD models

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness.

3.CHECK HARNESS CONTINUITY (REAR POWER WINDOW SWITCH RH)

1. Turn ignition switch OFF.
2. Disconnect power window main switch connector and rear power window switch RH connector.
3. Check continuity between power window main switch connector and rear power window switch RH connector.

Power window main switch connector	Terminal	Rear power window switch RH connector	Terminal	Continuity
D5 (D25)	5	D103 (D93)	3	Existed
	7		2	

4. Check continuity between power window main switch connector and ground.

cardiagn.com

Power window main switch connector	Terminal	Ground	Continuity
D5 (D25)	5		Not existed
	7		

():RHD models

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness.

4.CHECK HARNESS CONTINUITY

1. Disconnect BCM connector and rear power window switch connector.
2. Check continuity between BCM connector and rear power window switch connector.

BCM connector	Terminal	Rear power window switch connector		Terminal	Continuity
M67	53	LH	D83 (D113)	1	Existed
		RH	D103 (D93)		

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	3		Not existed

():RHD models

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK BCM OUPOUT SIGNAL

1. Connect BCM connector.
2. Turn ignition switch ON.
3. Check voltage between BCM connector and ground.

BCM connector	Terminal	Ground	Voltage (V) (Approx.)
M67	3		Battery voltage

():RHD models

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

6.CHECK REAR POWER WINDOW SWITCH

Check rear power window switch.
Refer to PWC-19, "REAR POWER WINDOW SWITCH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace rear power window switch. Refer to PWC-83, "Exploded View".

REAR POWER WINDOW SWITCH : Component Inspection

INFOID:0000000000990499

COMPONENT INSPECTION

1.CHECK REAR POWER WINDOW SWITCH

Check rear power window switch.

Rear power window switch	Terminal		Power window switch condition	Continuity
LH:D83 (D113) RH:D103 (D93)	1	5	UP	Existed
	3	4		
	3	4	NEUTRAL	
	5	2		
	1	4	DOWN	
	5	2		

():RHD models

Is the inspection result normal?

YES >> Rear power window switch is OK.
NO >> Replace rear power window switch. Refer to PWC-83, "Exploded View".

cardiagn.com

POWER WINDOW MOTOR CIRCUIT
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000000990500

Door glass moves UP/DOWN by receiving the signal from power window main switch.

DRIVER SIDE : Component Function Check

INFOID:0000000000990501

1. CHECK POWER WINDOW MOTOR CIRCUIT

Does power window motor operate with operating power window main switch?

Is the inspection result normal?

YES >> Power window motor is OK.
NO >> Refer to PWC-21, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:0000000000990502

Power Window Motor Circuit Check

1. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Disconnect front power window motor (driver side) connector.
2. Turn ignition switch ON.
3. Check voltage between power window motor (driver side) connector and ground.

Terminal			Power window main switch Condition	Voltage (V) (Approx.)
(+)		(–)		
Power window motor (driver side) connector	Terminal			
D7 (D27)	3	Ground	UP	Battery voltage
			DOWN	0
	4		UP	0
			DOWN	Battery voltage

():RHD models

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect power window main switch connector and front power window motor (driver side) connector.
3. Check continuity between power window main switch connector and front power window motor (driver side).

Power window main switch connector	Terminal	Front power window motor (driver side) connector	Terminal	Continuity
D5 (D25)	16	D7 (D27)	3	Existed
	12		4	

4. Check continuity between power window main switch connector and ground.

Power window main switch connector	Terminal		Continuity
D5 (D25)	16	Ground	Not existed
	12		

():RHD models

Is the inspection result normal?

carsdiagn.com

YES >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".
NO >> Repair or replace harness.

3.CHECK POWER WINDOW MOTOR

Check front power window motor (driver side).
Refer to PWC-22, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace power window motor (driver side). Refer to GW-22, "Exploded View" and GW-22, "Removal and Installation". After that, Refer to PWC-22, "DRIVER SIDE : Special Repair Requirement".

DRIVER SIDE : Component Inspection

INFOID:0000000000990503

COMPONENT INSPECTION

1.CHECK POWER WINDOW MOTOR

Does motor operate by connecting the battery voltage directly to power window motor connector?

Front power window motor (driver side) connector	Terminal		Motor condition
	(+)	(–)	
D7 (D27)	4	3	DOWN
	3	4	UP

():RHD models

Is the inspection result normal?

YES >> Power window motor is OK.
NO >> Replace fornt power window motor (driver side). Refer to GW-22, "Exploded View" and GW-22, "Removal and Installation". After that, Refer to PWC-22, "DRIVER SIDE : Special Repair Requirement".

DRIVER SIDE : Special Repair Requirement

INFOID:0000000000990504

1.PERFORM INITIALIZATION PROCEDURE

Perform initialization procedure.
Refer to PWC-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

2.CHECK ANTI-PINCH OPERATION

Check anti-pinch operation.
Refer to PWC-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

Is the inspection result normal?

YES >> Inspection end.
NO >> Refer to PWC-28, "DRIVER SIDE : Component Function Check".

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000000990505

Door glass moves UP/DOWN by receiving the signal from power window main switch or front power window switch (passenger side).

PASSENGER SIDE : Component Function Check

INFOID:0000000000990506

cardiagn.com

1. CHECK POWER WINDOW MOTOR CIRCIUT

Does power window motor operate with operating power window main switch or front power window switch (passenger side)?

Is the inspection result normal?

YES >> Power window motor is OK.
NO >> Refer to PWC-23, "PASSENGER SIDE : Diagnosis Procedure".

PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000000990507

Front Power Window Motor (Passenger Side) Circuit Check

1. CHECK FRONT POWER WINDOW SWITCH (PASSENGER SIDE) OUTPUT SIGNAL

1. Disconnect front power window motor (passenger side) connector.
2. Turn ignition switch ON.
3. Check voltage between front power window motor (passenger side) connector and ground.

Terminal			Front power window motor (passenger side) condition	Voltage (V) (Approx.)
(+)		(–)		
Front power window motor (passenger side) connector	Terminal			
D46 (D66)	2	Ground	UP	Battery voltage
			DOWN	0
	1		UP	0
			DOWN	Battery voltage

():RHD models

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect front power window switch (passenger side) connector and front power window motor (passenger side) connector.
3. Check continuity between front power window switch (passenger side) connector and front power window motor (passenger side) connector.

Front power window switch (passenger side) connector	Terminal	Front power window motor (passenger side) connector	Terminal	Continuity
D45 (D65)	4	D46 (D66)	1	Existed
	5		2	

4. Check continuity between front power window switch (passenger side) connector and ground.

Front power window switch (passenger side) connector	Terminal	Ground	Continuity
D45 (D65)	4		Not existed
	5		

():RHD models

Is the inspection result normal?

YES >> Check front power window switch (passenger side). Refer to PWC-15, "FRONT POWER WINDOW SWITCH : Component Function Check".
NO >> Repair or replace harness.

3. CHECK FRONT POWER WINDOW MOTOR (PASSENGER SIDE)

Check front power window motor (passenger side).

A B C D E F G H I J PWC L M N O P
carsdiagn.com

Refer to PWC-24, "PASSENGER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace front power window motor (passenger side). Refer to GW-22, "Exploded View" and GW-22, "Removal and Installation".

PASSENGER SIDE : Component Inspection

INFOID:0000000000990508

COMPONENT INSPECTION

1.CHECK FRONT POWER WINDOW MOTOR (PASSENGER SIDE)

Does motor operate by connecting the battery voltage directly to front power window motor (passenger side) connector?

Front power window motor (passenger side) connector	Terminal		Motor condition
	(+)	(–)	
D46 (D66)	1	2	DOWN
	2	1	UP

():RHD models

Is the inspection result normal?

YES >> Power window motor is OK.
NO >> Replace front power window motor (passenger side). Refer to GW-22, "Exploded View" and GW-22, "Removal and Installation".

REAR LH

REAR LH : Description

INFOID:0000000000990509

Door glass moves UP/DOWN by receiving the signal from power window main switch or rear power window switch LH.

REAR LH : Component Function Check

INFOID:0000000000990510

1.CHECK POWER WINDOW MOTOR CURCUIT

Does rear power window motor LH operate with operating power window main switch or rear power window switch LH?

Is the inspection result normal?

YES >> Power window motor is OK.
NO >> Refer to PWC-24, "REAR LH : Diagnosis Procedure"

REAR LH : Diagnosis Procedure

INFOID:0000000000990511

Power Window Motor Circuit Check

1.CHECK REAR POWER WINDOW SWITCH OUTPUT SIGNAL

1. Disconnect rear power window motor LH connector.
2. Turn ignition switch ON.
3. Check voltage between rear power window motor LH connector and ground.

cardiagn.com

Terminal			Window condition	Voltage (V) (Approx.)
(+)		(–)		
Rear power window motor LH connector	Terminal			
D82 (D112)	2	Ground	UP	Battery voltage
			DOWN	0
	1		UP	0
			DOWN	Battery voltage

():RHD models

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect rear power window switch LH connector and rear power window motor LH connector.
3. Check continuity between rear power window switch LH connector and rear power window motor LH connector.

Rear power window switch LH connector	Terminal	Rear power window motor LH connector	Terminal	Continuity
D83 (D113)	4	D82 (D112)	1	Existed
	5		2	

4. Check continuity between rear power window switch LH connector and ground.

Rear power window switch LH connector	Terminal	Ground	Continuity
D83 (D113)	4		Not existed
	5		

():RHD models

Is the inspection result normal?

YES >> Check rear power window switch. Refer to PWC-17, "REAR POWER WINDOW SWITCH : Component Function Check".
NO >> Repair or replace harness.

3.CHECK REAR POWER WINDOW MOTOR LH

Check rear power window motor LH.
Refer to PWC-25, "REAR LH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace rear power window motor LH. Refer to GW-28, "Exploded View" and GW-28, "Removal and Installation".

REAR LH : Component Inspection

INFOID:0000000000990512

COMPONENT INSPECTION

1.CHECK POWER WINDOW MOTOR

Does motor operate by connecting the battery voltage directly to rear power window motor LH connector?

Rear power window motor LH connector	Terminal		Motor condition
	(+)	(–)	
D82 (D112)	1	2	DOWN
	2	1	UP

():RHD models

Is the inspection result normal?

YES >> Power window motor is OK.
NO >> Replace rear power window motor LH. Refer to GW-28, "Exploded View" and GW-28, "Removal and Installation".

REAR RH

REAR RH : Description

INFOID:0000000000990513

Door glass moves UP/DOWN by receiving the signal from power window main switch or rear power window switch RH.

REAR RH : Component Function Check

INFOID:0000000000990514

1. CHECK POWER WINDOW MOTOR CIRCUIT

Does rear power window motor RH operate with operating power window main switch or rear power window switch RH?

Is the inspection result normal?

YES >> Power window motor is OK.
NO >> Refer to PWC-26, "REAR RH : Diagnosis Procedure".

REAR RH : Diagnosis Procedure

INFOID:0000000000990515

Rear Power Window Motor RH Circuit Check

1. CHECK REAR POWER WINDOW SWITCH RH OUTPUT SIGNAL

1. Disconnect rear power window motor RH connector.
2. Turn ignition switch ON.
3. Check voltage between rear power window motor RH connector and ground.

Terminal			Rear power window switch RH condition	Voltage (V) (Approx.)
(+)		(–)		
Rear power window motor RH connector	Terminal			
D102 (D92)	2	Ground	UP	Battery voltage
			DOWN	0
	1		UP	0
			DOWN	Battery voltage

():RHD models

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect rear power window switch RH connector and rear power window motor RH connector.
3. Check continuity between rear power window switch RH connector and rear power window motor RH connector.

cardiagn.com

Rear power window switch RH connector	Terminal	Rear power window motor RH connector	Terminal	Continuity
D103 (D93)	4	D102 (D92)	1	Existed
	5		2	

4. Check continuity between rear power window switch RH connector and ground.

Rear power window switch RH connector	Terminal	Ground	Continuity
D103 (D93)	4		Not existed
	5		

():RHD models

Is the inspection result normal?

YES >> Check rear power window switch RH. Refer to PWC-17, "REAR POWER WINDOW SWITCH : Component Function Check".

NO >> Repair or replace harness.

3.CHECK REAR POWER WINDOW MOTOR RH

Check rear power window motor RH.
Refer to PWC-27, "REAR RH : Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

NO >> Replace rear power window motor RH. Refer to GW-28, "Exploded View" and GW-28, "Removal and Installation".

REAR RH : Component Inspection

INFOID:0000000000990516

COMPONENT INSPECTION

1.CHECK REAR POWER WINDOW MOTOR RH

Does motor operate by connecting the battery voltage directly to rear power window motor RH connector?

Rear power window motor RH connector	Terminal		Motor condition
	(+)	(–)	
D102 (D92)	1	2	DOWN
	2	1	UP

():RHD models

Is the inspection result normal?

YES >> Power window motor is OK.

NO >> Replace rear power window motor RH. Refer to GW-28, "Exploded View" and GW-28, "Removal and Installation".

ENCODER CIRCUIT
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000000990517

Detects condition of the front power window motor (driver side) operation and transmits to power window main switch as pulse signal.

DRIVER SIDE : Component Function Check

INFOID:0000000000990518

1.CHECK ENCODER OPERATION

Does front driver side door glass perform AUTO open/close operation normally when operating power window main switch?

Is the inspection result normal?

YES >> Encoder operation is OK.
NO >> Refer to PWC-28, "DRIVER SIDE : Diagnosis Procedure"

DRIVER SIDE : Diagnosis Procedure

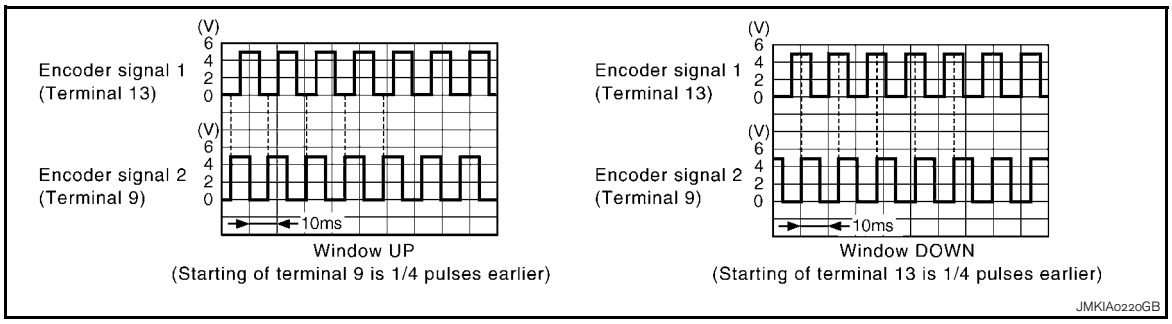
INFOID:0000000000990519

Encoder Circuit Check

1.CHECK ENCODER OPERATION

1. Connect front power window motor (driver side) connector.
2. Turn ignition switch ON.
3. Check signal between power window main switch connector and ground with oscilloscope.

Terminals			Signal (Reference value)
(+)		(–)	
Power window main switch connector	Terminal		
D5 (D25)	9	Ground	Refer to following signal
	13		



():RHD models

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK FRONT POWER WINDOW MOTOR (DRIVER SIDE) POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between front power window motor (driver side) connector and ground.

cardiagn.com

Terminal			Voltage (V) (Approx.)
(+)		(–)	
Front power window motor (driver side) connector	Terminal		
D7 (D27)	5	Ground	10

():RHD models

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK HARNESS CONTINUITY 1

1. Turn ignition switch OFF.
2. Disconnect power window main switch connector and front power window motor (driver side) connector.
3. Check continuity between power window main switch connector and front power window motor (driver side) connector.

Power window main switch connector	Terminal	Front power window motor (driver side) connector	Terminal	Continuity
D5 (D25)	15	D7 (D27)	5	Existed

4. Check continuity between power window main switch connector and ground.

Power window main switch connector	Terminal	Ground	Continuity
D5 (D25)	15		Not existed

():RHD models

Is the inspection result normal?

YES >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".
NO >> Repair or replace harness.

4.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect front power window motor (driver side) connector.
3. Check continuity between front power window motor (driver side) connector and ground.

Front power window motor (driver side) connector	Terminal	Ground	Continuity
D7 (D27)	2		Existed

():RHD models

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.CHECK HARNESS CONTINUITY 2

1. Disconnect power window main switch connector.
2. Check continuity between power window main switch connector and front power window motor (driver side) connector.

Power window main switch connector	Terminal	Front power window motor (driver side) connector	Terminal	Continuity
D5 (D25)	2	D7 (D27)	2	Existed

():RHD models

Is the inspection result normal?

A B C D E F G H I J PWC L M N O P
carsdiagn.com

YES >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, Refer to PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".
NO >> Repair or replace harness.

6. CHECK HARNESS CONTINUITY 3

1. Disconnect power window main switch connector.
2. Check continuity between power window main switch connector and front power window motor (driver side) connector.

Power window main switch connector	Terminal	Front power window motor (driver side) connector	Terminal	Continuity
D5 (D25)	9	D7 (D27)	1	Existed
	13		6	

3. Check continuity between power window main switch connector and ground.

Power window main switch connector	Terminal	Ground	Continuity
D5 (D25)	9		Not existed
	13		

():RHD models

Is the inspection result normal?

YES >> Replace front power window motor (driver side). Refer to GW-22, "Exploded View" and GW-22, "Removal and Installation". After that, Refer to PWC-22, "DRIVER SIDE : Special Repair Requirement".
NO >> Repair or replace harness.

cardiagn.com

POWER WINDOW LOCK SWITCH

Description

INFOID:0000000000990520

Ground circuit of power window main switch shuts off if power window lock switch of power window main switch is operated. This inhibits all operation, except for the main switch.

Component Function Check

INFOID:0000000000990521

1.CHECK POWER WINDOW LOCK SIGNAL

Exchanges for a normal power window main switch, and operation is checked.

Does power window lock operate?

YES >> Replace power window main switch. Refer to PWC-83, "Exploded View". After that, PWC-31, "Special Repair Requirement"

NO >> Check condition of harness and connector.

Special Repair Requirement

INFOID:0000000000990522

1.PERFORM INITIALIZATION PROCEDURE

Perform initialization procedure.
Refer to PWC-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

2.CHECK ANTI-PINCH OPERATION

Check anti-pinch operation.
Refer to PWC-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

Is the inspection result normal?

YES >> Inspection end.

NO >> Refer to PWC-28, "DRIVER SIDE : Component Function Check"

carsdiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001116528

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

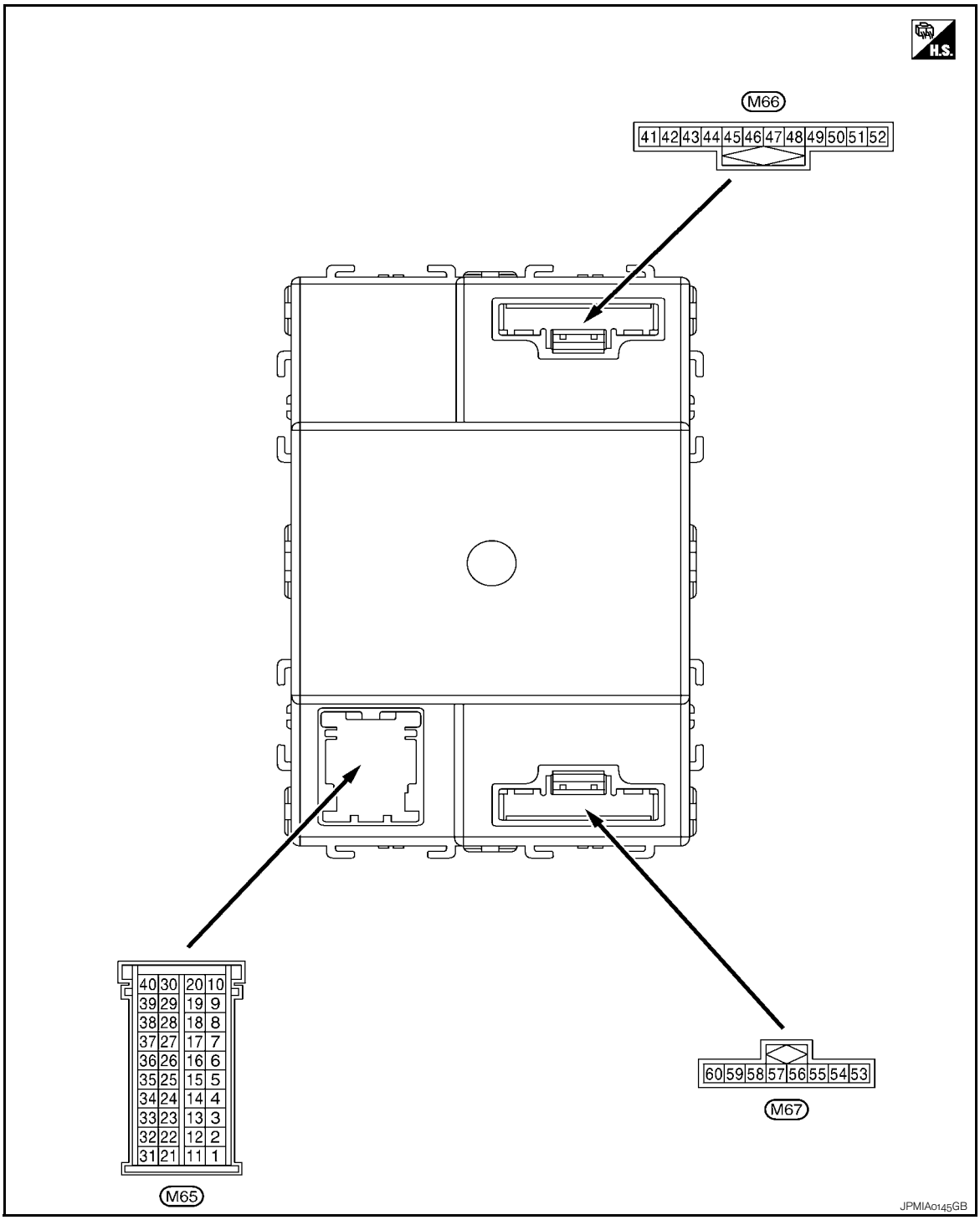
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

carsdiagn.com

TERMINAL LAYOUT

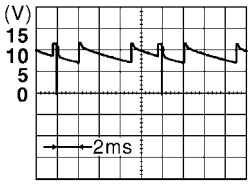
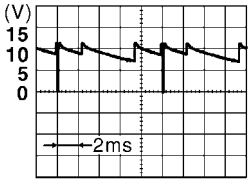
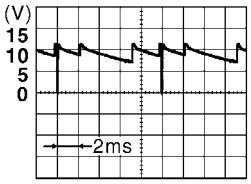
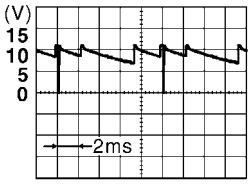


PHYSICAL VALUES

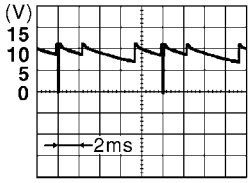
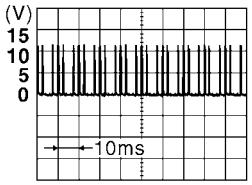
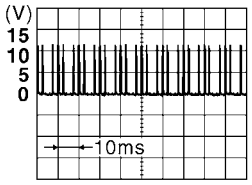
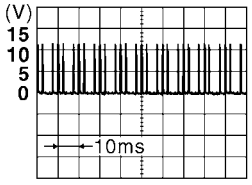
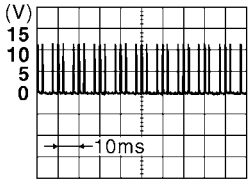
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

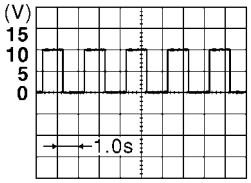
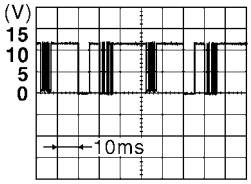
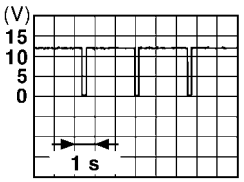
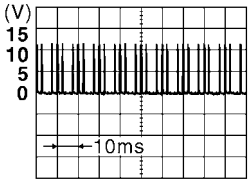
cardiagn.com

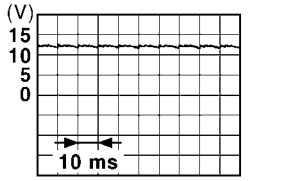
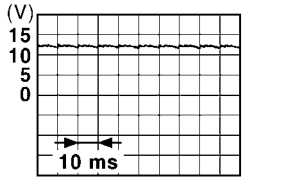
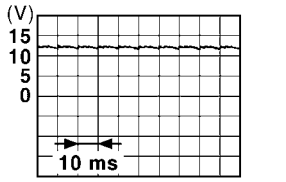
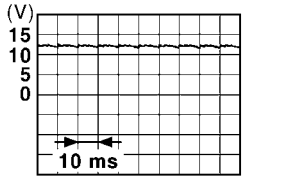
Terminal No. (Wire color) +	Terminal No. (Wire color) –	Description: Signal name	Description: Input/ Output	Condition		Value (Approx.)
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

carsdiagn.com

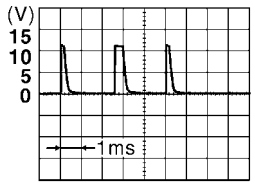
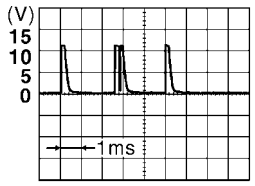
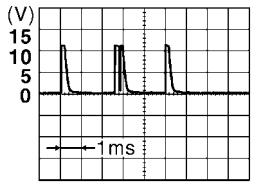
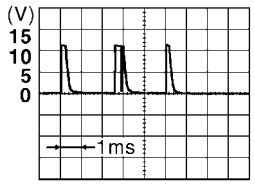
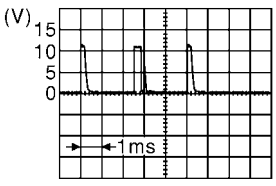
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

cardiagn.com

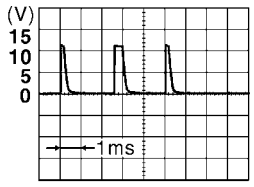
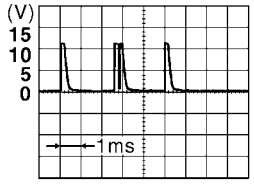
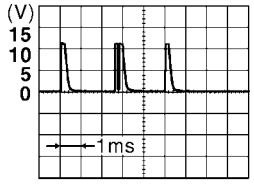
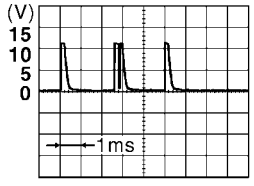
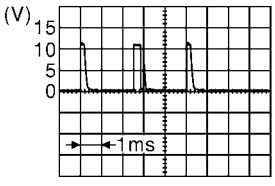
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIB0924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIB0924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIB0924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIB0924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

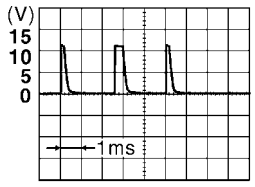
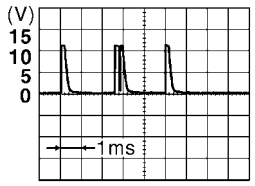
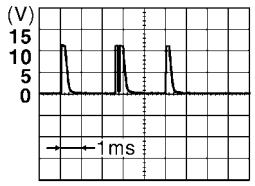
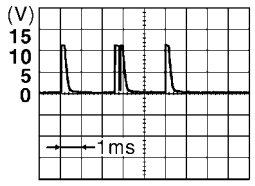
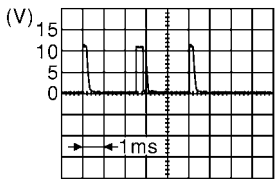
cardiagn.com

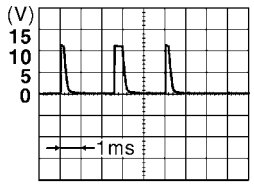
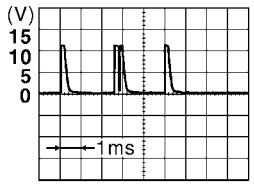
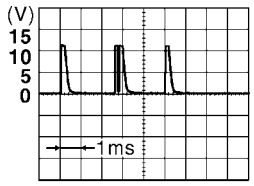
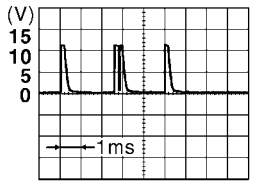
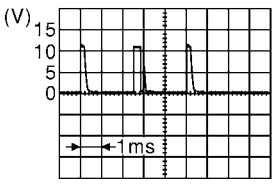
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

carsdiagn.com

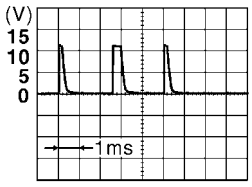
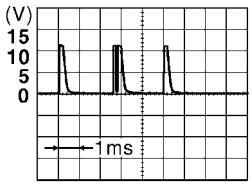
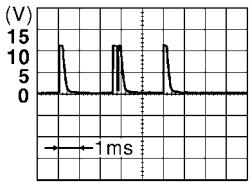
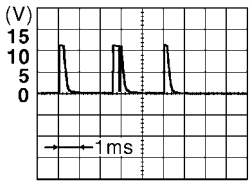
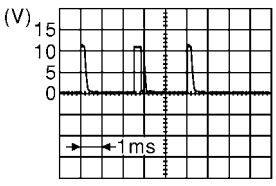
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

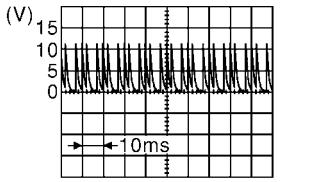
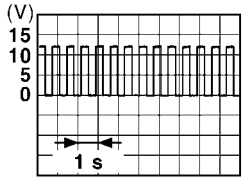
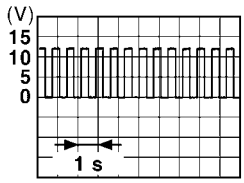
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

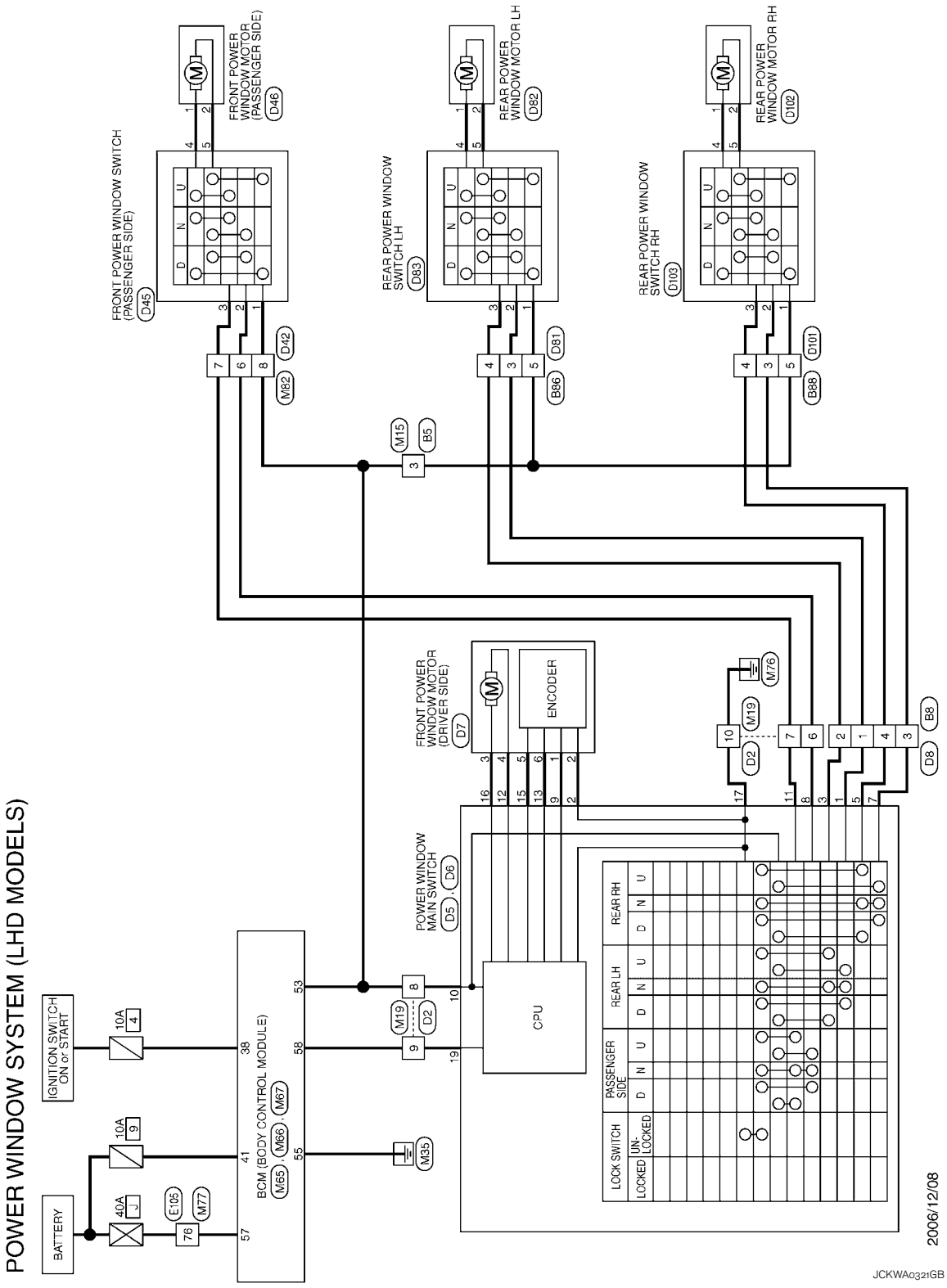
*1: With Intelligent Key system

*2: Without Intelligent Key system

Wiring Diagram - POWER WINDOW CONTROL SYSTEM (LHD MODELS) -

INFOID:0000000000990526

carsdiagn.com



cardiagn.com

POWER WINDOW SYSTEM (LHD MODELS)

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	L	–

Connector No.	B8
Connector Name	WIRE TO WIRE
Connector Type	NS04MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	Y	–
3	LG	–
4	Y	–

Connector No.	D2
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	–
7	SB	–
8	L	–
9	P	–
10	B	–

Connector No.	D5
Connector Name	POWER WINDOW MAIN SWITCH
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	R	–
3	O	–
5	Y	–
7	LG	–
8	W	–
9	O	–
10	L	–
11	SB	–
12	GR	–
13	LG	–

Connector No.	B86
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	–
4	Y	–
5	L	–

Connector No.	B88
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	–
4	Y	–
5	L	–

I5	Y	–
I6	BR	–

Connector No.	D6
Connector Name	POWER WINDOW MAIN SWITCH
Connector Type	NS03FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
17	B	–
19	P	–

JCKWA0322GB

carsdiagn.com

POWER WINDOW SYSTEM (LHD MODELS)

Connector No.	D7
Connector Name	FRONT POWER WINDOW MOTOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

1 2 3 4 5 6

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	R	–
3	BR	–
4	GR	–
5	Y	–
6	LG	–

Connector No.	D8
Connector Name	WIRE TO WIRE
Connector Type	NS04FW-CS

H.S.

4 3 2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	O	–
3	LG	–
4	Y	–

Connector No.	D42
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

5 4 3 2 1
12 11 10 9 8 7 6

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	–
7	SB	–
8	L	–

Connector No.	D45
Connector Name	FRONT POWER WINDOW SWITCH (PASSENGER SIDE)
Connector Type	NS08FW-CS

H.S.

2 3 4 5 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	W	–
3	SB	–
4	Y	–
5	R	–

Connector No.	D46
Connector Name	FRONT POWER WINDOW MOTOR (PASSENGER SIDE)
Connector Type	240PC023808

H.S.

2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	R	–

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3 2 1
8 7 6 5 4

Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	–
4	Y	–
5	L	–

Connector No.	D82
Connector Name	REAR POWER WINDOW MOTOR LH
Connector Type	240PC023S8006

H.S.

2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	R	–

Connector No.	D83
Connector Name	REAR POWER WINDOW SWITCH LH
Connector Type	NS08FW-CS

H.S.

2 3 4 5 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	LG	–
3	Y	–
4	G	–
5	R	–

JCKWA0323GB

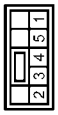
cardiagn.com

POWER WINDOW SYSTEM (LHD MODELS)

Connector No.	D102
Connector Name	REAR POWER WINDOW MOTOR RH
Connector Type	240PC023S8008

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	R	–

Connector No.	D103
Connector Name	REAR POWER WINDOW SWITCH RH
Connector Type	NS08FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	LG	–
3	Y	–
4	G	–
5	R	–

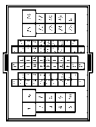
Connector No.	M19
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	–
7	SB	–
8	L	–
9	P	–
10	B	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

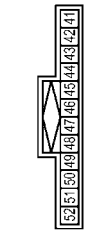
Terminal No.	Color of Wire	Signal Name [Specification]
38	W/L	IGN SW

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

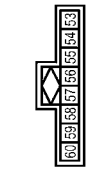


Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
3	L	–

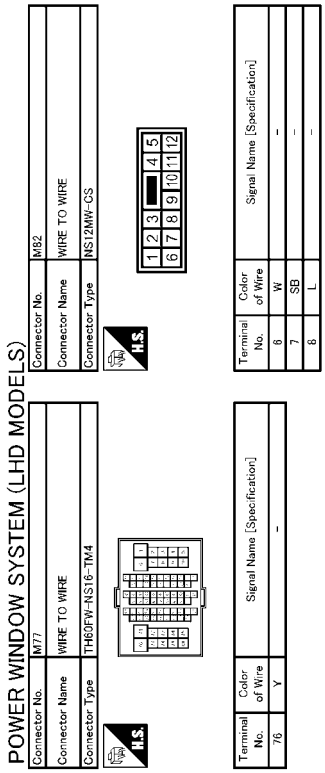
Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
53	L	POWER WDW PWR SUPPLY(LINKED TO IGN)
55	B	GND(POWER)
57	Y	BAT(F/L)
58	P	POWER WDW PWR SUPPLY(BAT)

JCKWA0324GB

carsdiagn.com

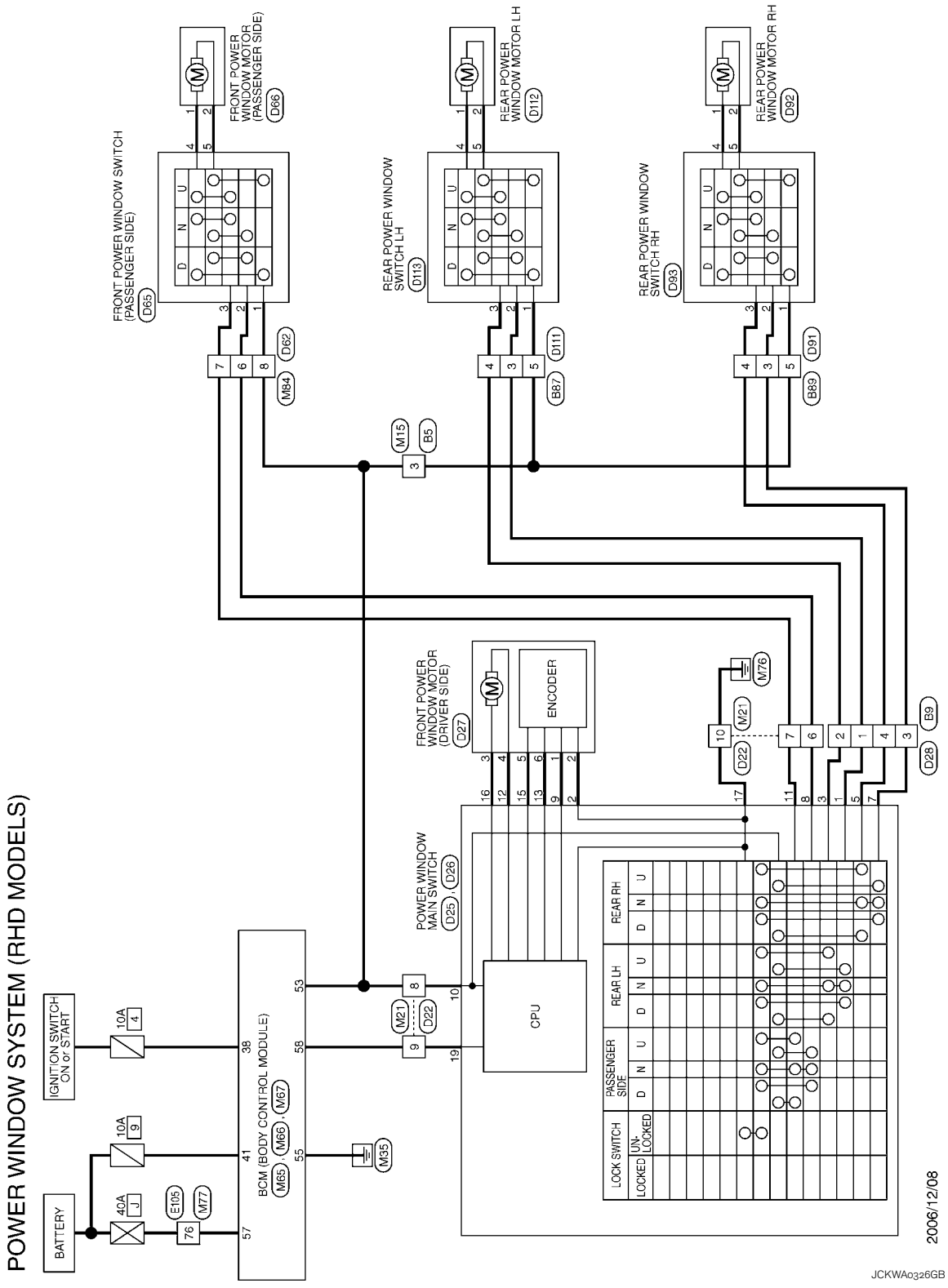


JCKWA0325GB

Wiring Diagram - POWER WINDOW CONTROL SYSTEM (RHD MODELS) -

INFOID:0000000000998708

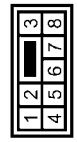
cardiagn.com


POWER WINDOW SYSTEM (RHD MODELS)
BATTERY
IGNITION SWITCH ON or START
10A 4
10A 9
40A J
E105
76
M77
BCM (BODY CONTROL MODULE)
M65 M66 M67
38
41
57
53
58
55
M35
M21
D22
8
9
10
19
POWER WINDOW MAIN SWITCH D25 D26
CPU
FRONT POWER WINDOW MOTOR (DRIVER SIDE) D27
ENCODER
M76
10
M21
D22
7
6
2
1
4
3
B9
D28
LOCK SWITCH
LOCKED
UN-LOCKED
PASSENGER SIDE
REAR LH
REAR RH
D N U
FRONT POWER WINDOW SWITCH (PASSENGER SIDE) D65
FRONT POWER WINDOW MOTOR (PASSENGER SIDE) D66
D62
M84
REAR POWER WINDOW SWITCH LH D113
REAR POWER WINDOW MOTOR LH D112
D111
B87
REAR POWER WINDOW SWITCH RH D93
REAR POWER WINDOW MOTOR RH D92
D91
B89
M15
B5
3
2006/12/08
JCKWA0326GB

POWER WINDOW SYSTEM (RHD MODELS)

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	L	-

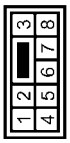
Connector No.	B9
Connector Name	WIRE TO WIRE
Connector Type	NS04MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-
3	LG	-
4	Y	-

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

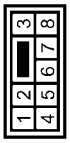
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	-
4	Y	-
5	L	-

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	-
4	Y	-
5	L	-

Connector No.	D22
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	-
7	SB	-
8	L	-
9	P	-
10	B	-

Connector No.	D25
Connector Name	POWER WINDOW MAIN SWITCH
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	R	-
3	O	-
5	Y	-
7	LG	-
8	W	-
9	O	-
10	L	-
11	SB	-
12	GR	-
13	LG	-

15	Y	-
16	BR	-

Connector No.	D26
Connector Name	POWER WINDOW MAIN SWITCH
Connector Type	NS03FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
17	B	-
19	P	-

JCKWA0327GB

cardiagn.com

POWER WINDOW SYSTEM (RHD MODELS)

Connector No.	D27
Connector Name	FRONT POWER WINDOW MOTOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

1 2 3 4 5 6

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	R	-
3	BR	-
4	GR	-
5	Y	-
6	LG	-

Connector No.	D28
Connector Name	WIRE TO WIRE
Connector Type	NS04FW-CS

H.S.

4 3 2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	O	-
3	LG	-
4	Y	-

Connector No.	D62
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

5 4 3 2 1
12 11 10 9 8 7 6

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	-
7	SB	-
8	L	-

Connector No.	D65
Connector Name	FRONT POWER WINDOW SWITCH (PASSENGER SIDE)
Connector Type	NS08FW-CS

H.S.

2 3 4 5 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	W	-
3	SB	-
4	Y	-
5	R	-

Connector No.	D66
Connector Name	FRONT POWER WINDOW MOTOR (PASSENGER SIDE)
Connector Type	240FCD23S8008

H.S.

2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	R	-

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3 2 1
8 7 6 5 4

Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	-
4	Y	-
5	L	-

Connector No.	D92
Connector Name	REAR POWER WINDOW MOTOR RH
Connector Type	240FCD23S8008

H.S.

2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	R	-

Connector No.	D93
Connector Name	REAR POWER WINDOW SWITCH RH
Connector Type	NS08FW-CS

H.S.

2 3 4 5 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	LG	-
3	Y	-
4	G	-
5	R	-

JCKWA0328GB

carsdiagn.com

POWER WINDOW SYSTEM (RHD MODELS)

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	-
4	Y	-
5	L	-

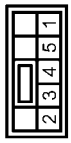
Connector No.	D112
Connector Name	REAR POWER WINDOW MOTOR LH
Connector Type	240PC023S8008

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	R	-

Connector No.	D113
Connector Name	REAR POWER WINDOW SWITCH LH
Connector Type	NS08FW-CS

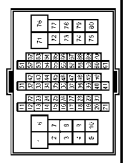
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	LG	-
3	Y	-
4	G	-
5	R	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	L	-

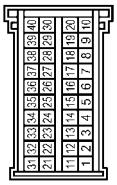
Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	-
7	SB	-
8	L	-
9	P	-
10	B	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

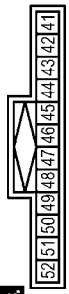
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

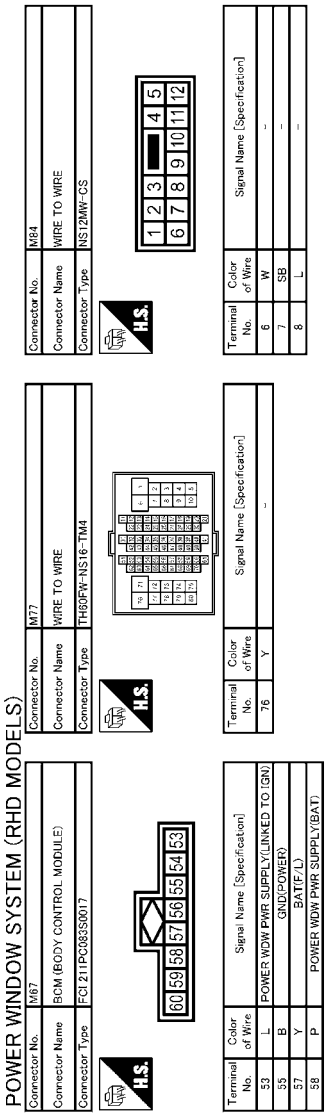


Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

JCKWA0329GB

cardiagn.com

POWER WINDOW SYSTEM (RHD MODELS)



JCKWA0330GB

Fail Safe

INFOID:0000000001116529

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001116530

cardiagn.com

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001116531

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

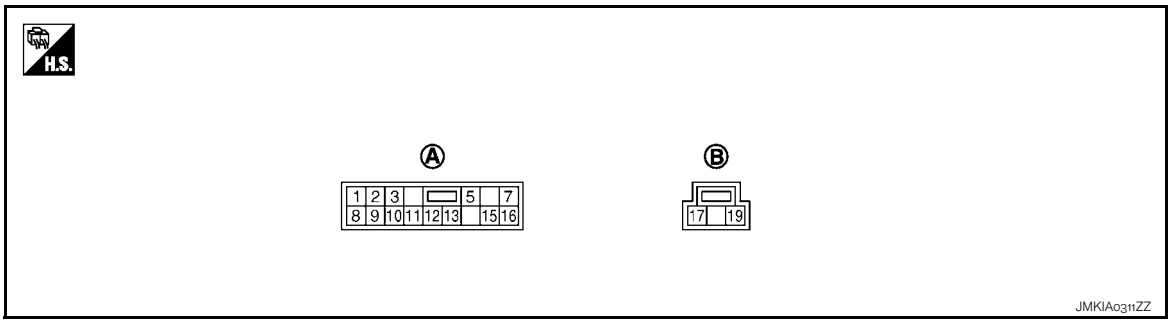
CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

POWER WINDOW MAIN SWITCH

Reference Value

INFOID:0000000000990530

TERMINAL LAYOUT

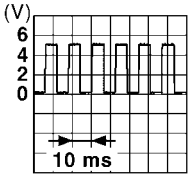


A. LHD:D5
RHD:D25

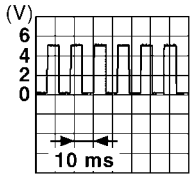
B. LHD:D6
RHD:D26

PHYSICAL VALUES

POWER WINDOW MAIN SWITCH

Terminal No.		Wire color	Description		Condition	Voltage [V] (Approx.)
+	-		Signal name	Input/ Output		
1	Ground	R	Rear power window motor LH UP signal	Output	When rear LH switch in power window main switch is UP at operated.	Battery voltage
2	Ground	R	Encoder ground	—	—	0
3	Ground	O	Rear power window motor LH DOWN signal	Output	When rear LH switch in power window main switch is DOWN at operated.	Battery voltage
5	Ground	Y	Rear power window motor RH DOWN signal	Output	When rear RH switch in power window main switch is DOWN at operated.	Battery voltage
7	Ground	LG	Rear power window motor RH UP signal	Output	When rear RH switch in power window main switch is UP at operated.	Battery voltage
8	Ground	W	Front power window motor (passenger side) UP signal	Output	When front RH switch in power window main switch is UP at operated.	Battery voltage
9	2	O	Encoder pulse signal 2	Input	When power window motor operates.	 JMKIA0070GB
10	Ground	L	IGN power supply	Input	IGN SW ON	Battery voltage
					Other than above	0
11	Ground	SB	Front power window motor (passenger side) DOWN signal	Output	When front RH switch in power window main switch is DOWN at operated.	Battery voltage

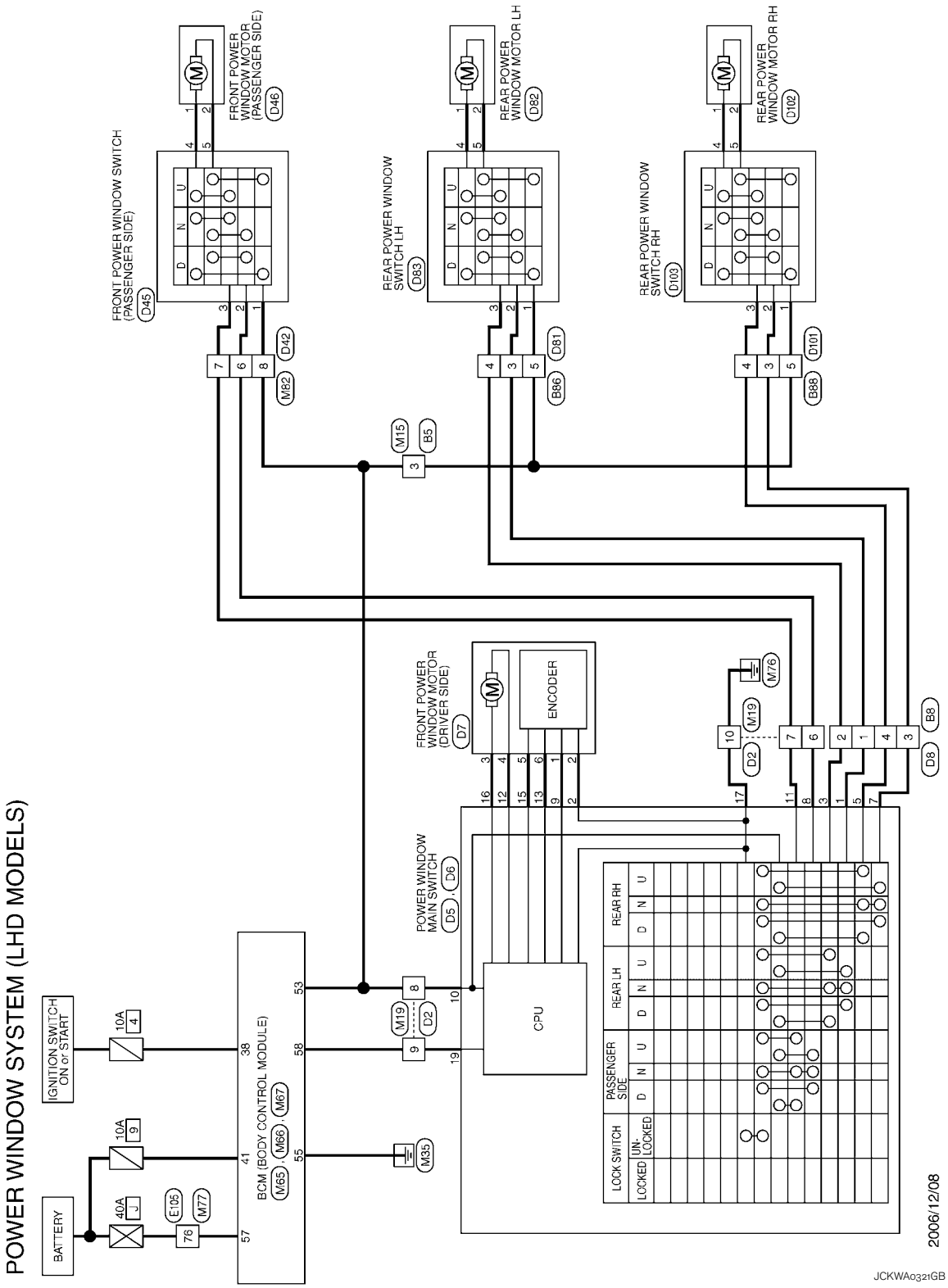
cardiagn.com

Terminal No.		Wire color	Description		Condition	Voltage [V] (Approx.)
+	-		Signal name	Input/ Output		
12	16	GR	Front power window motor (driver side) DOWN signal	Output	When front LH switch in power window main switch is DOWN at operated.	Battery voltage
13	2	LG	Encoder pulse signal 1	Input	When front power window motor (driver side) operates.	 JMKIA0070GB
15	Ground	Y	Encoder power supply	Output	When ignition switch ON.	10
16	12	BR	Front power window motor (driver side) UP signal	Output	When front LH switch in power window main switch is UP at operated.	Battery voltage
17	Ground	B	Ground	—	—	0
19	Ground	P	Battery power supply	Input	Ignition switch OFF	Battery voltage

Wiring Diagram - POWER WINDOW CONTROL SYSTEM (LHD MODELS) -

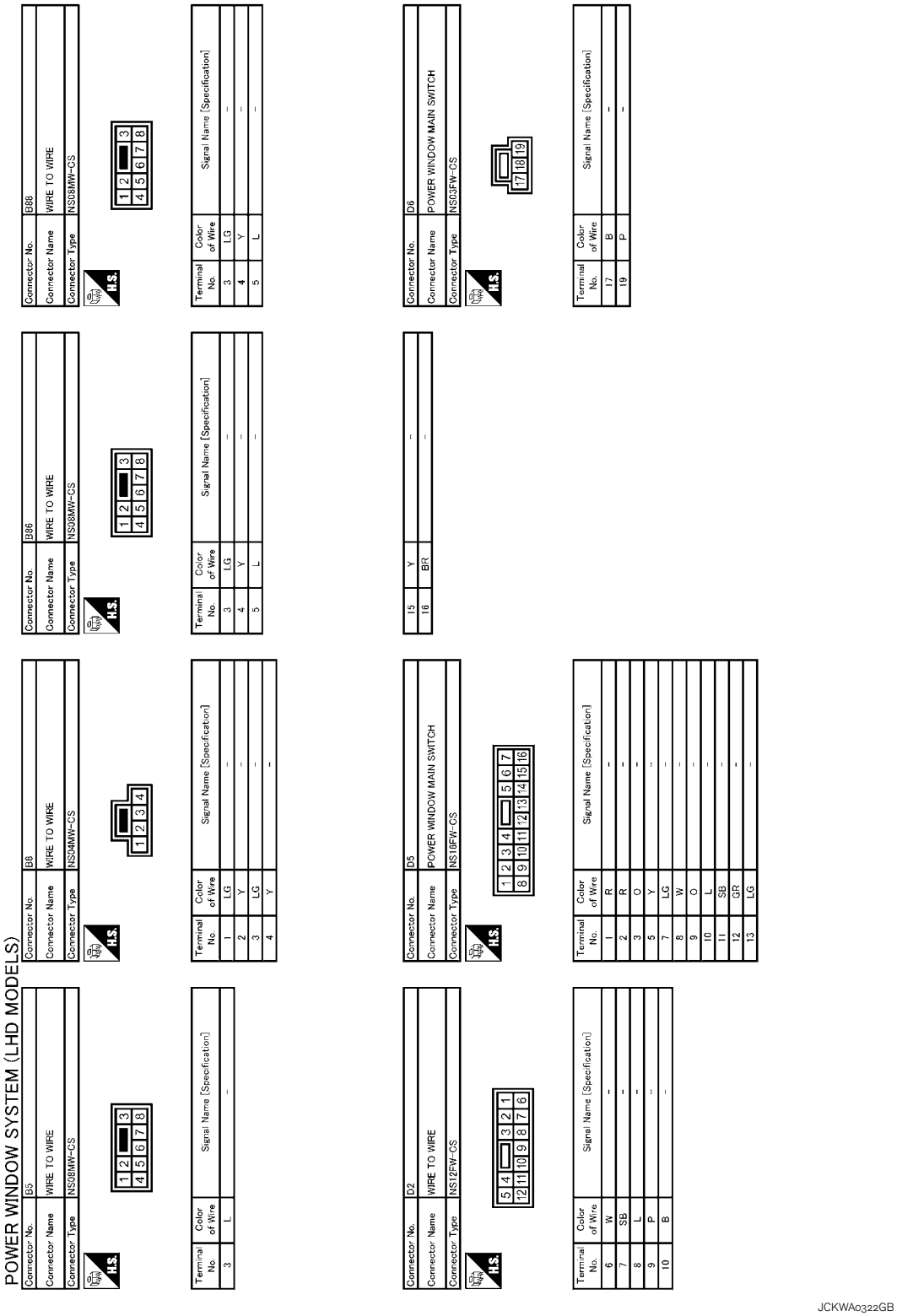
INFOID:0000000001125411

carsdiagn.com



cardiagn.com

POWER WINDOW SYSTEM (LHD MODELS)



JCKWA0322GB

carsdiagn.com

POWER WINDOW SYSTEM (LHD MODELS)

Connector No.	D7
Connector Name	FRONT POWER WINDOW MOTOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

1 2 3 4 5 6

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	R	–
3	BR	–
4	GR	–
5	Y	–
6	LG	–

Connector No.	D8
Connector Name	WIRE TO WIRE
Connector Type	NS04FW-CS

H.S.

4 3 2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	O	–
3	LG	–
4	Y	–

Connector No.	D42
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

5 4 3 2 1
12 11 10 9 8 7 6

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	–
7	SB	–
8	L	–

Connector No.	D45
Connector Name	FRONT POWER WINDOW SWITCH (PASSENGER SIDE)
Connector Type	NS08FW-CS

H.S.

2 3 4 5 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	W	–
3	SB	–
4	Y	–
5	R	–

Connector No.	D46
Connector Name	FRONT POWER WINDOW MOTOR (PASSENGER SIDE)
Connector Type	240PC023S8008

H.S.

2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	R	–

Connector No.	D81
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3 2 1
8 7 6 5 4

Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	–
4	Y	–
5	L	–

Connector No.	D82
Connector Name	REAR POWER WINDOW MOTOR LH
Connector Type	240PC023S8006

H.S.

2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	R	–

Connector No.	D83
Connector Name	REAR POWER WINDOW SWITCH LH
Connector Type	NS08FW-CS

H.S.

2 3 4 5 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	LG	–
3	Y	–
4	G	–
5	R	–

JCKWA0323GB

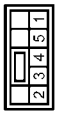
cardiagn.com

POWER WINDOW SYSTEM (LHD MODELS)

Connector No.	D102
Connector Name	REAR POWER WINDOW MOTOR RH
Connector Type	240PC023S8008

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	R	–

Connector No.	D103
Connector Name	REAR POWER WINDOW SWITCH RH
Connector Type	NS08FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	LG	–
3	Y	–
4	G	–
5	R	–

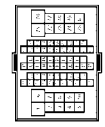
Connector No.	M19
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	–
7	SB	–
8	L	–
9	P	–
10	B	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
38	W/L	IGN SW

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

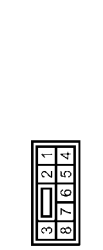


Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

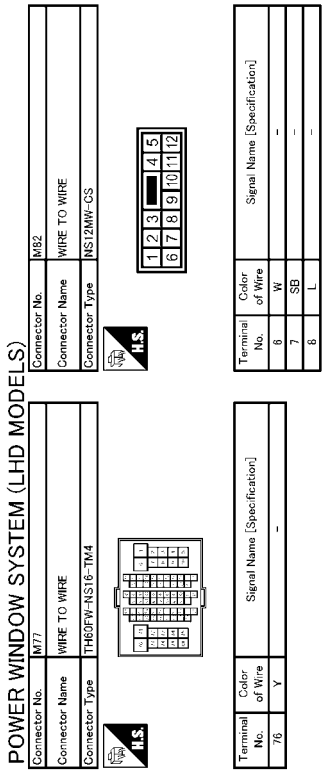


Terminal No.	Color of Wire	Signal Name [Specification]
3	L	–

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
33	L	POWER WDW PWR SUPPLY(LINKED TO IGN)
55	B	GND(POWER)
57	Y	BAT(F/L)
58	P	POWER WDW PWR SUPPLY(BAT)

JCKWA0324GB

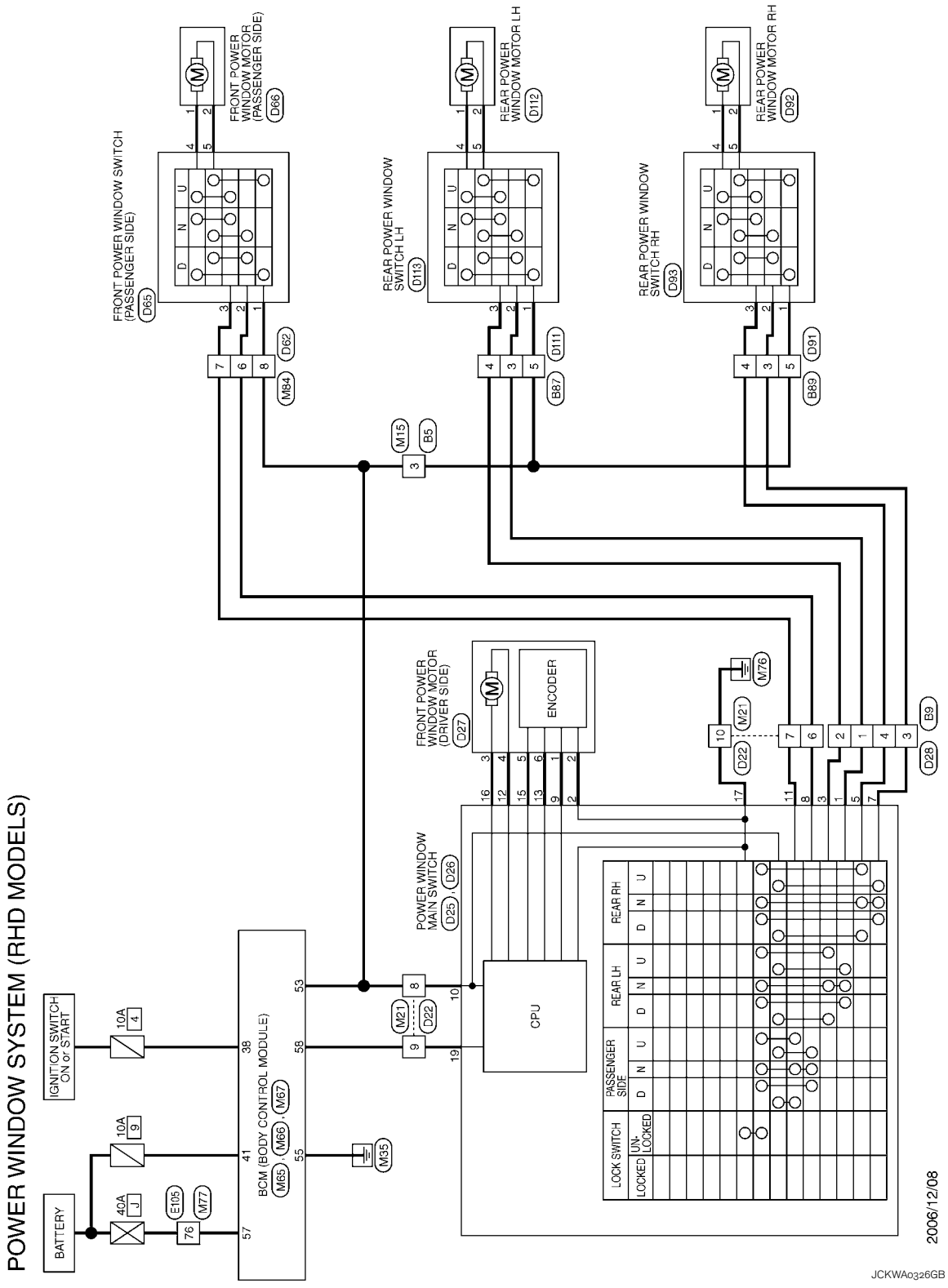


JCKWA0325GB

Wiring Diagram - POWER WINDOW CONTROL SYSTEM (RHD MODELS) -

INFOID:0000000001125413

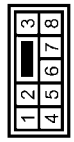
cardiagn.com


POWER WINDOW SYSTEM (RHD MODELS)
BATTERY
IGNITION SWITCH ON or START
40A J
10A 4
10A 9
E105
76
M77
BCM (BODY CONTROL MODULE)
M65
M66
M67
38
41
53
57
58
55
M35
FRONT POWER WINDOW SWITCH (PASSENGER SIDE) D65
FRONT POWER WINDOW MOTOR (PASSENGER SIDE) D66
REAR POWER WINDOW SWITCH LH D113
REAR POWER WINDOW MOTOR LH D112
REAR POWER WINDOW SWITCH RH D93
REAR POWER WINDOW MOTOR RH D92
D62
M84
D111
B87
D91
B89
M15
B5
FRONT POWER WINDOW MOTOR (DRIVER SIDE) D27
ENCODER
POWER WINDOW MAIN SWITCH D25, D26
CPU
M21
D22
M76
D28
B9
LOCK SWITCH
LOCKED
UN-LOCKED
PASSENGER SIDE
REAR LH
REAR RH
D
N
U
2006/12/08
JCKWA0326GB

POWER WINDOW SYSTEM (RHD MODELS)

Connector No.	B5
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	L	-

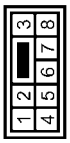
Connector No.	B9
Connector Name	WIRE TO WIRE
Connector Type	NS04MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-
3	LG	-
4	Y	-

Connector No.	B87
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.

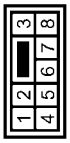


Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	-
4	Y	-
5	L	-

15	Y	-
16	BR	-

Connector No.	B89
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	-
4	Y	-
5	L	-

Connector No.	D22
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	-
7	SB	-
8	L	-
9	P	-
10	B	-

Connector No.	D25
Connector Name	POWER WINDOW MAIN SWITCH
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	R	-
3	O	-
5	Y	-
7	LG	-
8	W	-
9	O	-
10	L	-
11	SB	-
12	GR	-
13	LG	-

Connector No.	D26
Connector Name	POWER WINDOW MAIN SWITCH
Connector Type	NS03FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
17	B	-
19	P	-

JCKWA0327GB

cardiagn.com

POWER WINDOW SYSTEM (RHD MODELS)

Connector No.	D27
Connector Name	FRONT POWER WINDOW MOTOR (DRIVER SIDE)
Connector Type	FEA04FB-FHA2

H.S.

1 2 3 4 5 6

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	R	-
3	BR	-
4	GR	-
5	Y	-
6	LG	-

Connector No.	D28
Connector Name	WIRE TO WIRE
Connector Type	NS04FW-CS

H.S.

4 3 2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	O	-
3	LG	-
4	Y	-

Connector No.	D62
Connector Name	WIRE TO WIRE
Connector Type	NS12FW-CS

H.S.

5 4 3 2 1
12 11 10 9 8 7 6

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	-
7	SB	-
8	L	-

Connector No.	D65
Connector Name	FRONT POWER WINDOW SWITCH (PASSENGER SIDE)
Connector Type	NS08FW-CS

H.S.

2 3 4 5 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	W	-
3	SB	-
4	Y	-
5	R	-

Connector No.	D66
Connector Name	FRONT POWER WINDOW MOTOR (PASSENGER SIDE)
Connector Type	24DFCD23S8008

H.S.

2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	R	-

Connector No.	D91
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

3 2 1
8 7 6 5 4

Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	-
4	Y	-
5	L	-

Connector No.	D92
Connector Name	REAR POWER WINDOW MOTOR RH
Connector Type	24DFCD23S8008

H.S.

2 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	R	-

Connector No.	D93
Connector Name	REAR POWER WINDOW SWITCH RH
Connector Type	NS08FW-CS

H.S.

2 3 4 5 1

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	LG	-
3	Y	-
4	G	-
5	R	-

JCKWA0328GB

POWER WINDOW SYSTEM (RHD MODELS)

Connector No.	D111
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	-
4	Y	-
5	L	-

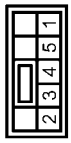
Connector No.	D112
Connector Name	REAR POWER WINDOW MOTOR LH
Connector Type	240PC023S8008

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	R	-

Connector No.	D113
Connector Name	REAR POWER WINDOW SWITCH LH
Connector Type	NS08FW-CS

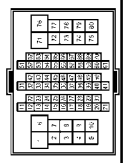
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	LG	-
3	Y	-
4	G	-
5	R	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M15
Connector Name	WIRE TO WIRE
Connector Type	NS08FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	L	-

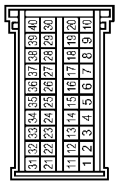
Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Type	NS12MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	W	-
7	SB	-
8	L	-
9	P	-
10	B	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

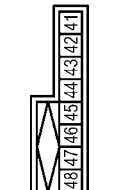
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

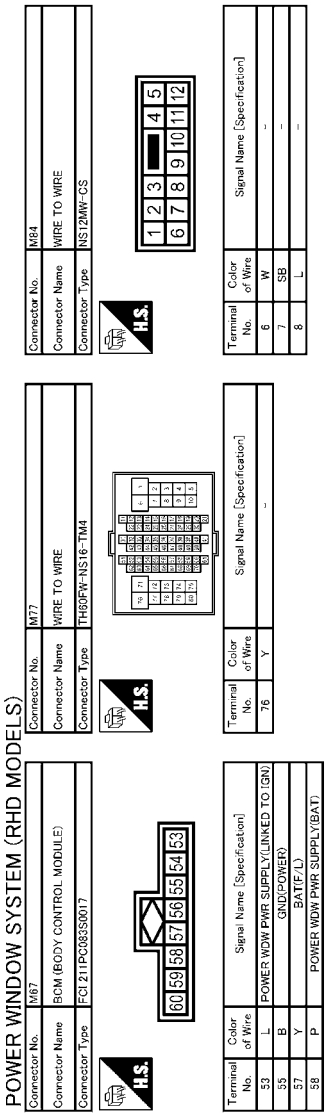


Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

JCKWA0329GB

cardiagn.com

POWER WINDOW SYSTEM (RHD MODELS)



JCKWA0330GB

Fail Safe

INFOID:0000000000990532

FAIL-SAFE CONTROL

Switches to fail-safe control when malfunction is detected in encoder signal that detects up/down speed and direction of door glass. Switches to fail-safe control when error beyond regulation value is detected between the fully closed position and the actual position of the glass.

Error	Error condition
Pulse sensor malfunction	When only one side of pulse signal is being detected for more than the specified value.
Both pulse sensors malfunction	When both pulse signals have not been detected for more than the specified value during glass open/close operation.
Pulse direction malfunction	When the pulse signal that is detected during glass open/close operation detects the opposite condition of power window motor operating direction.
Glass recognition position malfunction 1	When it detects the error between glass fully closed position in power window switch memory and actual fully closed position during glass open/close operation is more than the specified value.
Glass recognition position malfunction 2	When it detects pulse count more than the value of glass full stroke during glass open/close operation.
Malfunction of not yet updated closed position of glass	When glass open/close operation is continuously performed without fully closing more than the specified value (approximately 10 strokes).

It changes to condition before initialization and the following functions do not operate when switched to fail-safe control.
- Auto-up operation
- Anti-pinch function

Perform initial operation to recover when switched to fail-safe mode. However, it switches back to fail-safe control when malfunction is found in power window main switch or front power window motor (driver side).

cardiagn.com

SYMPTOM DIAGNOSIS

NONE OF THE POWER WINDOWS CAN BE OPERATED USING ANY SWITCH

Diagnosis Procedure

INFOID:0000000000990533

1. CHECK BCM POWER SUPPLY AND GROUND CIRCUIT

Check BCM power supply and ground circuit.
Refer to BCS-34, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2. CHECK POWER WINDOW MAIN SWITCH POWER SUPPLY AND GROUND CIRCUIT

Check power window switch main power supply and ground circuit.
Refer to PWC-10, "POWER WINDOW MAIN SWITCH : Component Function Check".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning parts.

3. CHECK POWER WINDOW MAIN SWITCH

Check power window main switch.
Refer to PWC-10, "POWER WINDOW MAIN SWITCH : Component Function Check".

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

carsdiagn.com

DRIVER SIDE POWER WINDOW ALONE DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000990534

1.CHECK FRONT POWER WINDOW MOTOR (DRIVER SIDE)

Check front power window motor.
Refer to PWC-21, "DRIVER SIDE : Component Function Check".

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

FRONT PASSENGER SIDE POWER WINDOW ALONE DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000990535

1. CHECK FRONT POWER WINDOW SWITCH (PASSENGER SIDE)

Check front power window switch (passenger side).
Refer to PWC-15, "FRONT POWER WINDOW SWITCH : Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2. CHECK FRONT POWER WINDOW MOTOR (PASSENGER SIDE)

Check front power window motor (passenger side).
Refer to PWC-22, "PASSENGER SIDE : Component Function Check".

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

carldiagn.com

REAR LH SIDE POWER WINDOW ALONE DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000990536

1.CHECK REAR POWER WINDOW SWITCH LH

Check rear power window switch LH.
Refer to PWC-17, "REAR POWER WINDOW SWITCH : Component Function Check".

Is th e inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK REAR POWER WINDOW MOTOR LH

Check rear power window motor LH.
Refer to PWC-24, "REAR LH : Component Function Check".

Is th e inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

REAR RH SIDE POWER WINDOW ALONE DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000990537

1.CHECK REAR POWER WINDOW SWITCH RH

Check rear power winodw switch RH.
Refer to PWC-17, "REAR POWER WINDOW SWITCH : Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK REAR POWER WINDOW MOTOR RH

Check rear power window motor RH.
Refer to PWC-26, "REAR RH : Component Function Check".

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

carsdiagn.com

ANTI-PINCH SYSTEM DOES NOT OPERATE NORMALLY (DRIVER SIDE)

Diagnosis Procedure

INFOID:0000000000990538

1.PERFORM INITIALIZATION PROCEDURE

Perform initialization procedure.
Refer to PWC-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK DOOR WINDOW SLIDING PART

Check door window sliding part.
- A foreign material adheres to window glass or glass run rubber.
- Glass run rubber wear or deformation.
- Sash is tilted too much or not enough.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning parts.

3.CHECK ENCODER CIRCUIT

Check encoder circuit.
Refer to PWC-28, "DRIVER SIDE : Component Function Check".

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

AUTO OPERATION DOES NOT OPERATE BUT MANUAL OPERATE NORMALLY (DRIVER SIDE)

Diagnosis Procedure

INFOID:0000000000990539

1.PERFORM INITIALIZATION PROCEDURE

Perform initialization procedure.
Refer to PWC-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

2.CHECK ENCODER

Check encoder.
Refer to PWC-28, "DRIVER SIDE : Component Function Check".

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

carldiagn.com

POWER WINDOW LOCK SWITCH DOES NOT FUNCTION

Diagnosis Procedure

INFOID:0000000000990540

1. REPLACE POWER WINDOW MAIN SWITCH

Replace power window main switch.
Refer to PWC-83, "Exploded View". After that, PWC-15, "POWER WINDOW MAIN SWITCH : Special Repair Requirement".

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000990541

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

carsdiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000000990542

BASIC INSPECTION

1.INSPECTION START

1. Check the service history.
2. Check the following parts.

- Fuse/circuit breaker blown.
- Poor connection, open or short circuit of harness connector.
- Battery voltage.

Is the inspection result normal?

YES >> Inspection end.
NO >> Repair or replace the malfunctioning parts.

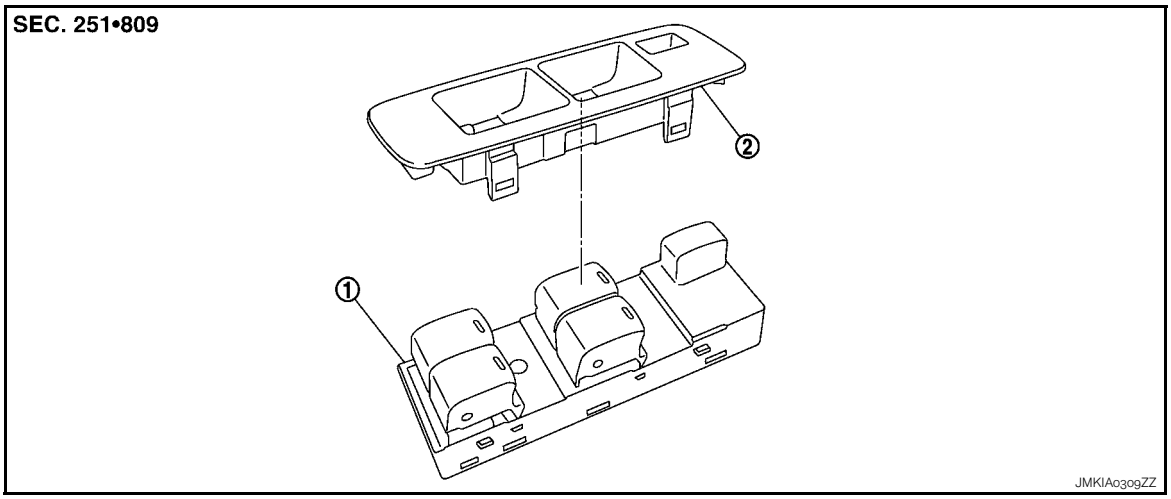
cardiagn.com

ON-VEHICLE REPAIR

POWER WINDOW MAIN SWITCH

Exploded View

INFOID:0000000000990543



1. Power window main switch
2. Power window main switch finisher

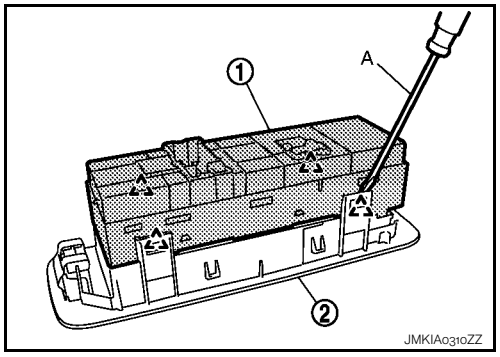
NOTE:
The same procedure is also performed for front power window switch (passenger side) and rear power switch (LH & RH).
Refer to removal and installation procedure. Refer to PWC-83, "Removal and Installation".

Removal and Installation

INFOID:0000000000990544

REMOVAL

1. Remove the power window main switch finisher (2).
   Refer to INT-10, "FRONT DOOR FINISHER : Exploded View" and INT-10, "FRONT DOOR FINISHER : Removal and Installation".
2. Power window main switch (1) is removed from power window main switch finisher (2) using flat-head screw driver (A) etc.



: Pawl

CAUTION:
Do not fold the pawl of power window main switch finisher.
NOTE:
The same procedure is also performed for front power window switch (passenger side) and rear power window switch (LH & RH).

INSTALLATION
Install in the reverse order of removal.

SECTION RAX
REAR AXLE

CONTENTS

2WD

SYMPTOM DIAGNOSIS 2

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 2
NVH Troubleshooting Chart 2

ON-VEHICLE MAINTENANCE 3

REAR WHEEL HUB AND HOUSING 3
Exploded View 3
Inspection 3

ON-VEHICLE REPAIR 4

REAR WHEEL HUB 4
Exploded View 4
Removal and Installation 4
Inspection 4

SERVICE DATA AND SPECIFICATIONS (SDS) 5

SERVICE DATA AND SPECIFICATIONS (SDS) 5
Wheel Bearing 5

4WD

SYMPTOM DIAGNOSIS 6

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 6
NVH Troubleshooting Chart 6

PRECAUTION 7

PRECAUTIONS 7
Precautions for Drive Shaft 7

PREPARATION 8

PREPARATION 8
Special Service Tool 8

ON-VEHICLE MAINTENANCE 9

REAR WHEEL HUB AND HOUSING 9
Exploded View 9
Inspection 9

REAR DRIVE SHAFT 10
Inspection 10

ON-VEHICLE REPAIR 11

REAR WHEEL HUB AND HOUSING 11
Exploded View 11
Removal and Installation 11
Inspection 12

REAR DRIVE SHAFT 13
Exploded View 13
Removal and Installation 13
Disassembly and Assembly 14
Inspection 18

SERVICE DATA AND SPECIFICATIONS (SDS) 20

SERVICE DATA AND SPECIFICATIONS (SDS) 20
Wheel Bearing 20
Drive Shaft 20

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000970492

Use chart below to find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			RAX-4	—	RAX-3	NVH in RAX and RSU sections	NVH in WT section	NVH in WT section	NVH in BR section
Possible cause and SUSPECTED PARTS			Improper installation, looseness	Parts interference	Wheel bearing damage	REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WHEELS	BRAKES
Symptom	RAER AXLE	Noise	×	×	×	×	×	×	×
		Shake	×	×	×	×	×	×	×
		Vibration	×	×	×	×	×		
		Shimmy	×	×		×	×	×	×
		Judder	×			×	×	×	×
		Poor quality ride or handling	×	×		×	×	×	

×: Applicable

cardiagn.com

ON-VEHICLE MAINTENANCE

REAR WHEEL HUB AND HOUSING

Exploded View

INFOID:0000000000970519

Refer to RAX-4, "Exploded View".

Inspection

INFOID:0000000000970520

MOUNTING INSPECTION

Make sure the mounting conditions (looseness, back lash) of each component and component conditions (wear, damage) are normal.

WHEEL BEARING INSPECTION

- Move wheel hub and bearing assembly in the axial direction by hand. Make sure there is no looseness of wheel bearing.

Standard

Axial end play : Refer to RAX-5, "Wheel Bearing".

- Rotate wheel hub, and make sure there is no unusual noise or other irregular conditions. If there is any of irregular conditions, replace wheel hub and bearing assembly.

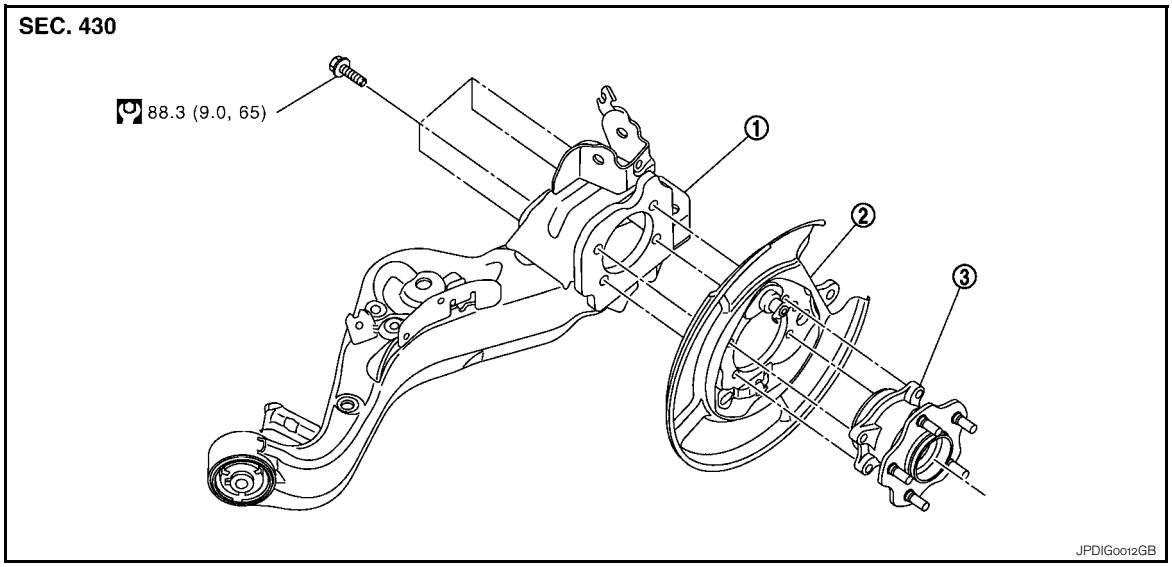
cardiagn.com

ON-VEHICLE REPAIR

REAR WHEEL HUB

Exploded View

INFOID:0000000000970516



1. Suspension arm
2. Back plate
3. Wheel hub and bearing assembly

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000970517

REMOVAL

Wheel Hub and Bearing Assembly

1. Remove tires from vehicle.
2. Remove torque member mounting bolts. Hang torque member not to interfere with work. Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-86, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depress brake pedal while brake caliper is removed.
3. Remove disc rotor. Refer to PB-7, "Removal and Installation".
4. Remove wheel hub and bearing assembly.

INSTALLTION

Install in the reverse order of removal.

Inspection

INFOID:0000000000970518

INSPECTION AFTER REMOVAL

Check wheel hub and bearing assembly for wear, cracks, and damage. Replace if there are.

INSPECTION AFTER INSTALLATION

Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Bearing

INFOID:0000000000970499

Axial end play	0.05 mm (0.002 in) or less

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000970500

Use chart below you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			—	RAX-18	—	RAX-13	—	NVH in DLN section	NVH in DLN section	NVH in RAX and RSU sections	Refer to REAR AXLE in this chart	NVH in WT section	NVH in WT section	Refer to DRIVE SHAFT in this chart	NVH in BR section
Possible cause and SUSPECTED PARTS			Excessive joint angle	Joint sliding resistance	Imbalance	Improper installation, looseness	Parts interference	PROPELLER SHAFT	DIFFERENTIAL	REAR AXLE AND REAR SUSPENSION	REAR AXLE	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES
Symptom	DRIVE SHAFT	Noise	×	×				×	×	×	×	×	×		×
		Shake	×		×			×		×	×	×	×		×
	REAR AXLE	Noise				×	×	×	×	×		×	×	×	×
		Shake				×	×	×		×		×	×	×	×
		Vibration				×	×	×		×		×		×	
		Shimmy				×	×			×		×	×		×
		Judder				×				×		×	×		×
		Poor quality ride or handling				×	×			×		×	×		

×: Applicable

cardiagn.com

PRECAUTION

PRECAUTIONS

Precautions for Drive Shaft

INFOID:0000000001117166

CAUTION:

Note the following precautions when disassembling and assembling drive shaft.

- **Joint sub-assembly does not disassemble because it is non-overhaul parts.**
- **Perform work in a dust-free location.**
- **Before disassembling and assembling, clean the parts.**
- **Prevent the entry of foreign objects during disassembly of the service location.**
- **Disassembled parts must be carefully reassembled in the correct order. If work is interrupted, a clean cover must be placed over parts.**
- **Paper shop cloths must be used. Fabric shop cloths must not be used because of the danger of lint adhering to parts.**
- **Disassembled parts (except for rubber parts) should be cleaned with kerosene which shall be removed by blowing with air or wiping with paper shop cloths.**

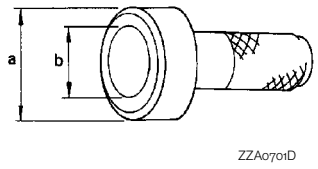
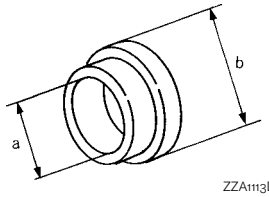
cardiagn.com

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000000970502

Tool number Tool name	Description
KV38100500 Drift a: 80 mm (3.15 in) dia. b: 60 mm (2.36 in) dia.  ZZA0701D	Installing sensor rotor
KV40101840 Color a: 67 mm (2.64 in) dia. b: 85 mm (3.35 in) dia.  ZZA1113D	Installing sensor rotor

cardiagn.com

ON-VEHICLE MAINTENANCE

REAR WHEEL HUB AND HOUSING

Exploded View

INFOID:0000000000970504

Refer to RAX-11, "Exploded View".

Inspection

INFOID:0000000000970505

MOUNTING INSPECTION

Make sure the mounting conditions (looseness, back lash) of each component and component conditions (wear, damage) are normal.

WHEEL BEARING INSPECTION

- Move wheel hub and bearing assembly in the axial direction by hand. Make sure there is no looseness of wheel bearing.

Standard

Axial end play : Refer to RAX-20, "Wheel Bearing".

- Rotate wheel hub, and make sure there is no unusual noise or other irregular conditions. If there is any of irregular conditions, replace wheel hub and bearing assembly.

cardiagn.com

REAR DRIVE SHAFT

Inspection

INFOID:0000000000970506

- Check drive shaft mounting point and joint for looseness and other damage.
- Check boot for cracks and other damage.

CAUTION:
Replace entire drive shaft assembly when noise or vibration occur from drive shaft.

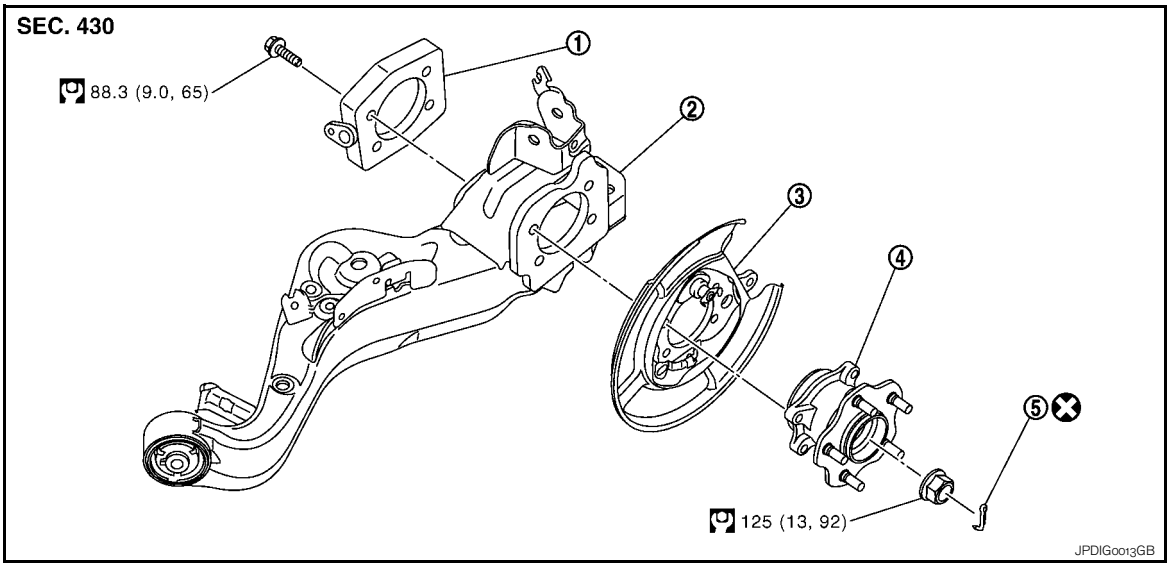
cardiagn.com

ON-VEHICLE REPAIR

REAR WHEEL HUB AND HOUSING

Exploded View

INFOID:0000000000970507



1. Axle housing
2. Suspension arm
3. Back plate
4. Wheel hub and bearing assembly
5. Cotter pin

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

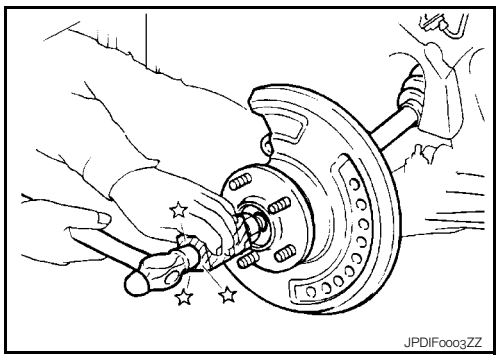
INFOID:0000000000970508

REMOVAL

Wheel Hub and Bearing Assembly

1. Remove tires from vehicle.
2. Remove torque member mounting bolts. Hang torque member not to interfere with work. Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-86, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depress brake pedal while brake caliper is removed.
3. Remove disc rotor. Refer to PB-7, "Removal and Installation".
4. Remove cotter pin, and then loosen hub lock nut.
5. Patch hub lock nut with a piece of wood. Hammer the wood to disengage wheel hub and bearing assembly from drive shaft. Remove the hub lock nut.
   CAUTION:
   - **Never place drive shaft joint at an extreme angle. Also be careful not to overextend slide joint.**
   - **Never droop drive shaft. Support drive shaft by housing, joint sub-assembly, shaft etc.**

   NOTE:
   Use suitable puller, if wheel hub and bearing assembly and drive shaft cannot be separated even after performing the above procedure.



6. Remove wheel hub and bearing assembly.

INSTALLTION

Install in the reverse order of removal.

cardiagn.com

Inspection

INFOID:0000000000970509

INSPECTION AFTER REMOVAL

Check wheel hub and bearing assembly for wear, cracks, and damage. Replace if there are.

INSPECTION AFTER INSTALLATION

Check wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection".

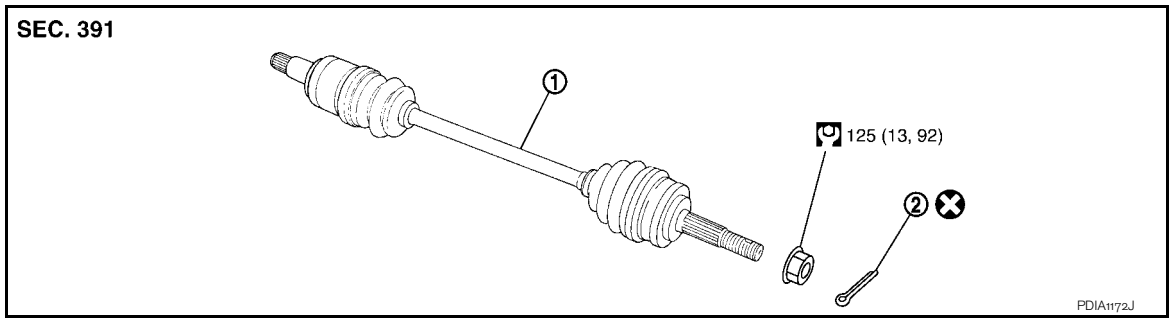
cardiagn.com

REAR DRIVE SHAFT

Exploded View

INFOID:0000000000970510

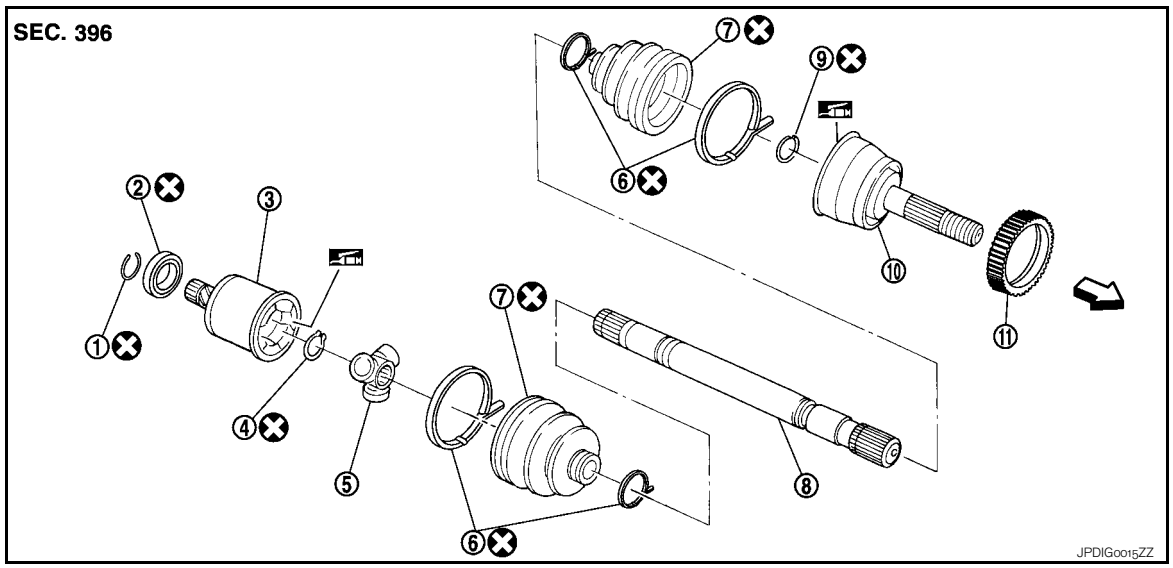
REMOVAL



1. Drive shaft
2. Cotter pin

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY



1. Circular clip
2. Dust shield
3. Housing
4. Snap ring
5. Spider assembly
6. Boot band
7. Boot
8. Shaft
9. Circular clip
10. Joint sub-assembly
11. Sensor rotor

⇦: Wheel side

: Fill NISSAN genuine grease or an equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

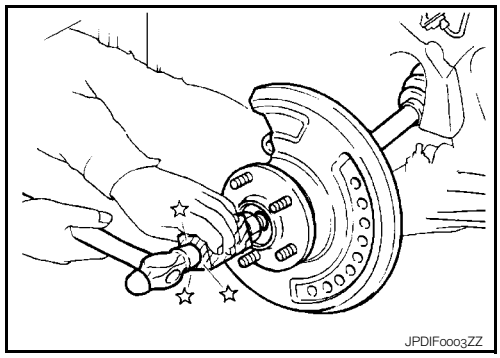
INFOID:0000000000970511

REMOVAL

1. Remove tires from vehicle.
2. Remove torque member mounting bolts. Hang torque member not to interfere with work. Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-86, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depress brake pedal while brake caliper is removed.

cardiagn.com

3. Remove disc rotor. Refer to PB-7, "Removal and Installation".
4. Remove cotter pin, then loosen hub lock nut.
5. Patch hub lock nut with a piece of wood. Hammer the wood to disengage wheel hub and bearing assembly from drive shaft. Remove the hub lock nut.



CAUTION:
- **Never place drive shaft joint at an extreme angle. Also be careful not to overextend slide joint.**
- **Never allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and the other parts.**

NOTE:
Using a suitable puller if the wheel hub and bearing assembly and drive shaft cannot be separated even after performing the above procedure.

6. Remove wheel sensor from axle housing. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "REAR WHEEL SENSOR : Exploded View" (with ESP).
7. Remove stabilizer link. Refer to RSU-12, "Exploded View".
8. Set suitable jack under suspension arm.
9. Remove shock absorber from suspension arm. Refer to RSU-8, "Exploded View".
10. Remove upper link from suspension arm. Refer to RSU-11, "Exploded View".
11. Remove lower link from suspension arm. Refer to RSU-11, "Exploded View".
12. Remove drive shaft from final drive assembly.

INSTALLATION

Note the following, and install in the reverse order of removal.
- Perform final tightening of bolts and nuts at suspension arm (rubber bushing), under unladen conditions with tires on level ground.

Disassembly and Assembly

INFOID:0000000001082911

DISASSEMBLY

Final Drive Side

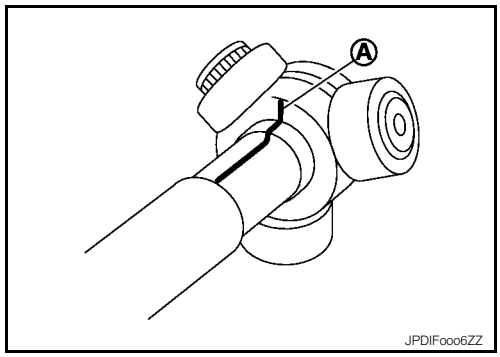
1. Fix shaft with a vise.

CAUTION:
Protect shaft using aluminum or copper plates when fixing with a vise.

2. Remove boot bands, and then remove boot from housing.
3. Put matching marks on housing and shaft.

CAUTION:
Use paint or an equivalent for matching marks. Never scratch the surface.

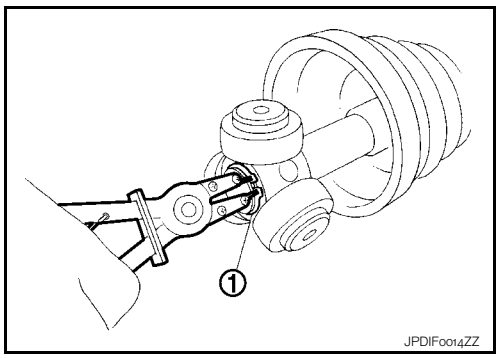
4. Put matching marks (A) on the spider assembly and shaft.



CAUTION:
Use paint or an equivalent for matching marks. Never scratch the surface.

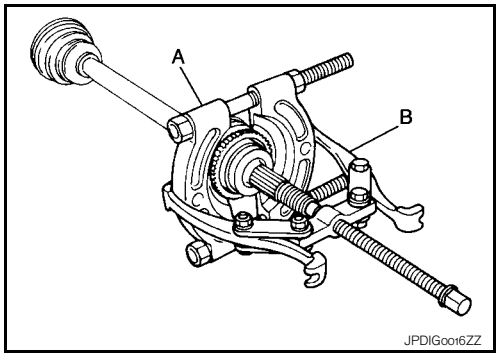
cardiagn.com

5. Remove snap ring (1), and then remove spider assembly from shaft.
6. Remove boot from shaft.
7. Remove circular clip housing.
8. Remove dust shield to housing.
9. Remove old grease on housing with paper towels.

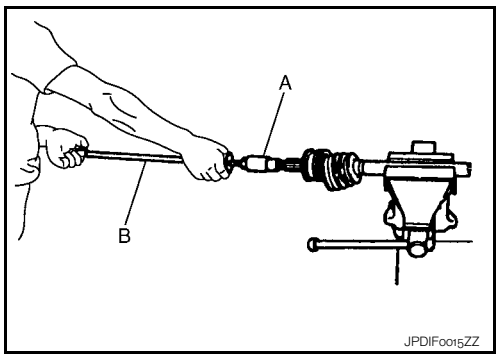


Wheel Side

1. If sensor rotor needs to be removed, use a bearing replacer (A) and puller (B). Refer to BRC-69, "REAR SENSOR ROTOR : Exploded View" (with ABS), BRC-174, "REAR SENSOR ROTOR : Exploded View" (with ESP).



2. Fix shaft with a vise.
   CAUTION:
   Protect shaft using aluminum or copper plates when fixing with a vise.
3. Remove boot bands. Then remove boot from joint sub-assembly.
4. Screw the drive shaft puller (A) 30 mm (1.18 in) or more into the thread of joint sub-assembly, and pull joint sub-assembly with a sliding hammer (B) from shaft.
   CAUTION:
   - **If joint sub-assembly cannot be removed after five or more unsuccessful attempts, replace shaft and joint sub assembly as a set.**
   - **Align sliding hammer and drive shaft and remove them by pulling directory.**
5. Remove boot from shaft.
6. Remove circular clip.
   CAUTION:
   Never reuse circular clip.

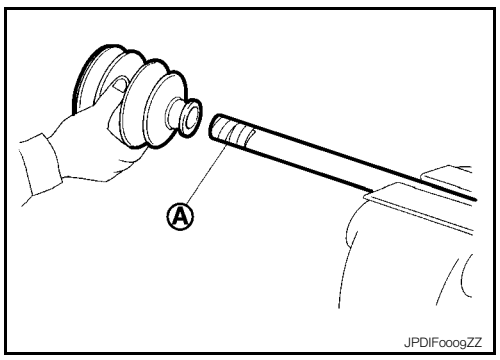


7. While rotating ball cage, clean old grease on joint sub-assembly with paper towels.

ASSEMBLY

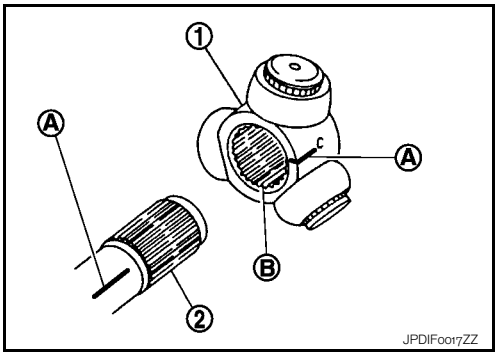
Final drive Side

1. Wrap serrated part of shaft with tape (A). Install boot band and boot to shaft. Be careful not to damage boot.
   CAUTION:
   Never reuse boot and boot band.
2. Remove the tape wrapped around the serrated on shaft.



cardiagn.com

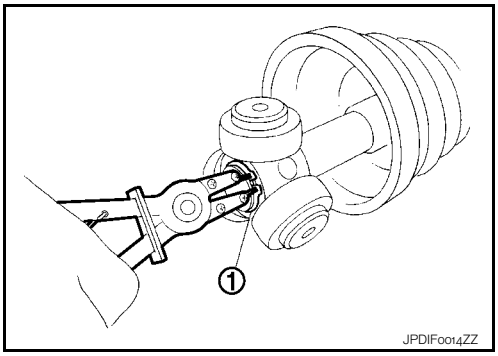
3. To install the spider assembly (1), align it with the matching marks (A) that were on the shaft (2) during the removal, and direct the serration mounting surface (B) to the shaft.



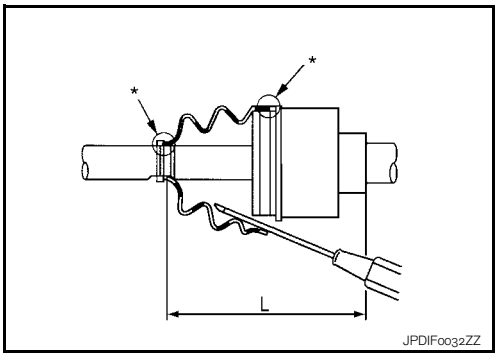
4. Secure spider assembly onto shaft with snap ring (1).
5. Apply the appropriate amount of grease onto housing and slid surface.
6. Assemble the housing onto spider assembly, and apply the balance of the specified amount grease.

Standard

Grease amount	**: Refer to RAX-20, "Drive Shaft".**



7. Align matching marks painted when housing were removed.
8. Install boot securely into grooves (indicated by "*" marks) shown in the figure.
   CAUTION:
   If there is grease on boot mounting surfaces (indicated by "*" marks) of shaft or housing, boot may be removed. Remove all grease from the surfaces.
9. To prevent from deformation of the boot, adjust the boot installation length to the value shown below (L) by inserting the suitable tool into the inside of boot from the large diameter side of boot and discharging inside air.

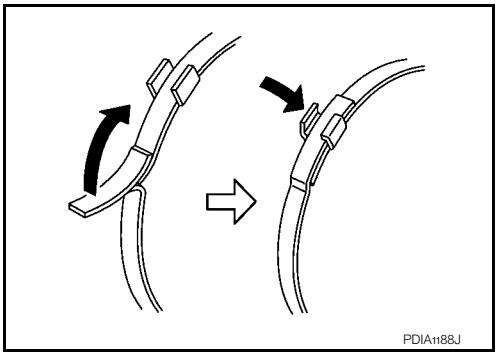


Standard

Boots installed length (L)	**: Refer to RAX-20, "Drive Shaft".**

CAUTION:
- **If the boot installation length exceeds the standard, it may cause breakage in boot.**
- **Be careful not to touch the inside of the boot with the tip of tool.**

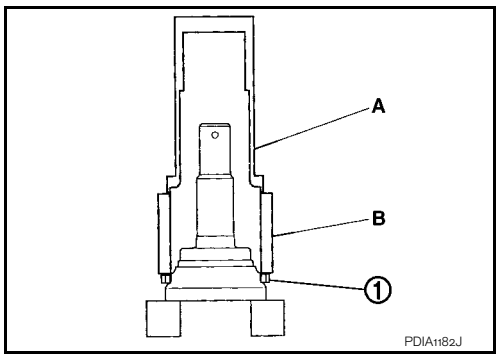
10. Secure large and small ends of boot with new boot bands as shown in the figure.
    CAUTION:
    Never reuse boot band.
11. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when the mounting positions become incorrect.
12. Install dust shield to housing.
    CAUTION:
    Never reuse dust shield.
13. Install circular clip to housing.
    CAUTION:
    Never reuse circular clip.



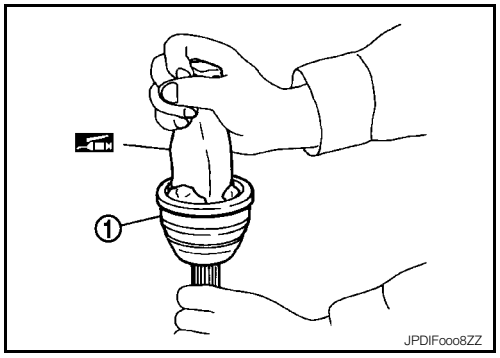
Wheel Side

cardiagn.com

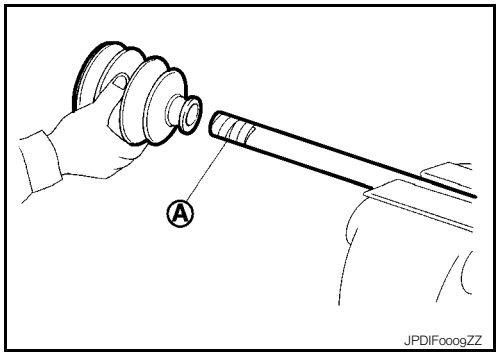
1. If sensor rotor (1) is removed, use a drift (A) (SST: KV38100500) and color (B) (SST: KV40101840) to press in a new one.



2. Fill serration slot joint sub-assembly (1) with NISSAN genuine grease or equivalent until the serration slot and ball groove become full to the brim.
CAUTION:
After applying grease, use a shop cloth to wipe off old grease that has oozed out.



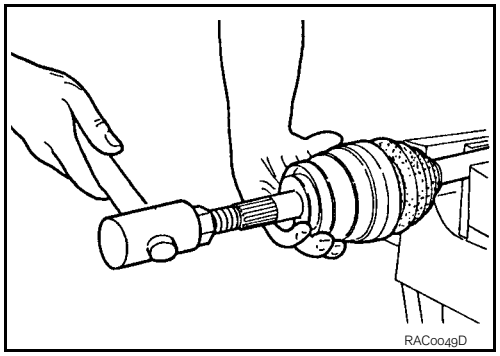
3. Wrap serrated part of shaft with tape (A). Install boot band and boot to shaft. Be careful not to damage boot.
CAUTION:
Never reuse boot and boot band.
4. Remove the tape wrapped around the serrated on shaft.
5. Position circular clip on groove at the shaft edge.
CAUTION:
Never reuse circular clip.
NOTE:
Drive joint inserter is recommended when installing circular clip.
6. Align both center axles of the shaft edge and joint sub-assembly. Then assemble shaft with circular clip joint sub-assembly.



7. Install joint sub-assembly to shaft using plastic hammer.
CAUTION:
Confirm that joint sub-assembly is correctly engaged while rotating drive shaft.
8. Apply the balance of the specified amount of grease into the boot inside from large diameter side of boot.

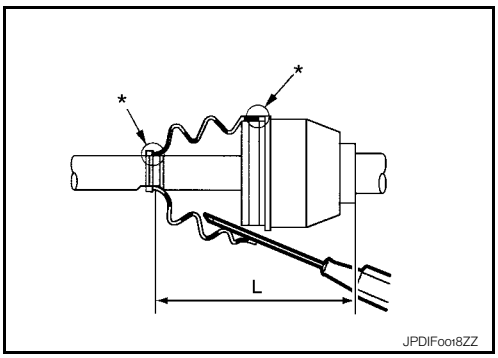
Standard

Grease amount **: Refer to RAX-20, "Drive Shaft".**



cardiagn.com

9. Install the boot securely into grooves (indicated by "*" marks) shown in the figure.
CAUTION:
If grease adheres to the boot mounting surface (with "*" mark) on the shaft or joint sub-assembly, boot may be removed. Remove all grease from the surfaces.



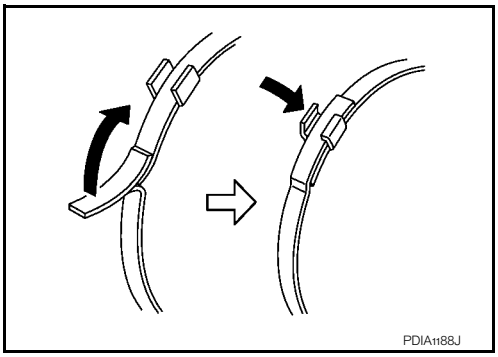
10. To prevent from deformation of the boot, adjust the boot installation length to the specified value shown below (L) by inserting the suitable tool into inside of the boot from the large diameter side of boot and discharging the inside air.

Standard

Boots installed length (L)	**: Refer to RAX-20, "Drive Shaft".**

CAUTION:
- **If the boot installation length exceeds the standard, it may cause breakage in boot.**
- **Be careful not to touch the inside of the boot with the tip of tool.**

11. Secure large and small ends of boot with new boot bands as shown in the figure.
CAUTION:
Never reuse boot band.



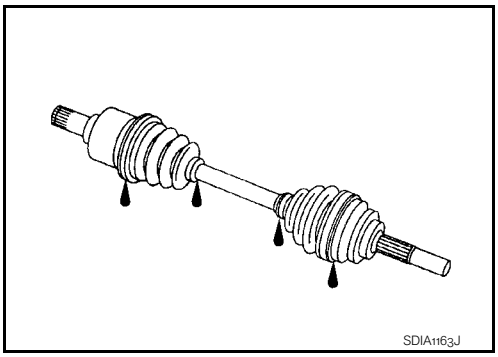
12. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when the mounting positions become incorrect.

Inspection

INFOID:0000000000970513

INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in the axial direction. Check for any rough movement or significant looseness.
- Check boot for cracks or other damage, and also for grease leakage.
- If a malfunction is found, disassemble drive shaft, and then replace with new one.



INSPECTION AFTER DISASSENBLY

Shaft
Check shaft for runout, cracks, or other damage. Replace if there are.

Joint Sub-Assembly (Wheel Side)
Check the following:
- Joint sub-assembly for rough rotation and excessive axial looseness.
- The inside of the joint sub-assembly for entry of foreign material.
- Joint sub-assembly for compression scars, cracks, and fractures inside of joint sub-assembly.

Replace joint sub-assembly if there are any non-standard conditions of components.

Housing and Spider assembly (Final Drive Side)

cardiagn.com

Replace housing and spider assembly if there is scratching or wear of housing roller contact surface or spider roller contact surface.

NOTE:

Housing and spider assembly are used in a set.

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Bearing

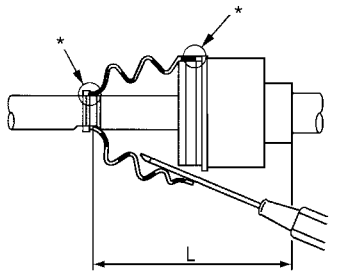
INFOID:0000000000970514

Axial end play	0.05 mm (0.002 in) or less

Drive Shaft

INFOID:0000000000970515

Joint	Wheel side	Final drive side
Grease quantity	35 – 45 g (1.23 – 1.59 oz)	40 – 50 g (1.41 – 1.76 oz)
Boots installed length (L)	66.7 – 68.7 mm (2.626 – 2.705 in)	78.6 – 80.6 mm (3.094 – 3.173 in)



JPDIF0032ZZ

cardiagn.com

SECTION RSU
REAR SUSPENSION

CONTENTS

SYMPTOM DIAGNOSIS 2

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 2
NVH Troubleshooting Chart 2

PRECAUTION 3

PRECAUTIONS 3
Precautions for Suspension 3

ON-VEHICLE MAINTENANCE 4

REAR SUSPENSION ASSEMBLY 4
Inspection and Adjustment 4

WHEEL ALIGNMENT 5
Wheel Alignment Inspection 5
Adjustment 6

ON-VEHICLE REPAIR 7

COIL SPRING 7
Exploded View 7
Removal and Installation 7
Inspection 7

REAR SHOCK ABSORBER 8
Exploded View 8
Removal and Installation 8
Inspection 8

SUSPENSION ARM 9
Exploded View 9
Removal and Installation 9
Inspection 9

LOWER LINK 10
Exploded View 10
Removal and Installation 10
Inspection 10

UPPER LINK 11
Exploded View 11
Removal and Installation 11
Inspection 11

REAR STABILIZER 12
Exploded View 12
Removal and Installation 12
Inspection 12

REAR SUSPENSION MEMBER 13
Exploded View 13
Removal and Installation 13
Inspection 13

REMOVAL AND INSTALLATION 14

REAR SUSPENSION ASSEMBLY 14
Exploded View 14
Removal and Installation 14
Inspection 15

SERVICE DATA AND SPECIFICATIONS (SDS) 16

SERVICE DATA AND SPECIFICATIONS (SDS) 16
Wheel Alignment 16
Wheel Height 16

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000935936

Use chart below to find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			RSU-14	RSU-8	—	—	—	RSU-14	RSU-5	RSU-12	NVH in DLN section	NVH in DLN section	NVH in RAX and RSU sections	NVH in WT section	NVH in WT section	NVH in RAX section	NVH in BR section
Possible cause and SUSPECTED PARTS			Improper installation, looseness	Shock absorber deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	PROPELLER SHAFT (4WD)	DIFFERENTIAL (4WD)	REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WHEELS	DRIVE SHAFT (4WD)	BRAKES
Symptom	REAR SUSPENSION	Noise	×	×	×	×	×	×			×	×	×	×	×	×	×
		Shake	×	×	×	×		×			×		×	×	×	×	×
		Vibration	×	×	×	×	×				×		×	×		×	
		Shimmy	×	×	×	×			×				×	×	×		×
		Judder	×	×	×								×	×	×		×
		Poor quality ride or handling	×	×	×	×	×		×	×			×	×	×		

×: Applicable

cardiagn.com

PRECAUTION

PRECAUTIONS

Precautions for Suspension

INFOID:0000000000935937

CAUTION:

- **When installing rubber bushings, the final tightening must be carried out under unladen conditions with tires on ground. Oil might shorten the life of rubber bushings. Be sure to wipe off any spilled oil.**
  - **Unladen conditions mean that fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.**
- **After servicing suspension parts, be sure to check wheel alignment.**
- **Self-lock nuts are not reusable. Always use new ones when installing. Since new self-lock nuts are pre-oiled, tighten as they are.**

cardiagn.com

ON-VEHICLE MAINTENANCE

REAR SUSPENSION ASSEMBLY

Inspection and Adjustment

INFOID:0000000000935940

MOUNTING INSPECTION

Make sure the mounting conditions (looseness, backlash) of each component and component conditions (wear, damage) are normal.

SHOCK ABSORBER

Check for oil leakage and damage, replace if malfunction is detected.

cardiagn.com

WHEEL ALIGNMENT

Wheel Alignment Inspection

INFOID:0000000000935941

INSPECTION

Description

Measure wheel alignment under unladen conditions.

NOTE:

“Unladen conditions” means that fuel, engine coolant, and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

Preliminary Check

Check the following:

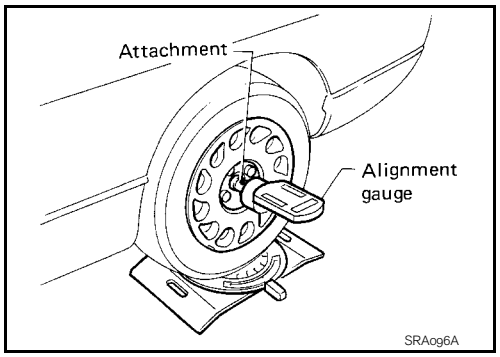
- Tires for improper air pressure and wear
- Road wheels for runout: Refer to WT-3, "Adjustment".
- Wheel bearing axial end play: Refer to RAX-3, "Inspection" (2WD), RAX-9, "Inspection" (4WD).
- Shock absorber operation
- Each mounting point of axle and suspension for looseness and deformation
- Each of lower link, upper link, rear suspension member, suspension arm and shock absorber for cracks, deformation, and other damage
- Vehicle height (posture)

Camber

- Measure camber of both right and left wheels with a suitable alignment gauge.
- If camber exceeds the standard value, adjust with adjusting bolt in lower. Refer to RSU-6, "Adjustment".

Standard

Camber: Refer to RSU-16, "Wheel Alignment".



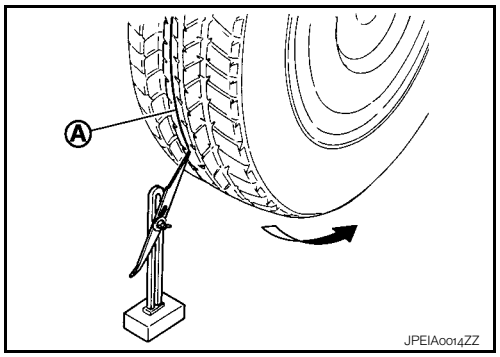
Toe-In

Measure toe-in buy the following procedure.

WARNING:

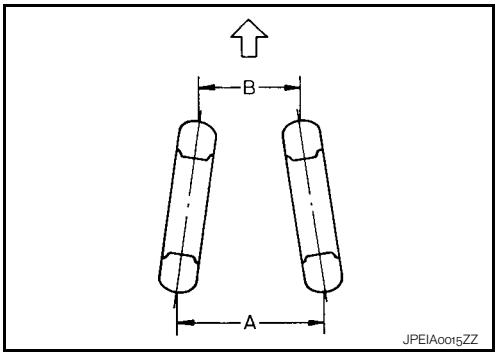
- **Always perform the following procedure on a flat surface.**
- **Make sure that no person is in front of vehicle before pushing it.**

1. Bounce the front of vehicle up and down to stabilize the vehicle height (posture).
2. Push vehicle straight ahead about 5 m (16 ft).
3. Put matching mark (A) on base line of the tread (rear side) of both tires at the same height of hub center. These are measuring points.



cardiagn.com

4. Measure distance (A) (rear side).
5. Push vehicle slowly ahead to rotate wheels 180 degrees (1/2 turn).
   NOTE:
   If the wheels rotates more than 180 degrees (1/2 turn), start this procedure again from the beginning. Do not push the vehicle backward.
6. Measure distance (B) (front side).



Standard

Total toe-in: Refer to RSU-16, "Wheel Alignment".

- If toe-in exceeds the standard value, adjust with adjusting bolt in suspension arm.

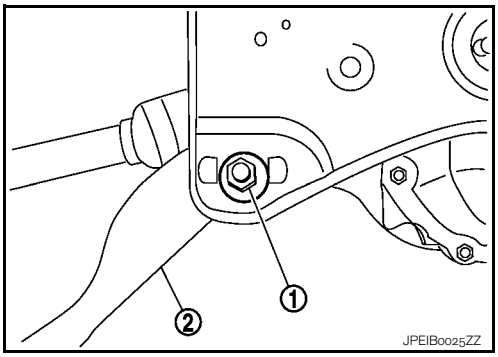
Adjustment

INFOID:0000000001102396

CAMBER

If camber exceeds the standard value, adjust with adjusting bolt (1) in lower link (2).

CAUTION:
After adjusting camber, be sure to check toe-in.



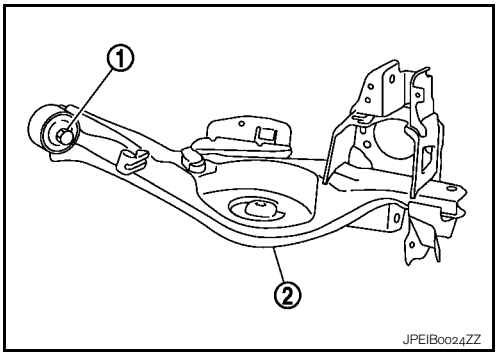
Standard

Camber: Refer to RSU-16, "Wheel Alignment".

- If camber exceeds the standard value, inspect and replace any damaged or worn suspension parts.

TOE-IN

If toe-in exceeds the standard value, adjust with adjusting bolt (1) in suspension arm (2).



Standard

Toe-In: Refer to RSU-16, "Wheel Alignment".

CAUTION:
Be sure to adjust equally on RH and LH side with adjusting bolt.

- If toe-in exceeds the standard value, inspect and replace any damaged or worn suspension parts.

cardiagn.com

ON-VEHICLE REPAIR

COIL SPRING

Exploded View

INFOID:0000000000935942

Refer to RSU-14, "Exploded View".

Removal and Installation

INFOID:0000000000935943

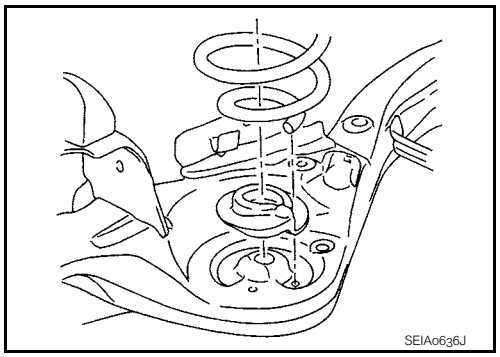
REMOVAL

1. Remove tires from vehicle.
2. Remove torque member mounting bolts. Hang torque member where it does not interfere with work. Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-86, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depress brake pedal while brake caliper is removed.
3. Remove wheel sensor from axle housing. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "REAR WHEEL SENSOR : Exploded View" (with ESP).
4. Set suitable jack under suspension arm.
5. Remove shock absorber from suspension arm. Refer to RSU-8, "Exploded View".
6. Remove lower link from suspension arm. Refer to RSU-10, "Exploded View".
7. Remove upper link from suspension arm. Refer to RSU-11, "Exploded View".
8. Remove drive shaft. Refer to RAX-13, "Exploded View".
9. Remove coil spring from vehicle.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Match up lower rubber seat indentions and suspension arm grooves and attach.
- Install coil spring by aligning lower end of the large diameter side to step between lower rubber seat and suspension arm.
- Perform the final tightening of rear suspension member and axle installation position (rubber bushing) under unladen condition with tires on level ground.



Inspection

INFOID:0000000000935944

INSPECTION AFTER REMOVAL

Check lower link, bushing and coil spring for deformation, crack, and damage. Replace it if necessary.

INSPECTION AFTER INSTALLATION

1. Adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection".

cardiagn.com

REAR SHOCK ABSORBER

Exploded View

INFOID:0000000000935945

Refer to RSU-14, "Exploded View".

Removal and Installation

INFOID:0000000000935946

REMOVAL

1. Remove tires from vehicle.
2. Set suitable jack under suspension arm to relieve the coil spring tension.
3. Remove shock absorber.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Perform final tightening of bolts and nuts at the shock absorber lower side (rubber bushing), under unladen conditions with tires on level ground.

Inspection

INFOID:0000000000935948

INSPECTION AFTER REMOVAL

- Check shock absorber for deformation, cracks, damage. Replace it if necessary.
- Check welded and sealed areas for oil leakage. Replace it if necessary.

INSPECTION AFTER INSTALLION

Check wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection".

cardiagn.com

SUSPENSION ARM

Exploded View

INFOID:0000000000935949

Refer to RSU-14, "Exploded View".

Removal and Installation

INFOID:0000000000935950

REMOVAL

1. Remove tires from vehicle.
2. Remove torque member mounting bolts. Hang torque member where it dose not interfere with work. Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-86, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depress brake pedal while brake caliper is removed.
3. Remove disc rotor. Refer to PB-7, "Removal and Installation".
4. Remove wheel sensor and sensor harness from axle housing and lower link. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "REAR WHEEL SENSOR : Exploded View" (with ESP).
5. Remove parking brake cable mounting bolt. Refer to PB-7, "Exploded View".
6. Remove stabilizer link. Refer to RSU-12, "Exploded View".
7. Remove height sensor (with xenon head lamp). Refer to EXL-180, "Exploded View".
8. Set suitable jack under suspension arm to relieve the coil spring tension.
9. Remove coil spring from suspension arm. Refer to FSU-9, "Removal and Installation".
10. Remove suspension arm from vehicle.

INSTALLATION

Note the following and, install in the reverse order of removal.

- Perform final tightening of rear suspension member installation position (rubber bussing), under unladen conditions with tires on level ground.

Inspection

INFOID:0000000000935951

INSPECTION AFTER REMOVAL

Visual Inspection

Check suspension arm and bushing for deformation, cracks or damage. Replace it if necessary.

INSPECTION AFTRE INSTALLATION

1. Adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection".
3. Adjust parking brake operation (stroke). Refer to PB-2, "Inspection and Adjustment".

cardiagn.com

LOWER LINK

Exploded View

INFOID:0000000001094001

Refer to RSU-14, "Exploded View".

Removal and Installation

INFOID:0000000001094002

REMOVAL

1. Remove tires from vehicle.
2. Set suitable jack under suspension arm to relieve the coil spring tension.
3. Remove height sensor (with xenon headlamp). Refer to EXL-180, "Exploded View".
4. Remove stabilizer link. Refer to RSU-12, "Exploded View".
5. Remove lower link from suspension arm.
6. Remove lower link from suspension member.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Perform final tightening of rear suspension member and axle installation position (rubber bushing), under unladen conditions with tires on level ground.

Inspection

INFOID:0000000001094003

INSPECTION AFTER REMOVAL

Check lower link and bushing for any deformation, cracks, or damage. Replace it if necessary.

INSPECTION AFTER INSTALLATION

1. Adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection".

cardiagn.com

UPPER LINK

Exploded View

INFOID:0000000000935955

Refer to RSU-14, "Exploded View".

Removal and Installation

INFOID:0000000000935956

REMOVAL

1. Remove tires from vehicle.
2. Set suitable jack under suspension arm to relieve the coil spring tension.
3. Remove wheel sensor harness from suspension arm.
4. Remove upper link from suspension arm.
5. Remove upper link from suspension member.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Perform final tightening of rear suspension member and axle installation position (rubber bushing), under unladen conditions with tires on level ground.

Inspection

INFOID:0000000000935957

INSPECTION AFTER REMOVAL

Check upper link and bushing for any deformation, cracks, or damage. Replace it if necessary.

INSPECTION AFTER INSTALLATION

1. Adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection".

cardiagn.com

REAR STABILIZER

Exploded View

INFOID:0000000000935958

Refer to RSU-14, "Exploded View".

Removal and Installation

INFOID:0000000000935959

REMOVAL

1. Remove stabilizer link. Refer to RSU-12, "Exploded View".
2. Remove main muffler. Refer to EX-5, "Exploded View" (HR16DE), EX-10, "Exploded View" (MR20DE), EX-15, "Exploded View" (K9K).
3. Remove mounting nuts on stabilizer clamp and stabilizer bar from suspension member.

INSTALLATION

Install in the reverse order of removal.

Inspection

INFOID:0000000000935960

INSPECTION AFTER REMOVAL

Check stabilizer bar, stabilizer link, stabilizer bushing and stabilizer clamp for deformation, cracks or damage. Replace it if necessary.

cardiagn.com

REAR SUSPENSION MEMBER

Exploded View

INFOID:0000000000935961

Refer to RSU-14, "Exploded View".

Removal and Installation

INFOID:0000000000935962

REMOVAL

1. Remove tires from vehicle.
2. Remove torque member mounting bolts. Hang torque member where it dose not interfere with work. Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View" (LHD), BR-86, "BRAKE CALIPER ASSEMBLY : Exploded View" (RHD).
   CAUTION:
   Never depressing brake pedal while brake caliper is removed.
3. Remove disc rotor. Refer to PB-7, "Removal and Installation".
4. Remove wheel sensor and sensor harness from axle housing and lower link. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "REAR WHEEL SENSOR : Exploded View" (with ESP).
5. Remove parking brake cable mounting bolts and separate parking brake cable from suspension arm. Refer to PB-7, "Exploded View".
6. Remove height sensor harness from lower link (with xenon head lamp). Refer to EXL-180, "Exploded View".
7. Remove main muffler. Refer to EX-5, "Exploded View" (HR16DE), EX-10, "Exploded View" (MR20DE), EX-15, "Exploded View" (K9K).
8. Remove stabilizer bar. Refer toRSU-12, "Exploded View".
9. Remove drive shaft. Refer to RAX-13, "Exploded View".
10. Remove propeller shaft (4WD). Refer to DLN-110, "Exploded View".
11. Remove rear final drive (4WD). Refer to DLN-128, "Exploded View".
12. Remove shock absorber. Refer to RSU-8, "Exploded View".
13. Remove coil spring. Refer to RSU-7, "Exploded View".
14. Set suitable jack under rear suspension member.
15. Remove mounting nuts and bolts rear suspension member.
16. Slowly lower jack, then remove rear suspension member, lower link and upper link from vehicle as a unit.
    CAUTION:
    Secure suspension assembly to a suitable jack while removing it.
17. Remove mounting bolts and nuts, then remove lower link, and upper link from rear suspension member.

INSTALLATION

Note the following, and install in the reverse order of the removal.

- Perform the final tightening of each parts removed when removing rear suspension assembly under unladen conditions.
- Check wheel sensor harness for proper connection. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "REAR WHEEL SENSOR : Exploded View" (with ESP).

Inspection

INFOID:0000000000935963

INSPECTION AFTER REMOVAL

Check rear suspension member for deformation, cracks, or any other damage. Replace it if necessary.

INSPECTION AFTER INSTALLATION

1. Adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection".
3. Adjust parking brake operation. Refer to PB-2, "Inspection and Adjustment".

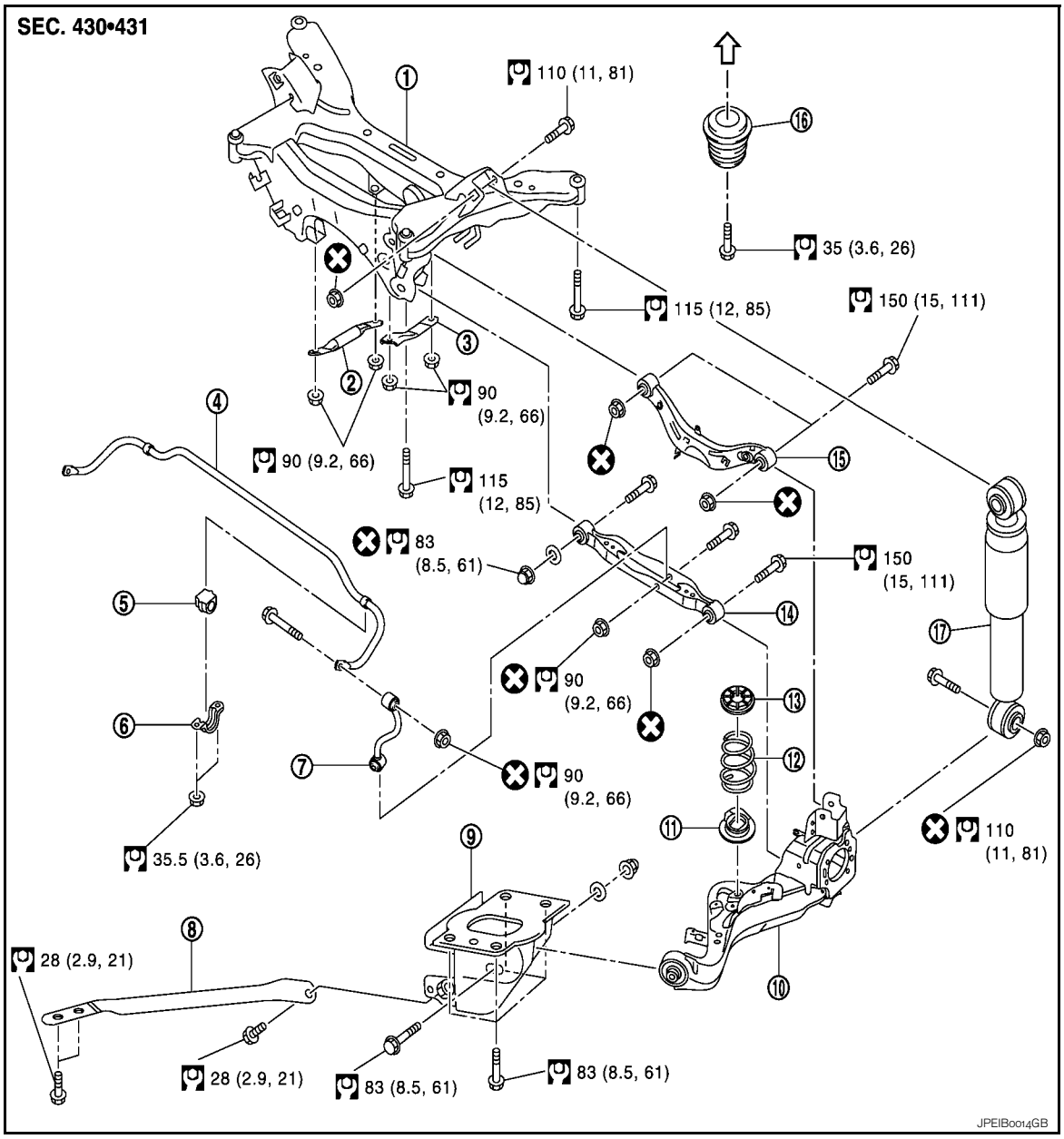
cardiagn.com

REMOVAL AND INSTALLATION

REAR SUSPENSION ASSEMBLY

Exploded View

INFOID:0000000000935964



1. Rear suspension member
2. Suspension member stay (right side)
3. Suspension member stay (left side)
4. Stabilizer bar
5. Stabilizer bushing
6. Stabilizer clamp
7. Stabilizer link
8. Suspension bar
9. Suspension arm bracket
10. Suspension arm
11. Low rubber seat
12. Coil spring
13. Upper rubber seat
14. lower link
15. Upper link
16. Bound bumper
17. Shock absorber

⇦ : Vehicle body

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001098343

cardiagn.com

REMOVAL

Refer to procedure from 1 to 17 in RSU-13, "Removal and Installation".

INSTALLATION

Note the following, and install in the reverse order of the removal.

- Perform the final tightening of each parts removed when removing rear suspension assembly under unladen conditions.
- Check wheel sensor harness for proper connection. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View" (with ABS), BRC-172, "REAR WHEEL SENSOR : Exploded View" (with ESP).

Inspection

INFOID:0000000001098344

INSPECTION AFTER REMOVAL

Check rear suspension member for deformation, cracks, or any other damage. Replace it if necessary.

INSPECTION AFTER INSTALLATION

1. Adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement" (with ESP).
2. Check wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection".
3. Adjust parking brake operation. Refer to PB-2, "Inspection and Adjustment".

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Alignment

INFOID:0000000000935967

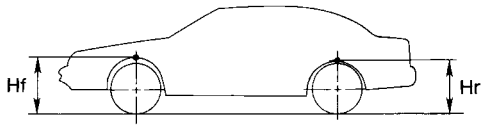
Camber Degree minute (Decimal degree)		Minimum	–1° 20′ (–1.33°)
		Nominal	–0° 50′ (–0.83°)
		Maximum	–0° 20′ (–0.33°)
Total toe-in	Distance	Minimum	0 mm (0 in)
		Nominal	2 mm (0.08 in)
		Maximum	4 mm (0.16 in)
	Angle (left wheel or right wheel) Degree minute (Decimal degree)	Minimum	0° 00′ (0.00°)
		Nominal	0° 05′ (0.08°)
		Maximum	0° 10′ (0.16°)

Measure value under unladen* conditions.

*: Fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

Wheel Height

INFOID:0000000000935969



SFA818A

Tire	215/65R16	215/60R17
Rear (Hr)	776 mm (30.55 in)	778 mm (30.63 in)

Measure value under unladen* conditions.

*: Fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

cardiagn.com

SECTION WT
ROAD WHEELS & TIRES

CONTENTS

PREPARATION 2

PREPARATION 2
Commercial Service Tools 2

ON-VEHICLE REPAIR 3

ROAD WHEEL TIRE ASSEMBLY 3
Adjustment 3

SERVICE DATA AND SPECIFICATIONS (SDS) 4

SERVICE DATA AND SPECIFICATIONS (SDS) 4
Road Wheel 4
Tire 4

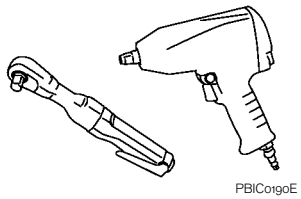
cardiagn.com

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000000935490

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts

cardiagn.com

ON-VEHICLE REPAIR

ROAD WHEEL TIRE ASSEMBLY

Adjustment

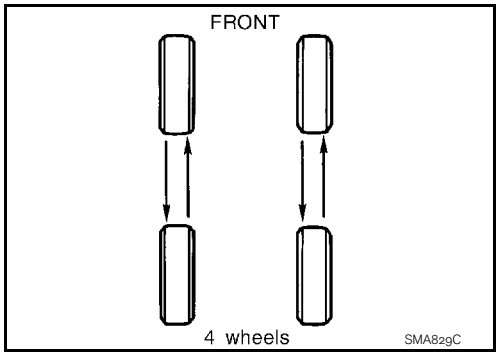
INFOID:0000000000935492

TIRE RORATION

1. Follow the maintenance schedule for tire rotation service intervals. Refer to MA-6, "General Maintenance".
2. Do not include the T-type spare tire when rotating the tires.
3. When installing the wheel, tighten wheel nuts to the specified torque.

CAUTION:

- **When installing wheels, tighten them diagonally by dividing the work two to three times in order to prevent the wheels from developing any distortion.**
- **Be careful not to tighten wheel nut at torque exceeding the criteria for preventing strain of disc rotor.**
- **Use NISSAN genuine wheel nuts for aluminum wheels.**



Wheel nuts tightening torque: **Refer to WT-4, "Road Wheel".**

cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Road Wheel

INFOID:0000000000935495

Kind of wheel		Aluminum	Steel	
			Conventional	For temporary use
Maximum radial runout limit	Lateral deflection	Less than 0.3 mm (0.012 in)	Less than 0.8 mm (0.031 in)	Less than 1.2 mm (0.047 in)
	Vertical deflection		Less than 0.7 mm (0.028 in)	Less than 1.3 mm (0.051 in)
Maximum allowable unbalance limit	Dynamic (At flange)	Less than 10 g (0.35 oz) (one side)		
	Static (At flange)	Less than 20 g (0.71 oz)		
Wheel nuts tightening torque		112.6 N·m (11 kg–m, 83 ft–lb)		

Tire

INFOID:0000000000935496

Unit: kPa (bar, kg/cm^2, psi)

Tire size	Air pressure		
	Front	Rear	
215/65R16 98H	230 (2.3, 2.3, 33)	210 (2.1, 2.1, 30)*1	265 (2.6, 2.7, 38)*2
215/60R17 96H	230 (2.3, 2.3, 33)	210 (2.1, 2.1, 30)*1	265 (2.6, 2.7, 38)*2
T145/90D16 106M	420 (4.2, 4.2, 60)	420 (4.2, 4.2, 60)	420 (4.2, 4.2, 60)

*1: The passenger are 3 or less.

*2: The passenger are 3 or more.

cardiagn.com

SECTION RF
ROOF

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
WorkFlow 3

INSPECTION AND ADJUSTMENT 4

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL 4
ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description 4
ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Special Repair Requirement 4

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 4
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 4
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement 4

FUNCTION DIAGNOSIS 5

SUNSHADE SYSTEM 5
System Diagram 5
System Description 5
Component Parts Location 5
Component Description 6

DIAGNOSIS SYSTEM (BCM) 7
Diagnosis Description 7

COMPONENT DIAGNOSIS 8

POWER SUPPLY AND GROUND CIRCUIT 8

SUNSHADE MOTOR ASSEMBLY 8
SUNSHADE MOTOR ASSEMBLY : Description 8
SUNSHADE MOTOR ASSEMBLY : Component Function Check 8
SUNSHADE MOTOR ASSEMBLY : Diagnosis Procedure 8
SUNSHADE MOTOR ASSEMBLY : Component Inspection 10
SUNSHADE MOTOR ASSEMBLY : Special Repair Requirement 10

ECU DIAGNOSIS 12

BCM (BODY CONTROL MODULE) 12
Reference Value 12
Wiring Diagram - SUNSHADE CONTROL SYSTEM - 27
Fail Safe 30
DTC Inspection Priority Chart 31
DTC Index 32

SUNSHADE SYSTEM 33

SUNSHADE MOTOR ASSEMBLY 33
SUNSHADE MOTOR ASSEMBLY : Reference Value 33
SUNSHADE MOTOR ASSEMBLY : Wiring Diagram - SUNSHADE CONTROL SYSTEM - 33

SYMPTOM DIAGNOSIS 37

SUNSHADE SYSTEM DOES NOT OPERATE PROPERLY 37
Diagnosis Procedure 37

AUTO OPERATION DOES NOT OPERATE 38
Diagnosis Procedure 38

DOES NOT STOP FULLY-OPEN OR FULLY-CLOSED POSITION 39
Diagnosis Procedure 39

SUNSHADE DOES NOT OPERATE ANTI-PINCH FUNCTION 40
Diagnosis Procedure 40

SQUEAK AND RATTLE TROUBLE DIAGNOSIS 41

Work Flow 41
Inspection Procedure 43
Diagnostic Worksheet 45

PRECAUTION 47

PRECAUTIONS 47
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 47
Service Notice 47
Precaution for Work 47

PREPARATION 48

PREPARATION 48
Commercial Service Tool 48

ON-VEHICLE MAINTENANCE 49

PRE-INSPECTION FOR DIAGNOSTIC 49
Basic Inspection 49

ON-VEHICLE REPAIR 50

SUNSHADE 50

SUNSHADE MOTOR ASSEMBLY 50
SUNSHADE MOTOR ASSEMBLY : Exploded View 50
SUNSHADE MOTOR ASSEMBLY : Removal and Installation 50

SUNSHADE UNIT ASSEMBLY 51
SUNSHADE UNIT ASSEMBLY : Exploded View ... 51
SUNSHADE UNIT ASSEMBLY : Removal and Installation 53
SUNSHADE UNIT ASSEMBLY : Disassembly and Assembly 54

SUNSHADE 55
SUNSHADE : Exploded View 55
SUNSHADE : Removal and Installation 55

SUNSHADE SWITCH 56
SUNSHADE SWITCH : Exploded View 56
SUNSHADE SWITCH : Removal and Installation... 56

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

WorkFlow

INFOID:0000000000978145

DETAILED FLOW

1.OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings the vehicles in.

>> GO TO 2.

2.REPRODUCE THE MALFUNCTION INFORMATION

Check the malfunction on the vehicle that the customer describes.
Inspect the relation of the symptoms and the condition when the symptoms occur.

>> GO TO 3.

3.PERFORM "BASIC INSPECTION"

Perform the basic inspection.
Refer to RF-49, "Basic Inspection".

>> GO TO 4.

4.IDENTIFY THE MALFUNCTIONING SYSTEM WITH “SYMPTOM DIAGNOSIS”

Use “Symptom diagnosis” from the symptom inspection result in step 2. Then identify where to start performing the diagnosis based on possible causes and symptom.

>> GO TO 5.

5.IDENTIFY MALFUNCTIONING PARTS WITH “COMPONENT DIAGNOSIS”

Perform the diagnosis with “Component diagnosis” of the applicable system.

>> GO TO 6.

6.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 7.

7.FINAL CHECK

Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 2.

Is the malfunction repaired or replaced?

YES >> Trouble diagnosis is completed.
NO >> GO TO 3.

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description

INFOID:0000000000984257

Initial setting is necessary when battery terminal is removed and replacing sunshade motor assembly.

NOTE:

The following specified operations are not performed under the non-initialized condition.

- Auto-slide operation
- Anti-pinch function

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Special Repair Requirement

INFOID:0000000000978378

INITIALIZATION PROCEDURE

If the sunshade does not close or open automatically, use the following procedure to return sunshade operation to normal.

1. Return sunshade to closed position.
2. Release the close switch once, press the close switch again, keep pushing the switch until shade is fully closed. (About 30 seconds)
3. Release the switch again, and push the close switch within the first 10 seconds. (keep pushing the switch)
4. After 3 or 4 seconds, the shade will be automatically operated in sequence of slide open and slide close. After the shade stops, release the switch 0.5 second later.
5. If sunshade switch operates normally, this initialization is done.

ANTI-PINCH FUNCTION

1. Full open the shade.
2. Place a piece of wood near fully closed position.
3. Close the shade completely with auto-slide close.

Check that shade opens fully and stops.

CAUTION:

- **Perform initialization procedure setting when auto-slide operation or anti-pinch function does not operate normally.**
- **Check that auto-slide operates before inspection when system initialization is performed.**
- **Do not check with hands and other part of body because they may be pinched. Do not get pinched.**
- **Depending on environment and driving conditions, if a similar impact or load is applied to the sunshade it may open.**
- **Thermal cut out may occur if open/close operation is performed continuously. In this situation allow system to cool before re-use.**

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000000984258

Refer to RF-4, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description".

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000000978147

Refer to RF-4, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Special Repair Requirement" for initialization procedure and check anti-pinch function.

cardiagn.com

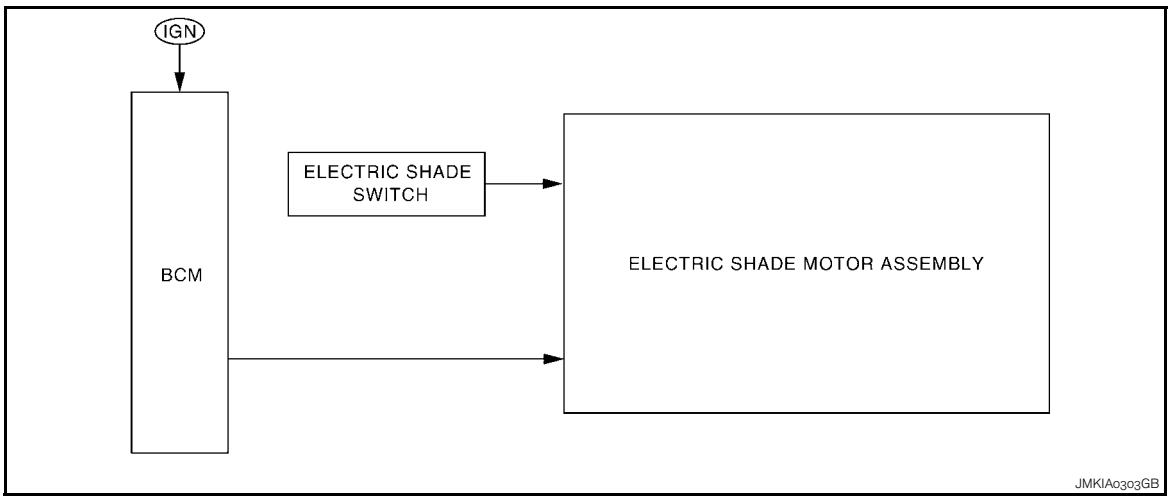
FUNCTION DIAGNOSIS

SUNSHADE SYSTEM

System Diagram

INFOID:0000000000978148

SUNSHADE SYSTEM



System Description

INFOID:0000000000978149

SUNSHADE SYSTEM
INPUT/OUTPUT SIGNAL CHART

Item	Input signal to sunshade motor assembly	Sunshade motor function	Actuator
Sunshade switch	Sunshade switch signal (slide open)	Sunshade control	Sunshade motor
	Sunshade switch signal (slide close)		

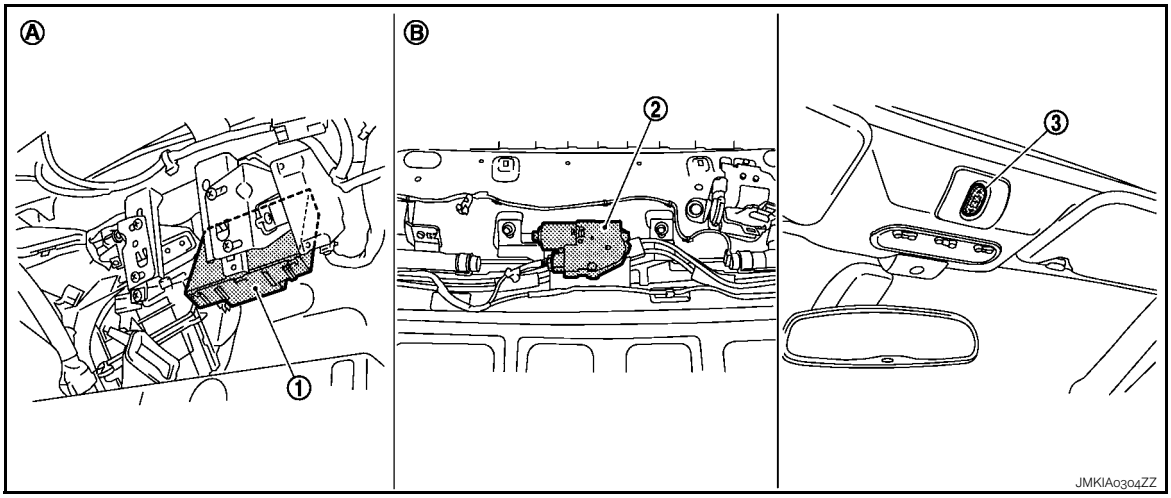
SUNSHADE OPERATION
- Sunshade motor assembly operates with the power supply from BCM while ignition switch is ON.
- Slide open and slide close signals from sunshade switch enables to operate sunshade motor.

AUTO OPERATION
Sunshade AUTO feature makes it possible to slide open and slide close the sunshade without holding the sunshade switch at the slide open or slide close position.
Auto operation is activated by a short press.(Less than 0.7 second)

ANTI-PINCH FUNCTION
The CPU of sunshade motor assembly monitors the sunshade motor operation and the shade position (fully-closed or other) by the signals from sunshade motor assembly.
When sunshade motor detects an interruption during the slide close operation, sunshade will auto open to the full-open position.
- Close operation when ignition switch is in the “ON” position

Component Parts Location

INFOID:0000000000978150



1. BCM M65, M66, M67
2. Sunshade motor assembly R5
3. Sunshade switch R2

A. View with dash side finisher RH removed
B. View with headlining removed

Component Description

INFOID:0000000000978151

Component	Function
BCM	Supplies the power to sunshade motor assembly.
Sunshade switch	Transmits slides open/close operation signal to sunshade motor assembly.
Sunshade motor assembly	It is sunshade motor and CPU integrated type that enables to slide open/close by sunshade switch operation

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

Diagnosis Description

INFOID:0000000000978152

BCM CONSULT-III FUNCTION

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.

c-diagn.com

COMPONENT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

SUNSHADE MOTOR ASSEMBLY

SUNSHADE MOTOR ASSEMBLY : Description

INFOID:0000000000978153

- BCM supplies power.
- It is sunshade motor and CPU integrated type.
- Slides open/close by sunshade switch operation.

SUNSHADE MOTOR ASSEMBLY : Component Function Check

INFOID:0000000000978154

1.CHECK SUNSHADE MOTOR FUNCTION

Do slide open/close operations operate normally with sunshade switch?

Is the inspection result normal?

YES >> Sunshade motor assembly is OK.
NO >> Refer to RF-8, "SUNSHADE MOTOR ASSEMBLY : Diagnosis Procedure".

SUNSHADE MOTOR ASSEMBLY : Diagnosis Procedure

INFOID:0000000000978155

SUNSHADE MOTOR ASSEMBLY

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sunshade motor assembly connector.
3. Turn ignition switch ON.
4. Check voltage between sunshade motor assembly connector and ground.

Terminal			Voltage (V) (Approx.)
(+)		(–)	
Sunshade motor assembly connector	Terminal		
R5	3	Ground	Battery voltage
	6		

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between sunshade motor assembly connector and ground.

Sunshade motor assembly connector	Terminal	Ground	Continuity
R5	1		Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

3.CHECK SUNSHADE MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector and sunshade motor assembly connector.

cardiagn.com

BCM connector	Terminal	Sunshade motor assembly connector	Terminal	Continuity
M67	53	R5	3	Existed
	58		6	

4. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M67	53		Not existed
	58		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Turn ignition switch ON.
3. Check voltage between BCM connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M67	53	Ground	Battery voltage
	58		

Is the inspection result normal?

YES >> Check condition of harness and connector.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

5.CHECK SUNROOF SWITCH INPUT SIGNAL

1. Connect sunshade motor assembly connector.
2. Turn ignition switch ON.
3. Check voltage between sunshade motor assembly connector and ground.

Sunshade motor assembly connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(–)		
R5	5	Ground	Sunroof switch is operated SLIDE OPEN	0
			Other than above	Battery voltage
	10		Sunroof switch is operated SLIDE CLOSE	0
			Other than above	Battery voltage

Is the inspection result normal?

YES >> Replace sunshade motor assembly. Refer to RF-50, "SUNSHADE MOTOR ASSEMBLY : Exploded View" and RF-50, "SUNSHADE MOTOR ASSEMBLY : Removal and Installation". After that, Refer to RF-10, "SUNSHADE MOTOR ASSEMBLY : Special Repair Requirement"
NO >> GO TO 6.

6.CHECK SUNROOF SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sunshade motor assembly connector and sunshade switch connector.
3. Check continuity between sunshade motor assembly connector and sunshade switch connector.

Sunshade motor assembly connector	Terminal	Sunshade switch connector	Terminal	Continuity
R5	5	R2	1	Existed
	10		3	

4. Check continuity between sunshade motor assembly connector and ground.

Sunshade motor assembly connector	Terminal	Ground	Continuity
R5	5		Not existed
	10		

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace harness.

7.CHECK SUNSHADE SWITCH GROUND CIRCUIT

Check continuity between sunshade switch connector and sunshade motor assembly connector.

Sunshade switch connector	Terminal	Sunshade motor assembly connector	Terminal	Continuity
R2	2	R5	2	Existed

Is the inspection result normal?

YES >> Refer to RF-10, "SUNSHADE MOTOR ASSEMBLY : Component Inspection".
NO >> Repair or replace harness.

SUNSHADE MOTOR ASSEMBLY : Component Inspection

INFOID:0000000000978156

SUNSHADE SWITCH

1.CHECK SUNSHADE SWITCH

1. Turn ignition switch OFF.
2. Disconnect sunshade switch connector.
3. Check continuity between sunshade switch terminals.

Terminals		Condition	Continuity
1	2	Sunshade switch is operated SLIDE OPEN	Existed
		Other than above	Not existed
3		Sunshade switch is operated SLIDE CLOSE	Existed
		Other than above	Not existed

Is the inspection result normal?

YES >> Sunshade switch is OK.
NO >> Replace sunshade switch. Refer to RF-56, "SUNSHADE SWITCH : Exploded View".

SUNSHADE MOTOR ASSEMBLY : Special Repair Requirement

INFOID:0000000000978157

1.PERFORM INITIALIZATION PROCEDURE

Perform initialization procedure.
Refer to RF-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

2.CHECK ANTI-PINCH OPERATION

Check anti-pinch operation.
Refer to RF-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

cardiagn.com

Is the inspection result normal?

YES >> Inspection end.

NO >> Replace sunshade motor assembly. Refer to RF-50, "SUNSHADE MOTOR ASSEMBLY : Exploded View" and RF-50, "SUNSHADE MOTOR ASSEMBLY : Removal and Installation".

carsdiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001116532

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

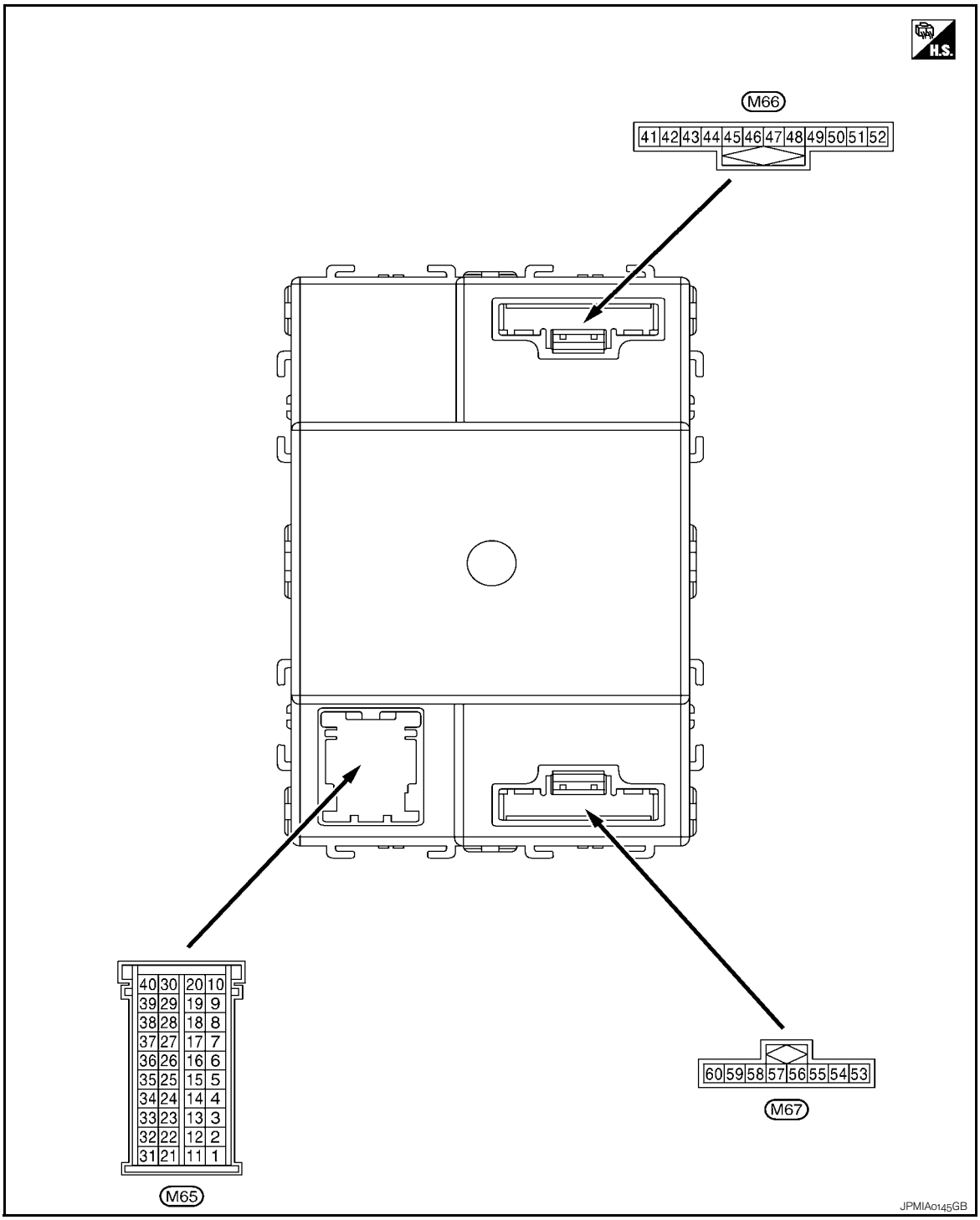
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

carsdiagn.com

TERMINAL LAYOUT

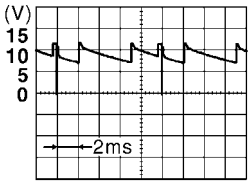
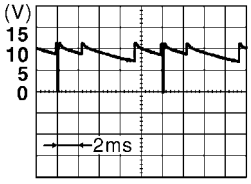
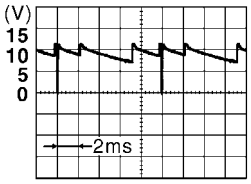
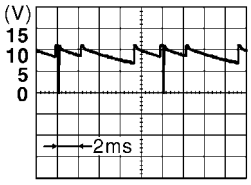


PHYSICAL VALUES

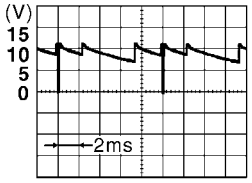
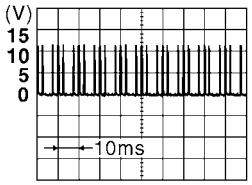
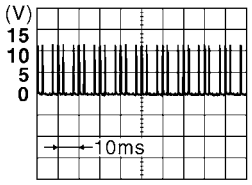
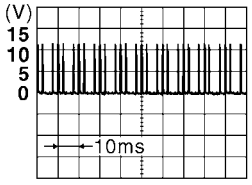
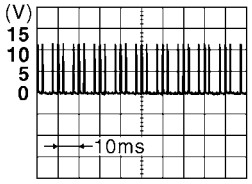
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

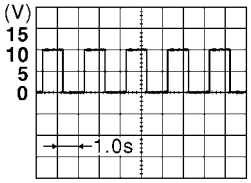
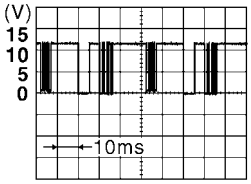
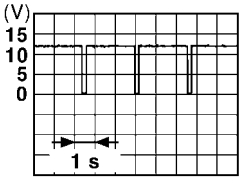
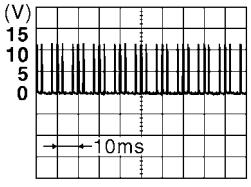
cardiagn.com

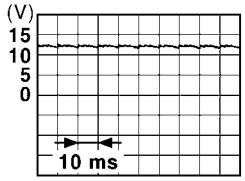
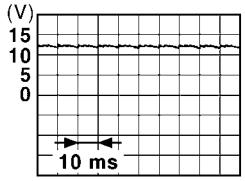
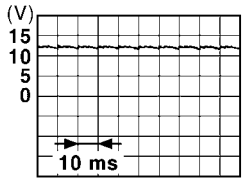
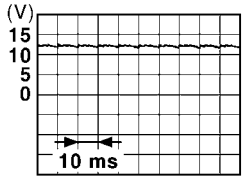
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

carsdiagn.com

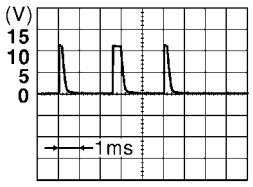
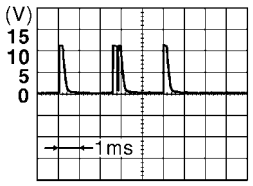
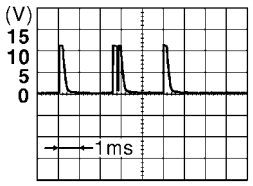
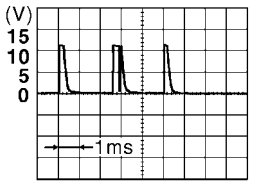
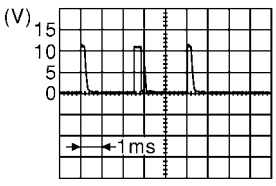
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIAo164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIAo154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIAo154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIAo154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIAo154GB 1.2 V
					Pressed	0 V

cardiagn.com

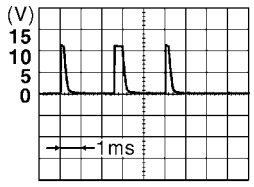
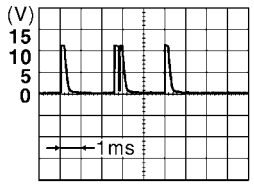
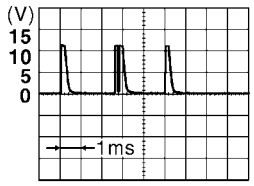
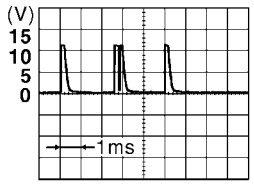
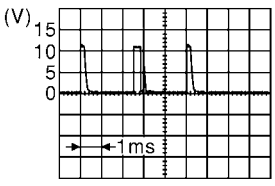
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIB0924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIB0924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIB0924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIB0924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

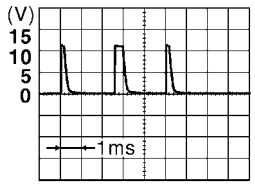
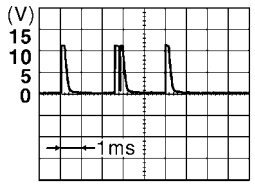
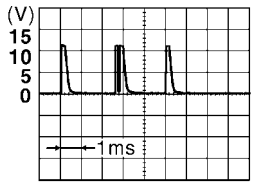
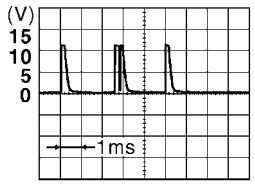
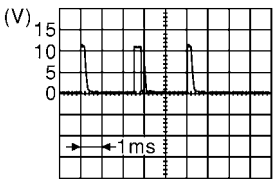
cardiagn.com

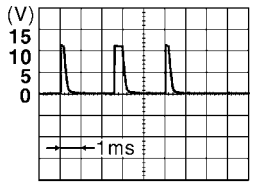
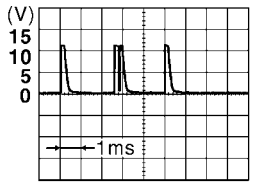
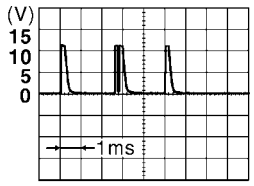
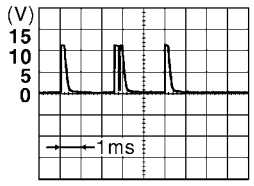
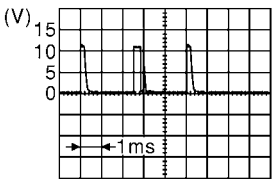
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

carsdiagn.com

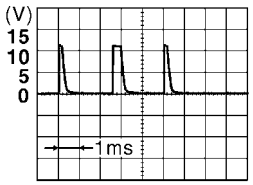
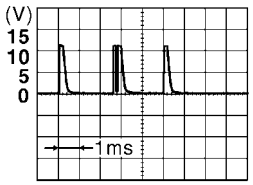
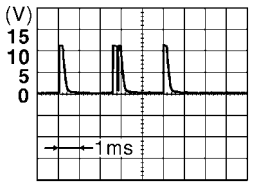
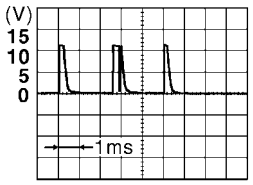
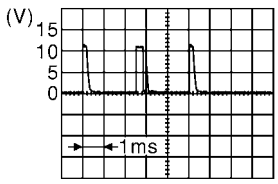
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

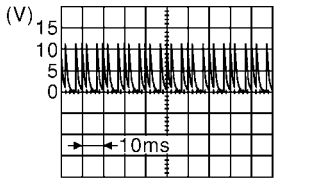
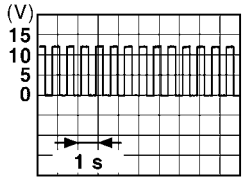
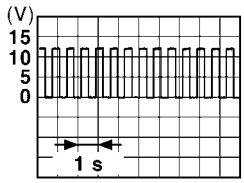
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color) +	Terminal No. (Wire color) –	Description Signal name	Description Input/ Output	Condition		Value (Approx.)
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

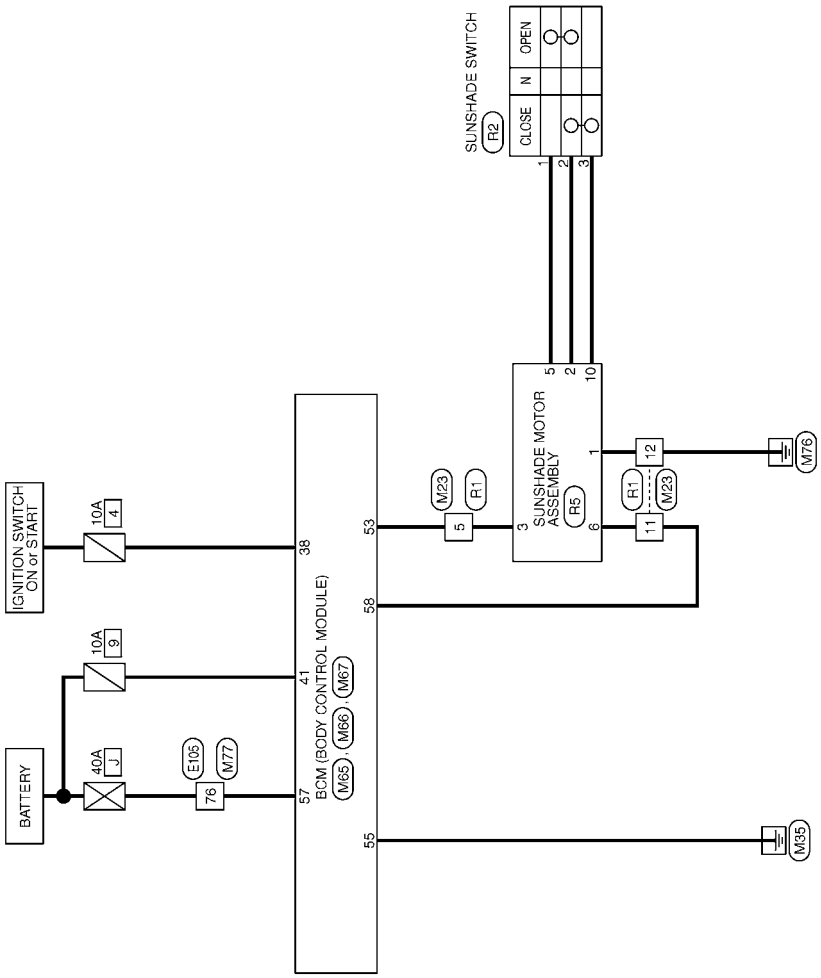
*1: With Intelligent Key system

*2: Without Intelligent Key system

Wiring Diagram - SUNSHADE CONTROL SYSTEM -

INFOID:0000000000978159

SUNSHADE SYSTEM



2006/12/08

JCKWA0331GB

cardiagn.com

SUNSHADE SYSTEM

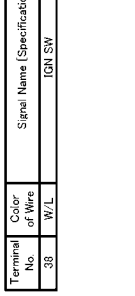
Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

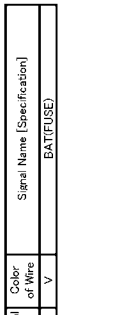
Terminal No.	Color of Wire	Signal Name [Specification]
5	L	–
11	P	–
12	B	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC063S0017

Terminal No.	Color of Wire	Signal Name [Specification]
53	L	POWER WDW PWR SUPPLY(LINKED TO IGN)
55	B	GND(POWER)
57	Y	BAT(F/L)
58	P	POWER WDW PWR SUPPLY(BAT)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
5	L	–
11	P	–
12	B	–

Connector No.	R2
Connector Name	SUNSHADE SWITCH
Connector Type	TK03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	B/W	–
3	G	–

JCKWA0332GB

SUNSHADE SYSTEM

Connector No.	R5
Connector Name	SUNSHADE MOTOR ASSEMBLY
Connector Type	Y2K 7283-5333-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND
2	B/W	SW GND
3	L	AUTHORI(IGN/RAP)
5	Y	SW OPEN
6	P	+12 BAT
10	G	SW CLOSE

JCKWA0333GB

Fail Safe

INFOID:0000000001116533

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control

Headlamp is turned ON.

Front Wiper Control

The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001116534

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001116535

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

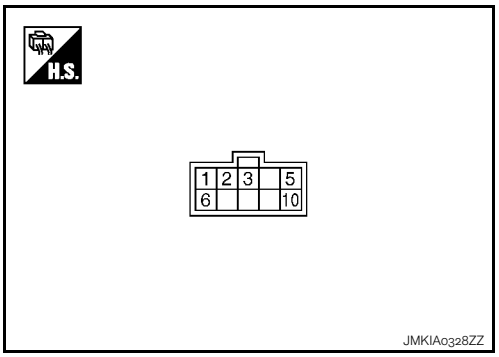
SUNSHADE SYSTEM

SUNSHADE MOTOR ASSEMBLY

SUNSHADE MOTOR ASSEMBLY : Reference Value

INFOID:0000000000978163

TERMINAL LAYOUT



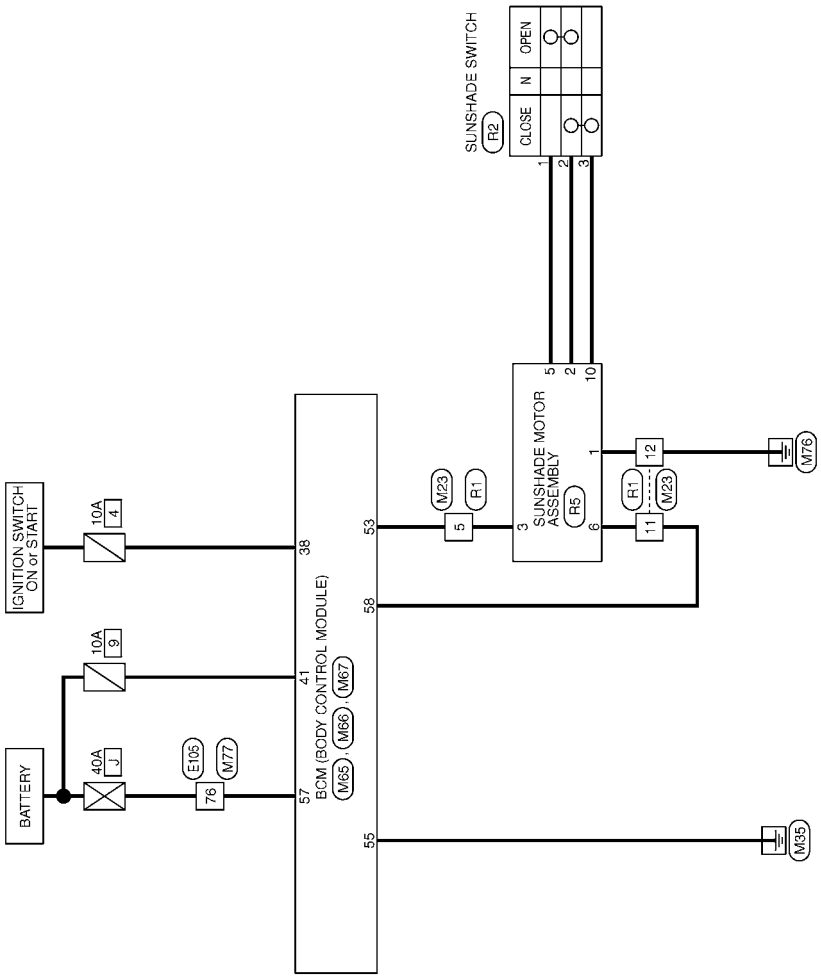
PHYSICAL VALUES

Terminal No.		Wire color	Description		Condition	Voltage (V) (Approx.)
+	-		Signal name	Input/ Output		
1	Ground	B	Ground	—	—	0
2	Ground	B/W	Sunshade switch ground	—	—	0
3	Ground	L	IGN power supply	Input	Ignition switch ON	Battery voltage
					Other than above	0
5	Ground	Y	Sunshade switch open signal	Input	Sunshade switch in following position • SLIDE OPEN	0
					Other than above	Battery voltage
6	Ground	P	Sunshade power supply	Input	Ignition switch OFF	Battery voltage
10	Ground	G	Sunshade switch close signal	Input	Sunshade switch in following position • SLIDE CLOSE	0
					Other than above	Battery voltage

SUNSHADE MOTOR ASSEMBLY : Wiring Diagram - SUNSHADE CONTROL SYSTEM -

INFOID:0000000001125412

SUNSHADE SYSTEM



2006/12/08

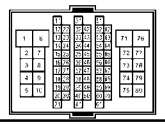
JCKWA0331GB

cardiagn.com

SUNSHADE SYSTEM

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

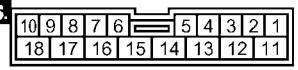
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

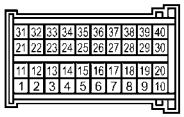
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
5	L	–
11	P	–
12	B	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

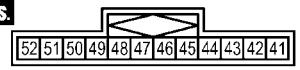
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
38	W/L	IGN SW

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

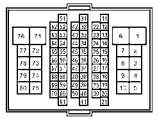
Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
53	L	POWER WDW PWR SUPPLY(LINKED TO IGN)
55	B	GND(POWER)
57	Y	BAT(F/L)
58	P	POWER WDW PWR SUPPLY(BAT)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

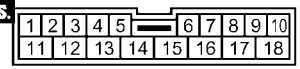
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
5	L	–
11	P	–
12	B	–

Connector No.	R2
Connector Name	SUNSHADE SWITCH
Connector Type	TK03FW

H.S.

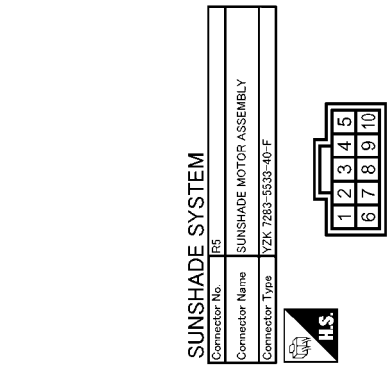
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	B/W	–
3	G	–

JCKWA0332GB

carsdiagn.com

SUNSHADE SYSTEM

Connector No.	R5
Connector Name	SUNSHADE MOTOR ASSEMBLY
Connector Type	YZK 7283-5533-40-F



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND
2	B/W	SW GND
3	L	AUTHORI(IGN/RAP)
5	Y	SW OPEN
6	P	+12 BAT
10	G	SW CLOSE

JCKWA0333GB

cardiagn.com

SYMPTOM DIAGNOSIS

SUNSHADE SYSTEM DOES NOT OPERATE PROPERLY

Diagnosis Procedure

INFOID:0000000000978165

1. CHECK BCM POWER SUPPLY AND GROUND CIRCUIT

Check BCM power supply and ground circuit.
Refer to BCS-34, "Diagnosis Procedure"

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2. CHECK SUNSHADE MOTOR ASSEMBLY POWER SUPPLY AND GROUND CIRCUIT

Check sunshade motor assembly power supply and ground circuit.
Refer to RF-8, "SUNSHADE MOTOR ASSEMBLY : Component Function Check"

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident"

carsdiagn.com

AUTO OPERATION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000000978166

1.PERFORM INITIALIZATION PROCEDURE

Perform initialization procedure.
Refer to RF-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

DOES NOT STOP FULLY-OPEN OR FULLY-CLOSED POSITION

Diagnosis Procedure

INFOID:0000000000978167

1.PERFORM INITIALIZATION PROCEDURE

Perform initialization procedure.
Refer to RF-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

Is the inspection result normal?

YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

A B C D E F G H I J RF L M N O P
carsdiagn.com

SUNSHADE DOES NOT OPERATE ANTI-PINCH FUNCTION

Diagnosis Procedure

INFOID:0000000000978168

1. PERFORM INITIALIZATION PROCEDURE

Perform initialization procedure.
Refer to RF-4, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

Is the inspection result normal?

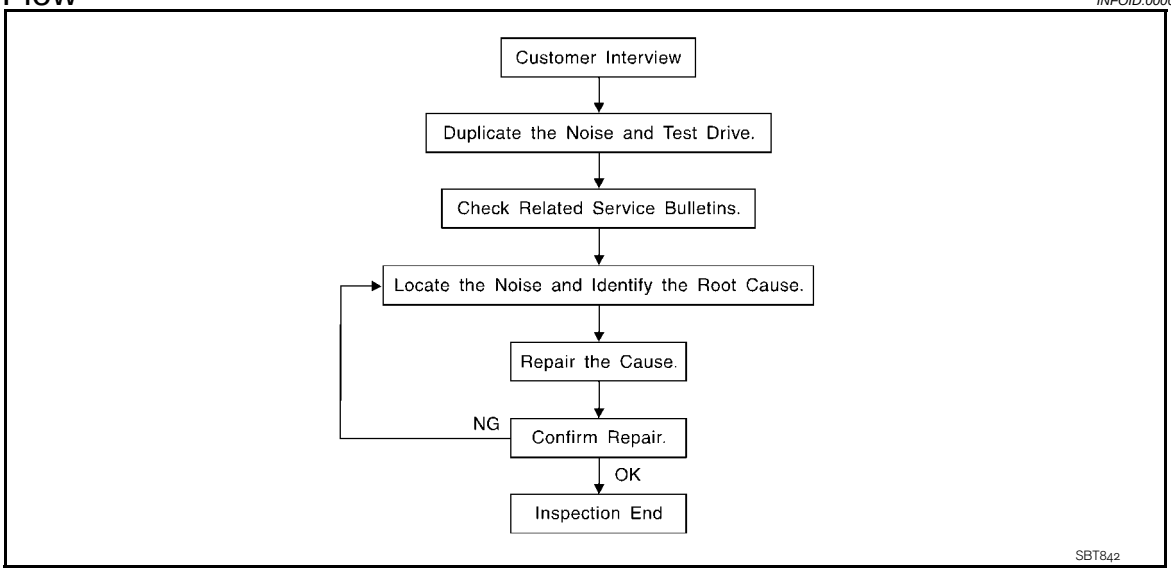
YES >> Inspection end.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

SQUEAK AND RATTLE TROUBLE DIAGNOSIS

Work Flow

INFOID:0000000001115894



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to RF-45, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to RF-43, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.
- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

cardiagn.com

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001115895

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

g-diagn.com

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.

Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.

Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

cardiagn.com

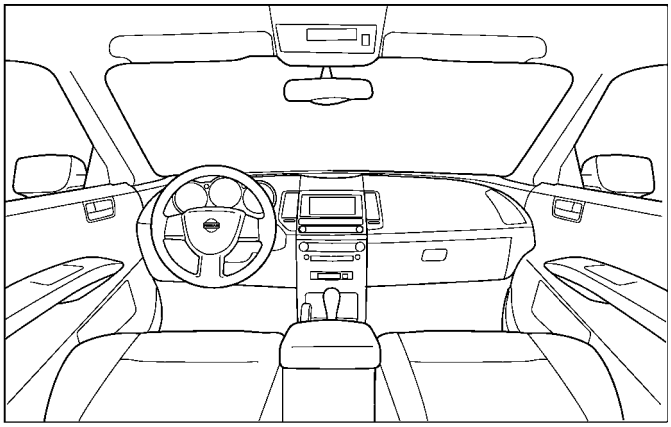
Diagnostic Worksheet

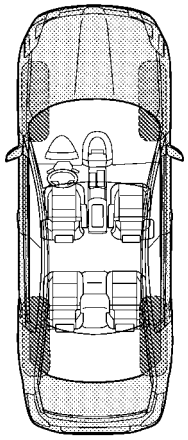
INFOID:0000000001115896

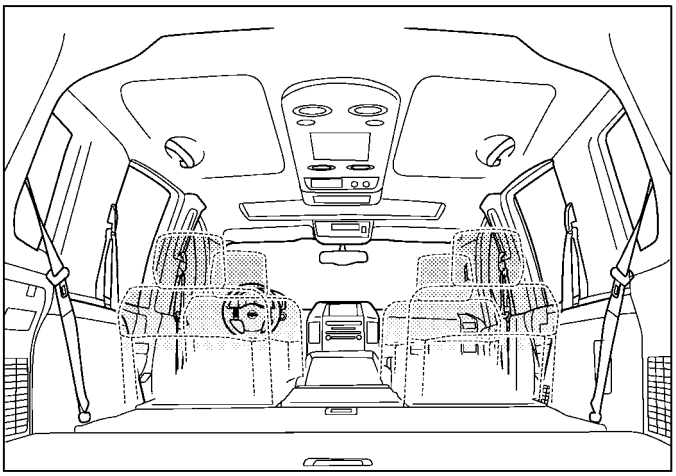
SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

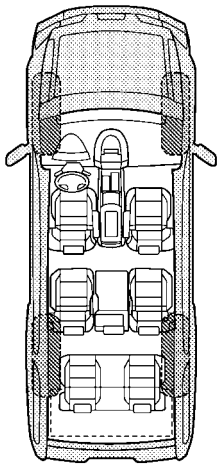
Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.









Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000978172

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Service Notice

INFOID:0000000000978173

- When removing or installing various parts, place a cloth or padding onto the vehicle body to prevent scratches.
- Handle trim, molding, instruments, grille, etc. carefully during removing or installing. Be careful not to oil or damage them.
- Apply sealing compound where necessary when installing parts.
- When applying sealing compound, be careful that the sealing compound does not protrude from parts.
- When replacing any metal parts (for example body outer panel, members, etc.), be sure to take rust prevention measures.

Precaution for Work

INFOID:0000000000978174

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and keep them.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After re-installation is completed, be sure to check that each part works normally.
- Follow the steps below to clean components.

- Water soluble foul: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the fouled area.
  Then rub with a soft and dry cloth.
- Oily foul: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the fouled area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, and gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

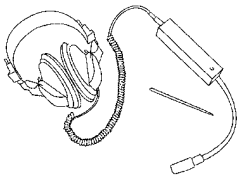
carsdiagn.com

PREPARATION

PREPARATION

Commercial Service Tool

INFOID:0000000000978176

Tool name	Description
Engine ear  SIIA0995E	Locating the noise

cardiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000000978177

BASIC INSPECTION

1. INSPECTION START

1. Check the service history.
2. Check the following parts.

- Fuse/circuit breaker blown.
- Poor connection, open or short circuit of harness connector.
- Battery voltage.

Is the inspection result normal?

YES >> Inspection end.
NO >> Repair or replace the malfunctioning parts.

carldiagn.com

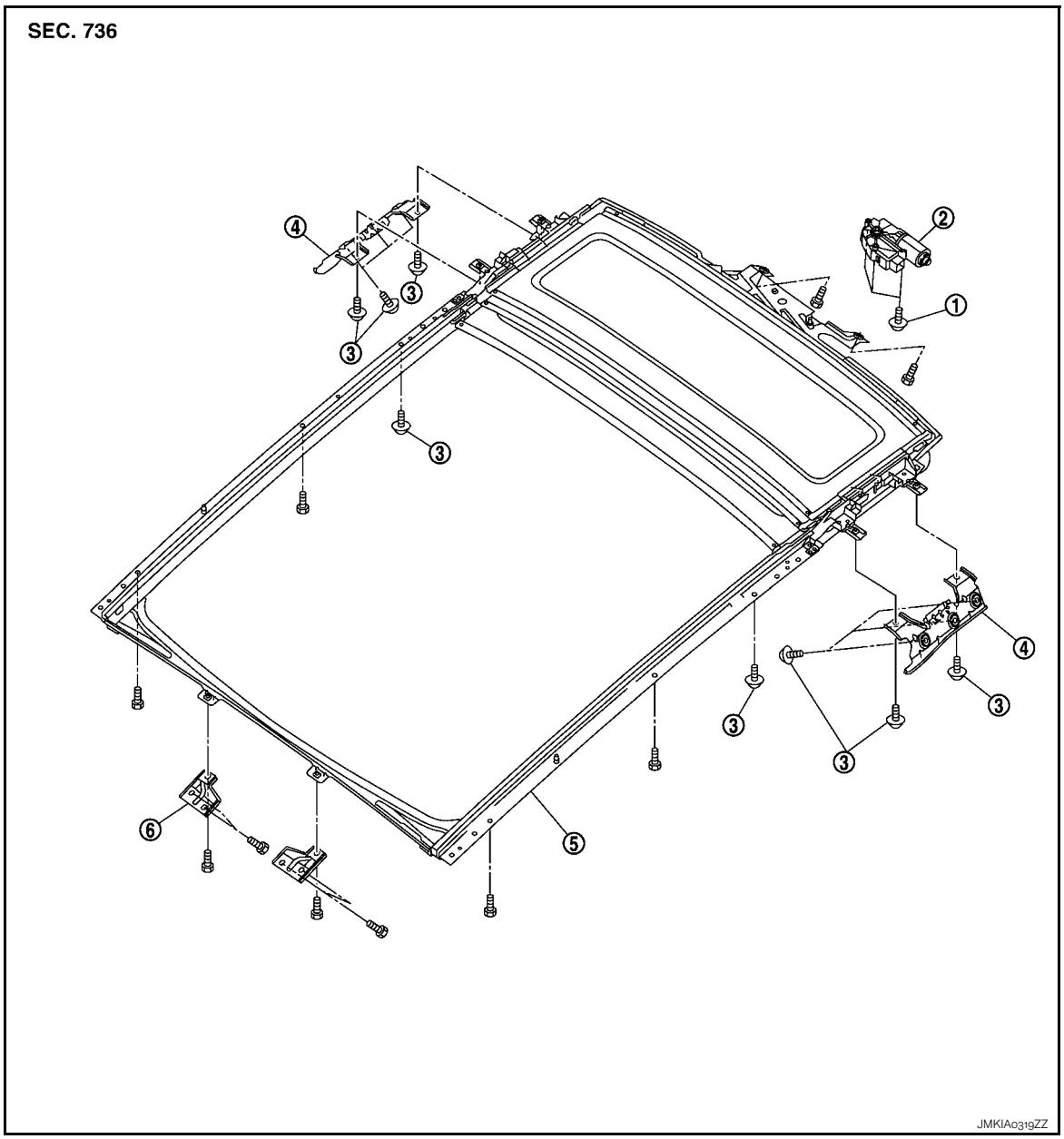
ON-VEHICLE REPAIR

SUNSHADE

SUNSHADE MOTOR ASSEMBLY

SUNSHADE MOTOR ASSEMBLY : Exploded View

INFOID:0000000000978178



1. TORX bolt (T25)
2. Sunshade motor
3. TORX bolt (T30)
4. Rear sunshade bracket
5. Sunshade unit assembly
6. Front sunshade bracket

SUNSHADE MOTOR ASSEMBLY : Removal and Installation

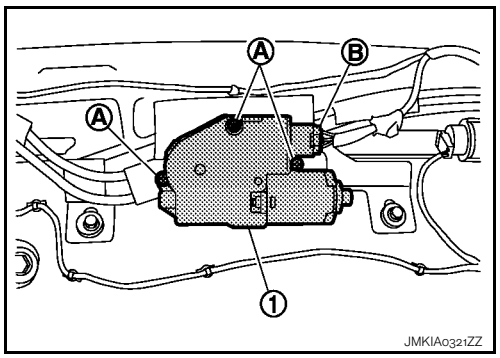
INFOID:0000000000978179

REMOVAL

1. Remove the headlining. Refer to INT-21, "Removal and Installation".
2. Remove the sunshade motor assembly.

cardiagn.com

- Remove the sunshade motor mounting TORX bolt (T25) (A).
- Disconnect harness connector (B) from sunshade motor assembly (1).



INSTALLATION

Install in the reverse order of removal.

NOTE:

After install the sunshade motor, perform additional service. Refer to RF-4, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description".

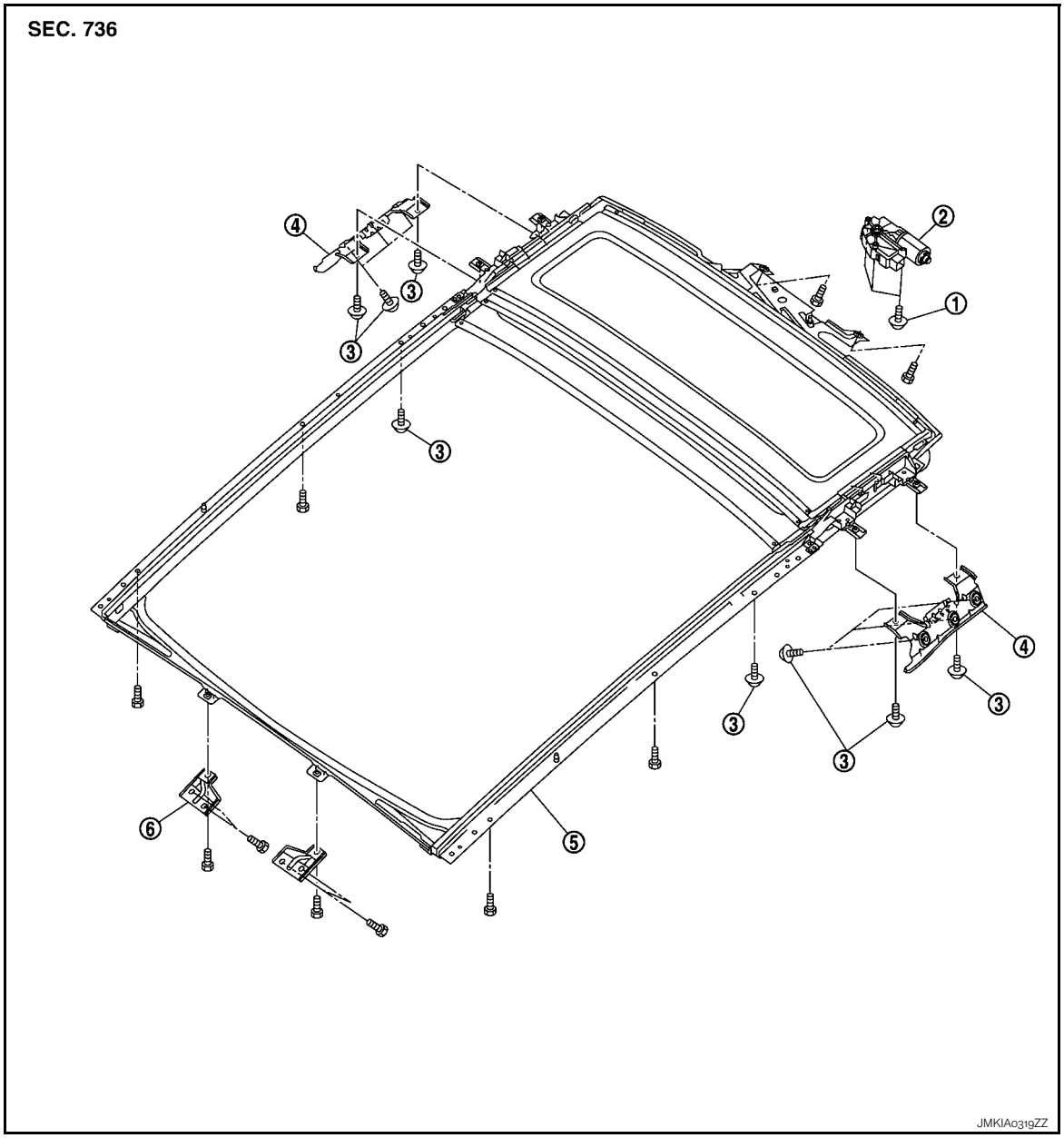
SUNSHADE UNIT ASSEMBLY

SUNSHADE UNIT ASSEMBLY : Exploded View

INFOID:0000000001026648

REMOVAL

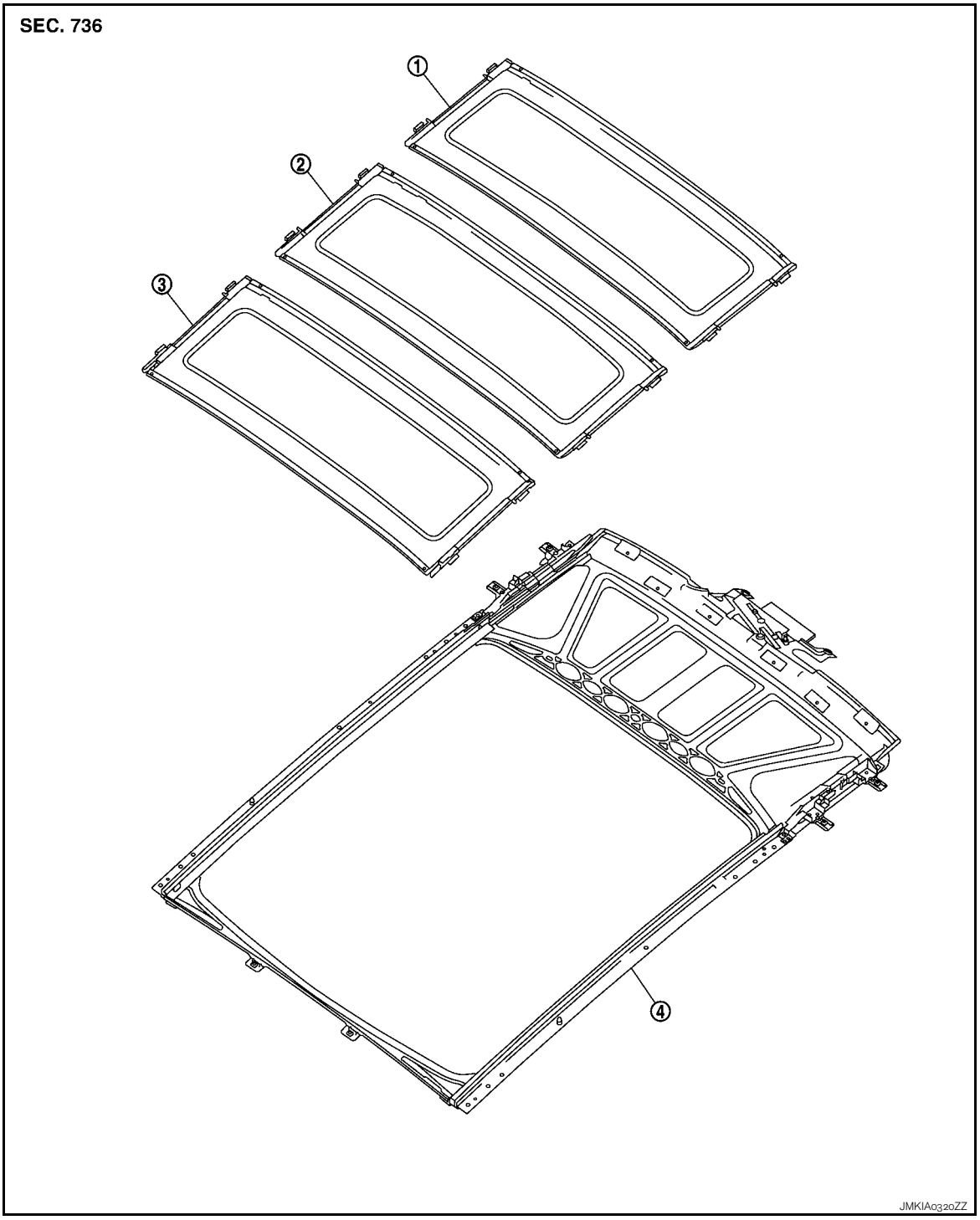
SEC. 736



1. TORX bolt (T25)
2. Sunshade motor
3. TORX bolt (T30)
4. Rear sunshade bracket
5. Sunshade unit assembly
6. Front sunshade bracket

DIASSEMBLY

cardiagn.com



1. Sunshade A
2. Sunshade B
3. Sunshade C
4. Sunshade unit assembly

SUNSHADE UNIT ASSEMBLY : Removal and Installation

INFOID:0000000001026654

REMOVAL

CAUTION:

- **Always work with a helper.**
- **Fully open the sunshade before removal.**
- **Never operate sunshade motor assembly after removal.**
- **When taking sunshade unit assembly out, use cloths to protect the seats and trim from damage.**

1. Fully open the sunshade.
2. Remove the headlining. Refer to INT-21, "Removal and Installation".
3. Remove the sunshade motor assembly. Refer to RF-50, "SUNSHADE MOTOR ASSEMBLY : Removal and Installation".
4. Remove the harness clamp.
5. Remove the TORX bolt (T30)
6. Remove the rear sunshade bracket.
7. Remove the mounting bolt from the side rail.
8. Remove the unit side bolts of the sunshade front bracket and loosen the body side bolts.
9. Remove the bolt from the rear end, and then remove sunshade unit assembly.
10. Remove the sunshade from vehicle.

INSTALLATION

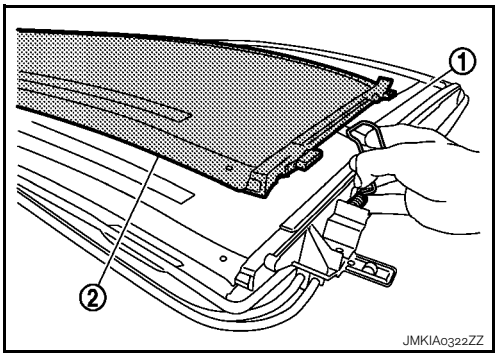
1. Temporarily tighten the mounting bolts to the sunshade front bracket.
2. Place the front end of the rail onto the sunshade front bracket.
3. Temporarily tighten the mounting bolts to the rear end of sunshade unit assembly.
4. Temporarily tighten the mounting bolts to the sunshade rear bracket.
5. Tighten the installation points diagonally excluding the installation point of the sunshade bracket around the roof.
6. Tighten the sunshade front and rear bracket bolts, of the vehicle side, and then tighten the bolt of the rail side.
7. Tighten the mounting bolt to the rear end.
8. Install the sunshade motor assembly. Refer to RF-50, "SUNSHADE MOTOR ASSEMBLY : Removal and Installation".
9. Install the headlining. Refer to INT-21, "Removal and Installation".

SUNSHADE UNIT ASSEMBLY : Disassembly and Assembly

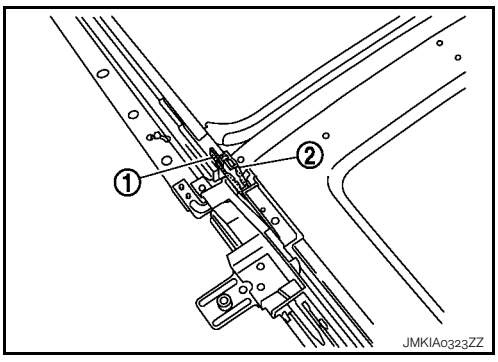
INFOID:0000000001026655

DISASSEMBLY

1. Remove the sunshade A and B.
   Slide sunshades (2) A and B while lifting up the spring (1), and then remove them from the rails



2. Remove the sunshade C.
   - Remove the tabs of the wire joint (1) and sunshade C joint (2).
   - Slide sunshades C while lifting up the spring, and then remove them from the rails



ASSEMBLY

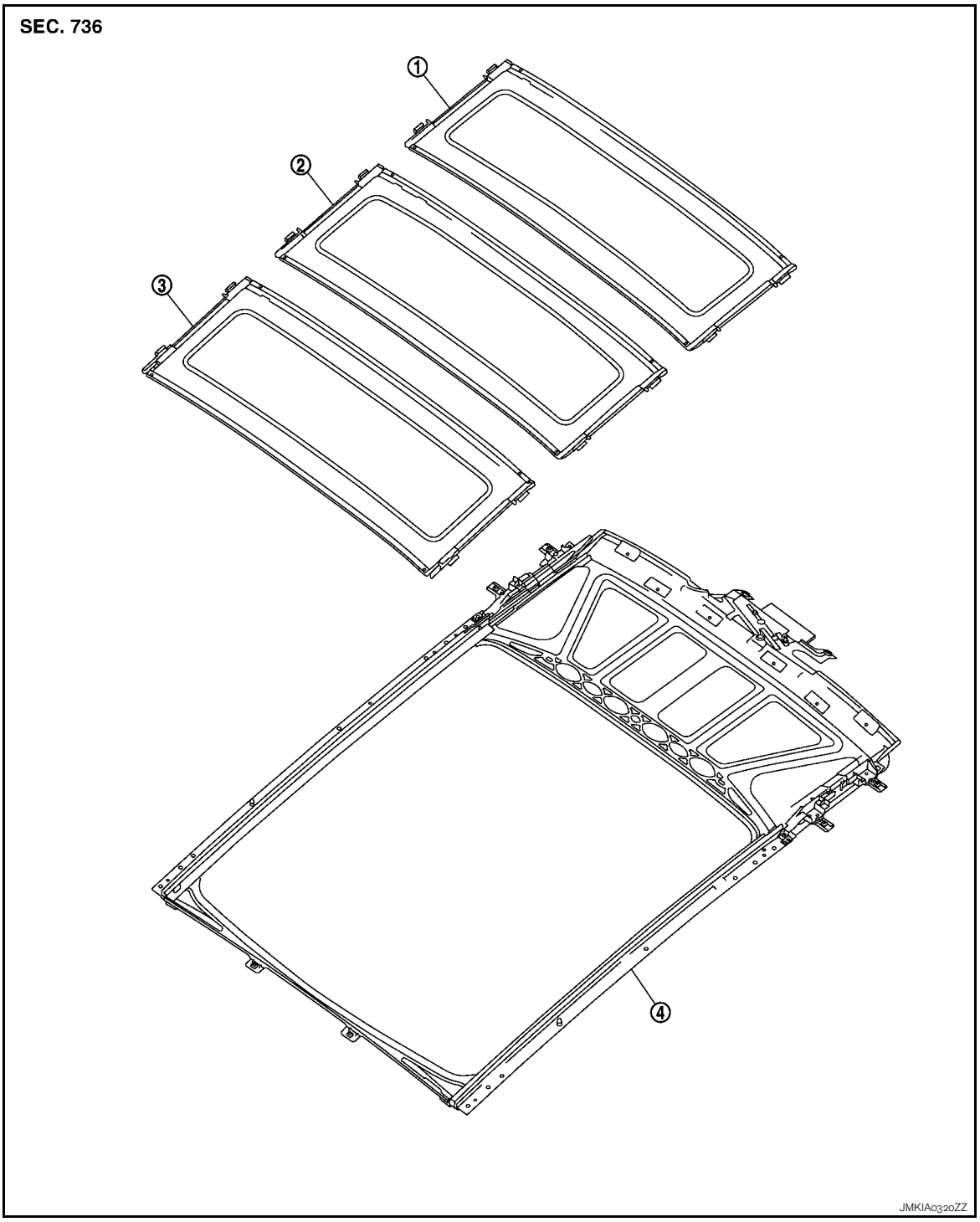
cardiagn.com

Assemble in the reverse order of disassembly.

SUNSHADE

SUNSHADE : Exploded View

INFOID:0000000001026737



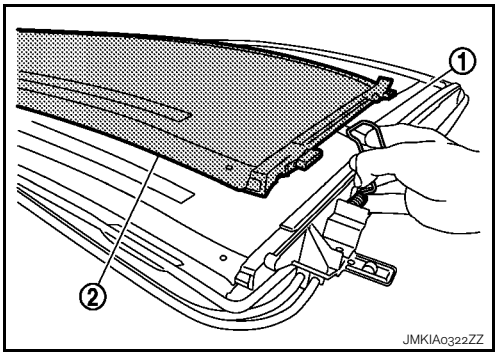
1. Sunshade A
2. Sunshade B
3. Sunshade C
4. Sunshade unit assembly

SUNSHADE : Removal and Installation

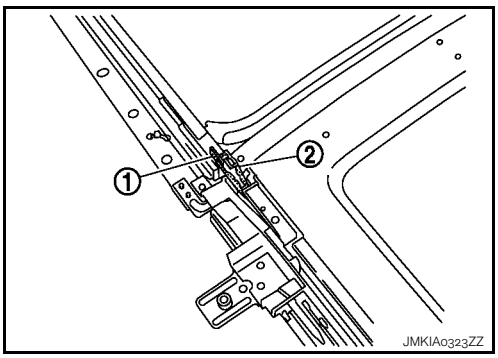
INFOID:0000000001026742

REMOVAL

1. Remove the sunshade unit assembly. Refer to RF-53, "SUNSHADE UNIT ASSEMBLY : Removal and Installation".
2. Remove the sunshade A and B.
   Slide sunshades (2) A and B while lifting up the spring (1), and then remove them from the rails



3. Remove the sunshade C.
   - Remove the tabs of the wire joint (1) and sunshade C joint (2).
   - Slide sunshades C while lifting up the spring, and then remove them from the rails

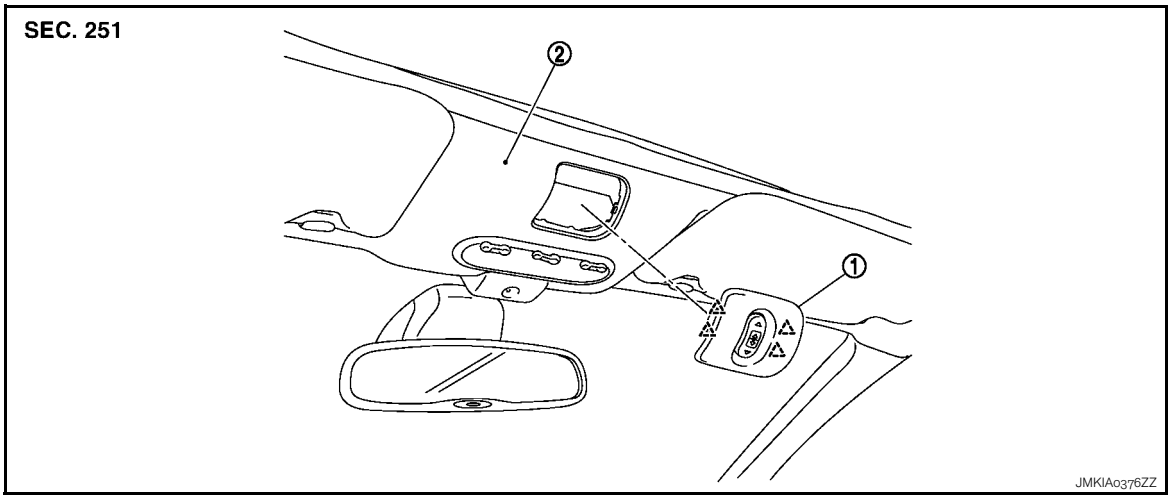


INSTALLATION
Install in the reverse order of removal.

SUNSHADE SWITCH

SUNSHADE SWITCH : Exploded View

INFOID:0000000001055267



1. Sunshade switch
2. Headlining
△ : Pawl

Refer to RF-56, "SUNSHADE SWITCH : Removal and Installation".

SUNSHADE SWITCH : Removal and Installation

INFOID:0000000001055266

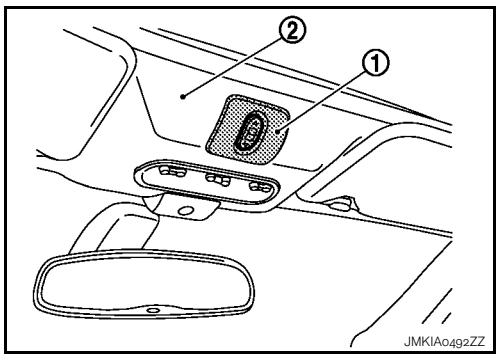
Removal

cardiagn.com

Remove the sunshade switch (1) from headlining (2).

CAUTION:

Do not bend headlining when sunshade switch removed.



Installation

Install in the reverse order of removal.

carsdiagn.com

SECTION SBC
SEAT BELT CONTROL SYSTEM

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
Work Flow 3

FUNCTION DIAGNOSIS 4

SEAT BELT WARNING LAMP 4
System Diagram 4
System Description 4
Component Parts Location 5
Component Description 5

COMPONENT DIAGNOSIS 6

INDICATOR UNIT POWER SUPPLY CIRCUIT 6
Component Function Check 6
Diagnosis Procedure 6

FRONT SEAT BELT BUCKLE SWITCH (DRIVER SIDE) 7
Description 7
Component Function Check 7
Diagnosis Procedure 7
Component Inspection 8

FRONT SEAT BELT BUCKLE SWITCH (PASSENGER SIDE) 9
Description 9
Component Function Check 9
Diagnosis Procedure 9
Component Inspection (seat belt buckle switch passenger side) 11
Component Inspection (occupant detection unit) 11

REAR SEAT BELT BUCKLE SWITCH 12
Description 12
Component Function Check 12
Diagnosis Procedure 12
Component Inspection 13

ALTERNATOR SIGNAL CIRCUIT 15
Description 15
Component Function Check 15
Diagnosis Procedure 15

ECU DIAGNOSIS 16

COMBINATION METER 16
Reference Value 16
Wiring Diagram - SEAT BELT WARNING LAMP CONTROL SYSTEM - 21
Fail Safe 23
DTC Index 24

SYMPTOM DIAGNOSIS 25

DRIVER SIDE SEAT BELT WARNING LAMP DOES NOT OPERATE 25
Diagnosis Procedure 25

PASSENGER SIDE SEAT BELT WARNING LAMP DOES NOT OPERATE 26
Diagnosis Procedure 26

REAR SEAT BELT WARNING LAMP DOES NOT OPERATE 27
Diagnosis Procedure 27

WARNING LAMP DOES NOT OPERATE EXCEPT FOR DRIVER SIDE 28
Diagnosis Procedure 28

DRIVER SIDE SEAT BELT WARNING LAMP DOES NOT TURN OFF 29
Diagnosis Procedure 29

PASSENGER SIDE SEAT BELT WARNING LAMP DOES NOT TURN OFF 30
Diagnosis Procedure 30

REAR SEAT BELT WARNING LAMP DOES NOT TURN OFF 31

cardiagn.com

Diagnosis Procedure 31

REAR SEAT BELT WARNING LAMP DOSE NOT TURN OFF AFTER A LAPSE OF SPECIFIED TIME 32
Diagnosis Procedure 32

PASSENGER SEAT IS OCCUPIED BUT SEAT BELT WARNING LAMP DOES NOT LIGHT UP 33
Diagnosis Procedure 33

PRECAUTION 34

PRECAUTIONS 34
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 34

ON-VEHICLE MAINTENANCE 35

PRE-INSPECTION FOR DIAGNOSTIC 35
Basic Inspection 35

ON-VEHICLE REPAIR 36

INDICATOR UNIT 36
Exploded View 36
Removal and Installation 36

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001059495

DETAILED FLOW

1.OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings the vehicle in.

>> GO TO 2.

2.REPRODUCE THE MALFUNCTION INFORMATION

Check the malfunction on the vehicle that the customer describes.
Inspect the relation of the symptoms and the condition when the symptoms occur.

>> GO TO 3.

3.PERFORM “BASIC INSPECTION”

Perform the basic inspection.Refer to SBC-35, "Basic Inspection".

>> GO TO 4.

4.IDENTIFY THE MALFUNCTIONING SYSTEM WITH “SYMPTOM DIAGNOSIS”

Use “Symptom diagnosis” from the symptom inspection result in step 2. Then identify where to start performing the diagnosis based on possible causes and symptoms.

>> GO TO 5.

5.IDENTIFY MALFUNCTIONING PARTS WITH “COMPONENT DIAGNOSIS”

Perform the diagnosis with “Component diagnosis” of the applicable system.

>> GO TO 6.

6.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 7.

7.FINAL CHECK

Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 2.

Is the malfunctioning part repaired or replaced?

YES >> Trouble diagnosis is completed.
NO >> GO TO 3.

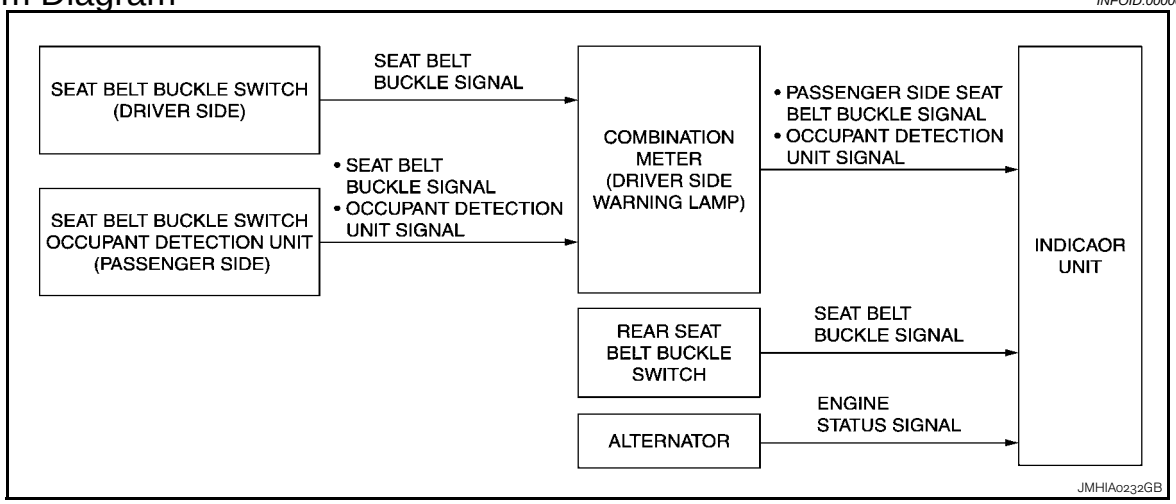
cardiagn.com

FUNCTION DIAGNOSIS

SEAT BELT WARNING LAMP

System Diagram

INFOID:0000000001092885



System Description

INFOID:0000000001059500

Seat belt warning lamp will light up if the driver has started the engine or turned ignition switch to ON position.

DRIVER SIDE SEAT BELT WARNING LAMP OPEARATION

- Driver side seat belt warning lamp is built in combination meter.
- Warning lamp lights up if seat belt buckle switch is in OFF position (unbuckled).
- Warning lamp turns off if seat belt buckle switch is in ON position (buckled).

PASSENGER SIDE SEAT BELT WARNING LAMP OPERATION

- Passenger side seat belt warning lamp is located on center consol indicator unit.
- There is an occupant detection unit situated inside passenger seat. Note that passenger seat belt warning lamp will not light up if the seat is unoccupied.
- If passenger seat is occupied and seat belt buckle is in OFF position warning lamp will light up.
- If passenger seat is occupied and seat belt buckle is in ON position warning lamp will turn off.

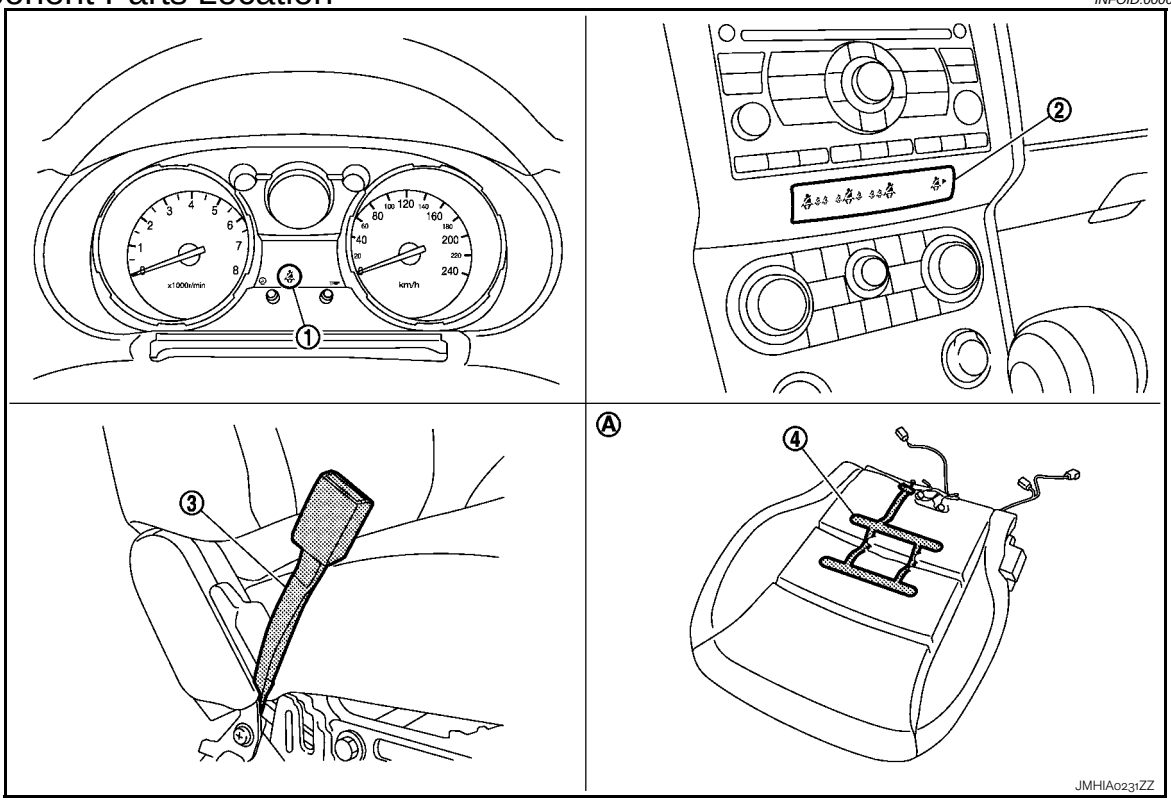
REAR SEAT BELT WARNING LAMP OPEATION

- Rear seat belt warning lamps are located on center consol indicator unit.
- Warning lamp lights up if seat belt buckle switch is in OFF position (unbuckled)
- Warning lamp turns off if seat belt buckle switch is in ON position (buckled).
- Regardless of rear seat belt status, warning lamp turns off approximately 35 seconds (the specified time) after the engine has started.

cardiagn.com

Component Parts Location

INFOID:0000000001059501



1. Seat belt warning lamp (built in combination meter M34)
2. Indicator unit M91
3. Seat belt buckle switch (Driver side) B22
4. Occupant detection unit B48
A. Behind seat cushion trim

Component Description

INFOID:0000000001059502

Item	Function
Combination meter	• Driver seat belt warning lamp is built in combination meter. • Detects the status of driver side passenger side seat belt buckle switch and controls warning lamp operation.
Indicator unit	• Passenger side and rear seat belt warning lamps are built in indicator unit. • Detects the status of rear seat belt buckle switch and controls the warning lamp illumination. • Judges the status of engine by detection of the signal transmitted by alternator and performs the control of seat belt warning lamp ON/OFF function.
Seat belt buckle switch (driver/passenger/rear)	Detects seat belt feature status transmits signal to combination meter or to indicator unit.

COMPONENT DIAGNOSIS

INDICATOR UNIT POWER SUPPLY CIRCUIT

Component Function Check

INFOID:0000000001080161

1.CHECK INDICATOR UNIT FUNCTION

1. All seat belt buckle are unbuckle.
2. Turn ignition switch ON.
3. Check indicator unit operation.

Is the inspection results normal?

YES >> Indicator unit power supply circuit is OK.
NO >> Refer to SBC-6, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001080162

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect indicator unit connector.
3. Check voltage between indicator unit connector and ground.

Terminals			Voltage(V) (Approx.)
(+)		(-)	
Indicator unit connector	Terminal		
M91	7	Ground	Battery voltage

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace power supply circuit.

cardiagn.com

FRONT SEAT BELT BUCKLE SWITCH (DRIVER SIDE)

Description

INFOID:0000000001083098

- Detects if the seat belt is fastened or unfastened.
- Warning lamp turns OFF if the seat belt is fastened.

Component Function Check

INFOID:0000000001083099

1.CHECK SEAT BELT BUCKLE SWITCH (DRIVER SIDE) FUNCTION

Check “SEAT BELT W/L” in DATA MONITOR mode with CONSULT-III

Driver seat belt is unfastened **SEAT BELT W/L : ON**

Driver seat belt is fastened **SEAT BELT W/L : OFF**

Is the inspection results normal?

YES >> Seat belt buckle switch (driver side) function is OK.
NO >> Refer to SBC-7, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001083100

1.CHECK SEAT BELT BUCKLE SWITCH (DRIVER SIDE) FUNCTION

1. Turn ignition switch ON.
2. Check voltage between combination meter connector and ground.

Combination meter connector	Terminal		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M34	35	Ground	Driver seat belt is unfastened	0
			Driver seat belt is fastened	5

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident"
NO >> GO TO 2.

2.CHECK SEAT BELT BUCKLE SWITCH (DRIVER SIDE) HARNESS

1. Turn ignition switch OFF.
2. Disconnect combination meter and seat belt buckle switch (driver side) connector.
3. Check continuity between combination meter and seat belt buckle switch (driver side) harness connector.

Combination meter connector	Terminal	Seat belt buckle switch (driver side) connector	terminal	Continuity
M34	35	B22	1	Existed

4. Check continuity between combination meter harness connector and ground.

Combination meter connector	Terminal	Ground	Continuity
M34	35		Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK GROUND CIRCUIT

Check continuity between seat belt buckle switch (driver side) harness connector and ground.

Seat belt buckle switch (driver side) connector	Terminal	Ground	Continuity
B22	2		Existed

Is the inspection result normal?

YES >> GO TO 4.

cardiagn.com

NO >> Repair or replace harness.

4. CHECK SEAT BELT BUCKLE SWITCH (DRIVER SIDE)

Check seat belt buckle switch (driver side).
Refer to SBC-8, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace seat belt buckle switch (driver side). Refer to SB-8, "SEAT BELT BUCKLE : Removal and Installation".

5. CHECK COMBINATION METER OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Connect combination meter connector.
3. Check voltage between combination meter connector and ground.

Combination meter connector	Terminal		Voltage (V) (Approx.)
M34	(+)	(-)	
	35	Ground	5

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Replace combination meter. Refer to MWI-72, "Removal and Installation".

Component Inspection

INFOID:0000000001083101

1. CHECK SEAT BELT BUCKLE SWITCH (DRIVER SIDE)

Check continuity between seat belt buckle switch (driver side) while performing the insertion operation to the seat belt buckle.

Seat belt buckle switch connector (driver side)	Terminal		Condition	Continuity
B22	1	2	When seat belt is unfastened	Existed
			When seat belt is fastened	Not existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace seat belt buckle switch (driver side). Refer to SB-8, "SEAT BELT BUCKLE : Removal and Installation".

cardiagn.com

FRONT SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)

Description

INFOID:0000000001084939

- Detects if the seat belt is fastened or unfastened.
- Warning lamp turns OFF if the seat belt is fastened.

Component Function Check

INFOID:0000000001083103

1.CHECK SEAT BELT BUCKLE SWITCH (PASSENGER SIDE) FUNCTION

Check if the warning lamp turns OFF as soon as the seat belt is fastened.

Is the inspection results normal?

YES >> Seat belt buckle switch (passenger side) is OK.
NO >> Refer to SBC-9, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001085564

1.CHECK INDICATOR UNIT HARNESS

1. Turn ignition switch OFF.
2. Disconnect indicator unit and combination meter connector.
3. Check continuity between indicator unit and combination meter harness connector.

Indicator unit connector	Terminal	Combination meter connector	terminal	Continuity
M91	1	M34	14	Existed

4. Check continuity between indicator unit harness connector and ground.

Indicator unit connector	Terminal	Ground	Continuity
M91	1		Not existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness.

2.CHECK SEAT BELT BUCKLE SWITCH (PASSENGER SIDE) FUNCTION

1. Connect combination meter connector.
2. Turn ignition switch ON.
3. Sits in the passenger seat.
4. Check voltage between combination meter connector and ground.

Combination meter connector	Terminal		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M34	36	Ground	Passenger seat belt is unfastened	0
			Passenger seat belt is fastened	Battery voltage

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK SEAT BELT BUCKLE SWITCH (PASSENGER SIDE) HARNESS

1. Turn ignition switch OFF.
2. Disconnect seat belt buckle switch (passenger side) and combination meter connector.
3. Check continuity between combination meter and seat belt buckle switch (passenger side) harness connector.

Combination meter connector	Terminal	Seat belt buckle switch (passenger side) connector	terminal	Continuity
M34	36	B23	1	Existed

4. Check continuity between combination meter harness connector and ground.

Combination meter connector	Terminal	Ground	Continuity
M34	36		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK OCCUPANT DETECTION UNIT HARNESS

1. Disconnect occupant detection unit connector.
2. Check continuity between seat belt buckle switch (passenger side) and occupant detection unit harness connector.

Seat belt buckle switch (passenger side) connector	Terminal	Occupant detection unit connector	terminal	Continuity
B23	2	B48	1	Existed

3. Check continuity between seat belt buckle switch (passenger side) harness connector and ground.

Seat belt buckle switch (passenger side) connector	Terminal	Ground	Continuity
B23	2		Not existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5. CHECK GROUND CIRCUIT

Check continuity between occupant detection unit harness connector and ground.

Occupant detection unit connector	Terminal	Ground	Continuity
B48	2		Existed

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness.

6. CHECK SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)

Check seat belt buckle switch (passenger side).
Refer to SBC-11, "Component Inspection (seat belt buckle switch passenger side)".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace seat belt buckle switch (passenger side). Refer to SB-8, "SEAT BELT BUCKLE : Removal and Installation".

7. CHECK OCCUPANT DETECTION UNIT

Check occupant detection unit.
Refer to SBC-11, "Component Inspection (occupant detection unit)".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace occupant detection unit. Refer to SE-25, "Disassembly and Assembly".

8. CHECK COMBINATION METER OUTPUT SIGNAL

1. Connect combination meter connector.
2. Turn ignition switch ON.
3. Check voltage between combination meter and ground.

Combination meter connector	Terminal		Voltage (V) (Approx.)
M34	(+)	(-)	
	36	Ground	Battery voltage

cardiagn.com

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Replace combination meter. Refer to MWI-72, "Removal and Installation".

Component Inspection (seat belt buckle switch passenger side)

INFOID:0000000001085839

1. CHECK SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)

Check continuity between seat belt buckle switch (passenger side) while performing the insertion operation to the seat belt buckle.

Seat belt buckle switch connector (passenger side)	Terminal		Condition	Continuity
B23	1	2	When seat belt is unfastened	Existed
			When seat belt is fastened	Not existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace seat belt buckle switch (passenger side). Refer to SB-8, "SEAT BELT BUCKLE : Removal and Installation".

Component Inspection (occupant detection unit)

INFOID:0000000001098099

1. CHECK OCCUPANT DETECTION UNIT

Check occupant detection unit.

Occupant detection unit connector	Terminal		Condition	Continuity
B48	1	2	When getting in the passenger seat	Existed
			Other than above	Not existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace occupant detection unit. Refer to SE-25, "Disassembly and Assembly".

REAR SEAT BELT BUCKLE SWITCH

Description

INFOID:0000000001094017

- Detects if the seat belt is fastened or unfastened.
- Warning lamp turns OFF if the seat belt is fastened.

Component Function Check

INFOID:0000000001094018

1.CHECK REAR SEAT BELT BUCKLE SWITCH FUNCTION

Check if the warning lamp turns OFF as soon as the seat belt is fastened.

Is the inspection results normal?

YES >> Rear seat belt buckle switch is OK.
NO >> Refer to SBC-12, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001085566

1.CHECK REAR SEAT BELT BUCKLE CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between rear seat belt buckle switch and ground.

Rear seat belt buckle switch connector	Terminal		Condition	Voltage (V) (Approx.)
	(+)	(-)		
B63 (LH and center)	1	Ground	Rear seat belt (LH) is fastened	Battery voltage
			Rear seat belt (LH) is unfastened	0
	3		Rear seat belt (center) is fastened	Battery voltage
			Rear seat belt (center) is unfastened	0
B64 (RH and center)	1		Rear seat belt (RH) is fastened	Battery voltage
			Rear seat belt (RH) is unfastened	0
	3		Rear seat belt (center) is fastened	Battery voltage
			Rear seat belt (center) is unfastened	0

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK INDICATOR UNIT OUTPUT SIGANL

Check voltage between indicator unit connector and ground.

Indicator unit connector	Terminal		Voltage (V) (Approx.)
M91	3	Ground	Battery voltage
	4		
	5		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace indicator unit. Refer to SBC-36, "Removal and Installation".

3.CHECK REAR SEAT BELT BUCKLE SWITCH HARNESS

1. Turn ignition switch OFF.
2. Disconnect indictor unit and rear seat belt buckle switch connector.
3. Check continuity between indictor unit and rear seat belt buckle switch harness connector.

cardiagn.com

Indicator unit connector	Terminal	Rear seat belt buckle switch connector	terminal	Continuity
M91	3	B63 (LH and center)	1	Existed
	4		3	
		B64 (RH and center)	3	
	5		1	

4. Check continuity between indicator unit connector and ground.

Indicator unit connector	Terminal		Continuity
M91	3	Ground	Not existed
	4		
	5		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK GROUND CIRCUIT

Check continuity between rear sear belt buckle switch connector and ground.

Rear seat belt buckle switch connector	Terminal		Continuity
B63 (LH and center)	2	Ground	Existed
	4		
B64 (RH and center)	2		
	4		

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK REAR SEAT BELT BUKLE SWITCH

Check rear seat belt buckle switch.
Refer to SBC-13, "Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Replace rear seat belt buckle switch. Refer to SB-17, "SEAT BELT BUCKLE : Removal and Installation".

Component Inspection

INFOID:0000000001088995

1.CHECK SEAT BELT BUCKLE SWITCH

Check continuity between rear seat belt buckle switch while performing the insertion operation to the rear seat belt buckle.

Rear seat belt buckle switch connector	Terminal		Condition	Continuity
B63 (LH and center)	1	2	Rear seat belt (LH) is unfastened	Existed
			Rear seat belt (LH) is fastened	Not existed
	3	4	Rear seat belt (center) is unfastened	Existed
			Rear seat belt (center) is fastened	Not existed
B64 (RH and center)	1	2	Rear seat belt (RH) is unfastened	Existed
			Rear seat belt (RH) is fastened	Not existed
	3	4	Rear seat belt (center) is unfastened	Existed
			Rear seat belt (center) is fastened	Not existed

cardiagn.com

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace seat belt buckle switch. Refer to SB-17, "SEAT BELT BUCKLE : Removal and Installation".

cardiagn.com

ALTERNATOR SIGNAL CIRCUIT

Description

INFOID:0000000001080171

Transmits the “engine started” signal to indicator unit.

Component Function Check

INFOID:0000000001080172

1.CHECK ALTERNATOR SIGNAL CIRCUIT

Check if the warning lamp turns OFF, approximately 35 seconds after the engine has started.

Is the inspection results normal?

YES >> Alternator signal circuit is OK.
NO >> Refer to SBC-15, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001080173

1.CHECK INDICATOR UNIT INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect indicator unit connector.
3. Turn ignition switch ON.
4. Check voltage between indicator unit harness connector and ground.

Indictor unit connector	Terminal		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M91	6	Ground	Engine running	Battery voltage
			Other than above	0

Is the inspection result normal?

YES >> Replace indictor unit. Refer to SBC-36, "Removal and Installation".
NO >> GO TO 2.

2.CHECK ALTERNATOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect alternator connector.
3. Check continuity between indictor unit and alternator harness connector.

Indicator unit connector	Terminal	Alternator connector	terminal	Continuity
M91	6	R5*1	3*1	Existed
		F60*2	4*2	

*1 With gasoline engine

*2 With diesel engine

4. Check continuity between indicator unit harness connector and ground.

Indicator unit connector	Terminal	Ground	Continuity
M91	6		Not existed

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace harness.

ECU DIAGNOSIS

COMBINATION METER

Reference Value

INFOID:0000000001102416

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
SPEED METER [km/h]	Ignition switch ON	While driving	Equivalent to speedometer reading **NOTE:** 655.35 is displayed when the malfunction signal is received
SPEED OUTPUT [km/h]	Ignition switch ON	While driving	Equivalent to speedometer reading **NOTE:** 655.35 is displayed when the malfunction signal is received
TACHO METER [rpm]	Ignition switch ON	While driving	Equivalent to tachometer reading **NOTE:** 8191.875 is displayed when the malfunction signal is received
W TEMP METER [°C]	Ignition switch ON	—	Values according to engine coolant temperature **NOTE:** 215 is displayed when the malfunction signal is input
FUEL METER [lit]	Ignition switch ON	—	Values according to fuel level
DISTANCE [km]	Ignition switch ON	—	Possible driving distance calculated by combination meter
FUEL W/L	Ignition switch ON	Low-fuel warning lamp ON	On
		Low-fuel warning lamp OFF	Off
MIL	Ignition switch ON	Malfunction indicator lamp ON	On
		Malfunction indicator lamp OFF	Off
SEAT BELT W/L	Ignition switch ON	Seat belt warning lamp ON	On
		Seat belt warning lamp OFF	Off
BUZZER	Ignition switch ON	Buzzer ON	On
		Buzzer OFF	Off
C-ENG 2 W/L	Ignition switch ON	Malfunction indicator lamp 2 ON	On
		Malfunction indicator lamp 2 OFF	Off
GLOW IND	Ignition switch ON	Glow indicator lamp ON	On
		Glow indicator lamp OFF	Off
DOOR W/L	Ignition switch ON	Door warning lamp ON	On
		Door warning lamp OFF	Off
HI-BEAM IND	Ignition switch ON	High-beam indicator lamp ON	On
		High-beam indicator lamp OFF	Off
TURN IND	Ignition switch ON	Turn signal indicator lamp ON	On
		Turn signal indicator lamp OFF	Off
FR FOG IND	Ignition switch ON	Front fog lamp indicator lamp ON	On
		Front fog lamp indicator lamp OFF	Off
RR FOG IND	Ignition switch ON	Rear fog lamp indicator lamp ON	On
		Rear fog lamp indicator lamp OFF	Off

cardiagn.com

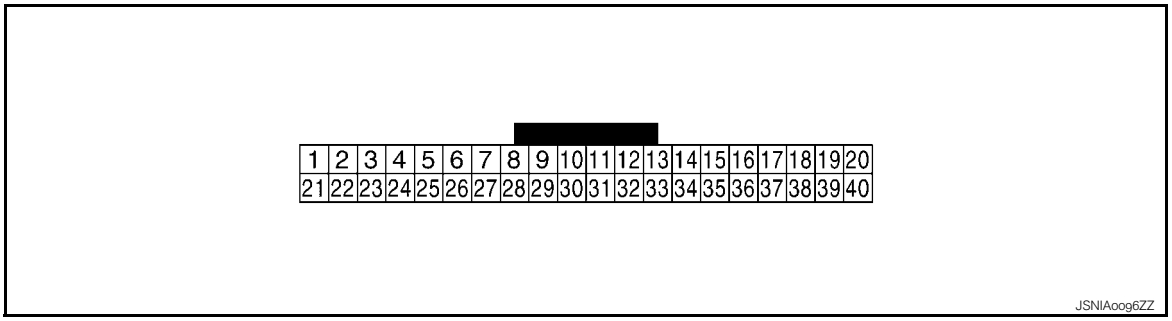
Monitor Item	Condition		Value/Status
OIL W/L	Ignition switch ON	Oil pressure warning lamp ON	On
		Oil pressure warning lamp OFF	Off
LIGHT IND	Ignition switch ON	Tail lamp indicator lamp ON	On
		Tail lamp indicator lamp OFF	Off
DPF W/L	Ignition switch ON	DPF warning lamp ON	On
		DPF warning lamp OFF	Off
VDC/TCS IND	Ignition switch ON	VDC OFF indicator lamp ON	On
		VDC OFF indicator lamp OFF	Off
ABS W/L	Ignition switch ON	ABS warning lamp ON	On
		ABS warning lamp OFF	Off
SLIP IND	Ignition switch ON	SLIP Indicator lamp ON	On
		SLIP indicator lamp OFF	Off
BRAKE W/L	Ignition switch ON	Brake warning lamp ON	On
		Brake warning lamp OFF	Off
OIL LEVEL IND	Ignition switch ON	Oil level 1 is detected	LEVEL1
		Oil level 2 is detected	LEVEL2
		Oil level 3 is detected	LEVEL3
		Oil level 4 is detected	LEVEL4
		Oil level 5 is detected	LEVEL5
		OIL LOW is detected	On
		Oil level is not detected	CR NG
KEY G W/L	Ignition switch ON	KEY warning lamp (green) ON	On
		KEY warning lamp (green) OFF	Off
KEY R W/L	Ignition switch ON	KEY warning lamp (red) ON	On
		KEY warning lamp (red) OFF	Off
KEY KNOB IND	Ignition switch ON	LOCK warning lamp ON	On
		LOCK warning lamp OFF	Off
M RANGE SW	Ignition switch ON	MANUAL MODE	On
		Other than the above	Off
NM RANGE SW	Ignition switch ON	MANUAL MODE	Off
		Other than the above	On
AT SFT UP SW	Ignition switch ON	Selector lever (+) position	On
		Other than the above	Off
AT SFT DWN SW	Ignition switch ON	Selector lever (–) position	On
		Other than the above	Off
P RANGE IND	Ignition switch ON	Selector lever in P position	On
		Other than the above	Off
R RANGE IND	Ignition switch ON	Selector lever in R position	On
		Other than the above	Off
N RANGE IND	Ignition switch ON	Selector lever in N position	On
		Other than the above	Off
D RANGE IND	Ignition switch ON	Selector lever in D position	On
		Other than the above	Off

cardiagn.com

Monitor Item	Condition		Value/Status
4 RANGE IND	Ignition switch ON	Shift indicator 4 is displayed	On
		Other than the above	Off
3 RANGE IND	Ignition switch ON	Shift indicator 3 is displayed	On
		Other than the above	Off
2 RANGE IND	Ignition switch ON	Shift indicator 2 is displayed	On
		Other than the above	Off
AT CHECK-W/L	Ignition switch ON	TCM electronic control system warning lamp ON	On
		TCM electronic control system warning lamp OFF	Off
CVT IND	Ignition switch ON	CVT warning lamp ON	On
		CVT warning lamp OFF	Off
CRUISE IND	Ignition switch ON	Cruise indicator lamp ON	On
		Cruise indicator lamp OFF	Off
SET IND	Ignition switch ON	SET indicator lamp ON	On
		SET indicator lamp OFF	Off
4WD LOCK SW	Ignition switch ON	4WD LOCK switch ON	On
		4WD LOCK switch OFF	Off
4WD LOCK IND	Ignition switch ON	4WD LOCK indicator lamp ON	On
		4WD LOCK indicator lamp OFF	Off
4WD W/L	Ignition switch ON	4WD warning lamp ON	On
		4WD warning lamp OFF	Off

NOTE:
Some items are not available according to vehicle specification.

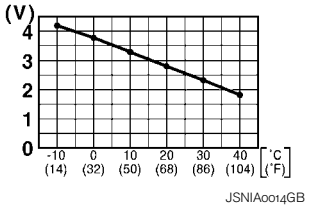
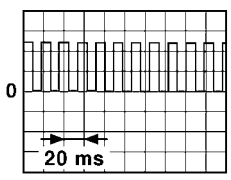
TERMINAL LAYOUT

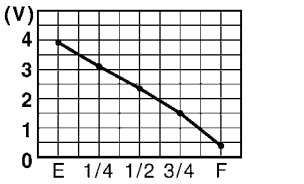


PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
1 (Y)	Ground	Battery power supply	Input	Ignition switch OFF	—	Battery voltage
2 (GR)	Ground	IGN signal	Input	Ignition switch ON	—	Battery voltage
3 (B)	Ground	Ground	—	Ignition switch ON	—	0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
11 (B)*1 (R)*2	Ground	Steering switch (trip computer) signal	Input	Ignition switch ON	Press the steering switch (trip computer)	0 V
					Other than the above	5 V
15 (W)	Ground	Air bag signal	Input	Ignition switch ON	Air bag warning lamp ON	4 V
					Air bag warning lamp OFF	0 V
19 (V)	Ground	OAT sensor signal	Input	Ignition switch ON	—	 JSNIA0014GB
20 (SB)	Ground	OAT sensor ground	—	Ignition switch ON	—	0 V
21 (L)	—	CAN-H	—	—	—	—
22 (P)	—	CAN-L	—	—	—	—
23 (B)	Ground	Ground	—	Ignition switch ON	—	0 V
24 (G)	Ground	Fuel level sensor signal ground	—	Ignition switch ON	—	0 V
25 (L)	Ground	Alternator signal	Input	Ignition switch ON	Charge warning lamp ON	0 V
					Charge warning lamp OFF	12 V
26 (V)	Ground	Parking brake switch signal	Input	Ignition switch ON	Parking brake ON	0 V
					Parking brake OFF	5 V
27 (BR)	Ground	Brake fluid level switch signal	Input	Ignition switch ON	Brake fluid level is normal	5 V
					Brake fluid level is less than LOW level	0 V
28 (SB)	Ground	Security signal	Input	Ignition switch ON	Security warning lamp ON	0 V
					Security warning lamp OFF	12 V
31 (Y)	Ground	Vehicle speed signal (8 pulse)	Output	Ignition switch ON	Vehicle speed is approximately 40 km/h (24.9 MPH)	**NOTE:** The maximum voltage varies depending on the specification (destination unit).  JSNIA0012GB

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (Y)	Ground	Oil level sensor signal	Input	Ignition switch ON	—	Refer to MWI-34, "Component Inspection". **NOTE:** The measurement cannot be performed because the signal is input for a moment with the ignition switch ON.
33 (P)	Ground	Oil level sensor signal ground	—	Ignition switch ON	—	0 V
34 (B)	Ground	Fuel level sensor signal	Input	Ignition switch ON	—	 JSNIA0322GB
35 (O)	Ground	Seat belt buckle switch signal (driver side)	Input	Ignition switch ON	When driver seat belt is fastened	5 V
					When driver seat belt is unfastened	0 V
36 (GR)	Ground	Seat belt buckle switch signal (passenger side)	Input	Ignition switch ON	• When getting in the passenger seat • When passenger seat belt is fastened	12 V
					• When getting in the passenger seat • When passenger seat belt is not fastened	0 V
37 (R/Y)	Ground	Not manual mode signal	Input	Ignition switch ON	Manual mode	12 V
					Other than the above	0 V
38 (LG)	Ground	Manual mode shift down signal	Input	Ignition switch ON	Selector lever down operation	0 V
					Other than the above	12 V
39 (G/W)	Ground	Manual mode shift up signal	Input	Ignition switch ON	Selector lever up operation	0 V
					Other than the above	12 V
40 (L)	Ground	Manual mode signal	Input	Ignition switch ON	Manual mode	0 V
					Other than the above	12 V

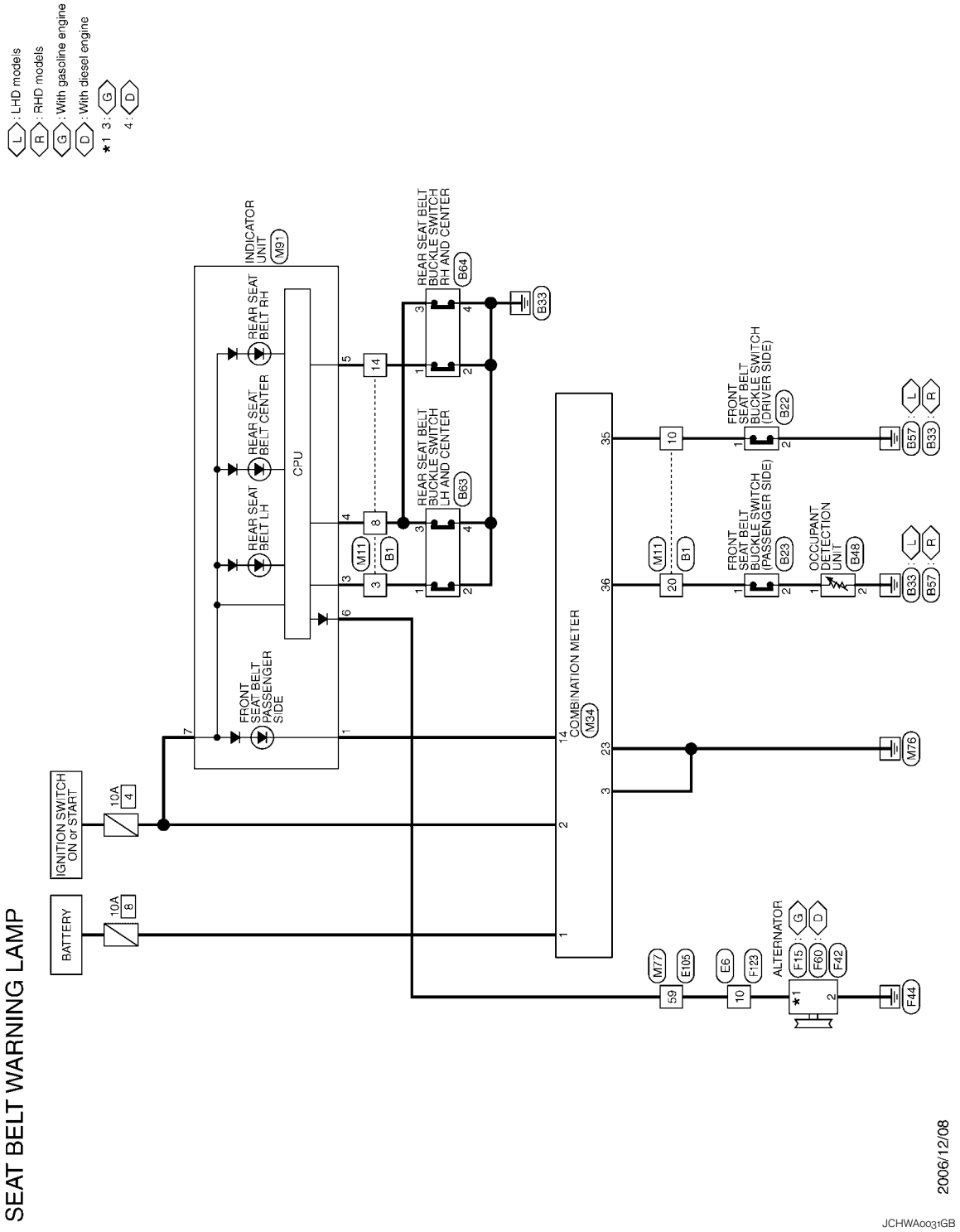
*1 : With NAVI
*2 : Without NAVI

cardiagn.com

Wiring Diagram - SEAT BELT WARNING LAMP CONTROL SYSTEM -

INFOID:0000000001102417

SEAT BELT WARNING LAMP



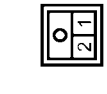
cardiagn.com

SEAT BELT WARNING LAMP

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
3	O	-
8	Y	-
10	O	-
14	GR	-
20	GR	-

Connector No.	B22
Connector Name	FRONT SEAT BELT BUCKLE SWITCH (DRIVER SIDE)
Connector Type	C02FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	B	-

Connector No.	B23
Connector Name	FRONT SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)
Connector Type	C02FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	LG	-

Connector No.	B48
Connector Name	OCCUPANT DETECTION UNIT
Connector Type	S02FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	B	-

Connector No.	B63
Connector Name	REAR SEAT BELT BUCKLE SWITCH LH AND CENTER
Connector Type	TH04FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	B	-
3	Y	-
4	B	-

Connector No.	B64
Connector Name	REAR SEAT BELT BUCKLE SWITCH RH AND CENTER
Connector Type	TH04FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	B	-
3	Y	-
4	B	-

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

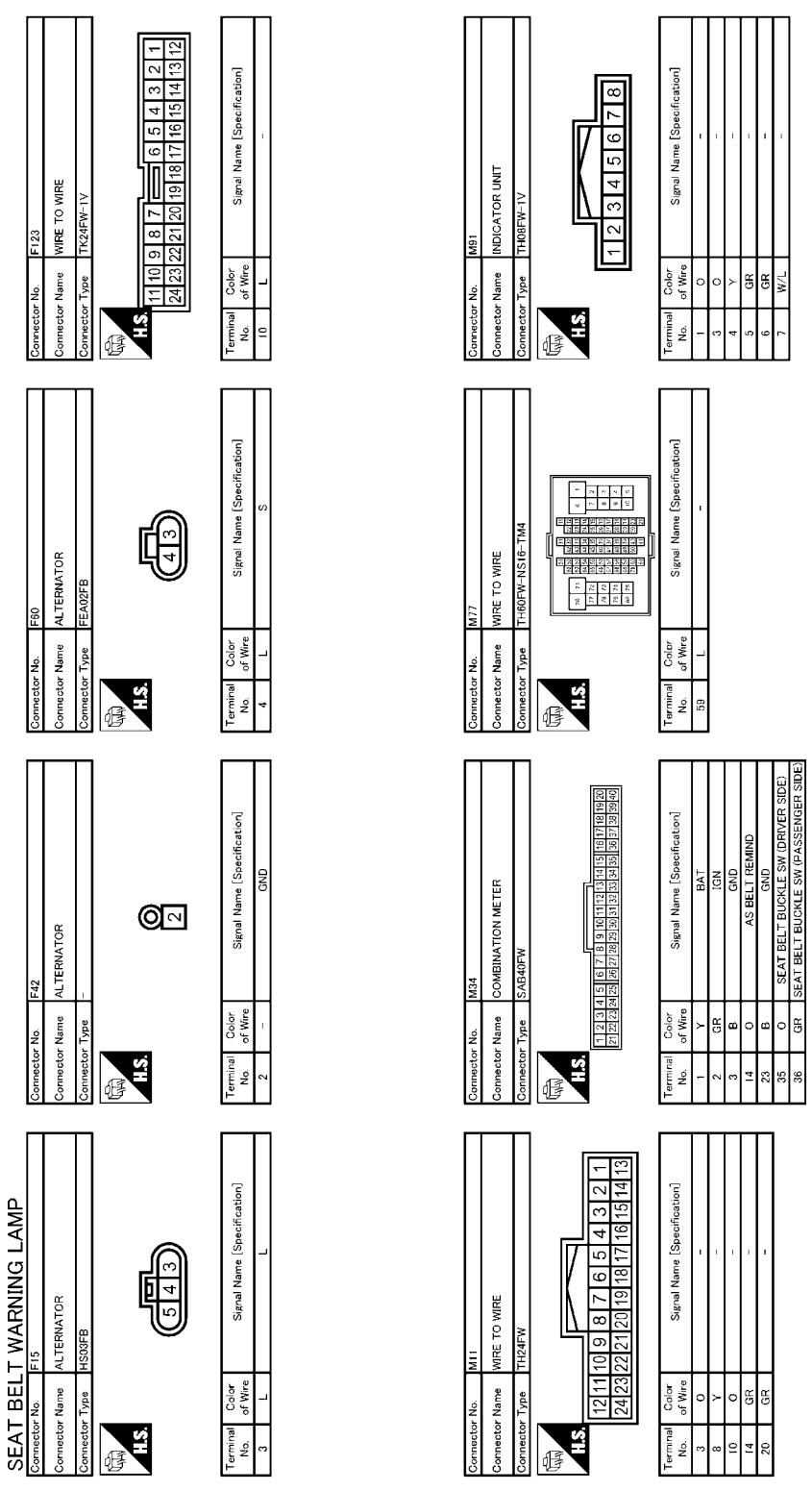
Terminal No.	Color of Wire	Signal Name [Specification]
10	L	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
59	L	-

JCHWA0032GB

cardiagn.com



JCHWA0033GB

Fail Safe

INFOID:0000000001102418

The combination meter activates the fail-safe control if the CAN communication lines between each unit are malfunctioning.

Function		Specifications
Speedometer		Reset to zero by suspending communication.
Tachometer		
Meter illumination control		Changed to nighttime mode.
Buzzer		Turned off by suspending communication.
Warning lamp/indicator lamp	ABS warning lamp	Turned on by suspending communication.
	Brake warning lamp	
	EPS OFF indicator lamp	
	VDC OFF indicator lamp	
	SLIP indicator lamp	
	CVT warning lamp	Turned off by suspending communication.
	Oil pressure warning lamp	
	Door warning lamp	
	Malfunction indicator lamp	
	CRUISE indicator lamp	
	Tail lamp indicator	
	Front fog indicator lamp	
	Rear fog indicator lamp	
	Glow indicator lamp	
	Malfunction indicator lamp 2	
	Trailer indicator lamp	
	Key R/G warning lamp	
	KEY LOCK warning lamp	
	High beam indicator lamp	
	Turn signal indicator lamp	

DTC Index

INFOID:0000000001102419

Display contents of CONSULT-III	Time	Diagnostic item is detected when ...	Refer to
CAN COMM CIRCUIT [U1000]	CRNT, 1 - 39	Combination meter is not transmitting or receiving CAN communication signal for 2 seconds or more.	MWI-26
VEHICLE SPEED [B2205]	CRNT, 1 - 39	The abnormal vehicle speed signal is input from ABS actuator and electric unit (control unit) for 2 seconds or more.	MWI-27

cardiagn.com

SYMPTOM DIAGNOSIS

DRIVER SIDE SEAT BELT WARNING LAMP DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000001080184

1. CHECK FRONT SEAT BELT BUCKLE SWITCH (DRIVER SIDE)

Check font seat belt buckle switch (driver side).
Refer to SBC-7, "Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2. CHECK COMBINATION METER

Check combination meter.
Refer to MWI-3, "Work Flow".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

PASSENGER SIDE SEAT BELT WARNING LAMP DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000001091054

1.CHECK FRONT SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)

Check front seat belt buckle switch (passenger side).
Refer to SBC-9, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident"
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

REAR SEAT BELT WARNING LAMP DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000001091055

1.CHECK REAR SEAT BELT BUCKLE SWITCH

Check rear seat belt buckle switch.
Refer to SBC-12, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

WARNING LAMP DOES NOT OPERATE EXCEPT FOR DRIVER SIDE

Diagnosis Procedure

INFOID:0000000001091242

1.CHECK INDICATOR UNIT POWER SUPPLY CIRCUIT

Check indicator unit power supply circuit.
Refer to SBC-6, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

DRIVER SIDE SEAT BELT WARNING LAMP DOES NOT TURN OFF

Diagnosis Procedure

INFOID:0000000001091152

1.CHECK FRONT SEAT BELT BUCKLE SWITCH (DRIVER SIDE)

Check font seat belt buckle switch (driver side).
Refer to SBC-7, "Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK COMBINATION METER

Check combination meter.
Refer to MWI-3, "Work Flow".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

PASSENGER SIDE SEAT BELT WARNING LAMP DOES NOT TURN OFF

Diagnosis Procedure

INFOID:0000000001091236

1.CHECK FRONT SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)

Check front seat belt buckle switch (passenger side).
Refer to SBC-9, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident"
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

REAR SEAT BELT WARNING LAMP DOES NOT TURN OFF

Diagnosis Procedure

INFOID:0000000001091237

1.CHECK REAR SEAT BELT BUCKLE SWITCH

Check rear seat belt buckle switch.
Refer to SBC-12, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

REAR SEAT BELT WARNING LAMP DOSE NOT TURN OFF AFTER A LAPSE OF SPECIFIED TIME

Diagnosis Procedure

INFOID:0000000001091060

1. CHECK ALTERNATOR SIGNAL CIRCUIT

Check alternator signal circuit.
Refer to SBC-15, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

PASSENGER SEAT IS OCCUPIED BUT SEAT BELT WARNING LAMP DOES NOT LIGHT UP

Diagnosis Procedure

INFOID:0000000001091238

1. CHECK FRONT SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)

Check front seat belt buckle switch (passenger side).
Refer to SBC-9, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident"
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001098109

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

cardiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000001059487

BASIC INSPECTION

1. INSPECTION START

1. Check the service history.
2. Check the following parts.

- Fuse/circuit breaker blown.
- Poor connection, open or short circuit of harness connector.
- Battery voltage.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Repair or replace the malfunctioning parts.

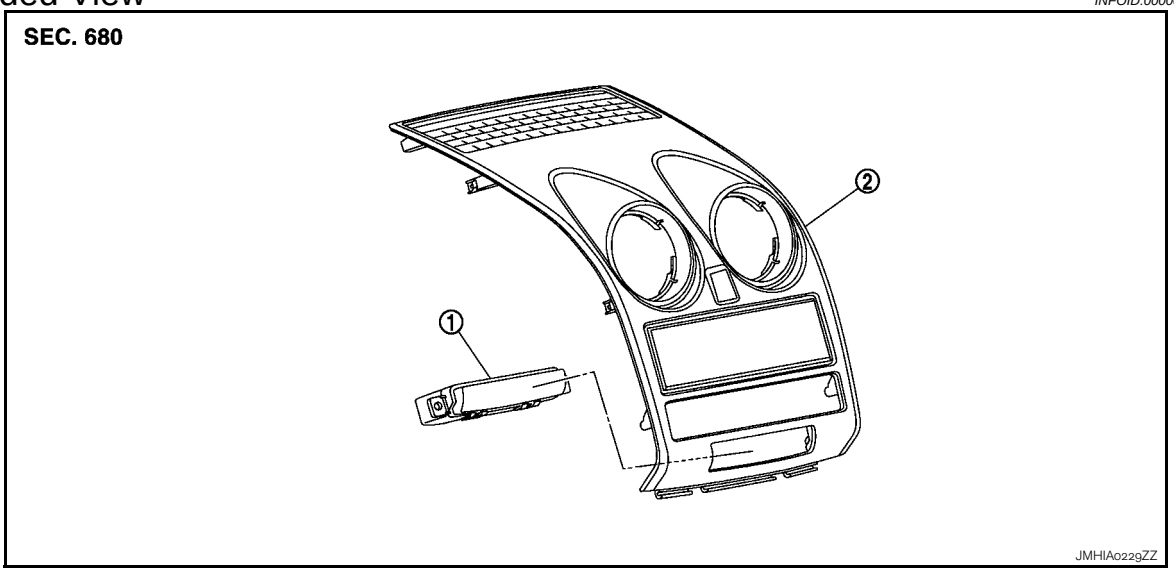
cardiagn.com

ON-VEHICLE REPAIR

INDICATOR UNIT

Exploded View

INFOID:0000000001090977



1. Indicator unit
2. Cluster lid C

Removal and Installation

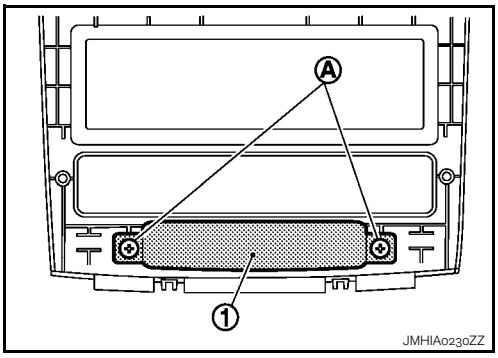
INFOID:0000000001059513

REMOVAL

CAUTION:

When removing and installing, use shop cloths to protect parts from damage.

1. Remove the battery negative terminal.
2. Remove the cluster lid C. Refer to IP-12, "Removal and Installation".
3. Remove the screws (A).
4. Remove indicator unit (1).



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

SECTION SB
SEAT BELT

CONTENTS

PRECAUTION 2

PRECAUTIONS 2
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 2
Precaution for Seat Belt Service 2

ON-VEHICLE REPAIR 3

FRONT SEAT BELT 3

SEAT BELT RETRACTOR 3
SEAT BELT RETRACTOR : Inspection 3
SEAT BELT RETRACTOR : Exploded View 5
SEAT BELT RETRACTOR : Removal and Installation 6

SEAT BELT BUCKLE 7
SEAT BELT BUCKLE : Inspection 7
SEAT BELT BUCKLE : Exploded View 8
SEAT BELT BUCKLE : Removal and Installation 8

REAR SEAT BELT 10

OUTER SEAT BELT RETRACTOR 10
OUTER SEAT BELT RETRACTOR : Inspection 10
OUTER SEAT BELT RETRACTOR : Exploded View 11
OUTER SEAT BELT RETRACTOR : Removal and Installation 12

CENTER SEAT BELT RETRACTOR 13
CENTER SEAT BELT RETRACTOR : Inspection 13
CENTER SEAT BELT RETRACTOR : Exploded View 14
CENTER SEAT BELT RETRACTOR : Removal and Installation 15

SEAT BELT BUCKLE 16
SEAT BELT BUCKLE : Inspection 16
SEAT BELT BUCKLE : Exploded View 16
SEAT BELT BUCKLE : Removal and Installation 17

LATCH SYSTEM FOR CHILDREN 18
Exploded View 18
Removal and Installation 18

TOP TETHER STRAP CHILD RESTRAINT 19
Removal and Installation 19

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001115377

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Seat Belt Service

INFOID:0000000001093940

CAUTION:

- **Before removing the front seat belt pre-tensioner assembly, turn the ignition switch off, disconnect both battery cables and wait at least 3 minutes.**
- **Do not use electrical test equipment for front seat belt pre-tensioner connector.**
- **After replacing or reinstalling front seat belt pre-tensioner assembly, or reconnecting front seat belt pre-tensioner connector, check the system function. Refer to SRC-10, "Diagnosis Description".**
- **Do not use disassembled buckle or seat belt assembly.**
- **Replace anchor bolts if they are deformed or worn out.**
- **Never oil tongue and buckle.**
- **If any component of seat belt assembly is questionable, do not repair. Replace the entire seat belt assembly.**
- **If webbing is cut, frayed or damaged, replace seat belt assembly.**
- **When replacing seat belt assembly, use a genuine NISSAN seat belt assembly.**

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attached hardware after any collision. NISSAN recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pre-tensioners should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident (i.e. torn webbing, bent retractor or guide).
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The front seat belt pre-tensioner should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

cardiagn.com

ON-VEHICLE REPAIR

FRONT SEAT BELT

SEAT BELT RETRACTOR

SEAT BELT RETRACTOR : Inspection

INFOID:0000000001093941

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attached hardware after any collision. NISSAN/INFINITI recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pretensioners should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident (i.e. torn webbing, bent retractor or guide, etc.).
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioners should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

PRELIMINARY CHECKS

1. Check the seat belt warning lamp/chime for proper operation as follows:

a. Turn ignition switch ON. The seat belt warning lamp should illuminate. Also, the seat belt warning chime should sound for about six seconds.

b. Fasten driver seat belt. The seat belt warning lamp should turn off and the chime (if sounding) should stop.

2. If the air bag warning lamp is blinking, conduct self-diagnosis with CONSULT-III and air bag warning lamp. Refer to SRC-10, "Diagnosis Description".

3. Check that the seat belt retractor, seat belt anchor and buckle bolts are securely attached.

4. Check the shoulder seat belt guide and shoulder belt height adjuster for front seats. Ensure guide swivels freely and that webbing lays flat and does not bind in guide. Ensure height adjuster operates properly and holds securely.

5. Check retractor operation:

a. Fully extend the seat belt webbing and check for twists, tears or other damage.

b. Allow the seat belt to retract. Ensure that webbing returns smoothly and completely into the retractor. If the seat belt does not return smoothly, wipe the inside of the loops with a clean paper cloth. Because dirt build-up in the loops of the upper anchors can cause the seat belts to retract slowly.

c. Fasten the seat belt. Check that seat belt returns smoothly and completely to the retractor. If the webbing does not return smoothly, the cause may be an accumulation of dust or dirt. Use the “SEAT BELT TAPE SET” and perform the following steps.

Inspect the front seat belt through-anchor

1. Pull the seat belt out to a length of 500 mm (19.69 in) or more.
2. Fix the seat belt at the center pillar webbing opening with a clip or other device.
3. Pass a thin wire through the through-anchor webbing opening. Hold both ends of the wire and pull it tauntly while moving it up and down several times along the webbing opening surface to remove dirt stuck there.
4. Any dirt that cannot be removed with the wire can be removed by cleaning the opening with a clean cloth.
5. Apply tape at the point where the webbing contacts the through-anchor webbing opening.
   NOTE:
   Apply the tape so that there is no looseness or wrinkling.

cardiagn.com

6. Remove the clip fixing the seat belt and check that the webbing returns smoothly.

6. Repeat steps above as necessary to check the other seat belts.

SEAT BELT RETRACTOR ON-VEHICLE CHECK

Emergency Locking Retractors (ELR) and Automatic Locking Retractors (ALR)

NOTE:

All seat belt retractors are Emergency Locking Retractors (ELR) type. In an emergency (sudden stop) the retractor will lock and prevent the webbing from extending any further. All 3-point type seat belt retractors except the driver seat belt also have an Automatic Locking Retractors (ALR) mode. The ALR mode (also called child restraint mode) is used when installing child seats. The ALR mode is activated when the seat belt is fully extended. When the webbing is then retracted partially, the ALR mode automatically locks the seat belt in a specific position so the webbing cannot be extended any further. To cancel the ALR mode, allow the seat belt to fully wind back into the retractor.

Check the seat belt retractors with the following test(s) to determine if a retractor assembly is operating properly.

ELR Function Stationary Check

Grasp the shoulder webbing and pull forward quickly. The retractor should lock and prevent the belt from extending further.

ALR Function Stationary Check

1. Pull out the entire length of seat belt from retractor until a click is heard.
2. Retract the webbing partially. A clicking noise should be heard as the webbing retracts indicating that the retractor is in the Automatic Locking Retractors (ALR) mode.
3. Grasp the seat belt and try to pull out the retractor. The webbing must lock and not extend any further. If NG, replace the retractor assembly.
4. Allow the entire length of the webbing to retract to cancel the automatic locking mode.

ELR Function Moving Check

WARNING:

Perform the following test in a safe, open area clear of other vehicles and obstructions (for example, a large, empty parking lot). Road surface must be paved and dry. DO NOT perform the following test on wet or gravel roads or on public streets and highways. This could result in an accident and serious personal injury. The driver and passenger must be prepared to brace themselves in the event that the retractor does not lock.

1. Fasten driver seat belt. Buckle a passenger into the seat for the belt that is to be tested.
2. Proceed to the designated safe area.
3. Drive the vehicle at approximately 16 km/h (10 MPH). Notify any passengers of a pending sudden stop and the driver and passenger must be prepared to brace themselves in the event that the retractor does not lock, apply brakes firmly and make a very hard stop.

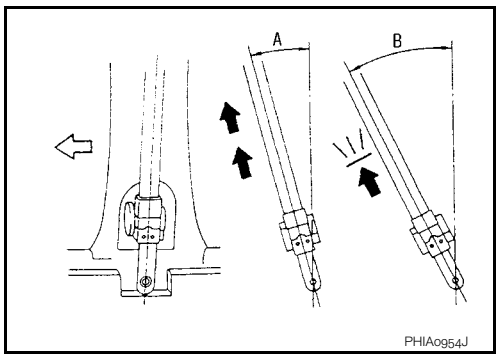
During stop, seat belts should lock and not be extended. If the seat belt retractor assembly does not lock, perform the retractor off-vehicle check.

SEAT BELT RETRACTOR OFF-VEHICLE CHECK

1. Remove the seat belt retractor.
   Remove the front seat belt assembly, refer to SB-5, "SEAT BELT RETRACTOR : Exploded View".
2. Slowly pull out webbing while tilting the retractor assembly forward from the mounted position without twisting the retractor assembly as shown in the illustration.

cardiagn.com

A : The webbing can be pulled out in case the retractor is tilted 15° degrees or less.
B : The webbing cannot be pulled out in case the retractor is tilted 27° degrees or more.
- A and B show tilting angles.
- ⇦ : Vehicle front.

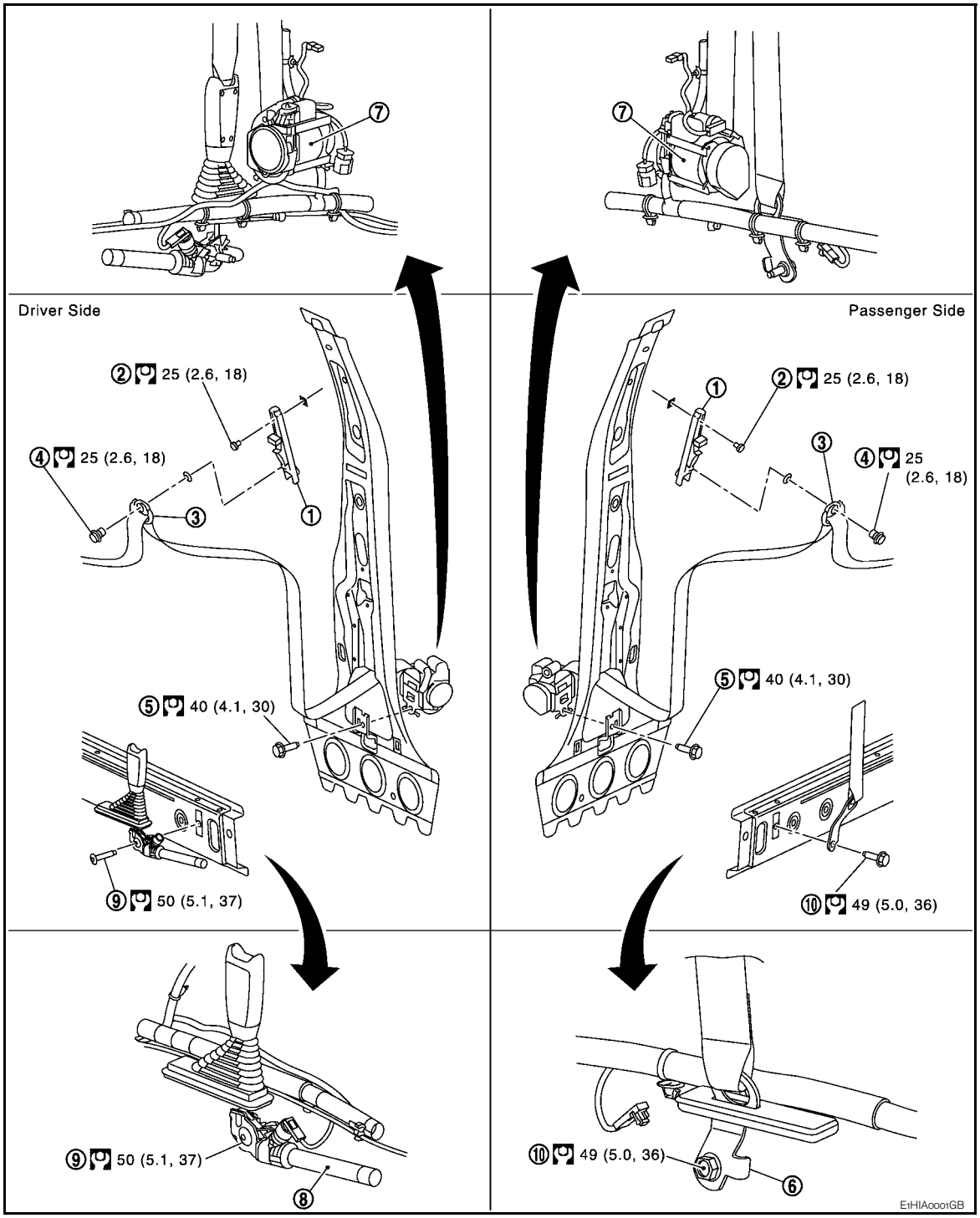


Replace the seat belt assembly if it does not operate normally.

SEAT BELT RETRACTOR : Exploded View

INFOID:0000000001093942

cardiagn.com



1. Seat belt shoulder adjuster
2. Seat belt shoulder adjuster fixing bolt
3. Shoulder anchor
4. Shoulder anchor fixing bolt
5. Seat belt retractor fixing bolt
6. Anchor plate
7. Seat belt retractor
8. Pre-tensionner
9. Pre-tensionner fixing bolt
10. Anchor plate fixing bolt

Refer to GI-3, "Contents" for symbols in the figure.

SEAT BELT RETRACTOR : Removal and Installation

INFOID:0000000001093943

REMOVAL

CAUTION:

cardiagn.com

Before servicing SRS, turn the ignition switch off, disconnect both battery cables and wait at least 3 minutes.

REMOVAL OF DRIVER SEAT BELT RETRACTOR

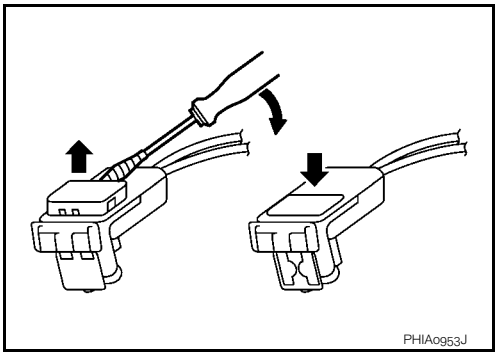
1. Remove rear kicking plate. Refer to INT-14, "Removal and Installation".
2. Remove upper and lower center pillar garnish. Refer to INT-14, "Removal and Installation".
3. Remove lower anchor.
   - Pull floor carpet.
   - Disconnect front seat belt pre-tensionner connector.
   - Remove pre-tensionner fixing bolt.
   - Push lower anchor through center pillar garnish.
4. Remove shoulder anchor.
   - Remove anchor fixing bolt.
5. Remove seat belt shoulder adjuster.
   - Remove upper fixing bolt.
   - Pull upward to release seat belt shoulder adjuster from center pillar.
6. Remove seat belt retractor.
   - Remove retractor fixing bolts.
   - Disconnect retractor connector.
   - Remove seat belt retractor.

REMOVAL OF PASSENGER SEAT BELT RETRACTOR

1. Remove rear kicking plate. Refer to INT-14, "Removal and Installation".
2. Remove upper and lower center pillar garnish. Refer to INT-14, "Removal and Installation".
3. Remove lower anchor.
   - Pull floor carpet.
   - Remove anchor plate finisher.
   - Remove anchor plate fixing bolt.
4. Remove shoulder anchor.
   - Remove anchor fixing bolt.
5. Remove seat belt shoulder adjuster.
   - Remove upper fixing bolt.
   - Pull upward to release seat belt shoulder adjuster from center pillar.
6. Remove seat belt retractor.
   - Remove retractor fixing bolts.
   - Disconnect retractor connector.
   - Remove seat belt retractor.

CAUTION:

- **For installing/removing seat belt pre-tensioner connector, insert thin screwdriver wrapped in tape into notch, lift lock and remove connector.**
- **Install connector with lock raised, and push lock into connector.**



INSTALLATION

Install in the reverse order of removal.

SEAT BELT BUCKLE

SEAT BELT BUCKLE : Inspection

INFOID:0000000001093944

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attached hardware after any collision. NISSAN/INFINITI recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pretensioners should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident (i.e. torn webbing, bent retractor or guide, etc.).
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioner should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

PRELIMINARY CHECKS

1. Check the seat belt warning lamp/chime for proper operation as follows:

a. Turn ignition switch ON. The seat belt warning lamp should illuminate. Also, the seat belt warning chime should sound for about six seconds.

b. Fasten driver seat belt. The seat belt warning lamp should turn off and the chime (if sounding) should stop.

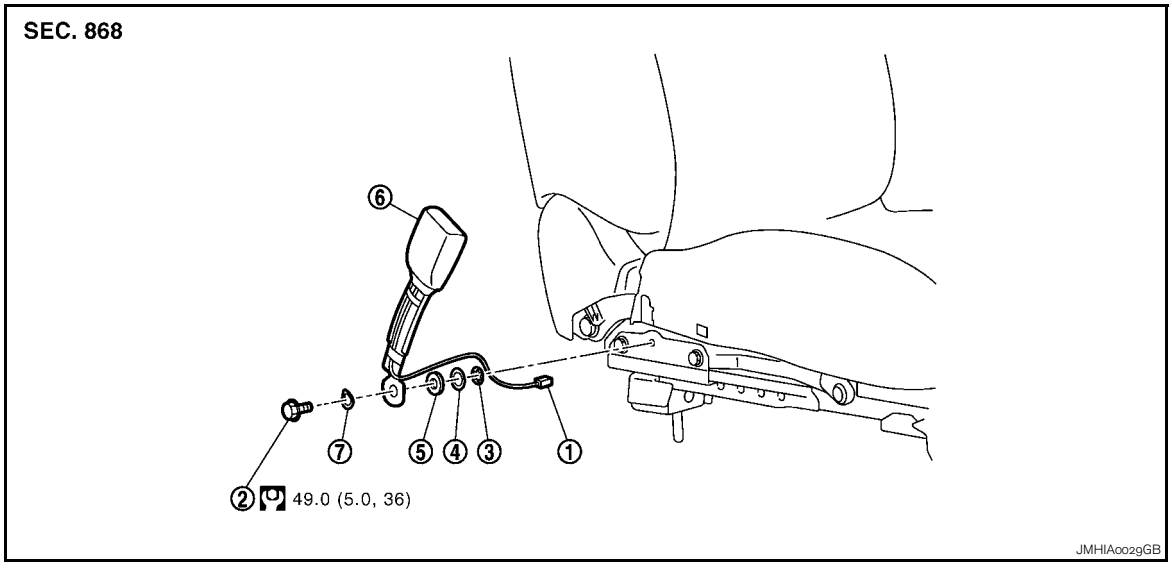
2. If the air bag warning lamp is blinking, conduct self-diagnosis using CONSULT-III and air bag warning lamp. Refer to SRC-10, "Diagnosis Description".

3. Check that the seat belt retractor, seat belt anchor and buckle bolts are securely attached.

4. Repeat steps above as necessary to check the other seat belts.

SEAT BELT BUCKLE : Exploded View

INFOID:0000000001093945



1. Seat belt buckle harness connector
2. Anchor bolt
3. Retaining washer
4. Washer
5. Spacer
6. Seat belt buckle
7. Wave washer

Refer to GI-3, "Contents" for symbols in the figure.

SEAT BELT BUCKLE : Removal and Installation

INFOID:0000000001093946

cardiagn.com

REMOVAL

Remove the seat belt buckle.

- Remove the front seat from vehicle. Refer to SE-24, "Removal and Installation".
- Remove front seat inner finisher. Refer to SE-25, "Disassembly and Assembly".
- Disconnect the seat belt buckle harness connector and harness clamp.
- Remove the seat belt buckle anchor fixing bolt.

INSTALLATION

Installation is basically the reverse order of removal.

cardiagn.com

REAR SEAT BELT
OUTER SEAT BELT RETRACTOR
OUTER SEAT BELT RETRACTOR : Inspection

INFOID:0000000001093947

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attached hardware after any collision. NISSAN/INFINITI recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pretensioners should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident (i.e. torn webbing, bent retractor or guide, etc.).
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioners should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

PRELIMINARY CHECKS

1. Check the seat belt warning lamp/chime for proper operation as follows:

a. Turn ignition switch ON. The seat belt warning lamp should illuminate. Also, the seat belt warning chime should sound for about six seconds.

b. Fasten driver seat belt. The seat belt warning lamp should turn off and the chime (if sounding) should stop.

2. If the air bag warning lamp is blinking, conduct self-diagnosis with CONSULT-III and air bag warning lamp. Refer to SRC-10, "Diagnosis Description".

3. Check that the seat belt retractor, seat belt anchor and buckle bolts are securely attached.

4. Check retractor operation:

a. Fully extend the seat belt webbing and check for twists, tears or other damage.

b. Allow the seat belt to retract. Ensure that webbing returns smoothly and completely into the retractor. If the seat belt does not return smoothly, wipe the inside of the loops with a clean paper cloth. Because dirt build-up in the loops of that upper anchors can cause the seat belts to retract slowly.

c. Fasten the seat belt. Check the seat belt returns smoothly and completely to the retractor. If the webbing does not return smoothly, the cause may be an accumulation of dust or dirt. Use the “SEAT BELT TAPE SET” and perform the following steps.

5. Repeat steps above as necessary to check the other seat belts.

SEAT BELT RETRACTOR ON-VEHICLE CHECK

Emergency Locking Retractors (ELR) and Automatic Locking Retractors (ALR)

NOTE:

All seat belt retractors are Emergency Locking Retractors (ELR) type. In an emergency (sudden stop) the retractor will lock and prevent the webbing from extending any further. All 3-point type seat belt retractors except the driver's seat belt also have an Automatic Locking Retractors (ALR) mode. The ALR mode (also called child restraint mode) is used when installing child seats. The ALR mode is activated when the seat belt is fully extended. When the webbing is then retracted partially, the ALR mode automatically locks the seat belt in a specific position so the webbing cannot be extended any further. To cancel the ALR mode, allow the seat belt to fully wind back into the retractor.

Check the seat belt retractors with the following test(s) to determine if a retractor assembly is operating properly.

ELR Function Stationary Check

cardiagn.com

Grasp the shoulder webbing and pull forward quickly. The retractor should lock and prevent the belt from extending further.

ALR Function Stationary Check

1. Pull out the entire length of seat belt from retractor until a click is heard.
2. Retract the webbing partially. A clicking noise should be heard as the webbing retracts indicating that the retractor is in the Automatic Locking Retractors (ALR) mode.
3. Grasp the seat belt and try to pull out the retractor. The webbing must lock and not extend any further. If NG, replace the retractor assembly.
4. Allow the entire length of the webbing to retract to cancel the automatic locking mode.

ELR Function Moving Check

WARNING:

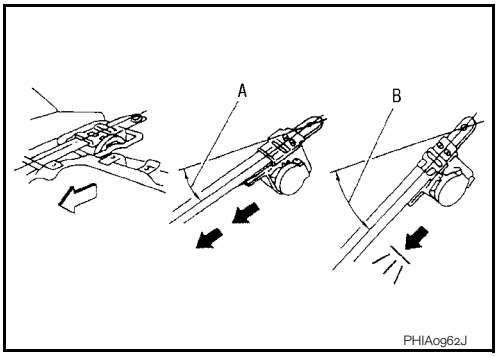
Perform the following test in a safe, open area clear of other vehicles and obstructions (for example, a large, empty parking lot). Road surface must be paved and dry. DO NOT perform the following test on wet or gravel roads or on public streets and highways. This could result in an accident and serious personal injury. The driver and passenger must be prepared to brace themselves in the event that the retractor does not lock.

1. Fasten driver seat belt. Buckle a passenger into the seat for the belt that is to be tested.
2. Proceed to the designated safe area.
3. Drive the vehicle at approximately 16 km/h (10 MPH). Notify any passengers of a pending sudden stop and the driver and passenger must be prepared to brace themselves in the event that the retractor does not lock, apply brakes firmly and make a very hard stop.

During stop, seat belts should lock and not be extended. If the seat belt retractor assembly does not lock, perform the retractor off-vehicle check.

SEAT BELT RETRACTOR OFF-VEHICLE CHECK

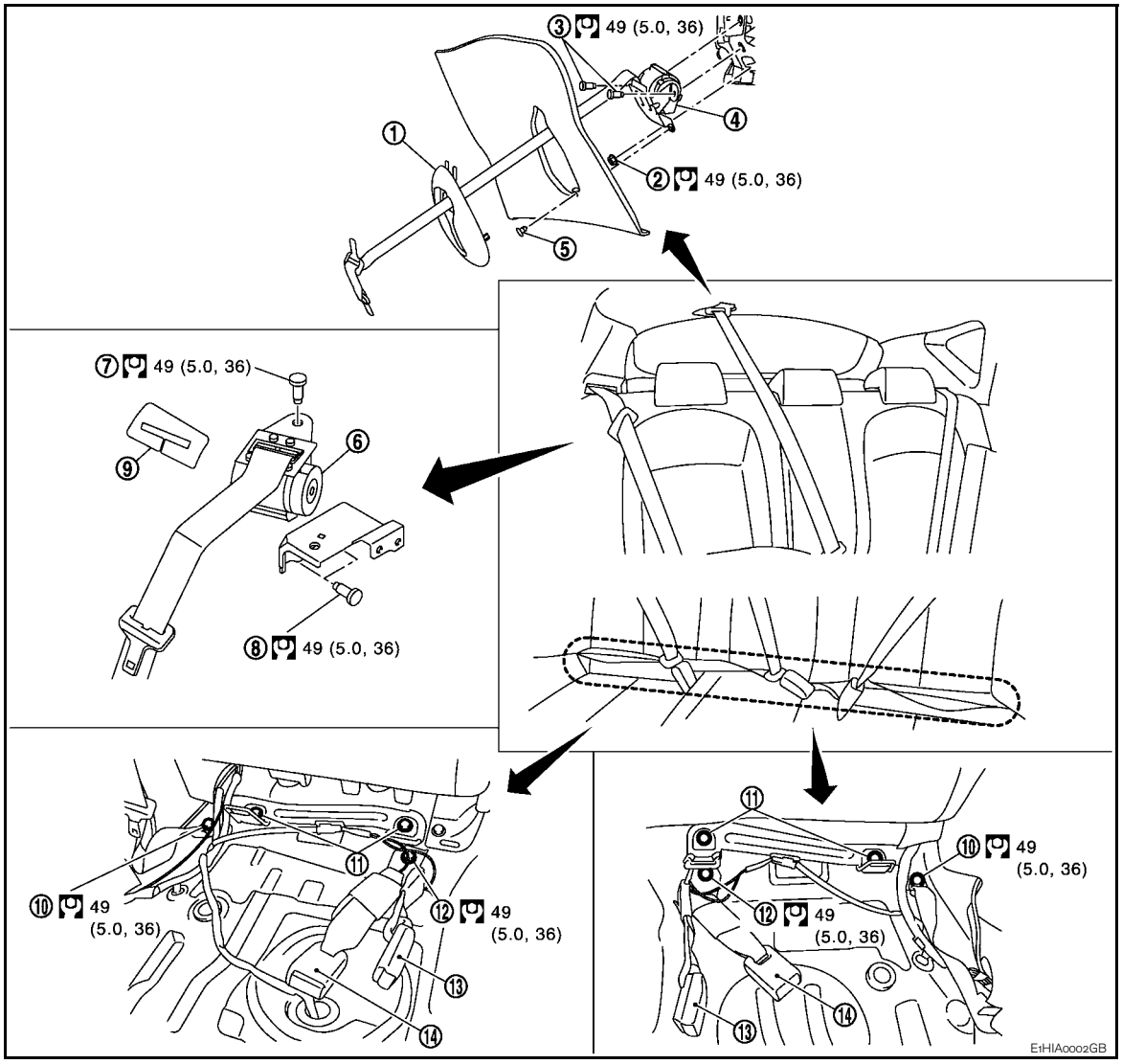
1. Remove the seat belt retractor.
   Remove the rear seat belt assembly, refer to SB-12, "OUTER SEAT BELT RETRACTOR : Removal and Installation".
2. Slowly pull out webbing while tilting the retractor assembly forward from the mounted position without twisting the retractor assembly as shown in the illustration.
   A : The webbing can be pulled out in case the retractor is tilted 15° degrees or less.
   B : The webbing cannot be pulled out in case the retractor is tilted 27° degrees or more.
   - A and B show tilting angles.
   - ⇦ : Vehicle front.



Replace the seat belt assembly if it does not operate normally.

OUTER SEAT BELT RETRACTOR : Exploded View

INFOID:0000000001093948



1. Center seat belt retractor finisher	2. Center seat belt retractor fixing nut	3. Center seat belt retractor fixing bolts
4. Center seat belt retractor	5. Clip	6. Side seat belt retractor
7. Side seat belt retractor fixing bolt	8. Side seat belt retractor bracket fixing bolt	9. Side seat belt retractor cover
10. Anchor bolt	11. Latch fixing bolts	12. Seat belt buckle fixing bolt
13. Outer seat belt buckle	14. Center seat belt buckle	

Refer to GI-3, "Contents" for symbols in the figure.

OUTER SEAT BELT RETRACTOR : Removal and Installation

INFOID:0000000001093949

REMOVAL

1. Remove outer anchor.
   - Remove rear seat cushion. Refer to SE-31, "Removal and Installation".
   - Remove the outer lower anchor fixing bolt and the outer lower anchor.
2. Remove center kicking plate. Refer to INT-14, "Removal and Installation".
3. Remove rear kicking plate. Refer to INT-14, "Removal and Installation".
4. Remove lower and upper rear trim. Refer to INT-14, "Removal and Installation".
5. Remove side seat belt retractor.
   - Remove retractor fixing bolt.
   - Release seat bolt finisher.
   - Push seat belt tongue through trim finisher

cardiagn.com

6. Remove outer seat belt retractor support
   - Remove outer seat belt retractor support fixing bolts

INSTALLATION

Install in the reverse order of removal.

CENTER SEAT BELT RETRACTOR

CENTER SEAT BELT RETRACTOR : Inspection

INFOID:0000000001109218

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attached hardware after any collision. NISSAN/INFINITI recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pretensioners should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident (i.e. torn webbing, bent retractor or guide, etc.).
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioners should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

PRELIMINARY CHECKS

1. Check the seat belt warning lamp/chime for proper operation as follows:

a. Turn ignition switch ON. The seat belt warning lamp should illuminate. Also, the seat belt warning chime should sound for about six seconds.

b. Fasten driver seat belt. The seat belt warning lamp should turn off and the chime (if sounding) should stop.

2. If the air bag warning lamp is blinking, conduct self-diagnosis with CONSULT-III and air bag warning lamp. Refer to SRC-10, "Diagnosis Description".
3. Check that the seat belt retractor, seat belt anchor and buckle bolts are securely attached.
4. Check retractor operation:

a. Fully extend the seat belt webbing and check for twists, tears or other damage.

b. Allow the seat belt to retract. Ensure that webbing returns smoothly and completely into the retractor. If the seat belt does not return smoothly, wipe the inside of the loops with a clean paper cloth. Because dirt build-up in the loops of that upper anchors can cause the seat belts to retract slowly.

c. Fasten the seat belt. Check the seat belt returns smoothly and completely to the retractor. If the webbing does not return smoothly, the cause may be an accumulation of dust or dirt. Use the “SEAT BELT TAPE SET” and perform the following steps.

5. Repeat steps above as necessary to check the other seat belts.

SEAT BELT RETRACTOR ON-VEHICLE CHECK

Emergency Locking Retractors (ELR) and Automatic Locking Retractors (ALR)

NOTE:

All seat belt retractors are Emergency Locking Retractors (ELR) type. In an emergency (sudden stop) the retractor will lock and prevent the webbing from extending any further. All 3-point type seat belt retractors except the driver's seat belt also have an Automatic Locking Retractors (ALR) mode. The ALR mode (also called child restraint mode) is used when installing child seats. The ALR mode is activated when the seat belt is fully extended. When the webbing is then retracted partially, the ALR mode automatically locks the seat belt in a specific position so the webbing cannot be extended any further. To cancel the ALR mode, allow the seat belt to fully wind back into the retractor.

Check the seat belt retractors with the following test(s) to determine if a retractor assembly is operating properly.

ELR Function Stationary Check

Grasp the shoulder webbing and pull forward quickly. The retractor should lock and prevent the belt from extending further.

ALR Function Stationary Check

1. Pull out the entire length of seat belt from retractor until a click is heard.
2. Retract the webbing partially. A clicking noise should be heard as the webbing retracts indicating that the retractor is in the Automatic Locking Retractors (ALR) mode.
3. Grasp the seat belt and try to pull out the retractor. The webbing must lock and not extend any further. If NG, replace the retractor assembly.
4. Allow the entire length of the webbing to retract to cancel the automatic locking mode.

ELR Function Moving Check

WARNING:

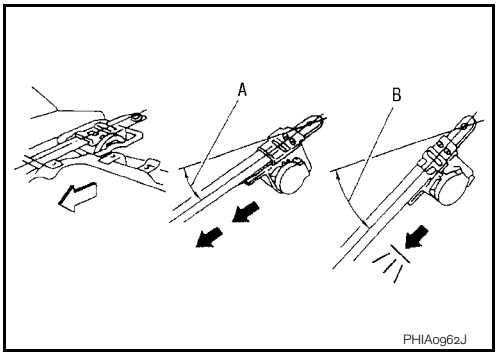
Perform the following test in a safe, open area clear of other vehicles and obstructions (for example, a large, empty parking lot). Road surface must be paved and dry. DO NOT perform the following test on wet or gravel roads or on public streets and highways. This could result in an accident and serious personal injury. The driver and passenger must be prepared to brace themselves in the event that the retractor does not lock.

1. Fasten driver seat belt. Buckle a passenger into the seat for the belt that is to be tested.
2. Proceed to the designated safe area.
3. Drive the vehicle at approximately 16 km/h (10 MPH). Notify any passengers of a pending sudden stop and the driver and passenger must be prepared to brace themselves in the event that the retractor does not lock, apply brakes firmly and make a very hard stop.

During stop, seat belts should lock and not be extended. If the seat belt retractor assembly does not lock, perform the retractor off-vehicle check.

SEAT BELT RETRACTOR OFF-VEHICLE CHECK

1. Remove the seat belt retractor.
   Remove the rear seat belt assembly, refer to SB-15, "CENTER SEAT BELT RETRACTOR : Removal and Installation".
2. Slowly pull out webbing while tilting the retractor assembly forward from the mounted position without twisting the retractor assembly as shown in the illustration.
   A : The webbing can be pulled out in case the retractor is tilted 15° degrees or less.
   B : The webbing cannot be pulled out in case the retractor is tilted 27° degrees or more.
   - A and B show tilting angles.
   - ⇦ : Vehicle front.

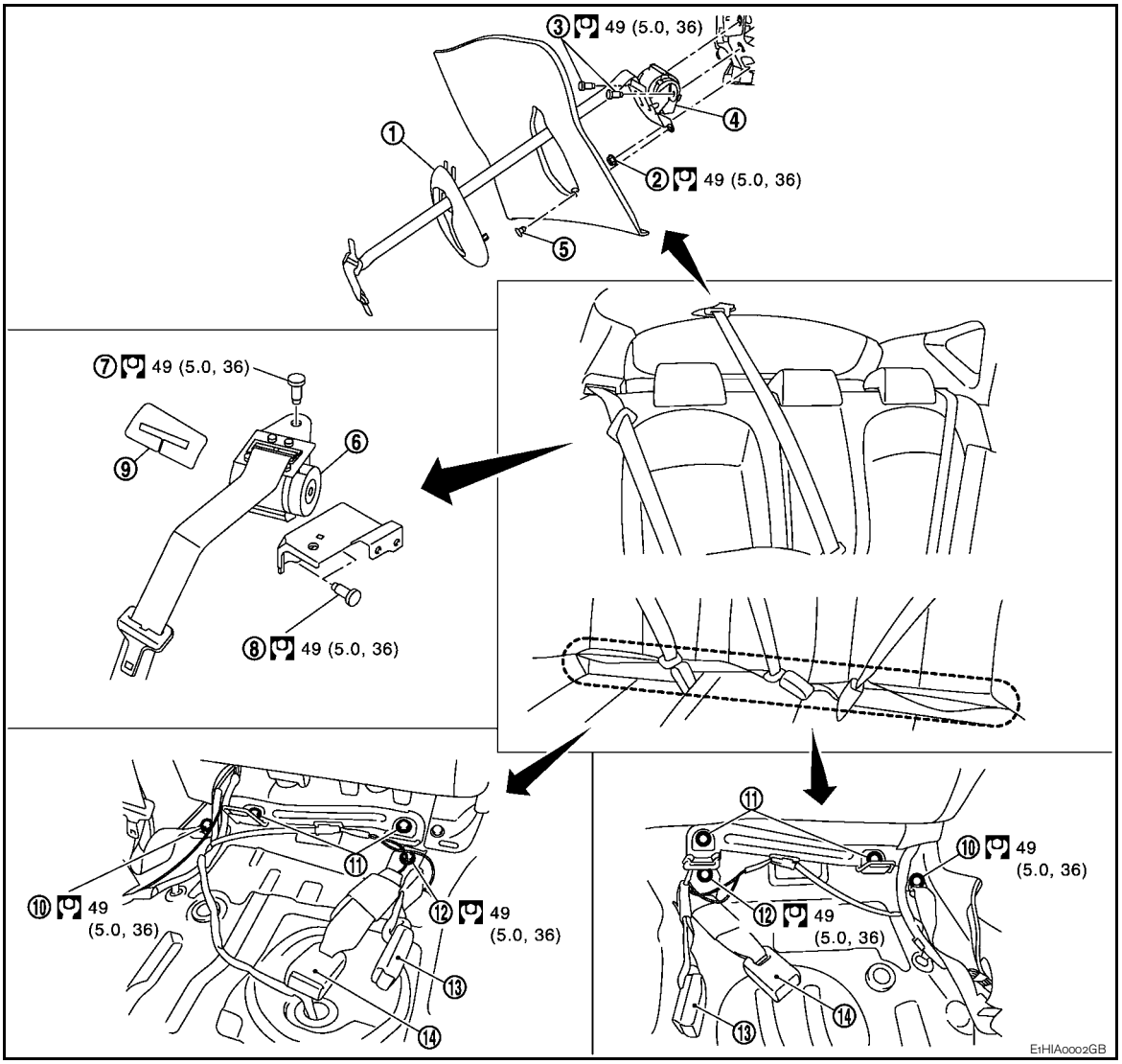


Replace the seat belt assembly if it does not operate normally.

CENTER SEAT BELT RETRACTOR : Exploded View

INFOID:0000000001109219

cardiagn.com



1. Center seat belt retractor finisher
2. Center seat belt retractor fixing nut
3. Center seat belt retractor fixing bolts
4. Center seat belt retractor
5. Clip
6. Side seat belt retractor
7. Side seat belt retractor fixing bolt
8. Side seat belt retractor bracket fixing bolt
9. Side seat belt retractor cover
10. Anchor bolt
11. Latch fixing bolts
12. Seat belt buckle fixing bolt
13. Outer seat belt buckle
14. Center seat belt buckle

Refer to GI-3, "Contents" for symbols in the figure.

CENTER SEAT BELT RETRACTOR : Removal and Installation

INFOID:0000000001109220

REMOVAL

1. Remove seat belt retractor finisher.
   - Release rear pawls from the roof.
   - Release pawls from seat belt retractor.
   - Slide down and pull backward.
2. Remove upper back trim (LH/RH). Refer EI.
3. Remove holder (RH/LH). Refer EI.
4. Remove rear headlining.

CAUTION:
Use safety glove to avoid the damage of headlining.

5. Remove center seat belt retractor.

A B C D E F G SB I J K L M N O P
cardiagn.com

- Remove fixing bolts and fixing nut.

INSTALLATION

Installation is basically the reverse order of removal.

SEAT BELT BUCKLE

SEAT BELT BUCKLE : Inspection

INFOID:0000000001093950

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attached hardware after any collision. NISSAN/INFINITI recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pretensioners should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident. (i.e. torn webbing, bent retractor or guide, etc.)
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioner should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

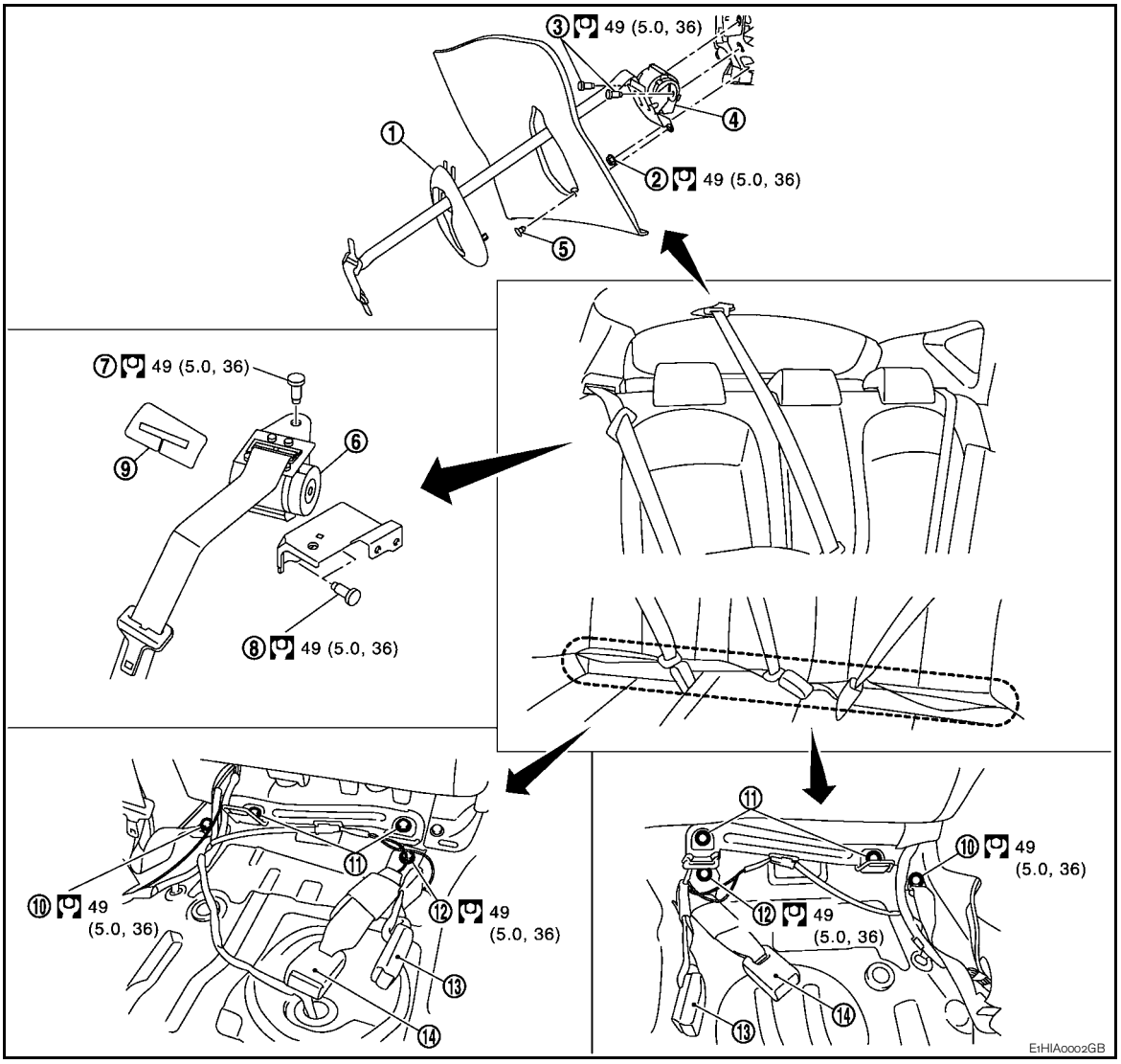
PRELIMINARY CHECKS

1. Check that the seat belt retractor, seat belt anchor and buckle bolts are securely attached.
2. Repeat step above as necessary to check the other seat belts.

SEAT BELT BUCKLE : Exploded View

INFOID:0000000001093951

cardiagn.com



1. Center seat belt retractor finisher	2. Center seat belt retractor fixing nut	3. Center seat belt retractor fixing bolts
4. Center seat belt retractor	5. Clip	6. Side seat belt retractor
7. Side seat belt retractor fixing bolt	8. Side seat belt retractor bracket fixing bolt	9. Side seat belt retractor cover
10. Anchor bolt	11. Latch fixing bolts	12. Seat belt buckle fixing bolt
13. Outer seat belt buckle	14. Center seat belt buckle	

Refer to GI-3, "Contents" for symbols in the figure.

SEAT BELT BUCKLE : Removal and Installation

INFOID:0000000001093952

REMOVAL

Remove the seat belt buckle.

- Remove the rear seat cushion. Refer to SE-31, "Removal and Installation".
- Remove the center anchor fixing bolt.

INSTALLATION

Installation is basically in the reverse order of removal.

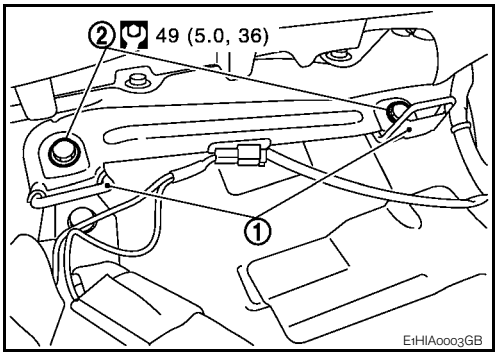
LATCH SYSTEM FOR CHILDREN

Exploded View

INFOID:0000000001093953

1. LATCH system

Refer to GI-3, "Contents" for symbols in the figure.



Removal and Installation

INFOID:0000000001093954

REMOVAL

CAUTION:

Replace anchor bolts if they are deformed or worn out.

1. Remove the rear seat cushion. Refer to SE-31, "Removal and Installation".
2. Remove LATCH (Lower Anchor and Tether for Children) system.

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

TOP TETHER STRAP CHILD RESTRAINT

Removal and Installation

INFOID:0000000001093956

REMOVAL

CAUTION:

Replace anchor bolts if they are deformed or worn out.

1. Remove the top tether strap child restraint cover. Refer to INT-14, "Exploded View".
2. Remove the top tether strap child restraint.

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

SECTION SE
SEAT

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
Work Flow 3

FUNCTION DIAGNOSIS 4

HEATED SEAT 4
System Description 4
Component Parts Location 4
Component Description 4

COMPONENT DIAGNOSIS 5

HEATED SEAT POWER SUPPLY AND GROUND CIRCUIT 5
Component Function Check 5
Diagnosis Procedure 5

HEATED SEAT SWITCH 6
Description 6
Component Function Check 6
Diagnosis Procedure 6
Component Inspection 6

SEAT HEATER 8
Description 8
Component Function Check 8
Diagnosis Procedure 8
Component Inspection 8

HEATED SEAT 9
Wiring Diagram - HEATED SEAT SYSTEM - 9

SYMPTOM DIAGNOSIS 11

BOTH DRIVER SEAT HEATER AND PASSENGER SEAT HEATER DO NOT OPERATE 11
Diagnosis Procedure 11

BOTH DRIVER SEAT HEATER AND PASSENGER SEAT HEATER DO NOT OPERATE 12
Diagnosis Procedure 12

PASSENGER SIDE HEATER DOES NOT OPERATE 13
Diagnosis Procedure 13

SQUEAK AND RATTLE TROUBLE DIAGNOSIS 14
Work Flow 14
Inspection Procedure 16
Diagnostic Worksheet 18

PRECAUTION 20

PRECAUTIONS 20
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 20
Service Notice 20
Precaution for Work 20

PREPARATION 21

PREPARATION 21
Commercial Service Tool 21

ON-VEHICLE MAINTENANCE 22

PRE-INSPECTION FOR DIAGNOSTIC 22
Basic Inspection 22

ON-VEHICLE REPAIR 23

FRONT SEAT 23
Exploded View 23
Removal and Installation 24
Disassembly and Assembly 25

REAR SEAT .....

Exploded View 30
Removal and Installation 31
Disassembly and Assembly 31

HEATED SEAT SWITCH 35
Exploded View 35
Removal and Installation 35

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001059405

DETAILED FLOW

1.OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings the vehicle in.

>> GO TO 2.

2.REPRODUCE THE MALFUNCTION INFORMATION

Check the malfunction on the vehicle that the customer describes.
Inspect the relation of the symptoms and the condition when the symptoms occur.

>> GO TO 3.

3.PERFORM “BASIC INSPECTION”

Perform the basic inspection.Refer to SE-22, "Basic Inspection".

>> GO TO 4.

4.IDENTIFY THE MALFUNCTIONING SYSTEM WITH “SYMPTOM DIAGNOSIS”

Use “Symptom diagnosis” from the symptom inspection result in step 2. Then identify where to start performing the diagnosis based on possible causes and symptoms.

>> GO TO 5.

5.IDENTIFY MALFUNCTIONING PARTS WITH “COMPONENT DIAGNOSIS”

Perform the diagnosis with “Component diagnosis” of the applicable system.

>> GO TO 6.

6.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 7.

7.FINAL CHECK

Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 2.

Is the malfunctioning part repaired or replaced?

YES >> Trouble diagnosis is completed.
NO >> GO TO 3.

carmanualsgn.com

FUNCTION DIAGNOSIS

HEATED SEAT

System Description

INFOID:0000000001059412

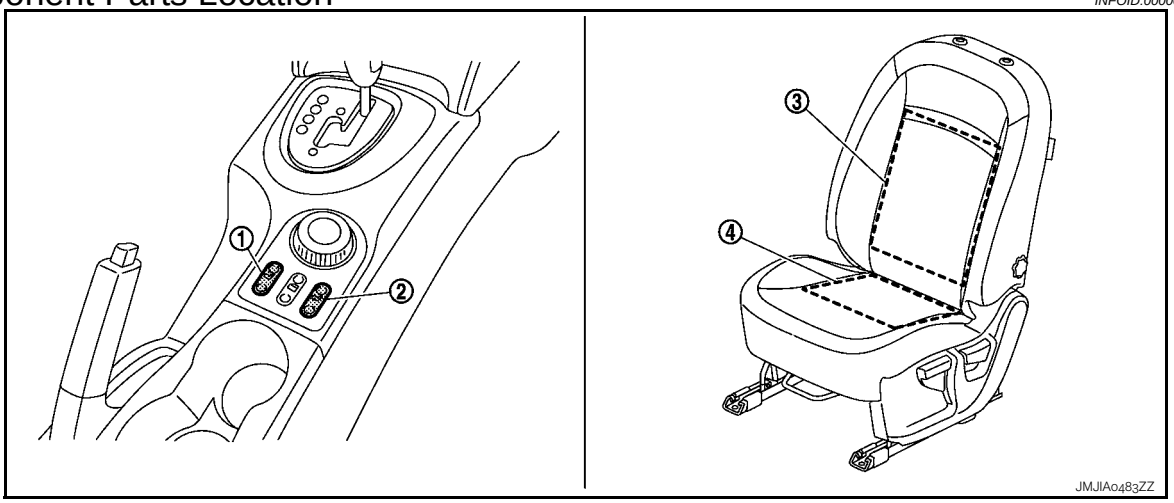
Heated seat is a system that operates when ignition switch is in ON or START position.

HEATER OPERATION

- While operating the heated seat switch, seat cushion heater and seat back heater operate.
- Temperature of seat can be adjusted by operating on heated seat switch.

Component Parts Location

INFOID:0000000001059413



1. Heated seat switch (LH) M56
2. Heated seat switch (RH) M55
3. Seat back heater unit
4. Seat cushion heater unit

Component Description

INFOID:0000000001059414

Item	Function
Heated seat switch	• Power is supplied to each heater. • Depending on LOW/HIGH position of switch, operating heater number is changeable.
Seat cushion heater	Built-in seat cushion, the heater operates with the power supplied by heater seat switch.
Seat back heater	Built-in seatback, the heater operates with the power supplied by heater seat switch.

cardiagn.com

COMPONENT DIAGNOSIS

HEATED SEAT POWER SUPPLY AND GROUND CIRCUIT

Component Function Check

INFOID:0000000001059420

1.CHECK HEATED SEAT FUNCTION

1. Turn ignition switch ON.
2. Check operation of heated seat with heated seat switch.

Is the inspection result normal?

YES >> Heated seat power supply and ground circuit are OK.
NO >> Refer to SE-5, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001059421

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect heated seat switch connector.
3. Check voltage between heated seat switch (LH) and ground.

Terminals			Voltage (V) (Approx.)
(+)		(-)	
Heated seat switch connector	Terminal		
M55	3	Ground	Battery voltage

4. Check voltage between heated seat switch (RH) and ground.

Terminals			Voltage (V) (Approx.)
(+)		(-)	
Heated seat switch connector	Terminal		
M56	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace power supply circuit.

2.CHECK GROUND CIRCUIT

1. Check continuity between heated seat switch (LH) and ground.

Heated seat switch connector	Terminal		Continuity
M55	5	Ground	Existed
	6		

2. Check continuity between heated seat switch (RH) and ground.

Heated seat switch connector	Terminal		Continuity
M56	5	Ground	Existed
	6		

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace ground circuit.

HEATED SEAT SWITCH

Description

INFOID:0000000001059434

- Power is supplied to each heater.
- Temperature of seat can be adjusted by operating on heated seat switch.

Component Function Check

INFOID:0000000001059435

1.CHECK HEATED SEAT SWITCH FUNCTION

1. Turn ignition switch ON.
2. Check heated seat operation with heated seat switch.

Is the inspection results normal?

YES >> Power seat switch is OK.
NO >> Refer to SE-6, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001059436

1.CHECK HEATED SEAT SWITCH SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect heated seat switch and heated seat connector.
3. Check continuity between heated seat switch and heated seat connector.

Heated seat switch connector	Terminal	Heated seat connector	Terminal	Continuity
M55 (LH) M56 (RH)	2	B20 (LH) B21 (RH)	3	Existed
	4		1	

4. Check continuity between heated seat switch and ground.

Heated seat switch connector	Terminal		Continuity
M55 (LH) M56 (RH)	2	Ground	Not existed
	4		

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace circuit.

2.CHECK HEATED SEAT SWITCH

Check heated seat switch.
Refer to SE-6, "Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Heated seat switch. Refer to SE-35, "Removal and Installation".

Component Inspection

INFOID:0000000001059437

NOTE:
Same component inspection procedure for driver seat and passenger seat.

1.CHECK HEATED SEAT SWITCH

1. Turn ignition switch OFF.
2. Disconnect heated seat switch connector.
3. Check continuity between heated seat switch terminals.

cardiagn.com

Terminal		Switch condition	Continuity
3	2	High	Existed
		OFF	Not existed
		Low	Not existed
	4	High	Not existed
		OFF	Not existed
		Low	Existed
3 (+)	6 (-)	High	Existed
		OFF	Not existed
		Low	Existed
3 (-)	6 (+)	High	Not existed
		OFF	Not existed
		Low	Not existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace heated seat switch. Refer to SE-35, "Removal and Installation".

carmanualsonline.com

SEAT HEATER

Description

INFOID:0000000001093529

- With a built-in seat cushion, the heater operates with the power supplied by heater seat switch.
- With a built-in seat back, the heater operates with the power supplied by heater seat switch.

Component Function Check

INFOID:0000000001093530

1.CHECK SEAT HEATER FUNCTION

Check heated operation with heated seat switch.

Is the inspection results normal?

YES >> Power seat switch is OK.
NO >> Refer to SE-8, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001093531

1.CHECK SEAT HEATER GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect heated seat connector.
3. Check continuity between heated seat connector and ground.

Heated seat connector	Terminal	Ground	Continuity
B20 (LH) B21 (RH)	2		Existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace circuit.

2.CHECK SEAT HEATER UNIT

Check seat heater unit.
Refer to SE-8, "Component Inspection"

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Replace seat heater unit. Refer to SE-25, "Disassembly and Assembly".

Component Inspection

INFOID:0000000001093548

1.CHECK SEAT HEATER

1. Turn ignition switch OFF.
2. Disconnect heated seat connector.
3. Check continuity between heated seat terminals.

Heated seat connector	Terminal		Continuity
B20 (LH) B21 (RH)	1	2	Existed
	3		

Is the inspection result normal?

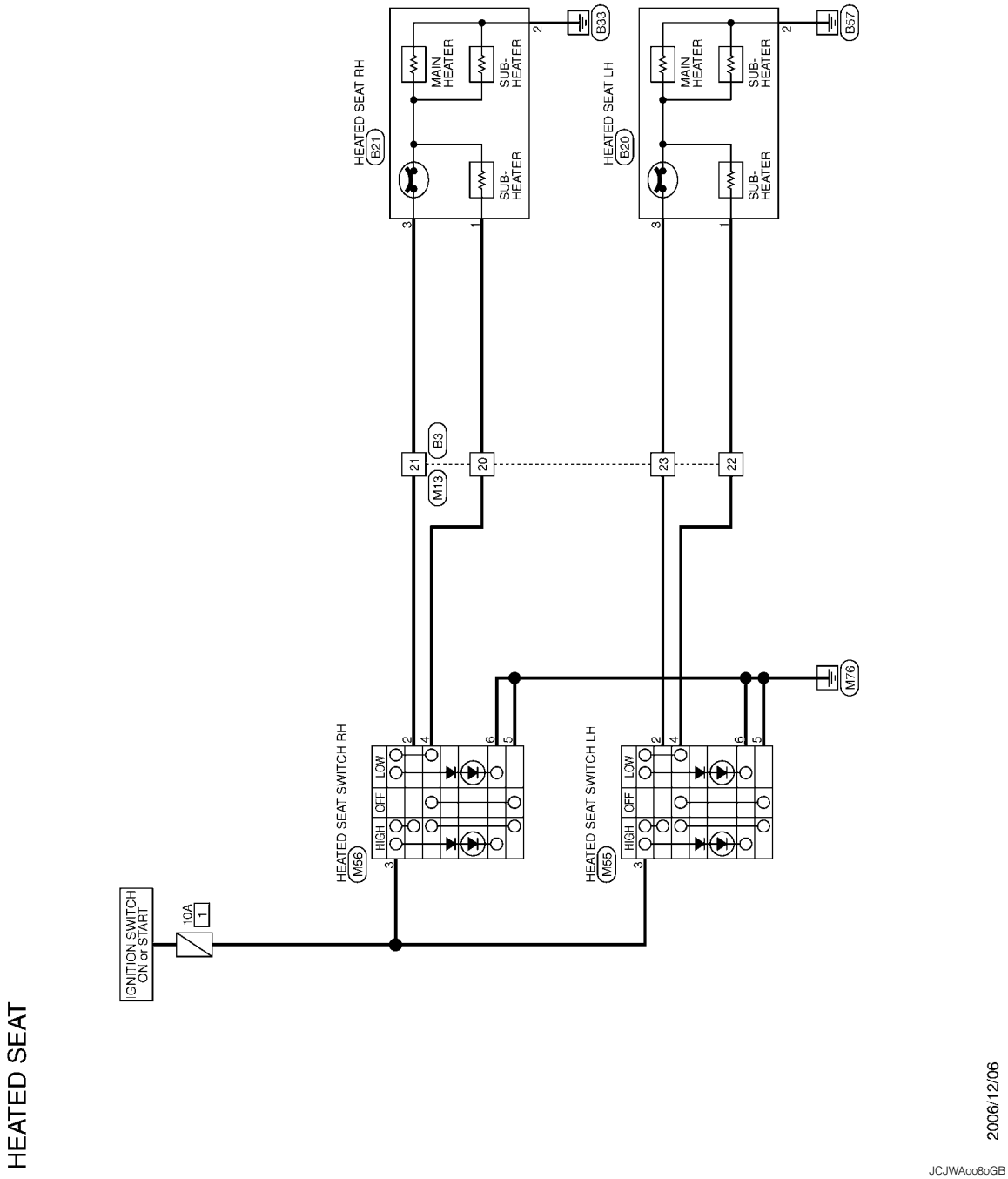
YES >> INSPECTION END.
NO >> Replace seat heater unit.Refer to SE-25, "Disassembly and Assembly".

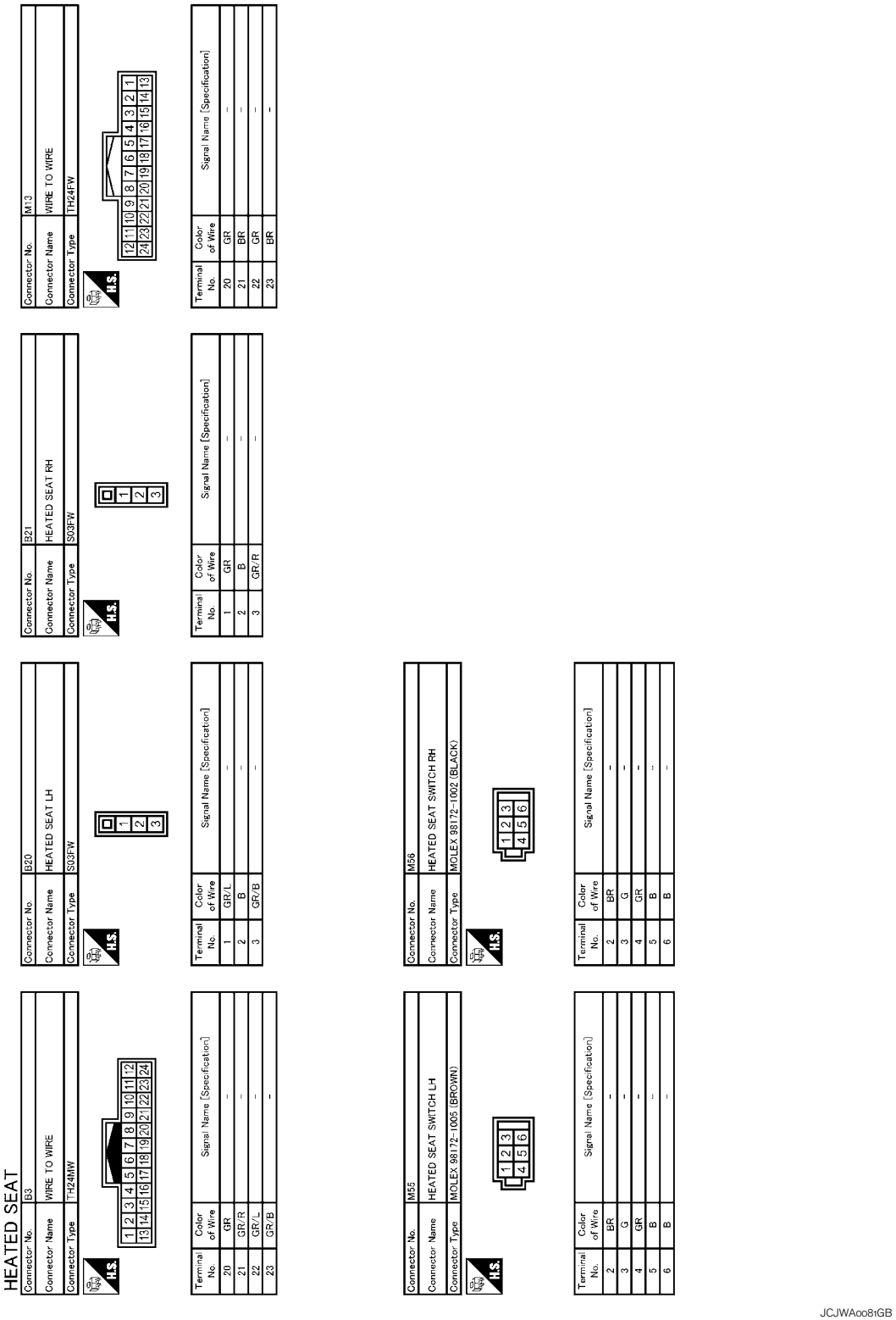
cardiagn.com

HEATED SEAT

Wiring Diagram - HEATED SEAT SYSTEM -

INFOID:0000000001059474





JCJWA0081GB

cardiagn.com

SYMPTOM DIAGNOSIS

BOTH DRIVER SEAT HEATER AND PASSENGER SEAT HEATER DO NOT OPERATE

Diagnosis Procedure

INFOID:0000000001059478

1. CHECK HEATED SEAT POWER SUPPLY AND GROUND CIRCUIT

Check heated seat power supply and ground circuit.
Refer to SE-5, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

carmanualsonline.com

BOTH DRIVER SEAT HEATER AND PASSENGER SEAT HEATER DO NOT OPERATE

Diagnosis Procedure

INFOID:0000000001059479

1.CHECK HEATED SEAT POWER SUPPLY AND GROUND CIRCUIT

Check heated seat power supply and ground circuit.
Refer to SE-5, "Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK HEATED SEAT SWITCH

Check heated seat switch.
Refer to SE-6, "Component Function Check".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning parts.

3.CHECK SEAT HEATER

Check seat heater.
Refer to SE-8, "Component Function Check".

Is the inspection result normal?

YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

PASSENGER SIDE HEATER DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000001059480

1.CHECK HEATED SEAT POWER SUPPLY AND GROUND CIRCUIT

Check heated seat power supply and ground circuit.
Refer to SE-5, "Component Function Check".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK HEATED SEAT SWITCH

Check heated seat switch.
Refer to SE-6, "Component Function Check".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the malfunctioning parts.

3.CHECK SEAT HEATER

Check seat heater.
Refer to SE-8, "Component Function Check".

Is the inspection result normal?

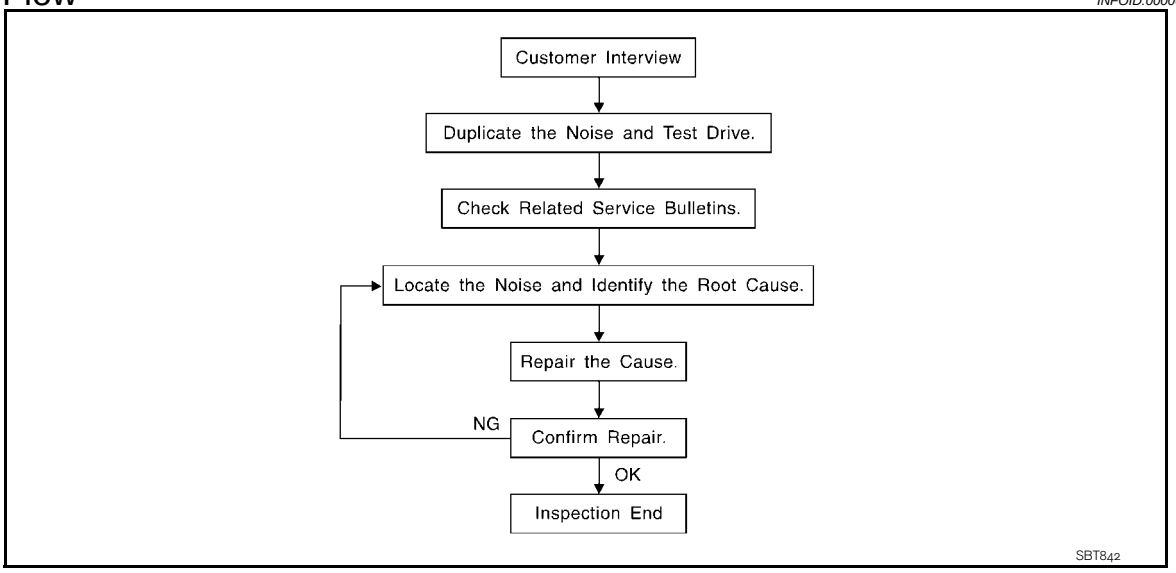
YES >> Refer to GI-39, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

carmanualsonline.com

SQUEAK AND RATTLE TROUBLE DIAGNOSIS

Work Flow

INFOID:0000000001115891



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any of the customer's comments; refer to SE-18, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by a test drive with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak – (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak – (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle – (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock – (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick – (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump – (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz – (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

cardiagn.com

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSB) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to SE-16, "Inspection Procedure".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:

- URETHANE PADS
  Insulates connectors, harness, etc.
- INSULATOR (Foam blocks)
  Insulates components from contact. Can be used to fill space behind a panel.
- INSULATOR (Light foam block)
- FELT CLOTHTAPE
  Used to insulate where movement does not occur. Ideal for instrument panel applications.
  The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
- UHMW(TEFLON) TAPE
  Insulates where slight movement is present. Ideal for instrument panel applications.
- SILICONE GREASE
  Used in place of UHMW tape that will be visible or not fit.
  Note: Will only last a few months.
- SILICONE SPRAY
  Use when grease cannot be applied.
- DUCT TAPE
  Use to eliminate movement.

CONFIRM THE REPAIR

carsign.com

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Inspection Procedure

INFOID:0000000001115892

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. Cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. Trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

cardiagn.com

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it is important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.

Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. Rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.

Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

carsign.com

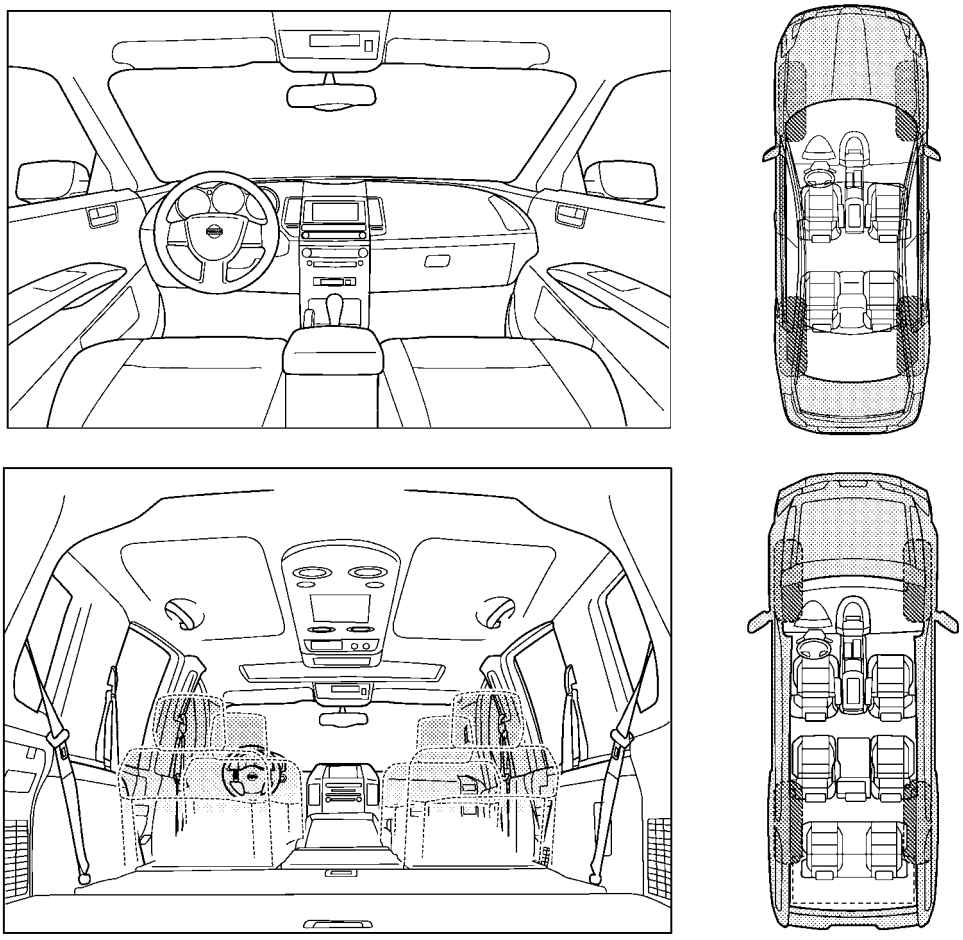
Diagnostic Worksheet

INFOID:0000000001115893

SQUEAK & RATTLE
DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB8740E

cardiagn.com

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ anytime
- ☐ 1st time in the morning
- ☐ only when it is cold outside
- ☐ only when it is hot outside
- ☐ after sitting out in the rain
- ☐ when it is raining or wet
- ☐ dry or dusty conditions
- ☐ other:

III. WHEN DRIVING:

- ☐ through driveways
- ☐ over rough roads
- ☐ over speed bumps
- ☐ only about ____ mph
- ☐ on acceleration
- ☐ coming to a stop
- ☐ on turns: left, right or either (circle)
- ☐ with passengers or cargo
- ☐ other: _____
- ☐ after driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ squeak (like tennis shoes on a clean floor)
- ☐ creak (like walking on an old wooden floor)
- ☐ rattle (like shaking a baby rattle)
- ☐ knock (like a knock at the door)
- ☐ tick (like a clock second hand)
- ☐ thump (heavy, muffled knock noise)
- ☐ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name: _____

W.O.# _____ Date: _____

This form must be attached to Work Order

PIIB8742E

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001025085

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Service Notice

INFOID:0000000001025086

- When removing or installing various parts, place a cloth or padding onto the vehicle body to prevent scratches.
- Handle trim, molding, instruments, grille, etc. carefully during removing or installing. Be careful not to oil or damage them.
- Apply sealing compound where necessary when installing parts.
- When applying sealing compound, be careful that the sealing compound does not protrude from parts.
- When replacing any metal parts (for example body outer panel, members, etc.), be sure to take rust prevention measures.

Precaution for Work

INFOID:0000000001025087

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and keep them.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After re-installation is completed, be sure to check that each part works normally.
- Follow the steps below to clean components.

- Water soluble foul: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the fouled area.
  Then rub with a soft and dry cloth.
- Oily foul: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the fouled area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, and gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

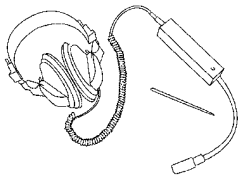
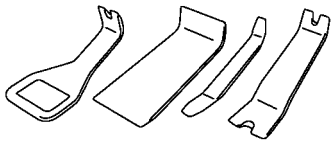
cardiagn.com

PREPARATION

PREPARATION

Commercial Service Tool

INFOID:0000000001025089

Tool name		Description
Engine ear	 SIIA0995E	Locating the noise
Remover tool	 PIIB7923J	Remove the clips, pawls and metal clips

carmagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000001059483

BASIC INSPECTION

1. INSPECTION START

1. Check the service history.
2. Check the following parts.

- Fuse/circuit breaker blown.
- Poor connection, open or short circuit of harness connector.
- Battery voltage.

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

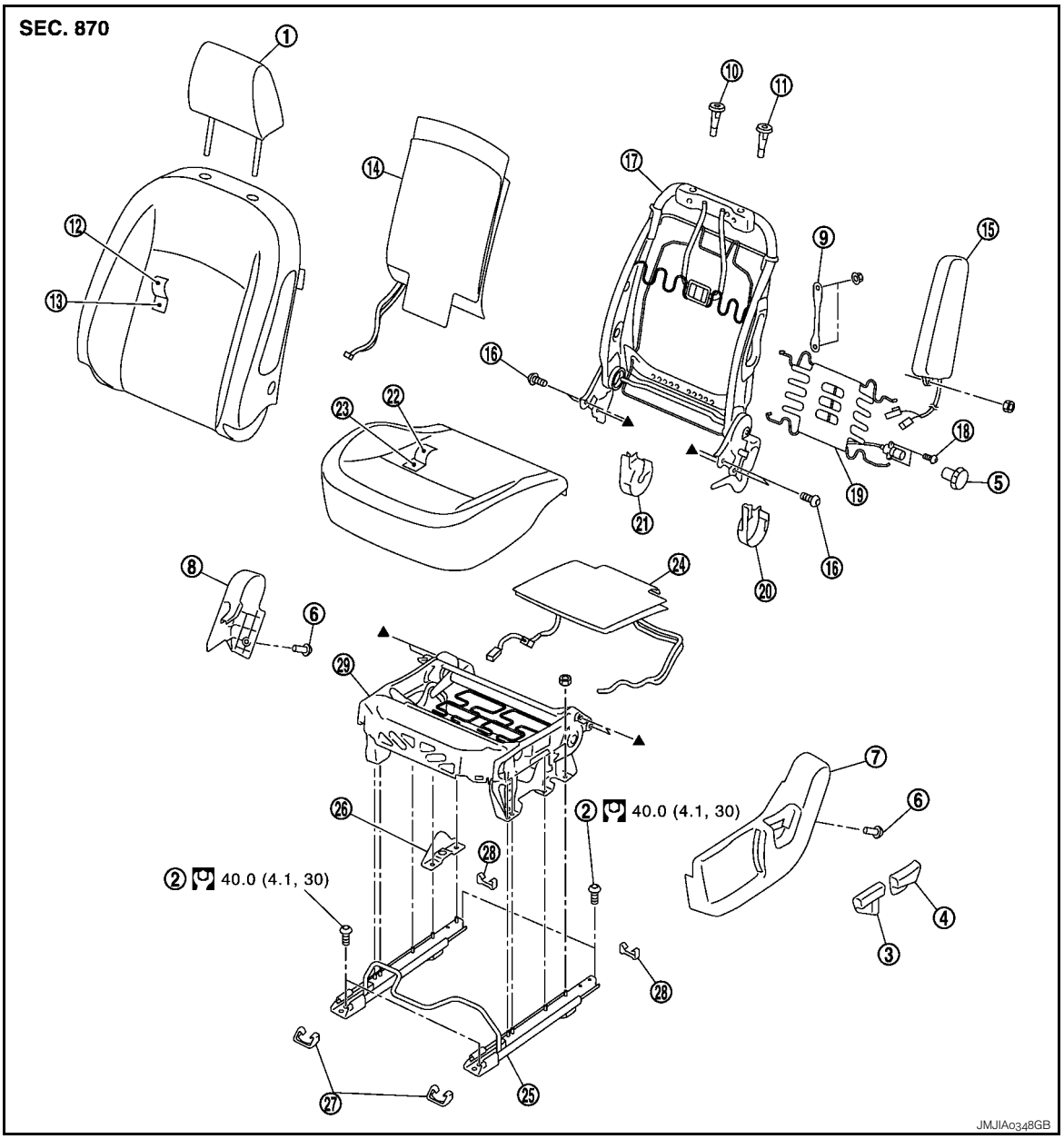
ON-VEHICLE REPAIR

FRONT SEAT

Exploded View

INFOID:0000000001025091

DRIVER'S SEAT

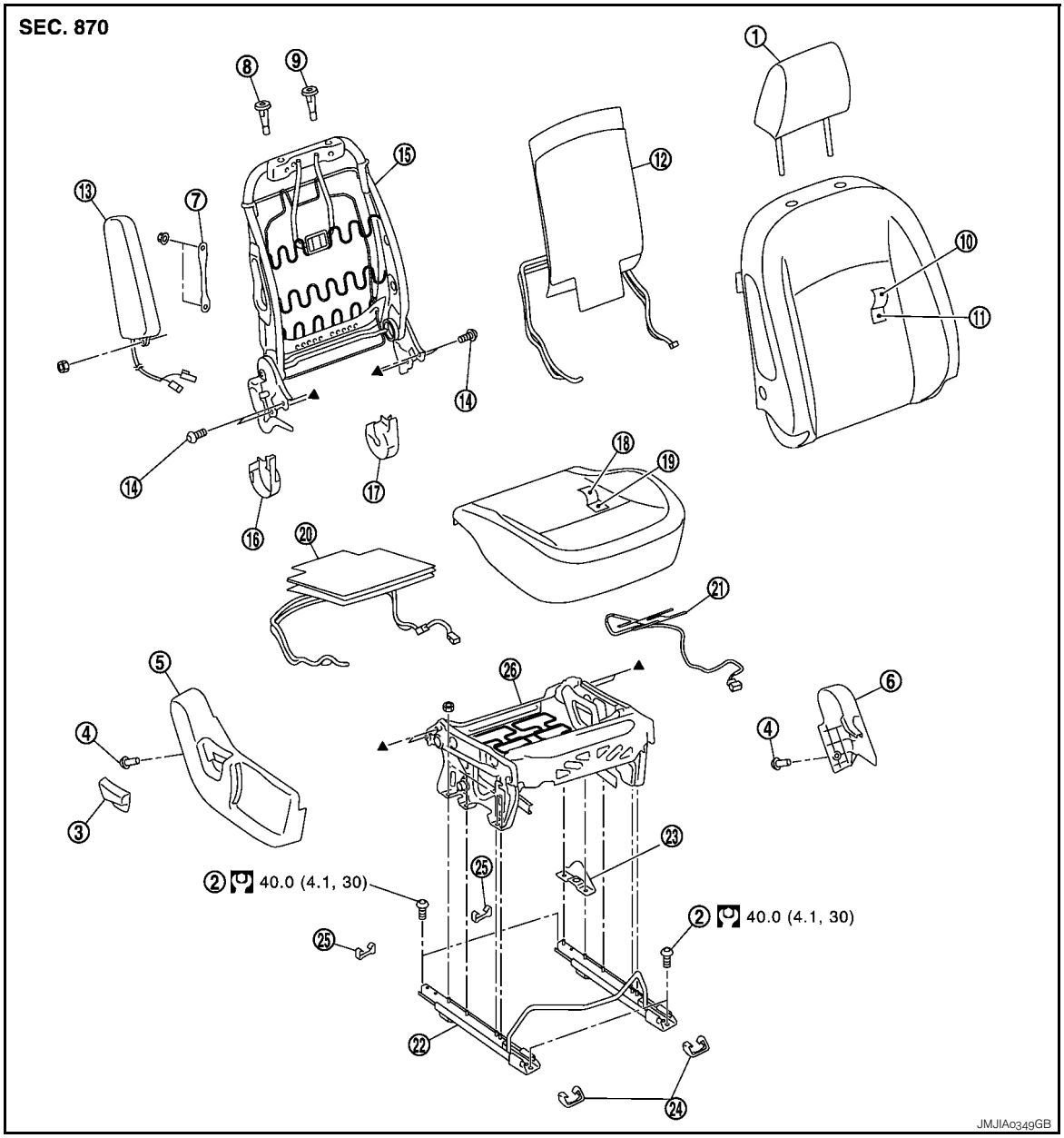


1. Headrest
2. TORX bolt (T50)
3. Lifter lever knob
4. Reclining lever knob
5. Lumbar support knob
6. TORX bolt (T25)
7. Seat cushion outer finisher
8. Seat cushion inner finisher
9. Side air bag rod
10. Headrest holder (free)
11. Headrest holder (locked)
12. Seatback trim
13. Seatback pad
14. Seatback heater unit
15. Side air bag module
16. TORX bolt (T50)
17. Seatback frame
18. TORX bolt (T20)
19. Lumbar support unit
20. Reclining device outer cover
21. Reclining device inner cover
22. Seat cushion trim
23. Seat cushion pad
24. Seat cushion heater unit
25. Seat slide assembly
26. Seat slide reinforce
27. Front slide cover

28. Rear slide cover
29. Seat cushion adjuster assembly

Refer to GI-4, "Components" for symbols in the figure.

PASSENGER'S SEAT



1. Headrest
2. TORX bolt (T50)
3. Reclining lever Knob
4. TORX bolt (T25)
5. Seat cushion outer finisher
6. Seat cushion inner finisher
7. Side air bag rod
8. Headrest holder (free)
9. Headrest holder (locked)
10. Seatback trim
11. Seatback pad
12. Seatback heater unit
13. Side air bag module
14. TORX bolt (T50)
15. Seatback frame
16. Reclining device outer cover
17. Reclining device inner cover
18. Seat cushion trim
19. Seat cushion pad
20. Seat cushion heater unit
21. Occupant detection unit
22. Seat slide assembly
23. Seat slide reinforce
24. Front slide cover
25. Rear slide cover
26. Seat cushion adjuster assembly

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001025092

cardiagn.com

REMOVAL

CAUTION:

- **When removing and installing, use shop cloths to protect parts from damage.**
- **Before removal, turn ignition switch OFF, disconnect both battery cables, and then wait for at least 3 minutes.**

1. Remove the headrest.
2. Remove the mounting TORX bolts (T50) on the front side of the front seat.
3. Remove the mounting TORX bolts (T50) on the rear side of the front seat.
4. Set seatback in a standing position.
5. Disconnect harness connector under the seat and remove harness securing clips.
6. Remove seat from the vehicle.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Before installation, turn ignition switch OFF, disconnect both battery cables, and then wait for at least 3 minutes.**
- **Clamp the harness in position.**

Disassembly and Assembly

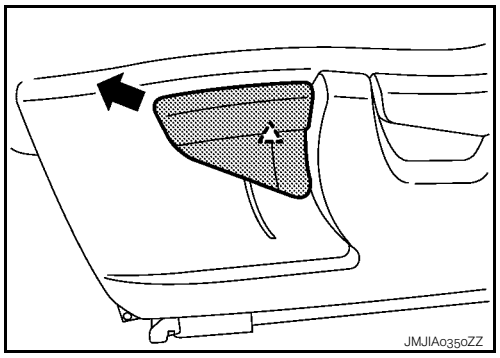
INFOID:0000000001025093

SEATBACK

Disassembly

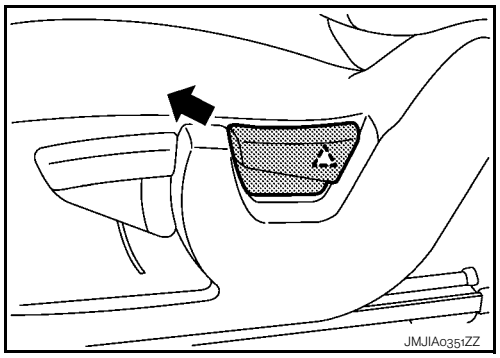
1. Remove the seat cushion outer finisher.
   - Pull out the lifter lever knob while holding and raising the pawls.

     : Pawl



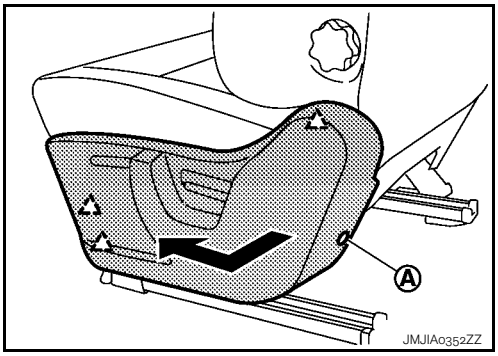
   - Pull out the reclining lever knob while holding and raising the pawls.

     : Pawl



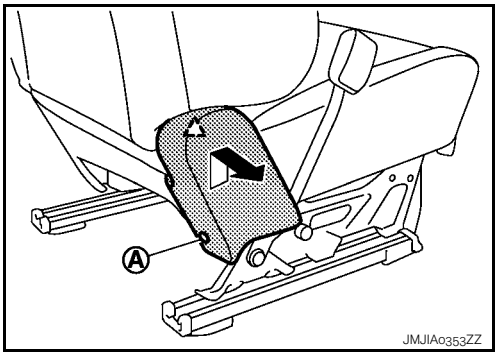
- Remove the TORX bolt (T25) (A).
- Pull the rear side of the seat cushion outer finisher frontward, and then slide it forward to remove the pawls.Remove the seat cushion outer finisher.

: Pawl

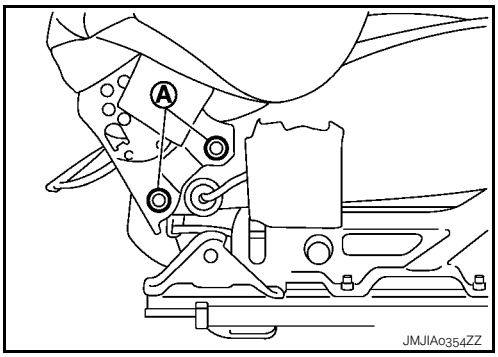


2. Remove the seat cushion inner finisher.
   - Remove the TORX bolt (T25) (A).
   - Pull the rear side of the seat cushion inner finisher frontward, and then slide it upward to remove the pawls.Remove the seat cushion inner finisher.

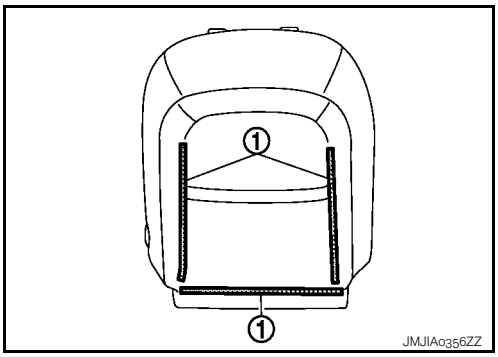
: Pawl



3. Remove the seatback assembly.
   - Disconnect the seat cushion heater harness connect, and remove the harness clamp.
   - Pull out the side air bag harness and seat heater harness from seat cushion trim.
   - Remove the TORX bolt (T50) (A).



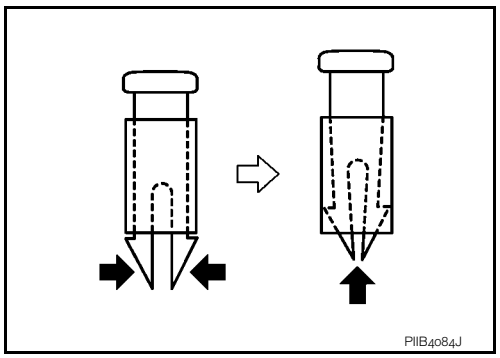
4. Remove the seatback trim and seatback pad.
   - Remove the lumbar support knob.
   - Remove the seatback retainer (1) on the back side of the seatback.



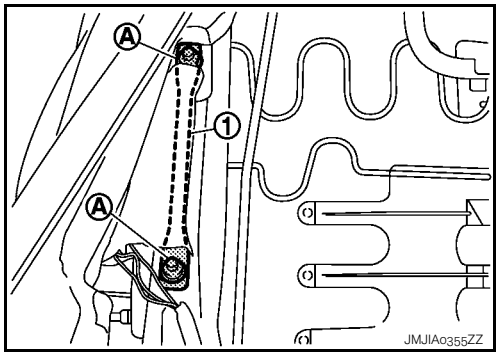
cardiagn.com

- Remove the headrest holder.

CAUTION:
Before installing headrest holder check its orientation. (front/rear and right/left)



- Remove the mounting nut (A), and then remove side air bag rod (1).



- Remove the seatback trim and seatback pad from the seatback frame.
- Remove the hog lings to separate the seatback trim and seatback pad.

5. Remove the air bag module. Refer to SR-12, "Removal and Installation".
6. Remove the lumbar support unit.(Lumbar support model only.)
   - Remove the TORX bolts (T20), and then remove lumbar support knob.
   - Remove the spring, and then remove lumbar support unit.

Assembly

Assemble in the reverse order of disassembly.

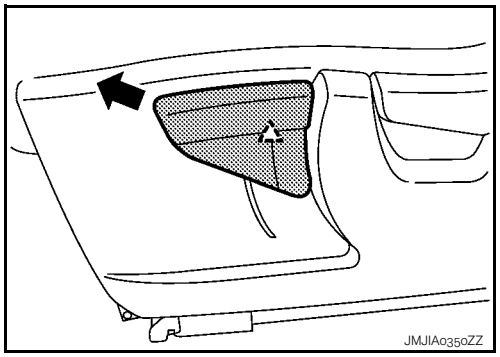
CAUTION:
Install the hog rings of seatback trim in position, and then securely connect the trim or trim cord with the pad side wire.

SEAT CUSHION

Disassembly

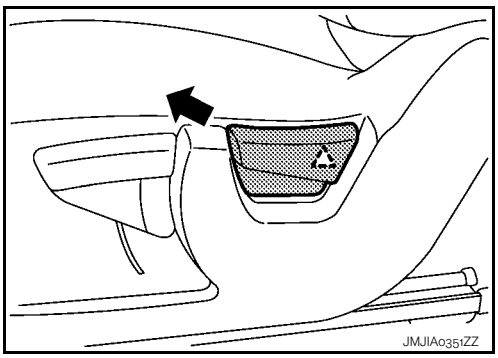
1. Remove the seat cushion outer finisher.
   - Pull out the lifter lever knob while holding and raising the pawls.

: Pawl



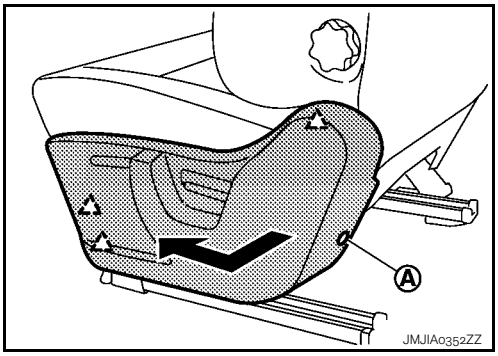
- Pull out the reclining lever knob while holding and raising the pawls.

△ : Pawl



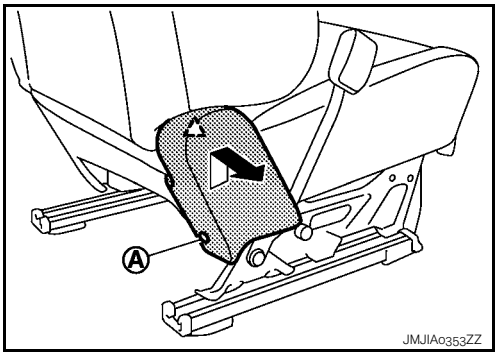
- Remove the TORX bolt (T25) (A).
- Pull the rear side of the seat cushion outer finisher frontward, and then slide it forward to remove the pawls.Remove the seat cushion outer finisher.

△ : Pawl

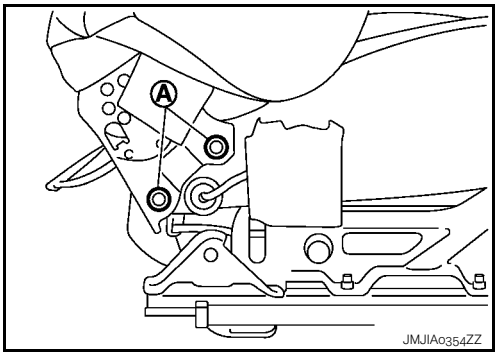


2. Remove the seat cushion inner finisher.
   - Remove the TORX bolt (T25) (A).
   - Pull the rear side of the seat cushion inner finisher frontward, and then slide it upward to remove the pawls.Remove the seat cushion inner finisher.

△ : Pawl



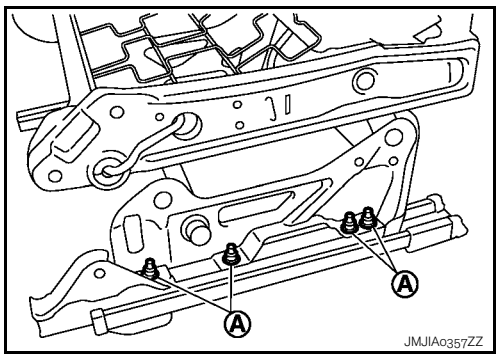
3. Remove the seatback assembly.
   - Disconnect the seat cushion heater harness connect, and remove the harness clamp.
   - Pull out the side air bag harness and seat heater harness from seat cushion trim.
   - Remove the TORX bolt (T50) (A).



4. Remove the seat belt buckle. Refer to SB-8, "SEAT BELT BUCKLE : Removal and Installation".
5. Remove the seat cushion trim and seat cushion pad.
   - Remove the seat cushion retainer.
   - Remove the seat cushion heater harness, and occupant detection unit harness connector.
   - Remove the hog rings, and separate the seat cushion trim and seat cushion pad, seat cushion heater unit and occupant detection unit.

cardiagn.com

6. Remove the seat slide assembly.
   Remove the mounting nuts (A), and them remove seat slide assembly.



7. Remove the front slide cover.
8. Remove the rear slide cover.

Assembly

Assemble in the reverse order of disassembly.

CAUTION:

Install the hog rings of seat cushion trim in position, and then securely connect the trim or trim cord with the pad side wire.

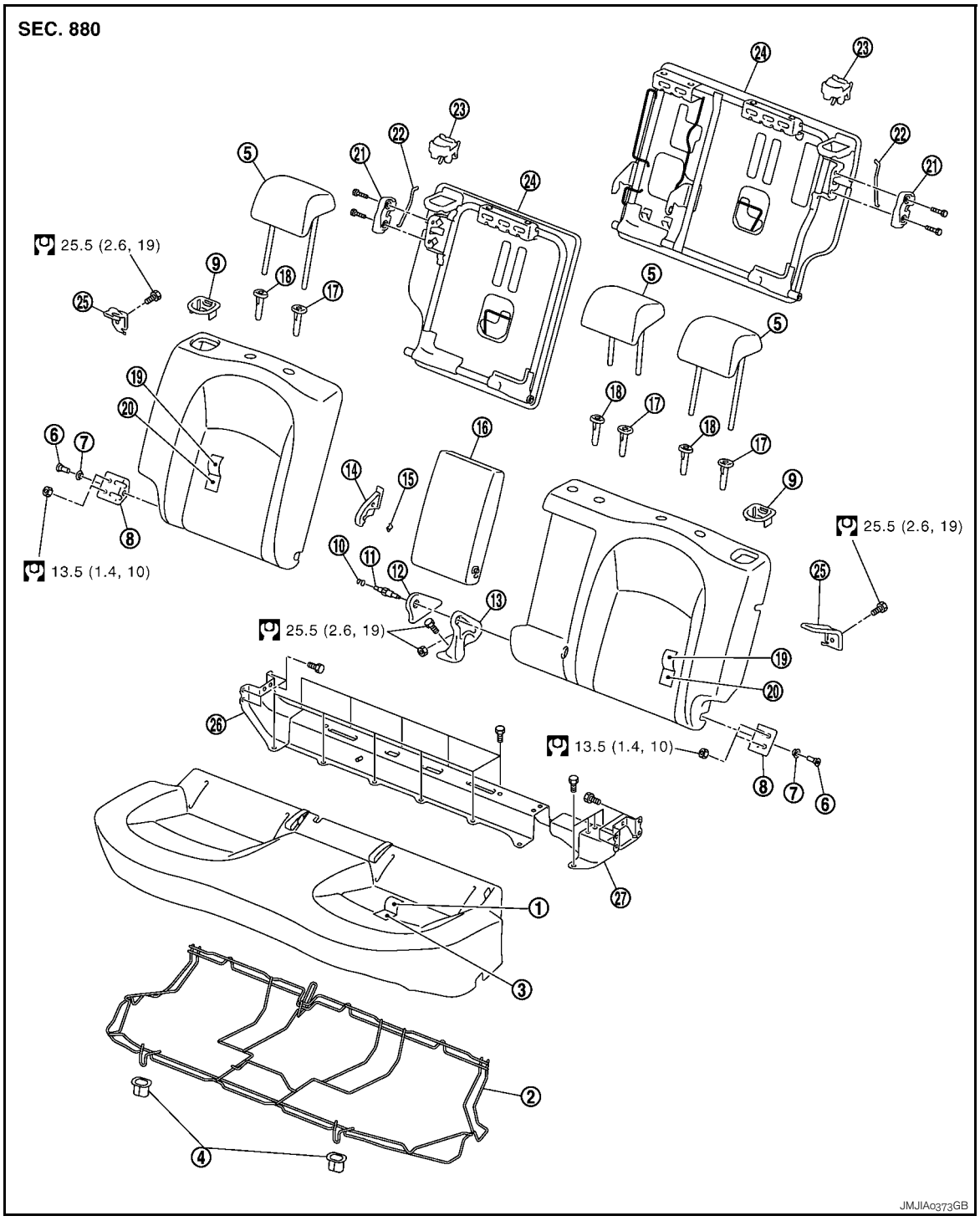
carmanualsonline.com

REAR SEAT

Exploded View

INFOID:0000000001025094

REAR SEAT



1. Seat cushion trim
2. Seat cushion frame
3. Seat cushion pad
4. Seat cushion hook
5. Headrest
6. TORX bolt (T55)
7. Bushing
8. Seatback side bracket
9. Seatback lock knob finisher
10. Bushing
11. Special bolt
12. Seatback center bracket cover
13. Seatback center bracket
14. Armrest bracket cover
15. Clip

cardiagn.com

16. Armrest assembly
17. Headrest holder (locked)
18. Headrest holder (free)
19. Seatback trim
20. Seatback pad
21. Seatback lock assembly
22. Seatback lock rod
23. Seatback lock knob
24. Seatback frame
25. Seat striker
26. Seatback lower support
27. Seatback mounting outer bracket

Refer to GI-3, "Contents" for symbols in the figure.

Removal and Installation

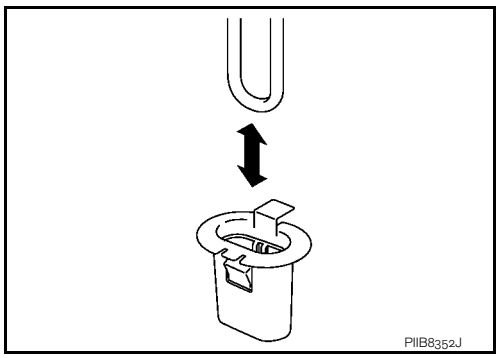
INFOID:0000000001025095

REMOVAL

CAUTION:

When removing and installing, use shop cloths to protect parts from damage.

1. Remove the seat cushion.
   Pull seat cushion up, and then remove the seat cushion from the seat cushion hook.



2. Remove the seatback.
   - Remove the luggage side lower finisher (front). Refer to INT-14, "Removal and Installation".
   - Remove the seatback side bracket (RH) mounting nuts.
   - Remove the seatback assembly (RH) from the vehicle.
   - Remove the seatback side bracket (LH) mounting nuts.
   - Remove the center seatback bracket mounting bolt and nut.
   - Remove the seatback assembly (LH) from the vehicle.
3. Remove the seat striker.
   - Remove the seat striker mounting bolt.
   - Remove the seat striker from the vehicle.
4. Remove the seatback lower support.
   - Remove the seatback lower support mounting bolt.
   - Remove the seatback lower support from the vehicle.
5. Remove the seatback mounting outer bracket.
   - Remove the seatback mounting outer bracket mounting bolt.
   - Remove the seatback mounting outer bracket from the vehicle.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

When removing and installing, use shop cloths to protect parts from damage.

Disassembly and Assembly

INFOID:0000000001025096

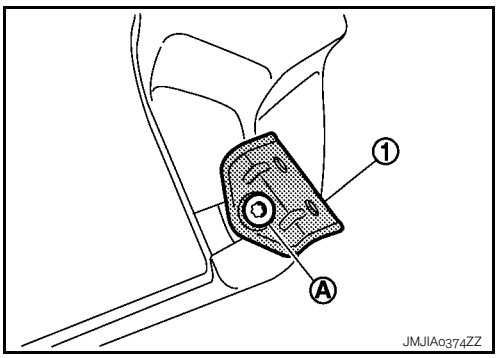
SEATBACK

Disassembly

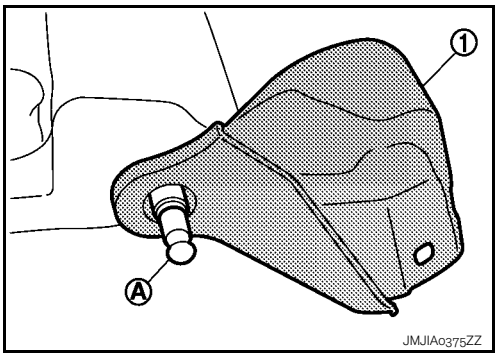
1. Remove the seatback side bracket.

carmanualsonline.com

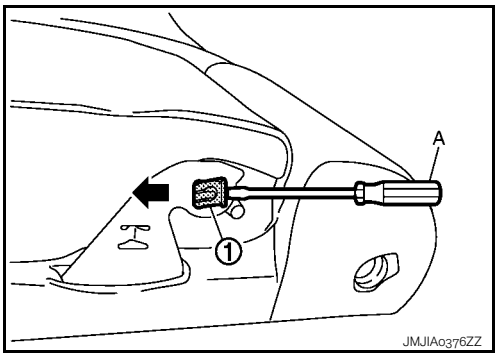
Remove the TORX bolt (T55) (A), and then seatback side bracket (1).



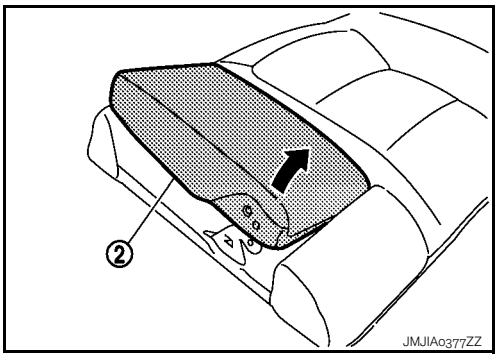
2. Remove the seatback center bracket.
Remove the special bolt (A), and then seatback center bracket (1).



3. Remove the armrest assembly.
   - Remove the armrest bracket cover.
   - Remove the clip (1).Using a driver (A).



   - Remove the pins while pushing the armrest assembly (2) toward the seat side. Remove the armrest assembly.

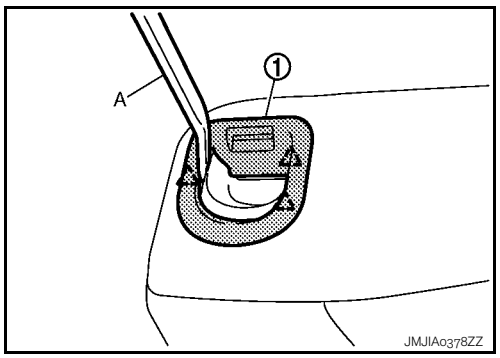


4. Remove the seatback trim and seatback pad.

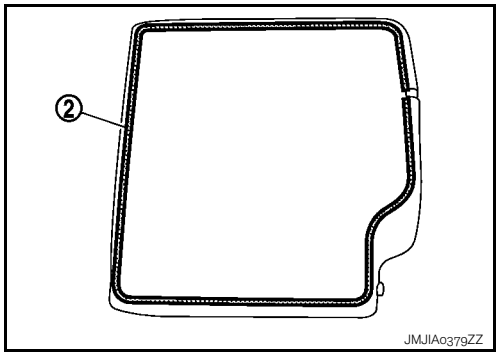
cardiagn.com

- Remove the seatback lock knob finisher (1).Using a remover tool (A).

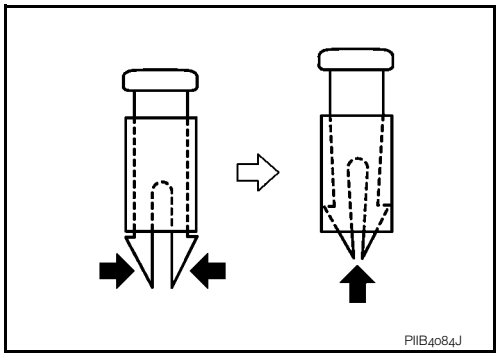
: Pawl



- Remove the seatback retainer (2) on the back side of the seatback.

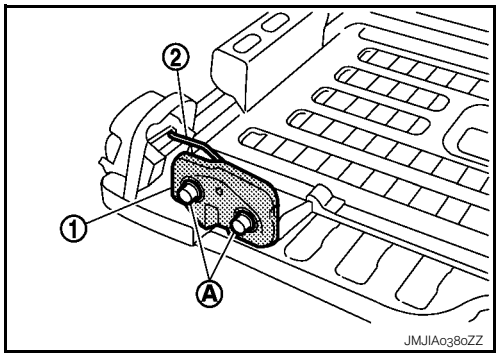


- Remove the headrest holder.
  CAUTION:
  Before installing headrest holder check its orientaion.(front/rear and right/left)



- Remove the clip, and then remove seatback trim and seatback pad from the seatback frame.
- Remove the hog rings to separate the seatback trim and seatback pad.

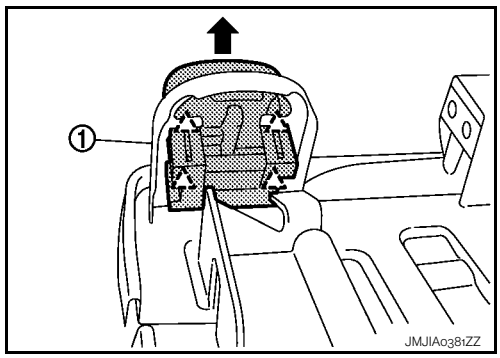
5. Remove the seatback lock assembly.
   - Remove the mounting bolt (A) and remove seatback lock assembly (1).
   - Remove the seatback lock knob rod (2).



6. Remove the seatback lock knob.
   While pressing pawls, remove the seatback lock knob (1) from the seatback frame.

carmagn.com

: Pawl



Assembly
Assemble in the reverse order of disassembly.

SEAT CUSHION

Disassembly

1. Remove the hog rings.
2. Remove the seat cushion retainer.
3. Remove the seat cushion trim and seat cushion pad from the seat cushion frame.
   Remove the hog rings to separate the seat cushion trim and seat cushion pad.

Assembly
Assemble in the reverse order of disassembly.

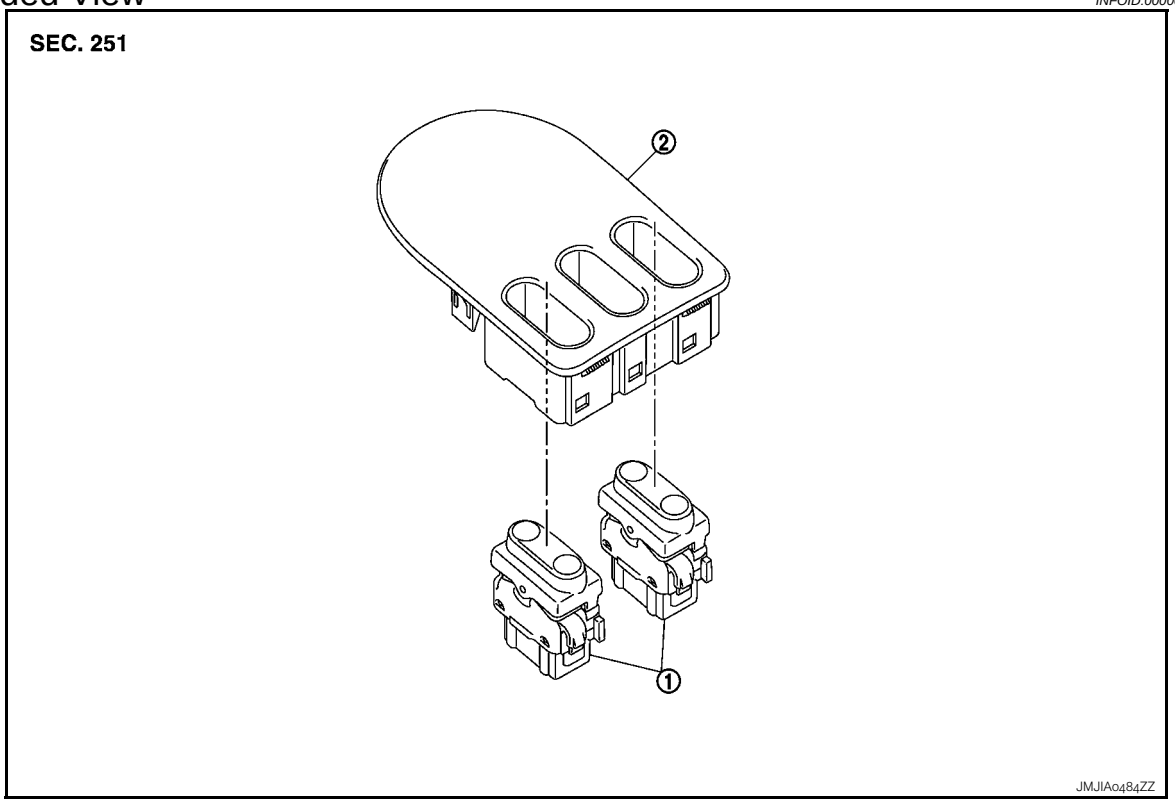
cardiagn.com

HEATED SEAT SWITCH

Exploded View

INFOID:0000000001093964

SEC. 251



1. Heated seat switch
2. Console switch panel

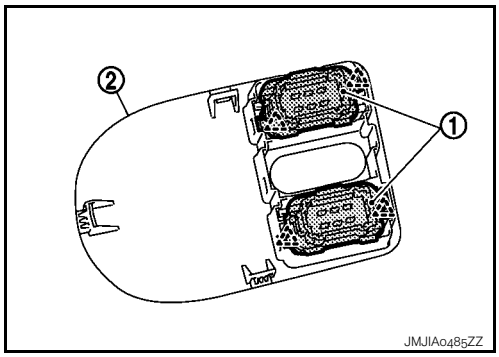
Removal and Installation

INFOID:0000000001093965

REMOVAL

1. Remove the console switch panel (2). Refer to IP-18, "Removal and Installation"
2. Remove heated seat switch (1) from console switch panel(2) .

△ : Pawl



INSTALLATION

Install in the reverse order of removal.

SECTION SEC
SECURITY CONTROL SYSTEM

CONTENTS

WITH INTELLIGENT KEY SYSTEM

BASIC INSPECTION 5

DIAGNOSIS AND REPAIR WORKFLOW 5
Work Flow 5

INSPECTION AND ADJUSTMENT 8

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 8
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 8
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement 8

ECM RE-COMMUNICATING FUNCTION 8
ECM RE-COMMUNICATING FUNCTION : Description 8
ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement 8

FUNCTION DIAGNOSIS 9

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION 9
System Diagram 9
System Description 9
Component Parts Location 11
Component Description 13

NATS (NISSAN ANTI-THEFT SYSTEM) 14
System Diagram 14
System Description 14
Component Parts Location 15
Component Description 17

VEHICLE SECURITY SYSTEM 19
System Diagram 19
System Description 19
Component Parts Location 20
Component Description 22

DIAGNOSIS SYSTEM (BCM) 23

COMMON ITEM 23
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 23

IMMU 23
IMMU : CONSULT-III Function (BCM - IMMU) 23

THEFT ALM 24
THEFT ALM : CONSULT-III Function (BCM - THEFT ALM) 24

DIAGNOSIS SYSTEM (INTELLIGENT KEY UNIT) 26
CONSULT-III Function (INTELLIGENT KEY) 26

COMPONENT DIAGNOSIS 29

U1000 CAN COMM CIRCUIT 29
Description 29
DTC Logic 29
Diagnosis Procedure 29

U1010 CONTROL UNIT (CAN) 30
Description 30
DTC Logic 30
Diagnosis Procedure 30
Special Repair Requirement 30

B2013 ID DISCORD I-KEY-STRG 31
Description 31
DTC Logic 31
Diagnosis Procedure 31

B2190, P1614 NATS ANTENNA AMP. 33
Description 33
DTC Logic 33
Diagnosis Procedure 33

B2191, P1615 DIFFERENCE OF KEY 35
Description 35
DTC Logic 35

carsdiagn.com

Diagnosis Procedure 35

B2192, P1611 ID DISCORD, IMMU-ECM 36
Description 36
DTC Logic 36
Diagnosis Procedure 36

B2193, P1612 CHAIN OF ECM-IMMU 38
Description 38
DTC Logic 38
Diagnosis Procedure 38

B2194 ID DISCORD IMMU-I-KEY 39
Description 39
DTC Logic 39
Diagnosis Procedure 39

B2195 ANTI-SCANNING 40
Description 40
DTC Logic 40
Diagnosis Procedure 40

B2196 DONGLE NG 41
Description 41
DTC Logic 41
Diagnosis Procedure 41

B2552 INTELLIGENT KEY 42
Description 42
DTC Logic 42
Diagnosis Procedure 42
Special Repair Requirement 42

B2590 ID DISCORD BCM-I-KEY 43
Description 43
DTC Logic 43
Diagnosis Procedure 43

P1610 LOCK MODE 44
Description 44
DTC Logic 44
Diagnosis Procedure 44

POWER SUPPLY AND GROUND CIRCUIT 45

INTELLIGENT KEY UNIT 45
INTELLIGENT KEY UNIT : Diagnosis Procedure... 45
INTELLIGENT KEY UNIT : Special Repair Requirement 45

SIREN CONTROL UNIT 45
SIREN CONTROL UNIT : Diagnosis Procedure ... 45
SIREN CONTROL UNIT : Special Repair Requirement 46

SIREN 46
SIREN : Diagnosis Procedure 46

BCM 47
BCM : Diagnosis Procedure 47

KEY SWITCH 48
Description 48
Component Function Check 48
Diagnosis Procedure 48
Component Inspection 49

IGNITION KNOB SWITCH 50
Description 50
Component Function Check 50
Diagnosis Procedure 50
Component Inspection 51

STOP LAMP 52
Description 52
Component Function Check 52
Diagnosis Procedure 52
Component Inspection 53

HOOD SWITCH 54
Description 54
Component Function Check 54
Diagnosis Procedure 54
Component Inspection 55

HORN 56
Description 56
Component Function Check 56
Diagnosis Procedure 56

VEHICLE SECURITY INDICATOR 58
Description 58
Component Function Check 58
Diagnosis Procedure 58

ULTRA SONIC SENSOR 60
Description 60
Component Function Check 60
Diagnosis Procedure 60

ECU DIAGNOSIS 62

BCM (BODY CONTROL MODULE) 62
Reference Value 62
Wiring Diagram - INTELLIGENT KEY SYSTEM/ ENGINE START FUNCTION - 78
Wiring Diagram - THEFT WARNING SYSTEM - ... 83
Wiring Diagram - NATS - 90
Fail Safe 94
DTC Inspection Priority Chart 95
DTC Index 96

INTELLIGENT KEY UNIT 97
Reference Value 97
Wiring Diagram - INTELLIGENT KEY SYSTEM/ ENGINE START FUNCTION - 104
Wiring Diagram - THEFT WARNING SYSTEM - . 109
Wiring Diagram - NATS - 116
Fail Safe 120
DTC Inspection Priority Chart 121
DTC Index 121

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 122

cardiagn.com

Reference Value 122
Wiring Diagram - INTELLIGENT KEY SYSTEM/ ENGINE START FUNCTION - 128
Wiring Diagram - THEFT WARNING SYSTEM - .. 133
Wiring Diagram - NATS - 140
Fail Safe 144
DTC Index 146

SYMPTOM DIAGNOSIS 147

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION SYMPTOMS 147
Symptom Table 147

VEHICLE SECURITY SYSTEM SYMPTOMS .. 148
Symptom Table 148

NATS (NISSAN ANTI-THEFT SYSTEM) SYMPTOMS 149
Symptom Table 149

ON-VEHICLE MAINTENANCE 150

PRE-INSPECTION FOR DIAGNOSTIC 150
Basic Inspection 150
Vehicle Security Operation Check 150

ON-VEHICLE REPAIR 152

NATS (NISSAN ANTI-THEFT SYSTEM) 152
Exploded View 152
Removal and Installation 152

SIREN 153
Exploded View 153
Removal and Installation 153

SIREN CONTROL UNIT 154
Exploded View 154
Removal and Installation 154

ULTRA SONIC SENSOR 155
Exploded View 155
Removal and Installation 155

HOOD SWITCH 156
Exploded View 156
Removal and Installation 156

WITHOUT INTELLIGENT KEY SYSTEM

BASIC INSPECTION 157

DIAGNOSIS AND REPAIR WORKFLOW 157
Work Flow 157

INSPECTION AND ADJUSTMENT 160

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 160
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 160
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement ... 160

ECM RE-COMMUNICATING FUNCTION 160
ECM RE-COMMUNICATING FUNCTION : Description 160
ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement 160

FUNCTION DIAGNOSIS 161

NATS (NISSAN ANTI-THEFT SYSTEM) 161
System Diagram 161
System Description 161
Component Parts Location 162
Component Description 163

VEHICLE SECURITY SYSTEM 165
System Diagram 165
System Description 165
Component Parts Location 166
Component Description 168

DIAGNOSIS SYSTEM (BCM) 169

COMMON ITEM 169
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 169

IMMU 169
IMMU : CONSULT-III Function (BCM - IMMU) 169

THEFT ALM 170
THEFT ALM : CONSULT-III Function (BCM - THEFT ALM) 170

COMPONENT DIAGNOSIS 172

U1000 CAN COMM CIRCUIT 172
Description 172
DTC Logic 172
Diagnosis Procedure 172

U1010 CONTROL UNIT (CAN) 173
DTC Logic 173
Diagnosis Procedure 173
Special Repair Requirement 173

B2190, P1614 NATS ANTENNA AMP. 174
Description 174
DTC Logic 174
Diagnosis Procedure 174

B2191, P1615 DIFFERENCE OF KEY 176
Description 176
DTC Logic 176
Diagnosis Procedure 176

B2192, P1611 ID DISCORD, IMMU-ECM 177
Description 177
DTC Logic 177
Diagnosis Procedure 177

cardiagn.com

B2193, P1612 CHAIN OF ECM-IMMU 178
Description 178
DTC Logic 178
Diagnosis Procedure 178

B2195 ANTI-SCANNING 179
Description 179
DTC Logic 179
Diagnosis Procedure 179

B2196 DONGLE NG 180
Description 180
DTC Logic 180
Diagnosis Procedure 180

P1610 LOCK MODE 181
Description 181
DTC Logic 181
Diagnosis Procedure 181

POWER SUPPLY AND GROUND CIRCUIT .. 182

SIREN CONTROL UNIT 182
SIREN CONTROL UNIT : Diagnosis Procedure .. 182
SIREN CONTROL UNIT : Special Repair Requirement 182

SIREN 182
SIREN : Diagnosis Procedure 182

BCM 183
BCM : Diagnosis Procedure 183

KEY SWITCH 185
Description 185
Component Function Check 185
Diagnosis Procedure 185
Component Inspection 186

STOP LAMP 187
Description 187
Component Function Check 187
Diagnosis Procedure 187
Component Inspection 188

HOOD SWITCH 189
Description 189
Component Function Check 189
Diagnosis Procedure 189
Component Inspection 190

HORN 191
Description 191
Component Function Check 191
Diagnosis Procedure 191

VEHICLE SECURITY INDICATOR 193
Description 193
Component Function Check 193
Diagnosis Procedure 193

ULTRA SONIC SENSOR 194
Description 194
Component Function Check 194
Diagnosis Procedure 194

ECU DIAGNOSIS 196

BCM (BODY CONTROL MODULE) 196
Reference Value 196
Wiring Diagram - THEFT WARNING SYSTEM - . 212
Wiring Diagram - NATS - 219
Fail Safe 223
DTC Inspection Priority Chart 224
DTC Index 225

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 226
Reference Value 226
Wiring Diagram - THEFT WARNING SYSTEM - . 232
Wiring Diagram - NATS - 239
Fail Safe 243
DTC Index 245

SYMPTOM DIAGNOSIS 246

VEHICLE SECURITY SYSTEM SYMPTOMS .. 246
Symptom Table 246

NATS (NISSAN ANTI-THEFT SYSTEM) SYMPTOMS 247
Symptom Table 247

ON-VEHICLE MAINTENANCE 248

PRE-INSPECTION FOR DIAGNOSTIC 248
Basic Inspection 248

ON-VEHICLE REPAIR 249

NATS (NISSAN ANTI-THEFT SYSTEM) 249
Exploded View 249
Removal and Installation 249

SIREN 250
Exploded View 250
Removal and Installation 250

SIREN CONTROL UNIT 251
Exploded View 251
Removal and Installation 251

ULTRA SONIC SENSOR 252
Exploded View 252
Removal and Installation 252

HOOD SWITCH 253
Exploded View 253
Removal and Installation 253

cardiagn.com

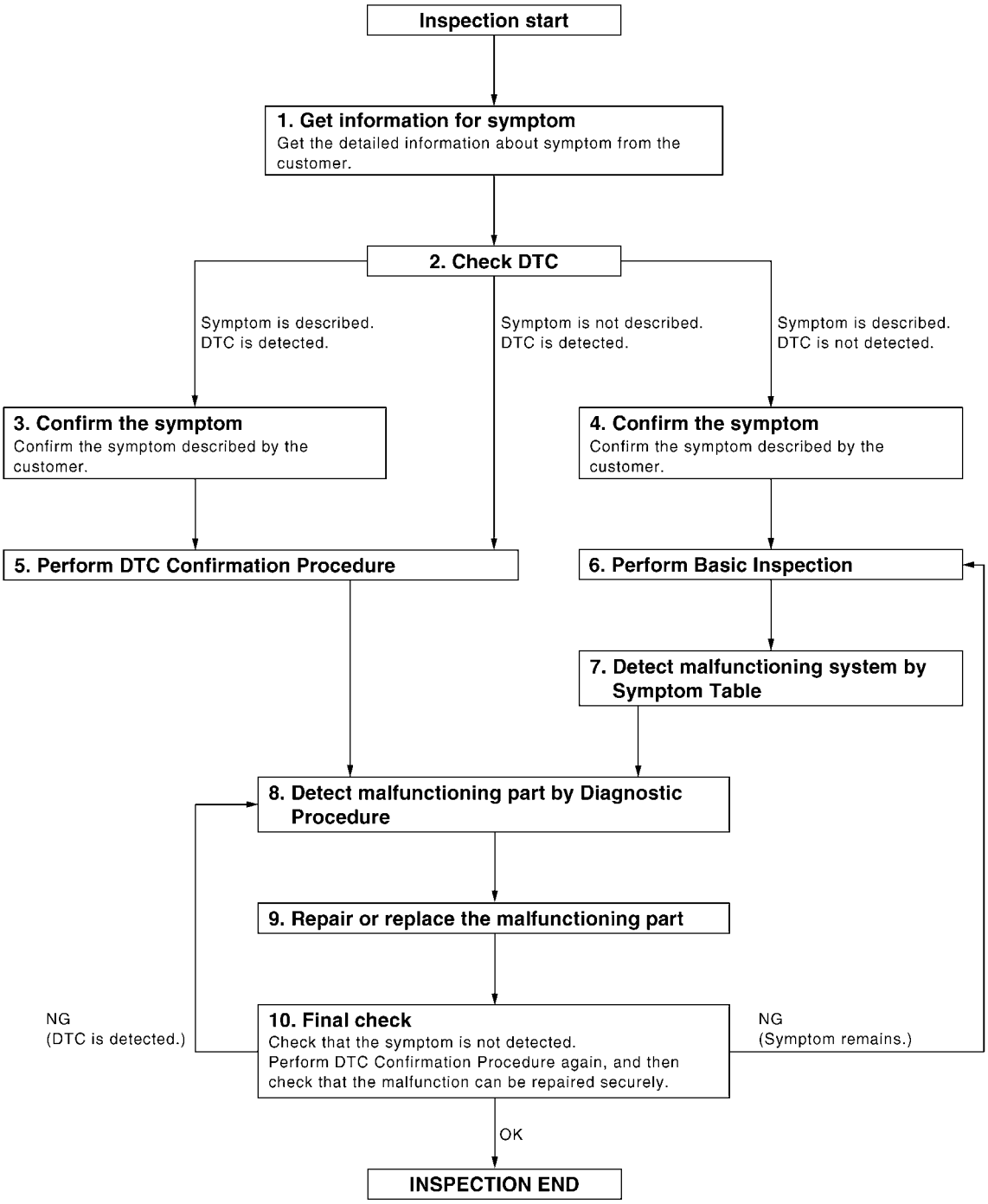
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001116419

OVERALL SEQUENCE



JMKIA0101GB

DETAILED FLOW

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred).

>> GO TO 2.

2.CHECK DTC

1. Check DTC for Intelligent Key unit and BCM.
2. Perform the following procedure if DTC is displayed.

- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.

3. Check related service bulletins for information.

Is any symptom described and any DTC detected?

Symptom is described, DTC is displayed>>GO TO 3.
Symptom is described, DTC is not displayed>>GO TO 4.
Symptom is not described, DTC is displayed>>GO TO 5.

3.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR” mode and check real-time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR ” mode and check real-time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC Confirmation Procedure for the displayed DTC, and then check that DTC is detected again.
If two or more DTCs are detected, refer to SEC-121, "DTC Inspection Priority Chart" (Intelligent Key unit), SEC-95, "DTC Inspection Priority Chart" (BCM) and determine trouble diagnosis order.

Is DTC detected?

YES >> GO TO 8.
NO >> Refer to GI-39, "Intermittent Incident".

6.PERFORM BASIC INSPECTION

Perform Basic Inspection. Refer to SEC-150, "Basic Inspection".

>> GO TO 7.

7.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to Symptom Table based on the confirmed symptom in step 4.

>> GO TO 8.

8.DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Inspect according to Diagnostic Procedure of the system.
NOTE:
The Diagnostic Procedure is described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure.

>> GO TO 9.

cardiagn.com

9.REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it.

>> GO TO 10.

10.FINAL CHECK

When DTC was detected in step 9, perform DTC Confirmation Procedure or Component Function Check again, and then check that the malfunctions have been fully repaired.
When symptom was described by the customer, refer to the confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Does the symptom reappear?

YES (DTC is detected)>>GO TO 8.
YES (Symptom remains)>>GO TO 6.
NO >> **INSPECTION END**

autodiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000001116423

Perform the system initialization when replacing siren.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000001116424

Refer to the CONSULT-III Operation Manual-NATS.

ECM RE-COMMUNICATING FUNCTION

ECM RE-COMMUNICATING FUNCTION : Description

INFOID:0000000000944523

Performing following procedure can automatically perform re-communication of ECM and BCM, but only when the ECM has been replaced with a new one (*1).
*1: New one means a virgin ECM which has never been energized on-board.
(In this step, initialization procedure by CONSULT-III is not necessary)
NOTE:
- **When registering new Key IDs or replacing the ECM that is not brand new, refer to CONSULT-III Operation Manual NATS.**
- **If multiple keys are attached to the key holder, separate them before work.**
- **Distinguish keys with unregistered key ID from those with registered ID.**

ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement

INFOID:0000000000944524

1.PERFORM ECM RE-COMMUNICATING FUNCTION

1. Install ECM.
2. Using a registered key (*2), turn ignition switch to “ON”.
   *2: To perform this step, use the key that has been used before performing ECM replacement.
3. Maintain ignition switch in “ON” position for at least 5 seconds.
4. Turn ignition switch to “OFF”.
5. Start engine.

Can engine be started?

YES >> Procedure is completed.
NO >> Initialize control unit. Refer to CONSULT-III Operation Manual NATS.

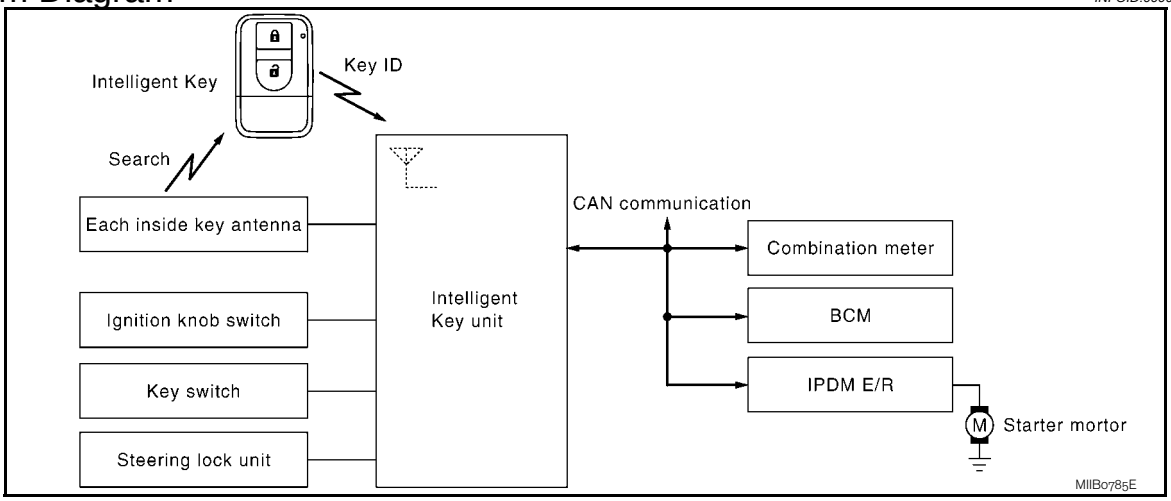
cardiagn.com

FUNCTION DIAGNOSIS

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

System Diagram

INFOID:0000000000944525



System Description

INFOID:0000000000944526

INPUT/OUTPUT SIGNAL CHART

Intelligent Key Unit

Switch/Input signal	Input signal to Intelligent Key unit	Intelligent Key unit function	Actuator/Output signal
Key switch	Mechanical key (insert/remove)	Engine start function	• KEY warning lamp/buzzer • Steering lock unit • Starter relay request (to IPDM E/R) • Inside key antenna (Instrument center, console, rear seat) • Key interlock solenoid
Ignition knob switch	Ignition knob (push/release)		
Steering lock unit	Steering lock (lock/unlock)		
Inside key antenna (Instrument center, console, rear seat)	Intelligent key (inside antenna detection area or not.)		

IPDM E/R

Switch/Input signal	Input signal to IPDM E/R	IPDM E/R function	Actuator/Output signal
Park/neutral position switch (only for CVT models)	P,N range	Engine start function	• Starter relay • Starter motor

BCM

Switch/Input signal	Input signal to BCM	BCM function	Actuator/Output signal
Stop lamp switch	Brake (press/release)	Engine start function	• Inside key antenna (Instrument center, console, rear seat)
Key switch	Mechanical key (insert/remove)		

SYSTEM DESCRIPTION

- The engine start function of Intelligent Key system is a system that makes it possible to start and stop the engine without using the key. It verifies the electronic ID using two-way communications when pressing the ignition knob switch while carrying the Intelligent Key, which operates based on the results of electronic ID verification for Intelligent Key using two-way communications between the Intelligent Key and the vehicle.

NOTE:

The driver should carry the Intelligent Key at all times.

A B C D E F G H I J SEC L M N O P
carsdiagn.com

- Intelligent Key has 2 IDs (for Intelligent Key and for NATS). It can perform the door lock/unlock operation and the engine start operation when the registered Intelligent Key is carried.
- When the Intelligent Key battery is discharged, it can be used as emergency back-up by inserting the mechanical key set in the Intelligent Key to the ignition key cylinder. At that time, perform the NATS ID verification. If it is used when the Intelligent Key is carried, perform the Intelligent Key ID verification.
- If the ID is successfully verified, and when the ignition knob switch is pressed, steering lock will be released and initiating the engine will be possible.
- The door lock/unlock operation can be performed when the Intelligent Key battery is discharged, by operating the driver door key cylinder using the mechanical key set in the Intelligent Key.
- Up to 4 Intelligent Keys can be registered (Including the standard Intelligent Key) on request from the owner.

NOTE:

- Refer to DLK-28, "INTELLIGENT KEY : System Description" for any functions other than engine start function of Intelligent Key system.

PRECAUTIONS FOR INTELLIGENT KEY SYSTEM

- **In the Intelligent Key system of model J10, the transponder [the chip for NATS ID verification] is integrated into the Intelligent Key. (For the conventional models, it is integrated into the mechanical key.) Therefore, the mechanical key cannot perform the ID verification, and thus it cannot start the engine. Instead, the NATS ID verification can be performed by inserting the mechanical key into the key cylinder, and then it can start the engine.**

OPERATION WHEN INTELLIGENT KEY IS CARRIED

1. When the ignition knob switch and brake switch are ON, and Intelligent Key unit is transmit the request signal to the Intelligent Key.
2. The Intelligent Key receives the request signal and transmits the Intelligent Key ID signal to the Intelligent Key unit.
3. The Intelligent Key unit receives the Intelligent Key ID signal and verifies it with the registered ID.
4. Intelligent Key unit transmits the steering lock unlock signal to steering lock unit and turn on the key warning lamp (green) if the verification results are OK. (The detail of key warning lamp operation, refer to DLK-52, "System Description")
5. Release of the steering lock.
6. BCM transmits the starter request signal via CAN communication to IPDM E/R and turns the starter relay in IPDM E/R ON if BCM judges that the engine start condition is satisfied.
7. IPDM E/R turns the starter control relay ON when receiving the starter request signal.
8. When shift position is in P or N position, battery power is supplied through the starter relay and operate the starter motor and to start the cranking.

   CAUTION:

   If a malfunction is detected in the Intelligent Key system, the “KEY” warning lamp in the combination meter illuminates. At that time, the engine cannot be started.

OPERATION RANGE

Engine can be started when Intelligent Key is inside the vehicle. However, sometimes engine might not start when Intelligent Key is on instrument panel or in glove box.

OPERATION WHEN MECHANICAL KEY IS USED

When the Intelligent Key battery is discharged, performs the NATS ID verification between the integrated transponder and BCM by inserting the mechanical key into the key cylinder, and then the engine can be started. For details relating to starting the engine using mechanical key, refer to SEC-14, "System Description".

STEERING LOCK OPERATION

Steering is locked by steering lock unit when ignition switch is in the OFF position (the ignition knob is released) and key switch is OFF (key is removed from ignition key cylinder).

KEY INTERLOCK OPERATION (ONLY FOR MT MODELS)

In case of a MT vehicle is in motion and ignition is turned into LOCK position, steering lock unit causes a risk by activating the steering lock actuator. The key interlock operation is designed to override the steering lock system and prevent the situation mentioned above from occuring.

LOCK condition

When the following conditions are fulfilled, key interlock solenoid will be locked. (Steering lock inactive)

- 1 second passes after ignition switch is in ON position and engine revolution speed goes above 500 rpm.

cardiagn.com

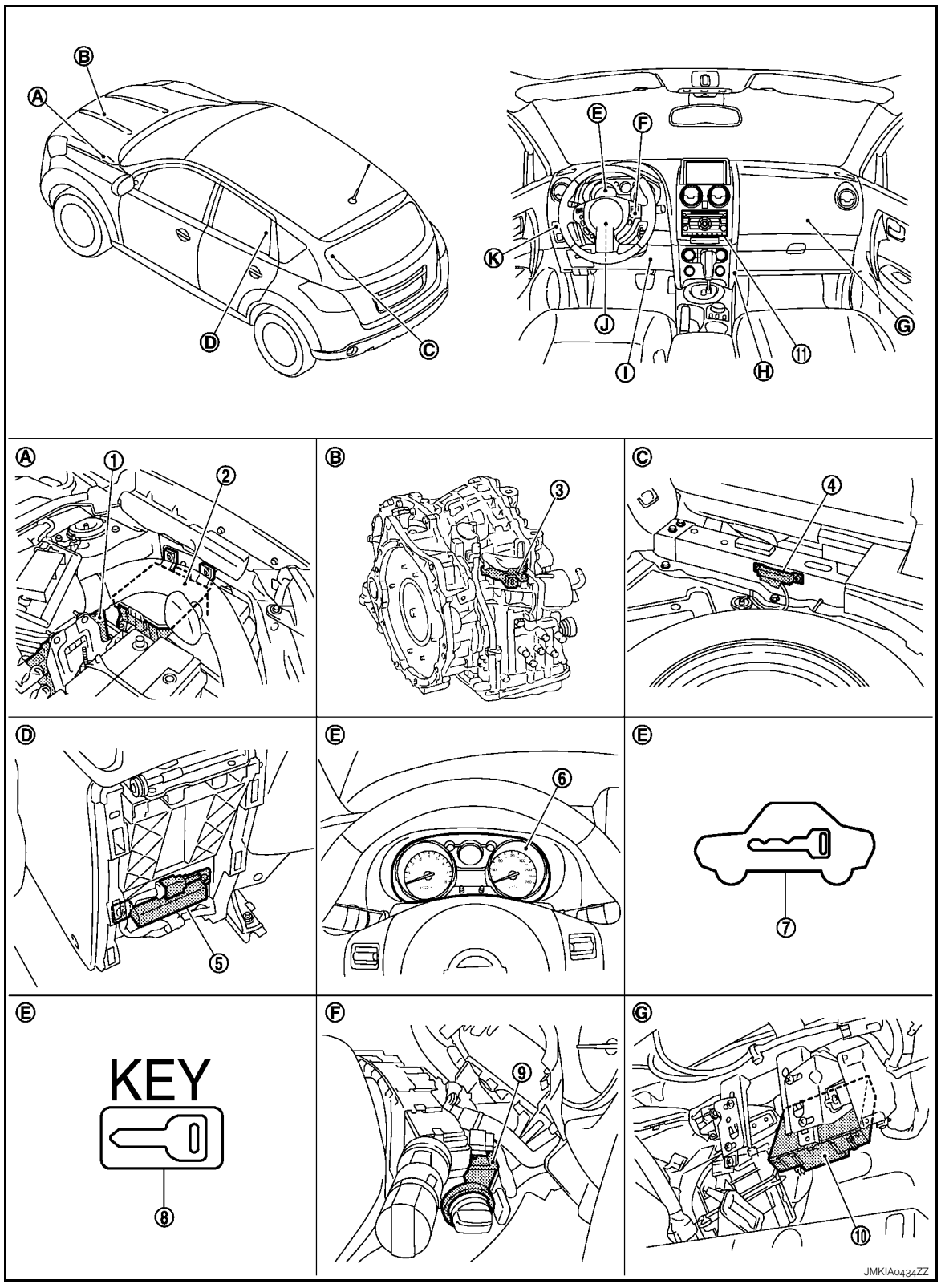
UNLOCK condition

When any of the following condition are fulfilled key interlock solenoid will be unlocked. (Steering lock active)

- When vehicle speed is below 4km/h and the ignition switch is turned from ON to OFF.
- When vehicle speed is over 4km/h but less than 10km/h in LOCK condition, and 3 second passes after the ignition switch is turned from ON to OFF.

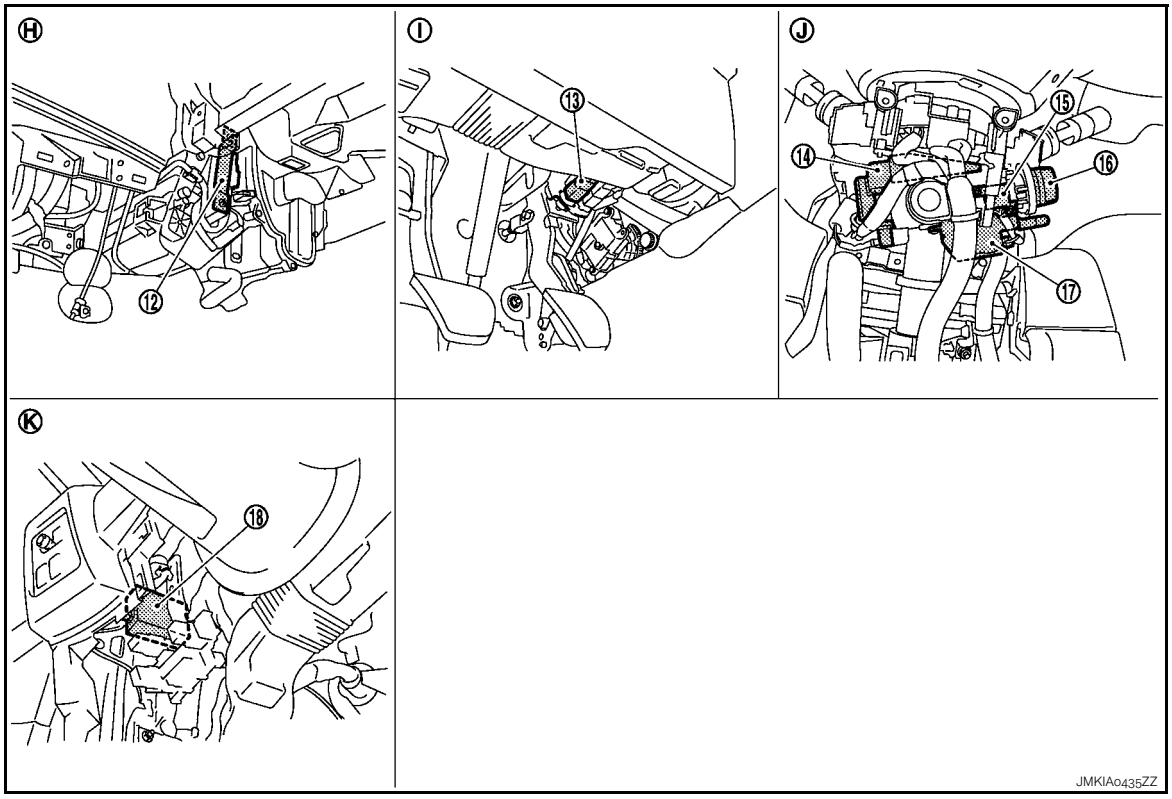
Component Parts Location

INFOID:0000000000944527



1. ECM
   Gasoline engine E16
   Diesel engine E60
2. IPDM E/R
   E10, E11, E13, E14
3. Park/neutral position switch
   F21
4. Inside key antenna (rear seat)
   B45
5. Inside key antenna (center console)
   M61
6. Combination meter (buzzer)
   (behind the combination meter)
   M34
7. Security indicator lamp
   M34
8. Key warning lamp
   M34
9. NATS antenna amp.
   M26
10. BCM
    M65, M66, M67

A. Engine room (LH)
B. CVT unit
C. View with luggage floor spacer (LH) removed
D. View with console rear finisher removed
E. Built in combination meter
F. View with steering column cover removed
G. Over the glove box



12. Inside Key antenna (instrument center)
    M70
13. Stop lamp switch
    Gasoline engine M/T models: E114
    Except gasoline engine M/T models: E115
14. Steering lock unit
    M28
15. Ignition knob switch, key switch and key lock solenoid (key switch)
    M25
16. Ignition knob switch, key switch and key lock solenoid (ignition knob switch)
    M25
17. Ignition knob switch, key switch and key lock solenoid (key lock solenoid)
    M25
18. Intelligent Key unit
    M40

H. View with instrument lower cover RH removed
I. Remove lower instrument panel (driver side)
J. View with steering column cover removed
K. Remove lower instrument panel (driver side)

cardiagn.com

Component Description

INFOID:0000000000944528

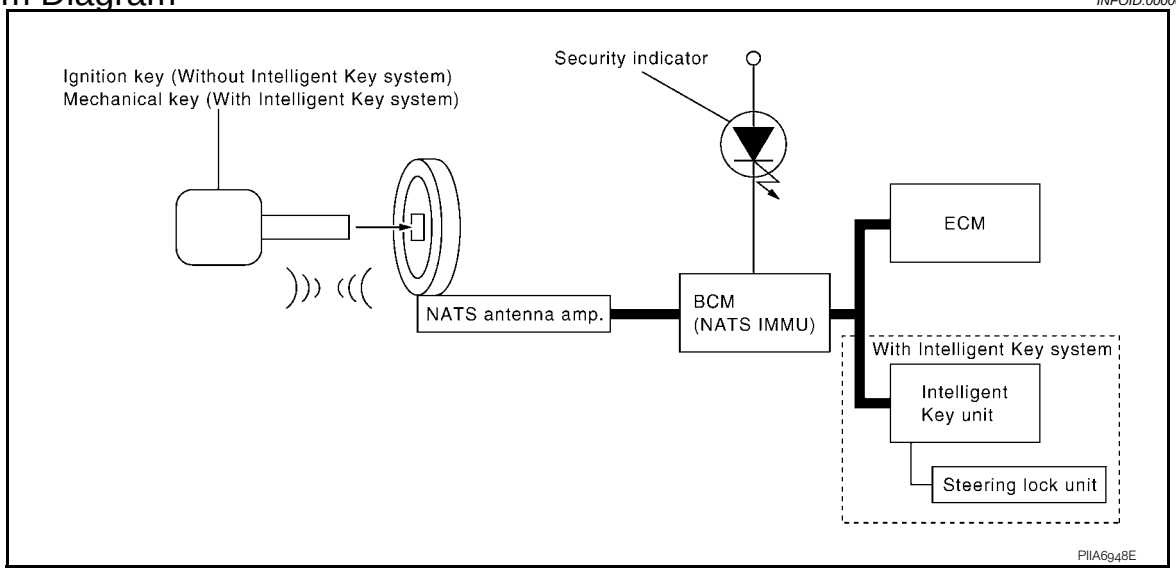
Component	Reference
Intelligent Key unit	SEC-42
BCM	BCS-7
ECM	HR16 (WITH EURO-OBD): EC-34 HR16 (WITHOUT EURO-OBD): EC-373 MR20 (WITH EURO-OBD): EC-650 MR20 (WITHOUT EURO-OBD): EC-994 K9K: EC-1277
Combination meter	MWI-4
Steering lock unit	SEC-31
Ignition knob switch, key switch and key lock solenoid	SEC-50
Inside key antenna	DLK-116
Stop lamp switch	SEC-52
Security indicator	SEC-58

carsdiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM)

System Diagram

INFOID:0000000000944529



System Description

INFOID:0000000000944530

INPUT/OUTPUT SIGNAL CHART

Intelligent Key Unit

Switch/Input signal	Input signal to BCM	BCM function	Actuator/Output signal
Ignition knob switch	Ignition knob (push/release)	NATS	• Steering lock unit
Key switch	Mechanical key (Insert/remove)		
Steering lock unit	Steering (lock/unlock)		
ECM	Engine status signal		

BCM

Switch/Input signal	Input signal to BCM	BCM function	Actuator/Output signal
NATS antenna amp.	Key ID	NATS	• Security indicator lamp • Starter request
Audio unit	Audio unit ID		
ECM	Engine status signal		

SYSTEM DESCRIPTION

NATS (Nissan Anti-Theft System) has the following immobilizer functions:

- Engine immobilizer shows high anti-theft performance to prevent engine from starting by other than the owner.
- Only a key with key ID registered in BCM and ECM can start engine, and shows high anti-theft performance to prevent key from being copied or stolen.
- Security indicator always flashes with mechanical key removed condition (key switch: OFF) and ignition knob released condition on LOCK position (ignition knob switch: OFF).
- Therefore, NATS warns outsiders that the vehicle is equipped with the anti-theft system. Refer to SEC-19, "System Description".
- If system detects malfunction, security indicator illuminates when ignition switch is turned to ON position.
- If the owner requires, ignition key ID or mechanical key ID can be registered for up to 5 keys.
- During trouble diagnosis or when the following parts have been replaced, and if mechanical key is added, registration* is required.

cardiagn.com

*1: All keys kept by the owner of the vehicle should be registered with mechanical key.

- ECM
- BCM
- Mechanical key
- ABS actuator control unit
- EPS control unit
- IPDM E/R
- Combination meter

- NATS trouble diagnosis, system initialization and additional registration of other mechanical key IDs must be carried out using CONSULT-III hardware and SECURITY CARD.
  When NATS initialization has been completed, the ID of the inserted mechanical key or mechanical key IDs can be carried out.
- Possible symptom of NATS malfunction is “Engine cannot start”. In J10, the engine can be started with the Intelligent Key system and NATS. Identify the possible causes according to “Work Flow”, Refer to SEC-5, "Work Flow".
- If ECM other than Genuine NISSAN is installed, the engine cannot be started. For ECM replacement procedure, refer to SEC-8, "ECM RE-COMMUNICATING FUNCTION : Description".

PRECAUTIONS FOR KEY REGISTRATION

- The key registration is a procedure that erases the current NATS ID once, and then re-registers a new ID. Therefore the registered Intelligent Key is necessary for this procedure. Before starting the registration operation collect all registered Intelligent Keys from the customer.
- The NATS ID registration is the procedure that registers the ID stored into the transponder (integrated in mechanical key) to BCM.
  The Intelligent Key ID registration is the procedure that registers the ID to Intelligent Key unit.
- When performing the Intelligent Key system registration only, the engine cannot be started by inserting the key into the key cylinder. When performing the NATS registration only, the engine cannot be started by using the mechanical key.

SECURITY INDICATOR

- Always flashes with ignition knob released (ignition knob switch: OFF) condition on ignition knob LOCK position.
- Always flashes with ignition knob released (ignition knob switch: OFF) condition on mechanical key removed position.

MAINTENANCE INFORMATION

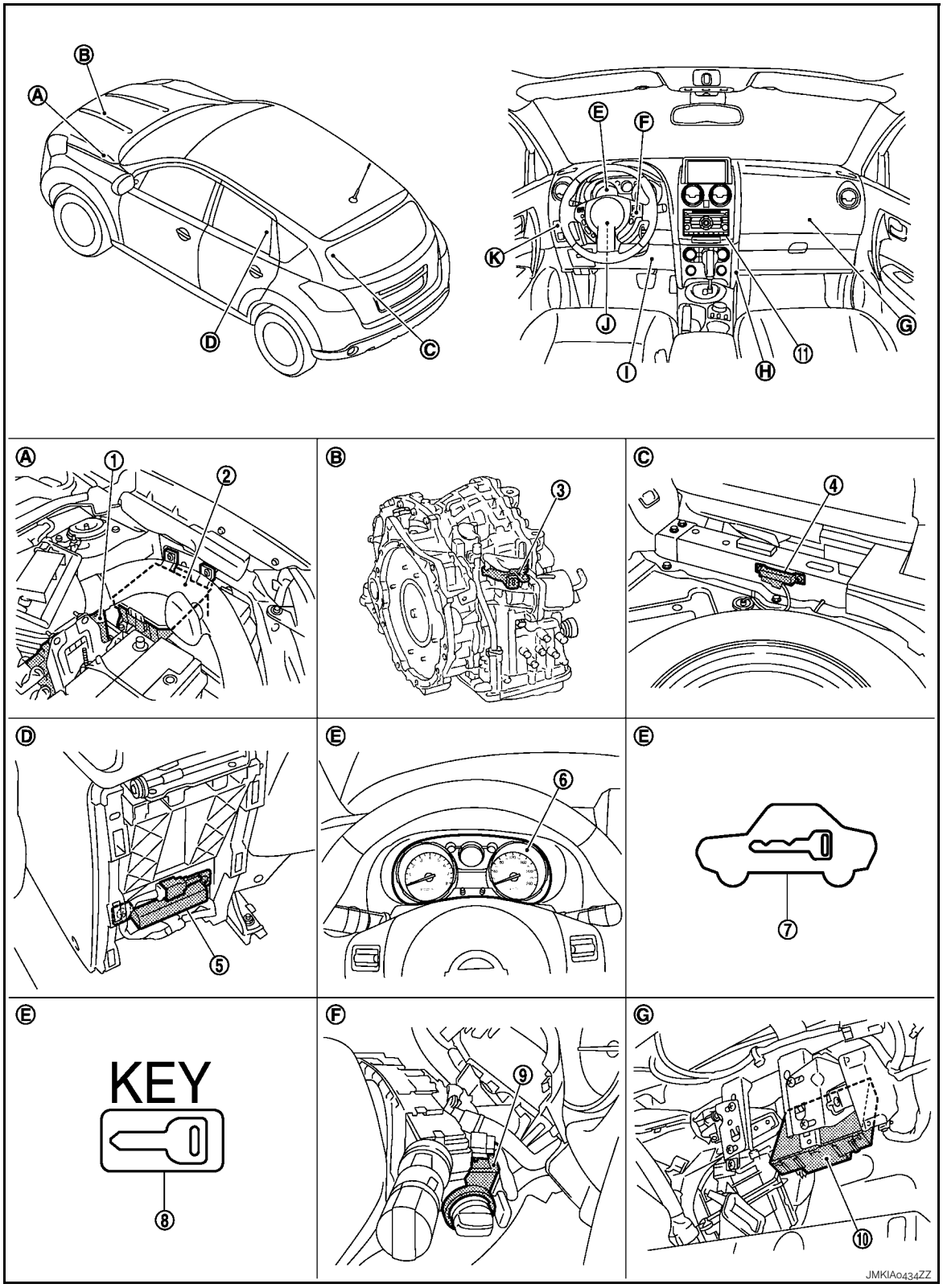
CAUTION:

It is necessary to perform NATS ID registration when replacing any of the following part.
If it's not (or fail to do so), the electrical system may not operate properly.
***: New one means a virgin control unit that has never been energized on-board.**

- **ABS actuator control unit**
- **EPS control unit**
- **IPDM E/R**
- **ECM**
- **Combination meter**

Component Parts Location

INFOID:0000000001090900

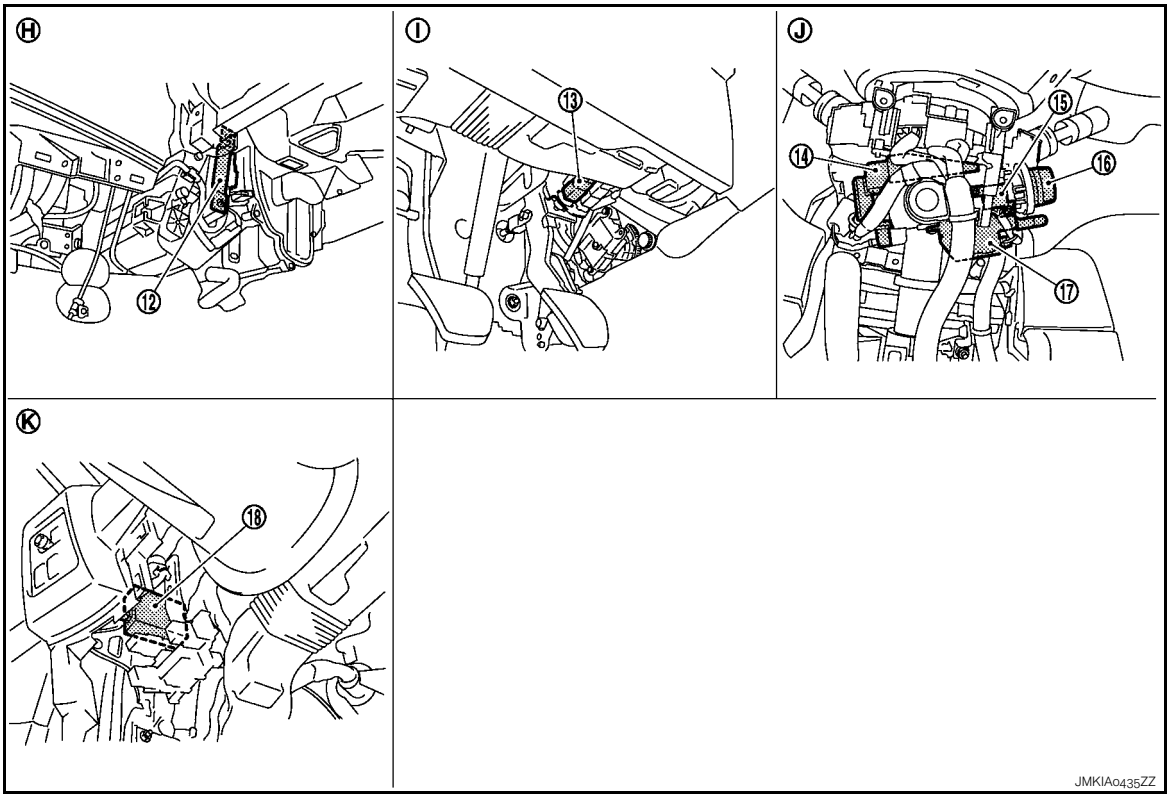


1. ECM
   Gasoline engine E16
   Diesel engine E60
2. IPDM E/R
   E10, E11, E13, E14
3. Park/neutral position switch
   F21
4. Inside key antenna (rear seat)
   B45
5. Inside key antenna (center console)
   M61
6. Combination meter (buzzer)
   (behind the combination meter)
   M34

cardiagn.com

7. Security indicator lamp M34
8. Key warning lamp M34
9. NATS antenna amp. M26
10. BCM M65, M66, M67

A. Engine room (LH)
B. CVT unit
C. View with luggage floor spacer (LH) removed
D. View with console rear finisher removed
E. Built in combination meter
F. View with steering column cover removed
G. Over the glove box



12. Inside Key antenna (instrument center) M70
13. Stop lamp switch Gasoline engine M/T models: E114 Except gasoline engine M/T models: E115
14. Steering lock unit M28
15. Ignition knob switch, key switch and key lock solenoid (key switch) M25
16. Ignition knob switch, key switch and key lock solenoid (ignition knob switch) M25
17. Ignition knob switch, key switch and key lock solenoid (key lock solenoid) M25
18. Intelligent Key unit M40

H. View with instrument lower cover RH removed
I. Remove lower instrument panel (driver side)
J. View with steering column cover removed
K. Remove lower instrument panel (driver side)

Component Description

INFOID:0000000000944532

Component	Reference
BCM	BCS-7
Steering lock unit	SEC-31

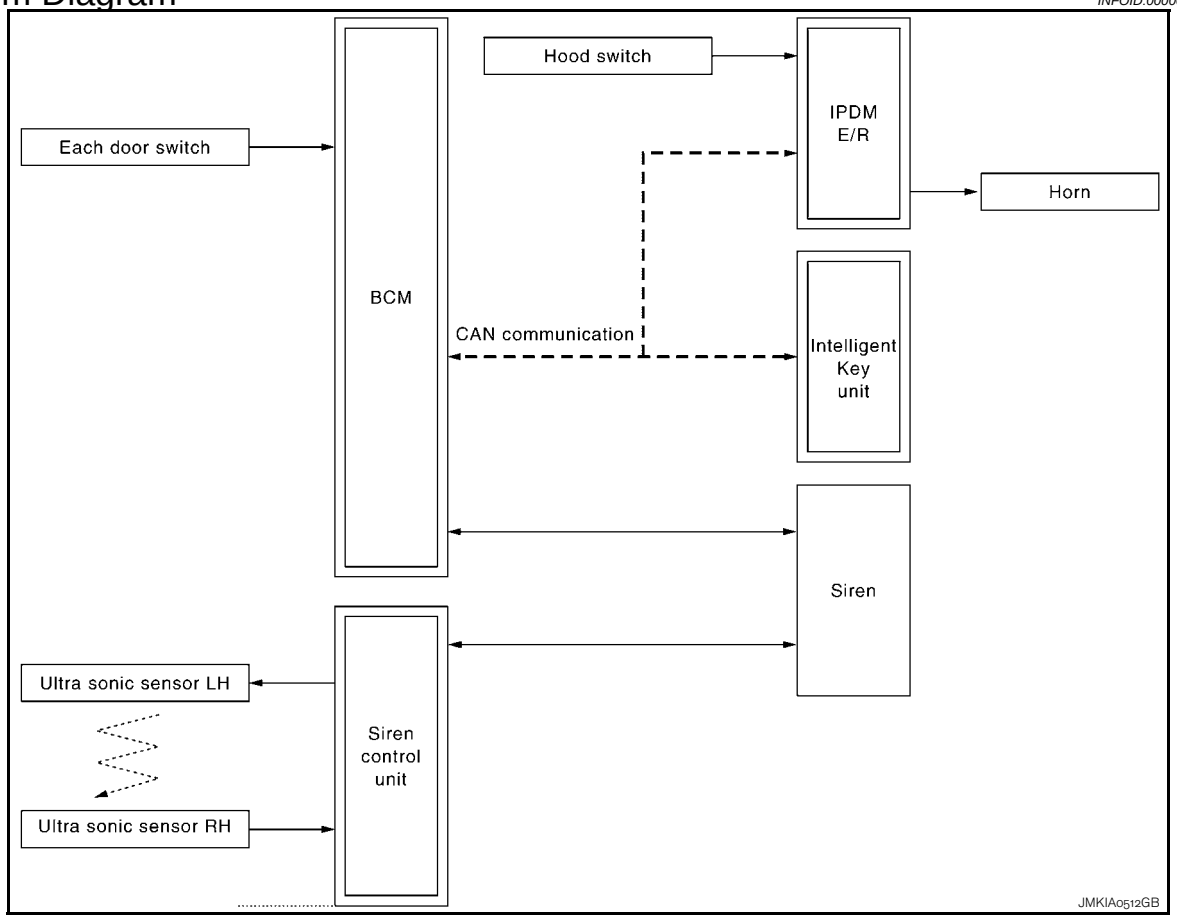
Component	Reference
Key switch	SEC-48
Ignition knob switch	SEC-50
NATS antenna amp.	SEC-33
Security indicator	SEC-58
IPDM E/R	PCS-7

cardiagn.com

VEHICLE SECURITY SYSTEM

System Diagram

INFOID:0000000000944533



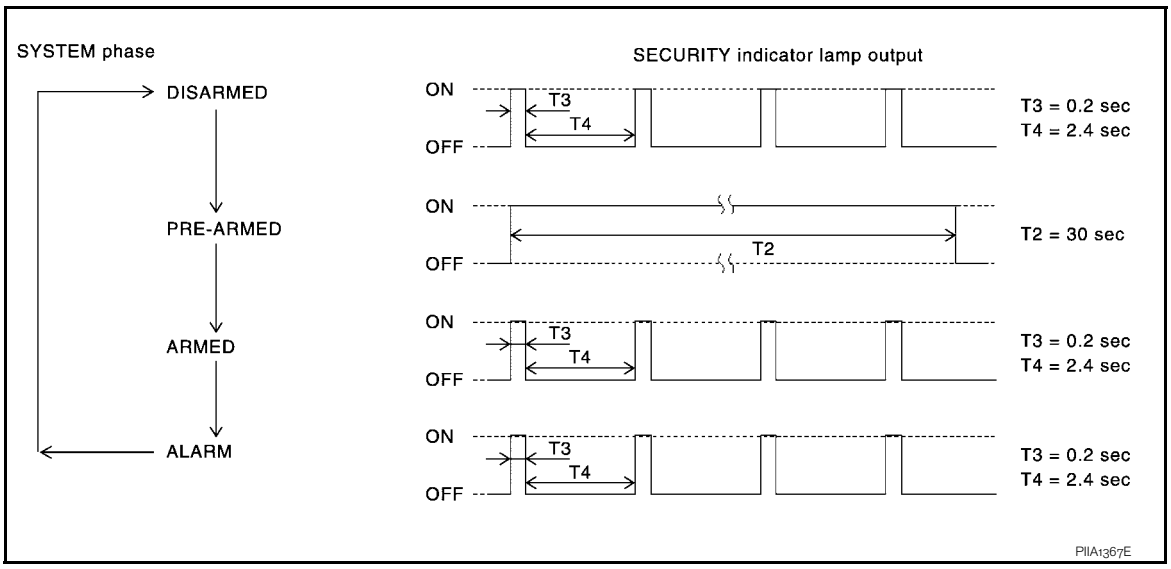
System Description

INFOID:0000000000944534

DESCRIPTION

The security system provides an audible and visual alarm when an unauthorized access to the vehicle is detected while the system is in armed phase.
The security system consist of two control units. BCM manages audible alarm (horn), siren control unit manage audible alarm (siren).

OPERATION FLOW



BCM shifts the phase as follows and the phase information is sent to siren control unit via communication line.

Disarmed Phase
When the vehicle is being driven or when doors are open, the theft warning system is set in the disarmed phase on the assumption that the owner is inside or near the vehicle.

Pre-Armed Phase And Armed Phase
The vehicle security system turns into the pre-armed phase when ignition switch is in OFF position, all doors are closed and locked (using Intelligent Key, door request switch or auto relock function). 10 seconds after the lock operation, the system automatically shifts into the armed phase.

Condition of Activating The System
When the following condition is performed in armed phase, the system sounds the horns/siren and flashes the head lamps for about 30 seconds.
- Hood or any door is opened.
- Ultra sonic sensor is triggered.
- Ignition switch goes ON with invalid transponder ID.

Condition of Deactivating The System
When one of the following operations is performed, the armed phase is canceled.
- Unlock the doors with Intelligent Key or door request switch.
- Ignition switch goes ON with transponder ID verified.

SIREN CONTROL UNIT

Siren control unit manages siren. The siren control unit does not shift to armed phase in the same way as BCM. The siren control unit goes to armed phase after about 10 seconds from lock command. If door is opened or closed within about 20 seconds, only the siren will be activated.
Siren control unit has battery inside. If disconnect or connect battery terminal before canceling armed phase, siren will be activated.

CAUTION:
When replace siren control unit (new one and used one), Perform "C/U INITALIZATION" with CONSULT-III.

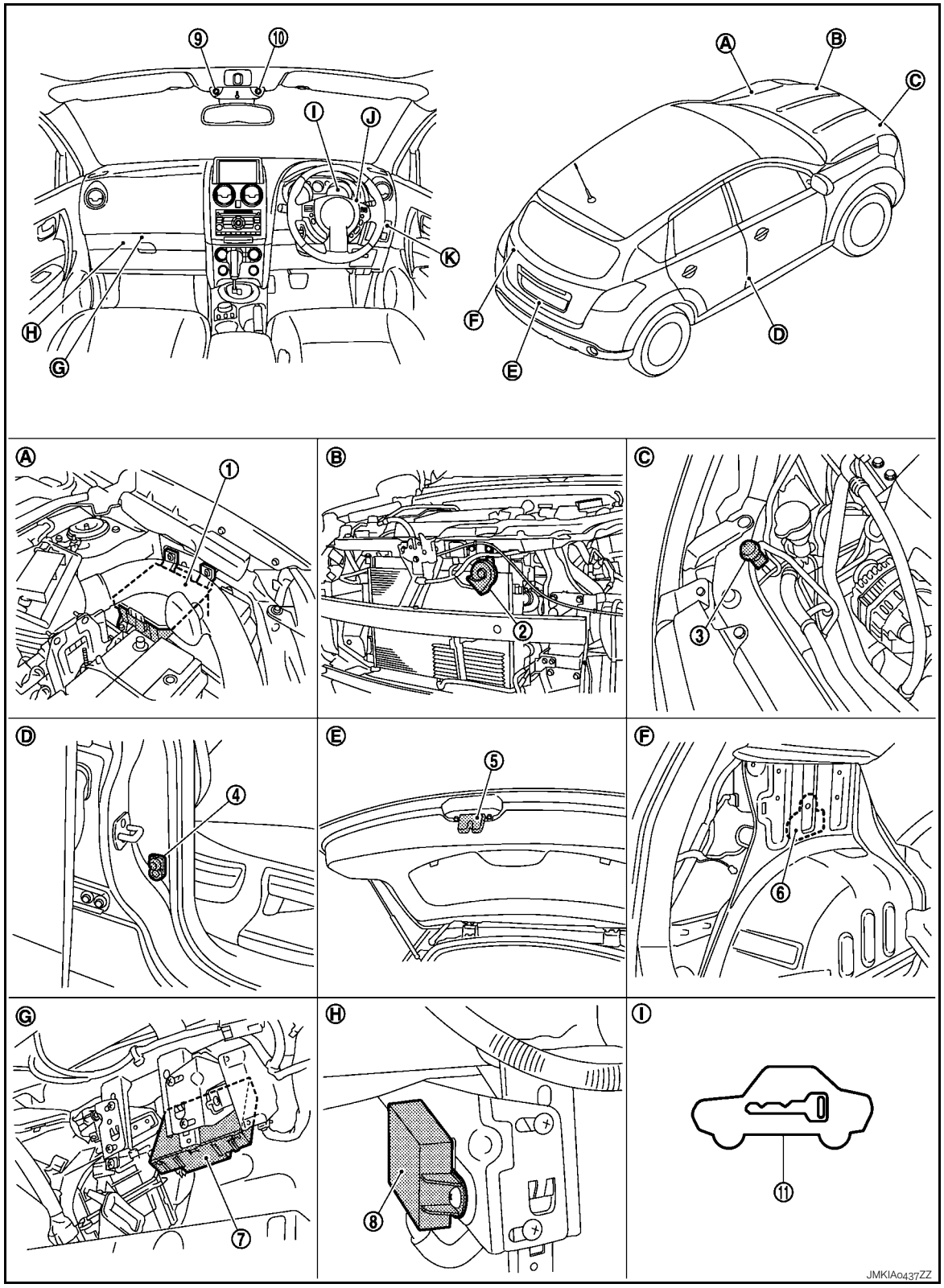
Ultra Sonic Sensor Function
The ultra sonic sensor consist of two separate units, a transmitter on the left and receiver on the right mounted on room mirror. The LH transmitter sensor sends an ultra sonic pulse of sound, and RH receiver sensor receives the returning echo pulse.
It is possible to exclude the ultrasonic sensors.
To exclude the ultra sonic sensors:
1. Turn the ignition switch from the OFF to the ON position.
2. Turn the ignition switch from OFF to ON 3 times within 7 seconds.
3. Close the doors, bonnet and press the lock button on the Intelligent Key to lock all doors.

The ultra sonic sensors are now excluded from the alarm system. All other functions of the system remain activated until the alarm system is disarmed again.

Component Parts Location

INFOID:0000000000944535

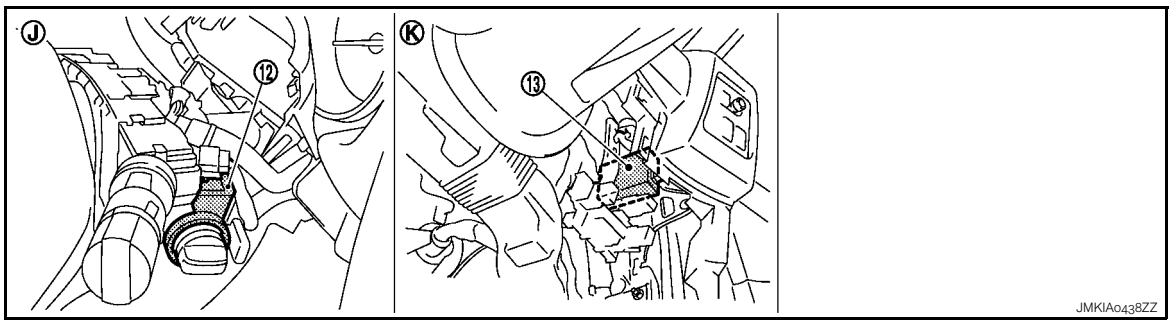
cardiagn.com



1. IPDM E/R
   E10,E12
2. Horn
   E51
3. Hood switch
   E113
4. Front door switch (driver side)
   B34
5. Back door lock assembly (back door switch)
   D152
6. Siren
   B68

7. BCM M65,M66,M67
8. Siren control unit M94
9. Ultra sonic sensor LH R11
10. Ultra sonic sensor RH R12
11. Security indicator lamp (built in combination meter) M34

A. Engine room (LH)
B. View with front bumper removed
C. Engine room (RH)
D. View with center pillar
E. View with back door opened
F. View with luggage side lower finisher (LH) removed
G. Over the glove box
H. Over the glove box
I. Built in combination meter



12. NATS antenna amp. M26
13. Intelligent Key unit M40

J. View with steering column cover removed
K. Remove instrument driver lower panel

Component Description

INFOID:0000000000944536

Component	Reference
BCM	BCS-7
Horn	SEC-56
Hood switch	SEC-54
Security indicator	SEC-58
Door switch	DLK-83
Siren control unit	SEC-60
Ultra sonic sensor	SEC-60

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001096688

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

IMMU

IMMU : CONSULT-III Function (BCM - IMMU)

INFOID:0000000001096689

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

carsdiagn.com

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.

DATA MONITOR

Monitor item	Content
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.

*1: For the vehicle Intelligent key is equipped.

ACTIVE TEST

Test item	Description
THEFT IND	This test is able to check security indicator operation [ON/OFF].

THEFT ALM

THEFT ALM : CONSULT-III Function (BCM - THEFT ALM)

INFOID:0000000001096690

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
KEYKESS LOCK*2	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK*2	Indicates [ON/OFF] condition of unlock signal from key fob.
I-KEY LOCK*1	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK*1	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.
HOOD SW	Indicates [ON/OFF] condition of hood switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.

*1: For vehicle equipped with Intelligent Key.

cardiagn.com

*2: For the vehicle equipped with remote key less entry system.

ACTIVE TEST

Test item	Description
THEFT IND	This test is able to check security indicator operation [ON/OFF].
VEHICLE SECURITY HORN	This test is able to check horn operation [ON].
FLASHER	This test is able to check flasher operation [LH/RH/OFF].

WORK SUPPORT

Test item	Description
SECURITY ALARM SET	Vehicle security function mode can be changed in this mode. • ON: Vehicle security function is ON. • OFF: Vehicle security function is OFF.
THEFT ALM TRG	The switch which triggered vehicle security system is recorded. This mode can be able to confirm and erase the record of vehicle security system.

c-diagn.com

DIAGNOSIS SYSTEM (INTELLIGENT KEY UNIT)

CONSULT-III Function (INTELLIGENT KEY)

INFOID:0000000001096691

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with Intelligent Key unit.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by Intelligent Key unit.
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from Intelligent Key unit.
DATA MONITOR	The Intelligent Key unit input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.
ECU IDENTIFICATION	The Intelligent Key unit part number is displayed.

WORK SUPPORT

Support item	Description	Selection item	Condition
CONFIRM KEY FOB ID	It can check whether Intelligent Key ID code is registered or not.	—	—
TAKE OUT FROM WINDOW WARN	Take away warning chime (from window) mode can be changed.	ON	Active
		OFF	Inactive
LOW BATT OF KEY FOB WARN	Intelligent Key low battery warning mode can be changed.	ON	Active
		OFF	Inactive
KEYLESS FUNCTION	Door lock function with Intelligent Key can be changed.	ON	Active
		OFF	Inactive
ANSWER BACK FUNCTION	Buzzer reminder operation can be changed.	ON	Active
		OFF	Inactive
SELECTIVE UNLOCK FUNCTION	Anti-hijack mode can be changed.	ON	Active
		OFF	Inactive
HAZARD ANSWER BACK	Hazard reminder operation mode can be changed.	Refer to DLK-58.	
ANSWER BACK WITH I-KEY LOCK	Buzzer reminder operation (lock operation) mode by each door request switch can be changed.	BUZZER	Active
		OFF	Inactive
ANSWER BACK WITH I-KEY UNLOCK	Buzzer reminder operation (unlock operation) mode by each door request switch can be changed.	BUZZER	Active
		OFF	Inactive
AUTO RELOCK TIMER	Auto door lock operation mode can be changed.	OFF	Inactive
		2 min	Active
ENGINE START BY I-KEY	Engine start function (by Intelligent Key) mode can be changed.	ON	Active
		OFF	Inactive
LOCK/UNLOCK BY I-KEY	Door lock function by door request switch can be changed.	ON	Active
		OFF	Inactive

SELF-DIAG RESULT

Refer to SEC-121, "DTC Index".

DATA MONITOR

cardiagn.com

Monitor Item	Condition
PUSH SW	Indicates [ON (pressed)/OFF (released)] condition of ignition knob switch.
KEY SW	Indicates [ON (inserted)/OFF (removed)] condition of key switch.
DR REQ SW	Indicates [ON (pressed)/OFF (released)] condition of door request switch (driver side).
AS REQ SW	Indicates [ON (pressed)/OFF (released)] condition of door request switch (passenger side).
BD/TR REQ SW	Indicates [ON (pressed)/OFF (released)] condition of door request switch (back door).
IGN SW	Indicates [ON (ON or START position)/OFF (other than ON and START position)] condition of ignition switch ON position.
ACC SW	Indicates [ON/OFF] condition of ignition switch ACC position.
STOP LAMP SW	Indicates [ON/OFF] condition of stop lamp switch.
DOOR LOCK SIG	Indicates [ON/OFF] condition of LOCK signal from Intelligent Key.
DOOR UNLOCK SIG	Indicates [ON/OFF] condition of UNLOCK signal from Intelligent Key.
DOOR SW DR	Indicates [OPEN/CLOSE] condition of front door switch (driver side) from BCM via CAN communication.
DOOR SW AS	Indicates [OPEN/CLOSE] condition of front door switch (passenger side) from BCM via CAN communication.
DOOR SW RR	Indicates [OPEN/CLOSE] condition of rear door switch (RH) from BCM via CAN communication.
DOOR SW RL	Indicates [OPEN/CLOSE] condition of rear door switch (LH) from BCM via CAN communication.
DOOR BK SW	Indicates [OPEN/CLOSE] condition of back door switch from BCM via CAN communication.
VEHICLE SPEED	Displays the vehicle speed signal received from combination meter by numerical value [km/h].

ACTIVE TEST

Test item	Description
DOOR LOCK/UNLOCK	This test is able to check door lock/unlock operation. • ALL UNLK: All door lock actuators are unlocked. • DR UNLK: Door lock actuator (driver side) is unlocked. • AS UNLK: Door lock actuator (passenger side) is unlocked. • BK UNLK: This item is indicated, but inactive. • LOCK: All door lock actuator is locked.
ANTENNA	This test is able to check Intelligent Key antenna operation. When the following condition are met, hazard warning lamps flash. • ROOM ANT1: Inside key antenna (console) detects Intelligent Key, when “ROOM ANT1” is selected. • ROOM ANT2: Inside key antenna (instrument center/rear seat) detects Intelligent Key, when “ROOM ANT2”is selected. • DRIVER ANT: Outside key antenna (driver side) detects Intelligent Key, when “DRIVER ANT” is selected. • ASSIST ANT: Outside key antenna (passenger side) detects Intelligent Key, when “ASSIST ANT” is selected. • BK DOOR ANT: Outside key antenna (rear bumper) detects Intelligent Key, when “BK DOOR ANT” is selected.
OUTSIDE BUZZER	This test is able to check Intelligent Key warning buzzer operation. • ON • OFF
INSIDE BUZZER	This test is able to check warning chime in combination meter operation. • TAKE OUT: Take away warning chime sounds. • KNOB: Ignition knob switch warning chime sounds. • KEY: Key warning chime sounds. • OFF

Test item	Description
INDICATOR	This test is able to check warning lamp operation. • BLUE ON: Key warning lamp (green) illuminates. • RED ON: Key warning lamp (red) illuminates. • KNOB ON: Lock warning lamp illuminates. • BLUE IND: Key warning lamp (green) flashes. • RED IND: Key warning lamp (red) flashes. • KNOB IND: Lock warning lamp flashes. • OFF
KEY LOCK SOLENOID*1	This test is able to check key interlock operation. • LOCK: Key interlock is active. • UNLOCK: Key interlock is inactive.

*1: The item is only for MT model.

cardiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001098010

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart, refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000001098011

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1000	CAN COMM CIRCUIT	When Intelligent Key unit cannot communicate CAN communication signal continuously for 2 seconds or more.	In CAN communication system, any item (or items) of the following listed below is malfunctioning. • Transmission • Receiving (BCM) • Receiving (IPDM E/R) • Receiving (ECM) • Receiving (METER/M&A) • Receiving (MULTI AV)

Diagnosis Procedure

INFOID:0000000001098012

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check “Self Diagnostic Result”.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000001098013

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart, refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000001098014

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of Intelligent Key unit.	Intelligent Key unit

Diagnosis Procedure

INFOID:0000000001098015

1.REPLACE INTELLIGENT KEY UNIT

When DTC [U1010] is detected, replace Intelligent Key unit.

>> Replace Intelligent Key unit.

Special Repair Requirement

INFOID:0000000001098016

1.REQUIRED WORK WHEN REPLACING INTELLIGENT KEY UNIT

Initialize control unit. Refer to CONSULT-III operation manual NATS-IVIS/NVIS.

>> Work end.

cardiagn.com

B2013 ID DISCORD I-KEY-STRG

Description

INFOID:0000000000944553

Intelligent Key unit performs the ID verification with the steering lock unit and releases the steering lock if both Intelligent Key unit and steering lock unit ID are same. Intelligent Key unit starts the communication with the steering lock unit when Intelligent Key is carried into the vehicle and the ignition knob switch is pressed.

DTC Logic

INFOID:0000000000944554

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2013	STRG COMM 1	The ID verification results between Intelligent Key unit and steering control unit are NG. The registration is necessary.	• Steering lock unit

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Press the ignition knob switch
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-31, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000000944555

1.PERFORM INITIALIZATION

Perform initialization with CONSULT-III. Re-register all mechanical keys.
For initialization and registration of mechanical key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can steering lock be released with re-registered mechanical key?

YES >> Steering lock unit was unregistered.
NO >> GO TO 2.

2.CHECK STEERING LOCK UNIT POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect steering lock unit connector.
3. Check voltage between steering lock unit harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Steering lock unit connector	Terminal		
M28	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK STEERING LOCK UNIT POWER SUPPLY-2

Check voltage between steering lock unit harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Steering lock unit connector	Terminal		
M28	2	Ground	5

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK STEERING LOCK UNIT GROUND CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit harness connector and steering lock unit harness connector.

Intelligent Key unit connector	Terminal	Steering lock unit connector	Terminal	Continuity
M40	31	M28	4	Existed

3. Check continuity between Intelligent Key unit connector and ground.

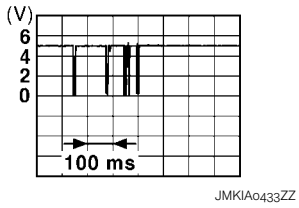
Intelligent Key unit connector	Terminal	Ground	Continuity
M40	31	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5. CHECK STEERING LOCK UNIT COMMUNICATION CIRCUIT

1. Connect Intelligent Key unit and steering lock unit connectors.
2. Check voltage between steering lock unit connector and ground.

Terminals (+) Steering lock unit connector	Terminals (+) Terminal	Terminals (–)	Condition		Voltage (V) (Approx.)
M28	3	Ground	Steering lock	LOCK status	Battery voltage
				LOCK ⇔ UNLOCK	
				For 15 seconds after UNLOCK	Battery voltage
				15 seconds later UN-LOCK	0

JMKIA0433ZZ

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace harness.

6. CHECK INTERMITTENT INCIDENT

Refer to SEC-49, "Component Inspection".

Is the inspection result normal?

YES >> Replace steering lock unit.
NO >> Repair or replace malfunctioning parts.

cardiagn.com

B2190, P1614 NATS ANTENNA AMP.

Description

INFOID:0000000001109193

Performs ID verification through BCM and NATS antenna amplifier when ignition knob switch is pressed.
Prohibits the release of steering lock or start of engine when an unregistered ID of mechanical key is used.

DTC Logic

INFOID:0000000001109194

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2190 P1614	NATS ANTENNA AMP	• Inactive communication between NATS antenna amp. and BCM. • Mechanical key is malfunctioning.	• Harness or connectors (The NATS antenna amp. circuit is open or shorted) • Mechanical key • NATS antenna amp. • BCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Insert mechanical key into the key cylinder.
2. Press the ignition knob switch.
3. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-33, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001109195

1.CHECK NATS ANTENNA AMP. INSTALLATION

Check NATS antenna amp. installation. Refer to SEC-152, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Reinstall NATS antenna amp. correctly.

2.CHECK MECHANICAL KEY

Start engine with another registered mechanical key.

Does the engine start?

YES >> Replace mechanical key. Perform initialization and registration of mechanical key. Refer to “”
NO >> GO TO 3.

3.CHECK NATS ANTENNA AMP. POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect NATS antenna amp. harness connector.
3. Check voltage between NATS antenna amp. harness connector and ground.

NATS antenna amp.		Ground	Voltage [V] (approx.)
Connector	Terminal		
M26	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK NATS ANTENNA AMP. GROUND CIRCUIT

Check continuity between NATS antenna amp. connector and ground.

Key slot		Ground	Continuity
Connector	Terminal		
M26	3	Ground	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace circuit.

5.CHECK NATS ANTENNA AMP. SIGNAL CIRCUIT

Check voltage between NATS antenna amp. harness connector and ground.

NATS antenna amp.		Ground	Condition	Voltage [V] (approx.)
Connector	Terminal			
M26	2	Ground	Just after inserting mechanical key in key cylinder.	Pointer of tester should move.
	4		Other than above.	0

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace circuit.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace NATS antenna amp.
NO >> Repair or replace malfunctioning parts.

cardiagn.com

B2191, P1615 DIFFERENCE OF KEY

Description

INFOID:0000000000944544

Performs ID verification through BCM when ignition knob switch is pressed.
Prohibits the release of steering lock or start of engine when an unregistered ID of mechanical key is used.

DTC Logic

INFOID:0000000000944545

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2191 P1615	DIFFERENCE OF KEY	The ID verification results between BCM and mechanical key are NG. The registration is necessary.	• Mechanical key

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Insert mechanical key into the key cylinder.
2. Press the ignition knob switch.
3. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer toSEC-35, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000000944546

1.PERFORM INITIALIZATION

Perform initialization with CONSULT-III. Re-register all mechanical keys.
For initialization and registration of mechanical key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started with re-registered mechanical key?

YES >> Mechanical key was unregistered.
NO >> BCM is malfunctioning.
- Replace BCM. Refer to BCS-64, "Removal and Installation".
- Perform initialization again

B2192, P1611 ID DISCORD, IMMU-ECM

Description

INFOID:0000000001034107

BCM performs the ID verification with ECM that allows the engine to start. BCM starts the communication with ECM if ignition switch is turned ON and starts the engine if the ID is OK. ECM prevents the engine from starting if the ID is not registered.

DTC Logic

INFOID:0000000001034108

DTC DETECTION LOGIC

NOTE:

- If DTC B2192 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to SEC-29, "DTC Logic".
- If DTC B2192 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to SEC-30, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2192 P1611	ID DISCORD BCM-ECM	The ID verification results between BCM and ECM are NG. The registration is necessary.	• BCM • ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-36, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001034109

1.PERFORM INITIALIZATION

Perform initialization with CONSULT-III. Re-register all mechanical keys.
For initialization and registration of mechanical key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started with re-registered mechanical key?

YES >> ID was unregistered.
NO >> GO TO 2.

2.PEPLACE BCM

1. Replace BCM. Refer to BCS-64, "Removal and Installation".
2. Perform initialization with CONSULT-III. Re-register all mechanical keys.
   For initialization and registration of mechanical key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started with re-registered mechanical key?

YES >> BCM is malfunctioning.
NO >> GO TO 3.

3.PEPLACE ECM

1. Replace ECM. Refer to the following page.

- HR16 (WITH EURO-OBD): EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- HR16 (WITHOUT EURO-OBD): EC-368, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20 (WITH EUR-OBD): EC-645, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"
- MR20 (WITHOUT EUR-OBD): EC-989, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

cardiagn.com

- K9K: EC-1273, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"

2. Perform initialization with CONSULT-III. Re-register all mechanical keys.
   For initialization and registration of mechanical key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started with re-registered mechanical key?

YES >> ECM is malfunctioning.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

carsdiagn.com

B2193, P1612 CHAIN OF ECM-IMMU

Description

INFOID:0000000001116341

BCM performs the ID verification with ECM that allows the engine to start. BCM starts the communication with ECM if ignition switch is turned ON and starts the engine if the ID is OK. ECM prevents the engine from starting if the ID is not registered.

DTC Logic

INFOID:0000000001116342

DTC DETECTION LOGIC

NOTE:

- If DTC B2193 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to SEC-29, "DTC Logic".
- If DTC B2193 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to SEC-30, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2193 P1612	CHAIN OF BCM-ECM	Inactive communication between ECM and BCM	• Harness or connectors (The CAN communication line is open or short) • BCM • ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-38, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116343

1.REPLACE BCM

1. Replace BCM. Refer to BCS-64, "Removal and Installation".
2. Perform initialization with CONSULT-III.
   For initialization, refer to “CONSULT-III Operation Manual NATS”.

Does the engine start?

YES >> BCM was malfunctioning.
NO >> ECM is malfunctioning.
- Replace ECM.
- Perform ECM re-communicating function.

cardiagn.com

B2194 ID DISCORD IMMU-I-KEY

Description

INFOID:0000000001109365

BCM performs the ID verification with Intelligent Key unit that allows the engine to start. BCM starts the communication with Intelligent Key unit if ignition switch is turned ON and starts the engine if the ID is OK. BCM prevents the engine from starting if the ID is not registered.

DTC Logic

INFOID:0000000001109366

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2194	DISCORD BCM-I-KEY	The ID verification results between BCM and Intelligent Key unit are NG. The registration is necessary.	• BCM • Intelligent Key unit

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-39, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001109367

1.PERFORM INITIALIZATION

1. Perform initialization with CONSULT-III. Re-register all mechanical keys.
   For initialization and registration of mechanical key. Refer to “CONSULT-III Operation Manual NATS”.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> GO TO 2.
NO >> ID was unregistered.

2.REPLACE BCM

1. Turn ignition switch OFF.
2. Replace BCM. Refer to BCS-64, "Removal and Installation".
3. Perform initialization with CONSULT-III. Re-register all mechanical keys.
   For initialization and registration of mechanical key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started?

YES >> BCM is malfunctioning.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

B2195 ANTI-SCANNING

Description

INFOID:0000000000944547

When the ID of the remote control engine starter installed cannot be registered, anti-scanning operates and it may be possible that the engine can not start. In the case, obtain the customer approval to remove the remote control engine starter.

DTC Logic

INFOID:0000000000944548

DTC DETECTION LOGIC

NOTE:

- If DTC B2195 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to SEC-29, "DTC Logic".
- If DTC B2195 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to SEC-30, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2195	ANTI-SCANNING	The ID of the remote control engine starter installed cannot be registered.	Remote control engine starter

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-40, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000000944549

1.REMOVAL OF REMOTE CONTROL ENGINE STARTER

Remove remote control engine starter with the customer approval.

>> GO TO 2.

2.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Perform “Self diagnostic result” with CONSULT-III.
3. Erase DTC.
4. Start the engine.

Does the engine start?

YES >> INSPECTION END
NO >> BCM is malfunctioning.
- Replace BCM
- Perform initialization

cardiagn.com

B2196 DONGLE NG

Description

INFOID:0000000001034035

BCM performs the ID verification with the slave control units (ECM, ABS actuator, EPS column assy, IPDM E/R, combination meter).
If either slave control unit is replaced by used part, perform initialization with CONSULT-III. But if the control unit is replaced by new part, the system does not need initialization.

DTC Logic

INFOID:0000000001034036

DTC DETECTION LOGIC

NOTE:

- If DTC B2196 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to SEC-29, "DTC Logic".
- If DTC B2196 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to SEC-30, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2196	DONGLE NG	The ID verification results between BCM and each slave control unit are NG.	• ECM • ABS actuator assy • EPS column assy • Combination meter • IPDM E/R

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self Diagnostic Result” with CONSULT-III.

Is the DTC detected?

YES >> Refer to SEC-41, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001034037

1.PERFORM INITIALIZATION

1. Perform initialization with CONSULT-III. Re-register all mechanical keys. Refer to “CONSULT-III Operation Manual NATS”.
2. Start the engine.

Dose the engine start?

YES >> INSPECTION END
NO >> Perform “Self Diagnosis Result” for each control unit.

B2552 INTELLIGENT KEY

Description

INFOID:0000000001098017

Intelligent key unit performs engine start operation and steering lock control by crosschecking ID with the Intelligent key.

DTC Logic

INFOID:0000000001098018

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2552	INTELLIGENT KEY UNIT	Malfunction is detected inside Intelligent key unit.	• Intelligent Key unit

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-42, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001098019

1.REPLACE INTELLIGENT KEY UNIT

1. Replace Intelligent Key unit.
2. Perform initialization with CONSULT-III. Re-register all mechanical keys. Refer to “CONSULT-III Operation Manual NATS”.
3. Start the engine.

Does the engine start?

YES >> INSPECTION END
NO >> Perform “DTC confirmation procedure”. Refer to SEC-42, "DTC Logic".

Special Repair Requirement

INFOID:0000000001115369

1.REQUIRED WORK WHEN REPLACING INTELLIGENT KEY UNIT

Initialize control unit. Refer to CONSULT-III operation manual NATS-IVIS/NVIS.

>> Work end.

cardiagn.com

B2590 ID DISCORD BCM-I-KEY

Description

INFOID:0000000001109118

Intelligent Key unit performs the ID verification with BCM that allows the engine to start. BCM starts the engine if the ID is OK and prevents the engine from starting if the ID is not registered.

DTC Logic

INFOID:0000000001109119

DTC DETECTION LOGIC

NOTE:

- If DTC B2590 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to SEC-29, "DTC Logic".
- If DTC B2590 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to SEC-30, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2590	ID DISCORD BCM-I-KEY	The ID verification results between BCM and Intelligent Key unit are NG. The registration is necessary.	• BCM • Intelligent Key unit

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-43, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001109120

1.PERFORM INITIALIZATION

Perform initialization with CONSULT-III. Re-register all mechanical keys.
For initialization and registration of mechanical key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started with re-registered mechanical key?

YES >> ID was unregistered.
NO >> BCM is malfunctioning.
- Replace BCM
- Perform initialization again

P1610 LOCK MODE

Description

INFOID:0000000000944556

When the starting operation is carried more than five times consecutively under the following conditions, NATS will shift to the mode which prevents the engine from being started.
- Unregistered mechanical key is used.
- BCM or ECM's malfunctioning.

DTC Logic

INFOID:0000000000944557

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1610	LOCK MODE	When the starting operation is carried out five or more times consecutively under the following conditions. • Unregistered mechanical key • BCM or ECM's malfunctioning.	—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-44, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000944558

1.CHECK ENGINE START FUNCTION

1. Perform the check for DTC except DTC P1610.
2. Use CONSULT-III to erase DTC after fixing.
3. Check that engine can start with registered mechanical key.

Does the engine start?

YES >> INSPECTION END
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

POWER SUPPLY AND GROUND CIRCUIT
INTELLIGENT KEY UNIT

INTELLIGENT KEY UNIT : Diagnosis Procedure

INFOID:0000000001116020

1.CHECK FUSE AND FUSIBLE LINK

Check that the following fuse is not blown.

Terminal No.	Signal name	Fuse No.
11	Battery power supply	9 (10A)
6	Ignition power supply	4 (10A)

Is the fuse blown?

YES >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Turn ignition switch ON.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminal			Voltage (V) (Approx.)
(+)		(−)	
Intelligent Key unit		Ground	
Connector	Terminal		
M40	11		Battery voltage
	6		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between Intelligent Key unit harness connector and ground.

Intelligent Key unit		Ground	Continuity
Connector	Terminal		
M40	12		Exists

Does continuity exist?

YES >> Intelligent Key unit power supply and ground circuit are OK.
NO >> Repair harness or connector.

INTELLIGENT KEY UNIT : Special Repair Requirement

INFOID:0000000001098008

1.REQUIRED WORK WHEN REPLACING INTELLIGENT KEY UNIT

Initialize control unit. Refer to CONSULT-III operation manual NATS.

>> Work end.

SIREN CONTROL UNIT

SIREN CONTROL UNIT : Diagnosis Procedure

INFOID:0000000001098009

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

carDiagn.com

2. Disconnect siren control unit connector.
3. Check voltage between siren control unit harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Siren control unit			
Connector	Terminal	Ground	
M94	4	Ground	Battery voltage

Is the measurement value normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK GROUND CIRCUIT

Check continuity between siren control unit harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
M94	6	Ground	Existed

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

SIREN CONTROL UNIT : Special Repair Requirement

INFOID:0000000001116002

1.REQUIRED WORK WHEN REPLACING SIREN CONTROL UNIT

Initialize control unit. Refer to CONSULT-III operation manual NATS.

>> Work end.

SIREN

SIREN : Diagnosis Procedure

INFOID:0000000001116021

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect siren control unit connector.
3. Check voltage between siren harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Siren			
Connector	Terminal	Ground	
B68	2		Battery voltage

Is the measurement value normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK GROUND CIRCUIT

Check continuity between siren control unit harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
B68	5		Existed

cardiagn.com

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

BCM

BCM : Diagnosis Procedure

INFOID:0000000001116003

1.CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not fusing.

Terminal No.	Signal name	Fuses and fusible link No.
41	Battery power supply	9
57		J
37	ACC power supply	5
38	Ignition power supply	4

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)			
BCM			OFF	ACC	ON
Connector	Terminal				
M65	37	Ground	Approx. 0 V	Battery voltage	Battery voltage
	38		Approx. 0 V	Approx. 0 V	Battery voltage
M66	41		Battery voltage	Battery voltage	Battery voltage
M67	57				

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

KEY SWITCH

Description

INFOID:0000000001094466

Key switch detects that mechanical key is inserted into the key cylinder, and then transmits the signal to BCM and Intelligent Key unit.

Component Function Check

INFOID:0000000001094467

1.CHECK KEY SWITCH INPUT SIGNAL

Check key switch (“KEY SW”) in “DATA MONITOR” mode with CONSULT-III. Refer to DLK-62, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Monitor item	Condition	
KEY SW	Insert mechanical key into key cylinder	: ON
	Remove mechanical key from key cylinder	: OFF

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Refer to SEC-48, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001094468

1.CHECK KEY SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and BCM connector.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	7	Ground	Insert mechanical key into key cylinder	Battery voltage
			Remove mechanical key from key cylinder	0

4. Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	36	Ground	Insert mechanical key into key cylinder	Battery voltage
			Remove mechanical key from key cylinder	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Remove mechanical key from key cylinder.
2. Disconnect key switch connector.
3. Check voltage between key switch harness connector and ground.

cardiagn.com

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Key switch connector	Terminal		
M25	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK KEY SWITCH SIGNAL CIRCUIT

1. Check continuity between Intelligent Key unit harness connector and key switch connector.

Intelligent Key unit connector	Terminal	Key switch connector	Terminal	Continuity
M40	7	M25	1	Exists

2. Check continuity between BCM harness connector and key switch connector.

BCM connector	Terminal	Key switch connector	Terminal	Continuity
M65	36	M25	1	Exists

3. Check continuity between key switch connector and ground.

Key switch connector	Terminal	Ground	Continuity
M25	1	Ground	Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK KEY SWITCH

Check key switch function.
Refer to SEC-49, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace key switch.

Component Inspection

INFOID:0000000001094469

COMPONENT INSPECTION

1.CHECK KEY SWITCH

Check continuity between key switch terminals.

Terminal		Condition	Continuity
key switch connector			
1	2	Insert mechanical key into key cylinder	Exists
		Remove mechanical key from key cylinder	Does not exist

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Replace key switch.

IGNITION KNOB SWITCH

Description

INFOID:0000000001094769

Ignition knob switch detects that ignition knob is pressed, and then transmits the signal to Intelligent Key unit.

Component Function Check

INFOID:0000000001094773

1.CHECK IGNITION KNOB SWITCH INPUT SIGNAL

Check ignition knob switch (“PUSH SW”) in “DATA MONITOR” mode with CONSULT-III. Refer to DLK-62, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Monitor item	Condition	
PUSH SW	Ignition knob switch is pressed	: ON
	Ignition knob switch is released	: OFF

Is the inspection result normal?

YES >> Ignition knob switch is OK.
NO >> Refer to SEC-48, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096673

1.CHECK IGNITION KNOB SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and BCM connector.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M40	27	Ground	Ignition knob switch is pressed	Battery voltage
			Ignition knob switch is released	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK IGNITION KNOB SWITCH POWER SUPPLY CIRCUIT

1. Disconnect ignition knob switch connector.
2. Check voltage between ignition knob switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Ignition knob switch connector	Terminal		
M25	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK IGNITION KNOB SWITCH SIGNAL CIRCUIT

1. Check continuity between Intelligent Key unit harness connector and ignition knob switch connector.

Intelligent Key unit connector	Terminal	Ignition knob switch connector	Terminal	Continuity
M40	27	M25	3	Exists

cardiagn.com

2. Check continuity between ignition knob switch connector and ground.

Ignition knob switch connector	Terminal	Ground	Continuity
M25	3		Does not exist

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK IGNITION KNOB SWITCH

Check ignition knob switch function.
Refer to SEC-49, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace ignition knob switch.

Component Inspection

INFOID:0000000001094772

1. CHECK IGNITION KNOB SWITCH

1. Turn ignition switch OFF.
2. Disconnect ignition knob switch harness connector.
3. Check continuity between ignition knob switch terminals under the following conditions.

Ignition knob switch			Condition	Continuity
Connector	Terminal			
M25	3	4	Ignition knob switch is pressed	Exists
			Ignition knob switch is released	Does not exist

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace ignition knob switch.

cardiagn.com

STOP LAMP

Description

INFOID:0000000001096712

Stop lamp switch detects that brake pedal is depressed, and then transmits the signal to BCM.

Component Function Check

INFOID:0000000001096713

1.CHECK STOP LAMP SWITCH INPUT SIGNAL

Check stop lamp function by depressing brake pedal.

Is the inspection result normal?

YES >> Stop lamp switch is OK.
NO >> Refer to SEC-48, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001096714

1.CHECK STOP LAMP SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M66	51	Ground	Brake pedal is depressed	Battery voltage
			Brake pedal is not depressed	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch connector.
2. Check voltage between stop lamp switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Stop lamp switch connector	Terminal		
E114 (with gasoline engine and M/T models) E115 (except gasoline engine and M/T models)	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK STOP LAMP SWITCH SIGNAL CIRCUIT

1. Check continuity between BCM harness connector and stop lamp switch connector.

BCM connector	Terminal	Stop lamp switch connector	Terminal	Continuity
M66	51	E114 (with gasoline engine and M/T models) E115 (except gasoline engine and M/T models)	2	Existed

2. Check continuity between stop lamp switch connector and ground.

cardiagn.com

Stop lamp switch connector	Terminal	Ground	Continuity
E114 (with gasoline engine and M/T models) E115 (except gasoline engine and M/T models)	2	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK STOP LAMP SWITCH

Check stop lamp switch function.
Refer to SEC-49, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace stop lamp switch.

Component Inspection

INFOID:0000000001096715

1. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals under the following conditions.

Stop lamp switch			Condition	Continuity
Connector	Terminal			
E114 (with gasoline engine and M/T models) E115 (except gasoline engine and M/T models)	1	2	Brake pedal is depressed	Existed
			Brake pedal is released	Not existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace stop lamp switch.

HOOD SWITCH

Description

INFOID:0000000000944671

Hood switch detects that hood is open/close condition, and then transmits the signal to IPDM E/R.

Component Function Check

INFOID:0000000000944672

1.CHECK FUNCTION

1. Select “HOOD SW” in “Data Monitor” mode with CONSULT-III.
2. Check the hood switch signal under the following condition.

Test item	Condition		Status
HOOD SW	Hood	Open	ON
		Close	OFF

Is the indication normal?

YES >> INSPECTION END.
NO >> Refer to SEC-54, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000944673

1.CHECK HOOD SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Condition		Voltage (V) (Approx.)
Connector	Terminal				
E12	21	Ground	Hood	Open	0
				Close	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK HOOD SWITCH SIGNAL CIRCUIT

1. Disconnect IPDM E/R and hood switch connector.
2. Check continuity between IPDM E/R harness connector and hood switch harness connector.

IPDM E/R		Hood switch		Continuity
Connector	Terminal	Connector	Terminal	
E12	21	E113	2	Existed

3. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E12	21	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK HOOD SWITCH GROUND CIRCUIT

Check continuity between hood switch harness connector and ground.

cardiagn.com

Hood switch		Ground	Continuity
Connector	Terminal		
E113	1	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK IPDM E/R OUTPUT

1. Connect the IPDM E/R connector.
2. Check voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage (V) (Approx.)
Connector	Terminal		
E12	21	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".

5. CHECK HOOD SWITCH

Refer to SEC-55, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace hood switch.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".
NO >> Repair or replace malfunctioning parts.

Component Inspection

INFOID:0000000000944674

1. CHECK HOOD SWITCH

1. Turn ignition switch OFF.
2. Disconnect hood switch connector.
3. Check continuity between hood switch terminals.

Hood switch		Condition		Continuity
Terminal				
1	2	Hood switch	Push	Not existed
			Release	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace hood switch.

HORN

Description

INFOID:0000000000944675

Horn is located inside of front bumper and operates when theft warning system is in alarm phase.

Component Function Check

INFOID:0000000000944676

1.CHECK FUNCTION

1. Select “HORN” in “ACTIVE TEST” mode with CONSULT-III.
2. Check the horn operation.

Is the operation normal?

YES >> INSPECTION END.
NO >> Refer to SEC-56, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000944677

1.CHECK HORN FUNCTION

Check horn function with horn switch.

Does the horn sound?

YES >> GO TO 2.
NO >> Refer to HRN-2, "Wiring Diagram - HORN -".

2.CHECK HORN RELAY POWER SUPPLY

1. Turn ignition switch ON.
2. Perform “ACTIVE TEST” (“HORN”) with CONSULT-III.
3. Check voltage between horn relay harness connector and ground.

Horn relay		Ground	Test item		Voltage (V) (Applox.)
Connector	Terminal				
E5	2	Ground	HORN	ON	→Battery voltage →0 →Battery voltage
				Other than above	0

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK HORN RELAY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R and horn relay 1and 2 connector.
3. Check continuity between IPDM E/R harness connector and horn relay 1and 2 harness connector.

IPDM E/R		Horn relay 1 and 2		Continuity
Connector	Terminal	Connector	Terminal	
E12	30	E5	1	Existed

4. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E12	30	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK INTERMITTENT INCIDENT

cardiagn.com

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.Refer to PCS-32, "Removal and Installation".
NO >> Repair or replace the malfunctioning parts.

A
B
C
D
E
F
G
H
I
J
SEC
L
M
N
O
P

carsdiagn.com

VEHICLE SECURITY INDICATOR

Description

INFOID:0000000000944681

- Vehicle security indicator is built in combination meter.
- NATS (Nissan Anti-Theft System) and vehicle security system conditions are indicated by blink or illumination of vehicle security indicator.

Component Function Check

INFOID:0000000000944682

1.CHECK FUNCTION

1. Perform “THEFT IND” in the “ACTIVE TEST” mode with CONSULT-III.
2. Check vehicle security indicator operation.

Test item		Description	
THEFT IND	ON	Vehicle security indicator	ON
	OFF		OFF

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Refer to SEC-58, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001098043

1.CHECK SECURITY INDICATOR LAMP POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector.
3. Check voltage between combination meter harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Combination meter connector	Terminal		
M34	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness.

2.CHECK SECURITY INDICATOR LAMP SIGNAL CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM harness connector and combination meter connector.

BCM connector	Terminal	Combination meter connector	Terminal	Continuity
M65	18	M34	28	Existed

3. Check continuity between combination meter connector and ground.

Combination meter connector	Terminal	Ground	Continuity
M34	28	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK BCM FUNCTION

1. Connect combination meter connector.
2. Check voltage between BCM harness connector and ground.

cardiagn.com

Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M65	18	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace combination meter. Refer to MWI-72, "Removal and Installation".

4. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace BCM. Refer to BCS-64, "Removal and Installation".
NO >> Repair or replace malfunctioning parts.

autodiagn.com

ULTRA SONIC SENSOR

Description

INFOID:0000000001115998

Siren control unit sounds the siren when it received a trigger signal from ultra sonic sensor.

Component Function Check

INFOID:0000000001115999

1.CHECK SIREN CONTROL UNIT FUNCTION

1. Turn ignition switch OFF.
2. Get in the vehicle and close all doors.
3. Lock doors with Intelligent Key.
4. Check that security indicator blinks when theft warning system is armed.
5. With hand, intercept the signal between left and right sensors.

Does the siren sound?

YES >> Siren control unit function is OK.
NO >> Refer to SEC-60, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116000

1.CHECK SIREN FUNCTION

1. Turn ignition switch ON.
2. Perform “ACTIVE TEST” (“VEHICLE SECURITY HORN”) with CONSULT-Ill.

Does the siren sound?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK SIREN SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and siren connectors.
3. Check continuity between BCM harness connector and siren connector.

BCM connector	Terminal	Siren connector	Terminal	Continuity
M65	8	B68	1	Existed
	16		3	Existed

4. Check continuity between siren connector and ground.

Siren connector	Terminal	Ground	Continuity
B68	1	Ground	Not existed
	3		Not existed

Is the inspection result normal?

YES >> Replace siren. Refer to SEC-153, "Removal and Installation".
NO >> Repair or replace harness.

3.CHECK SIREN CONTROL UNIT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect siren control unit and siren connector.
3. Check continuity between siren control unit harness connector and siren connector.

Siren control unit connector	Terminal	Siren connector	Terminal	Continuity
M94	3	B68	4	Existed

4. Check continuity between siren control unit harness connector and ground.

cardiagn.com

Siren control unit connector	Terminal	Ground	Continuity
M94	3	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK ULTRA SONIC SENSOR SIGNAL CIRCUIT

1. Disconnect ultra sonic sensor connectors.
2. Check continuity between siren control unit harness connector and ultra sonic sensor connector.

Siren control unit connector	Terminal	Ultra sonic sensor connector	Terminal	Continuity
M94	1	R11	1	Existed
	8	R12	1	Existed

3. Check continuity between siren control unit connector and ground.

Siren control unit connector	Terminal	Ground	Continuity
M94	1	Ground	Not existed
	8		Not existed

Is the inspection result normal?

YES >> Replace ultra sonic sensor.
NO >> Repair or replace harness.

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001102176

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

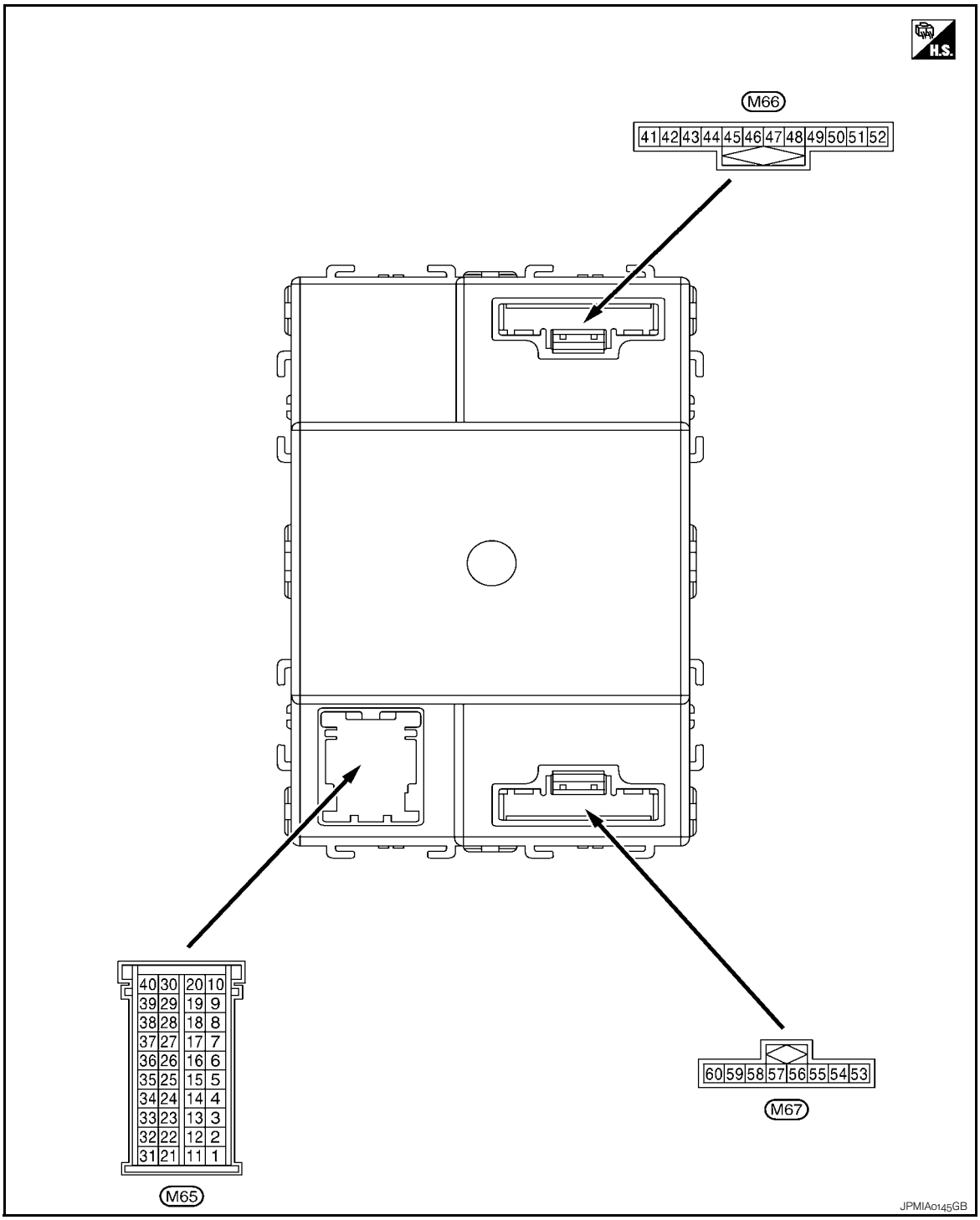
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

carsdiagn.com

TERMINAL LAYOUT

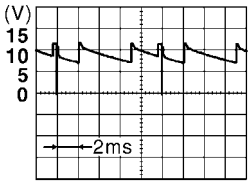
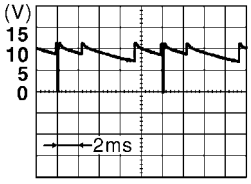
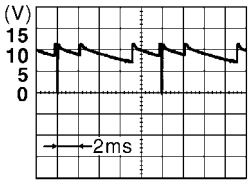
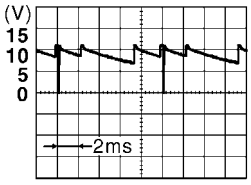


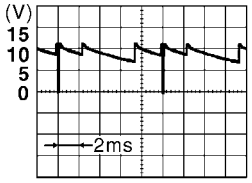
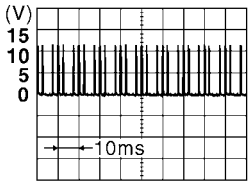
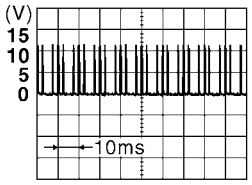
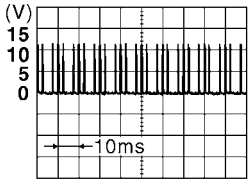
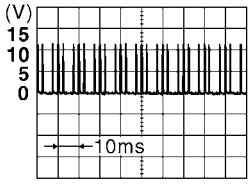
PHYSICAL VALUES

CAUTION:

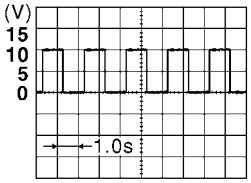
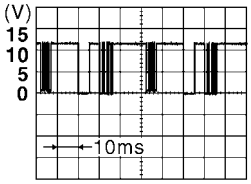
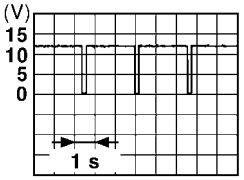
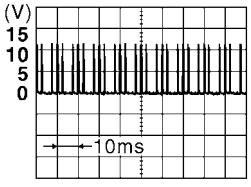
- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

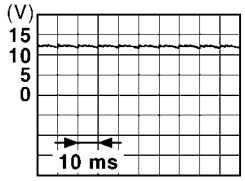
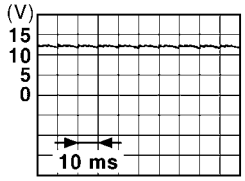
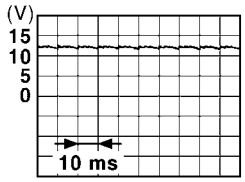
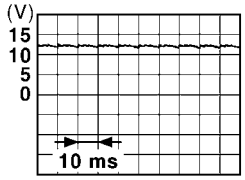
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

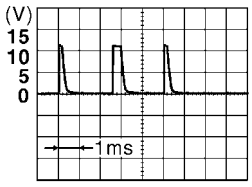
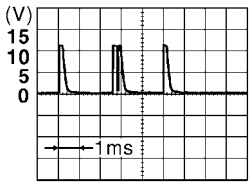
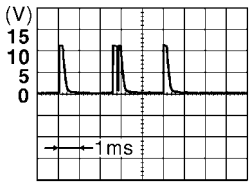
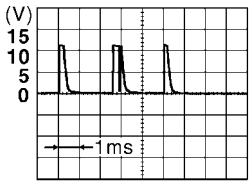
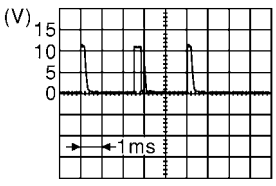
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

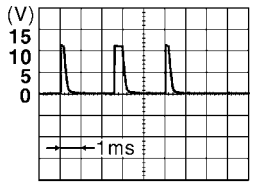
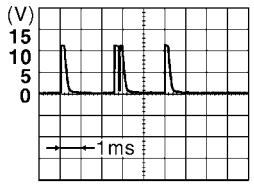
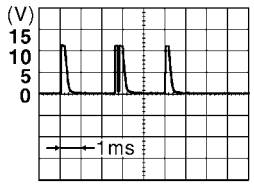
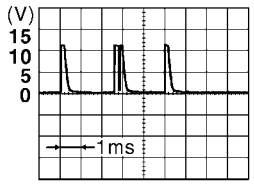
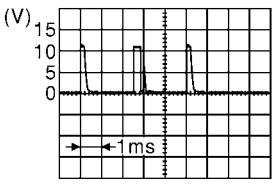
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

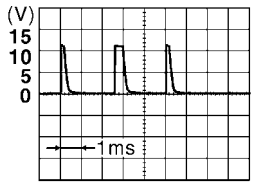
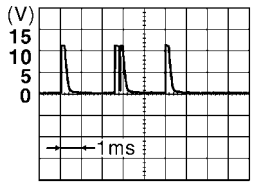
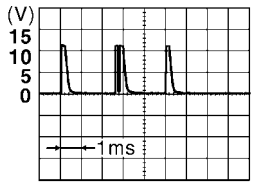
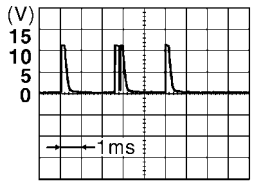
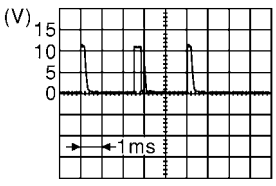
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIDo924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIDo924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIDo924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIDo924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

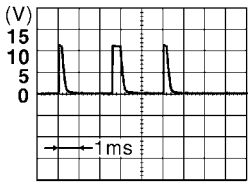
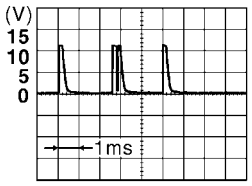
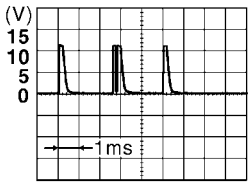
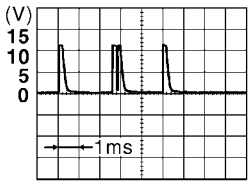
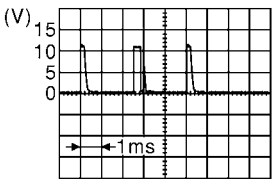
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

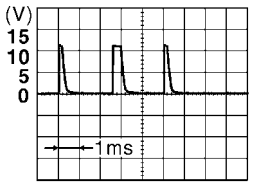
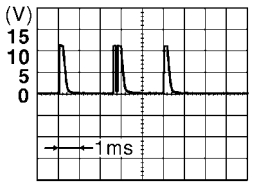
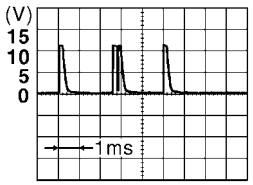
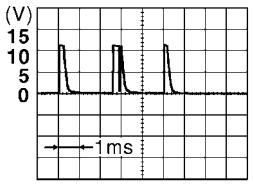
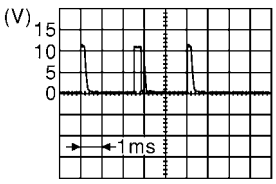
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

cardiagn.com

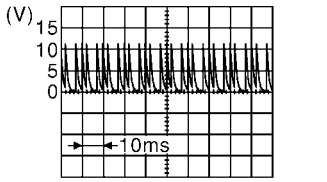
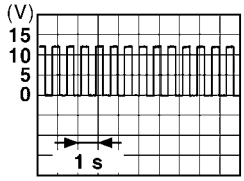
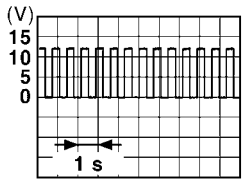
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color) +	Terminal No. (Wire color) –	Description Signal name	Description Input/ Output	Condition		Value (Approx.)
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

carsdiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

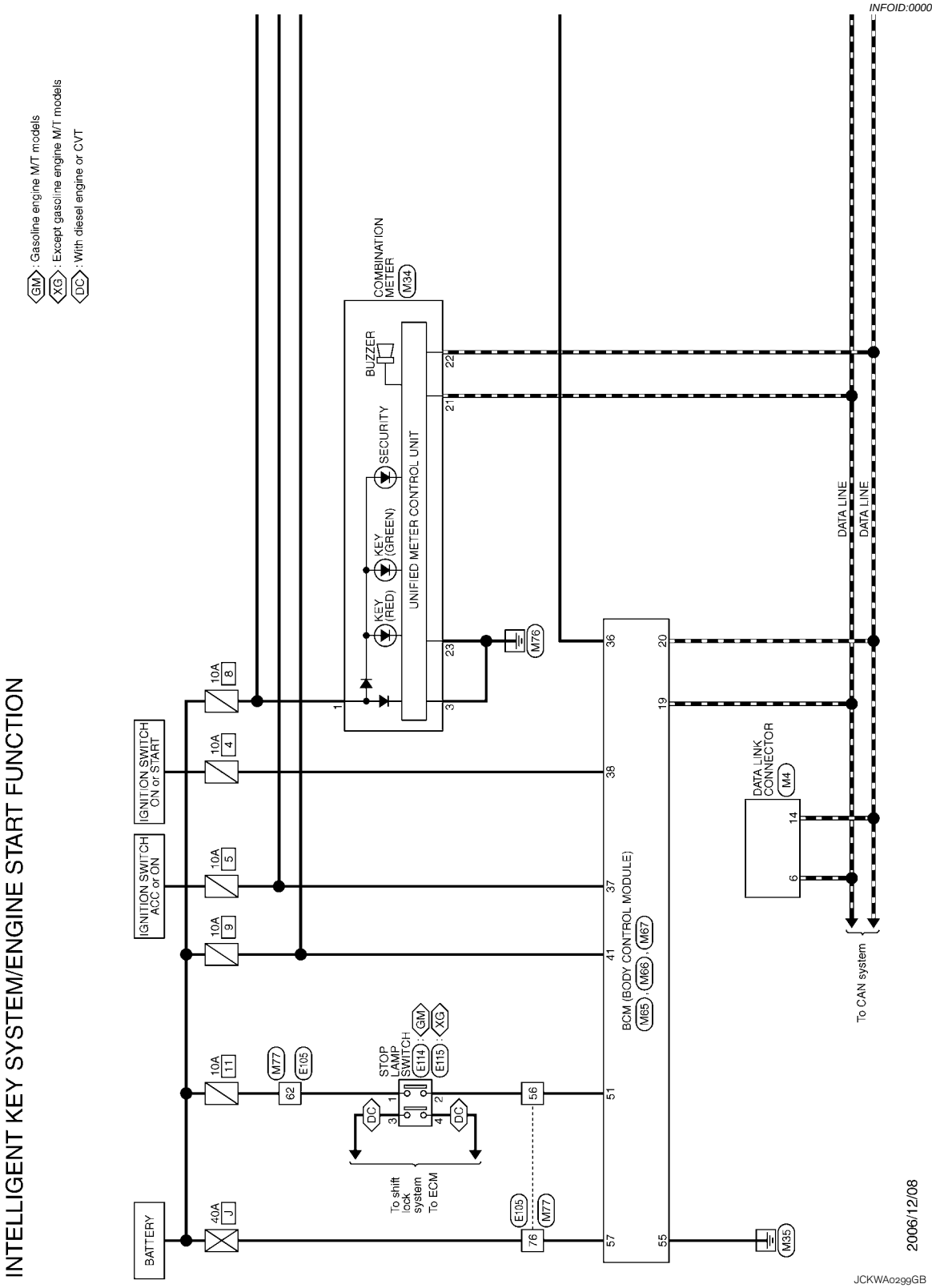
*1: With Intelligent Key system

*2: Without Intelligent Key system

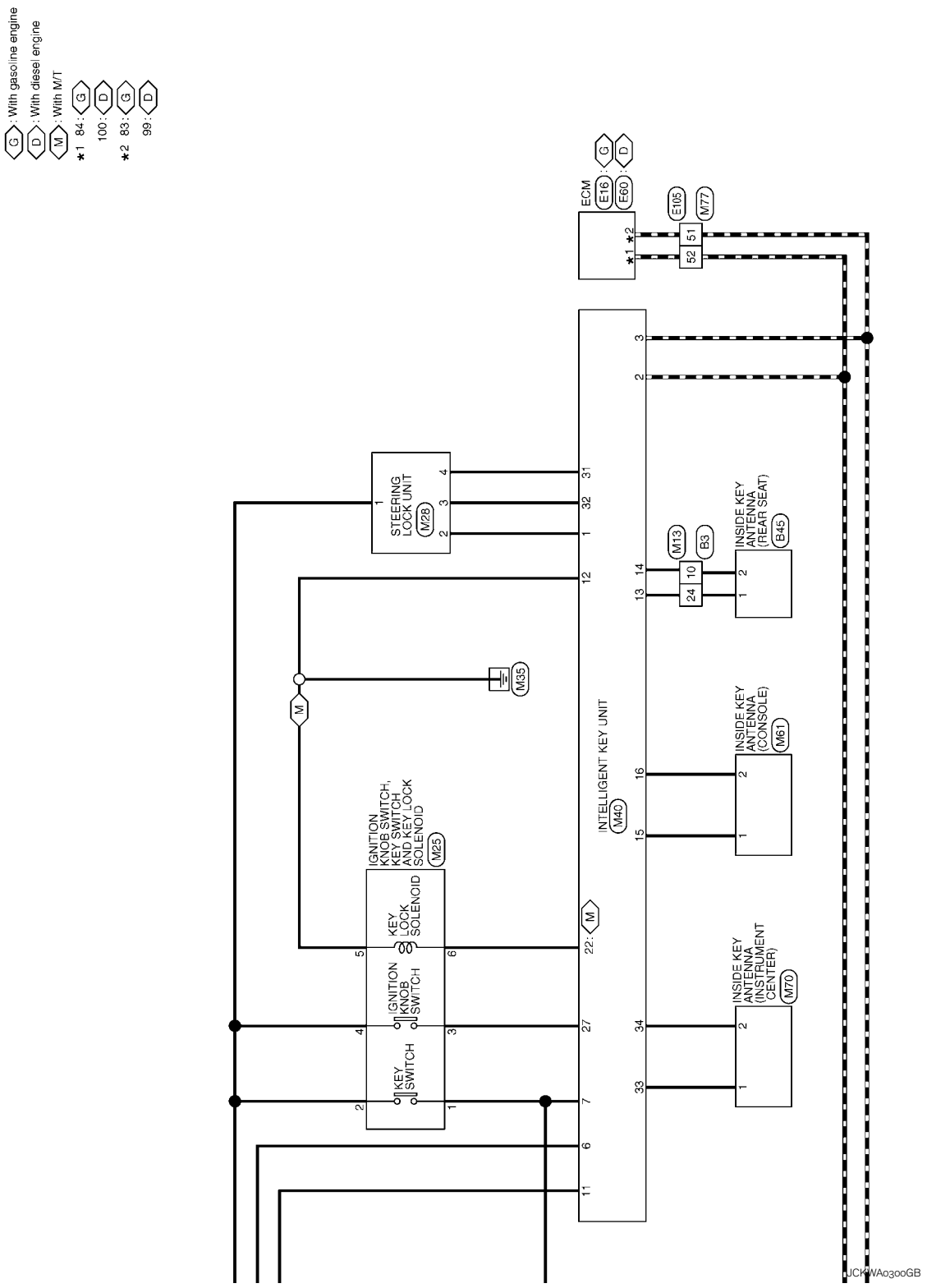
carsdiagn.com

Wiring Diagram - INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION -

INFOID:0000000001034354



cardiagn.com


G : With gasoline engine
D : With diesel engine
M : With M/T
*1 84 : G
100 : D
*2 83 : G
99 : D
ECM
E16 : G
E60 : D
E105
M77
STEERING LOCK UNIT
M28
INTELLIGENT KEY UNIT
M40
IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
M25
KEY LOCK SOLENOID
IGNITION KNOB SWITCH
KEY SWITCH
M35
M113
B3
INSIDE KEY ANTENNA (REAR SEAT)
B45
INSIDE KEY ANTENNA (CONSOLE)
M61
INSIDE KEY ANTENNA (INSTRUMENT CENTER)
M70
22 : M
JCKWA0300GB

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

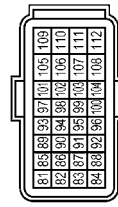
Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
10	W/R	-
24	Y	-

Connector No.	B45
Connector Name	INSIDE KEY ANTENNA (REAR SEAT)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	W/R	-

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L
84	L	CAN-H

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
51	P	-
52	L	-
56	R/W	-
82	V	-
76	Y	-

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	R/W	-

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	R/W	-
3	G	-[With CVT]
3	O	-[With diesel engine]
4	B	-[With CVT]
4	W/L	-[With diesel engine]

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

JCKWA0301GB

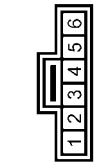
cardiagn.com

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
10	W	–
24	Y	–

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

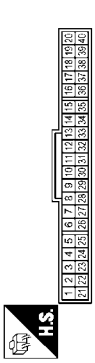


Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–
3	L	–
4	Y	–
5	B	–
6	W	–

Connector No.	M28
Connector Name	STEERING LOCK UNIT
Connector Type	TK04FW

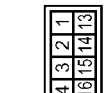
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	LG	–
3	P	–
4	GR	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
3	B	GND
21	L	CAN-H
22	P	CAN-L
23	B	GND

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	STRG C/U 5V
2	L	CAN-H
3	P	CAN-L
6	W	IGN SW
7	V	KEY SW
11	V	BATT+
12	B	GND
13	Y	REAR SEAT (+)
14	W	REAR SEAT (-)
15	SB	CONSOLE (+)
16	BR	CONSOLE (-)

22	W	KEY I/L SOL
27	L	KNOB SW
31	GR	STRG C/U GND
32	P	STRG C/U SIG
33	O	INSTRUMENT (+)
34	G	INSTRUMENT (-)

Connector No.	M61
Connector Name	INSIDE KEY ANTENNA (CONSOLE)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	BR	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L
36	V	KEY SW
37	R	ACC SW
38	W/L	IGN SW

JCKWA0302GB

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.

52 51 50 49 48 47 46 45 44 43 42 41

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
51	R/W	STOP LAMP SW [With Intelligent Key]

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

H.S.

60 59 58 57 56 55 54 53

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M70
Connector Name	INSIDE KEY ANTENNA (INSTRUMENT (CENTER)
Connector Type	RK02FGY

H.S.

1 2

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	G	–

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

H.S.

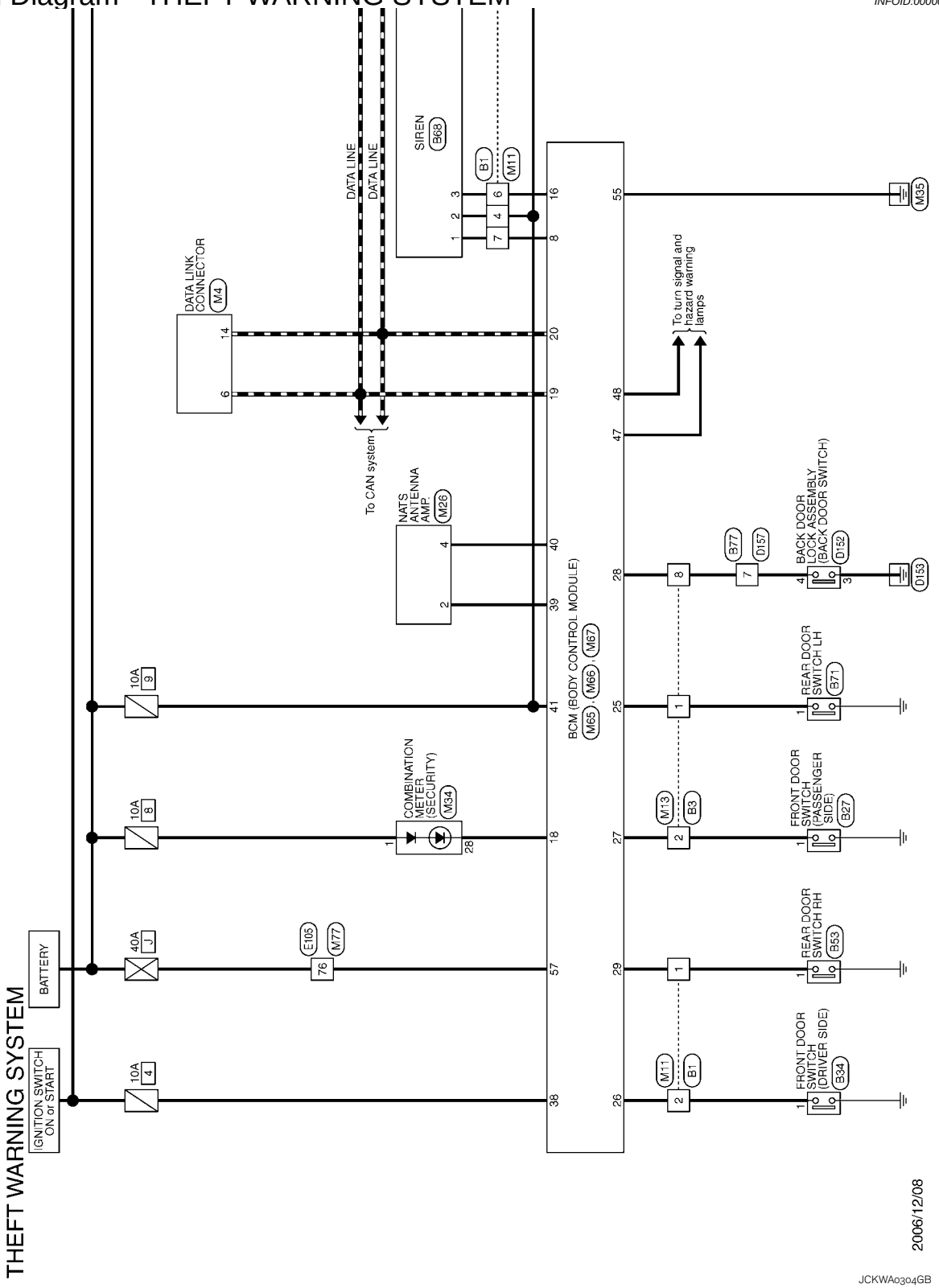
Terminal No.	Color of Wire	Signal Name [Specification]
51	P	–
52	L	–
55	R	–[Except RHD models with Intelligent Key]
56	R/W	–[RHD models with Intelligent Key]
62	V	–
76	Y	–

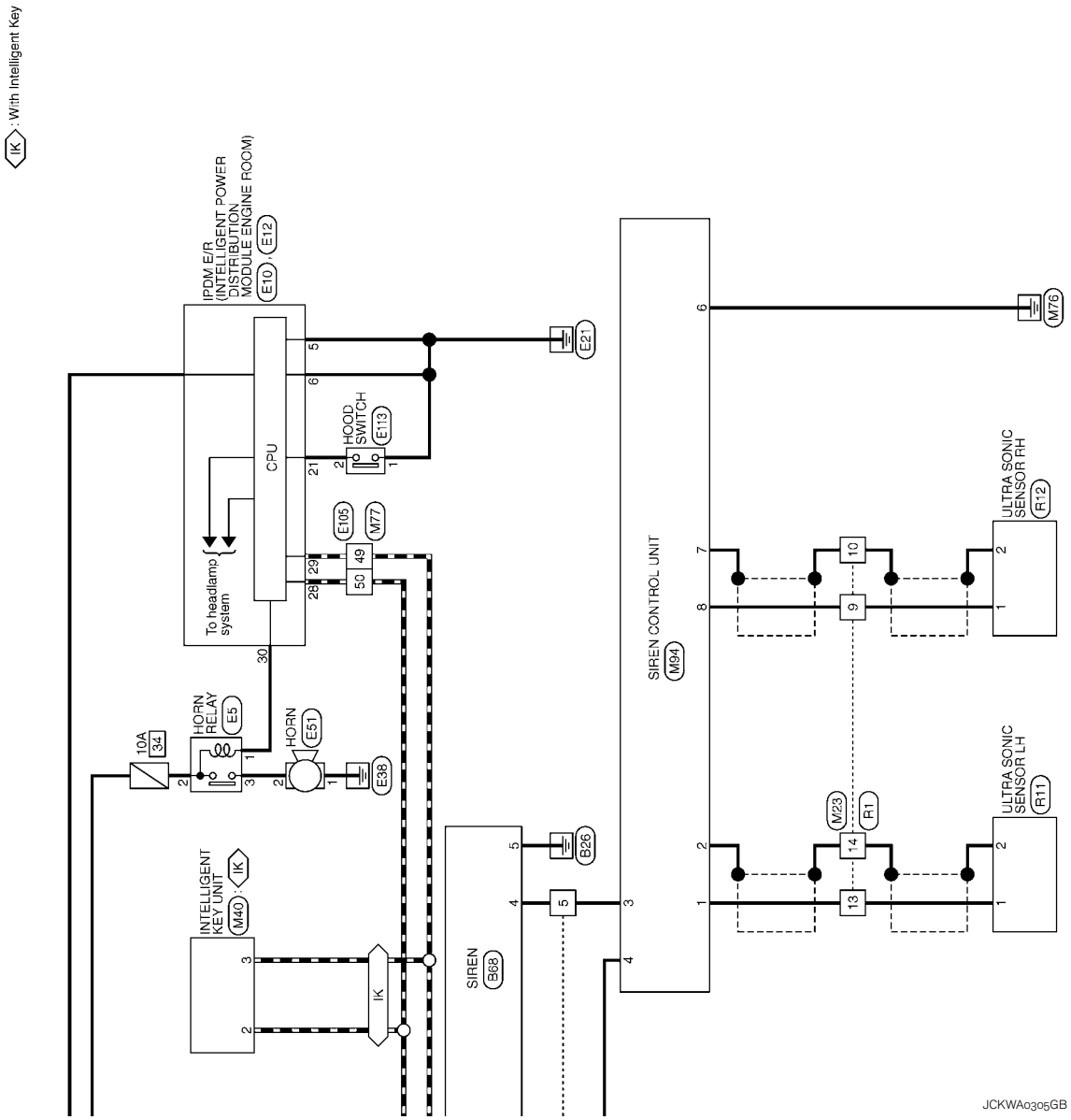
JCKWA0303GB

cardiagn.com

Wiring Diagram - THEFT WARNING SYSTEM -

INFOID:0000000001034355





cardiagn.com

THEFT WARNING SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	-[RHD models]
4	V	-
5	Y	-
6	GR	-
7	LG	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
8	G	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B68
Connector Name	SIREN
Connector Type	RH06FB

H.S.

1	2	3	4	5	6

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	HAZARD REQ
2	V	B+
3	GR	COMMON LINK
4	Y	U/S LINK
5	B	GND

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

JCKWA0306GB

carsdiagn.com

THEFT WARNING SYSTEM

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	-
4	G	-

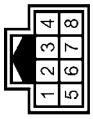
Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
21	GR	-
28	L	-
29	P	-
30	L	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	E51
Connector Name	HORN
Connector Type	DELPHI 15419715

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

Connector No.	E5
Connector Name	HORN RELAY
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	GR/L	-
3	G	-

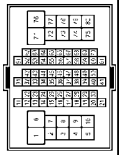
Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

Connector No.	E113
Connector Name	HOOD SWITCH
Connector Type	W02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-

JCKWA0307GB

cardiagn.com

THEFT WARNING SYSTEM

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	R	–[RHD models]
4	R	–
5	Y	–
6	GR	–
7	LG	–

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	BR	–[RHD models]
8	G	–

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	W	–
10	SHIELD	–
13	G	–
14	SHIELD	–

Connector No.	M26
Connector Name	NATS ANTENNA AMP.
Connector Type	TH04FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–
4	LG	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
28	SB	SECURITY

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

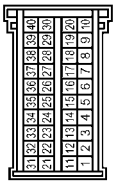
H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L

JCKWA0308GB

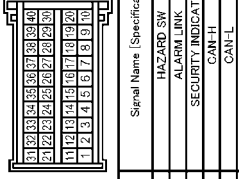
THEFT WARNING SYSTEM

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
8	LG	HAZARD SW
16	GR	ALARM_LINK
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)
38	W/L	IGN SW

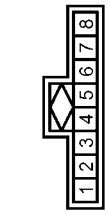
Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

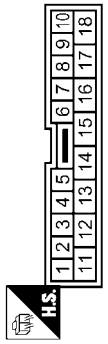
39	P	NATS ANTENNA AMP.
40	LG	NATS ANTENNA AMP.

Connector No.	M94
Connector Name	SIREN CONTROL UNIT
Connector Type	A08FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	U/S LEFT (TX)
2	SHIELD	SHIELD
3	Y	U/S LINK
4	R	B+
6	B	GND
7	SHIELD	SHIELD
8	W	U/S RIGHT (RX)

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
47	G/Y	FLASHER OUTPUT (LEFT)
48	G/B	FLASHER OUTPUT (RIGHT)

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
9	W	-
10	SHIELD	-
13	G	-
14	SHIELD	-

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	R11
Connector Name	ULTRA SONIC SENSOR LH
Connector Type	A02MW

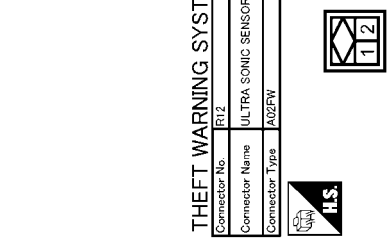
Terminal No.	Color of Wire	Signal Name [Specification]
1	G	SIG
2	SHIELD	SHIELD

JCKWA0309GB

cardiagn.com

THEFT WARNING SYSTEM

Connector No.	R12
Connector Name	ULTRA SONIC SENSOR RH
Connector Type	A02FW



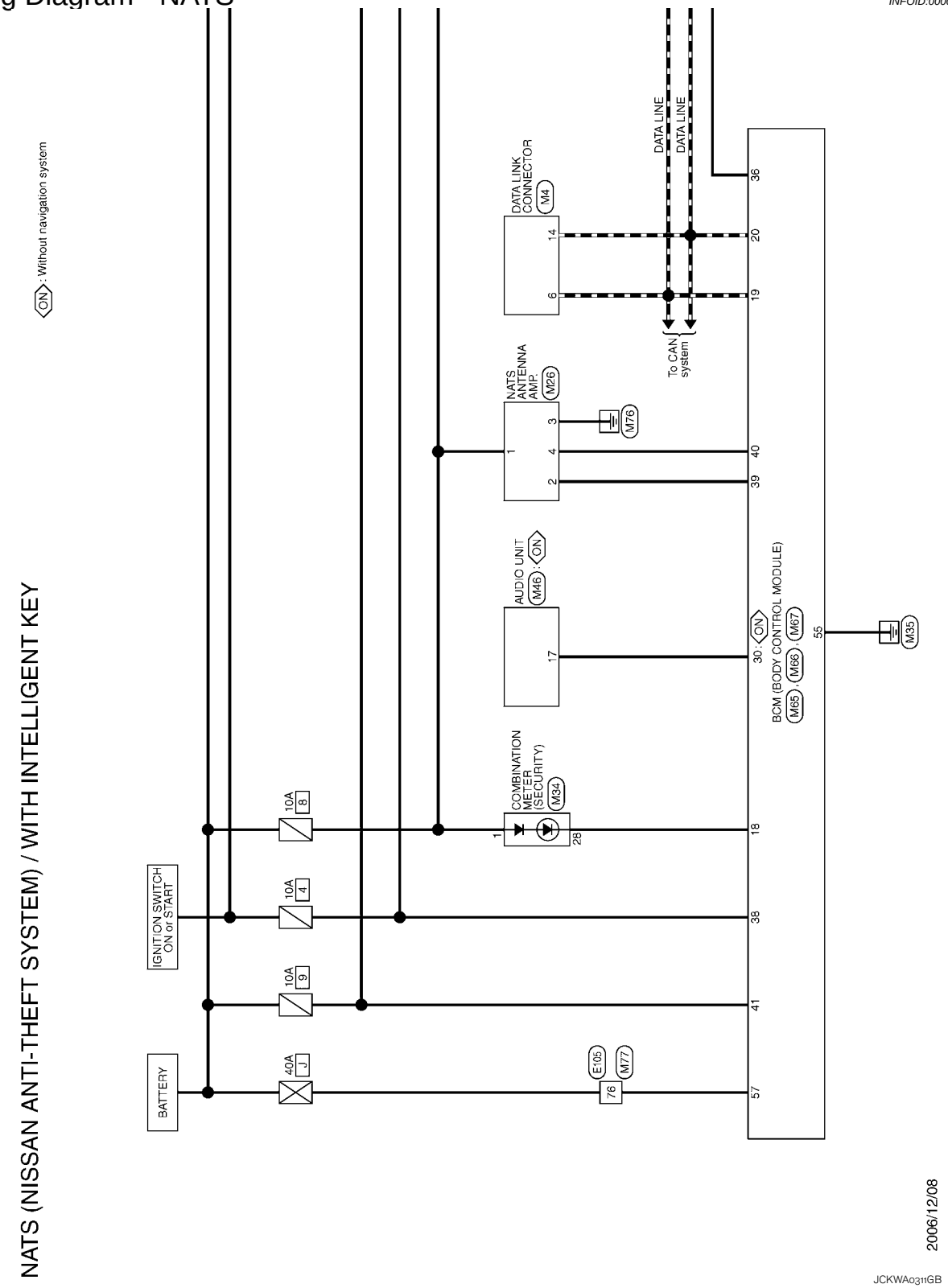
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	SIG
2	SHIELD	SHIELD

JCKWA0310GB

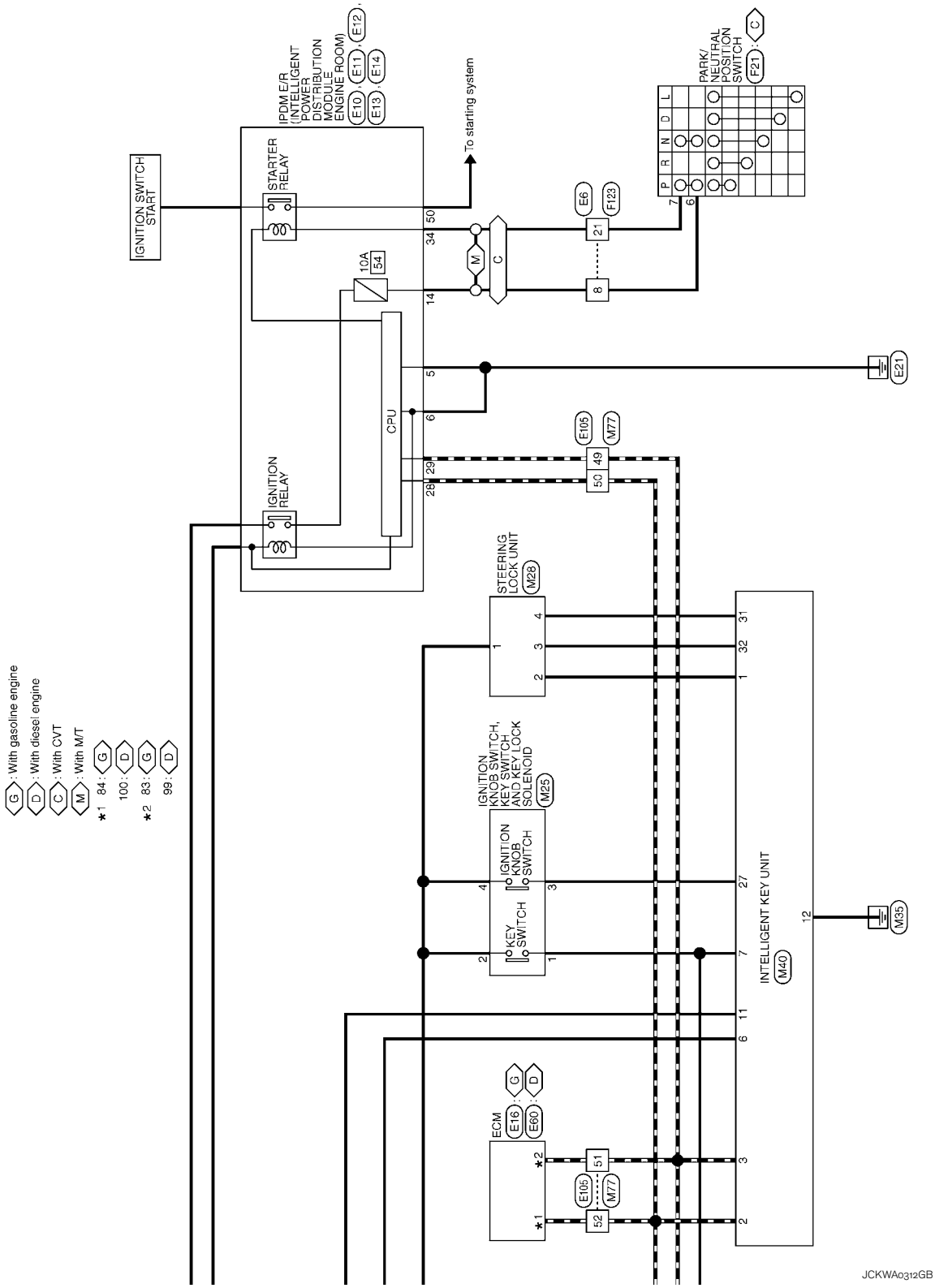
carsdiagn.com

Wiring Diagram - NATS -

INFOID:0000000001034356



cardiagn.com


IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E10, E11, E12, E13, E14
IGNITION SWITCH START
STARTER RELAY
To starting system
10A 54
CPU
IGNITION RELAY
PARK/ NEUTRAL POSITION SWITCH
F21
E6
F123
E21
E105
M77
STEERING LOCK UNIT
M28
IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
M25
IGNITION KNOB SWITCH
KEY SWITCH
INTELLIGENT KEY UNIT
M40
M35
ECM
E16
E60
G : With gasoline engine
D : With diesel engine
C : With CVT
M : With M/T
*1 84 : G
100 : D
*2 83 : G
99 : D
JCKWA0312GB

NATS (NISSAN ANTI-THEFT SYSTEM) / WITH INTELLIGENT KEY

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	-
21	R/B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	-
29	P	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
34	R/B	-

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	YZK 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
50	B/R	-

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

JCKWA0313GB

cardiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM) / WITH INTELLIGENT KEY

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
51	P	-
52	L	-
76	Y	-

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
6	W/B	-
7	R/B	-

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	Y	-
3	L	-
4	Y	-

Connector No.	M26
Connector Name	NATS ANTENNA AMP.
Connector Type	TH04FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	P	-
3	B	-
4	LG	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	-
21	R/B	-

Connector No.	M28
Connector Name	STEERING LOCK UNIT
Connector Type	TK04FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	LG	-
3	P	-
4	GR	-

Connector No.	M44
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

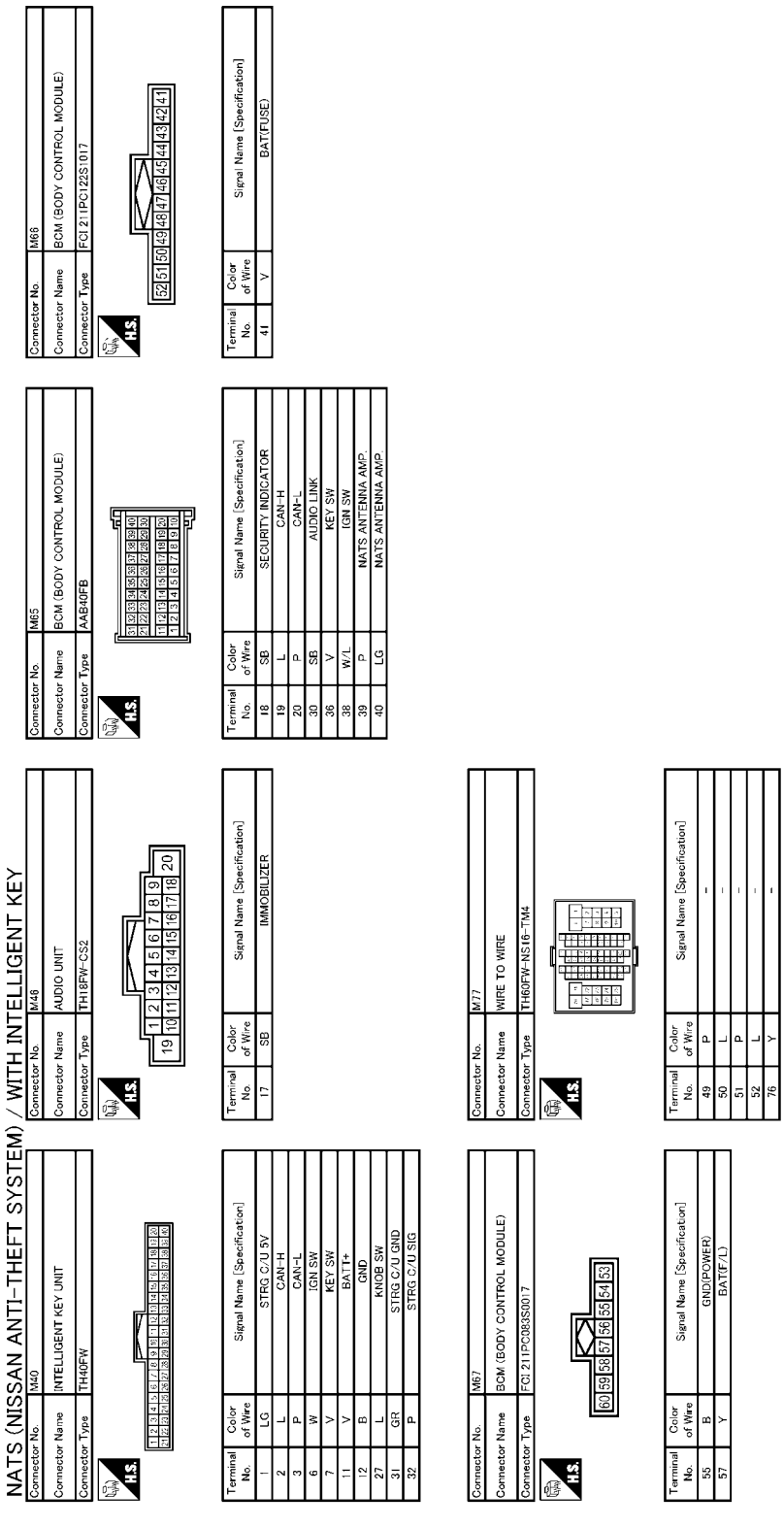
Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
26	SB	SECURITY

JCKWA0314GB

carsdiagn.com



JCKWA0315GB

Fail Safe

INFOID:0000000001102185

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001102186

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001102187

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

INTELLIGENT KEY UNIT

Reference Value

INFOID:0000000001102195

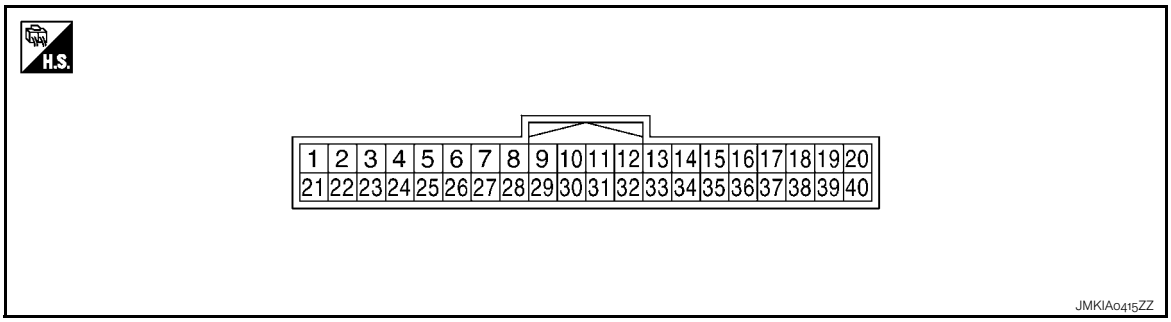
VALUES ON THE DIAGNOSIS TOOL

CONSULT-III MONITOR ITEM

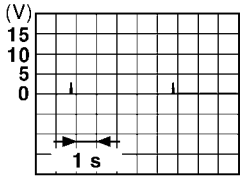
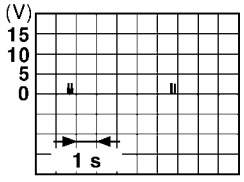
Monitor Item	Condition		Value/Status
PUSH SW	Ignition knob	Release	OFF
		Press	ON
KEY ON SW	Mechanical key	Removed	OFF
		Inserted	ON
DR REQ SW	Door request switch (driver)	Release	OFF
		Press	ON
AS REQ SW	Door request switch (passenger)	Release	OFF
		Press	ON
BD/TR REQ SW	Door request switch (back door)	Release	OFF
		Press	ON
IGN SW	Ignition switch	Other than ON position	OFF
		ON position	ON
ACC SW	Ignition switch	Other than ACC or ON position	OFF
		ACC or ON position	ON
STOP LAMP SW	Brake pedal	Press	OFF
		Release	ON
DOOR LOCK SIG	Lock button of Intelligent Key	Release	OFF
		Press	ON
DOOR UNLOCK SIG	Unlock button of Intelligent Key	Release	OFF
		Press	ON
DOOR SW DR	Door (driver side)	Close	OFF
		Open	ON
DOOR SW AS	Door (passenger side)	Close	OFF
		Open	ON
DOOR SW RR	Door (rear RH)	Close	OFF
		Open	ON
DOOR SW RL	Door (rear LH)	Close	OFF
		Open	ON
BACK DOOR SW	Back door	Close	OFF
		Open	ON
VEHICLE SPEED	While driving		Equivalent to speedometer reading

carsdiagn.com

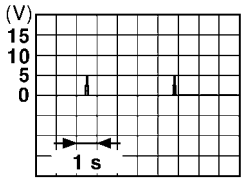
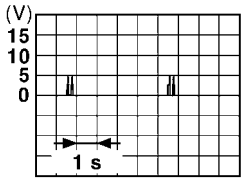
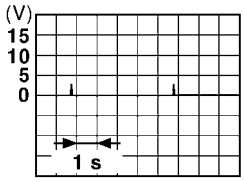
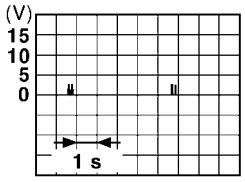
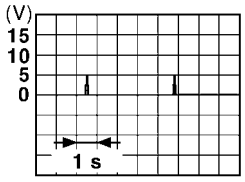
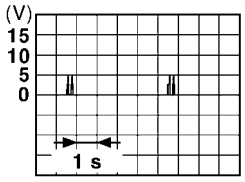
TERMINAL LAYOUT

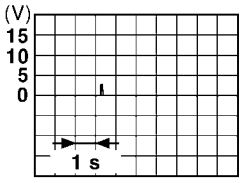
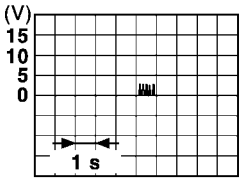
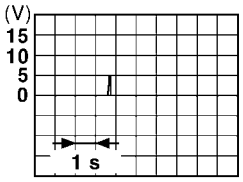
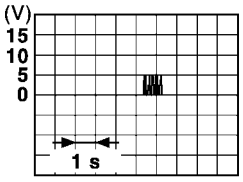
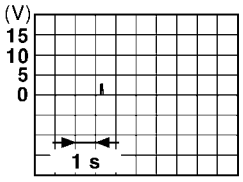
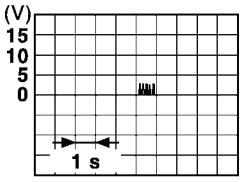


PHYSICAL VALUES

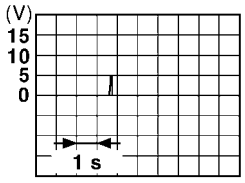
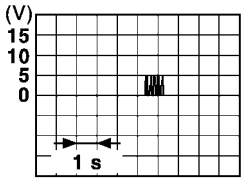
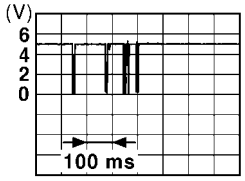
Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
1	Ground	LG	Steering lock unit power supply	Output	Ignition switch	OFF or ACC	5
						ON	0
2	Ground	L	CAN - H	Input/ Output	—		—
3	Ground	P	CAN - L	Input/ Output	—		—
4	Ground	LG	Intelligent Key warning buzzer	Output	Intelligent Key warning buzzer	Sounding	0
						Not sounding	Battery voltage
5	Ground	P	Front door request switch (driver side)	Input	Front door request switch (driver side)	ON (Pressed)	0
						OFF (Released)	5
6	Ground	W	Ignition switch power supply	Input	Ignition switch	OFF or ACC	0
						ON or START	Battery voltage
7	Ground	V	Key switch	Input	When ignition key is inserted into ignition key cylinder		Battery voltage
					When ignition key is not inserted into ignition key cylinder		0
11	Ground	V	Battery power supply	Input	Ignition switch OFF		Battery voltage
12	Ground	B	Ground	—	Ignition switch ON		0
13	Ground	Y	Inside key antenna (+) (rear seat)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0393ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0391ZZ

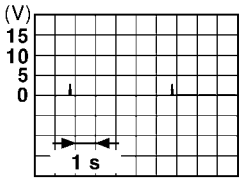
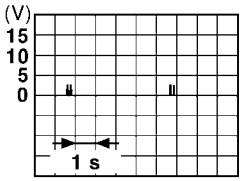
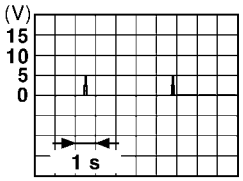
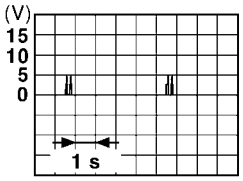
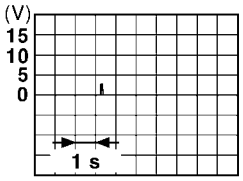
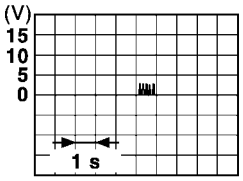
cardiagn.com

Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
14	Ground	W	Inside key antenna (-) (rear seat)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0392ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0390ZZ
15	Ground	SB	Inside key antenna (+) (console)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0393ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0391ZZ
16	Ground	BR	Inside key antenna (-) (console)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0392ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0390ZZ

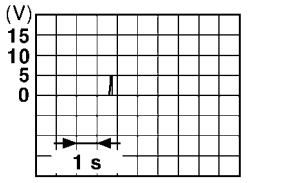
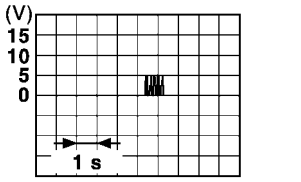
Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
17	Ground	SB	Outside key antenna (+) (rear bumper)	Output	When the back door request switch is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0397ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0514ZZ
18	Ground	V	Outside key antenna (-) (rear bumper)	Output	When the back door request switch is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0395ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0515ZZ
19	Ground	L	Outside key antenna (+) (driver side)	Output	When the front door request switch (driver side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0397ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0514ZZ

cardiagn.com

Terminal No. +	Terminal No. –	Wire color	Description Signal name	Description Input/ Output	Condition		Value [V] (Approx.)
20	Ground	BR	Outside key antenna (-) (driver side)	Output	When the front door request switch (driver side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0395ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0515ZZ
22*1	Ground	W	Key lock solenoid	Output	Key lock solenoid	LOCK*2	Battery voltage
						UNLOCK*2	0
25	Ground	BR	Front door request switch (passenger side)	Input	Front door request switch (passenger side)	ON (Pressed)	0
						OFF (Released)	5
27	Ground	L	Ignition knob switch	Input	Ignition switch OFF	When ignition knob switch is pressed	Battery voltage
						When ignition knob switch is released	0
29	Ground	GR	Back door request switch	Input	Back door request switch	ON (Pressed)	0
						OFF (Released)	5
31	Ground	GR	Steering lock unit ground	—	—	—	0
32	Ground	P	Steering lock unit communication	Input/ Output	Steering lock	LOCK status	5
						LOCK or UNLOCK	 JMKIA0433ZZ

Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
33	Ground	O	Inside key antenna (+) (instrument center)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0393ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0391ZZ
34	Ground	G	Inside key antenna (-) (instrument center)	Output	Ignition knob is pressed.	When Intelligent Key is in the antenna detection area	 JMKIA0392ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0390ZZ
37	Ground	L	Outside key antenna (+) (passenger side)	Output	When the front door request switch (passenger side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0397ZZ
						When Intelligent Key is in the antenna detection area	 JMKIA0514ZZ

cardiagn.com

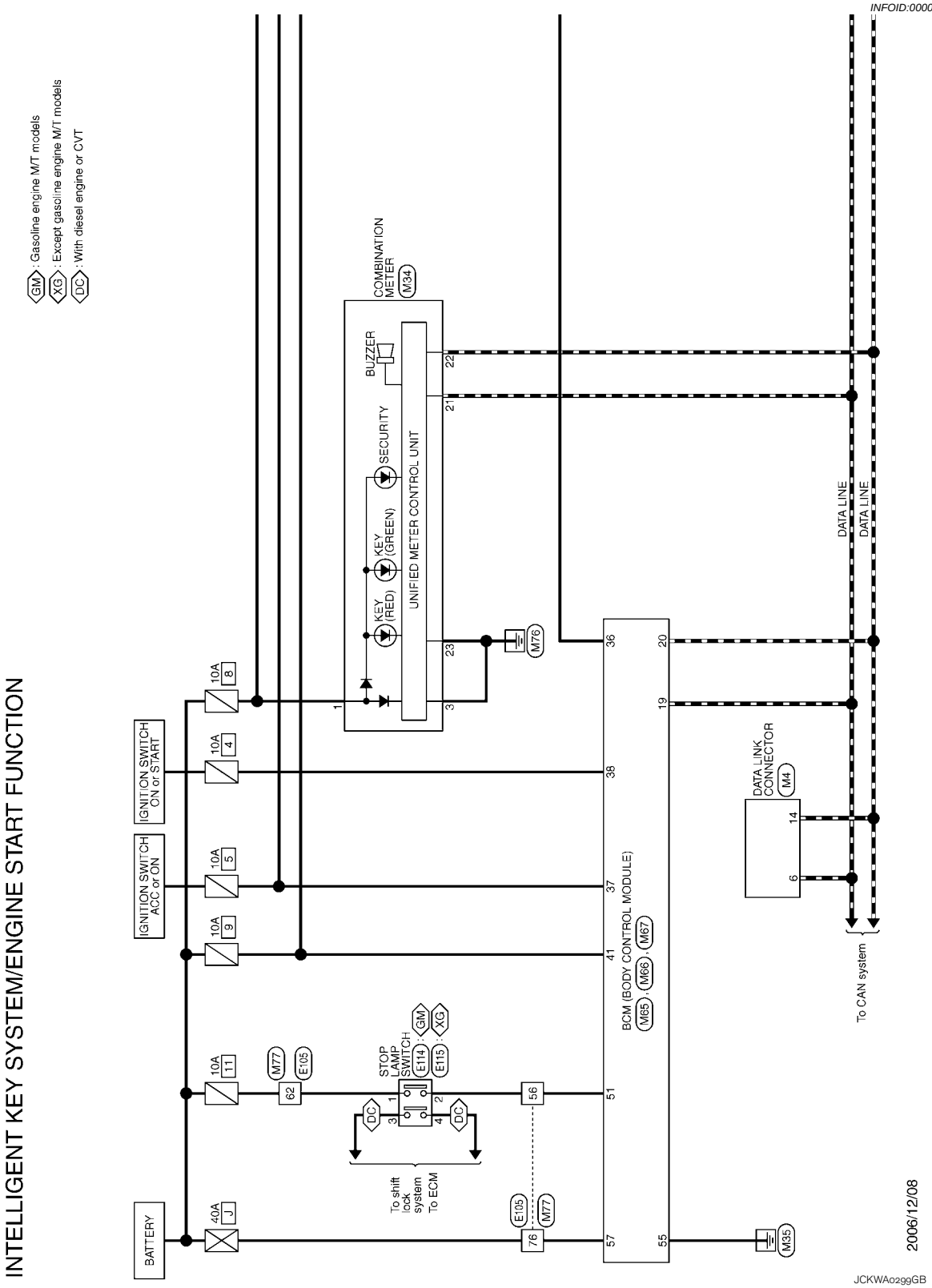
Terminal No.		Wire color	Description		Condition		Value [V] (Approx.)
+	–		Signal name	Input/ Output			
38	Ground	O	Outside key antenna (-) (passenger side)	Output	When the front door request switch (passenger side) is operated with ignition switch OFF	When Intelligent Key is in the antenna detection area	 JMKIA0395ZZ
						When Intelligent Key is not in the antenna detection area	 JMKIA0515ZZ
40	Ground	Y	Passenger side anti-hijack relay	Input	Press front door request switch (passenger side)	Anti-hijack operation	Battery voltage → 0 → Battery voltage
						Other than above	Battery voltage

*1: Only for MT model.

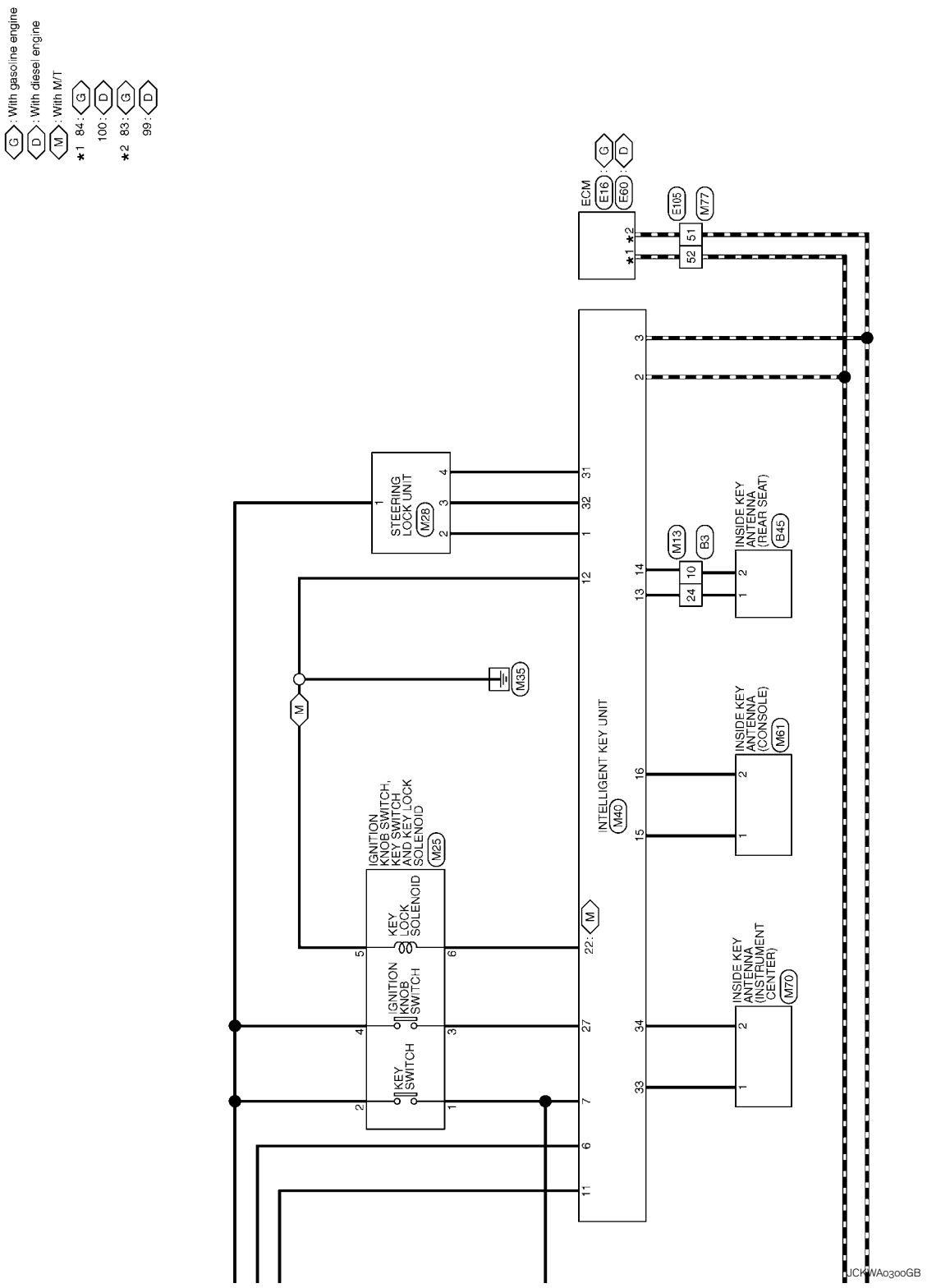
*2: Key interlock operation is only for M/T model for operation condition, refer to SEC-9, "System Description".

Wiring Diagram - INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION -

INFOID:0000000001102230



cardiagn.com


G : With gasoline engine
D : With diesel engine
M : With M/T
*1 84 : G
100 : D
*2 83 : G
99 : D
ECM
E16 : G
E60 : D
E105
M77
STEERING LOCK UNIT
M28
INTELLIGENT KEY UNIT
M40
IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
M25
KEY LOCK SOLENOID
IGNITION KNOB SWITCH
KEY SWITCH
M35
M113
B3
INSIDE KEY ANTENNA (REAR SEAT)
B45
INSIDE KEY ANTENNA (CONSOLE)
M61
INSIDE KEY ANTENNA (INSTRUMENT CENTER)
M70
22 : M
JCKWA0300GB

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

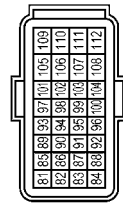
Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
10	W/R	–
24	Y	–

Connector No.	B45
Connector Name	INSIDE KEY ANTENNA (REAR SEAT)
Connector Type	RK02FGY

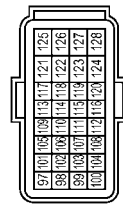
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	W/R	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L
84	L	CAN-H

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
51	P	–
52	L	–
56	R/W	–
82	V	–
76	Y	–

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–
3	G	–[With CVT]
3	O	–[With diesel engine]
4	B	–[With CVT]
4	W/L	–[With diesel engine]

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

JCKWA0301GB

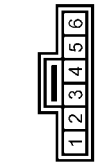
cardiagn.com

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
10	W	–
24	Y	–

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

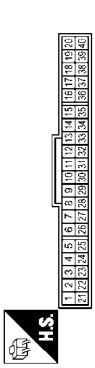


Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–
3	L	–
4	Y	–
5	B	–
6	W	–

Connector No.	M28
Connector Name	STEERING LOCK UNIT
Connector Type	TK04FW

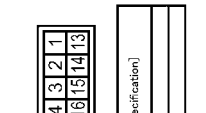
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	LG	–
3	P	–
4	GR	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
3	B	GND
21	L	CAN-H
22	P	CAN-L
23	B	GND

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

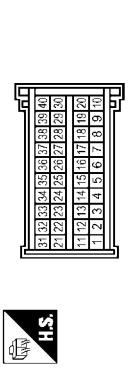


Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	STRG C/U 5V
2	L	CAN-H
3	P	CAN-L
6	W	IGN SW
7	V	KEY SW
11	V	BATT+
12	B	GND
13	Y	REAR SEAT (+)
14	W	REAR SEAT (–)
15	SB	CONSOLE (+)
16	BR	CONSOLE (–)
22	W	KEY I/L SOL
27	L	KNOB SW
31	GR	STRG C/U GND
32	P	STRG C/U SIG
33	O	INSTRUMENT (+)
34	G	INSTRUMENT (–)

Connector No.	M61
Connector Name	INSIDE KEY ANTENNA (CONSOLE)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	BR	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L
36	V	KEY SW
37	R	ACC SW
38	W/L	IGN SW

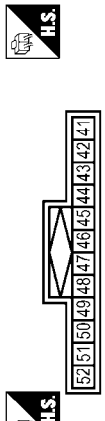
JCKWA0302GB

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
51	R/W	STOP LAMP SW [With Intelligent Key]

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

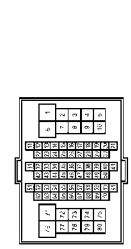


Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M70
Connector Name	INSIDE KEY ANTENNA (INSTRUMENT (CENTER)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	G	–

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



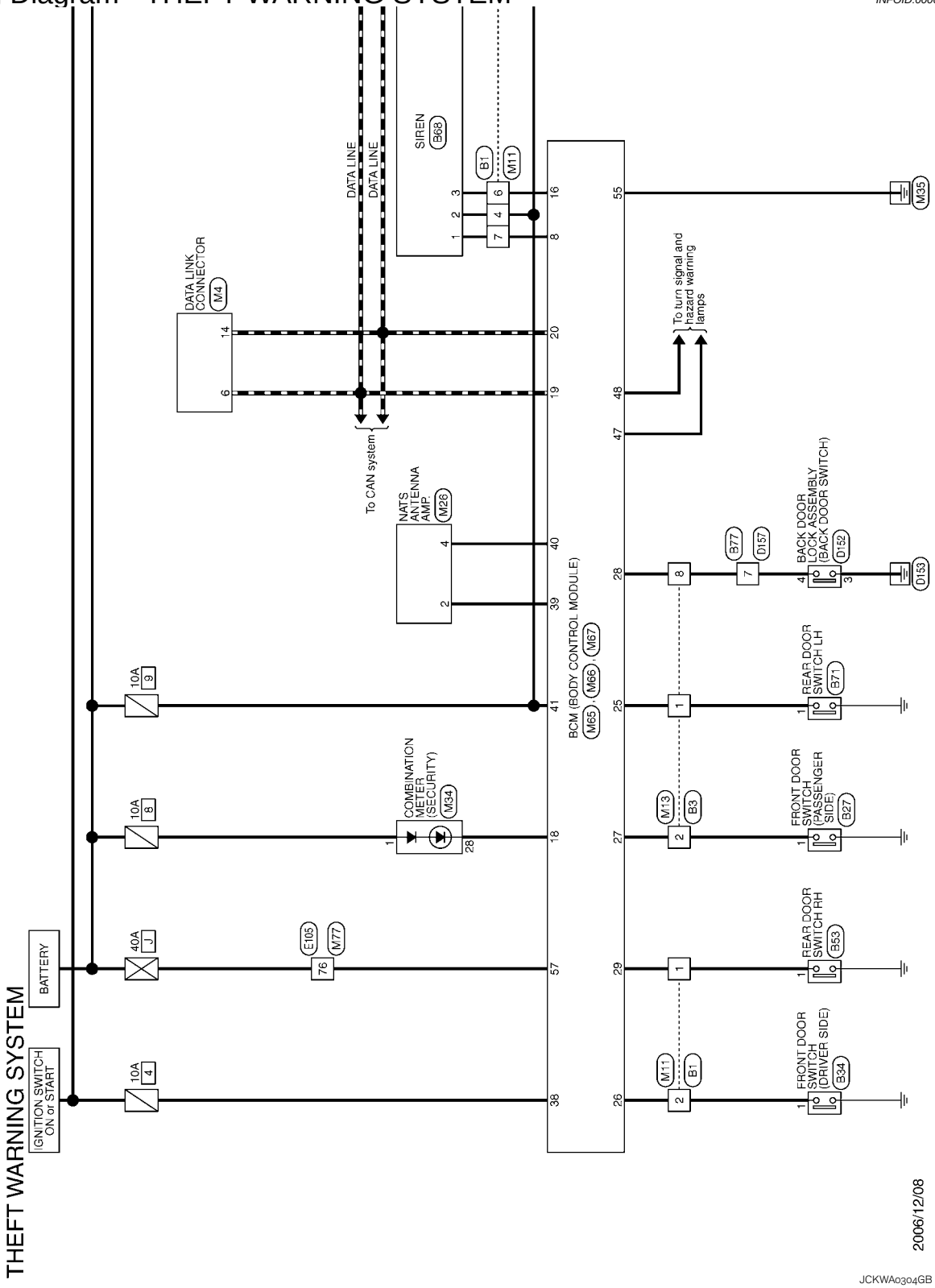
Terminal No.	Color of Wire	Signal Name [Specification]
51	P	–
52	L	–
55	R	–[Except RHD models with Intelligent Key]
56	R/W	–[RHD models with Intelligent Key]
62	V	–
76	Y	–

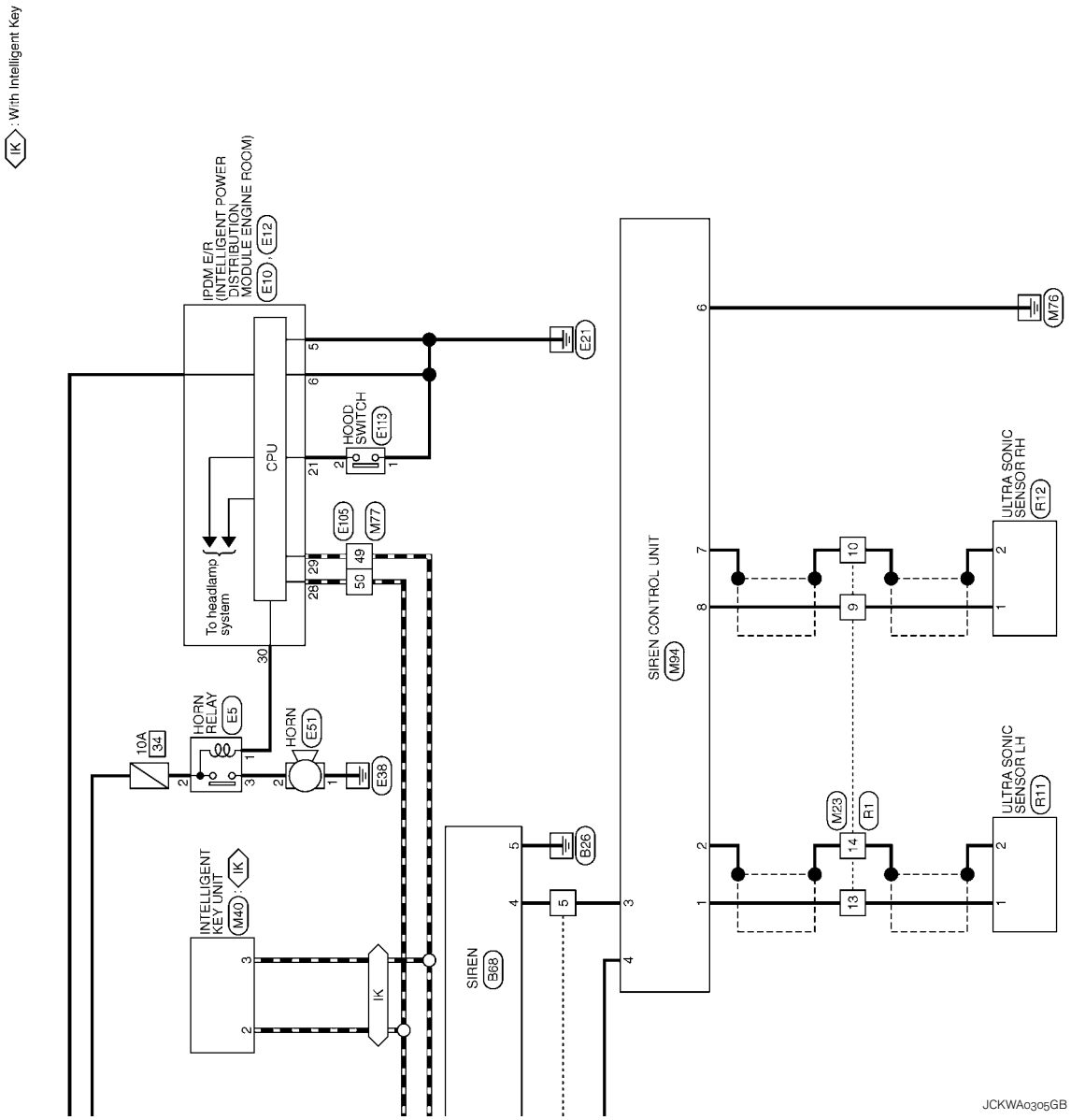
JCKWA0303GB

cardiagn.com

Wiring Diagram - THEFT WARNING SYSTEM -

INFOID:0000000001102231





cardiagn.com

THEFT WARNING SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	- [RHD models]
4	V	-
5	Y	-
6	GR	-
7	LG	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	- [RHD models]
8	G	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B68
Connector Name	SIREN
Connector Type	RH06FB

H.S.

1	2	3	4	5	6

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	HAZARD REQ
2	V	B+
3	GR	COMMON LINK
4	Y	U/S LINK
5	B	GND

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

JCKWA0306GB

carsdiagn.com

THEFT WARNING SYSTEM

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	-
4	G	-

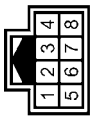
Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
21	GR	-
28	L	-
29	P	-
30	L	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	E51
Connector Name	HORN
Connector Type	DELPHI 15419715

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

Connector No.	E5
Connector Name	HORN RELAY
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	GR/L	-
3	G	-

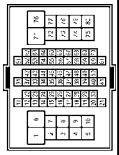
Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

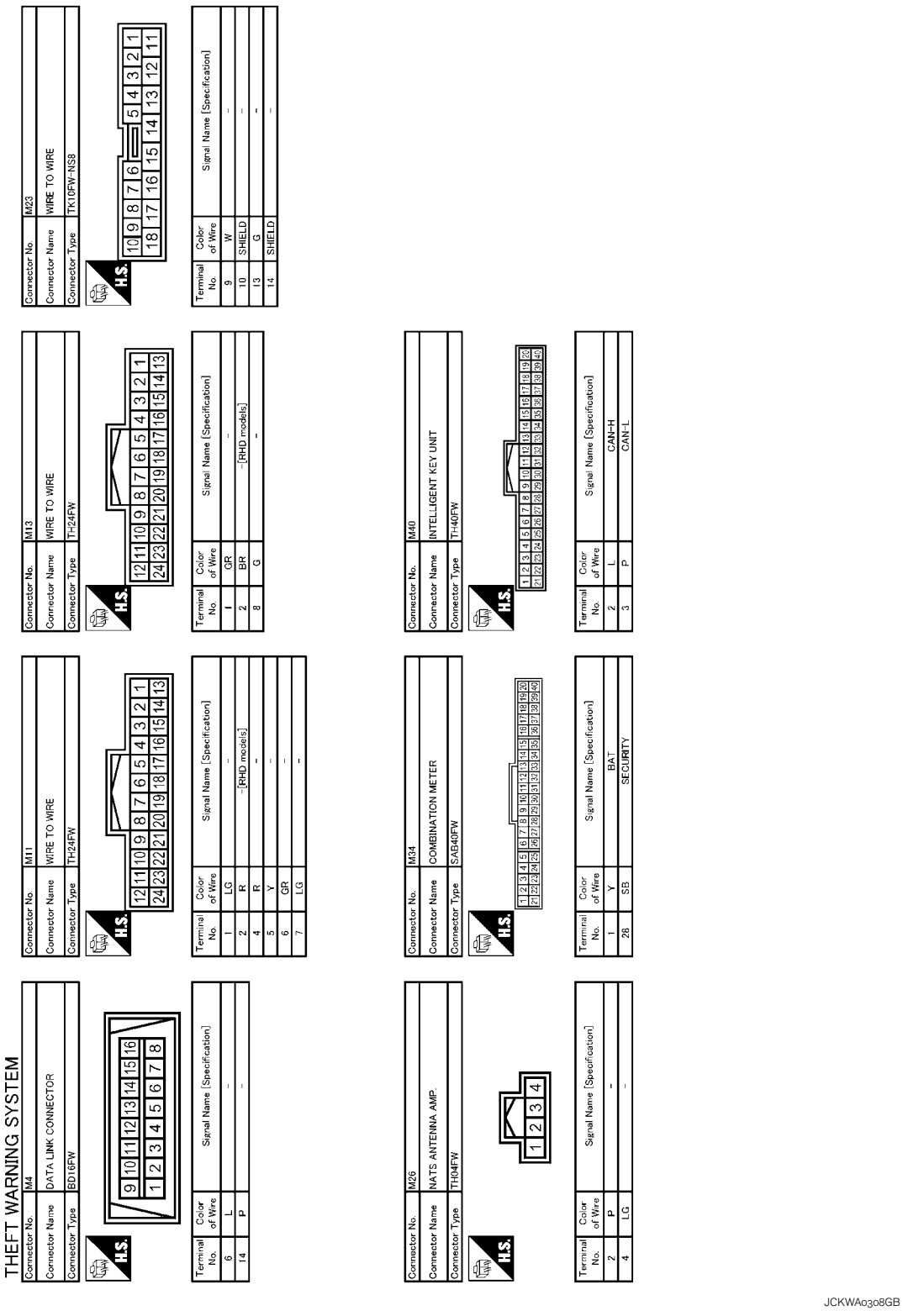
Connector No.	E113
Connector Name	HOOD SWITCH
Connector Type	W02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-

JCKWA0307GB

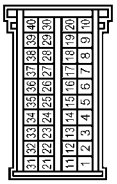
cardiagn.com



JCKWA0308GB

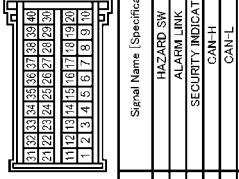
THEFT WARNING SYSTEM

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
8	LG	HAZARD SW
16	GR	ALARM_LINK
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)
38	W/L	IGN SW

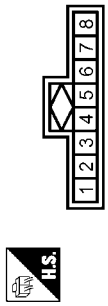
Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

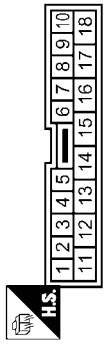
39	P	NATS ANTENNA AMP.
40	LG	NATS ANTENNA AMP.

Connector No.	M94
Connector Name	SIREN CONTROL UNIT
Connector Type	A08FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	U/S LEFT (TX)
2	SHIELD	SHIELD
3	Y	U/S LINK
4	R	B+
6	B	GND
7	SHIELD	SHIELD
8	W	U/S RIGHT (RX)

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
47	G/Y	FLASHER OUTPUT (LEFT)
48	G/B	FLASHER OUTPUT (RIGHT)

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
9	W	-
10	SHIELD	-
13	G	-
14	SHIELD	-

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	R11
Connector Name	ULTRA SONIC SENSOR LH
Connector Type	A02MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	SIG
2	SHIELD	SHIELD

JCKWA0309GB

cardiagn.com

THEFT WARNING SYSTEM

Connector No.	R12
Connector Name	ULTRA SONIC SENSOR RH
Connector Type	A02FW

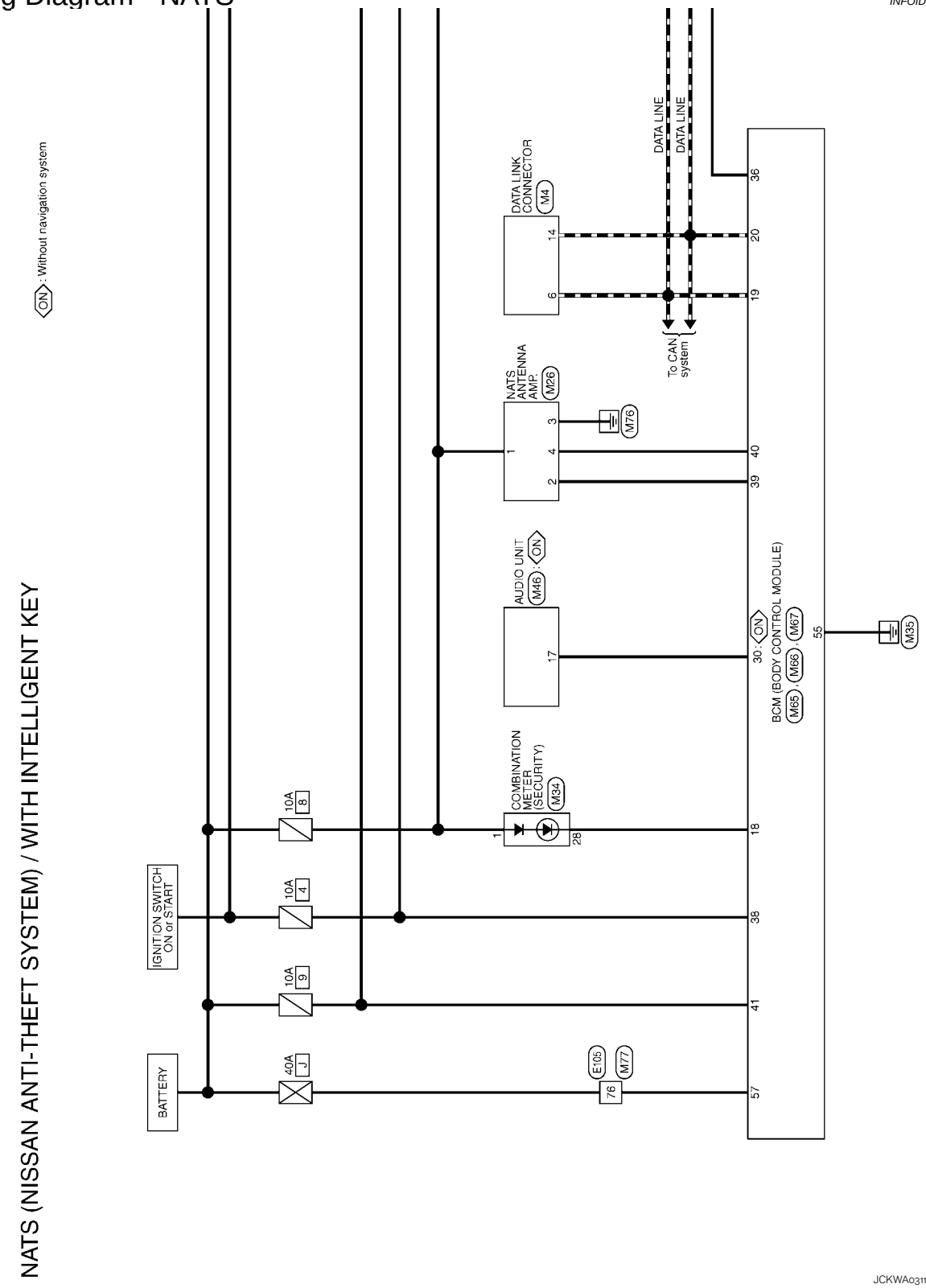
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	SIG
2	SHIELD	SHIELD

JCKWA0310GB

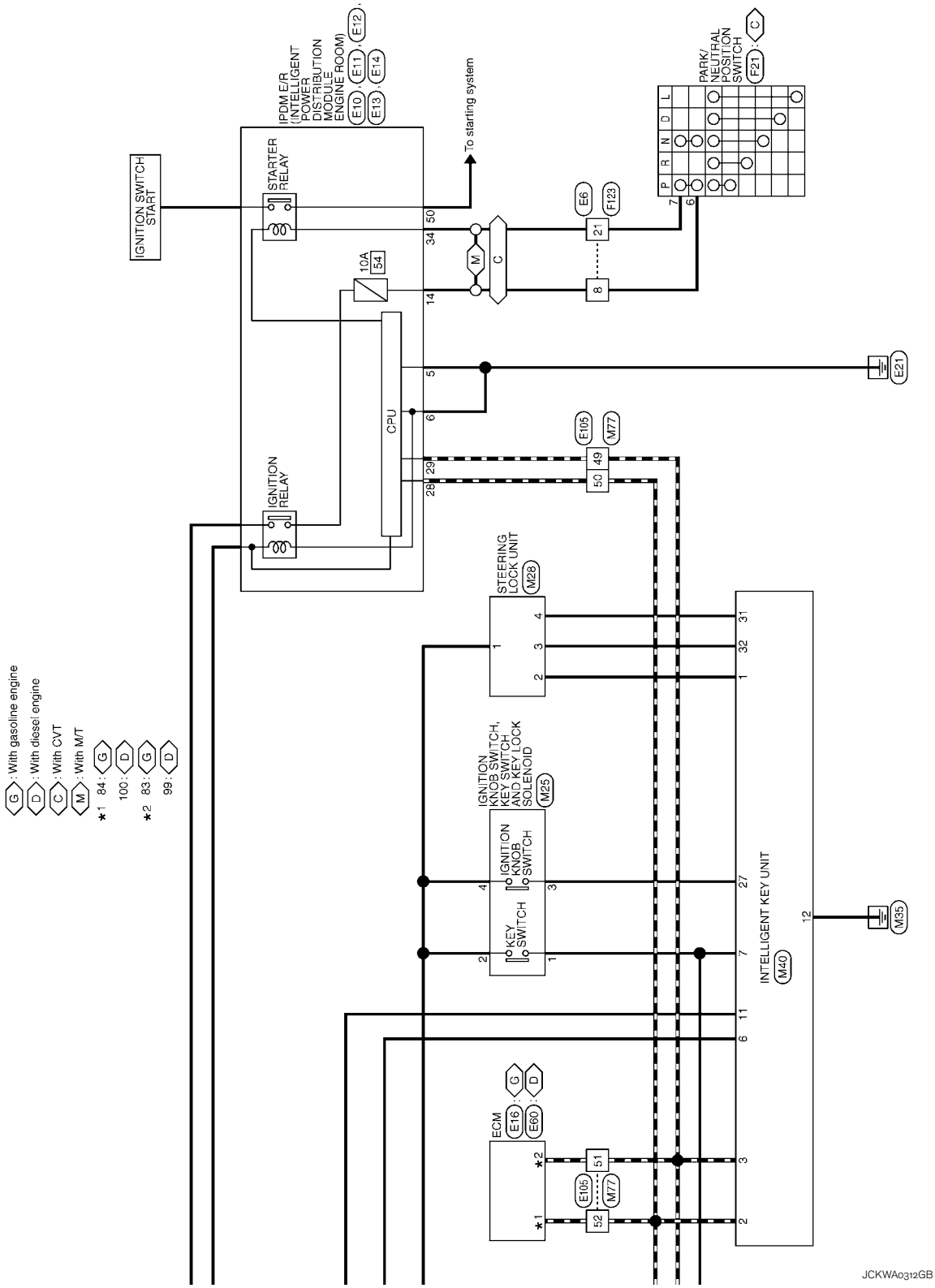
carsdiagn.com

Wiring Diagram - NATS -

INFOID:0000000001102232



cardiagn.com



G : With gasoline engine
D : With diesel engine
C : With CVT
M : With M/T
*1 84 : G
100 : D
*2 83 : G
99 : D

NATS (NISSAN ANTI-THEFT SYSTEM) / WITH INTELLIGENT KEY

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	-
21	R/B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

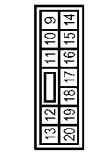
Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
34	R/B	-

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	YZK 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
50	B/R	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

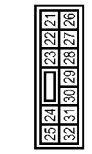


Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	-

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
28	L	-
29	P	-

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

JCKWA0313GB

cardiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM) / WITH INTELLIGENT KEY

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
51	P	-
52	L	-
76	Y	-

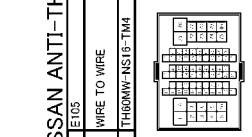
Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
6	W/B	-
7	R/B	-

Connector No.	M26
Connector Name	NATS ANTENNA AMP.
Connector Type	TH04FW

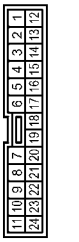
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	P	-
3	B	-
4	LG	-

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	Y	-
3	L	-
4	Y	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

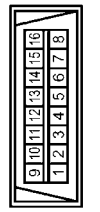


Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	-
21	R/B	-

Connector No.	M28
Connector Name	STEERING LOCK UNIT
Connector Type	TK04FW

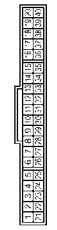
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	LG	-
3	P	-
4	GR	-

Connector No.	M44
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
26	SB	SECURITY

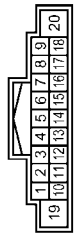
JCKWA0314GB

NATS (NISSAN ANTI-THEFT SYSTEM) / WITH INTELLIGENT KEY

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	STRG C/U 5V
2	L	CAN-H
3	P	CAN-L
6	W	IGN SW
7	V	KEY SW
11	V	BATT+
12	B	GND
27	L	KNOB SW
31	GR	STRG C/U GND
32	P	STRG C/U SIG

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

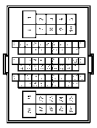


Terminal No.	Color of Wire	Signal Name [Specification]
17	SB	IMMOBILIZER

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

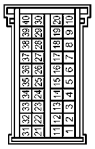
Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



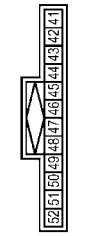
Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
51	P	-
52	L	-
76	Y	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L
30	SB	AUDIO LINK
36	V	KEY SW
38	W/L	IGN SW
39	P	NATS ANTENNA AMP
40	LG	NATS ANTENNA AMP

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PCI122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

JCKWA0315GB

Fail Safe

cardiagn.com

Display contents of CONSULT-III	Fail-safe	Cancellation
B2013: STRG COMM 1	• Inhibits steering look unlocking	Erase DTC
B2552: INTELLIGENT KEY	• Inhibits steering look unlocking • Inhibits engine cranking (BCM) • Fuel cut (ECM)	Erase DTC
B2590: NATS MALFUNCTION	• Inhibits steering look unlocking • Inhibits engine cranking (BCM) • Fuel cut (ECM)	Erase DTC

DTC Inspection Priority Chart

INFOID:0000000001102197

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN) • B2552: INTELIGENT KEY
2	• B2013: STRG COMM 1 • B2590: NATS MALFUNCTION

DTC Index

INFOID:0000000001102198

NOTE:
Details of time display
- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	Detection condition	Fail-safe	Diagnosis
No DTC is detected. further testing may be required.	—	—	—
U1000: CAN COMM CIRCUIT	Intelligent Key unit cannot receive CAN communication signal continuously for 2 seconds or more.	—	Check CAN communication system. Refer to SEC-29
U1010: CONTROL UNIT (CAN)	Intelligent Key unit detects internal CAN communication circuit malfunction.	—	Replace Intelligent Key unit.
B2013: STRG COMM 1	The ID verification result between Intelligent key unit and steering lock unit are NG. Or Intelligent Key unit cannot communicate with steering lock unit.	×	Perform steering lock unit ID registration with CONSULT-III
B2552: INTELLIGENT KEY	Intelligent Key unit internal malfunction.	×	Replace Intelligent Key unit.
B2590: NATS MALFUNCTION	The ID verification result between Intelligent key unit and BCM are NG. Or Intelligent Key unit cannot communicate with BCM.	×	Check NATS Refer to SEC-43

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Reference Value

INFOID:0000000001102192

VALUES ON THE DIAGNOSIS TOOL

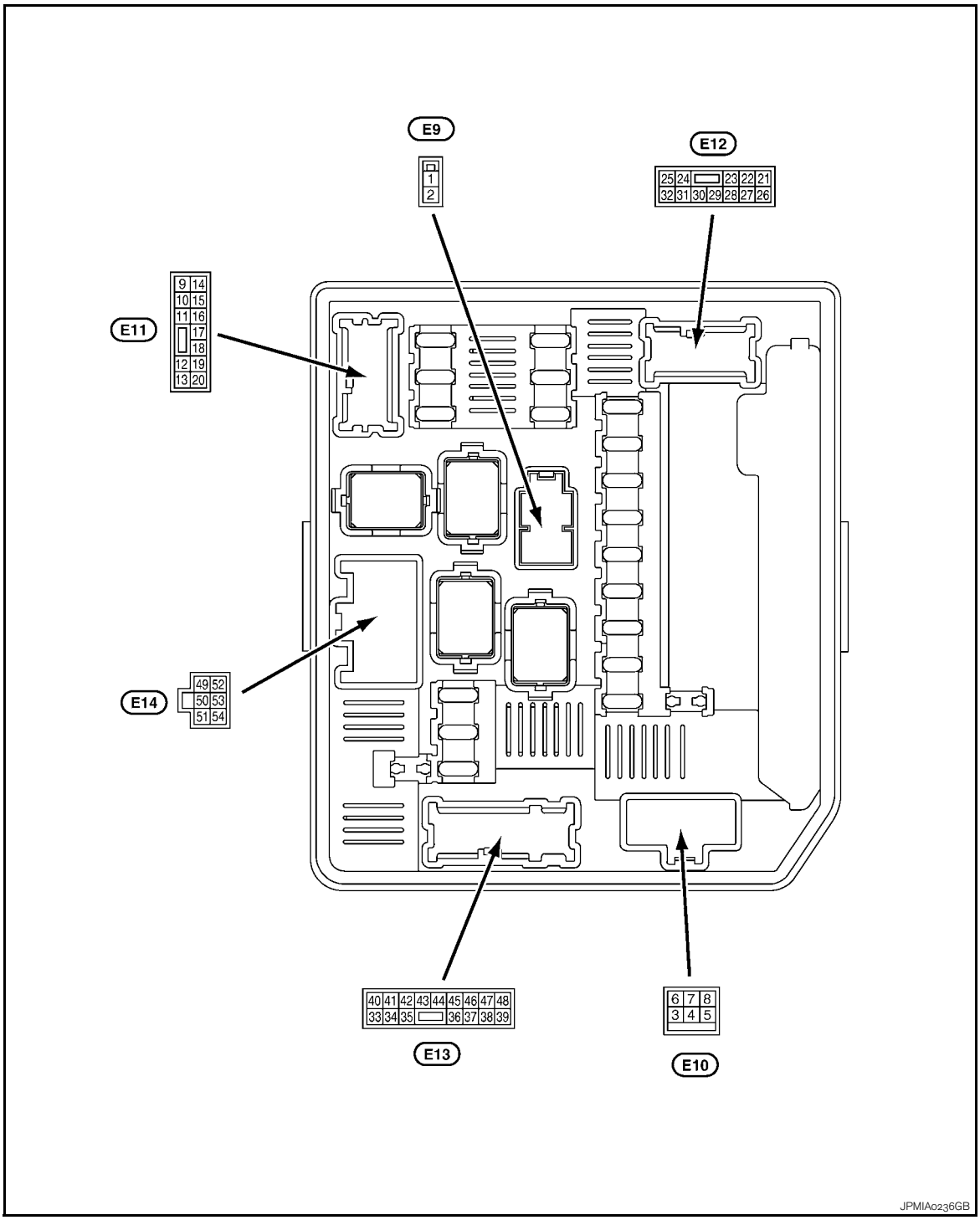
Monitor Item	Condition		Value/Status
MOTOR FAN REQ	Engine idle speed	Changes depending on engine coolant temperature, air conditioner operation status, vehicle speed, etc.	1 - 3
AC COMP REQ	Engine running	A/C switch OFF	Off
		A/C switch ON (Compressor is operating)	On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI (Light is illuminated)		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		Front fog lamp switch ON	On
HL WASHER REQ	Ignition switch ON, and low beam headlamp is ON	Front washer switch OFF	Off
		Front washer switch ON (When headlamp washer is operating)	On
FR WIP REQ	Ignition switch ON	Front wiper switch OFF	STOP
		Front wiper switch INT	1LOW
		Front wiper switch LO	Low
		Front wiper switch HI	Hi
WIP AUTO STOP	Ignition switch ON	Front wiper stop position	STOP P
		Any position other than front wiper stop position	ACT P
WIP PROT	Ignition switch ON	Front wiper operates normally	Off
		Front wiper stops at fail-safe operation	BLOCK
ST RLY REQ **NOTE:** Vehicle without Intelligent Key system indicates only “ON”, and it does not change.	When Intelligent Key is outside the vehicle, and the push switch is pushed		Off
	When Intelligent Key is inside the vehicle, and the push switch is pushed		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Ignition switch ON	Rear window defogger switch OFF	Off
		Rear window defogger switch ON (Rear window defogger is operating)	On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close

cardiagn.com

Monitor Item	Condition	Value/Status
REV SW	Except selector lever R position	Off
	Selector lever R position	On
HOOD SW **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Close the hood	Off
	Open the hood	On
THFT HRN REQ **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Not operation	Off
	Horn is activated with Vehicle Security (Theft Warning) system.	On
HORN CHIRP	**NOTE:** This item is indicated, but not monitored.	Off
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

carsdiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
		Signal name	Input/ Output		
+	–				
1 (G)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
2 (R)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
5 (B)	Ground	Ground	—	Ignition switch ON	0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
6 (B)	Ground	Ground	—	Ignition switch ON		0 V
7 (Y)	Ground	Front wiper LO	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch LO	Battery voltage
8 (Y/R)	Ground	Front wiper HI	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch HI	Battery voltage
9 (G)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
10*1 (L/R)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
11*2 (O)	Ground	PTC heater 1 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
12*2 (G/Y)	Ground	PTC heater 2 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
14 (R/B)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
15 (Y/L)*1 (B/R)*2	Ground	ECM relay control	Input	• Engine running • Ignition switch OFF (For a few seconds after turning ignition switch OFF)		0 - 1.0 V*1
						0.6 V*2
				Ignition switch OFF or ACC (More than a few seconds after turning ignition switch OFF)		Battery voltage
16*3 (Y/R)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
19*1 (R/O)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
21*4 (GR)	Ground	Hood switch	Input	Close the hood		Battery voltage
				Open the hood		0 V
22 (Y/G)	Ground	Reverse switch	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON	• Selector lever “R” (Except M/T models) • M/T control lever “R” (M/T models)	Battery voltage
					• Selector lever in any position other than “R” (Except M/T models) • M/T control lever in any position other than “R” (M/T models)	0 V
23 (Y/B)	Ground	A/C relay power supply	Output	Engine stopped		0 V
				Engine running	A/C switch OFF	0 V
					A/C switch ON (A/C compressor is operating)	Battery voltage
24 (R/Y)	Ground	Headlamp LO (RH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
25*1 (G/L)	Ground	ETC relay control	Input	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		0 - 1.0 V
26 (O)	Ground	Front wiper auto stop	Input	Ignition switch ON	Front wiper stop position	0 V
					Any position other than front wiper stop position	Battery voltage
27 (W)	Ground	Oil pressure switch	Input	Engine stopped		0 V
				Engine running		Battery voltage
28 (L)	—	CAN-H	Input/ Output	—		—
29 (P)	—	CAN-L	Input/ Output	—		—
30*4 (L)	Ground	Horn relay control	Output	The horn is not activated		Battery voltage
				The horn is activated		0 V
31 (R)	Ground	Headlamp LO (sensor)	Output	Ignition switch ON	Lighting switch OFF	0 V
					Lighting switch 2ND	Battery voltage
32*1 (R/Y)	Ground	ETC relay power supply	Output	Ignition switch ON		Battery voltage
33*1 (B/O)	Ground	Fuel pump relay control	Input	• Engine running • Ignition switch ON (For 1 second after turning ignition switch ON)		0 - 1.0 V
				Ignition switch ON (More than 1 second after turning ignition switch ON)		Battery voltage
34 (R/B)	Ground	Starter relay power supply	Input	Ignition switch ON (Except M/T models)	Selector lever “P” or “N”	0 V
					Selector lever in any position other than “P” or “N”	Battery voltage
				Ignition switch ON (M/T models)		
35 (W/L)	Ground	Ignition switch ON	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
36 (W)	Ground	Front fog lamp (RH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
37 (R/W)	Ground	Parking lamp (RH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
38 (R/L)	Ground	Tail, license plate lamps and illuminations	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
39 (GR)	Ground	Headlamp washer relay control	Output	Ignition switch ON	When headlamp washer is operating	0 V
					When headlamp washer is not operating	Battery voltage
40*1 (BR/Y)*5 (SB)*6	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
41 (P)	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
42*1 (B/Y)	Ground	Fuel pump relay power supply	Output	• Ignition switch OFF or ACC • Approximately 1 second or more after turning the ignition switch ON		0 V
				• Approximately 1 second after turning the ignition switch ON • Engine running		Battery voltage
43 (W/B)	Ground	Front fog lamp (LH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
44 (L)	Ground	Headlamp LO (LH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
45 (L/W)	Ground	Headlamp HI (RH)	Output	• Lighting switch 2ND and HI • lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
46 (G)	Ground	Headlamp HI (LH)	Output	• Lighting switch 2ND and HI • Lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
47 (R/L)	Ground	Parking lamp (LH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
48*7 (Y)	Ground	Cooling fan relay-3 control	Output	When cooling fan does HI operation		0 V
				When cooling fan does OFF or LO operation		Battery voltage
49 (B)	Ground	Rear window defogger relay power supply	Output	Ignition switch ON	Rear window defogger switch ON	Battery voltage
					Rear window defogger switch OFF	0 V
50 (B/R)	Ground	Starter relay power supply	Output	When engine is clanking		Battery voltage
				When engine is not clanking		0 V
51 (P)	Ground	Ignition switch START	Input	Ignition switch START		Battery voltage
				Ignition switch OFF, ACC or ON		0 V
52 (W)	Ground	Cooling fan relay-1 power supply	Output	When cooling fan does LO or HI operation		Battery voltage
				When cooling fan does OFF operation		0 V
53 (W/B)	Ground	Battery power supply (Cooling fan relay)	Input	Ignition switch OFF		Battery voltage
54*5 (R)	Ground	Cooling fan relay-2 power supply	Input	When cooling fan does HI operation		Battery voltage
				When cooling fan does OFF or LO operation		0 V

*1: HR engine and MR engine models

*2: K9K engine models

*3: Except M/T models only

*4: With vehicle security (theft warning) system

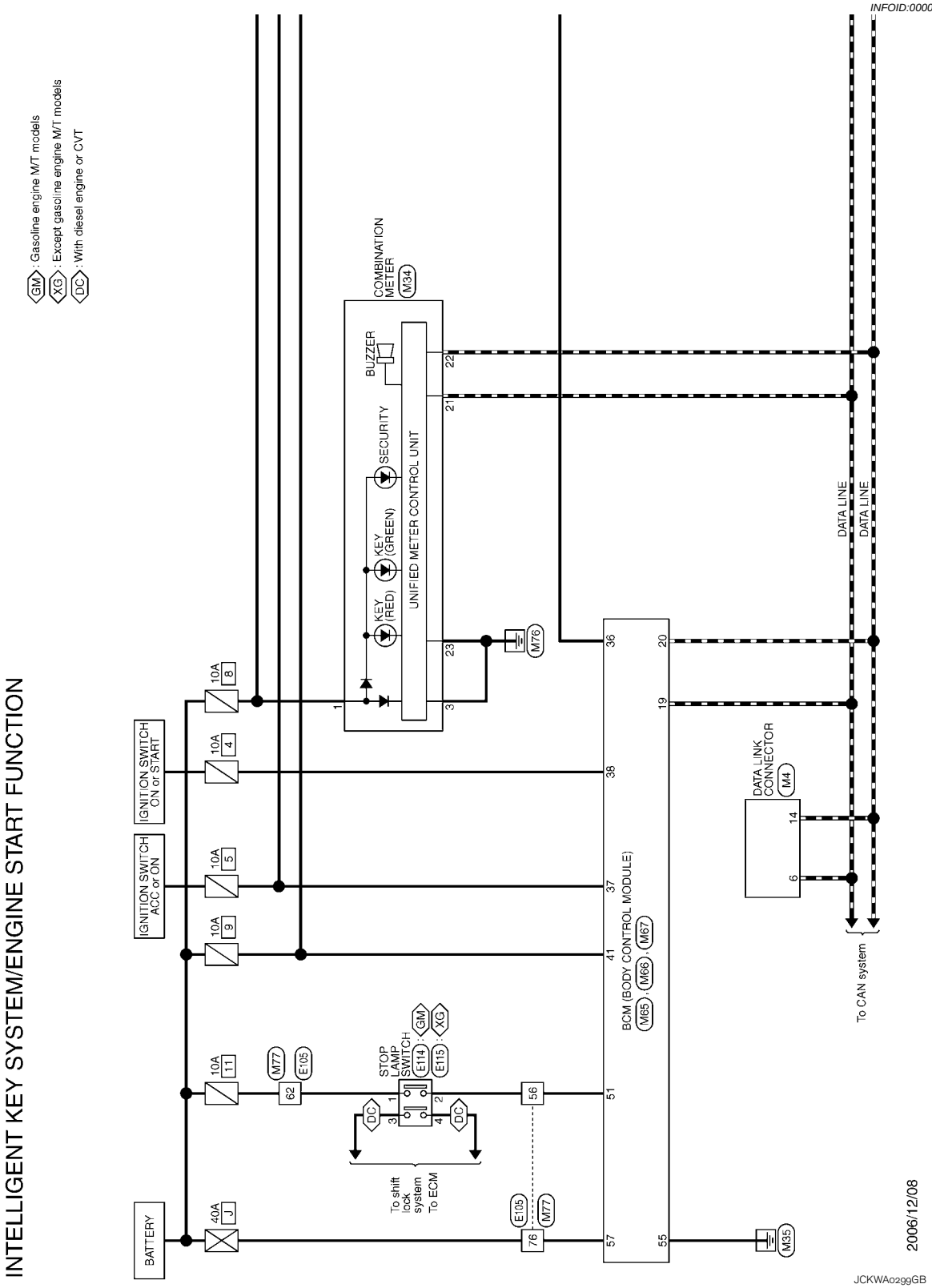
*5: HR engine models

*6: MR engine models

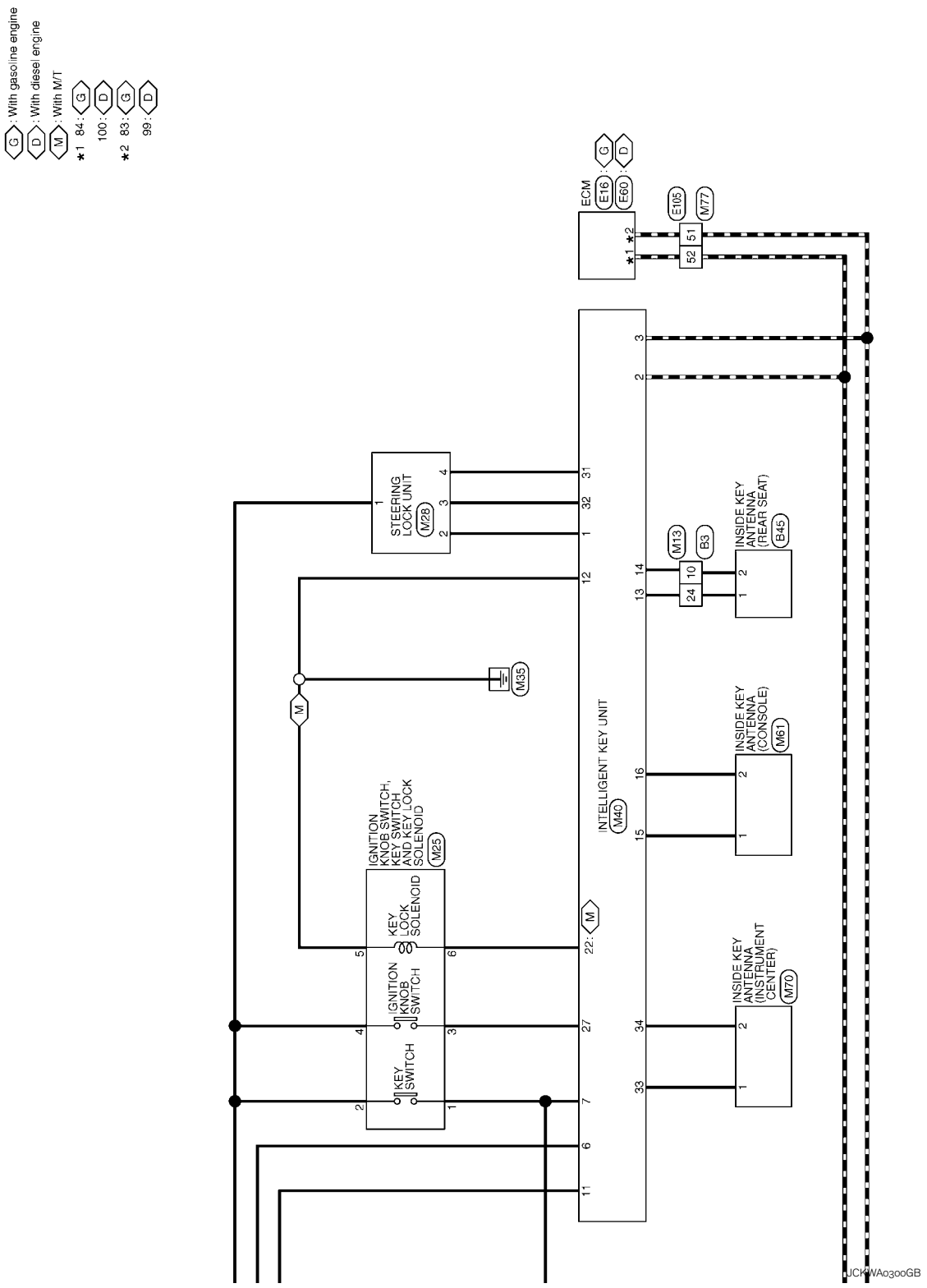
*7: MR engine and K9K engine models

Wiring Diagram - INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION -

INFOID:0000000001102233



cardiagn.com


G : With gasoline engine
D : With diesel engine
M : With M/T
*1 84 : G
100 : D
*2 83 : G
99 : D
ECM
E16 : G
E60 : D
E105
M77
STEERING LOCK UNIT
M28
INTELLIGENT KEY UNIT
M40
IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
M25
KEY LOCK SOLENOID
IGNITION KNOB SWITCH
KEY SWITCH
M35
M13
B3
INSIDE KEY ANTENNA (REAR SEAT)
B45
INSIDE KEY ANTENNA (CONSOLE)
M61
INSIDE KEY ANTENNA (INSTRUMENT CENTER)
M70
22 : M
JCKWA0300GB

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

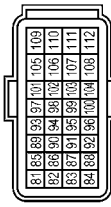
Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
10	W/R	–
24	Y	–

Connector No.	B45
Connector Name	INSIDE KEY ANTENNA (REAR SEAT)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	W/R	–

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L
84	L	CAN-H

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
51	P	–
52	L	–
56	R/W	–
82	V	–
76	Y	–

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–
3	G	–[With CVT]
3	O	–[With diesel engine]
4	B	–[With CVT]
4	W/L	–[With diesel engine]

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

JCKWA0301GB

cardiagn.com

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

Terminal No.	Color of Wire	Signal Name [Specification]
10	W	–
24	Y	–

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–
3	L	–
4	Y	–
5	B	–
6	W	–

Connector No.	M28
Connector Name	STEERING LOCK UNIT
Connector Type	TK04FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	LG	–
3	P	–
4	GR	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
3	B	GND
21	L	CAN-H
22	P	CAN-L
23	B	GND

Connector No.	M61
Connector Name	INSIDE KEY ANTENNA (CONSOLE)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	BR	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L
36	V	KEY SW
37	R	ACC SW
38	W/L	IGN SW

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	STRG C/U 5V
2	L	CAN-H
3	P	CAN-L
6	W	IGN SW
7	V	KEY SW
11	V	BATT+
12	B	GND
13	Y	REAR SEAT (+)
14	W	REAR SEAT (-)
15	SB	CONSOLE (+)
16	BR	CONSOLE (-)

22	W	KEY I/L SOL
27	L	KNOB SW
31	GR	STRG C/U GND
32	P	STRG C/U SIG
33	O	INSTRUMENT (+)
34	G	INSTRUMENT (-)

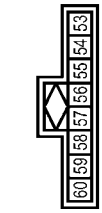
JCKWA0302GB

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
51	R/W	STOP LAMP SW [With Intelligent Key]

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

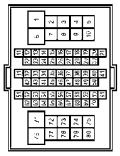


Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	M70
Connector Name	INSIDE KEY ANTENNA (INSTRUMENT (CENTER)
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	G	–

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



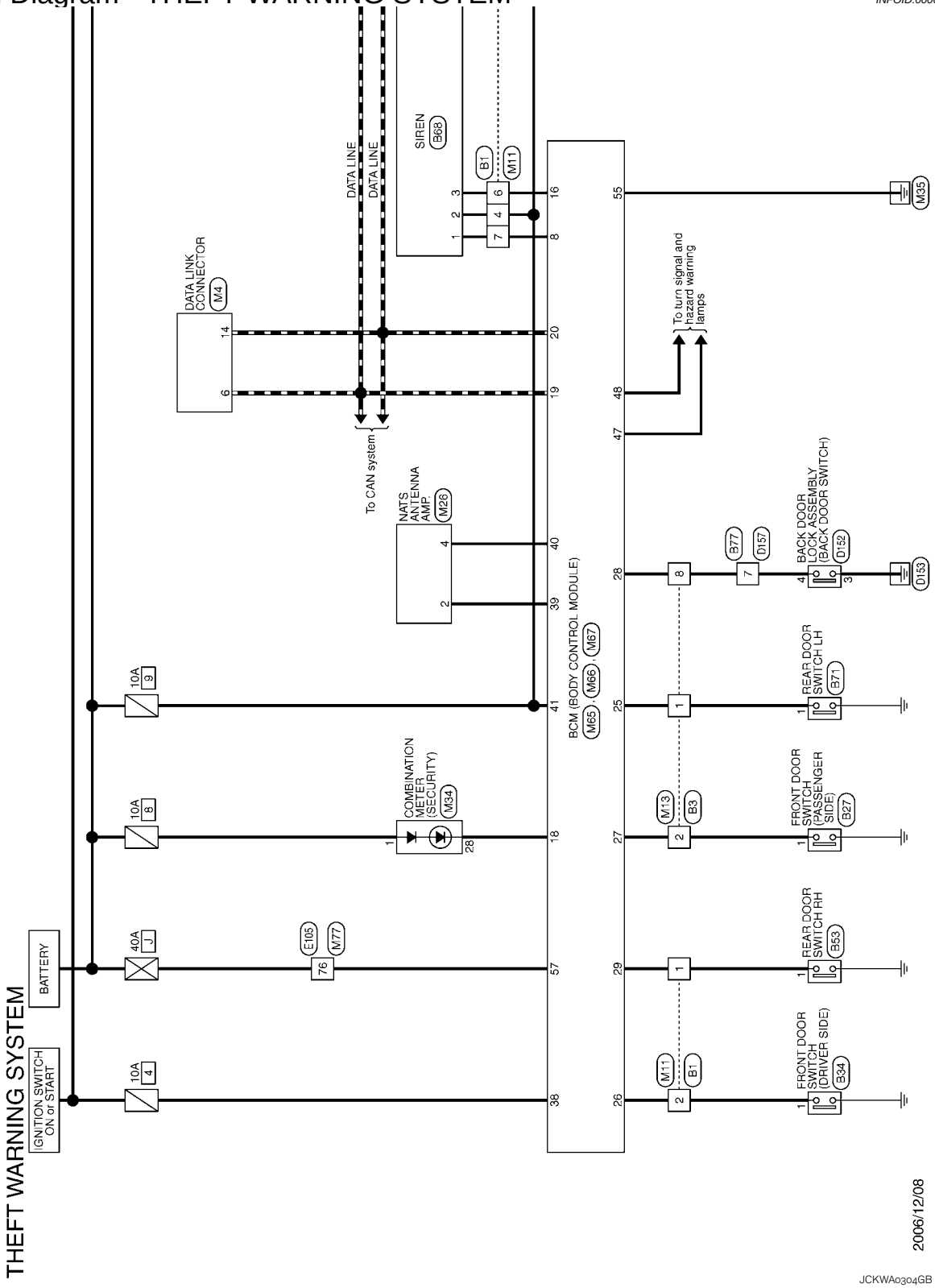
Terminal No.	Color of Wire	Signal Name [Specification]
51	P	–
52	L	–
55	R	–[Except RHD models with Intelligent Key]
55	R/W	–[RHD models with Intelligent Key]
62	V	–
76	Y	–

JCKWA0303GB

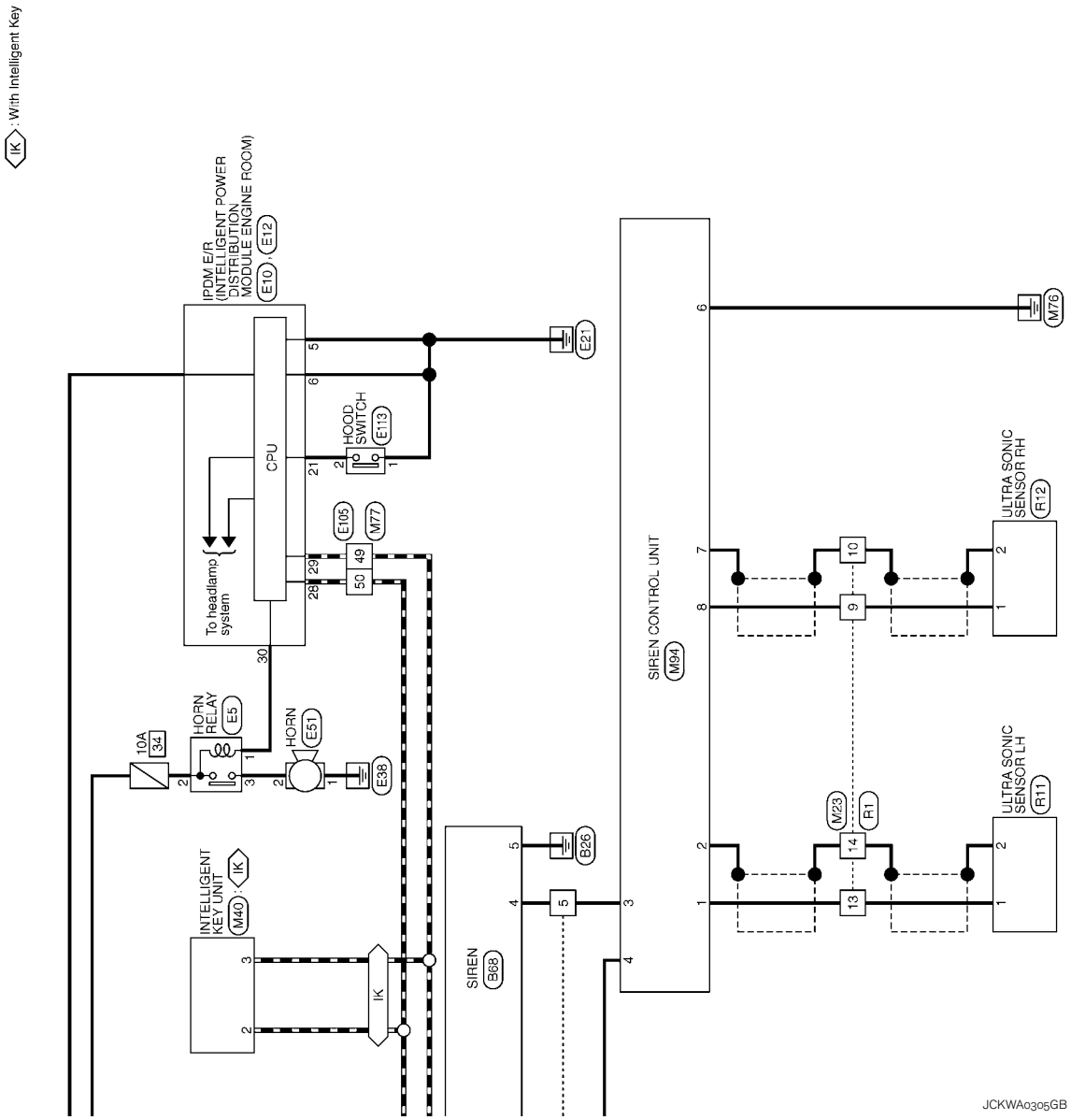
cardiagn.com

Wiring Diagram - THEFT WARNING SYSTEM -

INFOID:0000000001102234



carDiagn.com



cardiagn.com

THEFT WARNING SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	- [RHD models]
4	V	-
5	Y	-
6	GR	-
7	LG	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	- [RHD models]
8	G	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B68
Connector Name	SIREN
Connector Type	RH06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	HAZARD REQ
2	V	B+
3	GR	COMMON LINK
4	Y	U/S LINK
5	B	GND

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

JCKWA0306GB

carsdiagn.com

THEFT WARNING SYSTEM

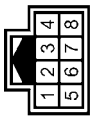
Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	E5
Connector Name	HORN RELAY
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	GR/L	-
3	G	-

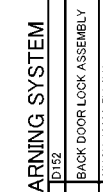
Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
21	GR	-
28	L	-
29	P	-
30	L	-

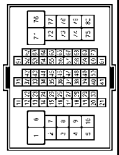
Connector No.	E51
Connector Name	HORN
Connector Type	DELPHI 15419715

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

Connector No.	E113
Connector Name	HOOD SWITCH
Connector Type	W02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-

JCKWA0307GB

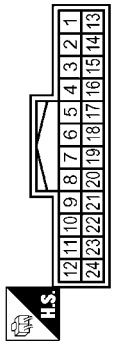
cardiagn.com

THEFT WARNING SYSTEM

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

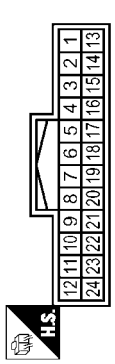
Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



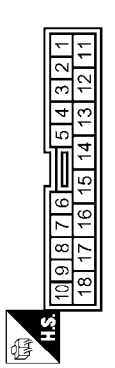
Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-[RHD models]
4	R	-
5	Y	-
6	GR	-
7	LG	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
8	G	-

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8



Terminal No.	Color of Wire	Signal Name [Specification]
9	W	-
10	SHIELD	-
13	G	-
14	SHIELD	-

Connector No.	M26
Connector Name	NATS ANTENNA AMP.
Connector Type	TH04FW

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	-
4	LG	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
28	SB	SECURITY

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L

JCKWA0308GB

carsdiagn.com

THEFT WARNING SYSTEM

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

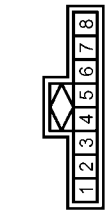
Terminal No.	Color of Wire	Signal Name [Specification]
8	LG	HAZARD SW
16	GR	ALARM_LINK
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)
38	W/L	IGN SW

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

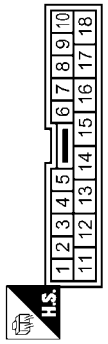
39	P	NATS ANTENNA AMP.
40	LG	NATS ANTENNA AMP.

Connector No.	M94
Connector Name	SIREN CONTROL UNIT
Connector Type	A08FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	U/S LEFT (TX)
2	SHIELD	SHIELD
3	Y	U/S LINK
4	R	B+
6	B	GND
7	SHIELD	SHIELD
8	W	U/S RIGHT (RX)

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
47	G/Y	FLASHER OUTPUT (LEFT)
48	G/B	FLASHER OUTPUT (RIGHT)

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
9	W	-
10	SHIELD	-
13	G	-
14	SHIELD	-

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	R11
Connector Name	ULTRA SONIC SENSOR LH
Connector Type	A02MW

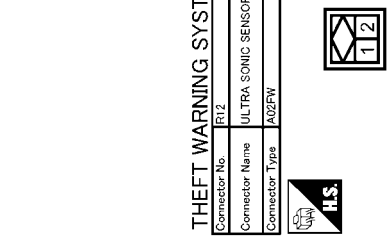
Terminal No.	Color of Wire	Signal Name [Specification]
1	G	SIG
2	SHIELD	SHIELD

JCKWA0309GB

cardiagn.com

THEFT WARNING SYSTEM

Connector No.	R12
Connector Name	ULTRA SONIC SENSOR RH
Connector Type	A02FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	SIG
2	SHIELD	SHIELD

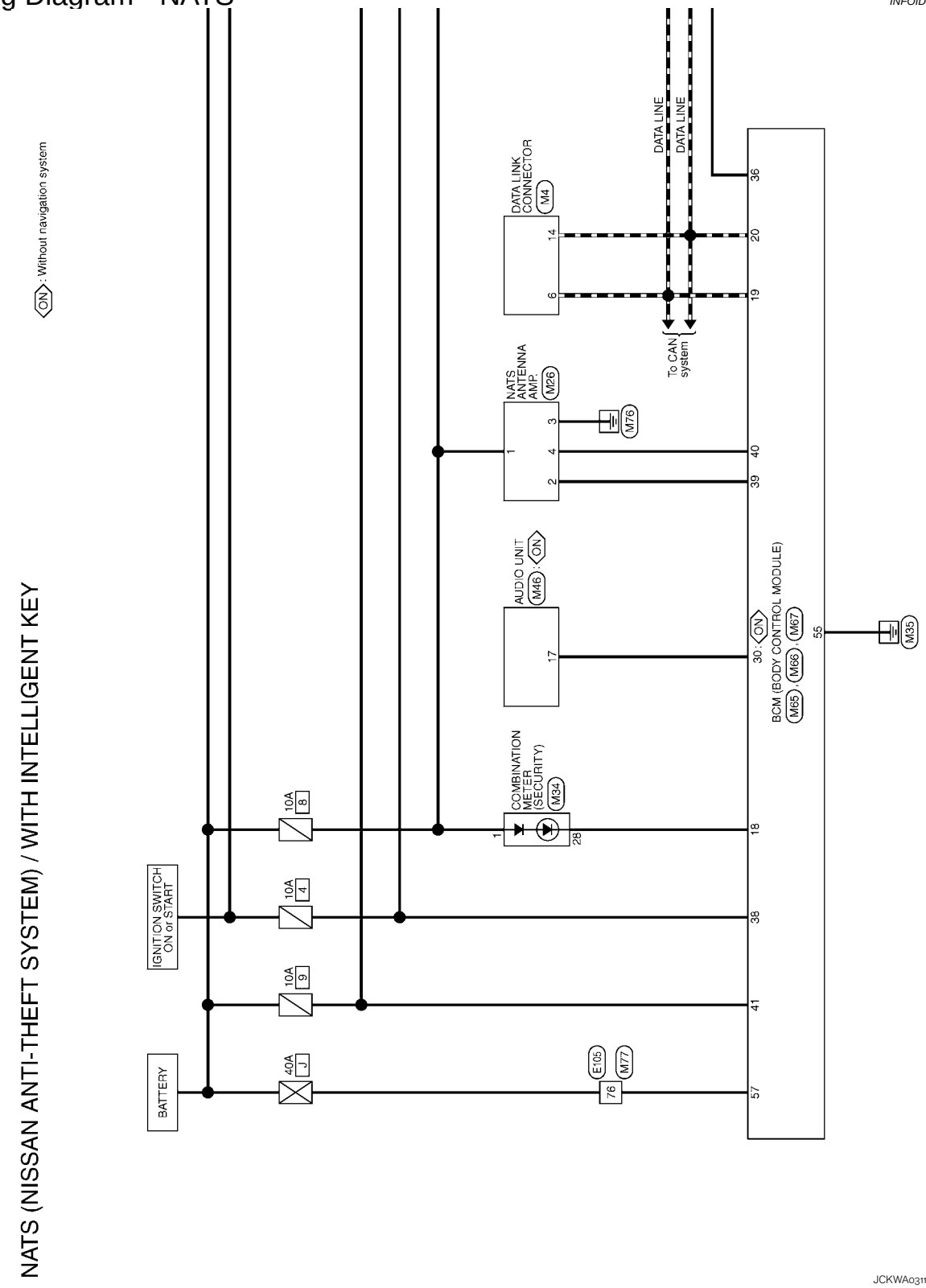
JCKWA0310GB

carsdiagn.com

Wiring Diagram - NATS -

INFOID:0000000001102235

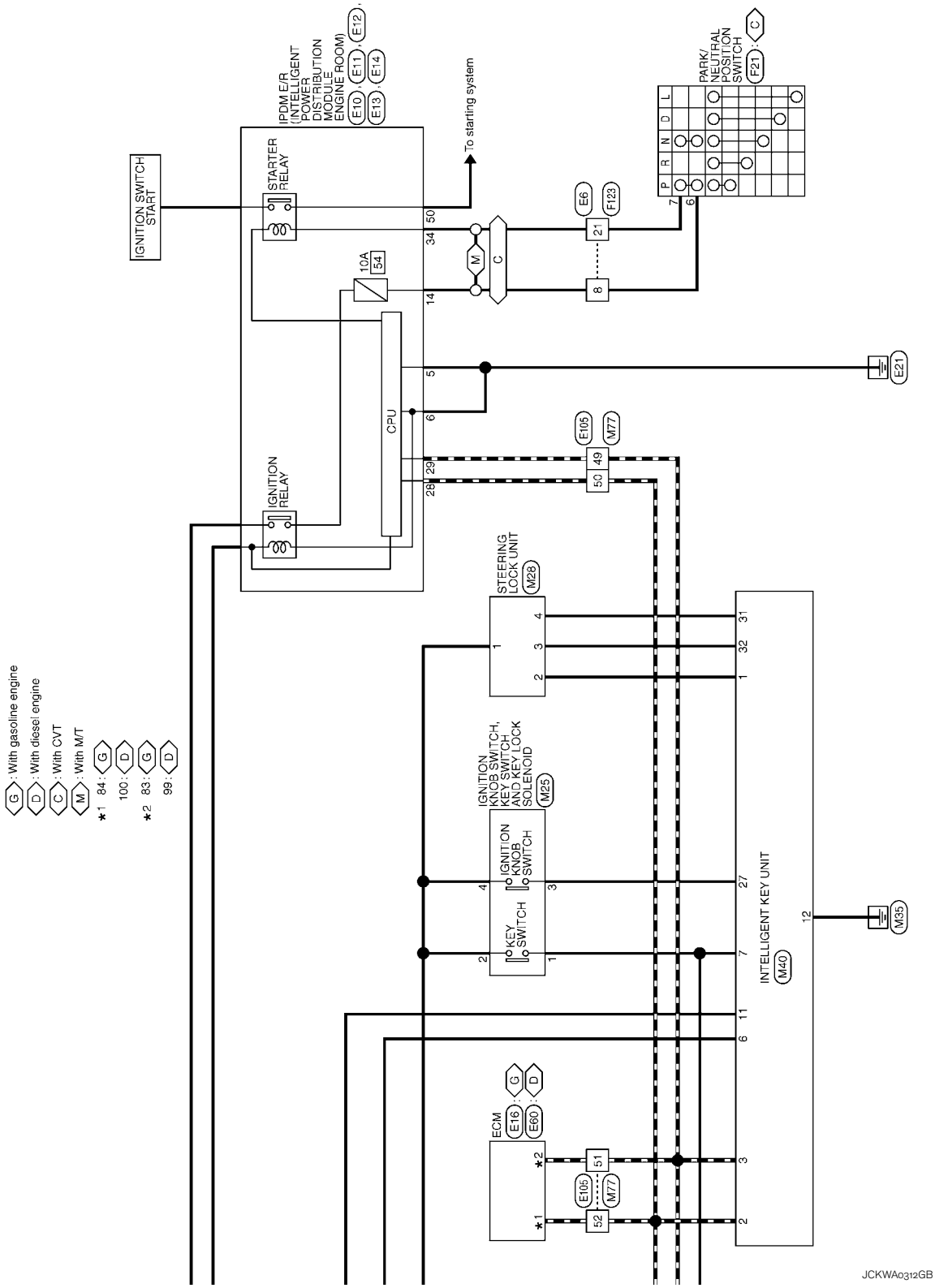
NATS (NISSAN ANTI-THEFT SYSTEM) / WITH INTELLIGENT KEY



2006/12/08

JCKWA0311GB

cardiagn.com



G : With gasoline engine
D : With diesel engine
C : With CVT
M : With M/T
*1 84 : G
100 : D
*2 83 : G
99 : D

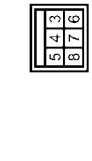
carsdiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM) / WITH INTELLIGENT KEY

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

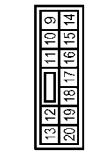
Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	-
21	R/B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC



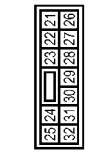
Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS



Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
28	L	-
29	P	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
34	R/B	-

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	YZK 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
50	B/R	-

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L1
84	L	CAN-H1

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

JCKWA0313GB

cardiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM) / WITH INTELLIGENT KEY

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
51	P	-
52	L	-
76	Y	-

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

Terminal No.	Color of Wire	Signal Name [Specification]
6	W/B	-
7	R/B	-

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	Y	-
3	L	-
4	Y	-

Connector No.	M26
Connector Name	NATS ANTENNA AMP.
Connector Type	TH04FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	P	-
3	B	-
4	LG	-

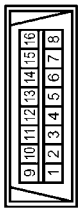
Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	-
21	R/B	-

Connector No.	M28
Connector Name	STEERING LOCK UNIT
Connector Type	TK04FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	LG	-
3	P	-
4	GR	-

Connector No.	M44
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

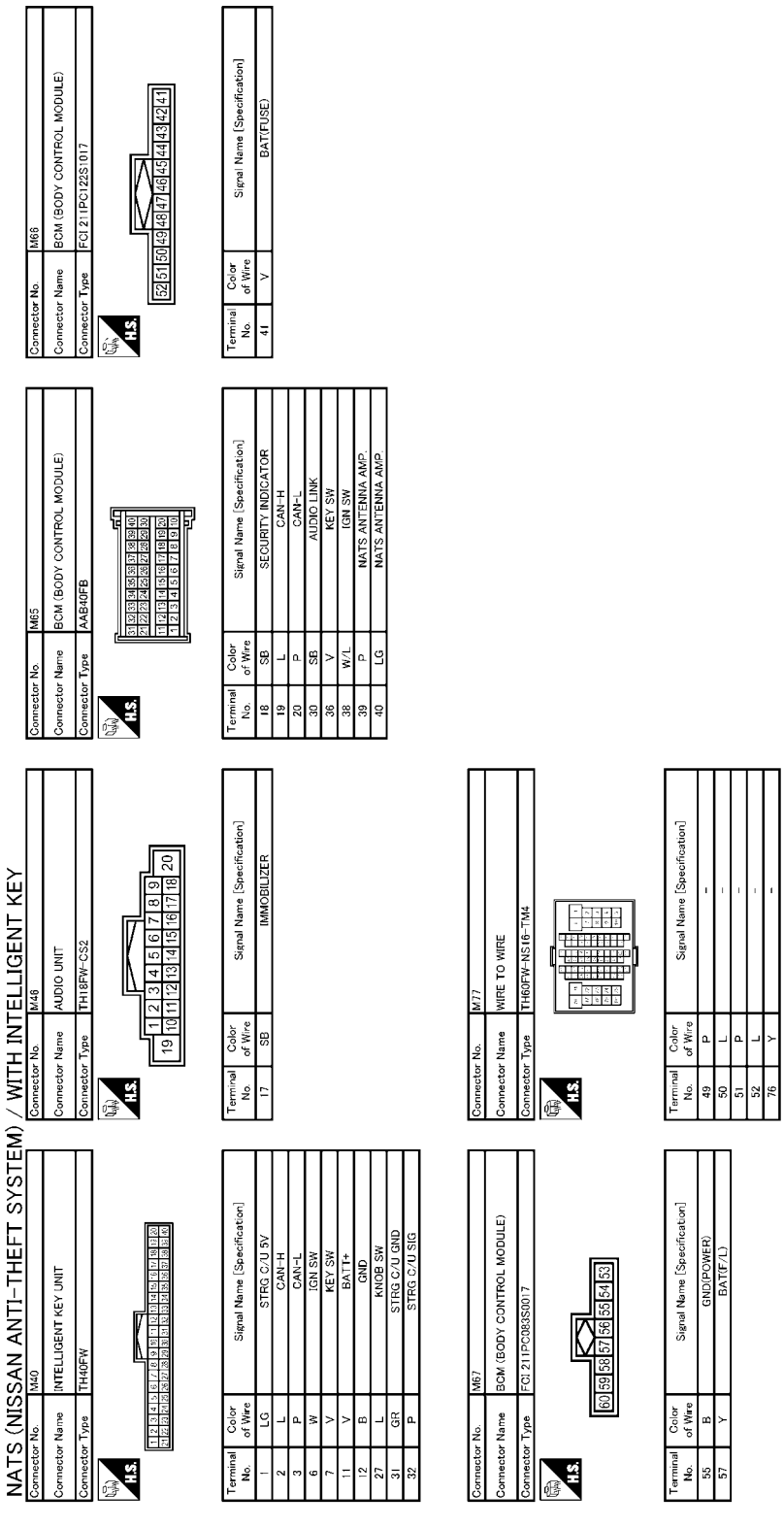


Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
26	SB	SECURITY

JCKWA0314GB



JCKWA0315GB

Fail Safe

INFOID:0000000001102193

CAN communication control

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If no CAN communication is available with ECM

cardiagn.com

Control part	Fail-safe in operation
Cooling fan	• The cooling fan relay-2*1 or the cooling fan relay-3*2 turns ON when the ignition switch is turned ON • Turns off the fan motor low relay when the ignition switch is turned OFF
A/C compressor	A/C relay OFF

*1: HR engine models

*2: MR engine and K9K engine models

If no CAN communication is available with BCM

Control part	Fail-safe in operation
Headlamp	• The headlamp low relay turns ON when the ignition switch is turned ON • The headlamp low relay turns OFF when the ignition switch is turned OFF • Headlamp high relay OFF
• Parking lamps • License plate lamps • Tail lamps • Illuminations	• The tail lamp relay turns ON when the ignition switch is turned ON • The tail lamp relay turns OFF when the ignition switch is turned OFF
Front wiper	• The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. • The front wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Front fog lamps	Front fog lamp relay OFF
Starter motor	Inhibit relay OFF
Rear window defogger	Rear window defogger relay OFF
Headlamp washer	Headlamp washer relay OFF
PTC heater	PTC heater relay OFF

Ignition relay malfunction detection function

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

DTC	Ignition switch	Ignition relay	Tail lamp relay
—	ON	ON	—
—	OFF	OFF	—
B2098: IGN RLY ON	OFF	ON	ON (10 minutes)
B2099: IGN RLY OFF	ON	OFF	—

NOTE:

The tail lamp relay is turned OFF when the ignition switch is turned ON.

Front wiper control

IPDM E/R detects the front wiper stop position with the front wiper auto stop signal.
When the front wiper auto stop signal is in the conditions listed below, IPDM E/R repeats a front wiper 10 seconds operation and 20 seconds stop five times.

Ignition switch	Front wiper switch	Front wiper auto stop signal
ON	OFF	The front wiper auto stop signal (stop position) cannot be input for 10 seconds.
	ON	The front wiper auto stop signal does not change for 10 seconds.

NOTE:

carDiagn.com

This operation status can be confirmed on the IPDM E/R “Data Monitor” that displays “BLOCK” for the item “WIP PROT” while the wiper is stopped.

DTC Index

INFOID:0000000001102194

CONSULT display	Fail-safe	Timing[NOTE]		Reference page
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	PAST	PCS-14
B2098: IGN RELAY ON	×	CRNT	PAST	PCS-15
B2099: IGN RELAY OFF	—	CRNT	PAST	PCS-16
B2100: EEPROM	—	CRNT	PAST	PCS-17

NOTE:

The details of time display are as follows.

- CRNT: The malfunctions that are detected now.
- PAST: The number is indicated when it is normal at present and a malfunction was detected in the past.

cardiagn.com

SYMPTOM DIAGNOSIS

INTELLIGENT KEY SYSTEM/ENGINE START FUNCTION SYMPTOMS

Symptom Table

INFOID:0000000000944697

NOTE:
- Before performing the diagnosis in the following table, check “DLK-20, "Work Flow"”.
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

CONDITIONS OF VEHICLE (OPERATING CONDITIONS)
- Engine start function is ON when setting on CONSULT-III.
- Mechanical key is not inserted in key cylinder.
- One or more of Intelligent Keys with registered Intelligent Key ID is in the vehicle.

Symptom	Diagnosis/service procedure	Reference page
Ignition switch does not turn on with Intelligent Key. [KEY warning lamp (green) illuminates.]	1. Check steering lock unit.	SEC-31
	2. Replace Intelligent Key unit.	DLK-282
Ignition switch does not turn on with Intelligent Key. [KEY warning lamp does not illuminate.]	1. Check Intelligent Key unit power supply and ground circuit.	DLK-71
	2. Check ignition knob switch.	SEC-50
	3. Check key switch.	SEC-48
	4. Replace Intelligent Key unit.	DLK-282
Ignition switch does not turn on with Intelligent Key. [KEY warning lamp (red) illuminates.]	1. Check inside key antenna.	DLK-116
	2. Replace Intelligent Key unit.	DLK-282
Ignition switch does not turn on with mechanical key	Check key switch.	SEC-48
Engine can not start	1. CHeck key switch.	SEC-48
	2. CHeck stop lamp switch.	SEC-52

carsdiagn.com

VEHICLE SECURITY SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000000944698

Procedure			Diagnostic procedure	Refer to page
Symptom				
1	Vehicle security system cannot be set by ····	Door switch	Check door switch	DLK-83
		Hood switch	Check hood switch	SEC-54
		Back door switch	Check back door switch	SEC-54
		Intelligent Key	Check Intelligent Key system	DLK-134
		—	Check Intermittent Incident	GI-39
	Security indicator does not turn ON.		Check vehicle security indicator	SEC-58
			Check Intermittent Incident	GI-39
2	* Vehicle security system does not sound alarm when ····	Any door is opened.	Check door switch	DLK-83
			Check Intermittent Incident	GI-39
3	Vehicle security alarm does not activate.	Horn alarm	Check horn switch	—
			Check Intermittent Incident	GI-39
		Siren control unit alarm	Check siren control unit power supply and ground circuit	SEC-45
			Check siren power supply and ground circuit	SEC-46
			Check ultra sonic sensor	SEC-60
			Check Intermittent Incident	GI-39
4	Vehicle security system cannot be canceled by ····	Intelligent Key	Check Intelligent Key system	DLK-28
			Check Intermittent Incident	GI-39

*: Check the system is in the armed phase.

cardiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM) SYMPTOMS

Symptom Table

INFOID:0000000000944699

NOTE:
- Before performing the diagnosis in the following table, check “SEC-5, "Work Flow"”.
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

CONDITIONS OF VEHICLE (OPERATING CONDITIONS)
- Mechanical key is not inserted into key cylinder.
- Ignition knob switch is not depressed.

Symptom	Diagnosis/service procedure	Reference page
Engine can not start.	1. Check stop lamp switch	SEC-52
	2. Check Intermittent Incident	GI-39
Security indicator does not turn ON or flash.	1. Check vehicle security indicator	SEC-58
	2. Check Intermittent Incident	GI-39

carsdiagn.com

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000001097890

The engine start function, door lock function, and NATS in the Intelligent Key system are closely related to each other regarding control. Narrow down the functional area in question by performing basic inspection to identify which function is malfunctioning. The vehicle security function can operate only when the door lock is operating normally. Therefore, it is easy to identify any factor unique to the vehicle security system by performing the vehicle security operation check after basic inspection.

1.CHECK DOOR LOCK OPERATION

Check the door lock for normal operation with the Intelligent Key and door request switch.
Successful door lock operation with the Intelligent Key and request switch indicates that the remote keyless entry receiver and inside key antenna required for engine start are functioning normally.
Identify the malfunctioning point by referring to the DLK section if the door cannot be unlocked.

Can the door be locked with the Intelligent Key and door request switch?

YES >> GO TO 2.
NO >> Refer to DLK-203, "INTELLIGENT KEY : Symptom Table".

2.CHECK IGNITION KNOB SWITCH OPERATION-1

With all registered Intelligent Keys, check if ignition knob can rotate when carrying Intelligent Key inside the vehicle.

Does ignition knob rotate?

YES >> GO TO 3.
NO >> Refer to SEC-149, "Symptom Table".

3.CHECK IGNITION KNOB SWITCH OPERATION-2

Insert registered mechanical key into key cylinder, and check if ignition knob can rotate. Check for all registered mechanical keys.

Does ignition knob rotate?

YES >> GO TO 4.
NO (Does not rotate with some of mechanical keys)>>Perform mechanical key registration.
NO (Does not rotate with all mechanical keys)>>Refer to SEC-149, "Symptom Table".

4.CHECK VEHICLE SECURITY SYSTEM

Check the vehicle security system for normal operation.
The vehicle security function can operate only when the door lock function is operating normally.
Therefore, it is easy to identify any factor unique to the vehicle security by performing the vehicle security operation check after this basic inspection.

>> Go to SEC-150, "Vehicle Security Operation Check".

Vehicle Security Operation Check

INFOID:0000000001097891

1.INSPECTION START

Turn ignition switch “OFF” and pull out mechanical key from key cylinder.
NOTE:
Before starting operation check, open front windows.

>> GO TO 2.

2.CHECK SECURITY INDICATOR LAMP

1. Lock doors using Intelligent Key.
2. Check that security indicator lamp illuminates for 30 seconds.

Security indicator lamp should illuminate.

OK >> GO TO 3.

cardiagn.com

NG >> Perform diagnosis and repair. Refer to SEC-148, "Symptom Table".

3. CHECK ALARM FUNCTION

1. After 30 seconds, security indicator lamp will start to blink.
2. Open any door or hood before unlocking with Intelligent Key or open back door without Intelligent Key.

Does alarm function properly.

OK >> GO TO 4.
NG >> Check the following.
- The vehicle security system does not phase in alarm mode. Refer to SEC-148, "Symptom Table".
- Alarm does not operate. Refer to SEC-148, "Symptom Table".

4. CHECK ALARM CANCEL OPERATION

Unlock any door or open back door using Intelligent Key.

Alarm (horn and headlamp) should stop.

OK >> INSPECTION END.
NG >> Check door lock function. Refer to DLK-20, "Work Flow".

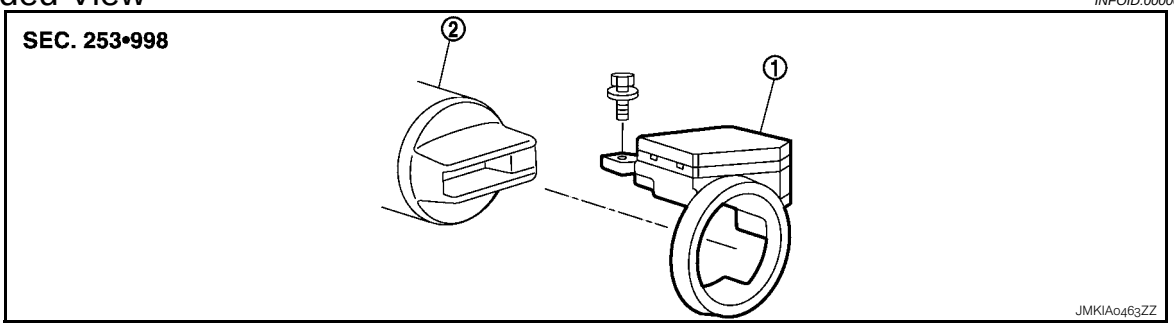
carldiagn.com

ON-VEHICLE REPAIR

NATS (NISSAN ANTI-THEFT SYSTEM)

Exploded View

INFOID:0000000000944700



1. NATS antenna amp.
2. Steering lock assembly

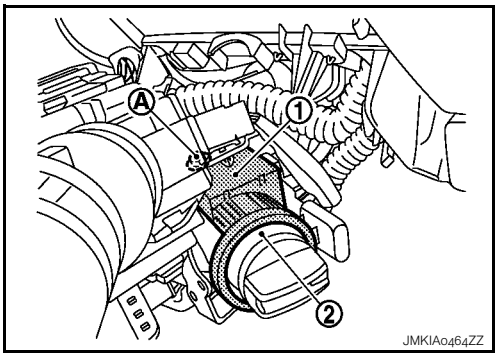
Refer to SEC-152, "Removal and Installation".

Removal and Installation

INFOID:0000000000944701

REMOVAL

1. Remove the steering column cover.
   Refer to IP-11, "Exploded View" and IP-12, "Removal and Installation".
2. Remove the NATS antenna amp. mounting screw (A), and then remove NATS antenna amp. (1) from steering lock assembly (2).



INSTALLATION

Install in the reverse order of removal.

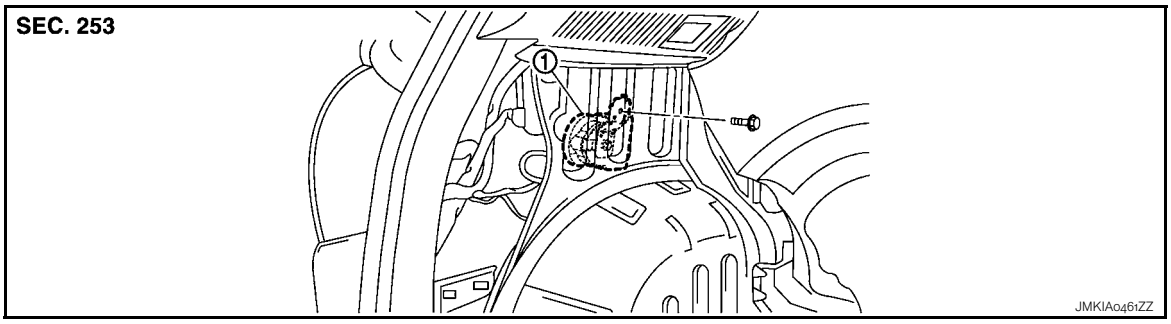
cardiagn.com

SIREN

Exploded View

INFOID:0000000001091488

SIREN



1. Siren

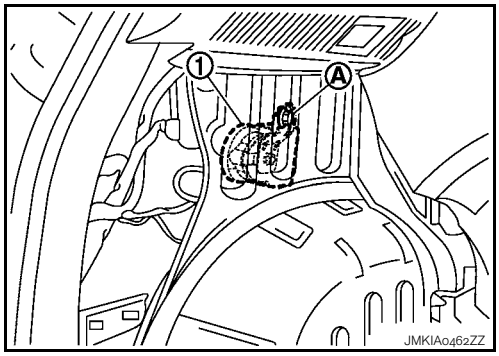
Refer to SEC-153, "Removal and Installation".

Removal and Installation

INFOID:0000000001091494

REMOVAL

1. Remove the luggage side lower finisher (LH).
   Refer to INT-24, "Exploded View" and INT-24, "Removal and Installation".
2. Remove the siren mounting bolt (A), and then remove siren (1).



INSTALLATION

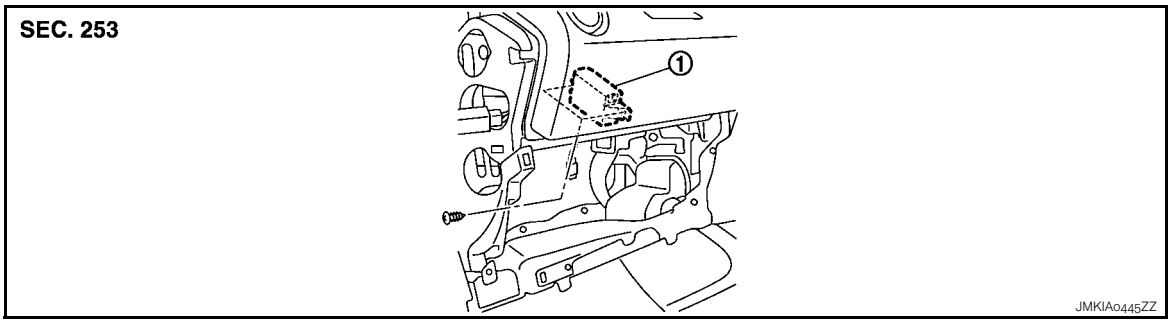
Install in the reverse order of removal.

SIREN CONTROL UNIT

Exploded View

INFOID:0000000001091551

SIREN CONTROL UNIT



1. Siren control unit

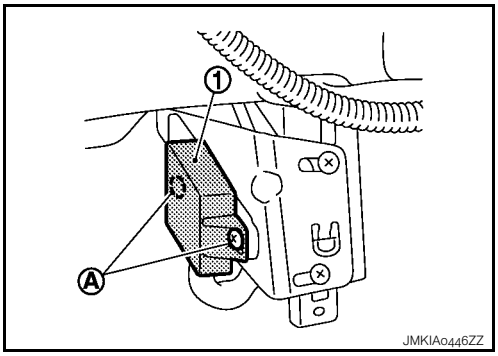
Refer to SEC-154, "Removal and Installation".

Removal and Installation

INFOID:0000000001091554

REMOVAL

1. Remove the glove box.
   Refer to IP-11, "Exploded View" and IP-12, "Removal and Installation".
2. Remove the siren control unit mounting screw (A), and then remove siren control unit (1).



INSTALLATION

Install in the reverse order of removal.

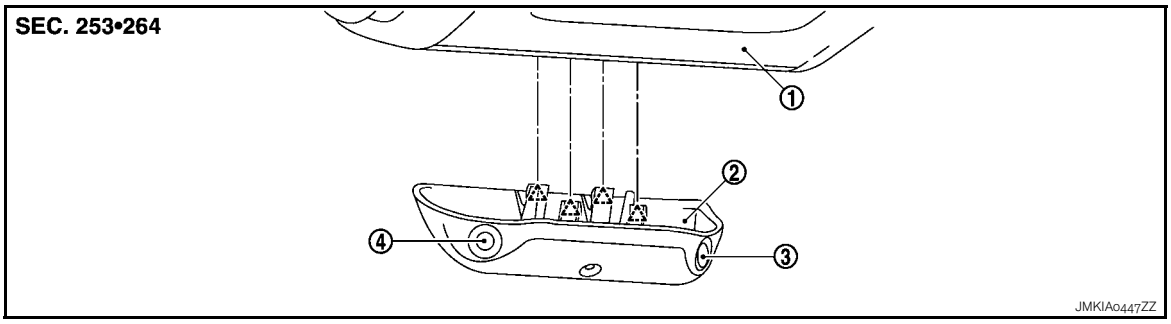
cardiagn.com

ULTRA SONIC SENSOR

Exploded View

INFOID:0000000001091573

ULTRA SONIC SENSOR



1. Headlining
2. Ultra sonic sensor finisher
3. Ultra sonic sensor RH
4. Ultra sonic sensor LH
- Pawl

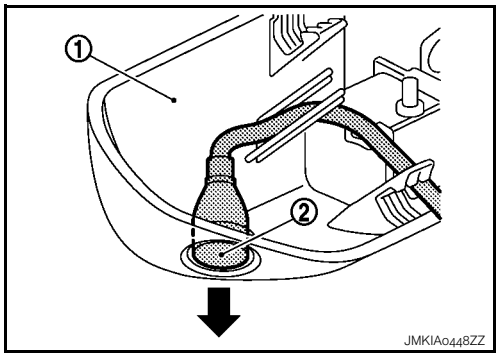
Refer to SEC-155, "Removal and Installation".

Removal and Installation

INFOID:0000000001091576

REMOVAL

1. Remove the ultra sonic sensor finisher.
   Refer to SEC-155, "Exploded View".
2. Remove the ultra sonic sensor (2) from ultra sonic sensor finisher (1).



INSTALLATION

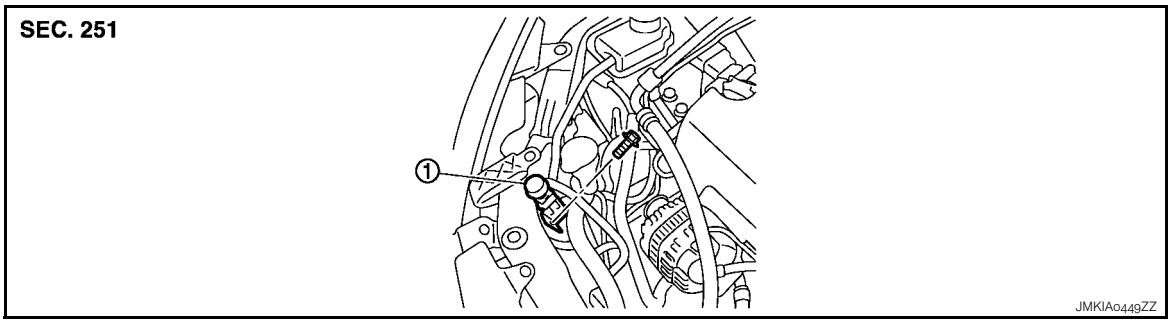
Install in the reverse order of removal.

HOOD SWITCH

Exploded View

INFOID:0000000001091595

HOOD SWITCH



1. Hood switch

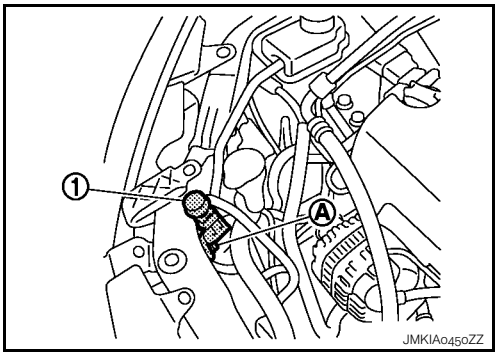
Refer to SEC-156, "Removal and Installation".

Removal and Installation

INFOID:0000000001091597

REMOVAL

1. Remove the hood switch mounting bolt (A), and then remove hood switch (1).



INSTALLATION

Install in the reverse order of removal.

cardiagn.com

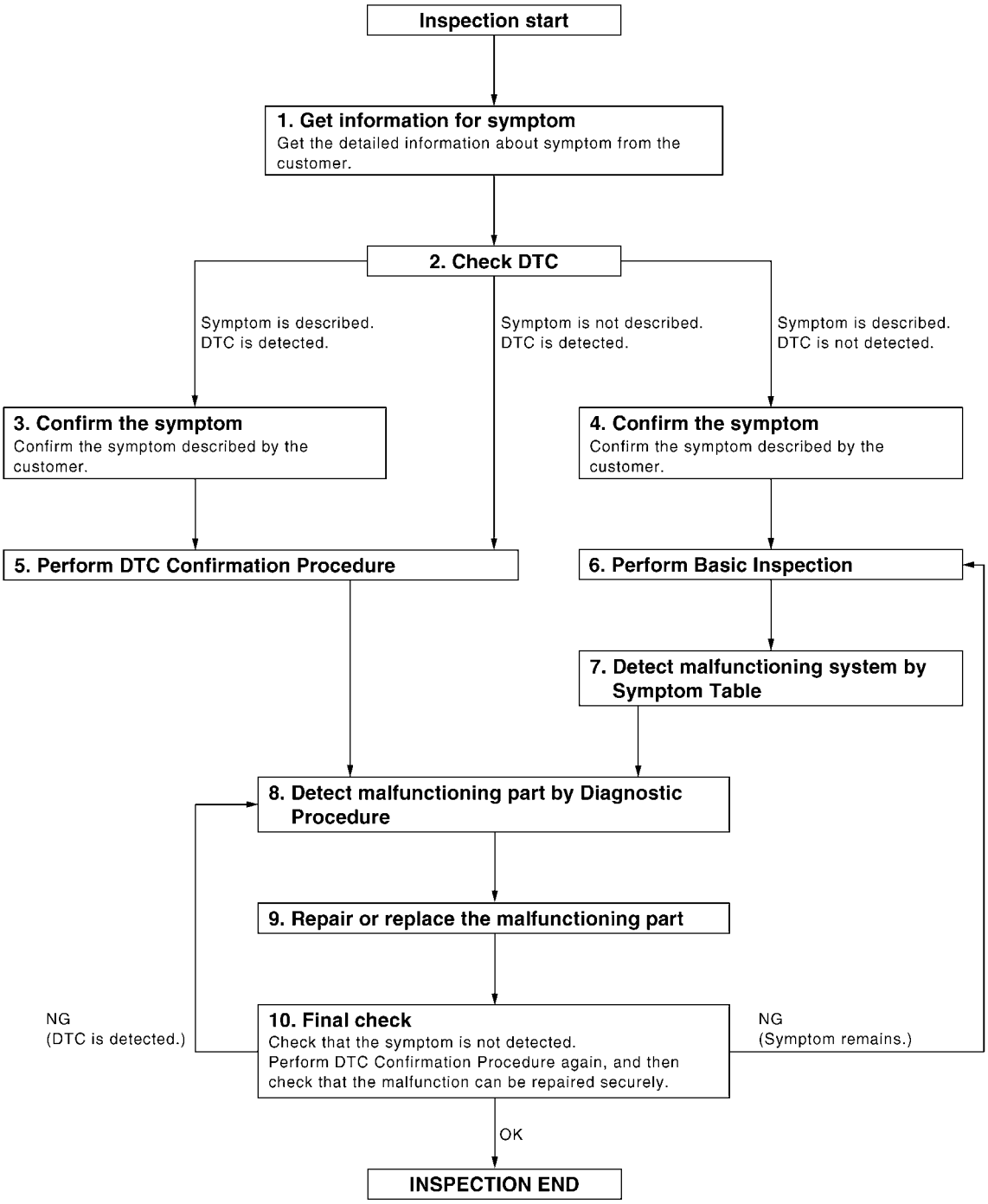
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001116420

OVERALL SEQUENCE



JMKIA0101GB

DETAILED FLOW

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred).

>> GO TO 2.

2.CHECK DTC

1. Check DTC for BCM.
2. Perform the following procedure if DTC is displayed.

- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.

3. Check related service bulletins for information.

Is any symptom described and any DTC detected?

Symptom is described, DTC is displayed>>GO TO 3.
Symptom is described, DTC is not displayed>>GO TO 4.
Symptom is not described, DTC is displayed>>GO TO 5.

3.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.
Connect CONSULT-III to the vehicle in “DATA MONITOR ” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC Confirmation Procedure for the displayed DTC, and then check that DTC is detected again.
If two or more DTCs are detected, refer to SEC-224, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

Is DTC detected?

YES >> GO TO 8.
NO >> Refer to GI-39, "Intermittent Incident".

6.PERFORM BASIC INSPECTION

Perform Basic Inspection, refer to SEC-248, "Basic Inspection".

Inspection End>>GO TO 7.

7.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to Symptom Table based on the confirmed symptom in step 4.

>> GO TO 8.

8.DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Inspect according to Diagnostic Procedure of the system.
NOTE:
The Diagnostic Procedure described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure.

>> GO TO 9.

cardiagn.com

9.REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it.

>> GO TO 10.

10.FINAL CHECK

When DTC was detected in step 2, perform DTC Confirmation Procedure or Component Function Check again, and then check that the malfunction have been repaired securely.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Does the symptom reappear?

YES (DTC is detected)>>GO TO 8.
YES (Symptom remains)>>GO TO 6.
NO >> **INSPECTION END**

autodiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000001116433

Perform the system initialization when replacing siren.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000001116434

Refer to the CONSULT-III Operation Manual-NATS.

ECM RE-COMMUNICATING FUNCTION

ECM RE-COMMUNICATING FUNCTION : Description

INFOID:0000000001116435

Performing following procedure can automatically perform re-communication of ECM and BCM, but only when the ECM has been replaced with a new one (*1).
*1: New one means a virgin ECM which has never been energized on-board.
(In this step, initialization procedure by CONSULT-III is not necessary)
NOTE:
- **When registering new Key IDs or replacing the ECM that is not brand new, refer to CONSULT-III Operation Manual NATS.**
- **If multiple keys are attached to the key holder, separate them before work.**
- **Distinguish keys with unregistered key ID from those with registered ID.**

ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement

INFOID:0000000001116436

1.PERFORM ECM RE-COMMUNICATING FUNCTION

1. Install ECM.
2. Using a registered key (*2), turn ignition switch to “ON”.
   *2: To perform this step, use the key that has been used before performing ECM replacement.
3. Maintain ignition switch in “ON” position for at least 5 seconds.
4. Turn ignition switch to “OFF”.
5. Start engine.

Can engine be started?

YES >> Procedure is completed.
NO >> Initialize control unit. Refer to CONSULT-III Operation Manual NATS.

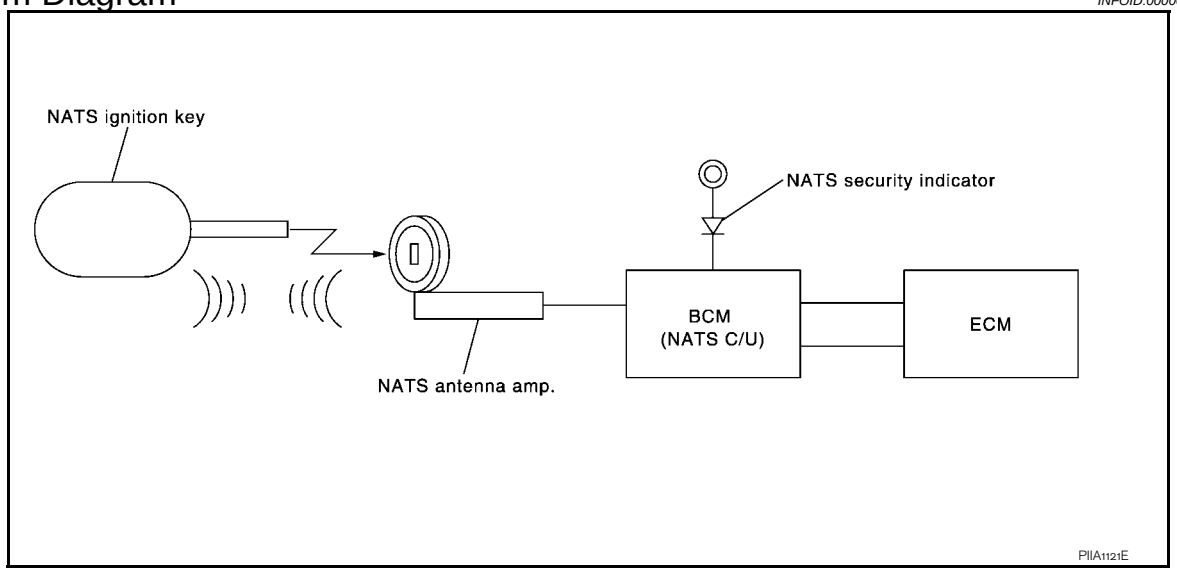
cardiagn.com

FUNCTION DIAGNOSIS

NATS (NISSAN ANTI-THEFT SYSTEM)

System Diagram

INFOID:0000000001097658



System Description

INFOID:0000000001097659

INPUT/OUTPUT SIGNAL CHART

BCM

Switch/Input signal	Input signal to BCM	BCM function	Actuator/Output signal
NATS antenna amp.	Key ID	NATS	• Security indicator lamp • Starter request
Audio unit	Audio unit ID		
ECM	Engine status signal		

SYSTEM DESCRIPTION

NATS (Nissan Anti-Theft System) has the following immobilizer functions:

- Engine immobilizer shows high anti-theft performance to prevent engine start by other than the owner.
- Only a key with key ID registered in BCM and ECM can start engine, and shows high anti-theft performance to prevent key from being copied or stolen.
- Security indicator always flashes with mechanical key removed condition (key switch: OFF).
- Therefore, NATS warns outsiders that the vehicle is equipped with the anti-theft system. Refer to SEC-165, "System Description".
- If system detects malfunction, security indicator illuminate when ignition switch is turned to ON position.
- If the owner requires, ignition key ID can be registered for up to 5 keys.
- During trouble diagnosis or when the following parts have been replaced, and if ignition key is added, registration* is required.

*1: All keys kept by the owner of the vehicle should be registered with ignition key.

- ECM
- BCM
- Ignition key
- ABS actuator control unit
- EPS sontrol unit
- IPDM E/R
- Combination meter

- NATS trouble diagnosis, system initialization and additional registration of other Ignition key IDs must be carried out using CONSULT-III hardware and SECURITY CARD.
  When NATS initialization has been completed, the ID of the inserted ignition key or ignition key IDs can be carried out.

- Possible symptom of NATS malfunction is “Engine cannot start” In J10, the engine can be started with the NATS. Identify the possible causes according to “Work Flow”. Refer to SEC-157, "Work Flow".
- If ECM other than Genuine NISSAN is installed, the engine cannot be started. For ECM replacement procedure, refer to SEC-160, "ECM RE-COMMUNICATING FUNCTION : Description".

PRECAUTIONS FOR KEY REGISTRATION

- The key registration is a procedure that erases the current NATS ID once, and then re-registers a new ID. Therefore the registered ignition key is necessary for this procedure. Before starting the registration operation collect all registered ignition keys from the customer
- The NATS ID registration is the procedure that registers the ID stored into the transponder (integrated in ignition key) to BCM.

SECURITY INDICATOR

- Security indicator blinks when the ignition switch is in “OFF” or “ACC” position.
- When NATS detects trouble, the security indicator lamp lights up while ignition key is in the “ON” position.

MAINTENANCE INFORMATION

CAUTION:

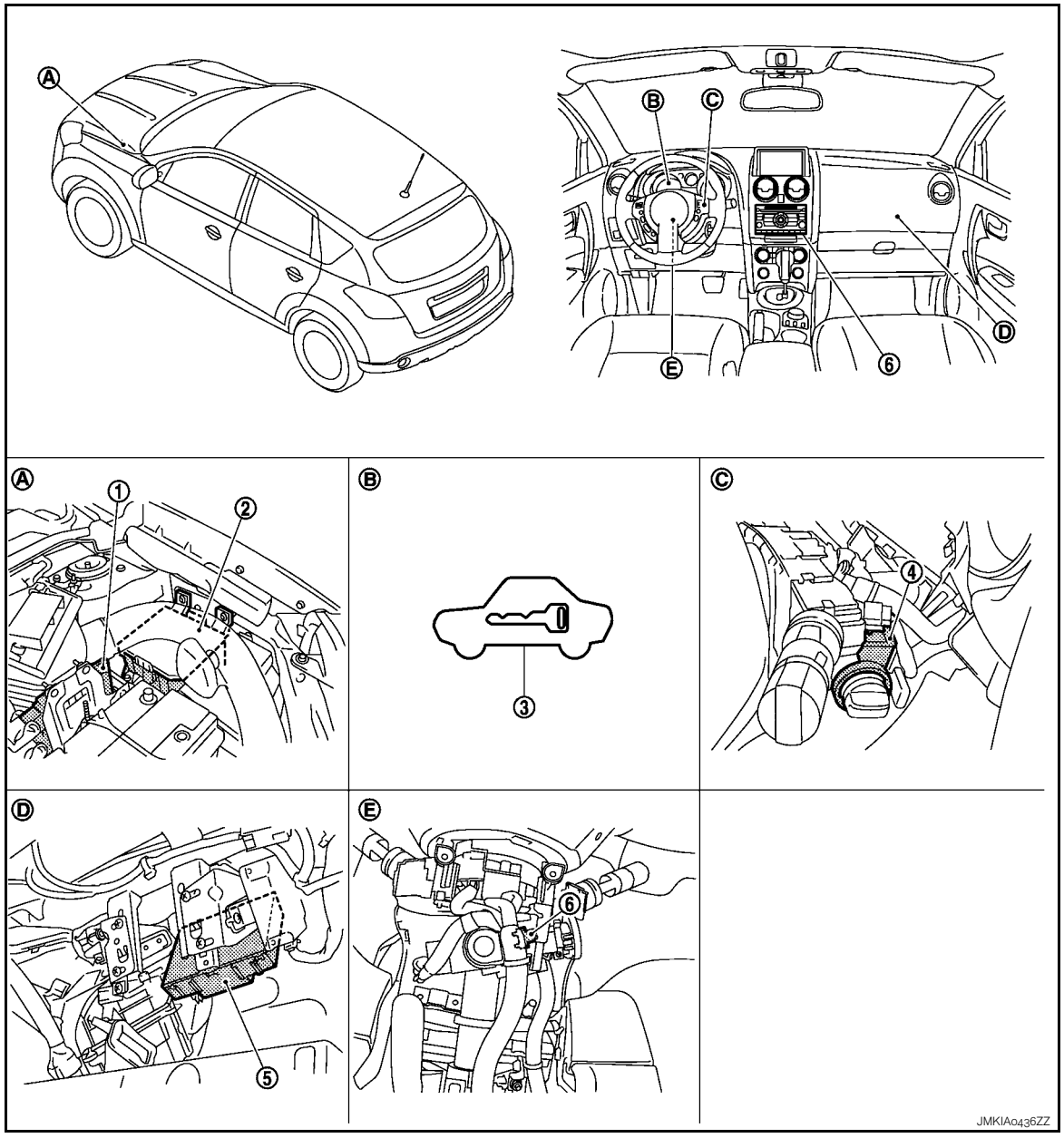
If necessary to perform NATS ID registration when replacing any of the following part.
If it's not (or fail to do so), the electrical system may not operate properly.
***: New one means a virgin control unit that has never been energized on-board.**

- **ABS actuator control unit**
- **EPS control unit**
- **IPDM E/R**
- **ECM**
- **Combination meter**

Component Parts Location

INFOID:0000000001097663

cardiagn.com



1. ECM
   Gasoline engine E16
   Diesel engine E60
2. IPDM E/R
   E10, E11, E13, E14
3. Security indicator lamp
   M34
4. NATS antenna amp.
   M26
5. BCM
   M65, M66, M67
6. Key switch
   M24

A. Engine room (LH)
B. Built in combination meter
C. View with steering column cover removed
D. Over the glove box
E. View with steering column cover removed

Component Description

INFOID:0000000001097662

Component	Reference
BCM	BCS-7
Key switch	SEC-185
NATS antenna amp.	SEC-174

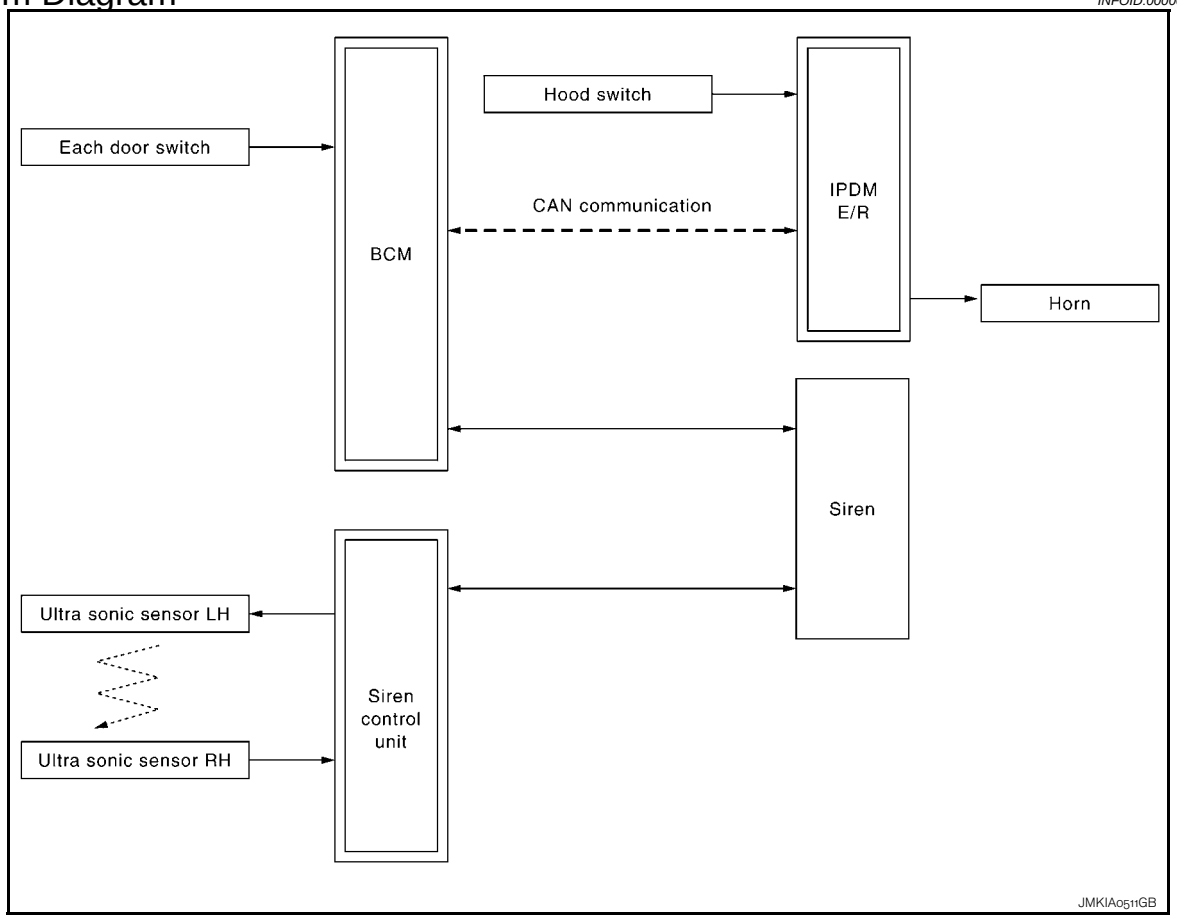
Component	Reference
Security indicator	SEC-193
IPDM E/R	PCS-7

cardiagn.com

VEHICLE SECURITY SYSTEM

System Diagram

INFOID:0000000001097664



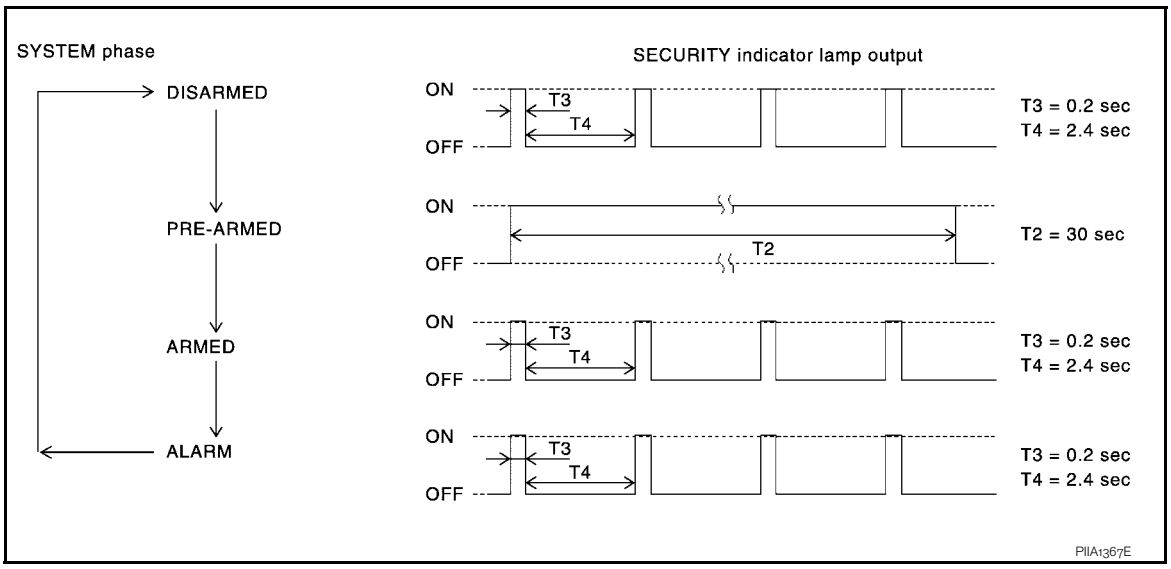
System Description

INFOID:0000000001116439

DESCRIPTION

The security system provides an audible and visual alarm when an unauthorized access to the vehicle is detected while the system is in armed phase.
The security system consist of two control units. BCM manages audible alarm (horn), siren control unit manage audible alarm (siren).

OPERATION FLOW



BCM shifts the phase as follows and the phase information is sent to siren control unit via communication line.

Disarmed Phase
When the vehicle is being driven or when doors are open, the theft warning system is set in the disarmed phase on the assumption that the owner is inside or near the vehicle.

Pre-Armed Phase And Armed Phase
The vehicle security system turns into the pre-armed phase when ignition switch is in OFF position, all doors are closed and locked (using Intelligent Key, door request switch or auto relock function). After 10 seconds from the lock operation, the system automatically shifts into the armed phase.

Condition of Activating The System
When the following condition are performed in armed phase, the system sounds the horns/siren and flashes the head lamps for about 30 seconds.
- Hood or any door is opened.
- Ultra sonic sensor is triggered.
- Ignition switch goes ON with invalid transponder ID.

Condition of Deactivating The System
When one of the following operations is performed, the armed phase is canceled.
- Unlock the doors with Intelligent Key or door request switch.
- Ignition switch goes ON with transponder ID verified.

SIREN CONTROL UNIT

Siren control unit manages siren. the siren control unit does not shift to armed phase in the same way as BCM. the siren control unit goes to armed phase after about 10 seconds from lock command. If door is opened or closed within about 20 seconds, only the siren will be activated.
Siren control unit has battery inside. If disconnect or connect battery terminal before canceling armed phase, siren will be activated.

CAUTION:
When replace siren control unit (new one and used one), Perform "C/U INITALIZATION" with CONSULT-III.

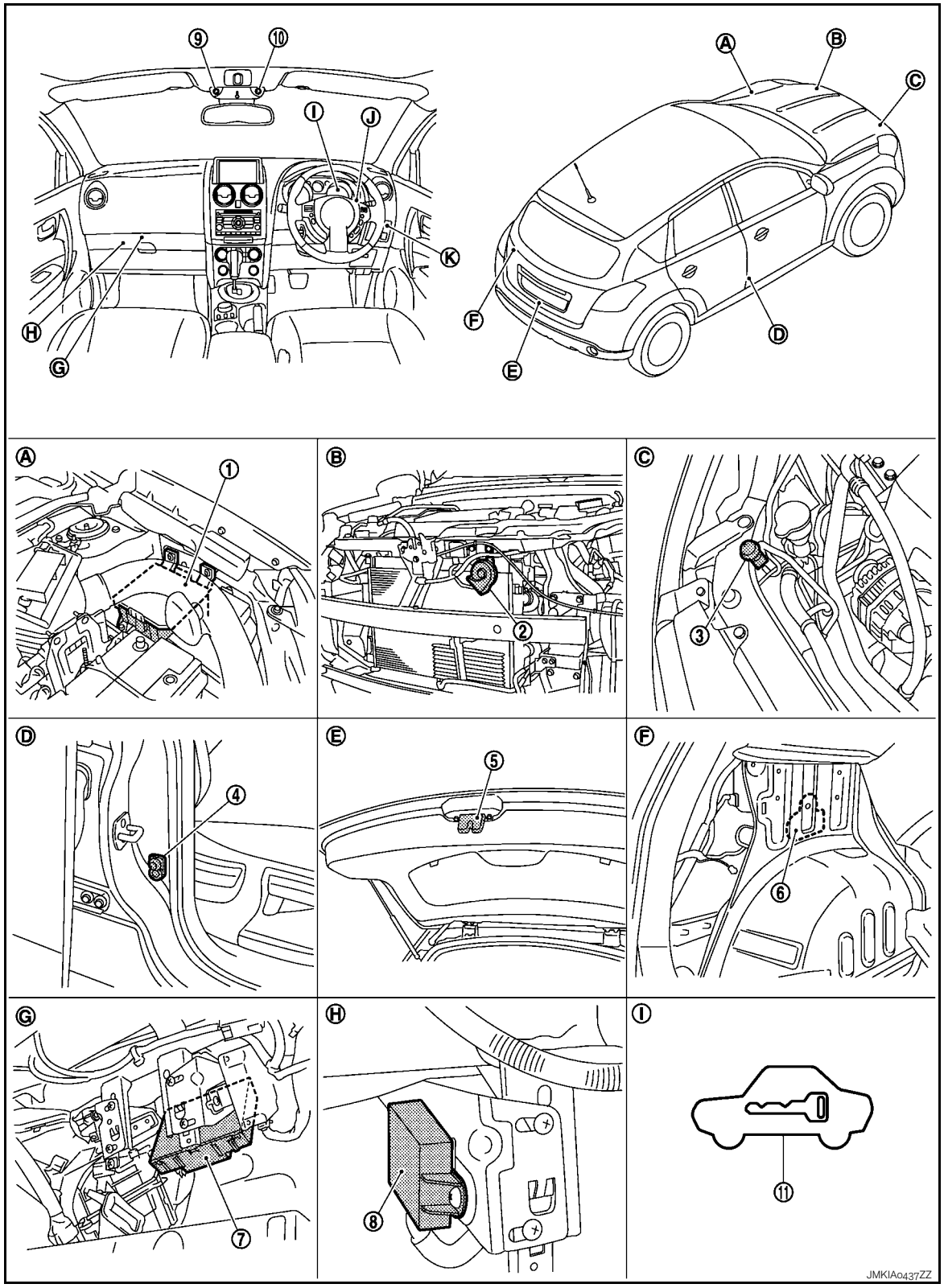
Ultra Sonic Sensor Function
The ultra sonic sensor consist of two separate units, a transmitter on the left and receiver on the right mounted on room mirror. The LH transmitter sensor sends an ultra sonic pulse of sound, and RH receiver sensor receives the returning echo pulse.
It is possible to exclude the ultrasonic sensors.
To exclude the ultra sonic sensors:
1. Turn the ignition switch from the OFF to the ON position.
2. Turn the ignition switch from OFF to ON 3 times within 7 seconds.
3. Close the doors, bonnet and press the lock button on the keyfob to lock all doors.

The ultra sonic sensors are now excluded from the alarm system. All other functions of the system remain activated until the alarm system is disarmed again.

Component Parts Location

INFOID:0000000001115038

cardiagn.com



1. IPDM E/R
   E10, E12
2. Horn
   E51
3. Hood switch
   E113
4. Front door switch (driver side)
   B34
5. Back door lock assembly (back door switch)
   D152
6. Siren
   B68

7. BCM M65, M66, M67
8. Siren control unit M94
9. Ultra sonic sensor LH R11
10. Ultra sonic sensor RH R12
11. Security indicator lamp (built in combination meter) M34

A. Engine room (LH)
B. View with front bumper removed
C. Engine room (RH)
D. View with center pillar
E. View with back door opened
F. View with luggage side lower finisher (LH) removed
G. Over the glove box
H. Over the glove box
I. Built in combination meter

Component Description

INFOID:0000000001097667

Component	Reference
BCM	BCS-7
Horn	SEC-191
Hood switch	SEC-189
Security indicator	SEC-193
Door switch	DLK-589
Siren control unit	SEC-194
Ultra sonic sensor	SEC-194
NATS antenna amp.	SEC-174

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001097675

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

IMMU

IMMU : CONSULT-III Function (BCM - IMMU)

INFOID:0000000001097676

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

carsdiagn.com

Diagnosis mode	Function Description
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from Intelligent Key unit.

DATA MONITOR

Monitor item	Content
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.

*1: For the vehicle Intelligent key is equipped.

ACTIVE TEST

Test item	Description
THEFT IND	This test is able to check security indicator operation [ON/OFF].

THEFT ALM

THEFT ALM : CONSULT-III Function (BCM - THEFT ALM)

INFOID:0000000001097677

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.

DATA MONITOR

Monitor Item	Condition
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
PUSH SW*1	Indicates [ON/OFF] condition of ignition knob switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
KEYKESS LOCK*2	Indicates [ON/OFF] condition of lock signal from key fob.
KEYLESS UNLOCK*2	Indicates [ON/OFF] condition of unlock signal from key fob.
I-KEY LOCK*1	Indicates [ON/OFF] condition of lock signal from Intelligent Key.
I-KEY UNLOCK*1	Indicates [ON/OFF] condition of unlock signal from Intelligent Key.
HOOD SW	Indicates [ON/OFF] condition of hood switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock and unlock switch.

*1: For vehicle equipped with Intelligent Key.

cardiagn.com

*2: For the vehicle equipped with remote key less entry system.

ACTIVE TEST

Test item	Description
THEFT IND	This test is able to check security indicator operation [ON/OFF].
VEHICLE SECURITY HORN	This test is able to check horn operation [ON].
FLASHER	This test is able to check flasher operation [LH/RH/OFF].

WORK SUPPORT

Test item	Description
SECURITY ALARM SET	Vehicle security function mode can be changed in this mode. • ON: Vehicle security function is ON. • OFF: Vehicle security function is OFF.
THEFT ALM TRG	The switch which triggered vehicle security system is recorded. This mode can be able to confirm and erase the record of vehicle security system.

c-diagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001116800

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart. Refer to LAN-59, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000001116801

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1000	CAN COMM CIRCUIT	When BCM cannot communicate CAN communication signal continuously for 2 seconds or more.	Any item (or items) of the following listed below is malfunctioning in CAN communication system. • Transmission • Receiving (ECM) • Receiving (METER/M&A) • Receiving (TCM) • Receiving (MULTI AV) • Receiving (IPDM E/R) • Receiving (I-KEY)

Diagnosis Procedure

INFOID:0000000001116802

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check “Self Diagnostic Result” of BCM.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

cardiagn.com

U1010 CONTROL UNIT (CAN)

DTC Logic

INFOID:0000000001116803

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of BCM.	BCM

Diagnosis Procedure

INFOID:0000000001116804

1.REPLACE BCM

When “DTC:U1010” is detected, replace BCM.

>> Replace BCM. Refer to BCS-64, "Exploded View".

Special Repair Requirement

INFOID:0000000001116805

1.ADDITIONAL SERVICE WHEN REPLACING BCM

>> Refer to BCS-3, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description".

carsdiagn.com

B2190, P1614 NATS ANTENNA AMP.

Description

INFOID:0000000001115688

Performs ID verification through BCM and NATS antenna amplifier when ignition switch is ON position.
Prohibits the release of steering lock or start of engine when an unregistered ID of ignition key is used.

DTC Logic

INFOID:0000000001115689

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2190 P1614	NATS ANTENNA AMP	• Inactive communication between NATS antenna amp. and BCM. • Ignition key is malfunctioning.	• Harness or connectors (The NATS antenna amp. circuit is open or short) • Ignition key • NATS antenna amp. • BCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Insert ignition key into the key cylinder.
2. Turn ignition switch ON.
3. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-174, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001115690

1.CHECK NATS ANTENNA AMP. INSTALLATION

Check NATS antenna amp. installation. Refer to SEC-249, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Reinstall NATS antenna amp. correctly.

2.CHECK IGNITION KEY

Start engine with another registered ignition key.

Does the engine start?

YES >> Replace ignition key. Perform initialization and registration of ignition key. Refer to “CONSULT-III Operation Manual NATS”
NO >> GO TO 3.

3.CHECK NATS ANTENNA AMP. POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect NATS antenna amp. harness connector.
3. Check voltage between NATS antenna amp. harness connector and ground.

NATS antenna amp.		Ground	Voltage [V] (approx.)
Connector	Terminal		
M26	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK NATS ANTENNA AMP. GROUND CIRCUIT

cardiagn.com

Check continuity between NATS antenna amp. harness connector and ground.

Key slot		Ground	Continuity
Connector	Terminal		
M26	3	Ground	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace circuit.

5. CHECK NATS ANTENNA AMP. SIGNAL CIRCUIT

Check voltage between NATS antenna amp. harness connector and ground.

NATS antenna amp.		Ground	Condition	Voltage [V] (approx.)
Connector	Terminal			
M26	2	Ground	Just after inserting ignition key in key cylinder.	Pointer of tester should move.
	4		Other than above.	0

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace circuit.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace NATS antenna amp.
NO >> Repair or replace malfunctioning parts.

B2191, P1615 DIFFERENCE OF KEY

Description

INFOID:0000000001115691

Performs ID verification through BCM when ignition switch is ON position.
Prohibits the release of steering lock or start of engine when an unregistered key is used.

DTC Logic

INFOID:0000000001115692

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2191 P1615	DIFFERENCE OF KEY	The ID verification results between BCM and ignition key are NG. The registration is necessary.	• Ignition key

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Insert ignition key into the key cylinder.
2. Press the ignition knob switch.
3. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-176, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001115693

1.PERFORM INITIALIZATION

Perform initialization with CONSULT-III. Re-register all ignition keys.
For initialization and registration of ignition key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started with re-registered ignition key?

YES >> Ignition key was unregistered.
NO >> BCM is malfunctioning.
- Replace BCM. Refer to BCS-64, "Removal and Installation".
- Perform initialization again

cardiagn.com

B2192, P1611 ID DISCORD, IMMU-ECM

Description

INFOID:0000000001115694

BCM performs the ID verification with ECM that allows the engine to start. BCM starts the communication with ECM if ignition switch is turned ON starts the engine if the ID is OK. ECM prevents the engine from starting if the ID is not registered.

DTC Logic

INFOID:0000000001115695

DTC DETECTION LOGIC

NOTE:

- If DTC B2192 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to SEC-172, "DTC Logic".
- If DTC B2192 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to SEC-173, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2192 P1611	ID DISCORD BCM-ECM	The ID verification results between BCM and ECM are NG. The registration is necessary.	• BCM • ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-177, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001115696

1.PERFORM INITIALIZATION

Perform initialization with CONSULT-III. Re-register all ignition keys.
For initialization and registration of ignition key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started with re-registered ignition key?

YES >> ID was unregistered.
NO >> GO TO 2.

2.PEPLACE BCM

1. Replace BCM. Refer to BCS-64, "Removal and Installation".
2. Perform initialization with CONSULT-III. Re-register all ignition keys.
   For initialization and registration of ignition key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started with re-registered ignition key?

YES >> BCM is malfunctioning.
NO >> GO TO 3.

3.PEPLACE ECM

1. Replace ECM.
2. Perform initialization with CONSULT-III. Re-register all ignition keys.
   For initialization and registration of ignition key. Refer to “CONSULT-III Operation Manual NATS”.

Can the system be initialized and can the engine be started with re-registered ignition key?

YES >> ECM is malfunctioning.
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

B2193, P1612 CHAIN OF ECM-IMMU

Description

INFOID:0000000001116346

BCM performs the ID verification with ECM that allows the engine to start. BCM starts the communication with ECM if ignition switch is turned ON and starts the engine if the ID is OK. ECM prevents the engine from starting if the ID is not registered.

DTC Logic

INFOID:0000000001116347

DTC DETECTION LOGIC

NOTE:

- If DTC B2193 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to SEC-29, "DTC Logic".
- If DTC B2193 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to SEC-30, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2193 P1612	CHAIN OF BCM-ECM	Inactive communication between ECM and BCM	• Harness or connectors (The CAN communication line is open or short) • BCM • ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-178, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116348

1.REPLACE BCM

1. Replace BCM. Refer to BCS-64, "Removal and Installation".
2. Perform initialization with CONSULT-III.
   For initialization, refer to “CONSULT-III Operation Manual NATS”.

Does the engine start?

YES >> BCM was malfunctioning.
NO >> ECM is malfunctioning.
- Replace ECM.
- Perform ECM re-communicating function.

cardiagn.com

B2195 ANTI-SCANNING

Description

INFOID:0000000001115700

When the ID of the remote control engine starter installed cannot be registered, anti-scanning operates and it may be possible that the engine can not start. In the case, obtain the customer approval to remove the remote control engine starter.

DTC Logic

INFOID:0000000001115701

DTC DETECTION LOGIC

NOTE:

- If DTC B2195 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to SEC-172, "DTC Logic".
- If DTC B2195 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to SEC-173, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2195	ANTI-SCANNING	The ID of the remote control engine starter installed cannot be registered.	Remote control engine starter

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-179, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001115702

1.REMOVAL OF REMOTE CONTROL ENGINE STARTER

Remove remote control engine starter with the customer approval.

>> GO TO 2.

2.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Perform “Self diagnostic result” with CONSULT-III.
3. Erase DTC.
4. Start the engine.

Does the engine start?

YES >> INSPECTION END
NO >> BCM is malfunctioning.
- Replace BCM
- Perform initialization

B2196 DONGLE NG

Description

INFOID:0000000001115703

BCM performs the ID verification with the slave control units (ECM, ABS actuator, EPS column assy, IPDM E/R, combination meter).
If either slave control unit is replaced by used part, perform initialization with CONSULT-III. But if the control unit is replaced by new part, the system does not need initialization.

DTC Logic

INFOID:0000000001115704

DTC DETECTION LOGIC

NOTE:

- If DTC B2196 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to SEC-172, "DTC Logic".
- If DTC B2196 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to SEC-173, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2196	DONGLE NG	The ID verification results between BCM and each slave control unit are NG.	• ECM • ABS actuator assy • EPS column assy • Combination meter • IPDM E/R

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self Diagnostic Result” with CONSULT-III.

Is the DTC detected?

YES >> Refer to SEC-180, "Diagnosis Procedure".
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:0000000001115705

1.PERFORM INITIALIZATION

1. Perform initialization with CONSULT-III. Re-register all ignition keys. Refer to “”.
2. Start the engine.

Dose the engine start?

YES >> INSPECTION END
NO >> Perform “Self Diagnosis Result” for each control unit.

cardiagn.com

P1610 LOCK MODE

Description

INFOID:0000000001115713

When the starting operation is carried more than five times consecutively under the following conditions, NATS will shift to the mode which prevents the engine from being started.
- Unregistered mechanical key is used.
- BCM or ECM's malfunctioning.

DTC Logic

INFOID:0000000001115714

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1610	LOCK MODE	When the starting operation is carried out five or more times consecutively under the following conditions. • Unregistered mechanical key • BCM or ECM's malfunctioning.	—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT-III.

Is DTC detected?

YES >> Refer to SEC-181, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001115715

1.CHECK ENGINE START FUNCTION

1. Perform the check for DTC except DTC P1610.
2. Use CONSULT-III to erase DTC after fixing.
3. Check that engine can start with registered mechanical key.

Does the engine start?

YES >> INSPECTION END
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

POWER SUPPLY AND GROUND CIRCUIT
SIREN CONTROL UNIT

SIREN CONTROL UNIT : Diagnosis Procedure

INFOID:0000000001102470

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect siren control unit connector.
3. Check voltage between siren control unit harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Siren control unit			
Connector	Terminal	Ground	
M94	4	Ground	Battery voltage

Is the measurement value normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK GROUND CIRCUIT

Check continuity between siren control unit harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
M94	6	Ground	Existed

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

SIREN CONTROL UNIT : Special Repair Requirement

INFOID:0000000001116005

1.REQUIRED WORK WHEN REPLACING SIREN CONTROL UNIT

Initialize control unit. Refer to CONSULT-III operation manual NATS.

>> Work end.

SIREN

SIREN : Diagnosis Procedure

INFOID:0000000001116024

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect siren control unit connector.
3. Check voltage between siren harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Siren			
Connector	Terminal	Ground	
B68	2		Battery voltage

Is the measurement value normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

cardiagn.com

2.CHECK GROUND CIRCUIT

Check continuity between siren control unit harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
B68	5		Existed

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

BCM

BCM : Diagnosis Procedure

INFOID:0000000001116004

1.CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not fusing.

Terminal No.	Signal name	Fuses and fusible link No.
41	Battery power supply	9
57		J
37	ACC power supply	5
38	Ignition power supply	4

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.
3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)			
BCM					
Connector	Terminal		OFF	ACC	ON
M65	37	Ground	Approx. 0 V	Battery voltage	Battery voltage
	38		Approx. 0 V	Approx. 0 V	Battery voltage
M66	41		Battery voltage	Battery voltage	Battery voltage
M67	57				

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

carsdiagn.com

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

cardiagn.com

KEY SWITCH

Description

INFOID:0000000001097819

Key switch detects that ignition key is inserted into the key cylinder, and then transmits the signal to BCM.

Component Function Check

INFOID:0000000001097820

1.CHECK KEY SWITCH INPUT SIGNAL

Check key switch (“KEY SW”) in “DATA MONITOR” mode with CONSULT-III. Refer to DLK-62, "DOOR LOCK : CONSULT-III Function (BCM - DOOR LOCK)".

Monitor item	Condition	
KEY SW	Insert mechanical key into key cylinder	: ON
	Remove mechanical key from key cylinder	: OFF

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Refer to SEC-185, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001097821

1.CHECK KEY SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M65	36	Ground	Insert ignition key into key cylinder	Battery voltage
			Remove ignition key from key cylinder	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Remove ignition key from key cylinder.
2. Disconnect key switch connector.
3. Check voltage between key switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Key switch connector	Terminal		
M25	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK KEY SWITCH SIGNAL CIRCUIT

1. Check continuity between BCM harness connector and key switch connector.

BCM connector	Terminal	Key switch connector	Terminal	Continuity
M65	36	M25	1	Existed

2. Check continuity between key switch connector and ground.

Key switch connector	Terminal	Ground	Continuity
M25	1	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK KEY SWITCH

Check key switch function.
Refer to SEC-186, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace key switch.

Component Inspection

INFOID:0000000001097822

COMPONENT INSPECTION

1.CHECK KEY SWITCH

Check continuity between key switch terminals.

Terminal		Condition	Continuity
key switch connector			
1	2	Insert ignition key into key cylinder	Existed
		Remove ignition key from key cylinder	Not existed

Is the inspection result normal?

YES >> Key switch is OK.
NO >> Replace key switch.

cardiagn.com

STOP LAMP

Description

INFOID:0000000001157664

Stop lamp switch detects that brake pedal is depressed, and then transmits the signal to BCM.

Component Function Check

INFOID:0000000001157665

1.CHECK STOP LAMP SWITCH INPUT SIGNAL

Check stop lamp function by depressing brake pedal.

Is the inspection result normal?

YES >> Stop lamp switch is OK.
NO >> Refer to SEC-48, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001157666

1.CHECK STOP LAMP SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M66	51	Ground	Brake pedal is depressed	Battery voltage
			Brake pedal is not depressed	0

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch connector.
2. Check voltage between stop lamp switch harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Stop lamp switch connector	Terminal		
E114 (with gasoline engine and M/T models) E115 (except gasoline engine and M/T models)	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK STOP LAMP SWITCH SIGNAL CIRCUIT

1. Check continuity between BCM harness connector and stop lamp switch connector.

BCM connector	Terminal	Stop lamp switch connector	Terminal	Continuity
M66	51	E114 (with gasoline engine and M/T models) E115 (except gasoline engine and M/T models)	2	Existed

2. Check continuity between stop lamp switch connector and ground.

Stop lamp switch connector	Terminal	Ground	Continuity
E114 (with gasoline engine and M/T models) E115 (except gasoline engine and M/T models)	2	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK STOP LAMP SWITCH

Check stop lamp switch function.
Refer to SEC-49, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace stop lamp switch.

Component Inspection

INFOID:0000000001157667

1. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals under the following conditions.

Stop lamp switch			Condition	Continuity
Connector	Terminal			
E114 (with gasoline engine and M/T models) E115 (except gasoline engine and M/T models)	1	2	Brake pedal is depressed	Existed
			Brake pedal is released	Not existed

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace stop lamp switch.

cardiagn.com

HOOD SWITCH

Description

INFOID:0000000001097846

Hood switch detects that hood is in open/close condition, and then transmits the signal to IPDM E/R.

Component Function Check

INFOID:0000000001097847

1.CHECK FUNCTION

1. Select “HOOD SW” in “Data Monitor” mode with CONSULT-III.
2. Check the hood switch signal under the following condition.

Test item	Condition		Status
HOOD SW	Hood	Open	ON
		Close	OFF

Is the indication normal?

YES >> INSPECTION END.
NO >> Refer to SEC-189, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001097848

1.CHECK HOOD SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Condition		Voltage (V) (Approx.)
Connector	Terminal				
E12	21	Ground	Hood	Open	0
				Close	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2.CHECK HOOD SWITCH SIGNAL CIRCUIT

1. Disconnect IPDM E/R and hood switch connector.
2. Check continuity between IPDM E/R harness connector and hood switch harness connector.

IPDM E/R		Hood switch		Continuity
Connector	Terminal	Connector	Terminal	
E12	21	E113	2	Existed

3. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E12	21	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK HOOD SWITCH GROUND CIRCUIT

Check continuity between hood switch harness connector and ground.

Hood switch		Ground	Continuity
Connector	Terminal		
E113	1	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK IPDM E/R OUTPUT

1. Connect the IPDM E/R connector.
2. Check voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage (V) (Approx.)
Connector	Terminal		
E12	21	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".

5.CHECK HOOD SWITCH

Refer to SEC-190, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace hood switch.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".
NO >> Repair or replace malfunctioning parts.

Component Inspection

INFOID:0000000001097849

1.CHECK HOOD SWITCH

1. Turn ignition switch OFF.
2. Disconnect hood switch connector.
3. Check continuity between hood switch terminals.

Hood switch		Condition		Continuity
Terminal				
1	2	Hood switch	Push	Not existed
			Release	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace hood switch.

cardiagn.com

HORN

Description

INFOID:0000000001097850

Horn is located inside of front bumper and operates when theft warning system is in alarm phase.

Component Function Check

INFOID:0000000001097851

1.CHECK FUNCTION

1. Select “HORN” in “ACTIVE TEST” mode with CONSULT-III.
2. Check the horn operation.

Is the operation normal?

YES >> INSPECTION END.
NO >> Refer to SEC-191, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001097852

1.CHECK HORN FUNCTION

Check horn function with horn switch.

Does the horn sound?

YES >> GO TO 2.
NO >> Refer to HRN-2, "Wiring Diagram - HORN -".

2.CHECK HORN RELAY POWER SUPPLY

1. Turn ignition switch ON.
2. Perform “ACTIVE TEST” (“HORN”) with CONSULT-Ill.
3. Check voltage between horn relay harness connector and ground.

Horn relay		Ground	Test item		Voltage (V) (Applox.)
Connector	Terminal				
E5	2	Ground	HORN	ON	→Battery voltage →0 →Battery voltage
				Other than above	0

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK HORN RELAY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R and horn relay 1and 2 connector.
3. Check continuity between IPDM E/R harness connector and horn relay 1and 2 harness connector.

IPDM E/R		Horn relay 1 and 2		Continuity
Connector	Terminal	Connector	Terminal	
E12	30	E5	1	Existed

4. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E12	30	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK INTERMITTENT INCIDENT

A B C D E F G H I J SEC L M N O P
carsdiagn.com

Refer to GI-39, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.Refer to PCS-32, "Removal and Installation".
NO >> Repair or replace the malfunctioning parts.

cardiagn.com

VEHICLE SECURITY INDICATOR

Description

INFOID:0000000001097856

- Vehicle security indicator is built in combination meter.
- NATS (Nissan Anti-Theft System) and vehicle security system conditions are indicated by blink or illumination of vehicle security indicator.

Component Function Check

INFOID:0000000001097857

1.CHECK FUNCTION

1. Perform “THEFT IND” in the “ACTIVE TEST” mode with CONSULT-III.
2. Check vehicle security indicator operation.

Test item		Description	
THEFT IND	ON	Vehicle security indicator	ON
	OFF		OFF

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Refer to SEC-193, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001097858

1.CHECK SECURITY INDICATOR LAMP POWER SUPPLY CIRCUIT

Perform “Self Diagnostic Result” for unified meter and A/C amp. Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the inspection result is normal?

YES >> GO TO 2.
NO >> Repair or replace the malfunctioning parts.

2.CHECK INTERMITTENT INCIDENT

Refer to GI-39, "Intermittent Incident".

>> INSPECTION END.

ULTRA SONIC SENSOR

Description

INFOID:0000000001116034

Siren control unit sounds the siren when it received a trigger signal from ultra sonic sensor.

Component Function Check

INFOID:0000000001116035

1.CHECK SIREN CONTROL UNIT FUNCTION

1. Turn ignition switch OFF.
2. Get in the vehicle and close all doors.
3. Lock doors with keyfob.
4. Check that security indicator blinks when theft warning system is armed.
5. With hand, intercept the signal between left and right sensors.

Does the siren sound?

YES >> Siren control unit function is OK.
NO >> Refer to SEC-194, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116036

1.CHECK SIREN FUNCTION

1. Turn ignition switch ON.
2. Perform “ACTIVE TEST” (“VEHICLE SECURITY HORN”) with CONSULT-Ill.

Does the siren sound?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK SIREN SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and siren connectors.
3. Check continuity between BCM harness connector and siren connector.

BCM connector	Terminal	Siren connector	Terminal	Continuity
M65	8	B68	1	Existed
	16		3	Existed

4. Check continuity between siren connector and ground.

Siren connector	Terminal	Ground	Continuity
B68	1	Ground	Not existed
	3		Not existed

Is the inspection result normal?

YES >> Replace siren. Refer to SEC-250, "Removal and Installation".
NO >> Repair or replace harness.

3.CHECK SIREN CONTROL UNIT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect siren control unit and siren connector.
3. Check continuity between siren control unit harness connector and siren connector.

Siren control unit connector	Terminal	Siren connector	Terminal	Continuity
M94	3	B68	4	Existed

4. Check continuity between siren control unit harness connector and ground.

cardiagn.com

Siren control unit connector	Terminal	Ground	Continuity
M94	3	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK ULTRA SONIC SENSOR SIGNAL CIRCUIT

1. Disconnect ultra sonic sensor connectors.
2. Check continuity between siren control unit harness connector and ultra sonic sensor connector.

Siren control unit connector	Terminal	Ultra sonic sensor connector	Terminal	Continuity
M94	1	R11	1	Existed
	8	R12	1	Existed

3. Check continuity between siren control unit connector and ground.

Siren control unit connector	Terminal	Ground	Continuity
M94	1	Ground	Not existed
	8		Not existed

Is the inspection result normal?

YES >> Replace ultra sonic sensor.
NO >> Repair or replace harness.

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001102201

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

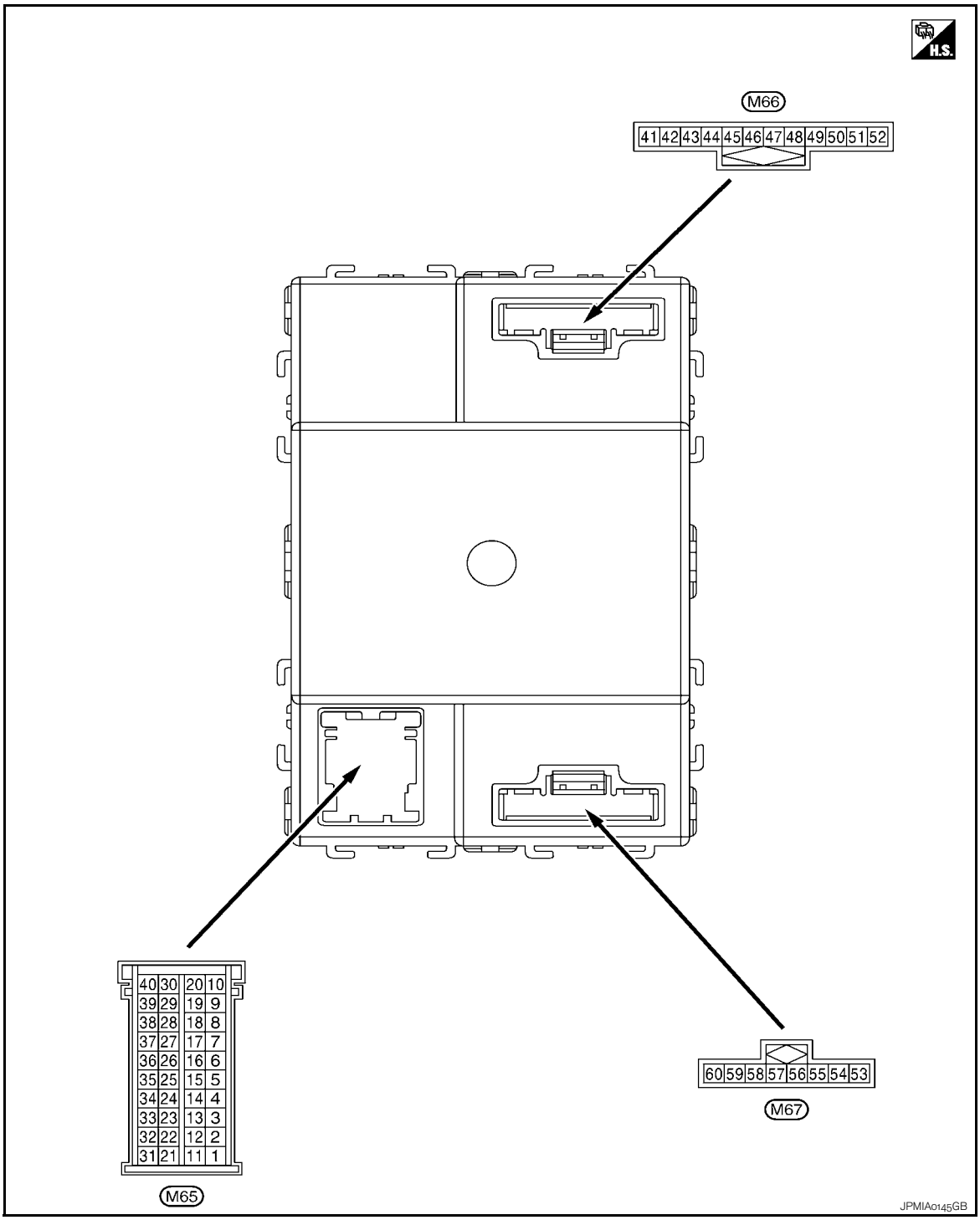
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

carsdiagn.com

TERMINAL LAYOUT

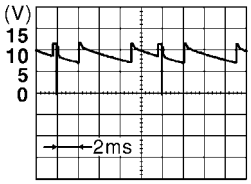
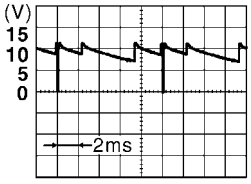
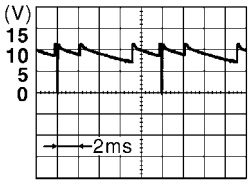
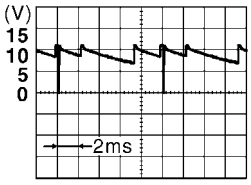


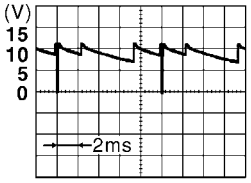
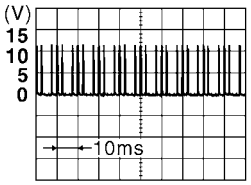
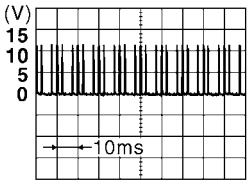
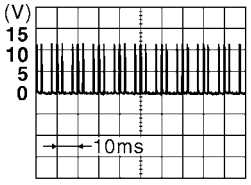
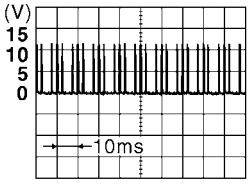
PHYSICAL VALUES

CAUTION:

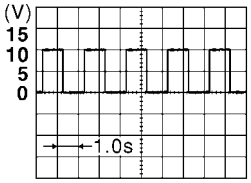
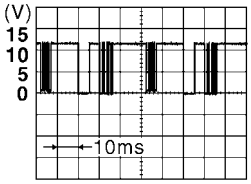
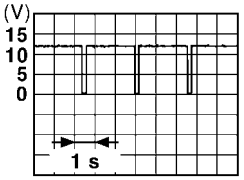
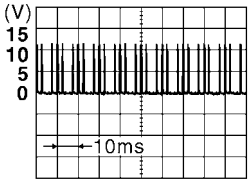
- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

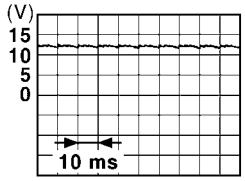
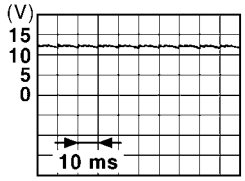
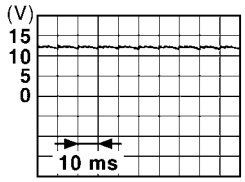
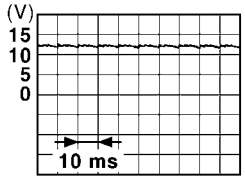
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
		Signal name	Input/ Output			
+	–					
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

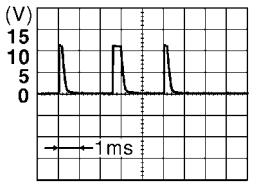
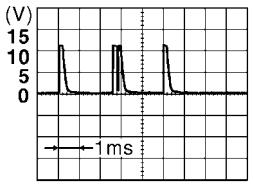
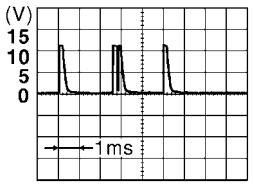
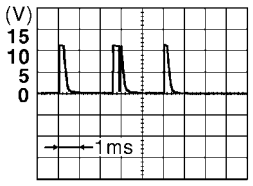
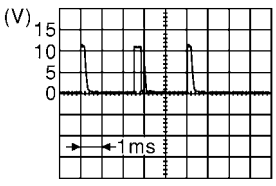
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

cardiagn.com

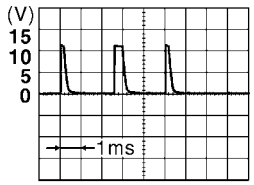
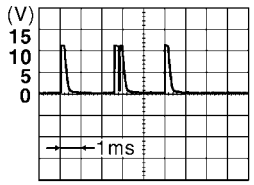
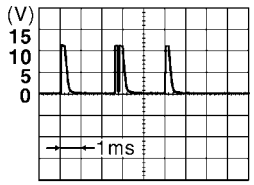
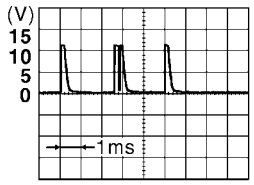
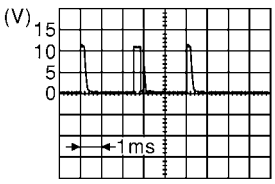
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIB0924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIB0924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIB0924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIB0924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

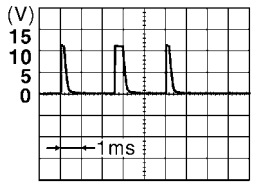
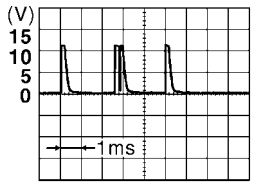
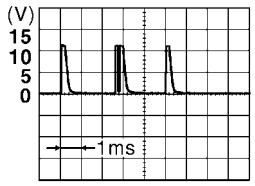
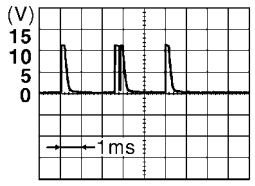
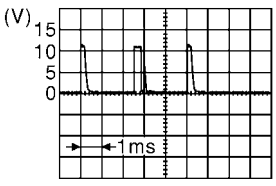
cardiagn.com

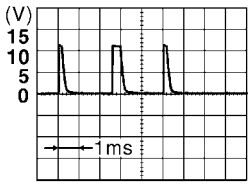
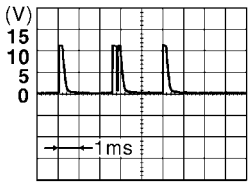
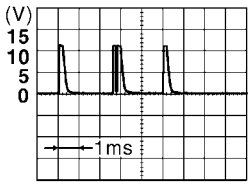
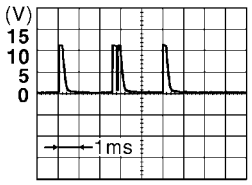
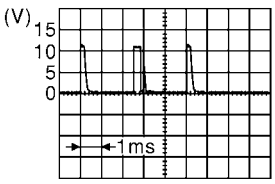
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

carsdiagn.com

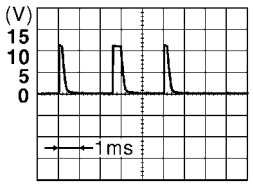
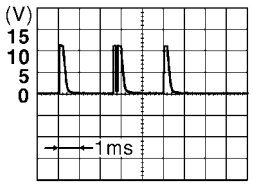
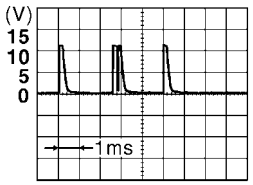
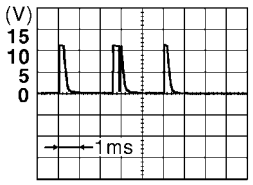
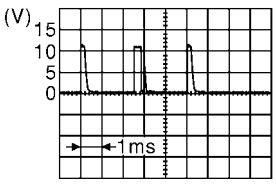
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

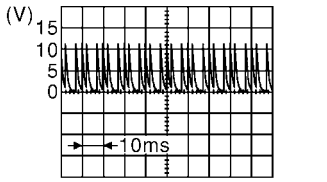
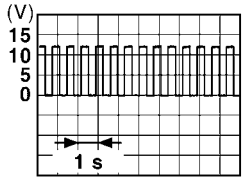
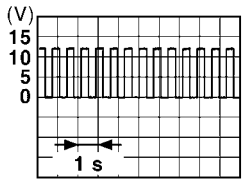
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color) +	Terminal No. (Wire color) –	Description: Signal name	Description: Input/ Output	Condition		Value (Approx.)
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

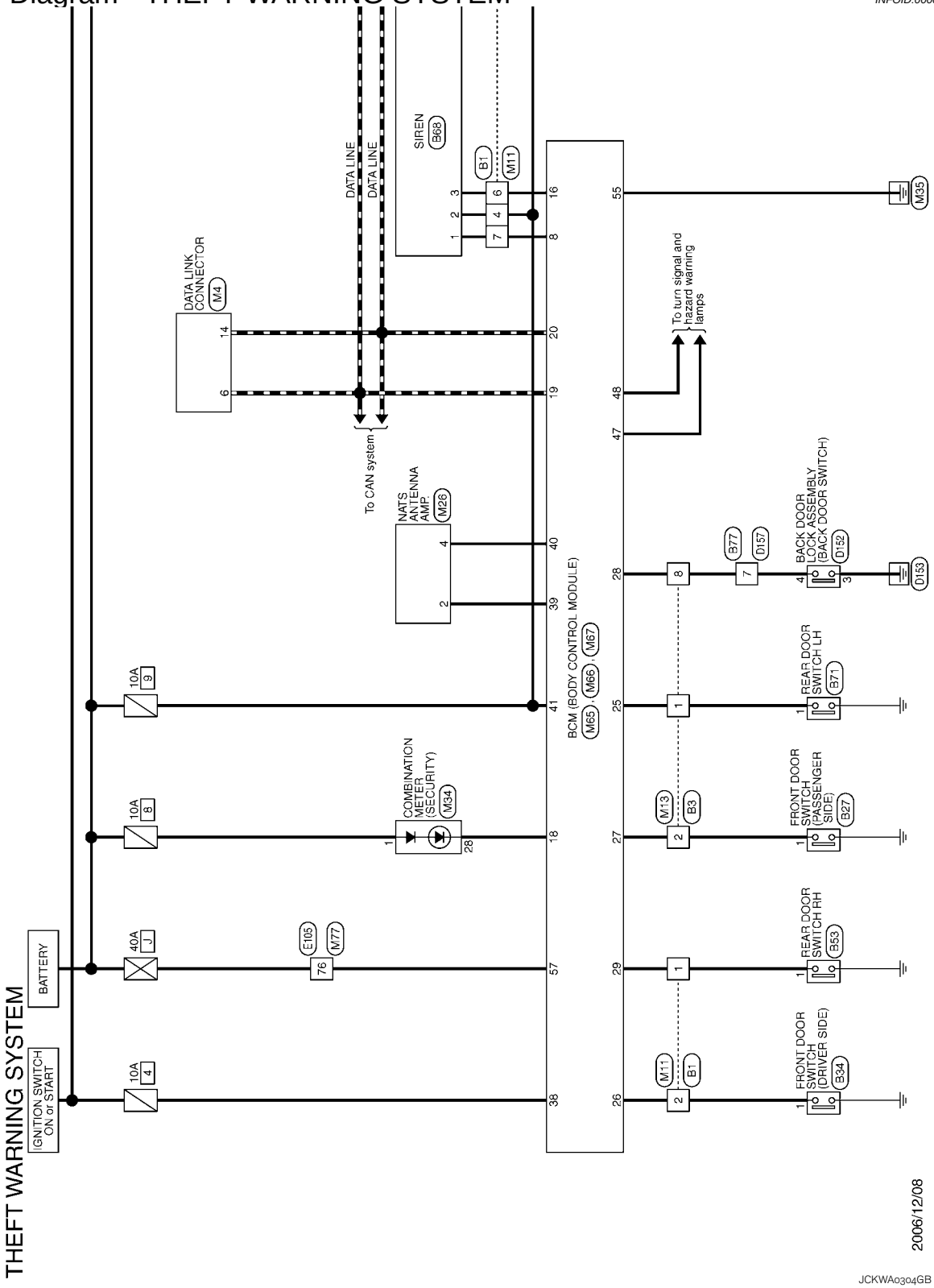
*1: With Intelligent Key system

*2: Without Intelligent Key system

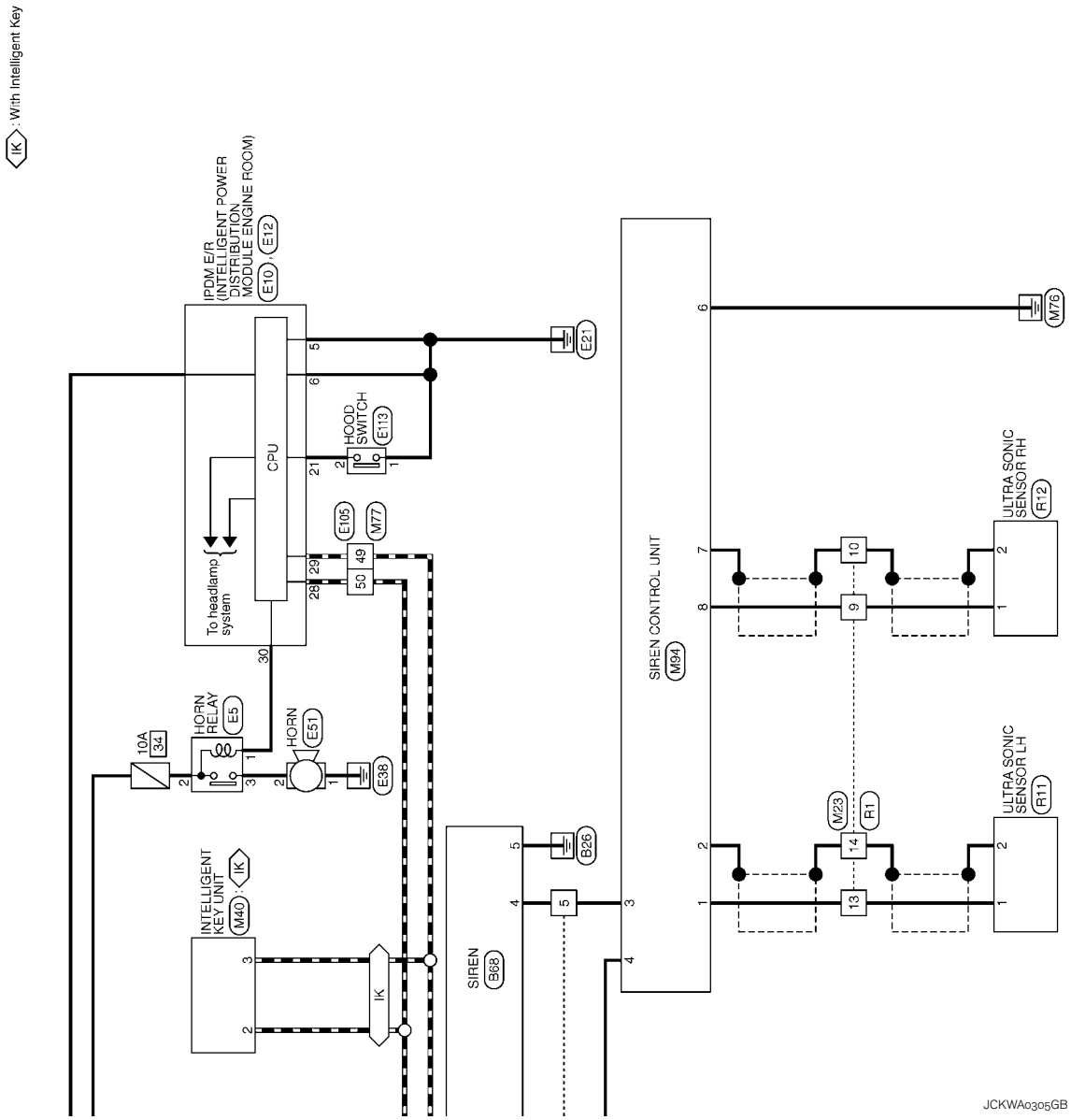
carsdiagn.com

Wiring Diagram - THEFT WARNING SYSTEM -

INFOID:0000000001102215



cardiagn.com

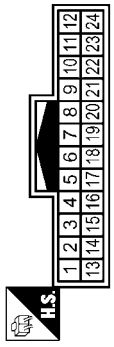

IK : With Intelligent Key
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E10, E12
CPU
To headlamp system
HOOD SWITCH
E113
E21
M76
SIREN CONTROL UNIT
M94
ULTRA SONIC SENSOR RH
R12
ULTRA SONIC SENSOR LH
R11
HORN RELAY
E5
HORN
E51
E38
10A
34
INTELLIGENT KEY UNIT
M40
SIREN
B68
B26
E105
M77
M23
R1
IK
JCKWA0305GB

THEFT WARNING SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	-[RHD models]
4	V	-
5	Y	-
6	GR	-
7	LG	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
8	G	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B68
Connector Name	SIREN
Connector Type	RH06FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	HAZARD REQ
2	V	B+
3	GR	COMMON LINK
4	Y	U/S LINK
5	B	GND

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

JCKWA0306GB

cardiagn.com

THEFT WARNING SYSTEM

Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4K9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	E5
Connector Name	HORN RELAY
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	GR/L	-
3	G	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
21	GR	-
28	L	-
29	P	-
30	L	-

Connector No.	E51
Connector Name	HORN
Connector Type	DELPHI 15419715

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

Connector No.	E113
Connector Name	HOOD SWITCH
Connector Type	W02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-

JCKWA0307GB

carsdiagn.com

THEFT WARNING SYSTEM

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

9	10	11	12	13	14	15	16
1	2	3	4	5	6	7	8

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	R	– [RHD models]
4	R	–
5	Y	–
6	GR	–
7	LG	–

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	BR	– [RHD models]
8	G	–

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

10	9	8	7	6	5	4	3	2	1
18	17	16	15	14	13	12	11		

Terminal No.	Color of Wire	Signal Name [Specification]
9	W	–
10	SHIELD	–
13	G	–
14	SHIELD	–

Connector No.	M26
Connector Name	NATS ANTENNA AMP.
Connector Type	TH04FW

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–
4	LG	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
28	SB	SECURITY

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L

JCKWA0308GB

cardiagn.com

THEFT WARNING SYSTEM

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
8	LG	HAZARD SW
16	GR	ALARM_LINK
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)
38	W/L	IGN SW

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

39	P	NATS ANTENNA AMP.
40	LG	NATS ANTENNA AMP.

Connector No.	M94
Connector Name	SIREN CONTROL UNIT
Connector Type	A08FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	U/S LEFT (TX)
2	SHIELD	SHIELD
3	Y	U/S LINK
4	R	B+
6	B	GND
7	SHIELD	SHIELD
8	W	U/S RIGHT (RX)

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
47	G/Y	FLASHER OUTPUT (LEFT)
48	G/B	FLASHER OUTPUT (RIGHT)

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
9	W	-
10	SHIELD	-
13	G	-
14	SHIELD	-

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

Connector No.	R11
Connector Name	ULTRA SONIC SENSOR LH
Connector Type	A02MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	SIG
2	SHIELD	SHIELD

JCKWA0309GB

carsdiagn.com

THEFT WARNING SYSTEM

Connector No.	R12
Connector Name	ULTRA SONIC SENSOR RH
Connector Type	A02FW

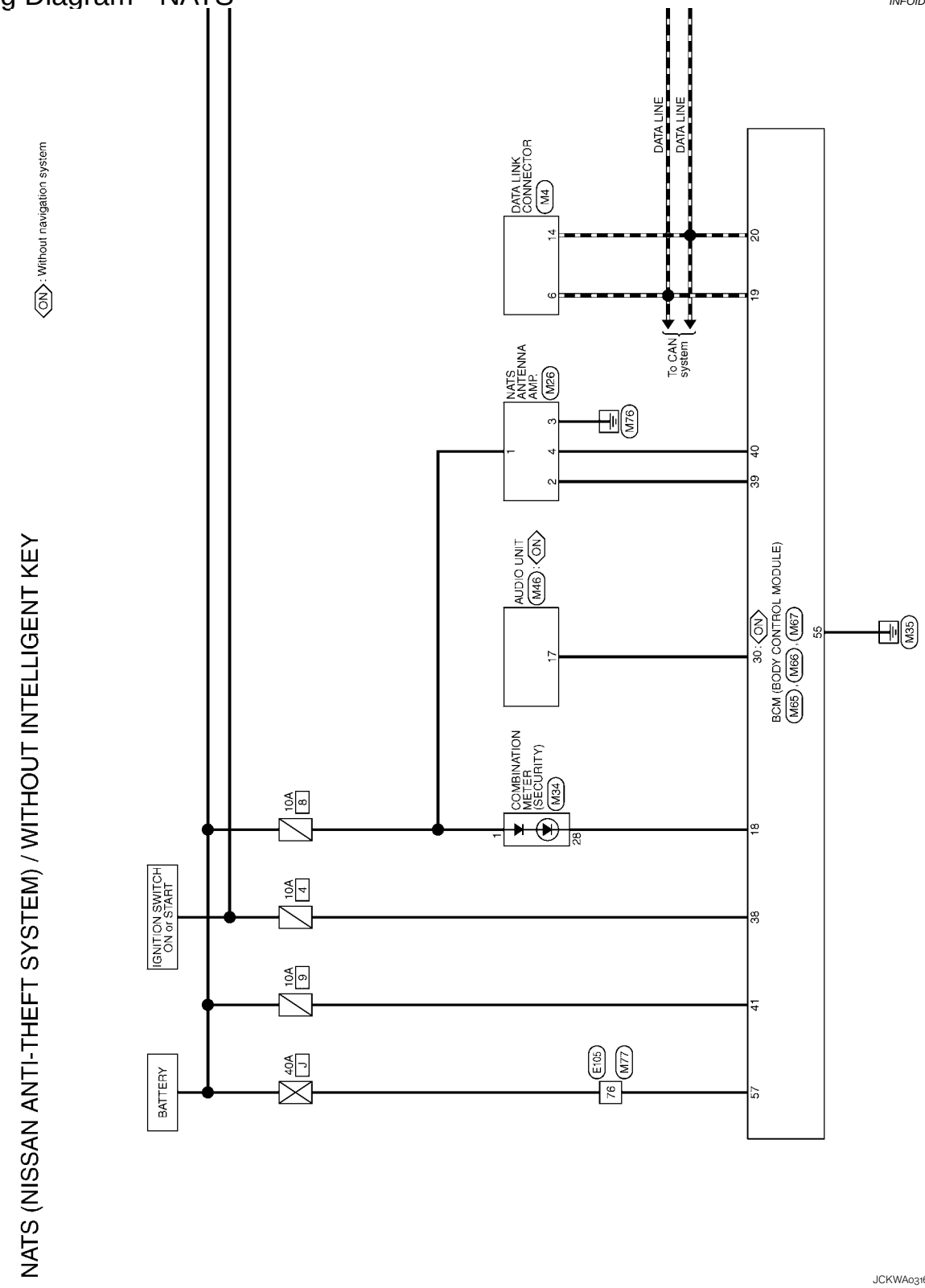
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	SIG
2	SHIELD	SHIELD

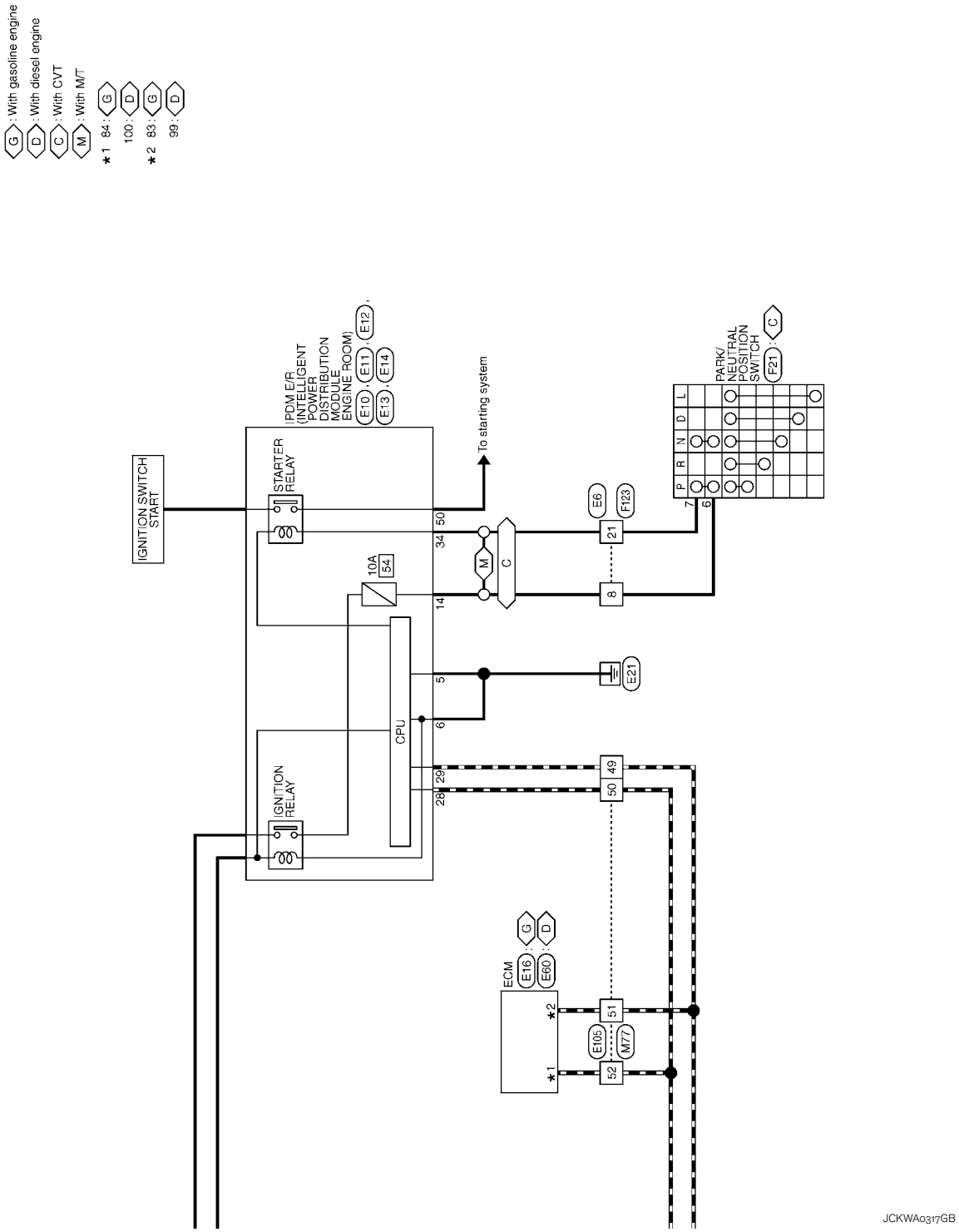
JCKWA0310GB

cardiagn.com

Wiring Diagram - NATS -

INFOID:0000000001102216





cardiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM) / WITHOUT INTELLIGENT KEY

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

H.S.

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	-
21	R/B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

5	4	3
8	7	6

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

39	38	37	36	35	34	33
48	47	46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name [Specification]
34	R/B	-

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

H.S.

51	50	49
54	53	52

Terminal No.	Color of Wire	Signal Name [Specification]
50	B/R	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

13	12	11	10	9
20	19	18	17	16	15	14

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	-

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

81	88	89	93	97	101	105	109
82	86	90	94	98	102	106	110
83	87	91	95	99	103	107	111
84	85	92	96	100	104	108	112

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-LI
84	L	CAN-HI

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

25	24	23	22	21
32	31	30	29	28	27	26

Terminal No.	Color of Wire	Signal Name [Specification]
28	L	-
29	P	-

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

H.S.

97	81	89	93	97	101	105	109
98	82	90	94	98	102	106	110
99	83	91	95	99	103	107	111
100	84	92	96	100	104	108	112

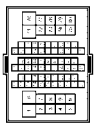
Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

JCKWA0318GB

NATS (NISSAN ANTI-THEFT SYSTEM) / WITHOUT INTELLIGENT KEY

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–
76	Y	–

Connector No.	M26
Connector Name	NATS ANTENNA AMP
Connector Type	TH04FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	P	–
3	B	–
4	LG	–

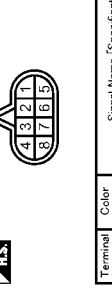
Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK06FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	W/B	–
7	R/B	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
28	SB	SECURITY

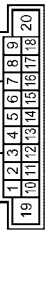
Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	–
21	R/B	–

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

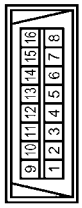
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
17	SB	IMMOBILIZER

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

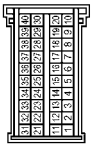
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

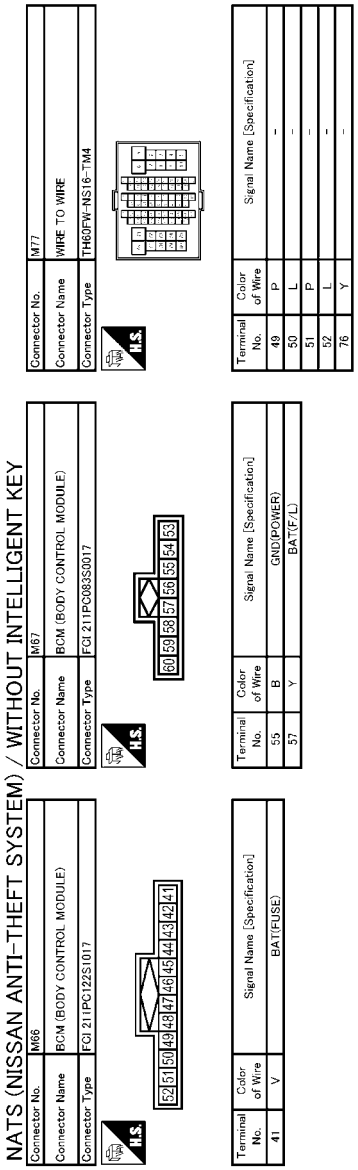
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L
30	SB	AUDIO LINK
38	W/L	IGN SW
39	P	NATS ANTENNA AMP
40	LG	NATS ANTENNA AMP

JCKWA0319GB

cardiagn.com



JCKWA0320GB

Fail Safe

INFOID:0000000001102208

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001102209

cardiagn.com

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001102210

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Reference Value

INFOID:0000000001102211

VALUES ON THE DIAGNOSIS TOOL

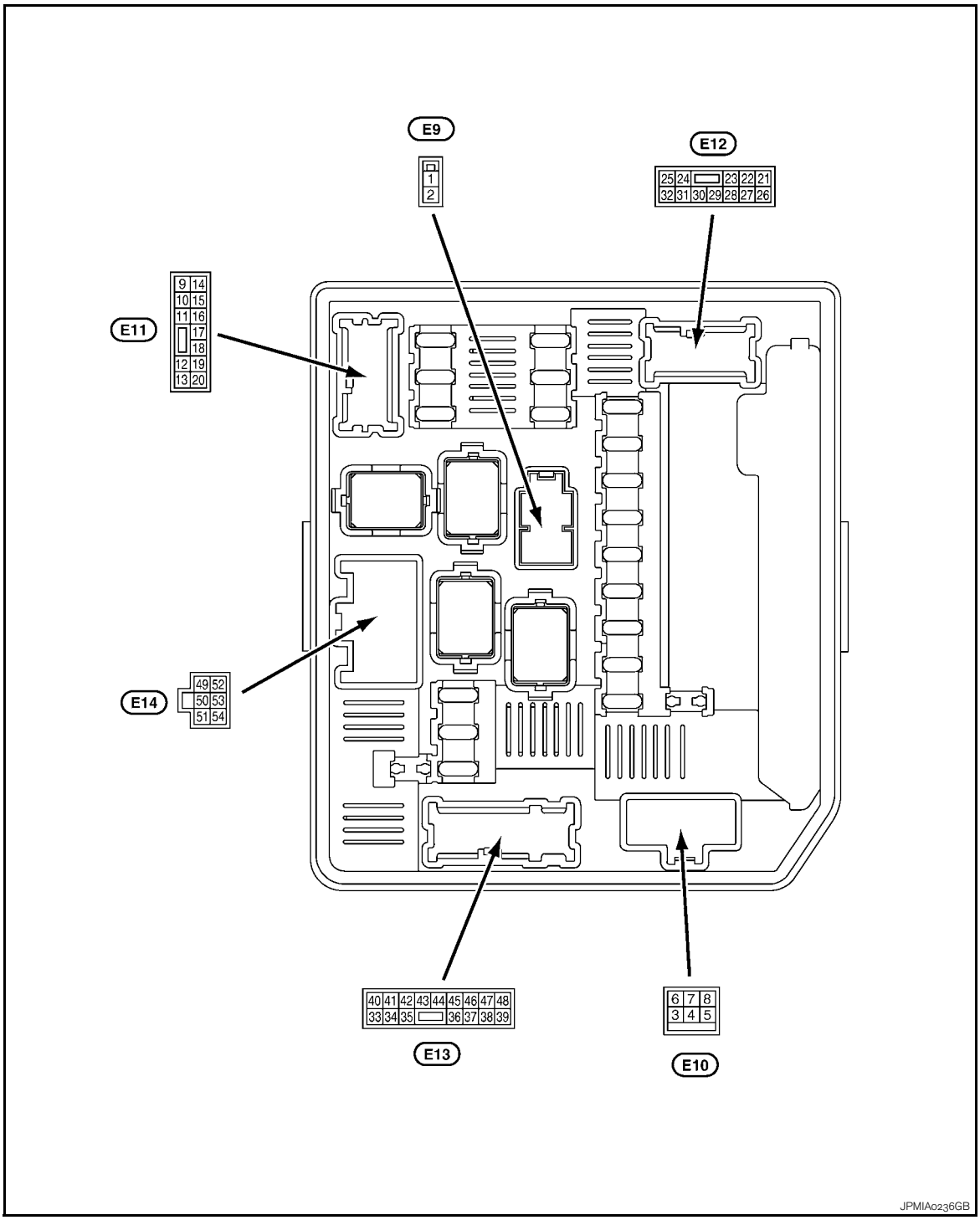
Monitor Item	Condition		Value/Status
MOTOR FAN REQ	Engine idle speed	Changes depending on engine coolant temperature, air conditioner operation status, vehicle speed, etc.	1 - 3
AC COMP REQ	Engine running	A/C switch OFF	Off
		A/C switch ON (Compressor is operating)	On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI (Light is illuminated)		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		Front fog lamp switch ON	On
HL WASHER REQ	Ignition switch ON, and low beam headlamp is ON	Front washer switch OFF	Off
		Front washer switch ON (When headlamp washer is operating)	On
FR WIP REQ	Ignition switch ON	Front wiper switch OFF	STOP
		Front wiper switch INT	1LOW
		Front wiper switch LO	Low
		Front wiper switch HI	Hi
WIP AUTO STOP	Ignition switch ON	Front wiper stop position	STOP P
		Any position other than front wiper stop position	ACT P
WIP PROT	Ignition switch ON	Front wiper operates normally	Off
		Front wiper stops at fail-safe operation	BLOCK
ST RLY REQ **NOTE:** Vehicle without Intelligent Key system indicates only “ON”, and it does not change.	When Intelligent Key is outside the vehicle, and the push switch is pushed		Off
	When Intelligent Key is inside the vehicle, and the push switch is pushed		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Ignition switch ON	Rear window defogger switch OFF	Off
		Rear window defogger switch ON (Rear window defogger is operating)	On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close

cardiagn.com

Monitor Item	Condition	Value/Status
REV SW	Except selector lever R position	Off
	Selector lever R position	On
HOOD SW **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Close the hood	Off
	Open the hood	On
THFT HRN REQ **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Not operation	Off
	Horn is activated with Vehicle Security (Theft Warning) system.	On
HORN CHIRP	**NOTE:** This item is indicated, but not monitored.	Off
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

carsdiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
		Signal name	Input/ Output		
+	–				
1 (G)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
2 (R)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
5 (B)	Ground	Ground	—	Ignition switch ON	0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
6 (B)	Ground	Ground	—	Ignition switch ON		0 V
7 (Y)	Ground	Front wiper LO	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch LO	Battery voltage
8 (Y/R)	Ground	Front wiper HI	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch HI	Battery voltage
9 (G)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
10*1 (L/R)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
11*2 (O)	Ground	PTC heater 1 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
12*2 (G/Y)	Ground	PTC heater 2 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
14 (R/B)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
15 (Y/L)*1 (B/R)*2	Ground	ECM relay control	Input	• Engine running • Ignition switch OFF (For a few seconds after turning ignition switch OFF)		0 - 1.0 V*1
						0.6 V*2
				Ignition switch OFF or ACC (More than a few seconds after turning ignition switch OFF)		Battery voltage
16*3 (Y/R)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
19*1 (R/O)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
21*4 (GR)	Ground	Hood switch	Input	Close the hood		Battery voltage
				Open the hood		0 V
22 (Y/G)	Ground	Reverse switch	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON	• Selector lever “R” (Except M/T models) • M/T control lever “R” (M/T models)	Battery voltage
					• Selector lever in any position other than “R” (Except M/T models) • M/T control lever in any position other than “R” (M/T models)	0 V
23 (Y/B)	Ground	A/C relay power supply	Output	Engine stopped		0 V
				Engine running	A/C switch OFF	0 V
					A/C switch ON (A/C compressor is operating)	Battery voltage
24 (R/Y)	Ground	Headlamp LO (RH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage

carsdiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
25*1 (G/L)	Ground	ETC relay control	Input	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		0 - 1.0 V
26 (O)	Ground	Front wiper auto stop	Input	Ignition switch ON	Front wiper stop position	0 V
					Any position other than front wiper stop position	Battery voltage
27 (W)	Ground	Oil pressure switch	Input	Engine stopped		0 V
				Engine running		Battery voltage
28 (L)	—	CAN-H	Input/ Output	—		—
29 (P)	—	CAN-L	Input/ Output	—		—
30*4 (L)	Ground	Horn relay control	Output	The horn is not activated		Battery voltage
				The horn is activated		0 V
31 (R)	Ground	Headlamp LO (sensor)	Output	Ignition switch ON	Lighting switch OFF	0 V
					Lighting switch 2ND	Battery voltage
32*1 (R/Y)	Ground	ETC relay power supply	Output	Ignition switch ON		Battery voltage
33*1 (B/O)	Ground	Fuel pump relay control	Input	• Engine running • Ignition switch ON (For 1 second after turning ignition switch ON)		0 - 1.0 V
				Ignition switch ON (More than 1 second after turning ignition switch ON)		Battery voltage
34 (R/B)	Ground	Starter relay power supply	Input	Ignition switch ON (Except M/T models)	Selector lever “P” or “N”	0 V
					Selector lever in any position other than “P” or “N”	Battery voltage
				Ignition switch ON (M/T models)		
35 (W/L)	Ground	Ignition switch ON	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
36 (W)	Ground	Front fog lamp (RH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
37 (R/W)	Ground	Parking lamp (RH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
38 (R/L)	Ground	Tail, license plate lamps and illuminations	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
39 (GR)	Ground	Headlamp washer relay control	Output	Ignition switch ON	When headlamp washer is operating	0 V
					When headlamp washer is not operating	Battery voltage
40*1 (BR/Y)*5 (SB)*6	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
41 (P)	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
42*1 (B/Y)	Ground	Fuel pump relay power supply	Output	• Ignition switch OFF or ACC • Approximately 1 second or more after turning the ignition switch ON		0 V
				• Approximately 1 second after turning the ignition switch ON • Engine running		Battery voltage
43 (W/B)	Ground	Front fog lamp (LH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
44 (L)	Ground	Headlamp LO (LH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
45 (L/W)	Ground	Headlamp HI (RH)	Output	• Lighting switch 2ND and HI • lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
46 (G)	Ground	Headlamp HI (LH)	Output	• Lighting switch 2ND and HI • Lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
47 (R/L)	Ground	Parking lamp (LH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
48*7 (Y)	Ground	Cooling fan relay-3 control	Output	When cooling fan does HI operation		0 V
				When cooling fan does OFF or LO operation		Battery voltage
49 (B)	Ground	Rear window defogger relay power supply	Output	Ignition switch ON	Rear window defogger switch ON	Battery voltage
					Rear window defogger switch OFF	0 V
50 (B/R)	Ground	Starter relay power supply	Output	When engine is clanking		Battery voltage
				When engine is not clanking		0 V
51 (P)	Ground	Ignition switch START	Input	Ignition switch START		Battery voltage
				Ignition switch OFF, ACC or ON		0 V
52 (W)	Ground	Cooling fan relay-1 power supply	Output	When cooling fan does LO or HI operation		Battery voltage
				When cooling fan does OFF operation		0 V
53 (W/B)	Ground	Battery power supply (Cooling fan relay)	Input	Ignition switch OFF		Battery voltage
54*5 (R)	Ground	Cooling fan relay-2 power supply	Input	When cooling fan does HI operation		Battery voltage
				When cooling fan does OFF or LO operation		0 V

*1: HR engine and MR engine models

*2: K9K engine models

*3: Except M/T models only

*4: With vehicle security (theft warning) system

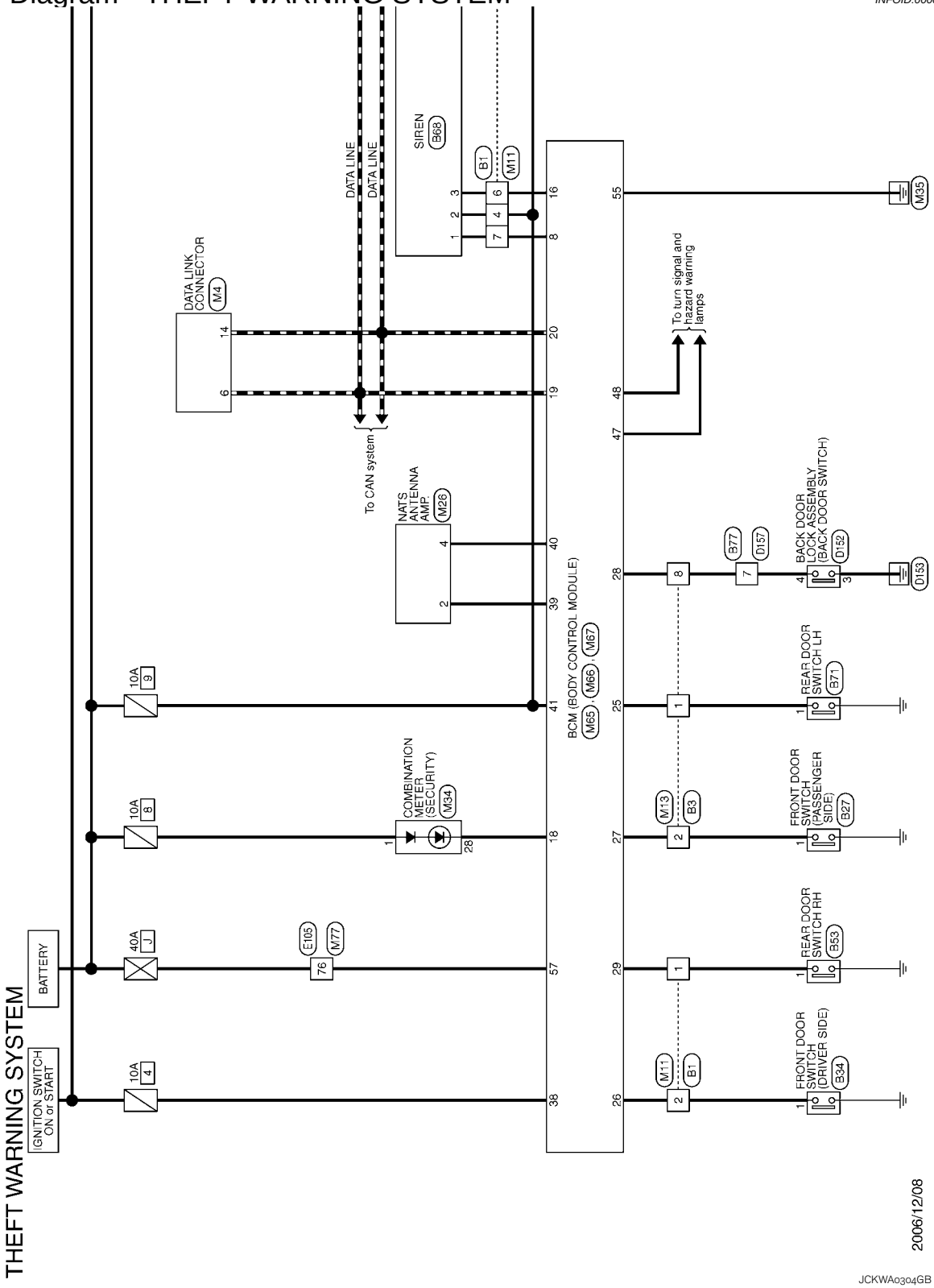
*5: HR engine models

*6: MR engine models

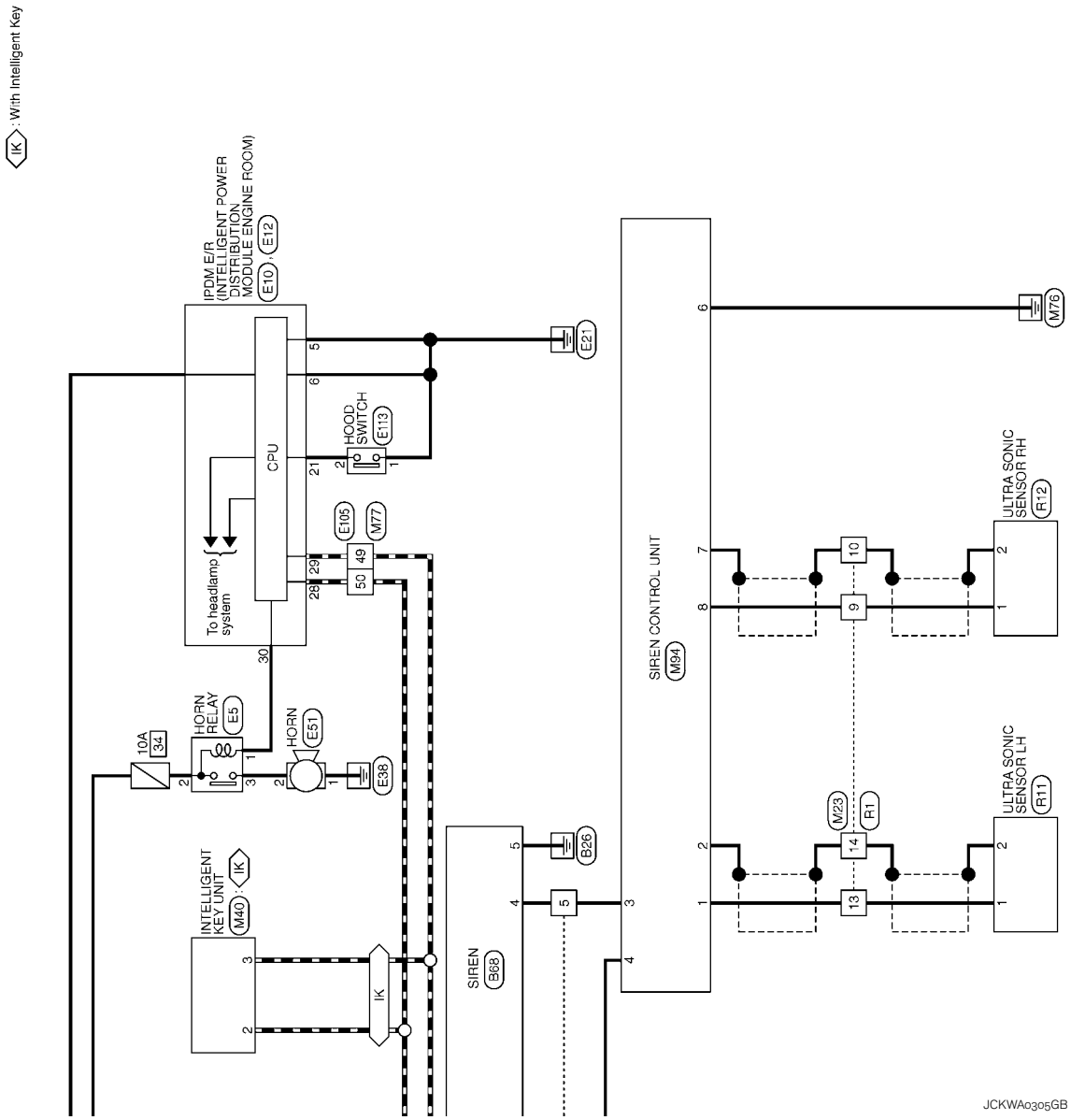
*7: MR engine and K9K engine models

Wiring Diagram - THEFT WARNING SYSTEM -

INFOID:0000000001102218



cardiagn.com


IK : With Intelligent Key
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E10, E12
CPU
To headlamp system
HOOD SWITCH
E113
E105
M77
E21
M76
SIREN CONTROL UNIT
M94
ULTRA SONIC SENSOR RH
R12
ULTRA SONIC SENSOR LH
R11
M23
R1
HORN RELAY
E5
HORN
E51
E38
10A
34
INTELLIGENT KEY UNIT
M40
IK
SIREN
B68
B26
JCKWA0305GB

THEFT WARNING SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R/W	-[RHD models]
4	V	-
5	Y	-
6	GR	-
7	LG	-

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	BR	-[RHD models]
8	G	-

Connector No.	B27
Connector Name	FRONT DOOR SWITCH (PASSENGER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-

Connector No.	B34
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	-

Connector No.	B53
Connector Name	REAR DOOR SWITCH RH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Connector No.	B68
Connector Name	SIREN
Connector Type	RH06FB

H.S.

1	2	3	4	5	6

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	HAZARD REQ
2	V	B+
3	GR	COMMON LINK
4	Y	U/S LINK
5	B	GND

Connector No.	B71
Connector Name	REAR DOOR SWITCH LH
Connector Type	A03FW

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-

Connector No.	B77
Connector Name	WIRE TO WIRE
Connector Type	TH08FW

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

JCKWA0306GB

cardiagn.com

THEFT WARNING SYSTEM

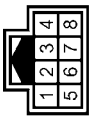
Connector No.	D152
Connector Name	BACK DOOR LOCK ASSEMBLY
Connector Type	CINCH 49309 EV 4K9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	-
4	G	-

Connector No.	D157
Connector Name	WIRE TO WIRE
Connector Type	TH08MW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	G	-

Connector No.	E5
Connector Name	HORN RELAY
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	GR/L	-
3	G	-

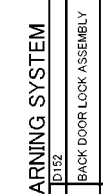
Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
21	GR	-
28	L	-
29	P	-
30	L	-

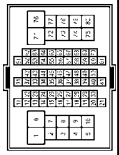
Connector No.	E51
Connector Name	HORN
Connector Type	DELPHI 15419715

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	G	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

Connector No.	E113
Connector Name	HOOD SWITCH
Connector Type	W02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	GR	-

JCKWA0307GB

carsdiagn.com

THEFT WARNING SYSTEM

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	R	–[RHD models]
4	R	–
5	Y	–
6	GR	–
7	LG	–

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	BR	–[RHD models]
8	G	–

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	W	–
10	SHIELD	–
13	G	–
14	SHIELD	–

Connector No.	M26
Connector Name	NATS ANTENNA AMP.
Connector Type	TH04FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	P	–
4	LG	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
28	SB	SECURITY

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

H.S.

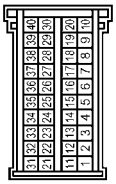
Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L

JCKWA0308GB

cardiagn.com

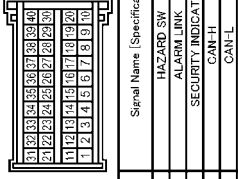
THEFT WARNING SYSTEM

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
8	LG	HAZARD SW
16	GR	ALARM LINK
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L
25	GR	DOOR SW (RL)
26	R	DOOR SW (DR)
27	BR	DOOR SW (AS)
28	G	DOOR SW (BACK)
29	LG	DOOR SW (RR)
38	W/L	IGN SW

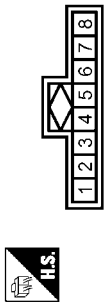
Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
76	Y	-

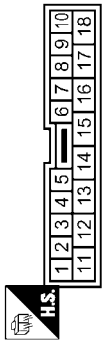
39	P	NATS ANTENNA AMP.
40	LG	NATS ANTENNA AMP.

Connector No.	M94
Connector Name	SIREN CONTROL UNIT
Connector Type	A08FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	U/S LEFT (TX)
2	SHIELD	SHIELD
3	Y	U/S LINK
4	R	B+
6	B	GND
7	SHIELD	SHIELD
8	W	U/S RIGHT (RX)

Connector No.	M66
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)
47	G/Y	FLASHER OUTPUT (LEFT)
48	G/B	FLASHER OUTPUT (RIGHT)

Connector No.	R1
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

Terminal No.	Color of Wire	Signal Name [Specification]
9	W	-
10	SHIELD	-
13	G	-
14	SHIELD	-

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017

Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

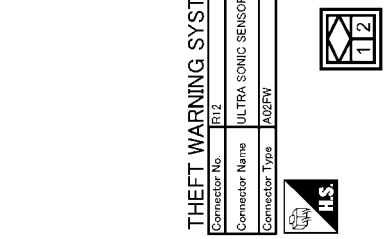
Connector No.	R11
Connector Name	ULTRA SONIC SENSOR LH
Connector Type	A02MW

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	SIG
2	SHIELD	SHIELD

JCKWA0309GB

THEFT WARNING SYSTEM

Connector No.	R12
Connector Name	ULTRA SONIC SENSOR RH
Connector Type	A02FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	SIG
2	SHIELD	SHIELD

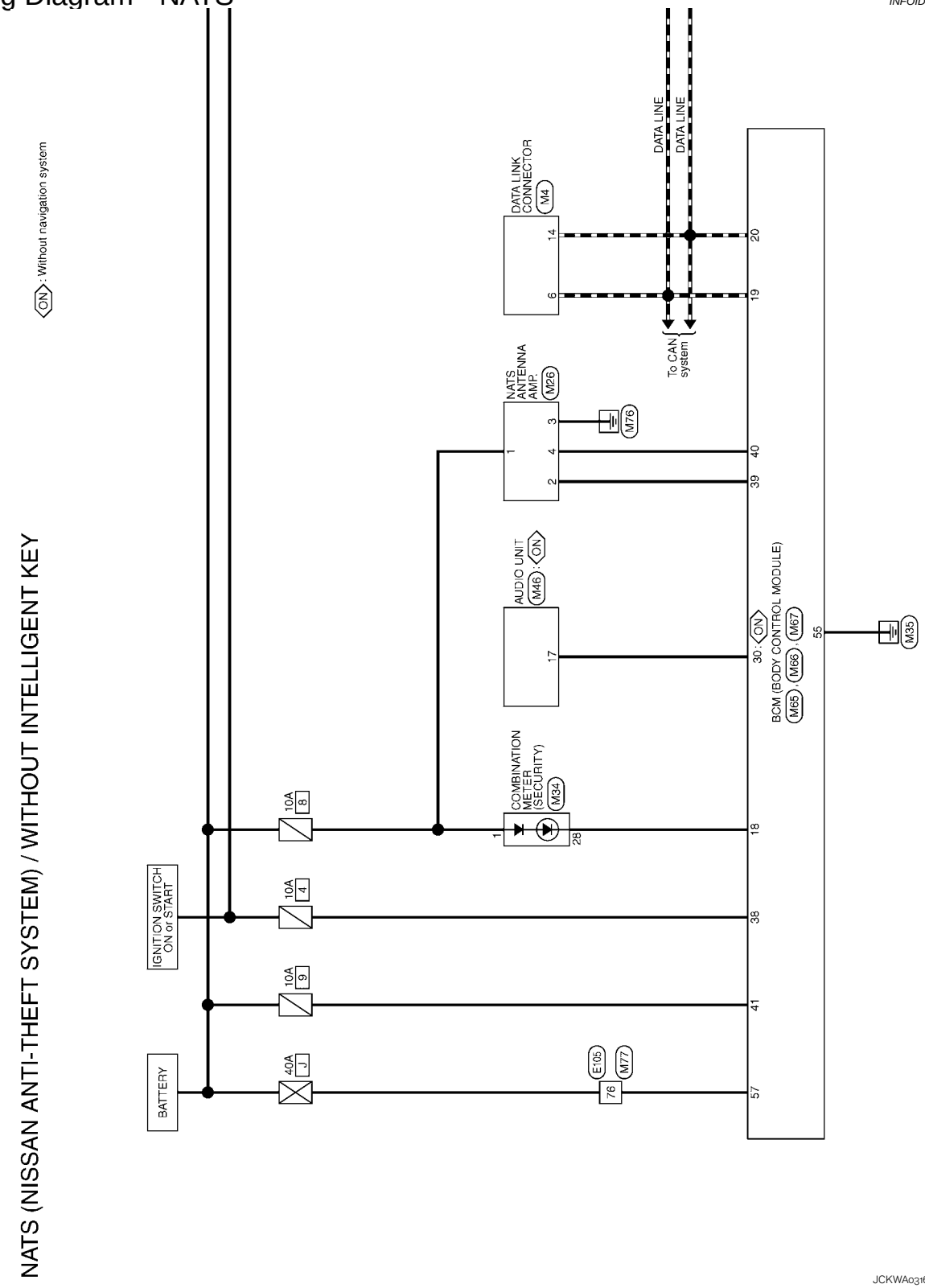
JCKWA0310GB

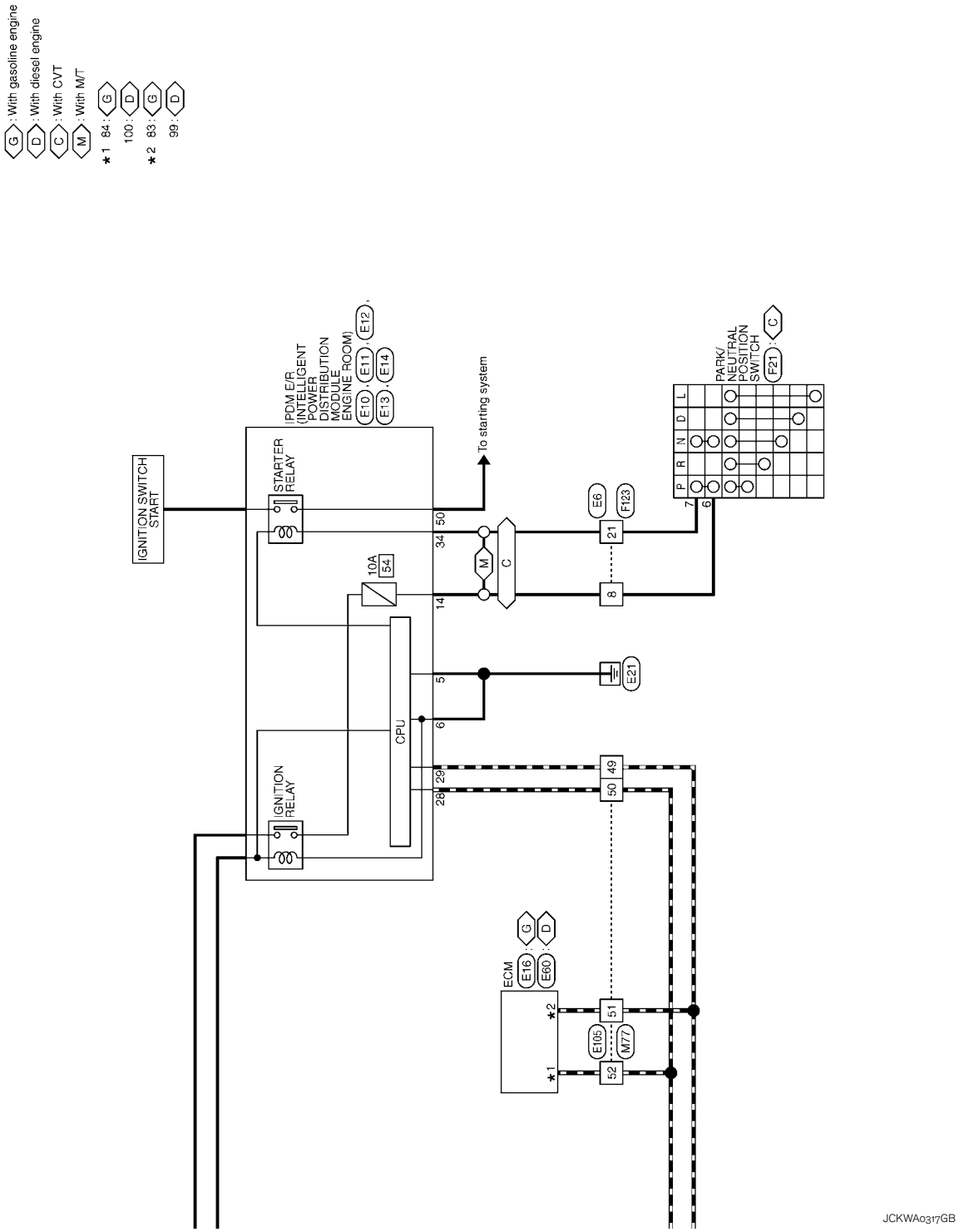
cardiagn.com

Wiring Diagram - NATS -

INFOID:0000000001102219

NATS (NISSAN ANTI-THEFT SYSTEM) / WITHOUT INTELLIGENT KEY

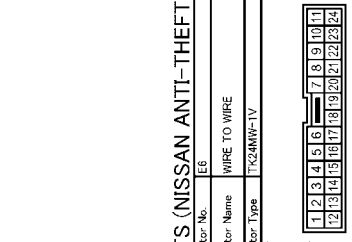




cardiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM) / WITHOUT INTELLIGENT KEY

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

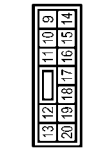


Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	-
21	R/B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

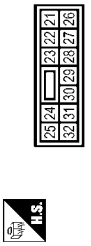
Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS



Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
28	L	-
29	P	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
34	R/B	-

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
50	B/R	-

Connector No.	E16
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-LI
84	L	CAN-HI

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH

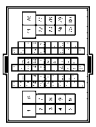
Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

JCKWA0318GB

carsdiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM) / WITHOUT INTELLIGENT KEY

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–
76	Y	–

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK06FG

Terminal No.	Color of Wire	Signal Name [Specification]
6	W/B	–
7	R/B	–

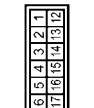
Connector No.	M26
Connector Name	NATS ANTENNA AMP.
Connector Type	TH04FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	P	–
3	B	–
4	LG	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
28	SB	SECURITY

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

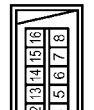


Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	–
21	R/B	–

Connector No.	M46
Connector Name	AUDIO UNIT
Connector Type	TH18FW-CS2

Terminal No.	Color of Wire	Signal Name [Specification]
17	SB	IMMOBILIZER

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



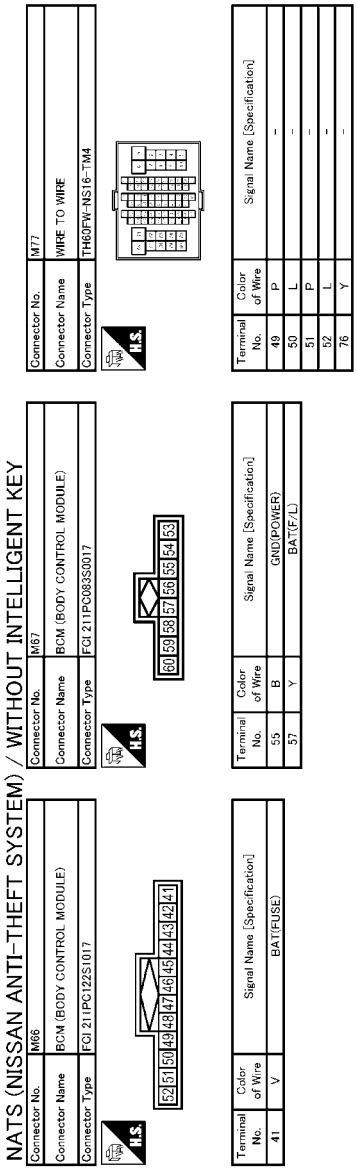
Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L
30	SB	AUDIO LINK
38	W/L	IGN SW
39	P	NATS ANTENNA AMP.
40	LG	NATS ANTENNA AMP.

JCKWA0319GB

cardiagn.com



JCKWA0320GB

Fail Safe

INFOID:0000000001102212

CAN communication control

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If no CAN communication is available with ECM

Control part	Fail-safe in operation
Cooling fan	• The cooling fan relay-2*1 or the cooling fan relay-3*2 turns ON when the ignition switch is turned ON • Turns off the fan motor low relay when the ignition switch is turned OFF
A/C compressor	A/C relay OFF

*1: HR engine models

*2: MR engine and K9K engine models

If no CAN communication is available with BCM

Control part	Fail-safe in operation
Headlamp	• The headlamp low relay turns ON when the ignition switch is turned ON • The headlamp low relay turns OFF when the ignition switch is turned OFF • Headlamp high relay OFF
• Parking lamps • License plate lamps • Tail lamps • Illuminations	• The tail lamp relay turns ON when the ignition switch is turned ON • The tail lamp relay turns OFF when the ignition switch is turned OFF
Front wiper	• The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. • The front wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Front fog lamps	Front fog lamp relay OFF
Starter motor	Inhibit relay OFF
Rear window defogger	Rear window defogger relay OFF
Headlamp washer	Headlamp washer relay OFF
PTC heater	PTC heater relay OFF

Ignition relay malfunction detection function

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

DTC	Ignition switch	Ignition relay	Tail lamp relay
—	ON	ON	—
—	OFF	OFF	—
B2098: IGN RLY ON	OFF	ON	ON (10 minutes)
B2099: IGN RLY OFF	ON	OFF	—

NOTE:

The tail lamp relay is turned OFF when the ignition switch is turned ON.

Front wiper control

IPDM E/R detects the front wiper stop position with the front wiper auto stop signal.
When the front wiper auto stop signal is in the conditions listed below, IPDM E/R repeats a front wiper 10 seconds operation and 20 seconds stop five times.

Ignition switch	Front wiper switch	Front wiper auto stop signal
ON	OFF	The front wiper auto stop signal (stop position) cannot be input for 10 seconds.
	ON	The front wiper auto stop signal does not change for 10 seconds.

NOTE:

cardiagn.com

This operation status can be confirmed on the IPDM E/R “Data Monitor” that displays “BLOCK” for the item “WIP PROT” while the wiper is stopped.

DTC Index

INFOID:0000000001102213

CONSULT display	Fail-safe	Timing[NOTE]		Reference page
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	PAST	PCS-14
B2098: IGN RELAY ON	×	CRNT	PAST	PCS-15
B2099: IGN RELAY OFF	—	CRNT	PAST	PCS-16
B2100: EEPROM	—	CRNT	PAST	PCS-17

NOTE:

The details of time display are as follows.

- CRNT: The malfunctions that are detected now.
- PAST: The number is indicated when it is normal at present and a malfunction was detected in the past.

SYMPTOM DIAGNOSIS

VEHICLE SECURITY SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000001116454

Procedure	Symptom		Diagnostic procedure	Refer to page
1	Vehicle security system cannot be set by ····	Door switch	Check door switch	DLK-83
		Hood switch	Check hood switch	SEC-54
		Back door switch	Check back door switch	SEC-54
		Keyfob	Check keyfob.	DLK-612
		—	Check Intermittent Incident	GI-39
	Security indicator does not turn ON.		Check vehicle security indicator	SEC-193
			Check Intermittent Incident	GI-39
2	* Vehicle security system does not sound alarm when ····	Any door is opened.	Check door switch	DLK-83
			Check Intermittent Incident	GI-39
3	Vehicle security alarm does not activate.	Horn alarm	Check horn switch	—
			Check Intermittent Incident	GI-39
		Siren control unit alarm	Check siren control unit power supply and ground circuit	SEC-182
			Check siren power supply and ground circuit	SEC-182
			Check siren control unit	SEC-194
			Check Intermittent Incident	GI-39
4	Vehicle security system cannot be canceled by ····	Keyfob	Check multi remote control system.	DLK-553
			Check Intermittent Incident	GI-39

*: Check the system is in the armed phase.

cardiagn.com

NATS (NISSAN ANTI-THEFT SYSTEM) SYMPTOMS

Symptom Table

INFOID:0000000001097889

NOTE:
- Before performing the diagnosis in the following table, check “SEC-157, "Work Flow"”.
- Check that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following symptoms are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

CONDITIONS OF VEHICLE (OPERATING CONDITIONS)

- Ignition key is not inserted into key cylinder.

Symptom	Diagnosis/service procedure	Reference page
Engine can not start	1. Check stop lamp switch	SEC-187
	2. Check Intermittent Incident	GI-39
Security indicator does not turn ON or flash	1. Check vehicle security indicator	SEC-193
	2. Check Intermittent Incident	GI-39

ON-VEHICLE MAINTENANCE

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000001116849

1.INSPECTION START

Turn ignition switch “OFF” and pull out ignition key from key cylinder.
NOTE:
Before starting operation check, open front windows.

>> GO TO 2.

2.CHECK SECURITY INDICATOR LAMP

1. Lock doors using keyfob.
2. Check that security indicator lamp illuminates for 30 seconds.

Security indicator lamp should illuminate.

OK >> GO TO 3.
NG >> Perform diagnosis and repair. Refer to SEC-246, "Symptom Table".

3.CHECK ALARM FUNCTION

1. After 30 seconds, security indicator lamp will start to blink.
2. Open any door or hood before unlocking with keyfob or open back door without keyfob.

Do alarm function properly.

OK >> GO TO 4.
NG >> Check the following.
- The vehicle security system does not phase in alarm mode. Refer to SEC-246, "Symptom Table".
- Alarm do not operate. Refer to SEC-246, "Symptom Table".

4.CHECK ALARM CANCEL OPERATION

Unlock any door or open back door using keyfob.

Alarm (horn and siren) should stop.

OK >> INSPECTION END.
NG >> Check door lock function. Refer to DLK-645, "KEYFOB : Symptom Table".

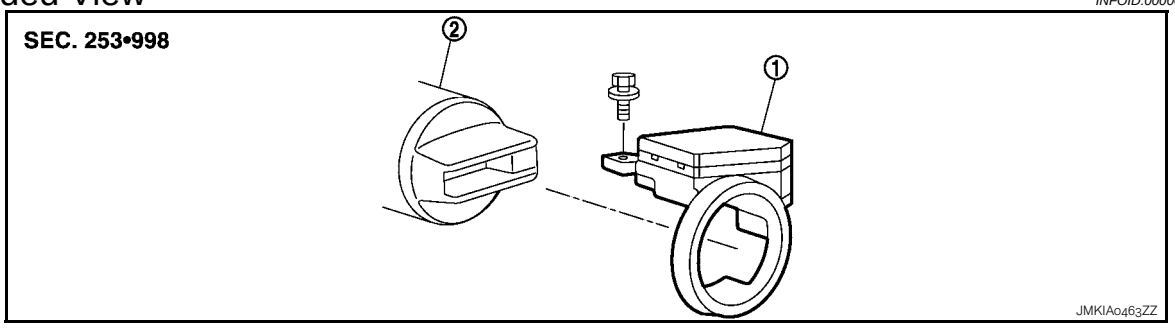
cardiagn.com

ON-VEHICLE REPAIR

NATS (NISSAN ANTI-THEFT SYSTEM)

Exploded View

INFOID:0000000001097892



1. NATS antenna amp. 2. Steering lock assembly

Refer to SEC-249, "Removal and Installation".

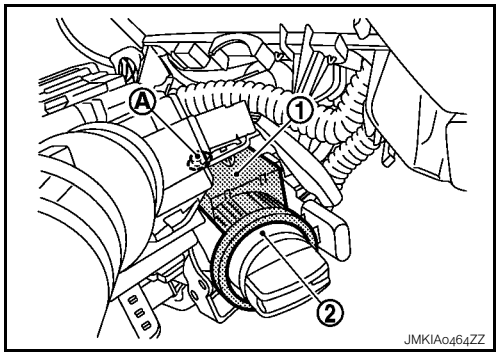
NOTE:
An illustration is an object for Intelligent Key system.

Removal and Installation

INFOID:0000000001097893

REMOVAL

1. Remove the steering column cover.
   Refer to IP-11, "Exploded View" and IP-12, "Removal and Installation".
2. Remove the NATS antenna amp. mounting screw (A), and then remove NATS antenna amp. (1) from steering lock assembly (2).
   NOTE:
   An illustration is an object for Intelligent Key system.



INSTALLATION

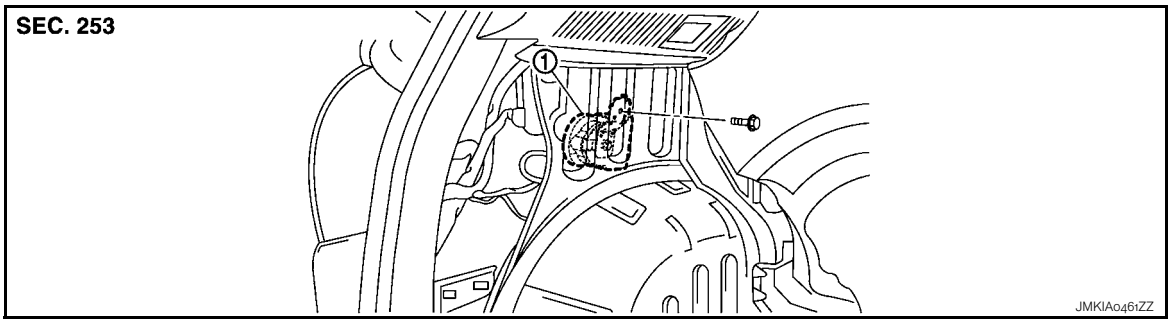
Install in the reverse order of removal.

SIREN

Exploded View

INFOID:0000000001097894

SIREN



1. Siren

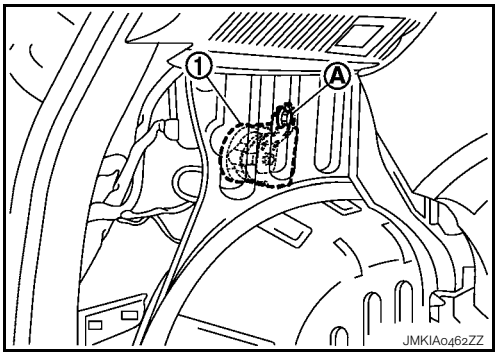
Refer to SEC-250, "Removal and Installation".

Removal and Installation

INFOID:0000000001097895

REMOVAL

1. Remove the luggage side lower finisher (LH).
   Refer to INT-24, "Exploded View" and INT-24, "Removal and Installation".
2. Remove the siren mounting bolt (A), and then remove siren (1).



INSTALLATION

Install in the reverse order of removal.

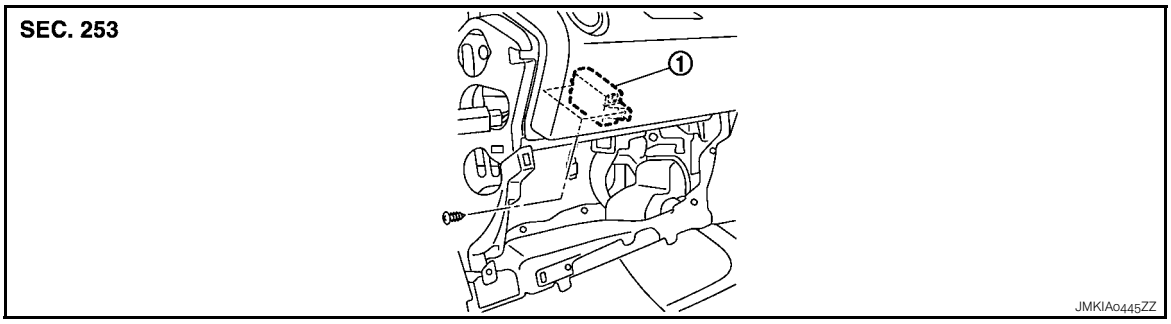
cardiagn.com

SIREN CONTROL UNIT

Exploded View

INFOID:0000000001097916

SIREN CONTROL UNIT



1. Siren control unit

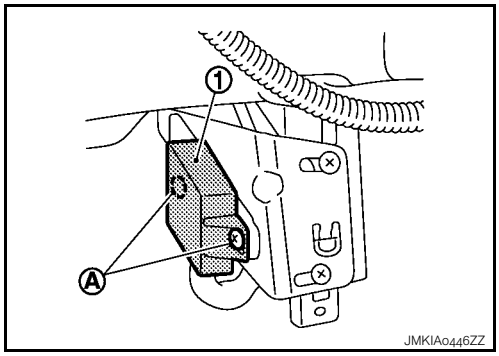
Refer to SEC-251, "Removal and Installation".

Removal and Installation

INFOID:0000000001097917

REMOVAL

1. Remove the glove box.
   Refer to IP-11, "Exploded View" and IP-12, "Removal and Installation".
2. Remove the siren control unit mounting screw (A), and then remove siren control unit (1).



INSTALLATION

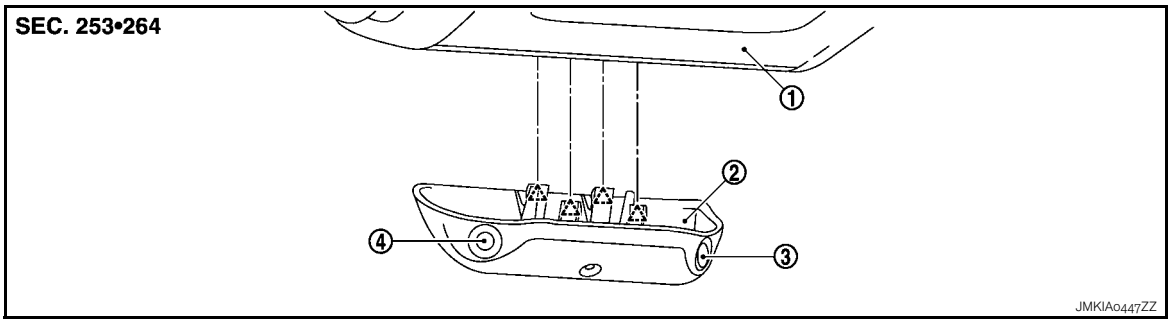
Install in the reverse order of removal.

ULTRA SONIC SENSOR

Exploded View

INFOID:0000000001097938

ULTRA SONIC SENSOR



1. Headlining
2. Ultra sonic sensor finisher
3. Ultra sonic sensor RH
4. Ultra sonic sensor LH
- Pawl

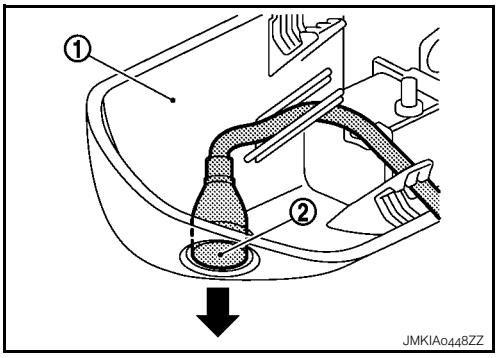
Refer to SEC-252, "Removal and Installation".

Removal and Installation

INFOID:0000000001097939

REMOVAL

1. Remove the ultra sonic sensor finisher.
   Refer to SEC-252, "Exploded View".
2. Remove the ultra sonic sensor (2) from ultra sonic sensor finisher (1).



INSTALLATION

Install in the reverse order of removal.

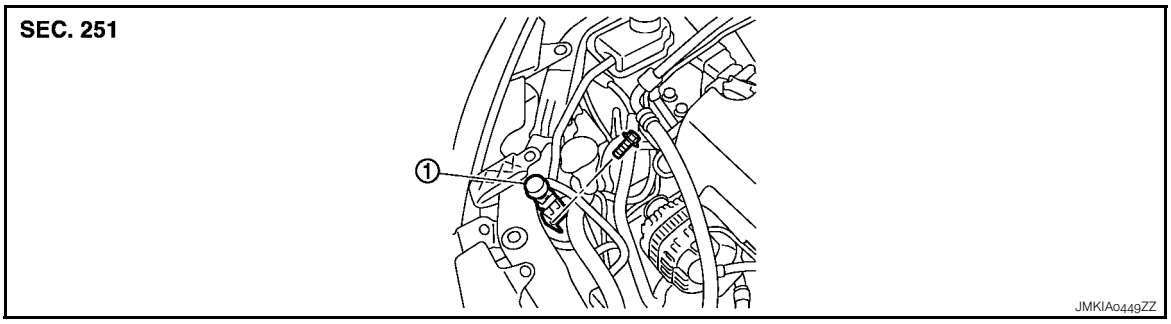
cardiagn.com

HOOD SWITCH

Exploded View

INFOID:0000000001097960

HOOD SWITCH



1. Hood switch

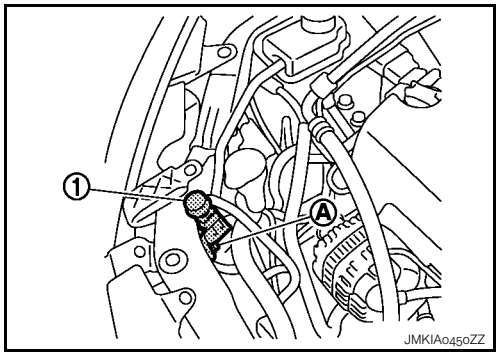
Refer to SEC-253, "Removal and Installation".

Removal and Installation

INFOID:0000000001097961

REMOVAL

1. Remove the hood switch mounting bolt (A), and then remove hood switch (1).



INSTALLATION

Install in the reverse order of removal.

SECTION SN
SONAR SYSTEM

CONTENTS

BASIC INSPECTION 2

DIAGNOSIS AND REPAIR WORKFLOW 2
Work Flow 2

FUNCTION DIAGNOSIS 3

SONAR SYSTEM 3
System Diagram 3
System Description 3
Component Parts Location 3
Component Description 4

DIAGNOSIS SYSTEM (SONAR CONTROL UNIT) 5
Diagnosis Description 5

COMPONENT DIAGNOSIS 7

POWER SUPPLY AND GROUND CIRCUIT 7

SONAR CONTROL UNIT 7
SONAR CONTROL UNIT : Diagnosis Procedure 7

SENSOR POWER SUPPLY AND GROUND CIRCUIT 8
Description 8
Diagnosis Procedure 8

BUZZER DRIVE SIGNAL CIRCUIT 9
Description 9
Diagnosis Procedure 9

SENSOR SIGNAL CIRCUIT 10
Description 10
Diagnosis Procedure 10

ECU DIAGNOSIS 11

SONAR CONTROL UNIT 11
Reference Value 11
Wiring Diagram - SONAR SYSTEM - 12
Fail Safe 15

SYMPTOM DIAGNOSIS 16

SONAR SYSTEM SYMPTOMS 16
Symptom Table 16

ON-VEHICLE REPAIR 17

SONAR CONTROL UNIT 17
Exploded View 17
Removal and Installation 17

SONAR SENSOR 18
Exploded View 18
Removal and Installation 18

BUZZER 19
Exploded View 19
Removal and Installation 19

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000935704

DETAILED FLOW

1.INTERVIEW FOR MALFUNCTION

Interview the conditions and environment when occurring any malfunction to the customer.

>> GO TO 2.

2.SYMPTOM CHECK

- Check the symptom from the customer's information.
- Check if any malfunction occurs other than the malfunction interviewed from the customer.

>> GO TO 3.

3.INSPECTION BEFORE DIAGNOSIS

Check the following conditions of the sensor.
- Check if the sonar sensor is not frozen.
- Check if snow, mud, or other foreign objects are not adhering to the sonar sensor.
- Check if there is no deformation, scratches, or other damage to the sonar sensor.
- Check if water has not accumulated in the sonar sensor.

Is the sensor condition normal?

YES >> GO TO 4.
NO >> Repair the sensor condition. GO TO 5.

4.MALFUNCTIONING PART EXTRACTION BY SYMPTOM DIAGNOSIS

Repair the malfunctioning part by the symptom diagnosis.

>> GO TO 5.

5.FINAL INSPECTION

Check that the sonar system activates normally.

Does the sonar system activate normally?

YES >> INSPECTION END
NO >> GO TO 1.

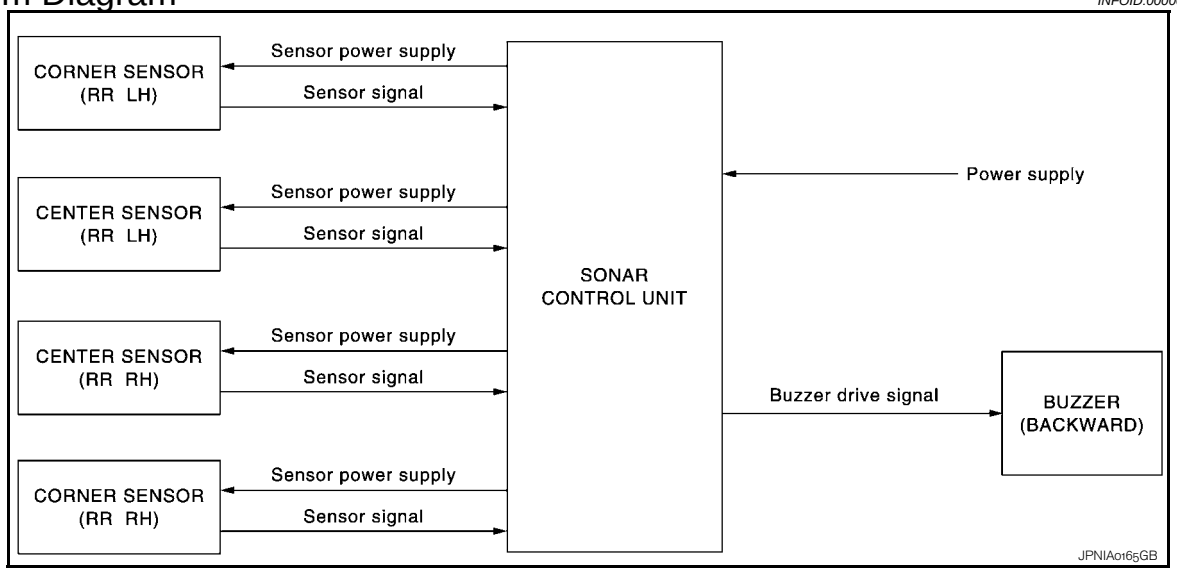
cardiagn.com

FUNCTION DIAGNOSIS

SONAR SYSTEM

System Diagram

INFOID:0000000000935705



System Description

INFOID:0000000000935706

- The sonar sensor installed to the rear bumper detects obstacles around the bumper.
- The distance between a bumper and obstacles is informed to the driver with different frequency of buzzer.

Activation condition

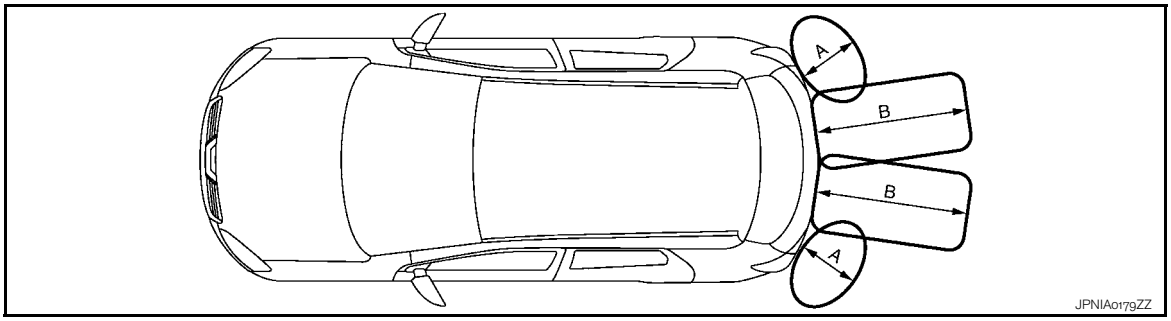
The rear sensor activates and outputs the warning buzzer in the following conditions.

- Reverse signal ON (Power supply)
- Obstacle detection

Obstacle detection distance

- The sonar control unit controls the obstacle detection distance. The detection distance differs between the corner sensor and the center sensor.
- Obstacle detection distance is indicated by a variable beep frequency.

Obstacle detection range image



A. Approx. 60 cm (23.6 in) B. Approx. 180 cm (70.9 in)

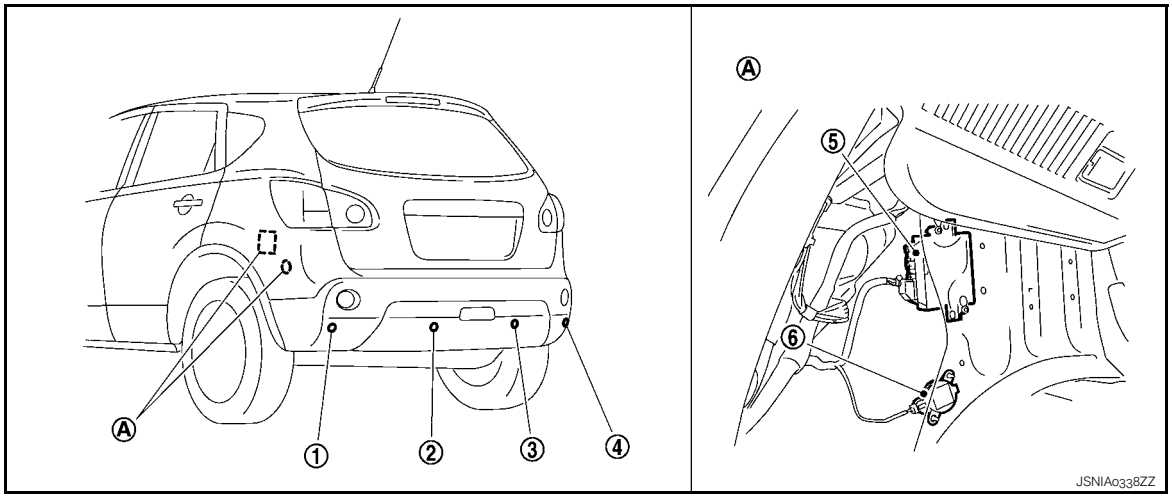
NOTE:

- When an obstacle and distance of a bumper approach to less than 30 cm (11.8 in), a buzzer sound becomes consecutive sounds.
- The nearest sensor from the detected obstacle applies the buzzer output frequency if plural sensors detect any obstacle simultaneously.

Component Parts Location

INFOID:0000000000935707

cardiagn.com



1. Corner sensor rear LH
2. Center sensor rear LH
3. Center sensor rear RH
4. Corner sensor rear RH
5. Sonar control unit
6. Buzzer

A Inside luggage side lower finisher LH

Component Description

INFOID:0000000000935708

Component	Description
SONAR CONTROL UNIT	• The warning buzzer outputs by inputting the sensor signal from corner/center sensor. The warning buzzer outputs the separated buzzer. • When reverse signal is input, a power supply is input into sonar control unit.
CORNER/CENTER SENSOR	The obstacle distance is detected. The signal is transmitted to the sonar control unit.
BUZZER	The warning buzzer outputs with the signal from the sonar control unit.

cardiagn.com

DIAGNOSIS SYSTEM (SONAR CONTROL UNIT)

Diagnosis Description

INFOID:0000000000935709

DESCRIPTION

Buzzer sounds to indicate a malfunctioning sensor system when a malfunction/error occurs in the body, power supply, ground, or sensor signals of the center/corner sensor. Also, a buzzer sounds if a sonar control unit includes a malfunction/error.

NOTE:

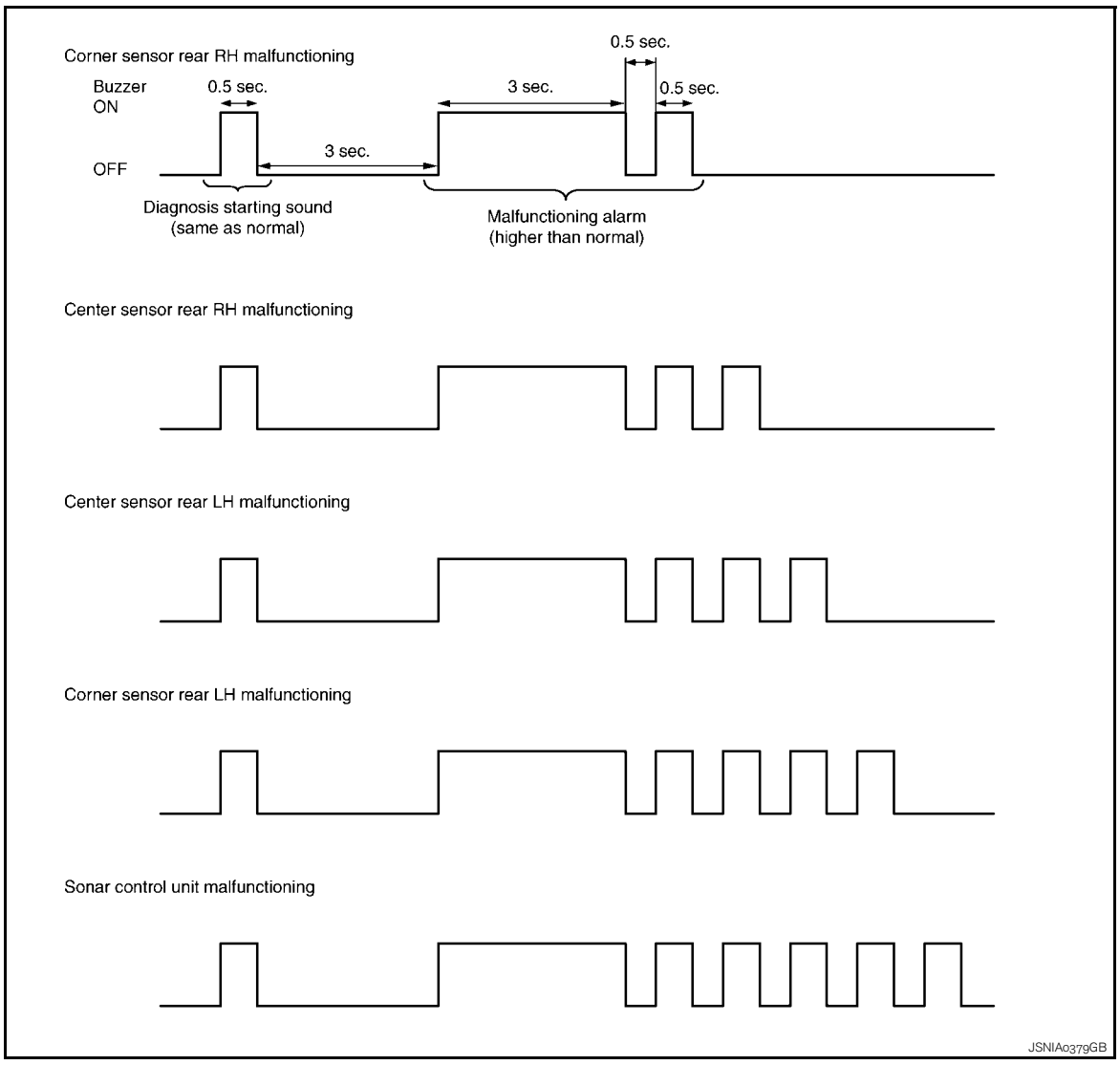
- Malfunctions are indicated by a sound of the buzzer. Therefore, errors/malfunctions cannot be identified when the buzzer system has a malfunction.
- Buzzer sounds to indicate a malfunctioning sensor system only once when turning ON the ignition switch and shifting the lever to the “REVERSE” position. For reconfirmation, shifting the lever to a position other than the reverse position and returning it to the “REVERSE” position enables to reconfirm the malfunction.
- Functions of the sonar system stop after indicating malfunctions/errors by the buzzer. (Buzzer does not sound if an obstacle is approaching to the sensor.)

Identifying malfunctioning sensor system

1. Turn the ignition switch ON. Shift lever to the “REVERSE” position.
2. Buzzer sounds once with the same sound range as heard at normal operations.
3. Then buzzer sounds with a higher sound range than normal operation. Malfunctioning sensor systems can be identified by the cycle (the number of buzzer sounds) of the buzzer sound.
   NOTE:

cardiagn.com

The sensors are indicated by a sound of the buzzer one by one when more than one sensor has a malfunction/error.



cardiagn.com

COMPONENT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

SONAR CONTROL UNIT

SONAR CONTROL UNIT : Diagnosis Procedure

INFOID:0000000000935750

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Shift the shift position to “R” position.
3. Check voltage between sonar control unit harness connector terminal 1 and ground.

1 – Ground : Approx. 12 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check back-up lamp switch circuit or park/neutral position switch circuit.

2.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sonar control unit connector.
3. Check continuity between sonar control unit harness connector terminal 3 and ground.

3 – Ground : Continuity should exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace sonar control unit ground harness.

cardiagn.com

SENSOR POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000001098824

The sonar control unit outputs sensor power supply to each sensor when the shift position to “R” position.

Diagnosis Procedure

INFOID:0000000000936327

1.CHECK CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect sonar control unit connector, center sensor and corner sensor connector.
3. Check continuity between sonar control unit harness connector terminal 9 and each sensor harness connector terminal 1.

9 – 1 : Continuity should exist.

4. Check continuity between sonar control unit harness connector terminal 9 and ground.

9 – Ground : Continuity should not exist.

5. Check continuity between sonar control unit harness connector terminal 10 and each sensor harness connector terminal 3.

10 – 3 : Continuity should exist.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK POWER SUPPLY CIRCUIT

1. Connect sonar control unit connector, center sensor and corner sensor connector.
2. Turn ignition switch ON.
3. Shift the shift position to “R” position.
4. Check voltage between each sensor harness connector terminal 1 and ground.

1 – Ground : Approx. 12 V

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace sonar control unit.

cardiagn.com

BUZZER DRIVE SIGNAL CIRCUIT

Description

INFOID:0000000000935757

The sonar control unit outputs the buzzer drive signal when the rear sonar detects the obstacle.

Diagnosis Procedure

INFOID:0000000000935759

1.CHECK HARNESS BUZZER CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sonar control unit connector and buzzer connector.
3. Check continuity between sonar control unit harness connector terminals 2, 6 and buzzer harness connector terminals 2, 1.

2 – 2	**: Continuity should exist.**
6 – 1	**: Continuity should exist.**

4. Check continuity between sonar control unit harness connector terminal 2 and ground.

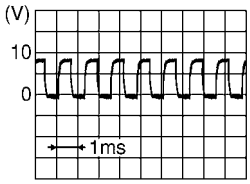
2 – Ground	**: Continuity should not exist.**

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK BUZZER DRIVE SIGNAL

1. Connect sonar control unit connector and buzzer connector.
2. Bring an obstacle near to sound the buzzer.
3. Check signal between sonar control unit harness connector terminals 2 and 6.

2 – 6	**Waveform period changes due to the distance to an obstacle.**  JPNIA0232ZZ

Is the inspection result normal?

YES >> Replace buzzer.
NO >> Replace sonar control unit.

cardiagn.com

SENSOR SIGNAL CIRCUIT

Description

INFOID:0000000000936324

The sensor detects the distance to obstacles and outputs the signal to the sonar control unit.

Diagnosis Procedure

INFOID:0000000000936326

1.CHECK SENSOR POWER SUPPLY AND GROUND CIRCUIT

Check sensor power supply and ground circuit. Refer to SN-8, "Diagnosis Procedure".

Is inspection result normal?

YES >> GO TO 2.
NO >> Repair malfunctioning parts.

2.CHECK HARNESS SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sonar control unit connector and each sensor connector.
3. Check continuity between sonar control unit harness connector terminals 13, 14, 15, 16 and each sensor harness connector terminal 2.

13 – 2	**: Continuity should exist.**
14 – 2	**: Continuity should exist.**
15 – 2	**: Continuity should exist.**
16 – 2	**: Continuity should exist.**

4. Check continuity between sonar control unit harness connector terminals 13, 14, 15, 16 and ground.

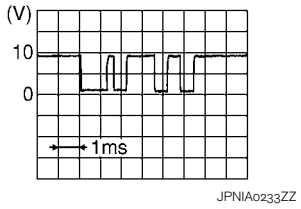
13 – Ground	**: Continuity should not exist.**
14 – Ground	**: Continuity should not exist.**
15 – Ground	**: Continuity should not exist.**
16 – Ground	**: Continuity should not exist.**

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK SENSOR SIGNAL

1. Connect sonar control unit connector and each sensor connector.
2. Turn ignition switch ON.
3. Shift the shift position to “R” position.
4. Check signal between sonar control unit harness connector terminals 13, 14, 15, 16 and Ground.

13 – Ground **14 – Ground** **15 – Ground** **16 – Ground**	 JPNIA0233ZZ

Is the inspection result normal?

YES >> Replace sonar control unit.
NO >> Replace malfunctioning sensor.

cardiagn.com

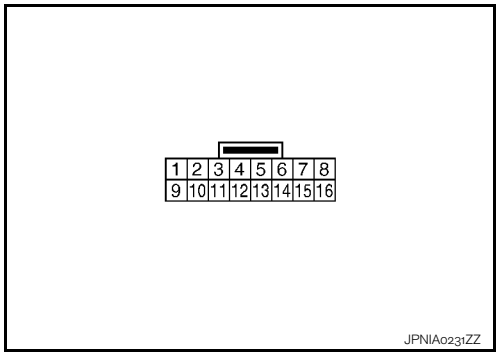
ECU DIAGNOSIS

SONAR CONTROL UNIT

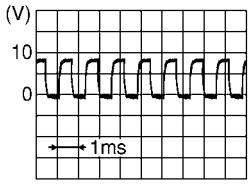
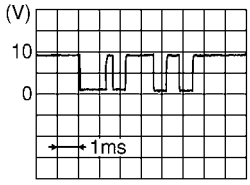
Reference Value

INFOID:0000000000935763

TERMINAL LAYOUT



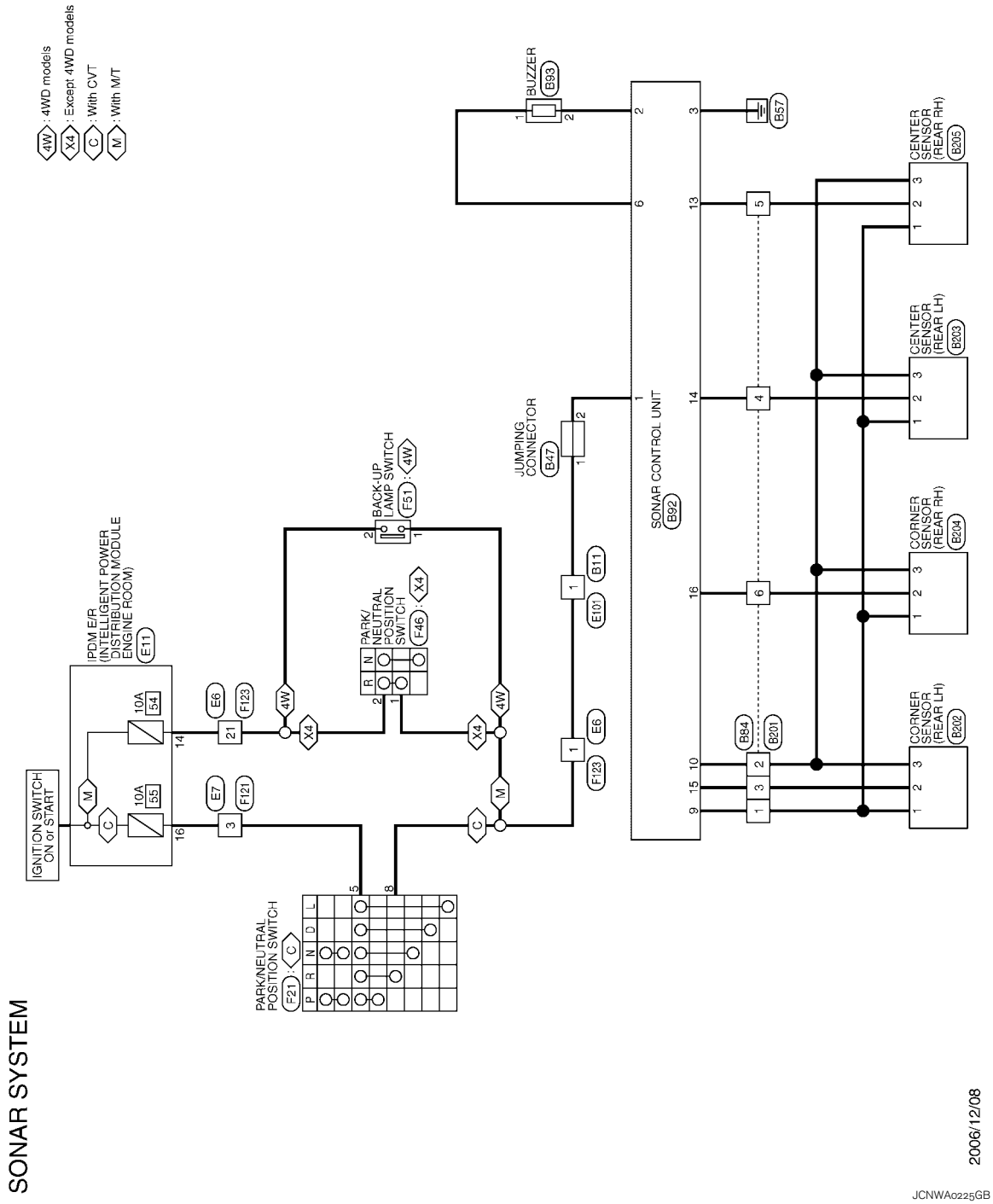
PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
1 (Y/G)	Ground	Power supply	Input	Ignition switch ON	Selector lever in R position	12 V
2 (Y/L)	6 (Y/B)	Buzzer drive signal	Output	Ignition switch ON	When buzzer operation	Waveform period changes according to the distance to an obstacle. 
3 (B)	Ground	GND	—	Ignition switch ON	—	0 V
9 (B/Y)	Ground	Sensor power supply	Output	Ignition switch ON	Shift position to “R” position	12 V
10 (B)	Ground	Sensor ground	—	Ignition switch ON	—	0 V
13 (O)	10 (B)	Center sensor signal RH	Input	Ignition switch ON	—	
14 (L)	10 (B)	Center sensor signal LH				
15 (R)	10 (B)	Corner sensor signal LH				
16 (LG)	10 (B)	Corner sensor signal RH				

cardiagn.com

Wiring Diagram - SONAR SYSTEM -

INFOID:0000000000935764

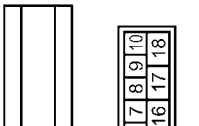


cardiagn.com

SONAR SYSTEM

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TK10MW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-

Connector No.	B47
Connector Name	JUMPING CONNECTOR
Connector Type	A02FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
2	Y/G	-

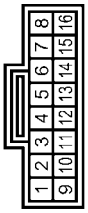
Connector No.	B84
Connector Name	WIRE TO WIRE
Connector Type	RS06MB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	-
2	B	-
3	R	-
4	L	-
5	O	-
6	LG	-

Connector No.	B92
Connector Name	SONAR CONTROL UNIT
Connector Type	AMP 828929-2

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	POWER SUPPLY
2	Y/L	BUZZER +
3	B	GROUND
6	Y/B	BUZZER -
9	B/Y	SENSOR POWER SUPPLY
10	B	SENSOR GROUND
13	O	CENTER SENSOR RH
14	L	CENTER SENSOR LH
15	R	CORNER SENSOR LH
16	LG	CORNER SENSOR RH

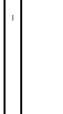
Connector No.	B93
Connector Name	BUZZER
Connector Type	AMP 174463-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	-
2	Y/L	-

Connector No.	B201
Connector Name	WIRE TO WIRE
Connector Type	RS06FB

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	-
2	B	-
3	R	-
4	L	-
5	O	-
6	LG	-

Connector No.	B202
Connector Name	CORNER SENSOR (REAR LH)
Connector Type	HIRSCHMANN-872-858-541

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	SENSOR POWER SUPPLY
2	R	SENSOR SIGNAL
3	B	SENSOR GROUND

Connector No.	B203
Connector Name	CENTER SENSOR (REAR LH)
Connector Type	HIRSCHMANN-872-858-541

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	SENSOR POWER SUPPLY
2	L	SENSOR SIGNAL
3	B	SENSOR GROUND

JCNWA0226GB

cardiagn.com

SONAR SYSTEM

Connector No.	B204
Connector Name	CORNER SENSOR (REAR RH)
Connector Type	HIRSCHMANN-872-858-541

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	SENSOR POWER SUPPLY
2	LG	SENSOR SIGNAL
3	B	SENSOR GROUND

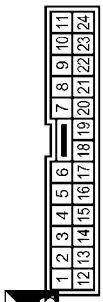
Connector No.	B205
Connector Name	CENTER SENSOR (REAR RH)
Connector Type	HIRSCHMANN-872-858-541

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	SENSOR POWER SUPPLY
2	O	SENSOR SIGNAL
3	B	SENSOR GROUND

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

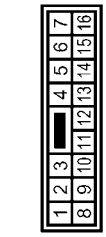
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

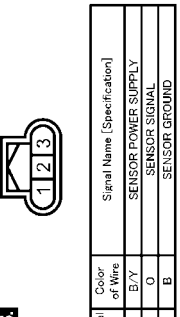
Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	–
16	Y/R	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS8

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	Y/R	–
8	Y/G	–

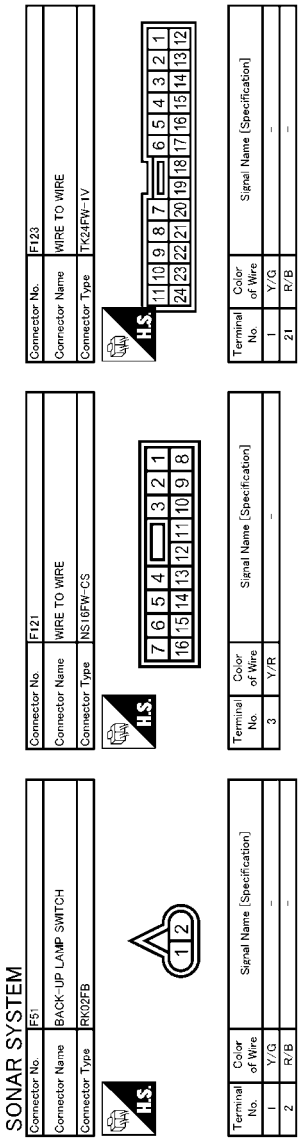
Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
2	R/B	–

JCNWA0227GB

cardiagn.com



JCNWA0228GB

Fail Safe

INFOID:0000000000935765

The warning buzzer function shuts off when the sensor system error is detected.

cardiagn.com

SYMPTOM DIAGNOSIS

SONAR SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000000935767

Symptom	Check item	Possible malfunction location / Action to take
All sonar sensors do not activate.	Error is detected automatically with self-diagnosis.	Sensor power supply and ground circuit (common part to each sensor) Refer to SN-8, "Diagnosis Procedure".
	Error is not detected automatically with self-diagnosis.	• Sonar control unit power supply and ground circuit Refer to SN-7, "SONAR CONTROL UNIT : Diagnosis Procedure". • Buzzer circuit Refer to SN-9, "Diagnosis Procedure".
Any sonar sensor does not activate.	Error is detected automatically with self-diagnosis.	• Sensor power supply and ground circuit (except common part to each sensor) Refer to SN-8, "Diagnosis Procedure". • Sensor signal circuit Refer to SN-10, "Diagnosis Procedure".

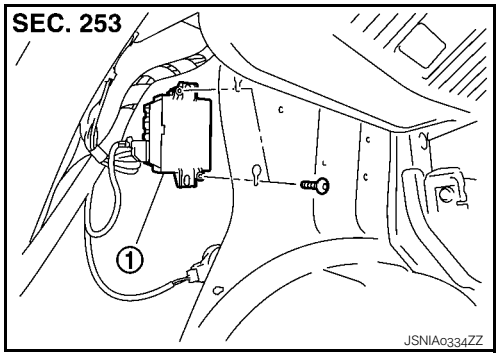
cardiagn.com

ON-VEHICLE REPAIR

SONAR CONTROL UNIT

Exploded View

INFOID:0000000000939633



1. Sonar control unit

Removal and Installation

INFOID:0000000000939634

REMOVAL

1. Remove the luggage side lower finisher (LH). Refer to INT-24, "Exploded View".
2. Remove sonar control unit.

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

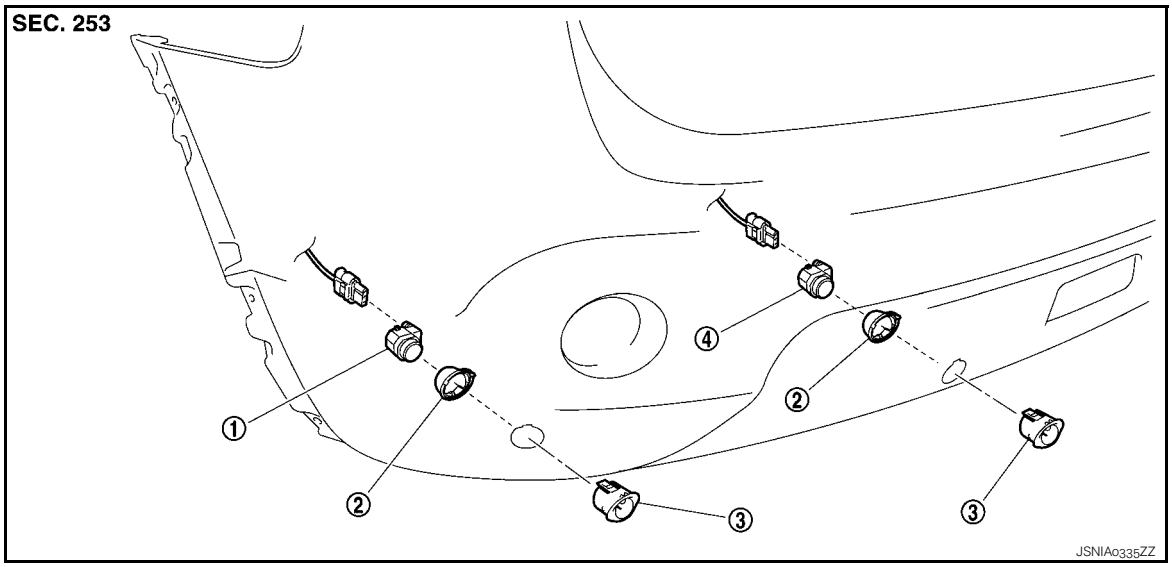
SONAR SENSOR

Exploded View

INFOID:0000000000935769

REMOVAL
Refer to EXT-14, "Exploded View".

DISASSEMBLY



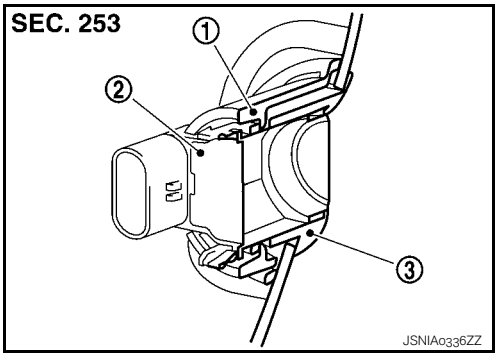
1. Corner sensor rear LH
2. Clip
3. Finisher
4. Center sensor rear LH

Removal and Installation

INFOID:0000000000935770

REMOVAL

1. Remove the rear bumper fascia. Refer to EXT-14, "Exploded View".
2. Separate the sensor (2) and the clip (1) from the finisher (3).
3. Separate the finisher from the rear bumper fascia.



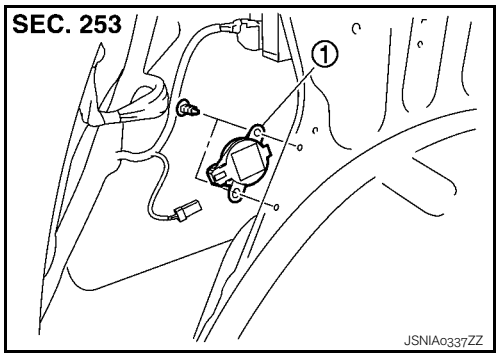
INSTALLATION
Install in the reverse order of removal.

cardiagn.com

BUZZER

Exploded View

INFOID:0000000000935771



1. Buzzer

Removal and Installation

INFOID:0000000000935772

REMOVAL

1. Remove the luggage side lower finisher (LH). Refer to INT-24, "Exploded View".
2. Remove the buzzer.

INSTALLATION

Install in the reverse order of removal.

cardiagn.com

SECTION SRC

SRS AIRBAG CONTROL SYSTEM

CONTENTS

BASIC INSPECTION 5

DIAGNOSIS AND REPAIR WORK FLOW 5
Work Flow 5

FUNCTION DIAGNOSIS 7

SRS AIR BAG SYSTEM 7
System Diagram 7
System Description 7
Component Parts Location 8
Component Description 9

DIAGNOSIS SYSTEM (AIRBAG) 10
Diagnosis Description 10
CONSULT-III Function 12

COMPONENT DIAGNOSIS 14

B1001, B1002, B1003, B1004, B1005 DIAGNOSIS SENSOR UNIT 14
Description 14
DTC Logic 14
Diagnosis Procedure (Component diagnosis) 15

B1006, B1007, B1008, B1009, B1010 DIAGNOSIS SENSOR UNIT 17
Description 17
DTC Logic 17
Diagnosis Procedure (Component diagnosis) 18

B1011, B1012, B1013, B1014, B1015 DIAGNOSIS SENSOR UNIT 20
Description 20
DTC Logic 20
Diagnosis Procedure (Component diagnosis) 21

B1023 PASS A/B INDCTR CKT 23
Description 23
DTC Logic 23
Diagnosis Procedure (Component diagnosis) 24

B1024 PASS A/B DEACT SW 26
Description 26
DTC Logic 26
Diagnosis Procedure (Component diagnosis) 27

B1026, B1027, B1028, B1029, B1030, B1031 DIAGNOSIS SENSOR UNIT 29
Description 29
DTC Logic 29
Diagnosis Procedure (Component diagnosis) 30

B1033, B1034 CRASH ZONE SEN 32
Description 32
DTC Logic 32
Diagnosis Procedure (Component diagnosis) 33

B1035 CRASH ZONE SEN 35
Description 35
DTC Logic 35
Diagnosis Procedure (Component diagnosis) 36

B1042, B1043, B1044, B1045, B1046, B1047 DIAGNOSIS SENSOR UNIT 38
Description 38
DTC Logic 38
Diagnosis Procedure (Component diagnosis) 39

B1054 DRIVER AIRBAG MODULE 41
Description 41
DTC Logic 41
Diagnosis Procedure (Component diagnosis) 42

B1055 DRIVER AIRBAG MODULE 44
Description 44
DTC Logic 44
Diagnosis Procedure (Component diagnosis) 45

B1056 DRIVER AIRBAG MODULE 47
Description 47
DTC Logic 47
Diagnosis Procedure (Component diagnosis) 48

cardiagn.com

B1057 DRIVER AIRBAG MODULE 50
Description 50
DTC Logic 50
Diagnosis Procedure (Component diagnosis) 51

B1058, B1059, B1060, B1061, B1062, B1063 DIAGNOSIS SENSOR UNIT 53
Description 53
DTC Logic 53
Diagnosis Procedure (Component diagnosis) 54

B1070 ASSIST A/B MODULE 56
Description 56
DTC Logic 56
Diagnosis Procedure (Component diagnosis) 57

B1071 ASSIST A/B MODULE 59
Description 59
DTC Logic 59
Diagnosis Procedure (Component diagnosis) 60

B1072 ASSIST A/B MODULE 62
Description 62
DTC Logic 62
Diagnosis Procedure (Component diagnosis) 63

B1073 ASSIST A/B MODULE 65
Description 65
DTC Logic 65
Diagnosis Procedure (Component diagnosis) 66

B1074, B1075, B1076, B1077, B1078, B1079 DIAGNOSIS SENSOR UNIT 68
Description 68
DTC Logic 68
Diagnosis Procedure (Component diagnosis) 69

B1081 PRE-TEN FRONT RH 71
Description 71
DTC Logic 71
Diagnosis Procedure (Component diagnosis) 72

B1082 PRE-TEN FRONT RH 74
Description 74
DTC Logic 74
Diagnosis Procedure (Component diagnosis) 75

B1083 PRE-TEN FRONT RH 77
Description 77
DTC Logic 77
Diagnosis Procedure (Component diagnosis) 78

B1084 PRE-TEN FRONT RH 80
Description 80
DTC Logic 80
Diagnosis Procedure (Component diagnosis) 81

B1086 PRE-TEN FRONT LH 83
Description 83
DTC Logic 83
Diagnosis Procedure (Component diagnosis) 84

B1087 PRE-TEN FRONT LH 86
Description 86
DTC Logic 86
Diagnosis Procedure (Component diagnosis) 87

B1088 PRE-TEN FRONT LH 89
Description 89
DTC Logic 89
Diagnosis Procedure (Component diagnosis) 90

B1089 PRE-TEN FRONT LH 92
Description 92
DTC Logic 92
Diagnosis Procedure (Component diagnosis) 93

B1106, B1107, B1108, B1109, B1110, B1111 DIAGNOSIS SENSOR UNIT 95
Description 95
DTC Logic 95
Diagnosis Procedure (Component diagnosis) 96

B1113, B1114 SATELLITE SENS RH 98
Description 98
DTC Logic 98
Diagnosis Procedure (Component diagnosis) 99

B1115 SATELLITE SENS RH 101
Description 101
DTC Logic 101
Diagnosis Procedure (Component diagnosis) ... 102

B1118, B1119 SATELLITE SENS LH 104
Description 104
DTC Logic 104
Diagnosis Procedure (Component diagnosis) ... 105

B1120 SATELLITE SENS LH 107
Description 107
DTC Logic 107
Diagnosis Procedure (Component diagnosis) ... 108

B1122, B1123, B1124, B1125, B1126, B1127 DIAGNOSIS SENSOR UNIT 110
Description 110
DTC Logic 110
Diagnosis Procedure (Component diagnosis) ... 111

B1129 SIDE MODULE RH 113
Description 113
DTC Logic 113
Diagnosis Procedure (Component diagnosis) ... 114

B1130 SIDE MODULE RH 116
Description 116
DTC Logic 116
Diagnosis Procedure (Component diagnosis) ... 117

B1131 SIDE MODULE RH 119
Description 119
DTC Logic 119
Diagnosis Procedure (Component diagnosis) ... 120

cardiagn.com

B1132 SIDE MODULE RH 122
Description 122
DTC Logic 122
Diagnosis Procedure (Component diagnosis) ... 123

B1134 SIDE MODULE LH 125
Description 125
DTC Logic 125
Diagnosis Procedure (Component diagnosis) ... 126

B1135 SIDE MODULE LH 128
Description 128
DTC Logic 128
Diagnosis Procedure (Component diagnosis) ... 129

B1136 SIDE MODULE LH 131
Description 131
DTC Logic 131
Diagnosis Procedure (Component diagnosis) ... 132

B1137 SIDE MODULE LH 134
Description 134
DTC Logic 134
Diagnosis Procedure (Component diagnosis) ... 135

B1138, B1139, B1140, B1141, B1142, B1143 DIAGNOSIS SENSOR UNIT 137
Description 137
DTC Logic 137
Diagnosis Procedure (Component diagnosis) ... 138

B1145 CURTAIN MODULE RH 140
Description 140
DTC Logic 140
Diagnosis Procedure (Component diagnosis) ... 141

B1146 CURTAIN MODULE RH 143
Description 143
DTC Logic 143
Diagnosis Procedure (Component diagnosis) ... 144

B1147 CURTAIN MODULE RH 146
Description 146
DTC Logic 146
Diagnosis Procedure (Component diagnosis) ... 147

B1148 CURTAIN MODULE RH 149
Description 149
DTC Logic 149
Diagnosis Procedure (Component diagnosis) ... 150

B1150 CURTAIN MODULE LH 152
Description 152
DTC Logic 152
Diagnosis Procedure (Component diagnosis) ... 153

B1151 CURTAIN MODULE LH 155
Description 155
DTC Logic 155
Diagnosis Procedure (Component diagnosis) ... 156

B1152 CURTAIN MODULE LH 158
Description 158
DTC Logic 158
Diagnosis Procedure (Component diagnosis) ... 159

B1153 CURTAIN MODULE LH 161
Description 161
DTC Logic 161
Diagnosis Procedure (Component diagnosis) ... 162

B1170, B1171, B1172, B1173, B1174, B1175 DIAGNOSIS SENSOR UNIT 164
Description 164
DTC Logic 164
Diagnosis Procedure (Component diagnosis) ... 165

B1177 PRE-TEN2 FRONT RH 167
Description 167
DTC Logic 167
Diagnosis Procedure (Component diagnosis) ... 168

B1178 PRE-TEN2 FRONT RH 170
Description 170
DTC Logic 170
Diagnosis Procedure (Component diagnosis) ... 171

B1179 PRE-TEN2 FRONT RH 173
Description 173
DTC Logic 173
Diagnosis Procedure (Component diagnosis) ... 174

B1180 PRE-TEN2 FRONT RH 176
Description 176
DTC Logic 176
Diagnosis Procedure (Component diagnosis) ... 177

B1182 PRE-TEN2 FRONT LH 179
Description 179
DTC Logic 179
Diagnosis Procedure (Component diagnosis) ... 180

B1183 PRE-TEN2 FRONT LH 182
Description 182
DTC Logic 182
Diagnosis Procedure (Component diagnosis) ... 183

B1184 PRE-TEN2 FRONT LH 185
Description 185
DTC Logic 185
Diagnosis Procedure (Component diagnosis) ... 186

B1185 PRE-TEN2 FRONT LH 188
Description 188
DTC Logic 188
Diagnosis Procedure (Component diagnosis) ... 189

B1202, B1203, B1204, B1205, B1206, B1207 DIAGNOSIS SENSOR UNIT 191
Description 191
DTC Logic 191
Diagnosis Procedure (Component diagnosis) ... 192

B1209 FRONTAL COLLISION DETECTION .. 194

cardiagn.com

Description 194
DTC Logic 194
Diagnosis Procedure (Component diagnosis) 194

B1210 SIDE COLLISION DETECTION 196
Description 196
DTC Logic 196
Diagnosis Procedure (Component diagnosis) 196

ECU DIAGNOSIS 198

DIAGNOSIS SENSOR UNIT 198
DTC Index 198
Wiring Diagram - SRS AIR BAG CONTROL SYSTEM - 206

SYMPTOM DIAGNOSIS 220

SRS AIR BAG SYSTEM 220
Symptom Table 220

PRECAUTION 222

PRECAUTIONS 222
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 222
Service 222

cardiagn.com

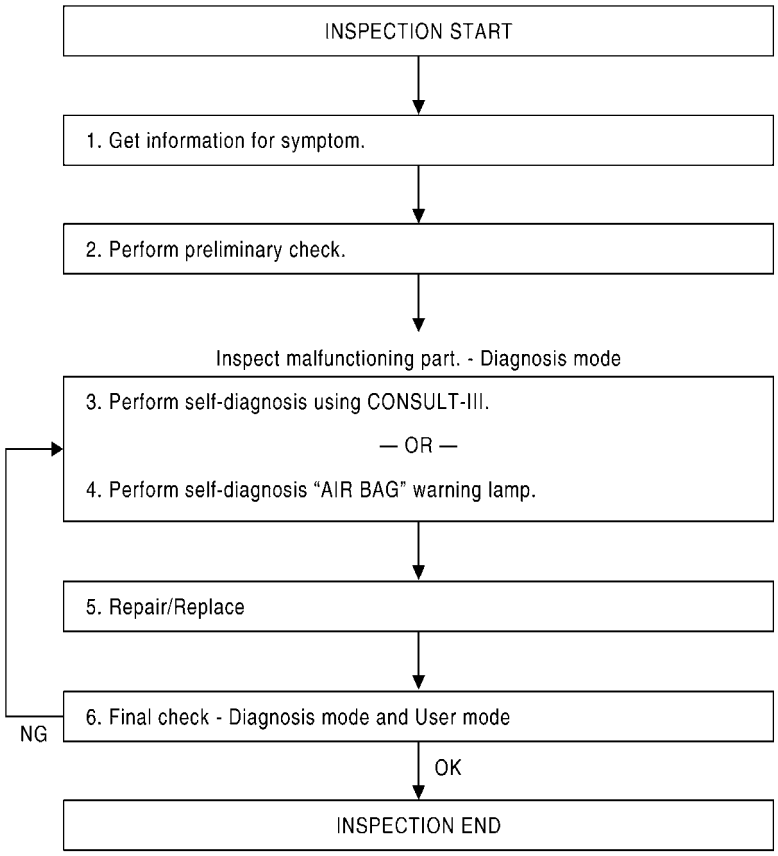
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000001069737

OVERALL SEQUENCE



JMHIA0027GB

DETAILED FLOW

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom.

>> GO TO 2.

2.PERFORM PRELIMINARY CHECK

At the begining of inspection, confirm the condition of power supply circuit, check that the battery is charged and fuses and fusible links are not blown.

Is power supply circuit normal?

YES >> GO TO 3.
NO >> Repair or replace the battery and fuse/fusible links.

3.PERFORM SELF-DIAGNOSIS USING “CONSULT-III” (WITH CONSULT-III)

Is malfunctioning part displayed on CONSULT-III?

YES >> GO TO 4.
NO >> Repeat DTC confirmation with diagnostic procedure.

4.PERFORM SELF-DIAGNOSIS “AIR BAG” WARNING LAMP (WITHOUT CONSULT-III)

Is malfunctioning part detected?

YES >> GO TO 5.
NO >> Repeat DTC confirmation with diagnostic procedure.

5.REPAIR OR REPLACE

Repair or replace the malfunctioning part.

After the malfunctioning is repaired, erase the self-diagnostic result. Refer to SRC-10, "Diagnosis Description".

>> GO TO 6.

6.FINAL CHECK-DIAGNOSIS MODE AND USER MODE

Does any symptom reappear again?

YES >> GO TO 3 or GO TO 4.
NO >> **INSPECTION END.**

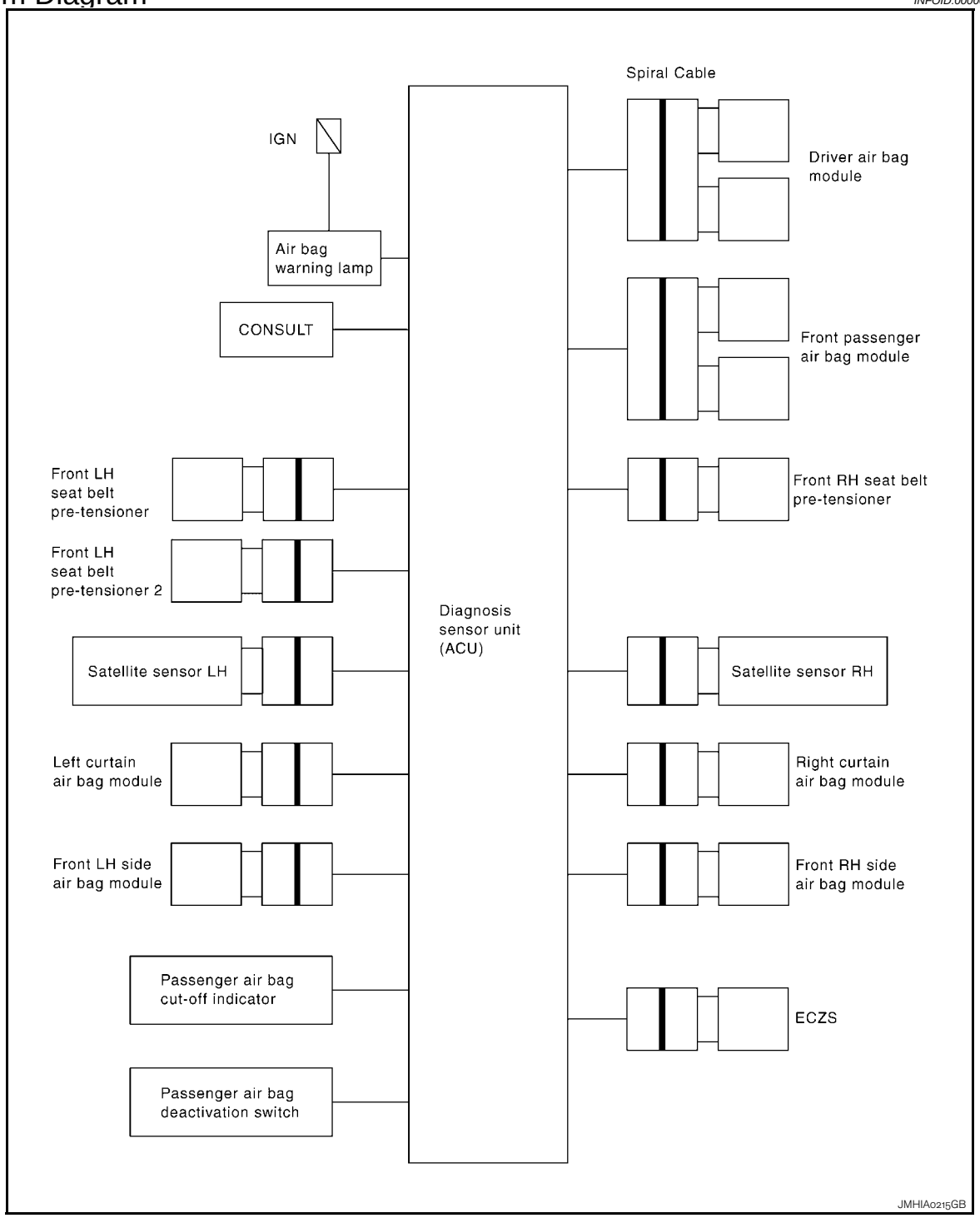
cardiagn.com

FUNCTION DIAGNOSIS

SRS AIR BAG SYSTEM

System Diagram

INFOID:0000000001069738



System Description

INFOID:0000000001069739

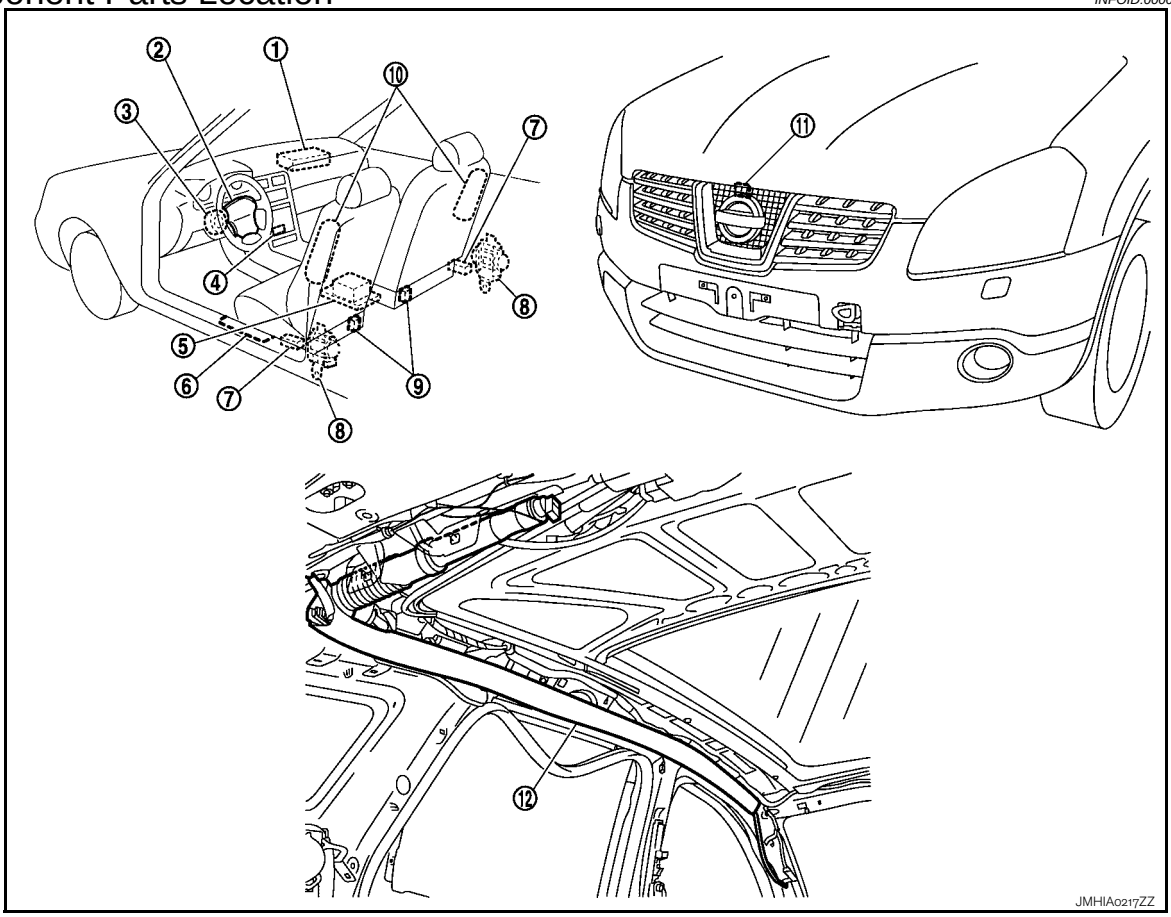
This SRS Air Bag System has the following function.

1. Detect crash and supply the energy for deploying air bag and seat belt pre-tensioner.
2. Detect electrical trouble in air bag system and seat belt pre-tensioner system, record trouble code, and blinking air bag warning lamp.

3. Detect and record the deployment of air bag and seat belt pre-tensioner, and turn on air bag warning lamp.
4. Indicate malfunctioning portion with blinking times of air bag warning lamp in diagnosis mode.
5. Indicate the malfunctioning record by CONSULT-III.

Component Parts Location

INFOID:0000000001069740

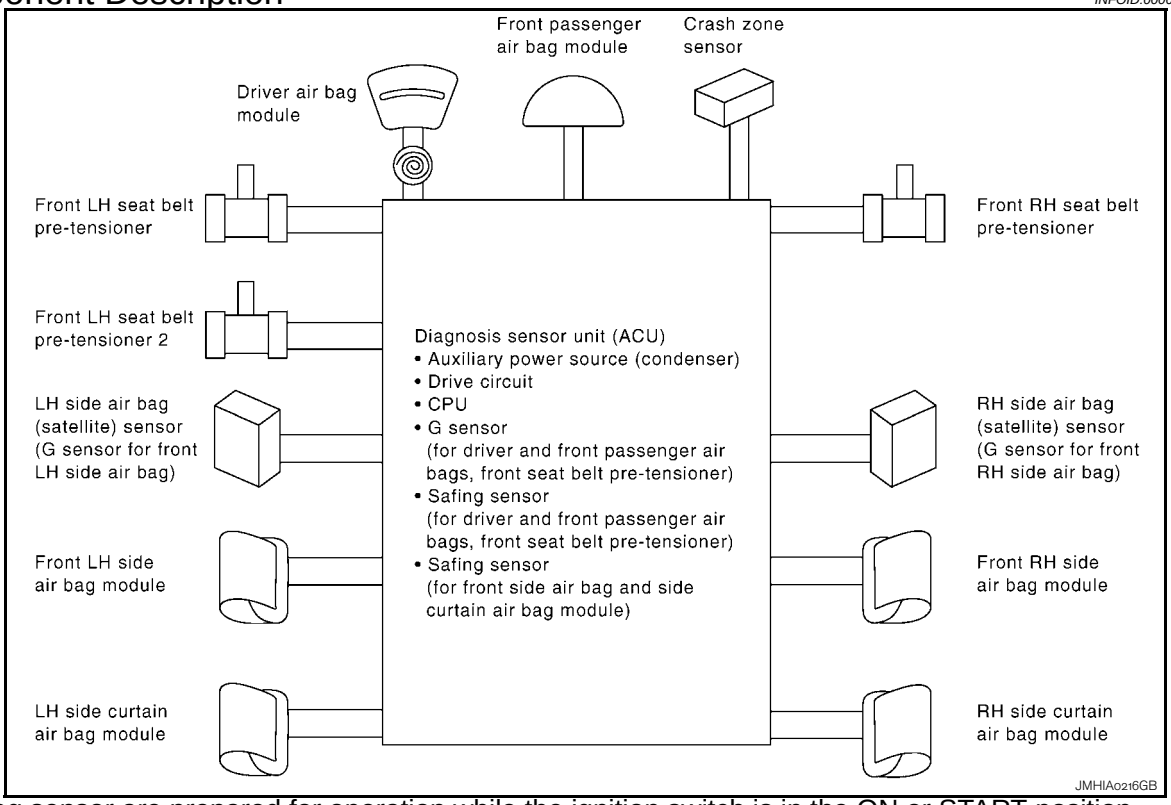


1. Front passenger air bag module
2. Driver air bag module
3. Spiral cable
4. Passenger air bag cut-off indicator
5. Diagnosis sensor unit (ACU)
6. Front seat belt pre-tensioner2
7. Side air bag (satellite) sensor (LH/RH)
8. Front seat belt pre-tensioner (LH/RH)
9. Seat belt buckle switch (LH/RH)
10. Front side air bag module (LH/RH)
11. Crash zone sensor
12. Side curtain air bag module (LH/RH)

cardiagn.com

Component Description

INFOID:0000000001069741



- Air bag sensor are prepared for operation while the ignition switch is in the ON or START position.
- The operation of supplemental restraint system is different from collision modes applicastion. For example the driver air bag module and front passenger air bag module are activated in a frontal collision but not in a side collision.
- SRS configurations which are activated for some collision modes are as follows;

SRS configuration	Frontal collision	Left side collision	Right side collision
Driver air bag module. Refer to SRC-194	×	—	—
Front passenger air bag module. Refer to SRC-194	×	—	—
Front LH seat belt pre-tensioner. Refer to SRC-194	×	—	—
Front RH seat belt pre-tensioner. Refer to SRC-194	×	—	—
Front LH seat belt pre-tensioner2. Refer to SRC-194	×	—	—
Front LH side air bag module. Refer to SRC-196	—	×	—
Front RH side air bag module. Refer to SRC-196	—	—	×
LH side curtain air bag module. Refer to SRC-196	—	×	—
RH side curtain air bag module. Refer to SRC-196	—	—	×

×: Application, —: Not application

DIAGNOSIS SYSTEM (AIRBAG)

Diagnosis Description

INFOID:0000000001069750

CAUTION:

- **Do not use electrical test equipment on any circuit related to the SRS unless instructed in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**
- **Do not repair, splice or modify the SRS wiring harness. If the harness is damaged, replace it with a new one.**
- **Keep ground portion clean.**

DIAGNOSIS FUNCTION

- The SRS self-diagnosis results can be read by using “AIR BAG” warning lamp and/or CONSULT-III.
- The user mode is exclusively prepared for the customer (driver). This mode warns the driver of a system malfunction through the operation of the “AIR BAG” warning lamp.
- The diagnosis mode allows the technician to locate and inspect the malfunctioning part.
- The mode applications for the “AIR BAG” warning lamp and CONSULT-III are as follows:

	User mode	Diagnosis mode	Display type
“AIR BAG” warning lamp	X	X	ON-OFF operation
CONSULT-III	–	X	Monitoring

HOW TO PERFORM TROUBLE DIAGNOSIS FOR QUICK AND ACCURATE REPAIR

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a malfunction. It is important to fully understand the symptoms or conditions for a customer complaint.

Information from Customer

- WHAT..... Vehicle model
- WHEN..... Date, Frequencies
- WHERE..... Road conditions
- HOW..... Operating conditions, Symptoms

Preliminary Check

Check that the following parts are in good order.

- Battery (Refer to PG-3, "How to Handle Battery".)
- Fuse (Refer to PG-71, "Fuse".)
- System component-to-harness connections

HOW TO ERASE SELF-DIAGNOSTIC RESULTS (With CONSULT-III)

- “SELF-DIAG [CURRENT]”
  A current self-diagnosis result is displayed on CONSULT-III screen in real time.
  After the malfunction is repaired completely, no malfunction is detected on “SELF-DIAG [CURRENT]”.
- “SELF-DIAG [PAST]”
  Return to “SELF-DIAG [CURRENT]”CONSULT-lll screen by touching “BACK” key of CONSULT-III and select “SELF-DIAG [CURRENT]” in SELECT DIAG MODE. Touch “ERASE” in “SELF-DIAG [CURRENT]” mode.
  NOTE:
  If the memory of the malfunction in “SELF-DIAG [PAST]” is not erased, the user mode shows the system malfunction by the operation of the warning lamp even if the malfunction is repaired completely.
- “TROUBLE DIAG RECORD”
  The memory of “TROUBLE DIAG RECORD” cannot be erased.

HOW TO ERASE SELF-DIAGNOSTIC RESULTS (Without CONSULT-III)

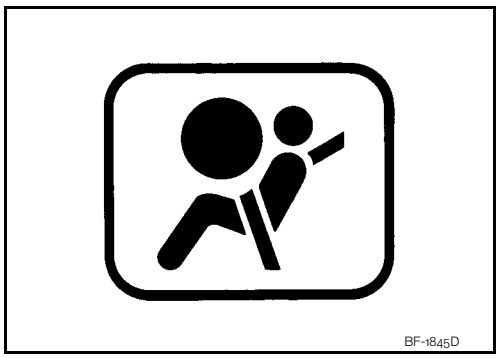
After a malfunction is repaired, turn the ignition switch OFF for at least one second, then turn ignition switch ON diagnosis mode returns to the user mode. At that time the self-diagnosis result is cleared.

cardiagn.com

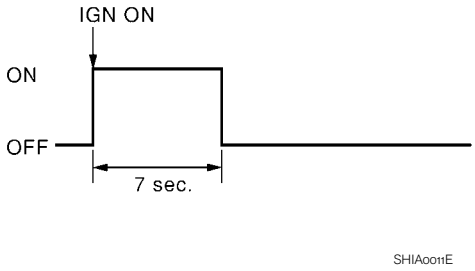
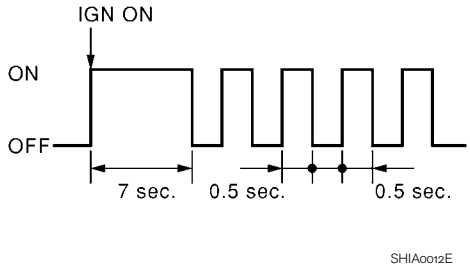
DIAGNOSTIC PROCEDURE (User mode)

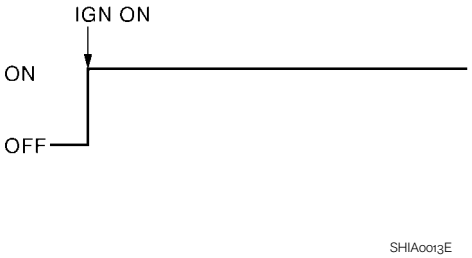
Checking Air bag operation according to “AIR BAG” Warning Lamp-User Mode

1. Turn the ignition switch from OFF to ON, and check that the air bag warning lamp blinks.
2. Compare the SRS air bag warning lamp blinking pattern with the examples.



Warning lamp examples (User mode)

“AIR BAG” warning lamp operation -User mode	SRS condition	Reference item
	• No malfunction is detected. • No further action is necessary.	—
	• The system is malfunctioning and needs to be repaired as indicated.	Go to SRC-10, "Diagnosis Description".

“AIR BAG” warning lamp operation -User mode	SRS condition	Reference item
	• Air bag is deployed. • Seat belt pre-tensioner is deployed.	Go toSRC-194, "Diagnosis Procedure (Component diagnosis)" or SRC-196, "Diagnosis Procedure (Component diagnosis)"
	• Diagnosis sensor unit is malfunctioning. • Air bag power supply circuit is malfunctioning. • SRS air bag warning lamp circuit is malfunctioning.	Go to SRC-220, "Symptom Table".
	• Diagnosis sensor unit is malfunctioning. • Air bag warning lamp circuit is malfunctioning.	Go to SRC-220, "Symptom Table".

DIAGNOSTIC PROCEDURE (With CONSULT-III)

Diagnostic Mode	Description
SELF-DIAG RESULT	The self-diagnosis result is displayed. (SELF-DIAG [CURRENT], [PAST], [RECORD])
ECU DISCRIMINATED No.	The part number of diagnosis sensor unit is displayed.

CONSULT-III Function

INFOID:0000000001069751

DIAGNOSIS MODE FOR CONSULT-III

- “SELF-DIAG [CURRENT]”
  A current self-diagnosis results (also indicated with the number of warning lamp fblinking in diagnosis mode) are displayed on CONSULT-III screen in real time. This refers to a malfunctioning part requiring repairs.
- “SELF-DIAG [PAST]”
  Diagnosis results previously stored in the memory are displayed on CONSULT-III screen. The stored results are not erased until memory erasing is executed.
- “TROUBLE DIAG RECORD”
  With TROUBLE DIAG [RECORD], diagnosis results previously erased by a reset operation can be displayed on CONSULT-Ill screen.
- “ECU DISCRIMINATED NO.”
  The diagnosis sensor unit for each vehicle model is assigned with its own individual classification number. This number will be displayed on CONSULT-III screen, as shown. When replacing the diagnosis sensor unit, refer to the part number for the compatibility. After installation, replacement with a correct unit can be checked by confirming this classification number on CONSULT-III screen.
  After repair, check that the discriminated number of diagnosis sensor unit installed to vehicle are same. Refer to SR-16, "Removal and Installation".

HOW TO CHANGE SELF-DIAGNOSIS MODE WITH CONSULT-III

From User Mode to Diagnosis Mode

After selecting “AIR BAG” on the “SELECT SYSTEM” screen, User mode automatically changes to Diagnosis mode.

cardiagn.com

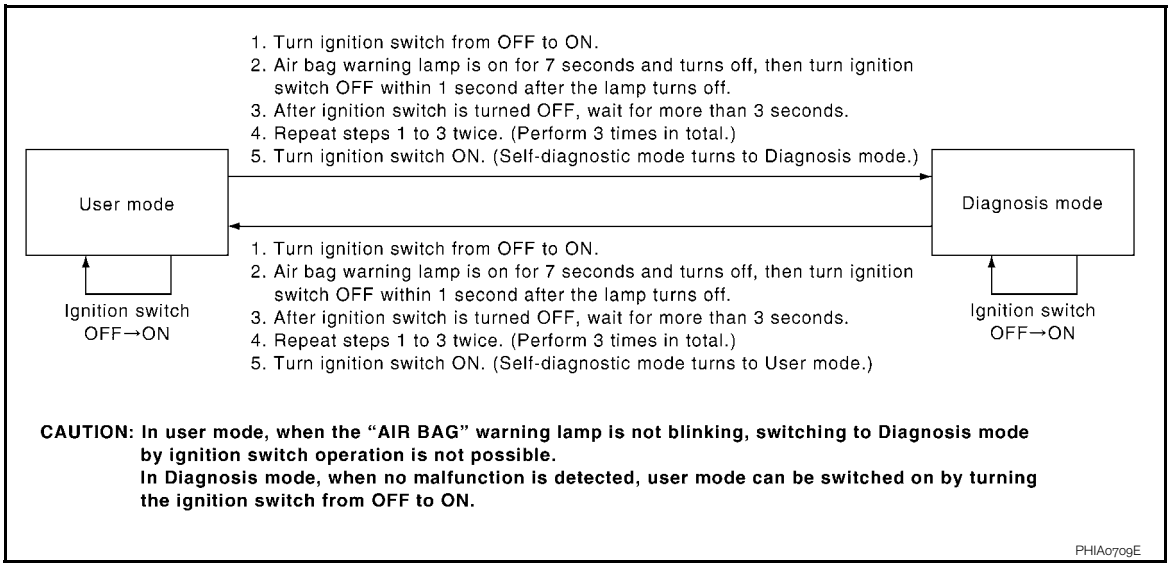
From Diagnosis Mode to User Mode

To return to User mode from Diagnosis mode, touch “BACK” key of CONSULT-III until “SELECT SYSTEM” appears, then diagnosis mode automatically changes to User mode.

SELF-DIAGNOSIS FUNCTION (Without CONSULT-III)

- The reading of these results is accomplished by “User mode” and “Diagnosis mode”.
- After a malfunction is repaired, turn ignition switch ON. Diagnosis mode returns to the user mode. At that time, the self-diagnosis result is cleared.

HOW TO CHANGE SELF-DIAGNOSIS MODE WITHOUT CONSULT-III



COMPONENT DIAGNOSIS

B1001, B1002, B1003, B1004, B1005 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069753

DTC B1001, B1002, B1003, B1004, B1005 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069754

DTC DETECTION LOGIC

With CONSULT-III

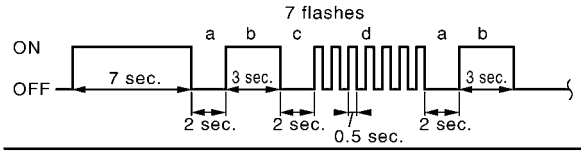
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1001 B1002 B1003 B1004 B1005	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Replace the diagnosis sensor unit (ACU).

JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-15

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-15

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069755

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1006, B1007, B1008, B1009, B1010 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069756

DTC B1006, B1007, B1008, B1009, B1010 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069757

DTC DETECTION LOGIC

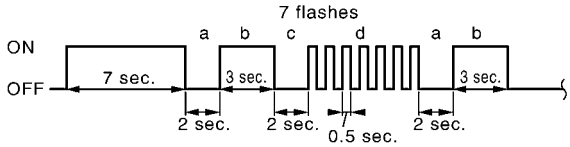
With CONSULT--

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1006 B1007 B1008 B1009 B1010	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>	
Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Replace the diagnosis sensor unit (ACU).

JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

• SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069758

With CONSULT-III

cardiagn.com

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1011, B1012, B1013, B1014, B1015 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069759

DTC B1011, B1012, B1013, B1014, B1015 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069760

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

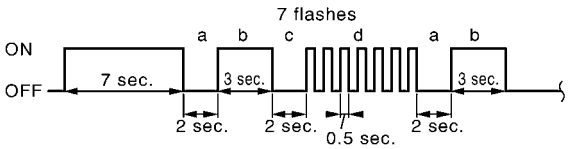
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1011 B1012 B1013 B1014 B1015	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit.	1. Replace the diagnosis sensor unit (ACU).



JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

• SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069761

With CONSULT-III

cardiagn.com

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1023 PASS A/B INDCTR CKT

Description

INFOID:0000000001069771

DTC B1023 PASS A/B INDCTR CKT

It is possible to suppress the deployment of passenger air bag by turning to OFF position the deactivation switch. Passenger air bag cut–off indicator illuminates when the deactivation switch is turned to the OFF position. In case of malfunction the blinking of the SRS air bag warning lamp tells the trouble to driver and by the on board self-diagnosis system or electro diagnosis tester CONSULT-III can detects the cause.

OPERATION

Passenger air bag cut–off indicator illuminates when the deactivation switch is turned to the OFF position.-

STRUCTURE

Passenger air bag cut–off indicator with LED illumination.

INSTALLATION

Passenger air bag cut–off indicator is installed at the instrument panel center.

DTC Logic

INFOID:0000000001069772

DTC DETECTION LOGIC

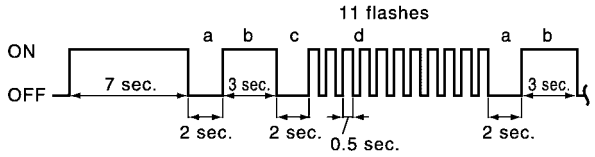
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1023	PASS A/B INDCTR CKT [UNIT FAIL]	Cut–off indicator circuit is open or shorted to ground or the circuits are shorted each other.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag cut–off indicator unit. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front passenger air bag indicator CKT>	
Flash pattern	Repair order
a through d are repeated. d: Eleven flashes indicate malfunctioning front passenger air bag off indicator. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag off indicator unit. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0233GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-24

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-24

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069773

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK PASSENGER AIR BAG CUT–OFF INDICATOR

Is “PASSENGER AIR BAG CUT-OFF INDICATOR” displayed on CONSULT-III?

YES >> Replace passenger air bag cut–off indicator.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1024 PASS A/B DEACT SW

Description

INFOID:0000000001070050

DTC B1024 PASS A/B DEACT SW

It is possible to suppress the deployment of passenger air bag by turning to OFF position the deactivation switch. Passenger air bag cut-off indicator illuminates when the deactivation switch is turned to the OFF position. In case of malfunction the blinking of the SRS air bag warning lamp tells the trouble to driver and by the on board self-diagnosis system or electro diagnosis tester CONSULT-III can detects the cause.

OPERATION

Passenger air bag cut-off indicator illuminates when the deactivation switch is turned to the OFF position.

STRUCTURE

Deactivation switch controls passenger air bag module deployments ON/OFF operation.

INSTALLATION

Passenger air bag deactivation switch is installed at the instrument panel side.

DTC Logic

INFOID:0000000001070051

DTC DETECTION LOGIC

With CONSULT-III

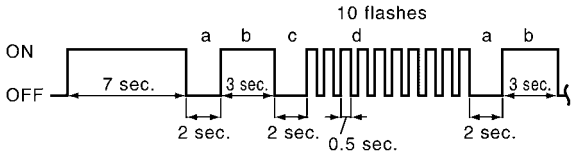
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1024	PASS A/B DEACT SW [UNIT FAIL]	Cut–off telltale circuit is open or shorted to ground or the circuits are shorted each other.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag deactivation switch. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front passenger air bag deactivation switch>

Flash pattern	Repair order
a through d are repeated. d: Ten flashes indicate malfunctioning front passenger air bag deactivation switch. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag deactivation switch. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0228GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-27

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

• SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-27

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070052

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK PASSENGER AIR BAG DEACT SWITCH

-

Is “PASSENGER AIR BAG DEACT SWITCH” displayed on CONSULT-III?

YES >> Replace passenger air bag deactivation switch.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1026, B1027, B1028, B1029, B1030, B1031 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069774

DTC B1026, B1027, B1028, B1029, B1030, B1031 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069775

DTC DETECTION LOGIC

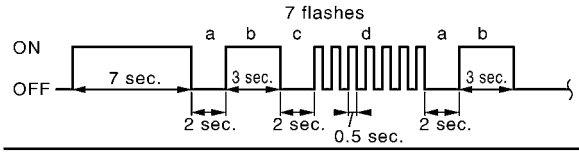
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1026 B1027 B1028 B1029 B1030 B1031	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>	
Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Replace the diagnosis sensor unit (ACU).

JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-30

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-30

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069776

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1033, B1034 CRASH ZONE SEN

Description

INFOID:0000000001069777

DTC B1033, B1034 [UNIT FAIL] CRASH ZONE SENSOR

Main “G” sensor generates signal voltage when it detects deceleration beyond the specified level caused by vehicle frontal collision.

OPERATION

When ACU define the both signal voltage of the “G” sensor and the safing sensor to be that of collision which exceeds specified level, the driving circuit switches on and feed the electric ignitor of both driver and passenger air bags and pre-tensioner seat belt.

STRUCTURE

Integrated type of the “G” sensor element for frontal collision with output terminals for signal voltage.

INSTALLATION

Crash zone sensor is installed on the radiator core support assembly with fixed nuts.

DTC Logic

INFOID:0000000001069778

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD)

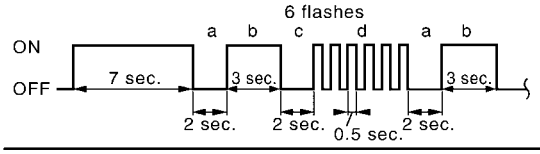
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1033 B1034	CRASH ZONE SENSOR [UNIT FAIL]	crash zone sensor is out of order.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace crash zone sensor. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Crash zone sensor>

Flash pattern	Repair order
a through d are repeated. d: Six flashes indicate malfunctioning crash zone sensor circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the crash zone sensor. 4. Replace the diagnosis sensor unit.



JMHIA0036GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-33

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-33

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069779

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK CRASH ZONE SENSOR

Is crash zone sensor displayed on CONSULT-III?

YES >> Replace crash zone sensor.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1035 CRASH ZONE SEN

Description

INFOID:0000000001069780

DTC B1035 [COMM FAIL] CRASH ZONE SENSOR

Main “G” sensor that generates signal voltage, when it detects deceleration beyond the specified level caused by vehicle frontal collision.

OPERATION

When ACU defines both signal voltage of the “G” sensor and the safing sensor to be that of collision which exceeds specified level, the driving circuit switches on and feed the electric ignitor of both driver and passenger air bags and pre-tensioner seat belt.

STRUCTURE

Integrated type of the “G” sensor element for frontal collision with output terminals for signal voltage.

INSTALLATION

Crash zone sensor is installed on the radiator core support assembly with fixed nuts.

DTC Logic

INFOID:0000000001069781

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

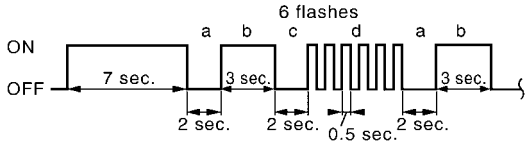
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1035	CRASH ZONE SENSOR [COMM FAIL]	Crash zone sensor is out of order.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace crash zone sensor. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Crash zone sensor>

Flash pattern	Repair order
a through d are repeated. d: Six flashes indicate malfunctioning crash zone sensor circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the crash zone sensor. 4. Replace the diagnosis sensor unit.



JMHIAoo36GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-36

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-36

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069782

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2. CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK CRASH ZONE SENSOR

Is crash zone sensor displayed on CONSULT-III?

YES >> Replace crash zone sensor.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1042, B1043, B1044, B1045, B1046, B1047 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069783

DTC B1042, B1043, B1044, B1045, B1046, B1047 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069784

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

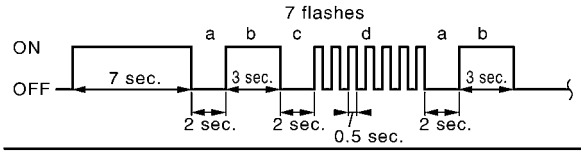
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1042 B1043 B1044 B1045 B1046 B1047	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit.	1. Replace the diagnosis sensor unit (ACU).



JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069785

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1054 DRIVER AIRBAG MODULE

Description

INFOID:0000000001069786

DTC B1054 [OPEN] DRIVER AIRBAG MODULE

For driver “AIR BAG”, crash is judged by main "G" sensor output signal and sub "G" sensor in front direction.

OPERATION

In case of frontal collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Driver air bag module is installed on the center of steering wheel with retaining clips.

DTC Logic

INFOID:0000000001069787

DTC DETECTION LOGIC

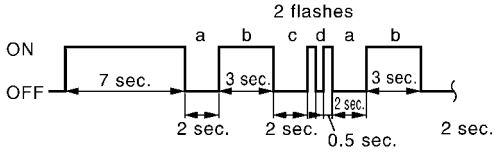
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1054	DRIVER AIRBAG MODULE [OPEN]	Driver air bag module circuit is open (including the spiral cable).	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace driver air bag module. 4. Replace spiral cable. 5. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Driver air bag module>	
Flash pattern	Repair order
a through d are repeated. d: Two flashes indicate malfunctioning driver air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the driver air bag module. 4. Replace the spiral cable. 5. Replace the diagnosis sensor unit (ACU).

JMHIAoo33GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-42

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE--DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice perform three times in all.

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON now in diagnosis mode.

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-42

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069788

With CONSULT-III

CAUTION:

cardiagn.com

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SPIRAL CABLE

Is continuity of spiral cable good?

YES >> GO TO 4.
NO >> Repair or replace spiral cable.

4.CHECK DRIVER AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-lll?

YES >> Replace driver air bag module
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1055 DRIVER AIRBAG MODULE

Description

INFOID:0000000001069789

DTC B1055 [VB-SHORT] DRIVER AIRBAG MODULE

For driver “AIR BAG”, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Driver air bag module is installed on the center of steering wheel with retaining clips.

DTC Logic

INFOID:0000000001069790

DTC DETECTION LOGIC

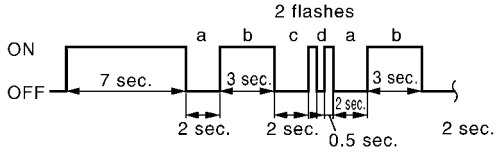
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1055	DRIVER AIRBAG MODULE [VB-SHORT]	Driver air bag module circuit is shorted to some power supply circuit. (including the spiral cable).	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace driver air bag module. 4. Replace spiral cable. 5. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Driver air bag module>	
Flash pattern	Repair order
a through d are repeated. d: Two flashes indicate malfunctioning driver air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the driver air bag module. 4. Replace the spiral cable. 5. Replace the diagnosis sensor unit (ACU).

JMHIA0033GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF- DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-45

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice perform three times in all.

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON now in diagnosis mode.

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-45

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069791

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SPIRAL CABLE

Is continuity of spiral cable good?

YES >> GO TO 4.
NO >> Repair or replace spiral cable.

4.CHECK DRIVER AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-lll?

YES >> Replace driver air bag module
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1056 DRIVER AIRBAG MODULE

Description

INFOID:0000000001069792

DTC B1056 [GND-SHORT] DRIVER AIRBAG MODULE

For driver “AIR BAG”, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Driver air bag module is installed on the center of steering wheel with retaining clips.

DTC Logic

INFOID:0000000001069793

DTC DETECTION LOGIC

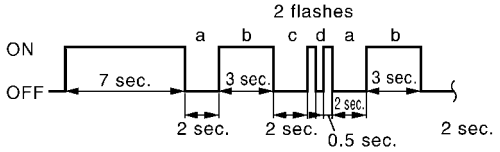
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1056	DRIVER AIRBAG MODULE [GND-SHORT]	Driver air bag module circuit is shorted to ground (including the spiral cable).	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace driver air bag module. 4. Replace spiral cable. 5. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Driver air bag module>	
Flash pattern	Repair order
a through d are repeated. d: Two flashes indicate malfunctioning driver air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the driver air bag module. 4. Replace the spiral cable. 5. Replace the diagnosis sensor unit (ACU).

JMHIAoo33GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-48

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-48

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069794

With CONSULT-III

CAUTION:

cardiagn.com

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SPIRAL CABLE

Is continuity of spiral cable good?

YES >> GO TO 4.
NO >> Repair or replace spiral cable.

4.CHECK DRIVER AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-lll?

YES >> Replace driver air bag module
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1057 DRIVER AIRBAG MODULE

Description

INFOID:0000000001069795

DTC B1057 [SHORT] DRIVER AIRBAG MODULE

For driver “AIR BAG”, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Driver air bag module is installed on the center of steering wheel with retaining clips.

DTC Logic

INFOID:0000000001069796

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

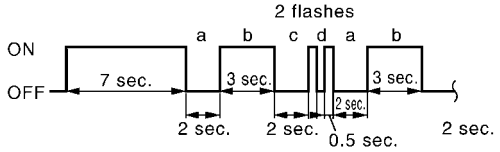
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1057	DRIVER AIRBAG MODULE [SHORT]	Driver air bag module circuit are shorted to each othor (including the spiral cable).	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace driver air bag module. 4. Replace spiral cable. 5. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Driver air bag module>

Flash pattern	Repair order
a through d are repeated. d: Two flashes indicate malfunctioning driver air bag module circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the driver air bag module. 4. Replace the spiral cable. 5. Replace the diagnosis sensor unit (ACU).



JMHIA0033GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-51

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-51

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069797

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SPIRAL CABLE

Is continuity of spiral cable good?

YES >> GO TO 4.
NO >> Repair or replace spiral cable.

4.CHECK DRIVER AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-lll?

YES >> Replace driver air bag module
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1058, B1059, B1060, B1061, B1062, B1063 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069798

DTC B1058, B1059, B1060, B1061, B1062, B1063 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069799

DTC DETECTION LOGIC

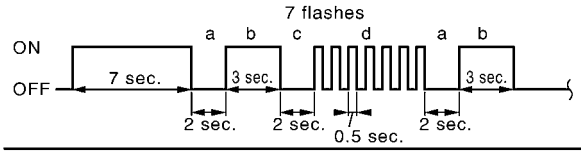
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1058 B1059 B1060 B1061 B1062 B1063	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>	
Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Replace the diagnosis sensor unit (ACU).

JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069800

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1070 ASSIST A/B MODULE

Description

INFOID:0000000001069801

DTC B1070 [OPEN] ASSIST A/B MODULE

For passenger “AIR BAG”, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front passenger air bag module is installed on the instrument panel with fixed bolts.

DTC Logic

INFOID:0000000001069802

DTC DETECTION LOGIC

With CONSULT-III

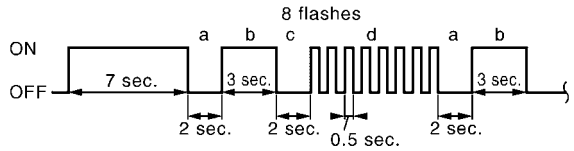
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1070	ASSIST A/B MODULE [OPEN]	Front passenger air bag module circuit is open.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger airbag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front passenger air bag module>

Flash pattern	Repair order
a through d are repeated. d: Eight flashes indicate malfunctioning front passenger air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front passenger air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0035GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-57

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-57

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069803

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK PASSENGER AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace passenger air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1071 ASSIST A/B MODULE

Description

INFOID:0000000001069804

DTC B1071 [VB-SHORT] ASSIST A/B MODULE

For front passenger “AIR BAG”, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front passenger air bag module is installed on the instrument panel with fixed bolts.

DTC Logic

INFOID:0000000001069805

DTC DETECTION LOGIC

With CONSULT-III

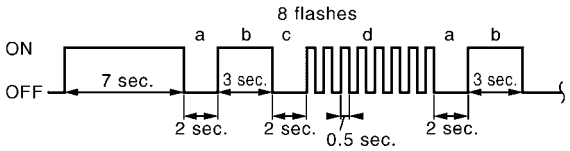
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1071	ASSIST A/B MODULE [VB-SHORT]	Front passenger air bag module circuit is shorted to some power supply circuit.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front passenger air bag module>	
Flash pattern	Repair order
a through d are repeated. d: Eight flashes indicate malfunctioning front passenger air bag module circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front passenger air bag module. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0035GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT” with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-60

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-60

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069806

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK PASSENGER AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace passenger air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1072 ASSIST A/B MODULE

Description

INFOID:0000000001069807

DTC B1072 [GND-SHORT] ASSIST A/B MODULE

For front passenger “AIR BAG”, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front passenger air bag module is installed on the instrument panel with fixed bolts.

DTC Logic

INFOID:0000000001069808

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

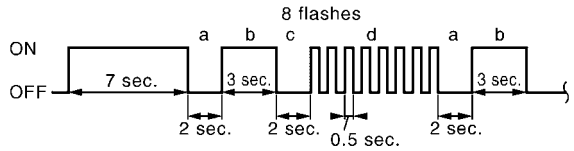
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1072	ASSIST A/B MODULE [GND-SHORT]	Front passenger air bag module circuit is shorted to ground.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front passenger air bag module>

Flash pattern	Repair order
a through d are repeated. d: Eight flashes indicate malfunctioning front passenger air bag module circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front passenger air bag module. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0035GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-63

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

• SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to the blinking times of air bag warning lamp. Refer to SRC-63

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069809

With CONSULT-III

CAUTION:

cardiagn.com

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK PASSENGER AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace passenger air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1073 ASSIST A/B MODULE

Description

INFOID:0000000001069810

DTC B1073 [SHORT] ASSIST A/B MODULE

For front passenger “AIR BAG”, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front passenger air bag module is installed on the instrument panel with fixed bolts.

DTC Logic

INFOID:0000000001069811

DTC DETECTION LOGIC

With CONSULT-III

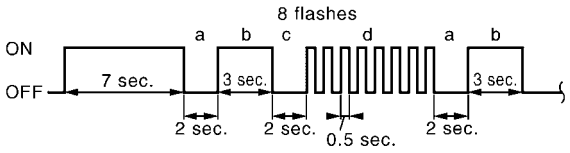
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1073	ASSIST A/B MODULE [SHORT]	Front passenger air bag module circuits are shorted to each othor.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front passenger air bag module>	
Flash pattern	Repair order
a through d are repeated. d: Eight flashes indicate malfunctioning front passenger air bag module circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front passenger air bag module. 4. Replace the diagnosis sensor unit (ACU).



JMHIAoo35GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-66

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-66

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069812

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminal and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK PASSENGER AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace passenger air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1074, B1075, B1076, B1077, B1078, B1079 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069813

DTC B1074, B1075, B1076, B1077, B1078, B1079 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069814

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

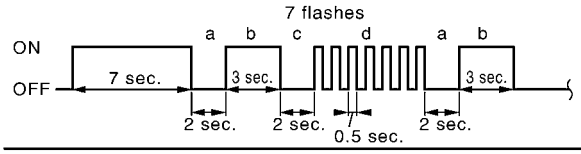
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1074 B1075 B1076 B1077 B1078 B1079	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit.	1. Replace the diagnosis sensor unit (ACU).



JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069815

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1081 PRE-TEN FRONT RH

Description

INFOID:0000000001069816

DTC B1081 [OPEN] PRE-TEN FRONT RH

For seat belt pre-tensioner, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner is installed on the under side of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069817

DTC DETECTION LOGIC

With CONSULT-III

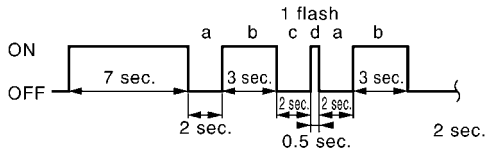
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1081	PRE-TEN FRONT RH [OPEN]	Front RH seat belt pretensioner circuit is open.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: One flash indicates malfunctioning front RH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0037GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-72

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-72

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069818

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2. CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SEAT BELT PRE-TENSIONER

Is “SEAT BELT PRE-TENSIONER” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1082 PRE-TEN FRONT RH

Description

INFOID:0000000001069819

DTC B1082 [VB-SHORT] PRE-TEN FRONT RH

For seat belt pre-tensioner, crash is judged by main "G" sensor output signal and sub "G" sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner is installed on the under side of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069820

DTC DETECTION LOGIC

With CONSULT-III

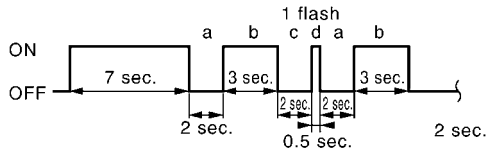
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1082	PRE-TEN FRONT RH [VB-SHORT]	Front RH seat belt pretensioner circuit is shorted to some power supply circuit.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: One flash indicates malfunctioning front RH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0037GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-75

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-75

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069821

With CONSULT-III

CAUTION:

- **Befor servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SEAT BELT PRE-TENSIONER

Is “SEAT BELT PRE-TENSIONER” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1083 PRE-TEN FRONT RH

Description

INFOID:0000000001069822

DTC B1083 [GND-SHORT] PRE-TEN FRONT RH

For seat belt pre-tensioner, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner is installed on the under side of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069823

DTC DETECTION LOGIC

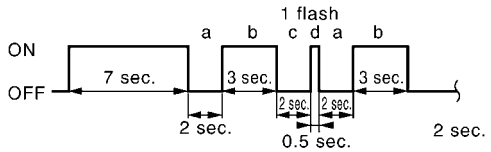
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1083	PRE-TEN FRONT RH [GND-SHORT]	Front RH seat belt pretensioner circuit is shorted to ground.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH seat belt pre-tensioner>	
Flash pattern	Repair order
a through d are repeated. d: One flash indicates malfunctioning front RH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0037GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-78

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-78

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069824

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2. CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SEAT BELT PRE-TENSIONER

Is “SEAT BELT PRE-TENSIONER” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1084 PRE-TEN FRONT RH

Description

INFOID:0000000001069825

DTC B1084 [SHORT] PRE-TEN FRONT RH

For seat belt pre-tensioner, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner is installed on the under side of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069826

DTC DETECTION LOGIC

With CONSULT-III

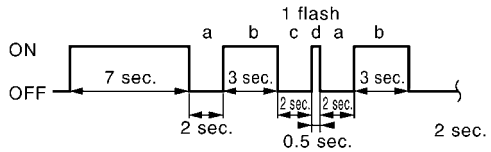
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1084	PRE-TEN FRONT RH [SHORT]	Front RH seat belt pretensioner circuit are shorted to each other.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: One flash indicates malfunctioning front RH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0037GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-81

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-81

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069827

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SEAT BELT PRE-TENSIONER

Is “SEAT BELT PRE-TENSIONER” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1086 PRE-TEN FRONT LH

Description

INFOID:0000000001069828

DTC B1086 [OPEN] PRE-TEN FRONT LH

For seat belt pre-tensioner, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner is installed on the under side of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069829

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

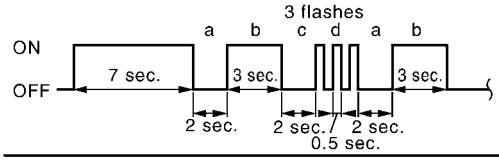
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1086	PRE-TEN FRONT LH [OPEN]	Front LH seat belt pre-tensioner circuit is open.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: Three flashes indicate malfunctioning front LH seat belt pre-tensioner circuit.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0038GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-84

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-84

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069830

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2. CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SEAT BELT PRE-TENSIONER

Is “SEAT BELT PRE-TENSIONER” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1087 PRE-TEN FRONT LH

Description

INFOID:0000000001069831

DTC B1087 [VB-SHORT] PRE-TEN FRONT LH

For seat belt pre-tensioner, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner is installed on the under side of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069832

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

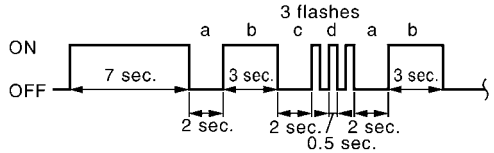
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1087	PRE-TEN FRONT LH [VB-SHORT]	Front LH seat belt pretensioner circuit is shorted to some power supply circuit.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: Three flashes indicate malfunctioning front LH seat belt pre-tensioner circuit.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0038GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-87

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-87

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069833

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SEAT BELT PRE-TENSIONER

Is “SEAT BELT PRE-TENSIONER” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1088 PRE-TEN FRONT LH

Description

INFOID:0000000001069834

DTC B1088 [GND-SHORT] PRE-TEN FRONT LH

For seat belt pre-tensioner, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner is installed on the under side of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069835

DTC DETECTION LOGIC

With CONSULT-III

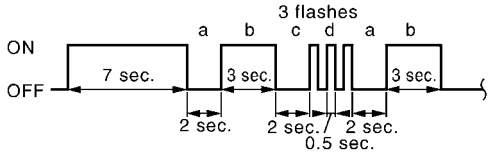
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1088	PRE-TEN FRONT LH [GND-SHORT]	Front LH seat belt pretensioner circuit is shorted to ground.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: Three flashes indicate malfunctioning front LH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0038GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-90

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-90

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069836

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2. CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SEAT BELT PRE-TENSIONER

Is “SEAT BELT PRE-TENSIONER” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1089 PRE-TEN FRONT LH

Description

INFOID:0000000001069837

DTC B1089 [SHORT] PRE-TEN FRONT LH

For seat belt pre-tensioner, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner is installed on the under side of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069838

DTC DETECTION LOGIC

With CONSULT-III

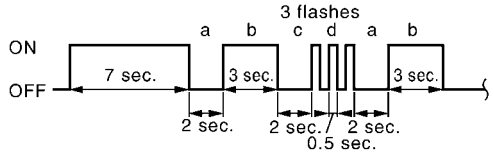
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1089	PRE-TEN FRONT LH [SHORT]	Front LH seat belt pretensioner circuit are shorted to each other.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: Three flashes indicate malfunctioning front LH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0038GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-93

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-93

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069839

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SEAT BELT PRE-TENSIONER

Is “SEAT BELT PRE-TENSIONER” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1106, B1107, B1108, B1109, B1110, B1111 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069840

DTC B1106, B1107, B1108, B1109, B1110, B1111 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069841

DTC DETECTION LOGIC

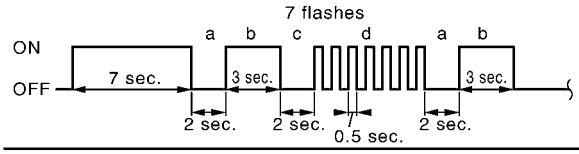
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1106 B1107 B1108 B1109 B1110 B1111	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>	
Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Replace the diagnosis sensor unit (ACU).

JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069842

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1113, B1114 SATELLITE SENS RH

Description

INFOID:0000000001069843

DTC B1113, B1114 [UNIT FAIL] SATELLITE SENS RH

Main “G” sensor generates signal voltage when it detects deceleration beyond the specified level by vehicle side collision.

OPERATION

When ACU define the both signal voltage of the “G” sensor and the Safing sensor to be that of collision which exceeds specified level, the driving circuit switches on and feed the electric ignitor of both the side air bag and curtain air bag.

STRUCTURE

Integrated type of the “G” sensor element for side collision with output terminals for signal voltage.

INSTALLATION

Satellite sensor is installed at the underside of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069844

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

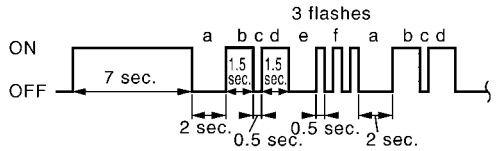
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1113 B1114	SATELLITE SENS RH [UNIT FAIL]	RH satellite sensor is out of order.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace RH satellite sensor. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<RH side air bag (Satellite) sensor>

Flash pattern	Repair order
a through f are repeated. f: Three flashes indicate malfunctioning RH side air bag (Satellite) sensor circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit.



JMHIA0039GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-99

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-99

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069845

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SATELLITE SENSOR

Is “SATELLITE SENSOR” displayed on CONSULT-III?

YES >> Replace satellite sensor.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1115 SATELLITE SENS RH

Description

INFOID:0000000001069846

DTC B1115 [COMM FAIL] SATELLITE SENS RH

Main “G” sensor generates signal voltage when it detects deceleration beyond the specified level by vehicle side collision.

OPERATION

When ACU defines both signal voltage of the “G” sensor and the Safing sensor to be that of collision which exceeds specified level, the driving circuit switches on and feed the electric ignitor of both the side air bag and curtain air bag.

STRUCTURE

Integrated type of the “G” sensor element for side collision with output terminals for signal voltage.

INSTALLATION

Satellite sensor is installed at the underside of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069847

DTC DETECTION LOGIC

With CONSULT-III

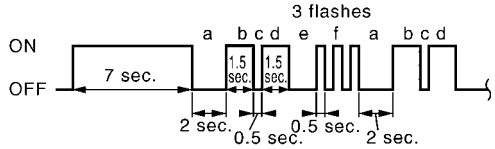
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1115	SATELLITE SENS RH [COMM FAIL]	RH satellite sensor is out of order.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace RH satellite sensor. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<RH side air bag (Satellite) sensor>	
Flash pattern	Repair order
a through f are repeated. f: Three flashes indicate malfunctioning RH side air bag (Satellite) sensor circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit.



JMHIA0039GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-102

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-102

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069848

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SATELLITE SENSOR

Is “SATELLITE SENSOR” displayed on CONSULT-III?

YES >> Replace satellite sensor.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1118, B1119 SATELLITE SENS LH

Description

INFOID:0000000001069849

DTC B1118, B1119 [UNIT FAIL] SATELLITE SENS LH

Main “G” sensor generates signal voltage when it detects deceleration beyond the specified level by vehicle side collision.

OPERATION

When ACU defines both signal voltage of the “G” sensor and the Safing sensor to be that of collision which exceeds specified level, the driving circuit switches on and feed the electric ignitor of both the side air bag and curtain air bag.

STRUCTURE

Integrated type of the “G” sensor element for side collision with out put terminals for signal voltage.

INSTALLATION

Satellite sensor is installed at the under side of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069850

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

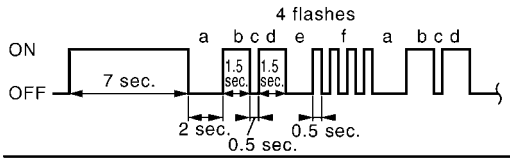
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1118 B1119	SATELLITE SENS LH [UNIT FAIL]	LH satellite sensor is out of order.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace LH satellite sensor. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<LH side air bag (Satellite) sensor>

Flash pattern	Repair order
a through f are repeated. f: Four flashes indicate malfunctioning LH side air bag (Satellite) sensor.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit.



JMHIA0040GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-105

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-105

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069851

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SATELLITE SENSOR

Is “SATELLITE SENSOR” displayed on CONSULT-III?

YES >> Replace satellite sensor.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1120 SATELLITE SENS LH

Description

INFOID:0000000001069852

DTC B1120 [COMM FAIL] SATELLITE SENS LH

Main “G” sensor generates signal voltage when it detects deceleration beyond the specified level by vehicle side collision.

OPERATION

When ACU defines both signal voltage of the “G” sensor and the Safing sensor to be that of collision which exceeds specified level, the driving circuit switches on and feed the electric ignitor of both the side air bag and curtain air bag.

STRUCTURE

Integrated type of the “G” sensor element for side collision with output terminals for signal voltage.

INSTALLATION

Satellite sensor is installed at the underside of center pillar with fixed nuts.

DTC Logic

INFOID:0000000001069853

DTC DETECTION LOGIC

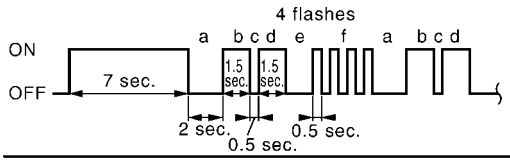
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1120	SATELLITE SENS LH [COMM FAIL]	LH satellite sens is out of order.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace LH satellite sens. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<LH side air bag (Satellite) sensor>	
Flash pattern	Repair order
a through f are repeated. f: Four flashes indicate malfunctioning LH side air bag (Satellite) sensor. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit.

JMHIA0040GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-108

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-108

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069854

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2. CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SATELLITE SENSOR

Is “SATELLITE SENSOR” displayed on CONSULT-III?

YES >> Replace satellite sensor.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1122, B1123, B1124, B1125, B1126, B1127 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069855

DTC B1122, B1123, B1124, B1125, B1126, B1127 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069856

DTC DETECTION LOGIC

With CONSULT-III

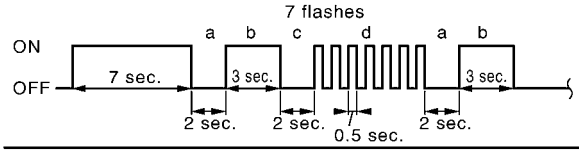
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1122 B1123 B1124 B1125 B1126 B1127	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Replace the diagnosis sensor unit (ACU).

JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069857

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1129 SIDE MODULE RH

Description

INFOID:0000000001069858

DTC B1129 [OPEN] SIDE MODULE RH

For side air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Front side air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front side air bag module is installed on the side of front seatback with fixed nuts.

DTC Logic

INFOID:0000000001069859

DTC DETECTION LOGIC

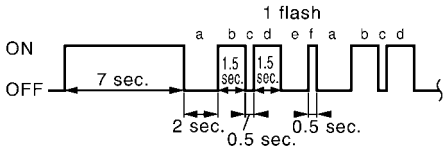
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1129	SIDE MODULE RH [OPEN]	Front RH side air bag module circuit is open.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH side air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH side air bag module>	
Flash pattern	Repair order
a through f are repeated. f: One flash indicates malfunctioning front RH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front RH side air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0041GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-114

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-114

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069860

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2. CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SIDE AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1130 SIDE MODULE RH

Description

INFOID:0000000001069861

DTC B1130 [VB-SHORT] SIDE MODULE RH

For side air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Front side air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front side air bag module is installed on the side of front seatback with fixed nuts.

DTC Logic

INFOID:0000000001069862

DTC DETECTION LOGIC

With CONSULT-III

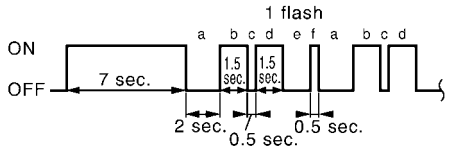
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1130	SIDE MODULE RH [VB-SHORT]	Front RH side air bag module circuit is shorted to some power supply circuit.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH side air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: One flash indicates malfunctioning front RH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front RH side air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0041GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-117

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-117

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069863

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1131 SIDE MODULE RH

Description

INFOID:0000000001069864

DTC B1131 [GND-SHORT] SIDE MODULE RH

For side air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Front side air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front side air bag module is installed on the side of front seatback with fixed nuts.

DTC Logic

INFOID:0000000001069865

DTC DETECTION LOGIC

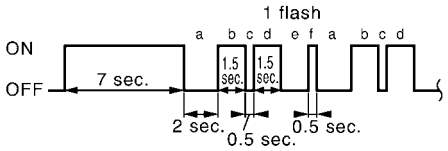
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1131	SIDE MODULE RH [GND-SHORT]	Front RH side air bag module circuit is shorted to ground.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH side air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH side air bag module>	
Flash pattern	Repair order
a through f are repeated. f: One flash indicates malfunctioning front RH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front RH side air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0041GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-120

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-120

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069866

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1132 SIDE MODULE RH

Description

INFOID:0000000001069867

DTC B1132 [SHORT] SIDE MODULE RH

For side air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Front side air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front side air bag module is installed on the side of front seatback with fixed nuts.

DTC Logic

INFOID:0000000001069868

DTC DETECTION LOGIC

With CONSULT-III

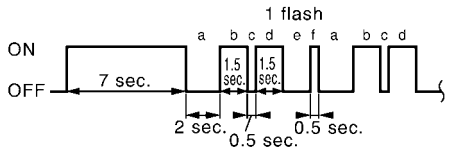
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1132	SIDE MODULE RH [SHORT]	Front RH side air bag module circuit are shorted to each other.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH side air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: One flash indicates malfunctioning front RH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front RH side air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0041GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-123

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-123

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069869

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1134 SIDE MODULE LH

Description

INFOID:0000000001069870

DTC B1134 [OPEN] SIDE MODULE LH

For side air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Front side air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front side air bag module is installed on the side of front seatback with fixed nuts.

DTC Logic

INFOID:0000000001069871

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

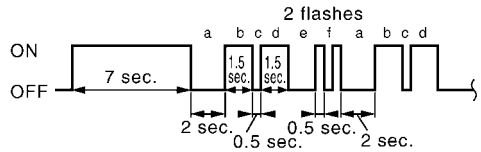
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1134	SIDE MODULE LH [OPEN]	Front LH side air bag module circuit is open.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH side air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: Two flashes indicate malfunctioning front LH side air bag module circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front LH side air bag module. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0042GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-126

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunction portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-126

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069872

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1135 SIDE MODULE LH

Description

INFOID:0000000001069873

DTC B1135 [VB-SHORT] SIDE MODULE LH

For side air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Front side air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front side air bag module is installed on the side of front seatback with fixed nuts.

DTC Logic

INFOID:0000000001069874

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

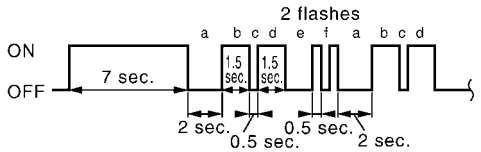
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1135	SIDE MODULE LH [VB-SHORT]	Front LH side air bag module circuit is shorted to some power supply circuit.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH side air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: Two flashes indicate malfunctioning front LH side air bag module circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front LH side air bag module. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0042GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-129

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunction portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-129

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069875

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1136 SIDE MODULE LH

Description

INFOID:0000000001069876

DTC B1136 [GND-SHORT] SIDE MODULE LH

For side air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Front side air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front side air bag module is installed on the side of front seatback with fixed nuts.

DTC Logic

INFOID:0000000001069877

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

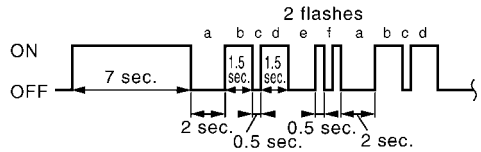
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1136	SIDE MODULE LH [GND-SHORT]	Front LH side air bag module circuit is shorted to ground.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH side air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: Two flashes indicate malfunctioning front LH side air bag module circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front LH side air bag module. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0042GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-132

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-132

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069878

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1137 SIDE MODULE LH

Description

INFOID:0000000001069879

DTC B1137 [SHORT] SIDE MODULE LH

For side air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Front side air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Front side air bag module is installed on the side of front seatback with fixed nuts.

DTC Logic

INFOID:0000000001069880

DTC DETECTION LOGIC

With CONSULT-III

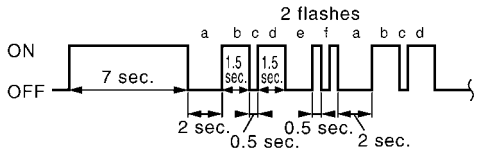
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1137	SIDE MODULE LH [SHORT]	Front LH side air bag module circuit are shorted to each other.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH side air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: Two flashes indicate malfunctioning front LH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front LH side air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0042GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer toSRC-135

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp lilluminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-135

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069881

cardiagn.com

With CONSULT-III

CAUTION:

- **Befor servicing, turn ignition switch OFF, disconnect both battery terminal and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use un specified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1138, B1139, B1140, B1141, B1142, B1143 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069882

DTC B1138, B1139, B1140, B1141, B1142, B1143 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069883

DTC DETECTION LOGIC

With CONSULT-III

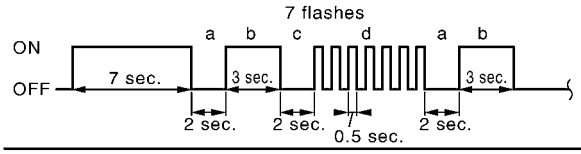
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1138 B1139 B1140 B1141 B1142 B1143	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Replace the diagnosis sensor unit (ACU).

JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069884

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2. CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1145 CURTAIN MODULE RH

Description

INFOID:0000000001069885

DTC B1145 [OPEN] CURTAIN MODULE RH

For curtain air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Curtain air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Curtain air bag module is installed on the roof side with fixed bolts.

DTC Logic

INFOID:0000000001069886

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

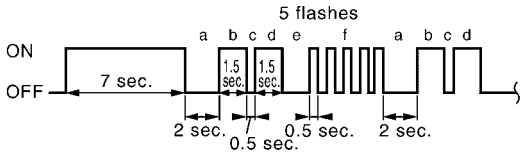
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1145	CURTAIN MODULE RH [OPEN]	RH curtain air bag module circuit is open.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace RH curtain air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<RH side curtain air bag module>

Flash pattern	Repair order
a through f are repeated. f: Five flashes indicate malfunctioning RH side curtain air bag module circuit.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the related harness.



PHIA1240E

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-141

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctiopning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-141

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069887

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE CURTAIN AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side curtain air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1146 CURTAIN MODULE RH

Description

INFOID:0000000001069888

DTC B1146 [VB-SHORT] CURTAIN MODULE RH

For curtain air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Curtain air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Curtain air bag module is installed on the roof side with fixed bolts.

DTC Logic

INFOID:0000000001069889

DTC DETECTION LOGIC

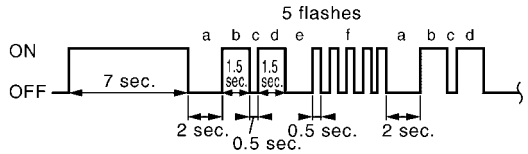
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1146	CURTAIN MODULE RH [VB-SHORT]	RH side curtain air bag module circuit is shorted to some power supply circuit.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace RH side curtain air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<RH side curtain air bag module>	
Flash pattern	Repair order
a through f are repeated. f: Five flashes indicate malfunctioning RH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side curtain air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0043GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-144

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-144

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069890

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE CURTAIN AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side curtain air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1147 CURTAIN MODULE RH

Description

INFOID:0000000001069891

DTC B1147 [GND-SHORT] CURTAIN MODULE RH

For curtain air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Curtain air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Curtain air bag module is installed on the roof side with fixed bolts.

DTC Logic

INFOID:0000000001069892

DTC DETECTION LOGIC

With CONSULT-III

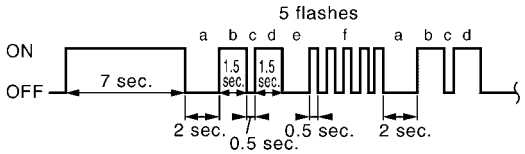
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1147	CURTAIN MODULE RH [GND-SHORT]	RH curtain air bag module circuit is shorted to ground.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace RH curtain air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<RH side curtain air bag module>

Flash pattern	Repair order
a through f are repeated. f: Five flashes indicate malfunctioning RH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side curtain air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0043GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-147

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-147

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069893

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE CURTAIN AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side curtain air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1148 CURTAIN MODULE RH

Description

INFOID:0000000001069894

DTC B1148 [SHORT] CURTAIN MODULE RH

For curtain air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Curtain air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Curtain air bag module is installed on the roof side with fixed bolts.

DTC Logic

INFOID:0000000001069895

DTC DETECTION LOGIC

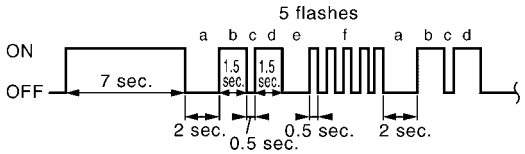
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1148	CURTAIN MODULE RH [SHORT]	RH curtain air bag module circuit are shorted to each other.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace RH curtain air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<RH side curtain air bag module>	
Flash pattern	Repair order
a through f are repeated. f: Five flashes indicate malfunctioning RH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side curtain air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0043GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-150

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-150

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069896

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE CURTAIN AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side curtain air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1150 CURTAIN MODULE LH

Description

INFOID:0000000001069897

DTC B1150 [OPEN] CURTAIN MODULE LH

For curtain air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Curtain air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Curtain air bag module is installed on the roof side with fixed bolts.

DTC Logic

INFOID:0000000001069898

DTC DETECTION LOGIC

With CONSULT-III

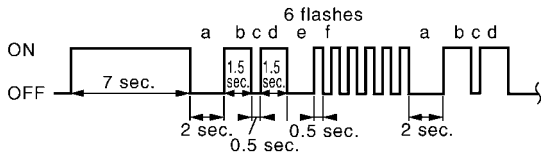
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1150	CURTAIN MODULE LH [OPEN]	LH curtain air bag module circuit is open.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace LH curtain air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<LH side curtain air bag module>

Flash pattern	Repair order
a through f are repeated. f: Six flashes indicate malfunctioning LH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side curtain air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0044GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-153

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-153

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069899

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE CURTAIN AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side curtain air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1151 CURTAIN MODULE LH

Description

INFOID:0000000001069900

DTC B1151 [VB-SHORT] CURTAIN MODULE LH

For curtain air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Curtain air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Curtain air bag module is installed on the roof side with fixed bolts.

DTC Logic

INFOID:0000000001069901

DTC DETECTION LOGIC

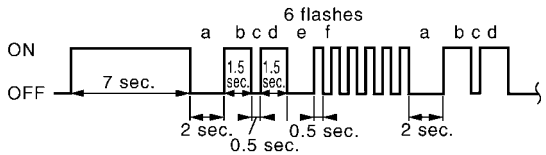
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1151	CURTAIN MODULE LH [VB-SHORT]	LH curtain air bag module circuit is shorted to some power supply circuit.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace LH curtain air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<LH side curtain air bag module>	
Flash pattern	Repair order
a through f are repeated. f: Six flashes indicate malfunctioning LH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side curtain air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0044GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-156

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-156

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069902

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE CURTAIN AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side curtain air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1152 CURTAIN MODULE LH

Description

INFOID:0000000001069903

DTC B1152 [GND-SHORT] CURTAIN MODULE LH

For curtain air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Curtain air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Curtain air bag module is installed on the roof side with fixed bolts.

DTC Logic

INFOID:0000000001069904

DTC DETECTION LOGIC

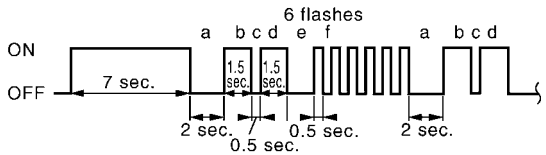
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“”SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1152	CURTAIN MODULE LH [GND-SHORT]	LH curtain air bag module circuit is shorted to ground.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace LH curtain airbag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<LH side curtain air bag module>	
Flash pattern	Repair order
a through f are repeated. f: Six flashes indicate malfunctioning LH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side curtain air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0044GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-159

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-159

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069905

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE CURTAIN AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side curtain air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1153 CURTAIN MODULE LH

Description

INFOID:0000000001069906

DTC B1153 [SHORT] CURTAIN MODULE LH

For curtain air bag, crash is judged by main “G” sensor output signal (left side: left satellite sensor, right side: right satellite sensor) and sub “G” sensor (right and left GP in center unit).

OPERATION

In case of collision whose acceleration exceeds the specified level, the ignition materials are ignited by electric ignition system. The system burns and introduces the chemical reaction of gas generating materials to generate hot gases that flow into the air bag through a filter and expand the bag.

STRUCTURE

Curtain air bag module mainly consists of air bag and inflator which inflates air bag.

INSTALLATION

Curtain air bag module is installed on the roof side with fixed bolts.

DTC Logic

INFOID:0000000001069907

DTC DETECTION LOGIC

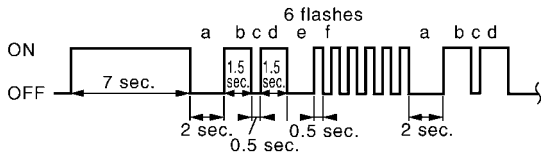
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1153	CURTAIN MODULE LH [SHORT]	LH curtain air bag module circuit are shorted to each other.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace LH curtain air bag module. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<LH side curtain air bag module>	
Flash pattern	Repair order
a through f are repeated. f: Six flashes indicate malfunctioning LH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side curtain air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0044GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-162

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-162

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069908

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SIDE CURTAIN AIR BAG MODULE

Is “AIR BAG” displayed on CONSULT-III?

YES >> Replace side curtain air bag module.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1170, B1171, B1172, B1173, B1174, B1175 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001070023

DTC B1170, B1171, B1172, B1173, B1174, B1175 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001070024

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

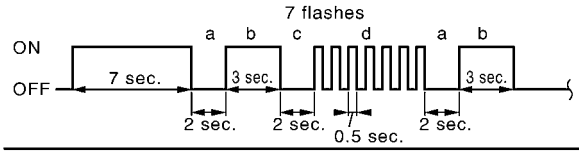
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1170 B1171 B1172 B1173 B1174 B1175	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit.	1. Replace the diagnosis sensor unit (ACU).



JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070025

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1177 PRE-TEN2 FRONT RH

Description

INFOID:0000000001070026

DTC B1177 [OPEN] PRE-TEN2 FRONT RH

For seat belt pre-tensioner2, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner2 is installed on the under side of center pillar with fixed bolt.

DTC Logic

INFOID:0000000001070027

DTC DETECTION LOGIC

With CONSULT-III

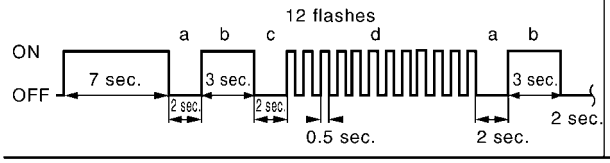
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1177	PRE-TEN2 FRONT RH [OPEN]	Front RH seat belt pre-tensioner2 circuit is open.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Twelve flashes indicates malfunctioning front RH seat belt pre-tensioner 2 circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0223GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-168

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-168

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070028

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2. CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SEAT BELT PRE-TENSIONER2

Is “SEAT BELT PRE-TENSIONER2” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner2.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1178 PRE-TEN2 FRONT RH

Description

INFOID:0000000001070029

DTC B1178 [VB-SHORT] PRE-TEN2 FRONT RH

For seat belt pre-tensioner2, crash is judged by main "G" sensor output signal and sub "G" sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner2 is installed on the under side of center pillar with fixed bolt.

DTC Logic

INFOID:0000000001070030

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index ("SELF-DIAG [CURRENT]"), ("SELF-DIAG [PAST]" or "TROUBLE DIAG RECORD")

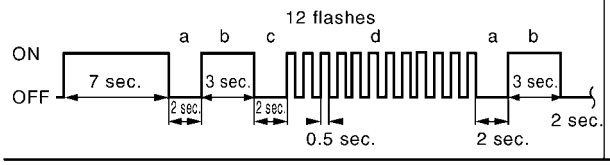
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1178	PRE-TEN2 FRONT RH [VB-SHORT]	Front RH seat belt pre-tensioner2 circuit is shorted to some power supply circuit.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Twelve flashes indicates malfunctioning front RH seat belt pre-tensioner 2 circuit.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0223GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-171

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

• SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-171

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070031

cardiagn.com

With CONSULT-III

CAUTION:

- **Befor servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SEAT BELT PRE-TENSIONER2

Is “SEAT BELT PRE-TENSIONER2” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner2.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1179 PRE-TEN2 FRONT RH

Description

INFOID:0000000001070032

DTC B1179 [GND-SHORT] PRE-TEN2 FRONT RH

For seat belt pre-tensioner2, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner2 is installed on the under side of center pillar with fixed bolt.

DTC Logic

INFOID:0000000001070033

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

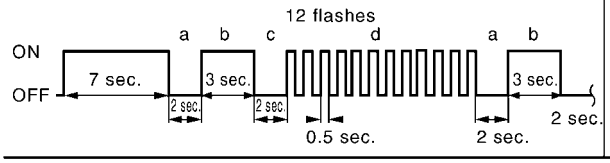
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1179	PRE-TEN2 FRONT RH [GND-SHORT]	Front RH seat belt pre-tensioner2 circuit is shorted to ground.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Twelve flashes indicates malfunctioning front RH seat belt pre-tensioner 2 circuit.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0223GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-174

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-174

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070034

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2. CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SEAT BELT PRE-TENSIONER2

Is “SEAT BELT PRE-TENSIONER2” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner2.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1180 PRE-TEN2 FRONT RH

Description

INFOID:0000000001070035

DTC B1180 [SHORT] PRE-TEN2 FRONT RH

For seat belt pre-tensioner2, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner2 is installed on the under side of center pillar with fixed bolt.

DTC Logic

INFOID:0000000001070036

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

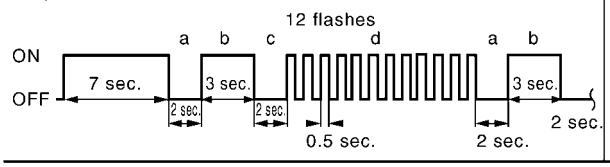
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1180	PRE-TEN2 FRONT RH [SHORT]	Front RH seat belt pre-tensioner2 circuit are shorted to each other.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front RH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Twelve flashes indicates malfunctioning front RH seat belt pre-tensioner 2 circuit.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0223GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-177

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-177

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070037

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SEAT BELT PRE-TENSIONER2

Is “SEAT BELT PRE-TENSIONER2” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner2.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1182 PRE-TEN2 FRONT LH

Description

INFOID:0000000001070038

DTC B1182 [OPEN] PRE-TEN2 FRONT LH

For seat belt pre-tensioner2, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner2 is installed on the under side of center pillar with fixed bolt.

DTC Logic

INFOID:0000000001070039

DTC DETECTION LOGIC

With CONSULT-III

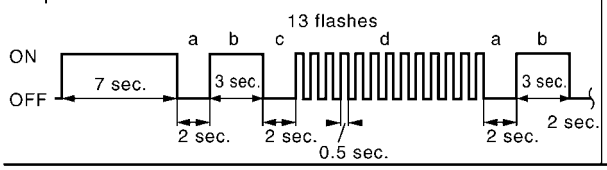
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1182	PRE-TEN2 FRONT LH [OPEN]	Front LH seat belt pre-tensioner2 circuit is open.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Thirteen flashes indicate malfunctioning front LH seat belt pre-tensioner 2 circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0222GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-180

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-180

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070040

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2. CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SEAT BELT PRE-TENSIONER2

Is “SEAT BELT PRE-TENSIONER2” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner2.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1183 PRE-TEN2 FRONT LH

Description

INFOID:0000000001070041

DTC B1183 [VB-SHORT] PRE-TEN2 FRONT LH

For seat belt pre-tensioner2, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner2 is installed on the under side of center pillar with fixed bolt.

DTC Logic

INFOID:0000000001070042

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

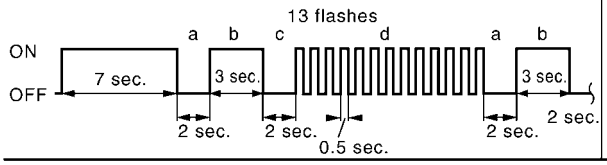
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1183	PRE-TEN2 FRONT LH [VB-SHORT]	Front LH seat belt pre-tensioner2 circuit is shorted to some power supply circuit.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Thirteen flashes indicate malfunctioning front LH seat belt pre-tensioner 2 circuit.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0222GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-183

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-183

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070043

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SEAT BELT PRE-TENSIONER2

Is “SEAT BELT PRE-TENSIONER2” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner2.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1184 PRE-TEN2 FRONT LH

Description

INFOID:0000000001070044

DTC B1184 [GND-SHORT] PRE-TEN2 FRONT LH

For seat belt pre-tensioner2, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner2 is installed on the under side of center pillar with fixed bolt.

DTC Logic

INFOID:0000000001070045

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

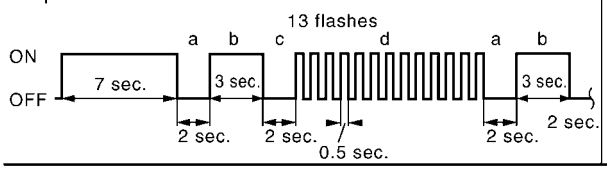
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1184	PRE-TEN2 FRONT LH [GND-SHORT]	Front LH seat belt pre-tensioner2 circuit is shorted to ground.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Thirteen flashes indicate malfunctioning front LH seat belt pre-tensioner 2 circuit.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).



JMHIA0222GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-186

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-186

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070046

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2. CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3. CHECK SEAT BELT PRE-TENSIONER2

Is “SEAT BELT PRE-TENSIONER2” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner2.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1185 PRE-TEN2 FRONT LH

Description

INFOID:0000000001070047

DTC B1185 [SHORT] PRE-TEN2 FRONT LH

For seat belt pre-tensioner2, crash is judged by main “G” sensor output signal and sub “G” sensor in front direction.

OPERATION

In case of frontal collision that exceeds specified impact level, the diagnosis sensor unit detects the deceleration caused by collision. If restrains the passenger with seat belt easing the stress on passengers chest with load limitter.

STRUCTURE

The restraint system for front seat occupant consists of the pre-tensioner mechanism and load limitter mechanism.

INSTALLATION

Seat belt pre-tensioner2 is installed on the under side of center pillar with fixed bolt.

DTC Logic

INFOID:0000000001070048

DTC DETECTION LOGIC

With CONSULT-III

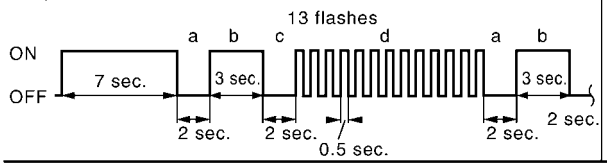
DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1185	PRE-TEN2 FRONT LH [SHORT]	Front LH seat belt pre-tensioner2 circuit are shorted to each other.	1. Visually check the wiring harness-connection. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Front LH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Thirteen flashes indicate malfunctioning front LH seat belt pre-tensioner 2 circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0222GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

cardiagn.com

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE.

If DTC is detected. Refer to SRC-189

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-189

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001070049

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connector.

2.CHECK WIRING HARNESS

Is the outside of wire harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK SEAT BELT PRE-TENSIONER2

Is “SEAT BELT PRE-TENSIONER2” displayed on CONSULT-III?

YES >> Replace seat belt pre-tensioner2.
NO >> Replace diagnosis sensor unit (ACU).

cardiagn.com

B1202, B1203, B1204, B1205, B1206, B1207 DIAGNOSIS SENSOR UNIT

Description

INFOID:0000000001069909

DTC B1202, B1203, B1204, B1205, B1206, B1207 DIAGNOSIS SENSOR UNIT

Detects the whole SRS electrical system and displays the malfunction either by illuminating or blinking the air bag warning lamp in the combination meter Malfunctioning part can be detected by on board self-diagnosis system and electro-diagnosis tester “CONSULT-III”.

OPERATION

It detects a shock that exceeds specified level and watches such systems as the driver and passenger air bag, side air bag, curtain air bag, pre-tensioner seat belts operate properly.

STRUCTURE

It contains the “G” sensors of both for frontal collision and for side collision and spare battery function in case of main battery damage in collision.

INSTALLATION

SRS diagnosis sensor unit is installed under the center console with fixed bolts.

DTC Logic

INFOID:0000000001069910

DTC DETECTION LOGIC

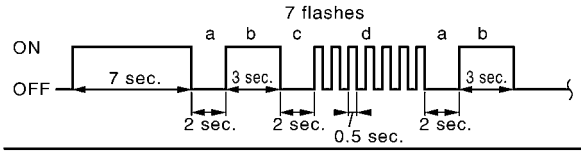
With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1202 B1203 B1204 B1205 B1206 B1207	DIAGNOSIS SENSOR UNIT	Diagnosis sensor unit is out of order.	1. Replace diagnosis sensor unit (ACU).

Without CONSULT-III

Warning Lamp Flash Code Chart

<Diagnosis sensor unit>	
Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Replace the diagnosis sensor unit (ACU).

JMHIA0034GB

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1. IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2. CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

cardiagn.com

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-21

>> **END**

DTC CONFIRMATION PROCEDURE (Without CONSULT-III)

NOTE:

- SRS will not enter diagnosis mode if no malfunction is detected in user mode.

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.USER MODE-DIAG MODE

After air bag warning lamp illuminates for 7 seconds, turn ignition switch OFF within 1 second.

>> GO TO 3.

3.USER MODE-DIAG MODE

Wait more than 3 seconds.

>> GO TO 4.

4.USER MODE-DIAG MODE

Repeat step 1 to 3 twice. (Perform three times in all.)

>> GO TO 5.

5.DIAG MODE

Turn ignition switch ON. (SRS is now in diagnosis mode.)

>> GO TO 6.

6.DIAG MODE (AIR BAG WARNING LAMP)

Malfunctioning portion is indicated according to blinking times of air bag warning lamp. Refer to SRC-21

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069911

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK HARNESS CONNECTOR

Are connections of harness connectors and terminals correct?

YES >> GO TO 2.
NO >> Repair or replace harness connectors.

2.CHECK WIRING HARNESS

Is the outside of wiring harness normal, without any damage?

YES >> GO TO 3.
NO >> Replace wiring harness.

3.CHECK DIAGNOSIS SENSOR UNIT

Is “DIAGNOSIS SENSOR UNIT” displayed on CONSULT-III?

YES >> Replace diagnosis sensor unit (ACU).
>> **INSPECTION END**.

cardiagn.com

B1209 FRONTAL COLLISION DETECTION

Description

INFOID:0000000001069912

DTC B1209 FRONTAL COLLISION DETECTION

If the components that are not activated in frontal collision are reused, they should be checked for damage by CONSULT-lll or air bag warning lamp. Repair or replace malfunctioning components.

OPERATION

The air bag and seat belt pre-tensioners for driver and front seat passenger are operated by the decision of the diagnosis sensor unit out signaltransmitted because of the frontal collision.

STRUCTURE

It consists of crash zone sensor, diagnosis sensor unit (ACU), air bags and seat belt pre-tensioners for drivers and front passenger.

INSTALLATION

Refer to SR-14, "Removal and Installation", SR-16, "Removal and Installation", SR-4, "Removal and Installation", SR-8, "Removal and Installation", SR-18, "Removal and Installation".

DTC Logic

INFOID:0000000001069913

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1209	FRONTAL COLLISION DETECTION	Seat belt pretensioner, front air bag is deployed.	• Go to SRC-194, "Diagnosis Procedure (Component diagnosis)".

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-194

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069914

cardiagn.com

With CONSULT-III

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor.)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1. CHECK FOR FRONT “AIR BAG” (DRIVER SIDE OR PASSENGER SIDE)

Is the “AIR BAG” module deployed?

YES >> Replace front air bag module.
NO >> Replace, if there are any malfunction signs checking with CONSULT-III.

2. CHECK FOR "SEAT BELT" PRE-TENSIONER

Is the “SEAT BELT” pre-tensioner activated?

YES >> Replace seat belt pre-tensioner.
NO >> Replace, if there are any malfunction signs checking with CONSULT-III.

3. CHECK FOR “AIR BAG” DIAGNOSIS SENSOR UNIT

Is the “AIR BAG” module and/or “SEAT BELT” pre-tensioner activated?

YES >> Replace diagnosis sensor unit (ACU).
NO >> Replace, if there are any malfunction signs checking with CONSULT-III.

4. CHECK FOR STEERING WHEEL

Is the steering wheel normal, without any damage?

YES >> Replace, if there are any visible signs of damage. (dents, tears or deformation)
NO >> Replace steering wheel.

5. CHECK FOR SPIRAL CABLE

Is the spiral cable normal, without excessive heavy operation force, abnormal noise or damage?

YES >> The spiral cable used again.
NO >> Replace spiral cable.

6. CHECK FOR WIRING HARNESS

Is the wiring harness normal, without any damage?

YES >> Replace, if there are any visible signs of damage. (dents, tears or deformation)
NO >> Replace wiring harness or harness connector.

7. CHECK FOR INSTRUMENT PANEL

Is the “PASSENGER AIR BAG” module activated?

YES >> Replace instrument panel.
NO >> Replace, if there are any visible signs of damage. (dents, tears or deformation)

cardiagn.com

B1210 SIDE COLLISION DETECTION

Description

INFOID:0000000001069915

DTC B1210 SIDE COLLISION DETECTION

If the components that are not activated in side collision are reused, they should be checked for damage by CONSULT-lll or air bag warning lamp. Repair or replace the malfunctioning parts.

OPERATION

The side air bag and curtain air bag are operated by the decision of the diagnosis sensor unit (ACU) signal of the side collision.

STRUCTURE

It consists of satellite sensor, diagnosis sensor unit (ACU), side air bag and curtain air bag.

INSTALLATION

Refer to SR-15, "Removal and Installation", SR-16, "Removal and Installation", SR-12, "Removal and Installation". SR-10, "Removal and Installation".

DTC Logic

INFOID:0000000001069916

DTC DETECTION LOGIC

With CONSULT-III

DTC No. Index (“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B1210	SIDE COLLISION DETECTION	Side, curtain air bag is deployed.	• Go to SRC-196, "Diagnosis Procedure (Component diagnosis)".

DTC CONFIRMATION PROCEDURE (With CONSULT-III)

1.IGNITION SWITCH

Turn ignition switch ON.

>> GO TO 2.

2.CONSULT-III

Check the “SELF-DIAG” RESULT with CONSULT-III.

>> GO TO 3.

3.DTC CODE

If DTC is detected. Refer to SRC-196

>> **END**

Diagnosis Procedure (Component diagnosis)

INFOID:0000000001069917

With CONSULT-III

cardiagn.com

CAUTION:
- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes. (To discharge backup capacitor)**
- **Do not use unspecified tester or other measuring device.**

DIAGNOSTIC PROCEDURE

1.CHECK FOR “SIDE AIR BAG”

Is the “SIDE AIR BAG” module deployed?

YES >> Replace side side air bag module.”
NO >> Replace, if there are any malfunction signs checking with CONSULT-III.

2.CHECK FOR "CURTAIN AIR BAG".

Is the “CURTAIN AIR BAG” module activated?

YES >> Replace curtain air bag module.
NO >> Replace, if there are any malfunction signs checking with CONSULT-III.

3.CHECK FOR SATELLITE SENSOR

Is the “SIDE AIR BAG” module and/or “CURTAIN AIR BAG” module activated?

YES >> Replace satellite sensor.
NO >> Replace, if there are any malfunction signs checking with CONSULT-III.

4.CHECK FOR DIAGNOSIS SENSOR UNIT

Is the “SIDE AIR BAG” module and/or “CURTAIN AIR BAG” module activated?

YES >> Replace diagnosis sensor unit (ACU).
NO >> Replace, if there are any malfunction signs checking with CONSULT-III.

5.CHECK FOR “SEAT BELT” PRE-TENSIONER

Is the seat belt able to extend smoothly any visible signs of damage?

YES >> Replace, if there are any malfunction signs checking with CONSULT-III.
NO >> Replace seat belt” pre-tensioner.

cardiagn.com

ECU DIAGNOSIS

DIAGNOSIS SENSOR UNIT

DTC Index

INFOID:0000000001069918

DTC No. Index (With CONSULT-III)
(“SELF-DIAG [CURRENT]”), (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)
NOTE:
Follow the procedures in numerical order when repairing malfunctioning parts. Confirm whether malfunction is eliminated using air bag warning lamp or CONSULT-III each time repair is completed. If malfunction is still observed, proceed to the next step. When malfunction is eliminated, further repair work is not required.

Diagnostic item	Explanation		Repair order “Recheck SRS at each replacement”
NO DTC IS DETECTED.	When malfunction is indicated by the “AIR BAG” warning lamp in User mode.	• Low battery voltage (Less than 9 V)	
		• Self-diagnosis result “SELF-DIAG [PAST]” (previously stored in the memory) might not be erased after repair. • Intermittent malfunction has been detected in the past.	• Go to SRC-10, "Diagnosis Description".
	• No malfunction is detected.		—
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1001-B1015]	• Diagnosis sensor is out of order.		• Replace diagnosis sensor unit (ACU).
PASS A/B INDCTR CKT [B1023]	• Front passenger air bag cut-off indicator circuit is open, or shorted each other or to ground.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace cut-off indicator unit. 4. Replace diagnosis sensor unit (ACU).
PASS A/B DEACT SW [B1024]	• Front passenger air bag deactivation switch unit is malfunctioning.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace deactivation switch unit. 4. Replace diagnosis sensor unit (ACU).
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1026-B1031]	• Diagnosis sensor is out of order.		• Replace diagnosis sensor unit (ACU).
CRASH ZONE SEN [UNIT FAIL] [B1033] [B1034] CRASH ZONE SEN [COMM FAIL] [B1035]	• Crash zone sensor is out of order.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace crash zone sensor. 4. Replace diagnosis sensor unit (ACU).
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1042-B1047]	• Diagnosis sensor is out of order.		• Replace diagnosis sensor unit (ACU).

cardiagn.com

Diagnostic item	Explanation	Repair order "Recheck SRS at each replacement"
DRIVER AIRBAG MODULE [OPEN] [B1054]	• Driver air bag module circuit is open. (including the spiral cable.)	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace driver air bag module. 4. Replace spiral cable. 5. Replace diagnosis sensor unit (ACU).
DRIVER AIRBAG MODULE [VB-SHORT] [B1055]	• Driver air bag module circuit is shorted to some power supply circuit. (including the spiral cable.)	
DRIVER AIRBAG MODULE [GND-SHORT] [B1056]	• Driver air bag module circuit is shorted to ground. (including the spiral cable.)	
DRIVER AIRBAG MODULE [SHORT] [B1057]	• Driver air bag module circuit is shorted to each other. (including spiral cable.)	
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1058-B1063]	• Diagnosis sensor is out of order.	• Replace diagnosis sensor unit (ACU).
ASSIST A/B MODULE [OPEN] [B1070]	• Front passenger air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag module. 4. Replace diagnosis sensor unit (ACU).
ASSIST A/B MODULE [VB-SHORT] [B1071]	• Front passenger air bag module circuit is shorted to some power supply circuit.	
ASSIST A/B MODULE [GND-SHORT] [B1072]	• Front passenger air bag module circuit is shorted to ground.	
ASSIST A/B MODULE [SHORT] [B1073]	• Front passenger air bag module circuit is shorted to each other.	
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1074-B1079]	• Diagnosis sensor is out of order.	• Replace diagnosis sensor unit (ACU).
PRE-TEN FRONT RH [OPEN] [B1081]	• Front RH pre-tensioner circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt. 4. Replace diagnosis sensor unit (ACU).
PRE-TEN FRONT RH [VB-SHORT] [B1082]	• Front RH pre-tensioner circuit is shorted to some power supply circuit.	
PRE-TEN FRONT RH [GND-SHORT] [B1083]	• Front RH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT RH [SHORT] [B1084]	• Front RH pre-tensioner circuit is shorted to each other.	

cardiagn.com

Diagnostic item	Explanation	Repair order "Recheck SRS at each replacement"
PRE-TEN FRONT LH [OPEN] [B1086]	• Front LH pre-tensioner circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt. 4. Replace diagnosis sensor unit (ACU).
PRE-TEN FRONT LH [VB-SHORT] [B1087]	• Front LH pre-tensioner circuit is shorted to some power supply circuit.	
PRE-TEN FRONT LH [GND-SHORT] [B1088]	• Front LH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT LH [SHORT] [B1089]	• Front LH pre-tensioner circuit is shorted to each other.	
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1106-B1111]	• Diagnosis sensor is out of order.	• Replace diagnosis sensor unit (ACU).
SATELLITE SENS RH [UNIT FAIL] [B1113] [B1114] SATELLITE SENS RH [COMM FAIL] [B1115]	• RH side air bag (satellite) sensor is out of order.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace RH side air bag (Satellite) sensor. 4. Replace diagnosis sensor unit (ACU).
SATELLITE SENS LH [UNIT FAIL] [B1118] [B1119] SATELLITE SENS LH [COMM FAIL] [B1120]	• LH side air bag (satellite) sensor is out of order.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace LH side air bag (Satellite) sensor. 4. Replace diagnosis sensor unit (ACU).
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1122-B1127]	• Diagnosis sensor is out of order.	• Replace diagnosis sensor unit (ACU).
SIDE MODULE RH [OPEN] [B1129]	• Front RH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front RH side air bag module. 4. Replace diagnosis sensor unit (ACU).
SIDE MODULE RH [VB-SHORT] [B1130]	• Front RH side air bag module circuit is shorted to some power supply circuit.	
SIDE MODULE RH [GND-SHORT] [B1131]	• Front RH side air bag module circuit is shorted to ground.	
SIDE MODULE RH [SHORT] [B1132]	• Front RH side air bag module circuit is shorted to each other.	

cardiagn.com

Diagnostic item	Explanation	Repair order "Recheck SRS at each replacement"
SIDE MODULE LH [OPEN] [B1134]	• Front LH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front LH side air bag module. 4. Replace diagnosis sensor unit (ACU).
SIDE MODULE LH [VB-SHORT] [B1135]	• Front LH side air bag module circuit is shorted to some power supply circuit.	
SIDE MODULE LH [GND-SHORT] [B1136]	• Front LH side air bag module circuit is shorted to ground.	
SIDE MODULE LH [SHORT] [B1137]	• Front LH side air bag module circuit is shorted to each other.	
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1138-B1143]	• Diagnosis sensor is out of order.	• Replace diagnosis sensor unit (ACU).
CURTAIN MODULE RH [OPEN] [B1145]	• RH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace RH side curtain air bag module. 4. Replace diagnosis sensor unit (ACU).
CURTAIN MODULE RH [VB-SHORT] [B1146]	• RH side curtain air bag module circuit is shorted to some power supply circuit.	
CURTAIN MODULE RH [GND-SHORT] [B1147]	• RH side curtain air bag module circuit is shorted to ground.	
CURTAIN MODULE RH [SHORT] [B1148]	• RH side curtain air bag module circuit is shorted to each other.	
CURTAIN MODULE LH [OPEN] [B1150]	• LH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace LH side curtain air bag module. 4. Replace diagnosis sensor unit (ACU).
CURTAIN MODULE LH [VB-SHORT] [B1151]	• LH side curtain air bag module circuit is shorted to some power supply circuits.	
CURTAIN MODULE LH [GND-SHORT] [B1152]	• LH side curtain air bag module circuit is shorted to ground.	
CURTAIN MODULE LH [SHORT] [B1153]	• LH side curtain air bag module circuit is shorted to each other.	
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1170-B1175]	• Diagnosis sensor is out of order.	• Replace diagnosis sensor unit (ACU).
PRE-TEN2 FRONT RH* [OPEN] [B1177]	• Front RH pre-tensioner2 circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).
PRE-TEN2 FRONT RH* [VB-SHORT] [B1178]	• Front RH pre-tensioner2 circuit is shorted to some power supply circuit.	
PRE-TEN2 FRONT RH* [GND-SHORT] [B1179]	• Front RH pre-tensioner2 circuit is shorted to ground.	
PRE-TEN2 FRONT RH* [SHORT] [B1180]	• Front RH pre-tensioner2 circuit is shorted to each other.	

Diagnostic item	Explanation	Repair order “Recheck SRS at each replacement”
PRE-TEN2 FRONT LH [OPEN] [B1182]	• Front LH pre-tensioner2 circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner2. 4. Replace diagnosis sensor unit (ACU).
PRE-TEN2 FRONT LH [VB-SHORT] [B1183]	• Front LH pre-tensioner2 circuit is shorted to some power supply circuit.	
PRE-TEN2 FRONT LH [GND-SHORT] [B1184]	• Front LH pre-tensioner2 circuit is shorted to ground.	
PRE-TEN2 FRONT LH [SHORT] [B1185]	• Front LH pre-tensioner2 circuit is shorted to each other.	
DIAGNOSIS SENSOR UNIT (CONTROL UNIT) [B1202-B1207]	• Diagnosis sensor is out of order.	• Replace diagnosis sensor unit (ACU).
FRONTAL COLLISION DETECTION [B1209]	• Seat belt pre-tensioner and front air bag is deployed.	• Go to SRC-194, "Diagnosis Procedure (Component diagnosis)".
SIDE COLLISION DETECTION [B1210]	• Side and curtain air bag is deployed.	• Go to SRC-196, "Diagnosis Procedure (Component diagnosis)".

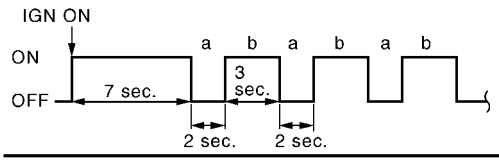
*: with RHD models.

WARNING LAMP FLASH CODE CHART (Without CONSULT-III)

NOTE:

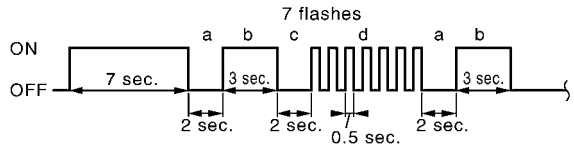
Follow the procedures in numerical order when repairing malfunctioning parts. Confirm whether malfunction is eliminated using air bag warning lamp or CONSULT-III each time repair is completed. If malfunction is still observed, proceed to the next step. When malfunction is eliminated, further repair work is not required.

<Diagnosis results (previously stored in the memory) might not be erased after repair or intermittent malfunctions have been detected in the past.>

Flash pattern	Repair order
a through b are repeated. 	1. Erase memory. (Once key switch is turned from OFF to ON, TROUBLE DIAG RECORD will be erased.)

PHIA0532E

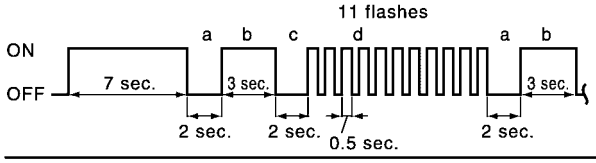
<Diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Replace the diagnosis sensor unit (ACU).

JMHIA0034GB

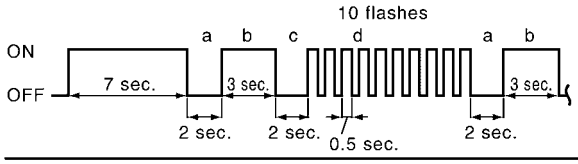
cardiagn.com

<Front passenger air bag indicator CKT>

Flash pattern	Repair order
a through d are repeated. d: Eleven flashes indicate malfunctioning front passenger air bag off indicator. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag off indicator unit. 4. Replace the diagnosis sensor unit (ACU).

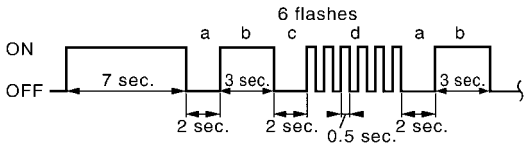
JMHIA0233GB

<Front passenger air bag deactivation switch>

Flash pattern	Repair order
a through d are repeated. d: Ten flashes indicate malfunctioning front passenger air bag deactivation switch. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag deactivation switch. 4. Replace the diagnosis sensor unit (ACU).

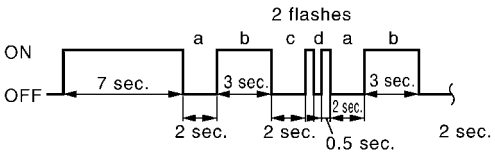
JMHIA0228GB

<Crash zone sensor>

Flash pattern	Repair order
a through d are repeated. d: Six flashes indicate malfunctioning crash zone sensor circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the crash zone sensor. 4. Replace the diagnosis sensor unit.

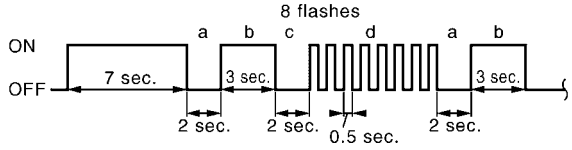
JMHIA0036GB

<Driver air bag module>

Flash pattern	Repair order
a through d are repeated. d: Two flashes indicate malfunctioning driver air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the driver air bag module. 4. Replace the spiral cable. 5. Replace the diagnosis sensor unit (ACU).

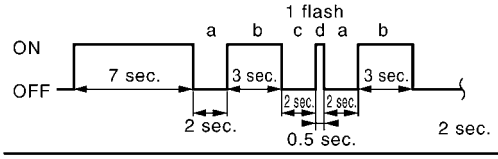
JMHIA0033GB

<Front passenger air bag module>

Flash pattern	Repair order
a through d are repeated. d: Eight flashes indicate malfunctioning front passenger air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front passenger air bag module. 4. Replace the diagnosis sensor unit (ACU).

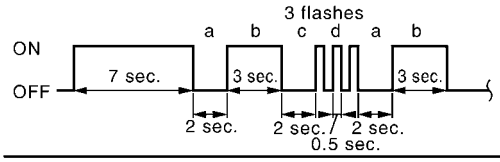
JMHIA0035GB

<Front RH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: One flash indicates malfunctioning front RH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt. 4. Replace the diagnosis sensor unit (ACU).

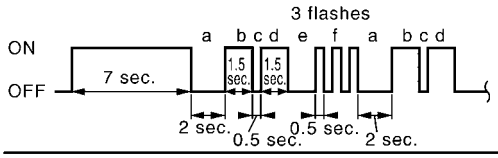
JMHIA0037GB

<Front LH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: Three flashes indicate malfunctioning front LH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt. 4. Replace the diagnosis sensor unit (ACU).

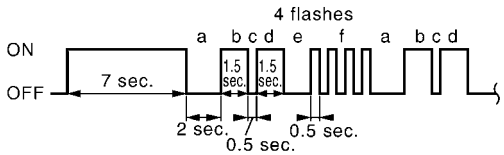
JMHIA0038GB

<RH side air bag (Satellite) sensor>

Flash pattern	Repair order
a through f are repeated. f: Three flashes indicate malfunctioning RH side air bag (Satellite) sensor circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit.

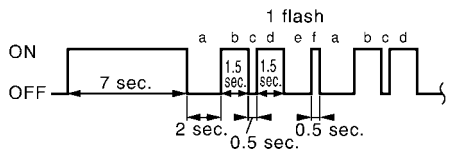
JMHIA0039GB

<LH side air bag (Satellite) sensor>

Flash pattern	Repair order
a through f are repeated. f: Four flashes indicate malfunctioning LH side air bag (Satellite) sensor. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit.

JMHIA0040GB

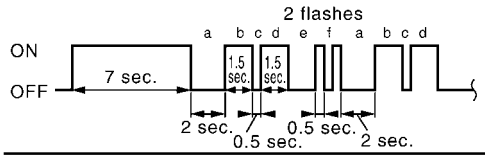
<Front RH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: One flash indicates malfunctioning front RH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front RH side air bag module. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0041GB

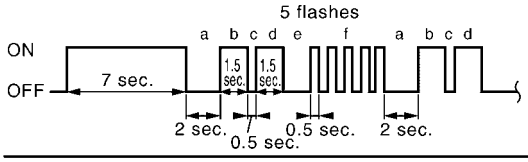
cardiagn.com

<Front LH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: Two flashes indicate malfunctioning front LH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front LH side air bag module. 4. Replace the diagnosis sensor unit (ACU).

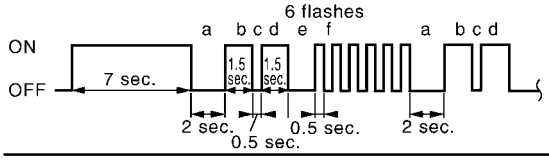
JMHIA0042GB

<RH side curtain air bag module>

Flash pattern	Repair order
a through f are repeated. f: Five flashes indicate malfunctioning RH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side curtain air bag module. 4. Replace the diagnosis sensor unit (ACU).

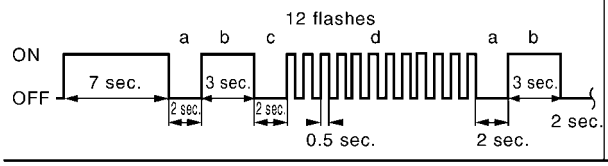
JMHIA0043GB

<LH side curtain air bag module>

Flash pattern	Repair order
a through f are repeated. f: Six flashes indicate malfunctioning LH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side curtain air bag module. 4. Replace the diagnosis sensor unit (ACU).

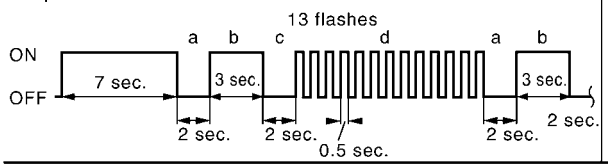
JMHIA0044GB

<Front RH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Twelve flashes indicates malfunctioning front RH seat belt pre-tensioner 2 circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).

JMHIA0223GB

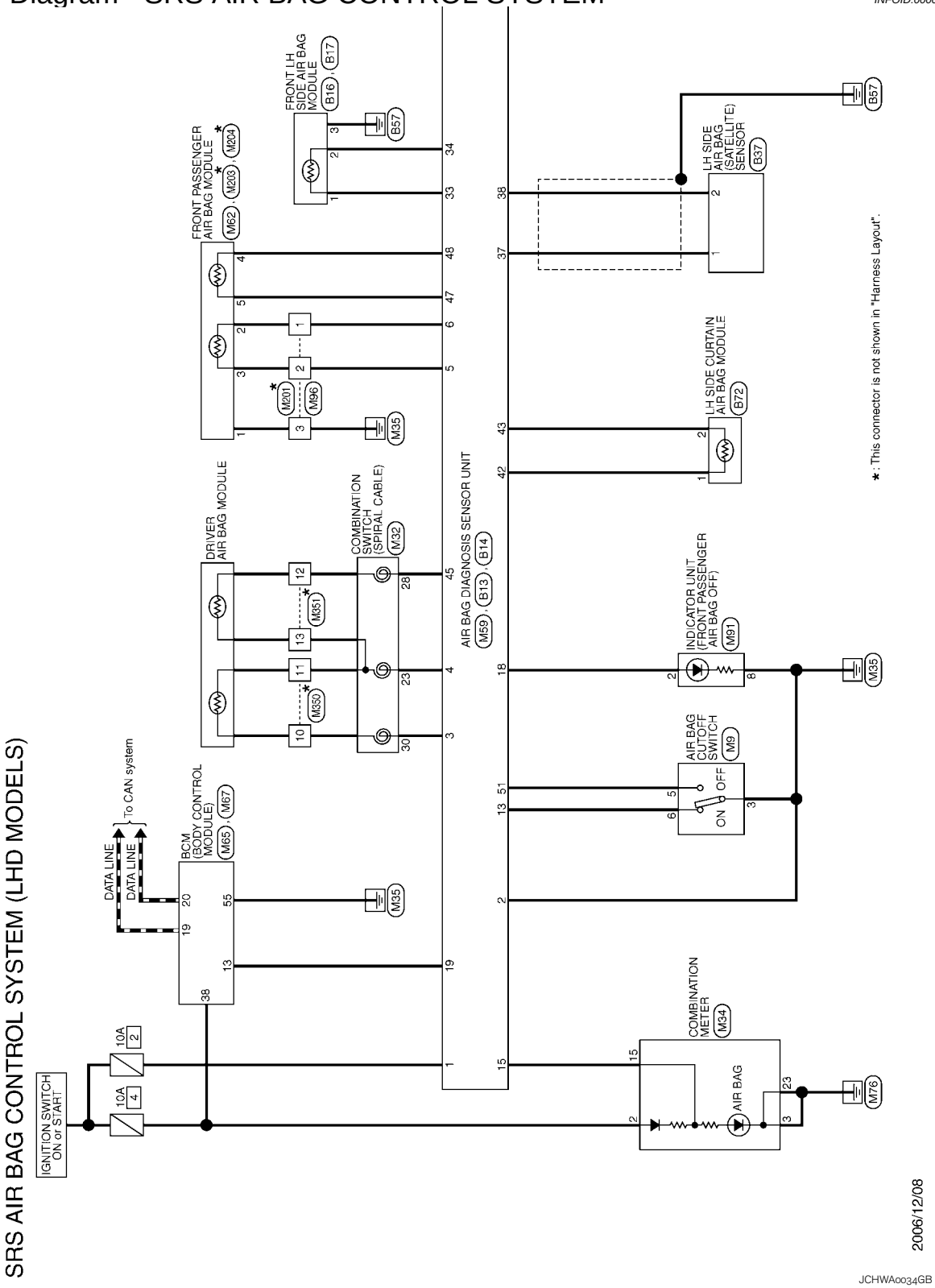
<Front LH seat belt pre-tensioner 2>

Flash pattern	Repair order
a through d are repeated. d: Thirteen flashes indicate malfunctioning front LH seat belt pre-tensioner 2 circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt pre-tensioner 2. 4. Replace the diagnosis sensor unit (ACU).

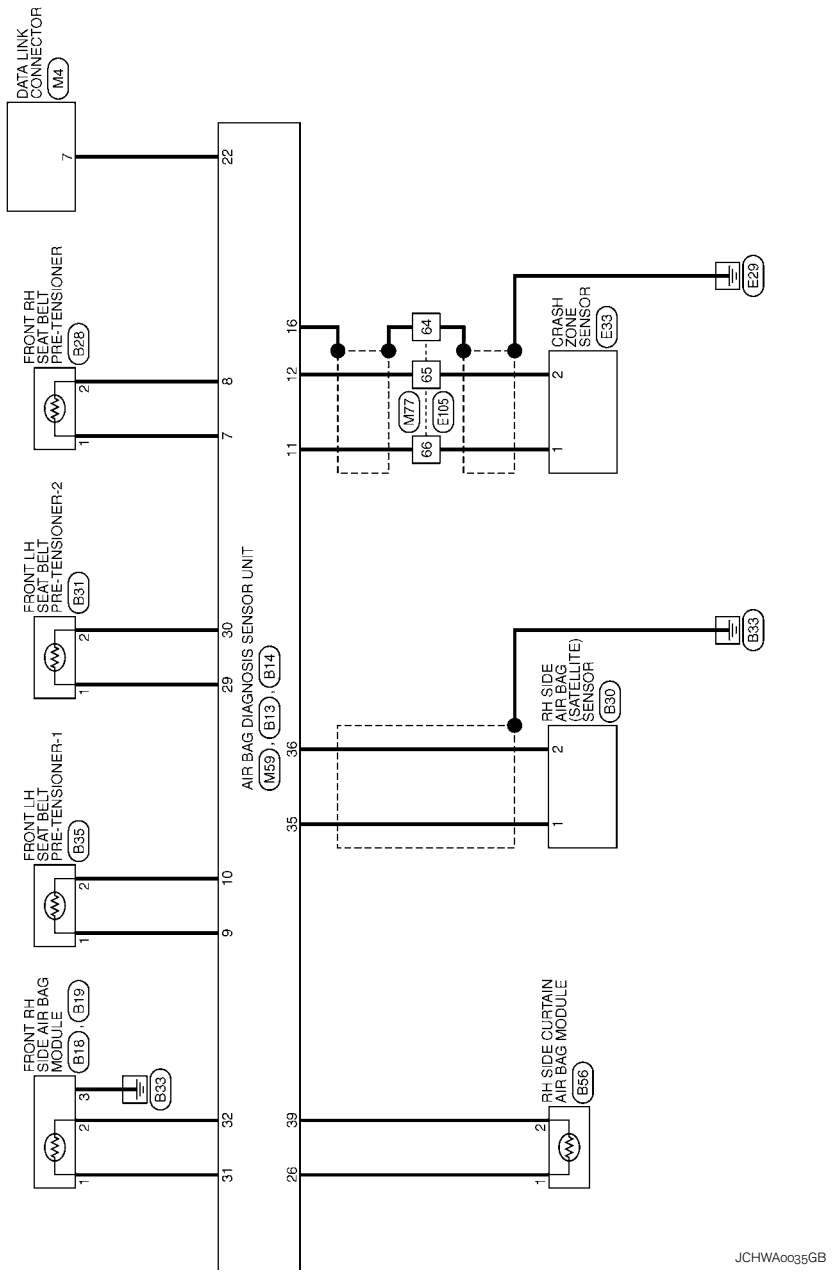
JMHIA0222GB

Wiring Diagram - SRS AIR BAG CONTROL SYSTEM -

INFOID:0000000001069919



cardiagn.com


DATA LINK CONNECTOR
M4
FRONT RH SEAT BELT PRE-TENSIONER
B28
FRONT LH SEAT BELT PRE-TENSIONER-2
B31
FRONT LH SEAT BELT PRE-TENSIONER-1
B35
FRONT RH SIDE AIR BAG MODULE
B18, B19
B33
AIR BAG DIAGNOSIS SENSOR UNIT
M59, B13, B14
CRASH ZONE SENSOR
E33
E29
M77
E105
64
65
66
RH SIDE AIR BAG (SATELLITE) SENSOR
B30
B33
RH SIDE CURTAIN AIR BAG MODULE
B56
JCHWA0035GB

SRS AIR BAG CONTROL SYSTEM (LHD MODELS)

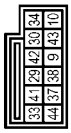
Connector No.	B13
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK12FY-1V-EX

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	R	RH P/T1+
8	W	RH P/T1−
26	L	CURTAIN RH+
31	R/W	RHS A/B+
32	L/Y	RHS A/B−
35	W	RH SAT SENS+
36	B	RH SAT SENS−
39	BR	CURTAIN RH−

Connector No.	B14
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK12FY-2V-EX

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
9	R	LH P/T1+
10	W	LH P/T1−
29	R	LH P/T2+
30	W	LH P/T2−
33	R/W	LHS A/B+
34	L/Y	LHSA/B−
37	W	LH SAT SENS+
38	B	LH SAT SENS−
42	L	CURTAIN LH+
43	BR	CURTAIN LH−

Connector No.	B16
Connector Name	FRONT LH SIDE AIR BAG MODULE
Connector Type	TK02FY-EX-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–
2	L/Y	–

Connector No.	B17
Connector Name	FRONT LH SIDE AIR BAG MODULE
Connector Type	CINCH-16600EV1M

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B/W	–

Connector No.	B18
Connector Name	FRONT RH SIDE AIR BAG MODULE
Connector Type	TK02FY-EX-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–
2	L/Y	–

Connector No.	B19
Connector Name	FRONT RH SIDE AIR BAG MODULE
Connector Type	CINCH-16600EV1M

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B/W	–

Connector No.	B28
Connector Name	FRONT RH SEAT BELT PRE-TENSIONER
Connector Type	AOA02FY-2V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	W	–

Connector No.	B30
Connector Name	RH SIDE AIR BAG (SATELLITE) SENSOR
Connector Type	HK02FY-1V-EX

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–

JCHWA0036GB

cardiagn.com

SRS AIR BAG CONTROL SYSTEM (LHD MODELS)

Connector No.	B31
Connector Name	FRONT LH SEAT BELT PRE-TENSIONER-2
Connector Type	ACA02FOR

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	W	–

Connector No.	B35
Connector Name	FRONT LH SEAT BELT PRE-TENSIONER-1
Connector Type	ACA02FY-2V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	W	–

Connector No.	B37
Connector Name	LH SIDE AIR BAG (SATELLITE) SENSOR
Connector Type	HK02FY-1V-EX

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–

Connector No.	B96
Connector Name	RH SIDE CURTAIN AIR BAG MODULE
Connector Type	FCI 61206310

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	BR	–

Connector No.	B72
Connector Name	LH SIDE CURTAIN AIR BAG MODULE
Connector Type	FCI 61206310

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	BR	–

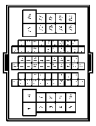
Connector No.	E33
Connector Name	CRASH ZONE SENSOR
Connector Type	HK02FY-1V-EX

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

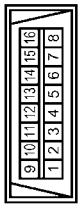
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
84	SHIELD	–
65	B	–
66	W	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–

JCHWA0037GB

SRS AIR BAG CONTROL SYSTEM (LHD MODELS)

Connector No.	M9
Connector Name	AIR BAG CUTOFF SWITCH
Connector Type	CINCH-49921221

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	–
5	R	–
6	G	–

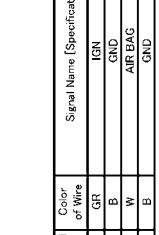
Connector No.	M32
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK06FY-EX-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
23	Y/L	–
26	Y/R	–
30	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	IGN
3	B	GND
15	W	AIR BAG
23	B	GND

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	IGN
2	B	GND
3	Y	DR1+
4	Y/L	DR-
5	Y	AS1+
6	Y/B	AS1-
11	W	ECZS+
12	B	ECZS-
13	G	AS CUTOFF SW 1
15	W	WARNING LAMP
16	SHIELD	EARTH (FOR ECZS)
18	LG	CUTOFF LED
19	R	UNLOCK
22	O	K-LINE
45	Y/R	DR2+
47	B/R	AS2+ [LHD models]
48	L	AS2- [LHD models]
51	R	OFF(DE-ACTIVATE)

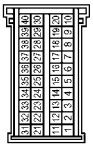
Connector No.	M62
Connector Name	FRONT PASSENGER AIR BAG MODULE
Connector Type	FCI 61206320

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
4	Y/L	–
5	Y	–

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

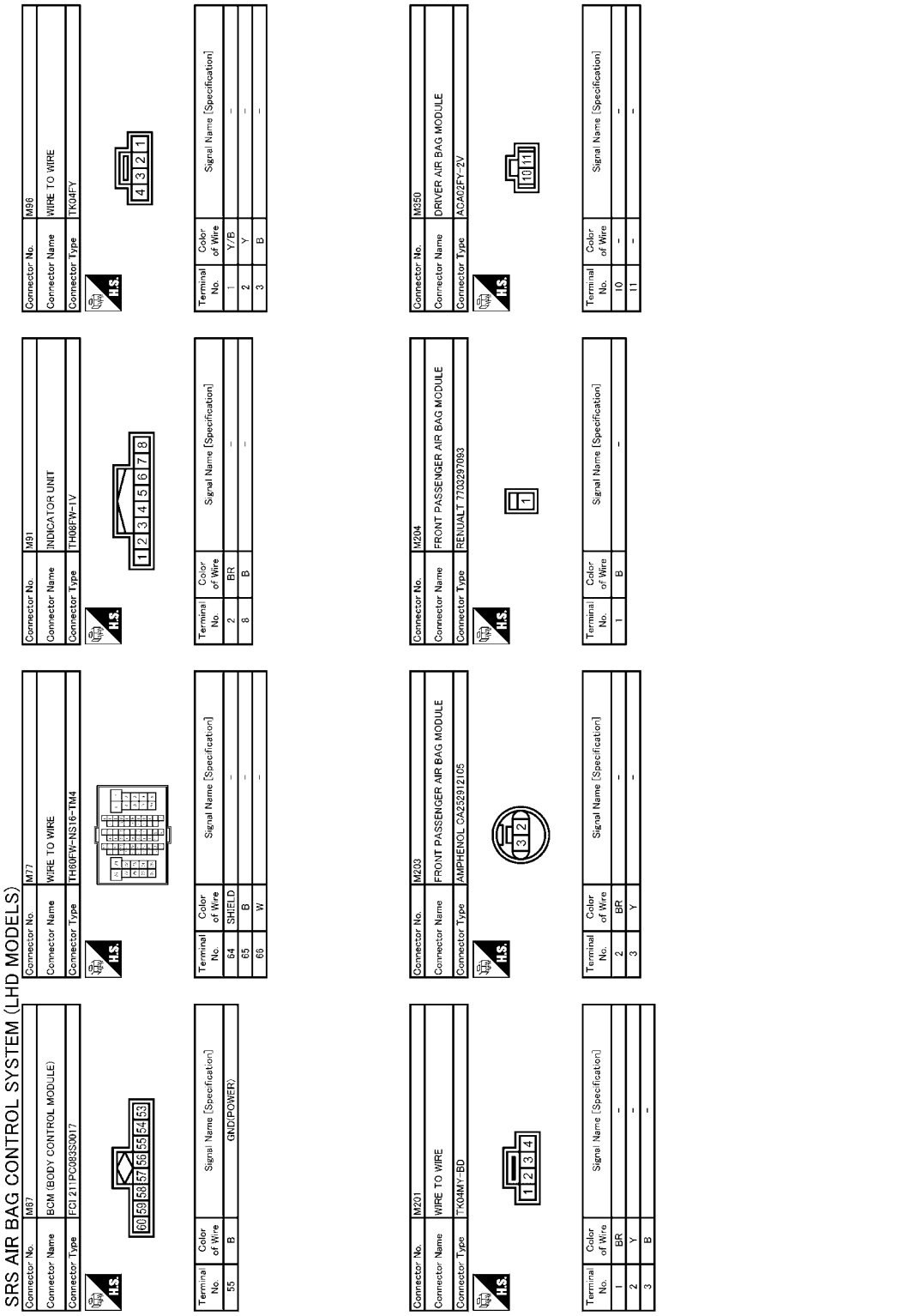


Terminal No.	Color of Wire	Signal Name [Specification]
13	R	SHOCK DETECT SIG
19	L	CAN-H
20	P	CAN-L
38	W/L	IGN SW

JCHWA0038GB

cardiagn.com

SRS AIR BAG CONTROL SYSTEM (LHD MODELS)



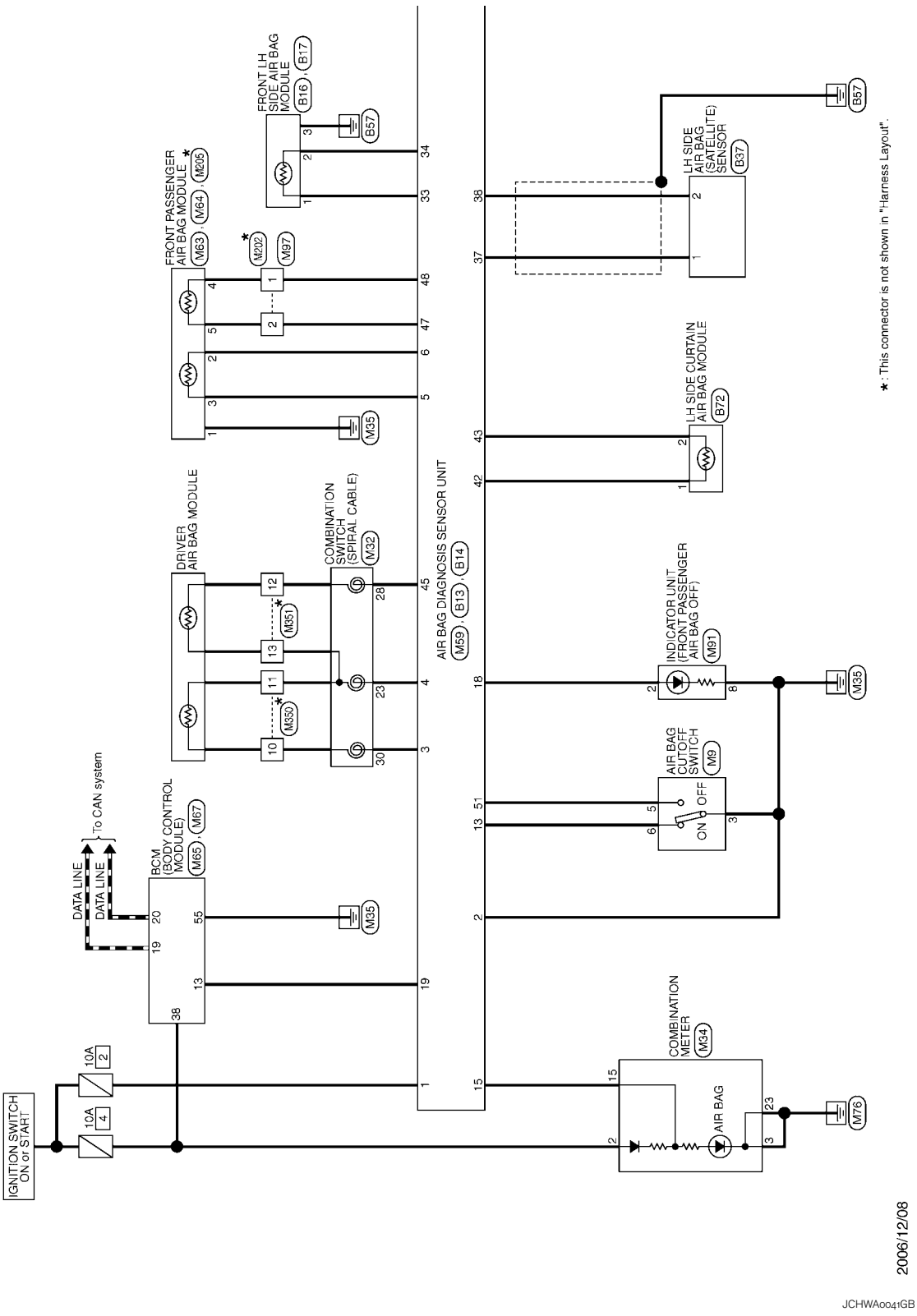
JCHWA0039GB

cardiagn.com

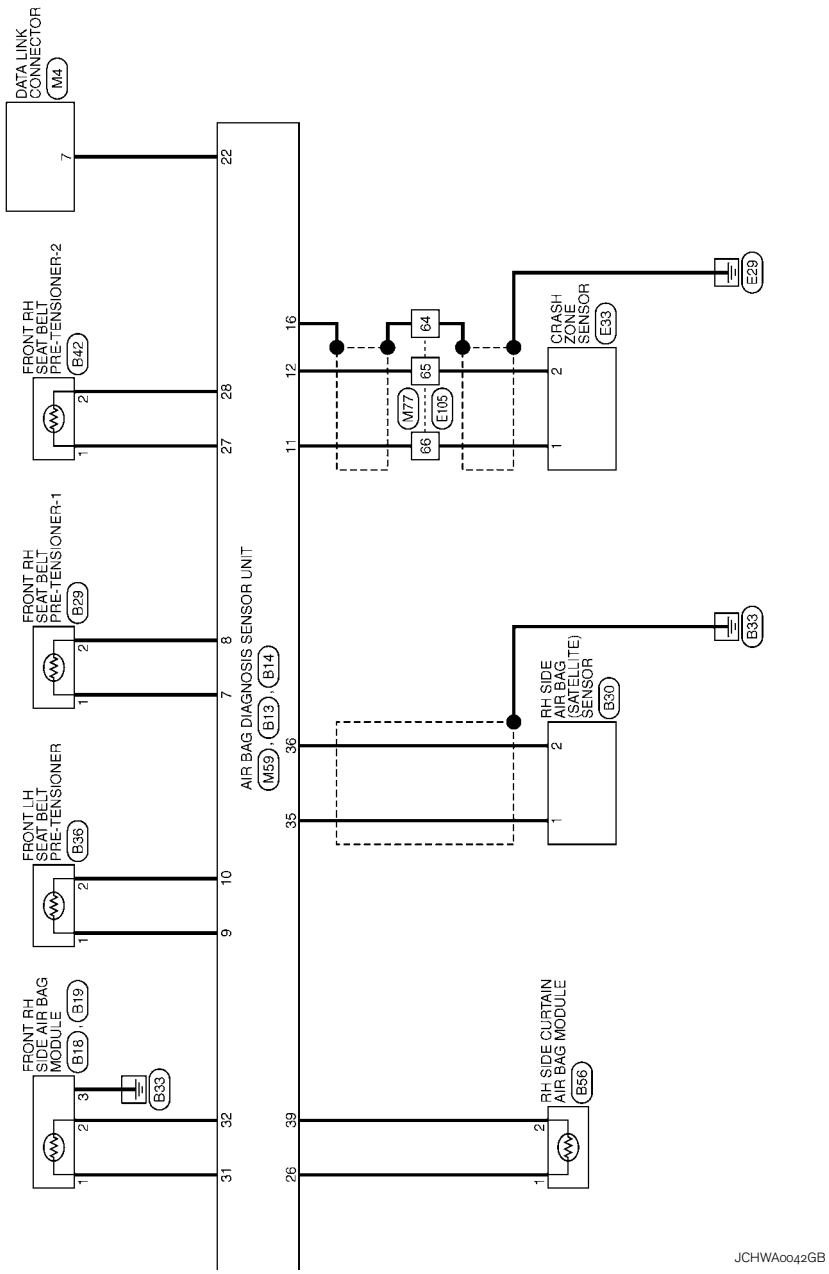
SRS AIR BAG CONTROL SYSTEM (LHD MODELS)

Connector No.	M351
Connector Name	DRIVER AIR BAG MODULE
Connector Type	ACA02FOR

SRS AIR BAG CONTROL SYSTEM (RHD MODELS)



cardiagn.com



cardiagn.com

SRS AIR BAG CONTROL SYSTEM (RHD MODELS)

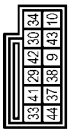
Connector No.	B13
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK12FY-1V-EX

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
7	R	RH P/T1+
8	W	RH P/T1−
26	L	CURTAIN RH+
27	R	RH P/T2+
28	W	RH P/T2−
31	R/W	RHS A/B+
32	L/Y	RHS A/B−
35	W	RH SAT SENS+
36	B	RH SAT SENS−
39	BR	CURTAIN RH−

Connector No.	B14
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK12FY-2V-EX

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
9	R	LH P/T1+
10	W	LH P/T1−
33	R/W	LHS A/B+
34	L/Y	LHSA/B−
37	W	LH SAT SENS+
38	B	LH SAT SENS−
42	L	CURTAIN LH+
43	BR	CURTAIN LH−

Connector No.	B16
Connector Name	FRONT LH SIDE AIR BAG MODULE
Connector Type	TK02FY-EX-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–
2	L/Y	–

Connector No.	B17
Connector Name	FRONT LH SIDE AIR BAG MODULE
Connector Type	CINCH-16600EV1M

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B/W	–

Connector No.	B18
Connector Name	FRONT RH SIDE AIR BAG MODULE
Connector Type	TK02FY-EX-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–
2	L/Y	–

Connector No.	B19
Connector Name	FRONT RH SIDE AIR BAG MODULE
Connector Type	CINCH-16600EV1M

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B/W	–

Connector No.	B29
Connector Name	FRONT RH SEAT BELT PRE-TENSIONER-I
Connector Type	ACA02FY-2V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	W	–

Connector No.	B30
Connector Name	RH SIDE AIR BAG (SATELLITE) SENSOR
Connector Type	HK02FY-1V-EX

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–

JCHWA0043GB

cardiagn.com

SRS AIR BAG CONTROL SYSTEM (RHD MODELS)

Connector No.	B36
Connector Name	FRONT LH SEAT BELT PRE-TENSIONER
Connector Type	ACA02FY-2V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	W	–

Connector No.	B37
Connector Name	LH SIDE AIR BAG (SATELLITE) SENSOR
Connector Type	HK02FY-1V-EX

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–

Connector No.	B42
Connector Name	FRONT RH SEAT BELT PRE-TENSIONER-2
Connector Type	ACA02FOR

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
2	W	–

Connector No.	B96
Connector Name	RH SIDE CURTAIN AIR BAG MODULE
Connector Type	FCI 61206310

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	BR	–

Connector No.	B72
Connector Name	LH SIDE CURTAIN AIR BAG MODULE
Connector Type	FCI 61206310

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	BR	–

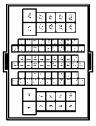
Connector No.	E33
Connector Name	CRASH ZONE SENSOR
Connector Type	HK02FY-1V-EX

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

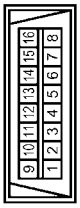
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
64	SHIELD	–
65	B	–
66	W	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–

JCHWA0044GB

cardiagn.com

SRS AIR BAG CONTROL SYSTEM (RHD MODELS)

Connector No.	M9
Connector Name	AIR BAG CUTOFF SWITCH
Connector Type	CINCH-4992121211

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	B	–
5	R	–
6	G	–

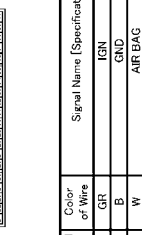
Connector No.	M32
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK06FY-EX-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
23	Y/L	–
26	Y/R	–
30	Y	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	GR	IGN
3	B	GND
15	W	AIR BAG
23	B	GND

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	IGN
2	B	GND
3	Y	DR1+
4	Y/L	DR-
5	Y	AS1+
6	Y/B	AS1-
11	W	ECZS+
12	B	ECZS-
13	G	AS CUTOFF SW 1
15	W	WARNING LAMP
16	SHIELD	EARTH (FOR ECZS)

18	LG	CUTOFF LED
19	R	UNLOCK
22	O	K-LINE
45	Y/R	DR2+
47	Y	AS2+ [RHD models]
48	Y/L	AS2- [RHD models]
51	R	OFF (DE-ACTIVATE)

Connector No.	M63
Connector Name	FRONT PASSENGER AIR BAG MODULE
Connector Type	AMPHENOL CA2529121O5

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	Y/B	–
3	Y	–

Connector No.	M64
Connector Name	FRONT PASSENGER AIR BAG MODULE
Connector Type	RENUALT 7703297093

H.S.

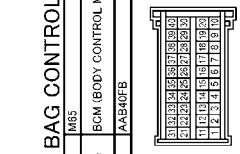
Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND

JCHWA0045GB

cardiagn.com

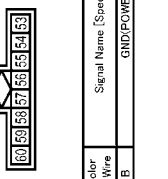
SRS AIR BAG CONTROL SYSTEM (RHD MODELS)

Connector No.	M85
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB



Terminal No.	Color of Wire	Signal Name [Specification]
13	R	SHOCK DETECT SIG
19	L	CAN-H
20	P	CAN-L
38	W/L	IGN SW

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC083S0017



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS18-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
64	SHIELD	-
65	B	-
66	W	-

Connector No.	M91
Connector Name	INDICATOR UNIT
Connector Type	TH08FW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
2	BR	-
8	B	-

Connector No.	M97
Connector Name	WIRE TO WIRE
Connector Type	TK02FY-EX

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	B/R	-

Connector No.	M232
Connector Name	WIRE TO WIRE
Connector Type	TK02MY-EX

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/L	-
2	Y	-

Connector No.	M205
Connector Name	FRONT PASSENGER AIR BAG MODULE
Connector Type	FCI 61206320

Terminal No.	Color of Wire	Signal Name [Specification]
4	Y/L	-
5	Y	-

Connector No.	M350
Connector Name	DRIVER AIR BAG MODULE
Connector Type	AGA02FY-2V

Terminal No.	Color of Wire	Signal Name [Specification]
10	-	-
11	-	-

JCHWA0046GB

cardiagn.com

SRS AIR BAG CONTROL SYSTEM (RHD MODELS)

Connector No.	M351
Connector Name	DRIVER AIR BAG MODULE
Connector Type	ACA02FOR

Terminal No.	Color of Wire	Signal Name [Specification]
12	–	–
13	–	–

JCHWA0047GB

cardiagn.com

SYMPTOM DIAGNOSIS

SRS AIR BAG SYSTEM

Symptom Table

INFOID:0000000001069920

“SRS AIR BAG” Warning Lamp Does Not Turn OFF

1.CHECK THE DEPLOYMENT OF AIR BAG MODULE

Is “AIR BAG” module deployed?

YES >> Refer to SRC-194, "Diagnosis Procedure (Component diagnosis)".
NO >> GO TO 2.

2.CHECK THE AIR BAG FUSE

Refer to PG-71, "Fuse".

Check 10A fuse [No.2, located in fuse block (J/B)].

OK >> GO TO 4.
NG >> GO TO 3.

3.CHECK AIR BAG FUSE AGAIN

Replace “AIR BAG” fuse and turn ignition switch ON.

Does the “AIR BAG” fuse blow again?

YES >> Repair or replace main harness.
NO >> **INSPECTION END**

4.CHECK DIAGNOSIS SENSOR UNIT

Is “AIR BAG” displayed on CONSULT-III?

YES >> GO TO 5.
NO >> Visually check the wiring harness connection of diagnosis sensor unit. If the harness connection check result is OK, replace diagnosis sensor unit.

5.CHECK HARNESS CONNECTION

Is harness connections between warning lamp and diagnosis sensor unit?

OK >> Replace diagnosis sensor unit.
NG >> Connect “AIR BAG” warning lamp and diagnosis sensor unit connector properly. If “AIR BAG” warning lamp still does not go off, replace harness.

“SRS AIR BAG” Warning Lamp Does Not Turn ON

1.CHECK METER FUSE

Refer to PG-71, "Fuse".

Check 10A fuse [No.4, located in fuse block (J/B)].

OK >> GO TO 3.
NG >> GO TO 2.

2.CHECK METER FUSE AGAIN

Replace meter fuse and turn ignition switch ON.

Does the meter fuse blow again?

YES >> Repair or replace the related harness.
NO >> **INSPECTION END**

cardiagn.com

3.CHECK HARNESS CONNECTION BETWEEN DIAGNOSIS SENSOR UNIT AND COMBINATION METER

Disconnect diagnosis sensor unit connector and turn ignition switch ON.

Does AIR BAG warning lamp turn ON?

YES >> Replace diagnosis sensor unit.
NO >> Replace combination meter assembly.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001069922

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Service

INFOID:0000000001069923

- Do not use electrical test equipment to check SRS circuits unless instructed to in this Service Manual.
- Before servicing the SRS, turn ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.
  For approximately 3 minutes after the cables are removed, it is still possible for the air bag and seat belt pretensioner to deploy. Therefore, do not work on any SRS connectors or wires until at least 3 minutes have elapsed.
- Diagnosis sensor unit must always be installed with their arrow marks “⇐” pointing towards the front of the vehicle for proper operation. Also check diagnosis sensor unit for cracks, deformities or rust before installation and replace as required.
- The spiral cable must be aligned in the neutral position since its rotations are limited. Do not turn steering wheel and column after removal of steering gear.
- Handle air bag module carefully. Always place driver and front passenger air bag modules with the pad side facing upward and seat mounted front side air bag module standing with the stud bolt side facing down.
- Conduct self-diagnosis to check entire SRS for proper function after replacing any components.
- After air bag inflates, the front instrument panel assembly should be replaced if damaged.
- Always replace instrument panel pad following front passenger air bag deployment.

cardiagn.com

SECTION SR
SRS AIRBAG

CONTENTS

PRECAUTION 2

PRECAUTIONS 2
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 2
Service 2

PREPARATION 3

PREPARATION 3
Special Service Tool 3

ON-VEHICLE REPAIR 4

DRIVER AIR BAG MODULE 4
Exploded View 4
Removal and Installation 4

SPIRAL CABLE 6
Exploded View 6
Removal and Installation 6

FRONT PASSENGER AIR BAG MODULE 8
Exploded View 8
Removal and Installation 8

SIDE CURTAIN AIR BAG MODULE 10
Exploded View 10
Removal and Installation 10

FRONT SIDE AIR BAG MODULE 12
Exploded View 12
Removal and Installation 12

CRASH ZONE SENSOR 14
Exploded View 14
Removal and Installation 14

SIDE AIR BAG (SATELLITE) SENSOR 15
Exploded View 15
Removal and Installation 15

DIAGNOSIS SENSOR UNIT 16
Exploded View 16
Removal and Installation 16

FRONT SEAT BELT PRE-TENSIONER 18
Removal and Installation 18

DISPOSAL OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER 19
Caution for Air Bag Module and Seat Belt Pre-tensioner 19

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001069717

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Service

INFOID:0000000001069718

- Do not use electrical test equipment to check SRS circuits unless instructed to in this Service Manual.
- Before servicing the SRS, turn ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.
  For approximately 3 minutes after the cables are removed, it is still possible for the air bag and seat belt pretensioner to deploy. Therefore, do not work on any SRS connectors or wires until at least 3 minutes have elapsed.
- Diagnosis sensor unit must always be installed with their arrow marks “⇐” pointing towards the front of the vehicle for proper operation. Also check diagnosis sensor unit for cracks, deformities or rust before installation and replace as required.
- The spiral cable must be aligned in the neutral position since its rotations are limited. Do not turn steering wheel and column after removal of steering gear.
- Handle air bag module carefully. Always place driver and front passenger air bag modules with the pad side facing upward and seat mounted front side air bag module standing with the stud bolt side facing down.
- Conduct self-diagnosis to check entire SRS for proper function after replacing any components.
- After air bag inflates, the front instrument panel assembly should be replaced if damaged.
- Always replace instrument panel pad following front passenger air bag deployment.

cardiagn.com

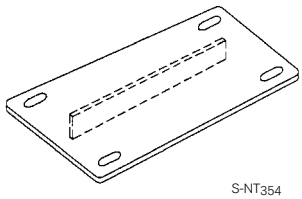
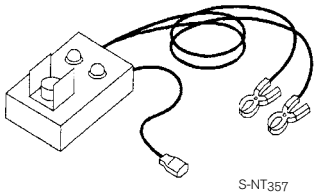
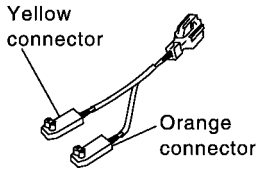
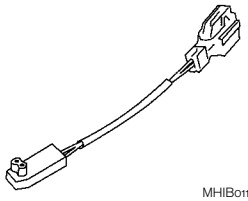
PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000001083079

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number Tool name		Description
KV99105300 Air bag module bracket	 S-NT354	Anchoring air bag module
KV99106400 Deployment tool	 S-NT357	Disposing of air bag module and front seat belt pre-tensioner
KV99110500 • Deployment tool adapter for driver air bag module (Yellow and orange connectors) • Deployment tool adapter for seat belt pre-tensioner (Yellow connector) • Deployment tool adapter for seat belt pre-tensioner2 (Orange connector) • Deployment tool adapter for front passenger air bag module (Yellow and orange connector)	 PHIA0184E	• Connecting between the deployment tool and driver air bag module • Connecting between the deployment tool and front seat belt pre-tensioner • Connecting between the deployment tool and seat belt pre-tensioner2 • Connecting between the deployment tool and front passenger air bag module
KV99109800 Deployment tool adapter for front side air bag module, side curtain air bag module	 MHIB0112E	Connecting between the deployment tool and front side air bag module, side curtain air bag module

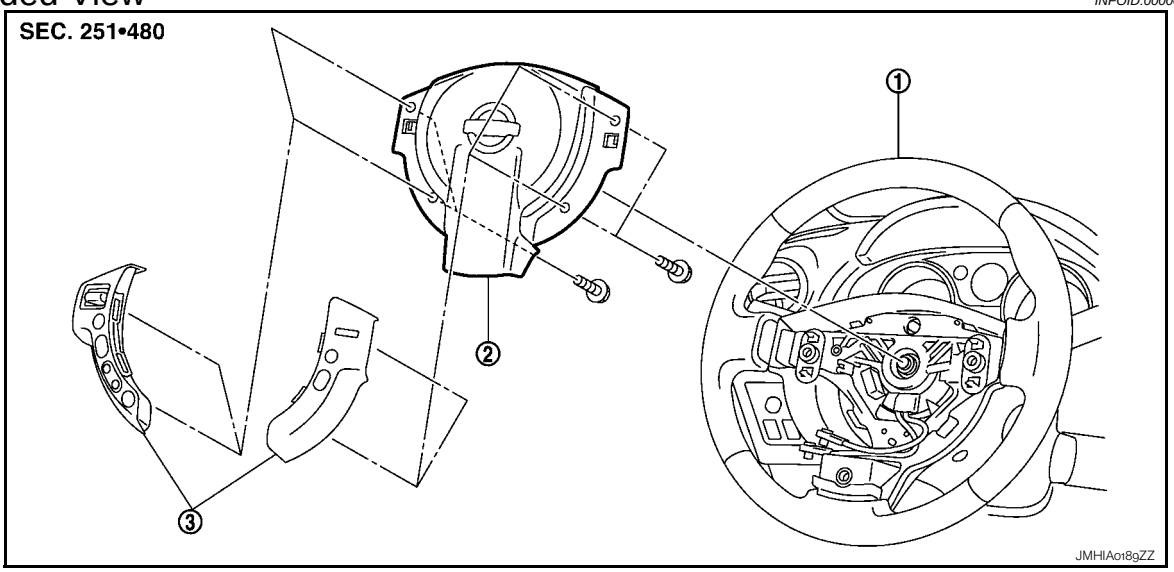
cardiagn.com

ON-VEHICLE REPAIR

DRIVER AIR BAG MODULE

Exploded View

INFOID:0000000001069721



1. Steering wheel
2. Driver air bag module
3. Steering switch

Removal and Installation

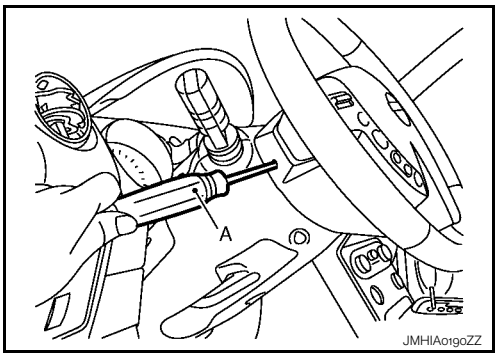
INFOID:0000000001069722

REMOVAL

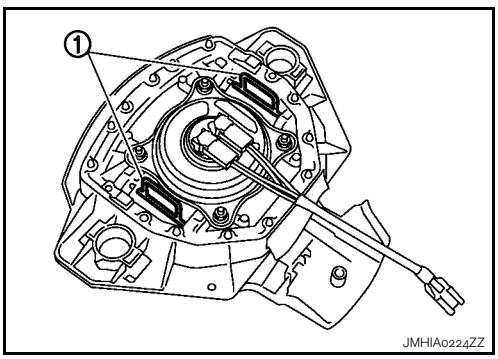
CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes.**
- **Always work from the side of air bag module. Do not work in front of it.**
- **Do not use air tools or electric tools for servicing.**

1. Locate retaining clip access hole (left/right) and insert screwdriver (A).



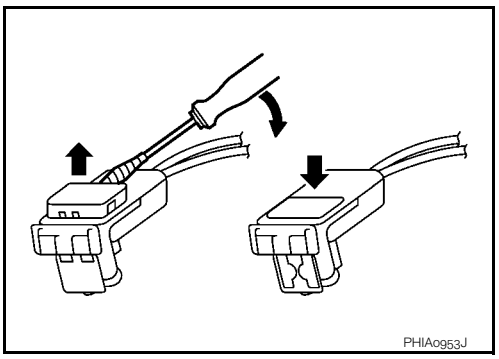
2. Press upward on retaining clip (1) until driver air bag module is released from steering wheel.



3. Lift the driver air bag module from the steering wheel.

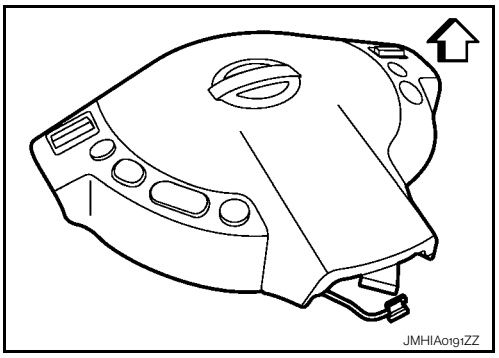
cardiagn.com

4. Disconnect the driver air bag module and horn connectors, then remove the driver air bag module.
NOTE:
- For installing/removing driver air bag module connector, insert thin screwdriver wrapped in tape into notch, lift lock and remove connector.
- Install connector with lohe k raised, and push lock into connector.
- After installing the connector, check that the lock is pushed securely into it.



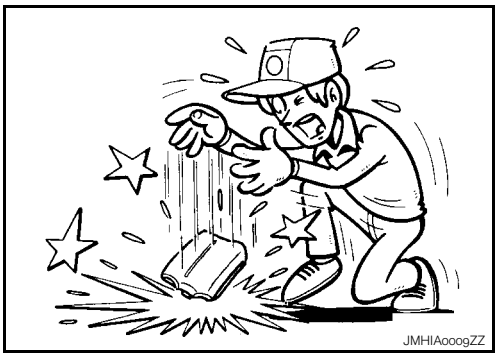
CAUTION:
- **Always place air bag module with pad side facing upward.**

⇦ : Upward



- **Do not insert any foreign objects (screwdriver, etc.) into air bag module.**
- **Do not disassemble air bag module.**
- **Do not expose the air bag module to temperatures exceeding 90°C (194°F).**
- **Do not allow oil, grease or water to come in contact with the air bag module.**

- **Replace the air bag module if it has been dropped or sustained an impact.**



INSTALLATION

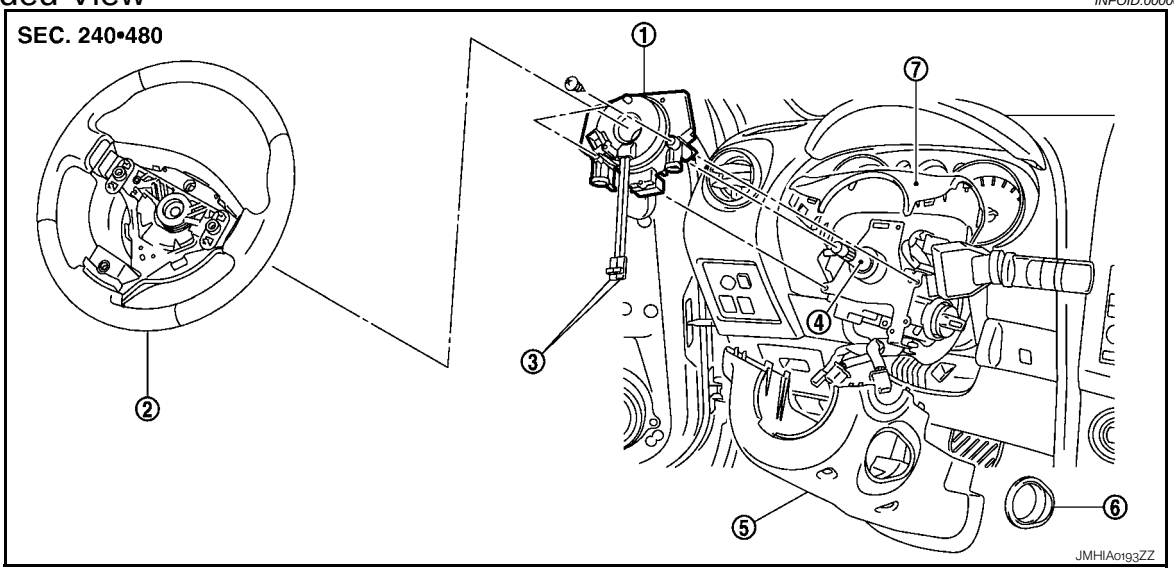
Install in the reverse order of removal.

CAUTION:
- **Do not damage the harness while installing.**
- **In case that malfunction is detected by the air bag warning lamp, reset by the self-diagnosis function and delete the memory by CONSULT-III.**
- **In case that malfunction is still detected after the above operations, perform self-diagnosis to repair malfunctions.**
- **After the work is completed, check that no malfunctioning system is detected by air bag warning lamp. Refer to SRC-10, "Diagnosis Description".**

SPIRAL CABLE

Exploded View

INFOID:0000000001069723



1. Spiral cable
2. Steering wheel
3. Driver air bag module harness connectors
4. Steering column assembly
5. Steering column cover (lower)
6. Steering lock escation
7. Steering column cover (upper)

Removal and Installation

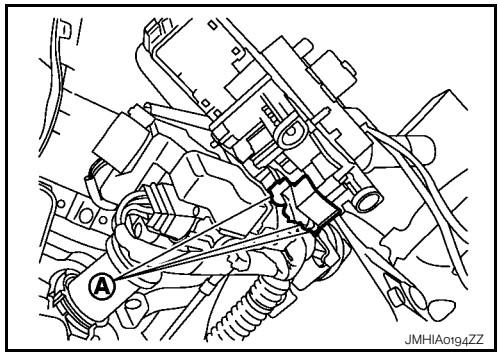
INFOID:0000000001069724

REMOVAL

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes.**
- **Do not use air tools or electric tools for servicing.**

1. Remove the driver air bag module. Refer to SR-4, "Removal and Installation".
2. Remove the steering wheel. Refer to ST-9, "Removal and Installation".
3. Remove the column cover (upper/lower). Refer to IP-11, "Exploded View".
4. Disconnect spiral cable body side connectors (A).
   NOTE:
   Disconnect spiral cable body side connectors after remove the spiral cable.



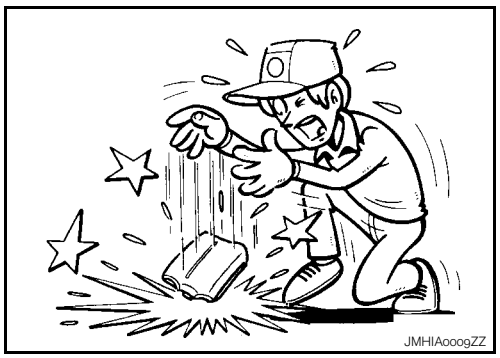
5. Remove spiral cable fixing screws, and pawls (left/right).
6. Pull out forward the spiral cable.

CAUTION:

- **Do not disassemble the spiral cable.**
- **Do not apply lubricant to the spiral cable.**
- **Do not allow oil, grease, detergent or water to come in contact with the spiral cable.**

cardiagn.com

- **Do not make an impact the spiral cable by dropping etc. Replace the spiral cable if it has been dropped or sustained an impact.**

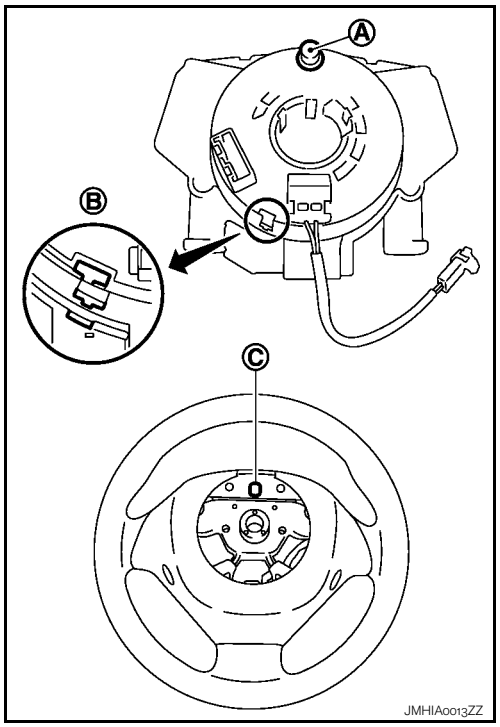


INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **The spiral cable may snap by steering operation if the cable is installed in an improper position.**
- **The neutral position is set as follows.**
- **Turn carefully the spiral cable clockwise to the end position. Then turn it counterclockwise (about 2 and half turns) and stop turning at the point (B) on which the stopper insertion holes are in the same position.**
- **The service part is installed in the neutral position by the stopper and can be set without adjusting after the stopper is removed.**
- **Do not over turn spiral cable or beyond number of turns required. (These will cause cable snap.)**
- **Adjust the spiral cable locating pin (A) to the steering wheel locating pin hole (C).**
- **Secure the air bag harness with the harness fixing hook.**

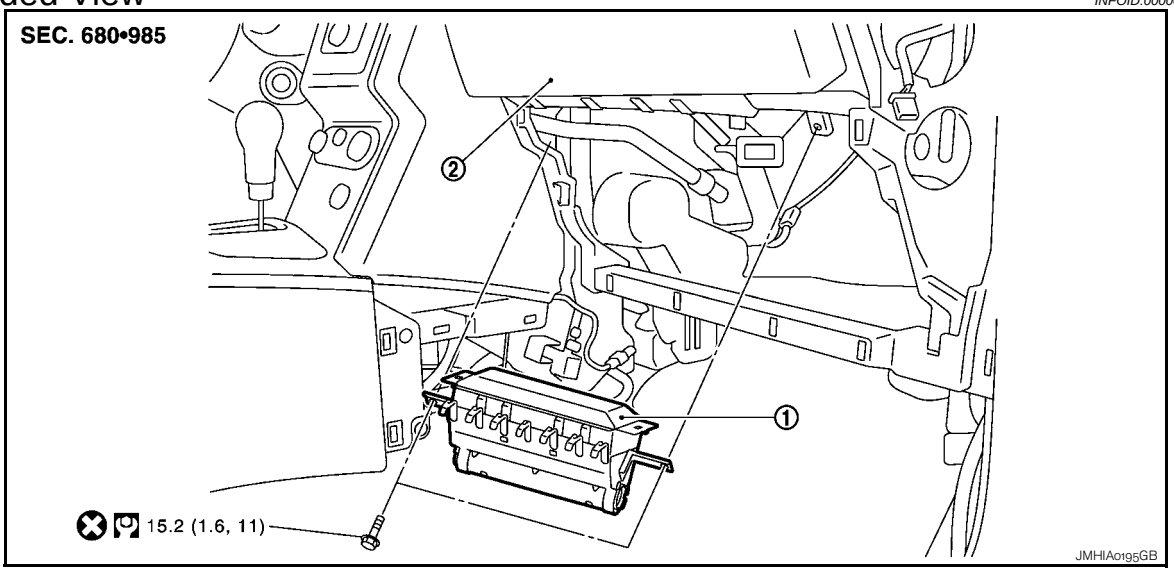


- **In case that malfunction is detected by the air bag warning lamp, reset by the self-diagnosis function and delete the memory by CONSULT-III.**
- **In case that malfunction is still detected after the above operations, perform self-diagnosis to repair malfunctions.**
- **After the work is completed, check that no malfunctioning system is detected by air bag warning lamp. Refer to SRC-10, "Diagnosis Description".**

FRONT PASSENGER AIR BAG MODULE

Exploded View

INFOID:0000000001069725



1. Passenger air bag modulel
2. Instrument panel ASSY

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001069726

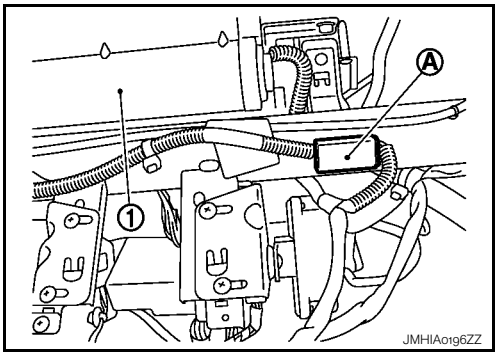
REMOVAL

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes.**
- **Always work from the side of air bag module. Do not work in front of it.**
- **Do not use air tools or electric tools for servicing.**

1. Remove the glove box assemblies. Refer to IP-12, "Removal and Installation".
2. Remove the Instrument lower assist panel. Refer to IP-12, "Removal and Installation".
3. Disconnect passenger air bag module harness connector (A).

(1): Passenger air bag module

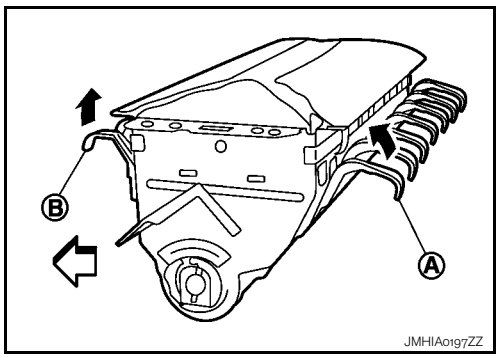


4. Remove the passenger air bag module fixing bolts.

cardiagn.com

5. Disconnect pawls (A)(B), and then remove passenger air bag module.

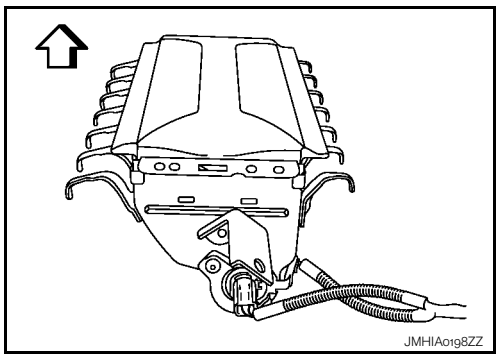
⇦ : Vehicle front



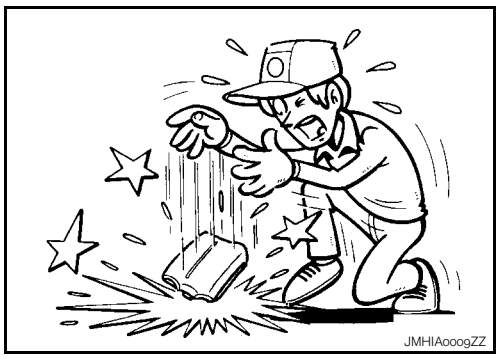
CAUTION:

- **Always place air bag module with pad side facing upward.**

⇦ : Upward



- **Do not insert any foreign objects (screwdriver, etc.) into air bag module.**
- **Do not disassemble air bag module.**
- **Do not use old fixing bolts after removal; replace with new bolts.**
- **Do not expose the air bag module to temperatures exceeding 90°C (194°F).**
- **Do not allow oil, grease or water to come in contact with the air bag module.**
- **Replace the air bag module if it has been dropped or sustained an impact.**



INSTALLATION

Install in the reverse order of removal.

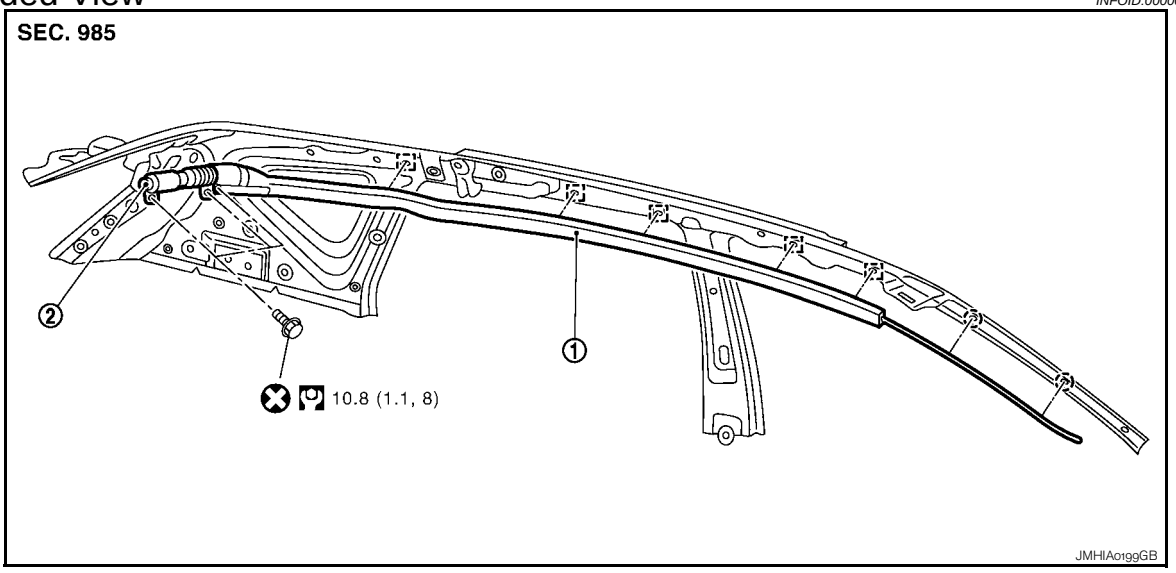
CAUTION:

- **Do not damage the harness while installing.**
- **In case that malfunction is detected by the air bag warning lamp, reset by the self-diagnosis function and delete the memory by CONSULT-III.**
- **In case that malfunction is still detected after the above operations, perform self-diagnosis to repair malfunctions.**
- **After the work is completed, check that no malfunctioning system is detected by air bag warning lamp. Refer to SRC-10, "Diagnosis Description".**

SIDE CURTAIN AIR BAG MODULE

Exploded View

INFOID:0000000001081123



1. Side curtain air bag module
2. Side curtain air bag inflator

: Clip

: Metal clip

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

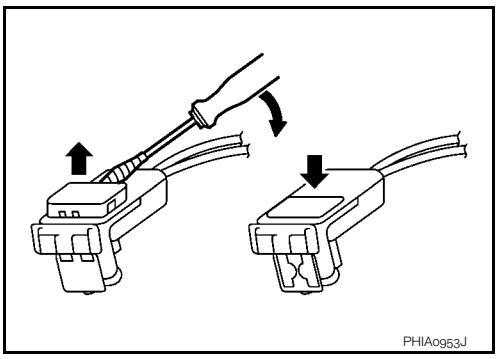
INFOID:0000000001081124

REMOVAL

CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes.**
- **Do not use air tools or electric tools for servicing.**

1. Remove the headlining. Refer to INT-21, "Removal and Installation".
2. Remove the side curtain air bag module connector.



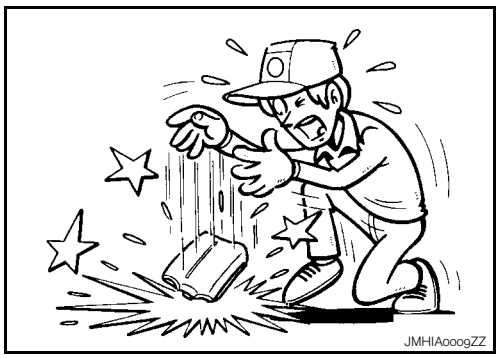
3. Remove the side air bag module fixing bolts and clips.
4. Remove the side curtain air bag module.

CAUTION:

- **Do not insert any foreign objects (screwdriver, etc.) into air bag module.**
- **Do not disassemble air bag module.**
- **Do not use old fixing nut after removal; replace with new bolts.**
- **Do not expose the air bag module to temperatures exceeding 90°C (194°F).**
- **Do not allow oil, grease or water to come in contact with the air bag module.**

cardiagn.com

- **Replace the air bag module if it has been dropped or sustained an impact.**



INSTALLATION

Install in the reverse order of removal.

CAUTION:

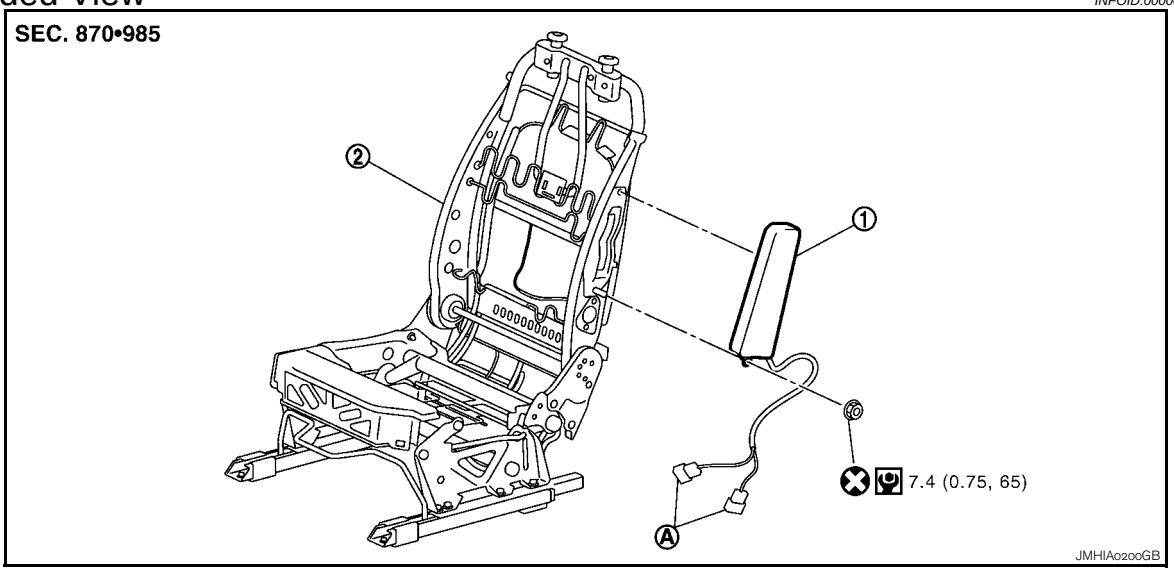
- **Do not damage the air bag harness.**
- **In case that malfunction is detected by the air bag warning lamp, reset by the self-diagnosis function and delete the memory by CONSULT-III.**
- **In case that malfunction is still detected after the above operations, perform self-diagnosis to repair malfunctions.**
- **After the work is completed, check that no malfunctioning system is detected by air bag warning lamp. Refer to SRC-10, "Diagnosis Description".**

cardiagn.com

FRONT SIDE AIR BAG MODULE

Exploded View

INFOID:0000000001069727



1. Front side air bag module
2. Front seatback flame

A. Front side air bag module connector

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001069728

REMOVAL

CAUTION:

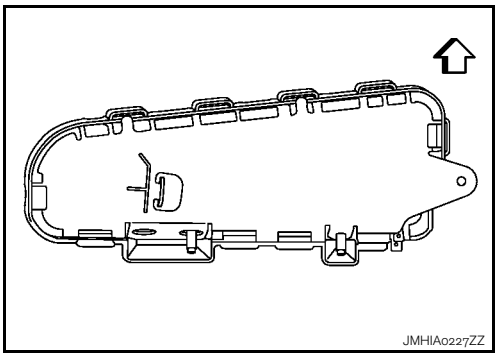
- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes.**
- **Always work from the rear of the front side air bag module.**
- **Do not use air tools or electric tools for servicing.**

1. Remove the front seat. Refer to SE-24, "Removal and Installation".
2. Remove the seatback trim and pad. Refer to SE-23, "Exploded View".
3. Remove the side air bag module fixing nut, and/or harness connector.
4. Remove the side air bag module.

CAUTION:

- **Always place air bag module with pad side facing upward.**

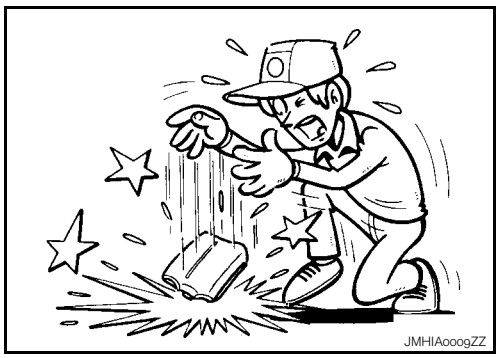
⇦: Upward



- **Do not insert any foreign objects (screwdriver, etc.) into air bag module.**
- **Do not disassemble air bag module.**
- **Do not use old fixing nut after removal; replace with new nut.**
- **Do not expose the air bag module to temperatures exceeding 90°C (194°F).**
- **Do not allow oil, grease or water to come in contact with the air bag module.**

cardiagn.com

- **Replace the air bag module if it has been dropped or sustained an impact.**



INSTALLATION

Install in the reverse order of removal.

CAUTION:

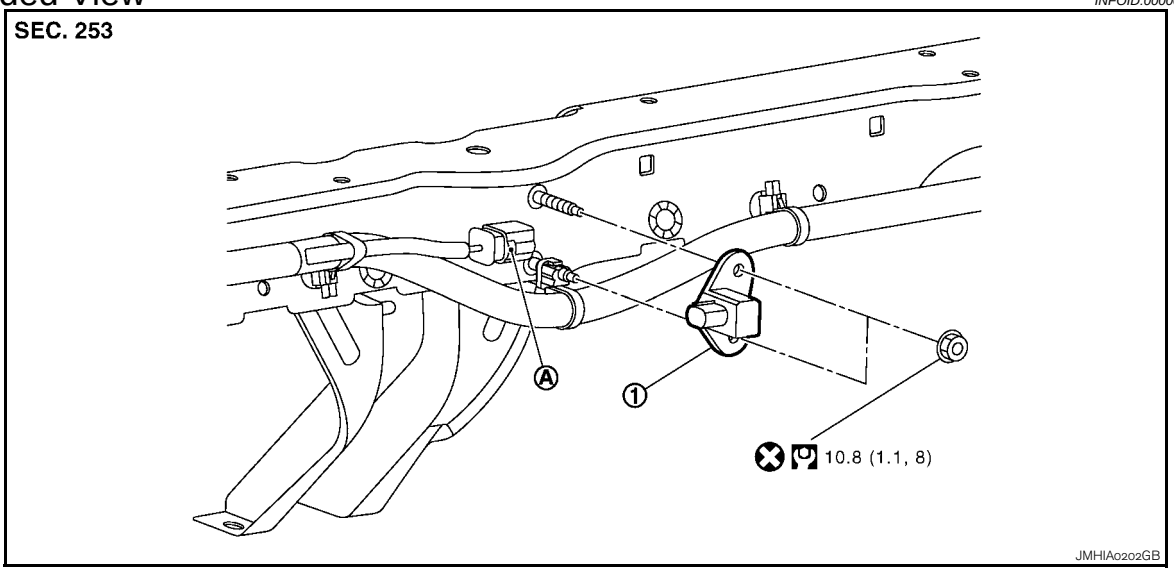
- **Do not damage the air bag harness.**
- **In case that malfunction is detected by the air bag warning lamp, reset by the self-diagnosis function and delete the memory by CONSULT-III.**
- **In case that malfunction is still detected after the above operations, perform self-diagnosis to repair malfunctions.**
- **After the work is completed, check that no malfunctioning system is detected by air bag warning lamp. Refer to SRC-10, "Diagnosis Description".**

cardiagn.com

CRASH ZONE SENSOR

Exploded View

INFOID:0000000001069729



1. Crash zone sensor
A. Harness connector

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001069730

REMOVAL

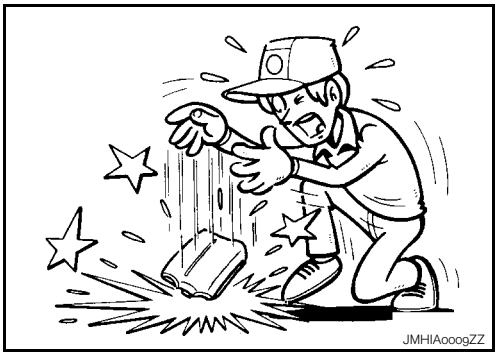
CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes.**
- **Do not use air tools or electric tools for servicing.**

1. Remove the crash zone sensor fixing nuts.
2. Disconnect harness connector, and then remove crash zone sensor.

CAUTION:

- **Replace the crash zone sensor if it has been dropped or sustained an impact.**
- **Do not use old fixing nuts after removal; replace with new nuts.**
- **Replace the crash zone sensor of deployed SRS driver air bag and deployed SRS front passenger air bag.**



INSTALLATION

Install in the reverse order of removal.

CAUTION:

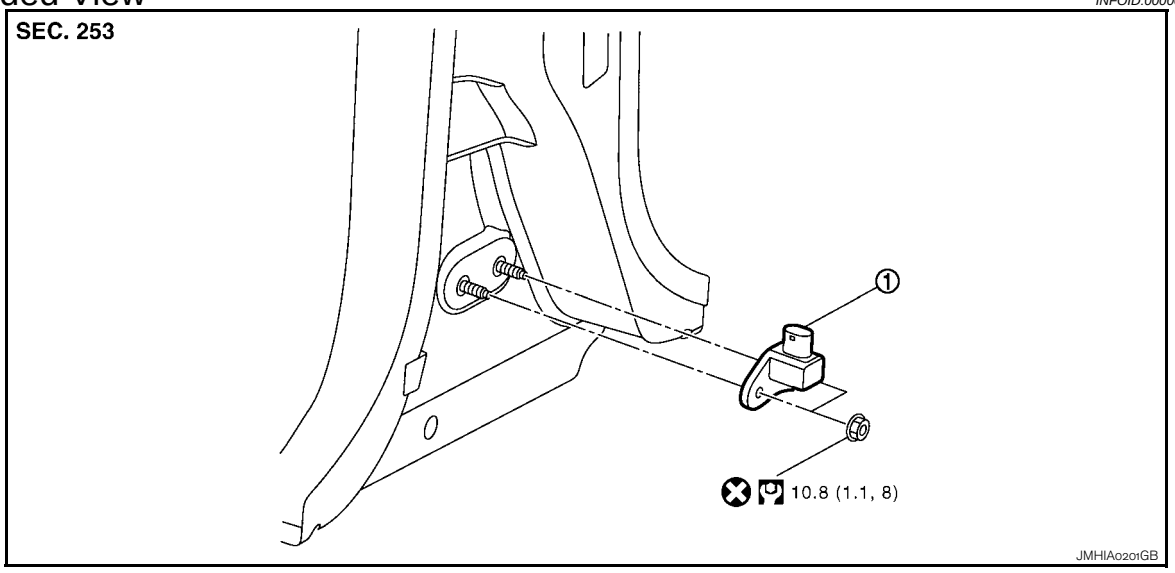
- **Do not damage the crash zone sensor harness.**
- **In case that malfunction is detected by the air bag warning lamp, reset by the self-diagnosis function and delete the memory by CONSULT-III.**
- **In case that malfunction is still detected after the above operations, perform self-diagnosis to repair malfunctions.**
- **After the work is completed, check that no malfunctioning system is detected by air bag warning lamp. Refer to SRC-10, "Diagnosis Description".**

cardiagn.com

SIDE AIR BAG (SATELLITE) SENSOR

Exploded View

INFOID:0000000001069731



1. Satellite sensor

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001069732

REMOVAL

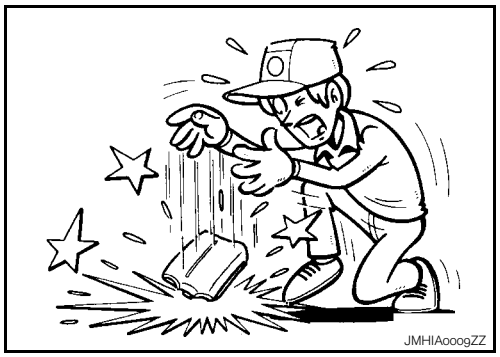
CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes.**
- **Do not use air tools or electric tools for servicing.**

1. Remove the front seat belt. Refer to SB-5, "SEAT BELT RETRACTOR : Exploded View".
2. Remove the side air bag (satellite) sensor fixing nuts.
3. Disconnect harness connector and then remove side air bag (satellite) sensor.

CAUTION:

- **Replace the side air bag (satellite) sensor if it has been dropped or sustained an impact.**
- **Do not use old fixing nuts after removal; replace with new nuts.**
- **Replace the satellite sensor of deployed SRS front side air bag and deployed SRS side curtain air bag.**



INSTALLATION

Install in the reverse order of removal.

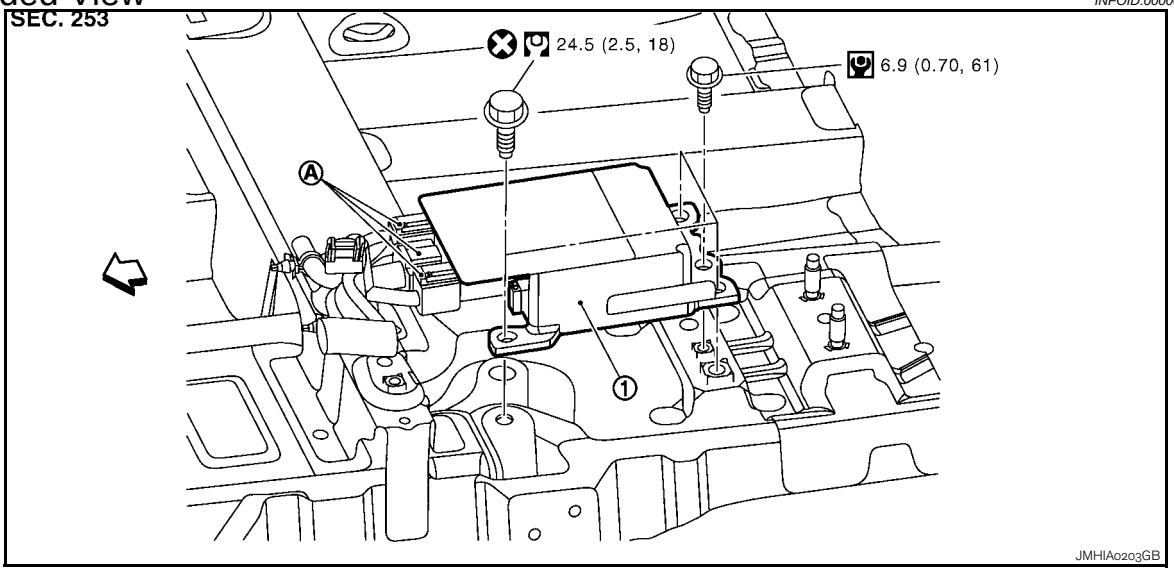
CAUTION:

- **Do not damage the satellite sensor harness.**
- **In case that malfunction is detected by the air bag warning lamp, reset by the self-diagnosis function and delete the memory by CONSULT-III.**
- **In case that malfunction is still detected after the above operations, perform self-diagnosis to repair malfunctions.**
- **After the work is completed, check that no malfunctioning system is detected by air bag warning lamp. Refer to SRC-10, "Diagnosis Description".**

DIAGNOSIS SENSOR UNIT

Exploded View

INFOID:0000000001069733



1. Diagnosis sensor unit
A. Harness connectors

Refer to GI-4, "Components" for symboles in the figure.

Removal and Installation

INFOID:0000000001069734

REMOVAL

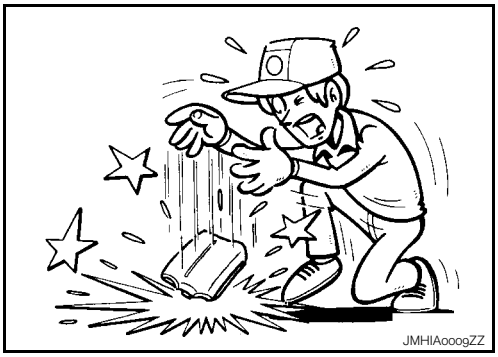
CAUTION:

- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes.**
- **Before disconnecting the air bag sensor unit harness connector, be sure to disconnect the each harness connector of the air bag module and pre-tensioner seat belt to prevent air bag deployment by static electricity and pre-tensioner seat belt operation.**
- **Do not use air tools or electric tools for servicing.**

1. Disconnect each connector of all air bag modules and pre-tensioner seat belts.
2. Remove the center console assembly. Refer to IP-18, "Exploded View".
3. Disconnect diagnosis sensor unit harness connectors.
4. Remove fixed bolts and ground bolt, and then remove diagnosis sensor unit.

CAUTION:

- **Replace the diagnosis sensor unit if it has been dropped or sustained an impact.**
- **Do not use old fixing bolts after removal; replace with new bolts.**
- **Replace the diagnosis sensor unit of deployed SRS air bag and deployed SRS front seat belt pre-tensioner.**



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Do not damage the diagnosis sensor harness.**

cardiagn.com

- **In case that malfunction is detected by the air bag warning lamp, reset by the self-diagnosis function and delete the memory by CONSULT-III.**
- **In case that malfunction is still detected after the above operations, perform self-diagnosis to repair malfunctions.**
- **After the work is completed, check that no malfunctioning system is detected by air bag warning lamp. Refer to SRC-10, "Diagnosis Description".**

ECU DISCRIMINATED NO.

After replacing the diagnosis sensor unit, confirm that the diagnosis sensor unit identification is correct for the vehicle as equipped.

	Specification	ECU DISCRIMINATED No.
LHD	Models with driver and passenger air bags, seat belt pre-tensioners, seat belt pre-tensioner2, side air bags and curtain air bags	F902
RHD	Models with driver and passenger air bags, seat belt pre-tensioners, seat belt pre-tensioner2, side air bags and curtain air bags	F900

FRONT SEAT BELT PRE-TENSIONER

Removal and Installation

INFOID:0000000001069735

For removal and installation procedures, refer to SB-5, "SEAT BELT RETRACTOR : Exploded View".

cardiagn.com

DISPOSAL OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER

Caution for Air Bag Module and Seat Belt Pre-tensioner

INFOID:0000000001082527

- Before disposing of air bag module and seat belt pre-tensioner, or vehicles equipped with such systems, deploy the systems. If such systems have already been deployed due to an accident, dispose of them as indicated in Disposing of Air Bag Module and Seat Belt Pre-tensioner.
- When deploying the air bag module and seat belt pre-tensioner,always use the Special Service Tool; Deployment tool (SST: KV99106400).
- When deploying the air bag module and seat belt pre-tensioner,stand at least 5 m (16 ft) away from the deployment component.
- When deploying air bag module and seat belt pre-tensioner, a fairlyloud noise is made, followed by smoke being released. The smoke is not poisonous,however, be careful not to inhale smoke since it irritates the throat and can cause choking.
- Always activate one air bag module at a time.
- Due to heat, leave air bag module unattended for more than 30 minutes after deployment. Also leave seat belt pre-tensioner unattended for more than 10 minutes after deployment.
- Wear gloves when handling a deployed air bag module and seat belt pre-tensioner.
- Never apply water to the deployed air bag module and seat belt pre-tensioner.
- Wash your hands after finishing work.
- Place the vehicle outdoors with an open space of at least 6 m (20 ft) on all sides when deploying air bag module and seat belt pre-tensioner while mounted in vehicle.
- Use a volt meter to make sure the vehicle battery is fully charged.
- Do not dispose of the air bag module and seat belt pre-tensioner undeployed.

CHECKING DEPLOYMENT TOOL

Connecting to Battery

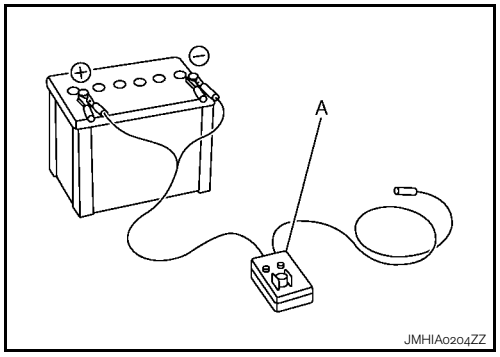
CAUTION:

The battery must show voltage of 9.6 V or more.

Remove the battery from the vehicle and place it on dry wood blocks approximately 5 m (16 ft) away from the vehicle.

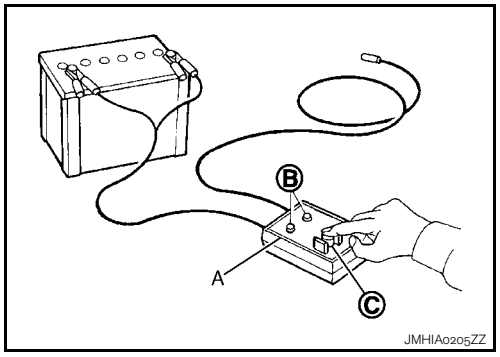
- Wait 3 minutes after the vehicle battery is disconnected before proceeding.
- Connect red clip of deployment tool (A) to battery positive terminal and black clip to negative terminal.

Check that the polarity is correct. The right side lamp in the tool, marked “deployment tool power”, should glow with a green light. If the right side lamp glows red, reverse the connections to the battery.



Deployment Tool Check

Press the deployment tool switch (C) to the ON position. The left side lamp in the tool, marked “air bag connector voltage” should illuminate (B). If it does not illuminate, replace the deployment tool (A).



Air Bag Deployment Tool Lamp Illumination Chart (Battery Connected)

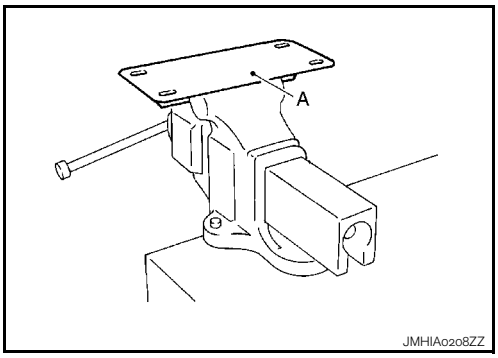
Switch operation	Left side lamp, green* “AIR BAG CONNECTOR VOLTAGE”	Right side lamp, green* “DEPLOYMENT TOOL POWER”
OFF	OFF	ON
ON	ON	ON

*: If this lamp glows red, the tool is connected to the battery incorrectly.Reverse the connections and check the lamp glows green.

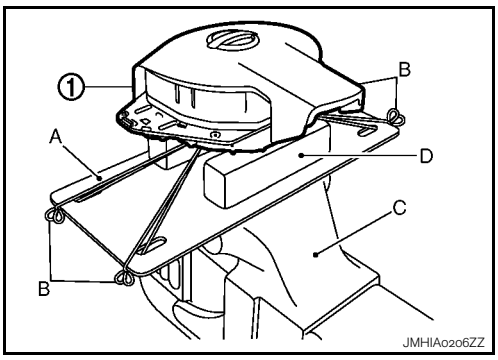
DEPLOYMENT OF AIR BAG MODULE (OUTSIDE OF VEHICLE)

Deployment of Driver Air Bag Module (Outside of Vehicle)

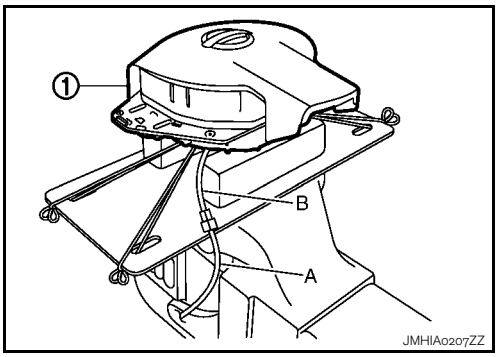
1. Unless the vehicle is being scrapped, deploying the air bag in the vehicle is not recommended. This may cause damage to the vehicle interior.
   Anchor air bag module bracket (SST: KV99105300) (A) in a vice secured to a firm foundation deployment.



2. Using wire (B), secure air bag module (1) to air bag module bracket (SST: KV99105300) (A) at four places.
   CAUTION:
   - **Use wire of at at least 1 mm (0.04 in) diameter.**
   - **If a gap exists between air bag module and air bag module bracket, use a piece of wood (D) inserted in the gap to stabilize the air bag module.**
3. Firmly secure air bag module bracket (SST: KV99105300) (A) with air bag module attached, in a vise (C).

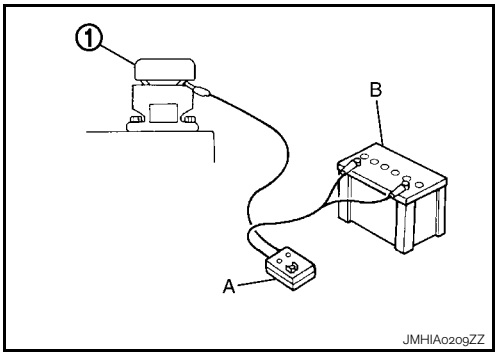


4. Connect deployment tool adapter (SST: KV99110500) (B) to air bag module (1) and deployment tool connector (SST: KV99106400) (A).



5. Connect red clip of deployment tool (A) to battery positive terminal and black clip to negative terminal (B).
6. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
7. Press the button on the deployment tool (A). The left side lamp on the tool, marked “air bag connector voltage”, will illuminate and the air bag module (1) will deploy.

CAUTION:
When deploying the driver air bag module, stand at least 5 m (16 ft)away from the air bag module.

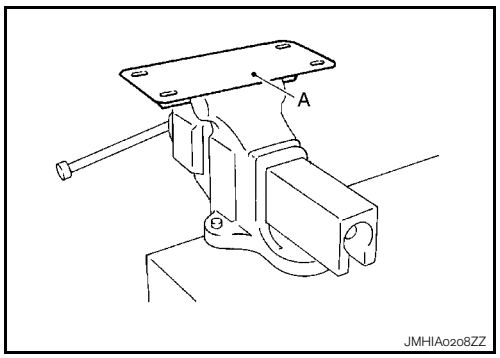


DEPLOYMENT OF AIR BAG MODULE (OUTSIDE OF VEHICLE)

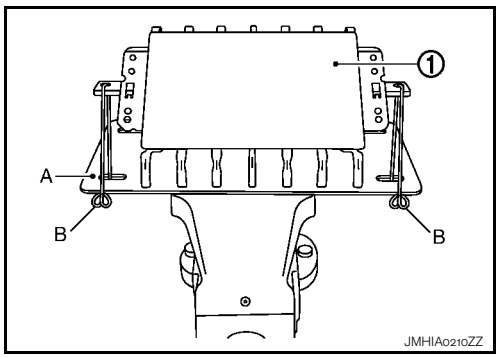
Deployment of Front Passenger Air Bag Module (Outside of Vehicle)

cardiagn.com

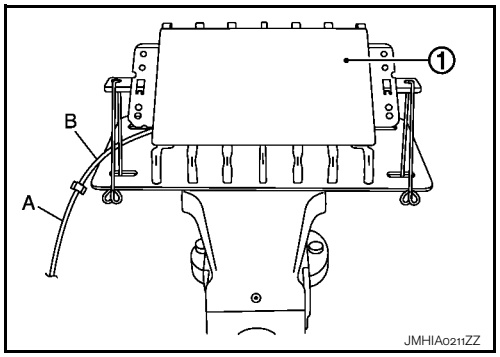
1. Firmly secure air bag module bracket (SST: KV99105300) (A) in a vise.



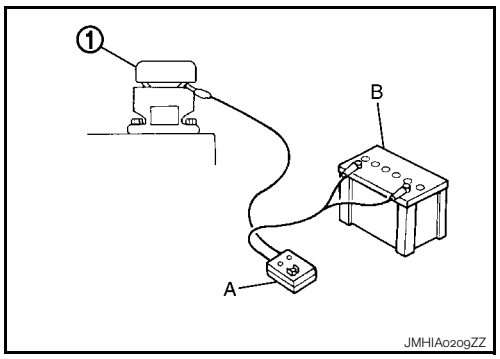
2. Using wire, secure air bag module to air bag module bracket (SST: KV99105300) (A) at two places.
CAUTION:
Use wire of at least 1 mm (0.04 in) diameter.



3. Connect deployment tool (SST: KV99106400) (A) and deployment tool adapter (SST: KV99110500) (B) to front passenger air bag module connector (1).



4. Connect red clip of deployment tool (A) to battery positive terminal and black clip to negative terminal (B).
5. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
6. Press the button on the deployment tool (A). The left side lamp on the tool, marked “air bag connector voltage”, will illuminate and the air bag module (1) will deploy.

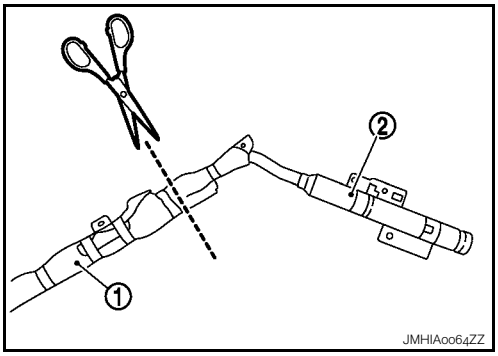


CAUTION:
- **When deploying the front passenger air bag module, do not stand on the deploying side.**
- **Stand at least 5 m (16 ft) away from the air bag module.**

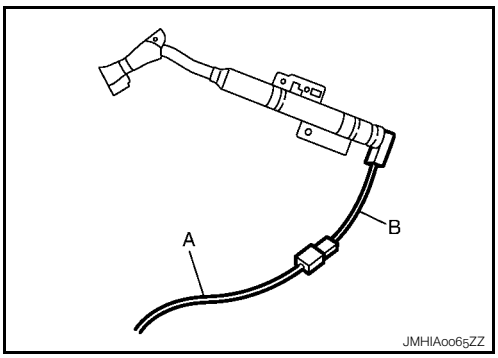
DEPLOYMENT OF AIR BAG MODULE (OUTSIDE VEHICLE)

Deployment of Side Curtain Air Bag Module (Outside of Vehicle)

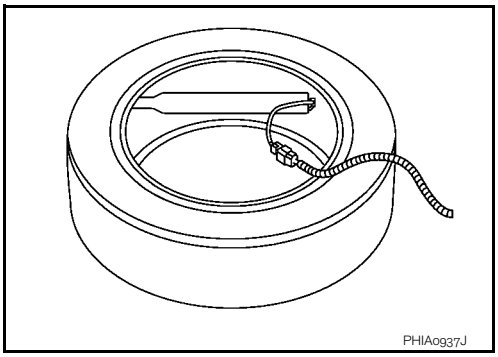
1. Cut the inflator (2) from side curtain air bag module (1).



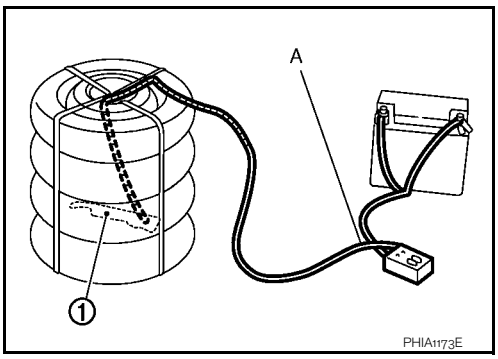
2. Connect deployment tool (SST: KV99106400) (A) and deployment tool adapter (SST: KV99109800) (B) to the inflator.



3. Put the inflator connected with the deployment tool (SST: KV99106400) and deployment tool adapter (SST: KV99109800) into a tire without a wheel.



4. Put the tire with the inflator (1) onto another tire without wheel.Add an additional tire without a wheel and then a tire mounted on a wheel on top.
   CAUTION:
   Tie all tires together with a strap in order keep them standing.
5. Connect red clip of deployment tool (A) to battery positive terminal and black clip to negative terminal.
6. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
7. Press the button on the deployment tool (A). The left side lamp on the tool, marked “air bag connector voltage”, will illuminate and the air bag module inflator (1) will deploy.
   CAUTION:
   When deploying the side curtain air bag module, stand at least 5 m (16ft) away from the side curtain air bag module.

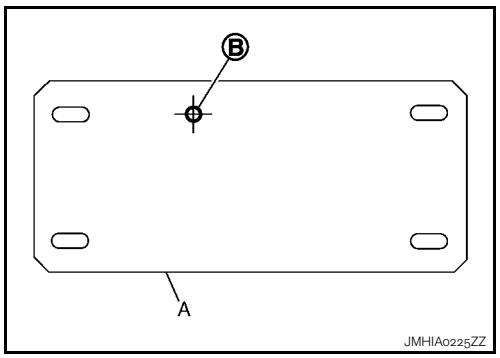


DEPLOYMENT OF AIR BAG MODULE (OUTSIDE VEHICLE)

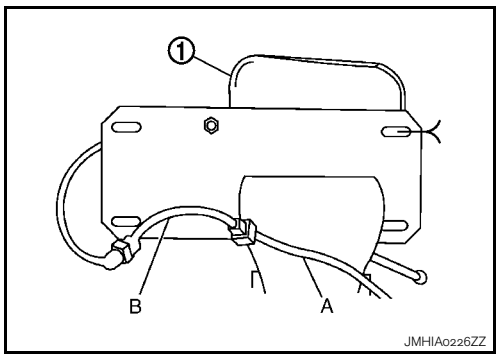
Deployment of Front Side Air Bag Module (Outside of Vehicle)

cardiagn.com

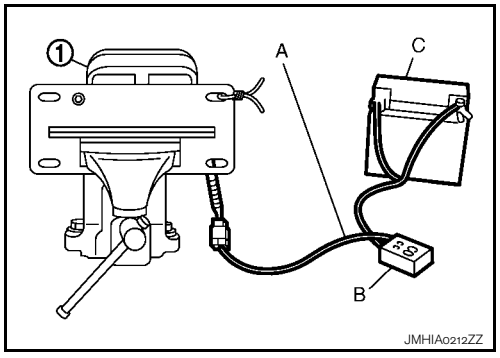
1. Make 6.5 mm (0.256 in) diameter hole (B) in air bag module bracket (SST: KV99105300) (A) at the position shown in figure.



2. Firmly secure air bag module bracket in a vise.
3. Insert one bolt through air bag module bracket and air bag module upper side holes, and fix them with one M6 bolt/nut.
   Insert wire through air bag module bracket and air bag module lower side holes, and fix them.
   CAUTION:
   Using wire, of at least 1 mm (0.04 in) diameter.
4. Connect deployment tool (SST: KV99106400) (A) and deployment tool adapter (SST: KV99109800) (B) to air bag module (1) connector.



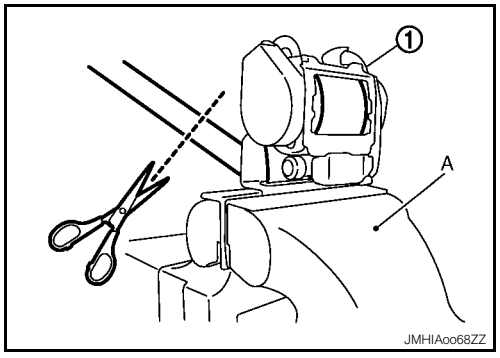
5. Connect red clip of deployment tool (SST: KV99106400) (A),(B) to battery positive terminal and black clip to negative terminal (C).
6. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
7. Press the button on the deployment tool. The left side lamp on the tool, marked “air bag connector voltage”, will illuminate and the air bag module (1) will deploy.
   CAUTION:
   When deploying the front side air bag module, stand at least 5 m (16ft) away from the air bag module.



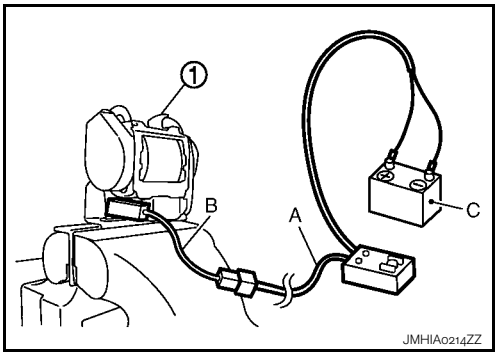
DEPLOYMENT OF SEAT BELT PRE-TENSIONER (OUTSIDE OF VEHICLE)

Deployment of Front Seat Belt Pre-Tensioner (Outside of Vehicle)

1. Firmly grip pre-tensioner (1) in a vise (A) and cut off the webbing.



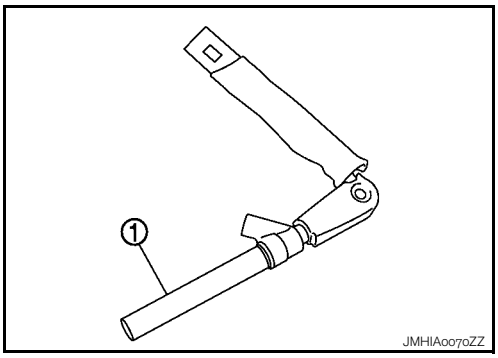
2. Connect deployment tool (SST: KV99106400) (A) and deployment tool adapter (SST: KV99110500) (B) yellow connector to front seat belt pre-tensioner (1).
3. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal (C).
4. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
5. Press the button on the deployment tool. The left side lamp on the tool, marked “seat belt pre-tensioner connector voltage”, will illuminate and the seat belt pre-tensioner (1) will deploy.
   CAUTION:
   When deploying the front seat belt pre-tensioner, stand at least 5 m(16 ft) away from the seat belt pre-tensioner.



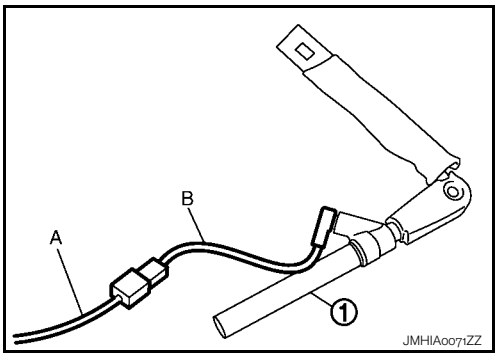
DEPLOYMENT OF SEAT BELT PRE-TENSIONER (OUTSIDE OF VEHICLE)

Deployment of Front Seat Belt Pre-Tensioner2 (Outside of Vehicle)

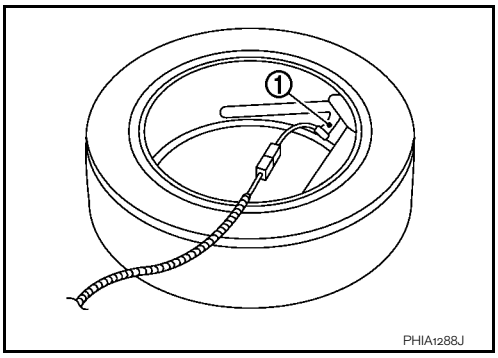
1. Disconnect the webbing of seat belt pre-tensioner2 (1).



2. Connect deployment tool (SST: KV99106400) (A) and deployment tool adapter (SST: KV99110500) (B) orange connector to seat belt pre-tensioner2 (1).

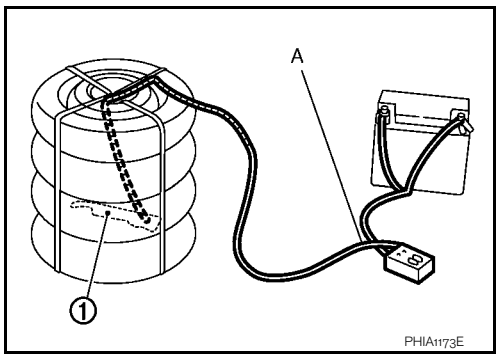


3. Put the seat belt pre-tensioner2 (1) connected with the deployment tool into a tire without a wheel.



cardiagn.com

4. Connect red clip of deployment tool (A) to battery positive terminal and black clip to negative terminal.
5. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
6. Press the button on the deployment tool (A). The left side lamp on the tool, marked “seat belt pre-tensioner2 connector voltage”, will illuminate and the seat belt pre-tensioner2 (1) will deploy.
   CAUTION:
   When deploying the front seat belt pre-tensioner2, stand at least 5 m(16 ft) away from the seat belt pre-tensioner2.

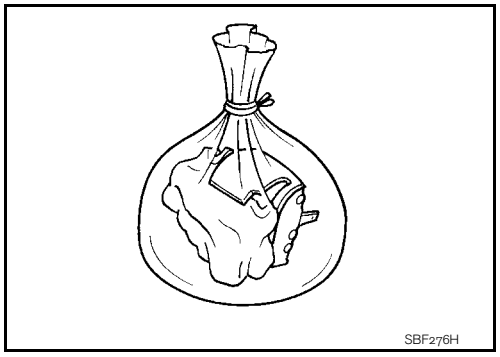


DISPOSING OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER

Deployed air bag module and seat belt pre-tensioner are very hot. Before disposing of air bag module and seat belt pre-tensioner, wait at least 30 minutes, and 10 minutes, respectively. Seal them in a plastic bag before disposal.

CAUTION:

- **Never apply water to a deployed air bag module or seat belt pre-tensioner.**
- **Wear gloves when handling a deployed air bag moduleor seat belt pre-tensioner.**
- **No poisonous gas is produced upon air bag module deployment. However,be careful not to inhale gas since it irritates the throat and can cause choking.**
- **Do not disassemble air bag module and seat belt pre-tensioner.**
- **Air bag module and seat belt pre-tensioner cannot be reused.**
- **Wash your hands clean after finishing work.**



cardiagn.com

SECTION STR
STARTING SYSTEM

CONTENTS

BASIC INSPECTION 2

DIAGNOSIS AND REPAIR WORKFLOW 2

K9K MODELS 2
K9K MODELS : Work Flow 2

HR16DE/MR20DE MODELS 4
HR16DE/MR20DE MODELS : Work Flow 4

FUNCTION DIAGNOSIS 8

STARTING SYSTEM 8
System Diagram 8
System Description 8
Component Parts Location 8
Component Description 9

COMPONENT DIAGNOSIS 10

B TERMINAL CIRCUIT 10
Description 10
Diagnosis Procedure 10

S TERMINAL CIRCUIT 11
Description 11
Diagnosis Procedure 11

STARTING SYSTEM 12
Wiring Diagram - STARTING SYSTEM (M/T MODELS) - 12
Wiring Diagram - STARTING SYSTEM (CVT MODELS) - 15

SYMPTOM DIAGNOSIS 18

STARTING SYSTEM 18
Symptom Table 18

PRECAUTION 19

PRECAUTIONS 19
Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 19

ON-VEHICLE REPAIR 20

STARTER MOTOR 20

K9K MODELS 20
K9K MODELS : Exploded View 20
K9K MODELS : Removal and Installation 20

HR16DE MODELS 20
HR16DE MODELS : Exploded View 20
HR16DE MODELS : Removal and Installation 22
HR16DE MODELS : Disassembly and Assembly 22
HR16DE MODELS : Inspection 22

MR20DE MODELS 25
MR20DE MODELS : Exploded View 25
MR20DE MODELS : Removal and Installation 27
MR20DE MODELS : Disassembly and Assembly 27
MR20DE MODELS : Inspection 27

SERVICE DATA AND SPECIFICATIONS (SDS) 31

SERVICE DATA AND SPECIFICATIONS (SDS) 31
Starter Motor 31

cardiagn.com

BASIC INSPECTION

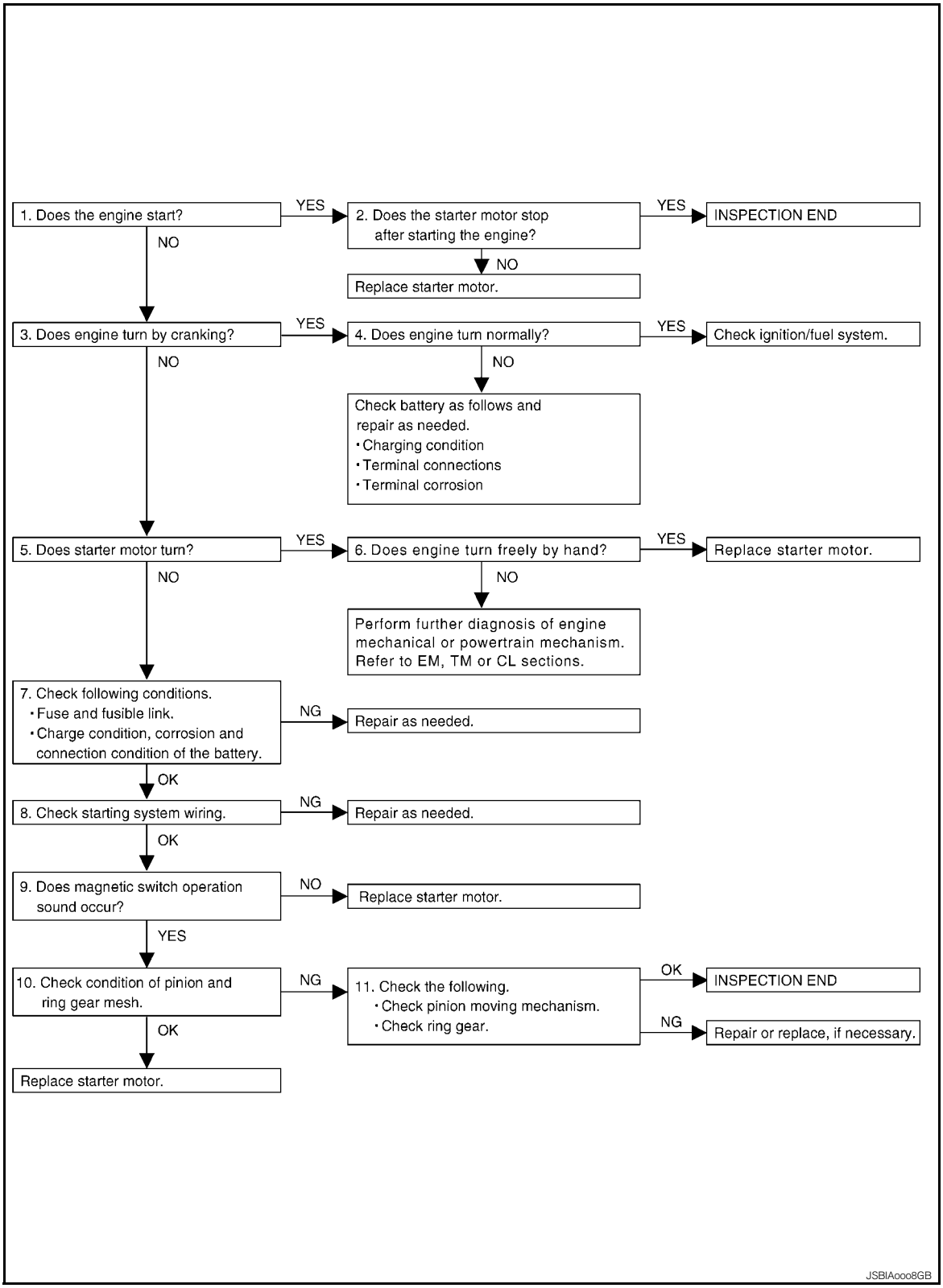
DIAGNOSIS AND REPAIR WORKFLOW

K9K MODELS

K9K MODELS : Work Flow

INFOID:0000000001116764

OVERALL SEQUENCE



cardiagn.com

DETAILED FLOW

NOTE:
If any malfunction is found, immediately disconnect the battery cable from the negative terminal.

1.CHECK ENGINE START

Crank the engine and check that the engine starts.

Does the engine start?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK THAT THE STARTER MOTOR STOPS

Check that the starter motor stops after starting the engine.

Does the starter motor stop?

YES >> INSPECTION END
NO >> Replace starter motor.

3.CHECK THE ENGINE SPEED WITH CRANKING

Check that the engine runs at cranking.

Does engine turn by cranking?

YES >> GO TO 4.
NO >> GO TO 5.

4.CHECK THE ENGINE SPEED WITH CRANKING

Check that the engine speed is not low at cranking.

Does engine turn normally?

YES >> Check ignition/fuel system.
NO >> Check charge condition, corrosion and connection condition of the battery. Refer to PG-4, "Work Flow".

5.CHECK STARTER MOTOR ACTIVATION

Check that the starter motor runs at cranking.

Does starter motor turn?

YES >> GO TO 6.
NO >> GO TO 7.

6.ENGINE ROTATION STATUS

Check that the engine can be rotated by hand.

Does engine turn freely by hand?

YES >> Replace starter motor.
NO >> Perform further diagnosis of engine mechanical or powertrain mechanism. Refer to EM, TM or CL sections.

7.CHECK POWER SUPPLY CIRCUIT

Check the following conditions.
- Fuse and fusible link
- Charge condition, corrosion and connection condition of the battery. Refer to PG-4, "Work Flow".

Are these inspection results normal?

YES >> GO TO 8.
NO >> Repair as needed.

8.CHECK STARTING SYSTEM WIRING

Check the following.
- “B” terminal circuit. Refer to STR-10, "Diagnosis Procedure"
- “S” terminal circuit. Refer to STR-11, "Diagnosis Procedure"

Are these inspection results normal?

YES >> GO TO 9.
NO >> Repair as needed.

cardiagn.com

9.CHECK MAGNETIC SWITCH OPERATION SOUND

Check that a magnetic switch operation sound can be heard when the ignition switch is set at the starting position.

Does magnetic switch operation sound occur?

YES >> GO TO 10.
NO >> Replace starter motor.

10.PINION AND RING GEAR ENGAGEMENT CHECK

Check condition of pinion and ring gear mesh.

Is the inspection result normal?

YES >> Replace starter motor.
NO >> GO TO 11.

11.CHECK STARTER MOTOR UNIT

Check the following.
- Check pinion moving mechanism.
- Check ring gear.

Are these inspection results normal?

YES >> INSPECTION END
NO >> Repair or replace, if necessary.

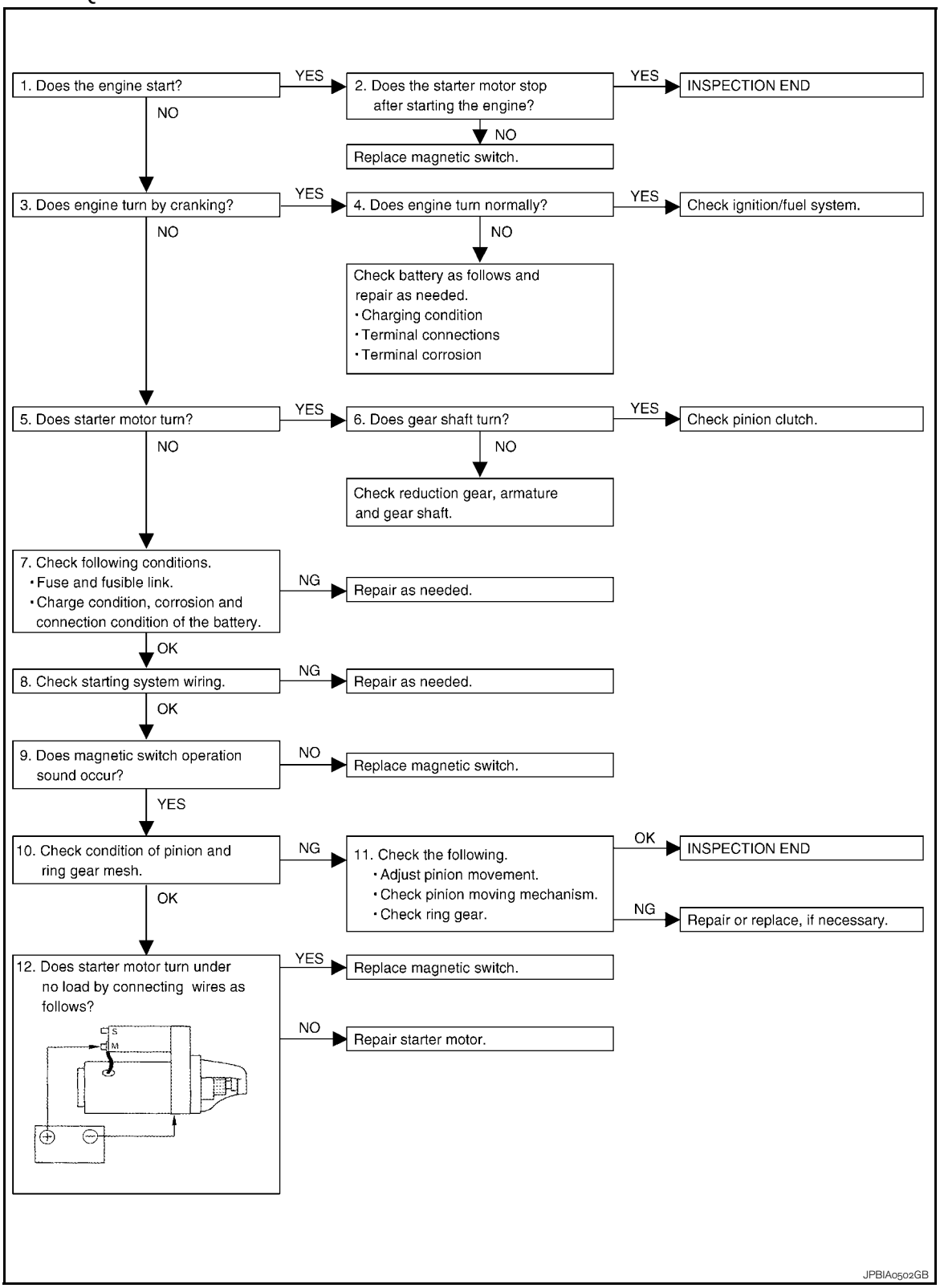
HR16DE/MR20DE MODELS

HR16DE/MR20DE MODELS : Work Flow

INFOID:0000000000955263

cardiagn.com

OVERALL SEQUENCE



DETAILED FLOW

NOTE:

If any malfunction is found, immediately disconnect the battery cable from the negative terminal.

1.CHECK ENGINE START

Crank the engine and check that the engine starts.

Does the engine start?

cardiagn.com

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK THAT THE STARTER MOTOR STOPS

Check that the starter motor stops after starting the engine.

Does the starter motor stop?

YES >> INSPECTION END
NO >> Replace magnetic switch.

3.CHECK THE ENGINE SPEED WITH CRANKING

Check that the engine runs at cranking.

Does engine turn by cranking?

YES >> GO TO 4.
NO >> GO TO 5.

4.CHECK THE ENGINE SPEED WITH CRANKING

Check that the engine speed is not low at cranking.

Does engine turn normally?

YES >> Check ignition/fuel system.
NO >> Check charge condition, corrosion and connection condition of the battery. Refer to PG-4, "Work Flow".

5.CHECK STARTER MOTOR ACTIVATION

Check that the starter motor runs at cranking.

Does starter motor turn?

YES >> GO TO 6.
NO >> GO TO 7.

6.CHECK STARTER MOTOR UNIT

1. Remove starter motor.
2. Check that the gear shaft of starter motor rotates.

Does gear shaft turn?

YES >> • Check pinion clutch. Refer to the following.
- HR16DE models: STR-22, "HR16DE MODELS : Inspection".
- MR20DE models: STR-27, "MR20DE MODELS : Inspection".

NO >> Check reduction gear, armature and gear shaft.

7.CHECK POWER SUPPLY CIRCUIT

Check the following conditions.
• Fuse and fusible link
• Charge condition, corrosion and connection condition of the battery. Refer to PG-4, "Work Flow".

Are these inspection results normal?

YES >> GO TO 8.
NO >> Repair as needed.

8.CHECK STARTING SYSTEM WIRING

Check the following.
• “B” terminal circuit. Refer to STR-10, "Diagnosis Procedure"
• “S” terminal circuit. Refer to STR-11, "Diagnosis Procedure"

Are these inspection results normal?

YES >> GO TO 9.
NO >> Repair as needed.

9.CHECK MAGNETIC SWITCH OPERATION SOUND

Check that a magnetic switch operation sound can be heard when the ignition switch is set at the starting position.

Does magnetic switch operation sound occur?

cardiagn.com

YES >> GO TO 10.
NO >> Replace magnetic switch.

10.PINION AND RING GEAR ENGAGEMENT CHECK

Check condition of pinion and ring gear mesh.

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 11.

11.CHECK STARTER MOTOR UNIT

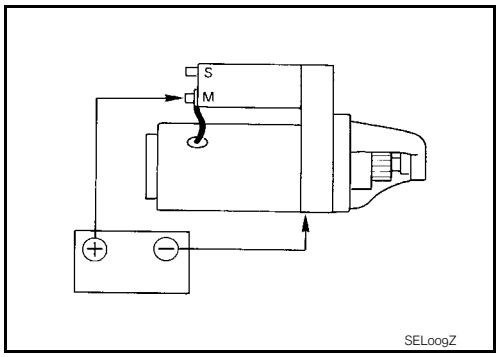
Check the following.
- Adjust pinion movement. Refer to the following.
- HR16DE models: STR-22, "HR16DE MODELS : Inspection"
- MR20DE engine models: STR-27, "MR20DE MODELS : Inspection"
- Check pinion moving mechanism.
- Check ring gear.

Are these inspection results normal?

YES >> INSPECTION END
NO >> Repair or replace, if necessary.

12.CHECK STARTER MOTOR UNIT

Check that the starter motor runs when connecting the positive terminal (12 V) to starter motor terminal M and the negative terminal (ground) to starter motor body.



Does the starter motor run?

YES >> Replace magnetic switch.
NO >> Repair starter motor.

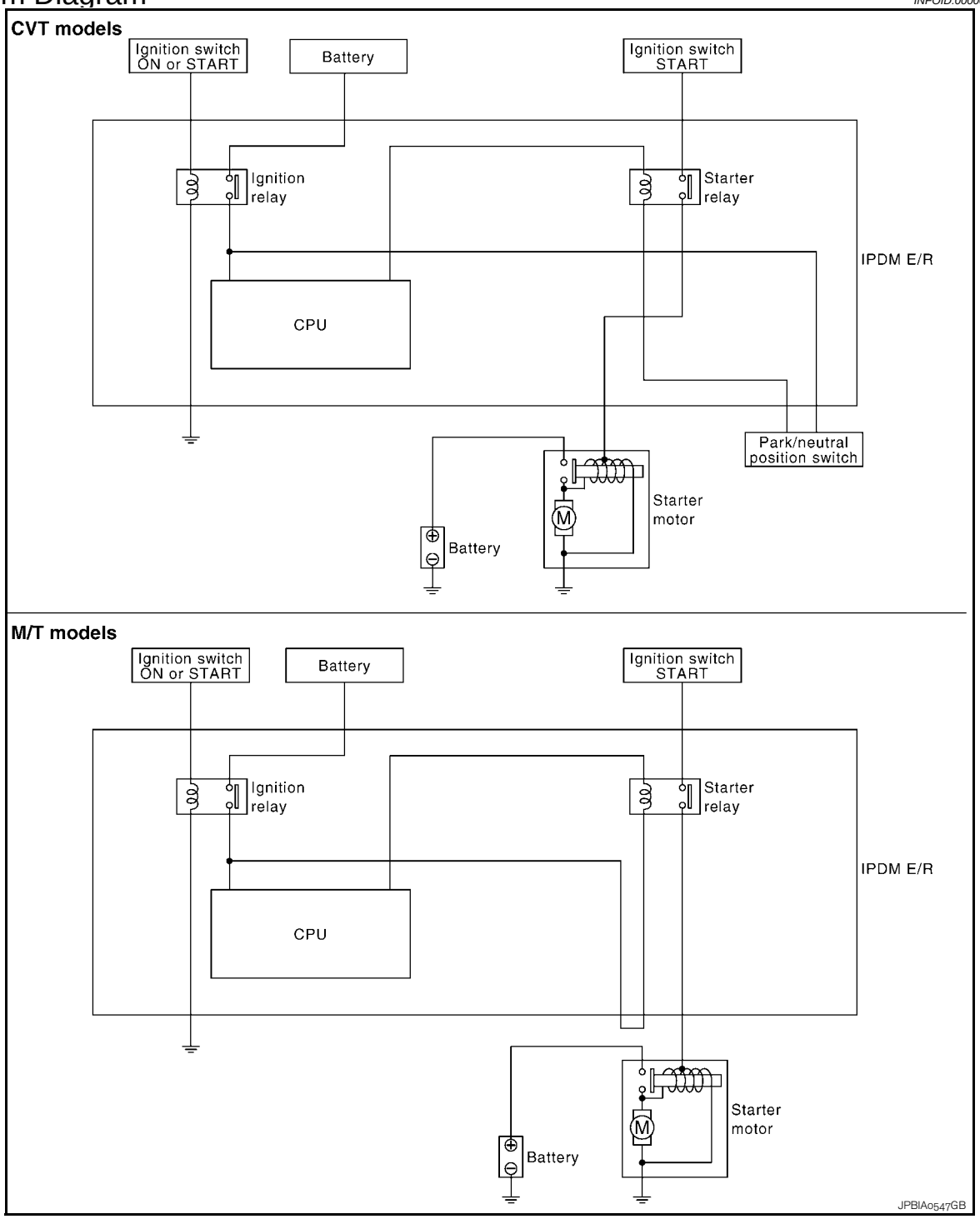
cardiagn.com

FUNCTION DIAGNOSIS

STARTING SYSTEM

System Diagram

INFOID:0000000000955264



System Description

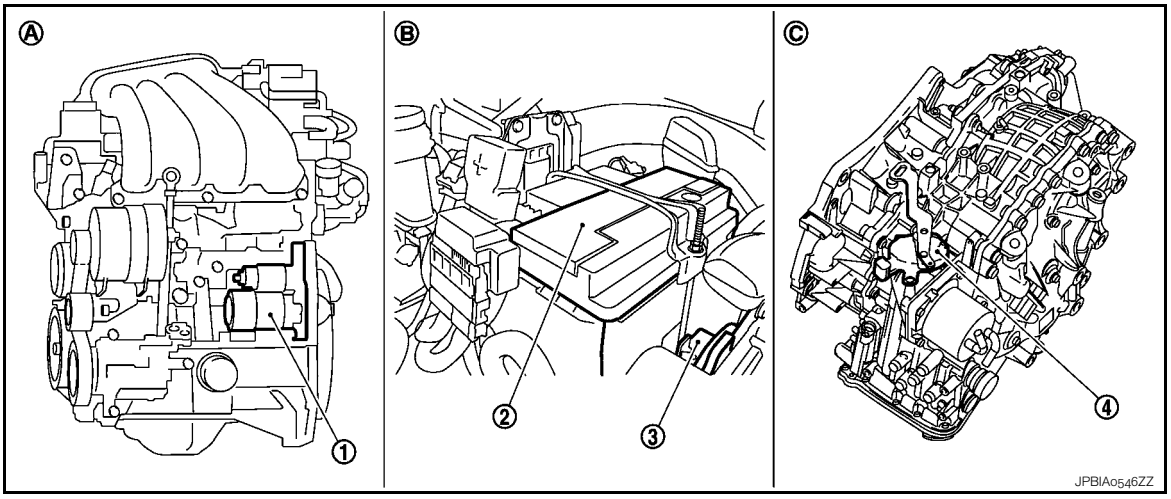
INFOID:0000000000955265

The starter motor plunger closes and provides a closed circuit between the battery and starter motor. The starter motor is grounded to the engine block. With power and ground supplied, cranking occurs and the engine starts.

Component Parts Location

INFOID:0000000000955266

cardiagn.com



1. Starter motor
2. Battery
3. IPDM E/R
4. Park/neutral position switch (CVT models only)

A. Engine
B. Engine room (left side)
C. CVT assembly

Component Description

INFOID:0000000000955267

Component part	Description
Park/neutral position switch (CVT models only)	Park/neutral position switch supplies power to the starter relay inside IPDM E/R when the selector lever is shifted to the P or N position.
IPDM E/R	CPU inside IPDM E/R controls the starter relay. Ignition relay inside IPDM E/R supplies power to the Park/neutral position switch when ignition switch is ON or START.
Starter motor	The starter motor plunger closes and the motor is supplied with battery power, which in turn cranks the engine, when the “S” terminal is supplied with electric power.

cardiagn.com

COMPONENT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:0000000000955268

The “B” terminal is constantly supplied with battery power.

Diagnosis Procedure

INFOID:0000000000955269

CAUTION:

Perform diagnosis under the condition that engine cannot start by the following procedure.

1. **Remove fuel pump fuse.**
2. **Crank or start the engine (where possible) until the fuel pressure is released.**

1.CHECK “B” TERMINAL CIRCUIT

1. Turn ignition switch OFF.
2. Check that starter motor “B” terminal connection is clean and tight.
3. Check voltage between starter motor “B” terminal and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Starter motor “B” terminal	Terminal		
F49 (K9K) F52 (HR16DE) F10 (MR20DE)	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check harness between battery and starter motor for open circuit.

2.CHECK BATTERY CABLE CONNECTION STATUS (VOLTAGE DROP TEST)

1. Shift CVT selector lever to “P” or “N” position. (CVT models)
2. Check voltage between battery positive terminal and starter motor “B” terminal.

Terminals			Condition	Voltage (Approx.)
(+)	(–)			
	Starter motor “B” terminal	Terminal		
Battery positive terminal	F49 (K9K) F52 (HR16DE) F10 (MR20DE)	2	When the ignition switch is in START position	Less than 0.5 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness between the battery and the starter motor for poor continuity.

3.CHECK GROUND CIRCUIT STATUS (VOLTAGE DROP TEST)

1. Shift CVT selector lever to “P” or “N” position. (CVT models)
2. Check voltage between starter motor case and battery negative terminal.

Terminals		Condition	Voltage (Approx.)
(+)	(–)		
Starter motor case	Battery negative terminal	When the ignition switch is in START position	Less than 0.2 V

Is the inspection result normal?

YES >> “B” terminal circuit is OK. Further inspection is necessary. Refer to STR-4, "HR16DE/MR20DE MODELS : Work Flow".
NO >> Check the starter motor case and ground for poor continuity.

cardiagn.com

S TERMINAL CIRCUIT

Description

INFOID:0000000000955270

The starter motor magnetic switch is supplied with power when the ignition switch is turned to START with the selector lever P or N for CVT models.

Diagnosis Procedure

INFOID:0000000000955271

CAUTION:
Perform diagnosis under the condition that engine cannot start by the following procedure.
1. **Remove fuel pump fuse.**
2. **Crank or start the engine (where possible) until the fuel pressure is released.**

1.CHECK “S” CONNECTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect “S” terminal.
3. Shift CVT selector lever to “P” or “N” position. (CVT models)
4. Check voltage between starter motor harness connector and ground.

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Starter motor harness connector	Terminal			
F50 (K9K) F53 (HR16DE) F11 (MR20DE)	1	Ground	When the ignition switch is in START position	Battery voltage

Is the inspection result normal?

YES >> “S” terminal circuit is OK. Further inspection is necessary. Refer to STR-2, "K9K MODELS : Work Flow" (K9K models) or STR-4, "HR16DE/MR20DE MODELS : Work Flow" (HR16DE/MR20DE models).
NO >> GO TO 2.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Check the following terminals and connectors for damage, bend and loose connection.

- Harness connector E8 (M/T models)
- Harness connector F122 (M/T models)
- Harness connector E6 (CVT models)
- Harness connector F123 (CVT models)

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the terminal and connector.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect IPDM E/R connector.
2. Check continuity between starter motor “S” terminal and IPDM E/R harness connector.

Starter motor “S” terminal		IPDM E/R harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
F50 (K9K) F53 (HR16DE) F11 (MR20DE)	1	E14	50	Existed

Is the inspection result normal?

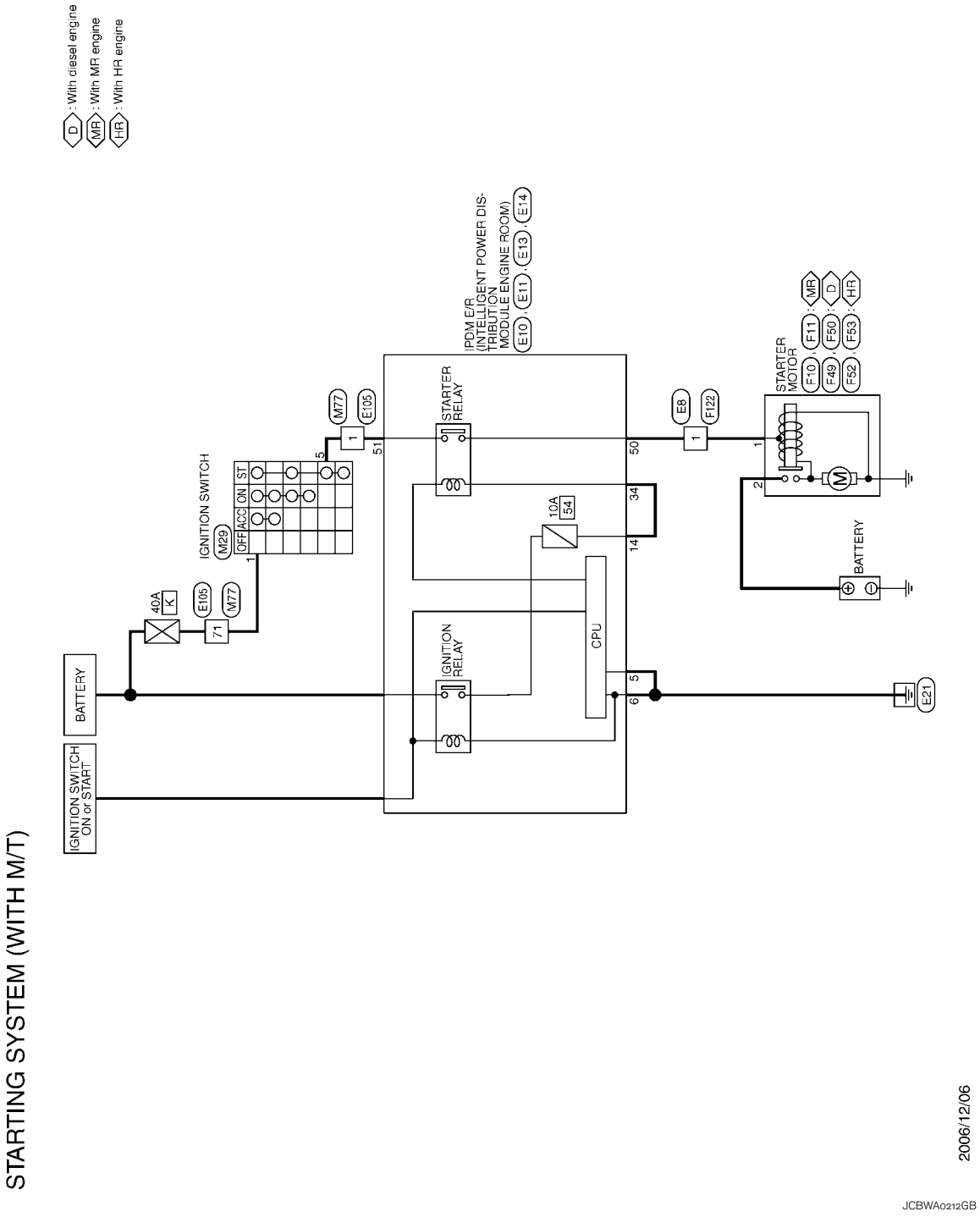
YES >> Inspect IPDM E/R and power supply circuit. Refer to SEC-5, "Work Flow".
NO >> Repair the harness.

cardiagn.com

STARTING SYSTEM

Wiring Diagram - STARTING SYSTEM (M/T MODELS) -

INFOID:0000000001059516



cardiagn.com

STARTING SYSTEM (WITH M/T)

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/R	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

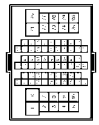
Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
50	B/R	–
51	P	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
71	L	–

Connector No.	F10
Connector Name	STARTER MOTOR
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B/Y	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
34	R/B	–

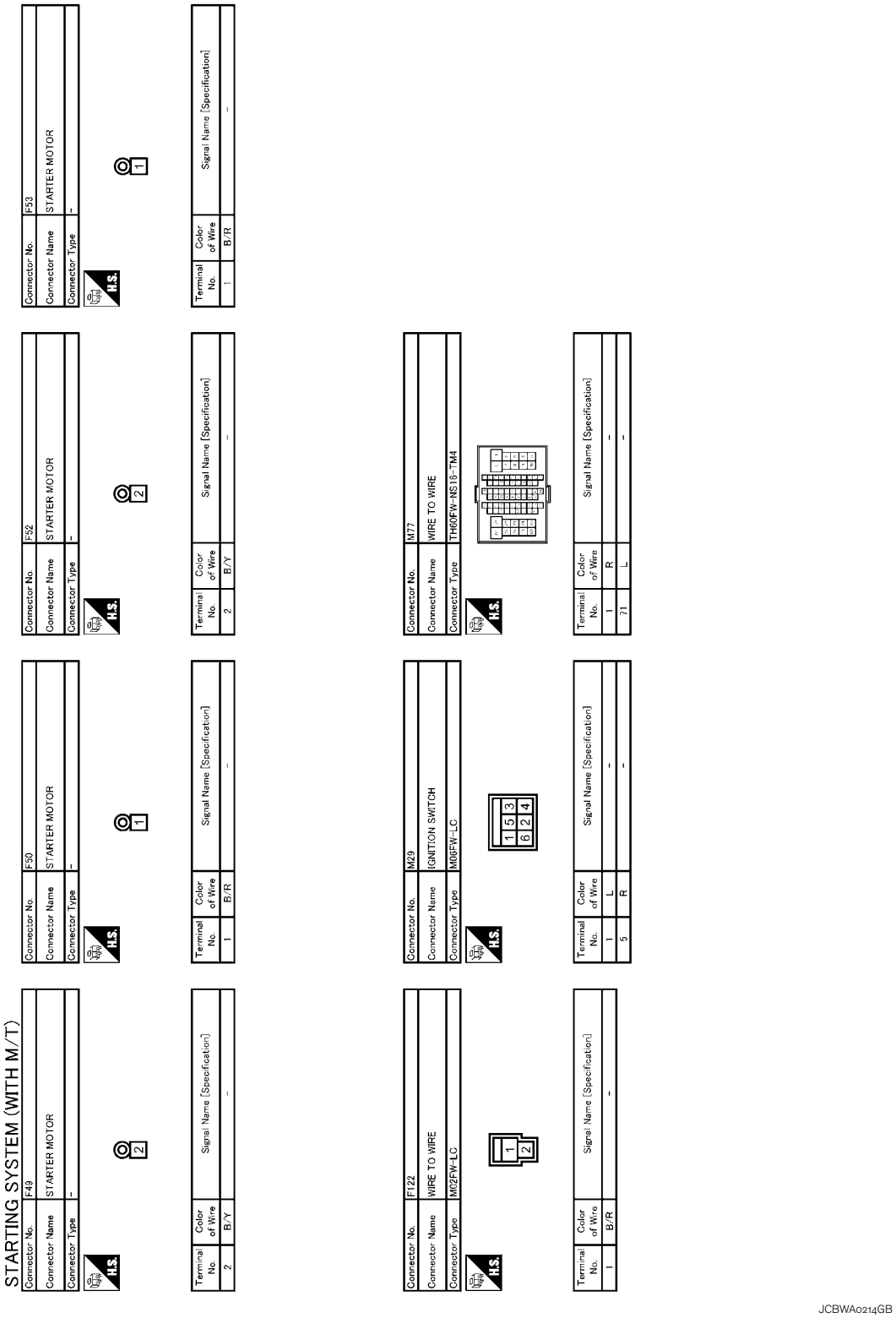
Connector No.	F11
Connector Name	STARTER MOTOR
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/R	–

JCBWA0213GB

cardiagn.com

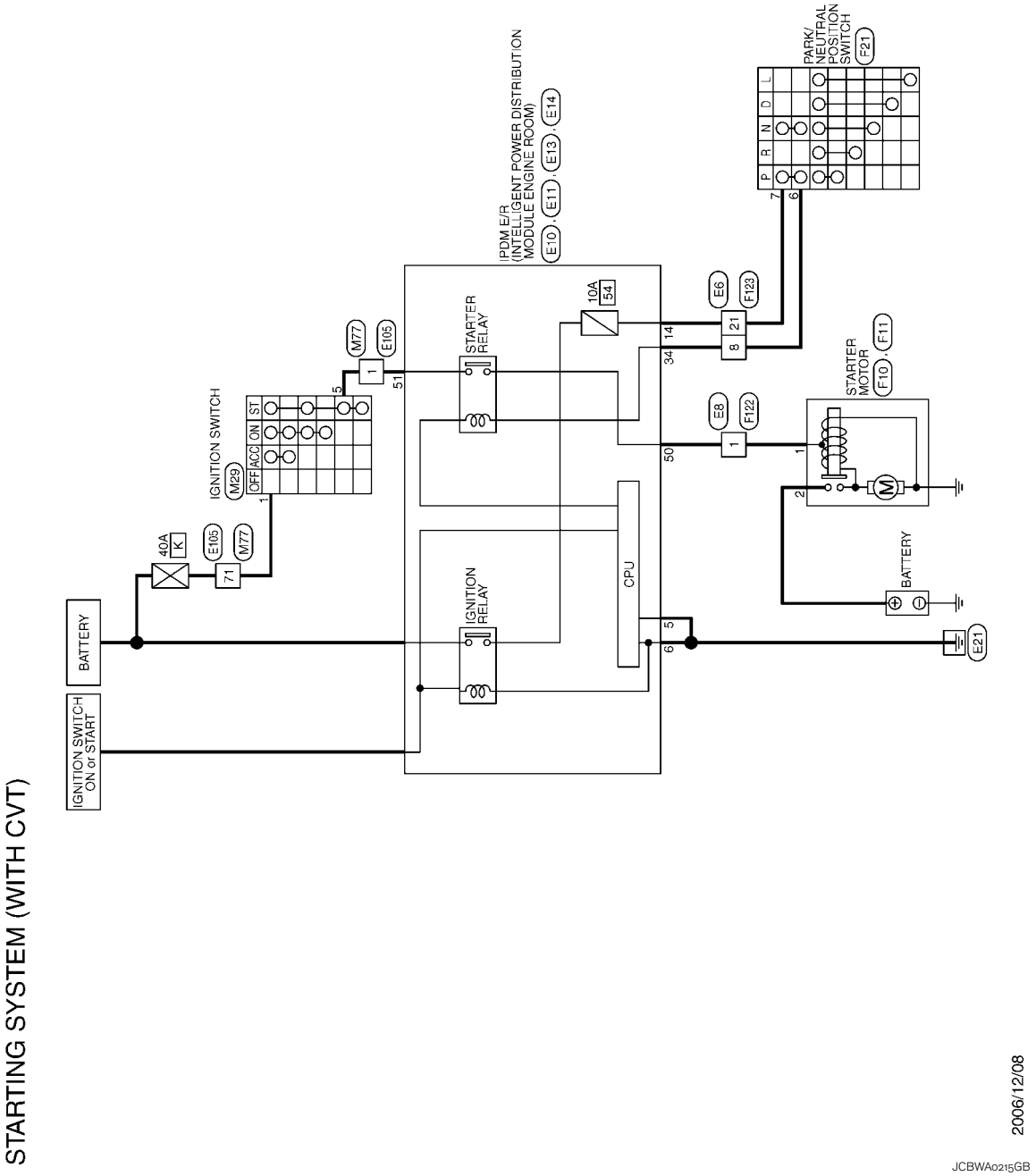


JCBWA0214GB

cardiagn.com

Wiring Diagram - STARTING SYSTEM (CVT MODELS) -

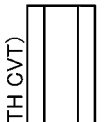
INFOID:0000000001125396



STARTING SYSTEM (WITH CVT)

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	-
21	R/B	-

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/R	-

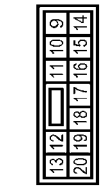
Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

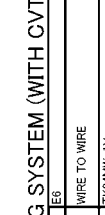
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
34	R/B	-

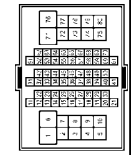
Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	YZK-7283-5591-40-F

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
50	B/R	-
51	P	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
71	L	-

Connector No.	F10
Connector Name	STARTER MOTOR
Connector Type	-

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	B/Y	-

JCBWA0216GB

cardiagn.com

STARTING SYSTEM (WITH CVT)

Connector No.	F11
Connector Name	STARTER MOTOR
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/R	–

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	W/B	–
7	R/B	–

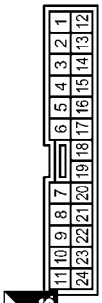
Connector No.	F122
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/R	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1Y

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
8	W/B	–
21	R/B	–

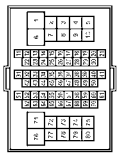
Connector No.	M29
Connector Name	IGNITION SWITCH
Connector Type	M06FW-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
5	R	–

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-NS16-TM4

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	–
71	L	–

JCBWA0217GB

cardiagn.com

SYMPTOM DIAGNOSIS

STARTING SYSTEM

Symptom Table

INFOID:0000000000955272

Symptom	Reference
No normal cranking	Refer to STR-2, "K9K MODELS : Work Flow" (K9K models) or STR-4, "HR16DE/MR20DE MODELS : Work Flow" (HR16DE/MR20DE models).
Starter motor does not rotate	

cardiagn.com

PRECAUTION

PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000955273

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

cardiagn.com

ON-VEHICLE REPAIR

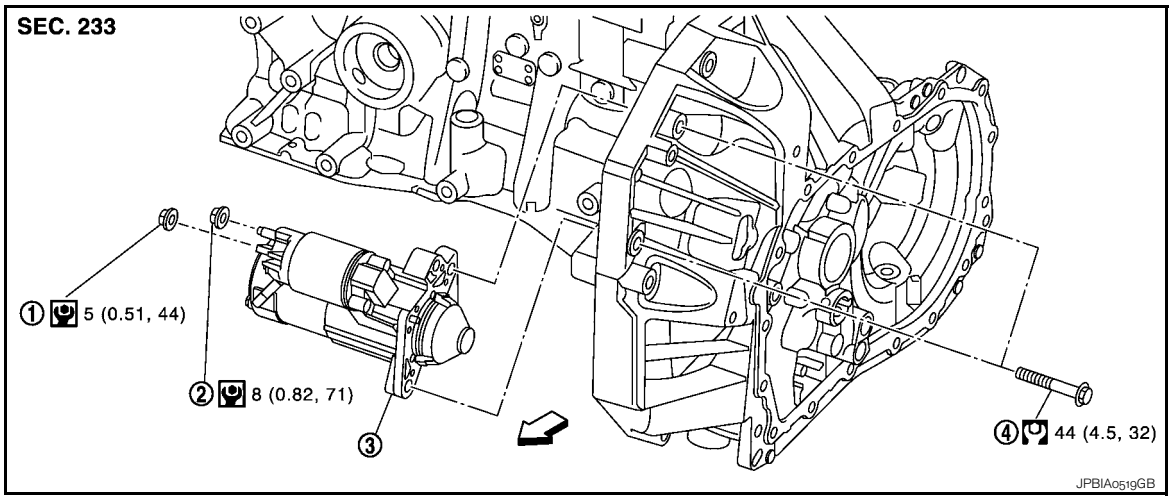
STARTER MOTOR

K9K MODELS

K9K MODELS : Exploded View

INFOID:0000000000955275

REMOVAL



1. “S” terminal nut
2. “B” terminal nut
3. Starter motor
4. Starter motor mounting bolt

⇦: Engine front

Refer to GI-4, "Components" for symbols in the figure.

K9K MODELS : Removal and Installation

INFOID:0000000000955276

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove “S” terminal nut and “S” terminal harness.
3. Remove “B” terminal nut and “B” terminal harness.
4. Remove starter motor mounting bolts.
5. Remove starter motor upward from the vehicle.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Be sure to tighten “B” terminal nut carefully.

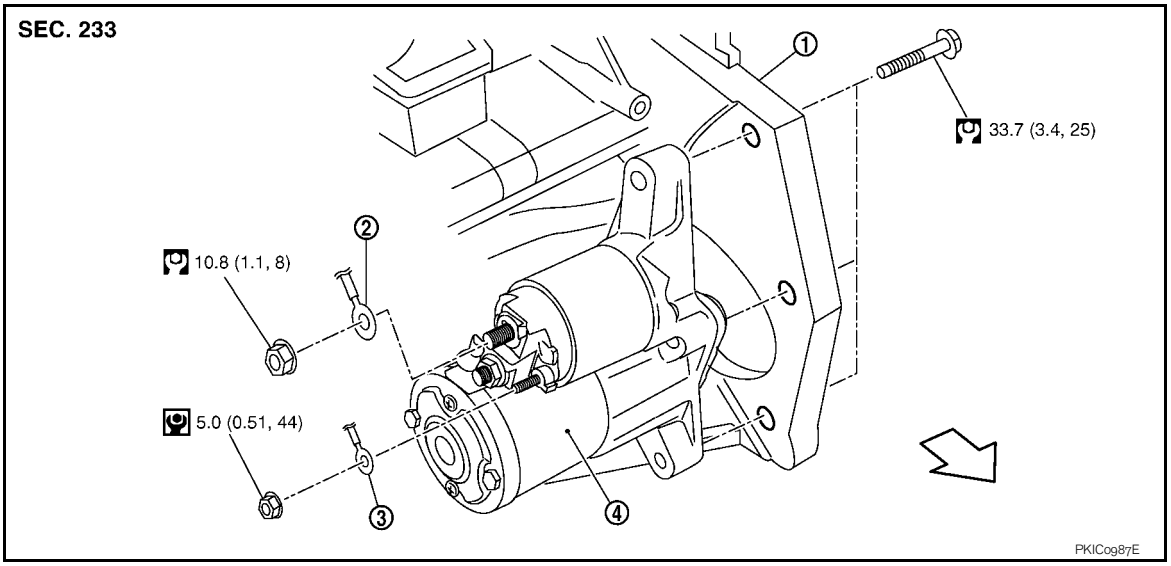
HR16DE MODELS

HR16DE MODELS : Exploded View

INFOID:0000000000955718

REMOVAL

cardiagn.com



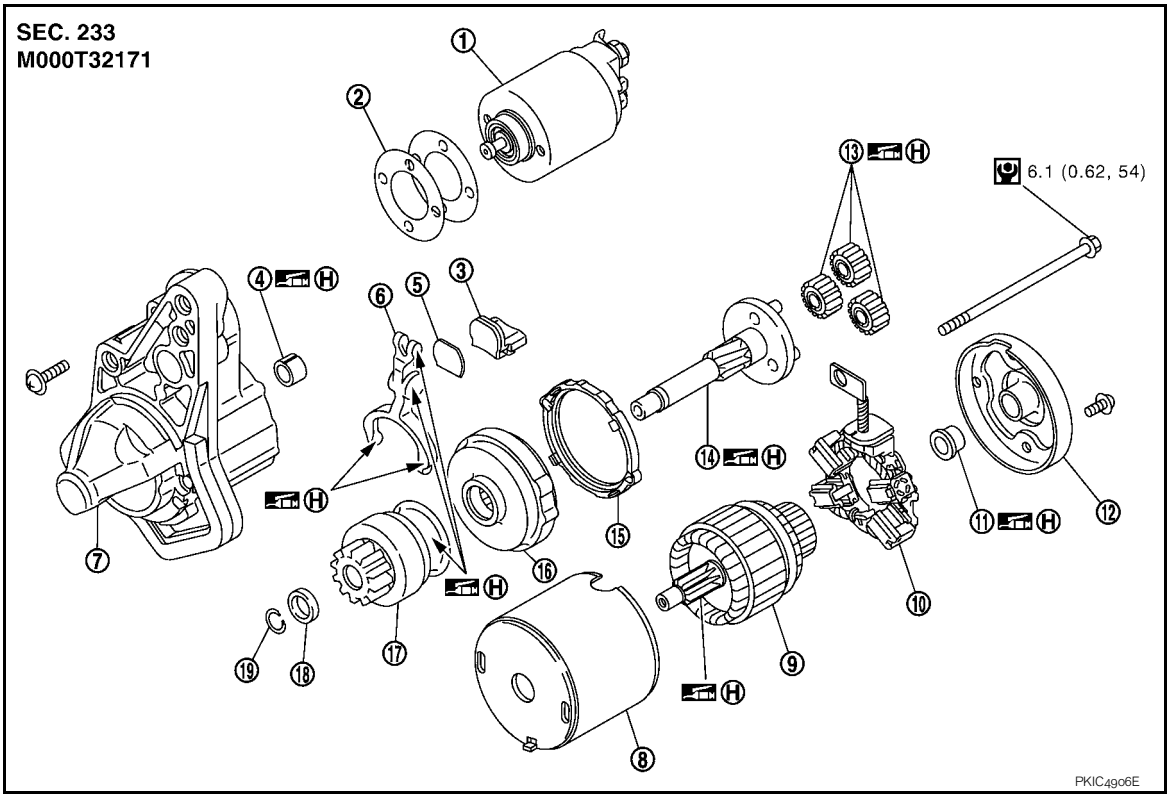
1. Cylinder block
2. “B” terminal harness
3. “S” terminal harness
4. Starter motor

⇦: Engine front

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY

Type: M000T32171



1. Magnetic switch assembly
2. Adjusting plate
3. Packing
4. Metal FR
5. Plate
6. Shift lever
7. Gear case
8. Yoke
9. Armature
10. Brush holder assembly
11. Metal RR
12. Rear cover

cardiagn.com

13. Planetary gear
14. Gear shaft
15. Packing
16. Internal gear
17. Pinion assembly
18. Stopper
19. Stopper ring

(H): High-temperature grease point

Refer to GI-4, "Components" for symbols not described on the above.

HR16DE MODELS : Removal and Installation

INFOID:0000000000955719

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove “B” terminal nut and “B” terminal harness.
3. Remove “S” terminal nut and “S” terminal harness.
4. Remove starter motor mounting bolts.
5. Remove starter motor upward from the vehicle.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Be sure to tighten “B” terminal nut carefully.

HR16DE MODELS : Disassembly and Assembly

INFOID:0000000000967656

ASSEMBLY

Apply high-temperature grease to lubricate the bearing, gears and frictional surface when assembling the starter.

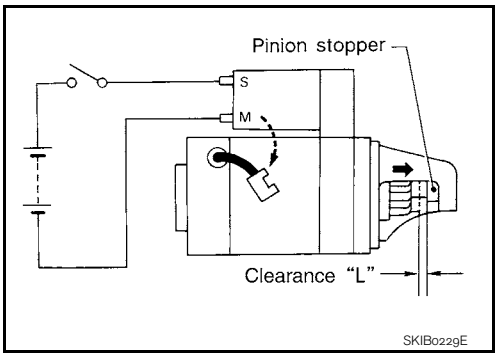
Carefully observe the following instructions.

Pinion Protrusion Length Adjustment

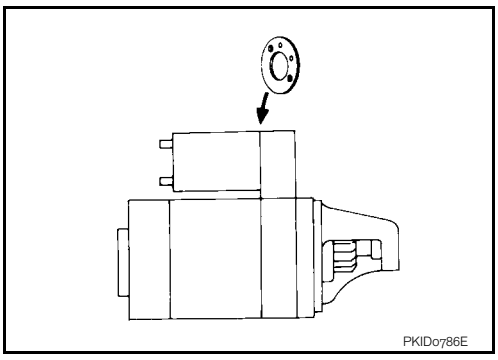
CLEARANCE

- With pinion driven out by magnetic switch, push pinion back to remove slack and measure clearance “L” between the front edge of the pinion and the pinion stopper.

Clearance “L” **: Refer to SDS STR-31, "Starter Motor".**



- Adjust with the adjusting plate if the measurement value is not in the specified area.



HR16DE MODELS : Inspection

INFOID:0000000000967657

INSPECTION

Magnetic Switch Check

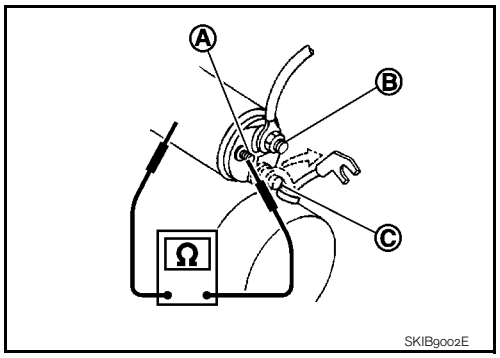
cardiagn.com

- Before starting to check, disconnect the battery cable from the negative terminal.
- Disconnect “M” terminal of starter motor.

1. Continuity test [between “S” terminal (A) and switch body]

B : “B” terminal
C : “M” terminal

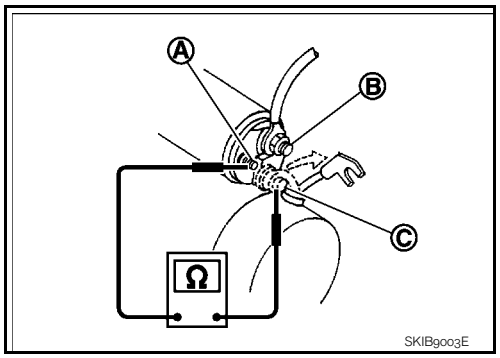
- Replace magnetic switch if continuity does not exist.



2. Continuity test [between “S” terminal (A) and “M” terminal (C)]

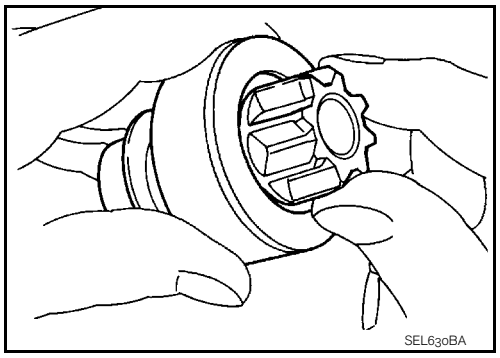
B : “B” terminal

- Replace magnetic switch if continuity does not exist.



Pinion/Clutch Check

1. Inspect pinion teeth.
   - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear teeth (If equipped).
   - Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
3. Check to see if pinion locks in one direction and rotates smoothly in the opposite direction.
   - Replace pinion assembly if it is locked or rotated in both directions or unusual resistance is evident.

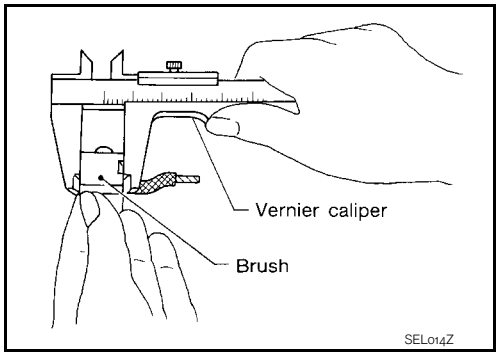


Brush Check

- Check wear of brush.

Minimum length of brush **: Refer to SDS STR-31, "Starter Motor".**

- Replace brush if the measurement value is less than the specified value.



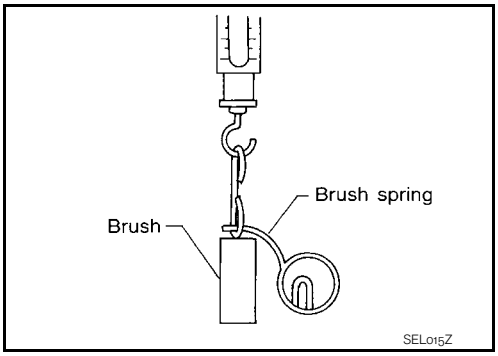
Brush Spring Check

cardiagn.com

- Check brush spring tension with brush spring detached from brush.

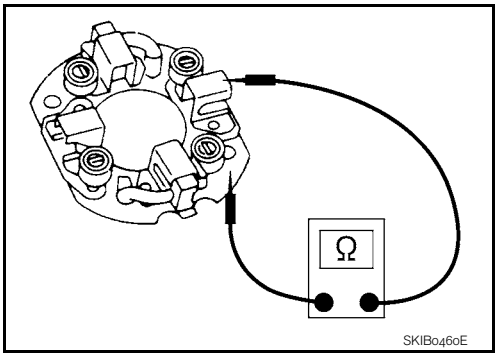
Spring tension (with new brush) : **Refer to SDS STR-31, "Starter Motor".**

- Replace brush spring if the measurement value is less than the specified value.



Brush Holder Check

1. Perform insulation test between brush holder (positive side) and its base (negative side).
   - Replace brush holder assembly if continuity does not exist.
2. Check brush to see if it moves smoothly.
   - If brush holder is bent, replace it; if sliding surface is dirty, clean.

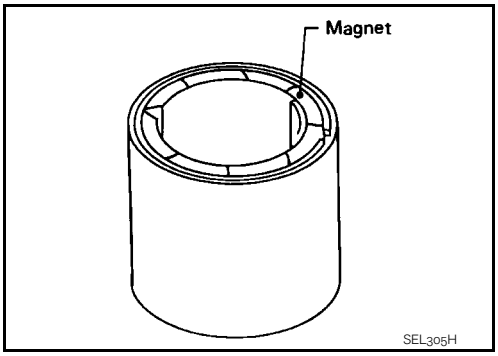


Yoke Check

Magnet is secured to yoke by bonding agent. Check magnet to see that it is secured to yoke and for any cracks. Replace malfunctioning parts as an assembly.

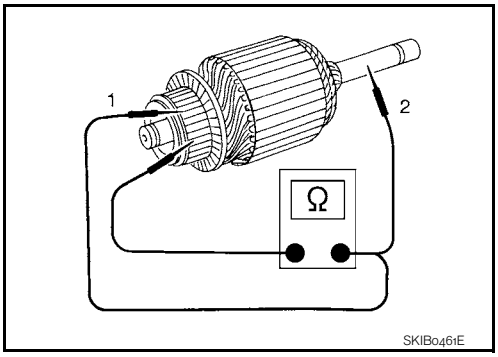
CAUTION:

Never clamp yoke in a vise or strike it with a hammer.



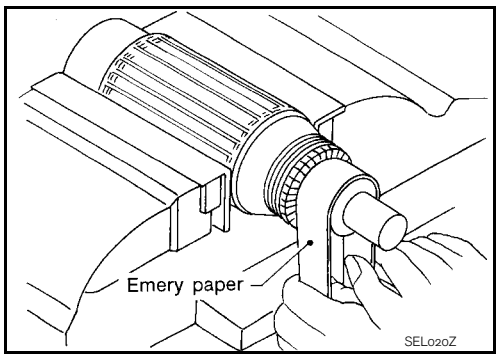
Armature Check

1. Continuity test (between two segments side by side)
   - Replace armature assembly if continuity does not exist.
2. Insulation test (between each commutator bar and shaft)
   - Replace armature assembly if continuity exists.



cardiagn.com

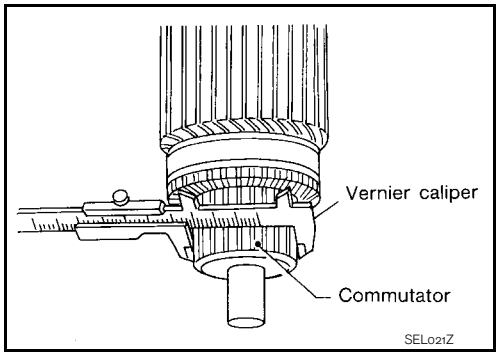
3. Check commutator surface.
   - Grind with No. 500 - 600 emery paper if it has a rough surface.



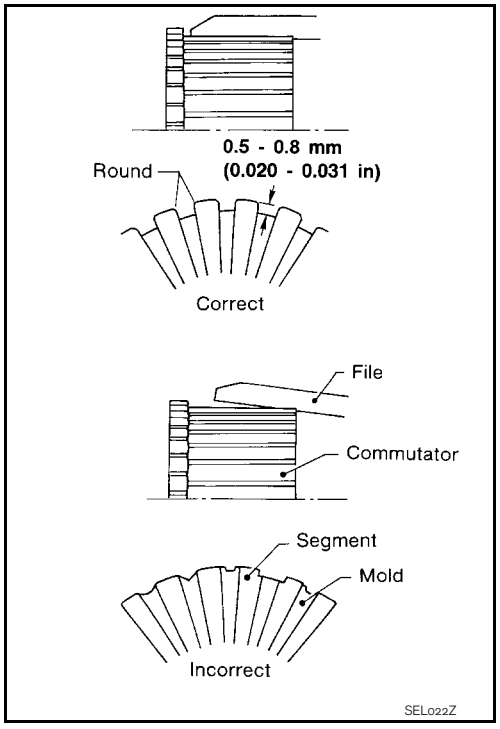
4. Check diameter of commutator.

Commutator minimum diameter	**: Refer to SDS STR-31, "Starter Motor".**

   - Replace armature assembly if the measurement value is less than the specified value.



5. Check depth of insulating mold from commutator surface.
   - Undercut to 0.5 to 0.8 mm (0.020 to 0.031 in) if the depth is 0.2 mm (0.008 in) or less.



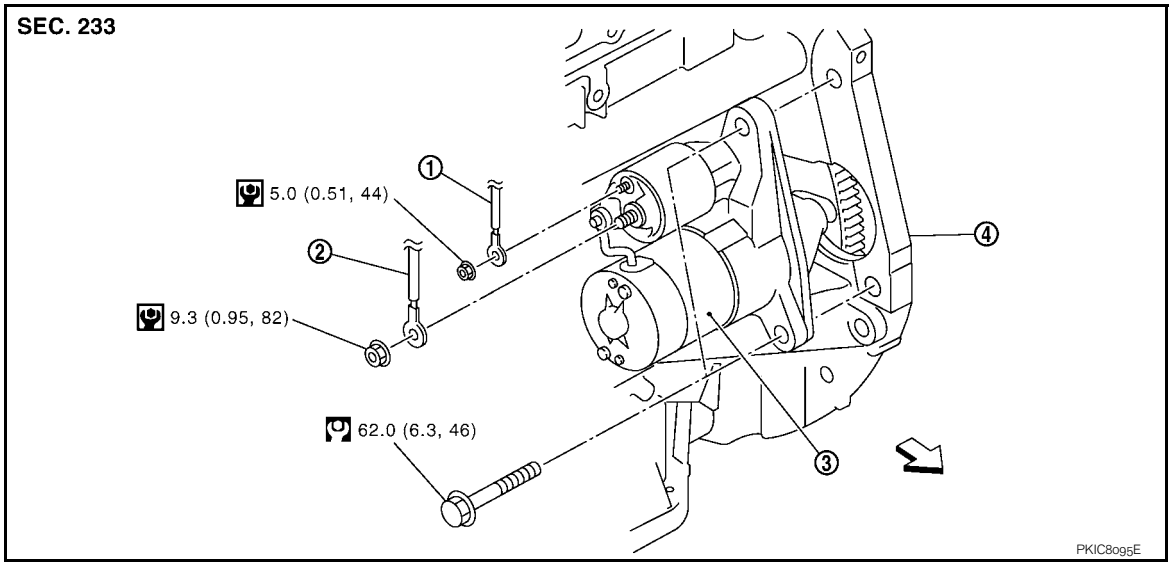
MR20DE MODELS

MR20DE MODELS : Exploded View

INFOID:0000000000955722

REMOVAL

cardiagn.com



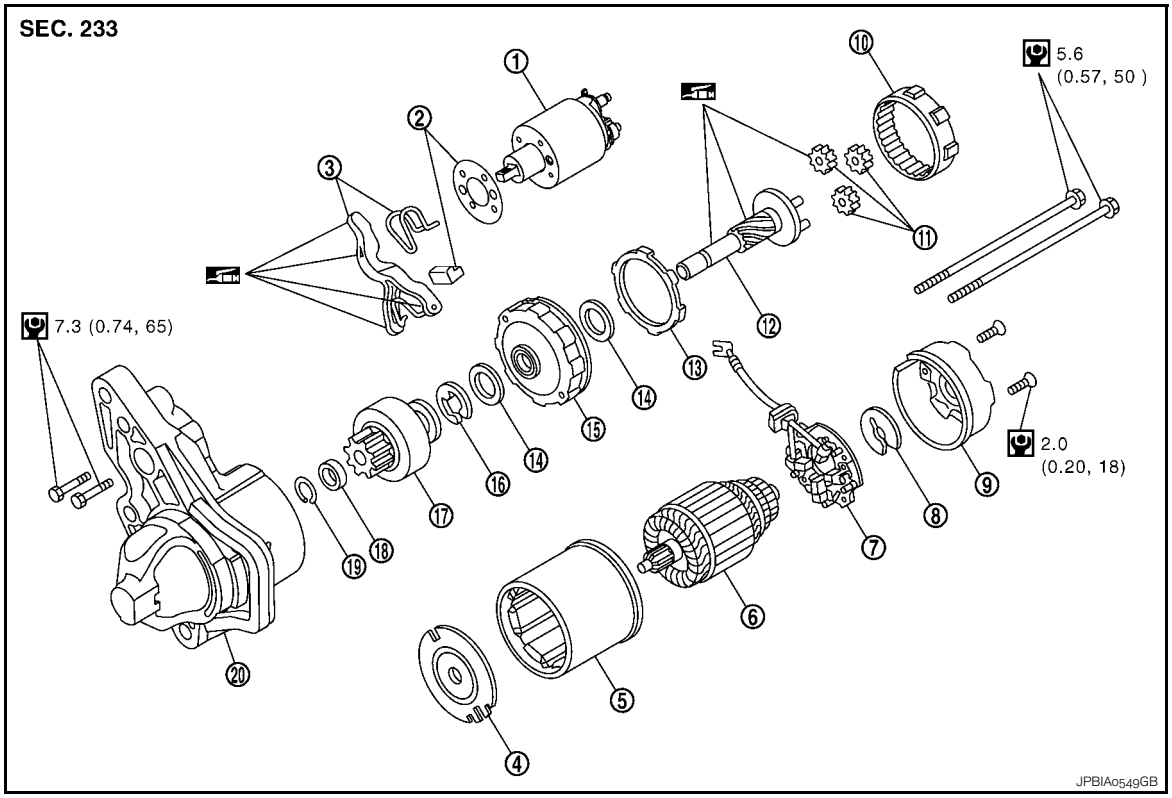
1. “S” terminal harness
2. “B” terminal harness
3. Starter motor
4. Cylinder block

⇦: Engine front

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY

Type: S114-902A



1. Magnetic switch assembly
2. Dust cover kit
3. Shift lever set
4. Center bracket (A)
5. Yoke assembly
6. Armature assembly
7. Brush holder assembly
8. Thrust washer
9. Rear cover assembly
10. Internal gear
11. Planetary gear
12. Pinion shaft

cardiagn.com

13. Packing
14. Thrust washer
15. Center bracket (P)
16. E-ring
17. Pinion assembly
18. Pinion stopper
19. Pinion stopper clip
20. Gear case assembly

: High-temperature grease point

Refer to GI-4, "Components" for symbols not described on the above.

MR20DE MODELS : Removal and Installation

INFOID:0000000000955723

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Disconnect the oil pressure switch connector.
3. Remove “B” terminal nut and “B” terminal harness.
4. Remove “S” terminal nut and “S” terminal harness.
5. Remove starter motor mounting bolts.
6. Remove starter motor upward from the vehicle.

CAUTION:
Never damage oil pressure switch when removing starter motor.

INSTALLATION

Install in the reverse order of removal.

CAUTION:
Be sure to tighten “B” terminal nut carefully.

MR20DE MODELS : Disassembly and Assembly

INFOID:0000000000955724

ASSEMBLY

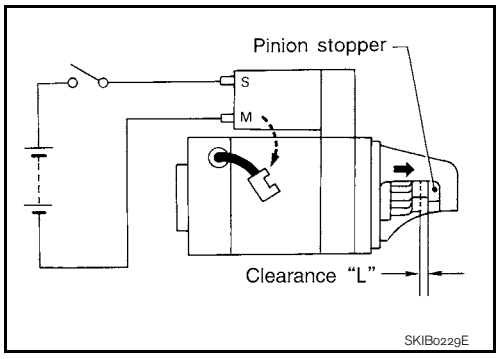
Apply high-temperature grease to lubricate the bearing, gears and frictional surface when assembling the starter.
Carefully observe the following instructions.

Pinion Protrusion Length Adjustment

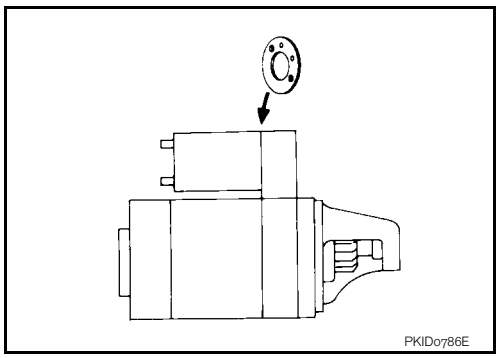
CLEARANCE

- With pinion driven out by magnetic switch, push pinion back to remove slack and measure clearance “L” between the front edge of the pinion and the pinion stopper.

Clearance “L” **: Refer to SDS STR-31, "Starter Motor".**



- Adjust with the adjusting plate if the measurement value is not in the specified area.



MR20DE MODELS : Inspection

INFOID:0000000000955725

cardiagn.com

INSPECTION

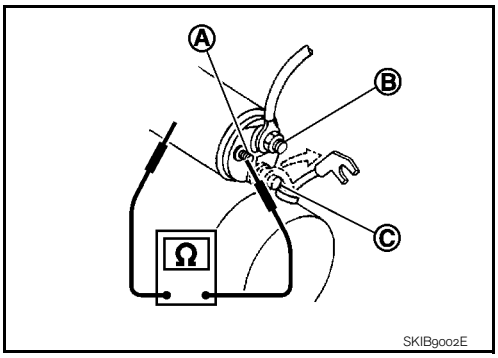
Magnetic Switch Check

- Before starting to check, disconnect the battery cable from the negative terminal.
- Disconnect “M” terminal of starter motor.

1. Continuity test [between “S” terminal (A) and switch body]

   B : “B” terminal
   C : “M” terminal

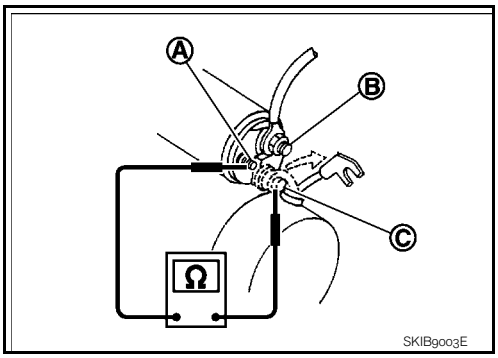
   - Replace magnetic switch if continuity does not exist.



2. Continuity test [between “S” terminal (A) and “M” terminal (C)]

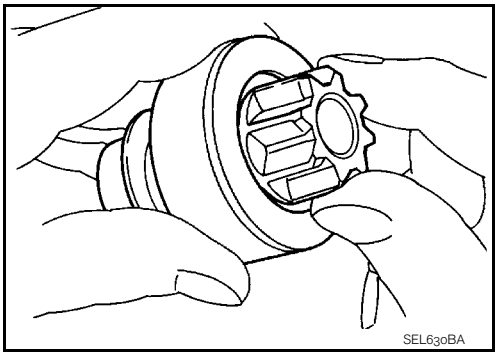
   B : “B” terminal

   - Replace magnetic switch if continuity does not exist.



Pinion/Clutch Check

1. Inspect pinion teeth.
   - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear teeth (If equipped).
   - Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
3. Check to see if pinion locks in one direction and rotates smoothly in the opposite direction.
   - Replace pinion assembly if it is locked or rotated in both directions or unusual resistance is evident.

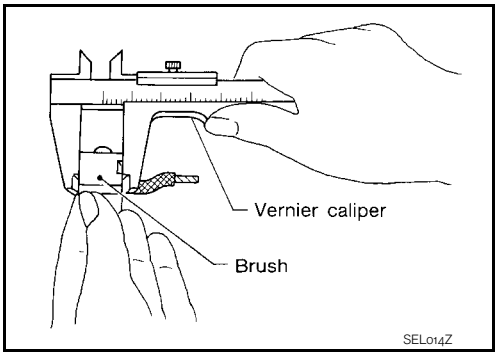


Brush Check

- Check wear of brush.

Minimum length of brush : Refer to SDS STR-31, "Starter Motor".

- Replace brush if the measurement value is less than the specified value.



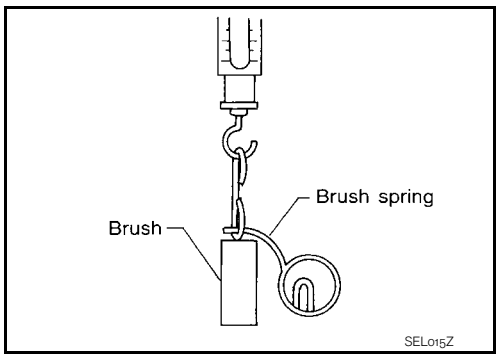
Brush Spring Check

cardiagn.com

- Check brush spring tension with brush spring detached from brush.

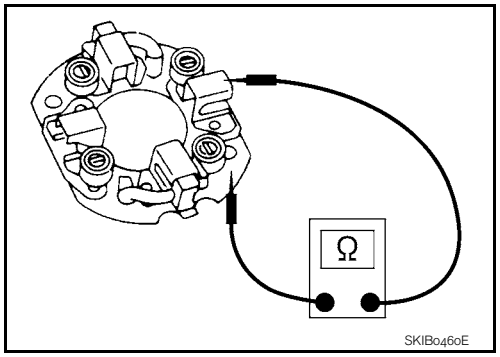
Spring tension (with new brush) : **Refer to SDS STR-31, "Starter Motor".**

- Replace brush spring if the measurement value is less than the specified value.



Brush Holder Check

1. Perform insulation test between brush holder (positive side) and its base (negative side).
   - Replace brush holder assembly if continuity does not exist.
2. Check brush to see if it moves smoothly.
   - If brush holder is bent, replace it; if sliding surface is dirty, clean.

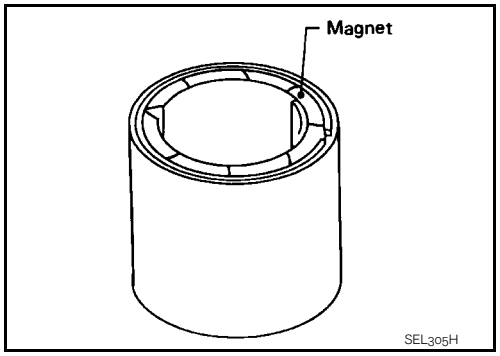


Yoke Check

Magnet is secured to yoke by bonding agent. Check magnet to see that it is secured to yoke and for any cracks. Replace malfunctioning parts as an assembly.

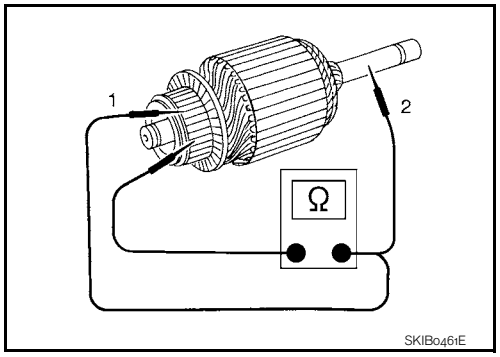
CAUTION:

Never clamp yoke in a vise or strike it with a hammer.



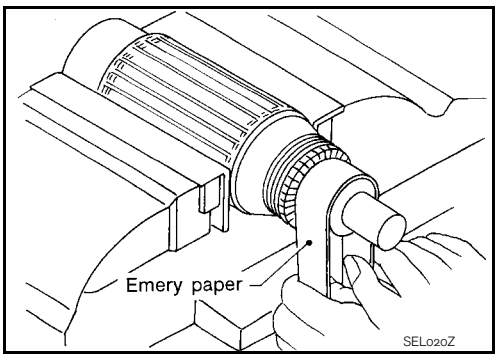
Armature Check

1. Continuity test (between two segments side by side)
   - Replace armature assembly if continuity does not exist.
2. Insulation test (between each commutator bar and shaft)
   - Replace armature assembly if continuity exists.



cardiagn.com

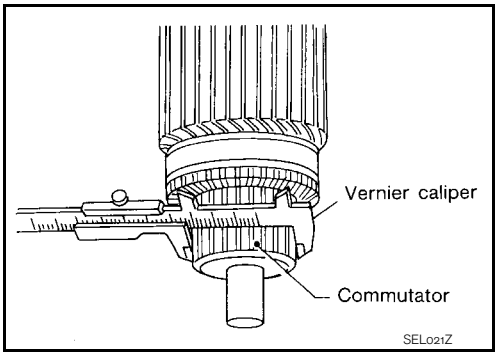
3. Check commutator surface.
   - Grind with No. 500 - 600 emery paper if it has a rough surface.



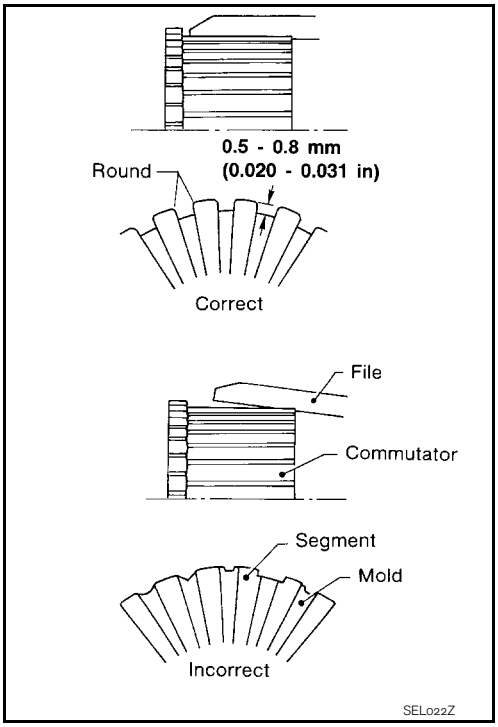
4. Check diameter of commutator.

   Commutator minimum diameter : **Refer to SDS STR-31, "Starter Motor".**

   - Replace armature assembly if the measurement value is less than the specified value.



5. Check depth of insulating mold from commutator surface.
   - Undercut to 0.5 to 0.8 mm (0.020 to 0.031 in) if the depth is 0.2 mm (0.008 in) or less.



cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Starter Motor

INFOID:0000000000955279

Applied model			K9K	HR16DE	MR20DE
Type			M000T87881	M000T32171	S114-902A
			MITSUBISHI make	MITSUBISHI make	HITACHI make
			Reduction gear type	Reduction gear type	Reduction gear type
System voltage		[V]	—	12	12
No-load	Terminal voltage	[V]	—	11	11
	Current	[A]	—	Less than 95	Less than 110
	Revolution	[rpm]	—	More than 3,000	More than 3,000
Minimum diameter of commutator		[mm (in)]	—	28.8 (1.134)	28.0 (1.102)
Minimum length of brush		[mm (in)]	—	5.5 (0.217)	10.5 (0.413)
Brush spring tension		[N (kg, lb)]	—	17.7 (1.81, 3.98)	16.2 (1.65, 3.64)
Clearance between bearing metal and armature shaft		[mm (in)]	—	Less than 0.2 (0.008)	Less than 0.2 (0.008)
Clearance “L” between pinion front edge and pinion stopper		[mm (in)]	—	0.3 - 2.0 (0.012 - 0.079)	0.3 - 2.5 (0.012 - 0.098)

cardiagn.com

SECTION STC
STEERING CONTROL SYSTEM

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
Work Flow 3

FUNCTION DIAGNOSIS 4

EPS SYSTEM 4
System Diagram 4
System Description 4
Component Parts Location 4
Component Description 6

DIAGNOSIS SYSTEM (EPS CONTROL UNIT) 7
CONSULT-III Function (EPS) 7

COMPONENT DIAGNOSIS 8

C1601 BATTERY POWER SUPPLY 8
Description 8
DTC Logic 8
Diagnosis Procedure 8
Special Repair Requirement 9

C1604 TORQUE SENSOR 10
Description 10
DTC Logic 10
Diagnosis Procedure 10
Special Repair Requirement 10

C1606 EPS MOTOR 11
Description 11
DTC Logic 11
Diagnosis Procedure 11
Special Repair Requirement 11

C1607 EEPROM 12
Description 12
DTC Logic 12
Diagnosis Procedure 12
Special Repair Requirement 12

C1608 CONTROL UNIT 13
Description 13
DTC Logic 13
Diagnosis Procedure 13
Special Repair Requirement 14

U1200 VEHICLE SPEED SIGNAL (ABS) 15
Description 15
DTC Logic 15
Diagnosis Procedure 15
Special Repair Requirement 15

U14FF VEHICLE SPEED SIGNAL (METER) 16
Description 16
DTC Logic 16
Diagnosis Procedure 16
Special Repair Requirement 16

U1000 CAN COMM CIRCUIT 17
Description 17
DTC Logic 17
Diagnosis Procedure 17
Special Repair Requirement 17

ECU DIAGNOSIS 18

EPS CONTROL UNIT 18
Reference Value 18
Wiring Diagram - ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM - 19
Fail-Safe 22
DTC No. Index 22

SYMPTOM DIAGNOSIS 24

EPS WARNING LAMP DOES NOT TURN ON 24
Diagnosis Procedure 24

EPS WARNING LAMP DOES NOT TURN OFF 25
Diagnosis Procedure 25

cardiagn.co

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT 27
Diagnosis Procedure 27

UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT 28
Diagnosis Procedure 28

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION) 29
Diagnosis Procedure 29

PRECAUTION 30

PRECAUTIONS 30
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 30
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 30
Service Notice or Precautions for EPS System 30

ON-VEHICLE REPAIR 32

EPS CONTROL UNIT 32
Removal and Installation 32

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000943735

DETAIED FLOW

1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet.

>> GO TO 2.

2. PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to STC-7, "CONSULT-III Function (EPS)".

Is there any DTC displayed?

YES >> GO TO 3.
NO >> GO TO 4.

3. PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to STC-22, "DTC No. Index".

>> GO TO 6.

4. CHECK THE WARNING LAMP FOR ILLUMINATION

Check that the warning lamp illuminate.

Is ON/OFF timing normal?

YES >> GO TO 5.
NO >> GO TO 2.

5. PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 6.

6. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 7.

7. FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to STC-7, "CONSULT-III Function (EPS)".

Is no other DTC present and the repair completed?

YES >> INSPECTION END
NO >> GO TO 3.

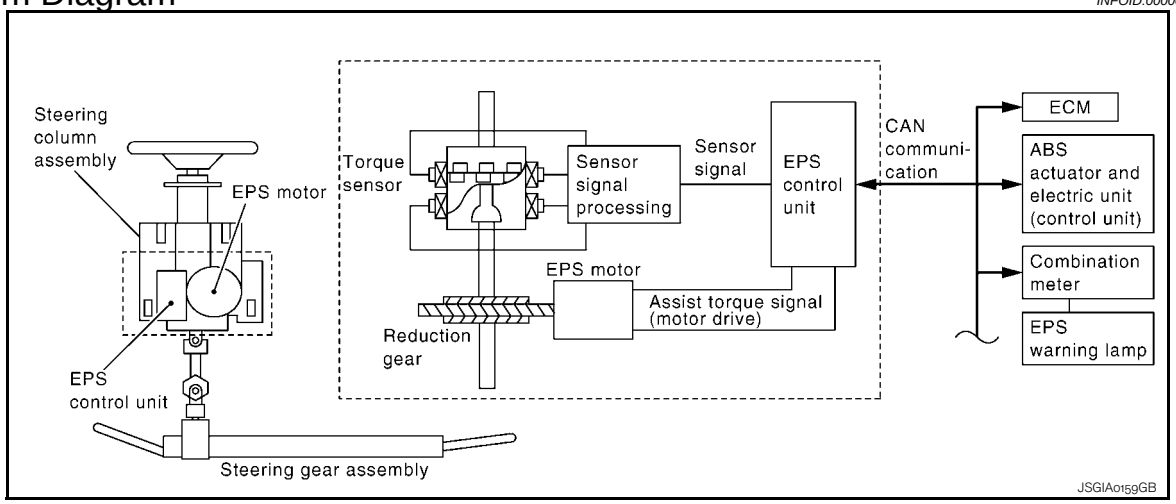
cardiagn.co

FUNCTION DIAGNOSIS

EPS SYSTEM

System Diagram

INFOID:0000000000940470



System Description

INFOID:0000000000940471

- EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque to the EPS motor according to the driving condition.
- EPS control unit decreases the output to EPS motor while extremely using the power steering function (e.g., full steering) for protecting EPS motor and EPS control unit (Protect overload status). While activating protect overload status, the assist torque gradually decreases, and the steering wheel turning force becomes heavy. The normal assist torque reactivates by not steering.
- In case of an error in the electrical system, the fail-safe function stops output signals to the EPS motor. Then the previous state is changed to the manual steering state.
- Self-diagnosis can be done with CONSULT-III.
- EPS control unit will decrease assistance under 2 conditions.

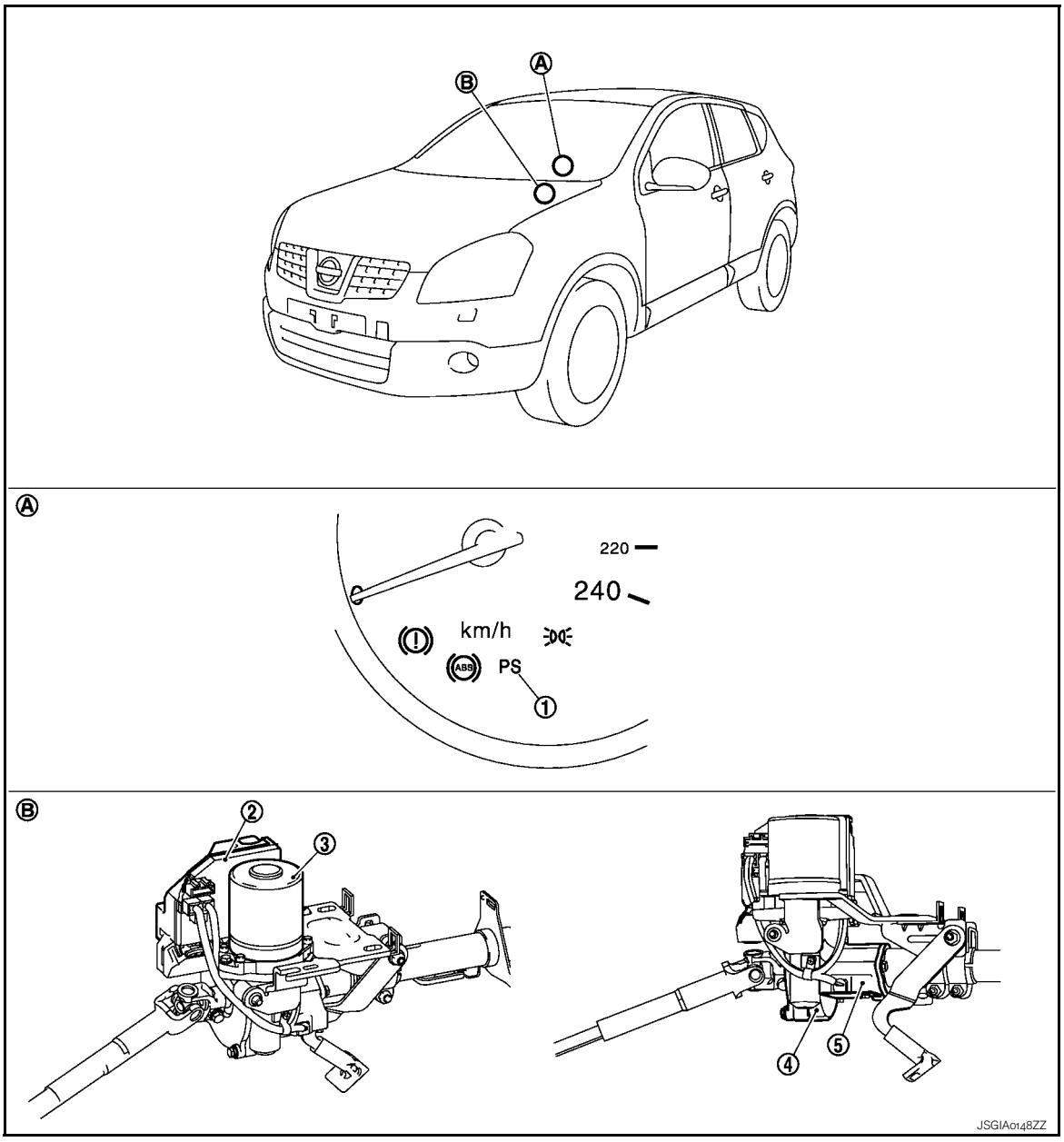
- Extensive steering at low speed will cause the ECU and MOTOR to heat up, once temperature reaches critical point ECU will reduce current to reduce heat up. System will recover as temperature lowers (reduced or no assistance).
- Holding steering on rack-end (full lock) for 1 second will cause the system to engage rack-end protection. This reduces assistance down to 40% in order to prevent heat up. Assistance is immediately returned to 100% when steering released or turned away from rack-end.

Component Parts Location

INFOID:0000000000940472

cardiagn.com

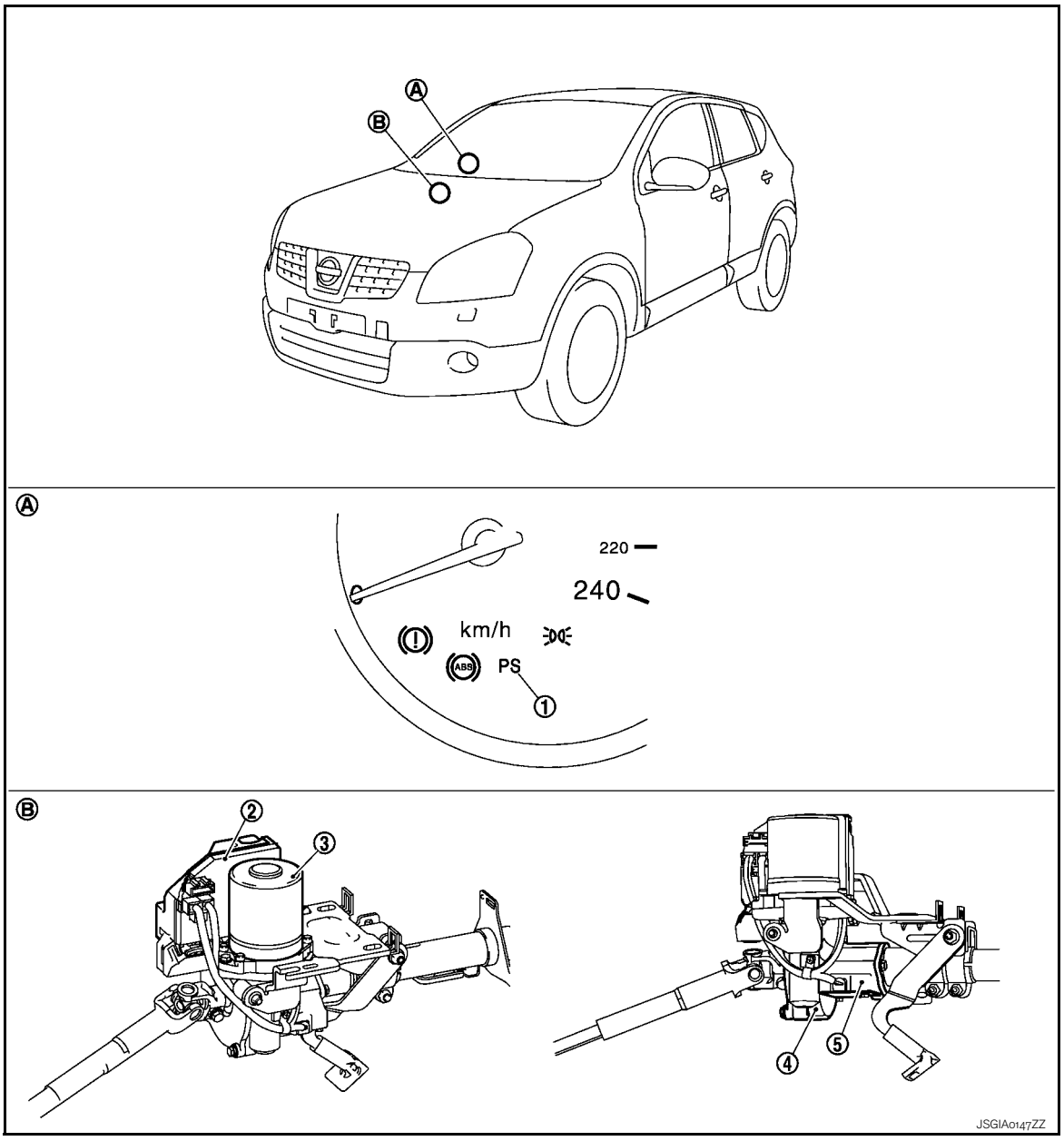
LHD models



1. EPS warning lamp
2. EPS control unit
3. EPS motor
4. Torque sensor
5. Reduction gear
A. Combination meter
B. Steering column assembly

cardiagn.co

RHD models



1. EPS warning lamp
2. EPS control unit
3. EPS motor
4. Torque sensor
5. Reduction gear
A. Combination meter
B. Steering column assembly

Component Description

INFOID:0000000000940473

Components parts	Reference
EPS control unit	STC-13, "Description"
EPS motor	STC-11, "Description"
Torque sensor	STC-10, "Description"
Reduction gear	Reduction gear increases the assist torque provided from EPS motor with worm gears, and outputs to the column shaft.
EPS warning lamp	Turn on when a malfunction occurs in the EPS system, and tells the driver the malfunction.

cardiagn.com

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

CONSULT-III Function (EPS)

INFOID:0000000000949820

FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic test mode	Function
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the EPS control unit can be read.
ECU part number	EPS control unit part number can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF-DIAG RESULTS MODE

Display Item List

Refer to STC-22, "DTC No. Index".

DATA MONITOR MODE

Display Item List

Monitor item (Unit)	Remarks
BATTERY VOLT (V)	Displays the power supply voltage for EPS control unit.
TORQUE SENSOR (Nm)	Displays steering wheel turning force detected by torque sensor.
MOTOR SIG (A)	Displays the current commanded value to EPS motor.
MOTOR CURRENT (A)	Displays the current value consumed by EPS motor.
ASSIST TORQUE (Nm)	Displays assist torque being output by the electric power steering.
C/U TEMP (°C)	Displays the temperature of the EPS control unit.
ASSIST LEVEL (%)	Normally displays 100%. In case of an excessive stationary steering, the assist curvature gradually falls. However, it return to 100% when left standing.
VEHICLE SPEED (km/h) or (MPH)	Vehicle speed is displayed from vehicle speed signal with CAN communication.
WARNING LAMP (On/Off)	EPS warning lamp control status is displayed.
ENGINE STATUS (STOP/RUN)	Engine speed is displayed from engine status signal with CAN communication.
MOTOR TEMP (°C)	Displays the temperature of EPS motor.
VHCL SPD CALC (km/h) or (MPH)	Displays vehicle speeds used for controlling EPS.

cardiagn.co

COMPONENT DIAGNOSIS

C1601 BATTERY POWER SUPPLY

Description

INFOID:0000000000940491

Power is supplied from the battery to EPS control unit.

DTC Logic

INFOID:0000000000940492

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1601	BATTERY VOLT	When the power supply malfunction supplied to EPS control unit is detected.	• Harness or connector • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLT

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to STC-8, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000940494

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform self-diagnosis. Refer to STC-7, "CONSULT-III Function (EPS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Repair or replace connector.

2.CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between EPS control unit harness connector terminals and ground.

EPS control unit		—	Voltage
Connector	Terminal		
M38	1	Ground	Battery voltage
M37	10		

5. Turn ignition switch OFF.
6. Check voltage between EPS control unit harness connector terminals and ground.

cardiagn.com

EPS control unit		—	Voltage
Connector	Terminal		
M38	1	Ground	Battery voltage
M37	10		Approx. 0 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK EPS CONTROL UNIT GROUND CIRCUIT

1. Check continuity between EPS control unit harness connector terminal and ground.

EPS control unit		—	Continuity
Connector	Terminal		
M38	2	Ground	Existed

2. Connect EPS control unit harness connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK DTC

Start engine.

Does EPS warning lamp turn OFF?

YES >> EPS control unit is malfunction. Replace steering column assembly.
NO >> Perform self-diagnosis, repair or replace damaged parts.

Special Repair Requirement

INFOID:0000000000956134

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". (With ESP models)

>> END

cardiagn.com

C1604 TORQUE SENSOR

Description

INFOID:0000000000940497

Torque sensor detects the steering torque, and transmit the signal to EPS control unit.

DTC Logic

INFOID:0000000000940498

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1604	TORQUE SENSOR	Malfunction of the torque sensor in steering column assembly is detected.	• Harness or connector • Torque sensor • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
TORQUE SENSOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to STC-10, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000940499

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform the self-diagnosis. Refer to STC-7, "CONSULT-III Function (EPS)".

Is the “TORQUE SENSOR” [C1604] displayed?

YES >> Torque sensor is malfunction. Replace steering column assembly.
NO >> Poor connection of connector terminal. Repair or replace connector.

Special Repair Requirement

INFOID:0000000000956143

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". (With ESP models)

>> END

cardiagn.com

C1606 EPS MOTOR

Description

INFOID:0000000000940502

EPS motor provides the assist torque by control signal from EPS control unit.

DTC Logic

INFOID:0000000000940503

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1606	EPS MOTOR	When the motor driver malfunction of EPS control unit or EPS motor malfunction is detected.	• Harness or connector • EPS motor • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
EPS MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to STC-11, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000940504

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform the self-diagnosis.

Is the “EPS MOTOR” [C1606] displayed?

YES >> EPS motor malfunctions. Replace steering column assembly.
NO >> Poor connection of connector terminal. Repair or replace connector.

Special Repair Requirement

INFOID:0000000000956144

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". (With ESP models)

>> END

C1607 EEPROM

Description

INFOID:0000000000940507

EPS control unit incorporates a memory function.

DTC Logic

INFOID:0000000000940508

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1607	EEPROM	When the memory (EEPROM) system malfunction is detected in EPS control unit.	• Harness or connector • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
EEPROM

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to STC-12, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000940509

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform the self-diagnosis.

Is the “EEPROM” [C1607] displayed?

YES >> EEPROM malfunctions. Replace steering column assembly. Refer to ST-10, "Exploded View".
NO >> Poor connection of connector terminal. Repair or replace connector.

Special Repair Requirement

INFOID:0000000000956145

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". (With ESP models)

>> END

cardiagn.com

C1608 CONTROL UNIT

Description

INFOID:0000000000940512

EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque to the EPS motor according to the driving condition.

DTC Logic

INFOID:0000000000940513

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1608	CONTROL UNIT	When the internal malfunction is detected in EPS control unit.	• Harness or connector • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROL UNIT

Is above displayed on the self-diagnosis dislay?

YES >> Proceed to diagnosis procedure. Refer to STC-13, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000940514

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Repair or replace connector.

2.EPS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between EPS control unit harness connector terminals and ground.

EPS control unit		—	Voltage
Connector	Terminal		
E38	1	Ground	Battery voltage
E37	10		

5. Turn ignition switch OFF.
6. Check voltage between EPS control unit harness connector terminals and ground.

EPS control unit		—	Voltage
Connector	Terminal		
E38	1	Ground	Battery voltage
E37	10		Approx. 0 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK EPS CONTROL UNIT GROUND CIRCUIT

1. Check continuity between EPS control unit harness connector terminal and ground.

EPS control unit		—	Continuity
Connector	Terminal		
E38	2	Ground	Existed

2. Connect EPS control unit harness connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK DTC

Start engine.

Does EPS warning lamp turn OFF?

YES >> EPS control unit is malfunction. Replace steering column assembly.
NO >> Perform self-diagnosis, repair or replace damaged parts.

Special Repair Requirement

INFOID:0000000000956146

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". (With ESP models)

>> END

cardiagn.com

U1200 VEHICLE SPEED SIGNAL (ABS)

Description

INFOID:0000000000940517

EPS control unit receives the vehicle speed signal from ABS actuator and electric unit (control unit) with CAN communication line.

DTC Logic

INFOID:0000000000940518

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1200	CAN VHCL SPEED (ABS)	Abnormal vehicle speed signals received with CAN communication are detected.	• Harness or connector • CAN communication line • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CAN VHCL SPEED (ABS)

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to STC-15, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000940519

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SYSTEM

Perform ABS actuator and electric unit (control unit) self-diagnosis. Repair or replace items indicated, then perform ABS actuator and electric unit (control unit) self-diagnosis again. Refer to BRC-17, "CONSULT-III Function (ABS)" (With ABS models), BRC-96, "CONSULT-III Function (ABS)" (With ESP models).

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace malfunctioning components.
NO >> GO TO 2.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> EPS control unit malfunctions. Replace steering column assembly. Refer to ST-10, "Exploded View".
NO >> Poor connection of connector terminal. Repair or replace connector.

Special Repair Requirement

INFOID:0000000000956147

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". (With ESP models)

>> END

cardiagn.co

U14FF VEHICLE SPEED SIGNAL (METER)

Description

INFOID:0000000000940522

EPS control unit receives the vehicle speed signal from combination meter with CAN communication line.

DTC Logic

INFOID:0000000000940523

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U14FF	CAN VHCL SPEED (METER)	Abnormal vehicle speed signals received with CAN communication are detected.	• Harness or connector • CAN communication line • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CAN VHCL SPEED (METER)

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to STC-16, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000940524

1.CHECK COMBINATION METER SYSTEM

Perform combination meter self-diagnosis. Repair or replace items indicated, then perform combination meter self-diagnosis again. Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace malfunctioning components.
NO >> GO TO 2.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform the self-diagnosis. Refer to STC-7, "CONSULT-III Function (EPS)".

Is any item indicated on the self-diagnosis display?

YES >> EPS control unit malfunctions. Replace steering column assembly. Refer to ST-10, "Exploded View".
NO >> Poor connection of connector terminal. Repair or replace connector.

Special Repair Requirement

INFOID:0000000000956148

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". (With ESP models)

>> END

cardiagn.com

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000000940527

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000000940528

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	When EPS control unit is not transmitting or receiving CAN communication signal for 2 seconds or more.	• Harness or connector • CAN communication line • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to STC-17, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000940529

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and perform self-diagnosis. Refer to STC-7, "CONSULT-III Function (EPS)".

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

Special Repair Requirement

INFOID:0000000000956149

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". (With ESP models)

>> END

cardiagn.co

ECU DIAGNOSIS

EPS CONTROL UNIT

Reference Value

INFOID:0000000000940480

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

The output signal indicates the EPS control unit calculation data. The normal values will be displayed even in the event that the output circuit (harness) is open.

Monitor item (Unit)	Content	Condition		Display value
BATTERY VOLT (V)	Power supply voltage for EPS control unit	Ignition switch: ON		Battery voltage
TORQUE SENSOR (Nm)	Steering wheel turning force	Engine running	Steering wheel: Not steering (There is no steering force)	0.0 Nm
			Steering wheel: Right turn	Positive value (Nm)
			Steering wheel: Left turn	Negative value (Nm)
MOTOR SIG (A)	Command current to EPS motor	Engine running	Steering wheel: Not steering (There is no steering force)	0.0 A
			Steering wheel: Right turn	Negative value (A)
			Steering wheel: Left turn	Positive value (A)
MOTOR CURRENT (A)	Consumption current of EPS motor	Engine running	Steering wheel: Not steering (There is no steering force)	0.0 A
			Steering wheel: Steering	0 – 105.0 A*1 (The value is changed according to steering left or right)
ASSIST TORQUE (Nm)	Displays assist torque being output by the EPS.	Engine running	Steering wheel: Not steering (There is no steering force)	0.0 Nm
			Steering wheel: Right turn	Negative value (Nm)
			Steering wheel: Left turn	Positive value (Nm)
ASSIST LEVEL (%)	Assist available level	Engine running		100 % *2
VEHICLE SPEED (km/h) or (mph)	Vehicle speed	Vehicle stopped		0 km/h (0 mph)
		While driving		Approximately equal to the indication on speed-ometer (inside of ±10%)*3
WARNING LAMP (On/Off)	EPS warning lamp condition	EPS warning lamp: ON		On
		EPS warning lamp: OFF		Off
ENGINE STATUS (RUN/STOP)	Engine status	Engine stopped (Engine speed: Less than 400 rpm)		STOP
		Engine running (Engine speed: 400 rpm or more)		RUN

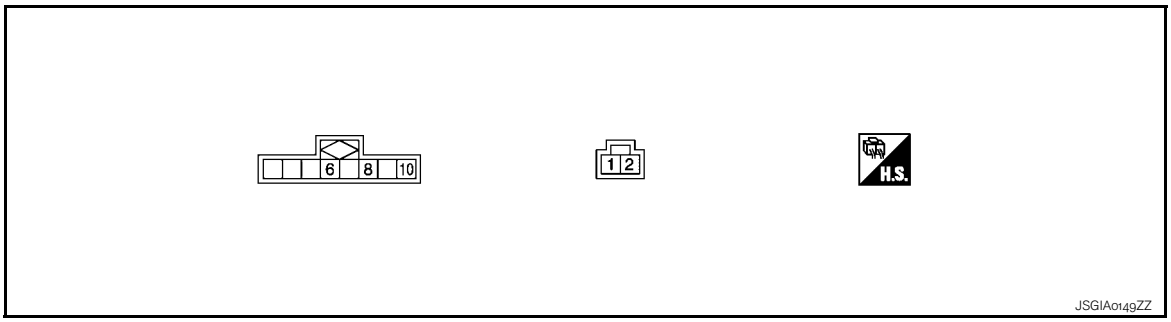
*1: Almost in accordance with the value of MOTOR SIG. It is not a malfunction though these values are not accorded when steering quickly.

*2: Normally displays 100%. In case of an excessive stationary steering, the assist curvature gradually falls. However, it returns to 100% when left standing.

*3: It is not a malfunction, though it might not be corresponding just after ignition switch in turned ON.

cardiagn.com

TERMINAL LAYOUT



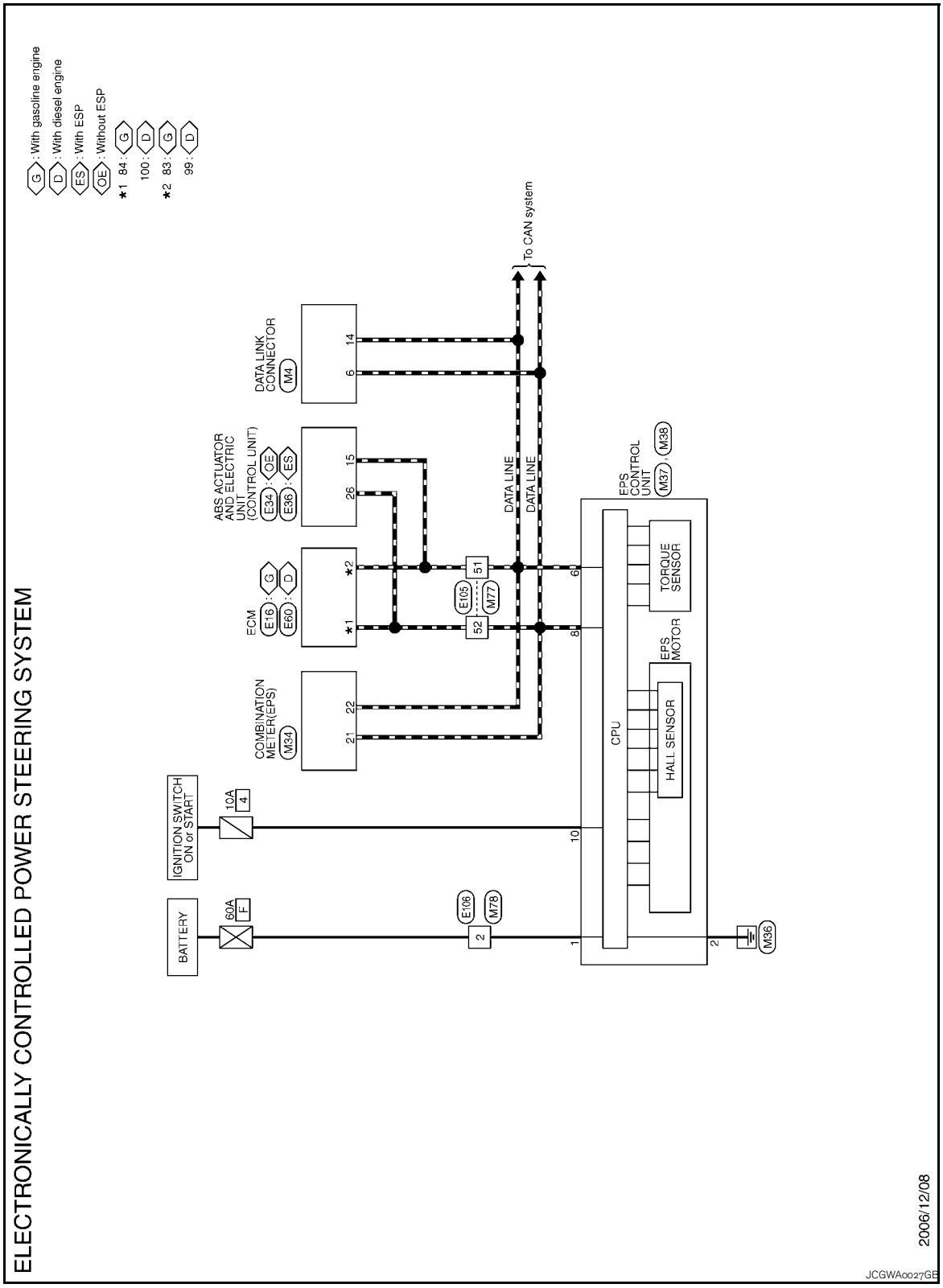
PHYSICAL VALUES

Terminal No. (Wire Color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
1 (W)	Ground	Battery power supply	Input	Always	Battery voltage
2 (B)	Ground	Ground	Output	Always	0 V
6 (P)	Ground	CAN-L	Input/Output	—	—
8 (L)	Ground	CAN-H	Input/Output	—	—
10 (O)	Ground	Ignition power supply	Input	Ignition switch: ON	Battery voltage
				Ignition switch: OFF	0 V

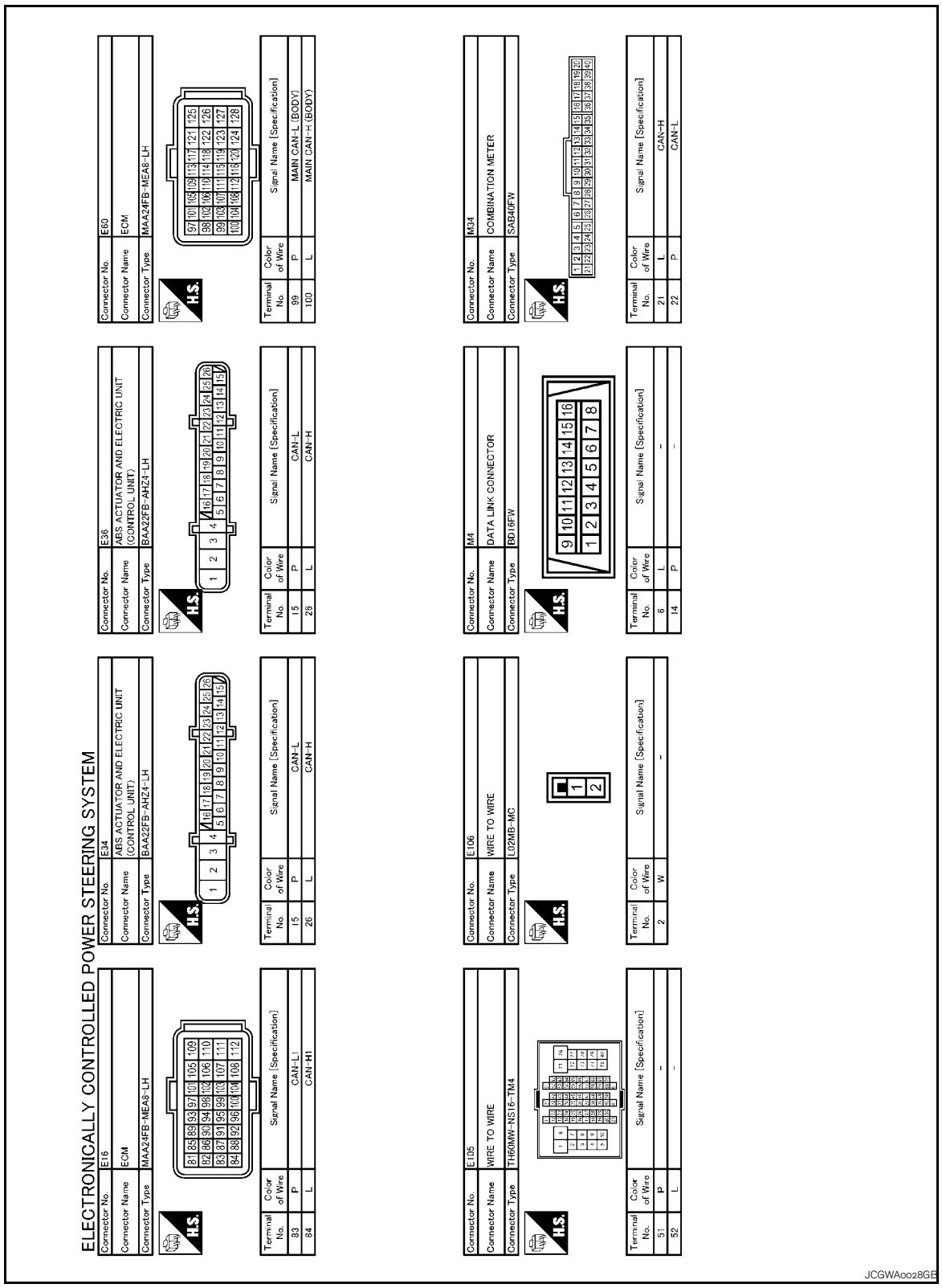
Wiring Diagram - ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM -

INFOID:0000000000940481

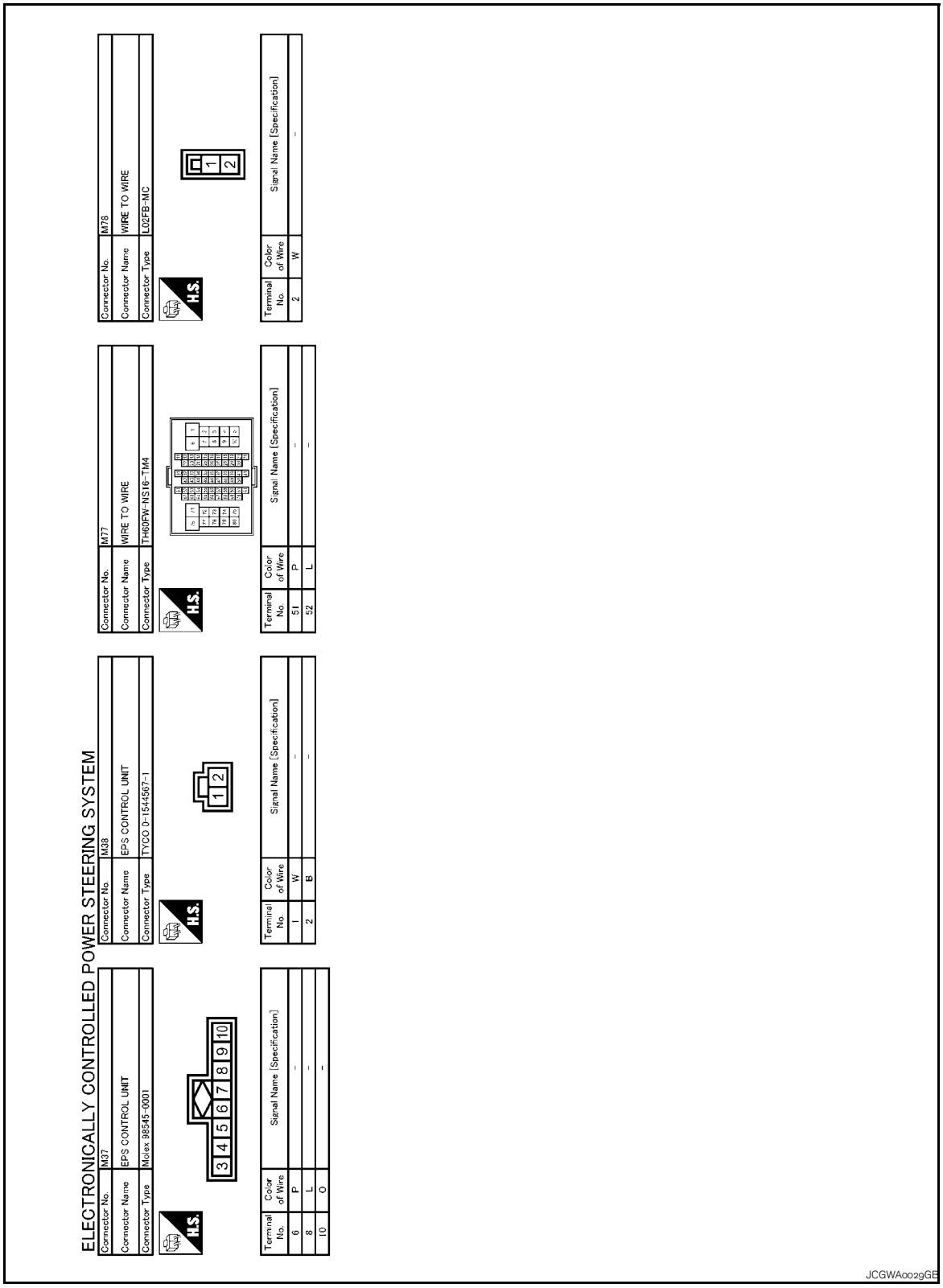
cardiagn.co



cardiagn.com


ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM
Connector No. E16
Connector Name ECM
Connector Type MAA24FB-MEA8-LH
H.S.
81 89 89 93 97 101 105 109
82 86 90 94 98 102 106 110
83 87 91 95 99 103 107 111
84 88 92 96 100 104 108 112
Terminal No. Color of Wire Signal Name [Specification]
83 P CAN-L
84 L CAN-H
Connector No. E34
Connector Name ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type BAA22FB-AHZ4-LH
H.S.
1 2 3 4 16 17 18 19 20 21 22 23 24 25 26
5 6 7 8 9 10 11 12 13 14 15
Terminal No. Color of Wire Signal Name [Specification]
15 P CAN-L
26 L CAN-H
Connector No. E105
Connector Name WIRE TO WIRE
Connector Type TH60MW-NS16-TM4
H.S.
Terminal No. Color of Wire Signal Name [Specification]
51 P -
52 L -
Connector No. E106
Connector Name WIRE TO WIRE
Connector Type L02MB-MC
H.S.
1 2
Terminal No. Color of Wire Signal Name [Specification]
2 W -
Connector No. E36
Connector Name ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type BAA22FB-AHZ4-LH
H.S.
1 2 3 4 16 17 18 19 20 21 22 23 24 25 26
5 6 7 8 9 10 11 12 13 14 15
Terminal No. Color of Wire Signal Name [Specification]
15 P CAN-L
26 L CAN-H
Connector No. E60
Connector Name ECM
Connector Type MAA24FB-MEA8-LH
H.S.
97 101 105 109 113 117 121 125
98 102 106 110 114 118 122 126
99 103 107 111 115 119 123 127
100 104 108 112 116 120 124 128
Terminal No. Color of Wire Signal Name [Specification]
99 P MAIN CAN-L (BODY)
100 L MAIN CAN-H (BODY)
Connector No. M4
Connector Name DATA LINK CONNECTOR
Connector Type BD16FW
H.S.
9 10 11 12 13 14 15 16
1 2 3 4 5 6 7 8
Terminal No. Color of Wire Signal Name [Specification]
6 L -
14 P -
Connector No. M34
Connector Name COMBINATION METER
Connector Type SAB40FW
H.S.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
Terminal No. Color of Wire Signal Name [Specification]
21 L CAN-H
22 P CAN-L
JCGWA0028GB

cardiagn.co



Fail-Safe

INFOID:0000000000940482

- If any malfunction occurs in the system, and control unit detects the malfunction, EPS warning lamp on combination meter turns ON to indicate system malfunction.
- When EPS warning lamp is ON, enters a manual steering state. (Control turning force steering wheel becomes heavy.)

DTC No. Index

INFOID:0000000000940483

cardiagn.com

DTC	Items (CONSULT screen terms)	Reference
C1601	BATTERY VOLT	STC-8, "Description"
C1604	TORQUE SENSOR	STC-10, "Description"
C1606	EPS MOTOR	STC-11, "Description"
C1607	EEPROM	STC-12, "Description"
C1608	CONTROL UNIT	STC-13, "Description"
U1200	CAN VHCL SPEED (ABS)	STC-15, "Description"
U14FF	CAN VHCL SPEED (METER)	STC-16, "Description"
U1000	CAN COMM CIRCUIT	STC-17, "Description"

cardiagn.co

SYMPTOM DIAGNOSIS

EPS WARNING LAMP DOES NOT TURN ON

Diagnosis Procedure

INFOID:0000000000940534

1. CHECK SYSTEM FOR CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to STC-7, "CONSULT-III Function (EPS)".

Is the “CAN COMM CIRCUIT [U1000]” displayed?

YES >> Perform trouble diagnosis for CAN communication line.
NO >> GO TO 2.

2. CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to STC-18, "Reference Value".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

3. CHECK COMBINATION METER SELF-DIAGNOSIS RESULTS

Perform combination meter self-diagnosis. Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

is self-diagnosis results indicated?

YES >> Repair or replace malfunctioning components.
NO >> GO TO 4.

4. SYMPTOM CHECK

Check again.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace combination meter.

cardiagn.com

EPS WARNING LAMP DOES NOT TURN OFF

Diagnosis Procedure

INFOID:0000000000940536

1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis. Refer to STC-7, "CONSULT-III Function (EPS)".

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 2.

2.CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between EPS control unit harness connector terminals and ground.

EPS control unit		—	Voltage
Connector	Terminal		
M38	1	Ground	Battery voltage
M37	10		

5. Turn ignition switch OFF.
6. Check voltage between EPS control unit harness connector terminals and ground.

EPS control unit		—	Voltage
Connector	Terminal		
M38	1	Ground	Battery voltage
M37	10		Approx. 0 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK EPS CONTROL UNIT GROUND CIRCUIT

1. Check continuity between EPS control unit harness connector terminal and ground.

EPS control unit		—	Continuity
Connector	Terminal		
M38	2	Ground	Existed

2. Connect EPS control unit harness connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK EPS CONTROL UNIT PIN TERMINAL

Check EPS control unit pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5.CHECK COMBINATION METER SELF-DIAGNOSIS RESULTS

Perform combination meter self-diagnosis. Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

is self-diagnosis results indicated?

YES >> Repair or replace malfunctioning components.

cardiagn.co

NO >> GO TO 6.

6. CHECK VEHICLE SPEED SIGNAL FROM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform self-diagnosis with ABS actuator and electric unit (control unit).
- Without ESP models: BRC-17, "CONSULT-III Function (ABS)"
- With ESP models: BRC-96, "CONSULT-III Function (ABS)"

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 7.

7. CHECK ENGINE STATUS SIGNAL

Perform self-diagnosis with ECM.
- HR16DE (with EURO-OBD): EC-100, "CONSULT-III Function".
- HR16DE (Without EURO-OBD): EC-430, "CONSULT-III Function".
- MR20DE (with EURO-OBD): EC-719, "CONSULT-III Function".
- MR20DE (without EURO-OBD): EC-1054, "CONSULT-III Function".
- K9K: EC-1315, "Diagnosis Description"

Is the malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 8.

8. SYMPTOM CHECK

Check again.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace combination meter. Refer to MWI-72, "Exploded View".

cardiagn.com

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

Diagnosis Procedure

INFOID:0000000000940537

1.CHECK SYSTEM FOR CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to STC-7, "CONSULT-III Function (EPS)".

Is the “CAN COMM CIRCUIT [U1000]” displayed.

YES >> Perform trouble diagnosis for CAN communication line. Refer to STC-17, "Description".
NO >> GO TO 2.

2.CHECK VEHICLE SPEED SIGNAL FROM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform self-diagnosis with ABS actuator and electric unit (control unit).
- Without ESP models: BRC-17, "CONSULT-III Function (ABS)"
- With ESP models: BRC-96, "CONSULT-III Function (ABS)"

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 3.

3.CHECK COMBINATION METER SIGNAL

Perform self-diagnosis with combination meter. Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Is the malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4.CHECK ENGINE STATUS SIGNAL

Perform self-diagnosis with ECM.
- HR16DE (with EURO-OBD): EC-100, "CONSULT-III Function".
- HR16DE (Without EURO-OBD): EC-430, "CONSULT-III Function".
- MR20DE (with EURO-OBD): EC-719, "CONSULT-III Function".
- MR20DE (without EURO-OBD): EC-1054, "CONSULT-III Function".
- K9K: EC-1315, "Diagnosis Description"

Is the malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 5.

5.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to STC-18, "Reference Value".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

6.CHECK STEERING WHEEL TURNING FORCE

Check steering wheel turning force. Refer to ST-7, "Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace malfunctioning components.

7.SYMPTOM CHECK

Check again.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to ST-7, "Inspection".

UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

Diagnosis Procedure

INFOID:0000000000940538

1.CHECK EPS WARNING LAMP

Confirm EPS warning lamp during engine running.

Does EPS warning lamp turn OFF?

YES >> GO TO 2.
NO >> Go to STC-25, "Diagnosis Procedure".

2.CHECK WHEEL ALIGNMENT

Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Adjust wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".

3.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to STC-18, "Reference Value".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

4.CHECK STEERING WHEEL TURNING FORCE

Check steering wheel turning force. Refer to ST-7, "Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace malfunctioning components.

5.SYMPTOM CHECK

Check again.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to ST-7, "Inspection".

cardiagn.com

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

Diagnosis Procedure

INFOID:0000000000940540

1.CHECK EPS WARNING LAMP

Confirm EPS warning lamp during engine running.

Does EPS warning lamp turn OFF?

YES >> GO TO 2.
NO >> Go to STC-25, "Diagnosis Procedure".

2.CHECK STEERING COLUMN INTERMEDIATE SHAFT

Check the connection between intermediate shaft and the mounting part of steering column assembly and steering gear assembly. Refer to ST-10, "Exploded View".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to STC-18, "Reference Value".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

4.SYMPTOM CHECK

Check again.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to ST-7, "Inspection".

cardiagn.co

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001115248

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001115249

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

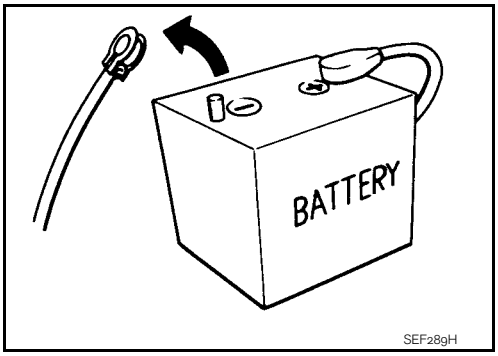
Service Notice or Precautions for EPS System

INFOID:0000000000940487

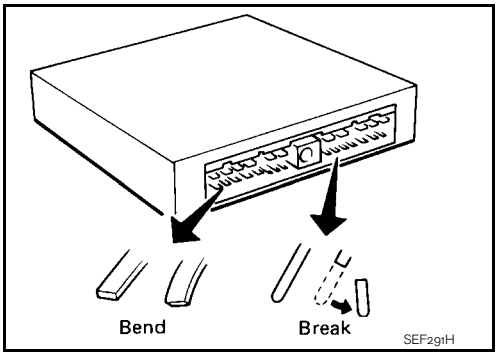
CAUTION:
Check the following item when performing the trouble diagnosis.

cardiagn.com

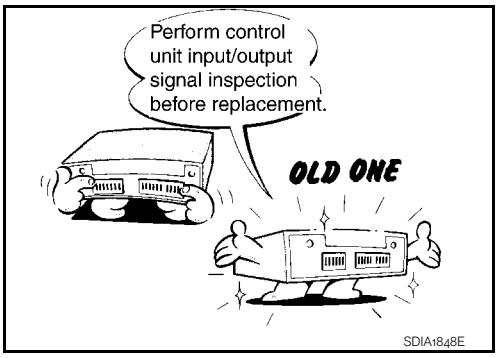
- **Check any possible causes by interviewing the symptom and it's condition from the customer if any malfunction, such as EPS warning lamp is turned ON, occurs.**
- **Check if air pressure and size of tires are proper, the specified part is used for the steering wheel, and control unit is genuine part.**
- **Check if the connection of steering column assembly and steering gear assembly is proper (there is not looseness of mounting bolts, damage of rods, boots or sealants, and leakage of grease, etc).**
- **Check if the wheel alignment is adjusted properly.**
- **Check if there is any damage or modification to suspension or body resulting in increased weight or altered ground clearance.**
- **Check if installation conditions of each link and suspension are proper.**
- **Check if the battery voltage is proper.**
- **Check connection conditions of each connector are proper.**
- **Before connecting or disconnecting the EPS control unit harness connector, turn ignition switch "OFF" and disconnect battery ground cable. Because battery voltage is applied to EPS control unit even if ignition switch is turned "OFF".**



- **When connecting or disconnecting pin connectors into or from EPS control unit, take care not to damage pin terminals (bend or break).**
  When connecting pin connectors, make sure that there are no bends or breaks on EPS control unit pin terminal.



- **Before replacing EPS control unit, perform EPS control unit input/output signal inspection and make sure whether EPS control unit functions properly or not. Refer to STC-18, "Reference Value".**



ON-VEHICLE REPAIR

EPS CONTROL UNIT

Removal and Installation

INFOID:0000000000945621

CAUTION:
When replacing EPS control unit, replace steering column assembly. Refer to ST-10, "Removal and Installation".

cardiagn.com

SECTION ST
STEERING SYSTEM

CONTENTS

SYMPTOM DIAGNOSIS 2

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 2
NVH Troubleshooting Chart 2

PRECAUTION 4

PRECAUTIONS 4
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 4
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 4
Service Notice or Precautions for Steering System 4

PREPARATION 6

PREPARATION 6
Special Service Tools 6
Commercial Service Tools 6

ON-VEHICLE MAINTENANCE 7

STEERING WHEEL 7
Inspection 7

ON-VEHICLE REPAIR 9

STEERING WHEEL 9
Exploded View 9
Removal and Installation 9

STEERING COLUMN 10
Exploded View 10
Removal and Installation 10
Inspection 11

STEERING GEAR AND LINKAGE 13
Exploded View 13
Removal and Installation 15
Disassembly and Assembly 15
Inspection 16

SERVICE DATA AND SPECIFICATIONS (SDS) 18

SERVICE DATA AND SPECIFICATIONS (SDS) 18
General Specifications 18
Steering Wheel Axial End Play and Play 18
Steering Wheel Turning Force 18
Steering Angle 18
Steering Column Operating Range 18
Rack Stroke 19
Socket Swing Force and Rotating Torque 19
Socket Axial End Play 19
Inner Socket Length 20

cardiagn.co

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000000953487

2WD MODELS

Use the chart below to find the cause of the symptom. If necessary, repair or replace these parts.

Reference			ST-16, "Inspection"	ST-16, "Inspection"	ST-16, "Inspection"	ST-7, "Inspection"	ST-7, "Inspection"	—	ST-13, "Exploded View"	ST-11, "Inspection"	ST-10, "Exploded View"	ST-13, "Exploded View"	NVH in FAX, RAX, FSU, RSU section	NVH in WT section	NVH in WT section	NVH in FAX section	NVH in BR section
Possible cause and SUSPECTED PARTS			Outer/inner socket ball joint swinging torque	Outer/inner socket ball joint rotating torque	Outer/inner socket ball joint end play	Steering wheel play	Improper steering wheel	Improper installation or looseness of tilt lock lever	Mounting looseness	Steering column deformation or damage	Improper installation or looseness of steering column	Steering linkage looseness	AXLE and SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES
Symptom	Steering	Noise	×	×	×	×				×	×		×	×	×	×	×
		Shake					×	×	×				×	×	×	×	×
		Vibration					×	×	×	×	×		×	×		×	
		Shimmy					×		×			×	×	×	×		×
		Judder						×	×			×	×	×	×		×

×: Applicable

4WD MODELS

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

cardiagn.com

			Reference	ST-16, "Inspection"	ST-16, "Inspection"	ST-16, "Inspection"	ST-7, "Inspection"	ST-7, "Inspection"	—	ST-13, "Exploded View"	ST-11, "Inspection"	ST-10, "Exploded View"	ST-13, "Exploded View"	NVH in DLN section	NVH in DLN section	NVH in FAX, RAX, FSU, RSU section	NVH in WT section	NVH in WT section	NVH in FAX section	NVH in BR section
			Possible cause and SUSPECTED PARTS	Outer/inner socket ball joint swinging torque	Outer/inner socket ball joint rotating torque	Outer/inner socket ball joint end play	Steering wheel play	Improper steering wheel	Improper installation or looseness of tilt lock lever	Mounting looseness	Steering column deformation or damage	Improper installation or looseness of steering column	Steering linkage looseness	PROPELLER SHAFT	DIFFERENTIAL	AXLE and SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES
Symptom	Steering	Noise		×	×	×	×				×	×		×	×	×	×	×	×	×
		Shake						×	×	×				×		×	×	×	×	×
		Vibration						×	×	×	×	×		×		×	×		×	
		Shimmy						×		×			×			×	×	×		×
		Judder							×	×			×			×	×	×		×

×: Applicable

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000955811

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000000955810

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Service Notice or Precautions for Steering System

INFOID:0000000000953490

CAUTION:

- **In case of removing steering gear assembly, make the final tightening with grounded and unloaded vehicle condition, and then check wheel alignment.**
- **Observe the following precautions when disassembling.**

- Before disassembly, thoroughly clean the outside of the unit.

cardiagn.com

- **Disassembly should be done in a clean work area. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.**
- **For easier and proper assembly, place disassembled parts in order on a parts rack.**
- **Use nylon cloth or paper towels to clean the parts; common shop rags can leave lint that might interfere with their operation.**
- **Never reuse non-reusable parts.**
- **Before assembling, apply the specified grease to the directed parts.**

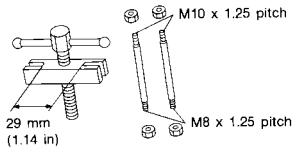
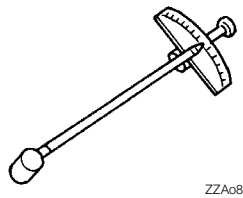
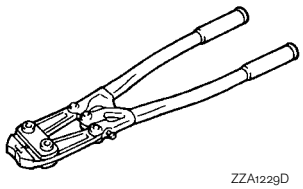
cardiagn.co

PREPARATION

PREPARATION

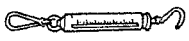
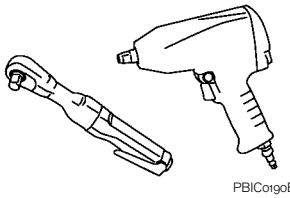
Special Service Tools

INFOID:0000000000953491

Tool number Tool name	Description
ST27180001 Steering wheel puller  S-NT544	Removing steering wheel
ST3127S000 Preload gauge  ZZA0806D	Inspecting steering column assembly rotating torque, pinion rotating torque and ball joint rotating torque
KV40107300 Boot Band crimping tool  ZZA1229D	Installing boot bands (large diameter)

Commercial Service Tools

INFOID:0000000000953492

Tool number Tool name	Description
Spring gauge  LST025	Inspecting steering wheel turning force and power steering gear linkage
Power tool  PBIC0190E	Loosening bolts and nuts

cardiagn.com

ON-VEHICLE MAINTENANCE

STEERING WHEEL

Inspection

INFOID:0000000000953494

STEERING WHEEL AXIAL END PLAY

1. Check installation conditions of steering gear assembly, front suspension assembly, axle and steering column assembly.
2. Check if movement exists when steering wheel is moved up and down, to the left and right and to the axial direction.

Standard	
Steering wheel axial end play	**: Refer to ST-18, "Steering Wheel Axial End Play and Play".**

3. Check the following items when steering wheel axial end play is out of the standard.
   - Check the steering column assembly mounting condition. Refer to ST-10, "Exploded View".
   - Check steering gear assembly mounting condition for looseness. Refer to ST-13, "Exploded View".

STEERING WHEEL PLAY

1. Turn steering wheel so that front wheels come to the straight-ahead position.
2. Start engine and lightly turn steering wheel to the left and right until front wheels start to move.
3. Measure steering wheel movement on the outer circumference.

Standard	
Steering wheel play on the outer circumference	**: Refer to ST-18, "Steering Wheel Axial End Play and Play".**

4. Check the following items when steering wheel play is out of the standard.
   - Check backlash for each joint of steering column assembly.
   - Check installation condition of steering gear assembly.

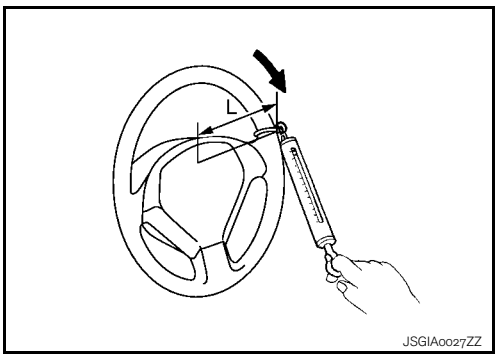
NEUTRAL POSITION STEERING WHEEL

1. Make sure that steering gear assembly, steering column assembly and steering wheel are installed in the correct position.
2. Perform neutral position inspection after wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".
3. Set vehicle to the straight-ahead position and confirm steering wheel is in the neutral position.
4. Loosen outer socket lock nut and turn inner socket to left and right equally to make fine adjustments if steering wheel is not in the neutral position.

STEERING WHEEL TURNING FORCE

1. Park vehicle on a level and dry surface, set parking brake.
2. Tires need to be inflated normal pressure. Refer to WT-4, "Tire".
3. Start engine.

4. Check steering wheel turning force when steering wheel has been turned 540° from neutral position.



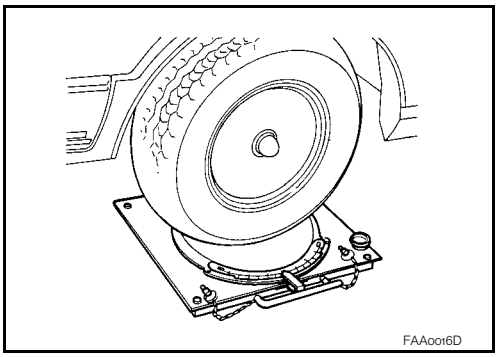
Standard

Steering wheel turning force	**: Refer to ST-18, "Steering Wheel Turning Force".**

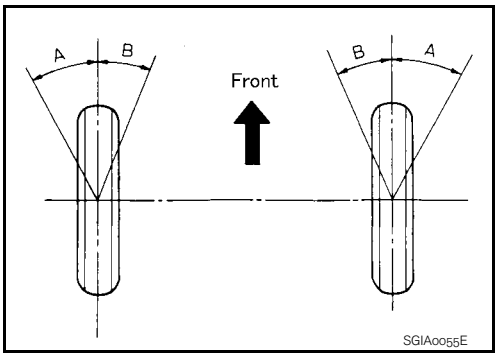
NOTE:
Multiply the distance (L) from the hook of spring balance to the center of steering wheel by the measurement value with a spring balance.

FRONT WHEEL TURNING ANGLE

1. Check front wheel turning angle after toe-in inspection. Refer to FSU-7, "Wheel Alignment Inspection".
2. Place front wheels on turning radius gauges and rear wheels on stands, so that vehicle can be level.
3. Check the maximum inner and outer wheel turning angles for LH and RH road wheels.



4. With the engine at idle, turn steering wheel from full left stop to full right stop and measure the turning angles.

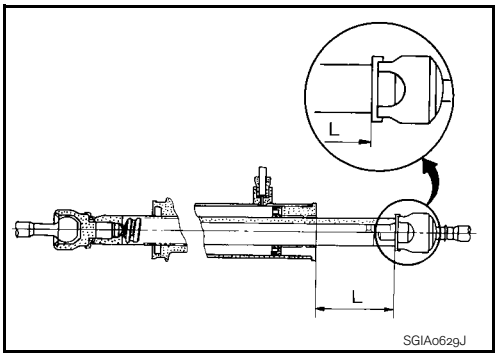


Standard

Inner wheel (Angle: A)	**: Refer to ST-18, "Steering Angle".**
Outer wheel (Angle: B)	**: Refer to ST-18, "Steering Angle".**

5. Check the following items when turning angle is out of the standard.

a. Check rack stroke.



Standard

Rack stroke “L”	**: Refer to ST-19, "Rack Stroke".**

b. Disassemble steering gear assembly to check the cause that rack stroke is outside of the standard.
- Steering angles are not adjustable. Check steering gear assembly, steering column assembly and front suspension components for wear or damage if any of the turning angles are different from the specified value. Replace any of them, if any non-standard condition exists.

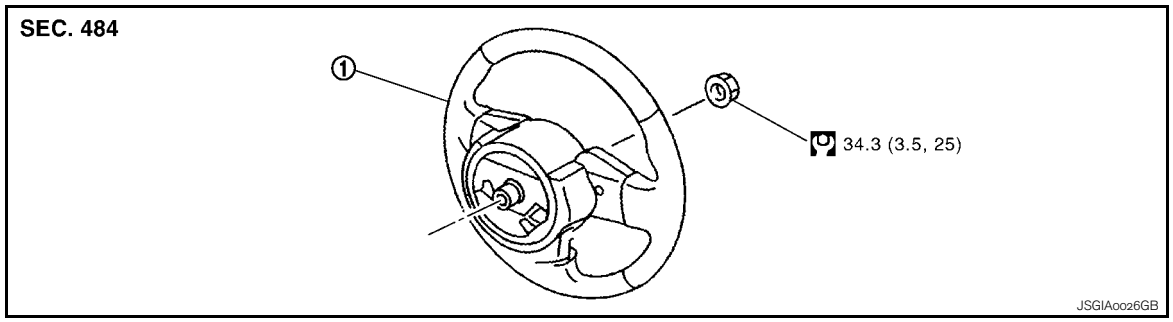
cardiagn.com

ON-VEHICLE REPAIR

STEERING WHEEL

Exploded View

INFOID:0000000000953495



1. Steering wheel

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

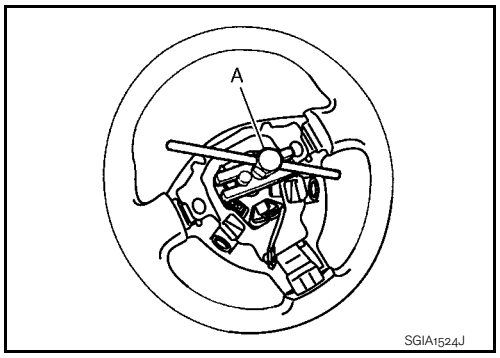
INFOID:0000000000953496

REMOVAL

NOTE:

When reconnecting spiral cable, fix cable with a tape so that fixing case and rotating part keep aligned. This will omit neutral position alignment procedure during spiral cable installation.

1. Set vehicle to the straight-ahead position.
2. Remove driver air bag module. Refer to SR-4, "Exploded View".
3. Remove steering wheel lock nut after steering is locked.
4. Remove steering wheel with the steering wheel puller (A) (SST: ST27180001).



INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Never twist spiral cable excessively after it becomes tight. (twisting may cause the cable to be torn off.)

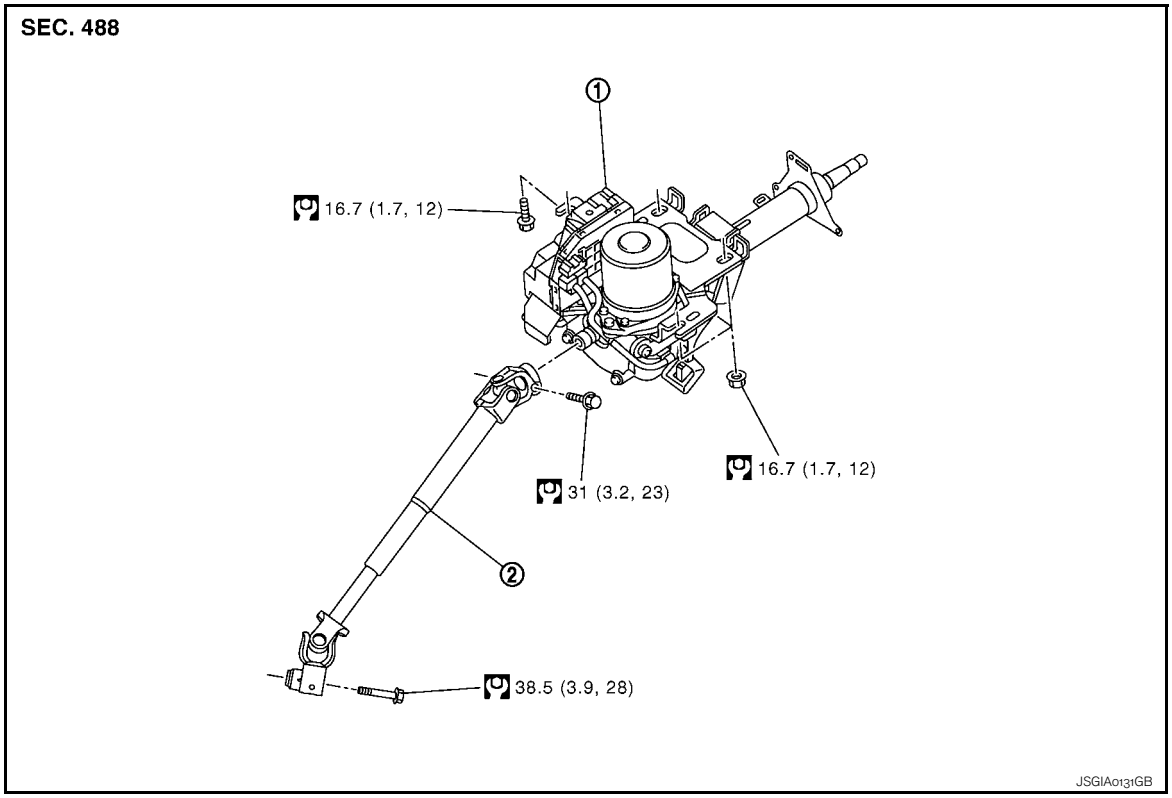
NOTE:

Check the spiral cable neutral position after replacing or rotating spiral cable. Refer to SR-6, "Removal and Installation".

STEERING COLUMN

Exploded View

INFOID:0000000000953497



1. Steering column assembly
2. Intermediate shaft

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000953498

REMOVAL

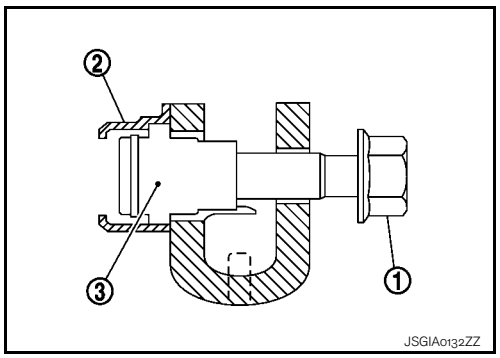
CAUTION:

- **Never impact on the axis when removing steering column assembly.**
- **Place a matching mark on both intermediate shaft and steering column assembly before removing intermediate shaft.**
- **Never repeat static steering. (Motor and EPS control unit is heated.)**
- **Be careful when removing steering column assembly from the vehicle because it is heavy.**
- **Keep steering column assembly away from magnetic sources.**
- **Never disassemble steering column assembly. It is not separable.**

1. Set vehicle to the straight-ahead position.
2. Place the tilt to the highest level.
3. Remove steering wheel. Refer to ST-9, "Exploded View".
4. Remove steering column cover. Refer to IP-11, "Exploded View".
5. Remove spiral cable. Refer to SR-6, "Exploded View".
6. Remove combination switch. Refer to BCS-65, "Exploded View".
7. Remove instrument driver lower panel. Refer to IP-11, "Exploded View".
8. Remove combination meter. Refer to MWI-72, "Exploded View".
9. Disconnect each switch harness connectors installed to steering column assembly.
10. Remove intermediate shaft to steering column assembly with the following procedure.

cardiagn.com

a. Remove fixing bolt (1).
b. Remove pressed cam nut holder (2) from intermediate shaft yoke.
c. Remove cam nut (3).
11. Remove steering column assembly.



INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

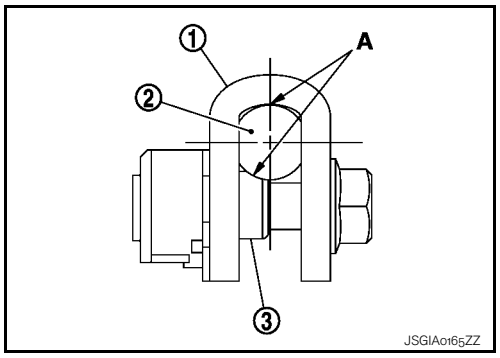
- **Never impact on the axis when removing steering column assembly.**
- **Place a matching mark on both intermediate shaft and steering column assembly before removing intermediate shaft.**
- **Never repeat static steering. (Motor and EPS control unit is heated.)**
- **Be careful when removing steering column assembly from the vehicle because it is heavy.**
- **Keep steering column assembly away from magnetic sources.**
- **Never disassemble steering column assembly. It is not separable.**

Be careful of the following points when installing the steering column assembly.

CAUTION:

Never reuse cam nut and fixing bolt.

1. Check that all parts of the cam nut holder are removed.
2. Fit yoke to pinion shaft, ensuring no clearance between yoke and pinion shaft.
3. Insert cam nut fully.
4. Whilst holding cam nut in position by hand, insert bolt and tighten to specified torque. Take care to hold cam nut in correct axial position during this process.
5. After intermediate shaft fitted, make sure there is no gap (A) between the yoke (1), pinion shaft (2) and cam nut (3).



CAUTION:

Adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

Inspection

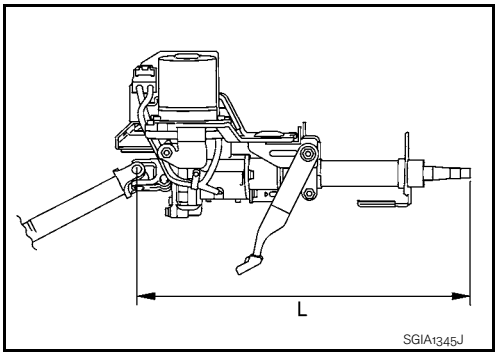
INFOID:0000000000953499

INSPECTION AFTER REMOVAL

- Check each part of steering column assembly for damage or other malfunctions. Replace if there are.
- Measure steering column assembly rotating torque using a preload gauge (SST: ST3127S000). Replace steering column assembly if outside the standard.

Standard	
Rotating torque	**: Refer to ST-18, "Steering Column Operating Range".**

- Measure the length “L” as shown, if vehicle has been involved in a minor collision. Replace steering column assembly (with motor, reduction gear, sensor) if outside the standard.

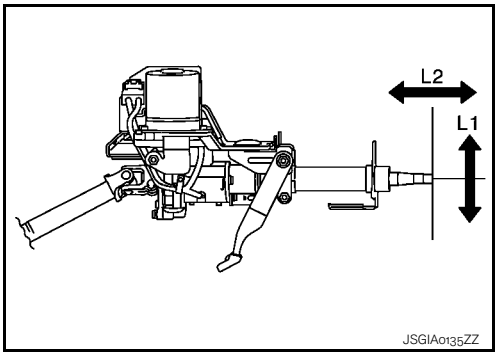


Standard

Steering column length “L”	**: Refer to ST-18, "Steering Column Operating Range".**

INSPECTION AFTER INSTALLATION

- Check each part of steering column assembly for damage or other malfunctions. Replace if there are.
- Check the steering wheel play, neutral position steering wheel, steering wheel turning force, and front wheel turning angle. Refer to ST-7, "Inspection".
- Check tilt and telescopic mechanism operating range “L^1”, “L^2” as shown in the figure.



Standard

Tilt operating range “L^1”	**: Refer to ST-18, "Steering Column Operating Range".**
Telescopic operating range “L^2”	**: Refer to ST-18, "Steering Column Operating Range".**

cardiagn.com

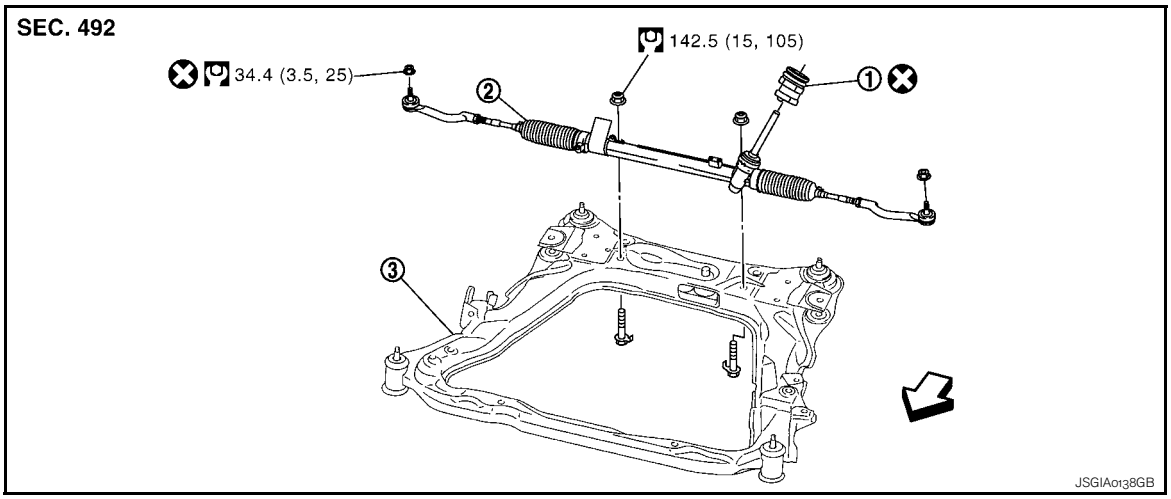
STEERING GEAR AND LINKAGE

Exploded View

INFOID:0000000000953510

REMOVAL AND INSTALLATION

LHD models

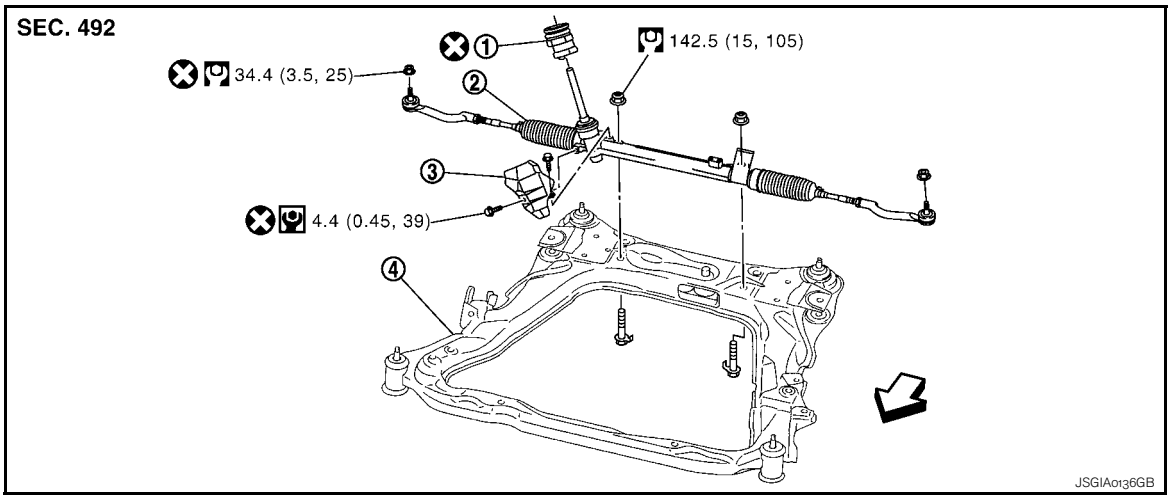


1. Fire wall seal
2. Steering gear assembly
3. Front suspension member

⇦: Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

RHD models



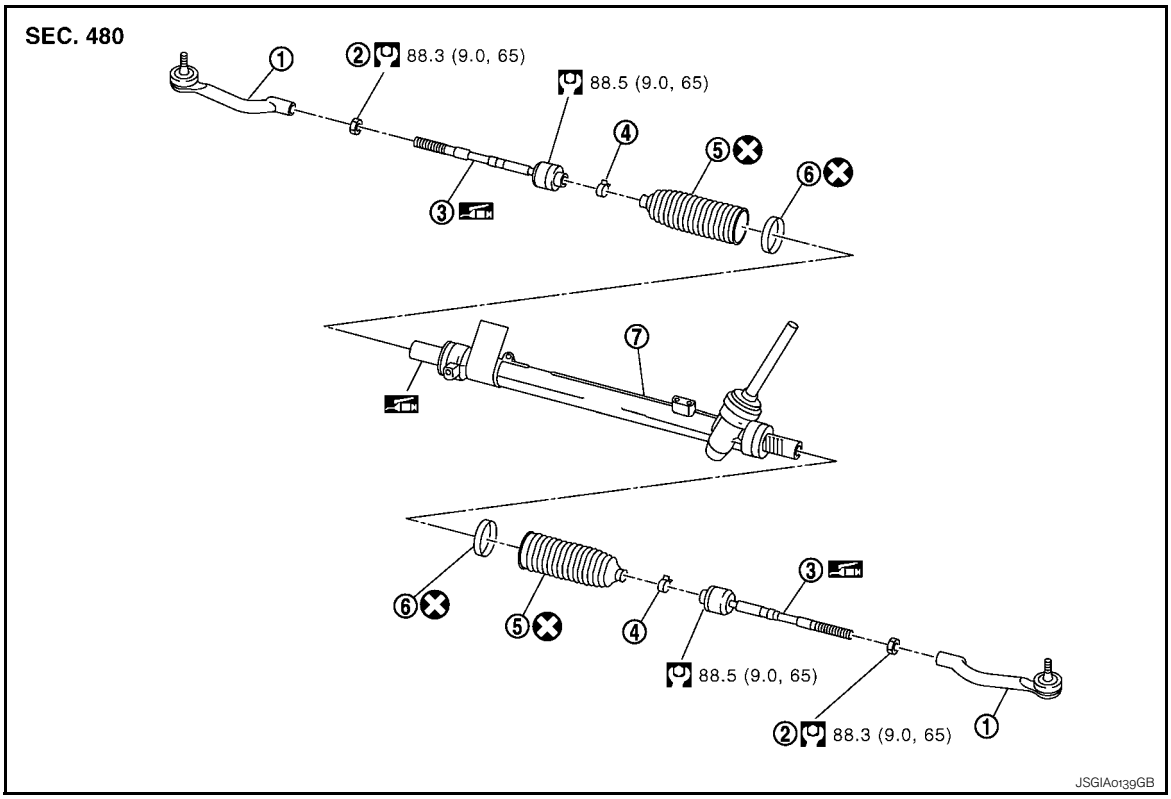
1. Fire wall seal
2. Steering gear assembly
3. Heat insulator
4. Front suspension member

⇦: Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

DISASSEMBLY AND ASSEMBLY

LHD models

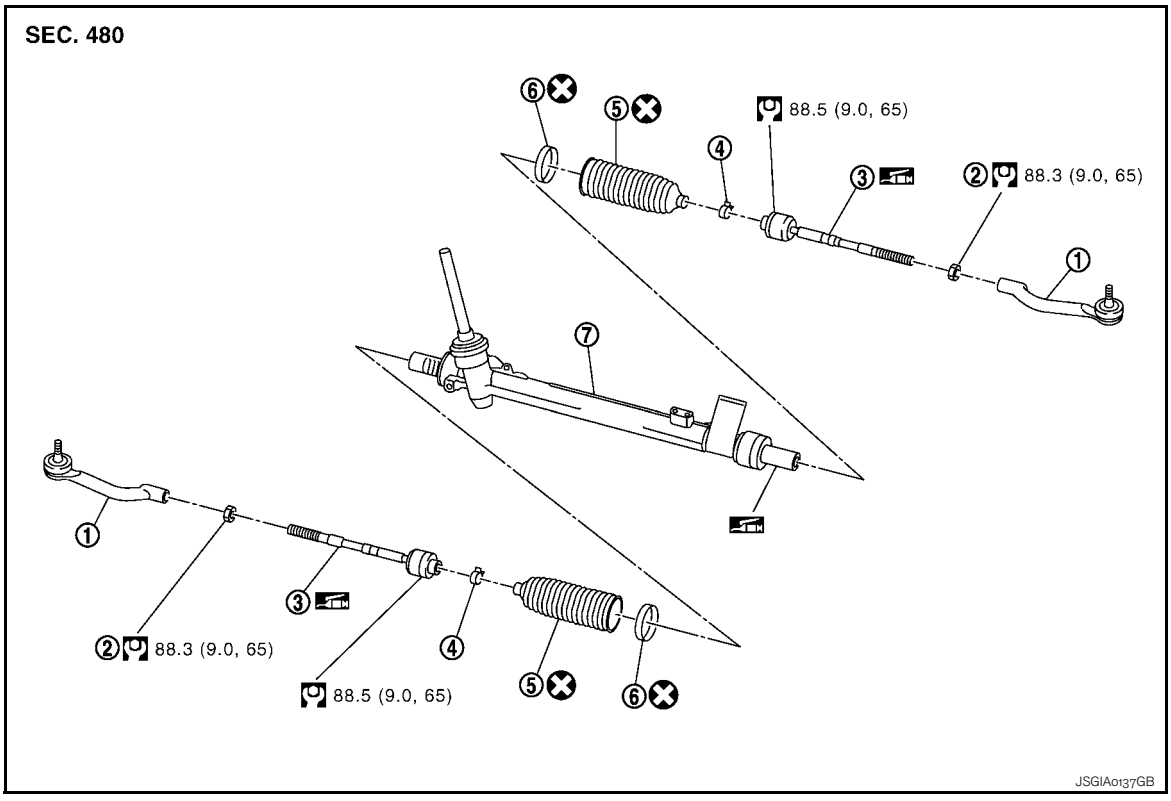


1. Outer socket
2. Outer socket lock nut
3. Inner socket
4. Boot clamp (small diamater)
5. Boot
6. Boot clamp (large diameter)
7. Gear housing assembly

: Apply Molywhite LSG or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

RHD models



cardiagn.com

1. Outer socket
2. Outer socket lock nut
3. Inner socket
4. Boot clamp (small diamater)
5. Boot
6. Boot clamp (large diameter)
7. Gear housing assembly

: Apply Molywhite LSG or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000953511

REMOVAL

1. Set vehicle to the straight-ahead position.
2. Remove bolt of intermediate shaft (lower side), and then remove intermediate shaft from steering gear pinion shaft.
3. Remove tires with a power tool.
4. Remove steering outer socket from steering knuckle so as not to damage ball joint boot using suitable ball joint remover.
   CAUTION:
   Temporarily tighten the nut to prevent damage to threads and to prevent the ball joint remover from suddenly coming off.
5. Remove front suspension member.
6. Remove steering gear assembly.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Spiral cable may be cut if steering wheel turns while separating steering column assembly and steering gear assembly. Be sure to secure steering wheel using string to avoid turning.

- Perform final tightening of nuts and bolts on each part under unladen conditions with tires on level ground when removing steering gear assembly. Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".
- Adjust neutral position of steering angle sensor after checking wheel alignment. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement". (ESP models)

Disassembly and Assembly

INFOID:0000000000953512

DISASSEMBLY

1. Loosen outer socket lock nut, and remove outer socket.
2. Remove boot clamps, and then remove boot from inner socket.
   CAUTION:
   Never damage inner socket and gear housing assembly when removing boot. Inner socket and gear housing assembly must be replaced if inner socket and gear housing assembly are damaged because it may cause foreign material interfusion.
3. Remove inner socket from gear housing assembly.

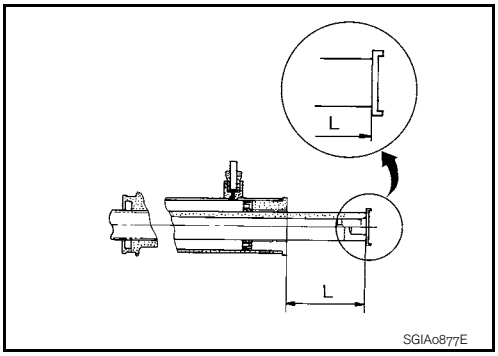
ASSEMBLY

1. Install inner socket to gear housing assembly.
2. Apply recommended grease to inner socket.

3. Decide on the neutral position for the rack.

Standard

Rack stroke “L” **: Refer to ST-19, "Rack Stroke".**

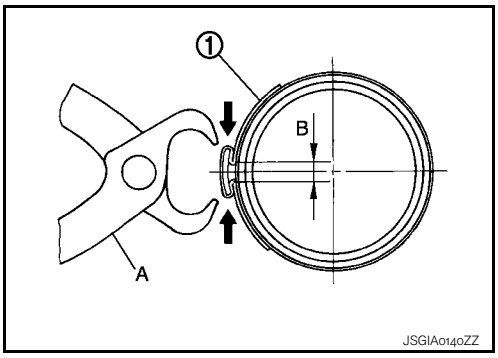


4. Install boot to gear housing assembly and inner socket.

5. Install boot clamp (large diameter) (1) to boot using boot band crimping tool (A) (SST: KV40107300).

CAUTION:

Install large diameter side boot clamp (1) securely to boot groove, and crimp it so as to have clearance (B) of 3 mm (0.12 in) or less as shown.



6. Install boot clamp (small diameter) to boot.

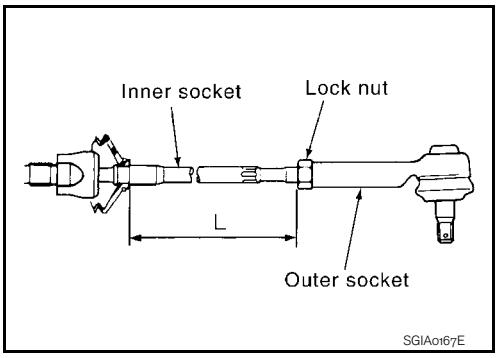
7. Adjust inner socket to standard length “L”, and then tighten lock nut to the specified torque. Check length “L” again after tightening lock nut.

Standard

Inner socket length “L” **: Refer to ST-20, "Inner Socket Length".**

CAUTION:

Adjust toe-in after this procedure. Length achieved after toe-in adjustment is not necessaly the value above.



Inspection

INFOID:0000000000953513

INSPECTION AFTER INSTALLATION

- Check if steering wheel turns smoothly when it is turned several times fully to the end of the left and right.
- Check the steering wheel play, neutral position steering wheel, steering wheel turning force, and front wheel turning angle. Refer to ST-7, "Inspection".

INSPECTION AFTER DISASSEMBLY

Boot

- Check boot for cracks, and replace it if a malfunction is detected.

Gear Housing Assembly

- Check gear housing assembly for damage and scratches (inner wall). Replace if there are.

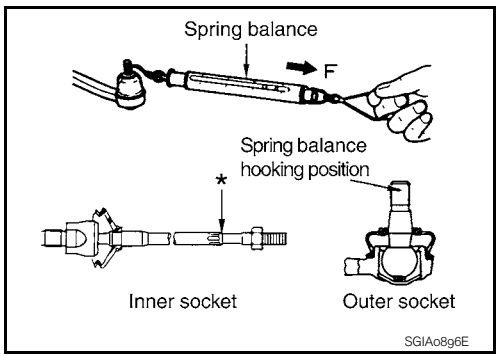
Outer Socket and Inner Socket

- Check the following items and replace the component if it does not meet the standard.

BALL JOINT SWINGING TORQUE

cardiagn.com

- Hook a spring balance at the point shown in the figure and pull the spring balance. Make sure that the spring balance reads the specified value when ball stud and inner socket start to move. Replace outer socket and inner socket if they are outside the standard.



Standard for outer socket

(Measuring point: Ball stud upper side)

Swinging torque	**: Refer to ST-19, "Socket Swing Force and Rotating Torque".**
Spring balance measurement	**: Refer to ST-19, "Socket Swing Force and Rotating Torque".**

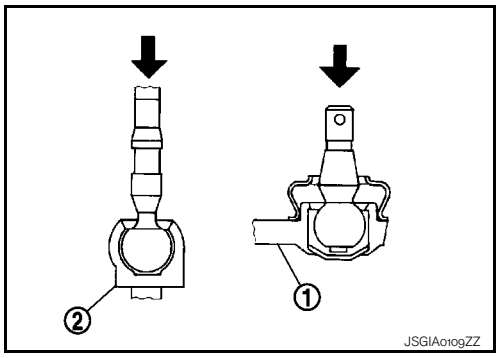
Standard for inner socket

(Measuring point: "*" mark shown in the figure)

Swinging torque	**: Refer to ST-19, "Socket Swing Force and Rotating Torque".**
Spring balance measurement	**: Refer to ST-19, "Socket Swing Force and Rotating Torque".**

BALL JOINT AXIAL END PLAY

- Apply an axial load of 490 N (50 kg, 110 lb) to ball stud. Using a dial gauge, measure amount of stud movement, and then make sure that the value is within the following specified range. Replace outer socket (1) and inner socket (2) if the measured value is outside the standard.



Standard

Outer socket	**: Refer to ST-19, "Socket Axial End Play".**
Inner socket	**: Refer to ST-19, "Socket Axial End Play".**

cardiagn.co

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000000953528

Steering gear model	R27N

Steering Wheel Axial End Play and Play

INFOID:0000000000953529

Unit: mm (in)

Item	Standard
Steering wheel axial end play	0 (0)
Steering wheel play on the outer circumference	0 - 35 (0 - 1.38)

Steering Wheel Turning Force

INFOID:0000000000953530

Unit: N·m (kg-m, ft-lb)

Item	Standard
Steering wheel turning force	34 (3.5, 25)

Steering Angle

INFOID:0000000000953531

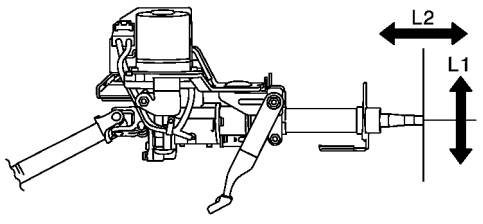
Unit: Degree minute (Decimal degree)

Item		Standard	
Tire size		215/65R16	215/60R17
Inner wheel	Minimum	36°00′ (36.0°)	
	Nominal	39°00′ (39.0°)	
	Maximum	40°00′ (40.0°)	
Outer wheel	Nominal	33°00′ (33.0°)	

Steering Column Operating Range

INFOID:0000000000953532

Item	Standard
Tilt operating range “L”	40 mm (1.57 in)
Telescopic operating range “L”	25 mm (0.98 in)

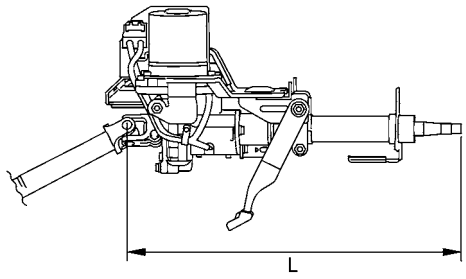


JSGIA0135ZZ

Rotating torque	0.49 N·m (0.05 kg-m, 4 in-lb)

cardiagn.com

Item	Standard
Steering column length “L”	495 mm (19.49 in)



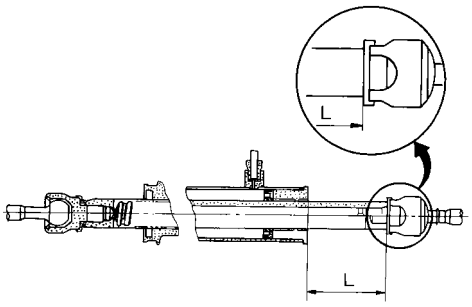
SGIA1345J

Rack Stroke

INFOID:0000000000953535

Unit: mm (in)

Item	Standard	
Tire size	215/65R16	215/60R17
Rack neutral position, dimension “L”	77.5 (3.051)	

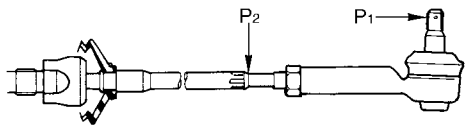


SGIA0629J

Socket Swing Force and Rotating Torque

INFOID:0000000000953536

Item		Spring balance
Outer socket “P1”	Swinging torque	0.3 – 2.9 N·m (0.03 – 0.29 kg-m, 3.0 – 25 in-lb)
	Spring balance measurement	5.0 – 54 N (0.51 – 5.5 kg-f, 1.12 – 12.14 lb-f)
Inner socket “P2”	Swinging torque	0.5 – 8.0 N·m (0.06 – 0.81 kg-m, 5.0 – 70 in-lb)
	Spring balance measurement	4.0 – 60 N (0.41 – 6.12 kg-f, 0.90 – 13.49 lb-f)



SGIA1540E

Socket Axial End Play

INFOID:0000000000953537

cardiagn.co

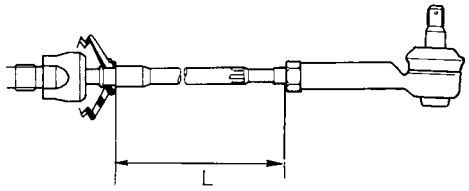
Item	Standard
Outer socket	No free play
Inner socket	No free play

Inner Socket Length

INFOID:0000000000953538

Unit: mm (in)

Item	Standard
Rack neutral position, dimension “L”	100.7 (3.965)



SGIA1512E

cardiagn.com

SECTION TM
TRANSAXLE & TRANSMISSION

CONTENTS

5MT: RS5F92R

FUNCTION DIAGNOSIS 8

M/T SYSTEM 8
System Diagram 8
System Description 8

COMPONENT DIAGNOSIS 10

POSITION SWITCH 10

BACK-UP LAMP SWITCH 10
BACK-UP LAMP SWITCH : Component Parts Location 10
BACK-UP LAMP SWITCH : Component Inspection 10

PARK/NEUTRAL POSITION (PNP) SWITCH 10
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location 10
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection 10

SYMPTOM DIAGNOSIS 12

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 12
NVH Troubleshooting Chart 12

PRECAUTION 13

PRECAUTIONS 13
Service Notice or Precautions for Manual Transaxle 13

PREPARATION 14

PREPARATION 14
Special Service Tools 14
Commercial Service Tools 15

ON-VEHICLE MAINTENANCE 17

GEAR OIL 17
Exploded View 17
Draining 17
Refilling 17
Inspection 17

ON-VEHICLE REPAIR 18

SIDE OIL SEAL 18
Exploded View 18
Removal and Installation 18

CONTROL LINKAGE 19
Exploded View 19
Removal and Installation 19
Inspection 21

AIR BREATHER HOSE 22
Exploded View 22
Removal and Installation 22

REMOVAL AND INSTALLATION 23

TRANSAXLE ASSEMBLY 23
Exploded View 23
Removal and Installation 23

DISASSEMBLY AND ASSEMBLY 25

TRANSAXLE ASSEMBLY 25
Exploded View 25
Disassembly 29
Assembly 34
Adjustment 39

INPUT SHAFT AND GEAR 41
Exploded View 41
Disassembly 41
Assembly 41
Inspection 41

MAINSHAFT AND GEAR 43
Exploded View 43

cardiagn.com

Disassembly 43
Assembly 43
Inspection 44

REVERSE IDLER SHAFT AND GEAR 46
Exploded View 46
Disassembly 46
Assembly 46

FINAL DRIVE 47
Exploded View 47
Disassembly 47
Assembly 47
Inspection 47

SHIFT FORK AND FORK ROD 49
Exploded View 49
Disassembly 49
Assembly 49
Inspection 49

SERVICE DATA AND SPECIFICATIONS (SDS) 50

SERVICE DATA AND SPECIFICATIONS (SDS) 50
General Specification 50

6MT: RS6F94R

FUNCTION DIAGNOSIS 52

M/T SYSTEM 52
System Diagram 52
System Description 52

COMPONENT DIAGNOSIS 54

POSITION SWITCH 54

BACK-UP LAMP SWITCH 54
BACK-UP LAMP SWITCH : Component Parts Location 54
BACK-UP LAMP SWITCH : Component Inspection 54

PARK/NEUTRAL POSITION (PNP) SWITCH 54
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location 54
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection 54

SYMPTOM DIAGNOSIS 56

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 56
NVH Troubleshooting Chart 56

PRECAUTION 57

PRECAUTIONS 57
Service Notice or Precautions for Manual Transaxle 57

PREPARATION 58

PREPARATION 58
Special Service Tools 58
Commercial Service Tools 59

ON-VEHICLE MAINTENANCE 61

GEAR OIL 61
Exploded View 61
Draining 61
Refilling 61
Inspection 61

ON-VEHICLE REPAIR 62

SIDE OIL SEAL 62
Exploded View 62
Removal and Installation 62

CONTROL LINKAGE 63
Exploded View 63
Removal and Installation 63
Inspection 66

AIR BREATHER HOSE 67
Exploded View 67
Removal and Installation 67

REMOVAL AND INSTALLATION 68

TRANSAXLE ASSEMBLY 68
Exploded View 68
Removal and Installation 69

DISASSEMBLY AND ASSEMBLY 71

TRANSAXLE ASSEMBLY 71
Exploded View 71
Disassembly 76
Assembly 82

INPUT SHAFT AND GEAR 88
Exploded View 88
Disassembly 88
Assembly 89
Inspection 90

MAINSHAFT AND GEAR 92
Exploded View 92
Disassembly 92
Assembly 93
Inspection 95

REVERSE IDLER SHAFT AND GEAR 97
Exploded View 97
Disassembly 97
Assembly 98

FINAL DRIVE 99
Exploded View 99
Disassembly 99

cardiagn.com

Assembly 99
Inspection 100

SHIFT FORK AND FORK ROD 102
Exploded View 102
Disassembly 102
Assembly 102
Inspection 102

SERVICE DATA AND SPECIFICATIONS (SDS) 103

SERVICE DATA AND SPECIFICATIONS (SDS) 103
General Specification 103

6MT: RS6F52A

FUNCTION DIAGNOSIS 105

M/T SYSTEM 105
System Diagram 105
System Description 106

COMPONENT DIAGNOSIS 107

BACK-UP LAMP SWITCH 107
Component Parts Location 107
Component Inspection 107

PARK/NEUTRAL POSITION (PNP) SWITCH.. 108
Component Parts Location 108
Component Inspection 108

SYMPTOM DIAGNOSIS 109

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 109
NVH Troubleshooting Chart 109

PRECAUTION 110

PRECAUTIONS 110
Service Notice or Precautions for Manual Transaxle 110

PREPARATION 111

PREPARATION 111
Special Service Tools 111
Commercial Service Tools 113

ON-VEHICLE MAINTENANCE 115

GEAR OIL 115
Exploded View 115
Draining 115
Refilling 115
Inspection 115

ON-VEHICLE REPAIR 117

SIDE OIL SEAL 117
Exploded View 117
Removal and Installation 117

CONTROL LINKAGE 118
Exploded View 118
Removal and Installation 118
Inspection 121

AIR BREATHER HOSE 122
Exploded View 122
Removal and Installation 122

REMOVAL AND INSTALLATION 123

TRANSAXLE ASSEMBLY 123
Exploded View 123
Removal and Installation 123

DISASSEMBLY AND ASSEMBLY 125

TRANSAXLE ASSEMBLY 125
Exploded View 125
Disassembly 129
Assembly 136
Adjustment 147

INPUT SHAFT AND GEAR 155
Exploded View 155
Disassembly 155
Assembly 156
Inspection 160

MAINSHAFT AND GEAR 162
Exploded View 162
Disassembly 162
Assembly 163
Inspection 167

REVERSE IDLER SHAFT AND GEAR 171
Exploded View 171
Disassembly 171
Assembly 171
Inspection 171

FINAL DRIVE 173
Exploded View 173
Disassembly 173
Assembly 174
Inspection 178

SHIFT FORK AND FORK ROD 180
Exploded View 180
Disassembly 180
Assembly 180
Inspection 180

SERVICE DATA AND SPECIFICATIONS (SDS) 183

SERVICE DATA AND SPECIFICATIONS (SDS) 183

cardiagn.com

General Specifications 183
End Play 184
Baulk Ring Clearance 184
Dimension 185
Differential Side Bearing Preload 185
Differential Side Gear Clearance 185

CVT: RE0F10A

BASIC INSPECTION 186

DIAGNOSIS AND REPAIR WORKFLOW 186
Work Flow 186
Diagnostic Work Sheet 187

INSPECTION AND ADJUSTMENT 189

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 189
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Service After Replacing TCM and Transaxle Assembly 189

FUNCTION DIAGNOSIS 191

CVT SYSTEM 191
System Diagram 191
Component Parts Location 191

MECHANICAL SYSTEM 193
Cross-Sectional View 193
System Diagram 193
System Description 194
Component Parts Location 194
Component Description 195

HYDRAULIC CONTROL SYSTEM 197
System Diagram 197
System Description 197
Component Parts Location 198
Component Description 199

CONTROL SYSTEM 201
System Diagram 201
System Description 201
Component Parts Location 202
Component Description 203

LOCK-UP AND SELECT CONTROL SYSTEM . 205
System Diagram 205
System Description 205
Component Parts Location 205
Component Description 206

SHIFT CONTROL SYSTEM 208
System Diagram 208
System Description 208
Component Parts Location 209
Component Description 209

SHIFT LOCK SYSTEM 211
System Description 211
Component Parts Location 212
Component Description 213

ON BOARD DIAGNOSTIC (OBD) SYSTEM ...214
Diagnosis Description 214

DIAGNOSIS SYSTEM (TCM) 216
CONSULT-III Function (TRANSMISSION) 216
Diagnostic Tool Function 221

COMPONENT DIAGNOSIS 222

U1000 CAN COMM CIRCUIT 222
Description 222
DTC Logic 222
Diagnosis Procedure 222

U1010 CONTROL UNIT (CAN) 223
Description 223
DTC Logic 223
Diagnosis Procedure 223

P0703 STOP LAMP SWITCH 224
Description 224
DTC Logic 224
Diagnosis Procedure 224
Component Inspection 224

P0705 PARK/NEUTRAL POSITION SWITCH..226
Description 226
DTC Logic 226
Diagnosis Procedure 227
Component Inspection 227

P0710 CVT FLUID TEMPERATURE SENSOR ..229
Description 229
DTC Logic 229
Diagnosis Procedure 229
Component Inspection 230

P0715 INPUT SPEED SENSOR (PRI SPEED SENSOR) 231
Description 231
DTC Logic 231
Diagnosis Procedure 231

P0720 VEHICLE SPEED SENSOR CVT (SECONDARY SPEED SENSOR) 234
Description 234
DTC Logic 234
Diagnosis Procedure 234

P0725 ENGINE SPEED SIGNAL 237
Description 237
DTC Logic 237
Diagnosis Procedure 237

P0730 BELT DAMAGE 239
Description 239

cardiagn.com

DTC Logic 239
Diagnosis Procedure 239

P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE 240
Description 240
DTC Logic 240
Diagnosis Procedure 240
Component Inspection 241

P0744 A/T TCC S/V FUNCTION (LOCK -UP) .. 242
Description 242
DTC Logic 242
Diagnosis Procedure 242

P0745 LINE PRESSURE SOLENOID VALVE . 244
Description 244
DTC Logic 244
Diagnosis Procedure 244
Component Inspection 245

P0746 PRESSURE CONTROL SOLENOID A PERFORMANCE (LINE PRESSURE SOLENOID VALVE) 246
Description 246
DTC Logic 246
Diagnosis Procedure 246

P0776 PRESSURE CONTROL SOLENOID B PERFORMANCE (SEC PRESSURE SOLENOID VALVE) 248
Description 248
DTC Logic 248
Diagnosis Procedure 248

P0778 PRESSURE CONTROL SOLENOID B ELECTRICAL (SEC PRESSURE SOLENOID VALVE) 250
Description 250
DTC Logic 250
Diagnosis Procedure 250
Component Inspection 251

P0826 MANUAL MODE SWITCH 252
Description 252
DTC Logic 252
Diagnosis Procedure 252
Component Inspection 254

P0840 TRANSMISSION FLUID PRESSURE SENSOR A (SEC PRESSURE SENSOR) 255
Description 255
DTC Logic 255
Diagnosis Procedure 255

P0841 PRESSURE SENSOR FUNCTION 258
Description 258
DTC Logic 258
Diagnosis Procedure 258

P0845 TRANSMISSION FLUID PRESSURE SENSOR B (PRI PRESSURE SENSOR) 260
Description 260
DTC Logic 260
Diagnosis Procedure 260

P0868 SECONDARY PRESSURE DOWN 263
Description 263
DTC Logic 263
Diagnosis Procedure 263

P1701 TRANSMISSION CONTROL MODULE (POWER SUPPLY) 265
Description 265
DTC Logic 265
Diagnosis Procedure 265

P1705 THROTTLE POSITION SENSOR 267
Description 267
DTC Logic 267
Diagnosis Procedure 267

P1722 ESTM VEHICLE SPEED SIGNAL 268
Description 268
DTC Logic 268
Diagnosis Procedure 268

P1723 CVT SPEED SENSOR FUNCTION 270
Description 270
DTC Logic 270
Diagnosis Procedure 270

P1726 ELECTRIC THROTTLE CONTROL SYSTEM 272
Description 272
DTC Logic 272
Diagnosis Procedure 272

P1740 LOCK-UP SELECT SOLENOID VALVE 273
Description 273
DTC Logic 273
Diagnosis Procedure 273
Component Inspection 274

P1745 LINE PRESSURE CONTROL 275
Description 275
DTC Logic 275
Diagnosis Procedure 275

P1777 STEP MOTOR 276
Description 276
DTC Logic 276
Diagnosis Procedure 276
Component Inspection 277

P1778 STEP MOTOR - FUNCTION 278
Description 278
DTC Logic 278
Diagnosis Procedure 278

cardiagn.com

CVT SHIFT LOCK SYSTEM 280
Description 280
Wiring Diagram - CVT SHIFT LOCK SYSTEM - 280
Diagnosis Procedure 282
Component Inspection (Stop lamp switch) 284

ECU DIAGNOSIS 285

TCM 285
Reference Value 285
Wiring Diagram - CVT CONTROL SYSTEM - 289
Fail-safe 292
DTC Inspection Priority Chart 293
DTC Index 293

SYMPTOM DIAGNOSIS 295

SYSTEM SYMPTOM 295
Symptom Table 295

PRECAUTION 307

PRECAUTIONS 307
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 307
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 307
Precaution for Procedure without Cowl Top Cover 307
Precaution for On Board Diagnosis (OBD) System of CVT and Engine 308
Precaution for TCM and CVT Assembly Replacement 308
Removal and Installation Procedure for CVT Unit Connector 308
Precaution 309
Service Notice or Precaution 310
ATFTEMP COUNT Conversion Table 311

PREPARATION 312

PREPARATION 312
Special Service Tool 312
Commercial Service Tool 312

ON-VEHICLE MAINTENANCE 314

CVT FLUID 314
Inspection 314
Changing 315

STALL TEST 316
Inspection and Judgment 316

LINE PRESSURE TEST 318
Inspection and Judgment 318

ROAD TEST 320
Description 320
Check before Engine Is Started 320
Check at Idle 321
Cruise Test 322

CVT POSITION 324
Inspection and Adjustment 324

ON-VEHICLE REPAIR 325

TRANSMISSION CONTROL MODULE 325
Exploded View 325
Removal and Installation 325

CONTROL DEVICE 326
Exploded View 326
Removal and Installation 326
Inspection and Adjustment 329

CONTROL CABLE 330
Exploded View 330
Removal and Installation 330

KEY INTERLOCK CABLE 332
Exploded View 332
Removal and Installation 332

OIL PAN 335
Exploded View 335
Removal and Installation 335
Inspection 336

PARK/NEUTRAL POSITION (PNP) SWITCH 337
Exploded View 337
Removal and Installation 337
Inspection and Adjustment 337

PRIMARY SPEED SENSOR 339
Exploded View 339
Removal and Installation 339

SECONDARY SPEED SENSOR 340
Exploded View 340
Removal and Installation 340

DIFFERENTIAL SIDE OIL SEAL 341

2WD 341
2WD : Exploded View 341
2WD : Removal and Installation 341
2WD : Inspection 342

4WD 342
4WD : Exploded View 342
4WD : Removal and Installation 342
4WD : Inspection 343

OIL PUMP FITTING BOLT 344
Description 344
Exploded View 344
Removal and Installation 344

AIR BREATHER HOSE 345
Exploded View 345
Removal and Installation 345

cardiagn.com

FLUID COOLER SYSTEM 346

WATER HOSE 346
WATER HOSE : Exploded View 346
WATER HOSE : Removal and Installation 346

FLUID COOLER 347
FLUID COOLER : Exploded view 348
FLUID COOLER : Removal and Installation 348

REMOVAL AND INSTALLATION 351

TRANSAXLE ASSEMBLY 351

2WD 351
2WD : Exploded View 351
2WD : Removal and Installation 351
2WD : Inspection 354

4WD 354
4WD : Exploded View 354
4WD : Removal and Installation 355
4WD : Inspection 358

DISASSEMBLY AND ASSEMBLY 359

TORQUE CONVERTER AND CONVERTER HOUSING OIL SEAL 359
Exploded View 359
Disassembly 359
Assembly 359
Inspection 360

SERVICE DATA AND SPECIFICATIONS (SDS) 361

SERVICE DATA AND SPECIFICATIONS (SDS) 361
General Specification 361
Vehicle Speed When Shifting Gears 361
Stall Speed 361
Line Pressure 361
Solenoid Valves 361
CVT Fluid Temperature Sensor 362
Primary Speed Sensor 362
Secondary Speed Sensor 362
Removal and Installation 362

cardiagn.com

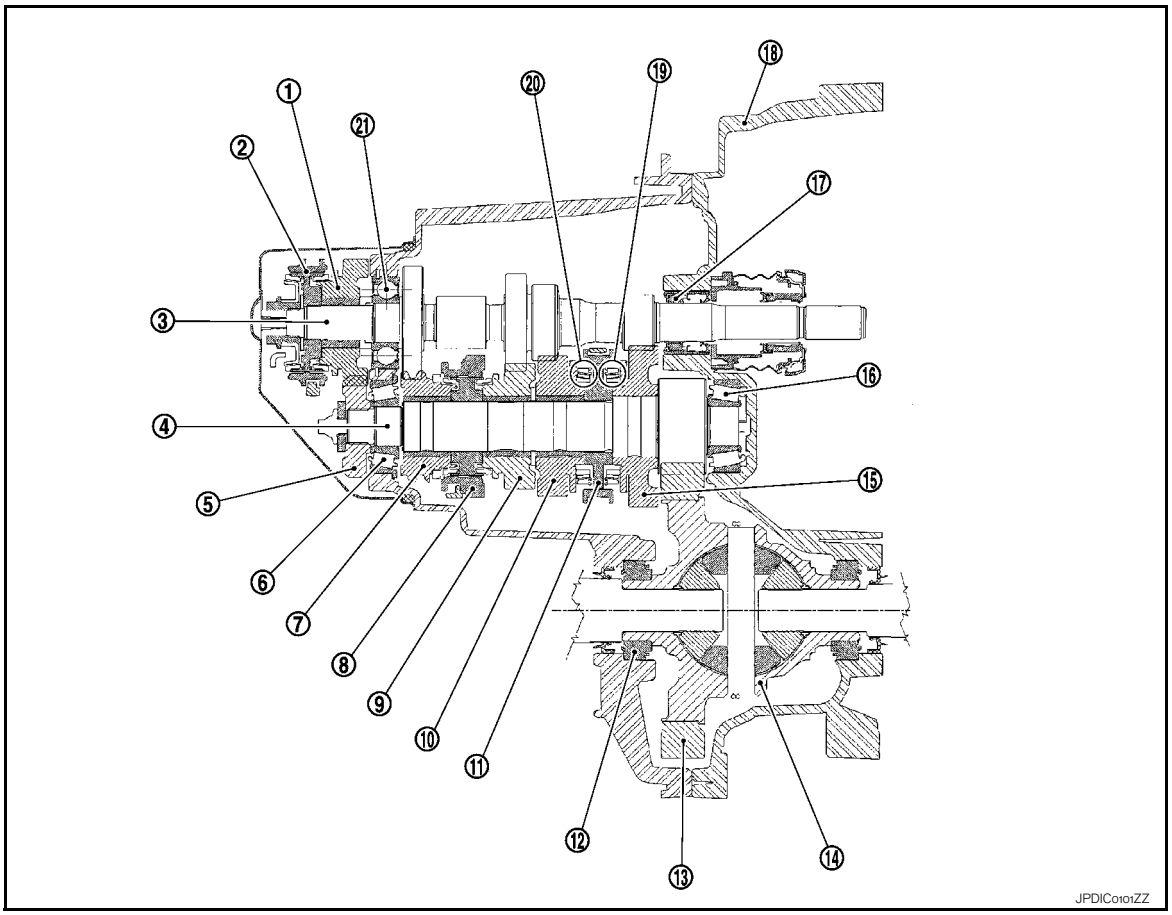
FUNCTION DIAGNOSIS

M/T SYSTEM

System Diagram

INFOID:0000000001070424

CROSS-SECTIONAL VIEW



1. 5th input gear
2. 5th-reverse synchronizer assembly
3. Input shaft
4. Mainshaft
5. 5th main gear
6. Mainshaft rear bearing
7. 4th main gear
8. 3rd-4th synchronizer assembly
9. 3rd main gear
10. 2nd main gear
11. 1st-2nd synchronizer assembly
12. Differential side bearing
13. Final gear
14. Differential assembly
15. 1st main gear
16. Mainshaft front bearing
17. Input shaft front bearing
18. Clutch housing
19. 1st double cone synchronizer
20. 2nd double cone synchronizer
21. Input shaft rear bearing

System Description

INFOID:0000000001098398

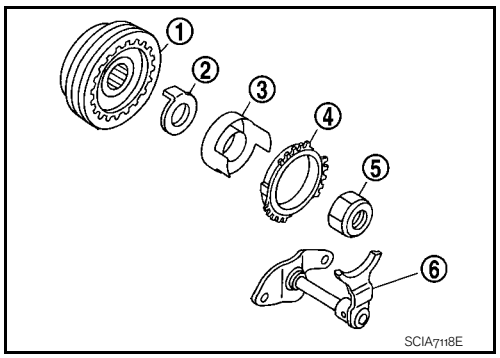
DOUBLE-CONE SYNCHRONIZER

Double-cone synchronizer are adopted for 1st and 2nd gears to reduce operating force of the control lever.

REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

cardiagn.com

5th-reverse synchronizer hub assembly consists of reverse baulk ring, reverse synchronizer cone and reverse gear gate assembly. When the lever is shifted to the reverse position, the construction allows smooth shift operation by stopping the input shaft rotation by frictional force of synchronizer.



1 : 5th-reverse synchronizer hub assembly
2 : Lock washer
3 : Reverse synchronizer cone
4 : Reverse baulk ring
5 : Input shaft nut
6 : Reverse gear gate assembly

cardiagn.com

COMPONENT DIAGNOSIS

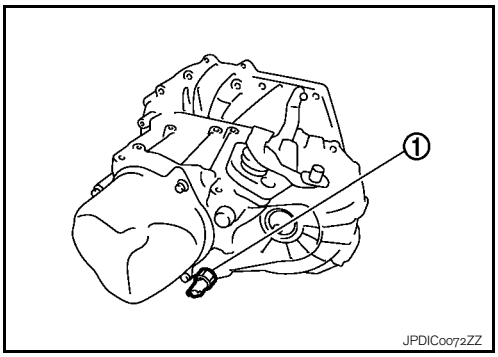
POSITION SWITCH

BACK-UP LAMP SWITCH

BACK-UP LAMP SWITCH : Component Parts Location

INFOID:0000000001070426

1 : Position switch



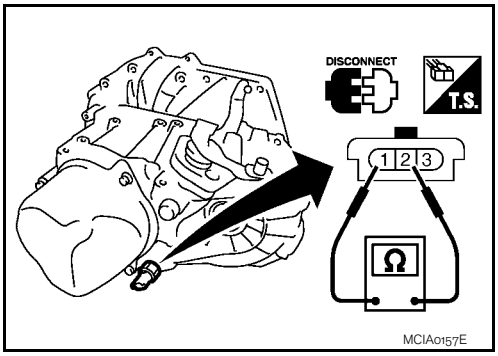
BACK-UP LAMP SWITCH : Component Inspection

INFOID:0000000001070427

1.CHECK BACK-UP LAMP SWITCH

Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
1 – 2	Reverse	Existed
	Except reverse	Not existed



Is the inspection result normal?

YES >> INSPECTION END

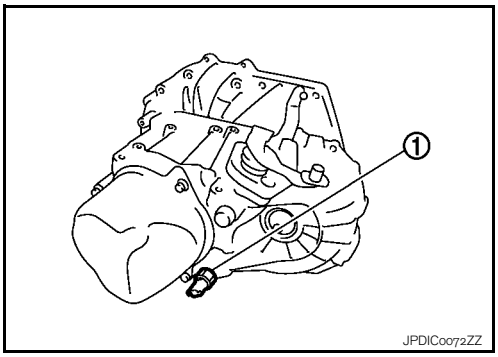
NO >> Replace position switch. Refer to TM-25, "Exploded View".

PARK/NEUTRAL POSITION (PNP) SWITCH

PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location

INFOID:0000000001070428

1 : Position switch



PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection

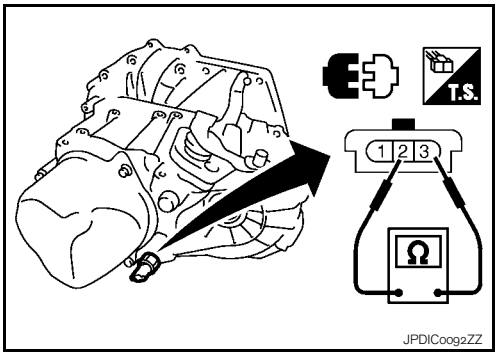
INFOID:0000000001070429

1.CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

cardiagn.com

Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
2 – 3	Neutral	Existed
	Except neutral	Not existed



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace position switch. Refer to TM-25, "Exploded View".

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001070430

Symptoms (after checking the clutch)	Possible causes

Symptoms	Oil level or grade	External control	Synchro-nizer	Gearing	Sliding gear hub	Fork and balls	Bearings	Engine mounting - housing
Gear grinding	1	2	3		4			
One or more gears cannot be selected	1	2	3			4		
Gear disengagement		2	4		4	3		1
One or more gears locked		1		4		2		3
Noisy	1			3			2	

NOTE:
The numbers indicate the order of priority for diagnostics.

cardiagn.com

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Manual Transaxle

INFOID:0000000001070431

CAUTION:

- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never reuse transaxle gear oil, once it has been drained.**
- **Check oil level or replace gear oil with vehicle on level surface.**
- **During removal or installation, keep inside of transaxle clear of dust or dirt.**
- **Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.**
- **Never damage sliding surfaces and mating surfaces.**
- **Removing and handling the parts must be carried out on a workbench with a knockproof cover. (rubber or thick plastic)**
- **Cover all turning and synchronizer points in gear oil.**
- **Observe the tightening torques.**
- **Carefully carry out the specific settings and adjustments.**
- **Be sure to properly refit parts in the same order and position after removal.**

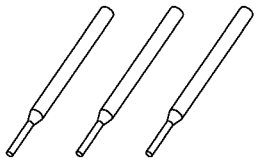
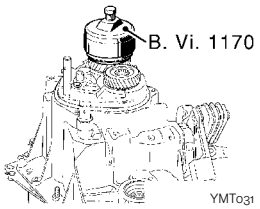
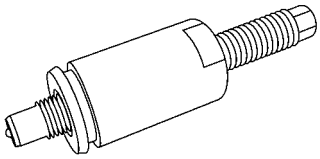
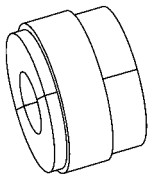
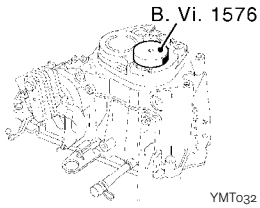
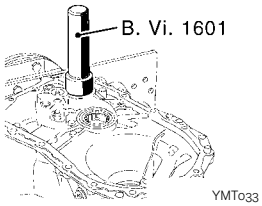
cardiagn.com

PREPARATION

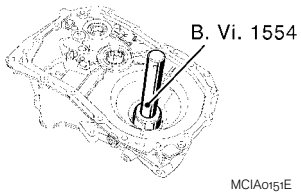
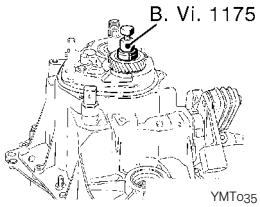
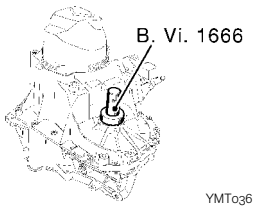
PREPARATION

Special Service Tools

INFOID:0000000001070432

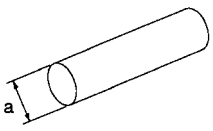
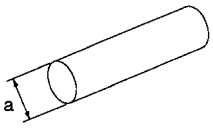
Tool number (Renault SST No.) Tool name	Description
— (B. Vi. 31-01) Pin punch  YMT030	Removing and installing retaining pin
— (B. Vi. 1170) Puller  YMT031	Removing 5th-reverse synchronizer hub
KV32300QAC (B. Vi. 22-01) Puller  SCIA1781J	Removing 5th main gear
KV32300QAD (B. Vi. 1000-01) Puller  SCIA1782J	Removing 5th main gear
— (B. Vi. 1576) Mandrel  YMT032	Removing and installing input shaft rear bearing
— (B. Vi. 1601) Mandrel  YMT033	Installing input shaft front bearing

cardiagn.com

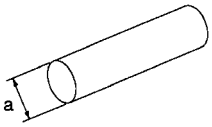
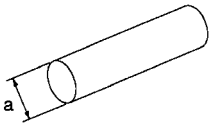
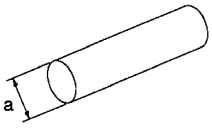
Tool number (Renault SST No.) Tool name	Description
— (B. Vi. 1554) Drift kit  MCIA0151E	Installing differential side bearing outer race
— (B. Vi. 1175) Installer  YMT035	Installing 5th main gear
— (B. Vi. 1666) Drift  YMT036	Installing differential side oil seal
— (B. Vi. 1161) Dial gauge support plate	Measuring preload of mainshaft rear bearing
— (B. Vi. 1527) Special spacer S-NT135	Measuring preload of mainshaft rear bearing

Commercial Service Tools

INFOID:0000000001094778

Tool name	Description
Drift a: 55 mm (2.17 in) dia.  SZNT063	Removing mainshaft rear bearing outer race
Drift a: 38 mm (1.50 in) dia.  SZNT063	Removing input shaft front bearing

cardiagn.com

Tool name	Description
Drift a: 60 mm (2.36 in) dia.  SZNT063	Installing the mainshaft rear bearing outer race
Drift a: 55 mm (2.17 in) dia.  SZNT063	Removing mainshaft front bearing outer race
Drift a: 14.5 mm (0.571 in) dia.  SZNT063	Installing bushing

cardiagn.com

ON-VEHICLE MAINTENANCE

GEAR OIL

Exploded View

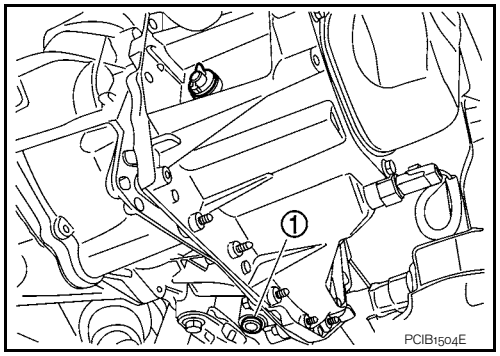
INFOID:0000000001070434

Refer to TM-25, "Exploded View".

Draining

INFOID:0000000001070435

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and then drain gear oil.
3. Set a new gasket on drain plug and install it to clutch housing. Tighten drain plug to the specified torque.
   CAUTION:
   Never reuse gasket.



Refilling

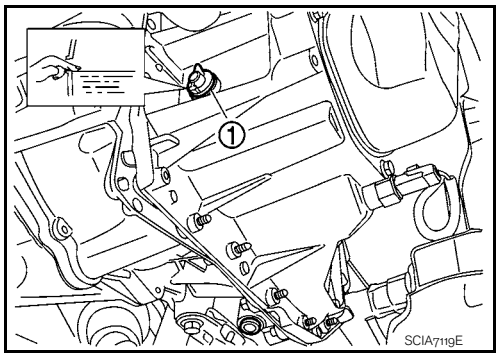
INFOID:0000000001070436

1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified limit at filler plug hole as shown.

   Oil grade and viscosity : **Refer to MA-21, "Fluids and Lubricants".**

   Oil capacity : **Refer to TM-50, "General Specification".**

2. After refilling gear oil, check oil level. Refer to TM-17, "Inspection".
3. Set a new gasket on filler plug and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
4. Tighten filler plug to the specified torque.



Inspection

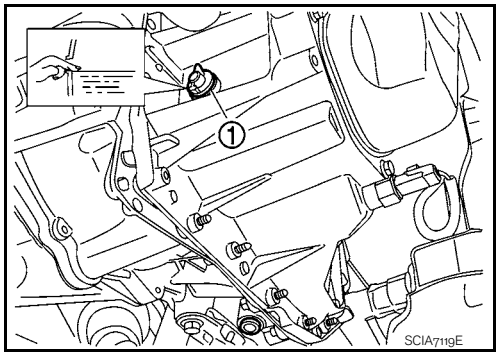
INFOID:0000000001070437

LEAKAGE

Make sure that gear oil is not leaking from transaxle or around it.

LEVEL

1. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Never start engine while checking oil level.
2. Set a new gasket on filler plug and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
3. Tighten filler plug to the specified torque.



cardiagn.com

ON-VEHICLE REPAIR

SIDE OIL SEAL

Exploded View

INFOID:0000000001070438

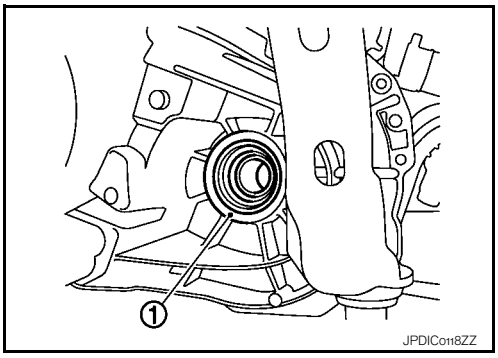
Refer to TM-25, "Exploded View".

Removal and Installation

INFOID:0000000001070439

REMOVAL

1. Remove front drive shafts. Refer to FAX-17, "HR16DE MODELS : Removal and Installation".
2. Remove differential side oil seals (1) using a suitable tool.
   CAUTION:
   Never damage transaxle case and clutch housing.



INSTALLATION

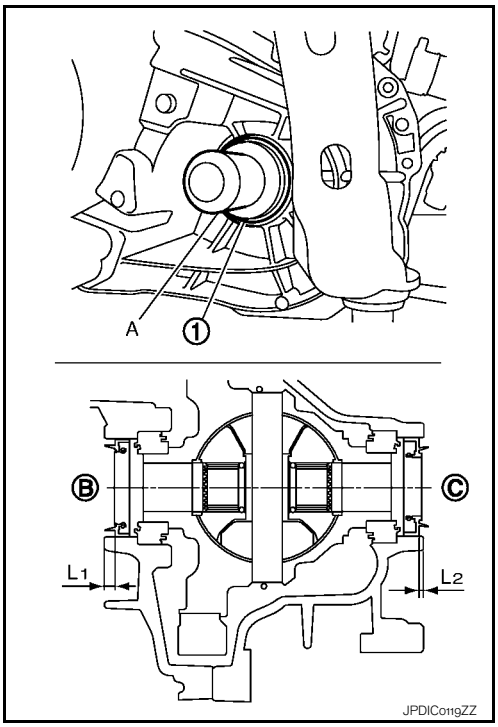
Note the following, and install in the reverse order of removal.

- Install differential side oil seals (1) to clutch housing and transaxle case using the drift (A) [SST: — (B. Vi. 1666)].

  B : Transaxle case side
  C : Clutch housing side

  Dimension "L_1" : 5.7 - 6.3 mm (0.224 - 0.248 in)
  Dimension "L_2" : 2.4 - 3.0 mm (0.094 - 0.118 in)

  CAUTION:
  - **Never reuse differential side oil seal.**
  - **When installing, never incline differential side oil seal.**
  - **Never damage clutch housing and transaxle case.**
- Check oil level and oil leakage after installation. Refer to TM-17, "Inspection".

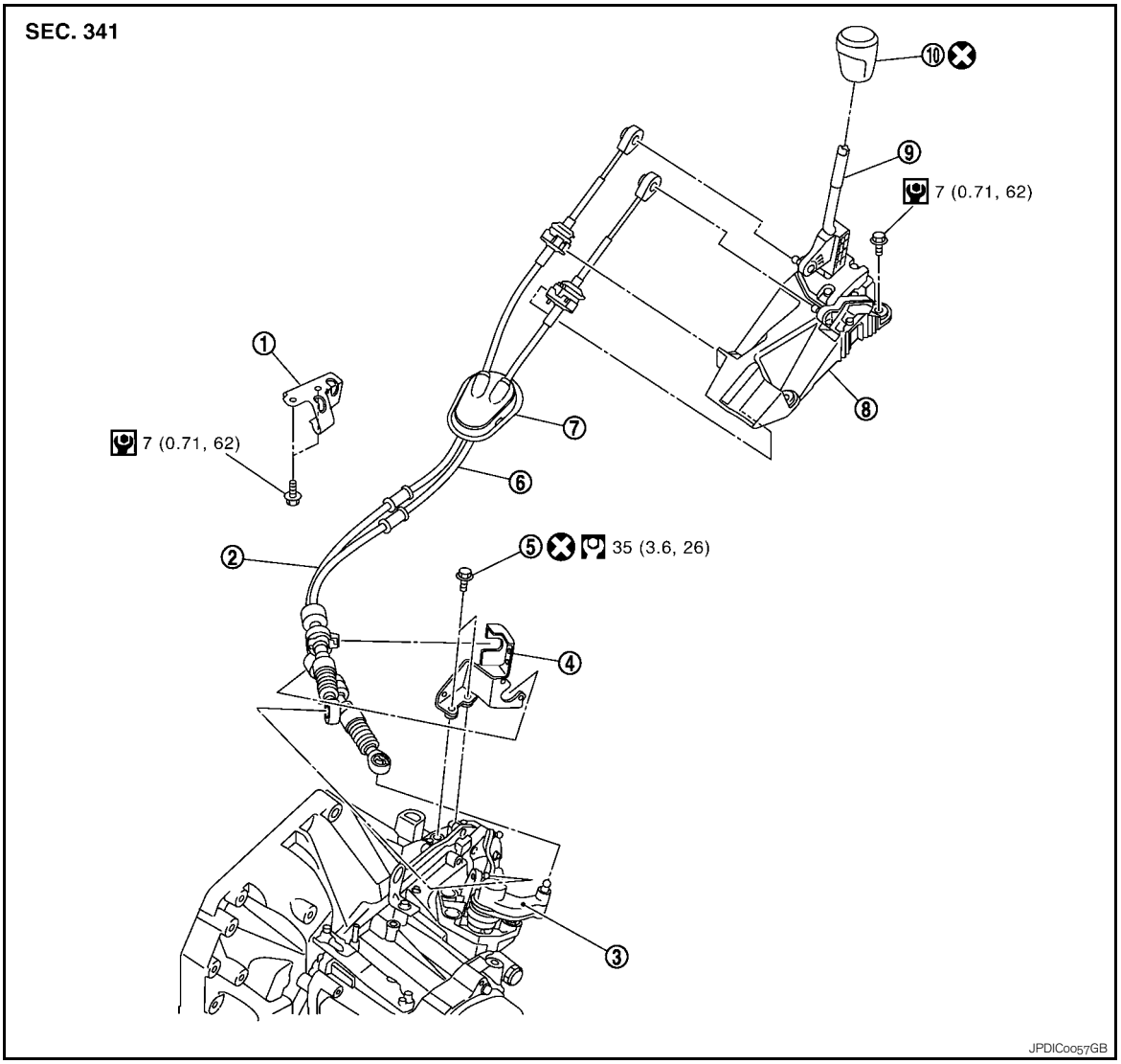


cardiagn.com

CONTROL LINKAGE

Exploded View

INFOID:0000000001070440



1. Bracket
2. Shift cable
3. Control shaft assembly
4. Cable mounting bracket
5. Tapping bolt
6. Select cable
7. Grommet
8. Control device assembly
9. Control lever
10. Control lever knob

Refer to GI-4, "Components" for the symbols in the figure.

Removal and Installation

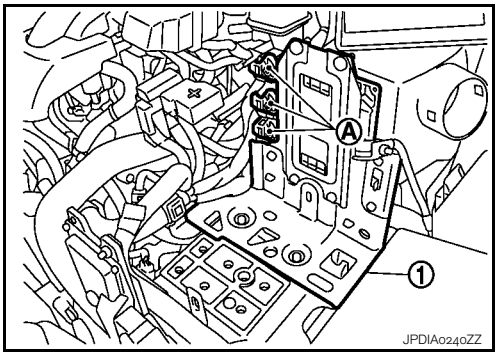
INFOID:0000000001070441

REMOVAL

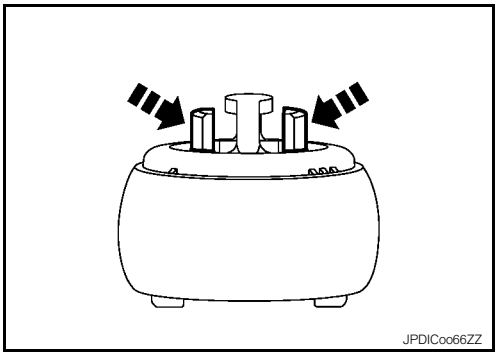
1. Remove the air cleaner case and air duct (inlet). Refer to EM-27, "Removal and Installation".
2. Remove the battery. Refer to PG-118, "Removal and Installation".

cardiagn.com

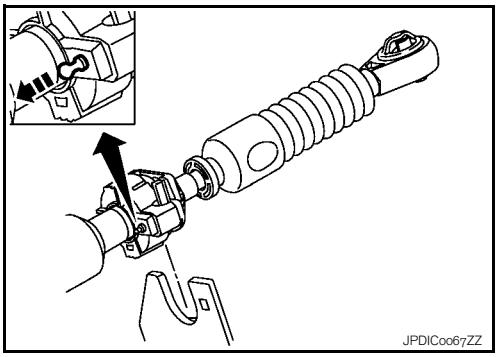
3. Disconnect the connectors (A) and then remove the bracket (1).



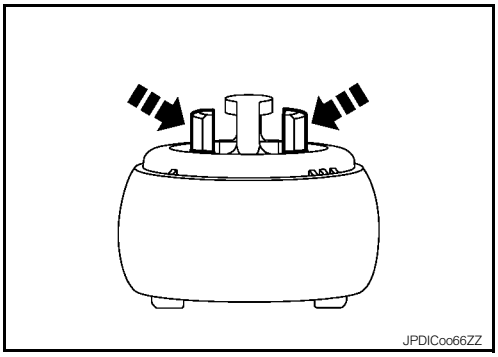
4. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control shaft assembly.
5. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control shaft assembly.



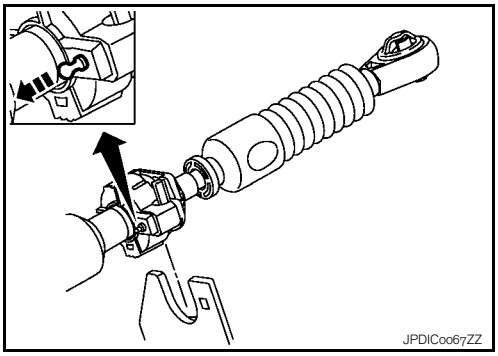
6. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the cable mounting bracket.
7. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the cable mounting bracket.
8. Remove the control lever knob.
9. Remove console finisher assembly and the center console assembly. Refer to IP-18, "Removal and Installation".
10. Shift the control lever to the neutral position.



11. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
12. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.



13. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
14. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.
15. Remove the control device assembly.
16. Remove the heat plate.
17. Remove the bracket.



cardiagn.com

18. Remove the grommet and then remove the shift cable and select cable from the vehicle.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Shift the control lever to the neutral position.
- Securely assemble each cable and the lever of the control shaft assembly.
- Securely assemble each cable and the cable mounting bracket.
- Securely assemble each cable and the control device assembly.
- Make sure that the claws of grommet are in contact with the floor.
- Be careful about the installation direction and push the control lever knob into the control lever.
  CAUTION:
  Never reuse control lever knob.
- Tapping work for tapping bolt is not applied to new clutch housing. Do not perform tapping by other than screwing tapping bolt because tapping is formed by screwing tapping bolt into clutch housing.
  CAUTION:
  Never reuse tapping bolt.

Inspection

INFOID:0000000001070442

After installing, confirm the following items:

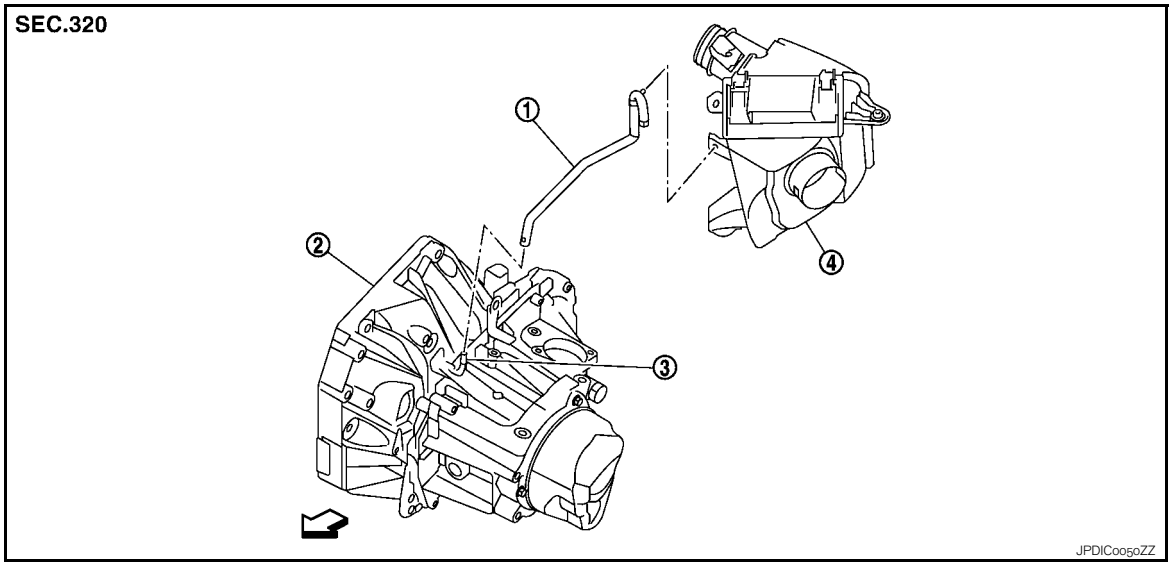
- When the control lever is shifted to 1st-2nd side and 5th-Reverse side, confirm the control lever returns to neutral position smoothly.
- When the control lever is shifted to each position, make sure there is no binding or disconnection in each boot.

cardiagn.com

AIR BREATHER HOSE

Exploded View

INFOID:0000000001070443



1. Air breather hose
2. Transaxle assembly
3. Breather pipe
4. Air cleaner case

⇦: Vehicle front

Removal and Installation

INFOID:0000000001070444

REMOVAL

Refer to the figure for removal procedure.

CAUTION:

When removing air breather hose, be sure to hold breather pipe securely.

INSTALLATION

Refer to the figure for installation procedure.

- When installing air breather hose on breather pipe, aim paint mark face toward the vehicle front.
- When installing air breather hose on breather pipe, push it until it hits transaxle case.
- When installing air breather hose to air cleaner case, make sure that clip are fully inserted.

CAUTION:

Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

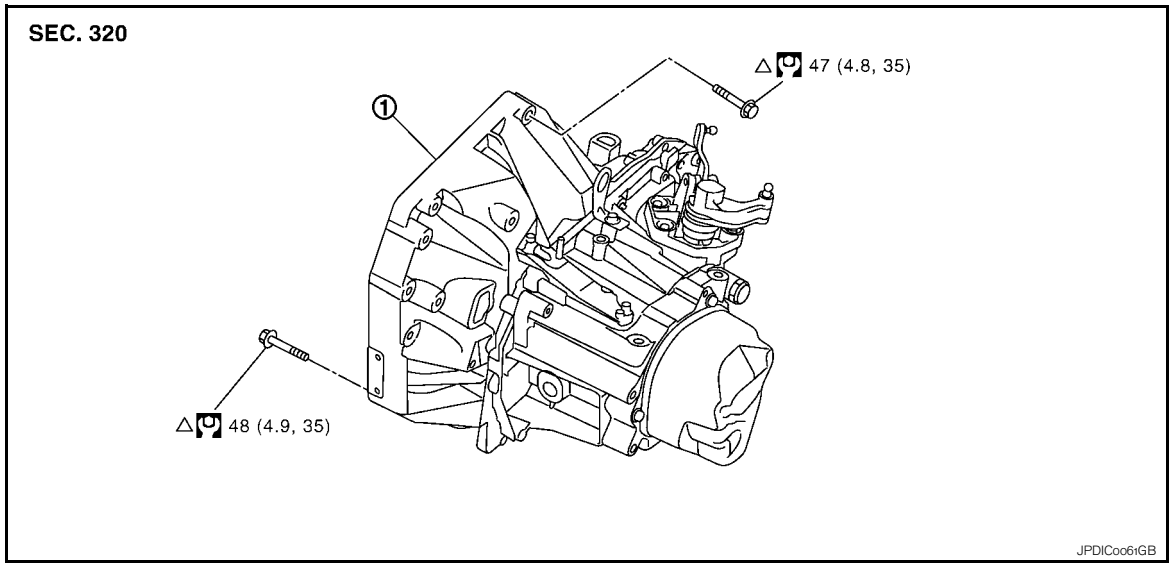
cardiagn.com

REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001070445



1. Transaxle assembly

△: For the bolt mounting positions, refer to “INSTALLATION”.

Refer to GI-4, "Components" for symbols not described on the above.

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

Removal and Installation

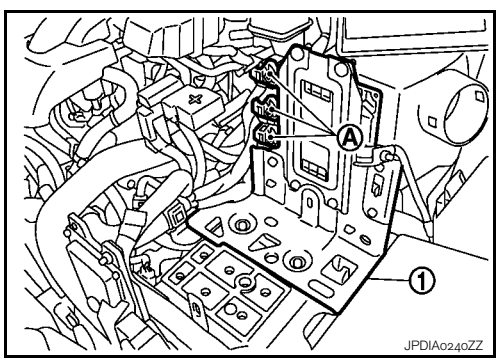
INFOID:0000000001070446

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-22, "Removal and Installation".
3. Remove air cleaner case and air duct (inlet). Refer to EM-27, "Removal and Installation".
4. Remove battery. Refer to PG-118, "Removal and Installation".
5. Disconnect connectors (A) and then remove bracket (1).
6. Drain clutch fluid and then remove clutch tube from CSC (Concentric Slave Cylinder). Refer to CL-14, "Removal and Installation".
   CAUTION:
   Never depress clutch pedal during removal procedure.
7. Disconnect position switch harness connector.
8. Disconnect ground cable.
9. Remove wire harnesses from transaxle assembly.
10. Disconnect select cable and shift cable from transaxle assembly. Refer to TM-19, "Removal and Installation".



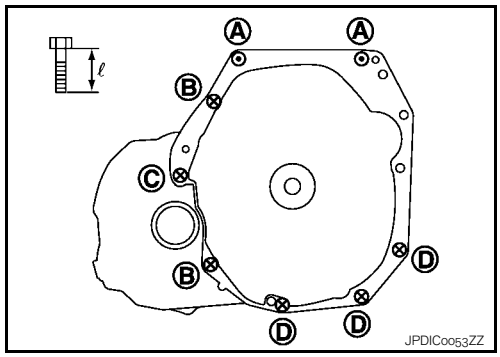
cardiagn.com

11. Remove starter motor. Refer to STR-22, "HR16DE MODELS : Removal and Installation".
12. Remove engine under cover.
13. Drain gear oil. Refer to TM-17, "Draining".
14. Remove exhaust front tube. Refer to EX-5, "Removal and Installation".
15. Remove front drive shafts. Refer to FAX-17, "HR16DE MODELS : Removal and Installation".
    NOTE:
    Insert a suitable plug into differential side oil seal after removing front drive shaft.
16. Remove rear engine mounting brackets and rear torque rod. Refer to EM-83, "Removal and Installation".
17. Remove suspension member and suspension member stay. Refer to FSU-17, "Removal and Installation".
18. Set a suitable jack to transaxle assembly and then set a suitable jack to engine assembly.
    CAUTION:
    When setting a suitable jack, be careful so that it does not contact with the switch.
19. Remove transaxle assembly mounting bolts.
20. Remove engine mounting through bolt-securing nut. Refer to EM-83, "Removal and Installation".
21. Remove transaxle assembly from the vehicle.
    CAUTION:
    - **Secure transaxle assembly to a suitable jack while removing it.**
    - **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
22. Remove CSC (Concentric Slave Cylinder). Refer to CL-15, "Removal and Installation".
    CAUTION:
    If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Tighten transaxle assembly mounting bolts to the specified torque. The figure is the view from the engine.



: Transaxle to engine

: Engine to transaxle

Bolt symbol	A	B	C	D
Quantity	2	2	1	3
" ℓ " mm (in)	55 (2.17)	49 (1.93)	69 (2.72)	80 (3.15)

CAUTION:
- **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
- **When installing transaxle assembly, never bring input shaft into contact with clutch cover.**

- Refer to CL-15, "Removal and Installation" for CSC (Concentric Slave Cylinder) installation procedure.
- Refer to TM-19, "Removal and Installation" for select cable and shift cable installation procedure.
- Bleed the air from the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".
- After installation, check for oil leakage and oil level. Refer to TM-17, "Inspection".

cardiagn.com

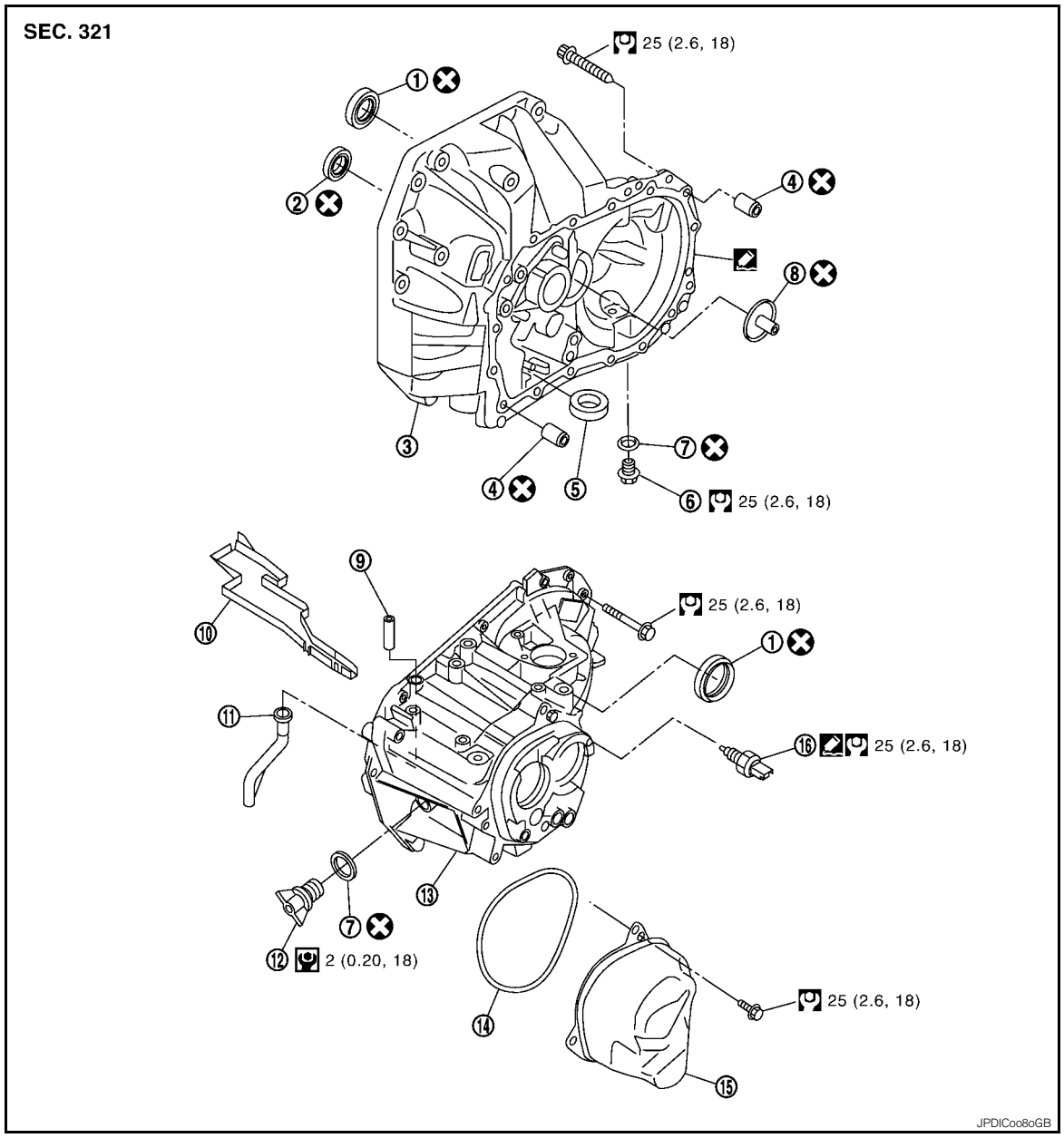
DISASSEMBLY AND ASSEMBLY

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001042531

CASE AND HOUSING



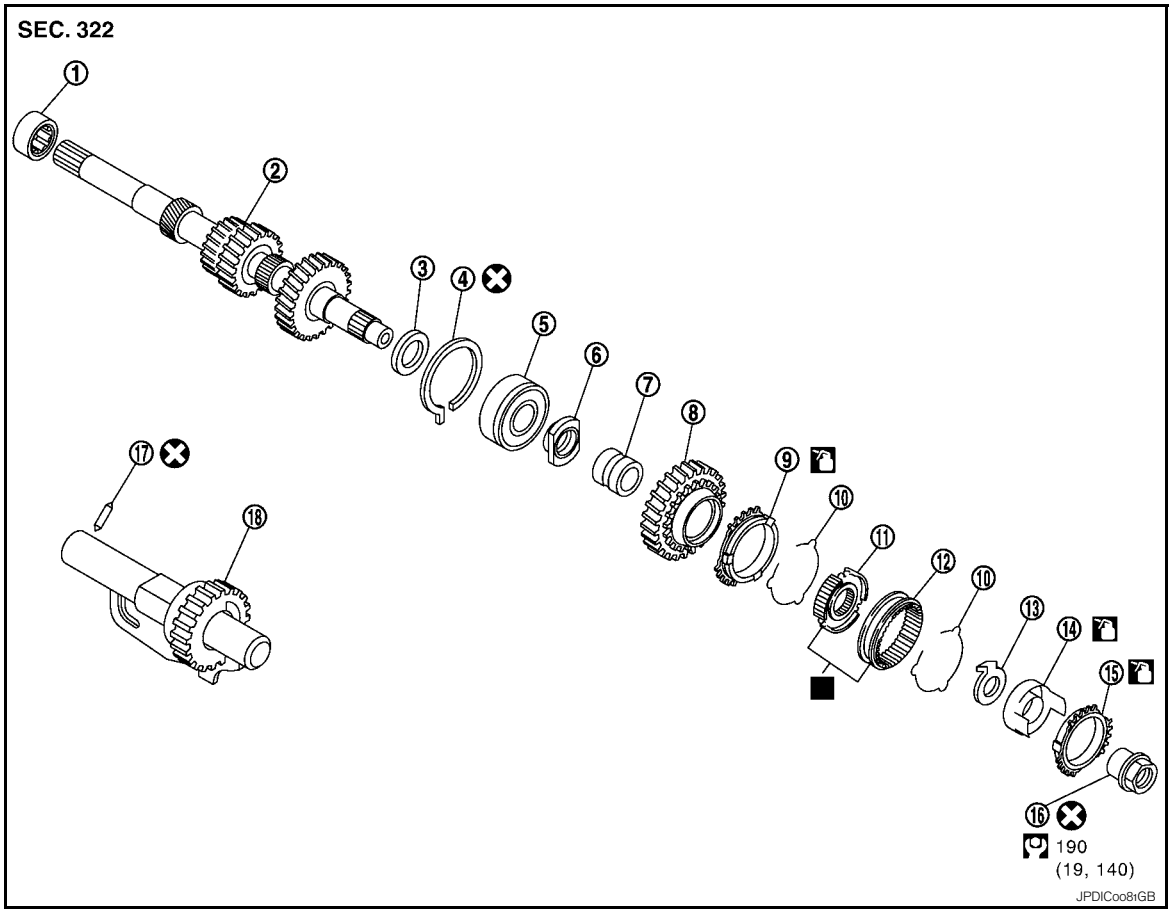
1. Differential side oil seal
2. Input shaft oil seal
3. Clutch housing
4. Dowel pin
5. Magnet
6. Drain plug
7. Gasket
8. Oil channel
9. 2 way connector
10. Oil gutter
11. Air breather inner tube
12. Filler plug
13. Transaxle case
14. O-ring
15. Rear housing
16. Position switch

: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

cardiagn.com

SHAFT AND GEAR



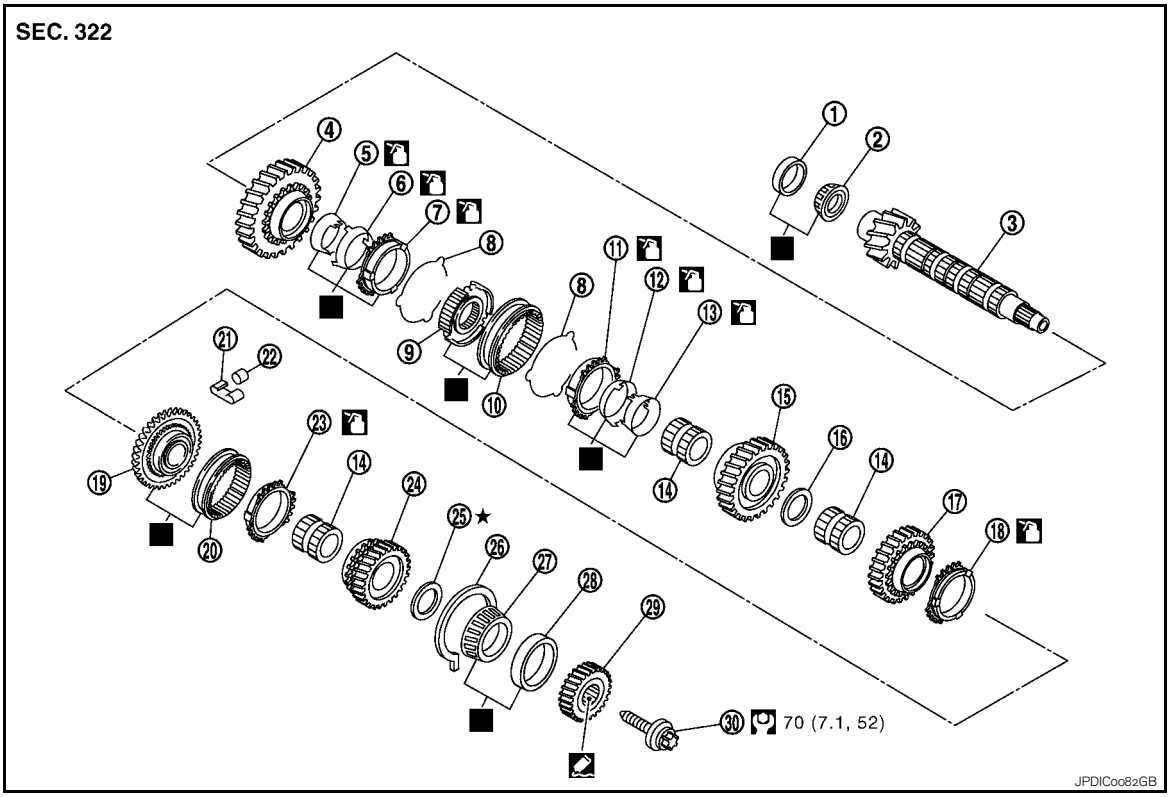
1. Input shaft front bearing
2. Input shaft
3. Washer
4. Snap ring
5. Input shaft rear bearing
6. Adapter plate
7. Bushing
8. 5th input gear
9. 5th baulk ring
10. Spread spring
11. 5th-reverse synchronizer hub
12. 5th-reverse coupling sleeve
13. Lock washer
14. Reverse synchronizer cone
15. Reverse baulk ring
16. Input shaft nut
17. Retaining pin
18. Reverse gear assembly

: Apply gear oil.

: Replace the parts as a set.

Refer to GI-4, "Components" for symbols not described on the above.

cardiagn.com



1. Mainshaft front bearing outer race	2. Mainshaft front bearing inner race	3. Mainshaft
4. 1st main gear	5. 1st inner baulk ring	6. 1st synchronizer cone
7. 1st outer baulk ring	8. Spread spring	9. 1st-2nd synchronizer hub
10. 1st-2nd coupling sleeve	11. 2nd outer baulk ring	12. 2nd synchronizer cone
13. 2nd inner baulk ring	14. Needle bearing	15. 2nd main gear
16. Thrust washer	17. 3rd main gear	18. 3rd baulk ring
19. 3rd-4th synchronizer hub	20. 3rd-4th coupling sleeve	21. Spring
22. Insert key	23. 4th baulk ring	24. 4th main gear
25. Bearing preloading shim	26. Snap ring	27. Mainshaft rear bearing inner race
28. Mainshaft rear bearing outer race	29. 5th main gear	30. Mainshaft bolt

: Apply gear oil.

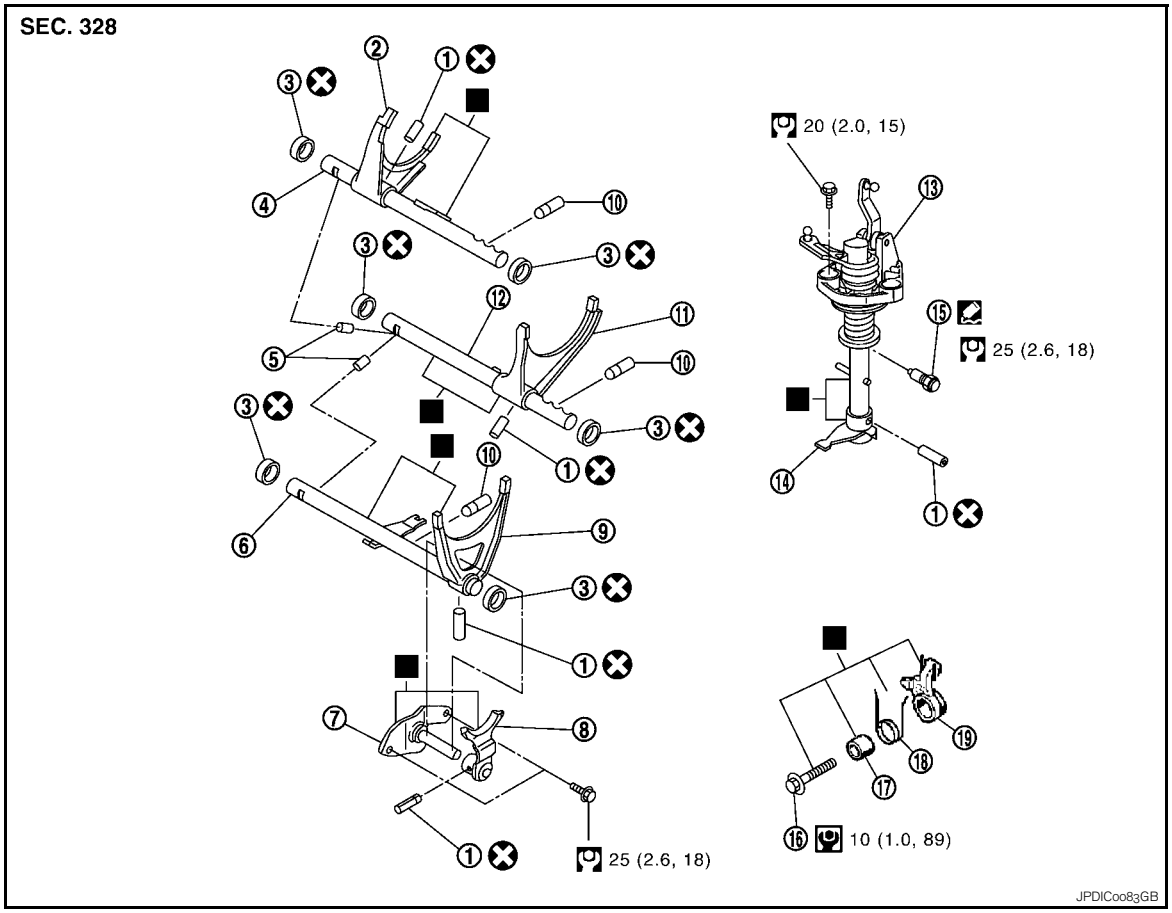
: Replace the parts as a set.

: Apply LOCTITE Frenbloc or an equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

SHIFT FORK AND FORK ROD

cardiagn.com



1. Retaining pin
2. 1st-2nd shift fork
3. Bushing
4. 1st-2nd fork rod
5. Lock pin
6. 5th-reverse fork rod
7. Bracket
8. Reverse gear gate
9. 5th-reverse shift fork
10. Check ball
11. 3rd-4th shift fork
12. 3rd-4th fork rod
13. Control shaft
14. Selector
15. Check ball plug
16. Interlock bolt
17. Bushing
18. Spring
19. Striking interlock

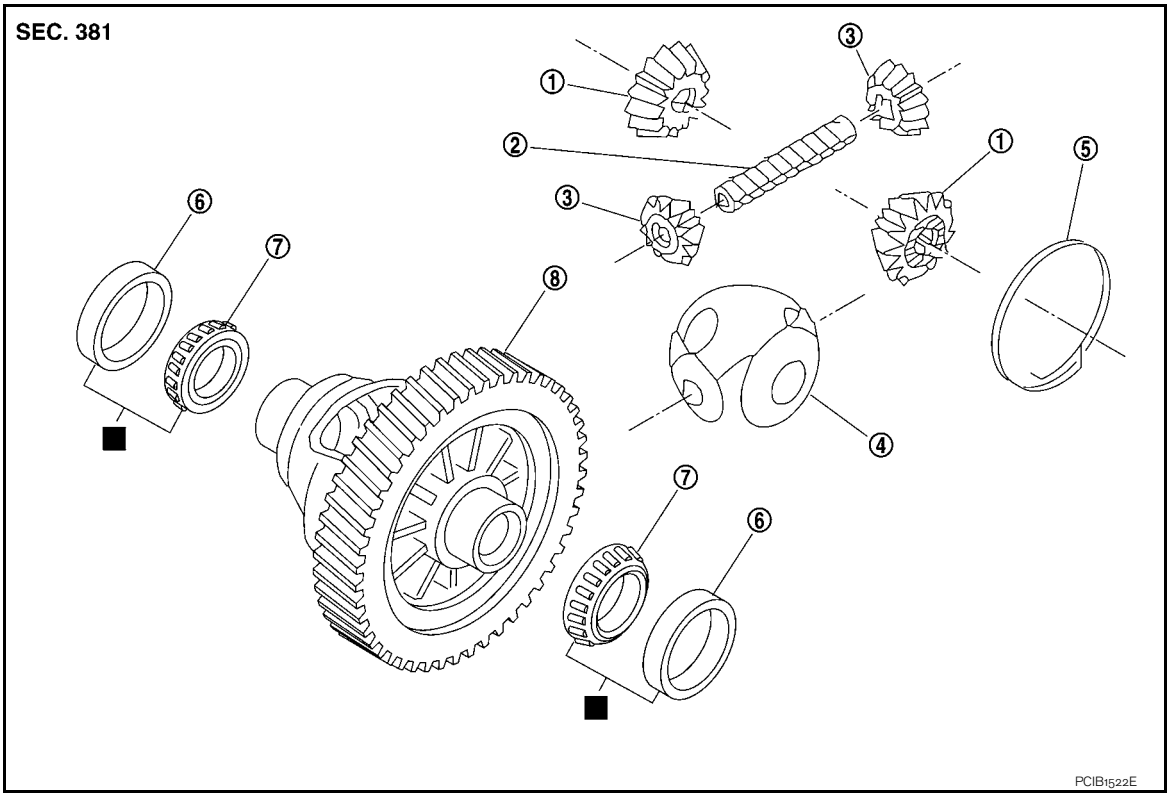
: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

: Replace the parts as a set.

Refer to GI-4, "Components" for symbols not described on the above.

FINAL DRIVE

cardiagn.com



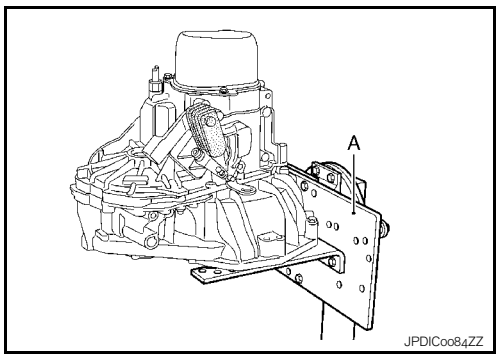
1. Side gear
2. Pinion mate shaft
3. Pinion mate gear
4. Thrust washer
5. Lock ring
6. Differential side bearing outer race
7. Differential side bearing inner race
8. Differential case

■: Replace the parts as a set.

Disassembly

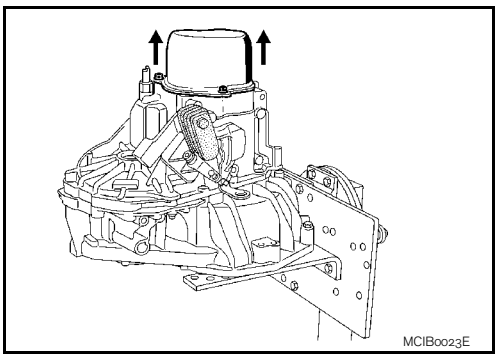
INFOID:0000000001070447

1. Remove drain plug and gasket from clutch housing and then drain oil.
2. Remove filler plug and gasket from transaxle case.
3. Install transaxle assembly on a suitable stand (A).
4. Remove mounting bolts from located inside the clutch housing.

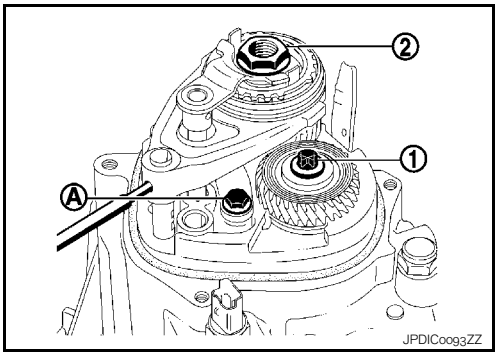


cardiagn.com

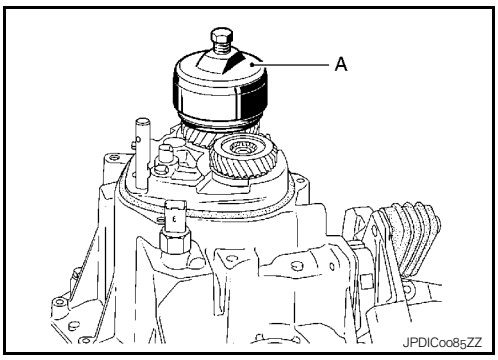
5. Remove rear housing and O-ring from transaxle case. This must be removed along the horizontal axis of the transaxle assembly because it has a lubrication spline which is located in the input shaft bore.



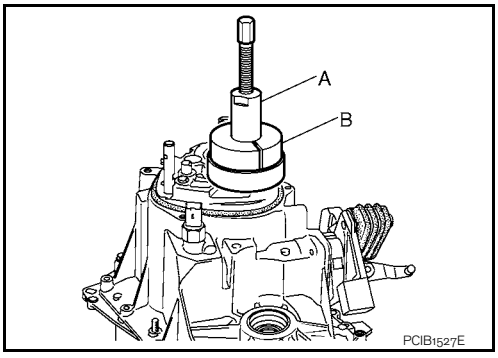
6. Remove reverse gear gate assembly mounting bolts (A).
7. Remove retaining pin from 5th-reverse shift fork using the pin punch [SST: — (B. Vi. 31-01)].
8. Shift the 3rd gear on the shift lever of control shaft assembly and the 5th gear by the 5th-reverse shift fork on its the 5th-reverse fork rod.
9. Remove the mainshaft bolt (1).
10. Remove the input shaft nut (2).
11. Remove the reverse synchronizer cone and reverse baulk ring.
12. Remove 5th-reverse shift fork, reverse gear gate assembly and 5th-reverse coupling sleeve from 5th-reverse synchronizer hub.



13. Remove the 5th-reverse synchronizer hub from input shaft using the puller (A) [SST: — (B. Vi. 1170)]. To do this, fit the puller and rotate it so that the splines are opposite those of the input shaft hub.

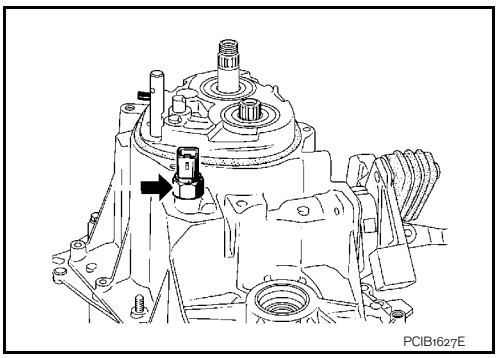


14. Remove 5th main gear using the puller (A) [SST: KV32300QAC (B. Vi. 22-01)] and (B) [SST: KV32300QAD (B. Vi. 1000-01)].

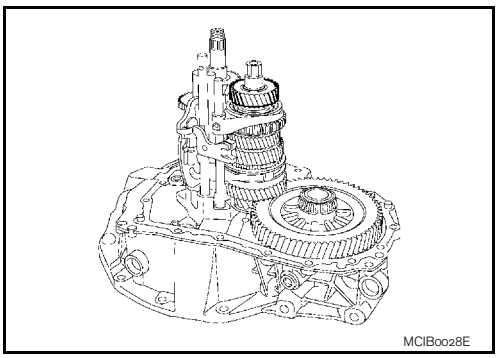


cardiagn.com

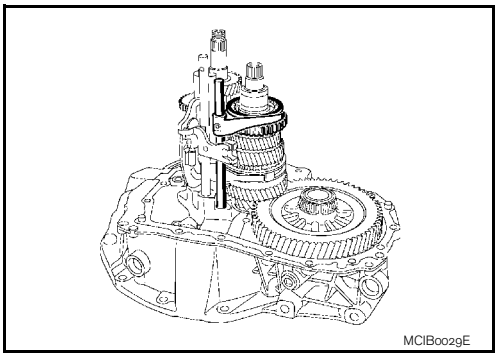
15. Remove position switch from transaxle case.
16. Engage 3rd gear.
17. Remove the transaxle case mounting bolts.
18. Remove the transaxle case from clutch housing.
19. Remove oil gutter from transaxle case.
20. Remove mainshaft rear bearing inner race from mainshaft using a suitable puller.


PCIB1627E

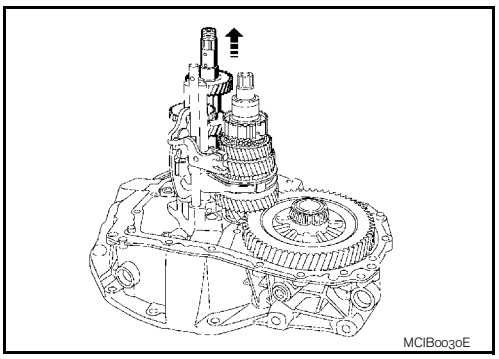
21. Remove bearing preloading shim, 4th main gear, needle bearing, and 4th baulk ring from mainshaft.


MCIB0028E

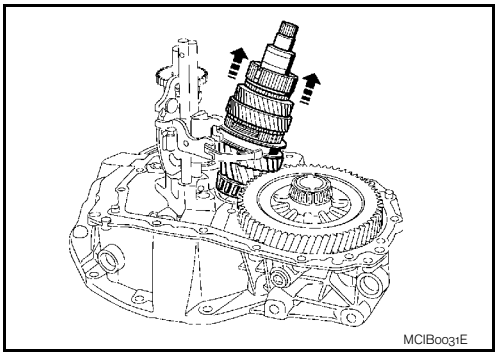
22. Remove 3rd-4th fork rod assembly and 3rd-4th coupling sleeve while gently lifting the mainshaft assembly.


MCIB0029E

23. Remove input shaft assembly.

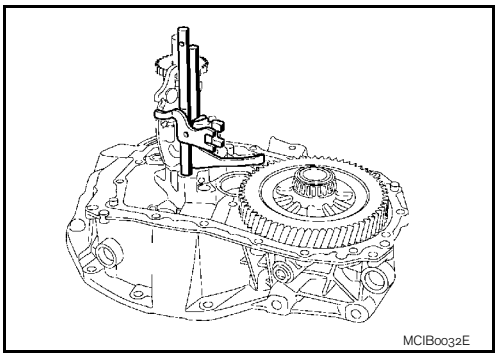

MCIB0030E

24. Remove mainshaft assembly.

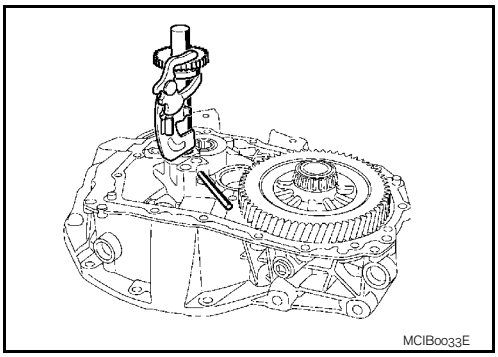

MCIB0031E

cardiagn.com

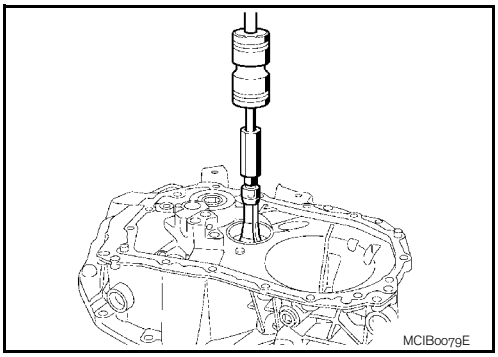
25. Remove 1st-2nd fork rod assembly and the 5th-reverse fork rod assembly.


MCIB0032E

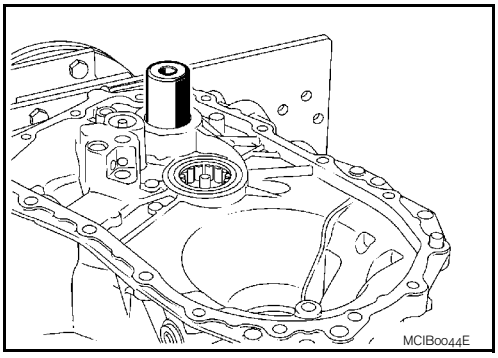
26. Remove retaining pin from reverse gear assembly using a pin punch.
27. Remove reverse gear assembly from clutch housing.
28. Remove final drive assembly from clutch housing.
29. Remove magnet and dowel pins from clutch housing.


MCIB0033E

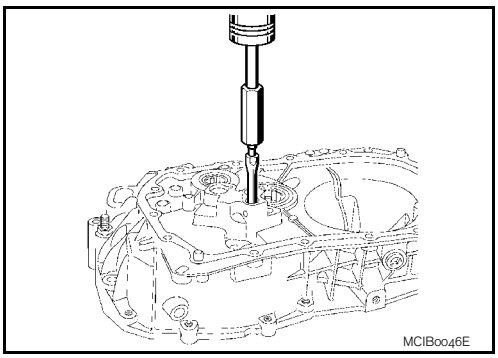
30. Cut the base of the oil channel plastic hollow needle located at the centre of the mainshaft front bearing.
31. Drive out mainshaft front bearing outer race using a suitable puller.


MCIB0079E

32. Remove input shaft front bearing using the press and the drift [Commercial service tool].

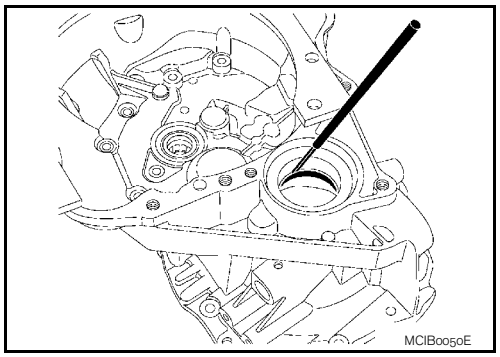

MCIB0044E

33. Remove bushings from clutch housing using a suitable puller.

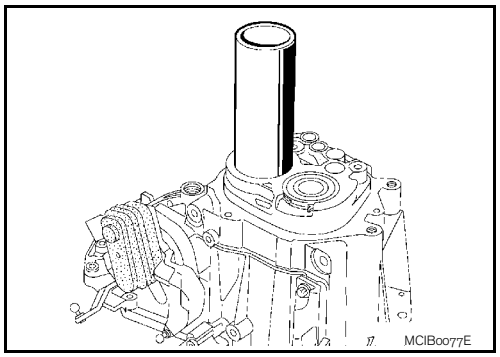

MCIB0046E

cardiagn.com

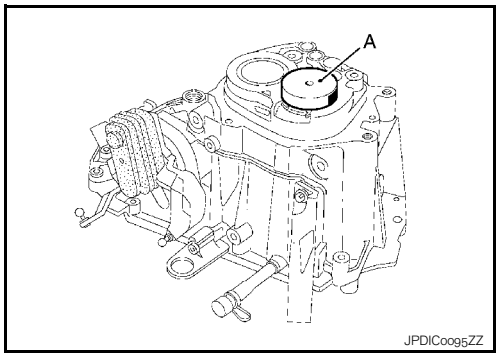
34. Remove differential side bearing outer races from clutch housing and transaxle case using a roll pin punch.
CAUTION:
Never damage clutch housing and transaxle case.



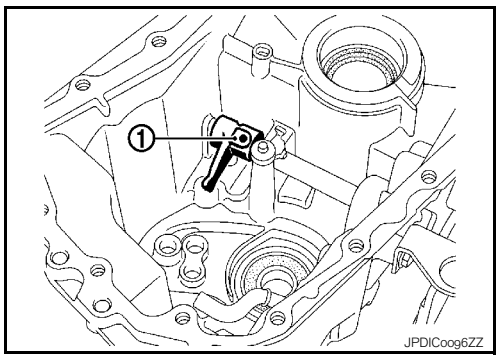
35. Remove snap ring and mainshaft rear bearing outer race using the drift [Commercial service tool].



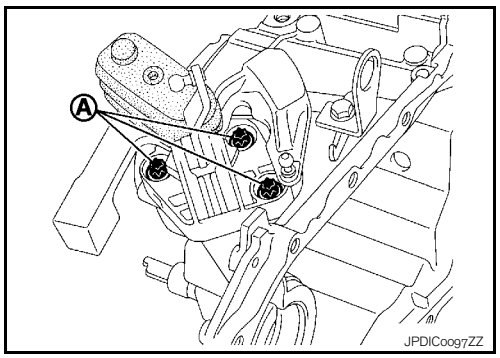
36. Remove snap ring and drive the input shaft rear bearing inside the transaxle case using the mandrel (A) [SST: — (B. Vi. 1576)].



37. Remove retaining pin from selector (1) using a pin punch.
38. Remove interlock bolt, bushing, spring, and striking interlock from transaxle case.



39. Remove mounting bolts (A) and then remove the control shaft assembly from transaxle case.
40. Pull out 2 way connector straight from air breather inner tube.
41. Remove air breather inner tube from transaxle case.



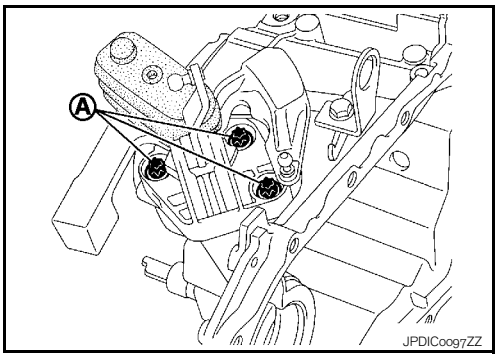
cardiagn.com

Assembly

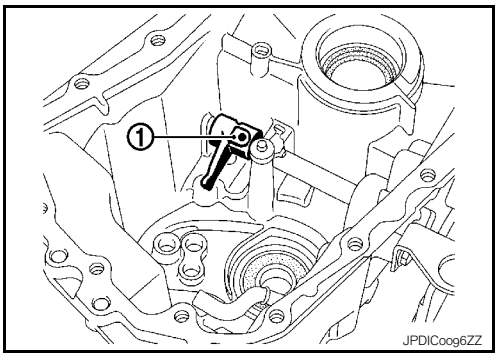
INFOID:0000000001070448

CAUTION:
When replacing the parts below, adjust mainshaft rear bearing preload. Refer to TM-39, "Adjustment".
- **Mainshaft front bearing outer race**
- **Mainshaft front bearing inner race**
- **Mainshaft rear bearing inner race**
- **Mainshaft rear bearing outer race**
- **Clutch housing**
- **Transaxle case**
- **Mainshaft**

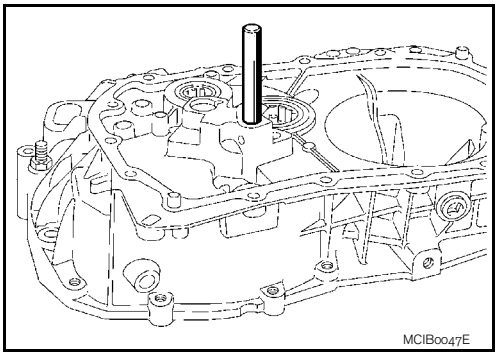
1. Install air breather inner tube to transaxle case.
   CAUTION:
   Never damage air breather inner tube.
   NOTE:
   It is easy to install the air breather inner tube when its end is closed with tape. Remove the tape after the installation.
2. Insert 2 way connector straight to air breather inner tube.
   CAUTION:
   Check air breather inner tube for twists after installing.
3. Install control shaft to transaxle case and then install selector to control shaft. Tighten mounting bolts (A) to the specified torque.



4. Install selector (1) onto control shaft, and then install retaining pin to selector.
5. Install striking interlock, spring, bushing, and interlock bolt to transaxle case, and then tighten interlock bolt to the specified torque.
6. Install bushings to transaxle case using a suitable drift.

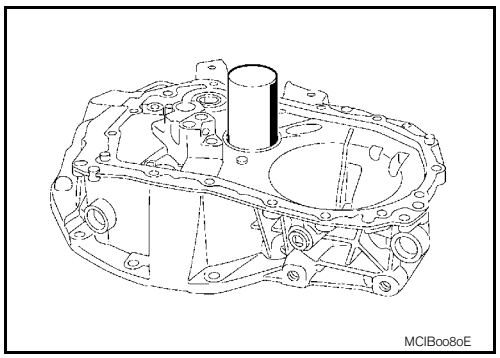


7. Install bushings using the drift [Commercial service tool] down to the thrust bearing.
   CAUTION:
   Never reuse bushing.

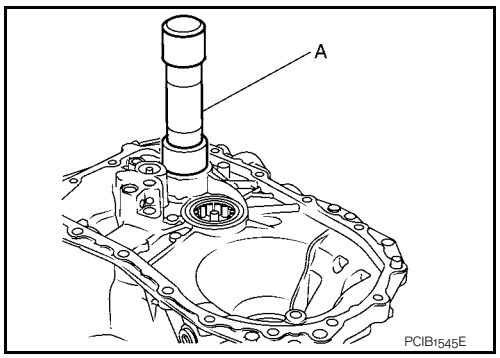


cardiagn.com

8. Install the oil channel and then the mainshaft front bearing outer race using the drift [Commercial service tool].
CAUTION:
- **Never reuse oil channel.**
- **Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.**

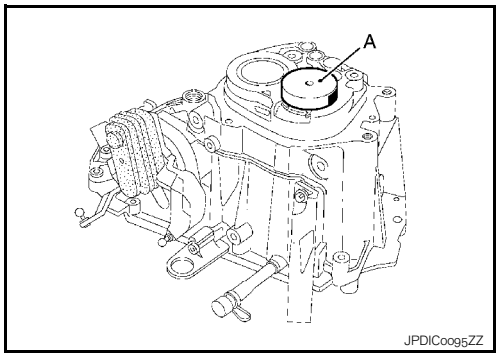

MCIB0080E

9. Install the input shaft front bearing using the press and the mandrel (A) [SST: — (B. Vi. 1601)].
10. Install input shaft oil seal to clutch housing using a suitable drift.



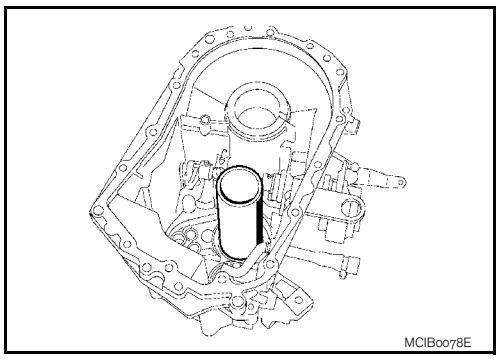
PCIB1545E

11. Install the snap rings.
CAUTION:
Never reuse snap ring.
12. Install the input shaft rear bearing using the mandrel (A) [SST: — (B. Vi. 1576)].

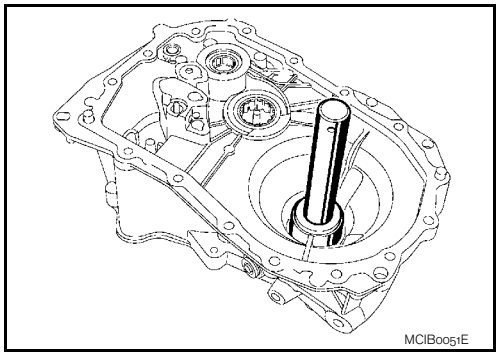


JPDIC0095ZZ

13. Install the mainshaft rear bearing outer race using the drift [Commercial service tool].
CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.


MCIB0078E

14. Install the differential side bearing outer races using the drift kit [SST: — (B. Vi. 1554)].
CAUTION:
Replace differential side bearing outer race and differential side bearing inner race as a set.


MCIB0051E

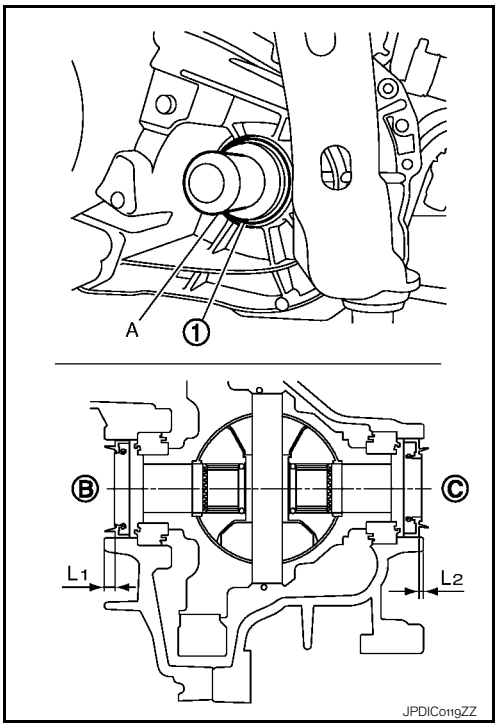
cardiagn.com

15. Install differential side oil seals (1) using the drift (A) [SST: — (B. Vi. 1666)].

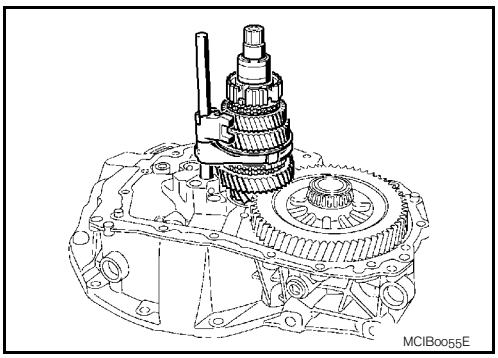
    B : Transaxle case side
    C : Clutch housing side

    Dimension "L_1" : 5.7 - 6.3 mm (0.224 - 0.248 in)
    Dimension "L_2" : 2.4 - 3.0 mm (0.094 - 0.118 in)

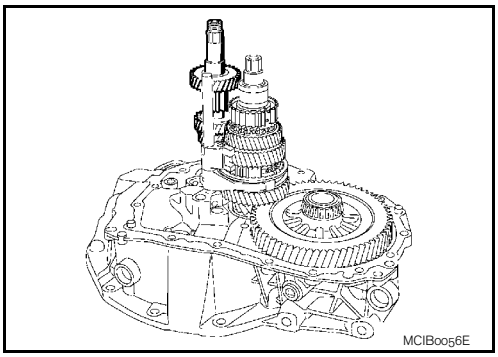
16. Install final drive assembly to clutch housing.
17. Install dowel pins and magnet to clutch housing.



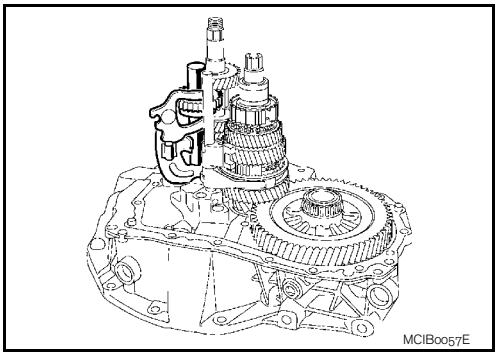
18. Install the mainshaft assembly and 1st-2nd fork rod assembly.



19. Install the input shaft assembly and washer.

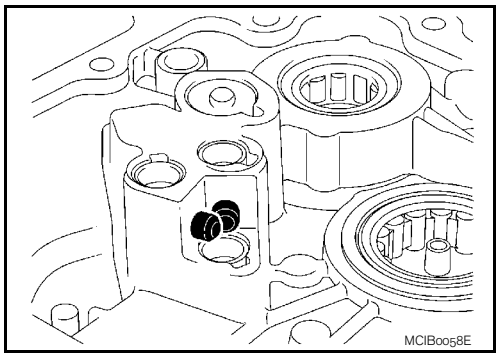


20. Install reverse gear assembly.

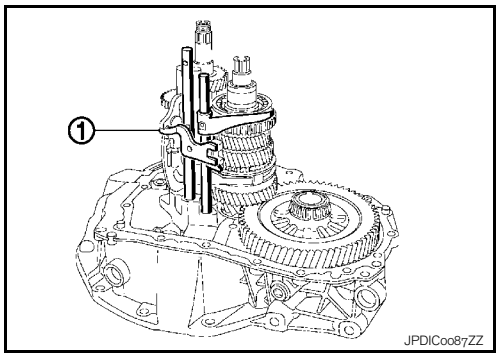


cardiagn.com

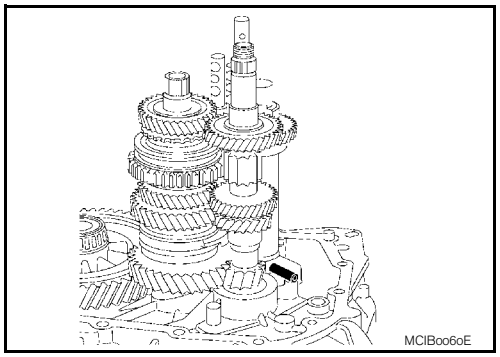
21. Install the lock pins.



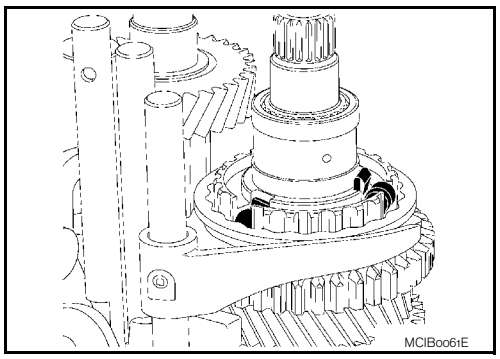
22. Install the 5th-reverse fork rod and the 3rd-4th fork rod assembly and the 3rd-4th coupling sleeve while gently lifting the input shaft assembly. Rotate the reverse gear assembly to position the 5th-reverse fork rod (1).
CAUTION:
Replace 3rd-4th coupling sleeve and 3rd-4th synchronizer hub as a set.



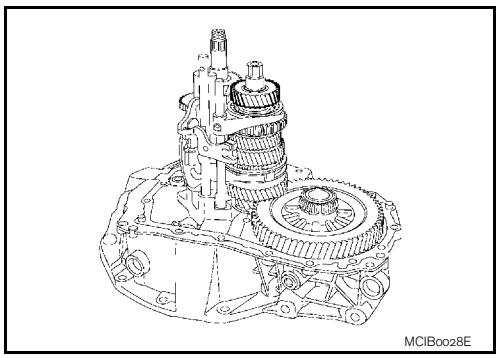
23. Install the retaining pin to the reverse gear assembly.
CAUTION:
Never reuse retaining pin.



24. Shift to 3rd gear and insert the springs and Insert keys.
25. Install needle bearing to mainshaft.

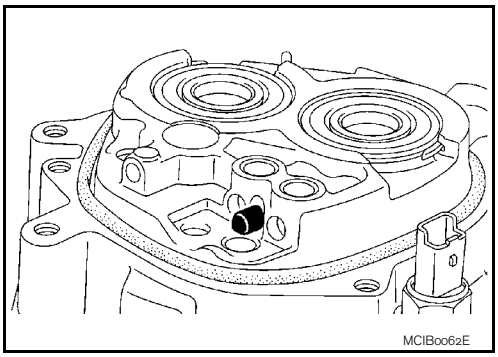


26. Apply gear oil to 4th baulk ring.
27. Install the 4th main gear fitted its 4th baulk ring.
28. Install selected bearing preloading shim to mainshaft.
    - For selection of bearing preloading shim, refer to TM-39, "Adjustment".
29. Install mainshaft rear bearing inner race to mainshaft using a suitable drift.
CAUTION:
Replace mainshaft rear bearing inner race and mainshaft rear bearing outer race as a set.



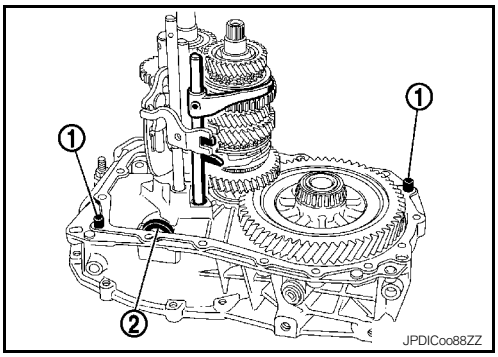
cardiagn.com

30. Install the check balls into the transaxle case.
31. Install oil gutter to transaxle case.
32. Engage 3rd gear.

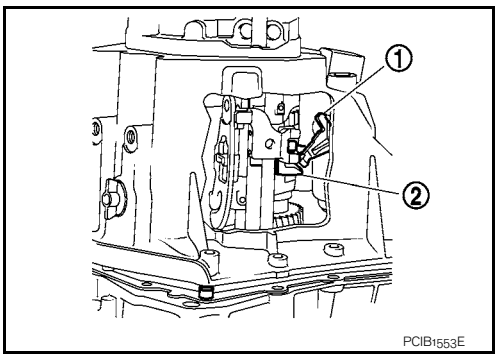


33. Check the positioning of the dowel pins (1).
    CAUTION:
    Never reuse dowel pin.
34. Check the positioning of magnet (2).
35. Apply recommended sealant to mating surface of clutch housing.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

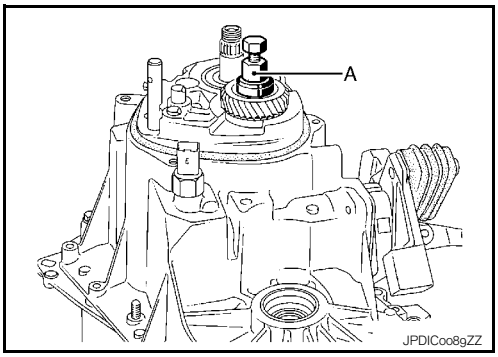
    CAUTION:
    - **Remove old sealant adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to both mounting surfaces.**
    - **Apply sealant so as not to break the bead.**



36. Offer up the transaxle case while guiding the selector (1) into shift fork (2) of the 3rd gear.
37. Pretighten the transaxle case mounting bolts and rotate the input shaft to check that they make contact with the bearings.
38. Tighten the transaxle case mounting bolts to the specified torque.

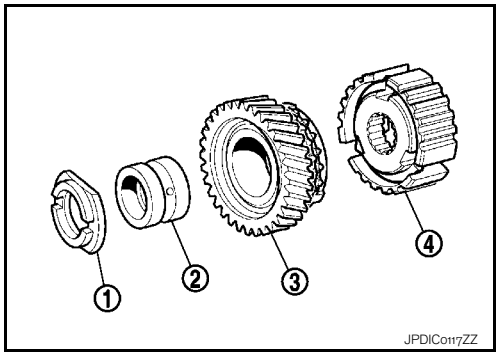


39. Put three drops of LOCTITE Frenbloc or an equivalent on the splines of the fixed 5th main gear and fit it using the installer (A) [SST: — (B. Vi. 1175)].

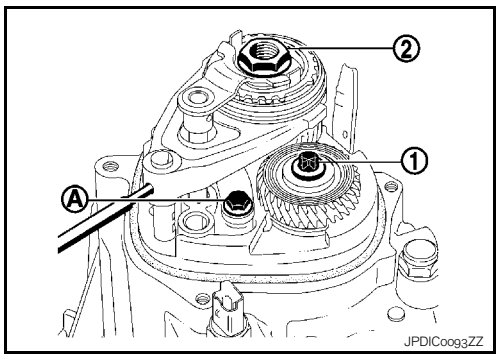


cardiagn.com

40. On the input shaft, fit the adapter plate (1) (top side gear side).
41. On the input shaft, fit the bushing (2).
42. Apply gear oil to 5th baulk ring.
43. On the input shaft, fit the 5th input gear (3) fitted with its 5th baulk ring.
44. On the input shaft, fit the 5th-reverse synchronizer hub (4) fitted with its spread springs.
    CAUTION:
    Replace 5th-reverse coupling sleeve and 5th-reverse synchronizer hub as a set.

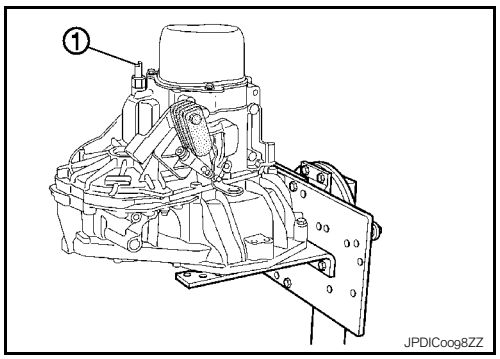


45. Install the 5th-reverse shift fork, 5th-reverse coupling sleeve, and reverse gear assembly.
    CAUTION:
    Replace 5th-reverse coupling sleeve and 5th-reverse synchronizer hub as a set.
46. Apply gear oil to the reverse synchronizer cone and the reverse baulk ring.
47. Install the reverse synchronizer cone and the reverse baulk ring.
48. Tighten mounting bolts (A) to the specified torque.
49. Slide the 5th-reverse shift fork on its 5th-reverse fork rod to engage 5th gear.



50. Tighten mainshaft bolt (1) to the specified torque.
51. Tighten input shaft nut (2) to the specified torque.
    CAUTION:
    Never reuse input shaft nut.
52. Reset to neutral and install retaining pin to the 5th-reverse shift fork.
53. Install O-ring to rear housing and then install them to transaxle case. Tighten mounting bolts to the specified torque.
    CAUTION:
    - **Rear housing oil channel is inserted to input shaft. Therefore, when installing rear housing, install it to axial direction of input shaft.**
    - **Be careful to pinch O-ring when installing rear housing.**
54. Apply recommended sealant to threads of the position switch (1) and then tighten it to the specified torque.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

    CAUTION:
    Remove old sealant and oil adhering to threads.
55. Install gaskets onto drain plug and filler plug, and then install them to clutch housing and transaxle case.
    CAUTION:
    - **Never reuse gasket.**
    - **After oil is filled, tighten filler plug to specified torque.**



Adjustment

INFOID:0000000001098127

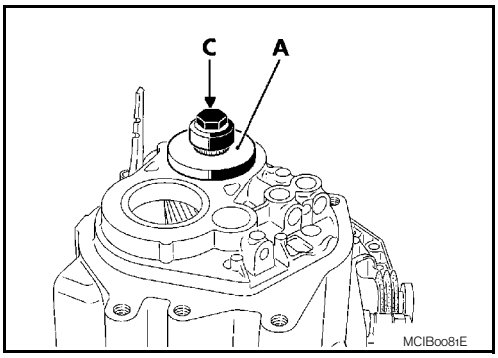
MAINSHAFT REAR BEARING PRELOAD

NOTE:
This operation is performed when replacing the mainshaft front bearing outer race, mainshaft front bearing inner race, mainshaft rear bearing inner race, mainshaft rear bearing outer race, clutch housing, transaxle case, or mainshaft.

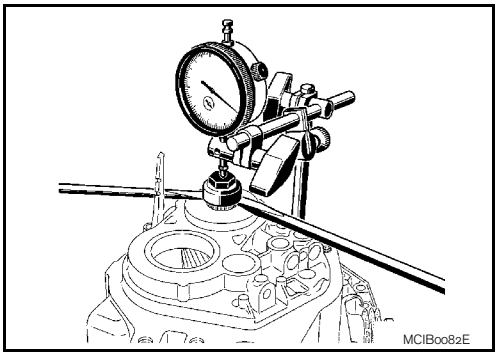
1. Remove final drive assembly and input shaft assembly from clutch housing.
2. Install the mainshaft assembly in the clutch housing with the mainshaft front bearing outer race, mainshaft front bearing inner race, mainshaft rear bearing inner race, mainshaft rear bearing outer race, and the presetting washer or an equivalent, of 1.60 mm (0.06 in) (large outer ϕ).

cardiagn.com

3. Install the transaxle case assembly and then tighten mounting bolts to the specified torque.
4. Fit the dial gauge support plate [SST: — (B. Vi. 1161)], or equivalent, on the tripod basin mountings.
5. Install the special spacer (A) [SST: — (B. Vi. 1527)].
6. Install a suitable bolt (C).



7. Fit the dial indicator with its magnetic holder.
8. Rotate the mainshaft assembly several times to fit the mainshaft front bearing outer race, mainshaft front bearing inner race, mainshaft rear bearing inner race, mainshaft rear bearing outer race.
9. Set the dial indicator to zero.
10. Pull the mainshaft assembly upwards by making a lever out of two screwdrivers.
11. Take a reading from the dial indicator.
12. Repeat the operations several times (7 to 10).
13. Calculate the average of the readings.
14. Calculation of the value of the bearing preloading shim.



Prescribed value + average of the readings on the dial indicator + value of the pre-setting washer = value of the bearing preloading shim.

Example:

Unit: mm (in)

0.26	**+**	**0.49**	**+**	**1.60**	**=**	**2.35**
↓		↓		↓		↓
Prescribed value		Average reading		Pre-setting washer value		Bearing preloading shim value

NOTE:
A set of pre-load washers of 2.15 mm (0.08 in) to 2.43 mm (0.10 in) from 0.04 mm (0.002 in) to 0.04 mm (0.002 in) thickness is supplied as replacement parts.

cardiagn.com

INPUT SHAFT AND GEAR

Exploded View

INFOID:0000000001070449

Refer to TM-25, "Exploded View".

Disassembly

INFOID:0000000001070450

Refer to TM-29, "Disassembly" for disassembly procedure.

Assembly

INFOID:0000000001070451

Refer to TM-34, "Assembly" for assembly procedure.

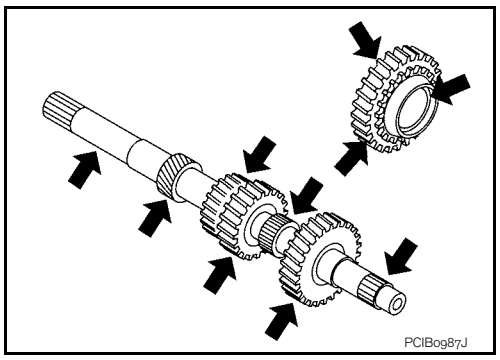
Inspection

INFOID:0000000001070452

INPUT SHAFT AND GEAR

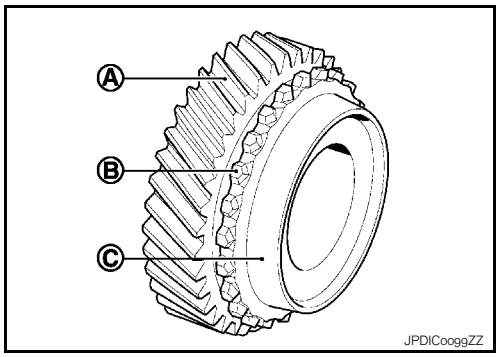
Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.



NOTE:
The inspection focuses mainly on the appearance of the teeth, especially in terms of claw chamfers.

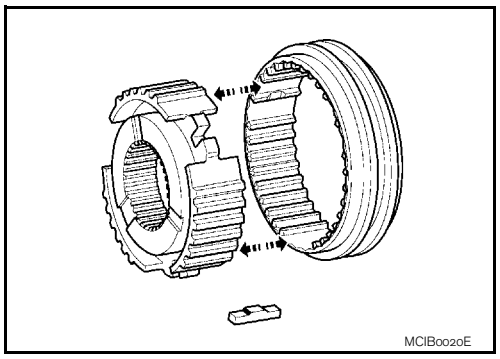
- Check that the teeth (A) are not broken or chipped.
- Check that the claws (B) are not broken, chipped or worn.
- Check that the cone (C) shows no scratches or blueness.



SYNCHRONIZER

Synchronizer Hub and Coupling Sleeve

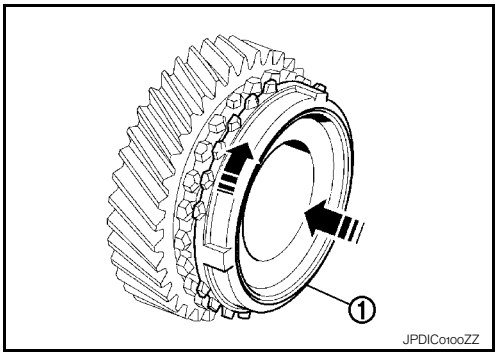
- Make sure the coupling sleeve turns smoothly in the synchronizer hub.
- Check that the springs or insert keys are in good condition.



Baulk Ring

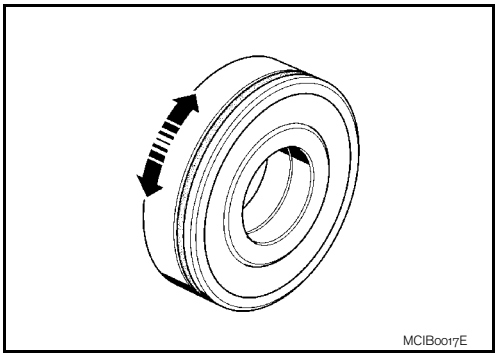
cardiagn.com

Check that the grooves and ridges on the ring are not worn or damaged. Otherwise, replace the baulk ring.
- Check that put the baulk ring onto the gear cone.
- Check that rotate the baulk ring while applying force in the direction of the cone (1).
- Check that the baulk ring should lock against the cone.



BEARING

If the bearings does not rotate smoothly of the contact surface on ball or race is damaged or peeled, replace with new ones.



cardiagn.com

MAINSHAFT AND GEAR

Exploded View

INFOID:0000000001070453

Refer to TM-25, "Exploded View".

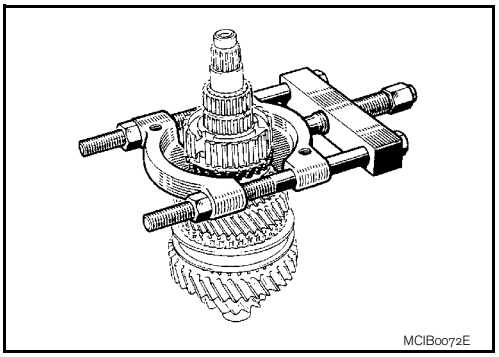
Disassembly

INFOID:0000000001070454

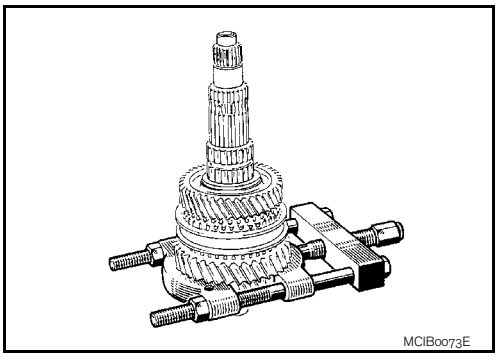
CAUTION:
- **Set mainshaft on the vise with back plate and remove gears.**
- **Disassemble gear components putting matching marks on the parts that do not affect any functions.**

NOTE:
The the parts below underneath the 2nd, 3rd, and 4th main gears are fitted tightened. They will be systematically replaced during assemble.
- 1st inner baulk ring
- 1st synchronizer cone
- 1st outer baulk ring
- 2nd inner baulk ring
- 2nd synchronizer cone
- 2nd outer baulk ring

1. Remove the 3rd main gear and 3rd-4th synchronizer hub with the press, resting underneath the 3rd main gear claw teeth.
2. Remove needle bearing and thrust washer.


MCIB0072E

3. Remove the 1st and 2nd main gears and 1st-2nd synchronizer assembly with the press, resting underneath the 1st main gear.
4. Remove mainshaft front bearing inner race from mainshaft using a suitable puller.


MCIB0073E

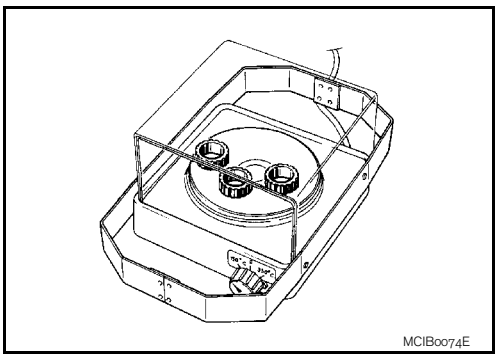
Assembly

INFOID:0000000001070455

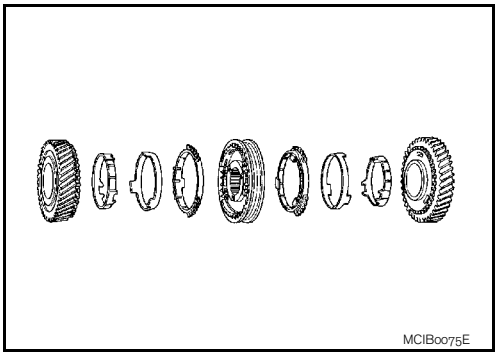
CAUTION:
- **When replacing the parts below, adjust mainshaft rear bearing preload. Refer to TM-39, "Adjustment".**
- **Mainshaft front bearing outer race**
- **Mainshaft front bearing inner race**
- **Mainshaft rear bearing inner race**
- **Mainshaft rear bearing outer race**
- **Clutch housing**
- **Transaxle case**
- **Mainshaft**

cardiagn.com

- **Place the new parts below on the hot plate. Heat them for 15 minutes with a thermostat setting of 150°C (302°F). The hot plate with a setting of 150°C (302°F) should be used for assemble.**
- **1st inner baulk ring**
- **1st synchronizer cone**
- **1st outer baulk ring**
- **2nd inner baulk ring**
- **2nd synchronizer cone**
- **2nd outer baulk ring**


MCIB0074E

- **Remove the parts below from the hot plate, using pliers. And use a suitable tube with an internal diameter of 33 mm (1.30 in) to fit it on the mainshaft until it is resting on the synchronizer hub.**
- **1st inner baulk ring**
- **1st synchronizer cone**
- **1st outer baulk ring**
- **2nd inner baulk ring**
- **2nd synchronizer cone**
- **2nd outer baulk ring**


MCIB0075E

1. Install mainshaft front bearing inner race to mainshaft using a suitable drift.
   CAUTION:
   Replace mainshaft front bearing inner race and mainshaft front bearing outer race as a set.
2. Install 1st main gear to mainshaft using a suitable drift.
3. Apply gear oil to 1st inner baulk ring, 1st synchronizer cone, 1st outer baulk ring, 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring.
   CAUTION:
   - **Replace 1st inner baulk ring, 1st synchronizer cone, and 1st outer baulk ring as a set.**
   - **Replace 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring as a set.**
4. Install 1st-2nd synchronizer hub assembly to mainshaft using a suitable drift.
   CAUTION:
   Replace 1st-2nd synchronizer hub and 1st-2nd coupling sleeve as a set.
5. Install needle bearing, 2nd main gear, and thrust washer to mainshaft.
6. Install needle bearing and 3rd main gear to mainshaft.
7. Apply gear oil to 3rd baulk ring and then install it to mainshaft.
8. Install 3rd-4th synchronizer hub to mainshaft using a suitable drift.

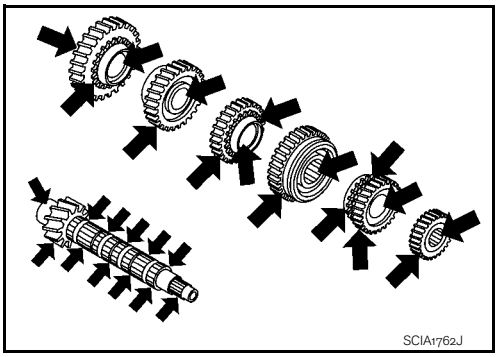
Inspection

INFOID:0000000001070456

MAINSHAFT AND GEAR

Check items below. If necessary, replace them with new ones.

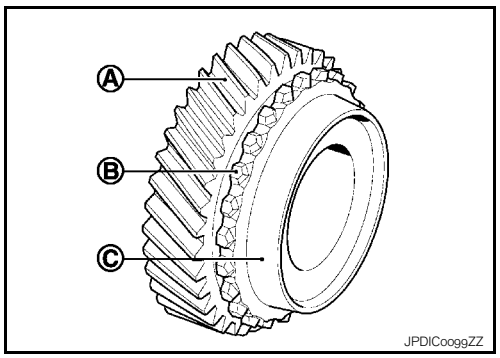
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.


SCIA1762J

NOTE:

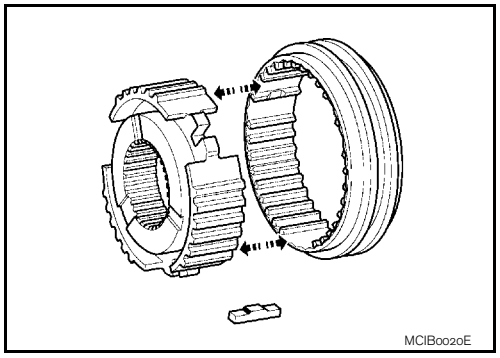
cardiagn.com

The inspection focuses mainly on the appearance of the teeth, especially in terms of claw chamfers.
- Check that the teeth (A) are not broken or chipped.
- Check that the claws (B) are not broken, chipped or worn.
- Check that the cone (C) shows no scratches or blueness.



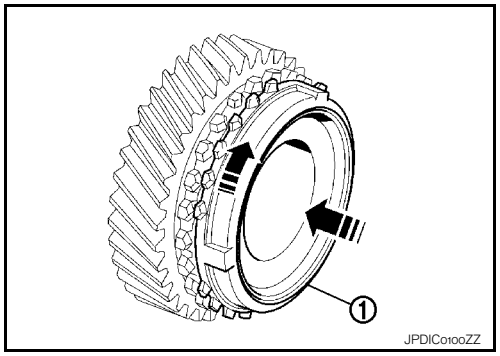
SYNCHRONIZER

Synchronizer Hub and Coupling Sleeve
- Make sure the coupling sleeve turns smoothly in the synchronizer hub.
- Check that the springs or insert keys are in good condition.
- The synchronizer hub teeth and the claws should not be chipped or excessively worn.
- Also ensure that there are no signs of grating or abnormal wear on the surfaces of the coupling sleeves or the inner walls of the synchronizer hubs.
- It is advisable to mark the position of the coupling sleeves in relation to the hub.



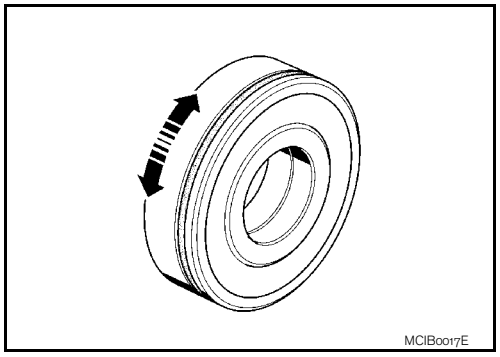
Baulk Ring

Check that the grooves and ridges on the ring are not worn or damaged. Otherwise, replace the baulk ring.
- Check that put the baulk ring onto the gear cone.
- Check that rotate the baulk ring while applying force in the direction of the cone (1).
- Check that the baulk ring should lock against the cone.



BEARING

If the bearings does not rotate smoothly of the contact surface on ball or race is damaged or peeled, replace with new ones.



cardiagn.com

REVERSE IDLER SHAFT AND GEAR

Exploded View

INFOID:0000000001070457

Refer to TM-25, "Exploded View".

Disassembly

INFOID:0000000001070458

Refer to TM-29, "Disassembly" for disassembly procedure.

Assembly

INFOID:0000000001070459

Refer to TM-34, "Assembly" for assembly procedure.

cardiagn.com

FINAL DRIVE

Exploded View

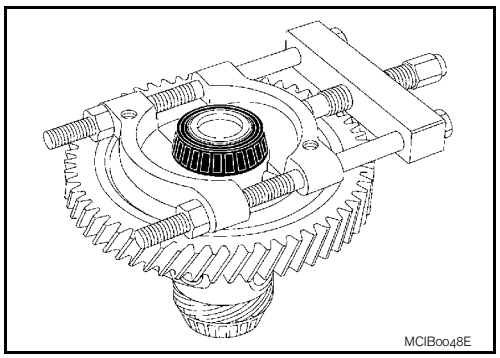
INFOID:0000000001070460

Refer to TM-25, "Exploded View".

Disassembly

INFOID:0000000001070461

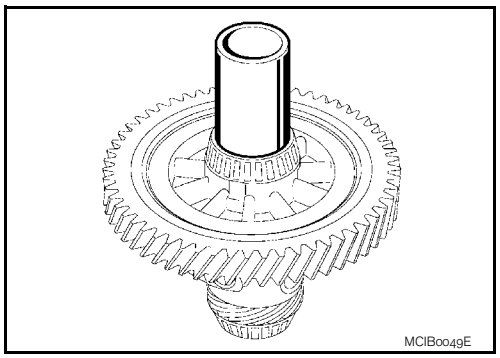
1. Remove differential side bearing inner races using a suitable puller.
2. Remove lock ring to differential case.
3. Remove pinion mate shaft, pinion mate gears, side gears, and thrust washer to differential case.



Assembly

INFOID:0000000001070462

Note the following, and assemble in the reverse order of disassembly.
- Install differential side bearing inner races using a suitable tube.

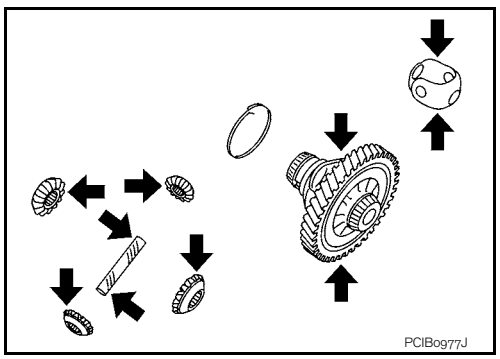


Inspection

INFOID:0000000001070463

GEAR, WASHER, SHAFT AND CASE

Check side gears, thrust washer, pinion mate shaft, pinion mate gears, lock ring and differential case. If necessary, replace with new one.



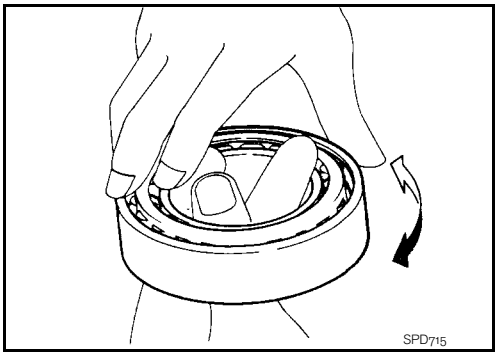
BEARING

cardiagn.com

Check for bearing damage and rough rotation. If necessary, replace with new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.



cardiagn.com

SHIFT FORK AND FORK ROD

Exploded View

INFOID:0000000001070464

Refer to TM-25, "Exploded View".

Disassembly

INFOID:0000000001070465

Refer to TM-29, "Disassembly" for disassembly procedure.

Assembly

INFOID:0000000001070466

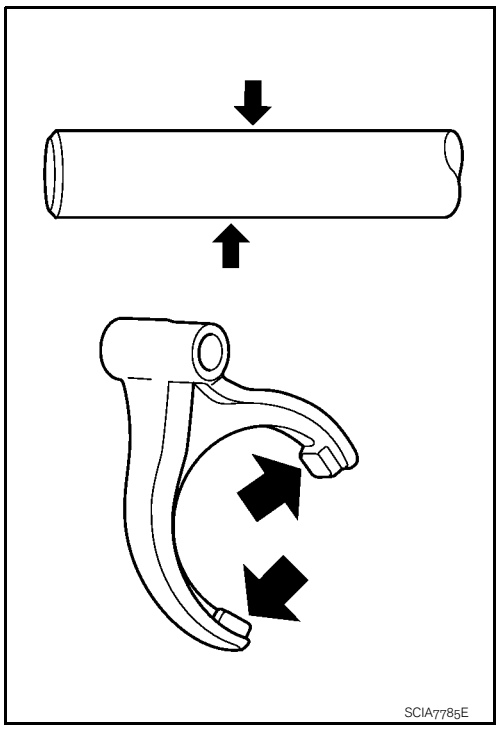
Refer to TM-34, "Assembly" for assembly procedure.

Inspection

INFOID:0000000001070467

FORK ROD AND SHIFT FORK

Check contact surface and sliding surface of fork rod and shift fork for wear, damage, and bend. Replace if necessary.



cardiagn.com

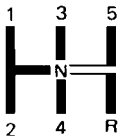
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000001042519

TRANSAXLE

Engine type			HR16DE
Transaxle model			RS5F92R
Model code number			JD00A
Number of speeds			5
Synchromesh type			Warner
Shift pattern			 SCIA0821E
Gear ratio	1st		3.7273
	2nd		2.0476
	3rd		1.3929
	4th		1.0968
	5th		0.8919
	Reverse		3.5455
	Final gear		4.5000
Number of teeth	Input gear	1st	11
		2nd	21
		3rd	28
		4th	31
		5th	37
		Reverse	11
	Main gear	1st	41
		2nd	43
		3rd	39
		4th	34
		5th	33
		Reverse	39
	Reverse idler gear		26
Oil capacity		ℓ (Imp pt)	Approx. 2.3 (4)
Remarks	Reverse synchronizer		Installed
	Double-cone synchronizer		1st and 2nd

FINAL GEAR

cardiagn.com

Engine type		HR16DE
Transaxle model		RS5F92R
Model code number		JD00A
Final gear ratio		4.5000
Number of teeth	Final gear/Pinion	63/14
	Side gear/Pinion mate gear	13/9

cardiagn.com

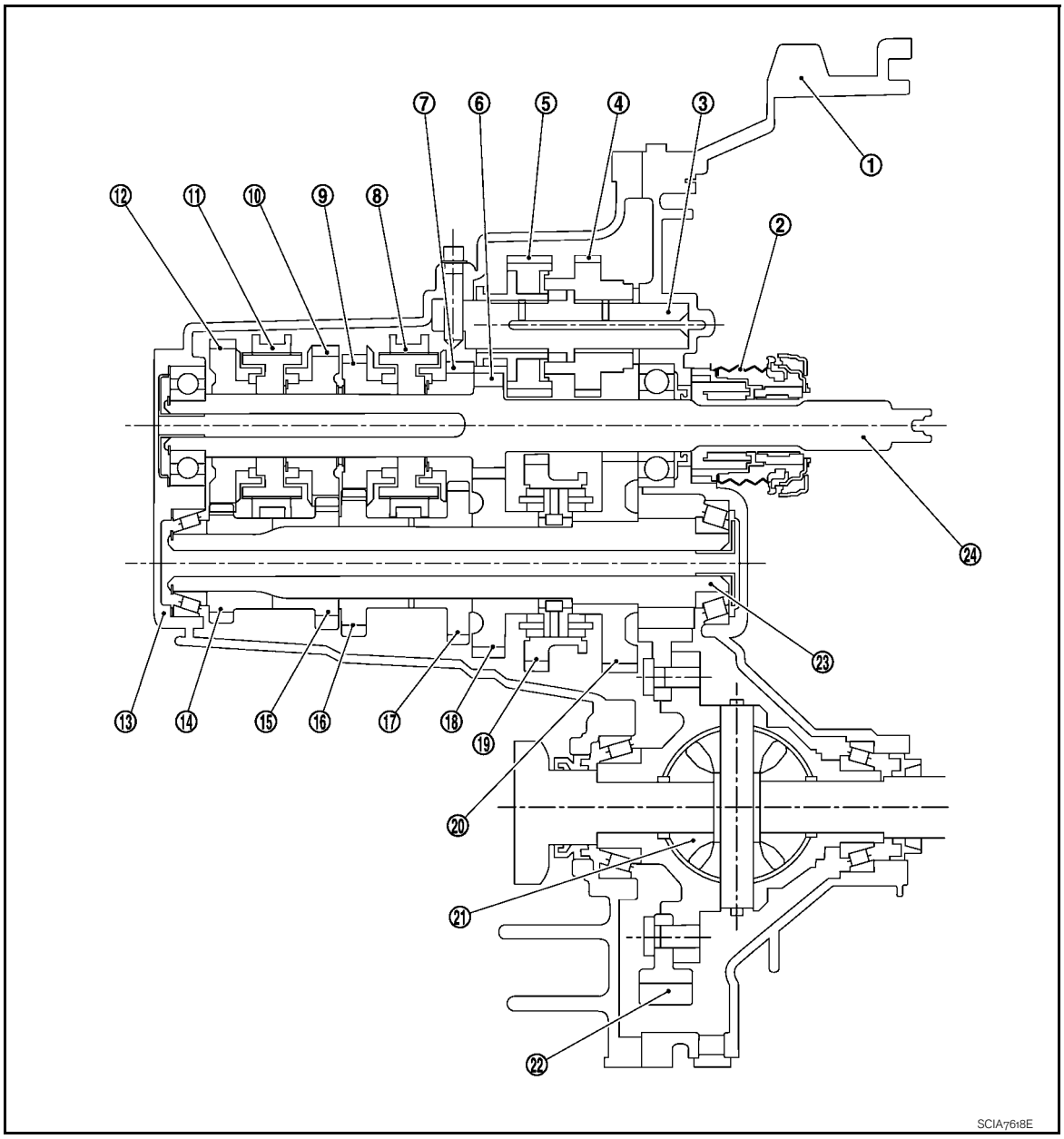
FUNCTION DIAGNOSIS

M/T SYSTEM

System Diagram

INFOID:0000000001070314

CROSS-SECTIONAL VIEW



1. Clutch housing
2. CSC (Concentric Slave Cylinder)
3. Reverse idler shaft
4. Reverse input gear
5. Reverse output gear
6. 2nd input gear
7. 3rd input gear
8. 3rd-4th synchronizer assembly
9. 4th input gear
10. 5th input gear
11. 5th-6th synchronizer assembly
12. 6th input gear
13. Transaxle case
14. 6th main gear
15. 5th main gear
16. 4th main gear
17. 3rd main gear
18. 2nd main gear
19. 1st-2nd synchronizer assembly
20. 1st main gear
21. Differential assembly
22. Final gear
23. Mainshaft
24. Input shaft

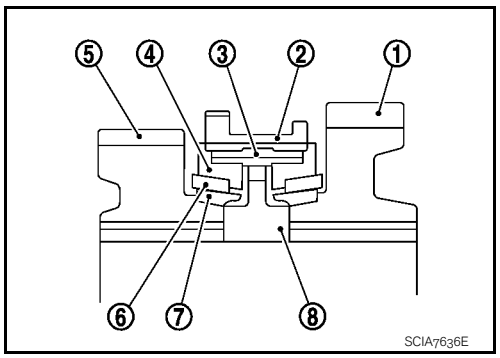
System Description

INFOID:0000000001070315

cardiagn.com

TRIPLE-CONE SYNCHRONIZER

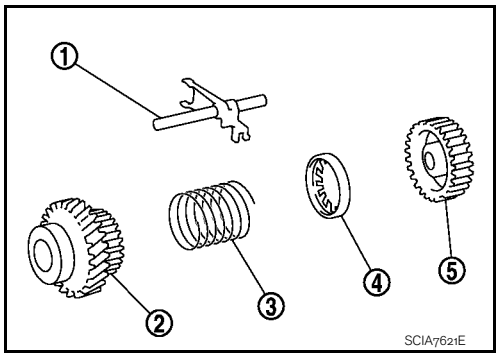
Triple-cone synchronizer is used for the 1st and the 2nd gears to reduce operating force of the control lever.



1 : 1st main gear
2 : 1st-2nd coupling sleeve
3 : Insert key
4 : Outer baulk ring
5 : 2nd main gear
6 : Synchronizer cone
7 : Inner baulk ring
8 : 1st-2nd synchronizer hub

REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

Reverse gear assembly consists of reverse input gear, return spring, reverse baulk ring and reverse output gear. When the control lever is shifted to the reverse position, the construction allows smooth shift operation by stopping the reverse idler shaft rotation by frictional force of synchronizer.



1 : Reverse fork rod
2 : Reverse output gear
3 : Return spring
4 : Reverse baulk ring
5 : Reverse input gear

cardiagn.com

COMPONENT DIAGNOSIS

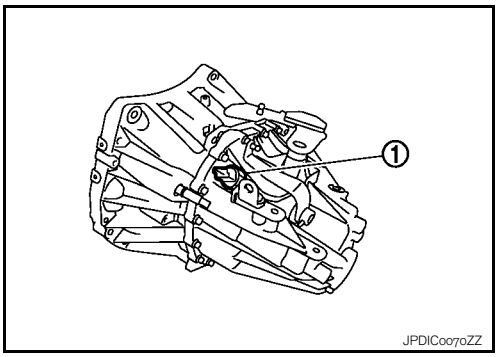
POSITION SWITCH

BACK-UP LAMP SWITCH

BACK-UP LAMP SWITCH : Component Parts Location

INFOID:0000000001070316

1 : Position switch



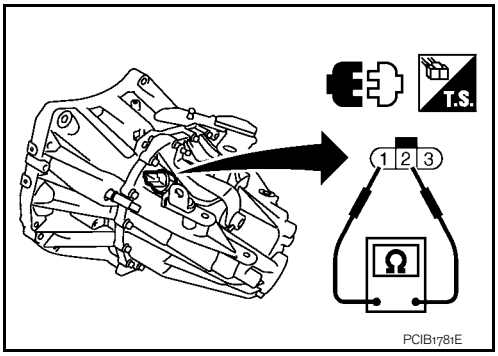
BACK-UP LAMP SWITCH : Component Inspection

INFOID:0000000001070317

1.CHECK BACK-UP LAMP SWITCH

Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
1 – 2	Reverse	Existed
	Except reverse	Not existed



Is the inspection result normal?

YES >> INSPECTION END

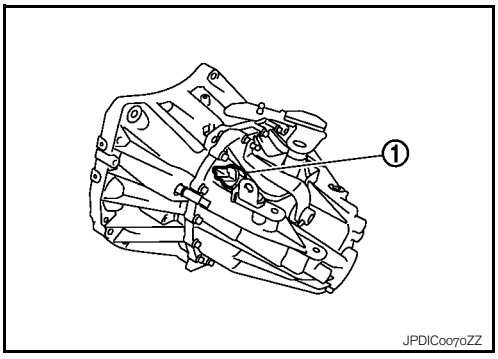
NO >> Replace position switch. Refer to TM-71, "Exploded View".

PARK/NEUTRAL POSITION (PNP) SWITCH

PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location

INFOID:0000000001070318

1 : Position switch



PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection

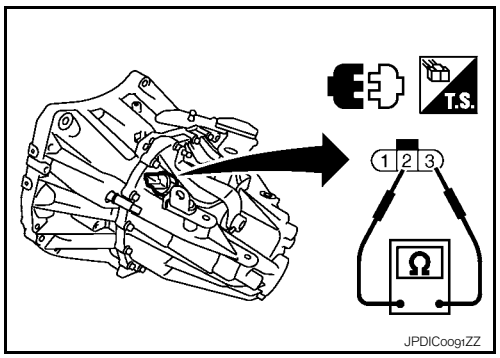
INFOID:0000000001070319

1.CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

cardiagn.com

Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
2 – 3	Neutral	Existed
	Except neutral	Not existed



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace position switch. Refer to TM-71, "Exploded View".

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001070320

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		TM-71			TM-71			TM-63	TM-71	TM-71			
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	O-RING (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2							3	3		
	Oil leakage		3	1	2	2	2						
	Hard to shift or will not shift		1	1				2				3	3
	Jumps out of gear							1	2	2			

cardiagn.com

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Manual Transaxle

INFOID:0000000001070321

CAUTION:

- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never reuse transaxle gear oil, once it has been drained.**
- **Check oil level or replace gear oil with vehicle on level surface.**
- **During removal or installation, keep inside of transaxle clear of dust or dirt.**
- **Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.**
- **Never damage sliding surfaces and mating surfaces.**

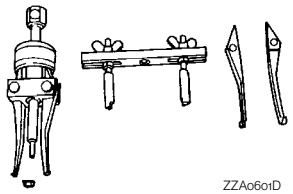
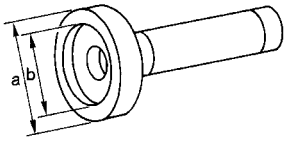
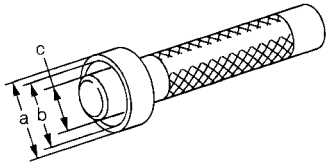
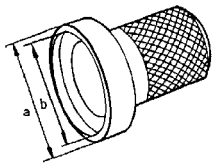
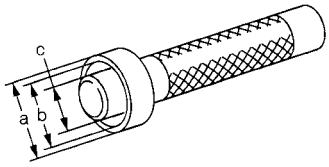
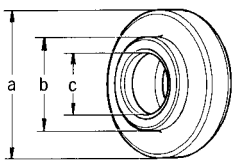
cardiagn.com

PREPARATION

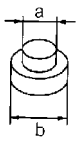
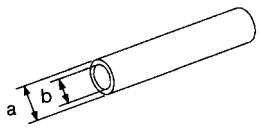
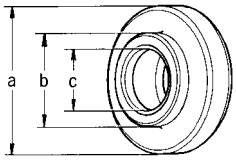
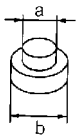
PREPARATION

Special Service Tools

INFOID:0000000001070322

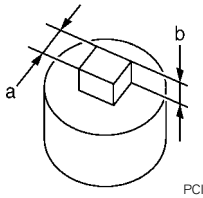
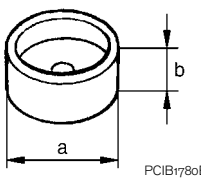
Tool number Tool name	Description
KV381054S0 Puller  ZZA0601D	Removing mainshaft front bearing outer race
KV38100200 Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.  ZZA1143D	• Installing mainshaft front bearing outer race • Installing mainshaft rear bearing outer race • Installing differential side bearing outer race (clutch housing side)
ST33220000 Drift a: 37 mm (1.46 in) dia. b: 31 mm (1.22 in) dia. c: 22 mm (0.87 in) dia.  ZZA1046D	Installing input shaft oil seal
ST33400001 Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  ZZA0814D	Installing differential side bearing outer race (transaxle case side)
KV38100300 Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia.  ZZA1046D	Installing differential side oil seal
ST36720030 Drift a: 70 mm (2.76 in) dia. b: 40 mm (1.57 in) dia. c: 29 mm (1.14 in) dia.  ZZA0978D	• Installing input shaft rear bearing • Installing mainshaft front bearing inner race

cardiagn.com

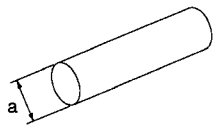
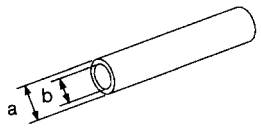
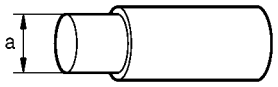
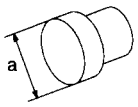
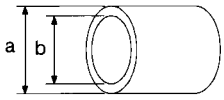
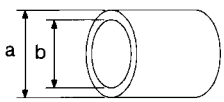
Tool number Tool name	Description
ST33052000 Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.  ZZA0969D	• Removing mainshaft rear bearing inner race • Removing 6th main gear • Removing 5th main gear • Removing 4th main gear • Removing 1st main gear • Removing 1st-2nd synchronizer assembly • Removing 2nd main gear • Removing bushing • Removing 3rd main gear • Removing mainshaft front bearing inner race
KV32102700 Drift a: 54 mm (2.13 in) dia. b: 32 mm (1.26 in) dia.  S-NT065	• Installing bushing • Installing 2nd main gear • Installing 3rd main gear • Installing 4th main gear • Installing 5th main gear • Installing 6th main gear
ST30901000 Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia.  ZZA0978D	Installing mainshaft rear bearing inner race
ST33061000 Drift a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia.  ZZA0969D	Removing differential side bearing inner race (clutch housing side)

Commercial Service Tools

INFOID:0000000001070323

Tool name	Description
Socket a: 8 mm (0.31 in) b: 5 mm (0.20 in)  PCIB1776E	Removing and installing drain plug
Spacer a: 25 mm (0.98 in) dia. b: 25 mm (0.98 in)  PCIB1780E	Removing mainshaft front bearing outer race

cardiagn.com

Tool name	Description
Drift a: 17 mm (0.67 in) dia.  S-NT063	• Installing bushing • Installing shifter lever oil seal • Installing selector lever oil seal
Drift a: 35 mm (1.38 in) dia. b: 25 mm (0.98 in) dia.  S-NT065	Installing input shaft front bearing
Drift a: 24 mm (0.94 in) dia.  PCIB1779E	Removing input shaft rear bearing
Drift a: 43 mm (1.69 in) dia.  NT109	• Removing differential side bearing inner race (transaxle case side) • Installing input shaft rear bearing
Drift a: 45 mm (1.77 in) dia. b: 39 mm (1.54 in) dia.  S-NT474	Installing differential side bearing inner race (clutch housing side)
Drift a: 52 mm (2.05 in) dia. b: 45 mm (1.77 in) dia.  S-NT474	Installing differential side bearing inner race (transaxle case side)

cardiagn.com

ON-VEHICLE MAINTENANCE

GEAR OIL

Exploded View

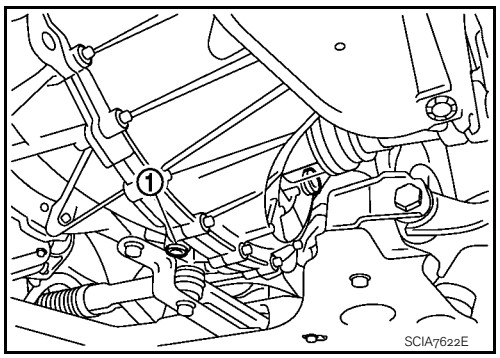
INFOID:0000000001070324

Refer to TM-71, "Exploded View".

Draining

INFOID:0000000001070325

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and then drain gear oil.
3. Set a new gasket on drain plug (1) and install it to clutch housing. Tighten drain plug to the specified torque.
   CAUTION:
   Never reuse gasket.



Refilling

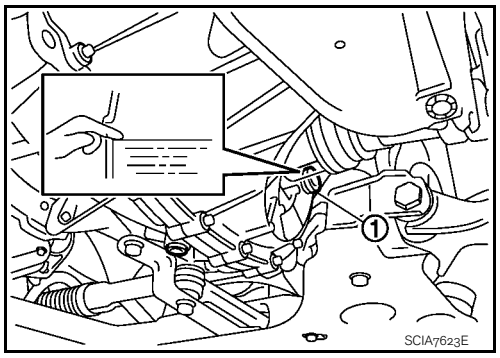
INFOID:0000000001070326

1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified limit at filler plug hole as shown.

   Oil grade and viscosity : **Refer to MA-21, "Fluids and Lubricants".**

   Oil capacity : **Refer to TM-103, "General Specification".**

2. After refilling gear oil, check oil level. Refer to TM-61, "Inspection".
3. Set a new gasket on filler plug (1) and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
4. Tighten filler plug to the specified torque.



Inspection

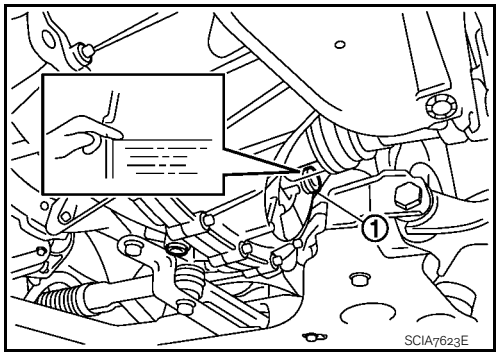
INFOID:0000000001070327

LEAKAGE

Make sure that gear oil is not leaking from transaxle or around it.

LEVEL

1. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Never start engine while checking oil level.
2. Set a new gasket on filler plug (1) and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
3. Tighten filler plug to the specified torque.



cardiagn.com

ON-VEHICLE REPAIR

SIDE OIL SEAL

Exploded View

INFOID:0000000001070328

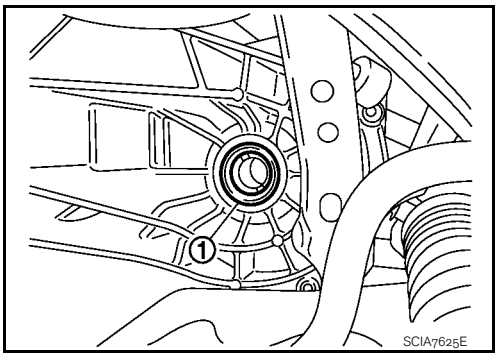
Refer to TM-71, "Exploded View".

Removal and Installation

INFOID:0000000001070329

REMOVAL

1. Remove front drive shafts. Refer to FAX-25, "MR20DE MODELS : Removal and Installation" (MR20DE) or FAX-33, "K9K MODELS : Removal and Installation" (K9K).
2. Remove differential side oil seals (1) using a suitable tool.
   CAUTION:
   Never damage transaxle case and clutch housing.



INSTALLATION

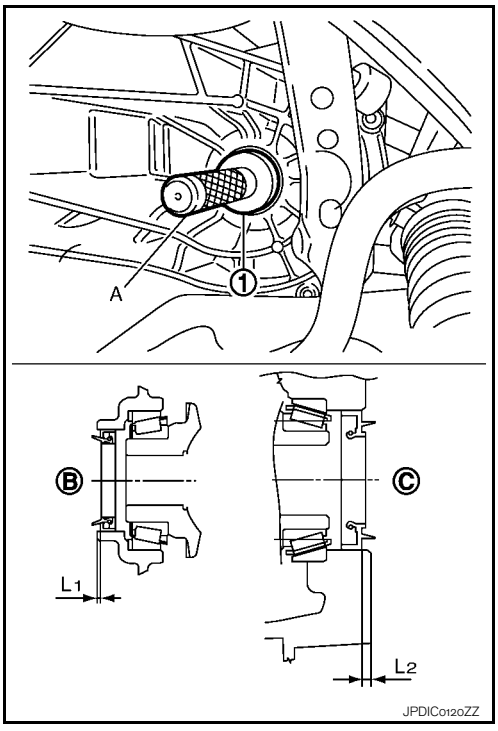
Note the following, and install in the reverse order of removal.

- Install differential side oil seals (1) to clutch housing and transaxle case using the drift (A) [SST: KV38100300].

  B : Transaxle case side
  C : Clutch housing side

  Dimension “L_1” : 1.2 - 1.8 mm (0.047 - 0.071 in)
  Dimension “L_2” : 2.7 - 3.3 mm (0.106 - 0.130 in)

  CAUTION:
  - **Never reuse differential side oil seal.**
  - **When installing, never incline differential side oil seal.**
  - **Never damage clutch housing and transaxle case.**
- Check oil level and oil leakage after installation. Refer to TM-61, "Inspection".

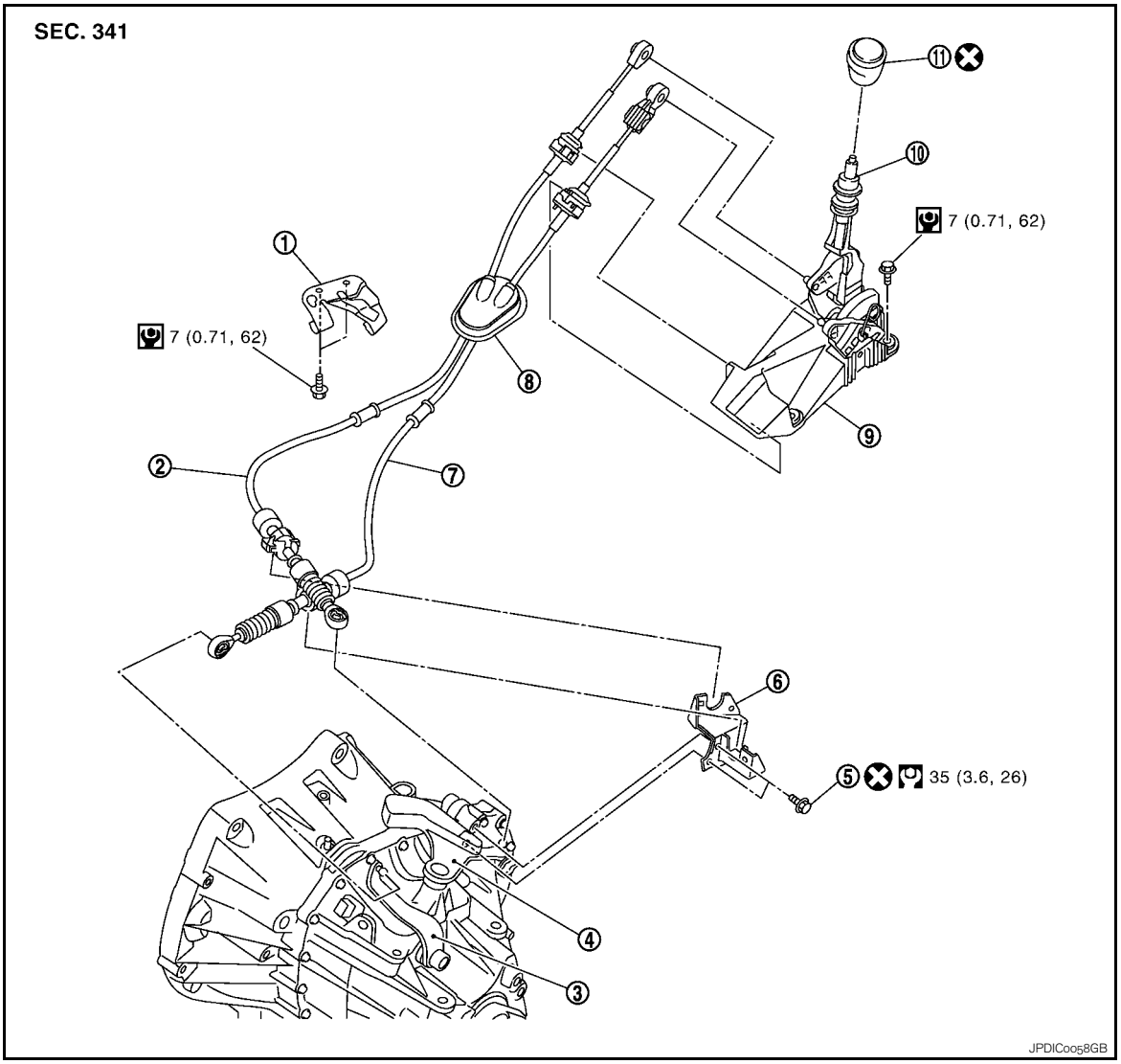


cardiagn.com

CONTROL LINKAGE

Exploded View

INFOID:0000000001070330



1. Bracket
2. Shift cable
3. Selector lever
4. Shifter lever
5. Tapping bolt
6. Cable mounting bracket
7. Select cable
8. Grommet
9. Control device assembly
10. Control lever
11. Control lever knob

Refer to GI-4, "Components" for the symbols in the figure.

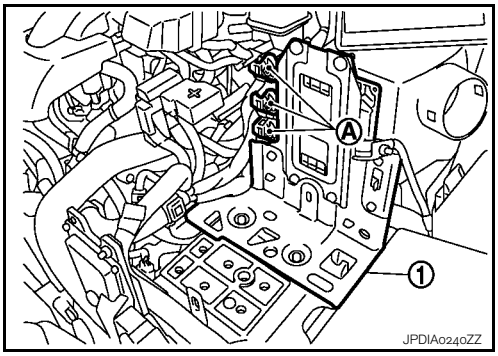
Removal and Installation

INFOID:0000000001070368

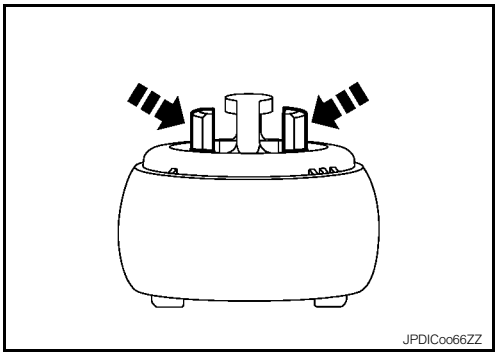
REMOVAL

1. Remove the air cleaner case and air duct (inlet) or air ducts. Refer to EM-144, "Removal and Installation" (MR20DE), EM-265, "Removal and Installation" (K9K).
2. Remove the battery. Refer to PG-118, "Removal and Installation".

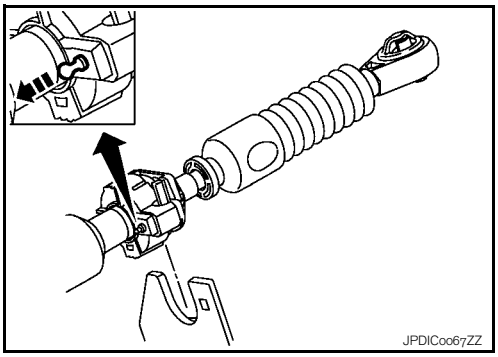
3. Disconnect connectors (A) and then remove bracket (1).



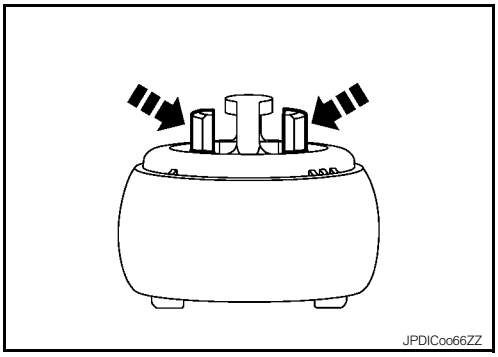
4. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the selector lever.
5. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the shifter lever.



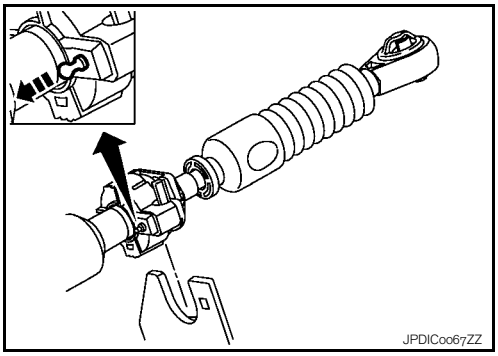
6. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the cable mounting bracket.
7. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the cable mounting bracket.
8. Remove the control lever knob.
9. Remove console finisher assembly and the center console assembly. Refer to IP-18, "Removal and Installation".
10. Shift the control lever to the neutral position.



11. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
12. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.



13. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
14. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.
15. Remove the control device assembly.
16. Remove the heat plate.
17. Remove the bracket.



cardiagn.com

18. Remove the grommet and then remove the shift cable and select cable from the vehicle.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Shift the control lever to the neutral position.
- Securely assemble each cable and the selector lever and shifter lever.
- Securely assemble each cable and the cable mounting bracket.
- Securely assemble each cable and the control device assembly.
- Make sure that the claws of grommet are in contact with the floor.
- Be careful about the installation direction and push the control lever knob into the control lever.

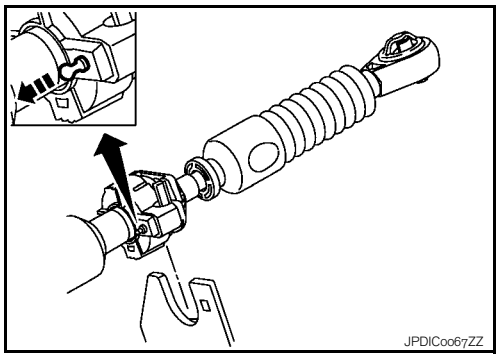
CAUTION:
Never reuse control lever knob.

- Tapping work for tapping bolt is not applied to new clutch housing. Do not perform tapping by other than screwing tapping bolt because tapping is formed by screwing tapping bolt into clutch housing.

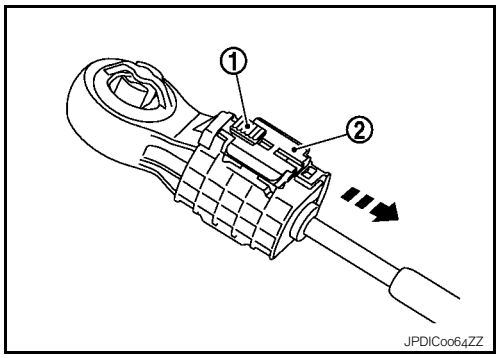
CAUTION:
Never reuse tapping bolt.

Install the select cable (the control device assembly side) with the following procedure.

1. While pulling the lock of the select cable in the direction of the arrow shown in the figure, install the select cable to the control device assembly.



2. Slide the lock (1) of the select cable in the direction of the arrow as shown in the figure to pull up the stopper (2) of the select cable.
3. Install the end of the select cable to the pin of the control device assembly.

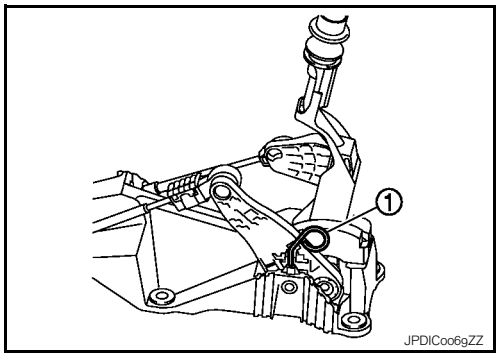


4. Install the lever stopper pin (1) or a pin [3 mm (0.12 in) dia.] to the control device assembly.

CAUTION:
Select cable cannot be adjusted accurately without a use of a lever stopper pin or a pin [3 mm (0.12 in) dia.].

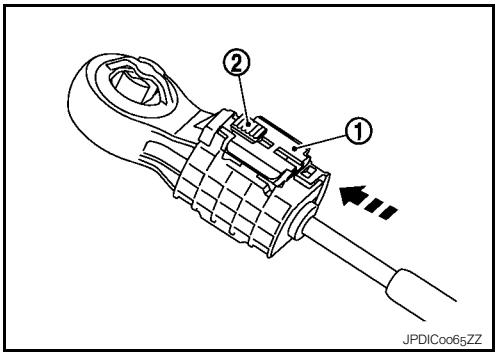
NOTE:
A lever stopper pin is not included in control device assembly. Therefore, if the control device assembly is not replaced, prepare a pin [3 mm (0.12 in) dia.].

5. Check that the control lever does not move in the direction of the select. If it moves, repeat step 3.
6. Shift the control lever to 4th gear position.



cardiagn.com

7. With the stopper (1) of the select cable pressed into all the way, slide lock (2) of the select cable all the way in the direction of the arrow.
8. Remove the lever stopper pin or a pin [3 mm (0.12 in) dia.] from the control device assembly.
9. Shift the control lever to each gear position to check that there is no bindings. If any, repeat step 3.



Inspection

INFOID:0000000001070332

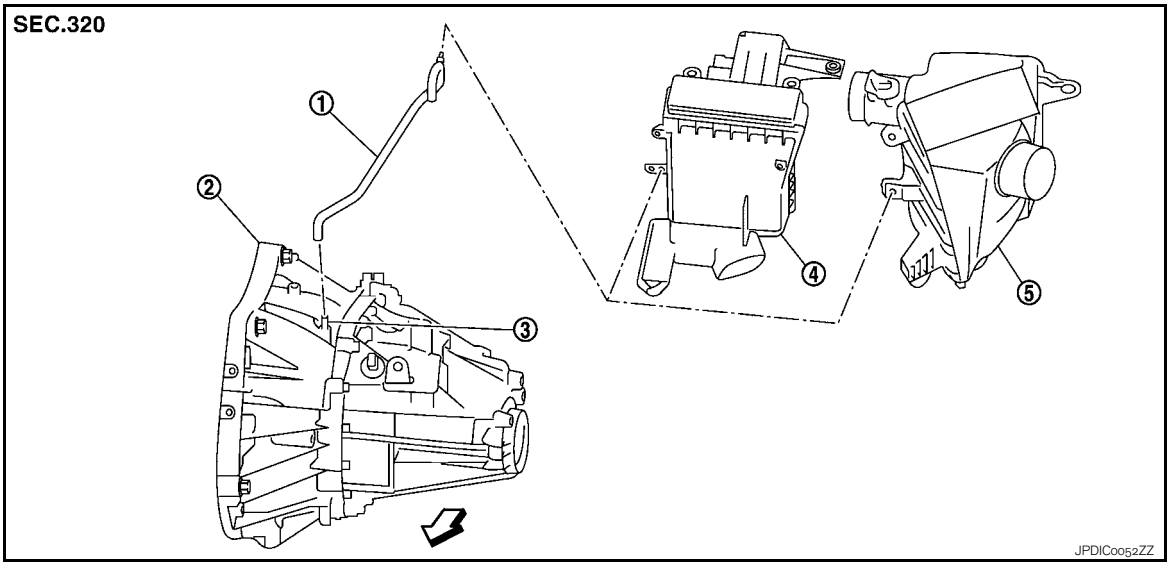
After installing, confirm the following items:
- When the control lever is shifted to 1st-2nd side and 5th-6th side, confirm the control lever returns to neutral position smoothly.
- When the control lever is shifted to each position, make sure there is no binding or disconnection in each boot.

cardiagn.com

AIR BREATHER HOSE

Exploded View

INFOID:0000000001070333



1. Air breather hose
2. Transaxle assembly
3. Two way connector
4. Air cleaner case (MR20DE)
5. Air cleaner case (K9K)

⇦: Vehicle front

Removal and Installation

INFOID:0000000001070334

REMOVAL

Refer to the figure for removal procedure.

CAUTION:

When removing air breather hose, be sure to hold two way connector securely.

INSTALLATION

Refer to the figure for installation procedure.

- When installing air breather hose on two way connector, aim paint mark face toward the vehicle front.
- When installing air breather hose on two way connector, push it until it hits transaxle case.
- When installing air breather hose to air cleaner case, make sure that clip are fully inserted.

CAUTION:

Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

cardiagn.com

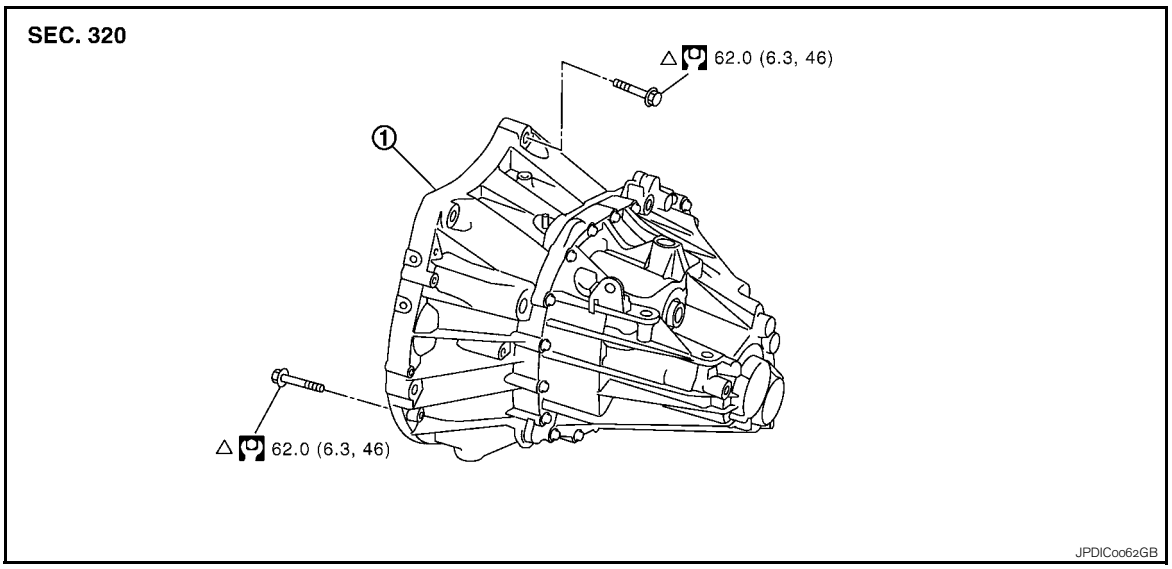
REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001070335

MR20DE



1. Transaxle assembly

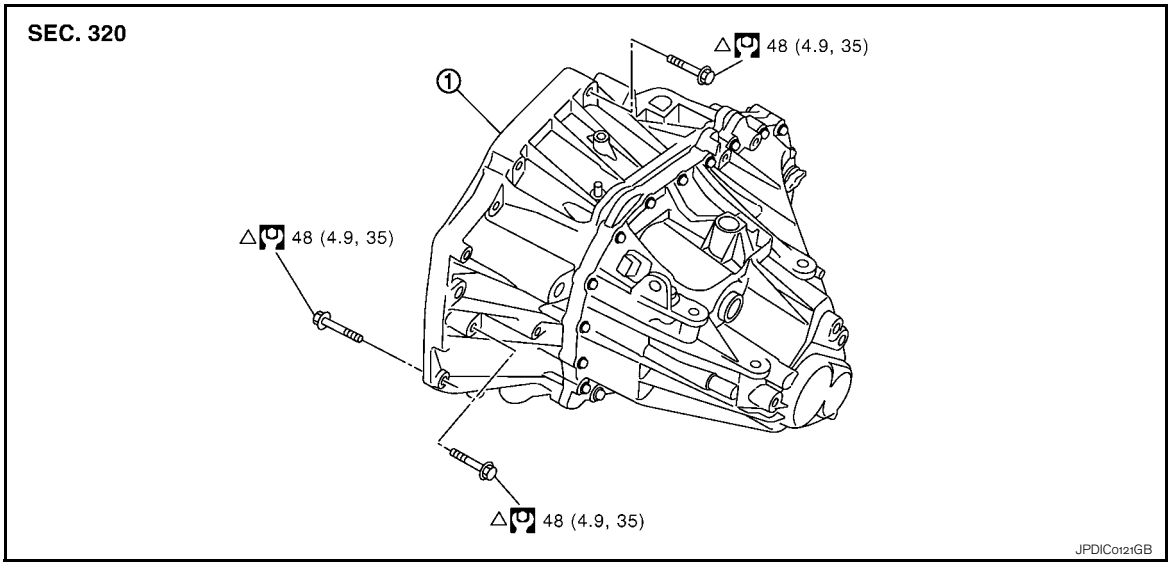
△: For the bolt mounting positions, refer to “INSTALLATION”.

Refer to GI-4, "Components" for symbols not described on the above.

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

K9K



1. Transaxle assembly

△: For the bolt mounting positions, refer to “INSTALLATION”.

Refer to GI-4, "Components" for symbols not described on the above.

CAUTION:

cardiagn.com

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

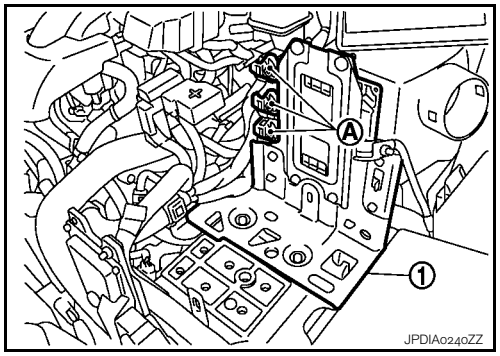
Removal and Installation

INFOID:0000000001070336

CAUTION:
If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-67, "Removal and Installation".
3. Remove air cleaner case and air duct (inlet). Refer to EM-144, "Removal and Installation" (MR20DE) or EM-265, "Removal and Installation" (K9K).
4. Remove battery. Refer to PG-118, "Removal and Installation".
5. Disconnect connectors (A) and then remove bracket (1).
6. Drain clutch fluid and then remove clutch tube from CSC (Concentric Slave Cylinder). Refer to CL-14, "Removal and Installation".
   CAUTION:
   Never depress clutch pedal during removal procedure.
7. Disconnect position switch harness connector.
8. Remove crankshaft position sensor (POS). (For K9K) Refer to EM-280, "Removal and Installation".
   CAUTION:
   - **Handle carefully to avoid dropping and shocks.**
   - **Never disassemble.**
   - **Never allow metal powder to adhere to magnetic part at sensor tip.**
   - **Never place sensors in a location where they are exposed to magnetism.**



9. Disconnect ground cable.
10. Remove wire harnesses from transaxle assembly.
11. Disconnect select cable and shift cable from transaxle assembly. Refer to TM-63, "Removal and Installation".
12. Remove starter motor. Refer to STR-27, "MR20DE MODELS : Removal and Installation" (MR20DE) or STR-20, "K9K MODELS : Removal and Installation" (K9K).
13. Remove engine under cover.
14. Drain gear oil. Refer to TM-61, "Draining".
15. Remove exhaust front tube. Refer to EX-10, "Removal and Installation" (MR20DE) or EX-15, "Removal and Installation" (K9K).
16. Remove front drive shafts. Refer to FAX-25, "MR20DE MODELS : Removal and Installation" (MR20DE) or FAX-33, "K9K MODELS : Removal and Installation" (K9K).
    NOTE:
    Insert a suitable plug into differential side oil seal after removing front drive shaft.
17. Remove rear engine mounting brackets and rear torque rod. (For MR20DE) Refer to EM-195, "M/T : Removal and Installation".
18. Remove transaxle mounting lower brackets and transaxle torque rod. (For K9K) Refer to EM-298, "Removal and Installation".
19. Remove suspension member and suspension member stay. Refer to FSU-17, "Removal and Installation".
20. Set a suitable jack to transaxle assembly and then set a suitable jack to engine assembly.
    CAUTION:
    When setting a suitable jack, be careful so that it does not contact with the switch.
21. Remove transaxle assembly mounting bolts.
22. Remove engine mounting through bolt-securing nut. Refer to EM-195, "M/T : Removal and Installation" (MR20DE) or EM-298, "Removal and Installation" (K9K).

cardiagn.com

23. Remove transaxle assembly from the vehicle.
CAUTION:
- **Secure transaxle assembly to a suitable jack while removing it.**
- **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**

24. Remove CSC (Concentric Slave Cylinder). Refer to CL-15, "Removal and Installation".
CAUTION:
If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

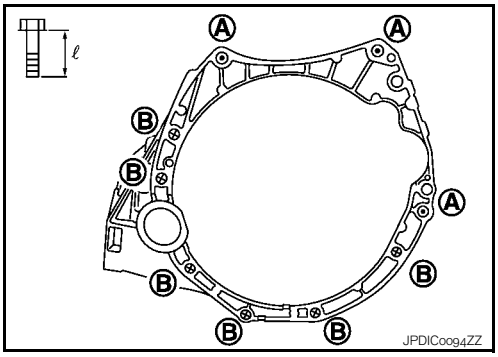
INSTALLATION

Note the following, and install in the reverse order of removal.
- Tighten transaxle assembly mounting bolts to the specified torque. The figure is the view from the engine.

- **MR20DE**

: Transaxle to engine

: Engine to transaxle

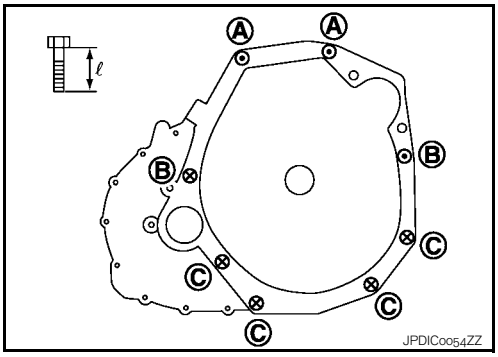


Bolt symbol	A	B
Quantity	3	6
"ℓ" mm (in)	60 (2.36)	50 (1.97)

- **K9K**

: Transaxle to engine

: Engine to transaxle



Bolt symbol	A	B	C
Quantity	2	2	4
"ℓ" mm (in)	50 (1.97)	80 (3.15)	65 (2.56)

CAUTION:
- **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
- **When installing transaxle assembly, never bring input shaft into contact with clutch cover.**
- Refer to CL-15, "Removal and Installation" for CSC (Concentric Slave Cylinder) installation procedure.
- Refer to TM-63, "Removal and Installation" for select cable and shift cable installation procedure.
- Bleed the air from the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".
- After installation, check for oil leakage and oil level. Refer to TM-61, "Inspection".

cardiagn.com

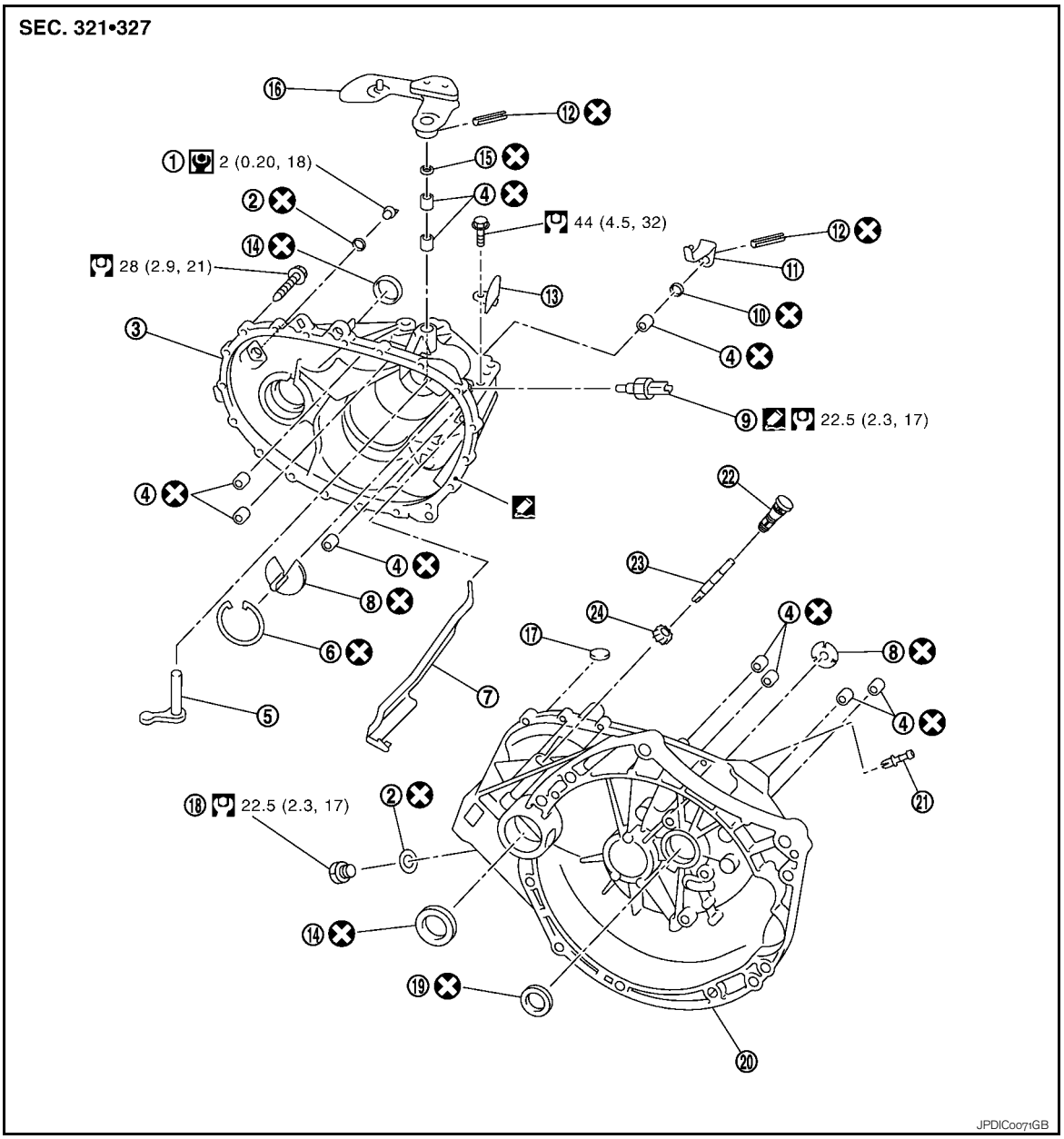
DISASSEMBLY AND ASSEMBLY

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001070337

CASE AND HOUSING



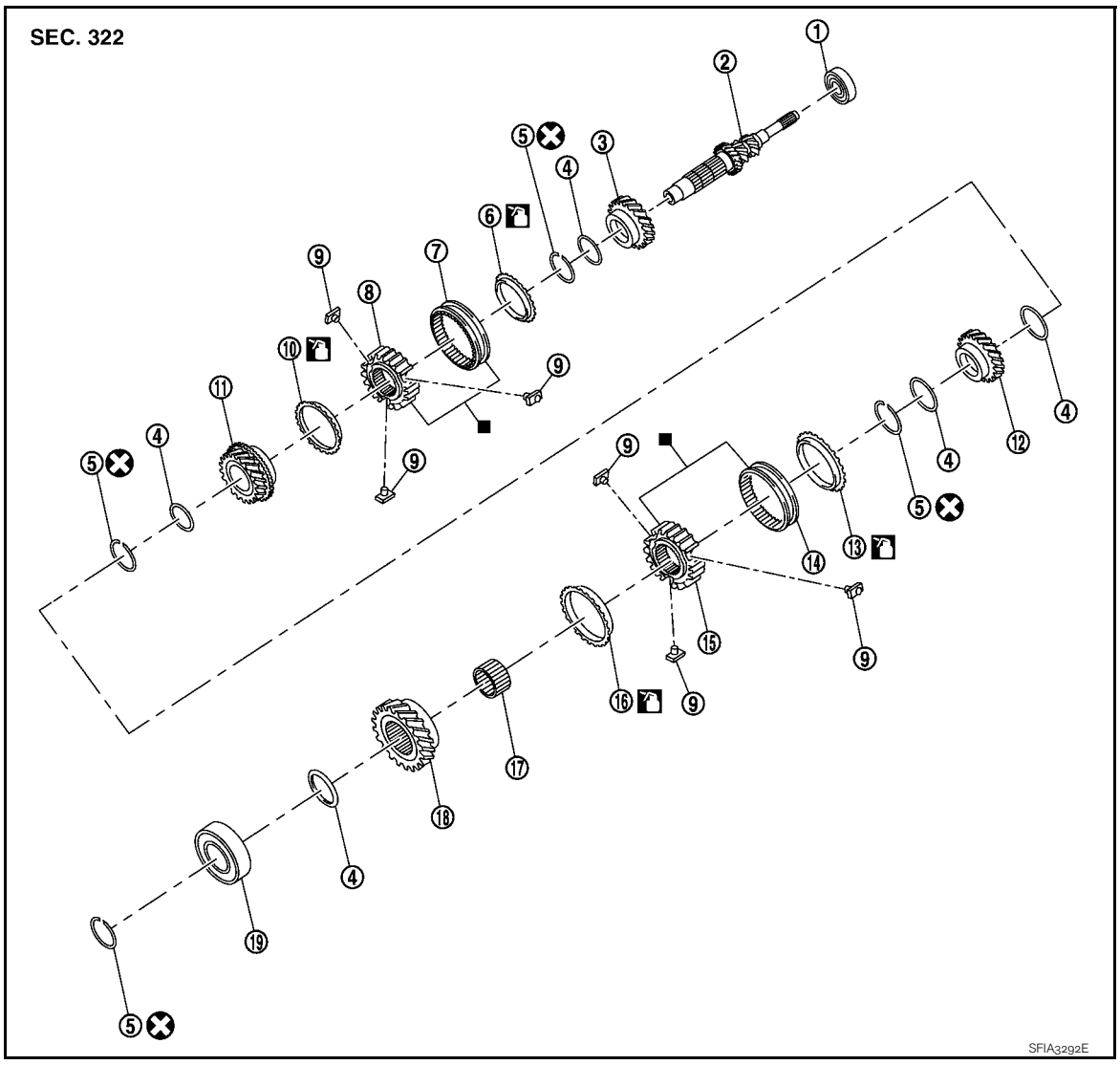
1. Filler plug
2. Gasket
3. Transaxle case
4. Bushing
5. Shift finger
6. Snap ring
7. Oil gutter
8. Oil channel
9. Position switch
10. Shifter lever oil seal
11. Shifter lever
12. Retaining pin
13. Bracket
14. Differential side oil seal
15. Selector lever oil seal
16. Selector lever
17. Magnet
18. Drain plug
19. Input shaft oil seal
20. Clutch housing
21. Two way connector
22. Plug (if equipped)
23. Pinion shaft (if equipped)
24. Pinion gear (if equipped)

cardiagn.com

: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

SHAFT AND GEAR



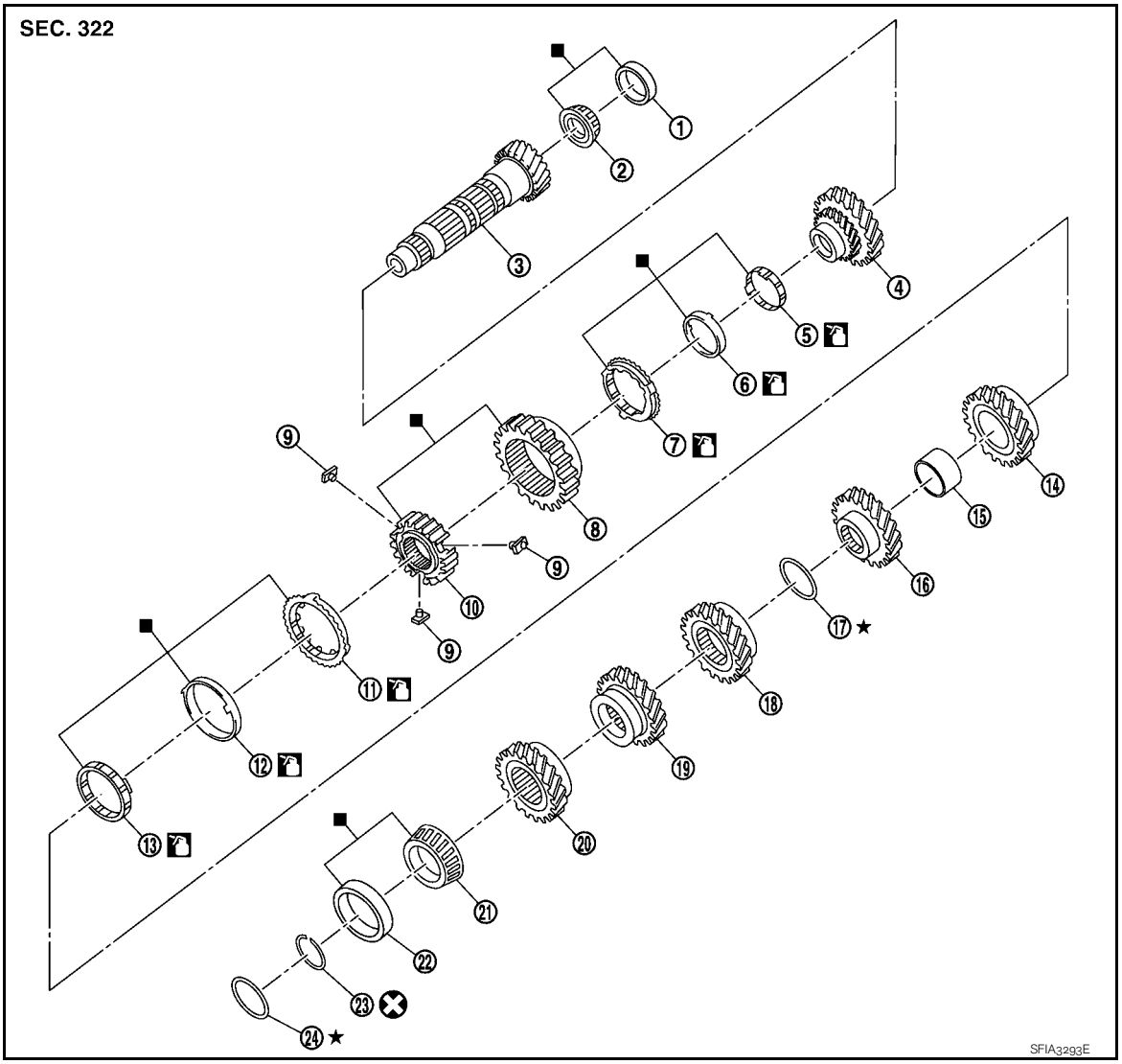
1. Input shaft front bearing
2. Input shaft
3. 3rd input gear
4. Washer
5. Snap ring
6. 3rd baulk ring
7. 3rd-4th coupling sleeve
8. 3rd-4th synchronizer hub
9. Insert key
10. 4th baulk ring
11. 4th input gear
12. 5th input gear
13. 5th baulk ring
14. 5th-6th coupling sleeve
15. 5th-6th synchronizer hub
16. 6th baulk ring
17. Needle bearing
18. 6th input gear
19. Input shaft rear bearing

: Apply gear oil.

: Replace the parts as a set.

Refer to GI-4, "Components" for symbols not described on the above.

cardiagn.com



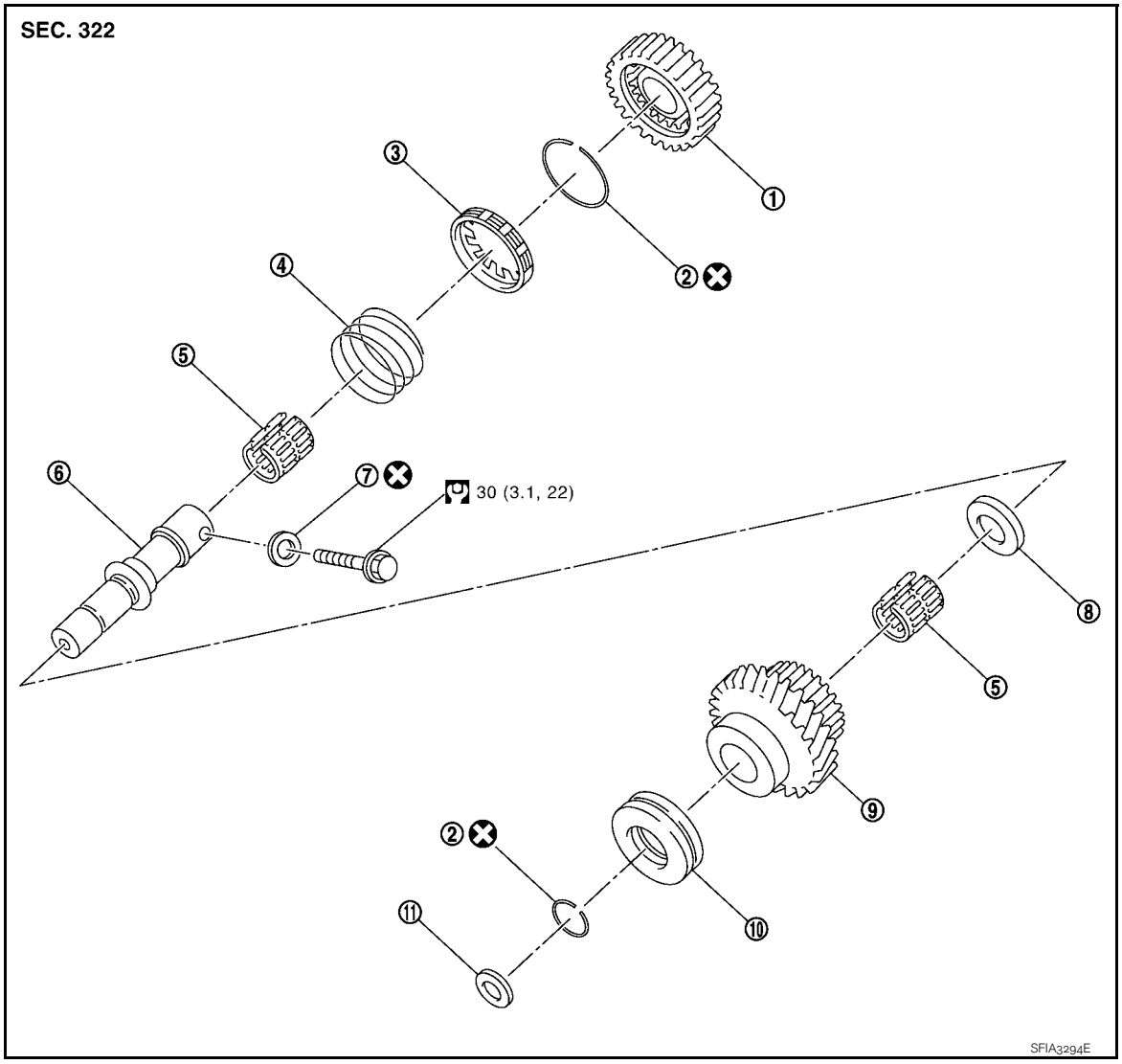
1. Mainshaft front bearing outer race	2. Mainshaft front bearing inner race	3. Mainshaft
4. 1st main gear	5. 1st inner baulk ring	6. 1st synchronizer cone
7. 1st outer baulk ring	8. 1st-2nd coupling sleeve	9. Insert key
10. 1st-2nd synchronizer hub	11. 2nd outer baulk ring	12. 2nd synchronizer cone
13. 2nd inner baulk ring	14. 2nd main gear	15. Bushing
16. 3rd main gear	17. Intermediate adjusting shim	18. 4th main gear
19. 5th main gear	20. 6th main gear	21. Mainshaft rear bearing inner race
22. Mainshaft rear bearing outer race	23. Snap ring	24. Bearing preloading shim

: Apply gear oil.

: Replace the parts as a set.

Refer to GI-4, "Components" for symbols not described on the above.

cardiagn.com

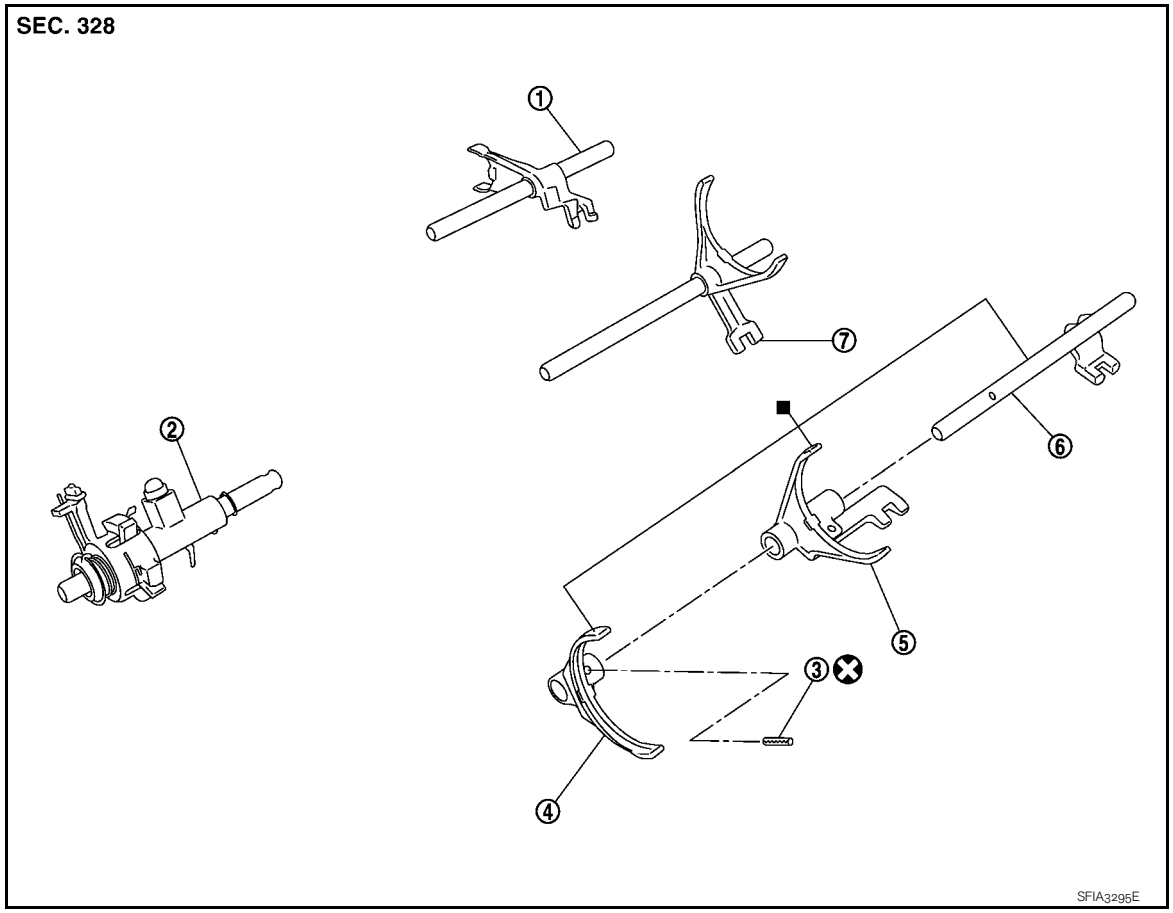


1. Reverse output gear
2. Snap ring
3. Reverse baulk ring
4. Return spring
5. Needle bearing
6. Reverse idler shaft
7. Seal washer
8. Washer
9. Reverse input gear
10. Lock washer
11. Spring washer

Refer to GI-4, "Components" for the symbols in the figure.

SHIFT FORK AND FORK ROD

cardiagn.com



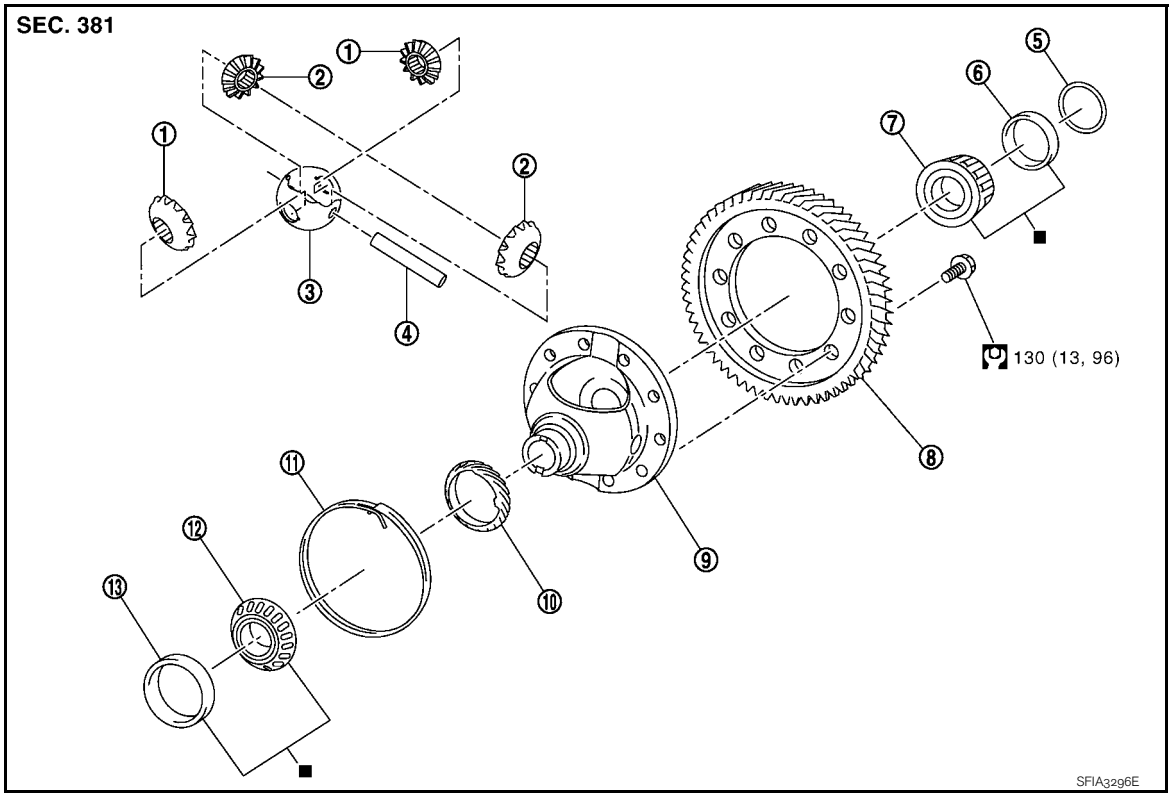
1. Reverse fork rod
2. Selector
3. Retaining pin
4. 5th-6th shift fork
5. 3rd-4th shift fork
6. 3rd-4th and 5th-6th fork rod
7. 1st-2nd fork rod

■: Replace the parts as a set.

Refer to GI-4, "Components" for symbols not described on the above.

FINAL DRIVE

cardiagn.com



1. Side gear
2. Pinion mate gear
3. Thrust washer
4. Pinion mate shaft
5. shim
6. Differential side bearing outer race (transaxle case side)
7. Differential side bearing inner race (transaxle case side)
8. Final gear
9. Differential case
10. Speedometer drive gear
11. Lock ring
12. Differential side bearing inner race (clutch housing side)
13. Differential side bearing outer race (clutch housing side)

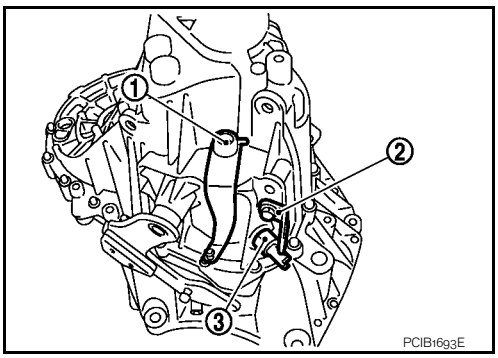
■: Replace the parts as a set.

Refer to GI-4, "Components" for symbols not described on the above.

Disassembly

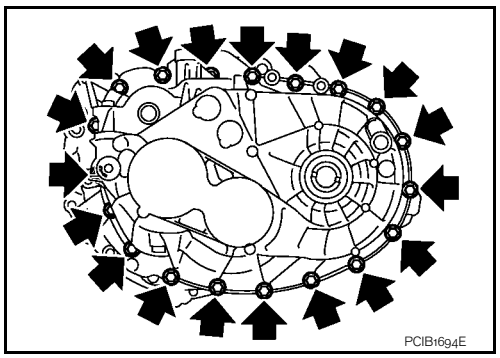
INFOID:0000000001070338

1. Remove drain plug and gasket from clutch housing using the socket [Commercial service tool] and then drain gear oil.
2. Remove filler plug and gasket from transaxle case.
3. Remove retaining pin from shifter lever (1) using a pin punch. And then remove shifter lever.
4. Remove bracket (2) and position switch (3) from transaxle case.

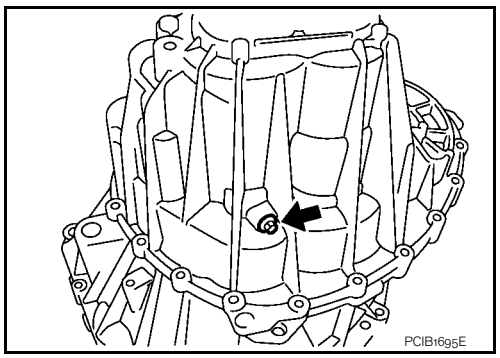


cardiagn.com

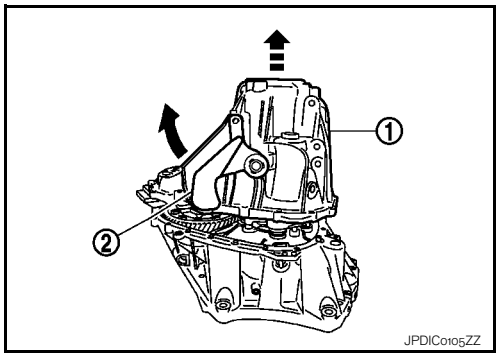
5. Remove mounting bolts.



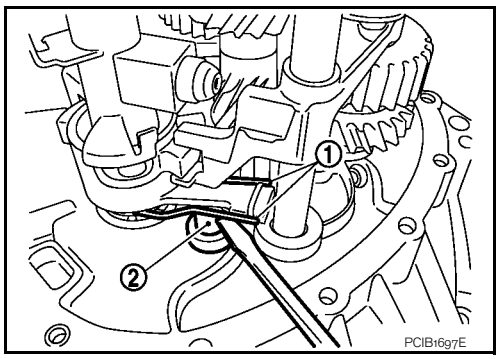
6. Remove reverse idler shaft mounting bolt and seal washer.



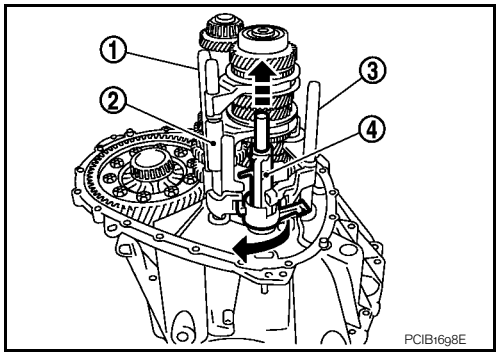
7. Remove transaxle case (1) upward while rotating selector lever (2).



8. Remove spring (1) of selector from return bushing (2).

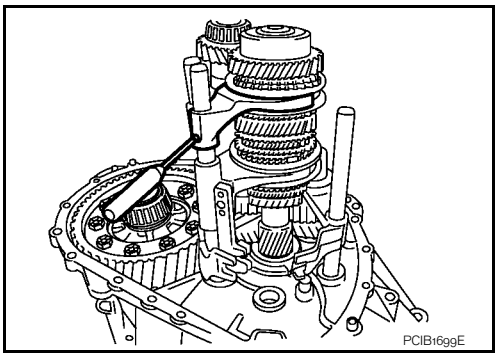


9. Move 1st-2nd fork rod (1), 3rd-4th and 5th-6th fork rod (2), and reverse fork rod (3) to neutral position.
10. Remove selector (4) from clutch housing.

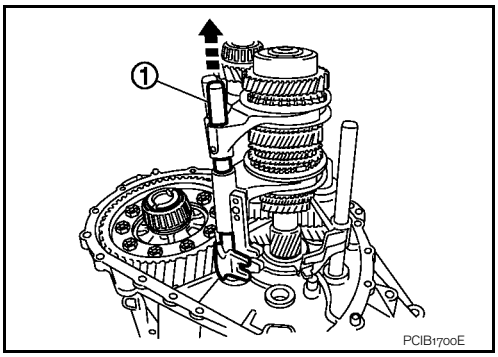


cardiagn.com

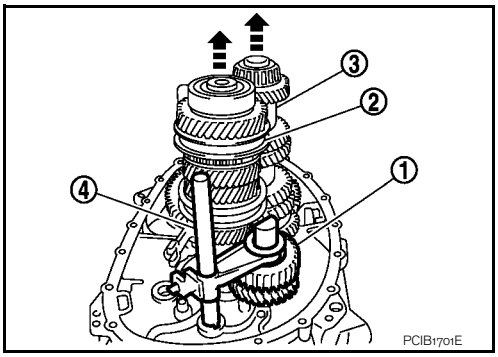
11. Remove retaining pin from 5th-6th shift fork using a pin punch.



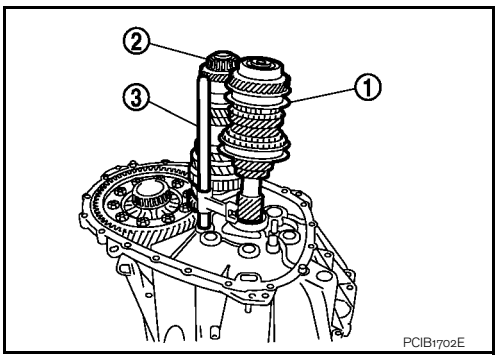
12. Remove 3rd-4th and 5th-6th fork rod (1) assembly according to the following.
a. Lift the fork rod up.
b. Remove 3rd-4th and 5th-6th fork rod (1) assembly from clutch housing.
c. Remove 3rd-4th shift fork and 5th-6th shift fork from 3rd-4th and 5th-6th fork rod.



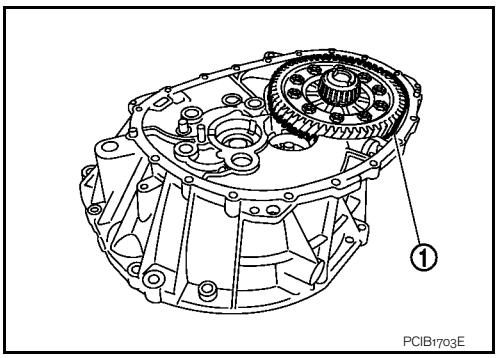
13. Remove reverse gear assembly (1) according to the following.
a. Lift up the input shaft assembly (2) and mainshaft assembly (3).
b. Remove reverse gear assembly (1) and reverse fork rod (4) from clutch housing.
14. Remove spring washer located under the reverse idler shaft.



15. Remove input shaft assembly (1), mainshaft assembly (2), and 1st-2nd fork rod (3) from clutch housing.

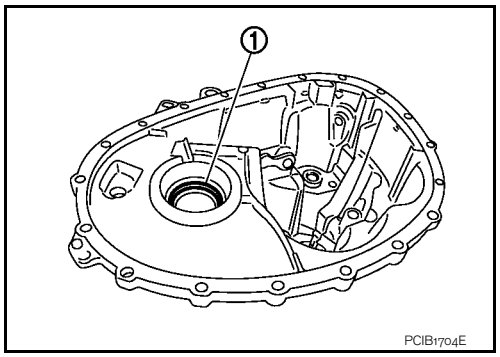


16. Remove final drive assembly (1) from clutch housing.
17. Remove magnet from clutch housing.

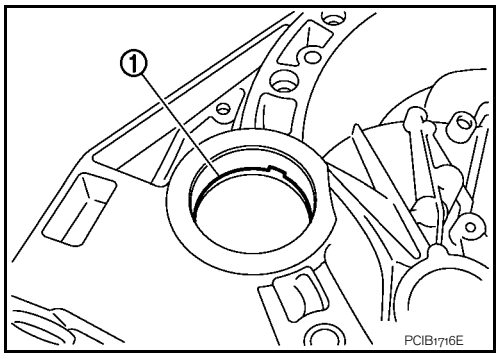


cardiagn.com

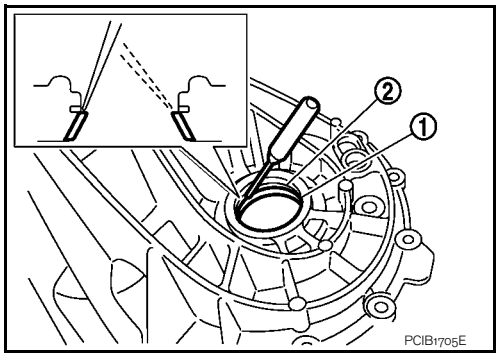
18. Remove differential side oil seals (1) from clutch housing and transaxle case using a flat-bladed screwdriver.
CAUTION:
Never damage clutch housing and transaxle case.



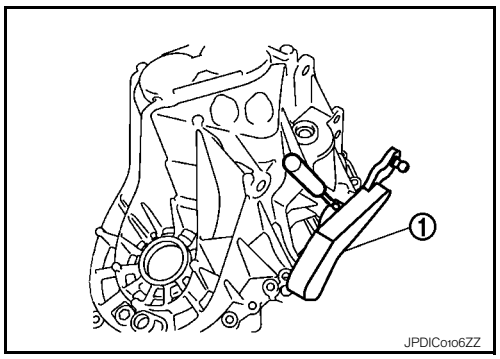
19. Remove differential side bearing outer race (1) from clutch housing using a brass bar.
CAUTION:
Never damage clutch housing.



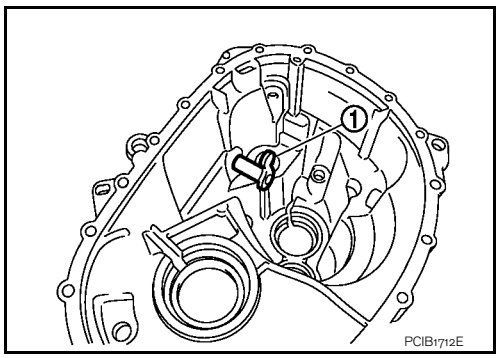
20. Remove differential side bearing outer race (1) and shim (2) from transaxle case using a brass bar as shown.
CAUTION:
Never damage transaxle case.



21. Remove retaining pin from selector lever (1) using a pin punch.
22. Remove selector lever.

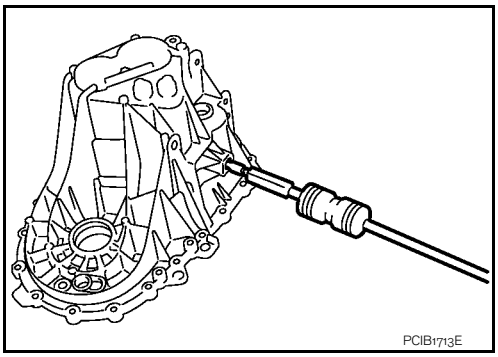


23. Remove shift finger (1) from transaxle case.

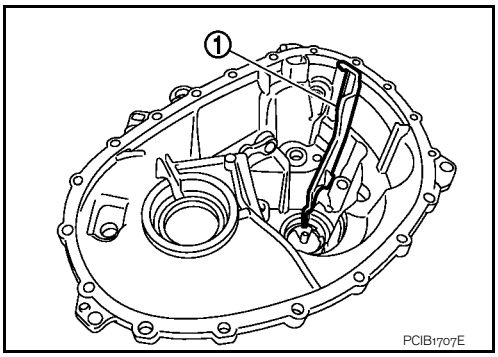


cardiagn.com

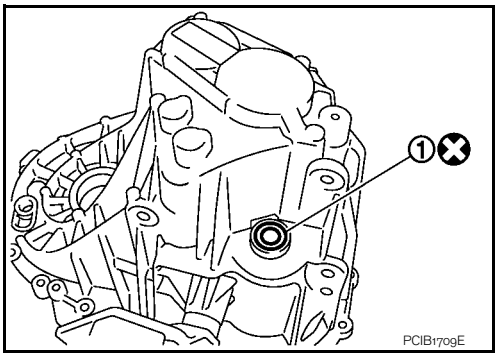
24. Remove selector lever oil seal and bushings from transaxle case using a suitable remover.



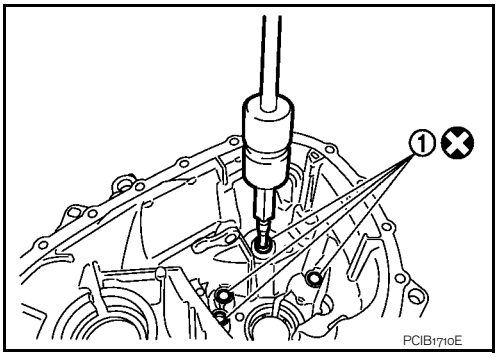
25. Remove oil gutter (1) from transaxle case.



26. Remove shifter lever oil seal (1) from transaxle case.



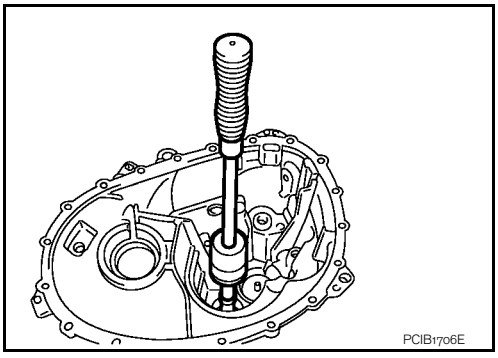
27. Remove bushings (1) from transaxle case using a suitable remover.



28. Remove mainshaft rear bearing outer race from transaxle case using a suitable remover and then remove bearing preloading shim.

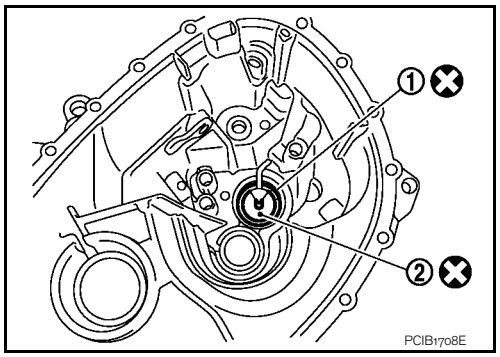
CAUTION:

Never damage transaxle case.

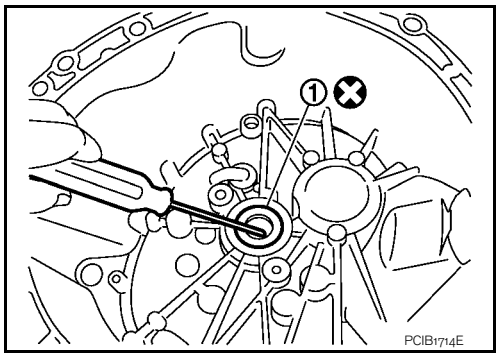


cardiagn.com

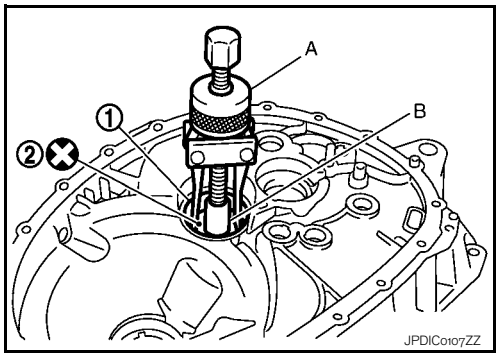
29. Remove snap ring (1) and oil channel (2) from transaxle case.



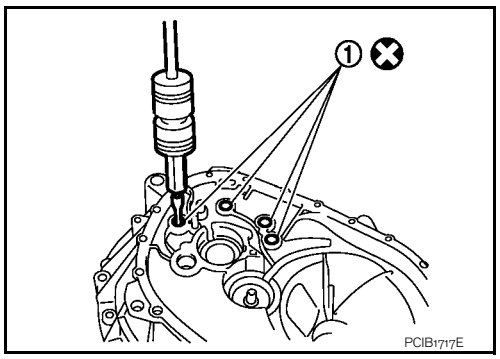
30. Remove input shaft oil seal (1) from clutch housing using a flat-bladed screwdriver.



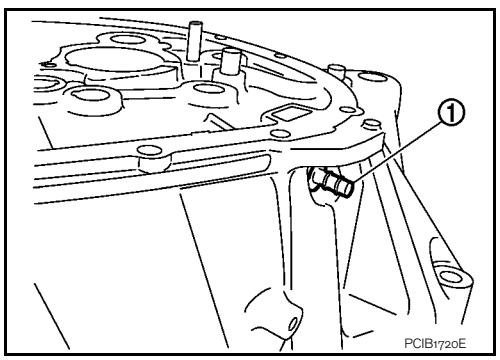
31. Remove mainshaft front bearing outer race (1) and oil channel (2) from clutch housing using the puller (A) [SST: KV381054S0] and the spacer (B) [Commercial service tool].



32. Remove bushings (1) from clutch housing using a suitable remover.

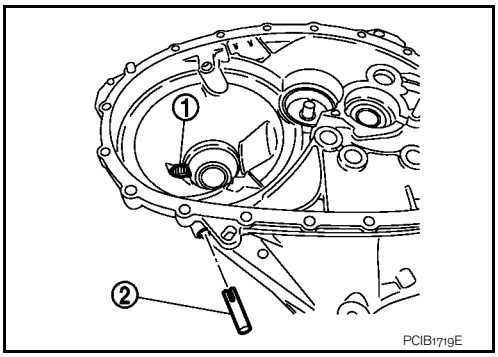


33. Remove two way connector (1) from clutch housing.



cardiagn.com

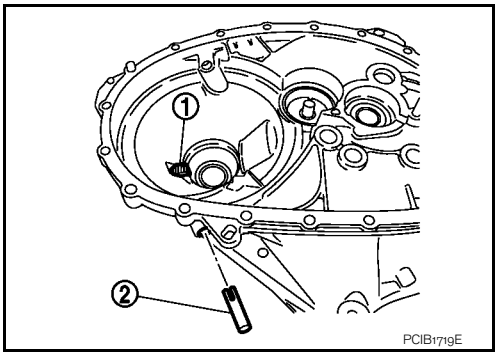
34. Remove pinion gear (1) and pinion shaft (2) from clutch housing.



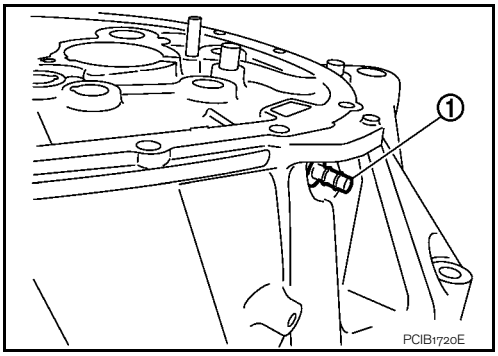
Assembly

INFOID:0000000001070339

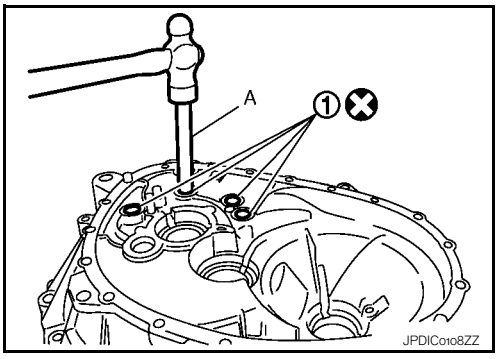
1. Install pinion gear (1) and pinion shaft (2) into clutch housing.



2. Install two way connector (1) into clutch housing.

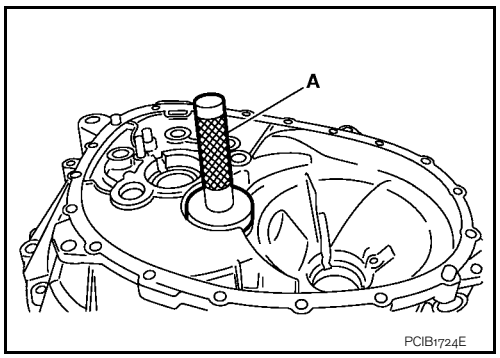


3. Install bushings (1) until they are flush with end face of clutch housing using the drift (A) [Commercial service tool].

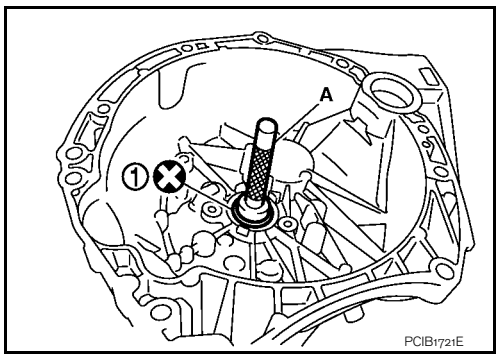


cardiagn.com

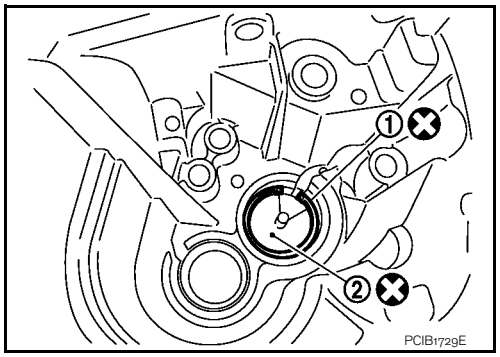
4. Install oil channel and mainshaft front bearing outer race into clutch housing using the drift (A) [SST: KV38100200].
CAUTION:
- **Never reuse oil channel.**
- **Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.**



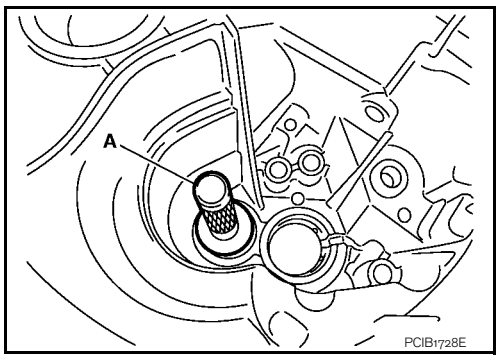
5. Install input shaft oil seal (1) into clutch housing using the drift (A) [SST: ST33220000].



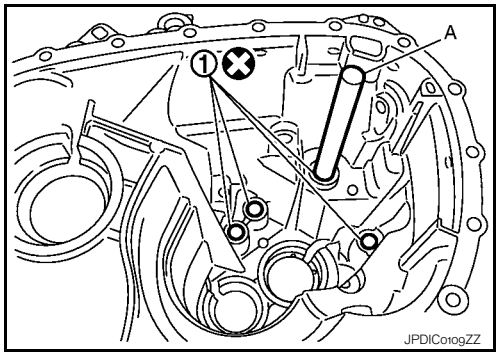
6. Install snap ring (1) and oil channel (2) onto transaxle case.



7. Install bearing preloading shim and mainshaft rear bearing outer race into transaxle case using the drift (A) [SST: KV38100200].
CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.

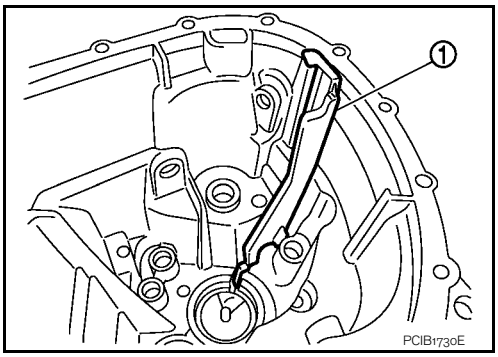


8. Install bushings (1) into transaxle case using the drift (A) [Commercial service tool].

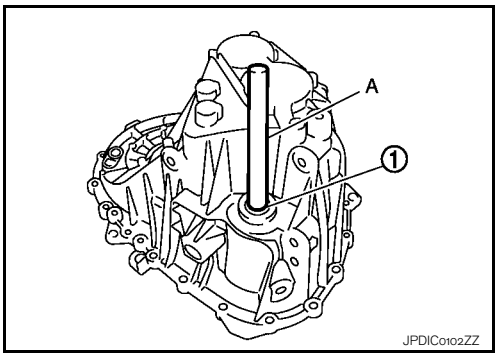


cardiagn.com

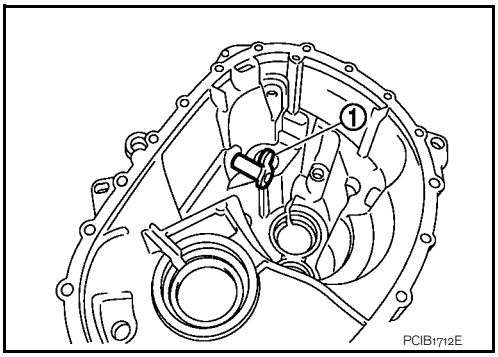
9. Install oil gutter (1) onto transaxle case.



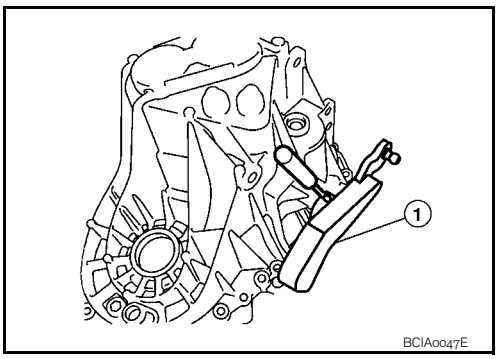
10. Install shifter lever oil seal (1) into transaxle case using the drift (A) [Commercial service tool].
11. Install selector lever oil seal and bushings into transaxle case using the drift [Commercial service tool].



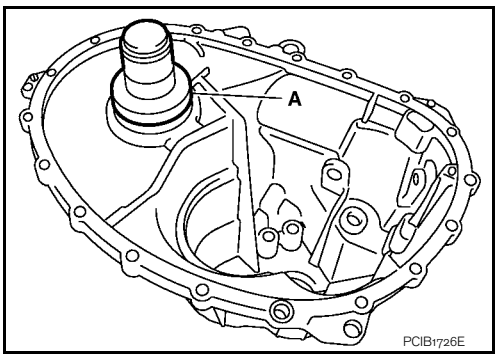
12. Install shift finger (1) into transaxle case.



13. Install selector lever (1) and then install retaining pin.
CAUTION:
Never reuse retaining pin.

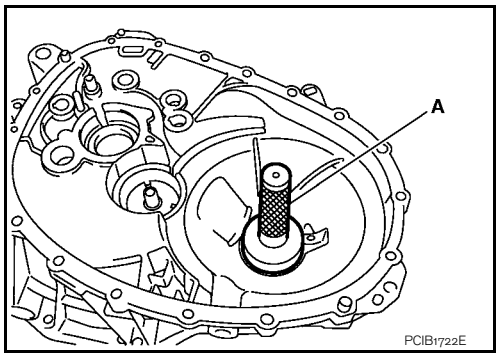


14. Install shim and differential side bearing outer race (transaxle case side) into transaxle case using the drift (A) [SST: ST33400001].
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.



cardiagn.com

15. Install differential side bearing outer race (clutch housing side) into clutch housing using the drift (A) [SST: KV38100200].
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.

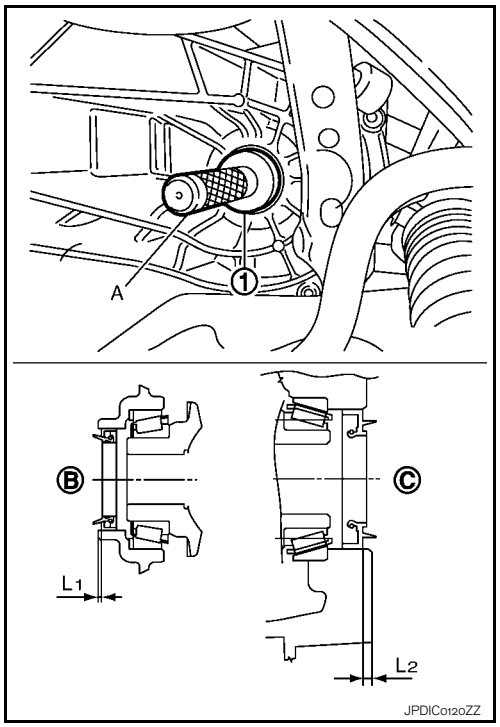


16. Install differential side oil seals (1) into clutch housing and transaxle case using the drift (A) [SST: KV38100300].

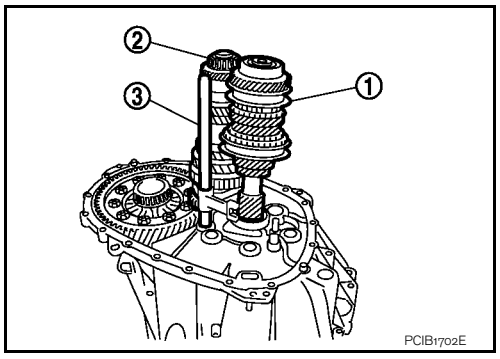
B : Transaxle case side
C : Clutch housing side

Dimension "L_1" : 1.2 - 1.8 mm (0.047 - 0.071 in)
Dimension "L_2" : 2.7 - 3.3 mm (0.106 - 0.130 in)

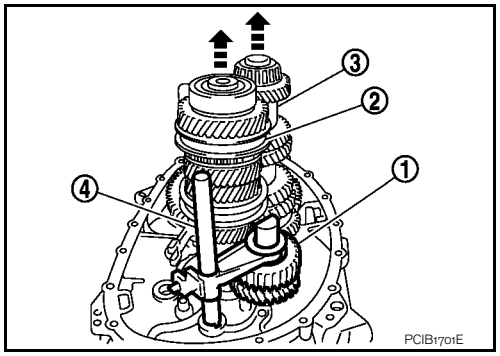
17. Install magnet onto clutch housing.
18. Install final drive assembly into clutch housing.



19. Install input shaft assembly (1), mainshaft assembly (2) and 1st-2nd fork rod (3) into clutch housing.
20. Install spring washer located under the reverse idler shaft.

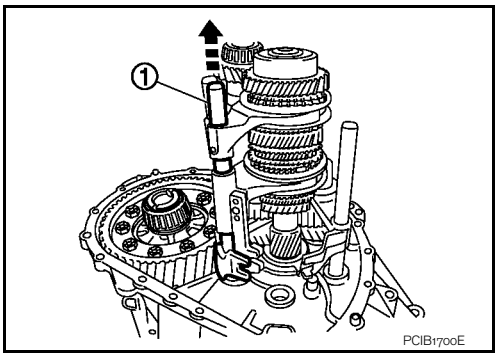


21. Install reverse gear assembly (1) according to the following.
a. Lift up the input shaft assembly (2) and mainshaft assembly (3).
b. Install reverse gear assembly and reverse fork rod (4) to clutch housing.
22. Install 3rd-4th shift fork and 5th-6th shift fork to 3rd-4th and 5th-6th fork rod.

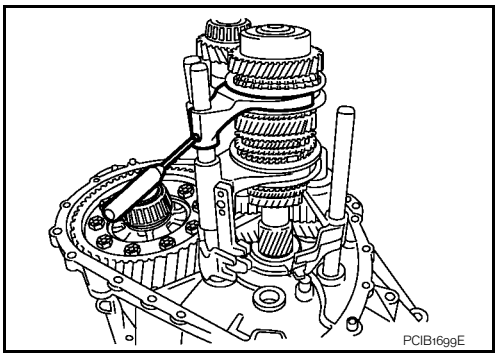


cardiagn.com

23. While lifting up fork rod (1), install 3rd-4th and 5th-6th fork rod assembly to clutch housing.
CAUTION:
Replace the 5th-6th shift fork, the 3rd-4th shift fork, and the 3rd-4th and 5th-6th fork rod as a set.

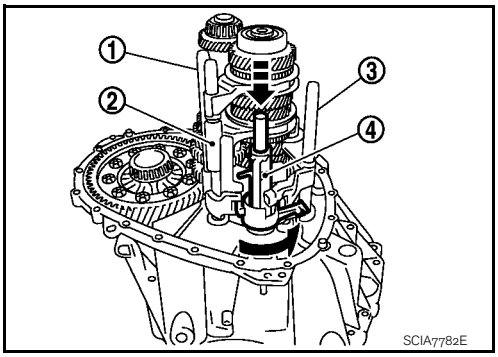


24. Install retaining pin into 5th-6th shift fork using a pin punch.
CAUTION:
Never reuse retaining pin.

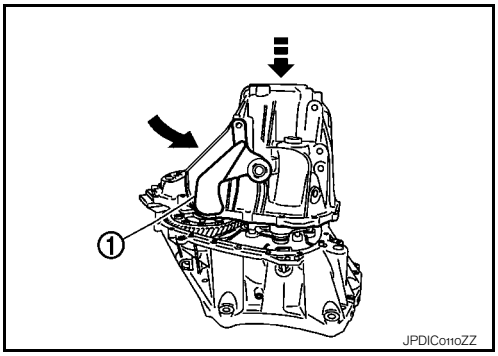


25. Move 1st-2nd fork rod (1), 3rd-4th and 5th-6th fork rod assembly (2), and reverse fork rod (3) to neutral position.
26. Install selector (4) into clutch housing.
27. Install spring of selector into return bushing.
28. Apply recommended sealant onto the mating surface of transaxle case.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

    CAUTION:
    - **Remove old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to both mating surfaces.**
    - **Check for damage on the mating surface.**
    - **Apply a continuous bead of liquid gasket to the mating surface.**

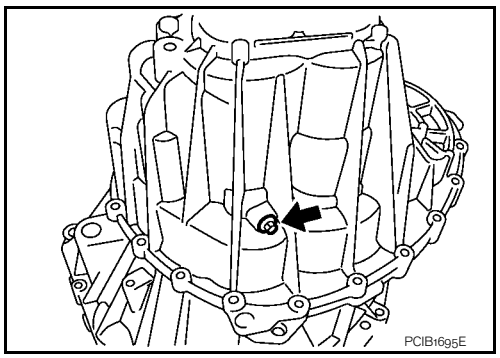


29. Engage shift finger and selector by moving selector lever (1). Install transaxle case to clutch housing.

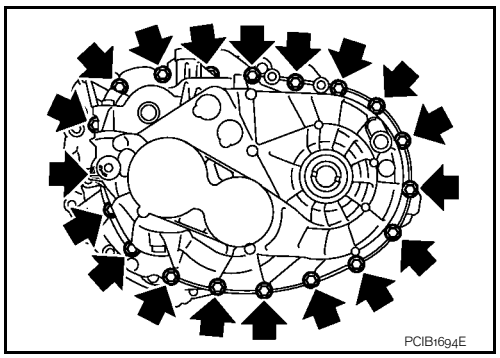


cardiagn.com

30. Install seal washer and reverse idler shaft mounting bolt, and then tighten mounting bolt to the specified torque.
CAUTION:
Never reuse seal washer.

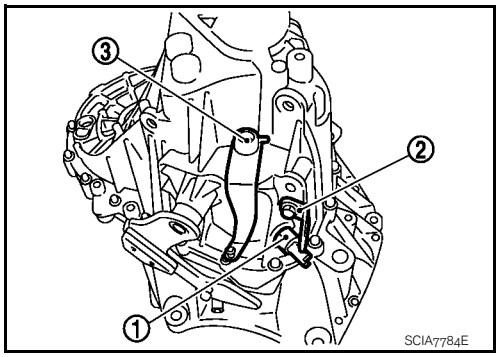


31. Tighten mounting bolts to the specified torque.



32. Apply recommended sealant to threads of position switch (1). Then install it to transaxle case and tighten to the specified torque.
- **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

33. Install bracket (2), and then mounting bolt to the specified torque.
34. Install shifter lever (3), and then install retaining pin using a pin punch.
CAUTION:
Never reuse retaining pin.



35. Install gasket onto drain plug, and then install it into clutch housing using the socket [Commercial service tool]. Tighten drain plug to the specified torque.
CAUTION:
Never reuse gasket.
36. Install gasket onto filler plug, and then install it into transaxle case. Tighten filler plug to the specified torque.
CAUTION:
- **Never reuse gasket.**
- **After gear oil is filled, tighten filler plug to specified torque.**

cardiagn.com

INPUT SHAFT AND GEAR

Exploded View

INFOID:0000000001070341

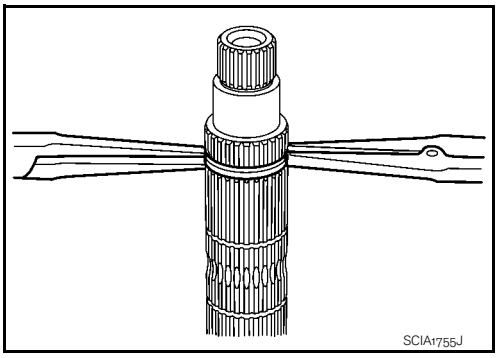
Refer to TM-71, "Exploded View".

Disassembly

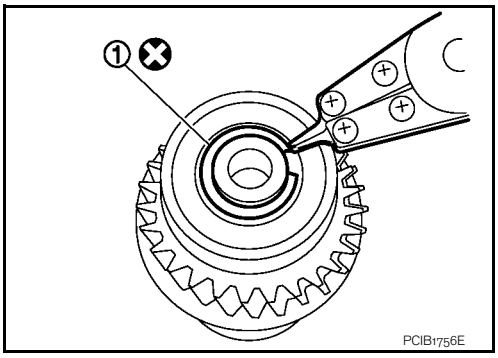
INFOID:0000000001070342

CAUTION:

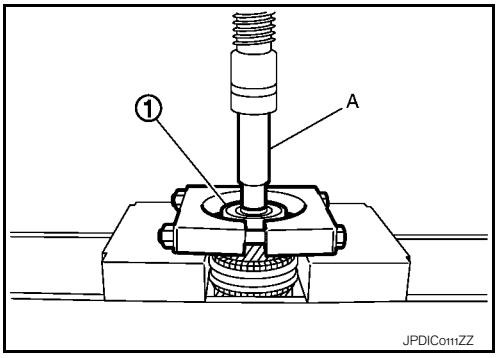
- **Set input shaft on the vise with back plate and remove gears and snap rings.**
- **For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.**
- **Disassemble gear components putting matching marks on the parts that do not affect any functions.**



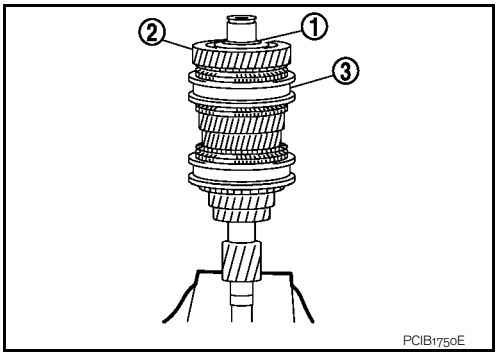
1. Remove snap ring (1).



2. Set the drift (A) [Commercial service tool] and puller to input shaft rear bearing (1), and remove input shaft rear bearing from input shaft using a press.

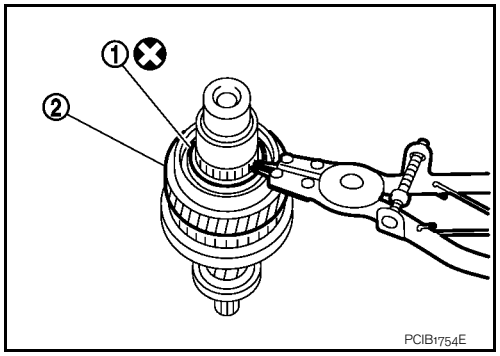


3. Remove washer (1), 6th input gear (2) and 5th-6th synchronizer assembly (3).
4. Remove needle bearing.

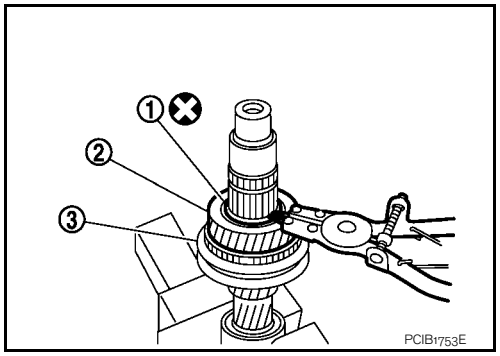


cardiagn.com

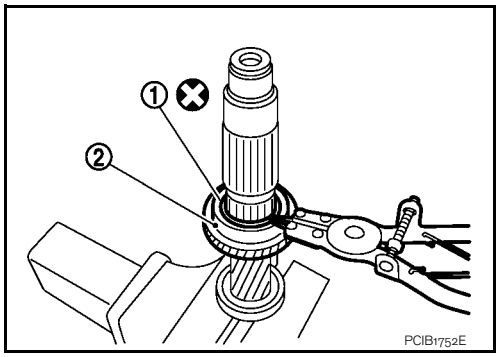
5. Remove snap ring (1), washer and 5th input gear (2).
6. Remove washer.



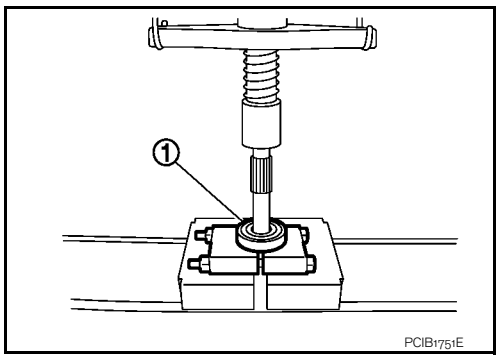
7. Remove snap ring (1), washer, 4th input gear (2) and 3rd-4th synchronizer assembly (3).



8. Remove snap ring (1), washer and 3rd input gear (2).



9. Remove input shaft front bearing (1) from input shaft using a press.



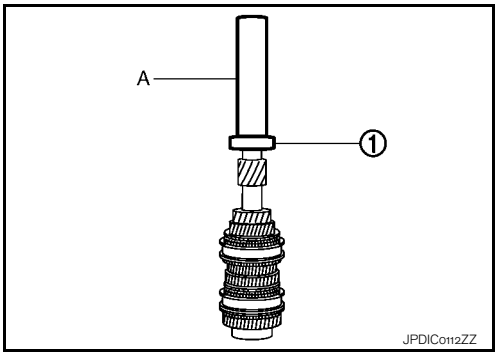
Assembly

INFOID:0000000001070343

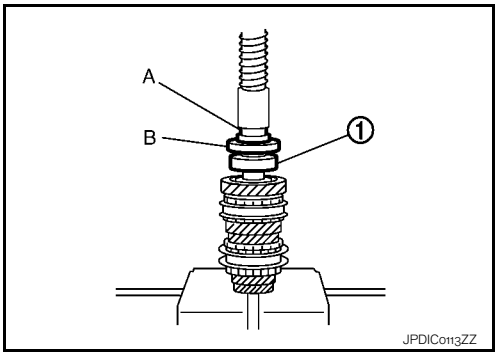
Note the following, and assembly is in the reverse order of disassembly.

cardiagn.com

- Press-fit the input shaft front bearing (1) onto the input shaft using the drift (A) [Commercial service tool] and press.

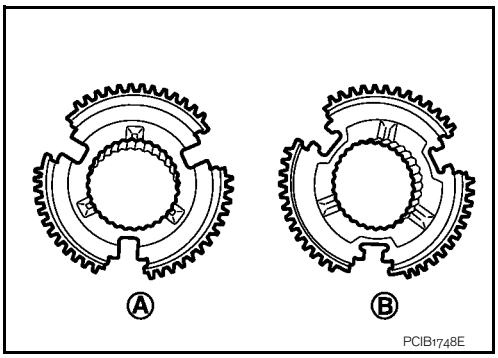


- Press-fit the input shaft rear bearing (1) onto the input shaft using the drift (A) [Commercial service tool], the drift (B) [SST: ST36720030] and press.



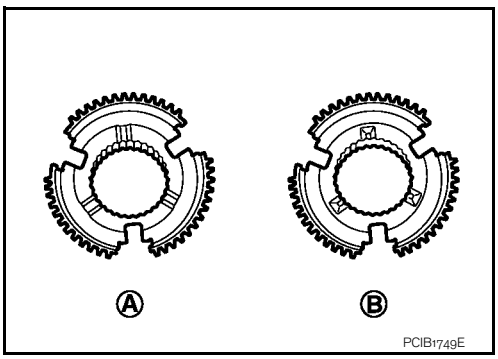
CAUTION:
- **Never reuse snap ring.**
- **Make sure that snap ring is securely installed in the groove.**
- **Apply gear oil to baulk ring.**
- **Replace coupling sleeve and synchronizer hub as a set.**
- **Be careful with the orientation of 3rd-4th synchronizer hub.**

A	: 3rd input gear side
B	: 4th input gear side



- **Be careful with the orientation of 5th-6th synchronizer hub.**

A	: 5th input gear side
B	: 6th input gear side



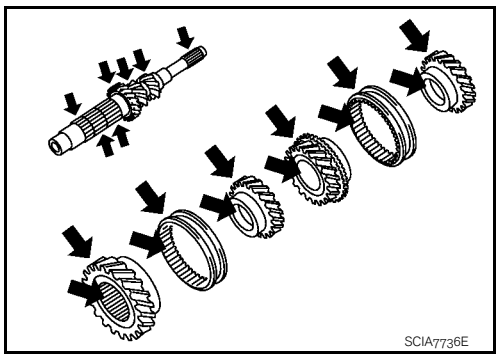
Inspection

INFOID:0000000001070344

INPUT SHAFT AND GEAR

cardiagn.com

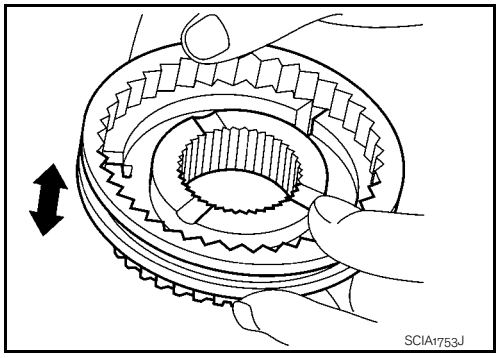
Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.


SCIA7736E

SYNCHRONIZER

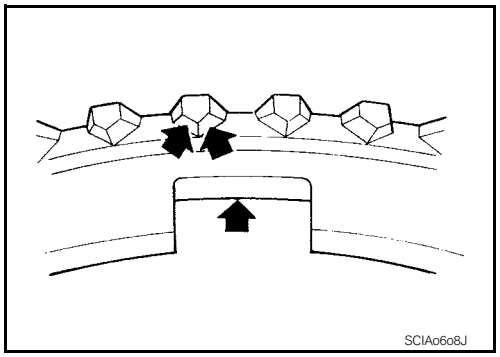
Synchronizer Hub and Coupling Sleeve

Check items below. If necessary, replace them with new ones.
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub and insert key.
- Coupling sleeve and synchronizer hub must move smoothly.


SCIA1753J

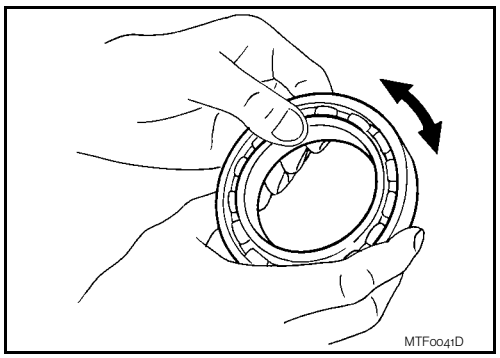
Baulk Ring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.


SCIA0608J

BEARING

Check items below. If necessary, replace them with new ones.
- Damage and rough rotation of bearing


MTF0041D

cardiagn.com

MAINSHAFT AND GEAR

Exploded View

INFOID:0000000001070345

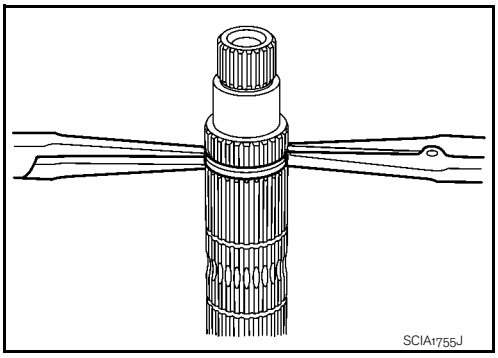
Refer to TM-71, "Exploded View".

Disassembly

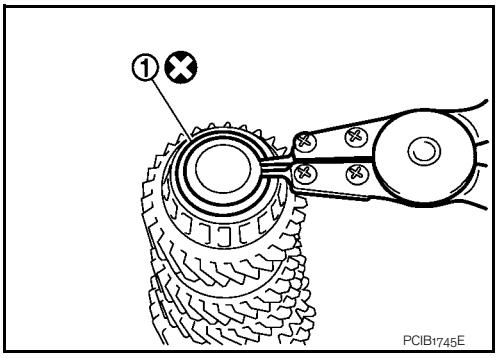
INFOID:0000000001070346

CAUTION:

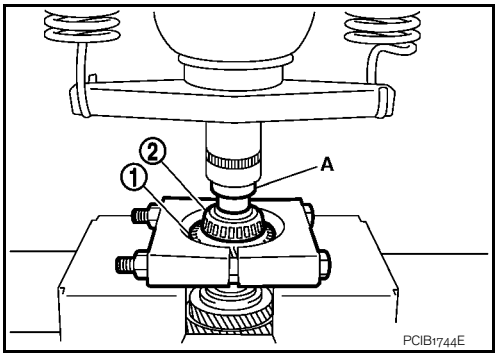
- **Set mainshaft on the vise with back plate and remove gears and snap rings.**
- **For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.**
- **Disassemble gear components putting matching marks on the parts that do not affect any functions.**



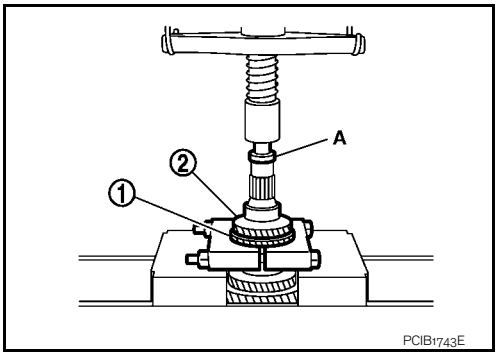
1. Remove snap ring (1).



2. Set the drift (A) [SST: ST33052000] and puller on 6th main gear (1), and remove mainshaft rear bearing inner race (2) and 6th main gear from mainshaft using a press.

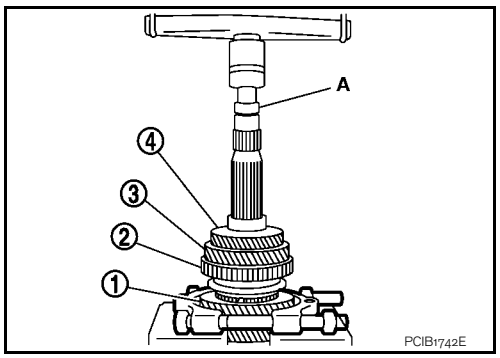


3. Set the drift (A) [SST: ST33052000] and puller on 4th main gear (1), and remove 5th main gear (2), and 4th main gear from mainshaft using a press.
4. Remove intermediate adjusting shim.

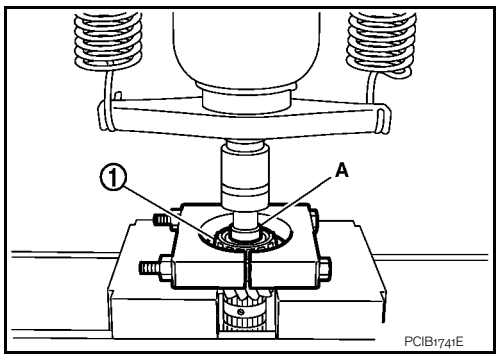


cardiagn.com

5. Set the drift (A) [SST: ST33052000] and puller on 1st main gear (1), and remove 1st main gear, 1st-2nd synchronizer assembly (2), 2nd main gear (3), bushing, and 3rd main gear (4) from mainshaft using a press.



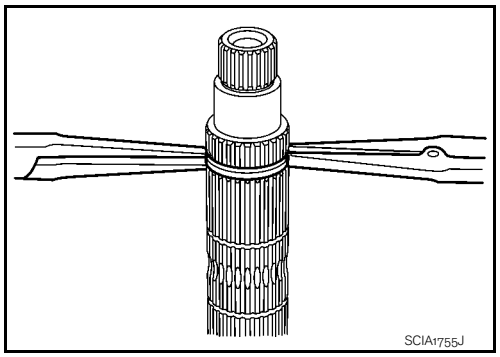
6. Set the drift (A) [SST: ST33052000] and puller on mainshaft front bearing inner race (1), and remove mainshaft front bearing inner race from mainshaft using a press.



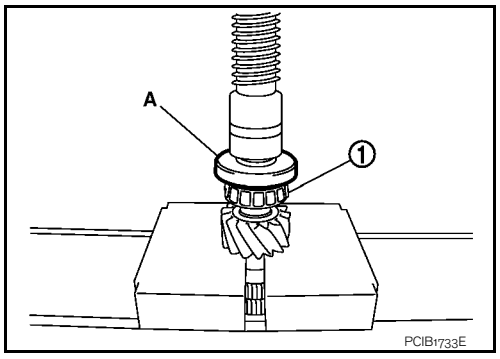
Assembly

INFOID:0000000001070347

CAUTION:
For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.

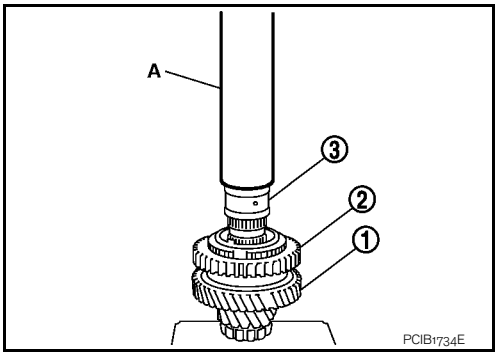


1. Press-fit the mainshaft front bearing inner race (1) onto the mainshaft using the drift (A) [SST: ST36720030] and press.
CAUTION:
Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.
2. Apply gear oil to 1st inner baulk ring, 1st synchronizer cone, 1st outer baulk ring, 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring.

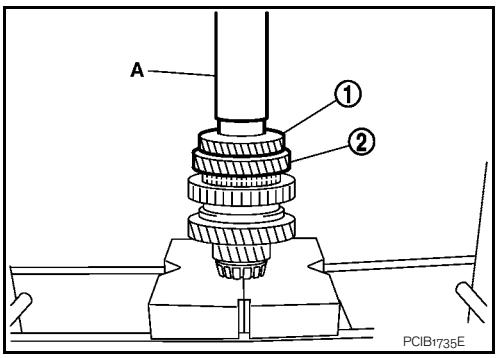


cardiagn.com

3. Install 1st main gear (1), and 1st-2nd synchronizer assembly (2) onto the mainshaft.
   CAUTION:
   - **Replace 1st inner baulk ring, 1st synchronizer cone and 1st outer baulk ring as a set.**
   - **Replace 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring as a set.**
   - **Replace 1st-2nd coupling sleeve and 1st-2nd synchronizer hub as a set.**
4. Press-fit the bushing (3) onto the mainshaft using the drift (A) [SST: KV32102700] and press.



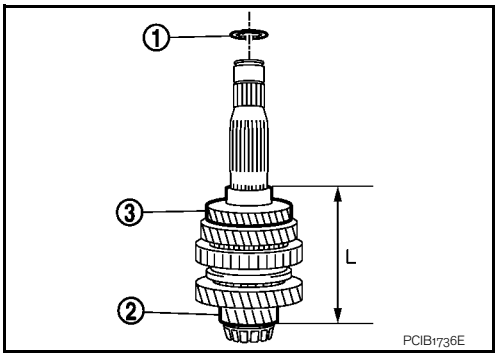
5. Press-fit 3rd main gear (1) to the mainshaft using the drift (A) [SST: KV32102700] and press after installing the 2nd main gear (2) and the 3rd main gear to the mainshaft.



6. Select the thickness of the intermediate adjusting shim (1) needed by measuring the distance “L” between the base of the mainshaft (2) and the top of the 3rd main gear (3).

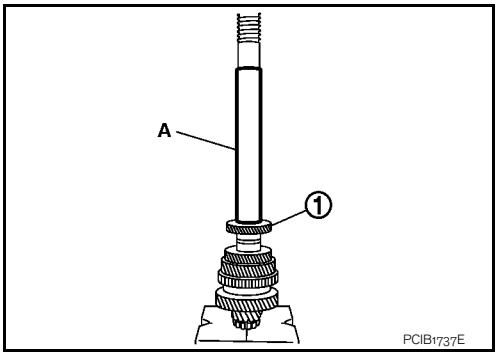
Unit: mm (in)

Distance “L”	Adjusting shim thickness
147.690 – 147.666 (5.8146 – 5.8136)	1.500 (0.0591)
147.665 – 147.641 (5.8136 – 5.8126)	1.525 (0.0600)
147.640 – 147.616 (5.8126 – 5.8116)	1.550 (0.0610)
147.615 – 147.591 (5.8116 – 5.8107)	1.575 (0.0620)
147.590 – 147.566 (5.8106 – 5.8097)	1.600 (0.0630)
147.565 – 147.541 (5.8096 – 5.8087)	1.625 (0.0640)
147.540 – 147.516 (5.8086 – 5.8077)	1.650 (0.0650)
147.515 – 147.491 (5.8077 – 5.8067)	1.675 (0.0659)
147.490 – 147.466 (5.8067 – 5.8057)	1.700 (0.0669)
147.465 – 147.441 (5.8057 – 5.8048)	1.725 (0.0679)
147.440 – 147.416 (5.8047 – 5.8038)	1.750 (0.0689)
147.415 – 147.391 (5.8037 – 5.8028)	1.775 (0.0699)



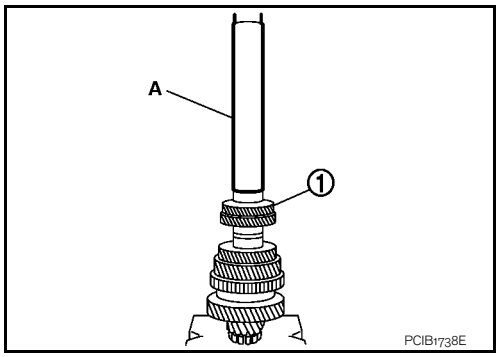
7. Install selected intermediate adjusting shim.

8. Press-fit the 4th main gear (1) onto the mainshaft using the drift (A) [SST: KV32102700].

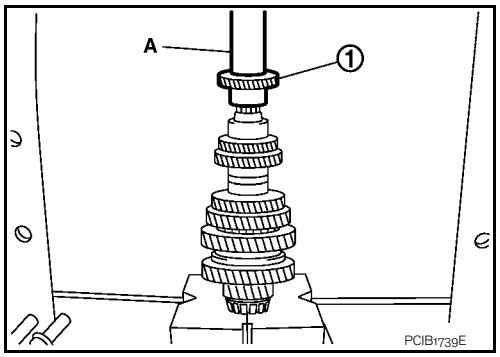


cardiagn.com

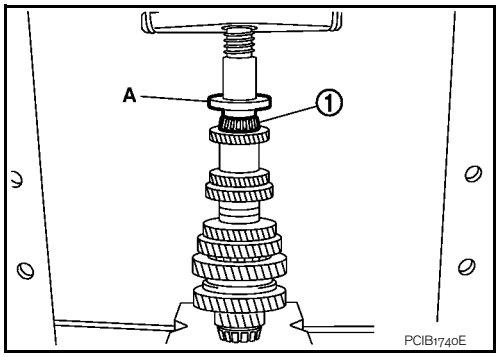
9. Press-fit the 5th main gear (1) onto the mainshaft using the drift (A) [SST: KV32102700].



10. Press-fit the 6th main gear (1) onto the mainshaft using the drift (A) [SST: KV32102700].



11. Press-fit the mainshaft rear bearing inner race (1) onto the mainshaft using the drift (A) [SST: ST30901000].
CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.
12. Install snap ring onto mainshaft.
CAUTION:
Never reuse snap ring.

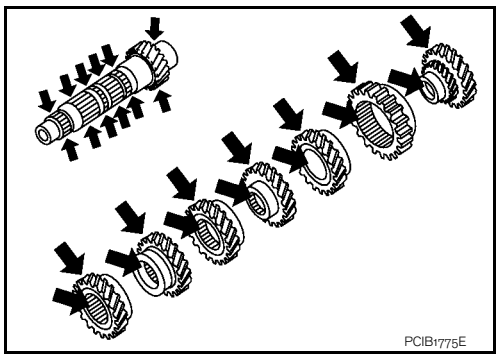


Inspection

INFOID:0000000001070348

MAINSHAFT AND GEAR

Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.

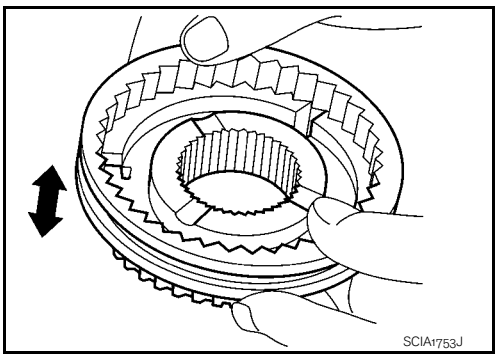


SYNCHRONIZER

Synchronizer Hub and Coupling Sleeve

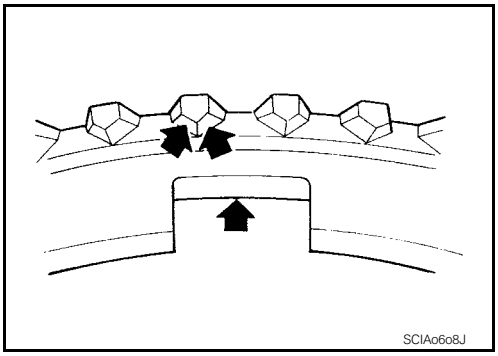
cardiagn.com

Check items below. If necessary, replace them with new ones.
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub, insert key.
- Coupling sleeve and synchronizer hub must move smoothly.



Baulk Ring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.

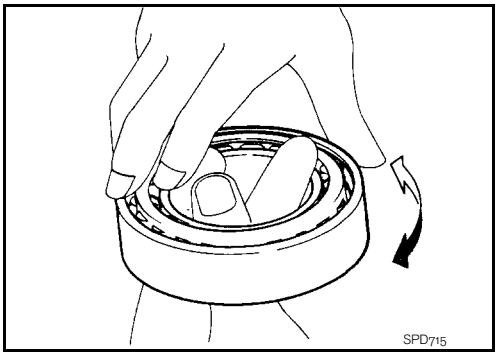


BEARING

Check for bearing damage and rough rotation. If necessary, replace with a new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.



CAUTION:

Bearing preloading shim: after the intermediate adjusting shim and/or the 6th main gear, 5th main gear, and 4th main gear have been replaced, it is necessary to modify the bearing preloading setting by changing the bearing preloading shim.
- **Replacing the intermediate adjusting shim.**
- **Increase the size of the bearing preloading shim, if the replaced intermediate adjusting shim is thinner than the shim used before.**
- **Decrease the size of the bearing preloading shim, if the replaced intermediate adjusting shim is thicker than the shim used before.**
- **Replacing the 6th main gear, 5th main gear, and 4th main gear.**
- **Measure the thickness of the main gear used before and the new main gear.**
- **Increase the thickness of the bearing preloading shim, if the difference is smaller than 0.025 mm (0.0010 in).**
- **Decrease the thickness of the bearing preloading shim, if the difference is greater than 0.025 mm (0.0010 in).**

cardiagn.com

REVERSE IDLER SHAFT AND GEAR

Exploded View

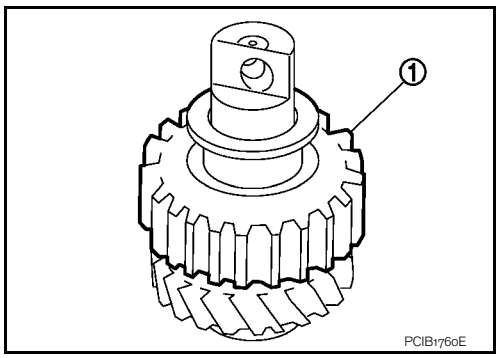
INFOID:0000000001070349

Refer to TM-71, "Exploded View".

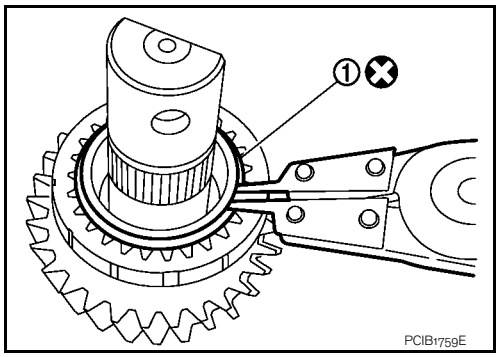
Disassembly

INFOID:0000000001070350

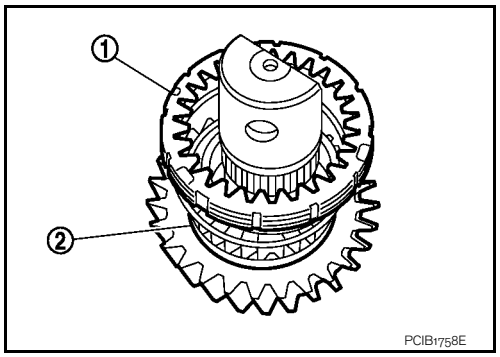
1. Remove reverse output gear (1).



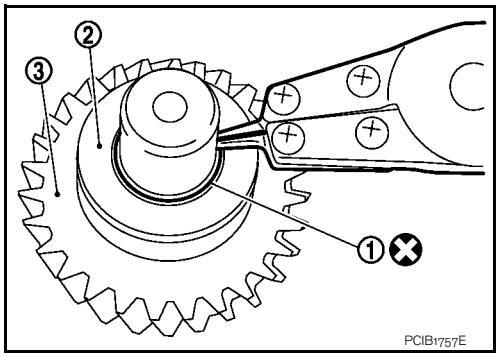
2. Remove snap ring (1).



3. Remove reverse baulk ring (1) and return spring (2).

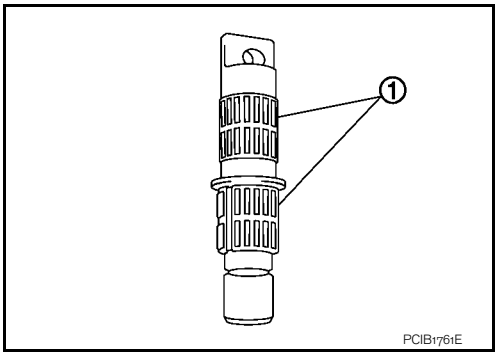


4. Remove snap ring (1), lock washer (2), reverse input gear (3) and washer.



cardiagn.com

5. Remove needle bearings (1) and washer from reverse idler shaft.



Assembly

INFOID:0000000001070351

Note the following, and assemble in the reverse order of disassembly.

CAUTION:

- **Never reuse snap ring.**
- **Make sure that snap ring is securely installed in the groove.**

cardiagn.com

FINAL DRIVE

Exploded View

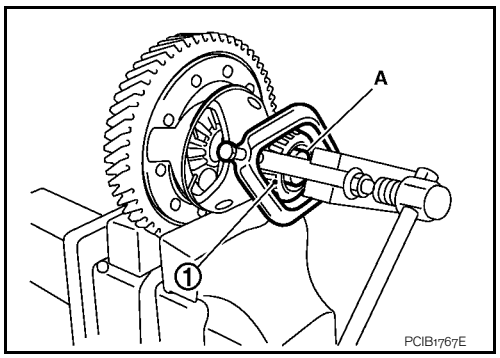
INFOID:0000000001070353

Refer to TM-71, "Exploded View".

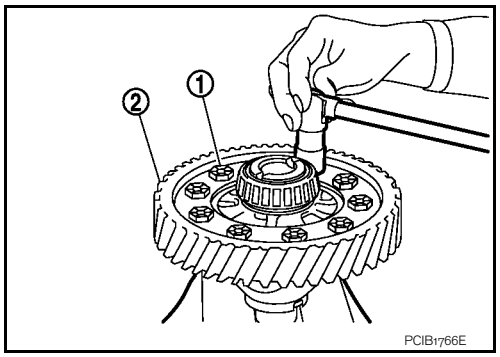
Disassembly

INFOID:0000000001070354

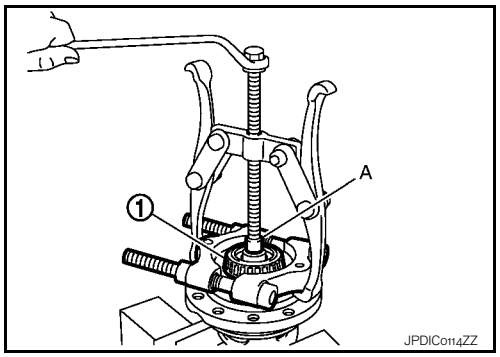
1. Remove differential side bearing inner race (clutch housing side) (1) using the drift (A) [SST: ST33061000] and a puller.
2. Remove speedometer drive gear.



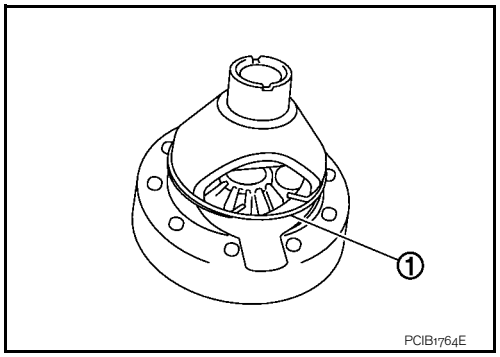
3. Remove final gear mounting bolts (1), and then separate the final gear (2) from differential case.



4. Remove differential side bearing inner race (transaxle case side) (1) using the drift (A) [Commercial service tool] and a suitable puller.



5. Remove lock ring (1) from differential case.
6. Remove pinion mate shaft, pinion mate gears, side gears and thrust washer from differential case.



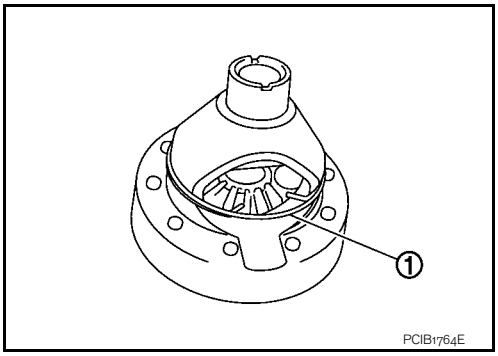
Assembly

INFOID:0000000001070355

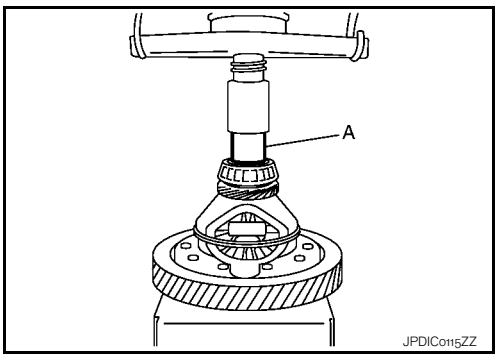
1. Install pinion mate shaft, pinion mate gears, side gears and thrust washer into differential case.

cardiagn.com

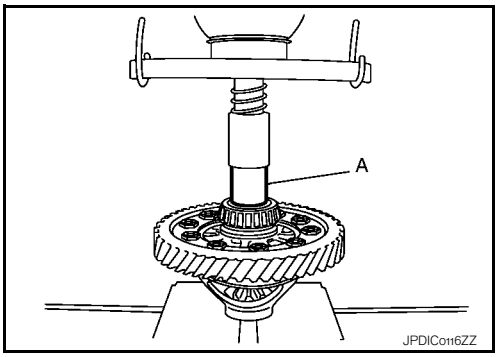
2. Install lock ring (1) onto differential case.
CAUTION:
Make sure that lock ring is securely installed in the groove.
3. Install final gear into differential case, and tighten final gear mounting bolts to the specified torque.
4. Install speedometer drive gear onto differential case.



5. Press-fit the differential side bearing inner race (clutch housing side) onto the differential case using the drift (A) [Commercial service tool] and press.
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.



6. Press-fit the differential side bearing inner race (transaxle case side) onto the differential case using the drift (A) [Commercial service tool] and press.
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.

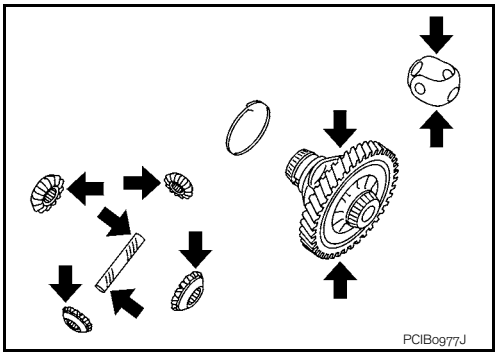


Inspection

INFOID:0000000001070356

GEAR, WASHER, SHAFT AND CASE

Check side gears, thrust washer, pinion mate shaft, pinion mate gears, lock ring and differential case. If necessary, replace with a new one.



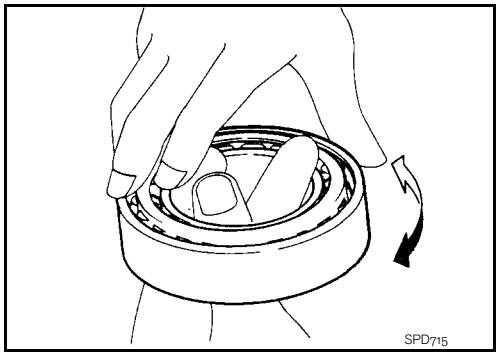
BEARING

cardiagn.com

Check for bearing damage and rough rotation. If necessary, replace with a new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.



cardiagn.com

SHIFT FORK AND FORK ROD

Exploded View

INFOID:0000000001070357

Refer to TM-71, "Exploded View".

Disassembly

INFOID:0000000001070358

Refer to TM-76, "Disassembly" for disassembly procedure.

Assembly

INFOID:0000000001070359

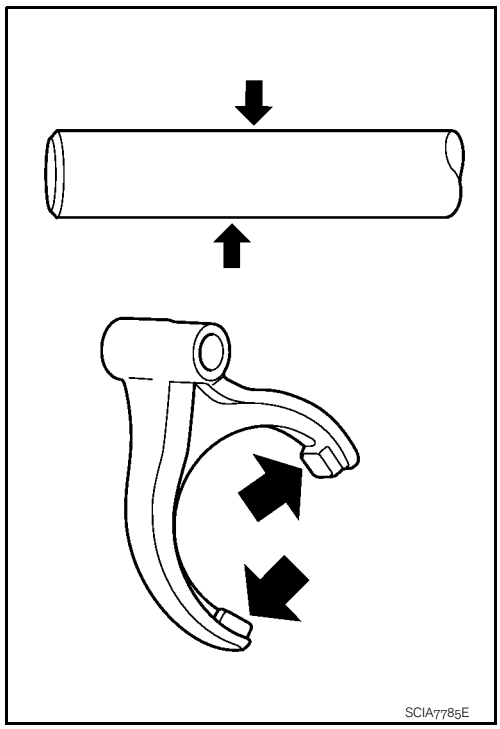
Refer to TM-82, "Assembly" for assembly procedure.

Inspection

INFOID:0000000001070360

FORK ROD AND SHIFT FORK

Check contact surface and sliding surface of fork rod and shift fork for wear, damage, and bend. Replace if necessary.



cardiagn.com

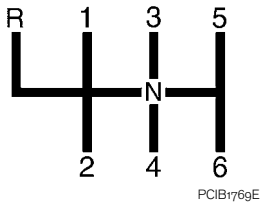
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000001043094

TRANSAXLE

Engine type			MR20DE	K9K
Transaxle model			RS6F94R	
Model code number			JD200	JD500
Number of speeds			6	
Synchromesh type			Warner	
Shift pattern			 PCIB1769E	
Gear ratio	1st		3.7273	
	2nd		2.1053	1.9474
	3rd		1.5185	1.3226
	4th		1.1714	0.975
	5th		0.9143	0.7632
	6th		0.7674	0.6383
	Reverse		3.6865	
Number of teeth	Input gear	1st	11	
		2nd	19	
		3rd	27	31
		4th	35	40
		5th	35	38
		6th	43	47
		Reverse	11	
	Main gear	1st	41	
		2nd	40	37
		3rd	41	
		4th	41	39
		5th	32	29
		6th	33	30
		Reverse	42	
	Reverse idler gear	Input/Output	28/29	
Oil capacity		ℓ (Imp pt)	Approx. 2.0 (3-1/2)	
Remarks	Reverse synchronizer		Installed	
	Triple-cone synchronizer		1st and 2nd	

FINAL GEAR

cardiagn.com

Engine type		MR20DE	K9K
Transaxle model		RS6F94R	
Model code number		JD200	JD500
Final gear ratio		4.4375	
Number of teeth	Final gear/Pinion	71/16	
	Side gear/Pinion mate gear	13/10	

cardiagn.com

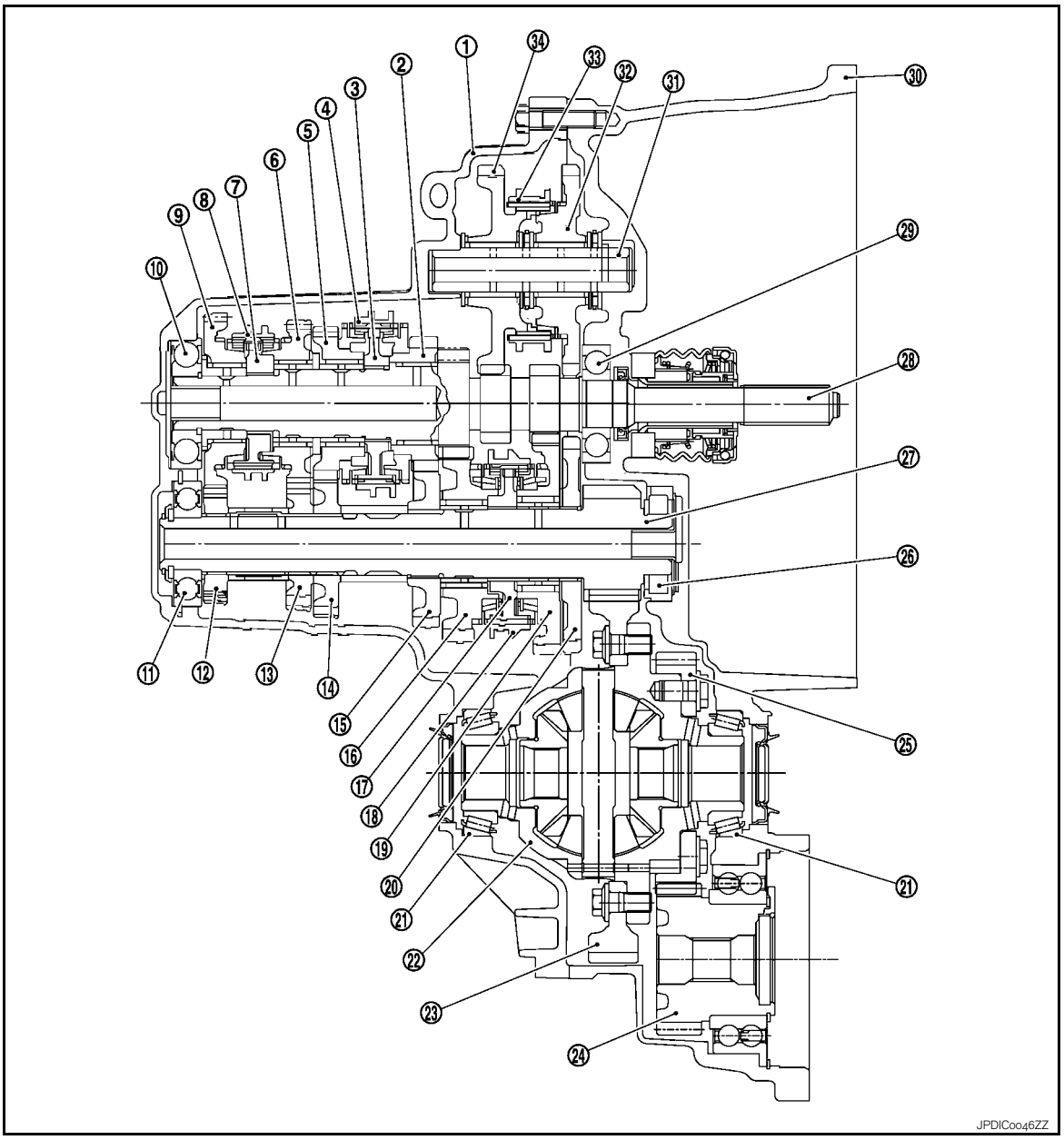
FUNCTION DIAGNOSIS

M/T SYSTEM

System Diagram

INFOID:0000000001034930

CROSS-SECTIONAL VIEW



1. Transaxle case
2. 3rd input gear
3. 3rd-4th synchronizer hub
4. 3rd-4th coupling sleeve
5. 4th input gear
6. 5th input gear
7. 5th-6th synchronizer hub
8. 5th-6th coupling sleeve
9. 6th input gear
10. Input shaft rear bearing
11. Mainshaft rear bearing
12. 6th main gear
13. 5th main gear
14. 4th main gear
15. 3rd main gear
16. 2nd main gear
17. 1st-2nd synchronizer hub
18. 1st-2nd coupling sleeve
19. 1st main gear
20. Reverse main gear
21. Differential side bearing
22. Differential case assembly
23. Final gear
24. Output gear assembly
25. Reduction gear
26. Mainshaft front bearing
27. Mainshaft

cardiagn.com

28. Input shaft
29. Input shaft front bearing
30. Clutch housing
31. Reverse idler shaft
32. Reverse idler gear (front)
33. Reverse coupling sleeve
34. Reverse idler gear (rear)

System Description

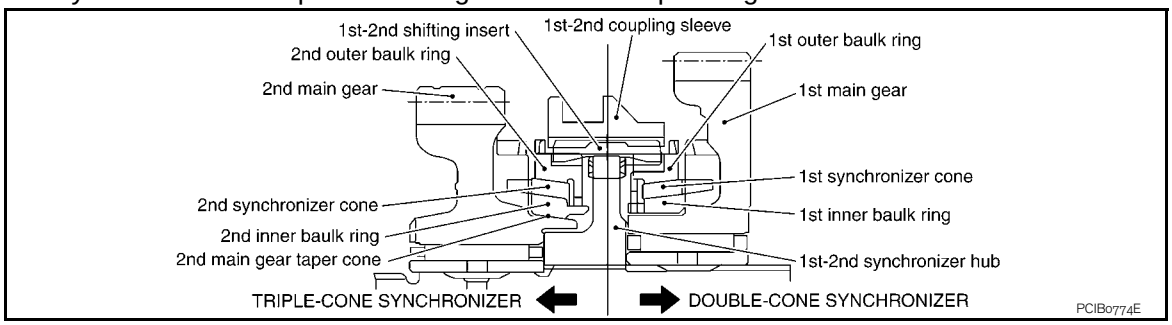
INFOID:0000000001034931

DOUBLE-CONE SYNCHRONIZER

Double-cone synchronizer are adopted for 1st and 3rd gears to reduce operating force of the control lever.

TRIPLE-CONE SYNCHRONIZER

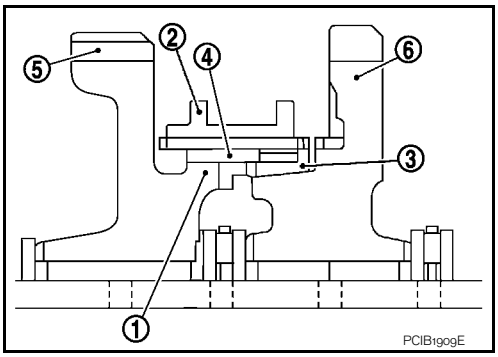
Triple-cone synchronizer is adopted for 2nd gear to reduce operating force of the control lever.



REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

Reverse gear can be matched smoothly in a structure by setting synchronizer hub (1) of reverse idler gear (rear), reverse coupling sleeve (2), reverse baulk ring (3), and reverse insert spring (4) to reverse idler gears, and letting reverse gear be synchronized.

5 : Reverse idler gear (rear)
6 : Reverse idler gear (front)



cardiagn.com

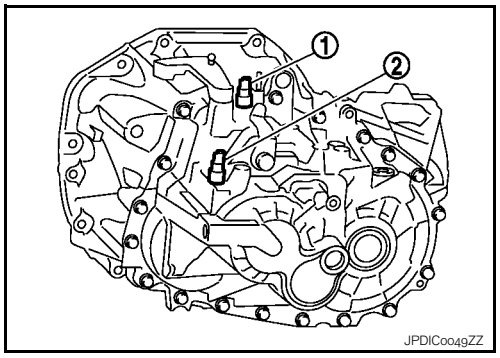
COMPONENT DIAGNOSIS

BACK-UP LAMP SWITCH

Component Parts Location

INFOID:0000000001065855

1 : Park/Neutral position (PNP) switch
2 : Back-up lamp switch



Component Inspection

INFOID:0000000001065856

1. CHECK BACK-UP LAMP SWITCH

Check continuity between back-up lamp switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
1 – 2	Reverse	Existed
	Except reverse	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace back up lamp switch. Refer to TM-125, "Exploded View".

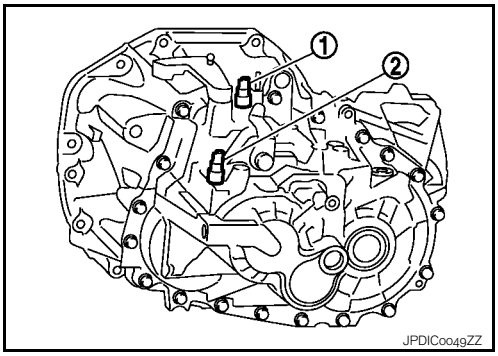
cardiagn.com

PARK/NEUTRAL POSITION (PNP) SWITCH

Component Parts Location

INFOID:0000000001065857

1 : Park/Neutral position (PNP) switch
2 : Back-up lamp switch



Component Inspection

INFOID:0000000001065858

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

Check continuity between park/neutral position (PNP) switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
1 – 2	Neutral	Existed
	Except neutral	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace park/neutral position (PNP) switch. Refer to TM-125, "Exploded View".

cardiagn.com

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001034932

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		TM-115			TM-125		TM-118	TM-125		TM-125			
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	STRIKING ROD ASSEMBLY (Worn or damaged)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2							3	3		
	Oil leakage		3	1	2	2							
	Hard to shift or will not shift		1	1			2					3	3
	Jumps out of gear						1	2	3	3			

cardiagn.com

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Manual Transaxle

INFOID:0000000001066146

CAUTION:

- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never reuse transaxle gear oil, once it has been drained.**
- **Check oil level or replace gear oil with vehicle on level surface.**
- **During removal or installation, keep inside of transaxle clear of dust or dirt.**
- **Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.**
- **Never damage sliding surfaces and mating surfaces.**

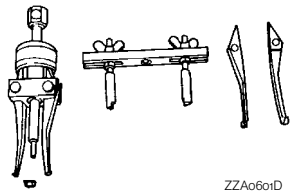
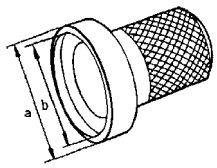
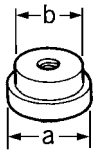
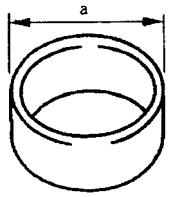
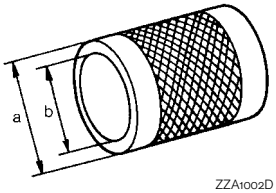
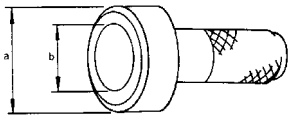
cardiagn.com

PREPARATION

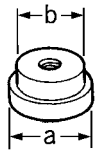
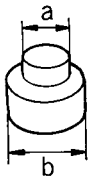
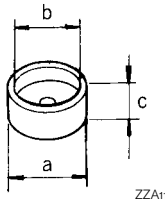
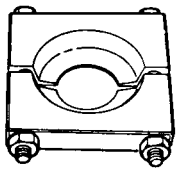
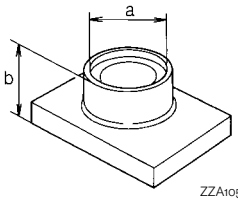
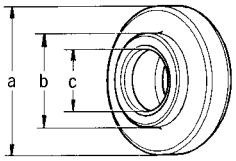
PREPARATION

Special Service Tools

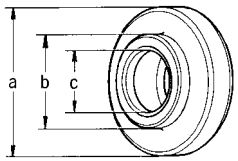
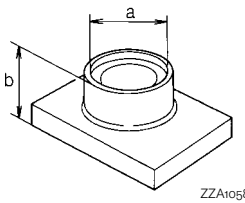
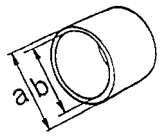
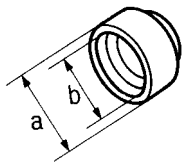
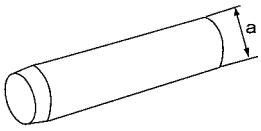
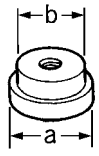
INFOID:0000000001069584

Tool number Tool name	Description
KV381054S0 Puller  ZZA0601D	• Removing differential side bearing outer race (transaxle case side) • Removing mainshaft front bearing • Removing differential side bearing outer race (clutch housing side)
ST33400001 Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  ZZA0814D	Installing differential side oil seal (clutch housing side)
ST35321000 Drift a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.  ZZA1000D	• Installing input shaft oil seal • Installing reverse main gear • Installing 1st main gear bushing • Installing 1st-2nd synchronizer hub assembly • Installing 2nd main gear bushing • Installing 3rd main gear
KV40105320 Drift a: 88 mm (3.46 in) dia.  ZZA0898D	Installing differential side bearing outer race (clutch housing side)
ST33200000 Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.  ZZA1002D	• Installing mainshaft front bearing • Installing 6th input gear bushing • Installing 4th main gear • Installing 5th main gear • Installing 6th main gear
ST30720000 Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.  ZZA0811D	• Installing differential side oil seal (transaxle case side) • Installing differential side bearing outer race (clutch housing side) • Installing differential side bearing outer race (transaxle case side) • Installing mainshaft rear bearing • Installing differential side bearing (clutch housing side) • Installing differential side bearing (transaxle case side)

cardiagn.com

Tool number Tool name		Description
ST33061000 Drift a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia.	 ZZA1000D	• Installing bore plug • Removing differential side bearing (transaxle case side) • Removing differential side bearing (clutch housing side)
ST33052000 Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.	 ZZA1023D	• Removing input shaft rear bearing • Removing 6th input gear, 6th input gear bushing, 5th-6th synchronizer hub assembly, and 5th input gear • Removing 5th input gear bushing, 4th input gear, 4th input gear bushing, 3rd-4th synchronizer hub assembly, and 3rd input gear • Installing input shaft front bearing • Removing mainshaft rear bearing • Removing 6th main gear • Removing 4th main gear and 5th main gear
KV40105020 Drift a: 39.7 mm (1.563 in) dia. b: 35 mm (1.38 in) dia. c: 15 mm (0.59 in)	 ZZA1133D	Removing 3rd main gear, 2nd main gear, 2nd main gear bushing, 1st-2nd synchronizer hub assembly, 1st main gear, 1st main gear bushing, and reverse main gear
ST30031000 Puller	 ZZA0537D	Measuring wear of inner baulk ring
KV40105710 Press stand a: 46 mm (1.81 in) dia. b: 41 mm (1.61 in)	 ZZA1058D	• Installing 3rd-4th synchronizer hub assembly • Installing 4th input gear bushing • Installing 5th input gear bushing • Installing 5th-6th synchronizer hub assembly • Installing 2nd main gear bushing • Installing 3rd main gear
ST30901000 Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia.	 ZZA0978D	• Installing input shaft rear bearing • Installing 4th main gear • Installing 5th main gear • Installing 6th main gear • Installing mainshaft rear bearing

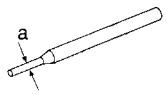
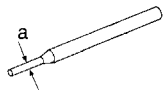
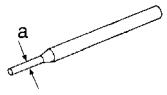
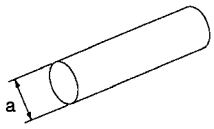
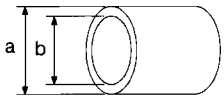
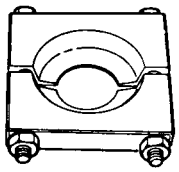
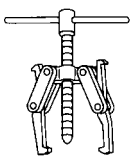
cardiagn.com

Tool number Tool name		Description
ST30032000 Drift a: 80 mm (3.15 in) dia. b: 38 mm (1.50 in) dia. c: 31 mm (1.22 in) dia.	 ZZA0978D	Installing input shaft front bearing
ST38220000 Press stand a: 63 mm (2.48 in) dia. b: 65 mm (2.56 in)	 ZZA1058D	• Installing reverse main gear • Installing 1st main gear bushing • Installing 1st-2nd synchronizer hub assembly
KV40101630 Drift a: 68 mm (2.68 in) dia. b: 60 mm (2.36 in) dia.	 ZZA1003D	Installing reverse main gear
KV38102510 Drift a: 71 mm (2.80 in) dia. b: 65 mm (2.56 in) dia.	 ZZA0838D	• Installing 1st main gear bushing • Installing 1st-2nd synchronizer hub assembly • Installing differential side bearing (clutch housing side) • Installing differential side bearing (transaxle case side)
ST15243000 Drift a: 30 mm (1.18 in) dia.	 SCIA1088J	Measuring end play of side gear
ST30612000 Drift b: 62 mm (2.44 in) dia. b: 40 mm (1.57 in) dia.	 ZZA1000D	Removing output gear bearing

Commercial Service Tools

INFOID:0000000001069585

cardiagn.com

Tool name	Description
Pin punch a: 4.5 mm (0.177 in) dia.  NT410	Removing and installing retaining pin
Pin punch a: 5.5 mm (0.217 in) dia.  NT410	Removing and installing retaining pin of selector lever
Pin punch a: 7.5 mm (0.295 in) dia.  NT410	Removing and installing retaining pin of each shifter lever
Drift a: 24.5 mm (0.965 in) dia.  S-NT063	Installing striking rod oil seal and shifter lever oil seal
Drift a: 80 mm (3.15 in) dia. b: 70 mm (2.76 in) dia.  S-NT474	Installing output gear bearing
Puller  ZZA0537D	Removing each bearing, gear, and bushing
Puller  NT077	Removing each bearing, gear, and bushing

cardiagn.com

ON-VEHICLE MAINTENANCE

GEAR OIL

Exploded View

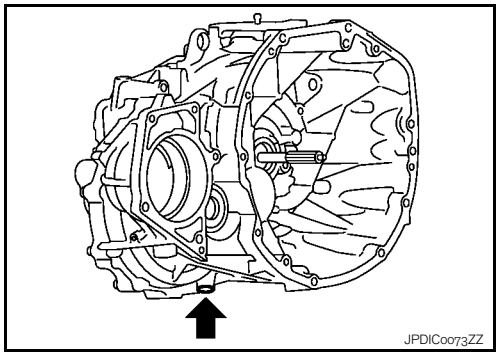
INFOID:0000000001066147

Refer to TM-125, "Exploded View".

Draining

INFOID:0000000001034936

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug and then drain gear oil.
3. Set a new gasket on drain plug and install it to clutch housing. Tighten drain plug to the specified torque.
   CAUTION:
   Never reuse gasket.



Refilling

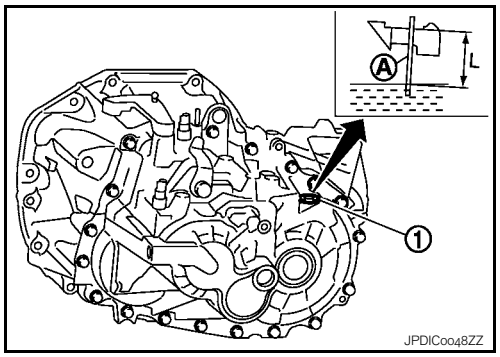
INFOID:0000000001034937

1. Remove filler plug (1). Fill with new gear oil to transaxle.

   A : Suitable gauge

   Oil grade and viscosity **: Refer to MA-21, "Fluids and Lubricants".**

   Oil capacity (reference) **: Refer to TM-183, "General Specifications".**



2. After refilling gear oil, check oil level. Refer to TM-115, "Inspection".
3. Set a new gasket on filler plug and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
4. Tighten filler plug to the specified torque.

Inspection

INFOID:0000000001034938

LEAKAGE

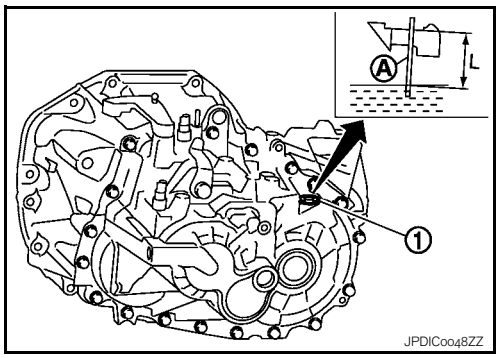
Make sure that gear oil is not leaking from transaxle or around it.

LEVEL

1. Remove filler plug (1).
2. Measure oil level using a suitable gauge (A) as shown in the figure and then check if it is within the specifications.

   Oil level "L" **: Refer to TM-183, "General Specifications".**

   CAUTION:
   Never start engine while checking oil level.
3. Set a new gasket on filler plug (1) and then install it to transaxle case.
   CAUTION:



cardiagn.com

Never reuse gasket.

4. Tighten filler plug to the specified torque.

cardiagn.com

ON-VEHICLE REPAIR

SIDE OIL SEAL

Exploded View

INFOID:0000000001066148

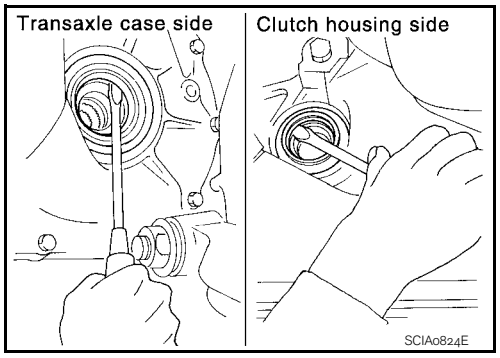
Refer to TM-125, "Exploded View".

Removal and Installation

INFOID:0000000001034939

REMOVAL

1. Remove front drive shafts. Refer to FAX-56, "Removal and Installation".
2. Remove differential side oil seals using a suitable tool.
   CAUTION:
   Never damage transaxle case and clutch housing.



INSTALLATION

Note the following, and install in the reverse order of removal.

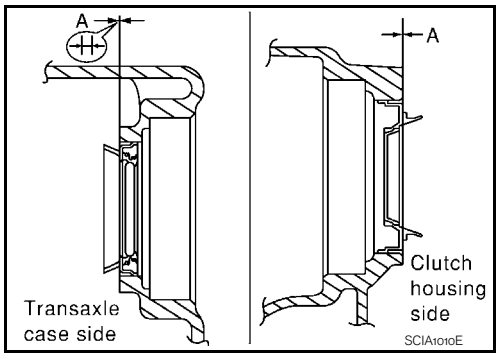
- Install differential side oil seal to clutch housing using the drift [SST: ST33400001].

  Dimension “A” : -0.5 - 0.5 mm (-0.020 - 0.020 in)

  CAUTION:
  - **Never reuse differential side oil seal.**
  - **When installing, never incline differential side oil seal.**
  - **Never damage clutch housing.**
- Install differential side oil seal to transaxle case using the drift [SST: ST30720000].

  Dimension “A” : -0.5 - 0.5 mm (-0.020 - 0.020 in)

  CAUTION:
  - **Never reuse differential side oil seal.**
  - **When installing, never incline differential side oil seal.**
  - **Never damage transaxle case.**
- Check oil level and oil leakage after installation. Refer to TM-115, "Inspection".

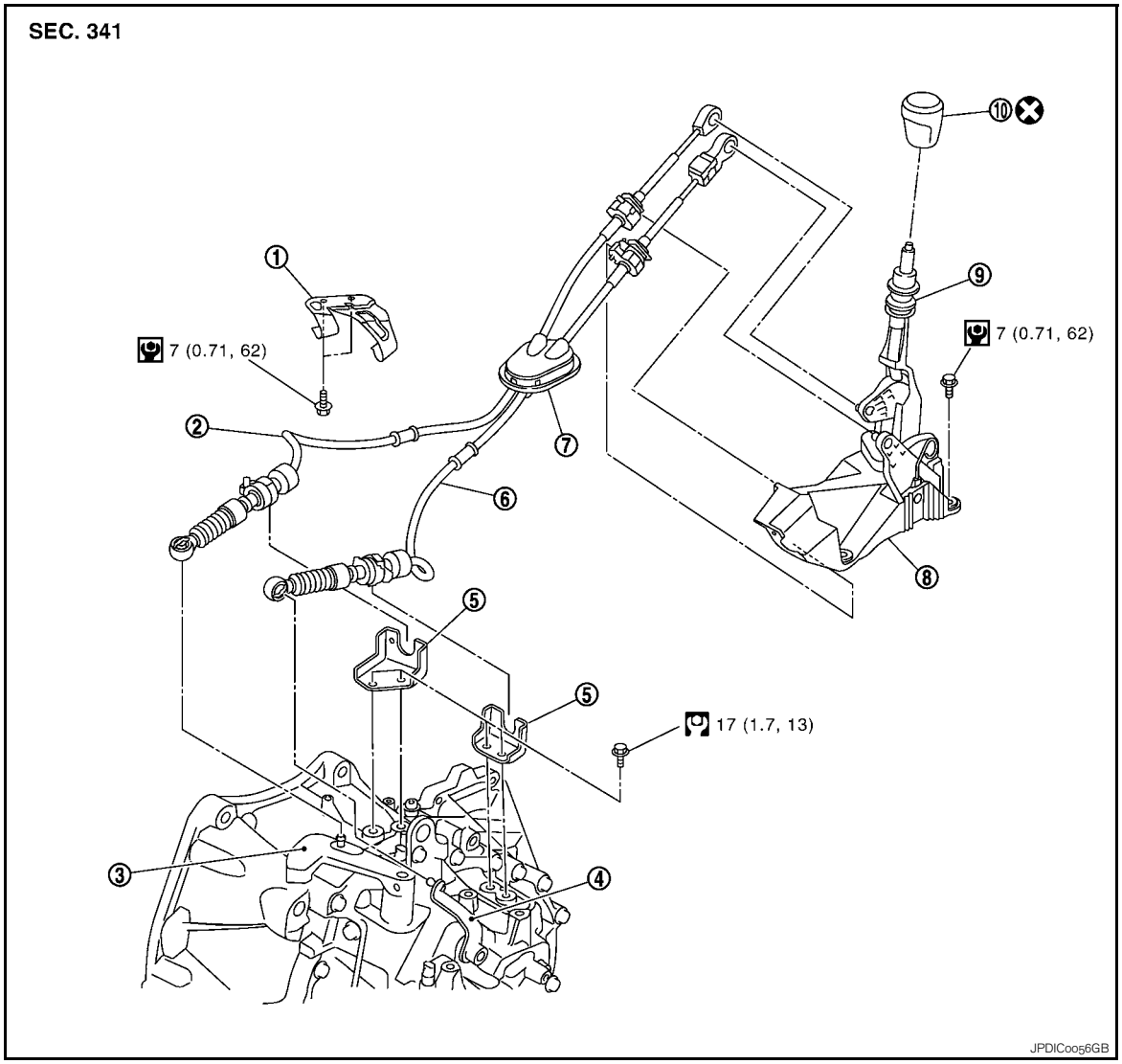


cardiagn.com

CONTROL LINKAGE

Exploded View

INFOID:0000000001034944



1. Bracket
2. Shift cable
3. Shifter lever A
4. Selector lever
5. Cable mounting bracket
6. Select cable
7. Grommet
8. Control device assembly
9. Control lever
10. Control lever knob

Refer to GI-4, "Components" for the symbols in the figure.

Removal and Installation

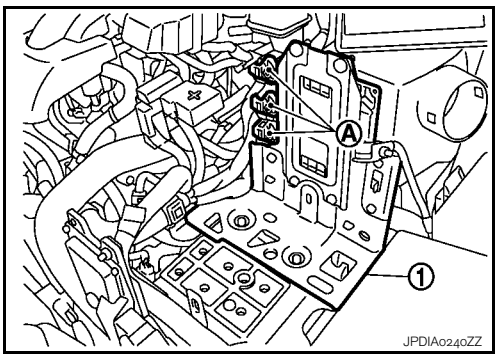
INFOID:0000000001034945

REMOVAL

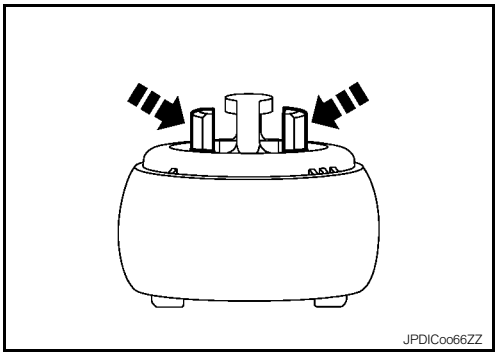
1. Remove the air cleaner case and air duct (inlet). Refer to EM-144, "Removal and Installation".
2. Remove the battery. Refer to PG-118, "Removal and Installation".

cardiagn.com

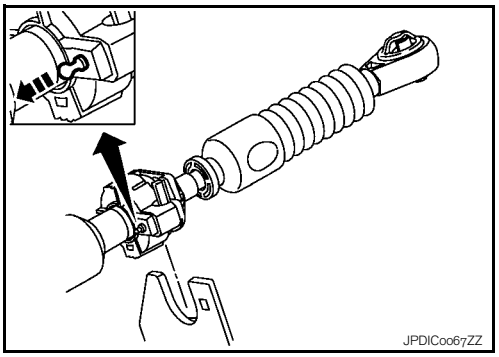
3. Disconnect connectors (A) and then remove bracket (1).



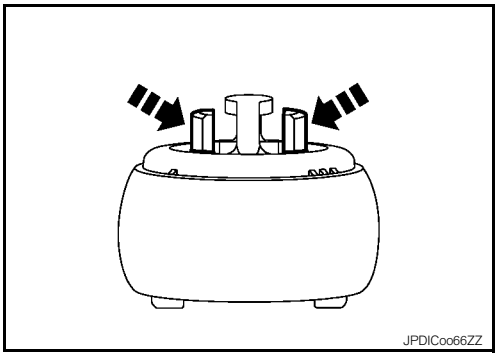
4. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the selector lever.
5. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the shifter lever A.



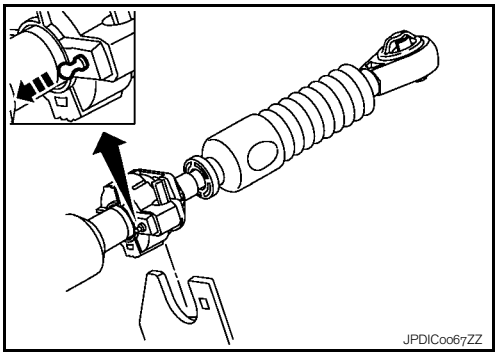
6. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the cable mounting bracket.
7. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the cable mounting bracket.
8. Remove the control lever knob.
9. Remove console finisher assembly and the center console assembly. Refer to IP-18, "Removal and Installation".
10. Shift the control lever to the neutral position.



11. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
12. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.



13. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
14. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.
15. Remove the control device assembly.
16. Remove the heat plate.
17. Remove the bracket.



cardiagn.com

18. Remove the grommet and then remove the shift cable and select cable from the vehicle.

INSTALLATION

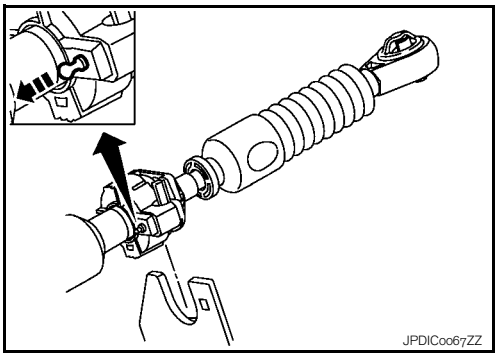
Note the following, and install in the reverse order of removal.

- Shift the control lever to the neutral position.
- Securely assemble each cable and the selector lever and shifter lever A.
- Securely assemble each cable and the cable mounting bracket.
- Securely assemble each cable and the control device assembly.
- Make sure that the claws of grommet are in contact with the floor.
- Be careful about the installation direction and push the control lever knob into the control lever.

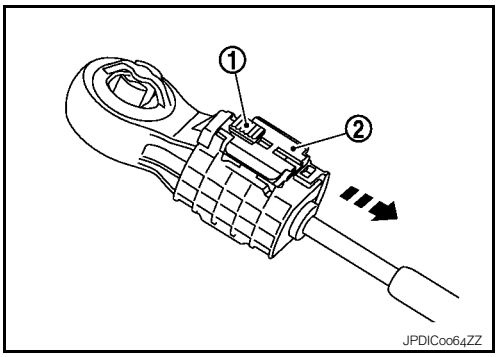
CAUTION:
Never reuse control lever knob.

Install the select cable (the control device assembly side) with the following procedure.

1. While pulling the lock of the select cable in the direction of the arrow shown in the figure, install the select cable to the control device assembly.



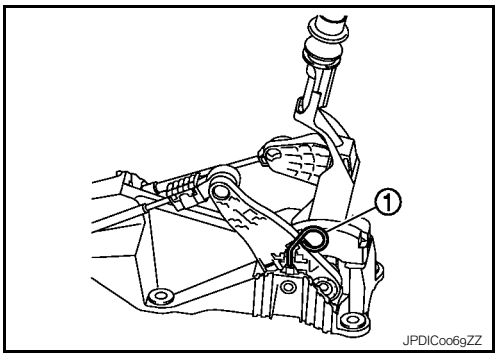
2. Slide the lock (1) of the select cable in the direction of the arrow as shown in the figure to pull up the stopper (2) of the select cable.
3. Install the end of the select cable to the pin of the control device assembly.



4. Install the lever stopper pin (1) or a pin [3 mm (0.12 in) dia.] to the control device assembly.

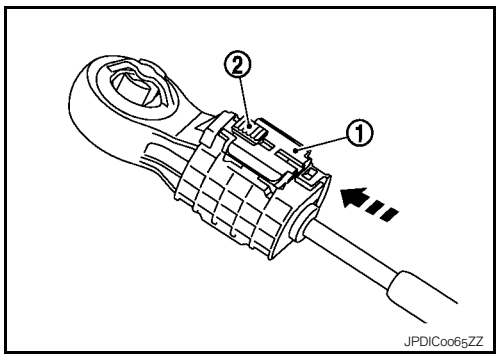
CAUTION:
Select cable cannot be adjusted accurately without a use of a lever stopper pin or a pin [3 mm (0.12 in) dia.].
NOTE:
A lever stopper pin is not included in control device assembly. Therefore, if the control device assembly is not replaced, prepare a pin [3 mm (0.12 in) dia.].

5. Check that the control lever does not move in the direction of the select. If it moves, repeat step 3.
6. Shift the control lever to 4th gear position.



cardiagn.com

7. With the stopper (1) of the select cable pressed into all the way, slide lock (2) of the select cable all the way in the direction of the arrow.
8. Remove the lever stopper pin or a pin [3 mm (0.12 in) dia.] from the control device assembly.
9. Shift the control lever to each gear position to check that there is no bindings. If any, repeat step 3.



Inspection

INFOID:0000000001034946

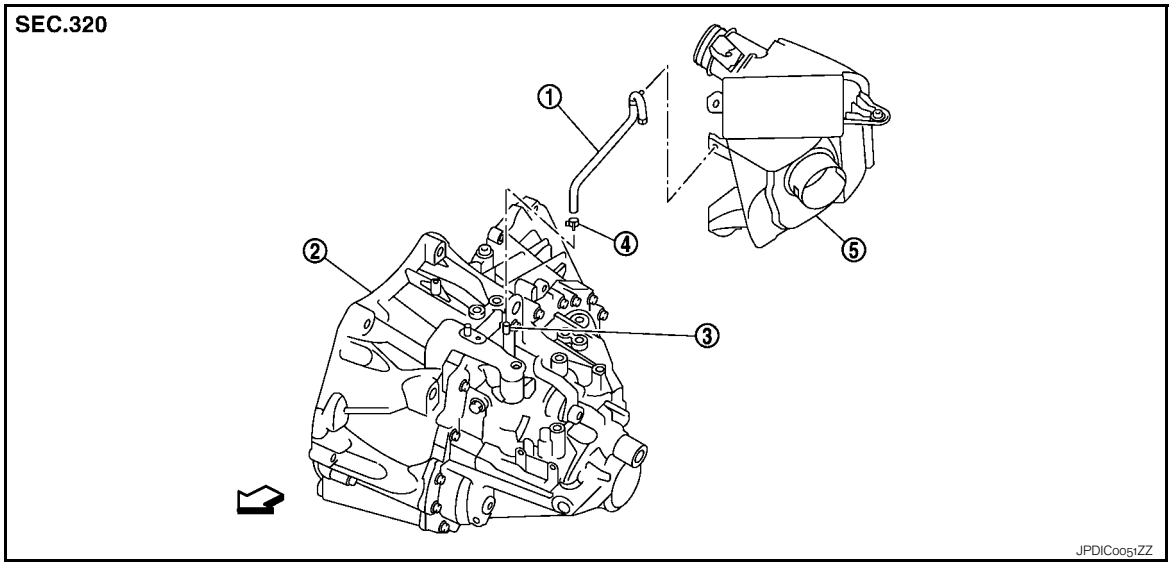
After installing, confirm the following items:
- When the control lever is shifted to 1st-2nd side and 5th-6th side, confirm the control lever returns to neutral position smoothly.
- When the control lever is shifted to each position, make sure there is no binding or disconnection in each boot.

cardiagn.com

AIR BREATHER HOSE

Exploded View

INFOID:0000000001034947



1. Air breather hose
2. Transaxle assembly
3. Air breather tube
4. Clamp
5. Air cleaner case

⇦: Vehicle front

Removal and Installation

INFOID:0000000001034948

REMOVAL

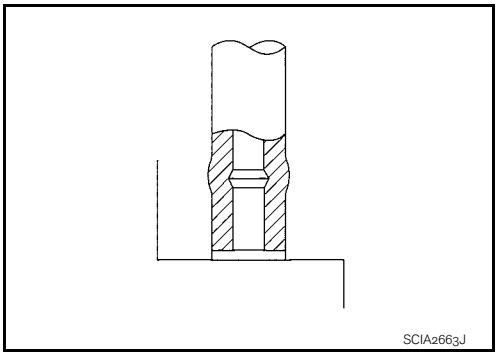
Refer to the figure for removal procedure.

INSTALLATION

Refer to the figure for installation procedure.

CAUTION:

- **Make sure there are no pinched or restricted areas on the air breather hose caused by bending or winding when installing it.**
- **Be sure to insert air breather hose into air breather tube until hose end reaches the tube's base.**
- **Set air breather hose with painted mark facing forward.**
- **Install air breather hose to air cleaner case by fully inserting the clip.**



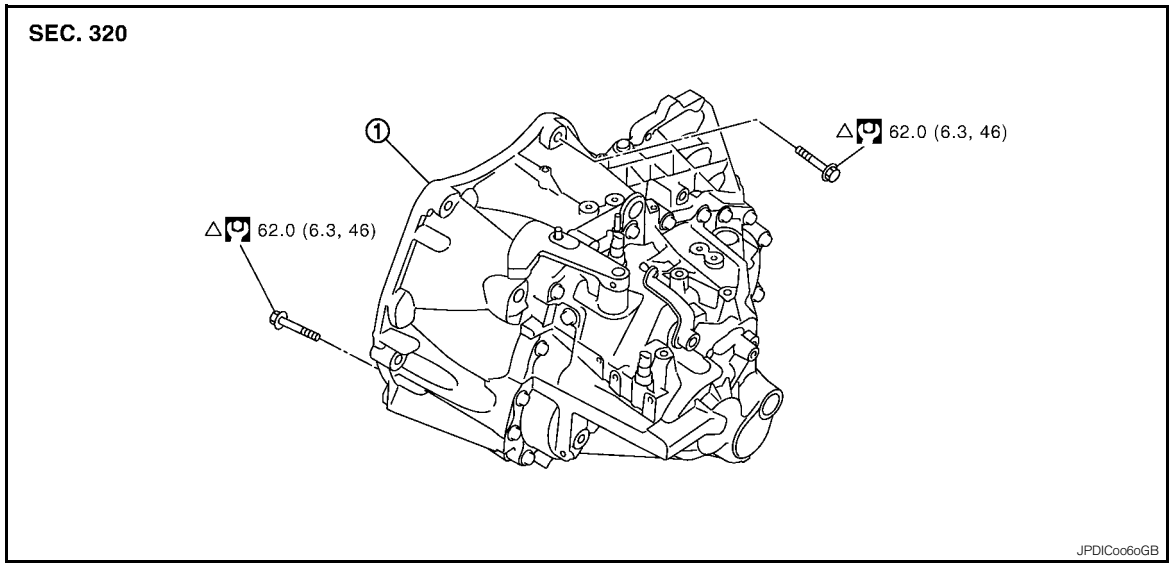
cardiagn.com

REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001034949



1. Transaxle assembly

△: For the bolt mounting positions, refer to “INSTALLATION”.

Refer to GI-4, "Components" for symbols not described on the above.

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

Removal and Installation

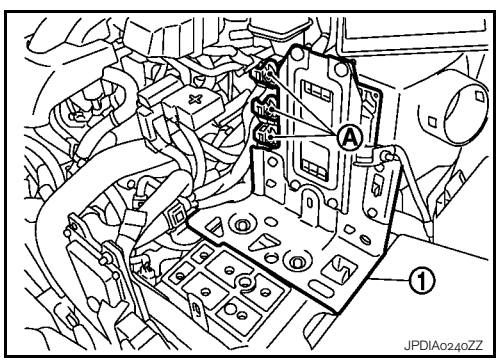
INFOID:0000000001034950

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-122, "Removal and Installation".
3. Remove air cleaner case and air duct (inlet). Refer to EM-144, "Removal and Installation".
4. Remove battery. Refer to PG-118, "Removal and Installation".
5. Disconnect connectors (A) and then remove bracket (1).
6. Drain clutch fluid and then remove clutch tube from CSC (Concentric Slave Cylinder). Refer to CL-14, "Removal and Installation".
   CAUTION:
   Never depress clutch pedal during removal procedure.
7. Disconnect park/neutral position (PNP) switch harness connector.
8. Disconnect back-up lamp switch harness connector.
9. Disconnect ground cable.
10. Remove wire harnesses from transaxle assembly.



cardiagn.com

11. Disconnect select cable and shift cable from transaxle assembly. Refer to TM-118, "Removal and Installation".
12. Remove starter motor. Refer to STR-27, "MR20DE MODELS : Removal and Installation".
13. Remove engine under cover.
14. Drain gear oil. Refer to TM-115, "Draining".
15. Remove exhaust front tube. Refer to EX-10, "Removal and Installation".
16. Remove propeller shaft assembly. Refer to DLN-110, "Removal and Installation".
17. Remove front drive shafts. Refer to FAX-56, "Removal and Installation".
    NOTE:
    Insert a suitable plug into differential side oil seal after removing front drive shaft.
18. Remove transfer assembly. Refer to DLN-58, "M/T : Removal and Installation".
19. Remove rear engine mounting brackets and rear torque rod. Refer to EM-195, "M/T : Removal and Installation".
20. Remove suspension member and suspension member stay. Refer to FSU-17, "Removal and Installation".
21. Set a suitable jack to transaxle assembly and then set a suitable jack to engine assembly.
    CAUTION:
    When setting a suitable jack, be careful so that it does not contact with the switch.
22. Remove transaxle assembly mounting bolts.
23. Remove engine mounting through bolt-securing nut. Refer to EM-195, "M/T : Removal and Installation".
24. Remove transaxle assembly from the vehicle.
    CAUTION:
    - **Secure transaxle assembly to a suitable jack while removing it.**
    - **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
25. Remove CSC (Concentric Slave Cylinder). Refer to CL-15, "Removal and Installation".
    CAUTION:
    If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

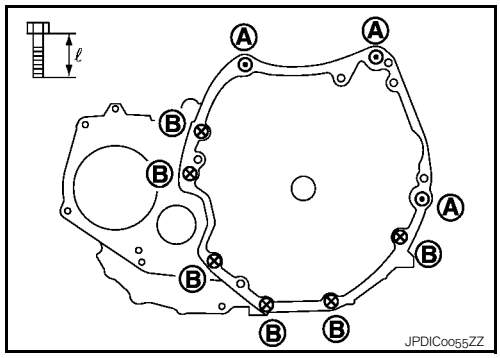
INSTALLATION

Note the following, and install in the reverse order of removal.

- Tighten transaxle assembly mounting bolts to the specified torque. The figure is the view from the engine.

: Transaxle to engine

: Engine to transaxle



Bolt symbol	A	B
Quantity	3	6
Bolt length " ℓ " mm (in)	60 (2.36)	50 (1.97)

CAUTION:
- **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
- **When installing transaxle assembly, never bring input shaft into contact with clutch cover.**

- Refer to CL-15, "Removal and Installation" for CSC (Concentric Slave Cylinder) installation procedure.
- Refer to TM-118, "Removal and Installation" for select cable and shift cable installation procedure.
- Bleed the air from the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".
- After installation, check for oil leakage and oil level. Refer to TM-115, "Inspection".

cardiagn.com

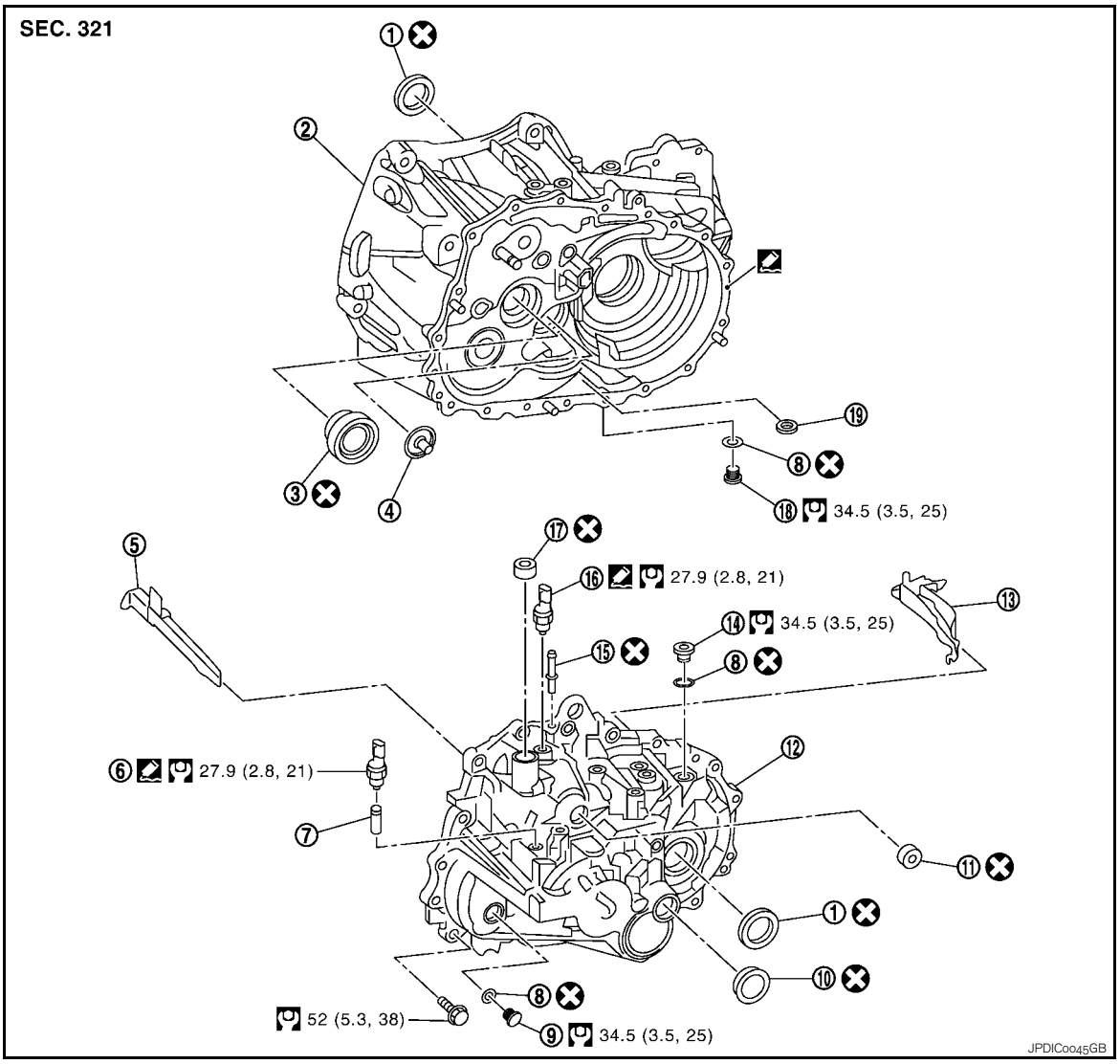
DISASSEMBLY AND ASSEMBLY

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001034951

CASE AND HOUSING



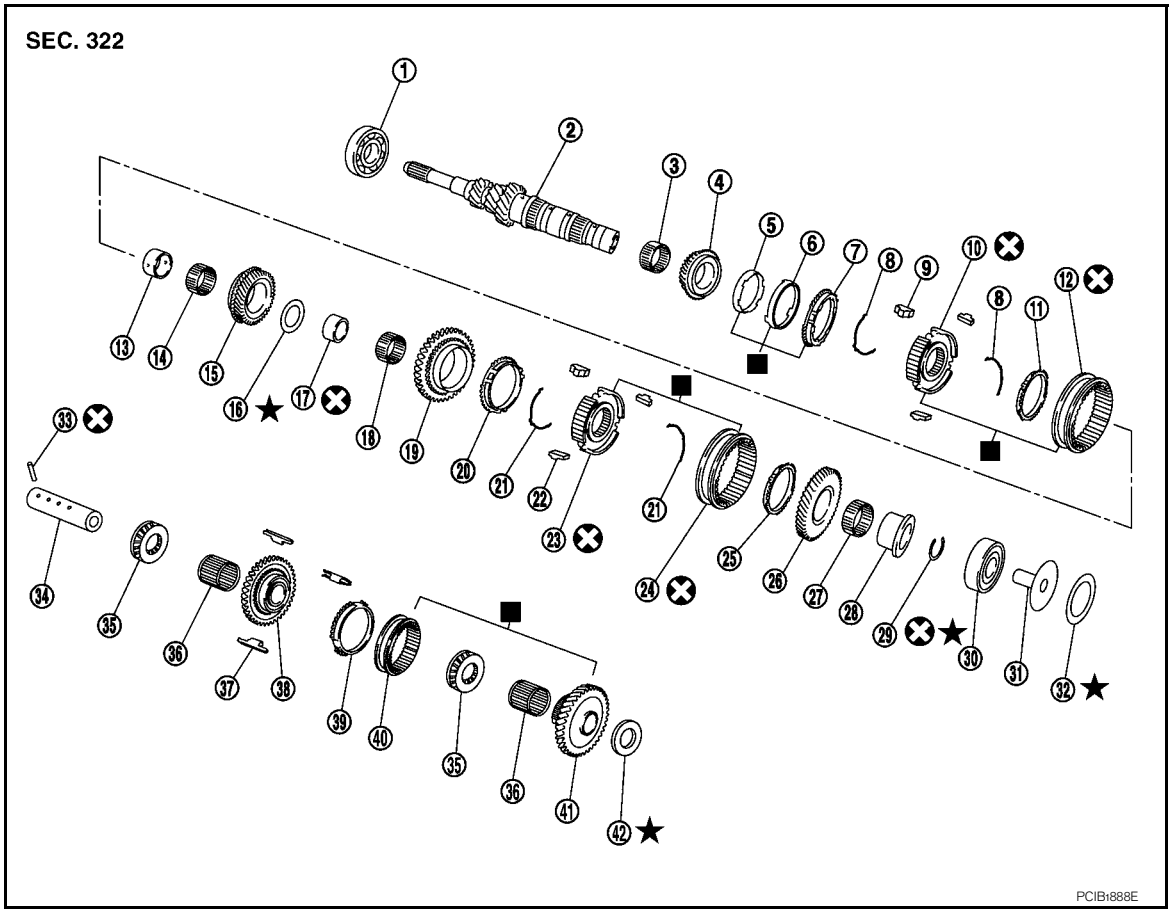
1. Differential side oil seal
2. Clutch housing
3. Input shaft oil seal
4. Oil channel
5. Oil gutter A
6. Back-up lamp switch
7. Plunger
8. Gasket
9. Plug
10. Bore plug
11. Striking rod oil seal
12. Transaxle case
13. Oil gutter B
14. Filler plug
15. Air breather tube
16. Park/Neutral position (PNP) switch
17. Shifter lever oil seal
18. Drain plug
19. Magnet

: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

SHAFT AND GEAR

cardiagn.com



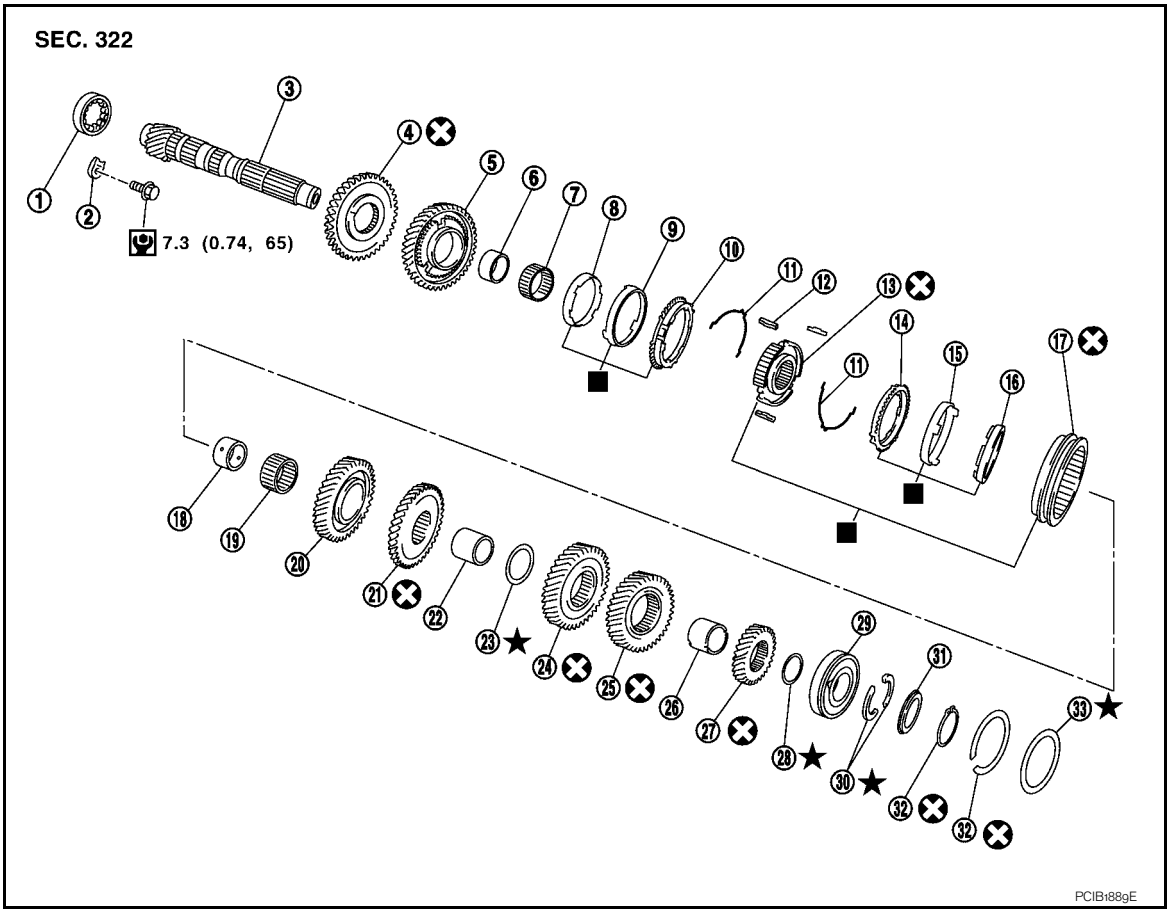
1. Input shaft front bearing
2. Input shaft
3. 3rd needle bearing
4. 3rd input gear
5. 3rd inner baulk ring
6. 3rd synchronizer cone
7. 3rd outer baulk ring
8. 3rd-4th spread spring
9. 3rd-4th shifting insert
10. 3rd-4th synchronizer hub
11. 4th baulk ring
12. 3rd-4th coupling sleeve
13. 4th input gear bushing
14. 4th needle bearing
15. 4th input gear
16. Thrust washer
17. 5th input gear bushing
18. 5th needle bearing
19. 5th input gear
20. 5th baulk ring
21. 5th-6th spread spring
22. 5th-6th shifting insert
23. 5th-6th synchronizer hub
24. 5th-6th coupling sleeve
25. 6th baulk ring
26. 6th input gear
27. 6th needle bearing
28. 6th input gear bushing
29. Snap ring
30. Input shaft rear bearing
31. Oil channel
32. Input shaft rear bearing adjusting shim
33. Retaining pin
34. Reverse idler shaft
35. Thrust needle bearing
36. Reverse idler gear needle bearing
37. Reverse insert spring
38. Reverse idler gear (front)
39. Reverse baulk ring
40. Reverse coupling sleeve
41. Reverse idler gear (rear)
42. Reverse idler gear adjusting shim

■: Replace the parts as a set.

Refer to GI-4, "Components" for symbols not described on the above.

- Apply gear oil to gears, shafts, synchronizers, and bearings when assembly.

cardiagn.com



1. Mainshaft front bearing
2. Mainshaft bearing retainer
3. Mainshaft
4. Reverse main gear
5. 1st main gear
6. 1st main gear bushing
7. 1st needle bearing
8. 1st inner baulk ring
9. 1st synchronizer cone
10. 1st outer baulk ring
11. 1st-2nd spread spring
12. 1st-2nd shifting insert
13. 1st-2nd synchronizer hub
14. 2nd outer baulk ring
15. 2nd synchronizer cone
16. 2nd inner baulk ring
17. 1st-2nd coupling sleeve
18. 2nd main gear bushing
19. 2nd needle bearing
20. 2nd main gear
21. 3rd main gear
22. 3rd-4th mainshaft spacer
23. 4th main gear adjusting shim
24. 4th main gear
25. 5th main gear
26. 5th-6th mainshaft spacer
27. 6th main gear
28. 6th main gear adjusting shim
29. Mainshaft rear bearing
30. Mainshaft C-ring
31. C-ring holder
32. Snap ring
33. Mainshaft rear bearing adjusting shim

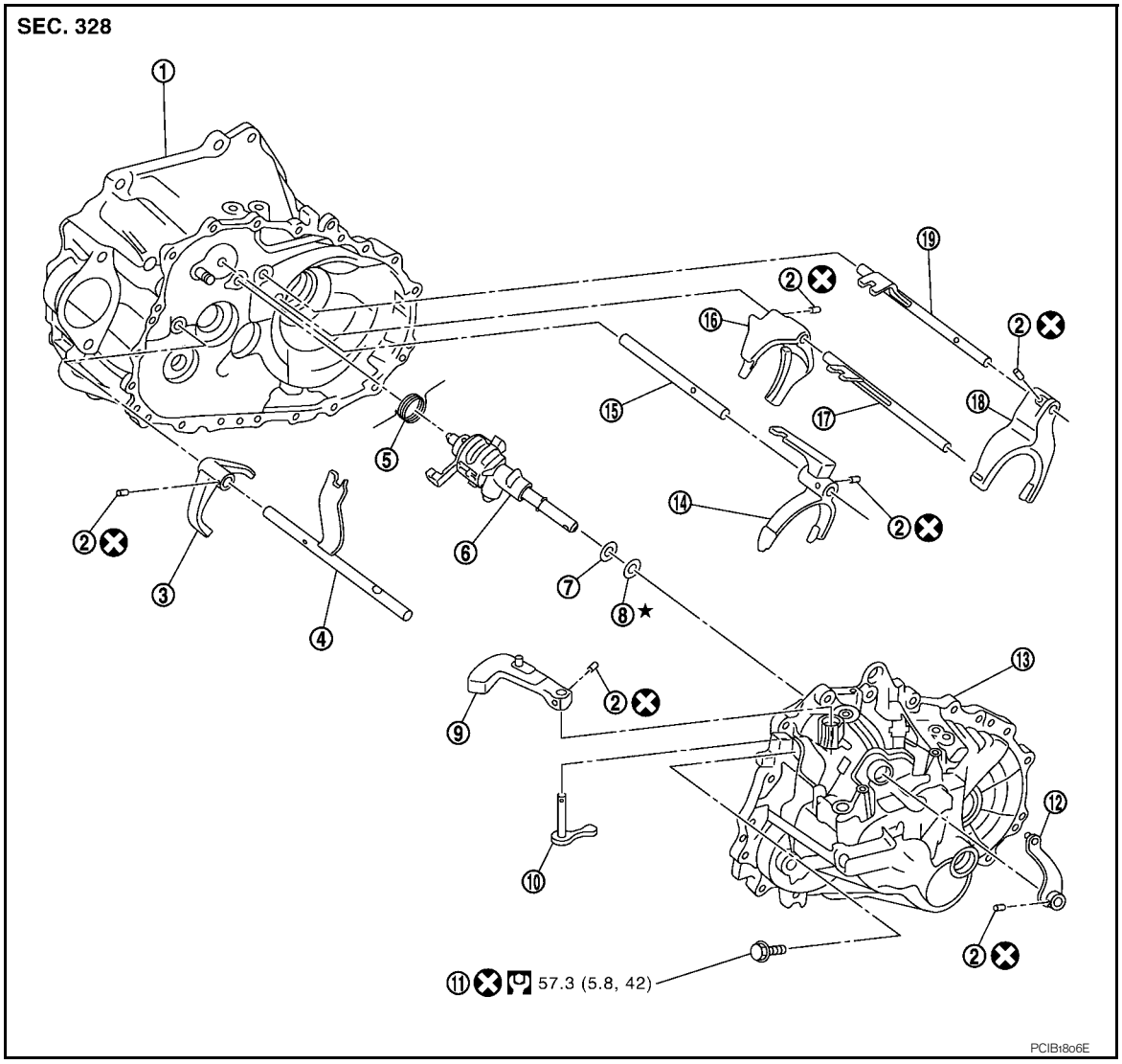
■: Replace the parts as a set.

Refer to GI-4, "Components" for symbols not described on the above.

- Apply gear oil to gears, shafts, synchronizers, and bearings when assembly.

SHIFT FORK AND FORK ROD

cardiagn.com

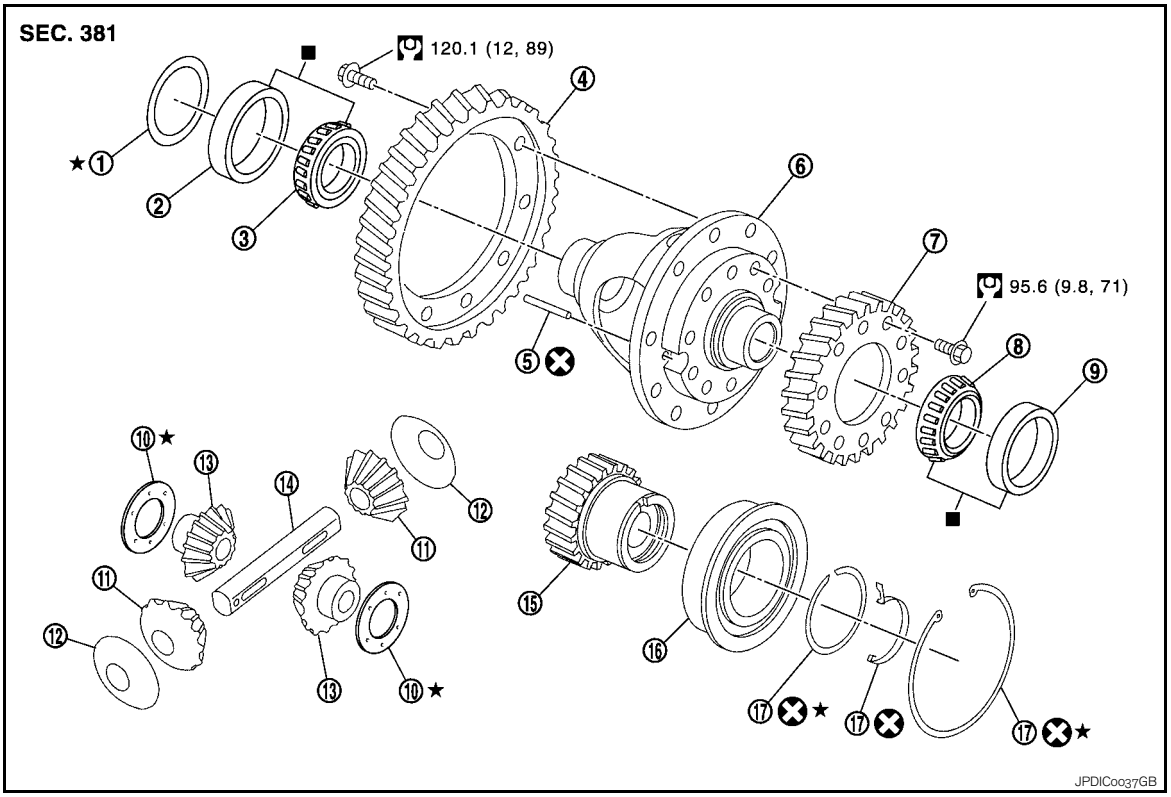


1. Clutch housing
2. Retaining pin
3. Reverse shift fork
4. Reverse fork rod
5. Return spring
6. Striking rod assembly
7. Striking rod shim
8. Striking rod adjusting shim
9. Shifter lever A
10. Shifter lever B
11. Guide bolt
12. Selector lever
13. Transaxle case
14. 3rd-4th shift fork
15. 3rd-4th fork rod
16. 1st-2nd shift fork
17. 1st-2nd fork rod
18. 5th-6th shift fork
19. 5th-6th fork rod

Refer to GI-4, "Components" for the symbols in the figure.

FINAL DRIVE

cardiagn.com



1. Differential side bearing adjusting shim
2. Differential side bearing outer race (transaxle case side)
3. Differential side bearing (transaxle case side)
4. Final gear
5. Retaining pin
6. Differential case
7. Reduction gear
8. Differential side bearing (clutch housing side)
9. Differential side bearing outer race (clutch housing side)
10. Side gear thrust washer
11. Pinion mate gear
12. Pinion mate thrust washer
13. Side gear
14. Pinion mate shaft
15. Output gear
16. Output gear bearing
17. Snap ring

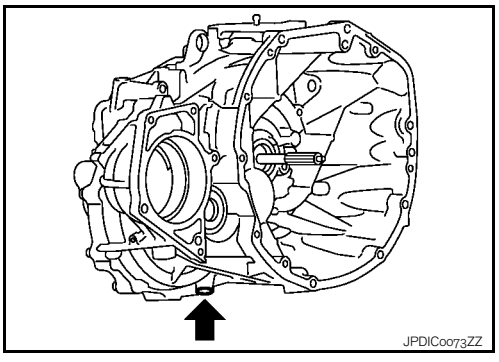
■: Replace the parts as a set.

Refer to GI-4, "Components" for symbols not described on the above.

Disassembly

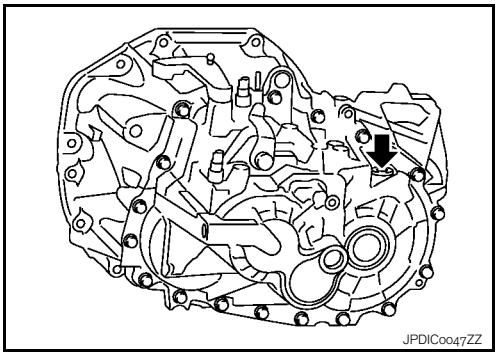
INFOID:0000000001034952

1. Remove drain plug and gasket from clutch housing.

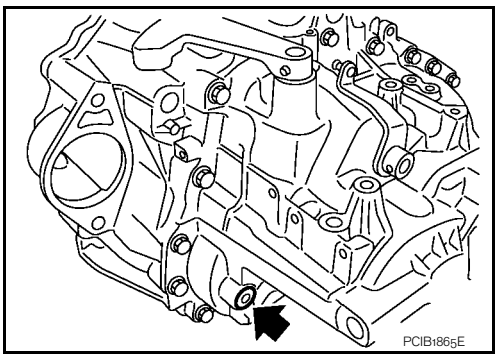


cardiagn.com

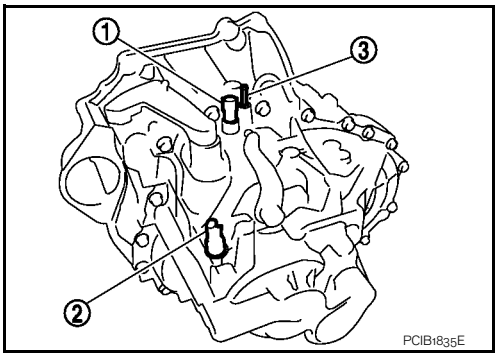
2. Remove filler plug and gasket from transaxle case.



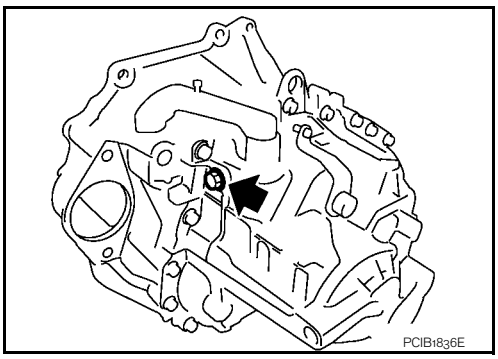
3. Remove plug and gasket from transaxle case.



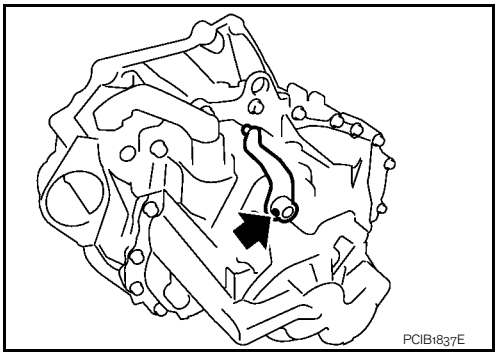
4. Remove park/neutral position (PNP) switch (1) from transaxle case.
5. Remove back-up lamp switch (2) and plunger from transaxle case.
   CAUTION:
   Never lose plunger.
6. Remove air breather tube (3) from transaxle case.



7. Remove guide bolt from transaxle case.

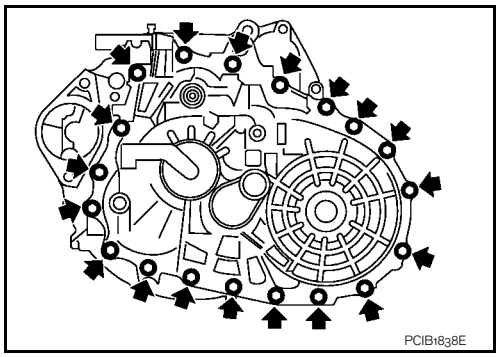


8. Remove retaining pin using a pin punch and then remove selector lever from transaxle case.

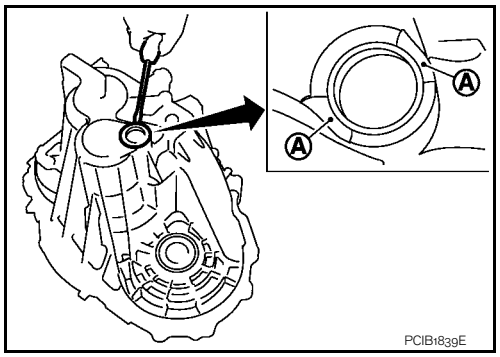


cardiagn.com

9. Remove transaxle case mounting bolts.

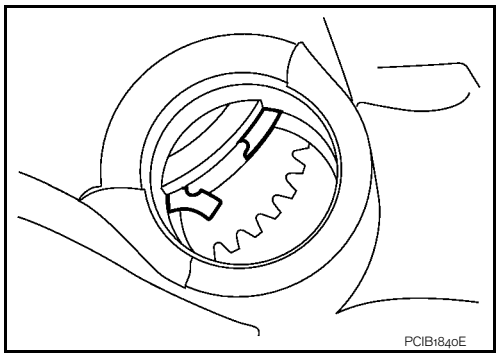


10. Remove bore plug from transaxle case.
CAUTION:
- **Never damage transaxle case.**
- **Access bore plug from cutout (A) of transaxle case when removing.**

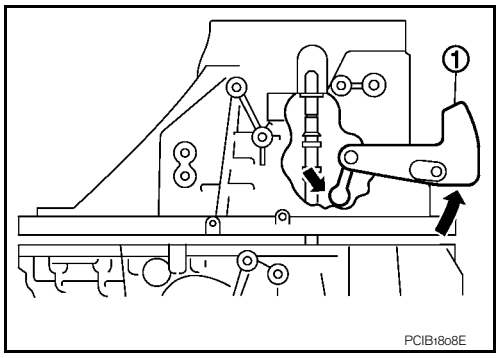


11. Remove transaxle case following the procedures below.

a. Expand snap ring at mainshaft rear bearing accessing from the bore plug hole. Then pull up transaxle case from clutch housing until snap ring comes off.



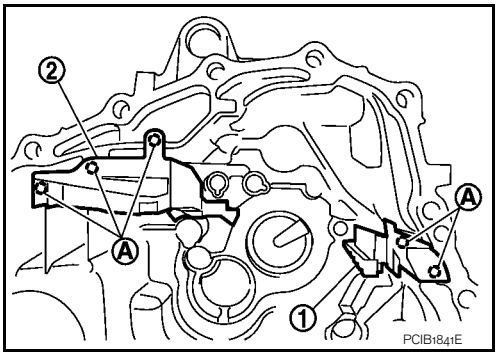
b. With shifter lever A (1) held in the position shown in the figure, remove transaxle case from clutch housing.
CAUTION:
Never drop each adjusting shim.
NOTE:
Make sure to hold shifter lever A in the position shown in the figure. Otherwise transaxle case cannot be removed from clutch housing.



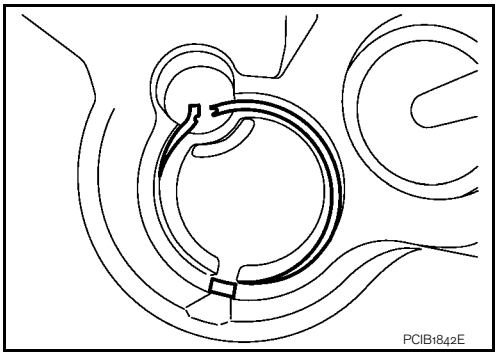
cardiagn.com

12. Remove oil gutter A (1) and oil gutter B (2) from transaxle case.

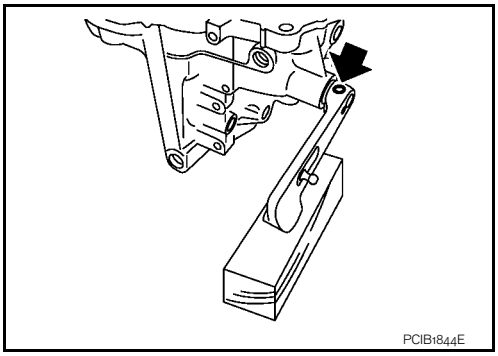
A : Tab of oil gutter



13. Remove snap ring from transaxle case.



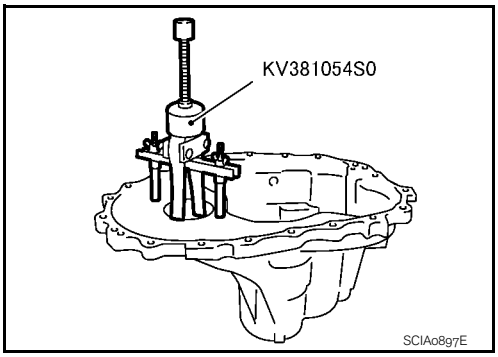
14. Remove retaining pin using a pin punch and then remove shifter lever A and shifter lever B from transaxle case.



15. Remove differential side bearing outer race (transaxle case side) from transaxle case using the puller and then remove differential side bearing adjusting shim from transaxle case.

CAUTION:

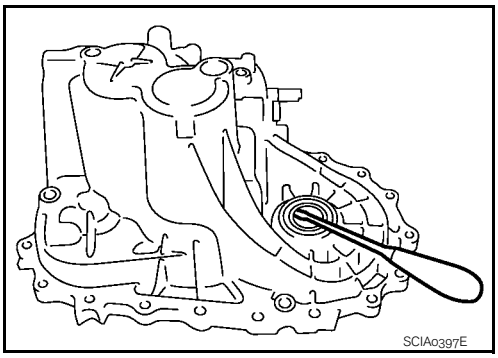
Never damage transaxle case and differential side bearing outer race.



16. Remove differential side oil seal from transaxle case.

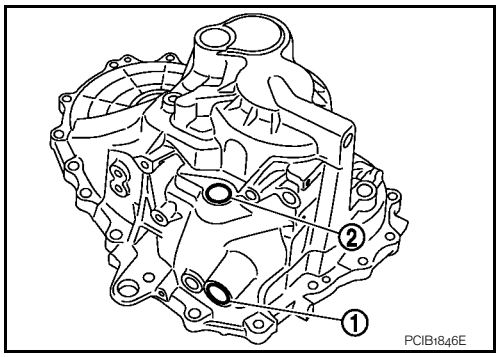
CAUTION:

Never damage transaxle case.

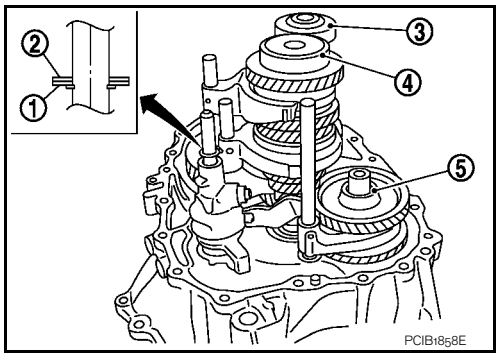


cardiagn.com

17. Remove shifter lever oil seal (1) and striking rod oil seal (2) from transaxle case.
CAUTION:
Never damage transaxle case.

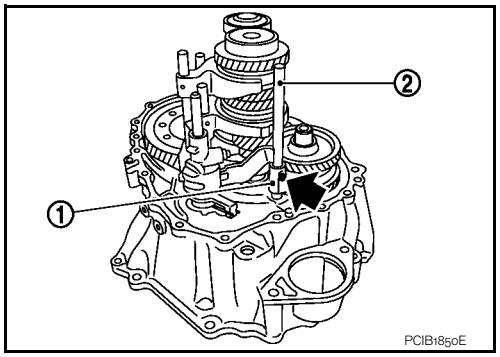


18. Remove striking rod shim (1), striking rod adjusting shim (2), mainshaft rear bearing adjusting shim (3), input shaft rear bearing adjusting shim (4), and reverse idler gear adjusting shim (5).

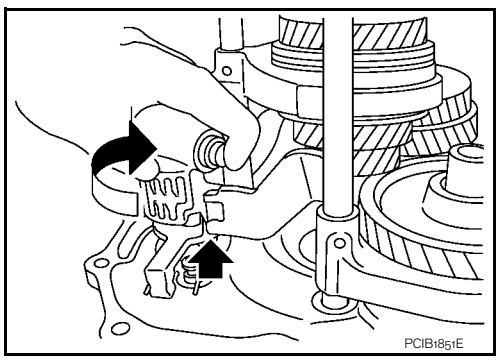


19. Remove retaining pin of reverse shift fork (1) using a pin punch.

2 : Reverse fork rod

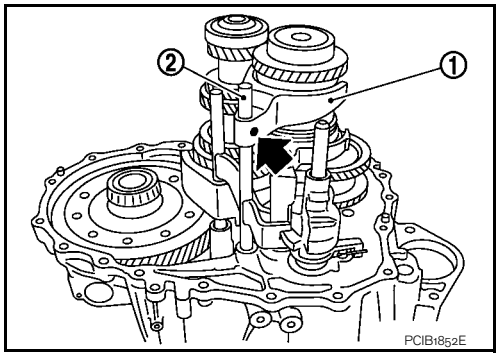


20. Rotate striking lever of striking rod assembly as shown in the figure. Then rotate reverse fork rod to a position where bracket of reverse fork rod does not interfere with striking lever of striking rod assembly.
21. Pull out reverse shift fork and reverse fork rod.



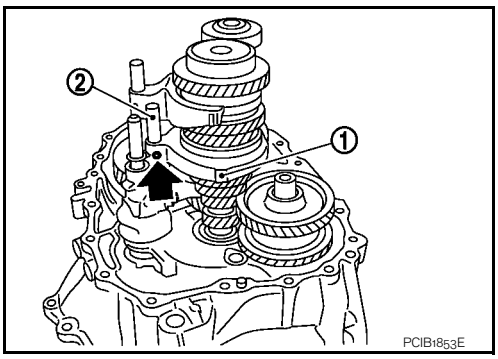
22. Remove retaining pin of 5th-6th shift fork (1) using a pin punch.

2 : 5th-6th fork rod

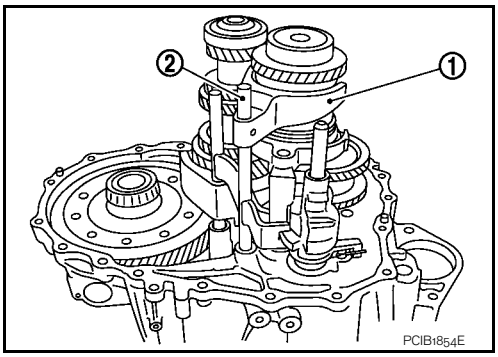


cardiagn.com

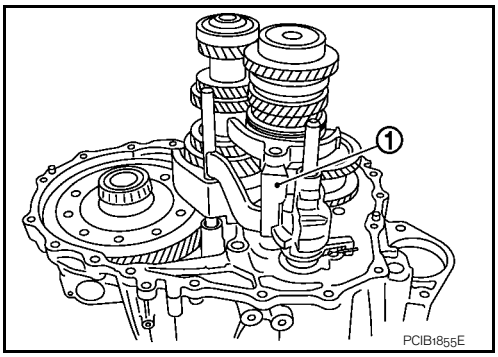
23. Remove retaining pin of 3rd-4th shift fork (1) using a pin punch.
24. Pull out 3rd-4th fork rod (2).



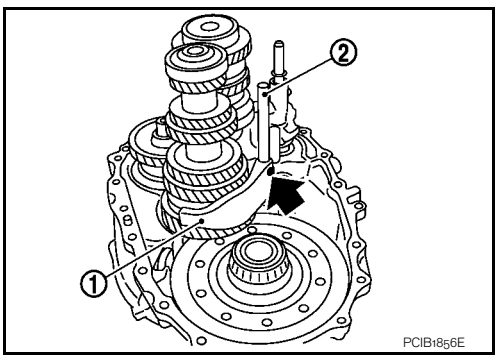
25. Pull out 5th-6th shift fork (1) and 5th-6th fork rod (2).



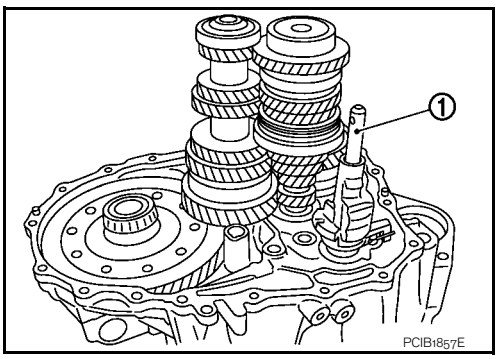
26. Pull out 3rd-4th shift fork (1).



27. Remove retaining pin of 1st-2nd shift fork (1) using a pin punch.
28. Pull out 1st-2nd shift fork and 1st-2nd fork rod (2).



29. Remove striking rod assembly (1).

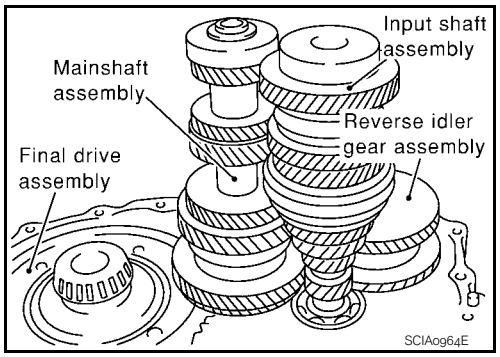


cardiagn.com

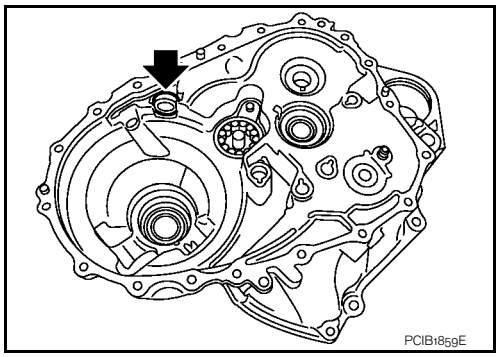
30. Remove gear components from clutch housing in the following procedure.

a. Remove a set of input shaft assembly, mainshaft assembly, and reverse idler gear assembly by tapping the tip of input shaft from the back of the clutch housing with a plastic hammer.
CAUTION:
Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.

b. Remove final drive assembly.

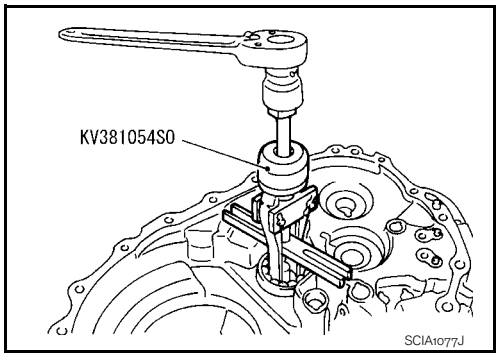


31. Remove magnet from clutch housing.

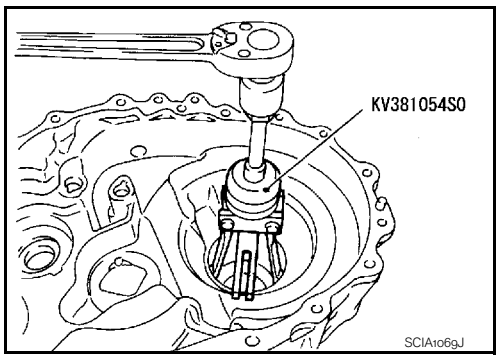


32. Remove mainshaft bearing retainer and then mainshaft front bearing from clutch housing using the puller.
CAUTION:
Never damage clutch housing, mainshaft front bearing, and oil channel.

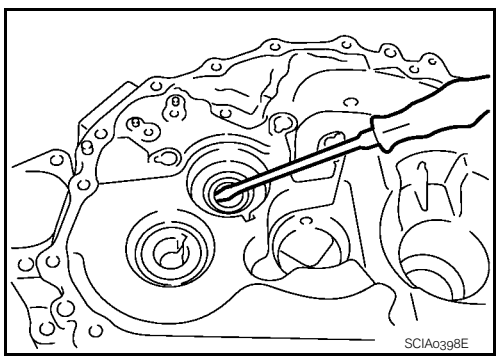
33. Remove oil channel from clutch housing.



34. Remove differential side bearing outer race (clutch housing side) from clutch housing using the puller.
CAUTION:
Never damage clutch housing and differential side bearing outer race.

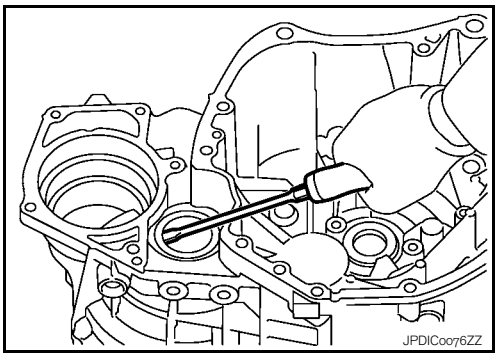


35. Remove input shaft oil seal from clutch housing.
CAUTION:
Never damage clutch housing.

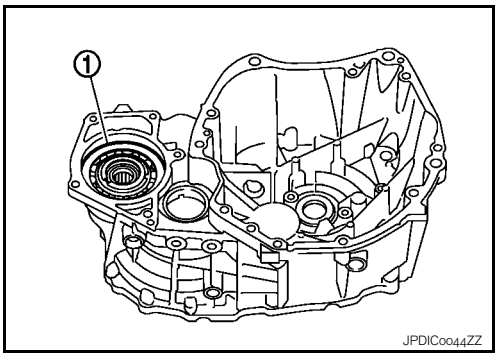


cardiagn.com

36. Remove differential side oil seal from clutch housing.
CAUTION:
Never damage clutch housing.

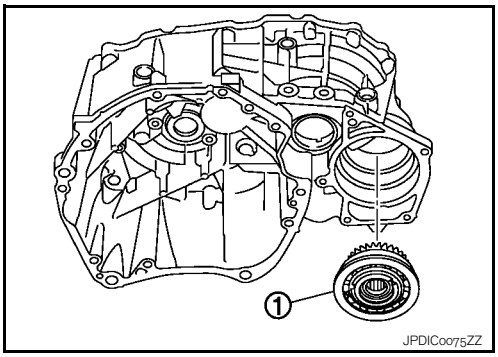


37. Remove snap ring (1) from clutch housing.
CAUTION:
Never damage clutch housing.



38. With output gear assembly (1) held by hand, turn clutch housing upside down as shown in the figure.
CAUTION:
- **When turning clutch housing upside down, hold output gear assembly by hand so that it will not become detached.**
- **Never damage clutch housing.**

NOTE:
Output gear assembly spontaneously falls when changing the clutch housing direction as shown in the figure.

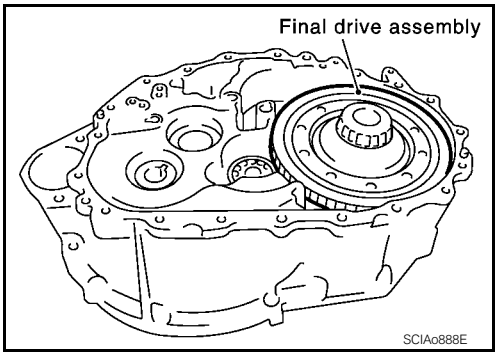


39. With output gear assembly held by hand, slowly remove output gear assembly from clutch housing. If output gear assembly can not be removed, tap it with a plastic hammer from the transaxle case contact surface side of clutch housing for removal.

Assembly

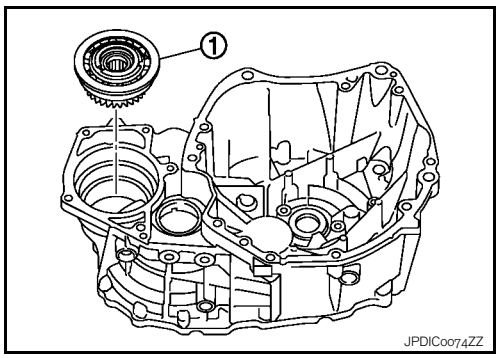
INFOID:0000000001034953

1. Install final drive assembly into clutch housing.
2. Select differential side bearing adjusting shim. Refer to TM-147, "Adjustment".
CAUTION:
Never select differential side bearing adjusting shim with output gear assembly installed on clutch housing.
3. Remove final drive assembly.



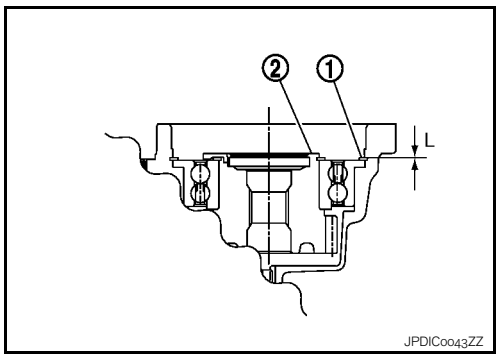
cardiagn.com

4. Turn clutch housing upside down as shown in the figure. And then install output gear assembly (1) into clutch housing.



CAUTION:
- **Gently install it, aligning the clutch housing hole with the center of output gear assembly.**
- **Install output gear assembly, straightening it with a magnet.**
- **Never damage clutch housing and output gear assembly.**

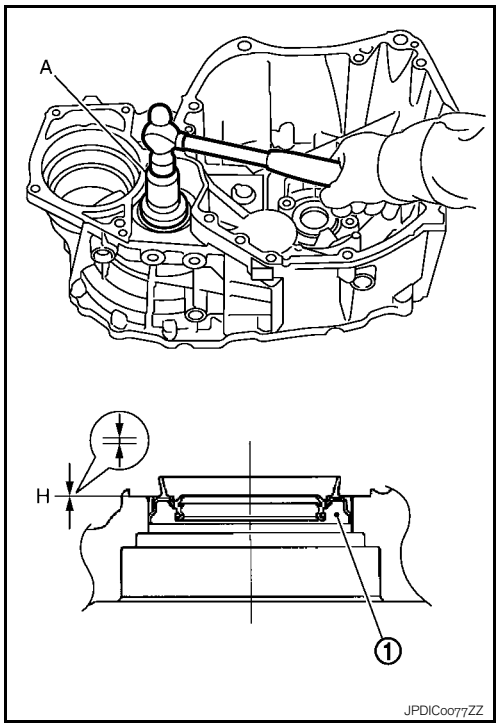
5. Install snap ring (1) onto clutch housing and make sure that end play (gap between snap ring and groove) of output gear assembly (2) satisfies the standard value.



End play standard value "L" : Refer to TM-184, "End Play".

CAUTION:
- **Only one snap ring can be selected.**
- **Never reuse snap ring.**
- **Never damage clutch housing.**

6. Install differential side oil seal (1) to clutch housing using the drift (A) [SST: ST33400001].



Dimension "H" : **-0.5 - 0.5 mm (-0.020 - 0.020 in)**

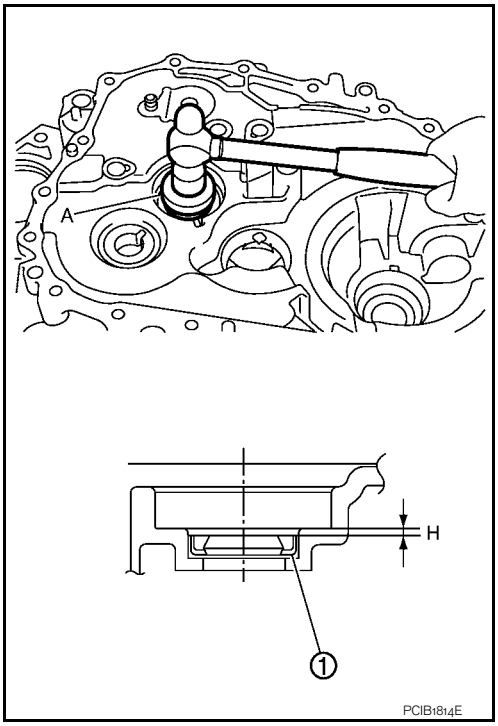
CAUTION:
- **Never reuse differential side oil seal.**
- **When installing, never incline differential side oil seal.**
- **Never damage clutch housing.**

cardiagn.com

7. Install input shaft oil seal (1) to clutch housing using the drift (A) [SST: ST35321000].

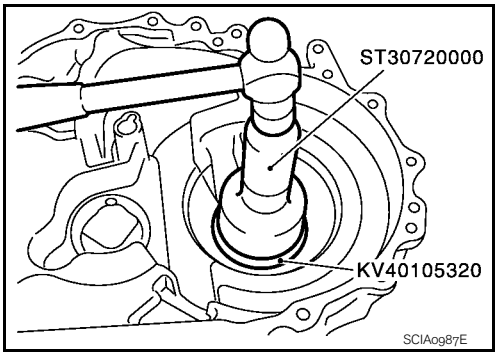
Dimension "H" : 1.1 - 2.1 mm (0.043 - 0.083 in)

CAUTION:
- **Never reuse input shaft oil seal.**
- **When installing, never incline input shaft oil seal.**
- **Never damage clutch housing.**



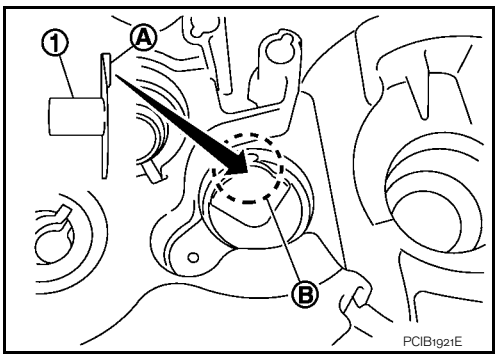
8. Install differential side bearing outer race (clutch housing side) to clutch housing using the drifts.

CAUTION:
Replace differential side bearing and differential side bearing outer race as a set.



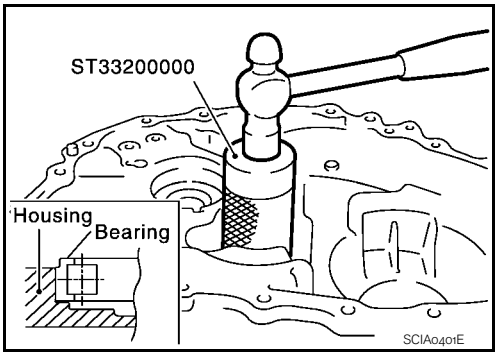
9. Install oil channel (1) on mainshaft side.

CAUTION:
When installing oil channel, fit the rib (A) of oil channel into the processed area of the spot facing (B).



10. Install mainshaft front bearing to clutch housing using the drift.

CAUTION:
Be careful with the orientation of mainshaft front bearing.

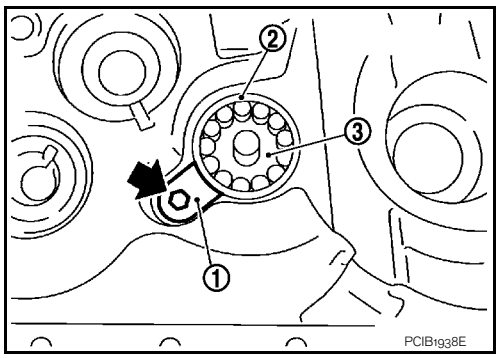


cardiagn.com

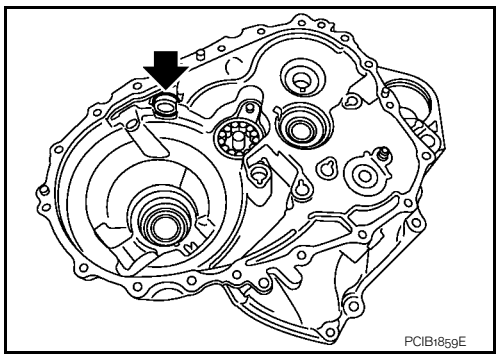
11. Install mainshaft bearing retainer (1) to clutch housing and tighten mounting bolt to the specified torque.

    2 : Mainshaft front bearing
    3 : Oil channel

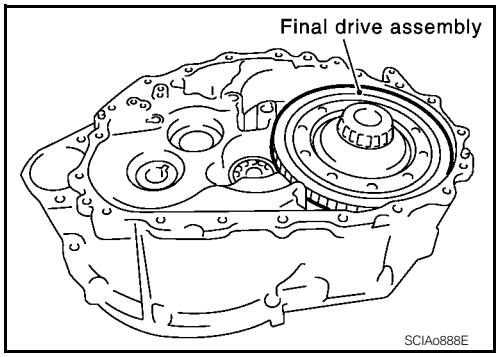
    CAUTION:
    Install with punched surface facing up.



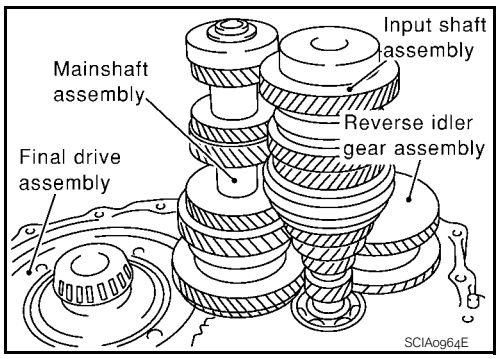
12. Install magnet to clutch housing.



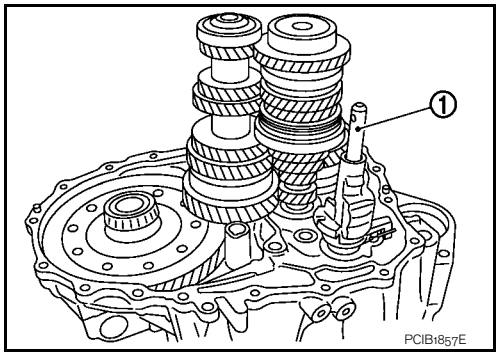
13. Install final drive assembly into clutch housing.
    CAUTION:
    Engage reduction gear teeth in output gear teeth.



14. Install input shaft assembly, mainshaft assembly, and reverse idler gear assembly into clutch housing.
    CAUTION:
    - **Wrap a tape, etc. to the spline of input shaft so as not to damage the input shaft oil seal.**
    - **Be careful with the orientation of reverse idler shaft.**

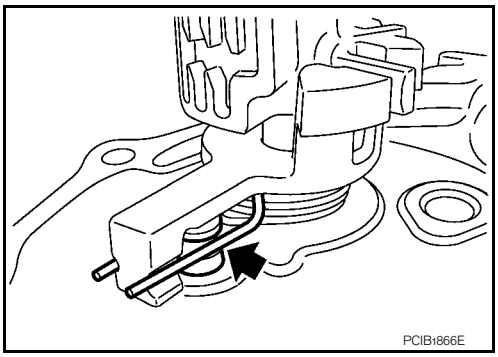


15. Install striking rod assembly (1) into clutch housing.

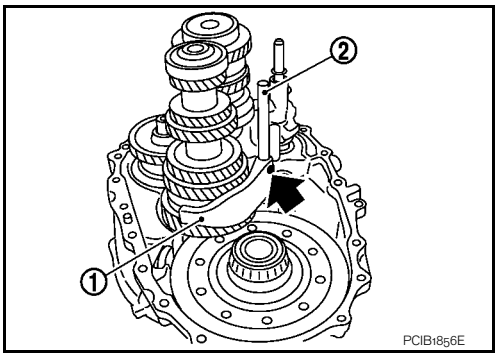


cardiagn.com

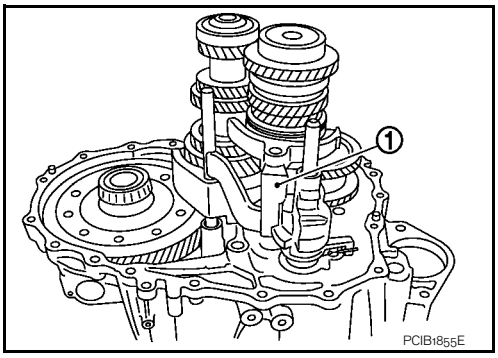
CAUTION:
Check that return spring is securely seated in the groove on return pin.



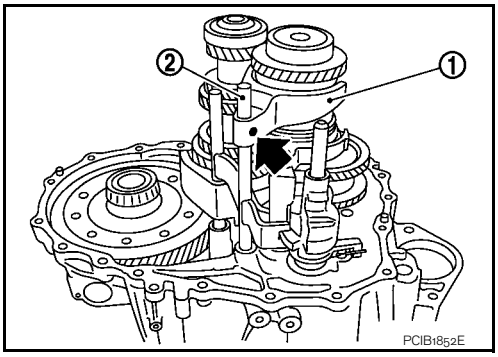
16. Install 1st-2nd shift fork (1) and 1st-2nd fork rod (2) and then install retaining pin to 1st-2nd shift fork.
CAUTION:
- **Never reuse retaining pin.**
- **Be careful with the orientation of 1st-2nd shift fork and 1st-2nd fork rod.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of 1st-2nd shift fork.**



17. Install 3rd-4th shift fork (1) to 3rd-4th coupling sleeve.
CAUTION:
Be careful with the orientation of 3rd-4th shift fork.



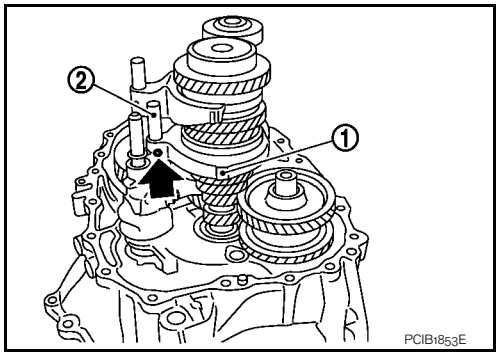
18. Install 5th-6th shift fork (1) and 5th-6th fork rod (2) and then install retaining pin to 5th-6th shift fork.
CAUTION:
- **Never reuse retaining pin.**
- **Be careful with the orientation of 5th-6th shift fork and 5th-6th fork rod.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of 5th-6th shift fork.**



cardiagn.com

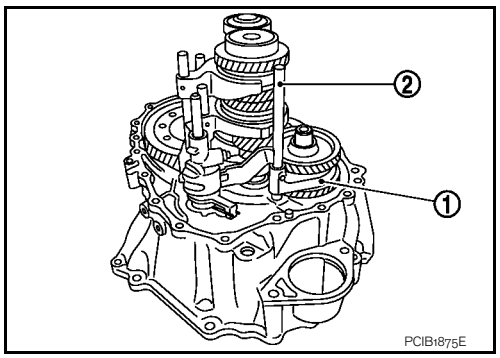
19. Install 3rd-4th fork rod (2) and then install retaining pin to 3rd-4th shift fork (1).

CAUTION:
- **Never reuse retaining pin.**
- **Be careful with the orientation of 3rd-4th fork rod.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of 3rd-4th shift fork.**

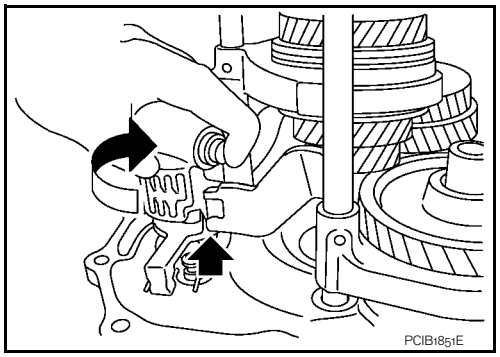


20. Install reverse shift fork (1) and reverse fork rod (2).

CAUTION:
Be careful with the orientation of reverse shift fork and reverse fork rod.



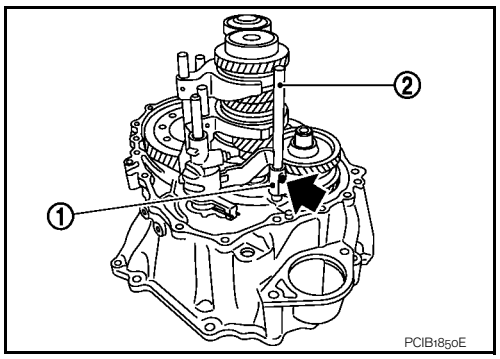
21. Rotate striking lever of striking rod assembly as shown in the figure. Then rotate reverse fork rod to a position where bracket of reverse fork rod does not interfere with striking lever of striking rod assembly.



22. Install retaining pin to reverse shift fork (1).

2 : Reverse fork rod

CAUTION:
- **Never reuse retaining pin.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of reverse shift fork.**



23. Install selected differential side bearing adjusting shim and differential side bearing outer race (transaxle case side).
- For selection of adjusting shim, refer to TM-147, "Adjustment".

24. Install selected reverse idler gear adjusting shim onto reverse idler gear assembly.
- For selection of adjusting shim, refer to TM-147, "Adjustment".

25. Install selected input shaft rear bearing adjusting shim onto input shaft.
- For selection of adjusting shim, refer to TM-147, "Adjustment".

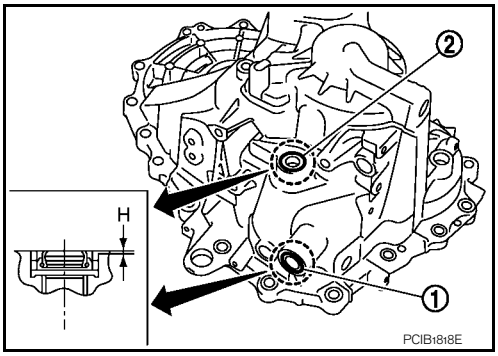
26. Install selected striking rod adjusting shim and striking rod shim onto striking rod assembly.
- For selection of adjusting shim, refer to TM-147, "Adjustment".

cardiagn.com

27. Install shifter lever oil seal (1) and striking rod oil seal (2) to transaxle case using the drift [Commercial service tool].

Dimension "H" : 0 - 1.0 mm (0 - 0.039 in)

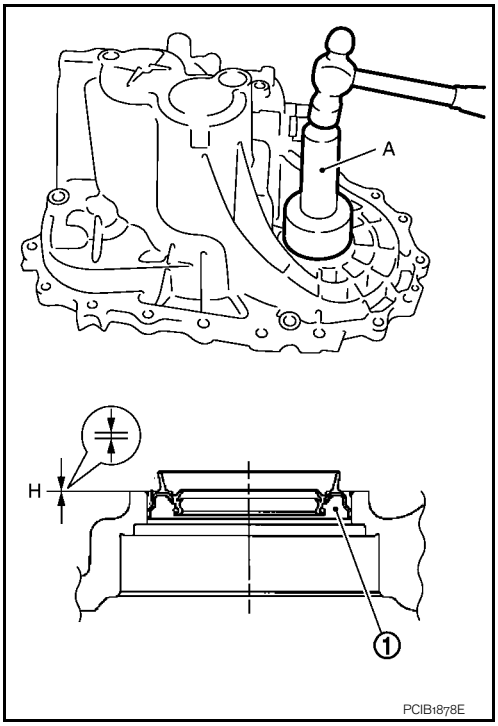
CAUTION:
- **Never reuse shifter lever oil seal and striking rod oil seal.**
- **When installing, never incline shifter lever oil seal and striking rod oil seal.**
- **Never damage transaxle case.**



28. Install differential side oil seal (1) to transaxle case using the drift (A) [SST: ST30720000].

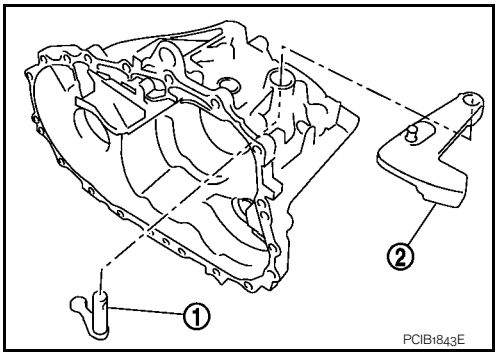
Dimension "H" : -0.5 - 0.5 mm (-0.020 - 0.020 in)

CAUTION:
- **Never reuse differential side oil seal.**
- **When installing, never incline differential side oil seal.**
- **Never damage transaxle case.**



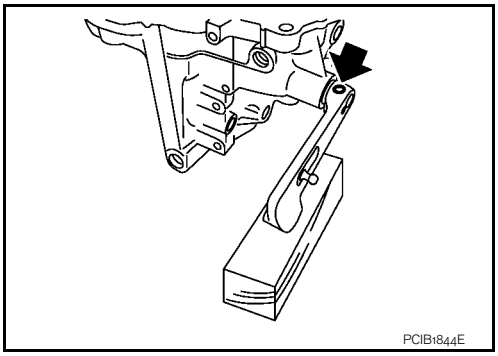
29. Install shifter lever B (1) and shifter lever A (2) to transaxle case.

CAUTION:
Be careful with the orientation of shifter lever B and shifter lever A.



30. Install retaining pin to shifter lever A.

CAUTION:
- **Never reuse retaining pin.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of shifter lever A.**

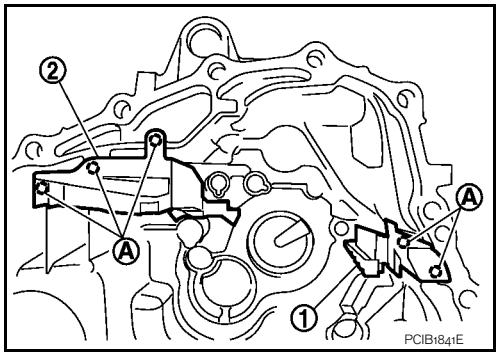


cardiagn.com

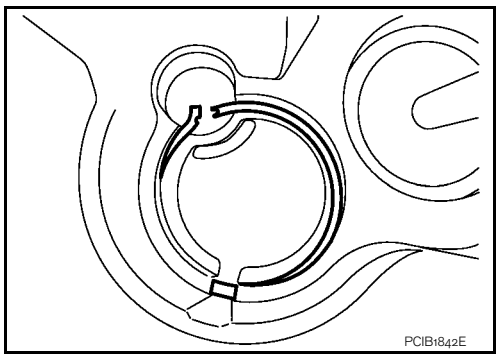
31. Install transaxle case following the procedures below.

a. Install selected mainshaft rear bearing adjusting shim into transaxle case.
   - For selection of adjusting shim, refer to TM-147, "Adjustment".

b. Install oil gutter A (1) and oil gutter B (2) to transaxle case.
   CAUTION:
   Insert the tab (A) of oil gutter A and oil gutter B into transaxle case.

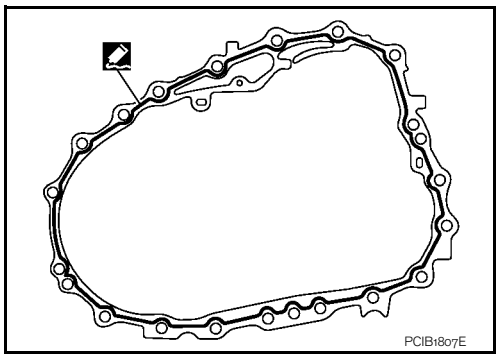


c. Temporarily install snap ring of mainshaft rear bearing into transaxle case.
   CAUTION:
   Never reuse snap ring.

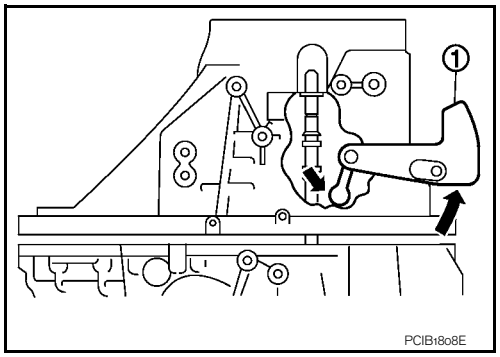


d. Apply recommended sealant to mating surface of clutch housing as shown in the figure.
   - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

   CAUTION:
   - **Remove old sealant adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to both mounting surfaces.**
   - **Apply sealant so as not to break the bead.**
   - **The width of sealant bead is 1 - 2 mm (0.04 - 0.08 in).**
   - **The height of sealant bead is 0.4 - 1 mm (0.016 - 0.04 in).**
   - **The overlap length of both ends of sealant bead is 3 - 5 mm (0.12 - 0.20 in).**



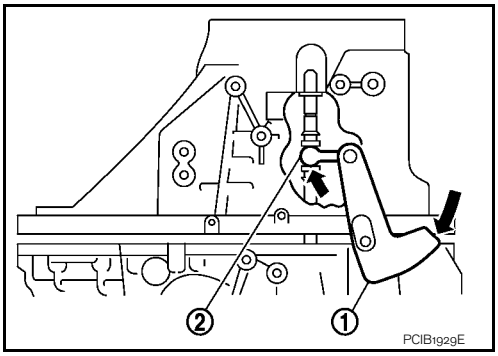
e. With shifter lever A (1) held in the position shown in the figure, temporarily assemble transaxle case to clutch housing.
   CAUTION:
   Never damage striking rod oil seal.
   NOTE:
   Make sure to hold shifter lever A in the position shown in the figure. Otherwise transaxle case cannot be installed to clutch housing.



cardiagn.com

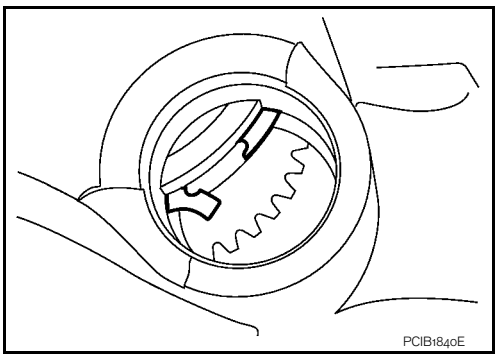
f. While rotating shifter lever A (1) in the direction of the arrow in the figure, assemble transaxle case to clutch housing.

2 : Shifter lever B

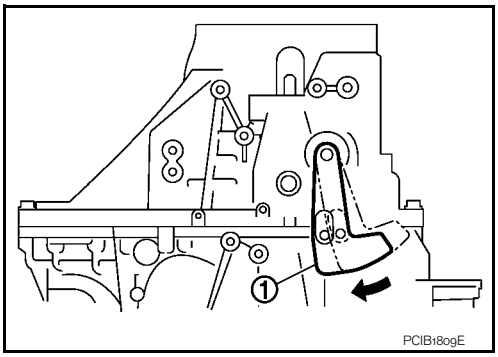


g. Accessing from the bore plug hole, expand snap ring at mainshaft rear bearing so that the ring catches the periphery of mainshaft rear bearing.

h. Temporarily tighten transaxle case mounting bolts.

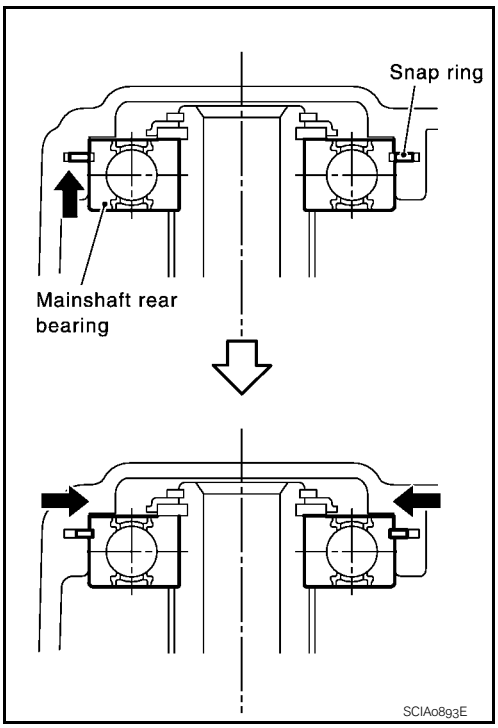


i. Shift the shifter lever A (1) to 2nd gear position.
NOTE:
- The 2nd gear position is attained when shifter lever A is in the position shown in the figure.



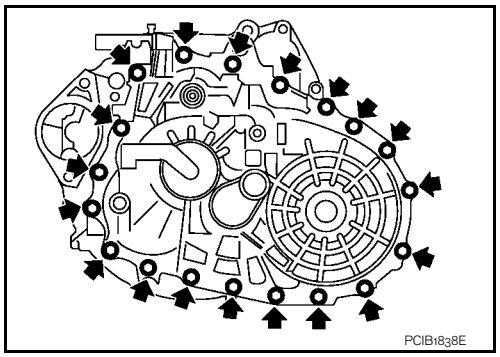
- When transaxle is shifted to the 2nd gear position, mainshaft assembly is lifted.

j. Seat snap ring in the groove on mainshaft rear bearing. If snap ring is not seated in the groove on mainshaft rear bearing, remove transaxle case and repeat the procedure from step d.

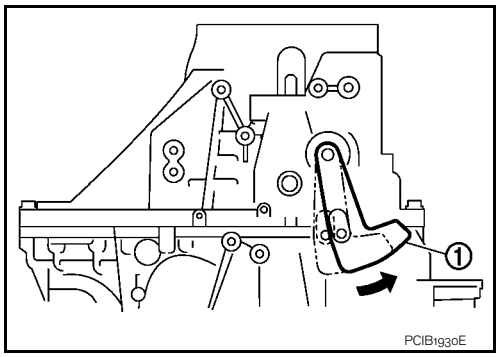


cardiagn.com

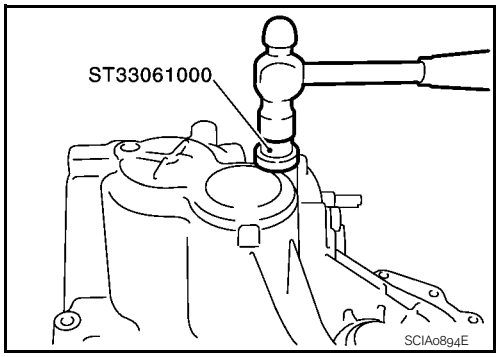
k. Tighten transaxle case mounting bolts to the specified torque.



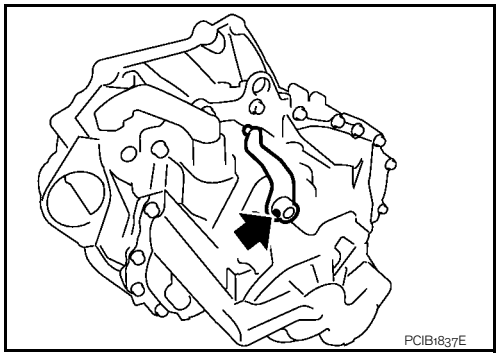
l. Shift the shifter lever A (1) to neutral position.
NOTE:
The neutral position is attained when shifter lever A is in the position shown in the figure.



32. Install bore plug to transaxle case using the drift.
CAUTION:
Never reuse bore plug.



33. Install selector lever to transaxle case and then install retaining pin to selector lever.
CAUTION:
- **Never reuse retaining pin.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of selector lever.**



34. Install guide bolt following the procedures below.
a. Shift the shifter lever A and selector lever to neutral position.

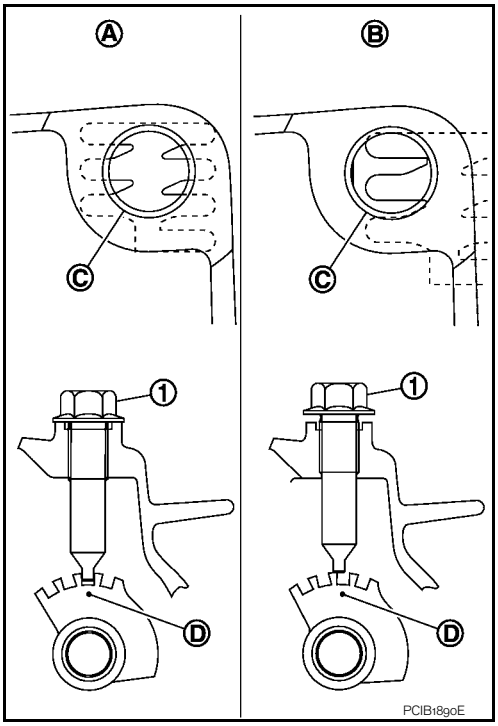
cardiagn.com

b. Visually confirm from the guide bolt mounting hole (C) that the lever is securely set to neutral position (A). If it is not in the neutral position, repeat the procedure from step a.

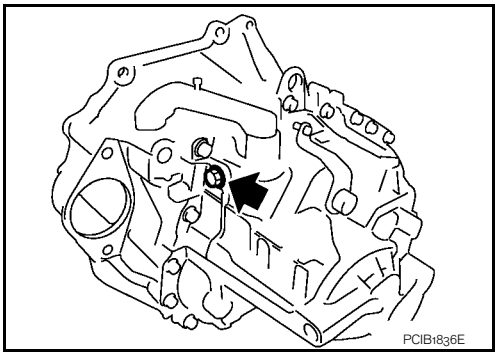
1 : Guide bolt

CAUTION:
The guide groove (D) of striking rod assembly will be damaged when assembling guide bolt with the lever is in except neutral position (B).

c. Check continuity between terminals of park/neutral position (PNP) switch to confirm it in the neutral position. If it is not in the neutral position, remove park/neutral position (PNP) switch and repeat the procedure from step a. Refer to TM-108, "Component Inspection".



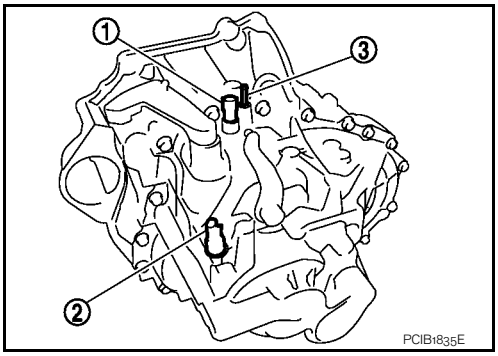
d. Install guide bolt to transaxle case and then tighten guide bolt to the specified torque.
CAUTION:
Never reuse guide bolt.



35. Apply recommended sealant to threads of park/neutral position (PNP) switch (1). Then install it to transaxle case and tighten to the specified torque.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

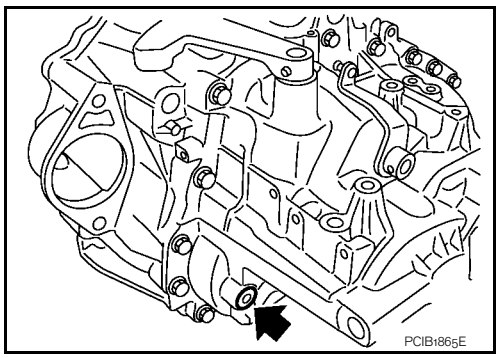
    CAUTION:
    Remove old sealant and oil adhering to threads.
36. Install plunger to transaxle case.
37. Apply recommended sealant to threads of back-up lamp switch (2). Then install it to transaxle case and tighten to the specified torque.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

    CAUTION:
    Remove old sealant and oil adhering to threads.
38. Install air breather tube (3) to transaxle case.
    CAUTION:
    - **Never reuse air breather tube.**
    - **Assemble air breather tube until its collar element contacts with transaxle case.**

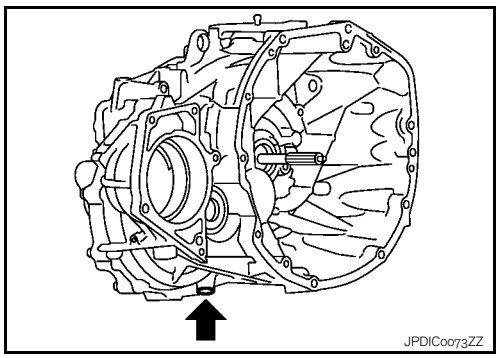


cardiagn.com

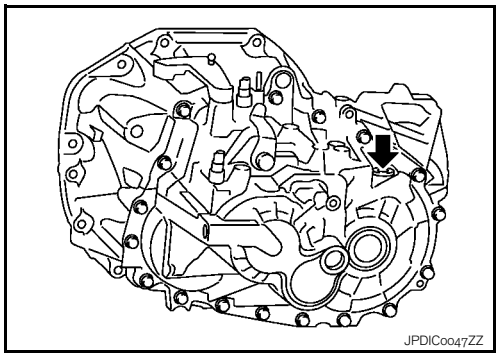
39. Install gasket onto plug and then install them into transaxle case. Tighten plug to the specified torque.
CAUTION:
Never reuse gasket.



40. Install gasket onto drain plug and then install them into clutch housing. Tighten drain plug to the specified torque.
CAUTION:
Never reuse gasket.



41. Install gasket onto filler plug and then install them into transaxle case. Tighten filler plug to the specified torque.
CAUTION:
- **Never reuse gasket.**
- **After gear oil is filled, tighten filler plug to specified torque.**

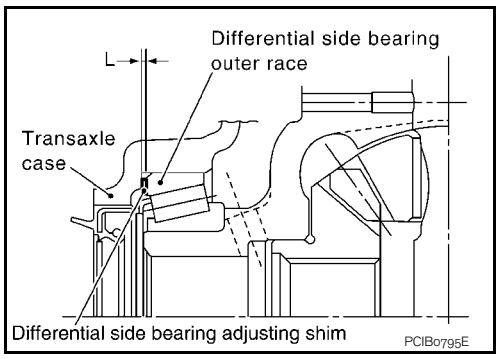


Adjustment

INFOID:0000000001034954

DIFFERENTIAL SIDE BEARING PRELOAD

- When adjusting differential side bearing preload, select adjusting shim for differential side bearing. To select adjusting shim, measure clearance “L” between transaxle case and differential side bearing outer race.
CAUTION:
Up to 2 adjusting shims can be selected.
- Calculate dimension “L” (thickness of adjusting shim) using the following procedure to satisfy specification of preload for differential side bearing.



Preload : Refer to TM-185, "Differential Side Bearing Preload".

Dimension “L” = (L_1 - L_2) + Preload

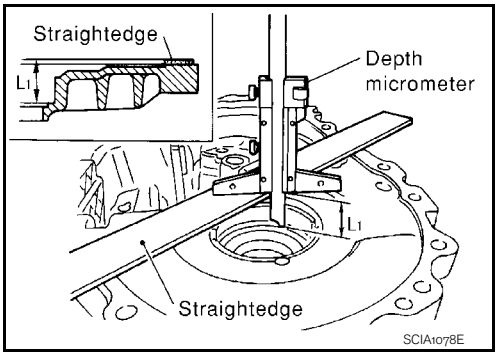
L : Thickness of adjusting shim

L_1 : Distance between transaxle case end face and mounting face of adjusting shim

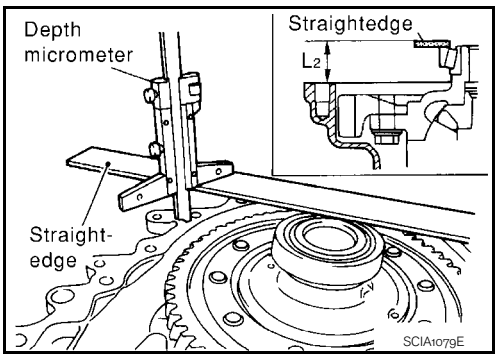
L_2 : Distance between differential side bearing outer race and clutch housing end face

cardiagn.com

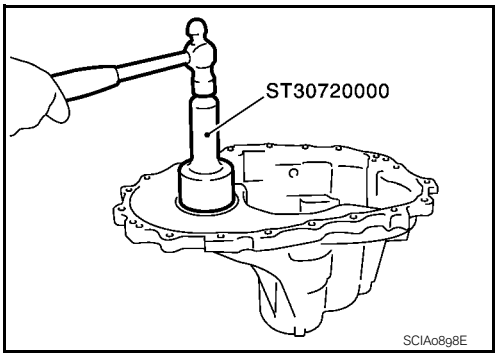
1. Using a depth micrometer and straightedge, measure dimension "L_1" between transaxle case end face and mounting face of adjusting shim.
2. Install differential side bearing outer race onto differential side bearing on final gear side. Holding lightly differential side bearing outer race horizontally by hand, rotate final gear five times or more (for smooth movement of bearing roller).



3. Using a depth micrometer and straightedge as shown in the figure, measure dimension "L_2" between differential side bearing outer race and clutch housing end face.
   CAUTION:
   "L_2": Measure at 4 point by approximately 90 degrees and use the average value.

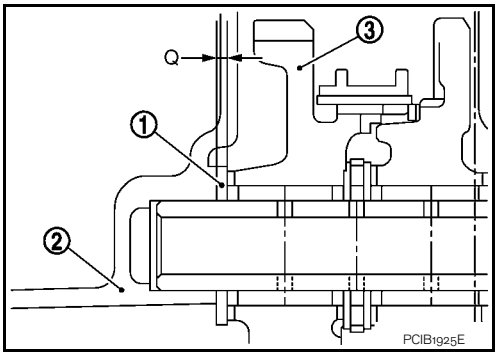


4. Install selected differential side bearing adjusting shim and then install differential side bearing outer race (transaxle case side) using the drift.
   CAUTION:
   Replace differential side bearing and differential side bearing outer race as a set.



REVERSE IDLER GEAR END PLAY

- When adjusting reverse idler gear end play, select adjusting shim for reverse idler gear. To select adjusting shim (1), measure clearance between transaxle case (2) and reverse idler gear (rear) (3).
  CAUTION:
  Only 1 adjusting shim can be selected.
- Calculate dimension "Q" (thickness of adjusting shim) using the following procedure to satisfy specification of end play for reverse idler gear.



End play : Refer to TM-184, "End Play".

Dimension "Q" = (Q_1 - Q_2) - End play

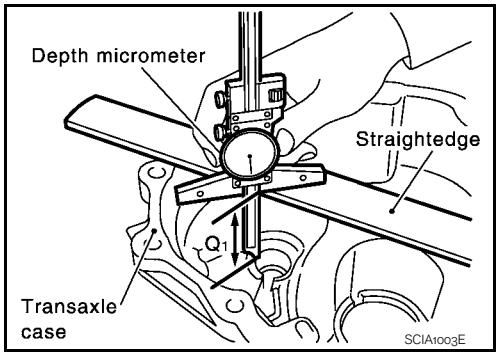
Q : Thickness of adjusting shim

Q_1 : Distance between transaxle case end face and mounting face of adjusting shim

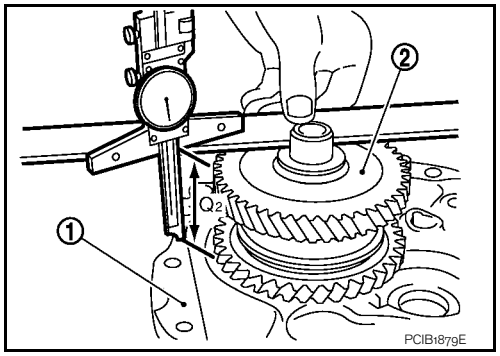
Q_2 : Distance between clutch housing end face and end face of reverse idler gear (rear)

cardiagn.com

1. Using a depth micrometer and straightedge, measure dimension "Q_1" between transaxle case end face and mounting face of adjusting shim.

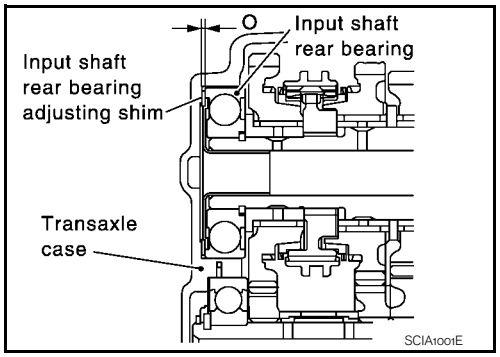


2. Using a depth micrometer and straightedge as shown in the figure, measure dimension "Q_2" between clutch housing (1) end face and end face of reverse idler gear (rear) (2).
CAUTION:
"Q_2": Measure at 4 point by approximately 90 degrees and use the average value.
3. Install selected reverse idler gear adjusting shim onto reverse idler gear (rear).



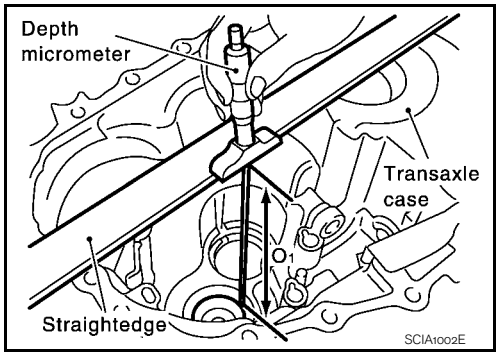
INPUT SHAFT END PLAY

- When adjusting input shaft end play, select adjusting shim for input shaft rear bearing. To select adjusting shim, measure clearance between transaxle case and input shaft rear bearing.
CAUTION:
Only 1 adjusting shim can be selected.
- Calculate dimension "O" (thickness of adjusting shim) using the following procedure to satisfy specification of end play for input shaft rear bearing.



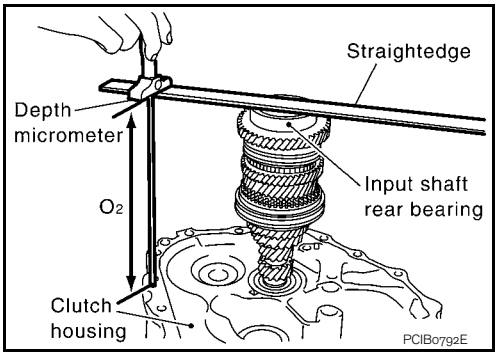
End play : Refer to TM-184, "End Play".
Dimension "O" = (O_1 - O_2) - End play
O : Thickness of adjusting shim
O_1 : Distance between transaxle case end face and mounting face of adjusting shim
O_2 : Distance between clutch housing end face and end face of input shaft rear bearing

1. Using a depth micrometer and straightedge, measure dimension "O_1" between transaxle case end face and mounting face of adjusting shim.
CAUTION:
"O_1": Measure at 4 point by approximately 90 degrees and use the average value.



cardiagn.com

2. Using a depth micrometer and straightedge as shown in the figure, measure dimension "O_2" between clutch housing end face and end face of input shaft rear bearing.
CAUTION:
"O_2": Measure at 4 point by approximately 90 degrees and use the average value.
3. Install selected input shaft rear bearing adjusting shim onto input shaft.



STRIKING ROD END PLAY

- When adjusting striking rod end play, select adjusting shim (1) for striking rod (2). To select adjusting shim, measure clearance between transaxle case (3) and striking rod shim (4).
CAUTION:
Only 1 adjusting shim can be selected.
- Calculate dimension "R" (thickness of adjusting shim) using the following procedure to satisfy specification of end play for striking rod.

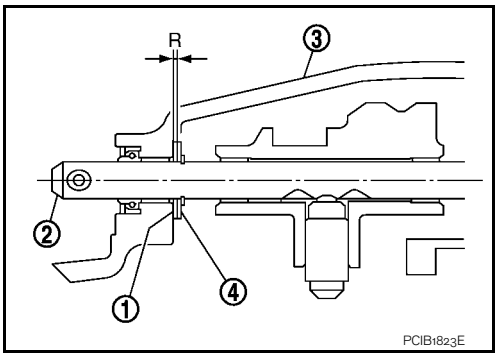
End play : Refer to TM-184, "End Play".

Dimension "R" = (R_1 - R_2) - End play

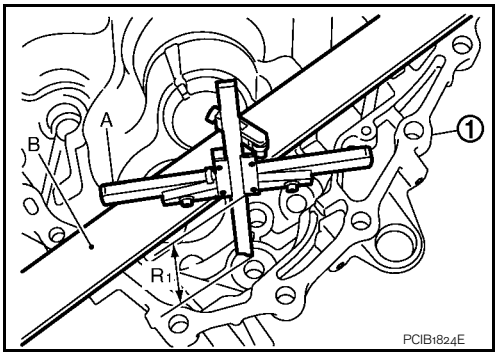
R : Thickness of adjusting shim

R_1 : Distance between transaxle case end face and mounting face of adjusting shim

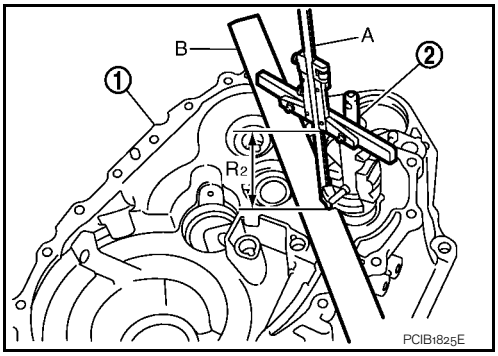
R_2 : Distance between clutch housing end face and end face of striking rod shim



1. Using a depth micrometer (A) and straightedge (B), measure dimension "R_1" between transaxle case (1) end face and mounting face of adjusting shim.
CAUTION:
"R_1": Measure at 4 point by approximately 90 degrees and use the average value.



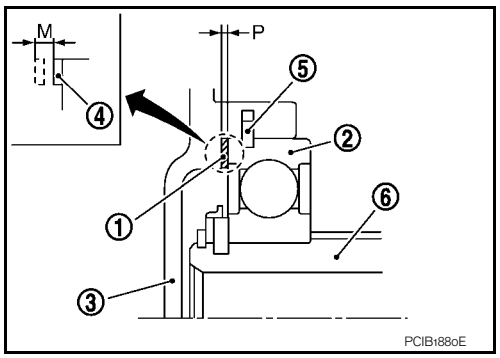
2. Using a depth micrometer (A) and straightedge (B) as shown in the figure, measure dimension "R_2" between clutch housing (1) end face and end face of striking rod shim (2).
CAUTION:
- **"R_2": Measure at 4 point by approximately 90 degrees and use the average value.**
- **When measuring, be careful for the inclination of striking rod assembly and striking rod shim.**
3. Install selected striking rod adjusting shim onto striking rod assembly.



MAINSHAFT END PLAY

cardiagn.com

- When adjusting mainshaft end play, select adjusting shim (1) for mainshaft rear bearing (2). To select adjusting shim, measure clearance “M” between transaxle case (3) and dummy adjusting shim (4) on mainshaft rear bearing.



5 : Snap ring
6 : Mainshaft

CAUTION:
Only 1 adjusting shim can be selected.

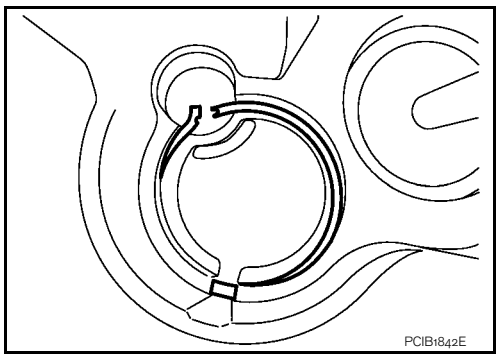
- Calculate dimension “P” (thickness of adjusting shim) using the following procedure to satisfy specification of end play for mainshaft rear bearing.

End play : Refer to TM-184, "End Play".
Dimension “P” = (M + N) - End play
P : Thickness of adjusting shim
M : Distance between dummy adjusting shim on mainshaft rear bearing end face and transaxle case end face
N* : Thickness of dummy adjusting shim

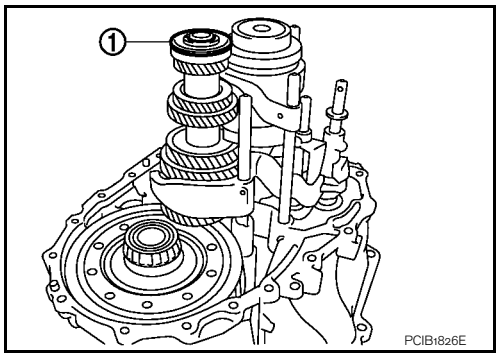
*: Refer to the latest parts information to use a dummy adjusting shim of which part number is the thinnest in thickness.

1. Install transaxle case following the procedures below.

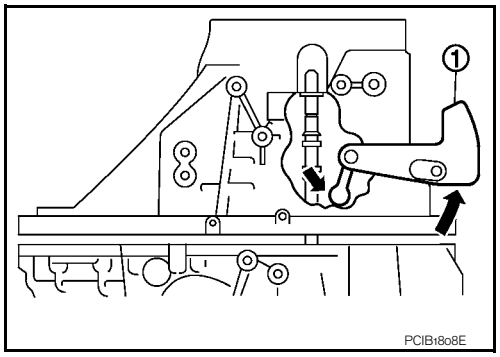
a. Temporarily install snap ring of mainshaft rear bearing into transaxle case.
CAUTION:
Do not reuse snap ring.



b. Install dummy adjusting shim (1) to mainshaft assembly.



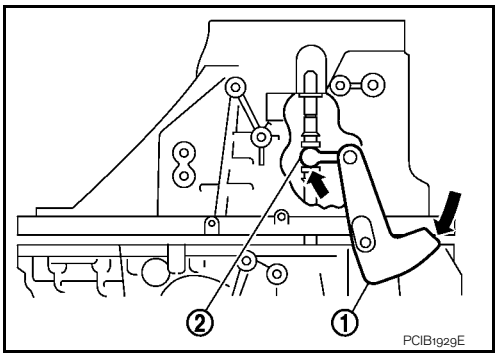
c. With shifter lever A (1) held in the position shown in the figure, temporarily assemble transaxle case to clutch housing.
CAUTION:
Be careful not to damage striking rod oil seal.
NOTE:
Make sure to hold shifter lever A in the position shown in the figure. Otherwise transaxle case cannot be installed to clutch housing.



cardiagn.com

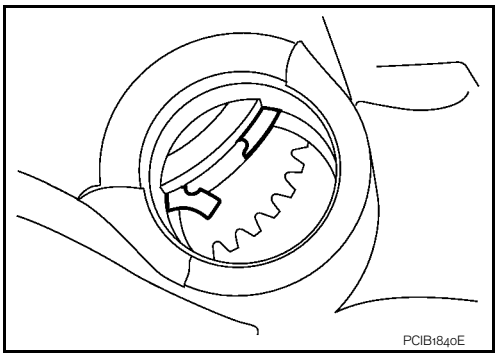
d. While rotating shifter lever A (1) in the direction of the arrow shown in the figure, assemble transaxle case to clutch housing.

2 : Shifter lever B

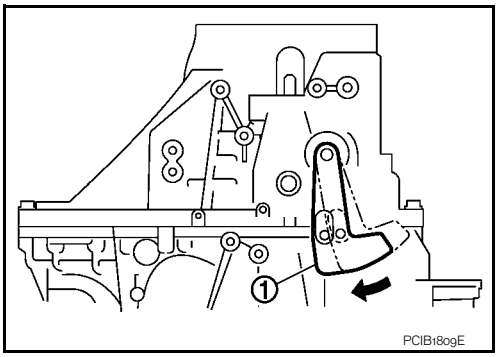


e. Accessing from the bore plug hole, expand snap ring at mainshaft rear bearing so that the ring catches the periphery of mainshaft rear bearing.

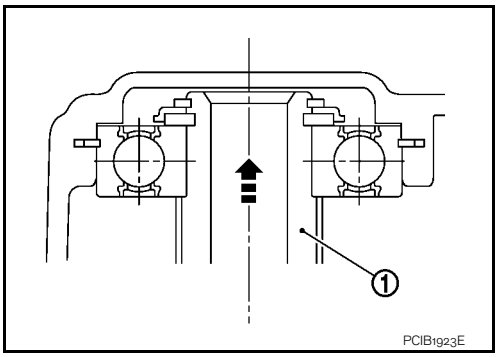
f. Temporarily tighten transaxle case mounting bolts.



2. Shift the shifter lever A (1) to 2nd gear position.
NOTE:
- The 2nd gear position is attained when shifter lever A is in the position shown in the figure.



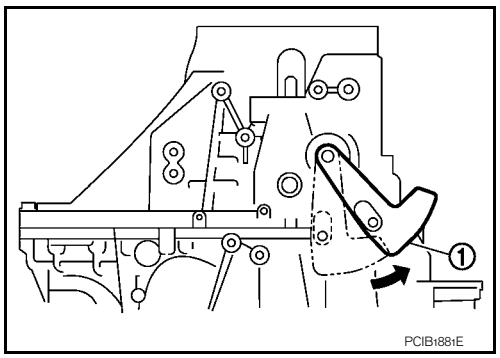
- When transaxle is shifted to the 2nd gear position, mainshaft assembly (1) is lifted.



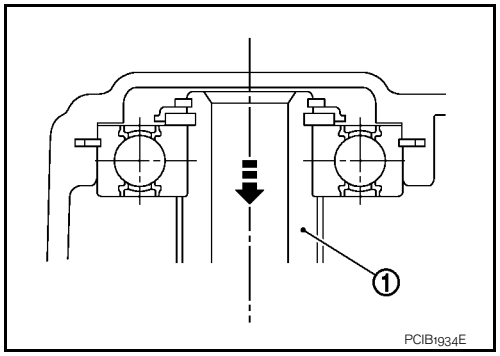
3. Seat snap ring in the groove on mainshaft rear bearing. If snap ring is not seated in the groove on mainshaft rear bearing, remove transaxle case and repeat the procedure 1 from step c.
4. Shift the shifter lever A to 1st gear position, and then shift it to 2nd gear position. Repeat 3 times.
NOTE:
- The mainshaft rear bearing position will be stabilized by shifting between 1st gear position and 2nd gear position alternately.

cardiagn.com

- The 1st gear position is attained when shifter lever A (1) is in the position shown in the figure.

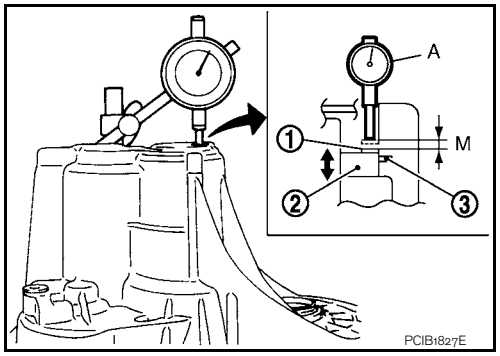


- When transaxle is shifted to the 1st gear position, mainshaft assembly (1) is declined.



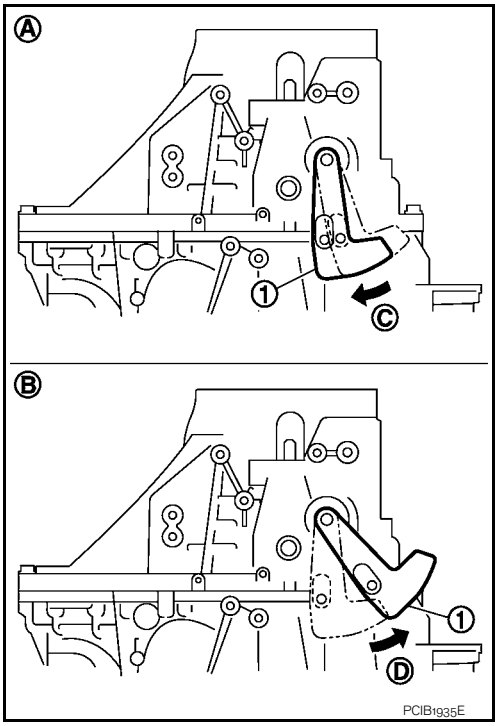
5. Set the dial indicator (A) to dummy adjusting shim (1) through the bore plug mounting hole.

   2 : Mainshaft rear bearing
   3 : Snap ring



cardiagn.com

6. Shift the shifter lever A (1) to 2nd gear position (A), and then rotate it in the direction of the arrow (C) in the figure until it stops. Using this position as the reference point, measure the amount of movement when shifting shifter lever A to 1st gear position (B) and rotating it in the direction of the arrow (D) in the figure until it stops. This measurement is the "M" dimension.
7. When measurement "M" is 0 - 0.06 mm (0 - 0.0024 in), adjustment terminates, and the dummy adjusting shim becomes regular adjusting shim. Select adjusting shim from the computed expressions when measurement "M" is over 0.06 mm (0.0024 in).



cardiagn.com

INPUT SHAFT AND GEAR

Exploded View

INFOID:0000000001034955

Refer to TM-125, "Exploded View".

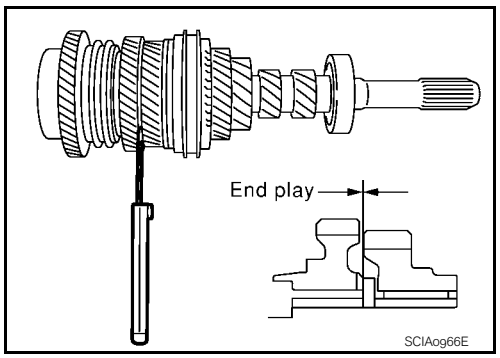
Disassembly

INFOID:0000000001034956

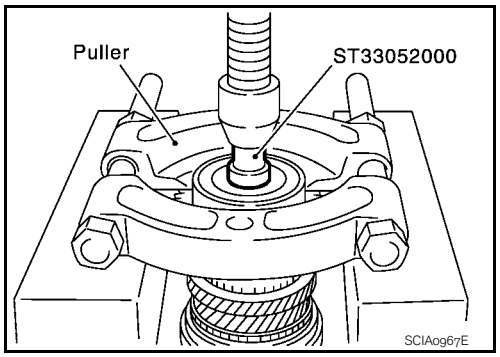
1. Before disassembling, measure end play for 3rd, 4th, 5th, and 6th input gears.

End play standard value : Refer to TM-184, "End Play".

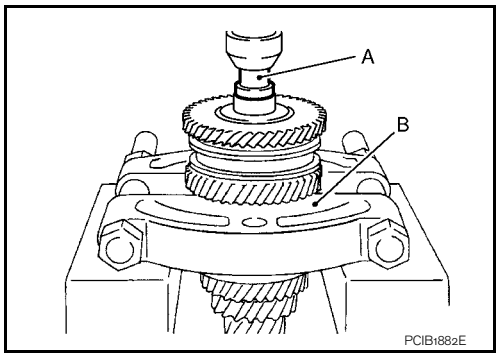
2. Remove oil channel.



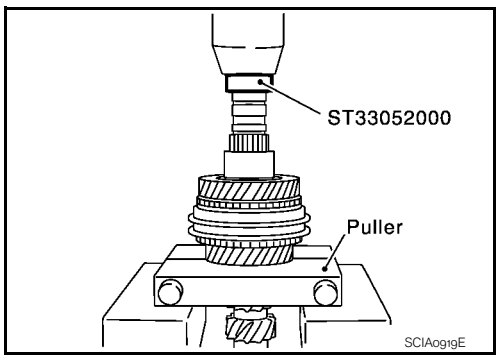
3. Press out input shaft rear bearing using the drift and a puller.
4. Remove snap ring.



5. Press out 6th input gear, 6th needle bearing, 6th input gear bushing, 5th-6th synchronizer hub assembly, and 5th input gear using the drift (A) [SST: ST33052000] and a puller (B).
6. Remove 5th needle bearing.

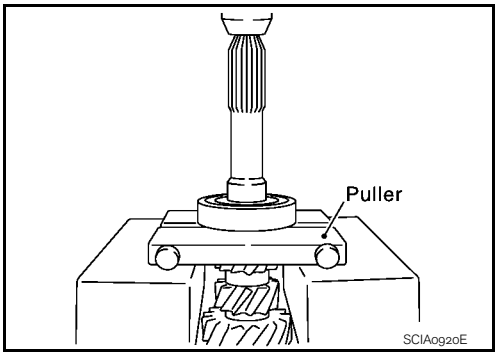


7. Press out 5th input gear bushing, thrust washer, 4th input gear, 4th needle bearing, 4th input gear bushing, 3rd-4th synchronizer hub assembly, and 3rd input gear using the drift and a puller.
8. Remove 3rd needle bearing.



cardiagn.com

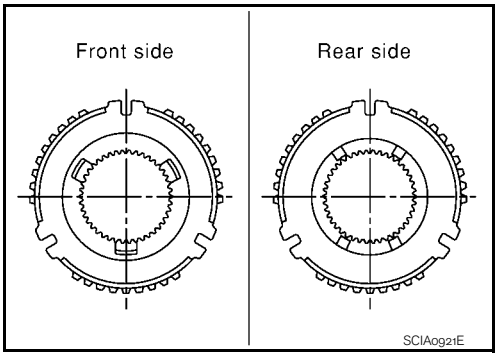
9. Press out input shaft front bearing using a puller.



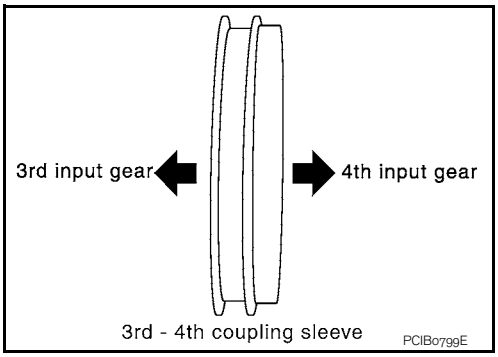
Assembly

INFOID:0000000001034957

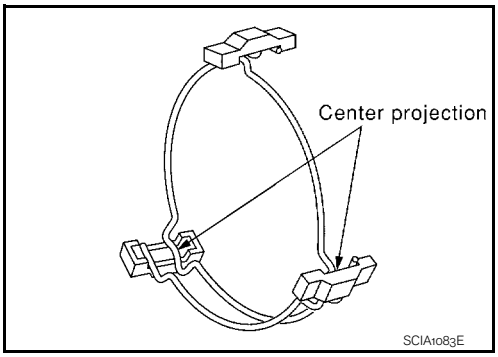
1. Install 3rd needle bearing to input shaft.
2. Install 3rd input gear, 3rd inner baulk ring, 3rd synchronizer cone, and 3rd outer baulk ring to input shaft.
   CAUTION:
   Replace 3rd inner baulk ring, 3rd synchronizer cone, and 3rd outer baulk ring as a set.
3. Install 3rd-4th spread springs, 3rd-4th shifting inserts, and 3rd-4th synchronizer hub onto 3rd-4th coupling sleeve.
   CAUTION:
   - **Be careful with orientation of 3rd-4th synchronizer hub.**
   - **Never reuse 3rd-4th synchronizer hub and 3rd-4th coupling sleeve.**
   - **Replace 3rd-4th synchronizer hub and 3rd-4th coupling sleeve as a set.**



   - **Be careful with orientation of 3rd-4th coupling sleeve.**

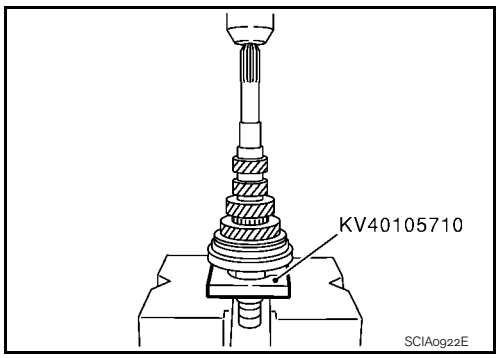


   - **Be sure not to hook center projection of 2 spread springs on same shifting insert.**

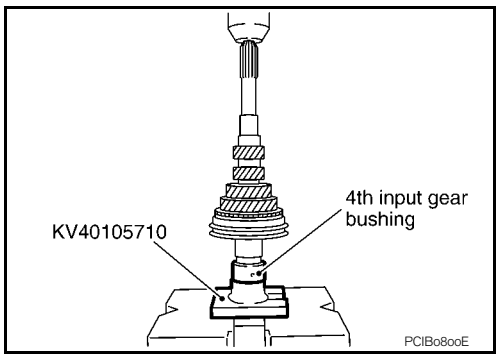


cardiagn.com

4. Press in 3rd-4th synchronizer hub assembly using the press stand.
   CAUTION:
   Align grooves of 3rd-4th shifting insert and 3rd outer baulk ring.



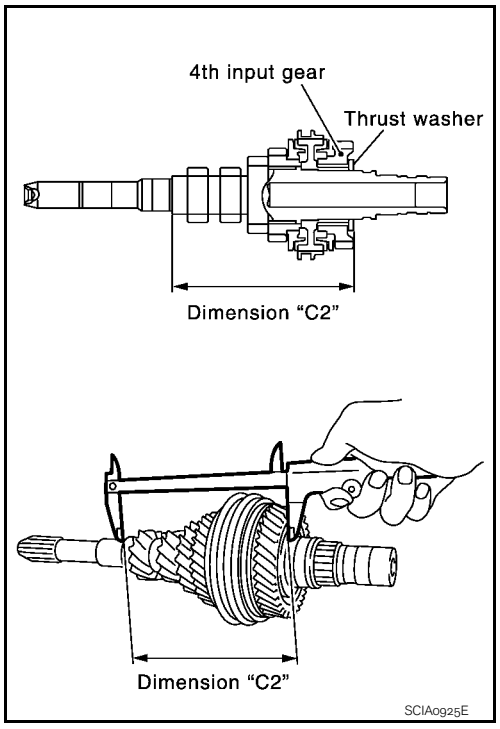
5. Press in 4th input gear bushing using the press stand.
6. Install 4th baulk ring.
7. Install 4th needle bearing and 4th input gear to input shaft.



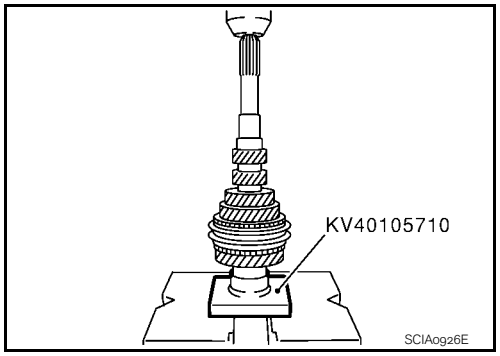
8. Select thrust washer so that dimension “C2” satisfies the standard value below. Then install thrust washer onto input shaft.

   Standard value for dimension “C2” : **Refer to TM-185, "Dimension".**

   CAUTION:
   Only one thrust washer can be selected.



9. Press in 5th input gear bushing using the press stand.
   CAUTION:
   Never reuse 5th input gear bushing.
10. Install 5th needle bearing and 5th input gear to input shaft.
11. Install 5th baulk ring.



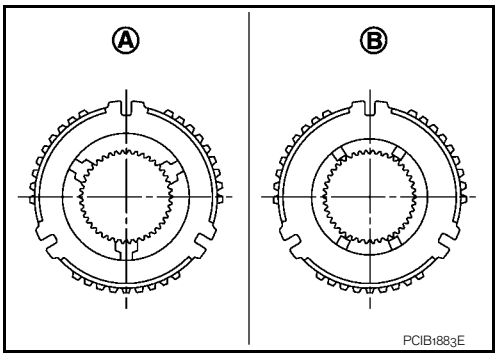
cardiagn.com

12. Install 5th-6th synchronizer hub, 5th-6th spread springs, and 5th-6th shifting inserts onto 5th-6th coupling sleeve.

CAUTION:

- **Be careful with orientation of 5th-6th synchronizer hub.**

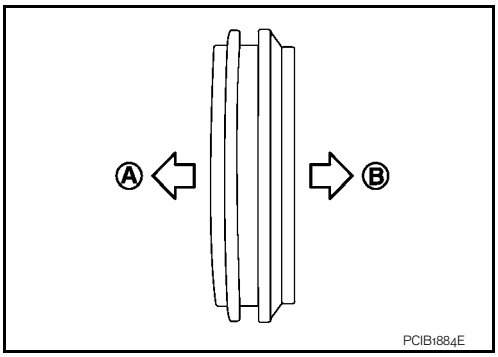
A	: Front side
B	: Rear side



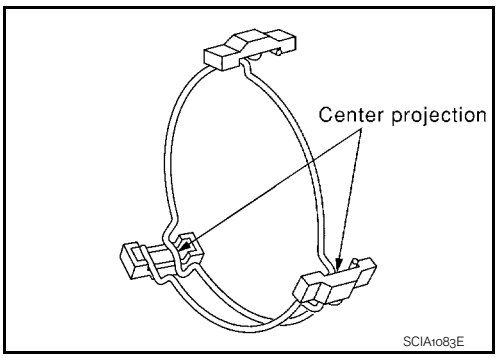
- **Never reuse 5th-6th synchronizer hub and 5th-6th coupling sleeve.**
- **Replace 5th-6th synchronizer hub and 5th-6th coupling sleeve as a set.**

- **Be careful with orientation of 5th-6th coupling sleeve.**

A	: 5th input gear side
B	: 6th input gear side



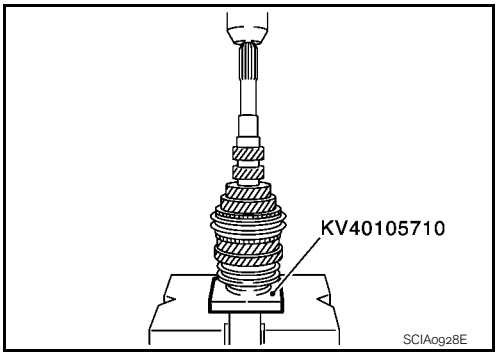
- **Be sure not to hook center projection of 2 spread springs on same shifting insert.**



13. Press in 5th-6th synchronizer hub assembly using the press stand.

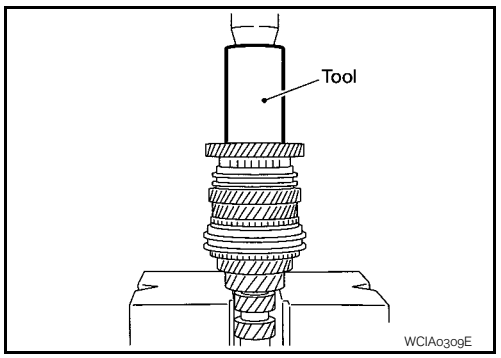
CAUTION:

Align grooves of 5th-6th shifting insert and 5th baulk ring.



cardiagn.com

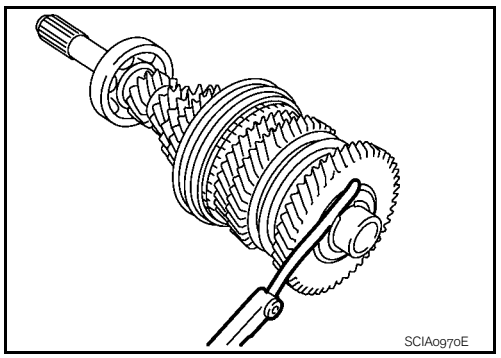
14. Install 6th needle bearing, 6th input gear, 6th baulk ring onto 6th input gear bushing and then press in 6th input gear bushing onto input shaft using the drift [SST: ST33200000].



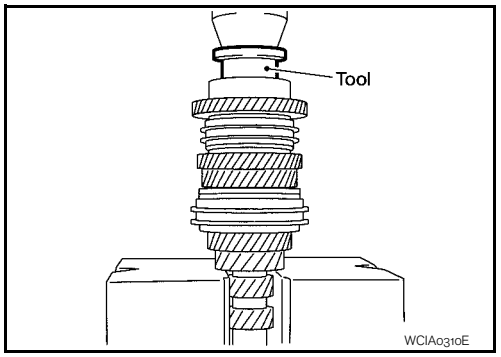
15. Install snap ring onto input shaft and make sure that end play (gap between snap ring and groove) of 6th input gear bushing satisfies the standard value.

End play standard value :Refer to TM-184, "End Play".

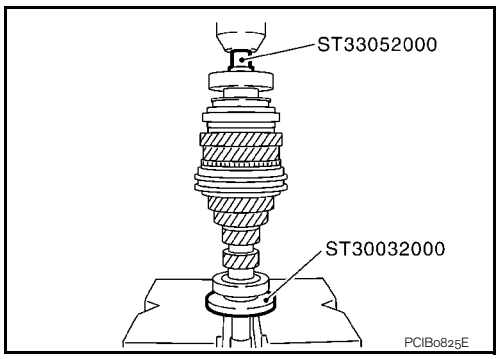
- If measurement is outside the standard range, select snap ring.
  CAUTION:
  Never reuse snap ring.



16. Press in input shaft rear bearing using the drift [SST: ST30901000].
    CAUTION:
    Install input shaft rear bearing with its brown surface facing the 6th input gear side.

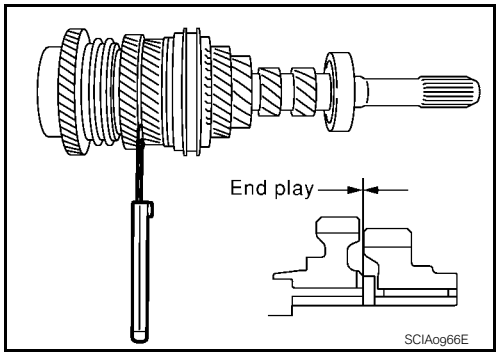


17. Press in input shaft front bearing using the drifts.
18. Install oil channel onto input shaft.



19. Check end play of 3rd, 4th, 5th, and 6th input gears.

End play standard value : Refer to TM-184, "End Play".



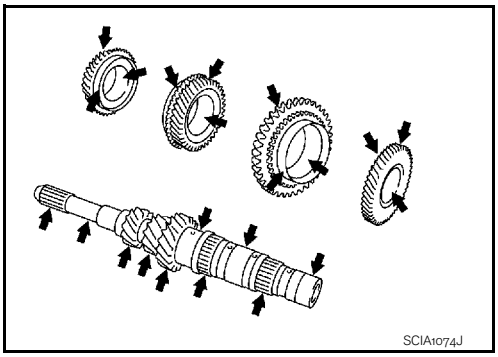
cardiagn.com

Inspection

INFOID:0000000001034958

INPUT SHAFT AND GEAR

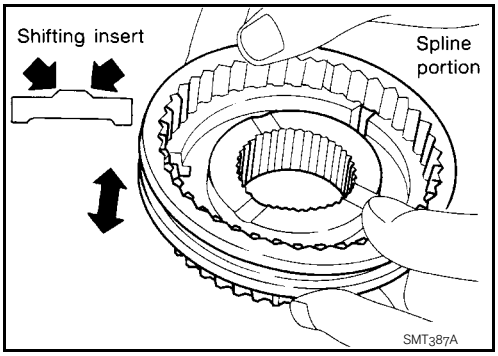
Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, etc. of shaft
- Excessive wear, damage, peeling, etc. of gears



SYNCHRONIZER

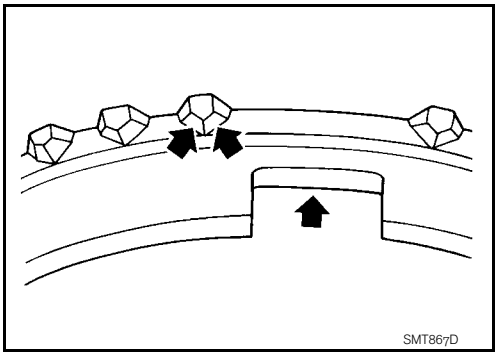
Synchronizer Hub and Coupling Sleeve

Check items below. If necessary, replace them with new ones.
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub and shifting insert
- Coupling sleeve and synchronizer hub must move smoothly.



Baulk Ring and Spread Spring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.

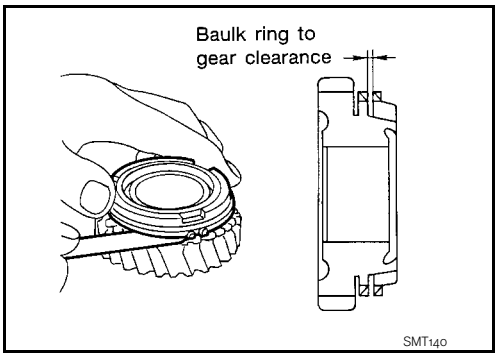


Baulk Ring Clearance for Single Cone Synchronizer (4th, 5th, and 6th)

Push baulk ring on the cone and measure the clearance between baulk ring and cone. If measurement is below limit, replace it with a new one.

Clearance

Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



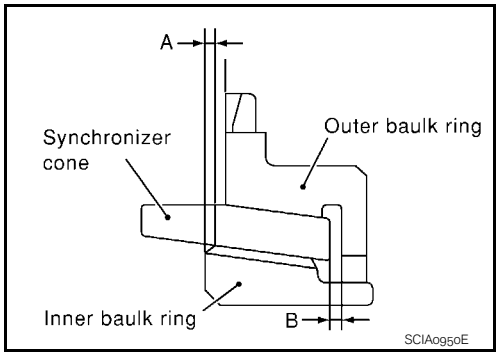
Baulk Ring Clearance for Double Cone Synchronizer (3rd)

cardiagn.com

Check the clearance between outer baulk ring, synchronizer cone, and inner baulk ring as follows.

CAUTION:

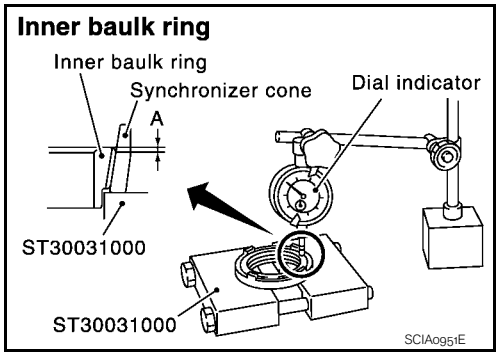
The clearances “A” and “B” are controlled with outer baulk ring, synchronizer cone, and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.



1. Measure the clearance “A” at 2 points or more diagonally opposite using a dial indicator. And then calculate mean value.

Clearance “A”

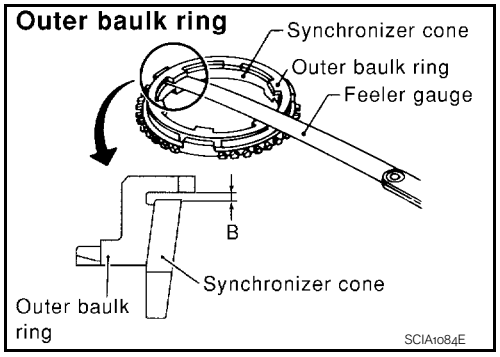
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



2. Measure the clearance “B” at 2 points or more diagonally opposite using a feeler gauge. And then calculate mean value.

Clearance “B”

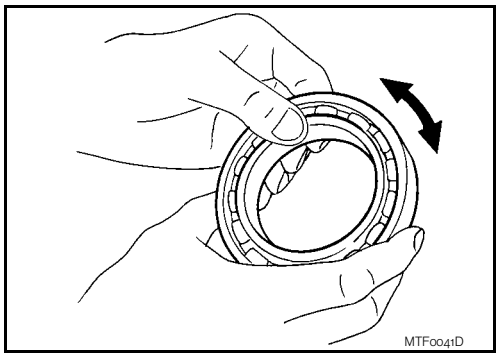
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



BEARING

Check items below. If necessary, replace them with new ones.

- Damage and rough rotation of bearing



MAINSHAFT AND GEAR

Exploded View

INFOID:0000000001034959

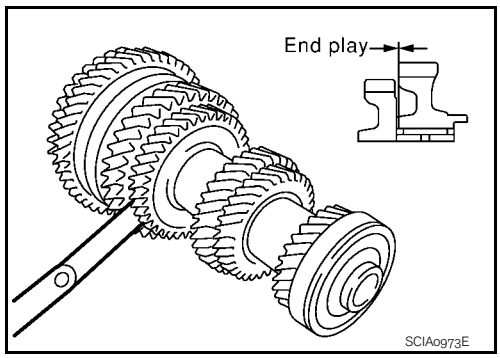
Refer to TM-125, "Exploded View".

Disassembly

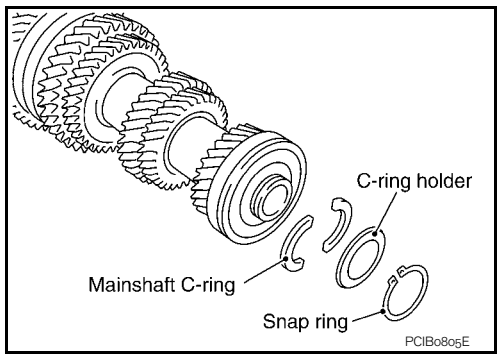
INFOID:0000000001034960

1. Before disassembling, measure the end play of 1st and 2nd main gears.

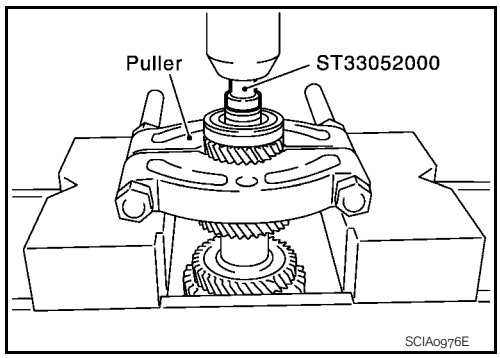
End play standard value : Refer to TM-184, "End Play".



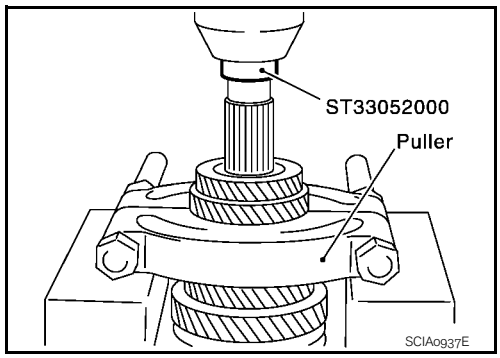
2. Remove snap ring.
3. Remove C-ring holder and then remove mainshaft C-rings.



4. Press out mainshaft rear bearing, 6th main gear adjusting shim, and 6th main gear using the drift and a puller.
5. Remove 5th-6th mainshaft spacer.

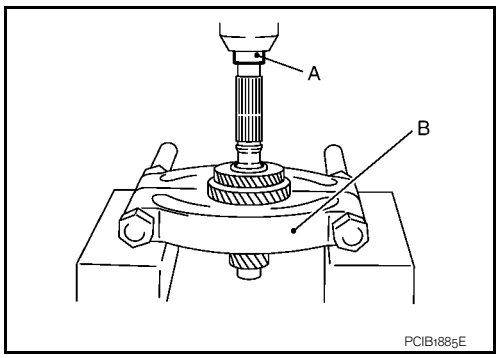


6. Press out 4th main gear and 5th main gear using the drift and a puller.
7. Remove 4th main gear adjusting shim.
8. Remove 3rd-4th mainshaft spacer.

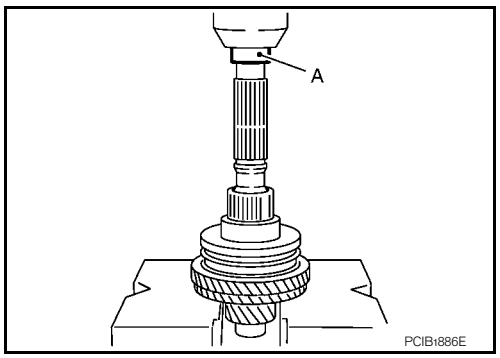


cardiagn.com

9. Press out 3rd main gear and 2nd main gear using the drift (A) [SST: KV40105020] and a puller (B).
10. Remove 2nd needle bearing.



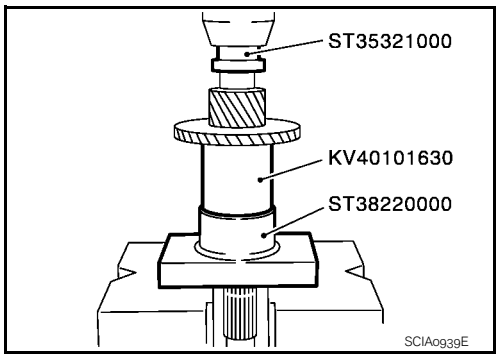
11. Press out 2nd main gear bushing, 1st-2nd synchronizer hub assembly, 1st main gear, 1st needle bearing, 1st main gear bushing, and reverse main gear using the drift (A) [SST: KV40105020].



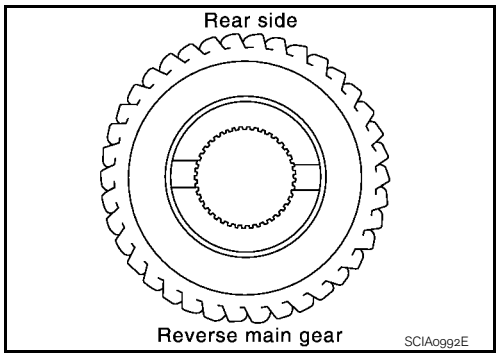
Assembly

INFOID:0000000001034961

1. Press in reverse main gear using the drifts and the press stand.

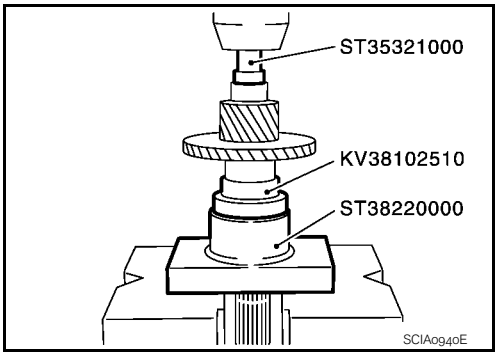


CAUTION:
- **Be careful with orientation of reverse main gear.**
- **Never reuse reverse main gear.**



cardiagn.com

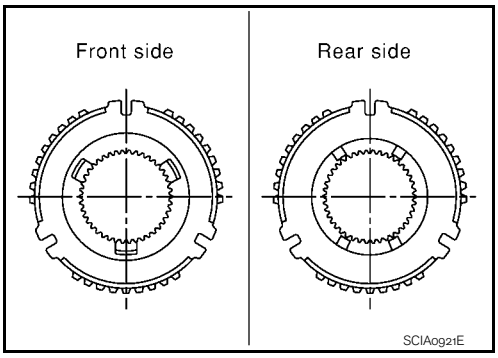
2. Press in 1st main gear bushing using the drifts and the press stand.
3. Install 1st needle bearing and then 1st main gear.



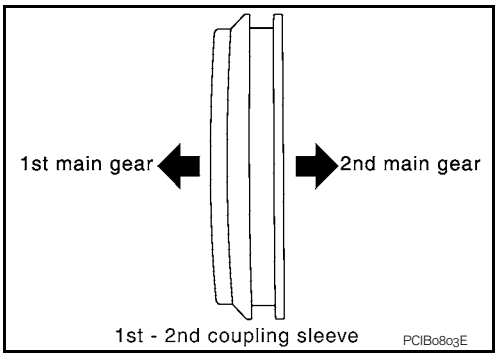
4. Install 1st-2nd spread springs, 1st-2nd shifting inserts, and 1st-2nd synchronizer hub onto 1st-2nd coupling sleeve.

CAUTION:

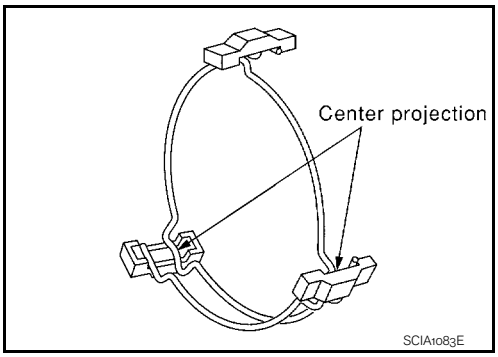
- **Be careful with orientation of 1st-2nd synchronizer hub.**
- **Never reuse 1st-2nd synchronizer hub and 1st-2nd coupling sleeve.**
- **Replace 1st-2nd synchronizer hub and 1st-2nd coupling sleeve as a set.**



- **Be careful with orientation of 1st-2nd coupling sleeve.**



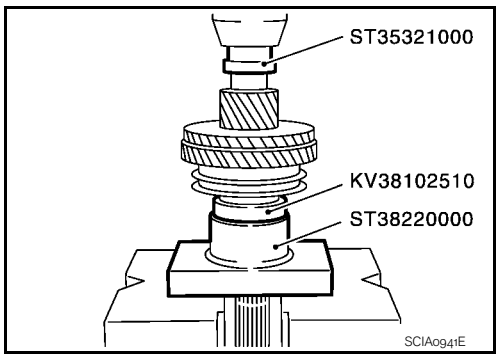
- **Be sure not to hook center projection of 2 spread springs on same 1st-2nd shifting insert.**



cardiagn.com

5. Install 1st inner baulk ring, 1st synchronizer cone, and 1st outer baulk ring onto mainshaft and then press in 1st-2nd synchronizer hub assembly onto mainshaft using the drifts and the press stand.

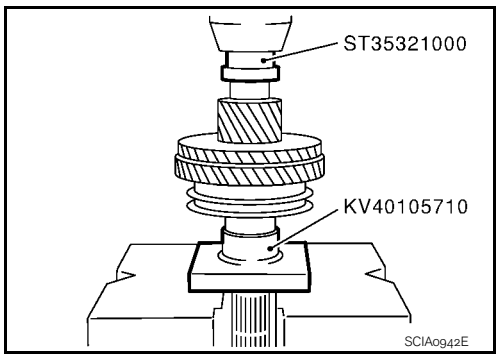
CAUTION:
- **Outer baulk ring, synchronizer cone, and inner baulk ring on 2nd gear-side must have been removed.**
- **Be careful with orientation of coupling sleeve.**
- **Replace 1st inner baulk ring, 1st synchronizer cone, and 1st outer baulk ring as a set.**



6. Press in 2nd main gear bushing using the drift and the press stand.
7. Install 2nd outer baulk ring, 2nd synchronizer cone, and 2nd inner baulk ring.

CAUTION:
Replace 2nd outer baulk ring, 2nd synchronizer cone, and 2nd inner baulk ring as a set.

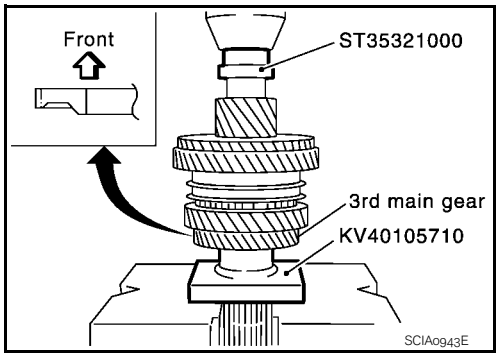
8. Install 2nd needle bearing and 2nd main gear.



9. Press in 3rd main gear using the drift and the press stand.

CAUTION:
- **Be careful with orientation of 3rd main gear.**
- **Never reuse 3rd main gear.**

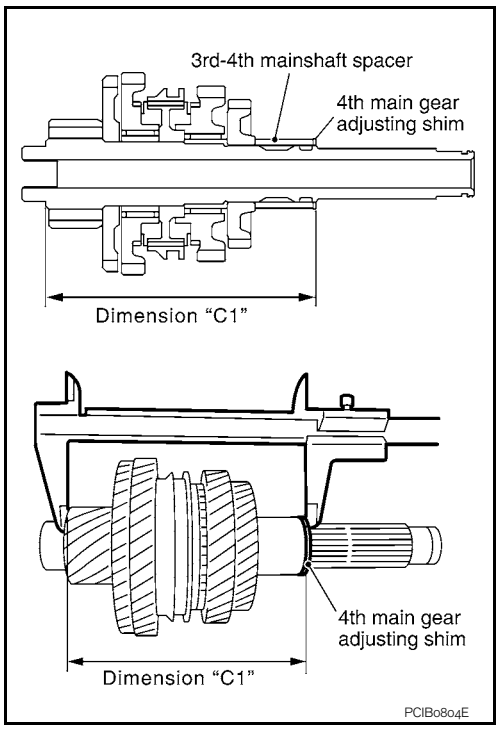
10. Install 3rd-4th mainshaft spacer.



11. Select 4th main gear adjusting shim so that dimension “C1” satisfies the standard value below and install 4th main gear adjusting shim onto mainshaft.

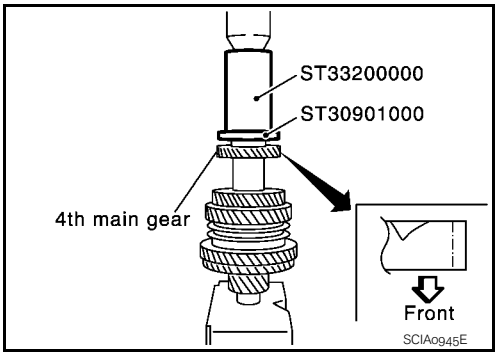
Standard value for dimension “C1” : Refer to TM-185, "Dimension".

CAUTION:
Only one adjusting shim can be selected.



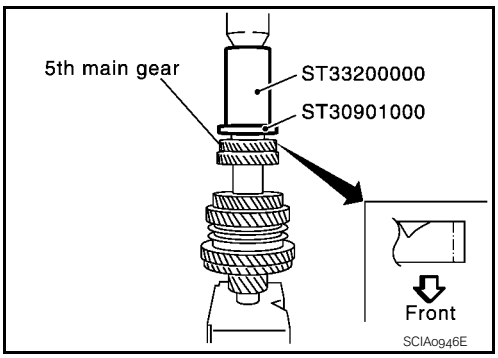
cardiagn.com

12. Press in 4th main gear using the drifts.
CAUTION:
- **Be careful with orientation of 4th main gear.**
- **Never reuse 4th main gear.**

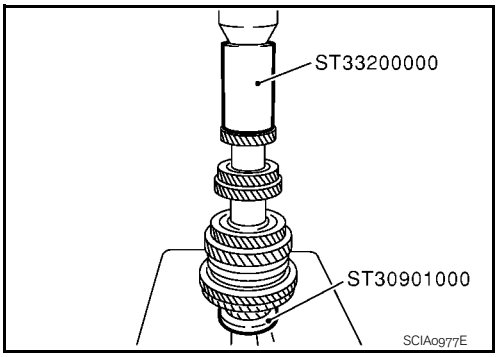


13. Press in 5th main gear using the drifts.
CAUTION:
- **Be careful with orientation of 5th main gear.**
- **Never reuse 5th main gear.**

14. Install 5th-6th mainshaft spacer.



15. Press in 6th main gear using the drifts.
CAUTION:
Never reuse 6th main gear.



16. Select 6th main gear adjusting shim and then install it onto mainshaft.
- Calculate thickness “S” of 6th main gear adjusting shim following the procedure below so that end play dimension between 6th main gear and mainshaft rear bearing becomes the dimension shown below.

End play :Refer to TM-184, "End Play".

Dimension “S” = (S_1 - S_2) - End play

S : Thickness of adjusting shim

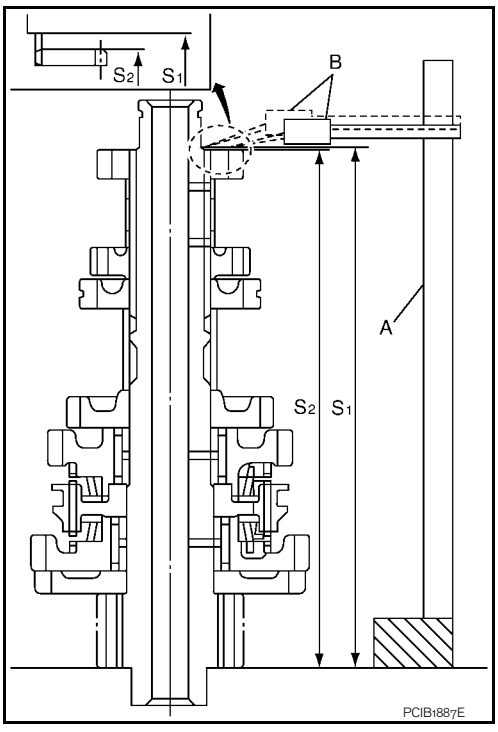
S_1 : Dimension from mainshaft standard face to mainshaft rear bearing press-fit end face

S_2 : Dimension from mainshaft standard face to 6th main gear end face

CAUTION:
Only one adjusting shim can be selected.

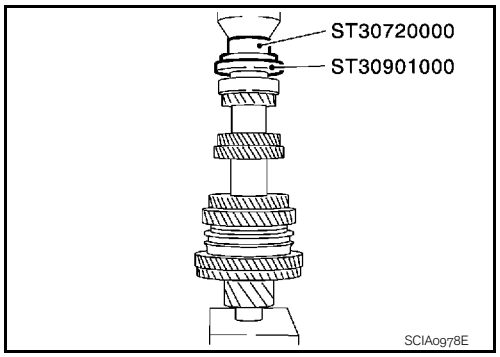
a. Measure dimension “S_1” and “S_2” using a height gauge (A) and pick tester (B).

b. Install selected 6th main gear adjusting shim to mainshaft.



cardiagn.com

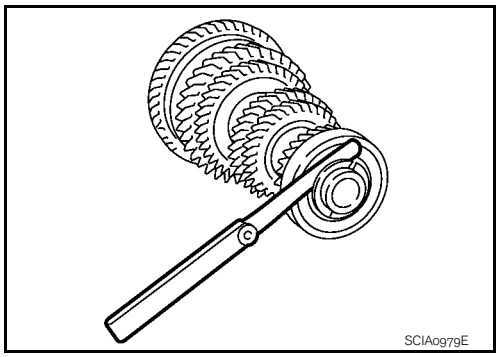
17. Press in mainshaft rear bearing using the drifts.



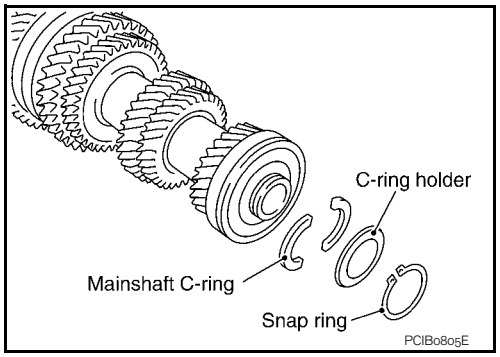
18. Install mainshaft C-rings onto mainshaft and check that end play of mainshaft rear bearing satisfies the standard value.

End play standard value : Refer to TM-184, "End Play".

- If measurement is outside the standard range, reselect mainshaft C-rings.

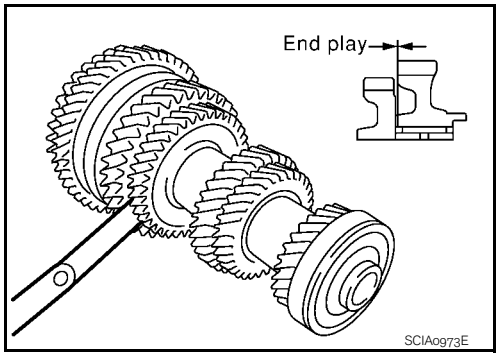


19. Install C-ring holder and then install snap ring.
CAUTION:
Never reuse snap ring.



20. Check end play of 1st and 2nd main gears.

End play standard value : Refer to TM-184, "End Play".



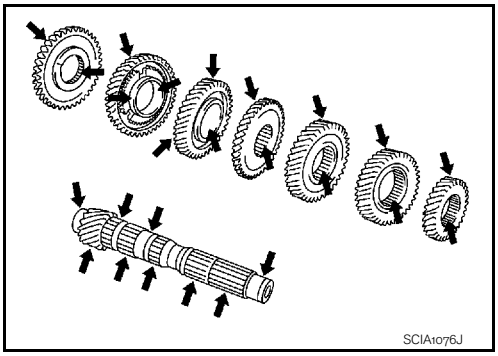
Inspection

INFOID:0000000001034962

MAINSHAFT AND GEAR

cardiagn.com

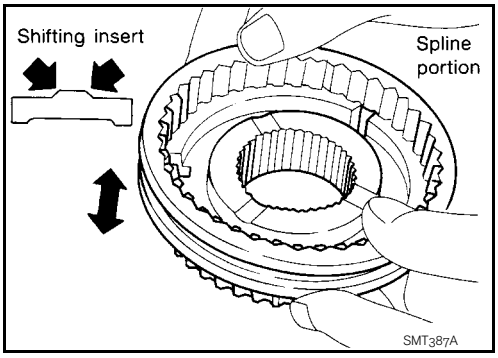
Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.



SYNCHRONIZER

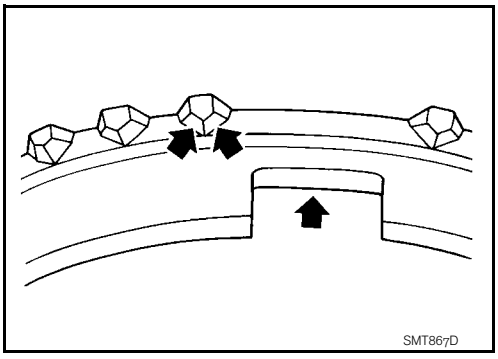
Synchronizer Hub and Coupling Sleeve

Check items below. If necessary, replace them with new ones.
- Damage and unusual wear on contact surfaces of coupling sleeve, synchronizer hub and shifting insert.
- Coupling sleeve and synchronizer hub must move smoothly.



Baulk Ring and Spread Spring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.

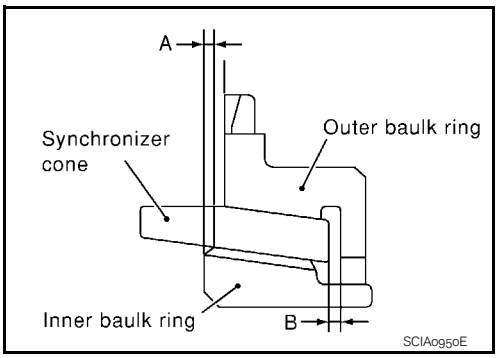


Baulk Ring Clearance for Double Cone Synchronizer (1st)

Check the clearance between outer baulk ring, synchronizer cone, and inner baulk ring as follows.

CAUTION:

The clearances “A” and “B” are controlled with outer baulk ring, synchronizer cone, and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.

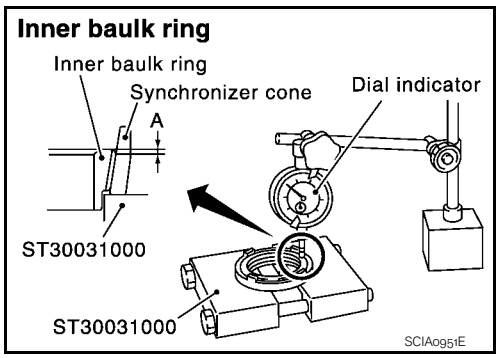


cardiagn.com

1. Measure the clearance “A” at 2 points or more diagonally opposite using a dial indicator. And then calculate mean value.

Clearance “A”

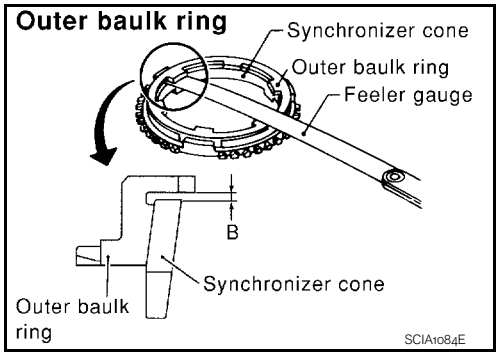
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



2. Measure the clearance “B” at 2 points or more diagonally opposite using a feeler gauge. And then calculate mean value.

Clearance “B”

Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**

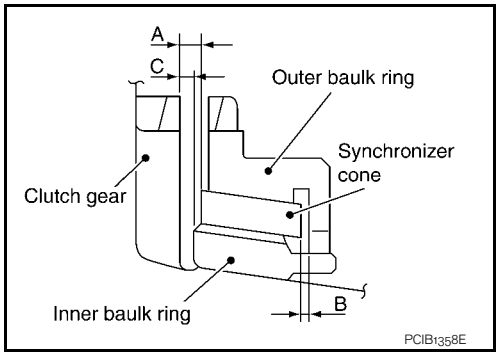


Baulk Ring Clearance for Triple Cone Synchronizer (2nd)

Check the clearance between outer baulk ring, synchronizer cone, and inner baulk ring as follows.

CAUTION:

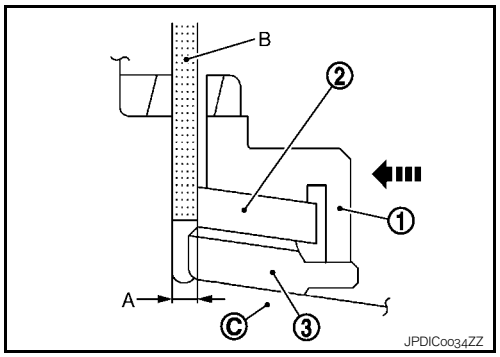
The clearances “A”, “B”, and “C” are controlled with outer baulk ring, synchronizer cone, and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.



1. Measure the clearance “A” at 2 points or more diagonally opposite using a feeler gauge (B) when pressing outer baulk ring (1), synchronizer cone (2), and inner baulk ring (3) toward gear taper cone (C). And then calculate mean value.

Clearance “A”

Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**

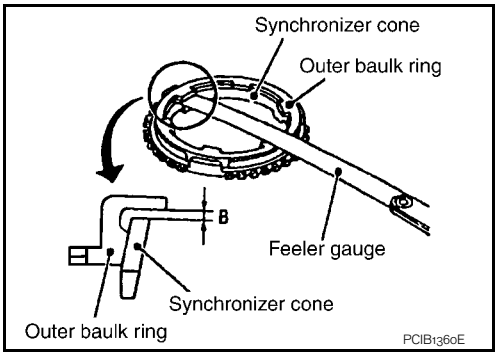


cardiagn.com

2. Measure the clearance “B” at 2 points or more diagonally opposite using a feeler gauge. And then calculate mean value.

Clearance “B”

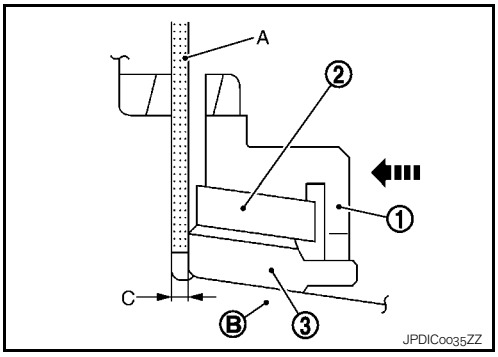
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



3. Measure the clearance “C” at 2 points or more diagonally opposite using a feeler gauge (A) when pressing outer baulk ring (1), synchronizer cone (2), and inner baulk ring (3) toward gear taper cone (B). And then calculate mean value.

Clearance “C”

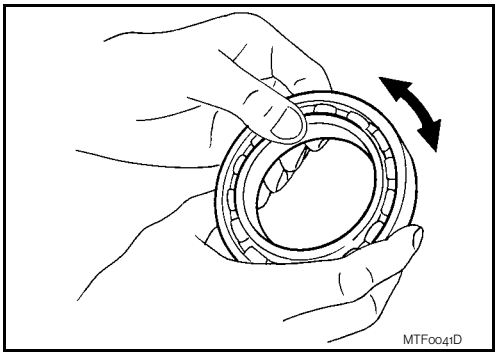
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



BEARING

Check items below. If necessary, replace them with new ones.

- Damage and rough rotation of bearing



cardiagn.com

REVERSE IDLER SHAFT AND GEAR

Exploded View

INFOID:0000000001034963

Refer to TM-125, "Exploded View".

Disassembly

INFOID:0000000001034964

1. Remove reverse idler gear (rear), reverse coupling sleeve, and reverse insert springs simultaneously.
2. Remove reverse idler gear needle bearing.
3. Remove thrust needle bearing.
4. Remove reverse baulk ring.
5. Remove reverse idler gear (front).
6. Remove reverse idler gear needle bearing.
7. Remove thrust needle bearing.
8. Remove retaining pin from reverse idler shaft.

Assembly

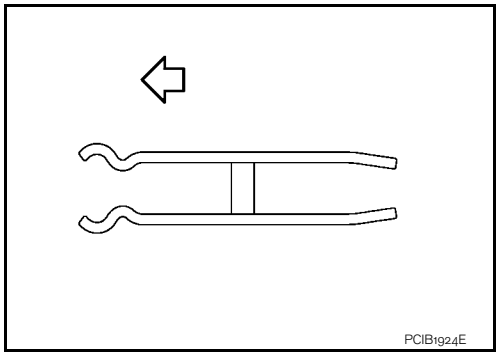
INFOID:0000000001034965

Note the following, and assemble in the reverse order of disassembly.

CAUTION:

- **Be careful with orientation of reverse insert spring.**

⇦ : Front



- **Never reuse retaining pin.**

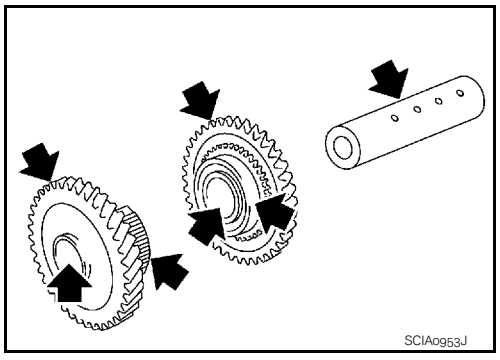
Inspection

INFOID:0000000001034966

REVERSE IDLER SHAFT AND GEAR

Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.

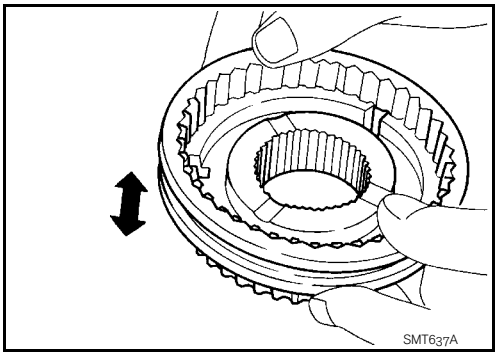


SYNCHRONIZER

Synchronizer Hub and Coupling Sleeve

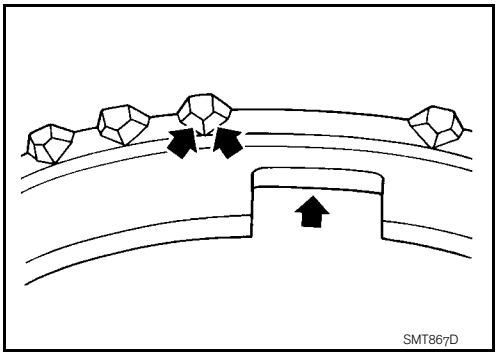
cardiagn.com

Check items below. If necessary, replace them with new ones.
- Damage and unusual wear on contact surfaces of coupling sleeve, synchronizer hub of reverse idler gear (rear), and insert spring.
- Coupling sleeve and synchronizer hub of reverse idler gear (rear) must move smoothly.



Baulk Ring

Check damage, or excessive wear on cam face of baulk ring or working face of insert. If necessary, replace it with new ones.

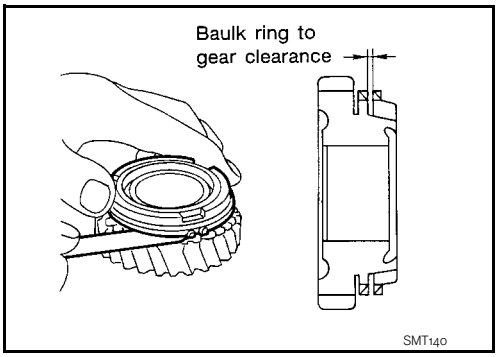


Baulk Ring Clearance for Single Cone Synchronizer (Reverse)

Push baulk ring on the cone and measure the clearance between baulk ring and cone. If the measurement is below limit, replace it with a new one.

Clearance

Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



BEARING

Check items below. If necessary, replace them with new ones.
- Damage and rough rotation of bearing

cardiagn.com

FINAL DRIVE

Exploded View

INFOID:0000000001034967

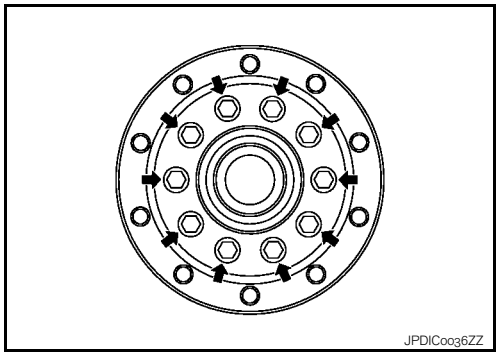
Refer to TM-125, "Exploded View".

Disassembly

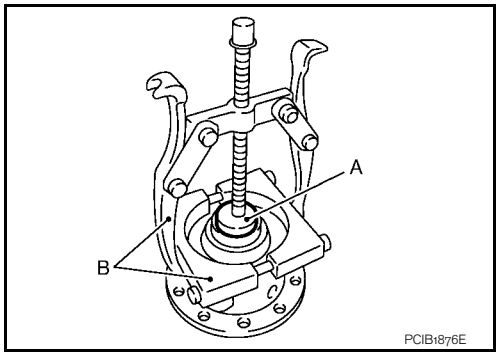
INFOID:0000000001034968

DIFFERENTIAL CASE

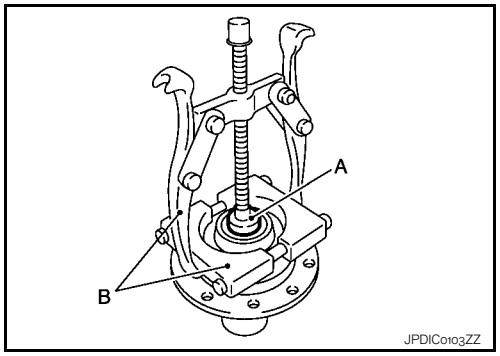
1. Remove final gear mounting bolts and then separate the final gear from differential case.
2. Remove reduction gear mounting bolts.



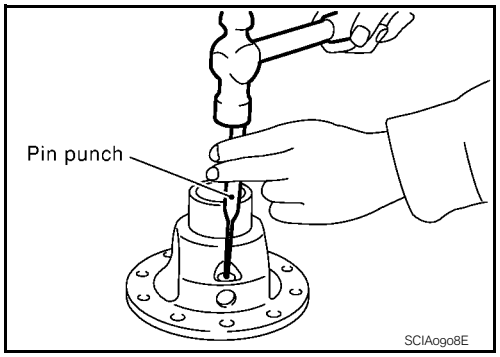
3. Remove differential side bearing (clutch housing side) using the drift (A) [SST: ST33061000] and pullers (B).
   CAUTION:
   Hook a puller on the inner race of differential side bearing.
4. Remove reduction gear.



5. Remove differential side bearing (transaxle case side) using the drift (A) [SST: ST33061000] and pullers (B).
   CAUTION:
   Hook a puller on the inner race of differential side bearing.



6. Remove retaining pin from differential case using a pin punch and then remove pinion mate shaft.
7. Rotate pinion mate gears and remove pinion mate gears, pinion mate thrust washers, side gears, and side gear thrust washers from differential case.

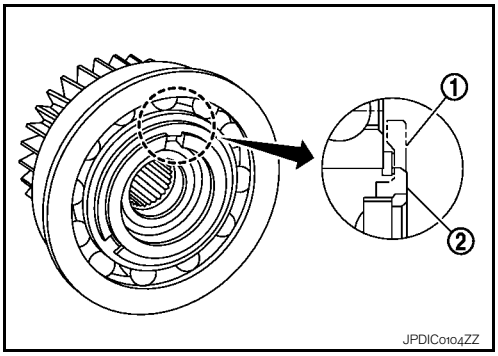


OUTPUT GEAR

cardiagn.com

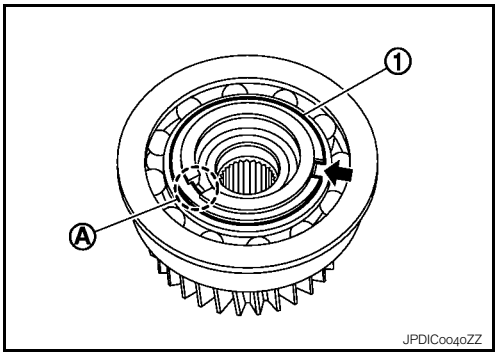
1. Remove snap ring (1).

2 : Output gear

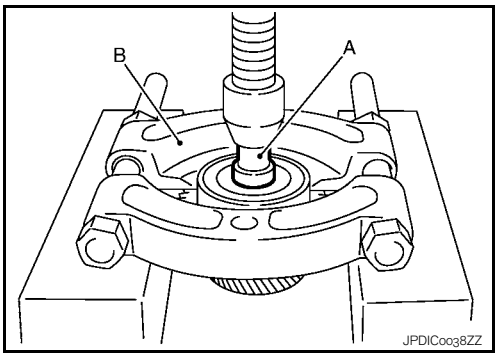


2. Remove snap ring (1).

A : Output gear groove
⬅ : Snap ring notch



3. Remove output gear bearing using the drift (A) [SST: ST30612000] and a puller (B).

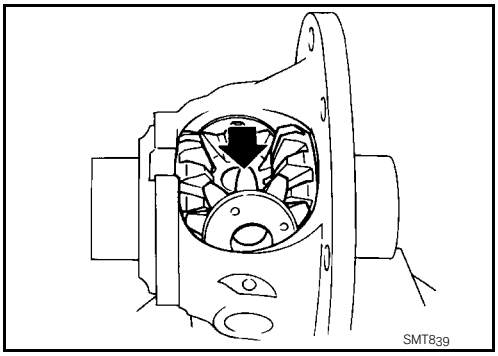


Assembly

INFOID:0000000001034969

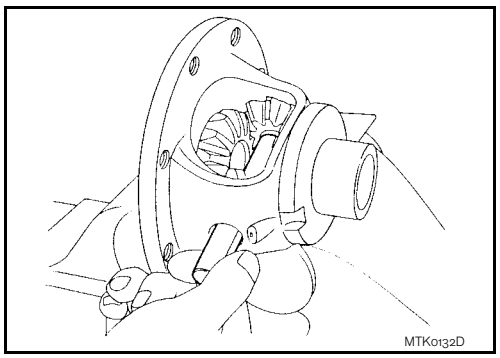
DIFFERENTIAL CASE

1. Apply gear oil to sliding area of differential case, each gear, and thrust washer.
2. Install side gear thrust washers and side gears into differential case.
3. While rotating pinion mate thrust washers and pinion mate gears, aligning them diagonally, install them into differential case.



cardiagn.com

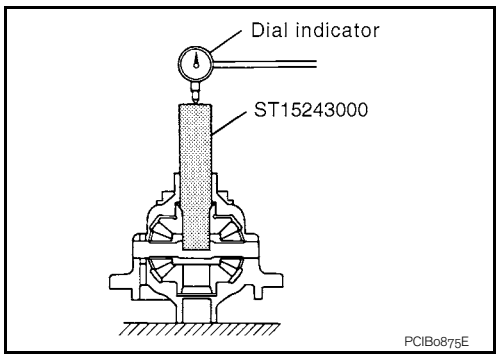
4. Insert pinion mate shaft into differential case.
CAUTION:
Be sure not to damage pinion mate thrust washers.



5. Measure end play of side gears following the procedure below. Then select side gear thrust washer.

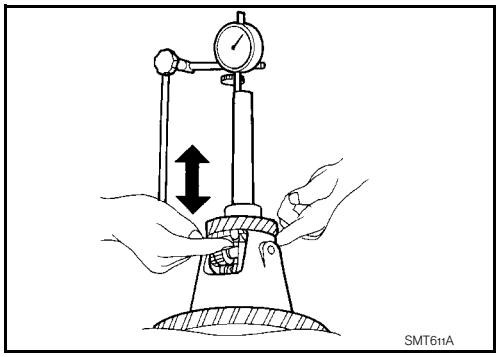
a. Put differential case vertically so that its side gear to be measured faces upward.

b. Place the drift and a dial indicator onto side gears.



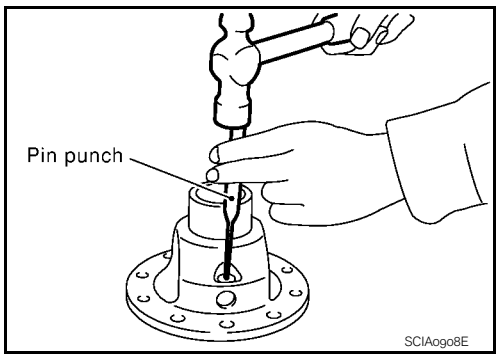
c. Move side gears up and down to measure the clearance and select thrust washer so that it satisfies the standard value.

Allowable Clearance between side gear and differential case with thrust washer	**: Refer to TM-185, "Differential Side Gear Clearance".**



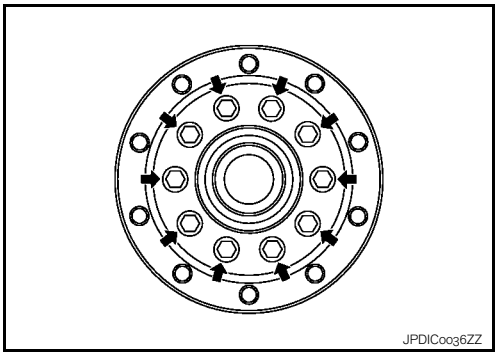
CAUTION:
- **There should be no resistance and gears should rotate freely.**
- **Place differential case upside down. Measure the end play for opposite side-gears likewise securely.**
- **Only one thrust washer can be selected.**

6. Install retaining pin into pinion mate shaft using a pin punch.
CAUTION:
Never reuse retaining pin.



cardiagn.com

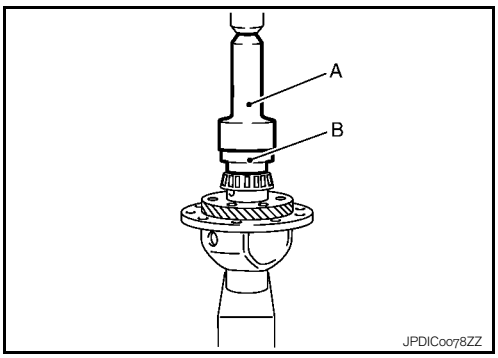
7. Install reduction gear into differential case and tighten reduction gear mounting bolts to the specified torque.



8. Press in differential side bearing (clutch housing side) to differential case using the drifts.

   A: Drift [SST: ST30720000]
   B: Drift [SST: KV38102510]

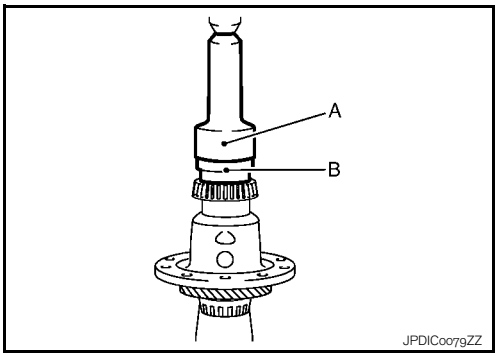
   CAUTION:
   Replace differential side bearing and differential side bearing outer race as a set.



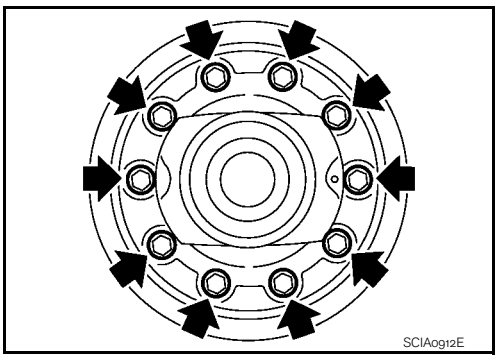
9. Press in differential side bearing (transaxle case side) to differential case using the drifts.

   A: Drift [SST: ST30720000]
   B: Drift [SST: KV38102510]

   CAUTION:
   Replace differential side bearing and differential side bearing outer race as a set.



10. Install final gear into differential case and tighten final gear mounting bolts to the specified torque.

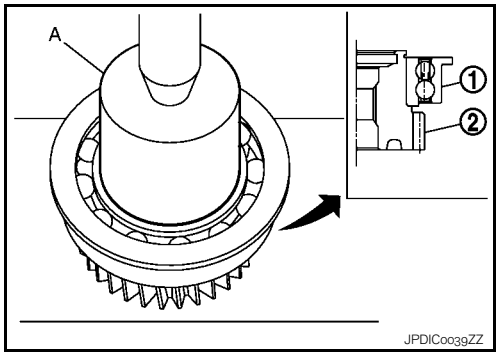


OUTPUT GEAR

cardiagn.com

1. Install output gear bearing (1) to output gear (2) using the drift (A) [Commercial service tool].

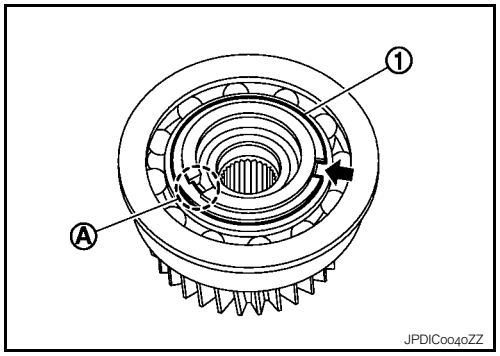
CAUTION:
Be careful with the orientation of output gear bearing.



2. Install snap ring (1) onto output gear and make sure that end play (gap between snap ring and groove) of output gear bearing satisfies the standard value.

End play standard value : Refer to TM-184, "End Play".

CAUTION:
- **Only one snap ring can be selected.**
- **Never reuse snap ring.**
- **Never align snap ring notch with output gear groove (A) when assembling.**



3. Install snap ring following the procedures below.

CAUTION:
If the following steps b and c are not performed when installing snap ring, it may become detached from output gear.

a. Press (A) of the snap ring (1) against (B) of the output gear (2).

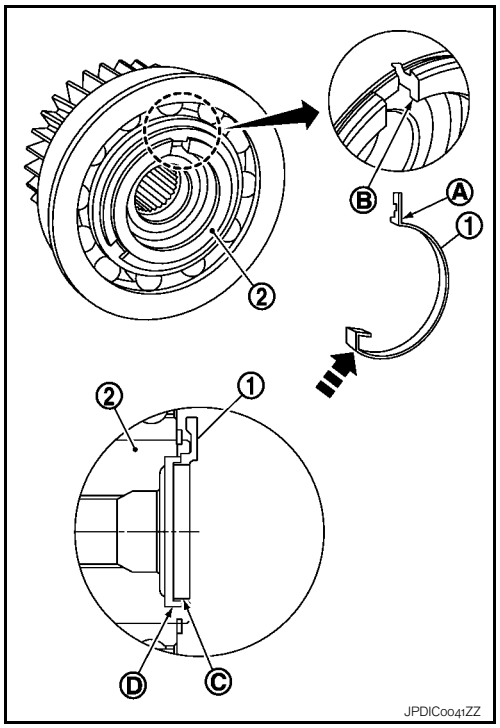
CAUTION:
Never reuse snap ring.

b. Press snap ring from the direction shown in the figure. Temporarily install it so that the rim of snap ring contacts with (C) of output gear.

CAUTION:
- **When compressing snap ring, outside diameter of snap ring must not become 46 mm (1.81 in) or less.**
- **Never press snap ring excessively.**
- **Never insert snap ring in (D) of output gear.**

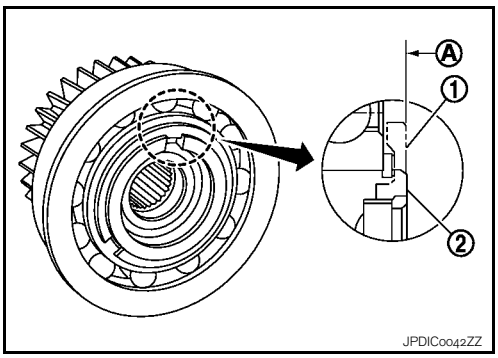
c. Evenly press snap ring in the axial direction to install it on (D) of output gear.

CAUTION:
- **Securely install snap ring on (D) of output gear.**



cardiagn.com

- **Snap ring (1) must not lie off (A) of output gear (2).**



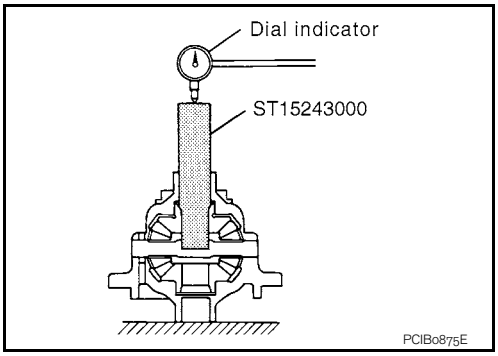
Inspection

INFOID:0000000001034970

INSPECTION BEFORE DISASSEMBLY

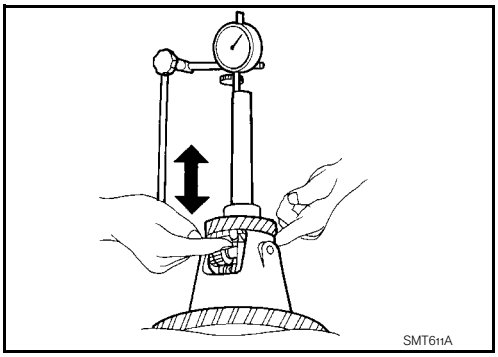
Check the clearance between side gear and differential case as follows.

1. Clean final drive assembly sufficiently to prevent side gear thrust washer, differential case, side gear, and other parts from sticking by gear oil.



2. Put differential case vertically so that side gear to be measured faces upward.
3. Place the drift and a dial indicator onto side gear. Move side gear up and down, and measure the clearance.

Allowable Clearance between side gear and differential case with thrust washer : **Refer to TM-185, "Differential Side Gear Clearance".**



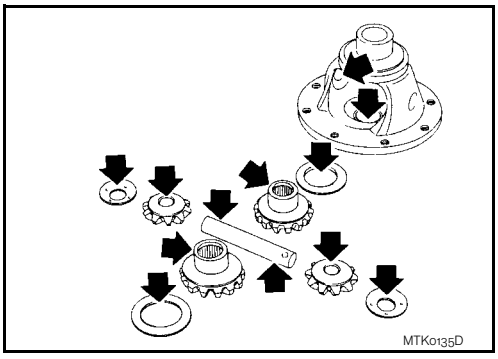
CAUTION:
There should be no resistance and gears should rotate freely.

4. If not within specification, adjust the clearance by changing side gear thrust washer thickness.
5. Turn differential case upside down and measure the clearance between side gear and differential case on the other side in the same way.

INSPECTION AFTER DISASSEMBLY

Gear, Washer, Shaft, and Case

- Check side gears, side gear thrust washers, pinion mate shaft, pinion mate gears, pinion mate thrust washers and differential case. If necessary, replace with a new one.



Gear

cardiagn.com

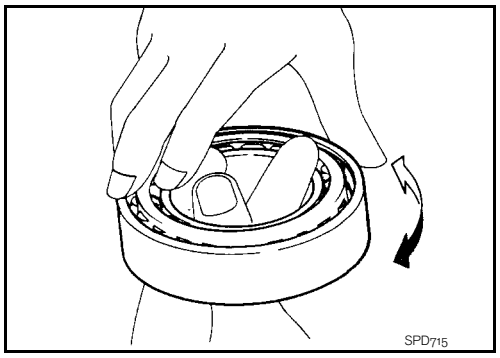
- Check output gear and reduction gear. If necessary, replace with a new one.

Bearing

Check for bearings damage and rough rotation. If necessary, replace with a new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.



cardiagn.com

SHIFT FORK AND FORK ROD

Exploded View

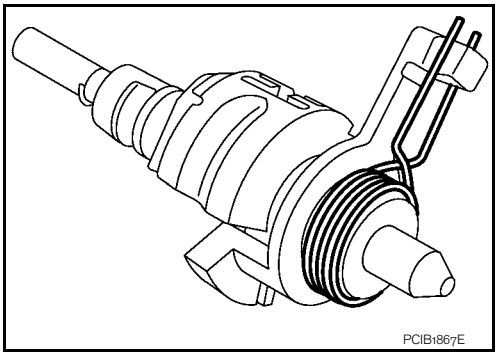
INFOID:0000000001034971

Refer to TM-125, "Exploded View".

Disassembly

INFOID:0000000001034972

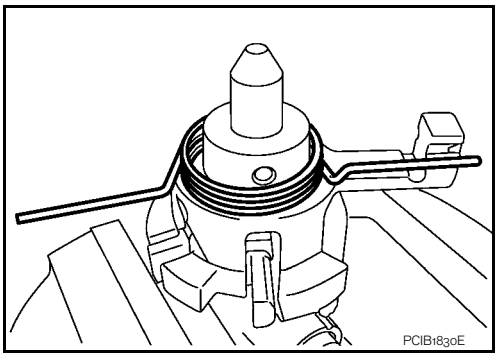
Remove return spring to striking rod assembly.



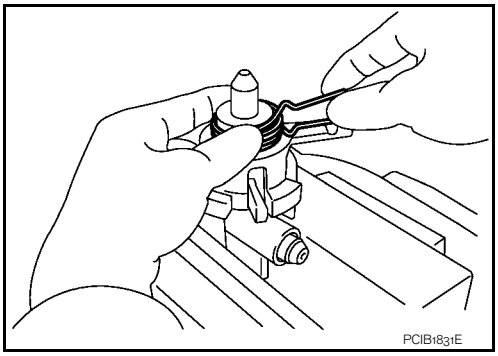
Assembly

INFOID:0000000001034973

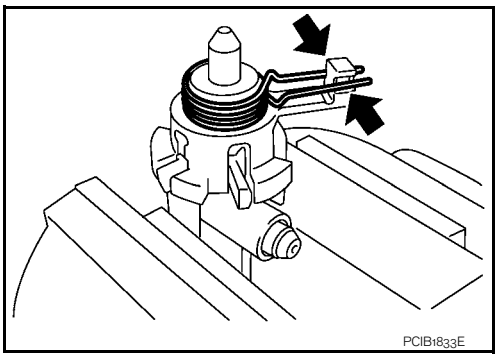
1. Temporarily install return spring to striking rod assembly.
   CAUTION:
   Be careful with the orientation of return spring.



2. Attach one end of the return spring to striking interlock of striking rod assembly while holding return spring.



CAUTION:
When installing, check that return spring is securely seated in the groove of striking interlock of striking rod assembly.



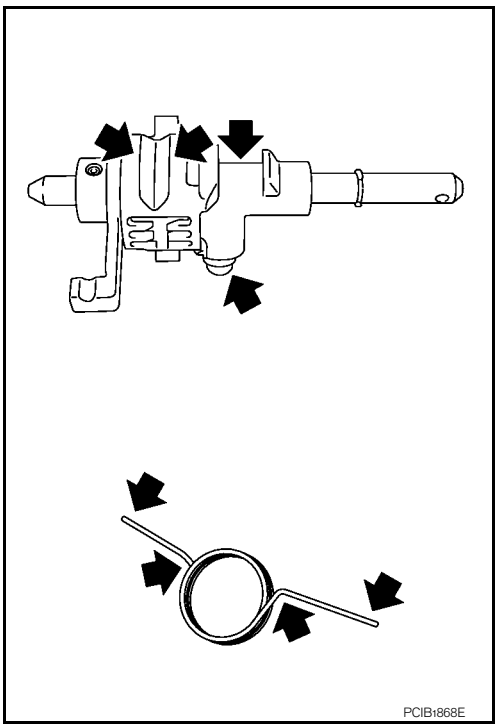
Inspection

INFOID:0000000001034974

cardiagn.com

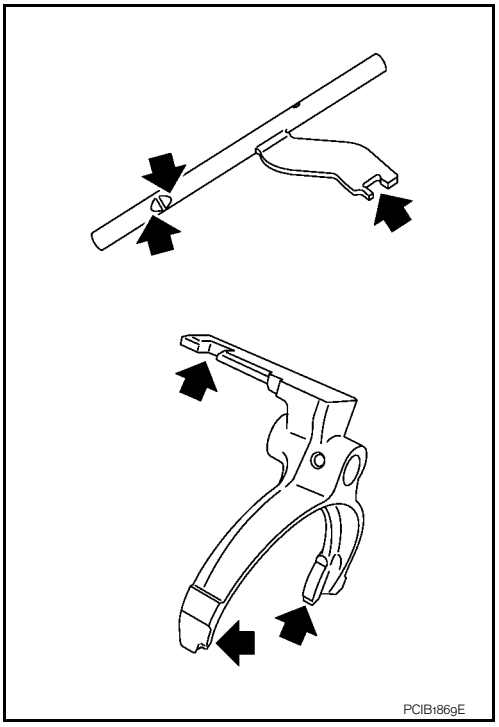
STRIKING ROD ASSEMBLY AND RETURN SPRING

Check contact surfaces and sliding area for wear, damage, bending, etc. If necessary, replace parts.



FORK ROD AND SHIFT FORK

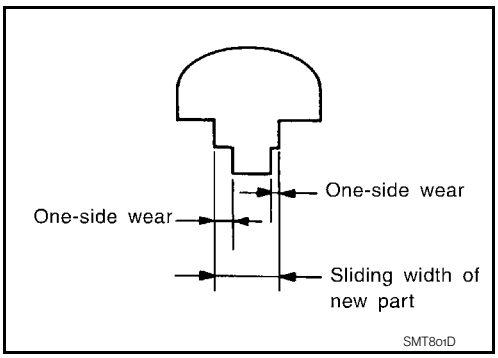
- Check contact surfaces and sliding area for wear, damage, bending, etc. If necessary, replace parts.



cardiagn.com

• Check if the width of shift fork hook (sliding area with coupling sleeve) is within allowable specification below.

Item	One-side wear specification	Sliding width of new part
1st-2nd	0.2 mm (0.008 in)	7.80 - 7.93 mm (0.3071 - 0.3122 in)
3rd-4th	0.2 mm (0.008 in)	7.80 - 7.93 mm (0.3071 - 0.3122 in)
5th-6th	0.2 mm (0.008 in)	6.10 - 6.23 mm (0.2402 - 0.2453 in)
Reverse	0.2 mm (0.008 in)	12.80 - 12.93 mm (0.5039 - 0.5091 in)



cardiagn.com

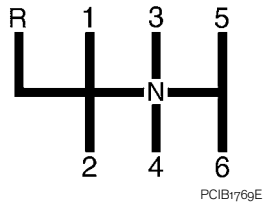
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000001034975

TRANSAXLE

Engine type			MR20DE
Transaxle model			RS6F52A
Model code number			JG20C
Number of speed			6
Synchromesh type			Warner
Shift pattern			 PCIB1769E
Gear ratio	1st		3.727
	2nd		2.043
	3rd		1.392
	4th		1.055
	5th		0.865
	6th		0.732
	Reverse		3.641
Number of teeth	Input gear	1st	11
		2nd	23
		3rd	28
		4th	36
		5th	52
		6th	56
		Reverse	11
	Main gear	1st	41
		2nd	47
		3rd	39
		4th	38
		5th	45
		6th	41
		Reverse	38
	Reverse idler gear	Front	37
		Rear	39
Oil level		mm (in)	85.0 - 90.0 (3.346 - 3.543)
Oil capacity (Reference)		ℓ (Imp pt)	2.0 (3-1/2)
Remarks	Reverse synchronizer		Installed
	Double-cone synchronizer		1st and 3rd
	Triple-cone synchronizer		2nd

cardiagn.com

FINAL GEAR

Engine type		MR20DE
Transaxle model		RS6F52A
Model code number		JG20C
Final gear ratio		4.687
Number of teeth	Final gear/Pinion	75/16
	Side gear/Pinion mate gear	14/10

End Play

INFOID:0000000001034976

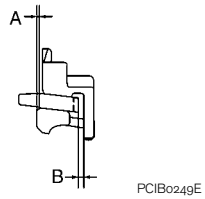
Unit: mm (in)

Items	Standard value
1st main gear	0.20 - 0.30 (0.0079 - 0.0118)
2nd main gear	0.06 - 0.16 (0.0024 - 0.0063)
6th main gear	0 - 0.1 (0 - 0.004)
3rd input gear	0.18 - 0.31 (0.0071 - 0.0122)
4th input gear	0.20 - 0.30 (0.0079 - 0.0118)
5th input gear	0.06 - 0.16 (0.0024 - 0.0063)
6th input gear	0.06 - 0.16 (0.0024 - 0.0063)
Reverse idler gear	0.04 - 0.10 (0.0016 - 0.0039)
6th input gear bushing	0 - 0.1 (0 - 0.004)
Input shaft	0 - 0.06 (0 - 0.0024)
Mainshaft	0 - 0.06 (0 - 0.0024)
Mainshaft C-ring	0 - 0.06 (0 - 0.0024)
Striking rod	0.05 - 0.152 (0.0020 - 0.0060)
Output gear bearing	0 - 0.06 (0 - 0.0024)
Output gear assembly	0 - 0.06 (0 - 0.0024)

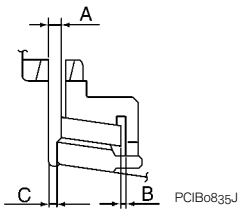
Baulk Ring Clearance

INFOID:0000000001034977

Unit: mm (in)

Measurement point		Standard value	Limit value
1st and 3rd (Double-cone synchronizer)	Clearance between synchronizer cone and inner baulk ring end face “A”	0.6 - 0.8 (0.024 - 0.031)	0.2 (0.008)
 PCIB0249E	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.6 - 1.1 (0.024 -0.043)	0.2 (0.008)
2nd (Triple-cone synchronizer)	Clearance between synchronizer cone and clutch gear end face “A”	0.6 - 1.2 (0.024 - 0.047)	0.3 (0.012)

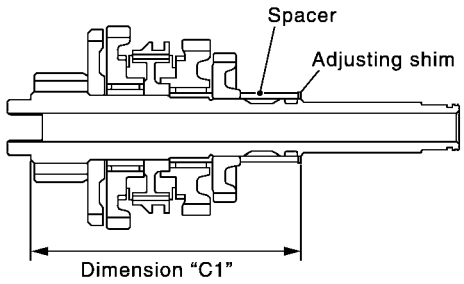
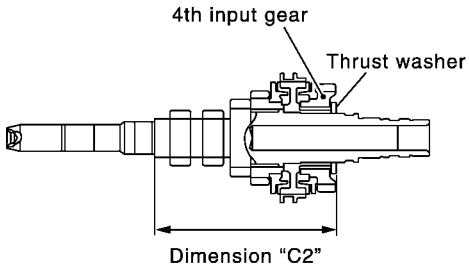
cardiagn.com

Measurement point		Standard value	Limit value
	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.6 - 1.1 (0.024 - 0.043)	0.2 (0.008)
	Clearance between inner baulk ring and clutch gear end face “C”	0.7 - 1.1 (0.028 - 0.043)	0.3 (0.012)
4th		0.9 - 1.45 (0.035 - 0.0571)	0.7 (0.028)
5th		0.95 - 1.4 (0.0374 - 0.055)	0.7 (0.028)
6th		0.95 - 1.4 (0.0374 - 0.055)	0.7 (0.028)
Reverse		0.95 - 1.4 (0.0374 - 0.055)	0.7 (0.028)

Dimension

INFOID:0000000001034978

Unit: mm (in)

Measurement point	Standard value
Mainshaft: Dimension “C1” 	173.85 - 173.95 (6.844 - 6.848)
Input shaft: Dimension “C2” 	154.7 - 154.8 (6.091 - 6.094)

Differential Side Bearing Preload

INFOID:0000000001034979

Unit: mm (in)

Differential side bearing preload: L*	0.15 - 0.21 (0.0059 - 0.0083)

*: Install shims which are “deflection of differential case” + “L” in thickness.

Differential Side Gear Clearance

INFOID:0000000001034980

Unit: mm (in)

Allowable clearance between side gear and differential case with thrust washer	0.1 - 0.2 (0.004 - 0.008)

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

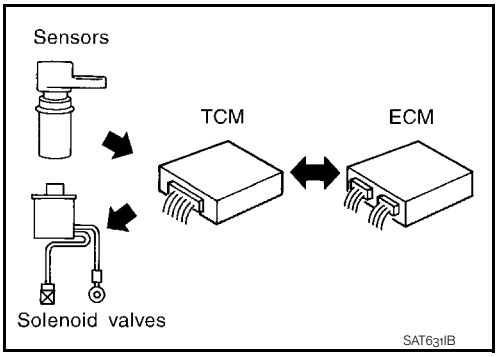
INFOID:0000000000987941

INTRODUCTION

The TCM receives a signal from the vehicle speed sensor, PNP switch and provides shift control or lock-up control via CVT solenoid valves.

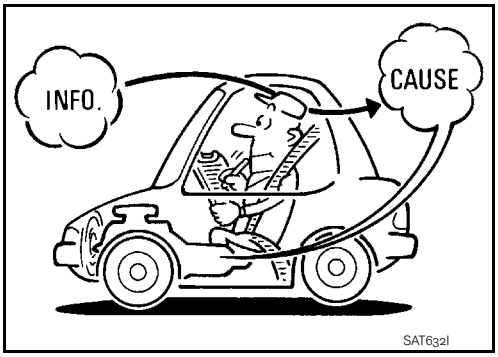
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the CVT system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

Input and output signals must always be correct and stable in the operation of the CVT system. The CVT system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.



It is much more difficult to diagnose an error that occurs intermittently rather than continuously. Most intermittent errors are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

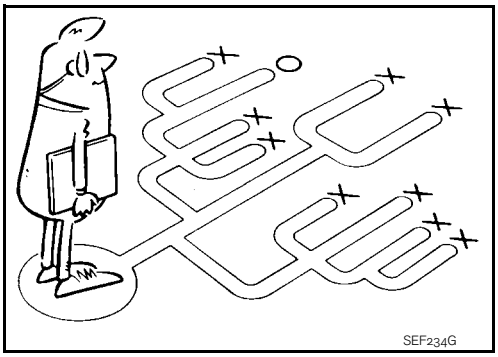
A visual check only may not find the cause of the errors. A road test with CONSULT-III (or GST) or a circuit tester connected should be performed. Follow the “DETAILED FLOW”.



Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such errors, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic Work Sheet” as shown on the example (Refer to TM-187) should be used.

Start your diagnosis by looking for “conventional” errors first. This will help troubleshoot driveability errors on an electronically controlled engine vehicle.

Also check related Service bulletins.



DETAILED FLOW

1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using diagnosis worksheet. Refer to TM-187, "Diagnostic Work Sheet".

>> GO TO 2.

2. CHECK SYMPTOM 1

Check the following items based on the information obtained from the customer.

- Fail-safe. Refer to TM-292, "Fail-safe".
- CVT fluid inspection. Refer to TM-314, "Inspection".
- Line pressure test. Refer to TM-318, "Inspection and Judgment".

cardiagn.com

• Stall test. Refer to TM-316, "Inspection and Judgment".

>> GO TO 3.

3.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is detected.

• Record DTC.
• Erase DTC. Refer to TM-214, "Diagnosis Description".

Is any DTC detected?

YES >> GO TO 4.
NO >> GO TO 5.

4.PERFORM DIAGNOSTIC PROCEDURE

Perform “Diagnostic Procedure” for the displayed DTC.

>> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform “DTC CONFIRMATIOM PROCEDURE” for the displayed DTC.

Is DTC detected?

YES >> GO TO 4.
NO >> GO TO 6.

6.CHECK SYMPTOM 2

Confirm the symptom described by the customer.

Is any malfunction present?

YES >> GO TO 7.
NO >> **INSPECTION END**

7.RODE TEST

Perform “RODE TEST”. Refer to TM-320, "Description".

>> GO TO 8.

8.CHECK SYMPTOM 3

Confirm the symptom described by the customer.

Is any malfunction present?

YES >> GO TO 2.
NO >> **INSPECTION END**

Diagnostic Work Sheet

INFOID:0000000000987942

INFORMATION FROM CUSTOMER

KEY POINTS

• **WHAT**..... Vehicle & CVT model
• **WHEN**..... Date, Frequencies
• **WHERE**..... Road conditions
• **HOW**..... Operating conditions, Symptoms

Customer name MR/MS	Model & Year	VIN
Trans. Model	Engine	Mileage
Malfunction Date	Manuf. Date	In Service Date
Frequency	o Continuous o Intermittent (times a day)	

cardiagn.com

Symptoms	o Vehicle does not move. (o Any position o Particular position)	
	o No shift	
	o Lock-up malfunction	
	o Shift shock or slip (o N → D o N → R o Lock-up o Any drive position)	
	o Noise or vibration	
	o No pattern select	
	o Others ( )	
Malfunction indicator (MI)	o Continuously lit	o Not lit

DIAGNOSTIC WORKSHEET

1	o Read the item on cautions concerning fail-safe and understand the customer's complaint.			TM-292
2	o CVT fluid inspection, stall test and line pressure test			
		o CVT fluid inspection		TM-314
			o Leak (Repair leak location.) o State o Amount	
		o Stall test		TM-316, TM-318
			o Torque converter one-way clutch o Reverse brake o Forward clutch o Steel belt	o Engine o Line pressure low o Primary pulley o Secondary pulley
		o Line pressure inspection - Suspected part:		
3	o Perform self-diagnosis.			TM-216
		Enter checks for detected items.		
4	o Perform road test.			TM-320
	4-1.	Check before engine is started		TM-320
	4-2.	Check at idle		TM-321
	4-3.	Cruise test		TM-322
	o After completing all rode test, check malfunction phenomena to repair or replace malfunctioning part.Refer to TM-295, "Symptom Table".			
5	o Drive vehicle to check that the malfunction phenomenon has been resolved.			
6	o Erase the results of the self-diagnosis from the TCM and the ECM.			TM-214, TM-216

cardiagn.com

INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Service After Replacing TCM and Transaxle Assembly

INFOID:0000000000987943

SERVICE AFTER REPLACING TCM AND TRANSAXLE ASSEMBLY

Perform the applicable service in the following sheet when replacing TCM or transaxle assembly.

CAUTION:

- **Never start the engine until the service is completed.**
- **"TCM- POWER SUPPLY [P1701]" may be indicated soon after replacing TCM or transaxle assembly (after erasing the memory at the pattern B). Restart the self-diagnosis after erasing the self-diagnosis result. Check that no error is detected.**

TCM	CVT assembly	Service pattern
Replace the new unit.	Do not replace the unit.	"PATTERN A"
Do not replace the unit.	Replace the old unit with new one.	"PATTERN B"
Replace the old unit.	Do not replace the unit.	
	Replace the old unit with new one.	
Replace the new unit.	Replace the old unit with new one.	"PATTERN C"

NOTE:

Old unit means that the unit has been already used for another vehicle.

PATTERN A

1. Shift the selector lever to "P" position after replacing TCM. Turn the ignition switch ON.
2. Check that the shift position indicator in the combination meter turns ON (It indicates approximately 1 or 2 seconds after turning the ignition switch ON.)
   - Check the following items if the shift position indicator does not turn ON. Repair or replace the shift position indicator if necessary.
   - The harness between TCM and ROM ASSY in the transaxle assembly is open or short.
   - Cable disconnected, loosen, or bent from the connector housing.

PATTERN B

1. Turn the ignition switch ON after replacing each part.
2. Start engine.
   CAUTION:
   Never start the driving.
3. Select "DATA MONITOR".
4. Warm up the transaxle assembly until "ATFTEMP COUNT" indicates 47 [approximately 20°C (68°)] or more. Turn the ignition switch OFF.
5. Turn the ignition switch ON.
   CAUTION:
   Never start engine.
6. Select "SELF-DIAG RESULTS".
7. Shift the selector lever to "R" position.
8. Depress slightly the accelerator pedal (Pedal angle: 2/8) while depressing the brake pedal.
9. Perform "ERASE".
10. Shift the selector lever to "R" position after replacing TCM. Turn the ignition switch OFF.
11. Wait approximately 10 minutes after turning the ignition switch OFF.
12. Turn the ignition switch ON while shifting the selector lever to "R" position.
    CAUTION:
    Never start engine.
13. Select "Special function".
14. Check that the value on "CALIBRATION DATA" is same as the data after erasing "Calibration Data".

cardiagn.com

- Restart the procedure from step 3 if the values are not same.

15. Shift the selector lever to “P” position.
16. Check that the shift position indicator in the combination meter turns ON (It indicates approximately 1 or 2 seconds after shifting the selector lever to “P” position.)
    - Check the following items if the shift position indicator does not turn ON. Repair or replace the shift position indicator if necessary.
    - The harness between TCM and ROM ASSY in the transaxle assembly is open or short.
    - Cable disconnected, loosen, or bent from the connector housing.
    - Power supply and ground of TCM. Refer to TM-265, "Description".

Calibration Data

Data after deletion

Item name	Display value	Item name	Display value
UNIT CLB ID 1	0000	GAIN PL	256
UNIT CLB ID 2	0000	OFFSET PL	40
UNIT CLB ID 3	0000	OFFSET2 PL	0
UNIT CLB ID 4	0000	MAP NO SEC	32
UNIT CLB ID 5	0000	GAIN SEC	256
UNIT CLB ID 6	0000	OFFSET SEC	40
MAP NO LU	33	OFFSET2 SEC	0
GAIN LU	256	MAP NO SL	32
OFFSET LU	40	GAIN SL	256
OFFSET2 LU	0	OFFSET SL	40
MAP NO PL	32	OFFSET2 SL	0

PATTERN C

1. Replace the transaxle assembly first, and then replace TCM.
2. Perform the service of “PATTERN A”.
   (Perform the service of “PATTERN B” if TCM is replaced first.)

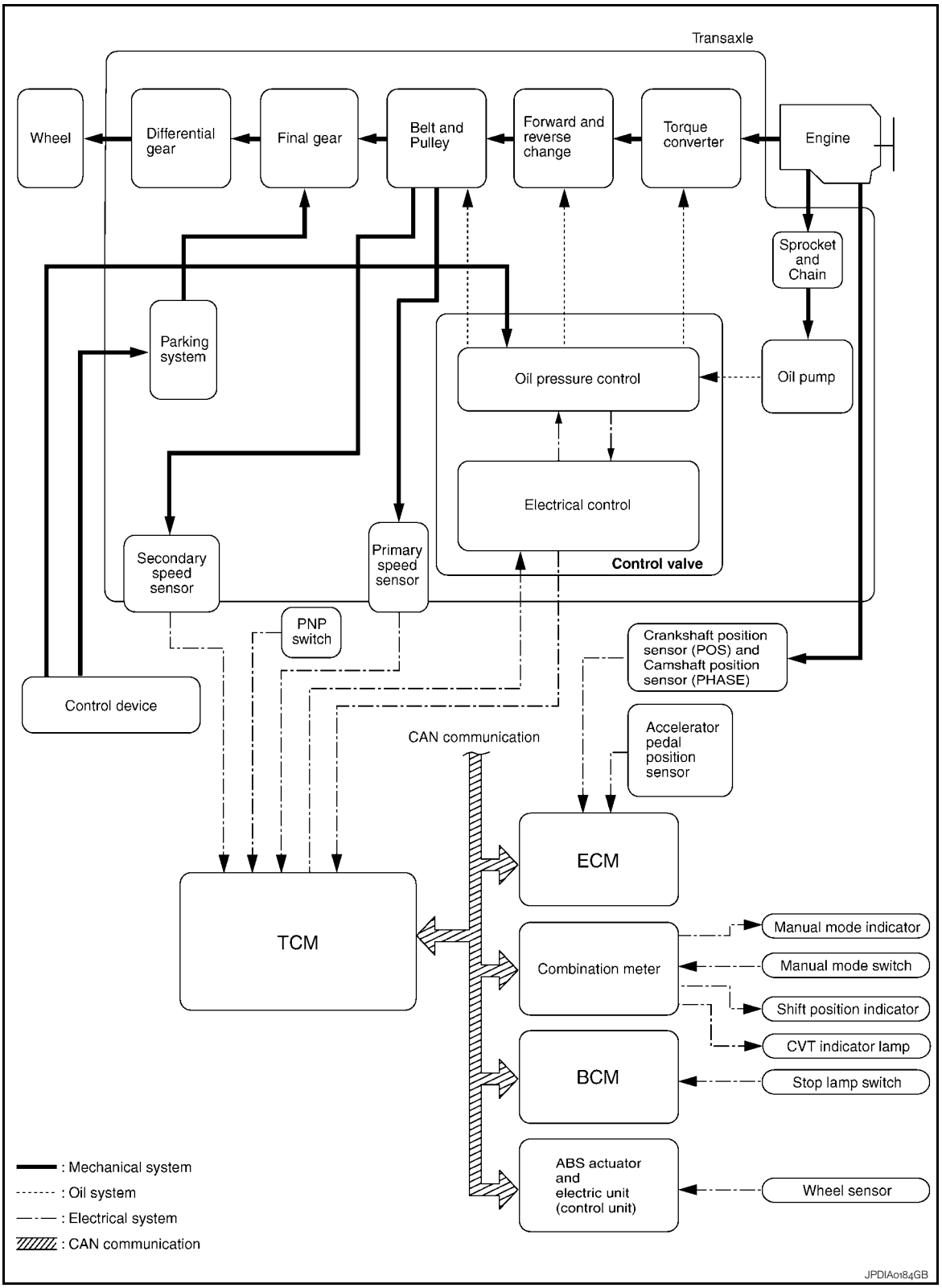
cardiagn.com

FUNCTION DIAGNOSIS

CVT SYSTEM

System Diagram

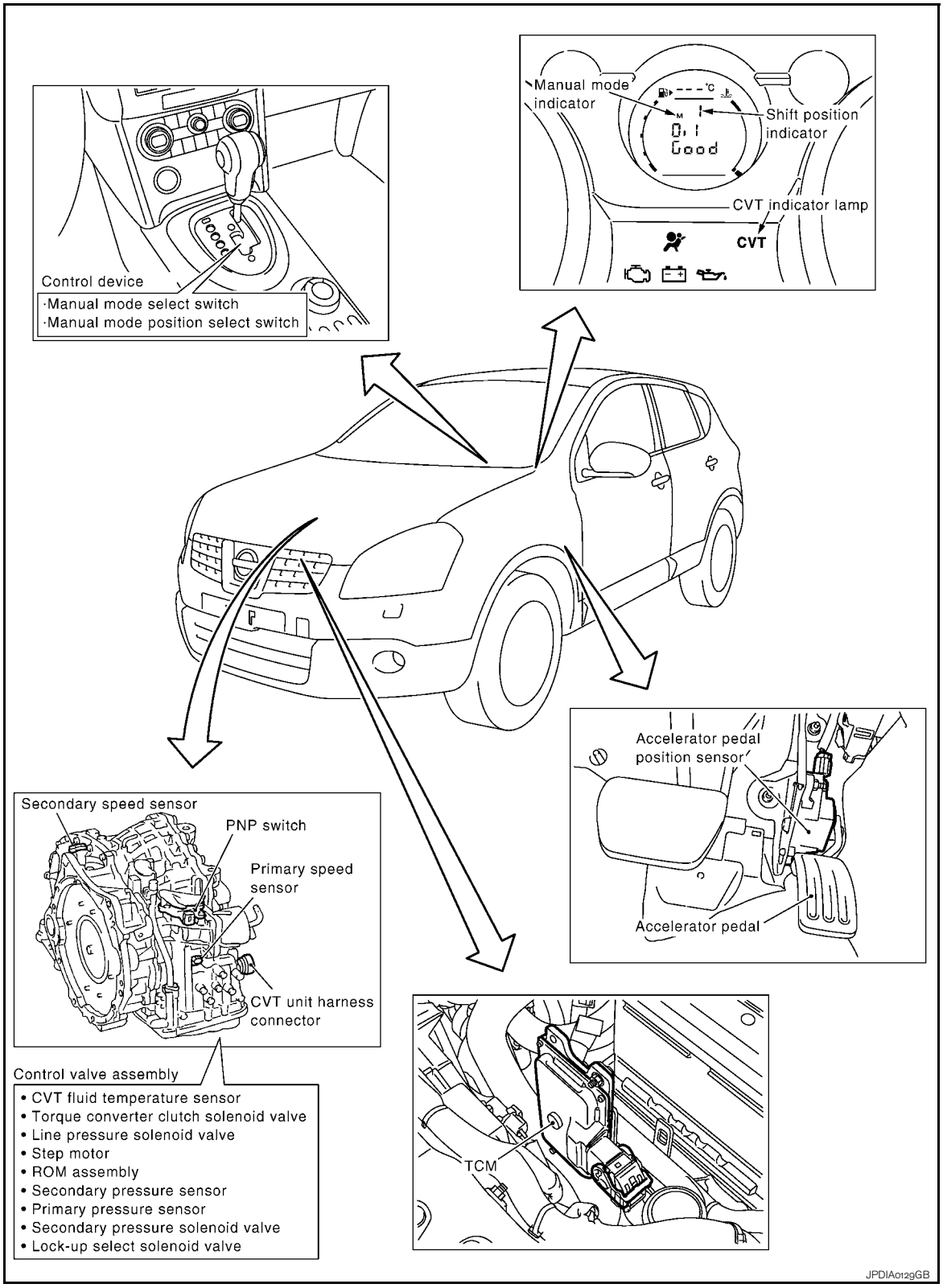
INFOID:0000000000988603



Component Parts Location

INFOID:0000000000988604

cardiagn.com

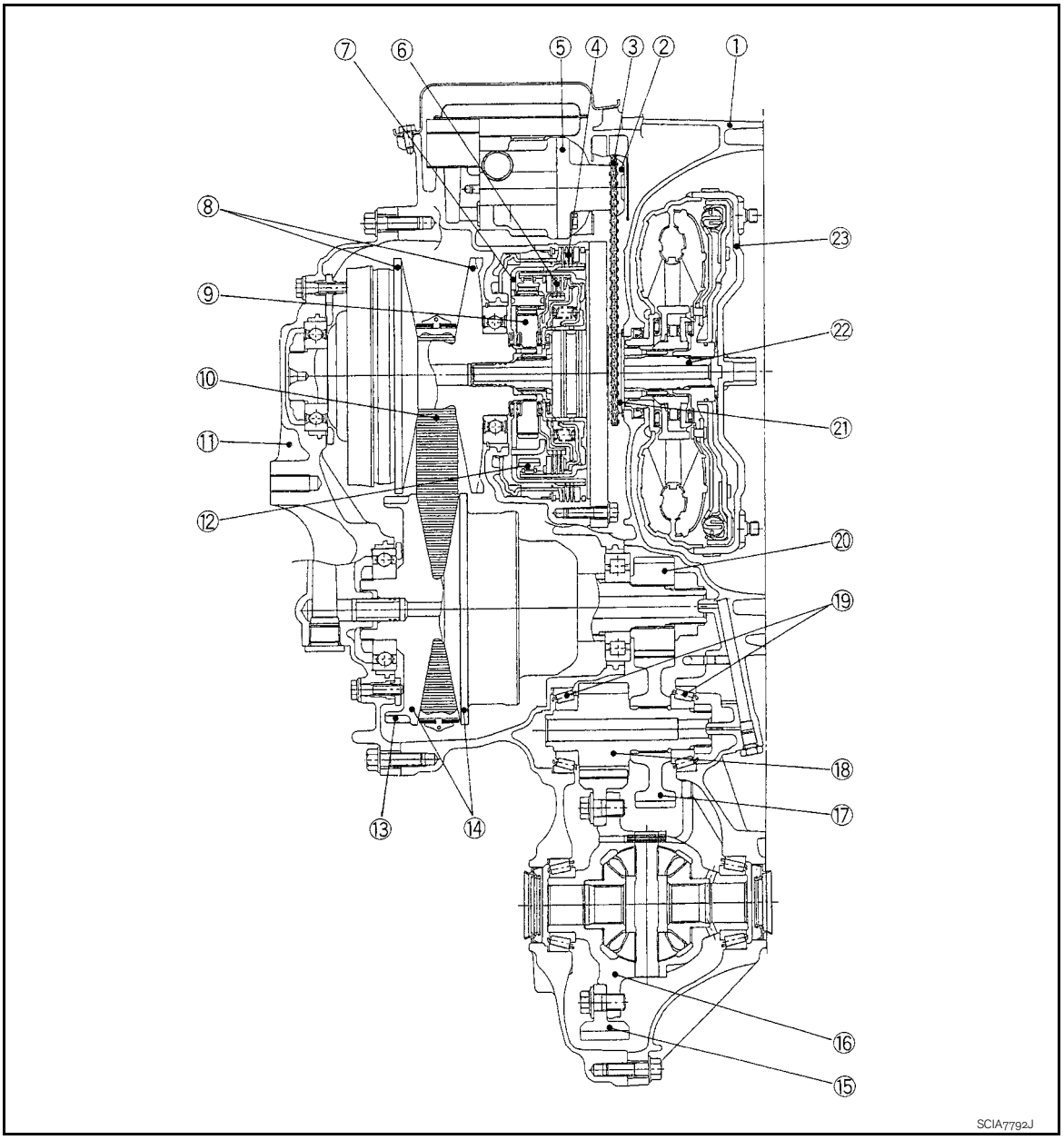


cardiagn.com

MECHANICAL SYSTEM

Cross-Sectional View

INFOID:0000000000988605

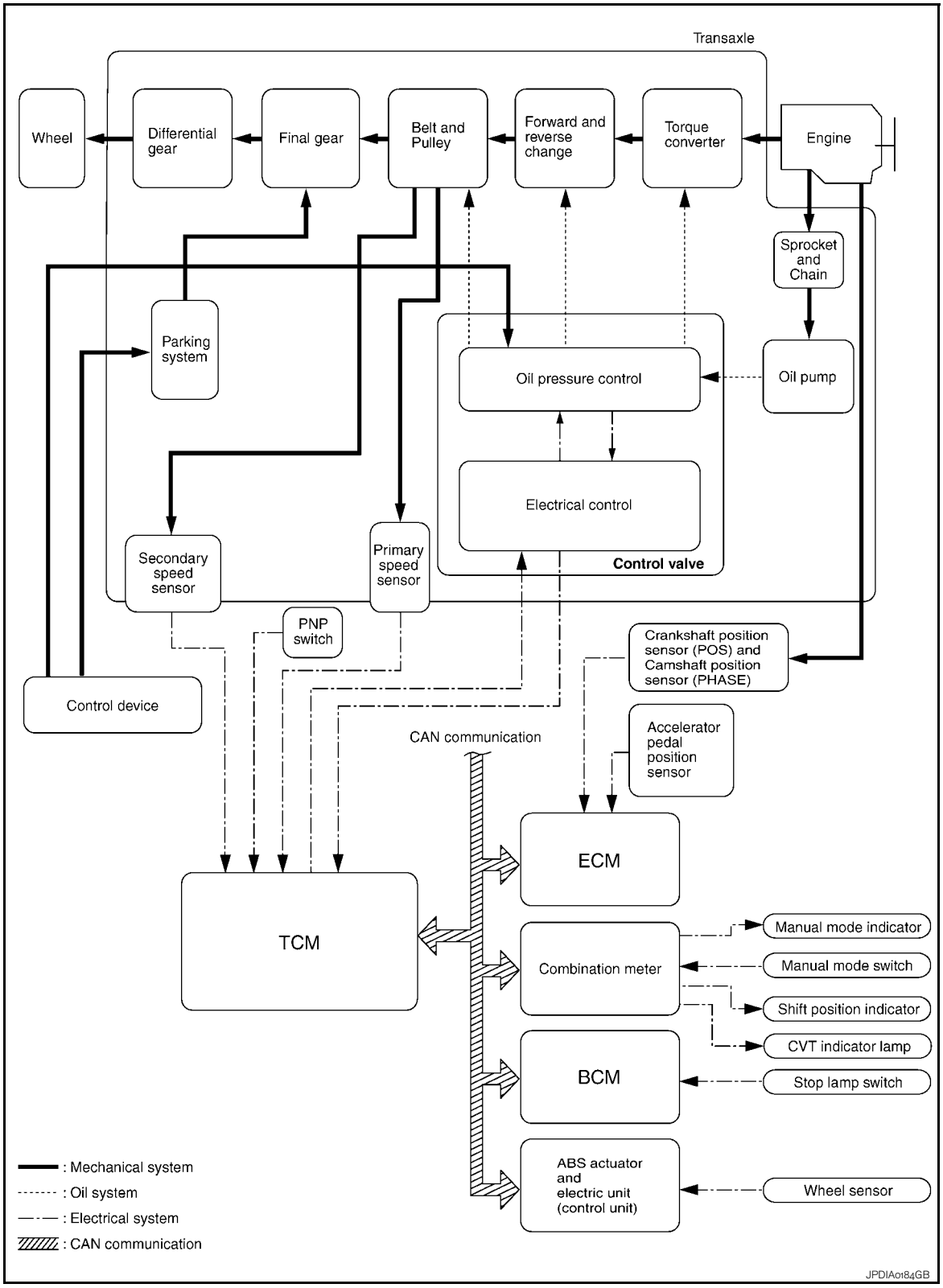


1. Converter housing
2. Driven sprocket
3. Chain
4. Reverse brake
5. Oil pump
6. Forward clutch
7. Planetary carrier
8. Primary pulley
9. Sun gear
10. Steel belt
11. Side cover
12. Internal gear
13. Parking gear
14. Secondary pulley
15. Final gear
16. Differential case
17. Idler gear
18. Reduction gear
19. Taper roller bearing
20. Output gear
21. Drive sprocket
22. Input shaft
23. Torque converter

System Diagram

INFOID:0000000000988606

cardiagn.com



System Description

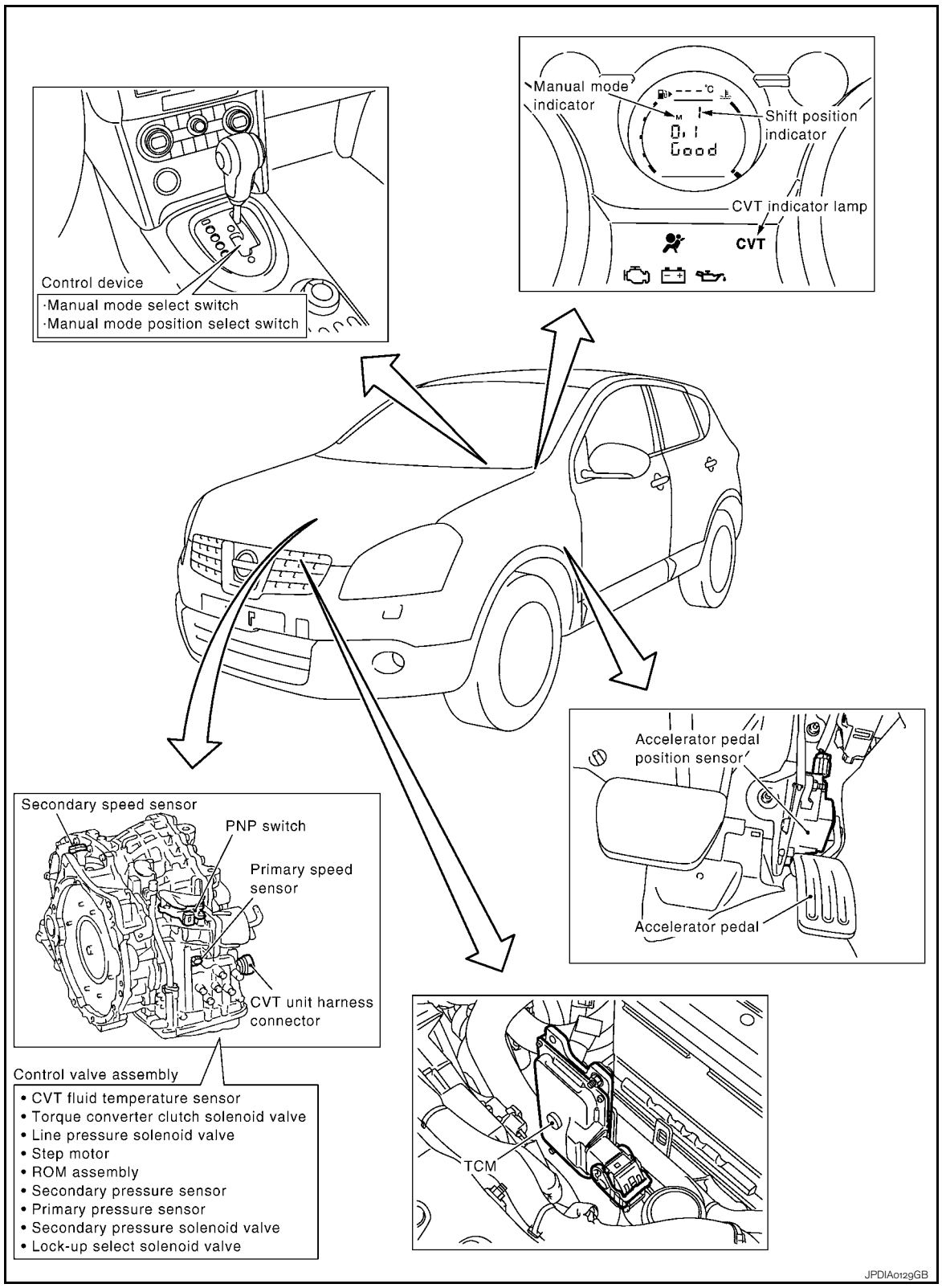
INFOID:0000000000988607

Transmits the power from the engine to the drive wheel.

Component Parts Location

INFOID:0000000000988608

cardiagn.com



Component Description

INFOID:0000000000988609

cardiagn.com

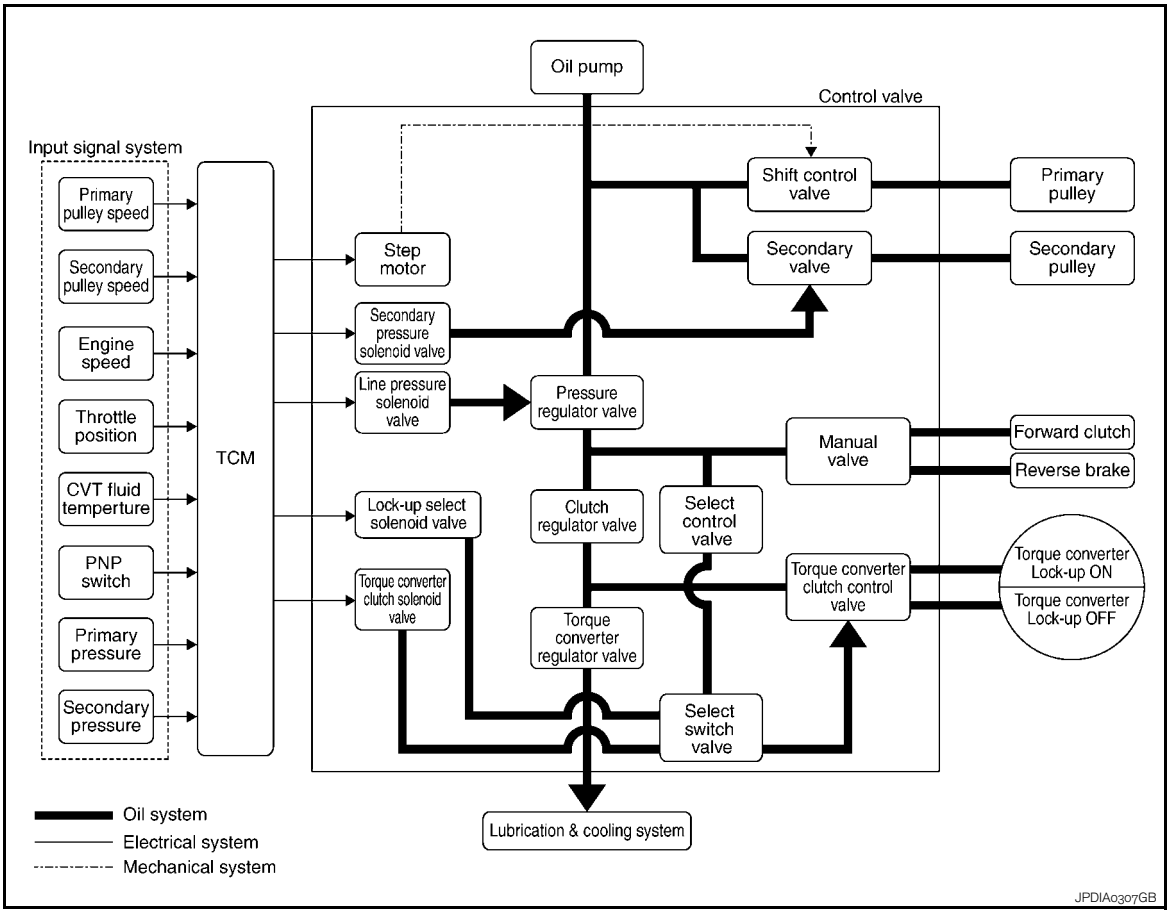
Item	Function
Torque converter	The torque converter is the device that increases the engine torque as well as the conventional CVT and transmits it to the transaxle.
Oil pump	The efficiency of pump discharge rate at low-rpm and the optimization at high-rpm have been increased through the oil pump drive chain by adopting a vane-type oil pump controlled by the engine. Discharged oil from oil pump is transmitted to the control valve. It is used as the oil of primary and secondary pulley operation and the oil of clutch operation and the lubricant for each part.
Planetary gear	Perform the transmission of drive power and the switching of forward/backward movement.
Forward clutch	
Reverse brake	
Primary pulley	It is composed of a pair of pulleys (the groove width is changed freely in the axial direction) and the steel belt (the steel star wheels are placed continuously and the belt is guided with the multilayer steel rings on both sides). The groove width changes according to wrapping radius of steel belt and pulley from low status to overdrive status continuously with non-step. It is controlled with the oil pressures of primary pulley and secondary pulley.
Secondary pulley	
Steel belt	
Output gear	The drive power from the secondary pulley returns the deceleration gears [primary deceleration (output gear/idler gear pair) and secondary deceleration (reduction gear/final gear pair)]. It is transmitted from differential to drive wheel.
Idler gear	
Reduction gear	
Final gear	
Differential	
Manual shaft	The parking rod rotates the parking pole and the parking pole engages with the parking gear when the manual shaft is in P position. As a result the parking gear and the output axis are fixed.
Parking rod	
Parking pawl	
Parking gear	

cardiagn.com

HYDRAULIC CONTROL SYSTEM

System Diagram

INFOID:0000000000988610



System Description

INFOID:0000000000988611

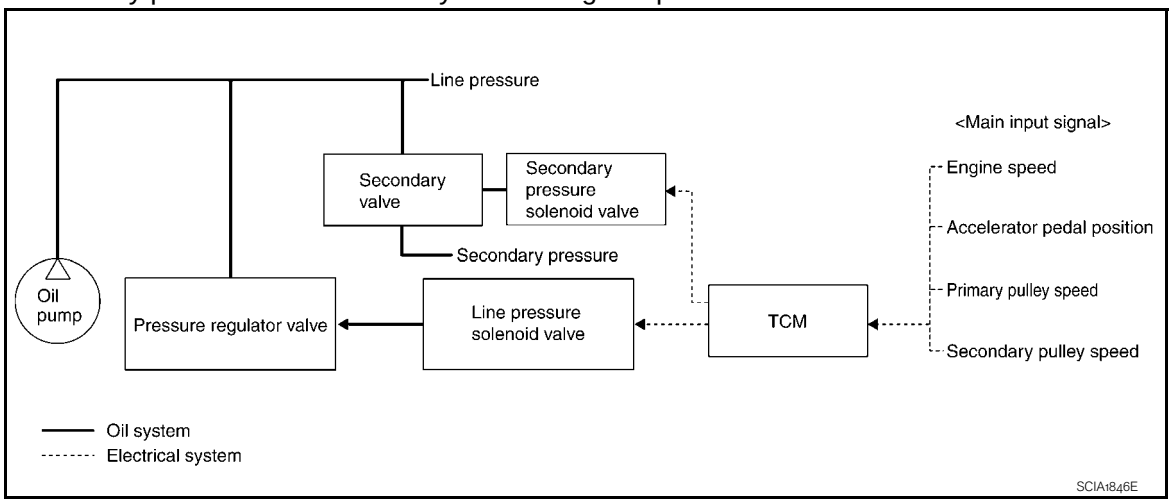
The hydraulic control mechanism consists of the oil pump directly driven by the engine, the hydraulic control valve that controls line pressure and transmission, and the input signal line.

LINE PRESSURE AND SECONDARY PRESSURE CONTROL

- When an input torque signal equivalent to the engine drive force is sent from the ECM to the TCM, the TCM controls the line pressure solenoid valve and secondary pressure solenoid valve.

cardiagn.com

- This line pressure solenoid controls the pressure regulator valve as the signal pressure and adjusts the pressure of the operating oil discharged from the oil pump to the line pressure most appropriate to the driving state. Secondary pressure is controlled by decreasing line pressure.



Normal Control

Optimize the line pressure and secondary pressure, depending on driving conditions, on the basis of the throttle position, the engine speed, the primary pulley (input) revolution speed, the secondary pulley (output) revolution speed, the brake signal, the PNP switch signal, the lock-up signal, the voltage, the target gear ratio, the fluid temperature, and the fluid pressure.

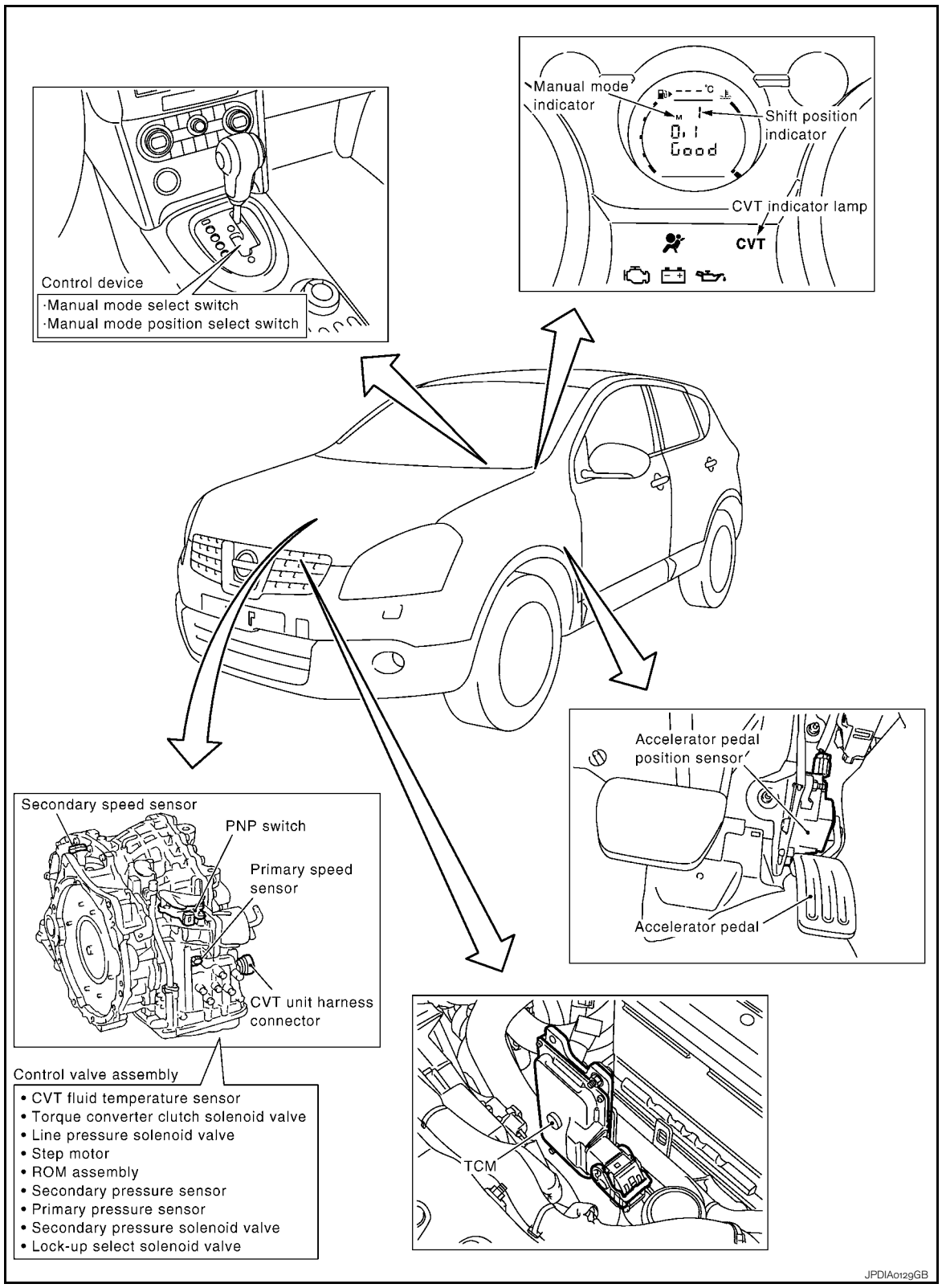
Feedback Control

When controlling the normal fluid pressure or the selected fluid pressure, the secondary pressure can be set more accurately by using the fluid pressure sensor to detect the secondary pressure and controlling the feedback.

Component Parts Location

INFOID:0000000000988612

cardiagn.com



Component Description

INFOID:0000000000988613

TRANSAXLE ASSEMBLY

cardiagn.com

Name	Function
Torque converter regulator valve	Optimizes the supply pressure for the torque converter depending on driving conditions.
Pressure regulator valve	Optimizes the discharge pressure from the oil pump depending on driving conditions.
TCC control valve	• Activates or deactivate the lock-up. • Lock-up smoothly by opening lock-up operation excessively.
TCC solenoid valve	TM-242
Shift control valve	Controls flow-in/out of line pressure from the primary pulley depending on the stroke difference between the stepping motor and the primary pulley.
Secondary valve	Controls the line pressure from the secondary pulley depending on operating conditions.
Clutch regulator valve	Adjusts the clutch operating pressure depending on operating conditions.
Secondary pressure solenoid valve	TM-250
Line pressure solenoid valve	TM-244
Step motor	TM-276
Manual valve	Transmits the clutch operating pressure to each circuit in accordance with the selected position.
Select control valve	Engages forward clutch, reverse brake smoothly depending on select operation.
Select switch valve	Switches torque converter clutch solenoid valve control pressure use to torque converter clutch control valve or select control valve.
Lock-up select solenoid valve	TM-273
Primary speed sensor	TM-231
Secondary speed sensor	TM-234
PNP switch	TM-231
Primary pulley	TM-195
Secondary pulley	
Forward clutch	
Torque converter	

EXCEPT TRANSAXLE ASSEMBLY

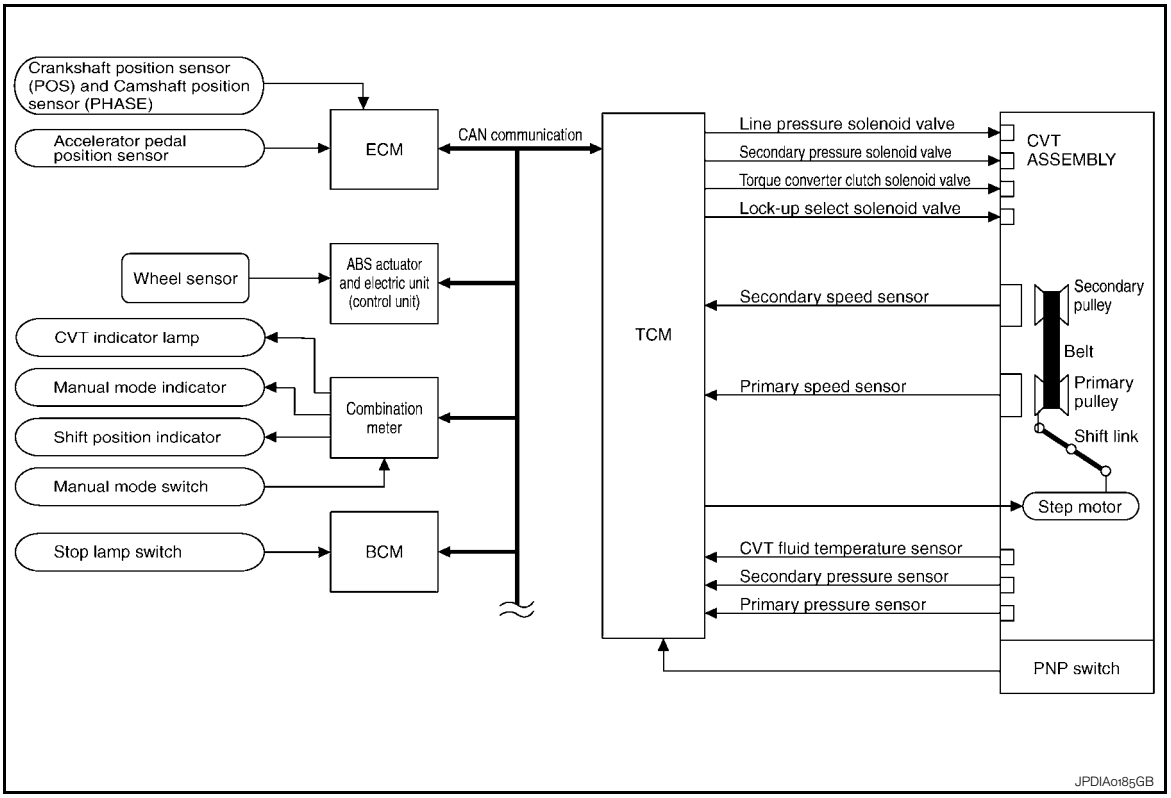
Name	Function
TCM	Judges the vehicle driving status according to the signal from each sensor and controls the non-step transmission mechanism properly.
Accelerator pedal position sensor	TM-267

cardiagn.com

CONTROL SYSTEM

System Diagram

INFOID:0000000000988614



System Description

INFOID:0000000000988615

The function of the TCM is to:
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, and lock-up operation.
- Send required output signals to the step motor and the respective solenoids.

CONTROL SYSTEM OUTLINE

The CVT senses vehicle operating conditions through various sensors. It always controls the optimum shift position and reduces shifting and lock-up shocks.

SENSORS (or SIGNAL)		TCM		ACTUATORS
PNP switch Accelerator pedal position signal Closed throttle position signal Engine speed signal CVT fluid temperature sensor Vehicle speed signal Manual mode signal Stop lamp switch signal Primary speed sensor Secondary speed sensor Primary pressure sensor Secondary pressure sensor	⇒	Shift control Line pressure control Primary pressure control Secondary pressure control Lock-up control Engine brake control Vehicle speed control Fail-safe control Self-diagnosis CONSULT-III communication line Duet-EA control CAN system On board diagnosis	⇒	Step motor Torque converter clutch solenoid valve Lock-up select solenoid valve Line pressure solenoid valve Secondary pressure solenoid valve Manual mode indicator Shift position indicator CVT indicator lamp

INPUT/OUTPUT SIGNAL OF TCM

cardiagn.com

Control item		Fluid pressure control	Select control	Shift control	Lock-up control	CAN communication control	Fail-safe function(*2)
Input	PNP switch	X	X	X	X	X	X
	Accelerator pedal position signal (*1)	X	X	X	X	X	X
	Closed throttle position signal(*1)	X		X	X	X	
	Engine speed signal(*1)	X	X		X	X	X
	CVT fluid temperature sensor	X	X	X	X		X
	Manual mode signal(*1)	X		X	X	X	X
	Stop lamp switch signal(*1)	X		X	X	X	
	Primary speed sensor	X		X	X	X	X
	Secondary speed sensor	X	X	X	X	X	X
	Primary pressure sensor	X		X			
	Secondary pressure sensor	X		X			X
Output	Step motor			X			X
	TCC solenoid valve		X		X		X
	Lock-up select solenoid valve		X		X		X
	Line pressure solenoid valve	X	X	X			X
	Secondary pressure solenoid valve	X		X			X

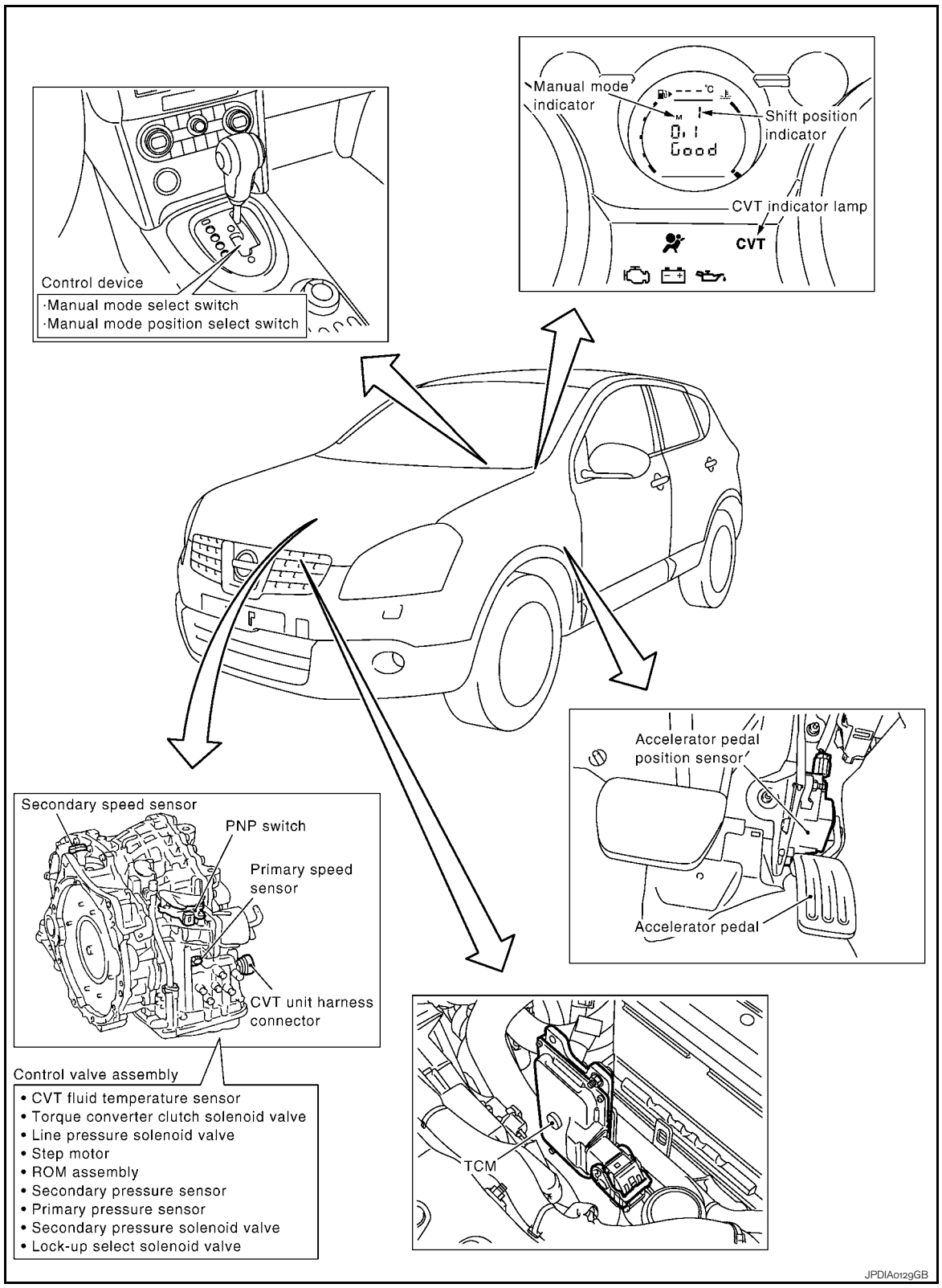
*1: Input by CAN communications.

*2: If these input and output signals are different, the TCM triggers the fail-safe function.

Component Parts Location

INFOID:0000000000988616

cardiagn.com



Component Description

INFOID:0000000000988617

TRANSAXLE ASSEMBLY

cardiagn.com

Name	Function
PNP switch	TM-226
CVT fluid temperature sensor	TM-229
Primary speed sensor	TM-231
Secondary speed sensor	TM-234
Primary pressure sensor	TM-260
Secondary pressure sensor	TM-255
Step motor	TM-276
TCC solenoid valve	TM-240
Lock-up select solenoid valve	TM-273
Line pressure solenoid valve	TM-244
Secondary pressure solenoid valve	TM-248

EXCEPT TRANSAXLE ASSEMBLY

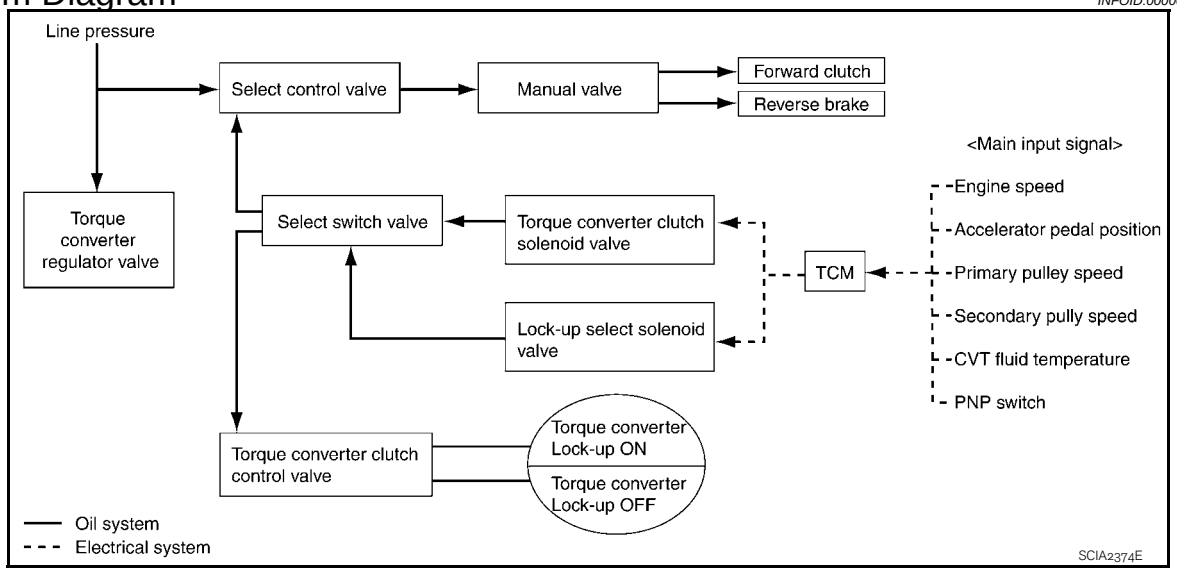
Name	Function
TCM	Optimally controls continuously variable transmission system by judging driving conditions based on signals from each sensor.
Stop lamp switch	TM-224

cardiagn.com

LOCK-UP AND SELECT CONTROL SYSTEM

System Diagram

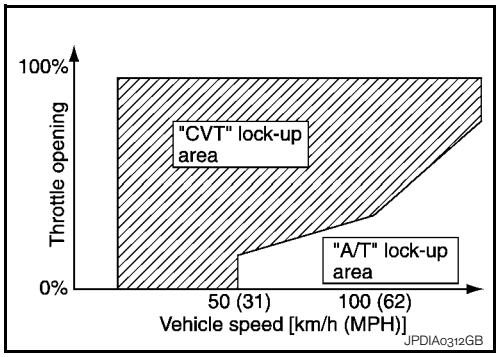
INFOID:0000000000988618



System Description

INFOID:0000000000988619

- The torque converter clutch piston in the torque converter is engaged to eliminate torque converter slip to increase power transmission efficiency.
- The torque converter clutch control valve operation is controlled by the torque converter clutch solenoid valve, which is controlled by a signal from TCM. The torque converter clutch control valve engages or releases the torque converter clutch piston.
- When shifting between “N” (“P”) ⇔“D” (“R”), torque converter clutch solenoid controls engagement power of forward clutch and reverse brake.
- The lock-up applied gear range was expanded by locking up the torque converter at a lower vehicle speed than conventional CVT models.



TORQUE CONVERTER CLUTCH AND SELECT CONTROL VALVE CONTROL

Lock-up Released

In the lock-up released state, the torque converter clutch control valve is set into the unlocked state by the torque converter clutch solenoid and the lock-up apply pressure is drained.
In this way, the torque converter clutch piston is not coupled.

Lock-up Applied

In the lock-up applied state, the torque converter clutch control valve is set into the locked state by the torque converter clutch solenoid and lock-up apply pressure is generated.
In this way, the torque converter clutch piston is pressed and coupled.

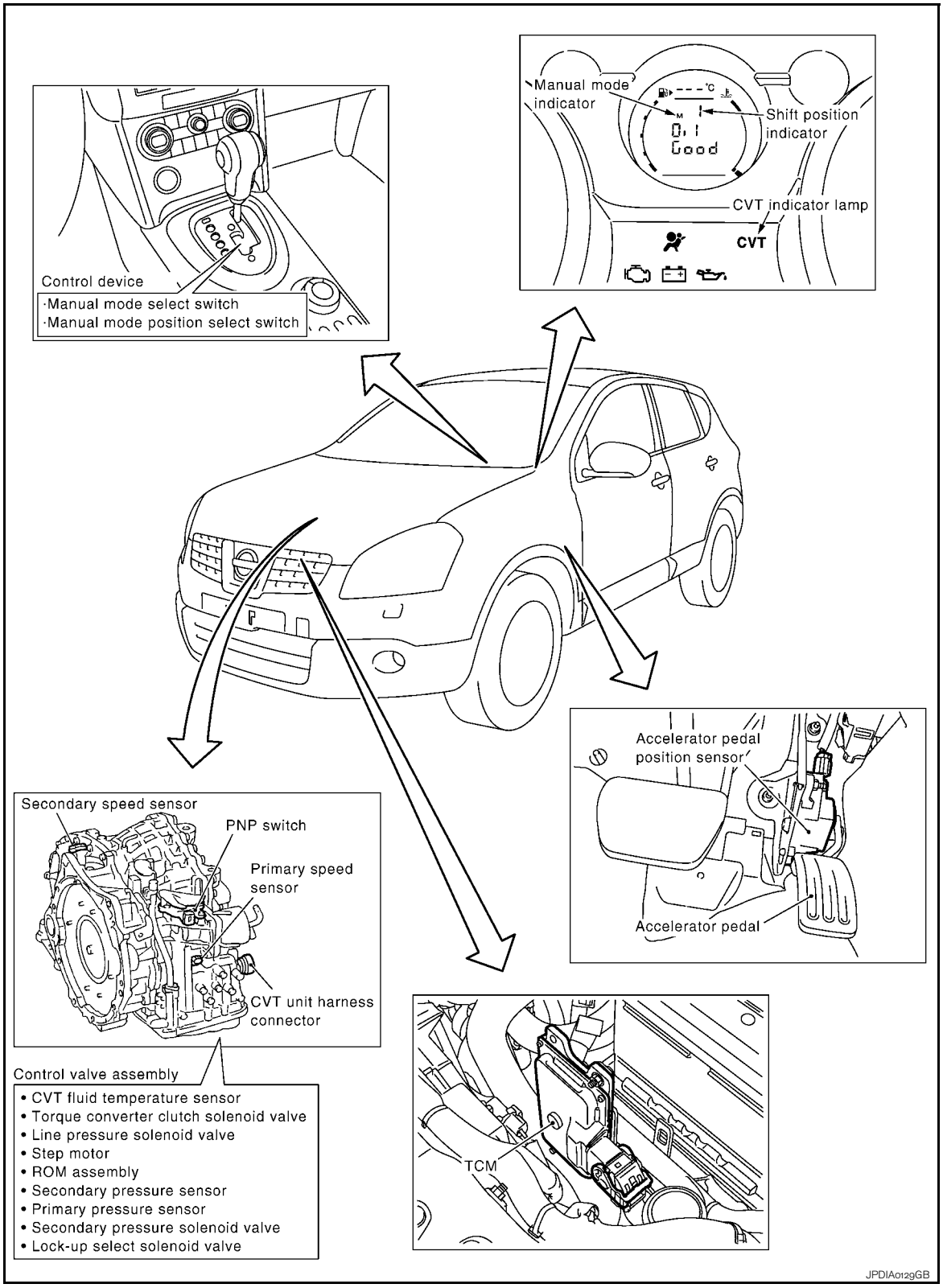
Select Control

When shifting between “N” (“P”) ⇔“D” (“R”), optimize the operating pressure on the basis of the throttle position, the engine speed, and the secondary pulley (output) revolution speed to lessen the shift shock.

Component Parts Location

INFOID:0000000000988620

cardiagn.com



Component Description

INFOID:0000000000988621

TRANSAXLE ASSEMBLY

cardiagn.com

Name	Function
Torque converter regulator valve	TM-199
TCC control valve	
Select control valve	
Select switch valve	
Manual valve	
TCC solenoid valve	TM-240
Lock-up select solenoid valve	TM-273
Primary speed sensor	TM-231
Secondary speed sensor	TM-234
CVT fluid temperature sensor	TM-229
PNP switch	TM-226
Forward clutch	TM-195
Reverse brake	
Torque converter	

EXCEPT TRANSAXLE ASSEMBLY

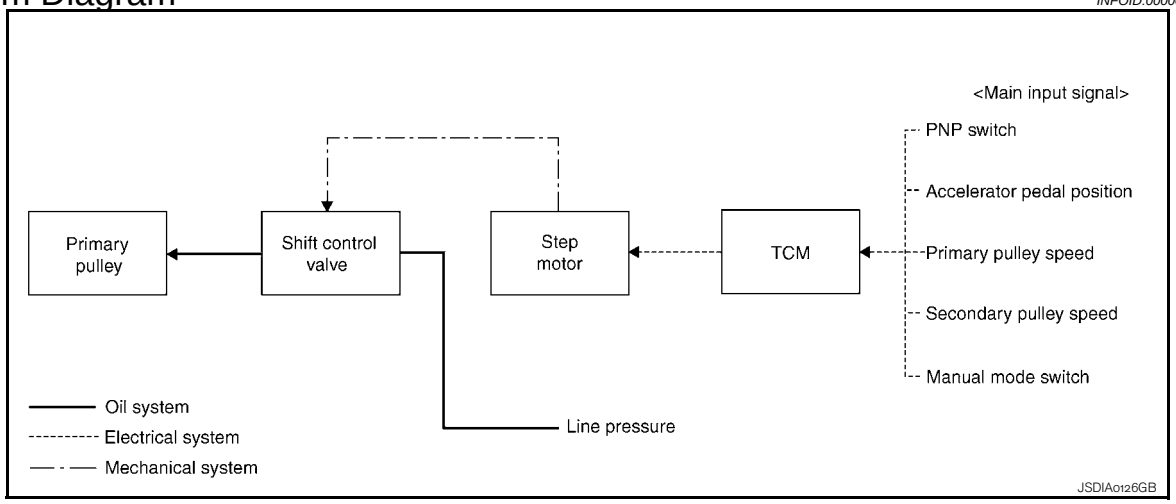
Name	Function
TCM	TM-203
Accelerator pedal position sensor	TM-267

cardiagn.com

SHIFT CONTROL SYSTEM

System Diagram

INFOID:0000000000988622



NOTE:
The gear ratio is set for every position separately.

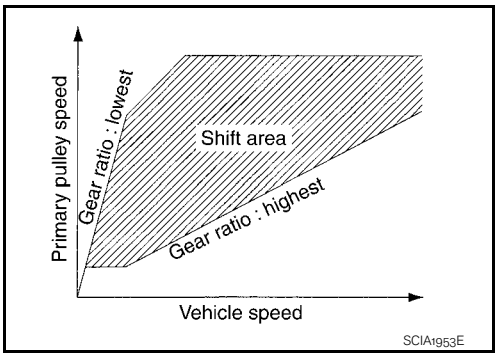
System Description

INFOID:0000000000988623

In order to select the gear ratio which can obtain the driving force in accordance with driver's intention and the vehicle condition, TCM monitors the driving conditions, such as the vehicle speed and the throttle position and selects the optimum gear ratio, and determines the gear change steps to the gear ratio. Then send the command to the step motor, and control the flow-in/flow-out of line pressure from the primary pulley to determine the position of the moving-pulley and control the gear ratio.

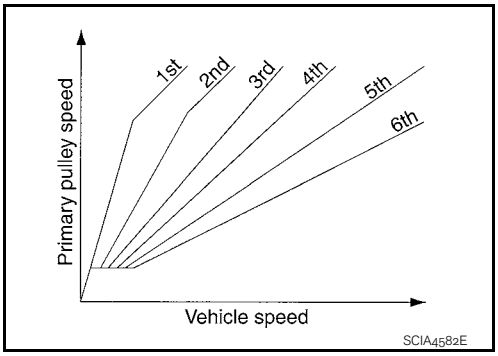
"D" POSITION

Shifting over all the ranges of gear ratios from the lowest to the highest.



"M" POSITION

When the selector lever is put in the manual shift gate side, the fixed changing gear line is set. By moving the selector lever to + side or - side, the manual mode switch is changed over, and shift change like M/T becomes possible following the changing gear set line step by step.



DOWNHILL ENGINE BRAKE CONTROL (AUTO ENGINE BRAKE CONTROL)

When downhill is detected with the accelerator pedal released, the engine brake will be strengthened up by downshifting so as not to accelerate the vehicle more than necessary.

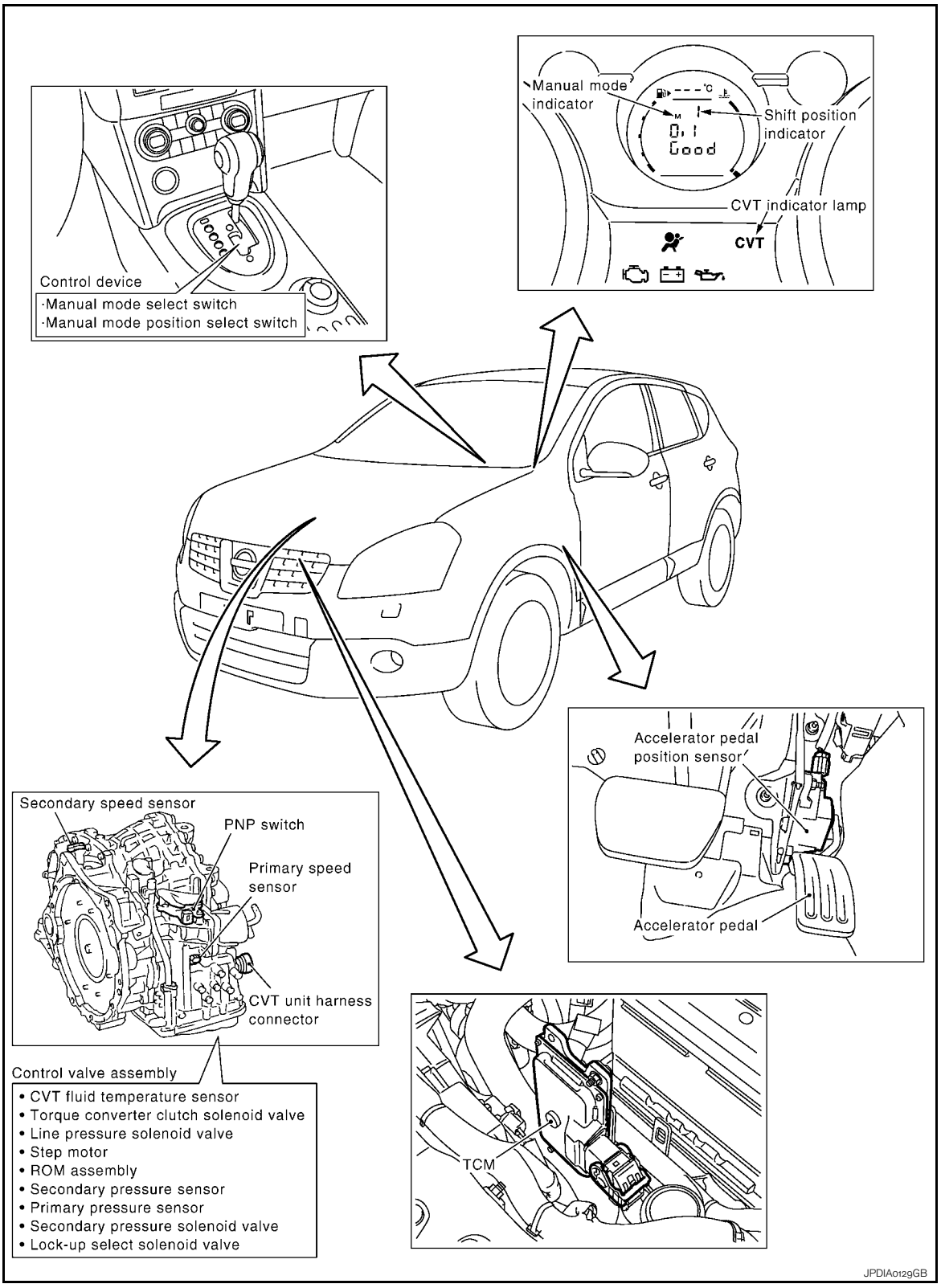
ACCELERATION CONTROL

cardiagn.com

According to vehicle speed and a change of accelerator pedal angle, driver's request for acceleration and driving scene are judged. This function assists improvement in acceleration feeling by making the engine speed proportionate to the vehicle speed. And a shift map which can gain a larger driving force is available for compatibility of mileage with driveability.

Component Parts Location

INFOID:0000000000988624



Component Description

INFOID:0000000000988625

cardiagn.com

TRANSAXLE ASSEMBLY

Item	Function
PNP switch	TM-226
Primary speed sensor	TM-231
Secondary speed sensor	TM-234
Step motor	TM-276
Shift control valve	TM-199
Primary pulley	TM-195
Secondary pulley	TM-195

EXCEPT TRANSAXLE ASSEMBLY

Item	Function
TCM	TM-203

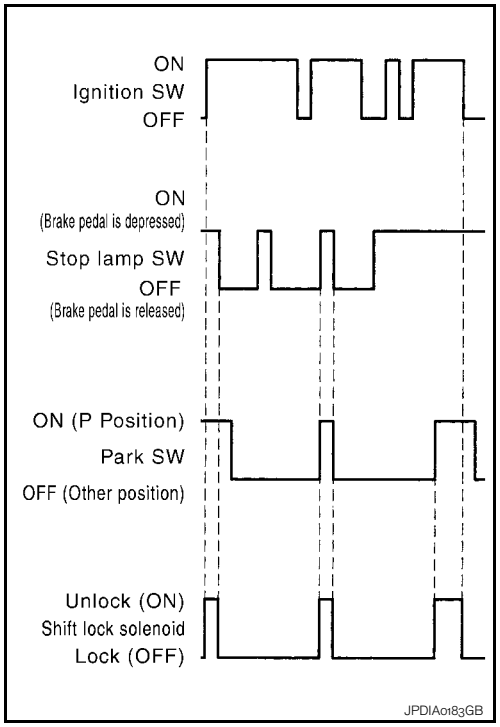
cardiagn.com

SHIFT LOCK SYSTEM

System Description

INFOID:0000000000914573

It is designed so that it cannot be shifted from the P position unless the brake pedal is depressed while the ignition switch is set to ON. The shift lock is unlocked by turning the shift lock solenoid ON when the ignition switch is set to ON, the park switch is turned ON (selector lever is in P position), and the stop lamp switch is turned ON (brake pedal is depressed) as shown in the operation chart in the figure. Therefore, the shift lock solenoid receives no ON signal and the shift lock remains locked if all of the above conditions are not fulfilled. (However, selector operation is allowed if the shift lock release button is pressed.)

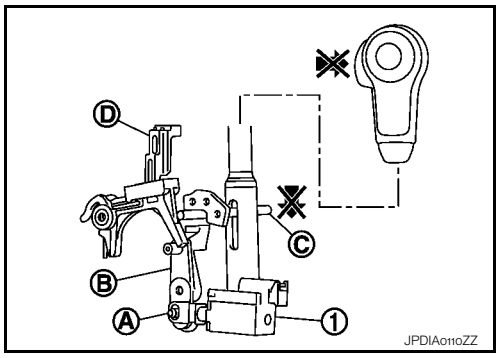


SHIFT LOCK OPERATION at P POSITION

When Brake Pedal Is Not Depressed (No Selector Operation Allowed)

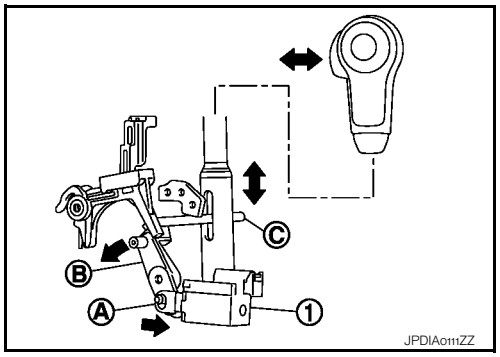
The shift lock solenoid (1) is turned OFF (not energized) and the solenoid rod (A) is extended with the spring when the brake pedal is not depressed (no selector operation allowed) with the ignition switch ON.

The connecting lock lever (B) is located at the position shown in the figure when the solenoid rod is extended. It prevents the movement of the detent rod (C). The selector lever cannot be shifted from the P position for this reason. However, the lock lever is forcibly moved to the direction opposite to that of the arrow when the shift lock release button (D) is pressed. Selector operation can be performed.



When Brake Pedal Is Depressed (Shift Operation Allowed)

The shift lock solenoid (1) is turned ON (energized) when the brake pedal is depressed with the ignition switch ON. The solenoid rod (A) is compressed with the electromagnetic force. The connecting lock lever (B) rotates when the solenoid is compressed. Therefore, the detent rod (C) can be moved. The selector lever can be shifted to other positions for this reason.



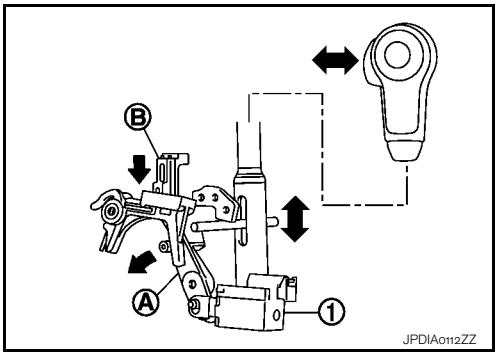
P POSITION HOLD MECHANISM (IGNITION SWITCH LOCK)

cardiagn.com

The shift lock solenoid (1) is not energized when the ignition switch is in any position other than ON. The shift mechanism is locked and P position is held. The operation cannot be performed from P position if the brake pedal is depressed with the ignition switch ON when the operation system of shift lock solenoid is malfunctioning. However, the lock lever (A) is forcibly rotated and the shift lock is released when the shift lock release button (B) is pressed from above. The selector operation from P position can be performed.

CAUTION:

Use the shift lock release button only when the selector lever cannot be operated even if the brake pedal is depressed with the ignition switch ON.

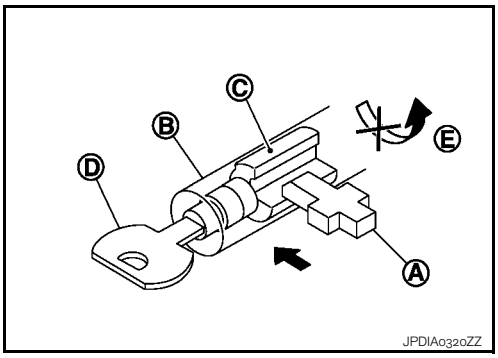


KEY LOCK MECHANISM

The key is not set to LOCK when the selector lever is not selected to P position. This prevents the key from being removed from the key cylinder.

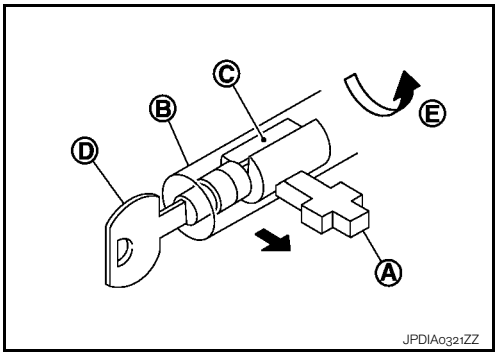
Key Lock Status

The slider (A) in the key cylinder (B) is moved to the left side of the figure when the selector lever is in any position other than P position. The rotator (C) that rotates together with the key (D) cannot be rotated for this reason. The key cannot be removed from the key cylinder because it cannot be turned to LOCK (E).



Key Unlock Status

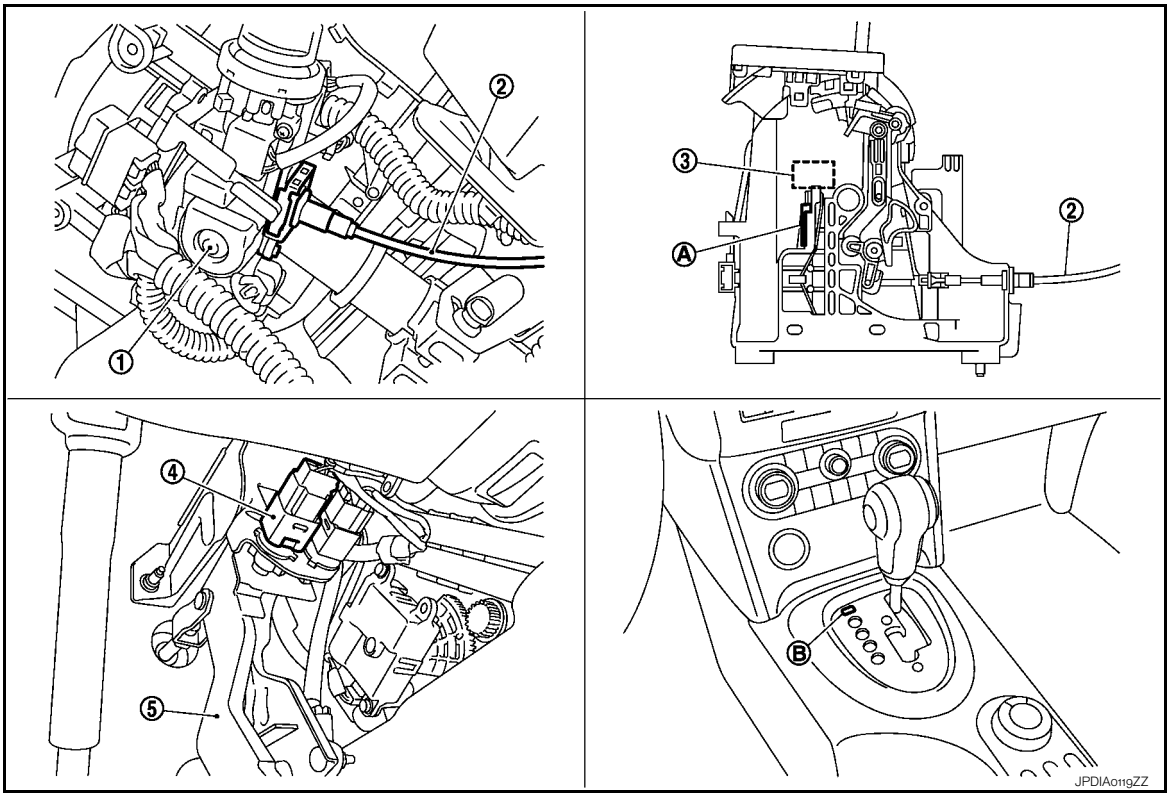
The slider (A) in the key cylinder (B) is moved to the right side of the figure when the selector lever is in P position and the finger is removed from the selector button. The rotator (C) can be rotated for this reason. The key (D) can be removed from the key cylinder because it can be turned to LOCK (E).



Component Parts Location

INFOID:0000000000914574

cardiagn.com



1. Key cylinder
2. Key interlock cable
3. Shift lock solenoid
4. Stop lamp switch
5. Brake pedal
A. Park position switch
B. Shift lock release button*

*: Shift lock release button becomes operative by removing shift lock cover. (LHD only)

Component Description

INFOID:0000000000927611

SHIFT LOCK

Component	Function
Shift lock solenoid	Refer to TM-280, "Description"
Lock lever	
Detent rod	
Park position switch	
Key interlock cable and rod	
Shift lock release button	

KEY LOCK

Component		Function
Key cylinder	Rotator	It rotates together with the key and restricts the slider movement when the ignition switch is in LOCK position.
	Slider	It moves according to the rotation of the lock lever.
Key interlock cable and key interlock rod		Actuation of lock lever is conveyed to slider in the key cylinder.

cardiagn.com

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000000988626

DESCRIPTION

The CVT system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (OBD) performed by the TCM in combination with the ECM. The malfunction is indicated by the MI (malfunction indicator) and is stored as a DTC in the ECM memory, and the TCM memory.
The second is the TCM original self-diagnosis performed by the TCM. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD self-diagnostic items. For detail, refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

OBD FUNCTION

The ECM provides emission-related on board diagnostic (OBD) functions for the CVT system. One function is to receive a signal from the TCM used with OBD-related parts of the CVT system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part. The other function is to indicate a diagnostic result by means of the MI (malfunction indicator) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.
The MI automatically illuminates in “One or Two Trip Detection Logic” when a malfunction is sensed in relation to CVT system parts.

ONE OR TWO TRIP DETECTION LOGIC OF OBD

One Trip Detection Logic

If a malfunction is sensed during the first test drive, the MI will illuminate and the malfunction will be stored in the ECM memory as a DTC. The TCM is not provided with such a memory function.

Two Trip Detection Logic

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MI will not illuminate. — 1st trip
If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MI will illuminate. — 2nd trip
The “trip” in the “One or Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.

OBD DIAGNOSTIC TROUBLE CODE (DTC)

How to Read DTC and 1st Trip DTC

DTC and 1st trip DTC can be read by the following methods.
(with CONSULT-III or GST) CONSULT-III or GST (Generic Scan Tool) Examples: P0705, P0720 etc.
These DTC are prescribed by ISO 15031-5.
(CONSULT-III also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST, they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.**
  CONSULT-III can identify them as shown below, therefore, CONSULT-III (if available) is recommended.

- DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode for “ENGINE” with CONSULT-III. Time data indicates how many times the vehicle was driven after the last detection of a DTC.
- If the DTC is being detected currently, the time data will be “0”.
- If a 1st trip DTC is stored in the ECM, the time data will be “1t”.

Freeze Frame Data and 1st Trip Freeze Frame Data

- The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.
  Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST. For details, refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

cardiagn.com

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data, and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MI on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes CVT related items)
3	1st trip freeze frame data	

Both 1st trip freeze frame data and freeze frame data (along with the DTC) are cleared when the ECM memory is erased.

How to Erase DTC

- The diagnostic trouble code can be erased by CONSULT-III, GST or ECM DIAGNOSTIC TEST MODE as described following.
- **If the battery cable is disconnected, the diagnostic trouble code will be lost within 24 hours.**
- **When you erase the DTC, using CONSULT-III or GST is easier and quicker than switching the mode selector on the ECM.**
- The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD. For details, refer to EC-962, "DTC Index".
- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**
- **Freeze frame data**
- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

How to Erase DTC (With CONSULT-III)

The emission related diagnostic information in the TCM and ECM can be erased by selecting “ALL Erase” in the “Description” of “FINAL CHECK” mode with CONSULT-III.

How to Erase DTC (With GST)

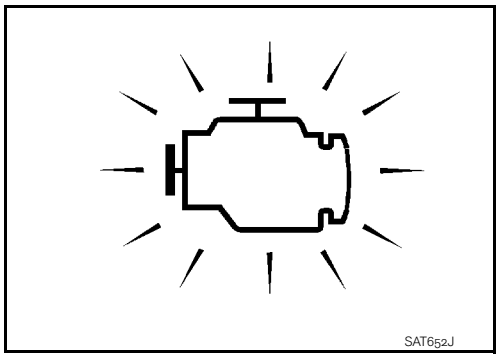
1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Select Mode 4 with GST (Generic Scan Tool). For details, refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

MALFUNCTION INDICATOR (MI)

Description

The MI is located on the instrument panel.

1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   - If the MI does not light up, refer to EC-934, "Component Function Check" (WITH EURO-OBD), EC-1213, "Component Function Check" (WITHOUT EURO-OBD).
2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



cardiagn.com

DIAGNOSIS SYSTEM (TCM)

CONSULT-III Function (TRANSMISSION)

INFOID:0000000000988627

CONSULT-III can display each diagnostic item using the diagnostic test modes shown below.

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-III.
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the TCM can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
CALIB data	Characteristic information for TCM and CVT assembly can be read. Do not use, but displayed.
Function test	Performed by CONSULT-III instead of a technician to determine whether each system is “OK” or “NG”.
ECU part number	TCM part number can be read.

WORK SUPPORT MODE

Display Item List

Item name	Description
ENGINE BRAKE ADJ.	The engine brake level setting can be canceled.
CONFORM CVTF DETERIORTN	The CVT fluid deterioration level can be checked.

Engine Brake Adjustment

“ENGINE BRAKE LEVEL”

0: Initial set value (Engine brake level control is activated)

OFF: Engine brake level control is deactivated.

CAUTION:

Mode of “+1”“0”“–1”“–2”“OFF” can be selected by pressing the “UP”“DOWN” on CONSULT-III screen. However, do not select mode other than “0” and “OFF”. If the “+1” or “–1” or “–2” is selected, that might cause the irregular driveability.

Check CVT Fluid Deterioration Date

“CVTF DETERIORATION DATE”

More than 210000:

It is necessary to change CVT fluid.

Less than 210000:

It is not necessary to change CVT fluid.

CAUTION:

Touch “CLEAR” after changing CVT fluid, and then erase “CVTF DETERIORATION DATE”.

SELF-DIAGNOSTIC RESULT MODE

After performing self-diagnosis, place check marks for results on the TM-187, "Diagnostic Work Sheet". Reference pages are provided following the items.

Display Items List

cardiagn.com

X: Applicable —: Not applicable

Items (CONSULT-III screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD (DTC)	Reference page
		"TRANSMISSION" with CONSULT-III	MI*, "ENGINE" with CONSULT-III or GST	
CAN COMM CIRCUIT	When TCM is not transmitting or receiving CAN communication signal for 2 seconds or more.	U1000	U1000	TM-222
CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller to TCM.	U1010	U1010	TM-223
BRAKE SW/CIRC	When the brake switch does not switch to ON or OFF.	P0703	—	TM-224
PNP SW/CIRC	TCM does not receive the correct voltage signal (based on the gear position) from the switch.	P0705	P0705	TM-226
ATF TEMP SEN/CIRC	During running, the CVT fluid temperature sensor signal voltage is excessively high or low.	P0710	P0710	TM-229
INPUT SPD SEN/CIRC	• Input speed sensor (primary speed sensor) signal is not input due to an open circuit. • An unexpected signal is input when vehicle is being driven.	P0715	P0715	TM-231
VEH SPD SEN/CIR AT	• Signal from vehicle speed sensor CVT [Output speed sensor (Secondary speed sensor)] not input due to open or short circuit. • Unexpected signal input during running.	P0720	P0720	TM-234
ENGINE SPEED SIG	• TCM does not receive the CAN communication signal from the ECM. • Engine speed is too low while driving.	P0725	—	TM-237
BELT DAMG	Unexpected gear ratio detected.	P0730	—	TM-239
TCC SOLENOID/CIRC	Normal voltage not applied to solenoid due to open or short circuit.	P0740	P0740	TM-240
A/T TCC S/V FNCTN	• CVT cannot perform lock-up even if electrical circuit is good. • TCM detects as irregular by comparing difference value with slip rotation. • There is big difference engine speed and primary speed when TCM lock-up signal is on.	P0744	P0744	TM-242
L/PRESS SOL/CIRC	• Normal voltage not applied to solenoid due to open or short circuit. • TCM detects as irregular by comparing target value with monitor value.	P0745	P0745	TM-244
PRS CNT SOL/A FCTN	Unexpected gear ratio was detected in the LOW side due to excessively low line pressure.	P0746	P0746	TM-246
PRS CNT SOL/B FCTN	Secondary pressure is too high or too low compared with the commanded value while driving.	P0776	P0776	TM-248
PRS CNT SOL/B CIRC	• Normal voltage not applied to solenoid due to cut line, short, or the like. • TCM detects as irregular by comparing target value with monitor value.	P0778	P0778	TM-250
MANUAL MODE SWITCH	When an impossible pattern of switch signals is detected, a malfunction is detected.	P0826	—	TM-252
TR PRS SENS/A CIRC	Signal voltage of the transmission fluid pressure sensor A (secondary pressure sensor) is too high or too low while driving.	P0840	P0840	TM-255
PRESS SEN/FNCTN	Correlation between the values of the transmission fluid pressure sensor A (secondary pressure sensor) and the transmission fluid pressure sensor B (primary pressure sensor) is out of specification.	P0841	—	TM-258

cardiagn.com

Items (CONSULT-III screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD (DTC)	Reference page
		"TRANSMISSION" with CONSULT-III	MI*, "ENGINE" with CONSULT-III or GST	
TR PRS SENS/B CIRC	Signal voltage of the transmission fluid pressure sensor B (primary pressure sensor) is too high or too low while driving.	P0845	P0845	TM-260
SEC/PRESS DOWN	Secondary fluid pressure is too low compared with the commanded value while driving.	P0868	—	TM-263
TCM-POWER SUPPLY	• When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnosis memory function stops. • This is not a malfunction message (Whenever shutting OFF a power supply to the TCM, this message appears on the screen).	P1701	—	TM-265
TP SEN/CIRC A/T	TCM does not receive the proper accelerator pedal position signals (input by CAN communication) from ECM.	P1705	—	TM-267
ESTM VEH SPD SIG	• CAN communication with the ABS actuator and the electric unit (control unit) is malfunctioning. • There is a great difference between the vehicle speed signal from the ABS actuator and the electric unit (control unit), and the vehicle speed sensor signal.	P1722	—	TM-268
CVT SPD SEN/ FNCTN	A rotation sensor error is detected because the gear does not change in accordance with the position of the stepping motor. **CAUTION:** **One of the "P0720 VEH SPD SEN/CIR AT", the "P0715 INPUT SPD SEN/CIRC" or the "P0725 ENGINE SPEED SIG" is displayed with the DTC at the same time.**	P1723	—	TM-270
ELEC TH CONTROL	The electronically controlled throttle for ECM is malfunctioning.	P1726	—	TM-272
LU-SLCT SOL/ CIRC	• Normal voltage not applied to solenoid due to cut line, short, or the like. • TCM detects as irregular by comparing target value with monitor value.	P1740	P1740	TM-273
L/PRESS CONTROL	TCM detects the unexpected line pressure.	P1745	—	TM-275
STEP MOTR CIRC	Each coil of the step motor is not energized properly due to an open or a short.	P1777	P1777	TM-276
STEP MOTR/FNC	There is a great difference between the number of steps for the stepping motor and for the actual gear ratio.	P1778	P1778	TM-278
NO DTC IS DETECTED: FURTHER TESTING MAY BE REQUIRED	No NG item has been detected.	X	X	—

*: Refer to TM-214, "Diagnosis Description".

DATA MONITOR MODE

Display Items List

cardiagn.com

X: Standard, —: Not applicable, ▼: Option

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VSP SENSOR (km/h)	X	—	▼	Output speed sensor (secondary speed sensor)
ESTM VSP SIG (km/h)	X	—	▼	—
PRI SPEED SEN (rpm)	X	—	▼	—
ENG SPEED SIG (rpm)	X	—	▼	—
SEC HYDR SEN (V)	X	—	▼	—
PRI HYDR SEN (V)	X	—	▼	—
ATF TEMP SEN (V)	X	—	▼	CVT fluid temperature sensor
VIGN SEN (V)	X	—	▼	—
VEHICLE SPEED (km/h)	—	X	▼	Vehicle speed recognized by the TCM.
PRI SPEED (rpm)	—	X	▼	Primary pulley speed
SEC SPEED (rpm)	—	—	▼	Secondary pulley speed
ENG SPEED (rpm)	—	X	▼	—
SLIP REV (rpm)	—	X	▼	Difference between engine speed and primary pulley speed.
GEAR RATIO	—	X	▼	—
G SPEED (G)	—	—	▼	—
ACC PEDAL OPEN (0.0/8)	X	X	▼	Degree of opening for accelerator recognized by the TCM. For fail-safe operation, the specific value used for control is displayed.
TRQ RTO	—	—	▼	—
SEC PRESS (MPa)	—	X	▼	—
PRI PRESS (MPa)	—	X	▼	—
ATFTEMP COUNT	—	X	▼	Means CVT fluid temperature. Actual oil temperature (° numeric value is converted. Refer to TM-311
DSR REV (rpm)	—	—	▼	—
DGEAR RATIO	—	—	▼	—
DSTM STEP (step)	—	—	▼	—
STM STEP (step)	—	X	▼	—
LU PRS (MPa)	—	—	▼	—
LINE PRS (MPa)	—	—	▼	—
TGT SEC PRESS (MPa)	—	—	▼	—
ISOLT1 (A)	—	X	▼	Torque converter clutch solenoid valve output current
ISOLT2 (A)	—	X	▼	Pressure control solenoid valve A (line pressure solenoid valve) output current
ISOLT3 (A)	—	X	▼	Pressure control solenoid valve B (secondary pressure solenoid valve) output current

cardiagn.com

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
SOLMON1 (A)	X	X	▼	Torque converter clutch solenoid valve monitor current
SOLMON2 (A)	X	X	▼	Pressure control solenoid valve A (line pressure solenoid valve) monitor current
SOLMON3 (A)	X	X	▼	Pressure control solenoid valve B (secondary pressure solenoid valve) monitor current
P POSITION SW (ON/OFF)	X	—	▼	—
R POSITION SW (ON/OFF)	X	—	▼	—
N POSITION SW (ON/OFF)	X	—	▼	—
D POSITION SW (ON/OFF)	X	—	▼	—
L POSITION SW (ON/OFF)	X	—	▼	—
BRAKE SW (ON/OFF)	X	X	▼	Stop lamp switch (Signal input with CAN communications)
FULL SW (ON/OFF)	X	X	▼	Signal input with CAN communications
IDLE SW (ON/OFF)	X	X	▼	
SPORT MODE SW (ON/OFF)	X	X	▼	Not mounted but displayed.
STRDWNSW (ON/OFF)	X	—	▼	
STRUPSW (ON/OFF)	X	—	▼	
DOWNLVR (ON/OFF)	X	—	▼	—
UPLVR (ON/OFF)	X	—	▼	—
NONMMODE (ON/OFF)	X	—	▼	—
MMODE (ON/OFF)	X	—	▼	—
INDLRNG (ON/OFF)	—	—	▼	—
INDDRNG (ON/OFF)	—	—	▼	“D” position indicator output
INDNRNG (ON/OFF)	—	—	▼	“N” position indicator output
INDRRNG (ON/OFF)	—	—	▼	“R” position indicator output
INDPRNG (ON/OFF)	—	—	▼	“P” position indicator output
CVT LAMP (ON/OFF)	—	—	▼	—
SPORT MODE IND (ON/OFF)	—	—	▼	—
MMODE IND (ON/OFF)	—	—	▼	—
SMCOIL D (ON/OFF)	—	—	▼	Step motor coil “D” energizing status
SMCOIL C (ON/OFF)	—	—	▼	Step motor coil “C” energizing status
SMCOIL B (ON/OFF)	—	—	▼	Step motor coil “B” energizing status
SMCOIL A (ON/OFF)	—	—	▼	Step motor coil “A” energizing status
LUSEL SOL OUT (ON/OFF)	—	—	▼	—
LUSEL SOL MON (ON/OFF)	—	—	▼	—
VDC ON (ON/OFF)	X	—	▼	ESP (Electronic Stability Program System)

cardiagn.com

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
TCS ON (ON/OFF)	X	—	▼	—
ABS ON (ON/OFF)	X	—	▼	—
ACC ON (ON/OFF)	X	—	▼	Not mounted but displayed.
RANGE	—	X	▼	Indicates position is recognized by TCM. Indicates a specific value required for control when fail-safe function is activated.
M GEAR POS	—	X	▼	—
Voltage (V)	—	—	▼	Displays the value measured by the voltage probe.
Frequency (Hz)	—	—	▼	The value measured by the pulse probe is displayed.
DUTY-HI (high) (%)	—	—	▼	
DUTY-LOW (low) (%)	—	—	▼	
PLS WIDTH-HI (ms)	—	—	▼	
PLS WIDTH-LOW (ms)	—	—	▼	

Diagnostic Tool Function

INFOID:0000000000988628

OBD SELF-DIAGNOSTIC PROCEDURE (WITH GST)

Refer to EC-726, "Diagnosis Tool Function" (WITH EURO-OBD).

cardiagn.com

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000000988643

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H and CAN-L) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000000988644

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
U1000	CAN COMM CIRCUIT	When TCM is not transmitting or receiving CAN communication signal for 2 seconds or more.	Harness or connectors (CAN communication line is open or shorted.)

DTC CONFIRMATION PROCEDURE

NOTE:
If “DTC CONFIRMATION PROCEDURE” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Start engine and wait for at least 6 seconds.
3. Perform “SELF-DIAG RESULTS”. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST
Follow the procedure “With CONSULT-III”.

Is “U1000 CAN COMM CIRCUIT” detected?

YES >> Go to TM-222, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988645

1.CHECK CAN COMMUNICATION CIRCUIT

With CONSULT-III
1. Turn ignition switch ON and start engine.
2. Select “SELF-DIAG RESULTS”.

Is any malfunction of the “U1000 CAN COMM CIRCUIT” indicated?

YES >> Go to LAN section. Refer to LAN-55, "CAN System Specification Chart".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000000988646

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H and CAN-L) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000000988647

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller to TCM.	Harness or connectors (CAN communication line is open or shorted.)

DTC CONFIRMATION PROCEDURE

NOTE:
If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Start engine and wait for at least 6 seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST
Follow the procedure "With CONSULT-III".

Is "U1010 CONTROL UNIT (CAN)" detected?

YES >> Go to TM-223, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988648

1. CHECK CAN COMMUNICATION CIRCUIT

With CONSULT-III
1. Turn ignition switch ON and start engine.
2. Select "SELF-DIAG RESULTS".

Is any malfunction of the "U1010 CONTROL UNIT (CAN)" indicated?

YES >> Print out CONSULT-III screen, go to LAN section. Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

P0703 STOP LAMP SWITCH

Description

INFOID:0000000000988649

ON, OFF status of the stop lamp switch is sent via the CAN communication from the BCM to TCM using the signal.

DTC Logic

INFOID:0000000000988650

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0703	BRAKE SW/CIRC	When the brake switch does not switch to ON or OFF.	• Harness or connectors - (Stop lamp switch, and BCM circuit are open or shorted.) - (CAN communication line is open or shorted.) • Stop lamp switch

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Start engine.
3. Start vehicle for at least 3 consecutive seconds.
4. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is "P0703 BRAKE SW/CIRC" detected?

YES >> Go to TM-224, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988651

1. CHECK STOP LAMP SWITCH

Check stop lamp switch.

Is the inspection result normal?

YES >> Check the following. If NG, repair or replace damaged parts.
- Harness for short or open between battery and stop lamp switch.
- Harness for short or open between stop lamp switch and BCM.
- 10A fuse (No. 11, located in fuse block).

NO >> Repair or replace the stop lamp switch.

Component Inspection

INFOID:0000000000988652

1. CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp switch			Condition	Continuity
Connector	Terminal			
E115	1	2	Depressed brake pedal	Existed
			Released brake pedal	Not existed

cardiagn.com

Check stop lamp switch after adjusting brake pedal — refer to BR-8, "Exploded View" (LHD), BR-52, "Exploded View"(RHD).

Is the inspection result normal?

YES >> Check the following. If NG, repair or replace damaged parts.
- Harness for short or open between battery and stop lamp switch.
- Harness for short or open between stop lamp switch and BCM.
- 10A fuse (No. 11, located in fuse block).

NO >> Repair or replace the stop lamp switch.

cardiagn.com

P0705 PARK/NEUTRAL POSITION SWITCH

Description

INFOID:0000000000988653

- The PNP switch assembly includes a transaxle range switch.
- The transaxle range switch detects the selector lever position and sends a signal to the TCM.

Item name	Condition	Display value
P POSITION SW	Selector lever in “P” position	ON
	Other than the above position.	OFF
R POSITION SW	Selector lever in “R” position	ON
	Other than the above position.	OFF
N POSITION SW	Selector lever in “N” position	ON
	Other than the above position.	OFF
D POSITION SW	Selector lever in “D” position	ON
	Other than the above position.	OFF
RANGE	Selector lever in “N” or “P” position	N/P
	Selector lever in “R” position	R
	Selector lever in “D” position	D

DTC Logic

INFOID:0000000000988654

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0705	PNP SW/CIRC	TCM does not receive the correct voltage signal (based on the gear position) from the switch.	• Harness or connectors (PNP switches circuit is open or shorted.) • PNP switch

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC CONFIRMATION PROCEDURE” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 2 consecutive seconds.

VEHICLE SPEED	**: More than 10 km/h (6 MPH)**
ENG SPEED	**: More than 450 rpm**
ACC PEDAL OPEN	**: More than 1.0/8**

With GST

Follow the procedure “With CONSULT-III”.

Is “P0705 PNP SW/CIRC” detected?

YES >> Go to TM-227, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

Diagnosis Procedure

INFOID:0000000000988655

1. CHECK HARNESS BETWEEN TCM AND PNP SWITCH

1. Turn ignition switch OFF.
2. Disconnect TCM connector and PNP switch connector.
3. Check continuity between TCM connector terminals and PNP switch connector terminals.

TCM connector		PNP switch connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	1	F21	8	Existed
	2		3	
	3		4	
	4		1	
	11		2	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

OK >> GO TO 2.
NG >> Repair or replace damaged parts.

2. DETECT MALFUNCTIONING ITEM

Check the following items.
- Harness for short or open between ignition switch and PNP switch.
- 10A fuse (No. 55, located in the IPDM E/R).
- Ignition switch.

Is the inspection result normal?

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK PNP SWITCH

Check PNP switch. Refer to TM-227, "Component Inspection".

Is the inspection result normal?

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988656

1. CHECK PNP SWITCH

Change selector lever to various positions to check the continuity between terminals on the PNP switch and ground.

Selector lever position	PNP switch connector		Continuity
	Connector	Terminal	

cardiagn.com

P	F21	2	5	Existed
		6	7	
R		5	8	
N		3	5	
		6	7	
D		4	5	

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> GO TO 2.

2.CHECK CVT POSITION

1. Disconnect control cable.
2. Check PNP switch. (Refer to step 1 above.)

Is the inspection result normal?

YES >> Adjust CVT position. Refer to TM-324, "Inspection and Adjustment".
NO >> GO TO 3.

3.CHECK PNP SWITCH

1. Remove PNP switch from transaxle assembly. Refer to TM-337, "Exploded View".
2. Check PNP switch. (Refer to step 1 above.)

Is the inspection result normal?

YES >> Adjust PNP switch. Refer to TM-337, "Inspection and Adjustment".
NO >> Replace PNP switch. Refer to TM-337, "Exploded View".

cardiagn.com

P0710 CVT FLUID TEMPERATURE SENSOR

Description

INFOID:0000000000988657

The CVT fluid temperature sensor detects the CVT fluid temperature and sends a signal to the TCM.

DTC Logic

INFOID:0000000000988658

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0710	ATF TEMP SEN/CIRC	During running, the CVT fluid temperature sensor signal voltage is excessively high or low.	• Harness or connectors (Sensor circuit is open or shorted.) • CVT fluid temperature sensor

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 10 minutes (Total).

VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ENG SPEED	**: 450 rpm more than**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**

With GST

Follow the procedure "With CONSULT-III".

Is "P0710 ATF TEMP SEN/CIRC" detected?

YES >> Go to TM-229, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988659

1. CHECK CVT FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals.

TCM connector			Temperature °C (°F)	Resistance (Approx.)
Connector	Terminal			
F25	13	25	20 (68)	6.5 kΩ
			80 (176)	0.9 kΩ

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2. CHECK CVT FLUID TEMPERATURE SENSOR

cardiagn.com

Check CVT fluid temperature sensor. Refer to TM-230, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the transaxle assembly. Refer toTM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

3. CHECK HARNESS BETWEEN TCM AND CVT FLUID TEMPERATURE SENSOR

1. Disconnect the CVT unit harness connector.
2. Check continuity between TCM connector terminals and CVT unit harness connector terminals.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	13	F24	17	Existed
	25		19	

3. If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

Is the inspection result normal?

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988660

CVT FLUID TEMPERATURE SENSOR

1. CHECK CVT FLUID TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminals.

CVT unit harness connector			Temperature °C (°F)	Resistance (Approx.)
Connector	Terminal			
F24	17	19	20 (68)	6.5 kΩ
			80 (176)	0.9 kΩ

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

cardiagn.com

P0715 INPUT SPEED SENSOR (PRI SPEED SENSOR)

Description

INFOID:0000000000988661

The input speed sensor (primary speed sensor) detects the primary pulley revolution speed and sends a signal to the TCM.

DTC Logic

INFOID:0000000000988662

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0715	INPUT SPD SEN/CIRC	• Input speed sensor (primary speed sensor) signal is not input due to an open circuit. • An unexpected signal is input when vehicle is being driven.	• Harness or connectors (Sensor circuit is open or shorted.) • Input speed sensor (Primary speed sensor)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC CONFIRMATION PROCEDURE” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: “D” position**
ENG SPEED	**: 450 rpm or more**
Driving location	**: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

With GST

Follow the procedure “With CONSULT-III”.

Is “P0715 INPUT SPD SEN/CIRC” detected?

YES >> Go to TM-231, "Diagnosis Procedure".

NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988663

1. CHECK PRIMARY SPEED SENSOR

With CONSULT-III

1. Start engine.
2. Check power supply to input speed sensor (primary speed sensor) by voltage between TCM connector terminals.

TCM connector		Voltage (Approx.)
Connector	Terminal	

cardiagn.com

F25	25	46	Battery voltage
		48	

3. If OK, check the pulse when vehicle cruises.

TCM connector		Condition	Data (Approx.)
Connector	Terminal		
F25	33	When running at 20 km/h (12 MPH) in "M1" position, use the CONSULT-III pulse frequency measuring function. **CAUTION:** **Connect the data link connector to the vehicle-side diagnosis connector.**	800 Hz

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK POWER AND SENSOR GROUND

1. Turn ignition switch OFF.
2. Disconnect the input speed sensor (primary speed sensor) harness connector.
3. Turn ignition switch ON.
4. Check voltage between input speed sensor (primary speed sensor) harness connector terminals.

Input speed sensor (primary speed sensor) harness connector			Voltage (Approx.)
Connector	Terminal		
F55	1	3	Battery voltage

5. Check voltage between input speed sensor (primary speed sensor) harness connector terminal and ground.

Input speed sensor (primary speed sensor) harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
F55	3		Battery voltage

6. If OK, check harness for short to ground and short to power.
7. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 3.
NO - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminal 3 and ground: GO TO 4.
NO - 2 >> Battery voltage is not supplied between terminals 1 and 3 only: GO TO 5.

3. CHECK HARNESS BETWEEN TCM AND INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminal and input speed sensor (primary speed sensor) harness connector terminal.

TCM connector		Input speed sensor (primary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	33	F55	2	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HARNESS BETWEEN TCM AND INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) (POW-

cardiagn.com

ER)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and input speed sensor (primary speed sensor) harness connector terminal.

IPDM E/R		Input speed sensor (primary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E11	16	F55	3	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> 10 A fuse (No. 55, located in the IPDM E/R) or ignition switch are malfunctioning.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HARNESS BETWEEN TCM AND INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) (SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminal and input speed sensor (primary speed sensor) harness connector terminal.

TCM connector		Input speed sensor (primary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	25	F55	1	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and then drive the vehicle [more than 10 km/h (6 MPH)], perform self-diagnosis check. Refer to TM-231, "DTC Logic".

Is “P0715 INPUT SPD SEN/CIRC” detected again?

YES >> Replace the primary speed sensor. Refer toTM-339, "Exploded View".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

7. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P0720 VEHICLE SPEED SENSOR CVT (SECONDARY SPEED SENSOR)

Description

INFOID:0000000000988664

The vehicle speed sensor CVT [output speed sensor (secondary speed sensor)] detects the revolution of the CVT output shaft and emits a pulse signal. The pulse signal is sent to the TCM, which converts it into vehicle speed.

DTC Logic

INFOID:0000000000988665

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0720	VEH SPD SEN/CIR AT	• Signal from vehicle speed sensor CVT [Output speed sensor (Secondary speed sensor)] not input due to open or short circuit. • Unexpected signal input during running.	• Harness or connectors (Sensor circuit is open or shorted.) • Output speed sensor (Secondary speed sensor)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 12 consecutive seconds.

ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
Driving location	**: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

4. If DTC is detected,

With GST

Follow the procedure "With CONSULT-III".

Is "P0720 VEH SPD SEN/CIR AT" detected?

YES >> Go to TM-234, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988666

1. CHECK SECONDARY SPEED SENSOR

With CONSULT-III

1. Start engine.
2. Check power supply to output speed sensor (secondary speed sensor) by voltage between TCM connector terminals.

cardiagn.com

TCM connector			Voltage (Approx.)
Connector	Terminal		
F25	7	46	Battery voltage
		48	

3. If OK, check the pulse when vehicle cruises.

TCM connector		Condition	Data (Approx.)
Connector	Terminal		
F25	34	When running at 20 km/h (12 MPH) in “D” position, use the CONSULT-III pulse frequency measuring function. **CAUTION:** **Connect the data link connector to the vehicle-side diagnosis connector.**	500 Hz

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK POWER AND SENSOR GROUND

1. Turn ignition switch OFF.
2. Disconnect the output speed sensor (secondary speed sensor) harness connector.
3. Turn ignition switch ON.
4. Check voltage between output speed sensor (secondary speed sensor) harness connector terminals.

Output speed sensor (Secondary speed sensor) harness connector			Voltage (Approx.)
Connector	Terminal		
F19	1	3	Battery voltage

5. Check voltage between output speed sensor (secondary speed sensor) harness connector terminal and ground.

Output speed sensor (Secondary speed sensor) harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
F19	3		Battery voltage

6. If OK, check harness for short to ground and short to power.
7. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 3.
NO - 1 >> Battery voltage is not supplied between terminals 1 and 3, neither terminal 3 and ground: GO TO 4.
NO - 2 >> Battery voltage is not supplied between terminals 1 and 3 only: GO TO 5.

3. CHECK HARNESS BETWEEN TCM AND OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminal and output speed sensor (secondary speed sensor) harness connector terminal.

TCM connector		Output speed sensor (Secondary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	34	F19	2	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

cardiagn.com

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HARNESS BETWEEN TCM AND OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) (POWER)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and output speed sensor (secondary speed sensor) harness connector terminal.

IPDM E/R		Output speed sensor (Secondary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E11	16	F19	3	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> 10 A fuse (No. 55, located in the IPDM E/R) or ignition switch are malfunctioning.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HARNESS BETWEEN TCM AND OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) (SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminal and output speed sensor (secondary speed sensor) harness connector terminal.

TCM connector		Output speed sensor (Secondary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	7	F19	1	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and then drive the vehicle [more than 40 km/h (25 MPH)], perform self-diagnosis check. Refer to TM-234, "DTC Logic".

Is “P0720 VEH SPD SEN/CIR AT” detected again?

YES >> Replace the secondary speed sensor. Refer to TM-340, "Exploded View".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

7. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P0725 ENGINE SPEED SIGNAL

Description

INFOID:0000000000988667

The engine speed signal is transmitted from ECM to TCM by CAN communication line.

DTC Logic

INFOID:0000000000988668

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0725	ENGINE SPEED SIG	• TCM does not receive the CAN communication signal from the ECM. • Engine speed is too low while driving.	• Harness or connectors (The ECM to the TCM circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 10 consecutive seconds.

PRI SPEED SEN : More than 1000 rpm

Is "P0725 ENGINE SPEED SIG" detected?

YES >> Go to TM-237, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988669

1. CHECK DTC WITH ECM

With CONSULT-III
1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode for "ENGINE" with CONSULT-III. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

Is the inspection result normal?

OK >> GO TO 2.
NG >> Check the DTC detected item. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

2. CHECK DTC WITH TCM

With CONSULT-III
Select "SELF-DIAG RESULTS" mode for "TRANSMISSION" with CONSULT-III. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is the inspection result normal?

OK >> GO TO 3.
NG >> Check the DTC detected item. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

3. CHECK INPUT SIGNALS

cardiagn.com

With CONSULT-III

1. Start engine.
2. Select “DATA MONITOR”.
3. While monitoring “ENG SPEED SIG”, check for engine speed change corresponding to “ACC PEDAL OPEN”.

Item name	Condition	Display value
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
ACC PEDAL OPEN	Released accelerator pedal – Fully depressed accelerator pedal	0.0/8 – 8.0/8

Is the inspection result normal?

OK >> GO TO 4.
NG >> Check ignition signal circuit. Refer to EC-929, "Description" (WITH EURO-OBD), EC-1208, "Description" (WITHOUT EURO-OBD).

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Replace the TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P0730 BELT DAMAGE

Description

INFOID:0000000000988670

TCM selects the gear ratio using the engine load (throttle position), the primary pulley revolution speed, and the secondary pulley revolution speed as input signal. Then it changes the operating pressure of the primary pulley and the secondary pulley and changes the groove width of the pulley.

DTC Logic

INFOID:0000000000988671

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0730	BELT DAMG	Unexpected gear ratio detected.	Transaxle assembly

DTC CONFIRMATION PROCEDURE

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Make sure that output voltage of CVT fluid temperature sensor is within the range below.

ATF TEMP SEN	**: 1.0 – 2.0 V**

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

4. Start engine and maintain the following conditions for at least 30 consecutive seconds.

TEST START FROM 0 km/h (0 MPH)	
CONSTANT ACCELERATION	**: Keep 30 sec or more**
VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
ENG SPEED	**: 450 rpm or more**

Is "P0730 BELT DAMG" detected?

YES >> Go to TM-239, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988672

1. CHECK DTC

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS".

Are any DTC displayed?

YES - 1>> DTC except for "P0730 BELT DAMG" is displayed: Go to Check the DTC detected item. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".
YES - 2>> DTC for "P0730 BELT DAMG" is displayed: Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Description

INFOID:0000000000988673

- The torque converter clutch solenoid valve is activated by the TCM in response to signals sent from the vehicle speed and accelerator pedal position sensors. Lock-up piston operation will then be controlled.
- Lock-up operation, however, is prohibited when CVT fluid temperature is too low.
- When the accelerator pedal is depressed (less than 2.0/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.

DTC Logic

INFOID:0000000000988674

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0740	TCC SOLENOID/CIRC	Normal voltage not applied to solenoid due to open or short circuit.	• Torque converter clutch solenoid valve • Harness or connectors (Solenoid circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Wait at least 10 consecutive seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST

Follow the procedure "With CONSULT-III".

Is "P0740 TCC SOLENOID/CIRC" detected?

YES >> Go to TM-240, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988675

1. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

TCM connector		Ground	Resistance (Approx.)
Connector	Terminal		
F25	38		3.0 – 9.0 Ω

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2. CHECK HARNESS BETWEEN TCM AND TORQUE CONVERTER CLUTCH SOLENOID VALVE

1. Disconnect CVT unit harness connector.
2. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

cardiagn.com

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	38	F24	12	Existed

3. If OK, check harness for short to ground and short to power.
4. If OK, check continuity between ground and CVT assembly.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3.CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE

Check torque converter clutch solenoid valve. Refer to TM-241, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988676

TORQUE CONVERTER CLUTCH SOLENOID VALVE

1.TORQUE CONVERTER CLUTCH SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	12		3.0 – 9.0 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

cardiagn.com

P0744 A/T TCC S/V FUNCTION (LOCK -UP)

Description

INFOID:0000000000988677

This malfunction is detected when the torque converter clutch does not lock-up as instructed by the TCM. This is not only caused by electrical malfunction (circuits open or shorted), but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000000988678

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0744	A/T TCC S/V FNCTN	• CVT cannot perform lock-up even if electrical circuit is good. • TCM detects as irregular by comparing difference value with slip rotation. • There is big difference engine speed and primary speed when TCM lock-up signal is on.	• Torque converter clutch solenoid valve • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following condition for at least 30 seconds.

ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
VEHICLE SPEED	**: Constant speed of more than 40 km/h (25 MPH)**

4. If DTC is detected

With GST

Follow the procedure "With CONSULT-III".

Is "P0744 A/T TCC S/V FNCTN" detected?

YES >> Go to TM-242, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988679

1.CHECK LINE PRESSURE

Perform line pressure test. Refer toTM-318, "Inspection and Judgment".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

2.CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE

cardiagn.com

Check torque converter clutch solenoid valve. Refer to TM-241, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3. CHECK LOCK-UP SELECT SOLENOID VALVE

Check lock-up select solenoid valve. Refer to TM-274, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4. CHECK OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) SYSTEM

Check output speed sensor (secondary speed sensor) system. Refer to TM-234, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5. CHECK INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) SYSTEM

Check input speed sensor (primary speed sensor) system. Refer to TM-231, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace damaged parts.

6. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P0745 LINE PRESSURE SOLENOID VALVE

Description

INFOID:0000000000988680

The pressure control solenoid valve A (line pressure solenoid valve) regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

DTC Logic

INFOID:0000000000988681

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0745	L/PRESS SOL/CIRC	• Normal voltage not applied to solenoid due to open or short circuit. • TCM detects as irregular by comparing target value with monitor value.	• Harness or connectors (Solenoid circuit is open or shorted.) • Pressure control solenoid valve A (Line pressure solenoid valve)

DTC CONFIRMATION PROCEDURE

NOTE:

If “DTC CONFIRMATION PROCEDURE” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Start engine and wait at least 5 seconds.
3. Perform “SELF-DIAG RESULTS” TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST

Follow the procedure “With CONSULT-III”.

Is “P0745 L/PRESS SOL/CIRC” detected?

YES >> Go to TM-244, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988682

1.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE) CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

TCM connector		Ground	Resistance (Approx.)
Connector	Terminal		
F25	40		3.0 – 9.0 Ω

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve A (Line pressure solenoid valve). Refer to TM-245, "Component Inspection"

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

cardiagn.com

3. CHECK HARNESS BETWEEN TCM AND PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector and TCM connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	40	F24	2	Existed

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and CVT assembly.
6. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988683

PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

1. PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	2		3.0 – 9.0 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

cardiagn.com

P0746 PRESSURE CONTROL SOLENOID A PERFORMANCE (LINE PRESSURE SOLENOID VALVE)

Description

INFOID:0000000000988684

The pressure control solenoid valve A (line pressure solenoid valve) regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

DTC Logic

INFOID:0000000000988685

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0746	PRS CNT SOL/A FCTN	Unexpected gear ratio was detected in the LOW side due to excessively low line pressure.	• Line pressure control system • Output speed sensor (Secondary speed sensor) • Input speed sensor (Primary speed sensor)

DTC CONFIRMATION PROCEDURE

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 10 consecutive seconds. Test start from 0 km/h (0 MPH).

ATF TEMP SEN	**: 1.0 – 2.0 V**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
VEHICLE SPEED	**: 10 km/h (6 MPH) More than**
Driving location	**: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

With GST
Follow the procedure "With CONSULT-III".

Is "P0746 PRS CNT SOL/A FCTN" detected?

YES >> Go to TM-246, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988686

1.CHECK LINE PRESSURE

Perform line pressure test. Refer to TM-318, "Inspection and Judgment".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

2.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

cardiagn.com

Check pressure control solenoid valve A (line pressure solenoid valve). Refer to TM-245, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3. CHECK OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) SYSTEM

Check output speed sensor (secondary speed sensor) system. Refer to TM-234, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4. CHECK INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) SYSTEM

Check input speed sensor (primary speed sensor) system. Refer to TM-231, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P0776 PRESSURE CONTROL SOLENOID B PERFORMANCE (SEC PRESSURE SOLENOID VALVE)

Description

INFOID:0000000000988687

The pressure control solenoid valve B (secondary pressure solenoid valve) regulates the secondary pressure to suit the driving condition in response to a signal sent from the TCM.

DTC Logic

INFOID:0000000000988688

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0776	PRS CNT SOL/B FCTN	Secondary pressure is too high or too low compared with the commanded value while driving.	• Harness or connectors (Solenoid circuit is open or shorted.) • Pressure control solenoid valve B (Secondary pressure solenoid valve system) • Transmission fluid pressure sensor A (Secondary pressure sensor) • Line pressure control system

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 30 consecutive seconds.

ATF TEMP SEN	**: 1.0 – 2.0 V**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
VEHICLE SPEED	**: 10 km/h (6 MPH) More than**
Driving location	**: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

With GST

Follow the procedure "With CONSULT-III".

Is "P0776 PRS CNT SOL/B FCTN" detected?

YES >> Go to TM-248, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988689

1. CHECK LINE PRESSURE

Perform line pressure test. Refer to TM-318, "Inspection and Judgment".

Is the inspection result normal?

cardiagn.com

YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

2.CHECK PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve B (Secondary pressure solenoid valve). Refer to TM-251, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve A (Line pressure solenoid valve). Refer to TM-245, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4.CHECK TRANSMISSION FLUID PRESSURE SENSOR A (SECONDARY PRESSURE SENSOR) SYSTEM

Check transmission fluid pressure sensor A (secondary pressure sensor) system. Refer to TM-255, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P0778 PRESSURE CONTROL SOLENOID B ELECTRICAL (SEC PRESSURE SOLENOID VALVE)

Description

INFOID:0000000000988690

The pressure control solenoid valve B (secondary pressure solenoid valve) regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

DTC Logic

INFOID:0000000000988691

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0778	PRS CNT SOL/B CIRC	• Normal voltage not applied to solenoid due to cut line, short, or the like. • TCM detects as irregular by comparing target value with monitor value.	• Harness or connectors (Sensor circuit is open or shorted.) • Pressure control solenoid valve B (Secondary pressure solenoid valve)

DTC CONFIRMATION PROCEDURE

NOTE:
If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Start engine.
3. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
4. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST
Follow the procedure "With CONSULT-III".

Is "P0778 PRS CNT SOL/B CIRC" detected?

YES >> Go to TM-250, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988692

1.CHECK PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE) CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

TCM connector		Ground	Resistance (Approx.)
Connector	Terminal		
F25	39		3.0 – 9.0 Ω

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve B (secondary pressure solenoid valve). Refer to TM-251, "Component Inspection".

cardiagn.com

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3. CHECK HARNESS BETWEEN TCM AND PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	39	F24	3	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988693

PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

1. PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	3		3.0 – 9.0 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

cardiagn.com

P0826 MANUAL MODE SWITCH

Description

INFOID:0000000000988694

Manual mode switch is installed in shift control device. The manual mode switch sends shift up and shift down switch signals to TCM.
TCM sends the switch signals to combination meter via CAN communication line. Then manual mode switch position is indicated on the shift position indicator.

DTC Logic

INFOID:0000000000988695

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0826	MANUAL MODE SWITCH	When an impossible pattern of switch signals is detected, a malfunction is detected.	• Harness or connectors - (These switches circuit is open or shorted.) - (TCM, and combination meter circuit are open or shorted.) - (CAN communication line is open or shorted.) • Manual mode select switch (Built into control device) • Manual mode position select switch (Built into control device)

DTC CONFIRMATION PROCEDURE

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Start engine.
4. Drive vehicle for at least 2 consecutive seconds.

MMODE : ON

Is “P0826 MANUAL MODE SWITCH” detected?

YES >> Go to TM-252, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988696

1. CHECK MANUAL MODE SWITCH SIGNALS

With CONSULT-III
1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Read out ON/OFF switching action of the “MMODE”, “NON M-MODE”, “UPLVR”, “DOWNLVR”.

cardiagn.com

Item name	Condition	Display value
MMODE	Manual shift gate position (neutral)	ON
	Other than the above	OFF
NONMMODE	Manual shift gate position (neutral, +side, -side)	OFF
	Other than the above	ON
UPLVR	Selector lever: + side	ON
	Other than the above	OFF
DOWNLVR	Selector lever: - side	ON
	Other than the above	OFF

Without CONSULT-III

Drive vehicle in the manual mode, and confirm that the actual gear position and the meter's indication of the position mutually coincide when the selector lever is shifted to the “+ (up)” or “- (down)” side (1st ⇔ 6th gear).

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK MANUAL MODE SWITCH

Check manual mode switch. Refer to TM-254, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3.CHECK SELF-DIAGNOSTIC RESULTS (COMBINATION METER)

Perform self-diagnosis check. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4.CHECK MANUAL MODE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect control device connector and combination meter connector.
3. Check continuity between control device harness connector terminals and combination meter harness connector terminals.

Control device harness connector		Combination meter harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M57	7	M34	40	Existed
	8		38	
	9		39	
	11		37	

4. Check continuity between control device harness connector terminal and ground.

Control device harness connector		Ground	Continuity
Connector	Terminal		
M57	10		Existed

5. If OK, check harness for short to ground and short to power.
6. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 5.

cardiagn.com

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988697

MANUAL MODE SWITCH

1.MANUAL MODE SWITCH

Check continuity between control device harness connector terminals.

Item	Position	Control device harness connector			Continuity
		Connector	Terminal		
Manual mode select switch	Not manual	M57	10	11	Existed
	Manual		7	10	
Manual mode position select switch	Up		9	10	
	Down		8	10	

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Repair or replace damaged parts.

cardiagn.com

P0840 TRANSMISSION FLUID PRESSURE SENSOR A (SEC PRESSURE SENSOR)

Description

INFOID:0000000000988698

The transmission fluid pressure sensor A (secondary pressure sensor) detects secondary pressure of CVT and sends TCM the signal.

DTC Logic

INFOID:0000000000988699

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0840	TR PRS SENS/A CIRC	Signal voltage of the transmission fluid pressure sensor A (secondary pressure sensor) is too high or too low while driving.	• Transmission fluid pressure sensor A (Secondary pressure sensor) • Harness or connectors (Switch circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

NOTE:
If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Make sure that output voltage of line temperature sensor is within the range below.

ATF TEMP SEN : 1.0 – 2.0 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

4. Start engine and wait for at least 5 consecutive seconds.

With GST
Follow the procedure "With CONSULT-III".

Is "P0840 TR PRS SENS/A CIRC" detected?

YES >> Go to TM-255, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988700

1. CHECK INPUT SIGNAL

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

TCM connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F25	15		"N" position idle	1.0 V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2. CHECK HARNESS BETWEEN TCM AND TRANSMISSION FLUID PRESSURE SENSOR A (SECOND-

cardiagn.com

ARY PRESSURE SENSOR)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	15	F24	23	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK SENSOR POWER AND SENSOR GROUND

1. Connect TCM connector.
2. Turn ignition switch ON.
3. Check voltage between CVT unit harness connector terminals.

CVT unit harness connector			Voltage (Approx.)
Connector	Terminal		
F24	19	20	5.0 V

4. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. CHECK HARNESS BETWEEN TCM AND CVT UNIT HARNESS CONNECTOR (SENSOR POWER AND SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and CVT unit harness connector terminals.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	25	F24	19	Existed
	26		20	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and then start engine perform self-diagnosis check. Refer to TM-255, "DTC Logic".

Is “P0840 TR PRS SENS/A CIRC” detected again?

YES >> Replace the transaxle assembly. Refer to TM-340, "Exploded View".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

6. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

NO >> Replace TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P0841 PRESSURE SENSOR FUNCTION

Description

INFOID:0000000000988701

Using the engine load (throttle position), the primary pulley revolution speed, and the secondary pulley revolution speed as input signal, TCM changes the operating pressure of the primary pulley and the secondary pulley and changes the groove width of the pulley to control the gear ratio.

DTC Logic

INFOID:0000000000988702

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0841	PRESS SEN/FNCTN	Correlation between the values of the transmission fluid pressure sensor A (secondary pressure sensor) and the transmission fluid pressure sensor B (primary pressure sensor) is out of specification.	• Transmission fluid pressure sensor A (Secondary pressure sensor) • Transmission fluid pressure sensor B (Primary pressure sensor) • Harness or connectors (Sensor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 12 consecutive seconds.

VEHICLE SPEED	**: 40 km/h (25 MPH) More than**
RANGE	**: "D" position**

Is "P0841 PRESS SEN/FNCTN" detected?

YES >> Go to TM-258, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988703

1.CHECK LINE PRESSURE

Perform line pressure test. Refer to TM-318, "Inspection and Judgment".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

2.CHECK TRANSMISSION FLUID PRESSURE SENSOR A (SECONDARY PRESSURE SENSOR) SYSTEM

Check transmission fluid pressure sensor A (secondary pressure sensor) system. Refer to TM-255, "Description".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

cardiagn.com

3. CHECK TRANSMISSION FLUID PRESSURE SENSOR B (PRIMARY PRESSURE SENSOR) SYSTEM

Check transmission fluid pressure sensor B (primary pressure sensor) system. Refer to TM-260, "Description".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4. CHECK LINE PRESSURE SOLENOID VALVE

Check line pressure solenoid valve. Refer to TM-245, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5. CHECK SECONDARY PRESSURE SOLENOID VALVE

Check secondary pressure solenoid valve. Refer to TM-251, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace damaged parts.

6. CHECK STEP MOTOR

Check step motor. Refer to TM-277, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace damaged parts.

7. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P0845 TRANSMISSION FLUID PRESSURE SENSOR B (PRI PRESSURE SENSOR)

Description

INFOID:0000000000988704

The transmission fluid pressure sensor B (primary pressure sensor) detects primary pressure of CVT and sends TCM the signal.

DTC Logic

INFOID:0000000000988705

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0845	TR PRS SENS/B CIRC	Signal voltage of the transmission fluid pressure sensor B (primary pressure sensor) is too high or too low while driving.	• Transmission fluid pressure sensor B (Primary pressure sensor) • Harness or connectors (Sensor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Make sure that output voltage of line temperature sensor is within the range below.

ATF TEMP SEN : 1.0 – 2.0 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

4. Start engine and wait for at least 5 consecutive seconds.

With GST

Follow the procedure "With CONSULT-III".

Is "P0845 TR PRS SENS/B CIRC" detected?

YES >> Go to TM-260, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988706

1. CHECK INPUT SIGNAL

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

TCM connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F25	14		"N" position idle	0.7 – 3.5 V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2. CHECK HARNESS BETWEEN TCM AND TRANSMISSION FLUID PRESSURE SENSOR B (PRIMARY

cardiagn.com

PRESSURE SENSOR)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	14	F24	25	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK SENSOR POWER AND SENSOR GROUND

1. Connect TCM connector.
2. Turn ignition switch ON.
3. Check voltage between CVT unit harness connector terminals.

CVT unit harness connector			Voltage (Approx.)
Connector	Terminal		
F24	19	20	5.0 V

4. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. CHECK HARNESS BETWEEN TCM AND CVT UNIT HARNESS CONNECTOR (SENSOR POWER AND SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and CVT unit harness connector terminals.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	25	F24	19	Existed
	26		20	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and then start engine perform self-diagnosis check. Refer to TM-260, "DTC Logic".

Is “P0845 TR PRS SENS/B CIRC” detected again?

YES >> Replace the transaxle assembly. Refer to TM-340, "Exploded View".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

6. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

NO >> Replace TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P0868 SECONDARY PRESSURE DOWN

Description

INFOID:0000000000988707

The pressure control solenoid valve B (secondary pressure solenoid valve) regulates the secondary pressure to suit the driving condition in response to a signal sent from the TCM.

DTC Logic

INFOID:0000000000988708

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0868	SEC/PRESS DOWN	Secondary fluid pressure is too low compared with the commanded value while driving.	• Harness or connectors (Solenoid circuit is open or shorted.) • Pressure control solenoid valve B (Secondary pressure solenoid valve) system • Transmission fluid pressure sensor A (Secondary pressure sensor) • Line pressure control system

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC CONFIRMATION PROCEDURE” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Make sure that output voltage of CVT fluid temperature sensor is within the range below.

ATF TEMP SEN	**: 1.0 – 2.0 V**
If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)	

4. Start engine and maintain the following conditions for at least 10 consecutive seconds.

VEHICLE SPEED (accelerate slowly)	**: 0 → 50 km/h (31 MPH)**
ACC PEDAL OPEN	**: 0.5/8 – 1.0/8**
RANGE	**: “D” position**

Is “P0868 SEC/PRESS DOWN” detected?

YES >> Go to TM-263, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988709

1. CHECK LINE PRESSURE

Perform line pressure test. Refer to TM-318, "Inspection and Judgment".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

cardiagn.com

2.CHECK PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve B (secondary pressure solenoid valve). Refer to TM-251, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve A (line pressure solenoid valve). Refer to TM-245, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4.CHECK TRANSMISSION FLUID PRESSURE SENSOR A (SECONDARY PRESSURE SENSOR) SYSTEM

Check transmission fluid pressure sensor A (secondary pressure sensor) system. Refer to TM-255, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5.CHECK TCM

Check input/output signal. Refer to TM-285, "Reference Value"

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P1701 TRANSMISSION CONTROL MODULE (POWER SUPPLY)

Description

INFOID:0000000000988710

When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnosis memory function stops, malfunction is detected.

NOTE:

Since “P1701 TCM-POWER SUPPLY” will be indicated when replacing TCM, perform diagnosis after erasing “SELF-DIAG RESULTS”

DTC Logic

INFOID:0000000000988711

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1701	TCM-POWER SUPPLY	• When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnosis memory function stops. • This is not a malfunction message (Whenever shutting OFF a power supply to the TCM, this message appears on the screen).	• Harness or connectors (Battery or ignition switch and TCM circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

NOTE:

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Wait for at least 2 consecutive seconds.
3. Perform “SELF-DIAG RESULTS”. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is “P1701 TCM-POWER SUPPLY” detected?

YES >> Go to TM-265, "Diagnosis Procedure".

NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988712

1. CHECK TCM POWER SOURCE

Check voltage between TCM connector terminals and ground.

Name	TCM connector		Ground	Condition	Voltage (Approx.)
	Connector	Terminal			
Power supply	F25	46	Ground	Ignition switch ON	Battery voltage
				Ignition switch OFF	0 V
		48		Ignition switch ON	Battery voltage
				Ignition switch OFF	0 V
Power supply (memory back-up)		45		Always	Battery voltage
		47			

Is the inspection result normal?

YES >> GO TO 4.

cardiagn.com

NO >> GO TO 2.

2.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between battery and TCM connector terminal 45, 47
- Harness for short or open between ignition switch and TCM connector terminal 46, 48
- 10 A fuse (No. 55, located in the IPDM E/R)
- 15 A fuse (No. 13, located in the J/B)
- Ignition switch. Refer to TM-332, "Exploded View".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3.CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and ground.

TCM connector		Ground	Continuity
Connector	Terminal		
F25	5		Existed
	42		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P1705 THROTTLE POSITION SENSOR

Description

INFOID:0000000000988713

Electric throttle control actuator consists of throttle control motor, accelerator pedal position sensor, throttle position sensor etc. The actuator sends a signal to the ECM, and ECM sends the signal to TCM with CAN communication.

DTC Logic

INFOID:0000000000988714

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1705	TP SEN/CIRC A/T	TCM does not receive the proper accelerator pedal position signals (input by CAN communication) from ECM.	• ECM • Harness or connectors (CAN communication line is open or shorted.)

DTC CONFIRMATION PROCEDURE

NOTE:
If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Depress accelerator pedal fully and release it, then wait for 5 seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is "P1705 TP SEN/CIRC A/T" detected?

YES >> Go to TM-267, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988715

1. CHECK INPUT SIGNAL

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Read out the value of "ACC PEDAL OPEN".

Item name	Condition	Display value (Approx.)
ACC PEDAL OPEN	Released accelerator pedal - Fully depressed accelerator pedal	0.0/8 - 8.0/8

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> GO TO 2.

2. CHECK DTC WITH ECM

With CONSULT-III
1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode for "ENGINE" with CONSULT-III. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Check the DTC Detected Item. Go to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

cardiagn.com

P1722 ESTM VEHICLE SPEED SIGNAL

Description

INFOID:0000000000988716

The vehicle speed signal is transmitted from ABS actuator and electric unit (control unit) to TCM by CAN communication line.

DTC Logic

INFOID:0000000000988717

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1722	ESTM VEH SPD SIG	• CAN communication with the ABS actuator and the electric unit (control unit) is malfunctioning. • There is a great difference between the vehicle speed signal from the ABS actuator and the electric unit (control unit), and the vehicle speed sensor signal.	• Harness or connectors (Sensor circuit is open or shorted.) • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

ACC PEDAL OPEN	**: 1.0/8 or less**
VEHICLE SPEED	**: 30 km/h (19 MPH) or more**

Is "P1722 ESTM VEH SPD SIG" detected?

YES >> Go to TM-268, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988718

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform "SELF-DIAG RESULTS". Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace damaged parts.

2.CHECK INPUT SIGNALS

With CONSULT-III

1. Start engine.
2. Select "DATA MONITOR".
3. Drive vehicle and read out the value of "VEHICLE SPEED" and "ESTM VSP SIG".

cardiagn.com

Item name	Condition	Display value
ESTM VSP SIG	During driving	Approximately matches the speedometer reading.
VEHICLE SPEED		

4. Check if there is a great difference between the two values.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P1723 CVT SPEED SENSOR FUNCTION

Description

INFOID:0000000000988719

The vehicle speed sensor CVT [output speed sensor (secondary speed sensor)] detects the revolution of parking gear and generates a pulse signal. The pulse signal is sent to the TCM, which converts it into vehicle speed.
The input speed sensor (primary speed sensor) detects the primary pulley revolution speed and sends a signal to the TCM.

DTC Logic

INFOID:0000000000988720

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1723	CVT SPD SEN/FNCTN	A rotation sensor error is detected because the gear does not change in accordance with the position of the stepping motor. **CAUTION:** **One of the "P0720 VEH SPD SEN/CIR AT", the "P0715 INPUT SPD SEN/CIRC" or the "P0725 ENGINE SPEED SIG" is displayed with the DTC at the same time.**	• Harness or connectors (Sensor circuit is open or shorted.) • Output speed sensor (Secondary speed sensor) • Input speed sensor (Primary speed sensor) • Engine speed signal system

DTC CONFIRMATION PROCEDURE

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
ENG SPEED	**: 450 rpm or more**
Driving location	**: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

Is "P1723 CVT SPD SEN/FNCTN" detected?

YES >> Go to TM-270, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988721

1.CHECK STEP MOTOR FUNCTION

Perform the self-diagnosis check. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is a malfunction in the step motor function indicated in the results?

cardiagn.com

YES >> Repair or replace damaged parts. (Check the step motor function. Refer to TM-278, "DTC Logic".)
NO >> GO TO 2.

2. CHECK OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) SYSTEM

Check output speed sensor (secondary speed sensor) system. Refer to TM-234, "DTC Logic".

Is the inspection result normal?

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) SYSTEM

Check input speed sensor (primary speed sensor) system. Refer to TM-231, "DTC Logic".

Is the inspection result normal?

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK ENGINE SPEED SIGNAL SYSTEM

Check engine speed signal system. Refer to TM-237, "DTC Logic".

Is the inspection result normal?

OK >> GO TO 5.
NG >> Repair or replace damaged parts. Refer to EC-929, "Description" (WITH EURO-OBD), EC-1208, "Description" (WITHOUT EURO-OBD).

5. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Replace the TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P1726 ELECTRIC THROTTLE CONTROL SYSTEM

Description

INFOID:0000000000988722

Electric throttle control actuator consists of throttle control motor, accelerator pedal position sensor, throttle position sensor etc. The actuator sends a signal to the ECM, and ECM sends the signal to TCM with CAN communication.

DTC Logic

INFOID:0000000000988723

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1726	ELEC TH CONTROL	The electronically controlled throttle for ECM is malfunctioning.	Harness or connectors (Sensor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Start engine and let it idle for 5 seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is "P1726 ELEC TH CONTROL" detected?

YES >> Go to TM-272, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988724

1.CHECK DTC WITH ECM

With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode for "ENGINE" with CONSULT-III. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check the DTC Detected Item. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

2.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

cardiagn.com

P1740 LOCK-UP SELECT SOLENOID VALVE

Description

INFOID:0000000000988725

- Lock-up select solenoid valve controls lock-up clutch pressure or forward clutch pressure (reverse brake pressure).
- When controlling lock-up clutch, the valve is turned OFF. When controlling forward clutch, it is turned ON.

DTC Logic

INFOID:0000000000988726

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1740	LU-SLCT SOL/CIRC	• Normal voltage not applied to solenoid due to cut line, short, or the like. • TCM detects as irregular by comparing target value with monitor value.	• Lock-up select solenoid valve • Harness or connectors (Solenoid circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC CONFIRMATION PROCEDURE” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

RANGE : “D” position and “N” positions

(At each time, wait for 5 seconds.)

With GST

Follow the procedure “With CONSULT-III”.

Is “P1740 LU-SLCT SOL/CIRC” detected?

YES >> Go to TM-273, "Diagnosis Procedure".

NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988727

1. CHECK LOCK-UP SELECT SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

TCM connector		Ground	Resistance (Approx.)
Connector	Terminal		
F25	37		17.0 – 38.0 Ω

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

cardiagn.com

2.CHECK LOCK-UP SELECT SOLENOID VALVE

Check lock-up select solenoid valve.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3.CHECK HARNESS BETWEEN TCM AND LOCK-UP SELECT SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	37	F24	13	Existed

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988728

LOCK-UP SELECT SOLENOID VALVE

1.LOCK-UP SELECT SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	13		17.0 – 38.0 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

cardiagn.com

P1745 LINE PRESSURE CONTROL

Description

INFOID:0000000000988729

The pressure control solenoid valve A (line pressure solenoid valve) regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

DTC Logic

INFOID:0000000000988730

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1745	L/PRESS CONTROL	TCM detects the unexpected line pressure.	TCM

DTC CONFIRMATION PROCEDURE

NOTE:
If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON
2. Select "DATA MONITOR".
3. Make sure that output voltage of CVT fluid temperature sensor is within the range below.

ATF TEMP SEN : 1.0 – 2.0 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

Is "P1745 L/PRESS CONTROL" detected?

YES >> Go to TM-275, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988731

1. CHECK DTC

With CONSULT-III
1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".
3. Erase self-diagnostic results.
4. Turn ignition switch OFF, and wait for 10 seconds or more.
5. Start engine.
6. Confirm self-diagnostic results again. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is the "P1745 L/PRESS CONTROL" displayed?

YES >> Replace TCM. Refer to TM-325, "Exploded View".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

cardiagn.com

P1777 STEP MOTOR

Description

INFOID:0000000000988732

The step motor changes the step with turning 4 coils ON/OFF according to the signal from TCM. As a result, the flow of line pressure to primary pulley is changed and pulley ratio is controlled.

DTC Logic

INFOID:0000000000988733

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1777	STEP MOTR CIRC	Each coil of the step motor is not energized properly due to an open or a short.	• Step motor • Harness or connectors (Step motor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Drive vehicle for at least 5 consecutive seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST

Follow the procedure "With CONSULT-III".

Is "P1777 STEP MOTR CIRC" detected?

YES >> Go to TM-276, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988734

1.CHECK INPUT SIGNALS

With CONSULT-III

1. Start engine.
2. Select "DATA MONITOR".
3. Start vehicle and read out the value of "STM STEP", "SMCOIL A", "SMCOIL B", "SMCOIL C", and "SMCOIL D".

Item name	Condition	Display value (Approx.)
STM STEP	During driving	0 step – 177 step
SMCOIL A		Changes ON⇔OFF.
SMCOIL B		
SMCOIL C		
SMCOIL D		

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK HARNESS BETWEEN TCM AND STEP MOTOR

cardiagn.com

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector and TCM connector.
3. Check continuity between TCM connector terminals and CVT unit harness connector terminals.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	27	F24	9	Existed
	28		8	
	29		7	
	30		6	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between body ground and transaxle assembly.
6. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK STEP MOTOR

Check step motor. Refer to TM-277, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988735

STEP MOTOR

1.STEP MOTOR

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminals and ground.

CVT unit harness connector			Resistance (Approx.)
Connector	Terminal		
F24	6	7	30.0 Ω
	8	9	

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	6		15.0 Ω
	7		
	8		
	9		

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

cardiagn.com

P1778 STEP MOTOR - FUNCTION

Description

INFOID:0000000000988736

- The step motor's 4 aspects of ON/OFF change according to the signal from TCM. As a result, the flow of line pressure to primary pulley is changed and pulley ratio is controlled.
- This diagnosis item is detected when electrical system is OK, but mechanical system is NG.
- This diagnosis item is detected when the state of the changing the speed mechanism in unit does not operate normally.

DTC Logic

INFOID:0000000000988737

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1778	STEP MOTR/FNC	There is a great difference between the number of steps for the stepping motor and for the actual gear ratio.	Step motor

DTC CONFIRMATION PROCEDURE

CAUTION:

- **Always drive vehicle at a safe speed.**
- **Before starting “DTC CONFIRMATION PROCEDURE”, confirm “Hi” or “Mid” or “Low” fixation by “PRI SPEED” and “VEHICLE SPEED” on “DATA MONITOR MODE”.**
- **If hi-geared fixation occurred, go to TM-278, "Diagnosis Procedure".**

NOTE:

If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Make sure that output voltage of CVT fluid temperature sensor is within the range below.

ATF TEMP SEN	**: 1.0 – 2.0 V**

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

4. Start engine and maintain the following conditions for at least 30 consecutive seconds.

TEST START FROM 0 km/h (0 MPH)	
CONSTANT ACCELERATION	**: Keep 30 sec or more**
VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: “D” position**
ENG SPEED	**: 450 rpm or more**

With GST.

Follow the procedure “With CONSULT-III”.

Is “P1778 STEP MOTR/FNC” detected?

YES >> Go to TM-278, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988738

1. CHECK STEP MOTOR

cardiagn.com

With CONSULT-III

It is monitoring whether “GEAR RATIO: 2.34 – 0.39” changes similarly to “STM STEP: 0 – 177” by “DATA MONITOR” mode. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Without CONSULT-III

Inspect the engine speed (rise and descend), vehicle speed, throttle position, and check shift change. Refer to TM-361, "Vehicle Speed When Shifting Gears".

OK or NG

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View"(4WD).

cardiagn.com

CVT SHIFT LOCK SYSTEM

Description

INFOID:0000000000914676

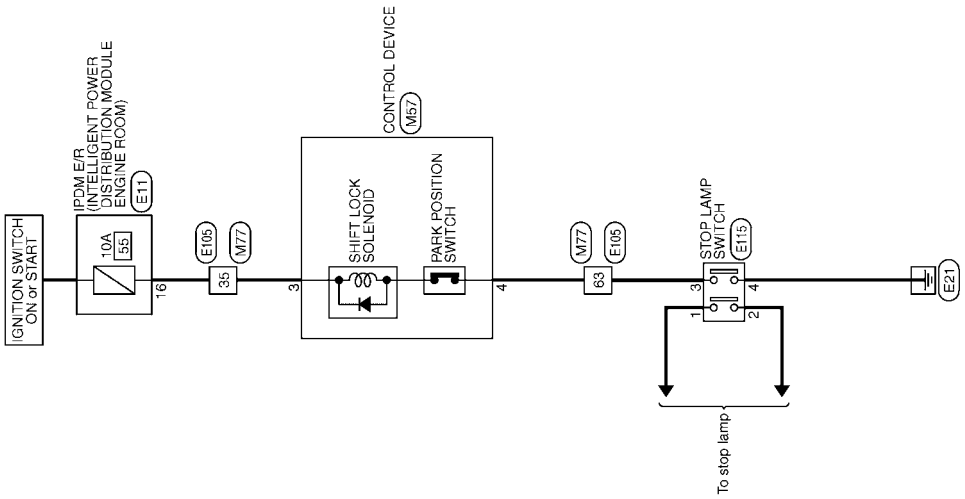
Component	Function
Shift lock solenoid	It operates according to the signal from the stop lamp switch and moves the lock lever.
Lock lever	It moves according to the operation of the shift lock solenoid and performs the release of the shift lock.
Detent rod	It links with the selector button and restricts the selector lever movement.
Park position switch	It detects that the selector lever is in P position.
Key interlock cable and key interlock rod	It transmits the lock lever operation to the slider in the key cylinder.
Shift lock release button	It moves the lock lever forcibly.

Wiring Diagram - CVT SHIFT LOCK SYSTEM -

INFOID:0000000000914677

cardiagn.com

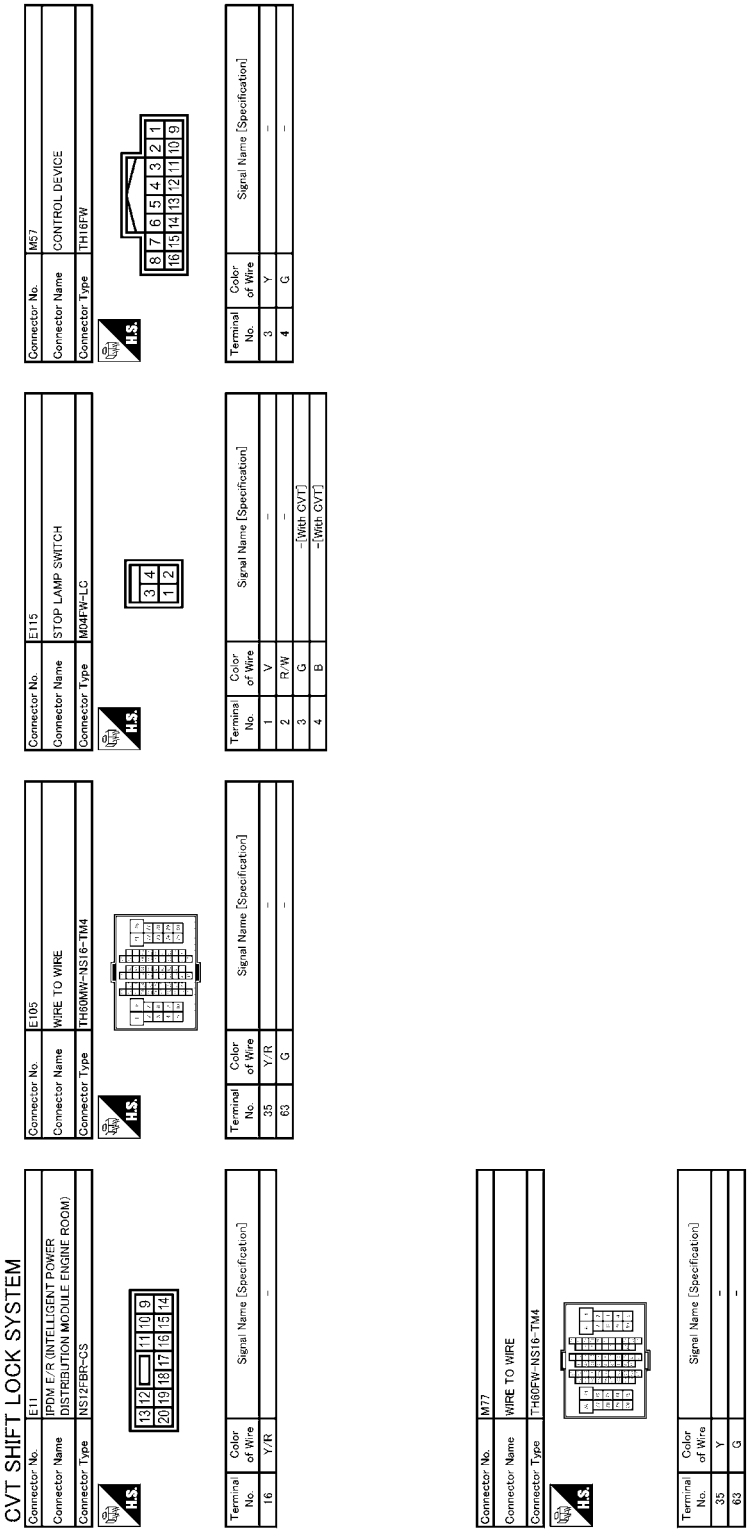
CVT SHIFT LOCK SYSTEM



2006/12/08

JCDWA0072GB

cardiagn.com



Diagnosis Procedure

INFOID:0000000000914678

1. CHECK POWER SOURSE

1. Turn ignition switch ON.
2. Check voltage between control device harness connector and ground.

cardiagn.com

Control device harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
M57	3		Battery Voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> • Harness for short or open between ignition switch and control device harness connector terminal 3
• 10 A fuse [No. 55, located in the IPDM E/R]
• Ignition switch

2.CHECK HARNESS BETWEEN CONTROL DEVICE AND STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect control device harness connector and stop lamp switch connector.
3. Check continuity between control device harness connector terminal and stop lamp switch connector terminal.

Control device harness connector		Stop lamp switch harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M57	4	E115	3	Existed

4. If OK, check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch harness connector terminal 3 and 4.

Stop lamp switch harness connector			Condition	Continuity
Connector	Terminal			
E115	3	4	Depressed brake pedal	Existed
			Released brake pedal	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4.CHECK GROUND CIRCUIT

Check continuity between stop lamp switch harness connector and ground.

Stop lamp switch harness connector		Ground	Continuity
Connector	Terminal		
E115	4		Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK CONTROL DEVICE

1. Move selector lever to “P” position.
2. Check continuity between control device harness connector.

Control device harness connector			Continuity
Connector	Terminal		
M57	3	4	Existed

Is the inspection result normal?

cardiagn.com

YES >> GO TO 6.
NO >> Replace control device. Refer to TM-326, "Exploded View".

6.CHECK SHIFT LOCK SOLENOID

1. Move selector lever to “P” position.
2. Apply voltage to terminals 3 and 4 of control device harness connector, and then shift lock solenoid is activated.

CAUTION:
Connect the fuse between the terminals when applying the voltage.

(+) (fuse)		(–)	Condition	Status
Control device harness connector				
Connector	Terminal			
M57	3	4	Apply 12 V direct current between terminals 3 and 4.	Shift lock solenoid operates

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace control device. Refer to TM-326, "Exploded View".

Component Inspection (Stop lamp switch)

INFOID:0000000001115989

1.CHECK STOP LAMP SWITCH

1. Disconnect stop lamp switch harness connector.
2. Check continuity between stop lamp switch connector terminal 3 and 4.

Stop lamp switch connector			Condition	Continuity
Connector	Terminal			
E115	3	4	Depressed brake pedal	Existed
			Released brake pedal	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to BR-17, "Exploded View" (LHD), BR-61, "Exploded View" (RHD).

cardiagn.com

ECU DIAGNOSIS

TCM

Reference Value

INFOID:0000000000988740

VALUES ON THE DIAGNOSIS TOOL

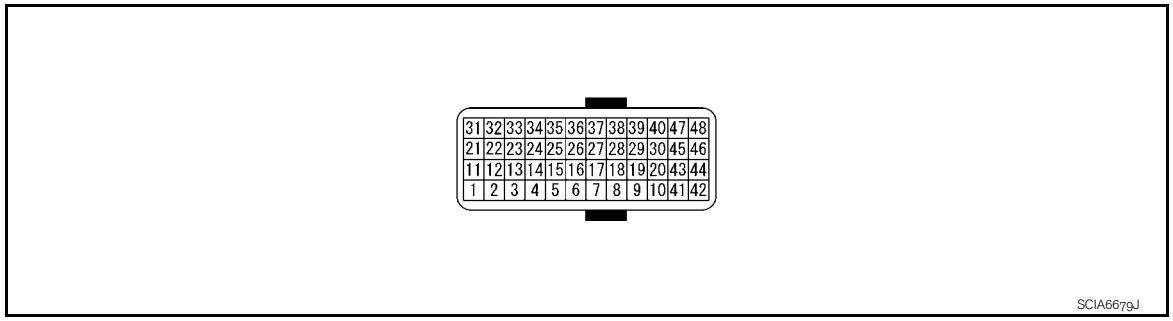
Item name	Condition	Display value (Approx.)
VSP SENSOR	During driving	Approximately matches the speedometer reading.
ESTM VSP SIG	During driving	Approximately matches the speedometer reading.
PRI SPEED SEN	During driving (lock-up ON)	Approximately matches the engine speed.
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
SEC HYDR SEN	“N” position idle	1.0 V
PRI HYDR SEN	“N” position idle	0.7 - 3.5 V
ATF TEMP SEN	When CVT fluid temperature is 20°C (68°F)	2.0 V
	When CVT fluid temperature is 80°C (176°F)	1.0 V
VIGN SEN	Ignition switch: ON	Battery voltage
VEHICLE SPEED	During driving	Approximately matches the speedometer reading.
PRI SPEED	During driving (lock-up ON)	Approximately matches the engine speed.
SEC SPEED	During driving	45 X Approximately matches the speedometer reading.
ENG SPEED	Engine running	Closely matches the tachometer reading.
GEAR RATIO	During driving	2.34 - 0.39
ACC PEDAL OPEN	Released accelerator pedal - Fully depressed accelerator pedal	0.0/8 - 8.0/8
SEC PRESS	“N” position idle	0.5 MPa
PRI PRESS	“N” position idle	0.3 - 0.7 MPa
STM STEP	During driving	0 step – 177 step
ISOLT1	Lock-up “OFF”	0.0 A
	Lock-up “ON”	0.7 A
ISOLT2	Release your foot from the accelerator pedal.	0.8 A
	Press the accelerator pedal all the way down.	0.0 A
ISOLT3	Secondary pressure low - Secondary pressure high	0.8 - 0.0 A
SOLMON1	Lock-up “OFF”	0.0 A
	Lock-up “ON”	0.7 A
SOLMON2	“N” position idle	0.8 A
	When stalled	0.3 - 0.6 A
SOLMON3	“N” position idle	0.6 - 0.7 A
	When stalled	0.4 - 0.6 A
P POSITION SW	Selector lever in “P” position	ON
	Other than the above position.	OFF
R POSITION SW	Selector lever in “R” position	ON
	Other than the above position.	OFF
N POSITION SW	Selector lever in “N“ position	ON
	Other than the above position.	OFF

cardiagn.com

Item name	Condition	Display value (Approx.)
D POSITION SW	Selector lever in “D” position	ON
	Other than the above position.	OFF
BRAKE SW	Depressed brake pedal	ON
	Released brake pedal	OFF
FULL SW	Fully depressed accelerator pedal	ON
	Released accelerator pedal	OFF
IDLE SW	Released accelerator pedal	ON
	Fully depressed accelerator pedal	OFF
INDDRNG	Selector lever in “D” position	ON
	When setting selector lever to other positions.	OFF
INDNRNG	Selector lever in “N“ position	ON
	When setting selector lever to other positions.	OFF
INDRRNG	Selector lever in “R” position	ON
	When setting selector lever to other positions.	OFF
INDPRNG	Selector lever in “P” position	ON
	When setting selector lever to other positions.	OFF
SMCOIL A	During driving	Changes ON ⇔ OFF.
SMCOIL B	During driving	Changes ON ⇔ OFF.
SMCOIL C	During driving	Changes ON ⇔ OFF.
SMCOIL D	During driving	Changes ON ⇔ OFF.
LUSEL SOL OUT	Selector lever in “P”, “N” positions	ON
	Wait at least for 5 seconds with the selector lever in “R”, “D” position	OFF
LUSEL SOL MON	Selector lever in “P”, “N” positions	ON
	Wait at least for 5 seconds with the selector lever in “R”, “D” or position	OFF
ABS ON	ABS operate	ON
	Other conditions	OFF
RANGE	Selector lever in “N” or “P” position	N·P
	Selector lever in “R” position	R
	Selector lever in “D” position	D
DOWNLVR	Selector lever: - side	ON
	Other than the above	OFF
UPLVR	Selector lever: + side	ON
	Other than the above	OFF
NONMMODE	Manual shift gate position (neutral, +side, -side)	OFF
	Other than the above	ON
MMODE	Manual shift gate position (neutral)	ON
	Other than the above	OFF
M GEAR POS	During driving	1, 2, 3, 4, 5, 6

TERMINAL LAYOUT

cardiagn.com



PHYSICAL VALUES

Terminal No. (wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
1 (Y/G)	Ground	R RANGE SW	Input	Ignition switch ON	Selector lever in “R” position	Battery voltage
					Other than the above position	0 V
2 (P/B)	Ground	N RANGE SW	Input		Selector lever in “N” position	Battery voltage
					Other than the above position	0 V
3 (G/O)	Ground	D RANGE SW	Input		Selector lever in “D” positions	Battery voltage
					Other than the above position	0 V
4 (GR)	Ground	L RANGE SW	Input		Selector lever in “L” position	Battery voltage
					Other than the above position	0 V
5 (B)	Ground	Ground	Output	Always		0 V
6 (O)	Ground	K-LINE	Input/Output	—		—
7 (R/W)	Ground	Sensor ground	Input	Always		0 V
8 (G/W)	—	CLOCK (SEL2)	—	—		—
9 (L/R)	—	CHIP SELECT (SEL1)	—	—		—
10 (Y)	—	DATA I/O (SEL3)	—	—		—
11 (BR/W)	Ground	P RANGE SW	Input	Ignition switch ON	Selector lever in “P” position	Battery voltage
					Other than the above position	0 V
13 (V)	Ground	CVT fluid temperature sensor	Output	Ignition switch ON	When CVT fluid temperature is 20°C (68°F)	2.0 V
					When CVT fluid temperature is 80°C (176°F)	1.0 V
14 (LG)	Ground	Transmission fluid pressure sensor B (Primary pressure sensor)	Input	“N” position idle		0.7 – 3.5 V
15 (V/W)	Ground	Transmission fluid pressure sensor A (Secondary pressure sensor)	Input			1.0 V

cardiagn.com

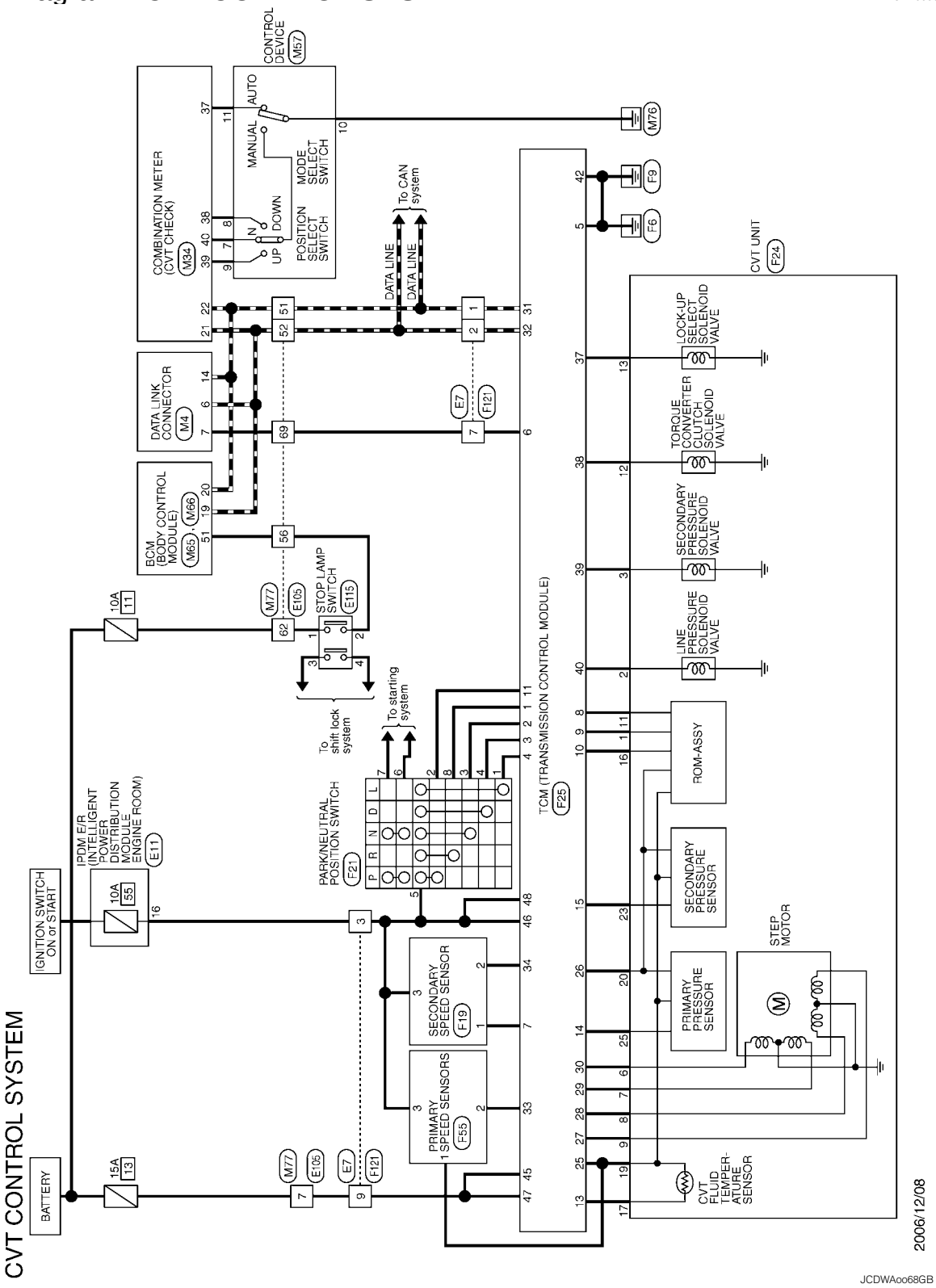
Terminal No. (wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
25 (W/R)	Ground	Sensor ground	Input	Always		0 V
26 (L/O)	Ground	Sensor power	Output	Ignition switch ON	—	5.0 V
				Ignition switch OFF	—	0 V
27 (R/G)	Ground	Step motor D	Output	Within 2 seconds after ignition switch ON, the time measurement by using the pulse width measurement function (Hi level) of CONSULT-III.* **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.**		10.0 msec
28 (R)	Ground	Step motor C	Output			30.0 msec
29 (O/B)	Ground	Step motor B	Output			10.0 msec
30 (G/R)	Ground	Step motor A	Output			30.0 msec
31 (P)	—	CAN-L	Input/Output	—		—
32 (L)	—	CAN-H	Input/Output	—		—
33 (LG/R)	Ground	Input speed sensor (Primary speed sensor)	Input	When driving [“M1” position, 20 km/h (12 MPH)]		800 Hz
34 (W)	Ground	Output speed sensor (Secondary speed sensor)	Input	When driving [“D” position, 20 km/h (12 MPH)]		500 Hz
37 (L/W)	Ground	Lock-up select solenoid valve	Output	Ignition switch ON	Selector lever in “P” or “N” positions	Battery voltage
					Wait at least for 5 seconds with the selector lever in “R” or “D” positions.	0 V
38 (G)	Ground	Torque converter clutch solenoid valve	Output	When vehicle cruises in “D” position	When CVT performs lock-up	6.0 V
					When CVT does not perform lock-up	1.5 V
39 (W/G)	Ground	Pressure control solenoid valve B (Secondary pressure solenoid valve)	Output	“P” or “N” position idle	Release your foot from the accelerator pedal.	5.0 – 7.0 V
					Press the accelerator pedal all the way down.	3.0 – 4.0 V
40 (R/Y)	Ground	Pressure control solenoid valve A (Line pressure solenoid valve)	Output		Release your foot from the accelerator pedal.	5.0 – 7.0 V
					Press the accelerator pedal all the way down.	1.0 V
42 (B)	Ground	Ground	Output	Always		0 V
45 (R/B)	Ground	Power supply (memory back-up)	Input	Always		Battery voltage
46 (Y/R)	Ground	Power supply	Input	Ignition switch ON	—	Battery voltage
				Ignition switch OFF	—	0 V
47 (R/B)	Ground	Power supply (memory back-up)	Input	Always		Battery voltage
48 (Y/R)	Ground	Power supply	Input	Ignition switch ON	—	Battery voltage
				Ignition switch OFF	—	0 V

*: A circuit tester cannot be used to test this item.

cardiagn.com

Wiring Diagram - CVT CONTROL SYSTEM -

INFOID:0000000000988741



CVT CONTROL SYSTEM

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

CVT CONTROL SYSTEM

Connector No.	F25
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	MOLEX 600094-4111

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	R RANGE SW
2	P/B	N RANGE SW
3	G/O	D RANGE SW
4	GR	L RANGE SW
5	B	GND
6	O	K-LINE
7	R/W	SENSOR GND
8	G/W	CLOCK (SEL2)
9	L/R	CHIP SELECT (SEL1)
10	Y	DATA I/O (SEL3)
11	BR/W	P RANGE SW

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
7	O	-
14	P	-

13	V	ATF TEMP SENS
14	LG	PRI PRESS SEN
15	V/W	SEC PRESS SEN
25	W/R	SENSOR GND
26	L/O	SENS POWER SOURCE
27	R/G	S/M-D
28	R	S/M-C
29	O/B	S/M-B
30	G/R	S/M-A
31	P	CAN-L
32	L	CAN-H
33	LG/R	PRI SEN
34	W	SEC SENS
37	L/W	L/U&SELECT-ON/OFF SOL
38	G	L/U&SELECT-LINEAR SOL
39	W/G	SEC-LINEAR SOL
40	R/Y	PL-LINEAR SOL
42	B	GND
45	R/B	BATT
46	Y/R	VIGN
47	R/B	BATT
48	Y/R	VIGN

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
37	R/Y	NOT MANUAL MODE
38	LG	SHIFT DOWN
39	G/W	SHIFT UP
40	L	MANUAL MODE

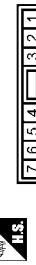
Connector No.	F55
Connector Name	PRIMARY SPEED SENSOR
Connector Type	RW03FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/R	-
2	LG/R	-
3	Y/R	-

Connector No.	M57
Connector Name	CONTROL DEVICE
Connector Type	TH16FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	L	-
8	LG	-
9	W	-
10	B	-
11	R	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS



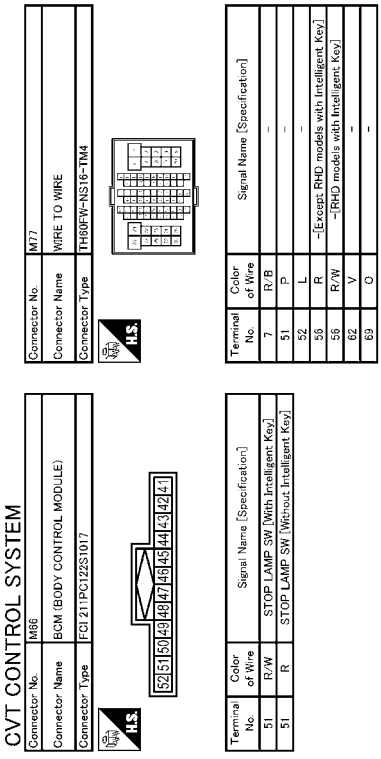
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	L	-
3	Y/R	-
7	O	-
9	R/B	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L

JCDWA0070GB

cardiagn.com



JCDWA0071GB

Fail-safe

INFOID:0000000000988742

The TCM has an electrical fail-safe mode. In this mode TCM is operator even if there is an error in a main electronic control input/output signal circuit.

FAIL-SAFE FUNCTION

If any malfunction occurs in a sensor or solenoid, this function controls the CVT to make driving possible.

Output Speed Sensor (Secondary Speed Sensor)

cardiagn.com

The shift pattern is changed in accordance with throttle position when an unexpected signal is sent from the output speed sensor (secondary speed sensor) to the TCM. The manual mode position is inhibited, and the transaxle is put in “D”.

Input Speed Sensor (Primary Speed Sensor)
The shift pattern is changed in accordance with throttle position and secondary speed (vehicle speed) when an unexpected signal is sent from the input speed sensor (primary speed sensor) to the TCM. The manual mode position is inhibited, and the transaxle is put in “D”.

PNP Switch
If an unexpected signal is sent from the PNP switch to the TCM, the transaxle is put in “D”.

Manual Mode Switch
If an unexpected signal is sent from the manual mode switch to the TCM, the transaxle is put in “D”.

CVT Fluid Temperature Sensor
If an unexpected signal is sent from the CVT fluid temperature sensor to the TCM, the gear ratio in use before receiving the unexpected signal is maintained or the gear ratio is controlled to keep engine speed under 5000 rpm.

Transmission Fluid Pressure Sensor A (Secondary Pressure Sensor)
- If an unexpected signal is sent from the transmission fluid pressure sensor A (secondary pressure sensor) to the TCM, the secondary pressure feedback control is stopped and the offset value obtained before the non-standard condition occurs is used to control line pressure.
- If transmission fluid pressure sensor A (secondary pressure sensor) error signal is input to TCM, secondary pressure feedback control stops, but line pressure is controlled normally.

Pressure Control Solenoid A (Line Pressure Solenoid)
If an unexpected signal is sent from the solenoid to the TCM, the pressure control solenoid A (line pressure solenoid) is turned OFF to achieve the maximum fluid pressure.

Pressure Control Solenoid B (Secondary Pressure Solenoid)
If an unexpected signal is sent from the solenoid to the TCM, the pressure control solenoid B (secondary pressure solenoid) is turned OFF to achieve the maximum fluid pressure.

Torque Converter Clutch Solenoid
If an unexpected signal is sent from the solenoid to the TCM, the torque converter clutch solenoid is turned OFF to cancel the lock-up.

Step Motor
If an unexpected signal is sent from the step motor to the TCM, the step motor coil phases “A” through “D” are all turned OFF to hold the gear ratio used right before the non-standard condition occurred.

CVT Lock-up Select Solenoid
If an unexpected signal is sent from the solenoid to the TCM, the CVT lock-up select solenoid is turned OFF to cancel the lock-up.

TCM Power Supply (Memory Back-up)
Transaxle assembly is protected by limiting the engine torque when the memory back-up power supply (for controlling) from the battery is not supplied to TCM. Normal statues is restored when turning the ignition switch OFF to ON after the normal power supply.

DTC Inspection Priority Chart

INFOID:0000000000988743

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:
If DTC “U1000 CAN COMM CIRCUIT” is displayed with other DTCs, first perform the trouble diagnosis for “DTC U1000 CAN COMMUNICATION LINE”. Refer to TM-222.

Priority	Detected items (DTC)
1	U1000 CAN communication line
2	Except above

DTC Index

INFOID:0000000000988744

cardiagn.com

NOTE:
If DTC "U1000 CAN COMM CIRCUIT" is displayed with other DTCs, first perform the trouble diagnosis for "DTC U1000 CAN COMMUNICATION LINE". Refer to TM-222.

DTC		Items (CONSULT-III screen terms)	Reference page
OBD	Except OBD		
CONSULT-III GST*	CONSULT-III only "TRANSMISSION"		
—	P0703	BRAKE SW/CIRC	TM-224
P0705	P0705	PNP SW/CIRC	TM-226
P0710	P0710	ATF TEMP SEN/CIRC	TM-229
P0715	P0715	INPUT SPD SEN/CIRC	TM-231
P0720	P0720	VEH SPD SEN/CIR AT	TM-234
—	P0725	ENGINE SPEED SIG	TM-237
—	P0730	BELT DAMG	TM-239
P0740	P0740	TCC SOLENOID/CIRC	TM-240
P0744	P0744	A/T TCC S/V FNCTN	TM-242
P0745	P0745	L/PRESS SOL/CIRC	TM-244
P0746	P0746	PRS CNT SOL/A FCTN	TM-246
P0776	P0776	PRS CNT SOL/B FCTN	TM-248
P0778	P0778	PRS CNT SOL/B CIRC	TM-250
—	P0826	MANUAL MODE SWITCH	TM-252
P0840	P0840	TR PRS SENS/A CIRC	TM-255
—	P0841	PRESS SEN/FNCTN	TM-258
P0845	P0845	TR PRS SENS/B CIRC	TM-260
—	P0868	SEC/PRESS DOWN	TM-263
—	P1701	TCM-POWER SUPPLY	TM-265
—	P1705	TP SEN/CIRC A/T	TM-267
—	P1722	ESTM VEH SPD SIG	TM-268
—	P1723	CVT SPD SEN/FNCTN	TM-270
—	P1726	ELEC TH CONTROL	TM-272
P1740	P1740	LU-SLCT SOL/CIRC	TM-273
—	P1745	L/PRESS CONTROL	TM-275
P1777	P1777	STEP MOTR CIRC	TM-276
P1778	P1778	STEP MOTR/FNC	TM-278
U1000	U1000	CAN COMM CIRCUIT	TM-222
U1010	U1010	CONTROL UNIT (CAN)	TM-223

*: These numbers are prescribed by ISO 15031-5.

cardiagn.com

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Table

INFOID:0000000000988745

The diagnostics item numbers show the sequence for inspection. Inspect in order from item 1.

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
1	Shift Shock	Large shock. (“N”→ “D” position)	ON vehicle	1. Engine idle speed	EC-646 (WITH EURO-OBD), EC-990 (WITH-OUT EURO-OBD)
				2. Engine speed signal	TM-237
				3. Accelerator pedal position sensor	TM-267
				4. CVT position	TM-324
				5. CVT fluid temperature sensor	TM-229
				6. CAN communication line	TM-222
				7. CVT fluid level and state	TM-314
				8. Line pressure test	TM-318
				9. Torque converter clutch solenoid valve	TM-240
				10. Lock-up select solenoid valve	TM-273
				11. PNP switch	TM-226
			OFF vehicle	12. Forward clutch	TM-351
				13. Control valve	
2		Large shock. (“N”→ “R” position)	ON vehicle	1. Engine idle speed	EC-646 (WITH EURO-OBD), EC-990 (WITH-OUT EURO-OBD)
				2. Engine speed signal	TM-237
				3. Accelerator pedal position sensor	TM-267
				4. CVT position	TM-324
				5. CVT fluid temperature sensor	TM-229
				6. CAN communication line	TM-222
				7. CVT fluid level and state	TM-314
				8. Line pressure test	TM-318
				9. Torque converter clutch solenoid valve	TM-240
				10. Lock-up select solenoid valve	TM-273
				11. PNP switch	TM-226
			OFF vehicle	12. Reverse brake	TM-351
				13. Control valve	
3		Shock is too large for lock-up.	ON vehicle	1. CVT position	TM-324
				2. Engine speed signal	TM-237
				3. CAN communication line	TM-222
				4. CVT fluid level and state	TM-314
			OFF vehicle	5. Torque converter	TM-359
				6. Control valve	TM-351

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
4	Slips/Will Not Engage	Vehicle cannot be started from “D” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. CVT position	TM-324
				3. CAN communication line	TM-222
				4. Line pressure test	TM-318
				5. Stall test	TM-316
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Oil pump assembly	TM-351
				14. Forward clutch	
				15. Control valve	
				16. Parking components	
5		Vehicle cannot be started from “R” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. CVT position	TM-324
				3. CAN communication line	TM-222
				4. Line pressure test	TM-318
				5. Stall test	TM-316
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Oil pump assembly	TM-351
				14. Reverse brake	
				15. Control valve	
				16. Parking components	

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
6	Slips/Will Not Engage	Does not lock-up.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Engine speed signal	TM-237
				4. Primary speed sensor	TM-231
				5. Torque converter clutch solenoid valve	TM-240
				6. CAN communication line	TM-222
				7. Stall test	TM-316
				8. Step motor	TM-276
				9. PNP switch	TM-226
				10. Lock-up select solenoid valve	TM-273
				11. CVT fluid temperature sensor	TM-229
				12. Secondary speed sensor	TM-234
				13. Secondary pressure sensor	TM-255
			OFF vehicle	14. Torque converter	TM-359
				15. Oil pump assembly	TM-351
				16. Control valve	
7		Does not hold lock-up condition.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Engine speed signal	TM-237
				4. Primary speed sensor	TM-231
				5. Torque converter clutch solenoid valve	TM-240
				6. CAN communication line	TM-222
				7. Stall test	TM-316
				8. Step motor	TM-276
				9. PNP switch	TM-226
				10. Lock-up select solenoid valve	TM-273
				11. CVT fluid temperature sensor	TM-229
				12. Secondary speed sensor	TM-234
				13. Secondary pressure sensor	TM-255
			OFF vehicle	14. Torque converter	TM-359
				15. Oil pump assembly	TM-351
				16. Control valve	

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
8	Slips/Will Not Engage	Lock-up is not released.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Engine speed signal	TM-237
				4. Primary speed sensor	TM-231
				5. Torque converter clutch solenoid valve	TM-240
				6. CAN communication line	TM-222
				7. Stall test	TM-316
			OFF vehicle	8. Torque converter	TM-359
				9. Oil pump assembly	TM-351
				10. Control valve	
9		With selector lever in “D” position, acceleration is extremely poor.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Stall test	TM-316
				4. Accelerator pedal position sensor	TM-267
				5. CAN communication line	TM-222
				6. PNP switch	TM-226
				7. CVT position	TM-324
				8. Step motor	TM-276
				9. Primary speed sensor	TM-231
				10. Secondary speed sensor	TM-234
				11. Accelerator pedal position sensor	TM-267
				12. Primary pressure sensor	TM-260
				13. Secondary pressure sensor	TM-255
				14. CVT fluid temperature sensor	TM-229
				15. Power supply	TM-265
			OFF vehicle	16. Torque converter	TM-359
				17. Oil pump assembly	TM-351
				18. Forward clutch	
				19. Control valve	

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
10	Slips/Will Not Engage	With selector lever in “R” position, acceleration is extremely poor.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Stall test	TM-316
				4. Accelerator pedal position sensor	TM-267
				5. CAN communication line	TM-222
				6. PNP switch	TM-226
				7. CVT position	TM-324
				8. Step motor	TM-276
				9. Primary speed sensor	TM-231
				10. Secondary speed sensor	TM-234
				11. Accelerator pedal position sensor	TM-267
				12. Primary pressure sensor	TM-260
				13. Secondary pressure sensor	TM-255
				14. CVT fluid temperature sensor	TM-229
				15. Power supply	TM-265
			OFF vehicle	16. Torque converter	TM-359
				17. Oil pump assembly	TM-351
				18. Reverse brake	
				19. Control valve	
11		Slips at lock-up.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Engine speed signal	TM-237
				4. Primary speed sensor	TM-231
				5. Torque converter clutch solenoid valve	TM-240
				6. CAN communication line	TM-222
				7. Stall test	TM-316
				8. Step motor	TM-276
				9. PNP switch	TM-226
				10. Lock-up select solenoid valve	TM-273
				11. CVT fluid temperature sensor	TM-229
				12. Secondary speed sensor	TM-234
				13. Secondary pressure sensor	TM-255
			OFF vehicle	14. Torque converter	TM-359
				15. Oil pump assembly	TM-351
				16. Control valve	

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
12	Other	No creep at all.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Accelerator pedal position sensor	TM-267
				4. PNP switch	TM-226
				5. CAN communication line	TM-222
				6. Stall test	TM-316
				7. CVT position	TM-324
				8. Step motor	TM-276
				9. Primary speed sensor	TM-231
				10. Secondary speed sensor	TM-234
				11. Accelerator pedal position sensor	TM-267
				12. CVT fluid temperature sensor	TM-229
				13. Primary pressure sensor	TM-260
				14. Secondary pressure sensor	TM-255
				15. Power supply	TM-265
			OFF vehicle	16. Torque converter	TM-359
				17. Oil pump assembly	TM-351
				18. Gear system	
				19. Forward clutch	
				20. Reverse brake	
				21. Control valve	
13		Vehicle cannot run in all positions.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. PNP switch	TM-226
				4. Stall test	TM-316
				5. CVT position	TM-324
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Torque converter	TM-359
				14. Oil pump assembly	TM-351
				15. Gear system	
				16. Forward clutch	
				17. Reverse brake	
				18. Control valve	
				19. Parking components	

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
14	Other	With selector lever in “D” position, driving is not possible.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. PNP switch	TM-226
				4. Stall test	TM-316
				5. CVT position	TM-324
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Torque converter	TM-359
				14. Oil pump assembly	TM-351
				15. Gear system	
				16. Forward clutch	
				17. Control valve	
				18. Parking components	
15		With selector lever in “R” position, driving is not possible.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. PNP switch	TM-226
				4. Stall test	TM-316
				5. CVT position	TM-324
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Torque converter	TM-359
				14. Oil pump assembly	TM-351
				15. Gear system	
				16. Reverse brake	
				17. Control valve	
				18. Parking components	

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
16	Other	Judder occurs during lock-up.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. Primary speed sensor	TM-231
				4. Secondary speed sensor	TM-234
				5. Accelerator pedal position sensor	TM-267
				6. CAN communication line	TM-222
				7. Torque converter clutch solenoid valve	TM-240
			OFF vehicle	8. Torque converter	TM-359
				9. Control valve	TM-351
17		Strange noise in “D” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. CAN communication line	TM-222
			OFF vehicle	4. Torque converter	TM-359
				5. Oil pump assembly	TM-351
				6. Gear system	
				7. Forward clutch	
				8. Control valve	
				9. Bearing	
18		Strange noise in “R” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. CAN communication line	TM-222
			OFF vehicle	4. Torque converter	TM-359
				5. Oil pump assembly	TM-351
				6. Gear system	
				7. Reverse brake	
				8. Control valve	
19		Strange noise in “N” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. CAN communication line	TM-222
			OFF vehicle	4. Torque converter	TM-359
				5. Oil pump assembly	TM-351
				6. Gear system	
				7. Control valve	

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
20	Other	Vehicle does not decelerate by engine brake.	ON vehicle	1. CVT fluid level and state	TM-314
				2. CVT position	TM-324
				3. CAN communication line	TM-222
				4. Step motor	TM-276
				5. Primary speed sensor	TM-231
				6. Secondary speed sensor	TM-234
				7. Line pressure test	TM-318
				8. Engine speed signal	TM-237
				9. Accelerator pedal position sensor	TM-267
			OFF vehicle	10. Control valve	TM-351
21		Maximum speed low.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Accelerator pedal position sensor	TM-267
				4. CAN communication line	TM-222
				5. Stall test	TM-316
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Primary pressure sensor	TM-260
				10. Secondary pressure sensor	TM-255
				11. CVT fluid temperature sensor	TM-229
			OFF vehicle	12. Torque converter	TM-359
				13. Oil pump assembly	TM-351
				14. Gear system	
				15. Forward clutch	
				16. Control valve	
22		With selector lever in “P” position, vehicle does not enter parking condition or, with selector lever in another position, parking condition is not cancelled.	ON vehicle	1. PNP switch	TM-226
				2. CVT position	TM-324
			OFF vehicle	3. Parking components	TM-351
23		Vehicle runs with CVT in “P” position.	ON vehicle	1. PNP switch	TM-226
				2. CVT fluid level and state	TM-314
				3. CVT position	TM-324
			OFF vehicle	4. Parking components	TM-351
				5. Gear system	
				6. Control valve	

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
24	Other	Vehicle runs with CVT in “N” position.	ON vehicle	1. PNP switch	TM-226
				2. CVT fluid level and state	TM-314
				3. CVT position	TM-324
			OFF vehicle	4. Gear system	TM-351
				5. Forward clutch	
				6. Reverse brake	
				7. Control valve	
25		Engine stall.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. Primary speed sensor	TM-231
				4. Torque converter clutch solenoid valve	TM-240
				5. CAN communication line	TM-222
				6. Stall test	TM-316
				7. Secondary pressure sensor	TM-255
			OFF vehicle	8. Torque converter	TM-359
				9. Control valve	TM-351
26		Engine stalls when selector lever shifted “N”→“D”or “R”.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. Primary speed sensor	TM-231
				4. Torque converter clutch solenoid valve	TM-240
				5. CAN communication line	TM-222
				6. Stall test	TM-316
			OFF vehicle	7. Torque converter	TM-359
				8. Control valve	TM-351
27		Engine speed does not return to idle.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Accelerator pedal position sensor	TM-267
				3. Secondary speed sensor	TM-234
				4. CAN communication line	TM-222
			OFF vehicle	5. Control valve	TM-351
28		CVT does not shift	ON vehicle	1. CVT fluid level and state	TM-314
				2. CVT position	TM-324
				3. Line pressure test	TM-318
				4. Engine speed signal	TM-237
				5. Accelerator pedal position sensor	TM-267
				6. CAN communication line	TM-222
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Step motor	TM-276
			OFF vehicle	10. Control valve	TM-351
				11. Oil pump assembly	

cardiagn.com

No.	Item	Symptom	Condition	Diagnostic Item	Reference page
29	Other	Engine does not start in “N” or “P” position.	ON vehicle	1. Ignition switch and starter	PG-47,STC-4
				2. CVT position	TM-324
				3. PNP switch	TM-226
30		Engine starts in positions other than “N” or “P”.	ON vehicle	1. Ignition switch and starter	PG-47,STC-4
				2. CVT position	TM-324
				3. PNP switch	TM-226
31		When brake pedal is depressed with ignition switch ON, selector lever cannot be shifted from “P” position to other position.	ON vehicle	1. Stop lamp switch	TM-280
				2. Shift lock solenoid	
				2. Control device	
32		When brake pedal is not depressed with ignition switch ON, selector lever can be shifted from “P” position to other position.	ON vehicle	1. Stop lamp switch	TM-280
				2. Shift lock solenoid	
				2. Control device	

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000000914688

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001102435

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

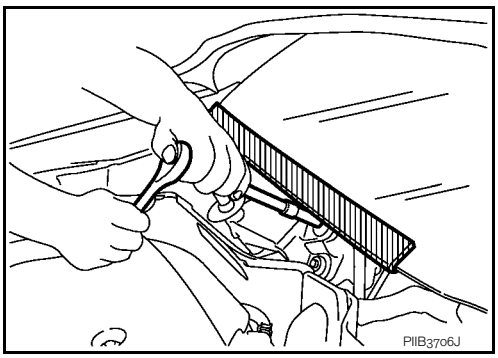
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000000914689

cardiagn.com

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution for On Board Diagnosis (OBD) System of CVT and Engine

INFOID:0000000000914691

The ECM has an on board diagnostic system. It will light up the malfunction indicator (MI) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the battery cable from the negative terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI to light up due to an open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Be sure to route and secure the harnesses properly after work. Interference of the harness with a bracket, etc. may cause the MI to light up due to a short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to a malfunction of the EVAP system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM and ECM before returning the vehicle to the customer.**

Precaution for TCM and CVT Assembly Replacement

INFOID:0000000000914692

CAUTION:

- **Check if new data (Unit ID) are entered correctly after replacing CVT assembly and erasing data in TCM. (Connect CONSULT-III, and then turn ignition switch OFF.)**
- **When replacing CVT assembly or TCM, refer to the pattern table below and erase the EEPROM in the TCM if necessary.**

EEPROM ERASING PATTERNS

CVT assembly	TCM	Erasing EEPROM in TCM	Remarks
Replaced	Replaced	Not required	Not required because the EEPROM in the TCM is in the default state. (CVT assembly must be replaced first.)
Not replaced	Replaced	Not required	Not required because the EEPROM in the TCM is in the default state.
Replaced	Not replaced	Required	Required because data has been written in the EEPROM in the TCM and because the TCM cannot write data from the ROM assembly in the transmission.

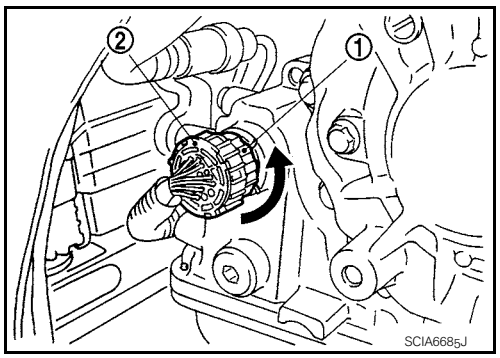
Removal and Installation Procedure for CVT Unit Connector

INFOID:0000000000914693

REMOVAL

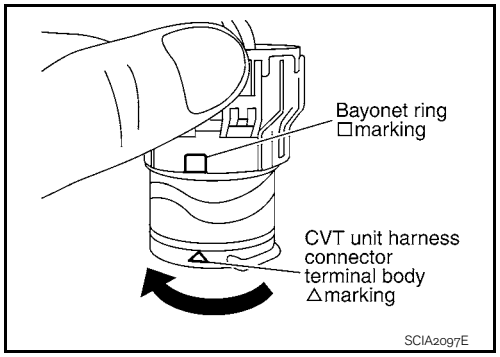
cardiagn.com

Rotate bayonet ring (1) counterclockwise, pull out CVT unit harness connector (2) upward and remove it.

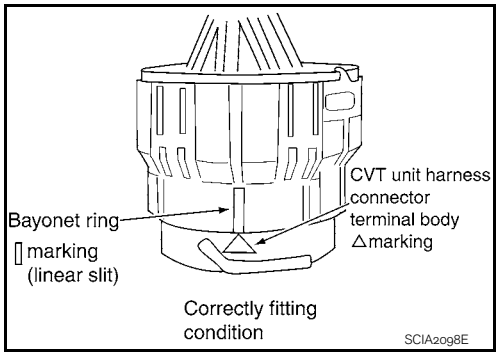


INSTALLATION

1. Align Δ marking on CVT unit harness connector terminal body with o marking on bayonet ring, insert CVT unit harness connector, and then rotate bayonet ring clockwise.

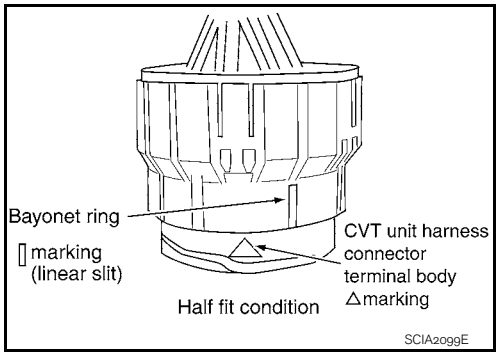


2. Rotate bayonet ring clockwise until Δ marking on CVT unit harness connector terminal body is aligned with the slit on bayonet ring as shown in the figure (correctly fitting condition), install CVT unit harness connector to CVT unit harness connector terminal body.



CAUTION:

- **Securely align Δ marking on CVT unit harness connector terminal body with bayonet ring slit. Then, be careful not to make a half fit condition as shown in the figure.**
- **Never mistake the slit of bayonet ring for other dent portion.**



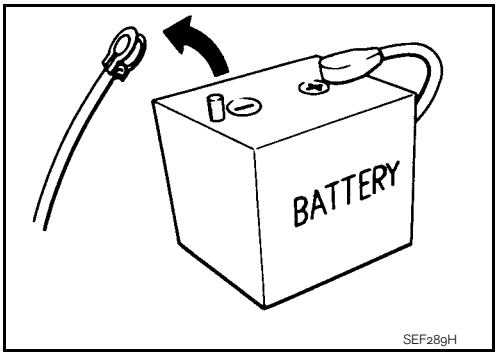
Precaution

INFOID:0000000000914694

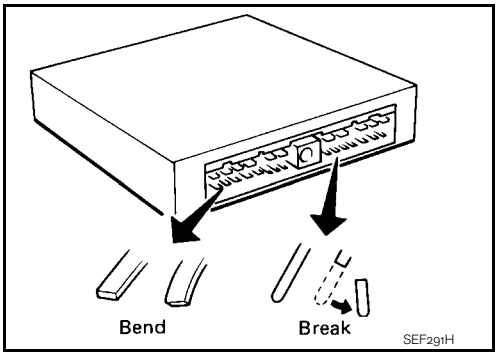
NOTE:
If any malfunction occurs in the RE0F10A model transaxle, replace the entire transaxle assembly.

cardiagn.com

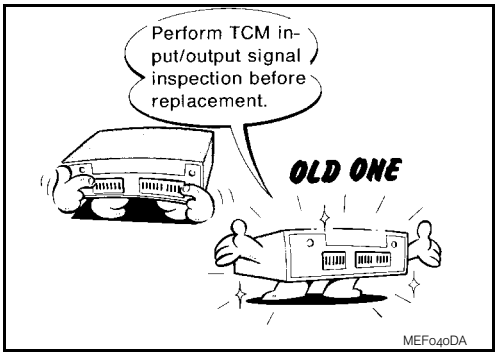
- **Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect negative battery cable. Because battery voltage is applied to TCM even if ignition switch is turned OFF.**



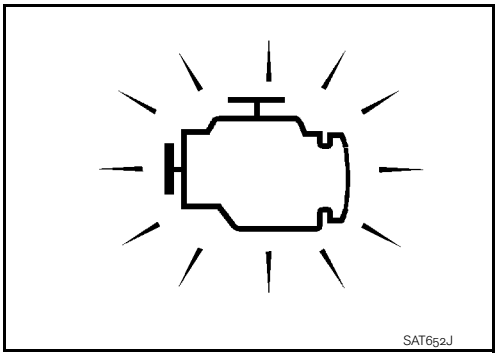
- **When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).**
  When connecting pin connectors make sure that there are not any bends or breaks on TCM pin terminal.



- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. TM-285, "Reference Value"**.



- **After performing each TROUBLE DIAGNOSIS, perform “DTC Confirmation Procedure”.**
  If the repair is completed the DTC should not be displayed in the “DTC Confirmation Procedure”.
- Always use the specified brand of CVT fluid. Refer to PG-47, "Wiring Diagram - IGNITION POWER SUPPLY -".
- Use lint-free paper, not cloth rags, during work.
- After replacing the CVT fluid, dispose of the waste oil using the methods prescribed by law, ordinance, etc.



Service Notice or Precaution

INFOID:0000000000914695

OBD SELF-DIAGNOSIS

- CVT self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the malfunction indicator (MI). Refer to the table on TM-216, "CONSULT-III Function (TRANSMISSION)" for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MI are automatically stored in both the ECM and TCM memories. **Always perform the procedure on TM-214, "Diagnosis Description" to complete the repair and avoid unnecessary blinking of the MI.**

cardiagn.com

For details of OBD, refer to EC-706, "Diagnosis Description" (WITH EURO-OBD), EC-1050, "Diagnosis Description" (WITHOUT EURO-OBD).

- **Certain systems and components, especially those related to OBD, may use the new style slide-locking type harness connector. For description and how to disconnect, refer to PG-105.**

ATFTEMP COUNT Conversion Table

INFOID:0000000001095943

ATFTEMP COUNT	Temperature °C (°F)	ATFTEMP COUNT	Temperature °C (°F)
4	–30 (–22)	177	90 (194)
8	–20 (–4)	183	95 (203)
13	–10 (14)	190	100 (212)
17	–5 (23)	196	105 (221)
21	0 (32)	201	110 (230)
27	5 (41)	206	115 (239)
32	10 (50)	210	120 (248)
39	15 (59)	214	125 (257)
47	20 (68)	218	130 (266)
55	25 (77)	221	135 (275)
64	30 (86)	224	140 (284)
73	35 (95)	227	145 (293)
83	40 (104)	229	150 (302)
93	45 (113)	231	155 (311)
104	50 (122)	233	160 (320)
114	55 (131)	235	165 (329)
124	60 (140)	236	170 (338)
134	65 (149)	238	175 (347)
143	70 (158)	239	180 (356)
152	75 (167)	241	190 (374)
161	80 (176)	243	200 (392)
169	85 (185)	—	—

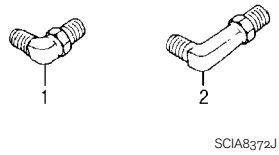
cardiagn.com

PREPARATION

PREPARATION

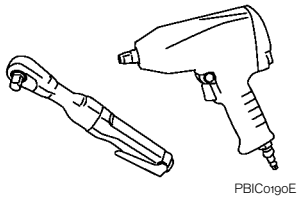
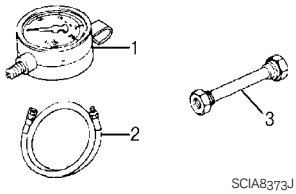
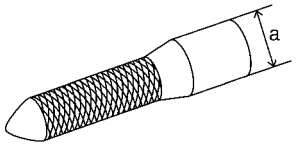
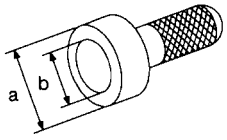
Special Service Tool

INFOID:0000000001136882

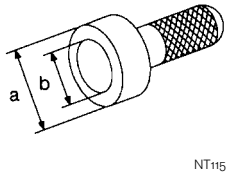
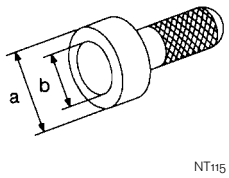
Tool number Tool name	Description
1. ST25054000 Adapter 2. ST25055000 Adapter  SCIA8372J	Measuring line pressure

Commercial Service Tool

INFOID:0000000000914697

Tool number Tool name	Description
Power tool  PBIC0190E	Loosening nuts and bolts
Oil pressure gauge set 1. Oil pressure gauge 2. Hose 3. Joint pipe  SCIA8373J	Measuring line pressure
31197CA000 Drive plate location guide a: Ø 14 mm (0.55 in)  SCIA2013E	Installing transaxle assembly
Drift a: 54 mm (2.13 in) dia. b: 47 mm (1.85 in) dia.  NT115	Installing differential side oil seal

cardiagn.com

Tool number Tool name		Description
Drift a: 70 mm (2.76 in) dia. b: 56 mm (2.20 in) dia.	 NT115	Installing side oil seal (transfer joint)
Drift a: 65 mm (2.56 in) dia. b: 60 mm (2.36 in) dia.	 NT115	Installing converter housing oil seal

cardiagn.com

ON-VEHICLE MAINTENANCE

CVT FLUID

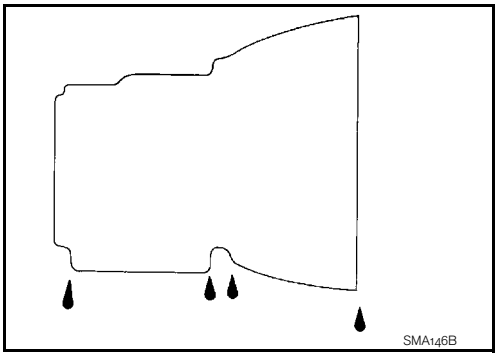
Inspection

INFOID:0000000000988983

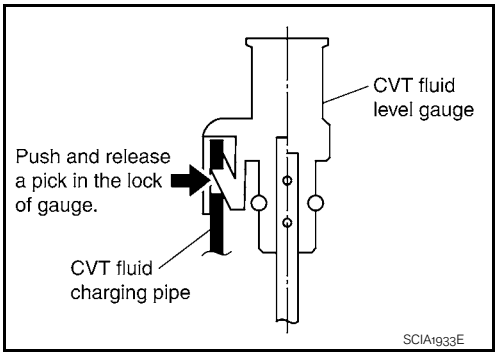
CHECKING CVT FLUID

Fluid level should be checked with the fluid warmed up to 50 to 80°C (122 to 176°F). The fluid level check procedure is as follows:

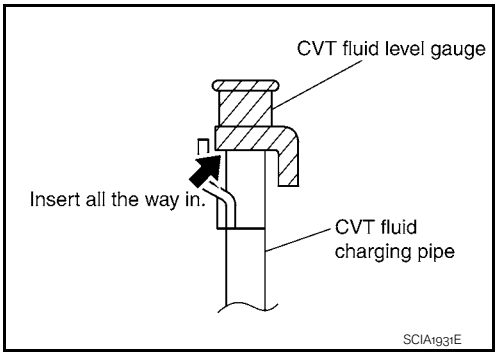
1. Check for fluid leakage.
2. With the engine warmed up, drive the vehicle in an urban area. When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50 to 80°C (122 to 176°F).
3. Park the vehicle on a level surface.
4. Apply parking brake firmly.
5. With engine at idle, while depressing brake pedal, move shift selector throughout the entire shift range.



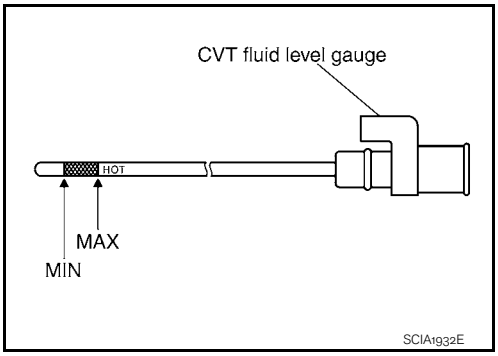
6. Pull out the CVT fluid level gauge from the CVT fluid charging pipe after pressing the tab on the CVT fluid level gauge to release the lock.



7. Wipe fluid off the CVT fluid level gauge. Insert the CVT fluid level gauge rotating 180° from the originally installed position, then securely push the CVT fluid level gauge until it meets the top end of the CVT fluid charging pipe.
   CAUTION:
   When wiping away the CVT fluid level gauge, always use lint-free paper, not a cloth rag.



8. Place the selector lever in “P” or “N” and make sure the fluid level is within the specified range.
   CAUTION:
   When reinstalling CVT fluid level gauge, insert it into the CVT fluid charging pipe and rotate it to the original installation position until securely locked.

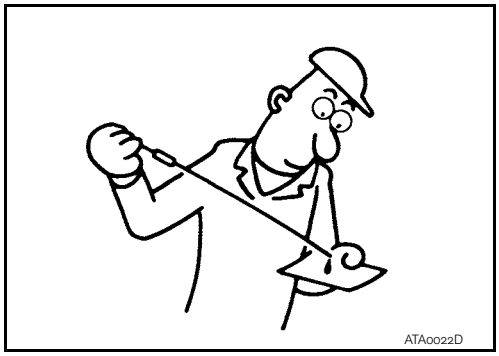


CVT FLUID CONDITION

cardiagn.com

Check CVT fluid condition.

- If CVT fluid is very dark or smells burned, check operation of CVT. Flush cooling system after repair of CVT.
- If CVT fluid contains frictional material (clutches, brakes, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of CVT. Refer to CO-34, "Exploded View".



Fluid status	Conceivable cause	Required operation
Varnished (viscous varnish state)	CVT fluid become degraded due to high temperatures.	Replace the CVT fluid and check the CVT main unit and the vehicle for malfunctions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the CVT fluid and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within CVT	Replace the CVT fluid and check for improper operation of the CVT.

Changing

INFOID:0000000000988984

1. Remove drain plug, and then drain CVT fluid from oil pan.
2. Install drain plug to oil pan.
   CAUTION:
   Never reuse drain plug gasket.

   Drain plug – tightening torque : Refer to TM-335, "Exploded View".
3. Fill CVT fluid from CVT fluid charging pipe to the specified level.
4. With the engine warmed up, drive the vehicle in an urban area. When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50 to 80°C (122 to 176°F).
5. Check CVT fluid level and condition.
6. Repeat steps 1 to 5 if CVT fluid has been contaminated.

CVT fluid : Refer to TM-361, "General Specification".

Fluid capacity : Refer to TM-361, "General Specification".

CAUTION:

- **Use only Genuine NISSAN CVT Fluid NS-2. Never mix with other fluid.**
- **Using CVT fluid other than Genuine NISSAN CVT Fluid NS-2 will deteriorate in driveability and CVT durability, and may damage the CVT, which is not covered by the warranty.**
- **When filling CVT fluid, take care not to scatter heat generating parts such as exhaust.**
- **Sufficiently shake the container of CVT fluid before using.**
- **Delete CVT fluid deterioration date with CONSULT-III after changing CVT fluid.**

cardiagn.com

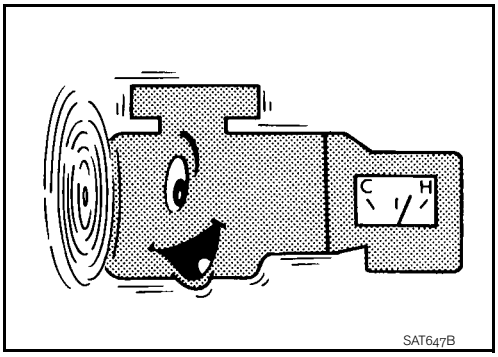
STALL TEST

Inspection and Judgment

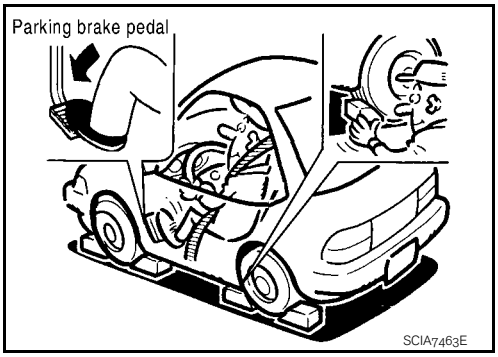
INFOID:0000000000914702

INSPECTION

1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
2. Drive for about 10 minutes to warm up the vehicle so that the CVT fluid temperature is 50 to 80°C (122 to 176°F). Inspect the amount of CVT fluid. Replenish if necessary.

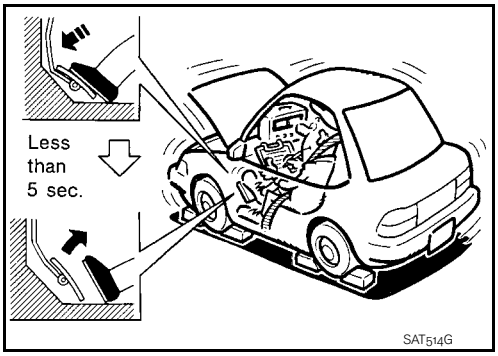


3. Securely engage the parking brake so that the tires do not turn.
4. Install a tachometer where it can be seen by driver during test.
   NOTE:
   It is good practice to mark the point of specified engine rpm on indicator.
5. Start engine, apply foot brake, and place selector lever in “D” position.



6. While holding down the foot brake, gradually press down the accelerator pedal.
7. Quickly read off the stall speed, and then quickly remove your foot from the accelerator pedal.
   CAUTION:
   Never hold down the accelerator pedal for more than 5 seconds during this test.

   Stall speed: **Refer to TM-361, "Stall Speed".**



8. Move the selector lever to the “N” position.
9. Cool down the CVT fluid.
   CAUTION:
   Run the engine at idle for at least 1 minute.
10. Repeat steps 6 through 9 with selector lever in “R” position.

JUDGMENT

cardiagn.com

	Selector lever position		Expected problem location
	“D”	“R”	
Stall rotation	H	O	• Forward clutch
	O	H	• Reverse brake
	L	L	• Engine and torque converter one-way clutch
	H	H	• Line pressure low • Primary pulley • Secondary pulley • Steel belt

O: Stall speed within standard value position.

H: Stall speed is higher than standard value.

L: Stall speed is lower than standard value.

cardiagn.com

LINE PRESSURE TEST

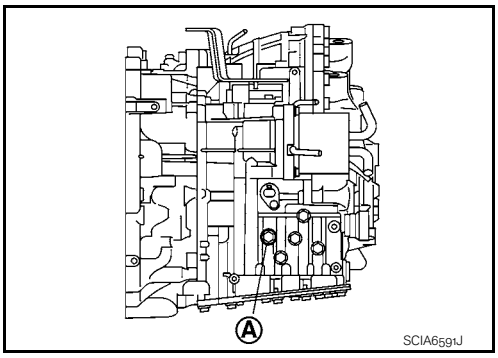
Inspection and Judgment

INFOID:0000000000914703

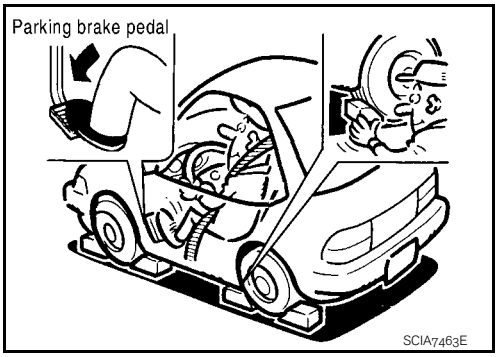
INSPECTION

Line Pressure Test Procedure

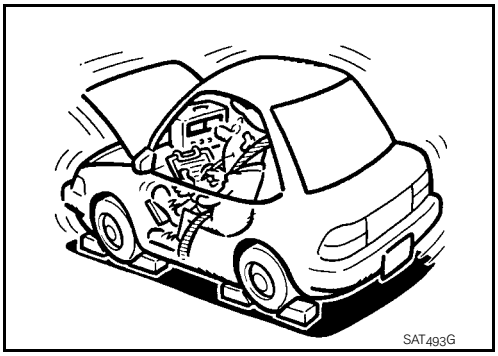
1. Inspect the amount of engine oil and replenish if necessary.
2. Drive the car for about 10 minutes to warm it up so that the CVT fluid reaches in the range of 50 to 80°C (122 to 176°F), then inspect the amount of CVT fluid and replenish if necessary.
   NOTE:
   The CVT fluid temperature rises in the range of 50 to 80°C (122 to 176°F) during 10 minutes of driving.
3. After warming up CVT, remove the oil pressure detection plug (A) and install the oil pressure gauge (commercial service tool).
   CAUTION:
   When using the oil pressure gauge, be sure to use the O-ring attached to the oil pressure detection plug.



4. Securely engage the parking brake so that the tires do not turn.



5. Start the engine, and then measure the line pressure at both idle and the stall speed.
   CAUTION:
   - **Keep the brake pedal pressed all the way down during measurement.**
   - **When measuring the line pressure at the stall speed, refer to TM-316, "Inspection and Judgment".**
6. After the measurements are complete, install the oil pressure detection plug and tighten to the specified torque below.



: 7.5 N·m (0.77 kg-m, 66 in-lb)

CAUTION:
- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

Line Pressure

cardiagn.com

kPa (bar, kg/cm^2, psi)

Engine speed	Line pressure
	"R" or "D" positions
At idle	750 (7.50, 7.65, 108.8)
At stall	5,700 (57.00, 58.14, 826.5)*

*: Reference values

JUDGMENT

Judgment		Possible cause
Idle speed	Low for all positions ("P", "R", "N", "D")	Possible causes include malfunctions in the pressure supply system and low oil pump output. For example • Oil pump wear • Pressure regulator valve or plug sticking or spring fatigue • Oil strainer ⇒ oil pump ⇒ pressure regulator valve passage oil leak • Engine idle speed too low
	Only low for a specific position	Possible causes include an oil pressure leak in a passage or device related to the position after the pressure is distributed by the manual valve.
	High	Possible causes include a sensor malfunction or malfunction in the line pressure adjustment function. For example • Accelerator pedal position signal malfunction • CVT fluid temperature sensor malfunction • Pressure control solenoid A (line pressure solenoid) malfunction (sticking in OFF state, filter clog, cut line) • Pressure regulator valve or plug sticking
Stall speed	Line pressure does not rise higher than the line pressure for idle.	Possible causes include a sensor malfunction or malfunction in the pressure adjustment function. For example • Accelerator pedal position signal malfunction • TCM malfunction • Pressure control solenoid A (line pressure solenoid) malfunction (shorting, sticking in ON state) • Pressure regulator valve or plug sticking
	The pressure rises, but does not enter the standard position.	Possible causes include malfunctions in the pressure supply system and malfunction in the pressure adjustment function. For example • Accelerator pedal position signal malfunction • Pressure control solenoid A (line pressure solenoid) malfunction (sticking, filter clog) • Pressure regulator valve or plug sticking
	Only low for a specific position	Possible causes include an oil pressure leak in a passage or device related to the position after the pressure is distributed by the manual valve.

cardiagn.com

ROAD TEST

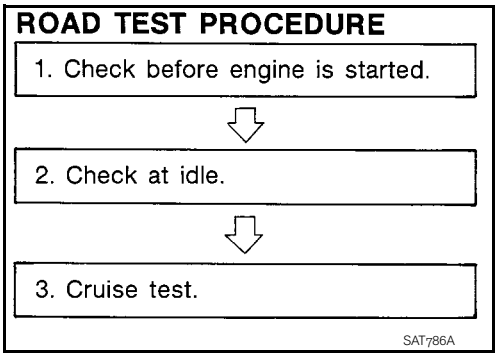
Description

INFOID:0000000000988985

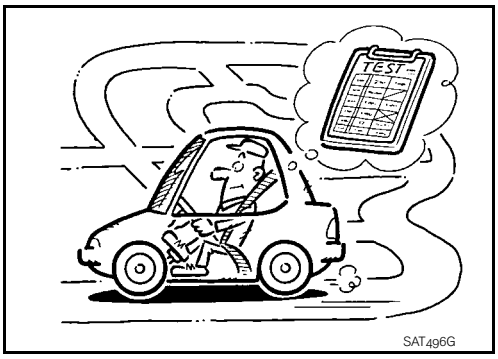
DESCRIPTION

- The purpose of the test is to determine overall performance of CVT and analyze causes of problems.
- The road test consists of the following three parts:

1. "Check Before Engine Is Started" TM-320.
2. "Check at Idle" TM-321.
3. "Cruise Test" TM-322.



- Before road test, familiarize yourself with all test procedures and items to check.
- Perform tests on all items until specified symptom is found. Troubleshoot items the malfunctioning items after road test.



CONSULT-III SETTING PROCEDURE

- Using CONSULT-III, perform a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule.

1. Touch "DATA MONITOR" on "SELECT DIAG MODE" screen.
2. Touch "MAIN SIGNALS" to set recording condition.
3. See "Numerical Display", "Barchart Display" or "Line Graph Display".
4. Touch "START".
5. When performing cruise test. Refer to TM-322, "Cruise Test".
6. After finishing cruise test part, touch "RECORD".
7. Touch "STORE".
8. Touch "BACK".
9. Touch "DISPLAY".
10. Touch "PRINT".
11. Check the monitor data printed out.

Check before Engine Is Started

INFOID:0000000000988986

1.CHECK CVT INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to "P" position.
3. Turn ignition switch OFF. Wait at least 5 seconds.
4. Turn ignition switch ON. (Do not start engine.)

Is shift position indicator activated for about 2 seconds?

YES >> 1. Turn ignition switch OFF.
2. Perform self-diagnosis and note NG items.
Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".
3. Go to TM-321, "Check at Idle".

cardiagn.com

NO >> Stop “Road Test”. Refer to TM-295, "Symptom Table".

Check at Idle

INFOID:0000000000988987

1. CHECK STARTING THE ENGINE

1. Park vehicle on flat surface.
2. Move selector lever to “P” or “N” position.
3. Turn ignition switch OFF.
4. Turn ignition switch to “START” position.

Is engine started?

YES >> GO TO 2.
NO >> Stop “Road Test”. Refer to TM-295, "Symptom Table".

2. CHECK STARTING THE ENGINE

1. Turn ignition switch ON.
2. Move selector lever to “D”, “M” or “R” position.
3. Turn ignition switch to “START” position.

Is engine started?

YES >> Stop “Road Test”. Refer to TM-295, "Symptom Table".
NO >> GO TO 3.

3. CHECK “P” POSITION FUNCTION

1. Move selector lever to “P” position.
2. Turn ignition switch OFF.
3. Release parking brake.
4. Push vehicle forward or backward.
5. Apply parking brake.

Does vehicle move forward or backward?

YES >> Refer to TM-295, "Symptom Table". Continue “Road Test”.
NO >> GO TO 4.

4. CHECK “N” POSITION FUNCTION

1. Start engine.
2. Move selector lever to “N” position.
3. Release parking brake.

Does vehicle move forward or backward?

YES >> Refer to TM-295, "Symptom Table". Continue “Road Test”.
NO >> GO TO 5.

5. CHECK SHIFT SHOCK

1. Apply foot brake.
2. Move selector lever to “R” position.

Is there large shock when changing from “N” to “R” position?

YES >> Refer to TM-295, "Symptom Table". Continue “Road Test”.
NO >> GO TO 6.

6. CHECK “R” POSITION FUNCTION

Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

YES >> GO TO 7.
NO >> Refer toTM-295, "Symptom Table". Continue “Road Test”.

7. CHECK “D” POSITION FUNCTION

Move selector lever to “D” position and check if vehicle creeps forward.

Does vehicle creep forward in all positions?

YES >> Go to TM-322, "Cruise Test".
NO >> Stop “Road Test”. Refer to TM-295, "Symptom Table".

cardiagn.com

Cruise Test

INFOID:0000000000988988

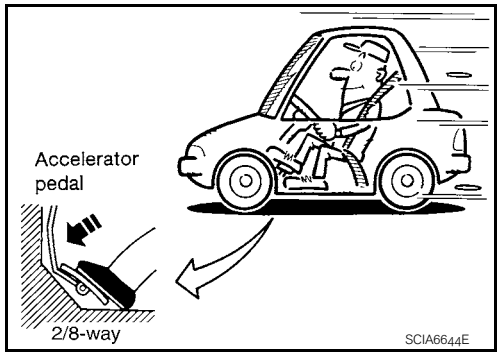
1.CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 1

1. Drive vehicle for approximately 10 minutes to warm engine oil and CVT fluid up to operating temperature.

CVT fluid operating temperature: 50 – 80°C (122 – 176°F)

2. Park vehicle on flat surface.
3. Move selector lever to “P” position.
4. Start engine.
5. Move selector lever to “D” position.
6. Accelerate vehicle to 2/8-way throttle depressing accelerator pedal constantly.

Read vehicle speed and engine speed. Refer to TM-361, "Vehicle Speed When Shifting Gears".



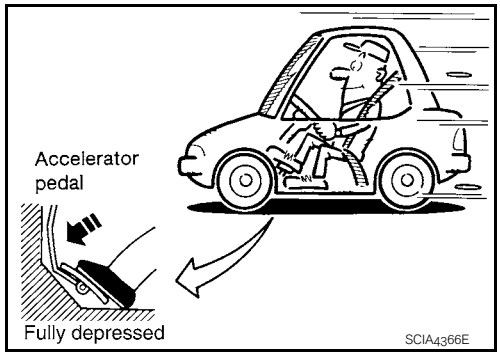
OK or NG

OK >> GO TO 2.
NG >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

2.CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 2

1. Park vehicle on flat surface.
2. Move selector lever to “D” position.
3. Accelerate vehicle to full depression depressing accelerator pedal constantly.

Read vehicle speed and engine speed.Refer to TM-361, "Vehicle Speed When Shifting Gears".



OK or NG

OK >> GO TO 3.
NG >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

3.CHECK MANUAL MODE FUNCTION

Move to manual mode from “D” position.

Does it switch to manual mode?

YES >> GO TO 4.
NO >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

4.CHECK SHIFT-UP FUNCTION

During manual mode driving, is upshift from M1 → M2 → M3 → M4 → M5 → M6 performed?

Read the gear position. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is upshifting correctly performed?

YES >> GO TO 5.
NO >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

5.CHECK SHIFT-DOWN FUNCTION

During manual mode driving, is downshift from M6 → M5 → M4 → M3 → M2 → M1 performed?

Read the gear position. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is downshifting correctly performed?

YES >> GO TO 6.
NO >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

cardiagn.com

6.CHECK ENGINE BRAKE FUNCTION

Check engine brake.

Does engine braking effectively reduce speed in M1 position?

YES >> 1. Stop the vehicle.
2. Perform self-diagnosis. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

NO >> Refer to TM-295, "Symptom Table". Then continue trouble diagnosis.

cardiagn.com

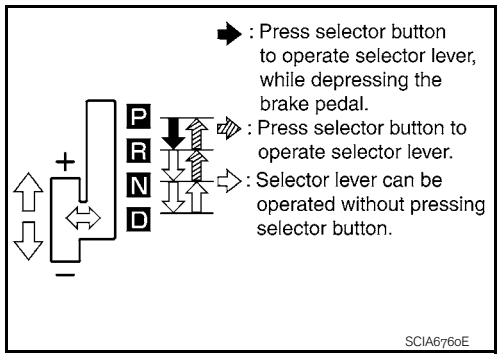
CVT POSITION

Inspection and Adjustment

INFOID:0000000000914708

INSPECTION

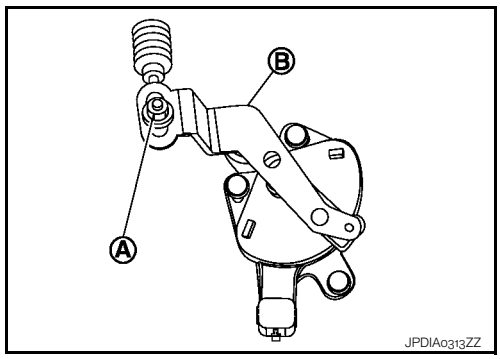
1. Place selector lever in “P” position, and turn ignition switch ON (engine stop).
2. Make sure that selector lever can be shifted to other than “P” position when brake pedal is depressed. Also make sure that selector lever can be shifted from “P” position only when brake pedal is depressed.
3. Move the selector lever and check for excessive effort, sticking, noise or rattle.
4. Confirm the selector lever stops at each position with the feel of engagement when it is moved through all the positions. Check that the actual position of the selector lever matches the position shown by the shift position indicator and the manual lever on the transaxle.
5. The method of operating the selector lever to individual positions correctly should be as shown.
6. When selector button is pressed in “P”, “R”, or “N” position without applying forward/backward force to selector lever, check button operation for sticking.
7. Confirm the back-up lamps illuminate only when selector lever is placed in the “R” position. Confirm the back-up lamps do not illuminate when the selector lever is pushed toward the “R” position when in the “P” or “N” position.
8. Confirm the engine can only be started with the selector lever in the “P” and “N” positions.



9. Make sure transaxle is locked completely in “P” position.
10. When selector lever is set to manual shift gate, make sure that manual mode is displayed on combination meter.
    Shift selector lever to “+” and “–” sides, and check that set shift position changes.

ADJUSTMENT

1. Place selector lever in “ P” position.
   CAUTION:
   Turn wheels more than 1/4 rotations and apply the park lock.
2. Loosen nut (A) and place manual lever (B) in “P” position.
   CAUTION:
   Never apply any force to the manual lever.
3. Tighten nut. Refer to TM-330, "Exploded View".
   CAUTION:
   Fix the manual lever when tightening.



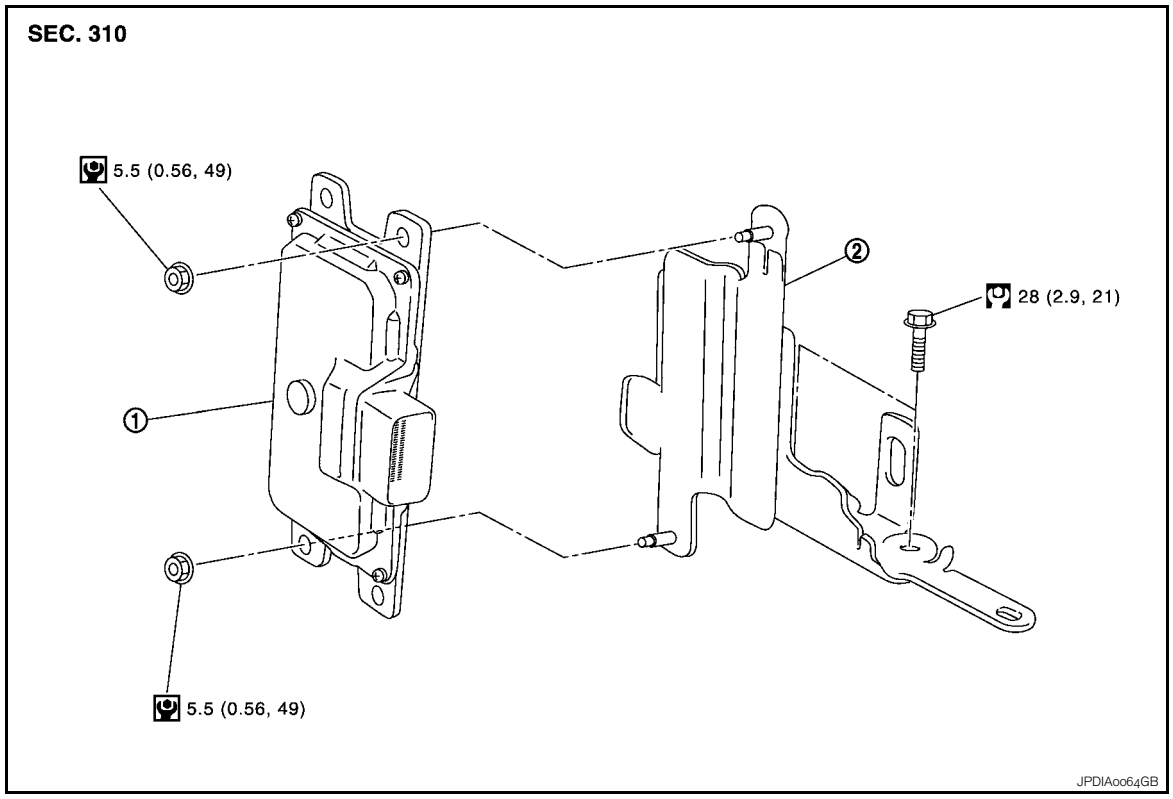
cardiagn.com

ON-VEHICLE REPAIR

TRANSMISSION CONTROL MODULE

Exploded View

INFOID:0000000000914709



1. TCM
2. Bracket

Refer to GI-4, "Components" for symbols in the figure.

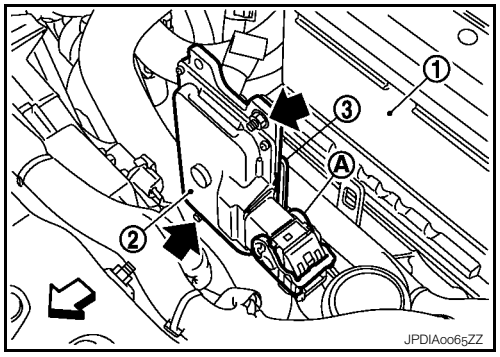
Removal and Installation

INFOID:0000000000914710

REMOVAL

1. Disconnect the battery cable from negative terminal.
2. Remove the Air duct (inlet). Refer to EM-144, "Exploded View".
3. Disconnect the TCM harness connector (A).

⇦ : Vehicle front
⬅ : Nut
1 : Battery



4. Remove the TCM (2) from the bracket (3).

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

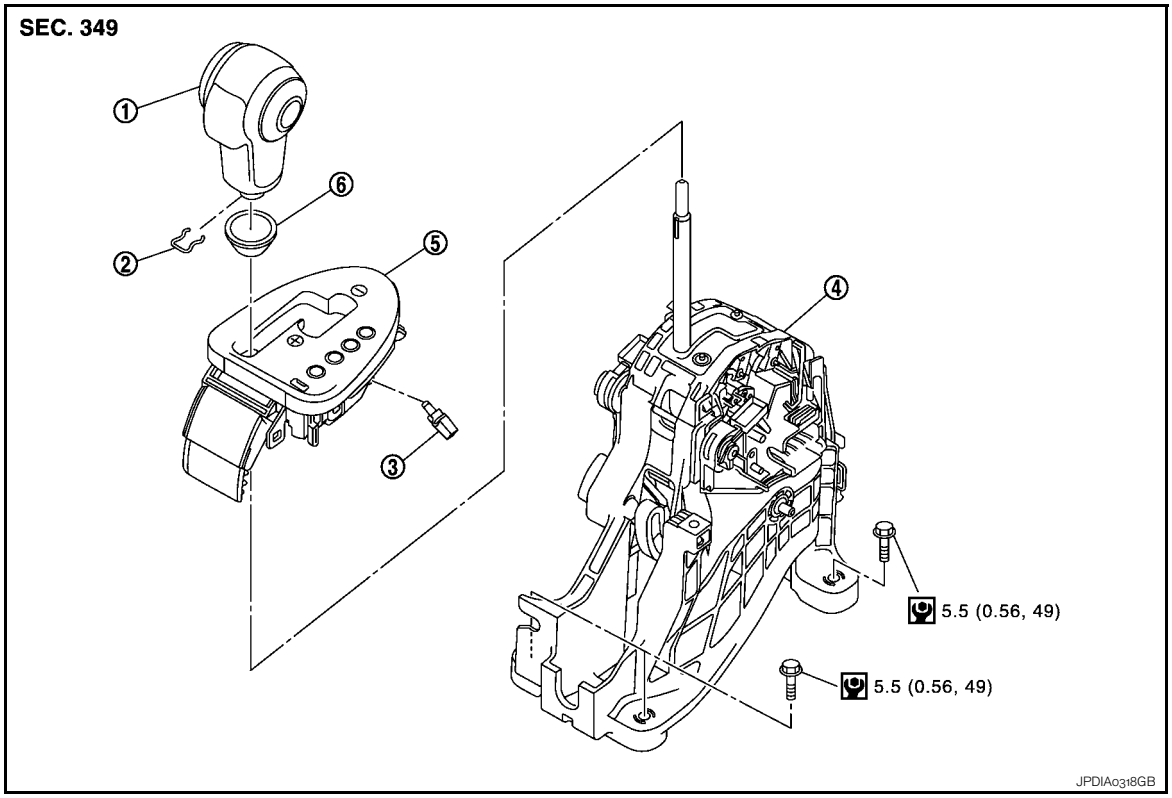
After TCM is replaced, refer to TM-189, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Service After Replacing TCM and Transaxle Assembly".

cardiagn.com

CONTROL DEVICE

Exploded View

INFOID:0000000000914711



1. Selector lever knob
2. Lock pin
3. Position lamp
4. Control device assembly
5. Position indicator plate
6. Knob cover

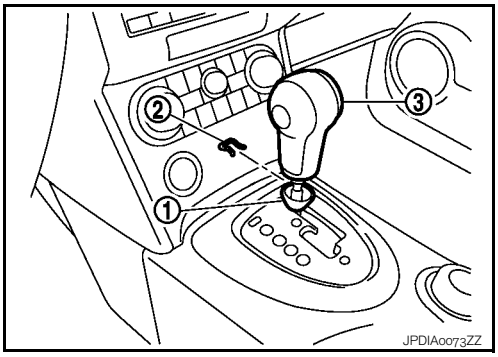
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000914712

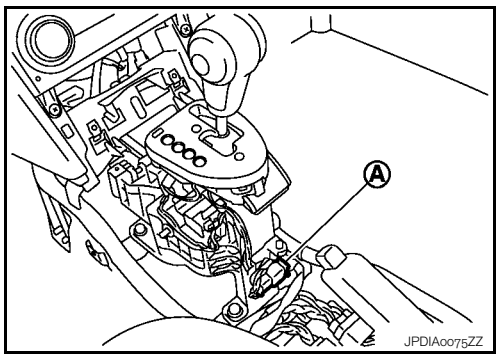
REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Move selector lever to “N” position.
3. Remove knob cover (1) below selector lever downward.
   CAUTION:
   Be careful not to damage the knob cover.
4. Pull lock pin (2) out of selector lever knob (3).
5. Remove selector lever knob and knob cover.
6. Remove center console. Refer to IP-18, "Exploded View".

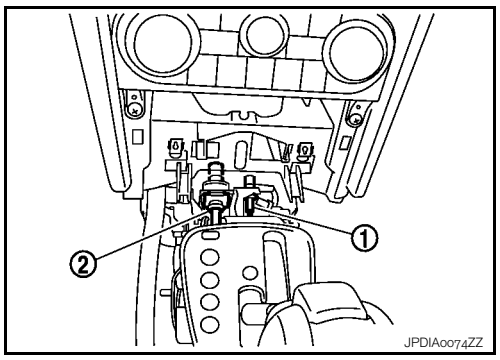


cardiagn.com

7. Disconnect CVT device harness connector (A).



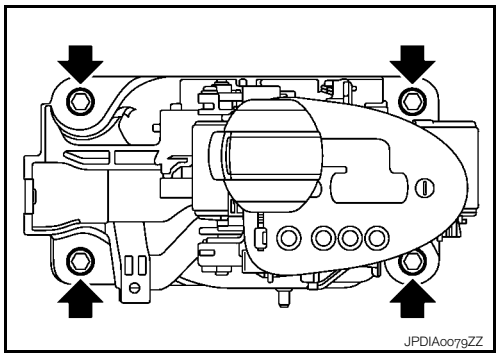
8. Move selector lever to “P” position.
9. Disconnect key interlock cable (1) from control device assembly.
10. Disconnect control cable (2) from control device assembly. Refer to TM-330, "Exploded View".



11. Remove control device assembly.

⬅ : Bolt

12. Remove position lamp.

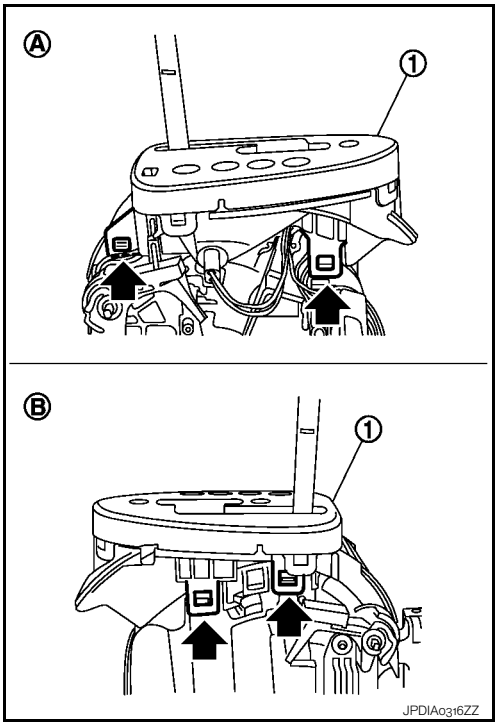


13. Unhook (⬅) position indicator plate (1) for removal.

cardiagn.com

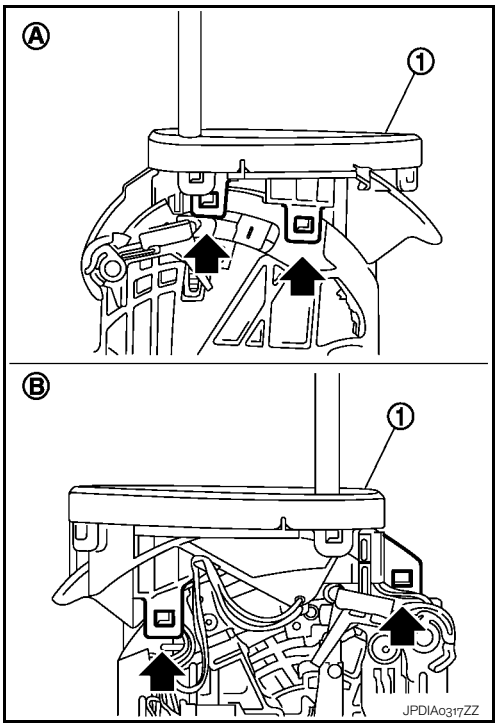
- LHD

A : Driver side
B : Passenger side



- RHD

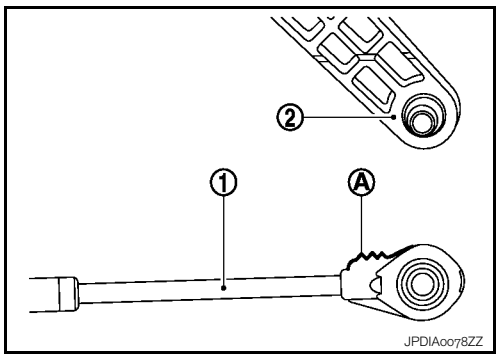
A : Passenger side
B : Driver side



INSTALLATION
Note the following, and install in the reverse order of removal.

cardiagn.com

- When installing the control cable (1) to the control device assembly (2), make sure that the control cable is fully pressed in with the ribbed (A) surface facing upward.



Inspection and Adjustment

INFOID:0000000000914713

ADJUSTMENT AFTER INSTALLATION

Adjust the CVT positions after installing the control device. Refer to TM-324, "Inspection and Adjustment".

INSPECTION AFTER INSTALLATION

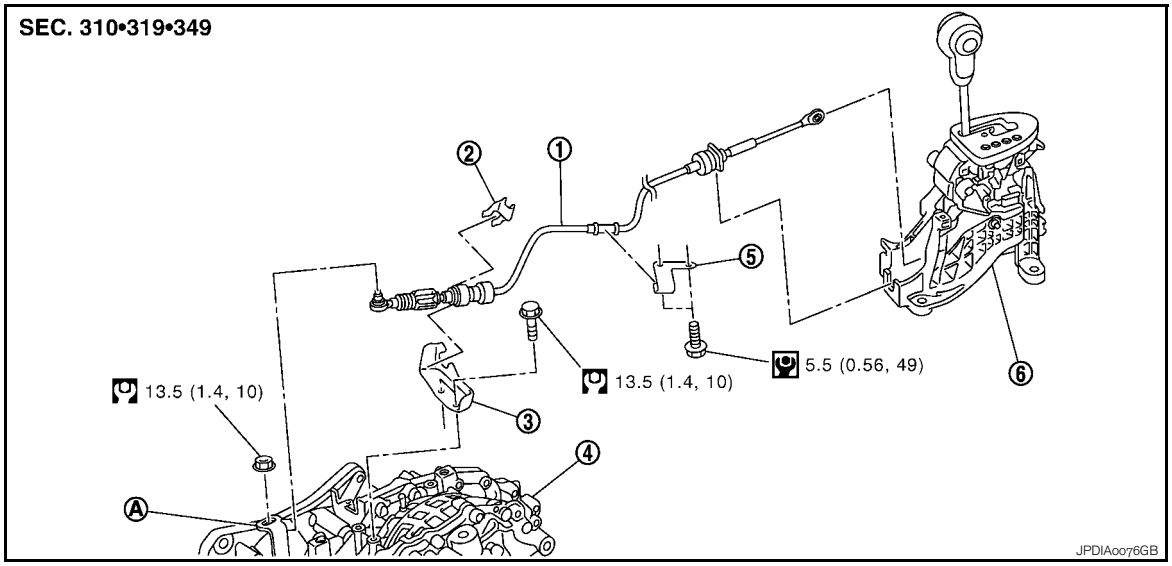
Check the CVT positions after adjusting the CVT positions. Refer to TM-324, "Inspection and Adjustment".

cardiagn.com

CONTROL CABLE

Exploded View

INFOID:0000000000914714



1. Control cable
2. Lock plate
3. Bracket
4. Transaxle assembly
5. Bracket
6. Control device assembly

A. Manual lever

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

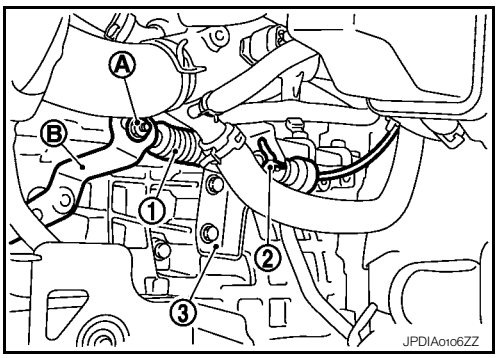
INFOID:0000000000914715

REMOVAL

CAUTION:

Make sure that parking brake is applied before removal/installation.

1. Disconnect control cable from control device assembly. Refer to TM-326, "Exploded View".
2. Move selector lever to “P” position.
3. Remove the air cleaner assembly. Refer to EM-144, "Exploded View".
4. Remove nut (A) and control cable (1) from the manual lever (B).
5. Remove the lock plate (2) and the control cable from the bracket (3).
6. Remove exhaust front tube. Refer to EX-10, "Exploded View".
7. Separate the propeller shaft. Refer to DLN-110, "Exploded View" (4WD only).
8. Remove heat plate.

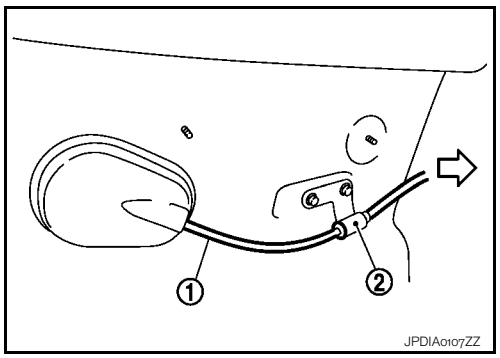


cardiagn.com

9. Remove control cable (1) from bracket (2).

⇦ : Vehicle front

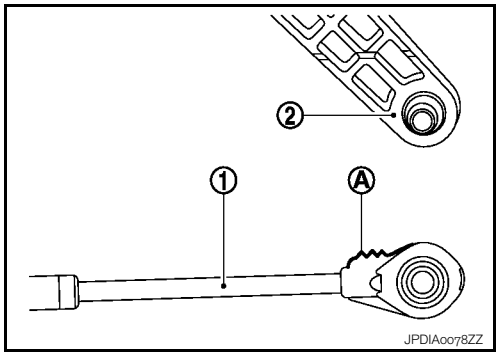
10. Remove the control cable from the vehicle.



INSTALLATION

Note the following, and install in the reverse order of removal.

- When installing the control cable (1) to the control device assembly (2), make sure that the control cable is fully pressed in with the ribbed (A) surface facing upward.



ADJUSTMENT AFTER INSTALLATION

Adjust the CVT positions after installing the control device. Refer to TM-324, "Inspection and Adjustment".

INSPECTION AFTER INSTALLATION

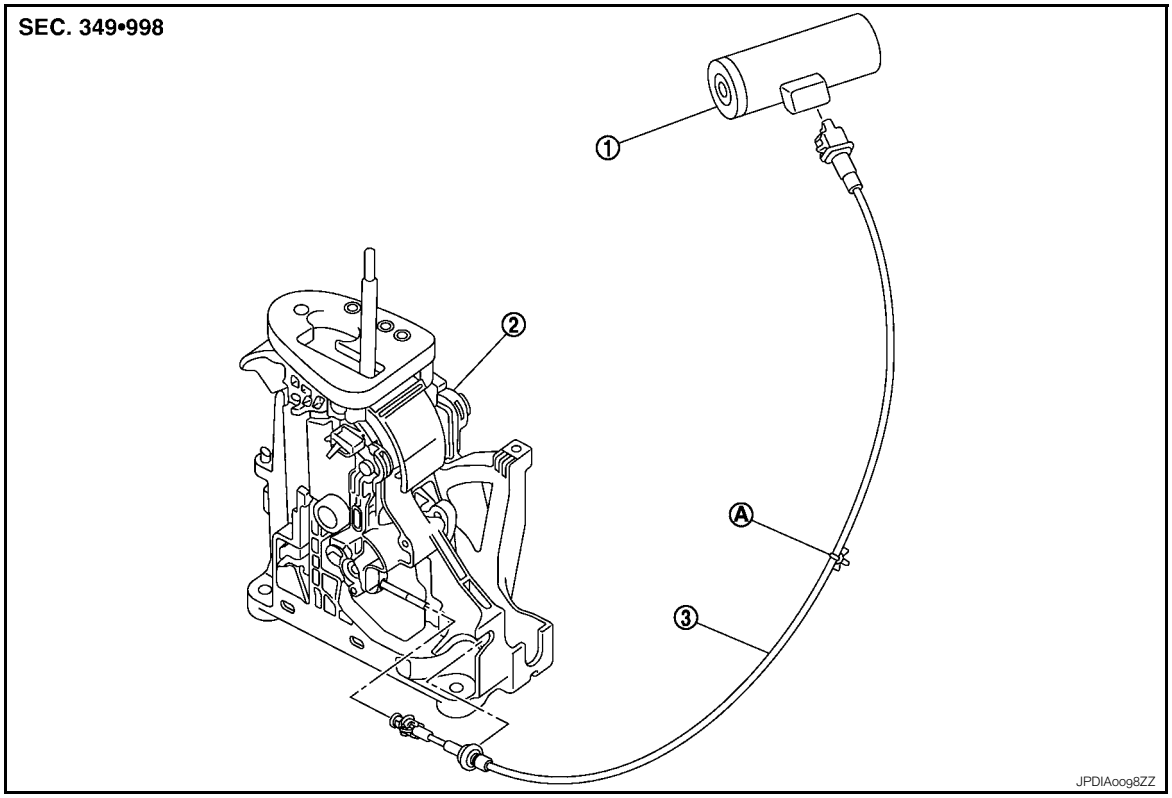
Check the CVT positions after adjusting the CVT positions. Refer to TM-324, "Inspection and Adjustment".

cardiagn.com

KEY INTERLOCK CABLE

Exploded View

INFOID:0000000000941127



1. Key cylinder
2. Control device assembly
3. Key interlock cable

A. Clip

Removal and Installation

INFOID:0000000000941125

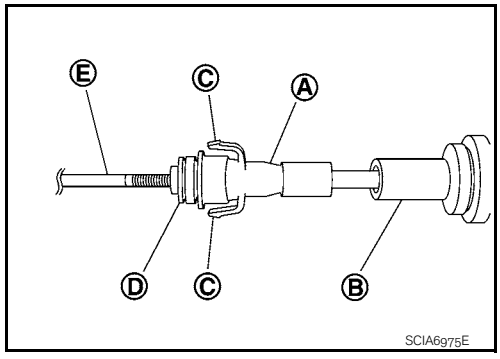
REMOVAL

CAUTION:

Make sure that parking brake is applied before removal/installation.

1. Move selector lever to “P” position.
2. Removal selector lever knob. Refer to TM-326, "Exploded View".
3. Removal center console. Refer to IP-18, "Exploded View".
4. Slide slider (A) toward casing cap (B) while pressing tabs (C) on slider to separate slider from adjust holder (D).

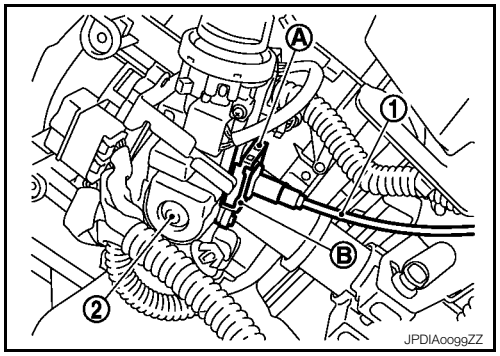
   E : Key interlock rod



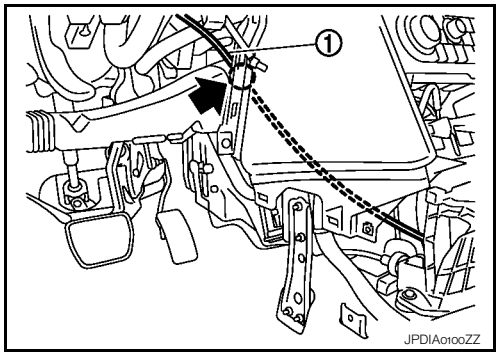
5. Remove steering column lower cover and lower instrument panel, driver side. Refer to IP-11, "Exploded View".

cardiagn.com

6. Remove clip (A) from holder (B) and remove key inter lock cable (1) from key cylinder (2).



7. Remove clip (⬅) and remove key inter lock cable (1).



INSTALLATION

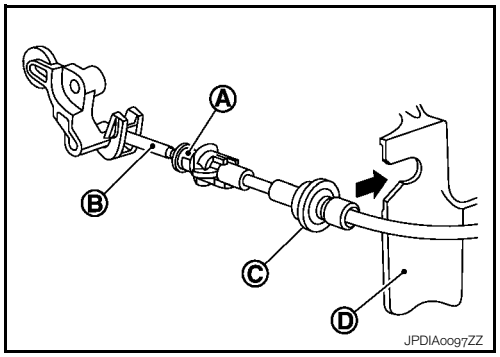
Note the following, and install in the reverse order of removal.

CAUTION:

- **Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.**
- **After installing key interlock cable to control device assembly, make sure that casing cap and bracket are firmly secured in their positions.**
- Temporarily install adjust holder (A) to key interlock rod (B). Install casing cap (C) to cable bracket (D) on control device assembly.

  CAUTION:

  - **Never bend or twist key interlock cable excessively when installing.**
  - **After installing key interlock cable to cable bracket on control device assembly, make sure casing caps is firmly secured in cable bracket on control device assembly.**
  - **If casing cap is loose [less than 39.2 N (4.0 kg, 8.8 lb) removing force], replace key interlock cable.**

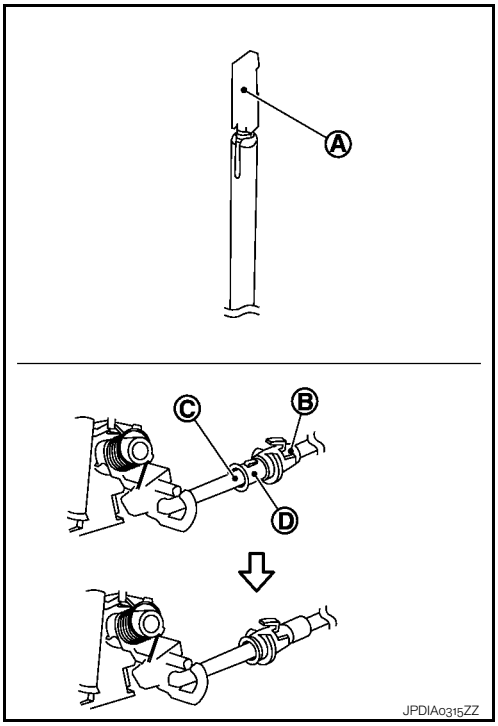


cardiagn.com

- With the detent rod (A) pressed fully to the end, slider the key interlock cable slider (B) to the key interlock rod side (C), and install adjust holder (D) and key interlock rod.

CAUTION:

- **Never press tabs when holding slider.**
- **Never apply any force at the right angle to key interlock rod when slider.**

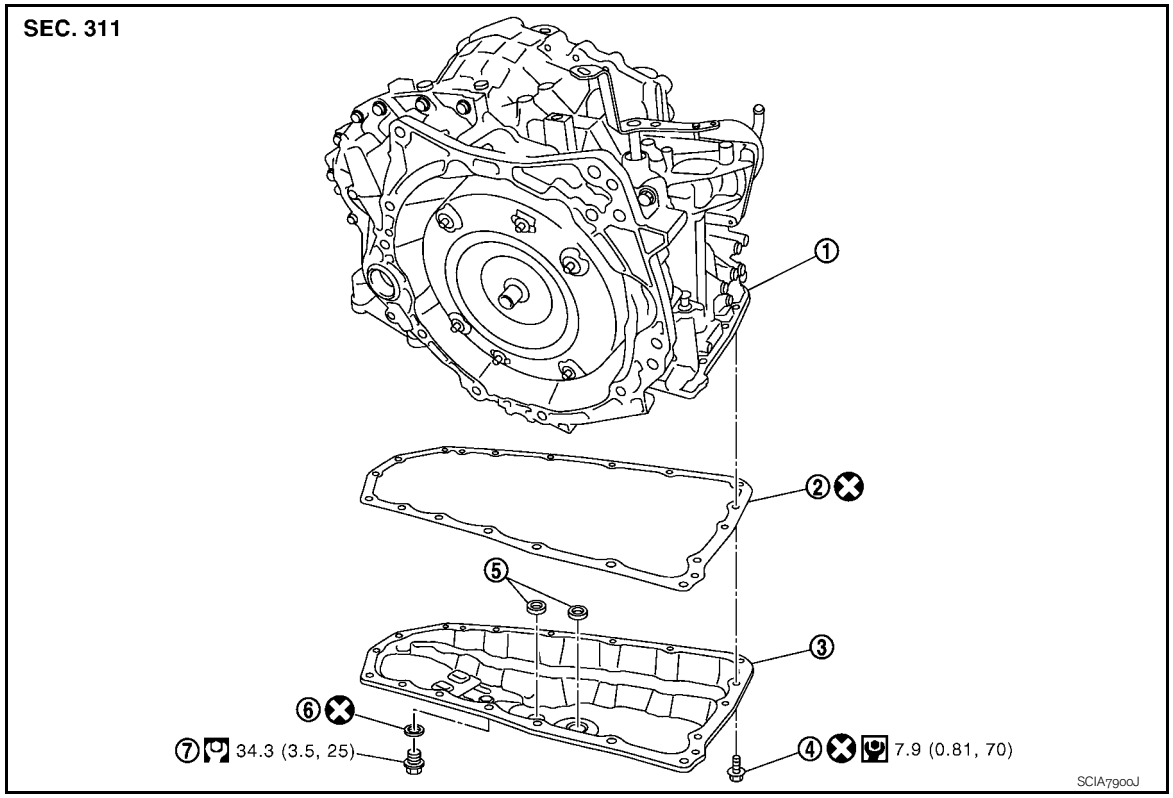


cardiagn.com

OIL PAN

Exploded View

INFOID:0000000000950755



1. Transaxle assembly
2. Oil pan gasket
3. Oil pan
4. Oil pan fitting bolt
5. Magnet
6. Drain plug gasket
7. Drain plug

Refer to GI-4, "Components" for symbols in the figure.

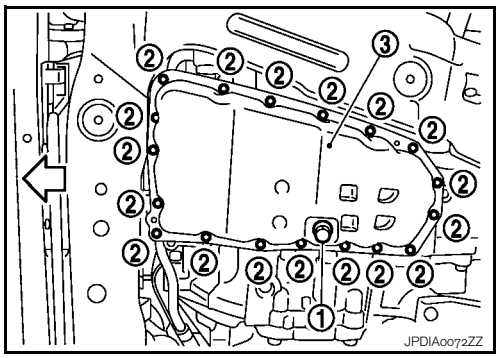
Removal and Installation

INFOID:0000000000950757

REMOVAL

1. Remove engine under cover with power tool.
2. Remove drain plug (1), and then drain CVT fluid from oil pan.

⇦ : Vehicle front



3. Remove oil pan fitting bolts (2).
4. Remove oil pan (3).
5. Remove oil pan gasket from oil pan.
6. Remove magnet from oil pan.

INSTALLTION

Note the following, and install in the reverse order of removal.

CAUTION:

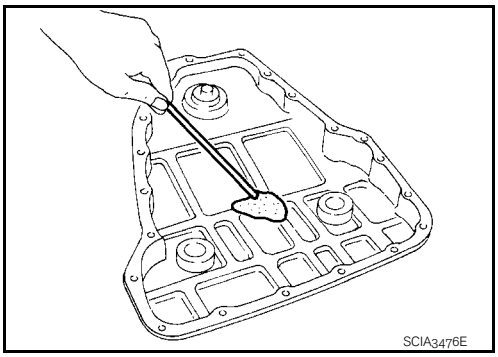
- **Completely remove all moisture, oil and old gasket, etc. from the oil pan gasket mounting surface of transaxle case and oil pan.**
- **Never reuse oil pan gasket and oil pan fitting bolts.**

cardiagn.com

Inspection

INFOID:0000000000954882

- Check foreign materials in oil pan to help determine causes of malfunction. If the CVT fluid is very dark, smells burned, or contains foreign particles, frictional material (clutches) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves and clutches to stick and can inhibit pump pressure.



INSPECTION AFTER INSTALLATION

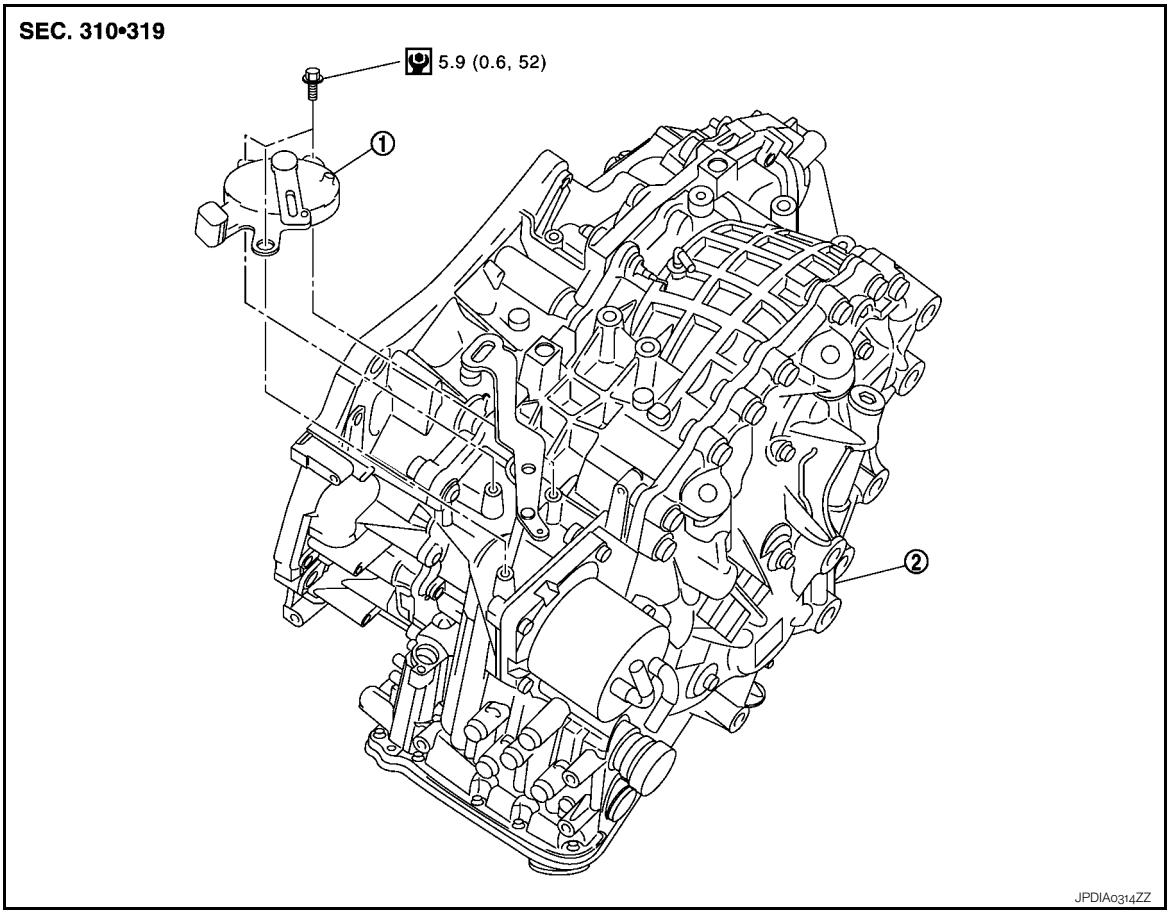
After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

cardiagn.com

PARK/NEUTRAL POSITION (PNP) SWITCH

Exploded View

INFOID:0000000000950776



1. PNP switch
2. Transaxle assembly

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000950777

REMOVAL

1. Remove battery. Refer to PG-118, "Exploded View".
2. Remove ECM bracket.
3. Remove PNP switch connector.
4. Remove control cable. Refer to TM-330, "Exploded View".
5. Remove PNP switch from transaxle assembly.

INSTALLATION

Install in the reverse order of removal.

Inspection and Adjustment

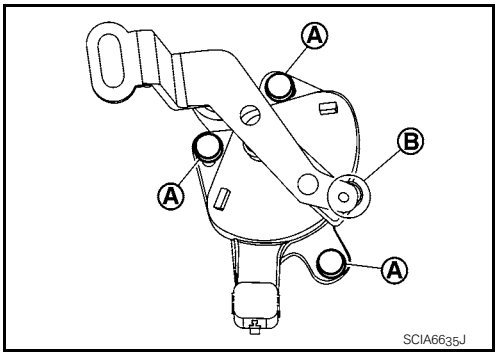
INFOID:0000000000950778

ADJUSTMENT OF PNP SWITCH

1. Move selector lever to “N” position.
2. Remove control cable from manual lever.

cardiagn.com

3. Loosen mounting bolts (A) of PNP switch. Insert a pin (ϕ4 mm) into the adjusting holes (B) on both PNP switch and manual lever for adjusting the position.
4. Tighten mounting bolts of PNP switch.
5. Connect control cable on manual lever. Refer to TM-324, "Inspection and Adjustment".



ADJUSTMENT AFTER INSTALLATION

Adjust the CVT positions after installing the control device. Refer to TM-324, "Inspection and Adjustment".

INSPECTION AFTER INSTALLAION

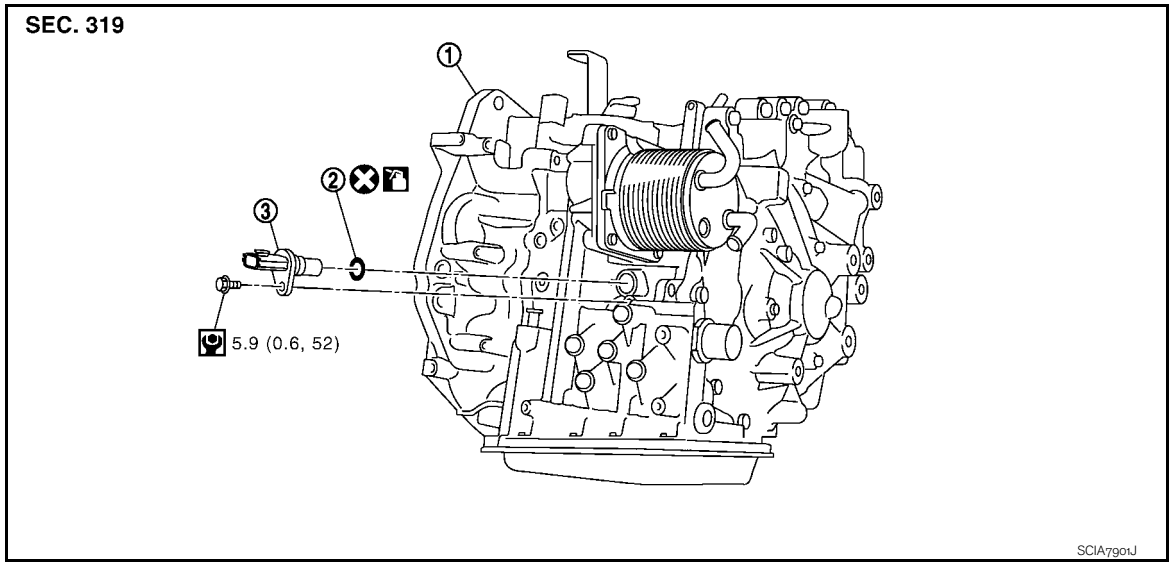
Check the CVT positions after adjusting the CVT positions. Refer to TM-324, "Inspection and Adjustment".

cardiagn.com

PRIMARY SPEED SENSOR

Exploded View

INFOID:0000000000950779



1. Transaxle assembly
2. O-ring
3. Primary speed sensor

: Apply CVT Fluid NS-2.

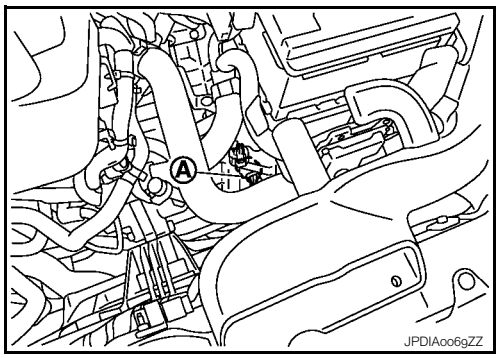
Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000950780

REMOVAL

1. Remove primary speed sensor connector (A).
2. Remove primary speed sensor.
3. Remove O-ring from primary speed sensor.



INSTALLATION

Note the following, and install in the reverse order of removal.

- After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

CAUTION:

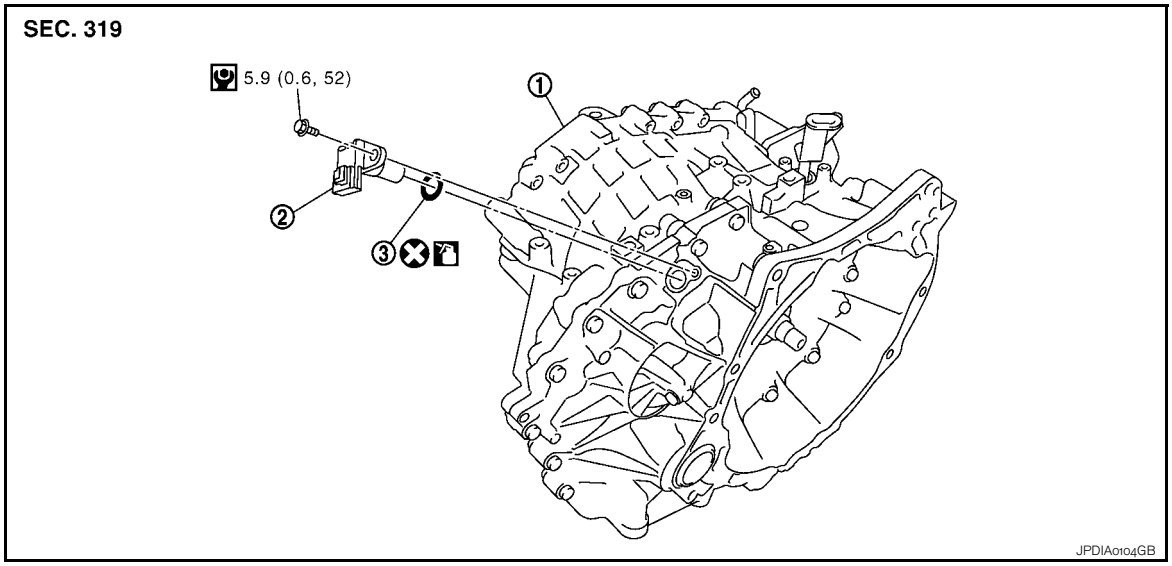
- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

cardiagn.com

SECONDARY SPEED SENSOR

Exploded View

INFOID:0000000000950781



1. Transaxle assembly
2. Secondary speed sensor
3. O-ring

: Apply CVT Fluid NS-2.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000950782

REMOVAL

1. Remove secondary speed sensor connector.
2. Remove secondary speed sensor.
3. Remove O-ring from secondary speed sensor.

INSTALLATION

Note the following, and install in the reverse order of removal.

- After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

CAUTION:

- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

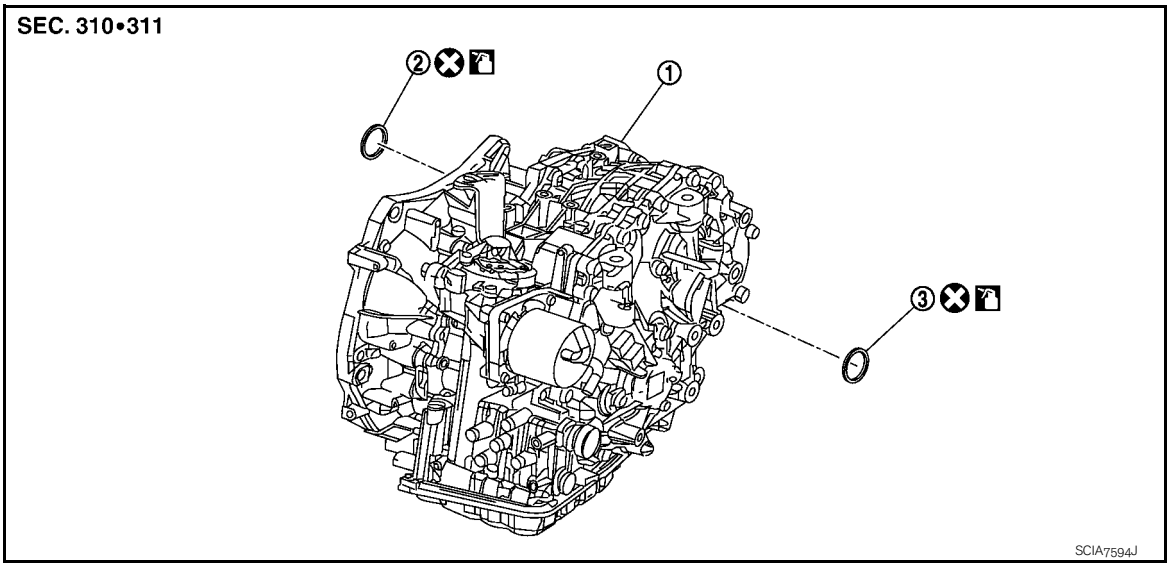
cardiagn.com

DIFFERENTIAL SIDE OIL SEAL

2WD

2WD : Exploded View

INFOID:0000000000950783



1. Transaxle assembly
2. RH differential side oil seal
3. LH differential side oil seal

: Apply CVT Fluid NS-2.

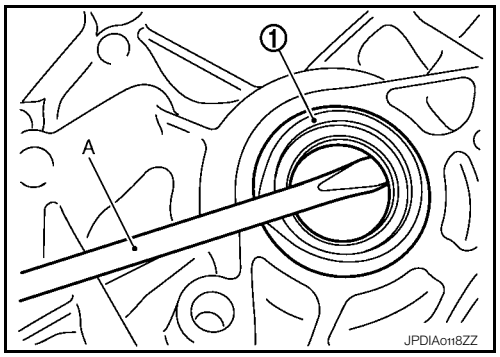
Refer to GI-4, "Components" for symbols not described on the above.

2WD : Removal and Installation

INFOID:0000000000950784

REMOVAL

1. Remove drive shaft assembly. Refer to FAX-22, "MR20DE MODELS : Exploded View".
2. Remove differential side oil seals (1) using a flat-bladed screwdriver (A).
   CAUTION:
   Be careful not to scratch transaxle case and converter housing.



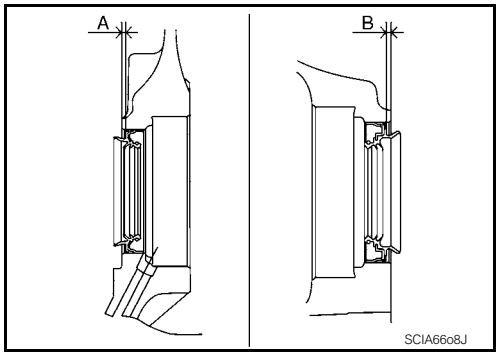
INSTALLTION

Note the following, and install in the reverse order of removal.

- Drive each differential side oil seal evenly using a commercial service tool so that differential side oil seal protrudes by the dimension (A) or (B) respectively.

Unit: mm (in)

Dimension A	1.8 ± 0.5 (0.071 ± 0.020)
Dimension B	2.2 ± 0.5 (0.087 ± 0.020)



NOTE:
Differential side oil seal pulling direction is used as the reference.
CAUTION:
- **Never reuse differential side oil seals.**

cardiagn.com

- **Apply CVT fluid to differential side oil seals.**

Drift to be used:

Location	Tool number
Transaxle case side	Commercial service tool [Outer diameter: 54 mm (2.13 in), inner diameter: 47 mm (1.85 in)]
Converter housing side	

2WD : Inspection

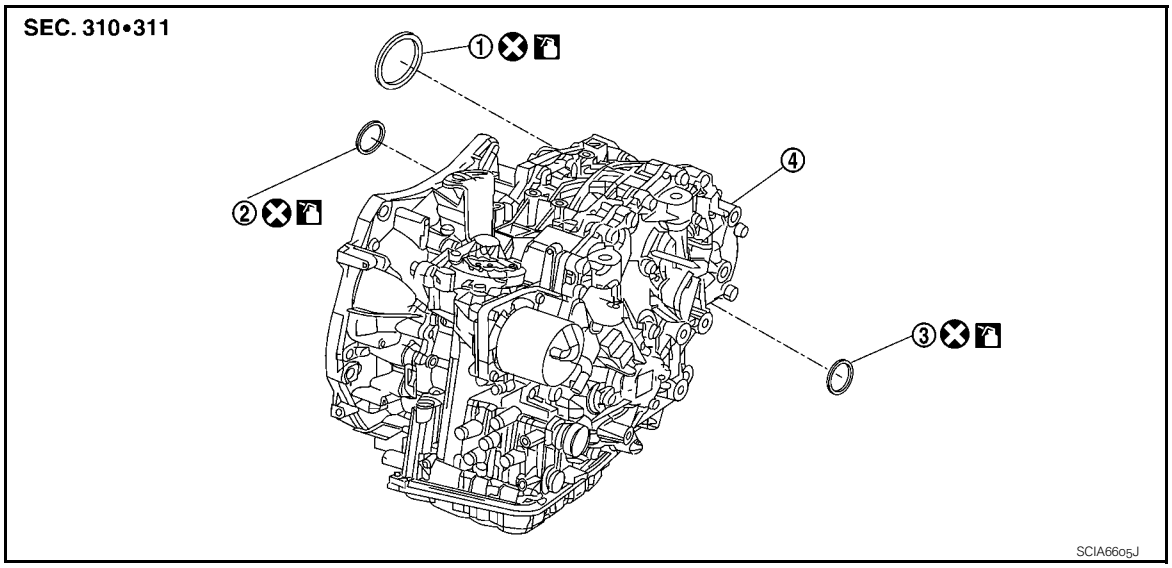
INFOID:0000000001091256

After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

4WD

4WD : Exploded View

INFOID:0000000001091129



1. Side oil seal (transfer joint)
2. RH differential side oil seal
3. LH differential side oil seal
4. Transaxle assembly

: Apply CVT Fluid NS-2.

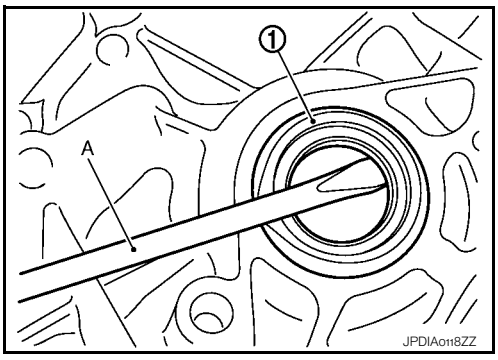
Refer to GI-4, "Components" for symbols not described on the above.

4WD : Removal and Installation

INFOID:0000000001091130

REMOVAL

1. Remove exhaust front tube. Refer to EX-10, "Exploded View".
2. Separate the propeller shaft. Refer to DLN-110, "Exploded View".
3. Remove drive shaft assembly. Refer to FAX-55, "Exploded View".
4. Remove transfer from transaxle assembly. Refer to DLN-59, "CVT : Exploded View".
5. Remove differential side oil seals (1) and side oil seal (transfer joint) using a flat-bladed screwdriver (A).
   CAUTION:
   Be careful not to scratch transaxle case and converter housing.

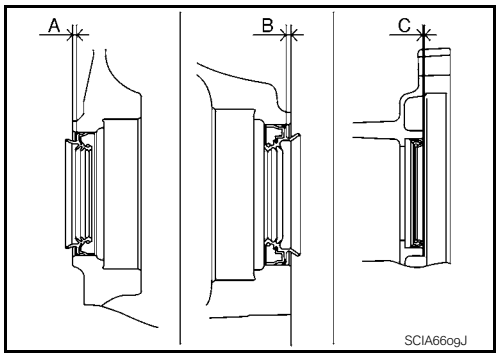


INSTALLTION

cardiagn.com

Note the following, and install in the reverse order of removal.

- Drive each differential side oil seal and side oil seal (transfer joint) evenly using a commercial service tool so that differential side oil seal and side oil seal (transfer joint) protrudes by the dimension (A), (B), or (C) respectively.



Unit: mm (in)

Dimension A	1.8 ± 0.5 (0.071 ± 0.020)
Dimension B	2.2 ± 0.5 (0.087 ± 0.020)
Dimension C	0.5 ± 0.5 (0.020 ± 0.020)

NOTE:
Differential side oil seal and side oil seal (transfer joint) pulling direction is used as the reference.

CAUTION:

- **Never reuse differential side oil seals and side oil seal (transfer joint).**
- **Apply CVT fluid to differential side oil seals and side oil seal (transfer joint).**

Drift to be used:

Location		Tool number
Differential side oil seal	Transaxle case side	Commercial service tool [Outer diameter: 54 mm (2.13 in), inner diameter: 47 mm (1.85 in)]
	Converter housing side	
Side oil seal (transfer joint)	Transaxle engagement	Commercial service tool [Outer diameter: 70 mm (2.76 in), inner diameter: 56 mm (2.20 in)]

4WD : Inspection

INFOID:0000000001091252

After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

cardiagn.com

OIL PUMP FITTING BOLT

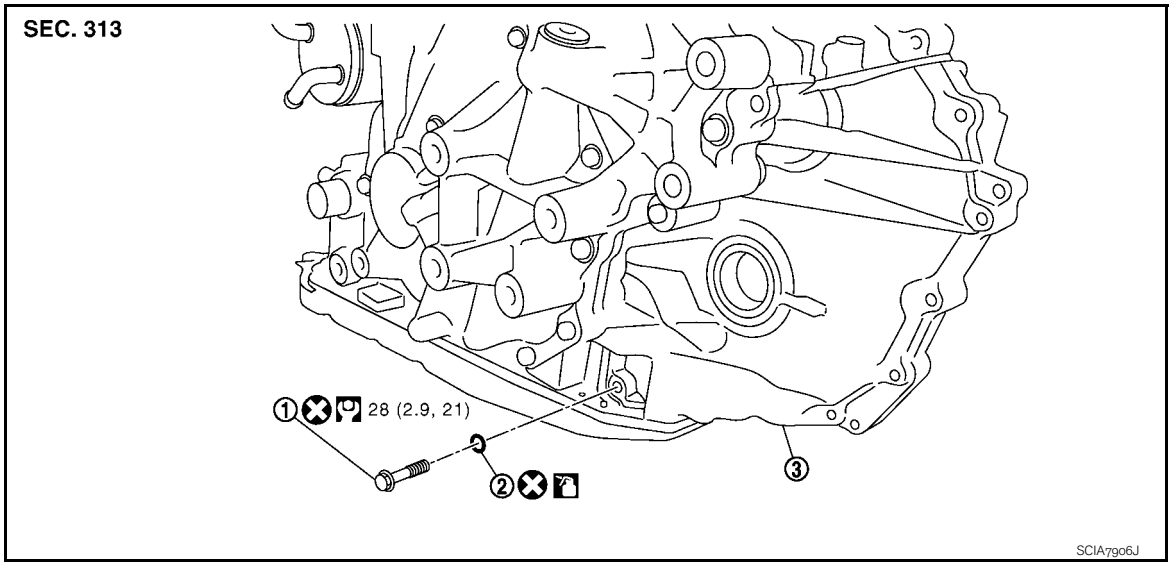
Description

INFOID:0000000000952022

Replace the oil pump fitting bolt and the O-ring if oil leakage or exudes from the oil pump fitting bolt.

Exploded View

INFOID:0000000000952023



1. Oil pump fitting bolt
2. O-ring
3. Transaxle assembly

: Apply CVT Fluid NS-2.

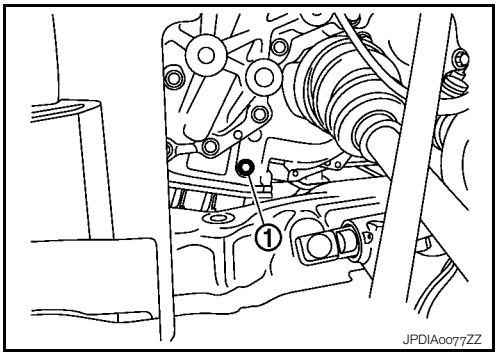
Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000952024

REMOVAL

1. Remove Oil pump fitting bolt (1) from transaxle assembly.
2. Remove O-ring from oil pump fitting bolt.



INSTALLATION

Note the following, and install in the reverse order of removal.

- After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

CAUTION:

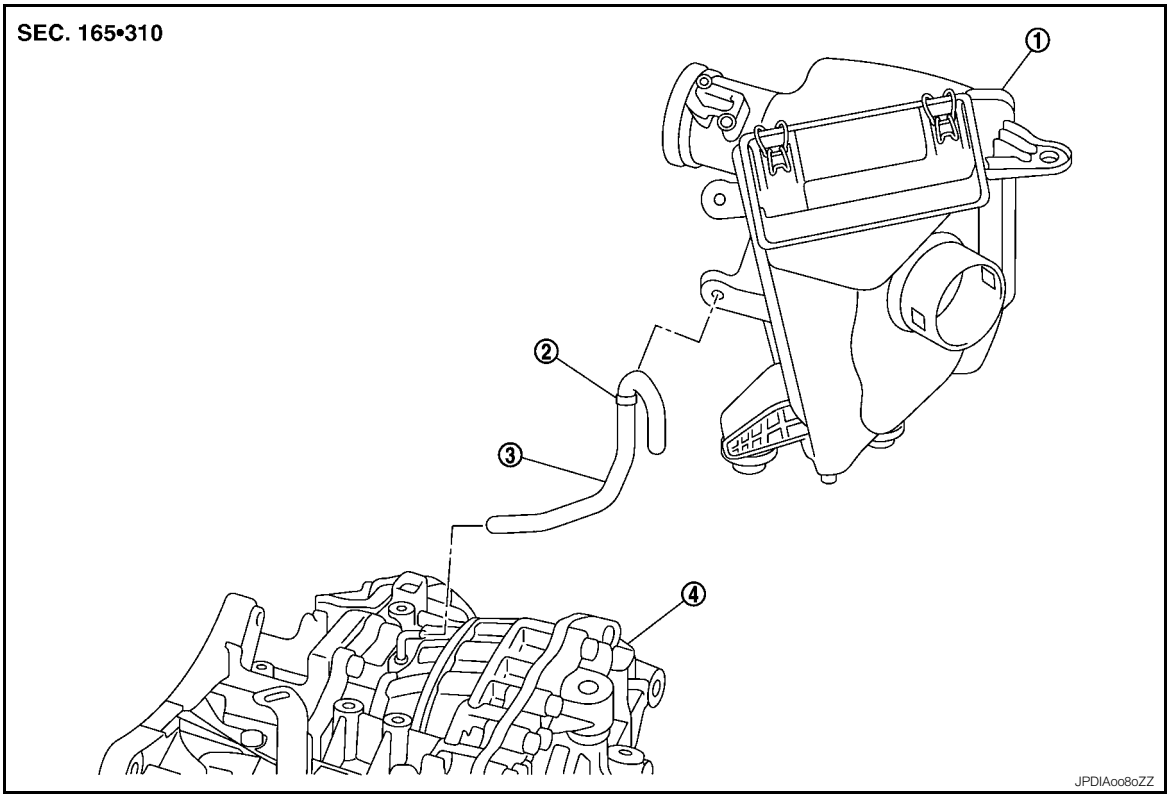
- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

cardiagn.com

AIR BREATHER HOSE

Exploded View

INFOID:0000000000914718



1. Air cleaner assembly
2. Clip
3. Air breather hose
4. Transaxle assembly

Removal and Installation

INFOID:0000000000914719

REMOVAL

1. Remove clip from Air cleaner assembly.
2. Remove Air breather hose from transaxle assembly.

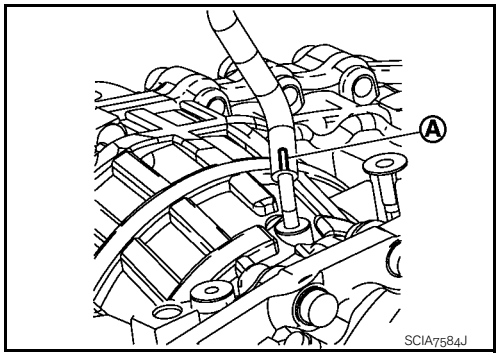
INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Make sure air breather hose not collapsed or blocked due to folding or bending when installed.

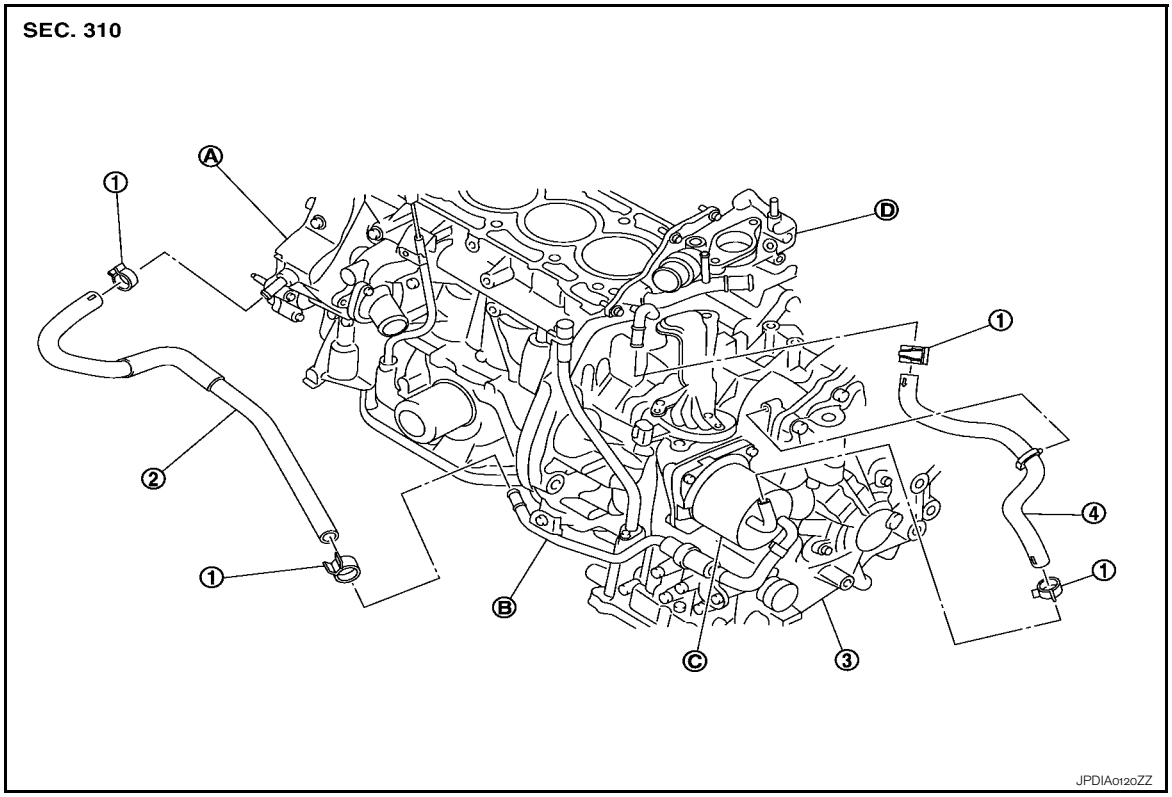
- Install air breather hose to air breather tube so that the paint mark (A) faces upward. Also insert hose to the bend of air breather tube.



cardiagn.com

FLUID COOLER SYSTEM
WATER HOSE
WATER HOSE : Exploded View

INFOID:0000000000967500



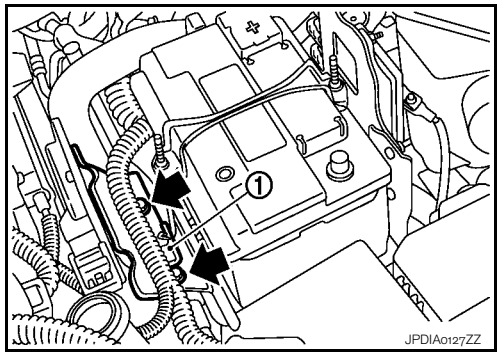
1. Hose clamp
2. CVT water hose A
3. Transaxle assembly
4. CVT water hose B
- A. Thermostat housing
- B. Heater thermostat
- C. CVT fluid cooler
- D. Water outlet

WATER HOSE : Removal and Installation

INFOID:0000000000967503

REMOVAL

1. Remove the TCM. Refer to TM-325, "Exploded View".
2. Remove TCM bracket (1). Refer to TM-325, "Exploded View".



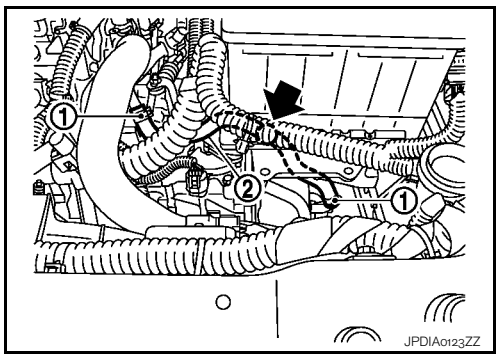
⬅ : Bolt

3. Remove hose clamp, and remove CVT water hose A.

cardiagn.com

4. Remove hose clamp (1), and remove CVT water hose B (2).

⬅ : Clip



INSTALLATION

Note the following, and install in the reverse order of removal.

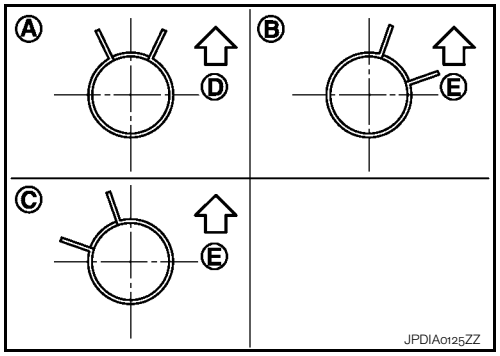
CVT water hose	Hose end	Paint mark	Position of hose clamp*
CVT water hose A	Thermostat housing	Facing upward	B
	Heater thermostat	Facing forward	C
CVT water hose B	CVT fluid cooler	Facing forward	A
	Water outlet	Facing forward	A

*: Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

⇦ D: Front

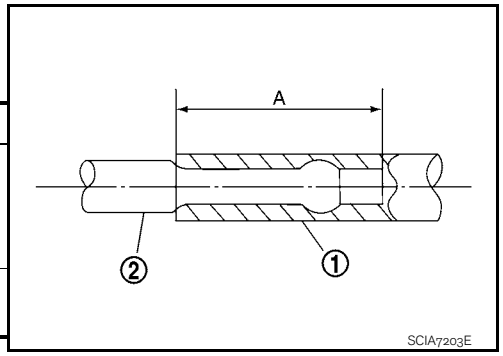
⇦ E: Upper



- When installing hose clamps center line of each clamp tab should be positioned as shown in the figure.

- Insert CVT water hose according to dimension (A) described below.

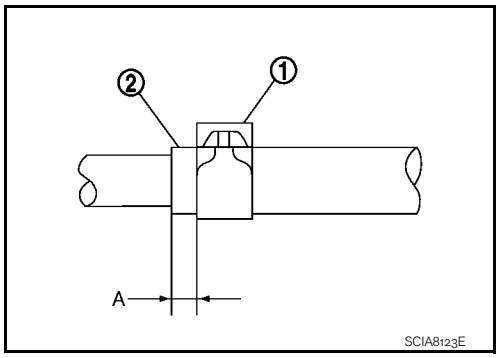
(1)	(2)	Distance A
CVT water hose A	Thermostat housing	27 mm (1.06 in)
	Heater thermostat	
CVT water hose B	Water outlet	
	CVT fluid cooler	End reaches the tube bend R position.



- Set hose clamps (1) from the end of fluid cooler hose (2) according to dimension (A) described below.

Dimension A : 5 – 7 mm (0.20 – 0.28 in)

- Hose clamp should not interfere with the bulge.

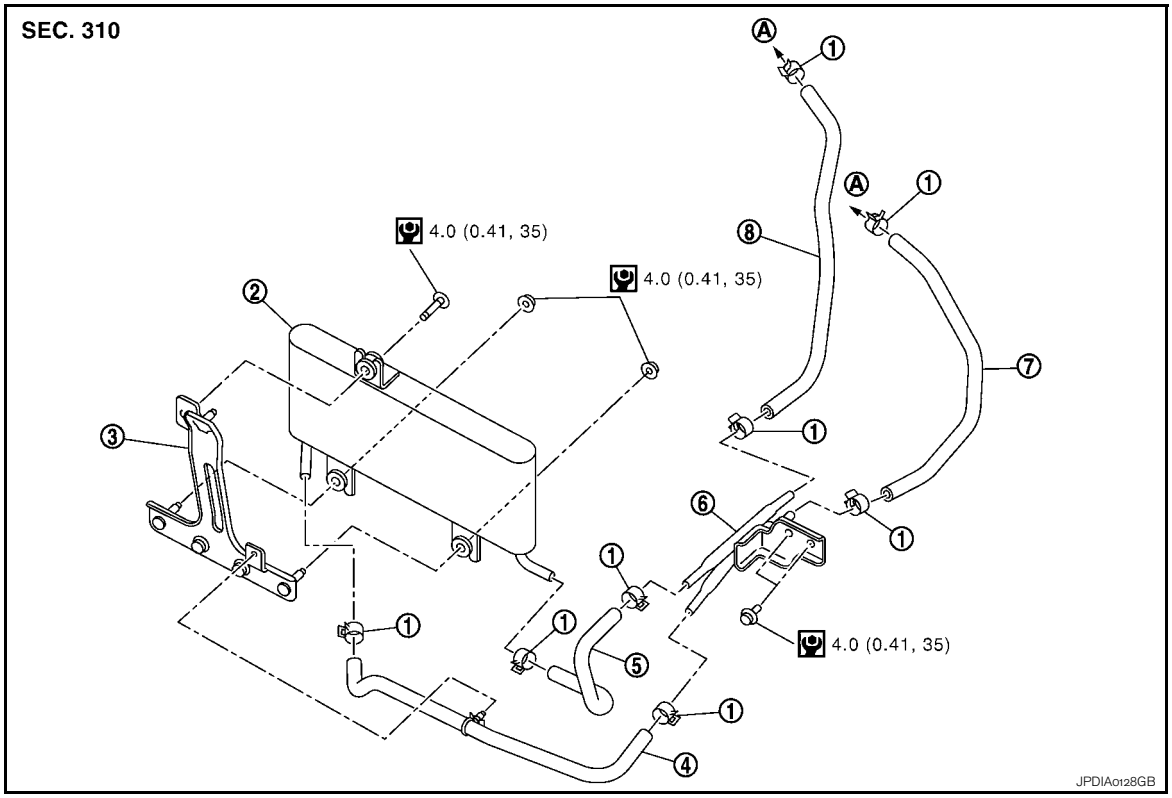


FLUID COOLER

cardiagn.com

FLUID COOLER : Exploded view

INFOID:0000000000967504



1. Hose clamp
2. Fluid cooler
3. Bracket
4. Fluid cooler hose A
5. Fluid cooler hose B
6. Fluid cooler tube
7. Fluid cooler hose D
8. Fluid cooler hose C
A. To CVT fluid cooler

Refer to GI-4, "Components" for symbols in the figure.

FLUID COOLER : Removal and Installation

INFOID:0000000000967505

REMOVAL

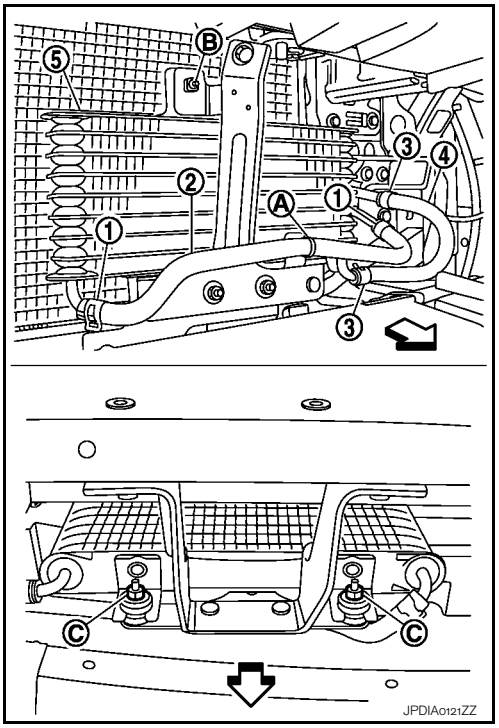
1. Remove engine under cover.
2. Remove front bumper assembly. Refer to EXT-11, "Exploded View".
3. Remove air duct (inlet). Refer to EM-144, "Exploded View".

cardiagn.com

4. Remove clip (A).

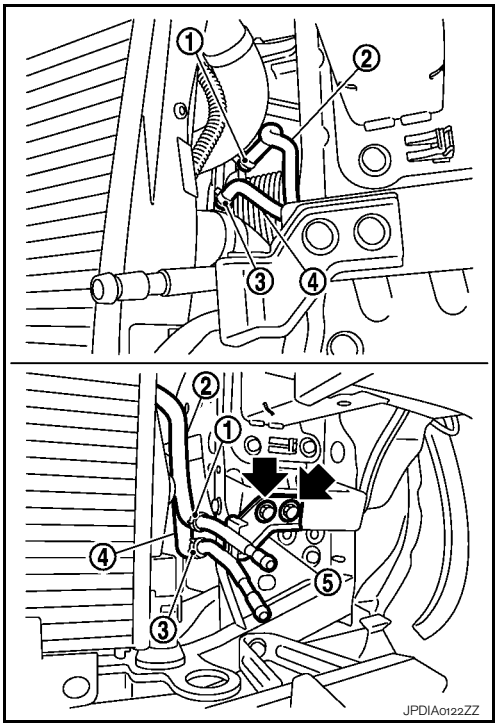
B : Bolt
C : Nut
⇦ : Vehicle front

5. Remove hose clamp (1) and fluid cooler hose A (2).
6. Remove hose clamp (3) and fluid cooler hose B (4).
7. Remove fluid cooler (5).



8. Remove hose clamp (1) and fluid cooler hose C (2).
9. Remove hose clamp (3) and fluid cooler hose D (4).
10. Remove fluid cooler tube (5).

⇦ : Bolt



INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

Fluid cooler hose	Hose end	Paint mark	Position of hose clamp*
Fluid cooler hose A	Fluid cooler side	Facing forward	D
	Fluid cooler tube side	Facing to the left of the vehicle	C

cardiagn.com

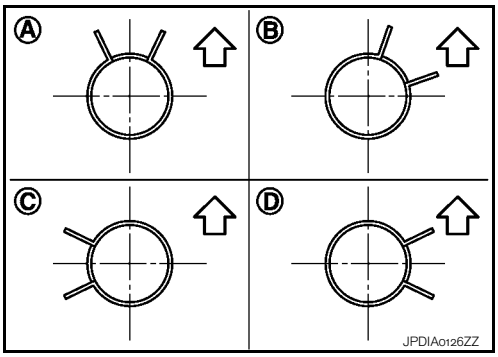
Fluid cooler hose	Hose end	Paint mark	Position of hose clamp*
Fluid cooler hose B	Fluid cooler side	Facing forward	D
	Fluid cooler tube side	Facing to the left of the vehicle	C
Fluid cooler hose C	Fluid cooler tube side	Facing to the Right of the vehicle	C
	CVT fluid cooler side	Facing upward	B
Fluid cooler hose D	Fluid cooler tube side	Facing to the Right of the vehicle	C
	CVT fluid cooler side	Facing upward	A

*: Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

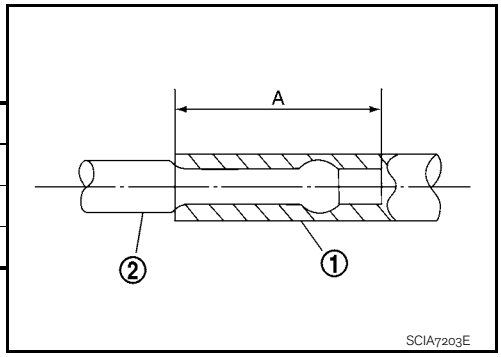
⇦ : Upper

- When installing hose clamps center line of each clamp tab should be positioned as shown in the figure.



- Insert fluid cooler hose according to dimension (A) described below.

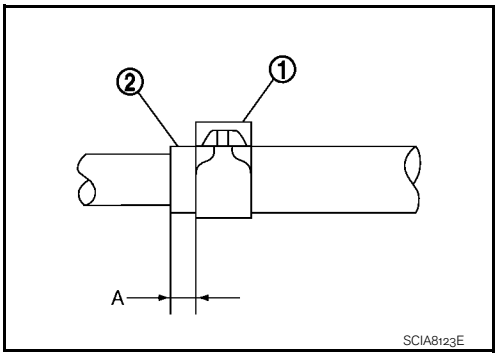
(1)	(2)	Distance A
Fluid cooler hose A, B	Fluid cooler	24 mm (0.94 in)
Fluid cooler hose B, C	Fluid cooler tube	33 mm (1.30 in)
Fluid cooler hose C, D	CVT fluid cooler	30 mm (1.18 in)



- Set hose clamps (1) from the end of fluid cooler hose (2) according to dimension (A) described below.

Dimension A : 5 – 7 mm (0.20 – 0.28 in)

- Hose clamp should not interfere with the bulge.



cardiagn.com

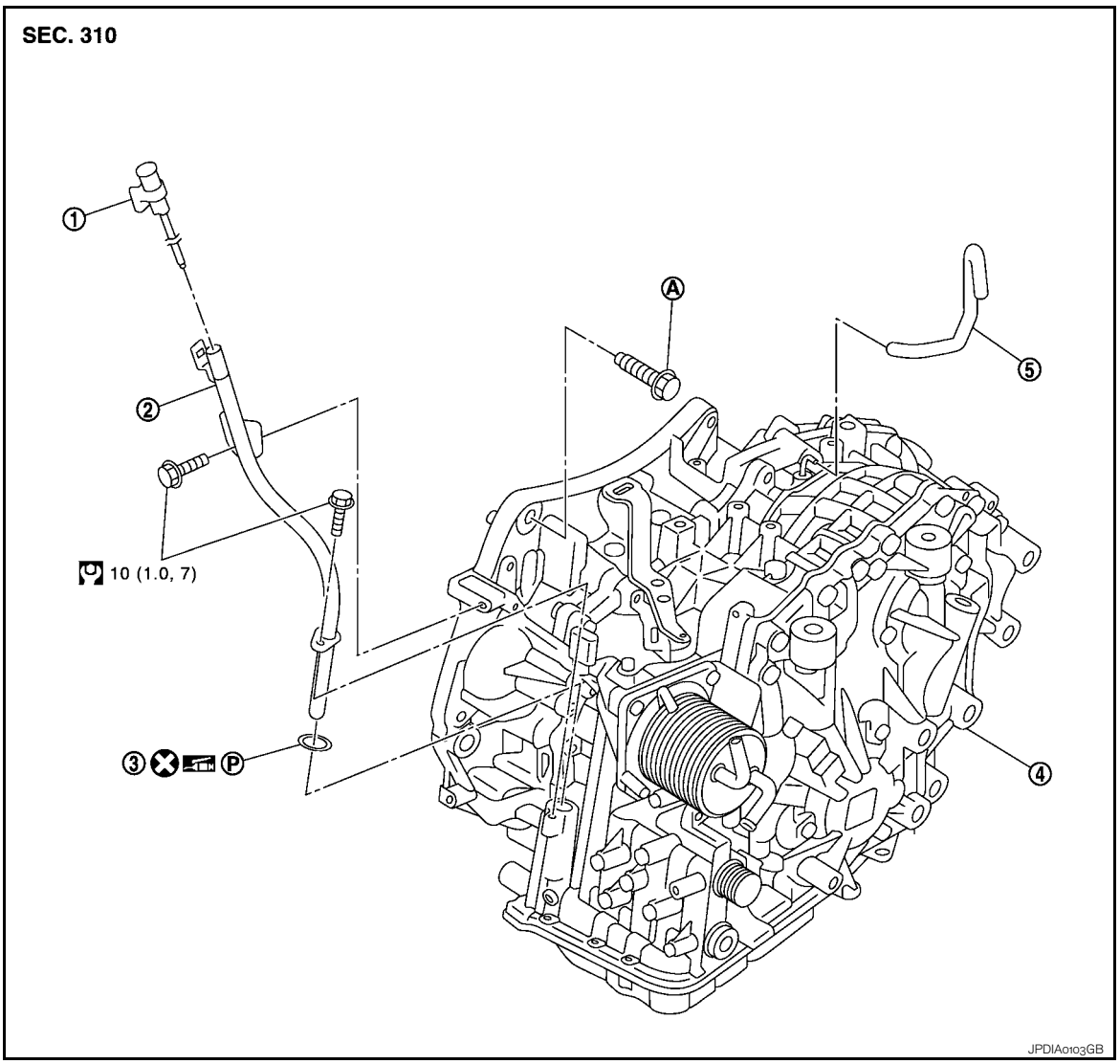
REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

2WD

2WD : Exploded View

INFOID:0000000000914726



1. CVT fluid level gauge
2. CVT fluid charging pipe
3. O-ring
4. Transaxle assembly
5. Air breather hose

A. For tightening torque, refer to TM-351, "2WD : Removal and Installation".

Refer to GI-4, "Components" for symbols not descrived on the above.

2WD : Removal and Installation

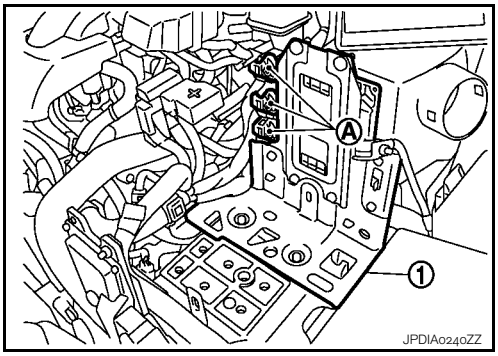
INFOID:0000000000914727

REMOVAL

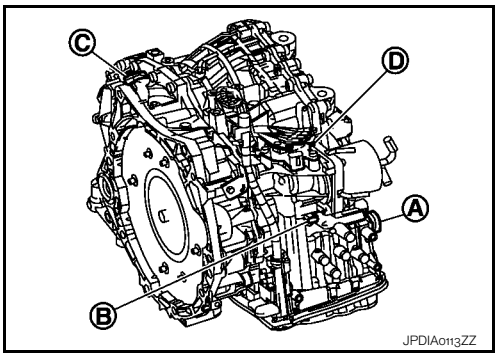
1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-345, "Exploded View".
3. Remove air duct (inlet). Refer to EM-144, "Exploded View".
4. Remove battery. Refer to PG-118, "Exploded View".

cardiagn.com

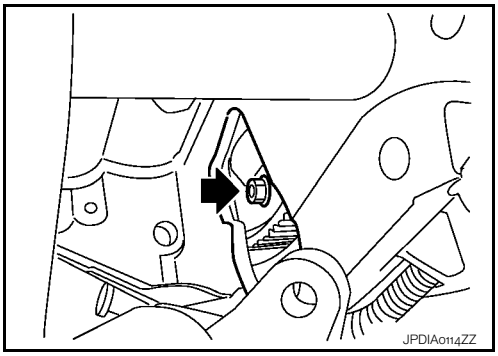
5. Disconnect connectors (A) and then remove bracket (1).
6. Remove air cleaner case. Refer to EM-144, "Exploded View".
7. Drain engine coolant.
8. Remove CVT fluid level gauge.
9. Remove CVT fluid charging pipe from transaxle assembly.
10. Remove O-ring from CVT fluid charging pipe.



11. Disconnect fluid cooler hose from transaxle assembly. Refer to TM-348, "FLUID COOLER : Exploded view".
12. Disconnect following harness connector and wire harness.
    - CVT unit harness connector (A).
    - Primary speed sensor harness connector (B).
    - Secondary speed sensor harness connector (C).
    - PNP switch connector (D).
13. Remove harness and clip from the transaxle assembly.
14. Remove CVT water hose. Refer to TM-346, "WATER HOSE : Exploded View".
15. Remove control cable from transaxle assembly. Refer to TM-330, "Exploded View".
16. Remove starter motor. Refer to STR-25, "MR20DE MODELS : Exploded View".
17. Remove engine under cover with power tool.



18. Turn crankshaft, and remove the four tightening nuts (⬅) for drive plate and torque converter.
    CAUTION:
    When turning crankshaft, turn it clockwise as viewed from the front of the engine.
19. Remove exhaust front tube. Refer to EX-10, "Exploded View".
20. Remove front drive shafts. Refer to FAX-22, "MR20DE MODELS : Exploded View".
21. Remove suspension member from vehicle. Refer to FSU-15, "Exploded View".
22. Support transaxle assembly with a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to collide against the drain plug.
23. Support engine assembly with a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to collide against the drain plug.
24. Remove engine mounting insulator (LH). Refer to EM-198, "CVT : Exploded View".
25. Remove bolts fixing transaxle assembly to engine assembly.
26. Remove transaxle assembly from vehicle.
    CAUTION:
    - **Secure torque converter to prevent it from dropping.**
    - **Secure transaxle assembly to a transmission jack.**
27. Remove heater thermostat. Refer to CO-41, "Exploded View".



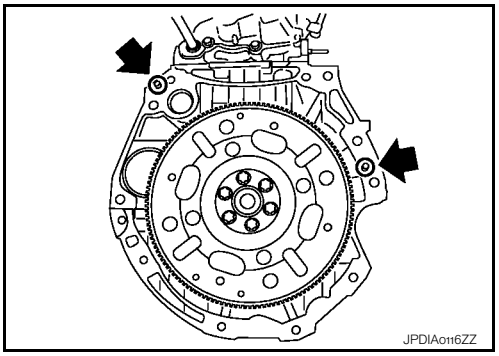
INSTALLATION

Note following, and install the removed parts in the reverse order of the removal.

CAUTION:

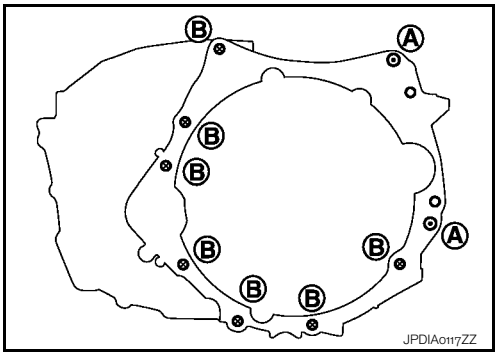
cardiagn.com

- **Check fitting of dowel pin (⬅) when installing transaxle assembly to engine assembly.**



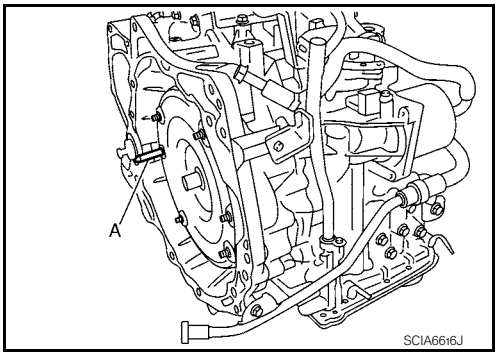
- **When installing Transaxle assembly to the engine assembly, attach the fixing bolts in accordance with the following.**

A : Transaxle to engine
B : Engine to transaxle

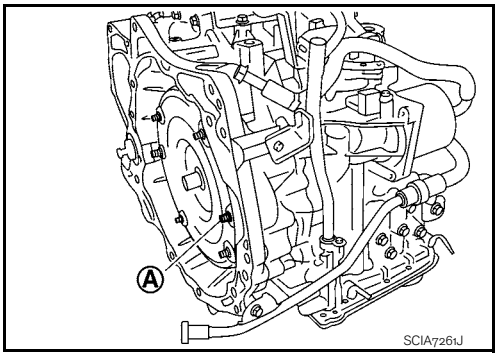


Bolt No.	A	B
Number of bolts	2	7
Bolt length " ℓ " mm (in)	55 (2.17)	50 (1.97)
Tightening torque N·m (kg-m, ft-lb)	62 (6.3, 46)	

- Set and screw in the drive plate location guide (commercial service tool: 31197CA000) (A) onto the stud bolts for the torque converter locate.



- When not using drive plate location guide, rotate torque converter so that the stud bolt (A) for mounting the drive plate location guide of torque converter aligns with the mounting position of starter motor.

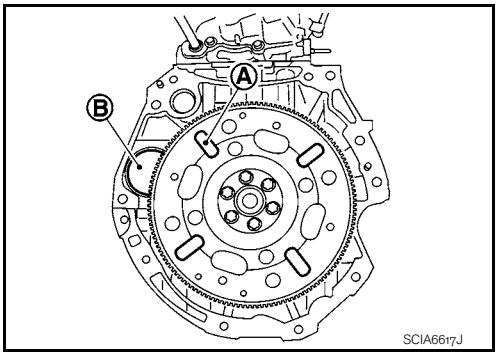


cardiagn.com

- Rotate crankshaft so that the hole (A) for inserting drive plate location guide of drive plate aligns with the mounting position (B) of starter motor.

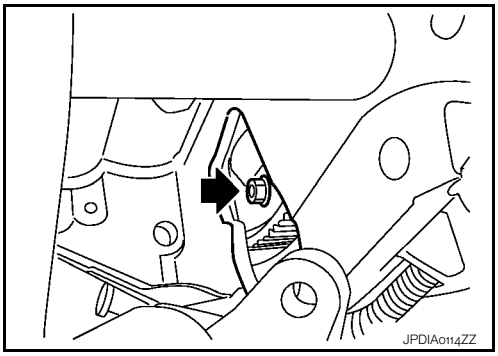
NOTE:
When not using drive plate location guide, insert stud bolt of torque converter into the hole of drive plate, aligning the drive plate hole position and torque converter.

CAUTION:
Note that the stud bolt strikes the drive plate hole position is not aligned the torque converter stud bolt.



- Align the position of tightening nuts (⬅) for drive plate with those of the torque converter, and temporarily tighten the nuts. Then, tighten the bolts with the specified torque.

:51 N·m (5.2 kg-m,38 ft-lb)



CAUTION:
- **When turning crankshaft, turn it clockwise as viewed from the front of the engine.**
- **When tightening the tightening nuts for the torque converter after fixing the crankshaft pulley bolts, confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-163, "Removal and Installation".**
- **After converter is installed to drive plate, rotate crankshaft several turns and check that transaxle rotates freely without binding.**

2WD : Inspection

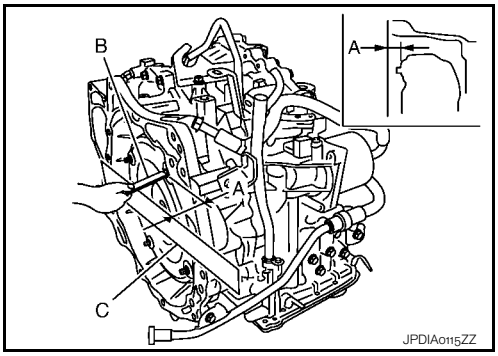
INFOID:0000000000914728

INSPECTION BE FORE INSTALLATION

- After inserting a torque converter to the CVT, check distance (A) with in the reference value limit.

B : Scale
C : Straightedge

Distance (A) : Refer to TM-362, "Removal and Installation".



INSPECTION AFTER INSTALLATION

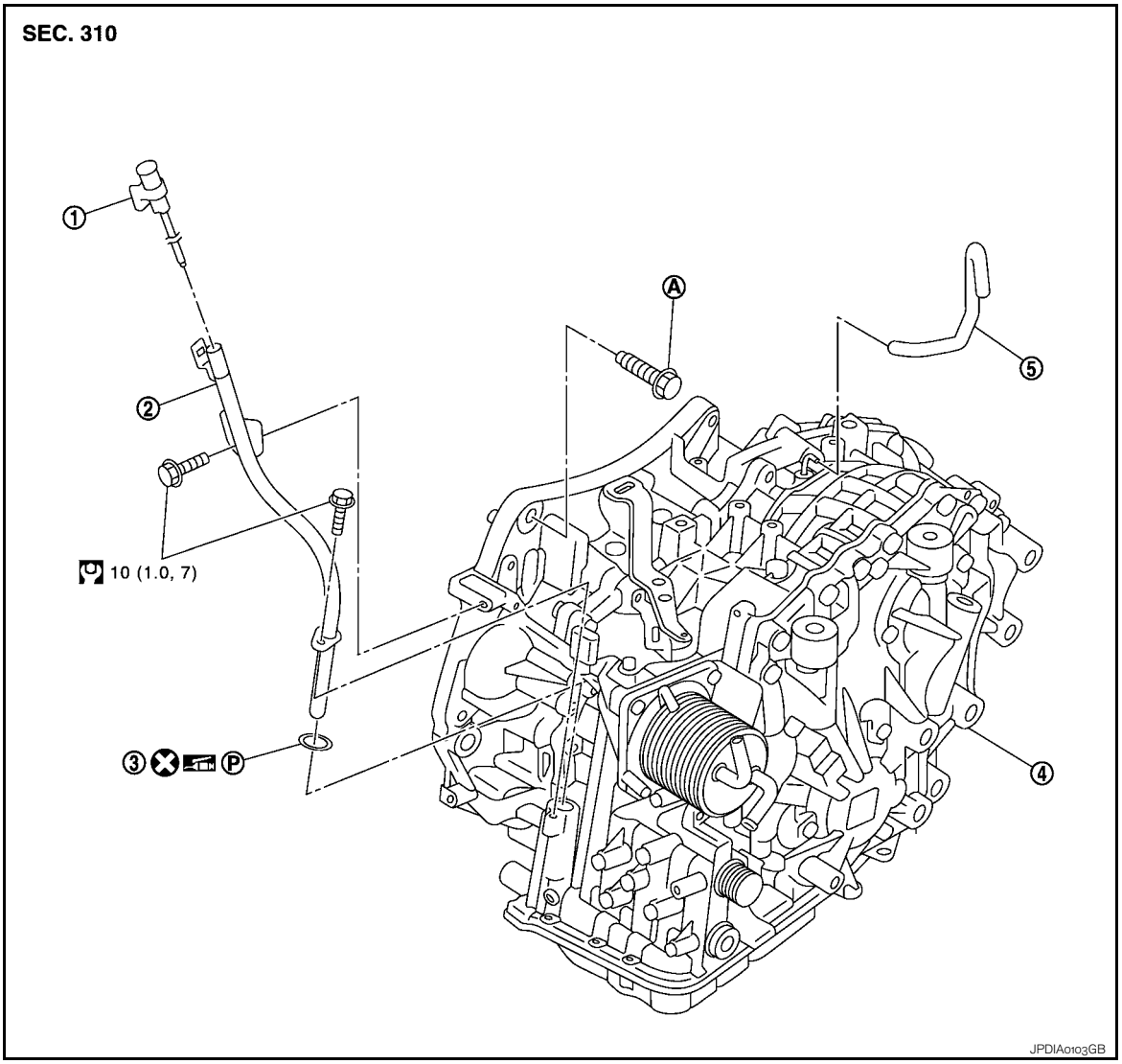
- After completing installation, check the following item.
- CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".
- CVT position. Refer to TM-324, "Inspection and Adjustment".

4WD

4WD : Exploded View

INFOID:0000000001116416

cardiagn.com



1. CVT fluid level gauge
2. CVT fluid charging pipe
3. O-ring
4. Transaxle assembly
5. Air breather hose

A. For tightening torque, refer to TM-355, "4WD : Removal and Installation".

Refer to GI-4, "Components" for symbols not descrived on the above.

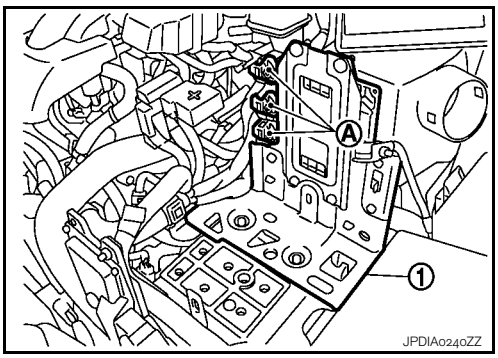
4WD : Removal and Installation

INFOID:0000000001116417

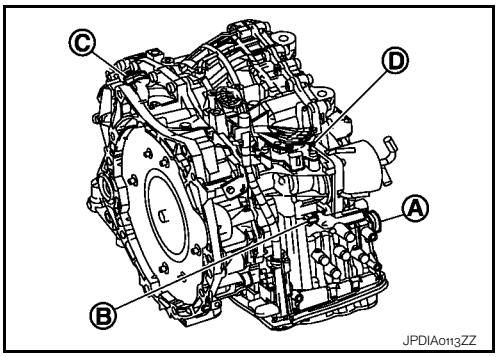
REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-345, "Exploded View".
3. Remove air duct (inlet). Refer to EM-144, "Exploded View".
4. Remove battery. Refer to PG-118, "Exploded View".

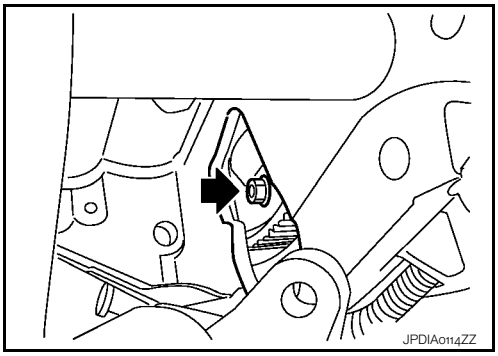
5. Disconnect connectors (A) and then remove bracket (1).
6. Remove air cleaner case. Refer to EM-144, "Exploded View".
7. Drain engine coolant.
8. Remove CVT fluid level gauge.
9. Remove CVT fluid charging pipe from transaxle assembly.
10. Remove O-ring from CVT fluid charging pipe.



11. Disconnect fluid cooler hose from transaxle assembly. Refer to TM-348, "FLUID COOLER : Exploded view".
12. Disconnect following harness connector and wire harness.
    - CVT unit harness connector (A).
    - Primary speed sensor harness connector (B).
    - Secondary speed sensor harness connector (C).
    - PNP switch connector (D).
13. Remove harness and clip from the transaxle assembly.
14. Remove CVT water hose. Refer to TM-346, "WATER HOSE : Exploded View".
15. Remove control cable from transaxle assembly. Refer to TM-330, "Exploded View".
16. Remove starter motor. Refer to STR-25, "MR20DE MODELS : Exploded View".
17. Remove engine under cover with power tool.



18. Turn crankshaft, and remove the four tightening nuts (⬅) for drive plate and torque converter.
    CAUTION:
    When turning crankshaft, turn it clockwise as viewed from the front of the engine.
19. Remove exhaust front tube. Refer to EX-10, "Exploded View".
20. Separate the propeller shaft. Refer to DLN-110, "Exploded View".
21. Remove front drive shafts. Refer to FAX-22, "MR20DE MODELS : Exploded View".
22. Remove suspension member from vehicle. Refer to FSU-15, "Exploded View".



23. Remove transfer assembly from transaxle assembly with power tool. Refer to DLN-59, "CVT : Exploded View".
24. Support transaxle assembly with a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to collide against the drain plug.
25. Support engine assembly with a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to collide against the drain plug.
26. Remove engine mounting insulator (LH). Refer to EM-198, "CVT : Exploded View".
27. Remove bolts fixing transaxle assembly to engine assembly.
28. Remove transaxle assembly from vehicle.
    CAUTION:
    - **Secure torque converter to prevent it from dropping.**
    - **Secure transaxle assembly to a transmission jack.**
29. Remove heater thermostat. Refer to CO-41, "Exploded View".

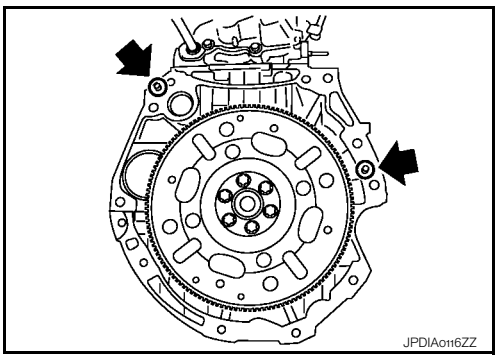
INSTALLATION

cardiagn.com

Note following, and install the removed parts in the reverse order of the removal.

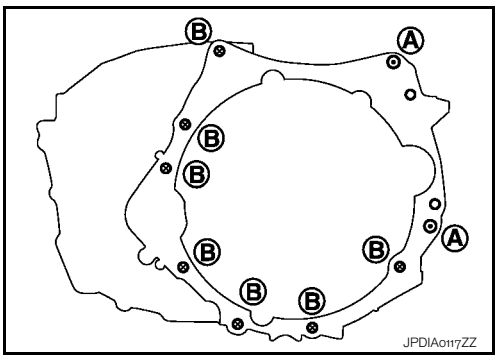
CAUTION:

- **Check fitting of dowel pin (⬅) when installing transaxle assembly to engine assembly.**



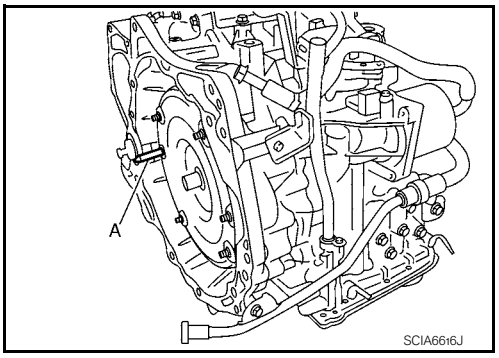
- **When installing transaxle assembly to the engine assembly, attach the fixing bolts in accordance with the following.**

A : Transaxle to engine
B : Engine to transaxle

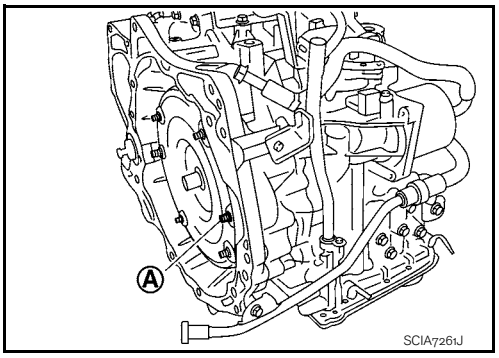


Bolt No.	A	B
Number of bolts	2	7
Bolt length " ℓ " mm (in)	55 (2.17)	50 (1.97)
Tightening torque N·m (kg-m, ft-lb)	62 (6.3, 46)	

- Set and screw in the drive plate location guide (commercial service tool: 31197CA000) (A) onto the stud bolts for the torque converter locate.



- When not using drive plate location guide, rotate torque converter so that the stud bolt (A) for mounting the drive plate location guide of torque converter aligns with the mounting position of starter motor.

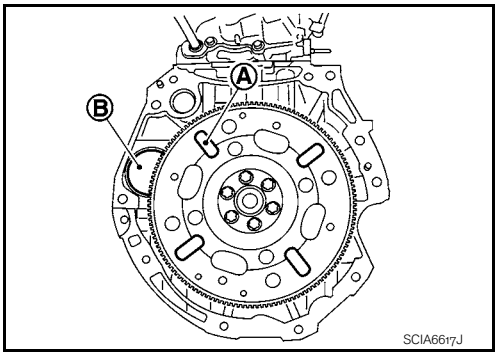


cardiagn.com

- Rotate crankshaft so that the hole (A) for inserting drive plate location guide of drive plate aligns with the mounting position (B) of starter motor.

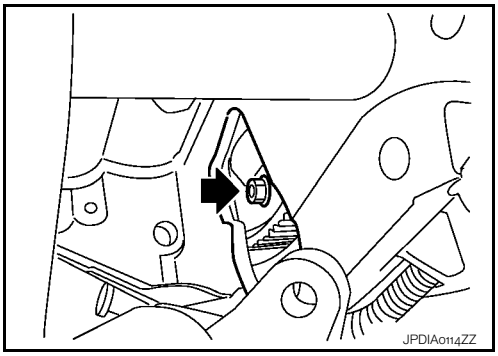
NOTE:
When not using drive plate location guide, insert stud bolt of torque converter into the hole of drive plate, aligning the drive plate hole position and torque converter.

CAUTION:
Note that the stud bolt strikes the drive plate hole position is not aligned the torque converter stud bolt.



- Align the position of tightening nuts (⬅) for drive plate with those of the torque converter, and temporarily tighten the nuts. Then, tighten the bolts with the specified torque.

:51 N·m (5.2 kg-m,38 ft-lb)



CAUTION:
- **When turning crankshaft, turn it clockwise as viewed from the front of the engine.**
- **When tightening the tightening nuts for the torque converter after fixing the crankshaft pulley bolts, confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-163, "Removal and Installation".**
- **After converter is installed to drive plate, rotate crankshaft several turns and check that transaxle rotates freely without binding.**

4WD : Inspection

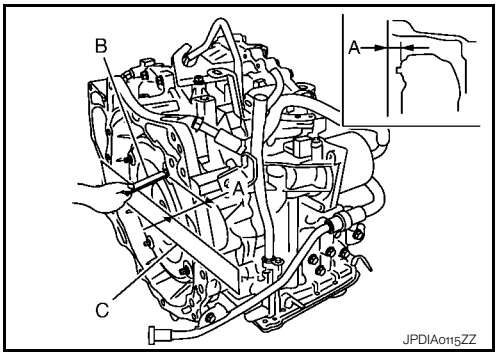
INFOID:0000000001116418

INSPECTION BE FORE INSTALLATION

- After inserting a torque converter to the CVT, check distance (A) with in the reference value limit.

B : Scale
C : Straightedge

Distance (A) : Refer to TM-362, "Removal and Installation".



INSPECTION AFTER INSTALLATION

- After completing installation, check the following item.
- CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".
- CVT position. Refer to TM-324, "Inspection and Adjustment".

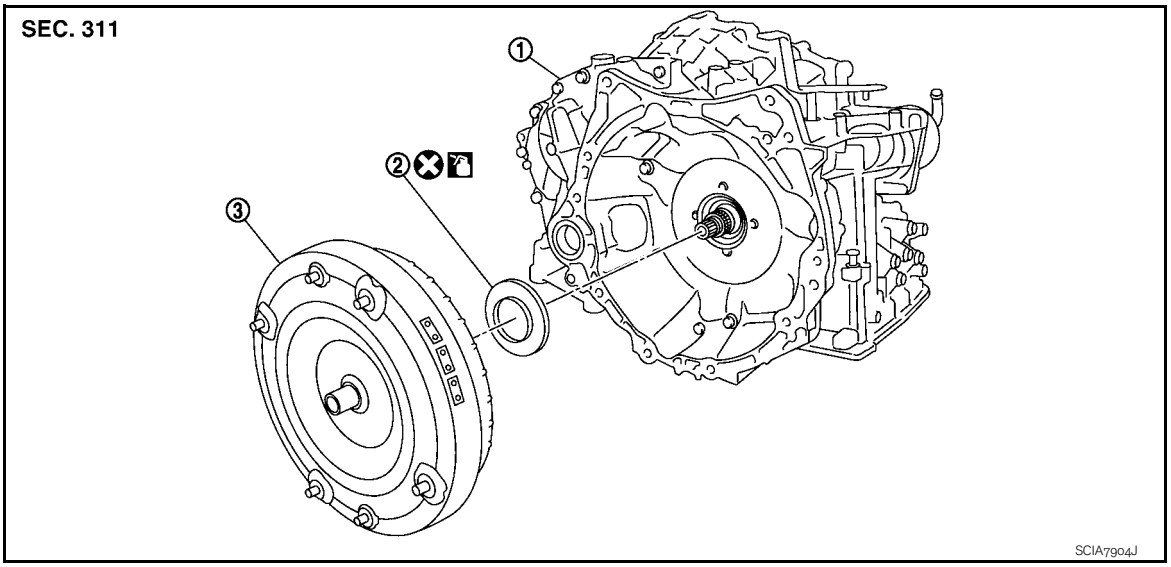
cardiagn.com

DISASSEMBLY AND ASSEMBLY

TORQUE CONVERTER AND CONVERTER HOUSING OIL SEAL

Exploded View

INFOID:0000000000987937



1. Transaxle assembly
2. Converter housing oil seal
3. Torque converter

: Apply CVT Fluid NS-2.

Refer to GI-4, "Components" for symbols not described on the above.

Disassembly

INFOID:0000000000987938

1. Remove transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).
2. Remove torque converter from transaxle assembly.
   CAUTION:
   Never damage bush on the inside of torque converter sleeve when removing torque converter.
3. Remove converter housing oil seal using a flat-bladed screwdriver.
   CAUTION:
   Be careful not to scratch converter housing.

Assembly

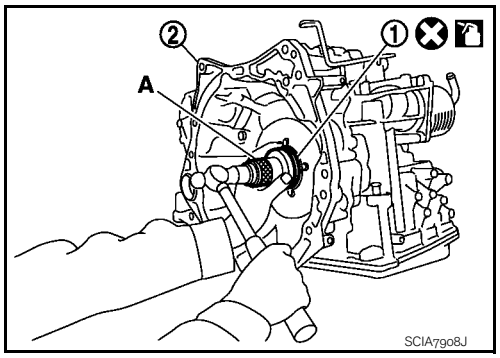
INFOID:0000000000987939

Note the following, and install in the reverse order of removal.

- Drive converter housing oil seal (1) evenly using a drift (A) (commercial service tool) so that converter housing oil seal protrudes by the dimension (B" respectively.

Unit: mm (in)

Commercial service tool: A	Outer diameter: 65 (2.56)
	Inner diameter: 60 (2.36)

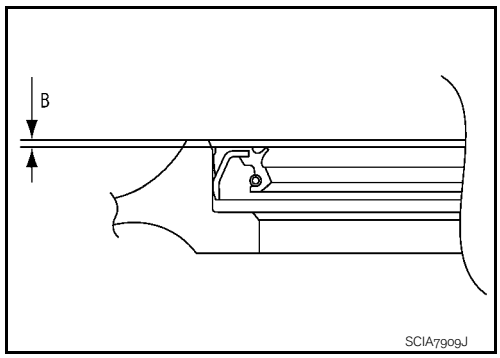


2 : Transaxle assembly

cardiagn.com

Unit: mm (in)

Dimension B	1.0 ± 0.5 (0.039 ± 0.020)

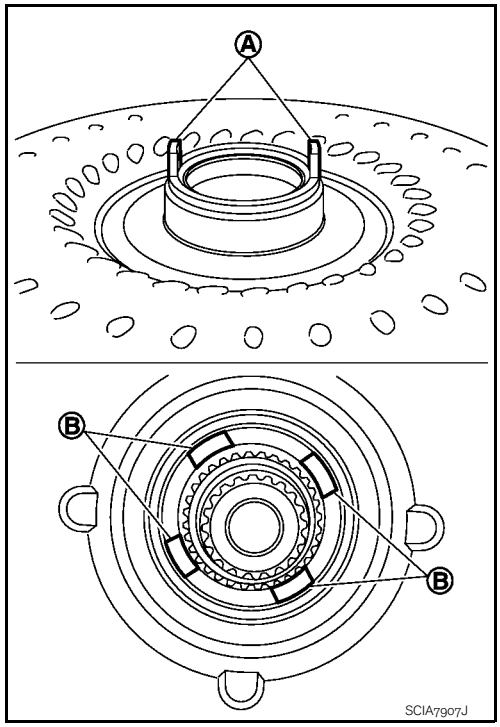


NOTE:
Converter housing oil seal pulling direction is used as the reference.

- After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

- Attach the pawl (A) of the torque converter to the drive sprocket hole (B) on the transaxle assembly side.

CAUTION:
- **Rotate the torque converter for installing torque converter.**
- **Never damage the bushing inside the torque converter sleeve when installing the converter housing oil seal.**



Inspection

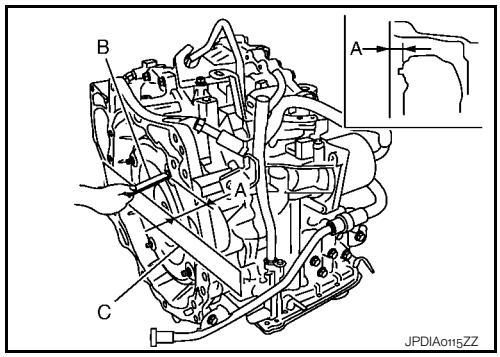
INFOID:0000000001116442

INSPECTION AFTER INSTALLATION

- After inserting a torque converter to the CVT, check distance (A) with in the reference value limit.

B : Scale
C : Straightedge

Distance (A) : Refer to TM-362, "Removal and Installation".



cardiagn.com

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000000914729

Applied model		MR20DE	
		2WD	4WD
CVT model		RE0F10A	
CVT assembly	Model code number	1XF0D	1XF0E
Transmission gear ratio	D range	2.349 – 0.394	
	Reverse	1.750	
	Final drive	6.466	
Recommended fluid		NISSAN CVT Fluid NS-2*1	
Fluid capacity		8.3 liter (7-1/4 Imp qt)	

CAUTION:

- **Use only Genuine NISSAN CVT Fluid NS-2. Do not mix with other fluid.**
- **Using CVT fluid other than Genuine NISSAN CVT Fluid NS-2 will deteriorate in driveability and CVT durability, and may damage the CVT, which is not covered by the warranty.**

*1: Refer to MA-21, "Fluids and Lubricants".

Vehicle Speed When Shifting Gears

INFOID:0000000000914730

Numerical value data are reference values.

(rpm)

Engine type	Throttle position	Shift pattern	Engine speed	
			At 40 km/h (25 MPH)	At 60 km/h (37 MPH)
MR20DE	8/8	“D” position	3,600 – 4,500	4,500 – 5,400
	2/8	“D” position	1,200 – 3,100	1,300 – 3,500

CAUTION:

Lock-up clutch is engaged when vehicle speed is approximately 18 km/h (11 MPH) to 90 km/h (56 MPH).

Stall Speed

INFOID:0000000000914731

Stall speed	2,500 – 3,000 rpm

Line Pressure

INFOID:0000000000914732

kPa (bar, kg/cm^2, psi)

Engine speed	Line pressure
	“R” or “D” positions
At idle	750 (7.50, 7.65, 108.8)
At stall	5,700 (57.00, 58.14, 826.5)*

*: Reference values

Solenoid Valves

INFOID:0000000000914733

cardiagn.com

Name	Resistance (Approx.)	Terminal
Pressure control solenoid valve B (secondary pressure solenoid valve)	3.0 – 9.0 Ω	3
Pressure control solenoid valve A (line pressure solenoid valve)		2
Torque converter clutch solenoid valve		12
Lock-up select solenoid valve	17.0 – 38.0 Ω	13

CVT Fluid Temperature Sensor

INFOID:0000000000914734

Name	Condition	CONSULT-III "DATA MONITOR" (Approx.)	Resistance (Approx.)
CVT fluid temperature sensor	20°C (68°F)	2.0 V	6.5 kΩ
	80°C (176°F)	1.0 V	0.9 kΩ

Primary Speed Sensor

INFOID:0000000000914735

Name	Condition	Data (Approx.)
Primary speed sensor	When driving ["M1" position, 20 km/h (12 MPH)]	800 Hz

Secondary Speed Sensor

INFOID:0000000000914736

Name	Condition	Data (Approx.)
Secondary speed sensor	When driving ["D" position, 20 km/h (12 MPH)]	500 Hz

Removal and Installation

INFOID:0000000000914737

Distance between end of converter housing and torque converter	14.4 mm (0.567 in)

cardiagn.com

SECTION VTL
VENTILATION SYSTEM

CONTENTS

AUTOMATIC AIR CONDITIONER

FUNCTION DIAGNOSIS 4

SWITCHES AND THEIR CONTROL FUNCTION 4
System Description 4

AIR DISTRIBUTION 5
System Description 5

PRECAUTION 6

PRECAUTIONS 6
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 6
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 6
Precaution for Procedure without Cowl Top Cover 6
Precautions For Xenon Headlamp Service 7
Working with HFC-134a (R-134a) 7
General Refrigerant Precaution 7
Refrigerant Connection 8
Service Equipment 11

COMPRESSOR 13
General Precautions 13

FLUORESCENT LEAK DETECTOR 14
General Precautions 14

PREPARATION 15

PREPARATION 15
HFC-134a (R-134a) Service Tools and Equipment 15
Sealant or/and Lubricant 17

ON-VEHICLE MAINTENANCE 18

AIR CONDITIONER FILTER 18
Exploded View 18
Removal and Installation 18
Replacement 19

ON-VEHICLE REPAIR 20

PRESET SWITCH 20
Exploded View 20
Removal and Installation 20

AUTO AMP. 21
Exploded View 21
Removal and Installation 21

AMBIENT SENSOR 22
Exploded View 22
Removal and Installation 22

IN-VEHICLE SENSOR 23
Exploded View 23
Removal and Installation 23

SUNLOAD SENSOR 24
Exploded View 24
Removal and Installation 24

INTAKE SENSOR 25
Exploded View 25
Removal and Installation 25

BLOWER UNIT 27
Exploded View 27
Removal and Installation 27

BLOWER MOTOR 29
Exploded View 29
Removal and Installation 29

INTAKE DOOR MOTOR 31
Exploded View 31
Removal and Installation 31

HEATER & COOLING UNIT ASSEMBLY 32
Exploded View 32

Removal and Installation 32

MODE DOOR MOTOR 35
Exploded View 35
Removal and Installation 35

HIGH-LEVEL VENTILATOR DOOR MOTOR ... 37
Exploded View 37
Removal and Installation 37

AIR MIX DOOR MOTOR 39
Exploded View 39
Removal and Installation 39

HEATER CORE 41
Exploded View 41
Removal and Installation 41

DUCTS AND GRILLES 43

CENTER VENTILATOR GRILLES 43
CENTER VENTILATOR GRILLES : Exploded View 43
CENTER VENTILATOR GRILLES : Removal and Installation 43

SIDE VENTILATOR GRILLES 44
SIDE VENTILATOR GRILLES : Exploded View 44
SIDE VENTILATOR GRILLES : Removal and Installation 44

FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT 45
FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT : Exploded View 45
FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT : Removal and Installation 46

SIDE DEFROSTER DUCTS 46
SIDE DEFROSTER DUCTS : Exploded View 46
SIDE DEFROSTER DUCTS : Removal and Installation 46

FOOT DUCTS 47
FOOT DUCTS : Exploded View 47
FOOT DUCTS : Removal and Installation 48

FLOOR DUCTS 49
FLOOR DUCTS : Exploded View 49
FLOOR DUCTS : Removal and Installation 50

MANUAL AIR CONDITIONER

FUNCTION DIAGNOSIS 51

SWITCHES AND THEIR CONTROL FUNCTION 51
System Description 51

AIR DISTRIBUTION 52
System Description 52

PRECAUTION 53

PRECAUTIONS 53
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 53
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 53
Precaution for Procedure without Cowl Top Cover... 53
Precautions For Xenon Headlamp Service 54
Working with HFC-134a (R-134a) 54
General Refrigerant Precaution 54
Refrigerant Connection 55
Service Equipment 58

COMPRESSOR 60
General Precautions 60

FLUORESCENT LEAK DETECTOR 61
General Precautions 61

PREPARATION 62

PREPARATION 62
HFC-134a (R-134a) Service Tools and Equipment ... 62
Sealant or/and Lubricant 64

ON-VEHICLE MAINTENANCE 65

MODE DOOR 65
Exploded View 65
Adjustment 65

AIR MIX DOOR 67
Exploded View 67
Adjustment 67

AIR CONDITIONER FILTER 69
Exploded View 69
Removal and Installation 69
Replacement 70

ON-VEHICLE REPAIR 71

PRESET SWITCH 71
Exploded View 71
Removal and Installation 71

HEATER CONTROL PANEL 72
Exploded View 72
Removal and Installation 72

AMBIENT SENSOR 74
Exploded View 74
Removal and Installation 74

IN-VEHICLE SENSOR 75
Exploded View 75
Removal and Installation 75

SUNLOAD SENSOR 76

cardiagn.com

Exploded View 76
Removal and Installation 76

BLOWER UNIT 77
Exploded View 77
Removal and Installation 77

BLOWER MOTOR 79
Exploded View 79
Removal and Installation 79

INTAKE DOOR MOTOR 81
Exploded View 81
Removal and Installation 81

HEATER & COOLING UNIT ASSEMBLY 82
Exploded View 82
Removal and Installation 82

HIGH-LEVEL VENTILATOR DOOR MOTOR 85
Exploded View 85
Removal and Installation 85

HEATER CORE 87
Exploded View 87
Removal and Installation 87

DUCTS AND GRILLES 89

CENTER VENTILATOR GRILLES 89
CENTER VENTILATOR GRILLES : Exploded View 89
CENTER VENTILATOR GRILLES : Removal and Installation 89

SIDE VENTILATOR GRILLES 89
SIDE VENTILATOR GRILLES : Exploded View 89
SIDE VENTILATOR GRILLES : Removal and Installation 90

FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT 90
FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT : Exploded View 90
FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT : Removal and Installation 91

SIDE DEFROSTER DUCTS 91
SIDE DEFROSTER DUCTS : Exploded View 91
SIDE DEFROSTER DUCTS : Removal and Installation 92

FOOT DUCTS 93
FOOT DUCTS : Exploded View 93
FOOT DUCTS : Removal and Installation 94

FLOOR DUCTS 94
FLOOR DUCTS : Exploded View 94
FLOOR DUCTS : Removal and Installation 95

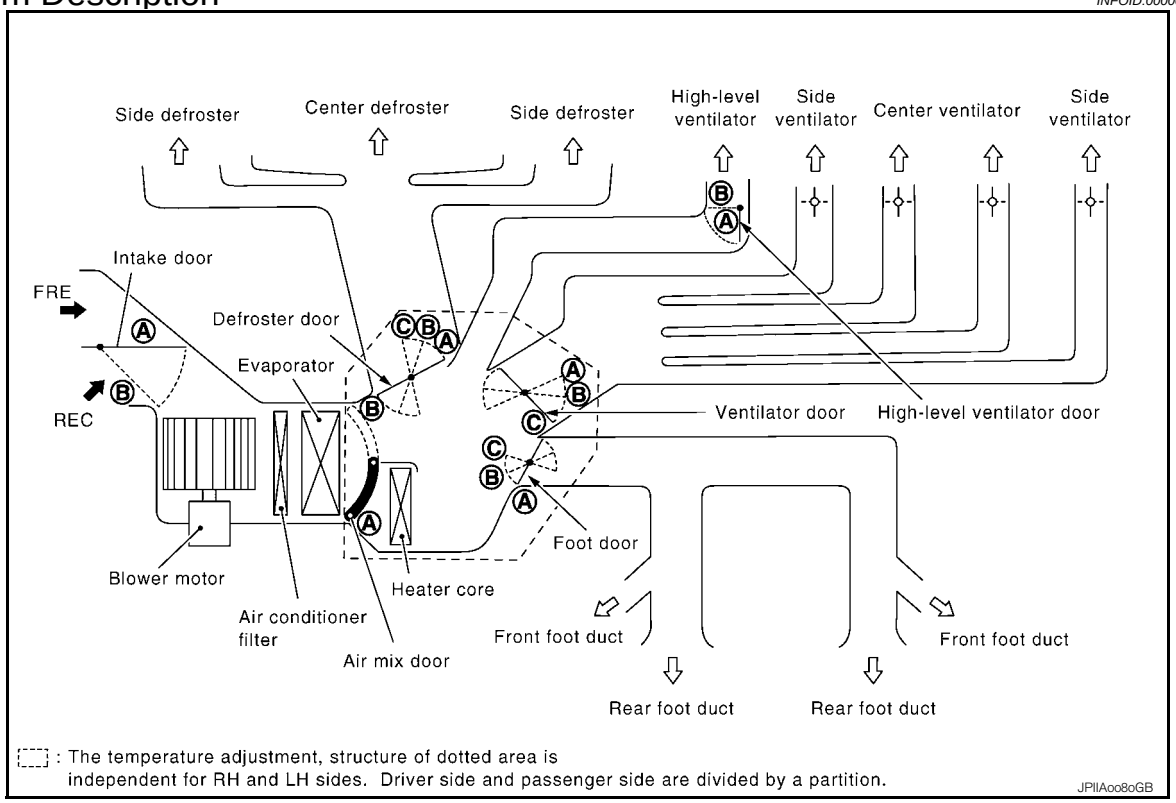
cardiagn.com

FUNCTION DIAGNOSIS

SWITCHES AND THEIR CONTROL FUNCTION

System Description

INFOID:0000000001093683



: The temperature adjustment, structure of dotted area is independent for RH and LH sides. Driver side and passenger side are divided by a partition.

JPIIAoo80GB

Door \ Position or Switch	DUAL SW ON	DUAL SW OFF	MODE SW VENT	MODE SW B/L	MODE SW FOOT	MODE SW D/F	DEF SW ON	DEF SW OFF	High-level ventilator SW ON	High-level ventilator SW OFF	AUTO SW	Intake SW FRE SW	Intake SW REC SW	Temperature control dial (Driver side)	Temperature control dial (Passenger side)	ON/OFF SW
	DUAL										AUTO			16°C ⇔ 30°C	16°C ⇔ 30°C	OFF
Ventilator door	—		A	B	C	C	C									C
Defroster door	—		A	A	A B *1	C	A									A B *1
Foot door	—		A	B	C	B	C									C
High-level ventilator door	—		—	—	—	—	—		A	B	—					—
Intake door	—		—			B	B				—	B *2	A *2			AUTO
Air mix door (Driver side)	—		—				—					—		A AUTO B	—	
Air mix door (Passenger side)	ON		—				—		—	—	AUTO	—		—	A AUTO B	—
	OFF		—				—					—		A AUTO B	—	

* 1 This position is selected only when the mode door is automatic controlled.
* 2 Inlet status is displayed under the automatic control.

JPIIAoo81GB

cardiagn.com

AIR DISTRIBUTION

System Description

INFOID:0000000001093685

Fan speed display	Discharge air flow							
	Automatically controls the mode door				Manually controls the mode door			
	VENT	FOOT		DEF	VENT	FOOT		DEF
		Front	Rear			Front	Rear	
1st speed (Initial setting)	15%	39%	26%	20%	19%	49%	32%	–
2nd speed	15%	39%	26%	20%	15%	39%	26%	20%
3rd speed	19%	49%	32%	–	15%	39%	26%	20%
4th speed	19%	49%	32%	–	19%	49%	32%	–

JPIIA0105GB

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001115378

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001115380

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

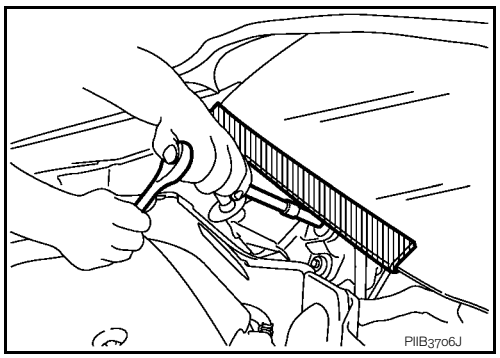
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001115382

cardiagn.com

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:0000000001115385

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

Working with HFC-134a (R-134a)

INFOID:0000000001093690

CAUTION:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed and compressor malfunction is likely occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**

- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.**

General Refrigerant Precaution

INFOID:0000000001093691

WARNING:

- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**

cardiagn.com

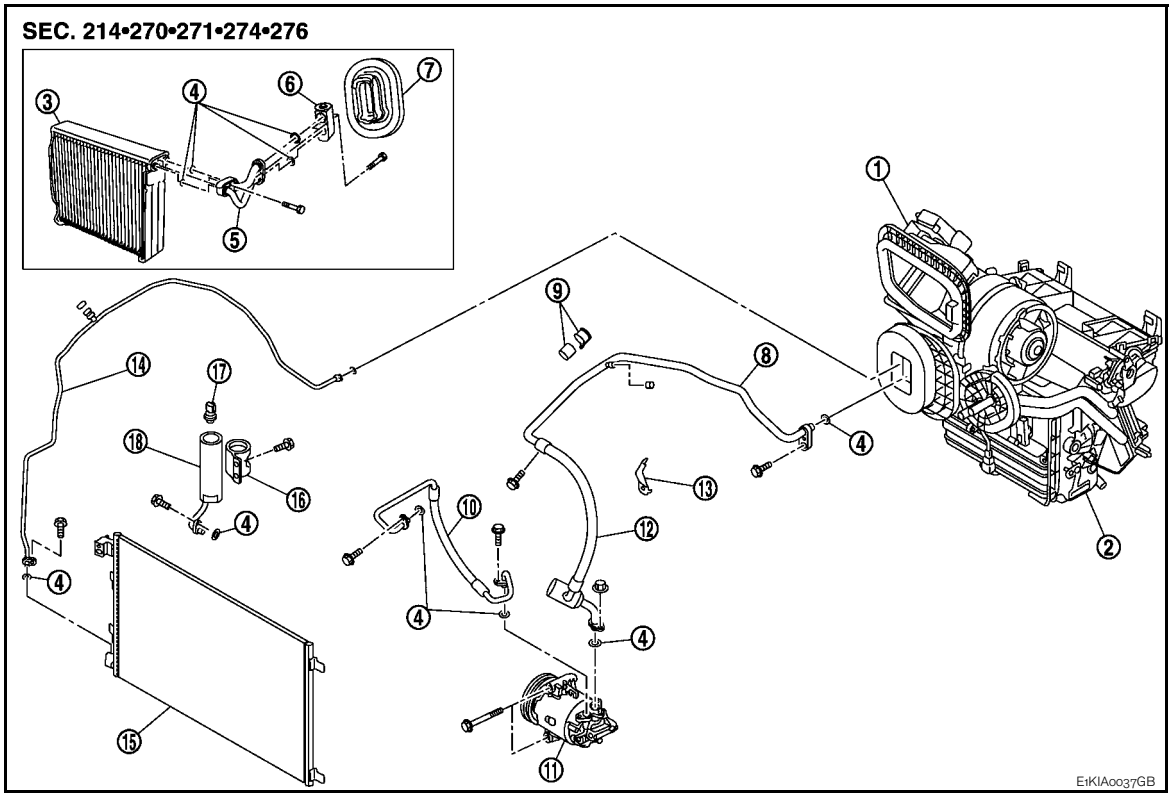
- **Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Never store or heat refrigerant containers above 52°C (126°F).**
- **Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Never intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Refrigerant Connection

INFOID:0000000001093692

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.
- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

O-RING AND REFRIGERANT CONNECTION (HR/MR)



1. Heater sealing
2. Expansion valve
3. O-ring
4. Evaporator
5. Evaporator connector pipes
6. Connector pipe fixing bolt
7. High pressure pipe
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & Blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Pipe fixing bolt
16. Low pressure flexible hose assembly
17. Low & high pipe bracket support
18. Low pressure flexible hose
19. Pipes fixing clip
20. Low pipe fixing clamp assembly
21. Liquid tank fixing screw
22. Liquid tank fixing bracket
23. High pressure flexible hose

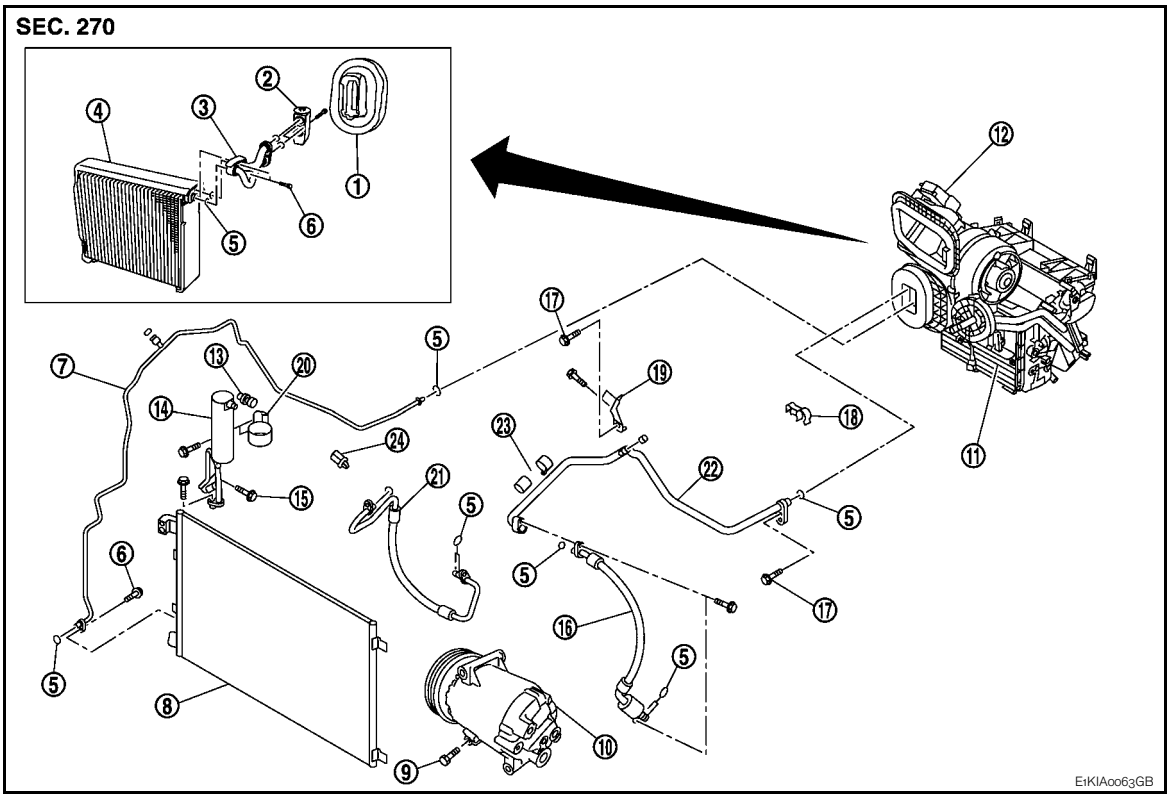
cardiagn.com

CAUTION:
The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure pipe 2 assembly to expansion valve	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure pipe 2 assembly to evaporator	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		92474 N8210	2	19
	Compressor to high pressure flexible hose		92474 N8210	2	12
	Liquid tank to condenser		92473 N8210	1	16

O-RING AND REFRIGERANT CONNECTION (K9K)



1. Heater sealing
2. Expansion valve
3. Evaporator connector pipes
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & Blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip

19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

CAUTION:
The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure flexible hose to Low pressure pipe 2		92473 N8210	1	16
	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure	Inlet	92475 71L00	1	12
	Pipe 2 assembly to expansion valve	Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure	Inlet	92475 71L00	1	12
	Pipe 2 assembly to evaporator	Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		01-57-112	2	19
	Compressor to high pressure flexible hose		01-57-112	2	12
	Liquid tank to condenser		92473 N8210	2	16

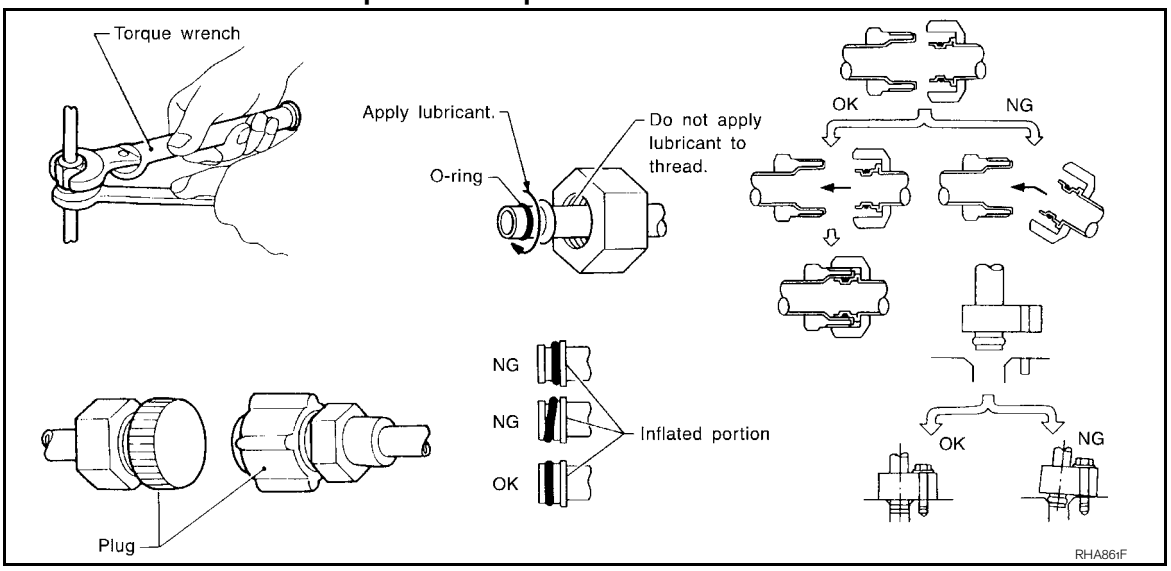
WARNING:
Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.
CAUTION:
When replacing or cleaning refrigerant cycle components, observe the following.
- **When the compressor is removed, store it in the same way at it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Name : Nissan A/C System Oil Type S

- **O-ring must be closely attached to the groove portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.**

cardiagn.com

- **After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Service Equipment

INFOID:0000000001093693

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRICAL LEAK DETECTOR

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

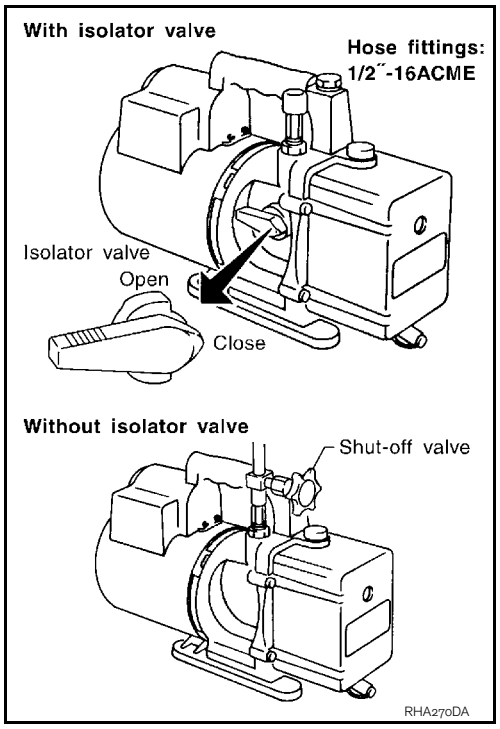
VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

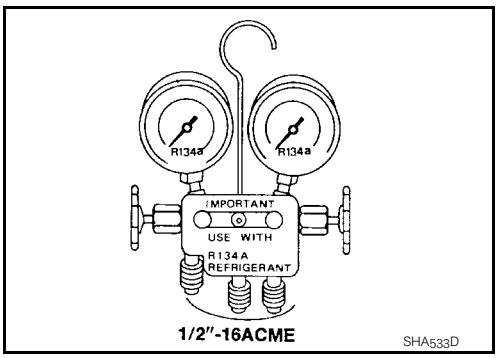
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



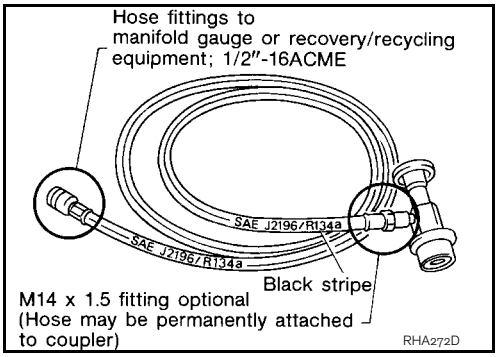
MANIFOLD GAUGE SET

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

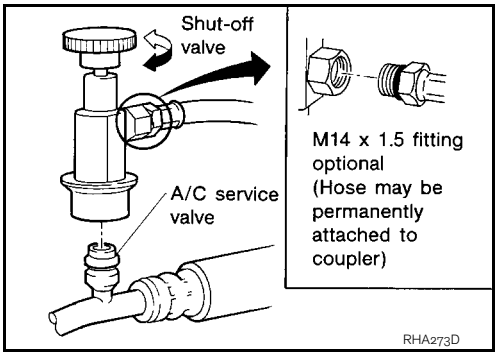
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

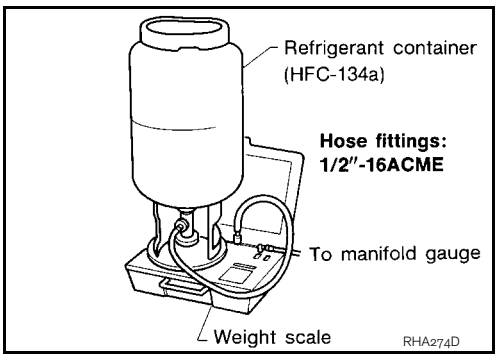
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

cardiagn.com

COMPRESSOR

General Precautions

INFOID:0000000001093694

CAUTION:

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same way at it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to HA-27, "Adjustment".**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

cardiagn.com

FLUORESCENT LEAK DETECTOR

General Precautions

INFOID:0000000001093695

CAUTION:

- **The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.**
- **Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.**
- **The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST: J-41995) to pin-point refrigerant leaks.**
- **For the purpose of safety and customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.**
- **A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electrical leak detector (SST: J-41995).**
- **Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.**
- **Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.**
- **Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).**
- **Never use more than one refrigerant dye bottle (1/4 ounce /7.4 cc) per A/C system.**
- **Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Never use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.**
- **The fluorescent properties of the dye will remain for three years or a little over unless a compressor malfunction occurs.**

IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have the identification label on the front side of hood.

cardiagn.com

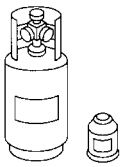
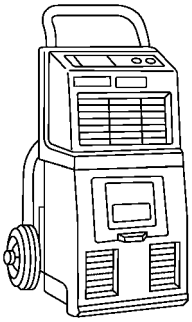
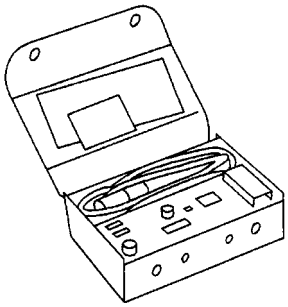
PREPARATION

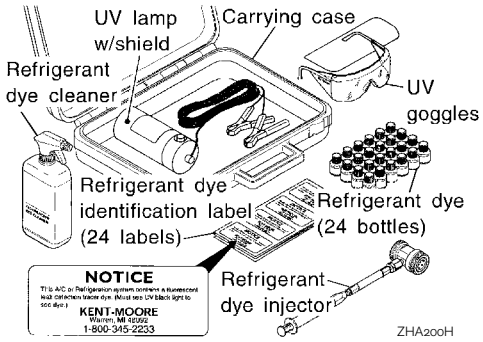
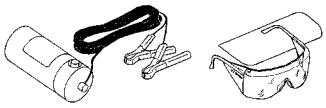
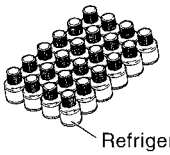
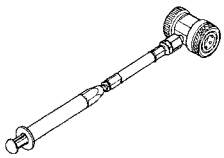
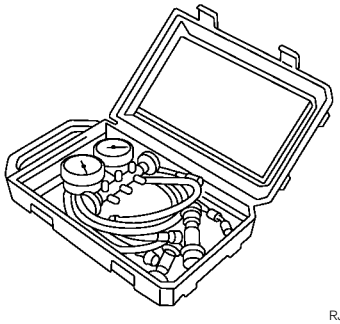
PREPARATION

HFC-134a (R-134a) Service Tools and Equipment

INFOID:0000000001116483

Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

Tool number Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
KLH00-PAGS0 Nissan A/C System Oil Type S (DH-PS)	S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) wobble (swash) plate compressors (Nissan only) Lubricity: 40 m ℓ (1.4 Imp fl oz.)
Recovery/Recycling/ Recharging equipment (ACR4)	 RJIA0195E	Function: Refrigerant recovery and recycling and recharging
Electrical leak detector	 A/C leak detector SHA705EB	Power supply: DC 12V (Cigarette lighter)

Tool number Tool name		Description
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12V (Battery terminal)
(J-42220) UV lamp and UV safety goggles	 SHA438F	Power supply: DC 12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
(J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 SHA439F	Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle	 SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system.
(J-43872) Refrigerant dye cleaner	 SHA441F	For cleaning dye spills.
Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: • The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size • 1/2″ -16 ACME

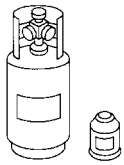
cardiagn.com

Sealant or/and Lubricant

INFOID:0000000001093698

HFC-134a (R-134a) Service Tool and Equipment

- Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
- Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
- Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
- Never use adapters that convert one size fitting to another: refrigerant/lubricant contamination occurs and compressor malfunction may result.

Tool name	Description
HFC-134a (R-134a) refrigerant  S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
Nissan A/C System Oil Type S (DH-PS) S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) swash plate compressors (Nissan only) Capacity: 40 m ℓ (1.4 US fl oz., 1.4 Imp fl oz.)

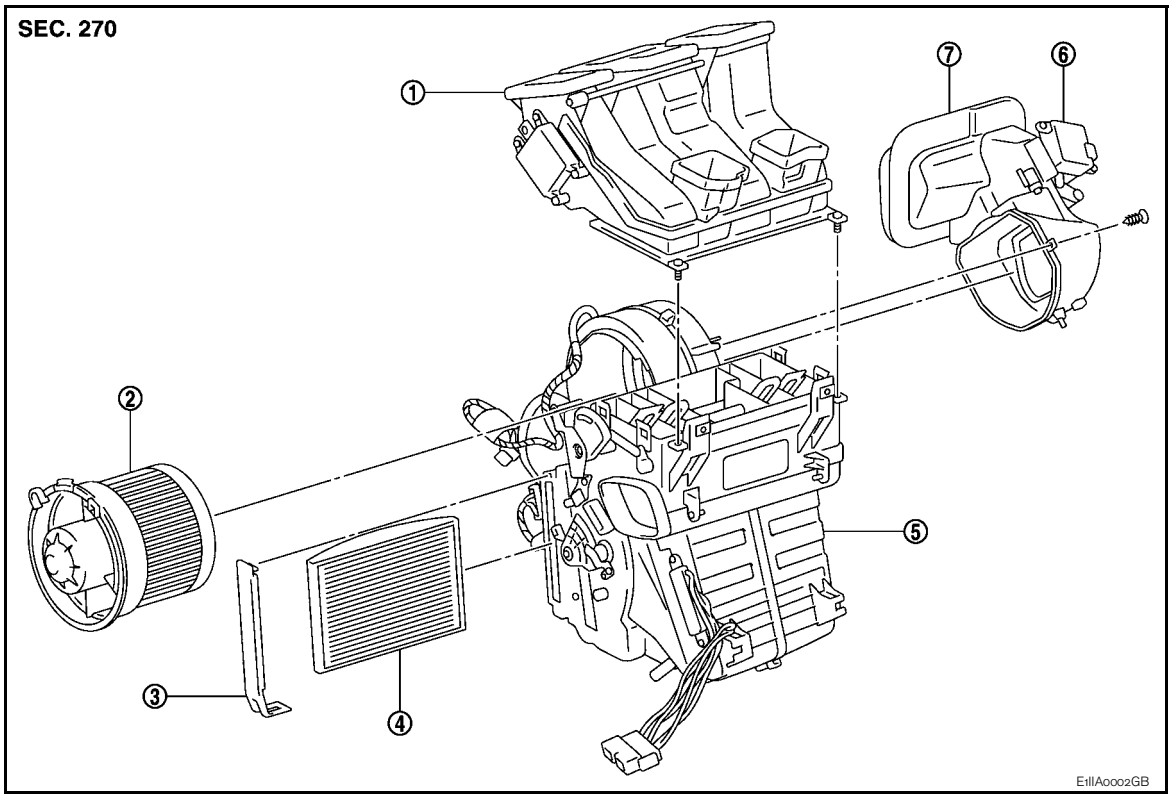
cardiagn.com

ON-VEHICLE MAINTENANCE

AIR CONDITIONER FILTER

Exploded View

INFOID:0000000001093699



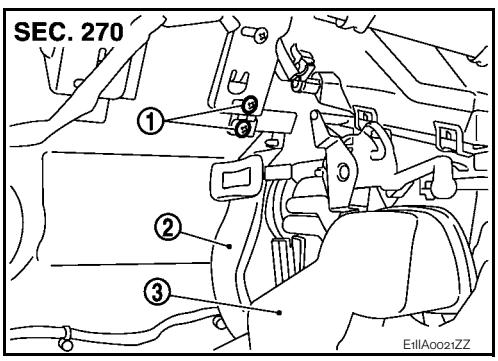
1. Hi-Level ventilation door unit assembly
2. Blower motor assembly
3. Filter cover
4. In-cabin microfilter
5. Blower unit
6. Intake door motor
7. Intake door unit assembly

Removal and Installation

INFOID:0000000001093700

REMOVAL

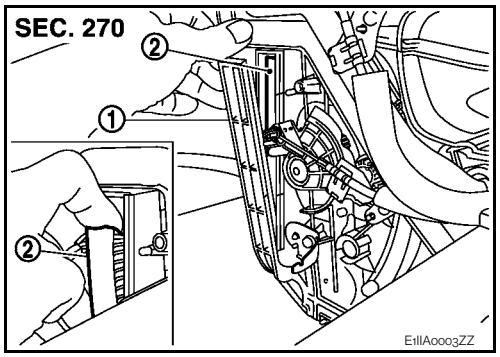
1. Remove passenger instrument lower panel. Refer to IP-12, "Removal and Installation".
2. Remove glove box assembly (RHD). Refer to IP-12, "Removal and Installation".
3. Remove glove box air duct (RHD).
   - Remove fixing screw (1)
   - Pull outside to remove air duct (2)



4. Remove LH foot duct (3). Refer to VTL-48, "FOOT DUCTS : Removal and Installation".
5. Remove LH lower instrument panel (LHD).

cardiagn.com

6. Remove accelerator pedal assembly (LHD). Refer to ACC-3, "Removal and Installation".
7. Remove clutch and brake pedal assembly (LHD). Refer to CL-8, "Removal and Installation" (Clutch pedal), BR-17, "Removal and Installation" (Brake pedal for LHD), BR-61, "Removal and Installation" (Brake pedal for RHD).
8. Remove filter cover (1) then remove air conditioner filter (2).



INSTALLATION

Installation is basically the reverse order of removal.

Replacement

INFOID:0000000001093701

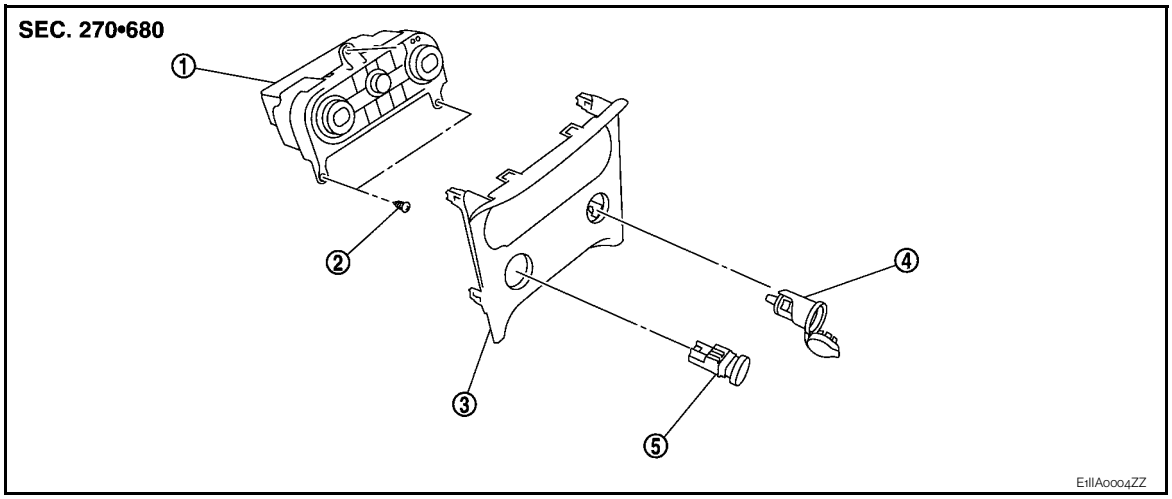
Replace air conditioner filter.
Refer to MA-7, "Periodic Maintenance".
When replacing filter, affix a caution label inside the glove box.

ON-VEHICLE REPAIR

PRESET SWITCH

Exploded View

INFOID:0000000001093702



1. Preset switch
2. Preset switch fixing screw
3. Cluster lid D
4. Power socket
5. Button

Removal and Installation

INFOID:0000000001093703

REMOVAL

Refer to IP-12, "Removal and Installation".

INSTALLATION

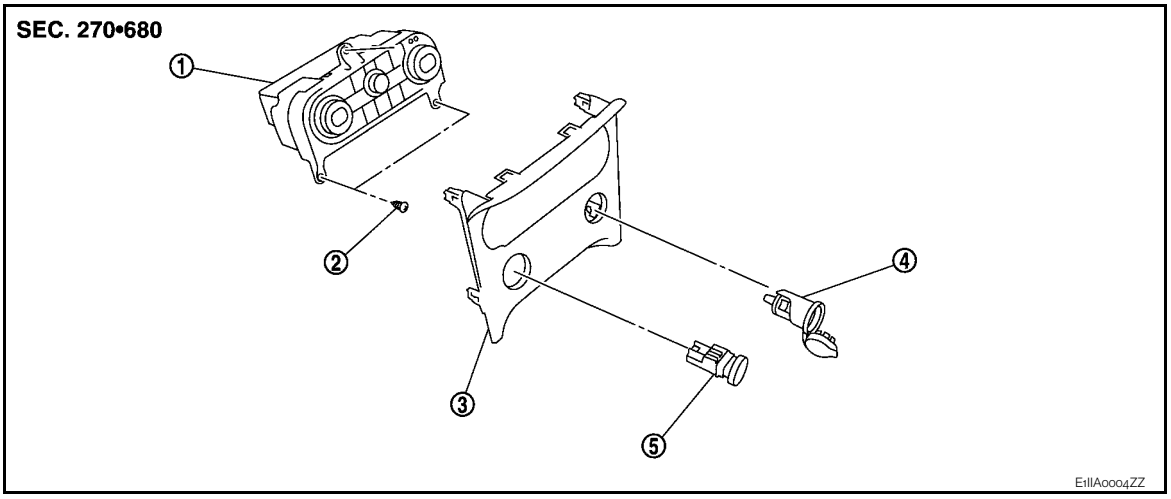
Installation is basically the reverse order of removal.

cardiagn.com

AUTO AMP.

Exploded View

INFOID:0000000001093704



1. Auto amp.
2. Preset switch fixing screw
3. Cluster lid D
4. Power socket
5. Button

Removal and Installation

INFOID:0000000001093705

REMOVAL

1. Remove cluster lid D. Refer to IP-12, "Removal and Installation".
2. Remove cluster lid C. Refer to IP-12, "Removal and Installation".
3. Remove auto amp. fixing screws from instrument panel, then pull auto amp. assembly, and disconnect harness connectors.
4. Remove auto amp. assembly.

INSTALLATION

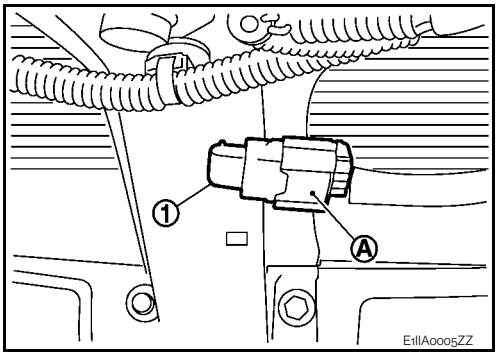
Installation is basically the reverse order of removal.

AMBIENT SENSOR

Exploded View

INFOID:0000000001093706

1. Ambient sensor

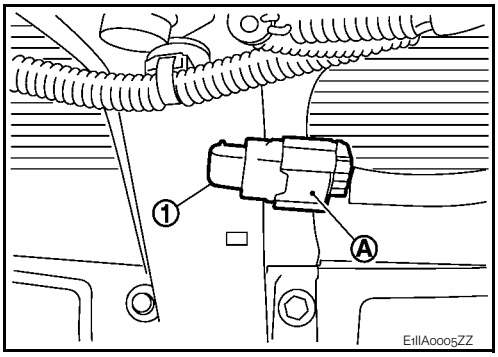


Removal and Installation

INFOID:0000000001093707

REMOVAL

1. Disconnect ambient sensor connector (A), and then remove ambient sensor(1).



INSTALLATION

Installation is basically the reverse order of removal.

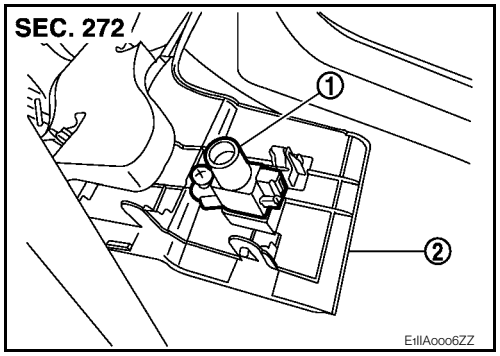
cardiagn.com

IN-VEHICLE SENSOR

Exploded View

INFOID:0000000001093708

1. In-vehicle sensor
2. instrument driver lower panel

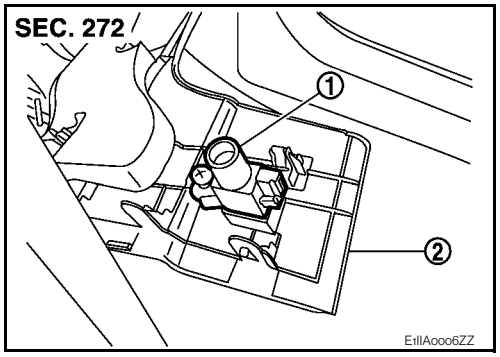


Removal and Installation

INFOID:0000000001093709

REMOVAL

1. Remove instrument driver lower panel (2). Refer to IP-12, "Removal and Installation".
2. Disconnect harness connector.
3. Remove hose tube from in-vehicle sensor (1).
4. Remove mounting screws, and then remove in-vehicle sensor.



INSTALLATION

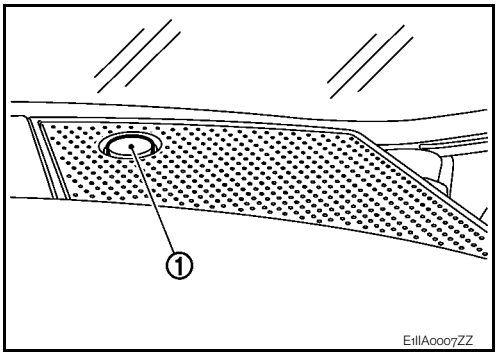
Installation is basically the reverse order of removal.

SUNLOAD SENSOR

Exploded View

INFOID:0000000001093710

1. Sunload sensor

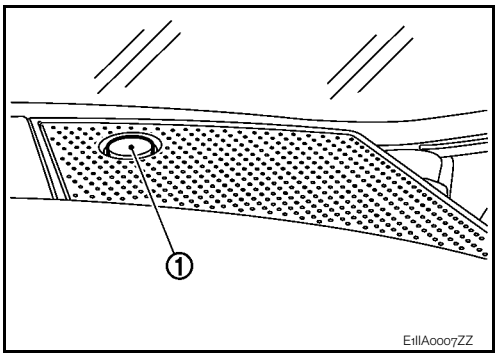


Removal and Installation

INFOID:0000000001093711

REMOVAL

1. Remove speaker grille (left). Refer to IP-12, "Removal and Installation".
2. Disconnect sunload sensor connector, and then remove sunload sensor (1).



INSTALLATION

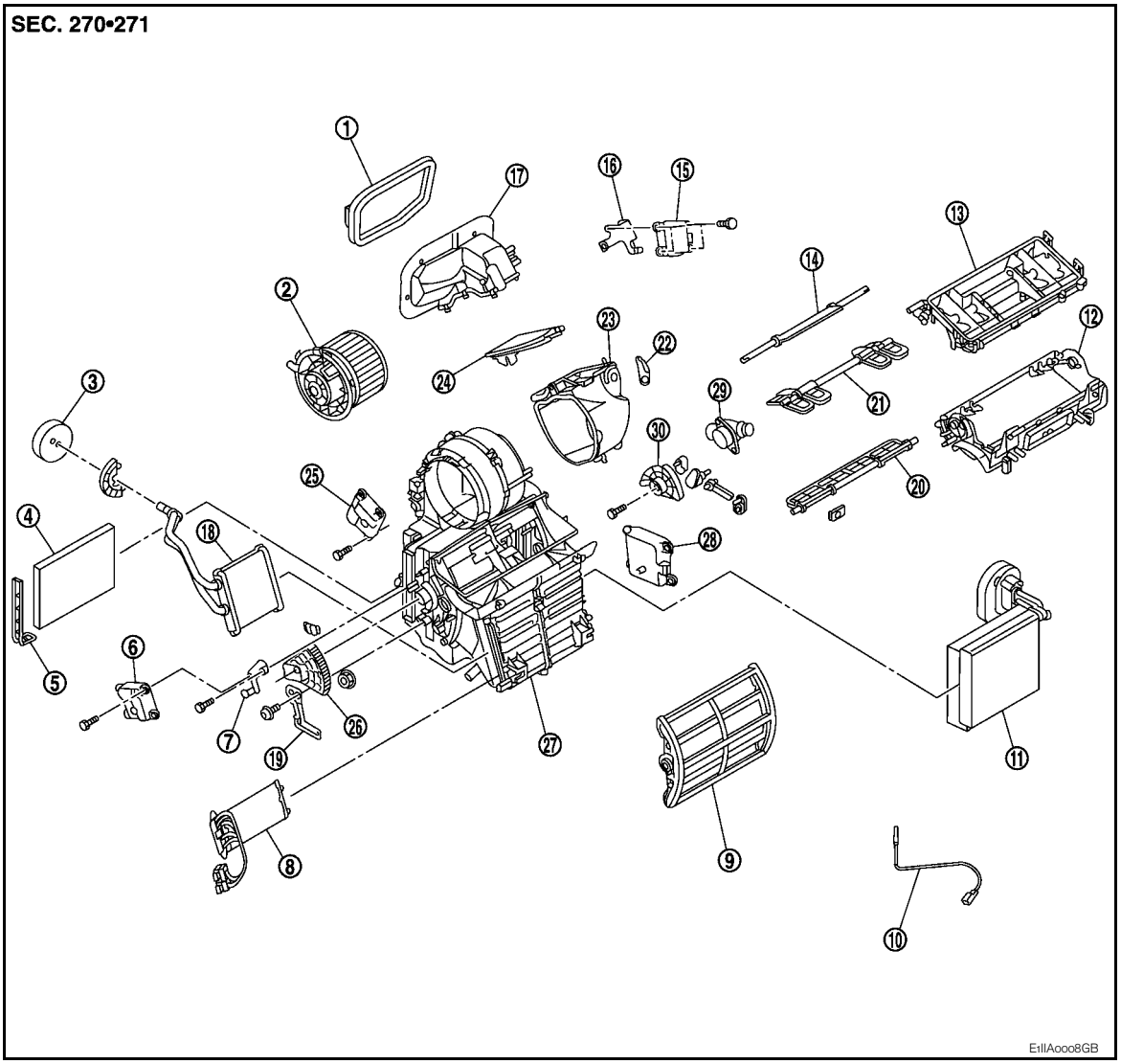
Installation is basically the reverse order of removal.

cardiagn.com

INTAKE SENSOR

Exploded View

INFOID:0000000001093714



1. Intake connector seal	2. Blower motor assembly	3. Heater pipe seal
4. Air conditioner filter	5. Air conditioner filter cover	6. Air mix door motor (left)
7. Air mix door lever	8. Electrical heater	9. Air mix door (slide door)
10. Intake sensor	11. Evaporator and expansion valve unit	12. Center case (lower)
13. Center case (upper)	14. Defroster door	15. Intake door motor
16. Intake motor bracket	17. Intake connector	18. Heater core
19. Air mix door link bracket	20. Front ventilator door	21. Slide ventilator door
22. Intake door lever	23. Intake door box	24. Intake door
25. More door motor	26. Air mix door link (left)	27. Heater and cooling unit case
28. Air mix door motor (right)	29. Aspirator	30. Air mix door link (right)

Removal and Installation

INFOID:0000000001093715

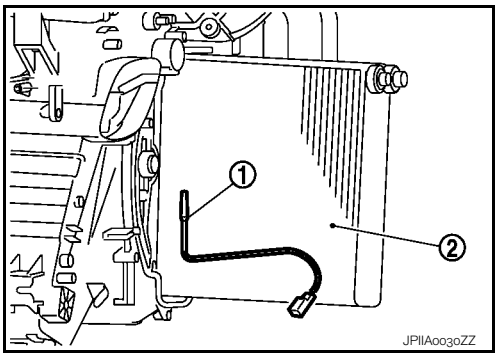
REMOVAL

1. Remove passenger front Air Bag. Refer to SR-8, "Removal and Installation".
2. Remove Instrument Panel. Refer to IP-12, "Removal and Installation".

3. Remove heater and cooling unit case.
4. Remove low-pressure pipe 1 and high-pressure pipe 2. Refer to HA-47, "Removal and Installation" (MR/HR), HA-98, "Removal and Installation" (K9K).

CAUTION:
Cap or wrap the joint of low-pressure pipe 1, 2 and high-pressure pipe 1, 2 with suitable material such as vinyl tape to avoid the entry of air.

5. Slide evaporator (2) to passenger side, and then remove intake sensor (1).



INSTALLATION

Installation is basically the reverse order of removal.

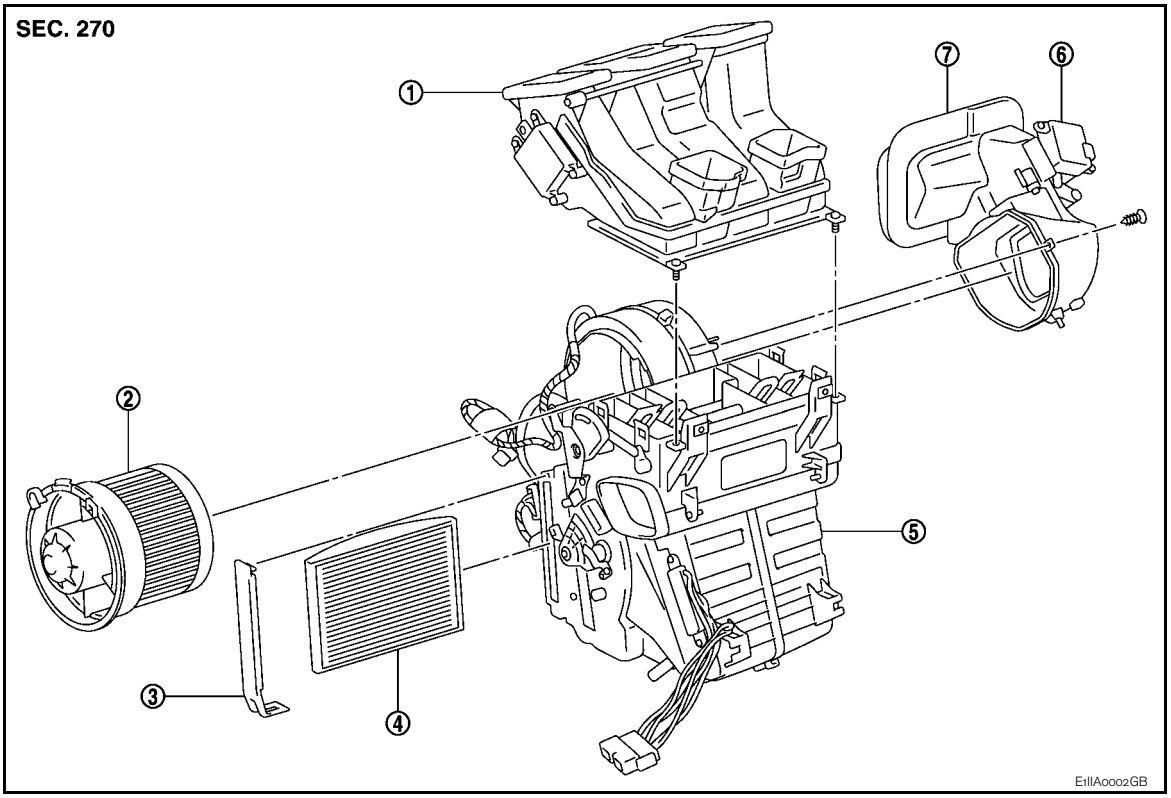
CAUTION:
- **Replace O-rings of low-pressure pipe 1, 2 and high-pressure pipe 1, 2 with new ones, and then apply compressor oil to it when installing it.**
- **Mark the mounting position of intake sensor bracket prior to removal so that the reinstalled sensor can be located in the same position.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

cardiagn.com

BLOWER UNIT

Exploded View

INFOID:0000000001115961



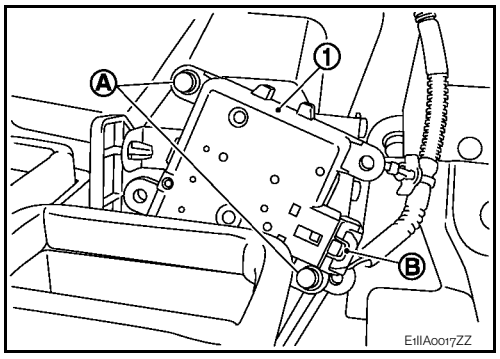
1. Hi-Level ventilation door unit assembly
2. Blower motor assembly
3. Filter cover
4. In-cabin microfilter
5. Blower unit
6. Intake door motor
7. Intake door unit assembly

Removal and Installation

INFOID:0000000001115962

REMOVAL

1. Remove Instrument Panel. Refer to IP-12, "Removal and Installation".
2. Remove steering member.
3. Remove Heater and cooling unit assembly. Refer to VTL-32, "Removal and Installation".
4. Remove harness fixing clip from upper intake box.
5. Remove door motor harness connector (B).
6. Remove lower intake box fixing screw from heater and cooling case.
7. Remove intake door motor (1).
   - Remove fixing screws (A).
   - Remove bracket support fixing screws and bracket support.
8. Remove blower motor.Refer to VTL-29, "Removal and Installation".



CAUTION:
Move blower unit rightward, and remove locating pin (1 part) and joint. Then remove blower unit downward.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

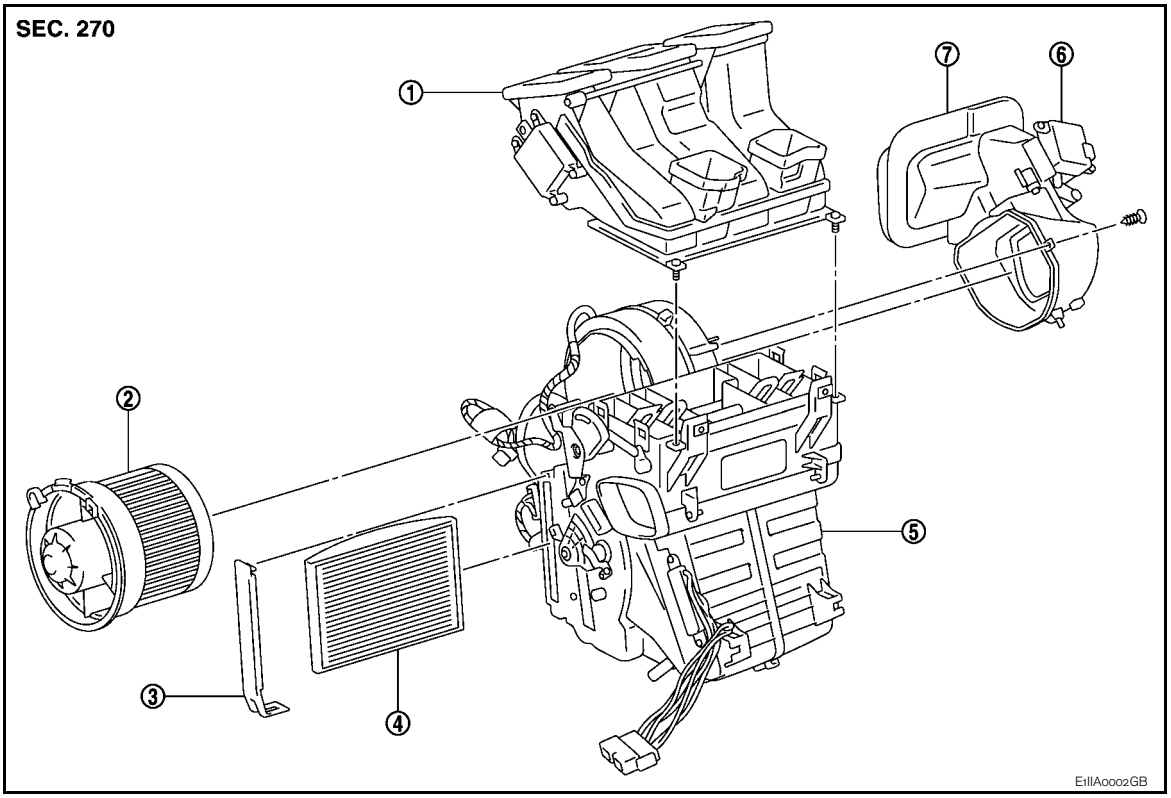
Make sure locating pin are securely inserted.

cardiagn.com

BLOWER MOTOR

Exploded View

INFOID:0000000001093716



1. Hi-Level ventilation door unit assembly
2. Blower motor assembly
3. Filter cover
4. In-cabin microfilter
5. Blower unit
6. Intake door motor
7. Intake door unit assembly

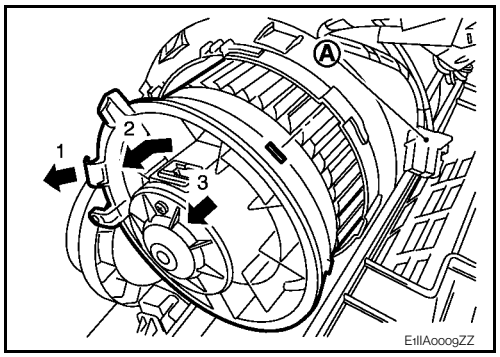
Removal and Installation

INFOID:0000000001093717

REMOVAL

LHD MODEL

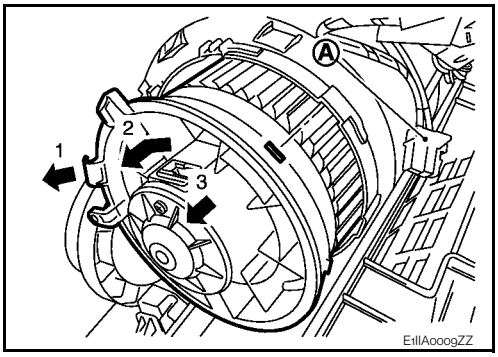
1. Remove driver lower instrument panel. Refer to IP-12, "Removal and Installation".
2. Remove driver foot duct fixing screw, and remove it.
3. Remove accelerator pedal, and disconnect harness connector. Refer to ACC-3, "Removal and Installation".
4. Remove brake and clutch pedal assembly, disconnect harness connectors. Refer to BR-17, "Removal and Installation" (Brake pedal), CL-8, "Removal and Installation" (Clutch pedal).
5. Remove blower motor harness connector.
6. Remove motor fixing screw, then remove blower motor.
7. Remove blower motor assembly, as shown.
   - Remove fixing screw.
   - Disconnect harness connector (A).
   - Release maintaining pawl (1) then turn counter clockwise (2) blower motor assembly.
   - Pull outside (3) and remove it.



CAUTION:
Take care of harness connectors around blower motor.

RHD MODEL

1. Remove passenger lower instrument panel. Refer to IP-12, "Removal and Installation".
2. Remove glove Box.
3. Remove passenger foot duct fixing screw, and remove it.
4. Remove glove box duct fixing screw, and remove it.
5. Remove BCM unit. Refer to BCS-64, "Removal and Installation".
6. Remove blower motor harness connector.
7. Remove blower motor assembly, as shown
8. Remove fixing screw.
   - Disconnect harness connector (A).
   - Release maintaining pawl (1) then turn counter clockwise (2) blower motor assembly.
   - Pull outside (3) and remove it.



CAUTION:
Take care of harness connectors around blower motor.

INSTALLATION

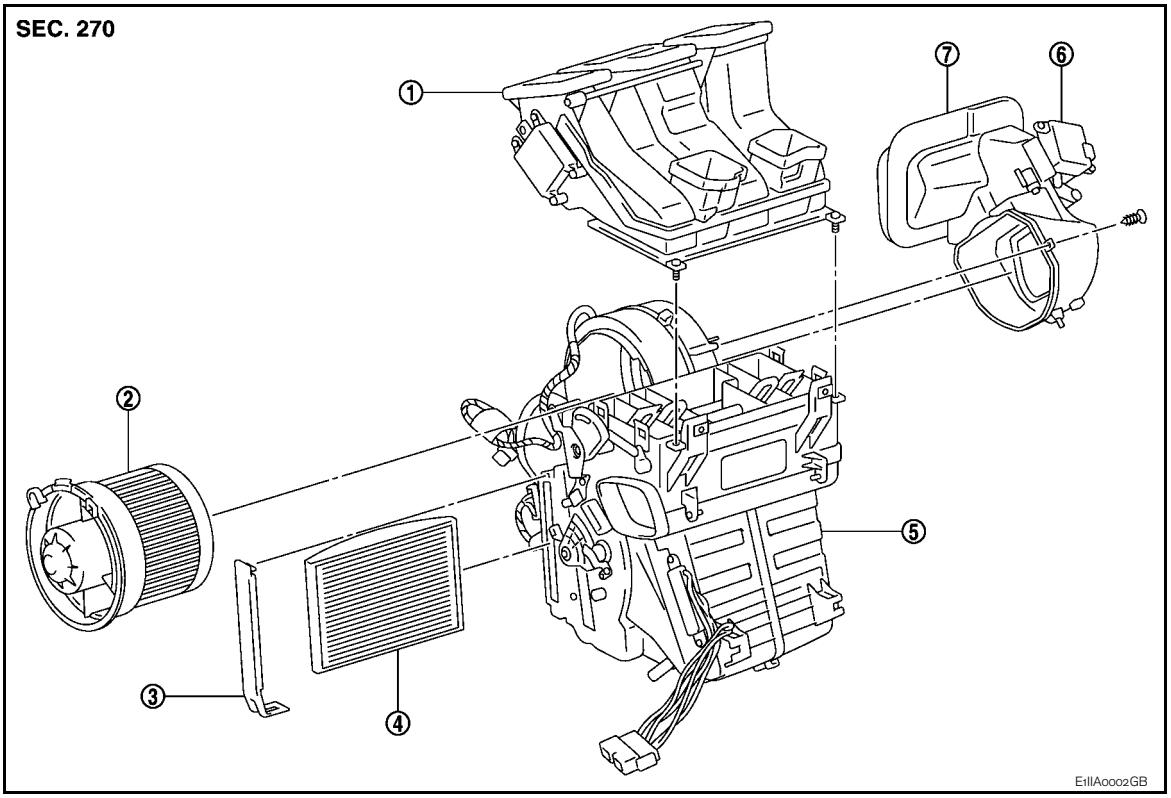
Installation is basically the reverse order of removal.

cardiagn.com

INTAKE DOOR MOTOR

Exploded View

INFOID:0000000001093718



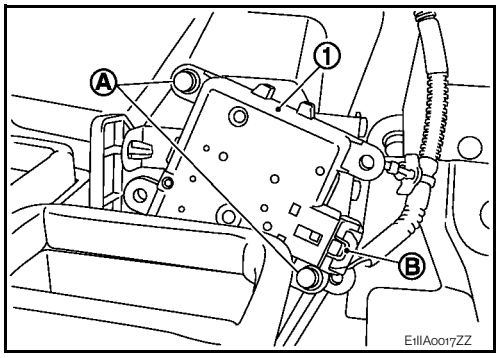
1. Hi-Level ventilation door unit assembly
2. Blower motor assembly
3. Filter cover
4. In-cabin microfilter
5. Blower unit
6. Intake door motor
7. Intake door unit assembly

Removal and Installation

INFOID:0000000001093719

REMOVAL

1. Remove Instrument Panel. Refer to IP-12, "Removal and Installation".
2. Disconnect intake door motor connector (B).
3. Remove harness connector fixing clip.
4. Remove intake door motor fixing screws (A).
5. Remove intake door motor (1).



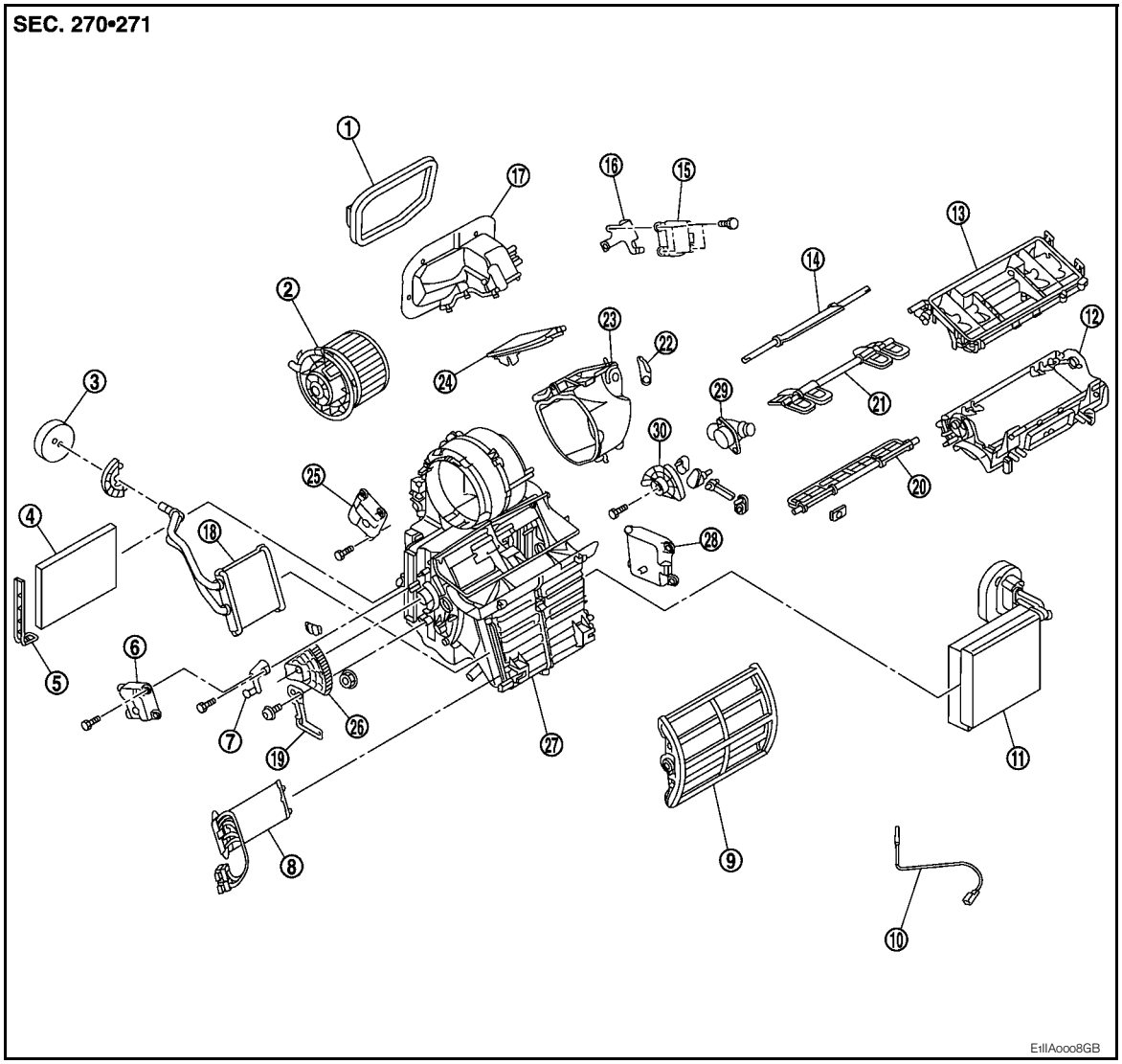
INSTALLATION

Installation is basically the reverse order of removal.

HEATER & COOLING UNIT ASSEMBLY

Exploded View

INFOID:0000000001093720



1. Intake connector seal
2. Blower motor assembly
3. Heater pipe seal
4. Air conditioner filter
5. Air conditioner filter cover
6. Air mix door motor (left)
7. Air mix door lever
8. Electrical heater
9. Air mix door (slide door)
10. Intake sensor
11. Evaporator and expansion valve unit
12. Center case (lower)
13. Center case (upper)
14. Defroster door
15. Intake door motor
16. Intake motor bracket
17. Intake connector
18. Heater core
19. Air mix door link bracket
20. Front ventilator door
21. Side ventilator door
22. Intake door lever
23. Intake door box
24. Intake door
25. Mode door motor
26. Air mix door link (left)
27. Heater and cooling unit case
28. Air mix door motor (right)
29. Aspirator
30. Air mix door link (right)

*With left and right ventilation temperature separately system.

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

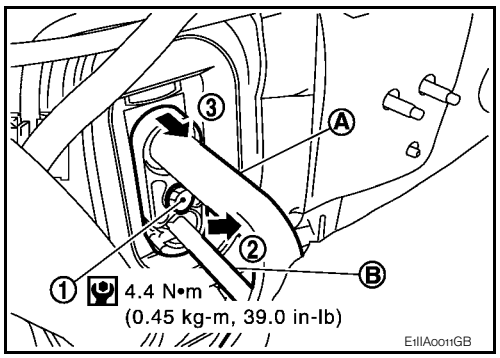
INFOID:0000000001093721

REMOVAL

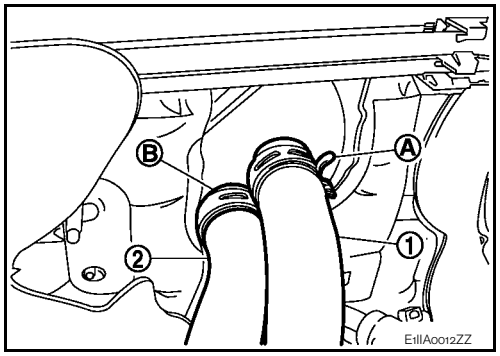
cardiagn.com

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Drain engine coolant from cooling system. Refer to CO-9, "Draining" (HR), CO-30, "Draining" (MR), CO-52, "Draining" (K9K).
3. Remove pipe bracket fixing bolt (1), then, disconnect high-pressure pipe (B) and low-pressure pipe (A) from expansion valve as shown.

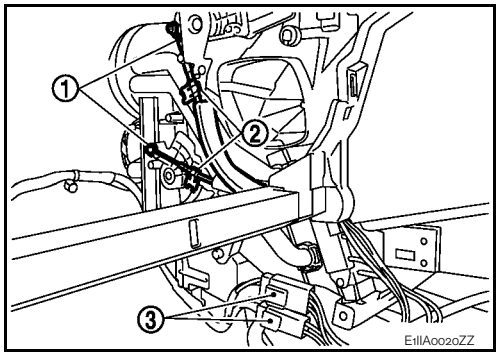
CAUTION:
Cap or wrap the joint of low-pressure pipe 1 and low-pressure pipe 2 with suitable material such as vinyl tape to avoid the entry of air.

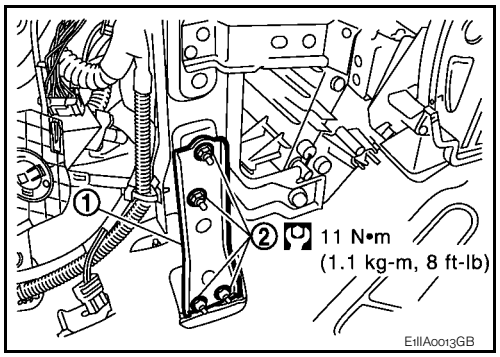


4. Remove clamp (A), then disconnect heater hoses (1) and then remove clamp (B), to remove heater hose (2).

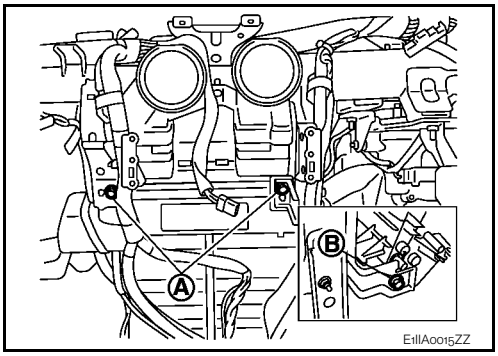


5. Remove Instrument Panel. Refer to IP-12, "Removal and Installation".
6. Remove BCM.Refer to BCS-64, "Removal and Installation".
   - Remove fixing screws.
   - Remove harness connectors.
7. Disconnect heater connectors (3), then remove heater connector and bracket.
8. Disconnect blower motor connector.
9. Remove heater control cable retainers (2) and cables (1) from heater and cooling unit.
10. Remove foot duct, RH.
11. Remove power steering C/U. Refer to STC-32, "Removal and Installation".
12. Disconnect intake door motor connector and blower motor connector.
13. Remove center air duct.
14. Remove blower intake motor connector and remove harness fixing clip.
15. Remove instrument stay (1).
16. Remove fixing nuts (2).
17. Remove heater draining hose.





18. Remove heater and cooling assembly lower fixing bolts, RH side.
19. Remove heater and cooling assembly upper fixing bolts.
20. Remove high and low pressure pipes. Refer to HA-47, "Removal and Installation" (HR/MR), HA-98, "Removal and Installation" (K9K).



21. Remove clips of main harness from steering member.
22. Remove steering member mounting bolts.
    • Disconnect harness fixing clips from steering member
    NOTE:
    Two workers are necessary to remove this part.
23. Remove heater and cooling unit assembly.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure pipe 1, 2 and high-pressure pipe 1, 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a clicks is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

NOTE:

- When filling radiator with engine coolant, refer to CO-9, "Refilling" (HR), CO-30, "Refilling" (MR), CO-52, "Refilling" (K9K).
- Recharge the refrigerant.

Heater & cooling unit (1) assembly mounting bolt (A)

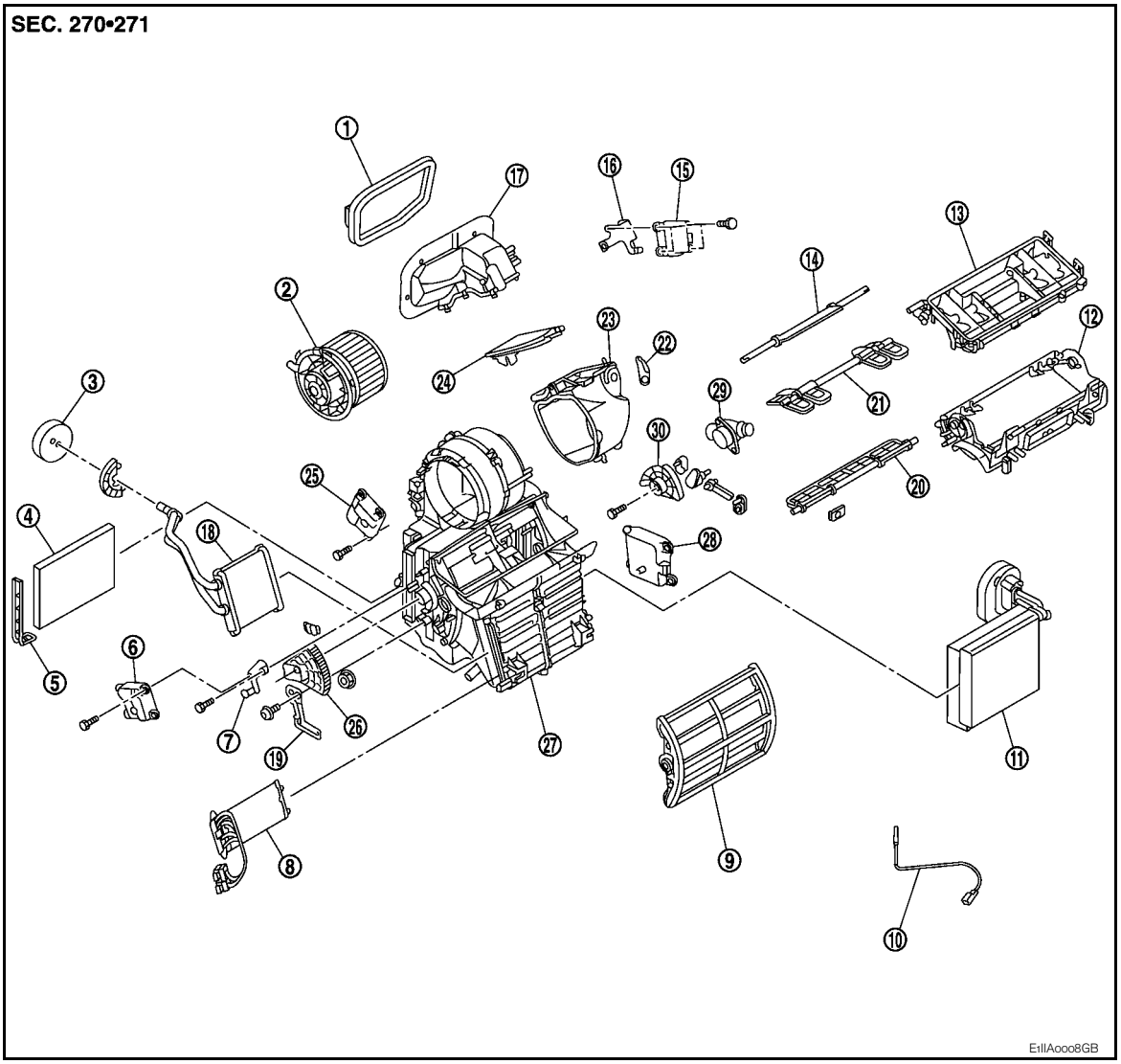
: 6.9 N·m (0.7 kg·m, 61 in-lb)

cardiagn.com

MODE DOOR MOTOR

Exploded View

INFOID:0000000001093722



1. Intake connector seal	2. Blower motor assembly	3. Heater pipe seal
4. Air conditioner filter	5. Air conditioner filter cover	6. Air mix door motor (left)
7. Air mix door lever	8. Electrical heater	9. Air mix door (slide door)
10. Intake sensor	11. Evaporator and expansion valve unit	12. Center case (lower)
13. Center case (upper)	14. Defroster door	15. Intake door motor
16. Intake motor bracket	17. Intake connector	18. Heater core
19. Air mix door link bracket	20. Front ventilator door	21. Side ventilator door
22. Intake door lever	23. Intake door box	24. Intake door
25. Mode door motor	26. Air mix door link (left)	27. Heater and cooling unit case
28. Air mix door motor (right)	29. Aspirator	30. Air mix door link (right)

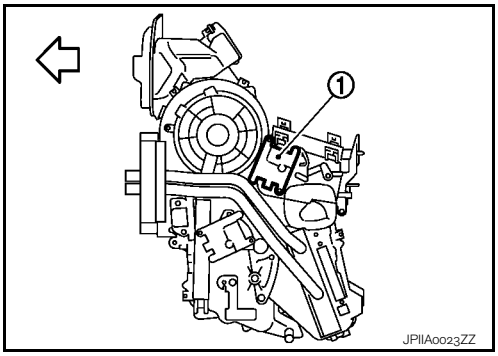
Removal and Installation

INFOID:0000000001093723

REMOVAL

1. Remove Instrument Panel. Refer to IP-12, "Removal and Installation".

2. Remove mode door motor fixing screws.
3. Remove harness connector and then remove mode door motor (1) from link.



INSTALLATION

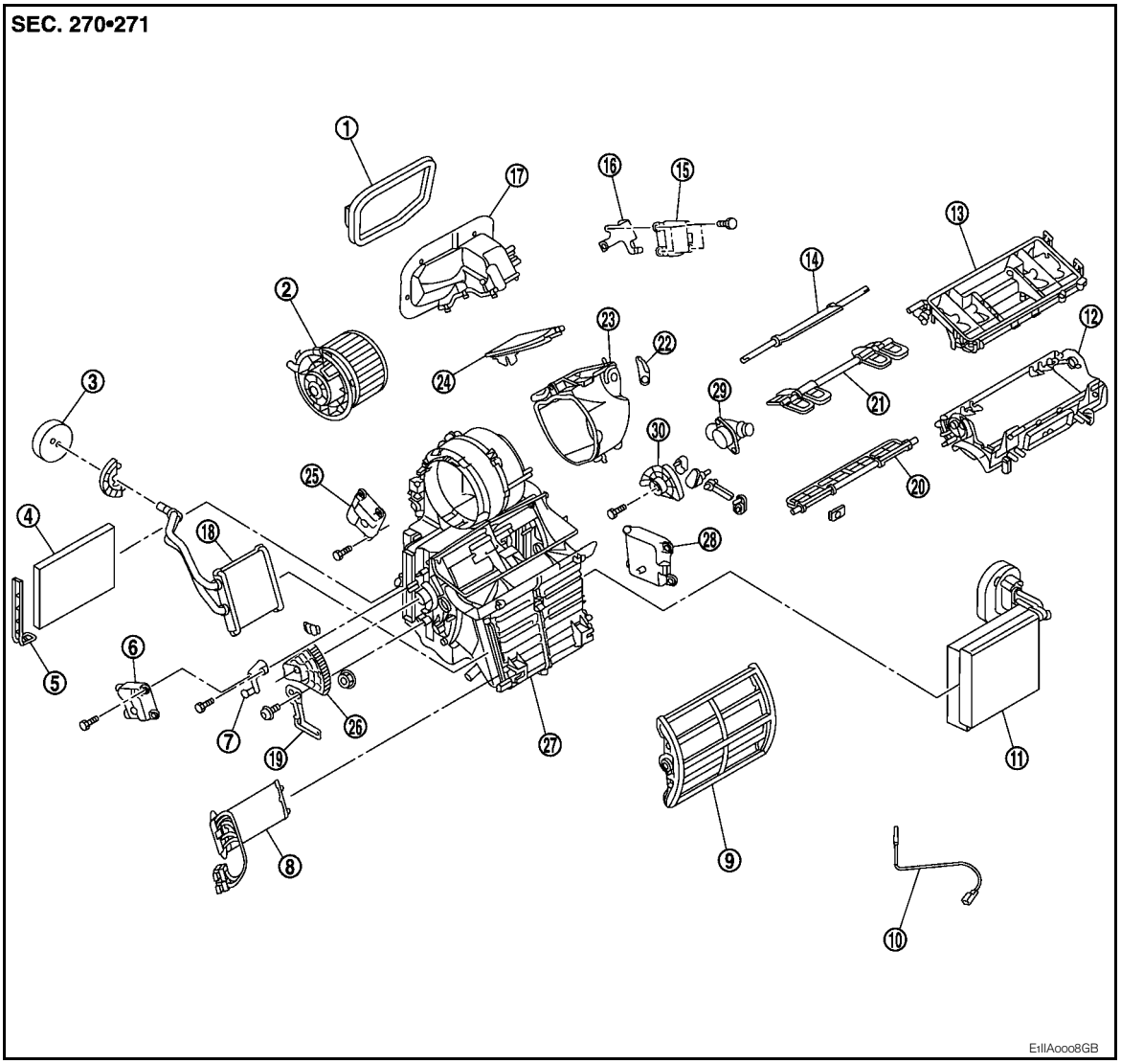
installation is basically the reverse order of removal.

cardiagn.com

HIGH-LEVEL VENTILATOR DOOR MOTOR

Exploded View

INFOID:0000000001109264



1. Intake connector seal
2. Blower motor assembly
3. Heater pipe seal
4. Air conditioner filter
5. Air conditioner filter cover
6. Air mix door motor (left)
7. Air mix door lever
8. Electrical heater
9. Air mix door (slide door)
10. Intake sensor
11. Evaporator and expansion valve unit
12. Center case (lower)
13. Center case (upper)
14. Defroster door
15. Intake door motor
16. Intake motor bracket
17. Intake connector
18. Heater core
19. Air mix door link bracket
20. Front ventilator door
21. Slide ventilator door
22. Intake door lever
23. Intake door box
24. Intake door
25. Mode door motor
26. Air mix door link (left)
27. Heater and cooling unit case
28. Air mix door motor (right)
29. Aspirator
30. Air mix door link (right)

Removal and Installation

INFOID:0000000001109265

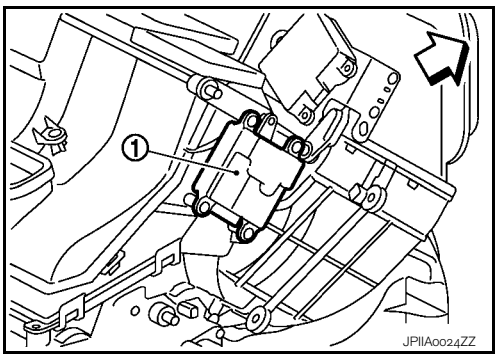
REMOVAL

LHD

1. Unclip instrument lower panel - passenger side.

2. Remove lower instrument cover.
3. Remove Glove Box Assembly. Refer to IP-12, "Removal and Installation".
4. Remove RH Foot Duct. Refer to VTL-48, "FOOT DUCTS : Removal and Installation".
5. Remove high level motor fixing screws.
6. Remove high level motor harness connector.
7. Remove high level motor(1) from link.

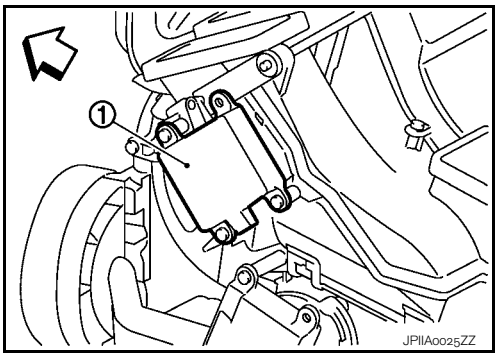
⇦ : Front



RHD

1. Unclip lower instrument panel - passenger side.
2. Remove lower instrument cover.
3. Remove Glove Box Assembly. Refer to IP-12, "Removal and Installation".
4. Remove LH Foot Duct. Refer to VTL-48, "FOOT DUCTS : Removal and Installation".
5. Remove high level motor fixing screws.
6. Remove high level motor harness connector.
7. Remove high level motor(1) from link.

⇦ : Front



INSTALLATION

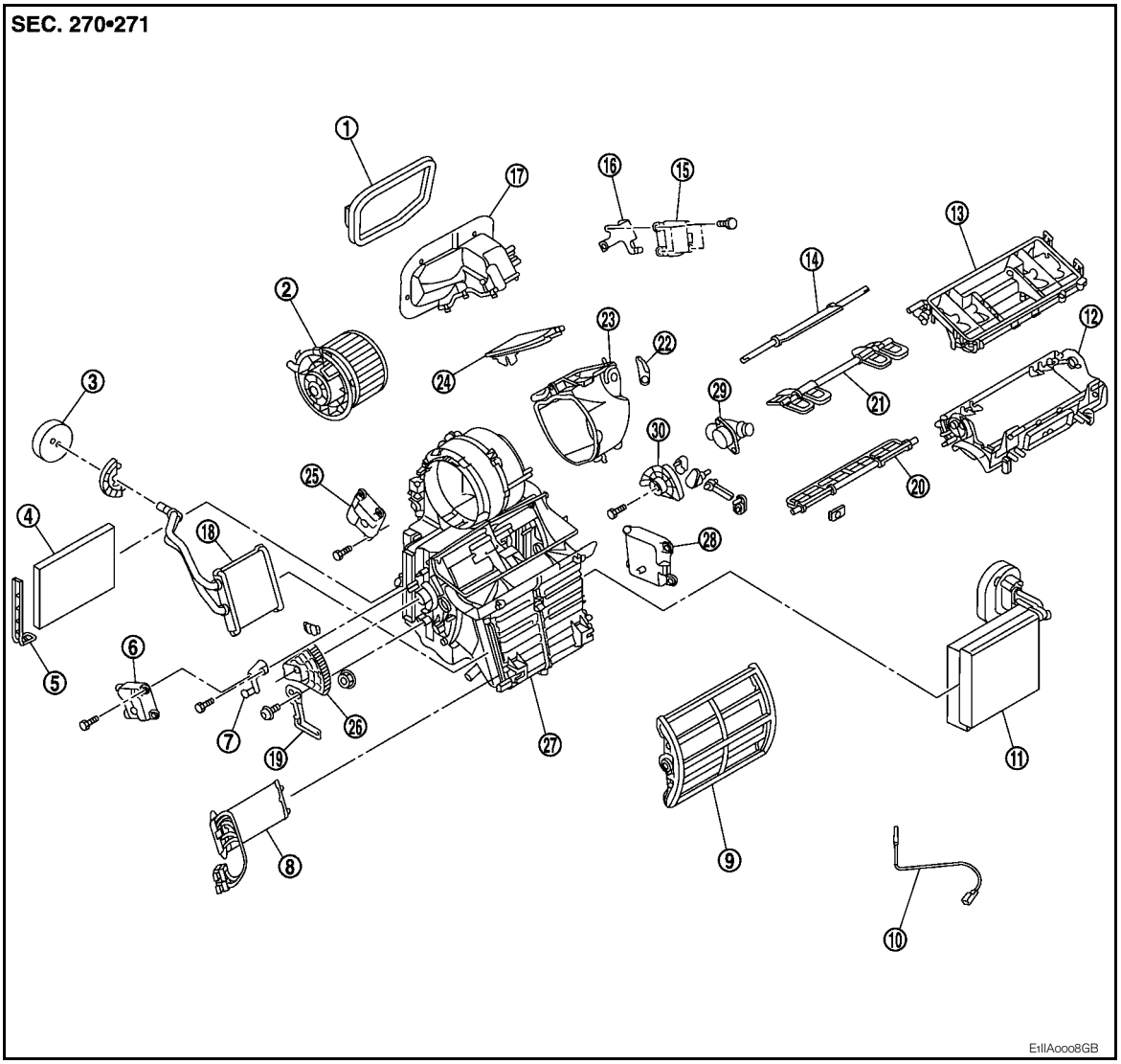
installation is basically the reverse order of removal.

cardiagn.com

AIR MIX DOOR MOTOR

Exploded View

INFOID:0000000001093724



1. Intake connector seal
2. Blower motor assembly
3. Heater pipe seal
4. Air conditioner filter
5. Air conditioner filter cover
6. Air mix door motor (left)
7. Air mix door lever
8. Electrical heater
9. Air mix door (slide door)
10. Intake sensor
11. Evaporator and expansion valve unit
12. Center case (lower)
13. Center case (upper)
14. Defroster door
15. Intake door motor
16. Intake motor bracket
17. Intake connector
18. Heater core
19. Air mix door link bracket
20. Front ventilator door
21. Slide ventilator door
22. Intake door lever
23. Intake door box
24. Intake door
25. Mode door motor
26. Air mix door link (left)
27. Heater and cooling unit case
28. Air mix door motor (right)
29. Aspirator
30. Air mix door link (right)

Removal and Installation

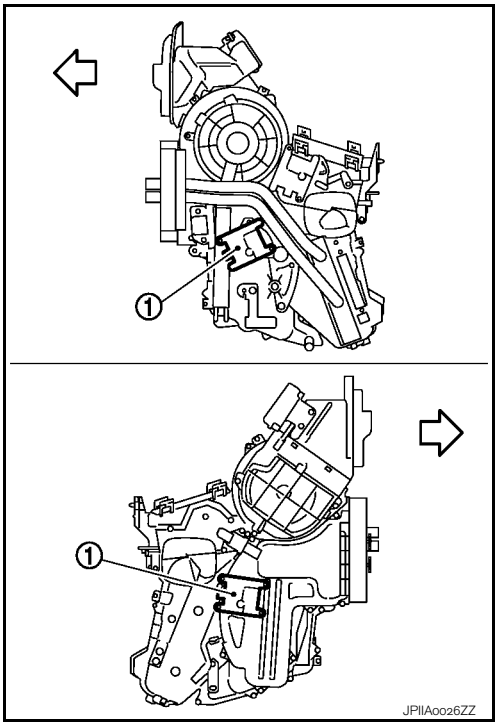
INFOID:0000000001093725

REMOVAL

Driver side

1. Remove lower instrument cover.
2. Remove Foot Duct. Refer to VTL-48, "FOOT DUCTS : Removal and Installation".
3. Remove air mix door motor fixing screws.
4. Remove air mix door motor harness connector.
5. Remove air mix door motor(1) from link.

⇦ : Front



Passenger side

1. Unclip instrument lower panel - passenger side.
2. Remove lower instrument cover.
3. Remove Glove Box Assembly. Refer to IP-12, "Removal and Installation".
4. Remove Foot Duct. Refer to VTL-48, "FOOT DUCTS : Removal and Installation".
5. Remove air mix door motor fixing screws.
6. Remove air mix door motor harness connector.
7. Remove air mix door motor(1) from link.

INSTALLATION

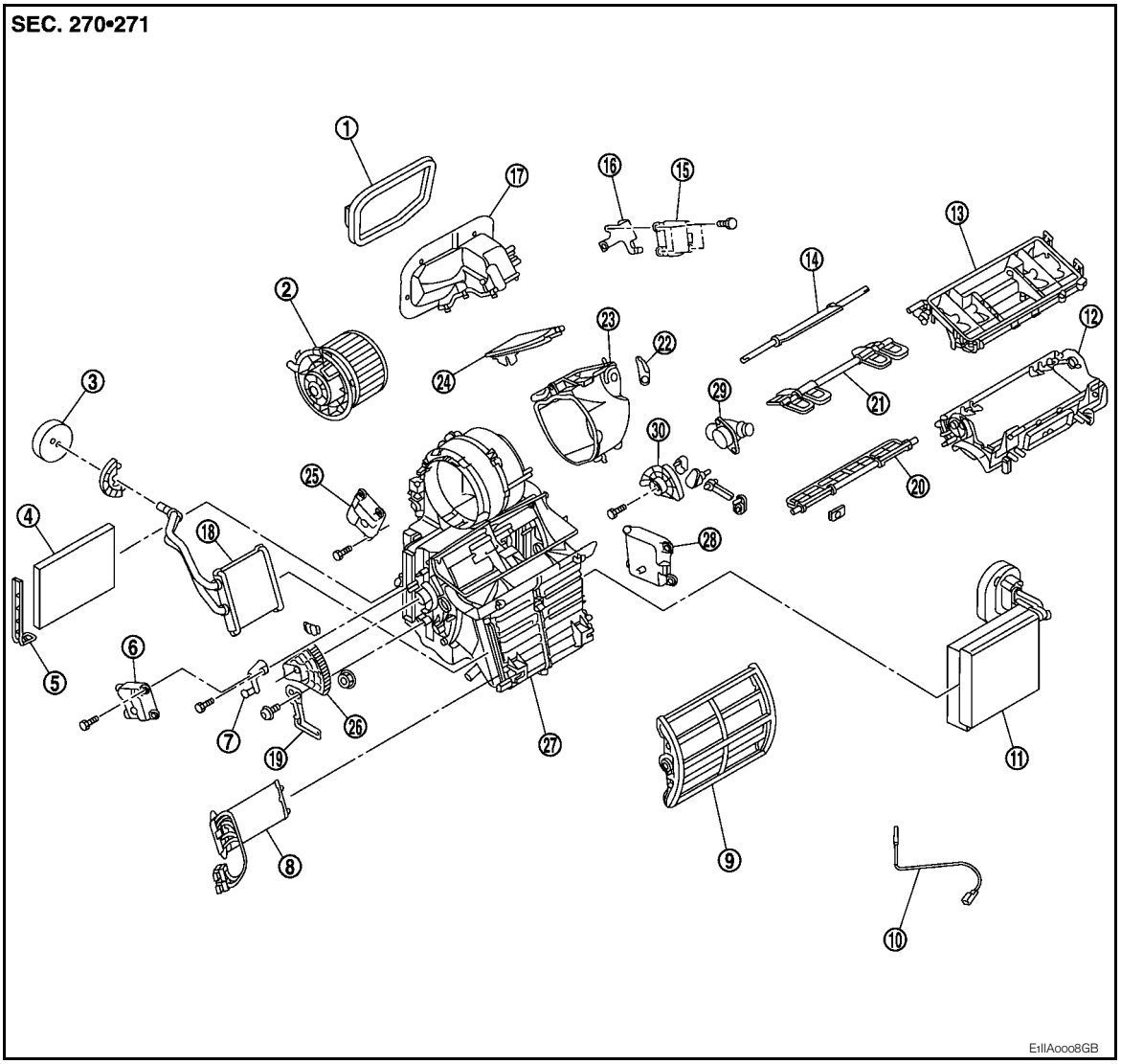
Installation is basically the reverse order of removal.

cardiagn.com

HEATER CORE

Exploded View

INFOID:0000000001093726



1. Intake connector seal	2. Blower motor assembly	3. Heater pipe seal
4. Air conditioner filter	5. Air conditioner filter cover	6. Air mix door motor (left)
7. Air mix door lever	8. Electrical heater	9. Air mix door (slide door)
10. Intake sensor	11. Evaporator and expansion valve unit	12. Center case (lower)
13. Center case (upper)	14. Defroster door	15. Intake door motor
16. Intake motor bracket	17. Intake connector	18. Heater core
19. Air mix door link bracket	20. Front ventilator door	21. Side ventilator door
22. Intake door lever	23. Intake door box	24. Intake door
25. Mode door motor	26. Air mix door link (left)	27. Heater and cooling unit case
28. Air mix door motor (right)	29. Aspirator	30. Air mix door link (right)

*With left and right ventilation temperature separately system.

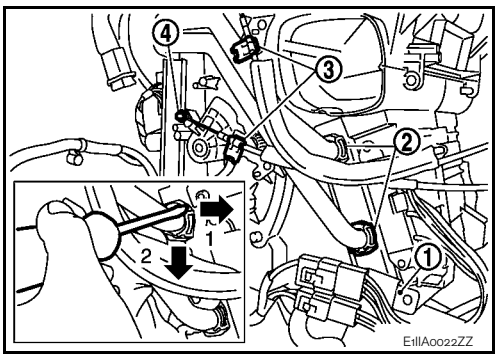
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001093727

REMOVAL

1. Remove LH instrument lower panel (LHD).
2. Remove glove box (RHD). Refer to IP-12, "Removal and Installation".
3. Remove LH foot duct.
4. Disconnect harness connectors, remove harness bracket (1).
5. Remove air mix door motor fixing screw.
6. Remove air mix door motor (4), from heater.
7. Remove heater core pipes metal clip retainers (2).
   CAUTION:
   Use shop cloth and all other protection necessaries to avoid damaging floor carpet.
8. Remove heater pipes as shown.
9. Pull to remove heater core.



INSTALLATION

Installation is basically the reverse order of removal.

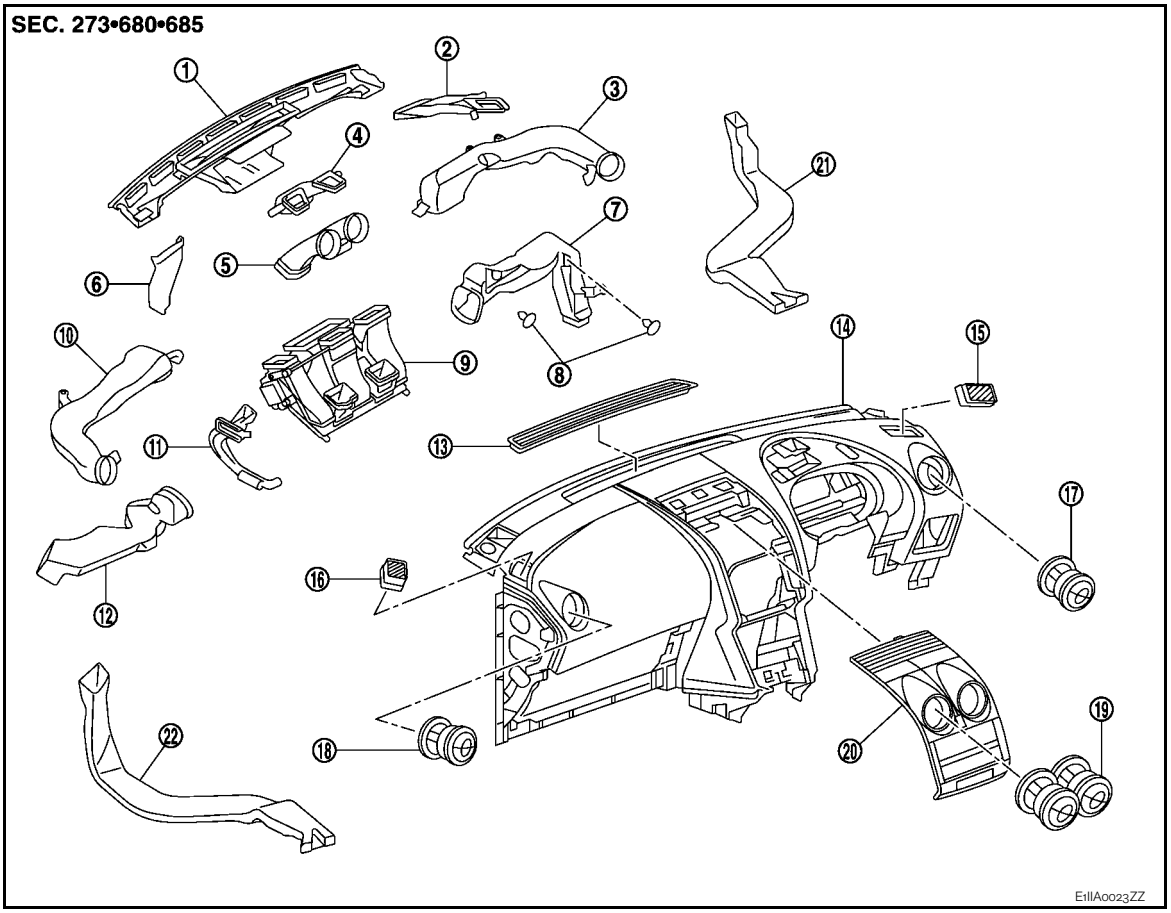
cardiagn.com

DUCTS AND GRILLES

CENTER VENTILATOR GRILLES

CENTER VENTILATOR GRILLES : Exploded View

INFOID:0000000001093728



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

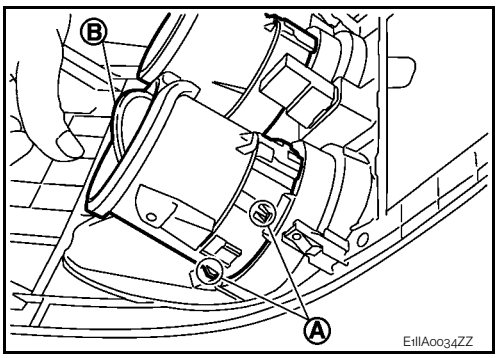
CENTER VENTILATOR GRILLES : Removal and Installation

INFOID:0000000001093729

REMOVAL

1. Remove cluster lid C. Refer to IP-12, "Removal and Installation".
2. Remove center ventilator grilles.

- Push pawl (A).
- Push center ventilator grille from the back, to remove it.



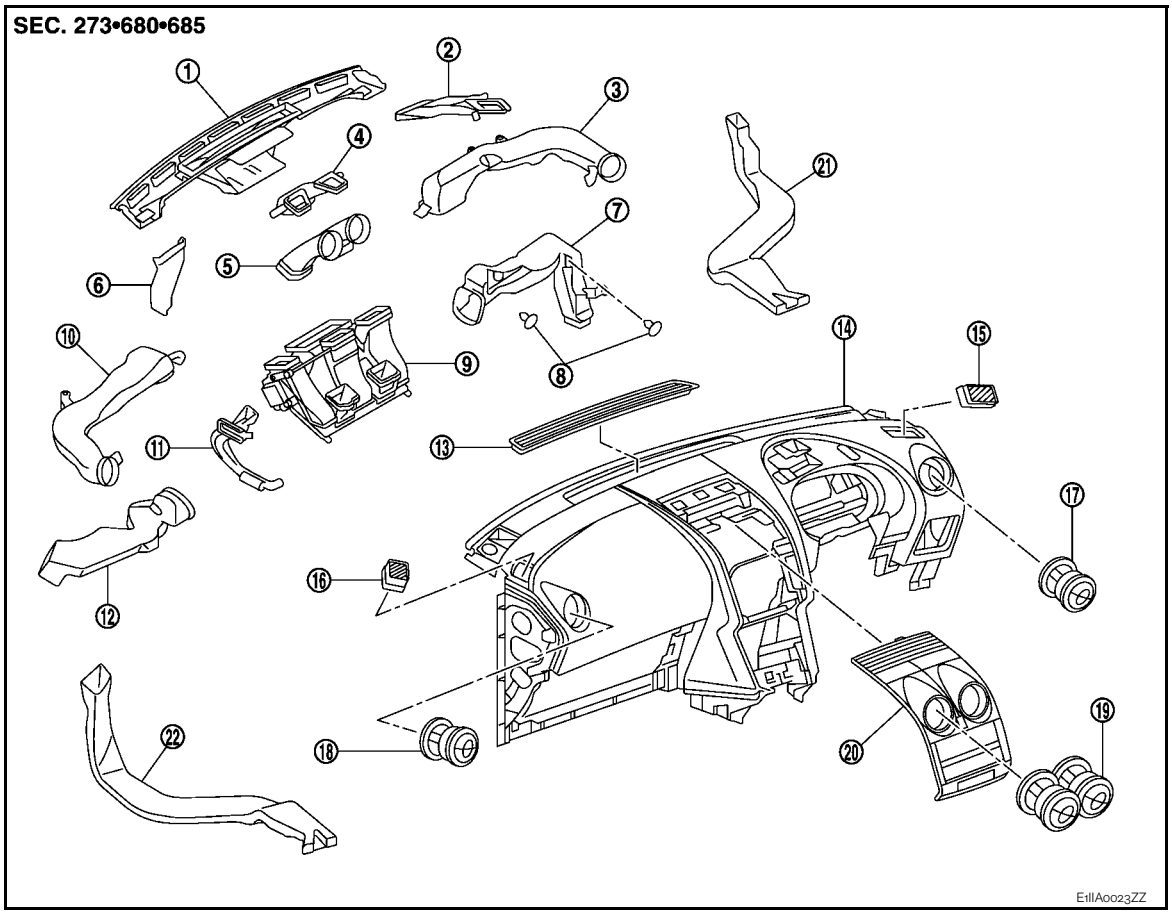
CAUTION:
Use shop cloth and all other protection necessaries to avoid damage.

INSTALLATION
Installation is basically the reverse order of removal.

SIDE VENTILATOR GRILLES

SIDE VENTILATOR GRILLES : Exploded View

INFOID:0000000001093730



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

SIDE VENTILATOR GRILLES : Removal and Installation

INFOID:0000000001093731

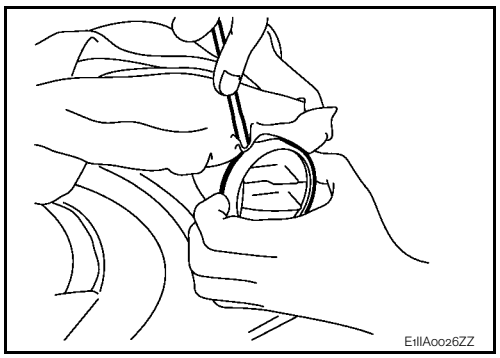
cardiagn.com

REMOVAL

Remove side ventilator grilles as shown.

CAUTION:

Use shop cloth and all other protection necessaries to avoid damage.



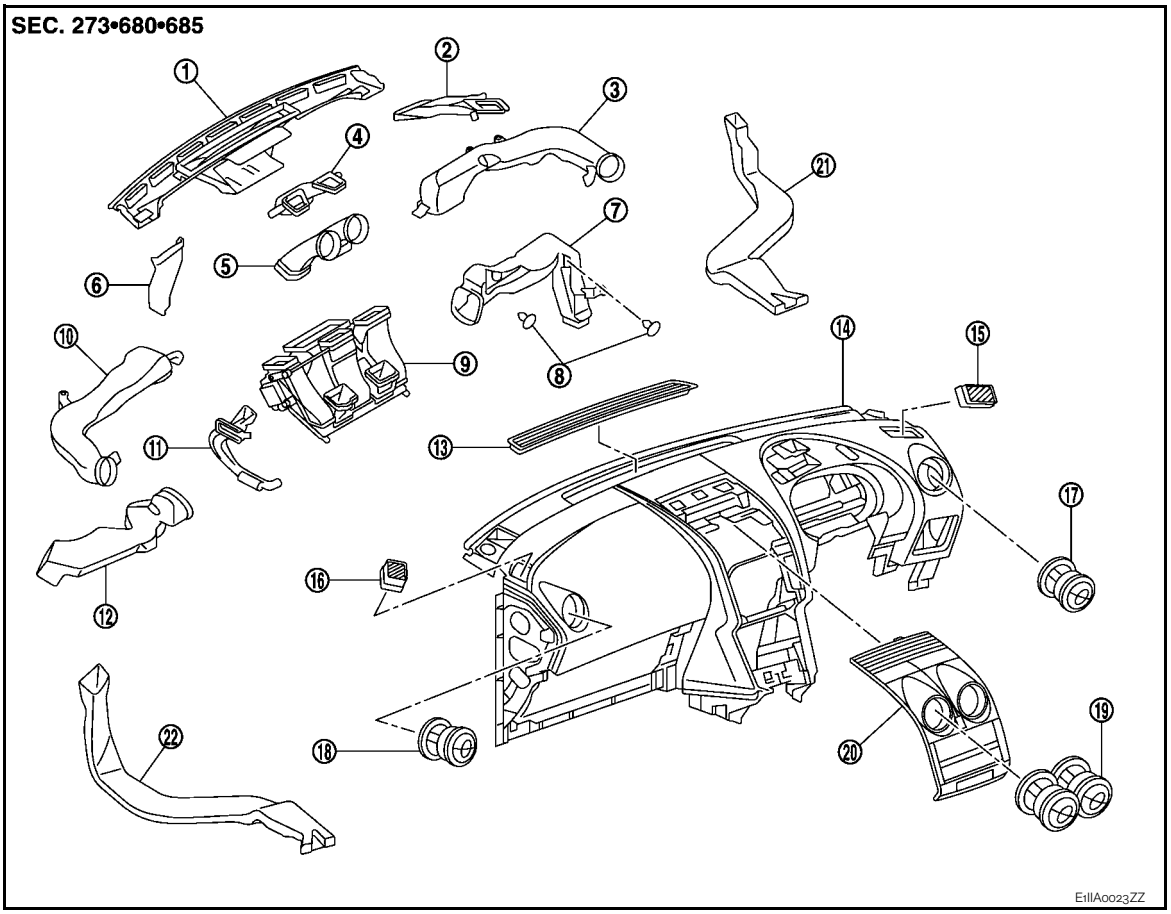
INSTALLATION

Installation is basically the reverse order of removal.

FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT

FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT : Exploded View

INFOID:0000000001093732



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH

19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT : Removal and Installation

INFOID:0000000001093733

REMOVAL

1. Remove instrument panel & pad. Refer to IP-12, "Removal and Installation".
2. Remove mounting screws.
3. Remove clips, and then remove defroster nozzle, side defroster nozzle and ventilator duct.

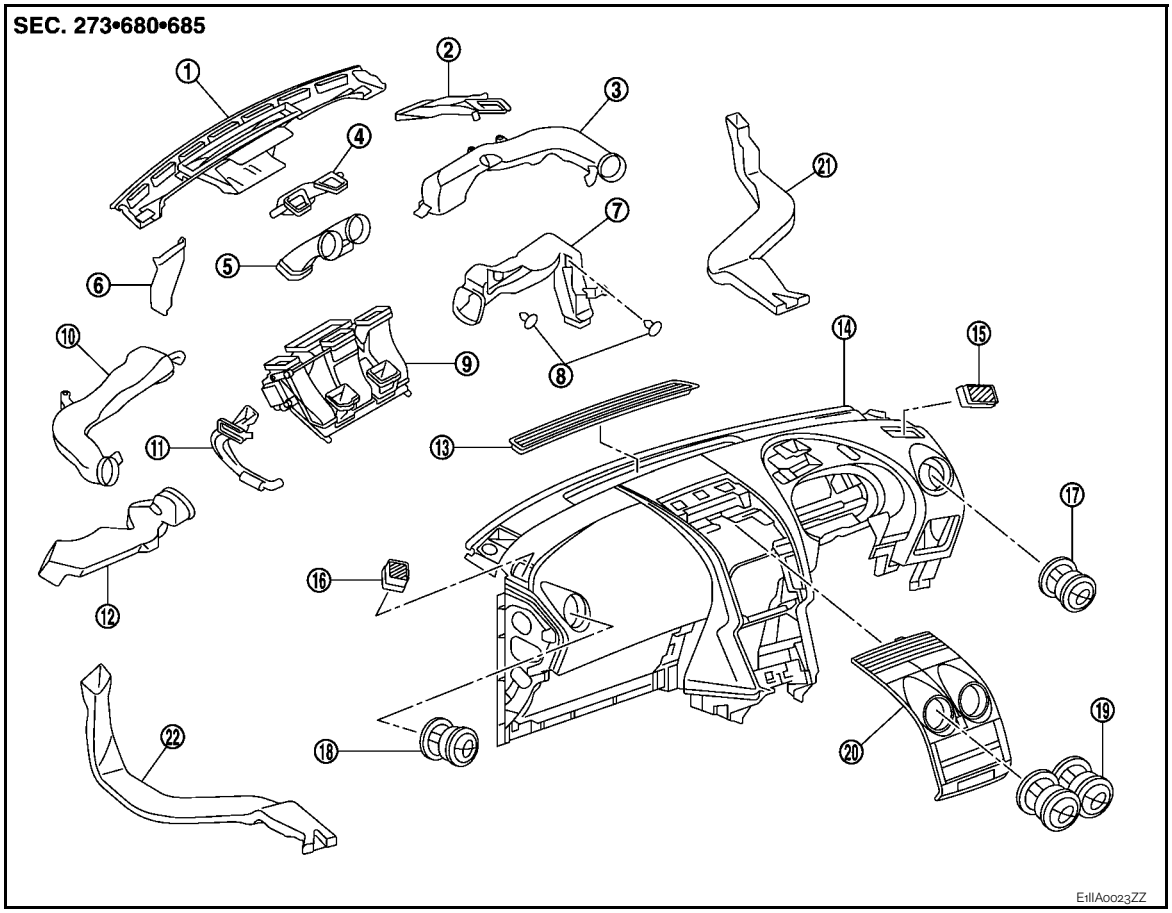
INSTALLATION

Installation is basically the reverse order of removal.

SIDE DEFROSTER DUCTS

SIDE DEFROSTER DUCTS : Exploded View

INFOID:0000000001093734



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

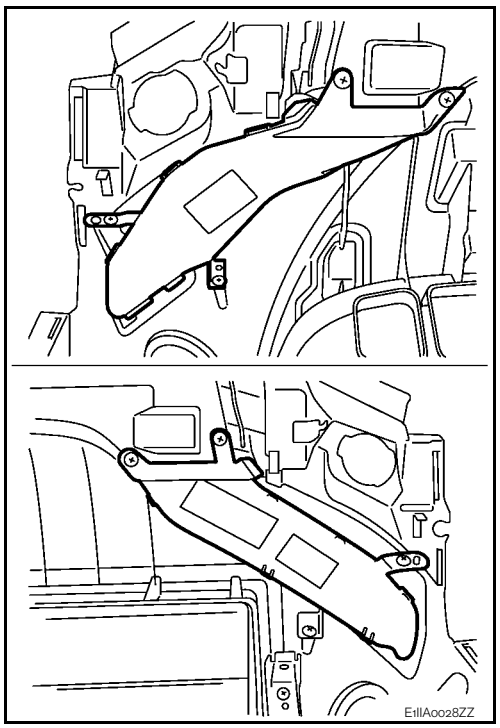
SIDE DEFROSTER DUCTS : Removal and Installation

INFOID:0000000001093735

cardiagn.com

REMOVAL

1. Remove instrument panel. Refer to IP-12, "Removal and Installation".
2. Remove side ventilator ducts (RH/LH). Refer to VTL-44, "SIDE VENTILATOR GRILLES : Removal and Installation".
3. Remove side defroster ducts (RH/LH) fixing screws.
4. Pull to release from center defroster duct.
5. Remove side defroster ducts.



INSTALLATION

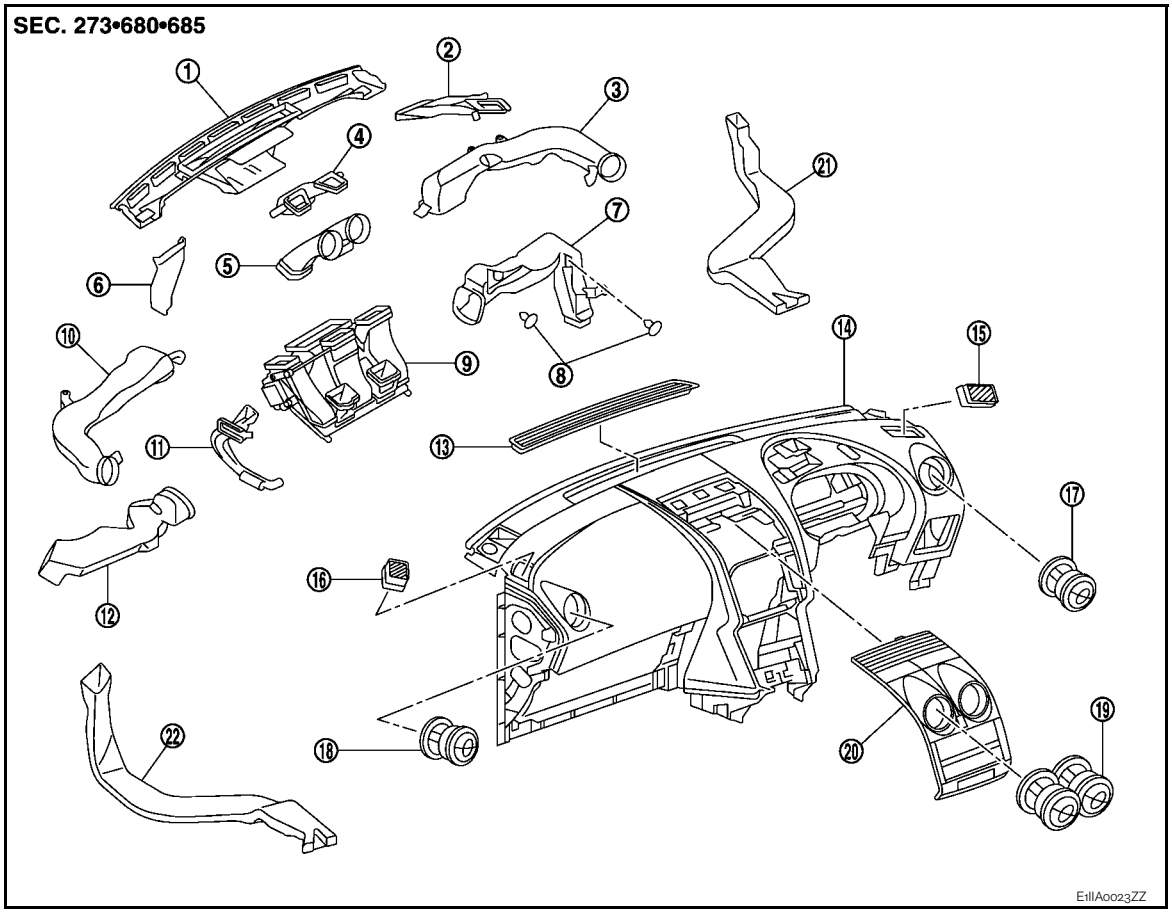
Installation is basically the reverse order of removal.

FOOT DUCTS

FOOT DUCTS : Exploded View

INFOID:0000000001093742

cardiagn.com



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

FOOT DUCTS : Removal and Installation

INFOID:0000000001093743

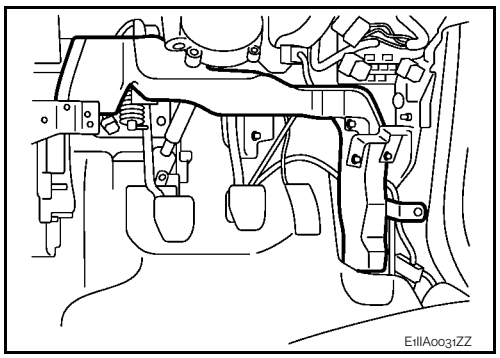
REMOVAL

Driver Side

1. Remove driver side lower panel. Refer to IP-12, "Removal and Installation".
2. Remove side finisher. Refer to IP-12, "Removal and Installation".
3. Remove duct fixing bolt from lid and hood opener bracket.

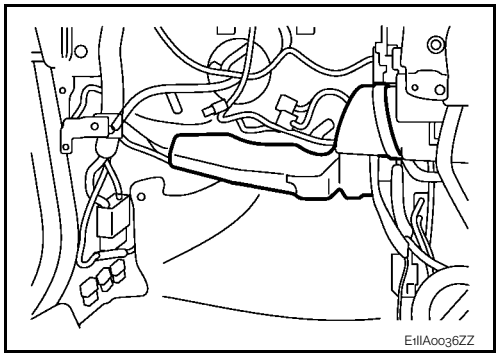
cardiagn.com

4. Remove lower fixing clip from driver side foot duct.
5. Pull duct center side to release it from heater and cooling assembly
6. Release foot duct from floor duct (if equipped)
7. Handle to remove foot duct.



Passenger Side

1. Remove glove box assembly. Refer to IP-12, "Removal and Installation".
2. Remove lower IP finisher.
3. Remove outer fixing screw from bracket.
4. Release foot duct center side from heater and cooling assembly.
   CAUTION:
   Be careful not to damage upper fixing clip.
5. Release foot duct from floor duct.
6. Handle to remove foot duct.



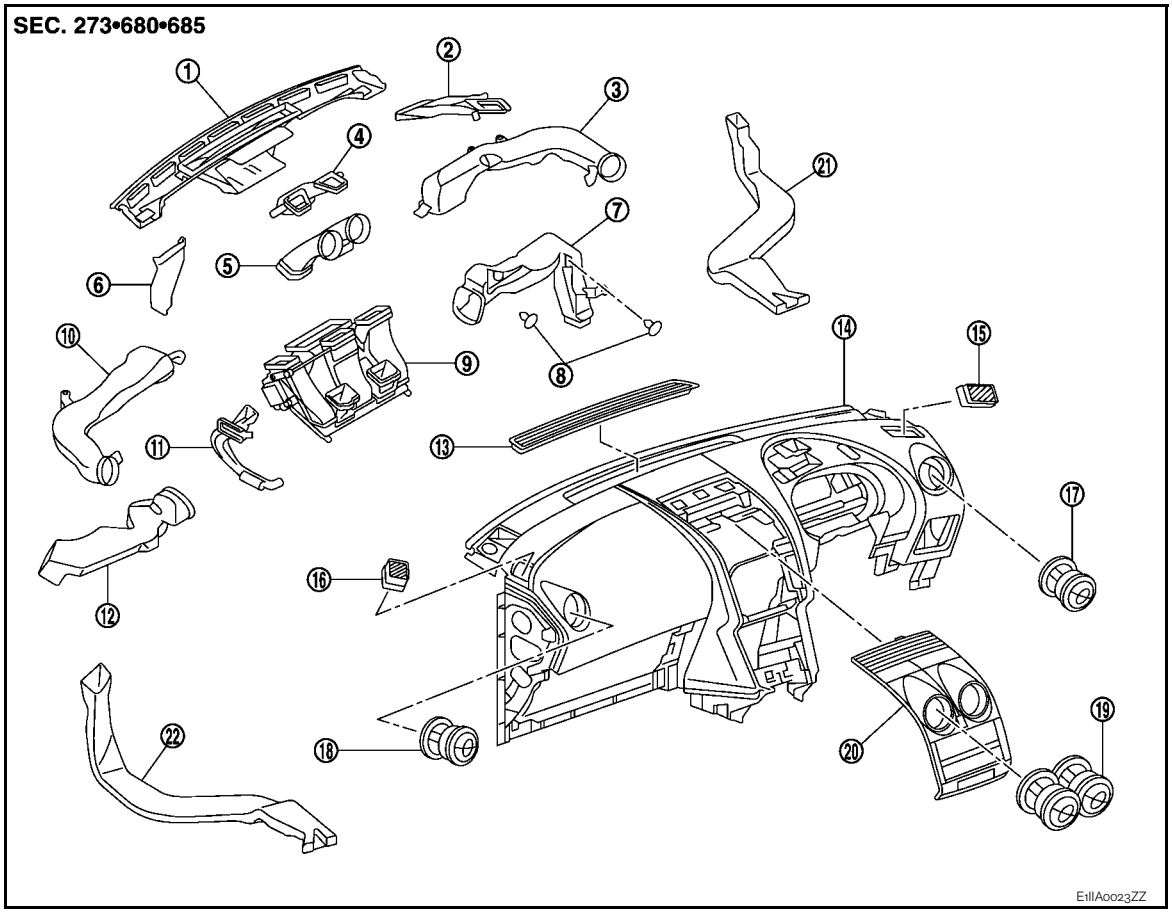
INSTALLATION

Installation is basically the reverse of removal.

FLOOR DUCTS

FLOOR DUCTS : Exploded View

INFOID:0000000001115925



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

FLOOR DUCTS : Removal and Installation

INFOID:0000000001115926

REMOVAL

1. Remove floor carpet. Refer to INT-18, "Removal and Installation".
2. Remove floor duct.

INSTALLATION

Installation is basically the reverse of removal.

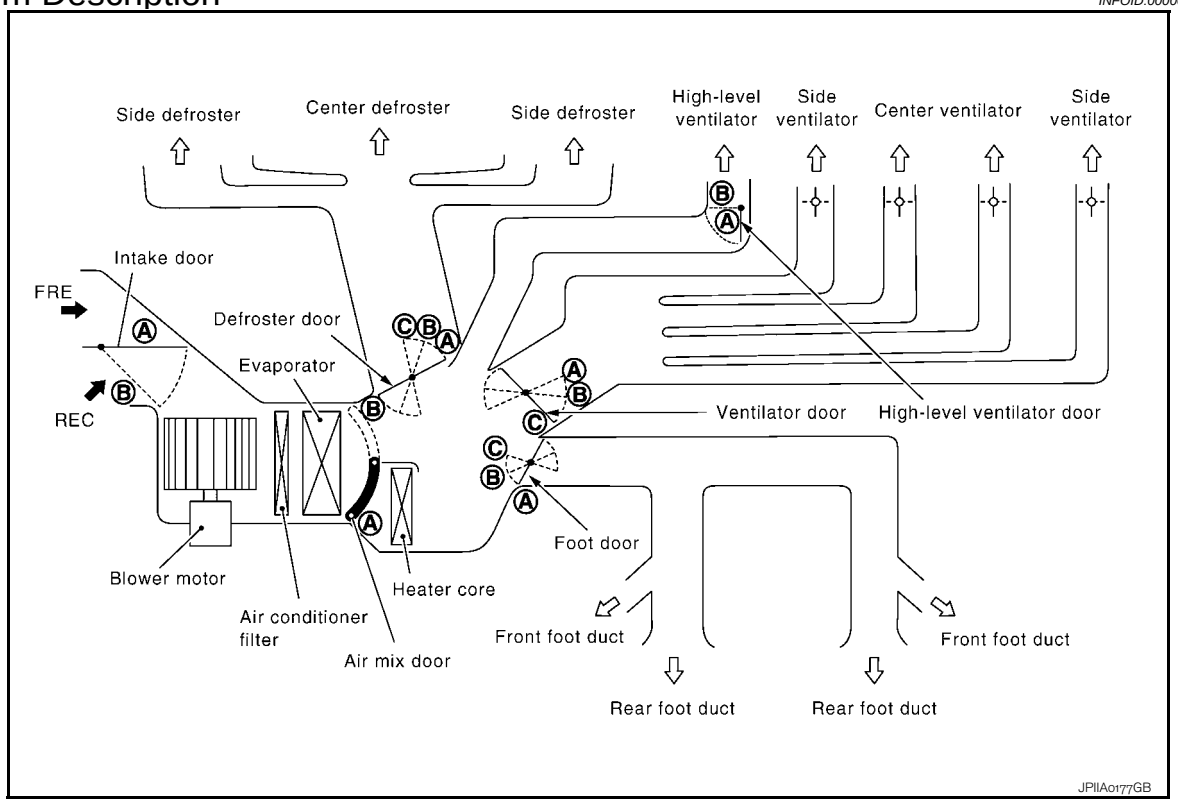
cardiagn.com

FUNCTION DIAGNOSIS

SWITCHES AND THEIR CONTROL FUNCTION

System Description

INFOID:0000000001093811



DOOR \ Mode control dial	MODE position					High-level ventilator SW		REC SW		Temperature control dial		
	VENT	B/L	FOOT	D/F	DEF	ON	OFF	FRE	REC	Full cold	⇔	Full hot
Ventilator door	A	B	C	C	C	–		–		–		
Defroster door	A	A	A	B	C	–		–		–		
Foot door	A	B	C	B	A	–		–		–		
High-level ventilator door	–	–	–	–	–	A	B	–		–		
Intake door	–					–		B	A	–		
Air mix door	–					–		–		A	⇔	B

JPIIA0174GB

AIR DISTRIBUTION

System Description

INFOID:0000000001093813

Without rear ventilation

Discharge air flow

Mode door position	Air outlet/distribution		
	Vent	Foot	Defroster
	100%	–	–
	60%	40%	–
	16%	72%	12%
	16%	60%	24%
	16%	–	84%

SJIA0707E

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001115379

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001115381

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

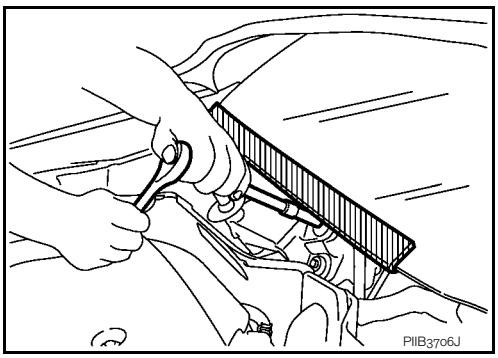
OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001115383

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:0000000001115384

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

Working with HFC-134a (R-134a)

INFOID:0000000001093818

CAUTION:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed and compressor malfunction is likely occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**

- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.**

General Refrigerant Precaution

INFOID:0000000001093819

WARNING:

- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**

cardiagn.com

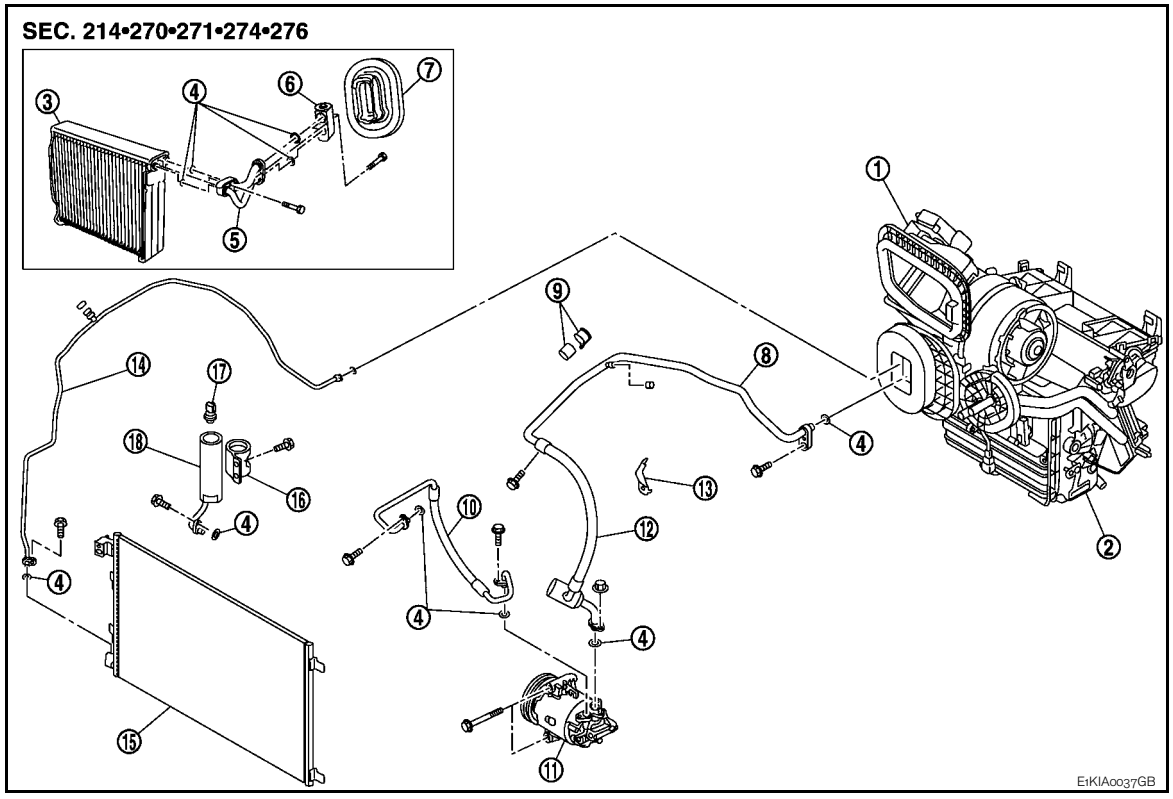
- **Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Never store or heat refrigerant containers above 52°C (126°F).**
- **Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Never intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Refrigerant Connection

INFOID:0000000001093820

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.
- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

O-RING AND REFRIGERANT CONNECTION (HR/MR)



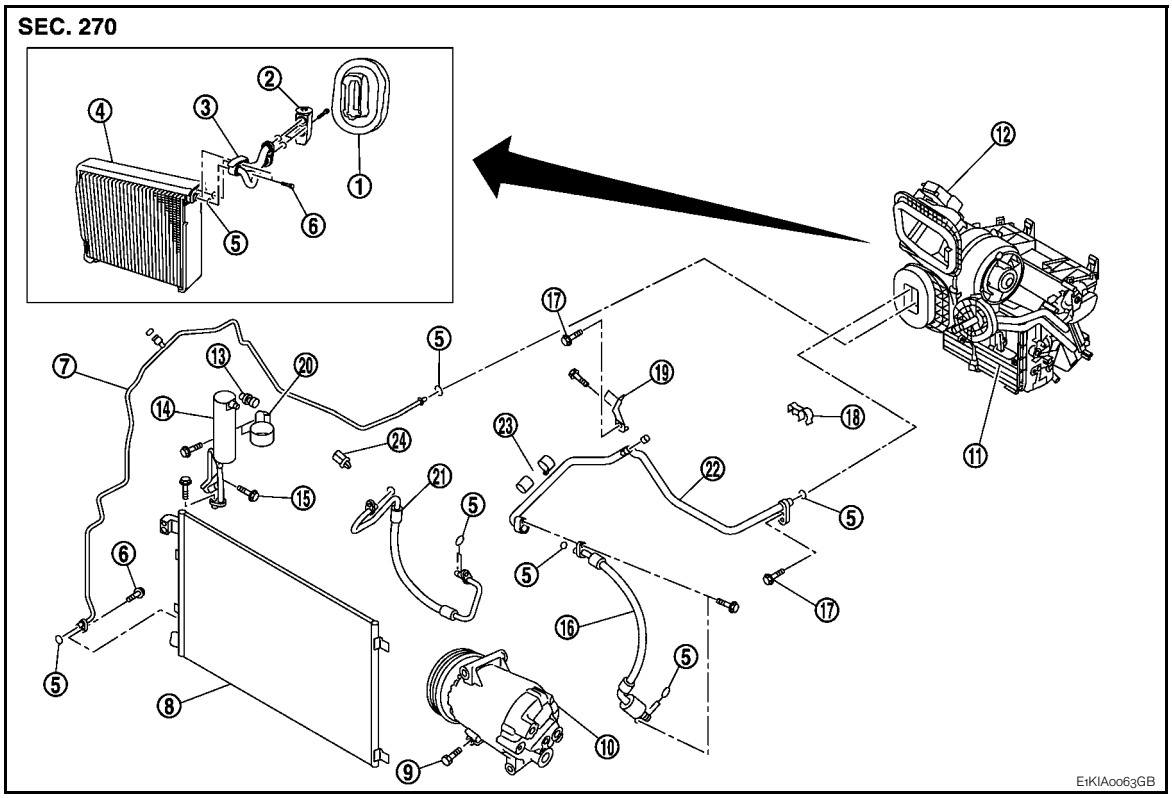
1. Heater sealing	2. Expansion valve	3. O-ring
4. Evaporator	5. Evaporator connector pipes	6. Connector pipe fixing bolt
7. High pressure pipe	8. Condenser assembly	9. Fixing bolt
10. Compressor	11. Heater & cooling unit assembly	12. Heater & Blower unit assembly
13. Refrigerant pressure sensor	14. Liquid tank	15. Pipe fixing bolt
16. Low pressure flexible hose	17. Low & high pipe bracket support	18. Low pressure flexible hose assembly
19. Pipes fixing clip	20. Low pipe fixing clamp assembly	21. Liquid tank fixing screw
22. Liquid tank fixing bracket	23. High pressure flexible hose	

CAUTION:
The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure pipe 2 assembly to expansion valve	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure pipe 2 assembly to evaporator	Inlet	92475 71L00	1	12
		Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		92474 N8210	2	19
	Compressor to high pressure flexible hose		92474 N8210	2	12
	Liquid tank to condenser		92473 N8210	1	16

O-RING AND REFRIGERANT CONNECTION (K9K)



1. Heater sealing
2. Expansion valve
3. Evaporator connector pipes
4. Evaporator
5. O-ring
6. Connector pipe fixing bolt
7. High pressure pipe
8. Condenser assembly
9. Fixing bolt
10. Compressor
11. Heater & cooling unit assembly
12. Heater & Blower unit assembly
13. Refrigerant pressure sensor
14. Liquid tank
15. Liquid tank fixing screw
16. Low pressure flexible hose
17. Fixing bolt
18. Pipes fixing clip

cardiagn.com

19. Low & high pressure pipe bracket
20. Liquid tank fixing bracket
21. High pressure flexible hose
22. Low pressure pipe
23. Low pressure pipe fixing clamp assembly
24. Pipe mantening clip

CAUTION:
The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and SpecificationsA

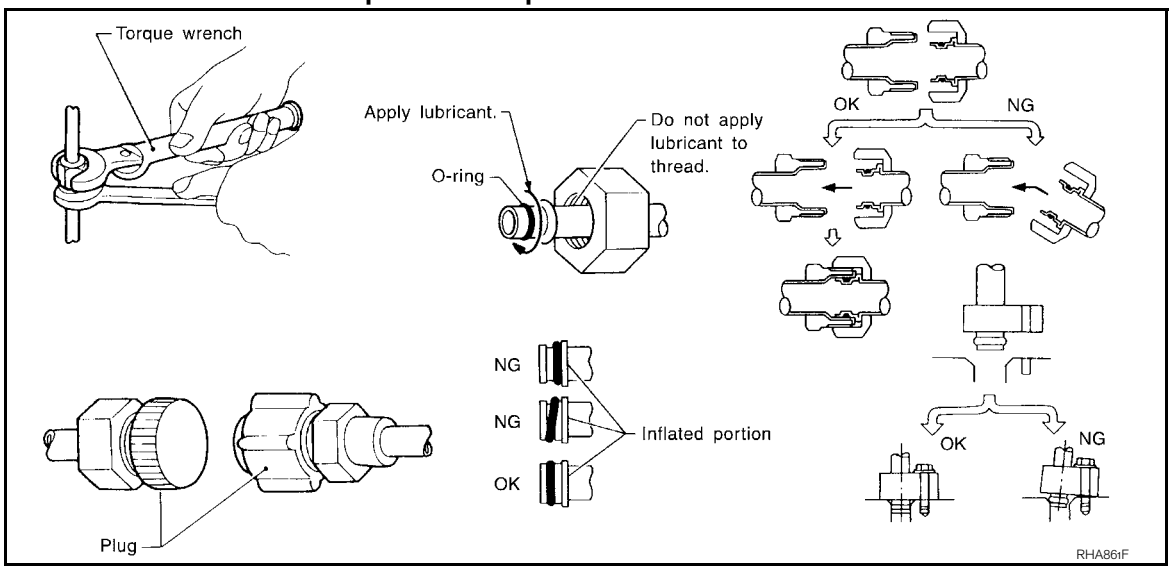
Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure flexible hose to Low pressure pipe 2		92473 N8210	1	16
	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure	Inlet	92475 71L00	1	12
	Pipe 2 assembly to expansion valve	Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure	Inlet	92475 71L00	1	12
	Pipe 2 assembly to evaporator	Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		01-57-112	2	19
	Compressor to high pressure flexible hose		01-57-112	2	12
	Liquid tank to condenser		92473 N8210	2	16

WARNING:
Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.
CAUTION:
When replacing or cleaning refrigerant cycle components, observe the following.
- **When the compressor is removed, store it in the same way at it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Name : Nissan A/C System Oil Type S

- **O-ring must be closely attached to the groove portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.**

- **After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Service Equipment

INFOID:0000000001093821

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRICAL LEAK DETECTOR

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

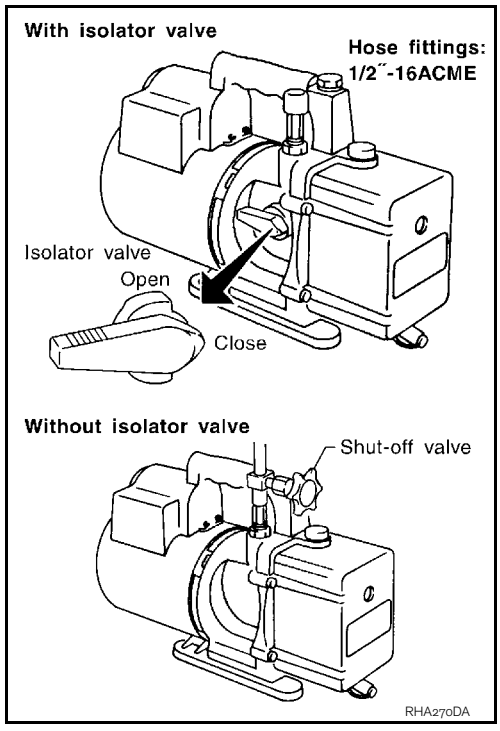
VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

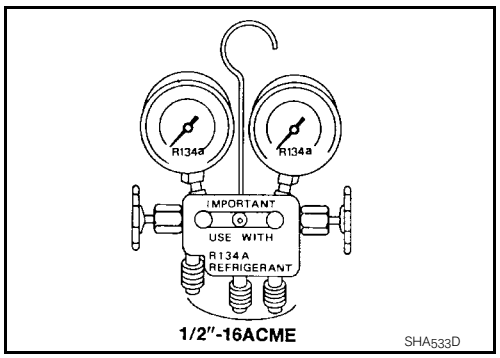
Some one-way valves open when vacuum is applied and close under no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



MANIFOLD GAUGE SET

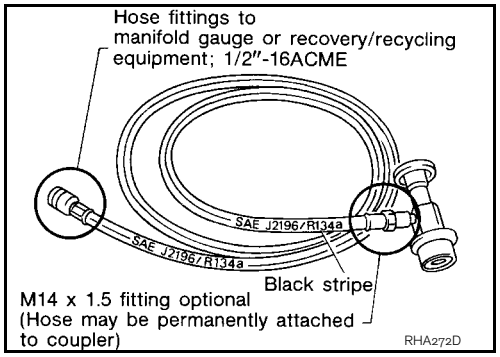
cardiagn.com

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

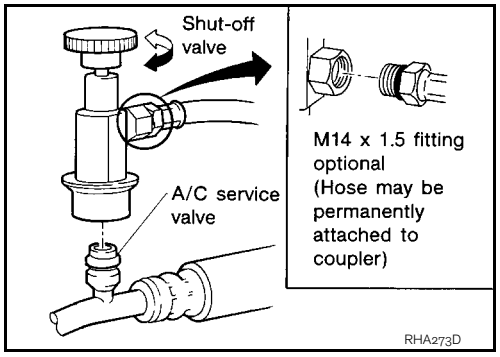
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

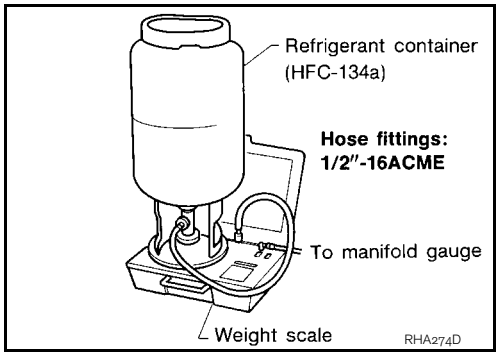
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

COMPRESSOR

General Precautions

INFOID:0000000001093822

CAUTION:

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same way at it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to HA-129, "Adjustment".**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

cardiagn.com

FLUORESCENT LEAK DETECTOR

General Precautions

INFOID:0000000001093823

CAUTION:

- **The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.**
- **Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.**
- **The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST: J-41995) to pin-point refrigerant leaks.**
- **For the purpose of safety and customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.**
- **A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electrical leak detector (SST: J-41995).**
- **Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.**
- **Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.**
- **Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).**
- **Never use more than one refrigerant dye bottle (1/4 ounce /7.4 cc) per A/C system.**
- **Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Never use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.**
- **The fluorescent properties of the dye will remain for three years or a little over unless a compressor malfunction occurs.**

IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have the identification label on the front side of hood.

cardiagn.com

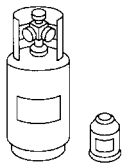
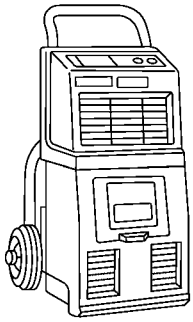
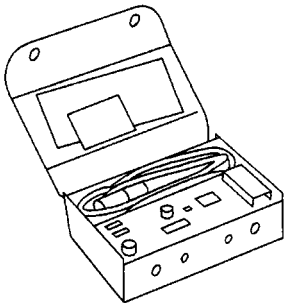
PREPARATION

PREPARATION

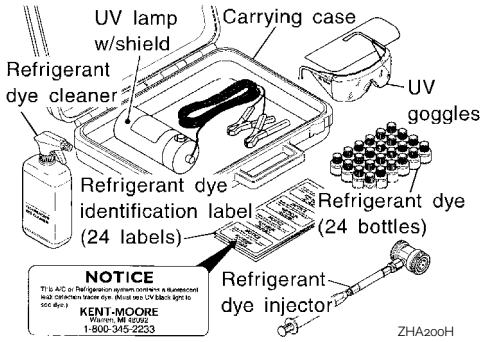
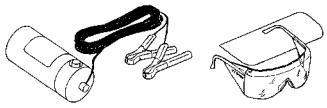
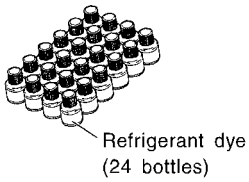
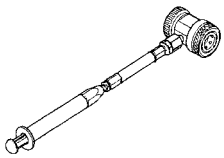
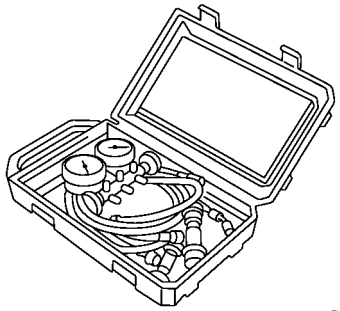
HFC-134a (R-134a) Service Tools and Equipment

INFOID:0000000001116519

Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

Tool number Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
KLH00-PAGS0 Nissan A/C System Oil Type S (DH-PS)	S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) wobble (swash) plate compressors (Nissan only) Lubricity: 40 m ℓ (1.4 Imp fl oz.)
Recovery/Recycling/ Recharging equipment (ACR4)	 RJIA0195E	Function: Refrigerant recovery and recycling and recharging
Electrical leak detector	 A/C leak detector SHA705EB	Power supply: DC 12V (Cigarette lighter)

cardiagn.com

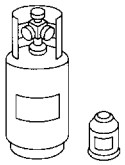
Tool number Tool name		Description
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12V (Battery terminal)
(J-42220) UV lamp and UV safety goggles	 SHA438F	Power supply: DC 12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
(J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 SHA439F	Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle	 SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system.
(J-43872) Refrigerant dye cleaner	 SHA441F	For cleaning dye spills.
Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: • The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size • 1/2″ -16 ACME

Sealant or/and Lubricant

INFOID:0000000001093826

HFC-134a (R-134a) Service Tool and Equipment

- Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
- Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
- Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
- Never use adapters that convert one size fitting to another: refrigerant/lubricant contamination occurs and compressor malfunction may result.

Tool name	Description
HFC-134a (R-134a) refrigerant  S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • Large container 1/2″-16 ACME
Nissan A/C System Oil Type S (DH-PS) S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) swash plate compressors (Nissan only) Capacity: 40 m ℓ (1.4 US fl oz., 1.4 Imp fl oz.)

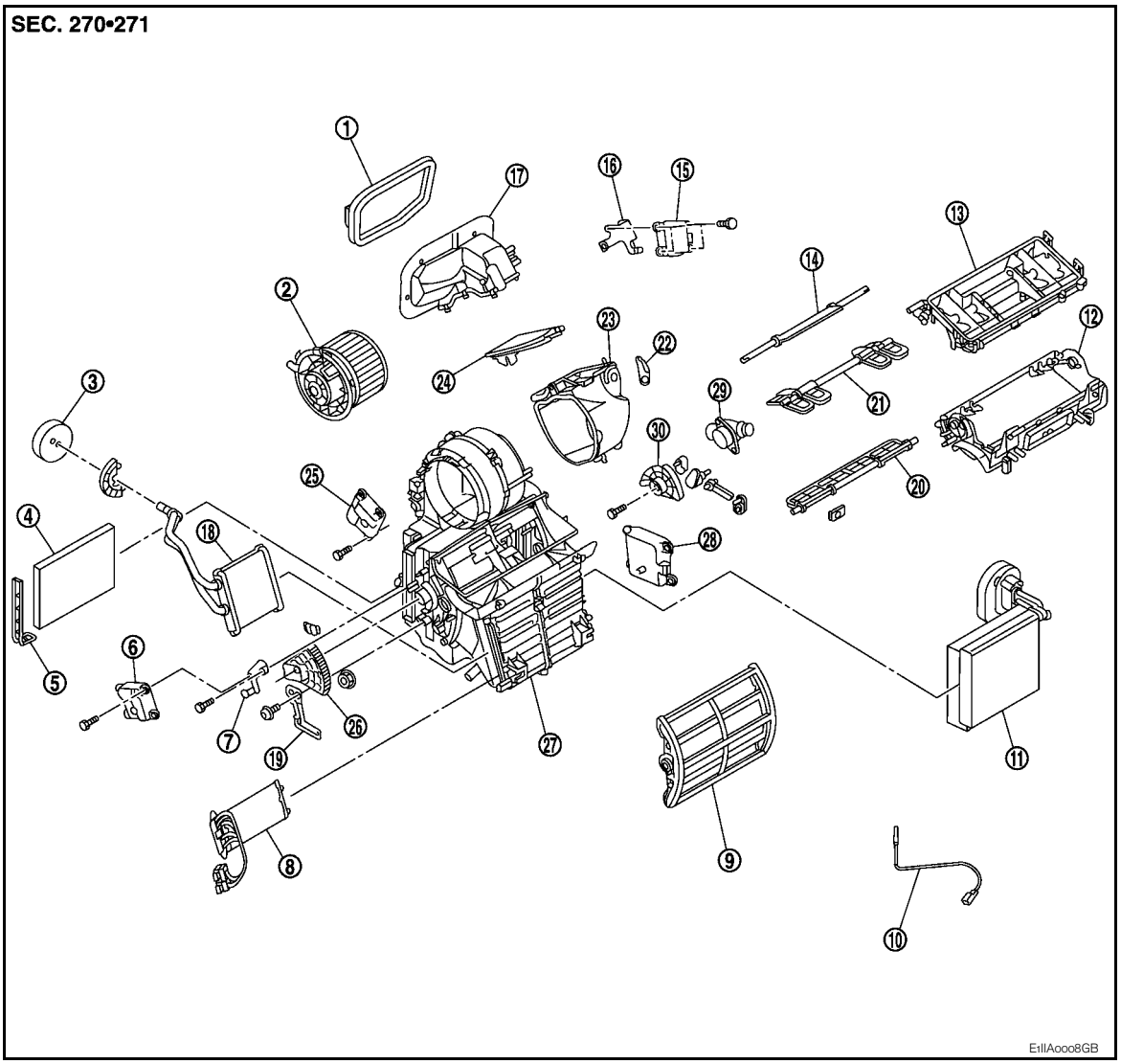
cardiagn.com

ON-VEHICLE MAINTENANCE

MODE DOOR

Exploded View

INFOID:0000000001117098



1. Intake connector seal	2. Blower motor assembly	3. Heater pipe seal
4. Air conditioner filter	5. Air conditioner filter cover	6. Air mix door motor (left)
7. Air mix door lever	8. Electrical heater	9. Air mix door (slide door)
10. Intake sensor	11. Evaporator and expansion valve unit	12. Center case (lower)
13. Center case (upper)	14. Defroster door	15. Intake door motor
16. Intake motor bracket	17. Intake connector	18. Heater core
19. Air mix door link bracket	20. Front ventilator door	21. Side ventilator door
22. Intake door lever	23. Intake door box	24. Intake door
25. Mode door motor	26. Air mix door link (left)	27. Heater and cooling unit case
28. Air mix door motor (right)	29. Aspirator	30. Air mix door link (right)

*With left and right ventilation temperature separately system.

Refer to GI-4, "Components" for symbols in the figure.

Adjustment

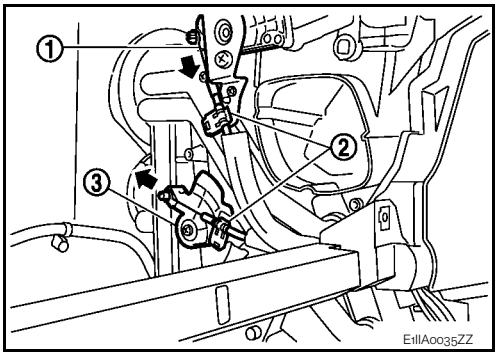
INFOID:0000000001098000

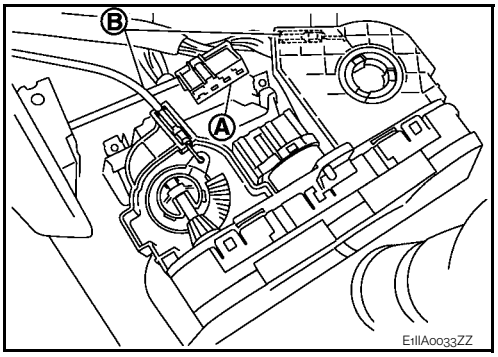
cardiagn.com

1. Remove the instrument lower panel. Refer to IP-12, "Removal and Installation".
2. Remove the outer cable of mode door cable from the clamp.
3. Set mode dial to “ventilation” position.
4. Push the main link in the direction shown by the arrow, then carefully pull outer cable to the controller side, and install the clamp.
5. Operate the mode dial to insure that the inner cable moves smoothly.

CAUTION:

When clamping the outer cable, de not move the inner cable.



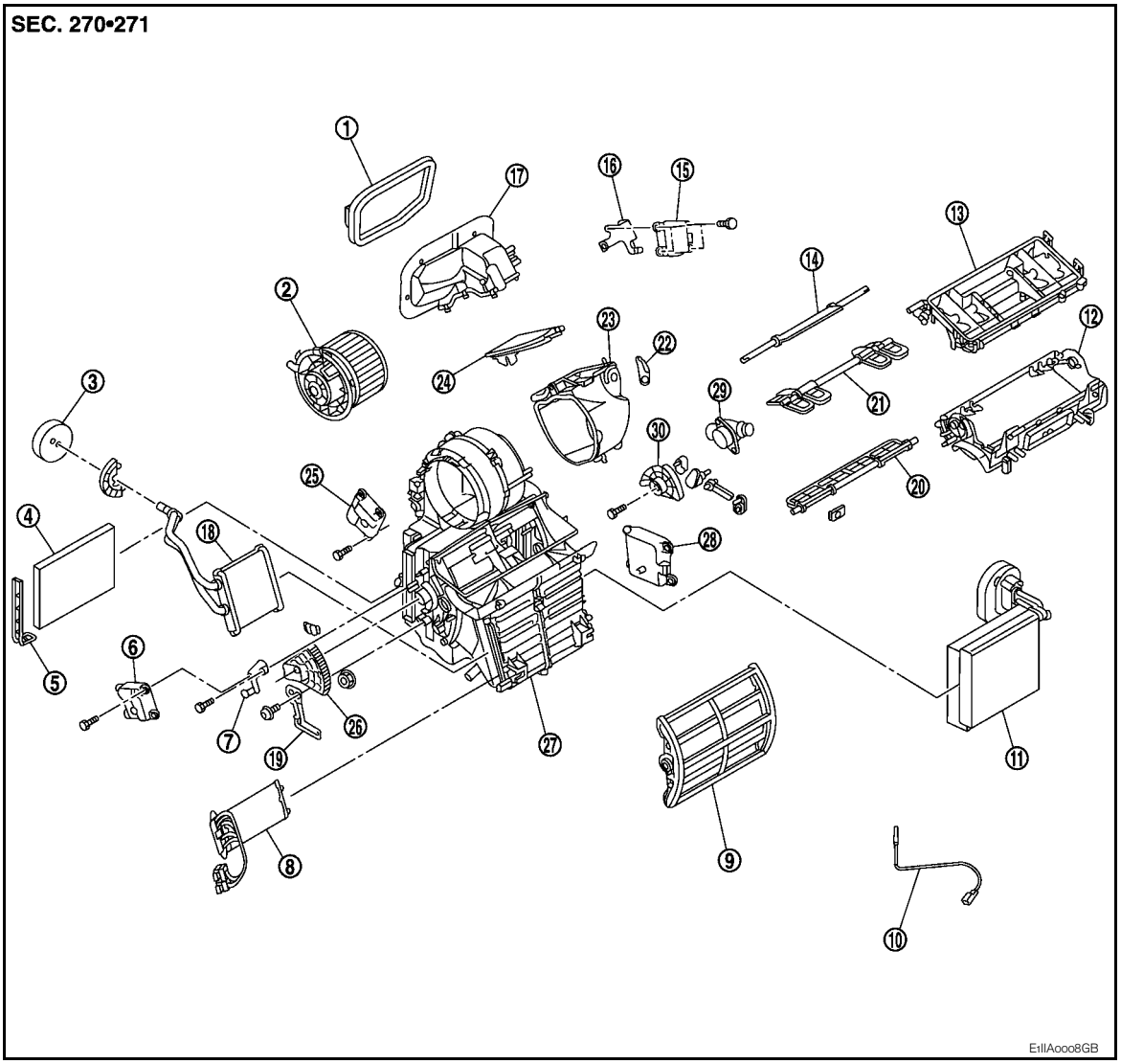


cardiagn.com

AIR MIX DOOR

Exploded View

INFOID:0000000001117099



1. Intake connector seal	2. Blower motor assembly	3. Heater pipe seal
4. Air conditioner filter	5. Air conditioner filter cover	6. Air mix door motor (left)
7. Air mix door lever	8. Electrical heater	9. Air mix door (slide door)
10. Intake sensor	11. Evaporator and expansion valve unit	12. Center case (lower)
13. Center case (upper)	14. Defroster door	15. Intake door motor
16. Intake motor bracket	17. Intake connector	18. Heater core
19. Air mix door link bracket	20. Front ventilator door	21. Side ventilator door
22. Intake door lever	23. Intake door box	24. Intake door
25. Mode door motor	26. Air mix door link (left)	27. Heater and cooling unit case
28. Air mix door motor (right)	29. Aspirator	30. Air mix door link (right)

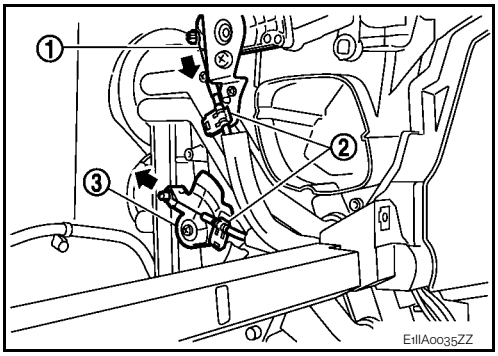
*With left and right ventilation temperature separately system.

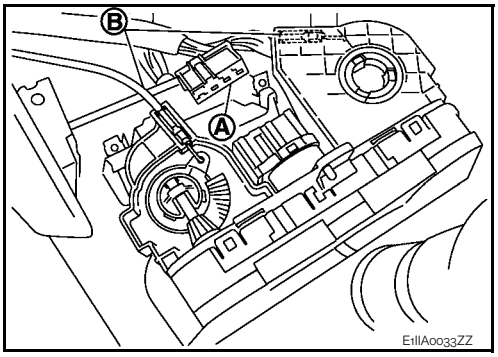
Refer to GI-4, "Components" for symbols in the figure.

Adjustment

INFOID:0000000001093852

1. Remove the instrument panel stay cover. Refer to IP-12, "Removal and Installation".
2. Remove the outer cable of air mix door cable from the clamp.
3. Set temperature control dial to “full cold” position.
4. Push the air mix door lever in the direction shown by arrow and then carefully pull the outer cable toward controller side, and install the clamp.
5. Operate the temperature control dial to insure than the inner cable moves smoothly.
   CAUTION:
   When clamping the outer cable, do not move the inner cable.



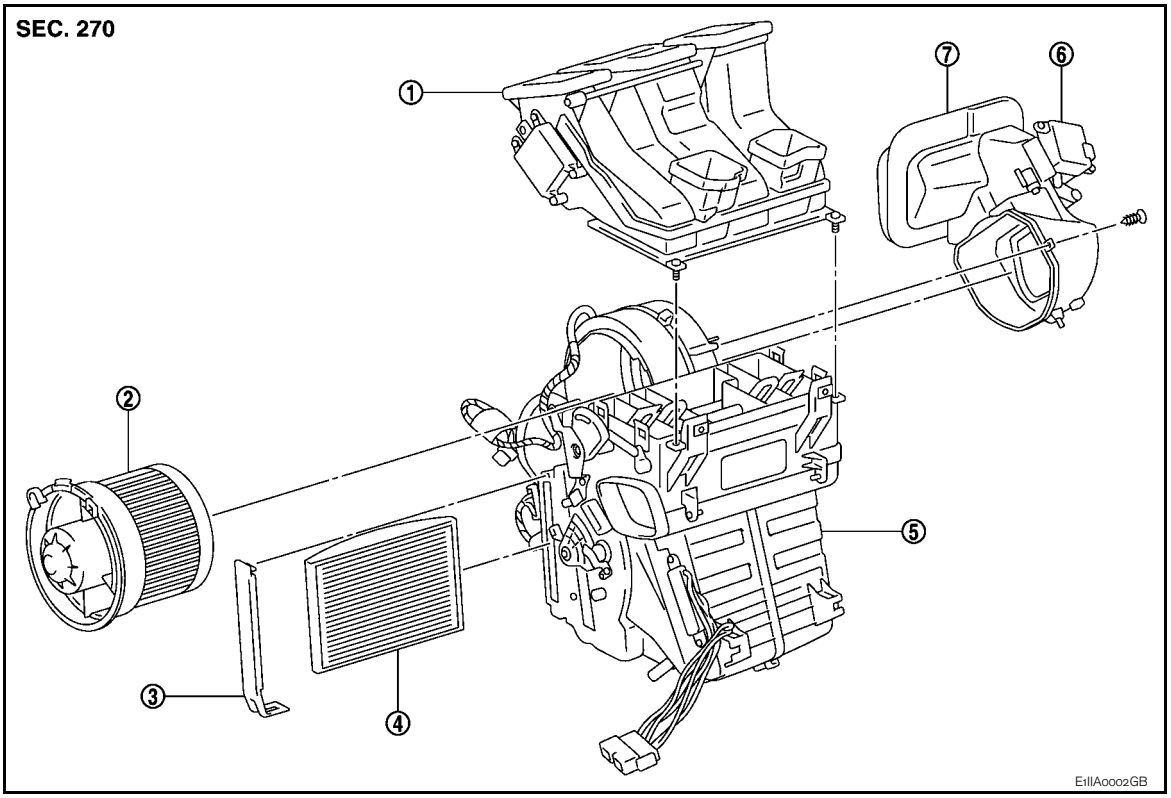


cardiagn.com

AIR CONDITIONER FILTER

Exploded View

INFOID:0000000001093827



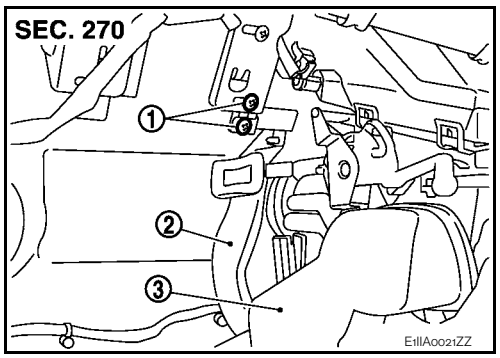
1. Hi-Level ventilation door unit assembly
2. Blower motor assembly
3. Filter cover
4. In-cabin microfilter
5. Blower unit
6. Intake door motor
7. Intake door unit assembly

Removal and Installation

INFOID:0000000001093828

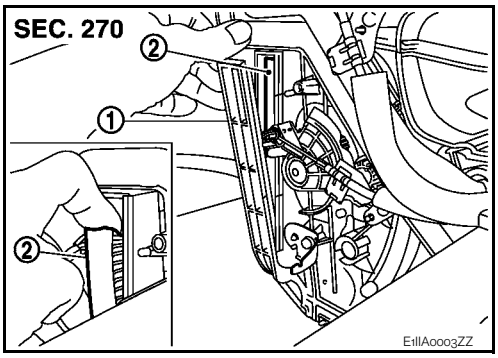
REMOVAL

1. Remove passenger Lower instrument panel. Refer to IP-12, "Removal and Installation".
2. Remove glove box assembly (RHD). Refer to IP-12, "Removal and Installation".
3. Remove glove box air duct (RHD).
   - Remove fixing screw (1)
   - Pull outside to remove air duct (2)



4. Remove LH foot duct (3). Refer to VTL-48, "FOOT DUCTS : Removal and Installation".
5. Remove LH Lower instrument panel, (LHD)
6. Remove accelerator pedal assembly (LHD). Refer to ACC-3, "Removal and Installation".

7. Remove clutch and brake pedal assembly (LHD). Refer to CL-8, "Removal and Installation" (Clutch pedal), BR-17, "Removal and Installation" (Brake pedal).
8. Remove filter cover (1) then remove air conditioner filter (2).



INSTALLATION
Installation is basically the reverse order of removal.

Replacement

INFOID:0000000001093829

Replace air conditioner filter.
Refer to MA-7, "Periodic Maintenance".
When replacing filter, affix a caution label inside the glove box.

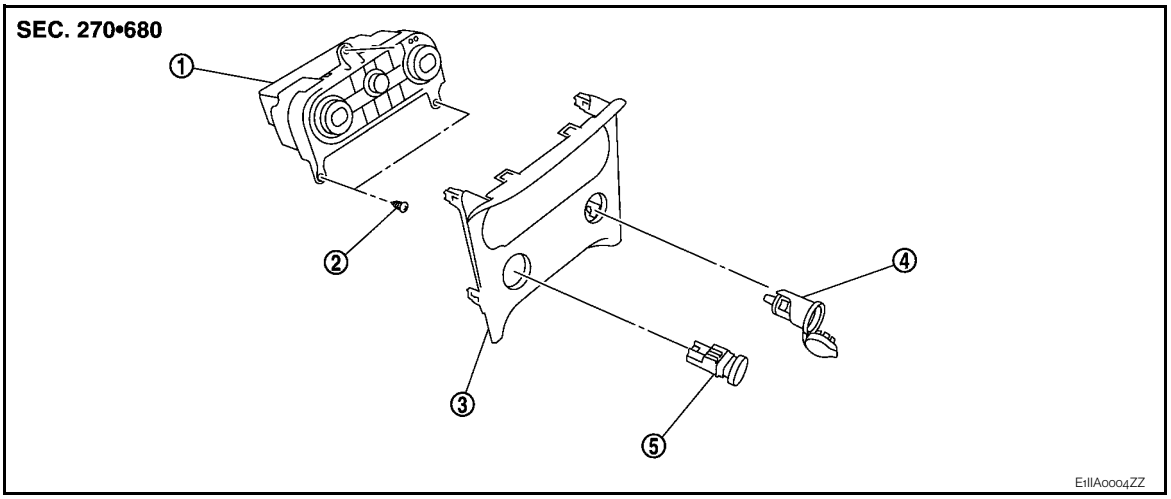
cardiagn.com

ON-VEHICLE REPAIR

PRESET SWITCH

Exploded View

INFOID:0000000001093830



1. Preset switch
2. Preset switch fixing screw
3. Cluster lid D
4. Power socket
5. Button

Removal and Installation

INFOID:0000000001093831

REMOVAL

Refer to IP-12, "Removal and Installation".

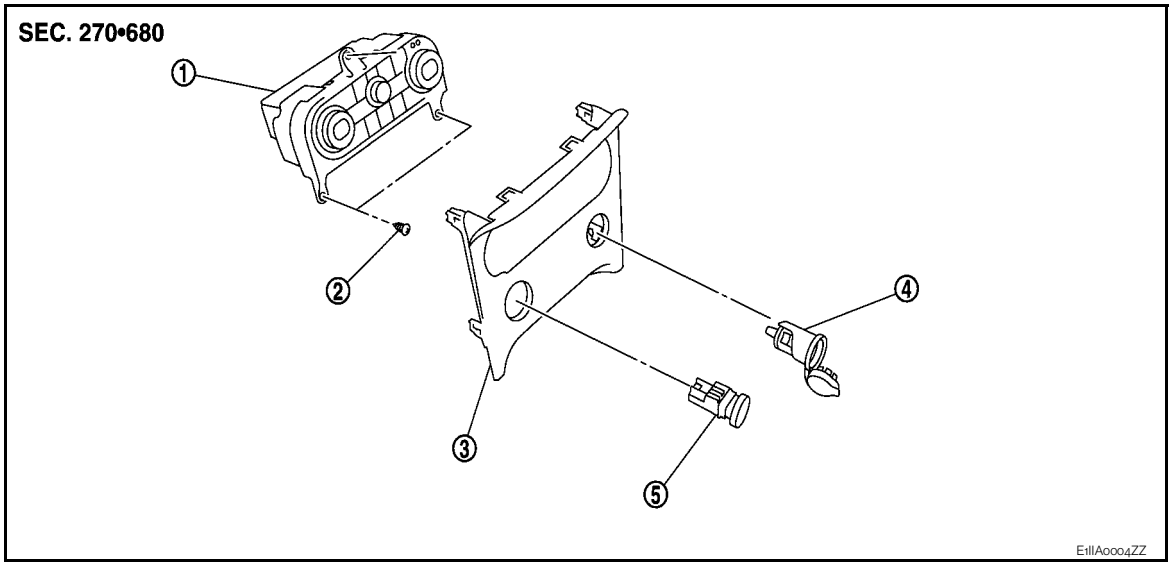
INSTALLATION

Installation is basically the reverse order of removal.

HEATER CONTROL PANEL

Exploded View

INFOID:0000000001093832



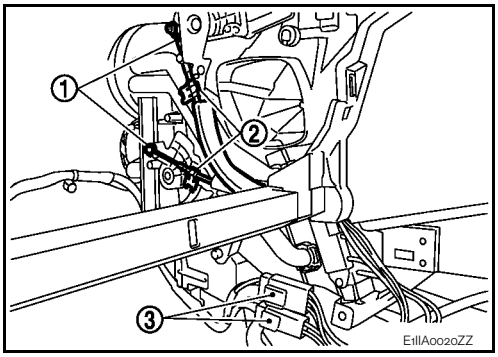
1. Heater control panel
2. Preset switch fixing screw
3. Cluster lid D
4. Power socket
5. Button

Removal and Installation

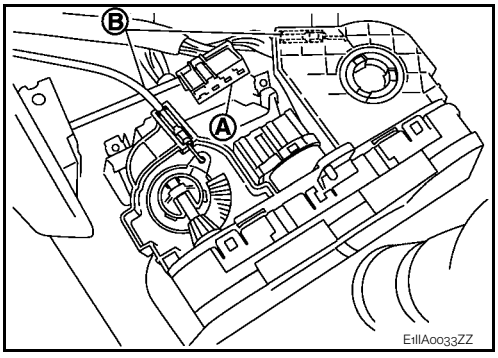
INFOID:0000000001093833

REMOVAL

1. Remove cluster lid D. Refer to IP-12, "Removal and Installation".
2. Remove cluster lid C. Refer to IP-12, "Removal and Installation".
3. Remove glove box (RHD). Refer to IP-12, "Removal and Installation".
4. Remove RH foot duct (RHD). Refer to VTL-94, "FOOT DUCTS : Removal and Installation".
5. Remove cables fixing metal clips (2), then remove cables (1) from heater assembly.



6. Remove heater control fixing screws from instrument panel, then pull manual heater control assembly, and disconnect harness connector (A), and hand heater control cables (B).
7. Remove heater control assembly.



INSTALLATION

cardiagn.com

Installation is basically the reverse order of removal.

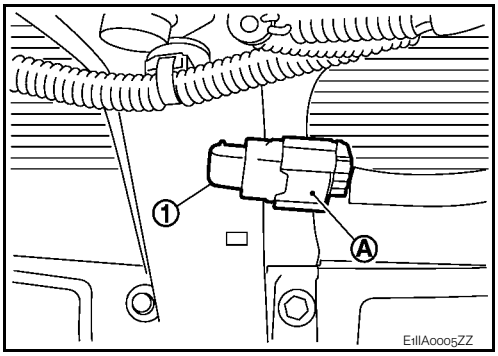
cardiagn.com

AMBIENT SENSOR

Exploded View

INFOID:0000000001093834

1. Ambient sensor

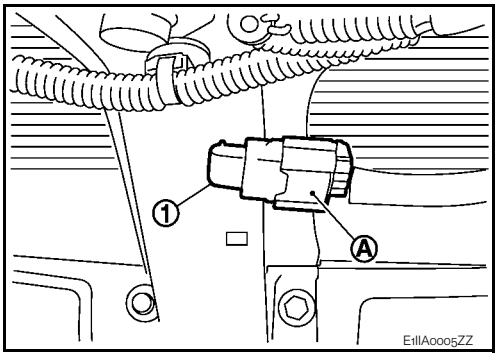


Removal and Installation

INFOID:0000000001093835

REMOVAL

1. Disconnect ambient sensor connector (A), and then remove ambient sensor (1).



INSTALLATION

Installation is basically the reverse order of removal.

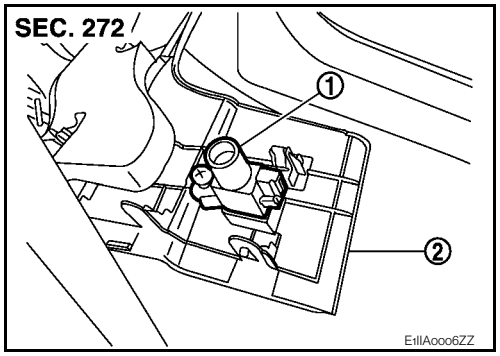
cardiagn.com

IN-VEHICLE SENSOR

Exploded View

INFOID:0000000001093836

1. In-vehicle sensor
2. instrument driver lower panel

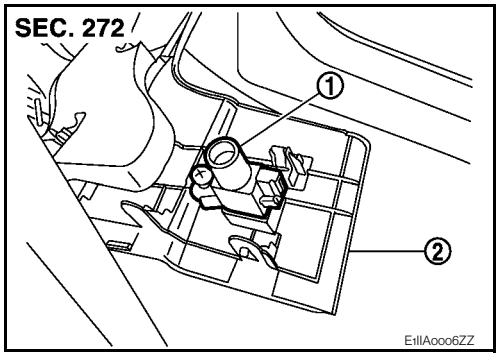


Removal and Installation

INFOID:0000000001093837

REMOVAL

1. Remove instrument driver lower panel (2). Refer to IP-12, "Removal and Installation".
2. Disconnect harness connector.
3. Remove hose tube from in-vehicle sensor (1).
4. Remove mounting screws, and then remove in-vehicle sensor.



INSTALLATION

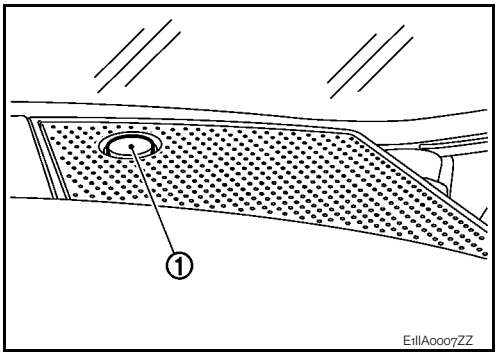
Installation is basically the reverse order of removal.

SUNLOAD SENSOR

Exploded View

INFOID:0000000001093838

1. Sunload sensor

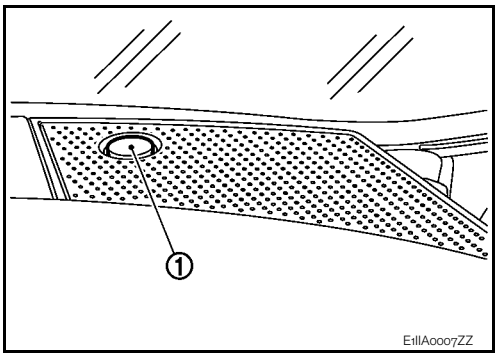


Removal and Installation

INFOID:0000000001093839

REMOVAL

1. Remove speaker grille (left). Refer to IP-12, "Removal and Installation".
2. Disconnect sunload sensor connector, and then remove sunload sensor (1).



INSTALLATION

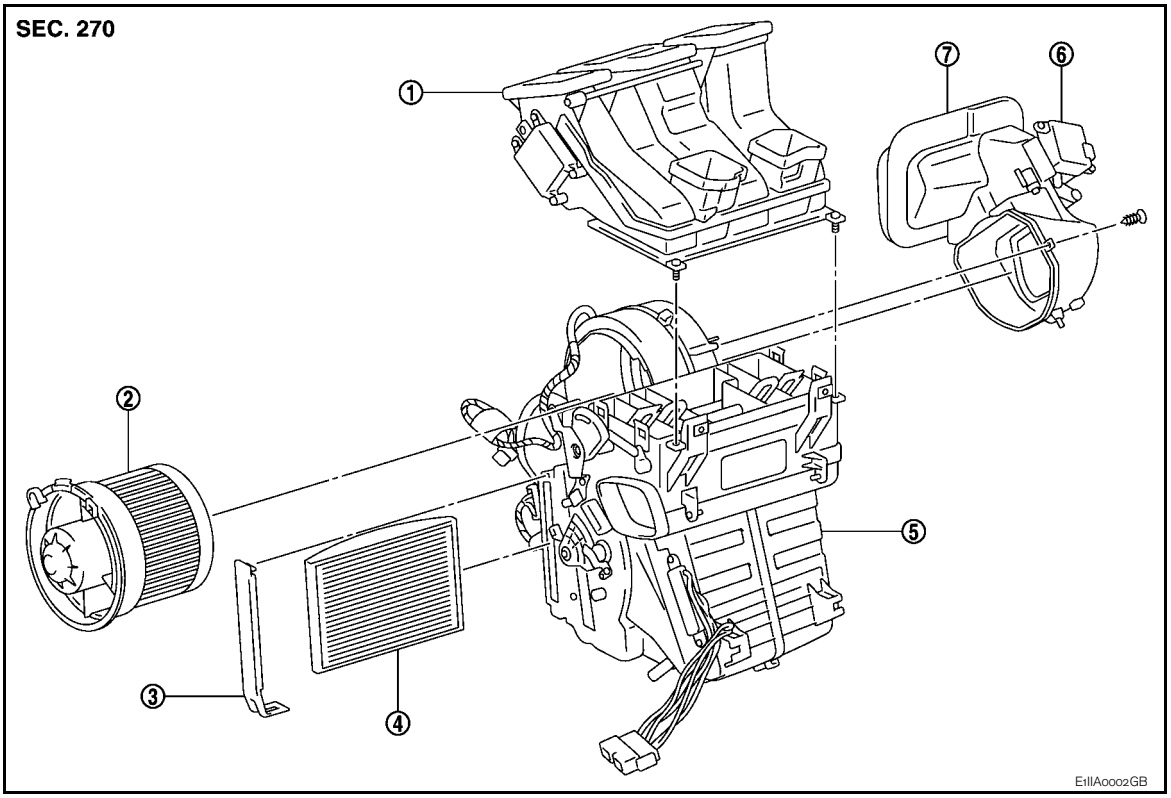
Installation is basically the reverse order of removal.

cardiagn.com

BLOWER UNIT

Exploded View

INFOID:0000000001093842



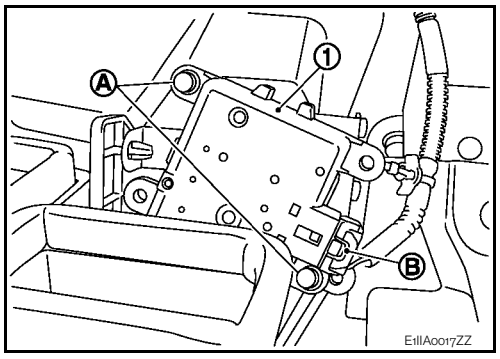
1. Hi-Level ventilation door unit assembly
2. Blower motor assembly
3. Filter cover
4. In-cabin microfilter
5. Blower unit
6. Intake door motor
7. Intake door unit assembly

Removal and Installation

INFOID:0000000001093843

REMOVAL

1. Remove Instrument Panel. Refer to IP-12, "Removal and Installation".
2. Remove steering member. Refer to IP-12, "Removal and Installation".
3. Remove Heater and cooling unit assembly.
4. Remove harness fixing clip from upper intake box.
5. Remove door motor harness connector (B).
6. Remove lower intake box fixing screw from heater and cooling case.
7. Remove intake door motor (1).
   - Remove fixing screws (A)
   - Remove bracket support fixing screws and bracket support
8. Remove blower motor.Refer to VTL-79, "Removal and Installation".



CAUTION:
Move blower unit rightward, and remove locating pin (1 part) and joint. Then remove blower unit downward.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

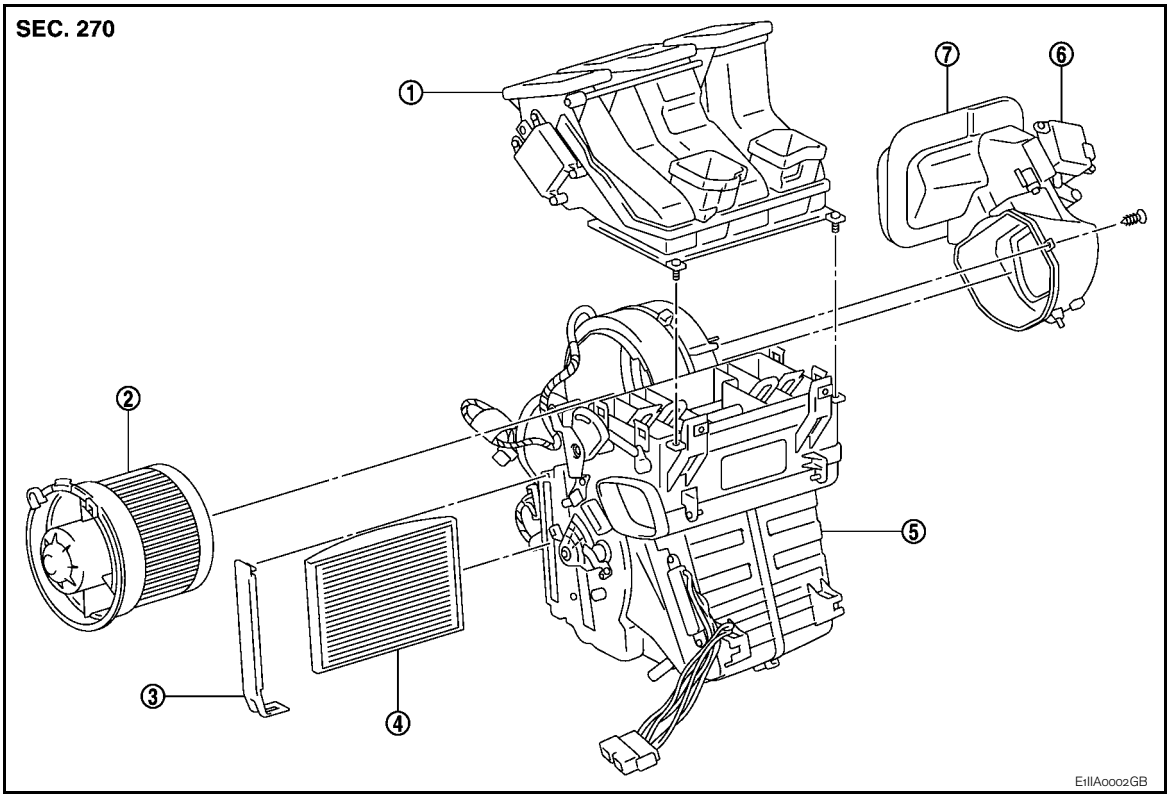
Make sure locating pin (A) are securely inserted.

cardiagn.com

BLOWER MOTOR

Exploded View

INFOID:0000000001093844



1. Hi-Level ventilation door unit assembly
2. Blower motor assembly
3. Filter cover
4. In-cabin microfilter
5. Blower unit
6. Intake door motor
7. Intake door unit assembly

Removal and Installation

INFOID:0000000001093845

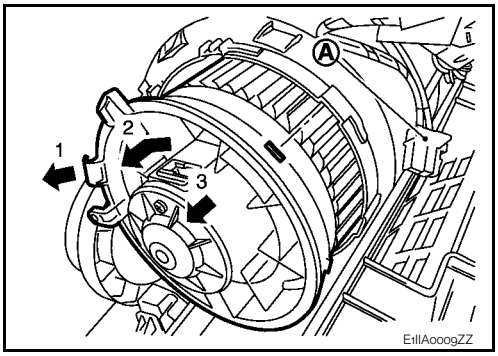
REMOVAL

LHD Model

1. Remove driver lower instrument panel. Refer to IP-12, "Removal and Installation".
2. Remove driver foot duct fixing screw, and remove it.
3. Remove accelerator pedal, and disconnect harness connector. Refer to ACC-3, "Removal and Installation".
4. Remove brake and clutch pedal assembly, disconnect harness connectors. Refer to BR-17, "Removal and Installation" [Brake pedal (LHD)], BR-61, "Removal and Installation" [Brake pedal (RHD)], CL-8, "Removal and Installation" (Clutch pedal).

5. Remove blower motor harness connector.
6. Remove motor fixing screw, then remove blower motor.
7. Remove blower motor assembly, as shown.
   - Remove fixing screw.
   - Disconnect harness connector (A).
   - Release maintaining pawl (1) then turn counter clockwise (2) blower motor assembly.
   - Pull outside (3) and remove it.

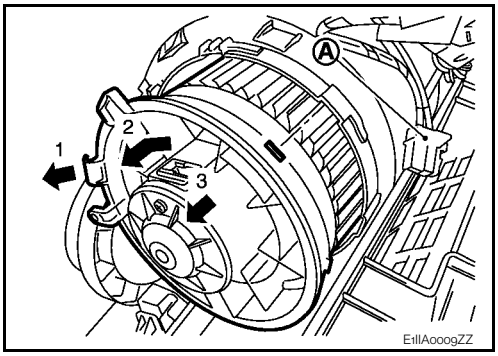
   CAUTION:
   Take care of harness connectors around blower motor.



RHD Model

1. Remove passenger lower instrument panel. Refer to IP-12, "Removal and Installation".
2. Remove Glove Box.
3. Remove passenger foot duct fixing screw, and remove it.
4. Remove glove box duct fixing screw, and remove it.
5. Remove BCM unit. Refer to BCS-64, "Removal and Installation".
6. Remove blower motor harness connector.
7. Remove blower motor assembly, as shown.
8. Remove fixing screw.
   - Disconnect harness connector (A).
   - Release maintaining pawl (1) then turn counter clockwise (2) blower motor assembly.
   - Pull outside (3) and remove it.

   CAUTION:
   Take care of harness connectors around blower motor.



INSTALLATION

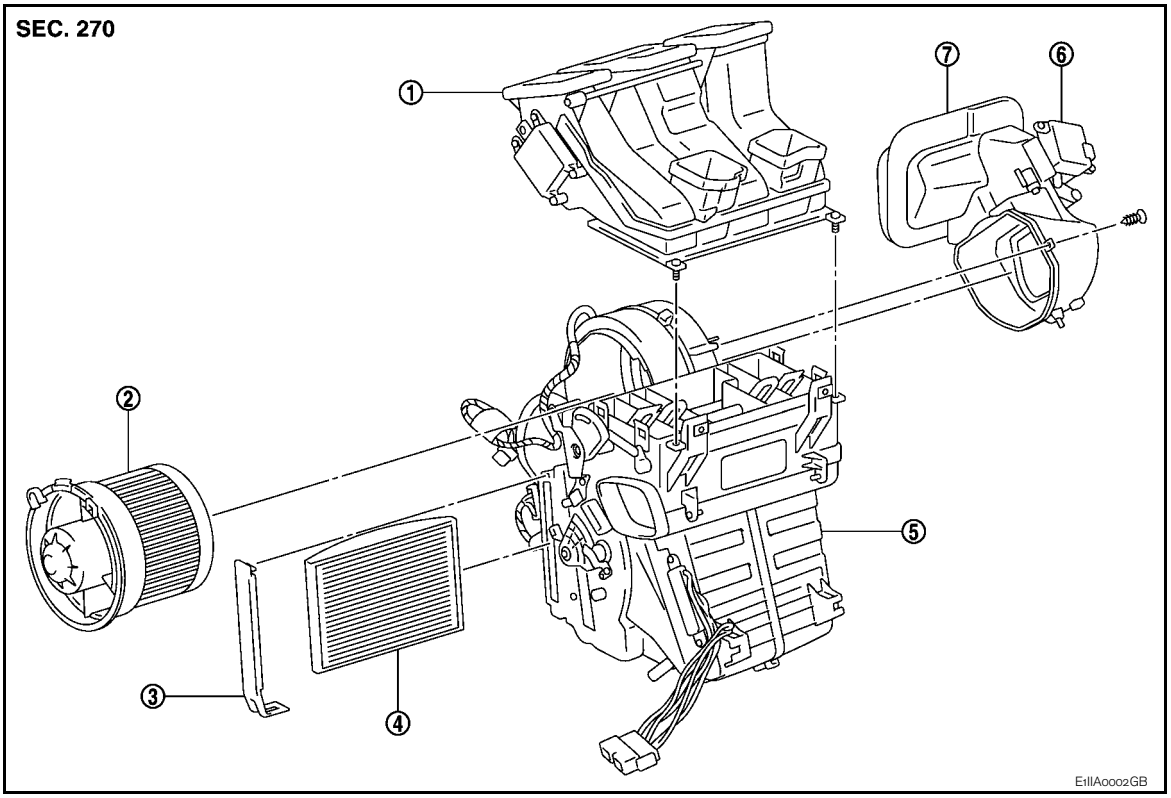
Installation is basically the reverse order of removal.

cardiagn.com

INTAKE DOOR MOTOR

Exploded View

INFOID:0000000001093846



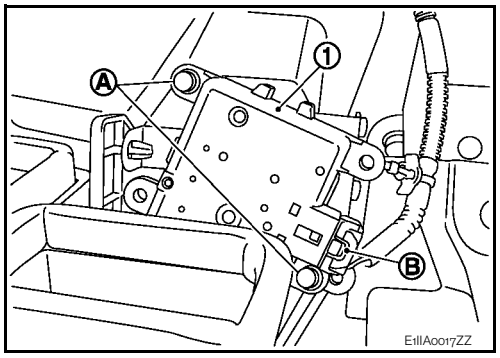
1. Hi-Level ventilation door unit assembly
2. Blower motor assembly
3. Filter cover
4. In-cabin microfilter
5. Blower unit
6. Intake door motor
7. Intake door unit assembly

Removal and Installation

INFOID:0000000001093847

REMOVAL

1. Remove Instrument Panel. Refer to IP-12, "Removal and Installation".
2. Disconnect intake door motor connector (B).
3. Remove harness connector fixing clip.
4. Remove intake door motor fixing screws (A).
5. Remove intake door motor (1).



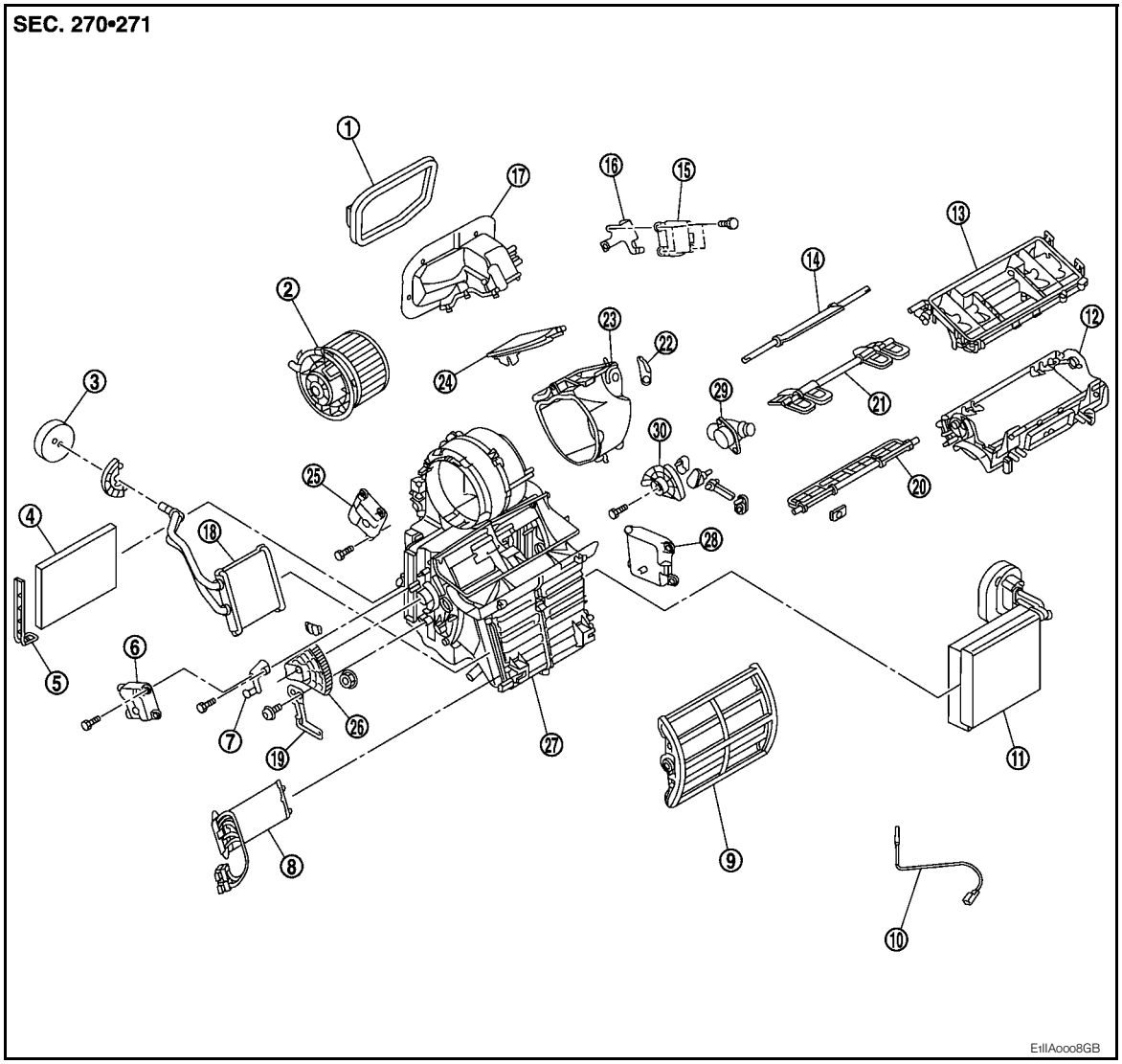
INSTALLATION

Installation is basically the reverse order of removal.

HEATER & COOLING UNIT ASSEMBLY

Exploded View

INFOID:0000000001093848



1. Intake connector seal	2. Blower motor assembly	3. Heater pipe seal
4. Air conditioner filter	5. Air conditioner filter cover	6. Air mix door motor (left)
7. Air mix door lever	8. Electrical heater	9. Air mix door (slide door)
10. Intake sensor	11. Evaporator and expansion valve unit	12. Center case (lower)
13. Center case (upper)	14. Defroster door	15. Intake door motor
16. Intake motor bracket	17. Intake connector	18. Heater core
19. Air mix door link bracket	20. Front ventilator door	21. Side ventilator door
22. Intake door lever	23. Intake door box	24. Intake door
25. Mode door motor	26. Air mix door link (left)	27. Heater and cooling unit case
28. Air mix door motor (right)	29. Aspirator	30. Air mix door link (right)

*With left and right ventilation temperature separately system.

Refer to GI-4, "Components" for symbols in the figure.

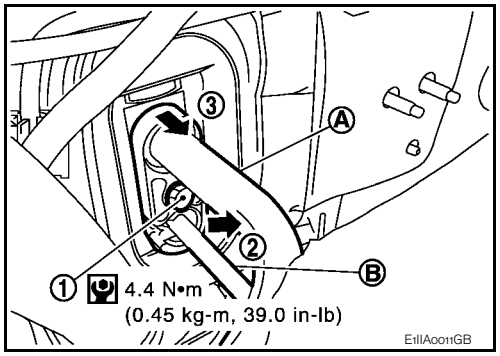
Removal and Installation

INFOID:0000000001093849

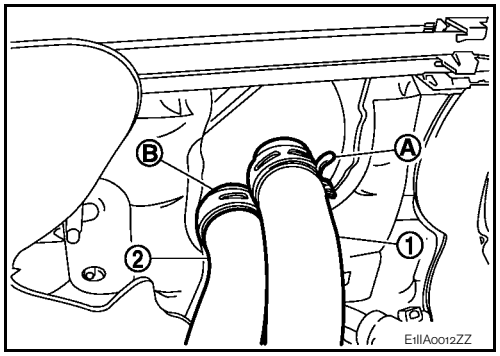
REMOVAL

cardiagn.com

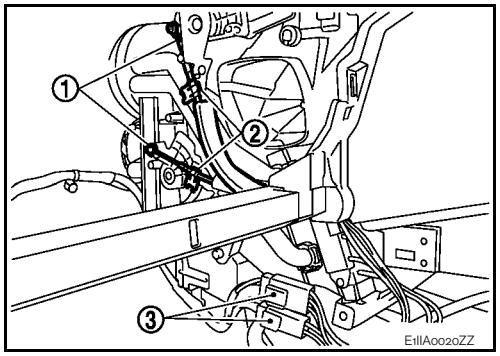
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Drain engine coolant from cooling system. Refer to CO-9, "Draining" (HR), CO-30, "Draining" (MR), CO-52, "Draining" (K9K).
3. Remove pipe bracket fixing bolt (1), then, disconnect high-pressure pipe 1 (B) and low-pressure pipe 2 (A) from expansion valve.
   CAUTION:
   Cap or wrap the joint of high-pressure pipe 1 and low-pressure pipe 2 with suitable material such as vinyl tape to avoid the entry of air.



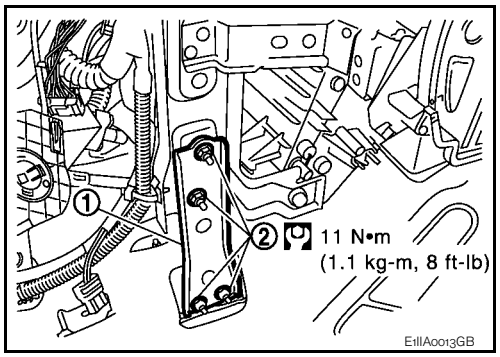
4. Remove clamp (A), then disconnect heater hoses (1), and then remove clamp (B), to remove heater hose (2).



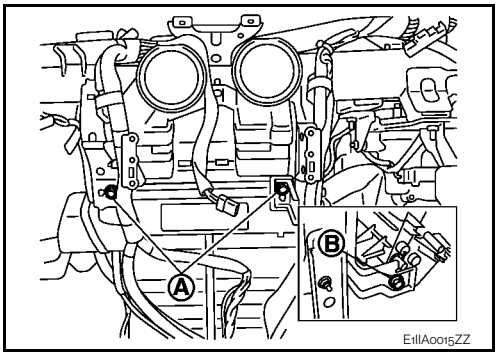
5. Remove Instrument Panel. Refer to IP-12, "Removal and Installation".
6. Remove BCM.Refer to BCS-64, "Removal and Installation".
   - Remove fixing screws.
   - Remove harness connectors.
7. Disconnect heater connectors (3), then remove heater connector and bracket.
8. Disconnect blower motor connector.
9. Remove heater control cables from heater and cooling unit (1).
10. Remove foot duct, RH.
11. Remove power steering C/U. Refer to STC-32, "Removal and Installation".
12. Disconnect intake door motor connector and blower motor connector.
13. Remove center air duct.
14. Remove blower intake motor connector and remove harness fixing clip.



15. Remove instrument stay (1).
16. Remove fixing nuts (2).
17. Remove heater draining hose.



18. Remove heater and cooling assembly lower fixing bolts (B), RH side.
19. Remove heater and cooling assembly upper fixing bolts (A).
20. Remove high and low pressure pipes. Refer to HA-149, "Removal and Installation" (HR/MR), HA-200, "Removal and Installation" (K9K).



21. Remove clips of main harness from steering member.
22. Remove steering member mounting bolts.
    • Disconnect harness fixing clips from steering member
    NOTE:
    Two workers are necessary to remove this part.
23. Remove heater and cooling unit assembly.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure pipe 1, 2 and high-pressure pipe 1, 2 with new ones, and then apply compressor oil to it when installing it.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a clicks is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **When recharging refrigerant, check for leaks.**

NOTE:

- When filling radiator with engine coolant. Refer to CO-9, "Refilling" (HR), CO-30, "Refilling" (MR), CO-52, "Refilling" (K9K).
- Recharge the refrigerant.

Heater & cooling unit (1) assembly mounting bolt (A)

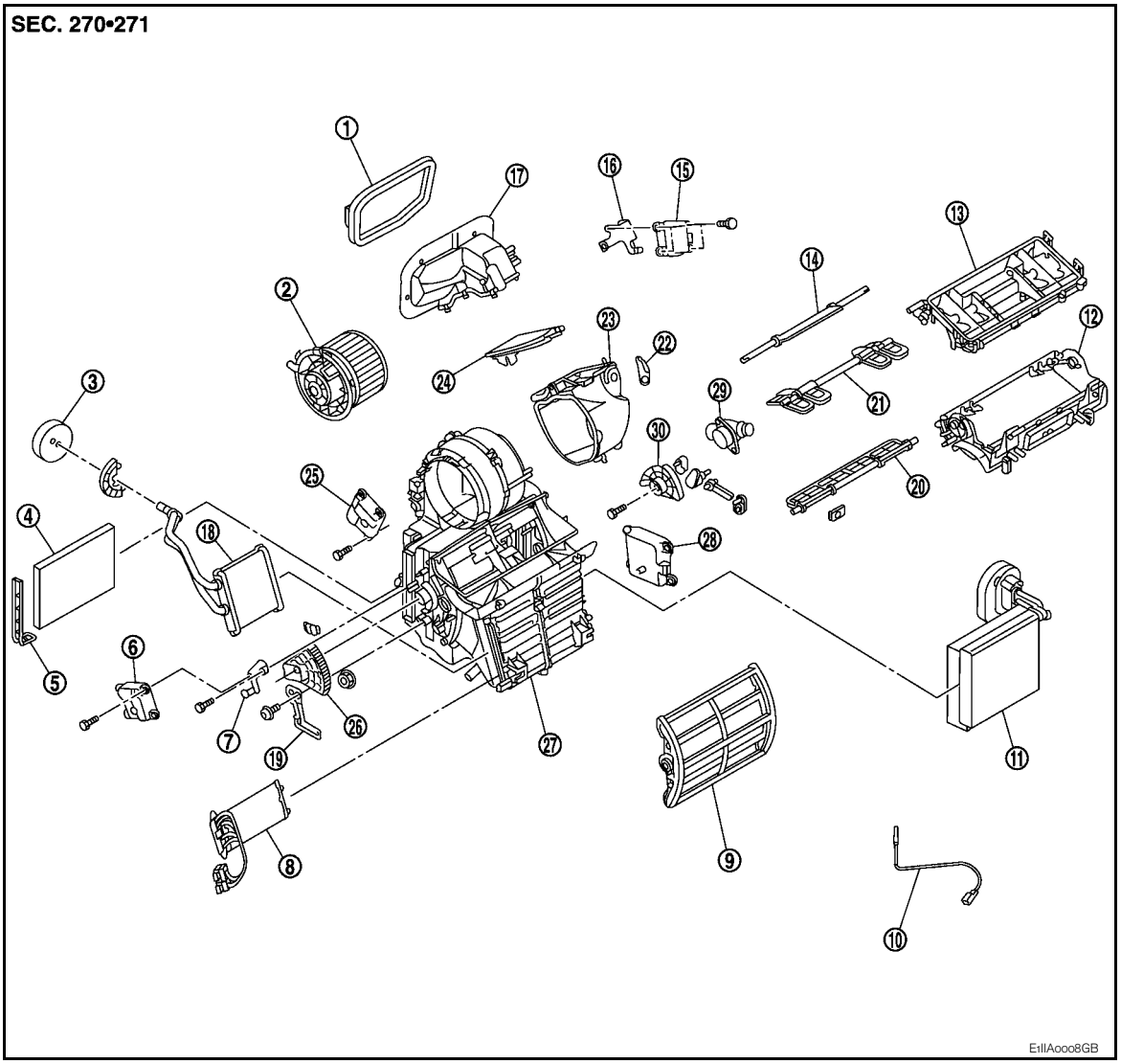
: 6.9 N·m (0.7 kg·m, 61 in-lb)

cardiagn.com

HIGH-LEVEL VENTILATOR DOOR MOTOR

Exploded View

INFOID:0000000001097998



1. Intake connector seal
2. Blower motor assembly
3. Heater pipe seal
4. Air conditioner filter
5. Air conditioner filter cover
6. Air mix door motor (left)
7. Air mix door lever
8. Electrical heater
9. Air mix door (slide door)
10. Intake sensor
11. Evaporator and expansion valve unit
12. Center case (lower)
13. Center case (upper)
14. Defroster door
15. Intake door motor
16. Intake motor bracket
17. Intake connector
18. Heater core
19. Air mix door link bracket
20. Front ventilator door
21. Side ventilator door
22. Intake door lever
23. Intake door box
24. Intake door
25. Mode door motor
26. Air mix door link (left)
27. Heater and cooling unit case
28. Air mix door motor (right)
29. Aspirator
30. Air mix door link (right)

Removal and Installation

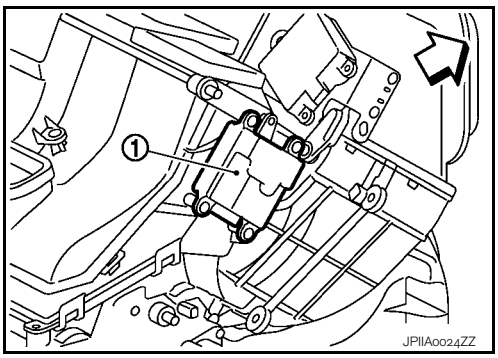
INFOID:0000000001097999

REMOVAL

LHD Model

1. Unclip lower instrument panel - passenger side.

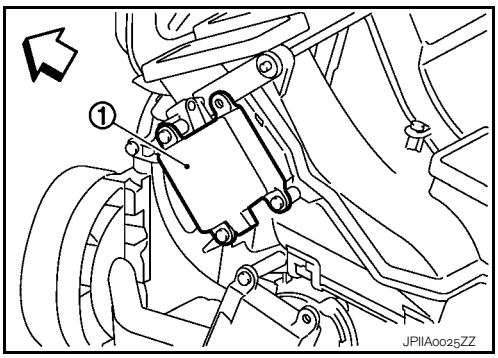
2. Remove lower instrument cover.
3. Remove Glove Box Assembly. Refer to IP-12, "Removal and Installation".
4. Remove RH foot Duct. Refer to VTL-94, "FOOT DUCTS : Removal and Installation".
5. Remove high level door motor fixing screws.
6. Remove high level door motor harness connector.
7. Remove high level door motor (1) from link.



⇦ : Front

RHD Model

1. Unclip instrument lower panel - passenger side.
2. Remove lower instrument cover.
3. Remove Glove Box Assembly. Refer to IP-12, "Removal and Installation".
4. Remove LH foot Duct. Refer to VTL-94, "FOOT DUCTS : Removal and Installation".
5. Remove high level door motor fixing screws.
6. Remove high level door motor harness connector.
7. Remove high level door motor (1) from link.



⇦ : Front

INSTALLATION

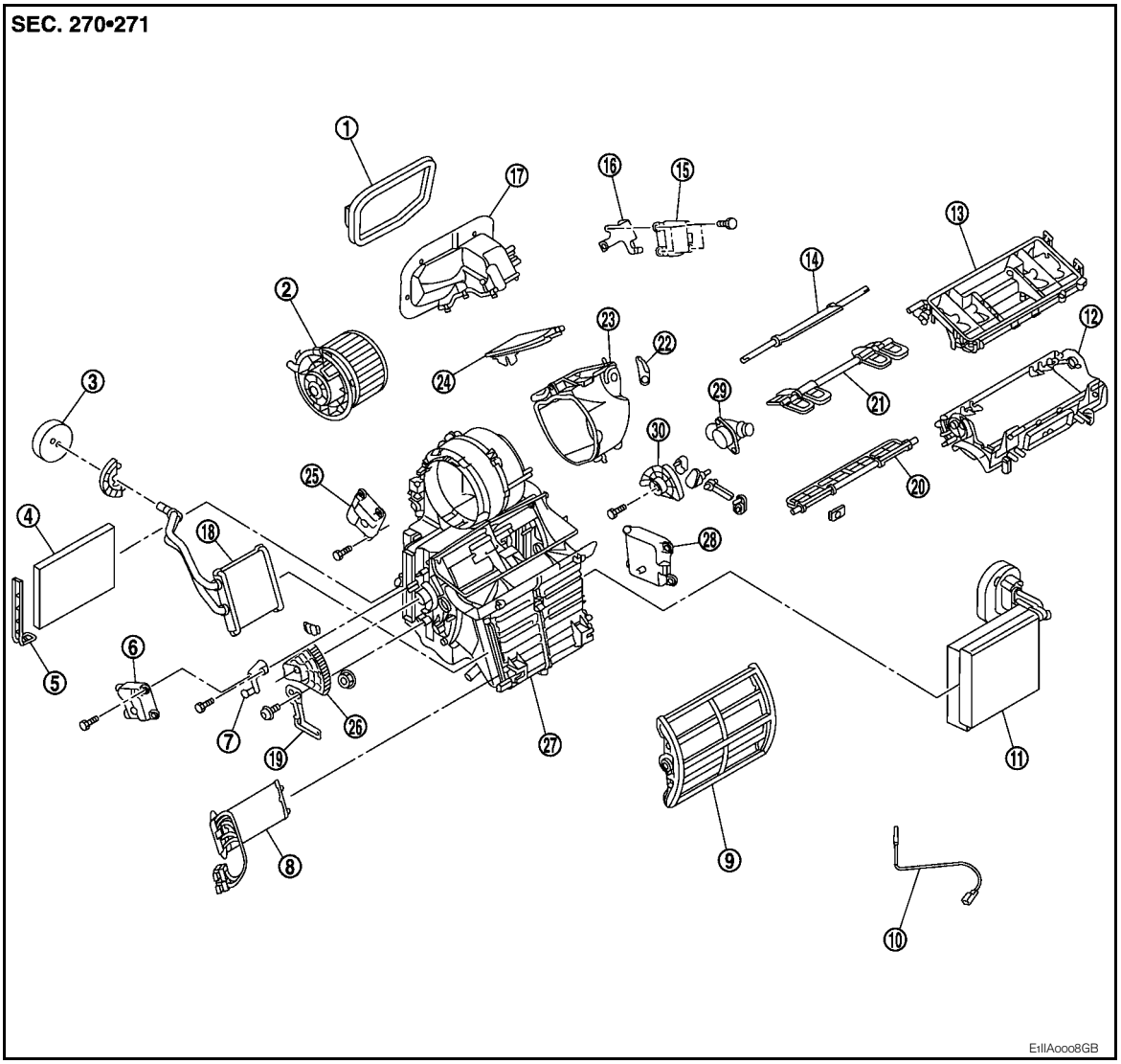
installation is basically the reverse order of removal.

cardiagn.com

HEATER CORE

Exploded View

INFOID:0000000001093854



1. Intake connector seal	2. Blower motor assembly	3. Heater pipe seal
4. Air conditioner filter	5. Air conditioner filter cover	6. Air mix door motor (left)
7. Air mix door lever	8. Electrical heater	9. Air mix door (slide door)
10. Intake sensor	11. Evaporator and expantion valve unit	12. Center case (lower)
13. Center case (upper)	14. Defroster door	15. Intake door motor
16. Intake motor bracket	17. Intake connector	18. Heater core
19. Air mix door link bracket	20. Front ventilator door	21. Side ventilator door
22. Intake door lever	23. Intake door box	24. Intake door
25. Mode door motor	26. Air mix door link (left)	27. Heater and cooling unit case
28. Air mix door motor (right)	29. Aspirator	30. Air mix door link (right)

*With left and right ventilation temperature separately system.

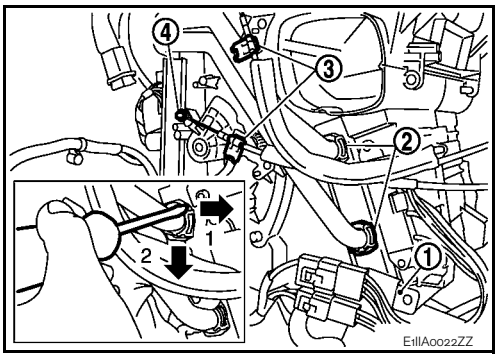
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000001093855

REMOVAL

1. Remove LH lower instrument panel (RHD).
2. Remove LH foot duct.
3. Disconnect harness connectors, remove harness bracket (1).
4. Remove heater cable fixing metal clips (3).
5. Remove air mix cable (4), from heater.
6. Remove heater core pipes metal clip retainers (2).
   CAUTION:
   Use shop cloth and all other protection necessaries to avoid damaging floor carpet.
7. Remove heater pipes as shown.
8. Pull to remove heater core.



INSTALLATION

Installation is basically the reverse order of removal.

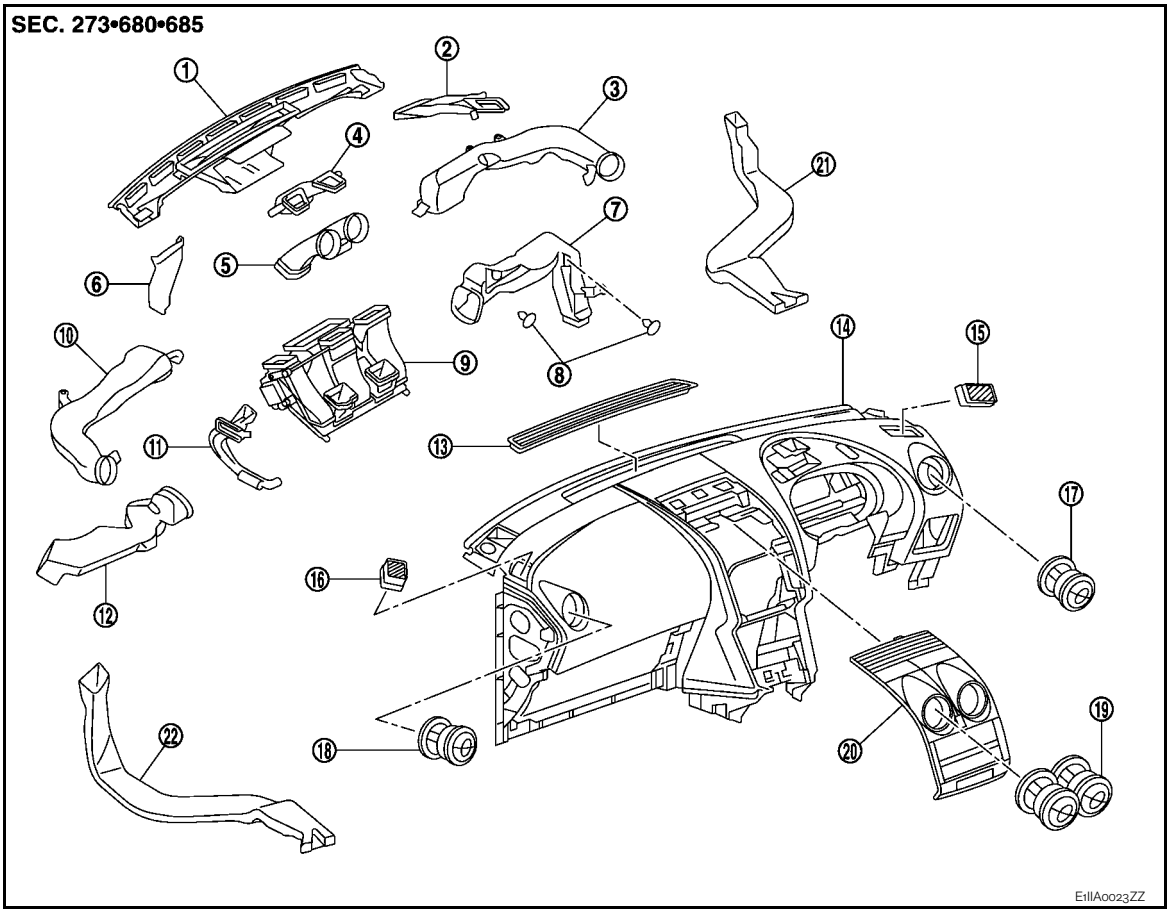
cardiagn.com

DUCTS AND GRILLES

CENTER VENTILATOR GRILLES

CENTER VENTILATOR GRILLES : Exploded View

INFOID:0000000001093856



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilator grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

CENTER VENTILATOR GRILLES : Removal and Installation

INFOID:0000000001093857

REMOVAL

1. Remove cluster lid C. Refer to IP-12, "Removal and Installation".
2. Remove center ventilator grilles.

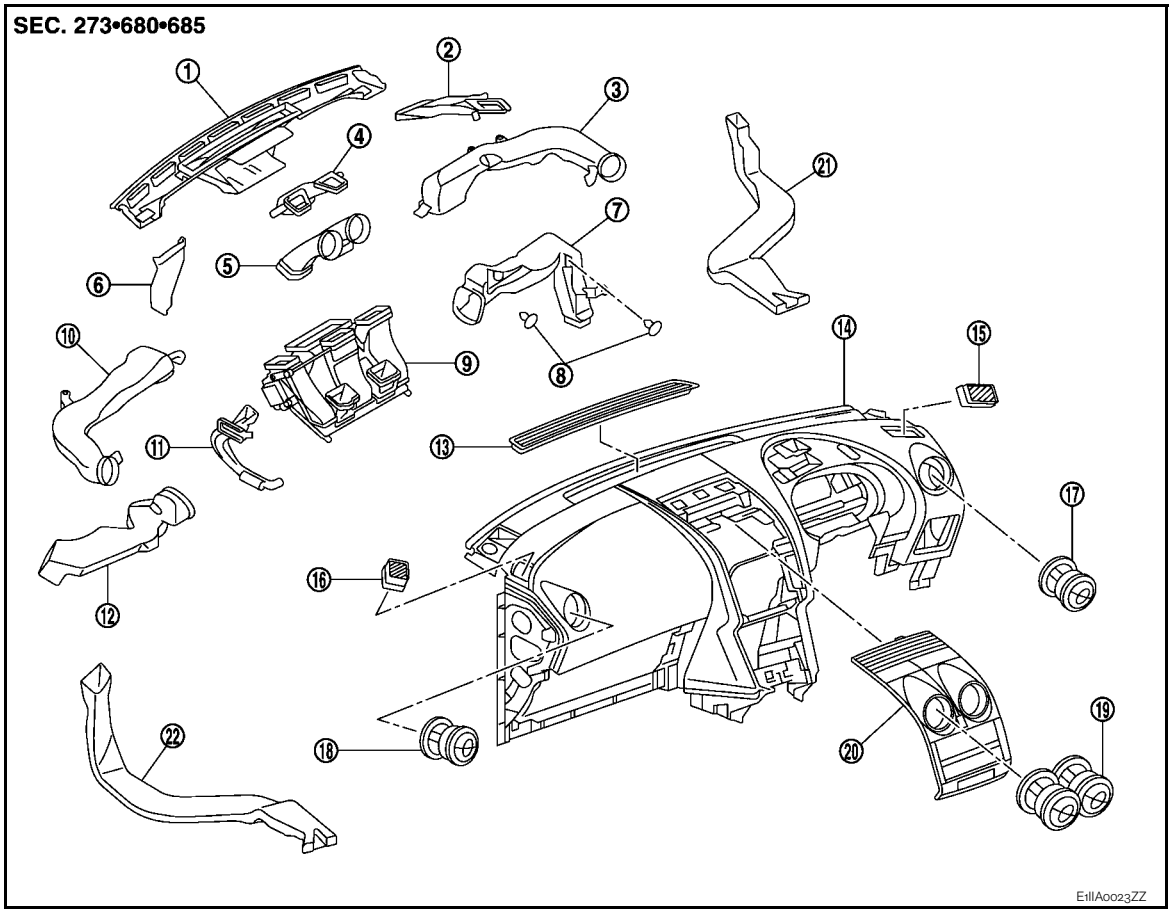
CAUTION:
Use shop cloth and all other protection necessaries to avoid damage.

INSTALLATION
Installation is basically the reverse order of removal.

SIDE VENTILATOR GRILLES

SIDE VENTILATOR GRILLES : Exploded View

INFOID:0000000001093858



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

SIDE VENTILATOR GRILLES : Removal and Installation

INFOID:0000000001093859

REMOVAL

Remove side ventilator assembly. Refer to VTL-90, "SIDE VENTILATOR GRILLES : Removal and Installation".

Use flat screw driver and shop cloth to remove side ventilator grille from the instrument panel.

INSTALLATION

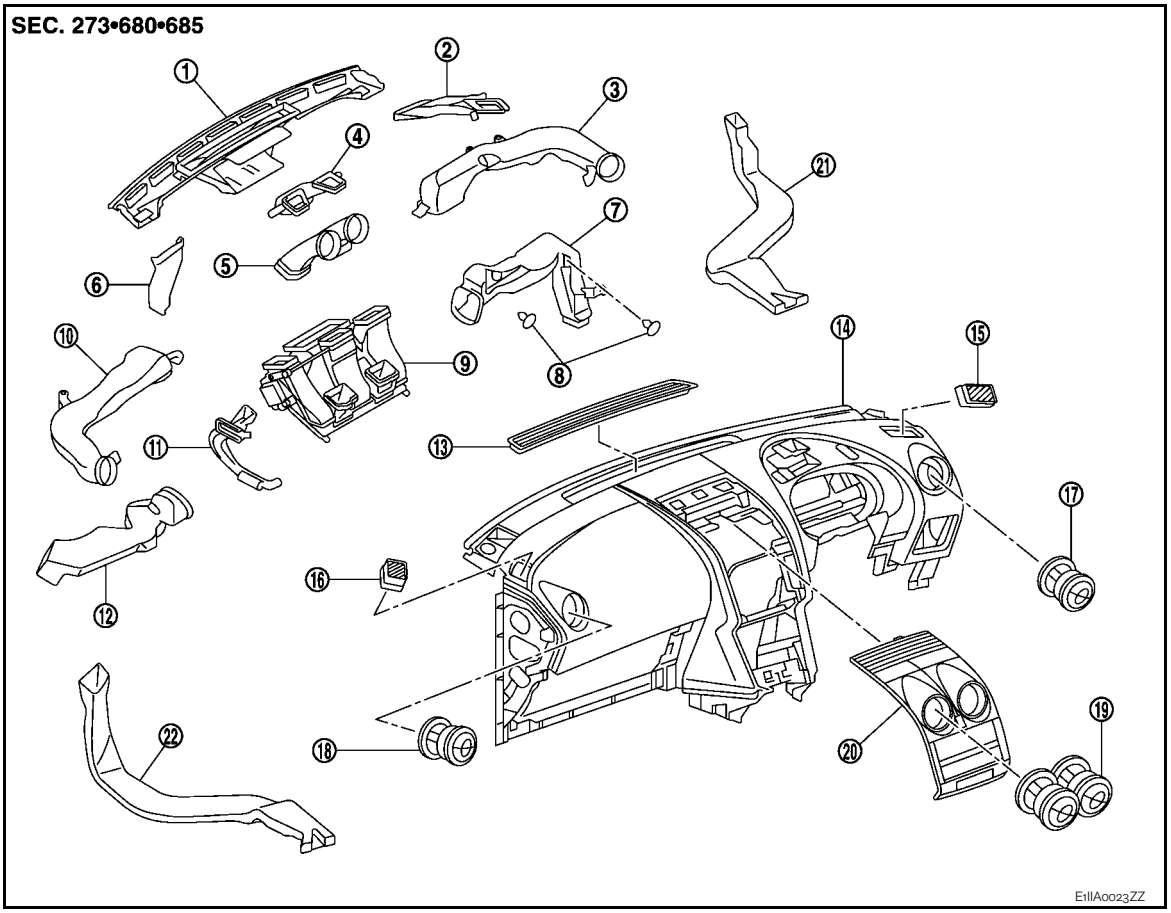
Installation is basically the reverse order of removal.

FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT

FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT : Exploded View

INFOID:0000000001093860

cardiagn.com



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

FRONT DEFROSTER NOZZLE, SIDE DEFROSTER NOZZLES AND VENTILATOR DUCT : Removal and Installation

INFOID:0000000001093861

REMOVAL

1. Remove instrument panel & pad. Refer to IP-12, "Removal and Installation".
2. Remove mounting screws.
3. Remove clips, and then remove defroster nozzle, side defroster nozzle and ventilator duct.

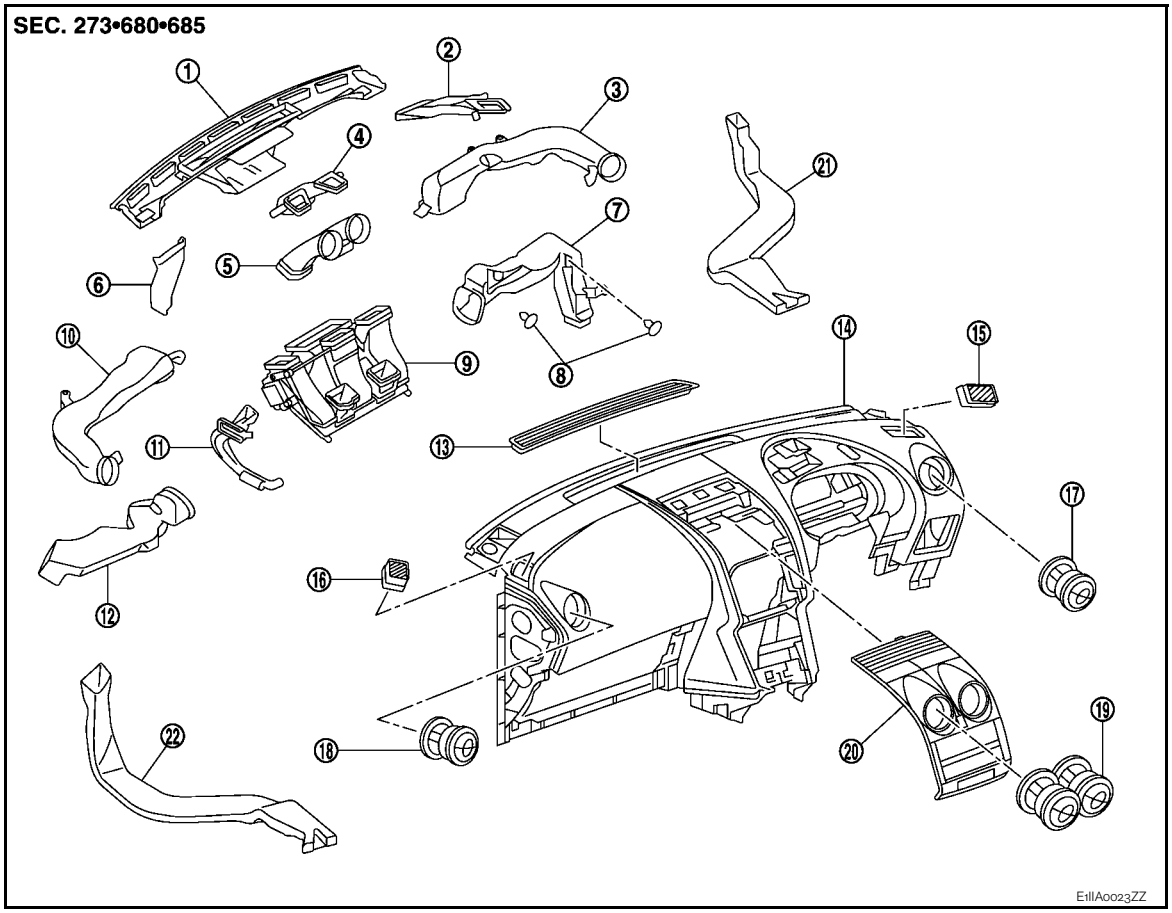
INSTALLATION

Installation is basically the reverse order of removal.

SIDE DEFROSTER DUCTS

SIDE DEFROSTER DUCTS : Exploded View

INFOID:0000000001093862



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

SIDE DEFROSTER DUCTS : Removal and Installation

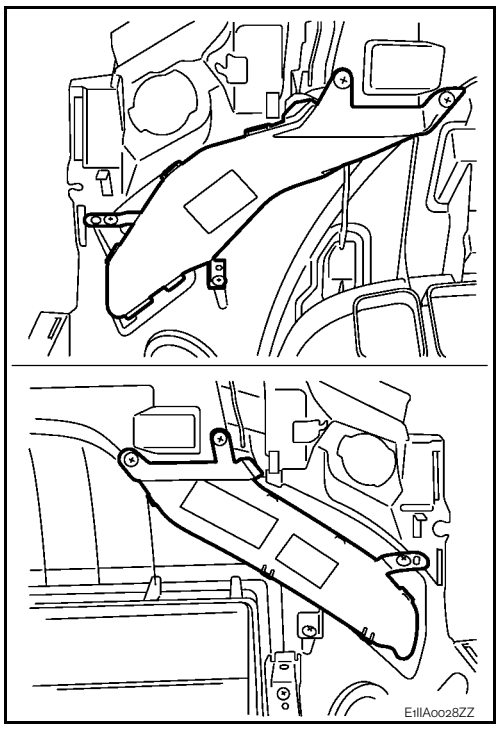
INFOID:0000000001093863

REMOVAL

1. Remove instrument panel. Refer to IP-12, "Removal and Installation".
2. Remove side ventilator ducts (RH/LH). Refer to VTL-90, "SIDE VENTILATOR GRILLES : Removal and Installation".
3. Remover side defroster ducts (RH/LH) fixing screws.
4. Pull to release from center defroster duct.

cardiagn.com

5. Remove side defroster ducts.



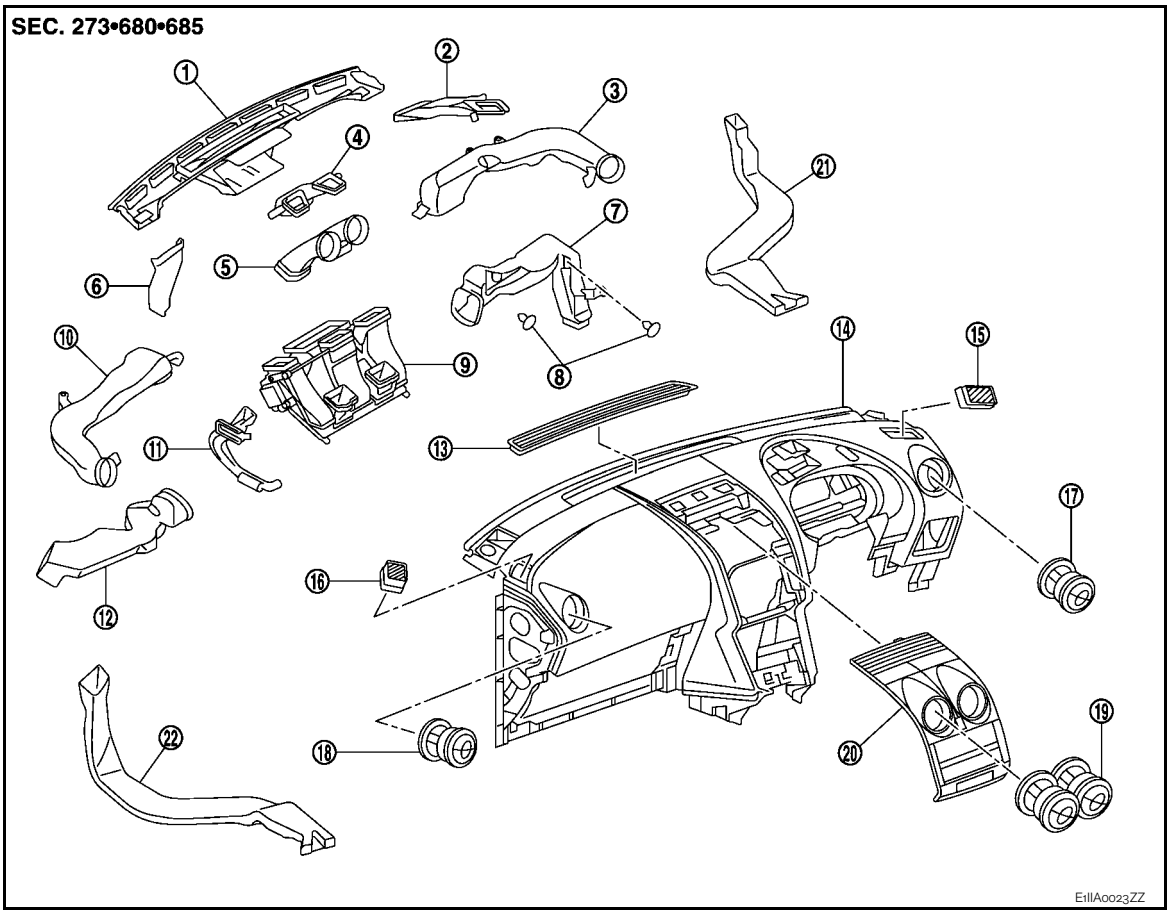
INSTALLATION

Installation is basically the reverse order of removal.

FOOT DUCTS

FOOT DUCTS : Exploded View

INFOID:0000000001093870



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C
21. Floor duct - RH
22. Floor duct - LH

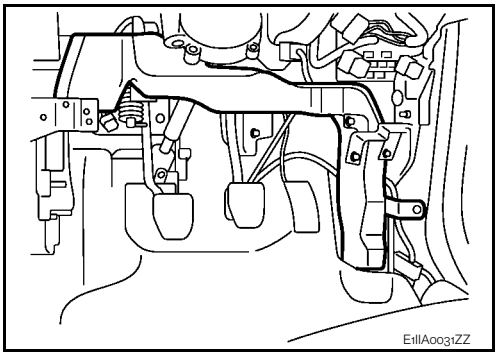
FOOT DUCTS : Removal and Installation

INFOID:0000000001116019

REMOVAL

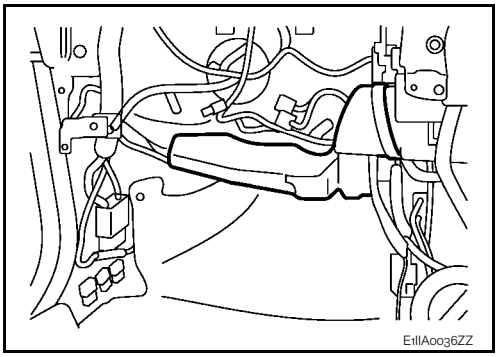
Driver Side

1. Remove driver side lower panel. Refer to IP-12, "Removal and Installation".
2. Remove side finisher. Refer to IP-12, "Removal and Installation".
3. Remove duct fixing bolt from lid and hood opener bracket.
4. Remove lower fixing clip from driver side foot duct.
5. Pull duct center side to release it from heater and cooling assembly.
6. Release foot duct from floor duct (if equipped).
7. Handle to remove foot duct.



Passenger Side

1. Remove glove box assembly. Refer to IP-12, "Removal and Installation".
2. Remove lower instrument panel finisher.
3. Remove outer fixing screw from bracket.
4. Release foot duct center side from heater and cooling assembly.
   CAUTION:
   Be careful not to damage upper fixing clip.
5. Release foot duct from floor duct.
6. Handle to remove foot duct.



INSTALLATION

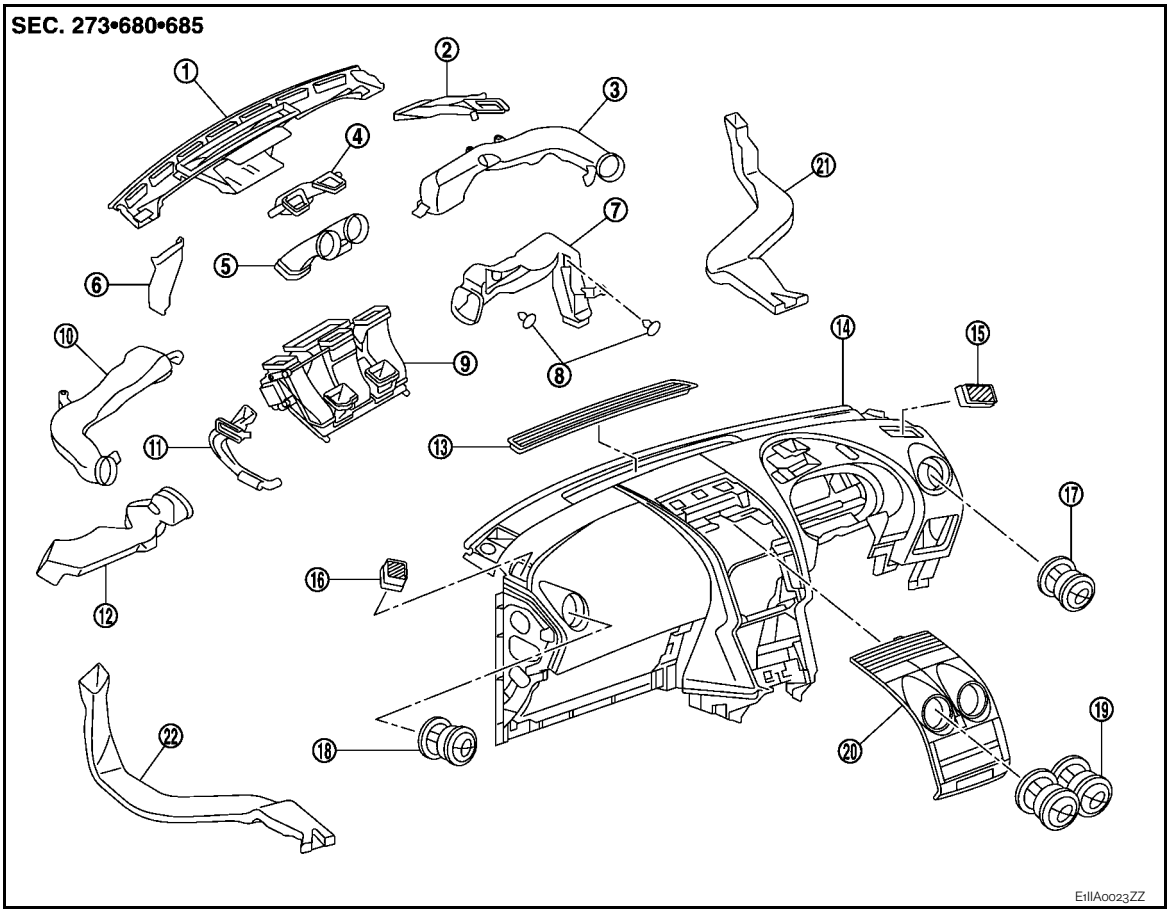
Installation is basically the reverse of removal.

FLOOR DUCTS

FLOOR DUCTS : Exploded View

INFOID:0000000001116017

cardiagn.com



1. Center defroster duct
2. Defroster duct - RH
3. Side ventilator duct - RH
4. Front upper ventilator duct
5. Front ventilator duct
6. Defroster duct - LH
7. Side foot duct - RH
8. Clip
9. Air mix duct
10. Side ventilator duct - LH
11. Glove box duct
12. Side foot duct - LH
13. Front defroster grille - center
14. Instrument panel
15. Side defroster grille - RH
16. Side defroster grille - LH
17. Side ventilation grille - RH
18. Side ventilation grille - LH
19. Center ventilation grille
20. Cluster lid C

FLOOR DUCTS : Removal and Installation

INFOID:0000000001116018

REMOVAL

1. Remove floor carpet. Refer to INT-18, "Removal and Installation".
2. Remove floor duct.

INSTALLATION

Installation is basically the reverse of removal.

SECTION WCS
WARNING CHIME SYSTEM

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
Work Flow 3

FUNCTION DIAGNOSIS 4

WARNING CHIME SYSTEM 4

WARNING CHIME SYSTEM 4
WARNING CHIME SYSTEM : System Diagram 4
WARNING CHIME SYSTEM : System Description 4
WARNING CHIME SYSTEM : Component Parts Location 5
WARNING CHIME SYSTEM : Component Description 5

LIGHT REMINDER WARNING CHIME 5
LIGHT REMINDER WARNING CHIME : System Diagram 6
LIGHT REMINDER WARNING CHIME : System Description 6
LIGHT REMINDER WARNING CHIME : Component Parts Location 6
LIGHT REMINDER WARNING CHIME : Component Description 6

SEAT BELT REMINDER WARNING CHIME 7
SEAT BELT REMINDER WARNING CHIME : System Diagram 7
SEAT BELT REMINDER WARNING CHIME : System Description 7
SEAT BELT REMINDER WARNING CHIME : Component Parts Location 8
SEAT BELT REMINDER WARNING CHIME : Component Description 8

PARKING BRAKE RELEASE WARNING CHIME 8
PARKING BRAKE RELEASE WARNING CHIME : System Diagram 8
PARKING BRAKE RELEASE WARNING CHIME : System Description 8
PARKING BRAKE RELEASE WARNING CHIME : Component Parts Location 9
PARKING BRAKE RELEASE WARNING CHIME : Component Description 9

KEY WARNING CHIME (WITH INTELLIGENT KEY) 9
KEY WARNING CHIME (WITH INTELLIGENT KEY) : System Diagram 10
KEY WARNING CHIME (WITH INTELLIGENT KEY) : System Description 10
KEY WARNING CHIME (WITH INTELLIGENT KEY) : Component Parts Location 10
KEY WARNING CHIME (WITH INTELLIGENT KEY) : Component Description 10

LOW FUEL WARNING CHIME 11
LOW FUEL WARNING CHIME : System Diagram 11
LOW FUEL WARNING CHIME : System Description 11
LOW FUEL WARNING CHIME : Component Parts Location 11
LOW FUEL WARNING CHIME : Component Description 12

DIAGNOSIS SYSTEM (METER) 13
CONSULT-III Function (METER/M&A) 13

DIAGNOSIS SYSTEM (BCM) 16

COMMON ITEM 16
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 16

BUZZER 16
BUZZER : CONSULT-III Function (BCM - BUZZER) 16

COMPONENT DIAGNOSIS 18

POWER SUPPLY AND GROUND CIRCUIT 18

cardiagn.com

COMBINATION METER 18
COMBINATION METER : Diagnosis Procedure ... 18

BCM (BODY CONTROL MODULE) 18
BCM (BODY CONTROL MODULE) : Diagnosis Procedure 18

METER BUZZER CIRCUIT 20
Description 20
Component Function Check 20
Diagnosis Procedure 20

SEAT BELT BUCKLE SWITCH SIGNAL CIRCUIT 21
Description 21
Component Function Check 21
Diagnosis Procedure 21

PARKING BRAKE SWITCH SIGNAL CIRCUIT 23
Description 23
Diagnosis Procedure 23
Component Inspection 23

WARNING CHIME SYSTEM 24
Wiring Diagram - WARNING CHIME - 24

ECU DIAGNOSIS 28

COMBINATION METER 28
Reference Value 28
Wiring Diagram - METER - 33
Fail Safe 40
DTC Index 41

BCM (BODY CONTROL MODULE) 42
Reference Value 42
Wiring Diagram - BCM - 58
Fail Safe 62
DTC Inspection Priority Chart 63
DTC Index 64

SYMPTOM DIAGNOSIS 65

THE LIGHT REMINDER WARNING DOES NOT SOUND 65
Description 65
Diagnosis Procedure 65

THE SEAT BELT REMINDER WARNING CONTINUES SOUNDING, OR DOES NOT SOUND 66
Description 66
Trouble diagnosis procedure 66

THE PARKING BRAKE RELEASE WARNING CONTINUES SOUNDING, OR DOES NOT SOUND 67
Description 67
Diagnosis Procedure 67

THE KEY WARNING DOES NOT SOUND 68
Description 68
Diagnosis Procedure 68

PRECAUTION 69

PRECAUTIONS 69
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 69

cardiagn.com

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000000953318

DETAILED FLOW

1.OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain as much information as possible about the conditions and environment under which the malfunction occurred.

>> GO TO 2.

2.CHECK SYMPTOM

- Check the symptom based on the information obtained from the customer.
- Check if any other malfunctions are present.

>> GO TO 3.

3.CHECK CONSULT-III SELF-DIAGNOSIS RESULTS

Connect CONSULT-III and perform self-diagnosis. Refer to MWI-23, "CONSULT-III Function (METER/M&A)".

Are self-diagnosis results normal?

YES >> GO TO 4.
NO >> Repair or replace the malfunctioning parts and go to 5.

4.NARROW DOWN MALFUNCTIONING PARTS THROUGH SYMPTOM DIAGNOSIS

Perform symptom diagnosis and repair or replace the identified malfunctioning parts.

>> GO TO 5.

5.FINAL CHECK

Check that the warning buzzer in the combination meter operates normally.

Does it operate normally?

YES >> INSPECTION END
NO >> GO TO 1.

cardiagn.com

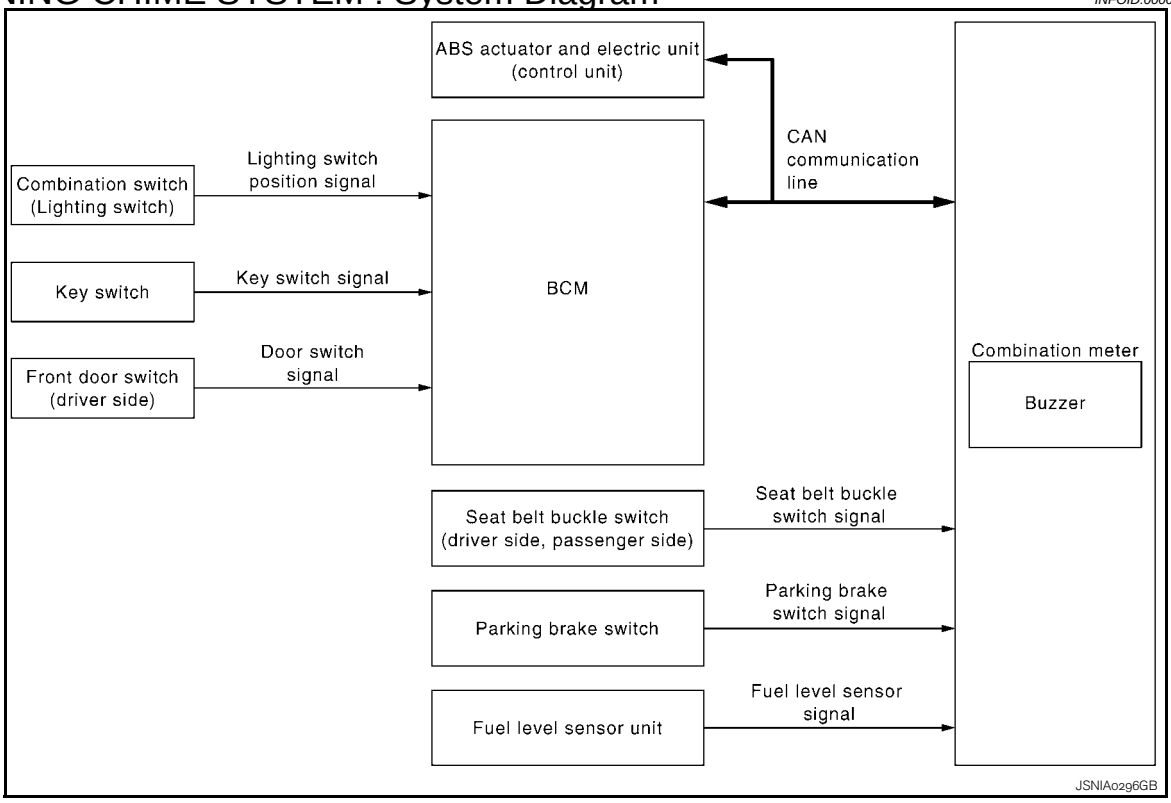
FUNCTION DIAGNOSIS

WARNING CHIME SYSTEM

WARNING CHIME SYSTEM

WARNING CHIME SYSTEM : System Diagram

INFOID:0000000000892392

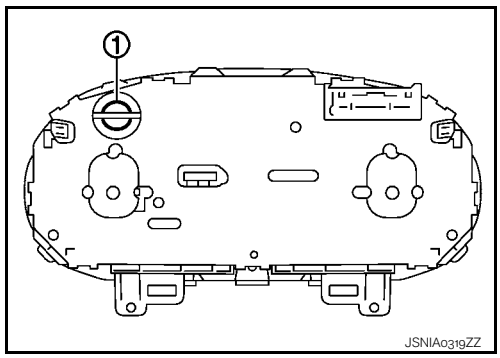


WARNING CHIME SYSTEM : System Description

INFOID:0000000000892393

COMBINATION METER

- The buzzer (1) for the warning chime system is integrated in the combination meter.
- The combination meter sounds the alarm buzzer installed in the combination meter when receiving the buzzer output signal transmitted from each unit.



BCM

BCM receives signals from various units and transmits a buzzer output signal to the combination meter via CAN communication if it judges that the warning buzzer should be activated.

BCM warning function list

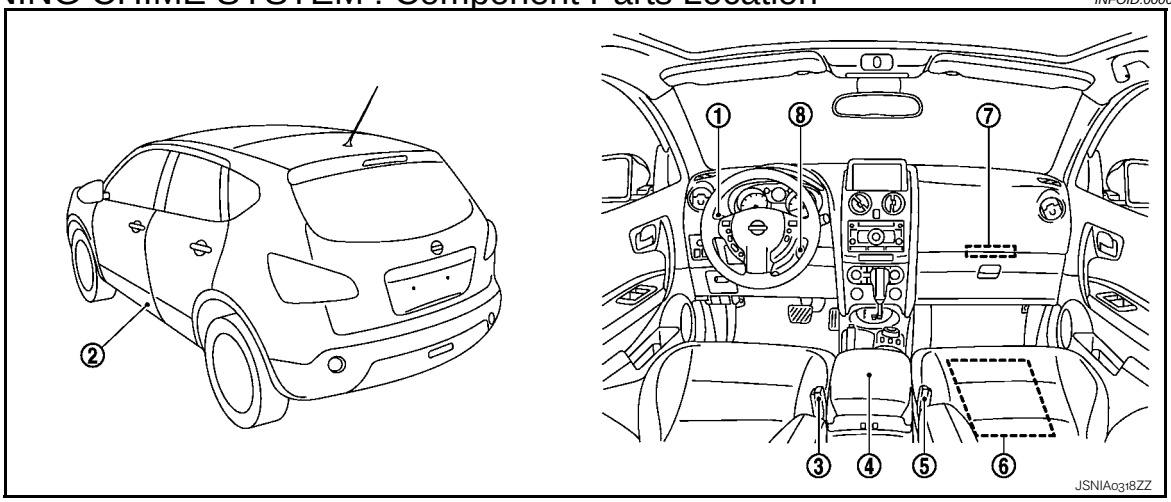
Warning functions	Signal name
Light reminder warning chime	• Ignition signal • Lighting switch position signal • Front door switch signal (driver side)
Key warning chime	• Ignition signal • Key switch signal • Front door switch signal (driver side)

cardiagn.com

NOTE:
- Seat belt reminder warning, parking brake release warning and low fuel warning are judged by combination meter.
- Intelligent key warning is judged by intelligent key unit.

WARNING CHIME SYSTEM : Component Parts Location

INFOID:0000000000892394



1. Combination switch (Lighting switch)
2. Front door switch (driver side)
3. Front seat belt buckle switch (driver side)
4. Parking brake switch
5. Front seat belt buckle switch (passenger side)
6. Occupant detection unit
7. BCM
8. Key switch

WARNING CHIME SYSTEM : Component Description

INFOID:0000000000892395

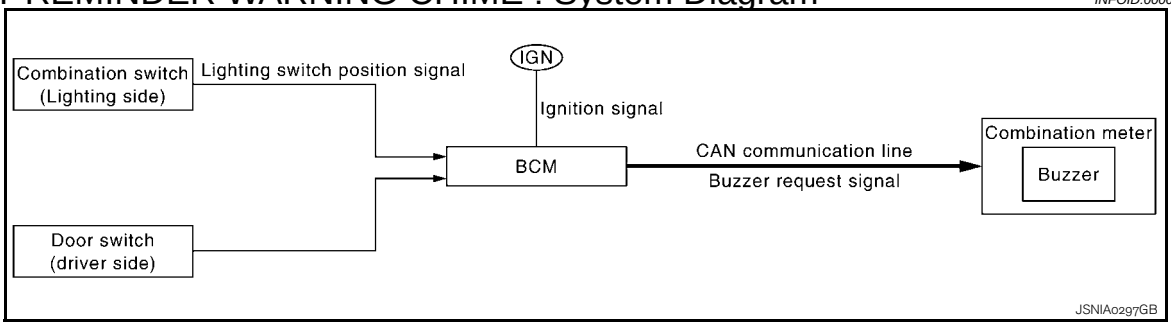
Unit	Description
Combination meter	• Receives the buzzer output signal from BCM with the CAN communication line and sounds the buzzer. • Judges the remaining parking brake according to the vehicle speed signal received from the ABS actuator and electric unit (control unit) via CAN communication and the parking brake switch signal from parking brake switch to sound the warning buzzer.
BCM	Transmits signals received from each unit to the combination meter with the CAN communication line.
ABS actuator and electric unit (control unit)	Transmits the vehicle speed signal to combination meter with the CAN communication line.
Front seat belt buckle switch (Driver side, passenger side)	Transmits the seat belt buckle switch signal to the combination meter.
Combination switch (Lighting switch)	Transmits the lighting switch signal to BCM.
Front door switch	Transmits the door switch signal to BCM.
Key switch	Transmits the ignition switch signal to BCM.
Fuel level sensor unit	Refer to MWI-30, "2WD : Description" (2WD) or MWI-31, "4WD : Description" (4WD).
Parking brake switch	Refer to WCS-23, "Description".

LIGHT REMINDER WARNING CHIME

cardiagn.com

LIGHT REMINDER WARNING CHIME : System Diagram

INFOID:0000000000892396



LIGHT REMINDER WARNING CHIME : System Description

INFOID:0000000000892397

DESCRIPTION

With ignition switch in OFF or ACC position, driver door open, and lighting switch in 1ST or 2ND position, the light warning chime will sound.

- BCM detects ignition switch in OFF or ACC position, front door switch (driver side) ON, and lighting switch in 1ST or 2ND position. And then transmits buzzer output signal (light reminder warning chime) to combination meter with CAN communication line.
- When combination meter receives buzzer output signal (light reminder warning chime), it sounds the buzzer.

WARNING OPERATION CONDITIONS

If all of the following conditions are fulfilled.

- Lighting switch is at 1st or 2nd position
- Ignition switch is at OFF or ACC
- Front door switch (driver side) is ON

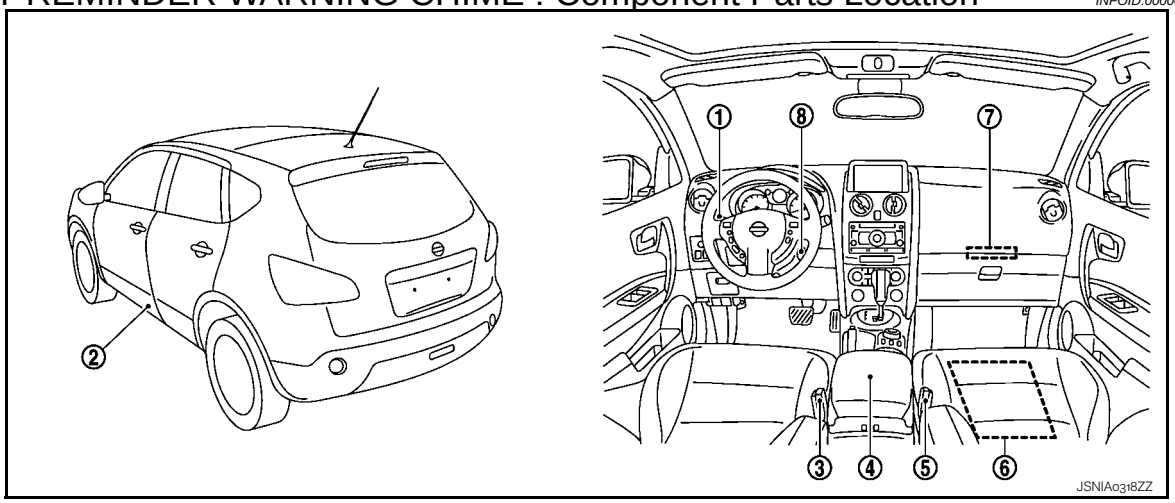
WARNING CANCEL CONDITIONS

Warning is canceled if any of the following conditions is fulfilled.

- Lighting switch OFF
- Ignition switch ON
- Front door switch (driver side) is OFF

LIGHT REMINDER WARNING CHIME : Component Parts Location

INFOID:0000000000936032



1. Combination switch (Lighting switch)
2. Front door switch (driver side)
3. Front seat belt buckle switch (driver side)
4. Parking brake switch
5. Front seat belt buckle switch (passenger side)
6. Occupant detection unit
7. BCM
8. Key switch

LIGHT REMINDER WARNING CHIME : Component Description

INFOID:0000000000892399

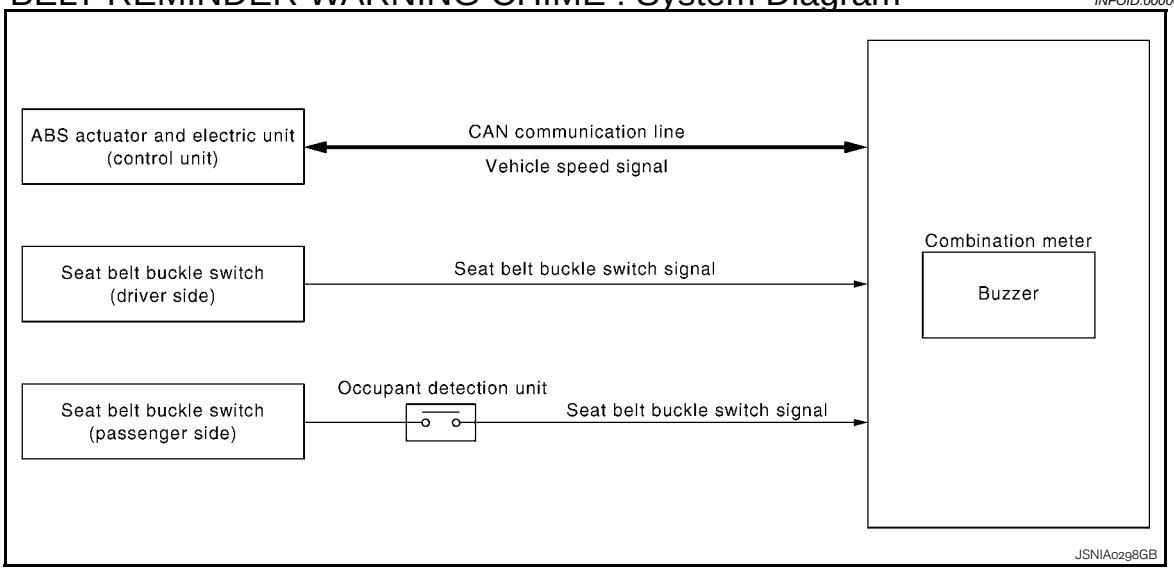
cardiagn.com

Unit	Description
Combination meter	Receives a buzzer output signal from the BCM and sounds the buzzer.
BCM	Judges the light warning conditions from the signals provided by various switches and transmits a buzzer output signal to the combination meter via CAN communication line if necessary.
Combination switch (Lighting switch)	Transmits the lighting switch position signal to BCM.
Front door switch (driver side)	Transmits the door switch signal to BCM.

SEAT BELT REMINDER WARNING CHIME

SEAT BELT REMINDER WARNING CHIME : System Diagram

INFOID:0000000000892400



SEAT BELT REMINDER WARNING CHIME : System Description

INFOID:0000000000892401

DESCRIPTION

- Combination meter receives the vehicle speed signals from ECM with CAN communication line.
- Combination meter receives the seat belt buckle switch signals from seat belt buckle switches (driver side and passenger side).
- Combination meter judges seat belt reminder based on the received signals to sound the warning buzzer.

WARNING OPERATION CONDITIONS

Driver Side Warning Operation Conditions

If all of the following conditions are fulfilled.
- When driver seat belt is not fastened (driver seat belt buckle switch ON)
- Vehicle speed approximately 15 km/h (9.3 MPH) or more

Passenger Side Operation Conditions

If all of the following conditions are fulfilled.
- When getting in the passenger seat
- When passenger seat belt is not fastened (passenger seat belt buckle switch ON)
- Vehicle speed approximately 15 km/h (9.3 MPH) or more

WARNING CANCEL CONDITIONS

Driver Side Warning Cancel Conditions

Warning is canceled if any of the following conditions is fulfilled.
- When driver seat belt is fastened (driver seat belt buckle switch OFF)
- Vehicle speed approximately 15 km/h (9.3 MPH) or less

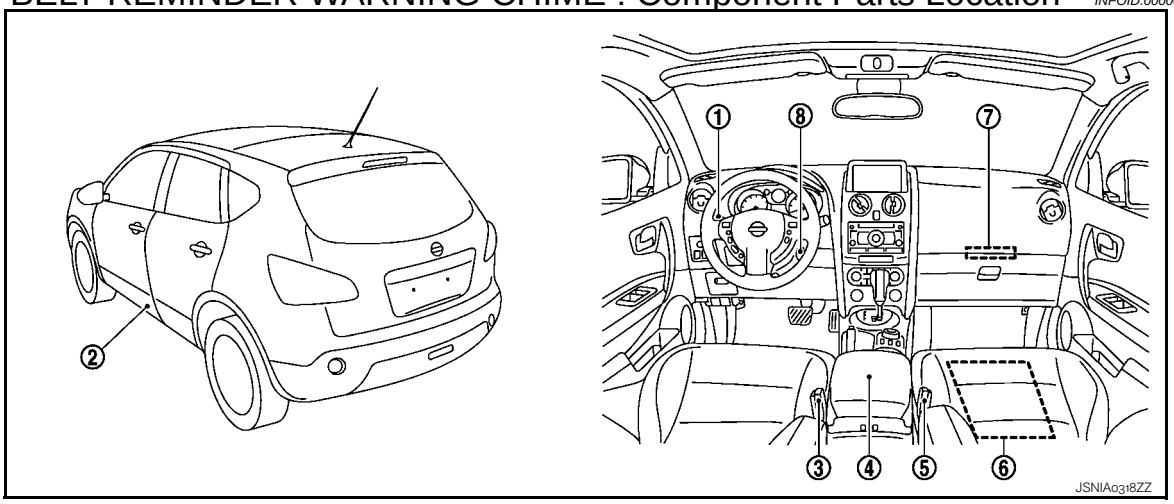
Passenger Side Warning Cancel Conditions

cardiagn.com

Warning is canceled if any of the following conditions is fulfilled.
- When getting out the passenger seat
- When passenger seat belt is fastened (passenger seat belt buckle switch OFF)
- Vehicle speed approximately 15 km/h (9.3 MPH) or less

SEAT BELT REMINDER WARNING CHIME : Component Parts Location

INFOID:0000000000936033



1. Combination switch (Lighting switch)
2. Front door switch (driver side)
3. Front seat belt buckle switch (driver side)
4. Parking brake switch
5. Front seat belt buckle switch (passenger side)
6. Occupant detection unit
7. BCM
8. Key switch

SEAT BELT REMINDER WARNING CHIME : Component Description

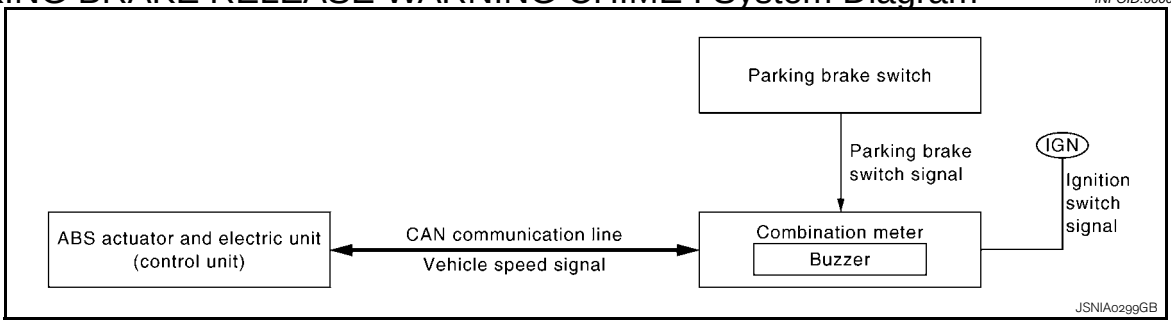
INFOID:0000000000892403

Unit	Description
Combination meter	Judges the seat belt reminder warning according to the vehicle speed signal received from the ABS actuator and electric unit (control unit) via CAN communication and the seat belt buckle switch signal from seat belt buckle switch and sounds the warning buzzer.
Front seat belt buckle switch (driver side)	Transmits the seat belt buckle switch signal to the combination meter.
Front seat belt buckle switch (passenger side)	Transmits the seat belt buckle switch signal to the combination meter via the occupant detection unit.
Occupant detection unit	Detects getting in/out conditions of passenger seat.

PARKING BRAKE RELEASE WARNING CHIME

PARKING BRAKE RELEASE WARNING CHIME : System Diagram

INFOID:0000000000892404



PARKING BRAKE RELEASE WARNING CHIME : System Description

INFOID:0000000000892405

DESCRIPTION

cardiagn.com

Parking brake release warning chime judges the remaining parking brake according to the vehicle speed signal received from the ABS actuator and electric unit (control unit) via CAN communication and the parking brake switch signal from parking brake switch to sound the warning buzzer.

WARNING OPERATION CONDITIONS

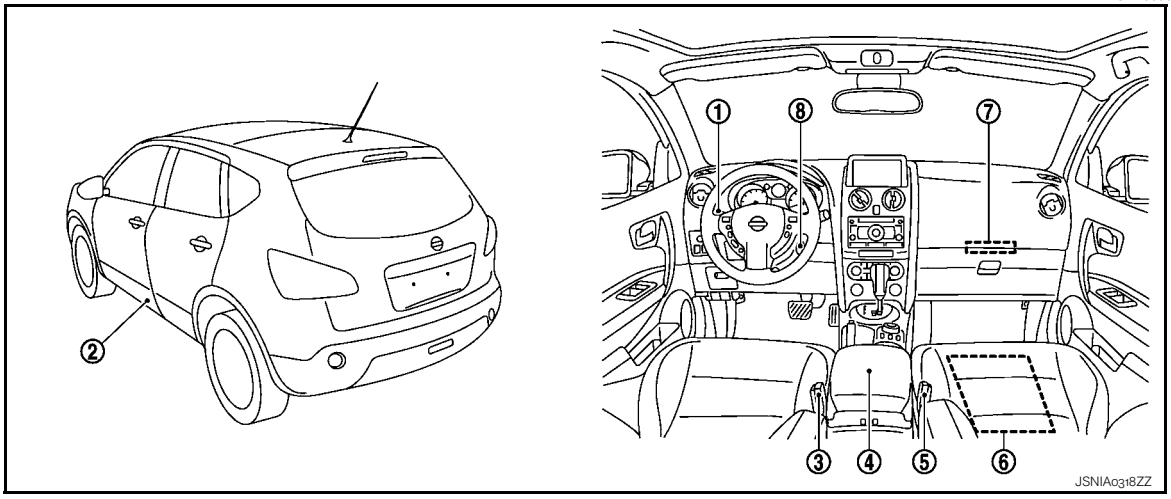
If all of the following conditions are fulfilled.
- Vehicle speed is 7 km/h (4.3 MPH) or higher
- Parking brake switch ON

WARNING CANCEL CONDITIONS

Warning is canceled if any of the following conditions is fulfilled.
- Vehicle speed is approximately 3 km/h (1.9 MPH) or less
- Parking brake switch OFF

PARKING BRAKE RELEASE WARNING CHIME : Component Parts Location

INFOID:0000000000936034



1. Combination switch (Lighting switch)
2. Front door switch (driver side)
3. Front seat belt buckle switch (driver side)
4. Parking brake switch
5. Front seat belt buckle switch (passenger side)
6. Occupant detection unit
7. BCM
8. Key switch

PARKING BRAKE RELEASE WARNING CHIME : Component Description

INFOID:0000000000892407

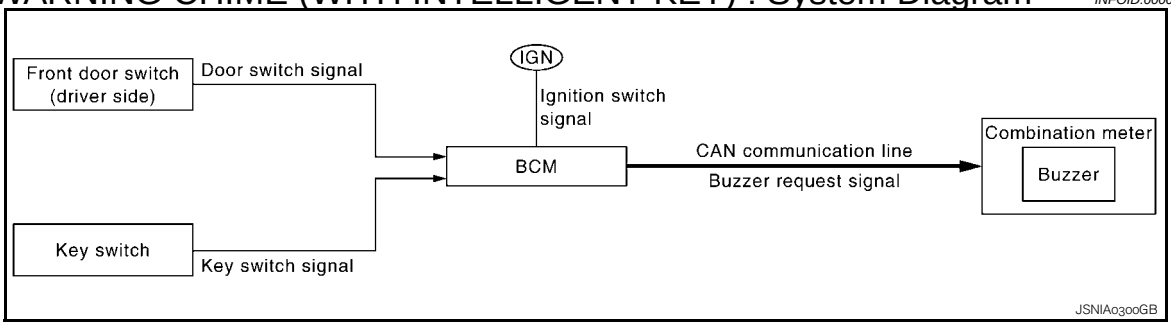
Unit	Description
Combination meter	Judges the remaining parking brake according to the vehicle speed signal received from the ABS actuator and electric unit (control unit) via CAN communication and the parking brake switch signal from parking brake switch and sounds the warning buzzer.
ABS actuator and electric unit (control unit)	Transmits the vehicle speed signal to the combination meter via CAN communication.
Parking brake switch	Transmits the parking brake switch signal to the combination meter.

KEY WARNING CHIME (WITH INTELLIGENT KEY)

cardiagn.com

KEY WARNING CHIME (WITH INTELLIGENT KEY) : System Diagram

INFOID:0000000000892408



KEY WARNING CHIME (WITH INTELLIGENT KEY) : System Description

INFOID:0000000000892409

DESCRIPTION

- BCM judges “key warning” according to the input of ignition switch, key switch and door switch (driver side) signals and transmits the buzzer output signal via CAN communication.
- The combination meter receives the buzzer output signal from BCM and sounds the warning buzzer.

WARNING OPERATION CONDITIONS

If all of the following conditions are fulfilled.

- Other than ignition switch ON
- Key switch ON
- Door switch (driver side) ON

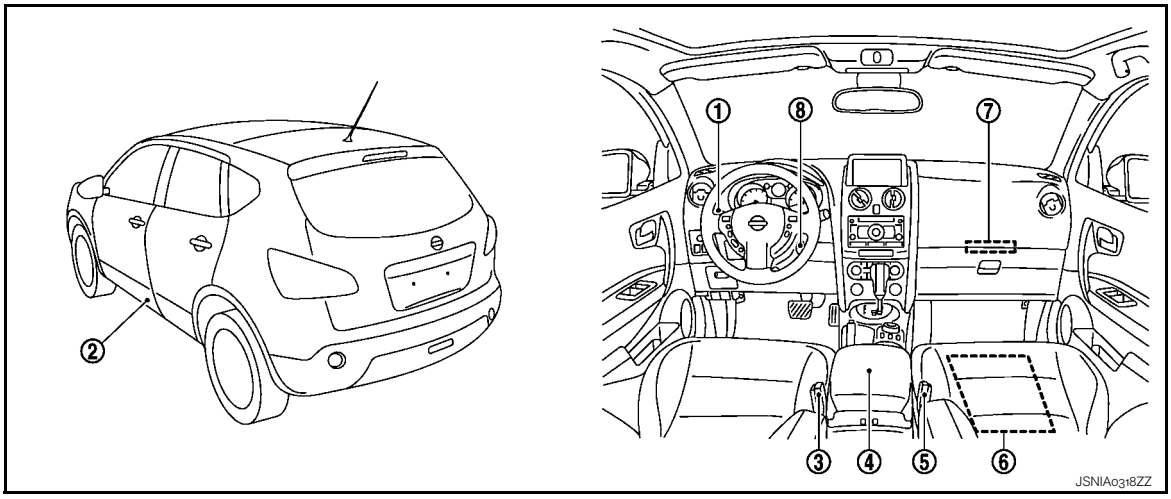
WARNING CANCEL CONDITIONS

Warning is canceled if any of the following conditions is fulfilled.

- Ignition switch ON
- Key switch OFF
- Door switch (driver side) OFF

KEY WARNING CHIME (WITH INTELLIGENT KEY) : Component Parts Location

INFOID:0000000000936035



1.	Combination switch (Lighting switch)	2.	Front door switch (driver side)	3.	Front seat belt buckle switch (driver side)
4.	Parking brake switch	5.	Front seat belt buckle switch (passenger side)	6.	Occupant detection unit
7.	BCM	8.	Key switch		

KEY WARNING CHIME (WITH INTELLIGENT KEY) : Component Description

INFOID:0000000000892411

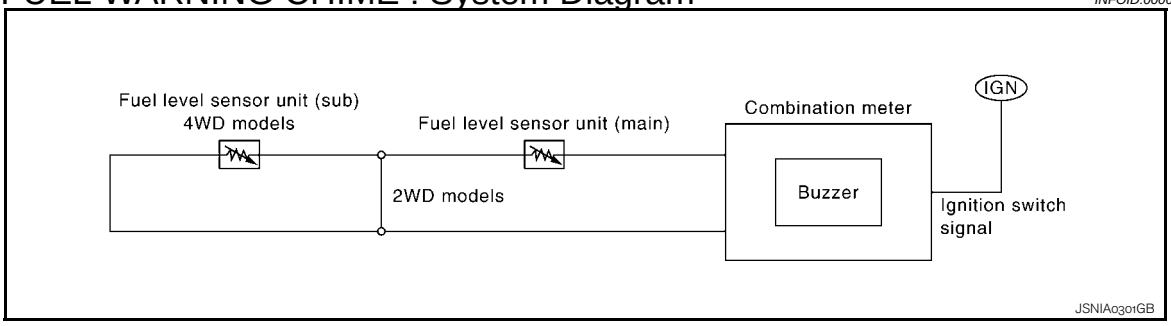
cardiagn.com

Unit	Description
Combination meter	Sounds the warning buzzer according to the buzzer output signal received from BCM via CAN communication.
BCM	Judges according to the door switch signal from the front door switch (driver side) and the key switch signal from the key switch and transmits the buzzer output signal to the combination meter via CAN communication.
Front door switch (driver side)	Transmits the door switch signal to BCM.
Key switch	Transmits the key switch signal to BCM.

LOW FUEL WARNING CHIME

LOW FUEL WARNING CHIME : System Diagram

INFOID:0000000000909713



LOW FUEL WARNING CHIME : System Description

INFOID:0000000000909714

DESCRIPTION

The combination meter judges the low fuel warning according to the fuel level sensor signal from the fuel level sensor and sounds the warning buzzer.

WARNING OPERATION CONDITIONS

If all of the following conditions are fulfilled.

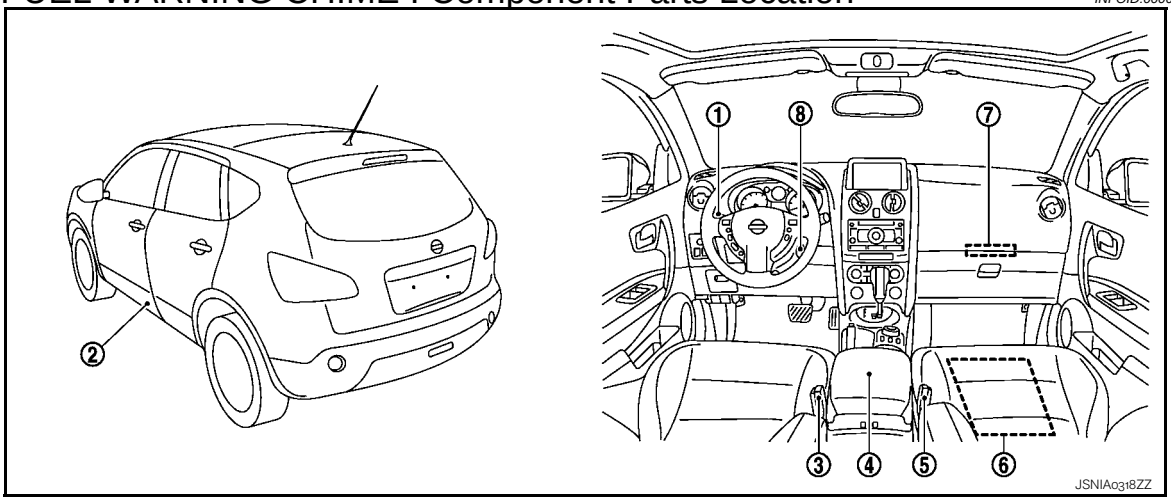
- Ignition switch ON
- Fuel level: Approximately 12.5 ℓ (3 - 3/10 US gal, 2 - 4/5 Imp gal) or less

NOTE:

The low fuel warning does not operate until refueling the fuel and fulfilling the above operation conditions again if it operates once.

LOW FUEL WARNING CHIME : Component Parts Location

INFOID:0000000001002906



1. Combination switch (Lighting switch)
2. Front door switch (driver side)
3. Front seat belt buckle switch (driver side)

cardiagn.com

4. Parking brake switch
5. Front seat belt buckle switch (passenger side)
6. Occupant detection unit
7. BCM
8. Key switch

LOW FUEL WARNING CHIME : Component Description

INFOID:0000000000909716

Unit	Description
Combination meter	Judges according to the fuel level sensor signal received from the fuel level sensor and sounds the warning buzzer.
Fuel level sensor	Refer to MWI-30, "2WD : Description" (2WD) or MWI-31, "4WD : Description" (4WD).

cardiagn.com

DIAGNOSIS SYSTEM (METER)

CONSULT-III Function (METER/M&A)

INFOID:0000000000911519

CONSULT-III FUNCTION (METER/M&A)

System	Diagnosis mode	Description
METER/M&A	Self Diagnostic Result	Combination meter checks the conditions and displays memorized error.
	Data Monitor	Displays combination meter input/output data in real time.

SELF DIAG RESULT

Refer to MWI-51, "DTC Index".

DATA MONITOR

Display Item List

X: Applicable

Display item [Unit]	MAIN SIGNALS	Description
SPEED METER [km/h]	X	Value of vehicle speed signal received from ABS actuator and electric unit (control unit) with CAN communication line. **NOTE:** 655.35 is displayed when the malfunction signal is received.
SPEED OUTPUT [km/h]	X	Vehicle speed signal value transmitted to other units with CAN communication line. **NOTE:** 655.35 is displayed when the malfunction signal is received.
TACHO METER [rpm]	X	Value of the engine speed signal received from ECM with CAN communication line. **NOTE:** 8191.875 is displayed when the malfunction signal is received.
W TEMP METER [°C]	X	Value of engine coolant temperature signal received from ECM with CAN communication line. **NOTE:** 215 is displayed when the malfunction signal is input.
FUEL METER [lit.]	X	Fuel level indicated on combination meter.
DISTANCE [km]	X	Value of possible driving distance calculated by combination meter.
FUEL W/L [On/Off]	X	Low-fuel warning status judged by the identified fuel level.
MIL [On/Off]		Status of malfunction indicator lamp judged from malfunctioning indicator lamp signal received from ECM with CAN communication line.
SEAT BELT W/L [On/Off]		Status of front seat belt buckle switch (driver side).
BUZZER [On/Off]	X	Buzzer status (in the combination meter) judged with the buzzer output signal received from BCM via CAN communication and the warning output condition of the combination meter.
C -ENG2 W/L [On/Off]		Status of malfunction indicator lamp 2 judged from malfunctioning indicator lamp signal received from ECM with CAN communication line.
GLOW IND [On/Off]		Glow indicator lamp status judged from glow indicator lamp signal received from ECM with the CAN communication line.
DOOR W/L [On/Off]		Status of door warning judged from door switch signal received from BCM with CAN communication line.
HI -BEAM IND [On/Off]		Status of high beam indicator lamp judged from high beam request signal received from BCM with CAN communication line.

cardiagn.com

Display item [Unit]	MAIN SIGNALS	Description
TURN IND [On/Off]		Status of turn indicator lamp judged from turn indicator signal received from BCM with CAN communication line.
FR FOG IND [On/Off]		Status of front fog light indicator lamp judged from front fog light request signal received from BCM with CAN communication line.
RR FOG IND [On/Off]		Status of rear fog light indicator lamp judged from rear fog light request signal received from BCM with CAN communication line.
OIL W/L [On/Off]		Status of oil pressure warning lamp judged from oil pressure switch signal received from IPDM E/R with CAN communication line.
LIGHT IND [On/Off]		Status of light indicator lamp judged from position light request signal received from BCM with CAN communication line.
DPF W/L [On/Off]		DPF warning lamp status judged by the DPF warning lamp signal received from ECM with the CAN communication line.
VDC/TCS IND [On/Off]		Status of VDC indicator lamp judged from VDC OFF indicator lamp signal received from ABS actuator and electric unit (control unit) with CAN communication line.
ABS W/L [On/Off]		Status of ABS warning lamp judged from ABS warning lamp signal received from ABS actuator and electric unit (control unit) with CAN communication line.
SLIP IND [On/Off]		Status of slip indicator lamp judged from slip indicator lamp signal received from ABS actuator and electric unit (control unit) with CAN communication line.
BRAKE W/L [On/Off]		Status of brake warning lamp judged from brake warning lamp signal received from ABS actuator and electric unit (control unit) with CAN communication line. **NOTE:** Displays “Off” if the brake warning lamp is illuminated when the valve check starts, the parking brake switch is turned ON or the brake fluid level switch is turned ON.
OIL LEVEL IND [LEVEL1, 2, 3, 4, 5/CR NG/On]		Oil level status judged by the oil level sensor signal from the oil level sensor.
KEY G W/L [On/Off]		Status of key warning lamp (G) judged from key warning signal received from BCM with CAN communication line.
KEY R W/L [On/Off]		Status of key warning lamp (R) judged from key warning signal received from BCM with CAN communication line.
KEY KNOB W/L [On/Off]		Key knob switch status received from Intelligent Key unit with the CAN communication line.
M RANGE SW [On/Off]	X	Status of mode select switch (manual).
NM RANGE SW [On/Off]	X	Status of mode select switch (auto).
AT SFT UP SW [On/Off]	X	Status of position select switch (up).
AT SFT DWN SW [On/Off]	X	Status of position select switch (down).

cardiagn.com

Display item [Unit]	MAIN SIGNALS	Description
P RANGE IND [On/Off]	X	Status of shift position indicator judged from shift position signal and manual mode indicator signal received from TCM with CAN communication line.
R RANGE IND [On/Off]	X	
N RANGE IND [On/Off]	X	
D RANGE IND [On/Off]	X	
4 RANGE IND [On/Off]	X	
3 RANGE IND [On/Off]	X	
2 RANGE IND [On/Off]	X	
AT CHECK W/L [On/Off]		A/T check warning lamp status judged by the A/T CHECK indicator lamp signal received from TCM with the CAN communication line.
CVT IND [On/Off]		CVT indicator lamp status judged from CVT CHECK indicator lamp signal received from TMC with the CAN communication line.
CRUISE IND [On/Off]		Status of CRUISE indicator judged from ASCD CRUISE lamp signal received from ECM with CAN communication line.
SET IND [On/Off]		Status of set indicator judged from ASCD SET indicator signal received from ECM with CAN communication line.
4WD LOCK SW [On/Off]		4WD lock switch status judged by the 4WD signal received from 4WD control unit with the CAN communication line.
4WD LOCK IND [On/Off]		4WD lock indicator status judged by the 4WD signal received from 4WD control unit with the CAN communication line.
4WD W/L [On/Off]		Status of 4WD warning lamp judged from 4WD warning lamp signal received from 4WD control unit with CAN communication line.

NOTE:

Some items are not available according to vehicle specification.

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001102445

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

BUZZER

BUZZER : CONSULT-III Function (BCM - BUZZER)

INFOID:0000000000892413

CONSULT-III FUNCTION (BCM – BUZZER)

cardiagn.com

Test item	Diagnosis mode	Description
Buzzer	Data Monitor	Displays BCM input data in real time.
	Active Test	Operation of electrical loads can be checked by sending driving signal to them.

DATA MONITOR

Display item [Unit]	Description
IGN ON SW [On/Off]	Ignition switch (ON) status judged by ignition power supply input.
KEY ON SW [On/Off]	Key switch status.
DOOR SW -DR [On/Off]	Front door switch (driver side) status judged by BCM.
TAIL LAMP SW [On/Off]	Lighting switch status judged by the lighting switch signal read with combination switch reading function.
BUCKLE SW [On/Off]	Seat belt buckle switch status judged by the seat belt buckle switch signal received from combination meter via CAN communication.
DOOR SW -AS	Front door switch (passenger side) status judged by BCM.
DOOR SW -RR	Rear door switch RH status judged by BCM.
DOOR SW -RL	Rear door switch LH status judged by BCM.
BACK DOOR SW	Back door switch status judged by BCM.
VEHICLE SPEED [km/h]	Vehicle speed signal value received from combination meter via CAN communication.

ACTIVE TEST

Display item	Description
LIGHT WARN ALM	The light reminder warning operation can be checked by operating the relevant function (On/Off).
IGN KEY WARN ALM	The key warning operation can be checked by operating the relevant function (On/Off).
KEY REMINDER WARN	The key reminder warning operation can be checked by operating the relevant function (On/Off).

cardiagn.com

COMPONENT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

COMBINATION METER

COMBINATION METER : Diagnosis Procedure

INFOID:0000000000936047

1.CHECK FUSE

Check for blown fuses.

Battery power supply	: 8
Ignition signal	: 4

Is the inspection result normal?

YES >> GO TO 2.
NO >> Be sure to eliminate cause of malfunction before installing new fuse.

2.CHECK POWER SUPPLY CIRCUIT

Check voltage between combination meter harness connector terminals 1, 2 and ground.

Terminal No.	Signal name	Ignition switch position	Value (Approx.)
1	Battery power supply	OFF	Battery voltage
2	Ignition signal	ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness between combination meter and fuse.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector.
3. Check continuity between combination meter harness connector terminals 3, 23 and ground.

3, 23 – Ground	: Continuity should exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

BCM (BODY CONTROL MODULE)

BCM (BODY CONTROL MODULE) : Diagnosis Procedure

INFOID:0000000001102067

1.CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not fusing.

Terminal No.	Signal name	Fuses and fusible link No.
41	Battery power supply	9
57		J
38	Ignition power supply	4

Is the fuse fusing?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit if a fuse or fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connectors.

cardiagn.com

3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)			
BCM			OFF	ACC	ON
Connector	Terminal				
M65	38	Ground	Approx. 0 V	Approx. 0 V	Battery voltage
M66	41		Battery voltage	Battery voltage	Battery voltage
M67	57				

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M67	55		Existed

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

cardiagn.com

METER BUZZER CIRCUIT

Description

INFOID:0000000000892420

- The buzzer for warning chime system is installed in the combination meter.
- The combination meter sounds the alarm buzzer based on the signals transmitted from various units.

Component Function Check

INFOID:0000000000892421

1.CHECK OPERATION OF METER BUZZER

1. Select “BUZZER” of “BCM” on CONSULT-III.
2. Perform “LIGHT WARN ALM” of “ACTIVE TEST”.

Does meter buzzer beep?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK COMBINATION METER INPUT SIGNAL

Select the “Data Monitor” for the “METER/M&A” and check the “BUZZER” monitor value.

BUZZER	
Under the condition of buzzer input	: On
Except above	: Off

Is the inspection result normal?

YES >> Replace combination meter. Refer to MWI-72, "Removal and Installation".
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

Diagnosis Procedure

INFOID:0000000000892422

1.CHECK POWER SUPPLY AND GROUND CIRCUIT OF COMBINATION METER

Check power supply and ground circuit of combination meter. Refer to WCS-18, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace malfunctioning parts.

cardiagn.com

SEAT BELT BUCKLE SWITCH SIGNAL CIRCUIT

Description

INFOID:0000000000892423

Transmits a seat belt buckle switch signal to the combination meter.

Component Function Check

INFOID:0000000000892424

1.CHECK COMBINATION METER INPUT SIGNAL

Select the “Data Monitor” for the “METER/M&A” and check the “BUCKLE SW” monitor value.

BUCKLE SW	
When seat belt is fastened (driver side)	: Off
When seat belt is unfastened (driver side)	: On

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000000892425

1.CHECK COMBINATION METER INPUT SIGNAL 1

1. Turn ignition switch ON.
2. Check voltage between combination meter harness connector terminal 35 and ground.

35 – Ground	
When driver seat belt is fastened	: Approx. 5 V
When driver seat belt is unfastened	: Approx. 0 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK COMBINATION METER INPUT SIGNAL 2

Check voltage between combination meter harness connector terminal 36 and ground.

36 – Ground	
• Passenger seat getting in conditions • When passenger seat belt is fastened	: Approx. 12 V
When passenger seat belt is unfastened	: Approx. 0 V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 5.

3.CHECK SEAT BELT BUCKLE SWITCH (DRIVER SIDE) SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and front seat belt buckle switch (driver side) connector.
3. Check continuity between combination meter harness connector terminal 35 and front seat belt buckle switch (driver side) harness connector terminal 1.

35 – 1	: Continuity should exist.

4. Check harness continuity between combination meter harness connector terminal 35 and ground.

35 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair harness or connector.

cardiagn.com

4. CHECK SEAT BELT BUCKLE SWITCH (DRIVER SIDE) GROUND CIRCUIT

Check harness continuity between front seat belt buckle switch (driver side) harness connector terminal 2 and ground.

2 – Ground	: Continuity should exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

5. CHECK SEAT BELT BUCKLE SWITCH (PASSENGER SIDE) CIRCUIT 1

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and front seat belt buckle switch (passenger side) connector.
3. Check continuity between combination meter harness connector terminal 36 and front seat belt buckle switch (passenger side) harness connector terminal 1.

36 – 1	: Continuity should exist.

4. Check harness continuity between combination meter harness connector terminal 36 and ground.

36 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connector.

6. CHECK SEAT BELT BUCKLE SWITCH (PASSENGER SIDE) CIRCUIT 2

1. Disconnect occupant detection unit connector.
2. Check continuity between front seat belt buckle switch (passenger side) harness connector terminal 2 and occupant detection unit harness connector terminal 1.

2 – 1	: Continuity should exist.

3. Check harness continuity between front seat belt buckle switch (passenger side) harness connector terminal 2 and ground.

2 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair harness or connector.

7. CHECK SEAT BELT BUCKLE SWITCH (PASSENGER SIDE) GROUND CIRCUIT

Check harness continuity between occupant detection unit harness connector terminal 2 and ground.

2 – Ground	: Continuity should exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

cardiagn.com

PARKING BRAKE SWITCH SIGNAL CIRCUIT

Description

INFOID:0000000000905323

Transmits the parking brake switch signal to the combination meter.

Diagnosis Procedure

INFOID:0000000000905324

1.CHECK COMBINATION METER INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between combination meter harness connector terminal 26 and ground.

26 – Ground	
Parking brake ON	: Approx. 0 V
Parking brake OFF	: Approx. 5 V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK PARKING BRAKE SWITCH SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and parking brake switch connector.
3. Check continuity between combination meter harness connector terminal 26 and parking brake switch harness connector terminal 1.

26 – 1	: Continuity should exist.

4. Check continuity between combination meter harness connector terminal 26 and ground.

26 – Ground	: Continuity should not exist.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

Component Inspection

INFOID:0000000000905325

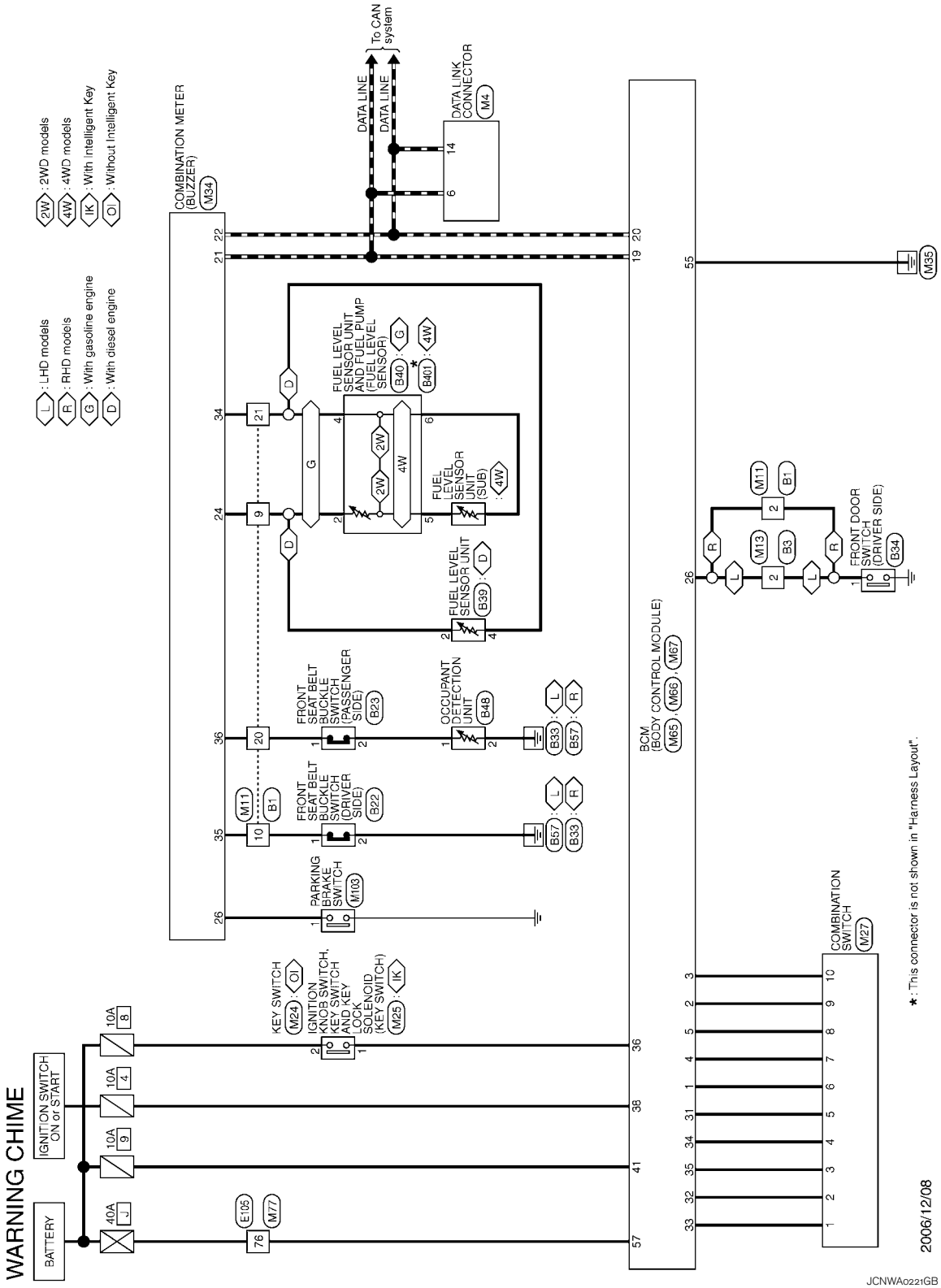
Refer to BRC-47, "Component Inspection".

cardiagn.com

WARNING CHIME SYSTEM

Wiring Diagram - WARNING CHIME -

INFOID:0000000001090901



cardiagn.com

WARNING CHIME

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	–[RHD models]
9	G	–
10	O	–
20	GR	–
21	B	–

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name [Specification]
2	R/W	–[LHD models]

Connector No.	B22
Connector Name	FRONT SEAT BELT BUCKLE SWITCH (DRIVER SIDE)
Connector Type	C02FW

H.S.

2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	–
2	B	–

Connector No.	B23
Connector Name	FRONT SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)
Connector Type	C02FW

H.S.

2	1

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	LG	–

Connector No.	A03FW
Connector Name	FRONT DOOR SWITCH (DRIVER SIDE)
Connector Type	

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–

Connector No.	B39
Connector Name	FUEL LEVEL SENSOR UNIT
Connector Type	E04FGY-RS

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	–
4	B	–

Connector No.	B40
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	E04FGY-RS

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	–
4	B	–

Connector No.	B48
Connector Name	OCCUPANT DETECTION UNIT
Connector Type	S02FW

H.S.

1
2

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	B	–

JCNWA0222GB

cardiagn.com

WARNING CHIME

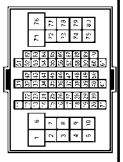
Connector No.	B401
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	–

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	–	–
6	–	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

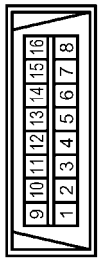
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

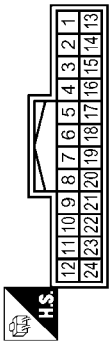
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
6	L	–
14	P	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

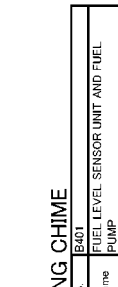
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	R	–[RHD models]
9	G	–
10	O	–
20	GR	–
21	B	–

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	R	–[LHD models]

Connector No.	M24
Connector Name	KEY SWITCH
Connector Type	A02NW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–

Connector No.	M25
Connector Name	IGNITION KNOB SWITCH, KEY SWITCH AND KEY LOCK SOLENOID
Connector Type	TK06MGY

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

JCNWA0223GB

cardiagn.com

WARNING CHIME

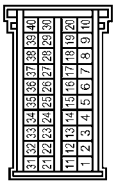
Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
24	G	FUEL LEVEL SENS GND
26	V	PARKING BRAKE SW
34	B	FUEL LEVEL SENS
35	O	SEAT BELT BUCKLE SW (DRIVER SIDE)
36	GR	SEAT BELT BUCKLE SW (PASSENGER SIDE)

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

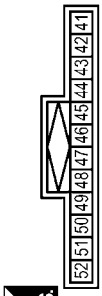
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	COMBI SW OUTPUT 1
2	Y	COMBI SW OUTPUT 4
3	LG	COMBI SW OUTPUT 3
4	R	COMBI SW OUTPUT 2
5	W	COMBI SW OUTPUT 5
19	L	CAN-H
20	P	CAN-L
26	R	DOOR SW (DR)
31	BR	COMBI SW INPUT 5
32	G	COMBI SW INPUT 2
33	V	COMBI SW INPUT 1
34	GR	COMBI SW INPUT 4
35	L	COMBI SW INPUT 3
36	V	KEY SW
38	W/L	IGN SW

Connector No.	M86
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC122S1017

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
41	V	BAT(FUSE)

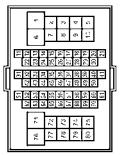
Connector No.	M103
Connector Name	PARKING BRAKE SWITCH
Connector Type	P01FB-A

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-NS16-TM4

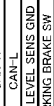
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
76	Y	-

Connector No.	M67
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FCI 211PC063S0017

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
55	B	GND(POWER)
57	Y	BAT(F/L)

JCNWA0224GB

cardiagn.com

ECU DIAGNOSIS

COMBINATION METER

Reference Value

INFOID:0000000000936439

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
SPEED METER [km/h]	Ignition switch ON	While driving	Equivalent to speedometer reading **NOTE:** 655.35 is displayed when the malfunction signal is received
SPEED OUTPUT [km/h]	Ignition switch ON	While driving	Equivalent to speedometer reading **NOTE:** 655.35 is displayed when the malfunction signal is received
TACHO METER [rpm]	Ignition switch ON	While driving	Equivalent to tachometer reading **NOTE:** 8191.875 is displayed when the malfunction signal is received
W TEMP METER [°C]	Ignition switch ON	—	Values according to engine coolant temperature **NOTE:** 215 is displayed when the malfunction signal is input
FUEL METER [lit]	Ignition switch ON	—	Values according to fuel level
DISTANCE [km]	Ignition switch ON	—	Possible driving distance calculated by combination meter
FUEL W/L	Ignition switch ON	Low-fuel warning lamp ON	On
		Low-fuel warning lamp OFF	Off
MIL	Ignition switch ON	Malfunction indicator lamp ON	On
		Malfunction indicator lamp OFF	Off
SEAT BELT W/L	Ignition switch ON	Seat belt warning lamp ON	On
		Seat belt warning lamp OFF	Off
BUZZER	Ignition switch ON	Buzzer ON	On
		Buzzer OFF	Off
C-ENG 2 W/L	Ignition switch ON	Malfunction indicator lamp 2 ON	On
		Malfunction indicator lamp 2 OFF	Off
GLOW IND	Ignition switch ON	Glow indicator lamp ON	On
		Glow indicator lamp OFF	Off
DOOR W/L	Ignition switch ON	Door warning lamp ON	On
		Door warning lamp OFF	Off
HI-BEAM IND	Ignition switch ON	High-beam indicator lamp ON	On
		High-beam indicator lamp OFF	Off
TURN IND	Ignition switch ON	Turn signal indicator lamp ON	On
		Turn signal indicator lamp OFF	Off
FR FOG IND	Ignition switch ON	Front fog lamp indicator lamp ON	On
		Front fog lamp indicator lamp OFF	Off
RR FOG IND	Ignition switch ON	Rear fog lamp indicator lamp ON	On
		Rear fog lamp indicator lamp OFF	Off

cardiagn.com

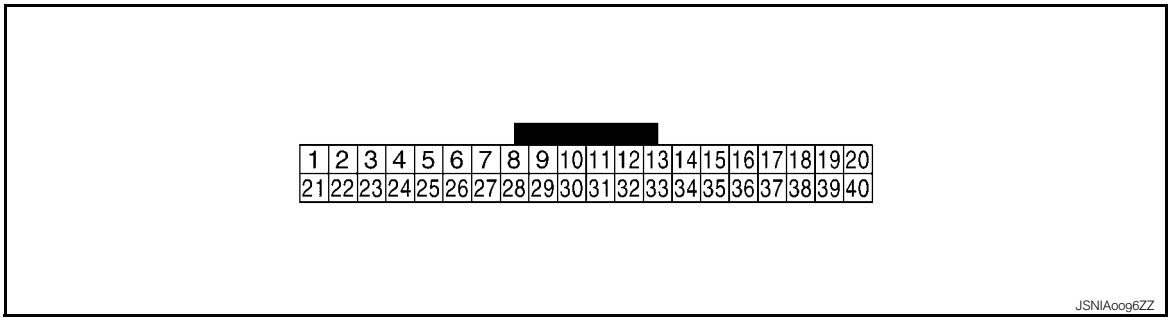
Monitor Item	Condition		Value/Status
OIL W/L	Ignition switch ON	Oil pressure warning lamp ON	On
		Oil pressure warning lamp OFF	Off
LIGHT IND	Ignition switch ON	Tail lamp indicator lamp ON	On
		Tail lamp indicator lamp OFF	Off
DPF W/L	Ignition switch ON	DPF warning lamp ON	On
		DPF warning lamp OFF	Off
VDC/TCS IND	Ignition switch ON	VDC OFF indicator lamp ON	On
		VDC OFF indicator lamp OFF	Off
ABS W/L	Ignition switch ON	ABS warning lamp ON	On
		ABS warning lamp OFF	Off
SLIP IND	Ignition switch ON	SLIP Indicator lamp ON	On
		SLIP indicator lamp OFF	Off
BRAKE W/L	Ignition switch ON	Brake warning lamp ON	On
		Brake warning lamp OFF	Off
OIL LEVEL IND	Ignition switch ON	Oil level 1 is detected	LEVEL1
		Oil level 2 is detected	LEVEL2
		Oil level 3 is detected	LEVEL3
		Oil level 4 is detected	LEVEL4
		Oil level 5 is detected	LEVEL5
		OIL LOW is detected	On
		Oil level is not detected	CR NG
KEY G W/L	Ignition switch ON	KEY warning lamp (green) ON	On
		KEY warning lamp (green) OFF	Off
KEY R W/L	Ignition switch ON	KEY warning lamp (red) ON	On
		KEY warning lamp (red) OFF	Off
KEY KNOB IND	Ignition switch ON	LOCK warning lamp ON	On
		LOCK warning lamp OFF	Off
M RANGE SW	Ignition switch ON	MANUAL MODE	On
		Other than the above	Off
NM RANGE SW	Ignition switch ON	MANUAL MODE	Off
		Other than the above	On
AT SFT UP SW	Ignition switch ON	Selector lever (+) position	On
		Other than the above	Off
AT SFT DWN SW	Ignition switch ON	Selector lever (–) position	On
		Other than the above	Off
P RANGE IND	Ignition switch ON	Selector lever in P position	On
		Other than the above	Off
R RANGE IND	Ignition switch ON	Selector lever in R position	On
		Other than the above	Off
N RANGE IND	Ignition switch ON	Selector lever in N position	On
		Other than the above	Off
D RANGE IND	Ignition switch ON	Selector lever in D position	On
		Other than the above	Off

cardiagn.com

Monitor Item	Condition		Value/Status
4 RANGE IND	Ignition switch ON	Shift indicator 4 is displayed	On
		Other than the above	Off
3 RANGE IND	Ignition switch ON	Shift indicator 3 is displayed	On
		Other than the above	Off
2 RANGE IND	Ignition switch ON	Shift indicator 2 is displayed	On
		Other than the above	Off
AT CHECK-W/L	Ignition switch ON	TCM electronic control system warning lamp ON	On
		TCM electronic control system warning lamp OFF	Off
CVT IND	Ignition switch ON	CVT warning lamp ON	On
		CVT warning lamp OFF	Off
CRUISE IND	Ignition switch ON	Cruise indicator lamp ON	On
		Cruise indicator lamp OFF	Off
SET IND	Ignition switch ON	SET indicator lamp ON	On
		SET indicator lamp OFF	Off
4WD LOCK SW	Ignition switch ON	4WD LOCK switch ON	On
		4WD LOCK switch OFF	Off
4WD LOCK IND	Ignition switch ON	4WD LOCK indicator lamp ON	On
		4WD LOCK indicator lamp OFF	Off
4WD W/L	Ignition switch ON	4WD warning lamp ON	On
		4WD warning lamp OFF	Off

NOTE:
Some items are not available according to vehicle specification.

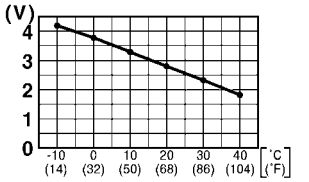
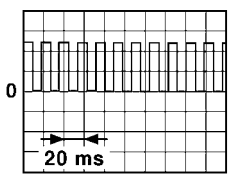
TERMINAL LAYOUT



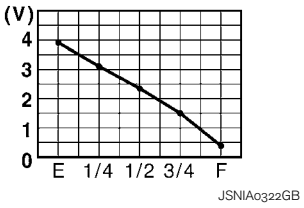
PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
1 (Y)	Ground	Battery power supply	Input	Ignition switch OFF	—	Battery voltage
2 (GR)	Ground	IGN signal	Input	Ignition switch ON	—	Battery voltage
3 (B)	Ground	Ground	—	Ignition switch ON	—	0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
11 (B)*1 (R)*2	Ground	Steering switch (trip computer) signal	Input	Ignition switch ON	Press the steering switch (trip computer)	0 V
					Other than the above	5 V
15 (W)	Ground	Air bag signal	Input	Ignition switch ON	Air bag warning lamp ON	4 V
					Air bag warning lamp OFF	0 V
19 (V)	Ground	OAT sensor signal	Input	Ignition switch ON	—	 JSNIA0014GB
20 (SB)	Ground	OAT sensor ground	—	Ignition switch ON	—	0 V
21 (L)	—	CAN-H	—	—	—	—
22 (P)	—	CAN-L	—	—	—	—
23 (B)	Ground	Ground	—	Ignition switch ON	—	0 V
24 (G)	Ground	Fuel level sensor signal ground	—	Ignition switch ON	—	0 V
25 (L)	Ground	Alternator signal	Input	Ignition switch ON	Charge warning lamp ON	0 V
					Charge warning lamp OFF	12 V
26 (V)	Ground	Parking brake switch signal	Input	Ignition switch ON	Parking brake ON	0 V
					Parking brake OFF	5 V
27 (BR)	Ground	Brake fluid level switch signal	Input	Ignition switch ON	Brake fluid level is normal	5 V
					Brake fluid level is less than LOW level	0 V
28 (SB)	Ground	Security signal	Input	Ignition switch ON	Security warning lamp ON	0 V
					Security warning lamp OFF	12 V
31 (Y)	Ground	Vehicle speed signal (8 pulse)	Output	Ignition switch ON	Vehicle speed is approximately 40 km/h (24.9 MPH)	**NOTE:** The maximum voltage varies depending on the specification (destination unit).  JSNIA0012GB

cardiagn.com

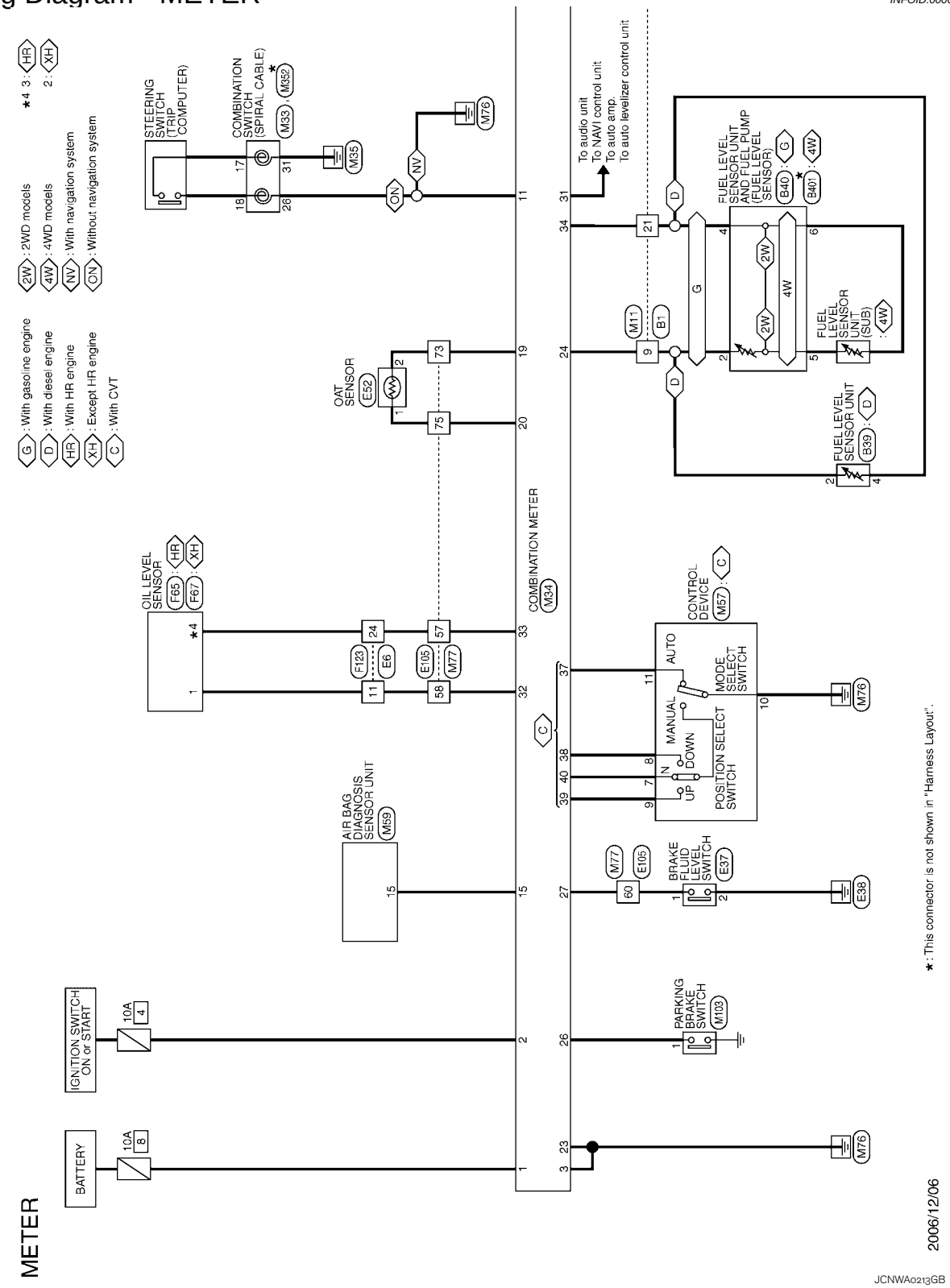
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (Y)	Ground	Oil level sensor signal	Input	Ignition switch ON	—	Refer to MWI-34, "Component Inspection". **NOTE:** The measurement cannot be performed because the signal is input for a moment with the ignition switch ON.
33 (P)	Ground	Oil level sensor signal ground	—	Ignition switch ON	—	0 V
34 (B)	Ground	Fuel level sensor signal	Input	Ignition switch ON	—	 JSNIA0322GB
35 (O)	Ground	Seat belt buckle switch signal (driver side)	Input	Ignition switch ON	When driver seat belt is fastened	5 V
					When driver seat belt is unfastened	0 V
36 (GR)	Ground	Seat belt buckle switch signal (passenger side)	Input	Ignition switch ON	• When getting in the passenger seat • When passenger seat belt is fastened	12 V
					• When getting in the passenger seat • When passenger seat belt is not fastened	0 V
37 (R/Y)	Ground	Not manual mode signal	Input	Ignition switch ON	Manual mode	12 V
					Other than the above	0 V
38 (LG)	Ground	Manual mode shift down signal	Input	Ignition switch ON	Selector lever down operation	0 V
					Other than the above	12 V
39 (G/W)	Ground	Manual mode shift up signal	Input	Ignition switch ON	Selector lever up operation	0 V
					Other than the above	12 V
40 (L)	Ground	Manual mode signal	Input	Ignition switch ON	Manual mode	0 V
					Other than the above	12 V

*1 : With NAVI
*2 : Without NAVI

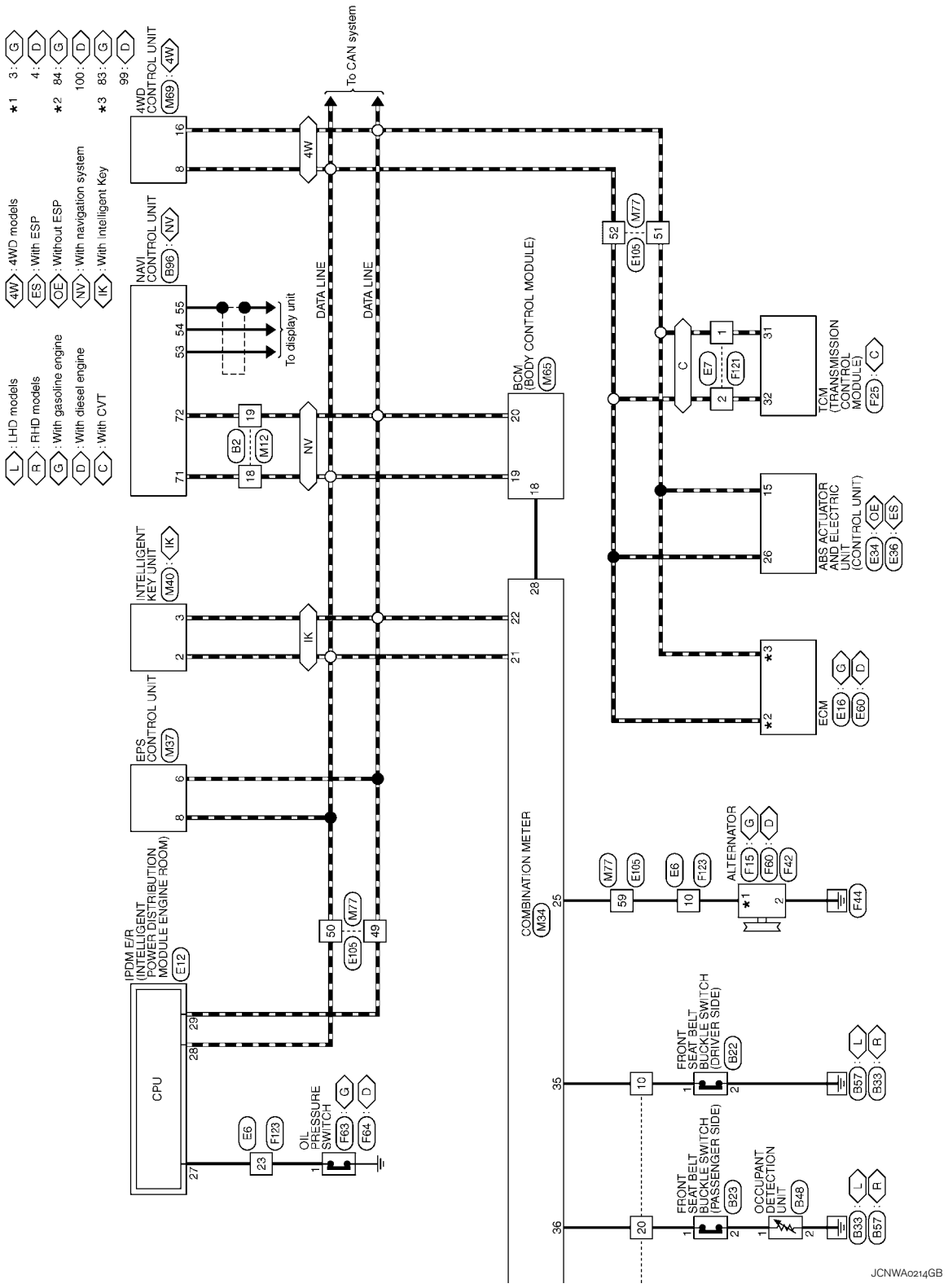
cardiagn.com

Wiring Diagram - METER -

INFOID:0000000000936440



cardiagn.com



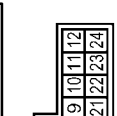
cardiagn.com

METER

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

Terminal No.	Color of Wire	Signal Name [Specification]
9	G	-
10	O	-
20	GR	-
21	B	-

Connector No.	B2
Connector Name	WIRE TO WIRE
Connector Type	TH24MW

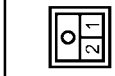


Terminal No.	Color of Wire	Signal Name [Specification]
18	L	-
19	P	-

Connector No.	B22
Connector Name	FRONT SEAT BELT BUCKLE SWITCH (DRIVER SIDE)
Connector Type	C02FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	B	-

Connector No.	B23
Connector Name	FRONT SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)
Connector Type	C02FW

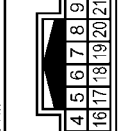


Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	LG	-

Connector No.	B39
Connector Name	FUEL LEVEL SENSOR UNIT
Connector Type	E04FGY-RS

Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-
4	B	-

Connector No.	B40
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	E04FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
2	G	-
4	B	-

Connector No.	B48
Connector Name	OCCUPANT DETECTION UNIT
Connector Type	S02FW

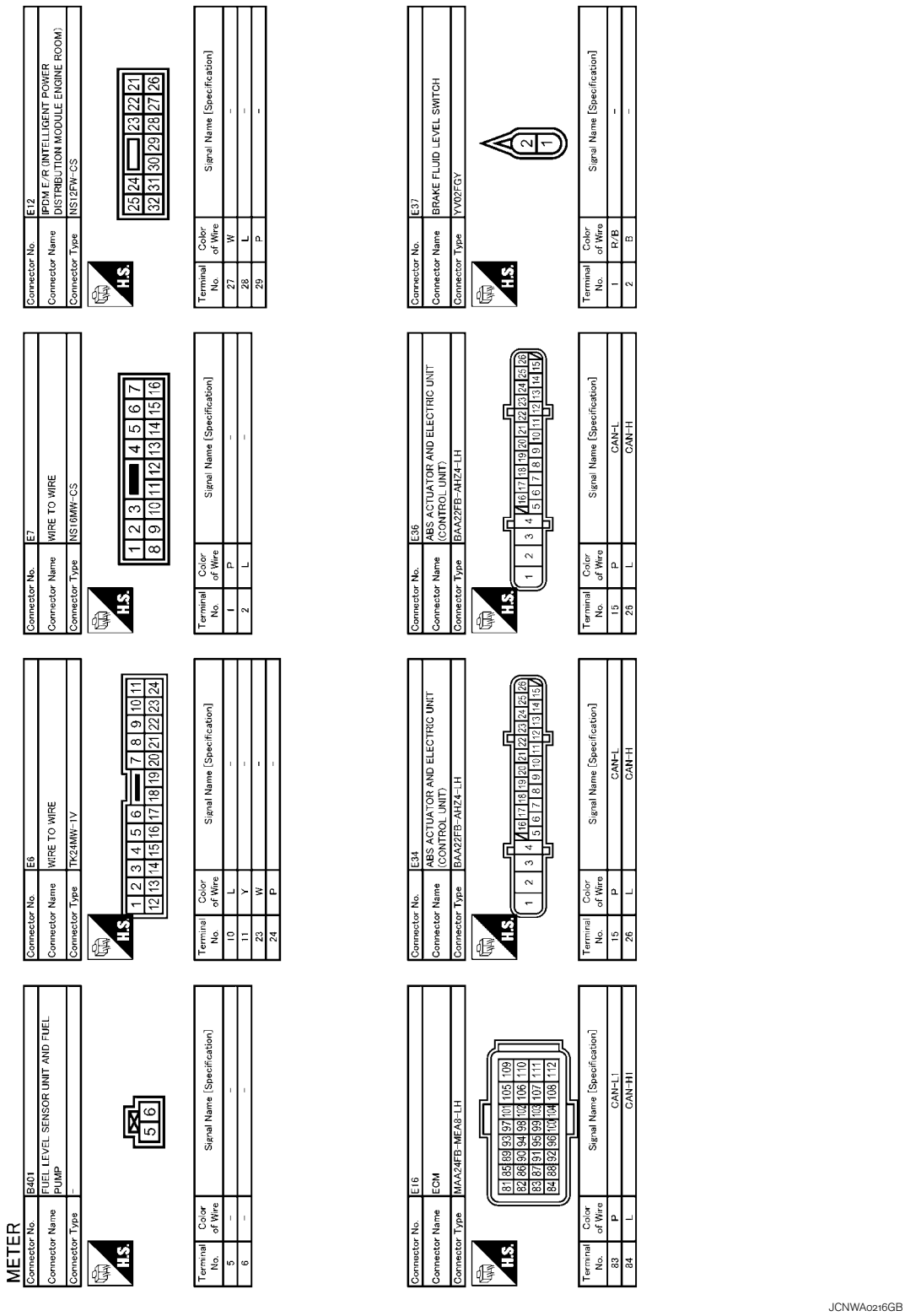
Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	B	-

Connector No.	B96
Connector Name	NAVI CONTROL UNIT
Connector Type	TH32FW

Terminal No.	Color of Wire	Signal Name [Specification]
53	W	COMM (CONT->DISP)
54	O	COMM (DISP->CONT)
55	SHIELD	SHIELD
71	L	CAN-H
72	P	CAN-L

JCNWA0215GB

cardiagn.com



JCNWA0216GB

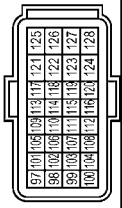
cardiagn.com

METER

Connector No.	E52
Connector Name	OAT SENSOR
Connector Type	RH04FB

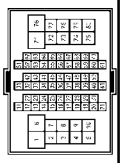
Terminal No.	Color of Wire	Signal Name [Specification]
1	L/O	–
2	V	–

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
51	P	–
52	L	–
57	P	–
58	Y	–
59	L	–
60	R/B	–
73	V	–
75	L/O	–

Connector No.	F15
Connector Name	ALTERNATOR
Connector Type	HS03FB

Terminal No.	Color of Wire	Signal Name [Specification]
3	L	L

Connector No.	F25
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	MOLEX 500994-4111

Terminal No.	Color of Wire	Signal Name [Specification]
31	P	CAN-L
32	L	CAN-H

Connector No.	F42
Connector Name	ALTERNATOR
Connector Type	–

Terminal No.	Color of Wire	Signal Name [Specification]
2	–	GND

Connector No.	F60
Connector Name	ALTERNATOR
Connector Type	FEA02FB

Terminal No.	Color of Wire	Signal Name [Specification]
4	L	S

Connector No.	F63
Connector Name	OIL PRESSURE SWITCH
Connector Type	EDTFGY-RS-AR

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–

JCNWA0217GB

cardiagn.com

METER

Connector No.	F64
Connector Name	OIL PRESSURE SWITCH
Connector Type	RH02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-

Connector No.	F65
Connector Name	OIL LEVEL SENSOR
Connector Type	RS03FSB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	+
3	P	-

Connector No.	F67
Connector Name	OIL LEVEL SENSOR
Connector Type	BS02FB-AHY-S

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	+
2	P	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	L	-

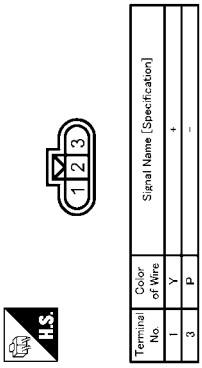
Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
10	L	-
11	Y	-
23	W	-
24	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

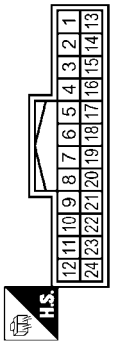
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
9	G	-
10	O	-
20	GR	-
21	B	-

Connector No.	M12
Connector Name	WIRE TO WIRE
Connector Type	TH24FW

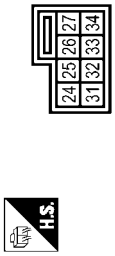
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
18	L	-
19	P	-

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
26	R	-
31	B	-

JCNWA0218GB

cardiagn.com

METER

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
2	GR	IGN
3	B	GND
11	R	STEERING SW[Without navigation system]
15	W	AIR BAG
19	V	OAT SENS
20	SB	OAT SENS GND
21	L	CAN-H
22	P	CAN-L
23	B	GND
24	G	FUEL LEVEL SENS GND

Connector No.	M57
Connector Name	CONTROL DEVICE
Connector Type	TH16FW

H.S.

8	7	6	5	4	3	2	1
16	15	14	13	12	11	10	9

Terminal No.	Color of Wire	Signal Name [Specification]
7	L	-
8	LG	-
9	W	-
10	B	-
11	R	-

25	L	ALTERNATOR
26	V	PARKING BRAKE SW
27	BR	BRAKE FLUID LEVEL SW
28	SB	SECURITY
31	Y	VEHICLE SPEED (8-PULSE)
32	Y	OIL LEVEL SENS
33	P	OIL LEVEL SENS GND
34	B	FUEL LEVEL SENS
35	O	SEAT BELT BUCKLE SW (DRIVER SIDE)
36	GR	SEAT BELT BUCKLE SW (PASSENGER SIDE)
37	R/Y	NOT MANUAL MODE
38	LG	SHIFT DOWN
39	G/W	SHIFT UP
40	L	MANUAL MODE

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	TK28FY-EX-SC

H.S.

20	21	17							24	49	1
22	11	46	48	47	45	13	3	4	6	5	
16	12	19	15	14	51	23	50	18	52	2	

Terminal No.	Color of Wire	Signal Name [Specification]
15	W	WARNING LAMP

Connector No.	M37
Connector Name	EPS CONTROL UNIT
Connector Type	Molex 98545-0601

H.S.

3	4	5	6	7	8	9	10

Terminal No.	Color of Wire	Signal Name [Specification]
6	P	-
8	L	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

H.S.

31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Terminal No.	Color of Wire	Signal Name [Specification]
18	SB	SECURITY INDICATOR
19	L	CAN-H
20	P	CAN-L

Connector No.	M40
Connector Name	INTELLIGENT KEY UNIT
Connector Type	TH40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	CAN-H
3	P	CAN-L

Connector No.	M69
Connector Name	4WD CONTROL UNIT
Connector Type	TH16FW

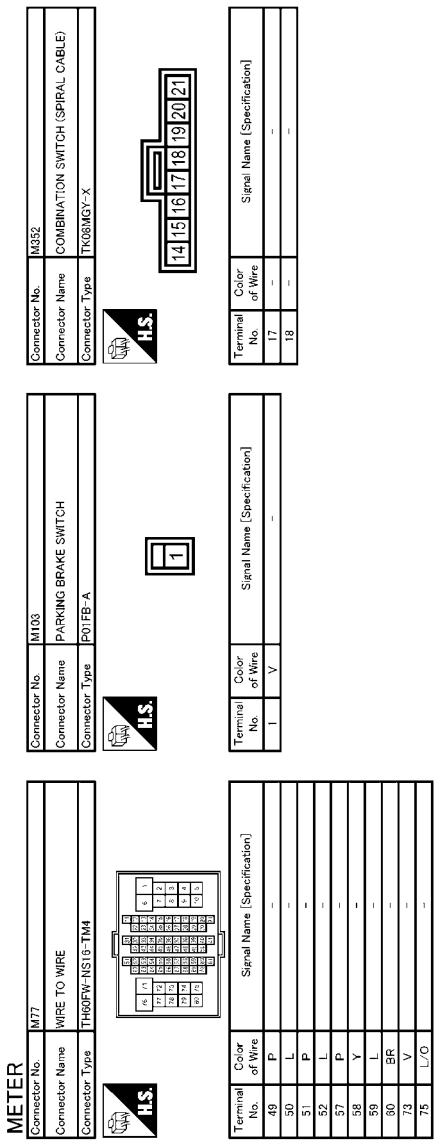
H.S.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
8	L	CAN-H
16	P	CAN-L

JCNWA0219GB

cardiagn.com



JCNWA0220GB

Fail Safe

INFOID:0000000000936441

The combination meter activates the fail-safe control if the CAN communication lines between each unit are malfunctioning.

cardiagn.com

Function		Specifications
Speedometer		Reset to zero by suspending communication.
Tachometer		
Meter illumination control		Changed to nighttime mode.
Buzzer		Turned off by suspending communication.
Warning lamp/indicator lamp	ABS warning lamp	Turned on by suspending communication.
	Brake warning lamp	
	EPS OFF indicator lamp	
	VDC OFF indicator lamp	
	SLIP indicator lamp	
	CVT warning lamp	Turned off by suspending communication.
	Oil pressure warning lamp	
	Door warning lamp	
	Malfunction indicator lamp	
	CRUISE indicator lamp	
	Tail lamp indicator	
	Front fog indicator lamp	
	Rear fog indicator lamp	
	Glow indicator lamp	
	Malfunction indicator lamp 2	
	Trailer indicator lamp	
	Key R/G warning lamp	
	KEY LOCK warning lamp	
	High beam indicator lamp	
	Turn signal indicator lamp	

DTC Index

INFOID:0000000000936442

Display contents of CONSULT-III	Time	Diagnostic item is detected when ...	Refer to
CAN COMM CIRCUIT [U1000]	CRNT, 1 - 39	Combination meter is not transmitting or receiving CAN communication signal for 2 seconds or more.	MWI-26
VEHICLE SPEED [B2205]	CRNT, 1 - 39	The abnormal vehicle speed signal is input from ABS actuator and electric unit (control unit) for 2 seconds or more.	MWI-27

cardiagn.com

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001102068

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

cardiagn.com

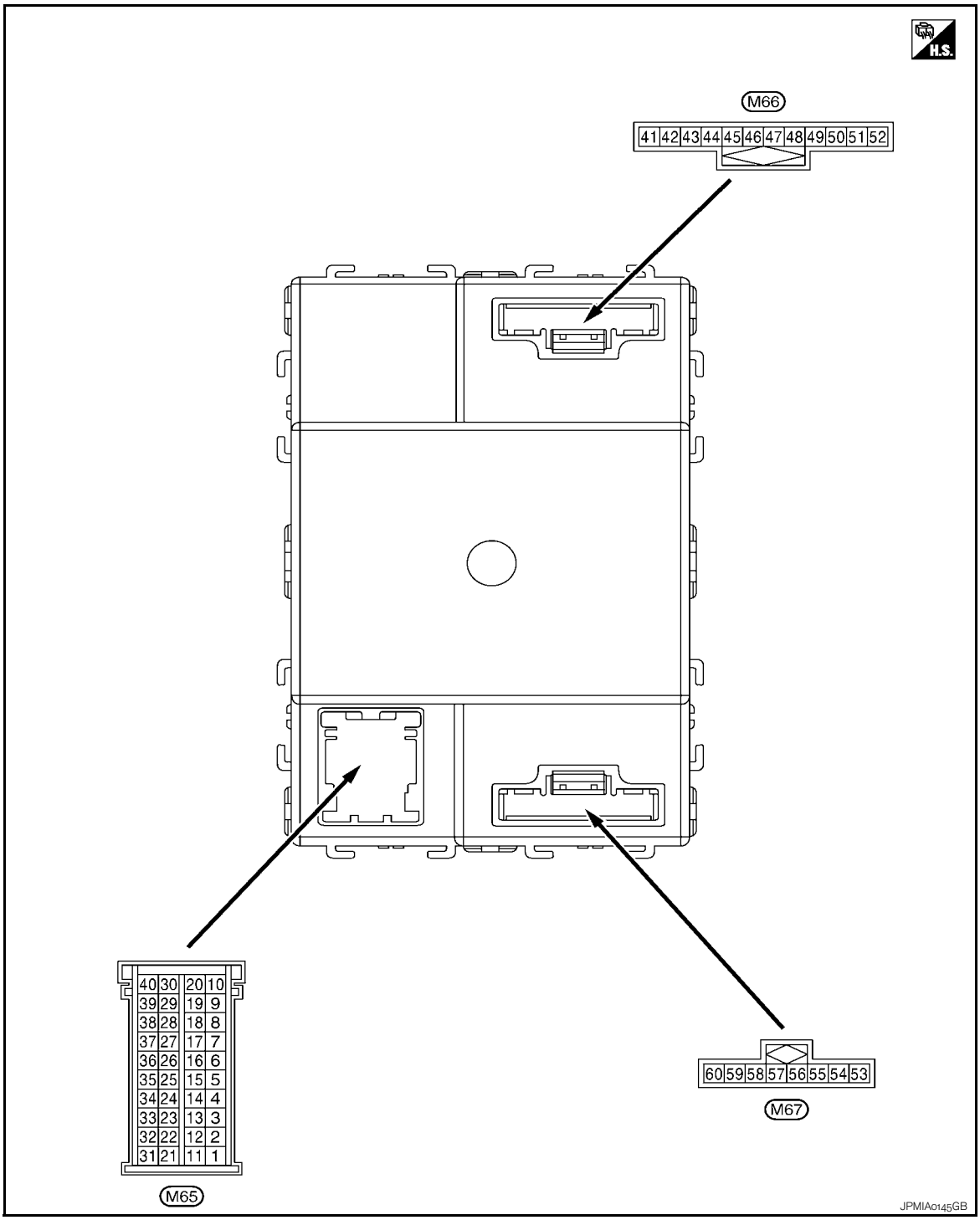
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

cardiagn.com

TERMINAL LAYOUT

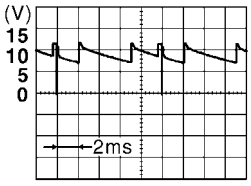
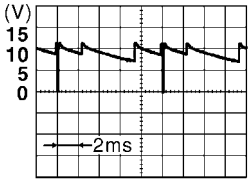
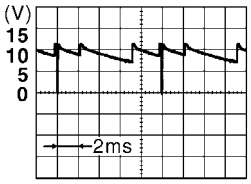
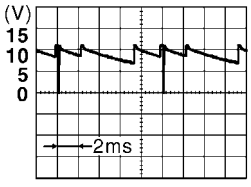


PHYSICAL VALUES

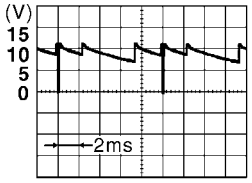
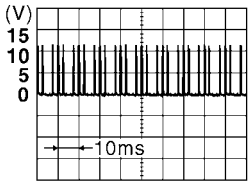
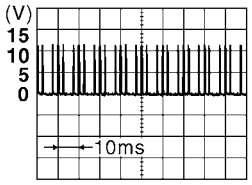
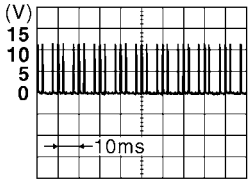
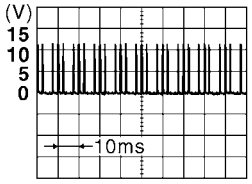
CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

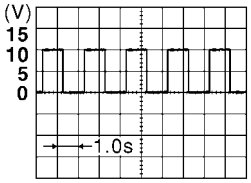
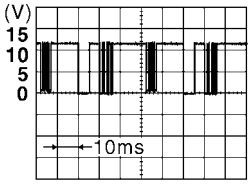
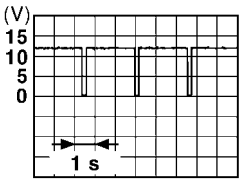
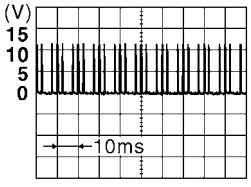
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

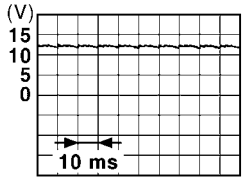
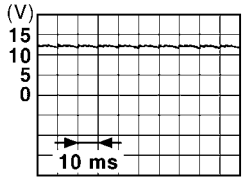
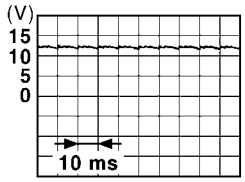
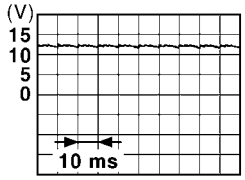
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

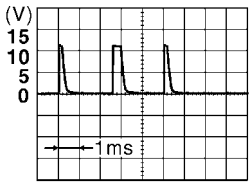
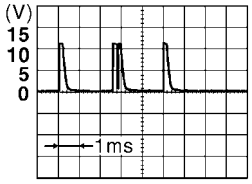
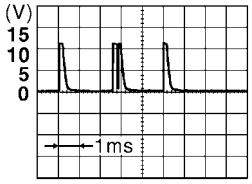
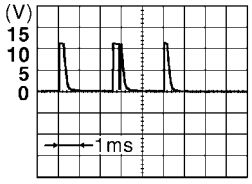
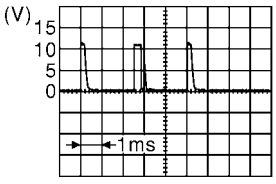
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

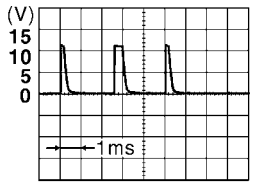
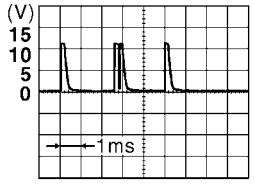
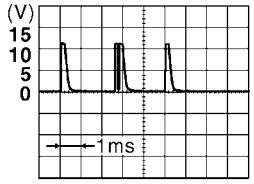
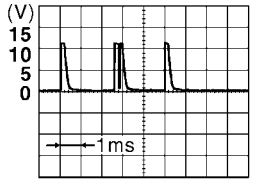
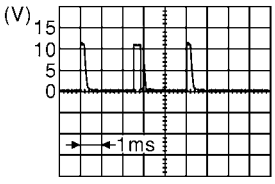
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIDo924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIDo924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIDo924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIDo924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

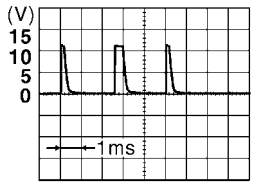
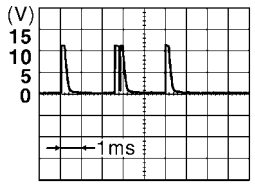
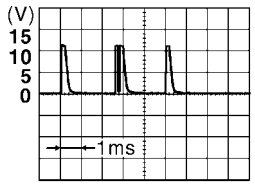
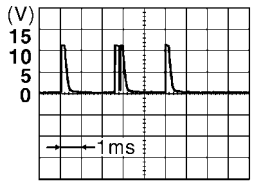
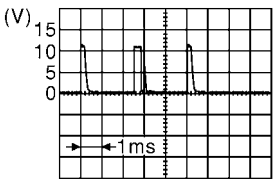
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

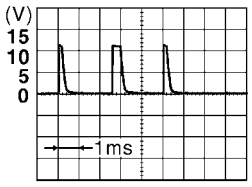
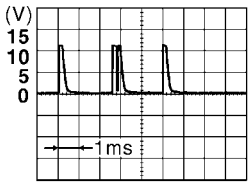
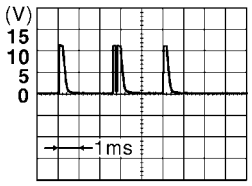
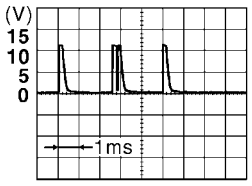
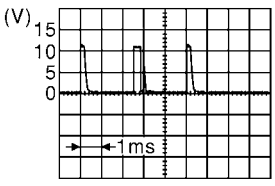
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

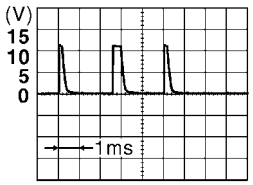
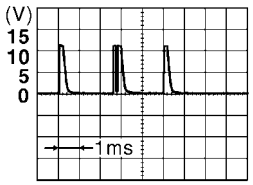
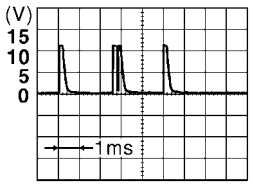
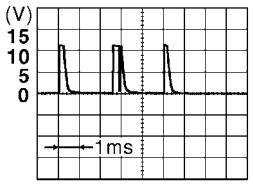
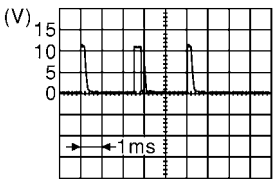
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

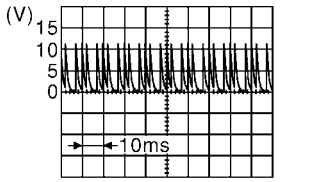
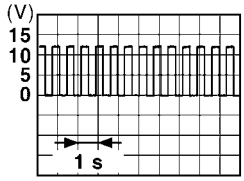
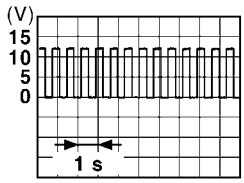
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

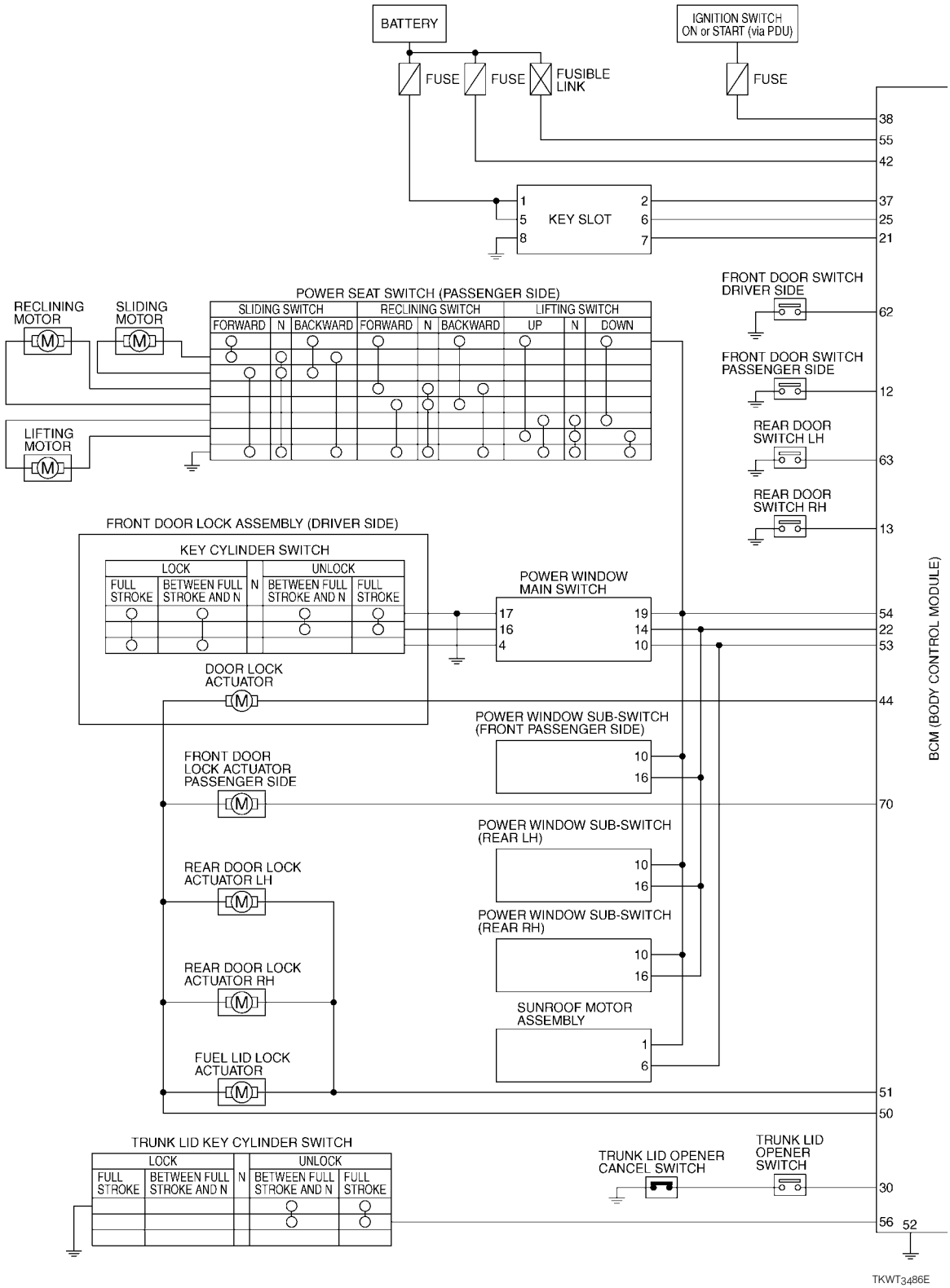
*1: With Intelligent Key system

*2: Without Intelligent Key system

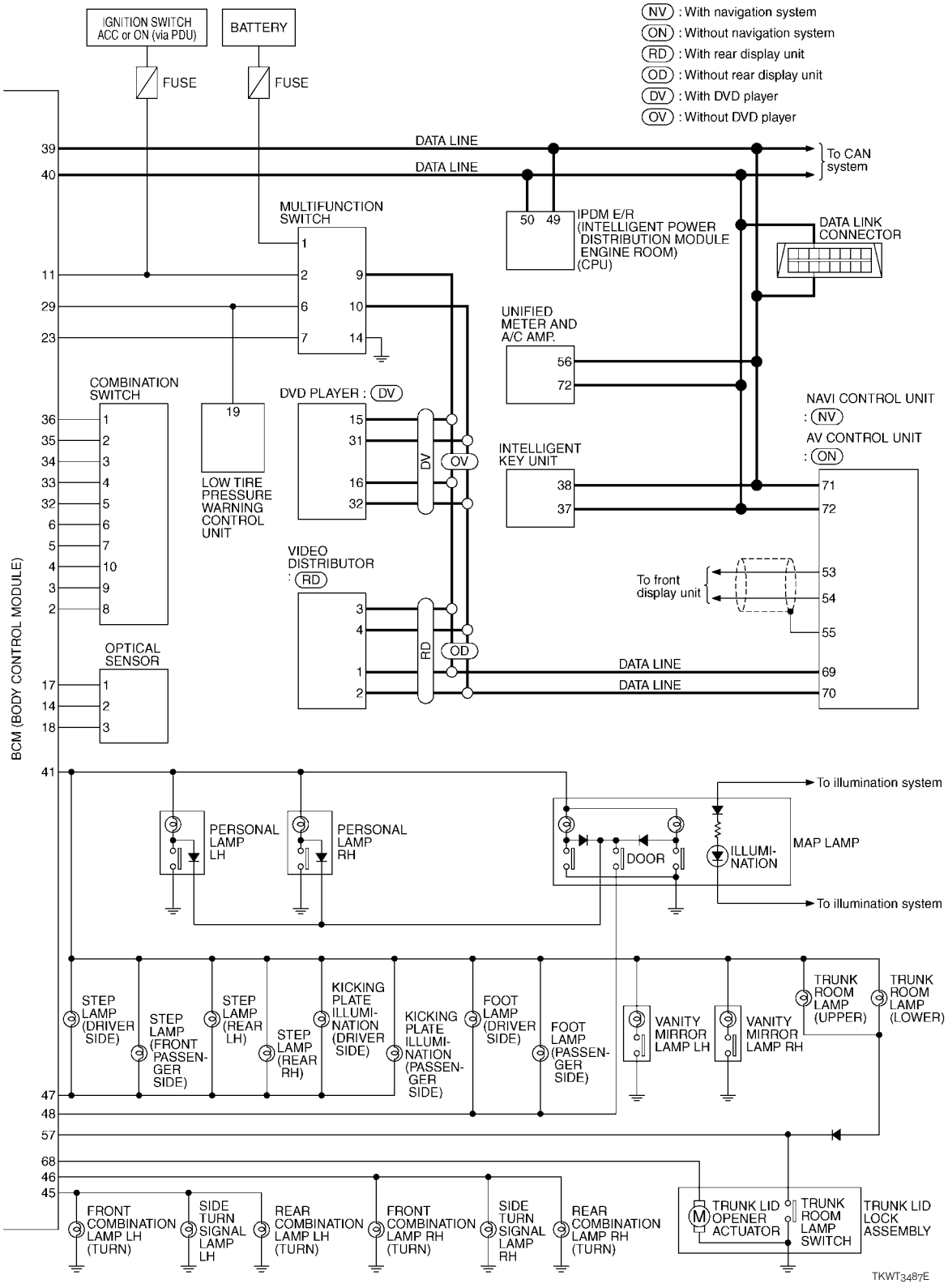
cardiagn.com

Wiring Diagram - BCM -

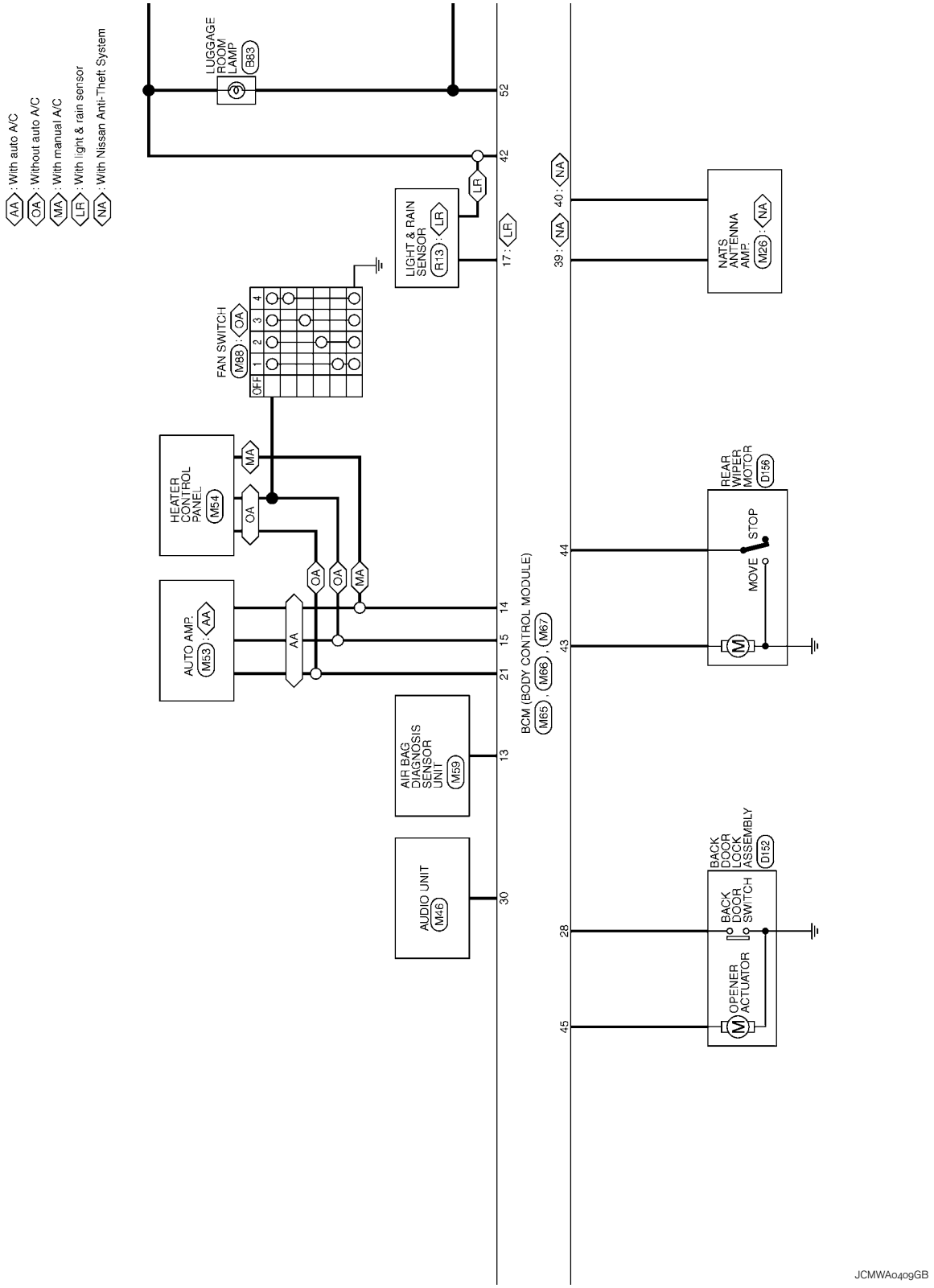
INFOID:0000000001102069



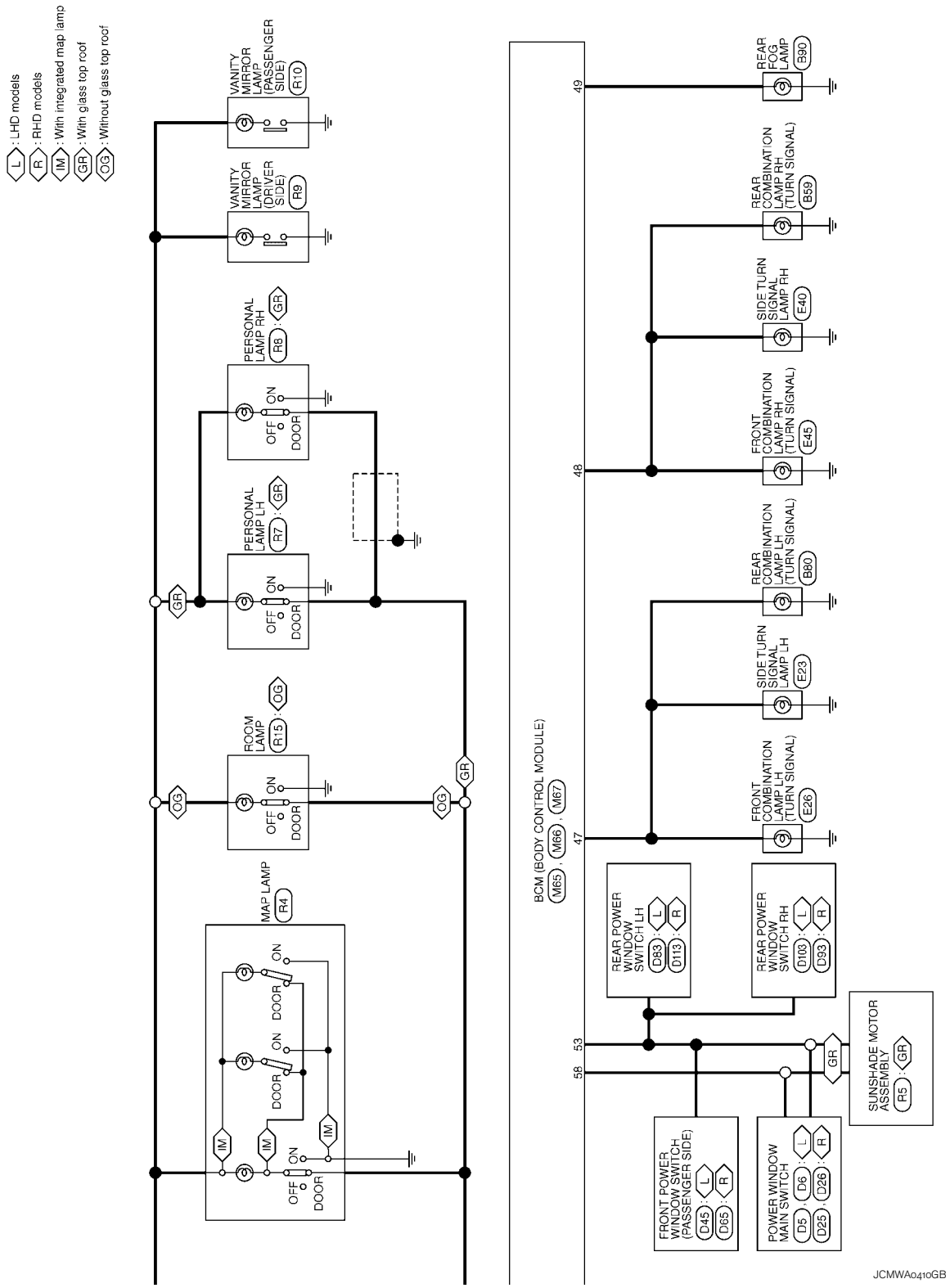
cardiagn.com



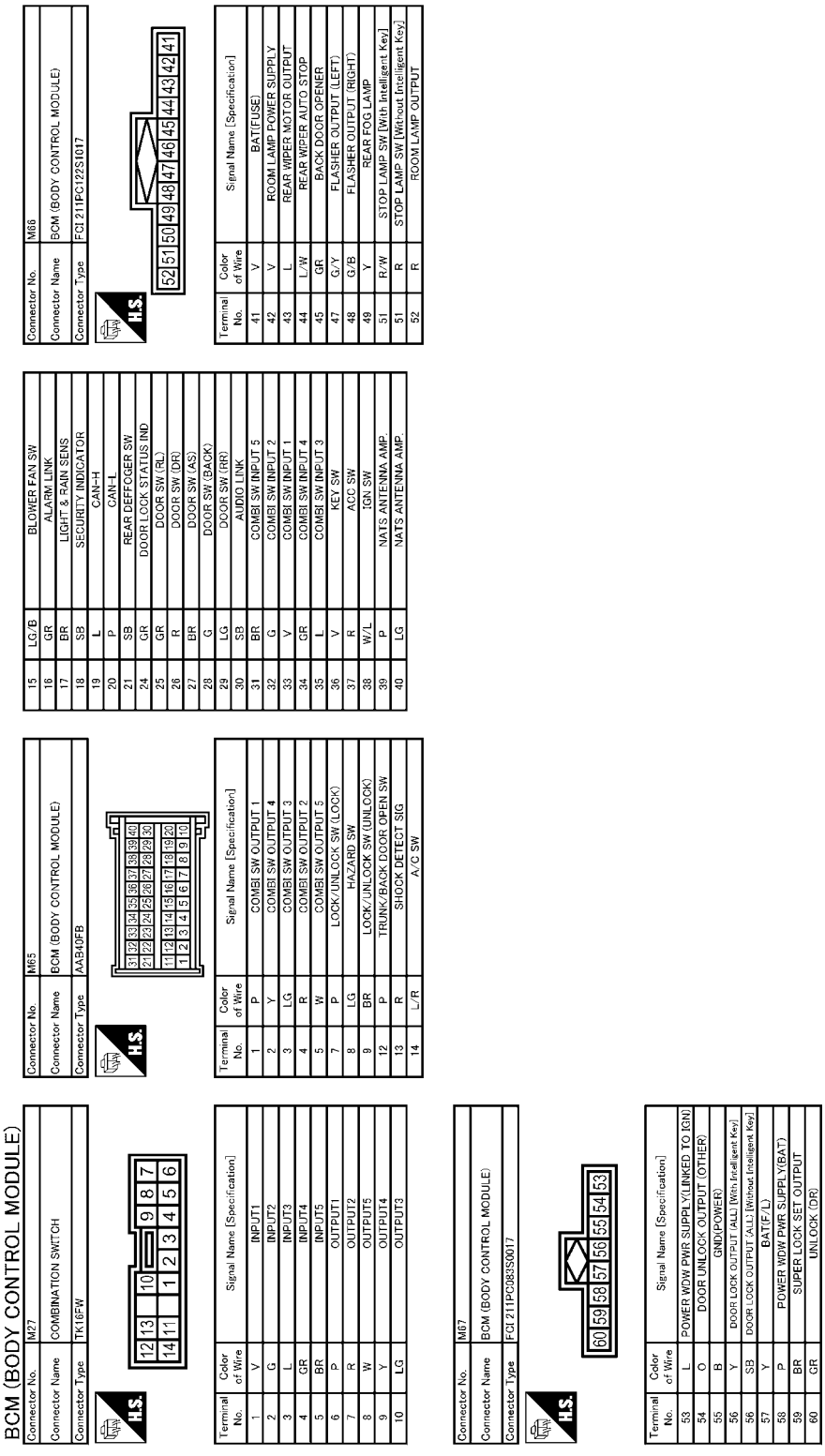
cardiagn.com



cardiagn.com



cardiagn.com



JCMWA0411GB

Fail Safe

INFOID:0000000001102070

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001102071

cardiagn.com

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001102072

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

SYMPTOM DIAGNOSIS

THE LIGHT REMINDER WARNING DOES NOT SOUND

Description

INFOID:0000000000892444

The light reminder warning does not sound under the following conditions.
- Lighting switch 1st or 2nd position
- Driver door open
- Ignition switch OFF or ACC

Diagnosis Procedure

INFOID:0000000000892445

1. CHECK COMBINATION SWITCH (LIGHTING SWITCH) OPERATION

Check that the headlamps operate normally by operating the combination switch (lighting switch).

Do they operate normally?

YES >> GO TO 2.
NO >> Refer to EXL-156, "Symptom Table".

2. CHECK FRONT DOOR SWITCH (DRIVER SIDE) SIGNAL CIRCUIT

Perform the inspection for the front door switch (driver side) signal circuit. Refer to DLK-83, "DRIVER SIDE : Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3. CHECK FRONT DOOR SWITCH (DRIVER SIDE) UNIT

Perform a unit inspection for the front door switch (driver side). Refer to DLK-84, "DRIVER SIDE : Component Inspection".

Is the inspection result normal?

YES >> Replace the BCM. Refer to BCS-64, "Exploded View".
NO >> Replace the front door switch (driver side). Refer to DLK-272, "Removal and Installation".

cardiagn.com

THE SEAT BELT REMINDER WARNING CONTINUES SOUNDING, OR DOES NOT SOUND

Description

INFOID:0000000000892446

- Seat belt reminder warning does not sound.
- Seat belt reminder warning sounds continuously.

Trouble diagnosis procedure

INFOID:0000000000892447

1.CHECK FRONT SEAT BELT BUCKLE SWITCH CIRCUIT

Perform the front seat belt buckle switch circuit inspection. Refer to WCS-21, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the harnesses or connectors.

2.CHECK FRONT SEAT BELT BUCKLE SWITCH UNIT

Perform the front seat belt buckle switch unit inspection. Refer to SBC-8, "Component Inspection" (driver side) or SBC-11, "Component Inspection (seat belt buckle switch passenger side)" (passenger side).

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the seat belt buckle. Refer to SB-8, "SEAT BELT BUCKLE : Removal and Installation".

3.CHECK OCCUPANT DETECTION UNIT

Perform a unit inspection for the occupant detection unit. Refer to SBC-11, "Component Inspection (occupant detection unit)".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the occupant detection unit. Refer to SE-25, "Disassembly and Assembly".

cardiagn.com

THE PARKING BRAKE RELEASE WARNING CONTINUES SOUNDING, OR DOES NOT SOUND

Description

INFOID:0000000000892442

- The parking brake warning buzzer sounds continuously during vehicle travel even though the parking brake is released.
- The parking brake warning buzzer does not sound at all even though driving the vehicle with the parking brake applied.

Diagnosis Procedure

INFOID:0000000000892443

1.CHECK PARKING BRAKE WARNING LAMP OPERATION

1. Start engine.
2. Check the operation of the parking brake warning lamp when operating the parking brake.

Condition	Warning lamp status
Parking brake ON	ON
Parking brake OFF	OFF

Is the inspection result normal?

YES >> Replace combination meter.
NO >> GO TO 2.

2.CHECK PARKING BRAKE SWITCH SIGNAL CIRCUIT

Perform an inspection for the parking brake switch signal circuit. Refer to WCS-23, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK PARKING BRAKE SWITCH UNIT

Perform a unit inspection for the parking brake switch. Refer to WCS-23, "Component Inspection".

Is the inspection result normal?

YES >> Replace combination meter. Refer to MWI-72, "Removal and Installation".
NO >> Replace parking brake switch.

cardiagn.com

THE KEY WARNING DOES NOT SOUND

Description

INFOID:0000000000911528

The key warning does not sound with the ignition switch OFF, the driver door open, and the mechanical key inserting conditions.

Diagnosis Procedure

INFOID:0000000000911529

1.CHECK BCM INPUT SIGNAL

Connect CONSULT-III and inspect the BCM input signal. Refer to DLK-597, "Component Function Check".

Is the inspection result normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> GO TO 2.

2.CHECK KEY SWITCH SIGNAL CIRCUIT

Perform an inspection for the key switch signal circuit. Refer to DLK-597, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> Check applicable parts, and repair or replace corresponding parts.

cardiagn.com

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001078352

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

cardiagn.com

SECTION WW
WIPER & WASHER

CONTENTS

BASIC INSPECTION 3

DIAGNOSIS AND REPAIR WORKFLOW 3
Work Flow 3

FUNCTION DIAGNOSIS 6

FRONT WIPER AND WASHER SYSTEM 6
System Diagram 6
System Description 6
Component Parts Location 9
Component Description 9

REAR WIPER AND WASHER SYSTEM 11
System Diagram 11
System Description 11
Component Parts Location 13
Component Description 13

HEADLAMP WASHER SYSTEM 15
System Diagram 15
System Description 15
Component Parts Location 16
Component Description 16

DIAGNOSIS SYSTEM (BCM) 17

COMMON ITEM 17
COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM) 17

WIPER 17
WIPER : CONSULT-III Function (BCM - WIPER) 17

DIAGNOSIS SYSTEM (IPDM E/R) 19
Diagnosis Description 19
CONSULT - III Function (IPDM E/R) 21

COMPONENT DIAGNOSIS 24

WIPER AND WASHER FUSE, FUSIBLE LINK 24
Description 24
Diagnosis Procedure 24

FRONT WIPER MOTOR LO CIRCUIT 25
Component Function Check 25
Diagnosis Procedure 25

FRONT WIPER MOTOR HI CIRCUIT 27
Component Function Check 27
Diagnosis Procedure 27

FRONT WIPER AUTO STOP SIGNAL CIRCUIT 29
Component Function Check 29
Diagnosis Procedure 29

FRONT WIPER MOTOR GROUND CIRCUIT 31
Diagnosis Procedure 31

WASHER SWITCH 32
Description 32
Component Inspection 32

RAIN SENSOR 33
Description 33
Diagnosis Procedure 33

REAR WIPER MOTOR CIRCUIT 34
Component Function Check 34
Diagnosis Procedure 34

REAR WIPER AUTO STOP SIGNAL CIRCUIT 36
Component Function Check 36
Diagnosis Procedure 36

HEADLAMP WASHER RELAY 38
Component Inspection 38

HEADLAMP WASHER CIRCUIT 39
Component Function Check 39
Diagnosis Procedure 39

FRONT WIPER AND WASHER SYSTEM 42

A B C D E F G H I J K WW M N O P

cardiagn.com

Wiring Diagram - FRONT WIPER AND WASHER SYSTEM - 42

REAR WIPER AND WASHER SYSTEM 46
Wiring Diagram - REAR WIPER AND WASHER SYSTEM - 46

HEADLAMP WASHER SYSTEM 51
Wiring Diagram - HEADLAMP WASHER SYSTEM - 51

ECU DIAGNOSIS 54

BCM (BODY CONTROL MODULE) 54
Reference Value 54
Wiring Diagram - BCM - 70
Fail Safe 74
DTC Inspection Priority Chart 75
DTC Index 76

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 77
Reference Value 77
Wiring Diagram - IPDM E/R - 83
Fail Safe 86
DTC Index 88

SYMPTOM DIAGNOSIS 89

WIPER AND WASHER SYSTEM SYMPTOMS ... 89
Symptom Table 89

NORMAL OPERATING CONDITION 92
Description 92

FRONT WIPER DOES NOT OPERATE 93
Description 93
Diagnosis Procedure 93

HEADLAMP WASHER DOES NOT OPERATE 95
Description 95
Diagnosis Procedure 95

PRECAUTION 96

PRECAUTIONS 96
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 96
Precaution for Procedure without Cowl Top Cover... 96

ON-VEHICLE REPAIR 97

HEADLAMP WASHER NOZZLE AND TUBE ... 97
Exploded View 97
Hydraulic Layout 97
Removal and Installation 97
Inspection 98

WASHER TANK 99
Exploded View 99
Removal and Installation 99

WASHER PUMP 100
Exploded View 100
Removal and Installation 100

HEADLAMP WASHER PUMP 101
Exploded View 101
Removal and Installation 101

FRONT WASHER NOZZLE AND TUBE 102
Hydraulic Layout 102
Removal and Installation 102
Inspection and Adjustment 102

FRONT WIPER ARM 104
Exploded View 104
Removal and Installation 104
Adjustment 105

FRONT WIPER DRIVE ASSEMBLY 106

LHD MODELS 106
LHD MODELS : Exploded View 106
LHD MODELS : Removal and Installation 106
LHD MODELS : Disassembly and Assembly 107

RHD MODELS 107
RHD MODELS : Exploded View 107
RHD MODELS : Removal and Installation 108
RHD MODELS : Disassembly and Assembly 108

RAIN SENSOR 110
Exploded View 110
Removal and Installation 110

WIPER AND WASHER SWITCH 111
Exploded View 111
Removal and Installation 111

REAR WIPER MOTOR 112
Exploded View 112
Removal and Installation 112
Adjustment 113

REAR WASHER NOZZLE AND TUBE 114
Hydraulic Layout 114
Removal and Installation 114
Inspection 115

cardiagn.com

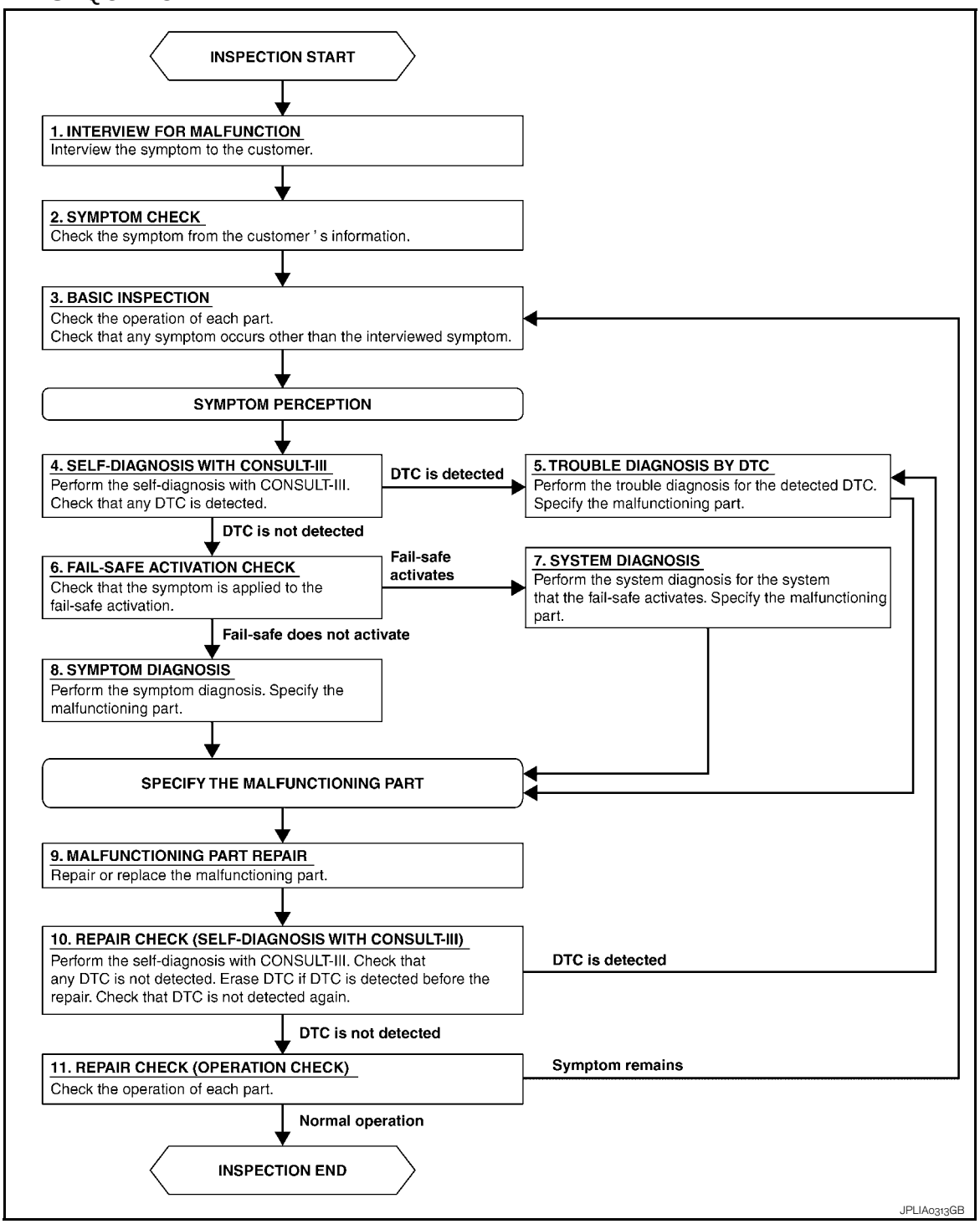
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001109306

OVERALL SEQUENCE



DETAILED FLOW

1. INTERVIEW FOR MALFUNCTION

Interview the symptom to the customer.

>> GO TO 2.

2.SYMPTOM CHECK

Check the symptom from the customer's information.

>> GO TO 3.

3.BASIC INSPECTION

Check the operation of each part. Check that any symptom occurs other than the interviewed symptom.

>> GO TO 4.

4.SELF-DIAGNOSIS WITH CONSULT-III

Perform the self-diagnosis with CONSULT-III. Check that any DTC is detected.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 6.

5.TROUBLE DIAGNOSIS BY DTC

Perform the trouble diagnosis for the detected DTC. Specify the malfunctioning part.

>> GO TO 9.

6.FAIL-SAFE ACTIVATION CHECK

Check that the symptom is applied to the fail-safe activation.

Does the fail-safe activate?

YES >> GO TO 7.
NO >> GO TO 8.

7.SYSTEM DIAGNOSIS

Perform the system diagnosis for the system that the fail-safe activates. Specify the malfunctioning part.

>> GO TO 9.

8.SYMPTOM DIAGNOSIS

Perform the symptom diagnosis. Specify the malfunctioning part.

>> GO TO 9.

9.MALFUNCTION PART REPAIR

Repair or replace the malfunctioning part.

>> GO TO 10.

10.REPAIR CHECK (SELF-DIAGNOSIS WITH CONSULT-III)

Perform the self-diagnosis with CONSULT-III. Check that any DTC is not detected. Erase DTC if DTC is detected before the repair. Check that DTC is not detected again.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 11.

11.REPAIR CHECK (OPERATION CHECK)

Check the operation of each part.

Does it operate normally?

YES >> INSPECTION END

cardiagn.com

NO >> GO TO 3.

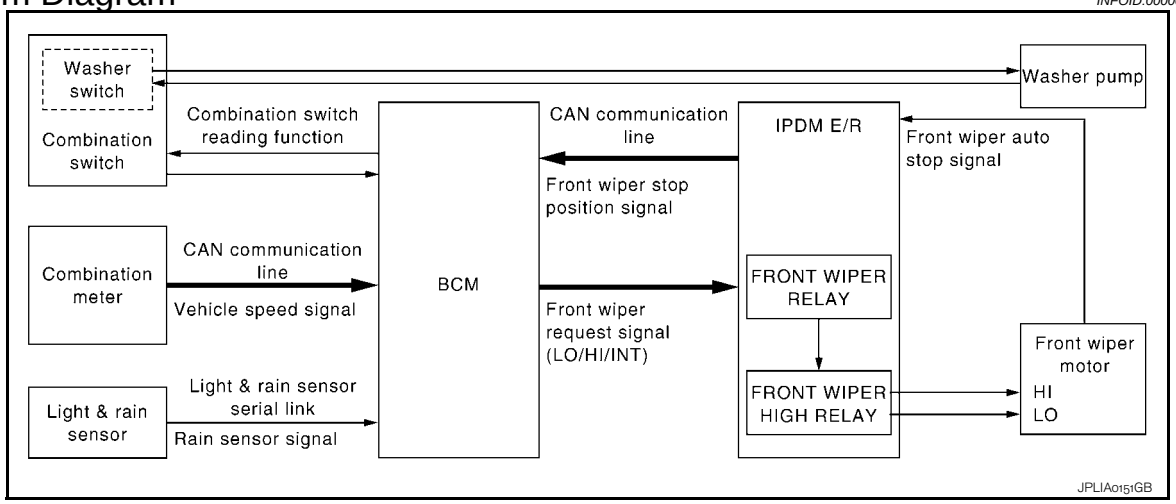
cardiagn.com

FUNCTION DIAGNOSIS

FRONT WIPER AND WASHER SYSTEM

System Diagram

INFOID:0000000000896754



System Description

INFOID:0000000000896755

OUTLINE

The front wiper is controlled by each function of BCM and IPDM E/R.

Control by BCM
- Combination switch reading function
- Front wiper control function

Control by IPDM E/R
- Front wiper control function
- Relay control function

FRONT WIPER BASIC OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM transmits the front wiper request signal to IPDM E/R with CAN communication depending on each operating condition of the front wiper.
- IPDM E/R turns ON/OFF the integrated front wiper relay and the front wiper high relay according to the front wiper request signal. IPDM E/R provides the power supply to operate the front wiper HI/LO operation.

FRONT WIPER LO OPERATION

- BCM transmits the front wiper request signal (LO) to IPDM E/R with CAN communication according to the front wiper LO operating condition.

Front wiper LO operating condition
- Ignition switch ON
- Front wiper switch LO or front wiper switch MIST (while pressing)
- IPDM E/R turns ON the integrated front wiper relay according to the front wiper request signal (LO).

FRONT WIPER HI OPERATION

- BCM transmits the front wiper request signal (HI) to IPDM E/R with CAN communication according to the front wiper HI operating condition.

Front wiper HI operating condition
- Ignition switch ON
- Front wiper switch HI
- IPDM E/R turns ON the integrated front wiper relay and the front wiper high relay according to the front wiper request signal (HI).

FRONT WIPER INT OPERATION (LINKED WITH VEHICLE SPEED)

cardiagn.com

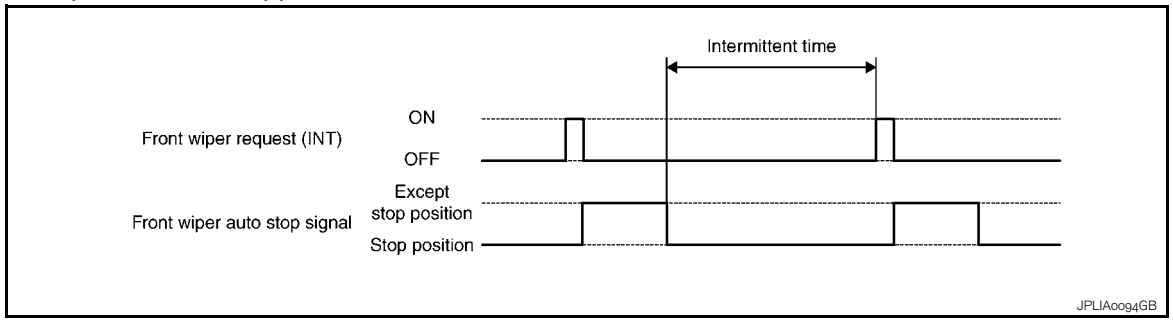
- BCM transmits the front wiper request signal (INT) to IPDM E/R with CAN communication according to the front wiper INT operation condition and the intermittent operation delay interval judged value.

Front wiper INT operating condition
- Ignition switch ON
- Front wiper switch INT

Intermittent operation delay interval judgment
- BCM calculates the intermittent operation delay interval from the vehicle speed signal received from the wiper dial position and the combination meter with CAN communication.

Wiper intermittent dial position	Intermittent operation interval	Intermittent operation delay Interval (s)			
		Vehicle speed			
		Vehicle stopped or less than 5 km/h (3.1 MPH)	5 km/h (3.1 MPH) or more or less than 35 km/h (21.7 MPH)	35 km/h (21.7 MPH) or more or less than 65 km/h (40.4 MPH)	65 km/h (40.4 MPH) or more
1	Short ↑	0.8	0.6	0.4	0.24
2		4	3	2	1.2
3		10	7.5	5	3
4		16	12	8	4.8
5		24	18	12	7.2
6		32	24	16	9.6
7	↓ Long	42	31.5	21	12.6

- IPDM E/R turns the integrated front wiper relay ON so that the front wiper is operated only once according to the front wiper request signal (INT).
- BCM detects stop position/except stop position of the front wiper motor according to the front wiper stop position signal received from IPDM E/R with CAN communication.
- BCM transmits the front wiper request signal (INT) again after the intermittent operation delay interval after the front wiper motor is stopped.



FRONT WIPER AUTO OPERATION

- BCM receives the wiping speed request signal from the rain sensor with the light and rain sensor serial link.
- BCM judges the auto wiping condition depending on the wiping speed request signal and the rain sensor sensitivity setting under front wiper AUTO operating condition.
- BCM transmits the front wiper request signals (LO or HI) to the IPDM E/R through CAN communication line according to the auto wiping condition.

  NOTE:

  When the wiper volume is turned down at 1 level with front wiper AUTO operating condition, BCM transmits front wiper request signal (LO) to IPDM E/R with CAN communication.

Front wiper AUTO operating condition
- Ignition switch ON
- Front wiper switch AUTO

Rain sensor sensitivity setting
- BCM determines rain sensor sensitivity according to a wiper volume.

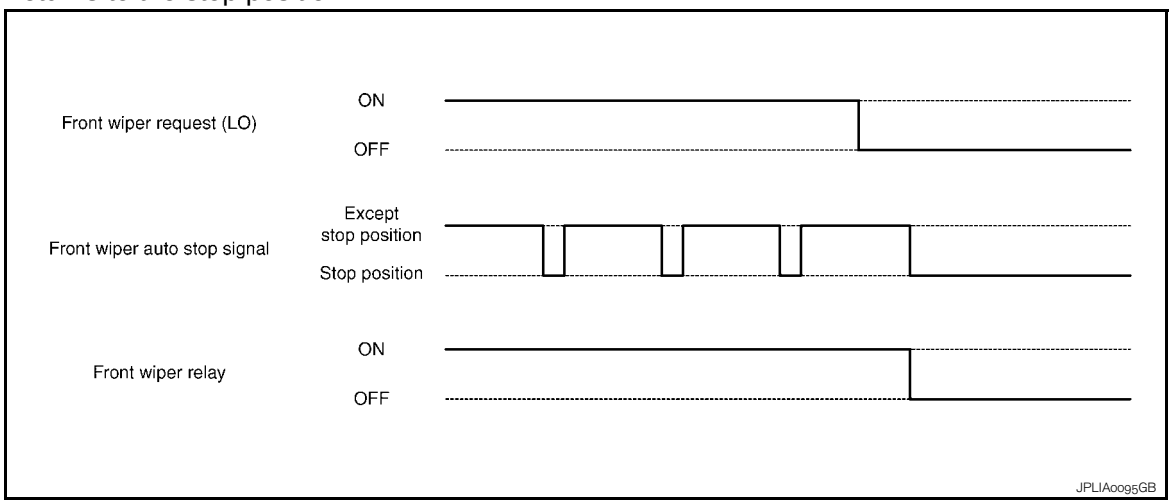
carDiagn.com

Wiper intermittent dial position	Sensitivity
1	High sensitivity
2	
3	Medium–high sensitivity
4	
5	Low–medium sensitivity
6	
7	Low sensitivity

- IPDM E/R turns ON the integrated front wiper relay and front wiper HI relay according to the front wiper request signal (LO or HI).
- Light and rain sensor transmits rain sensor signal to BCM for HI operation immediately after sensing the raindrops increase under the wiper motor LO operating with the front wiper switch AUTO.

FRONT WIPER AUTO STOP OPERATION

- BCM stops transmitting the front wiper request signal when the front wiper switch is turned OFF.
- IPDM E/R detects the front wiper auto stop signal from the front wiper motor and detects the front wiper motor position (stop position/except stop position).
- When the front wiper request signal is stopped, IPDM E/R turns ON the front wiper relay until the front wiper motor returns to the stop position.



NOTE:

- BCM stops the transmitting of the front wiper request signal when the ignition switch is OFF.
- IPDM E/R turns the front wiper relay OFF when the ignition switch is OFF.

FRONT WIPER OPERATION LINKED WITH WASHER

- BCM transmits the front wiper request signal (LO) to IPDM E/R with CAN communication according to the washer linked operating condition of the front wiper.
- BCM transmits the front wiper request signal (LO) so that the front wiper operates approximately 3 times when the front washer switch OFF is detected.

Washer linked operating condition of front wiper

- Ignition switch ON
- Front washer switch ON (0.4 second or more)

- IPDM E/R turns ON the integrated front wiper relay according to the front wiper request signal (LO).
- The washer pump is grounded through the combination switch with the front washer switch ON.

FRONT WIPER DROP WIPE OPERATION

- BCM controls the front wiper to operate once according to the conditions of front wiper drop wipe operation.

Front wiper drop wipe operating condition

- Ignition switch ON
- Front wiper switch OFF
- Front washer switch OFF

cardiagn.com

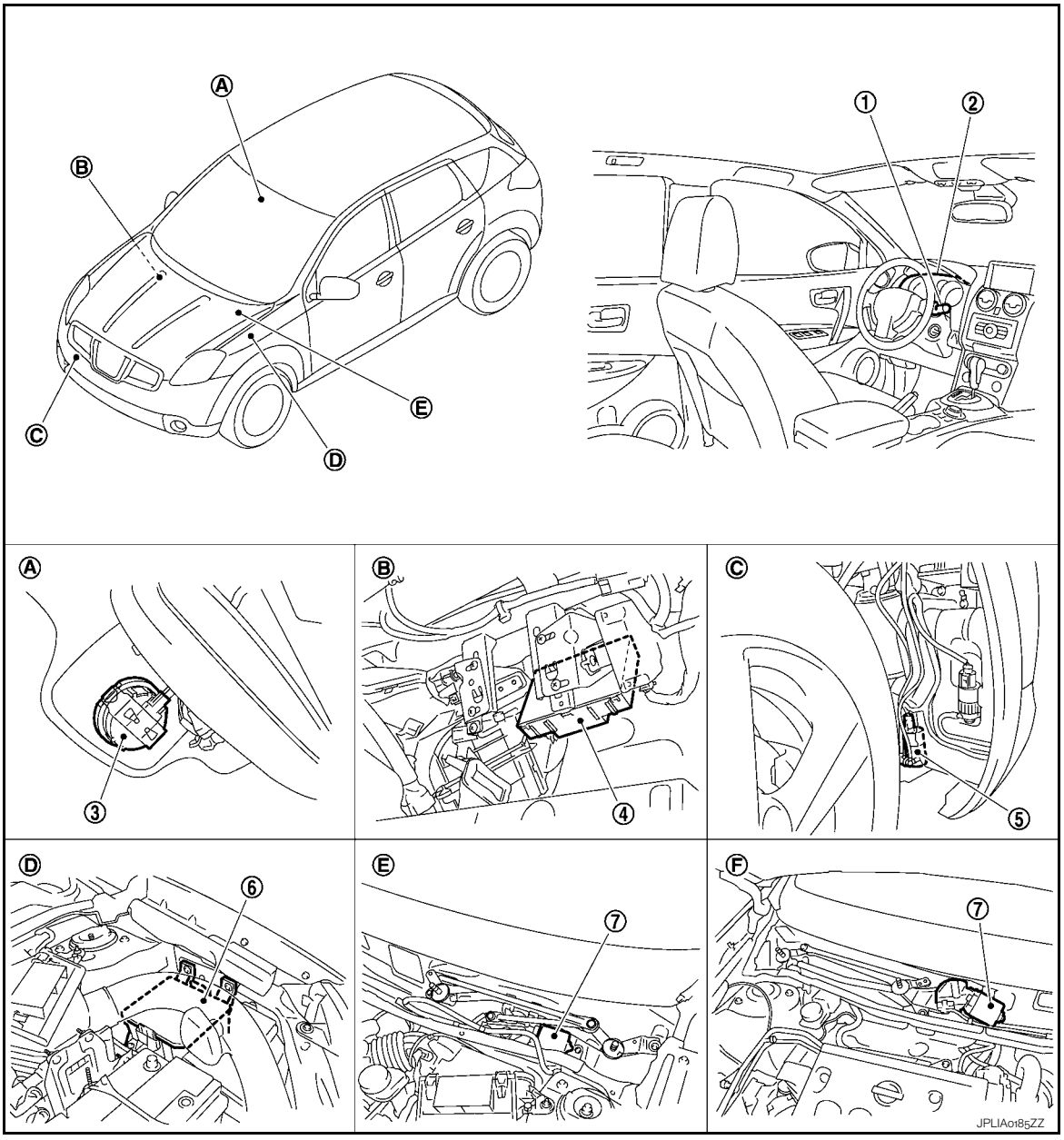
- BCM transmits the front wiper request signal (LO) to IPDM E/R with CAN communication so that the front wiper operate once three seconds after front wiper operation linked with washer.
- IPDM E/R turns ON the integrated front wiper relay according to the front wiper request signal (LO).

FRONT WIPER FAIL–SAFE OPERATION

- IPDM E/R performs the fail-safe function when the front wiper auto stop circuit is malfunctioning. Refer to PCS-28, "Fail Safe".
- BCM performs fail-safe operation when light and rain sensor or light and rain sensor-related systems are malfunctioning. Refer to BCS-59, "Fail Safe".

Component Parts Location

INFOID:0000000000896757



1. Combination switch
2. Combination meter
3. Light and rain sensor
4. BCM
5. Washer pump
6. IPDM E/R
7. Front wiper motor
- A. Inside mirror cover inside
- B. Over the glove box
- C. Radiator core support (RH)
- D. Engine room (left side)
- E. Cowl top, left side of engine room
- F. Cowl top, right side of engine room

Component Description

INFOID:0000000000896818

carDiagn.com

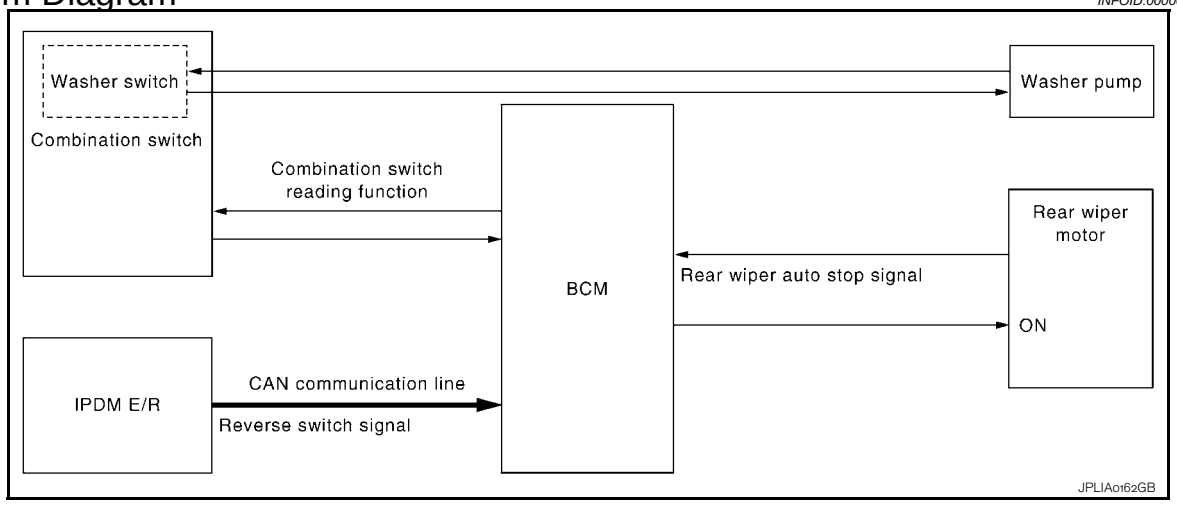
Part	Description
BCM	• Judges each switch status by the combination switch reading function. • Requests (with CAN communication) the front wiper relay and the front wiper high relay ON to IPDM E/R.
IPDM E/R	• Controls the integrated relay according to the request (with CAN communication) from BCM. • Performs the auto stop control of the front wiper.
Combination switch (Wiper & washer switch)	Refer to BCS-9, "System Diagram".
Combination meter	Transmits the vehicle speed signal to BCM with CAN communication.
Light and rain sensor	Detects water droplets on the windshield with infrared rays, and transmits the rain sensor signal to BCM through the light and rain sensor serial link.

cardiagn.com

REAR WIPER AND WASHER SYSTEM

System Diagram

INFOID:0000000000896810



System Description

INFOID:0000000000896811

OUTLINE

The rear wiper is controlled by each function of BCM and IPDM E/R.

Control by BCM
- Combination switch reading function
- Rear wiper control function

Control by IPDM E/R
- Reverse-linked rear wiper function

REAR WIPER BASIC OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM controls the rear wiper to start or stop.

REAR WIPER ON OPERATION

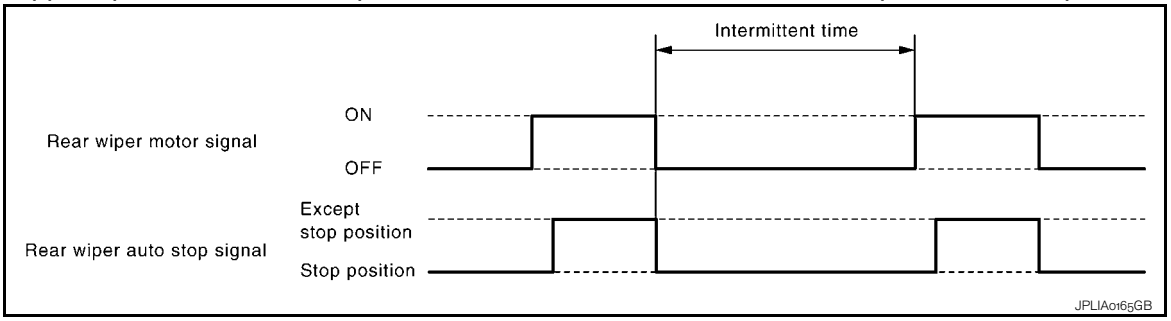
- BCM supplies power to the rear wiper motor according to the rear wiper ON operating condition.

Rear wiper ON operating condition
- Ignition switch ON
- Rear wiper switch ON

REAR WIPER INT OPERATION LINKED WITH VEHICLE SPEED

- BCM supplies power to the rear wiper motor according to the INT operating condition.

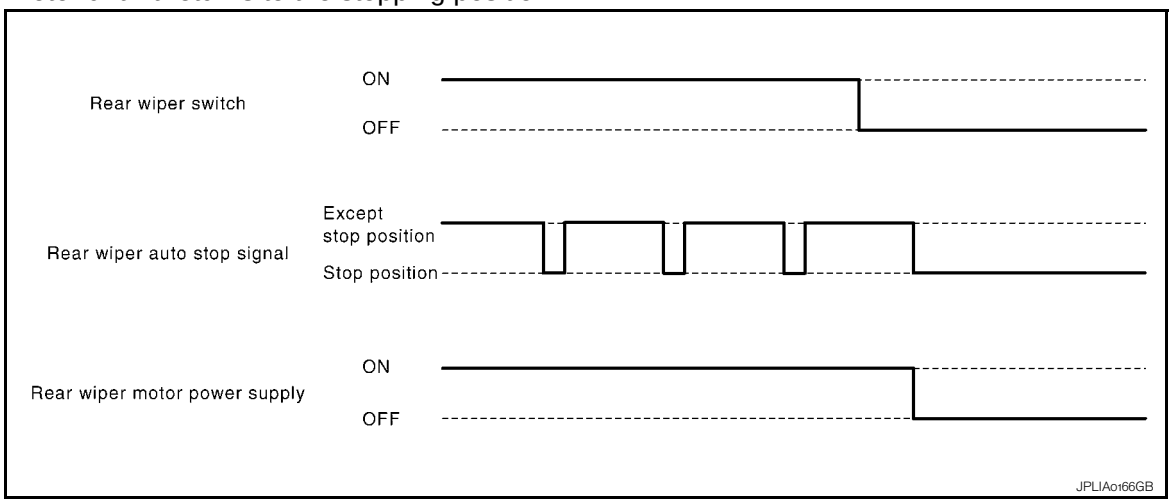
Rear wiper INT operating condition
- Ignition switch ON
- Rear wiper switch INT
- BCM controls the rear wiper to operate once.
- BCM detects the rear wiper motor stopping position.
- BCM supplies power to the rear wiper motor after an intermittent from the stop of the rear wiper motor.



carDiag.com

REAR WIPER AUTO STOP OPERATION

- BCM stops supplying power to the rear wiper motor when the rear wiper switch is turned OFF.
- BCM reads an auto stop signal from the rear wiper motor to detect a rear wiper motor position.
- When the rear wiper motor is at other than the stopping position, BCM continues to supply power to the rear wiper motor until it returns to the stopping position.



NOTE:
BCM stops supplying power to the rear wiper motor when the ignition switch is turned OFF.

REAR WIPER OPERATION LINKED WITH WASHER

- BCM supplies power to the rear wiper motor according to the washer linked operating condition of rear wiper. When the rear washer switch is turned OFF, BCM controls rear wiper to operate approximately three times.

Washer linked operating condition of rear wiper
- Ignition switch ON
- Rear washer switch ON (0.4 second or more)
- Washer pump becomes grounded through the combination switch when the rear washer switch is turned ON.

REAR WIPER OPERATION LINKED WITH REVERSE

- BCM controls rear wiper to operate once according to the conditions of rear wiper operation linked with reverse.

Condition of rear wiper operation linked with reverse
- Ignition switch ON
- Front wiper switch: LO, HI, AUTO*1, or INT*2
  NOTE:
  *1: With light and rain sensor
  *2: Without light and rain sensor
- Rear wiper switch OFF
- Selector lever “R”.
- IPDM E/R transmits a reverse switch signal to BCM through the CAN communication line when the selector lever is shifted to the “R”.
- BCM supplies power to the rear wiper motor when receiving the reverse switch signal.

REAR WIPER DROP WIPE OPERATION

- BCM controls the rear wiper to operate once according to the rear wiper drop wipe operating condition.

Rear wiper drop wipe operating condition
- Ignition switch ON
- Rear wiper switch OFF
- Rear washer switch OFF
- BCM controls the rear wiper so that it operates once time approximately three seconds later after the washer interlocking operation of the rear wiper.

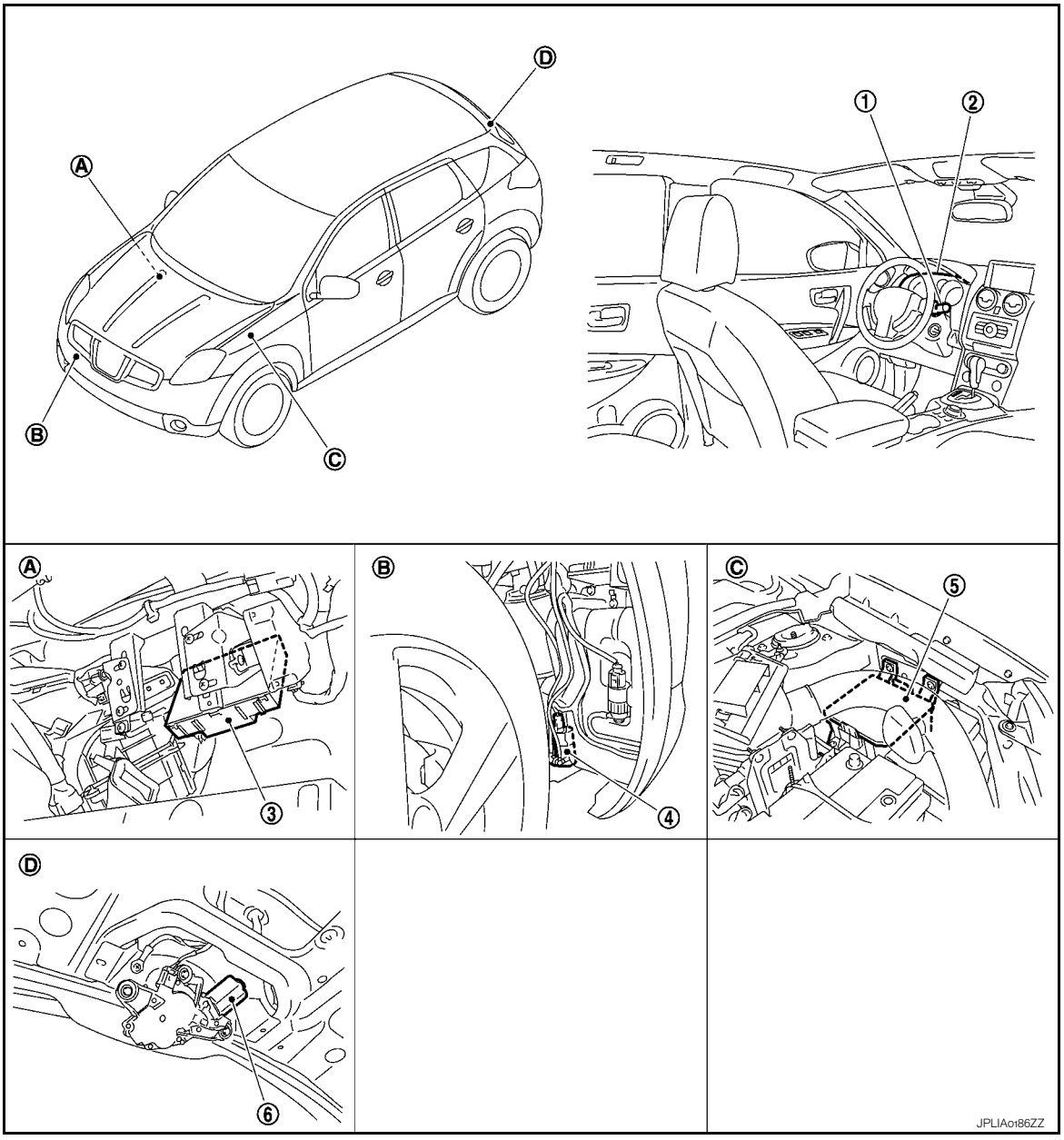
REAR WIPER FAIL–SAFE OPERATION

cardiagn.com

BCM performs the fail-safe function when the rear wiper auto stop circuit is malfunctioning. Refer to BCS-59, "Fail Safe".

Component Parts Location

INFOID:0000000000896812



1. Combination switch
2. Combination meter
3. BCM
4. Washer pump
5. IPDM E/R
6. Rear wiper motor
A. Over the glove box
B. Radiator core support (RH)
C. Engine room (left side)
D. Back door trim finisher lower inside

Component Description

INFOID:0000000000896819

Part	Description
BCM	• Judges each switch status by the combination switch reading function. • Supplies power to the rear wiper motor. • Performs the auto stop control of the rear wiper.

carDiagn.com

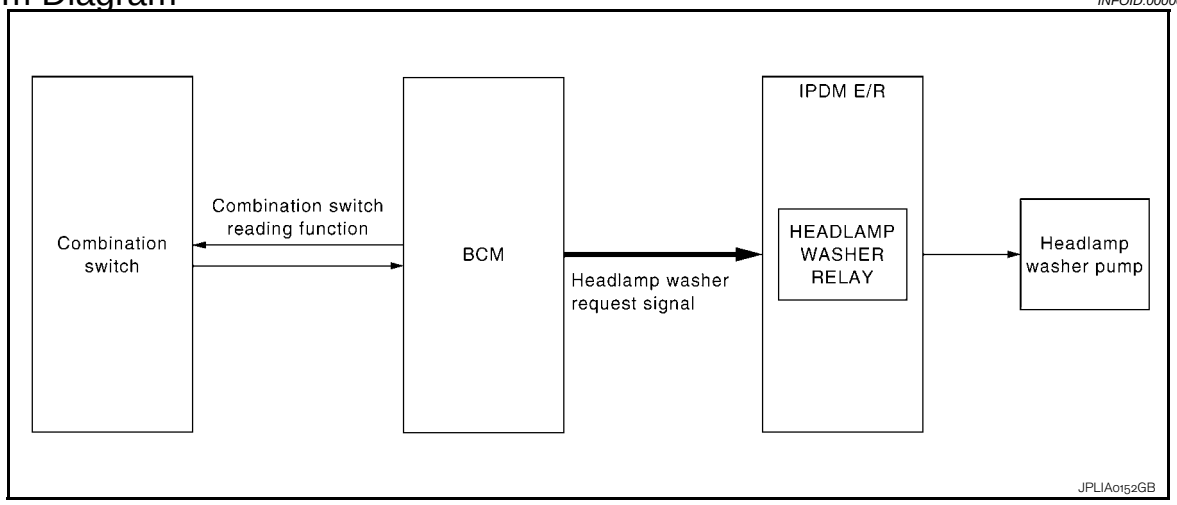
Part	Description
IPDM E/R	Transmits the reverse switch signal to BCM with CAN communication.
Combination switch (Wiper & washer switch)	Refer to BCS-9, "System Diagram".

cardiagn.com

HEADLAMP WASHER SYSTEM

System Diagram

INFOID:0000000000896814



System Description

INFOID:0000000000896815

OUTLINE

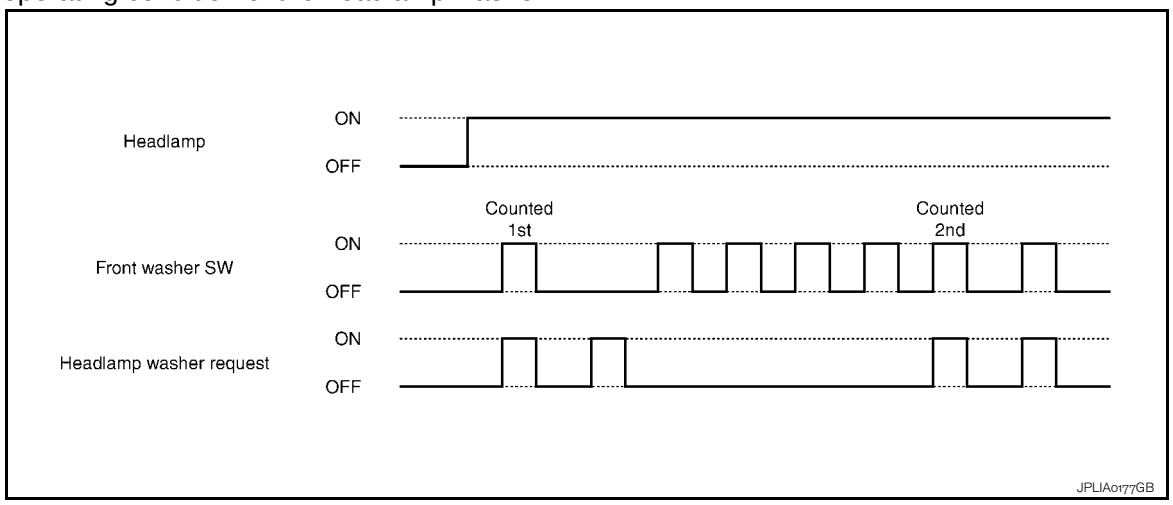
The headlamp washer is controlled by each function of BCM and IPDM E/R.

Control by BCM
- Combination switch reading function
- Headlamp washer control function

Control by IPDM E/R
- Relay control function

HEADLAMP WASHER BASIC OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM transmits the headlamp washer request signal to IPDM E/R with CAN communication depending on each operating condition of the headlamp washer.



Operating conditions (The first time)
- Ignition switch ON
- Headlamps ON (PASS excluded)
- Front washer switch ON at first time.

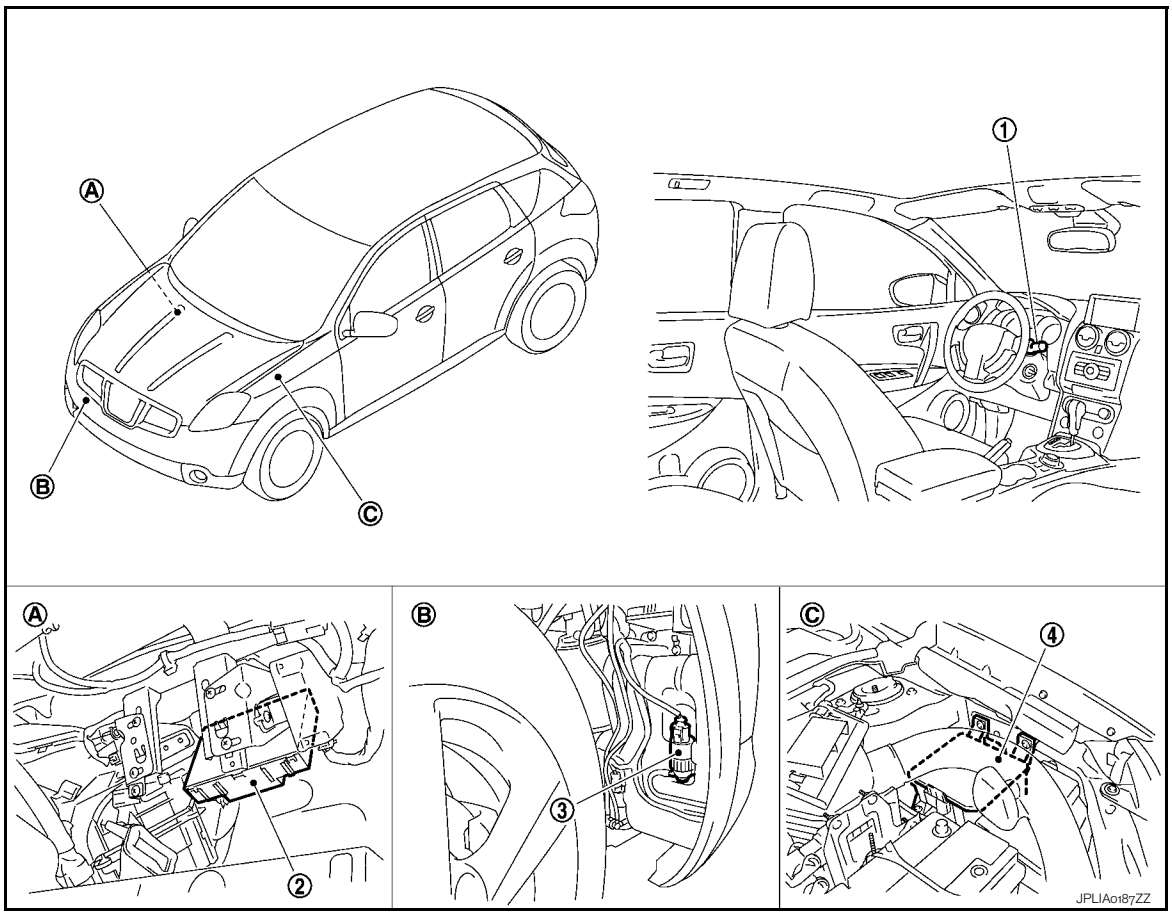
Operating conditions (From the second time)
- Ignition switch ON
- Headlamps ON (PASS excluded)
- Front washer switch ON at fifth time after the first time.

carDiagn.com

- IPDM E/R turns ON/OFF the headlamp washer relay by receiving the headlamp washer request signal, and controls the headlamp washer twice.

Component Parts Location

INFOID:0000000000896816



1. Combination switch
2. BCM
3. Headlamp washer pump
4. IPDM E/R
A. Over the glove box
B. Radiator core support (RH)
C. Engine room (left side)

Component Description

INFOID:0000000000896820

Part	Description
BCM	• Judges each switch status by the combination switch reading function. • Requests (with CAN communication) the headlamp washer relay ON to IPDM E/R.
IPDM E/R	Controls the integrated relay according to the request (with CAN communication) from BCM.
Combination switch (Wiper & washer switch)	Refer to BCS-9, "System Diagram".

cardiagn.com

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000001054857

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-61, "DTC Index".
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	• Enables to read and save the vehicle specification. • Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

WIPER

WIPER : CONSULT-III Function (BCM - WIPER)

INFOID:0000000000896761

WORK SUPPORT

carDiag.com

Service item	Setting item	Description
WIPER SPEED SETTING	ON*	With vehicle speed (Front wiper intermittent time linked with the vehicle speed and wiper intermittent dial position)
	OFF	Without vehicle speed (Front wiper intermittent time linked with the wiper intermittent dial position)

*:Factory setting

DATA MONITOR

Monitor Item [Unit]	Description
IGN ON SW	Ignition switch ON status judged from ignition power supply.
IGN SW CAN	Ignition switch ON status received from IPDM E/R with CAN communication.
FR WIPER HI [OFF/ON]	Each switch status that BCM judges from the combination switch reading function.
FR WIPER LOW [OFF/ON]	
FR WIPER INT [OFF/ON]	
FR WASHER SW [OFF/ON]	
H/L WASH SW [OFF/ON]	**NOTE:** The item is indicated, but not monitored.
INT VOLUME [1 – 7]	Each switch status that BCM judges from the combination switch reading function.
FR WIPER STOP [OFF/ON]	Front wiper motor (stop position) status received from IPDM E/R with CAN communication.
VEHICLE SPEED [km/h]	The value of the vehicle speed signal received from combination meter with CAN communication.
RR WIPER ON [OFF/ON]	Each switch status that BCM judges from the combination switch reading function.
RR WIPER INT [OFF/ON]	
RR WASHER SW [OFF/ON]	
RR WIPER STOP [OFF/ON]	Rear wiper motor (stop position) status input from the rear wiper motor.

ACTIVE TEST

Test item	Operation	Description
FR WIPER	HI	Transmits the front wiper request signal (HI) to IPDM E/R with CAN communication to operate the front wiper HI operation.
	LO	Transmits the front wiper request signal (LO) to IPDM E/R with CAN communication to operate the front wiper LO operation.
	INT	Transmits the front wiper request signal (INT) to IPDM E/R with CAN communication to operate the front wiper INT operation.
	OFF	Stops transmitting the front wiper request signal to stop the front wiper operation.
RR WIPER	ON	Outputs the voltage to operate the rear wiper motor.
	OFF	Stops the voltage to stop.
HEADLAMP WASHER	ON	Transmits the headlamp washer request signal to IPDM E/R with CAN communication to operate the headlamp washer operation.

cardiagn.com

DIAGNOSIS SYSTEM (IPDM E/R)

Diagnosis Description

INFOID:0000000001054858

Auto active test

Description

In auto active test mode, the IPDM E/R sends a drive signal to the following systems to check their operation.

- Oil pressure warning lamp
- Rear window defogger
- Front wiper (LO, HI)
- Parking lamps
- License plate lamps
- Tail lamps
- Front fog lamps
- Headlamps (LO, HI)
- A/C compressor (magnet clutch)
- Cooling fan (LO, HI)

Operation procedure

1. Close the hood and lift the wiper arms from the windshield. (Prevent windshield damage due to wiper operation)
   NOTE:
   When auto active test is performed with hood opened, sprinkle water on windshield beforehand.
2. Turn ignition switch OFF.
3. Turn the ignition switch ON, and within 20 seconds, press the driver door switch 10 times. Then turn the ignition switch OFF.
   CAUTION:
   Close passenger door.
4. Turn the ignition switch ON within 10 seconds. Then the horn sounds once and the auto active test starts.
5. The oil pressure warning lamp starts blinking when the auto active test starts.
6. After a series of the following operations is repeated 3 times, auto active test is completed.

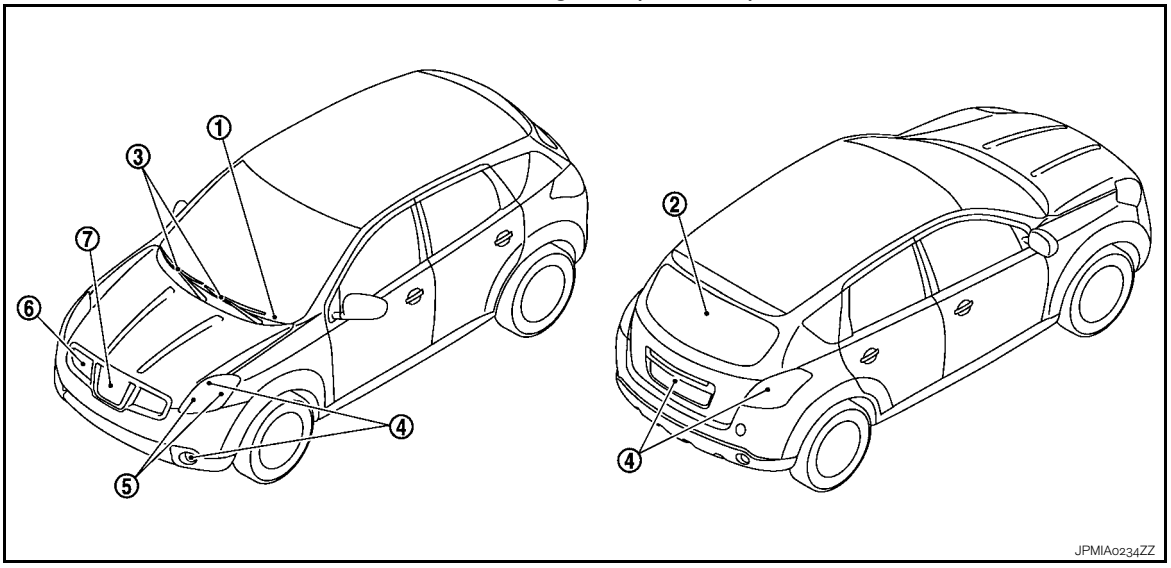
NOTE:
When auto active test mode has to be cancelled halfway through test, turn ignition switch OFF.

CAUTION:

- **If auto active test mode cannot be actuated, check door switch system.**
- **Never start the engine.**

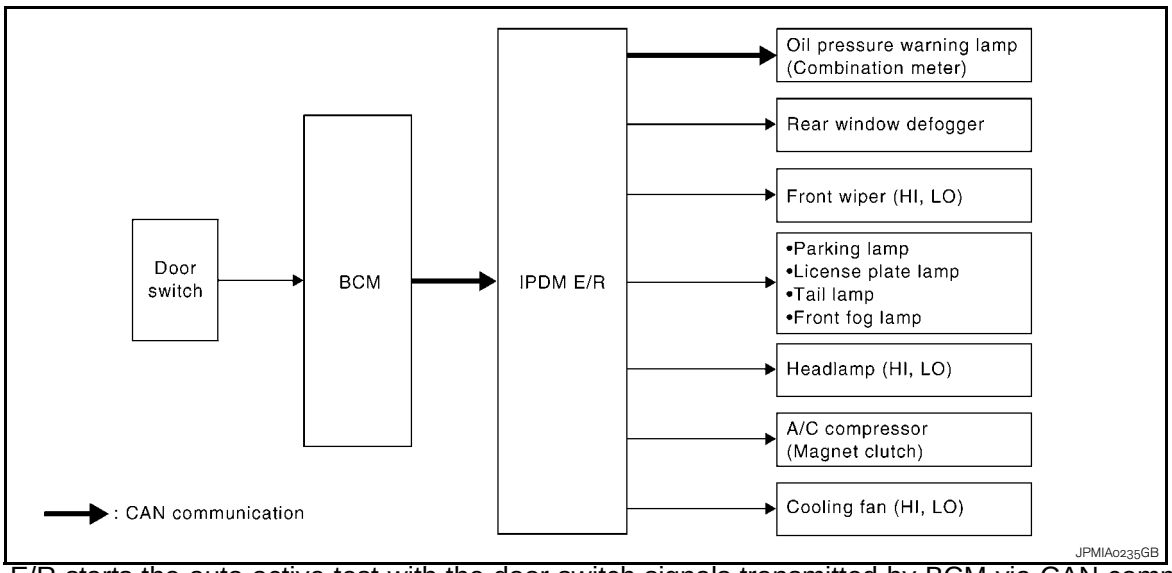
Inspection in auto active test mode

When auto active test mode is actuated, the following 6 steps are repeated 3 times.



Operation sequence	Inspection location	Operation
1	Oil pressure warning lamp	Blinks continuously during operation of auto active test.
2	Rear window defogger	10 seconds
3	Front wiper	LO for 5 seconds → HI for 5 seconds
4	• Parking lamps • License plate lamps • Tail lamps • Front fog lamps	10 seconds
5	Headlamps	LO ⇔ HI 5 times
6	A/C compressor (magnet clutch)	ON ⇔ OFF 5 times
7	Cooling fan	LO for 5 seconds → HI for 5 seconds

Concept of auto active test



- IPDM E/R starts the auto active test with the door switch signals transmitted by BCM via CAN communication. Therefore, the CAN communication line between IPDM E/R and BCM is considered normal if the auto active test starts successfully.
- The auto active test facilitates troubleshooting if any systems controlled by IPDM E/R cannot be operated.

Diagnosis chart in auto active test mode

Symptom	Inspection contents		Possible cause
Rear window defogger does not operate	Perform auto active test. Does the rear window defogger operate?	YES	BCM signal input circuit
		NO	• Rear window defogger • Rear window defogger ground circuit • Harness or connector between IPDM E/R and rear window defogger • IPDM E/R
Any of the following components do not operate • Parking lamps • License plate lamps • Tail lamps • Front fog lamps • Headlamp (HI, LO) • Front wiper (HI, LO)	Perform auto active test. Does the applicable system operate?	YES	BCM signal input circuit
		NO	• Lamp or motor • Lamp or motor ground circuit • Harness or connector between IPDM E/R and applicable system • IPDM E/R

cardiagn.com

Symptom	Inspection contents		Possible cause
A/C compressor does not operate	Perform auto active test. Does the magnet clutch operate?	YES	• Communication signal between BCM and auto amp. (with auto A/C) • Communication signal between BCM and heater control panel (without auto A/C, with manual A/C) • BCM • CAN communication signal between BCM and ECM • CAN communication signal between ECM and IPDM E/R
		NO	• Magnet clutch • Harness or connector between IPDM E/R and magnet clutch • IPDM E/R
Oil pressure warning lamp does not operate	Perform auto active test. Does the oil pressure warning lamp blink?	YES	• Harness or connector between IPDM E/R and oil pressure switch • Oil pressure switch • IPDM E/R
		NO	• CAN communication signal between IPDM E/R and BCM • CAN communication signal between BCM and combination meter • Combination meter
Cooling fan does not operate	Perform auto active test. Does the cooling fan operate?	YES	• ECM signal input circuit • CAN communication signal between ECM and IPDM E/R
		NO	• Cooling fan • Cooling fan ground circuit • Harness or connector between IPDM E/R and cooling fan • IPDM E/R • Cooling fan relay-3* • Harness or connector between IPDM E/R and cooling fan relay-3* • Harness or connector between cooling fan and cooling fan relay-3*

NOTE:

*: MR engine and K9K engine models

CONSULT - III Function (IPDM E/R)

INFOID:0000000001054859

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with IPDM E/R.

Diagnosis mode	Description
Ecu Identification	Allows confirmation of IPDM E/R part number.
Self Diagnostic Result	Displays the diagnosis results judged by IPDM E/R.
Data Monitor	Displays the real-time input/output data from IPDM E/R input/output data.
Active Test	IPDM E/R can provide a drive signal to electronic components to check their operations.
CAN Diag Support Monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF DIAGNOSTIC

Refer to PCS-30, "DTC Index".

DATA MONITOR

Monitor item

carDiagn.com

Monitor Item [Unit]	MAIN SIGNALS	Description
MOTOR FAN REQ [1 - 4]	×	Displays the value of the cooling fan speed signal received from ECM via CAN communication.
AC COMP REQ [Off/On]	×	Displays the status of the A/C compressor request signal received from ECM via CAN communication.
TAIL&CLR REQ [Off/On]	×	Displays the status of the position light request signal received from BCM via CAN communication.
HL LO REQ [Off/On]	×	Displays the status of the low beam request signal received from BCM via CAN communication.
HL HI REQ [Off/On]	×	Displays the status of the high beam request signal received from BCM via CAN communication.
FR FOG REQ [Off/On]	×	Displays the status of the front fog light request signal received from BCM via CAN communication.
HL WASHER REQ [Off/On]		Displays the status of the headlamp washer request signal received from BCM via CAN communication.
FR WIP REQ [Stop/1LOW/Low/Hi]	×	Displays the status of the front wiper request signal received from BCM via CAN communication.
WIP AUTO STOP [STOP P/ACT P]	×	Displays the status of the front wiper auto stop signal judged by IPDM E/R.
WIP PROT [Off/BLOCK]	×	Displays the status of the front wiper fail-safe operation judged by IPDM E/R.
ST RLY REQ [Off/On]		Displays the status of the ignition and starter request signal received from BCM via CAN communication.
IGN RLY [Off/On]	×	Displays the status of the ignition relay judged by IPDM E/R.
RR DEF REQ [Off/On]	×	Displays the status of the rear defogger request signal received from BCM via CAN communication.
OIL P SW [Open/Close]		Displays the status of the oil pressure switch judged by IPDM E/R.
REV SW [Off/On]		Displays the status of the reverse switch judged by IPDM E/R.
HOOD SW [Off/On]		Displays the status of the hood switch judged by IPDM E/R. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
THFT HRN REQ [Off/On]		Displays the status of the theft warning horn request signal received from BCM via CAN communication. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
HORN CHIRP [Off/On]		**NOTE:** This item is indicated, but not monitored.
IGN ON SW [Off/On]		Displays the status of the ignition switch judged by IPDM E/R.

ACTIVE TEST

Test item

Test item	Operation	Description
REAR DEFOGGER	Off	OFF
	On	Operates the rear window defogger relay.
FRONT WIPER	Off	OFF
	Lo	Operates the front wiper relay.
	Hi	Operates the front wiper relay and front wiper high relay.

cardiagn.com

Test item	Operation	Description
MOTOR FAN	1	OFF
	2	Operates the cooling fan relay (low operation).
	3	Operates the cooling fan relay (high operation).
	4	
HEAD LAMP WASHER	On	Operates the headlamp washer relay for 1 second.
EXTERNAL LAMPS	Off	OFF
	TAIL	Operates the tail lamp relay.
	Lo	Operates the headlamp low relay.
	Hi	Operates the headlamp low relay and ON/OFF the headlamp high relay at 1 second intervals.
	Fog	Operates the front fog lamp relay.
HORN	On	Operates horn relay for 20 ms.

carDiagn.com

COMPONENT DIAGNOSIS

WIPER AND WASHER FUSE, FUSIBLE LINK

Description

INFOID:0000000000896764

Fuse, fusible link list

Unit	Location	No.	Capacity
Front wiper motor	IPDM E/R	#44	30 A
Washer pump	Fuse block	#3	20 A
Headlamp washer pump	Fuse and fusible link block	#G	30 A

Diagnosis Procedure

INFOID:0000000000896765

1.CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not fusing.

Unit	Location	No.	Capacity
Front wiper motor	IPDM E/R	#44	30 A
Washer pump	Fuse block	#3	20 A
Headlamp washer pump	Fuse and fusible link block	#G	30 A

Is the fuse or fusible link fusing?

YES >> Replace the fuse block or fusible link with a new one after repairing the applicable circuit.
NO >> The fuse or fusible link is normal.

cardiagn.com

FRONT WIPER MOTOR LO CIRCUIT

Component Function Check

INFOID:0000000000924447

1.CHECK FRONT WIPER LO OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Start IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the front wiper operates at the LO operation.

CONSULT-III ACTIVE TEST
1. Select "FRONT WIPER" of IPDM E/R active test item.
2. With operating the test item, check front wiper operation.

LO : Front wiper (LO) operation
OFF : Stop the front wiper.

Is front wiper (LO) operation normally?

YES >> Front wiper motor LO circuit is normal.
NO >> Refer to WW-25, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000924448

1.CHECK FRONT WIPER MOTOR FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
Front wiper motor	IPDM E/R	#44	30 A

Is the fuse fusing?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK FRONT WIPER MOTOR (LO) SHORT CIRCUIT

1. Disconnect front wiper motor connector.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E10	7		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if the fuse is fusing again.)

3.CHECK FRONT WIPER MOTOR (LO) OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Connect IPDM E/R connector.
2. Turn the ignition switch ON.
3. Select "FRONT WIPER" of IPDM E/R active test item.
4. With operating the test item, check voltage between IPDM E/R harness connector and ground.

cardiagn.com

Terminals			Test item	Voltage (Approx.)
(+)		(-)		
IPDM E/R		Ground	FRONT WIPER	
Connector	Terminal			
E10	7		LO	Battery voltage
			OFF	0 V

Is the measurement value normal?

YES >> GO TO 4.
NO >> Replace IPDM E/R.

4. CHECK FRONT WIPER MOTOR (LO) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector and front wiper motor harness connector.

IPDM E/R		Front wiper motor		Continuity
Connector	Terminal	Connector	Terminal	
E10	7	E20	2	Existed

Does continuity exist?

YES >> Replace front wiper motor.
NO >> Repair the harnesses or connectors.

cardiagn.com

FRONT WIPER MOTOR HI CIRCUIT

Component Function Check

INFOID:0000000000924449

1.CHECK FRONT WIPER HI OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Start IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the front wiper operates at the HI operation.

CONSULT-III ACTIVE TEST
1. Select "FRONT WIPER" of IPDM E/R active test item.
2. With operating the test item, check front wiper operation.

HI : Front wiper (HI) operation
OFF : Stop the front wiper.

Is front wiper (HI) operation normally?

YES >> Front wiper motor HI circuit is normal.
NO >> Refer to WW-27, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000924450

1.CHECK FRONT WIPER MOTOR FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuses are not fusing.

Unit	Location	Fuse No.	Capacity
Front wiper motor	IPDM E/R	#44	30 A

Is the fuse fusing?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK FRONT WIPER MOTOR (HI) SHORT CIRCUIT

1. Disconnect front wiper motor connector.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E10	8		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors. And then replace the fuse.
NO >> Replace the fuse. (Replace IPDM E/R if the fuse is fusing again.)

3.CHECK FRONT WIPER MOTOR (HI) OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Connect IPDM E/R connector.
2. Turn the ignition switch ON.
3. Select "FRONT WIPER" of IPDM E/R active test item.
4. With operating the test item, check voltage between IPDM E/R harness connector and ground.

carDiagn.com

Terminals			Test item	Voltage (Approx.)
(+)		(-)		
IPDM E/R		Ground	FRONT WIPER	
Connector	Terminal			
E10	8		HI	Battery voltage
			OFF	0 V

Is the measurement value normal?

YES >> GO TO 4.
NO >> Replace IPDM E/R.

4. CHECK FRONT WIPER MOTOR (HI) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector and front wiper motor harness connector.

IPDM E/R		Front wiper motor		Continuity
Connector	Terminal	Connector	Terminal	
E10	8	E20	1	Existed

Does continuity exist?

YES >> Replace front wiper motor.
NO >> Repair the harnesses or connectors.

cardiagn.com

FRONT WIPER AUTO STOP SIGNAL CIRCUIT

Component Function Check

INFOID:0000000000924451

1.CHECK FRONT WIPER (AUTO STOP) SIGNAL CHECK

CONSULT-III DATA MONITOR
1. Select "FRONT WIPER STOP" of IPDM E/R data monitor item.
2. Operate the front wiper.
3. Check that "FR WIPER STOP" changes to "STOP P" and "ACT P" linked with the wiper operation.

Monitor item	Condition		Monitor status
FR WIPER STOP	Front wiper motor	Stop position	STOP P
		Except stop position	ACT P

Is the status of item normal?

YES >> Front wiper auto stop signal circuit is normal.
NO >> Refer to WW-29, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000924452

1.CHECK FRONT WIPER MOTOR (AUTO STOP) OUTPUT VOLTAGE

1. Turn the ignition switch OFF.
2. Disconnect front wiper motor connector.
3. Turn the ignition switch ON.
4. Check voltage between IPDM E/R harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(-)	
IPDM E/R		Ground	
Connector	Terminal		
E12	26		Battery voltage

Is the measurement value normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FRONT WIPER MOTOR (AUTO STOP) SHORT CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E12	26		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Replace IPDM E/R.

3.CHECK FRONT WIPER MOTOR (AUTO STOP) CIRCUIT CONTINUITY

1. Check continuity between IPDM E/R harness connector and front wiper motor harness connector.

carDiagn.com

IPDM E/R		Front wiper motor		Continuity
Connector	Terminal	Connector	Terminal	
E12	26	E20	4	Existed

Does continuity exist?

YES >> Replace front wiper motor.
NO >> Repair the harnesses or connectors.

cardiagn.com

FRONT WIPER MOTOR GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000000924453

1.CHECK FRONT WIPER MOTOR (GROUND) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect front wiper motor connector.
3. Check continuity between front wiper motor harness connector and ground.

Front wiper motor		Ground	Continuity
Connector	Terminal		
E20	5		Existed

Does continuity exist?

YES >> Front wiper motor ground circuit is normal.
NO >> Repair the harnesses or connectors.

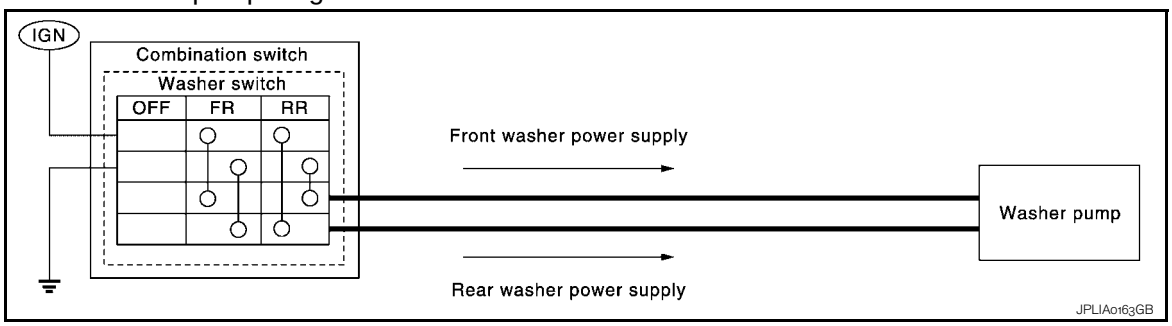
carDiagn.com

WASHER SWITCH

Description

INFOID:0000000000896851

- Washer switch is integrated with combination switch.
- Combination switch switches polarity between front washer operating and rear washer operating to supply power to the washer pump on ground.



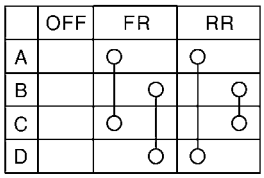
Component Inspection

INFOID:0000000000896852

1.CHECK WIPER SWITCH

1. Turn the ignition switch OFF.
2. Disconnect combination switch connector.
3. Check continuity between the combination switch terminals.

A : Terminal 14
B : Terminal 12
C : Terminal 13
D : Terminal 11



Combination switch		Condition	Continuity
Terminal			
11	12	Front washer switch ON	Existed
13	14		
11	14	Rear washer switch ON	
12	13		

Does continuity exist?

YES >> Wiper and washer switch is normal.
NO >> Replace wiper and washer switch.

cardiagn.com

RAIN SENSOR

Description

INFOID:0000000000984465

Detects water droplets on the windshield with infrared rays, and transmits the rain sensor signal to BCM through the light and rain sensor serial link.

Diagnosis Procedure

INFOID:0000000000907640

Refer to EXL-69, "Component Function Check".

carDiag.com

REAR WIPER MOTOR CIRCUIT

Component Function Check

INFOID:0000000000903198

1.CHECK REAR WIPER ON OPERATION

CONSULT-III ACTIVE TEST
1. Select "RR WIPER" of BCM active test item.
2. With operating the test item, check rear wiper operation.

ON : Rear wiper ON operation
OFF : Stop the rear wiper.

Is rear wiper operation normally?

YES >> Rear wiper motor circuit is normal.
NO >> Refer to WW-34, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000903199

1.CHECK REAR WIPER MOTOR OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Turn the ignition switch OFF.
2. Disconnect rear wiper motor connector.
3. Turn the ignition switch ON.
4. Select "RR WIPER" of BCM active test item.
5. With operating the test item, check voltage between BCM harness connector and ground.

Terminals			Test item	Voltage (Approx.)
(+)		(–)		
BCM		Ground	REAR WIPER	
Connector	Terminal			
M66	43		ON	Battery voltage
			OFF	0 V

Is the measurement value normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK REAR WIPER MOTOR GROUND OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Check continuity between rear wiper motor harness connector and ground.

Rear wiper motor		Ground	Continuity
Connector	Terminal		
D156	1		Existed

Does continuity exist?

YES >> Replace rear wiper motor.
NO >> Repair the harnesses or connectors.

3.CHECK REAR WIPER MOTOR OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector and rear wiper motor harness connector.

cardiagn.com

BCM		Rear wiper motor		Continuity
Connector	Terminal	Connector	Terminal	
M66	43	D156	3	Existed

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

4. CHECK REAR WIPER MOTOR SHORT CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M66	43		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Replace BCM. Rrefer to BCS-64, "Exploded View".

carDiag.com

REAR WIPER AUTO STOP SIGNAL CIRCUIT

Component Function Check

INFOID:0000000000903201

1.CHECK REAR WIPER (AUTO STOP) OPERATION

CONSULT-III DATA MONITOR
1. Select "WIPER" of BCM data monitor item.
2. Operate the rear wiper.
3. Check that "RR WIPER STOP" changes to "ON" and "OFF" linked with the wiper operation.

Monitor item	Condition		Monitor status
RR WIPER STOP	Rear wiper motor	Stop position	ON
		Except stop position	OFF

Is the status of item normal?

YES >> Rear wiper auto stop signal circuit is normal.
NO >> Refer to WW-36, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000903200

1.CHECK REAR WIPER MOTOR (AUTO STOP) OUTPUT VOLTAGE

1. Turn the ignition switch OFF.
2. Disconnect rear wiper motor connector.
3. Turn the ignition switch ON.
4. Check voltage between BCM harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
BCM		Ground	
Connector	Terminal		
M66	44		Battery voltage

Is the measurement value normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK REAR WIPER MOTOR (AUTO STOP) SHORT CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M66	44		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Replace BCM. Refer to BCS-64, "Exploded View".

3.CHECK REAR WIPER MOTOR (AUTO STOP) CIRCUIT CONTINUITY

1. Check continuity between BCM harness connector and rear wiper motor harness connector.

cardiagn.com

BCM		Rear wiper motor		Continuity
Connector	Terminal	Connector	Terminal	
M66	44	D156	2	Existed

Does continuity exist?

YES >> Replace rear wiper motor.
NO >> Repair the harnesses or connectors.

carDiagn.com

HEADLAMP WASHER RELAY

Component Inspection

INFOID:0000000000903229

1.CHECK HEADLAMP WASHER RELAY

1. Turn the ignition switch OFF.
2. Disconnect headlamp washer relay.
3. Apply battery voltage to headlamp washer relay between terminals 3 and 4.
4. Check continuity of headlamp washer relay.

Headlamp washer relay		Condition	Continuity
Terminal		Voltage	
1	2	Apply	Existed
		Not Apply	Not existed

Does continuity exist?

YES >> Headlamp washer relay is normal.
NO >> Replace headlamp washer relay.

cardiagn.com

HEADLAMP WASHER CIRCUIT

Component Function Check

INFOID:0000000000904047

1.CHECK HEADLAMP WASHER OPERATION

CONSULT-III ACTIVE TEST
1. Select "HEADLAMP WASHER" of IPDM E/R active test item.
2. With operating the test item, check headlamp washer operation.

ON	**: Headlamp washer ON operation**
OFF	**: Stop the headlamp washer.**

Is the headlamp washer operation normally?

YES >> Headlamp washer circuit is normal.
NO >> Refer to WW-39, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000000903230

1.CHECK HEADLAMP WASHER FUSIBLE LINK

1. Turn the ignition switch OFF.
2. Check that the headlamp washer 30A fusible link (#G) is not fusing.

Is the fusible link fusing?

YES >> Replace the fusible link after repairing the applicable circuit.
NO >> GO TO 2.

2.CHECK HEADLAMP WASHER RELAY POWER SUPPLY

1. Remove headlamp washer relay.
2. Turn the ignition switch ON.
3. Check voltage between headlamp washer harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Headlamp washer relay		Ground	
Connector	Terminal		
E32	2		Battery voltage
	3		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair the harnesses or connectors.

3.CHECK HEADLAMP WASHER RELAY

1. Check headlamp washer relay. Refer to WW-38, "Component Inspection".

Is the headlamp washer relay normal?

YES >> GO TO 4.
NO >> Replace the headlamp washer relay.

4.CHECK HEADLAMP WASHER RELAY SIGNAL OUTPUT

CONSULT-III ACTIVE TEST
1. Turn the ignition switch OFF.
2. Install headlamp washer relay.
3. Turn the ignition switch ON.
4. Select "HEADLAMP WASHER" of IPDM E/R active test item.
5. With operating the test item, check voltage between IPDM E/R harness connector and ground.

cardiagn.com

Terminals			Test item	Voltage (Approx.)
(+)		(–)		
IPDM E/R		Ground	HEADLAMP WASHER	
Connector	Terminal			
E13	39		ON	0 V
			OFF	Battery voltage

Is the measurement value normal?

YES >> GO TO 7.
Fixed at 0 V >> GO TO 5.
Fixed at Battery voltage >> Replace IPDM E/R.

5.CHECK HEADLAMP WASHER RELAY CONTROL SIGNAL OPEN CIRCUIT

1. Remove headlamp washer relay.
2. Disconnect IPDM E/R harness connector.
3. Check continuity between IPDM E/R harness connector and headlamp washer relay harness connector.

IPDM E/R		Headlamp washer relay		Continuity
Connector	Terminal	Connector	Terminal	
E13	39	E32	4	Existed

Does continuity exist?

YES >> GO TO 6.
NO >> Repair the harnesses or connectors.

6.CHECK HEADLAMP WASHER RELAY CONTROL SIGNAL SHORT CIRCUIT

Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E13	39		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> Replace IPDM E/R.

7.CHECK HEADLAMP WASHER PUMP OPEN CIRCUIT

1. Disconnect headlamp washer pump connector.
2. Remove headlamp washer relay.
3. Check continuity between headlamp washer relay harness connector and headlamp washer pump harness connector.

Headlamp washer relay		Headlamp washer pump		Continuity
Connector	Terminal	Connector	Terminal	
E32	1	E42	1	Existed

Does continuity exist?

YES >> GO TO 8.
NO >> Repair the harnesses or connectors.

8.CHECK HEADLAMP WASHER PUMP SHORT CIRCUIT

Check continuity between headlamp washer pump harness connector and ground.

cardiagn.com

Headlamp washer pump		Ground	Continuity
Connector	Terminal		
E42	1		Not existed

Does continuity exist?

YES >> Repair the harnesses or connectors.
NO >> GO TO 9.

9. CHECK HEADLAMP WASHER PUMP (GROUND) OPEN CIRCUIT

1. Check continuity between headlamp washer pump harness connector and ground.

Headlamp washer pump		Ground	Continuity
Connector	Terminal		
E42	2		Existed

Does continuity exist?

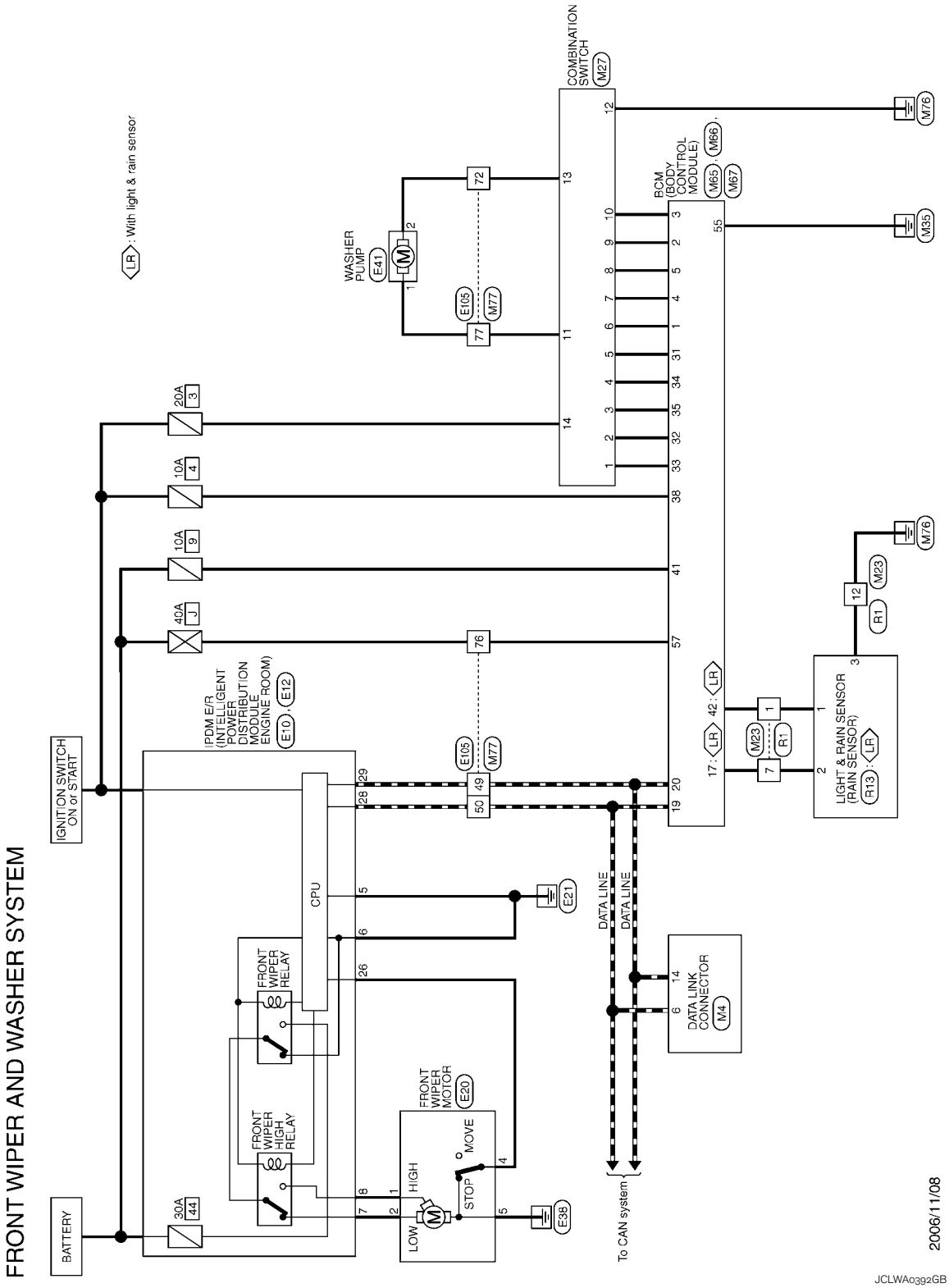
YES >> Replace the headlamp washer pump.
NO >> Repair the harnesses or connectors.

carDiag.com

FRONT WIPER AND WASHER SYSTEM

Wiring Diagram - FRONT WIPER AND WASHER SYSTEM -

INFOID:0000000000924454



cardiagn.com

FRONT WIPER AND WASHER SYSTEM

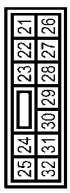
Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-
7	Y	-
8	Y/R	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

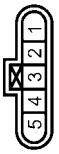
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
26	O	-
28	L	-
29	P	-

Connector No.	E20
Connector Name	FRONT WIPER MOTOR
Connector Type	AMP 953600-1

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/R	-
2	Y	-
4	O	-
5	B	-

Connector No.	E41
Connector Name	WASHER PUMP
Connector Type	FEA02FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	SB	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
72	SB	-
76	Y	-
77	SB	-

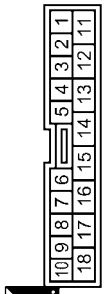
Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
14	P	-

Connector No.	M23
Connector Name	WIRE TO WIRE
Connector Type	TK10FW-NS6

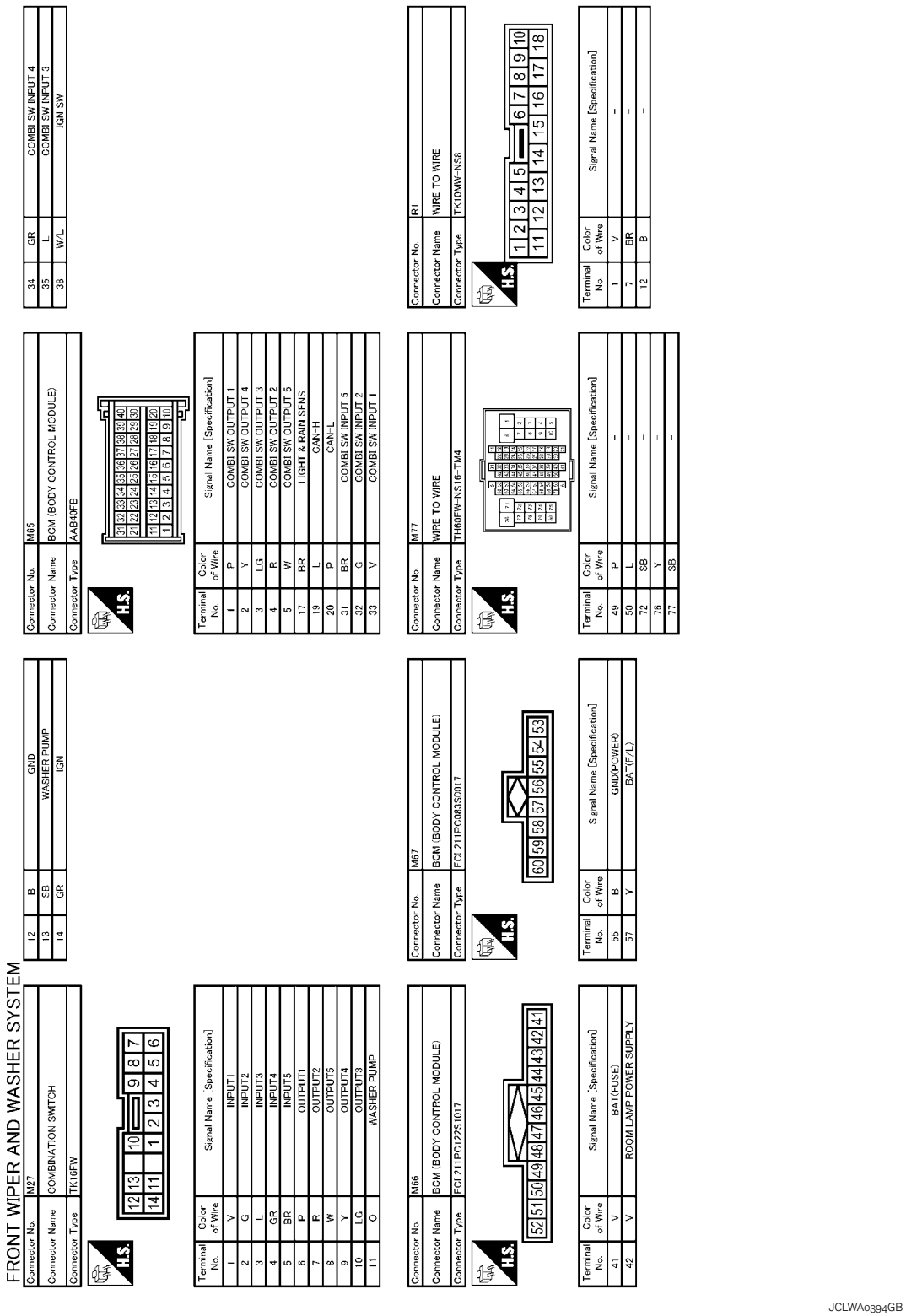
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
7	BR	-
12	B	-

JCLWA0393GB

cardiagn.com

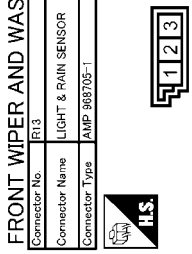


JCLWA0394GB

cardiagn.com

FRONT WIPER AND WASHER SYSTEM

Connector No.	R13
Connector Name	LIGHT & RAIN SENSOR
Connector Type	AMP 968705-1



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	+IG
2	BR	SIG
3	B	GND

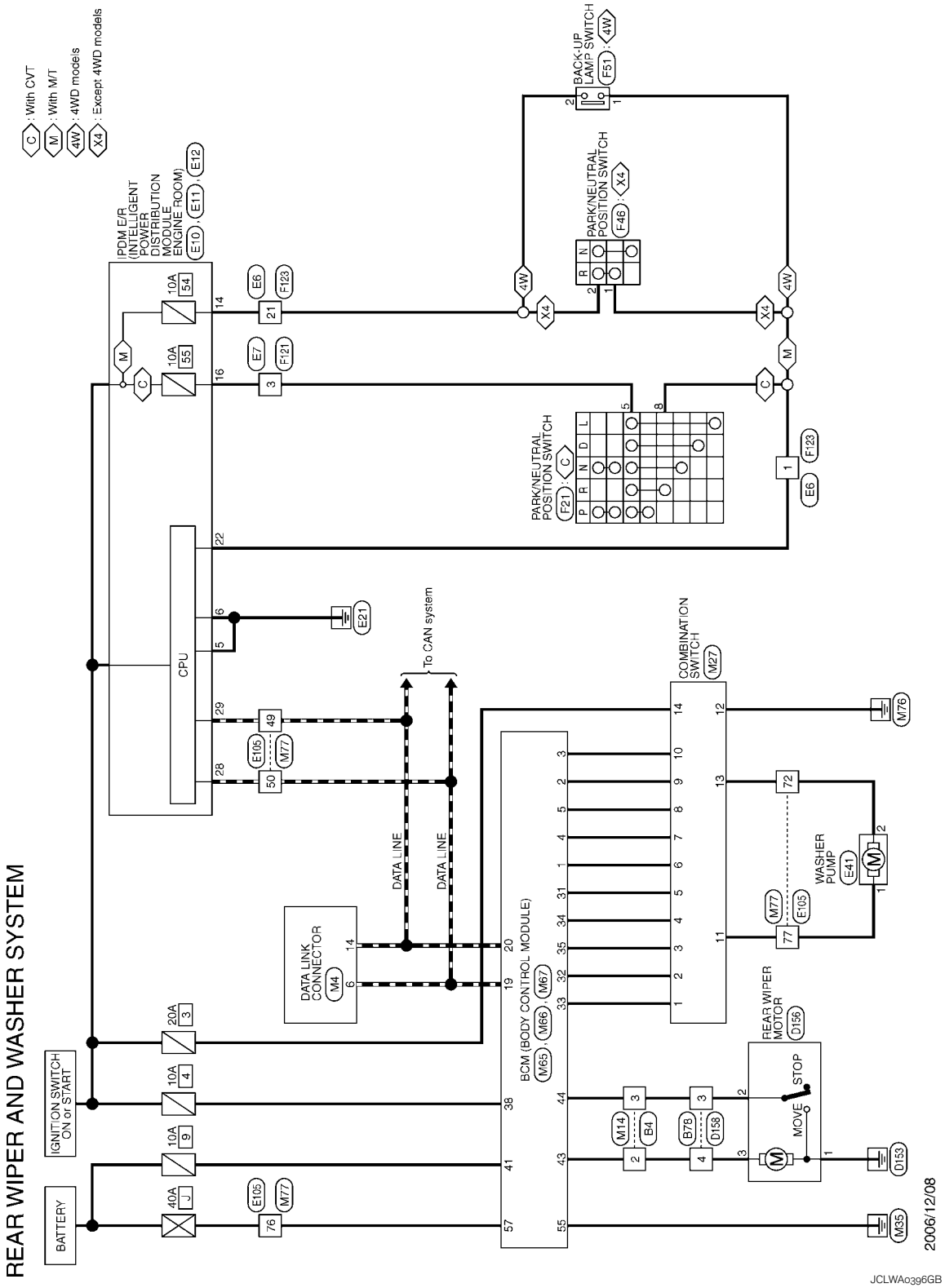
JCLWA0395GB

carDiagn.com

REAR WIPER AND WASHER SYSTEM

Wiring Diagram - REAR WIPER AND WASHER SYSTEM -

INFOID:0000000000978701

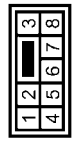


cardiagn.com

REAR WIPER AND WASHER SYSTEM

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS08MW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
2	L	–
3	L/W	–

Connector No.	B78
Connector Name	WIRE TO WIRE
Connector Type	NS04FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	L/W	–
4	L	–

Connector No.	D156
Connector Name	REAR WIPER MOTOR
Connector Type	GINCH 49609EV3M9

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	L/W	–
3	L	–

Connector No.	D158
Connector Name	WIRE TO WIRE
Connector Type	NS04MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	L/W	–
4	L	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1Y

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	–
21	R/B	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
14	R/B	–
16	Y/R	–

JCLWA0397GB

cardiagn.com

REAR WIPER AND WASHER SYSTEM

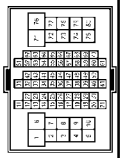
Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
22	Y/G	-
28	L	-
29	P	-

Connector No.	E41
Connector Name	WASHER PUMP
Connector Type	FEA02FB

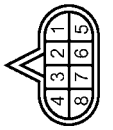
Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	SB	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	-
50	L	-
72	SB	-
76	Y	-
77	SB	-

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK06FG



Terminal No.	Color of Wire	Signal Name [Specification]
5	Y/R	-
8	Y/G	-

Connector No.	F46
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	FEA03FG

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
2	R/B	-

Connector No.	F51
Connector Name	BACK-UP LAMP SWITCH
Connector Type	RK02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
2	R/B	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

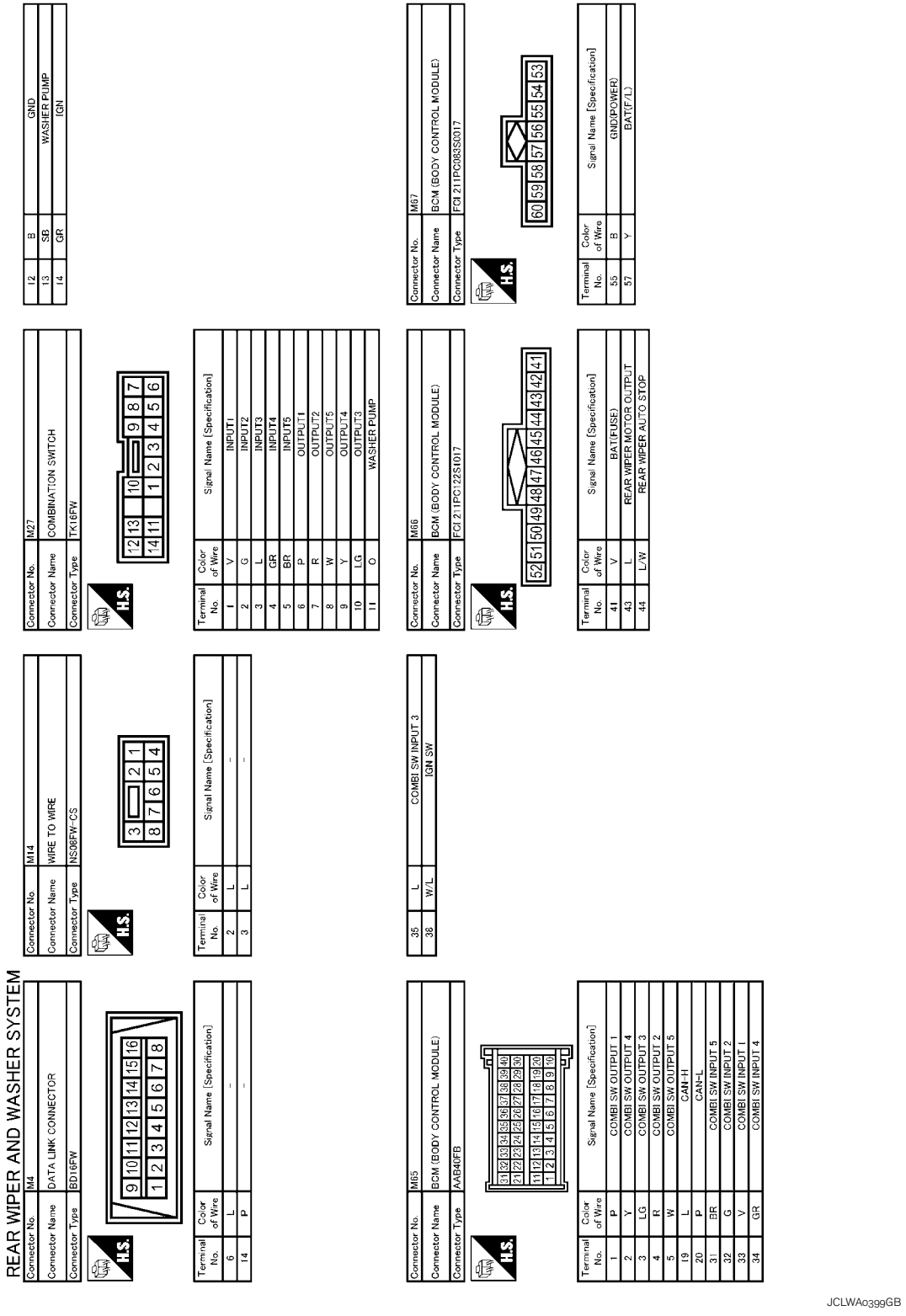
Terminal No.	Color of Wire	Signal Name [Specification]
3	Y/R	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	-
21	R/B	-

JCLWA0398GB

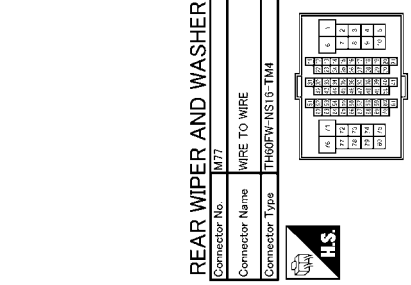
cardiagn.com



carDiagn.com

REAR WIPER AND WASHER SYSTEM

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
72	SB	–
76	Y	–
77	SB	–

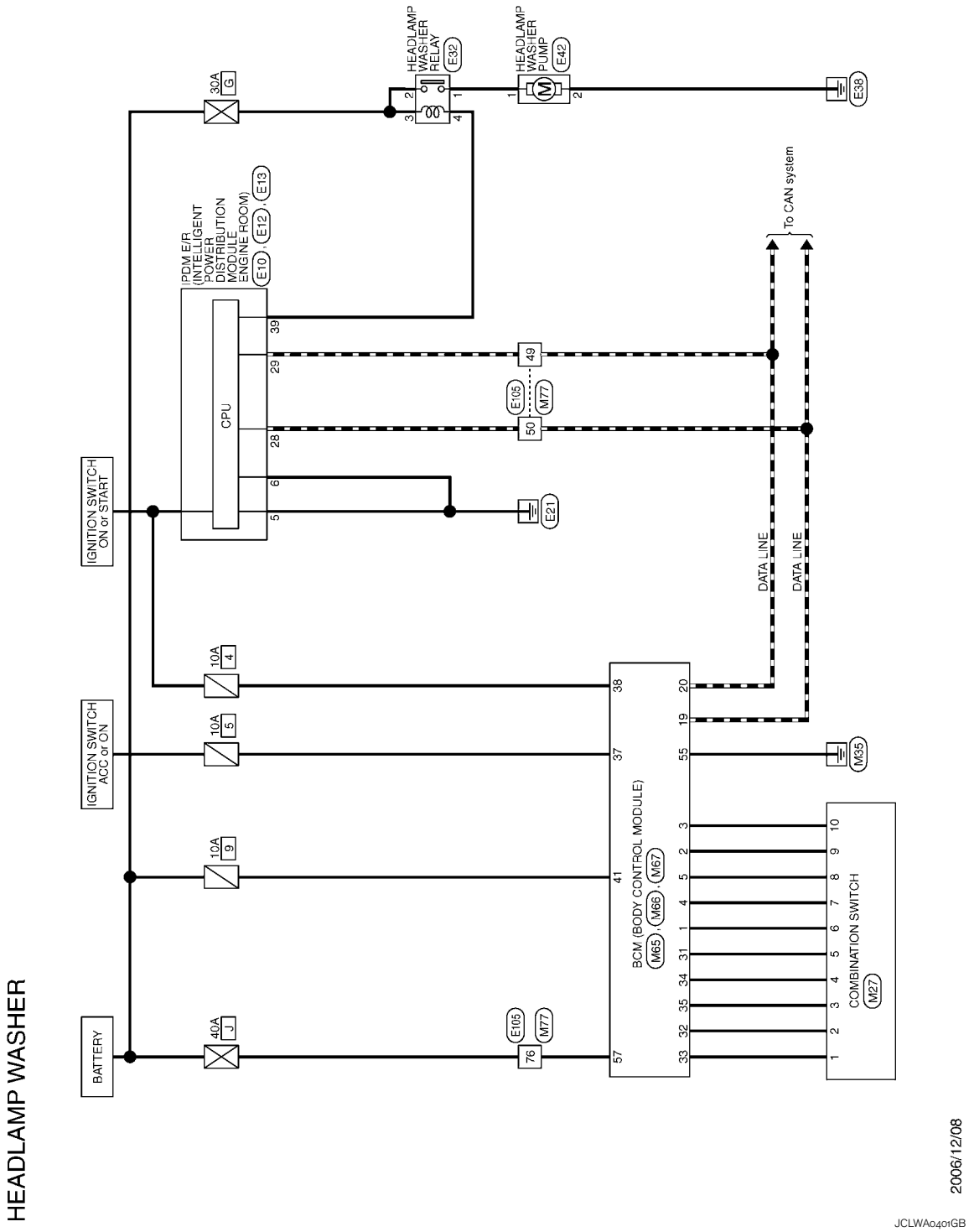
JCLWA0400GB

cardiagn.com

HEADLAMP WASHER SYSTEM

Wiring Diagram - HEADLAMP WASHER SYSTEM -

INFOID:0000000000978703

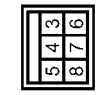


carDiagn.com

HEADLAMP WASHER

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

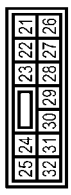
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
28	L	–
29	P	–

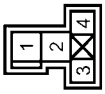
Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
39	GR	–

Connector No.	E32
Connector Name	HEADLAMP WASHER RELAY
Connector Type	MS02FL-M2

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR/R	–
2	G	–
3	G	–
4	GR	–

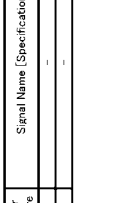
Connector No.	E42
Connector Name	HEADLAMP WASHER PUMP
Connector Type	TYCO 4983989-1

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR/R	–
2	B	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-NS16-TM4

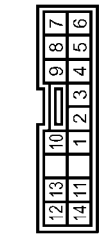
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
49	P	–
50	L	–
76	Y	–

Connector No.	M27
Connector Name	COMBINATION SWITCH
Connector Type	TK16FW

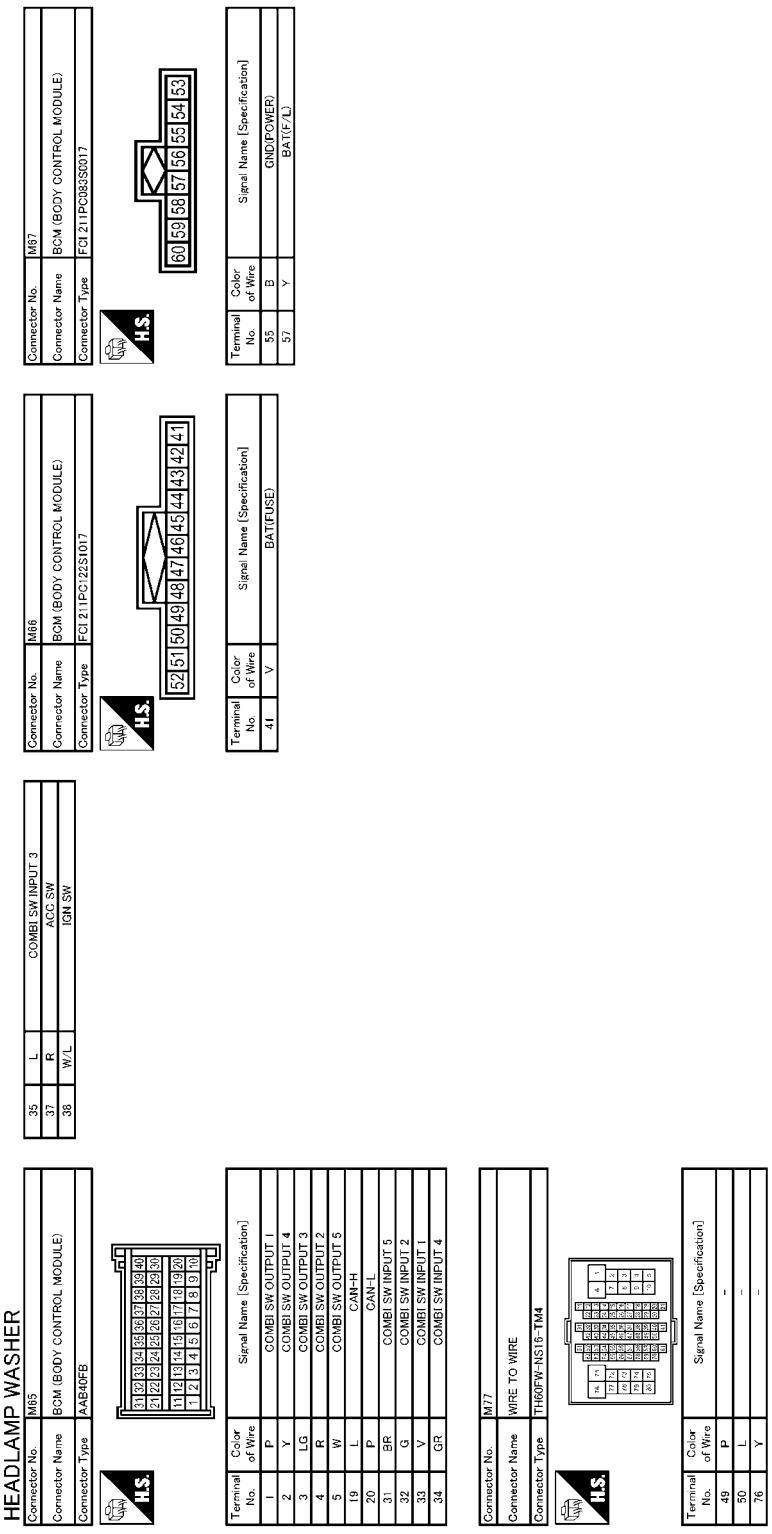
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	INPUT1
2	G	INPUT2
3	L	INPUT3
4	GR	INPUT4
5	BR	INPUT5
6	P	OUTPUT1
7	R	OUTPUT2
8	W	OUTPUT5
9	Y	OUTPUT4
10	LG	OUTPUT3

JCLWA0402GB

cardiagn.com



JCLWA0403GB

carDiagn.com

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000001116753

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
ACC ON SW	Ignition switch OFF		OFF
	Ignition switch ACC or ON		ON
AIR COND SW	A/C switch OFF		OFF
	A/C switch ON		ON
AUT LIGHT SYS	Outside of the room is dark		OFF
	Outside of the room is bright		ON
AUTO LIGHT SW	Lighting switch OFF		OFF
	Lighting switch AUTO		ON
BACK DOOR SW	Back door closed		OFF
	Back door opened		ON
BATTERY VOLT **NOTE:** Diesel engine models only	Ignition switch ON		Approximately the same as power supply voltage
BUCKLE SW	Driver's seat belt unfastened		OFF
	Driver's seat belt fastened		ON
CDL LOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the LOCK side		ON
CDL UNLOCK SW	Door lock/unlock switch does not operate		OFF
	Press door lock/unlock switch to the UNLOCK side		ON
DOOR SW-AS	Passenger door closed		OFF
	Passenger door opened		ON
DOOR SW-DR	Driver door closed		OFF
	Driver door opened		ON
DOOR SW-RL	Rear LH door closed		OFF
	Rear LH door opened		ON
DOOR SW-RR	Rear RH door closed		OFF
	Rear RH door opened		ON
ELEC PWR CUT **NOTE:** Diesel engine models only	Engine running	Fan switch ON (when engine coolant is cool) **NOTE:** Depending on the ambient temperature, battery voltage, etc.	OFF
		The current status maintained with the signal from ECM received.	FREEZ
		• Fan switch OFF • Fan switch ON after engine warming UP **NOTE:** Depending on the engine coolant temperature, ambient temperature, battery voltage, etc.	INHBT

cardiagn.com

Monitor Item	Condition	Value/Status
ENG COOLNT T **NOTE:** Diesel engine models only	Engine running	Approximately the same as water temperature gauge reading
ENGINE RPM **NOTE:** Diesel engine models only	Engine running	Approximately the same as tachometer reading
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
ENGINE STATUS **NOTE:** Diesel engine models only	Engine stopped	STOP
	While the engine stalls	STALL
	Engine running	RUN
	At engine cranking	CRA
FAN ON SIG	Fan switch OFF	OFF
	Fan switch ON	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
HEAD LAMP SW 1	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HEAD LAMP SW 2	Lighting switch OFF	OFF
	Lighting switch 2ND	ON
HI BEAM SW	Lighting switch OFF	OFF
	Lighting switch HI	ON
HOOD SW	Close the hood **NOTE:** Vehicles without theft warning system are OFF-fixed	OFF
	Open the hood	ON
H/L WASH SW	**NOTE:** The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7

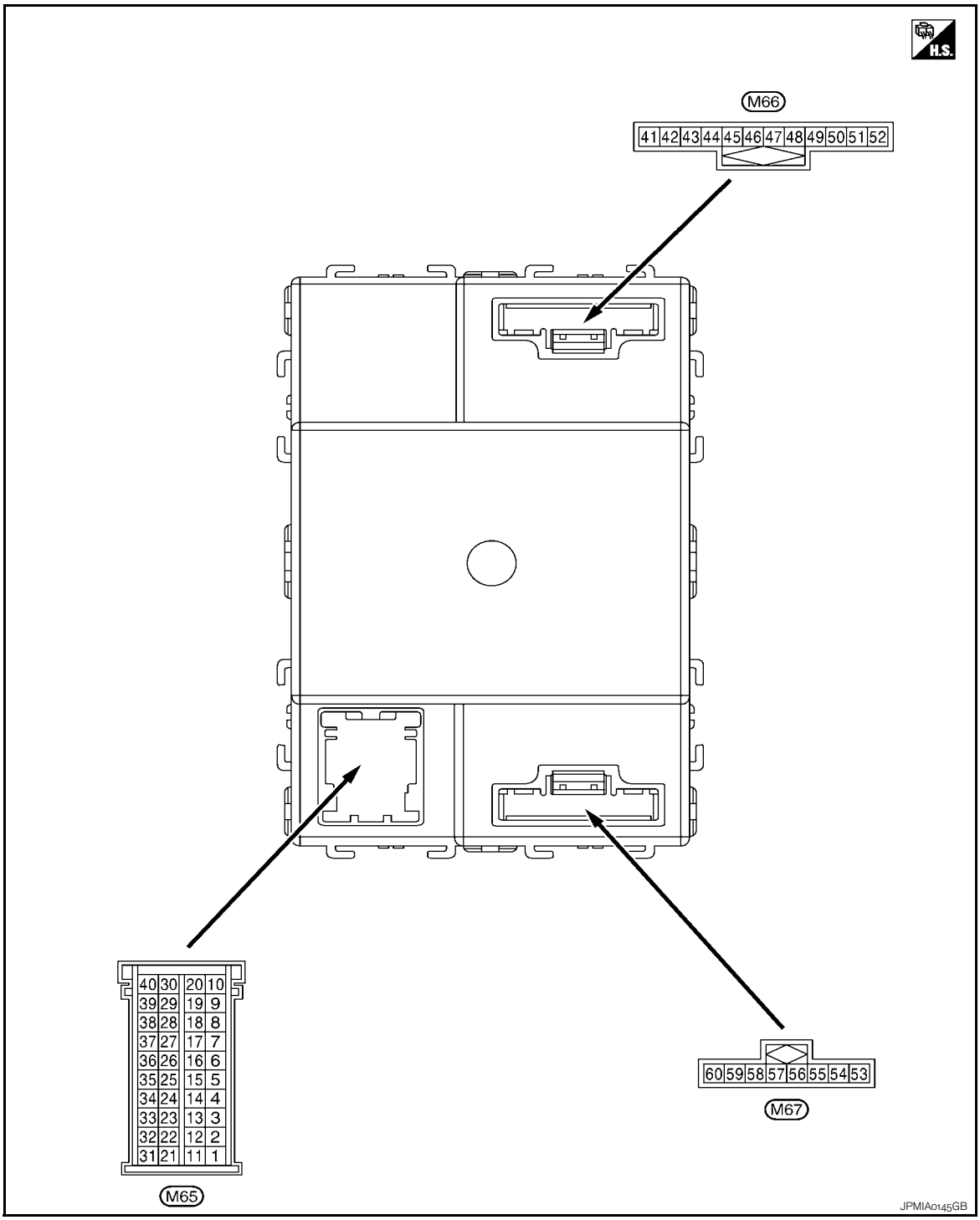
Monitor Item	Condition	Value/Status
I-KEY LOCK	LOCK button of Intelligent Key is not pressed	OFF
	LOCK button of Intelligent Key is pressed	ON
I-KEY UNLOCK	UNLOCK button of Intelligent Key is not pressed	OFF
	UNLOCK button of Intelligent Key is pressed	ON
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
LIT-SEN FAIL	Light & rain sensor is in normal condition	OK
	Light & rain sensor is with internal error	NOTOK
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	OFF
	Ignition switch ON	ON
OUT SIDE TEMP **NOTE:** Diesel engine models	Ignition switch ON	Approximately the same as outside air temperature
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
PUSH SW	Return to ignition switch to LOCK position	OFF
	Press ignition switch	ON
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	ON
RKE LOCK AND UN-LOCK	**NOTE:** The item is indicated, but not monitored	OFF
		ON
RR FOG SW	Rear fog lamp switch OFF	OFF
	Rear fog lamp switch ON	ON
RR WASHER SW	Rear washer switch OFF	OFF
	Rear washer switch ON	ON
RR WIPER INT	Rear wiper switch OFF	OFF
	Rear wiper switch INT	ON
RR WIPER ON	Rear wiper switch OFF	OFF
	Rear wiper switch ON	ON
RR WIPER STOP	Rear wiper stop position	OFF
	Other than rear wiper stop position	ON
SHOCK SENSOR	Ignition switch ON	NOMAL
	After the reception of air bag deployment signal from air bag diagnosis sensor unit	OFF
	During the reception of air bag deployment signal from air bag diagnosis sensor unit	ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TRNK OPNR SW	When back door opener switch is not pressed	OFF
	When back door opener switch is pressed	ON

cardiagn.com

Monitor Item	Condition	Value/Status
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
UNLOCK WITH DR	**NOTE:** The item is indicated, but not monitored	OFF
		ON
UNLOCK SHOCK	Other than the following	OFF
	During the unlock operation interlocked with air bag	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

cardiagn.com

TERMINAL LAYOUT

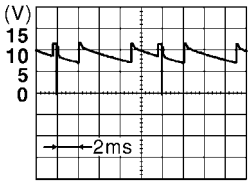
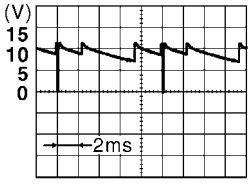
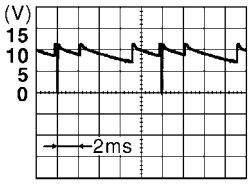
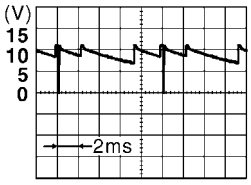


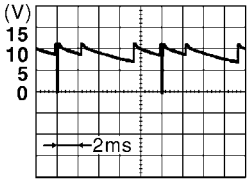
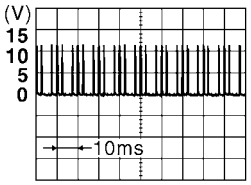
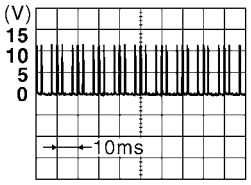
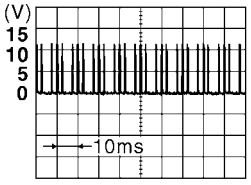
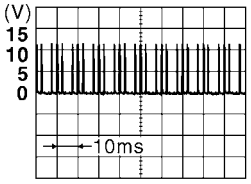
PHYSICAL VALUES

CAUTION:

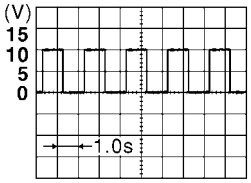
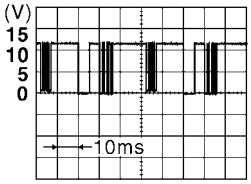
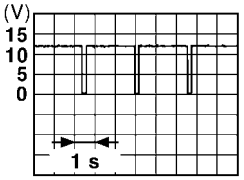
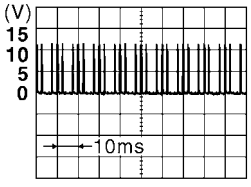
- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.**
- **Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to BCS-26, "COMB SW : CONSULT-III Function (BCM - COMB SW)".**
- **BCM reads the status of the combination switch at 10 ms internal normally. Refer to BCS-7, "System Description".**

cardiagn.com

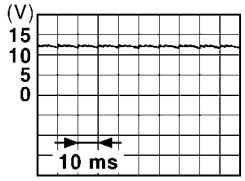
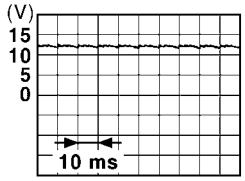
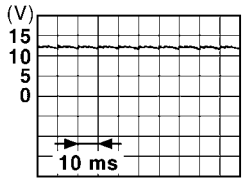
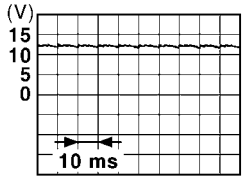
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
1 (P)	Ground	Combination switch OUTPUT 1	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front wiper switch HI (Wiper intermittent dial 4)	 JPMIA0160GB 9.1 V
					Rear wiper switch INT (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3 • Wiper intermittent dial 6 • Wiper intermittent dial 7	
2 (Y)	Ground	Combination switch OUTPUT 4	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 2ND	 JPMIA0163GB 9.3 V
					Lighting switch PASS	
					Front fog lamp switch ON	
					Turn signal switch LH	
3 (LG)	Ground	Combination switch OUTPUT 3	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch AUTO	 JPMIA0162GB 9.3 V
					Rear fog lamp switch OFF	
					Front wiper switch MIST	
					Front wiper switch INT	
					Front wiper switch LO	
4 (R)	Ground	Combination switch OUTPUT 2	Output	Combination switch	All switch OFF (Wiper intermittent dial 4)	0 V
					Front washer switch ON (Wiper intermittent dial 4)	 JPMIA0161GB 9.1 V
					Rear wiper switch ON (Wiper intermittent dial 4)	
					Rear washer switch ON (Wiper intermittent dial 4)	
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 5 • Wiper intermittent dial 6	

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
5 (W)	Ground	Combination switch OUTPUT 5	Output	Combination switch (Wiper intermittent dial 4)	All switch OFF	0 V
					Lighting switch 1ST	 JPMIA0164GB 9.1 V
					Lighting switch 2ND	
					Lighting switch HI	
					Turn signal switch RH	
7 (P)	Ground	Door lock/unlock switch (Lock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the lock side	0 V
8 (LG)	Ground	Hazard switch	Output	Hazard switch	Not pressed	 JPMIA0154GB 1.3 V
					Pressed	0 V
9 (BR)	Ground	Door lock/unlock switch (Unlock)	Output	Door lock/unlock switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed to the unlock side	0 V
12 (P)	Ground	Back door opener switch	Output	Back door opener switch	Not pressed	 JPMIA0154GB 1.2 V
					Pressed	0 V

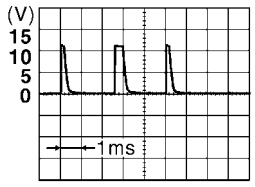
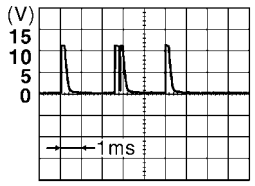
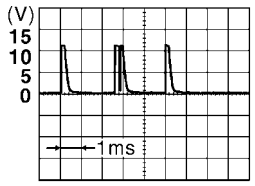
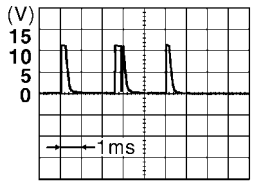
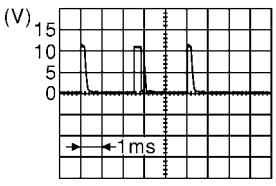
cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
13 (R)	Ground	Shock detect sensor	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		 JPMIA0155GB 6.0 V
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V
16 (GR)	Ground	Alarm link	Input	—		—
17 (BR)	Ground	Light & rain sensor serial link	Output	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		 JPMIA0156GB 8.7 V
18 (SB)	Ground	Security indicator	Output	Security indicator	ON	0 V
					Blinking	 JPMIA0014GB 10.3 V
					OFF	Battery voltage
19 (L)	—	CAN-H	Input/ Output	—		—
20 (P)	—	CAN-L	Input/ Output	—		—
21 (SB)	Ground	Rear window defogger switch	Output	Rear window defogger switch	Not pressed	 JPMIA0154GB 1.1 V
					While pressing	0 V

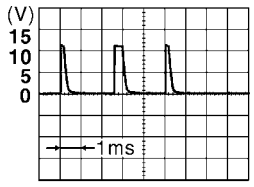
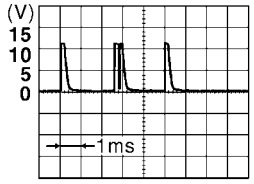
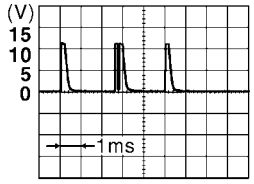
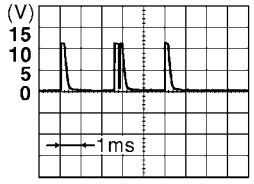
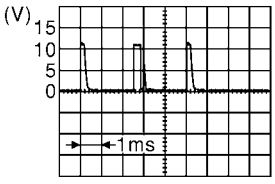
carDiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
24 (GR)	Ground	Door lock status indicator	Output	Door lock status indicator	ON	Battery voltage
					OFF	0 V
25 (GR)	Ground	Rear door switch LH	Input	Rear door switch LH	OFF (When rear door LH closed)	 PKIB0924E 11.2 V
					ON (When rear door LH opened)	0 V
26 (R)	Ground	Driver door switch	Input	Driver door switch	OFF (When driver door closed)	 PKIB0924E 11.2 V
					ON (When driver door opened)	0 V
27 (BR)	Ground	Passenger door switch	Input	Passenger door switch	OFF (When passenger door closed)	 PKIB0924E 11.2 V
					ON (When passenger door opened)	0 V
28 (G)	Ground	Back door switch	Input	Back door switch	OFF (When back door closed)	Battery voltage
					ON (When back door opened)	0 V
29 (LG)	Ground	Rear door switch RH	Input	Rear door switch RH	OFF (When rear door RH closed)	 PKIB0924E 11.2 V
					ON (When rear door RH opened)	0 V
30 (SB)	Ground	Audio link	Output	—	—	—

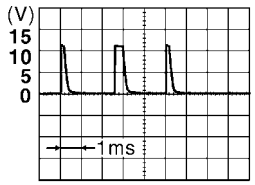
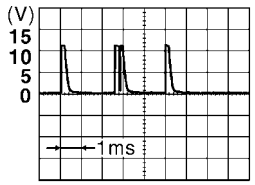
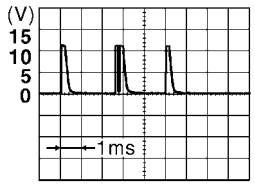
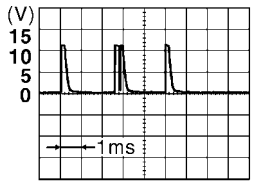
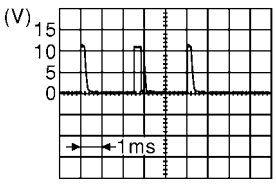
cardiagn.com

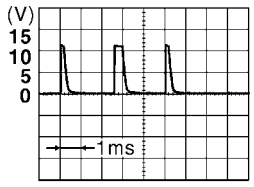
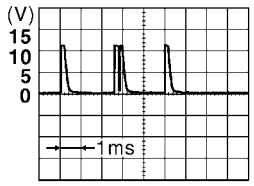
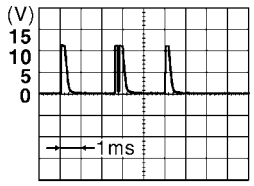
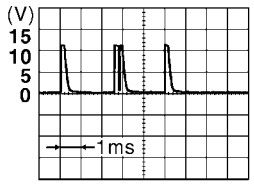
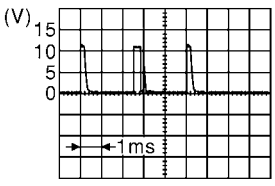
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
31 (BR)	Ground	Combination switch INPUT 5	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.3 V
					Front fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear fog lamp switch ON (Wiper intermittent dial 4)	 JPMIA0168GB 1.3 V
					Rear wiper switch ON (Wiper intermittent dial 4)	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 6 • Wiper intermittent dial 7	 JPMIA0196GB 1.3 V

carDiagn.com

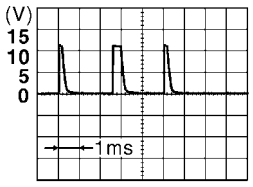
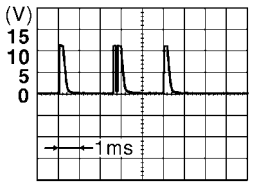
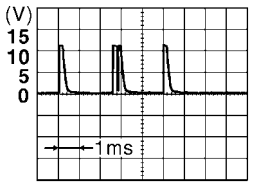
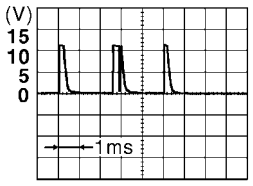
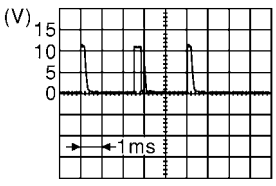
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
32 (G)	Ground	Combination switch INPUT 2	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Lighting switch PASS	 JPMIA0167GB 1.3 V
					Lighting switch 2ND	 JPMIA0166GB 1.3 V
					Front wiper switch INT	 JPMIA0168GB 1.3 V
					Front wiper switch HI	 JPMIA0196GB 1.3 V

cardiagn.com

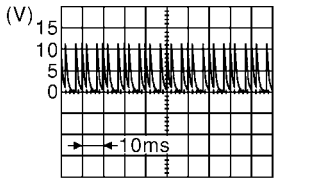
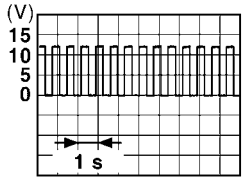
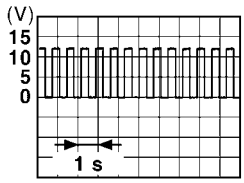
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
33 (V)	Ground	Combination switch INPUT 1	Input	Combination switch (Wiper intermittent dial 4)	All switch OFF	 JPMIA0165GB 1.4 V
					Turn signal switch LH	 JPMIA0167GB 1.3 V
					Turn signal switch RH	 JPMIA0166GB 1.3 V
					Front wiper switch LO	 JPMIA0168GB 1.3 V
					Front washer switch ON	 JPMIA0196GB 1.3 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
34 (GR)	Ground	Combination switch INPUT 4	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch AUTO (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Lighting switch 1ST (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Rear wiper INT (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 6	 JPMIA0196GB 1.3 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
35 (L)	Ground	Combination switch INPUT 3	Input	Combination switch	All switch OFF (Wiper intermittent dial 4)	 JPMIA0165GB 1.4 V
					Lighting switch HI (Wiper intermittent dial 4)	 JPMIA0166GB 1.3 V
					Lighting switch 2ND (Wiper intermittent dial 4)	 JPMIA0167GB 1.3 V
					Rear wiper switch ON	 JPMIA0169GB 1.3 V
					Any of the condition below with all switch OFF • Wiper intermittent dial 1 • Wiper intermittent dial 2 • Wiper intermittent dial 3	 JPMIA0196GB 1.3 V
36 (V)	Ground	Key switch	Output	Insert mechanical key into ignition key cylinder		Battery voltage
				Remove mechanical key from ignition key cylinder		0 V
37 (R)	Ground	ACC power supply	Output	Ignition switch OFF		0 V
				Ignition switch ACC or ON		Battery voltage
38 (W/L)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

carDiag.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
39 (P)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
40 (LG)	Ground	NATS antenna amp.	Input/ Output	Insert mechanical key into ignition key cylinder		Just after Insert mechanical key into ignition key cylinder. Pointer of tester should move
41 (V)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
42 (V)	Ground	Interior room lamp power supply	Output	After passing the interior room lamp battery saver operation time		0 V
				Any other time after passing the interior room lamp battery saver operation time		Battery voltage
43 (L)	Ground	Rear wiper motor	Output	Rear wiper switch OFF		0 V
				Rear wiper switch ON		Battery voltage
44 (L/W)	Ground	Rear wiper auto stop	Output	Ignition switch ON	Rear wiper stop position	0 V
					Any position other than rear wiper stop position	 JPMIA0197GB
45 (GR)	Ground	Back door lock actuator	Output	Back door opener switch	Pressed	Battery voltage (300ms)
					Not pressed	0 V
47 (G/Y)	Ground	Turn signal LH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch LH	 PKIDog26E 6.5 V
48 (G/B)	Ground	Turn signal RH	Output	Ignition switch ON	Turn signal switch OFF	0 V
					Turn signal switch RH	 PKIDog26E 6.5 V
49 (Y)	Ground	Rear fog lamp	Output	Lighting switch 1ST and front fog lamp switch ON	Rear fog lamp switch OFF	0 V
					Rear fog lamp switch ON	Battery voltage
51 (R/W)*1 (R)*2	Ground	Stop lamp switch	Output	Depress the brake pedal		Battery voltage
				Release the brake pedal		0 V

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
52 (R)	Ground	Room lamp timer control	Output	Interior room lamp	OFF	Battery voltage
					ON	0 V
53 (L)	Ground	Power window power supply	Output	Ignition switch	OFF or ACC	0 V
					ON	Battery voltage
54 (O)	Ground	Door unlock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V
55 (B)	Ground	Ground	—	Ignition switch ON		0 V
56 (Y)*1 (SB)*2	Ground	Door lock (All)	Output	Door lock/unlock switch	Pressed to the unlock side	0 V
					Pressed to the lock side	Battery voltage
57 (Y)	Ground	Battery power supply	Output	Ignition switch OFF		Battery voltage
58 (P)	Ground	Power window power supply	Output	Ignition switch OFF		Battery voltage
59 (BR)	Ground	Super lock	Output	When lock button of key fob or Intelligent Key is not pressed		0 V
				When lock button of key fob or Intelligent Key is pressed		Battery voltage
60 (GR)	Ground	Driver door unlock	Output	Door lock/unlock switch	Pressed to the unlock side	Battery voltage
					Pressed to the lock side	0 V

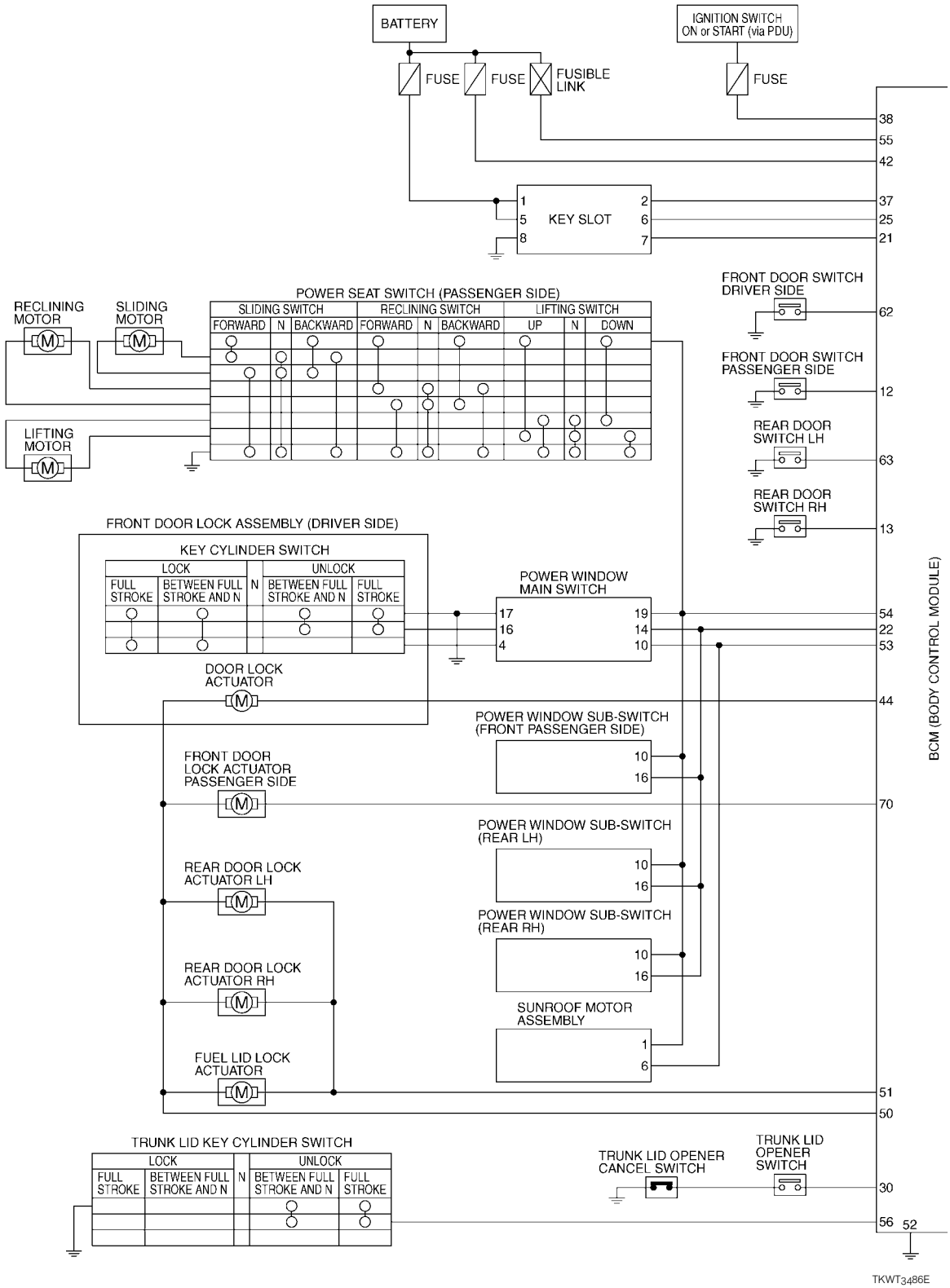
*1: With Intelligent Key system

*2: Without Intelligent Key system

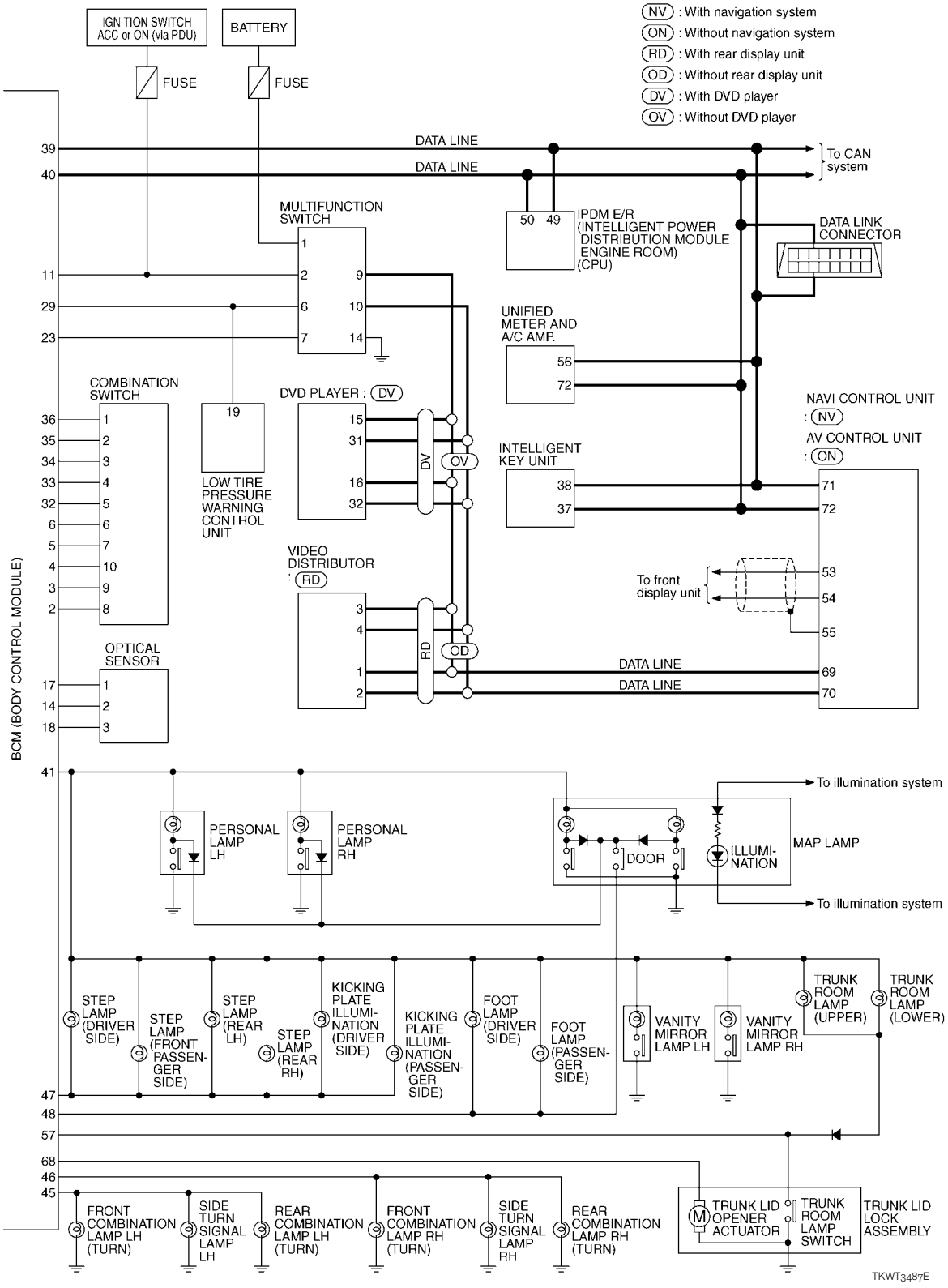
cardiagn.com

Wiring Diagram - BCM -

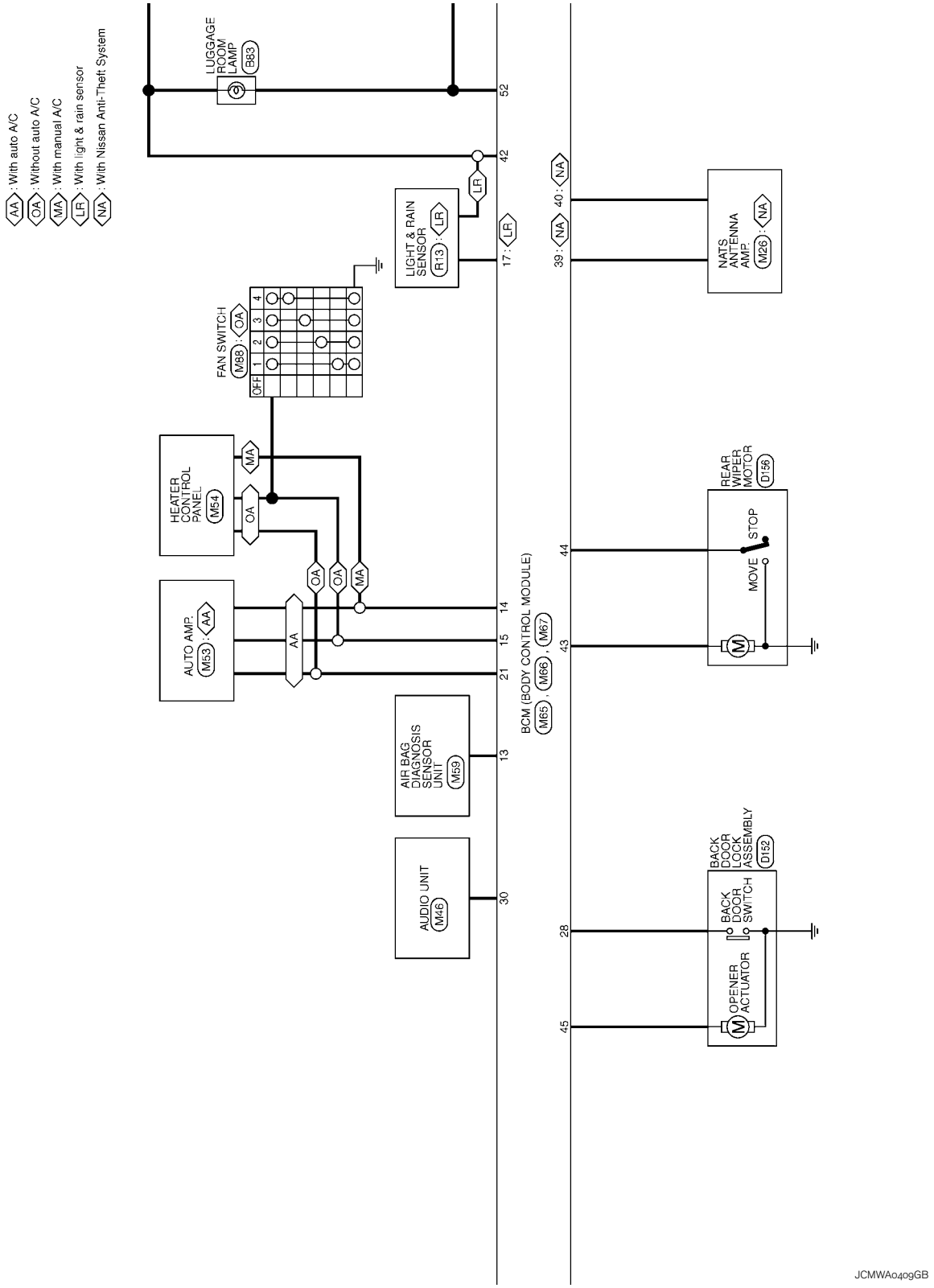
INFOID:0000000001116754



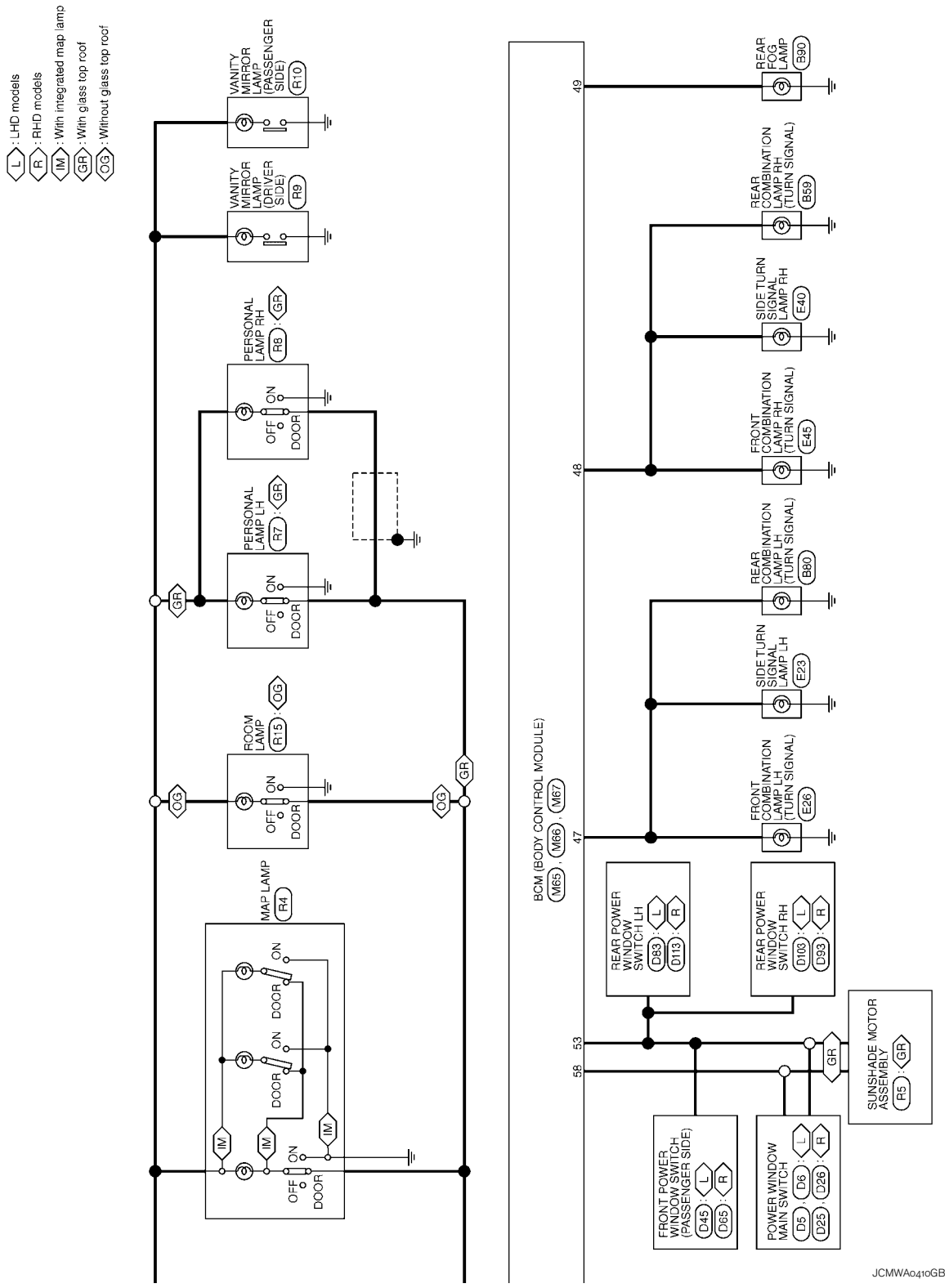
cardiagn.com



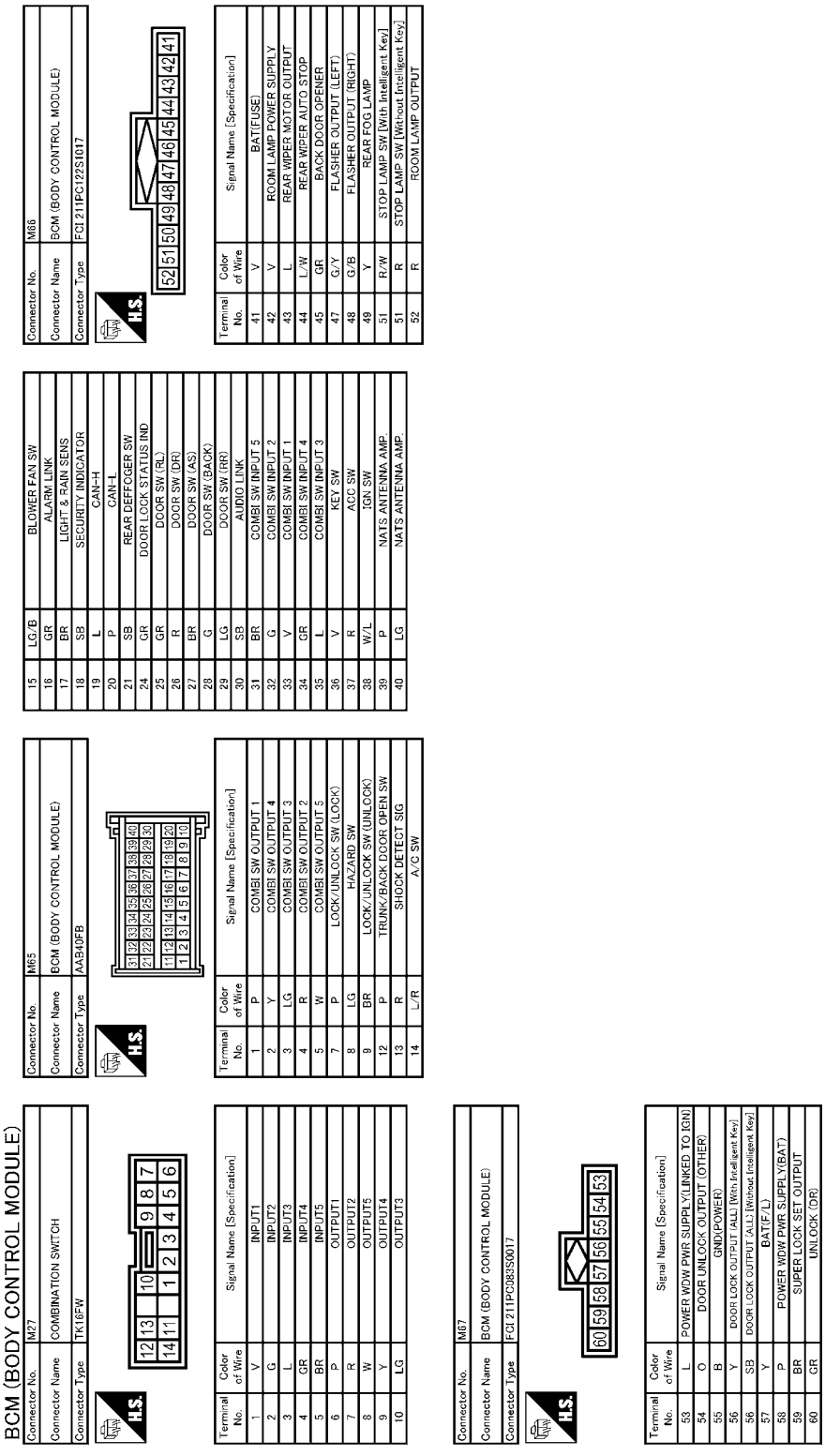
carDiagn.com



cardiagn.com



carDiagn.com



JCMWA0411GB

Fail Safe

INFOID:0000000001116755

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

cardiagn.com

Display contents of CONSULT	Fail-safe	Cancellation
B2190: NATS ANTENNA AMP	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2191: DIFFERENCE OF KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2192: ID DISCORD BCM-ECM	Fuel cut (ECM)	Erase DTC
B2193: CHAIN OF BCM-ECM	Fuel cut (ECM)	Erase DTC
B2194: DISCORD BCM-I-KEY	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2195: ANTI SCANNING	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC
B2196: DONGLE NG	• Inhibits engine cranking • Inhibits steering lock unlocking (Intelligent Key unit) • Fuel cut (ECM)	Erase DTC

REAR WIPER CONTROL

BCM detects a rear wiper stopping position according to a rear wiper auto stop signal.
When a rear wiper auto stop signal is in the condition listed below, BCM stops power supply to rear wiper after rear wiper is activated for five seconds.

Ignition switch	Rear wiper switch	Auto stop signal
ON	OFF	Rear wiper stop position signal cannot be input 5 seconds.
	ON	The signal does not change for 5 seconds.

NOTE:
The above operation is repeated when operating the rear wiper switch one minute after the stop of the rear wiper caused by Fail-safe.

TURN SIGNAL LAMP CONTROL

BCM detects the turn signal lamp circuit status from the terminal voltage.
BCM increases the turn signal lamp blinking speed if the bulb or harness open is detected with the turn signal lamp operating.

NOTE:
The blinking speed is normal while activating the hazard warning lamp.

LIGHT & RAIN SENSOR MALFUNCTION DETECTION FUNCTION

BCM controls the following items when LIGHT & RAIN sensor has a malfunction.

Auto Light Control
Headlamp is turned ON.

Front Wiper Control
The condition just before the activation of Fail-safe is maintained until the front wiper switch is turned OFF.

DTC Inspection Priority Chart

INFOID:0000000001116756

cardiagn.com

Priority	DTC
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERNCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM • B2194: DISCORD BCM-I-KEY • B2195: ANTI SCANNING • B2196: DONGLE NG

DTC Index

INFOID:0000000001116757

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- PAST: Displays when there is a malfunction that is detected in the past and stored.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	TIME		Fail-safe	Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	0	1 - 39	—	BCS-32
U1010: CONTROL UNIT (CAN)	0	1 - 39	—	BCS-33
B2190: NATS ANTENNA AMP	CRNT	PAST	×	• With Intelligent Key system SEC-33 • Without Intelligent Key system SEC-174
B2191: DIFFERENCE OF KEY	CRNT	PAST	×	• With Intelligent Key system SEC-35 • Without Intelligent Key system SEC-176
B2192: ID DISCORD BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-36 • Without Intelligent Key system SEC-177
B2193: CHAIN OF BCM-ECM	CRNT	PAST	×	• With Intelligent Key system SEC-38 • Without Intelligent Key system SEC-178
B2194: DISCORD BCM-I-KEY	CRNT	PAST	×	SEC-39
B2195: ANTI SCANNING	CRNT	PAST	×	• With Intelligent Key system SEC-179 • Without Intelligent Key system SEC-179
B2196: DONGLE NG	CRNT	PAST	×	• With Intelligent Key system SEC-41 • Without Intelligent Key system SEC-180

cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Reference Value

INFOID:0000000001116758

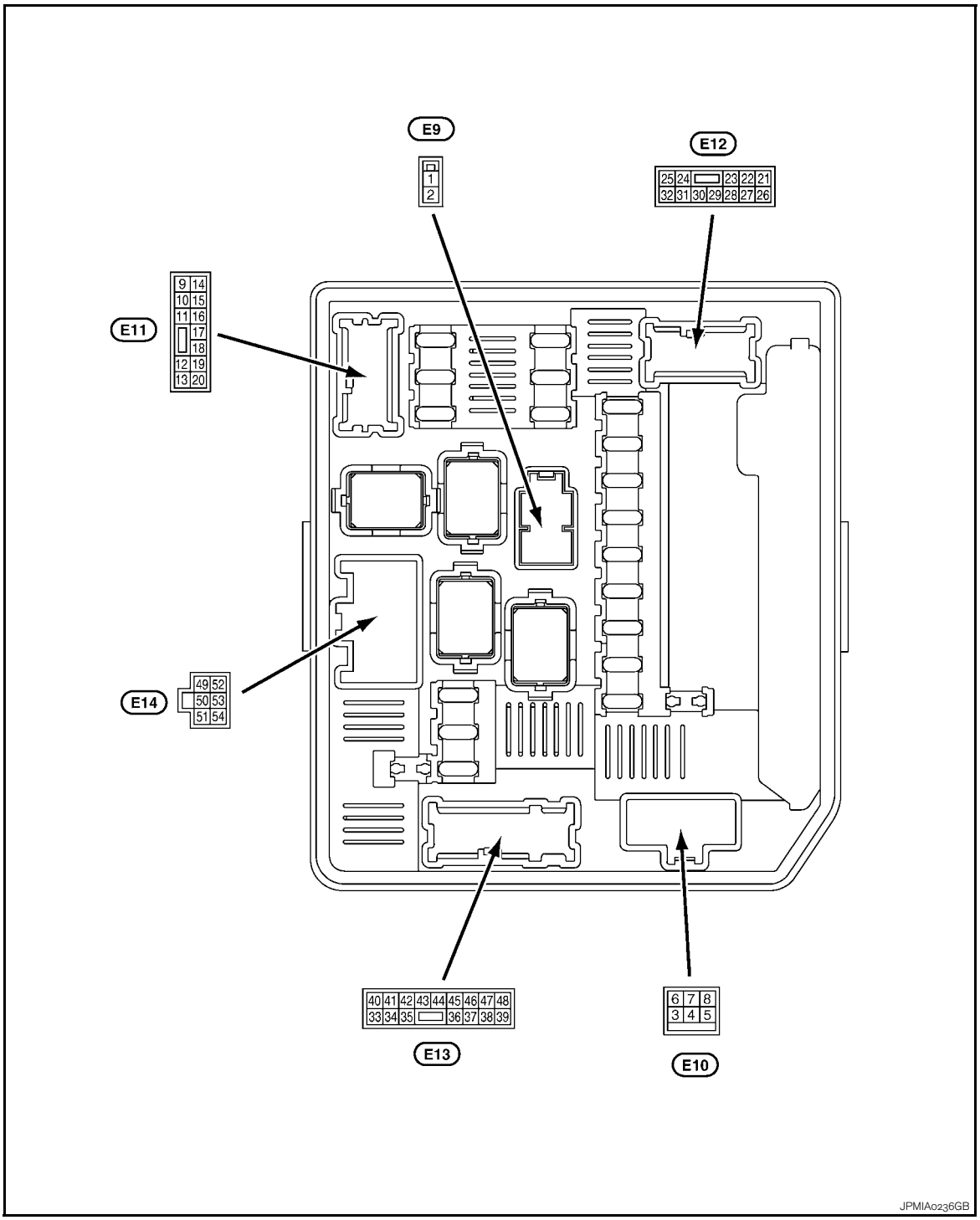
VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
MOTOR FAN REQ	Engine idle speed	Changes depending on engine coolant temperature, air conditioner operation status, vehicle speed, etc.	1 - 3
AC COMP REQ	Engine running	A/C switch OFF	Off
		A/C switch ON (Compressor is operating)	On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI (Light is illuminated)		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		Front fog lamp switch ON	On
HL WASHER REQ	Ignition switch ON, and low beam headlamp is ON	Front washer switch OFF	Off
		Front washer switch ON (When headlamp washer is operating)	On
FR WIP REQ	Ignition switch ON	Front wiper switch OFF	STOP
		Front wiper switch INT	1LOW
		Front wiper switch LO	Low
		Front wiper switch HI	Hi
WIP AUTO STOP	Ignition switch ON	Front wiper stop position	STOP P
		Any position other than front wiper stop position	ACT P
WIP PROT	Ignition switch ON	Front wiper operates normally	Off
		Front wiper stops at fail-safe operation	BLOCK
ST RLY REQ **NOTE:** Vehicle without Intelligent Key system indicates only “ON”, and it does not change.	When Intelligent Key is outside the vehicle, and the push switch is pushed		Off
	When Intelligent Key is inside the vehicle, and the push switch is pushed		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Ignition switch ON	Rear window defogger switch OFF	Off
		Rear window defogger switch ON (Rear window defogger is operating)	On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close

Monitor Item	Condition	Value/Status
REV SW	Except selector lever R position	Off
	Selector lever R position	On
HOOD SW **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Close the hood	Off
	Open the hood	On
THFT HRN REQ **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Not operation	Off
	Horn is activated with Vehicle Security (Theft Warning) system.	On
HORN CHIRP	**NOTE:** This item is indicated, but not monitored.	Off
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

cardiagn.com

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
		Signal name	Input/ Output		
+	–				
1 (G)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
2 (R)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
5 (B)	Ground	Ground	—	Ignition switch ON	0 V

carDiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
6 (B)	Ground	Ground	—	Ignition switch ON		0 V
7 (Y)	Ground	Front wiper LO	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch LO	Battery voltage
8 (Y/R)	Ground	Front wiper HI	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch HI	Battery voltage
9 (G)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
10*1 (L/R)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
11*2 (O)	Ground	PTC heater 1 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
12*2 (G/Y)	Ground	PTC heater 2 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
14 (R/B)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
15 (Y/L)*1 (B/R)*2	Ground	ECM relay control	Input	• Engine running • Ignition switch OFF (For a few seconds after turning ignition switch OFF)		0 - 1.0 V*1
						0.6 V*2
				Ignition switch OFF or ACC (More than a few seconds after turning ignition switch OFF)		Battery voltage
16*3 (Y/R)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
19*1 (R/O)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
21*4 (GR)	Ground	Hood switch	Input	Close the hood		Battery voltage
				Open the hood		0 V
22 (Y/G)	Ground	Reverse switch	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON	• Selector lever “R” (Except M/T models) • M/T control lever “R” (M/T models)	Battery voltage
					• Selector lever in any position other than “R” (Except M/T models) • M/T control lever in any position other than “R” (M/T models)	0 V
23 (Y/B)	Ground	A/C relay power supply	Output	Engine stopped		0 V
				Engine running	A/C switch OFF	0 V
					A/C switch ON (A/C compressor is operating)	Battery voltage
24 (R/Y)	Ground	Headlamp LO (RH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage

cardiagn.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
25*1 (G/L)	Ground	ETC relay control	Input	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		0 - 1.0 V
26 (O)	Ground	Front wiper auto stop	Input	Ignition switch ON	Front wiper stop position	0 V
					Any position other than front wiper stop position	Battery voltage
27 (W)	Ground	Oil pressure switch	Input	Engine stopped		0 V
				Engine running		Battery voltage
28 (L)	—	CAN-H	Input/ Output	—		—
29 (P)	—	CAN-L	Input/ Output	—		—
30*4 (L)	Ground	Horn relay control	Output	The horn is not activated		Battery voltage
				The horn is activated		0 V
31 (R)	Ground	Headlamp LO (sensor)	Output	Ignition switch ON	Lighting switch OFF	0 V
					Lighting switch 2ND	Battery voltage
32*1 (R/Y)	Ground	ETC relay power supply	Output	Ignition switch ON		Battery voltage
33*1 (B/O)	Ground	Fuel pump relay control	Input	• Engine running • Ignition switch ON (For 1 second after turning ignition switch ON)		0 - 1.0 V
				Ignition switch ON (More than 1 second after turning ignition switch ON)		Battery voltage
34 (R/B)	Ground	Starter relay power supply	Input	Ignition switch ON (Except M/T models)	Selector lever “P” or “N”	0 V
					Selector lever in any position other than “P” or “N”	Battery voltage
				Ignition switch ON (M/T models)		
35 (W/L)	Ground	Ignition switch ON	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
36 (W)	Ground	Front fog lamp (RH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
37 (R/W)	Ground	Parking lamp (RH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
38 (R/L)	Ground	Tail, license plate lamps and illuminations	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
39 (GR)	Ground	Headlamp washer relay control	Output	Ignition switch ON	When headlamp washer is operating	0 V
					When headlamp washer is not operating	Battery voltage
40*1 (BR/Y)*5 (SB)*6	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
41 (P)	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

carDiag.com

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
42*1 (B/Y)	Ground	Fuel pump relay power supply	Output	• Ignition switch OFF or ACC • Approximately 1 second or more after turning the ignition switch ON		0 V
				• Approximately 1 second after turning the ignition switch ON • Engine running		Battery voltage
43 (W/B)	Ground	Front fog lamp (LH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
44 (L)	Ground	Headlamp LO (LH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
45 (L/W)	Ground	Headlamp HI (RH)	Output	• Lighting switch 2ND and HI • lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
46 (G)	Ground	Headlamp HI (LH)	Output	• Lighting switch 2ND and HI • Lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
47 (R/L)	Ground	Parking lamp (LH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
48*7 (Y)	Ground	Cooling fan relay-3 control	Output	When cooling fan does HI operation		0 V
				When cooling fan does OFF or LO operation		Battery voltage
49 (B)	Ground	Rear window defogger relay power supply	Output	Ignition switch ON	Rear window defogger switch ON	Battery voltage
					Rear window defogger switch OFF	0 V
50 (B/R)	Ground	Starter relay power supply	Output	When engine is clanking		Battery voltage
				When engine is not clanking		0 V
51 (P)	Ground	Ignition switch START	Input	Ignition switch START		Battery voltage
				Ignition switch OFF, ACC or ON		0 V
52 (W)	Ground	Cooling fan relay-1 power supply	Output	When cooling fan does LO or HI operation		Battery voltage
				When cooling fan does OFF operation		0 V
53 (W/B)	Ground	Battery power supply (Cooling fan relay)	Input	Ignition switch OFF		Battery voltage
54*5 (R)	Ground	Cooling fan relay-2 power supply	Input	When cooling fan does HI operation		Battery voltage
				When cooling fan does OFF or LO operation		0 V

*1: HR engine and MR engine models

*2: K9K engine models

*3: Except M/T models only

*4: With vehicle security (theft warning) system

*5: HR engine models

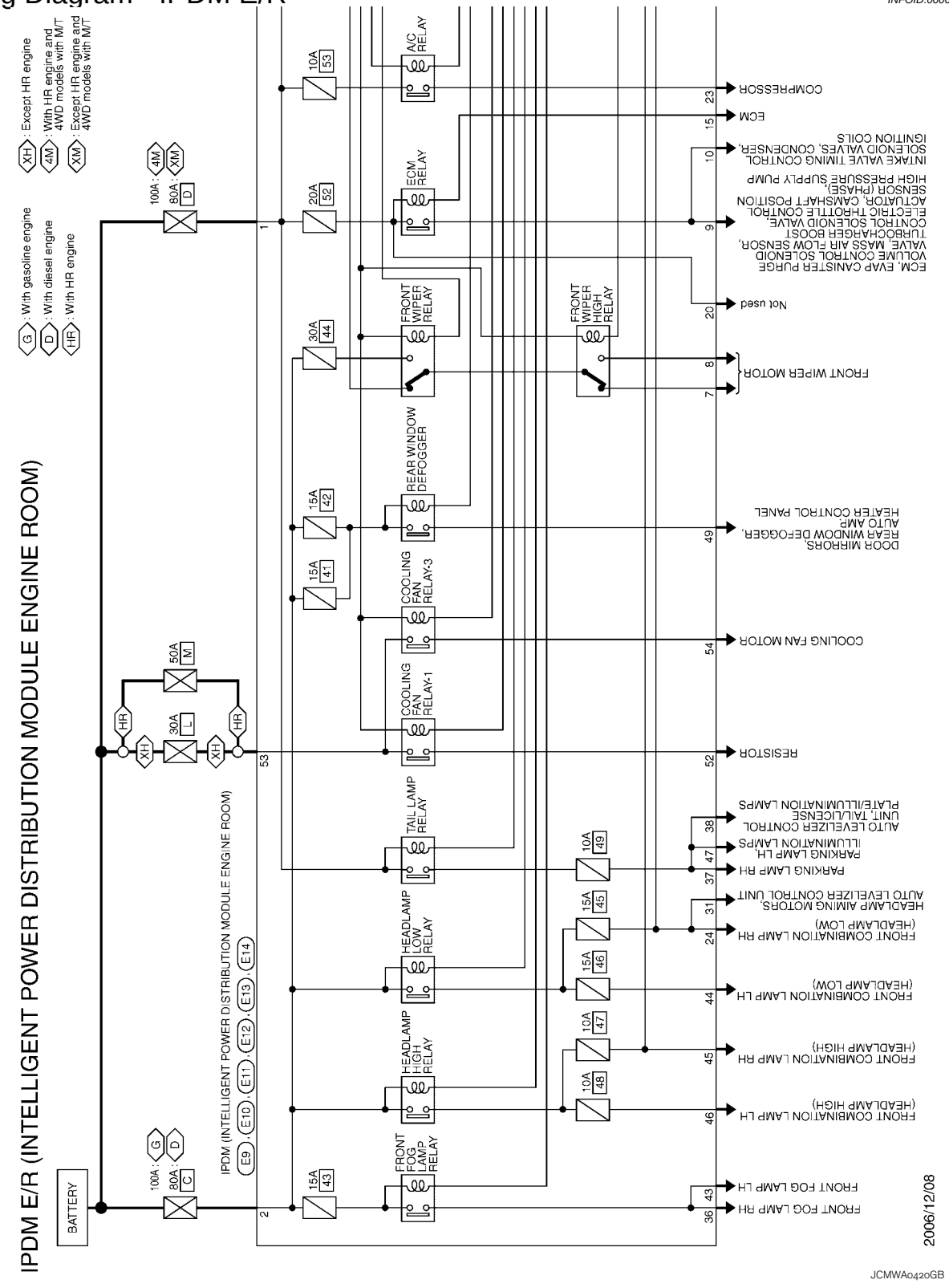
*6: MR engine models

*7: MR engine and K9K engine models

cardiagn.com

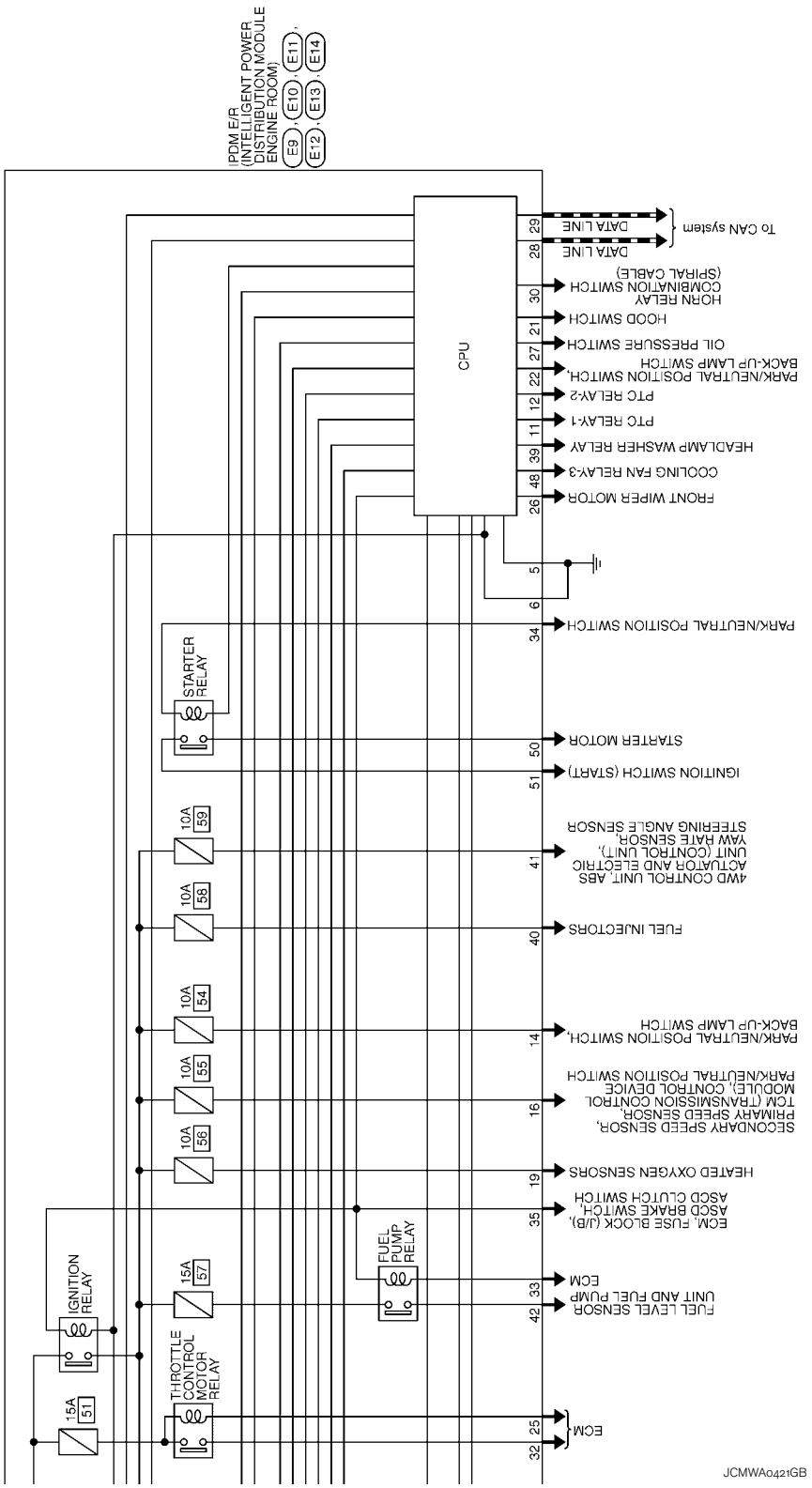
Wiring Diagram - IPDM E/R -

INFOID:0000000001116759



JCMWA0420GB

carDiagn.com



cardiagn.com

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E9
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	L02FB-MC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	R	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-
7	Y	-
8	V/R	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
9	G	-
10	L/R	-
11	O	-
12	G/Y	-
14	R/B	-
15	Y/L	-[With gasoline engine]
15	B/R	-[With diesel engine]
16	Y/R	-
19	R/O	-
20	-	-

Terminal No.	Color of Wire	Signal Name [Specification]
43	W/B	-
44	L	-
45	L/W	-
46	G	-
47	R/L	-
48	Y	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
21	GR	-
22	Y/G	-
23	Y/B	-
24	R/Y	-
25	G/L	-
26	O	-
27	W	-
28	L	-
29	P	-
30	L	-
31	R	-

32	R/Y	-

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
33	B/O	-
34	R/B	-
35	W/L	-
36	W	-
37	R/W	-
38	R/L	-
39	GR	-
40	SB	-[With MR engine]
40	BR/Y	-[With HR engine]
41	P	-
42	B/Y	-

JCMWA0422GB

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	-
50	B/R	-
51	P	-
52	W	-
53	W/B	-
54	R	-

JCMWA0423GB

Fail Safe

INFOID:0000000001116760

CAN communication control

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If no CAN communication is available with ECM

cardiagn.com

Control part	Fail-safe in operation
Cooling fan	• The cooling fan relay-2*1 or the cooling fan relay-3*2 turns ON when the ignition switch is turned ON • Turns off the fan motor low relay when the ignition switch is turned OFF
A/C compressor	A/C relay OFF

*1: HR engine models

*2: MR engine and K9K engine models

If no CAN communication is available with BCM

Control part	Fail-safe in operation
Headlamp	• The headlamp low relay turns ON when the ignition switch is turned ON • The headlamp low relay turns OFF when the ignition switch is turned OFF • Headlamp high relay OFF
• Parking lamps • License plate lamps • Tail lamps • Illuminations	• The tail lamp relay turns ON when the ignition switch is turned ON • The tail lamp relay turns OFF when the ignition switch is turned OFF
Front wiper	• The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. • The front wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Front fog lamps	Front fog lamp relay OFF
Starter motor	Inhibit relay OFF
Rear window defogger	Rear window defogger relay OFF
Headlamp washer	Headlamp washer relay OFF
PTC heater	PTC heater relay OFF

Ignition relay malfunction detection function

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

DTC	Ignition switch	Ignition relay	Tail lamp relay
—	ON	ON	—
—	OFF	OFF	—
B2098: IGN RLY ON	OFF	ON	ON (10 minutes)
B2099: IGN RLY OFF	ON	OFF	—

NOTE:

The tail lamp relay is turned OFF when the ignition switch is turned ON.

Front wiper control

IPDM E/R detects the front wiper stop position with the front wiper auto stop signal.
When the front wiper auto stop signal is in the conditions listed below, IPDM E/R repeats a front wiper 10 seconds operation and 20 seconds stop five times.

Ignition switch	Front wiper switch	Front wiper auto stop signal
ON	OFF	The front wiper auto stop signal (stop position) cannot be input for 10 seconds.
	ON	The front wiper auto stop signal does not change for 10 seconds.

NOTE:

carDiagn.com

This operation status can be confirmed on the IPDM E/R “Data Monitor” that displays “BLOCK” for the item “WIP PROT” while the wiper is stopped.

DTC Index

INFOID:0000000001116761

CONSULT display	Fail-safe	Timing[NOTE]		Reference page
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	PAST	PCS-14
B2098: IGN RELAY ON	×	CRNT	PAST	PCS-15
B2099: IGN RELAY OFF	—	CRNT	PAST	PCS-16
B2100: EEPROM	—	CRNT	PAST	PCS-17

NOTE:

The details of time display are as follows.

- CRNT: The malfunctions that are detected now.
- PAST: The number is indicated when it is normal at present and a malfunction was detected in the past.

cardiagn.com

SYMPTOM DIAGNOSIS

WIPER AND WASHER SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000000924455

CAUTION:

Perform the self-diagnosis with CONSULT-III before performing the diagnosis by symptom. Perform the diagnosis by DTC if DTC is detected.

Symptom		Probable malfunction location	Inspection item
Front wiper does not operate.	HI only	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		• IPDM E/R • Harness between IPDM E/R and front wiper motor • Front wiper motor	Front wiper motor (HI) circuit Refer to WW-27, "Component Function Check".
		Front wiper request signal • BCM • IPDM E/R	IPDM E/R DATA MONITOR "FR WIP REQ"
	LO and INT	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		• IPDM E/R • Harness between IPDM E/R and front wiper motor • Front wiper motor	Front wiper motor (LO) circuit Refer to WW-25, "Component Function Check".
		Front wiper request signal • BCM • IPDM E/R	IPDM E/R DATA MONITOR "FR WIP REQ"
	INT only	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		Front wiper request signal • BCM • IPDM E/R	IPDM E/R DATA MONITOR "FR WIP REQ"
	HI, LO, and INT	SYMPTOM DIAGNOSIS “FRONT WIPER DOES NOT OPERATE” Refer to WW-93, "Diagnosis Procedure".	

cardiagn.com

Symptom		Probable malfunction location	Inspection item
Front wiper does not stop.	HI only	• Combination switch • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		Front wiper request signal • BCM • IPDM E/R	IPDM E/R DATA MONITOR "FR WIP REQ"
		IPDM E/R	—
	LO only	• Combination switch • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		Front wiper request signal • BCM • IPDM E/R	IPDM E/R DATA MONITOR "FR WIP REQ"
		IPDM E/R	—
	INT only	• Combination switch • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		Front wiper request signal • BCM • IPDM E/R	IPDM E/R DATA MONITOR "FR WIP REQ"
Front wiper does not operate normally.	Intermittent adjustment cannot be performed.	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		BCM	—
	Intermittent control linked with vehicle speed cannot be performed.	Check the vehicle speed detection wiper setting. Refer to WW-17, "WIPER : CONSULT-III Function (BCM - WIPER)".	
	Wiper is not linked to the washer operation.	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		BCM	—
	Does not return to stop position (Repeatedly operates for 10 seconds and then stops for 20 seconds. After that, it stops the operation).	• IPDM E/R • Harness between IPDM E/R and front wiper motor • Front wiper motor	Front wiper auto stop signal circuit Refer to WW-29, "Component Function Check".
Rear wiper does not operate.	ON only	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63, "Symptom Table".
	INT only	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63, "Symptom Table".
	ON and INT	• Combination switch • Harness between combination switch and BCM • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		• BCM • Harness between rear wiper motor and BCM • Harness between rear wiper motor and ground • Rear wiper motor	Combination switch Refer to WW-34, "Component Function Check".

cardiagn.com

Symptom		Probable malfunction location	Inspection item
Rear wiper does not stop.	ON only	• Combination switch • BCM	Rear wiper motor circuit Refer to WW-34, "Component Function Check".
	INT only	• Combination switch • BCM	Combination switch Refer to BCS-63, "Symptom Table".
Rear wiper does not operate normally.	Wiper is not linked to the washer operation.	• Combination switch • Harness between rear wiper motor and BCM • BCM	Combination switch Refer to BCS-63, "Symptom Table".
		BCM	—
	Rear wiper does not return to the Stop position (Stops after a five-second operation).	• BCM • Harness between rear wiper motor and BCM • Rear wiper motor	Rear wiper auto stop signal circuit Refer to WW-36, "Component Function Check".
	Rear wiper stops after operating for five seconds when ignition switch is turned ON.		
	Rear wiper does not operate even when selector lever is shifted to the “R”.	Reverse switch signal (CAN communication) • BCM • IPDM E/R	IPDM E/R DATA MONITOR “REV SW”
Headlamp washer does not operate.	Headlamp washer does not operate with the front washer when headlamps are turned ON.	• Combination switch • Harness between combination switch and BCM • BCM • Headlamp washer pump	Combination switch Refer to BCS-63, "Symptom Table".
		• Fusible link • Harness between fusible link and headlamp washer relay • Headlamp washer relay • Harness between headlamp washer relay and IPDM E/R • IPDM E/R • Harness between headlamp washer relay and headlamp washer pump • Harness between headlamp washer pump and ground • Headlamp washer pump	Headlamp washer circuit Refer to WW-39, "Component Function Check".
		BCM	—

NORMAL OPERATING CONDITION

Description

INFOID:0000000000924458

FRONT WIPER MOTOR PROTECTION FUNCTION

- IPDM E/R may stop the front wiper to protect the front wiper motor if any obstruction (operation resistance) such as a large amount of snow is detected during the front wiper operation.
- At that time turn OFF the front wiper and remove the foreign object. Then wait for approximately 20 seconds or more and reactivate the front wiper. The wiper will operate normally.

REAR WIPER MOTOR PROTECTION FUNCTION

- BCM may stop rear wiper to protect the rear wiper motor when the rear wiper is stopped for 5 seconds or more due to a snowfall.
- Rear wiper operates normally one minute after the obstacles are removed with rear wiper OFF.

cardiagn.com

FRONT WIPER DOES NOT OPERATE

Description

INFOID:0000000000924456

The front wiper does not operate under any operation conditions.

Diagnosis Procedure

INFOID:0000000000924457

1.CHECK WIPER RELAY OPERATION

IPDM E/R AUTO ACTIVE TEST
1. Start IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".
2. Check that the front wiper operates at the LO/HI operation.

CONSULT-III ACTIVE TEST
1. Select "FRONT WIPER" of IPDM E/R active test item.
2. With operating the test item, check front wiper operation.

LO : Front wiper LO operation
HI : Front wiper HI operation
OFF : Stop the front wiper.

Is front wiper operation normally?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK FRONT WIPER MOTOR FUSE

1. Turn the ignition switch OFF.
2. Check that the front wiper motor 30A fuse (#44) is not fusing.

Is the fuse fusing?

YES >> Replace the fuse after repairing the applicable circuit.
NO >> GO TO 3.

3.CHECK FRONT WIPER MOTOR GROUND OPEN CIRCUIT

1. Disconnect front wiper motor connector.
2. Check continuity between front wiper motor harness connector and ground.

Front wiper motor		Ground	Continuity
Connector	Terminal		
E20	5		Existed

Does continuity exist?

YES >> GO TO 4.
NO >> Repair the harnesses or connectors.

4.CHECK FRONT WIPER MOTOR OUTPUT VOLTAGE

CONSULT-III ACTIVE TEST
1. Disconnect front wiper motor connector.
2. Turn the ignition switch ON.
3. Select "FRONT WIPER" of IPDM E/R active test item.
4. With operating the test item, check voltage between IPDM E/R harness connector and ground.

carDiagn.com

Terminals			Test item	Voltage (Approx.)
(+)		(–)		
IPDM E/R		Ground	FRONT WIPER	
Connector	Terminal			
E10	7		LO	Battery voltage
			OFF	0 V
	8		HI	Battery voltage
			OFF	0 V

Is the measurement value normal?

YES >> Replace front wiper motor.
NO >> Replace IPDM E/R.

5.CHECK FRONT WIPER REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR
1. Select "FR WIP REQ" of IPDM E/R data monitor item.
2. Switch the front wiper switch to HI and LO.
3. With operating the front wiper switch, check the status of "FR WIP REQ".

Monitor item	Condition		Monitor status
FR WIP REQ	Front wiper switch HI	ON	HI
		OFF	STOP
	Front wiper switch LO	ON	LOW
		OFF	STOP

Is the status of item normal?

YES >> Replace IPDM E/R.
NO >> GO TO 6.

6.CHECK COMBINATION SWITCH

1. Perform the inspection of the combination switch. Refer to BCS-63, "Symptom Table".

Is combination switch normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> Repair or replace the applicable parts.

cardiagn.com

HEADLAMP WASHER DOES NOT OPERATE

Description

INFOID:0000000001115040

Headlamp washer does not operate linked to front washer operation.

Diagnosis Procedure

INFOID:0000000000904271

1.CHECK IPDM E/R

CONSULT-III DATA MONITOR
1. Turn the lighting switch 2ND.
2. Select "HL WASHER REQ" of IPDM E/R data monitor item.
3. Operate the headlamp washer.
4. Check the status of "HL WASHER REQ".

Monitor item	Condition		Monitor status
HL WASHER REQ	Headlamp washer	Operating	ON
		Stopped	OFF

Is the status of item normal?

YES >> Refer to WW-39, "Component Function Check".
NO >> GO TO 2.

2.CHECK COMBINATION SWITCH

1. Perform the inspection of the combination switch. Refer to BCS-63, "Symptom Table".

Is combination switch normal?

YES >> Replace BCM. Refer to BCS-64, "Exploded View".
NO >> Repair or replace the applicable parts.

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001102412

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC and SB section of this Service Manual.

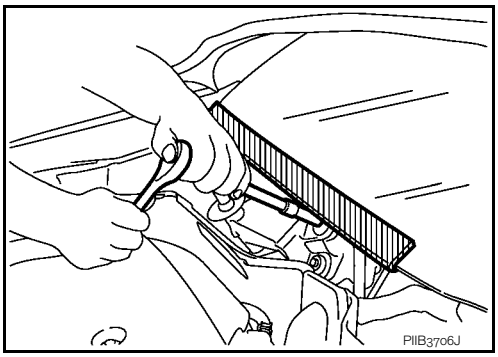
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRC section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001102413

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



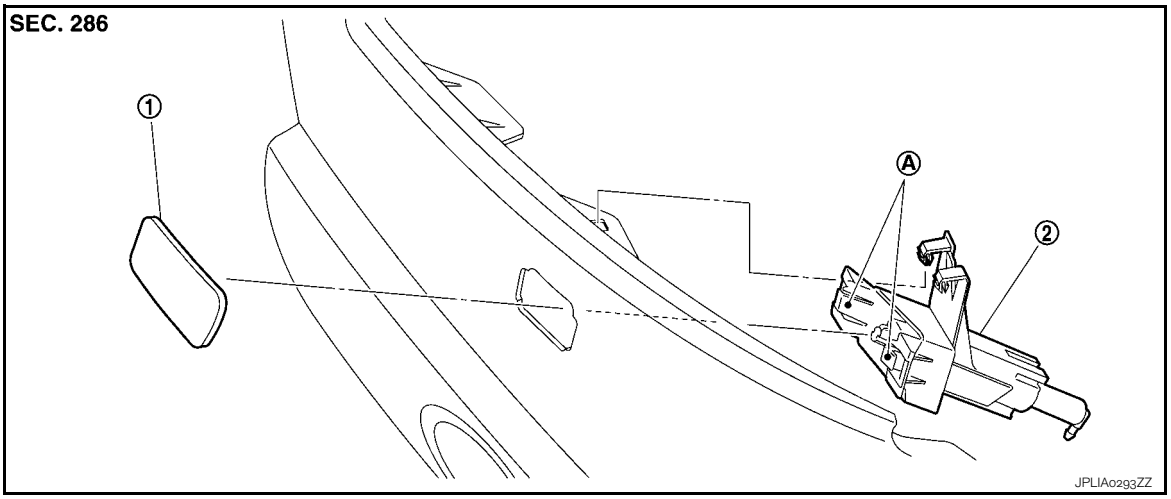
cardiagn.com

ON-VEHICLE REPAIR

HEADLAMP WASHER NOZZLE AND TUBE

Exploded View

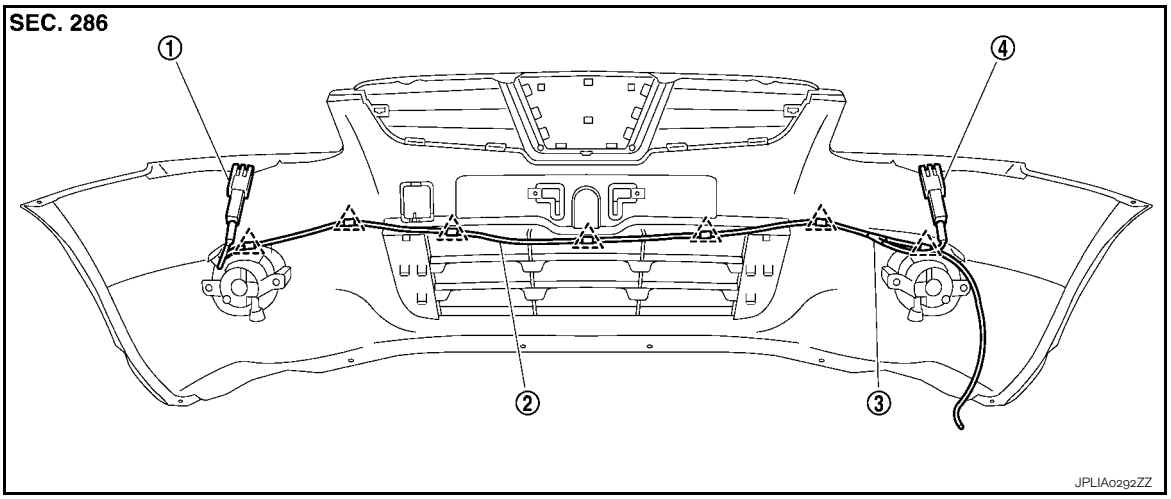
INFOID:0000000000926336



1. Headlamp washer nozzle cover
2. Headlamp washer nozzle assembly
A. Pawl

Hydraulic Layout

INFOID:0000000000926340



1. Headlamp washer nozzle assembly (LH)
2. Headlamp washer tube
3. Headlamp washer tube joint
4. Headlamp washer nozzle assembly (RH)

△ : Clip

Removal and Installation

INFOID:0000000000926337

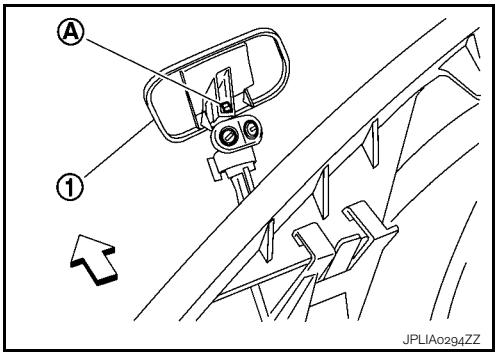
REMOVAL

1. Remove the front bumper fascia. Refer to EXT-11, "Exploded View".
2. Remove headlamp washer tube from headlamp washer nozzle assembly.

cardiagn.com

3. Push pawl (A), and remove headlamp washer nozzle cover (1).

⇦ : Vehicle front



4. Push pawl, and remove headlamp washer nozzle assembly from the front bumper fascia.

INSTALLATION

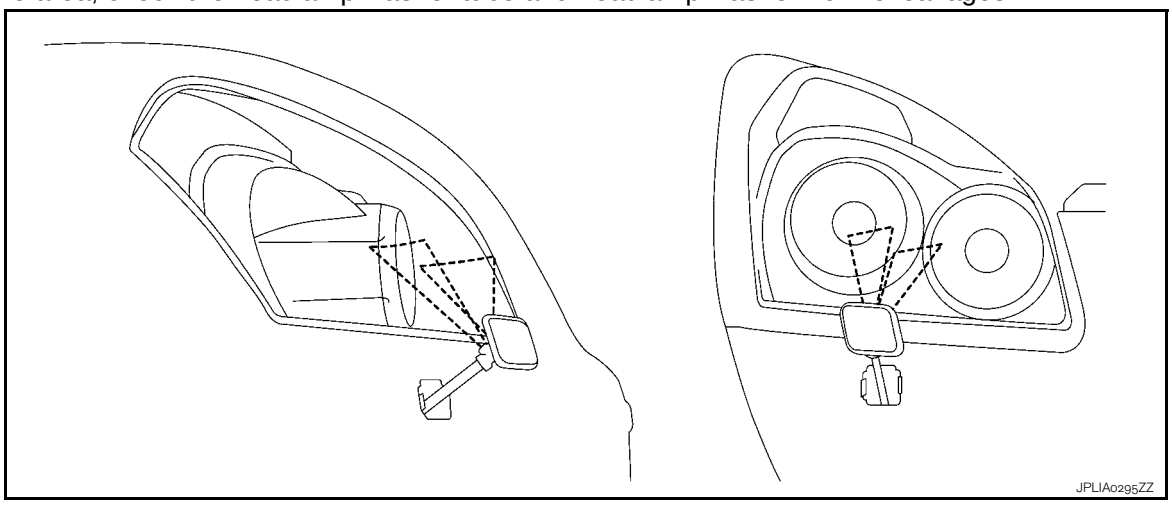
Note the following, and install in the reverse order of removal.

Inspection

INFOID:0000000000906858

HEADLAMP WASHER NOZZLE SPLAY POSITION INSPECTION

Check that the headlamp washer injection is certainly on the headlamp (LO) illuminating area. If the injection is out of the area, check the headlamp washer tube and headlamp washer nozzle leakages.

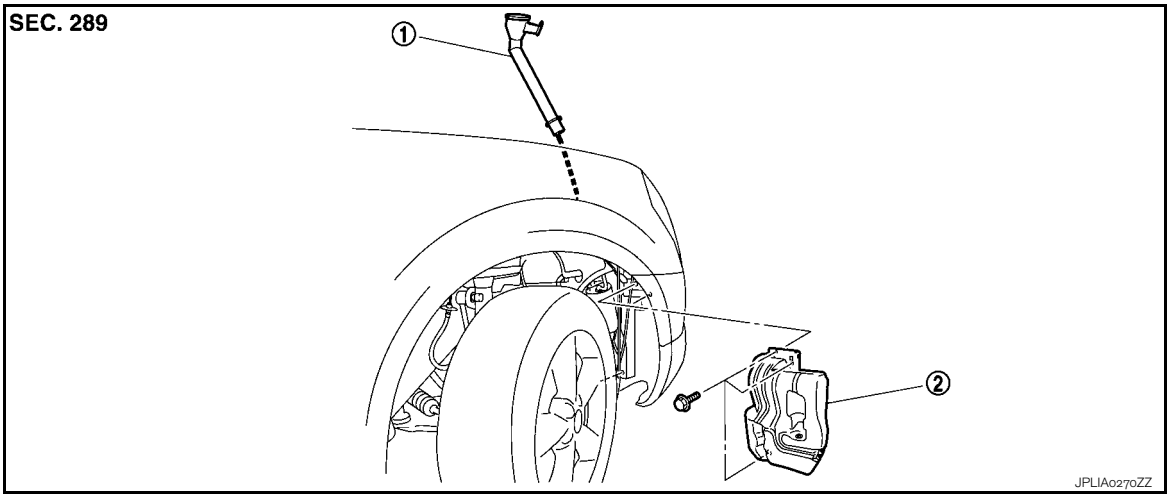


cardiagn.com

WASHER TANK

Exploded View

INFOID:0000000000896788



1. Washer tank inlet
2. Washer tank

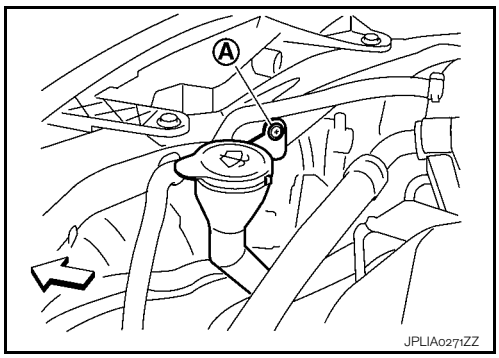
Removal and Installation

INFOID:0000000000896789

REMOVAL

1. Remove the clip (A).

⇦ : Vehicle front



2. Pull out the washer tank inlet from the washer tank.
3. Remove the splash guard. Refer to EXT-21, "Exploded View".
4. Remove the fender protector RH (front). Refer to EXT-21, "Exploded View".
5. Disconnect washer pump connector.
6. Disconnect headlamp washer pump connector.
7. Remove all washer tubes.
8. Remove washer tank mounting bolts.
9. Remove the washer tank from the vehicle.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

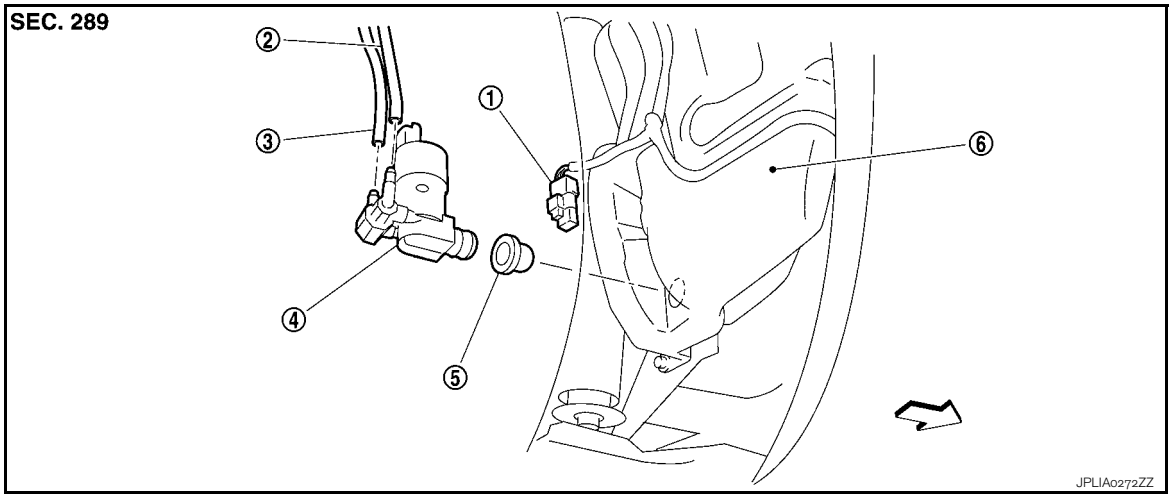
Add water up to the top of the washer tank inlet after installing. Check that there is no leakage.

A B C D E F G H I J K WW M N O P
cardiagn.com

WASHER PUMP

Exploded View

INFOID:0000000000896790



1. Washer pump connector
2. Front washer tube
3. Rear washer tube
4. Washer pump
5. Packing
6. Washer tank

⇦ : Vehicle front

Removal and Installation

INFOID:0000000000896791

REMOVAL

1. Remove the splash guard. Refer to EXT-21, "Exploded View".
2. Remove the fender protector RH (front). Refer to EXT-21, "Exploded View".
3. Disconnect washer pump connector.
4. Remove front washer tube and rear washer tube.
5. Remove washer pump from the washer tank.
6. Remove the packing from the washer tank.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

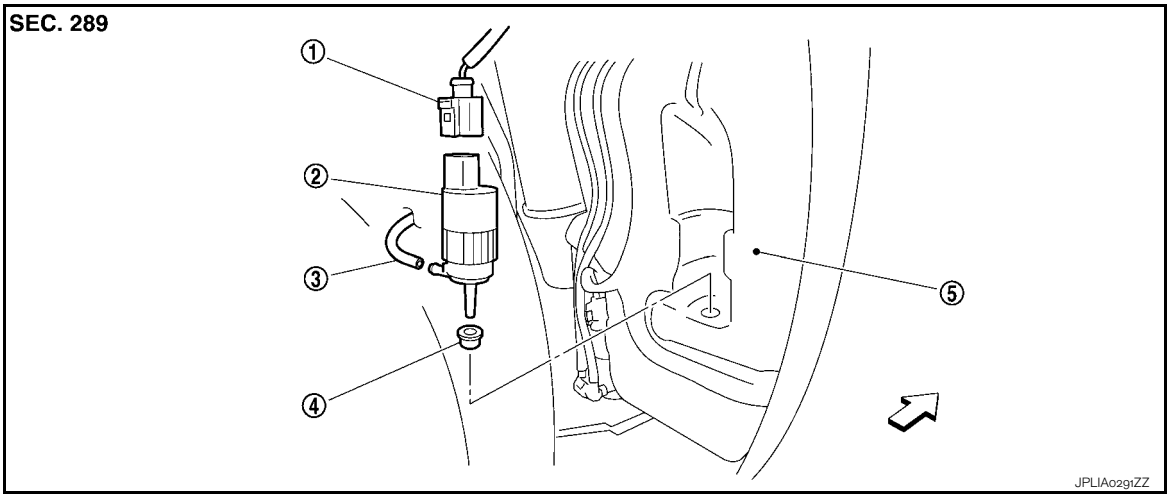
Never twist the packing when installing the washer pump.

cardiagn.com

HEADLAMP WASHER PUMP

Exploded View

INFOID:0000000000936071



1. Headlamp washer pump connector
2. Headlamp washer pump
3. Headlamp washer tube
4. Packing
5. Washer tank

⇦ : Vehicle front

Removal and Installation

INFOID:0000000000936072

REMOVAL

1. Remove the splash guard. Refer to EXT-21, "Exploded View".
2. Remove the fender protector RH (front). Refer to EXT-21, "Exploded View".
3. Disconnect the headlamp washer pump connector.
4. Remove headlamp washer tube.
5. Remove headlamp washer pump from the washer tank.
6. Remove the packing from the washer tank.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

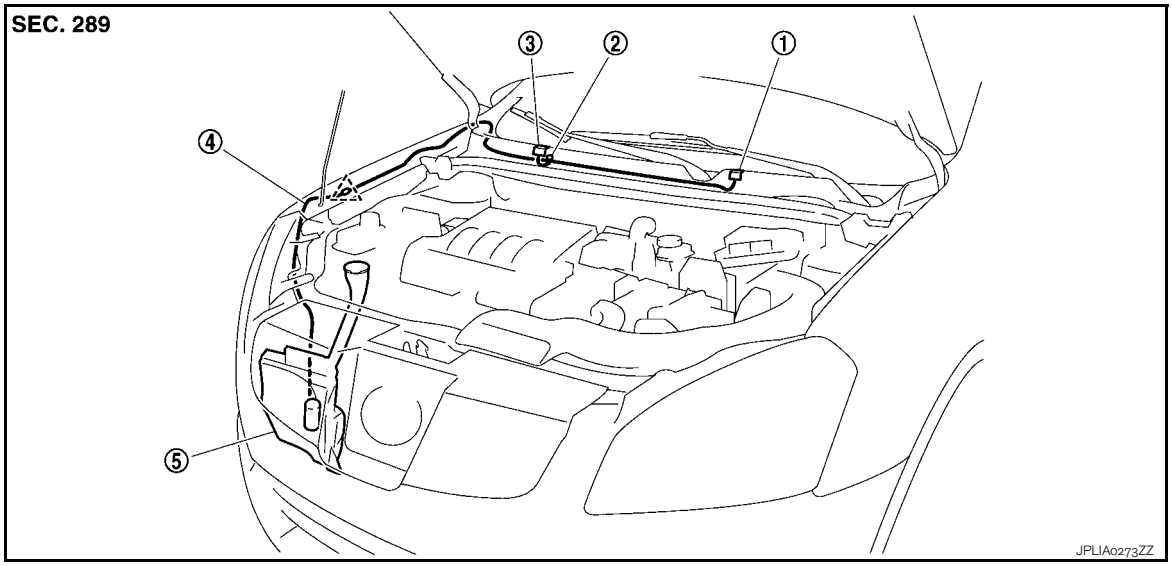
Never twist the packing when installing the washer pump.

cardiagn.com

FRONT WASHER NOZZLE AND TUBE

Hydraulic Layout

INFOID:0000000000896792



1. Front washer nozzle (LH)
2. Check valve
3. Front washer nozzle (RH)
4. Front washer tube
5. Washer tank

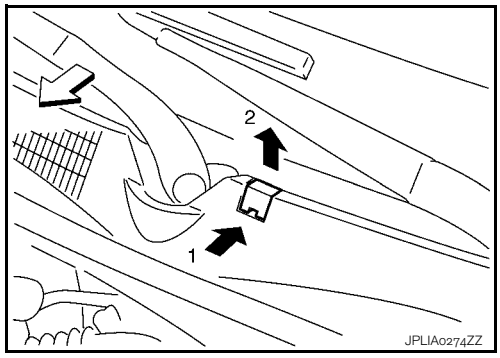
: Clip

Removal and Installation

INFOID:0000000000896793

REMOVAL

1. Open the hood.
2. Remove front washer nozzle in numerical order shown in the figure.
3. Remove the front washer tube from the front washer nozzle.



⇦ : Vehicle front

INSTALLATION

Install in the reverse order of removal.

CAUTION:

The spray positions differ, check that left and right nozzles are installed correctly.

Inspection and Adjustment

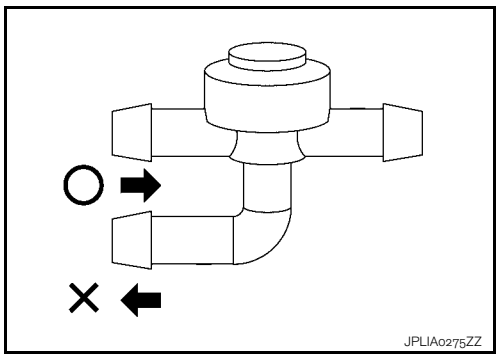
INFOID:0000000000926151

INSPECTION

Washer Nozzle Inspection

cardiagn.com

Check that air can pass through the hose by blowing forward (toward the nozzle), and check that air cannot pass through by sucking.

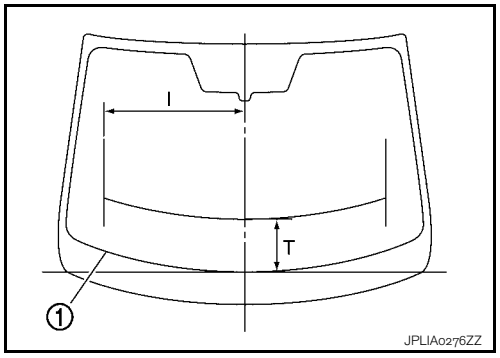


ADJUSTMENT

Washer Nozzle Spray Position Adjustment

Adjust spray positions to match the positions shown in the figure.

1 : Black printed frame line



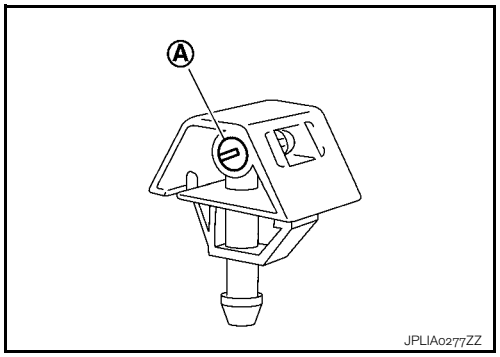
Unit: mm (in)

T (Standard)	I (Width)
200 (7.87)	522 (20.55)

NOTE:
Check the width is within the limit as it cannot be adjusted.

Turn an adjustment screw (A) to adjust a spray position.

NOTE:
If wax or dust gets into the nozzle, remove wax or dust with a needle or small pin.

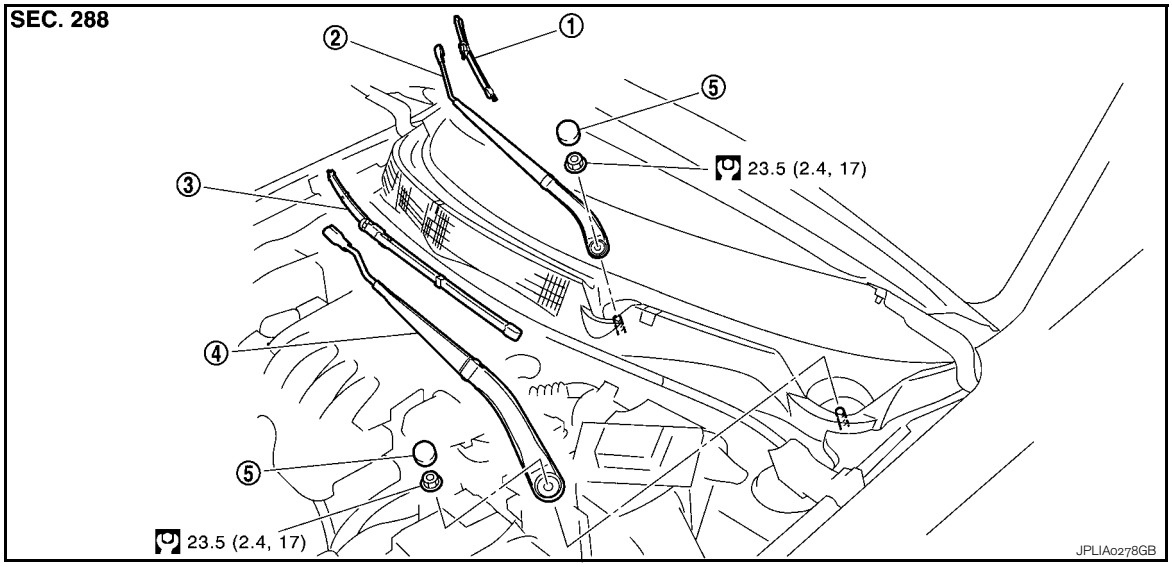


mycardiagn.com

FRONT WIPER ARM

Exploded View

INFOID:0000000000924466



1. Front wiper blade (RH)
2. Front wiper arm (RH)
3. Front wiper blade (LH)
4. Front wiper arm (LH)
5. Front wiper arm cap

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

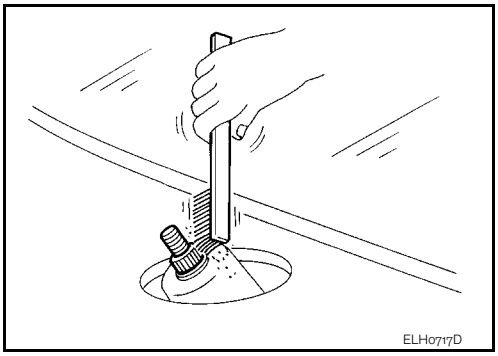
INFOID:0000000000924467

REMOVAL

1. Operate the front wiper to move it to the auto stop position.
2. Open the hood.
3. Remove front wiper arm caps.
4. Remove the front wiper arm mounting nuts.
5. Raise front wiper arm, and remove front wiper arm from the vehicle.

INSTALLATION

1. Clean wiper arm mount as shown in the figure to prevent nuts from being loosened.



2. Operate the front wiper motor to move the front wiper to the auto stop position.
3. Adjust the front wiper blade position. Refer to WW-105, "Adjustment".
4. Install the front wiper arm by tightening the mounting nut.
5. Inject the washer fluid.
6. Operate the front wiper to move it to the auto stop position.
7. Check that the front wiper blades stop at the specified position.
8. Install wiper arm cap.

cardiagn.com

Adjustment

INFOID:0000000000924468

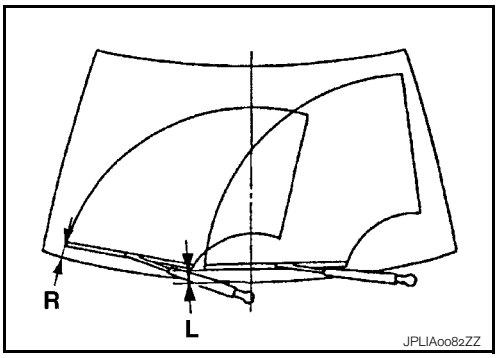
WIPER BLADE POSITION ADJUSTMENT

Clearance between the end of cowl top cover and the top of front wiper blade center

Standard clearance

R : 57.5 ± 10.3 mm (2.26 ± 0.406 in)

L : 56.1 ± 10.3 mm (2.21 ± 0.406 in)



carDiagn.com

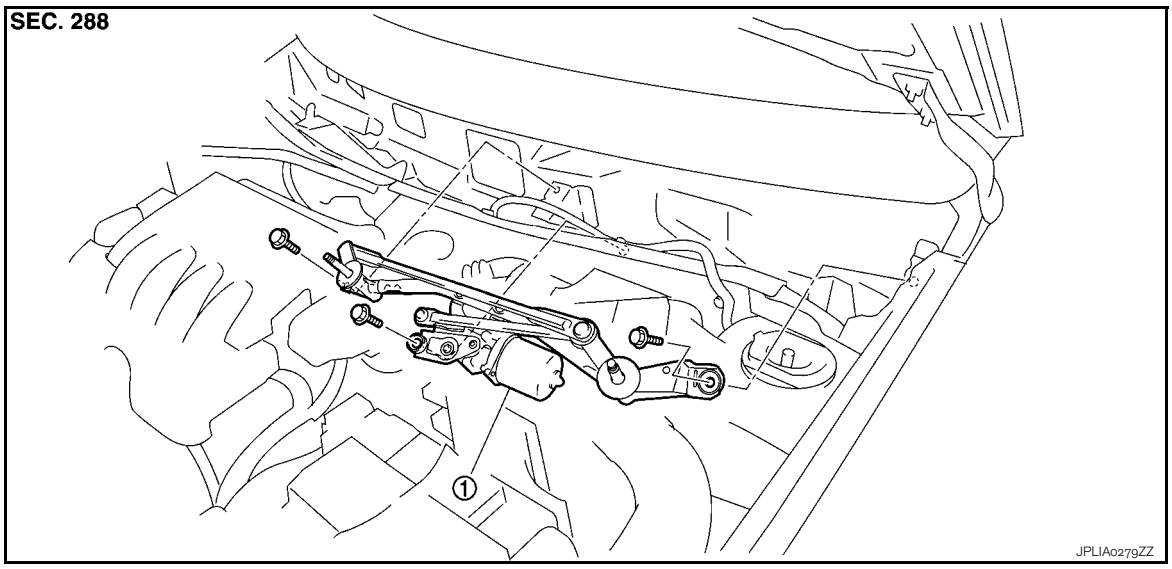
FRONT WIPER DRIVE ASSEMBLY

LHD MODELS

LHD MODELS : Exploded View

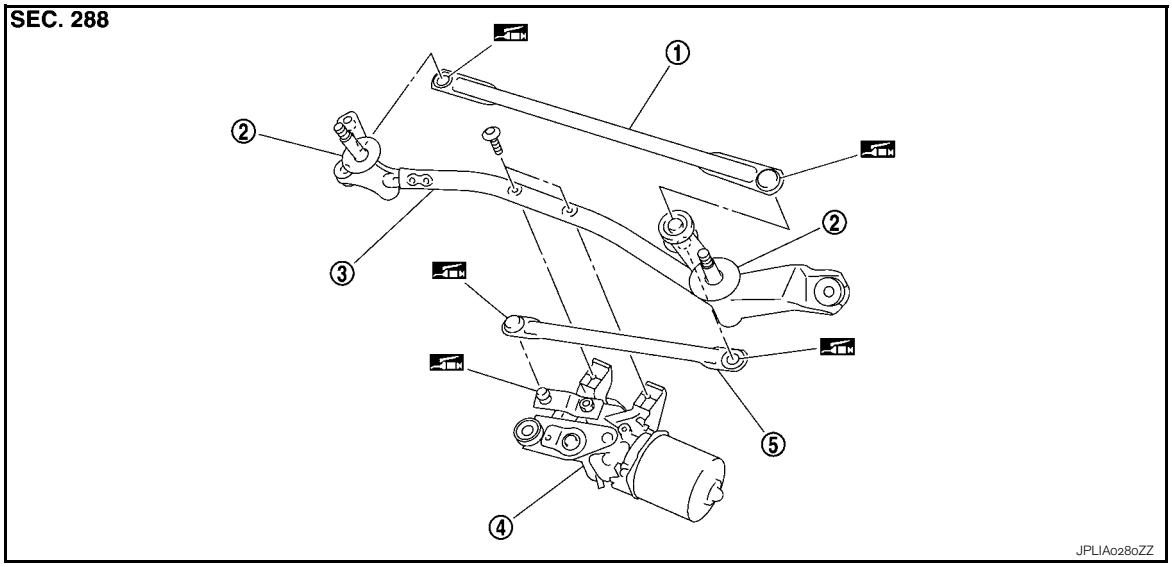
INFOID:0000000000924469

REMOVAL VIEW



1. Front wiper drive assembly

DISASSEMBLY VIEW



1. Front wiper linkage 1
2. Shaft seal
3. Front wiper frame
4. Front wiper motor
5. Front wiper linkage 2

: Multi–purpose grease or an equivalent.

LHD MODELS : Removal and Installation

INFOID:0000000000924470

REMOVAL

1. Remove front wiper arm. Refer to WW-104, "Exploded View".
2. Remove cowl top cover. Refer to EXT-19, "Exploded View".

cardiagn.com

3. Remove bolts from the front wiper drive assembly.
4. Disconnect the front wiper motor connector.
5. Remove front wiper drive assembly from the vehicle.

INSTALLATION

1. Install the front wiper drive assembly to the vehicle.
2. Connect the front wiper motor connector.
3. Operate the front wiper to move it to the auto stop position.
4. Install the cowl top cover. Refer to EXT-19, "Exploded View".
5. Install front wiper arms. Refer to WW-104, "Exploded View".

LHD MODELS : Disassembly and Assembly

INFOID:0000000000924471

DISASSEMBLY

1. Remove the front wiper linkage 1 and 2 from the front wiper drive assembly.
   CAUTION:
   Do not bend the linkage or damage the plastic part of the ball joint when removing the front wiper linkage.
2. Remove the front wiper motor mounting screws, and then remove the front wiper motor from the front wiper frame.

ASSEMBLY

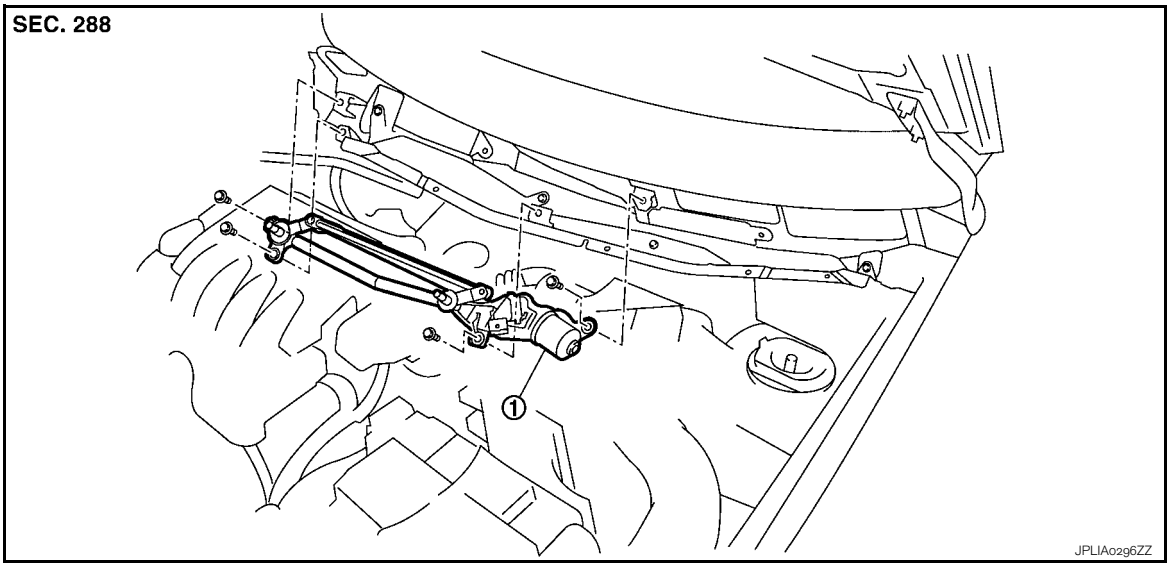
1. Connect the front wiper motor connector.
2. Operate the front wiper to move it to the auto stop position.
3. Disconnect the front wiper motor connector.
4. Install front wiper motor to front wiper frame.
5. Install the front wiper linkage 2 to the front wiper motor and the front wiper frame.
6. Install the front wiper linkage 1 to the front wiper frame.
   CAUTION:
   - **Do not drop front wiper motor or cause it to come into contact with other parts.**
   - **Be careful for the grease condition at the front wiper motor and front wiper linkage joint (retainer). Apply multi–purpose grease or an equivalent if necessary.**

RHD MODELS

RHD MODELS : Exploded View

INFOID:0000000000949930

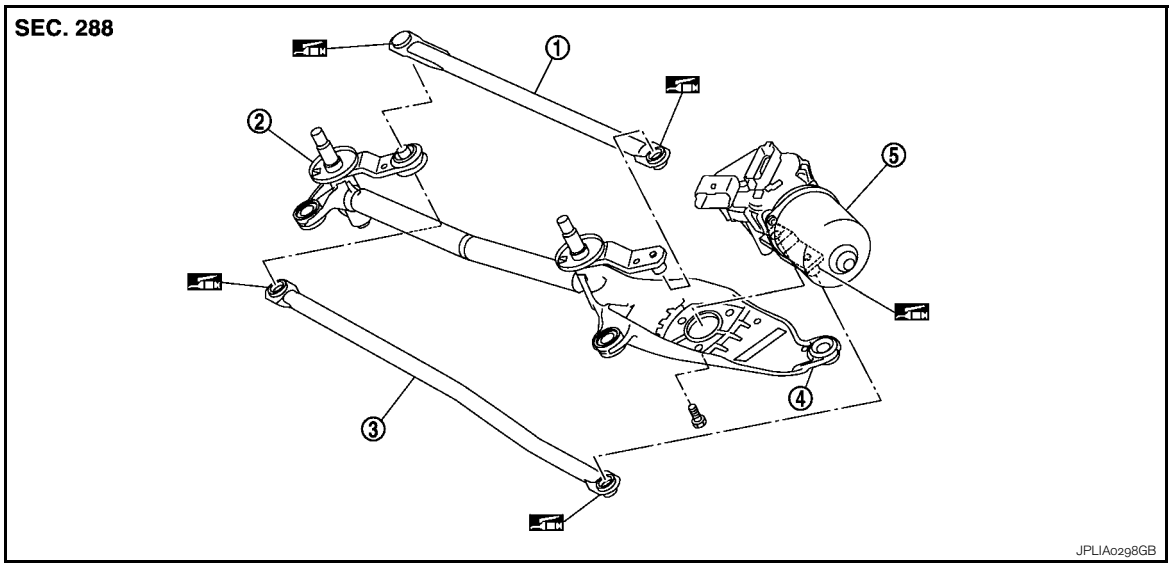
REMOVAL VIEW



carDiagn.com

1. Front wiper drive assembly

DISASSEMBLY VIEW



1. Front wiper linkage 1
2. Shaft seal
3. Front wiper linkage 2
4. Front wiper frame
5. Front wiper motor

: Multi–purpose grease or an equivalent.

RHD MODELS : Removal and Installation

INFOID:0000000000949931

REMOVAL

1. Remove front wiper arm. Refer to WW-104, "Exploded View".
2. Remove cowl top cover. Refer to EXT-19, "Exploded View".
3. Remove bolts from the front wiper drive assembly.
4. Disconnect the front wiper motor connector.
5. Remove front wiper drive assembly from the vehicle.

INSTALLATION

1. Install the front wiper drive assembly to the vehicle.
2. Connect the front wiper motor connector.
3. Operate the front wiper to move it to the auto stop position.
4. Install the cowl top cover. Refer to EXT-19, "Exploded View".
5. Install front wiper arms. Refer to WW-104, "Exploded View".

RHD MODELS : Disassembly and Assembly

INFOID:0000000000949932

DISASSEMBLY

1. Remove the front wiper linkage 1 and 2 from the front wiper drive assembly.
   CAUTION:
   Do not bend the linkage or damage the plastic part of the ball joint when removing the front wiper linkage.
2. Remove the front wiper motor mounting screws, and then remove the front wiper motor from the front wiper frame.

ASSEMBLY

1. Connect the front wiper motor connector.
2. Operate the front wiper to move it to the auto stop position.

cardiagn.com

3. Disconnect the front wiper motor connector.
4. Install front wiper motor to front wiper frame.
5. Install the front wiper linkage 2 to the front wiper motor and the front wiper frame.
6. Install the front wiper linkage 1 to the front wiper frame.

CAUTION:

- **Do not drop front wiper motor or cause it to come into contact with other parts.**
- **Be careful for the grease condition at the wiper motor and wiper linkage joint (retainer). Apply multi–purpose grease or an equivalent if necessary.**

cardiagn.com

RAIN SENSOR

Exploded View

INFOID:0000000000906861

Refer to EXL-175, "Exploded View".

Removal and Installation

INFOID:0000000000906863

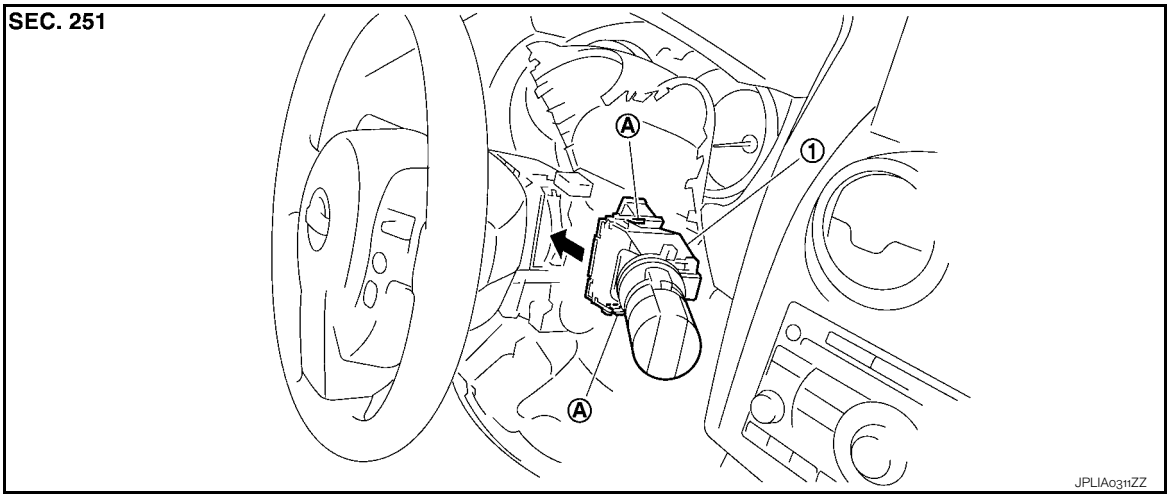
Refer to EXL-175, "Removal and Installation".

cardiagn.com

WIPER AND WASHER SWITCH

Exploded View

INFOID:0000000001083113



1. Wiper & washer switch
A. Pawl

Removal and Installation

INFOID:0000000001083114

REMOVAL

1. Remove steering column cover. Refer to IP-11, "Exploded View".
2. While pressing pawls, pull the wiper & washer switch. And disconnect from the switch base.

INSTALLATION

Installation is the reverse order of removal.

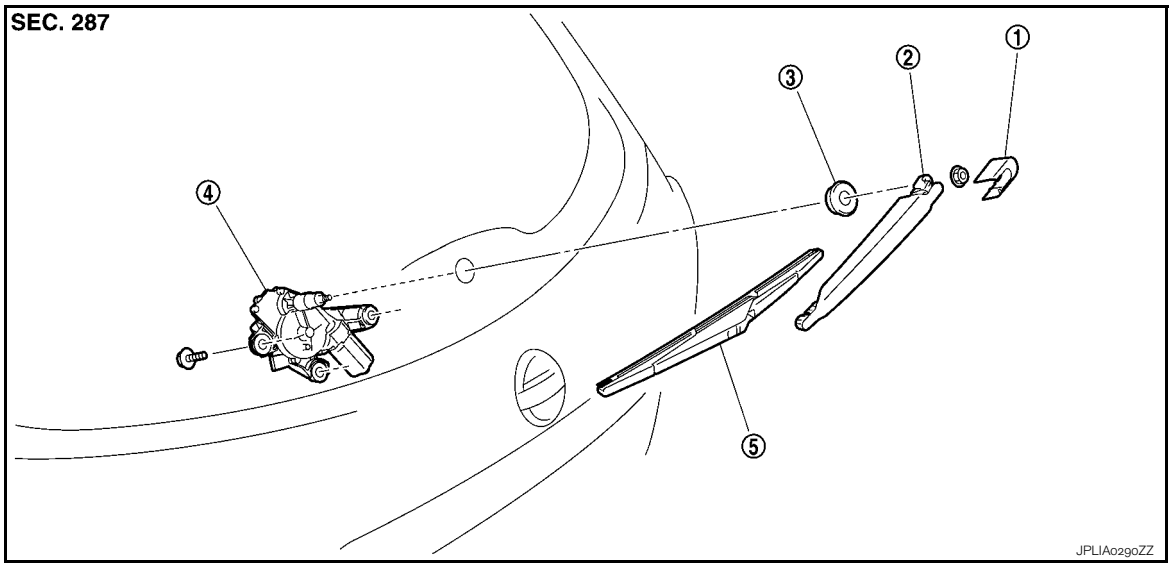
cardiagn.com

REAR WIPER MOTOR

Exploded View

INFOID:0000000000926247

REMOVAL VIEW



1. Rear wiper arm cover
2. Rear wiper arm
3. Pivot seal
4. Rear wiper motor
5. Rear wiper blade

Removal and Installation

INFOID:0000000000926248

REMOVAL

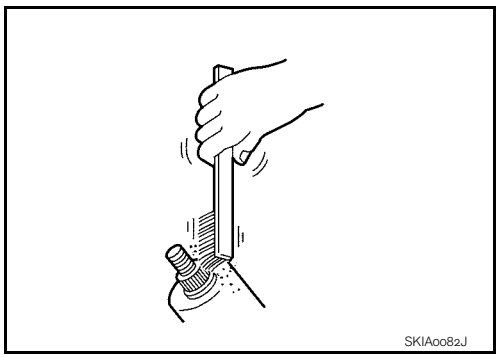
1. Operate the rear wiper to the auto stop position.
2. Remove rear wiper arm cover.
3. Remove the rear wiper arm mounting nut.
4. Raise rear wiper arm, and remove wiper arm from the vehicle.
5. Remove back door trim finisher lower. Refer to INT-26, "Exploded View".
6. Disconnect the rear wiper motor connector.
7. Remove bolts.
8. Remove rear wiper motor from the vehicle.
9. Remove pivot seal.

INSTALLATION

1. Install the pivot seal.
2. Install the rear wiper motor to the vehicle.
3. Connect the rear wiper motor connector.
4. Operate the rear wiper to the auto stop position.
5. Install the back door trim finisher lower. Refer to INT-26, "Exploded View".

cardiagn.com

6. Clean wiper arm mount as shown in the figure to prevent nut from being loosened.



7. Operate the rear wiper motor to the auto stop position.
8. Adjust the rear wiper blade position. Refer to WW-113, "Adjustment".
9. Install the rear wiper arm by tightening the mounting nut.
10. Inject the washer fluid.
11. Operate the rear wiper to the auto stop position.
12. Check that the rear wiper blades stop at the specified position.
13. Install rear wiper arm cover.

Adjustment

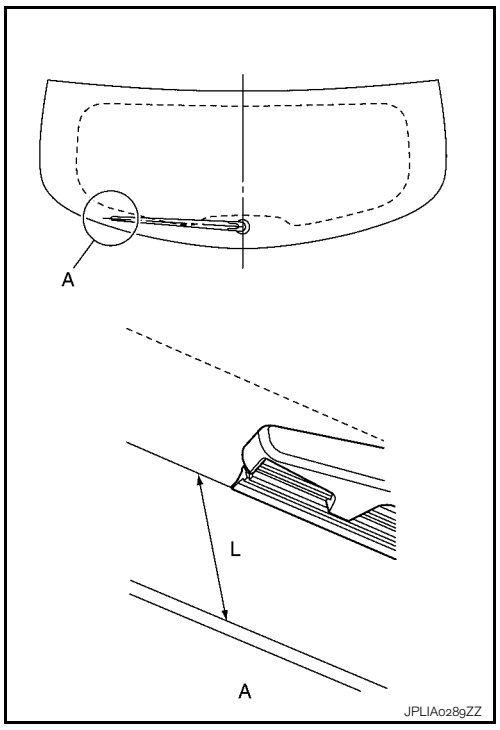
INFOID:0000000000926251

REAR WIPER BLADE POSITION ADJUSTMENT

Clearance between the end of back door glass and the top of wiper blade center.

Standard clearance

L : 26.5 ± 10.3 mm (1.04 ± 0.406 in)

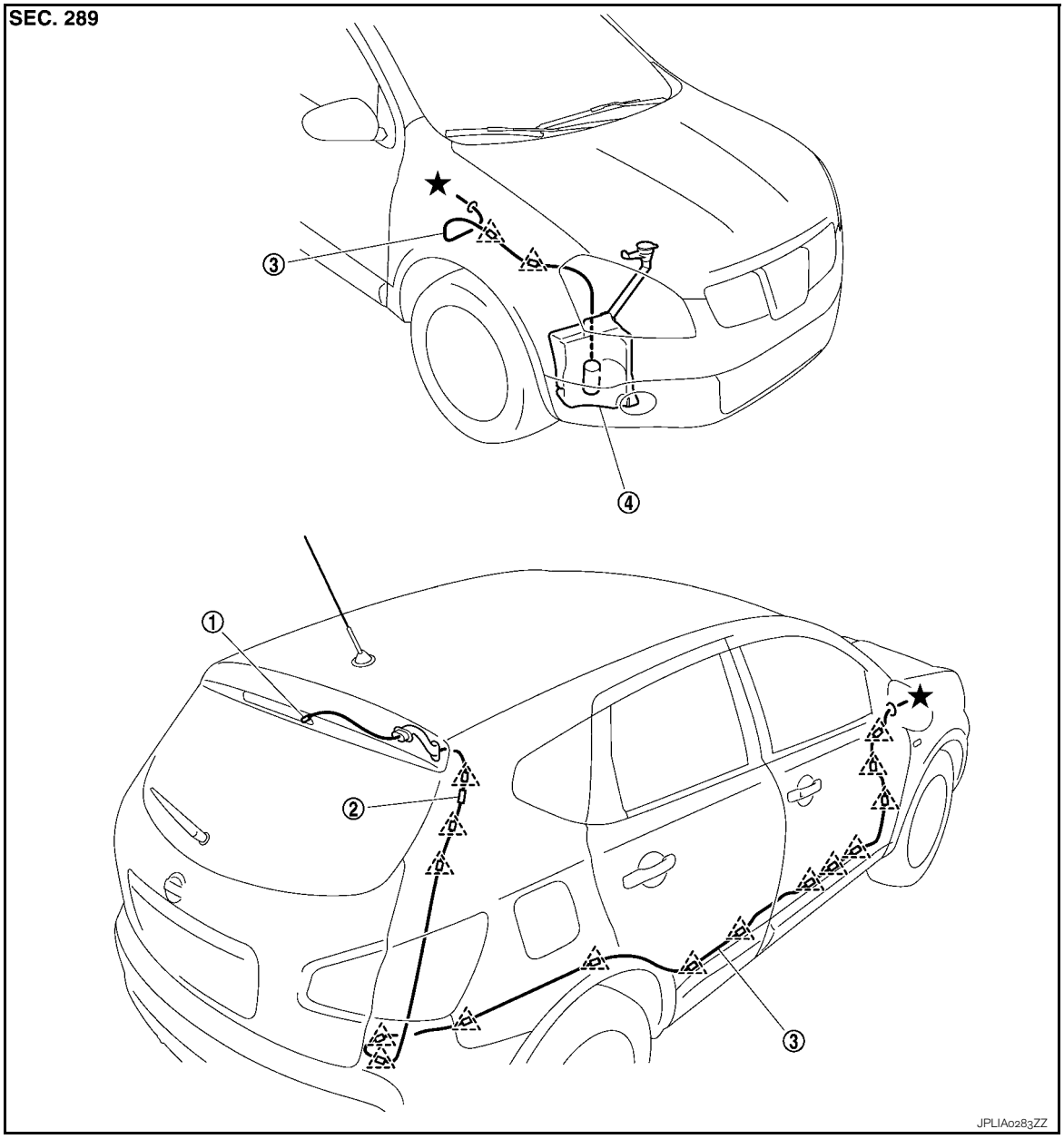


cardiagn.com

REAR WASHER NOZZLE AND TUBE

Hydraulic Layout

INFOID:0000000000926252



1. Rear washer nozzle
2. Check valve
3. Rear washer tube
4. Washer tank

: Clip

Removal and Installation

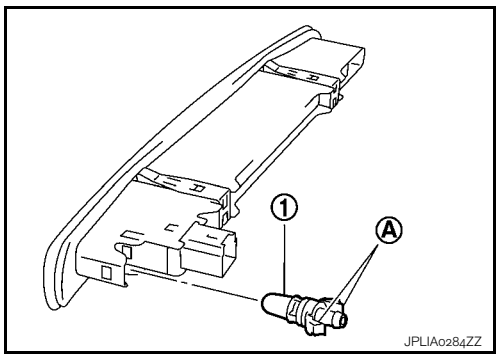
INFOID:0000000000926253

REMOVAL

1. Remove the high-mounted stop lamp. Refer to EXL-183, "Exploded View".
2. Remove the rear washer tube from the rear washer nozzle.

cardiagn.com

3. Push pawl (A), and remove the rear washer nozzle (1) from the high-mounted stop lamp.



INSTALLATION

Install in the reverse order of removal.

Inspection

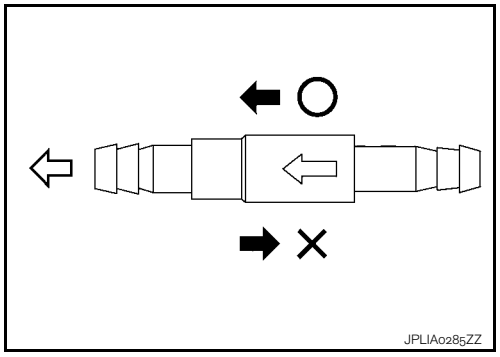
INFOID:0000000000936394

INSPECTION

Washer Nozzle Inspection

Check that air can pass through the hose by blowing forward (toward the nozzle), and check that air cannot pass through by sucking.

⇦ : To rear washer nozzle



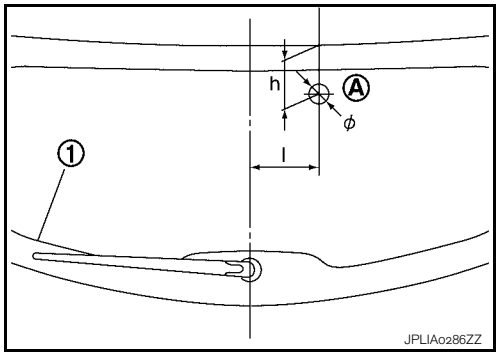
Washer Nozzle Spray Position

Check spray positions to match the positions shown in the figure.

1 : Black printed frame line

Unit: mm (in)

Spray position	h (Height)	l (width)	ϕ (Spray position area)
A	43 (1.69)	93.6 (3.69)	30 (1.18)



NOTE:

If wax or dust gets into the nozzle, remove wax or dust with a needle or small pin.